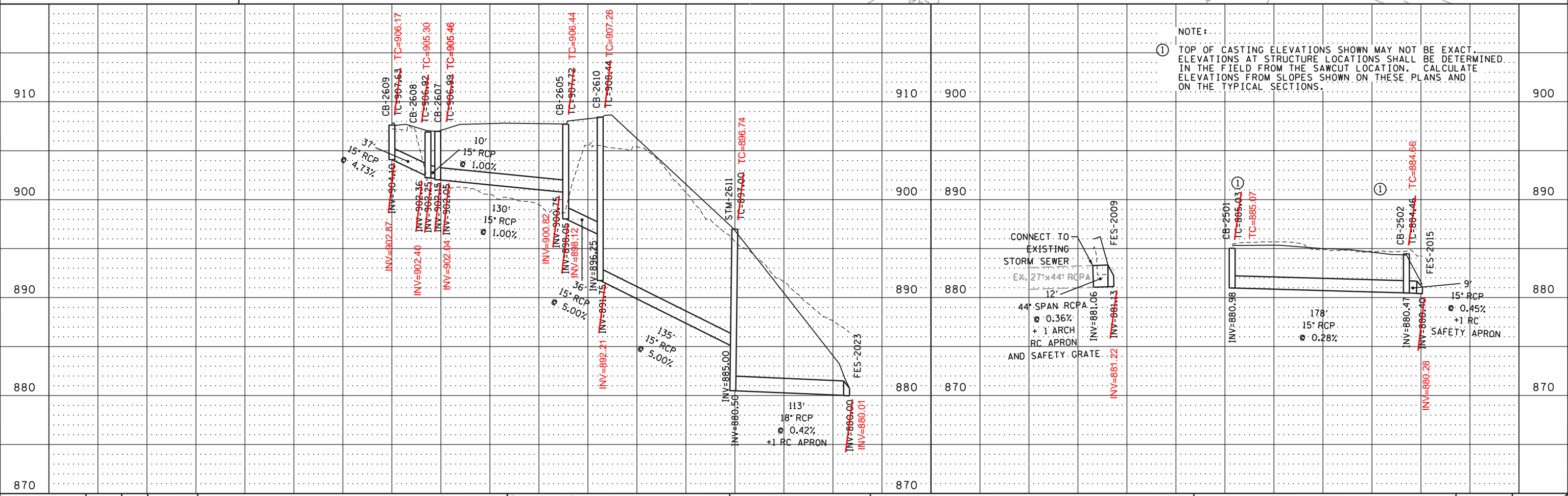


ASBUILT PLAN
CONFORMING TO
CONST. RECORDS

DONE BY: - KH
 DATE: - 4/24/19

- LEGEND**
- PROPOSED STORM SEWER
 - SUPERELEVATION TRANSITION (FT/FT)
 - EXISTING WETLAND BOUNDARY (ENVIRONMENTALLY SENSITIVE AREA)
 - DRAINAGE FLOW DIRECTION
 - 4" PERF PVC PIPE DRAIN
 - PRECAST CONCRETE HEADWALL FOR SUBSURFACE DRAINS
 - STORM STRUCTURE NUMBER
 - RANDOM RIPRAP WITH GEOTEXTILE FILTER
 - SAFL BAFFLE STRUCTURE. SEE MISCELLANEOUS DETAIL PLAN SHEET MD2.
- NOTE:
 LEGEND PERTAINS TO SUPERELEVATION & DRAINAGE PLAN SHEETS DR1 - DR7.

CITY OF
ARDEN HILLS



NOTE:
 TOP OF CASTING ELEVATIONS SHOWN MAY NOT BE EXACT. ELEVATIONS AT STRUCTURE LOCATIONS SHALL BE DETERMINED IN THE FIELD FROM THE SAWCUT LOCATION. CALCULATE ELEVATIONS FROM SLOPES SHOWN ON THESE PLANS AND ON THE TYPICAL SECTIONS.

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: REP				
CHECKED BY: REP				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: RACHEL E. PICHELMANN Lic. No. 51315
 Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SUPERELEVATION & DRAINAGE
PLAN AND PROFILE
 NB TH 35W INP STA. 341+57 - 347+00
 NB TH 10 STA. 421+41 - 430+00

FILE NO. **244**
 RAMSEI29594
 DR1
 OF DR9
367

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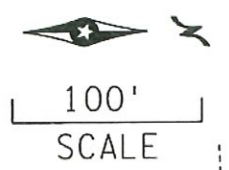
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A

RECORD DRAWING
TMS FIBER RELOCATE
4/5/18

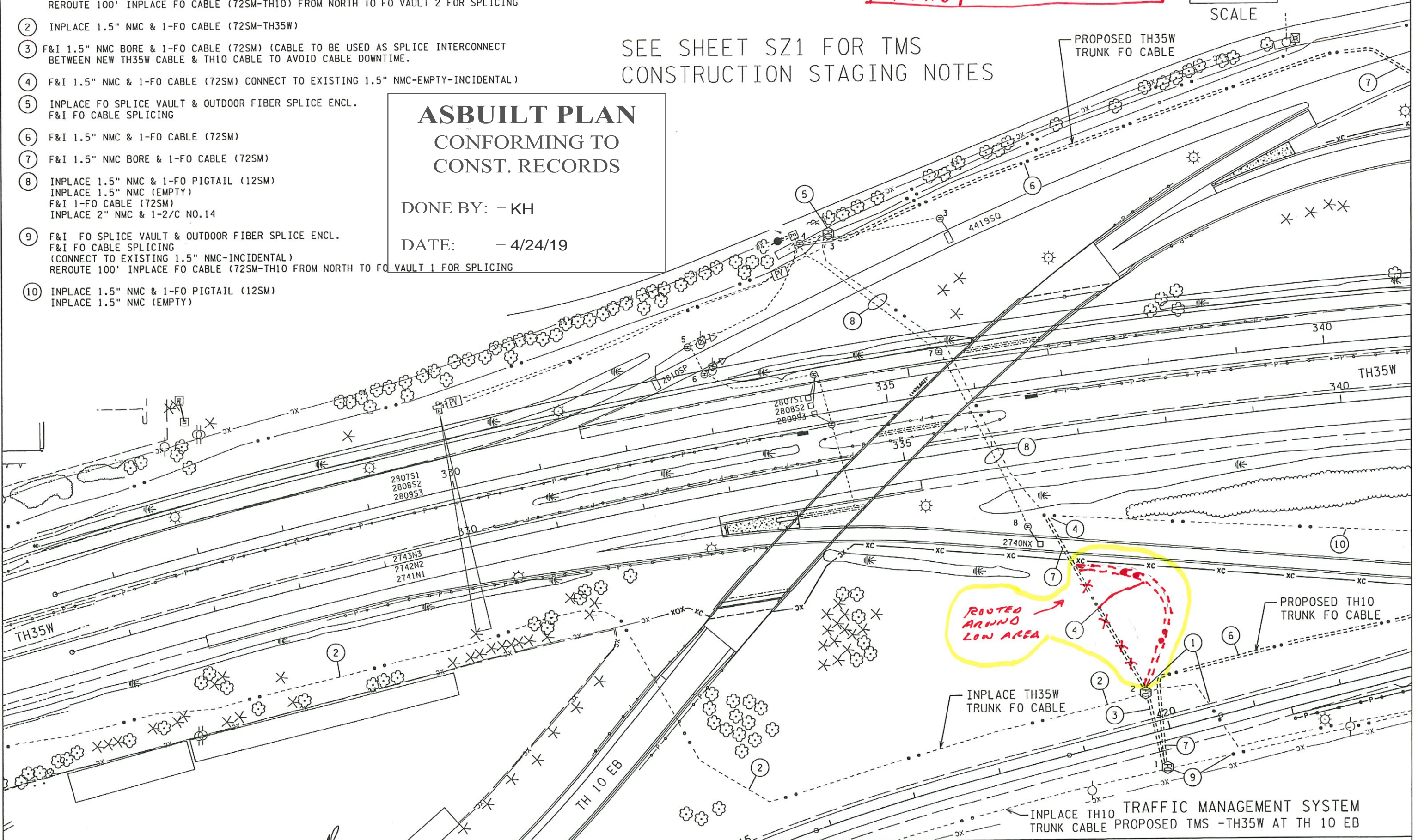


- ① F&I SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.
F&I FO CABLE SPLICING
(CONNECT TO EXISTING 1.5" NMC-INCIDENTAL)
REROUTE 100' INPLACE FO CABLE (72SM-TH10) FROM NORTH TO FO VAULT 2 FOR SPLICING
- ② INPLACE 1.5" NMC & 1-FO CABLE (72SM-TH35W)
- ③ F&I 1.5" NMC BORE & 1-FO CABLE (72SM) (CABLE TO BE USED AS SPLICE INTERCONNECT
BETWEEN NEW TH35W CABLE & TH10 CABLE TO AVOID CABLE DOWNTIME.
- ④ F&I 1.5" NMC & 1-FO CABLE (72SM) CONNECT TO EXISTING 1.5" NMC-EMPTY-INCIDENTAL)
- ⑤ INPLACE FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.
F&I FO CABLE SPLICING
- ⑥ F&I 1.5" NMC & 1-FO CABLE (72SM)
- ⑦ F&I 1.5" NMC BORE & 1-FO CABLE (72SM)
- ⑧ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)
INPLACE 1.5" NMC (EMPTY)
F&I 1-FO CABLE (72SM)
INPLACE 2" NMC & 1-2/C NO.14
- ⑨ F&I FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.
F&I FO CABLE SPLICING
(CONNECT TO EXISTING 1.5" NMC-INCIDENTAL)
REROUTE 100' INPLACE FO CABLE (72SM-TH10 FROM NORTH TO FO VAULT 1 FOR SPLICING
- ⑩ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)
INPLACE 1.5" NMC (EMPTY)

SEE SHEET SZ1 FOR TMS
CONSTRUCTION STAGING NOTES

ASBUILT PLAN
CONFORMING TO
CONST. RECORDS

DONE BY: - KH
DATE: - 4/24/19



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ASBUILT PLAN CONFORMING TO CONST. RECORDS

DONE BY: - KH

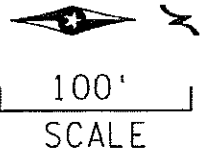
DATE: - 4/24/19

- ① F&I 1.5" NMC & 1-FO CABLE (72SM)
- ② F&I 1.5" NMC BORE & 1-FO CABLE (72SM)
NOTE:BORE BENEATH INPLACE POND SUFFICIENT
DISTANCE FROM FUTURE EDGE OF RAMP
- ③ INPLACE LOOP DETECTOR
F&I LOOP SPLICE
- ④ INPLACE 3" RSC
F&I 1-2/C NO.14
- ⑤ F&I 3" NMC & 1-2/C NO.14
(CONNECT TO EXISTING 3" RSC-INCIDENTAL)
- ⑥ F&I LOOP DETECTOR DESIGN PREFORMED
- ⑦ F&I 2" NMC & 2-2/C NO.14

- ⑧ INPLACE 3" NMC (EMPTY)
INPLACE 2" NMC
F&I 4-2/C NO.14
- ⑨ INPLACE 334Z-14 CAB (35W-28.50)
- ⑩ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)
INPLACE 1.5" NMC (EMPTY)
- ⑪ ABANDONED FO CABLE & 1-12/PR NO.19
- ⑫ INPLACE POWERPOLE-TMS SOURCE OF POWER-TO BE RELOCATED
REMOVE INPLACE SERVICE INSTALLATION
VERIFY NEW POLE LOCATION WITH XCEL ENERGY
F&I SERVICE INSTALLATION TYPE A-CONNECT TO INPLACE 2" NMC-INCIDENTAL
- ⑬ ABANDON INPLACE 1.5" NMC & REMOVE INPLACE 1-FO CABLE (72SM)
(SEE PREVIOUS SHEET FOR SOUTHERLY REMOVAL LIMITS)
- ⑭ INPLACE 2" NMC
F&I 3-1/C NO.6

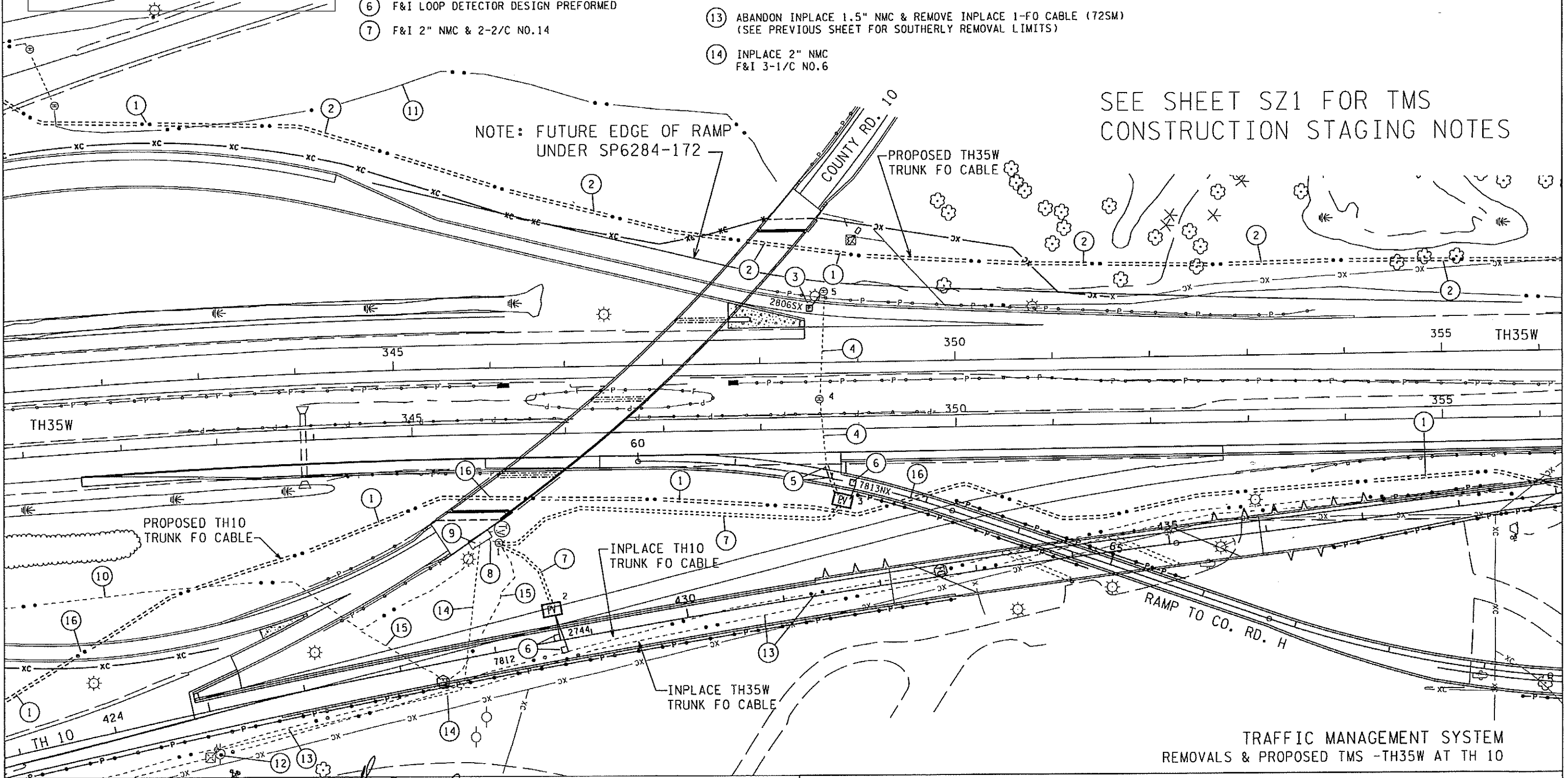
⑮ ABANDONED CONDUITS-SEE
REMOVAL PLANS

⑯ F&I 1.5" NMC BORE & 1-FO CABLE (72SM)



NOTE: FUTURE EDGE OF RAMP
UNDER SP6284-172

SEE SHEET SZ1 FOR TMS
CONSTRUCTION STAGING NOTES



TRAFFIC MANAGEMENT SYSTEM
REMOVALS & PROPOSED TMS -TH35W AT TH 10

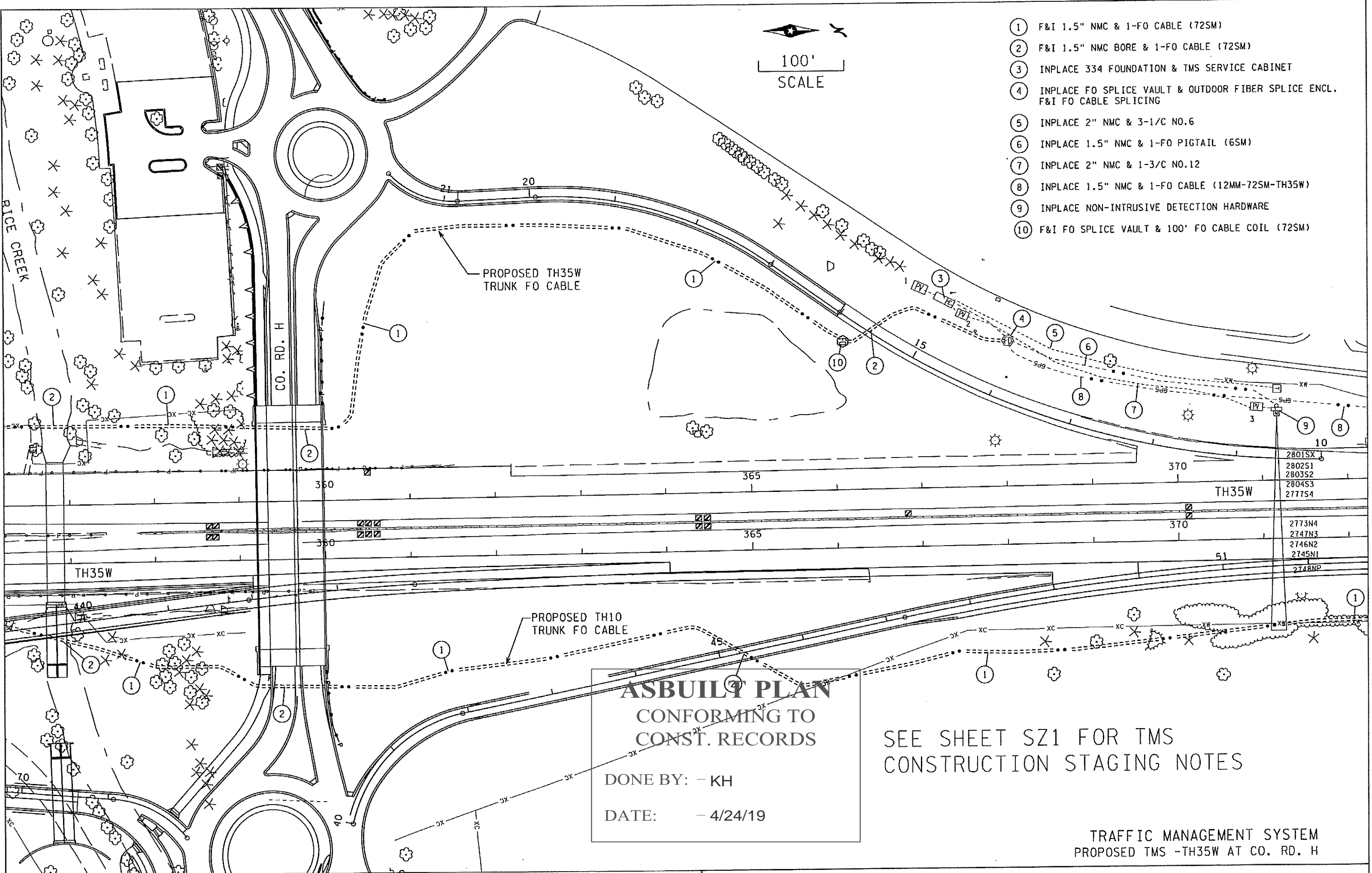
REV. NO.	DATE: / /
REV. NO.	DATE: / /

CERTIFIED BY *[Signature]*
LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ6 OF SZ33 SHEETS

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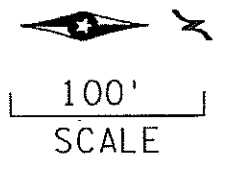
- ① F&I 1.5" NMC & 1-FO CABLE (72SM)
- ② F&I 1.5" NMC BORE & 1-FO CABLE (72SM)
- ③ INPLACE 334 FOUNDATION & TMS SERVICE CABINET
- ④ INPLACE FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL. F&I FO CABLE SPLICING
- ⑤ INPLACE 2" NMC & 3-1/C NO.6
- ⑥ INPLACE 1.5" NMC & 1-FO PIGTAIL (6SM)
- ⑦ INPLACE 2" NMC & 1-3/C NO.12
- ⑧ INPLACE 1.5" NMC & 1-FO CABLE (12MM-72SM-TH35W)
- ⑨ INPLACE NON-INTRUSIVE DETECTION HARDWARE
- ⑩ F&I FO SPLICE VAULT & 100' FO CABLE COIL (72SM)

ASBUILT PLAN
 CONFORMING TO
 CONST. RECORDS

DONE BY: - KH
 DATE: - 4/24/19

SEE SHEET SZ1 FOR TMS
 CONSTRUCTION STAGING NOTES

TRAFFIC MANAGEMENT SYSTEM
 PROPOSED TMS -TH35W AT CO. RD. H



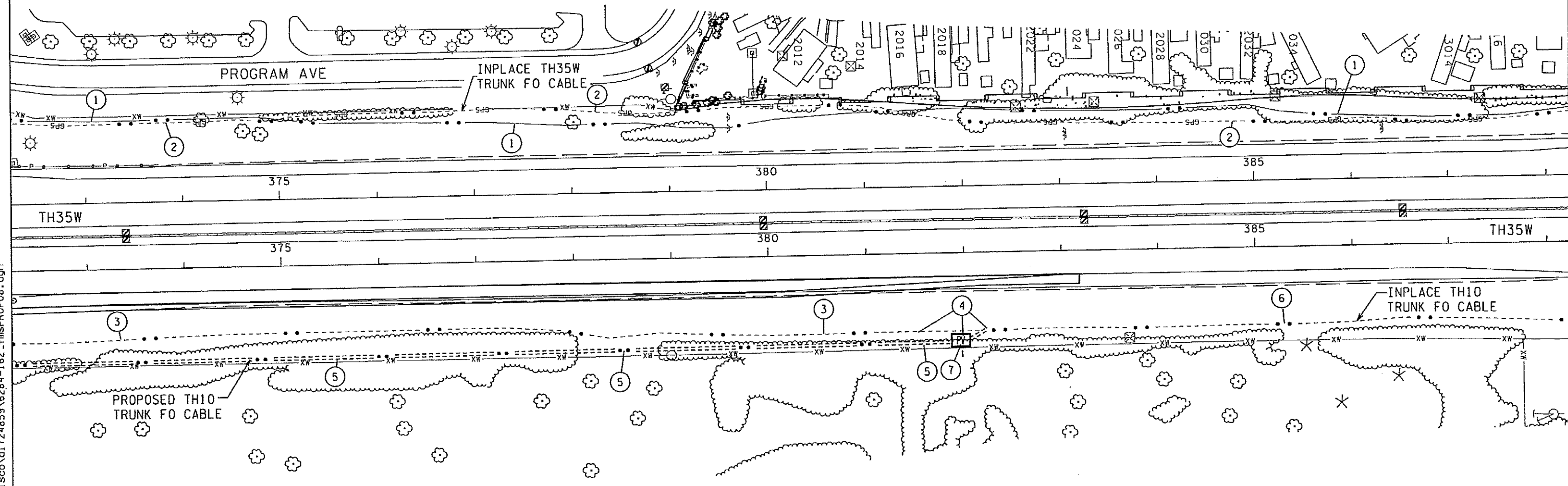
ASBUILT PLAN
 CONFORMING TO
 CONST. RECORDS

DONE BY: - KH

DATE: - 4/24/19

- ① ABANDONED FO CABLE (12MM-24SM) & 1-12/PR NO.19
- ② INPLACE 1.5" NMC & 1-FO CABLE (12MM-72SM-TH35W)
- ③ ABANDON 1.5" NMC & REMOVE 1-FO CABLE (72SM)
 (SEE NOTE 4)
- ④ REROUTE INPLACE 1.5" NMC & 1-FO CABLE (72SM) TO
 PROPOSED FO SPLICE VAULT LOCATION.
 NOTE: PULL 100' OF INPLACE FO CABLE (72SM) FROM SOUTH
 INTO PROPOSED PULL VAULT. (SEE NOTE 3)
- ⑤ F&I 1.5" NMC & 1-FO CABLE (72SM)
 NOTE: PLACE CABLE ADJACENT TO FENCE TO ACCOMODATE FUTURE TH35W WIDENING
- ⑥ INPLACE 1.5" NMC & 1-FO CABLE (72SM)
- ⑦ F&I FO PULL VAULT & OUTDOOR FIBER SPLICE ENCL.
 F&I FO CABLE SPLICING

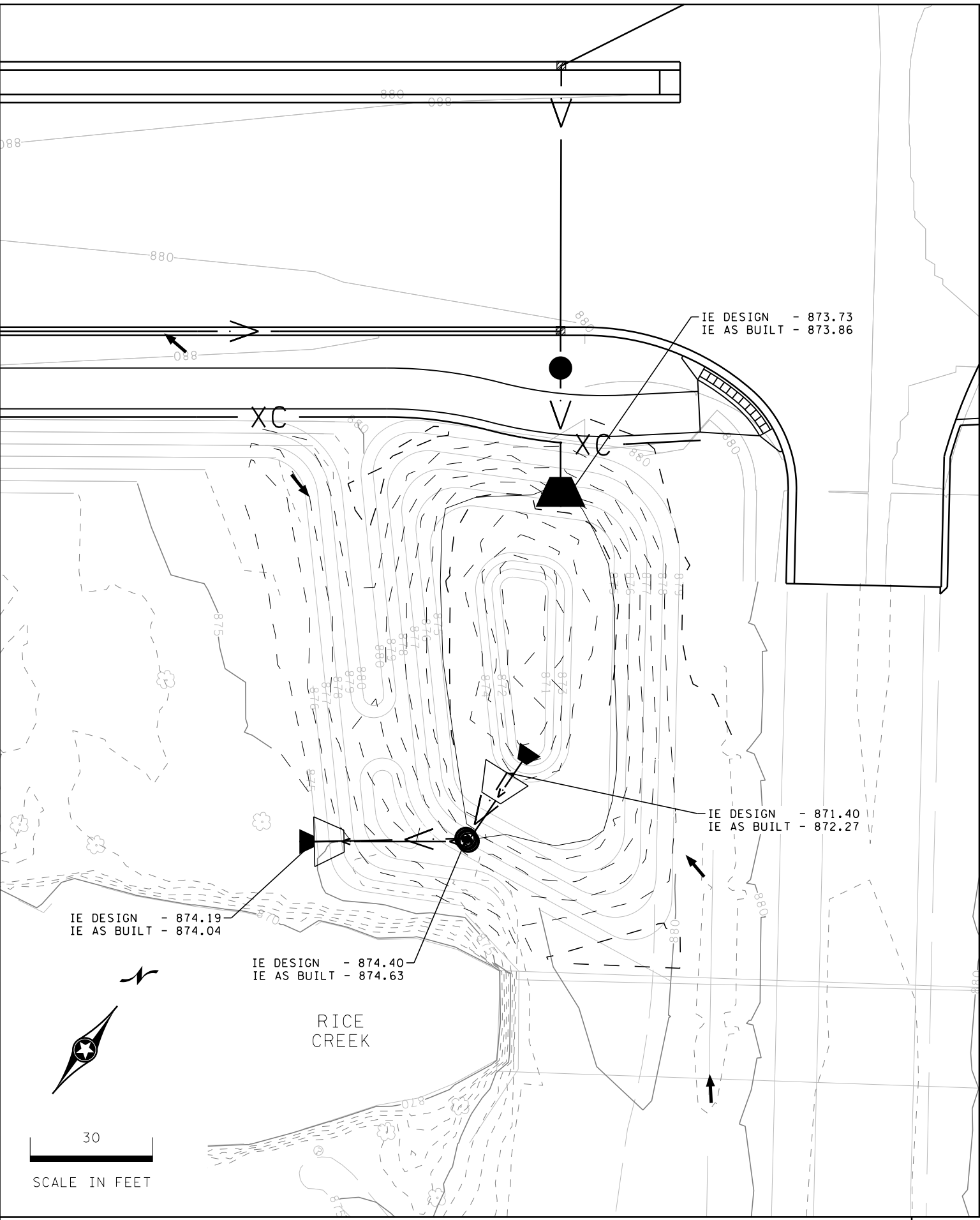
SEE SHEET SZ1 FOR TMS
 CONSTRUCTION STAGING NOTES



TRAFFIC MANAGEMENT SYSTEM
 REMOVALS & PROPOSED TMS -TH35W NORTH OF CO. RD. H

REV. NO.	DATE: / /	CERTIFIED BY <i>[Signature]</i> LICENSED PROFESSIONAL ENGINEER	LIC. NO. 26530 OCT 15 2015	STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ8 OF SZ33 SHEETS
REV. NO.	DATE: / /			

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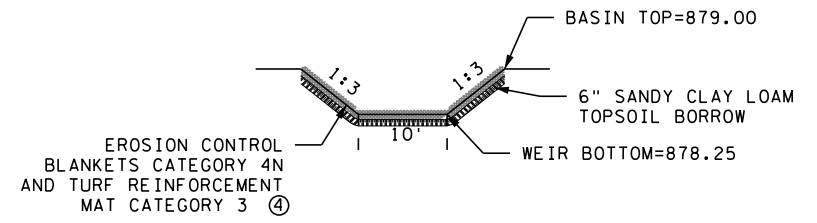
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- ==== PROPOSED CONTOURS
- AS-BUILT CONTOURS

**ASBUILT PLAN
CONFORMING TO
CONST. RECORDS**

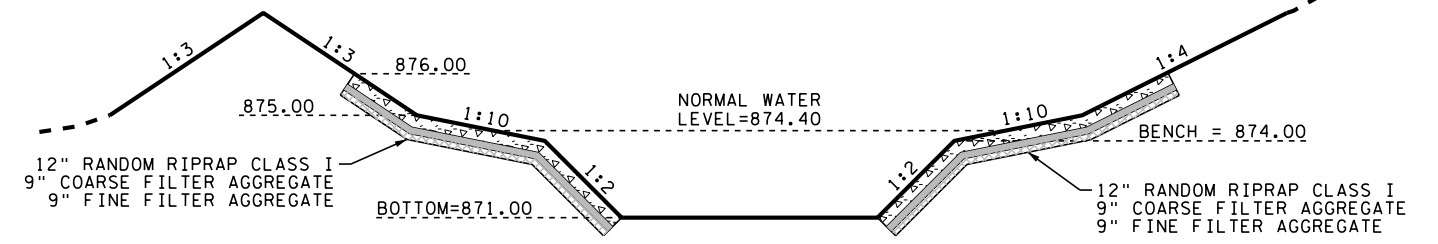
DONE BY: - KH

DATE: - 4/24/19

**MERMAID WET POND
WEIR OUTLET**



**MERMAID WET POND
SECTION A-A**



SPECIFIC NOTES:

- ④ SEE MISCELLANEOUS DETAIL SHEET MD7 FOR TURF REINFORCEMENT MAT DETAIL.

NOTE:

- 1: CONTOURS SHOWN AT FINISHED GROUND (TOP OF TOPSOIL)
- 2: BASIN MAY BE CONSTRUCTED AS A TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION. SEE STORM WATER POLLUTION PREVENTION PLAN SHEET SWP1
- 3: SEE SHEET MD3 FOR POND OUTLET DETAILS.

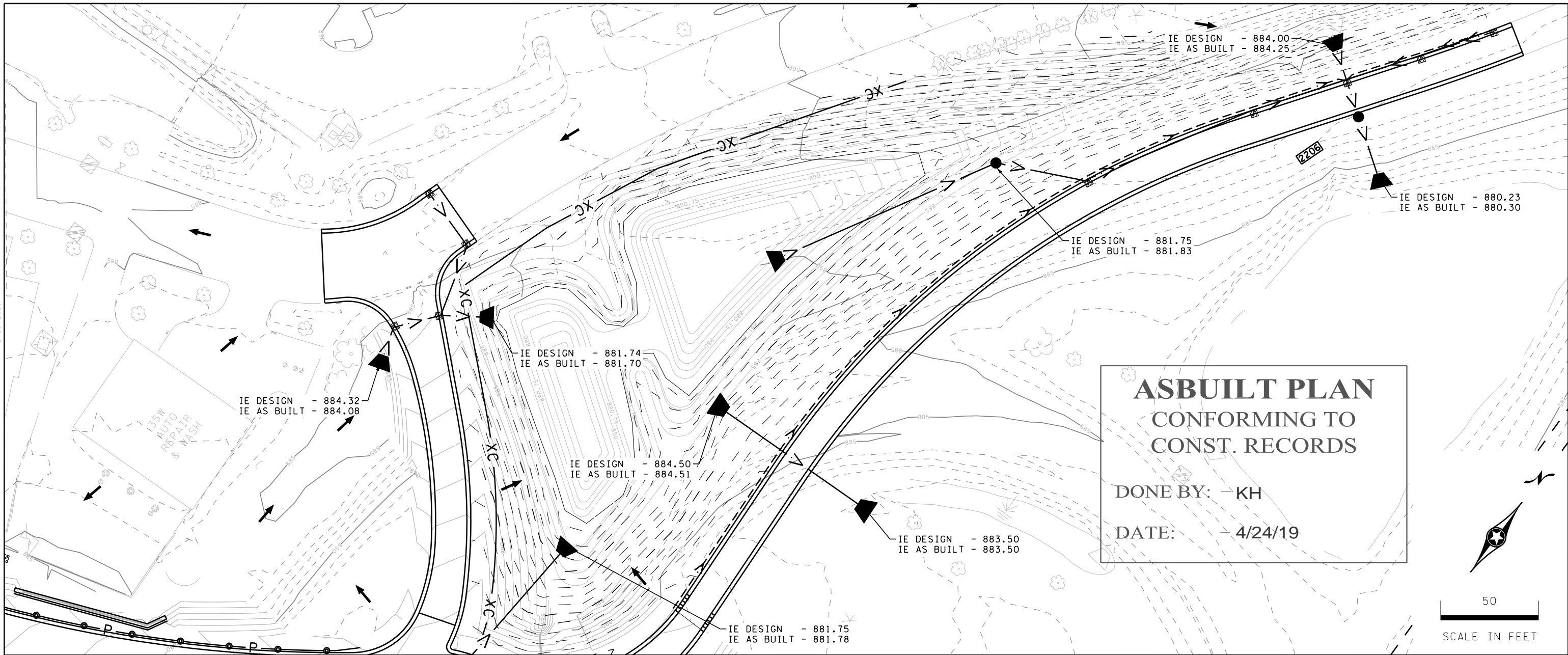
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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

POND AS-BUILTS
MERMAID WET POND

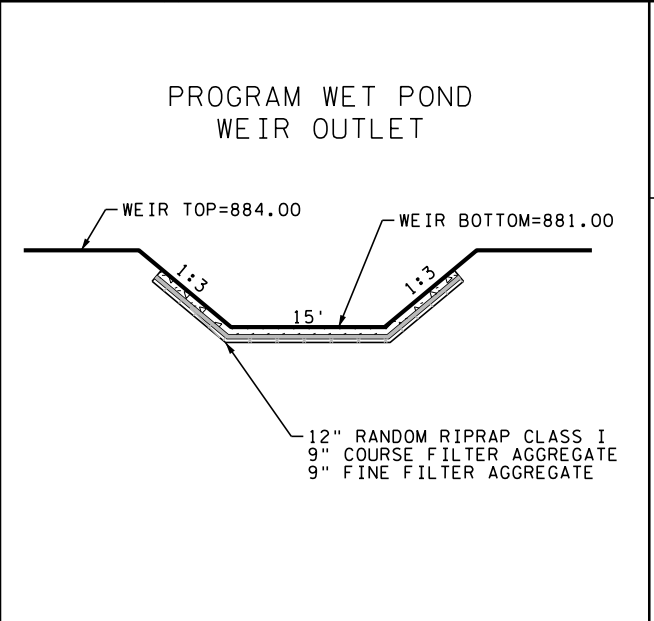
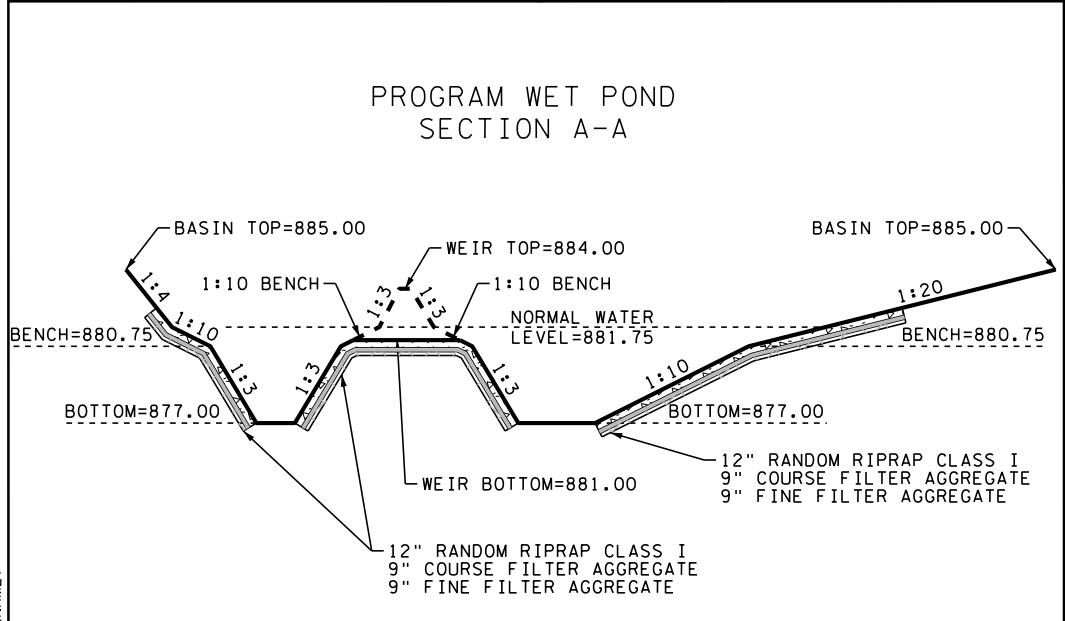
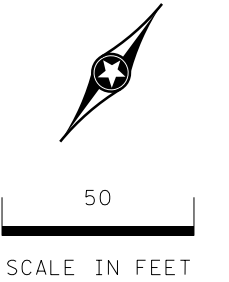
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OF	4

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ASBUILT PLAN
 CONFORMING TO
 CONST. RECORDS

DONE BY: KH
 DATE: 4/24/19



LEGEND

	EXISTING CONTOURS
	PROPOSED CONTOURS
	AS-BUILT CONTOURS

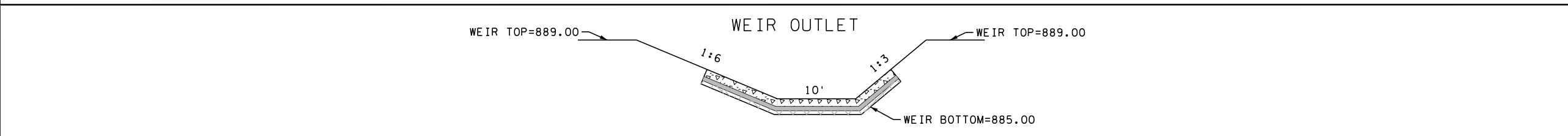
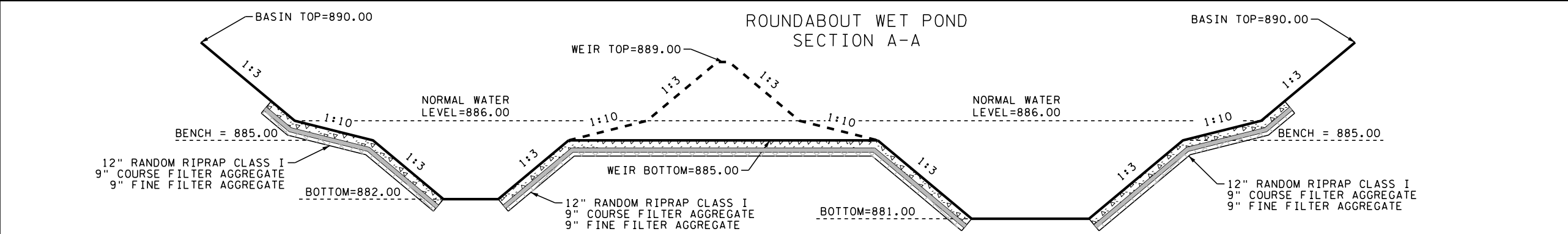
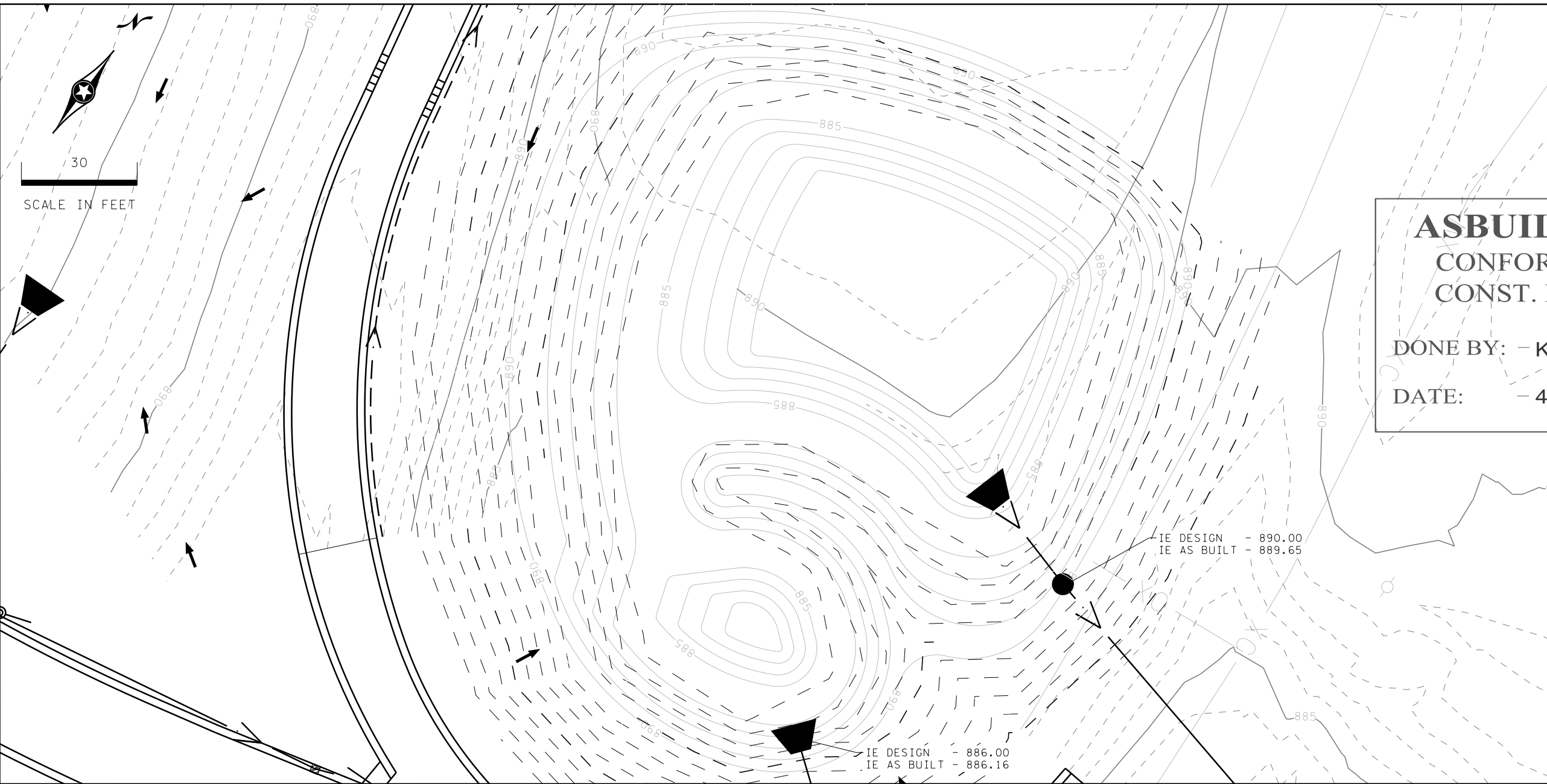
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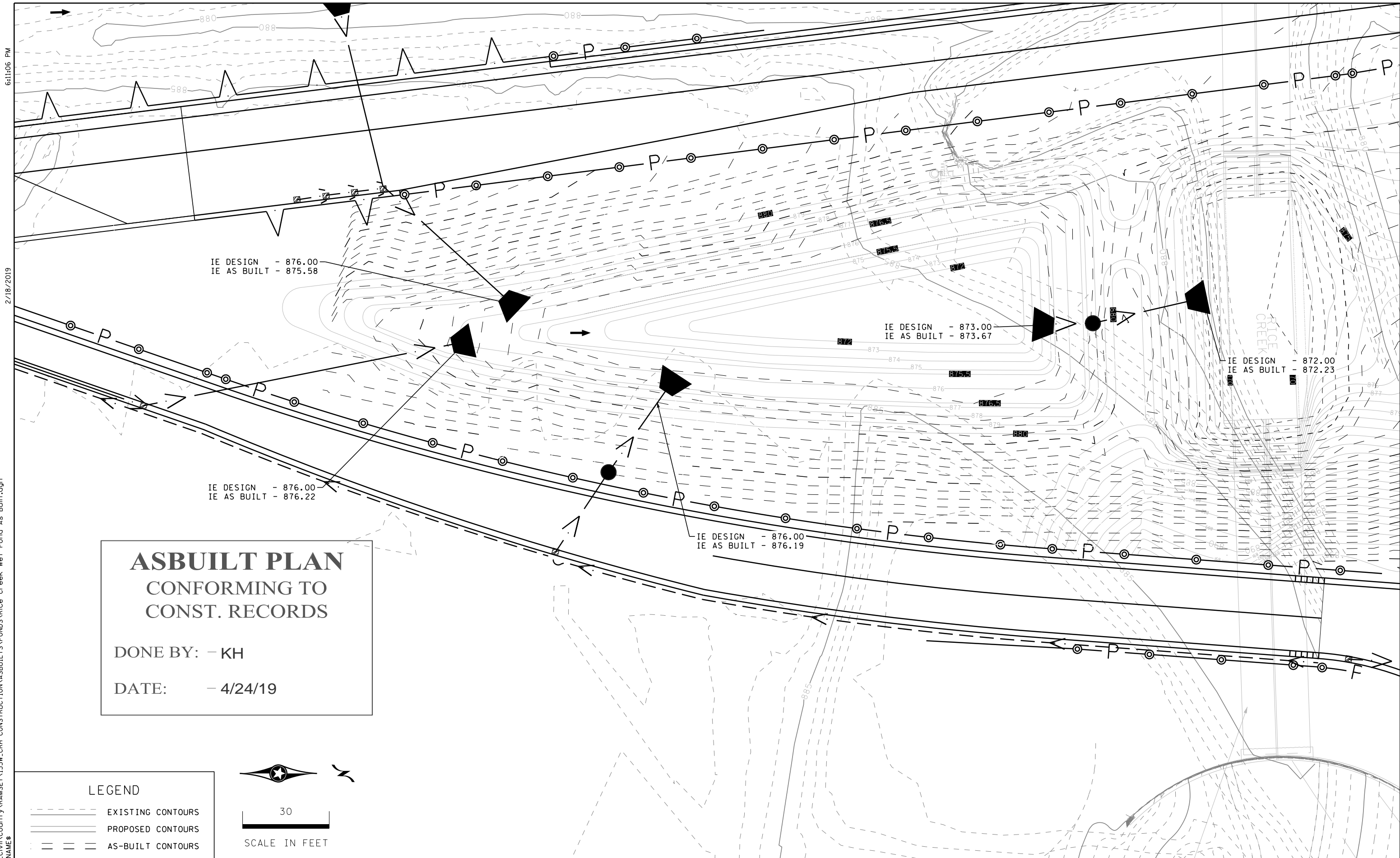
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	EXISTING CONTOURS
	PROPOSED CONTOURS
	AS-BUILT CONTOURS

30
SCALE IN FEET

ASBUILT PLAN
CONFORMING TO
CONST. RECORDS

DONE BY: - KH
 DATE: - 4/24/19





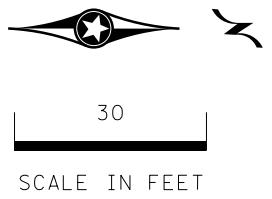
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 CONFORMING TO
 CONST. RECORDS

DONE BY: - KH

DATE: - 4/24/19

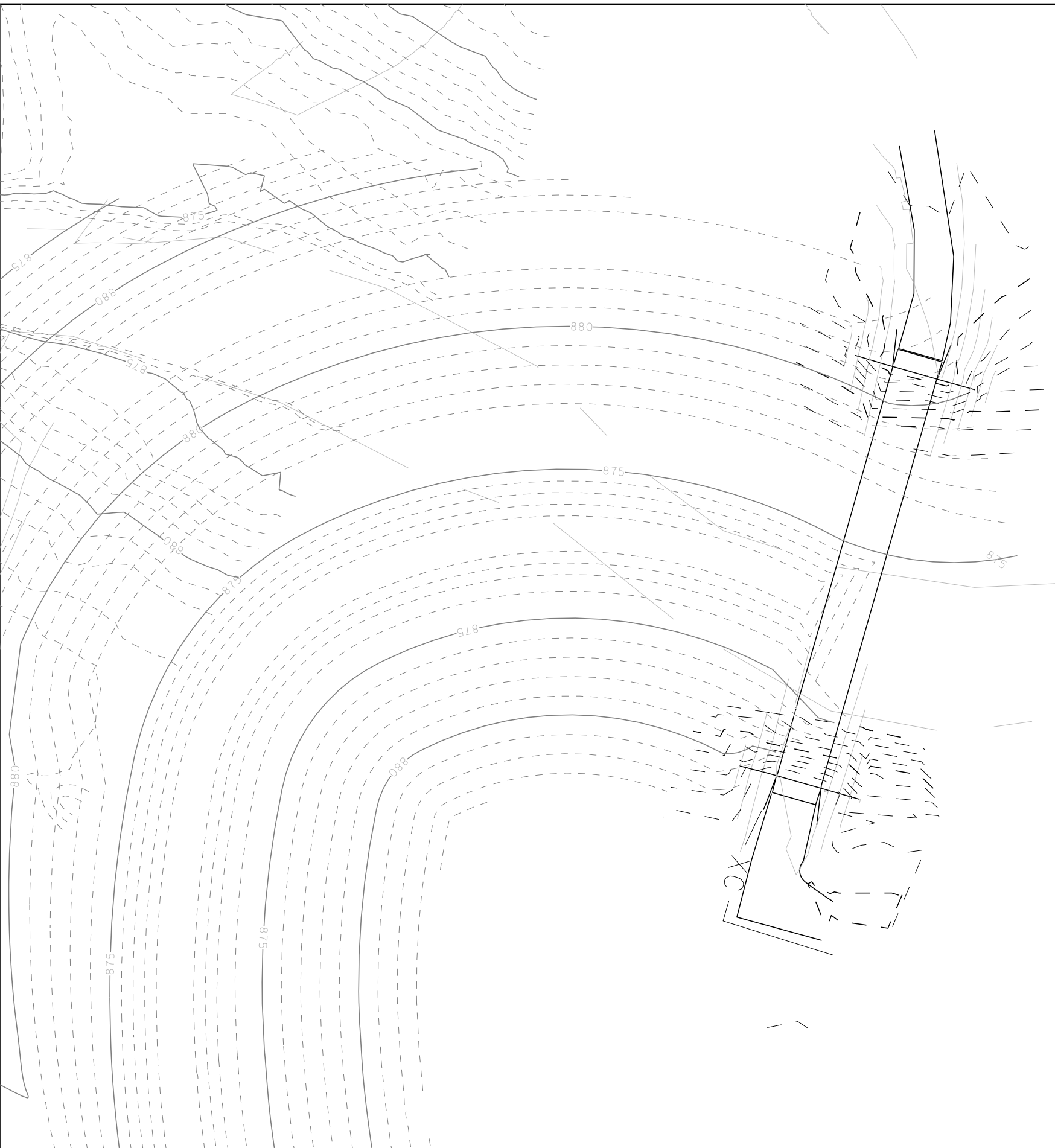
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	PROPOSED CONTOURS
	AS-BUILT CONTOURS



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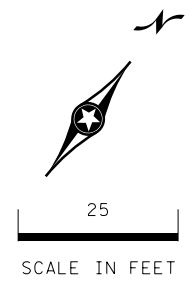
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LEGEND	
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	PROPOSED CONTOURS
	AS-BUILT CONTOURS

ASBUILT PLAN
CONFORMING TO
CONST. RECORDS

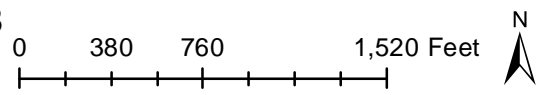
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DATE: - 4/24/19



RICE CREEK



Hoffman TCAAP Materials Update - December 4, 2018



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1/14/2016

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FED. PROJ. NO. HSIP 6216(150)

GOVERNING SPECIFICATIONS
THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION SHALL GOVERN.
ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING THE LATEST FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS.

MINNESOTA DEPARTMENT OF TRANSPORTATION
RAMSEY COUNTY DEPARTMENT OF PUBLIC WORKS
CONSTRUCTION PLAN FOR GRADING, BITUMINOUS AND CONCRETE SURFACING, ADA IMPROVEMENTS, RETAINING WALLS, ROUNDABOUTS, SIGNALS, LIGHTING, TMS, BRIDGE NOS 62937 & 62732
LOCATED ON TH 35W FROM 1850' SOUTH OF COUNTY ROAD H TO 2200' SOUTH OF COUNTY ROAD I



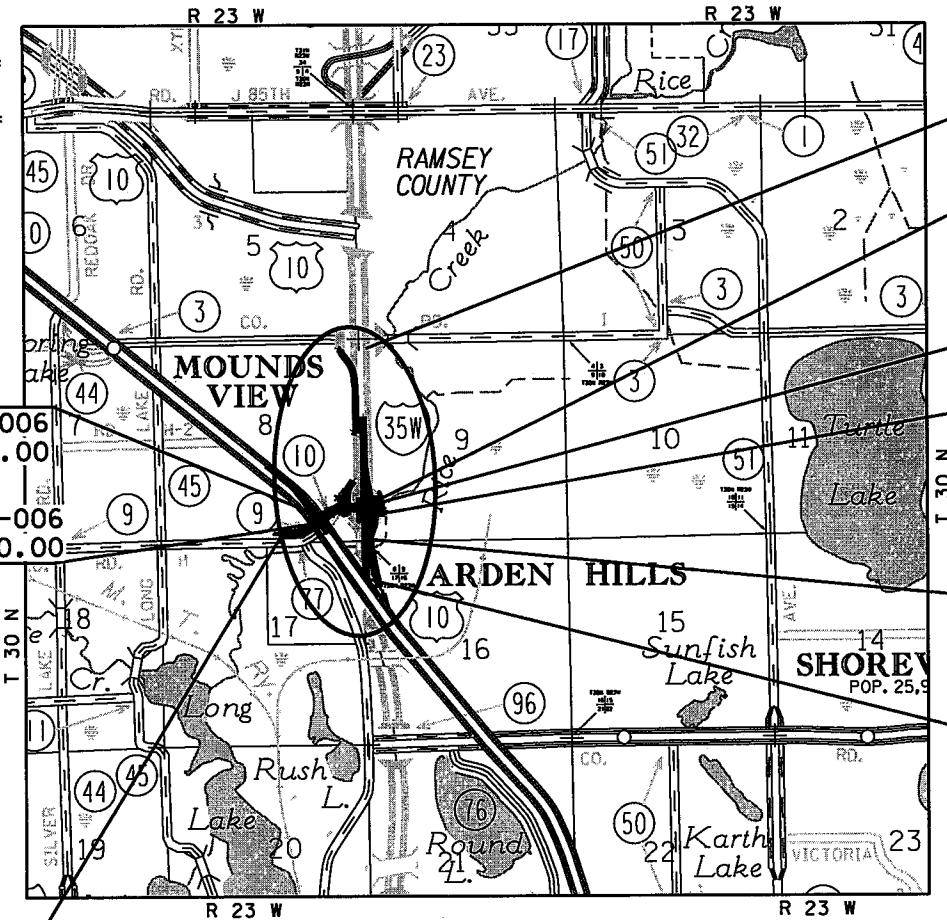
- UTILITY SYMBOLS
COMMUNICATIONS
OVERHEAD COMMUNICATION LINE
COM POLE
COM PED
COM MH
COM HH
COM TOWER
COM VAULT
FIBER OPTIC BURIED
FIBER OPTIC IN COND
TELEPHONE LINE
OVERHEAD TELEPHONE LINE
TEL POLE
TV CABLE
ELECTRICAL
ELECTRIC LINE
OVERHEAD ELECTRIC LINE
P MH
P POLE
P PED
P-BUR IN COND
P HH
P METER
P TOWER
P VAULT
GLY POLE
ANCHOR
L POLE
SIGNAL INTERCONNECT
SIG WIRE LINE
TRAFFIC SIG LIGHT
GAS
GAS LINE
GAS VLV
GAS METER
GAS MH
GAS VENT
SANITARY
SANITARY LINE
SAN MH
WATER
WATERMAIN LINE
WATER MH
WATER METER
WATER VLV
FIRE HYD
DRAINAGE
DRAINAGE CULVERT
STORM SEWER
PLAN SYMBOLS
BARBED WIRE FENCE
CHAIN LINK FENCE
WOODEN FENCE
WOVEN WIRE FENCE
BARRIER
WALL
NOISE WALL
GUARD RAIL - PLATE BEAM
SIGN POST
OVERHEAD SIGN POST
BILLBOARD POST
GUARD POST
REF. POINT MARKER
ORNAMENTAL ROCK
WOODS/TREE LINE
TREE-LEAF
EVERGREEN
PROPERTY LINE
SECTION LINE
CORPORATE OR CITY LIMITS
EXISTING R/W
PROPOSED R/W
TEMPORARY EASEMENT

EQUATIONS:
NB TH 35W INP STA. 345+97.38 BK = STA. 345+39.05 AH
STA. 383+07.42 BK = STA. 383+07.85 AH

Table with 2 columns: STATE PROJ. NO. and GROSS LENGTH. Rows include STATE PROJ. NO. 062-609-006 (CR H/CSAH 9), STATE AID PROJ. NO. 062-593-003 (CR H/CSAH 9), GROSS LENGTH 5997.47 FEET / 1.136 MILES, BRIDGES-LENGTH 2899.96 FEET / 0.549 MILES, EXCEPTIONS-LENGTH 251.67 FEET / 0.048 MILES, NET LENGTH 5997.47 FEET / 1.136 MILES, REF. POINT 28+00.352 TO REF. POINT 29+00.484.

ASBUILT PLAN
CONFORMING TO
CONST. RECORDS

DONE BY: - KH
DATE: - 4/24/19



END S.P. 062-609-006
EB CR H STA. 44+00.00
BEGIN S.P. 062-609-006
EB CR H STA. 41+50.00

END S.P. 6284-162
NB TH 35W INP STA. 400+97.44

END S.A.P. 146-020-011
BEGIN S.A.P. 187-020-019
EB CR H STA. 54+94.60

CONSTRUCT BRIDGE NO. 62732

END S.A.P. 062-593-003
END S.A.P. 187-020-019
EB CR H STA. 61+20.82

CONSTRUCT BRIDGE NO. 62937

BEGIN S.P. 6284-162
NB TH 35W INP STA. 341+57.87

AGREEMENT NUMBER 1001458.
RAMSEY COUNTY
S.P. 6284-162 (TH35W = 063)
STATE FUNDS
METRO DISTRICT

INDEX table with columns SHEET NO. and DESCRIPTION. Lists sheets 1 through 367 and their corresponding descriptions like TITLE SHEET, GENERAL LAYOUT, QUANTITIES, etc.

THIS PLAN CONTAINS 478 SHEETS

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

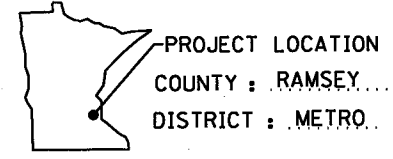
PRINT NAME: HEATHER L. REDETZKE LICENSE # 44267
DATE: 1/14/2016 SIGNATURE: Heather Redetzke

- APPROVED: [Signature] 1/19 2016 CITY OF ARDEN HILLS ENGINEER
APPROVED: [Signature] 1/15 2016 CITY OF MOUNDS VIEW ENGINEER
APPROVED: [Signature] 1/14 2016 RAMSEY COUNTY ENGINEER
RECOMMENDED FOR APPROVAL: [Signature] 1/22 2016 DISTRICT TRANSPORTATION ENGINEER
RECOMMENDED FOR APPROVAL: [Signature] 1/19 2016 DISTRICT MATERIALS ENGINEER
RECOMMENDED FOR APPROVAL: [Signature] 1-20 2016 DISTRICT WATER RESOURCES/HYDRAULICS ENGINEER
RECOMMENDED FOR APPROVAL: [Signature] 1-22 2016 DISTRICT TRAFFIC ENGINEER
RECOMMENDED FOR APPROVAL: [Signature] 2-22 2016 FOR STATE PRE-LETTING ENGINEER
OFFICE OF LAND MANAGEMENT APPROVAL: [Signature] 2/29 2016 DIRECTOR, LAND MANAGEMENT
APPROVED: [Signature] 2/29 2016 STATE DESIGN ENGINEER
for: Elisa Battas 1-25 2016 DISTRICT STATE AID ENGINEER REVIEWED FOR COMPLIANCE WITH STATE AID AND FEDERAL AID RULES/POLICY
for: Elisa Battas 1-25 2016 APPROVED FOR STATE AID AND FEDERAL AID FUNDING STATE AID ENGINEER

DESIGN DESIGNATION

Table with 3 columns: TH 35W, TH 10, CR H. Rows include FUNCTIONAL CLASSIFICATION, NO. OF TRAFFIC LANES, NO. OF PARKING LANES, STRUCTURAL DESIGN, R VALUE, ADT (2016), ADT (2036), HCADT (2036), ESALS = 20 YEAR CUMULATIVE, DESIGN SPEED, and BASED ON.

TRAIL
DESIGN SPEED: 20 MPH
BASED ON: STOPPING SIGHT DISTANCE
HEIGHT OF EYE: 4.5 FT. HEIGHT OF OBJECT: 0.0 FT.



SCALES
INDEX MAP 2500'
GENERAL LAYOUT 200'
PLAN 50'
PROFILE 50' HORIZ., 5' VERT.
CROSS SECTION 10' HORIZ., 10' VERT.

PLAN REVISIONS table with columns DATE, SHEET NO., and APPROVER.

STATE PROJ. NO. 6284-162 (TH35W = 063)
STATE PROJ. NO. 062-609-006
STATE AID PROJ. NO. 062-593-003
SHEET NO. 1 OF 367 SHEETS

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BEGIN S.A.P. 062-593-003
 BEGIN S.A.P. 146-020-011
 EB CR H STA. 32+20.86

BEGIN S.P. 062-609-006
 EB CR H STA. 41+50.00

END S.P. 062-609-006
 EB CR H STA. 44+00.00

BEGIN S.P. 6284-162
 BEGIN CONSTRUCTION
 NB TH 35W INP STA. 341+57.87

T.C.A.A.P.

RAMSEY
 COUNTY

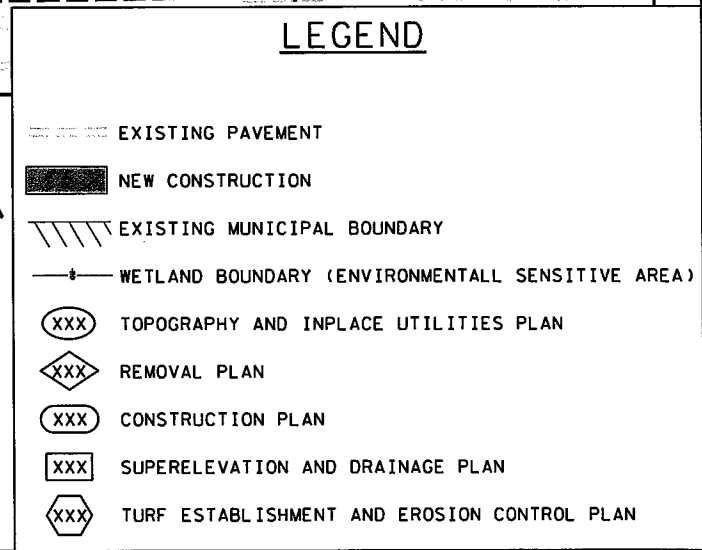
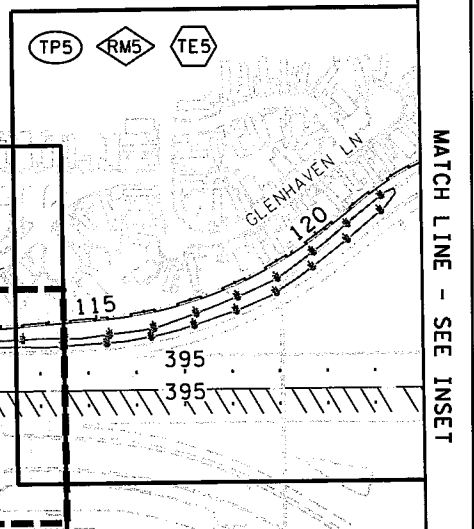
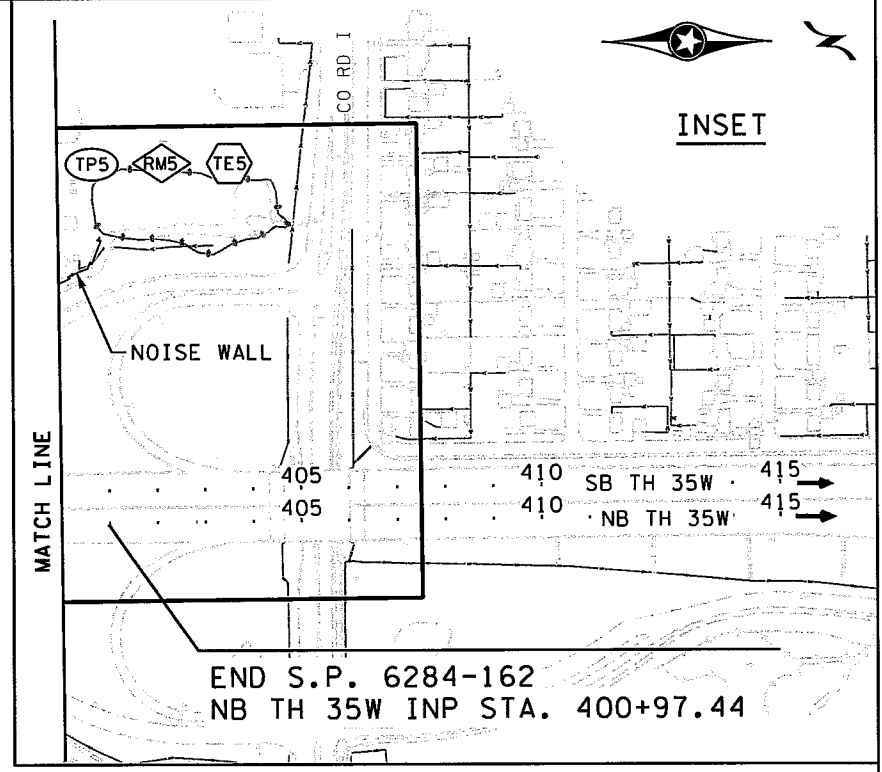
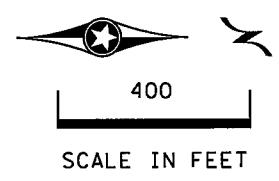
CITY OF
 MOUNDS VIEW

END S.A.P. 146-020-011
 BEGIN S.A.P. 187-020-019
 EB CR H STA. 54+94.60

RAMSEY
 COUNTY

CITY OF
 ARDEN HILLS

T.C.A.A.P.



DESIGN TEAM				REVISIONS			
DRAWN BY:	CF			NO.	BY	DATE	
DESIGNER:	RDH						
CHECKED BY:	HLR						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Reetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDEITZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	2
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2/19/2016

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STATEMENT OF ESTIMATED QUANTITIES

Main table with columns: TAB, ITEM NO, ITEM DESCRIPTION, NOTES, UNIT, TOTAL ESTIMATED QUANTITY, S.P. 6284-162 TH 35W (A)(B), FEDERAL PARTICIPATING CSAH 9/CR H (A) S.P. 062-609-006 S.P. 062-593-003, NON-FEDERAL PARTICIPATING CSAH 9/CR H S.A.P. 062-593-003, CITY OF ARDEN HILLS S.A.P. 187-020-019, CITY OF MOUNDS VIEW S.A.P. 146-020-011. Rows include items like MOBILIZATION, CLEARING, GRUBBING, REMOVE PIPE CULVERTS, etc.

TABULATION INDEX table with columns: TAB, SHEET, DESCRIPTION. Rows A through X listing sheet numbers and descriptions like EARTHWORK TABULATION & SUMMARY, MISCELLANEOUS REMOVALS, etc.

(P) DENOTES PLAN QUANTITY
(A) HSIP - 90% FEDERAL / 10% RAMSEY COUNTY
(B) LUMP SUM AGREEMENT #1001458 WITH RAMSEY COUNTY

NOTES:

- 1. CULVERT REMOVAL LENGTH INCLUDES APRONS.
2. EXISTING PAVEMENT THICKNESSES ARE ASSUMED TO BE APPROXIMATELY 4.0" OF BITUMINOUS OVER 10.0" OF REINFORCED CONCRETE ON TH 35W, AND APPROXIMATELY 3.0" OF BITUMINOUS OVER 9.0" OF REINFORCED CONCRETE ON ALL RAMPS.
9. HEIGHT OF EXISTING CHAIN LINK FENCE IS 5.0'.
10. EXISTING BITUMINOUS PAVEMENT IS ASSUMED TO BE APPROXIMATELY 4.0" THICK ON COUNTY ROAD H.
11. EXISTING REINFORCED CONCRETE PAVEMENT IS ASSUMED TO BE APPROXIMATELY 9.0" THICK ON NB TH 10 AND COUNTY ROAD 10.
12. EXISTING WOOD NOISE WALL IS APPROXIMATELY 10.0' IN HEIGHT.
15. DELIVER SALVAGED MAERIALS TO MNDOT METRO FACILITY.
20. INCLUDES REMOVAL OF ANCHORAGE BLOCK.

DESIGN TEAM table with columns: DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Heather L. Redetzke, Lic. No. 44267
Printed Name: HEATHER L. REDETZKE Date: 2/19/2016



PHONE: (651)490-2000
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ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.A.P. 062-609-006, S.A.P. 062-593-003

STATEMENT OF ESTIMATED QUANTITIES

Table with columns: FILE NO., RAMSEI29594, EQ1 OF EQ6, 3, 367

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TABULATION INDEX table with columns: TAB, SHEET, DESCRIPTION. Rows include: A 10-13 EARTHWORK TABULATION & SUMMARY, B 14-15 MISCELLANEOUS REMOVALS, C 16 CLEARING & GRUBBING, etc.

(P) DENOTES PLAN QUANTITY
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(B) LUMP SUM AGREEMENT #1001458 WITH RAMSEY COUNTY

- NOTES:
3. SEE SHEET MD1 FOR DETAILS
8. PLANT MIXED ASPHALT PAVEMENT-POLYMER MODIFIED BINDER (PMB) WILL NEED TO MEET THE PERCENT RECOVERY REQUIREMENTS INDICATED IN TABLE 3151.2A OF THE SPECIAL PROVISIONS.
13. RAMSEY COUNTY SHALL BE THE MATERIAL SOURCE FOR AGGREGATE BASE UTILIZED ON THIS PROJECT.
15. DELIVER SALVAGED MATERIALS TO MNDOT METRO FACILITY.

DESIGN TEAM table with columns: NO., BY, DATE, REVISIONS. Includes fields for DRAWN BY, DESIGNER, CHECKED BY.

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Certified By: Heather Redetzke Lic. No. 44267
Printed Name: HEATHER L. REDEZKE Date: 2/19/2016



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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

STATEMENT OF ESTIMATED QUANTITIES
FILE NO. RAMSEI29594
EQ2 OF EQ6
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TABULATION INDEX table with columns: TAB, SHEET, DESCRIPTION. Rows include A 10-13 EARTHWORK TABULATION & SUMMARY, B 14-15 MISCELLANEOUS REMOVALS, C 16 CLEARING & GRUBBING, etc.

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NOTES:

- 4. STRUCTURE INCLUDES SAFL BAFFLE. SEE SHEET MD2 FOR DETAILS.
5. STRUCTURE INCLUDES GRATE. SEE SHEET MD3 FOR DETAILS.
6. STRUCTURE INCLUDES GRATE AND WEIR. SEE SHEET MD3 FOR DETAILS.
7. INCLUDES GEOTEXTILE, FINE FILTER AGGREGATE, CONNECTIONS TO DRAINAGE STRUCTURES, AND ALL OTHER ASSOCIATED WORK AS SHOWN IN THE DETAIL FOR THIS ITEM.
14. INSTALLATION OF CARRIER PIPE FOR FUTURE IRRIGATION SYSTEM. INCLUDES ALL ASSOCIATED WORK. SEE CONSTRUCTION PLAN FOR LOCATIONS OF CARRIER PIPE.
23. 1:4 SLOPES.
25. SEE SHEETS SW1-SW2 FOR ITEMS NOT QUANTIFIED IN TAB M.
29. SEE SHEET SW3.
30. SEE SHEET MD9.

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Printed Name: HEATHER L. REDETZKE Date: 2/19/2016



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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.A.P. 062-609-006, S.A.P. 062-593-003

STATEMENT OF ESTIMATED QUANTITIES

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EQ3 OF EQ6 367

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TABULATION INDEX

Index table with columns: TAB, SHEET, DESCRIPTION. Lists sheets A through X and their corresponding descriptions like EARTHWORK TABULATION & SUMMARY, MISCELLANEOUS REMOVALS, PAVEMENT SAWING, etc.

(P) DENOTES PLAN QUANTITY
(A) HSIP - 90% FEDERAL / 10% RAMSEY COUNTY
(B) LUMP SUM AGREEMENT #1001458 WITH RAMSEY COUNTY

- NOTES:
25. SEE SHEETS SW1-SW2 FOR ITEMS NOT QUANTIFIED IN TAB M.
26. SEE SHEET LL10 FOR SPECIAL LIGHTING UNIT DETAILS.
27. SEE SHEET LL12 FOR LIGHT FOUNDATION DETAILS.
28. SEE SHEET LL13 FOR SERVICE CABINET DETAILS.

DESIGN TEAM table with columns: DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

STATEMENT OF ESTIMATED QUANTITIES

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TABULATION INDEX table with columns: TAB, SHEET, DESCRIPTION. Rows include: A 10-13 EARTHWORK TABULATION & SUMMARY, B 14-15 MISCELLANEOUS REMOVALS, C 16 CLEARING & GRUBBING, etc.

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- NOTES:
18. PULL VAULTS WITHOUT SPLICING WILL NOT REQUIRE DRAINS OR SHEATH GROUNDING UNITS.
19. INCLUDES FO CABLE AND CONDUITS.
22. INCLUDES OVERHEAD SIGN IDENTIFICATION PLATES.
24. TEST LEVEL 3, TEMPORARY.
32. SEE SHEET LL12 FOR EQUIPMENT PAD DETAILS.

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Printed Name: HEATHER L. REDEZKE, Date: 2/17/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

STATEMENT OF ESTIMATED QUANTITIES

FILE NO. RAMSEI29594, EQ5 OF EQ6, 7, 367

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TABULATION INDEX table with columns: TAB, SHEET, DESCRIPTION. Rows include: A 10-13 EARTHWORK TABULATION & SUMMARY, B 14-15 MISCELLANEOUS REMOVALS, C 16 CLEARING & GRUBBING, etc.

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NOTES:

- 16. TREE PROTECTION ITEMS SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER, WHERE TREES/SHRUBS ARE LEFT IN PLACE, LIE JUST OUTSIDE THE PROPOSED CONSTRUCTION, AND HAVE POTENTIAL SOIL DISTURBANCE WITHIN THEIR DRIPLINES AND ROOT ZONES.
17. SEE TABULATIONS J AND K FOR FERTILIZER APPLICATION RATES.
21. RAPID STABILIZATION IS PERFORMED ANY TIME WORK IS STOPPED AND THERE IS RISK THAT SEDIMENT WILL ENTER A RESOURCE WATER DUE TO STORMWATER RUNOFF. USE WILL BE AT THE DISCRETION OF THE ENGINEER, AND IS EXPECTED TO BE USED IN AND AROUND PONDS, DITCHES, STOCKPILES, AND AREAS WITHIN 200 FT OF A RESOURCE OF CONCERN.
31. SEE SHEET MD8 FOR DETAIL.

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Printed Name: HEATHER L. REDETZKE Date: 2/17/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.A.P. 062-609-006, S.A.P. 062-593-003

STATEMENT OF ESTIMATED QUANTITIES

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SOIL AND CONSTRUCTION NOTES

THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION SHALL APPLY ON THIS PROJECT.

PLATE NO.	DESCRIPTION
1070M	SUPPLEMENTAL PAVEMENT REINFORCEMENT
1103K	TYPICAL DOWEL BAR ASSEMBLY
1150R	CONCRETE HEADER JOINTS
3000L	REINFORCED CONCRETE PIPE
3006G	GASKET JOINT FOR R.C. PIPE
3014J	REINFORCED CONCRETE PIPE ARCH
3022C	PRECAST CONCRETE SAFETY APRONS
3100G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE
3110G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE-ARCH
3131C	PRECAST CONCRETE HEADWALL FOR SUBSURFACE DRAINS
3133D	RIPRAP AT RCP OUTLETS
3139B	RIPRAP AT PRECAST CONCRETE END SECTIONS
3145G	CONCRETE PIPE OR PRECAST CULVERT TIES
4005M	MANHOLE OR CATCH BASIN TYPE A & B CONE SECTIONS PRECAST - DESIGN F
4006L	MANHOLE OR CATCH BASIN PRECAST - TYPE G & H
4017C	CATCH BASIN (CONCRETE PIPE AND METAL PIPE) DESIGNS PC AND PM
4020J	MANHOLE OR CATCH BASIN FOR USE WITH OR WITHOUT TRAFFIC LOADS
4108F	ADJUSTING RINGS FOR CATCH BASINS AND MANHOLES
4110F	COVER CASTING FOR MANHOLE (FOR USE IN ALL TRAFFIC AREAS) - CASTING NO. 715 & 716
4125D	CATCH BASIN FRAME CASTING (FOR SQUARE GRATE) - CASTING NO. 806
4132F	CATCH BASIN FRAME CASTING (SQUARE GRATE) - CASTING NO. 805
4134A	CURB BOX CASTING FOR CATCH BASIN (FOR DESIGN B CURBS) - CASTING NO. 825
4151B	GRATE CASTING FOR CATCH BASIN (SQUARE TYPE) - CASTING NO. 811
4180J	MANHOLE OR CATCH BASIN STEP
7035N	CONCRETE WALK & CURB RETURNS AT ENTRANCES
7038A	DETECTABLE WARNING SURFACE TRUNCATED DOMES
7100H	CONCRETE CURB AND GUTTER (DESIGN B AND DESIGN V)
7102J	CONCRETE CURB AND GUTTER (DESIGN D, S, B4, B5 AND D3)
7107I	ENTRANCE NOSE (URBAN DESIGN)
7108G	EXIT NOSE (URBAN DESIGN)
7109C	MEDIAN NOSE AND ISLAND (UNDIVIDED TO DIVIDED ROADWAY)
7111J	INSTALLATION OF CATCH BASIN CASTINGS (CONCRETE CURB AND GUTTER)
7113A	CONCRETE APPROACH NOSE DETAIL
8000I	STANDARD BARRICADES
8106D	EQUIPMENT PAD B
8110E	TRAFFIC SIGNAL BRACKETING (POLE MOUNTED)
8112I	PEDESTAL FOUNDATION (TRAFFIC CONTROL SIGNALS)
8118D	SERVICE EQUIPMENT & POLE TRAFFIC CONTROL SIGNALS
8119C	GROUND MOUNTED CABINET FOUNDATION
8121H	TRANSFORMER BASE AND POLE BASE PLATE (PA85, PA90, AND PA100)
8122F	PEDESTAL AND PEDESTAL BASE (FOR TRAFFIC CONTROL SIGNALS SUPPORT)
8123G	POLE AND MAST ARM LUMINAIRES AND TRAFFIC LIGHTS ASSEMBLY (FOR ALL POLE TYPES)
8126L	POLE FOUNDATION (PA90 AND PA100)
8127E	LIGHT FOUNDATION - DESIGN E, PRECAST/CAST-IN-PLACE, 40' POLE OR LESS
8128E	LIGHT FOUNDATION - DESIGN H PRECAST/CAST-IN-PLACE 49' POLE
8129A	SHIM WITH WASHER (TRAFFIC CONTROL SIGNALS AND ROADWAY LIGHTING)
8132B	PREFORMED RIGID PVC CONDUIT LOOP DETECTORS
8150C	INSTALLATION OF CULVERT MARKERS
8308B	REINFORCED CONCRETE MEDIAN BARRIER TYPE F (NON-GLARE SCREEN TYPE)
8318C	GUARDRAIL ANCHORAGE PLATE FOR BRIDGES AND BCT'S
8332D	ANCHOR BOLT CLUSTER AND BASE PLATE FOR LIGHT POLES
8337C	TEMPORARY PORTABLE PRECAST CONCRETE BARRIER (TYPE F)
8338D	W-BEAM GUARDRAIL & END ANCHORAGES (INSTALLATION WITH STEEL POSTS)
9000E	APPROACHES AND ENTRANCES - RECOMMENDED STANDARDS
9101B	SHAPING AND SODDING OF SLOPES AT BOX CULVERT ENDS
9102E	TURF ESTABLISHMENT AREAS (AT PIPE CULVERT ENDS)
9322K	CHAIN LINK FENCE

- DO NOT USE A NUCLEAR GAUGE TO DETERMINE DENSITY OR MOISTURE CONTENT FOR QUALITY ASSURANCE OR VERIFICATION TESTING FOR ANY MATERIAL MEETING MNDOT 2105, 2106, 2112, 2211, 2212, 2215, 2221, 2331, 2451, 2502, OR 2511. USE OF A NUCLEAR GAUGE FOR QUALITY CONTROL TESTING IS ALLOWED ACCORDING TO THE GRADING AND BASE MANUAL.
- SLOPE DRESSING IS DEFINED AS A HORIZON SOIL AND INCLUDES THE INPLACE TOPSOIL OR OTHER SOIL PROVIDING A MEDIUM FOR ESTABLISHING TURF.
- STRIP ALL TOPSOIL AND INPLACE SLOPE DRESSING IN AREAS TO BE DISTURBED BY CONSTRUCTION AND STOCKPILE FOR REUSE AS SLOPE DRESSING. THE FINAL PERMANENT SLOPE DRESSING SHOULD BE A MINIMUM OF SIX INCHES THICK. THIS REMOVAL IS ANTICIPATED TO BE ON THE ORDER OF 0.5 FEET TO 2.5 FEET.
- ALL TOPSOIL STRIPPING WILL BE PAID FOR AS EXCAVATION-COMMON.
- TOPSOIL AND OTHER UNSUITABLE GRADING MATERIAL SHALL BE ELIMINATED FROM THE UPPER THREE FEET OF THE GRADING GRADE, WITHIN A 1:1 SLOPE DRAWN DOWN FROM THE SHOULDER PI AND SHALL NOT BE PLACED ADJACENT TO ANY STRUCTURES.
- IN ADDITION TO SURFACE STRIPPING, EXCAVATION OF BURIED PEAT AND HIGHLY ORGANIC LAYERS IS RECOMMENDED NEAR BORINGS R-21, W-9, AND W-10. SEE MATERIAL DESIGN RECOMMENDATIONS (MDR) FOR FULL BORING REPORTS. THE EXCAVATION DEPTHS AWAY FROM THE BORING LOCATIONS SHOULD BE DETERMINED IN THE FIELD AT THE TIME OF CONSTRUCTION BY A GEOTECHNICAL FIELD ENGINEER/TECHNICIAN. THE LATERAL EXTENT OF THE EXCAVATION SHOULD BE IN ACCORDANCE WITH MNDOT REQUIREMENTS FOR STANDARD EXCAVATION-MUCK.
- SANDY LOAMS SHOULD BE REMOVED WHERE THEY ARE PRESENT WITHIN THREE FEET OF GRADING GRADE. THE EXCEPTION IS IN THOSE AREAS WHERE THE NEW ROAD ABUTS AN EXISTING ROADWAY WHICH HAS SIMILAR SANDY LOAMS INPLACE. IN THIS CASE, THE INTENT SHOULD BE TO MATCH INPLACE CONDITIONS.
- WHERE CLAYS, LOAMS, SILTS ARE PRESENT WITHIN THE THREE FEET OF GRADING GRADE, AND THE SUBGRADE ABUTS AN EXISTING ROAD, THE SOIL SHOULD BE CUT OUT FROM WITHIN TWO FEET OF GRADING GRADE AND REPLACED WITH SELECT GRANULAR MATERIAL. THE SUBCUT AND SAND PLACEMENT SHOULD INCLUDE A 1:1 DOWNWARD TAPER FROM THE EXISTING PAVEMENT GRADING GRADE.
- WHERE MATCHING TO INPLACE PAVEMENT STRUCTURES, CUT VERTICALLY TO TOP OF GRADING GRADE, THEN TAPER AT 1:4 (V:H) TO THE BOTTOM OF THE RECOMMENDED EXCAVATION-SUBGRADE AT THAT LOCATION.
- PRIOR TO PLACEMENT OF PAVEMENT MATERIAL, THE EXPOSED SUITABLE GRADING MATERIAL SHALL BE SHAPED AND COMPACTED PER THE QUALITY COMPACTION METHOD.
- COMPACTION OF SELECT GRANULAR MATERIAL AND AGGREGATE BASE MATERIALS SHALL BE BY THE PENETRATION INDEX METHOD. COMPACTION OF REMAINING FILL SHALL BE PER THE SPECIFIED DENSITY METHOD.
- PROVIDE 1:20 (V:H) LONGITUDINAL GRANULAR TAPERS WHEN CHANGING SUBCUT DEPTHS OVER FROST SUSCEPTIBLE MATERIALS WITHIN THE FROST ZONE.
- THE MAXIMUM BITUMINOUS LIFT THICKNESS IS TWO INCHES FOR WEARING COURSES AND THREE INCHES FOR NON WEARING COURSES.
- PROVIDE FOR A UNIFORM BITUMINOUS TACK COAT BETWEEN ALL BITUMINOUS COURSES IN ACCORDANCE WITH MNDOT SPECIFICATION 2357. THE ROADWAY SURFACE SHALL BE CLEAN AND FREE OF DEBRIS PRIOR TO APPLYING TACK. TACK COAT SHALL BE INCIDENTAL.
- SELECT GRADING MATERIAL SHALL BE AN ENVIRONMENTALLY ACCEPTABLE MINERAL SOIL, WHICH CAN BE FROM THE PROJECT SITE, EXCLUDING SILT, SOILS WHICH HAVE AN ORGANIC CONTENT EXCEEDING 2%, AND SOILS WHICH INCLUDE DEBRIS AND/OR BOULDERS. THE SOIL MUST ALSO BE CAPABLE OF ATTAINING THE SPECIFIED COMPACTION LEVEL AT ITS CURRENT WATER CONTENT OR AT A WATER CONTENT AT WHICH THE SOIL CAN BE REASONABLY SCARIFIED, BLENDED, AND MOISTURE CONDITIONED TO A UNIFORM WATER CONTENT MEETING THE REQUIREMENTS OF STANDARD SPECIFICATION 2106.
- IN PERMANENT AREAS OF CONSTRUCTION, WHERE TURF ESTABLISHMENT IS REQUIRED, PROVIDE FOR A MINIMUM DEPTH OF 6" SLOPE DRESSING. PROVIDE 6" SANDY CLAY LOAM TOPSOIL BORROW WHERE TURF REINFORCEMENT MAT IS USED.
- DITCH BOTTOMS, TOE OF FILL, CUT RUNOUTS, AND THE TOP EDGE OF THE BACKSLOPES SHALL BE ROUNDED REGARDLESS OF THE SECTION USED ON THE CROSS SECTION SHEETS.
- ANY SOILS CONTAINING NOXIOUS WEEDS (OR WEED PARTS) THAT ARE MOVED OVER THE COURSE OF THIS PROJECT SHALL BE KEPT ON SITE AND ON THE SAME SIDE OF THE ROAD AS THEY ARE REMOVED FROM. IT IS RECOMMENDED THAT THESE SOILS BE BURIED THREE FEET UNDER THE FINAL GRADE WHEN POSSIBLE. IF THE CONTRACTOR WISHES TO REMOVE SOIL FROM THE SITE, THE CONTRACTOR SHALL RECEIVE A PERMIT(S) TO TRANSPORT FROM THE COUNTY AGRICULTURAL INSPECTOR(S) FROM THE COUNTY THE SOIL IS ORIGINATING, THE COUNTY THE SOIL IS BEING TAKEN TO, AND ANY COUNTIES TRAVELED THROUGH.

DESIGN TEAM				
DRAWN BY: C/JF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 2/16/2016



PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

STANDARD PLATES,
 SOIL AND
 CONSTRUCTION NOTES

FILE NO. RAMSEI29594	9
SCN1 OF SCN1	367

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12/8/2015

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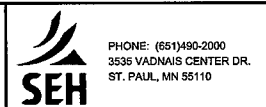
EARTHWORK TABULATION A						
PROJECT	LOCATION	EXCAVATION		EMBANKMENT (CV)		
		COMMON	SUBGRADE	COMMON	SELECT GRANULAR	GRANULAR
		CU YD	CU YD	CU YD	CU YD	CU YD
S.P. 6284-162	NB TH 35W					
	341+57.87 R4 TO 342+00.00 R4	5	16	7	14	7
	342+00.00 R4 TO 342+50.00 R4	6	22	8	16	9
	342+50.00 R4 TO 343+00.00 R4	40	24	58	18	10
	343+00.00 R4 TO 343+50.00 R4	194	32	130	21	16
	343+50.00 R4 TO 344+00.00 R4	605	40	161	24	20
	344+00.00 R4 TO 344+50.00 R4	457	42	99	24	20
	344+50.00 R4 TO 345+00.00 R4	45	43	29	24	20
	345+00.00 R4 TO 345+50.00 R4	43	43	19	24	20
	345+50.00 R4 TO 345+50.00 R5	120	49	31	28	23
	345+50.00 R5 TO 346+00.00 R5	200	42	45	24	20
	346+00.00 R5 TO 346+50.00 R5	204	42	52	24	20
	346+50.00 R5 TO 347+00.00 R5	232	42	67	24	21
	347+00.00 R5 TO 347+50.00 R5	268	50	74	27	26
	347+50.00 R5 TO 348+00.00 R5	280	69	70	34	41
	348+00.00 R5 TO 348+50.00 R5	285	97	54	47	66
	348+50.00 R5 TO 348+81.27 R5	196	83	25	63	34
	348+81.27 R5 TO 349+00.00 R5	143	51	19	53	6
	349+00.00 R5 TO 349+50.00 R5	467	131	82	137	6
	349+50.00 R5 TO 350+00.00 R5	282	80	74	77	6
	350+00.00 R5 TO 350+50.00 R5	170	18	49	16	6
	350+50.00 R5 TO 351+00.00 R5	389	18	60	16	6
	351+00.00 R5 TO 351+50.00 R5	371	20	56	16	6
	351+50.00 R5 TO 352+00.00 R5	240	20	44	16	6
	352+00.00 R5 TO 352+50.00 R5	194	20	40	16	6
	352+50.00 R5 TO 353+00.00 R5	137	21	39	16	6
	353+00.00 R5 TO 353+50.00 R5	103	22	40	16	6
	353+50.00 R5 TO 354+00.00 R5	80	21	37	16	6
	354+00.00 R5 TO 354+50.00 R5	50	21	36	16	6
	354+50.00 R5 TO 355+00.00 R5	26	21	59	16	6
	355+00.00 R5 TO 355+50.00 R5	13	21	75	16	6
	355+50.00 R5 TO 356+00.00 R5	13	21	49	16	6
	356+00.00 R5 TO 356+50.00 R5	10	21	29	16	6
	356+50.00 R5 TO 357+00.00 R5	6	21	328	48	69
	357+00.00 R5 TO 357+50.00 R5	55	49	374	81	132
	357+50.00 R5 TO 358+00.00 R5	89	98	81	81	132
	358+00.00 R5 TO 358+50.00 R5	66	149	33	82	135
	358+50.00 R5 TO 359+00.00 R5	240	182	28	77	127
	359+00.00 R5 TO 359+15.16 R5	253	86	5	31	55
	359+15.16 R5 TO 359+50.00 R5	956	253	1	91	162
	359+50.00 R5 TO 360+00.00 R5	1285	384	2	137	247
	360+00.00 R5 TO 360+50.00 R5	634	275	58	101	175
	360+50.00 R5 TO 361+00.00 R5	150	123	114	50	73
	361+00.00 R5 TO 361+50.00 R5	92	114	103	48	68
	361+50.00 R5 TO 362+00.00 R5	62	105	94	46	65
	362+00.00 R5 TO 362+50.00 R5	45	97	89	44	61
	362+50.00 R5 TO 363+00.00 R5	39	91	83	42	57
	363+00.00 R5 TO 363+50.00 R5	35	88	79	41	54
	363+50.00 R5 TO 364+00.00 R5	30	84	79	39	50
	364+00.00 R5 TO 364+50.00 R5	26	52	74	27	27
364+50.00 R5 TO 365+00.00 R5	35	23	47	17	7	
365+00.00 R5 TO 365+50.00 R5	76	23	25	17	7	
365+50.00 R5 TO 366+00.00 R5	94	21	21	17	7	
366+00.00 R5 TO 366+50.00 R5	263	50	124	40	50	
366+50.00 R5 TO 367+00.00 R5	470	99	188	64	96	
367+00.00 R5 TO 367+50.00 R5	514	122	122	67	104	
367+50.00 R5 TO 368+00.00 R5	507	121	80	69	110	
368+00.00 R5 TO 368+50.00 R5	461	138	60	75	123	
368+50.00 R5 TO 368+51.09 R5	10	3	1	2	3	
368+51.09 R5 TO 369+00.00 R5	368	141	50	73	122	
369+00.00 R5 TO 369+50.00 R5	280	123	52	64	104	
369+50.00 R5 TO 370+00.00 R5	225	110	65	55	85	
370+00.00 R5 TO 370+50.00 R5	185	103	66	48	70	
370+50.00 R5 TO 371+00.00 R5	150	98	53	42	59	
371+00.00 R5 TO 371+50.00 R5	123	88	44	38	51	
371+50.00 R5 TO 372+00.00 R5	103	81	42	35	46	
372+00.00 R5 TO 372+50.00 R5	87	77	44	34	43	
372+50.00 R5 TO 373+00.00 R5	75	66	47	33	40	
373+00.00 R5 TO 373+50.00 R5	79	58	47	31	38	

EARTHWORK TABULATION A							
PROJECT	LOCATION	EXCAVATION		EMBANKMENT (CV)			
		COMMON	SUBGRADE	COMMON	SELECT GRANULAR	GRANULAR	
		CU YD	CU YD	CU YD	CU YD	CU YD	
S.P. 6284-162	NB TH 35W (CONT.)						
	373+50.00 R5 TO 374+00.00 R5	93	56	46	31	37	
	374+00.00 R5 TO 374+50.00 R5	96	54	48	31	37	
	374+50.00 R5 TO 375+00.00 R5	100	55	49	31	37	
	375+00.00 R5 TO 375+50.00 R5	109	56	52	31	37	
	375+50.00 R5 TO 376+00.00 R5	111	56	52	31	37	
	376+00.00 R5 TO 376+50.00 R5	104	56	52	31	37	
	376+50.00 R5 TO 377+00.00 R5	92	52	51	31	37	
	377+00.00 R5 TO 377+50.00 R5	85	47	49	31	37	
	377+50.00 R5 TO 378+00.00 R5	98	50	45	31	37	
	378+00.00 R5 TO 378+50.00 R5	106	56	42	31	37	
	378+50.00 R5 TO 379+00.00 R5	119	53	43	31	37	
	379+00.00 R5 TO 379+50.00 R5	143	55	43	31	37	
	379+50.00 R5 TO 380+00.00 R5	154	58	41	31	37	
	380+00.00 R5 TO 380+50.00 R5	151	53	44	30	34	
	380+50.00 R5 TO 381+00.00 R5	136	43	45	27	28	
	381+00.00 R5 TO 381+50.00 R5	111	35	41	23	21	
	381+50.00 R5 TO 382+00.00 R5	92	26	36	19	14	
	382+00.00 R5 TO 382+50.00 R5	80	20	30	16	10	
	382+50.00 R5 TO 383+00.00 R5	70	21	28	15	9	
	383+00.00 R5 TO 383+19.02 R6	24	8	11	6	3	
		TH NB 35 W TOTALS	16110	5969	5368	3323	3916
	S.P. 6284-162	NB TH 10					
		421+40.65 TO 421+50.00	3	4	2	3	1
		421+50.00 TO 422+00.00	20	24	11	17	7
422+00.00 TO 422+50.00		24	26	15	18	9	
422+50.00 TO 423+00.00		31	30	23	19	11	
423+00.00 TO 423+50.00		48	35	40	21	14	
423+50.00 TO 424+00.00		61	38	86	24	18	
424+00.00 TO 424+50.00		64	37	169	26	24	
424+50.00 TO 425+00.00		78	120	259	59	93	
425+00.00 TO 425+50.00		85	193	341	86	160	
425+50.00 TO 426+00.00		74	160	499	81	159	
426+00.00 TO 426+50.00		76	116	673	81	159	
426+50.00 TO 427+00.00		82	61	797	81	159	
427+00.00 TO 427+50.00		90	16	986	81	159	
427+50.00 TO 428+00.00		97		1236	81	159	
428+00.00 TO 428+50.00		102		1507	81	159	
428+50.00 TO 429+00.00		105		1776	81	159	
429+00.00 TO 429+50.00		109		2033	81	159	
429+50.00 TO 430+00.00		116		2279	81	159	
430+00.00 TO 430+50.00		168		2493	81	159	
430+50.00 TO 431+00.00		336		2711	81	159	
431+00.00 TO 431+50.00		518		2680	79	154	
431+50.00 TO 432+00.00		451		2502	76	150	
432+00.00 TO 432+11.44		75		554	18	34	
432+11.44 TO 432+61.44		225		2284	150	77	
		BRIDGE NO. 62937					
435+33.88 TO 435+93.88		34		894	170	85	
435+93.88 TO 436+00.00		18		97	9	17	
436+00.00 TO 436+50.00		180		752	71	141	
436+50.00 TO 437+00.00		170		684	73	146	
437+00.00 TO 437+50.00	162		578	78	155		
437+50.00 TO 438+00.00	154	40	466	81	159		
438+00.00 TO 438+50.00	114	40	453	81	159		
438+50.00 TO 439+00.00	72		694	81	159		
439+00.00 TO 439+50	71		1025	81	159		
	NB TH 10 TOTALS	3942	940	30574	2131	3522	

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EARTHWORK TABULATION

FILE NO.
 RAMSEI29594
 EW1
 OF EW4

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 367

EARTHWORK TABULATION A						
PROJECT	LOCATION	EXCAVATION		EMBANKMENT (CV)		
		COMMON	SUBGRADE	COMMON	SELECT GRANULAR	GRANULAR
		CU YD	CU YD	CU YD	CU YD	CU YD
S.A.P 062-593-003	S.E. RAMP					
	62+85.00 TO 63+00.00	155	36	13	36	
	63+00.00 TO 63+50.00	548	121	35	121	
	63+50.00 TO 64+00.00	515	121	29	121	
	64+00.00 TO 64+50.00	627	120	19	120	
	64+50.00 TO 65+00.00	744	120	58	120	
	65+00.00 TO 65+50.00	586	120	100	120	
	65+50.00 TO 66+00.00	442	120	105	120	
	66+00.00 TO 66+50.00	516	120	115	120	
	66+50.00 TO 67+00.00	666	125	111	125	
	67+00.00 TO 67+50.00	574	140	93	91	49
	67+50.00 TO 68+00.00	370	158	88	55	104
	68+00.00 TO 68+50.00	282	176	85	61	116
	68+50.00 TO 69+00.00	194	92	267	64	122
	69+00.00 TO 69+50.00	162		779	64	123
	69+50.00 TO 70+00.00	227		1078	64	122
	70+00.00 TO 70+50.00	173		954	64	122
	70+50.00 TO 70+64.58	25		463	19	36
	70+65.00 TO 71+00.00	156		2177	47	94
	71+00.00 TO 71+50.00	291		4285	117	232
	71+50.00 TO 71+75.00	169		2341	51	101
71+75.00 TO 71+97.92	162		2206	48	95	
S.E. RAMP TOTALS		7584	1569	15401	1747	1315
S.A.P 062-593-003	N.E. RAMP					
	40+85.73 TO 41+00.00	9		187	15	27
	41+00.00 TO 41+50.00	274		647	51	95
	41+50.00 TO 42+00.00	422		639	48	90
	42+00.00 TO 42+50.00	342		595	46	86
	42+50.00 TO 43+00.00	318		559	46	86
	43+00.00 TO 43+50.00	290		545	46	86
	43+50.00 TO 44+00.00	246		542	46	86
	44+00.00 TO 44+50.00	217		537	46	86
	44+50.00 TO 45+00.00	224		536	46	86
	45+00.00 TO 45+50.00	249		499	46	86
	45+50.00 TO 46+00.00	267	2	404	46	86
	46+00.00 TO 46+50.00	304	23	300	46	85
	46+50.00 TO 47+00.85	382	52	232	46	87
N.E. RAMP TOTALS		3544	77	6222	574	1072
S.A.P 062-593-003	N.W. RAMP					
	15+50.00 TO 16+00.00	63	131	77	46	85
	16+00.00 TO 16+50.00	52	129	82	46	85
	16+50.00 TO 17+00.00	39	127	73	45	85
	17+00.00 TO 17+50.00	35	122	71	46	85
	17+50.00 TO 18+00.00	66	112	126	46	85
	18+00.00 TO 18+50.00	109	76	239	45	85
	18+50.00 TO 19+00.00	140	23	378	46	85
	19+00.00 TO 19+50.00	119		572	46	85
	19+50.00 TO 20+00.00	87		903	45	85
	20+00.00 TO 20+50.00	99		1160	46	85
20+50.00 TO 20+82.77	74		770	30	56	
N.W. RAMP TOTALS		883	720	4451	487	906

EARTHWORK TABULATION A						
PROJECT	LOCATION	EXCAVATION		EMBANKMENT (CV)		
		COMMON	SUBGRADE	COMMON	SELECT GRANULAR	GRANULAR
		CU YD	CU YD	CU YD	CU YD	CU YD
S.P. 6284-162	NOISE WALL					
	100+00.00 TO 100+50.00	11		25		
	100+50.00 TO 101+00.00	11		27		
	101+00.00 TO 101+50.00	11		23		
	101+50.00 TO 102+00.00	12		28		
	102+00.00 TO 102+50.00	12		30		
	102+50.00 TO 103+00.00	12		30		
	103+00.00 TO 103+50.00	11		22		
	103+50.00 TO 104+00.00	9		17		
	104+00.00 TO 104+50.00	10		18		
	104+50.00 TO 105+00.00	9		15		
	105+00.00 TO 105+50.00	9		15		
	105+50.00 TO 106+00.00	10		19		
	106+00.00 TO 106+50.00	10		18		
	106+50.00 TO 107+00.00	10		17		
	107+00.00 TO 107+50.00	12		22		
	107+50.00 TO 108+00.00	11		19		
	108+00.00 TO 108+50.00	14		11		
	108+50.00 TO 109+00.00	13		13		
	109+00.00 TO 109+50.00	9		14		
	109+50.00 TO 110+00.00	9		18		
	110+00.00 TO 110+50.00	10		20		
	110+50.00 TO 111+00.00	10		18		
	111+00.00 TO 111+50.00	8		13		
	111+50.00 TO 112+00.00	9		17		
	112+00.00 TO 112+50.00	11		24		
	112+50.00 TO 113+00.00	11		26		
	113+00.00 TO 113+50.00	10		20		
	113+50.00 TO 114+00.00	9		17		
	114+00.00 TO 114+50.00	9		21		
	114+50.00 TO 115+00.00	10		25		
	115+00.00 TO 115+50.00	23		37		
	115+50.00 TO 116+00.00	38		47		
	116+00.00 TO 116+50.00	44		44		
116+50.00 TO 117+00.00	51		41			
117+00.00 TO 117+50.00	55		43			
117+50.00 TO 118+00.00	65		43			
118+00.00 TO 118+50.00	95		41			
118+50.00 TO 119+00.00	124		44			
119+00.00 TO 119+50.00	108		50			
119+50.00 TO 120+00.00	81		60			
120+00.00 TO 120+50.00	63		60			
120+50.00 TO 121+00.00	32		44			
121+00.00 TO 121+50.00	14		28			
121+50.00 TO 122+00.00	34		32			
122+00.00 TO 122+50.00	54		41			
122+50.00 TO 123+00.00	75		57			
123+00.00 TO 123+50.00	55		46			
123+50.00 TO 124+00.00	8		14			
124+00.00 TO 124+07.51	1		3			
NOISE WALL TOTALS		1332		1377		

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



PHONE: (651)480-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EARTHWORK TABULATION

FILE NO.
 RAMSE129594
 EW2
 OF EW4

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 367

EARTHWORK TABULATION [A]								
PROJECT	LOCATION	EXCAVATION		EMBANKMENT (CV)				
		COMMON	SUBGRADE	COMMON	SELECT GRANULAR	GRANULAR		
		CU YD	CU YD	CU YD	CU YD	CU YD		
S. A. P 062-593-003	COUNTY H							
	32+20.86 TO 32+25.00	5	10	1	6	13		
	32+25.00 TO 32+50.00	55	115	10	39	76		
	32+50.00 TO 33+00.00	120	242	27	82	160		
	33+00.00 TO 33+50.00	133	256	32	87	169		
	33+50.00 TO 34+00.00	134	264	32	90	174		
	34+00.00 TO 34+50.00	123	276	25	93	182		
	34+50.00 TO 35+00.00	142	312	28	105	207		
	35+00.00 TO 35+50.00	182	356	41	120	235		
	35+50.00 TO 36+00.00	188	372	50	126	246		
	36+00.00 TO 36+50.00	127	325	28	109	216		
	36+50.00 TO 37+00.00	66	288	0	96	192		
	37+00.00 TO 37+50.00	69	328	0	110	221		
	37+50.00 TO 38+00.00	123	378	179	135	267		
	38+00.00 TO 38+50.00	179	402	338	155	304		
	38+50.00 TO 39+00.00	187	420	306	167	326		
	39+00.00 TO 39+50.00	207	449	289	178	349		
	39+50.00 TO 40+00.00	231	463	311	184	360		
	40+00.00 TO 40+50.00	238	478	300	184	362		
	40+50.00 TO 41+00.00	240	510	161	184	362		
	41+00.00 TO 41+50.00	234	537	58	184	362		
	41+50.00 TO 41+58.00	19	86	27	29	58		
	44+01.31 TO 44+50.00	247	492	197	201	394		
	44+50.00 TO 45+00.00	393	765	412	598	1171		
	45+00.00 TO 45+50.00	190	515	107	368	721		
	45+50.00 TO 46+00.00	181	506	117	355	696		
	46+00.00 TO 46+50.00	168	493	79	347	681		
	46+50.00 TO 47+00.00	133	439	100	341	670		
	47+00.00 TO 47+50.00	121	360	240	314	613		
	47+50.00 TO 48+00.00	171	291	406	279	544		
	48+00.00 TO 48+50.00	217	247	413	256	501		
	48+50.00 TO 49+00.00	246	236	378	253	495		
	49+00.00 TO 49+50.00	238	325	552	266	522		
	49+50.00 TO 49+78.98	167	243	425	162	321		
	51+25.52 TO 51+58.00	145	221	303	86	170		
	51+58.00 TO 52+00.00	332	376	556	162	319		
	52+00.00 TO 52+50.00	359	200	491	124	243		
	52+50.00 TO 53+00.00	397	146	744	129	252		
	53+00.00 TO 53+50.00	457	57	1152	130	254		
	53+50.00 TO 53+55.76	57	1	170	15	29		
	53+55.76 TO 56+49.43	BRIDGE NO. 62732						
	56+49.43 TO 57+00.00	310	0	1270	131	258		
	57+00.00 TO 57+50.00	465	0	2233	220	430		
	57+50.00 TO 57+81.34	214	0	1405	115	223		
	59+81.62 TO 60+00.00	160	0	1975	97	190		
	60+00.00 TO 60+50.00	619	0	6376	254	499		
	60+50.00 TO 61+00.00	396	0	1633	162	320		
	61+00.00 TO 61+20.82	88	0	233	33	65		
	COUNTY H TOTALS		9475	12780	24209	7863	15426	

EARTHWORK TABULATION [A]							
PROJECT	LOCATION	EXCAVATION		EMBANKMENT (CV)			
		COMMON	SUBGRADE	COMMON	SELECT GRANULAR	GRANULAR	
		CU YD	CU YD	CU YD	CU YD	CU YD	
S. A. P 062-593-003	HIGHWAY 8						
	200+10.97 TO 200+20.00	123		421	21	42	
	200+20.00 TO 201+00.00	1344		5944	272	536	
	201+00.00 TO 201+50.00	328		2638	102	201	
	201+50.00 TO 201+61.77	72		562	23	46	
	HIGHWAY 8 TOTALS		1866		9566	397	783
S. P. 062-609-006	CO RD 10						
	441+09.85 TO 441+50.00	26	24	27	9	15	
	441+50.00 TO 442+00.00	62	59	61	22	37	
	442+00.00 TO 442+50.00	55	59	47	22	37	
	442+50.00 TO 443+00.00	125	177	200	61	116	
	443+00.00 TO 443+50.00	173	304	208	103	201	
	443+50.00 TO 444+00.00	146	311	49	106	206	
	444+00.00 TO 444+50.00	220	496	78	130	254	
	444+50.00 TO 445+00.00	213	649	57	169	334	
	445+00.00 TO 445+50.00	129	617	0	183	367	
	445+50.00 TO 446+00.00	174	630	61	170	338	
	446+00.00 TO 446+50.00	133	423	86	109	209	
	446+50.00 TO 447+00.00	45	171	39	56	101	
	447+00.00 TO 447+50.00	48	142	23	51	94	
	447+50.00 TO 448+00.00	52	144	20	51	94	
	448+00.00 TO 448+50.00	49	142	22	51	94	
	448+50.00 TO 449+00.00	41	136	26	51	94	
	449+00.00 TO 449+50.00	40	132	28	51	94	
	449+50.00 TO 450+00.00	36	125	32	51	94	
	450+00.00 TO 450+50.00	32	121	38	50	94	
	450+50.00 TO 451+00.00	38	120	41	48	89	
451+00.00 TO 451+50.00	51	115	45	43	79		
451+50.00 TO 452+00.00	61	103	49	37	67		
452+00.00 TO 452+50.00	68	86	52	31	55		
452+50.00 TO 453+00.00	72	78	51	29	50		
453+00.00 TO 453+50.00	72	78	58	29	50		
453+50.00 TO 454+00.00	72	78	63	29	50		
454+00.00 TO 454+33.53	25	26	20	10	17		
CO RD 10 TOTALS		2258	5545	1480	1740	3309	
S. A. P 062-593-003	PROGRAM CONNECTOR						
	59+57.73 TO 60+22.83	35	73	52	39	79	
	60+22.83 TO 60+50.00	28	44	67	29	59	
	60+50.00 TO 61+00.00	211	94	602	70	141	
	61+00.00 TO 61+50.00	356	129	1167	93	188	
	61+50.00 TO 61+80.00	200	47	630	61	122	
61+80.00 TO 61+90.37	77	8	150	23	45		
PROGRAM CONNECTOR TOTALS		907	396	2668	276	555	

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSE129594	12
EW3 OF EW4	367

EARTHWORK SUMMARY [A]

PROJECT	LOCATION	EXCAVATION				EMBANKMENT (CV)				
		COMMON ①	SUBGRADE	STRUCTURE EXCAVATION CLASS U	MUCK ④	COMMON ②	SELECT GRANULAR	GRANULAR	SELECT GRANULAR MOD 10% (CV)	STRUCTURAL BACKFILL
		CU YD	CU YD	CU YD	CU YD	CU YD	CU YD	CU YD	CU YD	CU YD
S.P. 6284-162	TH NB 35 W	16110	5969			5368	3323	3916		
	NB TH 10	3942	940		740	30574	2131	3522		
	BRIDGE 62937 APPROACH PANELS ③	210				2722	146	290	879	
	NOISE WALL	1332				1377				
	RICE CREEK WET POND ③	5530				11				
	NORTH GRADING AREA ③	100				1910				
	RETAINING WALL A ③									47
	RETAINING WALL B ③									288
	RETAINING WALL C ③									214
	SUBTOTAL	27224	6909		740	41962	5600	7728	879	549
⑥	CO RD 10	2258	5545			1480	1740	3309		
	TEMPORARY CROSSOVER ③	1150				552				
	SUBTOTAL	3408	5545			2032	1740	3309		
S.A.P. 062-593-003	S.E. RAMP	7584	1569			15401	1747	1315		
	N.E. RAMP	3544	77			6222	574	1072		
	N.W. RAMP	883	720			4451	487	906		
	BRIDGE 62732 APPROACH PANELS ③	786							1696	
	RICE CREEK WET POND ③	1746				4				
	COUNTY H	9475	12780			24209	7863	15426		
	PROGRAM CONNECTOR	907	396			2668	276	555		
	W-CID ③	1612				2669	719	1288		
	E-CID ③	2370				17412	976	1753		
	HWY 8	1866				9566	397	783		
	FREE RIGHT ③	285				2392	130	245		
	PARKING LOT ③					1674				
	DRIVEWAYS ③	500	1500			1000	670	1340		
	TEMPORARY CROSSOVER ③	200				130				
	RETAINING WALL D ③			961						833
MERMAID WET POND ③	414				54					
ROUNDAABOUT WET POND ③	4468				1355					
PROGRAM WET POND ③	8020				429					
SUBTOTAL	44660	17042	961		89636	13839	24683	1696	833	
S.A.P. 146-020 -011	MERMAID WET POND ③	1875				242				
	PROGRAM WET POND ③	2329				125				
	SUBTOTAL	4204				367				
	TOTAL	79496	29496	961	740	133997	21179	35720	2575	1382

- SPECIFIC NOTES:**
- ① STRIPPING OF SLOPE DRESSING IS INCLUDED IN EXCAVATION-COMMON.
 - ② SLOPE DRESSING EMBANKMENT IS INCLUDED IN COMMON EMBANKMENT.
 - ③ VOLUMES ARE NOT INCLUDED IN EARTHWORK TABULATIONS ON EW1-EW3.
 - ④ FULL EXTENT OF MUCK EXCAVATION SHALL BE DETERMINED IN THE FIELD AT THE TIME OF CONSTRUCTION BY A GEOTECHNICAL FIELD ENGINEER.
 - ⑤ COST PARTICIPATION S.P. 062-609-006 AND S.P. 062-593-003

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Bedetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. BEDETZKE Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EARTHWORK SUMMARY

MISCELLANEOUS REMOVALS B

PROJECT	STATION	LOCATION	REMOVE PIPE CULVERTS	REMOVE SEWER PIPE (STORM)	REMOVE SEWER PIPE (SANITARY)	REMOVE CURB & GUTTER	REMOVE BITUMINOUS CURB	REMOVE CONCRETE CURB	REMOVE CHAIN LINK FENCE	REMOVE CONCRETE MEDIAN BARRIER	REMOVE NOISE WALL	REMOVE BITUMINOUS WALK	REMOVE CONCRETE WALK	REMOVE PAVEMENT	REMOVE CONCRETE PAVEMENT	REMOVE CONCRETE APPROACH PANEL	REMOVE BITUMINOUS PAVEMENT	REMOVE MANHOLE OR CATCH BASIN	PLUG FILL & ABANDON PIPE CULVERT	BULKHEAD CULVERT	ADJUST VALVE BOX - WATER	ADJUST FRAME & RING CASTING			
			①													②									
			LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	SQ FT	SQ FT	SQ YD	SQ YD	SQ YD	SQ YD	EACH	EACH	EACH	EACH	EACH	
A	NB TH 35W																								
	341+58 - 383+19	LT													6876										
		349+51	RT																	1					
		343+88	RT	17																					
		352+86	RT	12																					
		358+30	RT	20																					
		358+08 - 360.68	LT								324														
		358+77 - 360+44	RT	167																					
		SB TH 35W																							
		379+06 - 400+71	LT									2348													
		400+46 - 400+97	LT							80															
		358+58 - 360+46	LT	188																					
		359+00 - 359+32	LT							43															
		NW LOOP INP																							
		8+83 - 3+35	LT & RT												1179										
		5+00	RT	30																					
		5+00	RT																						
		7+26	RT	25																					
		8+00	RT	22																					
		NB TH 10																							
	421+41 - 435+48	LT & RT													2355										
	435+48 - 435+66	LT & RT												29											
	424+51 - 442+15	RT							1834																
	432+28	LT	17																						
	439+26	LT	40																						
	439+86 - 440+13	LT & RT	65																						
	441+50	LT	25																						
	SUBTOTAL		628						1957	324	2348			8084	2355				6	1					
B	CO RD H																								
	41+50 - 42+20	LT & RT					490	57				620	203					831							
	41+98	LT & RT	192																						
	42+20 - 43+18	LT & RT													1572			1557							
	43+18 - 44+00	LT & RT										790	490					1527							
	43+60	LT	31																						
	43+65	LT	31																						
	43+97	LT & RT	88																						
	CO RD 10																								
	446+00	LT & RT	65																						
	446+57	RT	48																						
	TEMPORARY CROSSOVER	LT & RT	400																						
	SUBTOTAL		855				490	289				1410	693		1572			5173							

SPECIFIC NOTES:

- ① CULVERT REMOVAL LENGTH INCLUDES APRONS.
- ② BITUMINOUS OVER CONCRETE. REMOVAL INCLUDES INTEGRAL CURB.

COST PARTICIPATION:

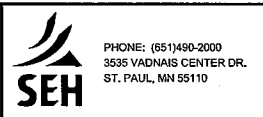
- A S.P. 6284-162
- B S.P. 062-609-006 AND S.P. 062-593-003
- C S.A.P. 062-593-003
- D S.A.P 187-020-019
- E S.A.P 146-020-011

MISCELLANEOUS REMOVALS

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

QUANTITY TABULATIONS

FILE NO. RAMSE129594	14
TB1 OF TB12	367

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2/16/2016

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MISCELLANOUS REMOVALS B

Table with columns: PROJECT, STATION, LOCATION, REMOVE PIPE CULVERTS, REMOVE SEWER PIPE (STORM), REMOVE SEWER PIPE (SANITARY), REMOVE CURB & GUTTER, REMOVE BITUMINOUS CURB, REMOVE CONCRETE CURB, REMOVE CHAIN LINK FENCE, REMOVE CONCRETE MEDIAN BARRIER, REMOVE NOISE WALL, REMOVE BITUMINOUS WALK, REMOVE CONCRETE WALK, REMOVE PAVEMENT, REMOVE CONCRETE PAVEMENT, REMOVE CONCRETE APPROACH PANEL, REMOVE BITUMINOUS PAVEMENT, REMOVE MANHOLE OR CATCH BASIN, PLUG FILL & ABANDON PIPE CULVERT, BULKHEAD CULVERT, ADJUST VALVE BOX - WATER, ADJUST FRAME & RING CASTING. Includes rows for SE RAMP, NE RAMP, NW RAMP, CO RD H, PROGRAM CONNECTOR, TEMPORARY CROSSOVER, SB PARK & RIDE, and SUBTOTAL/TOTAL.

COST PARTICIPATION:

SPECIFIC NOTES:

- 1 CULVERT REMOVAL LENGTH INCLUDES APRONS.
2 BITUMINOUS OVER CONCRETE.

- A S.P. 6284-162
B S.P. 062-609-006 AND S.P. 062-593-003
C S.A.P. 062-593-003
D S.A.P 187-020-019
E S.A.P 146-020-011

MISCELLANEOUS REMOVALS

Table with columns: DESIGN TEAM, DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Heather L. Redetzke, Lic. No. 44267
Printed Name: HEATHER L. REDETZKE Date: 2/16/2016



PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

QUANTITY TABULATIONS

Table with columns: FILE NO., TB2 OF TB12, 15, 367

CLEARING & GRUBBING [C]						
PROJECT	STATION	LOCATION	CLEARING	GRUBBING	CLEARING	GRUBBING
			ACRE	ACRE	TREE	TREE
A	NB TH 35W					
	368+44 - 369+47	RT			4	4
	369+50 - 378+07	RT	0.32	0.32		
	378+86 - 382+24	RT	0.05	0.05		
	SB TH 35W					
	358+59 - 359+14	LT			8	8
	359+95	LT	0.24	0.24		
	379+00 - 388+66	LT	0.36	0.36	1	1
	389+26 - 391+29	LT	0.51	0.51	6	6
	NB TH 10					
439+32	RT			2	2	
439+84 - 440+48	RT			4	4	
440+60 - 441+44	RT	0.14	0.14			
442+76 - 443+77	RT	0.09	0.09			
SUBTOTAL			1.71	1.71	25	25
C	SE RAMP					
	69+60	RT			1	1
	70+70 - 71+78	LT & RT			6	6
	NE RAMP					
	40+79 - 41+45	LT			6	6
	46+88	LT			1	1
	NW RAMP					
	18+04 - 18+65	LT			3	3
	19+92 - 20+86	LT			2	2
	CO RD H					
34+73 - 36+40	RT	0.05	0.05			
36+00 - 41+40	RT			9	9	
36+79 - 40+00	RT	0.25	0.25			
46+25 - 48+00	RT			4	4	
50+00 - 53+50	RT			11	11	
53+50 - 54+10	LT			3	3	
57+50 - 61+25	LT & RT			43	43	
PROGRAM CONNECTOR						
59+50 - 60+10	LT & RT			3	3	
SUBTOTAL			0.55	0.55	92	92
TOTAL			2.26	2.26	117	117

PAVEMENT SAWING [D]					
PROJECT	STATION	LOCATION	SAWING CONCRETE PAVEMENT (FULL DEPTH)	SAWING BIT PAVEMENT (FULL DEPTH)	
			LIN FT	LIN FT	
A	NB TH 35W				
	341+58 - 372+85	RT	4256		
	SB TH 35W				
	360+90 - 362+19	LT	129		
	NB TH 10				
	421+41 - 425+36	LT & RT	437		
	SUBTOTAL			4822	
	B	CO RD H			
		42+20 - 43+18	LT & RT	148	
		CO RD 10			
441+00 - 442+80		RT		173	
446+10 - 454+50		LT & RT		915	
SUBTOTAL			148	1088	
NW RAMP					
15+50		LT & RT	18		
CO RD H					
32+18 - 42+20		LT & RT		238	
43+18 - 48+00	LT & RT		144		
PROGRAM CONNECTOR					
59+50 - 60+10	LT & RT		74		
SB PARK & RIDE					
90+00 - 91+48	LT & RT		250		
SUBTOTAL			18	706	
TOTAL			4988	1794	

BITUMINOUS PAVEMENT [E]							
PROJECT	STATION	LOCATION	DESCRIPTION	TYPE SP 12.5 WEARING COURSE MIX (4,F) (SPWEB440F) (PMB)	TYPE SP 12.5 WEARING COURSE MIX (3,C) (SPWEB340C) (PMB)	TYPE SP 12.5 NON WEAR COURSE MIX (4,B) (SPNWB430B)	MILL BITUMINOUS SURFACE (2.0")
				TON	TON	TON	SQ YD
A	NB TH 35W						
	341+58 - 383+08	RT	ROADWAY/SHOULDER	1646		1234	
	359+18 - 360+01	RT	CTY H BRIDGE PVMT RT	53		40	
	SB TH 35W						
	359+18 - 360+01	LT	CTY H BRIDGE PVMT LT	49		37	
	NB TH 10						
	421+41 - 432+11	RT	ROADWAY/SHOULDER	492		369	
	436+66 - 442+03	RT	ROADWAY/SHOULDER	251		188	
	SUBTOTAL			2491		1868	
	76						
B	CO RD 10						
	441+00 - 442+80	RT	SHOULDER	32		12	
	441+00 - 443+35	RT					90
	446+00	LT & RT					110
	446+10 - 454+50	LT & RT	SHOULDER	397		149	
	TEMPORARY CROSSOVER			285			
	SUBTOTAL			714		161	200
	SE RAMP						
	62+09 - 63+65	LT & RT	ROADWAY	47		35	
	64+43 - 65+69	LT	NB10 BRIDGE PVMT LT	38		29	
63+88 - 65+13	RT	NB10 BRIDGE PVMT RT	38		28		
NE RAMP							
45+81 - 48+99	LT & RT	ROADWAY	133		99		
PROGRAM CONNECTOR							
59+50 - 61+75	LT & RT	ROADWAY		146			
TEMPORARY CROSSOVER			33				
CO RD H							
32+18 - 37+52	LT & RT	ROADWAY	794		298		
32+18 - 51+93	RT	TRAIL	137				
45+91	LT					45	
52+46 - 53+82	LT & RT					2	
56+08 - 57+47	LT & RT					2	
56+50 - 59+00	RT	TRAIL	20				
SB PARK & RIDE							
90+00 - 91+48	LT & RT	PARKING LOT	453		227		
SUBTOTAL			1693	146	716	49	
CO RD H							
56+50 - 59+50	RT	TRAIL	20				
SUBTOTAL			20				
CO RD H							
32+18 - 51+93	RT	TRAIL	137				
SUBTOTAL			137				
TOTAL			5055	146	2745	249	

COST PARTICIPATION:

- A S.P. 6284-162
- B S.P. 062-609-006 AND S.P. 062-593-003
- C S.A.P. 062-593-003
- D S.A.P 187-020-019
- E S.A.P 146-020-011

CLEARING & GRUBBING
PAVEMENT SAWING
BITUMINOUS PAVEMENT

DESIGN TEAM				
DRAWN BY: <u>CJF</u>				
DESIGNER: <u>RDH</u>				
CHECKED BY: <u>HLR</u>				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: Heather L. Redetzke Lic. No. 44267

Printed Name: HEATHER L. REDETZKE Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

QUANTITY TABULATIONS

FILE NO. RAMSEI29594	16
TB3 OF TB12	367

CONCRETE PAVEMENT [F]

PROJECT	STATION	LOCATION	CONCRETE PAVEMENT 8.5"	SUPPLEMENTAL PAVEMENT REINFORCEMENT	DOWEL BAR	EXPANSION JOINTS, DESIGN E8H	PERMANENT HEADER	BRIDGE APPROACH PANELS
			SQ YD	POUND	EACH	LIN FT	LIN FT	SQ YD
A	NB TH 10							
	425+72 - 432+11	LT	856	410	462			
	425+72	LT					13	
	435+94 - 439+51	LT	759	544	349			
	432+11.44	LT & RT						
	435+94	LT & RT						
	436+66	RT					22	
	439+51	LT					14	
	432+11 - 432+97	LT & RT				38		231
	435+05 - 435+94	LT & RT				38		237
SUBTOTAL			1615	954	811	76	49	468
B	CO RD H							
	41+50 - 44+00	LT & RT	4862	2540	3342			
	SUBTOTAL			4862	2540	3342		
C	SE RAMP							
	63+65	LT & RT					12	
	63+65 - 70+65	LT & RT	1338	1267	961			
	NE RAMP							
	40+86 - 45+81	LT & RT	795	310	352			
	45+81	LT & RT					14	
	NW RAMP							
	15+50 - 20+84	LT & RT	833	2324	385			
	15+50						14	
	CO RD H							
53+57 - 54+25	LT & RT				76		175	
56+28 - 56+48	LT & RT				76		175	
CO RD H								
37+50 - 41+50	LT & RT	3310	1428	1955				
44+00 - 48+00	LT & RT	3567	1455	2170				
48+00 - 52+57	LT & RT	4682	4101	2773				
56+48 - 61+20	LT & RT	5683	2818	3482				
SUBTOTAL			20208	13703	12078	152	40	350
TOTAL			26685	17197	16231	228	89	818

FENCE [H]

PROJECT	STATION	LOCATION	CONC MED BARRIER DES 8308 TYPE AA	WIRE FENCE DESIGN 48V-9332
			LIN FT	LIN FT
A	NB TH 35W			
	358+76 - 360+38	LT	166	
	SUBTOTAL			166
C	PROGRAM CONNECTOR			
	59+90 - 61+80	LT		431
	SUBTOTAL			
TOTAL			166	431

COST PARTICIPATION:

- A S.P. 6284-162
- B S.P. 062-609-006 AND S.P. 062-593-003
- C S.A.P. 062-593-003
- D S.A.P 187-020-019
- E S.A.P 146-020-011

CONCRETE ITEMS [G]

PROJECT	STATION	LOCATION	6" CONCRETE WALK	4" CONCRETE WALK	CONCRETE WALK	CONCRETE CURB & GUTTER DESIGN B624	CONCRETE CURB & GUTTER DESIGN D424	CONCRETE CURB & GUTTER DESIGN S524	CONCRETE CURB DESIGN B6	CONCRETE CURB DESIGN V	TRUNCATED DOMES
			SQ FT	SQ FT	SQ FT	LIN FT	LIN FT	LIN FT	LIN FT	LIN FT	SQ FT
A	NB TH 35W										76
	342+79 - 348+78	RT					657				
	348+81 - 348+86	RT	50								
	348+81 - 359+15	RT					1034				
	NB TH 10										
	424+87 - 425+37	LT	523								
	424+87 - 425+37	LT					52				
	424+87 - 431+35	LT					649				
	425+72 - 432+75	RT					702				
	437+23 - 442+03	LT					481				
SUBTOTAL			573				3575				76
B	CO RD H										
	41+50 - 44+00	LT & RT		1036	1343	978				26	260
	SUBTOTAL				1036	1343	978			26	260
C	SE RAMP										
	62+08 - 70+55	LT					845				
	62+08 - 70+55	RT					850				
	70+55 - 70+65	LT				10					
	70+55 - 70+65	RT				10					
	NE RAMP										
	40+86 - 42+15	LT				135					
	40+86 - 42+15	RT				122					
	42+15 - 48+99	LT					685				
	42+15 - 47+82	RT					567				
NW RAMP											
15+50 - 20+74	LT					520					
20+74 - 20+84	LT				10						
15+50 - 20+73	RT					530					
20+73 - 20+83	RT				10						
CO RD H											
32+18 - 41+50	LT & RT		2499	468	2685					38	
44+00 - 48+00	LT & RT		3183	179	1757					26	
48+00 - 52+57	LT & RT		4976	146	2283			330	242	24	
56+48 - 61+20	LT & RT		8904	189	2921			448	360	20	
PROGRAM CONNECTOR											
59+50 - 61+75	LT & RT				471						
CO RD H											
90+00 - 91+15	LT & RT		1013		383						
SUBTOTAL				20575	982	10797	3997	778	602	20	128
D	CO RD H										
	56+48 - 61+20	LT & RT			189						40
	SUBTOTAL					189					40
E	CO RD H										
	32+18 - 41+50	LT & RT			468						38
	44+00 - 48+00	LT & RT			179						26
	48+00 - 52+57	LT & RT			146						24
	SUBTOTAL					793					88
TOTAL			573	21611	3307	11775	7572	778	602	46	592

**CONCRETE PAVEMENT
CONCRETE ITEMS
FENCE**

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2/19/2016

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: Heather L. Redetzke Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 2/19/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

QUANTITY TABULATIONS

FILE NO. RAMSEI29594	17
TB4 OF TB12	367

AGGREGATE I					
PROJECT	STATION	LOCATION	DESCRIPTION	AGGREGATE BASE (CV) CLASS 6	AGGREGATE SURFACING (LV), CLASS 6
				CU YD	CU YD
A	NB TH 35W				
	341+58 - 383+19	RT	TH NB 35W AGGREGATE BASE	1850	
	359+18 - 360+01	RT	CTY H BRIDGE PVMT RT	39	
	SB TH 35W				
	359+18 - 360+01	LT	CTY H BRIDGE PVMT LT	36	
B	NB TH 10				
	421+41 - 439+50	LT & RT	NB TH 10 AGGREGATE	949	
	SUBTOTAL			2874	
	CO RD 10				
	441+00 - 442+80	RT		28	
C	442+80 - 446+10	LT & RT		616	20
	442+70 - 446+40	LT & RT			
	446+10 - 454+50	LT & RT		347	
	TEMPORARY CROSSOVER	LT & RT	TEMPORARY CROSSOVER	321	
	SUBTOTAL			1312	20
D	SE RAMP				
	62+85 - 70+65	LT & RT	SE RAMP AGGREGATE BASE	374	
	64+43 - 65+69	LT	NB10 BRIDGE PVMT LT	28	
	63+88 - 65+13	RT	NB10 BRIDGE PVMT RT	28	
	NE RAMP				
E	40+86 - 47+01	LT & RT	NE RAMP AGGREGATE	240	
	NW RAMP				
	15+50 - 20+83	LT & RT	NW RAMP AGGREGATE	192	
	CO RD H				
	32+18 - 51+93	RT	TRAIL	180	
F	32+18 - 37+52	LT & RT		783	
	37+52 - 41+50	LT & RT		572	
	44+00 - 48+00	LT & RT		644	
	48+00 - 52+57	LT & RT		824	
	56+50 - 59+00	RT	TRAIL	26	
G	56+48 - 61+20	LT & RT		942	
	PROGRAM CONNECTOR				
	59+50 - 61+75	LT & RT		141	
	TEMPORARY CROSSOVER	LT & RT	TEMPORARY CROSSOVER	38	
	SUBTOTAL			5414	
H	CO RD H				
	56+50 - 59+00	RT	TRAIL	26	
	SUBTOTAL			26	
	CO RD H				
	32+18 - 51+93	RT	TRAIL	180	
I	SUBTOTAL			180	
	TOTAL			9806	20

PERMANENT EROSION CONTROL AND TURF ESTABLISHMENT J													
PROJECT	STATION	LOCATION	FERTILIZER TYPE 3	FERTILIZER TYPE 4	SEEDING	SOIL BED PREP	SEED MIXTURE 25-141	SEED MIXTURE 35-241	SEED MIXTURE 33-261	EROSION CONTROL BLANKET CATEGORY 3N	RANDOM RIPRAP CLASS V	GEOTEXTILE FILTER TYPE VII	
			POUND	POUND	ACRE	ACRE	POUND	POUND	POUND	SQ YD	CU YD	SQ YD	
A	NB TH 35W												
	348+86 - 358+62	RT	384		1.10	1.10	65			5303			
	359+99 - 368+51	RT	685		1.96	1.96	116			9481			
	341+58 - 346+00	RT		84	0.56	0.56		20		2695			
	363+14 - 383+19	RT		391	2.61	2.61		95		12616			
	SB TH 35W												
	378+92 - 400+97	LT		278	1.85	1.85		68		8976			
	358+37 - 359+20	LT		15	0.11	0.11		4		514			
	NW LOOP INP												
	2+13 - 9+64	LT & RT		150	1.00	1.00		36		4840			
B	NB TH 10												
	425+37 - 433+50	LT	556		1.59	1.59	94			7675			
	439+77 - 442+05	RT	349		1.00	1.00	58			4816			
	421+41 - 434+24	RT		189	1.26	1.26		46		6104			
	434+77 - 439+77	RT		120	0.80	0.80		30		3873			
	436+20 - 439+17	RT		35	0.24	0.24			8	1140			
	439+68 - 440+13	RT									130	156	
	SUBTOTAL			1974	1262	14.06	14.06	333	299	8	68033	130	156
	CO RD 10												
	441+10 - 444+50	LT	31		0.09	0.09	6			415			
C	441+10 - 444+50	RT		16	0.12	0.12		4		564			
	445+90 - 454+50	LT & RT	100		0.29	0.29	18			1373			
	SUBTOTAL		131	16	0.5	0.5	24	4		2352			
	SE RAMP												
	64+98 - 70+65	RT		77	0.51	0.51		19		2485			
	70+47 - 70+67	LT									12	15	
	NW RAMP												
	15+50 - 21+73	LT & RT		140	0.93	0.93		34		4337			
	CO RD H												
	32+18 - 42+31	LT	111		0.32	0.32	19			1522			
D	32+18 - 42+31	RT	57	62	0.62	0.62	10	13	2	2974			
	43+35 - 50+25	LT	86		0.25	0.25	15			1185			
	43+35 - 52+57	RT	53	39	0.44	0.44	10	10		2111			
	56+85 - 59+50	LT		125	0.92	0.92		27	5	4414			
	58+75 - 61+20	LT & RT		154	1.13	1.13		38		5468			
	PROGRAM CONNECTOR												
	59+50 - 61+75	LT	2	68	0.5	0.5	1	13	4	2399			
	59+50 - 61+75	RT	29		0.09	0.09	6			394			
	W CID												
	20+00 - 23+42	LT	30		0.09	0.09	6			406			
E	E CID												
	10+00 - 14+60	LT	73		0.21	0.21	12			990			
	SUBTOTAL		441	665	6.02	6.02	79	154	11	28685	12	15	
	TOTAL		2546	1943	20.58	20.58	436	457	19	99070	142	171	

SPECIFIC NOTES:

- ① NATURAL NETTING ONLY.
- ② COMMERCIAL FERTILIZER ANALYSIS 22-5-10, TO BE APPLIED AT 200 LBS/ACRE.
- ③ COMMERCIAL FERTILIZER ANALYSIS 18-1-8, TO BE APPLIED AT 150 LBS/ACRE.

COST PARTICIPATION:

- A S.P. 6284-162
- B S.P. 062-609-006 AND S.P. 062-593-003
- C S.A.P. 062-593-003
- D S.A.P 187-020-019
- E S.A.P 146-020-011

AGGREGATE PERMANENT EROSION CONTROL AND TURF ESTABLISHMENT QUANTITY TABULATIONS

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDEZKE Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TEMPORARY EROSION CONTROL [K]

PROJECT	STATION	LOCATION	SILT FENCE, TYPE MS	STORM DRAIN INLET PROTECTION	SEDIMENT CONTROL LOG TYPE WOOD FIBER	CULVERT END CONTROLS	SEEDING ①	SEED MIXTURE 22-112 ①	FERTILIZER TYPE 1 ②	SEDIMENT CONTROL LOG TYPE COMPOST	RAPID STABILIZATION METHOD 3	RAPID STABILIZATION METHOD 4
			LIN FT	EACH	LIN FT	EACH	ACRE	POUND	POUND	LIN FT	M GALLON	SQ YD
A	NB TH 35W 341+58 - 383+19	RT		8	627	3	12.44	1244	2487	2396	75	11615
	SB TH 35W 378+92 - 400+98	LT				1	3.92	392	784	5325	24	
	NW LOOP INP 0+98 - 9+64	RT	1005				2.00	200	400	300	12	
	NB TH 10 425+75 - 443+00	LT & RT		9		1	9.75	975	1951	1593	20	17562
SUBTOTAL			1005	17	627	5	28.11	2811	5622	9614	131	29177
B	CO RD 10 441+10 - 444+50	LT	191				0.18	18	36		1	
	441+10 - 444+50	RT	388				0.24	24	48		1	1282
	445+90 - 454+50	RT	119				0.58	58	116		4	
	SUBTOTAL			698				1.00	100	200	6	1282
C	SE RAMP 62+00 - 70+50	LT & RT		8			1.03	103	205	541	20	3282
	NE RAMP 40+85 - 50+00	RT	356	5		2						4742
	NW RAMP 15+50 - 21+67	RT	273	7		1	1.87	187	374	758	11	
	CO RD H 31+00 - 42+31	LT	940	12		1	0.64	64	128		5	
	31+00 - 42+31	RT	1065	16		1	1.24	124	248		4	4831
	43+35 - 52+57	LT	571	12			0.5	50	100		2	
	43+35 - 52+57	RT	985	13			0.88	88	176		4	629
	56+50 - 61+20	LT		9			1.84	184	368		10	4214
	56+50 - 61+20	RT	803	5			2.26	226	452		17	1389
	PROGRAM CONNECTOR											
59+50 - 61+75	LT	420	4			1.00	100	200		3	1315	
59+50 - 61+75	RT	269	3		1	0.18	18	36		1		
W CID 20+00 - 23+42	LT					0.18	18	36		1		
E CID 10+00 - 14+60	LT					0.42	42	84		3		
SUBTOTAL			5682	94		6	12.04	1204	2407	1299	81	20402
TOTAL			7385	111	627	11	41.15	4115	8229	10913	218	50861

③ PONDS [L]

PROJECT	STATION	LOCATION	DESCRIPTION (WET POND)	GEOTEXTILE FILTER TYPE IV	COARSE FILTER AGGREGATE (CV)	FINE FILTER AGGREGATE (CV)	RANDOM RIPRAP CLASS 1	SANDY CLAY LOAM TOPSOIL BORROW	EROSION CONTROL BLANKET CATEGORY 4N	TURF REINFORCEMENT MAT CATEGORY 3
				SQ YD	CU YD	CU YD	CU YD	CU YD	SQ YD	SQ YD
A	NB TH 10 436+00 - 439+00	RT	RICE CREEK	504	126		168	13	77	77
	SUBTOTAL			504	126		168	13	77	77
C	NB TH 10 436+00 - 439+00	RT	RICE CREEK	120	30		40	3	19	19
	CO RD H 41+40	RT	MERMAID		20	20	26	2	9	9
	57+50	LT	ROUNDABOUT		366	366	488			
	PROGRAM AVE 60+50				365	365	487			
SUBTOTAL			120	781	751	1041	5	28	28	
E	CO RD H 41+40	RT	MERMAID		87	87	116	7	37	37
	PROGRAM AVE 60+50				106	106	142			
	SUBTOTAL				193	193	258	7	37	37
TOTAL			624	1100	944	1467	25	142	142	

SPECIFIC NOTES:

- ① TEMPORARY SEEDING AREAS SHALL BE DETERMINED BY THE ENGINEER.
- ② COMMERCIAL FERTILIZER ANALYSIS 10-10-20, TO BE APPLIED AT 200 LBS/ACRE.
- ③ TURF ESTABLISHMENT ITEMS FOR POND AREAS WHICH ARE NOT INCLUDED IN POND TAB ARE INCLUDED IN TAB K.

TEMPORARY EROSION CONTROL PONDS

COST PARTICIPATION:

- A S.P. 6284-162
- B S.P. 062-609-006 AND S.P. 062-593-003
- C S.A.P. 062-593-003
- D S.A.P 187-020-019
- E S.A.P 146-020-011

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDEZKE Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

QUANTITY TABULATIONS

FILE NO. RAMSE129594
 TB6 OF TB12
 19
 367

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2/22/2016

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PROJECT	STATION	LOCATION	GUARDRAIL <input checked="" type="checkbox"/>												
			REMOVE				SALVAGE		FURNISH AND INSTALL						
			REMOVE GUARDRAIL-PLATE BEAM	REMOVE ENERGY ABSORBING TERMINAL	REMOVE TWISTED END TREATMENT	REMOVE ECCENTRIC LOADER BCT	REMOVE ANCHORAGE ASSEMBLY-PLATE BEAM	SALVAGE GUARDRAIL-PLATE BEAM ①	SALVAGE ENERGY ABSORBING TERMINAL	TRAFFIC BARRIER DESIGN SPECIAL	TRAFFIC BARRIER DESIGN B8338	T-BARRIER BRIDGE CONN DES 8318	INSTALL TRAFFIC BARRIER DESIGN B8338	INSTALL ENERGY ABSORBING TERMINAL	END TREATMENT-TANGENT TERMINAL
LIN FT	EACH	EACH	EACH	EACH	LIN FT	EACH	LIN FT	LIN FT	EACH	LIN FT	EACH	EACH	EACH		
A	NB TH 35W														
	344+07 - 345+90	RT				143	1 (3)								
	353+59 - 359+90	RT	628	1 (3)											
	344+12 - 345+39	RT									143	1			
	358+76 - 360+38	LT													
	SB TH 35W														
	356+08 - 362+47	LT	640	1 (3)											
	356+08 - 361+02	LT													
	NB TH 10														
	421+41 - 432+74	RT													
430+35 - 431+35	LT														
435+94 - 441+99	RT														
437+23 - 437+92	LT														
SUBTOTAL			1268	2		143	1	50	2151	2	143	1	3	3	
B	WB HWY 10														
	441+10 - 442+70	RT	175												
	SUBTOTAL		175						25	150					
C	SE RAMP														
	63+28 - 70+64	LT													
	62+29 - 65+16	RT													
	69+41 - 70+65	RT													
	CO RD H														
	32+18 - 41+50	LT & RT	162												
	36+80 - 36+86	RT				2									
	37+35 - 37+42	RT													
	52+46 - 53+82	LT & RT	260		2										
	56+08 - 57+47	LT & RT	240		2										
47+90 - 50+00	LT														
SUBTOTAL		662		4	2			50	1513			9	3		
TOTAL		2105	2	4	2	2	143	1	125	3814	2	143	1	12	6

PROJECT	STATION	LOCATION	SUBSURFACE DRAINAGE <input checked="" type="checkbox"/>	
			4" PERF PE PIPE DRAIN	4" PRECAST CONCRETE HEADWALL
			LIN FT	EACH
A	NB TH 35W			
	342+79 - 348+78	RT	689	3
	348+81 - 359+15	RT	956	
	NB TH 10			
	425+72 - 432+75	RT	720	1
SUBTOTAL			2365	4
B	CO RD H			
	41+50 - 44+00	LT & RT	800	
	SUBTOTAL		800	
C	SE RAMP			
	62+08 - 70+65	RT	847	
	NE RAMP			
	40+86 - 47+20	RT	622	
	NW RAMP			
	15+50 - 20+23	RT	522	
	CO RD H			
	32+18 - 41+50	LT & RT	1850	
	44+00 - 48+00	LT & RT	850	
	48+00 - 52+57	LT & RT	1345	
56+48 - 61+20	LT & RT	1472		
PROGRAM CONNECTOR				
59+50 - 61+75	LT & RT	406		
SUBTOTAL			7914	
TOTAL			11079	4

COST PARTICIPATION:

- A S.P. 6284-162
- B S.P. 062-609-006 AND S.P. 062-593-003
- C S.A.P. 062-593-003
- D S.A.P 187-020-019
- E S.A.P 146-020-011

SPECIFIC NOTES:

- ① SALVAGE GUARD RAIL-PLATE BEAM TO INCLUDE SALVAGE OF TRAFFIC BARRIER SPECIAL.
- ② THE FOLLOWING STRUCTURES SHALL BE CONSTRUCTED WITH TWO A-7D CASTINGS: CB-2305, STM-1210, STM-1409, STM-1507, AND STM-2206. SEE SHEET MD2.
- ③ TYPE ET-2000.
- ④ SEE SHEET SPN37 FOR TRAFFIC BARRIER DESIGN SPECIAL DETAIL.
- ⑤ SEE SHEET SPN38 AND SPN39 FOR TRAFFIC BARRIER DESIGN SPECIAL DETAIL.

CASTING ASSEMBLIES SUMMARY

ASSEMBLY	ASSEMBLY REQUIRED	ASSEMBLY REQUIRED	ASSEMBLY REQUIRED	ASSEMBLY REQUIRED	CASTING NUMBER	STANDARD PLATE NO.
	S.P.	S.P.	S.A.P.	S.A.P.		
	6284-162	062-609-006	062-593-003	146-020-011		
A-7D ②	2	6	7		RING CASTING NO. 700-7	4101
					COVER CASTING 715	4110
B-5		5	40	2	GRATE CASTING NO. 816	4154
					CURB BOX NO. 823A	4160
					FRAME CASTING NO. 802A	4129
D-4	17		17		GRATE CASTING NO. 816	4154
					FRAME CASTING NO. 805	4132
M-11		1	1		FRAME AND GRATE CASTING NO. 731, STOOL	4143
S-5			3		GRATE CASTING NO. 816	4154
					FRAME CASTING NO. 805	4132
TOTALS	19	12	68	2		

GUARDRAIL
SUBSURFACE DRAINAGE
CASTING ASSEMBLIES SUMMARY

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
	NO.	BY	DATE
REVISIONS			

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: Heather L. Redetzke Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 2/22/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

QUANTITY TABULATIONS

FILE NO.	20
RAMSEI29594	
TB7	367
OF TB12	

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2/16/2016

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DRAINAGE M

Main data table with columns: COST PART., STRUCTURE NO., STRUCTURE LOCATION, PAY HEIGHT LIN FT, PIPE SEWER DESIGN 3006, CLASS B PIPE BEDDING, PIPE APRONS, RANDOM RIPRAP, and NOTES.

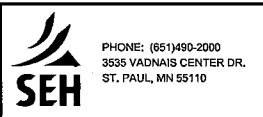
- NOTES:
1. ALL CONCRETE PIPE SEWER IS DESIGN 3006 GASKET JOINT PIPE WITH CLASS B BEDDING.
2. THE OUTLET ELEVATION IS THE INVERT ELEVATION OF THE PIPE AT THE INSIDE EDGE OF THE FLOWS FROM STRUCTURE.
3. THE INLET ELEVATION IS THE INVERT ELEVATION OF THE PIPE AT THE INSIDE EDGE OF THE FLOWS TO STRUCTURE.
4. THE INVERT ELEVATIONS ON THE PROFILES ARE AT THE CENTER OF THE STRUCTURE.
5. PAY HEIGHT SHALL BE FROM THE TOP OF THE STRUCTURE (BOTTOM OF THE RINGS) TO THE FINAL INVERT PLUS 0.7'.
6. THE CASTING STATION AND OFFSET IS GIVEN IN THE FIRST LINE OF EACH PIPE RUN.
7. THE STRUCTURE BOTTOM STATION AND OFFSET IS GIVEN IN THE SECOND LINE OF EACH PIPE RUN.
8. FOR CONCRETE PIPES WITH APRONS: THE LOCATION OF THE APRON IS THE OUTLET, INVERT END OF THE APRON.
9. THE LENGTH IN THE TABULATION WILL BE ADJUSTED FOR THE TYPE OF APRON LISTED.
10. FOR STRUCTURES WITH SUMPS WHERE THE INVERT OF THE STRUCTURE IS BELOW THE INVERT OF THE OUTLET PIPE,
11. THE PAY HEIGHT IS CALCULATED TO INCLUDE THE SUMP DISTANCE.

- SPECIFIC NOTES:
1. SEE MISCELLANEOUS DETAIL SHEET MD2 FOR SAFL BAFFLE STRUCTURE REQUIREMENTS.
2. CONNECT TO EXISTING STORM SEWER.
3. SEE MISCELLANEOUS DETAIL SHEET MD2 FOR ELEVATION LOCATIONS OF STRUCTURES AND HOW PIPE SLOPE IS CALCULATED.
4. CASTING TO INCLUDE CURB BOX. ALL OTHER CASTINGS SHOULD BE CONSTRUCTED WITHOUT CURB BOX.
5. NOT USED.
6. SEE MISCELLANEOUS DETAIL SHEET MD2 FOR PIPE BEDDING REQUIREMENTS.
7. REFER TO STANDARD PLATE 3133 FOR RIPRAP. NO SUMP FOR RIPRAP AT STORM SEWER INLET APRONS.
8. TOP OF CASTING ELEVATIONS SHOWN MAY NOT BE EXACT. ELEVATIONS AT STRUCTURE LOCATIONS SHALL BE DETERMINED IN THE FIELD FROM THE SAWCUT LOCATION. CALCULATE ELEVATIONS FROM SLOPES SHOWN ON THESE PLANS AND ON THE TYPICAL SECTIONS.
9. CONSTRUCT CONCRETE INLET PAD.
10. CONSTRUCT STRUCTURE WITH TWO CASTINGS IN TOP SLAB. SEE SHEET MD2.
11. NOT USED.
12. CONSTRUCT APRON WITH SAFETY GRATE. SEE SHEET MD10A FOR DETAIL.

COST CODES:
A = S.P. 6284-162
B = S.P. 062-609-006 AND S.P. 062-593-003
C = S.A.P. 062-593-003
D = S.A.P. 187-020-019
E = S.A.P. 146-020-011

DESIGN TEAM table with columns: DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Rachel E. Pichelmann, Ltc. No. 51315
Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W), S.A.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSEY129594, QUANTITY TABULATIONS, TB8 OF TB12, 21, 367

11/28/06 AM

2/16/2016

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DRAINAGE M

Main data table with columns: STRUCTURE NO., STRUCTURE LOCATION, PAY HEIGHT, PIPE SEWER DESIGN 3006, CLASS B PIPE BEDDING, PIPE APRONS, RANDOM RIPRAP, and NOTES.

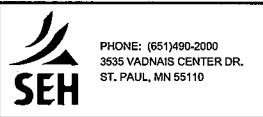
- NOTES: 1. ALL CONCRETE PIPE SEWER IS DESIGN 3006 GASKET JOINT PIPE WITH CLASS B BEDDING. 2. THE OUTLET ELEVATION IS THE INVERT ELEVATION OF THE PIPE AT THE INSIDE EDGE OF THE FLOWS FROM STRUCTURE.

- SPECIFIC NOTES: 1. SEE MISCELLANEOUS DETAIL SHEET MD2 FOR SAFL BAFFLE STRUCTURE REQUIREMENTS. 2. CONNECT TO EXISTING STORM SEWER.

COST CODES: A = S.P. 6284-162 B = S.P. 062-609-006 AND S.P. 062-593-003

Table with columns: DESIGN TEAM, DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

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RAMSEY COUNTY, MINNESOTA TH 35W / COUNTY ROAD H S.P. NO. 6284-162 (TH35W), S.P. 062-609-006, S.A.P. 062-593-003

QUANTITY TABULATIONS

Table with columns: FILE NO. (22), TB9 OF TB12, 367

11/28/07 AM

2/16/2016

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DRAINAGE M

Main data table with columns: COST PART., STRUCTURE NO., STRUCTURE LOCATION, PAY HEIGHT, DRAINAGE STRUCTURES, PIPE SEWER DESIGN 3006, CLASS B PIPE BEDDING, PIPE APRONS, RANDOM RIPRAP, GRANULAR FILTER MATERIAL, GEOTEXTILE FILTER, GUIDE POST, NOTES.

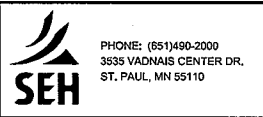
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- SPECIFIC NOTES:
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2. CONNECT TO EXISTING STORM SEWER.
3. SEE MISCELLANEOUS DETAIL SHEET MD2 FOR ELEVATION LOCATIONS OF STRUCTURES AND HOW PIPE SLOPE IS CALCULATED.
4. CASTING TO INCLUDE CURB BOX. ALL OTHER CASTINGS SHOULD BE CONSTRUCTED WITHOUT CURB BOX.
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11. NOT USED.
12. CONSTRUCT APRON WITH SAFETY GRATE. SEE SHEET MD10A FOR DETAIL.

COST CODES:
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DESIGN TEAM table with columns: DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Rachel F. Pichlmann, L.C. No. 51315
Printed Name: RACHEL F. PICHLMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W), S.P. 062-609-006, S.A.P. 062-593-003

Quantity Tabulations table with columns: FILE NO., TB10 OF TB12, 23, 367

11/28/07 AM

2/16/2016

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COST PART.	STRUCTURE NO.		STRUCTURE LOCATION			DRAINAGE STRUCTURES															PIPE SEWER DESIGN 3006												CLASS B PIPE BEDDING		PIPE APRONS		RANDOM RIPRAP			NOTES
						PAY HEIGHT					CASTING ASSEMBLY TYPE	CONE TYPE	STEPS REQ'D	TOP OF CASTING ELEV	OUTLET ELEV	INLET ELEV	PIPE SLOPE %	LIN FT												APRON	APRON TYPE	CU YD								
	H	F	G	48-4020	60-4020	72-4020	SPECIAL 1	SPECIAL 2	SPECIAL 3	12" RCP CL V								15" RCP CL V	18" RCP CL III	18" RCP CL IV	24" RCP CL III	24" RCP CL IV	27" RCP CL IV	30" RCP CL II	30" RCP CL III	36" RCP CL V	36" RCP CL II	44" SPAN RCP-A CL IIA	GRANULAR BED-DING CU YD			AGGRE-GATE BACK-FILL CU YD	CL II	CL III	CL V	GRANULAR FILTER MATERIAL CU YD	GEOTEXTILE FILTER TYPE IV SQ YD	GUIDE POST TYPE B EACH		
	FROM	TO	ALIGN	STATION	OFFSET	TYPE																																		
	CB-2609	CB-2608	NBTH10	425+75.00	15.0' LT	CB	3.5																																	
A	CB-2610	STM-2611	NBTH10	427+15.00	15.0' LT	CB																												⑨						
	CB-2610	STM-2611	NBTH10	427+15.00	15.8' LT	CB		16.7																																
C	FES-1002	CB-1003	PROG-CONN	60+45.00	29.0' RT	APR																																		
C/E	FES-1005	CB-1003	PROG-CONN	60+30.00	33.5' LT	APR																																		
C	FES-1108		WBCRH	50+66.50	102.5' LT	APR																																		
B	FES-1205	CB-1206	WBCRH	43+43.00	76.0' LT	APR																																		
B	FES-1211		EBCRH	43+93.00	68.0' RT	APR																																		
B	FES-1400	STM-1401	EBCRH	16+41.00	47.0' RT	APR																																		
B	FES-1402	STM-1403	EBCRH	16+50.00	42.0' LT	APR																																		
B	FES-1410		EBCRH	41+52.00	77.0' RT	APR																																		
C/E	FES-1411	STM-1412	EBCRH	41+18.50	127.0' RT	APR																																		
C	FES-1510		EBCRH	37+55.00	66.0' RT	APR																																		
C	FES-1613		SB_HWY8	200+40.00	80.5' LT	APR																																		
C	FES-1614	STM-1615	SB_HWY8	201+96.00	86.0' LT	APR																																		
C	FES-1616		NB_HWY8	201+72.00	70.0' RT	APR																																		
C	FES-2001	CB-2101	NERAMP	47+90.00	30.0' RT	APR																																		
C	FES-2002		NERAMP	45+00.00	58.0' LT	APR																																		
C	FES-2003		NERAMP	46+00.00	40.0' LT	APR																																		
C	FES-2004	CB-2201	NWRAMP	16+39.71	35.0' RT	APR																																		
C	FES-2005		NWRAMP	16+39.71	46.0' LT	APR																																		
C	FES-2007		SERAMP	68+24.83	44.8' LT	APR																																		
A	FES-2008		SERAMP	61+30.00	30.0' RT	APR																																		
A	FES-2009		35WNB	343+88.59	59.0' RT	APR																																		
C	FES-2010		SERAMP	67+53.85	48.9' LT	APR																																		
C	FES-2011	CB-2306	SERAMP	61+97.00	55.0' RT	APR																																		
C	FES-2012	FES-2013	35WNB	360+77.92	136.4' RT	APR																																		
C	FES-2013		35WNB	358+46.00	141.6' RT	APR																																		
A	FES-2014		NBTH10	437+01.48	68.3' RT	APR																																		
	FES-2014					APR																																		

NOTES:
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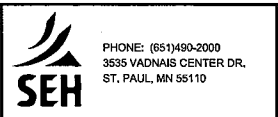
SPECIFIC NOTES:
 ① SEE MISCELLANEOUS DETAIL SHEET MD2 FOR SAFL BAFFLE STRUCTURE REQUIREMENTS.
 ② CONNECT TO EXISTING STORM SEWER.
 ③ SEE MISCELLANEOUS DETAIL SHEET MD2 FOR ELEVATION LOCATIONS OF STRUCTURES AND HOW PIPE SLOPE IS CALCULATED.
 ④ CASTING TO INCLUDE CURB BOX. ALL OTHER CASTINGS SHOULD BE CONSTRUCTED WITHOUT CURB BOX.
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COST CODES:
 A = S.P. 6284-162
 B = S.P. 062-609-006 AND S.P. 062-593-003
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 D = S.A.P. 187-020-019
 E = S.A.P. 146-020-011

DESIGN TEAM			
DRAWN BY: C/F			
DESIGNER: REP			
CHECKED BY: REP			

NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: Rachel F. Pichelmann Lic. No. 51315
 Printed Name: RACHEL F. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSEY129594	24
TB11 OF TB12	367

DRAINAGE

11/28/08 AM

2/16/2016

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DRAINAGE M

Table with columns: COST PART., STRUCTURE NO., STRUCTURE LOCATION, PAY HEIGHT, DRAINAGE STRUCTURES, PIPE SEWER DESIGN 3006, CLASS B PIPE BEDDING, PIPE APRONS, RANDOM RIPRAP, GRANULAR FILTER MATERIAL, GEOTEXTILE FILTER, GUIDE POST, NOTES. Includes a 'TOTALS' row at the bottom of the table.

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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.A.P. 062-609-006, S.A.P. 062-593-003

Table with columns: FILE NO. (RAMSEI29594), QUANTITY TABULATIONS (25), TB12 OF TB12, 367

UTILITIES

N

STATION TO STATION	LOCATION	OFFSET TO OFFSET FT	ITEM IN PLACE	OWNER	RELOCATE	ADJUST	LEAVE	REMARKS
30+00 TO 32+91	EBCRH	30 LT TO 33 LT	T-BUR	CL	X			
58+25 TO 58+41	EBCRH	32 LT TO 30 RT	FO	CL	X			X-ING @ STA 58+34
32+91 TO 34+74	WBCRH	33 LT TO 31 LT	T-BUR	CL	X			
34+74	WBCRH	31 LT	PED	CL	X			
34+74 TO 40+81	WBCRH	31 LT TO 22 LT	T-BUR	CL	X			
40+81 TO 41+50	WBCRH	22 LT TO 38 LT	T-BUR	CL	X			
41+68 TO 43+43	WBCRH	82 LT TO 57 LT	T-BUR	CL	X			
43+43 TO 43+50	WBCRH	57 LT TO 37 LT	T-BUR	CL	X			
43+50 TO 46+04	WBCRH	37 LT TO 22 LT	T-BUR	CL	X			
46+04 TO 49+18	WBCRH	22 LT TO 0	F/O	CL	X			X-ING @ STA 49+18
49+18 TO 51+25	WBCRH	0 TO 52 RT	F/O	CL	X			X-ING @ STA 51+25
51+25 TO 51+77	WBCRH	52 RT TO 0	F/O	CL	X			X-ING @ STA 51+77
51+77 TO 56+49	WBCRH	0 TO 8 LT		CL	X			
56+49 TO 57+84	WBCRH	8 LT TO 33 LT	F/O	CL	X			
57+84 TO 59+06	WBCRH	33 LT TO 1 LT	F/O	CL	X			
59+06 TO 61+92	WBCRH	1 LT TO 154 LT	F/O	CL	X			
61+92 TO 62+11	WBCRH	154 LT TO 36 LT	F/O	CL	X			
51+00 TO 51+72	WBCRH	0 TO 81 RT	FO	CL	X			
58+72 TO 58+41	WBCRH	0 TO 77 RT	FO	CL	X			
425+76 TO 432+81	NB TH10	41 RT TO 0	FO	CL	X			X-ING @ STA 432+81
432+81 TO 435+35	NB TH10	0 TO 23 LT	FO	CL	X			
435+35 TO 437+71	NB TH10	23 LT TO 0	FO	CL	X			X-ING @ STA 437+71
437+71 TO 438+39	NB TH10	0 TO 6 RT	FO	CL	X			
438+39 TO 441+78	NB TH10	6 RT TO 250 RT	FO	CL	X			
436+89 TO 440+55	NB TH10	46 LT TO 0	FO	CL	X			X-ING @ STA 440+55
440+55 TO 443+90	NB TH10	0 TO 34 RT	FO	CL	X			
439+00 TO 442+16	NB TH10	0 TO 22 RT	FO	CL	X			
40+26 TO 47+88	NE RAMP	0 TO 3 RT		CL				
359+78	NB TH35	0	FO	CL	X			X-ING @ STA 359+78
363+37 TO 363+37	NB TH35	0 TO 52 RT		CL	X			
363+37 TO 365+34	NB TH35	52 RT TO 55 RT	FO	CL	X			
354+00 TO 364+00	NB TH35	57 RT TO 70 RT	FO	CL	X			
364+00 TO 366+00	NB TH35	70 RT TO 70 LT	FO	CL	X			X-ING @ STA 365+19
10+00 TO 14+00	NW RAMP	64 RT TO 50 RT	FO	CL			X	
14+00 TO 14+78	NW RAMP	50 RT TO 69 LT		CL			X	X-ING @ STA 14+44
14+00 TO 19+56	NW RAMP	50 RT TO 136 RT	FO	CL	X			
19+56 TO 20+68	NW RAMP	136 RT TO 27 LT		CL	X			X-ING @ STA 20+48
20+68 TO 21+74	NW RAMP	27 LT TO 14 LT	FO	CL	X			
423+59 TO 437+95	NB TH10	21 RT TO 42 LT	P-BUR	XCEL-E	X			X-ING @ STA 427+24
443+59 TO 443+59	NB TH10	4 RT TO 14 RT	P-BUR	XCEL-E	X			
40+84 TO 44+02	NE RAMP	0 TO 0	P-BUR	XCEL-E	X			
44+02 TO 47+02	NE RAMP	0 TO 24 LT	P-BUR	XCEL-E	X			
47+02 TO 51+85	NE RAMP	24 LT TO 22 RT	P-BUR	XCEL-E	X			X-ING @ STA 48+06
10+00 TO 13+96	NW RAMP	41 RT TO 22 RT	P-BUR	XCEL-E			X	
13+96 TO 17+00	NW RAMP	22 RT TO 18 RT	P-BUR	XCEL-E	X			
17+00 TO 18+57	NW RAMP	18 RT TO 47 RT	P-BUR	XCEL-E	X			
427+63 TO 436+89	NB TH10	15 RT TO 46 LT	FO	CL	X			X-ING @ STA 430+43

ABBREVIATIONS	
FO-BUR	= FIBER OPTIC LINE BURIED
GAS	= GAS LINE BURIED
OHP	= POWER LINE OVERHEAD
CP	= COMMUNICATION POLE
POLE	= LIGHT POLE
P-BUR	= POWER LINE BURIED
P-POLE	= POWER POLE
CLIN	= COMMUNICATION LINE
SAN	= SANITARY SEWER LINE
SAN MH	= SANITARY SEWER MANHOLE
SGL	= SIGNAL LIGHT
SIG-INT	= SIGNAL INTERCONNECT
T-BUR	= TELEPHONE LINE BURIED
T-PED	= TELEPHONE PEDESTAL
T-POLE	= TELEPHONE POLE
WATER	= WATER LINE BURIED
WVALV	= WATER VALVE

GENERAL NOTES:

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ACS	= ARVIG COMMUNICATION SYSTEMS
CL	= CENTURY LINK
XCEL-E	= XCEL ENERGY (ELECTRIC)
XCEL-G	= XCEL ENERGY (GAS)
CTY MV	= CITY OF MOUNDS VIEW
CTY AH	= CITY OF ARDEN HILLS

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12/4/2015

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SMODELNAME\$

DESIGN TEAM				
DRAWN BY: RBC				
DESIGNER: NMG				
CHECKED BY: WCK				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Nicole Gulick* Lic. No. 45642
Printed Name: NICOLE GULLICK, P.E. Date: 12/4/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSE129594	26
UT1 OF UT4	367

UTILITIES

N

STATION TO STATION	LOCATION	OFFSET TO OFFSET FT	ITEM IN PLACE	OWNER	RELOCATE	ADJUST	LEAVE	REMARKS
100+71	NWALL .1	10 RT	GUY	XCEL-E	X			
100+73	NWALL .1	17 RT	SAN MH	CTY MV			X	
100+81	NWALL .1	7 RT	PP	XCEL-E	X			
102+97	NWALL .1	2 LT	TEL BOX	CL	X			
103+53	NWALL .1	5 RT	COMM BOX	CL	X			
104+47	NWALL .1	11 RT	COMM BOX	CL	X			
105+27	NWALL .1	7 RT	COMM BOX	CL	X			
106+26	NWALL .1	7 RT	TEL BOX	CL	X			
107+14	NWALL .1	4 RT	COMM BOX	CL	X			
109+25	NWALL .1	10 RT	COMM BOX	CL	X			
110+20	NWALL .1	6 RT	COMM BOX	CL	X			
111+06	NWALL .1	37 RT	LP	MNDOT			X	
111+10	NWALL .1	0	COMM BOX	CL	X			
111+81	NWALL .1	17 LT	GUY	XCEL-E			X	
111+88	NWALL .1	18 LT	PP	XCEL-E			X	
111+92	NWALL .1	13 LT	GUY	XCEL-1			X	
112+11	NWALL .1	5 LT	TEL BOX	CL	X			
113+17	NWALL .1	4 LT	COMM BOX	CL	X			
113+33	NWALL .1	39 LT	LP	MNDOT			X	
113+52	NWALL .1	18 LT	PP	XCEL-E			X	
114+24	NWALL .1	5 LT	COMM BOX	CL	X			
115+57	NWALL .1	43 RT	LP	MNDOT			X	
115+62	NWALL .1	20 LT	PP	XCEL-E			X	
115+62	NWALL .1	16 RT	GUY	XCEL-E			X	
115+68	NWALL .1	6 RT	COMM BOX	CL	X			
116+34	NWALL .1	11 RT	PP	XCEL-E	X			
117+05	NWALL .1	5 LT	COMM BOX	CL	X			
117+55	NWALL .1	19 RT	PP	XCEL-E			X	
117+55	NWALL .1	14 LT	GUY	XCEL-E			X	
117+74	NWALL .1	4 RT	COMM BOX	CL		X		
117+74	NWALL .1	8 RT	COMM BOX	CL		X		
117+77	NWALL .1	7 RT	COMM BOX	CL		X		
117+81	NWALL .1	4 RT	COMM BOX	CL		X		
117+81	NWALL .1	8 RT	COMM BOX	CL		X		
117+87	NWALL .1	10 RT	COMM BOX	CL		X		
117+97	NWALL .1	6 RT	COMM BOX	CL		X		
117+97	NWALL .1	7 RT	COMM BOX	CL		X		
117+97	NWALL .1	8 RT	COMM BOX	CL		X		
118+00	NWALL .1	5 RT	COMM BOX	CL		X		
118+00	NWALL .1	8 RT	COMM BOX	CL		X		
118+02	NWALL .1	60 RT	HH	MNDOT			X	
118+10	NWALL .1	15 RT	COMM BOX	CL		X		
118+21	NWALL .1	20 RT	COMM BOX	CL		X		
118+40	NWALL .1	4 RT	COMM BOX	CL		X		
118+40	NWALL .1	8 RT	COMM BOX	CL		X		
118+41	NWALL .1	6 RT	COMM BOX	CL		X		
118+45	NWALL .1	4 RT	COMM BOX	CL		X		
118+45	NWALL .1	8 RT	COMM BOX	CL	X			
119+08	NWALL .1	3 LT	COMM BOX	CL	X			
119+18	NWALL .1	17 RT	PP	XCEL-E			X	
119+18	NWALL .1	13 LT	GUY	XCEL-E			X	
119+99	NWALL .1	4 LT	COMM BOX	CL	X			
120+80	NWALL .1	3 LT	COMM BOX	CL	X			
120+90	NWALL .1	16 LT	PP	XCEL-E			X	
120+93	NWALL .1	11 LT	GUY	XCEL-E			X	
121+66	NWALL .1	3 LT	COMM BOX	CL	X			
122+03	NWALL .1	3 LT	COMM BOX	CL	X			
122+38	NWALL .1	57 RT	HH	MNDOT			X	
122+94	NWALL .1	3 LT	COMM BOX	CL	X			

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DESIGN TEAM				
DRAWN BY: RBC				
DESIGNER: NMG				
CHECKED BY: WCK				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

INPLACE UTILITY TABULATION

FILE NO.
 RAMSEI29594
 UT2
 OF UT4

27
 367

UTILITIES

N

STATION TO STATION	LOCATION	OFFSET TO OFFSET FT	ITEM IN PLACE	OWNER	RELOCATE	ADJUST	LEAVE	REMARKS
35+72	WBCRH	55 RT	P-POLE	XCEL-E	X			
35+72 TO 35+76	WBCRH	55 RT - 22 LT	OHP	XCEL-E	X			X-ING @ STA 35+75
35+76	WBCRH	22 LT	P-POLE	XCEL-E	X			
35+76 TO 37+50	WBCRH	22 LT TO 32 LT	OHP	XCEL-E	X			
37+50	WBCRH	32 LT	P-POLE	XCEL-E	X			
37+50 TO 40+80	WBCRH	32 LT TO 22 LT	OHP	XCEL-E	X			
40+80	WBCRH	22 LT	P-POLE	XCEL-E	X			
40+80 TO 40+92	WBCRH	22 LT TO 173 RT	OHP	XCEL-E	X			X-ING @ STA 40+83
40+92	WBCRH	173 RT	P-POLE	XCEL-E	X			
40+92 TO 41+50	WBCRH	22 LT TO 38 LT	OHP	XCEL-E	X			
41+50	WBCRH	38 LT	P-POLE	XCEL-E	X			
41+50 TO 43+71	WBCRH	38 LT TO 46 LT	OHP	XCEL-E	X			
43+71	WBCRH	46 LT	P-POLE	XCEL-E	X			
43+71 TO 45+52	WBCRH	46 LT TO 42 LT	OHP	XCEL-E	X			
45+52	WBCRH	42 LT	P-POLE	XCEL-E	X			
45+52 TO 47+31	WBCRH	42 LT TO 45 LT	OHP	XCEL-E	X			
47+31	WBCRH	45 LT	P-POLE	XCEL-E	X			
47+31 TO 49+05	WBCRH	45 LT TO 32 LT	OHP	XCEL-E	X			
49+05 TO 48+78	WBCRH	32 LT TO 79 RT	OHP	XCEL-E	X			X-ING @ STA 48+96
40+30 TO 41+59	WBCRH	13 LT TO 43 LT	SIG-INT	MNDOT	X			X-ING @ STA 41+54 ①
41+47 TO 41+54	WBCRH	52 RT TO 80 LT	SIG-INT	MNDOT	X			①
41+47 TO 43+28	WBCRH	52 RT TO 462 RT	SIG-INT	MNDOT	X			①
41+52 TO 41+51	WBCRH	79 LT TO 99 LT	SIG-INT	MNDOT	X			①
41+52 TO 41+91	WBCRH	69 LT TO 103 LT	SIG-INT	MNDOT	X			①
41+74 TO 41+89	WBCRH	42 LT TO 10 LT	SIG-INT	MNDOT	X			①
41+89 TO 43+29	WBCRH	10 LT TO 49 LT	SIG-INT	MNDOT	X			①
43+29 TO 43+28	WBCRH	49 LT TO 43 RT	SIG-INT	MNDOT	X			X-ING @ STA 43+29 ①
43+61 TO 42+51	WBCRH	37 LT TO 99 LT	SIG-INT	MNDOT	X			①
43+29 TO 43+45	WBCRH	49 LT TO 8 RT	SIG-INT	MNDOT	X			X-ING @ STA 43+45 ①
43+43 TO 43+75	WBCRH	27 LT TO 8 RT	SIG-INT	MNDOT	X			X-ING @ STA 43+70 ①
43+43 TO 45+40	WBCRH	27 LT TO 18 RT	SIG-INT	MNDOT	X			X-ING @ STA 45+38 ①
48+83 TO 54+66	WBCRH	87 RT TO 189 RT	SIG-INT	MNDOT	X			①
51+40 TO 54+69	WBCRH	33 RT TO 351 LT	SIG-INT	MNDOT	X			①
51+04 TO 50+92	WBCRH	29 LT TO 298 LT	SIG-INT	MNDOT	X			①
50+69 TO 50+76	WBCRH	217 LT TO 319 LT	SIG-INT	MNDOT	X			①
50+69 TO 50+87	WBCRH	217 LT TO 1339 LT	SIG-INT	MNDOT	X			①
50+92 TO 50+96	WBCRH	839 LT TO 805 LT	SIG-INT	MNDOT	X			①
54+94 TO 54+52	WBCRH	285 LT TO 299 LT	SIG-INT	MNDOT	X			①
54+51 TO 54+60	WBCRH	268 LT TO 285 LT	SIG-INT	MNDOT	X			①
54+68 TO 54+33	WBCRH	266 LT TO 280 LT	SIG-INT	MNDOT	X			①
54+66 TO 58+72	WBCRH	156 LT TO 1172 LT	SIG-INT	MNDOT	X			①
57+81 TO 57+79	WBCRH	48 LT TO 20 LT	SIG-INT	MNDOT	X			①
35+55 TO 35+58	WBCRH	14 LT TO 41 RT	GAS	XCEL-G	X			X-ING @ STA 35+56
39+64 TO 39+61	WBCRH	10 LT TO 39 RT	GAS	XCEL-G	X			X-ING @ STA 39+65
42+50 TO 42+90	WBCRH	46 LT TO 47 LT	GAS	XCEL-G	X			
43+70 TO 48+60	WBCRH	37 LT TO 30 LT	GAS	XCEL-G	X			
39+73 TO 39+96	EBCRH	7 RT TO 9 RT	GAS	XCEL-G	X			
39+96 TO 40+39	EBCRH	9 RT TO 10 LT	GAS	XCEL-G	X			X-ING @ STA 40+16

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DESIGN TEAM				
DRAWN BY: RBC				
DESIGNER: NMG				
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NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
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INPLACE UTILITY TABULATION

FILE NO.
RAMSEY129594

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OF UT4

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2/15/2016

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\$MODELNAME\$

UTILITIES

N

STATION TO STATION	LOCATION	OFFSET TO OFFSET FT	ITEM IN PLACE	OWNER	RELOCATE	ADJUST	LEAVE	REMARKS
31+30	EBCRH	22 LT	HYD	BOW			X	
31+26 TO 32+97	EBCRH	30 LT TO 33 LT	WATER	BOW			X	
32+97 TO 33+86	WBCRH	33 LT TO 32 LT	WATER	BOW			X	
33+87	WBCRH	35 LT	WVALV	BOW			X	
33+86 TO 33+87	WBCRH	32 LT TO 48 LT	WATER	BOW			X	
33+86 TO 36+28	WBCRH	32 LT TO 7 LT	WATER	BOW			X	
36+28	WBCRH	7 LT	WVALV	BOW		X		①
36+28 TO 36+36	WBCRH	7 LT TO 8 LT	WATER	BOW			X	
36+36 TO 36+35	WBCRH	8 LT TO 24 LT	WATER	BOW			X	
36+31	WBCRH	13 LT	WVALV	BOW			X	
36+34	WBCRH	23 LT	WVALV	BOW		X		①
36+35	WBCRH	23 LT	HYD	BOW			X	
36+67 TO 37+40	WBCRH	20 LT TO 21 LT	WATER	BOW			X	
39+78 TO 40+28	WBCRH	10 LT TO 17 LT	WATER	BOW			X	
40+28 TO 40+94	WBCRH	17 LT TO 35 LT	WATER	BOW			X	
40+94	WBCRH	35 LT	WVALV	BOW		X		①
40+94 TO 40+97	WBCRH	35 LT TO 35 LT	WATER	BOW			X	
40+97 TO 40+99	WBCRH	35 LT TO 125 RT	WATER	BOW			X	X-ING @ STA 40+98
40+97 TO 41+70	WBCRH	35 LT TO 106 LT	WATER	BOW			X	
16+68 TO 16+97	EBCSAH10	53 LT TO 53 LT	WATER	BOW			X	
16+82	EBCSAH10	52 LT	WVALV	BOW			X	
16+77 TO 16+76	EBCSAH10	52 LT TO 140 RT	WATER	BOW			X	X-ING @ STA 16+76
59+69 TO 59+79	PROG-COMM	12 LT TO 30 RT	WATER	BOW			X	X-ING @ STA 59+72
100+00 TO 100+75	NWALL .1	37 RT TO 64 RT	WATER	BOW			X	
378+50 TO 378+48	35WNB	186 LT TO 91 RT	WATER	BOW			X	
30+00 TO 32+97	EBCRH	11 LT TO 12 LT	SAN	CTY MV			X	
32+97 TO 33+31	WBCRH	12 LT TO 12 LT	SAN	CTY MV			X	
33+31	WBCRH	12 LT	SAN MH	CTY MV		X		①
33+31 TO 33+37	WBCRH	12 LT TO 46 LT	SAN	CTY MV			X	
33+37	WBCRH	46 LT	SAN MH	CTY MV		X		①
33+37 TO 33+95	WBCRH	46 LT TO 45 LT	SAN	CTY MV			X	
33+95	WBCRH	45 LT	SAN MH	CTY MV		X		①
33+31 TO 37+21	WBCRH	12 LT TO 42 RT	SAN	CTY MV			X	
37+21	WBCRH	42 RT	SAN MH	CTY MV		X		①
37+21 TO 40+88	WBCRH	42 RT TO 9 LT	SAN	CTY MV			X	
40+88	WBCRH	9 LT	SAN MH	CTY MV		X		①
40+88	WBCRH	9 LT TO 88 RT	SAN	CTY MV			X	
40+88 TO 41+91	WBCRH	9 LT TO 104 LT	SAN	CTY MV			X	
41+91	WBCRH	104 LT	SAN MH	CTY MV		X		①
41+91 TO 43+52	WBCRH	104 LT TO 99 LT	SAN	CTY MV			X	
43+52	WBCRH	99 LT	SAN MH	CTY MV		X		①
43+52 TO 43+80	WBCRH	99 LT TO 55 RT	SAN	CTY MV			X	X-ING @ STA 43+70
43+52 TO 43+53	WBCRH	99 TO 242 LT	SAN	CTY MV			X	
43+53	WBCRH	242 LT	SAN MH	CTY MV			X	
43+52 TO 43+99	WBCRH	99 LT TO 169 LT	SAN	CTY MV			X	
43+99	WBCRH	169 LT	SAN MH	CTY MV			X	
43+99 TO 54+51	WBCRH	169 RT TO 187 RT	SAN	CTY MV			X	
54+51	WBCRH	187 RT	SAN MH	CTY MV			X	
69+34 TO 72+53	SE RAMP	274 RT TO 12 RT	SAN	CTY MV			X	
70+58 TO 71+20	SE RAMP	3 RT TO 52 LT	SAN	CTY MV			X	
70+52	SE RAMP	12 RT	SAN MH	CTY MV			X	
70+58	SE RAMP	3 RT	SAN MH	CTY MV			X	
70+62 TO 71+23	SE RAMP	8 RT TO 48 LT	SAN	CTY MV			X	
70+62	SE RAMP	8 RT	SAN MH	CTY MV			X	
440+88 TO 440+45	NB TH10	187 LT TO 162 RT	SAN	CTY AH			X	
440+45	NB TH10	162 RT	SAN MH	CTY AH			X	

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 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

INPLACE UTILITY TABULATION

FILE NO. RAMSE129594	29
UT4 OF UT4	367

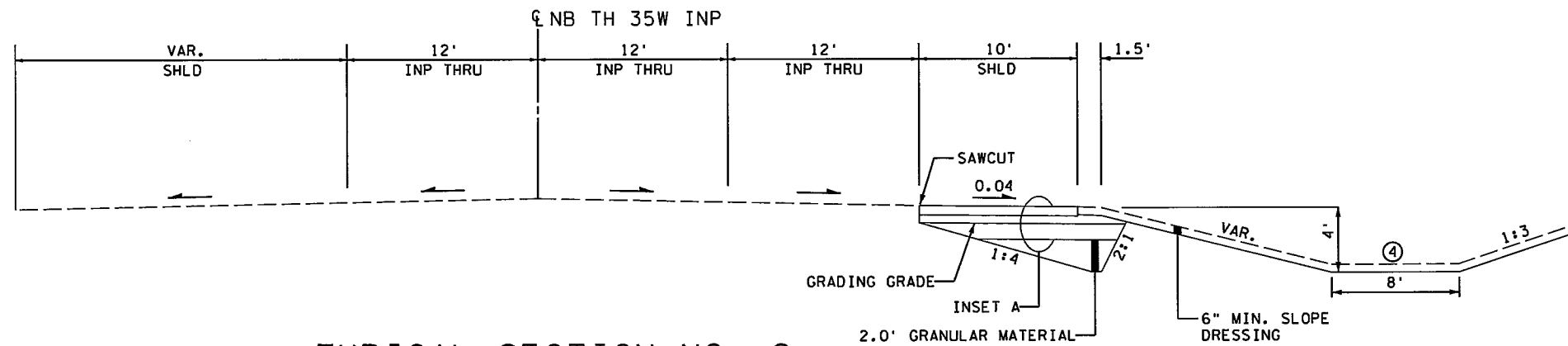
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12/8/2015

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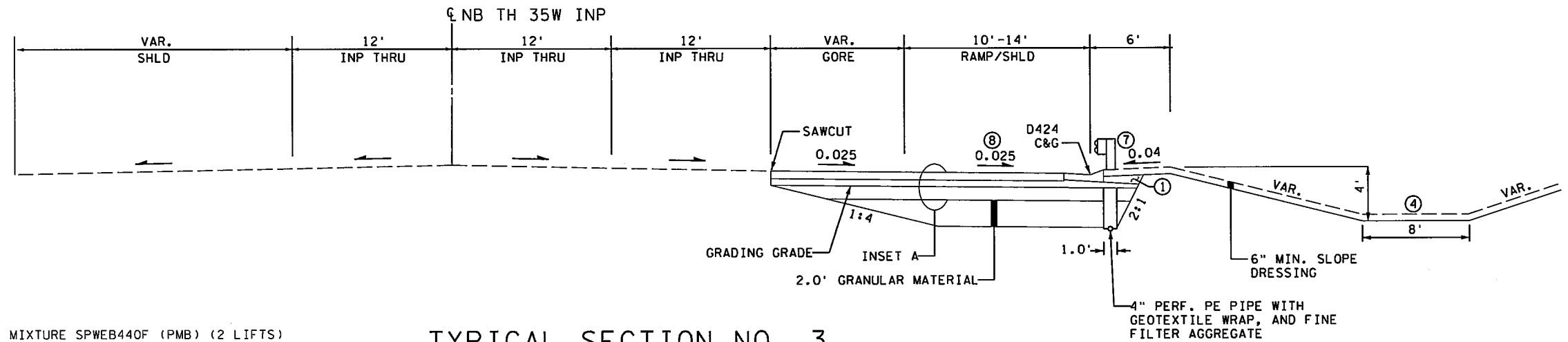
TYPICAL SECTION NO. 1

NB TH 35W INP STA. 341+57.87 - 342+79.40
NB TH 35W INP STA. 364+03.52 - 368+51.09
NB TH 35W INP STA. 382+18.69 - 383+19.02

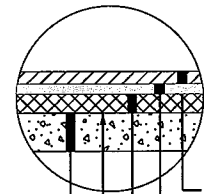


TYPICAL SECTION NO. 2

NB TH 35W INP STA. 342+79.40 - 359+14.94



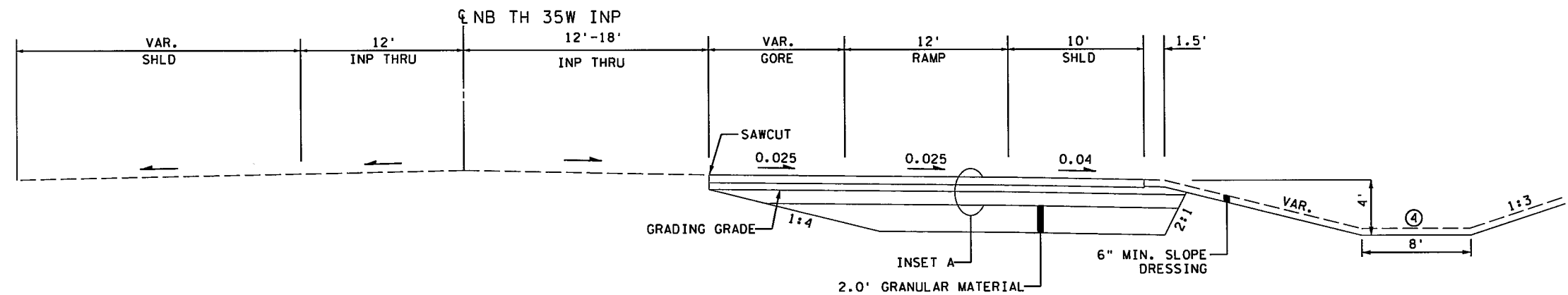
INSET A



- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- 3.0" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

TYPICAL SECTION NO. 3

NB TH 35W INP STA. 359+14.94 - 364+03.52



GENERAL NOTES:

ALL CROSS SLOPES ARE FOOT PER FOOT.

ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.

MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.

UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

NOTES:

- ① BACKFILL WITH SELECT GRADING MATERIAL.
- ④ SEE CROSS SECTIONS FOR DITCH VARIATIONS.
- ⑦ SEE CONSTRUCTION PLAN FOR GUARDRAIL LOCATIONS.
- ⑧ SHOULDER SLOPE SHALL BE 0.04 FROM STA. 349+41 TO STA. 358+55.01.

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	RDH			
CHECKED BY:	HLR			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDEZKE Date: 12/8/2015

SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS
 NB TH 35W INP

FILE NO. RAMSEI29594	30
TS1 OF TS12	367

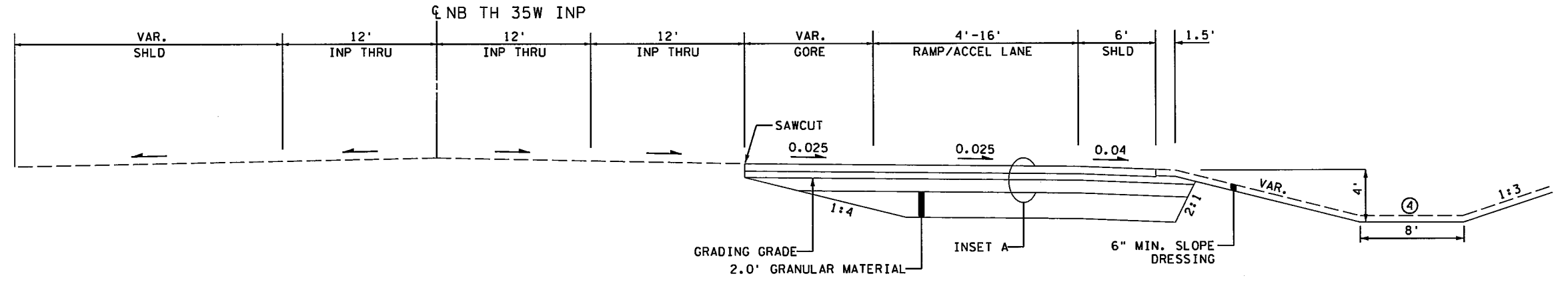
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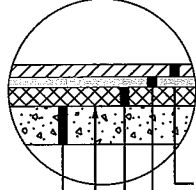
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TYPICAL SECTION NO. 4

NB TH 35W INP STA. 368+51.09 - 382+18.69



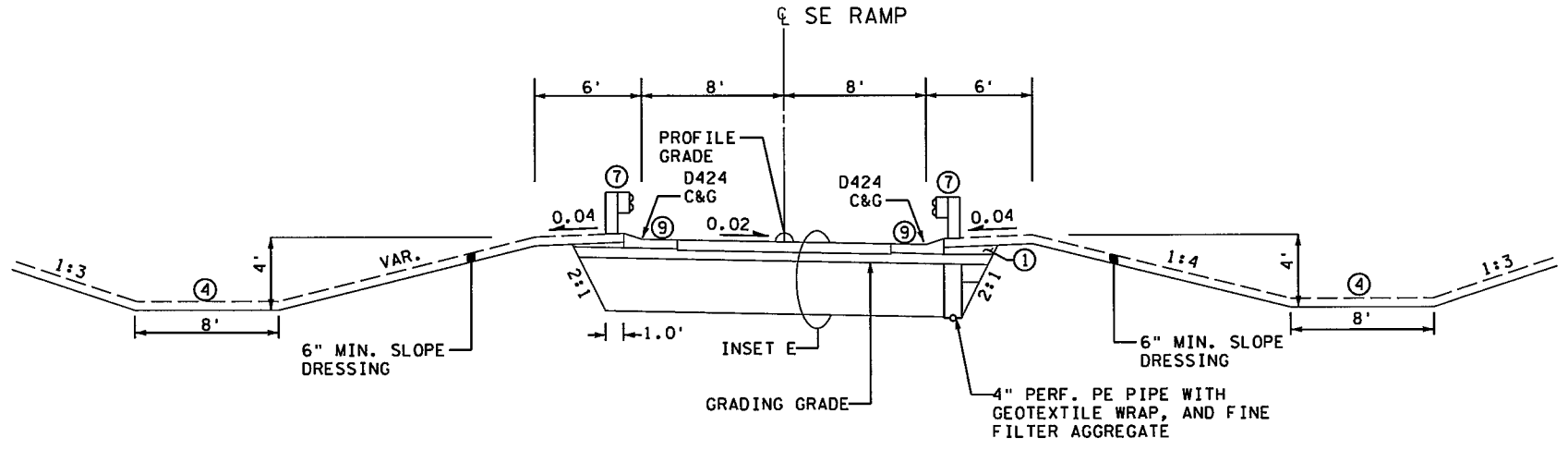
INSET A



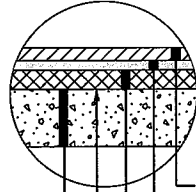
- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- 3.0" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

TYPICAL SECTION NO. 5

SE RAMP STA. 62+08.69 - 63+64.79



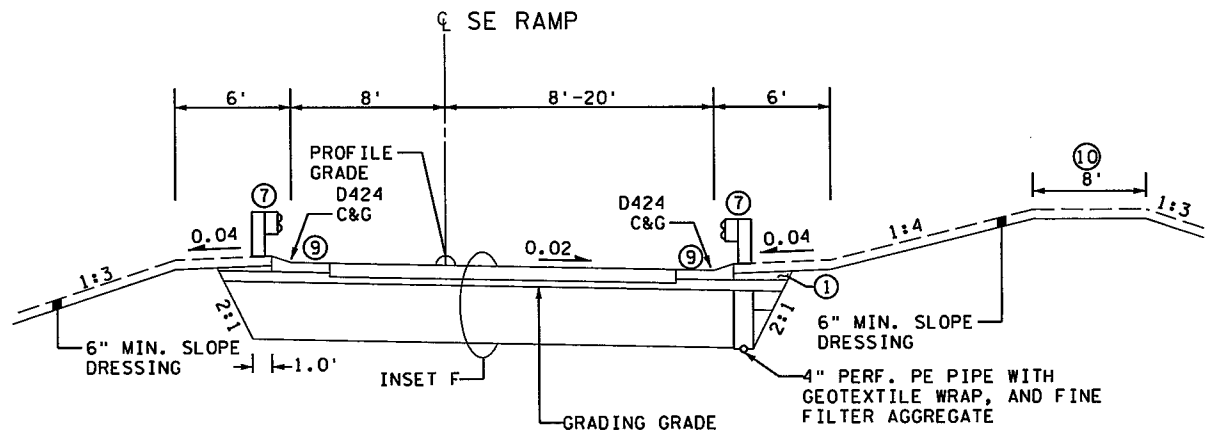
INSET E



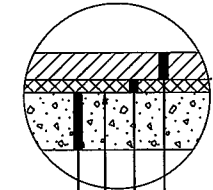
- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- 3.0" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 36" SELECT GRANULAR MATERIAL

TYPICAL SECTION NO. 6

SE RAMP STA. 63+64.79 - 63+91.32
SE RAMP STA. 65+66.03 - 67+00.00



INSET F



- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 36" SELECT GRANULAR MATERIAL

GENERAL NOTES:

- ALL CROSS SLOPES ARE FOOT PER FOOT.
- ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.
- MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.
- UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

NOTES:

- ① BACKFILL WITH SELECT GRADING MATERIAL.
- ④ SEE CROSS SECTIONS FOR DITCH VARIATIONS.
- ⑦ SEE CONSTRUCTION PLAN FOR GUARDRAIL LOCATIONS.
- ⑨ GUTTER SLOPE SHALL MATCH PAVEMENT SLOPE.
- ⑩ BERM SHALL BE CONSTRUCTED FROM STA. 65+50 TO 68+50.

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Reitzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REITZKE Date: 12/8/2015

PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.A.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSE129594	31
TS2 OF TS12	367

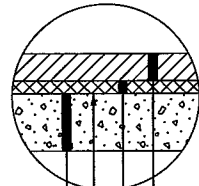
TYPICAL SECTIONS
NB TH 35W INP & SE RAMP

TYPICAL SECTION NO. 7

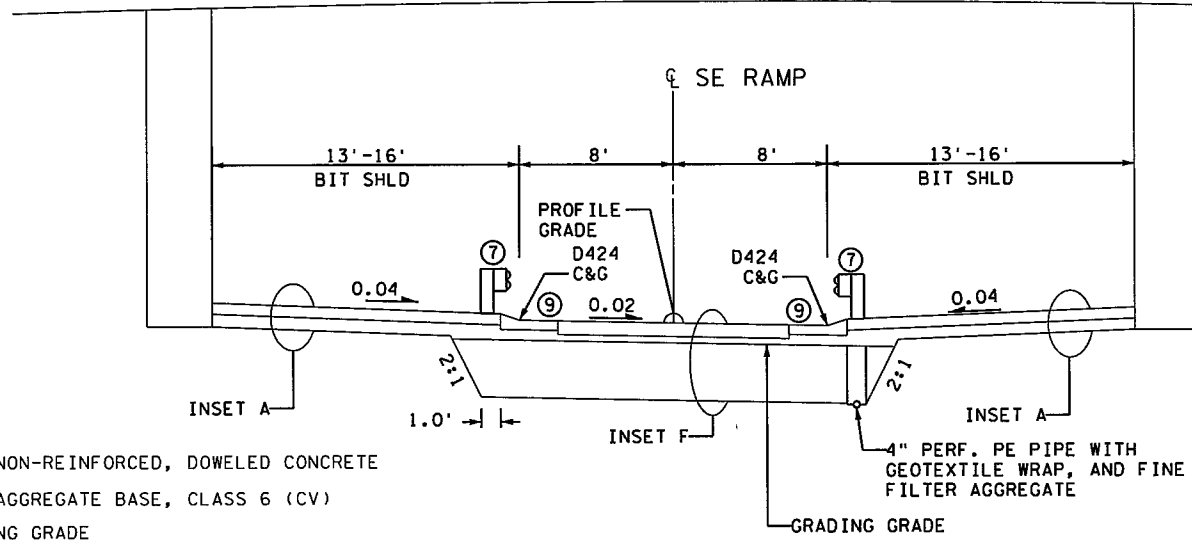
SE RAMP STA. 63+91.32 - 65+66.03

BRIDGE 62937 ⑤

INSET F

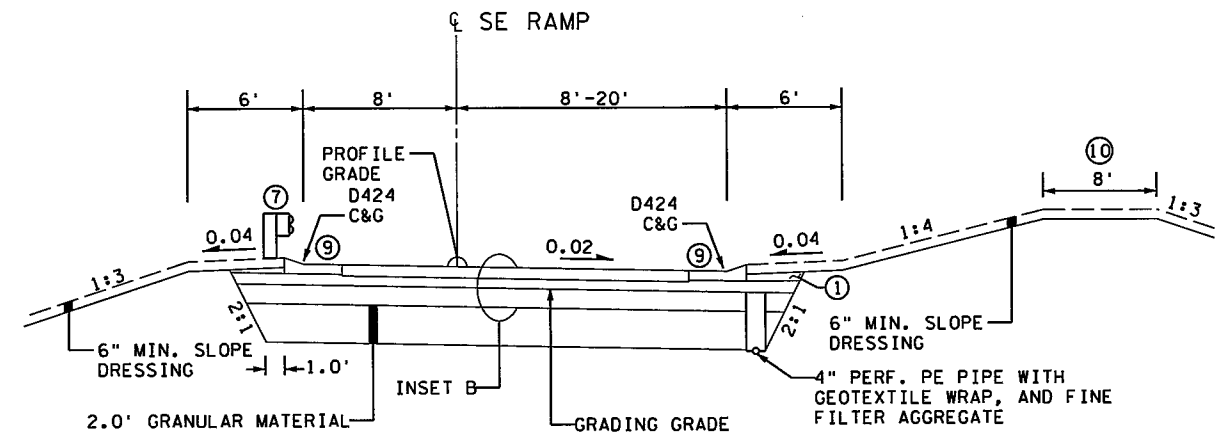


- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 36" SELECT GRANULAR MATERIAL



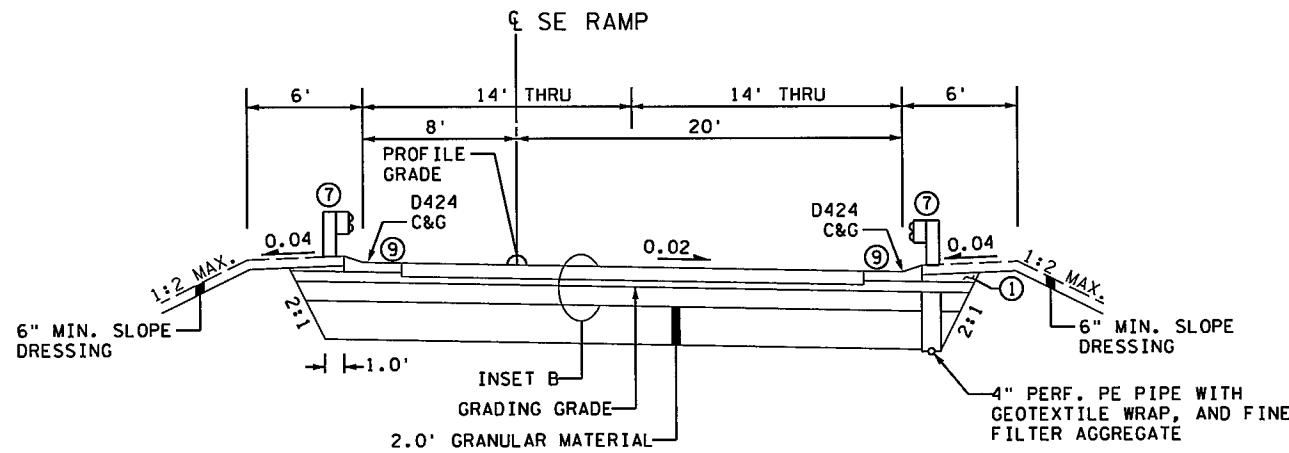
TYPICAL SECTION NO. 8

SE RAMP STA. 67+00.00 - 68+52.40



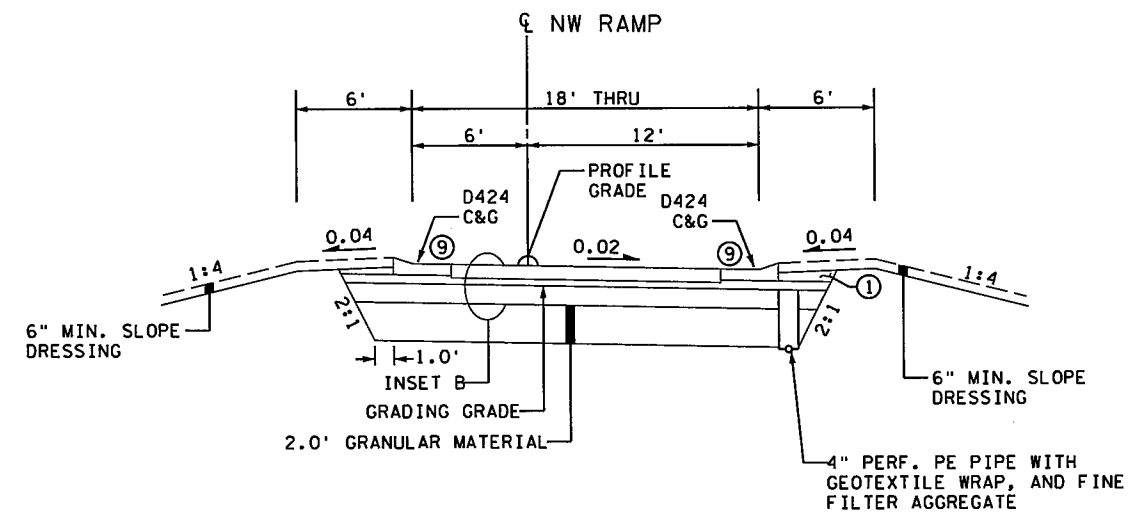
TYPICAL SECTION NO. 9

SE RAMP STA. 68+52.40 - 70+64.58

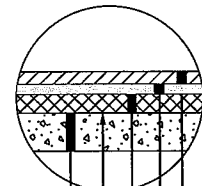


TYPICAL SECTION NO. 10

NW RAMP STA. 15+50.00 - 20+83.48



INSET A



GENERAL NOTES:

ALL CROSS SLOPES ARE FOOT PER FOOT.

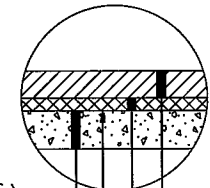
ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.

MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.

UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- 3.0" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

INSET B



- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

NOTES:

- ① BACKFILL WITH SELECT GRADING MATERIAL
- ⑤ SEE BRIDGE PLAN FOR BRIDGE DETAILS.
- ⑦ SEE CONSTRUCTION PLAN FOR GUARDRAIL LOCATIONS.
- ⑨ GUTTER SLOPE SHALL MATCH PAVEMENT SLOPE.
- ⑩ BERM SHALL BE CONSTRUCTED FROM STA. 65+50 TO 68+50.

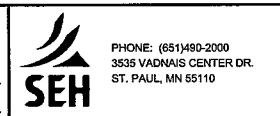
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12/8/2015

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DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015

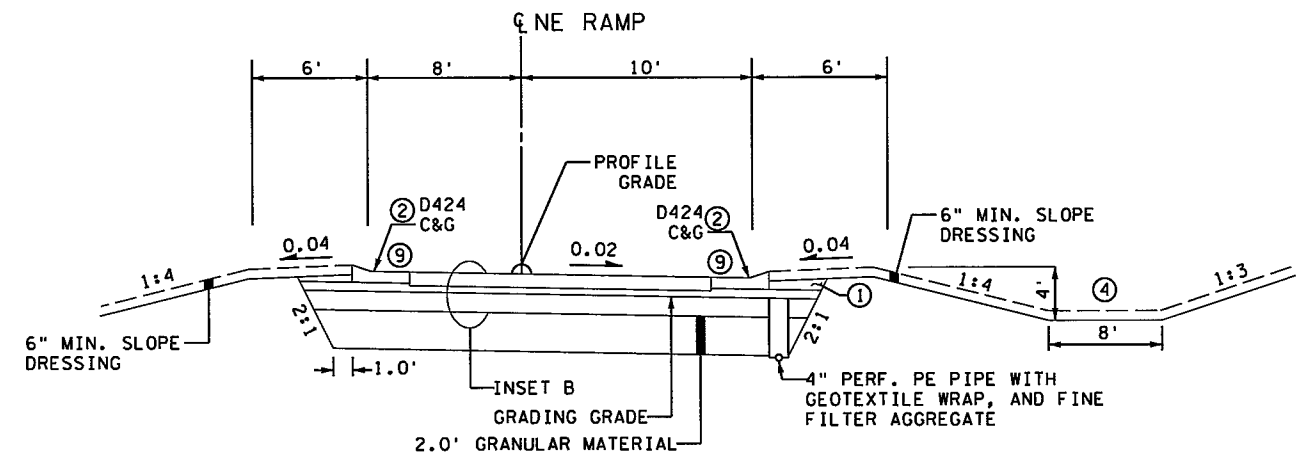


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

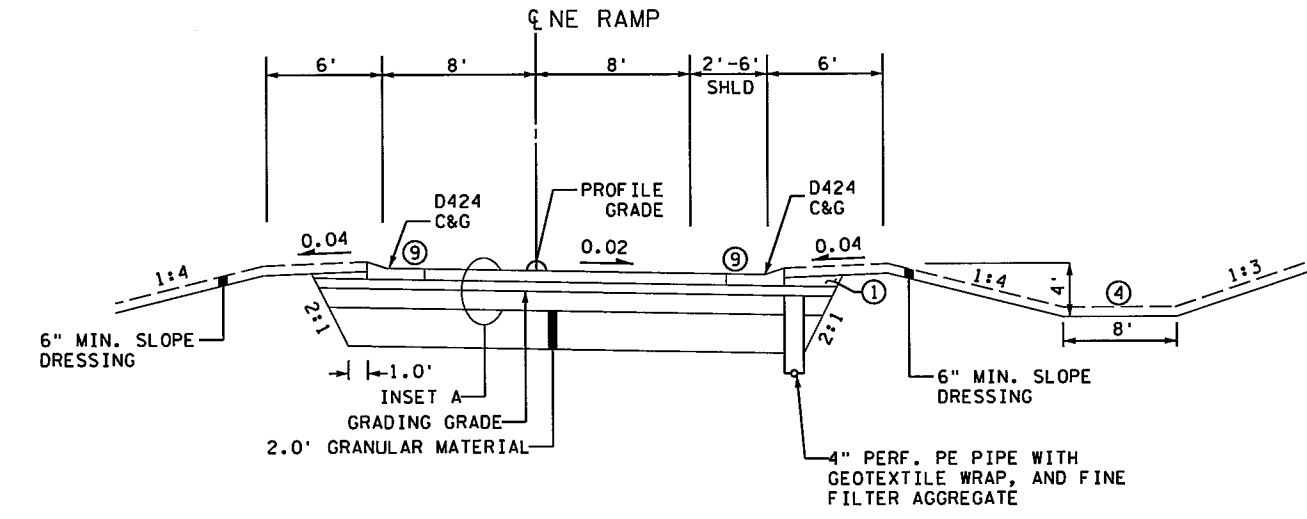
TYPICAL SECTIONS
 SE RAMP, NW RAMP

FILE NO. RAMSE129594	32
TS3 OF TS12	367

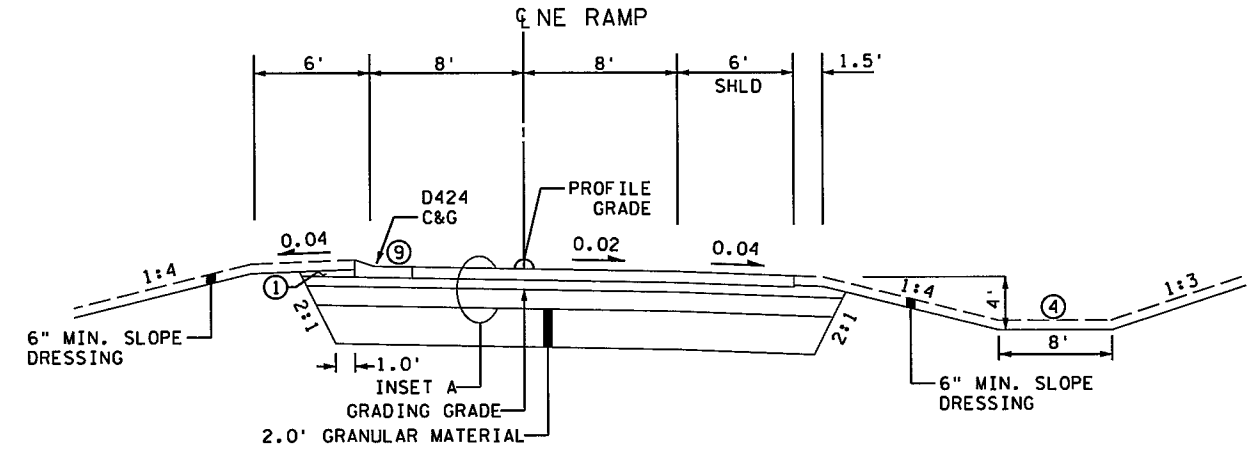
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NE RAMP STA. 40+85.68 - 45+80.52



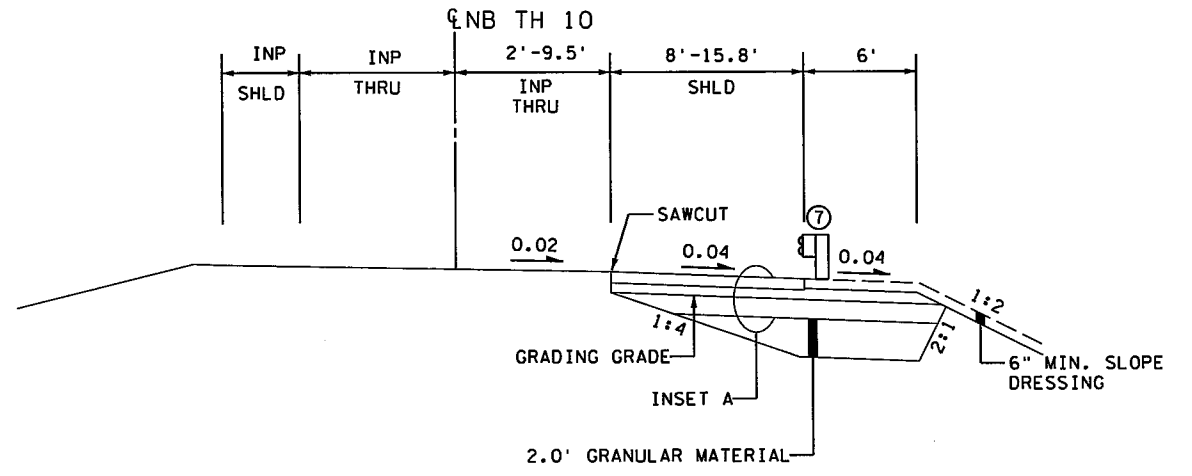
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NE RAMP STA. 45+80.52 - 47+81.88



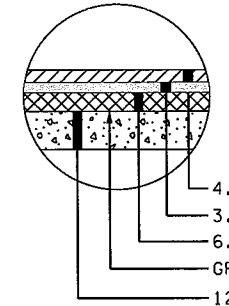
TYPICAL SECTION NO. 13
NE RAMP STA. 47+81.88 - 48+99.29



TYPICAL SECTION NO. 14
NB TH 10 STA. 421+40.65 - 424+82.95

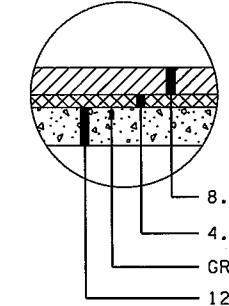


INSET A



- ① 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- ② 3.0" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- ③ 6.0" AGGREGATE BASE, CLASS 6 (CV)
- ④ GRADING GRADE
- ⑤ 12" SELECT GRANULAR MATERIAL

INSET B



- ① 8.5" NON-REINFORCED, DOWELED CONCRETE
- ② 4.0" AGGREGATE BASE, CLASS 6 (CV)
- ③ GRADING GRADE
- ④ 12" SELECT GRANULAR MATERIAL

GENERAL NOTES:
ALL CROSS SLOPES ARE FOOT PER FOOT.
ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.
MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.
UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

- NOTES:**
- ① BACKFILL WITH SELECT GRADING MATERIAL
 - ② B624 CURB AND GUTTER NE RAMP STA. 40+85.73 TO STA. 42+05.02.
 - ④ SEE CROSS SECTIONS FOR DITCH VARIATIONS.
 - ⑦ SEE CONSTRUCTION PLAN FOR GUARDRAIL LOCATIONS.
 - ⑨ GUTTER SLOPE SHALL MATCH PAVEMENT SLOPE.

11/05/21 AM
12/8/2015
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DESIGN TEAM				
DRAWN BY: CIE				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Heather L. Redetzke* Lic. No. 44267
Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSE129594	33
TS4 OF TS12	367

TYPICAL SECTIONS
NE RAMP & NB TH 10

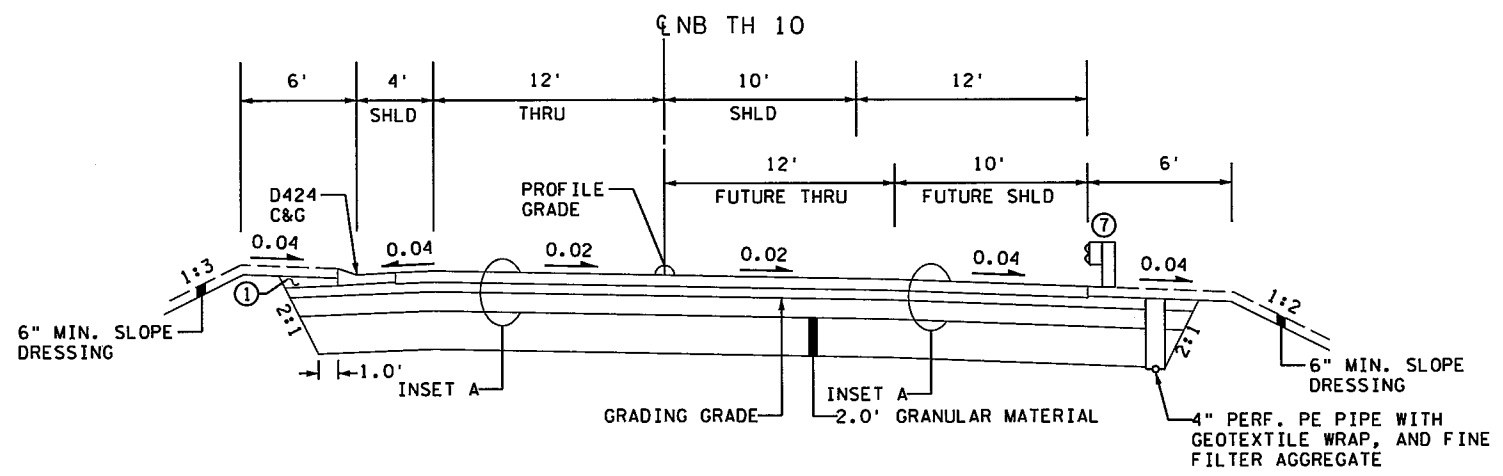
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12/8/2015

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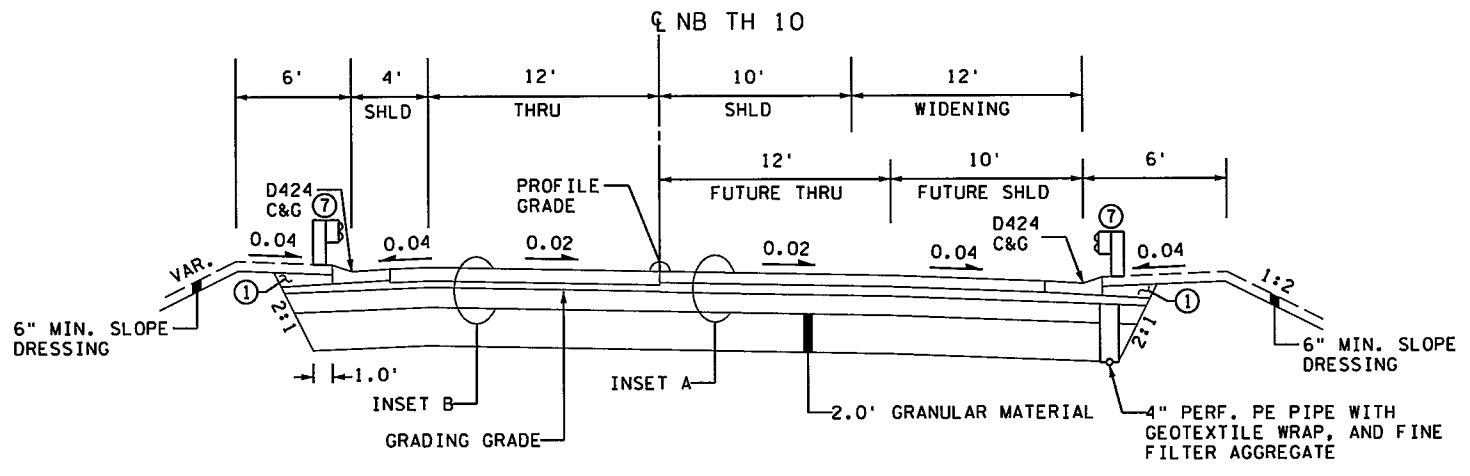
TYPICAL SECTION NO. 15

NB TH 10 STA. 424+82.93 - 425+71.50



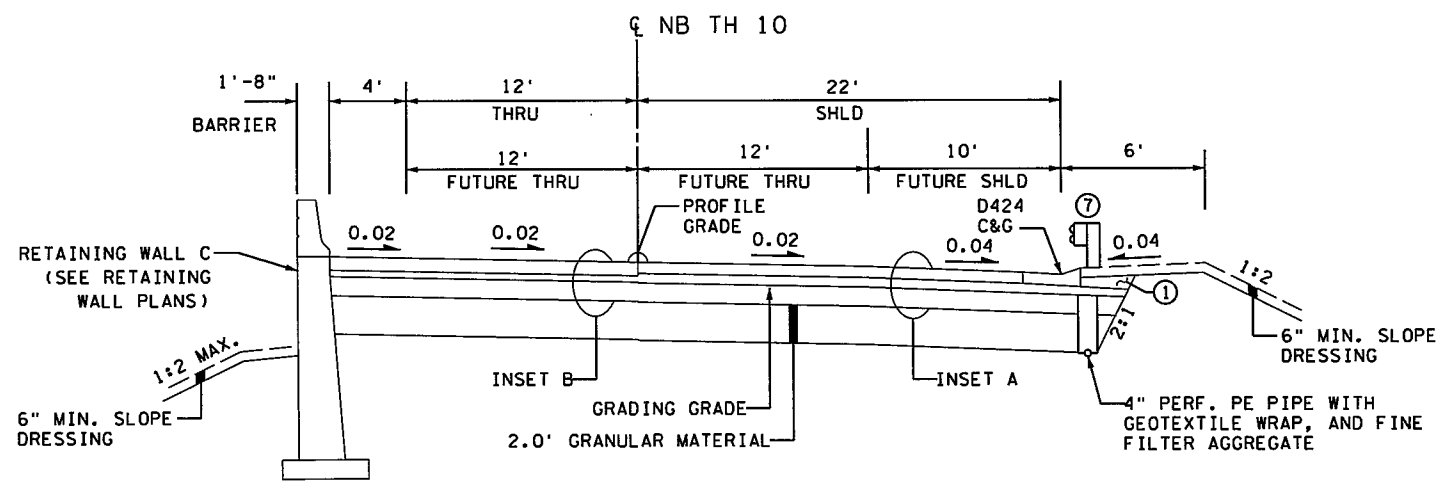
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NB TH 10 STA. 425+71.50 - 431+34.90



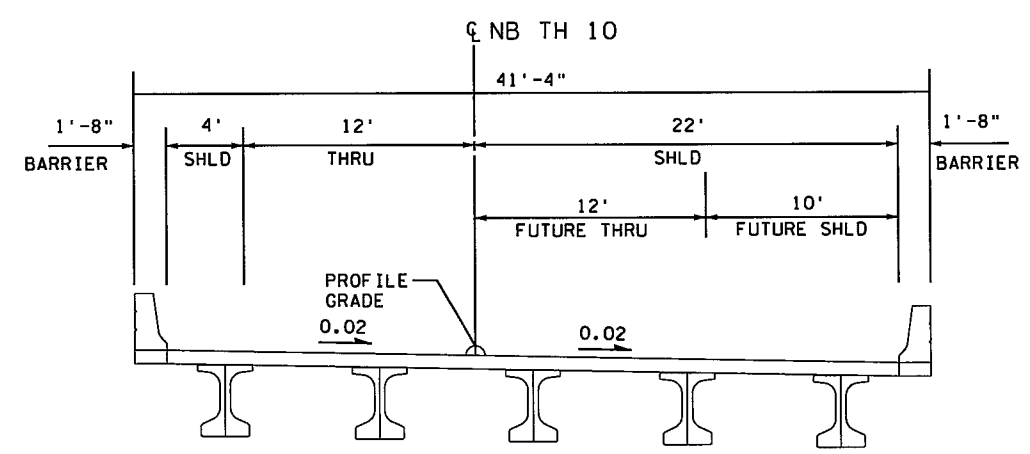
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NB TH 10 STA. 431+34.90 - 432+11.44

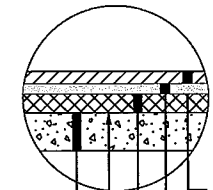


TYPICAL SECTION NO. 18

NB TH 10 STA. 432+61.01 - 435+32.50 (BRIDGE 62937) ⑤

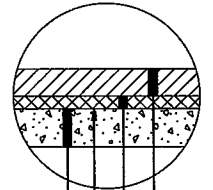


INSET A



- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWB440F (PMB) (2 LIFTS)
- 3.0" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

INSET B



- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

GENERAL NOTES:

ALL CROSS SLOPES ARE FOOT PER FOOT.

ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.

MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.

UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

- NOTES:**
- ① BACKFILL WITH SELECT GRADING MATERIAL.
 - ⑤ SEE BRIDGE PLAN FOR BRIDGE DETAILS.
 - ⑦ SEE CONSTRUCTION PLAN FOR GUARDRAIL LOCATIONS.

DESIGN TEAM					
DRAWN BY:	CIF				
DESIGNER:	RDH				
CHECKED BY:	HLR				
	NO.	BY	DATE	REVISIONS	

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 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS
 NB TH 10

FILE NO. RAMSE129594	34
TS5 OF TS12	367

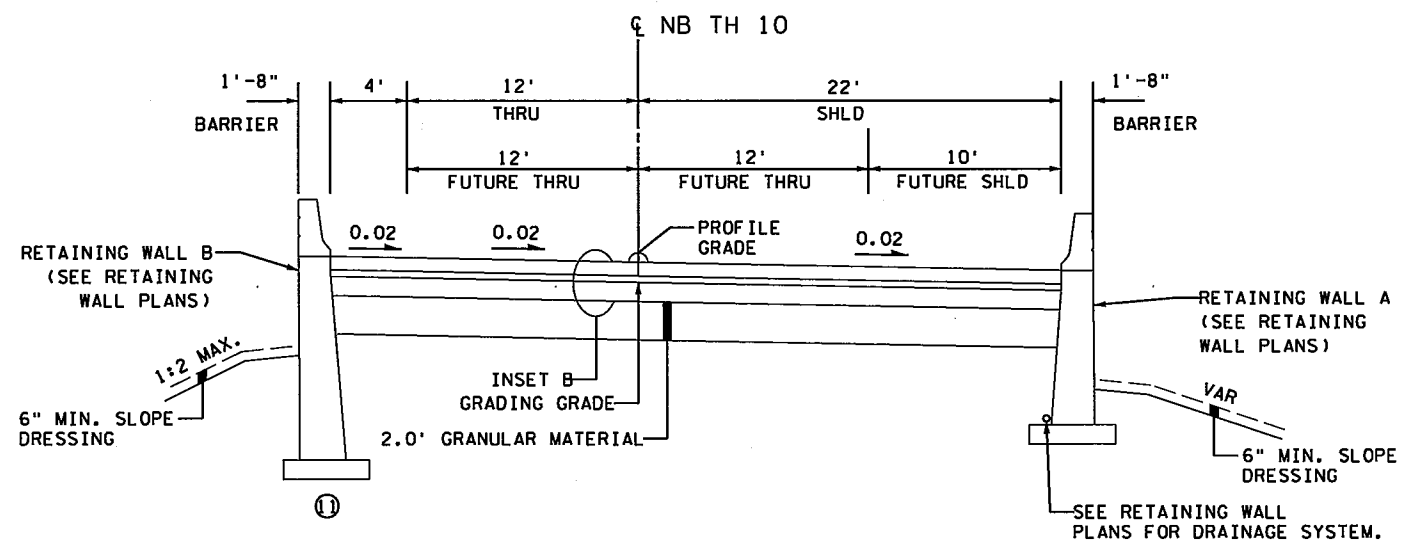
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2/19/2016

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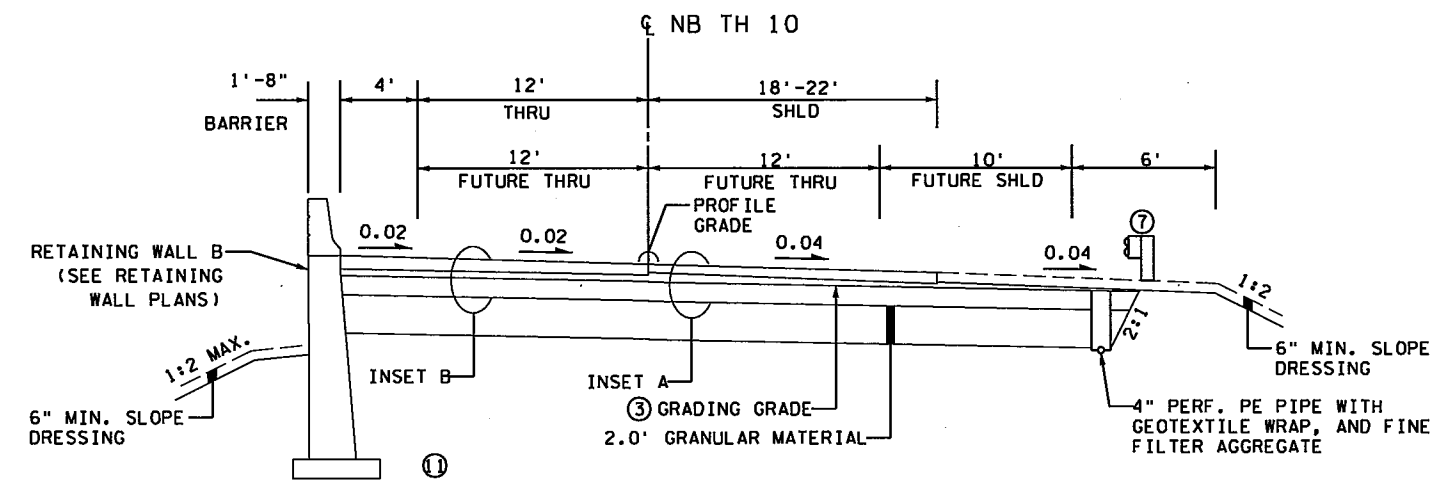
TYPICAL SECTION NO. 19

NB TH 10 STA. 435+93.88 - 436+65.58



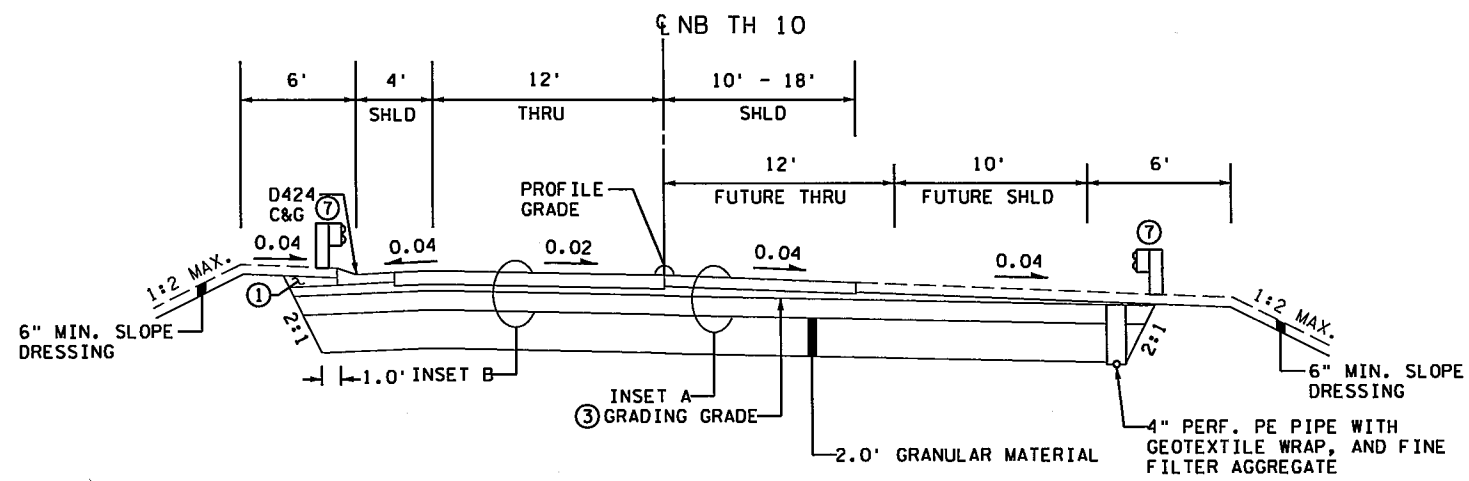
TYPICAL SECTION NO. 20

NB TH 10 STA. 436+65.58 - 437+22.63



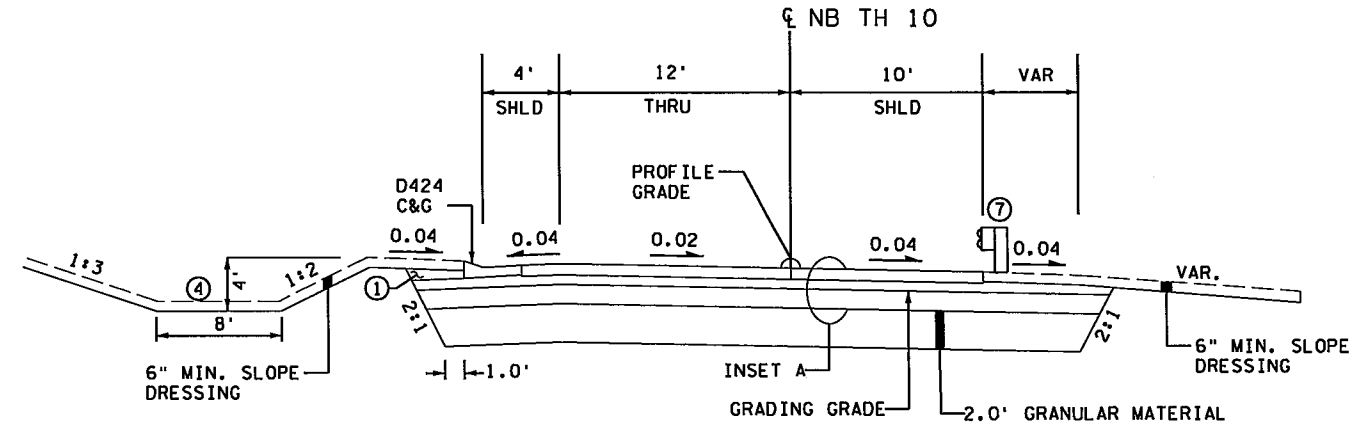
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NB TH 10 STA. 437+22.63 - 439+50.63

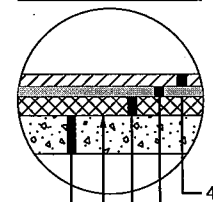


TYPICAL SECTION NO. 22

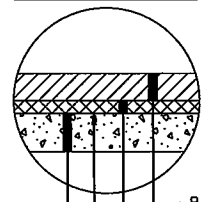
NB TH 10 STA. 439+50.63 - 442+02.91



INSET A



INSET B



NOTES:

- ① BACKFILL WITH SELECT GRADING MATERIAL.
- ③ GRADING GRADE CROSS SLOPE SHALL FOLLOW 0.02 FOOT PER FOOT OF FUTURE EXPANDED ROADWAY.
- ④ SEE CROSS SECTIONS FOR DITCH VARIATIONS.
- ⑦ SEE CONSTRUCTION PLAN FOR GUARDRAIL LOCATIONS.
- ⑩ AN ISOLATED AREA OF EXCAVATION-MUCK WILL BE REQUIRED NORTH OF BRIDGE NO. 62937. SEE MATERIAL REPORTS FOR BORING DETAILS. THE FULL EXTENT OF EXCAVATION-MUCK SHALL BE DETERMINED IN THE FIELD AT THE TIME OF CONSTRUCTION BY A GEOTECHNICAL FIELD ENGINEER.

GENERAL NOTES:
 ALL CROSS SLOPES ARE FOOT PER FOOT.
 ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.
 MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.
 UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

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 Certified By: *Heather L. ReDETzke* Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 2/19/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS
 NB TH 10

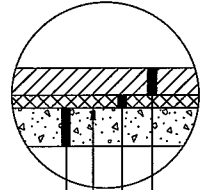
FILE NO. RAMSE129594
 TS6 OF TS12
 35
 367

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12/4/2015

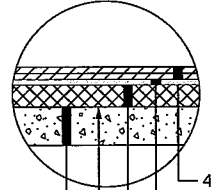
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SMODELNAME

INSET B



- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

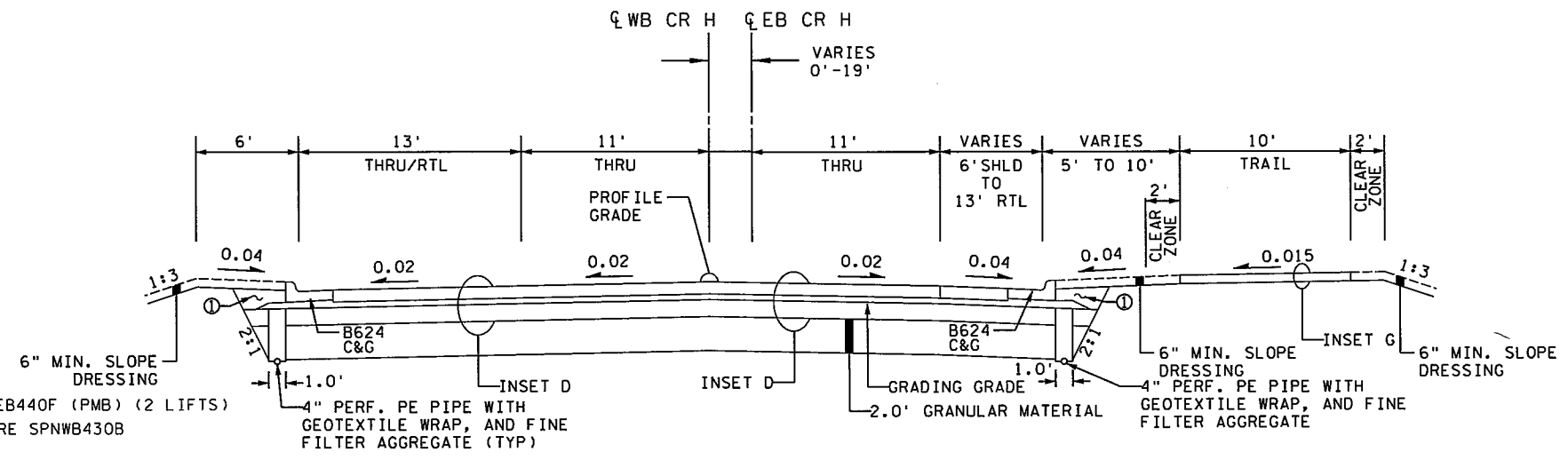
INSET D



- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- 1.5" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- 7.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

TYPICAL SECTION NO. 23

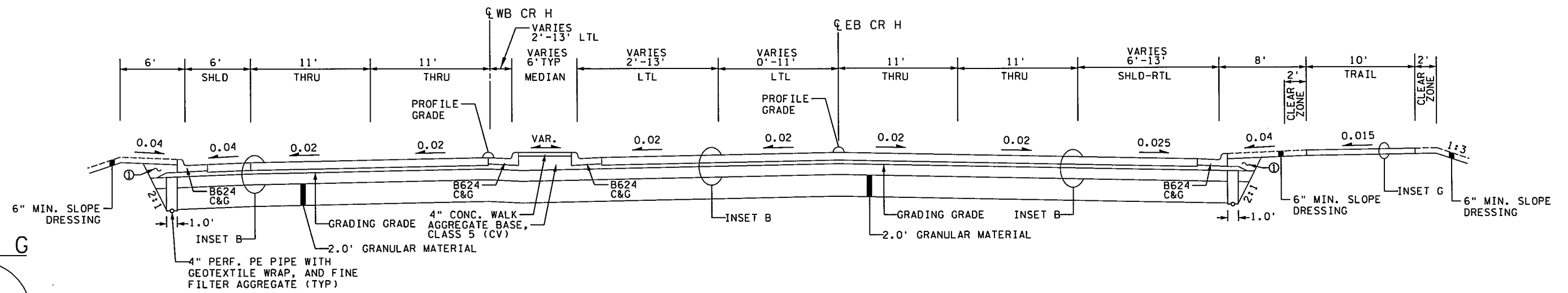
EB CR H STA. 32+20.86 - 37+51.10



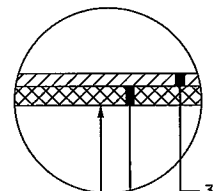
GENERAL NOTES:
 ALL CROSS SLOPES ARE FOOT PER FOOT.
 ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.
 MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.
 UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

TYPICAL SECTION NO. 24

EB CR H STA. 37+51.10 - 41+82.81



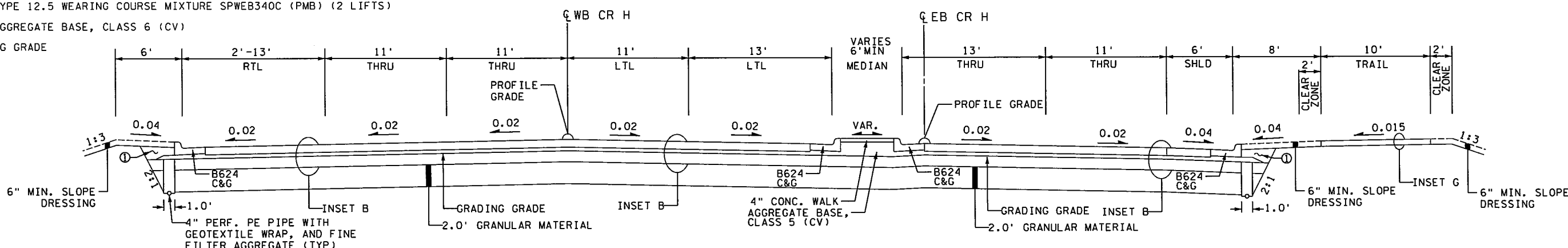
INSET G



- 3.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB340C (PMB) (2 LIFTS)
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE

TYPICAL SECTION NO. 25

EB CR H STA. 41+82.81 - 48+26.0



NOTES:
 ① BACKFILL WITH SELECT GRADING MATERIAL.

DESIGN TEAM				REVISIONS			
DRAWN BY:	JHO			NO.	BY	DATE	
DESIGNER:	NMG						
CHECKED BY:	WCK						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015

Kimley»Horn
 RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

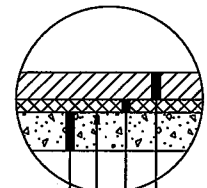
TYPICAL SECTIONS		FILE NO.	36
EB CR H, WB CR H		RAMSEY129594	
		TS7	367
		OF TS12	

9/19/17 AM

1/18/2016

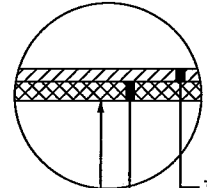
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INSET B



- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

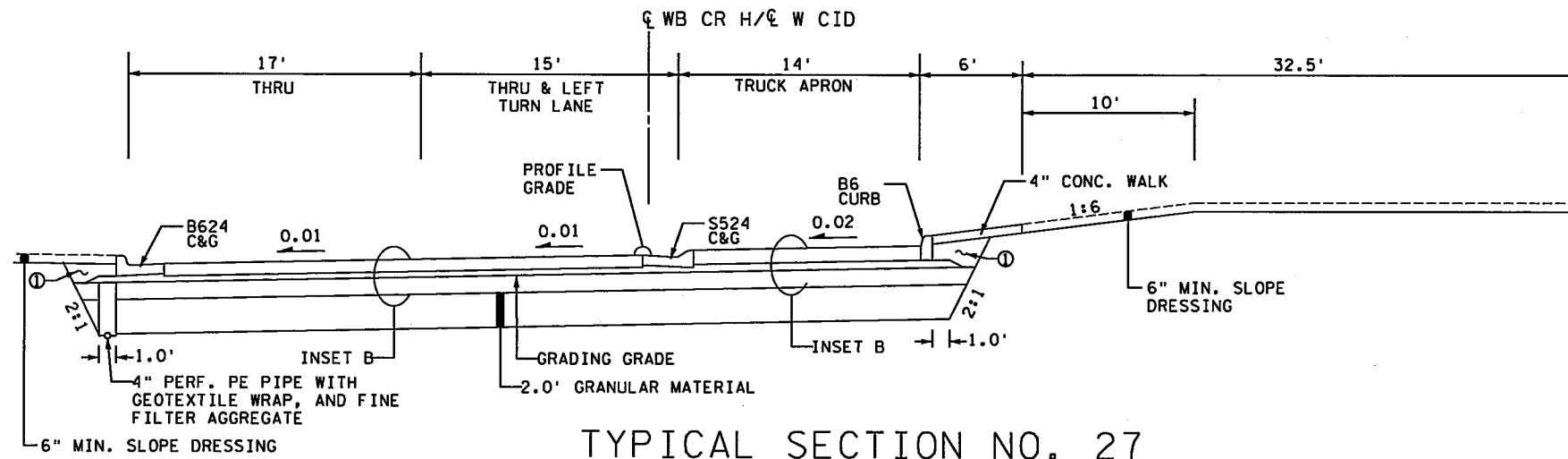
INSET G



- 3.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB340C (PMB) (2 LIFTS)
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE

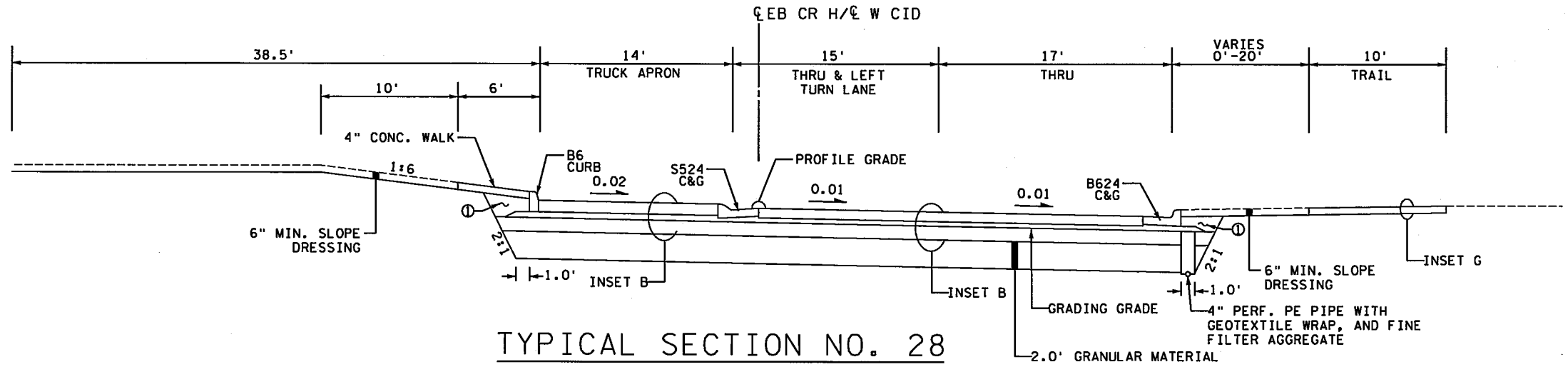
TYPICAL SECTION NO. 26

WB CR H STA. 47+94.9 - 52+70.6



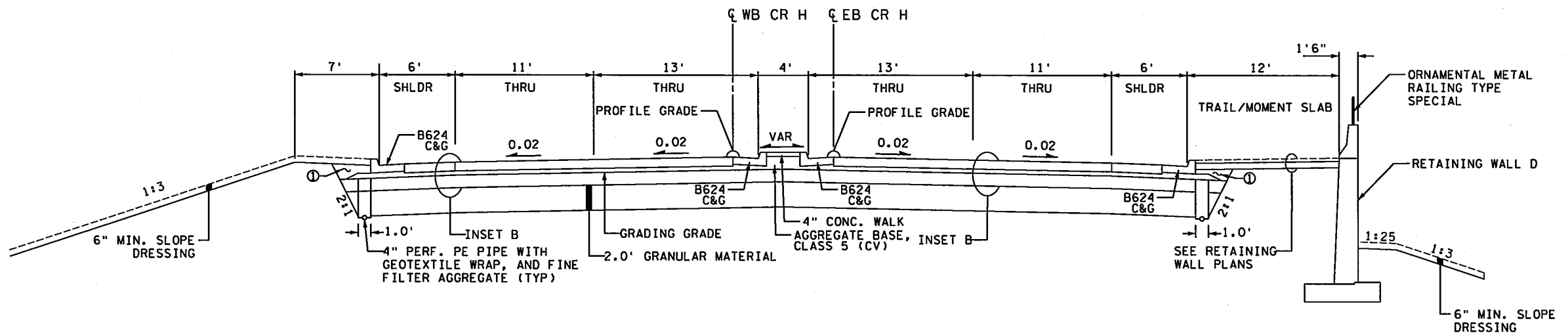
TYPICAL SECTION NO. 27

EB CR H STA. 48+26.0 - 51+92.7



TYPICAL SECTION NO. 28

EB CR H STA. 51+92.7 - 53+48.76



NOTES:
 ① BACKFILL WITH SELECT GRADING MATERIAL.

GENERAL NOTES:

- ALL CROSS SLOPES ARE FOOT PER FOOT.
- ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.
- MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.
- UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

DESIGN TEAM			
DRAWN BY:	JHO		
DESIGNER:	NMG		
CHECKED BY:	WCK		
	NO.	BY	DATE
			REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 1/18/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS
 EB CR H, WB CR H

FILE NO. RAMSE129594
 TS8 OF TS12
 37
 367

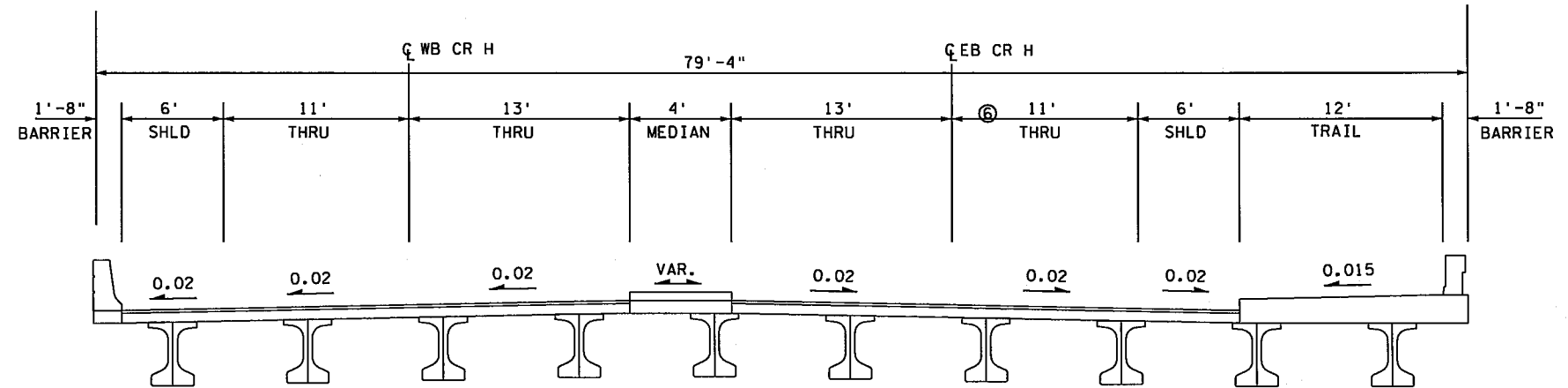
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2/15/2016

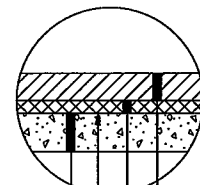
K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\C06284162-ts09.dgn

TYPICAL SECTION NO. 29

EB CR H STA. 53+48.76 - 56+53.43



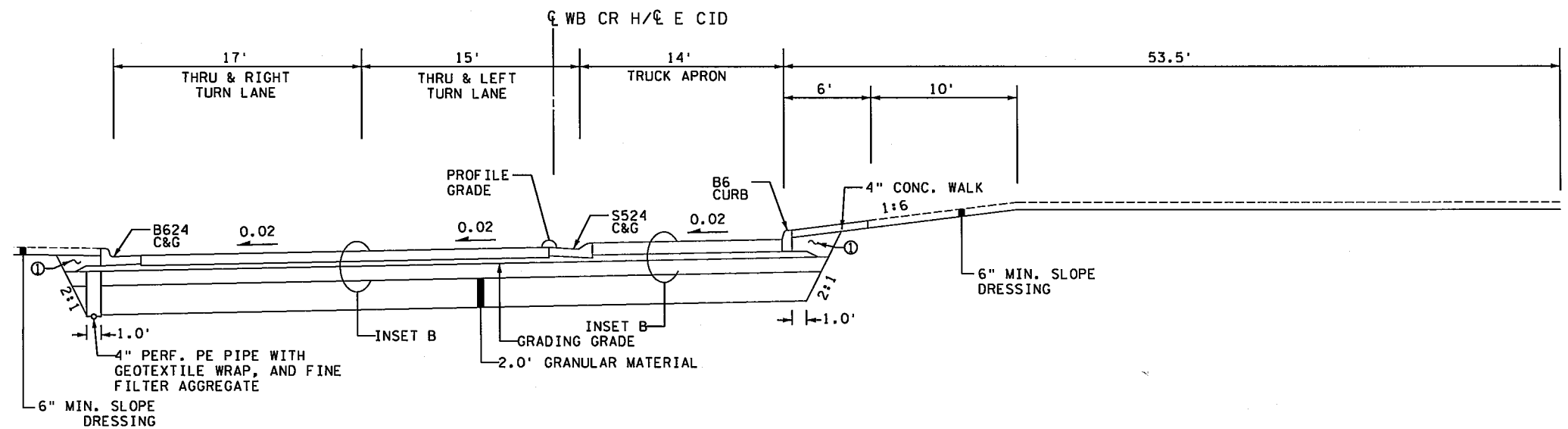
INSET B



- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

TYPICAL SECTION NO. 30

WB CR H STA. 57+01.51 - 60+67.90

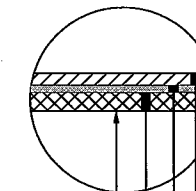


PARK AND RIDE PAVEMENT SECTION

- NOTES:
- ① BACKFILL WITH SELECT GRADING MATERIAL.
 - ⑥ SEE BRIDGE PLANS FOR FURTHER DETAILS

GENERAL NOTES:

- ALL CROSS SLOPES ARE FOOT PER FOOT.
- ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.
- MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.
- UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.



- 4.0" TYPE SP 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- 2.0" TYPE SP 12.5 NON WEARING COURSE MIXTURE SPNWB430B
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE

DESIGN TEAM			
DRAWN BY:	JHO		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS
 EB CR H, WB CR H, PARK AND RIDE

FILE NO.
 RAMSE129594
 TS9
 OF TS12
 38
 367

2:40:15 PM

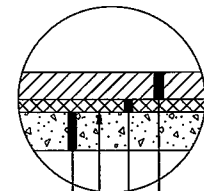
12/4/2015

K:\TWC_Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162-ts10.dgn \$MODELNAME\$

TYPICAL SECTION NO. 31

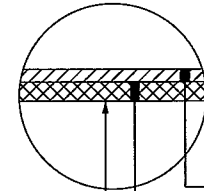
EB CR H STA. 56+53.43 - 60+19.67

INSET B

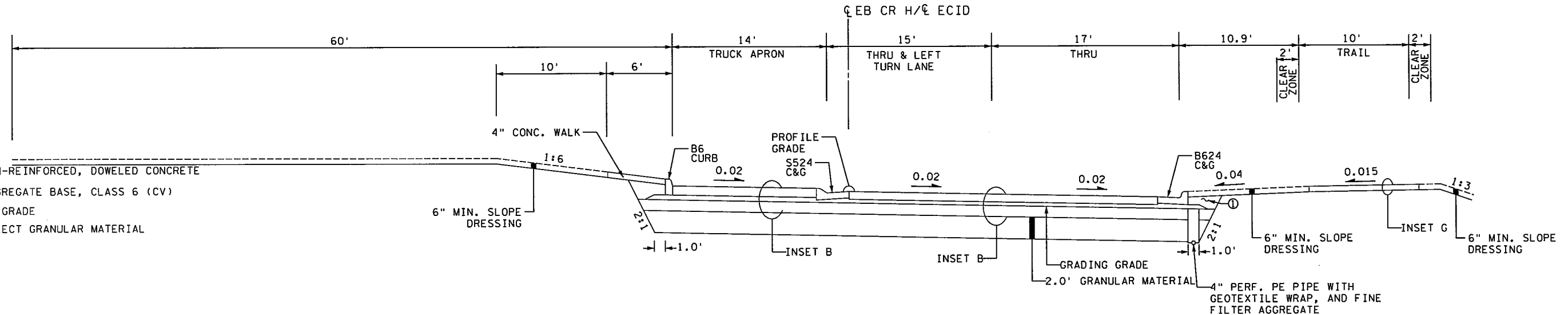


- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

INSET G

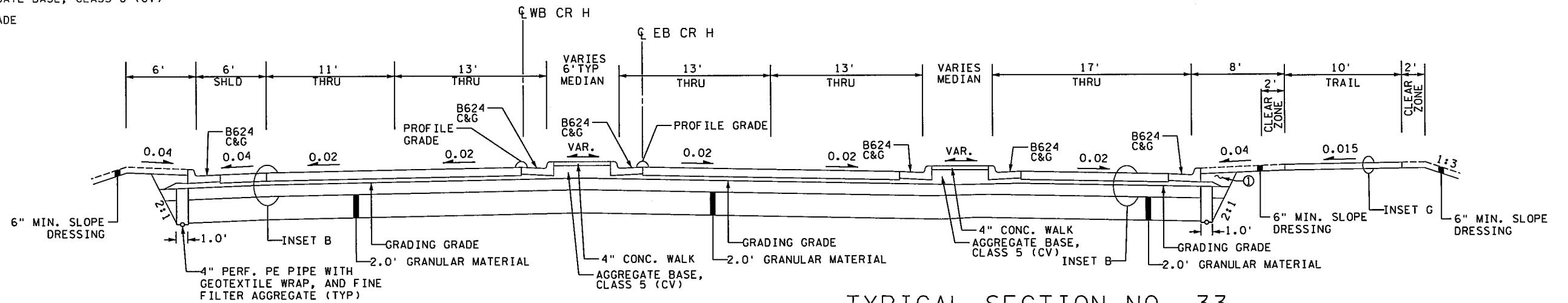


- 3.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB340C (PMB) (2 LIFTS)
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE



TYPICAL SECTION NO. 32

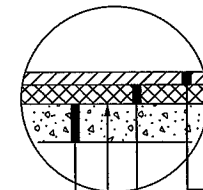
EB CR H STA. 60+19.67 - 61+20.82



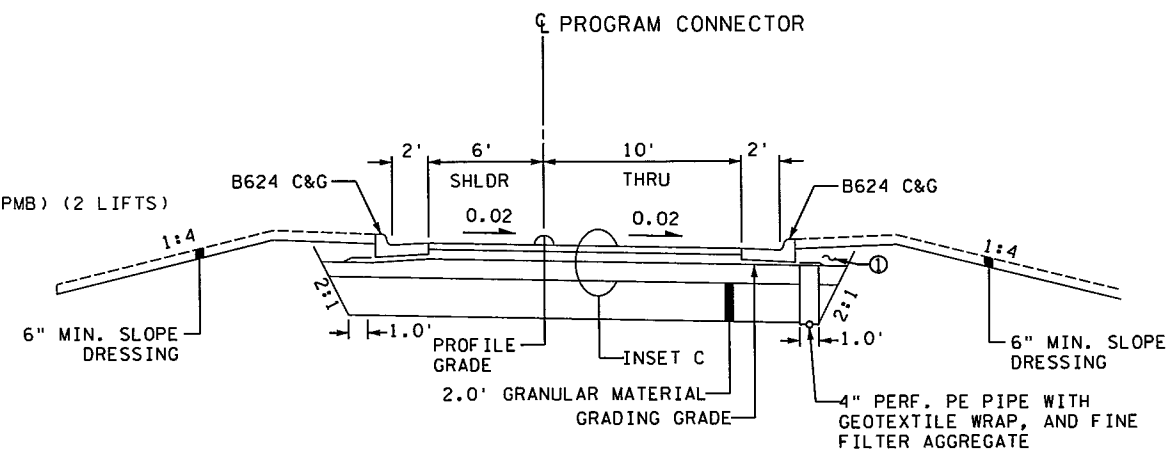
TYPICAL SECTION NO. 33

PROGRAM CONNECTOR STA. 59+67.56 - 61+97.51

INSET C



- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB340C (PMB) (2 LIFTS)
- 6.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL



NOTES:
 ① BACKFILL WITH SELECT GRADING MATERIAL.

GENERAL NOTES:
 ALL CROSS SLOPES ARE FOOT PER FOOT.
 ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.
 MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.
 UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015



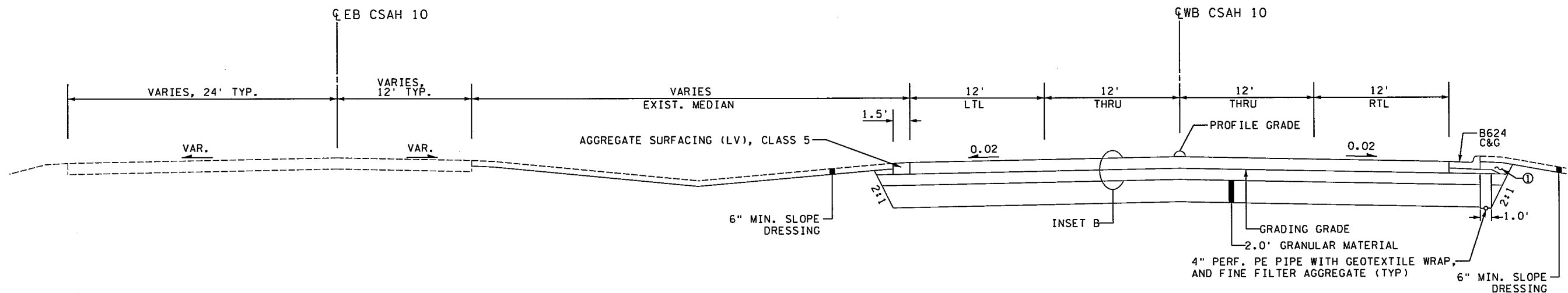
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS		FILE NO.	39
EB CR H, WB CR H, PROGRAM CONNECTOR		RAMSEI29594	
		TS10	367
		OF TS12	

DESIGN TEAM				
DRAWN BY: JHO				
DESIGNER: NMG				
CHECKED BY: WCK				
NO.	BY	DATE	REVISIONS	

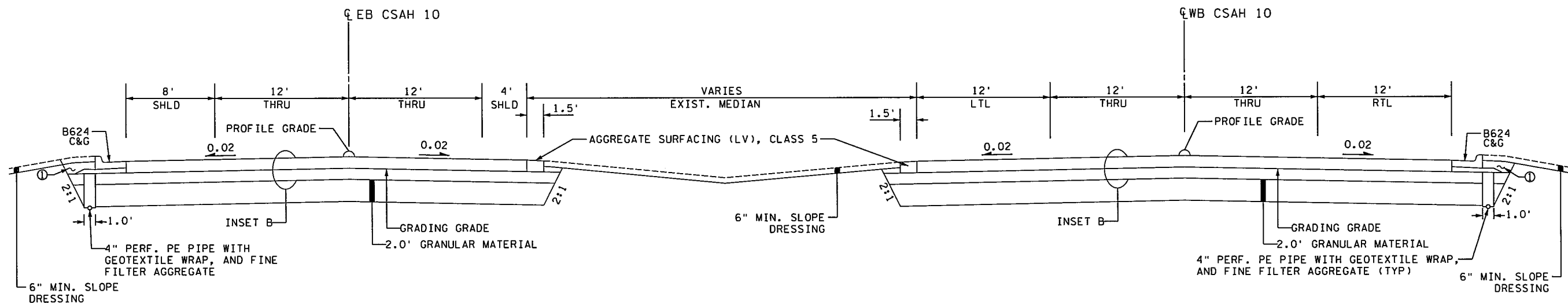
TYPICAL SECTION NO. 34

WB CSAH 10 STA. 442+70.00 - 444+08.71



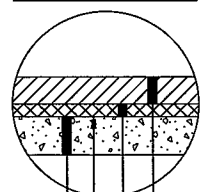
TYPICAL SECTION NO. 35

WB CSAH 10 STA. 444+08.71 - 445+21.92



NOTES:
 ① BACKFILL WITH SELECT GRADING MATERIAL.

INSET B



GENERAL NOTES:

ALL CROSS SLOPES ARE FOOT PER FOOT.

ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.

MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.

UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

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12/4/2015
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\$MODELNAME\$

DESIGN TEAM				
DRAWN BY: JHO				
DESIGNER: NMG				
CHECKED BY: WCK				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015

Kimley»Horn

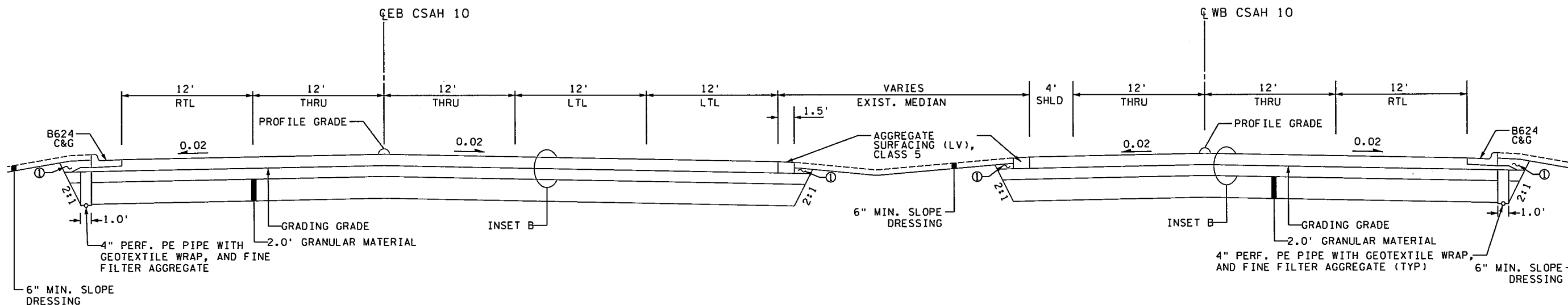
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS
 EB CSAH 10, WB CSAH 10

FILE NO. RAMSE129594	40
TS11 OF TS12	367

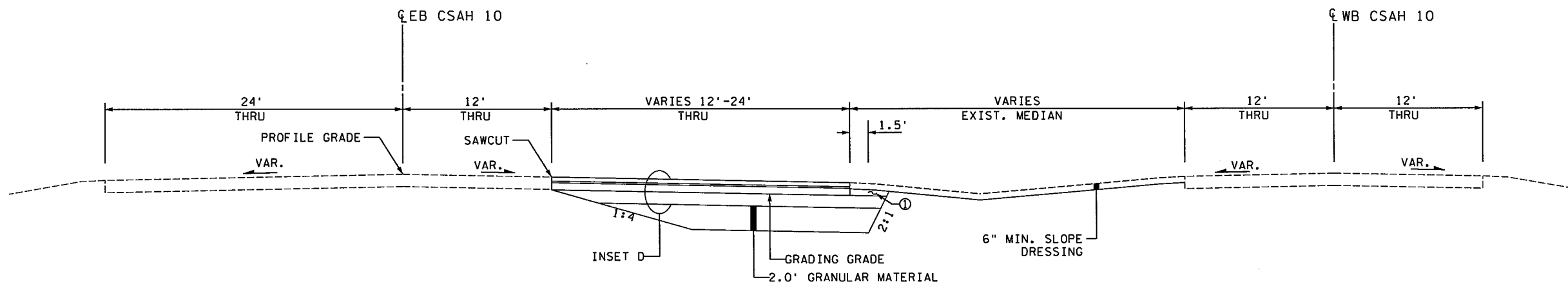
TYPICAL SECTION NO. 36

WB CSAH 10 STA. 445+21.92 - 446+27.42

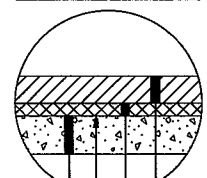


TYPICAL SECTION NO. 37

EB CSAH 10 STA. 16+67.06 - 24+51.37

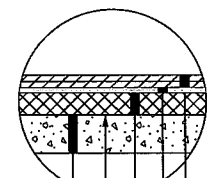


INSET B



- 8.5" NON-REINFORCED, DOWELED CONCRETE
- 4.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

INSET D



- 4.0" TYPE 12.5 WEARING COURSE MIXTURE SPWEB440F (PMB) (2 LIFTS)
- 1.5" TYPE 12.5 NON-WEARING COURSE MIXTURE SPNWB430B
- 7.0" AGGREGATE BASE, CLASS 6 (CV)
- GRADING GRADE
- 12" SELECT GRANULAR MATERIAL

NOTES:
 ① BACKFILL WITH SELECT GRADING MATERIAL.

GENERAL NOTES:

ALL CROSS SLOPES ARE FOOT PER FOOT.

ROADWAY CROSS SLOPES ARE TYPICAL, SEE DRAINAGE AND SUPERELEVATION PLAN FOR VARIATIONS.

MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.

UNLESS OTHERWISE SPECIFIED THE GRADING GRADE CROSS SLOPES SHALL BE THE SAME AS THE FINISHED SURFACE.

K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\06284162.tsl2.dgn

2/4/2015 2:40:16 PM

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015

Kimley»Horn

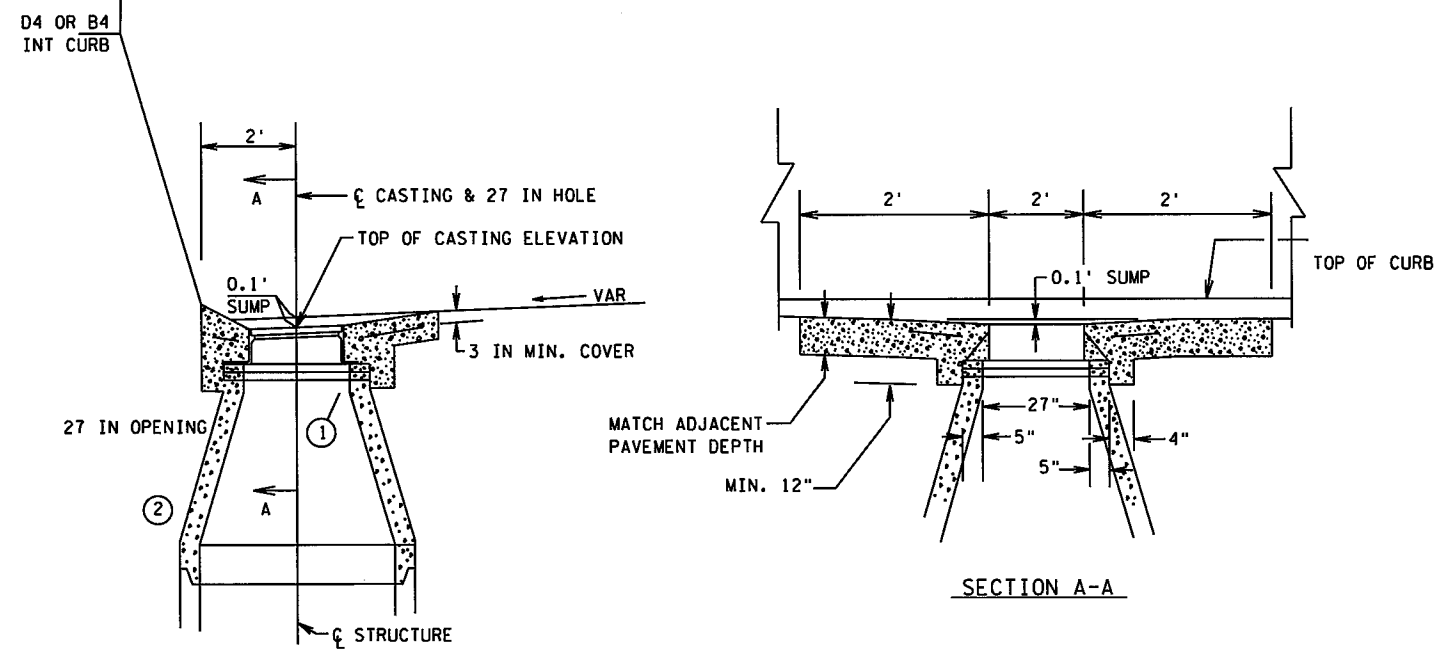
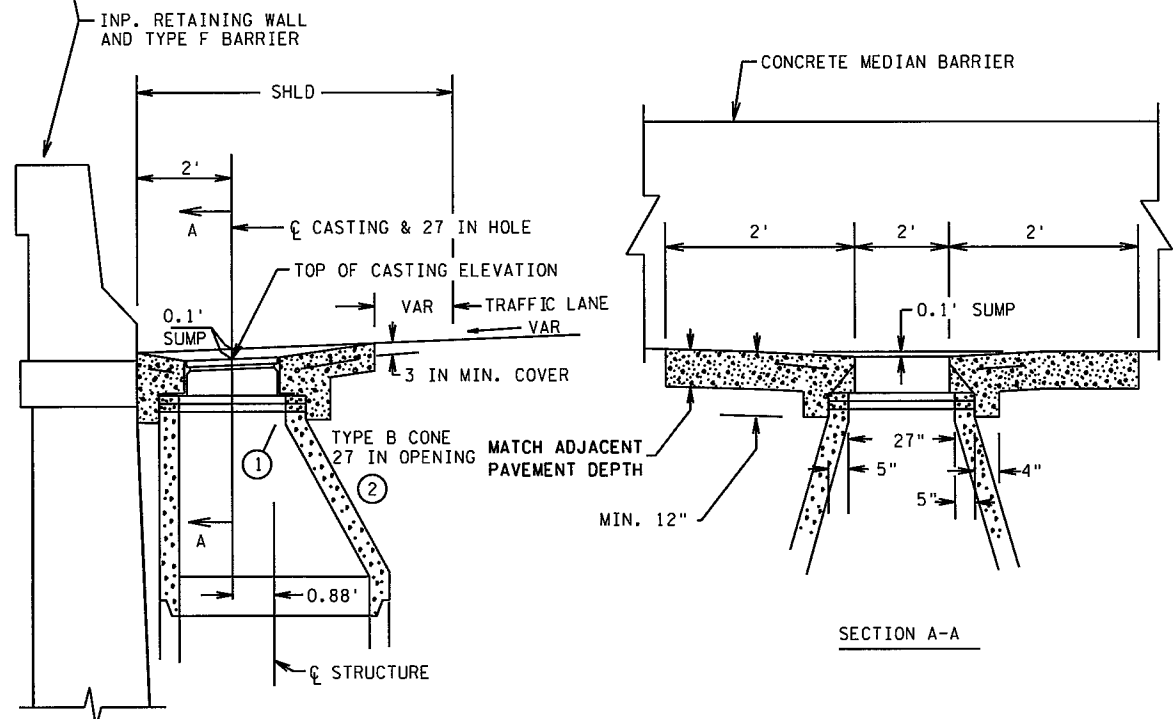
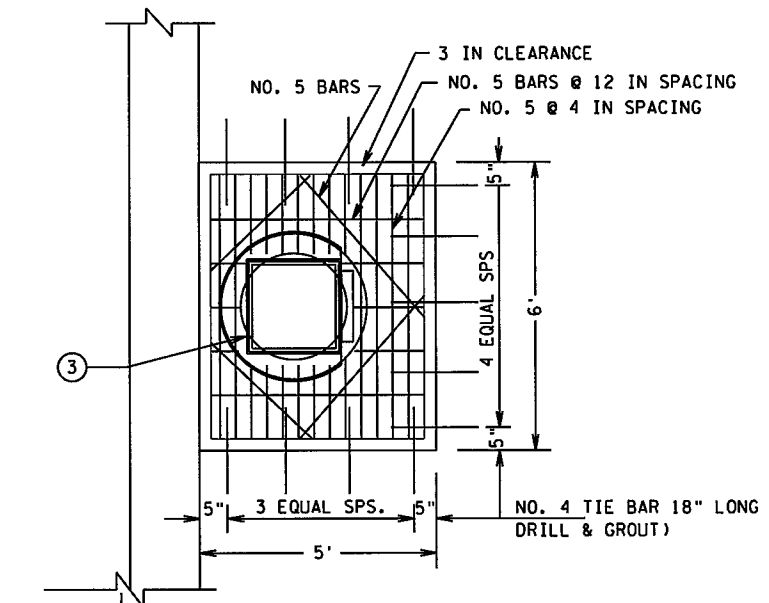
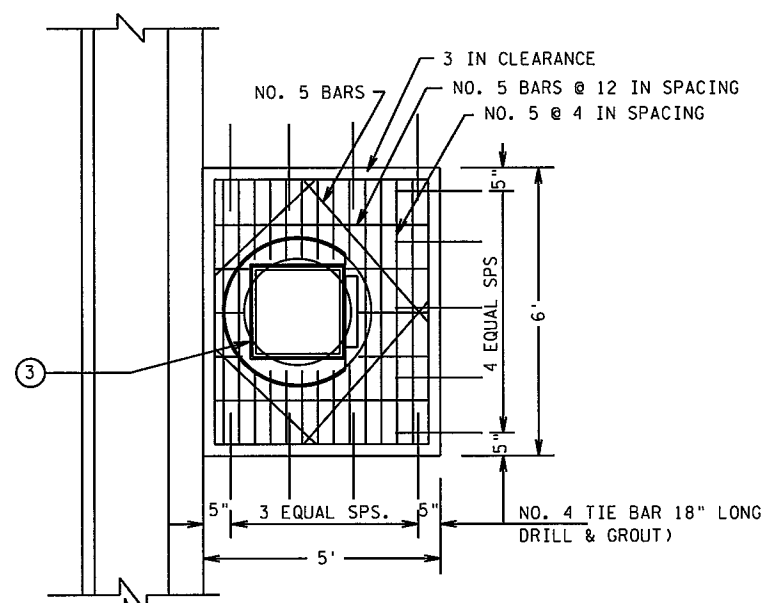
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TYPICAL SECTIONS
 EB CSAH 10, WB CSAH 10

FILE NO.
 RAMSE129594
 TS12
 OF TS12

41
 367

DESIGN TEAM				REVISIONS			
DRAWN BY:	JHO			NO.	BY	DATE	
DESIGNER:	NMG						
CHECKED BY:	WCK						



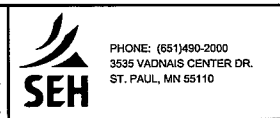
CONCRETE INLET PAD ④
ADJACENT TO RETAINING WALL

CONCRETE INLET PAD ④
ADJACENT TO INTEGRANT CURB

- ① 0.0' TO 1.0' ADJUSTING RINGS. MORTAR BETWEEN CASTING AND RINGS AND STRUCTURE AND RINGS.
- ② INPLACE OR NEW DRAINAGE STRUCTURE.
- ③ SEE MISCELLANEOUS DRAINAGE STRUCTURE ITEMS.
- ④ ALL ITEMS ARE INCLUDED IN CONCRETE INLET PAD PAY ITEM.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

MISCELLANEOUS DETAILS		FILE NO.	42
CONCRETE INLET PAD ADJACENT TO RETAINING WALL		RAMSE129594	
CONCRETE INLET PAD ADJACENT TO INTEGRANT CURB		MD1	
		OF MDIO	367

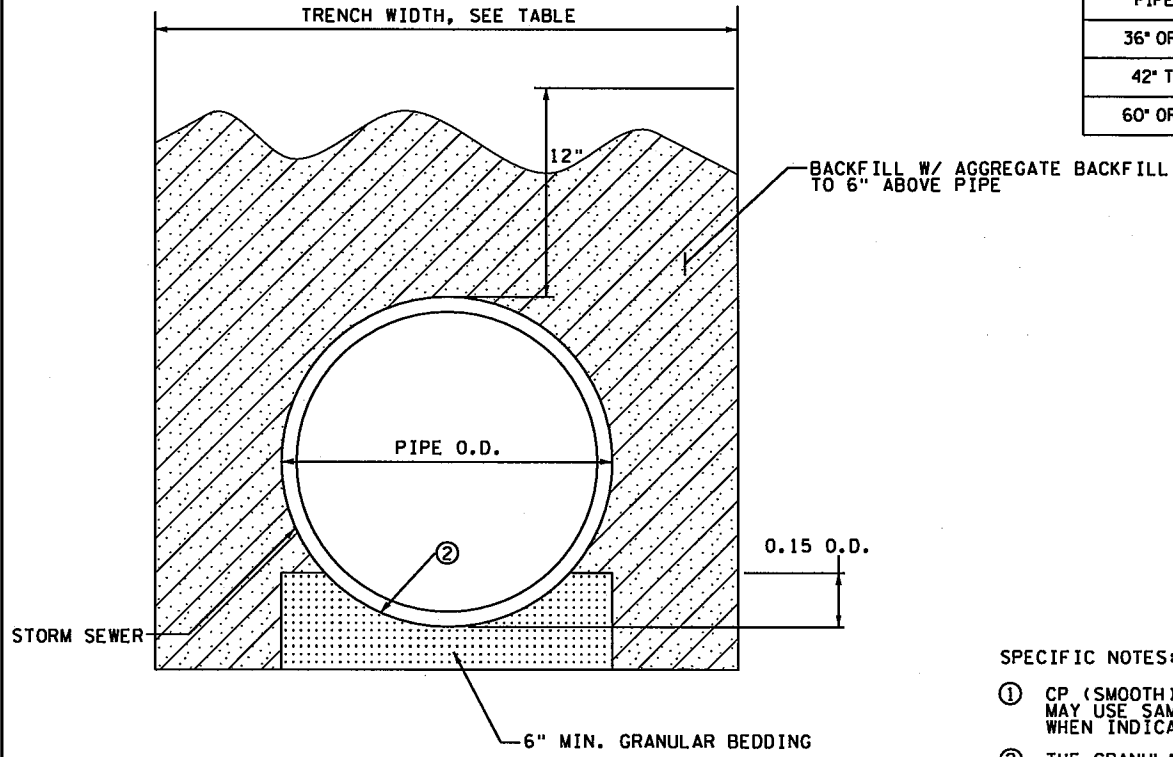
DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: REP				
CHECKED BY: REP				

11:28:11 AM

2/16/2016

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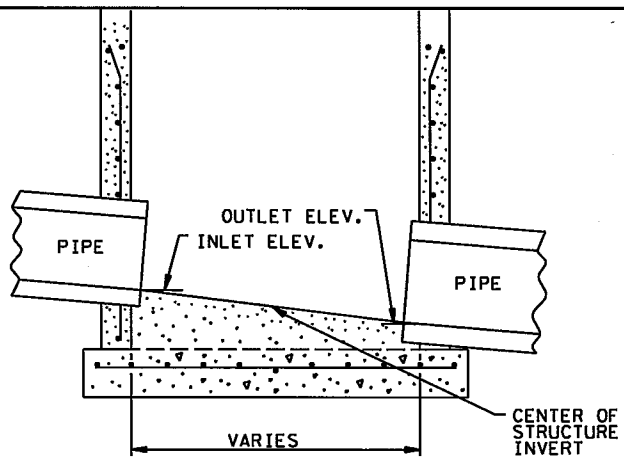
TRENCH WIDTH	
PIPE DIA.	TRENCH WIDTH
36" OR LESS	O.D. + 24"
42" TO 54"	1.5 X O.D.
60" OR OVER	O.D. / 36"



PIPE TRENCH DETAIL 1

SPECIFIC NOTES:

- ① CP (SMOOTH) AND PE (SMOOTH) MAY USE SAME BEDDING DETAIL WHEN INDICATED.
- ② THE GRANULAR BEDDING SHALL BE SHAPED TO MATCH THE OUTSIDE DIAMETER OF PIPE TO BE PLACED. THIS SHAPING SHALL BE DONE USING A TEMPLATE WITH THE SAME DIMENSIONS AS THE PIPE BEING PLACED.



INLET ELEVATION = PIPE INVERT (AT CENTER OF STRUCTURE) + PIPE SLOPE X STRUCTURE RADIUS

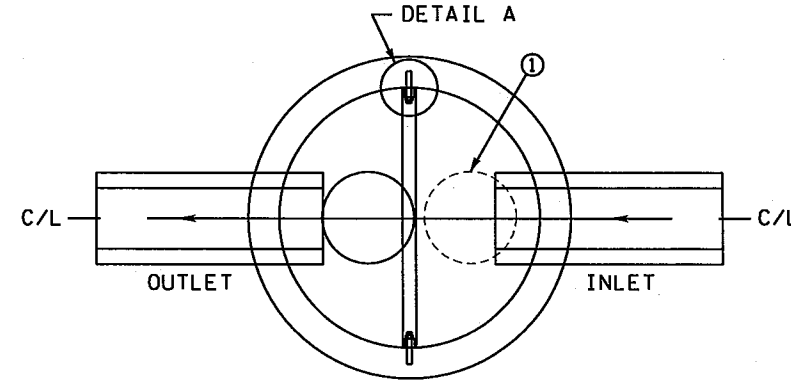
OUTLET ELEVATION = PIPE INVERT (AT CENTER OF STRUCTURE) - PIPE SLOPE X STRUCTURE RADIUS

PIPE INVERTS SHOWN ON PROFILES ARE GIVEN AT THE CENTER OF THE STRUCTURE

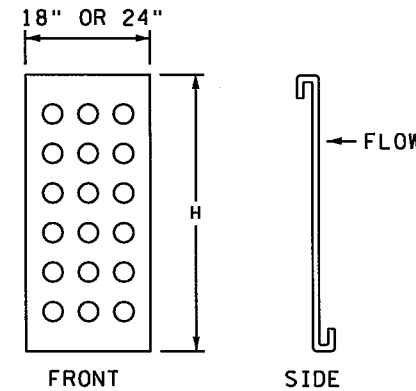
PIPE SLOPE IS CALCULATED FROM STRUCTURE CENTER INVERTS AND LENGTHS FROM CENTER OF STRUCTURE

INVERT EXPLANATION

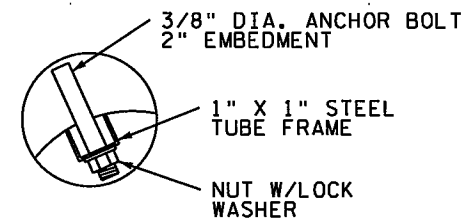
STRUCTURE ID	INSTALL TYPE	D (ft)	Ys (ft)	y (in)	H (in)
CB-2102	THROUGH	4	4	12	46
CB-2104	90°	4	3	12	36
CB-2305	THROUGH	5	5	12	57
STM-1210	THROUGH	5	5	12	57
STM-1409	THROUGH	5	5	12	57
STM-1507	145°	6	6	12	57
STM-2206	THROUGH	5	5	12	57
STM-2308	THROUGH	4	3	12	36
STM-2508	THROUGH	4	4	12	46



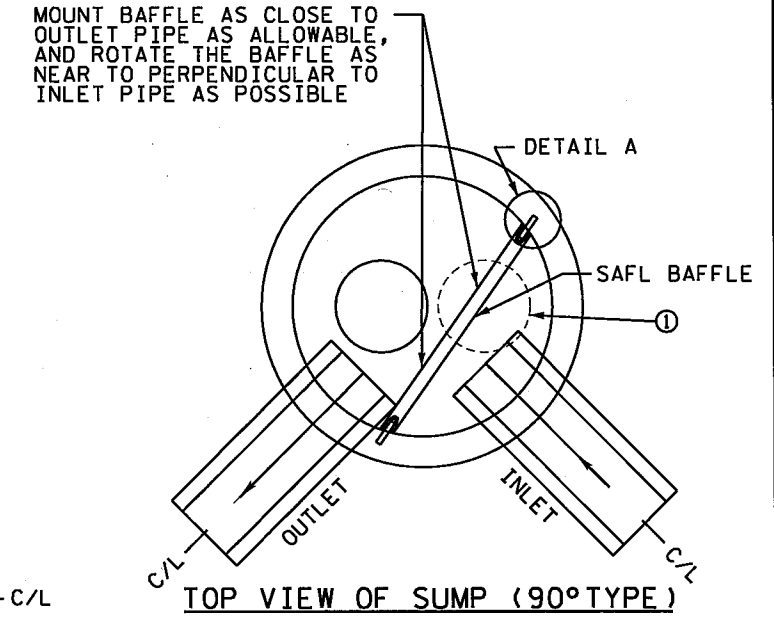
TOP VIEW OF SUMP (THROUGH TYPE)



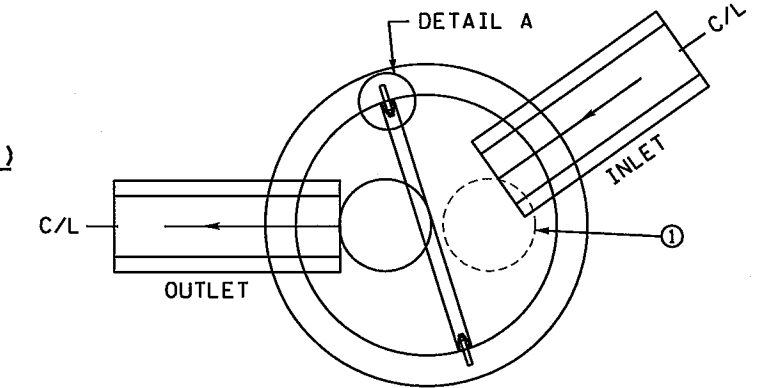
SAFL BAFFLE PANEL



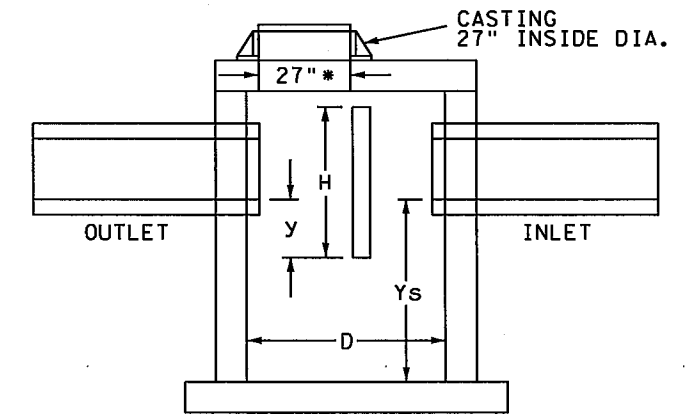
DETAIL A



TOP VIEW OF SUMP (90° TYPE)



TOP VIEW OF SUMP (145° TYPE)



SIDE VIEW OF SUMP

SPECIFIC NOTE:

- ① PROVIDE TWO CASTINGS FOR DESIGN SPECIAL 1 STRUCTURES WITH A DIAMETER OF 5 FEET OR GREATER. CONCRETE STRUCTURE SHALL BE IN ACCORDANCE WITH MNDOT STANDARD PLATE 4020.

SAFL BAFFLE STRUCTURE DETAIL
(2506) CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 1

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: REP				
CHECKED BY: REP				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel E. Pichelmann* Lic. No. 51315
Licensed Professional Engineer

Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

MISCELLANEOUS DETAILS
PIPE TRENCH DETAIL, INVERT EXPLANATION,
SAFL BAFFLE STRUCTURE

FILE NO. 43
RAMSEI29594
MD2
OF MD0 367

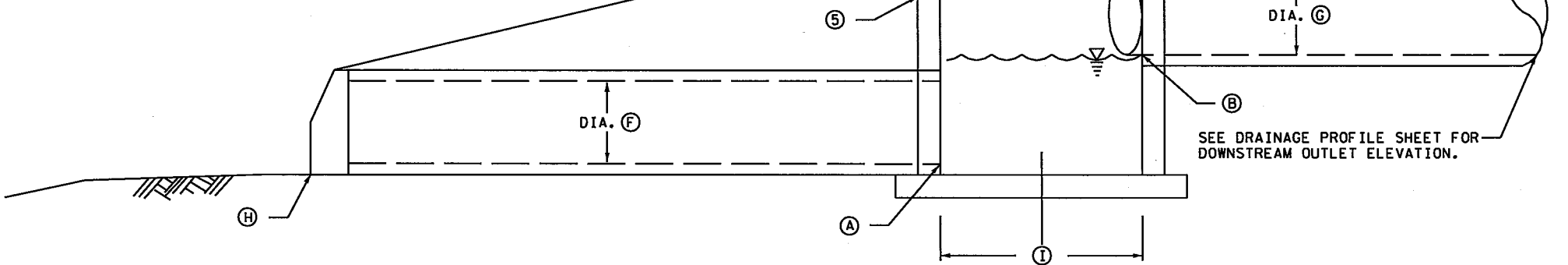
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2/16/2016

NOTES:

- ④ ELEVATION (C) OCCURS INLINE WITH THE CENTERLINE OF PIPE (F).
ELEVATION (D) OCCURS DIRECTLY ACROSS STRUCTURE FROM (C).
- ⑤ PRECAST BARREL AND BASE SLAB SHALL CONFORM TO MNDOT STD. PL. 4020.
- ⑥ SEE MISCELLANEOUS DETAIL SHEET MDB FOR SKIMMER MANHOLE GRATE AND RIPRAP DETAIL.

POND CONTROL STRUCTURE
(2506) CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 2

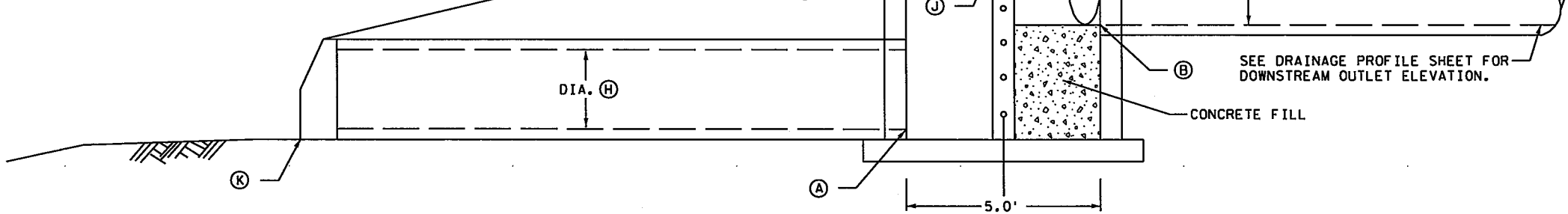


DRAINAGE STRUCTURE DESIGN	STRUCTURE NO.	LOCATION	INLET ELEVATION (A)	OUTLET ELEVATION (B)	OVERFLOW ELEVATION (C)	TOP OF STRUCTURE (D)	100-YEAR HWL (E)	INLET DIAMETER (IN.) (F)	OUTLET DIAMETER (IN.) (G)	POSITIVE OUTFLOW ELEVATION	INLET ELEVATION (H)	STRUCTURE DIAMETER (FT.) (I)
DESIGN SPECIAL 2	STM-1412	MERMAID WET POND	872.68	874.40	877.10	878.30	878.04	24	24	874.40	871.40	4.0

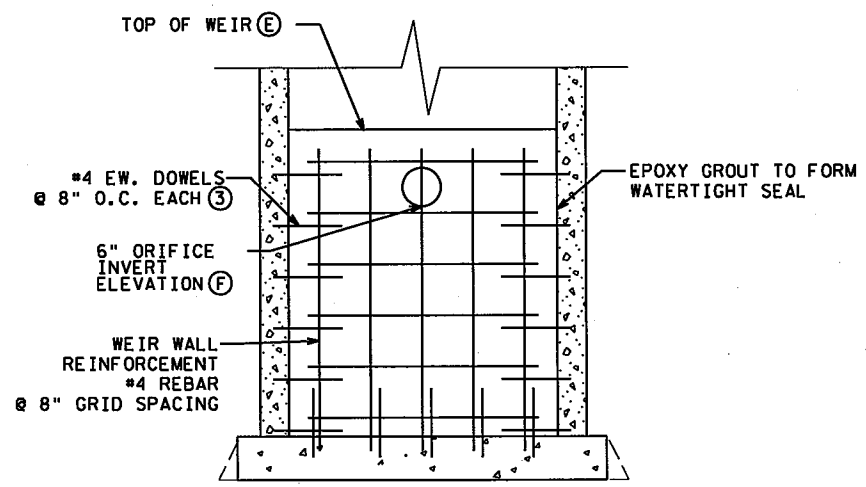
NOTES:

- ① WALL CONSTRUCTION MAY BE CLASS II PRECAST RC PIPE.
- ② PROVIDE FULL PENETRATION TACK WELD EVERY OTHER BAR-MINIMUM.
- ③ ALL REBAR SIZES ARE METRIC UNLESS NOTED OTHERWISE.
- ④ ELEVATION (C) OCCURS INLINE WITH THE CENTERLINE OF PIPE (H).
ELEVATION (D) OCCURS DIRECTLY ACROSS STRUCTURE FROM (C).
- ⑤ PRECAST BARREL AND BASE SLAB SHALL CONFORM TO MNDOT STD. PL. 4020.
- ⑥ SEE MISCELLANEOUS DETAIL SHEET MDB FOR SKIMMER MANHOLE GRATE AND RIPRAP DETAIL.

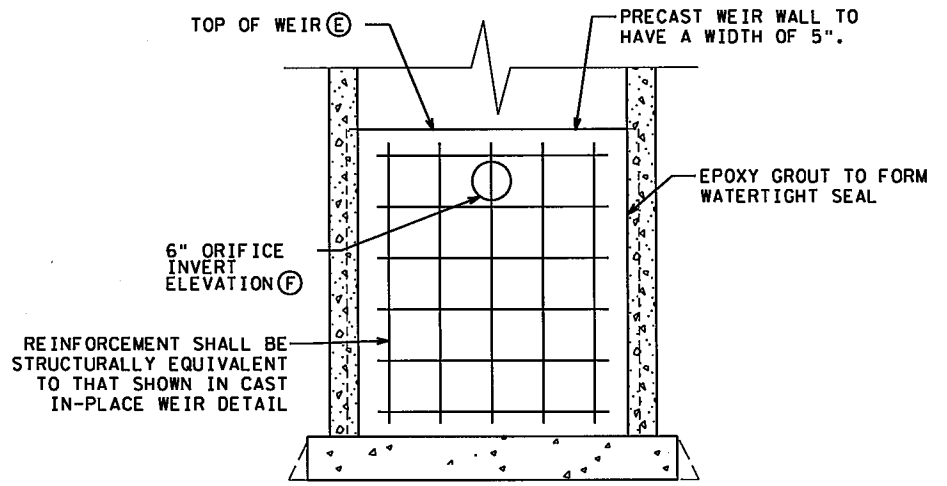
POND CONTROL STRUCTURE
(2506) CONSTRUCT DRAINAGE STRUCTURE DESIGN SPECIAL 3



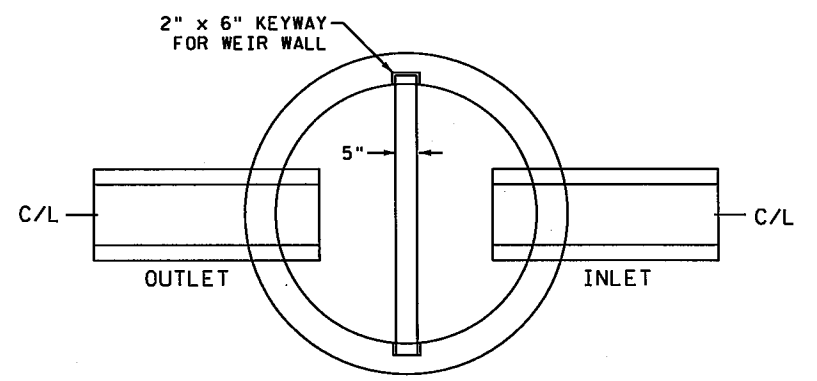
DRAINAGE STRUCTURE DESIGN	STRUCTURE NO.	LOCATION	INLET ELEVATION (A)	OUTLET ELEVATION (B)	OVERFLOW ELEVATION (C)	TOP OF STRUCTURE (D)	WEIR WALL THICKNESS (IN.) (E)	WEIR CREST (F)	ORIFICE INVERT ELEVATION (G)	100-YEAR HWL (H)	INLET DIAMETER (IN.) (I)	OUTLET DIAMETER (IN.) (J)	ORIFICE DIAMETER (IN.) (K)	POSITIVE OUTFLOW ELEVATION	INLET ELEVATION (L)
DESIGN SPECIAL 3	STM-1615	ROUNDAABOUT WET POND	883.00	881.00	889.00	890.00	5	888.50	886.00	888.25	24	24	6	886.00	882.00
DESIGN SPECIAL 3	STM-2027	PROGRAM WET POND	880.00	881.75	883.75	884.75	5	883.60	881.75	883.74	18	18	6	881.75	878.00
DESIGN SPECIAL 3	STM-2026	RICE CREEK WET POND	874.50	874.00	877.80	878.80	5	877.00	876.00	878.56	18	12	6	876.00	873.00



CAST-IN-PLACE WEIR DETAIL



PRECAST WEIR WALL DETAIL

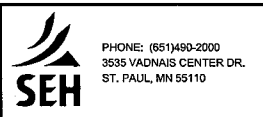


PRECAST WEIR WALL TOP VIEW

S:\PTV\Ramsey\129594\5-Final-dsgn\51-const-dwgs-CAD\40-TransHW\p1nshfts\CD6284162-dd01.dgn

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: REP				
CHECKED BY: REP				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Rachel E. Pichelmann* Lic. No. 51315
Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

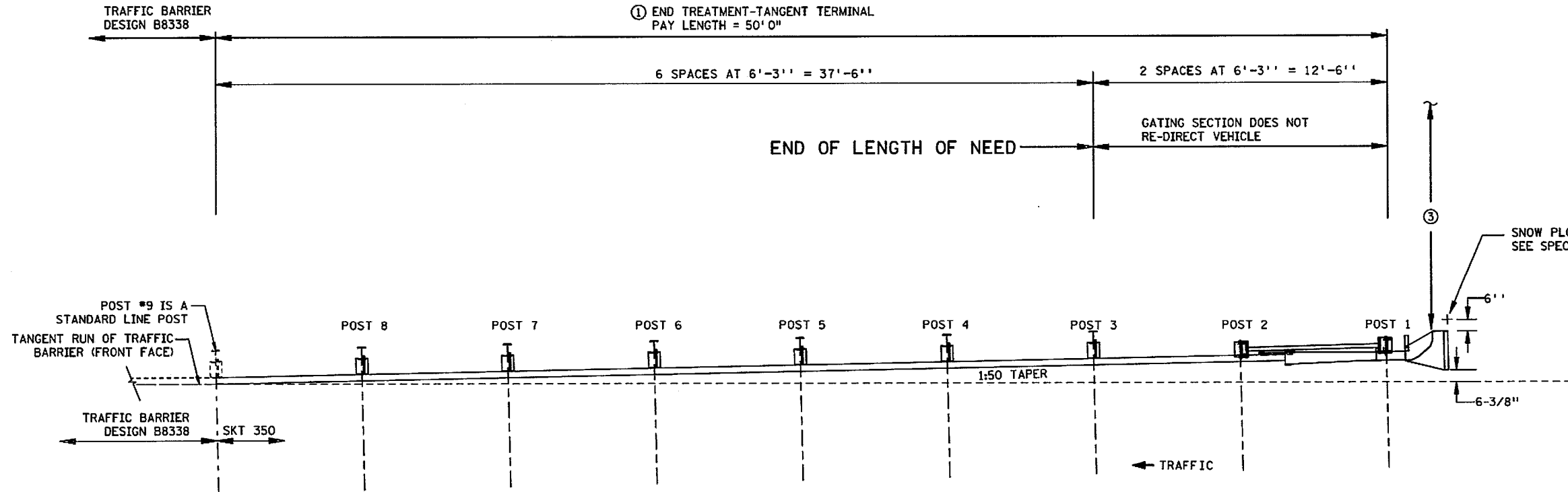
MISCELLANEOUS DETAILS
POND OUTLET CONTROL STRUCTURES
SKIMMER MANHOLE GRATE AND RIPRAP

FILE NO. RAMSE129594
MD3 OF MD0
44
367

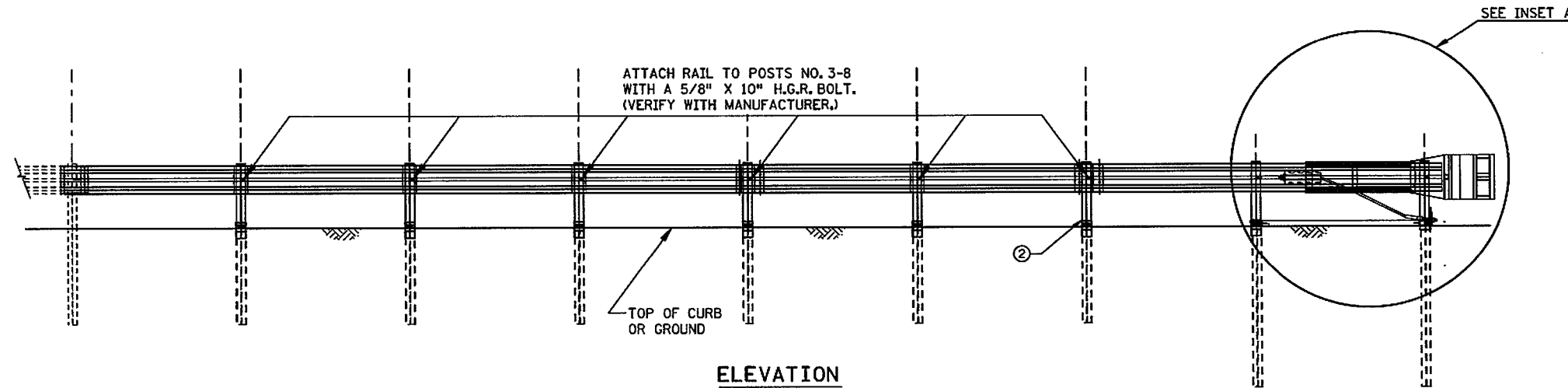
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12/8/2015

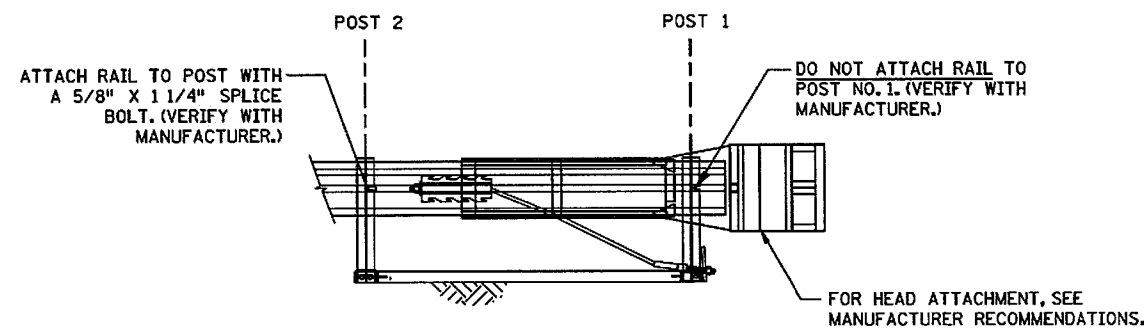
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PLAN



ELEVATION



INSET A

GENERAL NOTES:

ALL BOLTS, NUTS, CABLE ASSEMBLIES, CABLE ANCHORS AND BEARING PLATES SHALL BE GALVANIZED.

THIS DRAWING IS FOR INFORMATION ONLY. CONTACT THE MANUFACTURER, ROAD SYSTEMS, INC., FOR CURRENT DETAILS AND INSTALLATION INSTRUCTIONS. REFER TO MN/DOT STANDARD PLANS FOR ADDITIONAL GUARDRAIL INSTALLATION INSTRUCTIONS.

THIS IS A PROPRIETARY ITEM AS PER SPEC. 1703.

NOTES:

- ① USE STEEL HINGED BREAKAWAY (HBA) POSTS OPTIONS ONLY ON POSTS 1-8.
- ② THE NON-BREAKAWAY SECTION OF THE HBA POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE THE FINISHED GROUND LINE.
- ③ THE TRAFFIC BARRIER IS DESIGNED TO EXIT THE TERMINAL HEAD ON THE BACK SIDE OF THE INSTALLATION. A SPECIAL SITE EVALUATION SHOULD BE CONSIDERED PRIOR TO USING THE SKT WHERE THERE IS LESS THAN 25' BETWEEN THE BACK SIDE OF THE SKT AND ANY ADJACENT DRIVING LANE.

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015

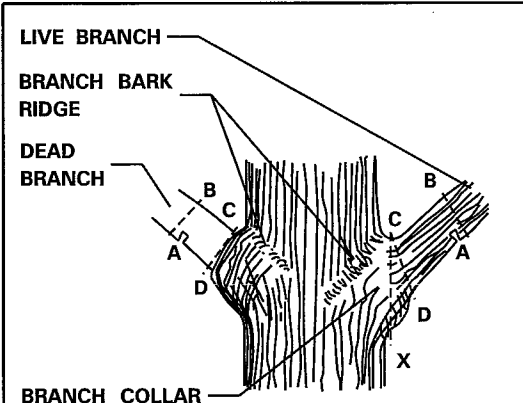
PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSE129594	45
MISCELLANEOUS DETAILS END TREATMENT - TANGENT TERMINAL SKT-350 HBA POST OPTION	MD4 OF MD10
	367

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12/8/2015

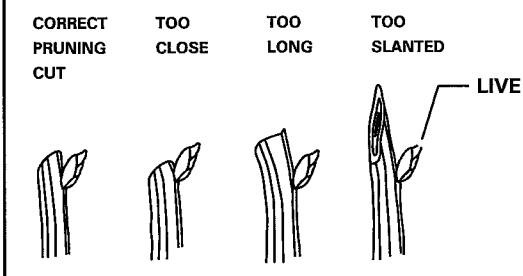


- STEPS TO PRUNING WITH PRUNING SAW:**
1. CUT PART WAY THROUGH THE BRANCH AT POINT A.
 2. CUT COMPLETELY THROUGH BRANCH FROM POINT B TO A.
 3. AT BRANCH COLLAR CUT FROM POINT C TO D.

INCORRECT CUT FROM POINT C TO X (TOO CLOSE) WILL RESULT IN DISCONTINUOUS CALLUS FORMATION AFTER ONE SEASON OF GROWTH.

CORRECT CUT FROM POINT C TO D (LEAVING BRANCH COLLAR BUT NOT THE STUB FROM POINT B TO A) WILL RESULT IN CONTINUOUS DOUGHNUT SHAPED CALLUS FORMATION AFTER ONE SEASON OF GROWTH.

BRANCHES PRUNED AT TRUNK
(SHIGO METHOD)

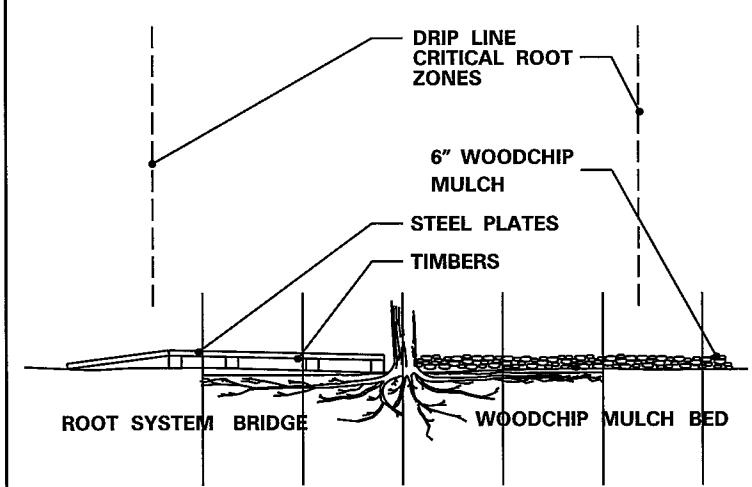


- PRUNING NOTES:**
1. PRUNE USING CLEAN AND SHARP SCISSOR-TYPE PRUNER OR PRUNING SAW.
 2. THE BEST TIME TO PRUNE IS LATE DORMANT SEASON OR EARLY SPRING.
 3. AVOID PRUNING OAKS IN APRIL, MAY, JUNE OR JULY.
 4. IF PRUNING IS NECESSARY OR IF WOUNDS OCCUR TO OAK TREES IN APRIL, MAY, JUNE OR JULY, IMMEDIATELY PAINT CUT SURFACE OR WOUND WITH LATEX PAINT OR SHELLAC.

BRANCHES PRUNED TO LIVE BUD

PRUNING

(MnDOT 2571.3K2a9 and 2571.3E1)



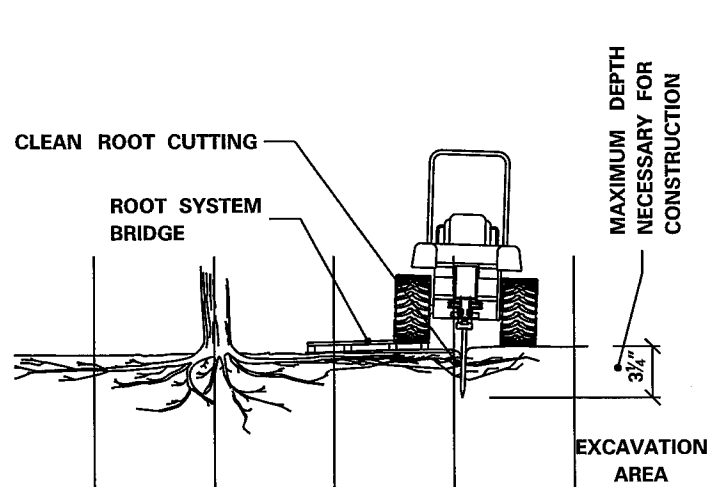
- IF CONSTRUCTION VEHICLES MUST PASS OVER ROOT ZONES, THE CONTRACTOR MUST EITHER:
1. CONSTRUCT ROOT SYSTEM BRIDGES WITH STEEL PLATE SUPPORTED ON WOOD TIMBERS PLACED RADIALLY TO THE TREE TRUNK.
- OR
2. PLACE A 6 INCH LAYER OF WOODCHIP MULCH OVER A TYPE III GEOTEXTILE (MnDOT 3733).

OTHER VEGETATION PROTECTION MEASURES

(MnDOT 2572.3A12)

TEMPORARY FENCE

(MnDOT 2572.3A1)



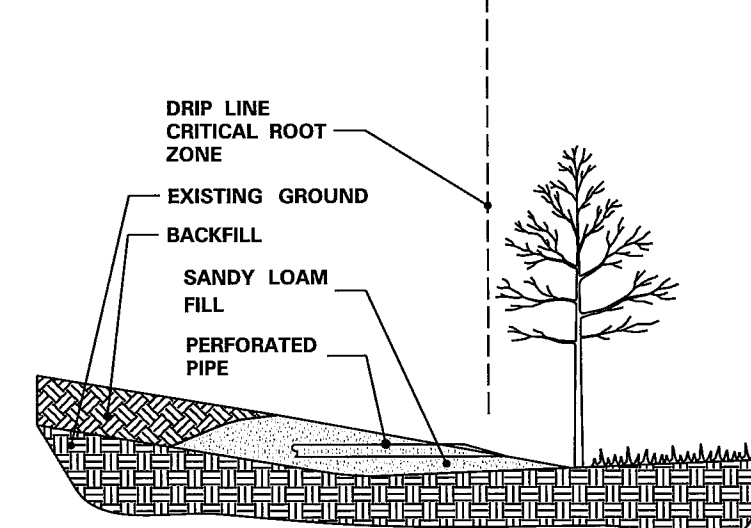
1. WHEN DESIGNATED IN THE PLAN OR DIRECTED BY THE ENGINEER, PRIOR TO EXCAVATION, ALL TREE ROOTS WILL BE CLEANLY CUT BY A VIBRATORY PLOW OR OTHER APPROVED ROOT CUTTER.
2. THE TREE ROOTS WILL BE CUT CLEANLY TO THE MAXIMUM DEPTH NECESSARY FOR CONSTRUCTION.
3. IMMEDIATELY, AND CLEANLY CUT DAMAGED AND EXPOSED ROOTS.
4. ROOT ENDS EXPOSED BY EXCAVATION ACTIVITIES SHALL BE IMMEDIATELY COVERED WITH A 6\"/>

CLEAN ROOT CUTTING

(MnDOT 2572.3A2)

SANDY LOAM TOPSOIL

(MnDOT 2572.3A4)



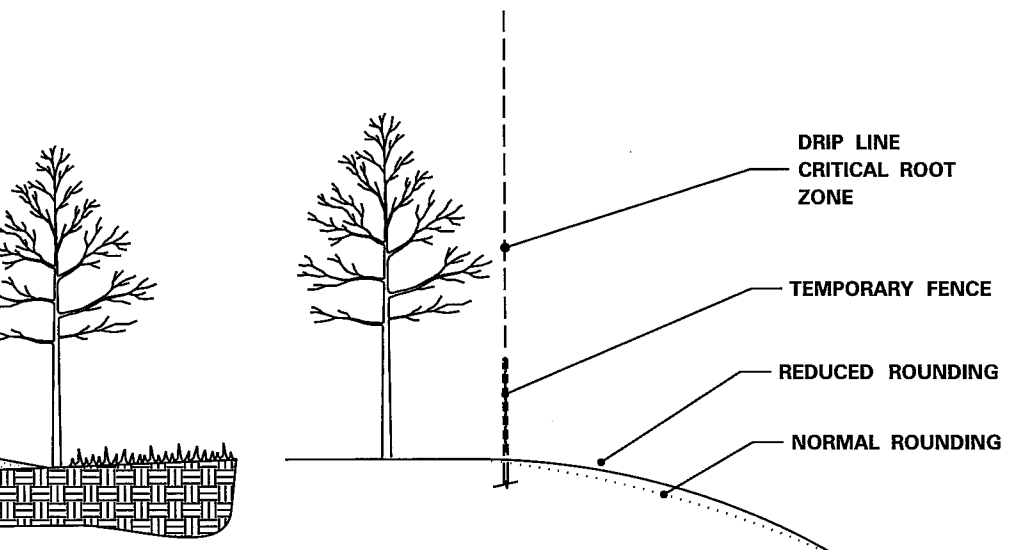
1. ANY FILL REQUIRED WITHIN THE DRIP LINE OF TREES, IS UNCOMPACTED SANDY LOAM TOPSOIL (WITH A COARSE SAND COMPONENT).
2. EXCESSIVE FILL MAY REQUIRE INSTALLING PERFORATED PIPE WITH AT LEAST ONE DAYLIGHTED END OPENING AS AN AERATION SYSTEM.

SANDY LOAM TOPSOIL

(MnDOT 2572.3A4)

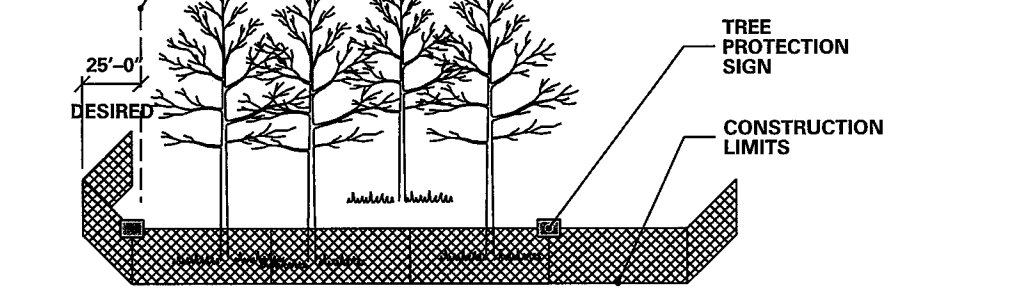
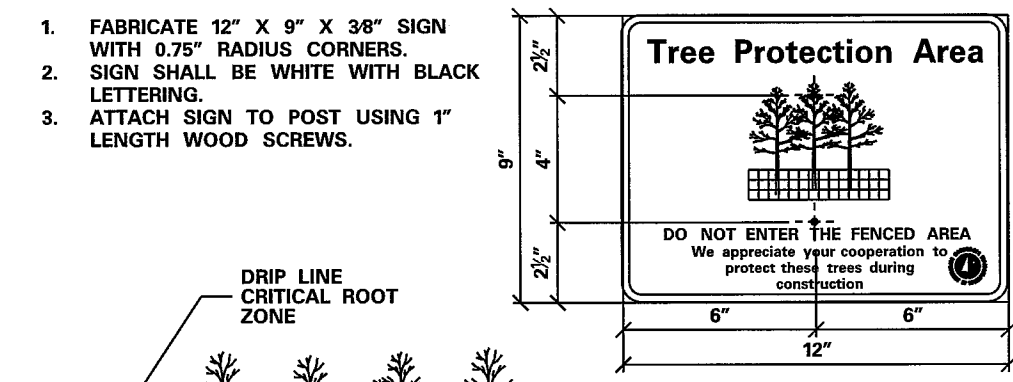
UTILITY CONSTRUCTION

(MnDOT 2572.3A5)



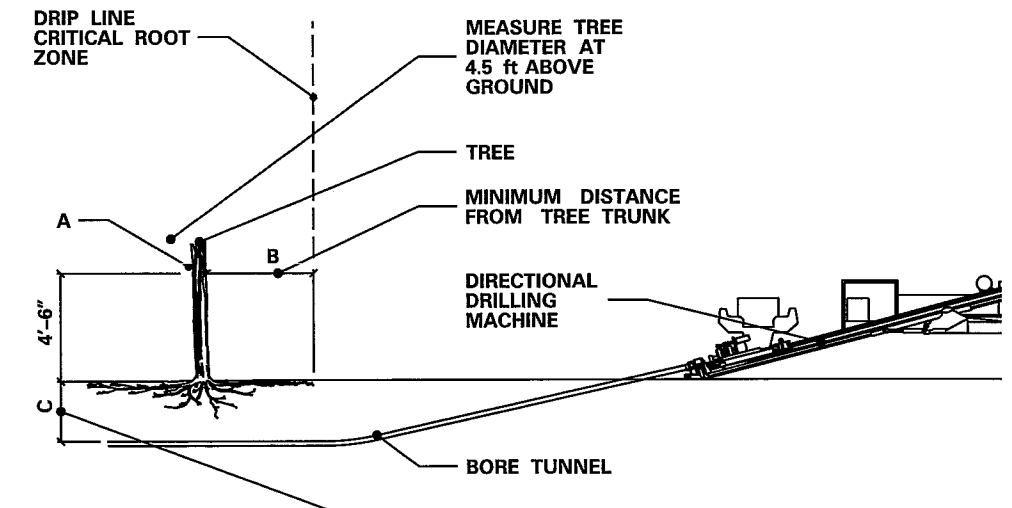
- SIGNIFICANT TREES NEAR THE PROPOSED CONSTRUCTION LIMITS WILL BE IDENTIFIED IN THE PLAN OR BY THE ENGINEER AND WILL BE PRESERVED BY THE CONTRACTOR.
1. PLACE THE TEMPORARY FENCE.
 2. REDUCE SLOPE ROUNDING WHERE ROOT ZONES ARE DISTURBED BY NORMAL SLOPE ROUNDING.
 3. VARY BACKSLOPE STEEPNESS TO AVOID TREE LOSS OR UNNECESSARY ROOT DAMAGE.

SLOPE ROUNDING



1. FURNISH AND INSTALL TEMPORARY FENCE AT THE TREE'S DRIPLINE OR CONSTRUCTION LIMITS AS SPECIFIED, PRIOR TO ANY CONSTRUCTION.
2. WHEN POSSIBLE PLACE FENCE 25 FEET BEYOND THE DRIP LINE.
3. PLACE TREE PROTECTION SIGNS ALONG FENCE AT 50' INTERVALS.

TEMPORARY FENCE



NOTE:

1. (A) IS THE DIAMETER OF TREES MEASURED 4-6 FEET ABOVE THE GROUND AND IS TERMED THE "DIAMETER AT BREAST HEIGHT," (DBH).
2. USING A TREE DIAMETER TAPE, WRAP THE TAPE AROUND THE GIRTH OF THE TREE, AT THE DBH, BEING CAREFUL NOT TO TWIST THE TAPE.

TREE PROTECTION ZONE			
	A	B	C
< 2"	2'	2'	
2-4"	4'	2.5'	
> 4-9"	6'	2.5'	
> 9-14"	10'	3'	
> 14-19"	12'	3.25'	
> 19"	15'	4'	

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DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: REP				
CHECKED BY: REP				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 12/8/2015

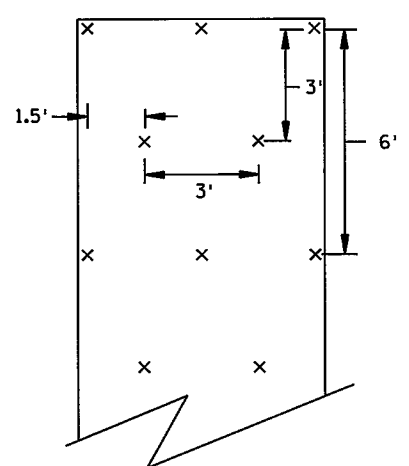


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

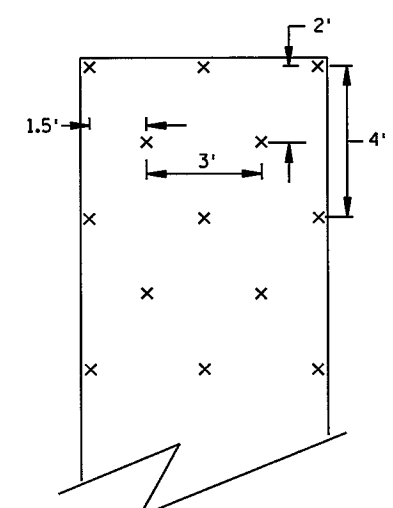
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MISCELLANEOUS DETAILS	
TEMPORARY VEGETATION TREATMENTS	
MD5 OF MD10	367

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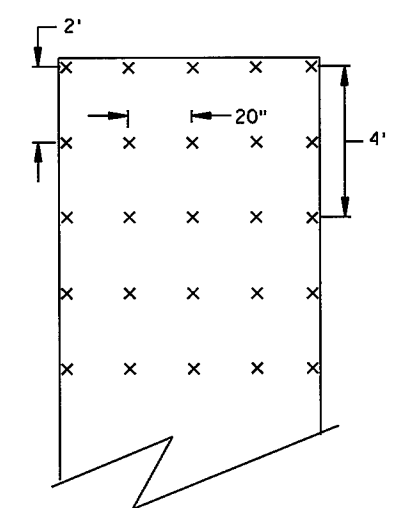
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SLOPES FLATTER THAN 1:2
(120 STAPLES PER 100 SQ YD)

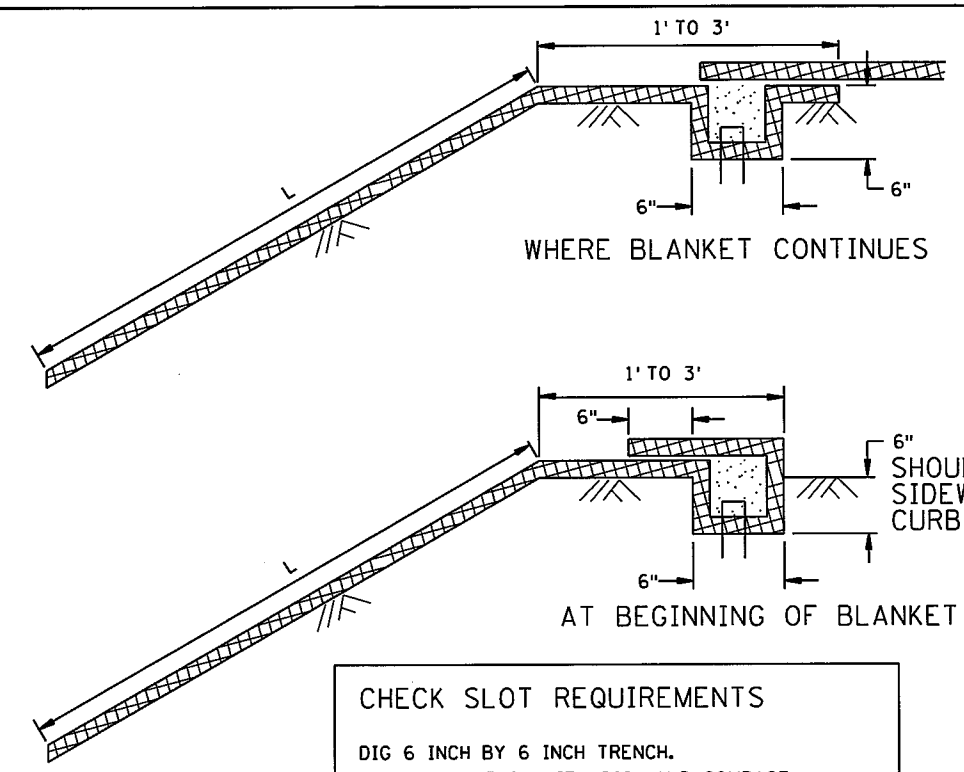


SLOPES 1:2 TO 1:1
(170 STAPLES PER 100 SQ YD)

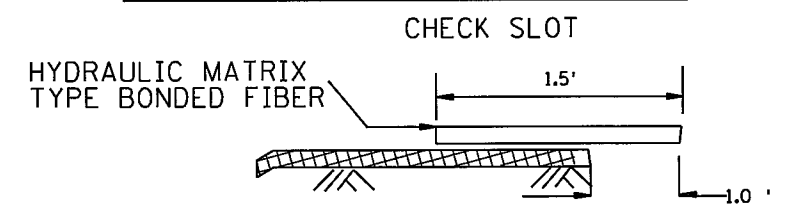


CHANNEL AND DITCH APPLICATIONS
(350 STAPLES PER 100 SQ YD)

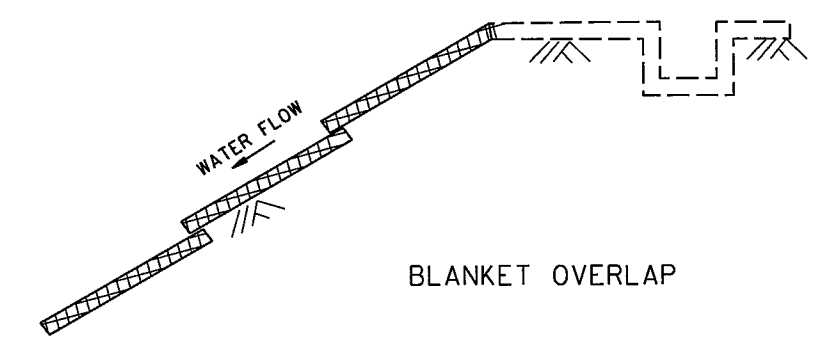
STANDARD 6.5 FT BLANKET STAPLE PATTERN



CHECK SLOT REQUIREMENTS
 DIG 6 INCH BY 6 INCH TRENCH.
 BACKFILL TRENCH WITH SOIL AND COMPACT.
 INSERT BLANKET INTO ENTIRE TRENCH PERIMETER.
 STAPLE BLANKET EVERY 2 FOOT ALONG THE BOTTOM OF THE TRENCH.

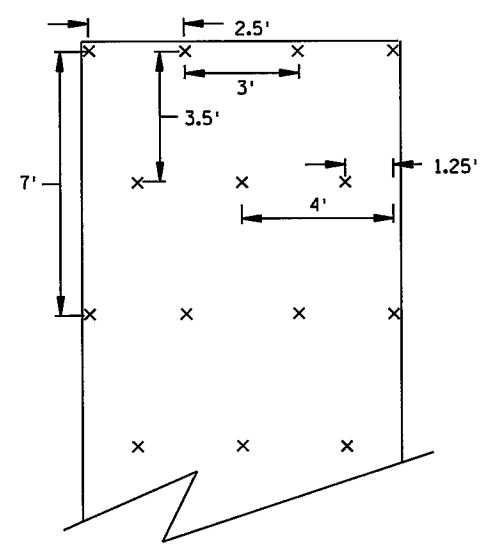


CHECK SLOT ALTERNATIVE

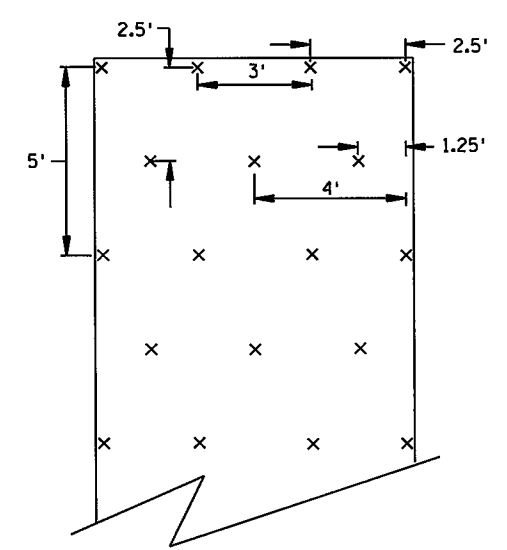


BLANKET OVERLAP

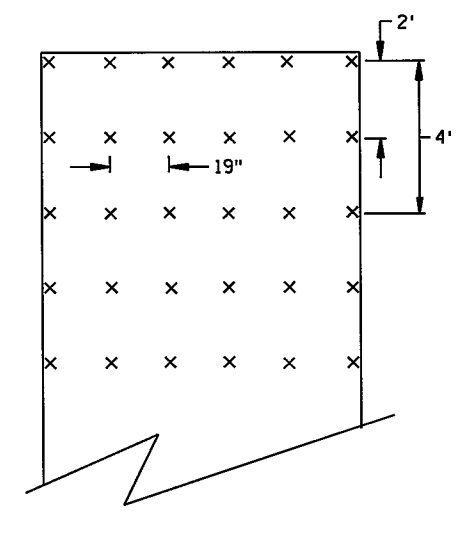
GENERAL BLANKET INSTALLATION REQUIREMENTS
 BLANKETS SHOULD BE LAID PARALLEL OR PERPENDICULAR TO THE DIRECTION OF WATER FLOW.
 OVERLAP ADJACENT STRIP EDGES A MINIMUM OF 4 INCHES.
 OVERLAP BLANKET 7 INCHES (MIN.) AT EACH END. OVERLAP BOTTOM END OF UPPER BLANKET OVER TOP END OF LOWER BLANKET. STAPLE ALONG OVERLAP EVERY 1.5 FEET.
 THE UPPERMOST BLANKET OF ALL SLOPE APPLICATIONS MUST START IN A CHECK SLOT. IF SLOPE LENGTH (L) IS 100 FT OR GREATER, INSERT BLANKET INTO A CHECK SLOT 1/3 FROM THE BOTTOM OF THE SLOPE.



SLOPES FLATTER THAN 1:2
(120 STAPLES PER 100 SQ YD)



SLOPES 1:2 TO 1:1
(170 STAPLES PER 100 SQ YD)



CHANNEL AND DITCH APPLICATIONS
(350 STAPLES PER 100 SQ YD)

STANDARD 8 FT BLANKET STAPLE PATTERN

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DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: REP				
CHECKED BY: REP				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Rachel Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

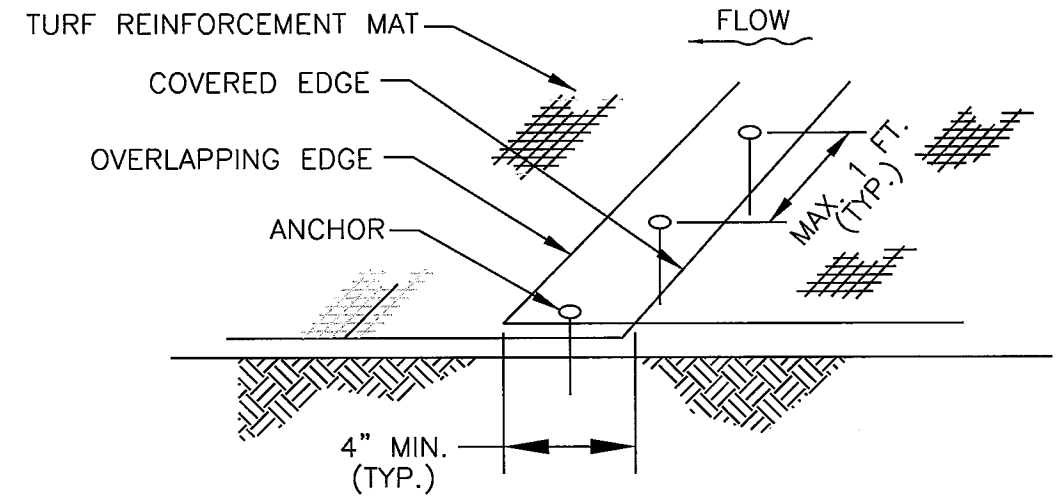
MISCELLANEOUS DETAILS
 EROSION BLANKET ANCHORING

FILE NO. RAMSE129594	47
MD6 OF MD10	367

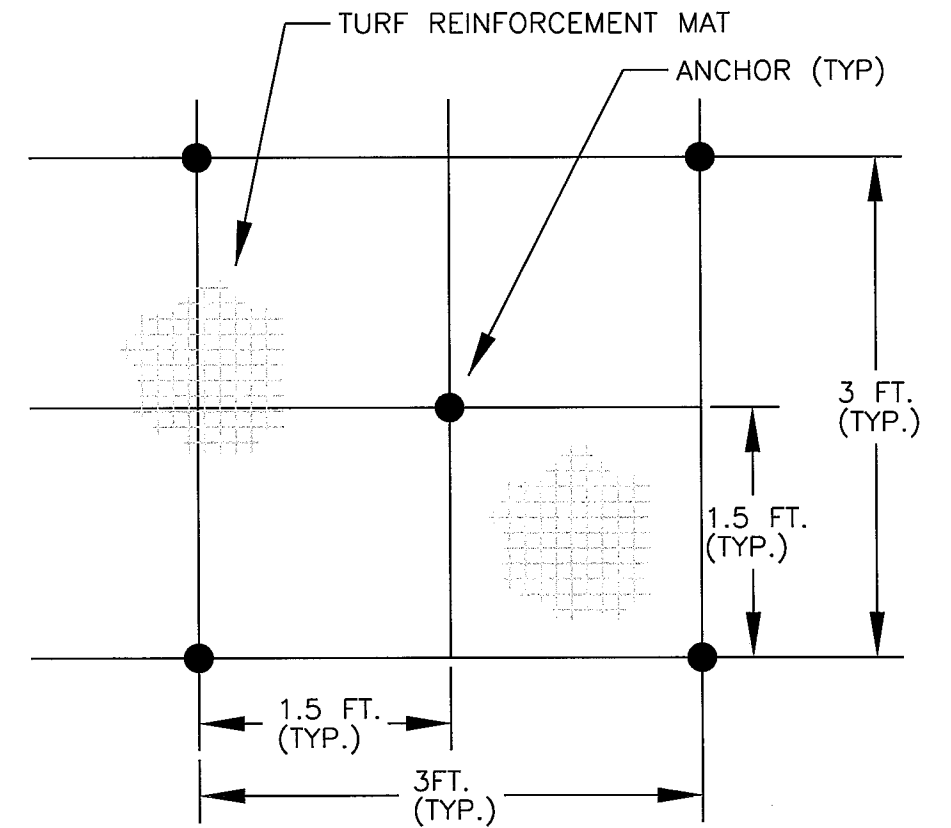
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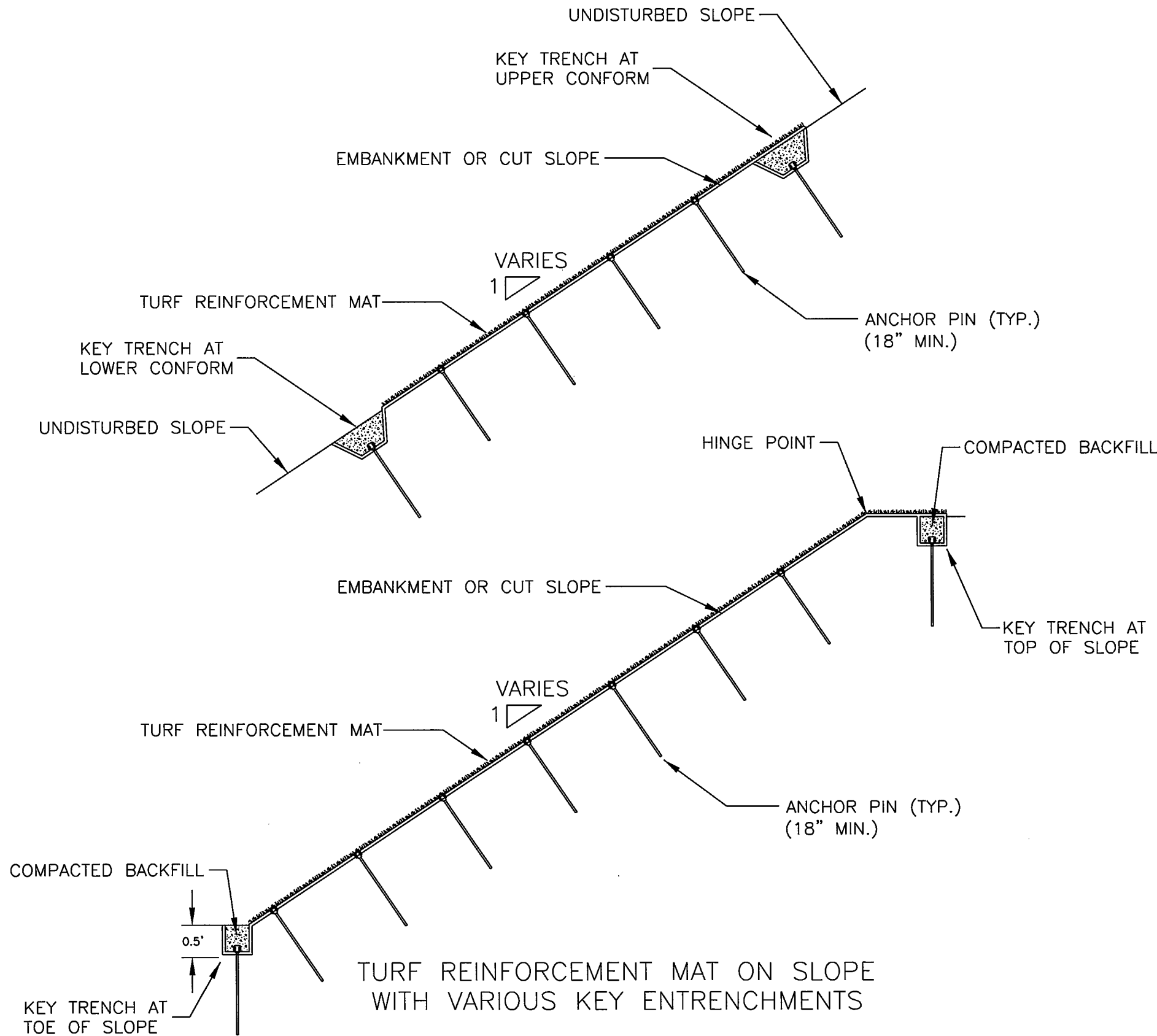
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TURF REINFORCEMENT MAT OVERLAP JOINT



ANCHOR PATTERN



TURF REINFORCEMENT MAT ON SLOPE WITH VARIOUS KEY ENTRENCHMENTS

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	REP		
CHECKED BY:	REP		
NO.	BY	DATE	REVISIONS

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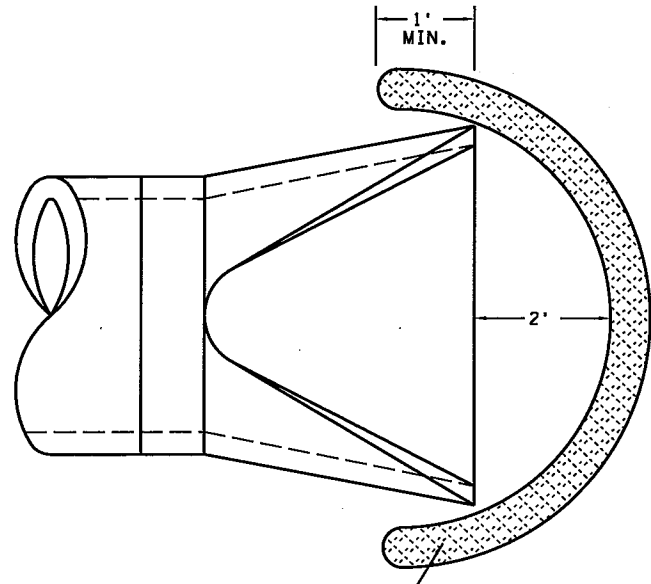
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

MISCELLANEOUS DETAILS
 TURF REINFORCEMENT MAT ON SLOPES

FILE NO. 48
 RAMSE129594
 MD7
 OF MD10 367

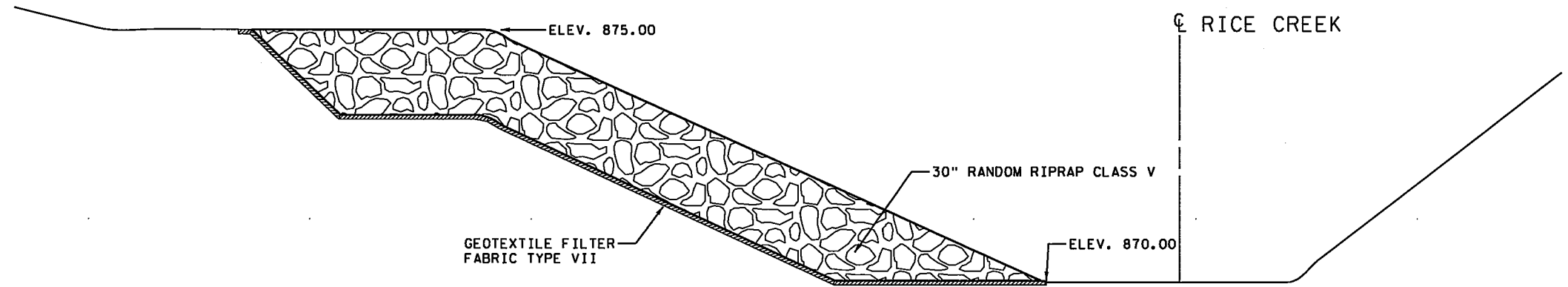
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2/19/2016

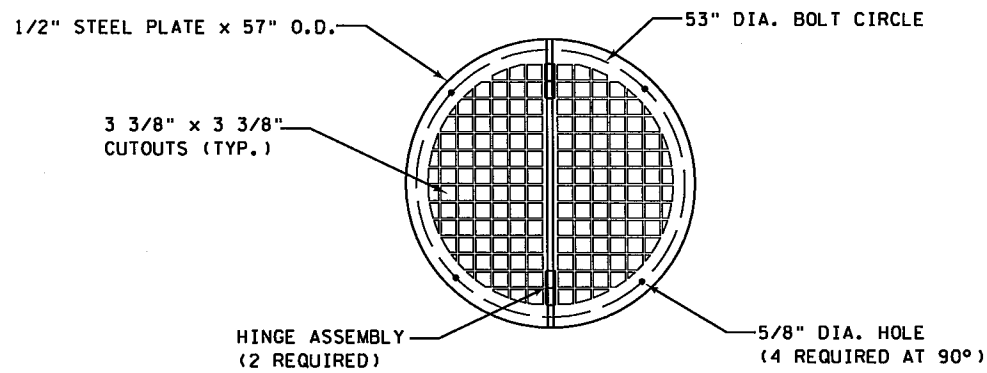


SEDIMENT CONTROL TYPE COMPOST.
PAID FOR AS CULVERT END CONTROLS.

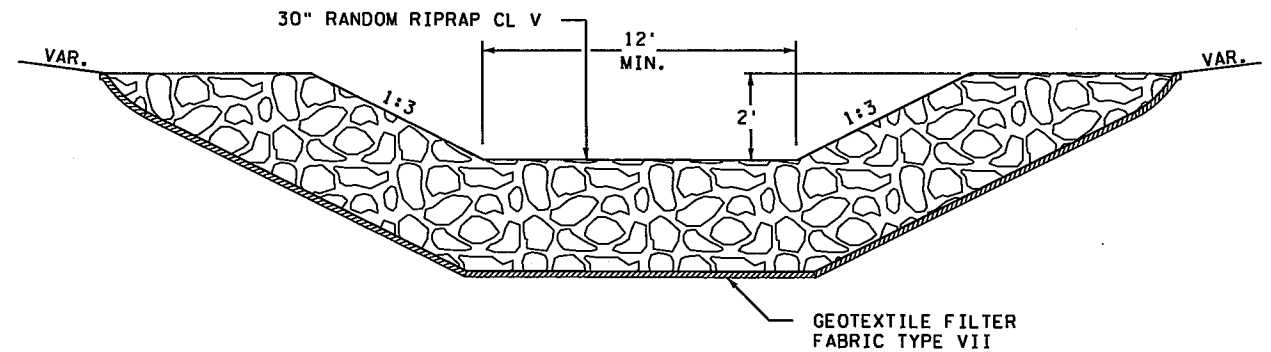
CULVERT PROTECTION
(2573) CULVERT END CONTROLS



RIPRAP SWALE DETAIL
AT NORTH SIDE RICE CREEK
PROFILE VIEW



TYPICAL SKIMMER MANHOLE GRATE DETAIL



RIPRAP SWALE DETAIL
AT NORTH SIDE RICE CREEK
SECTION VIEW

NOTES:

1. FINISHED RIPRAP SURFACE SHALL MATCH ADJACENT STREAM BANK GRADE AND ELEVATIONS.

S:\PT\VAR\Ramsey\129594\5-final-dsgn\51-const-dwgs-CAD\40-Transhwy\planshws\CD6284162.dwg

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	REP		
CHECKED BY:	REP		
	NO.	BY	DATE
			REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 2/19/2016



PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

MISCELLANEOUS DETAILS
 CULVERT PROTECTION
 SKIMMER MANHOLE GRATE DETAIL
 RIPRAP SWALE DETAIL

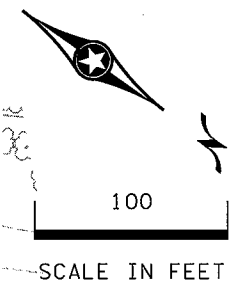
FILE NO.
 RAMSE129594
 MD8
 OF MD10

49
 367

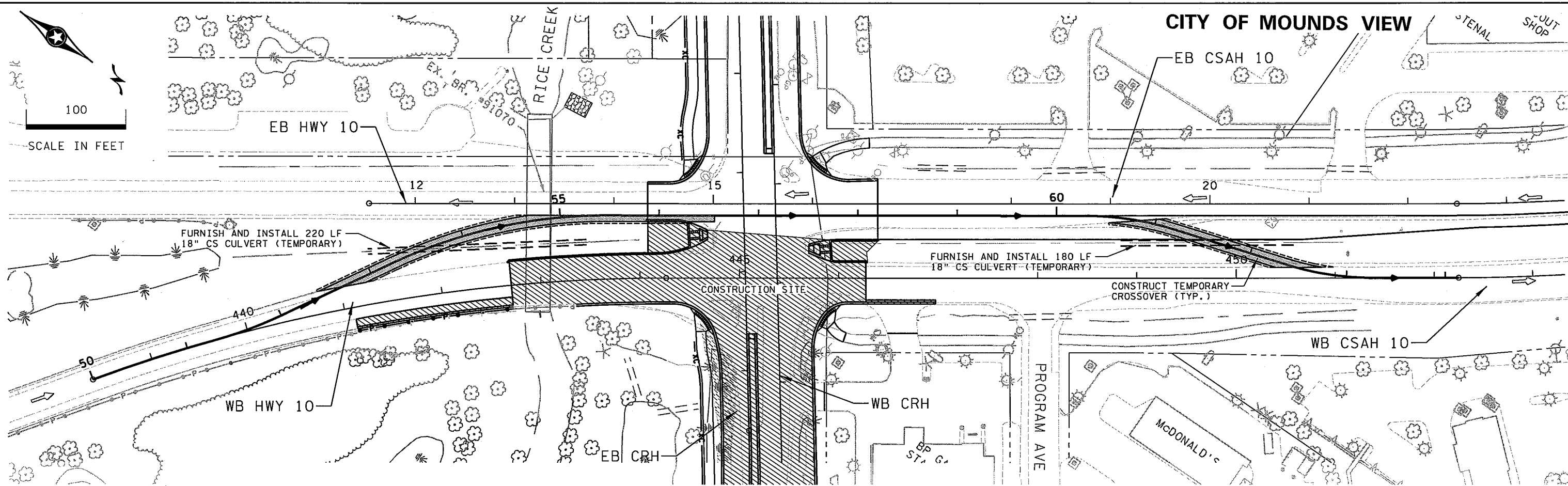
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2/15/2016

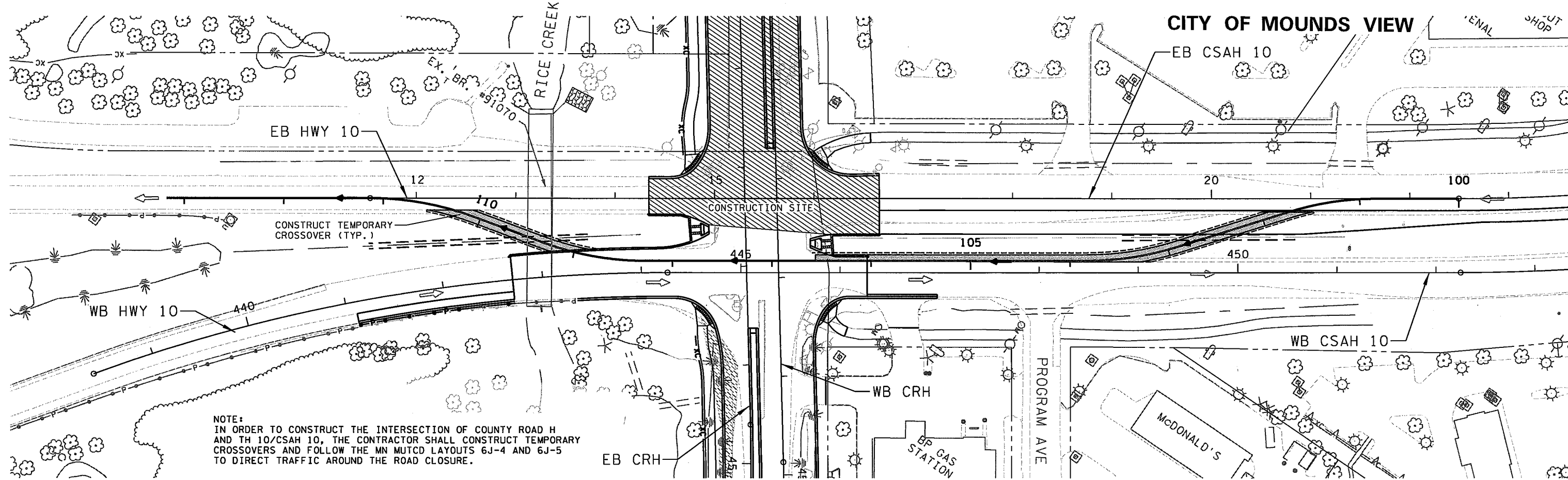
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MODEL\NAMES



CITY OF MOUNDS VIEW



CITY OF MOUNDS VIEW



NOTE:
 IN ORDER TO CONSTRUCT THE INTERSECTION OF COUNTY ROAD H
 AND TH 10/CSAH 10, THE CONTRACTOR SHALL CONSTRUCT TEMPORARY
 CROSSOVERS AND FOLLOW THE MN MUTCD LAYOUTS 6J-4 AND 6J-5
 TO DIRECT TRAFFIC AROUND THE ROAD CLOSURE.

DESIGN TEAM			
DRAWN BY:	BKM		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me
 or under my direct supervision and that I am a duly
 Licensed Professional Engineer under the laws of
 the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

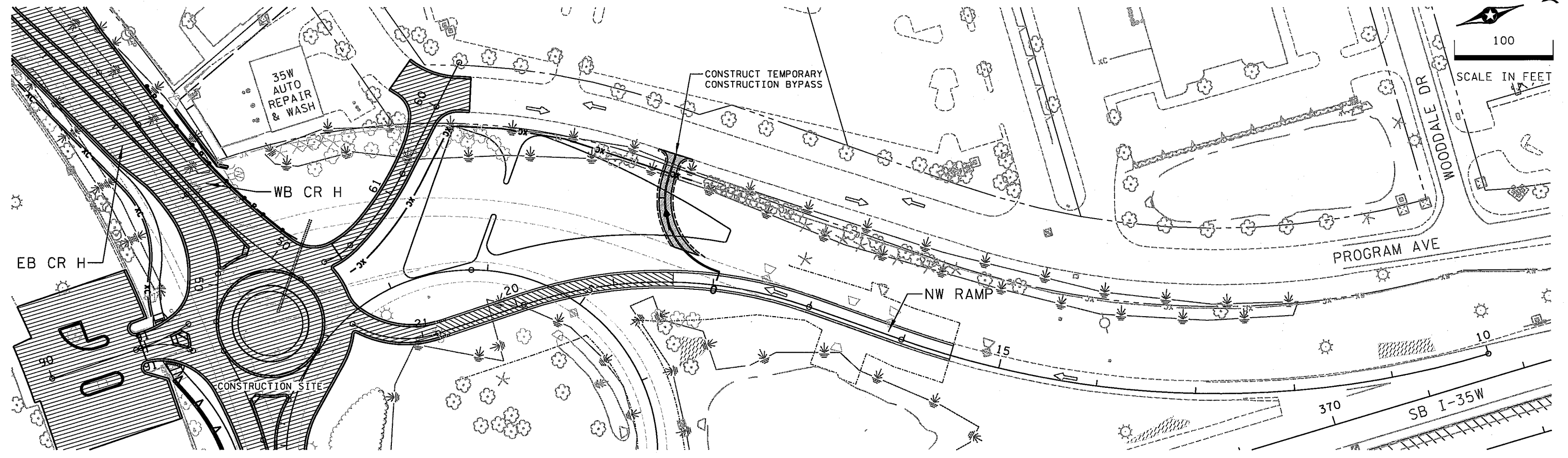


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

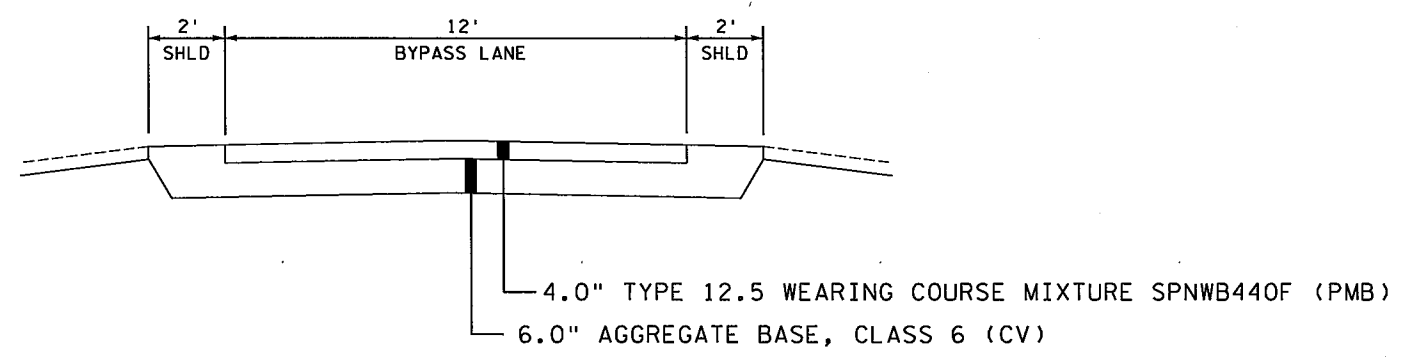
CONSTRUCTION STAGING CROSSOVER		FILE NO. RAMSEY129594	50
		MD9 OF MD0	367

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2/15/2016



K:\TWC\Civil\County\RAMSEY\135W_CPH\CAD\Plan Sheets\CDE284162.mcd06.dgn \$MODELNAME\$



TYPICAL SECTION

DESIGN TEAM			
DRAWN BY:	BKM		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

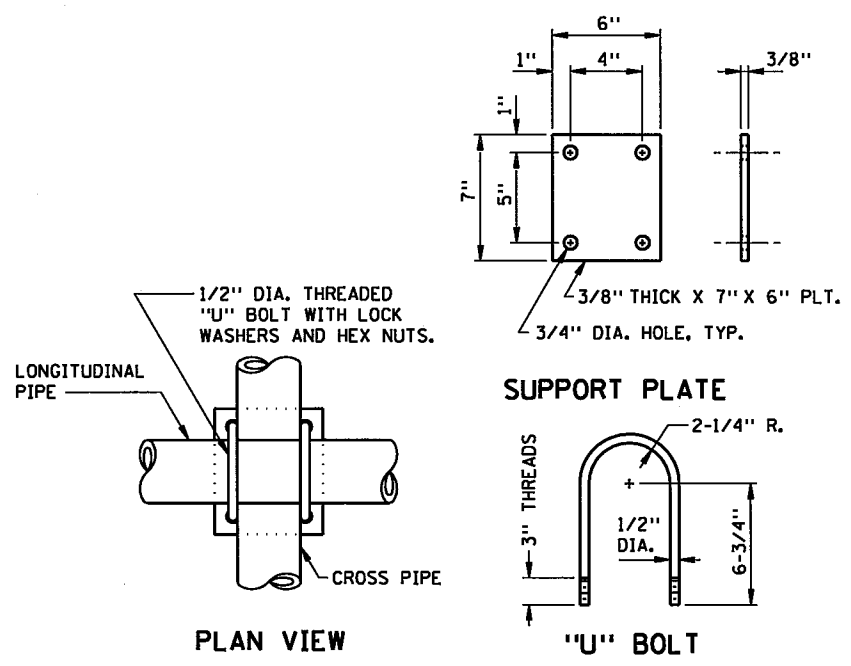
CONSTRUCTION STAGING BYPASS

FILE NO. RAMSE129594	51
MD10 OF MD10	367

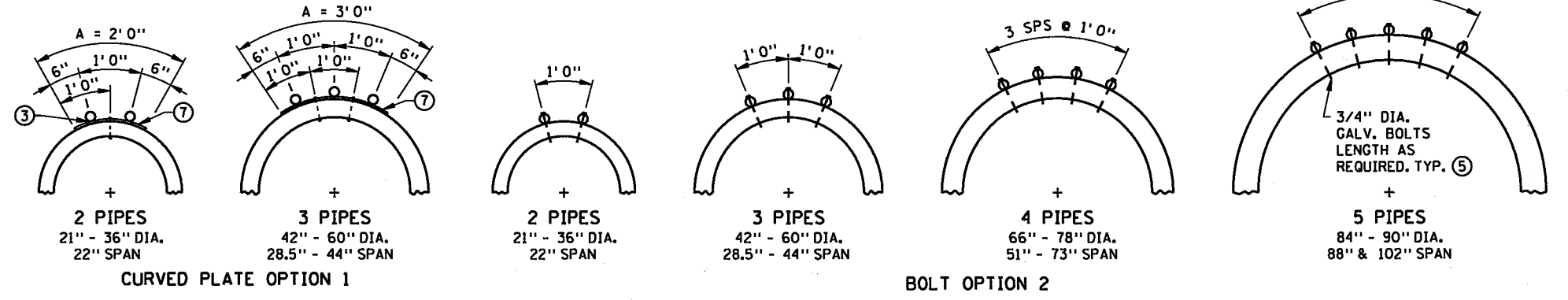
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2/16/2016

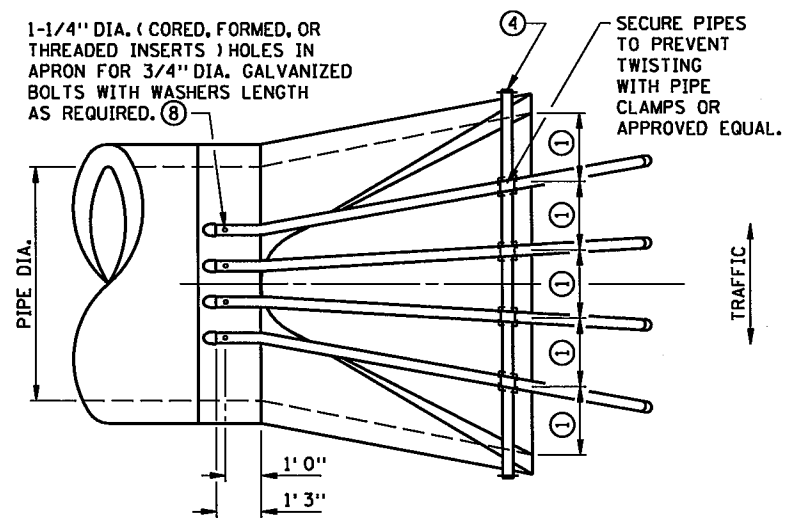
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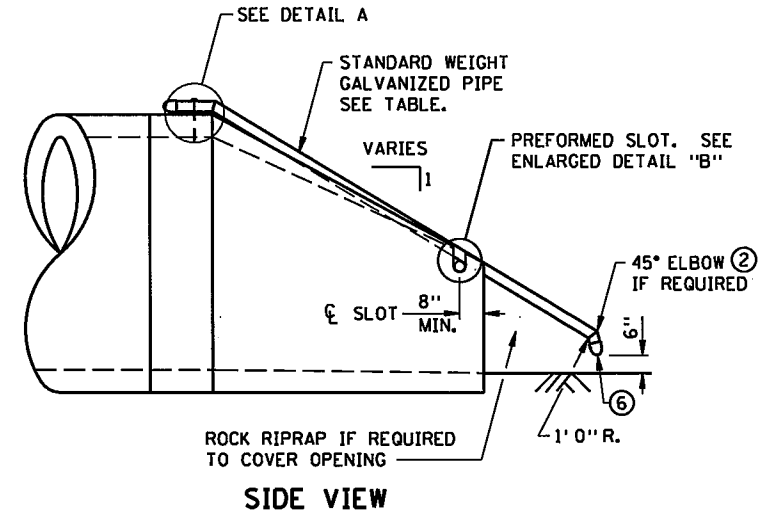
PIPE CLAMP DETAILS (GALVANIZE AS PER SPEC. 3392)



END VIEW OF TOP OF PIPE (ROUND PIPE SHOWN)



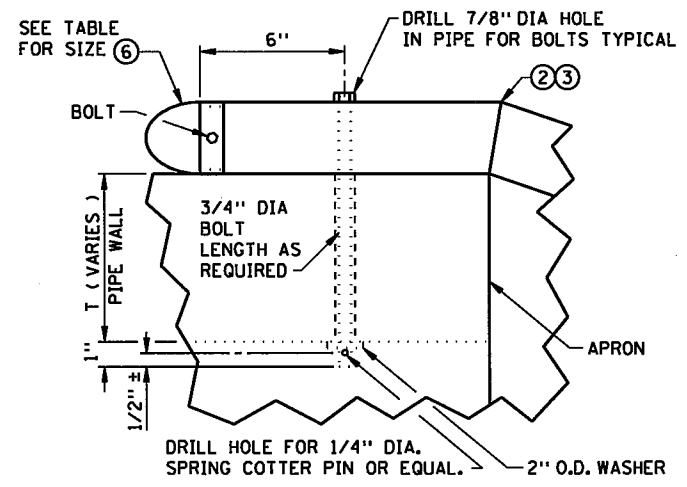
TOP VIEW (78" DIA. SHOWN)



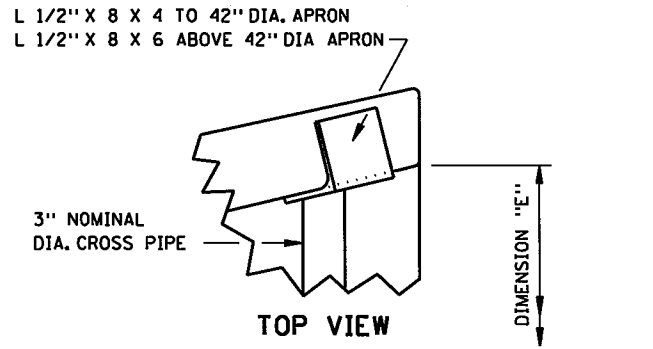
SIDE VIEW

GRATE PIPE SIZE TABLE		
DIA.	SPAN	PIPE SIZES
21"	22"	2" DIA. - 3.65 LBS./FT.
24" - 48"	28 1/2" - 65"	2-1/2" DIA. - 5.79 LBS./FT.
54" - 90"	73" - 102"	3" DIA. - 7.58 LBS./FT.

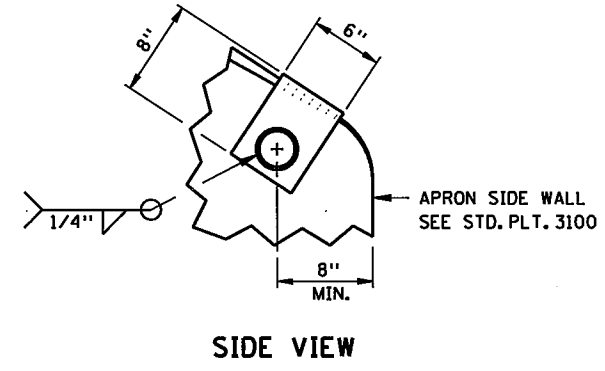
- NOTES:**
- SEE STD. PLATE 3100 AND 3110 FOR APRON DETAILS.
 - IF A GRATE IS USED ON AN OUTLET OF A STRUCTURE, A SIMILAR SAFETY GRATE SHOULD BE PLACED ON THE INLET TO PREVENT PLUGGING OF THE PIPE.
 - ALL PIPE IS SCHEDULE 40 GALVANIZED PIPE AS PER SPEC. 3362.
 - GALVANIZE ALL HARDWARE AFTER FABRICATION AS PER SPEC. 2471.3L.
 - GALVANIZE FASTENERS AS PER SPEC. 3392.
 - EQUAL SPACING OF LONGITUDINAL PIPE, NOT TO EXCEED 2 FT.
 - BEND PIPE OR APPROVED SPLICES MAY BE USED.
 - WELDING AS PER SPEC. 2471 MAY BE USED AT ALL PIPE CONNECTIONS.
 - CROSS PIPE: 3" NOMINAL DIA. X 7.58 LBS./FT. EXCEPT, 3-1/2" NOMINAL DIA. X 9.11 LBS./FT. PIPE FOR 102" SPAN.
 - OTHER METHODS OF SUPPORTING GRATES WHICH ARE EQUAL IN STRENGTH MAY BE USED IF APPROVED BY THE ENGINEER IN FIELD.
 - CAP ENDS OF ALL PIPE IN FIELD WITH PRESSED STEEL GALVANIZED PIPE CAPS. SECURE WITH SELF TAPPING BOLT.
 - CURVED PLATE CAN BE USED ON ANY SIZE APRONS. 3/8" THICK X 1'0" WIDE X LENGTH REQUIRED GALVANIZED STEEL PLATE. FORM OR CORED HOLES IN APRON FOR ATTACHING CURVED PLATE WITH 3/4" DIA. BOLTS AND WASHERS. SEE DETAIL "A" FOR BOLT DETAILS.
 - ELIMINATING COMPOUND BEND ON THE OUTSIDE PIPES IS A OPTION, NEW HOLE LOCATION IS FABRICATORS RESPONSIBILITY.



ENLARGED DETAIL "A" PLATE NOT SHOWN

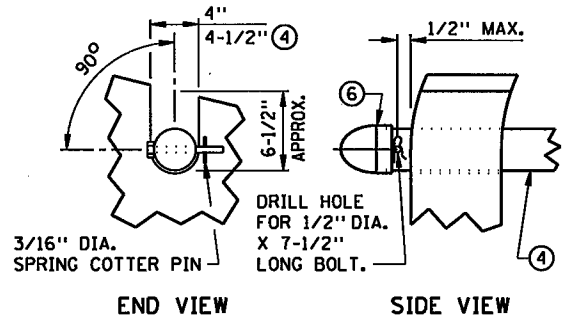


TOP VIEW



SIDE VIEW

CROSS PIPE FOR FLARED APRONS OPTION 2



ENLARGED DETAIL "B" OPTION 1

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	REP		
CHECKED BY:	REP		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

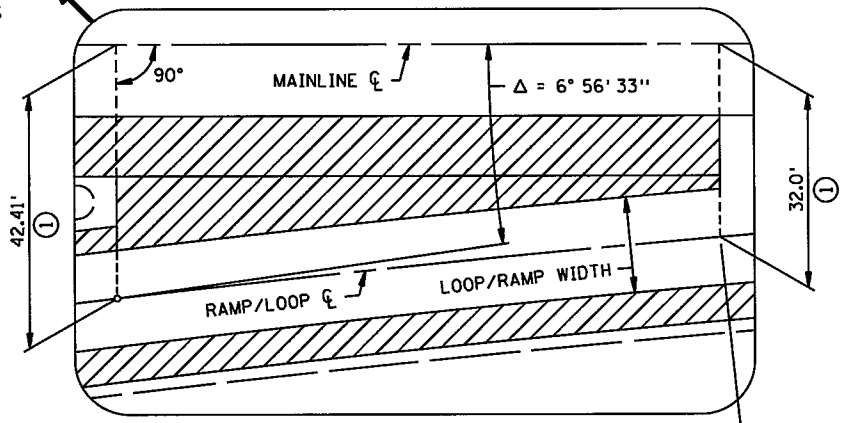
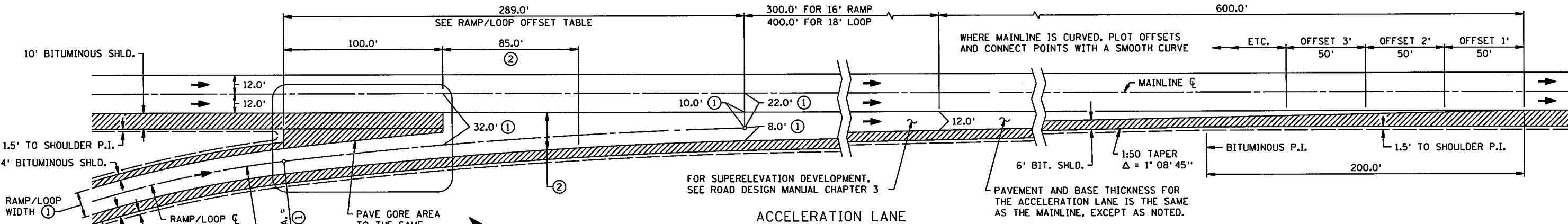
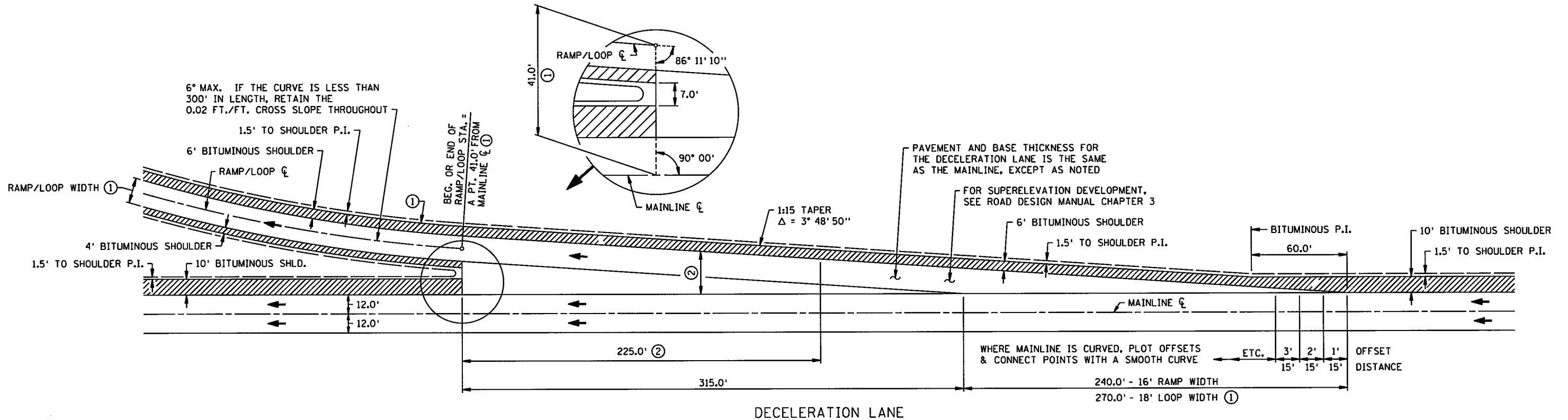
Certified By: *Rachel F. Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL F. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

MISCELLANEOUS DETAILS
 VEHICLE GRATES FOR FLARED END
 CONCRETE APRONS
 (CROSS-DRAINAGE STRUCTURES)

FILE NO. 51A
 RAMSEI29594
 MD10A
 OF MD10 367



- NOTES:
- ① WHEN IT IS NECESSARY FOR RAMPS/LOOPS TO BE WIDER, SEE ROAD DESIGN MANUAL CHAPTER 6, WIDENING SHALL BE DONE ON THE OUTSIDE AND THE TAPER LENGTH INCREASED ACCORDINGLY.
 - ② THE AREA SHOWN SHALL BE GRADED FOR MAINLINE DEPTH. THE RAMP PAVEMENT THICKNESS WILL BE USED WITH ADDITIONAL DEPTH CORRECTED IN THE AGGREGATE BASE, OR GRADING MATERIAL, DEPENDING ON THE SURFACING TYPE.

16 FT. RAMP/LOOP OFFSET TABLE FOR APPROX. 2° CURVE ①
OFFSET FROM MAINLINE CL TO RAMP/LOOP CL

DISTANCE	0'	20'	40'	60'	80'	100'	120'	140'	160'
OFFSET	22.00'	22.47'	23.08'	23.83'	24.72'	25.75'	26.91'	28.22'	29.67'
DISTANCE	180'	189'	200'	220'	240'	260'	280'	289'	
OFFSET	31.26'	32.00'	32.99'	34.86'	36.87'	39.02'	41.32'	42.41'	

FOR SUPERELEVATION DEVELOPMENT,
SEE ROAD DESIGN MANUAL, CHAPTER 3



Christina Ry
STATE DESIGN ENGINEER

REVISED:
APPROVED:
5-27-2014

SPN1 OF SPN42

STANDARD ACCELERATION AND DECELERATION LANES
(RURAL)
BITUMINOUS PAVEMENT

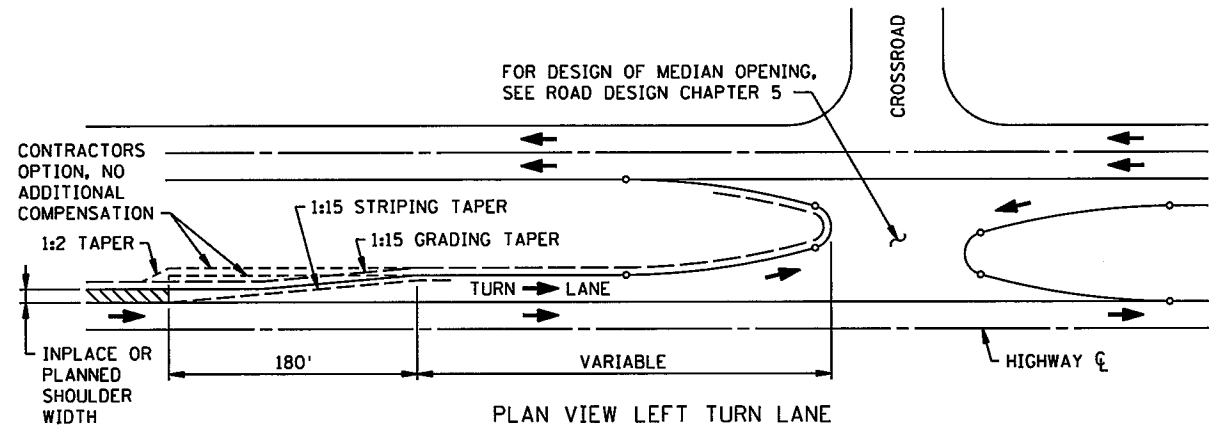
STANDARD PLAN 5-297.106 1 OF 1

S.P. NO. 6284-162 (TH35W) SHEET NO. 52 OF 367 SHEETS

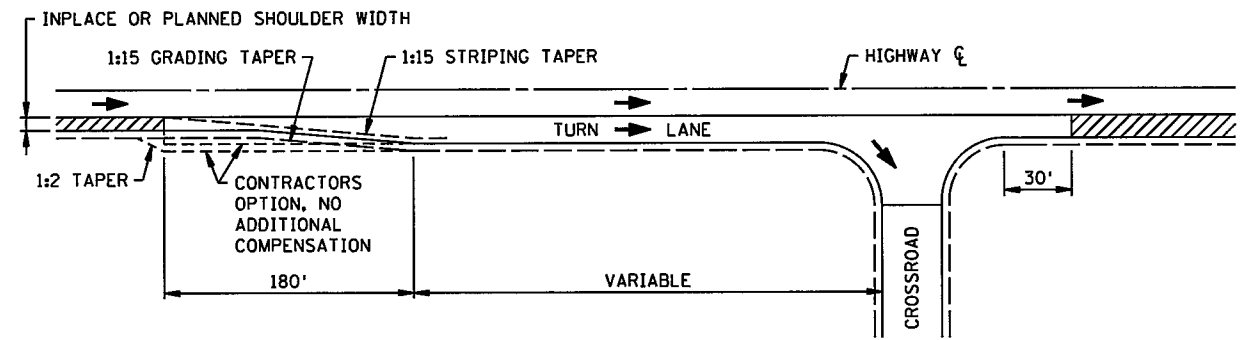
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12/8/2015

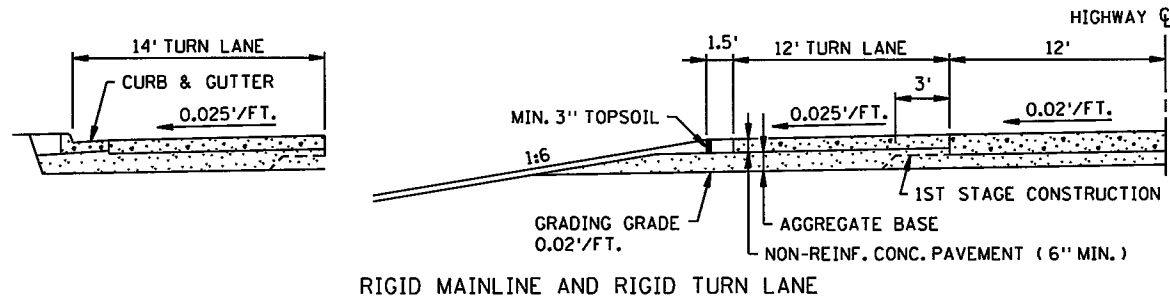
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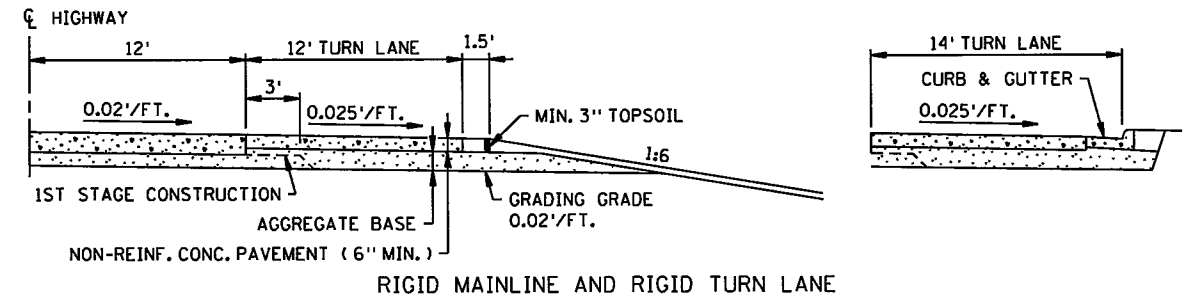
PLAN VIEW LEFT TURN LANE



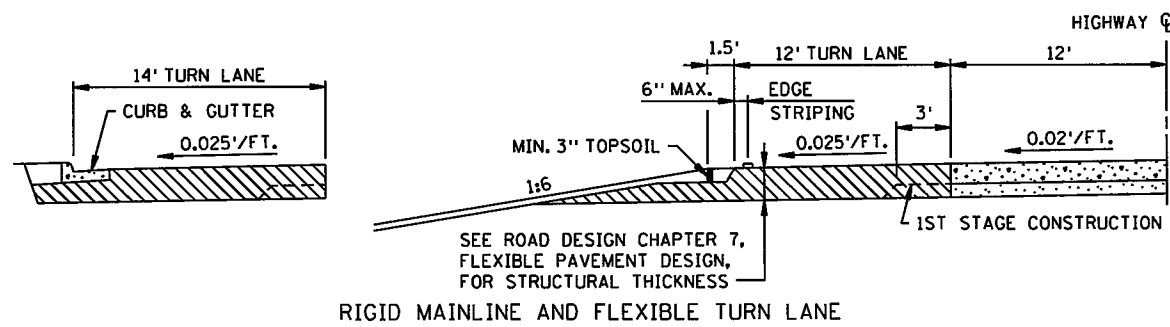
PLAN VIEW RIGHT TURN LANE



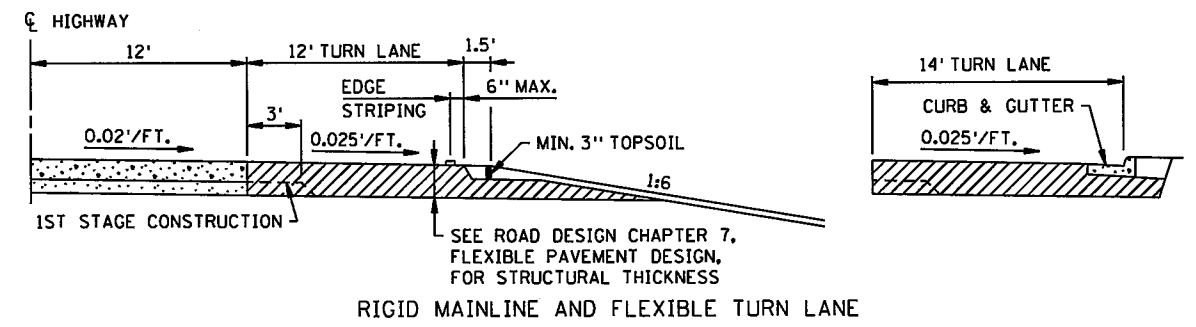
RIGID MAINLINE AND RIGID TURN LANE



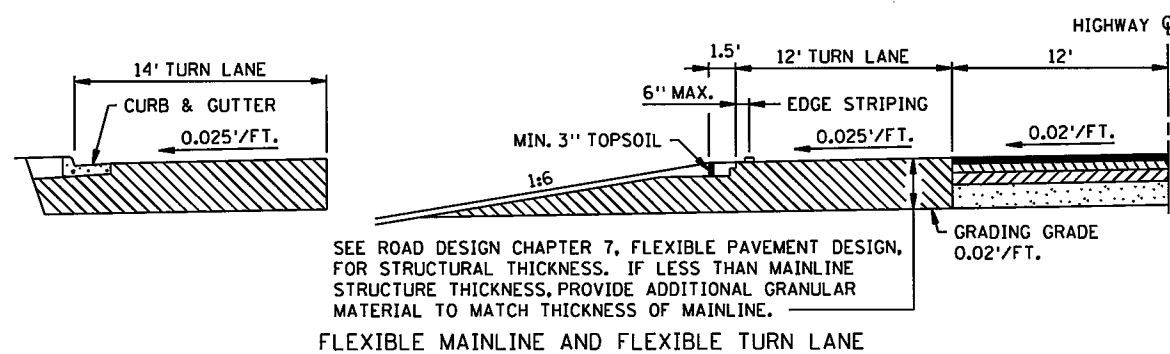
RIGID MAINLINE AND RIGID TURN LANE



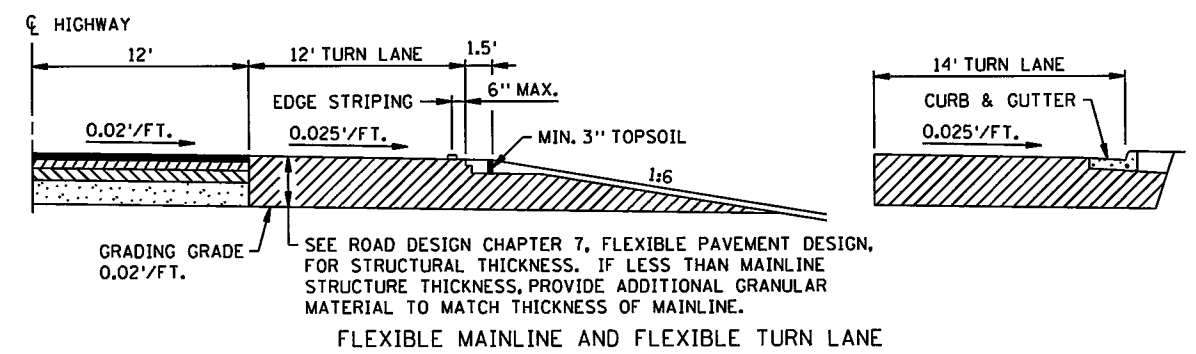
RIGID MAINLINE AND FLEXIBLE TURN LANE



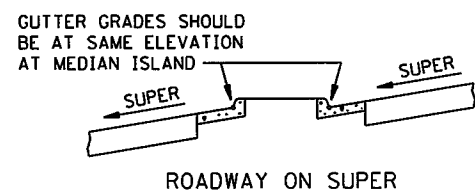
RIGID MAINLINE AND FLEXIBLE TURN LANE



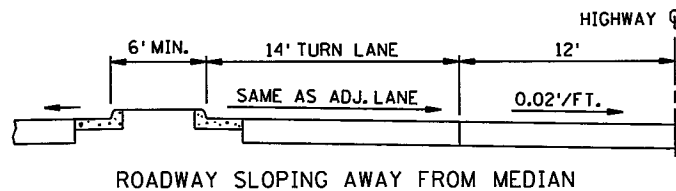
FLEXIBLE MAINLINE AND FLEXIBLE TURN LANE



FLEXIBLE MAINLINE AND FLEXIBLE TURN LANE



ROADWAY ON SUPER



ROADWAY SLOPING AWAY FROM MEDIAN

LEFT TURN LANES

RIGHT TURN LANES



Christophe R
STATE DESIGN ENGINEER

REVISOR:
APPROVED:
5-27-2014

RIGHT AND LEFT TURN LANES	
STANDARD PLAN 5-297.111	1 OF 1
S.P. NO. 6284-162 (TH35W)	SHEET NO. 54 OF 367 SHEETS

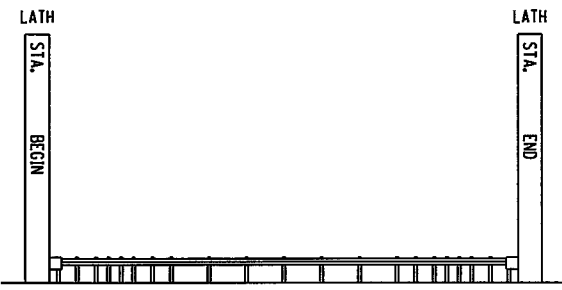
SPN3
OF SPN42

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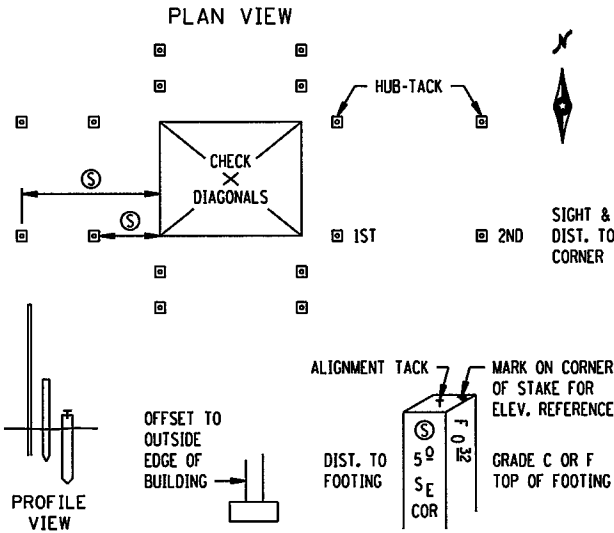
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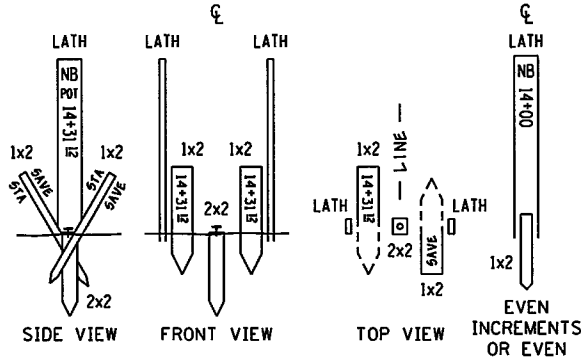
GUARDRAIL (GUARD)



BUILDING (BUILD) FOUNDATION / FOOTING



ALIGNMENT POINTS (ALIGN)



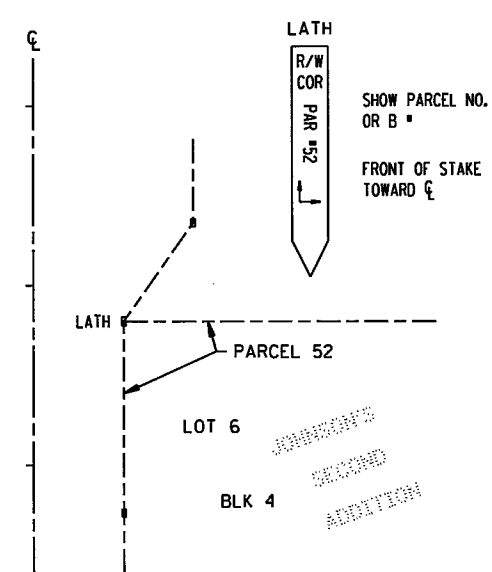
STAKE C = 2" X 2" HUB (LENGTH MAY VARY) SET AS TEMPORARY STAKE. MAY BE REPLACED BY MUDOT MARKER AFTER CONSTRUCTION IS COMPLETED.

SET AT GROUND LEVEL (TEMPORARY CONSTRUCTION STAKE).

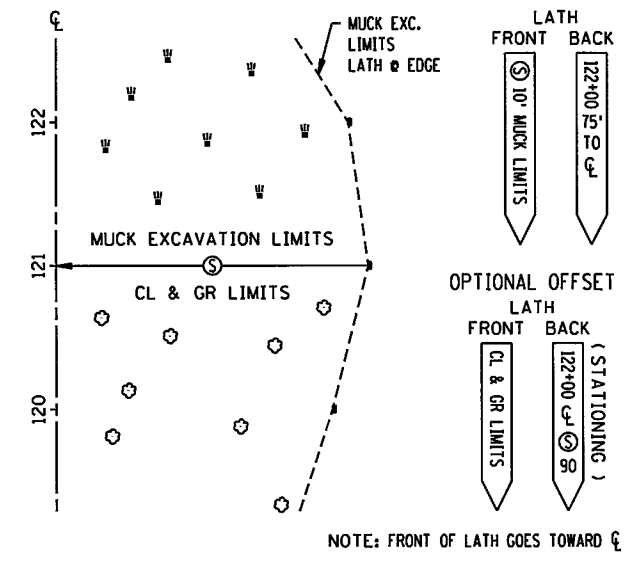
TACK SET AT ALIGNMENT POINTS.

STAKE A = GUARD STAKES SET AT ANGLE IN GROUND 6" EACH SIDE OF STAKE D, WITH STATIONING READ WHEN LOOKING UP STATION.

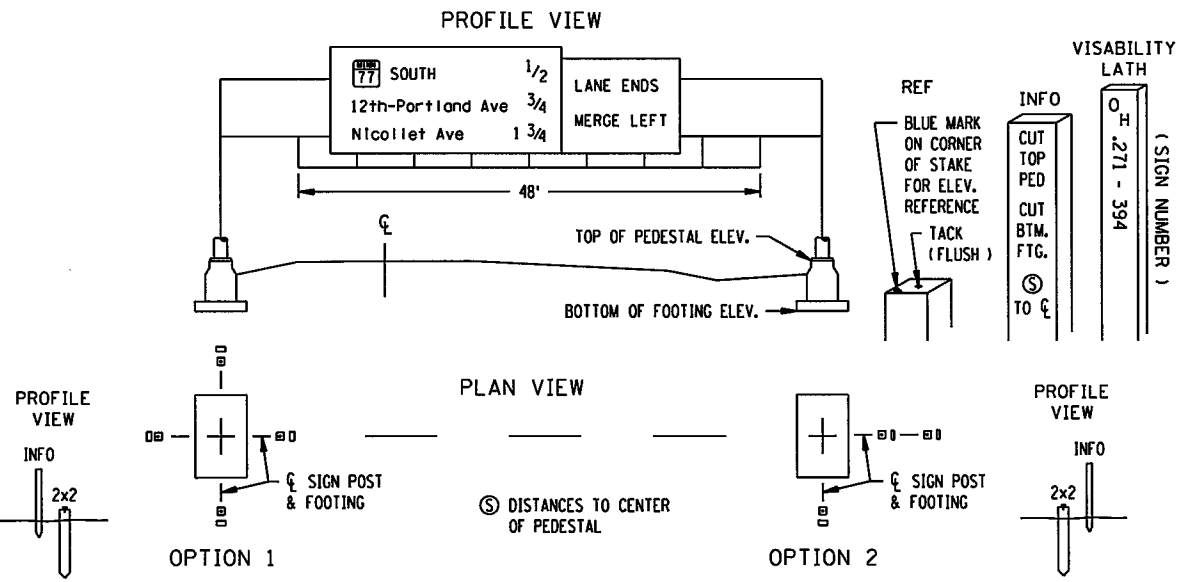
R/W & TEMP. EASEMENT (R/W)



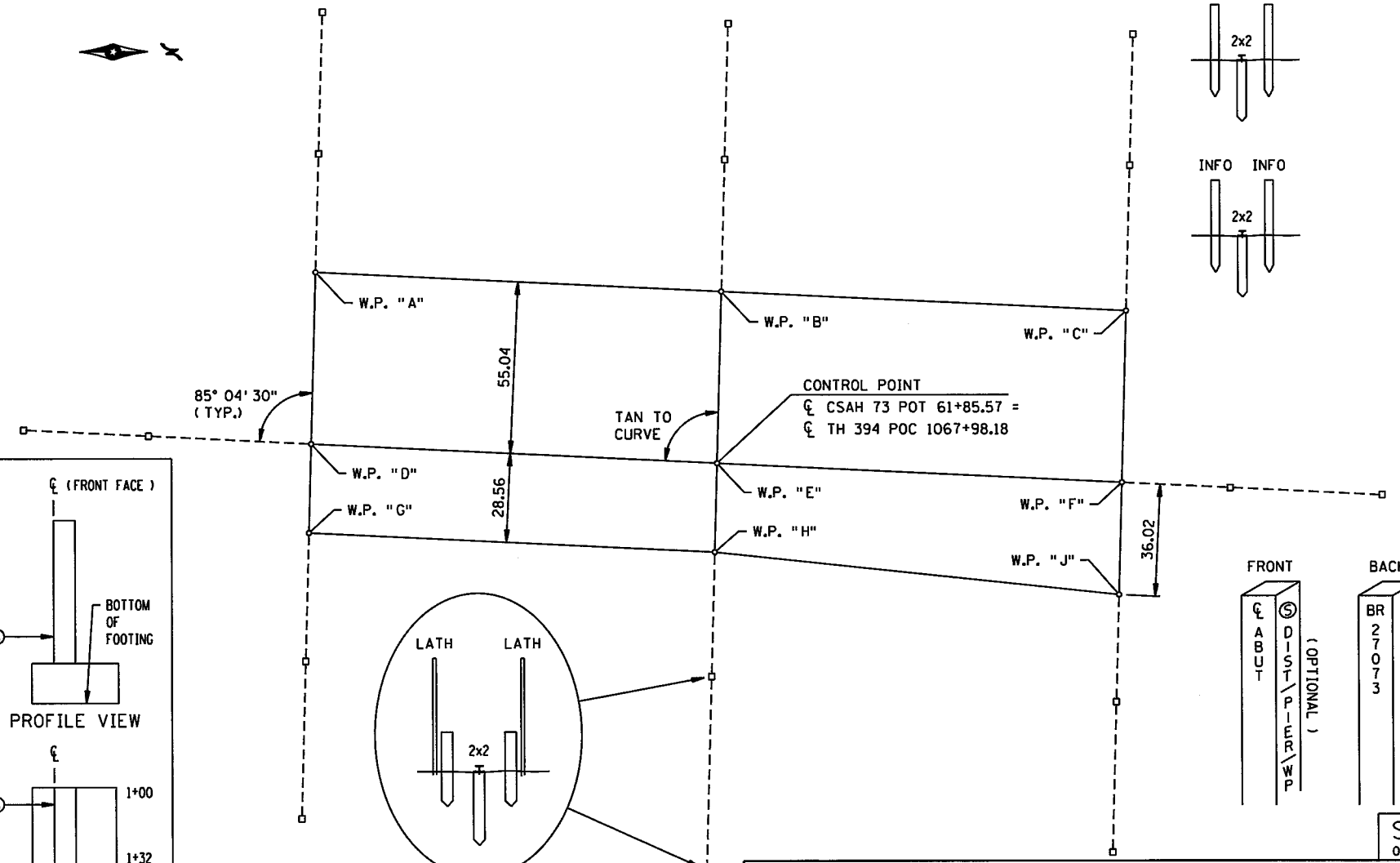
CLEAR & GRUBBING LIMITS (CLEAR) OR MUCK EXCAVATION LIMITS (MUCK)



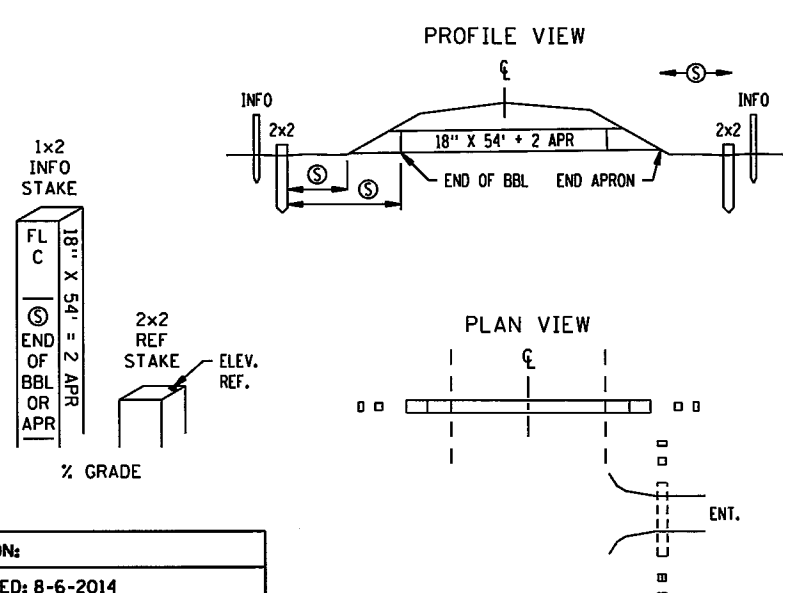
OVERHEAD SIGNS (SIGN)



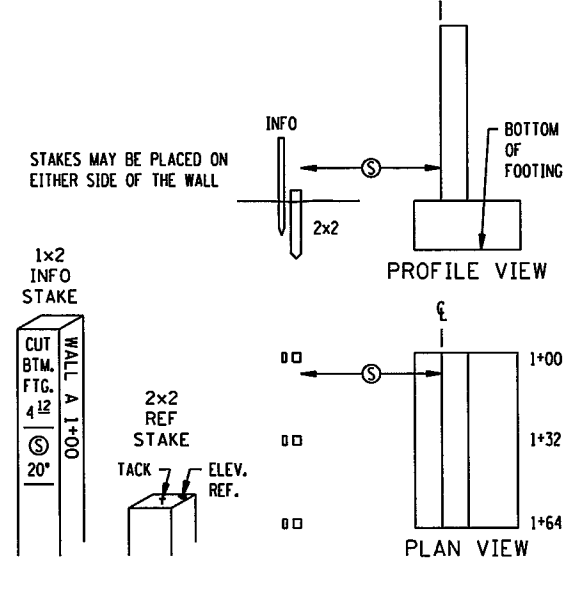
BRIDGESTAKING (BRIDGE) WORKING POINTS LAYOUT



CULVERT



WALL



REVISION:

APPROVED: 8-6-2014

Erin Dodds
DIRECTOR, OFFICE OF LAND MANAGEMENT

REVISOR:

Christine Ky
STATE DESIGN ENGINEER

APPROVED: 8-6-2014

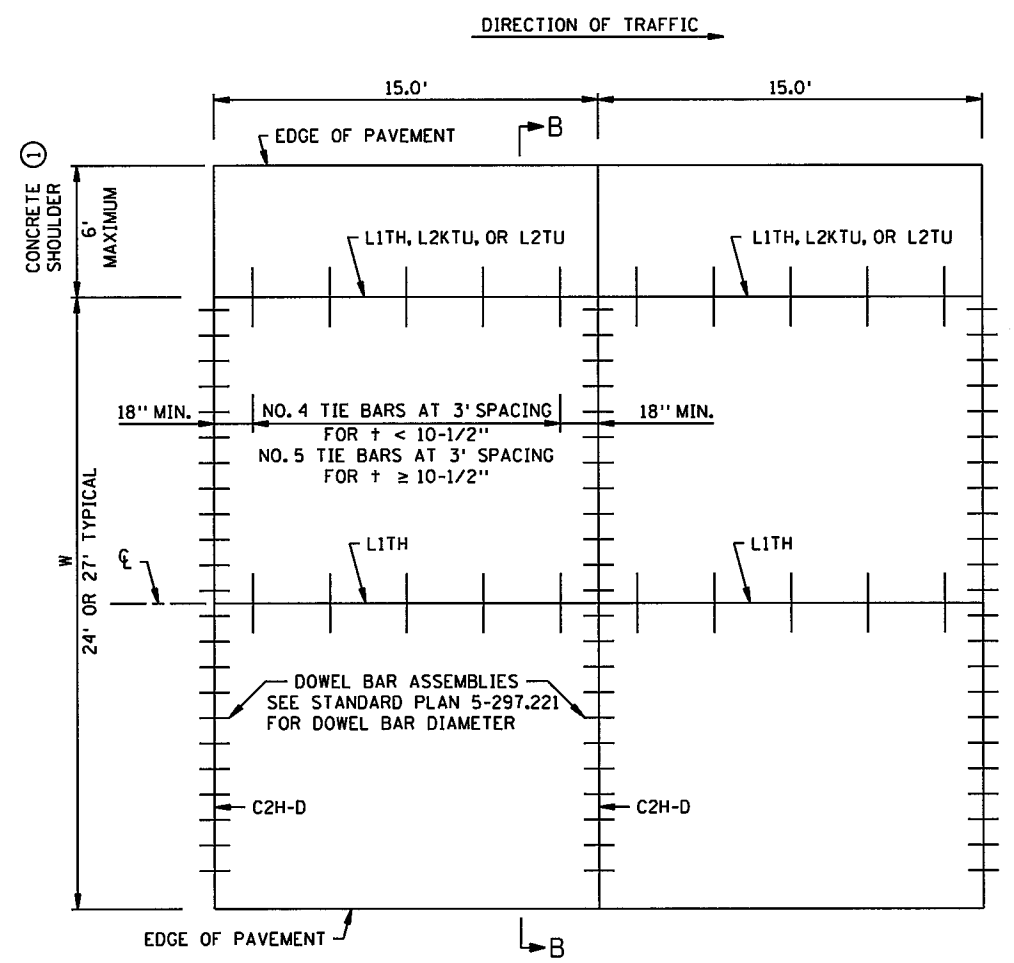
STAKING INFORMATION SHEET

STANDARD PLAN 5-297.115 2 OF 2

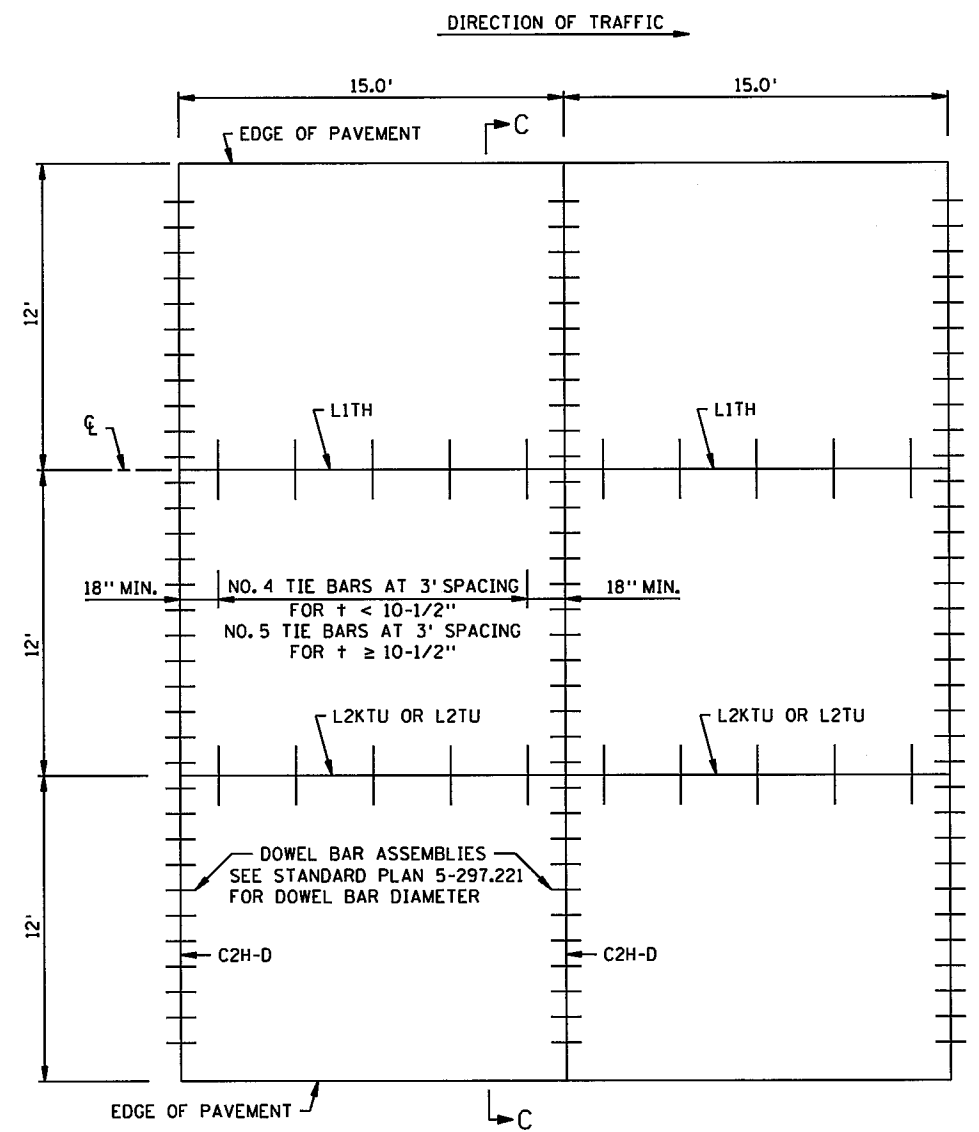
S.P. NO. 6284-162 (TH35W) SHEET NO. 56 OF 367 SHEETS

SPN5 OF SPN42

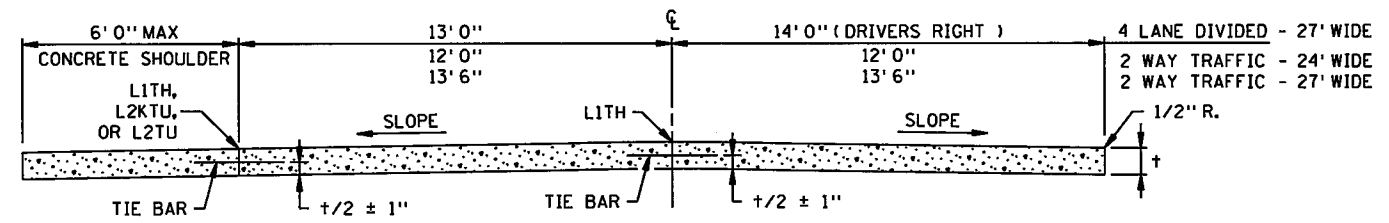
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 MODELNAME\$



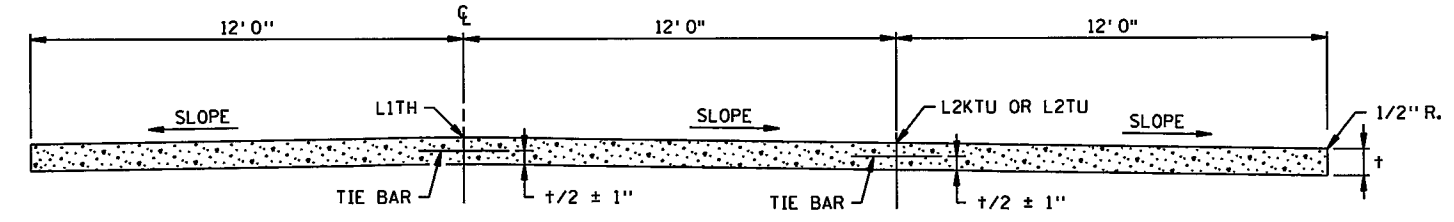
MAINLINE PAVEMENT WITH
INSIDE CONCRETE SHOULDER
DOWELED



MAINLINE PAVEMENT URBAN
DOWELED



SECTION B-B



SECTION C-C

GENERAL NOTES:

- SEE TYPICAL SECTIONS AND PLAN SHEETS FOR CROSS SLOPES AND PAVEMENT THICKNESS, t .
- DOWEL BAR ASSEMBLIES, WHEN REQUIRED, SHALL BE SIMILAR TO THOSE SHOWN ON STANDARD PLATE 1103.
- ALL REINFORCING BARS SHALL BE EPOXY COATED AND COMPLY WITH SPEC. 3301.
- FOR SUPPLEMENTAL PAVEMENT REINFORCEMENT, SEE STANDARD PLATE 1070.

- ① CONTACT THE CONCRETE ENGINEER TO DISCUSS WHETHER TIE BARS AND SAWED JOINTS ARE NEEDED BASED ON CONCRETE SHOULDER WIDTH AND DEPTH.

REVISION:
 APPROVED: 8-6-2014

 DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION
 REVISION:
 APPROVED: 8-6-2014

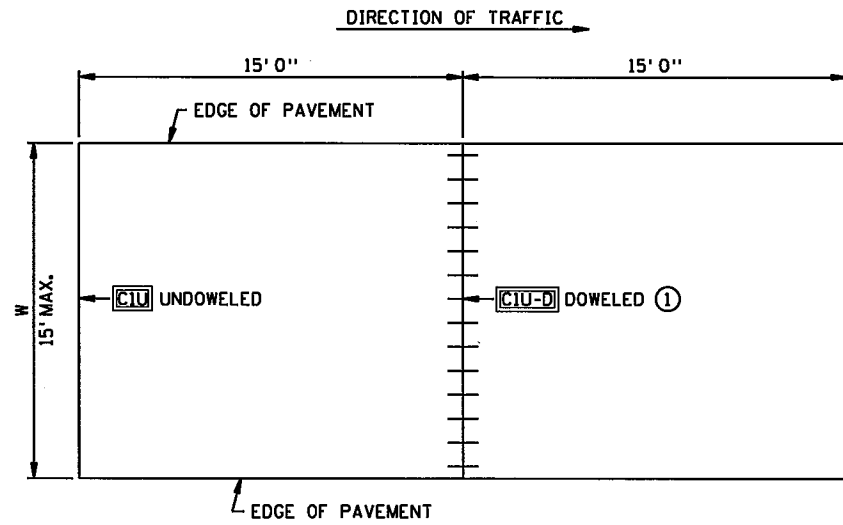
 STATE DESIGN ENGINEER

CONCRETE MAINLINE PAVEMENT 15.0 FT. PANEL LENGTH URBAN OR CONCRETE SHOULDERS		SPN6 <small>OF SPN42</small>
STANDARD PLAN 5-297.217	2 OF 2	
S.P. NO. 6284-162 (TH35W)		SHEET NO. 57 OF 367 SHEETS

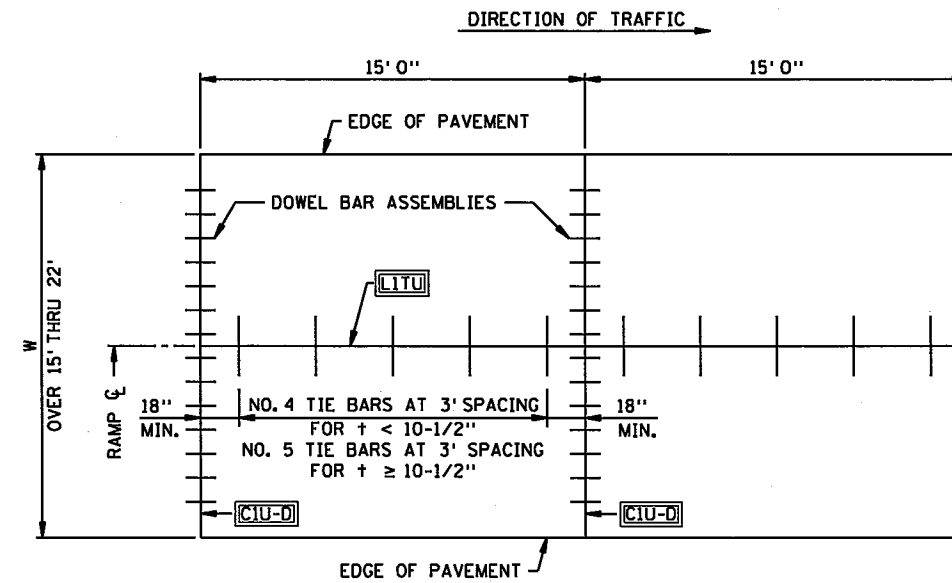
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2/16/2016

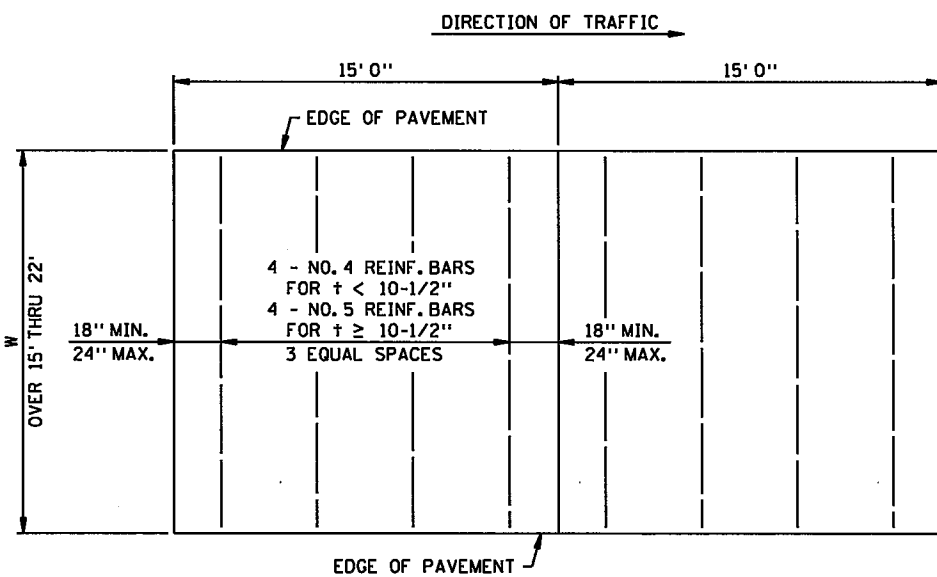
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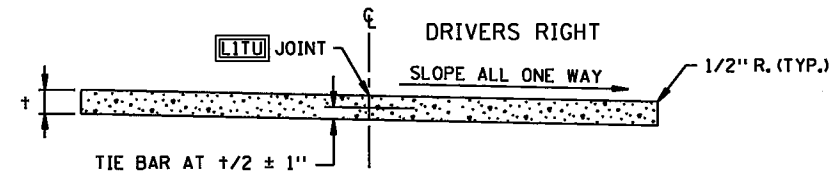
RAMP PAVEMENT 1 FT. THRU 15 FT. WIDTH



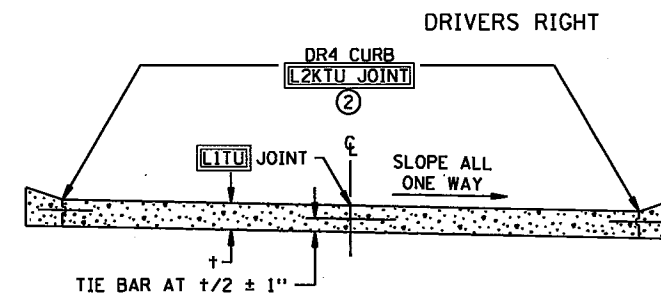
RAMP PAVEMENT OVER 15 FT. THRU 22 FT. WIDTH DOWELED



PANEL REINFORCEMENT
PANELS OVER 15 FT. THRU 22 FT. WIDTHS
IT IS PREFERRED TO ADD A LONGITUDINAL JOINT
RATHER THAN PAVE GREATER THAN 15 FT. IN WIDTH.
PLACEMENT DEPTH SHALL BE PLANNED $t/2 \pm 1''$



RURAL DESIGN RAMP CROSS SECTION



URBAN DESIGN RAMP CROSS SECTION

NOTES:

WHEN RAMP THICKNESS IS LESS THAN 7", USE L2TH JOINTS INSTEAD OF L2KTU JOINTS.

DOWEL BAR ASSEMBLIES, WHEN REQUIRED, SHALL BE SIMILAR TO THOSE SHOWN ON STANDARD PLATE 1103.

SEE TYPICAL SECTIONS AND PLAN SHEETS FOR CROSS SLOPES AND PAVEMENT THICKNESS, t .

ALL REINFORCING BARS SHALL BE EPOXY COATED AND COMPLY WITH SPEC. 3301.

FOR SUPPLEMENTAL PAVEMENT REINFORCEMENT, SEE STANDARD PLATE 1070.

① DOWELS USED WHEN PAVEMENT WIDTH IS GREATER THAN OR EQUAL TO 4'.

② THE CONTRACTOR SHALL HAVE THE OPTION TO CONSTRUCT INTEGRANT CURBS IN PLACE OF DR4 CURB WITH L2KTU JOINTS. IN EITHER OPTION, DOWEL BAR ASSEMBLIES WILL NOT BE REQUIRED IN THE CURB AREA. PAYMENT WILL BE BASED ON THE DR4 CURB OPTION, REGARDLESS OF THE METHOD OF CONSTRUCTION USED. DR4 JOINTS SHALL BE SEALED.

MODIFIED

SPN7 OF SPN42

CONCRETE RAMP/LOOP PAVEMENT
15 FT. PANEL LENGTH

STANDARD PLAN 5-297.219 1 OF 1

S.P. NO. 6284-162 (TH35W) SHEET NO. 58 OF 367 SHEETS

REVISION:
APPROVED: 8-6-2014
DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

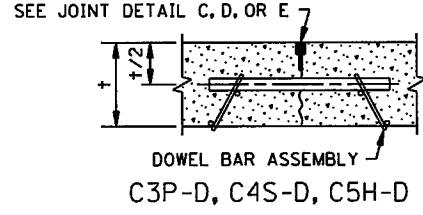
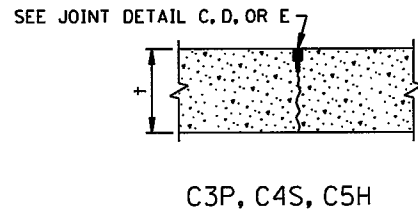
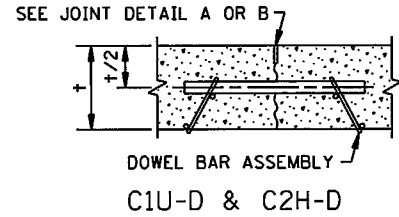
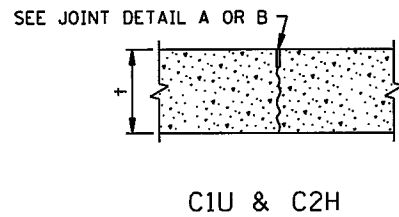
CERTIFIED BY: Jason E. Owens
LICENSED PROFESSIONAL ENGINEER
DATE: 2/16/2016
PRINTED NAME: JASON E. OWENS
LIC. NO. 43475

REVISOR:
APPROVED: 8-6-2014
STATE DESIGN ENGINEER

11/05/35 AM

12/8/2015

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CONTRACTION JOINT REFERENCE, DETAIL & SEALER SPEC. TABLE

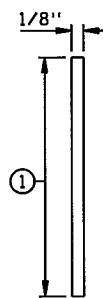
JOINT REFERENCE		JOINT DETAIL	JOINT SEALER SPEC.	JOINT WIDTH
WITHOUT DOWELS	WITH DOWELS			
C1U	C1U-D	A	UNSEALED	1/8"
C2H	C2H-D	B	3725	1/8"
C3P	C3P-D	C	3721	3/8"
C4S	C4S-D	D	3722	3/8"
C5H	C5H-D	E	3725	3/8"

LEGEND
 C = CONTRACTION JOINT
 NO. = JOINT REFERENCE
 U = UNSEALED
 H = HOT POURED
 P = PREFORMED
 S = SILICONE
 -D = DOWEL BARS

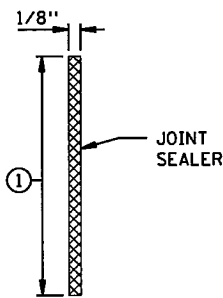
EXAMPLE
 C2H-D

DOWEL BAR DIAMETER TABLE

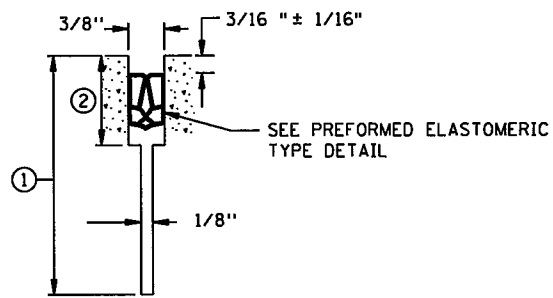
PAVEMENT THICKNESS †	DOWEL BAR DIAMETER
LESS THAN 6"	NONE
6" - 6 1/2"	1" OR NONE
7" - 7 1/2"	1"
8" - 10"	1 1/4"
10 1/2" AND GREATER	1 1/2"



JOINT DETAIL A
SAWED & UNSEALED



JOINT DETAIL B
SAWED & SEALED

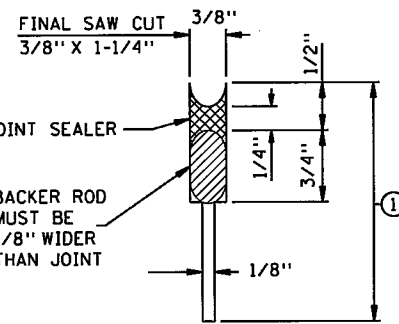


JOINT DETAIL C
SAWED AND SEALED

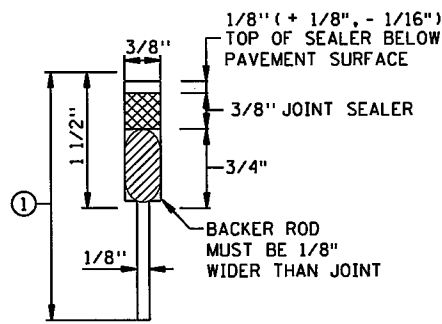
NOTES:

SEE STANDARD PLATE 1103 FOR DOWEL BAR ASSEMBLY.
 SEE STANDARD PLATE 1150 FOR CONSTRUCTION OF HEADER JOINTS.
 JOINT WIDTH TOLERANCE IS + 1/16" TO - 1/32"
 FURNISH AND INSTALL ALL JOINT SEALER IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
 SEE STANDARD PLANS 5-297.217 AND 5-297.219, FOR CONCRETE MAINLINE/RAMP PAVEMENT.
 SEE PAVING LAYOUTS IN THE PLANS FOR JOINT CLASS DESIGNATION TO BE USED AND SPECIAL REINFORCEMENT REQUIRED.

- ① JOINT DEPTH SHALL BE:
 FOR CONCRETE OVERLAYS - 1/3 THE PAVEMENT THICKNESS
 FOR CONCRETE PAVEMENT - 1/4 THE PAVEMENT THICKNESS
- ② SEE CONTRACTION JOINT SEALER DETAIL. WHEN USING PREFORMED JOINT SEALER, THE DEPTH SHALL BE 1/4" MORE THAN THE PREFORMED SEALER, WHEN COMPRESSED, TO FIT THE JOINT DESIGN WIDTH. "a" DIMENSION SHALL APPLY AT ANY POINT THROUGHOUT "c" DEPTH. SHARP INTERNAL CORNERS WILL NOT BE PERMITTED. ALL CORNERS SHALL BE PROVIDED WITH SUITABLE FILLET.
- ③ WHEN SEALING, THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING.
- ④ PRIOR TO SEALING THE JOINT, A 1/2" DIA. CLOSED CELL BACKER ROD SHALL BE PLACED SUCH THAT THE TOP OF THE BACKER ROD IS 1/2" BELOW THE SURFACE OF THE PAVEMENT. NON SELF-LEVELING SILICONE SHALL BE TOOLED INTO THE JOINT MAINTAINING A SEAL AND BEAD THICKNESS OF 1/4".
- ⑤ PRIOR TO SEALING THE JOINT, A 1/2" DIA. CLOSED CELL BACKER ROD CAPABLE OF WITHSTANDING SEALANT TEMPERATURES OF 400 DEGREES F. SHALL BE PLACED 1/2" BELOW THE TOP OF PAVEMENT.



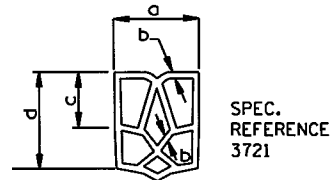
JOINT DETAIL D
SAWED AND SEALED



JOINT DETAIL E
SAWED AND SEALED

REQUIRED DIMENSIONS

JOINT TYPE	TRANSVERSE
NOMINAL SEALER SIZE	1 1/16"
a	USE IN ALL 3/8" JOINTS
b	0.69" + 0.13" - 0.05"
c	0.08" ± 0.02"
d	0.25" MIN.
e	0.63" MIN.



TYPICAL SHAPE FOR SATISFACTORY INSTALLATION IN JOINT (5 CELL MIN.)

PREFORMED ELASTOMERIC TYPE DETAIL

REVISION:
 APPROVED: 8-6-2014
 DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

CONTRACTION JOINTS
 DESIGN C



STATE DESIGN ENGINEER
 Christopher Ky

REVISED:

APPROVED:
 8-6-2014

PAVEMENT JOINTS
 CONTRACTION (DESIGN C) AND EXPANSION (DESIGN E)

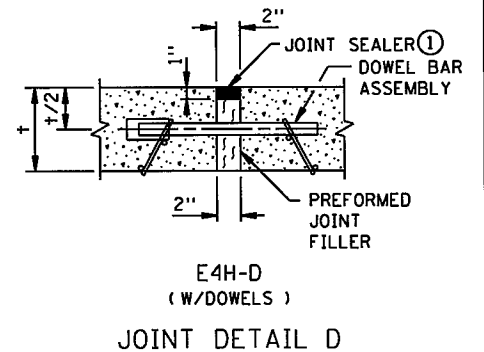
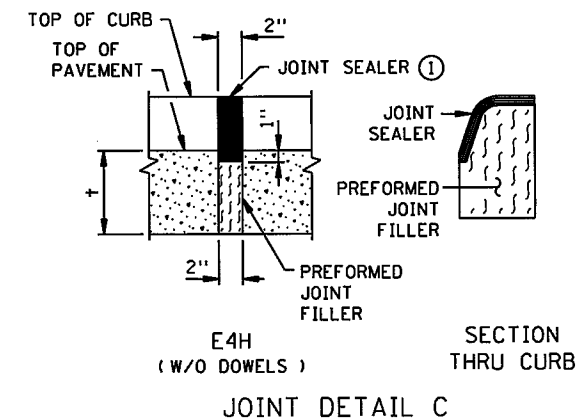
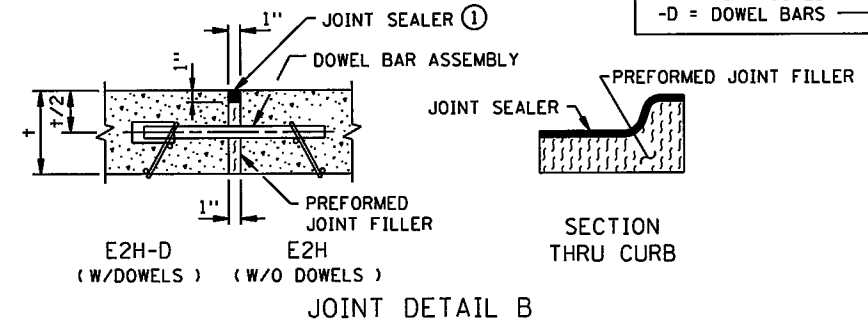
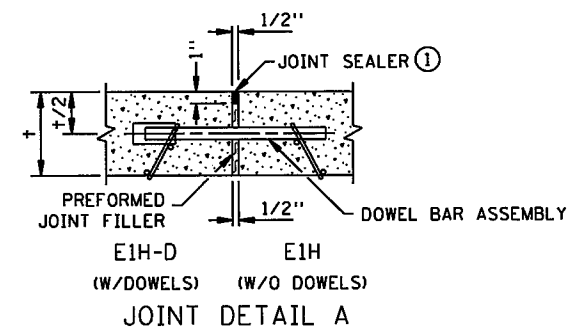
STANDARD PLAN 5-297.221 1 OF 2
 S.P. NO. 6284-162 (TH35W) SHEET NO. 59 OF 367 SHEETS

EXPANSION JOINT REFERENCE, DETAIL & SEALER SPEC. TABLE

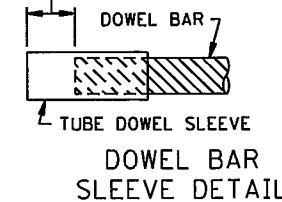
JOINT REFERENCE		JOINT DETAIL	JOINT SEALER SPEC.	JOINT WIDTH
WITHOUT DOWELS	WITH DOWELS			
E1H	E1H-D	A	3725	1/2"
E2H	E2H-D	B	3725	1"
E4H		C	3725	2"
	E4H-D	D	3725	2"
E8H		STANDARD PLAN 5-297.229	3725	4"

LEGEND
 E = EXPANSION JOINT
 NO. = JOINT REFERENCE
 H = HOT POURED
 -D = DOWEL BARS

EXAMPLE
 E4H-D



SPACE FROM END OF DOWEL BAR TO END OF SLEEVE TO BE EQUAL TO EXPANSION JOINT WIDTH (1" MIN.)



NOTES:

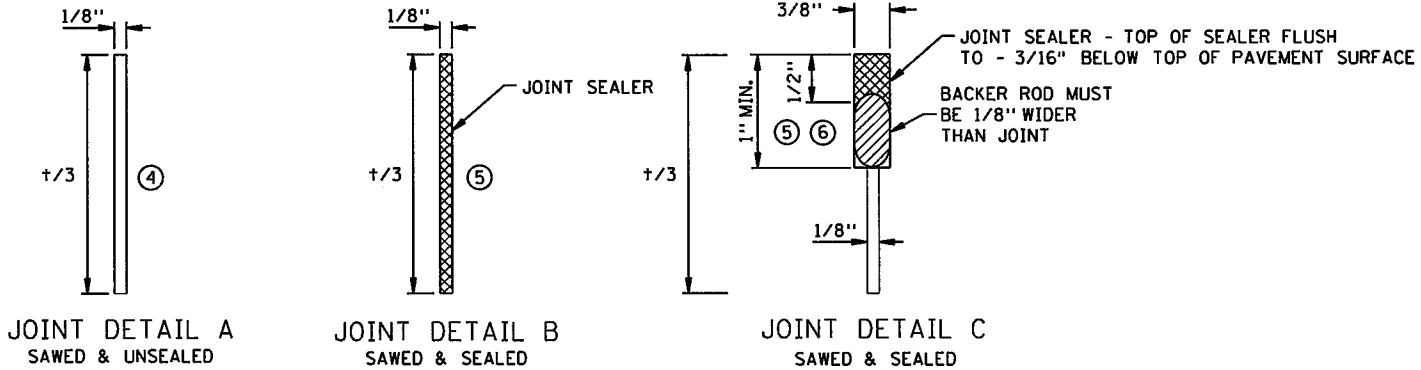
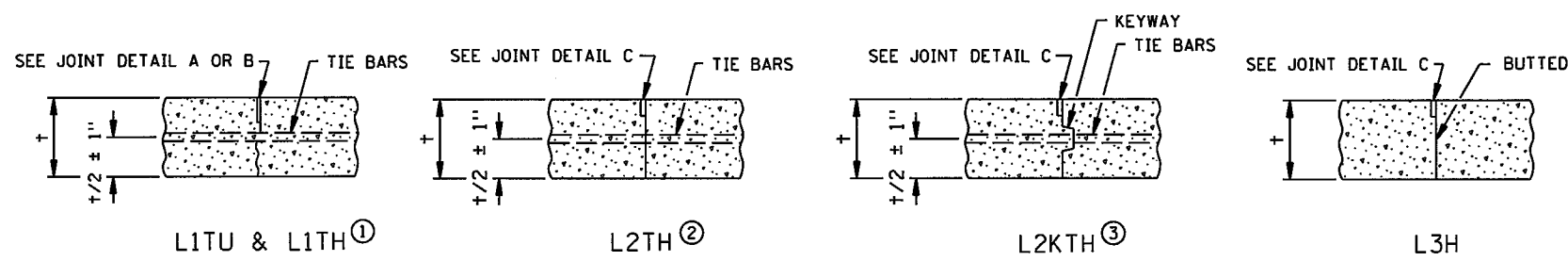
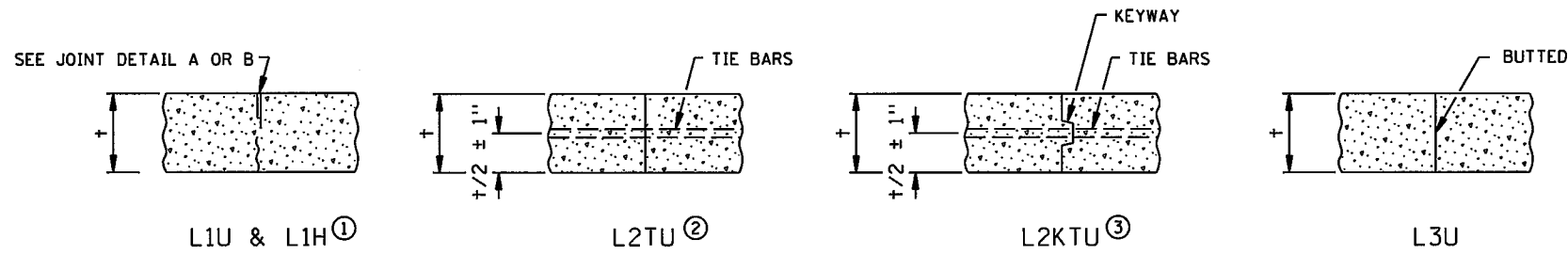
- PREFORMED JOINT FILLER MATERIAL, SPEC. 3702.
- FOR DOWEL BAR ASSEMBLY, SEE STANDARD PLATE 1103.
- ① JOINT SEALER SPEC. 3725. THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING. TOP OF SEALER, FLUSH TO 1/8" BELOW TOP OF PAVEMENT SURFACE. MAKE TOP OF SEALER FOR CURB SECTION D JOINTS FLUSH WITH SURFACE ± 1/8".

SPN8
 OF SPN42

11/05/16 AM

12/8/2015

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TIEBAR TABLE

PAVEMENT THICKNESS	TIEBAR SIZE	LENGTH
< 10-1/2"	NO. 4	30"
≥ 10-1/2"	NO. 5	36"
ALL THICKNESS WHEN TYING TO CURB AND GUTTER	NO. 4	30"

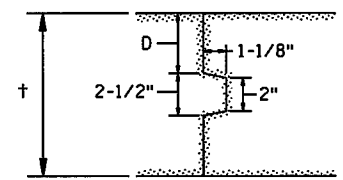
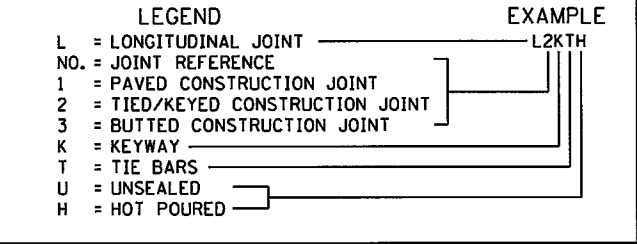
THE TIE BAR SPACING FOR ALL L2T AND L2KT JOINTS SHALL BE 3'-0" CENTER TO CENTER AND BENT 60° AS SHOWN, EXCEPT WHEN NOTED OTHERWISE IN THE PLANS.

TIE BARS IN THE L2T AND L2KT JOINTS SHALL BE THE SAME SIZE AND LENGTH AS USED FOR THE L1T JOINTS, WHEN TYING PAVEMENT TO PAVEMENT. TIE BARS IN THE L2KT JOINTS SHALL BE NO. 4 X 2' - 6", WHEN TYING CURB & GUTTER TO PAVEMENT.

ALL TIE BARS SHALL BE EPOXY COATED AND COMPLY WITH SPEC. 3301.

LONGITUDINAL JOINT REFERENCE, DETAIL & SEALER SPECIFICATION TABLE

JOINT REFERENCE			JOINT DETAIL	JOINT SEALER SPEC	JOINT WIDTH
WITHOUT TIE BARS	WITH TIE BARS	WITH KEYWAY & TIE BARS			
L1U	L1TU		A	UNSEALED	1/8"
L1H	L1TH		B	3725	1/8"
	L2TU	L2KTU	NONE	UNSEALED	
	L2TH	L2KTH	C	3725	3/8"
L3U			NONE	UNSEALED	
L3H			C	3725	3/8"

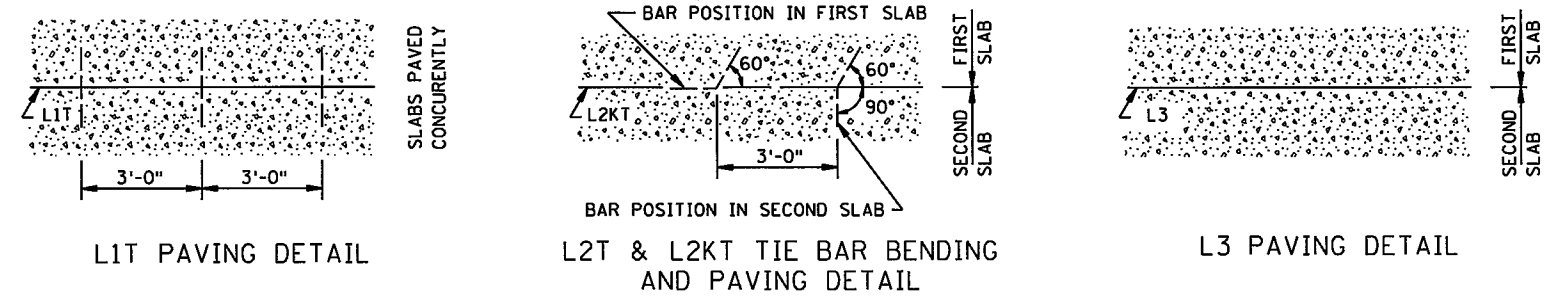


PAVEMENT KEYWAY DETAIL

KEYWAY DIMENSION TABLE

PAVEMENT THICKNESS	D (TOLERANCE ± 1/4")
< 7"	NO KEYWAY
7" TO 7-1/2"	3"
8" TO 10"	4"
≥ 10-1/2"	5"

KEYWAY (1-1/8" x 2" x 2-1/2") MAY BE FORMED WITH MOLD OR METAL FORM. OTHER APPROVED KEYWAY SHAPES GIVING EQUIVALENT CONSTRUCTION FEATURES MAY BE USED WITH APPROVAL OF THE ENGINEER.



- NOTES:
- NORMALLY, TIED PAVEMENT WIDTHS SHALL NOT EXCEED FOUR LANES, EXCEPT BRIDGE APPROACH PANELS AND PAVEMENT TAPERS.
- JOINT WIDTH TOLERANCE IS + 1/16 IN. TO - 1/32 IN.
- FURNISH AND INSTALL ALL JOINT SEALER IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- TIED/KEYED AND BUTTED CONSTRUCTION JOINTS SHALL BE UNSEALED EXCEPT AS OTHERWISE NOTED IN THE PLAN OR REQUIRED BY THE ENGINEER.
- SEE STANDARD PLANS 5-297.217 AND 5-297.219 FOR CONCRETE MAINLINE AND RAMP PAVEMENT.
- SEE PAVING LAYOUTS IN THE PLANS FOR JOINT CLASS DESIGNATIONS TO BE USED AND SPECIAL REINFORCEMENT REQUIRED.
- WHEN CURB AND GUTTER IS PLACED ADJACENT TO CONCRETE MAINLINE, THE TIEBARS SHALL BE PLACED A MINIMUM OF 2" ABOVE THE CURB AND GUTTER GRADE.
- SEE THE LONGITUDINAL JOINT REFERENCE, DETAIL & SEALER SPECIFICATION TABLE TO DETERMINE JOINT DETAIL.
 - CONCRETE PAVEMENTS LESS THAN 7" SHALL USE L2TU AND L2TH JOINTS UNLESS OTHERWISE ALLOWED BY THE ENGINEER.
 - CONCRETE PAVEMENTS GREATER THAN OR EQUAL TO 7" SHALL USE L2KTU AND L2KTH JOINTS UNLESS OTHERWISE ALLOWED BY THE ENGINEER.
 - THE JOINT FACES SHALL BE CLEANED WITH WATER DURING THE SAW CUTTING OPERATION OR BY WATER BLASTING AFTER SAWING.
 - THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING.
 - PRIOR TO SEALING THE JOINT, A 1/2" DIAMETER CLOSED CELL BACKER ROD CAPABLE OF WITHSTANDING SEALANT TEMPERATURES OF 400 DEGREES F. SHALL BE PLACED 1/2" BELOW THE TOP OF THE PAVEMENT.

REVISIONS:
 APPROVED: 8-6-2014
 DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

REVISOR:
 APPROVED: 8-6-2014
 STATE DESIGN ENGINEER

PAVEMENT JOINTS
 LONGITUDINAL (DESIGN L)

STANDARD PLAN 5-297.221 2 OF 2

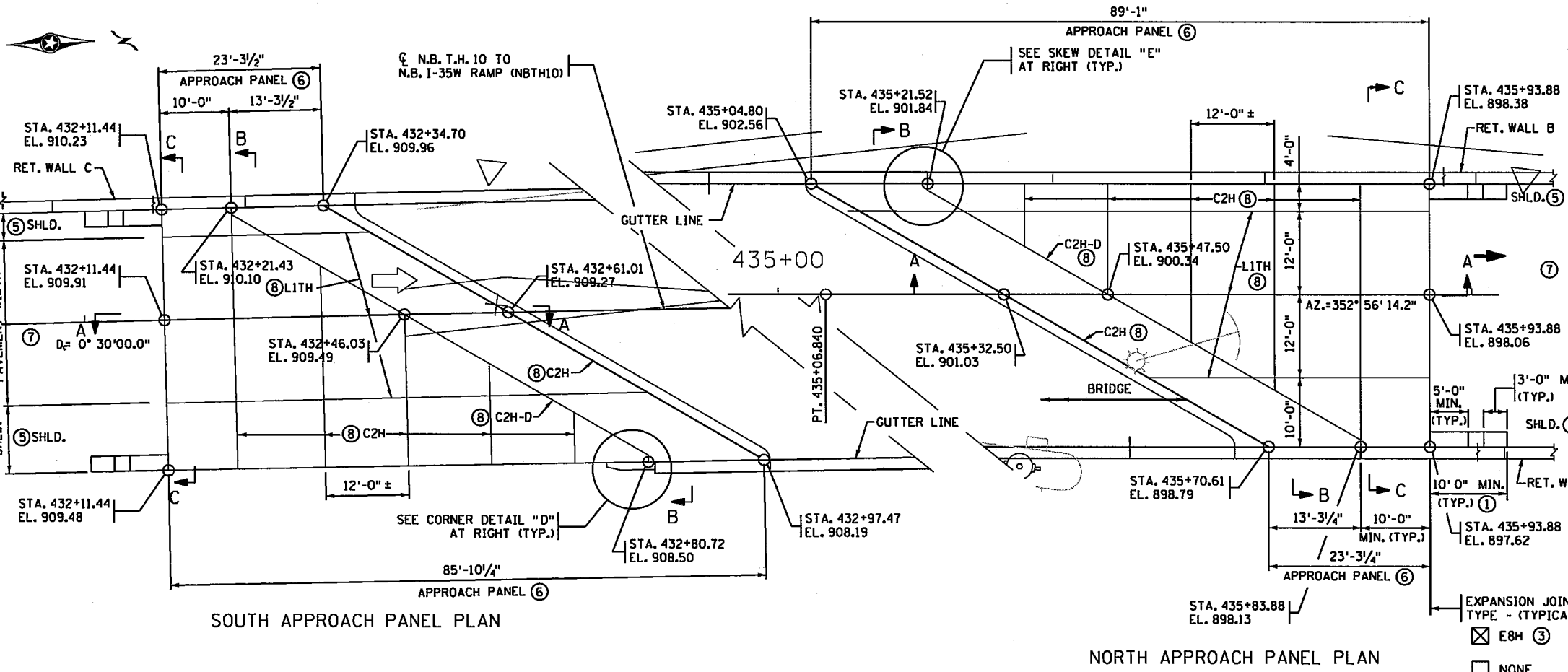
S.P. NO. 6284-162 (TH35W) SHEET NO. 60 OF 367 SHEETS

SPN9 OF SPN42

11/28/15 AM

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MODEL NAMES



NOTES:

- ① SEE STANDARD PLAN 5-297.231 FOR DRAINAGE DETAILS AND ADDITIONAL REQUIREMENTS.
- ② B4 CURB DESIGN SHOWN. SEE STANDARD PLATES FOR CURB DETAILS.
- ③ EBH QUANTITY SHALL BE PAID FOR SEPARATELY, MEASURED FROM BACK OF CURB TO BACK OF CURB.
- ④ WHEN SKEW IS OVER 45°, THE JOINT SHALL BE PERPENDICULAR TO GUTTER FOR 1' (TYP.).
- ⑤ SEE GRADING PLANS FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.
- ⑥ PANEL SIZE AND REQUIREMENTS FOR TRANSVERSE AND LONGITUDINAL JOINTS ARE SHOWN ON STANDARD PLANS 5-297.228 AND 5-297.229.
- ⑦ FOR CONCRETE PAVEMENT, SEE STANDARD PLAN 5-297.227 FOR LUG REQUIREMENTS.
- ⑧ SEE STD. 5-297.228 FOR JOINT INFORMATION, LAYOUT AS SHOWN ON THIS SHEET.

GENERAL NOTES:

SECTION A-A IS SHOWN ON STANDARD PLAN 5-297.227. SECTIONS B-B AND C-C ARE SHOWN ON STANDARD 5-297.223 AND SHOW THE STATION AND ELEVATION AT END LOCATIONS ON THE APPROACH PANEL.

A CONCRETE SILL IS REQUIRED BENEATH EXPANSION JOINT TYPE EBH. EXTEND THE EXPANSION JOINT AND THE SILL ALONG THE FULL WIDTH OF THE TRAFFIC LANES, SHOULDERS AND CURB. ENSURE THAT SILL DOES NOT INTERFERE WITH GUARDRAIL POST PLACEMENT. CONCRETE SILL AND CURBING, IF REQUIRED, ARE INCLUDED IN THE APPROACH PANEL PAY ITEM.

AT THE END OF THE CONCRETE BARRIER, TRANSITION FACE OF 4-INCH CURB INTO PROFILE OF CONCRETE BARRIER. SEE CURB TRANSITION DETAILS ON STANDARD PLAN 5-297.227. IF THERE IS NO ROADWAY CURB AT THE END OF THE APPROACH PANEL, TRANSITION THE APPROACH PANEL CURB HEIGHT FROM 4 INCH TO 0 INCH IN THE LAST 3'-4" SECTION (1:10 OR FLATTER SLOPE).

GENERAL DRAINAGE DETAILS ARE SHOWN ON BRIDGE APPROACH PANEL DRAINAGE DETAILS, STANDARD PLAN 5-297.231. ADDITIONAL CATCH BASIN DETAILS ARE SHOWN ON DRAINAGE PLAN SHEETS.

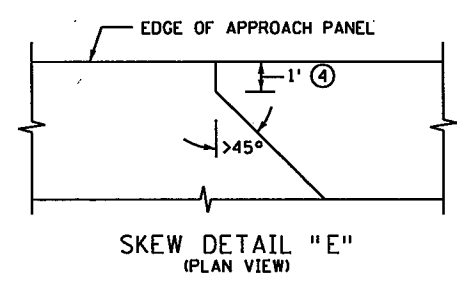
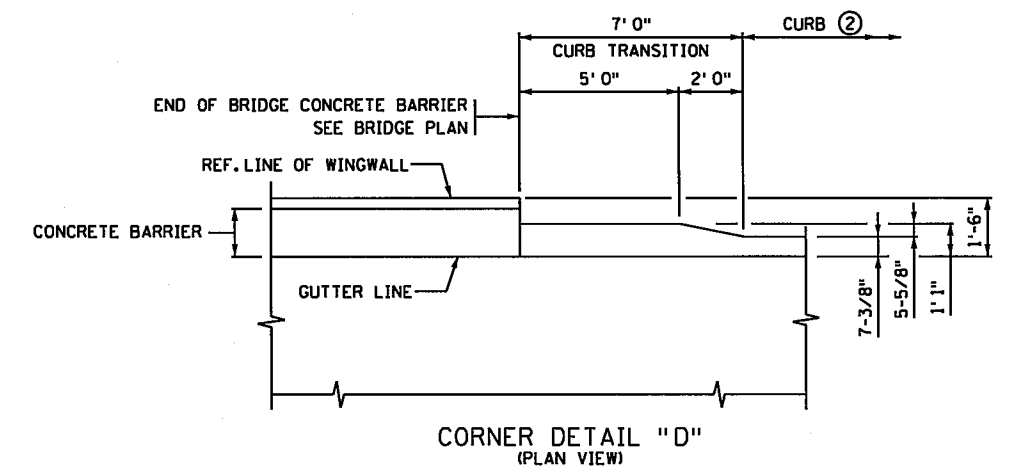
CONCRETE MIX SHALL BE 3S52 FOR APPROACH PANEL AND SILL.

REFER TO MNDOT SPEC. 2406 FOR ADDITIONAL INFORMATION.

* APPROACH PANEL LAYOUTS SHOWN ARE ACTUAL TO THIS BRIDGE LOCATION

DETAIL REMOVED

APPROACH PANEL PLAN
OVER 10° SKEW, BARRIER ON WINGWALL



* DENOTES MODIFICATION FROM STANDARD PLAN

MODIFIED

BRIDGE NO. 62937

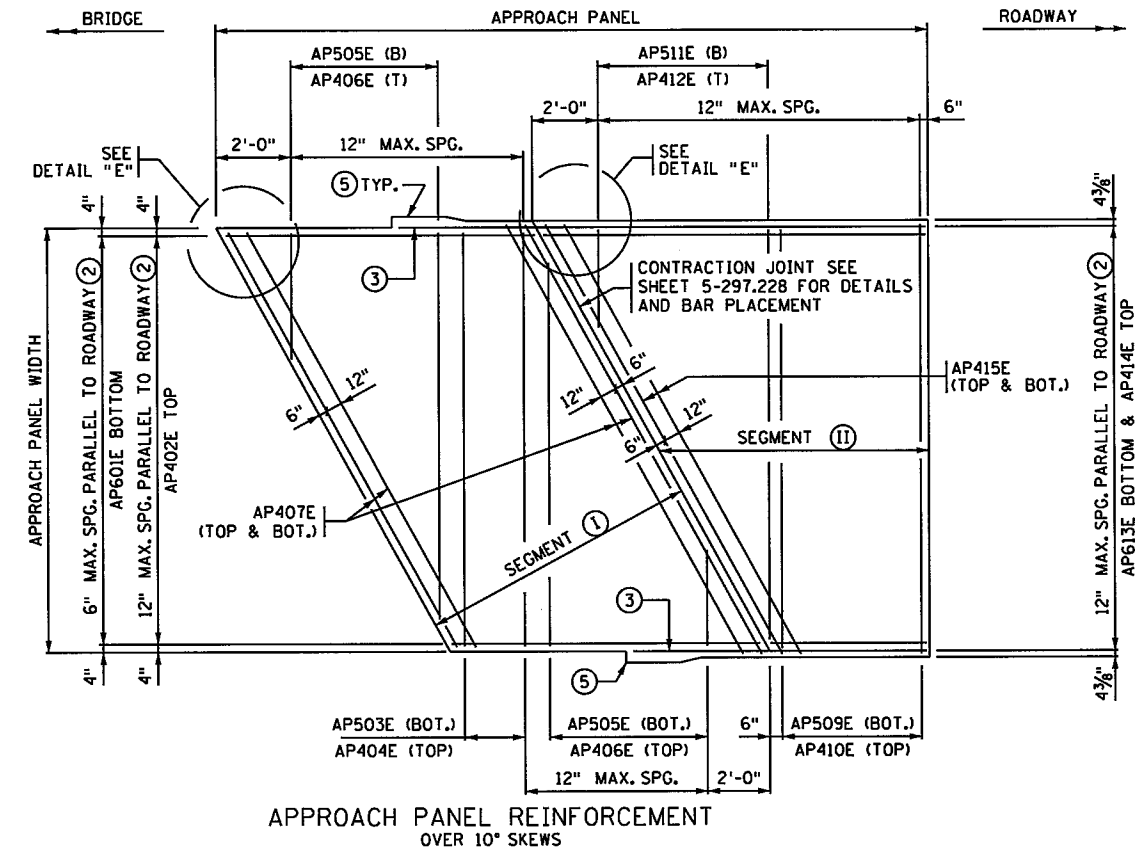
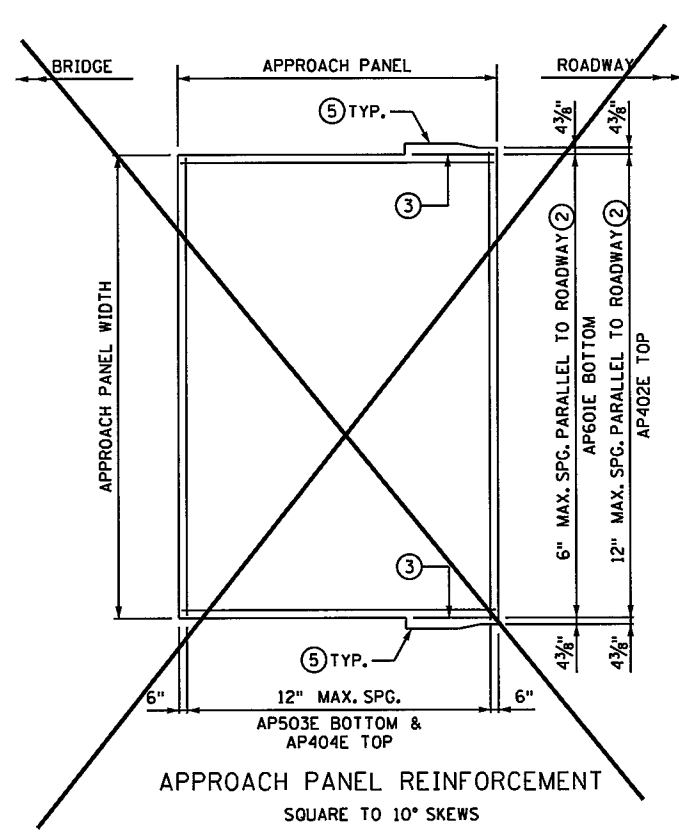
SPN10
OF SPN42

CERTIFIED BY LICENSED PROFESSIONAL ENGINEER PRINTED NAME: MARK K MAVES	2/16/2016 DATE	STANDARD PLAN SHEET NO. 5-297.222 STANDARD APPROVED MARCH 23, 2011	TITLE: BRIDGE APPROACH PANEL LAYOUT (CONCRETE BARRIER ON WINGWALL)
	LIC. NO. 20496	STATE PROJ. NO. 6284-162 (TH35W)	SHEET NO. 61 OF 367 SHEETS

11/05/17 AM

12/8/2015

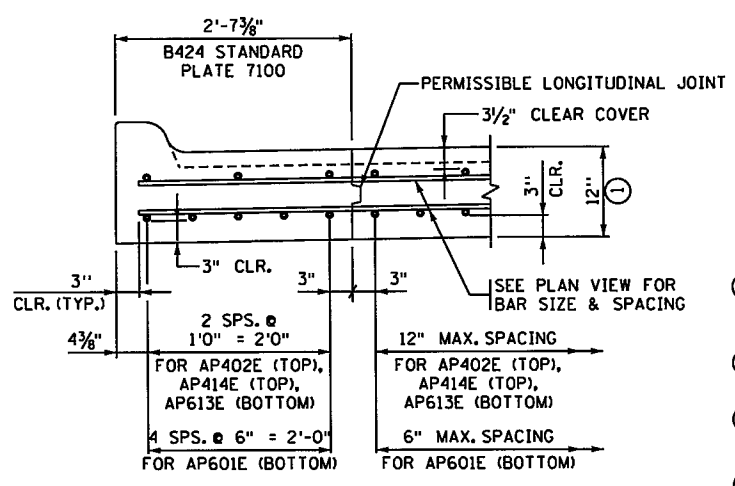
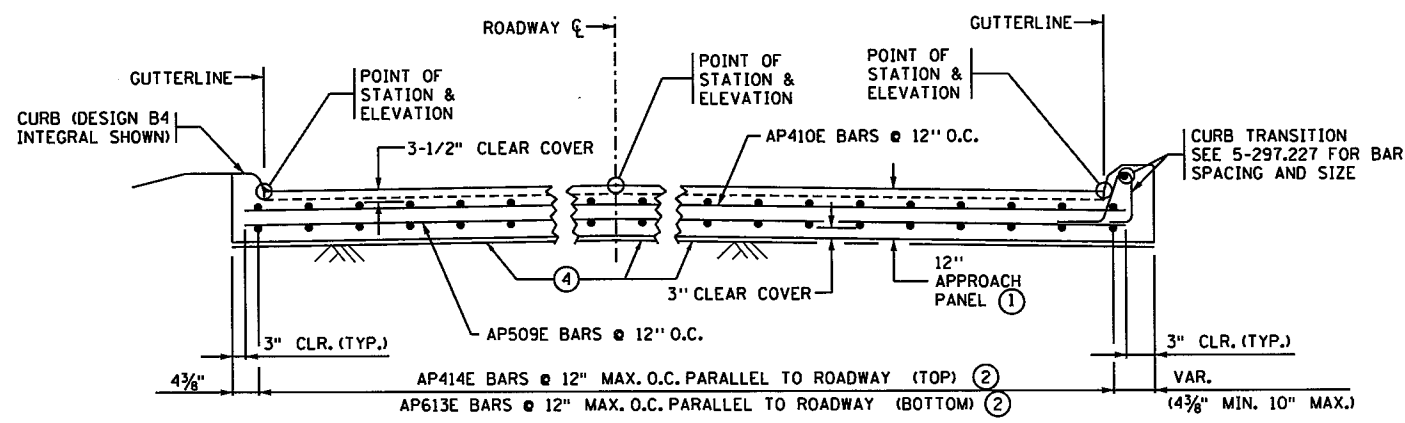
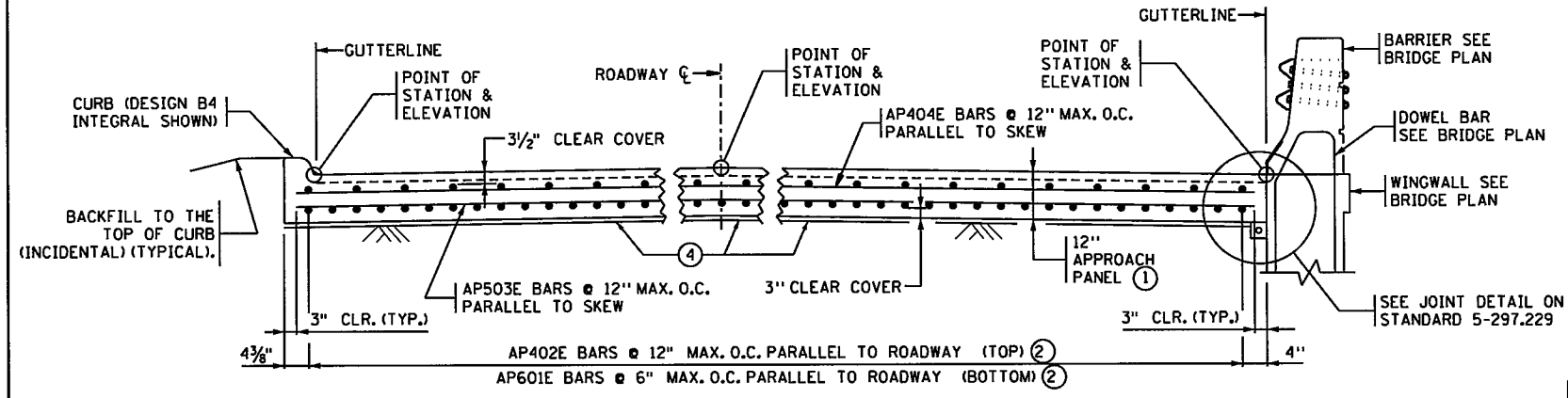
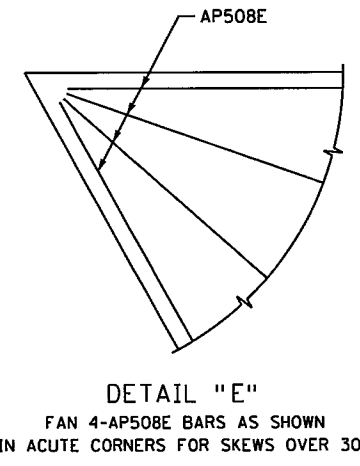
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TYPE	LOCATION	ESTIMATED WEIGHT
PANEL (SQ. TO 10°)	BRIDGE TO END OF APPROACH PANEL	48.5 LB./SQ. YD.
PANEL SEGMENT (I)	BRIDGE TO CONTRACTION JOINT	48.5 LB./SQ. YD.
PANEL SEGMENT (II)	CONTRACTION JOINT TO END OF APPROACH PANEL	35.0 LBS/SQ. YD.
CURB	7.0 FT. CURB TRANSITION	19.0 LBS/EACH
SILL	SILL (IF REQUIRED)	14.0 LBS/LIN FT.

NOTES:
 TRANSVERSE BARS IN BOTH PANEL SEGMENTS ARE PERPENDICULAR TO ROADWAY CENTERLINE EXCEPT AP407E ARE PARALLEL TO SKEW IN SEGMENT (I) AND AP415E ARE PARRALLEL TO SKEW IN SEGMENT (II).
 LONGITUDINAL BARS IN BOTH PANEL SEGMENTS ARE PARALLEL TO ROADWAY CENTERLINE.

BAR	NO.	LENGTH	SHAPE	LOCATION
AP601E		'-	—	BOTTOM LONGITUDINAL
AP402E		'-	—	TOP LONGITUDINAL
AP503E		'-	—	BOTTOM TRANSVERSE
AP404E		'-	—	TOP TRANSVERSE
AP505E	SER. OF	'- TO	—	BOTTOM TRANSVERSE
AP406E	SER. OF	'- TO	—	TOP TRANSVERSE
AP407E		'-	—	TOP & BOTTOM EDGE
AP508E		8'-0	—	TOP CORNER - FAN
AP509E		'-	—	BOTTOM TRANSVERSE
AP410E		'-	—	TOP TRANSVERSE
AP511E	SER. OF	'- TO	—	BOTTOM TRANSVERSE
AP412E	SER. OF	'- TO	—	TOP TRANSVERSE
AP613E	SER. OF	'- TO	—	BOTTOM LONGITUDINAL
AP414E	SER. OF	'- TO	—	TOP LONGITUDINAL
AP415E		'-	—	TOP & BOTTOM EDGE
AP616E		5'-0	—	C2H-D JOINT



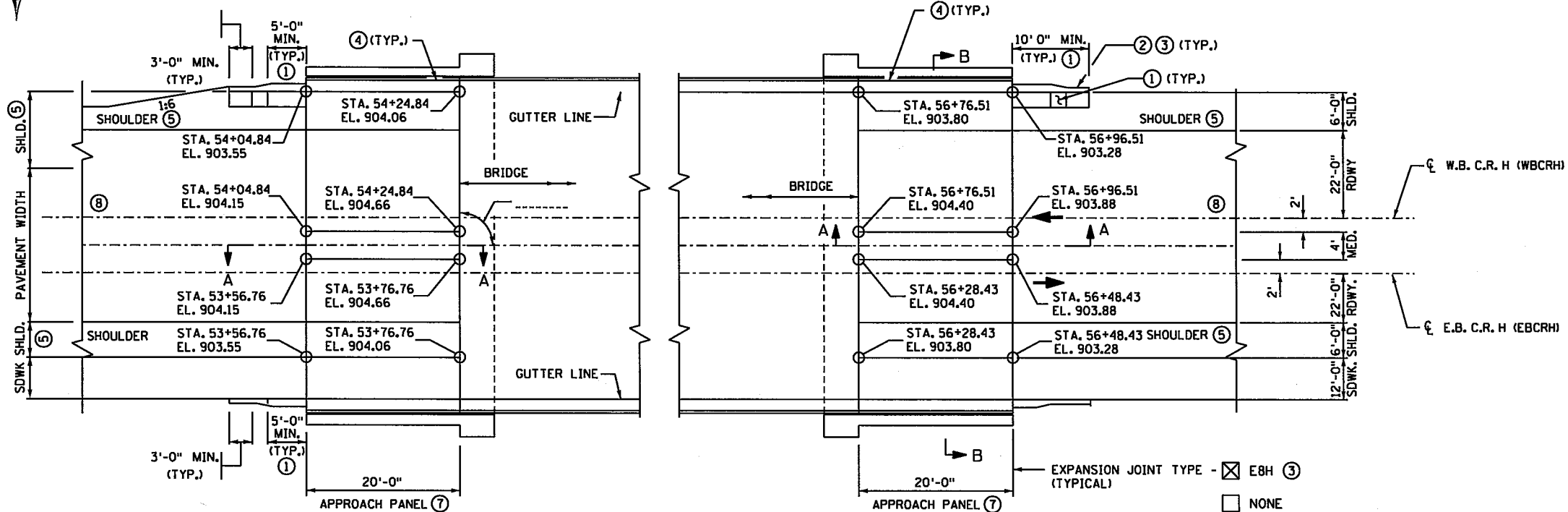
GENERAL NOTES:
 AS PER MNDOT SPEC. 3301, USE EPOXY COATED GRADE 60 REINFORCEMENT BARS IN APPROACH PANEL, CONCRETE SILL AND CURB TRANSITION.
 BARS MARKED WITH THE SUFFIX "E" SHALL BE EPOXY COATED IN ACCORDANCE WITH Mn/DOT SPEC. 3301.
 FOR VARIABLE ROADWAY WIDTHS, VARY THE LAP LENGTH OF THE REINFORCEMENT.
 MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS: NO. 4 BAR = 1'-8", NO. 5 BAR = 2'-1", NO. 6 BAR = 2'-6".
 ALL LAP SPLICES SHALL BE STAGGERED SUCH THAT NO MORE THAN 50% OF REBAR IS SPLICED AT THE SAME LOCATION.
 (1) APPROACH SLAB THICKNESS IS 12" (12" MONOLITHIC OR 10" SLAB + 2" WEARING COURSE). CHECK BRIDGE PLANS FOR CONCRETE WEARING COURSE, WHICH IS INCLUDED IN BRIDGE PLAN QUANTITIES.
 (2) SPACING ONLY FOR B4 INTEGRAL CURB. SEE CURB DETAIL FOR SPACING FOR USING B424 CURB AND GUTTER.
 (3) EXTEND AND/OR CUT REINFORCING AS NECESSARY TO ACCOMMODATE CURB TRANSITION IF PRESENT. REINFORCEMENT MUST EXTEND INTO CURB AS SHOWN IN TRANSVERSE SECTIONS B-B AND C-C.
 (4) IF THE APPROACH PANEL IS TIED TO THE BRIDGE ABUTMENT WITH REINFORCEMENT BARS, PLACE 12 MIL POLYETHYLENE SHEETING (OR 2 LAYERS OF 6 MIL) UNDER THE LIMITS OF THE APPROACH PANEL TO ALLOW THE PANEL TO MOVE LONGITUDINALLY ON THE GRADE. SHEETING IS INCLUDED IN THE APPROACH PANEL PAY ITEM.
 (5) SEE STANDARD PLAN 5-297.222 FOR CURB TRANSITION LOCATION.

CERTIFIED BY: *Mark K Maves*
 LICENSED PROFESSIONAL ENGINEER
 PRINTED NAME: MARK K MAVES
 DATE: 12/8/2015
 LIC. NO. 20496

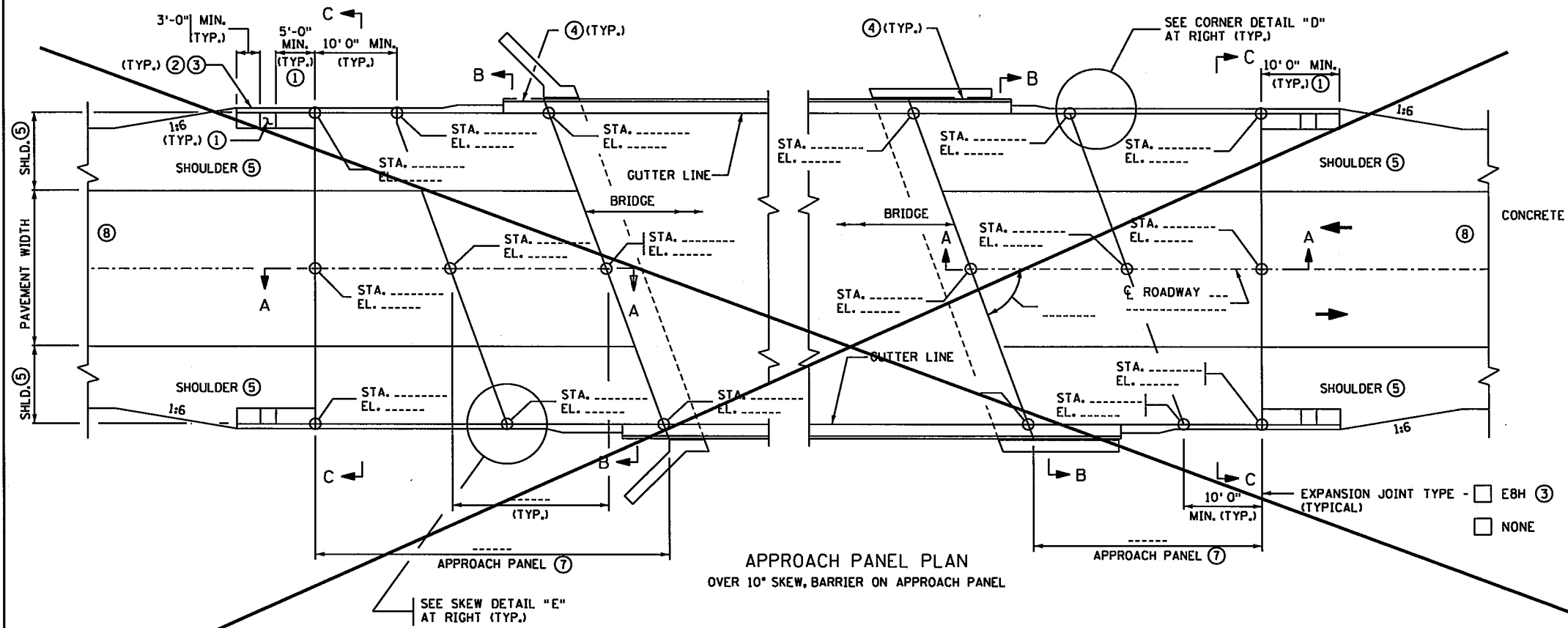
MODIFIED
 STANDARD PLAN SHEET NO. 5-297.223
 STANDARD APPROVED: DECEMBER 20, 2011

TITLE: BRIDGE APPROACH PANEL REINFORCEMENT DETAILS (CONCRETE BARRIER ON WINGWALL)
 STATE PROJ. NO. 6284-162 (TH35W) SHEET NO.62 OF 367 SHEETS
 SPN11 OF SPN42
 BRIDGE NO. 62937

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APPROACH PANEL PLAN
 SQUARE TO 10° SKEW, BARRIER ON APPROACH PANEL



APPROACH PANEL PLAN
 OVER 10° SKEW, BARRIER ON APPROACH PANEL

- NOTES:
- SEE STANDARD PLAN 5-297.231 FOR DRAINAGE DETAILS AND ADDITIONAL REQUIREMENTS.
 - B4 CURB DESIGN SHOWN. SEE STANDARD PLATES FOR CURB DETAILS.
 - E8H QUANTITY SHALL BE PAID FOR SEPARATELY, MEASURED FROM BACK OF CURB TO BACK OF CURB.
 - TO ACCOMMODATE GUARDRAIL CONNECTION AND CRASH TEST REQUIREMENTS THE CONCRETE BARRIER MUST EXTEND 7'-0" MINIMUM ONTO THE APPROACH PANEL. FOR PARALLEL WINGWALLS THE BARRIER MUST EXTEND 7'-0" MINIMUM ON TO THE APPROACH PANEL OR TO THE END OF THE WINGWALL, WHICH EVER IS LONGER. REFER TO BRIDGE PLAN FOR BARRIER REINFORCEMENT AND PAYMENT.
 - SEE GRADING PLANS FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.
 - WHEN SKEW IS OVER 45°, THE JOINT SHALL BE PERPENDICULAR TO GUTTER FOR 1' (TYP.).
 - PANEL SIZE AND REQUIREMENTS FOR TRANSVERSE AND LONGITUDINAL JOINTS ARE SHOWN ON STANDARD PLANS 5-297.228 AND 5-297.229.
 - FOR CONCRETE PAVEMENT, SEE STANDARD PLAN 5-297.227 FOR LUG REQUIREMENTS.

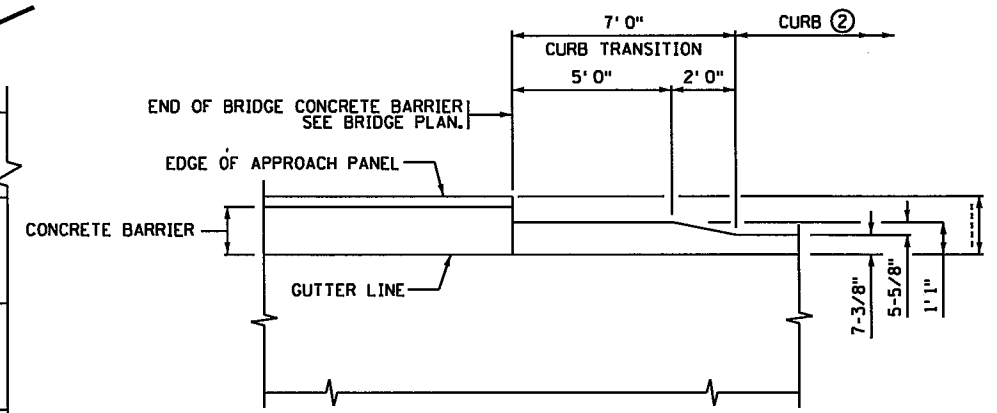
GENERAL NOTES:
 SECTION A-A IS SHOWN ON STANDARD PLAN 5-297.227.
 SECTIONS B-B AND C-C ARE SHOWN ON STANDARD PLAN 5-297.225
 AND SHOW THE STATION AND ELEVATION AT END LOCATIONS ON THE APPROACH PANEL.

A CONCRETE SILL IS REQUIRED BENEATH EXPANSION JOINT TYPE E8H. EXTEND THE EXPANSION JOINT AND THE SILL ALONG THE FULL WIDTH OF THE TRAFFIC LANES, SHOULDERS AND CURB. ENSURE THAT SILL DOES NOT INTERFERE WITH GUARDRAIL POST PLACEMENT. CONCRETE SILL AND CURBING, IF REQUIRED, ARE INCLUDED IN THE APPROACH PANEL PAY ITEM.

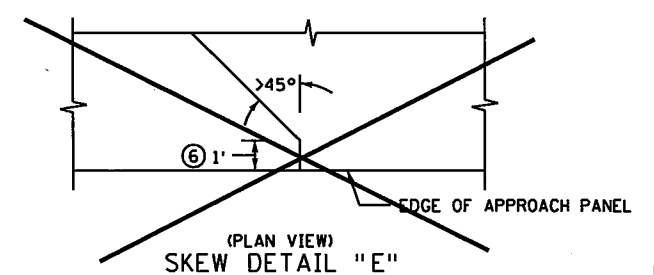
AT THE END OF THE CONCRETE BARRIER, TRANSITION FACE OF 4-INCH CURB INTO PROFILE OF CONCRETE BARRIER. SEE CURB TRANSITION DETAILS ON STANDARD PLAN 5-297.227 IF THERE IS NO ROADWAY CURB AT THE END OF THE APPROACH PANEL, APPROACH PANEL CURB HEIGHT FROM 4 INCH TO 0 INCH IN THE LAST 3'-4" SECTION (1:10 OR FLATTER SLOPE).

GENERAL DRAINAGE DETAILS ARE SHOWN ON BRIDGE APPROACH PANEL DRAINAGE DETAILS, STANDARD PLAN 5-297.231. ADDITIONAL CATCH BASIN DETAILS ARE SHOWN ON DRAINAGE PLAN SHEETS.

CONCRETE MIX SHALL BE 3552 FOR APPROACH PANEL AND SILL.
 REFER TO MNDOT SPEC. 2406 FOR ADDITIONAL INFORMATION.



CORNER DETAIL "D"
 (PLAN VIEW)



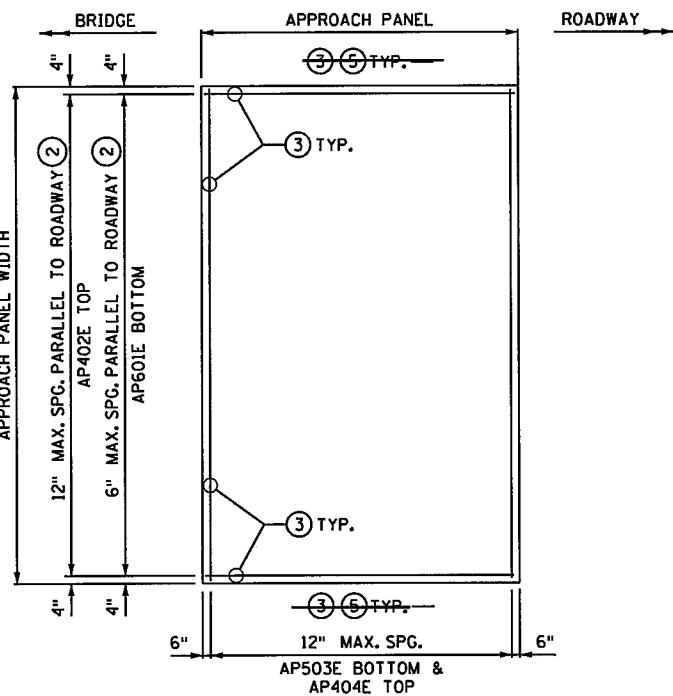
(PLAN VIEW)
 SKEW DETAIL "E"

MODIFIED		BRIDGE NO. 62732		SPN12
STANDARD PLAN SHEET NO. 5-297.224	TITLE:	BRIDGE APPROACH PANEL LAYOUT (CONCRETE BARRIER ON APPROACH PANEL)		
CERTIFIED BY: <i>Mark K. Maves</i>	DATE: 2/16/2016	STANDARD APPROVED: DECEMBER 20, 2011		
PRINTED NAME: MARK K MAVES	LIC. NO. 20496	STATE PROJ. NO. 6284-162 (TH35W)	SHEET NO. 63 OF 367 SHEETS	

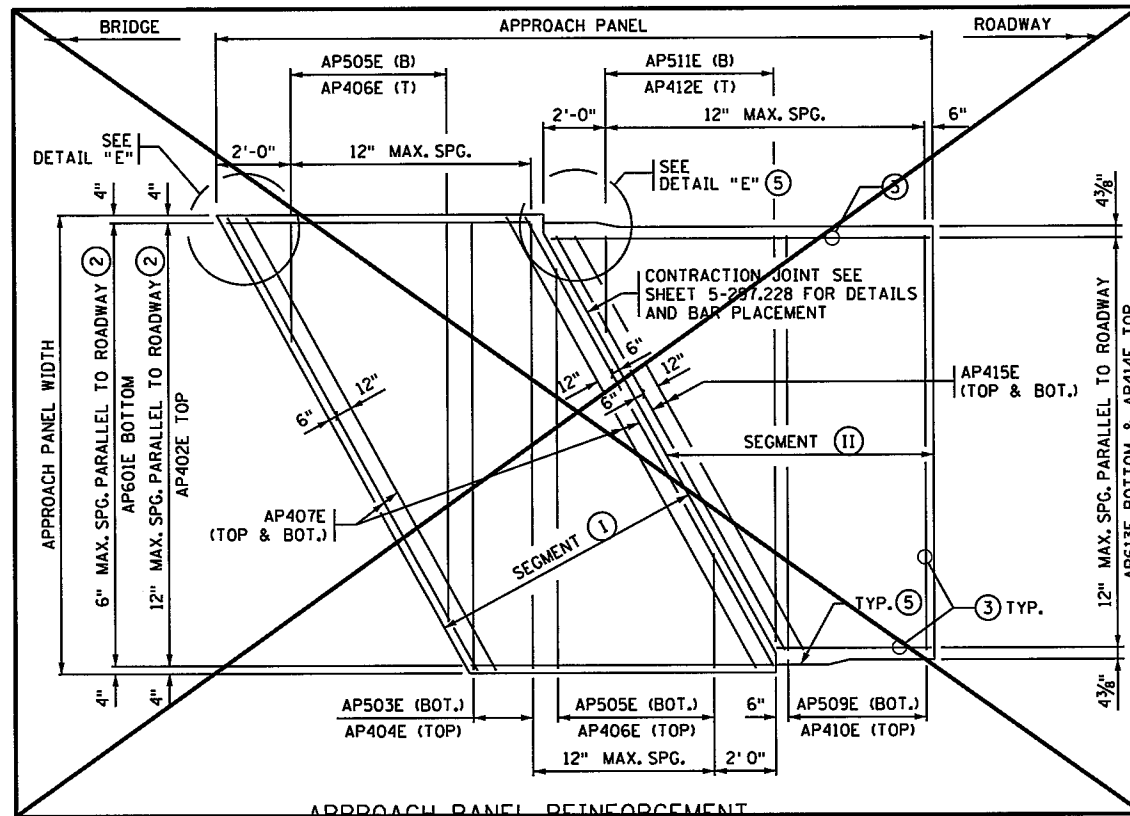
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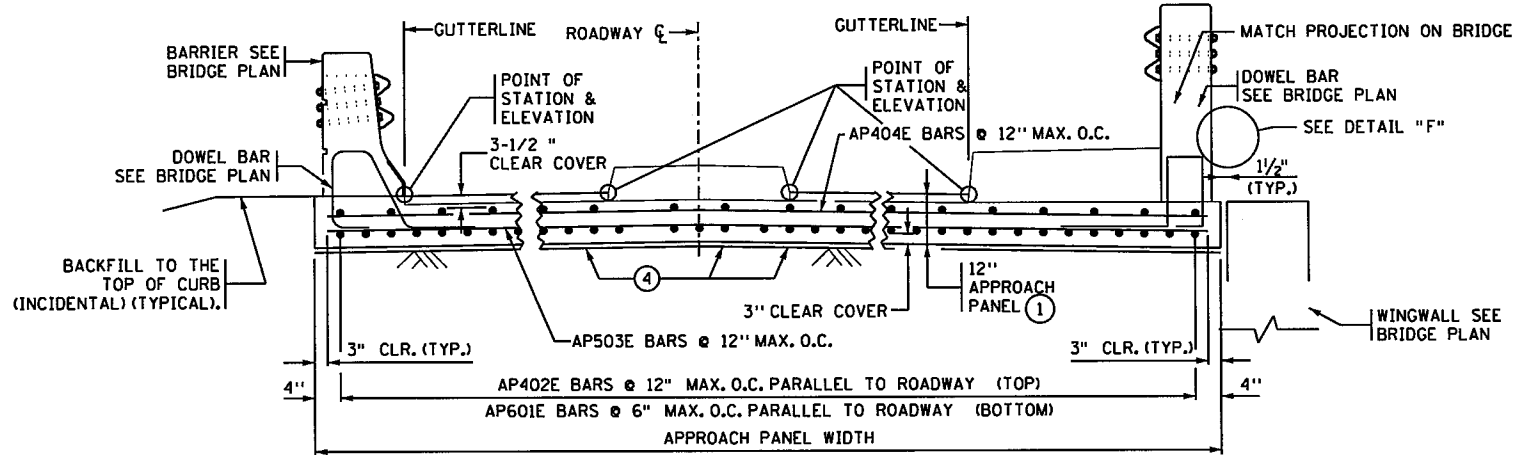
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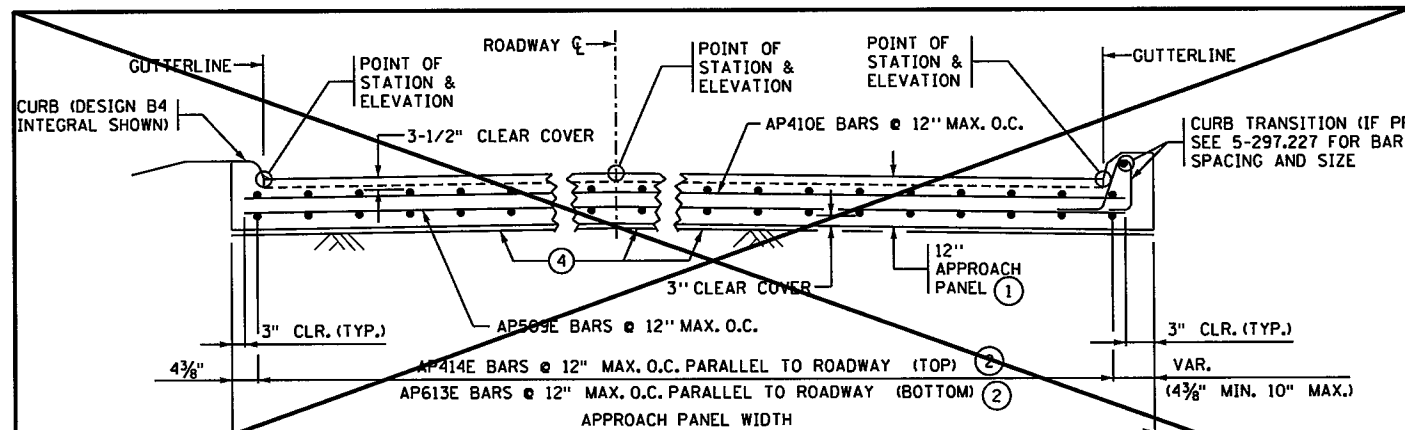
APPROACH PANEL REINFORCEMENT SQUARE TO 10° SKEWS



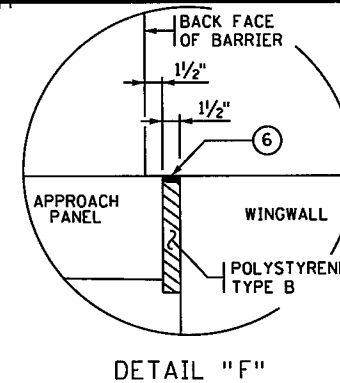
APPROACH PANEL REINFORCEMENT OVER 10° SKEWS



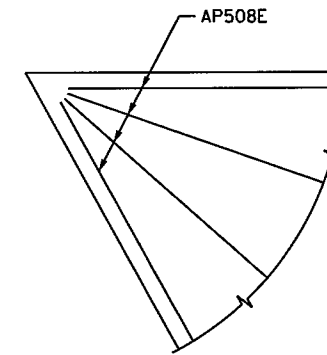
TRANSVERSE SECTION B-B FROM STANDARD PLAN 5-297.224 CONCRETE BARRIERS ARE SHOWN, BUT MAY NOT BE PRESENT. REFER TO BRIDGE PLANS FOR END OF BARRIER LOCATIONS.



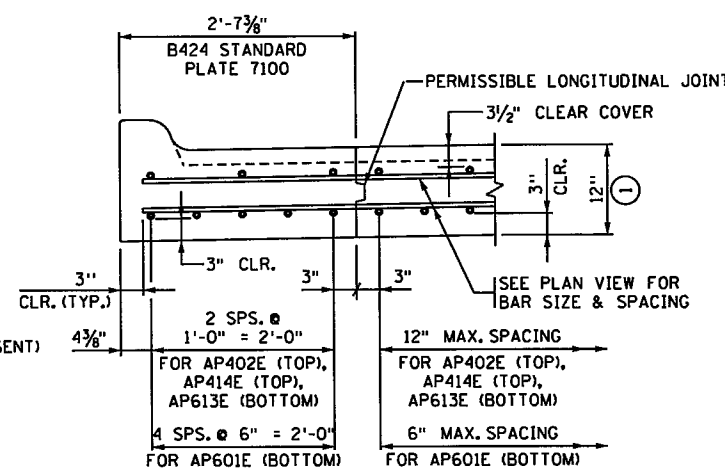
TRANSVERSE SECTION C-C FROM STANDARD PLAN 5-297.224



DETAIL "F"



DETAIL "E" FAN 4-AP508E BARS AS SHOWN IN ACUTE CORNERS FOR SKEWS OVER 30°.



CURB DETAIL (B424 CURB AND GUTTER SHOWN)

ESTIMATED REINFORCEMENT QUANTITY FOR BRIDGE APPROACH PANELS		
TYPE	LOCATION	ESTIMATED WEIGHT
PANEL (SQ. TO 10°)	BRIDGE TO END OF APPROACH PANEL	48.5 LB./SQ. YD.
PANEL SEGMENT (I)	BRIDGE TO CONTRACTION JOINT	48.5 LB./SQ. YD.
PANEL SEGMENT (II)	CONTRACTION JOINT TO END OF APPROACH PANEL	35.0 LBS./SQ. YD.
CURB	7.0 FT. CURB TRANSITION	19.0 LBS./EACH
SILL	SILL (IF REQUIRED)	14.0 LBS./LIN FT.

NOTES:

TRANSVERSE BARS IN BOTH PANEL SEGMENTS ARE PERPENDICULAR TO ROADWAY CENTERLINE EXCEPT AP407E ARE PARALLEL TO SKEW IN SEGMENT I AND AP415E ARE PARALLEL TO SKEW IN SEGMENT II.

LONGITUDINAL BARS IN BOTH PANEL SEGMENTS ARE PARALLEL TO ROADWAY CENTERLINE.

BILL OF REINFORCEMENT FOR BRIDGE APPROACH PANELS

CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND PREPARE SHOP DRAWINGS AND SUBMIT THEM TO THE PROJECT ENGINEER AT LEAST 3 WEEKS BEFORE REBAR FABRICATION.

BAR	NO.	LENGTH	SHAPE	LOCATION
AP601E		'-	---	BOTTOM LONGITUDINAL
AP402E		'-	---	TOP LONGITUDINAL
AP503E		'-	---	BOTTOM TRANSVERSE
AP404E		'-	---	TOP TRANSVERSE
AP505E	SER. OF	'-	---	BOTTOM TRANSVERSE
AP406E	SER. OF	'-	---	TOP TRANSVERSE
AP407E		'-	---	TOP & BOTTOM EDGE
AP508E		8'-0	---	TOP CORNER - FAN
AP509E		'-	---	BOTTOM TRANSVERSE
AP410E		'-	---	TOP TRANSVERSE
AP511E	SER. OF	'-	---	BOTTOM TRANSVERSE
AP412E	SER. OF	'-	---	TOP TRANSVERSE
AP613E	SER. OF	'-	---	BOTTOM LONGITUDINAL
AP414E	SER. OF	'-	---	TOP LONGITUDINAL
AP415E		'-	---	TOP & BOTTOM EDGE
AP616E		5'-0	---	C2H-D JOINT

GENERAL NOTES:

AS PER MNDOT SPEC. 3301, USE EPOXY COATED GRADE 60 REINFORCEMENT BARS IN APPROACH PANEL, CONCRETE SILL AND CURB TRANSITION.

BARS MARKED WITH THE SUFFIX "E" SHALL BE EPOXY COATED IN ACCORDANCE WITH MNDOT SPEC. 3301.

FOR VARIABLE ROADWAY WIDTHS, VARY THE LAP LENGTH OF THE REINFORCEMENT.

MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS: NO. 4 BAR = 1'-8", NO. 5 BAR = 2'-1", NO. 6 BAR = 2'-6".

ALL LAP SPLICES SHALL BE STAGGERED SUCH THAT NO MORE THAN 50% OF REBAR IS SPLICED AT THE SAME LOCATION.

- APPROACH SLAB THICKNESS IS 12" (12" MONOLITHIC OR 10" SLAB + 2" WEARING COURSE). CHECK BRIDGE PLANS FOR CONCRETE WEARING COURSE, WHICH IS INCLUDED IN BRIDGE PLAN QUANTITIES.
- SPACING ONLY FOR B4 INTEGRANT CURB. SEE CURB DETAIL FOR SPACING FOR USING B424 CURB AND GUTTER.
- EXTEND AND/OR CUT REINFORCING AS NECESSARY TO ACCOMMODATE CURB TRANSITION IF PRESENT. REINFORCEMENT MUST EXTEND INTO CURB AS SHOWN IN TRANSVERSE SECTIONS B-B AND C-C.
- IF THE APPROACH PANEL IS TIED TO THE BRIDGE ABUTMENT WITH REINFORCEMENT BARS, PLACE 12 MIL POLYETHYLENE SHEETING (OR 2 LAYERS OF 6 MIL) UNDER THE LIMITS OF THE APPROACH PANEL TO ALLOW THE PANEL TO MOVE LONGITUDINALLY ON THE GRADE. SHEETING IS INCLUDED IN THE APPROACH PANEL PAY ITEM.
- SEE STANDARD PLAN 5-297.224 FOR CURB TRANSITION LOCATION.
- SEAL WITH SELF-LEVELING SILICONE PER MNDOT 3722.

CERTIFIED BY: *Mark K. Maves* 12/8/2015 DATE
LICENSED PROFESSIONAL ENGINEER
PRINTED NAME: MARK K MAVES LIC. NO. 20496

MODIFIED
DATE REVISION DATE 3-22-2013
STANDARD PLAN SHEET NO. 5-297.225
STANDARD APPROVED: DECEMBER 20, 2011

BRIDGE NO. 62732
BRIDGE APPROACH PANEL REINFORCEMENT DETAILS (CONCRETE BARRIER ON APPROACH PANEL)

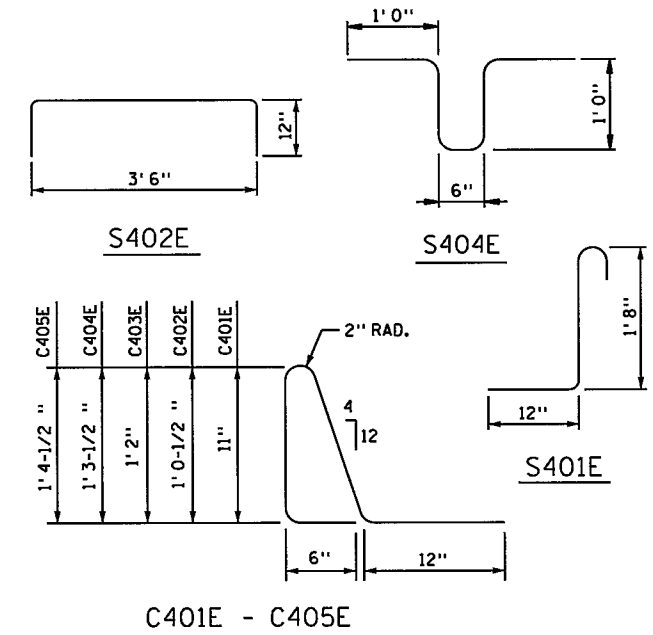
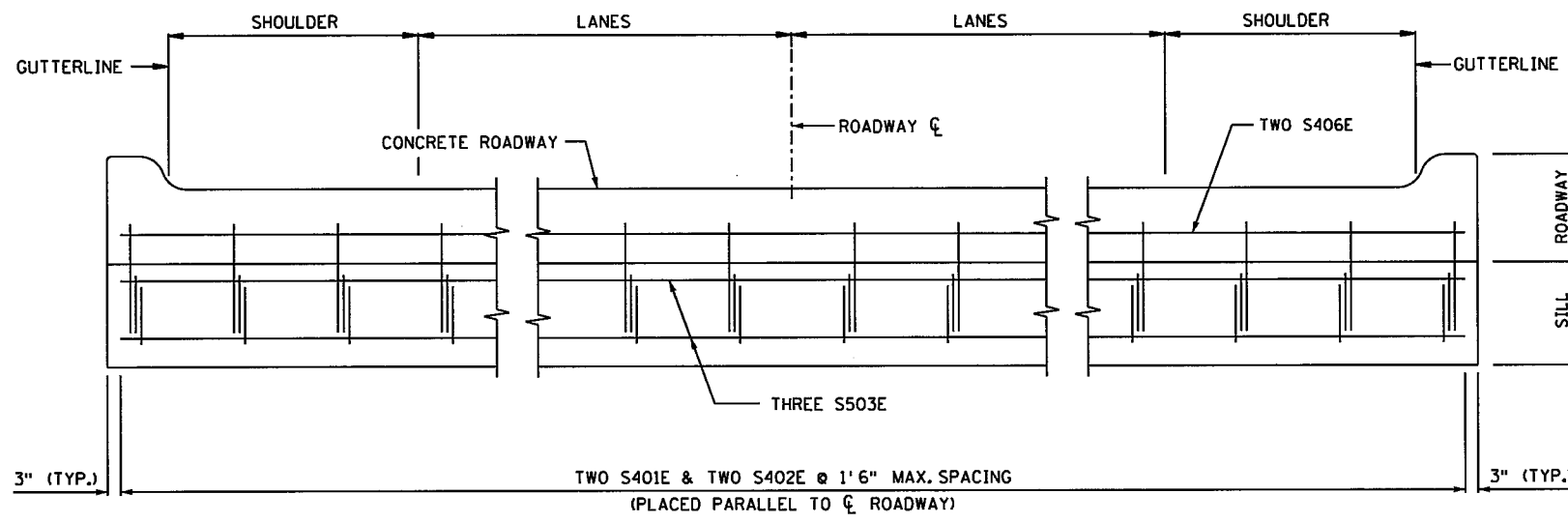
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SPN13 OF SPN42

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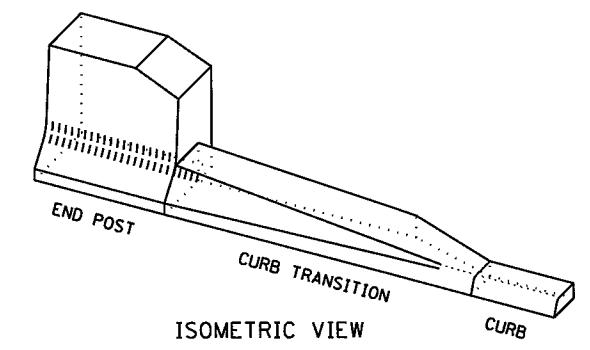
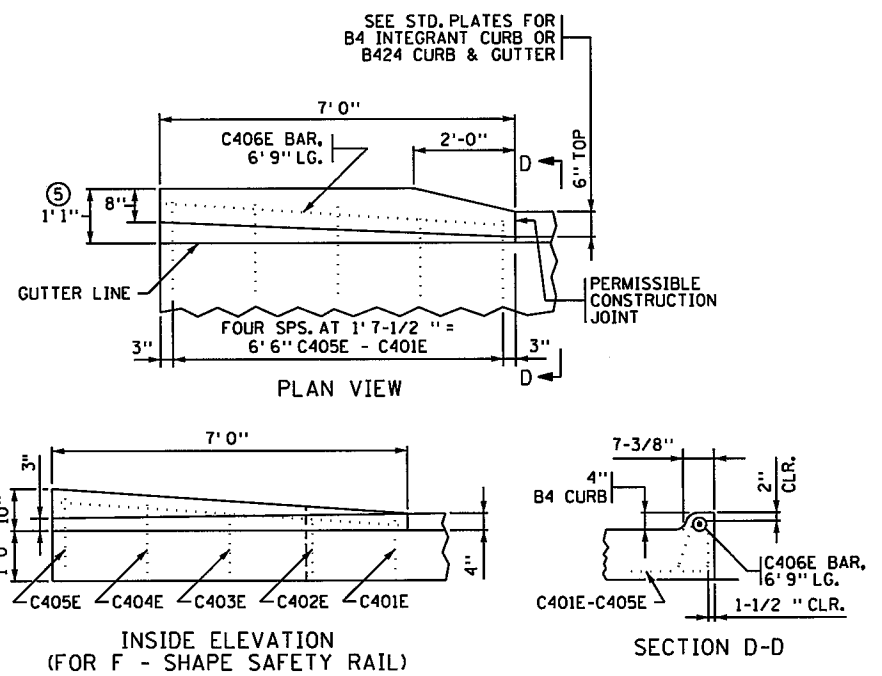
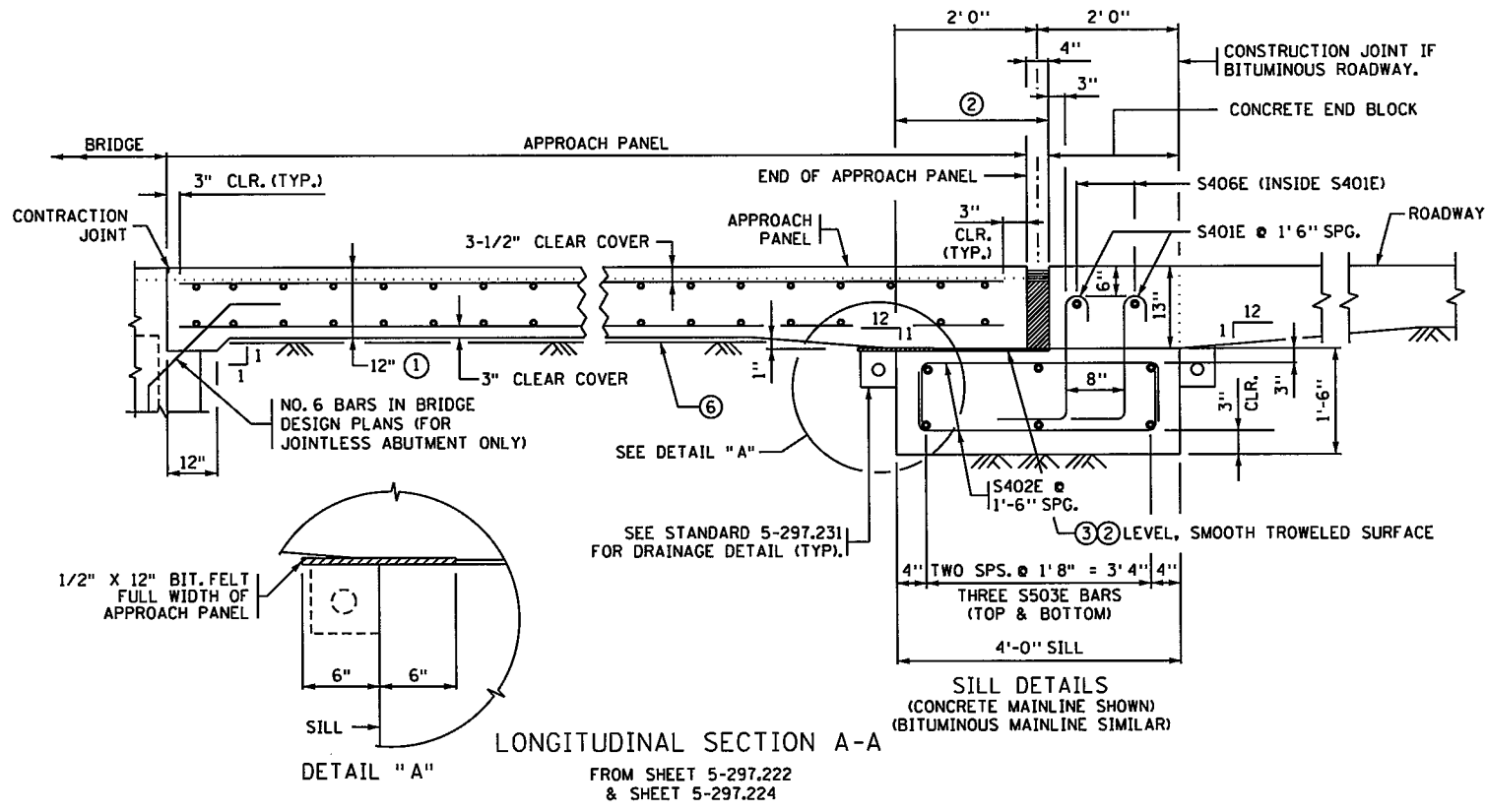
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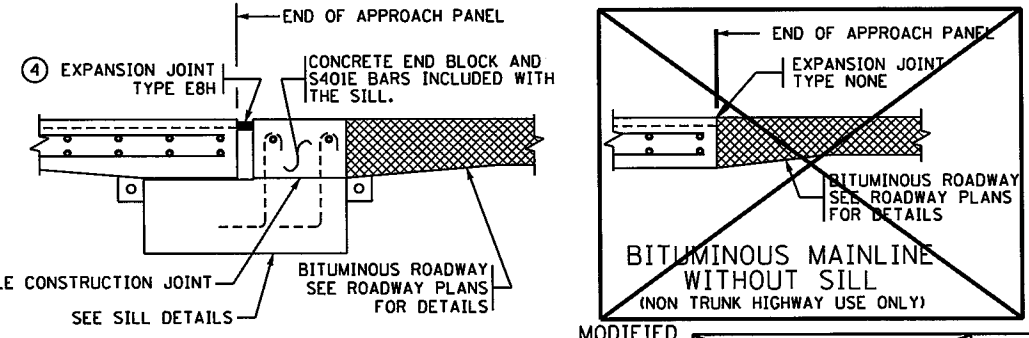
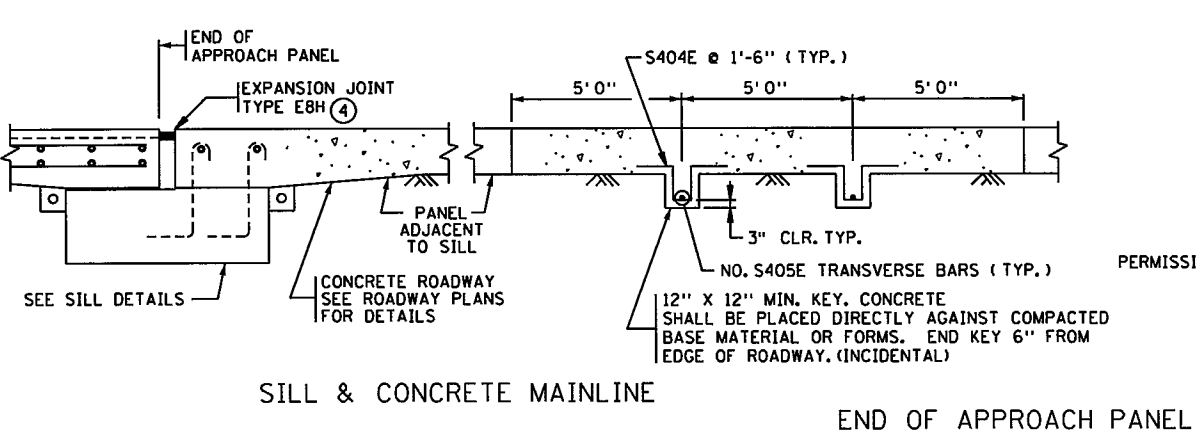
BILL OF REINFORCEMENT FOR CONCRETE SILL				
CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND PREPARE SHOP DRAWINGS AND SUBMIT THEM TO THE PROJECT ENGINEER AT LEAST 3 WEEKS BEFORE REBAR FABRICATION.				
BAR NO.	LENGTH	SHAPE	LOCATION	
S401E	3'2"	J	SILL VERTICAL	
S402E	5'6"	U	SILL TIE	
* S503E	'	—	SILL HORIZONTAL	
* S404E	4'6"	U	KEY TIE	
* S405E	'	—	KEY HORIZONTAL	
* S406E	'	—	END BLOCK HORIZONTAL	

* MINIMUM REINFORCEMENT LAP LENGTHS ARE AS FOLLOWS:
NO. 4 BAR = 1'-8", NO. 5 BAR = 2'-1".

BILL OF REINFORCEMENT FOR CURB TRANSITION				
CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND PREPARE SHOP DRAWINGS AND SUBMIT THEM TO THE PROJECT ENGINEER AT LEAST 3 WEEKS BEFORE REBAR FABRICATION.				
BAR NO.	LENGTH	SHAPE	LOCATION	
C401E	3'6"	N	CURB VERTICAL	
C402E	3'9"	N	CURB VERTICAL	
C403E	4'0"	N	CURB VERTICAL	
C404E	4'3"	N	CURB VERTICAL	
C405E	4'5"	N	CURB VERTICAL	
C406E	6'9"	—	CURB LONGITUDINAL	



- NOTES:
- AS PER MNDOT 3301, USE EPOXY COATED GRADE 60 REINFORCEMENT BARS.
 - ENSURE THAT SILL DOES NOT INTERFERE WITH GUARDRAIL POST PLACEMENT.
 - APPROACH SLAB THICKNESS IS 12" (12" MONOLITHIC OR 10" SLAB + 2" WEARING COURSE). CHECK BRIDGE PLANS FOR CONCRETE WEARING COURSE, WHICH IS INCLUDED IN BRIDGE PLAN QUANTITIES.
 - PLACE PLASTIC SHEETING (MNDOT 3756) AS APPROVED BY THE ENGINEER TO BREAK BOND. COVER AREA SHOWN IN DETAIL. (SHEETING IS INCLUDED IN THE APPROACH PANEL PAY ITEM).
 - REQUIRED CONSTRUCTION JOINT.
 - SEE STANDARD PLANS 5-297.222 & 5-297.224 FOR TYPE OF EXPANSION JOINT. DETAILS OF EXPANSION JOINT TYPE E8H ARE SHOWN ON STANDARD PLAN 5-297.229.
 - FROM BACK SIDE OF CURB TRANSITION TO GUTTERLINE.
 - IF THE APPROACH PANEL IS TIED TO THE BRIDGE ABUTMENT WITH REINFORCEMENT BARS, PLACE 12 MIL POLYETHYLENE SHEETING (OR 2 LAYERS OF 6 MIL) UNDER THE LIMITS OF THE APPROACH PANEL TO ALLOW THE PANEL TO MOVE LONGITUDINALLY ON THE GRADE. SHEETING IS INCLUDED IN THE APPROACH PANEL PAY ITEM.



CERTIFIED BY: *Mark K. Maves* 12/8/2015 DATE
PRINTED NAME: MARK K MAVES LIC. NO. 20496

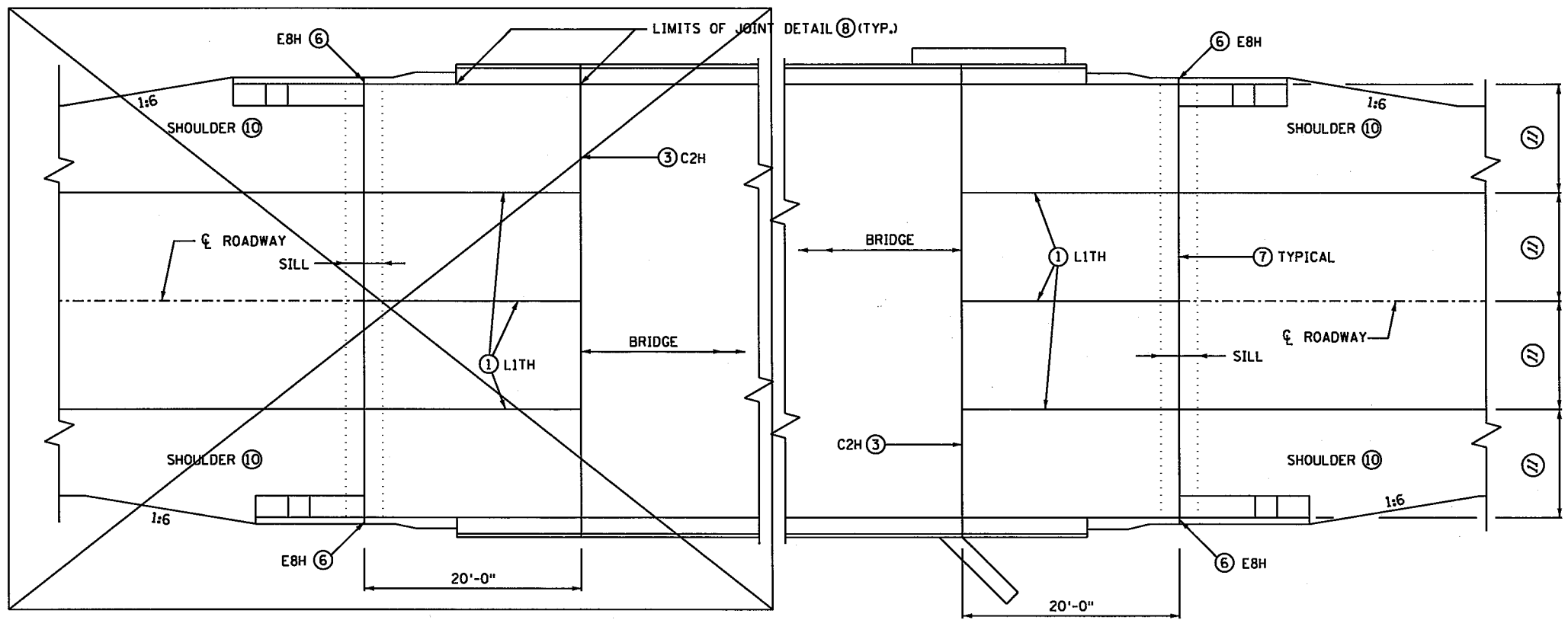
MODIFIED REVISION DATE: 3-22-2013
STANDARD PLAN SHEET NO. 5-297.227
STANDARD APPROVED: DECEMBER 20, 2011

BRIDGE NO. 62732 SPN14
BRIDGE NO. 62937 OF SPN42

BRIDGE APPROACH PANEL MISCELLANEOUS DETAILS

STATE PROJ. NO. 6284-162 (TH35W) SHEET NO.65 OF 367 SHEETS

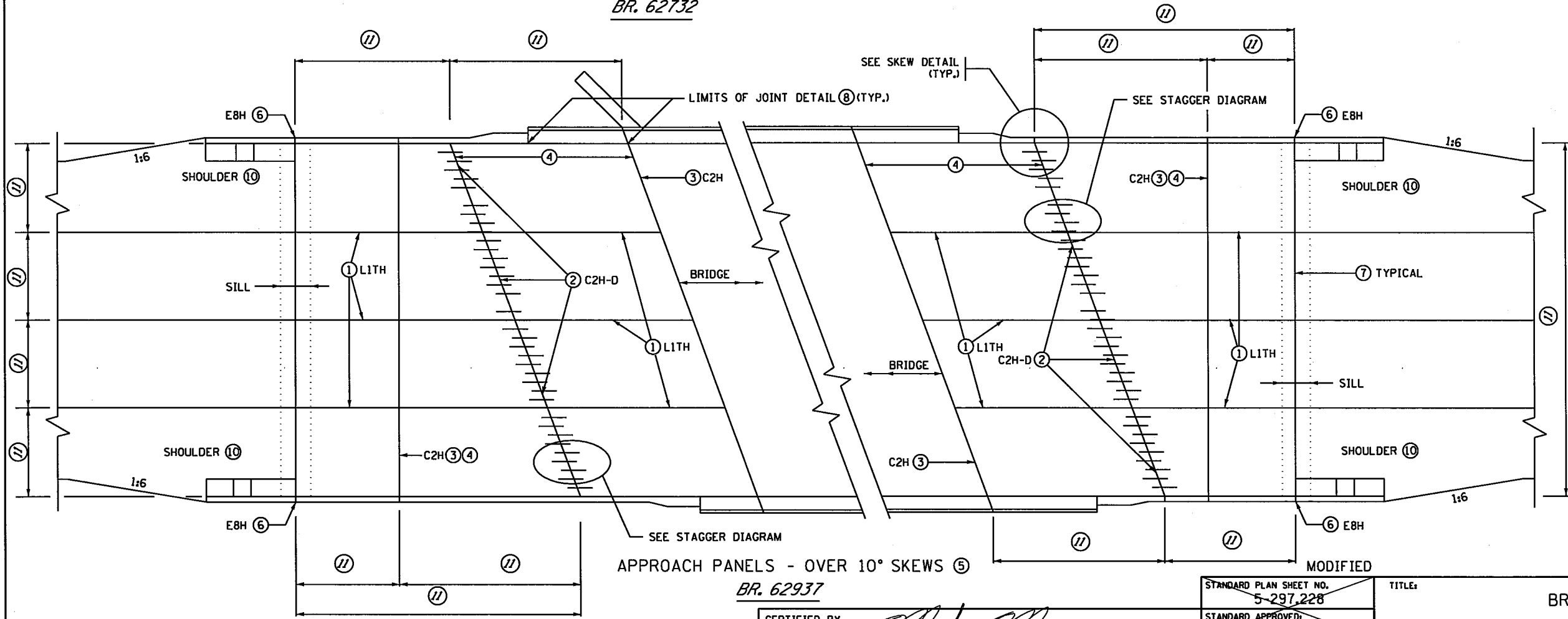
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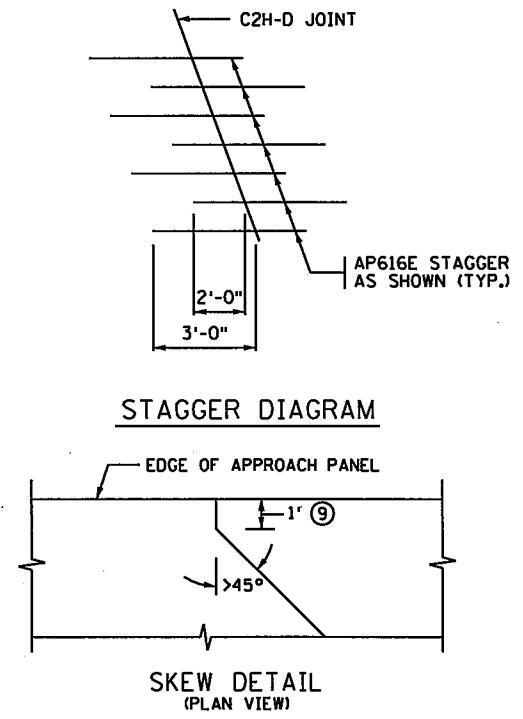
APPROACH PANELS - SQUARE TO 10° SKEWS ⑤
 BR. 62732

- APPROACH PANEL JOINT LAYOUT NOTES:**
- ① LITH LONGITUDINAL JOINT. SEE STANDARD PLAN 5-297.229 FOR REINFORCEMENT LAP LENGTH REQUIREMENTS FOR STAGED CONSTRUCTION.
 - ② PERMISSIBLE CONSTRUCTION JOINT. USE JOINT TYPE C2H-D WITH AP616E BARS AT 12-INCH SPACING AT MID DEPTH OF THE SLAB, PARALLEL TO THE CENTERLINE OF THE ROADWAY. AP616E BARS ARE 5'-0" LONG. PLACE THE BAR WITH 2'-0" ON ONE SIDE OF THE JOINT AND 3'-0" ON THE OPPOSITE SIDE OF THE JOINT. ALTERNATE THE 2'-0" AND 3'-0" DIMENSIONS AS SHOWN ON THE PLAN. THE C2H-D JOINT AND AP616E BARS ARE REQUIRED ON ALL PANELS WITH A SKEW OVER 10 DEGREES.
 - ③ C2H CONTRACTION JOINT.
 - ④ MAXIMUM PANEL LENGTH OF 20'-0" FOR UP TO 40° SKEWS, 15'-0" FOR SKEWS OVER 40°.
 - ⑤ ALL JOINTS SHALL BE SAWCUT. SAWCUTS SHALL BE MADE WHILE THE CONCRETE IS STILL GREEN, WHEN A CONCRETE WEARING COURSE IS SPECIFIED, THE JOINTS SHALL BE SAWN THROUGH BOTH THE WEARING COURSE AND THE UNDERLYING APPROACH SLAB IN A SINGLE OPERATION.
 - ⑥ E8H JOINT REQUIRED IN CURB ADJACENT TO E8H JOINT. E8H QUANTITY SHALL BE PAID FOR SEPARATELY, MEASURED FROM BACK OF CURB TO BACK OF CURB.
 - ⑦ SEE STANDARD PLANS 5-297.222 OR 5-297.224 FOR TYPE OF EXPANSION JOINT.
 - ⑧ SEE STANDARD PLANS 5-297.229 OR 5-297.231 FOR JOINT DETAIL FOR CONCRETE BARRIER ON WINGWALL.
 - ⑨ WHEN SKEW IS OVER 45°, THE JOINT SHALL BE PERPENDICULAR TO GUTTER FOR 1' (TYP.).
 - ⑩ SEE GRADING PLAN FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.

⑪ SEE STANDARD SHEETS 5-267.222 AND 5-297.224 FOR JOINT LAYOUT AND DIMENSIONS.



APPROACH PANELS - OVER 10° SKEWS ⑤
 BR. 62937



BRIDGE NO. 62732
 BRIDGE NO. 62937
 SPN15 OF SPN42

REVISION DATE 3-22-2013
 CERTIFIED BY *Mark K. Maves* 2/16/2016
 LICENSED PROFESSIONAL ENGINEER DATE
 PRINTED NAME: MARK K MAVES LIC. NO. 20496

STANDARD PLAN SHEET NO. 5-297.228
 STANDARD APPROVED: MARCH 23, 2011

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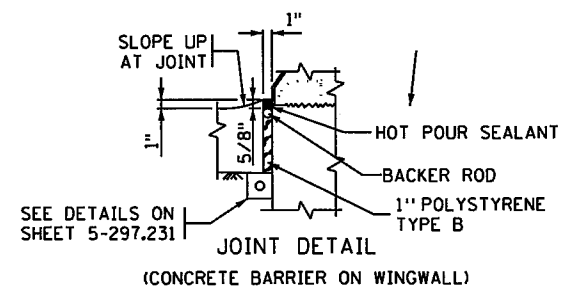
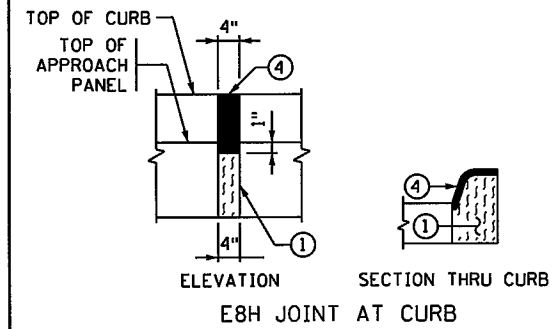
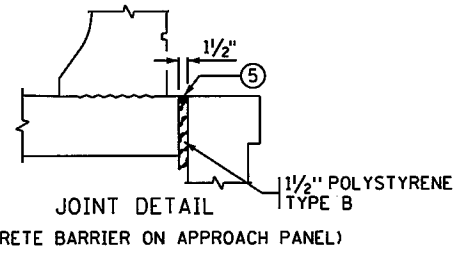
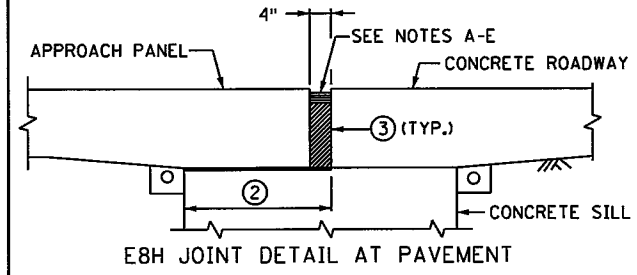
EXPANSION JOINTS

E8H PRESSURE RELIEF JOINT MATERIAL INSTALLATION INSTRUCTIONS:

SEE MNDOT APPROVED/QUALIFIED PRODUCTS LIST.

FURNISH AND INSTALL JOINT MATERIAL IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE FOLLOWING:

- (A) EXPANSION JOINT FILLER MATERIALS USED FOR A 4 INCH PRESSURE RELIEF JOINT CONSISTS OF A PREFORMED FOAM PRODUCT HAVING MINIMUM DIMENSIONS OF 4.5 INCHES IN WIDTH (MAY BE LAMINATED) AND 8 INCHES IN DEPTH, AND A MINIMUM LENGTH OF 10 FEET. WHEN THE CONCRETE DEPTH IS GREATER THAN THE DEPTH OF THE PRESSURE RELIEF MATERIAL, FILL THE VOID BELOW THE MATERIAL WITH POLYSTYRENE. FURNISH AND INSTALL THE JOINT MATERIAL UNDER COMPRESSION WITH A LUBRICANT ADHESIVE APPLIED TO THE CONCRETE CONTACT SURFACES.
- (B) SAW OR FORM THE JOINTS 4 INCHES WIDE BY THE FULL-DEPTH OF THE PANEL. INSPECT TO ASSURE THAT THE INSIDE WALLS OF THE JOINT HAVE BEEN SANDBLASTED, ARE DRY, SMOOTH AND FREE OF DEBRIS AND LOOSE PARTICLES. APPLY TAPE TO THE TOP 1 INCH OF THE INSIDE WALLS TO PREVENT THE LUBRICANT ADHESIVE FROM CONTAMINATING THE CONCRETE BONDING SURFACES OF THE SUBSEQUENTLY PLACED HOT POUR JOINT SEALER.
- (C) PAINT THE INSIDE WALLS OF THE JOINT WITH LUBRICANT ADHESIVE AT THE RATE OF 1 GALLON PER 50 LINEAL FEET OF JOINT.
- (D) PINCH THE BOTTOM OF THE MATERIAL TOGETHER AND PUSH IT DOWN INTO THE JOINT. WALK THE MATERIAL INTO THE JOINT; USE A SLEDGEHAMMER AND A 2 X 4 IF NECESSARY. APPLY LUBRICANT ADHESIVE TO THE ENDS OF THE PREFORMED FOAM MATERIAL WHEN BUTTING TWO PIECES TOGETHER.
- (E) FURNISH AND INSTALL THE FOAM RELIEF JOINT MATERIAL TO A DEPTH OF APPROXIMATELY 7/8 INCH BELOW THE FINISHED CONCRETE SURFACE. AFTER INSTALLATION, REMOVE THE TAPE AND FILL THE VOID ON TOP OF THE FOAM MATERIAL WITH APPROXIMATELY 1/2 INCH OF HOT POUR JOINT SEALER (MNDOT 3723 OR 3725) TO A LEVEL OF 3/8 INCH +/- 1/4 INCH BELOW THE FINISHED CONCRETE SURFACE. THE HOT POUR JOINT SEALER SHOULD ONLY SLIGHTLY MELT INTO THE FOAM JOINT MATERIAL (TO PREVENT EXCESSIVE MELTING OF THE JOINT MATERIAL, PLACE THE HOT POUR SEALER AT THE LOWER END OF THE TEMPERATURE SPECIFICATION). CHECK FOR CORRECT TEMPERATURE BY PLACING HOT POUR SEALER ON A SAMPLE OF WASTE FOAM MATERIAL.



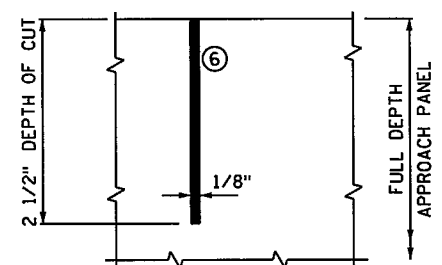
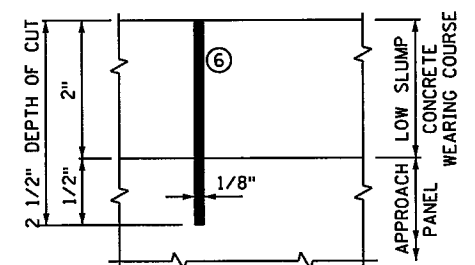
EXPANSION JOINT NOTES:

- ① PREFORMED JOINT FILLER MATERIAL, SPEC. 3702.
- ② PLACE PLASTIC SHEETING SPEC. 3756 AS APPROVED BY THE ENGINEER TO BREAK BOND. COVER AREA SHOWN IN DETAIL. SEE SILL DETAILS ON STANDARD PLAN 5-297.227.
- ③ THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING PRIOR TO SEALING THE JOINT.
- ④ HOT POUR JOINT SEALER SPEC. 3725. TOP OF SEALER FLUSH TO 1/8 INCH BELOW TOP OF PAVEMENT SURFACE. MAKE TOP OF SEALER FOR CURB SECTION E8H JOINTS FLUSH WITH SURFACE (+ 1/8 INCH OR - 1/8 INCH).
- ⑤ SEAL WITH SELF-LEVELING SILICONE PER MNDOT 3722.

JOINT NOTES:

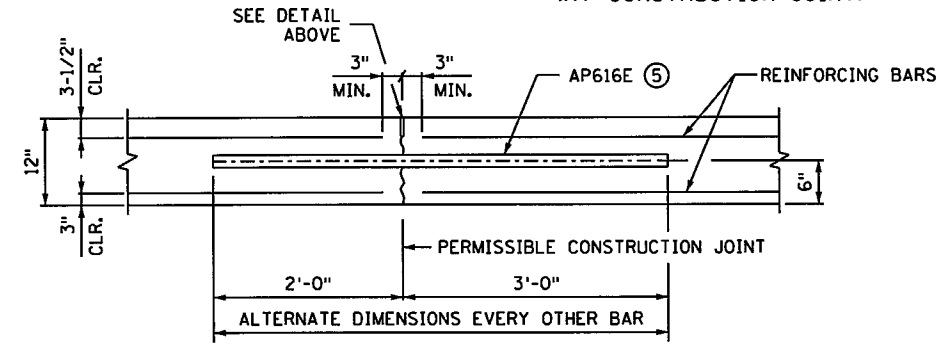
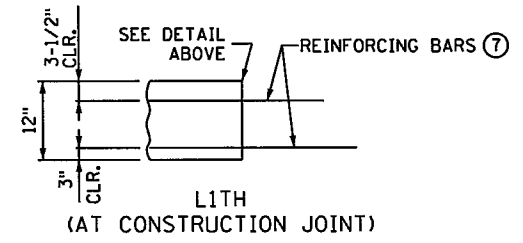
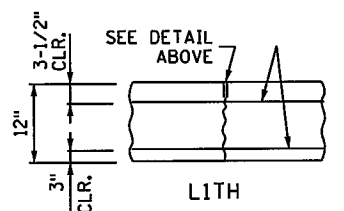
- ⑤ PERMISSIBLE CONSTRUCTION JOINT. AP616E BARS AT 12-INCH SPACING AT MID DEPTH OF SLAB, PARALLEL TO THE CENTERLINE OF THE ROADWAY. AP616E BARS ARE 5'-0" LONG. PLACE THE BAR WITH 2'-0" ON ONE SIDE OF THE JOINT AND 3'-0" ON THE OPPOSITE SIDE OF THE JOINT. ALTERNATE THE 2'-0" AND 3'-0" DIMENSION AS SHOWN ON THE PLAN.
- ⑥ CLEAN AND DRY FULLY CURED JOINT FACES BY SANDBLASTING PRIOR TO SEALING THE JOINT.
- ⑦ WHEN CONSTRUCTING A LITH JOINT UNDER STAGED CONSTRUCTION, EXTEND NO. 4 BARS 1'-8" AND NO. 5 BARS 2'-1" PAST THE EDGE OF THE FIRST CONCRETE POUR. CONSTRUCT LITH JOINT ACCORDING TO DETAIL SHOWN AFTER ADJACENT POUR IS COMPLETE.

JOINT DETAILS



C2H & LITH WITH CONCRETE WEARING COURSE ⑥ (SAWED & SEALED PER SPEC. 3725)

C2H & LITH WITHOUT CONCRETE WEARING COURSE ⑥ (SAWED & SEALED PER SPEC. 3725)



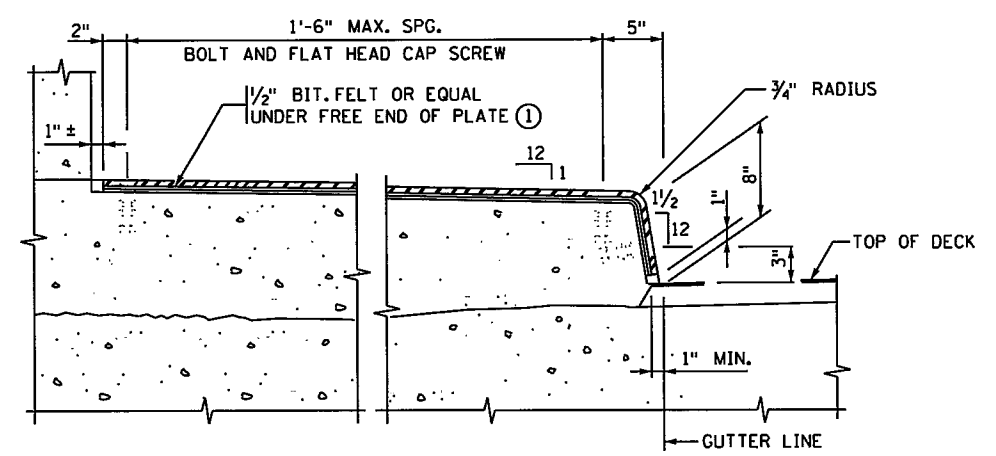
SECTION AT C2H-D JOINT ⑤

SIDEWALK COVER PLATE

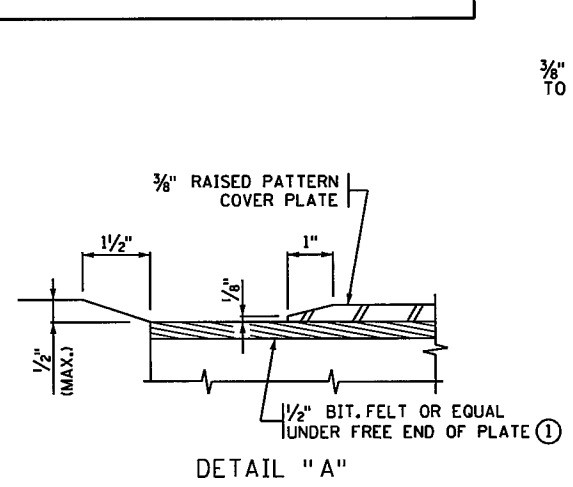
GENERAL NOTES:

- GALVANIZE STRUCTURAL STEEL AFTER FABRICATION PER Mn/DOT SPEC. 3394
- GALVANIZE FASTENERS PER Mn/DOT SPEC.3392.
- STRUCTURAL STEEL SHALL COMPLY WITH Mn/DOT SPEC. 3306 OR Mn/DOT SPEC. 3309.
- SHOP DRAWING SUBMITTALS REQUIRED PER Mn/DOT SPEC. 2471.
- CAP SCREWS SHALL BE COUNTERSUNK 1/16" BELOW TOP OF PLATE.
- FURNISHING AND INSTALLING SIDEWALK COVER PLATE IS INCIDENTAL.

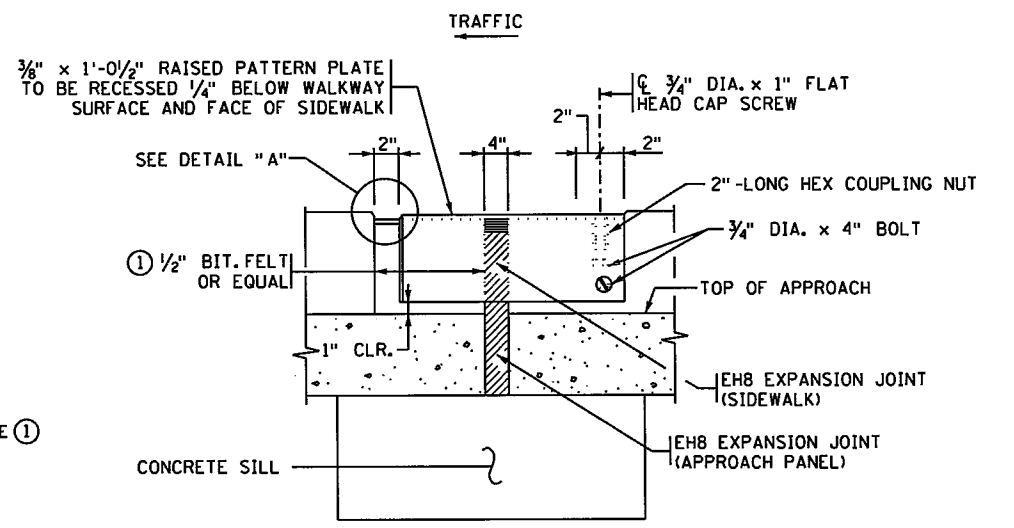
- ① USE LARGEST SINGLE PIECE POSSIBLE. USE OF SMALL PIECES OR SCRAPS SECURED TOGETHER IS PROHIBITED.



SECTION THROUGH SIDEWALK



DETAIL "A"



SIDEWALK ELEVATION

SPN16 OF SPN42

STANDARD PLAN SHEET NO.
5-297.229
STANDARD APPROVED:
DECEMBER 20, 2011

TITLE:
BRIDGE APPROACH PANEL
JOINT DETAILS

REVISION DATE
3-22-2013

STATE PROJ. NO. 6284-162 (TH35W)

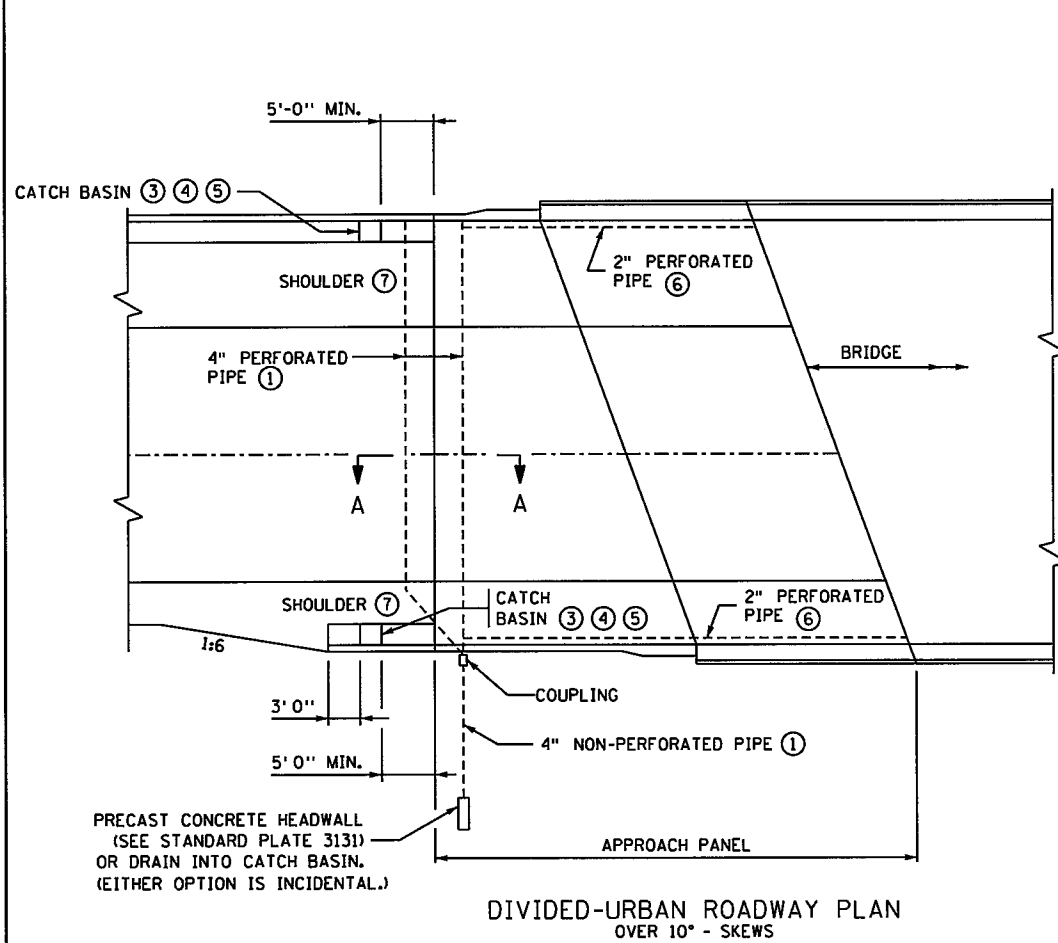
SHEET NO. 67 OF 367 SHEETS

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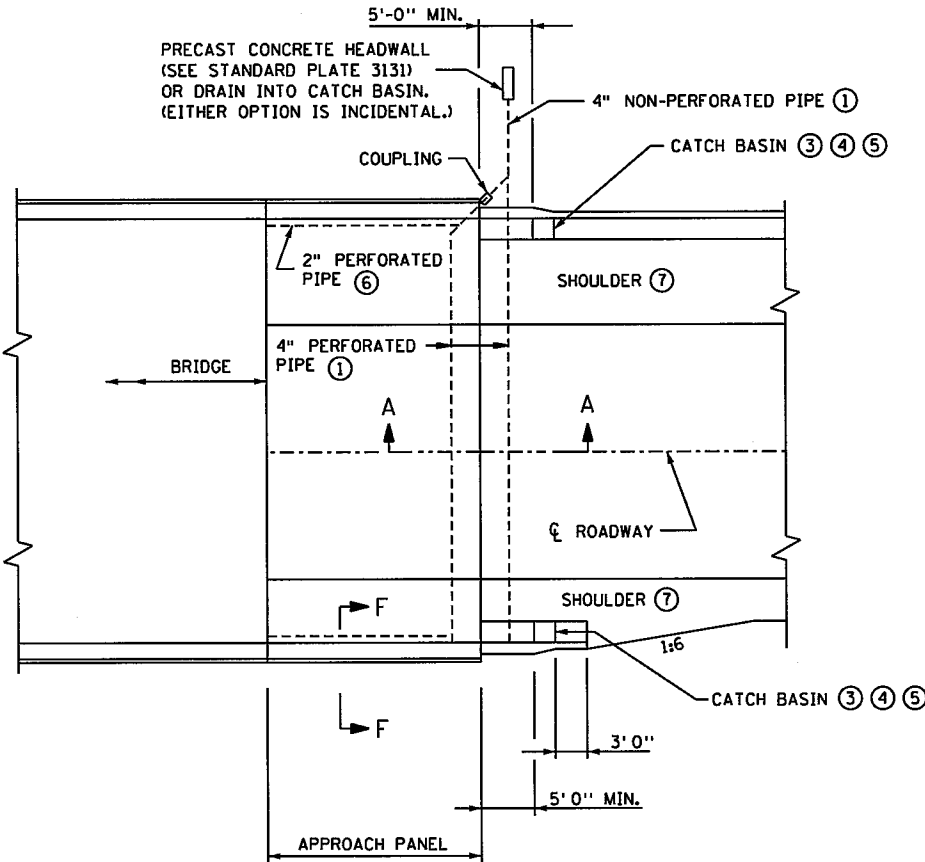
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12/8/2015

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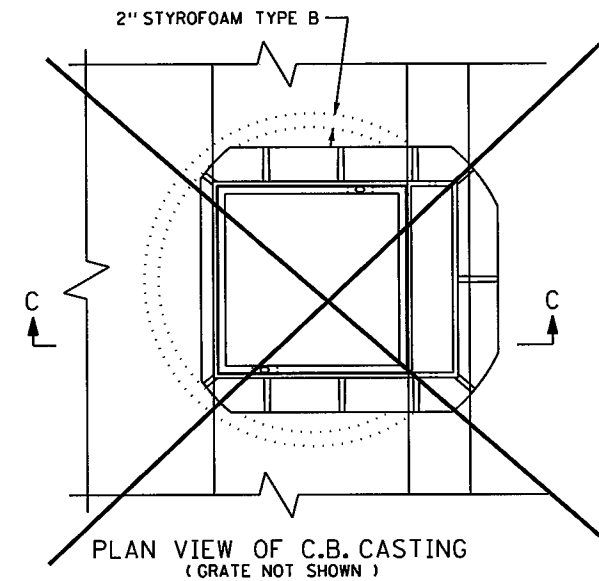
DIVIDED-URBAN ROADWAY PLAN
OVER 10° - SKEWS



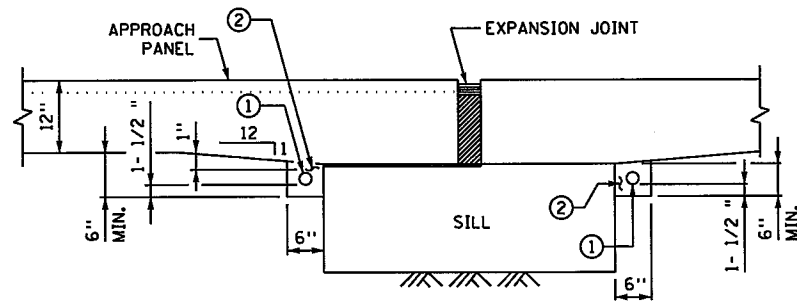
DIVIDED-URBAN ROADWAY PLAN
SQUARE TO 10° SKEWS

NOTES:

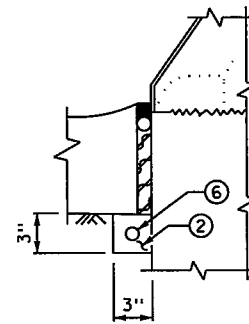
- ① 4-INCH NOMINAL DIAMETER THERMOPLASTIC PIPE, AS PER ASTM D1785M, SCHEDULE 40. SLOPE PIPE TO DITCH. WRAP PERFORATED PIPE WITH GEOTEXTILE AS PER SPEC. 3733. 1/8 INCH PER 12 INCH MINIMUM SLOPE. FURNISHING AND INSTALLING THE DRAIN SYSTEM IS INCIDENTAL.
- ② BACKFILL WITH FINE AGGREGATE (MNDOT 3149) MODIFIED TO 0-3% PASSING A NO. 200 SIEVE (INCIDENTAL).
- ③ SEE ROADWAY PLAN FOR ADDITIONAL CATCH BASIN DETAILS.
- ④ LOCATE BETWEEN GUARDRAIL POST OR AS DETERMINED BY THE DESIGNER.
- ⑤ REFER TO THE DRAINAGE PLAN TO DETERMINE WHETHER A FLUME OR A CATCH BASIN REQUIRED.
- ⑥ 2-INCH NOMINAL DIAMETER THERMOPLASTIC PIPE, AS PER ASTM D1785M, SCHEDULE 40. SLOPE PIPE TO DITCH. WRAP PERFORATED PIPE WITH GEOTEXTILE AS PER SPEC. 3733. 1/8 INCH PER 12 INCH MINIMUM SLOPE. FURNISHING AND INSTALLING THE DRAIN SYSTEM IS INCIDENTAL.
- ⑦ SEE GRADING PLANS FOR PAVEMENT AND SHOULDER WIDTHS AND CONFIGURATION.



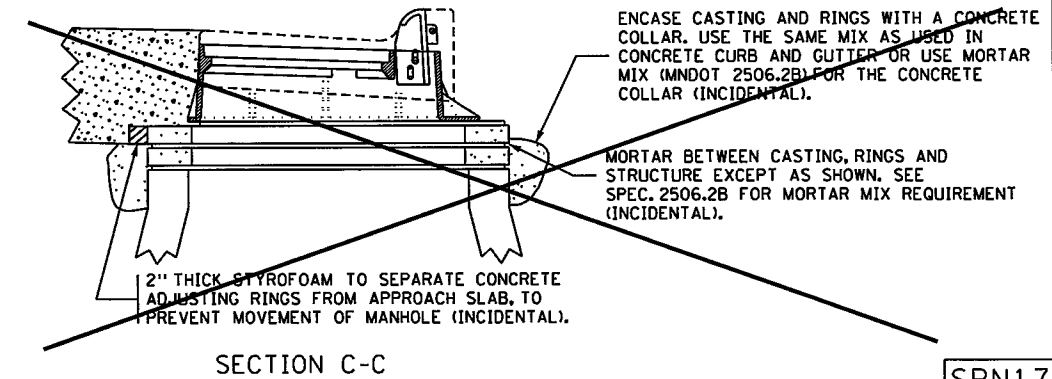
PLAN VIEW OF C.B. CASTING
(GRATE NOT SHOWN)



SECTION A-A
DRAINAGE AT EXPANSION JOINT DETAIL



SECTION F-F
DRAINAGE AT PANEL EDGE OF JOINT
(THIS DETAIL IS USED IF THE CONCRETE BARRIER IS MOUNTED ON THE WINGWALL. DO NOT USE THIS DETAIL IF THE BARRIER IS MOUNTED ON THE APPROACH PANEL.)



SECTION C-C

ENCASE CASTING AND RINGS WITH A CONCRETE COLLAR. USE THE SAME MIX AS USED IN CONCRETE CURB AND GUTTER OR USE MORTAR MIX (MNDOT 2506.2B) FOR THE CONCRETE COLLAR (INCIDENTAL).

MORTAR BETWEEN CASTING, RINGS AND STRUCTURE EXCEPT AS SHOWN. SEE SPEC. 2506.2B FOR MORTAR MIX REQUIREMENT (INCIDENTAL).

2" THICK STYROFOAM TO SEPARATE CONCRETE ADJUSTING RINGS FROM APPROACH SLAB, TO PREVENT MOVEMENT OF MANHOLE (INCIDENTAL).

SPN17
OF SPN42

CERTIFIED BY *Mark K. Maves* 12/8/2015
 LICENSED PROFESSIONAL ENGINEER DATE
 PRINTED NAME: MARK K MAVES LIC. NO. 20496

MODIFIED
 STANDARD PLAN SHEET NO. 5-297.231
 STANDARD APPROVED: MARCH 23, 2011

TITLE: BRIDGE APPROACH PANEL DRAINAGE DETAILS

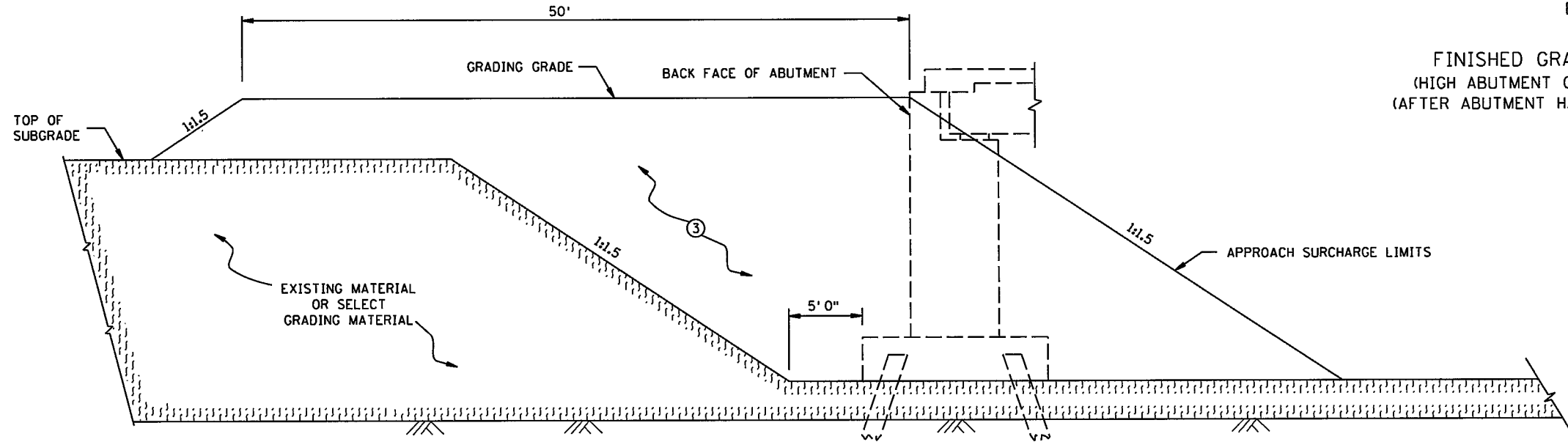
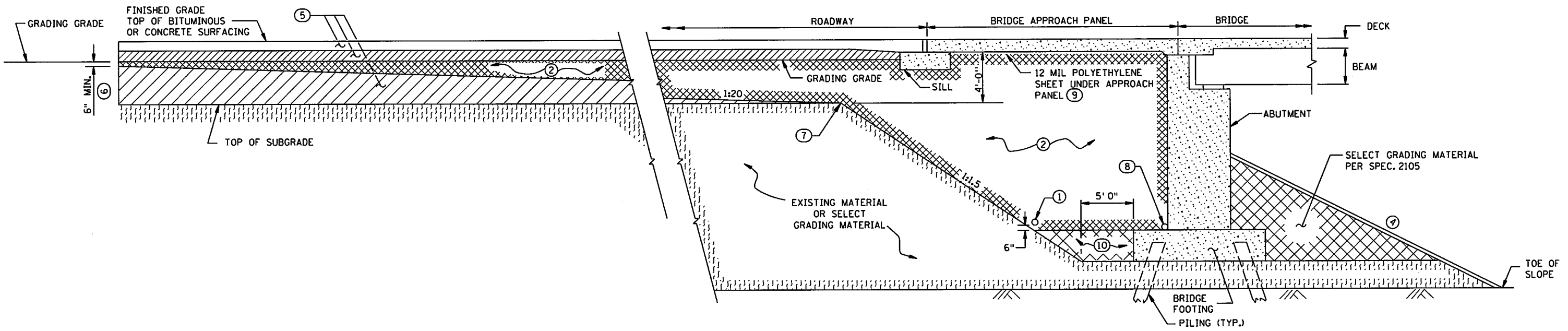
STATE PROJ. NO. 6284-162 (TH35W)

SHEET NO.68 OF 367 SHEETS

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12/8/2015

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NOTES:

- ① SUBSURFACE PIPE DRAIN. SEE GRADING PLAN FOR DETAILS. FURNISH AND INSTALL IF SHOWN IN GRADING PLAN.
- ② QUANTITY OF SELECT GRANULAR MATERIAL MODIFIED 10% (SPEC. 3149.2B4) IS BASED ON DIMENSIONS SHOWN, AND PAYMENT IS BASED ON THIS QUANTITY. SEE GRADING PLAN FOR QUANTITY. IF THE CONTRACTOR CHOOSES TO INCREASE DIMENSIONS IN ORDER TO FACILITATE CONSTRUCTION OPERATIONS, ANY QUANTITY INCREASES SHALL BE CONSIDERED INCIDENTAL.
- ③ PLACE ABUTMENT APPROACH SURCHARGE MATERIAL PRIOR TO ABUTMENT CONSTRUCTION. AFTER COMPLETION OF SURCHARGE WAITING PERIOD, REMOVE SURCHARGE AND EXISTING MATERIAL OR SELECT GRADING MATERIAL TO THE LIMITS SHOWN IN "ROUGH GRADING SECTION" ABOVE, PRIOR TO ABUTMENT CONSTRUCTION. SEE BRIDGE PLANS AND SPECIAL PROVISIONS FOR ABUTMENT APPROACH SURCHARGE REQUIREMENT AND PAYMENTS.
- ④ SEE BRIDGE PLANS FOR SLOPE AND SLOPE PROTECTION.
- ⑤ SEE GRADING PLANS FOR TYPE OF MATERIAL.
- ⑥ GRADING TO BE SQUARED OFF ON SKEWED BRIDGES.
- ⑦ TOP OF 1:1.5 SLOPE (FORMS A LINE PARALLEL TO END OF BRIDGE).
- ⑧ SUBSURFACE PIPE DRAIN. FURNISH AND INSTALL AT TOP OF BRIDGE FOOTING IF BRIDGE DETAIL B910 IS INCLUDED ON BRIDGE PLAN.
- ⑨ IF THE APPROACH PANEL IS TIED TO THE ABUTMENT WITH REINFORCEMENT BARS, PLACE 12 MIL POLYETHYLENE SHEETING (OR TWO LAYERS OF 6 MIL) UNDER THE LIMITS OF THE APPROACH PANEL TO ALLOW THE PANEL TO MOVE LONGITUDINALLY ON THE GRADE. SHEETING IS INCIDENTAL.
- ⑩ SELECT GRADING MATERIAL (SPEC. 2105) SHALL BE COMPACTED AND MEET THE MOISTURE REQUIREMENTS OF 2105, SELECT GRANULAR MATERIAL MODIFIED 10% (SPEC. 3149.2B4) MAY BE USED IN LIEU OF SELECT GRADING MATERIAL AS PER SPEC. 2105.

SPN18 OF SPN42

REVISIONS:

APPROVED: 7-15-2014

[Signature]

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

REVISOR:

[Signature] APPROVED: 7-15-2014

STATE DESIGN ENGINEER

BRIDGE ABUTMENT APPROACH TREATMENT FOR ABUTMENT ON FOOTING

STANDARD PLAN 5-297.233 1 OF 2

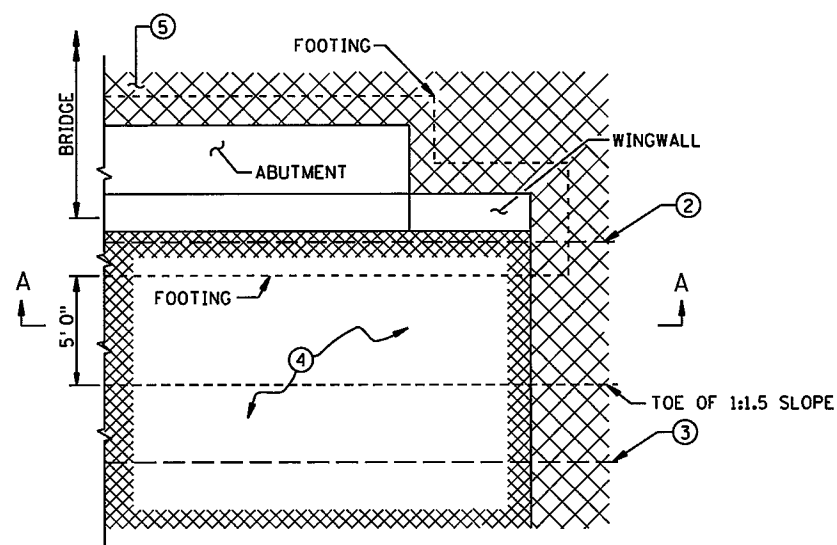
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SHEET NO. 69 OF 367 SHEETS

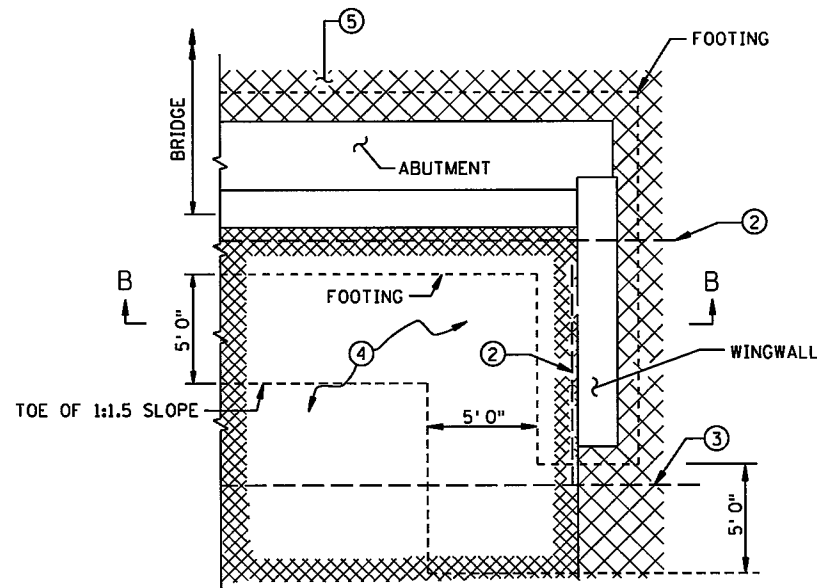
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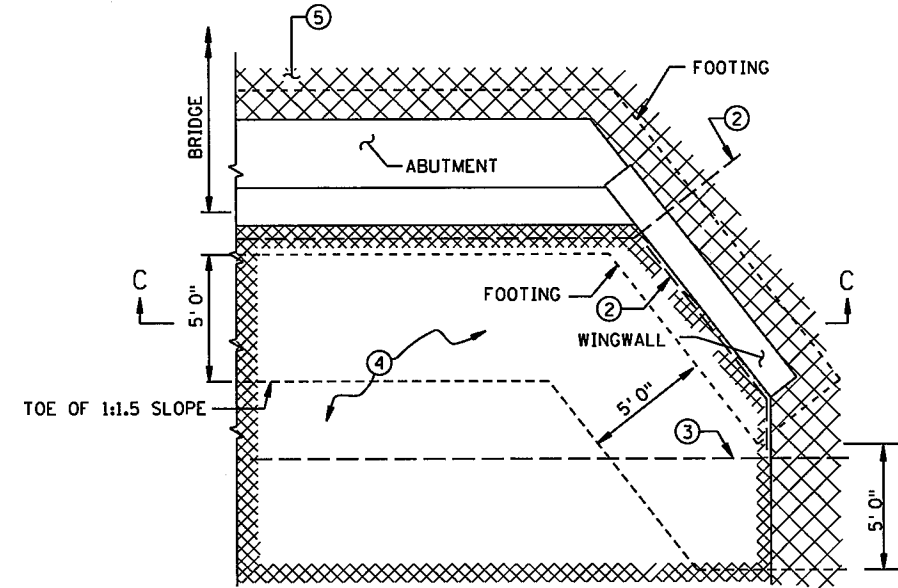
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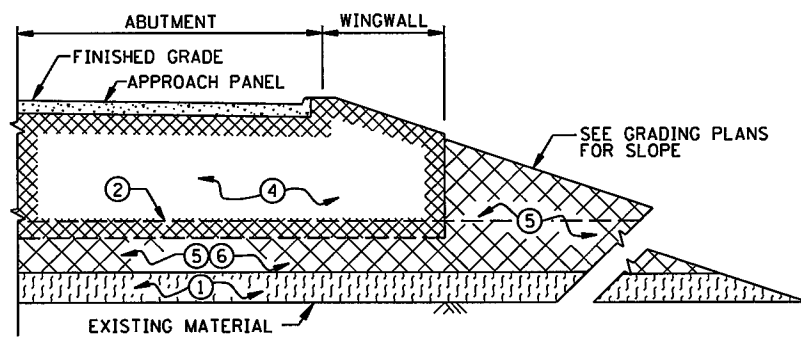
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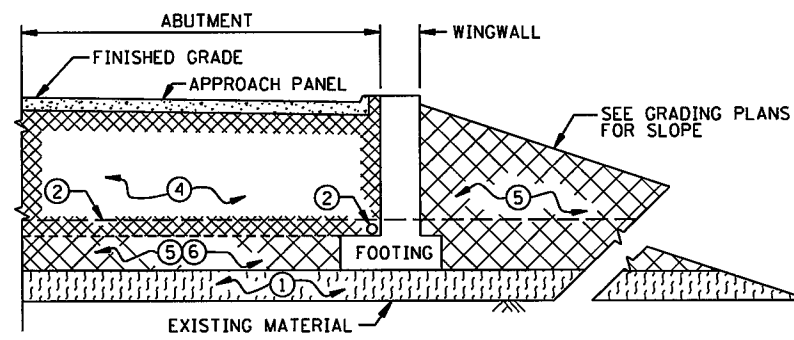
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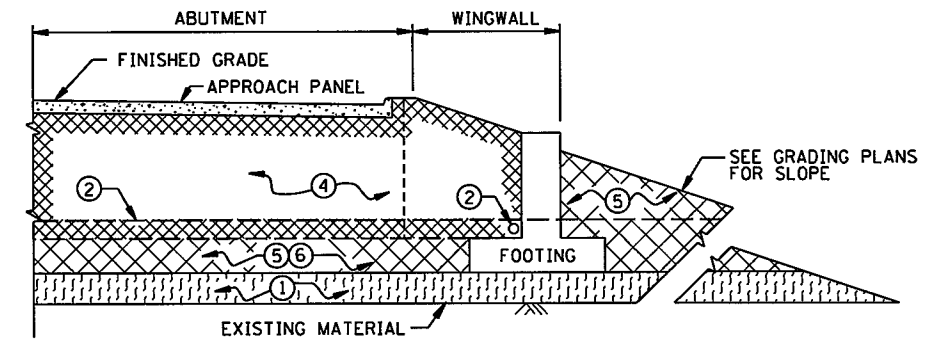
PARTIAL PLAN VIEW AT ABUTMENT (WINGWALL AT ANY OTHER ANGLE) (FINISHED GRADING)



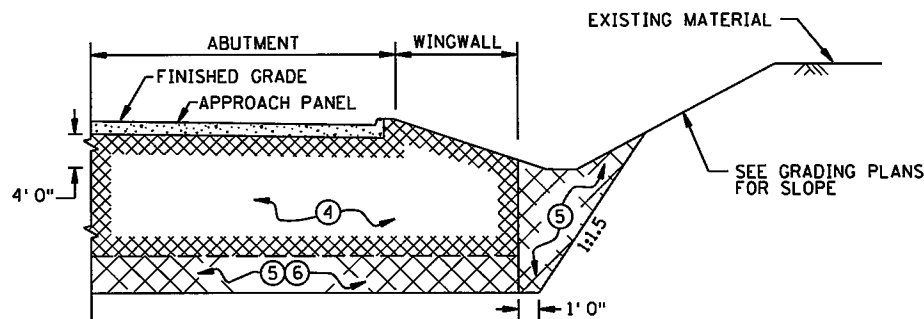
FINISHED GRADING SECTION A-A (FILL SECTION)



FINISHED GRADING SECTION B-B (FILL SECTION)



FINISHED GRADING SECTION C-C (FILL SECTION)



FINISHED GRADING SECTION A-A (CUT SECTION) (BRIDGE DETAIL B910 DRAIN NOT SHOWN)

NOTES:

- ① EXISTING MATERIAL OR SELECT GRADING MATERIAL (SPEC. 2105).
- ② SUBSURFACE PIPE DRAIN, FURNISH AND INSTALL AT TOP OF BRIDGE FOOTING IF BRIDGE DETAIL B910 IS INCLUDED ON BRIDGE PLAN.
- ③ SUBSURFACE PIPE DRAIN. SEE GRADING PLAN FOR DETAILS. FURNISH AND INSTALL IF SHOWN IN GRADING PLAN.
- ④ QUANTITY OF SELECT GRANULAR MATERIAL MODIFIED 10% (SPEC. 3149.2B4) IS BASED ON DIMENSIONS SHOWN, AND PAYMENT IS BASED ON THIS QUANTITY. SEE GRADING PLAN FOR QUANTITY. IF THE CONTRACTOR CHOOSES TO INCREASE DIMENSIONS IN ORDER TO FACILITATE CONSTRUCTION OPERATIONS, ANY QUANTITY INCREASES SHALL BE CONSIDERED INCIDENTAL.
- ⑤ SELECT GRADING MATERIAL (SPEC. 2105).
- ⑥ MATERIAL SHALL MEET THE COMPACTION AND MOISTURE CONTENT REQUIREMENTS OF SPEC. 2105. SELECT GRANULAR MATERIAL MODIFIED 10% (SPEC. 3149.2B4) MAY BE USED IN LIEU OF SELECT GRADING MATERIAL (SPEC. 2105).

REVISION:

APPROVED: 7-15-2014

[Signature]

DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

REVISOR:

[Signature] APPROVED:

7-15-2014

STATE DESIGN ENGINEER

SPN19 OF SPN42

BRIDGE ABUTMENT APPROACH TREATMENT FOR ABUTMENT ON FOOTING

STANDARD PLAN 5-297.233 2 OF 2

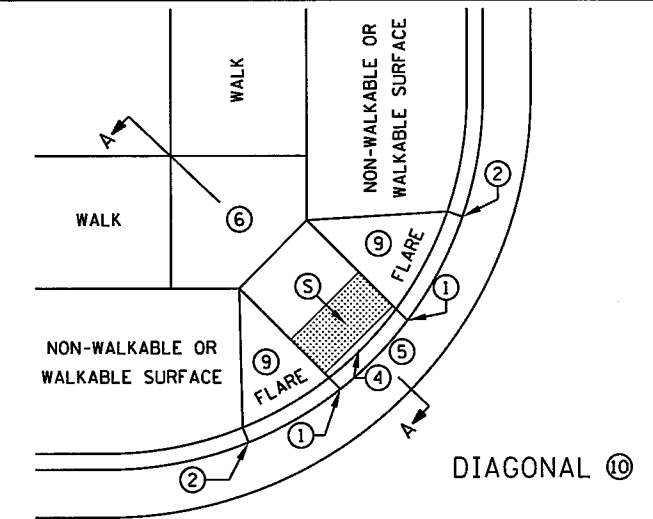
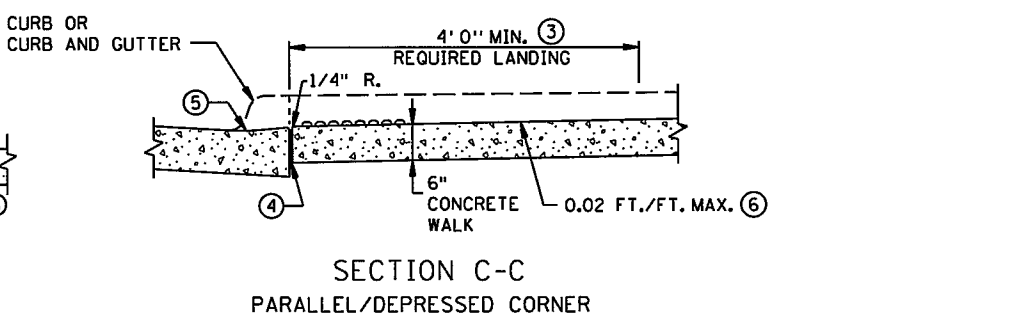
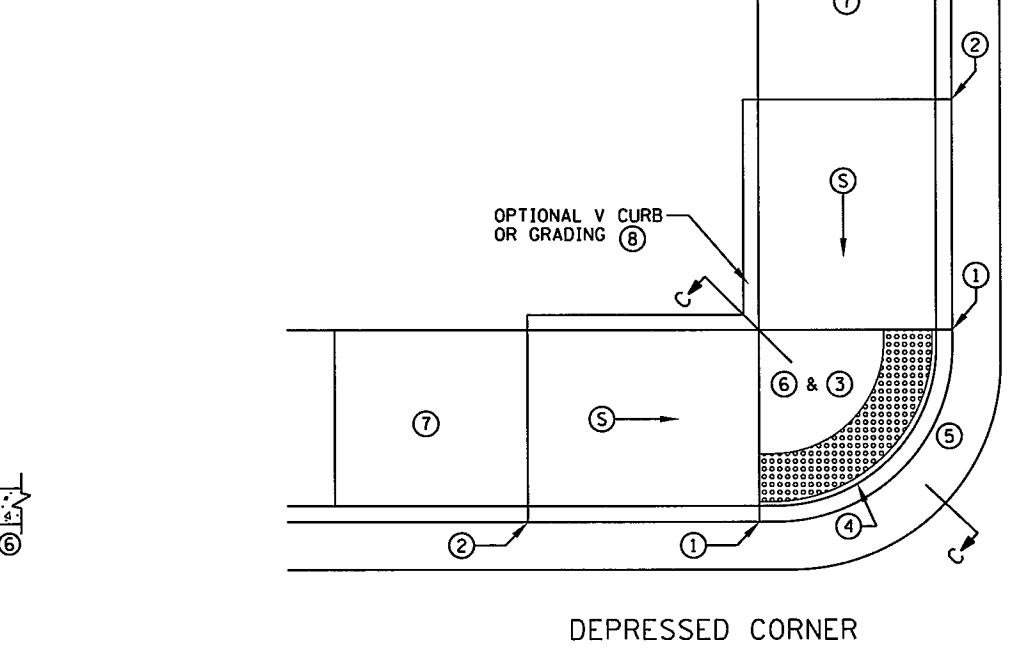
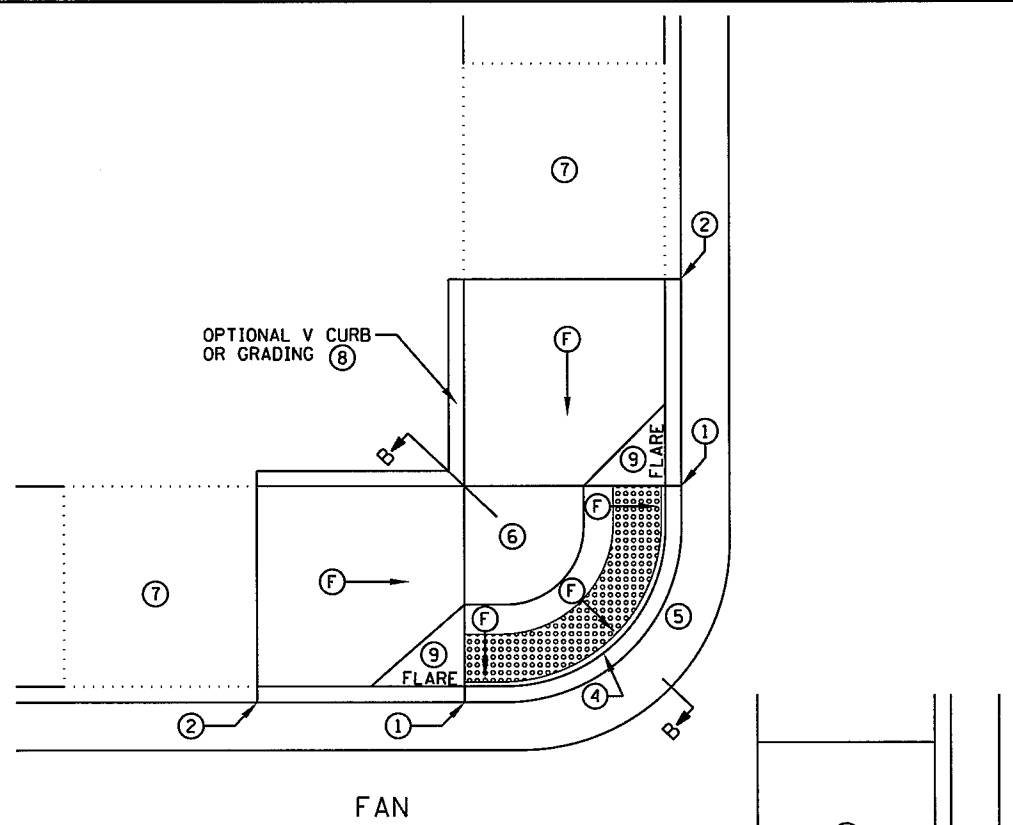
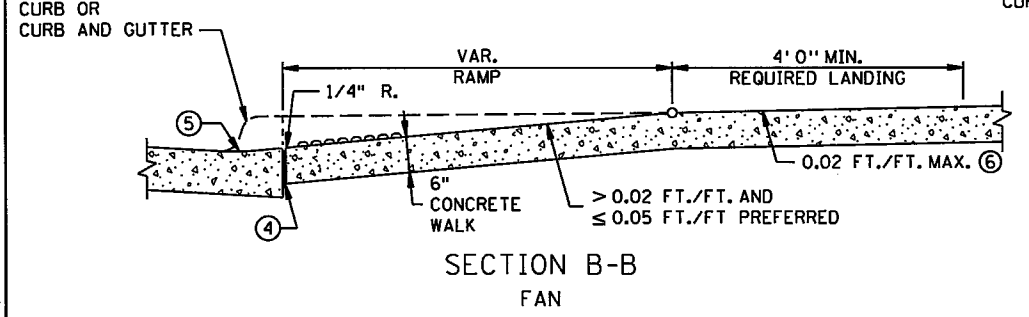
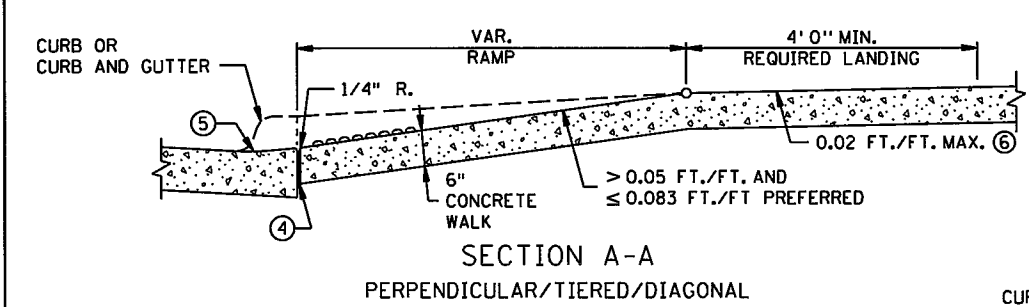
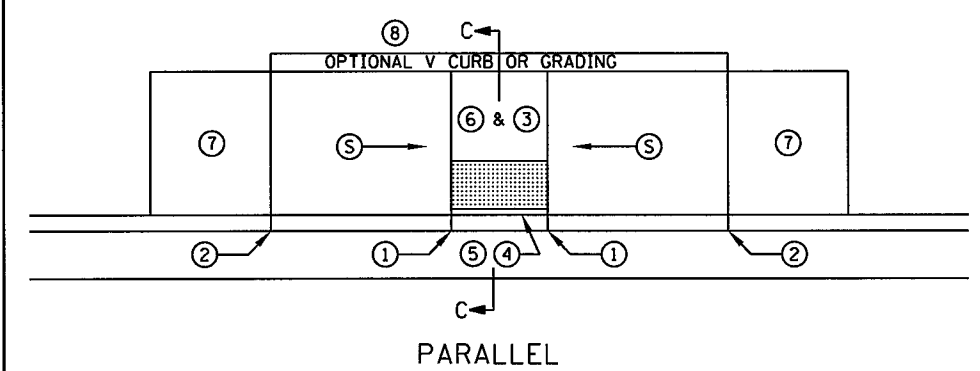
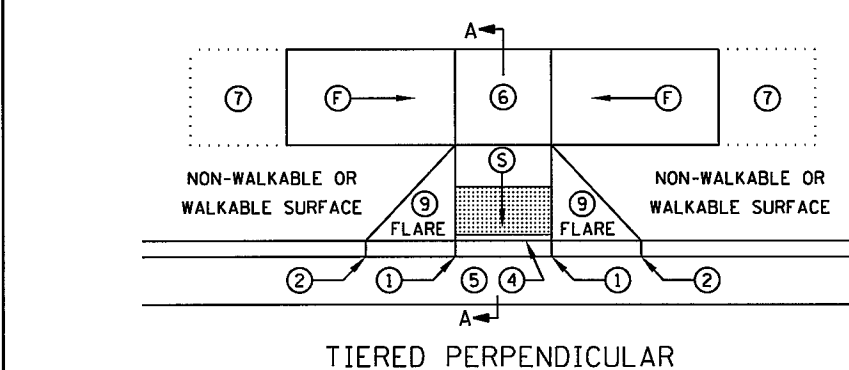
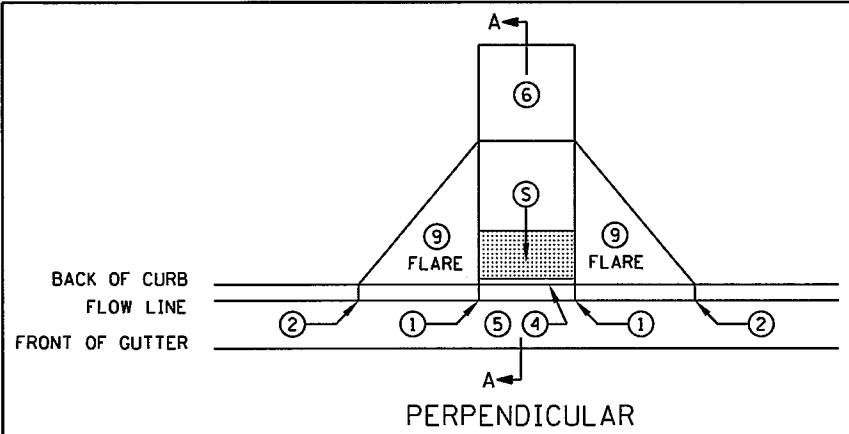
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SHEET NO. 70 OF 367 SHEETS

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- NOTES:**
- LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE CHANGES DIRECTION, AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5.0%, AND IF THE APPROACHING WALK IS INVERSE GRADE.
 - INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB, WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE.
 - SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS GREATER THAN 5.0%.
 - CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS.
 - ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL.
 - TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS MAY BE CAST SEPARATELY. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 5 WHEN LANDINGS ARE CAST SEPARATELY.
 - ALL SLOPES ARE ABSOLUTE, RATHER THAN RELATIVE TO SIDEWALK/ROADWAY GRADES.
 - TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.
 - 4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MINIMUM OF 24" IN THE PATH OF TRAVEL. SHARED USE PATHS SHALL HAVE DETECTABLE WARNING ACROSS THE ENTIRE WIDTH OF PATH WHEN THE PATH CROSSES A ROAD.
 - SEE STANDARD PLATE 7038 AND SHEET 4 OF 5 FOR ADDITIONAL DETAILS ON DETECTABLE WARNING.
 - ① 0" CURB HEIGHT.
 - ② FULL CURB HEIGHT.
 - ③ DETECTABLE WARNINGS MAY BE PART OF 4' X 4' LANDING AREA IF IT IS NOT FEASIBLE TO CONSTRUCT THE LANDING OUTSIDE OF THE DETECTABLE WARNING AREA.
 - ④ 1/2" PREFORMED JOINT FILLER MATERIAL AASHTO M 213. JOINT FILLER SHALL BE PLACED FLUSH WITH THE BACK OF CURB AND ADJACENT SIDEWALK. JOINT SHALL BE FREE OF DEBRIS. RECTANGULAR DETECTABLE WARNINGS SHALL BE SETBACK 3" FROM THE BACK OF CURB. RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 3" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB.
 - ⑤ SEE PEDESTRIAN ACCESS ROUTE CURB AND GUTTER DETAIL FOR INFORMATION ON CONSTRUCTING CURB AND GUTTER AT CURB OPENINGS. SEE SHEET NO. 3 OF 5.
 - ⑥ 4' BY 4' MIN. LANDING WITH MAX. 2.0% SLOPE IN ALL DIRECTIONS.
 - ⑦ IF LONGITUDINAL SLOPE IS GREATER THAN 5.0%, 4' X 4' MIN. LANDING WITH MAX 2.0% SLOPE IN ALL DIRECTIONS REQUIRED.
 - ⑧ V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. SEE SHEET 5 OF 5.
 - ⑨ SEE SHEET 4 OF 5, TYPICAL SIDE TREATMENT OPTIONS, FOR DETAILS ON FLARES AND RETURNED CURBS.
 - ⑩ DIAGONAL RAMPS SHOULD ONLY BE USED AFTER ALL OTHER CURB RAMP TYPES HAVE BEEN EVALUATED AND DEEMED IMPRACTICAL.

LEGEND	
THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.	
(S)	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%
(F)	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%

REVISION:

APPROVED: 8-6-2014

Michael J. Ramsey
OPERATIONS ENGINEER

REVISED:

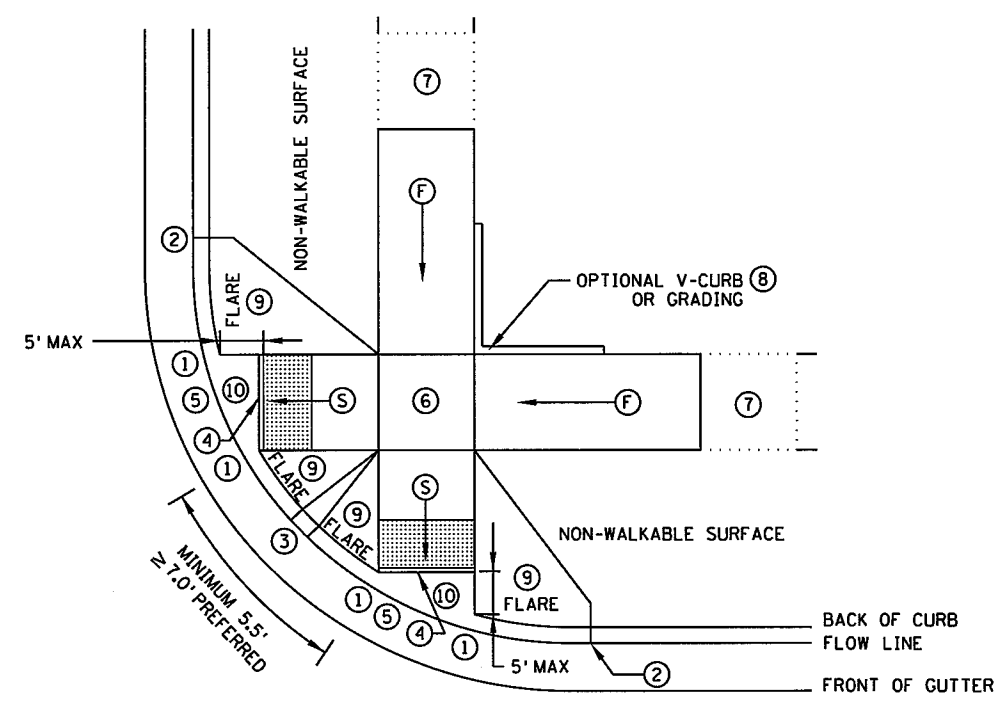
APPROVED: 8-6-2014

Christopher R. By
STATE DESIGN ENGINEER

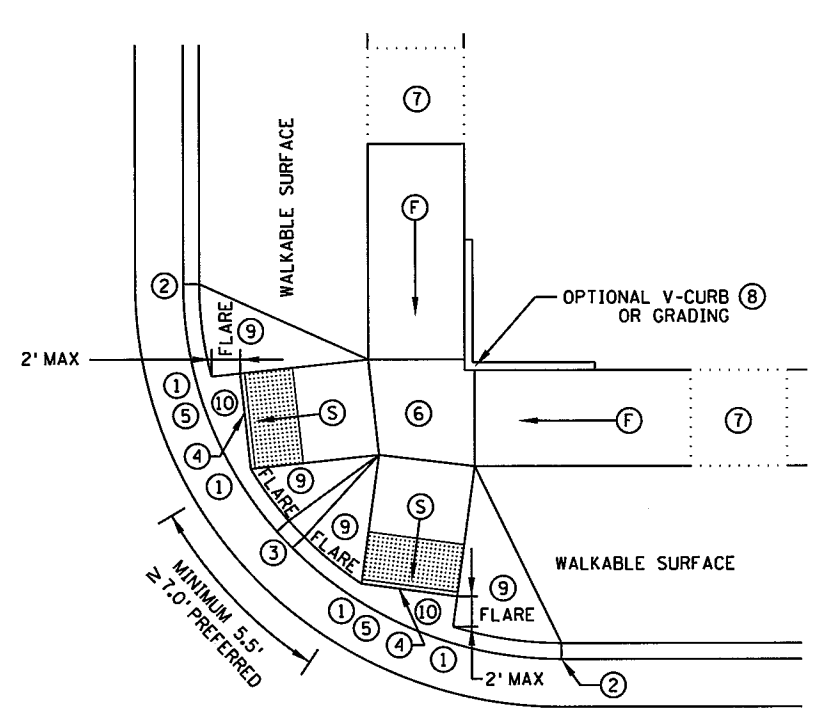
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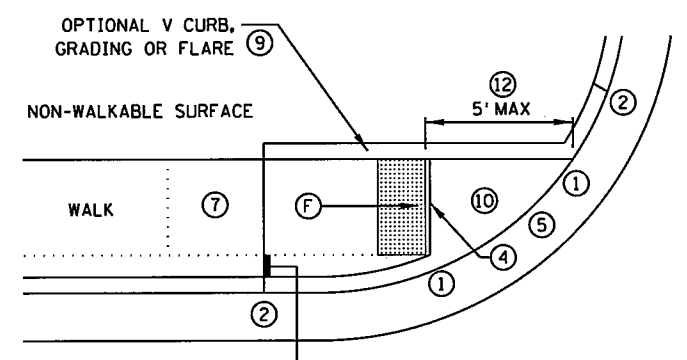


ADJACENT TO NON-WALKABLE SURFACE

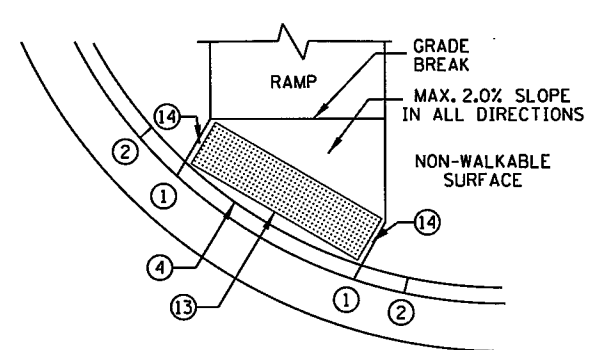
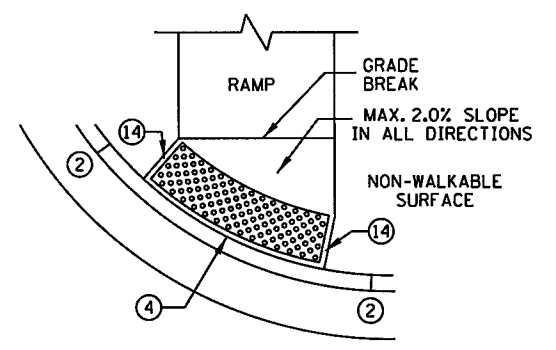


ADJACENT TO WALKABLE SURFACE

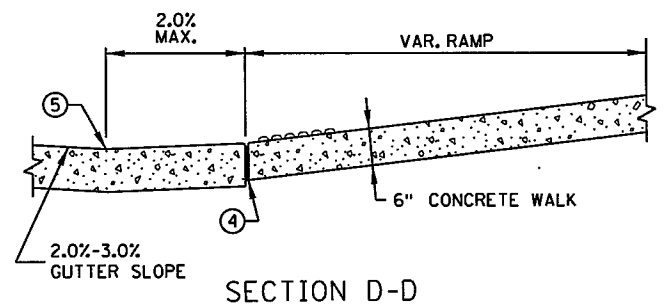
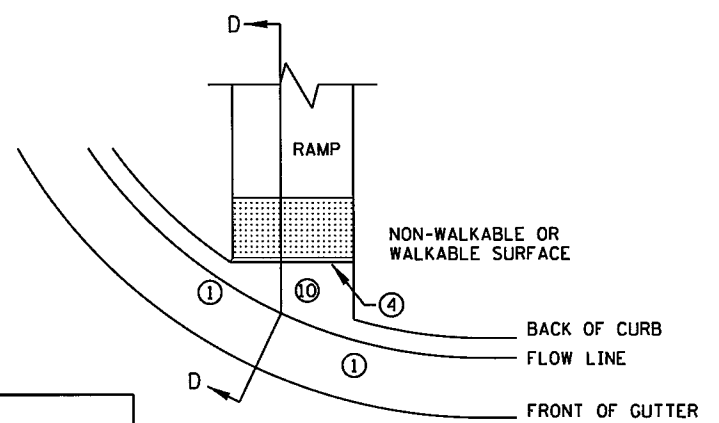
COMBINED DIRECTIONAL ⑮



ONE-WAY DIRECTIONAL



DETECTABLE WARNING PLACEMENT WHEN SETBACK CRITERIA IS EXCEEDED



SECTION D-D

NOTES:

- LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE CHANGES DIRECTION, AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5.0%, AND IF THE APPROACHING WALK IS INVERSE GRADE.
 - INITIAL CURB RAMP LANDINGS SHALL BE CONSTRUCTED WITHIN 15' FROM THE BACK OF CURB, WITH 6' FROM THE BACK OF CURB BEING THE PREFERRED DISTANCE.
 - SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL SLOPE IS GREATER THAN 5.0%.
 - CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS.
 - ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL.
 - TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS MAY BE CAST SEPARATELY. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 5 WHEN LANDINGS ARE CAST SEPARATELY.
 - ALL SLOPES ARE ABSOLUTE, RATHER THAN RELATIVE TO SIDEWALK/ROADWAY GRADES.
 - TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.
 - 4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MINIMUM OF 24" IN THE PATH OF TRAVEL. SHARED USE PATHS SHALL HAVE DETECTABLE WARNING ACROSS THE ENTIRE WIDTH OF PATH WHEN THE PATH CROSSES A ROAD.
 - SEE STANDARD PLATE 7038 AND SHEET 4 OF 5 FOR ADDITIONAL DETAILS ON DETECTABLE WARNING.
- ① 0" CURB HEIGHT.
 - ② FULL CURB HEIGHT.
 - ③ 3" MINIMUM CURB HEIGHT, 4" PREFERRED.
 - ④ 1/2" PREFORMED JOINT FILLER MATERIAL AASHTO M 213. JOINT FILLER SHALL BE PLACED FLUSH WITH THE BACK OF CURB AND ADJACENT SIDEWALK. JOINT SHALL BE FREE OF DEBRIS. RECTANGULAR DETECTABLE WARNINGS SHALL BE SETBACK 3" FROM THE BACK OF CURB. RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 3" MIN. TO 6" MAX. FROM THE BACK OF CURB.
 - ⑤ SEE PEDESTRIAN ACCESS ROUTE CURB AND GUTTER DETAIL FOR INFORMATION ON CONSTRUCTING CURB AND GUTTER AT CURB OPENINGS. SEE SHEET NO. 3 OF 5.
 - ⑥ 4' BY 4' MIN. LANDING WITH MAX. 2.0% SLOPE IN ALL DIRECTIONS.
 - ⑦ IF LONGITUDINAL SLOPE IS GREATER THAN 5.0%, 4' X 4' MIN. LANDING WITH MAX 2.0% SLOPE IN ALL DIRECTIONS REQUIRED.
 - ⑧ V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS.
 - ⑨ SEE SHEET 4 OF 5, TYPICAL SIDE TREATMENT OPTIONS, FOR DETAILS ON FLARES AND RETURNED CURBS.
 - ⑩ MAX. 2.0% SLOPE IN ALL DIRECTIONS IN FRONT OF GRADE BREAK AND DRAIN TO FLOW LINE. SHALL BE CONSTRUCTED INTEGRAL WITH CURB AND GUTTER.
 - ⑪ TO BE USED FOR ALL DIRECTIONAL RAMPS.
 - ⑫ PLACE DOMES AT THE BACK OF CURB WHEN ALLOWABLE SETBACK CRITERIA IS EXCEEDED.
 - ⑬ RECTANGULAR DETECTABLE WARNINGS MAY BE SETBACK 9" FROM THE BACK OF CURB WITH CORNERS SET 3" FROM BACK OF CURB. IF 9" SETBACK IS EXCEEDED USE RADIAL DETECTABLE WARNINGS.
 - ⑭ WHEN NO CONCRETE FLARES ARE PROPOSED, THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE BACK OF CURB. MAINTAIN 3" BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.
 - ⑮ FRONT EDGE OF DETECTABLE WARNING SHALL BE SET BACK 2' MAXIMUM WHEN ADJACENT TO WALKABLE SURFACE, AND 5' MAXIMUM WHEN ADJACENT TO NON-WALKABLE SURFACE WITH ONE CORNER SET 3" FROM BACK OF CURB. WHETHER A SURFACE IS WALKABLE OR NOT SHALL BE DETERMINED BY THE ENGINEER.

LEGEND	
THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.	
S	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND THE CROSS SLOPE SHALL NOT EXCEED 2.0%
F	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%

REVISION:
 APPROVED: 8-6-2014
 OPERATIONS ENGINEER

CURB FOR DIRECTIONAL RAMPS ⑮

REVISOR:
 APPROVED: 8-6-2014
 STATE DESIGN ENGINEER

SPN21
OF SPN42

PEDESTRIAN CURB RAMP DETAILS

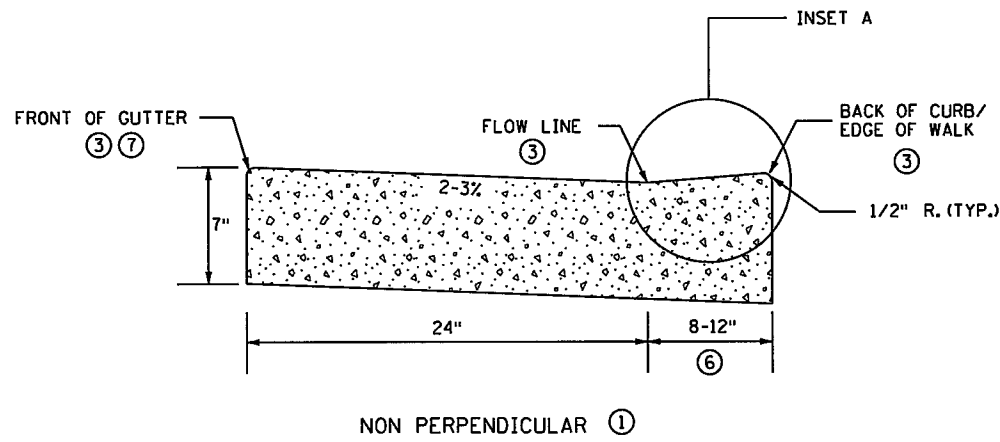
STANDARD PLAN 5-297.250 2 OF 5

S.P. NO. 6284-162 (TH35W) SHEET NO. 72 OF 367 SHEETS.

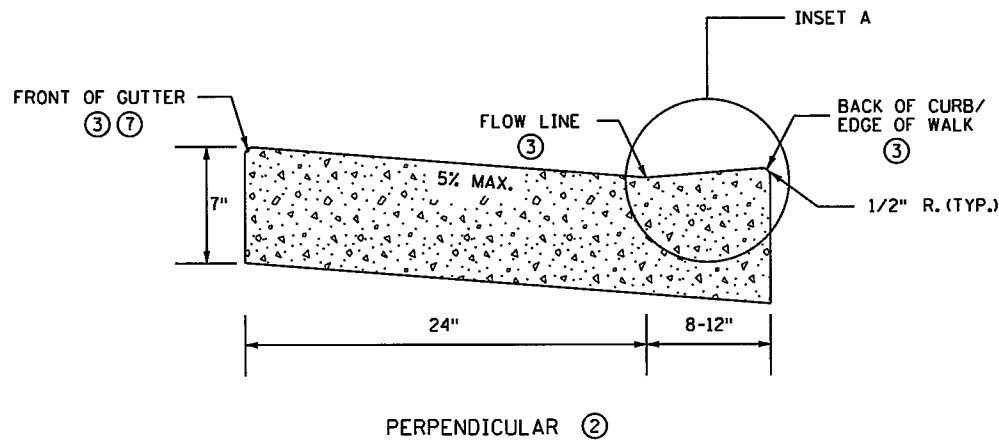
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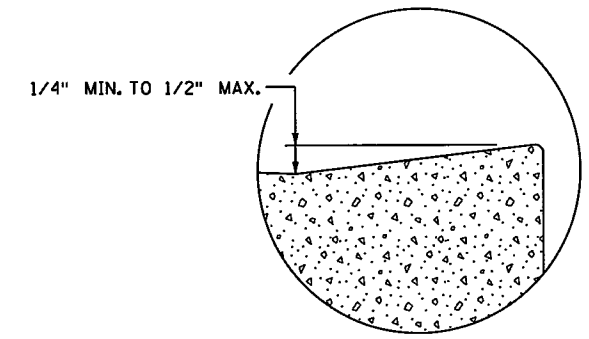
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NON PERPENDICULAR ①

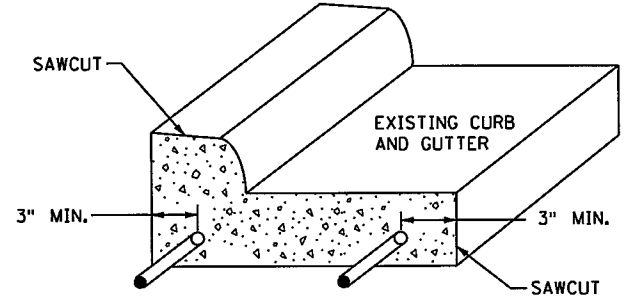
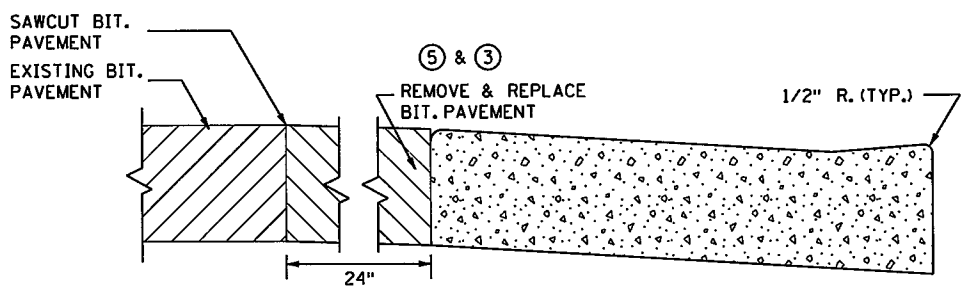
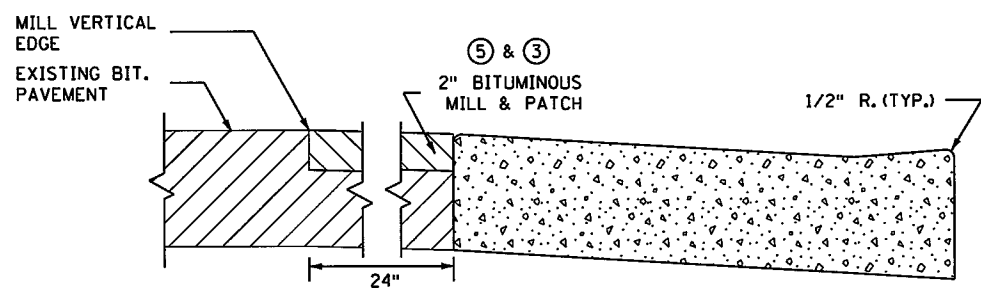


PERPENDICULAR ②

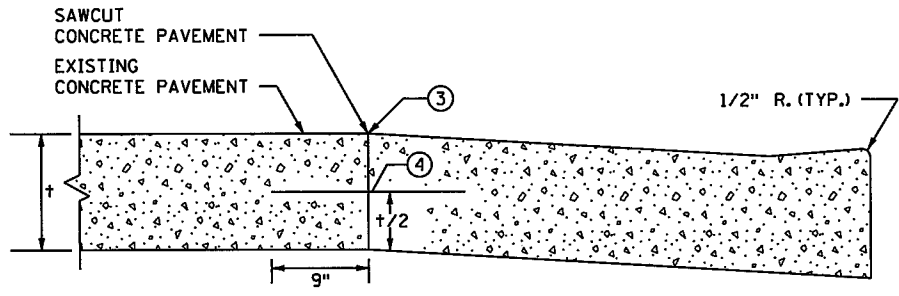
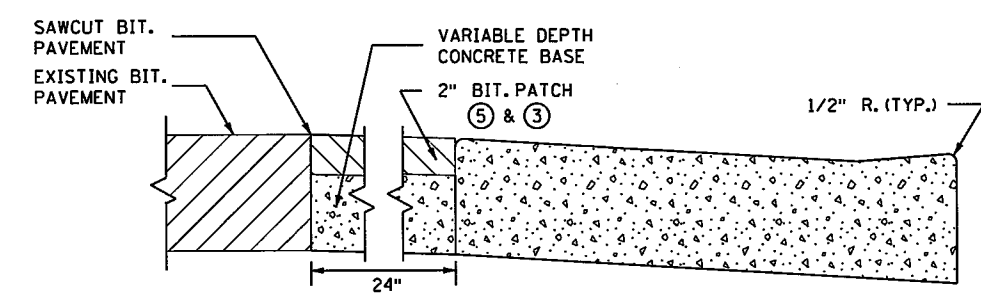


INSET A

PEDESTRIAN ACCESS ROUTE CURB & GUTTER DETAIL



CURB AND GUTTER REINFORCEMENT ⑧ FOR USE ON CURB RAMP RETROFITS



PAVEMENT TREATMENT OPTIONS IN FRONT OF CURB & GUTTER FOR USE ON CURB RAMP RETROFITS

- NOTES:
- POSITIVE FLOW LINE DRAINAGE SHALL BE MAINTAINED THROUGH THE PEDESTRIAN ACCESS ROUTE (PAR) AT A 2% MAXIMUM.
 - NO PONDING SHALL BE PRESENT IN THE PAR.
 - ANY VERTICAL LIP THAT OCCURS AT THE FLOW LINE SHALL NOT BE GREATER THAN 1/4 INCH.
 - ① FOR USE AT CURB CUTS WHERE THE PEDESTRIAN'S PATH OF TRAVEL IS ASSUMED NON PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: FANS, DEPRESSED CORNERS, & ONE WAY AND COMBINED DIRECTIONALS.
 - ② FOR USE AT CURB CUTS WHERE THE PEDESTRIAN'S PATH OF TRAVEL IS ASSUMED PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: PERPENDICULAR, TIERED PERPENDICULAR, PARALLEL, AND DIAGONAL RAMPS.
 - ③ THERE SHALL BE NO VERTICAL DISCONTINUITIES GREATER THAN 1/4\".
 - ④ DRILL AND GROUT NO. 4 EPOXY-COATED 18\" LONG TIE BARS AT 30\" CENTER TO CENTER INTO EXISTING CONCRETE PAVEMENT.
 - ⑤ ELEVATION CHANGE TAKES PLACE FROM THE EXISTING TO NEW FRONT OF GUTTER. PATCH IS USED TO MATCH THE NEW GUTTER FACE INTO THE EXISTING ROADWAY.
 - ⑥ VARIABLE WIDTH FOR DIRECTIONAL CURB APPLICATIONS.
 - ⑦ TOP FRONT OF GUTTER SHALL BE CONSTRUCTED FLUSH WITH PROPOSED ADJACENT PAVEMENT ELEVATION. PAR GUTTER SHALL NOT BE OVERLAID.
 - ⑧ WHERE PLAN SPECIFIES, DRILL AND GROUT 2 - NO. 4 X 12\" LONG REINFORCEMENT BARS (EPOXY COATED).

REVISION:
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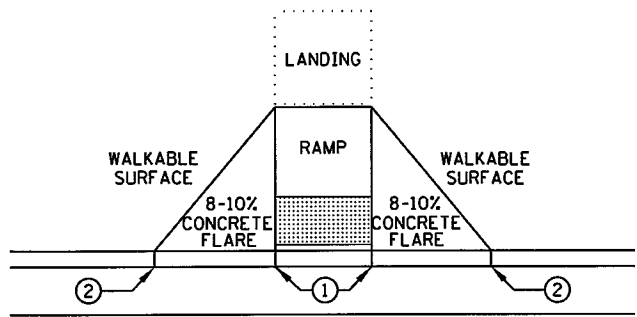
REVISED:
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 STATE DESIGN ENGINEER
 APPROVED: 8-6-2014

SPN22 OF SPN42	
PEDESTRIAN CURB RAMP DETAILS	
STANDARD PLAN 5-297.250	3 OF 5
S.P. NO. 6284-162 (TH35W) SHEET NO. 73 OF 367 SHEETS.	

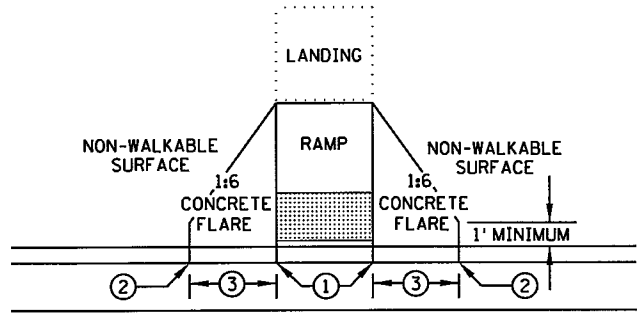
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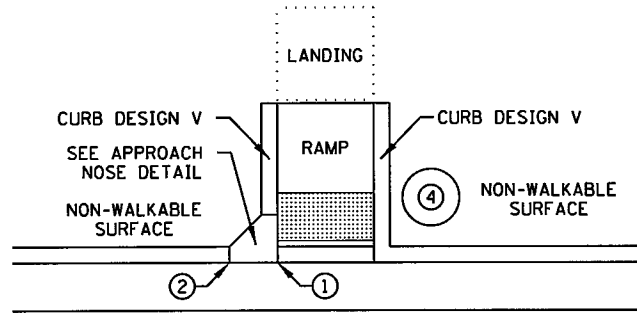
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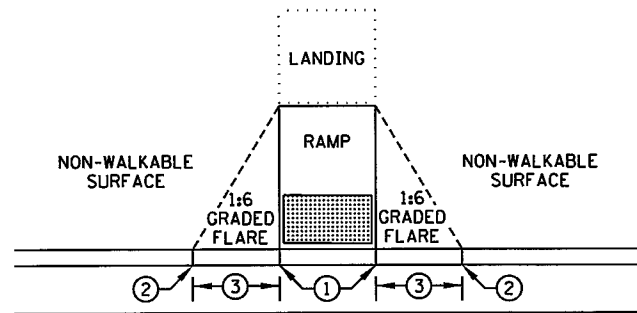
PAVED FLARES ADJACENT TO WALKABLE SURFACE



PAVED FLARES ADJACENT TO NON-WALKABLE SURFACE

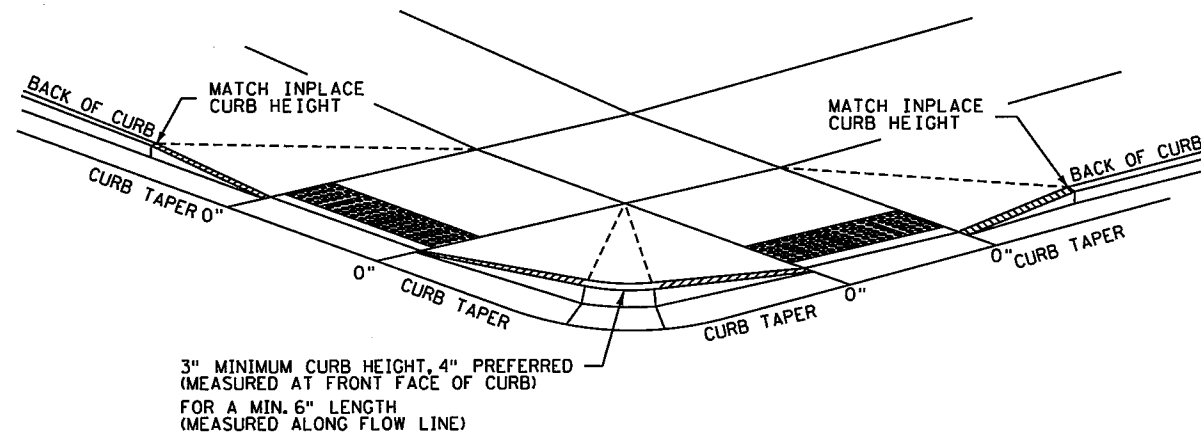


RETURNED CURB

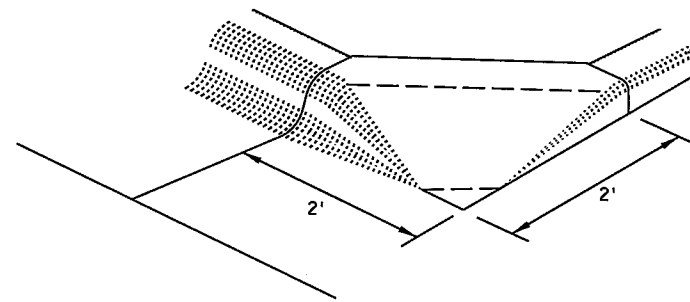


GRADED FLARES

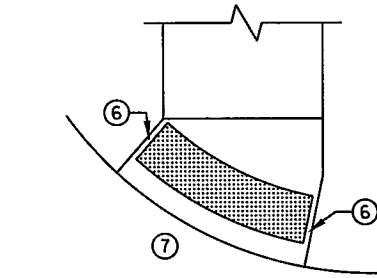
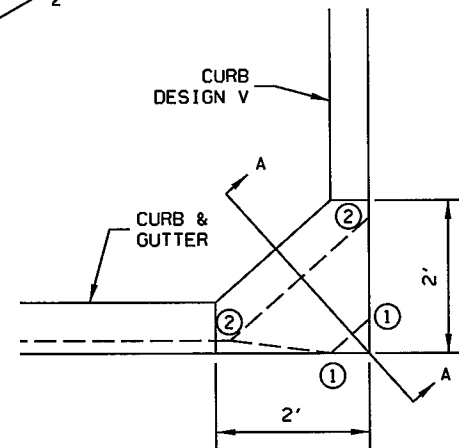
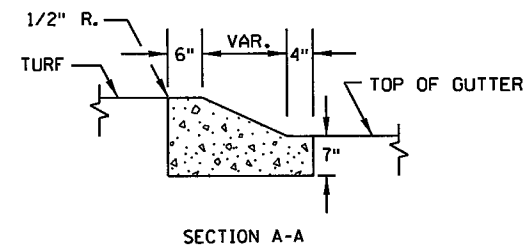
TYPICAL SIDE TREATMENT OPTIONS ⑤



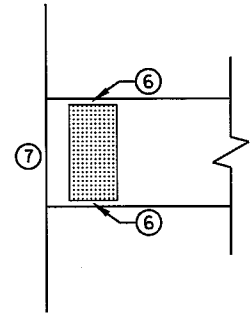
DETECTABLE EDGE WITH CURB AND GUTTER ⑧



APPROACH NOSE DETAIL FOR DOWNSTREAM SIDE OF TRAFFIC



RADIAL DETECTABLE WARNING



RECTANGULAR DETECTABLE WARNING

DETECTABLE EDGE WITHOUT CURB AND GUTTER

NOTES:

SEE STANDARD PLATE 7038 AND THIS SHEET FOR ADDITIONAL DETAILS ON DETECTABLE WARNING. WHETHER A SURFACE IS WALKABLE OR NOT SHALL BE DETERMINED BY THE ENGINEER. CONCRETE FLARE LENGTHS ADJACENT TO NON-WALKABLE SURFACES SHOULD BE LESS THAN 8' LONG MEASURED ALONG THE RAMPS FROM THE BACK OF CURB.

- ① 0" CURB HEIGHT.
- ② FULL CURB HEIGHT.
- ③ 2' - 3' FLARE.
- ④ IMMOVABLE OBJECT OR OBSTRUCTION.
- ⑤ SIDE TREATMENTS ARE APPLICABLE TO ALL RAMP TYPES AND SHOULD BE IMPLEMENTED AS NEEDED ON ALL RAMPS AS FIELD CONDITIONS DICTATE. THE ENGINEER SHALL DETERMINE THE RAMP SIDE TREATMENTS BASED ON MAINTENANCE OF BOTH ROADWAY AND SIDEWALK, ADJACENT PROPERTY CONSIDERATIONS, AND MITIGATING CONSTRUCTION IMPACTS.
- ⑥ WHEN NO CONCRETE FLARES ARE PROPOSED, THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE EDGE OF ROADWAY. MAINTAIN 3" BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.
- ⑦ IF NO CURB AND GUTTER IS PLACED IN RURAL SECTIONS, DETECTABLE WARNINGS SHALL BE PLACED 1' FROM THE EDGE OF ROADWAY TO PROVIDE VISUAL CONTRAST.
- ⑧ ALL CONSTRUCTED CURBS MUST HAVE A CONTINUOUS DETECTABLE EDGE FOR THE VISUALLY IMPAIRED. THIS DETECTABLE EDGE REQUIRES DETECTABLE WARNINGS WHEREVER THERE IS ZERO-INCH HIGH CURB. CURB TAPERS ARE CONSIDERED A DETECTABLE EDGE WHEN THE TAPER STARTS WITHIN 3" OF THE EDGE OF THE DETECTABLE WARNINGS AND UNIFORMLY RISES TO A 3-INCH MINIMUM CURB HEIGHT. ANY CURB NOT PART OF A CURB TAPER AND LESS THAN 3 INCHES IN HEIGHT IS NOT CONSIDERED A DETECTABLE EDGE AND THEREFORE IS NOT COMPLIANT WITH ACCESSIBILITY STANDARDS.

SPN23 OF SPN42

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250 4 OF 5
 S.P. NO. 6284-162 (TH35W) SHEET NO. 74 OF 367 SHEETS



REVISOR:
 APPROVED:
 STATE DESIGN ENGINEER

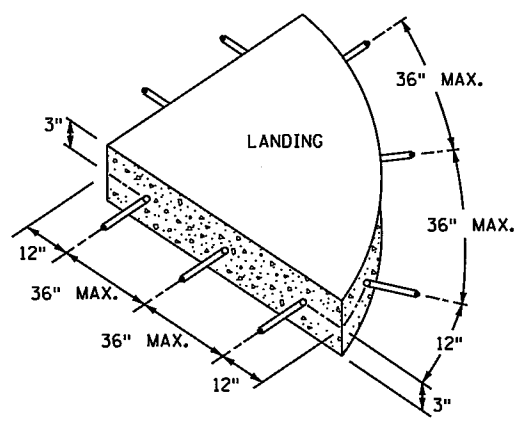
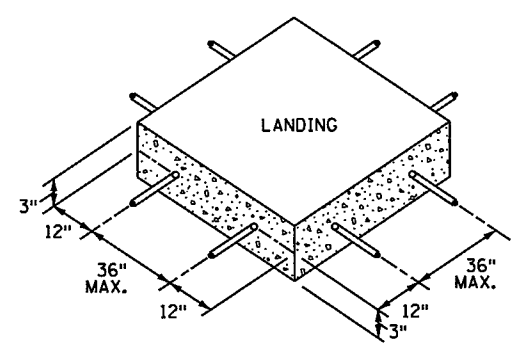
8-6-2014

REVISION:
 APPROVED: 8-6-2014
 OPERATIONS ENGINEER

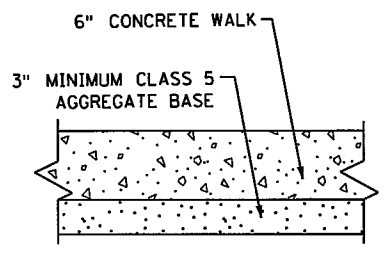
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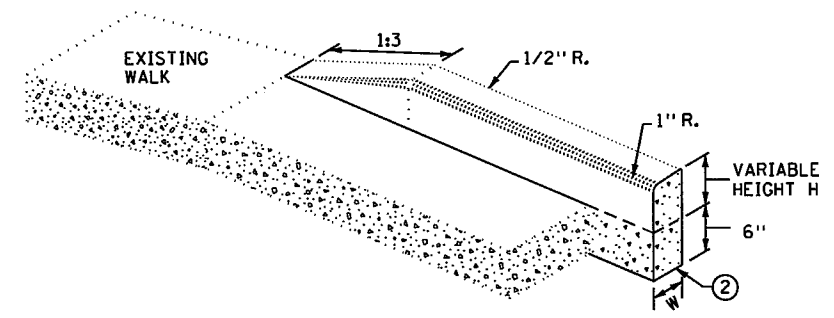
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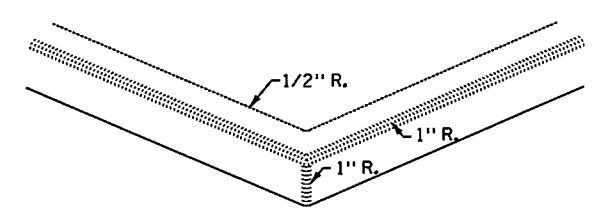
SIDEWALK REINFORCEMENT ⑥ ⑦



TYPICAL SIDEWALK SECTION WITHIN INTERSECTION CORNER

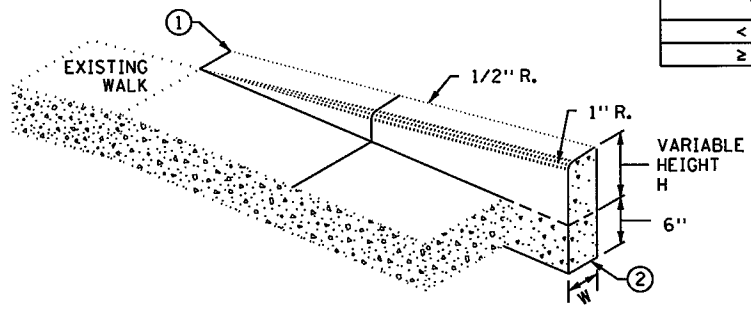


V CURB ADJACENT TO LANDSCAPE
CURB WITHIN SIDEWALK LIMITS

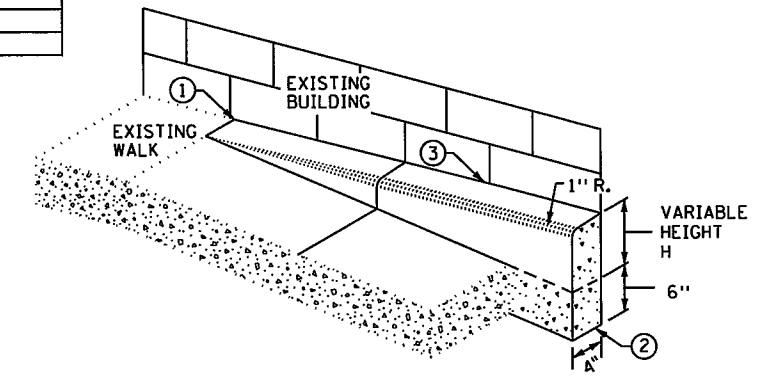


V CURB INTERSECTION

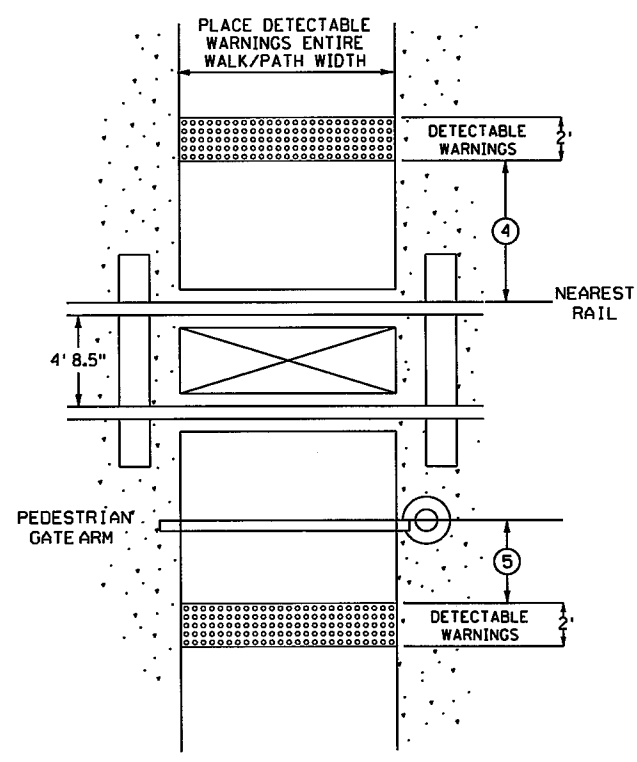
CONCRETE CURB DESIGN V	
CURB HEIGHT H	CURB WIDTH W
< 6"	4"
≥ 6"	6"



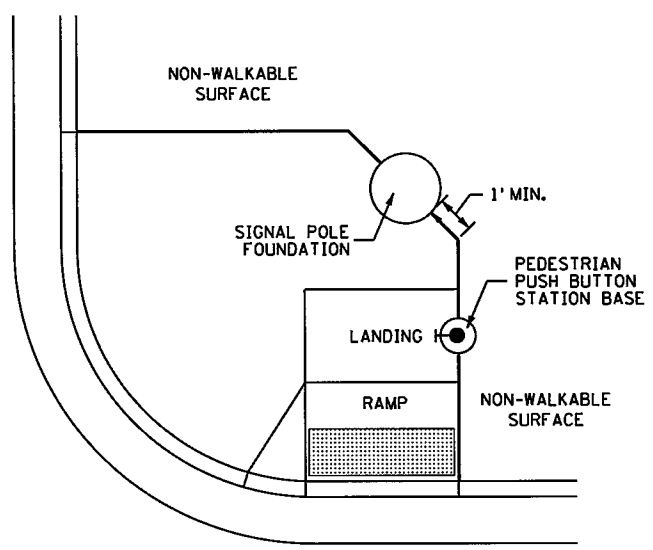
V CURB ADJACENT TO LANDSCAPE
CURB OUTSIDE SIDEWALK LIMITS



V CURB ADJACENT TO BUILDING
OR BARRIER



RAILROAD CROSSING
PLAN VIEW



CONCRETE WALK EDGES ADJACENT
TO CONCRETE STRUCTURES

NOTES:

- ALL V CURB CONTRACTION JOINTS SHALL MATCH CONCRETE WALK JOINTS.
- WHERE RIGHT-OF-WAY ALLOWS, USE OF V CURB SHOULD BE MINIMIZED. GRADING ADJACENT TURF OR SLOPING ADJACENT PAVEMENT IS PREFERRED.
- V CURB SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS.
- V CURB NEXT TO BUILDING SHALL BE A 4" WIDTH AND SHALL MATCH PREVIOUS TOP OF SIDEWALK ELEVATIONS.
- ① END TAPERS AT TRANSITION SECTION SHALL MATCH INPLACE SIDEWALK GRADES.
- ② ALL V CURB SHALL MATCH BOTTOM OF ADJACENT WALK.
- ③ EDGE BETWEEN NEW V CURB AND INPLACE STRUCTURE SHALL BE SEALED AND BOND BREAKER SHALL BE USED BETWEEN EXISTING STRUCTURE AND PLACED V-CURB.
- ④ NEAREST EDGE OF DETECTABLE WARNING SURFACES SHALL BE PLACED 12' MINIMUM TO 15' MAXIMUM FROM THE NEAREST RAIL. FOR SKEWED RAILWAYS IN NO INSTANCE SHALL THE DETECTABLE WARNING BE CLOSER THAN 12' MEASURED PERPENDICULAR TO THE NEAREST RAIL.
- ⑤ WHEN PEDESTRIAN GATES ARE PROVIDED, DETECTABLE WARNING SURFACES SHALL BE PLACED ON THE SIDE OF THE GATES OPPOSITE THE RAIL, 2' FROM THE APPROACHING SIDE OF THE GATE ARM.
- ⑥ WHEN PLAN SPECIFIES, DRILL AND GROUT NO. 4 12" LONG REINFORCEMENT BARS AT 36" MAX. CENTER TO CENTER (EPOXY COATED).
- ⑦ TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS MAY BE CAST SEPARATELY. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON THIS SHEET WHEN LANDINGS ARE CAST SEPARATELY.

REVISION:
 APPROVED: 2-9-2015

 OPERATIONS ENGINEER

REVISED:

 Christopher Ry
 STATE DESIGN ENGINEER
 APPROVED:
 2-9-2015

SPN24
OF SPN42

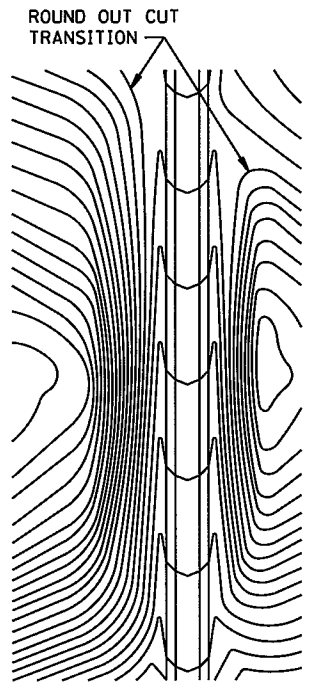
PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250 5 OF 5

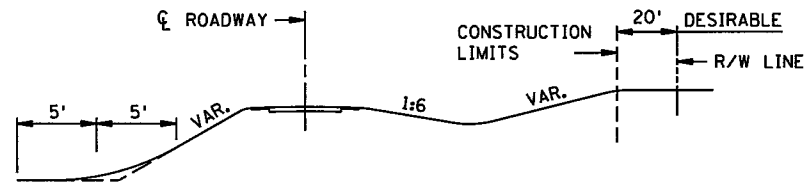
S.P. NO. 6284-162 (TH35W) SHEET NO. 75 OF 367 SHEETS.

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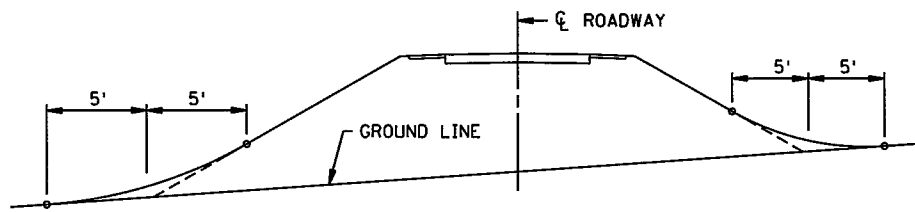
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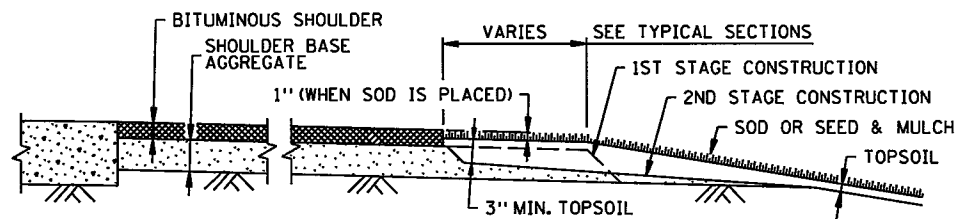
CONTOURING ROAD CUTS



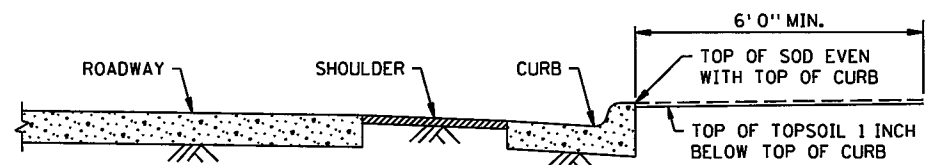
ROUNDING SHOULDERS AND BACKSLOPES



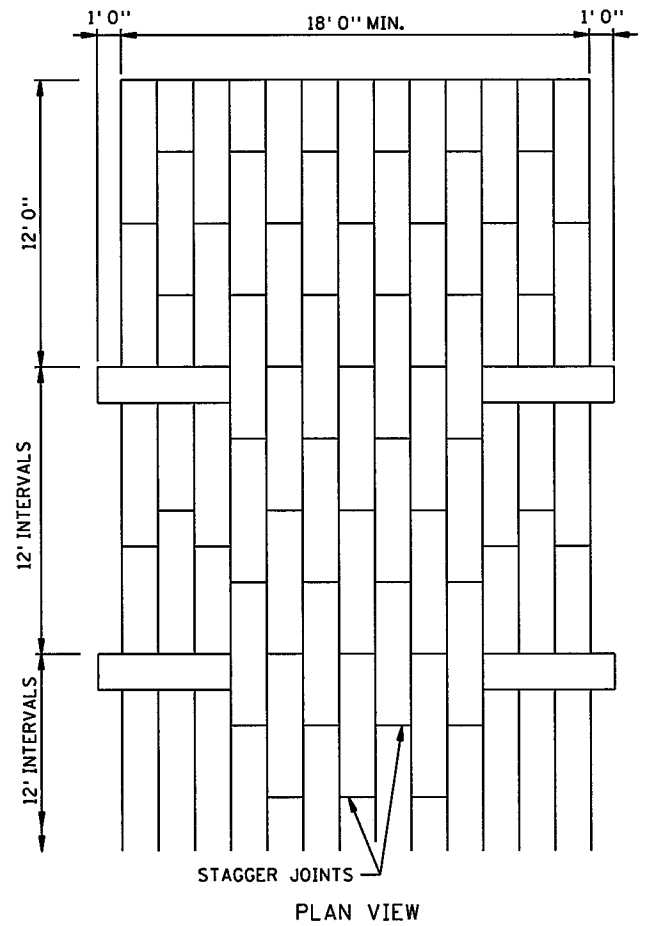
SHAPING FOR DRAINAGE ALONG THE TOE OF FILL SLOPES



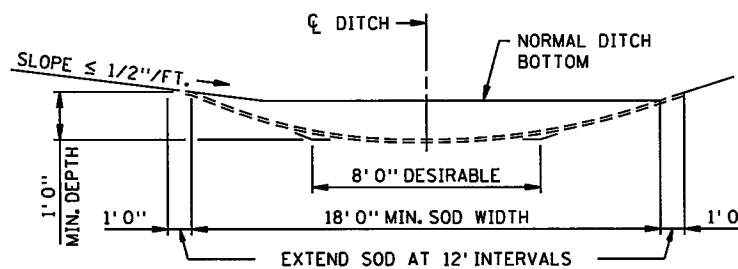
SHAPING AND TOPSOILING INSLOPES



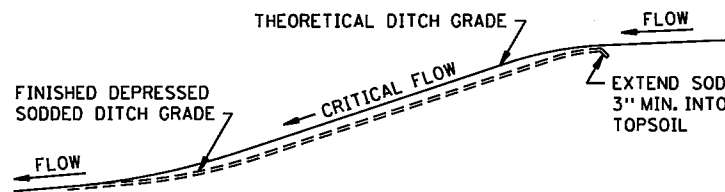
SHAPING ADJACENT TO CURBS WHEN SOD IS PLACED



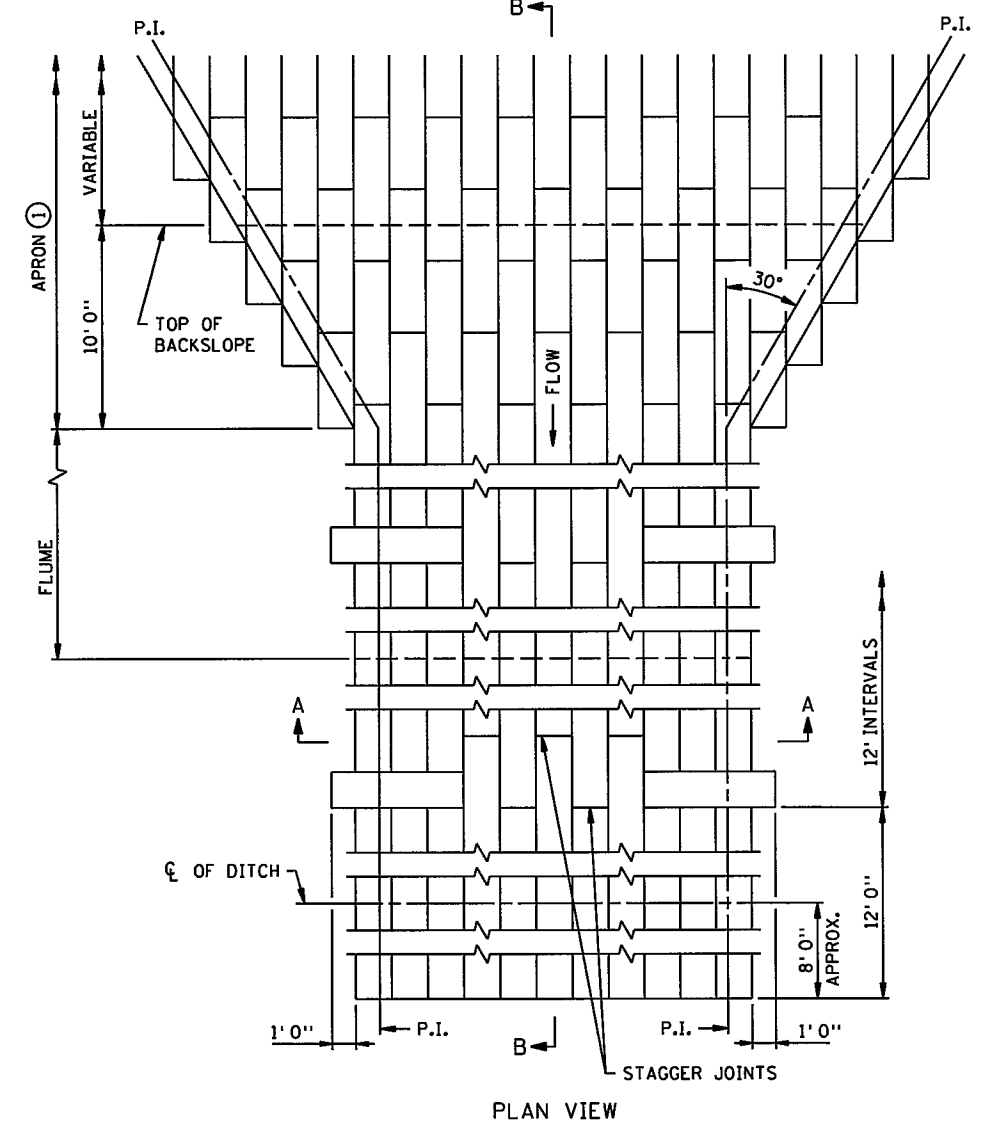
PLAN VIEW



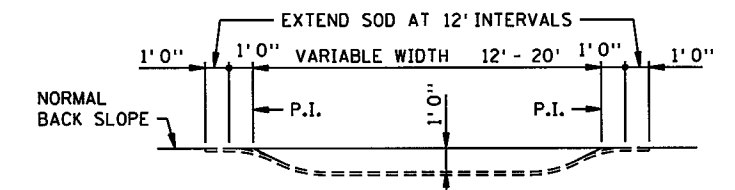
SODDED DITCH CROSS SECTION WHERE FRONT OR BACK SLOPE IS FLAT (LESS THAN 1/2"/FT.), FIRST NOTCH DITCH AND THEN PROVIDE ROUNDING.



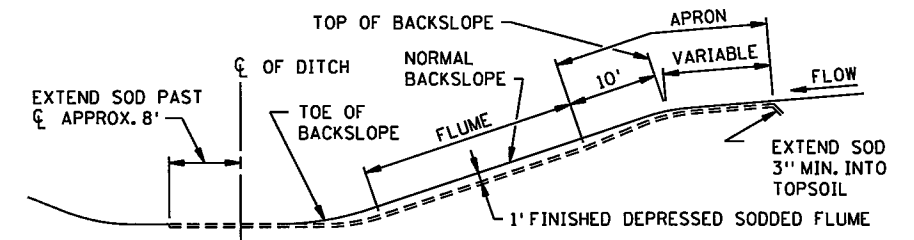
DITCH PROFILE SODDED DITCH DETAILS



PLAN VIEW



SECTION A-A



SECTION B-B SODDED FLUME DETAILS

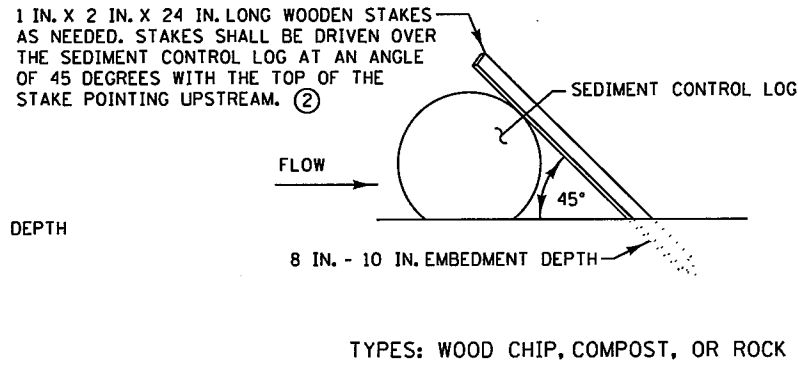
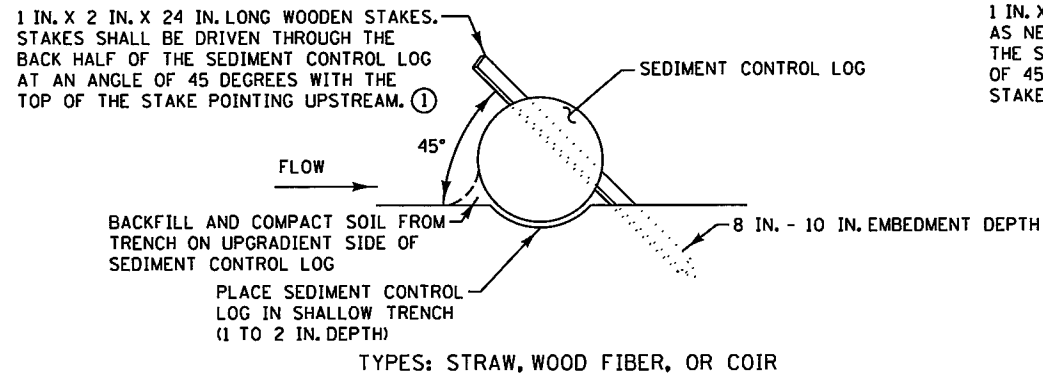
NOTES:
SEE SPEC. 2575.3 FOR ADDITIONAL INFORMATION.
① CONSTRUCT TAPER AS DIRECTED BY THE ENGINEER.

REVISION:
APPROVED: 8-6-2014
[Signature]
CHIEF ENVIRONMENTAL OFFICER

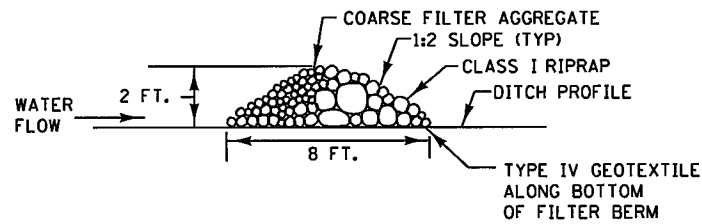
MINNESOTA DEPARTMENT OF TRANSPORTATION
APPROVED: 8-6-2014
[Signature]
STATE DESIGN ENGINEER

PERMANENT EROSION CONTROL ALONG ROADWAYS, DITCHES AND FLUMES	
STANDARD PLAN 5-297.404	1 OF 1
S.P. NO. 6284-162 (TH35W)	SHEET NO. 76 OF 367 SHEETS

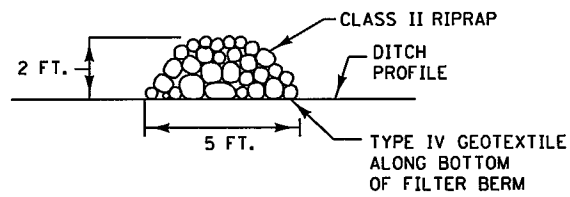
SPN25
OF SPN42



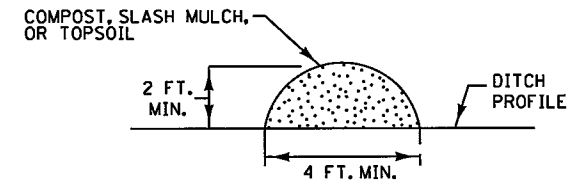
SEDIMENT CONTROL LOGS



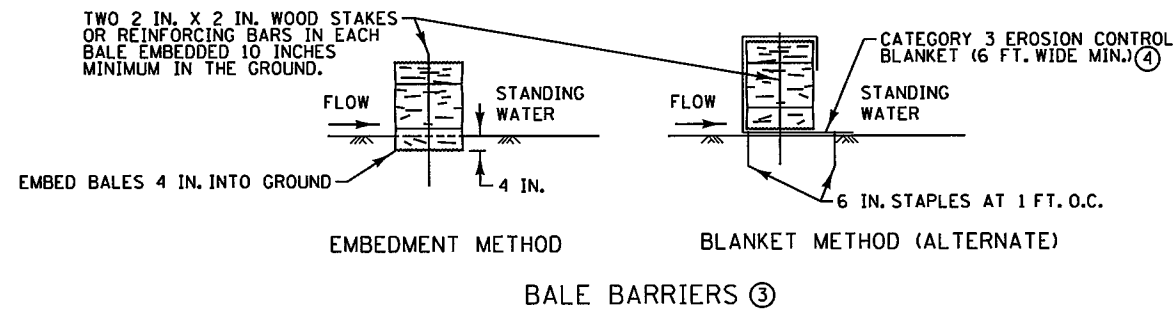
TYPE 3 (ROCK WEEPER)



TYPE 5 (ROCK) FILTER BERMS



TYPE 1 (COMPOST), TYPE 2 (SLASH MULCH), OR TYPE 4 (TOPSOIL)



BALE BARRIERS ③

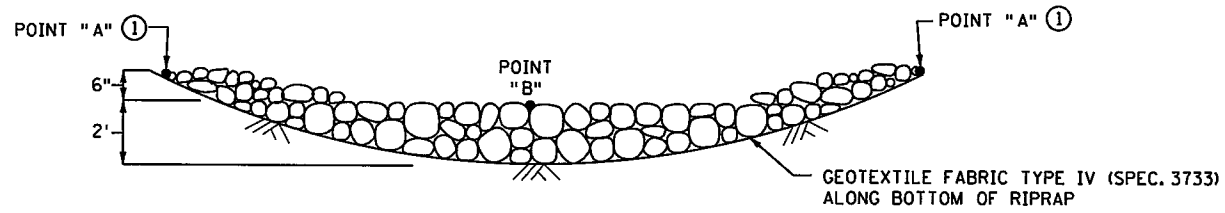
NOTES:

- SEE SPECS. 2573, 3149, 3874, 3882, 3886, & 3897.
- ① SPACE BETWEEN STAKES SHALL BE A MAXIMUM OF 1 FOOT FOR DITCH CHECKS OR 2 FEET FOR OTHER APPLICATIONS.
- ② PLACE STAKES AS NEEDED TO PREVENT MOVEMENT OF SEDIMENT CONTROL LOGS PLACED ON SLOPES OR AS NEEDED DUE TO OTHER FACTORS. STAKES SHALL BE INCIDENTAL.
- ③ TO BE USED FOR CRITICAL PERIMETER CONTROL AREAS WHERE STANDING WATER OCCURS (6 INCH MAX. DEPTH). BALES SHALL CONSIST OF TYPE 1 MULCH OF APPROXIMATELY 14 IN. X 18 IN. X 36 IN. LONG. BALES SHALL BE PLACED ON EDGE AND BUTTED TIGHT TO ADJACENT BALES.
- ④ INSTEAD OF TRENCHING, PLACE BALE ON THE BLANKET AND WRAP BLANKET AROUND THE BALE. PLACE STAKE THROUGH BALE AND BLANKET.

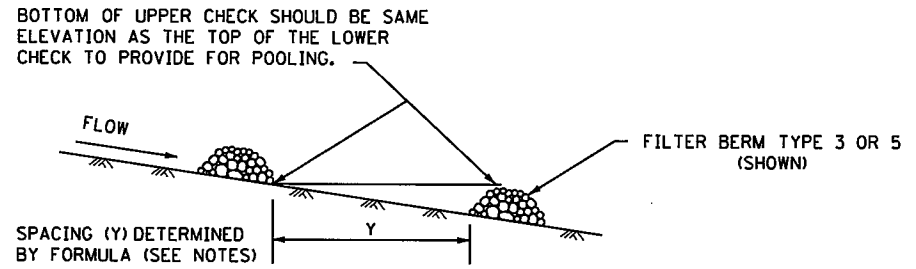
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 APPROVED:
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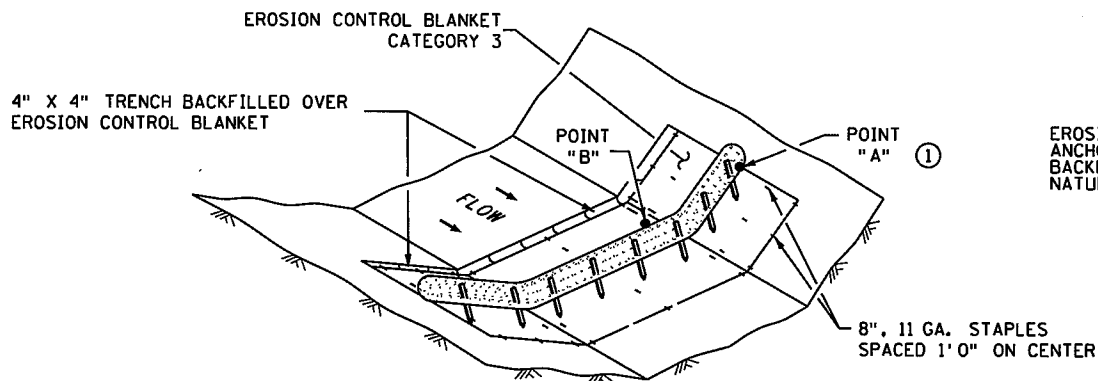
TEMPORARY SEDIMENT CONTROL
 FILTER BERMS, SEDIMENT CONTROL LOGS, AND BALE BARRIERS
 STANDARD PLAN 5-297.405 2 OF 7
 S.P. NO. 6284-162 (TH35W) SHEET NO. 77 OF 367 SHEETS



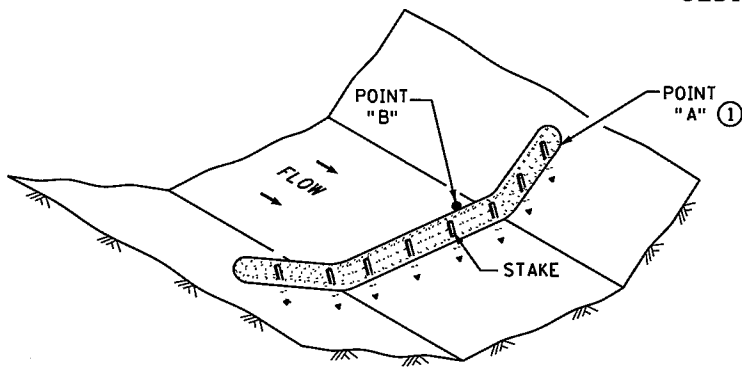
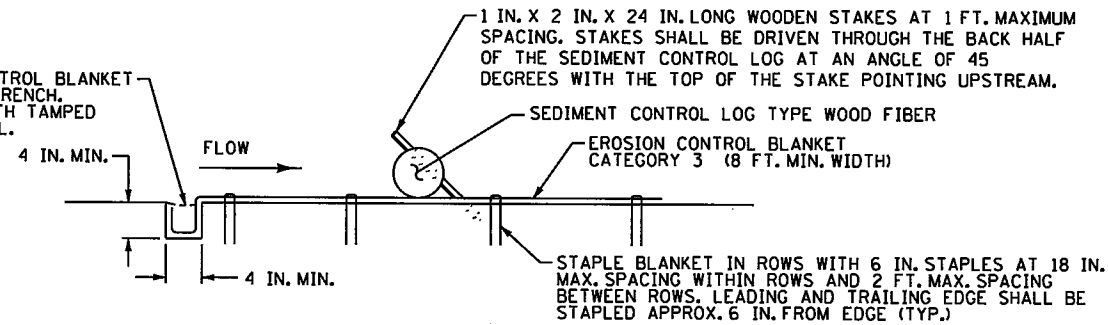
ROCK DITCH CHECKS
FILTER BERMS TYPE 3 (ROCK WEEPER) OR FILTER TYPE 5 (ROCK) ②③
 (FOR USE ON ROUGH GRADED AREAS)



DITCH CHECK SPACING
 (FOR ALL FILTER BERM TYPES)



SEDIMENT CONTROL LOG TYPE BLANKET SYSTEM ④



SEDIMENT CONTROL LOG TYPE WOOD FIBER, OR TYPE COMPOST ⑤
 (FOR USE ON ROUGH GRADED AREAS)

NOTES:

SEE SPECS. 2573, 3601, 3733, 3885, 3886 & 3889.

FOR DITCH CHECKS, PLACE SEDIMENT CONTROL LOG PERPENDICULAR TO FLOW AND IN A CRESCENT SHAPE WITH THE ENDS FACING UPSTREAM.

APPROXIMATE SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM THE FOLLOWING SPACING FORMULA:

$$\text{APPROXIMATE SPACING OF DITCH CHECKS (FT.)} = Y = \frac{\text{DITCH CHECK HEIGHT (FT)}}{\% \text{ CHANNEL SLOPE}} \times 100$$

- ① POINT "A" MUST BE A MINIMUM OF 6 INCHES HIGHER THAN POINT "B" TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ② PERMANENT ROCK DITCH CHECKS PLACED WITHIN THE CLEAR ZONE ARE TO BE 18" OR LESS IN HEIGHT. A 1:6 APPROACH AND DEPARTURE SLOPE SHALL BE PROVIDED.
- ③ DITCH GRADE 3% - 5%, MAX. FLOW VELOCITY 12 FT./SEC..
- ④ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 4.5 FT./SEC..
- ⑤ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 1.5 FT./SEC..

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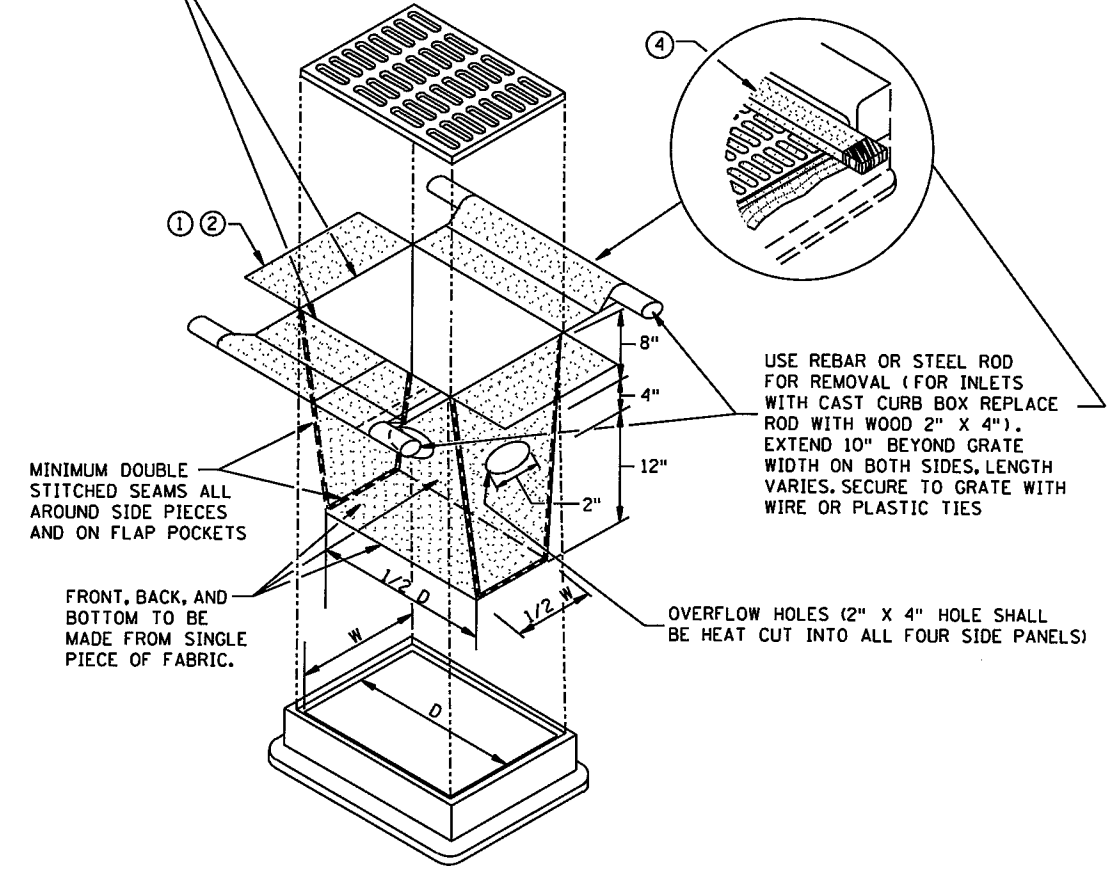
TEMPORARY SEDIMENT CONTROL
 DITCH CHECK
 STANDARD PLAN 5-297.405 | 3 OF 7
 S.P. NO. 6284-162 (TH35W) SHEET NO. 78 OF 367 SHEETS

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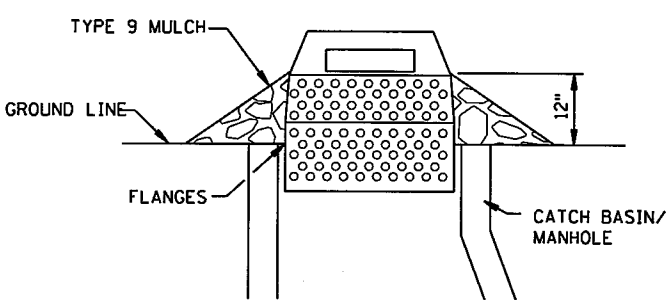
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MODELNAME\$

INLET SPECIFICATIONS AS PER THE PLAN
DIMENSION LENGTH AND WIDTH TO MATCH
FLAP POCKET



FILTER BAG INSERT ③

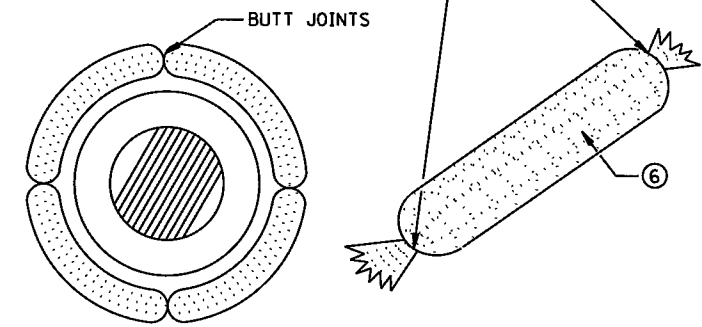
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)



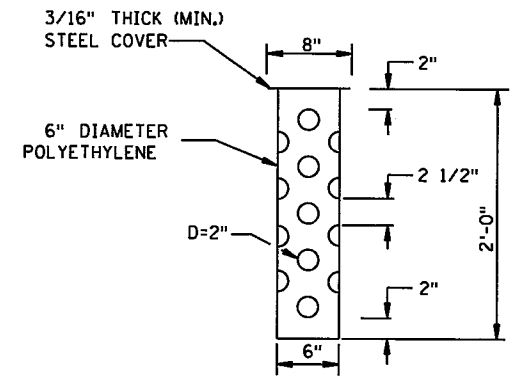
SEDIMENT CONTROL INLET HAT

NOTE:
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHYLENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.

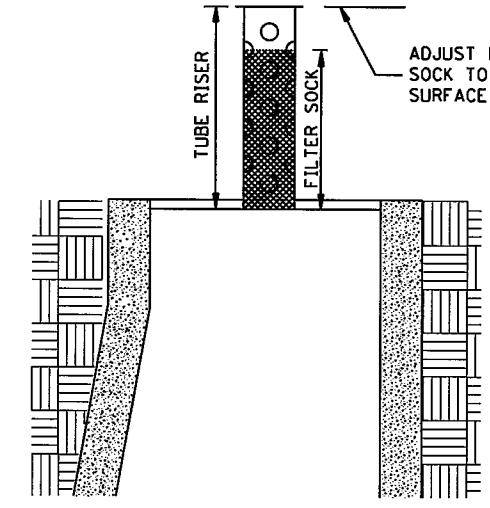
ENDS SECURELY CLOSED TO PREVENT LOSS OF OPEN GRADED AGGREGATE FILL. SECURED WITH 50 PSI. ZIP TIE.



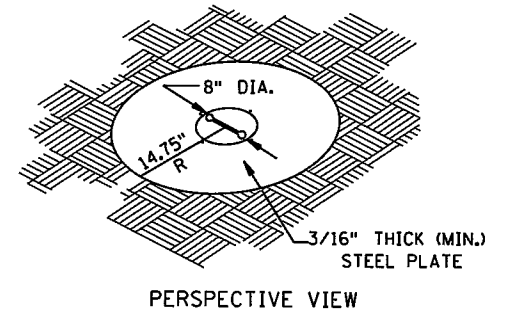
ROCK LOG/COMPOST LOG



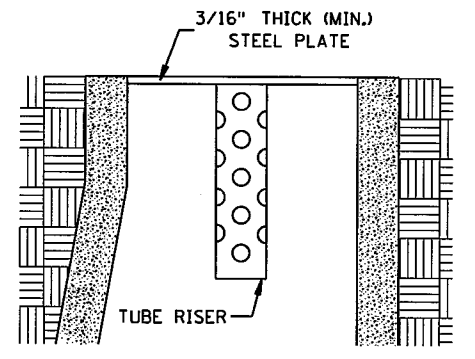
TUBE RISER



SECTION (UP POSITION)

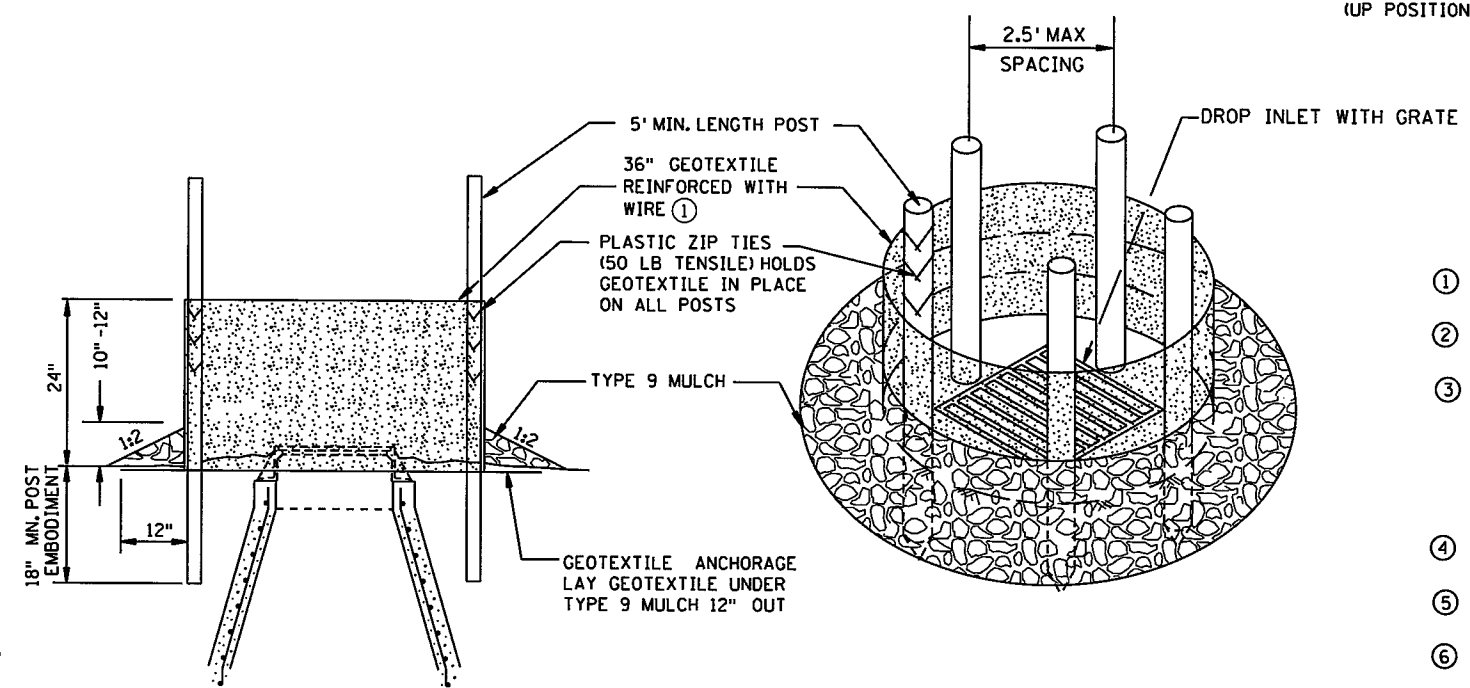


PERSPECTIVE VIEW



SECTION (DOWN POSITION)

POP-UP HEAD



SILT FENCE RING AND ROCK FILTER BERM
USE WHERE INLET DRAINS IN AN AREA WITH SLOPES AT 1:3 OR LESS

NOTES:

- SEE SPECS. 2573, 3137, & 3886.
- DEVICES MUST BE ADJUSTED ACCORDINGLY AS TO NOT CAUSE FLOODING ON ROADWAY THAT WOULD IMPEED TRAFFIC FLOW.
- ① ALL GEOTEXTILE USED FOR INLET PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886.
- ② FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED SHALL EXTEND A MINIMUM OF 10 INCHES AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- ③ INSTALLATION NOTES:
DO NOT PLACE FILTER BAG INSERT IN INLETS SHALLOWER THAN 30 INCHES, MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. THE PLACED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE OF 3 INCHES BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES. WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3 INCH SIDE CLEARANCE.
- ④ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2 INCH X 4 INCH OR USE A ROCK SOCK OR SAND BAGS IN PLACE OF THE FLAP POCKETS.
- ⑤ SOCK HEIGHT MUST NOT BE SO HIGH AS TO SLOW DOWN WATER FILTRATION TO CAUSE FLOODING OF THE ROADWAY.
- ⑥ GEOTEXTILE SOCK BETWEEN 4-10 FEET LONG AND 4-6 INCH DIAMETER. SEAM TO BE JOINED BY TWO ROWS OF STITCHING WITH A PLASTIC MESH BACKING OR PROVIDE A HEAT BONDED SEAM (OR APPROVED EQUIVALENT). FILL ROCK LOG WITH OPEN GRADED AGGREGATE CONSISTING OF SOUND DURABLE PARTICLES OF COARSE AGGREGATE CONFORMING TO SPEC. 3137 TABLE 3137-1; CA-3 GRADATION.

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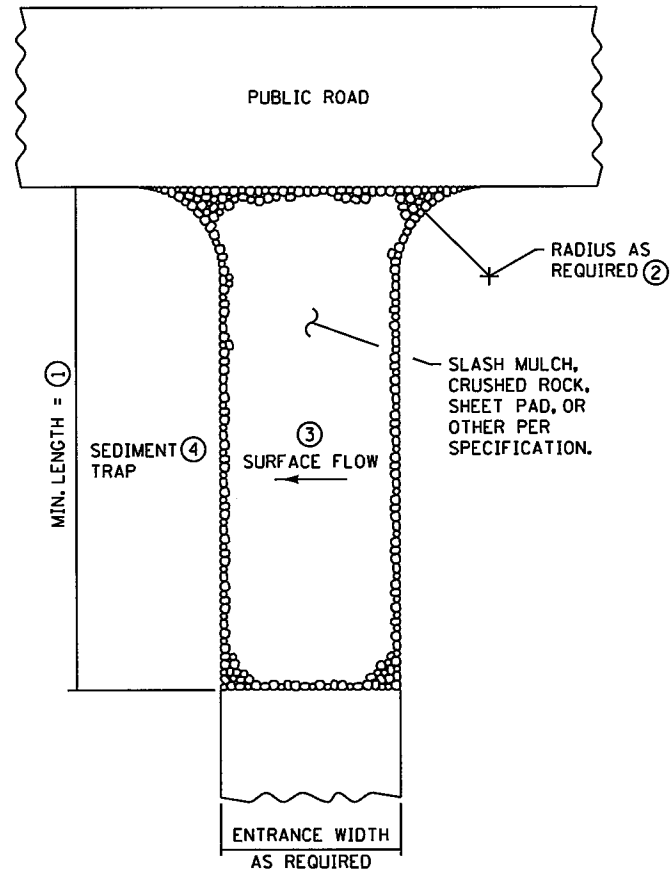
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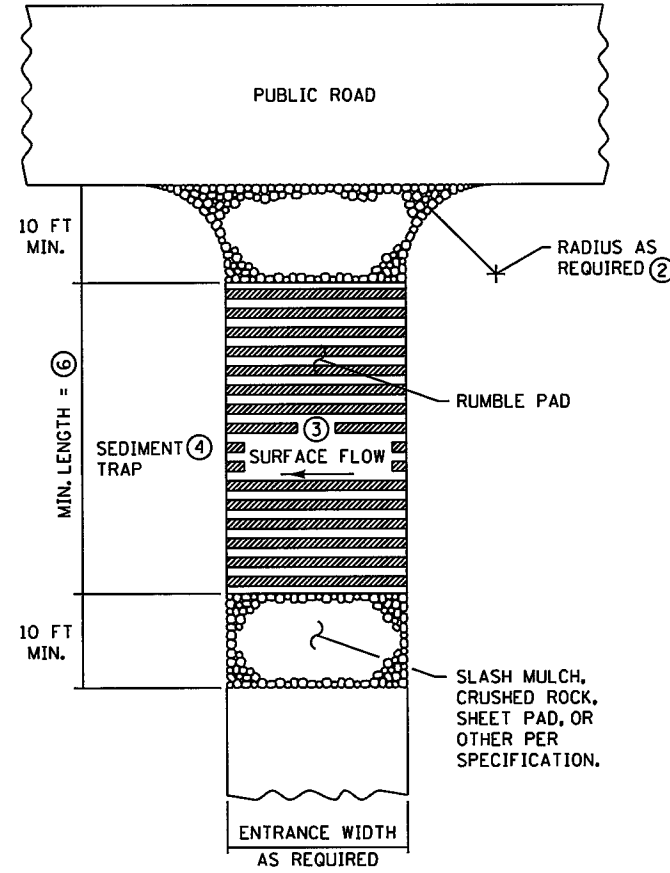
TEMPORARY SEDIMENT CONTROL
STORM DRAIN INLET PROTECTION

STANDARD PLAN 5-297.405 4 OF 7

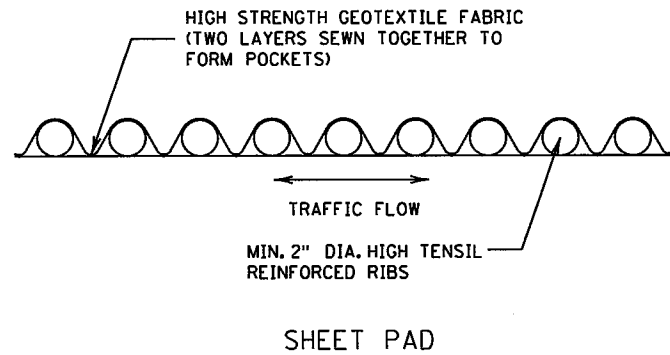
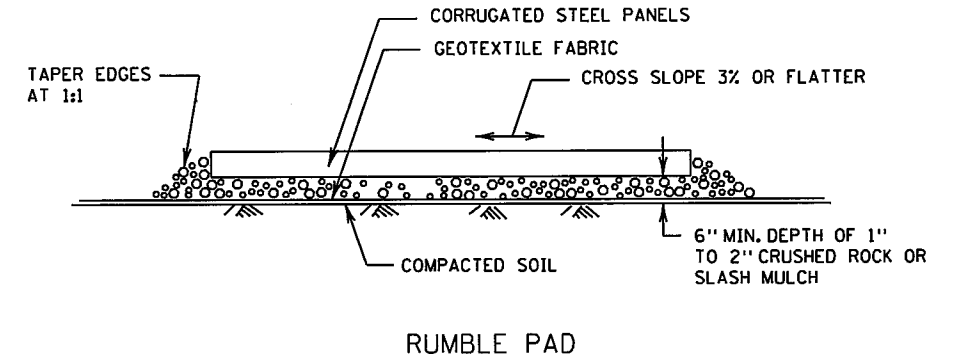
S.P. NO. 6284-162 (TH35W) SHEET NO. 79 OF 367 SHEETS



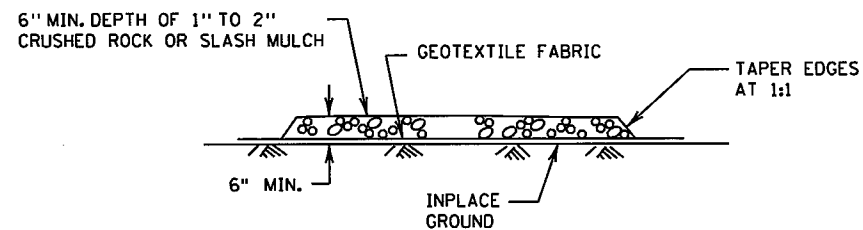
SLASH MULCH, CRUSHED ROCK, OR SHEET PAD CONSTRUCTION EXIT ⑤⑦



RUMBLE PAD CONSTRUCTION EXIT ⑤⑦



SHEET PAD



SLASH MULCH OR CRUSHED ROCK

NOTES:

SEE SPECS. 2573 & 3882.

- ① MINIMUM LENGTH SHALL BE THE GREATER OF 50 FEET OR A LENGTH SUFFICIENT TO ALLOW A MINIMUM OF 5 TIRE ROTATIONS ON THE PROVIDED PAD. MINIMUM LENGTH SHALL BE CALCULATED USING THE LARGEST TIRE WHICH WILL BE USED IN TYPICAL OPERATIONS.
- ② PROVIDE RADIUS OR WIDEN PAD SUFFICIENTLY TO PREVENT VEHICLE TIRES FROM TRACKING OFF OF PAD WHEN LEAVING SITE.
- ③ IF RUNOFF FROM DISTURBED AREAS FLOWS TOWARD CONSTRUCTION EXITS, PREVENT RUNOFF FROM DRAINING DIRECTLY TO PUBLIC ROAD OVER CONSTRUCTION EXIT BY CROWNING THE EXIT OR SLOPING TO ONE SIDE. IF SURFACE GRADING IS INSUFFICIENT, PROVIDE OTHER MEANS OF INTERCEPTING RUNOFF.
- ④ IF RUNOFF FROM CONSTRUCTION EXITS WILL DRAIN OFF OF PROJECT SITE, PROVIDE SEDIMENT TRAP WITH STABILIZED OVERFLOW.
- ⑤ IF A TIRE WASH OFF IS REQUIRED THE CONSTRUCTION EXITS SHALL BE GRADED TO DRAIN THE WASH WATER TO A SEDIMENT TRAP.
- ⑥ MINIMUM LENGTH OF RUMBLE PAD SHALL BE 20 FEET, OR AS REQUIRED TO REMOVE SEDIMENT FROM TIRES. IF SIGNIFICANT SEDIMENT IS TRACKED FROM THE SITE, THE RUMBLE PAD SHALL BE LENGTHENED OR THE DESIGN MODIFIED TO PROVIDE ADDITIONAL VIBRATION. WASH-OFF LENGTH SHALL BE AS REQUIRED TO EFFECTIVELY REMOVE CONSTRUCTION SEDIMENT FROM VEHICLE TIRES.
- ⑦ MAINTENANCE OF CONSTRUCTION EXITS SHALL OCCUR WHEN THE EFFECTIVENESS OF SEDIMENT REMOVAL HAS BEEN REDUCED. MAINTENANCE SHALL CONSIST OF REMOVING SEDIMENT AND CLEANING THE MATERIALS OR PLACING ADDITIONAL MATERIAL (SLASH MULCH OR CRUSHED ROCK) OVER SEDIMENT FILLED MATERIAL TO RESTORE EFFECTIVENESS.

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TEMPORARY SEDIMENT CONTROL
CONSTRUCTION EXITS

STANDARD PLAN 5-297.405

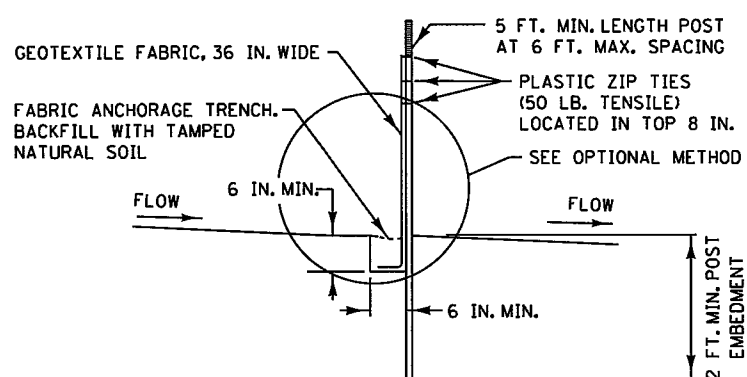
5 OF 7

S.P. NO. 6284-162 (TH35W) SHEET NO. 80 OF 367 SHEETS.

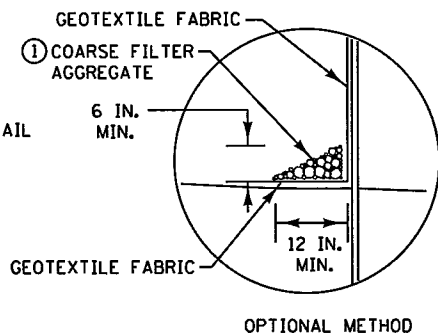
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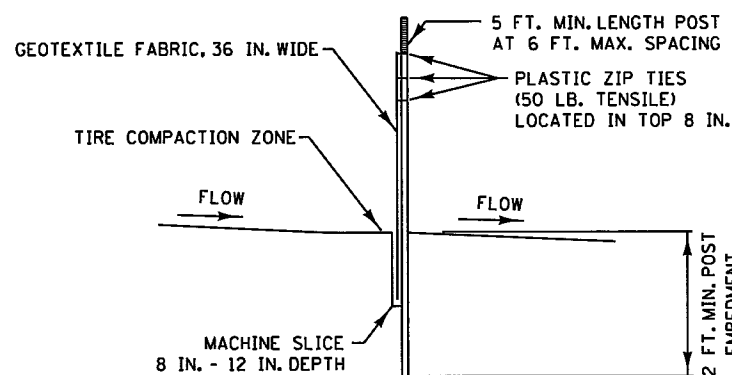
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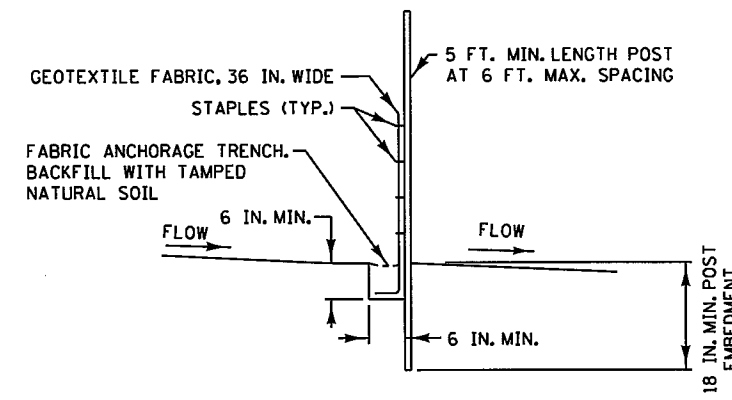
SILTS FENCE TYPE HI ② (HAND INSTALLED)



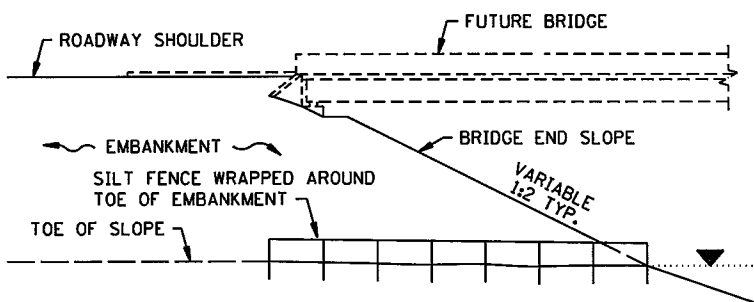
OPTIONAL METHOD



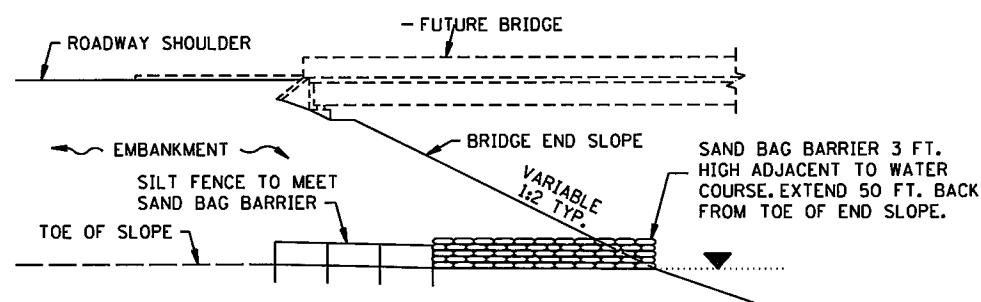
SILTS FENCE TYPE MS ② (MACHINE SLICED)



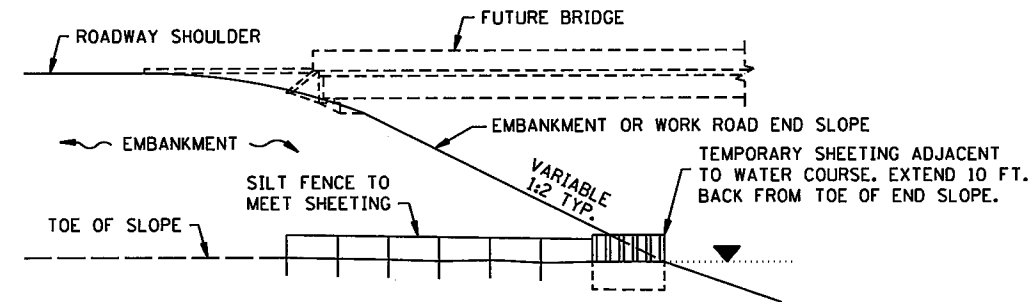
SILTS FENCE TYPE PA ③ (PREASSEMBLED)



SILTS FENCE ONLY ④

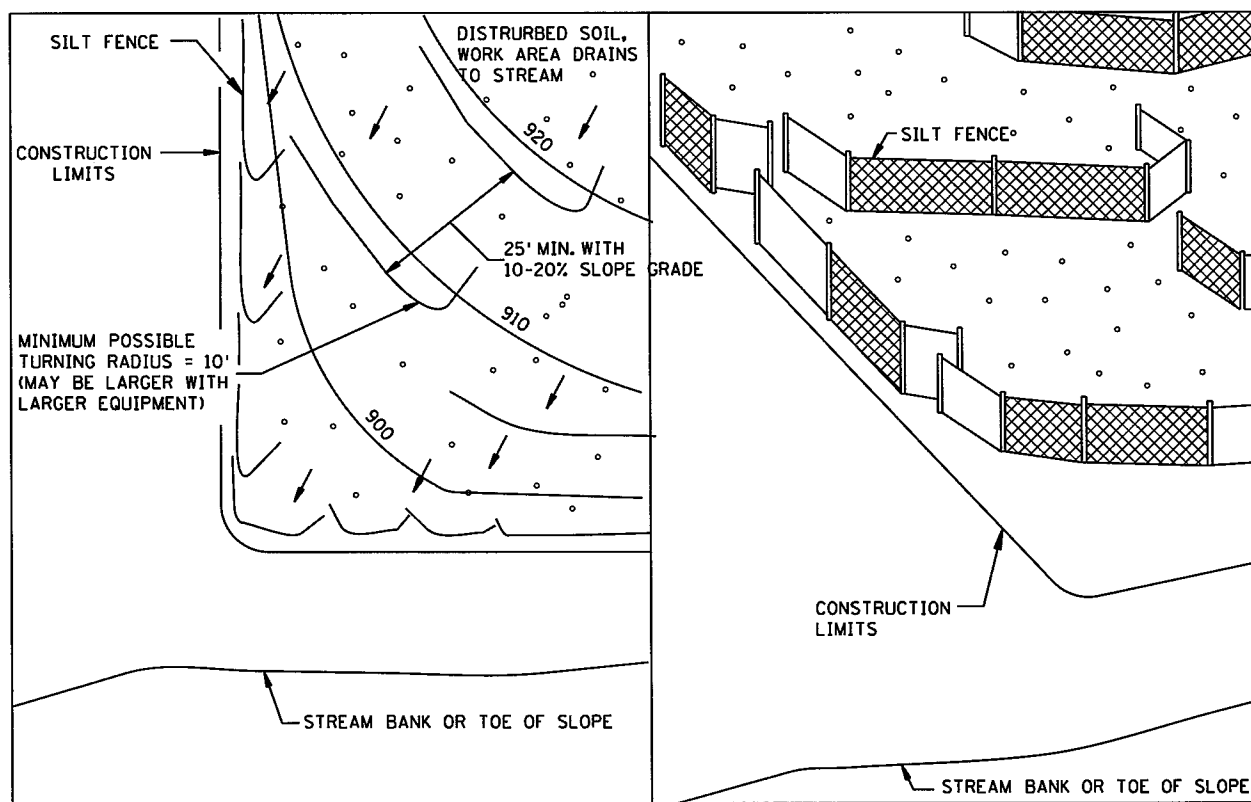


SILTS FENCE WITH SAND BAGS ⑤



SILTS FENCE WITH SHEETING ⑥

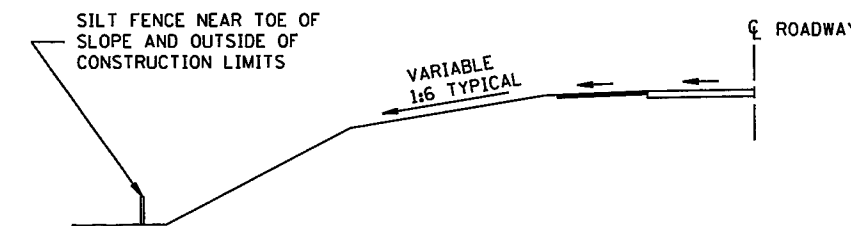
INSTALLATION AT BRIDGE EMBANKMENT ADJACENT TO WATER



PLAN VIEW

PERSPECTIVE VIEW

J-HOOK INSTALLATION



LOCATION AT TOE OF ROADWAY EMBANKMENT

NOTES:

- SEE SPECS. 2573, 3149 & 3886.
- ① COARSE FILTER AGGREGATE (SPEC. 3149) SHALL BE INCIDENTAL.
- ② TO PROTECT AREAS FROM SHEET FLOW, MAXIMUM CONTRIBUTING AREA: 1 ACRE.
- ③ TO PROTECT AREAS FROM SHEET FLOW, MAXIMUM CONTRIBUTING AREA: 0.25 ACRE.
- ④ WATER COURSE FLOW VELOCITY: STANDING. CONTRIBUTING SLOPE AREA: 1/2 ACRE.
- ⑤ WATER COURSE FLOW VELOCITY: 1 TO 7 FT./SEC. CONTRIBUTING SLOPE AREA: 1 ACRE.
- ⑥ WATER COURSE FLOW VELOCITY: 8 TO 15 FT./SEC. CONTRIBUTING SLOPE AREA: 3 ACRES.

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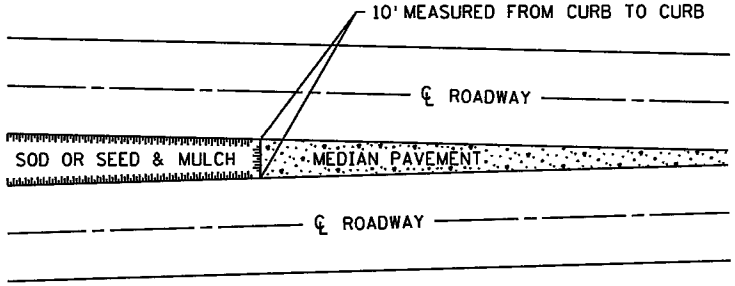
TEMPORARY SEDIMENT CONTROL
SILTS FENCE

STANDARD PLAN 5-297.405 6 OF 7

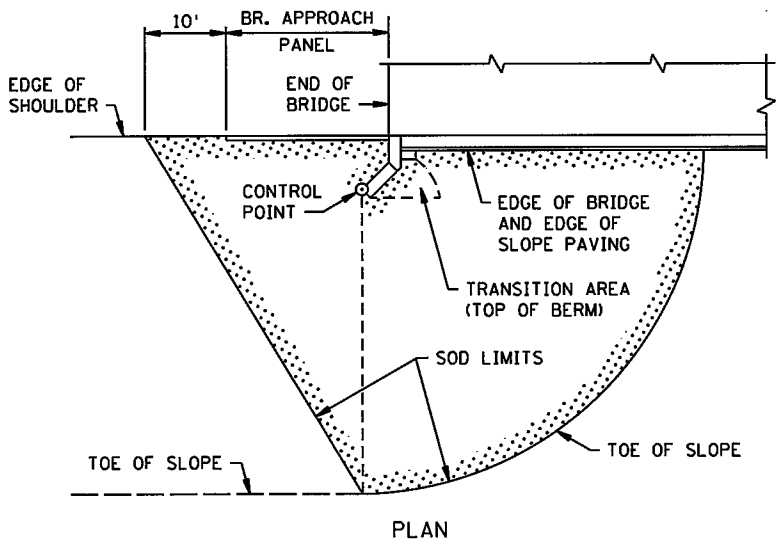
S.P. NO. 6284-162 (TH35W) SHEET NO. 81 OF 367 SHEETS.

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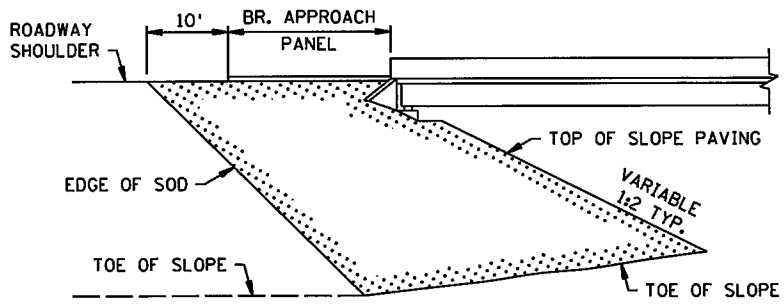
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SODDING LIMITS AT GORE AREA

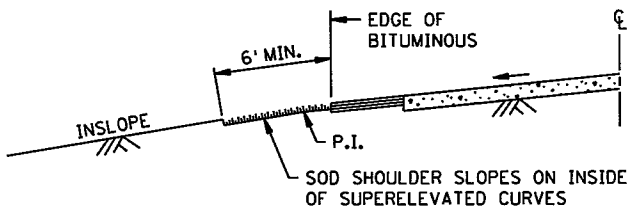


PLAN

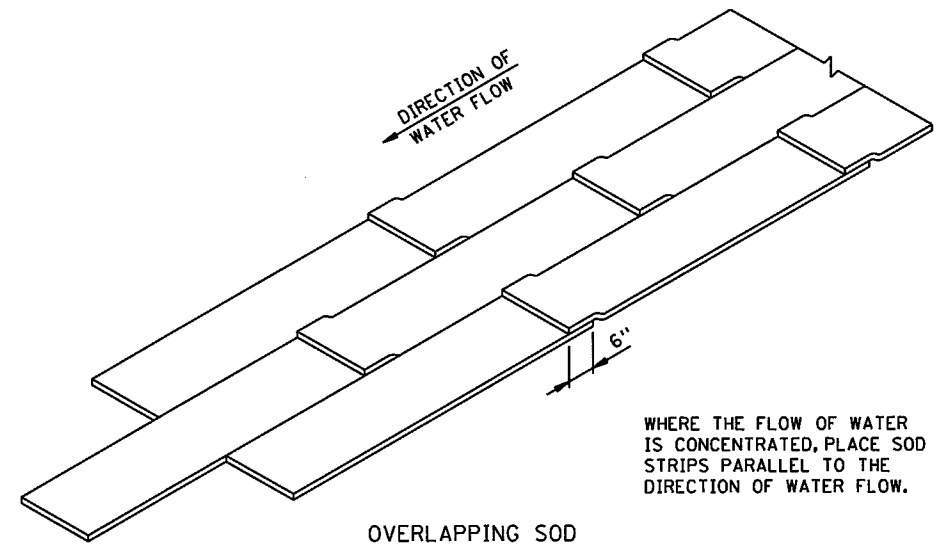


ELEVATION

SODDING LIMITS AT BRIDGE APPROACH FILLS

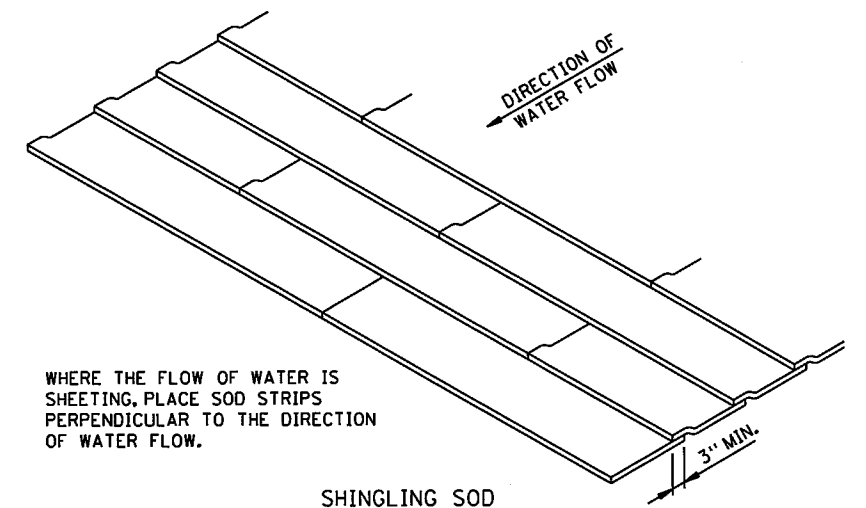


SODDING INSLOPES OF SUPERELEVATED CURVES



OVERLAPPING SOD

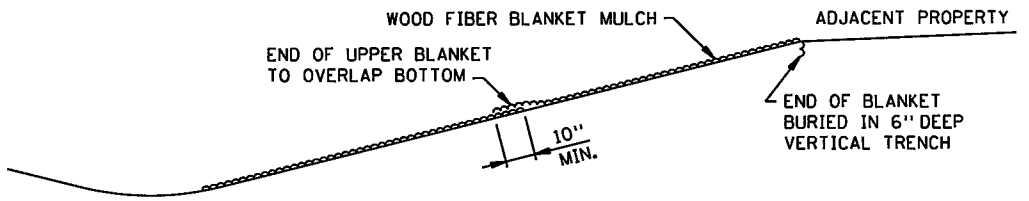
WHERE THE FLOW OF WATER IS CONCENTRATED, PLACE SOD STRIPS PARALLEL TO THE DIRECTION OF WATER FLOW.



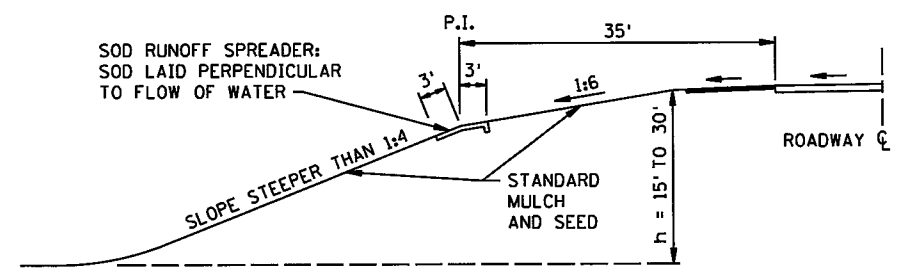
SHINGLING SOD

WHERE THE FLOW OF WATER IS SHEETING, PLACE SOD STRIPS PERPENDICULAR TO THE DIRECTION OF WATER FLOW.

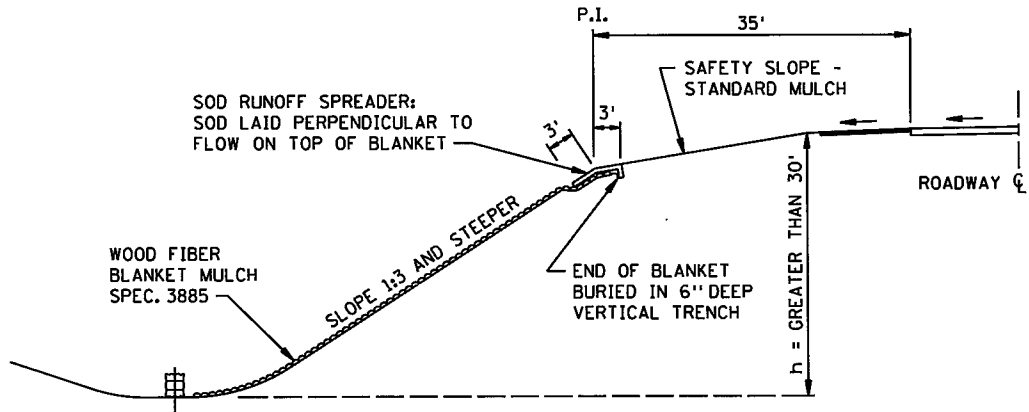
SPECIAL SOD PLACEMENT TECHNIQUES



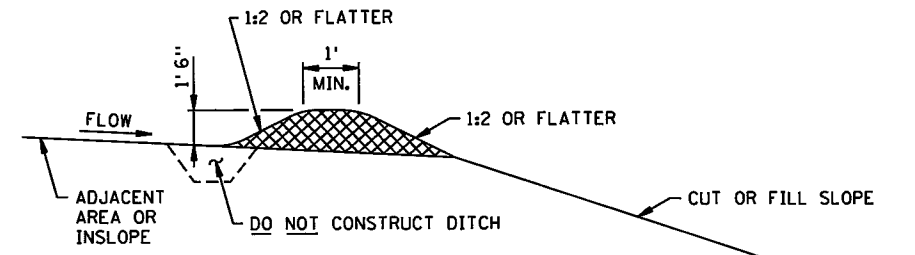
WOOD FIBER BLANKET INSTALLATION ON A CUT SLOPE



BROKEN-BACK SAFETY FILL SLOPE



WOOD FIBER BLANKET INSTALLATION ON AN INSLOPE (WHEN REQUIRED)



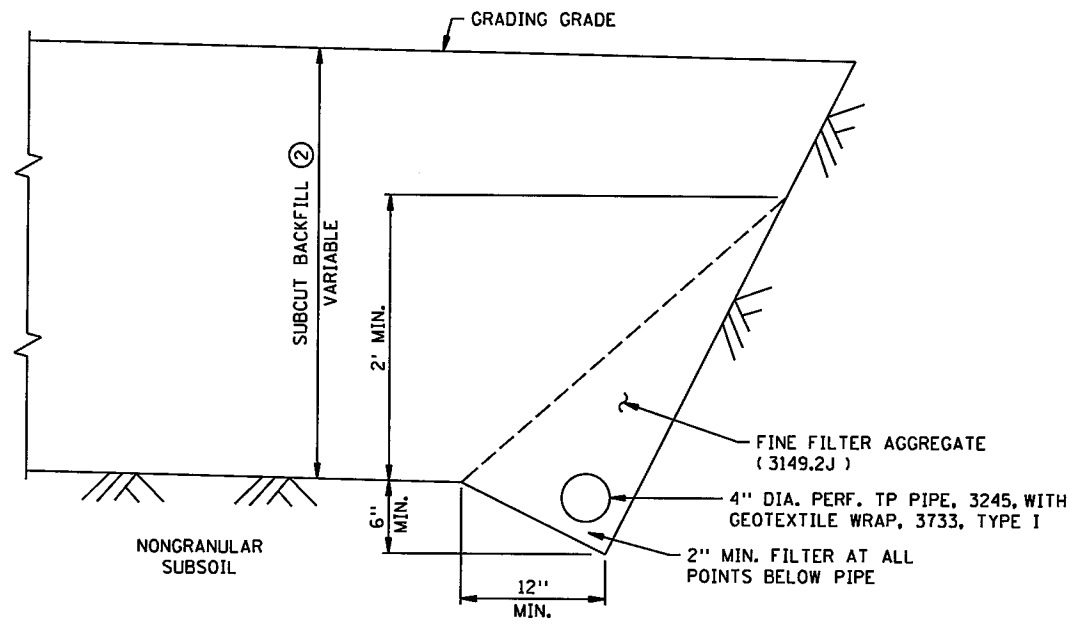
PERMANENT SLOPE PROTECTION DIKE

SPN31 OF SPN42

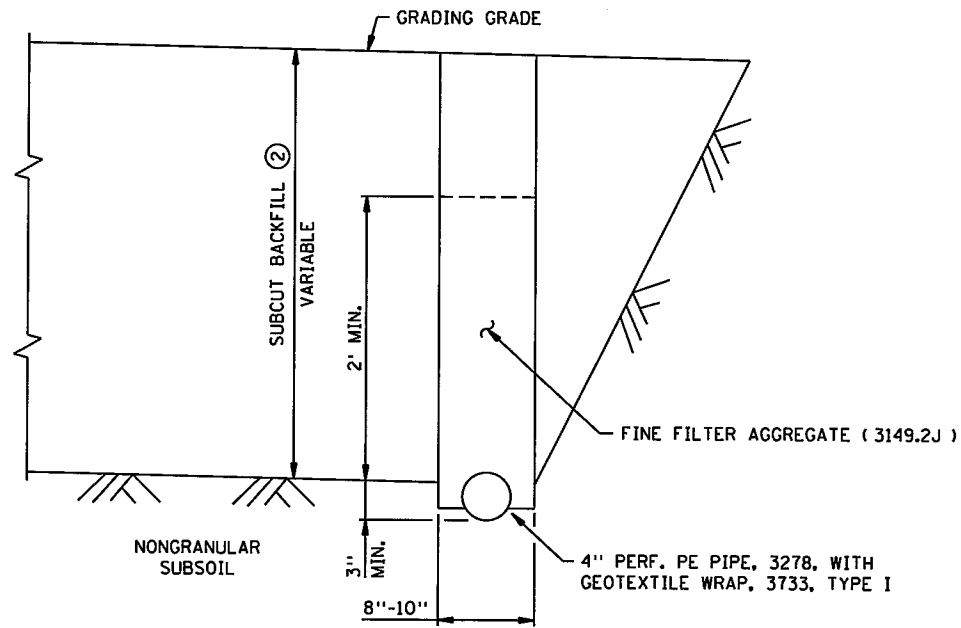
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MINNESOTA DEPARTMENT OF TRANSPORTATION
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PERMANENT SEDIMENT CONTROL
ALONG ROADWAYS AND AT GORE AREAS & BRIDGE APPROACH FILLS
STANDARD PLAN 5-297.406 1 OF 1
S.P. NO. 6284-162 (TH35W) SHEET NO. 82 OF 367 SHEETS



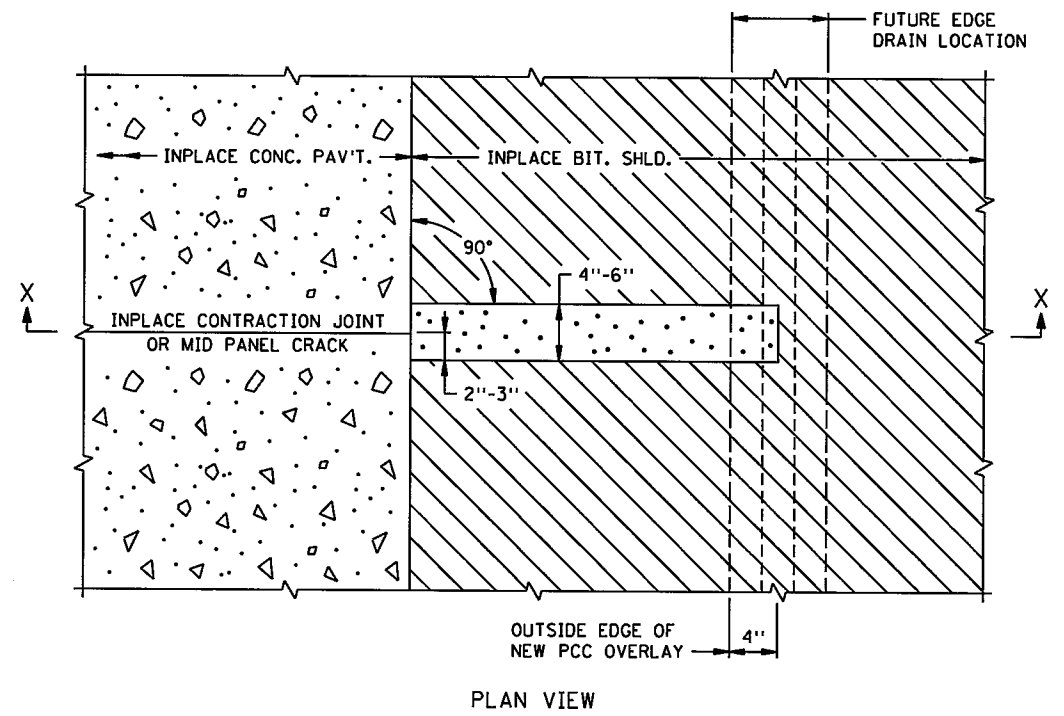
TYPICAL SECTION (OPTION NO. 1) ①



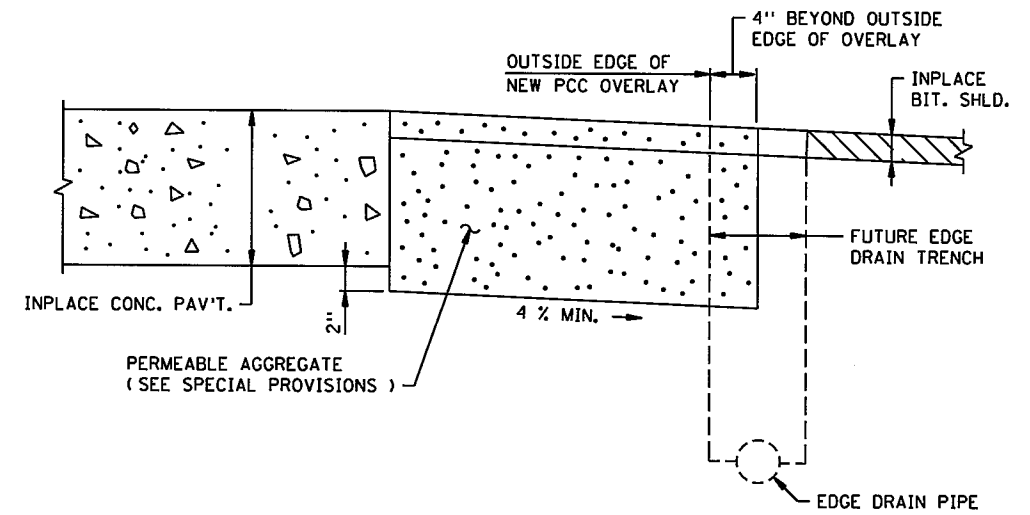
TYPICAL SECTION (OPTION NO. 2) ①

SUBSURFACE DRAIN, SUBCUT DRAIN TYPE

- NOTES:
- ① MAY NEED TO BE MODIFIED FOR SPECIFIC PROJECTS. SEE SPECIAL PROVISIONS FOR MATERIAL AND CONSTRUCTION DETAILS. OPTION NO. 2 MAY ONLY BE USED WHEN PIPE IS TO BE PLACED BY MACHINE TRENCHER.
 - ② GRANULAR, SELECT GRANULAR OR SELECT GRANULAR MODIFIED. (AS SHOWN IN DESIGN RECOMMENDATION LETTER).



PLAN VIEW



SECTION X-X

INTERCEPTOR DRAIN DETAIL ①

- NOTE:
- ① SEE SPECIAL PROVISIONS FOR MATERIAL AND CONSTRUCTION DETAILS.

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DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH

MINNESOTA DEPARTMENT OF TRANSPORTATION

REVISOR:

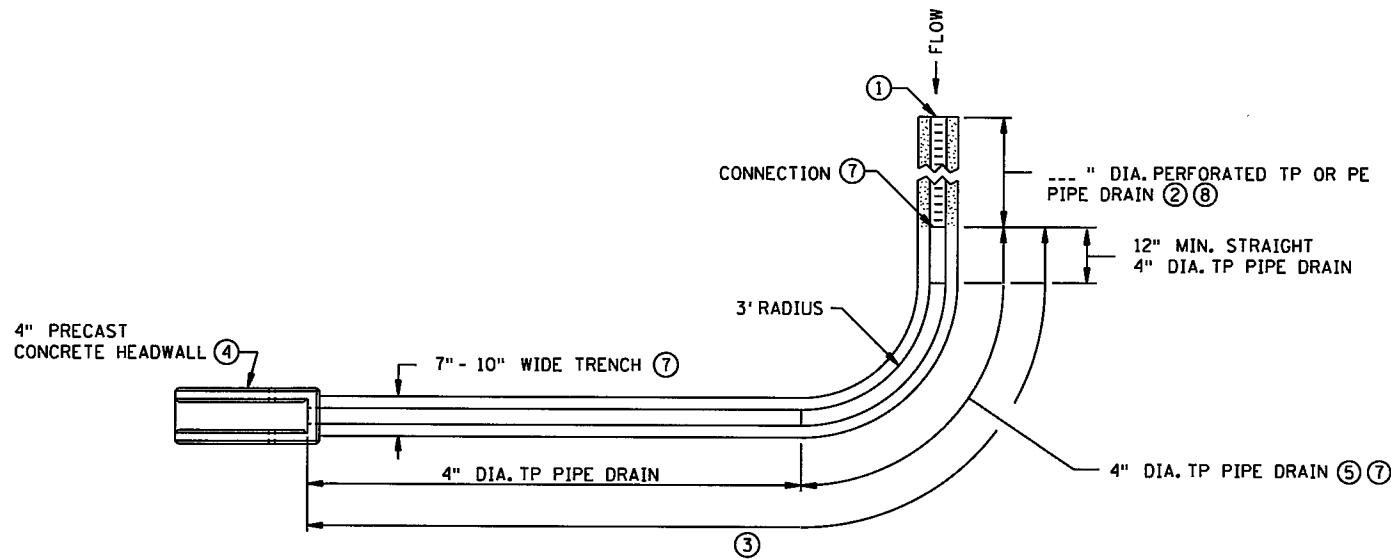
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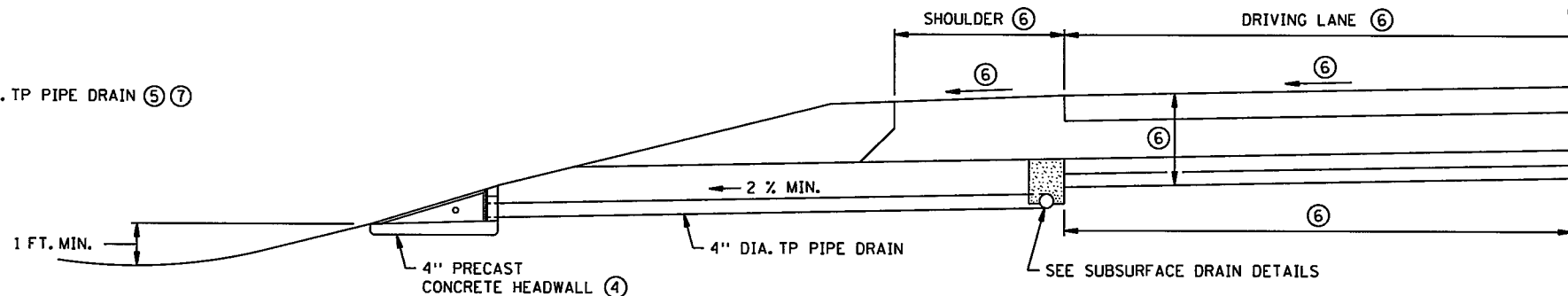
STATE DESIGN ENGINEER

SUBSURFACE DRAINS	
STANDARD PLAN 5-297.430	1 OF 1
S.P. NO. 6284-162 (TH35W)	SHEET NO. 83 OF 367 SHEETS

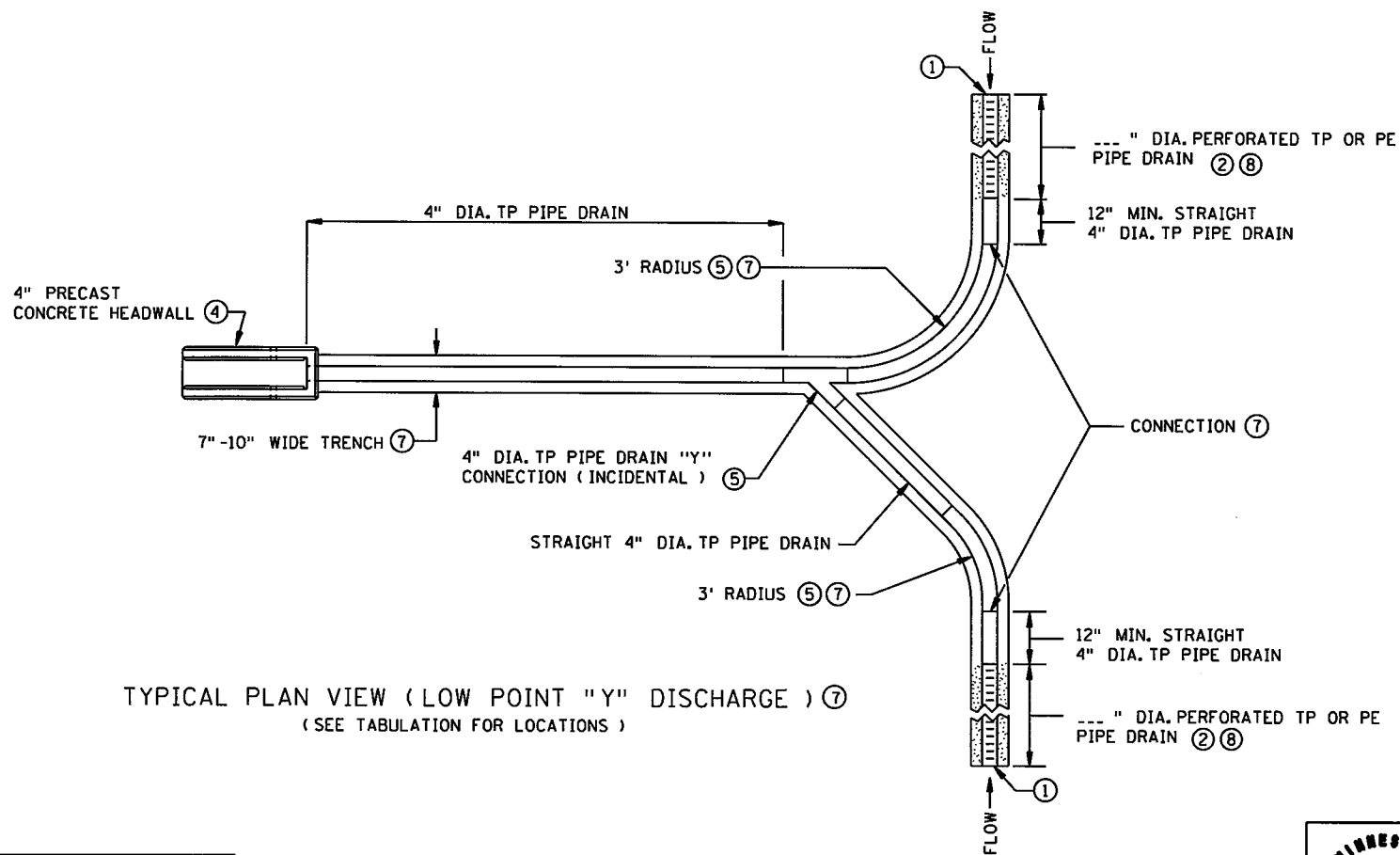
SPN32 OF SPN42



TYPICAL PLAN VIEW (SINGLE DISCHARGE) ⑦
(SEE TABULATION FOR LOCATIONS)



SECTION VIEW
TYPICAL EDGE DRAIN AND DISCHARGE CROSS SECTION ⑦
(SEE TABULATION FOR LOCATIONS)



TYPICAL PLAN VIEW (LOW POINT "Y" DISCHARGE) ⑦
(SEE TABULATION FOR LOCATIONS)

NOTES:

- ① THE UPSTREAM ENDS OF THE PERFORATED PIPE SHALL BE CAPPED AS APPROVED BY THE PROJECT ENGINEER, THE CAPS ARE INCIDENTAL. PLACE PERFORATED PIPE WITH THE PERFORATIONS DOWN.
- ② MAXIMUM LENGTH 500 FT., EXCEPT 300 FT. MAXIMUM FOR GRADES LESS THAN 0.2% . LENGTH INCLUDED AND PAID FOR AS SPEC. 2502, -- INCH PERFORATED TP OR PE PIPE DRAIN.
- ③ LENGTH INCLUDED AND PAID FOR AS SPEC. 2502, 4 INCH DIA. TP PIPE DRAIN.
- ④ PRECAST CONCRETE HEADWALL STANDARD PLATE 3131 PAID FOR AS SPEC. 2502, 4 INCH PRECAST CONCRETE HEADWALL.
- ⑤ DETAILS OF CONNECTION AND COUPLING TO PIPE SHALL BE APPROVED BY THE ENGINEER. PAYMENT FOR "Y " AND EXTRA CONNECTION, 11 INCH TP PIPE AND COUPLING TO BE INCIDENTAL.
- ⑥ SEE ROADWAY TYPICAL SECTIONS FOR ADDITIONAL INFORMATION.
- ⑦ SEE SPECIAL PROVISIONS FOR MATERIAL AND CONSTRUCTION DETAILS.
- ⑧ 3 INCH OR 4 INCH DIAMETER.

SPN33
OF SPN42

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REVISION:
APPROVED: 8-6-2014
[Signature]
DIRECTOR, OFFICE OF MATERIALS AND ROAD RESEARCH



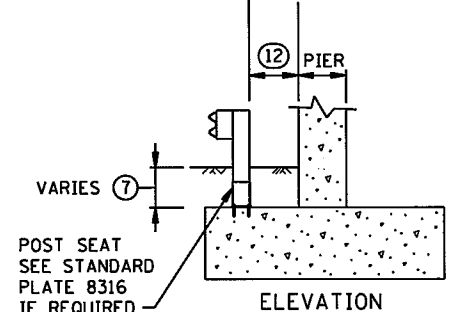
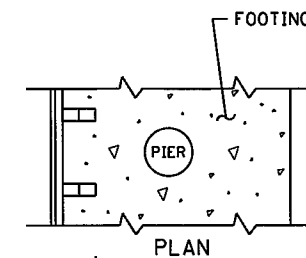
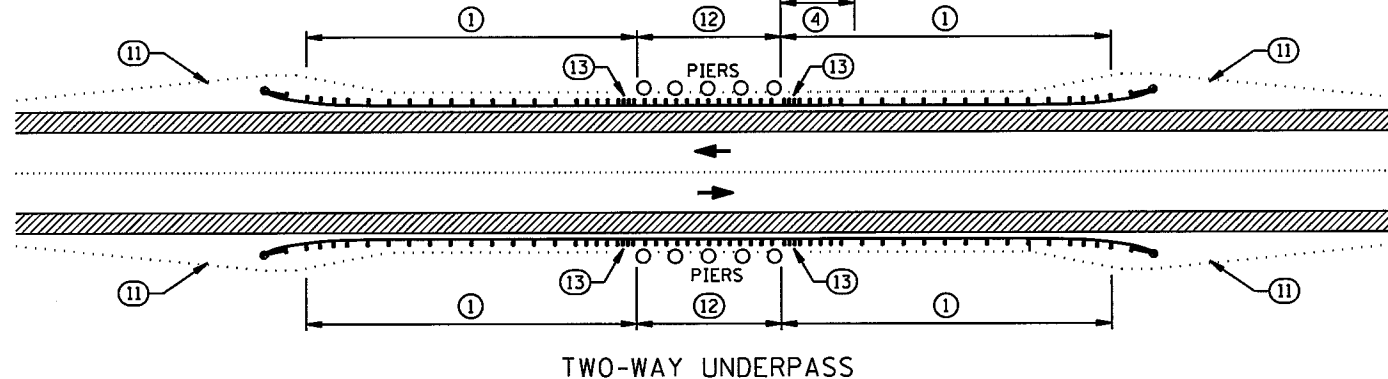
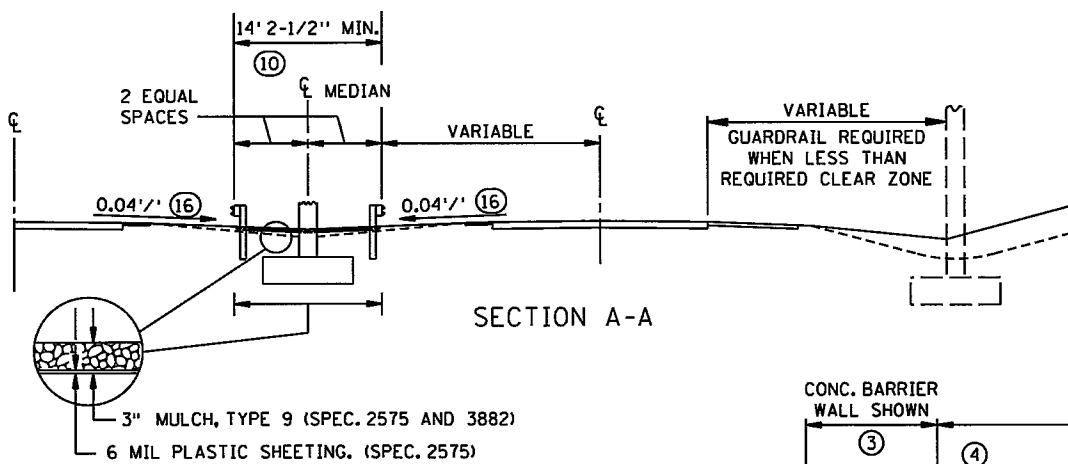
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[Signature] APPROVED:
STATE DESIGN ENGINEER 8-6-2014

SUBSURFACE DRAINS
OUTLET PIPES FOR EDGE AND SUBCUT DRAINS
STANDARD PLAN 5-297.433 1 OF 1
S.P. NO. 6284-162 (TH35W) SHEET NO. 84 OF 367 SHEETS

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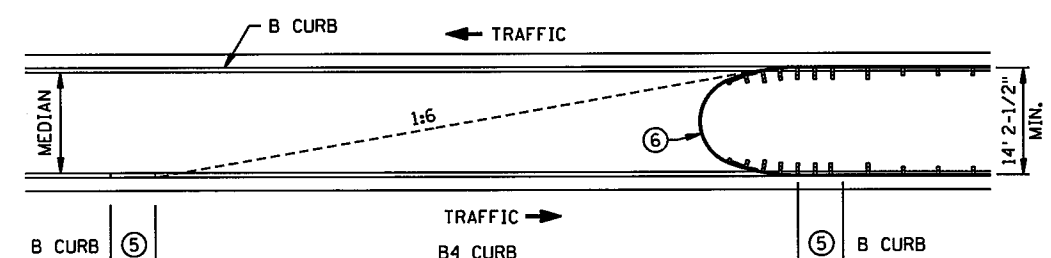
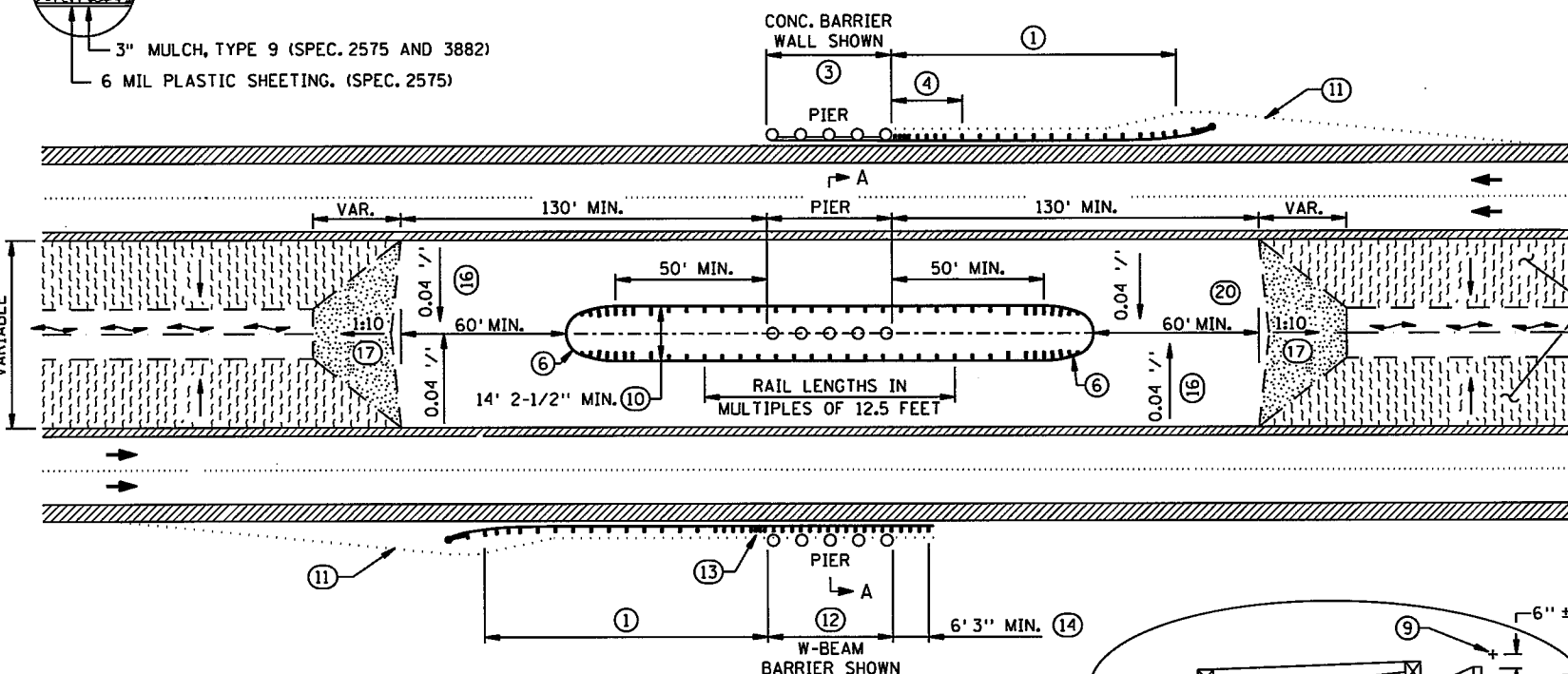


POST REQUIREMENTS AT PIERS

ESTIMATED DESIGN DEFLECTION TABLE FOR DESIGN B W-BEAM GUARDRAIL

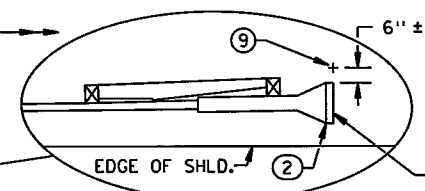
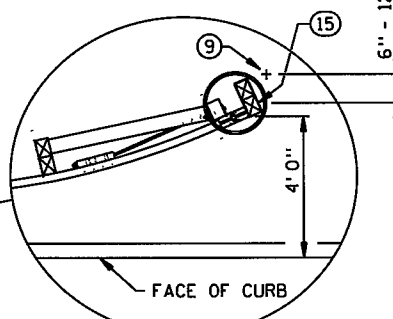
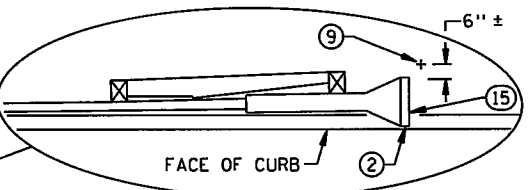
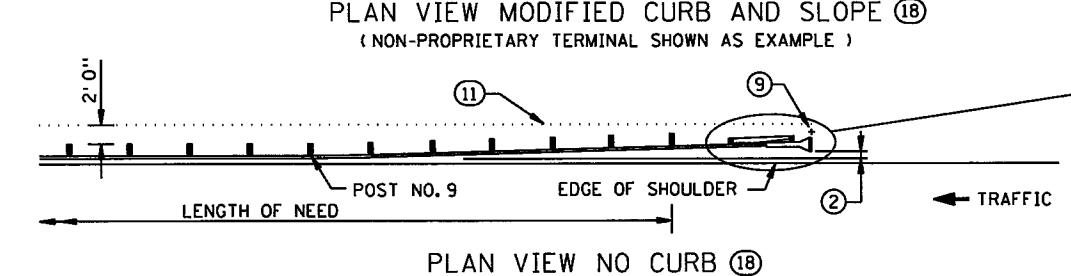
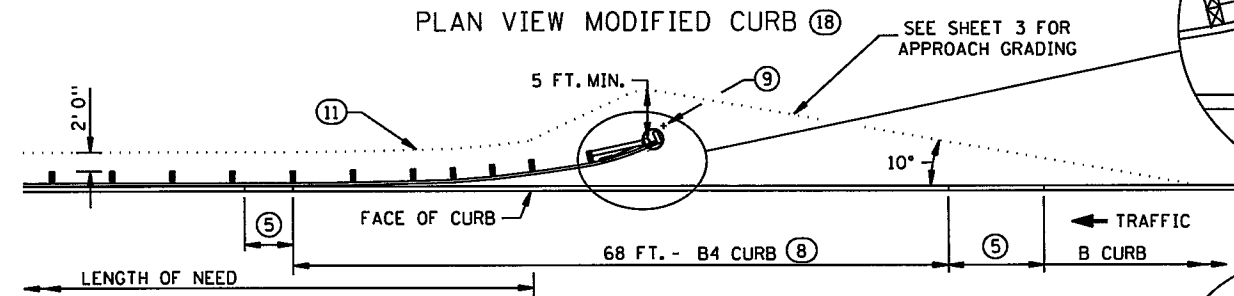
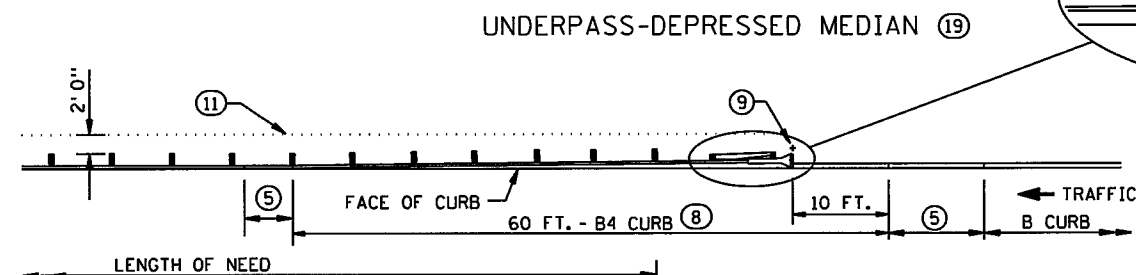
6' 3" POST SPACING	3' 0"
6' 3" POST SPACING WITH DOUBLE NESTED RAIL	2' 8"
MODIFIED 3'-1-1/2" POST SPACING	2' 3"
MODIFIED POST SPACING WITH DOUBLE NESTED RAIL	2' 0"

POST SEAT SEE STANDARD PLATE 8316 IF REQUIRED



NOTES:

- ALL GUARDRAIL POSTS SHALL BE 6 FT. 3 IN. CENTER TO CENTER (DESIGN B), EXCEPT WHERE NOTED.
- THE LATEST APPROVED VERSION OF STANDARD PLATES SHOWN OR AS INDICATED IN THE PLANS SHALL APPLY.
- ① FOR REQUIRED LENGTH OF INSTALLATION SEE ROAD DESIGN MANUAL CHAPTER 10.
- ② THE LAST 50 FT. OF TANGENT TERMINALS MAY BE FLARED AT 1:50 TAPER.
- ③ CONC. BARRIER WALL BETWEEN PIER COLUMNS MAY BE USED. IF USED, SEE BARRIER WALL DETAILS.
- ④ AN APPROVED TRANSITION MUST BE USED.
- ⑤ 10 FT. CURB TRANSITION, USE IF ADJACENT CURB IS GREATER THAN 4 INCHES.
- ⑥ THRIE BEAM BULLNOSE. SEE STANDARD PLAN 5-297.611 FOR DETAILS.
- ⑦ IF EMBEDMENT IS GREATER THAN 3 FT. 0 IN., OR IF EMBEDMENT IS 2 FT. 6 IN. TO 3 FT. 0 IN. AND ADJACENT POSTS ARE EMBEDDED 3 FT. 0 IN. OR MORE, POST SEAT IS NOT REQUIRED.
- ⑧ FOR CURB 6 IN. OR HIGHER, MILL TO 3 IN. HEIGHT.
- ⑨ SNOWPLOW MARKER (X4-5) WITH A 2 LB./FT. DELINEATOR POST 8 FT. LONG (SPEC. 3401) DRIVEN INTO THE GROUND. EXTEND 3 FT. ABOVE TERMINAL. THE MARKER IS INCIDENTAL FOR WHICH NO DIRECT PAYMENT WILL BE MADE.
- ⑩ MEASUREMENT IS FROM BACK OF RAIL TO BACK OF RAIL.
- ⑪ 1:10 OR FLATTER SLOPE P.I.
- ⑫ SEE ESTIMATED DESIGN DEFLECTION TABLE FOR DESIGN B W-BEAM GUARDRAIL.
- ⑬ WHEN CLOSE POST SPACING OR DOUBLE NESTED RAIL IS USED, THIS POST SPACING SHOULD EXTEND A MINIMUM OF 12 FT. IN THE DIRECTION OF APPROACHING TRAFFIC.
- ⑭ THE ANCHOR ASSEMBLY MUST BE LOCATED DOWNSTREAM OF THE HAZARD.
- ⑮ MARK THE APPROACH END OF PLATE BEAM GUARDRAIL INSTALLATIONS WITH A STRIPED OBJECT MARKER SIZED TO FIT THE END TERMINAL, HAVING ALTERNATING BLACK AND REFLECTIVE YELLOW (WIDE ANGLE PRISMATIC RETROREFLECTIVE SHEETING) STRIPES SLOPED DOWNWARD AT A 45 DEGREE ANGLE TOWARD THE SIDE ON WHICH TRAFFIC PASSES. FOR FLAT END TREATMENTS THE OBJECT MARKER SHALL FIT INSIDE THE RECESSED AREA. FOR ROUNDED END TREATMENTS THE OBJECT MARKER SHALL WRAP AROUND THE CIRCULAR END AND BE MOUNTED SO THE TOP OF THE OBJECT MARKER LINES UP WITH THE TOP OF THE END TREATMENT.
- ⑯ 0.04 FT./FT. CROSS SLOPE TYPICAL. 0.10 FT./FT. CROSS SLOPE MAXIMUM.
- ⑰ 1:10 SLOPE OR FLATTER.
- ⑱ USE ONLY FOR RETROFITS WITH SITE RESTRICTIONS. FOR RETROFITS WITHOUT SITE RESTRICTIONS AND NEW CONSTRUCTION, SEE SHEET 3.
- ⑲ MEDIAN GRADING DETAIL SHOWN APPLIES TO THRIE-BEAM BULLNOSE ONLY.
- ⑳ DRAINAGE DETAILS SHOWN ON GRADING PLAN.



SPN34 OF SPN42

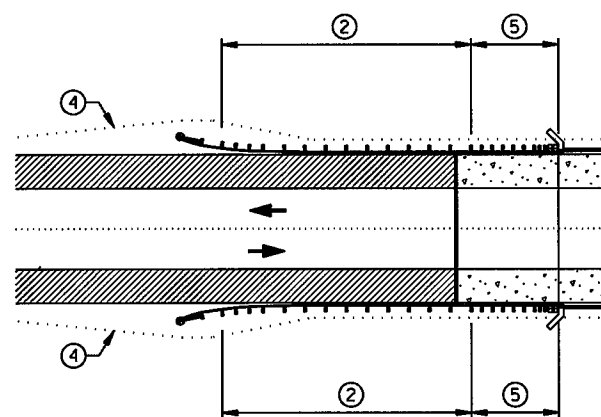
GUARDRAIL INSTALLATIONS AT MEDIANS AND END TREATMENTS

STANDARD PLAN 5-297.601 1 OF 3

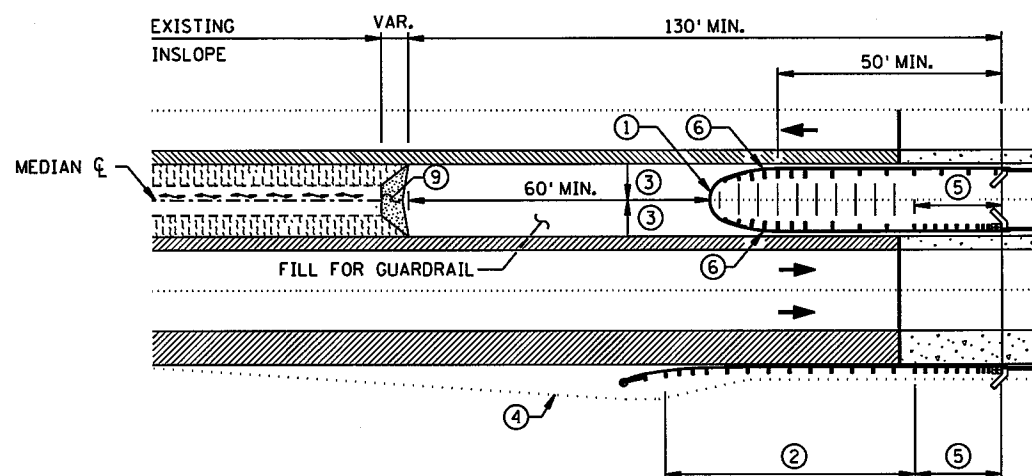
S.P. NO. 6284-162 (TH35W) SHEET NO. 85 OF 367 SHEETS



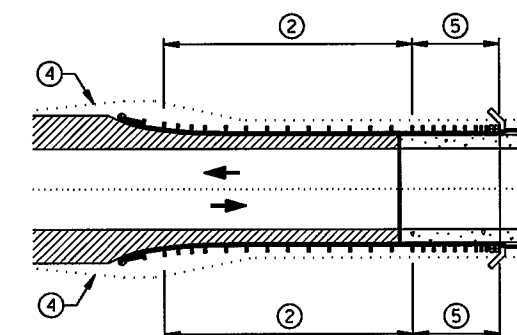
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STATE DESIGN ENGINEER



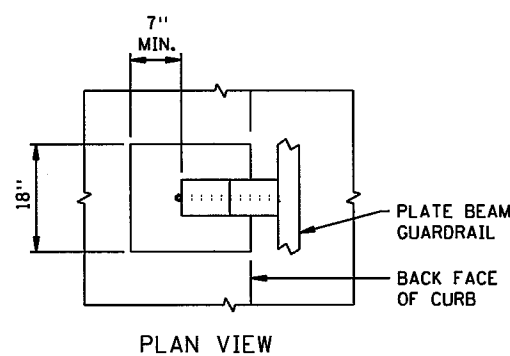
TWO - WAY BRIDGE WITH FULL SHOULDERS



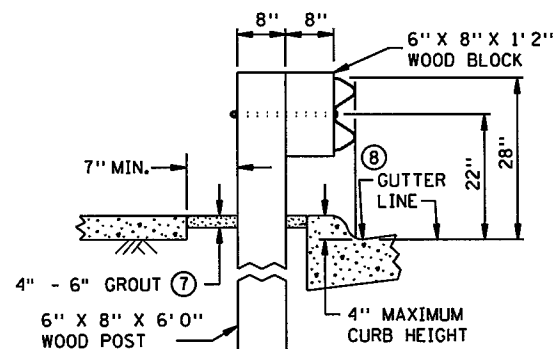
ONE - WAY BRIDGE WITH FULL RIGHT SHOULDER (FOR 14' 2-1/2" THRIE BEAM BULLNOSE)



TWO - WAY BRIDGE WITHOUT FULL SHOULDERS

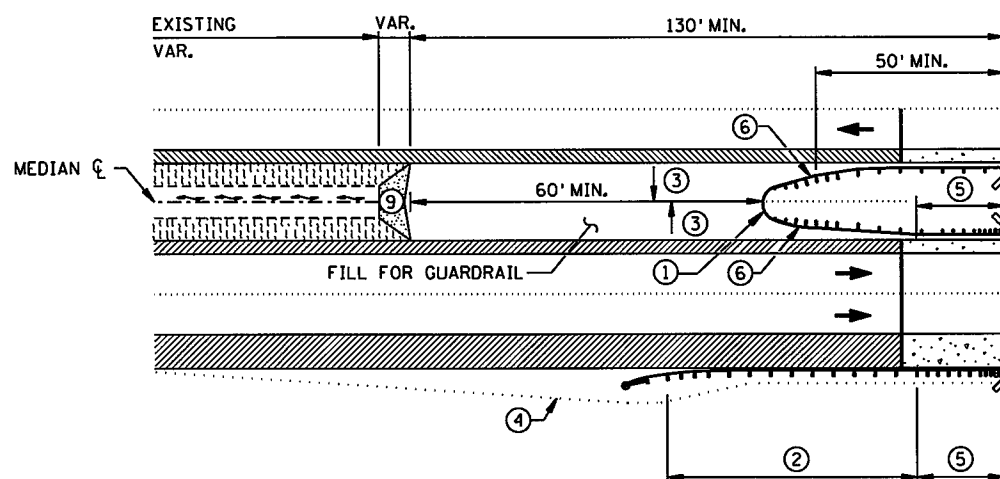


PLAN VIEW



ELEVATION

TYPICAL W-BEAM GUARDRAIL SECTION AT POST SET IN CONCRETE



ONE - WAY BRIDGE WITH FULL RIGHT SHOULDER (FOR MEDIANS WIDER THAN 14' 2-1/2" THRIE BEAM BULLNOSE)

NOTES:

- ALL GUARDRAIL POSTS SHALL BE 6 FT. 3 IN. CENTER TO CENTER (DESIGN B), EXCEPT WHERE NOTED.
- THE LATEST APPROVED VERSION OF STANDARD PLATES SHOWN OR AS INDICATED IN THE PLANS SHALL APPLY.
- ① THRIE BEAM BULLNOSE, SEE STANDARD PLAN 5-297.611 FOR DETAILS.
- ② FOR THE REQUIRED LENGTH SEE ROAD DESIGN MANUAL CHAPTER 10.
- ③ 0.04 FT./FT. CROSS SLOPE TYPICAL, 0.10 FT./FT. CROSS SLOPE MAXIMUM.
- ④ 1:10 OR FLATTER SLOPE P.I.. APPROACH GRADING VARIES WITH TERMINAL TYPE.
- ⑤ PLATE BEAM GUARDRAIL ATTACHMENTS TO FIXED OBJECTS REQUIRE AN APPROVED TRANSITION SECTION.
- ⑥ FOR MEDIANS WIDER THAN THE 14 FT. 2-1/2 IN., BEFORE TAPERING THE APPROACH SIDE, TAPER THE OPPOSING SIDE AS SHOWN ON THE BULLNOSE DESIGN DETAIL. APPROACH TAPER SHOULD NOT EXCEED 1:25 IF THE BARRIER IS WITHIN THE SHY LINE OR 1:15 IF IT IS OUTSIDE.
- ⑦ GROUT MIX (BY VOLUME: 1 PART CEMENT [TYPE 1A], 14 PARTS SAND, 5 PARTS WATER).
- ⑧ PLACE FRONT FACE OF W-BEAM DIRECTLY ABOVE FRONT FACE OF CURB.
- ⑨ 1:10 SLOPE OR FLATTER.

SPN35 OF SPN42

GUARDRAIL INSTALLATIONS AT MEDIANS AND END TREATMENTS

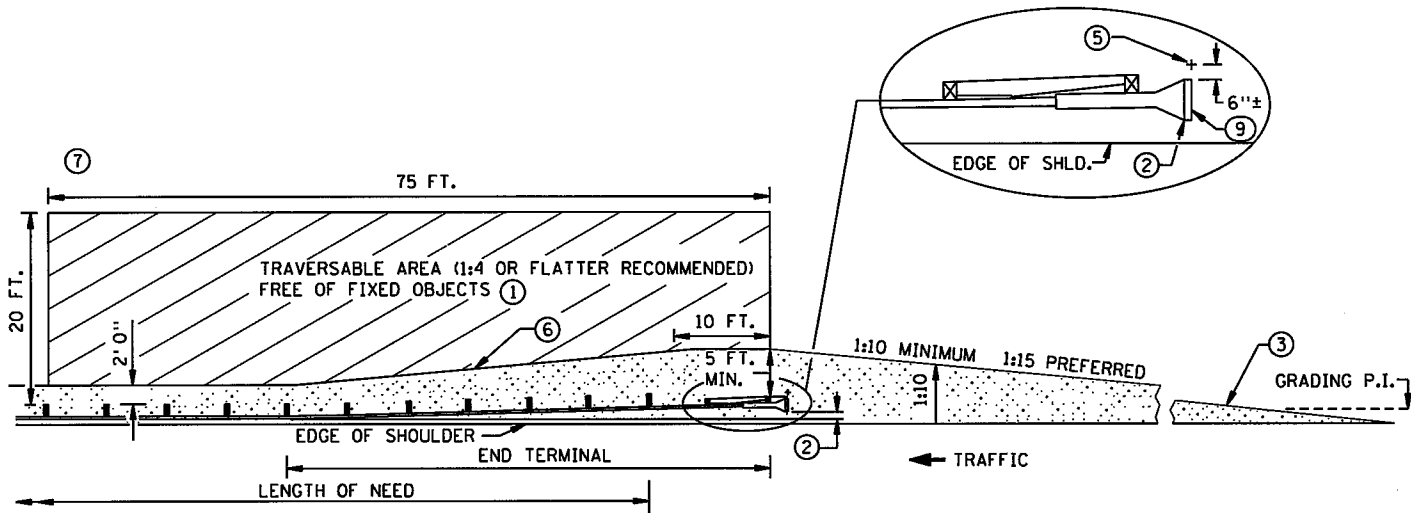
STANDARD PLAN 5-297.601 2 OF 3

S.P. NO. 6284-162 (TH35W) SHEET NO. 86 OF 367 SHEETS

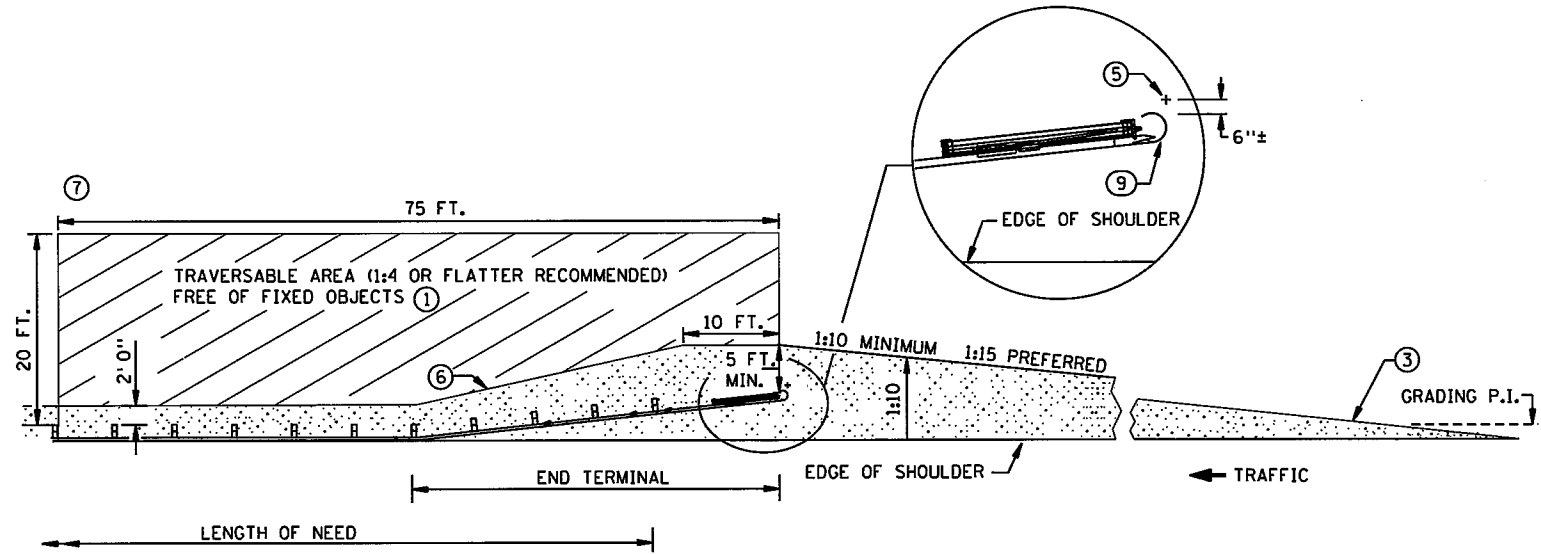
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APPROVED: *Christine By* 5-27-2014

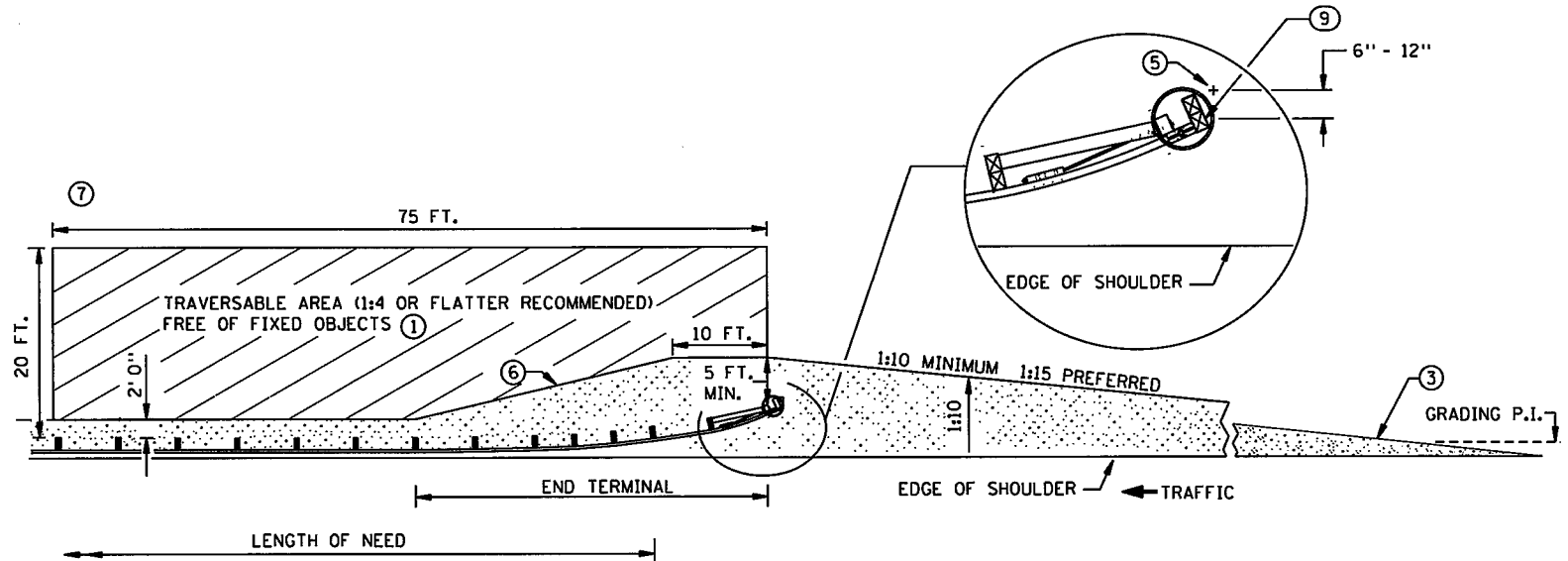
STATE DESIGN ENGINEER



PLAN VIEW
(PROPRIETARY TANGENT TERMINAL SHOWN AS EXAMPLE)



PLAN VIEW ⑧
(PROPRIETARY FLARED TERMINAL SHOWN AS EXAMPLE)



PLAN VIEW ④ ⑧
(ELT)

NOTES:

- ALL CROSS SLOPES ARE IN FOOT/FOOT UNLESS OTHERWISE NOTED.
- ALL GUARDRAIL POSTS SHALL BE 6 FT. 3 IN. CENTER TO CENTER (DESIGN B), EXCEPT WHERE NOTED.
- CHANGES (TO SUBJECTS COVERED BY THIS SHEET) INDICATED IN THE PLANS OR ON PLATES WITH MORE RECENT APPROVAL DATES SHALL APPLY.
- GRADING AND DRAINAGE HARDWARE ARE NOT INCIDENTAL TO GUARDRAIL INSTALLATION.
- ① SLOPES BETWEEN 1:3 AND 1:4 PERMITTED WHEN 1:4 OR FLATTER IS NOT POSSIBLE. FOR SLOPES STEEPER THAN 1:3 THE AREA IMMEDIATELY BEHIND AND BEYOND THE END TERMINAL SHOULD, AT LEAST, BE SIMILAR IN CROSS SECTION TO THE UNSHIELDED ROADSIDE AREA UPSTREAM OF THE END TERMINAL.
- ② THE LAST 50 FT. OF TANGENT TERMINALS CAN BE FLARED AT 1:50 TAPER.
- ③ WHEN GRADING PLATFORMS ARE BUILT, THEY MUST BE SMOOTHLY TRANSITIONED TO EXISTING SIDE SLOPE SO THE ENTIRE ROADSIDE APPROACH TO THE BARRIER REMAINS TRAVERSABLE, AS WELL AS THE AREA IMMEDIATELY BEHIND IT.

- ④ SEE STANDARD PLATE 8329.
- ⑤ SNOWPLOW MARKER (X4-5) WITH A 2 LB./FT. DELINEATOR POST 8 FT. LONG (SPEC. 3401) DRIVEN INTO THE GROUND. EXTEND 3 FT. ABOVE TERMINAL. THE MARKER IS INCIDENTAL FOR WHICH NO DIRECT PAYMENT WILL BE MADE. MARK BOTH THE BEGINNING AND END OF PLATE BEAM GUARDRAIL INSTALLATION.
- ⑥ 1:10 OR FLATTER SLOPE P.I.
- ⑦ GRADUALLY BLEND SLOPE FROM TRAVERSABLE AREA TO STEEP EXISTING SLOPE (WHEN SLOPE IS STEEPER THAN 1:6).
- ⑧ IF THE TERRAIN BEYOND THE TERMINAL END AND IMMEDIATELY BEHIND THE BARRIER IS NOT SAFELY TRAVERSABLE, A TANGENT (ENERGY- ABSORBING) TERMINAL SHALL BE USED.
- ⑨ MARK THE APPROACH END OF PLATE BEAM GUARDRAIL INSTALLATIONS WITH A STRIPED OBJECT MARKER SIZED TO FIT THE END TERMINAL, HAVING ALTERNATING BLACK AND REFLECTIVE YELLOW (WIDE ANGLE PRISMATIC RETROREFLECTIVE SHEETING). STRIPES SHALL SLOPE DOWNWARD AT A 45 DEGREE ANGLE TOWARD THE SIDE ON WHICH TRAFFIC PASSES. FOR FLAT END TREATMENTS THE OBJECT MARKER SHALL FIT INSIDE THE RECESSED AREA. FOR ROUNDED END TREATMENTS THE OBJECT MARKER SHALL WRAP AROUND THE CIRCULAR END AND BE MOUNTED SO THE TOP OF THE OBJECT MARKER LINES UP WITH THE TOP OF THE END TREATMENT.



Christina By
STATE DESIGN ENGINEER

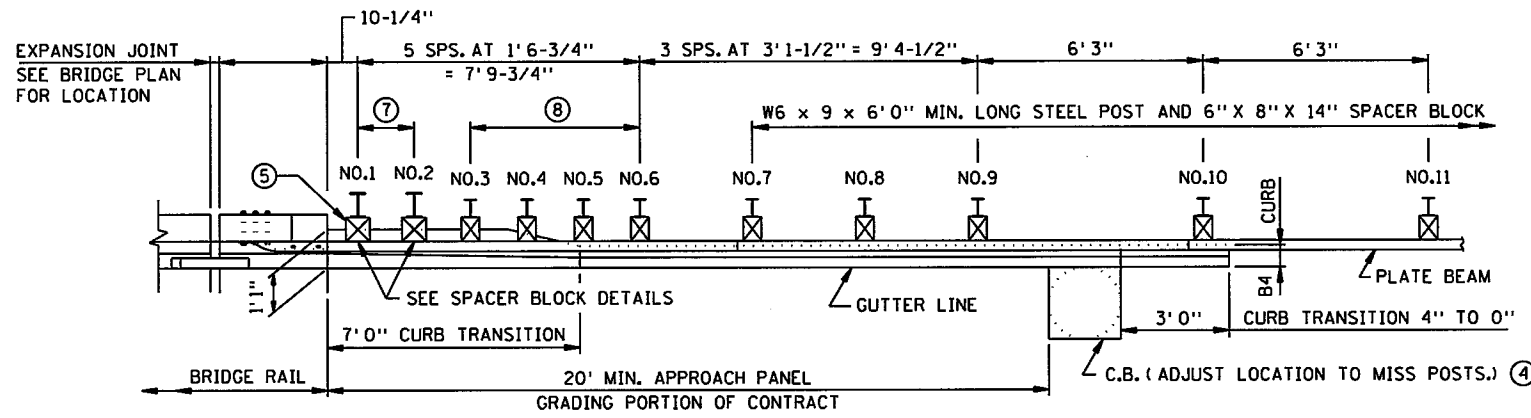
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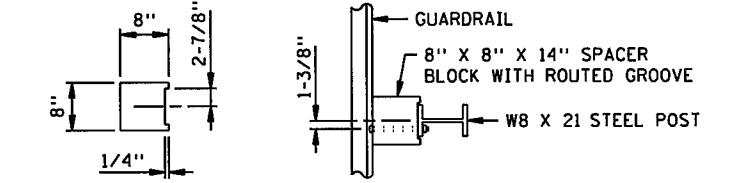
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SPN36
OF SPN42

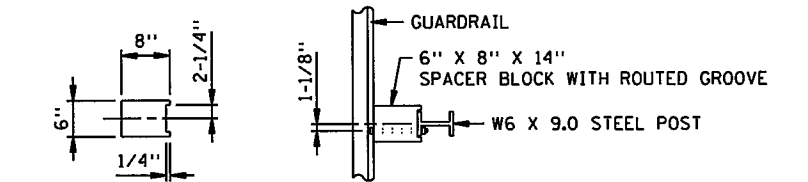
GUARDRAIL INSTALLATIONS AT MEDIANS AND END TREATMENTS (FOR NEW CONSTRUCTION AND RETROFITS WITHOUT SITE RESTRICTIONS)	
STANDARD PLAN 5-297.601	3 OF 3
S.P. NO. 6284-162 (TH35W) SHEET NO. 87 OF 367 SHEETS	



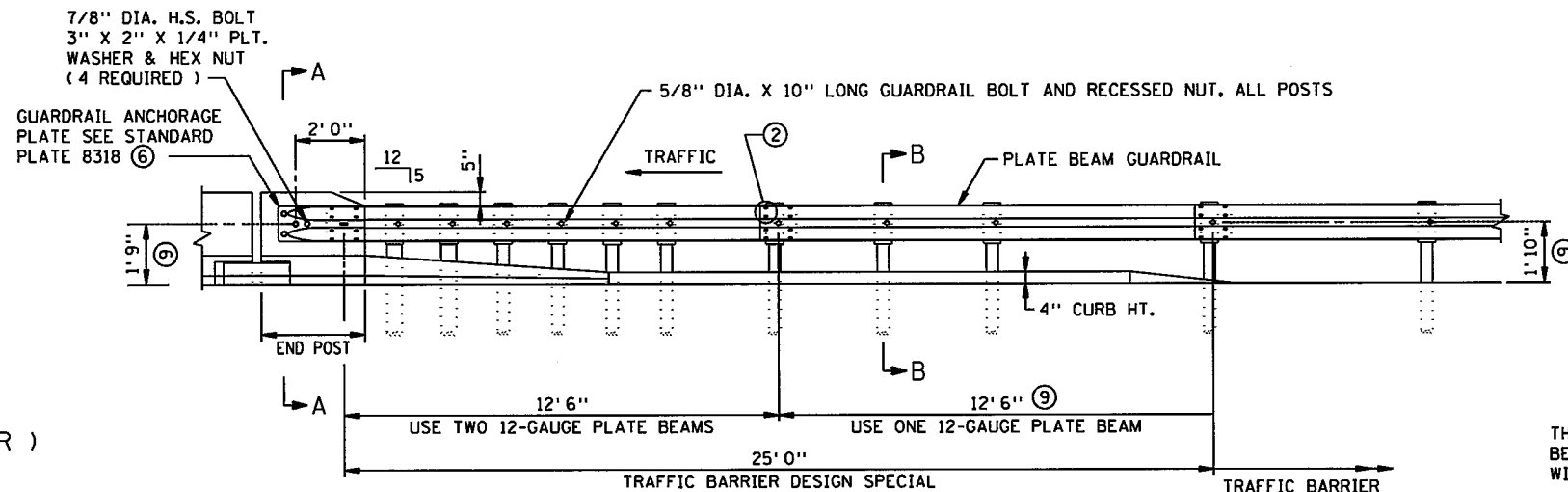
PLAN



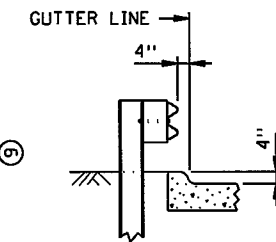
ROUTED GROOVE DETAIL TOP VIEW
POSTS 1 AND 2



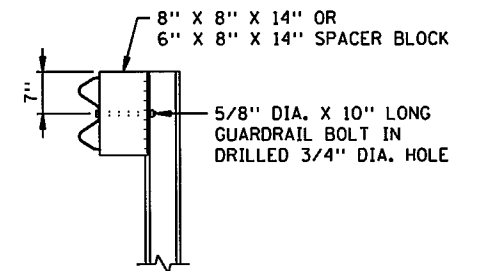
ROUTED GROOVE DETAIL TOP VIEW
POSTS 3 - 11



ELEVATION

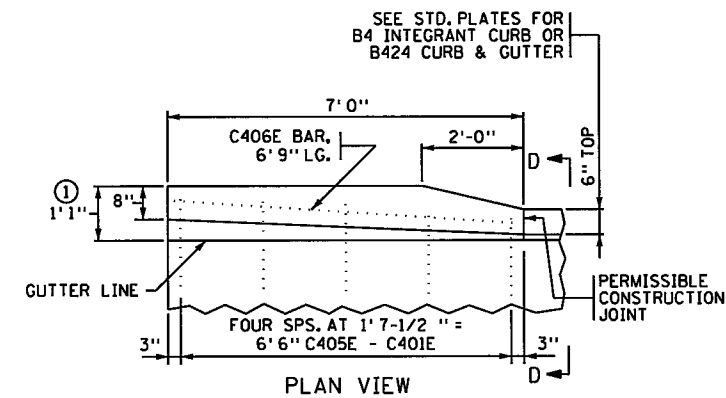


SECTION B-B
THE TRANSITION SECTION HAS BEEN TESTED AND APPROVED WITH THE CURB PLACED AS SHOWN

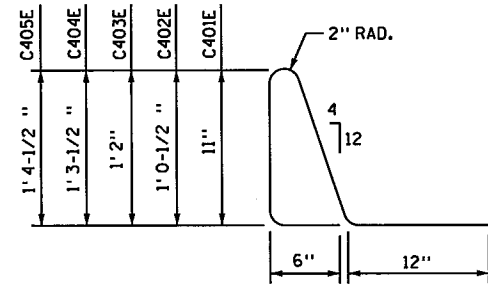


END VIEW
SPACER BLOCK DETAILS

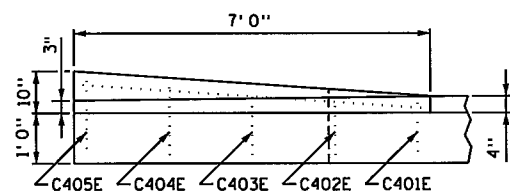
SECTION A - A
F SHAPE RAIL (F BARRIER)
(PARALLEL WINGWALL SHOWN)



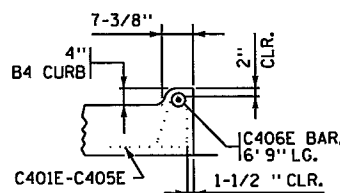
PLAN VIEW



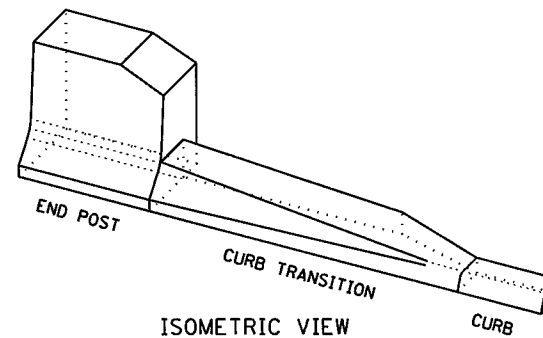
C401E - C405E ③



INSIDE ELEVATION
(FOR F - SHAPE SAFETY RAIL)



SECTION D-D



ISOMETRIC VIEW

NOTES:

- ① FROM BACK SIDE OF CURB TRANSITION TO GUTTERLINE.
- ② 5/8" DIA. X 1-1/4" LONG GUARDRAIL BOLTS AND NUTS TYPICAL AT SPLICES.
- ③ AS PER MNDOT 3301, USE EPOXY COATED GRADE 60 REINFORCEMENT BARS.
- ④ SEE ROAD PLANS TO VERIFY ACTUAL DIMENSION AND LOCATION.
- ⑤ ADDITIONAL BLOCKING MAY BE REQUIRED TO CLEAR BRIDGE STRUCTURE. VERIFY IN FIELD.
- ⑥ SANDWICH ANCHOR PLATE BETWEEN RAIL BEAMS.
- ⑦ POSTS 1 AND 2 TO BE W8 X 21 X 8'0" MINIMUM LONG STEEL POST AND 8" X 8" X 14" SPACER BLOCK.
- ⑧ POSTS 3, 4, 5, AND 6 TO BE W6 X 9 X 6'0" MIN. LONG STEEL POST AND 6" X 8" X 14" SPACER BLOCK.
- ⑨ GUARDRAIL CENTERLINE HEIGHT IS 1'-9" FROM 0' TO 12'-6" FROM BRIDGE. HEIGHT TRANSITIONS FROM 1'-9" TO 1'-10" BETWEEN 12'-6" AND 25' FROM BRIDGE.

TRAFFIC BARRIER DESIGN SPECIAL

CURB TRANSITION DETAILS
F-SHAPE SAFETY BARRIER TO B4 CURB
WITH W-BEAM GUARDRAIL BARRIER



APPROVED: *Christophe Ky*
STATE DESIGN ENGINEER

REVISED:

APPROVED:

5-27-2014

W-BEAM TRANSITION TO CONCRETE F-SHAPE
SAFETY RAIL WITH APPROACH CURB
(STEEL POST)

STANDARD PLAN 5-297.603

1 OF 1

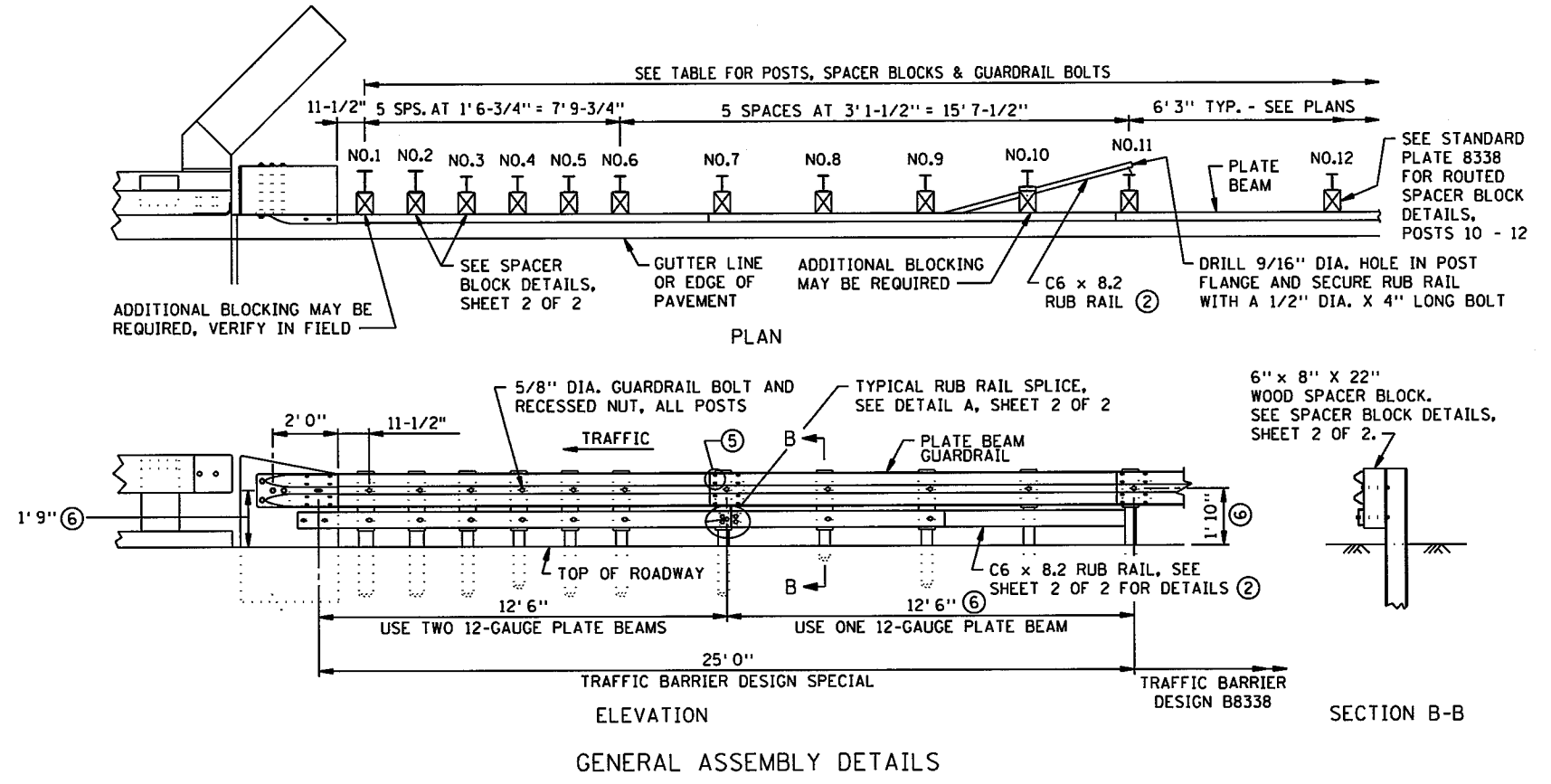
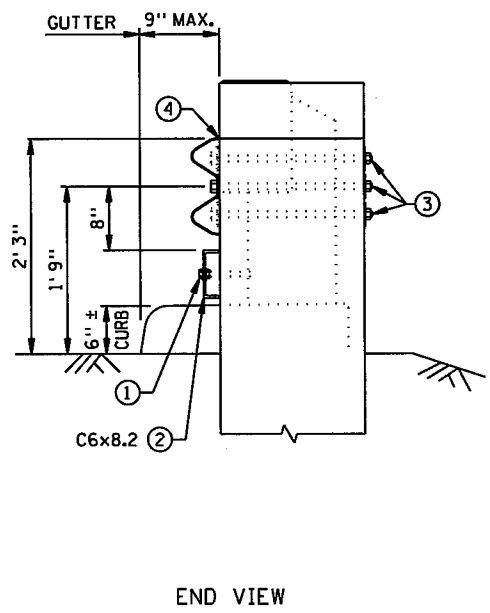
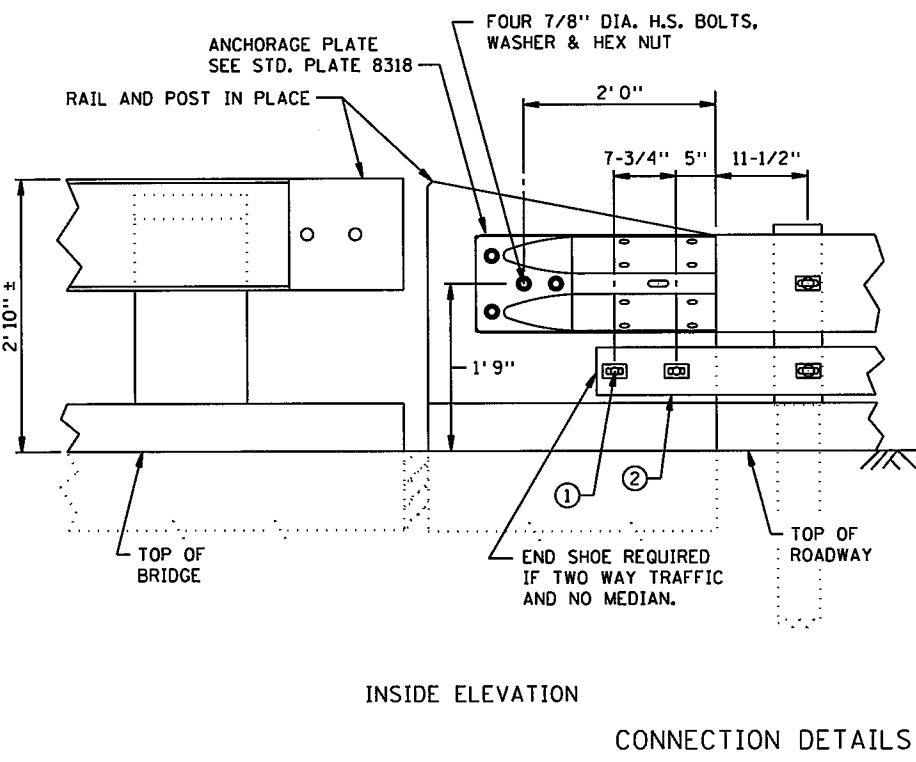
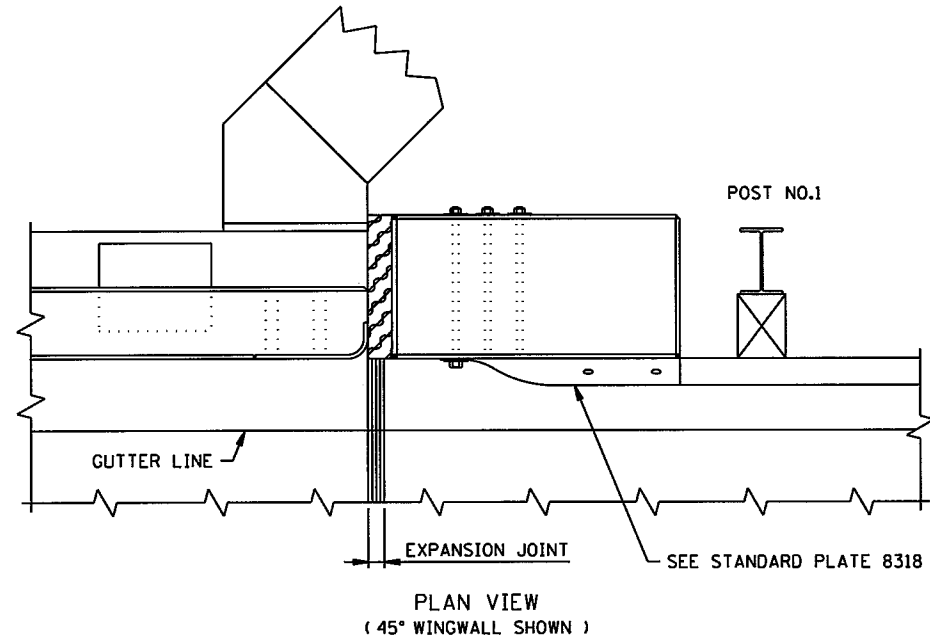
S.P. NO. 6284-162 (TH35W) SHEET NO. 88 OF 367 SHEETS

SPN37
OF SPN42

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POST, SPACER BLOCK & BOLT TABLE

DESCRIPTION	POST NO.	SIZE
POST	1 & 2	W8 X 21 X 8' 0" MIN. LONG
	3 - 12	W6 X 9 X 6' 0" MIN. LONG
SPACER BLOCK	1 - 9	6" X 8" X 22"
	10 - 12	6" X 8" X 14"
GUARDRAIL BOLT & RECESSED NUT	1 - 12	5/8" DIA. X 10" - GUARDRAIL
	1 - 9	5/8" DIA. X 12" - RUB RAIL

- NOTES:
- SOIL COMPACTION AT END POST AS PER SPEC. 2451.
 - GUARDRAIL CONNECTION SHALL BE THE SAME AS REQUIRED ON BRIDGE RAILINGS, SEE BRIDGE DETAILS MANUAL FOR ADDITIONAL INFORMATION.
 - ① 5/8" DIA. BOLTS WITH APPROVED CONCRETE ANCHORS EMBEDDED 5" IN END POST. LOCATE CONCRETE ANCHORS TO MISS BRIDGE REINFORCEMENT
 - ② RUB RAIL SHALL BE USED WHEN THERE IS NO CURBING ON APPROACH PANEL.
 - ③ 7/8" DIA. H.S. BOLT OR EQUAL THREADED ROD, 3" X 2" X 1/4" PLATE WASHER AND HEX NUT (4 REQUIRED).
 - ④ TIMBER BLOCKING MAY BE REQUIRED BEHIND GUARDRAIL CONNECTION AND RUB RAIL DEPENDING ON CURB WIDTH.
 - ⑤ 5/8" DIA. X 1-1/4" LONG GUARDRAIL BOLTS AND NUTS TYPICAL AT SPLICES.
 - ⑥ GUARDRAIL CENTERLINE HEIGHT IS 1'-9" FROM 0' TO 12'-6" FROM BRIDGE. HEIGHT TRANSITIONS FROM 1'-9" TO 1'-10" BETWEEN 12'-6" AND 25' FROM BRIDGE.

TRAFFIC BARRIER DESIGN SPECIAL

SPN38
OF SPN42

W-BEAM TRANSITION TO CONCRETE END POST
WITH OR WITHOUT APPROACH CURB
(STEEL POST)

STANDARD PLAN 5-297.619 1 OF 2

S.P. NO. 6284-162 (TH35W) SHEET NO. 89 OF 367 SHEETS

REVISOR: _____

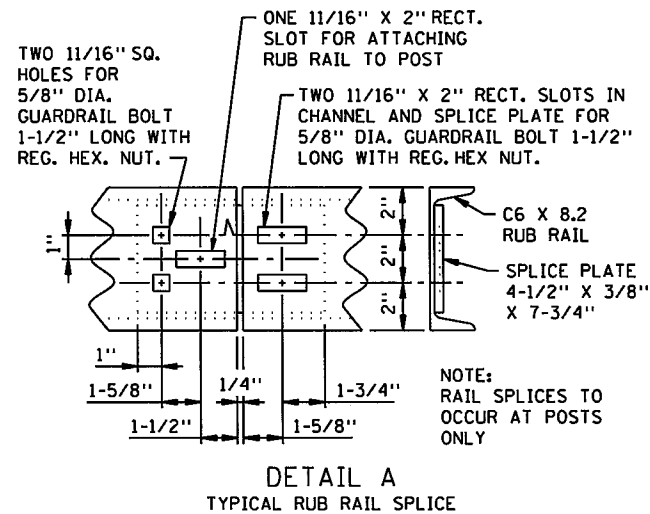
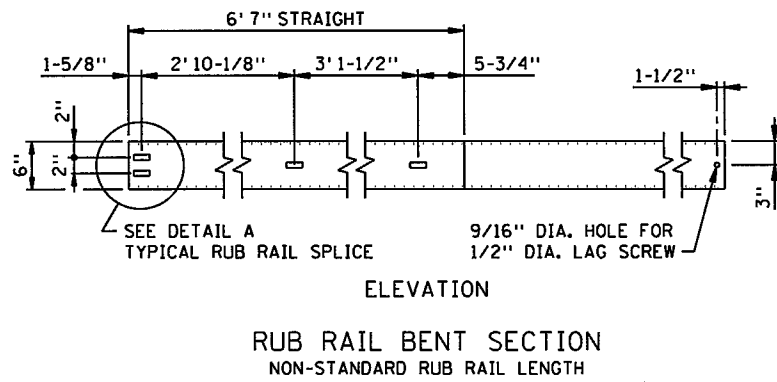
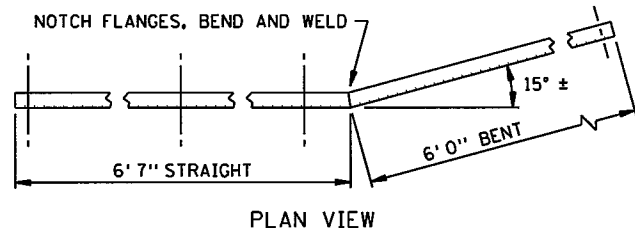
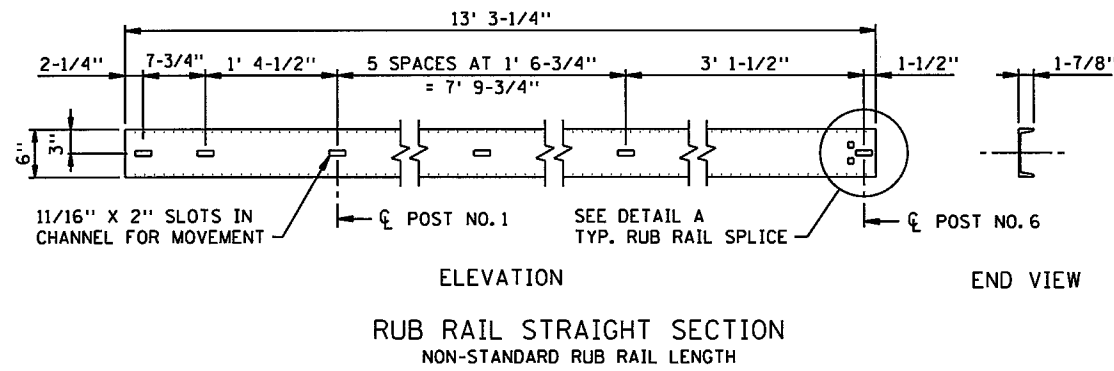
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STATE DESIGN ENGINEER

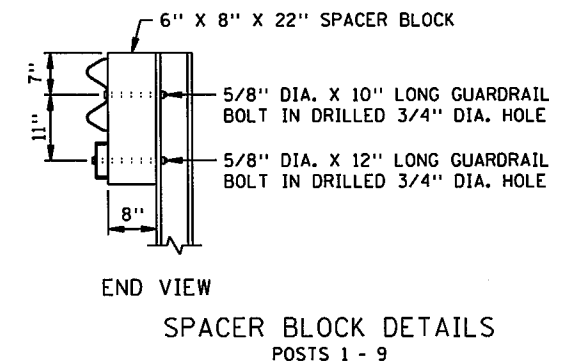
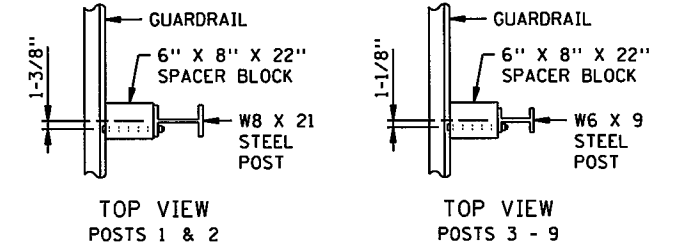
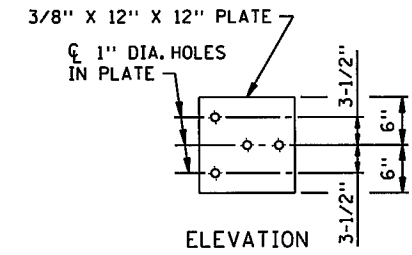
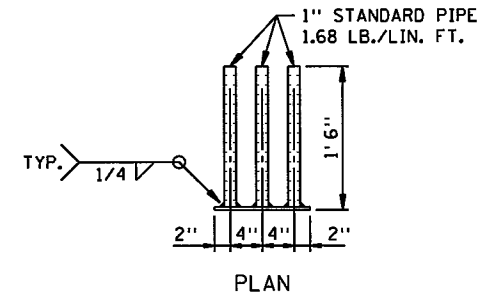
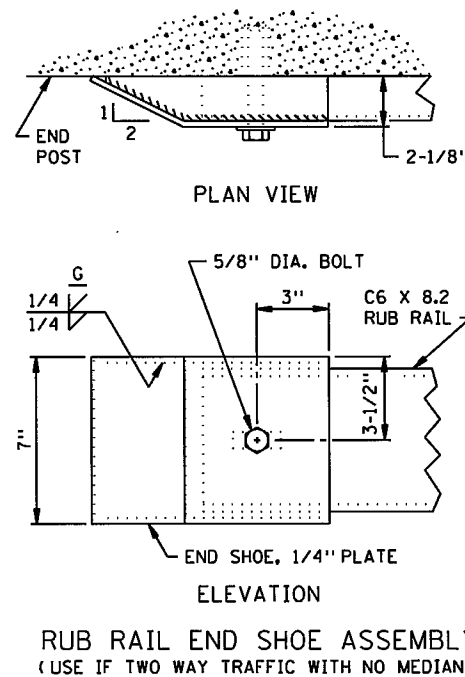
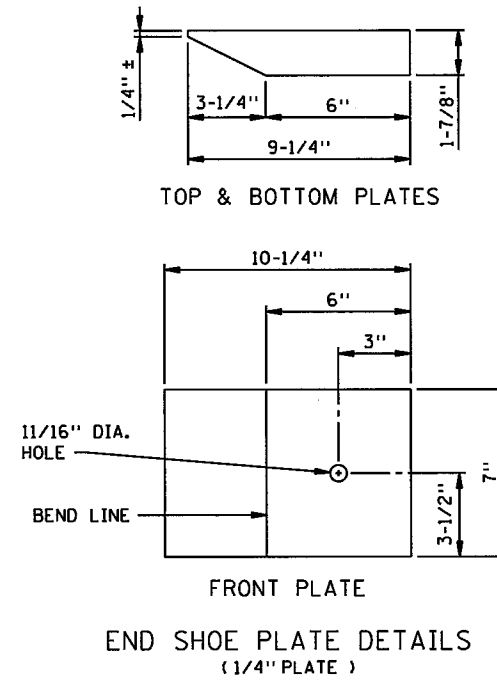
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NOTE:
RAIL SPLICES TO
OCCUR AT POSTS
ONLY



NOTES:
GALVANIZE ALL HARDWARE PER SPEC. 3392.
USE END SHOE ON RUB RAIL IF TWO WAY TRAFFIC WITH NO MEDIAN.
RUB RAIL IS C6 X 8.2
STRUCTURAL STEEL PER SPEC. 3306 UNLESS OTHERWISE NOTED.
ALL SLOTTED HOLES ARE 11/16" X 2".
ALL SQUARE HOLES ARE 11/16".
GALVANIZE STRUCTURAL SHAPES PER SPEC. 3394 AFTER FABRICATION UNLESS OTHERWISE NOTED.
① VERIFY DIMENSION IN FIELD.

TRAFFIC BARRIER DESIGN SPECIAL

SPN39 OF SPN42

W-BEAM TRANSITION TO CONCRETE END POST WITH OR WITHOUT APPROACH CURB (STEEL POST)

STANDARD PLAN 5-297.619

2 OF 2

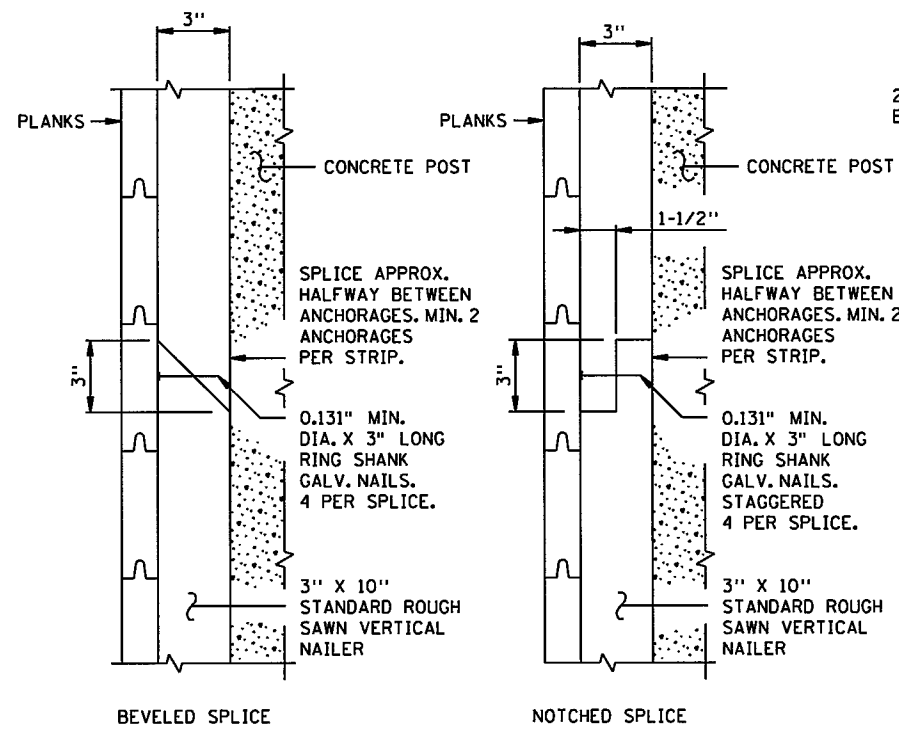
S.P. NO. 6284-162 (TH35W) SHEET NO. 90 OF 367 SHEETS

REVISID:
APPROVED:
5-27-2014
STATE DESIGN ENGINEER

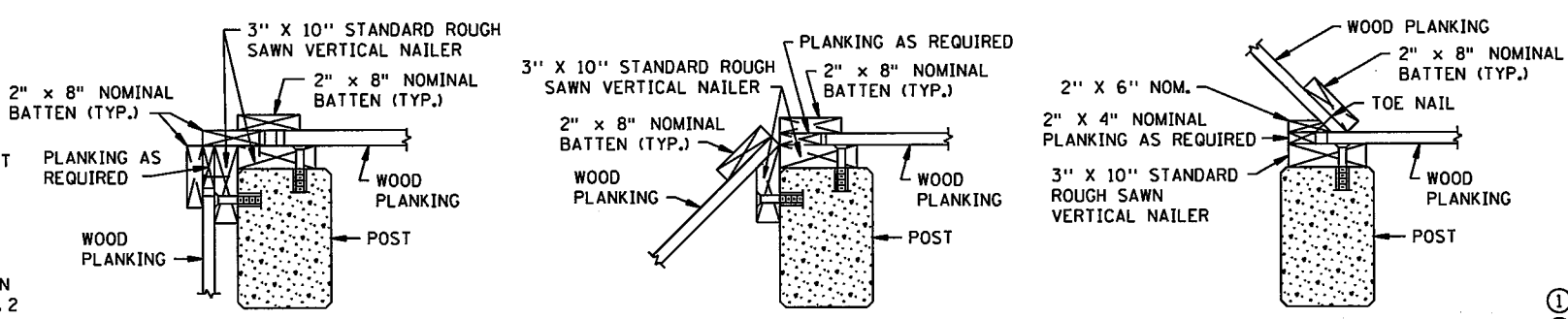
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12/8/2015

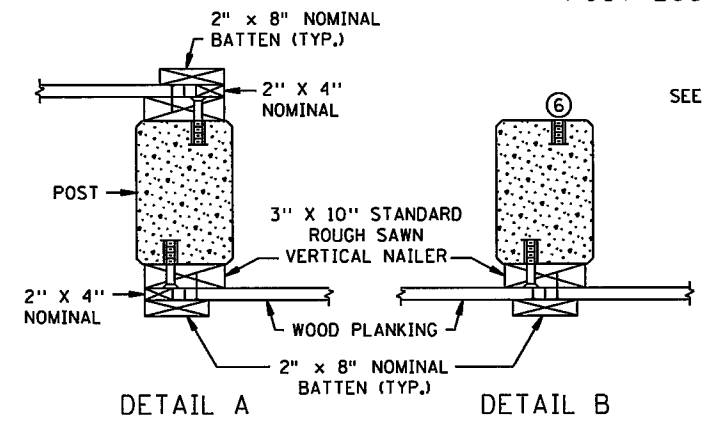
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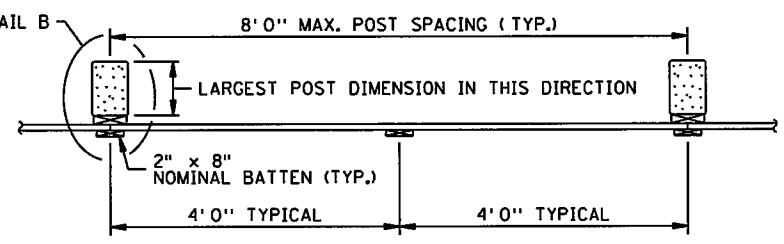
VERTICAL NAILER SPLICE DETAIL (CONTRACTOR OPTION)



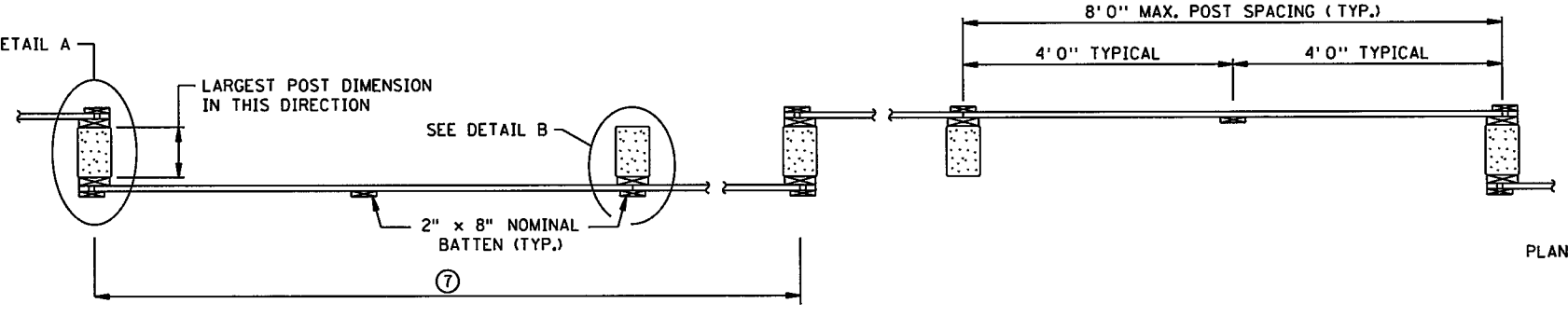
POST LOCATIONS FOR ANGLE TURNS



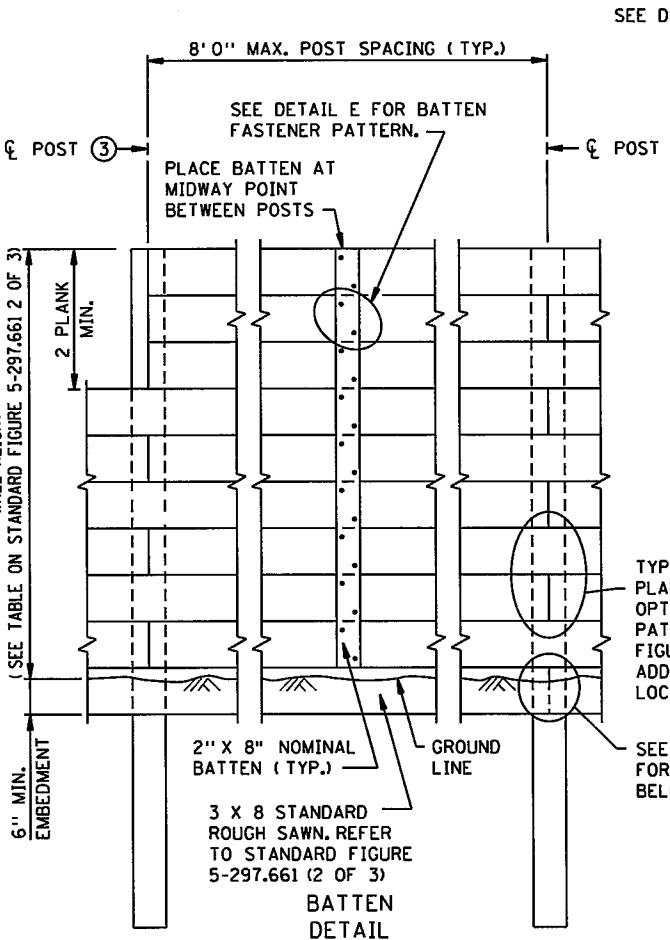
DETAIL A DETAIL B



FILL SIDE WALL TYPE NO. 1 ①

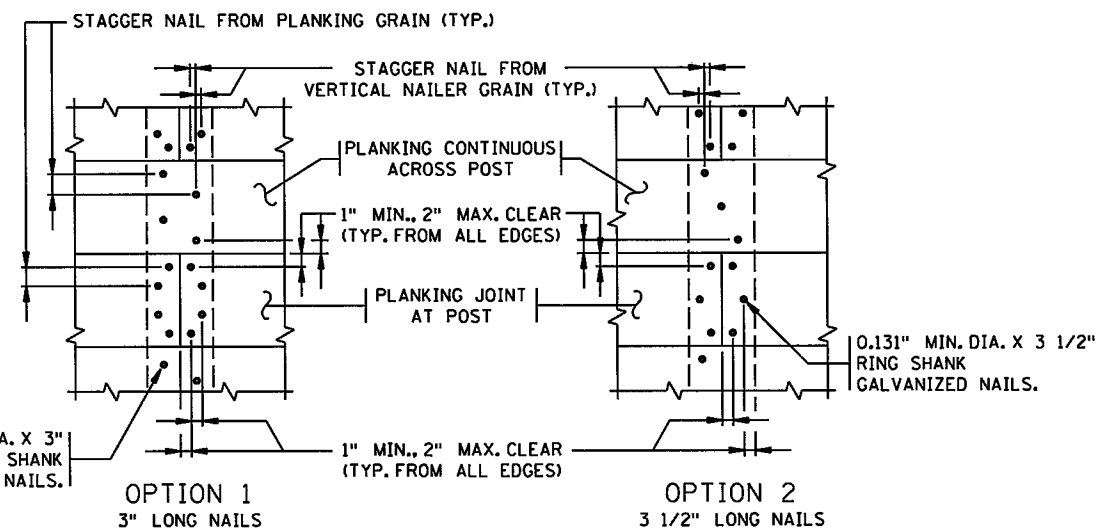


TRAFFIC SIDE WALL TYPE NO. 2 ①②

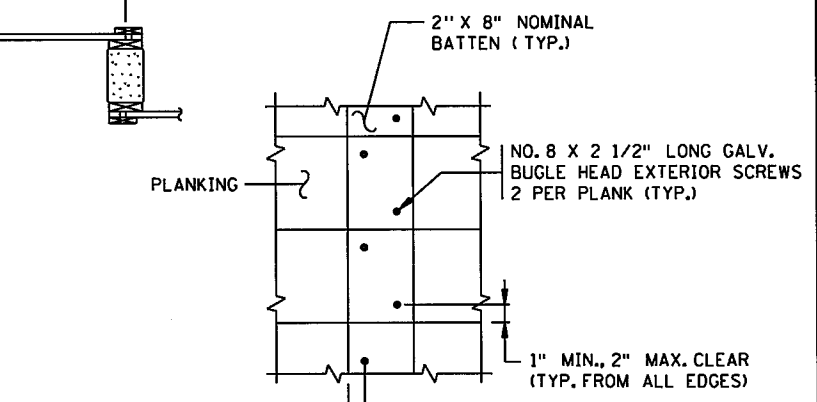


STEP DETAIL LEVEL DETAIL FRONT ELEVATION ⑤ POST BATTENS NOT SHOWN

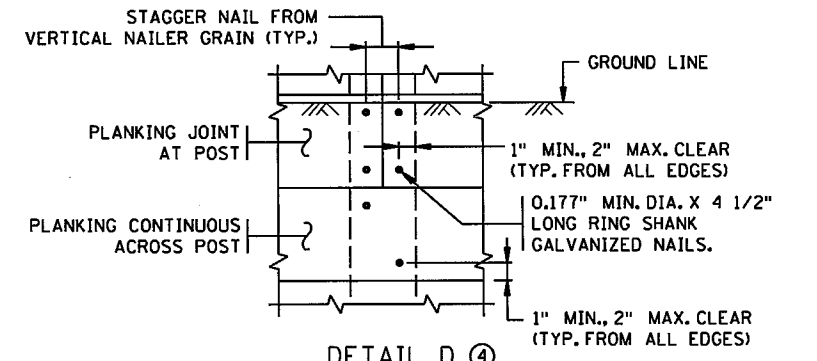
TYP. SPLICE DETAIL. ALTERNATE PLANK SPLICES. SEE DETAIL C OPTION 1 OR 2 FOR NAILING PATTERN. REFER TO STANDARD FIGURE 5-297.661 (3 OF 3) FOR ADDITIONAL PLANK SPLICE LOCATION OPTIONS.



DETAIL C ④ NAILING PATTERN FOR PLANK TO VERTICAL NAILER - ABOVE GROUND



DETAIL E ④ FASTENER PATTERN FOR BATTENS



DETAIL D ④ NAILING PATTERN FOR PLANK TO VERTICAL NAILER - BELOW GROUND

NOTES:

- PROVIDE PRESERVATIVE TREATED TIMBER PRODUCTS PER SPEC. 3491.
- GALVANIZE NAILS PER SPEC. 3392. NAILING REQUIREMENTS SHOWN ARE BASED ON FULL HEAD NAILS AND ENTIRE LENGTH OF SHANK RINGED.
- ① SEE CONSTRUCTION PLAN FOR REQUIRED WALL TYPE.
- ② WALL TYPE NO. 2 SHALL BE USED IN NON-FILL CONDITIONS ONLY.
- ③ USE THE POST SIZE AND EMBEDMENT FOR THE HIGHER WALL SECTION AT THE STEP.
- ④ SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION REGARDING SCREWS AND NAILS.
- ⑤ REFER TO STANDARD FIGURE 5-297.661 (3 OF 3) FOR ADDITIONAL DETAILS REGARDING OPTIONAL PLANK SPLICE LOCATIONS.
- ⑥ GALVANIZED COIL THREAD ANCHORS SHALL BE PLACED ON ALTERNATE SIDES OF POST FACE ϕ . MINIMUM FACTORED PULL OUT OF 2.5 KIPS PER ANCHOR. UNUSED ANCHORS SHALL BE COMPLETELY FILLED WITH A M_{DOT} APPROVED/QUALIFIED PRODUCT PER 3722, SILICONE JOINT SEALANT.
- ⑦ PREFERRED LAYOUT IS 5-7 POSTS SPACES.

REVISION:
APPROVED: 5-13-2014
Nancy Dubenberger
STATE BRIDGE ENGINEER

REVISED:
APPROVED: 5-13-2014
Christina Ky
STATE DESIGN ENGINEER

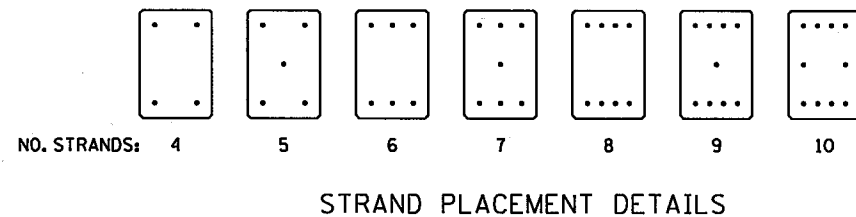
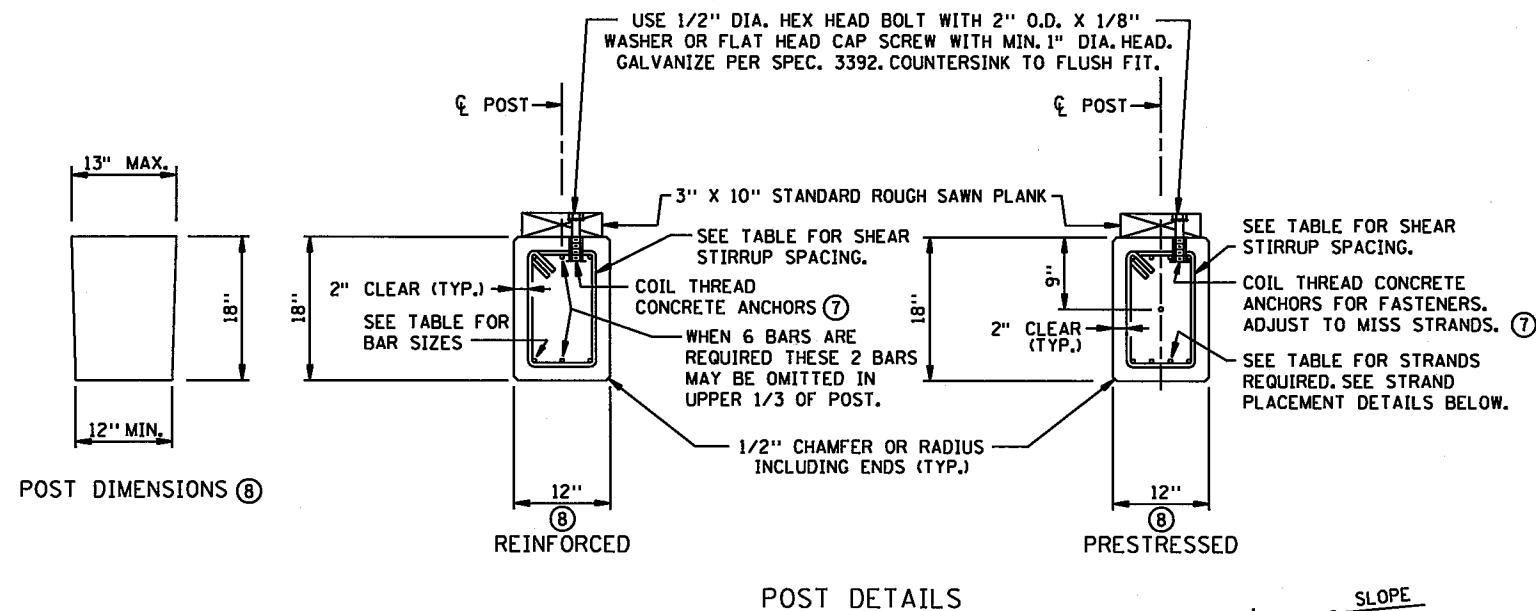
WOOD PLANKING NOISE WALL WITH CONCRETE POSTS
STANDARD PLAN 5-297.661 (1 of 3)
S.P. NO. 6284-162 (TH35W) SHEET NO. 91 OF 367 SHEETS

SPN40 OF SPN42

11/28/16 AM

2/16/2016

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POST EMBEDMENT TABLE
FILL HEIGHT W = 1 FT. MAXIMUM

"H" WALL HEIGHT (FT.)	POST SPACING (FT.)	POST SIZE (IN.)	REINF. BARS	SHEAR STIRRUP SPACING (IN.) (9)	PRE-STRESSED STRANDS	POST EMBEDMENT (1)			
						LEVEL GROUND	1(V):4(H) SLOPE	1(V):3(H) SLOPE	1(V):2(H) SLOPE (11)
5	8	12 X 18	4 NO. 4	18	4	6'0"	6'0"	7'0"	8'0"
6	8	12 X 18	4 NO. 4	18	4	7'0"	7'0"	7'0"	8'0"
7	8	12 X 18	4 NO. 4	18	4	7'0"	7'0"	8'0"	9'0"
8	8	12 X 18	4 NO. 5	18	4	7'0"	8'0"	8'0"	9'0"
9	8	12 X 18	4 NO. 5	18	4	8'0"	8'0"	8'0"	9'0"
10	8	12 X 18	4 NO. 5	18	4	8'0"	8'0"	9'0"	10'0"
11	8	12 X 18	4 NO. 5	10	4	8'0"	9'0"	9'0"	10'0"
12	8	12 X 18	6 NO. 5	10	4	8'0"	9'0"	9'0"	10'0"
13	8	12 X 18	6 NO. 5	10	4	9'0"	9'0"	10'0"	10'0"
14	8	12 X 18	6 NO. 5	10	4	9'0"	10'0"	10'0"	11'0"
15	8	12 X 18	6 NO. 6	10	4	9'0"	10'0"	10'0"	11'0"
16	8	12 X 18	6 NO. 6	10	4	10'0"	10'0"	11'0"	12'0"
17	8	12 X 18	6 NO. 6	10	4	10'0"	10'0"	11'0"	12'0"
18	8	12 X 18	6 NO. 6	10	4	10'0"	11'0"	11'0"	13'0"
19	8	12 X 18	6 NO. 7	10	5	11'0"	11'0"	12'0"	13'0"
20	8	12 X 18	6 NO. 7	10	6	11'0"	11'0"	12'0"	13'0"
21	8	12 X 18	6 NO. 7	10	6	11'0"	12'0"	12'0"	14'0"
22	8	12 X 18	6 NO. 8	10	7	12'0"	12'0"	13'0"	14'0"
23	8	12 X 18	6 NO. 8	10	8	12'0"	12'0"	13'0"	15'0"
24	8	12 X 18	6 NO. 8	10	9	12'0"	13'0"	14'0"	15'0"
25	8	12 X 18	6 NO. 8	10	10	12'0"	13'0"	14'0"	17'0"

DESIGN CRITERIA:
2012 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, INCLUDING 2013 INTERIMS.
2012 NATIONAL DESIGN SPECIFICATION (NDS) FOR WALL CONSTRUCTION - LRFD
φ = 30° (GRANULAR)
γ = 110 P.C.F.
WIND LOAD = 19 P.S.F.
F_b = 1500 P.S.I. WOOD PLANKING AND BATTEN.
F_b = 1200 P.S.I. ALL OTHER WOOD MEMBERS.

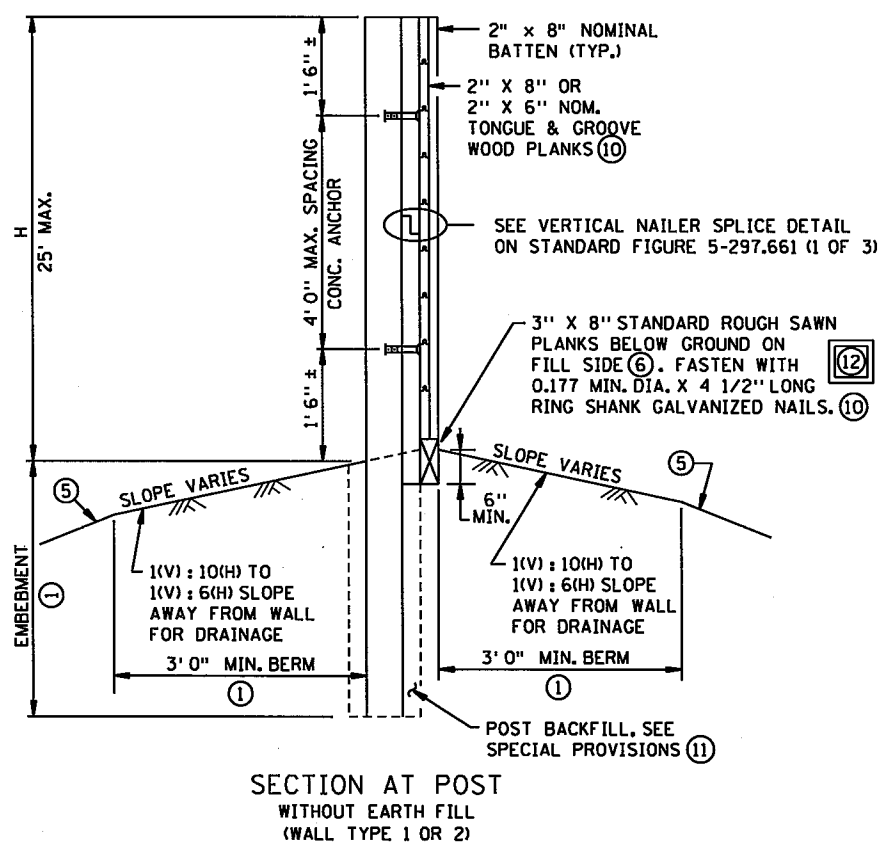
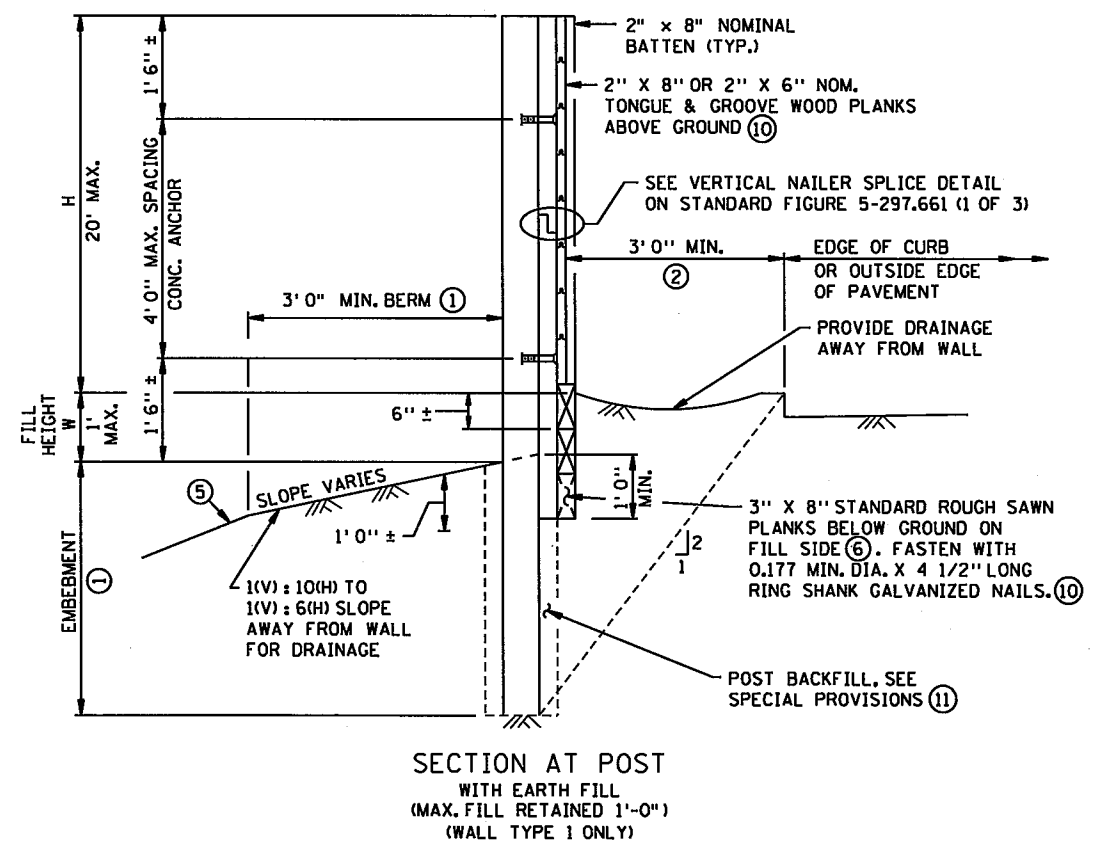
POST DESIGN CRITERIA

NO. OF STRANDS	f' _{ci} (3)	f' _c (4)
6 OR LESS	4000 PSI	5500 PSI
7 OR MORE	4000 PSI	6000 PSI

NOTES:
REFER TO SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION.
SLOPES ARE EXPRESSED AS A RATIO OF VERTICAL DISTANCE: HORIZONTAL DISTANCE.
EMBEDMENT LENGTH IS BASED ON THE WATER TABLE BEING BELOW THE EMBEDMENT DEPTH OTHER CONDITIONS REQUIRE A SPECIAL DESIGN.
FOR SLOPES BETWEEN THOSE SHOWN, USE THE EMBEDMENTS FOR THE STEEPER SLOPE OR USE INTERPOLATION.
FOR SLOPES 1(V):6(H) OR FLATTER, USE LEVEL GROUND EMBEDMENT.
POSTS LOCATED WITHIN 20 FEET OF THE OUTSIDE EDGE OF A ROADWAY SHOULDER AND ALL POSTS SUPPORTING GLUE LAMINATED RUBRAIL (STANDARD FIGURE 5-297.678) SHALL BE CONVENTIONALLY REINFORCED (NOT PRESTRESSED). FABRICATOR TO IDENTIFY NON-PRESTRESSED POSTS WITH PERMANENT MARK ON BOTTOM OF POST.

SOIL TESTS AT MAXIMUM 200 FT. INTERVALS SHALL BE REQUIRED AT EACH SITE LOCATION AND THE RESULTS REVIEWED BY THE SOILS ENGINEER FOR RECOMMENDATIONS.
CONCRETE POSTS WITH THE SAME TOTAL LENGTH SHALL USE THE LARGEST NUMBER OF PRESTRESSED STRANDS REQUIRED FOR THAT POST LENGTH. USE MIX 3W36 FOR ALL POSTS.
PRESTRESSED STEEL STRANDS ARE 1/2" DIA. (AREA = 0.153 SQ. IN.), MIN. OF 4 LOW-RELAXATION STRANDS, 270 KSI ULTIMATE STRENGTH. INITIAL PRESTRESS EQUALS 30,900 LBS./STRAND.
STEEL STRANDS PER SPEC. 3348 AND PAINT THE EXPOSED ENDS OF THE STRANDS WITH AN APPROVED GRAY EPOXY.
ALL REINF. BARS SHALL BE EPOXY COATED GRADE 60 PER SPEC. 3301 AND HAVE A MIN. 2" CLEAR UNLESS OTHERWISE NOTED.

- EMBEDMENT DEPTH IN THE TABLE IS BASED ON A 3 FT. MIN. BERM IN FRONT OF THE WALL.
- WHEN THE CURB LINE IS CLOSER THAN 1(V):2(H) SLOPE, A SPECIAL DESIGN IS REQUIRED.
- MINIMUM CONCRETE STRENGTH AT THE TIME OF PRESTRESS TRANSFER.
- MIN. CONCRETE STRENGTH AT WHICH THE POST CAN BE TRANSPORTED AND PLACED.
- SEE POST EMBEDMENT TABLES FOR MAXIMUM SLOPE.
- SEE SPEC. 3491 FOR ADDITIONAL PRESERVATIVE TREATMENT REQUIREMENTS FOR LUMBER PLACED BELOW GRADE.
- GALVANIZED COIL THREAD ANCHORS SHALL BE PLACED ON ALTERNATE SIDES OF POST FACE (7). MINIMUM FACTORED PULL OUT OF 2.5 KIPS PER ANCHOR. UNUSED ANCHORS SHALL BE COMPLETELY FILLED WITH A MnDOT APPROVED/QUALIFIED PRODUCT PER 3372, SILICONE JOINT SEALANT.
- 12" MIN, 13" MAX. TO ALLOW FOR DRAFT OF FORM.
- USE NO. 3 BARS FOR SHEAR STIRRUPS.
- REFER TO STANDARD FIGURE 5-297.661 (1 OF 3) FOR NAILING PATTERN.
- ON 1(V):2(H) SLOPES, WHEN H = 10 FT. AND GREATER, FILL HOLE WITH CONC. SEE SPECIAL PROVISIONS.
- REMOVE BOTTOM BOARD TO ALLOW WATER TO PASS.



REVISION:

APPROVED: 5-13-2014

Heather L. Redetzke
STATE BRIDGE ENGINEER

CERTIFIED BY: *Heather L. Redetzke*
LICENSED PROFESSIONAL ENGINEER

DATE: 2/16/2016

PRINTED NAME: HEATHER L. REDEZKE L.C. NO. 44267

REVISED:

APPROVED: 5-13-2014

Heather L. Redetzke
STATE DESIGN ENGINEER

MODIFIED SPN41 OF SPN42

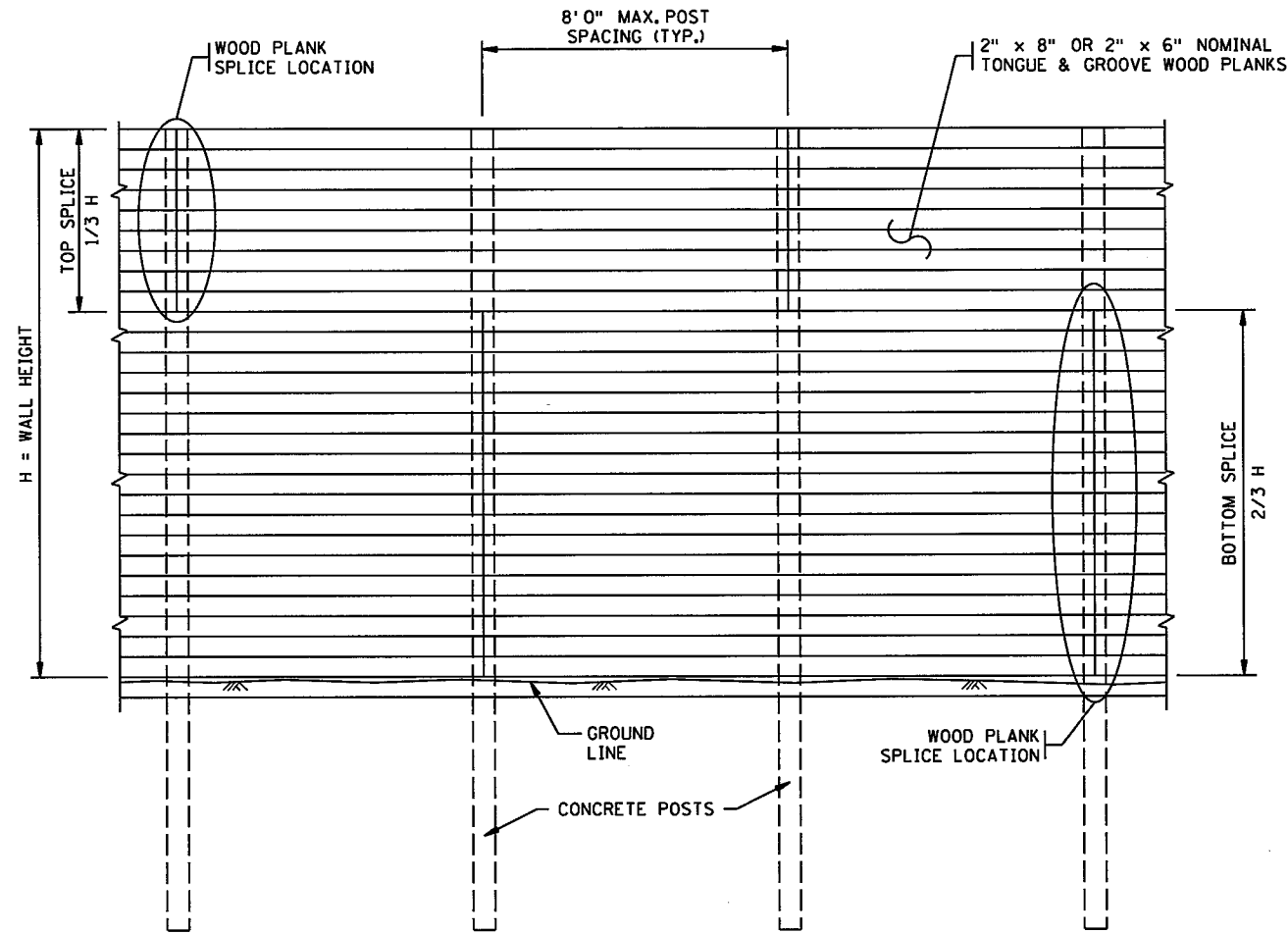
WOOD PLANKING NOISE WALL WITH CONCRETE POSTS STANDARD PLAN 5-297.661 (2 of 3)

S.P. NO. 6284-162 (TH35W) SHEET NO. 92 OF 367 SHEETS

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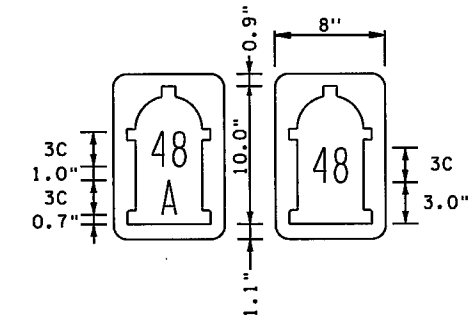
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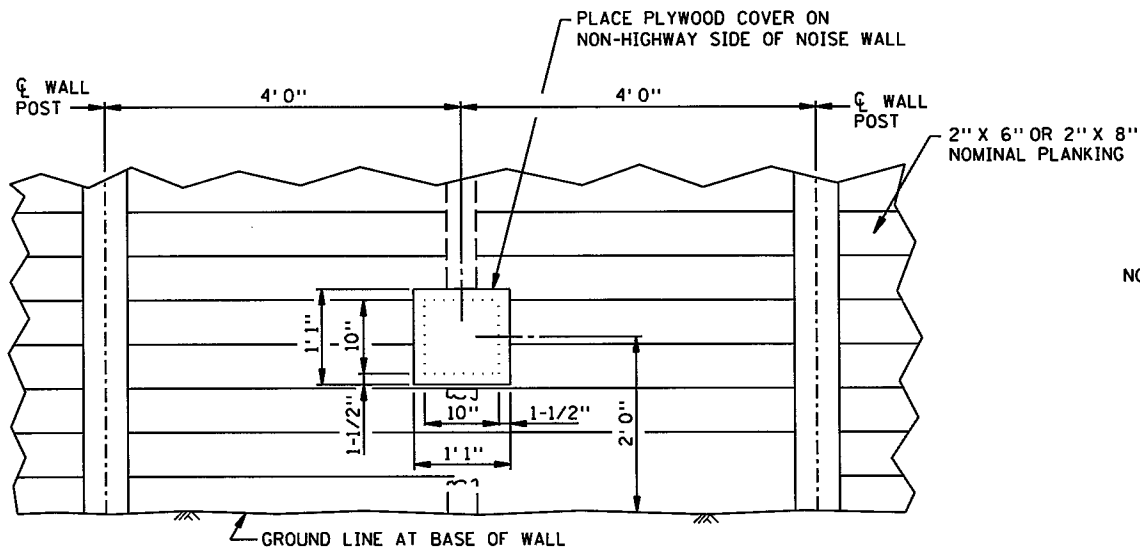
NOTES:
 ① IF THE CONTRACTOR CHOOSES TO USE THIS PLANK SPLICE PATTERN, THE TOP SPLICE DIMENSION SHALL BE 1/3 OF THE WALL HEIGHT (H/3) AS MEASURED FROM THE TOP OF THE WALL. THE BOTTOM SPLICE DIMENSION SHALL BE 2/3 OF THE WALL HEIGHT (2/3 OF H) AS MEASURED FROM THE BOTTOM OF THE WALL. IN NO CASE SHALL MORE THAN 2/3 OF THE BOARDS BE SPLICED AT ANY SINGLE POST LOCATION. REFER TO STANDARD FIGURE 5-297.661 (1 OF 3) FOR NAILING PATTERN

OPTIONAL PLANK SPLICE LOCATION ①
 AT THE CONTRACTOR'S OPTION, IN LIEU OF ALTERNATING PLANK SPLICES AS SHOWN ON MNDOT STANDARD PLAN SHEET 5-297.661 (1 OF 3) - FRONT ELEVATION, THE PATTERN SHOWN ABOVE MAY BE USED.

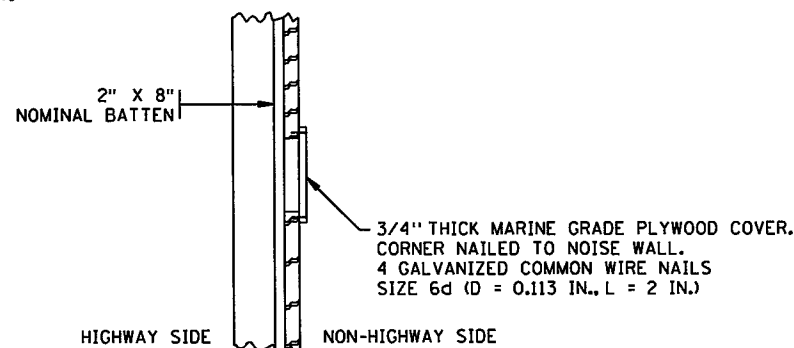


IDENTIFICATION SIGN

8" X 12" SIGN WITH 1" RADIUS CORNERS. WHITE LETTERS, RED HYDRANT ON WHITE BACKGROUND FULLY REFLECTORIZED. THE ENGINEER WILL PROVIDE THE NUMBER AND LETTER DESIGNATION FOR EACH LOCATION. LOCATE SIGN ON HIGHWAY SIDE ADJACENT TO FIRE HOSE ACCESS HOLE. SIGNS ARE INCIDENTAL.



ELEVATION FROM NON-HIGHWAY SIDE
FIRE HOSE ACCESS DETAIL



SECTION AT ACCESS OPENING



Christine Ky
 STATE DESIGN ENGINEER

REVISED:

APPROVED:

5-13-2014

WOOD PLANKING NOISE WALL WITH CONCRETE POSTS

STANDARD PLAN 5-297.661 (3 of 3)

S.P. NO. 6284-162 (TH35W)

SHEET NO. 93 OF 367 SHEETS

SPN42 OF SPN42

REVISION:

APPROVED: 5-13-2014

Nancy Daubenberger
 STATE BRIDGE ENGINEER

NOTES & GUIDELINES

GENERAL INFORMATION:

1. THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN THE DEVICES IN THIS TRAFFIC CONTROL PLAN UNLESS OTHERWISE NOTED.
2. FIELD CONDITIONS MAY REQUIRE MODIFICATIONS OF THIS LAYOUT AS DEEMED NECESSARY BY THE ENGINEER.
3. ALL DISTANCES ARE APPROXIMATE.
4. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING ANY WORK AREAS NEAR TRAFFIC IN ACCORDANCE WITH THE MN MUTCD.
5. AN ANNUAL FALL REVIEW OF ALL TRAFFIC CONTROLS WILL BE MADE TO PREPARE FOR WINTER MAINTENANCE OF THE PROJECT. THIS MAY INCLUDE ADJUSTMENTS OR EXCHANGE OF ONE TRAFFIC CONTROL DEVICE FOR ANOTHER. READJUSTMENTS MAY AGAIN BE REQUIRED IN THE SPRING.
6. IF THE CONTRACTOR DECIDES TO PERFORM THE CONSTRUCTION WORK IN A SEQUENCE OTHER THAN SHOWN IN THIS TRAFFIC CONTROL PLAN THE CONTRACTOR SHALL PROVIDE COMPLETE REVISED TRAFFIC CONTROL PLANS TO BE APPROVED BY THE ENGINEER.

SIGNING:

1. ALL TRAFFIC CONTROL DEVICES, INCLUDING OVERHEAD SIGNS ON ROADS OPEN TO TRAFFIC THAT ARE NOT CONSISTENT WITH TRAFFIC OPERATION SHALL BE COVERED, REMOVED OR REVISED AS DIRECTED BY THE ENGINEER.
2. WHEN SIGNS ARE PLACED, THEY SHALL BE MOUNTED ON POSTS DRIVEN INTO THE GROUND AT THE PROPER HEIGHT AND LATERAL OFFSET AS SHOWN IN THE TYPICAL TEMP SIGN FRAMING & INSTALLATION DETAILS IN THE PLAN. IF THIS IS NOT POSSIBLE THEY WILL BE MOUNTED ON PORTABLE SUPPORTS AS APPROVED BY THE ENGINEER. WHEN THE SIGNS ARE REMOVED THE SIGN POSTS SHALL ALSO BE REMOVED AS SOON AS POSSIBLE.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY EXTRA SIGNING NEEDED TO FACILITATE TRAFFIC SWITCHES OR FOR TRANSITIONING TRAFFIC FROM ONE STAGE TO ANOTHER.
4. ALL ORANGE WARNING AND ORANGE GUIDE SIGNS SHALL BE FABRICATED WITH SIGN SHEETING MATERIAL AS LISTED ON THE MnDOT APPROVED PRODUCT LIST FOR "SHEETING FOR RIGID TEMPORARY WORK ZONE SIGNS".
5. BARRICADES SHALL BE FABRICATED WITH SIGN SHEETING MATERIAL AS LISTED ON THE MnDOT APPROVED PRODUCT LIST FOR BARRICADE SHEETING. NOTE THAT ASTM TYPE VII SHEETING IS NOT ALLOWED ON BARRICADES AFTER JANUARY 1, 2010.
6. LONGITUDINAL DROPOFFS SHALL BE SIGNED AS SHOWN IN THE "TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS" FIELD MANUAL UNLESS OTHERWISE SPECIFIED IN THESE PLANS.
7. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE FINAL SIGNS TO ASSURE THAT THE FINAL SIGNS ARE PLACED AS NEEDED, OR PROVIDE TEMPORARY SIGNING AT THEIR EXPENSE UNTIL THE FINAL SIGNING IS PLACED.

PAVEMENT MARKING:

1. OBLITERATE ANY CONFLICTING PAVEMENT MARKINGS AS DIRECTED BY THE ENGINEER.
2. PAINT, POLYMER LANE TAPE AND/OR TRPM'S ARE ACCEPTABLE TEMPORARY STRIPING ALTERNATIVES ACCORDING TO ACTUAL CONDITIONS ENCOUNTERED AS DIRECTED BY THE ENGINEER. GENERALLY, ONLY PAINT WILL BE USED BEFORE MAY 1ST OR WHEN THE OTHER MANUFACTURERS' SPECIFICATIONS CAN NOT BE MET.
3. TRPM'S (TEMPORARY RAISED PAVEMENT MARKERS) SHOULD BE USED TO SUPPLEMENT THE LONG TERM (MORE THAN 3 DAYS) EDGELINES ON ALL TRANSITION AREAS WHEN THE CONDITIONS ARE WITHIN THE MANUFACTURERS' SPECIFICATIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PLACEMENT OF TEMPORARY AND FINAL STRIPING. MnDOT TRAFFIC PERSONNEL WILL ASSIST IN THE SPOTTING OF TRANSITION AREAS, GORES AND TAPERS.

BARRIER & DELINEATION:

1. TOP MOUNTED BARRIER DELINEATORS WILL HAVE A MINIMUM OF 24 SQ. IN. OF REFLECTIVE SURFACE AREA AND BE PLACED AT 25' SPACES ON TOP OF THE BARRIER WHEN THE BARRIER IS WITHIN 10' OF TRAFFIC UNLESS OTHERWISE NOTED OR AS DIRECTED BY THE ENGINEER. IF THE TRAFFIC ENGINEER REQUIRES SIDE MOUNTED BARRIER DELINEATORS, THEY WILL HAVE A MINIMUM OF 12 SQ. IN. OF REFLECTIVE SURFACE AREA AND BE PLACED AT 25' SPACES. IF A SMALLER APPROVED BARRIER DELINEATOR IS USED IT SHALL BE AT ONE HALF THE SPACING AND ONE HALF THE BID PRICE.

CONSTRUCTION INFORMATION SIGNING:

1. THE CONTRACTOR SHALL USE CONSTRUCTION INFORMATION SIGNING AS SHOWN IN THE PLAN AND WHICH ARE TO BE USED AS FOLLOWS:
 G20-X1 CLOSURE NOTICE SIGNS PAIRED WITH G20-X3 WORK ENDS SIGNS TO DISPLAY THE CORRECT START DATE AND AN ESTIMATED FINISH DATE AS APPROVED BY THE PROJECT ENGINEER.
 G20-X2 WORK ZONE ADVANCE NOTICE SIGNS WITH THE CORRECT STARTING DATE DISPLAYED BEFORE WORK BEGINS. ONCE WORK BEGINS, THE START DATE LEGEND SHALL BE COVERED BY THE SUGGESTED PLAQUE CONTAINED IN THIS PLAN. IF NO ALTERNATE MESSAGE IS SUGGESTED OR IF DIRECTED BY THE PROJECT ENGINEER, THE CORRECT ESTIMATED FINISH DATE, MONTH, OR SEASON SHALL BE DISPLAYED.
 CONSTRUCTION INFORMATION SIGNING NOT VISIBLE TO THE MOTORING PUBLIC ONCE WORK BEGINS WILL BE MOVED BY THE CONTRACTOR TO A SITE IN ADVANCE OF THE WORK ZONE OR CLOSURE AS DIRECTED BY THE PLAN OR PROJECT ENGINEER.

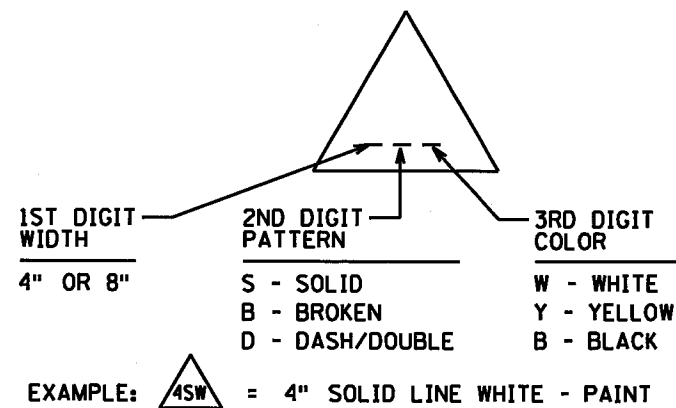
TRAFFIC CONTROL DEVICES & SYMBOLS LEGEND

SYMBOL DESCRIPTION

- AREA CLOSED TO TRAFFIC / WORK AREA
- TRAFFIC CONTROL SIGN
- TYPE III BARRICADE =
- DRUM-LIKE CHANNELIZER (TYPE B) =
- TYPE A FLASHING WARNING LIGHT
- FLASHING ARROW BOARD TYPE C = (4' X 8' UNLESS OTHERWISE NOTED).
- PORTABLE CHANGEABLE MESSAGE SIGN =
- CONCRETE BARRIER WITH DELINEATORS AT 30' SPACES
- TL3 IMPACT ATTENUATOR
- SOLID LINE PAVEMENT MARKING WITH TEMPORARY RAISED PAVEMENT MARKERS AT 10' SPACES

STRIPING KEY

TRIANGLE - PAINT



INDEX

TRAFFIC CONTROL SHEET NO.	DESCRIPTIONS
TC1	GENERAL NOTES
TC2	PAY ITEM TABULATION
TC3	TABULATIONS
TC4-TC6	DETAILS
TC7	PHASING PLAN
TC8	DETOUR PLAN PHASE 1A COUNTY RD H AND TH 35W RAMP CONSTRUCTION
TC9-TC10	TRAFFIC CONTROL PHASE 1A COUNTY RD H AND TH 35W RAMP CONSTRUCTION
TC11-TC12	DETOUR PLAN PHASE 1B BRIDGE REMOVAL
TC13-TC33	TRAFFIC CONTROL PHASE 1B BRIDGE REMOVAL
TC34-TC38	TRAFFIC CONTROL PHASE 1C CENTER PIER CONSTRUCTION
TC39-TC43	TRAFFIC CONTROL PHASE 1D AUXILIARY LANE CONSTRUCTION
TC44	DETOUR PLAN PHASES 2A & 2B
TC45-TC47	TRAFFIC CONTROL PHASE 2A TH 10 AND TH 35W RAMP CONSTRUCTION
TC48-TC53	TRAFFIC CONTROL PHASE 2B TH 35W AUXILIARY LANE CONSTRUCTION

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: JAH				
DESIGNER: JAH				
CHECKED BY: BJB				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 GENERAL NOTES

FILE NO. RAMSE129594	94
TC1 OF TC53	367

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1/13/2016

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TRAFFIC CONTROL TABULATION

R

ITEM	UNIT	PHASE 1A	PHASE 1B	PHASE 1C	PHASE 1D	PHASE 2A	PHASE 2B	TOTAL
PORTABLE PRECAST CONC BARRIER DES 8337	LIN FT	785		805	710		395	2695
RELOCATE PORT PRECAST CONC BARRIER DES 8337	LIN FT			785	1590		2300	4675
IMPACT ATTENUATOR	ASSEMBLY	1		1				2
RELOCATE IMPACT ATTENUATOR	ASSEMBLY			1	1		1	3
POLICE OFFICER	HOUR		114					114
TRAFFIC CONTROL	LUMP SUM	0.15	0.25	0.15	0.15	0.15	0.15	1
DETOUR SIGNING	LUMP SUM	1						1
PORTABLE CHANGEABLE MESSAGE SIGN	UNIT DAY		56					56
PORTABLE CONCRETE BARRIER DELINEATOR ③	EACH	32 ①		64 ②	92 ①		90 ①	278
RAISED PAVEMENT MARKER TEMP. ①	EACH				80	75	820	975
4" SOLID LINE PAINT	LIN FT				800 ①	750 ①	10095 ④	11645
4" BROKEN LINE PAINT ①	LIN FT						1265	1265
REMOVABLE PREFORMED PLASTIC MASK (BLACK)	LIN FT					200	5750	5950

SPECIFIC NOTES:

- ① WHITE.
- ② YELLOW.
- ③ ONE-WAY.
- ④ 5990 LIN FT WHITE, 4105 LIN FT YELLOW.

DESIGN TEAM				
DRAWN BY: JAH				
DESIGNER: JAH				
CHECKED BY: BJB				
NO.	BY	DATE	REVISIONS	

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 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANNDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PAY ITEM TABULATION

FILE NO. RAMSE129594	95
TC2 OF TC53	367

TRAFFIC CONTROL TABULATION SHEET

"M" SERIES			
SIGN	SIGN NO.	COLOR	SIZE
	M1-1	WHITE ON RED AND BLUE	30x24 45x36
	M1-4	BLACK ON WHITE	36x36
	M3-1	BLACK ON WHITE	24x12 36x18
	M3-3	BLACK ON WHITE	36x18
	M3-4	BLACK ON WHITE	36x18
	M4-5	BLACK ON WHITE	36x18
	M4-8	BLACK ON ORANGE	24x12 36x18
	M4-8a	BLACK ON ORANGE	24x18
	M4-9mL	BLACK ON ORANGE	30x24
	M4-9mR	BLACK ON ORANGE	30x24
	M4-9mR45	BLACK ON ORANGE	42x36
	M4-9mATR45	BLACK ON ORANGE	42x36
	M4-9mATL90	BLACK ON ORANGE	30x24
	M4-9mATR90	BLACK ON ORANGE	30x24
	M4-9mT	BLACK ON ORANGE	30x24
	M5-1R	BLACK ON WHITE	21x15
	M5-1L	BLACK ON WHITE	30x24
	M5-2R	BLACK ON WHITE	30x24
	M5-2L	BLACK ON WHITE	30x24
	M6-1R	BLACK ON WHITE	21x15 30x24

"M" SERIES			
SIGN	SIGN NO.	COLOR	SIZE
	M6-1L	BLACK ON WHITE	30x24
	M6-2R	BLACK ON WHITE	30x24
	M6-2L	BLACK ON WHITE	30x24
	M6-3	BLACK ON WHITE	21x15 30x24

"W" SERIES			
SIGN	SIGN NO.	COLOR	SIZE
	W1-1R	BLACK ON ORANGE	48x48
	W1-4cL	BLACK ON ORANGE	48x48
	W1-4cR	BLACK ON ORANGE	48x48
	W1-6	BLACK ON ORANGE	96x48
	W3-1	BLACK ON ORANGE	48x48
	W4-1R	BLACK ON ORANGE	48x48
	W4-2R	BLACK ON ORANGE	48x48
	W4-2L	BLACK ON ORANGE	48x48
	W8-23	BLACK ON ORANGE	48x48
	W9-1R	BLACK ON ORANGE	48x48
	W11-X3	BLACK ON ORANGE	48x48
	W13-1P	BLACK ON ORANGE	30x30
	W20-1	BLACK ON ORANGE	48x48

"W" SERIES			
SIGN	SIGN NO.	COLOR	SIZE
	W20-2	BLACK ON ORANGE	48x48
	W20-3	BLACK ON ORANGE	48x48
	W20-100F	BLACK ON ORANGE	42x24
	W20-X3R	BLACK ON ORANGE	48x48
	W20-X3L	BLACK ON ORANGE	48x48
	W20-X13L	BLACK ON ORANGE	48x48
	W20-X16	BLACK ON ORANGE	48x48
	W20-X17	BLACK ON ORANGE	48x48
	W21-X5R	BLACK ON ORANGE	48x48

"G" SERIES			
SIGN	SIGN NO.	COLOR	SIZE
	G20-X1	BLACK ON ORANGE	72x60
	G20-X3	BLACK ON ORANGE	60x24
	G20-X6L	BLACK ON ORANGE	48x36
	G20-X15	BLACK ON ORANGE	48x54

"R" SERIES			
SIGN	SIGN NO.	COLOR	SIZE
	R1-1	WHITE ON RED	48x48
	R1-3P	WHITE ON RED	30x12
	R3-1	BLACK ON RED AND WHITE	48x48
	R3-2	BLACK ON RED AND WHITE	48x48
	R11-2	BLACK ON WHITE	48x30

DEVICES			
DEVICE	TYPE	COLOR	SIZE
	FLASHING ARROW BOARD		4'x8'
	TYPE III	WHITE ON ORANGE	8'
	PCMS		
	REFLECTORIZED DRUM	WHITE ON ORANGE	
	TYPE "A" FLASHER		

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DESIGN TEAM				
DRAWN BY: JAH				
DESIGNER: JAH				
CHECKED BY: BJB				
NO.	BY	DATE	REVISIONS	

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Certified By: *Brandon J. Bourdon*, P.E. No. 43789
Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

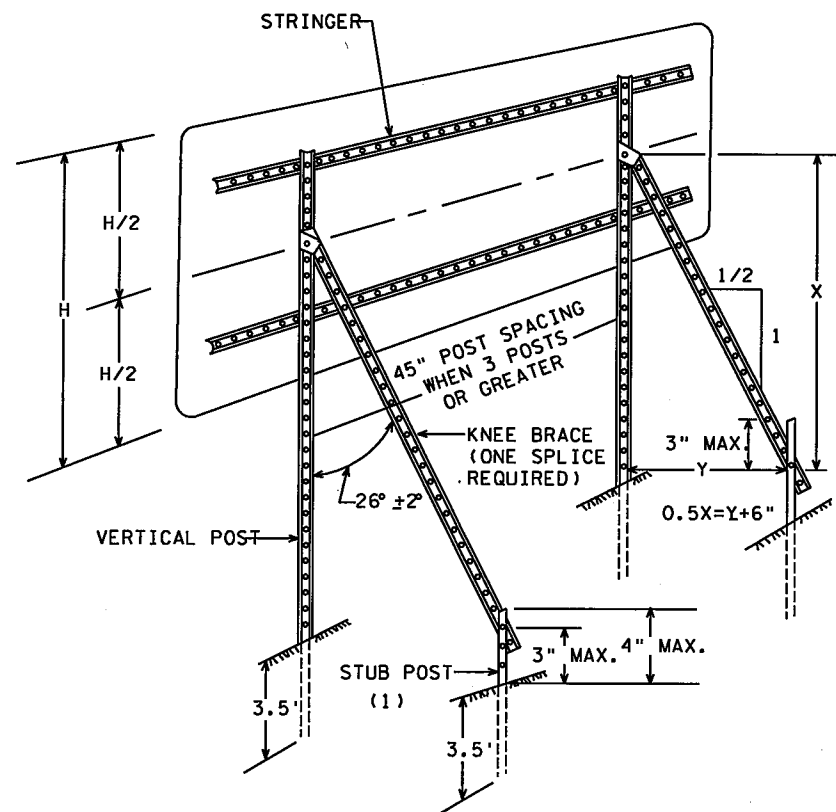
TRAFFIC CONTROL PLAN
TABULATIONS

FILE NO. RAMSEI29594	96
TC3 OF TC53	367

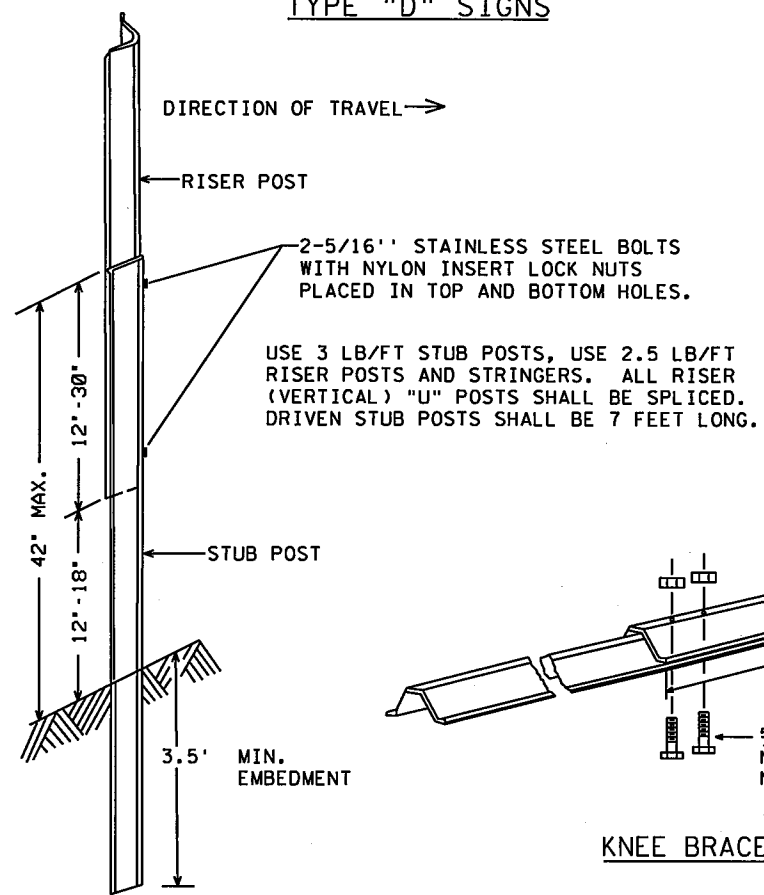
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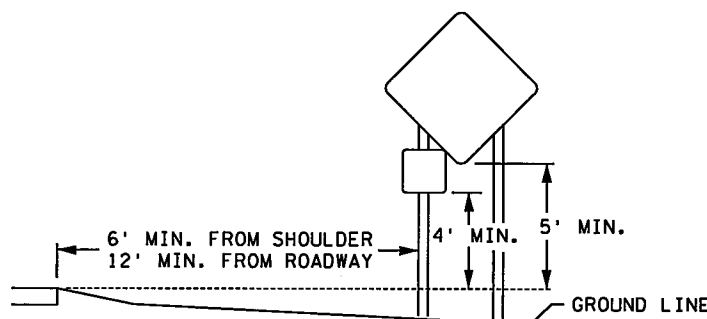


TYPICAL "A-FRAME" INSTALLATION
TYPE "D" SIGNS

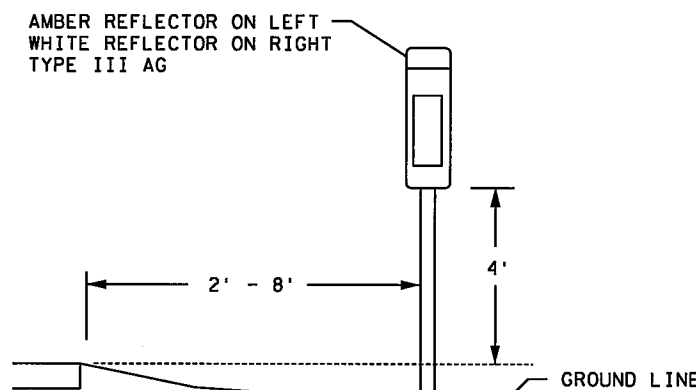


"U" POST BREAKAWAY SPLICE

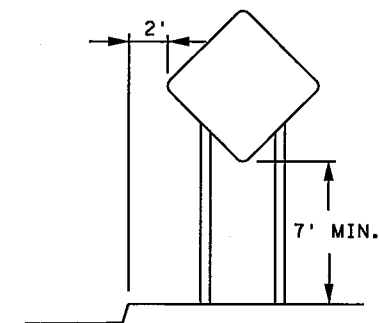
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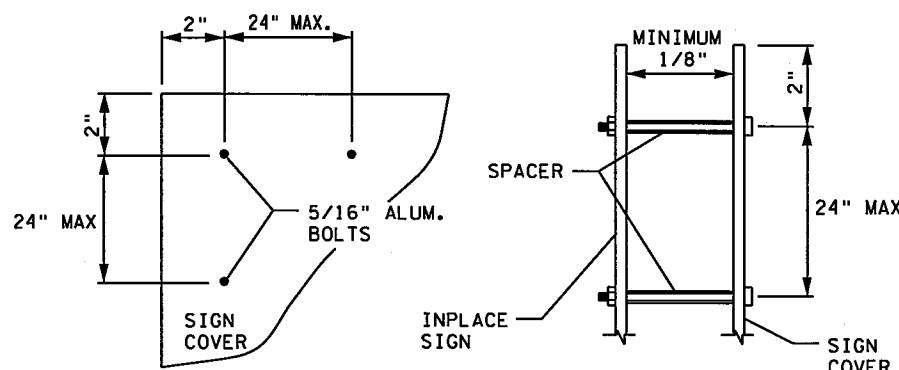
TYPICAL RURAL DESIGN



DELINEATION MOUNTING

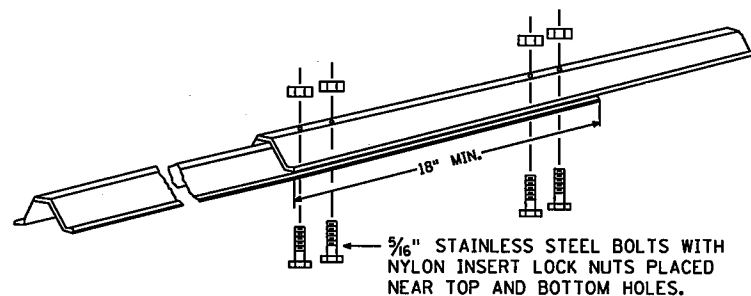


TYPICAL URBAN DESIGN

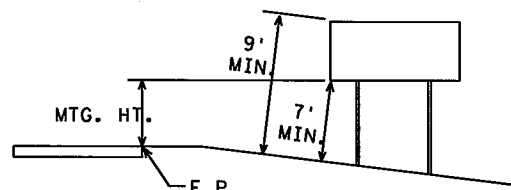


SIGN PANEL OVERLAY

SPACER SHALL BE A MATERIAL THAT DOES NOT HARM THE SIGN SHEETING FACE (SUCH AS PLASTIC OR RUBBER). REFER TO TRAFFIC ENGINEERING MANUAL CHAPTER 8 FOR MORE INFORMATION ON COVERING SIGNS



KNEE BRACE STRUCTURAL SPLICE



TYPICAL MOUNTING

(1) OFFSET STUB POST 1' TOWARD ROADWAY RELATIVE TO VERTICAL POST.

TYPICAL TEMPORARY SIGN FRAMING AND INSTALLATION DETAILS

SIGN DATA

SIGNS TO BE PLACED ON DRIVEN U-POSTS, SHALL BE PLACED IN ACCORDANCE WITH TABLE 1 OR TABLE 2 BELOW. IF THE TTC PLAN PLACES TTC DEVICES ADJACENT TO EXISTING STRUCTURES, THEN THEY SHOULD BE PLACED SLIGHTLY BEYOND THAT STRUCTURE, SO AS TO NOT COMPROMISE THAT STRUCTURE AND THE NEW DEVICE'S CRASHWORTHINESS (NO MORE THAN TWO U-POSTS WITHIN 84 INCHES, ALIGNED IN THE SAME PLANE). SIGN PANELS SHALL BE PLACED ON SIGN STRUCTURES TO MEET THE 5' MIN DEPICTED ON THE TYPICAL RURAL DESIGN DETAIL, THE 7' MIN DEPICTED ON THE TYPICAL URBAN DESIGN DETAIL, OR 7' MIN AND 9' MIN DEPICTED ON THE TYPICAL MOUNTING DETAIL ON THIS SHEET.

TABLE 1

STANDARD CONSTRUCTION SIGNS IN MN/DOT STANDARD SIGNS MANUAL

PANEL SIZE (IN.)	POSTS			
	NO. & TYPE	SPACING (IN.)	KNEE BRACES QUANT.	LENGTH (FT.)
24 x 24	2-U	18		13
30 x 24	2-U	18		13
36 x 30	2-U	24		13
36 x 36	2-U	18		14
42 x 36	2-U	30		14
48 x 48	2-U	30		15
60 x 60	2-U	42	1	16
72 x 72	2-U	42	2	17
96 x 54	2-U	54	2	16
168 x 132	4-U	48	4	20

GENERAL NOTES:

1. POST LENGTHS ARE APPROXIMATE AND INCLUDE EMBEDMENT, BUT DO NOT INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE.
2. SEE STANDARD SIGNS MANUAL FOR PUNCHING HOLES.

TABLE 2

SPECIAL DESIGN CONSTRUCTION SIGNS

PANEL SIZE		POSTS			
LENGTH (IN.)	HEIGHT (IN.)	NO. & TYPE	SPACING (IN.)	KNEE BRACES QUANT.	LENGTH (FT.)
54 - 96	78	2-U	42	2	20
102 - 138	78	3-U	45	3	20
144 - 180	78	4-U	45	4	20

NOTES:

FOR TEMPORARY CONSTRUCTION SIGN FRAMING, THE CONTRACTOR MAY USE GRADE 5 ZINC PLATED BOLTS FOR ALL BOLTED CONNECTIONS, EXCEPT FOR THE KNEE BRACE CONNECTION TO THE REAR STUB POST, WHICH SHALL UTILIZE A 5/16 INCH STAINLESS STEEL BOLT AND NYLON INSERT LOCK NUT. ADDITIONAL SIGN FRAMING DETAILS CAN BE FOUND IN THE TRAFFIC ENGINEERING MANUAL PART 6.

IF THE CONTRACTOR ELECTS TO USE SOME OTHER TYPE OF SIGN SUPPORT (OTHER THAN U-CHANNEL SIGN POSTS) FOR MOUNTING CONSTRUCTION SIGNS, DETAILS OF THE PROPOSED SIGN STRUCTURE SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO ORDERING THE SIGN STRUCTURE COMPONENTS. ANY SIGN STRUCTURE TO BE SUBMITTED TO THE ENGINEER SHALL BE AN FHWA ACCEPTED BREAKAWAY SIGN SUPPORT. SIGN STRUCTURE SHALL ALSO BE APPROVED FOR 90 MPH WIND LOAD.

GUIDE SIGNS SHOWN TO BE COVERED SHALL BE COVERED WITH THE SAME COLOR AS THE SIGN BACKGROUND. THE CONTRACTOR SHALL INSTALL COVERS OR ADDITIONAL SIGNS USING A MINIMUM 1/8" PLASTIC SPACER BETWEEN THE INPLACE SIGN AND THE COVERING MATERIAL. HOLES WILL BE DRILLED IN THE COVER AND THE INPLACE SIGN AND SHALL BE PLACED IN ACCORDANCE TO THE SIGN PANEL DETAIL. SPACERS ARE REQUIRED. MID-PANEL SPACING SHALL BE NO GREATER THAN 24".

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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Licensed Professional Engineer

Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn

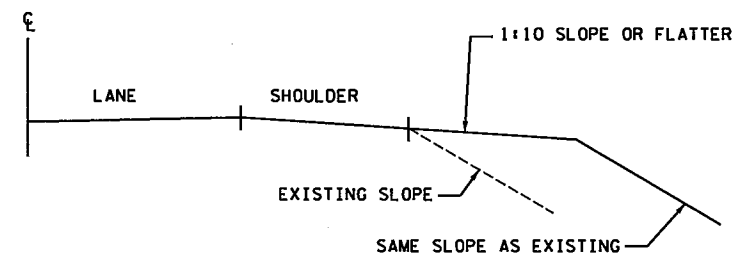
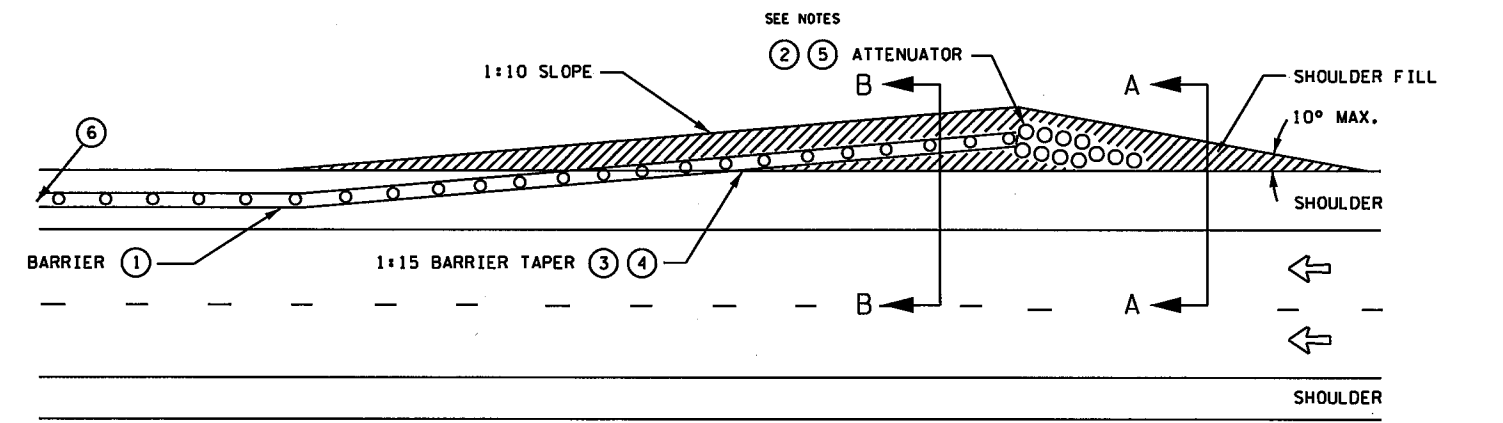
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN		FILE NO. RAMSE129594	97
DETAILS		TC4	367
		OF TC53	

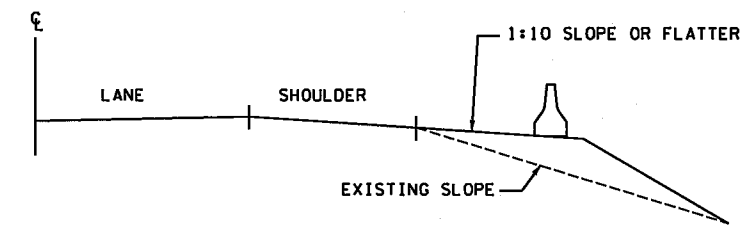
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SECTION A-A

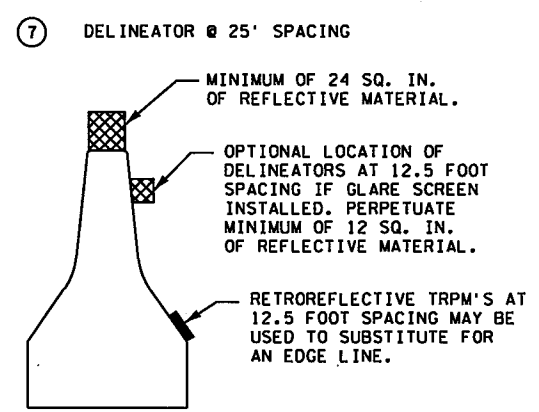


SECTION B-B

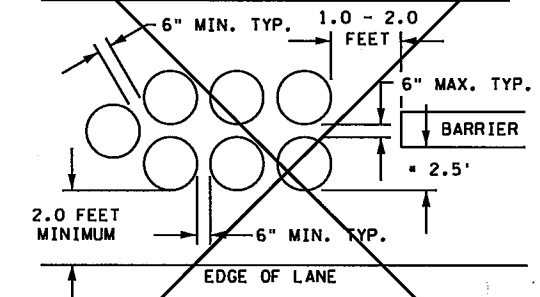
DESIGNER NOTES (REMOVE FROM LAYOUT BEFORE INSERTING IN PLAN):

- ① IT IS DESIRABLE TO MAINTAIN FULL SHOULDER WIDTH WHENEVER POSSIBLE. IF THAT IS NOT POSSIBLE, THE MINIMUM DESIRABLE LATERAL OFFSETS ARE BASED ON THE FOLLOWING POSTED SPEED LIMITS:
 70 MPH - 12.0 FEET
 60 MPH - 8.0 FEET
 50 MPH - 6.5 FEET
 40 MPH - 5.0 FEET
 FOR RESTRICTED CONDITIONS, LESSER OFFSETS MAY BE USED. THE OFFSETS SHOULD BE A MINIMUM OF 2 FEET UNLESS THE CONDITIONS ARE EXTREME. LATERAL OFFSETS ARE MEASURED TO THE BOTTOM OF THE BARRIER. BARRIER OFFSET FROM THE EDGE OF THE THRU LANE SHOULD NOT EXCEED 15 FEET.
- ② DESIRABLE TREATMENTS FOR EXPOSED BARRIER ENDS ARE; A CONNECTION TO EXISTING BARRIER; IMPACT ATTENUATOR; TAPER AWAY TO THE EDGE OF THE CLEAR ZONE; AND EXTENDING THROUGH A PLATE BEAM GUARDRAIL BY REMOVING A PANEL.
 FOR POSTED SPEED LIMITS OF 30 MPH OR LESS, THE TAPERING AWAY FROM THE TRAFFIC IS DESIRABLE AND THE USE OF AN IMPACT ATTENUATOR IS OPTIONAL.
- ③ A 1:8 TAPER MAY BE USED WHEN THE POSTED SPEED LIMIT IS 35 MPH OR LESS.
 A 1:12 TAPER MAY BE USED WHEN THE POSTED SPEED LIMIT IS 45 MPH OR LESS.
- ④ IF THE BARRIER IS TO BE EXTENDED BEYOND THE SHOULDER, ADDITIONAL FILL WILL BE NEEDED IN ORDER TO PROVIDE A FLAT (1:10) APPROACH AREA TO THE BARRIER. (SEE SHOULDER FILL DETAIL).
- ⑤ THE IMPACT ATTENUATOR SHOULD BE OFFSET A MINIMUM OF 2 FEET FROM THE EDGE OF THE THRU LANE (SEE SAND BARREL OFFSET DETAIL). THE IMPACT ATTENUATOR SHOULD BE ORIENTED TO ACCOMMODATE THE PROBABLE IMPACT ANGLE OF AN ENCROACHING VEHICLE. FOR MOST ROADSIDE CONDITIONS, AN ANGLE OF APPROXIMATELY 10 DEGREES, AS MEASURED BETWEEN THE HIGHWAY AND THE IMPACT ATTENUATOR LONGITUDINAL CENTERLINE, IS CONSIDERED APPROPRIATE. (SEE SHOULDER FILL DETAIL). FOR SAND BARREL ARRANGEMENT, SEE SAND FILLED BARREL OFFSET DETAIL.
- ⑥ FOR TWO-LANE, TWO-WAY TRAFFIC, BOTH ENDS OF THE BARRIER SHOULD BE TREATED IN THE SAME MANNER AS DESCRIBED IN ②.

DELINEATION OPTIONS FOR BARRIER

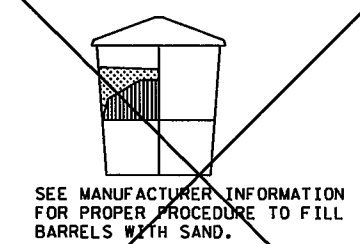


SAND FILLED BARREL OFFSET



NOTE:
 * DISTANCE MAY BE REDUCED TO MINIMUM OF 1.25 FEET THIS IS ACCEPTABLE ONLY WHERE A GREATER OFFSET WOULD CAUSE UNACCEPTABLE INTERFERENCE WITH TRAFFIC.

SEE MANUFACTURERS SPECIFICATIONS FOR BARREL ARRAY SET UP.



NOTE:
 AT THE DIRECTION OF THE ENGINEER, OTHER APPROVED IMPACT ATTENUATORS CAN BE SUBSTITUTED IN LIEU OF THE SAND BARRELS ESPECIALLY WHERE REDIRECTION IS DESIRED OR AT WIDTH RESTRICTED AREAS.

PORTABLE CONCRETE BARRIER PLACEMENT AND END TREATMENT

10/22/14 LAYOUT 19

DESIGN TEAM				
DRAWN BY:	JAH			
DESIGNER:	JAH			
CHECKED BY:	BJB			
	NO.	BY	DATE	REVISIONS

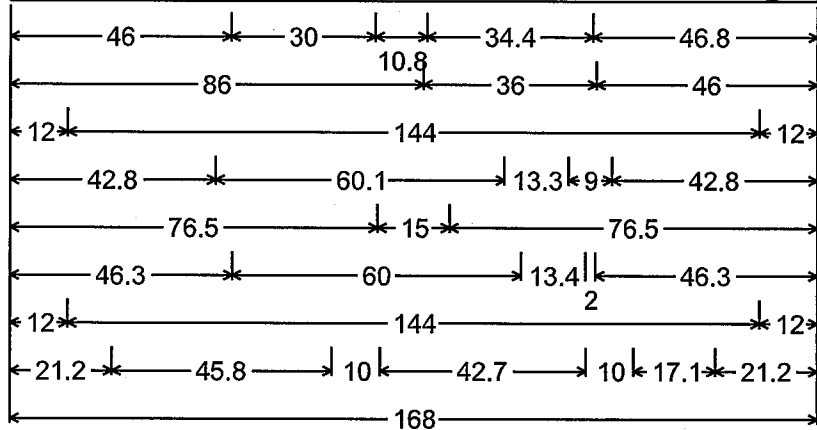
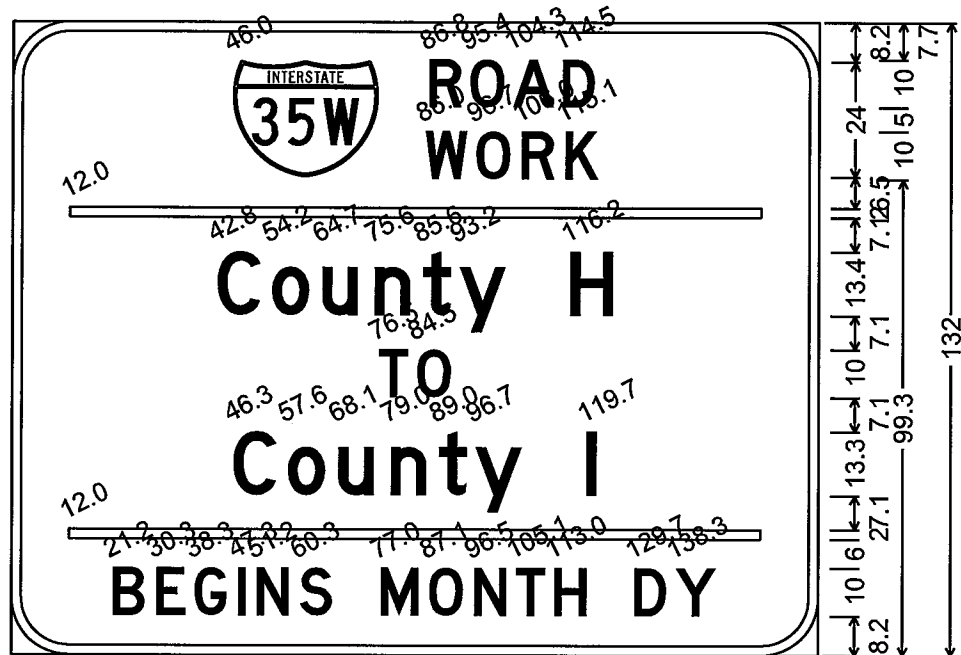
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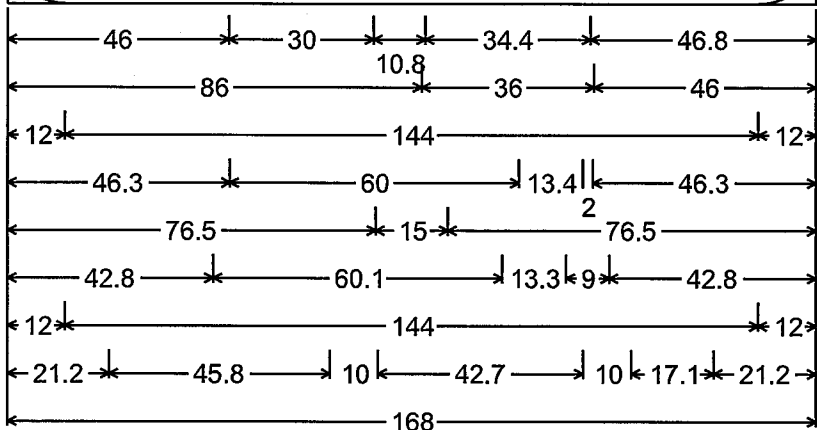
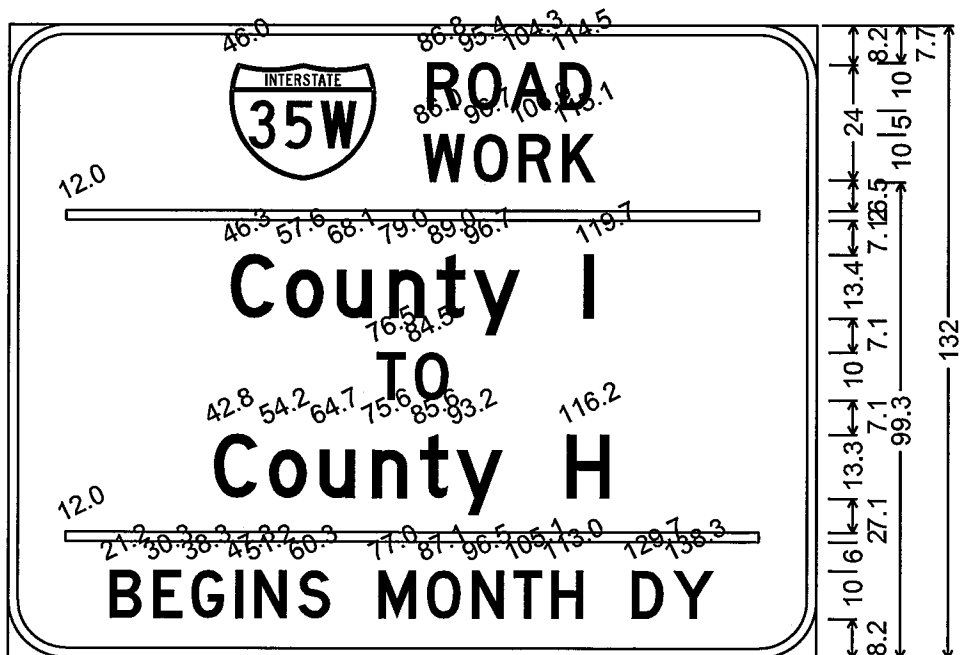
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 DETAILS

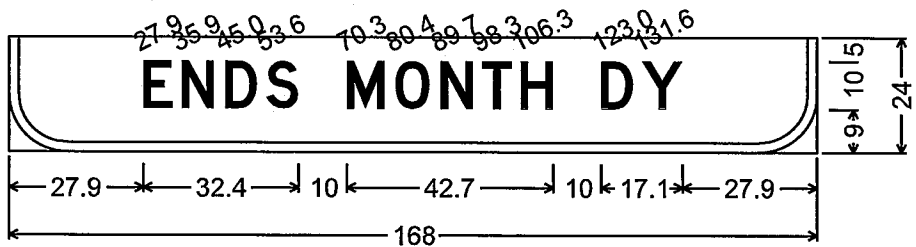
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RAMSE129594	
TC5	367
OF TC53	



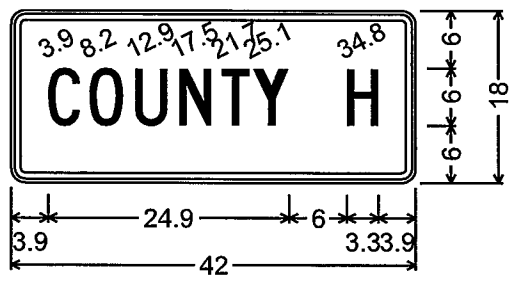
WZ-1; 12.0" Radius, 2.0" Border, Black on Orange;
[ROAD] D; [WORK] D; [County H] D; [TO] D; [County I] D;
[BEGINS] D; [MONTH DY] D;



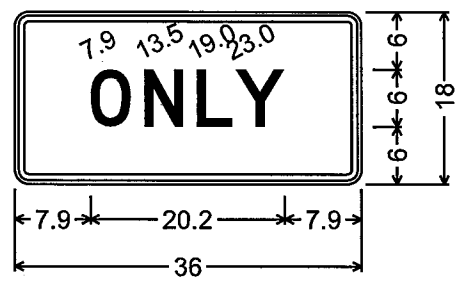
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[ROAD] D; [WORK] D; [County I] D; [TO] D; [County H] D;
[BEGINS] D; [MONTH DY] D;



WZ-3; 12.0" Radius, 2.0" Border, Black on Orange;
[ENDS MONTH DY] D;



WZ-4;
1.5" Radius, 0.6" Border, 0.4" Indent, Black on Orange;
[COUNTY H] C;



WZ-4;
1.5" Radius, 0.6" Border, 0.4" Indent, Black on Orange;
[ONLY] D;

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

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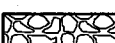

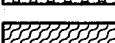
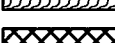
Kimley»Horn	RAMSEY COUNTY, MINNESOTA TH 35W / COUNTY ROAD H S.P. NO. 6284-162 (TH35W), S.P. 062-609-006, S.A.P. 062-593-003	TRAFFIC CONTROL PLAN DETAILS	FILE NO. RAMSE129594 99
			TC6 OF TC53 367

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LEGEND

-  PHASE 1A (2016 WORK)
-  PHASE 1B (2016 WORK)
-  PHASE 1C (2016 WORK)
-  PHASE 1D (2016 WORK)
-  PHASE 2A (2017 WORK)
-  PHASE 2B (2017 WORK)
-  PHASE 3 (2017 WORK)

NOTE:

1. THE CONTRACTOR SHALL DEVELOP DETAILED TRAFFIC CONTROL PLANS FOR EACH RESPECTIVE STAGE OF CONSTRUCTION ON COUNTY ROAD H AND AT THE INTERSECTION OF CSAH 10/TH 10/COUNTY ROAD 10 FOR APPROVAL BY THE ENGINEER. THE TRAFFIC CONTROL REQUIRED SHALL BE INCLUSIVE TO THE TRAFFIC CONTROL LUMP SUM PAY ITEM. THE CONTRACTOR SHALL SUBMIT THE PLANS FOR REVIEW AND APPROVAL TO THE ENGINEER 14 CALENDAR DAYS PRIOR TO IMPLEMENTATION OF TRAFFIC CONTROL.



300
SCALE IN FEET

PHASE 1 NOTES

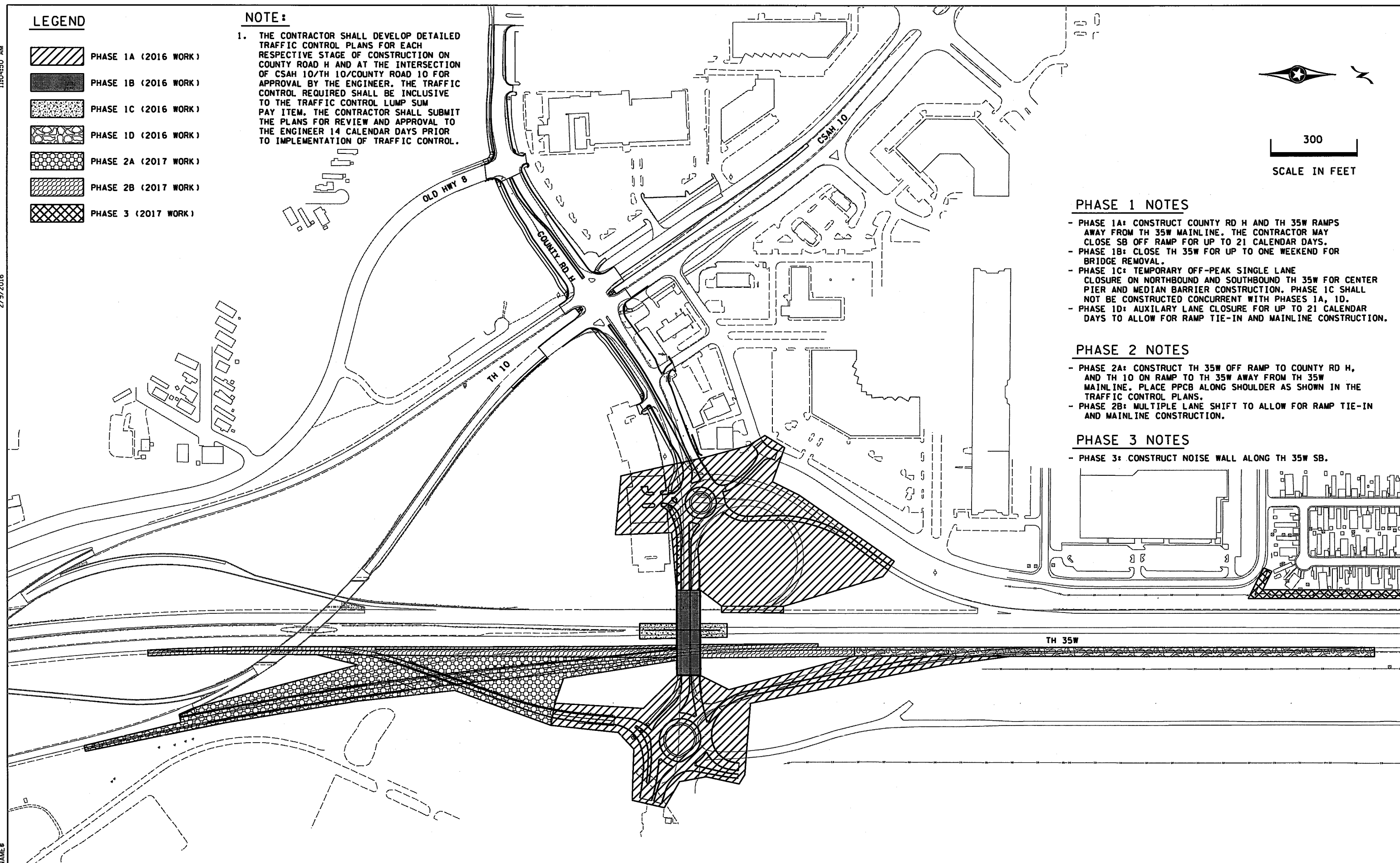
- PHASE 1A: CONSTRUCT COUNTY RD H AND TH 35W RAMPS AWAY FROM TH 35W MAINLINE. THE CONTRACTOR MAY CLOSE SB OFF RAMP FOR UP TO 21 CALENDAR DAYS.
- PHASE 1B: CLOSE TH 35W FOR UP TO ONE WEEKEND FOR BRIDGE REMOVAL.
- PHASE 1C: TEMPORARY OFF-PEAK SINGLE LANE CLOSURE ON NORTHBOUND AND SOUTHBOUND TH 35W FOR CENTER PIER AND MEDIAN BARRIER CONSTRUCTION. PHASE 1C SHALL NOT BE CONSTRUCTED CONCURRENT WITH PHASES 1A, 1D.
- PHASE 1D: AUXILIARY LANE CLOSURE FOR UP TO 21 CALENDAR DAYS TO ALLOW FOR RAMP TIE-IN AND MAINLINE CONSTRUCTION.

PHASE 2 NOTES

- PHASE 2A: CONSTRUCT TH 35W OFF RAMP TO COUNTY RD H, AND TH 10 ON RAMP TO TH 35W AWAY FROM TH 35W MAINLINE. PLACE PPCB ALONG SHOULDER AS SHOWN IN THE TRAFFIC CONTROL PLANS.
- PHASE 2B: MULTIPLE LANE SHIFT TO ALLOW FOR RAMP TIE-IN AND MAINLINE CONSTRUCTION.

PHASE 3 NOTES

- PHASE 3: CONSTRUCT NOISE WALL ALONG TH 35W SB.



DESIGN TEAM				REVISIONS			
NO.	BY	DATE	DESCRIPTION	NO.	BY	DATE	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43709
Licensed Professional Engineer

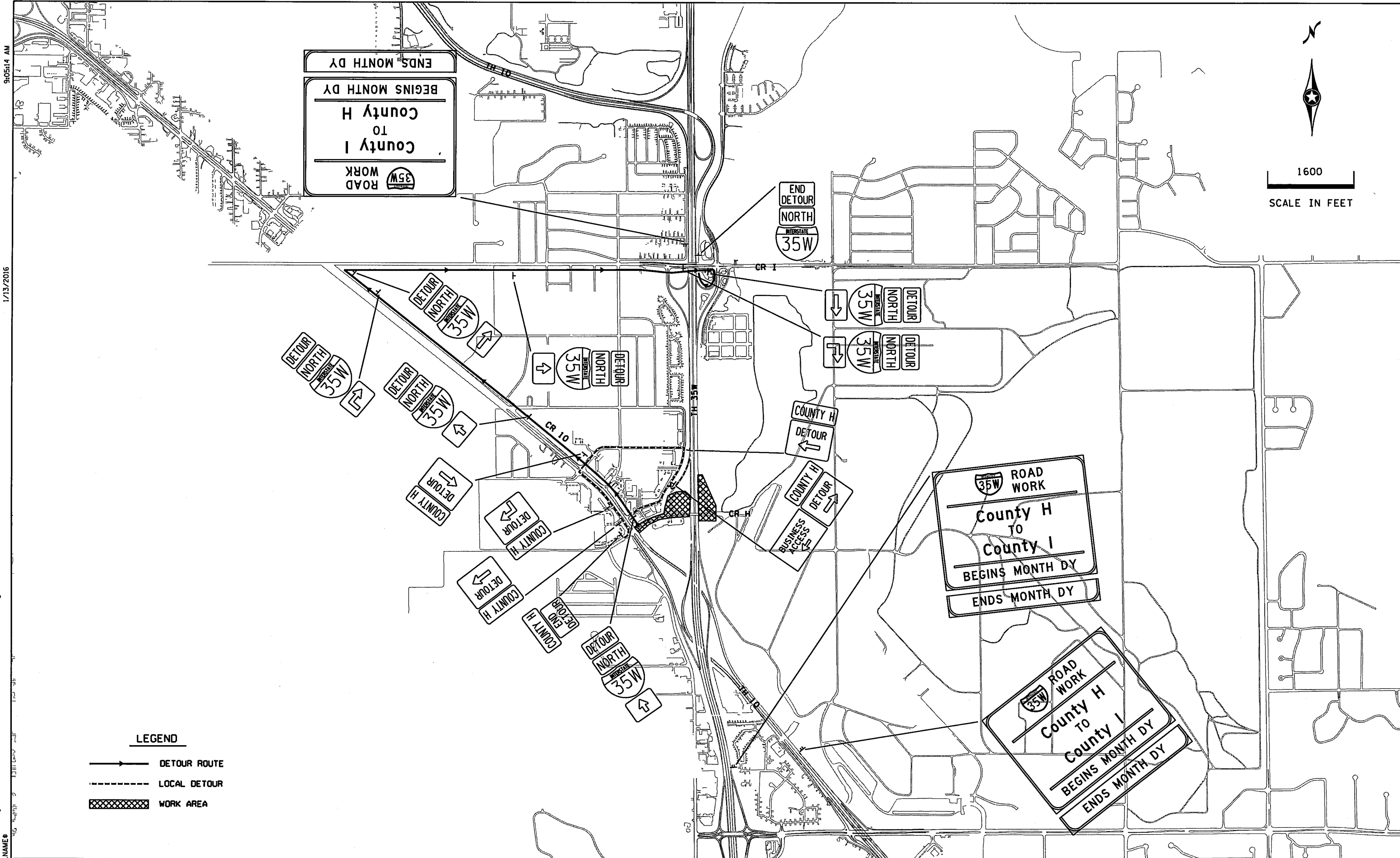
Printed Name: BRANDON J. BOURDON, P.E. Date: 2/9/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
PHASING PLAN

FILE NO. 100
RAMSE129594
TC7
OF TC53
367



9:05:14 AM

1/13/2016

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 \$MODELNAME\$

LEGEND

- DETOUR ROUTE
- - - LOCAL DETOUR
- ▨ WORK AREA

DESIGN TEAM			
DRAWN BY:			
DESIGNER:			
CHECKED BY:			
NO.	BY	DATE	REVISIONS

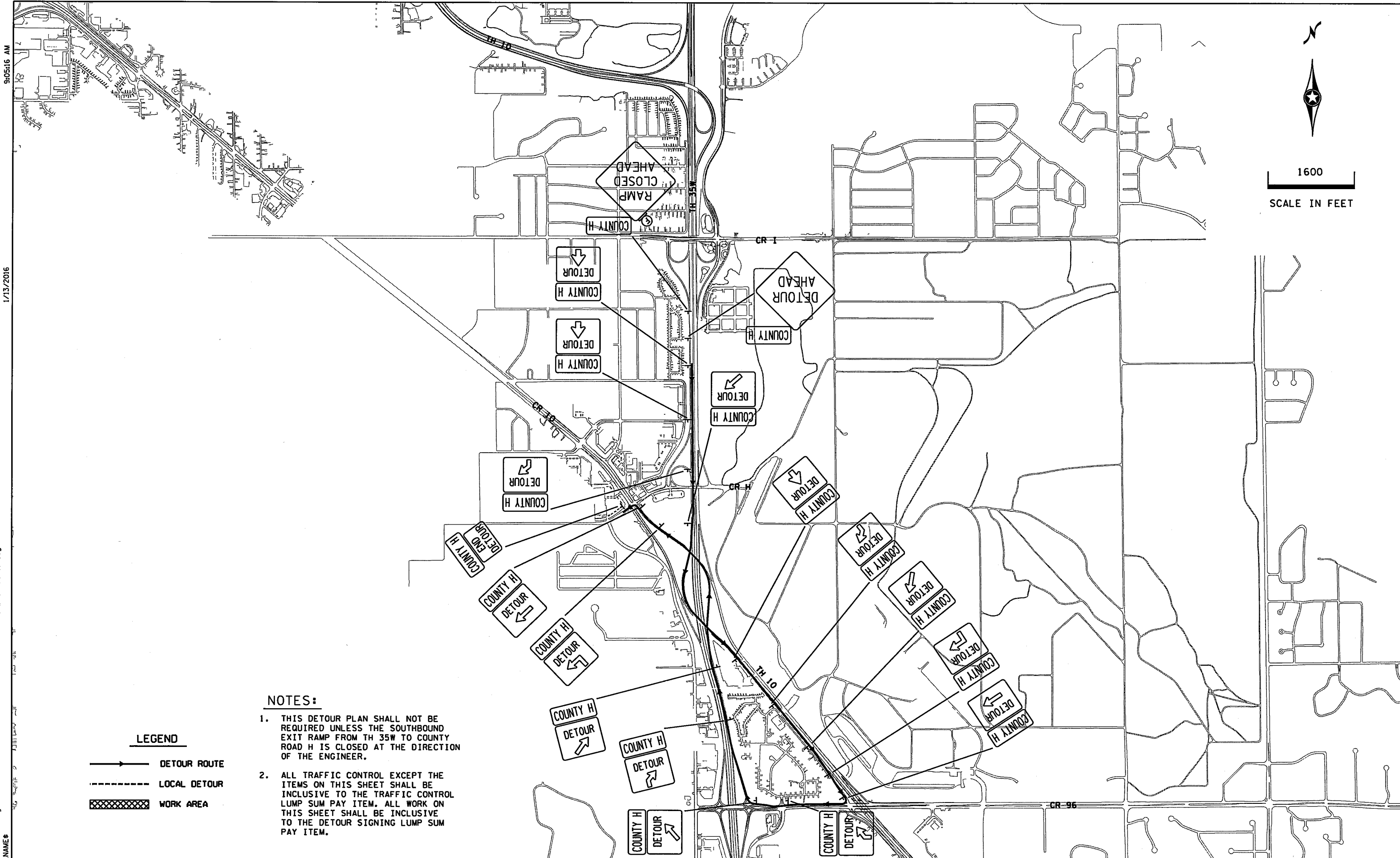
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

DETOUR PLAN
 PHASE 1A: COUNTY RD H AND TH 35W
 RAMP CONSTRUCTION

FILE NO. RAMSE129594	101
TC8 OF TC53	367



1600
SCALE IN FEET

NOTES:

1. THIS DETOUR PLAN SHALL NOT BE REQUIRED UNLESS THE SOUTHBOUND EXIT RAMP FROM TH 35W TO COUNTY ROAD H IS CLOSED AT THE DIRECTION OF THE ENGINEER.
2. ALL TRAFFIC CONTROL EXCEPT THE ITEMS ON THIS SHEET SHALL BE INCLUSIVE TO THE TRAFFIC CONTROL LUMP SUM PAY ITEM. ALL WORK ON THIS SHEET SHALL BE INCLUSIVE TO THE DETOUR SIGNING LUMP SUM PAY ITEM.

LEGEND

- DETOUR ROUTE
- LOCAL DETOUR
- WORK AREA

9:05:16 AM
 1/13/2016
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DESIGN TEAM			
DRAWN BY:			
DESIGNER:			
CHECKED BY:			
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* P.E. No. 43789
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

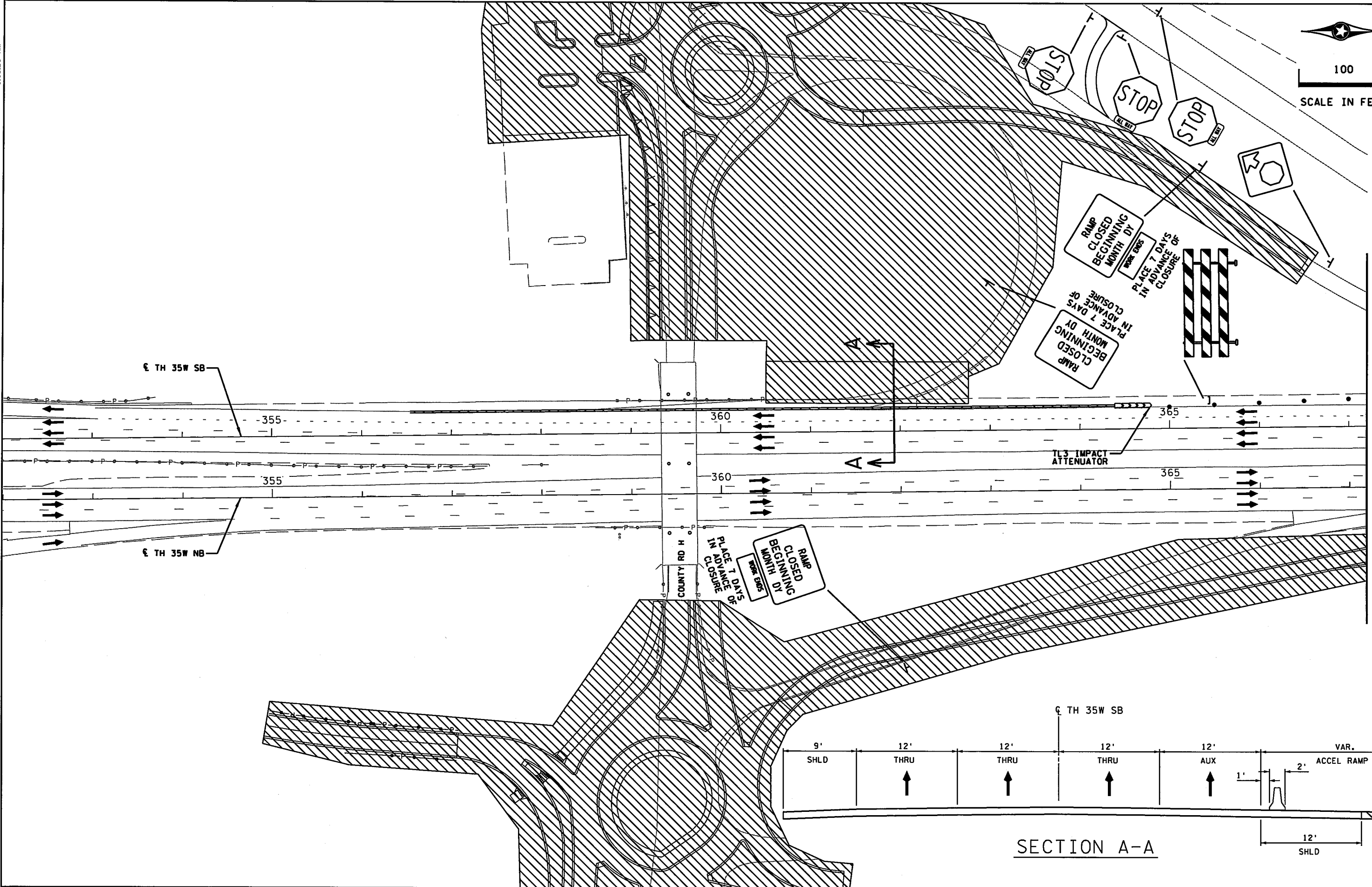
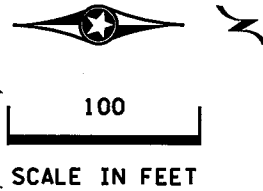
ALTERNATIVE DETOUR PLAN
 PHASE 1A: COUNTY RD H AND TH 35W
 RAMP CONSTRUCTION

FILE NO.	101A
RAMSEI29594	
TC8A	367
OF TC53	

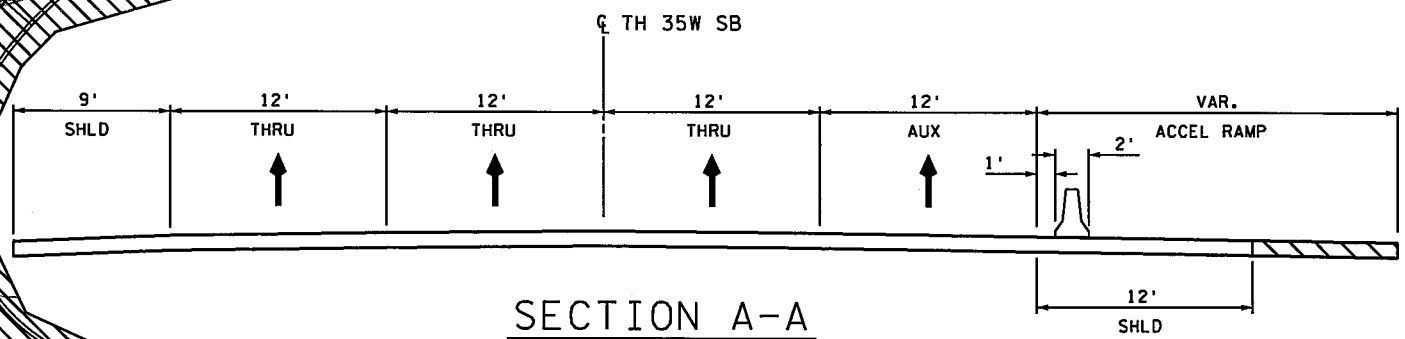
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1/13/2016

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MATCHLINE SEE SHEET TC10



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

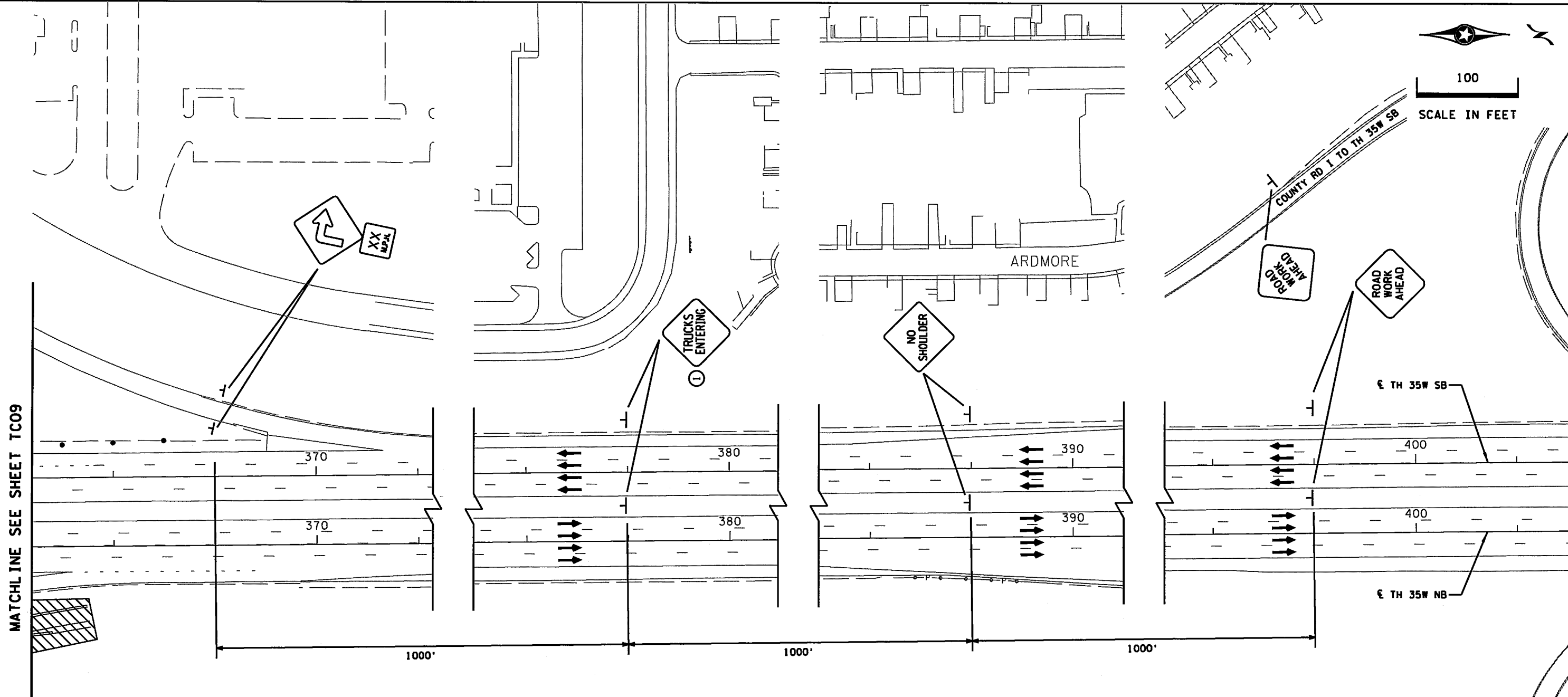
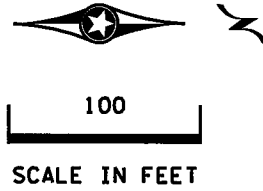
Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1A: COUNTY RD H AND TH 35W
 RAMP CONSTRUCTION

FILE NO. RAMSE129594	102
TC09 OF TC53	367



SPECIFIC NOTES:

- ① SIGN SHALL BE COVERED AT ALL TIMES EXCEPT WHEN THE CONDITION APPLIES AS ALLOWED IN THE SPECIAL PROVISIONS.

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1A: COUNTY RD H AND TH 35W
 RAMP CONSTRUCTION

FILE NO. RAMSEI29594	103
TC10 OF TC53	367

90547 AM

1/13/2016

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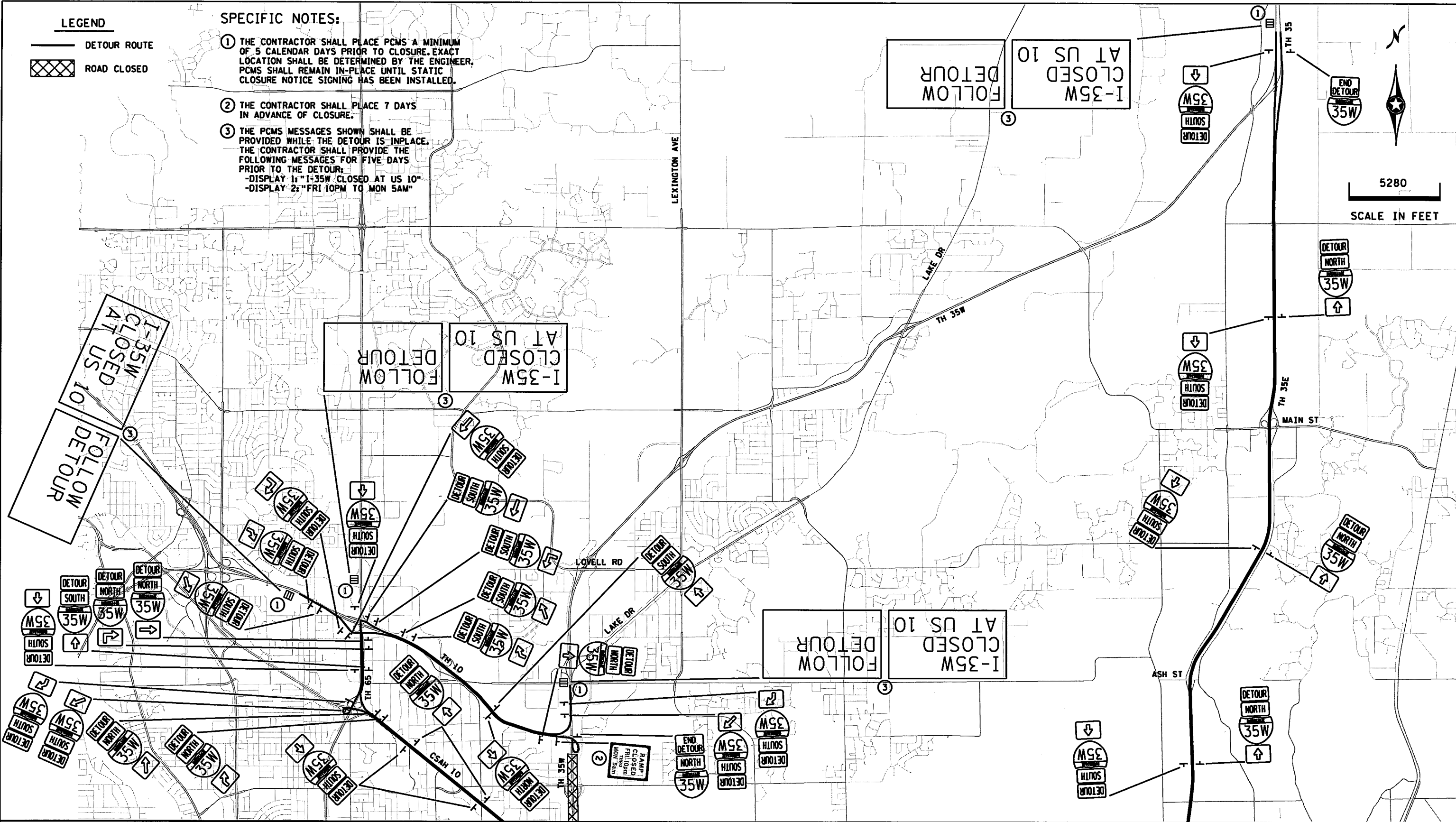
LEGEND

- DETOUR ROUTE
- ▨ ROAD CLOSED

SPECIFIC NOTES:

- 1 THE CONTRACTOR SHALL PLACE PCMS A MINIMUM OF 5 CALENDAR DAYS PRIOR TO CLOSURE. EXACT LOCATION SHALL BE DETERMINED BY THE ENGINEER. PCMS SHALL REMAIN IN-PLACE UNTIL STATIC CLOSURE NOTICE SIGNING HAS BEEN INSTALLED.
- 2 THE CONTRACTOR SHALL PLACE 7 DAYS IN ADVANCE OF CLOSURE.
- 3 THE PCMS MESSAGES SHOWN SHALL BE PROVIDED WHILE THE DETOUR IS IN-PLACE. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING MESSAGES FOR FIVE DAYS PRIOR TO THE DETOUR:
-DISPLAY 1: "I-35W CLOSED AT US 10"
-DISPLAY 2: "FRI 10PM TO MON 5AM"

5280
SCALE IN FEET



MATCHLINE SEE SHEET TC12

DESIGN TEAM				REVISIONS			
DRAWN BY:	JAH			NO.	BY	DATE	
DESIGNER:	JAH						
CHECKED BY:	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

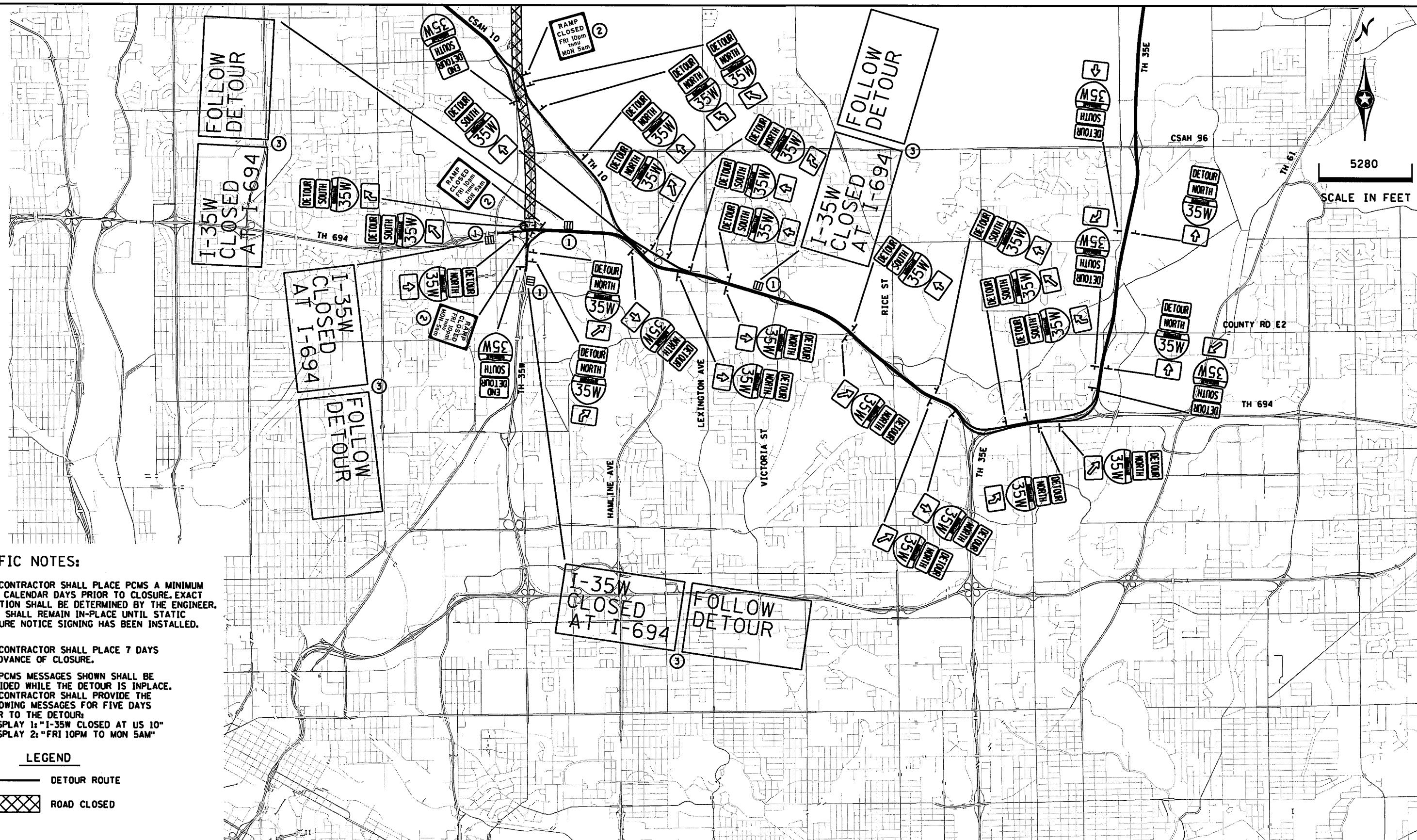


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

DETOUR PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO.	104
RAMSEY129594	
TC11	367
OF TC53	

MATCHLINE SEE SHEET TC11



SPECIFIC NOTES:

- ① THE CONTRACTOR SHALL PLACE PCMS A MINIMUM OF 5 CALENDAR DAYS PRIOR TO CLOSURE. EXACT LOCATION SHALL BE DETERMINED BY THE ENGINEER. PCMS SHALL REMAIN IN-PLACE UNTIL STATIC CLOSURE NOTICE SIGNING HAS BEEN INSTALLED.
- ② THE CONTRACTOR SHALL PLACE 7 DAYS IN ADVANCE OF CLOSURE.
- ③ THE PCMS MESSAGES SHOWN SHALL BE PROVIDED WHILE THE DETOUR IS INPLACE. THE CONTRACTOR SHALL PROVIDE THE FOLLOWING MESSAGES FOR FIVE DAYS PRIOR TO THE DETOUR:
 -DISPLAY 1: "I-35W CLOSED AT US 10"
 -DISPLAY 2: "FRI 10PM TO MON 5AM"

LEGEND

- DETOUR ROUTE
- ROAD CLOSED

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

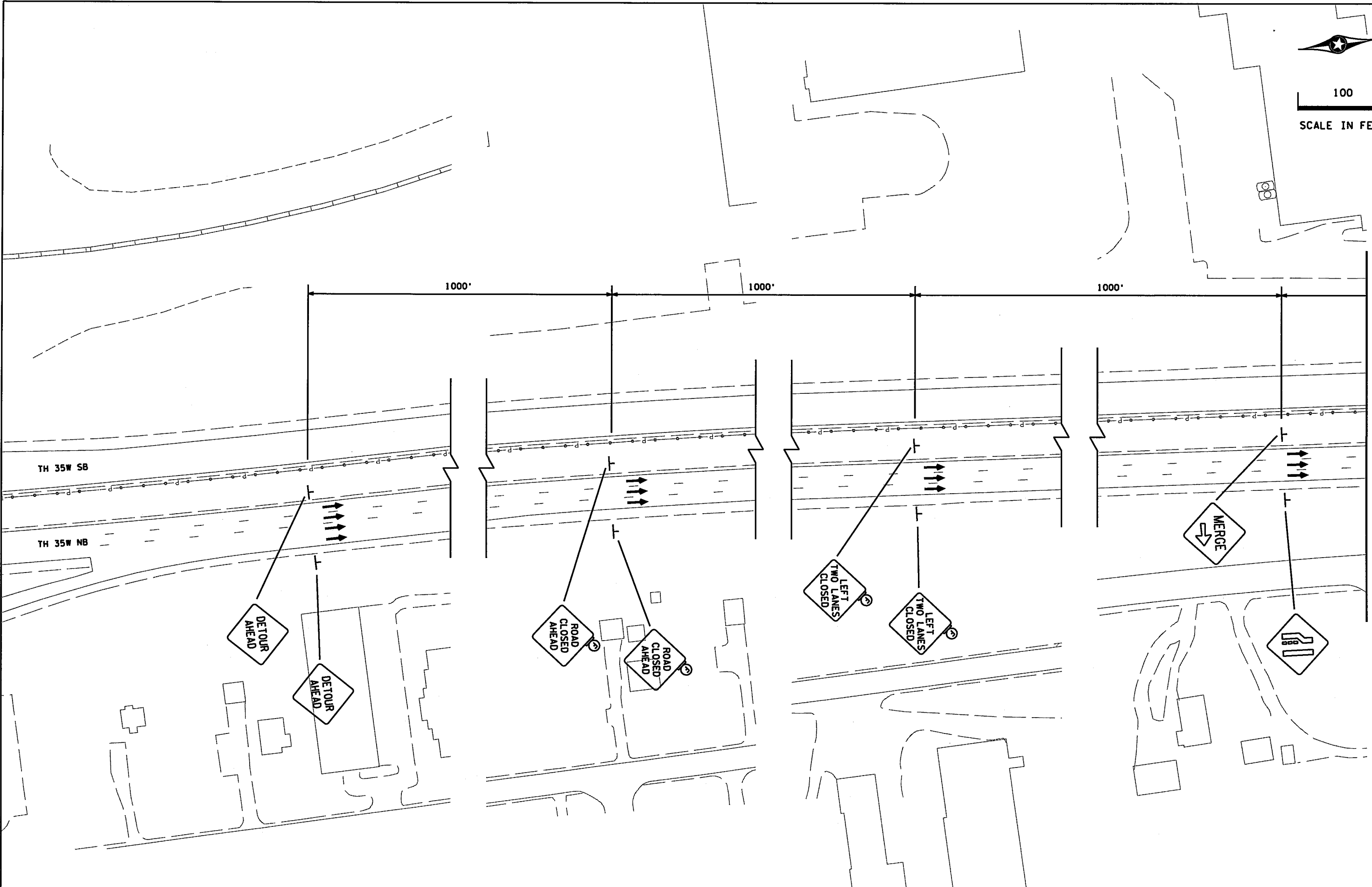
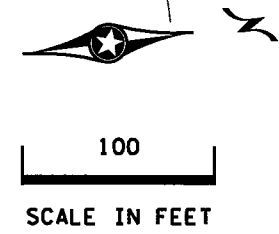
DETOUR PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO.	105
RAMSEI29594	
TC12	367
OF TC53	

9:05:54 AM

1/13/2016

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\$MODELNAME\$



MATCHLINE SEE SHEET TC14

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
	NO.	BY	DATE
			REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

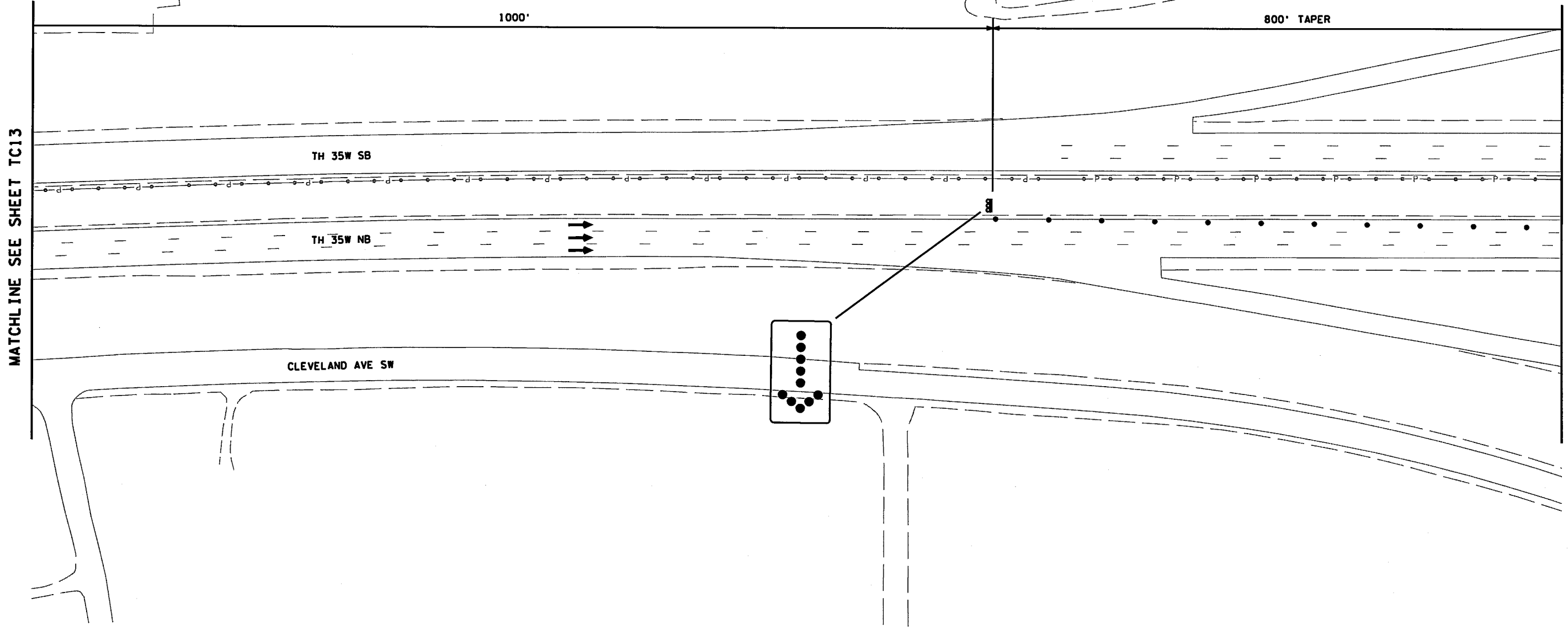
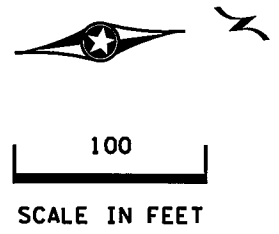
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594	106
TC13 OF TC53	367

9:05:55 AM

1/13/2016

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\$MODELNAME\$



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon*, Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

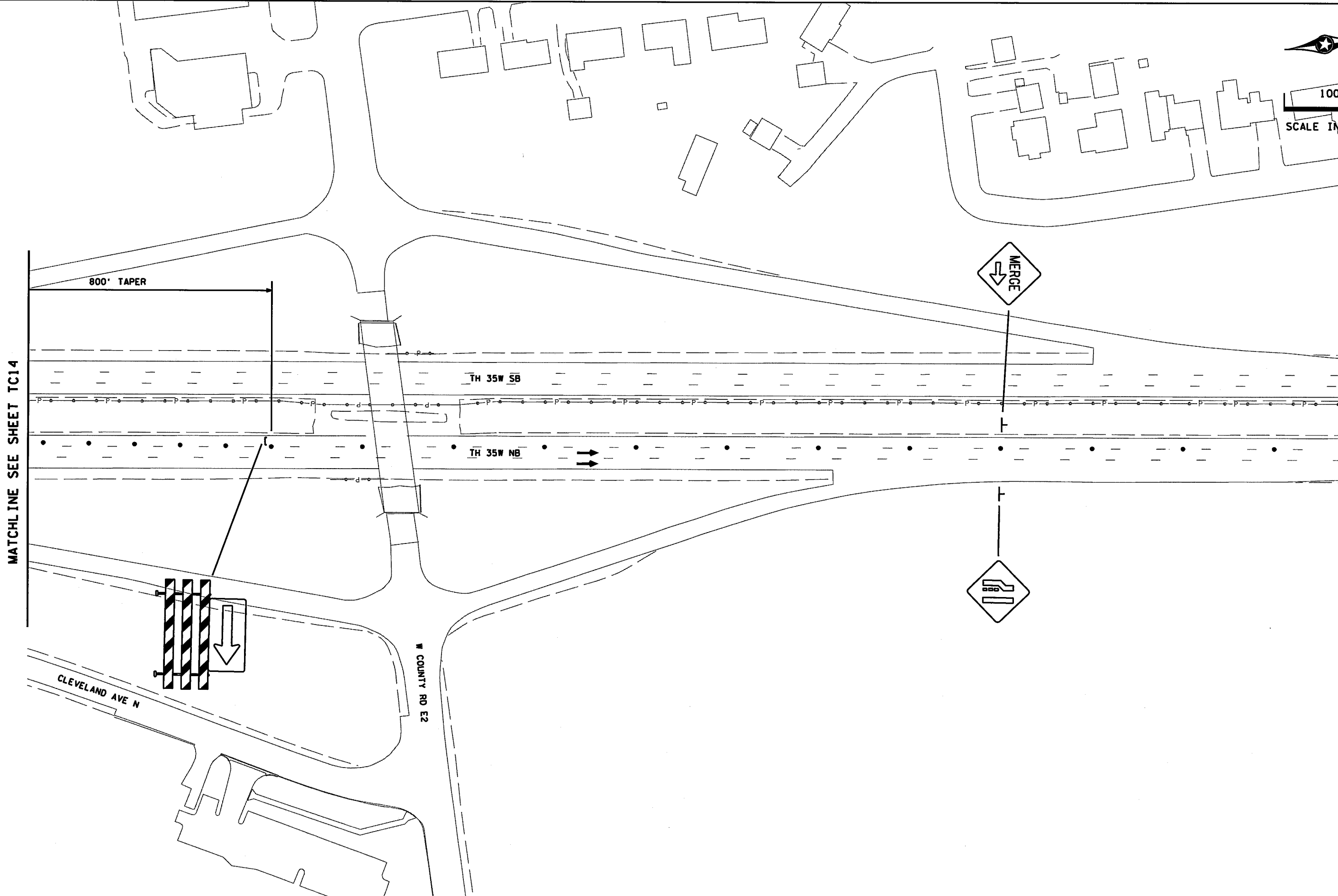
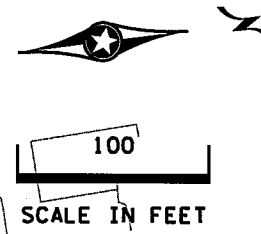
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	107
TC14 OF TC53	367

9:05:55 AM

1/13/2016

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\$MODELNAME\$



DESIGN TEAM				REVISIONS			
DRAWN BY:	JAH			NO.	BY	DATE	
DESIGNER:	JAH						
CHECKED BY:	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

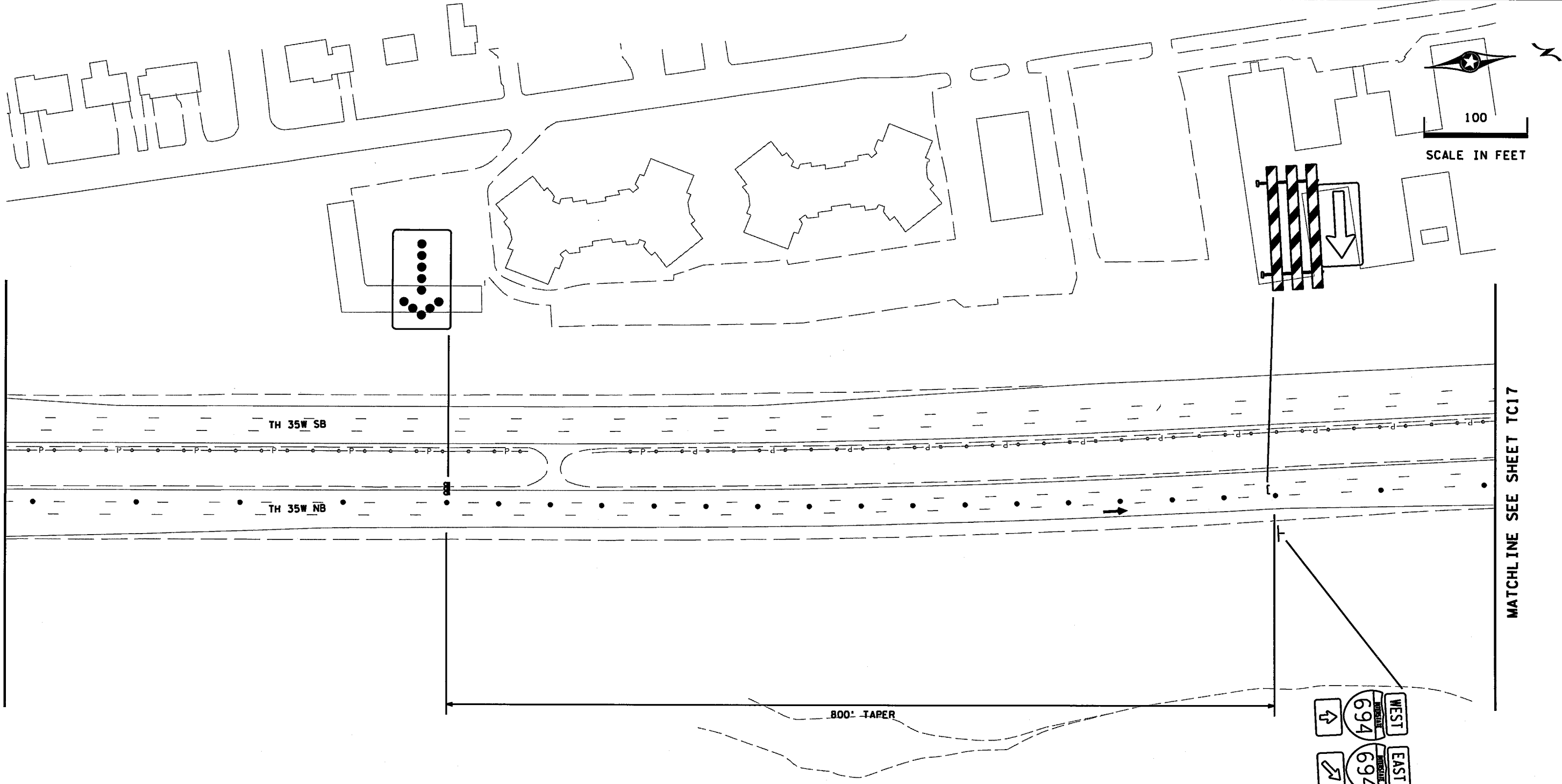
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	108
TC15 OF TC53	367

9:05:56 AM

1/13/2016

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\$MODELNAME\$



MATCHLINE SEE SHEET TC15

MATCHLINE SEE SHEET TC17

DESIGN TEAM				
DRAWN BY:	JAH			
DESIGNER:	JAH			
CHECKED BY:	BJB			
	NO.	BY	DATE	REVISIONS

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Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594	109
TC16 OF TC53	367

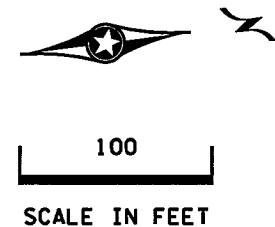
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1/13/2016

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SPECIFIC NOTES:

- ① THE CONTRACTOR SHALL PROVIDE A POLICE OFFICER WITH CAR DURING CLOSURE.



MATCHLINE SEE SHEET TC16

MATCHLINE SEE SHEET TC18

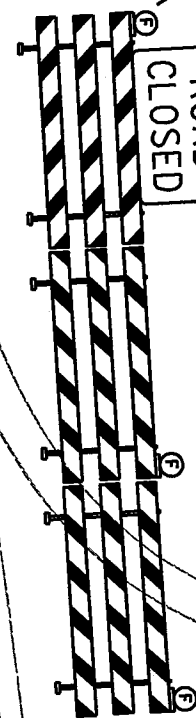
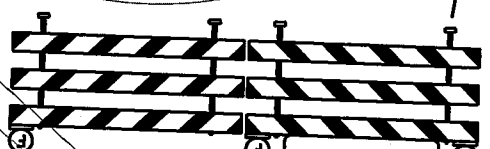
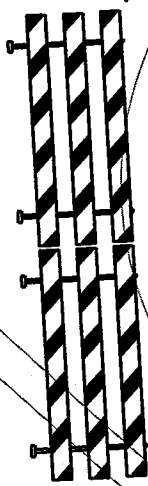
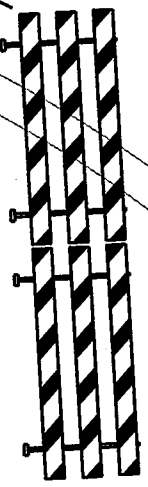
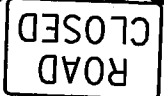
LAKE VALENTINE RD

TH 35W SB

TH 35W NB

TH 694 EB

TH 694 WB



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
	NO.	BY	DATE
			REVISIONS

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Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer

Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594
 TC17 OF TC53
 110
 367

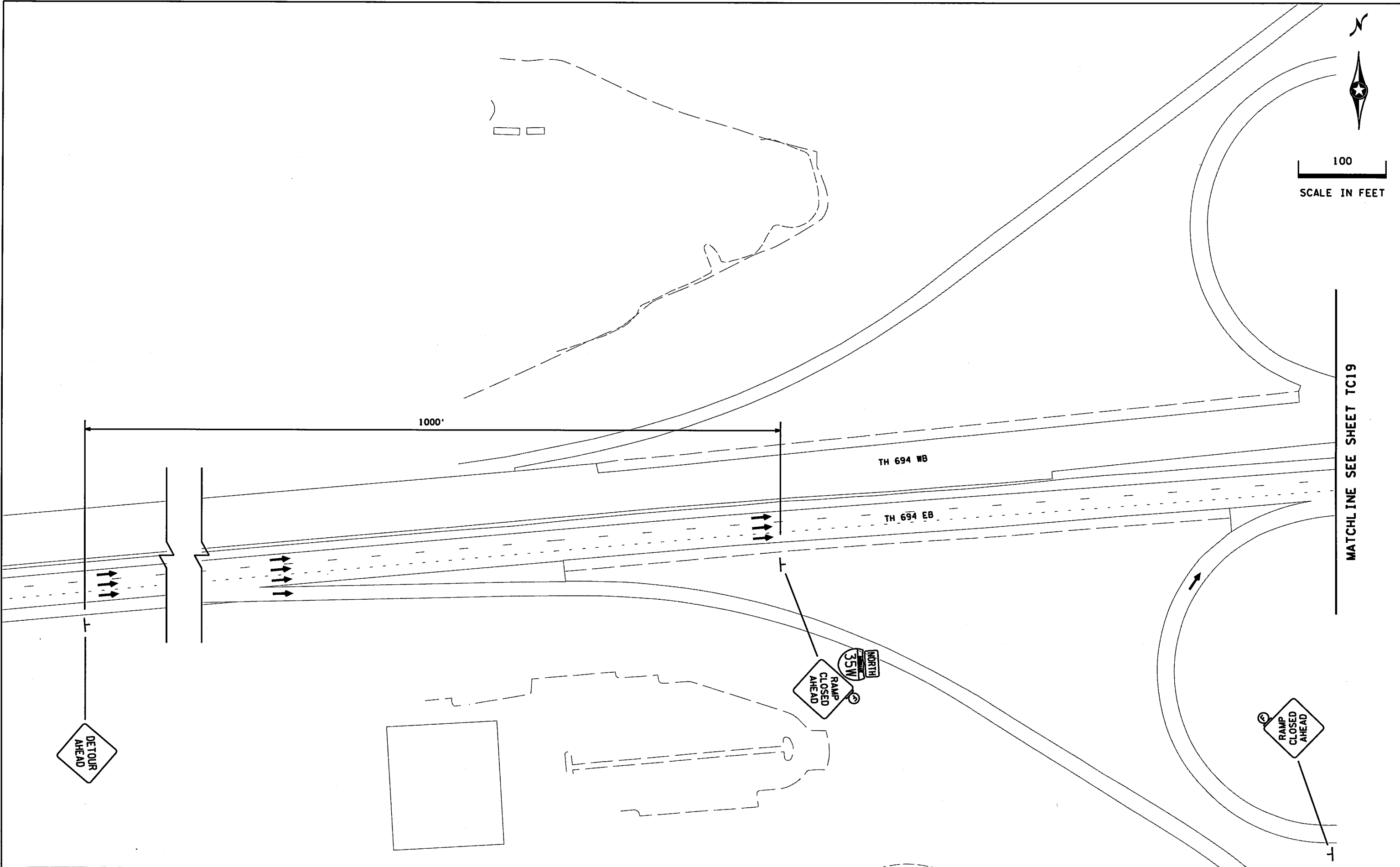
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1/13/2016

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\$MODELNAME\$



100
SCALE IN FEET



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
	NO.	BY	DATE
			REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594	111
TC18 OF TC53	367

9:05:57 AM

1/13/2016

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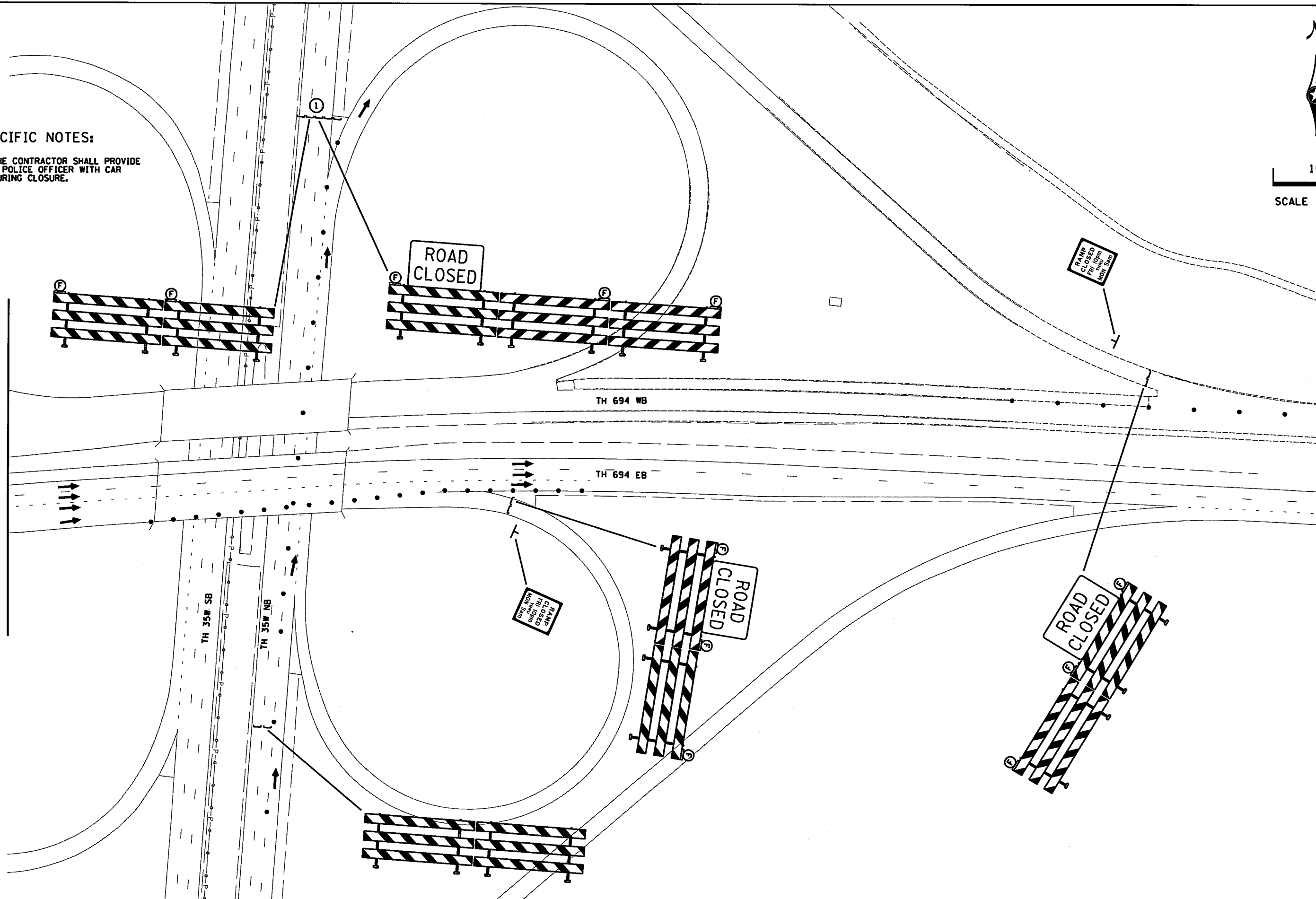
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SCALE IN FEET

SPECIFIC NOTES:

- ① THE CONTRACTOR SHALL PROVIDE A POLICE OFFICER WITH CAR DURING CLOSURE.

MATCHLINE SEE SHEET TC18

MATCHLINE SEE SHEET TC20



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer

Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594	112
TC19 OF TC53	367

9:05:57 AM

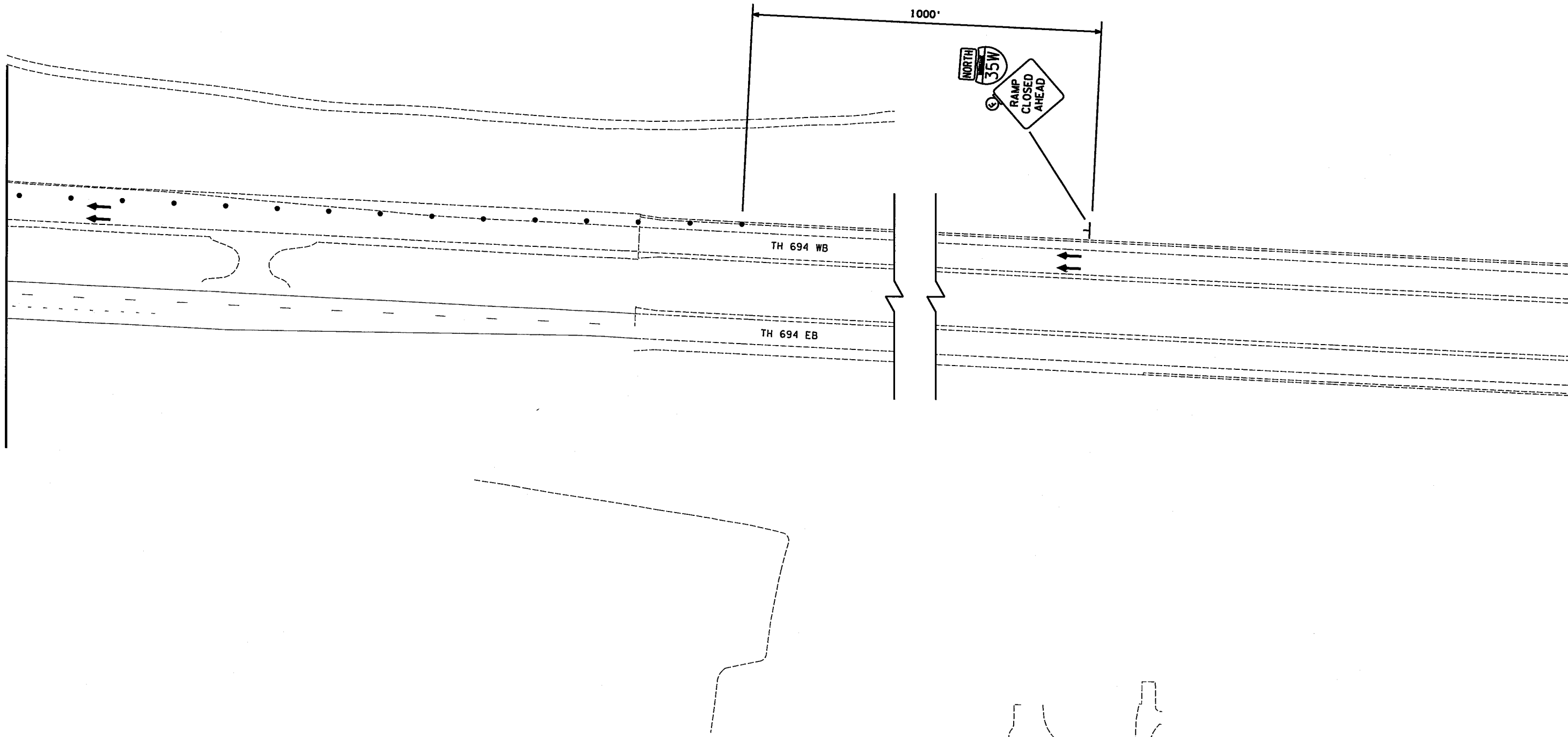
1/13/2016

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100
SCALE IN FEET

MATCHLINE SEE SHEET TC19



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer

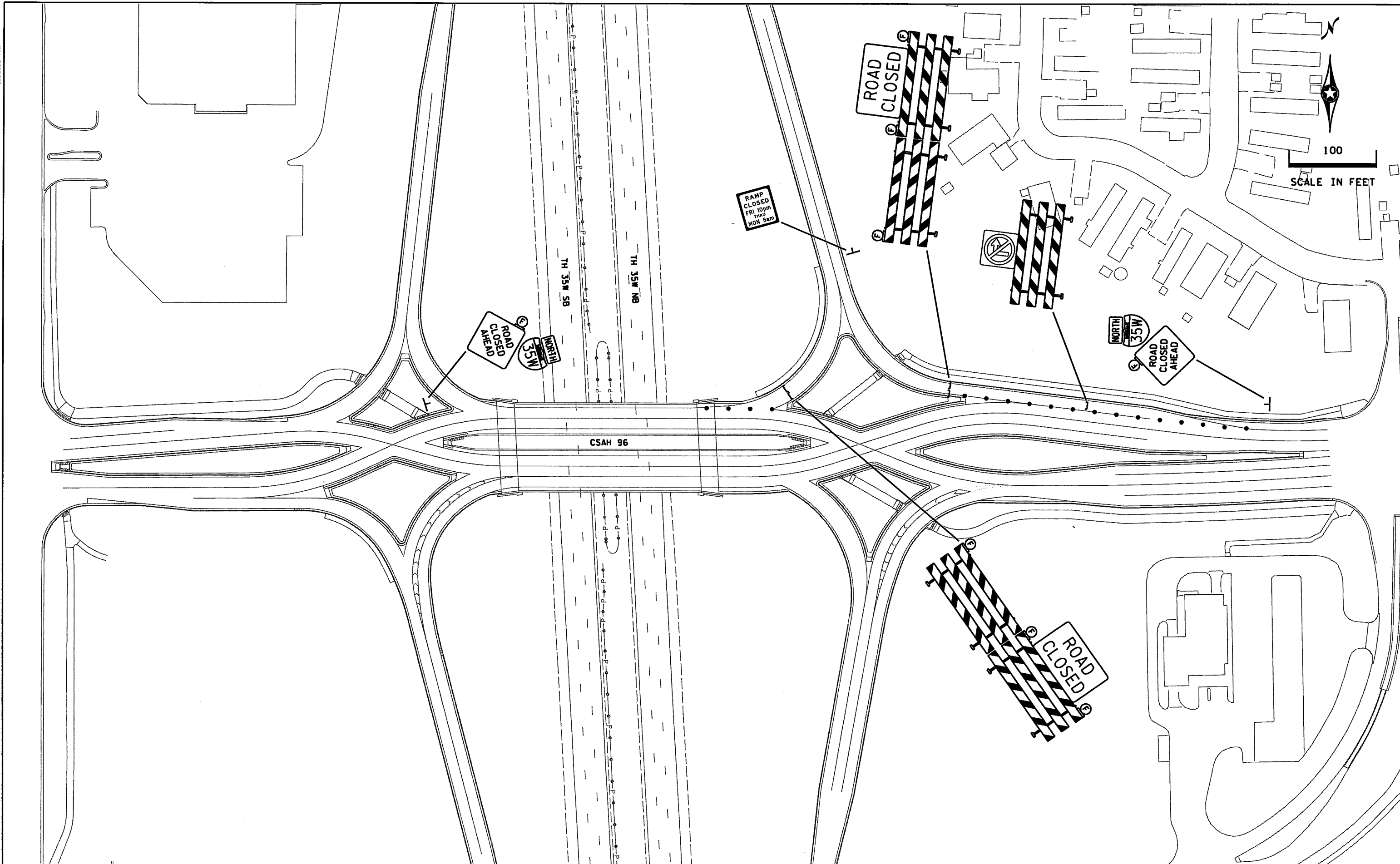
Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594	113
TC20 OF TC53	367



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

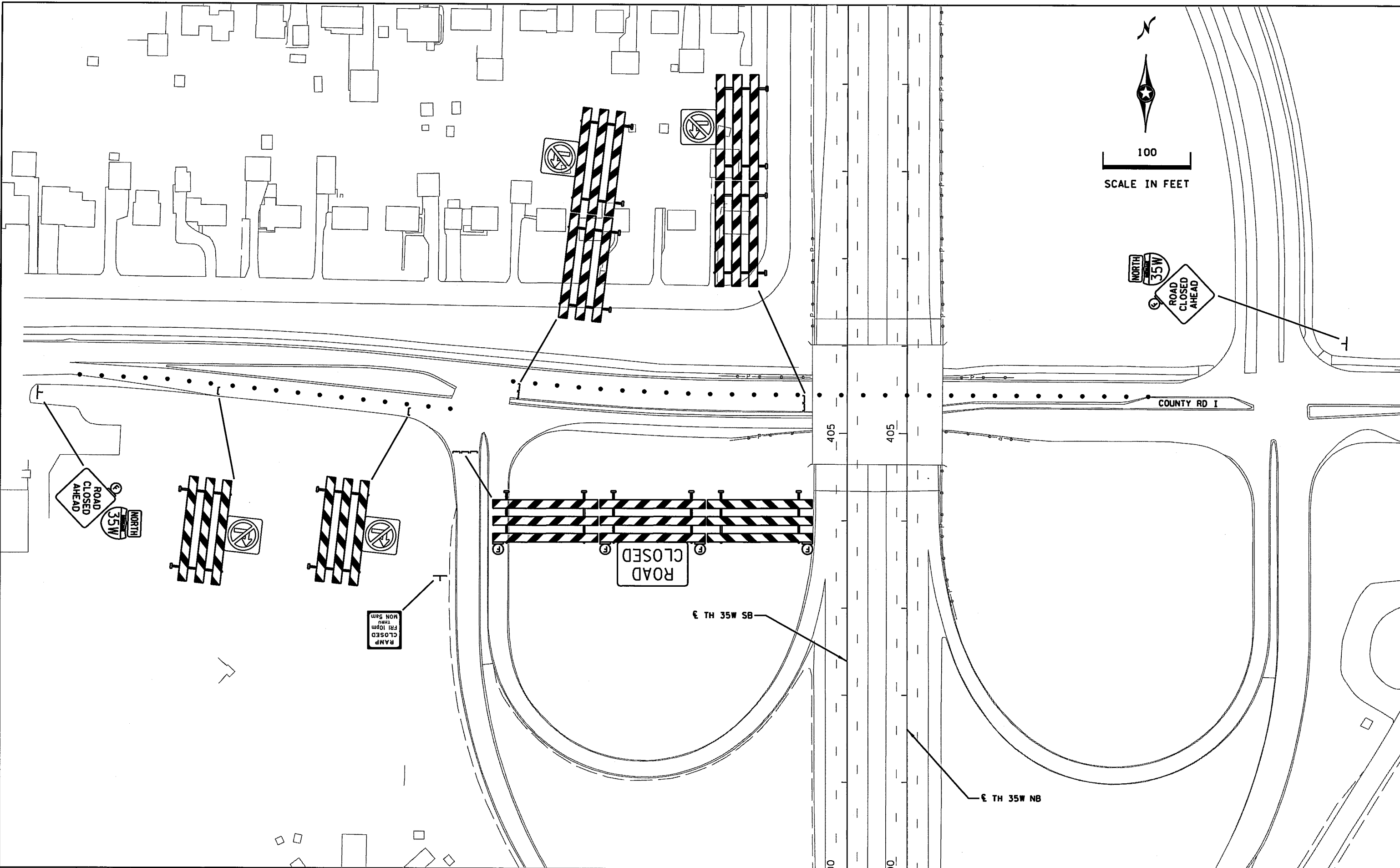
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594	114
TC21 OF TC53	367

9:05:59 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162.tc22.dgn
\$MODELNAME\$



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

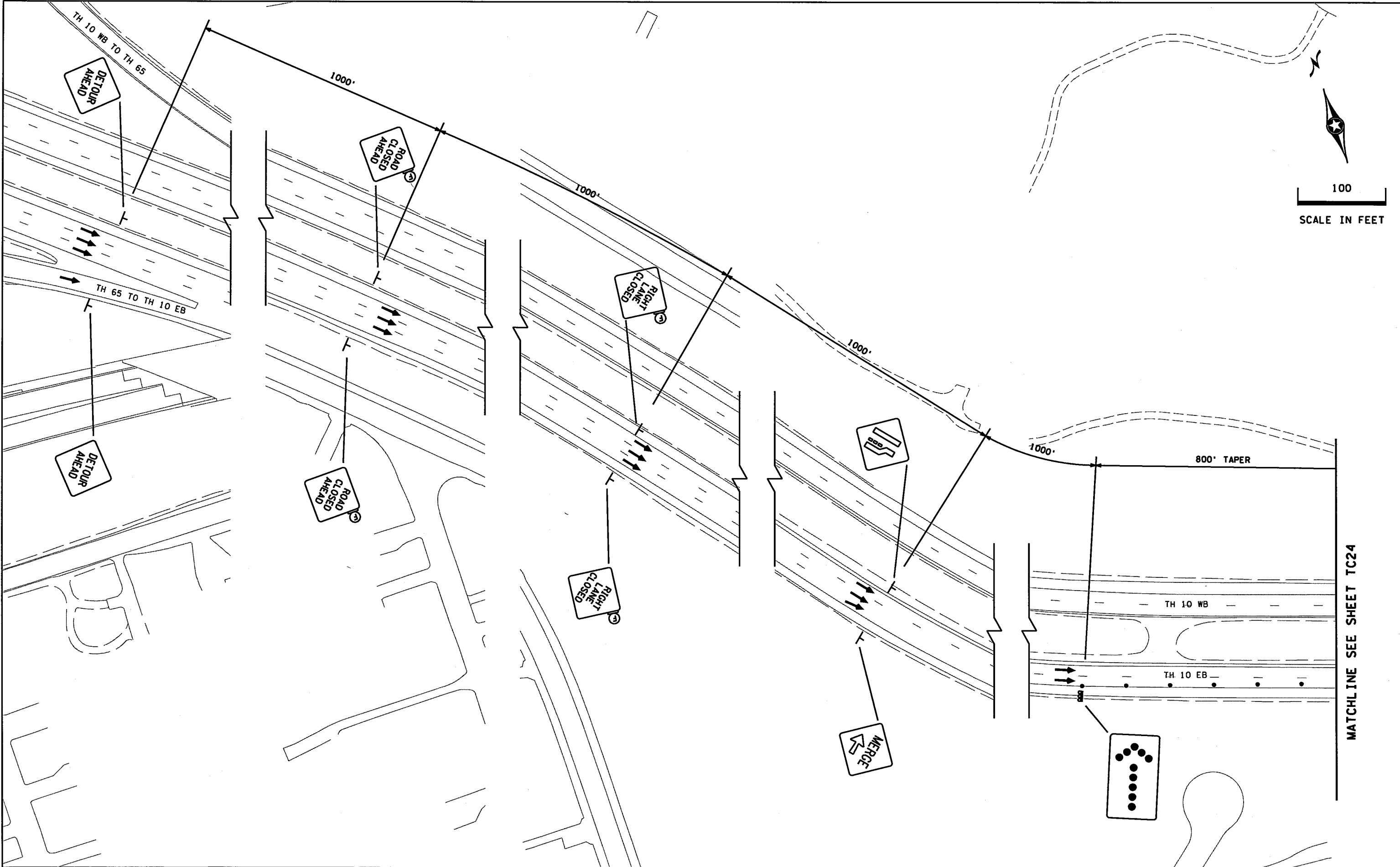
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	115
TC22 OF TC53	367

9:05:59 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162.tc23.dgn



100
SCALE IN FEET

MATCHLINE SEE SHEET TC24

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

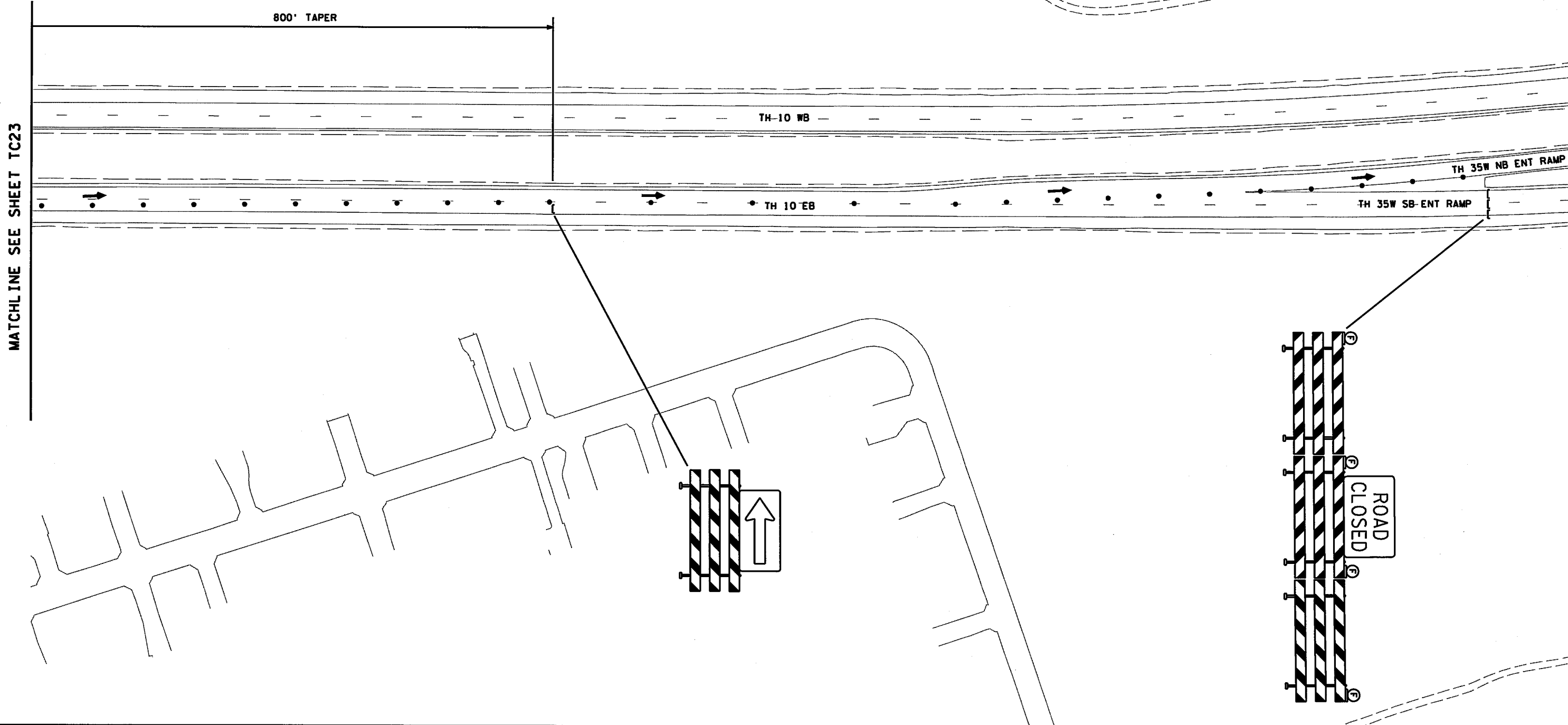
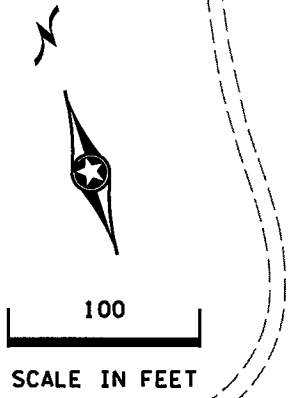
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	116
TC23 OF TC53	367

9:06:00 AM

1/13/2016

K:\TWC_Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162_tc24.dgn



MATCHLINE SEE SHEET TC23

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer

Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	117
TC24 OF TC53	367

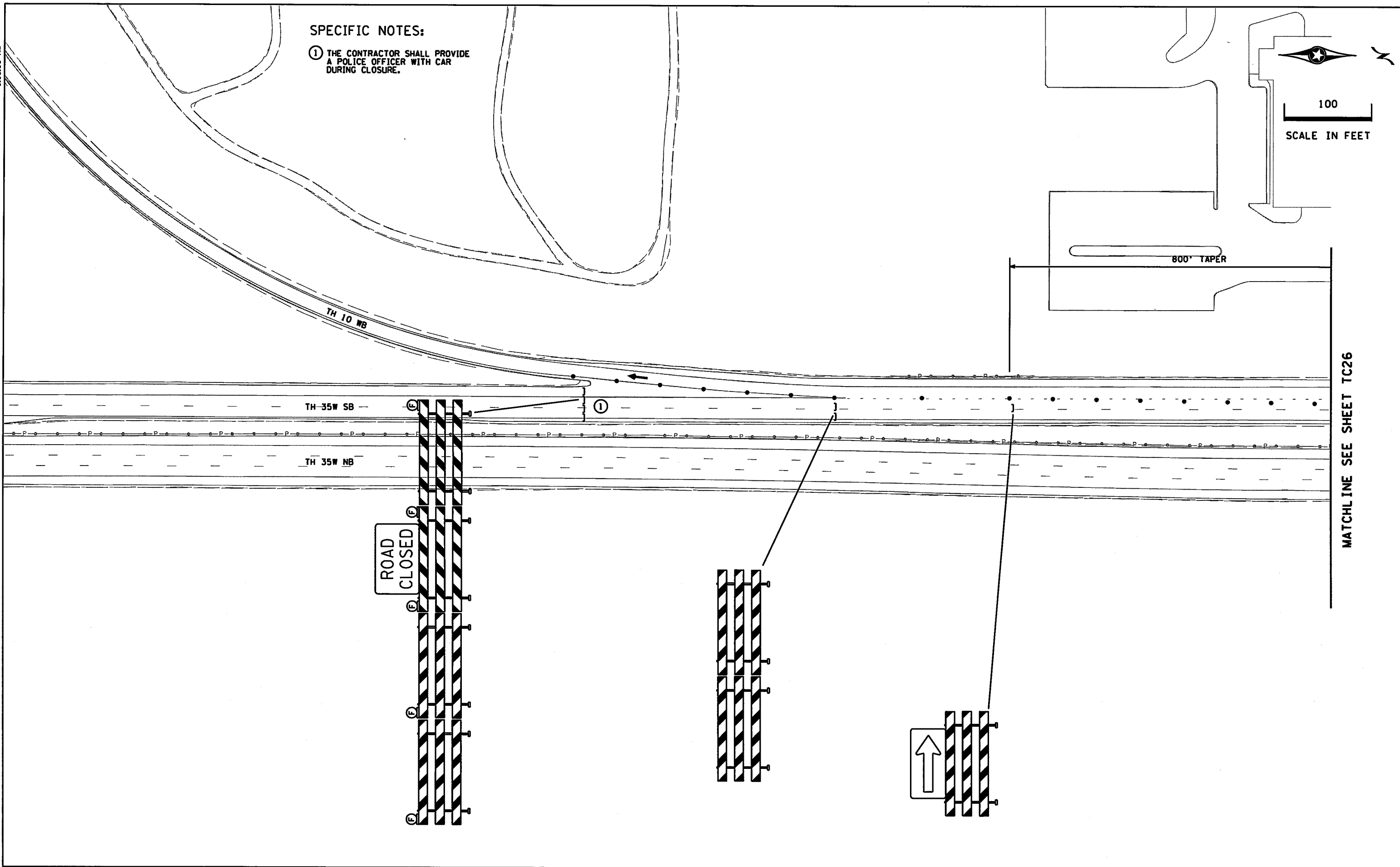
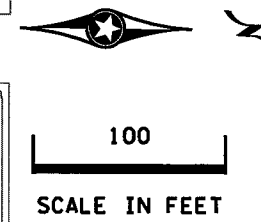
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1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162_tc25.dgn
\$MODELNAME\$

SPECIFIC NOTES:

- ① THE CONTRACTOR SHALL PROVIDE A POLICE OFFICER WITH CAR DURING CLOSURE.



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

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 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	118
TC25 OF TC53	367

9c06:01 AM

1/13/2016

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\$MODELNAME\$



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MATCHLINE SEE SHEET TC25

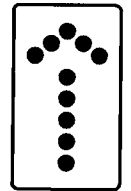
MATCHLINE SEE SHEET TC27

800' TAPER

COUNTY RD J

TH 35W-SB

TH 35W NB



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

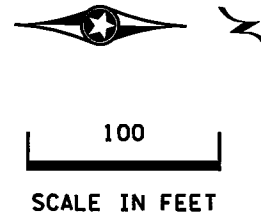
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	119
TC26 OF TC53	367

9:06:01 AM

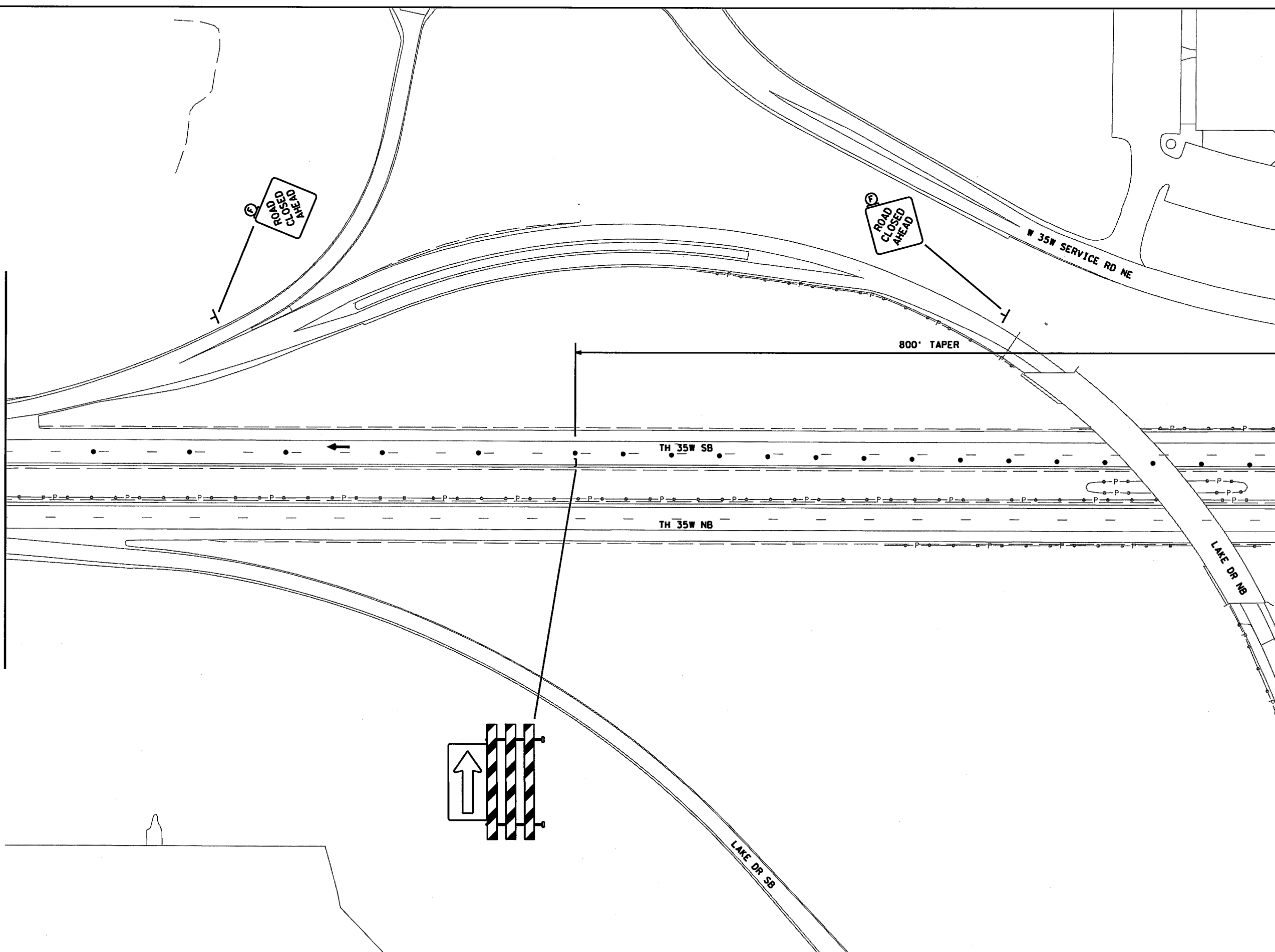
1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162_tc27.dgn
\$MODELNAME\$



MATCHLINE SEE SHEET TC26

MATCHLINE SEE SHEET TC28



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 13789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

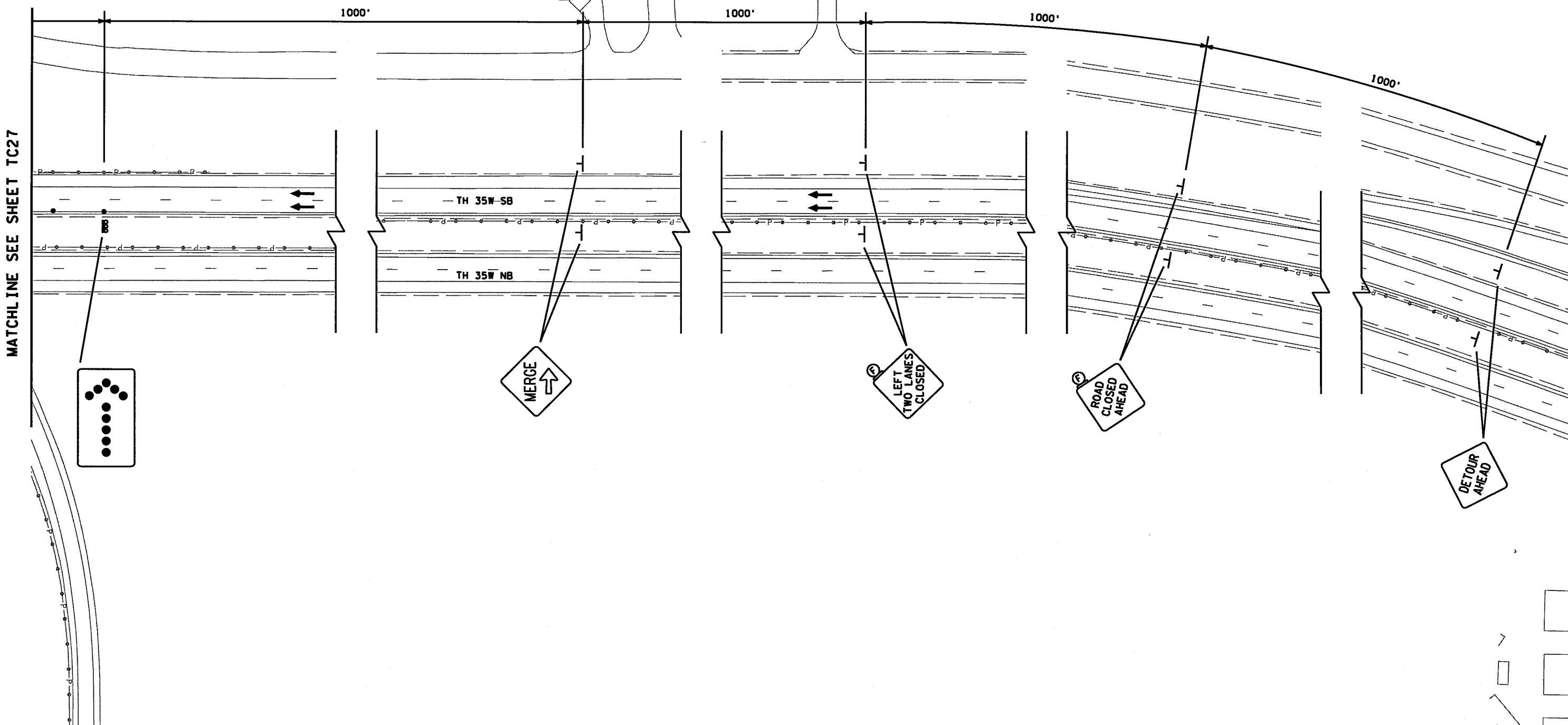
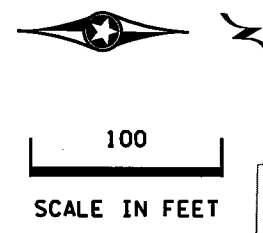
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	120
TC27 OF TC53	367

9:06:02 AM

1/13/2016

K:\TWC_Civil\County\RAMSEY\135W_CRN\CAD\Plan Sheets\CD6284162_tc28.dgn
\$MODELNAME\$



DESIGN TEAM				REVISIONS			
DRAWN BY:	JAH			NO.	BY	DATE	
DESIGNER:	JAH						
CHECKED BY:	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

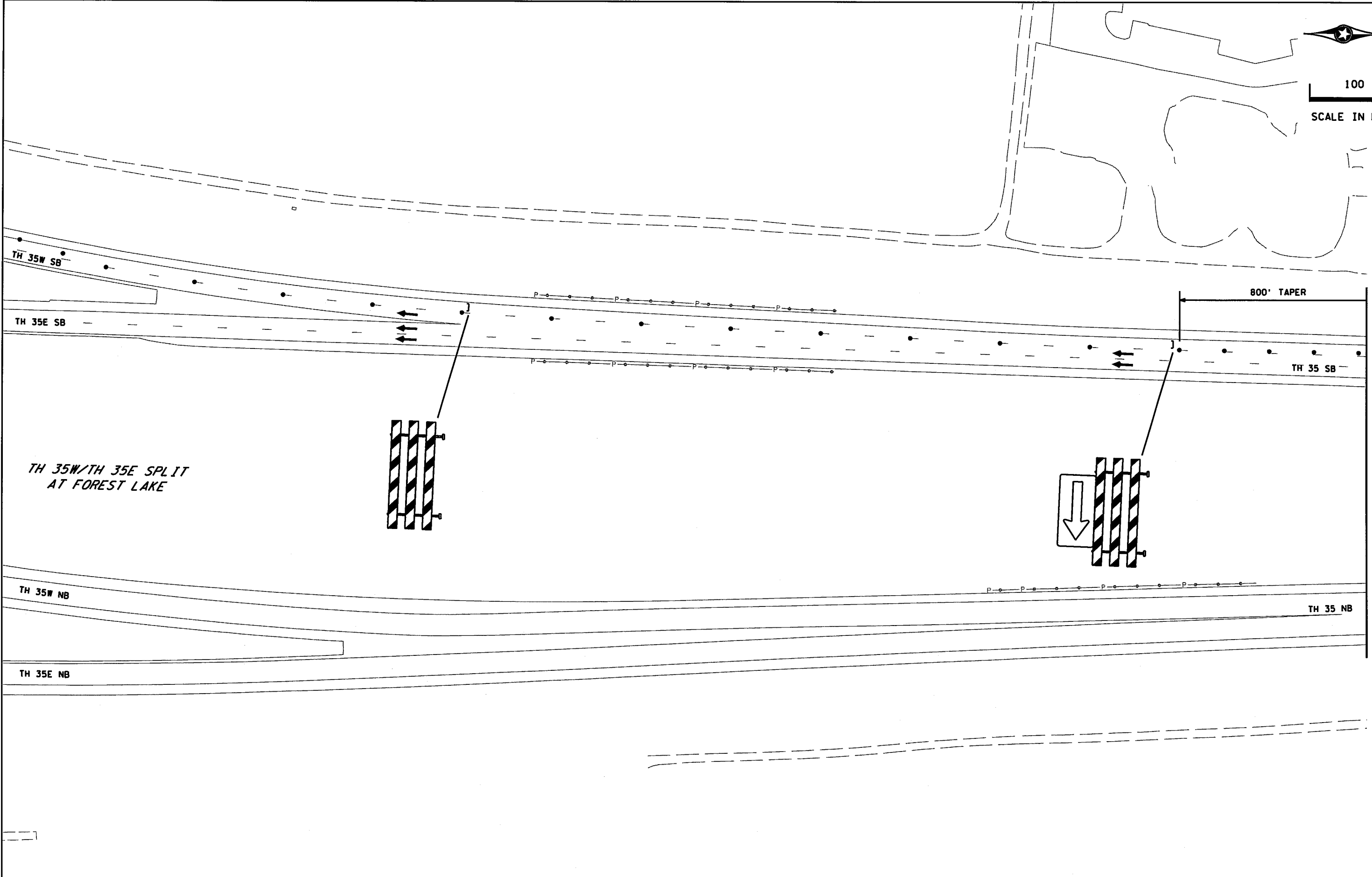
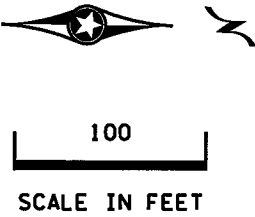
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEI29594	121
TC28 OF TC53	367

9:06:02 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162_tc29.dgn
\$MODELNAME\$



MATCHLINE SEE SHEET TC30

DESIGN TEAM				REVISIONS			
NO.	BY	DATE		NO.	BY	DATE	
1	JAH						
2	JAH						
3	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

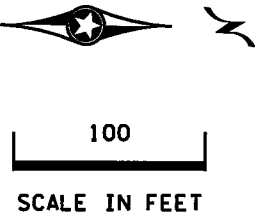
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	122
TC29 OF TC53	367

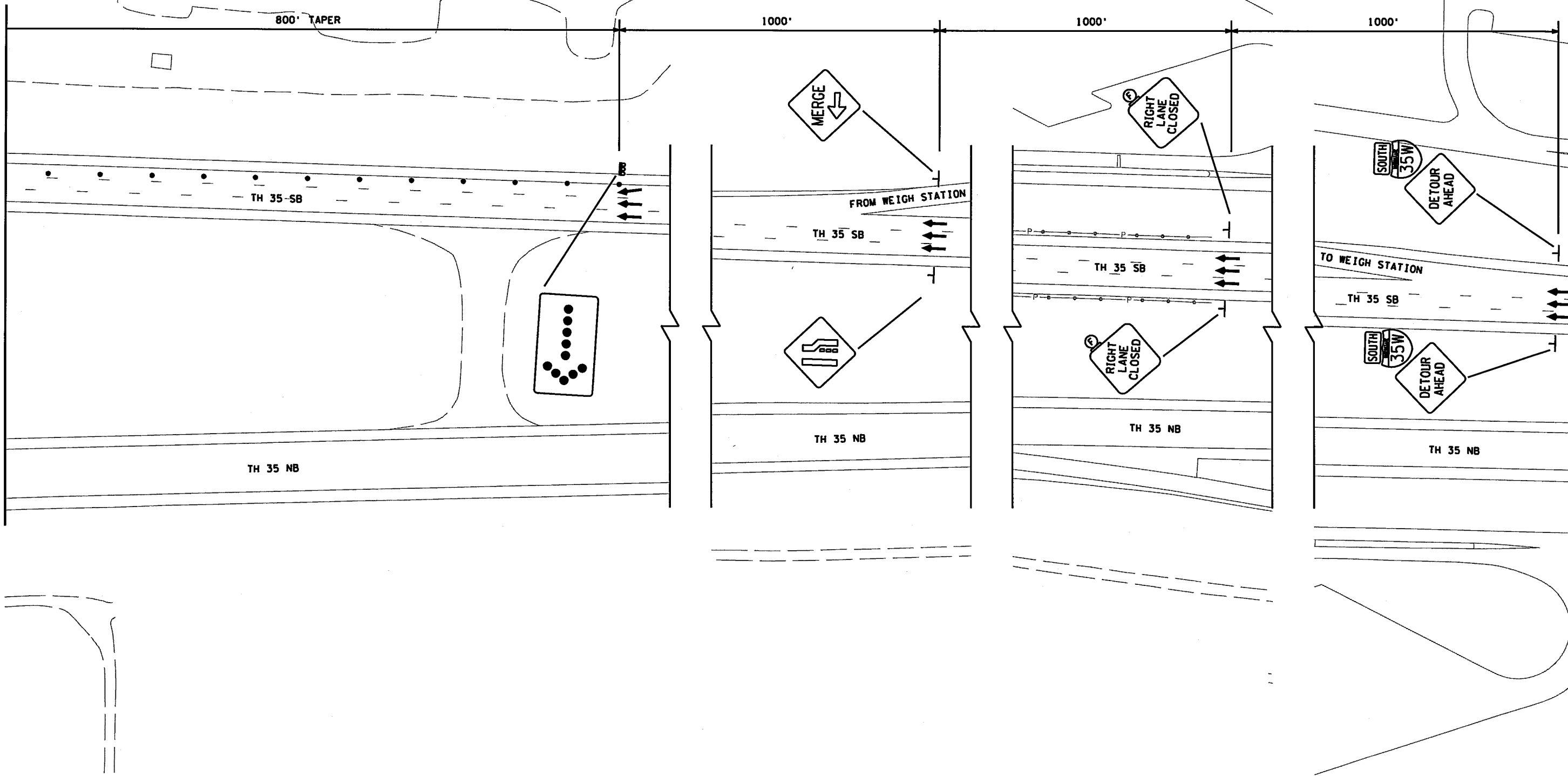
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1/13/2016

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MATCHLINE SEE SHEET TC29



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

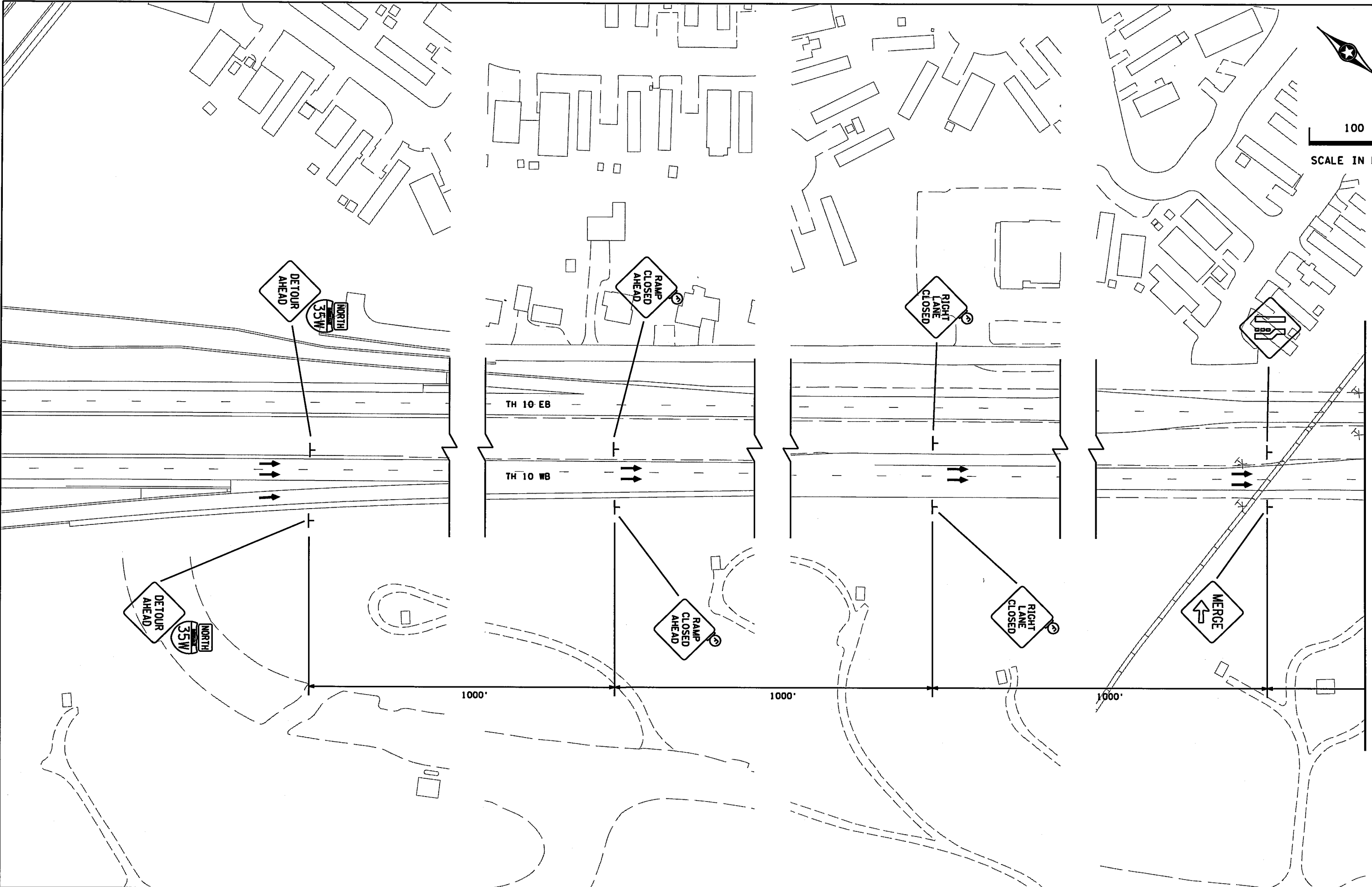
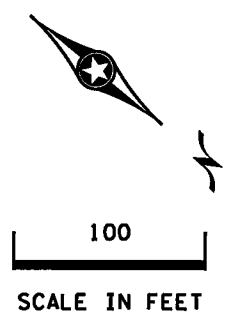
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	123
TC30 OF TC53	367

9:06:04 AM

1/13/2016

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\$MODELNAME\$



MATCHLINE SEE SHEET TC32

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

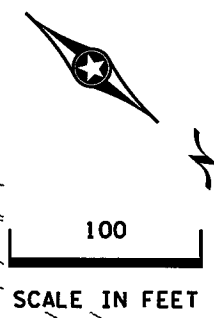
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO.	124
RAMSE129594	
TC31	367
OF TC53	

9:06:05 AM

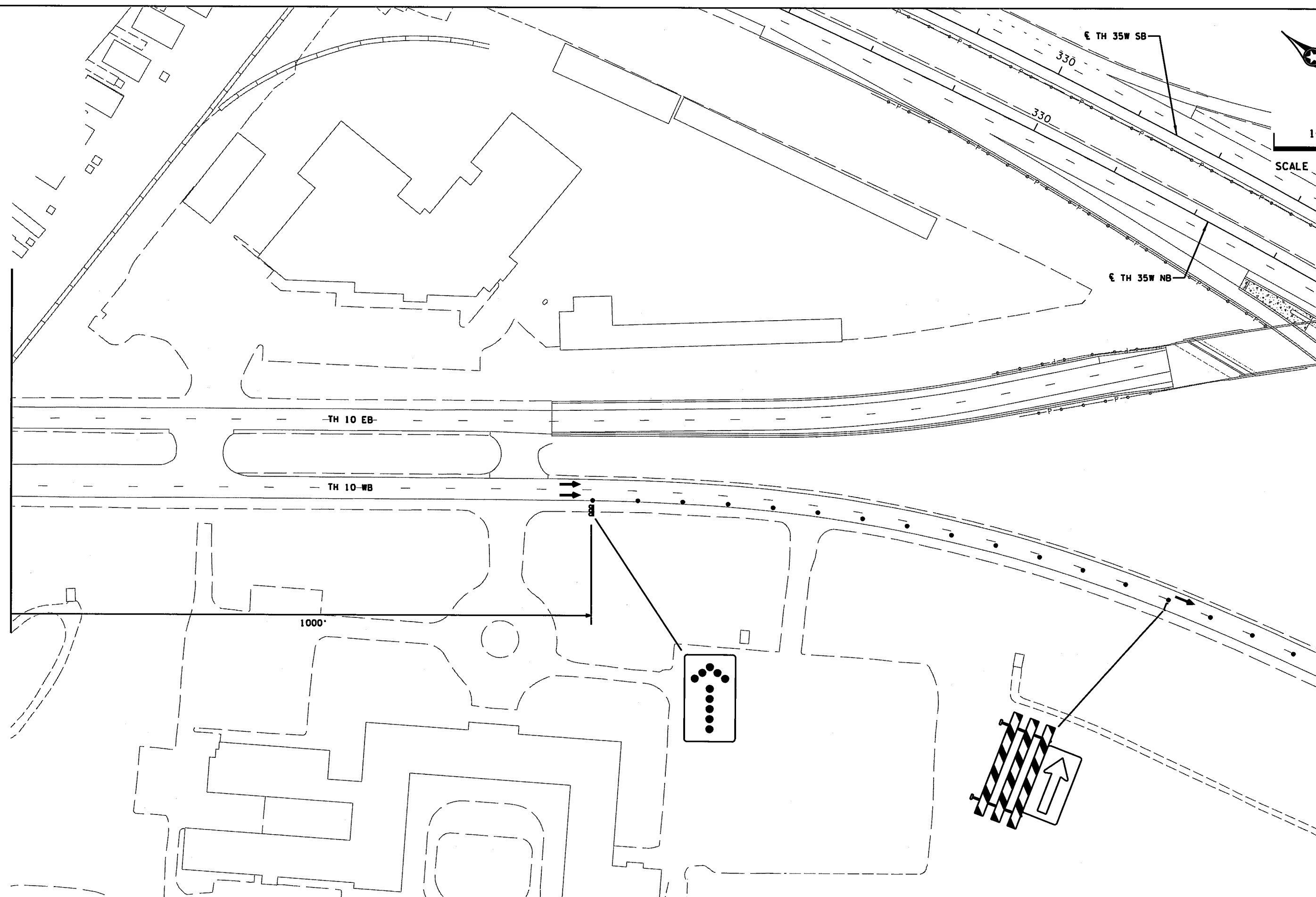
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MATCHLINE SEE SHEET TC31

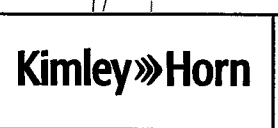
MATCHLINE SEE SHEET TC33



DESIGN TEAM				
DRAWN BY:	JAH			
DESIGNER:	JAH			
CHECKED BY:	BJB			
NO.	BY	DATE	REVISIONS	

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Certified By: *Brandon J. Bourdon* Lic. No. 43709
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 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

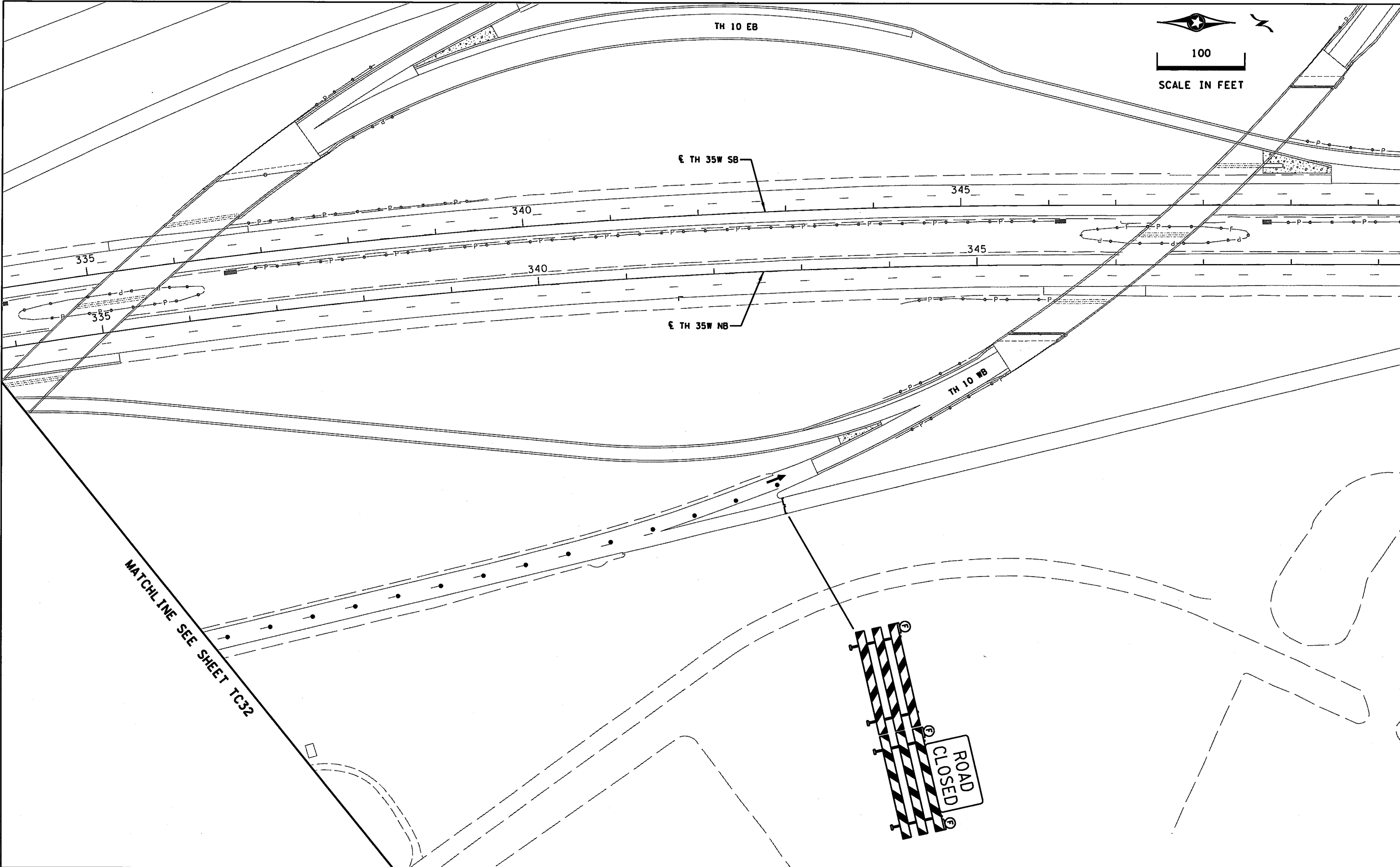
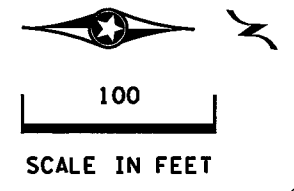
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSEY129594	125
TC32 OF TC53	367

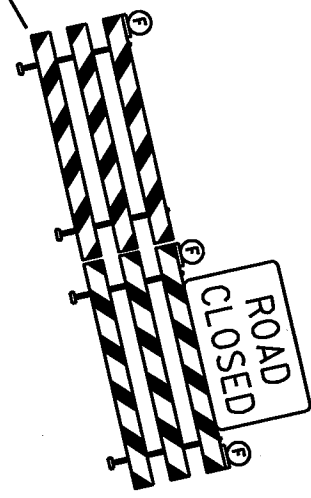
9/06/05 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162_tc33.dgn



MATCHLINE SEE SHEET TC32



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

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 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

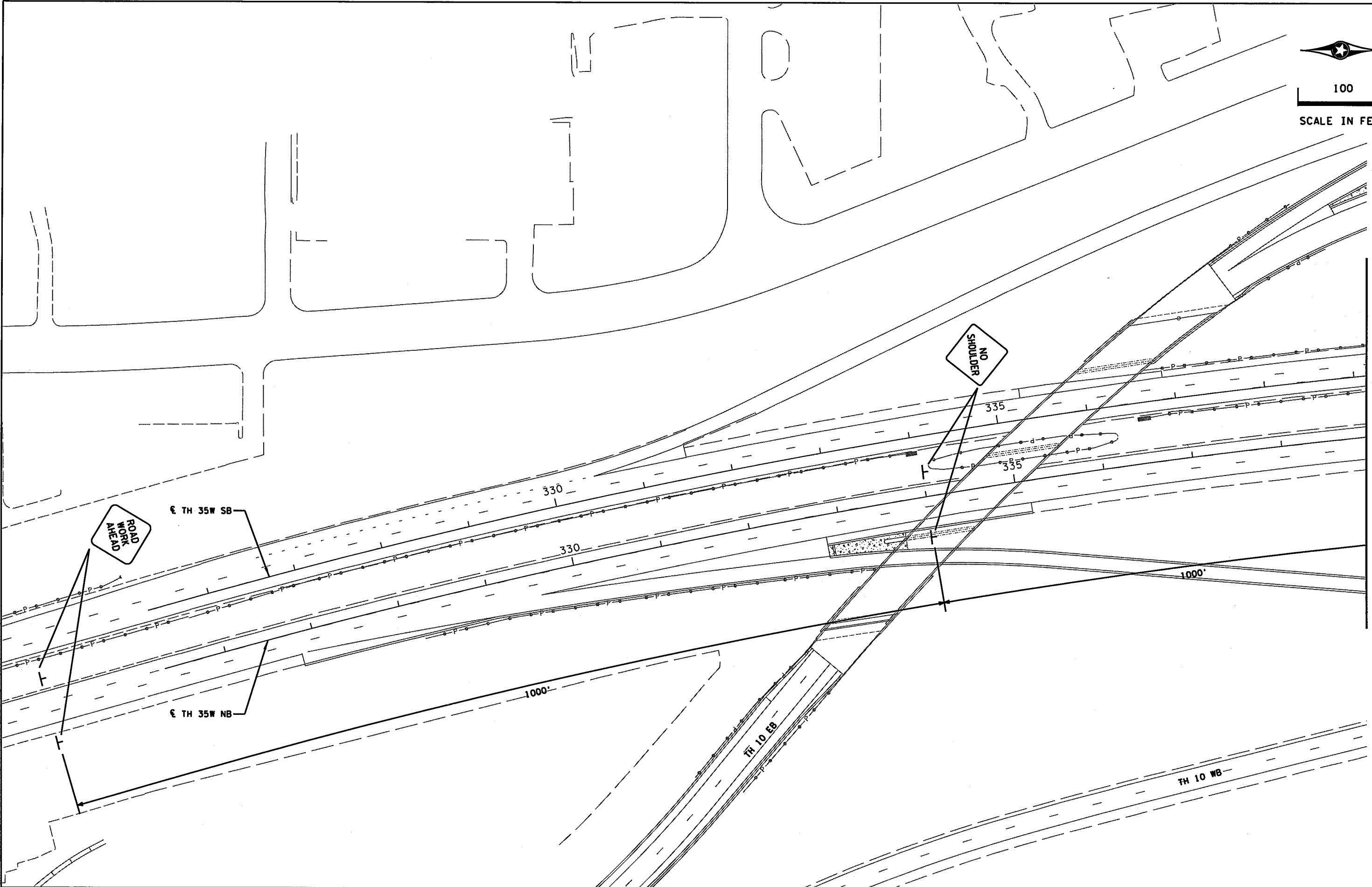
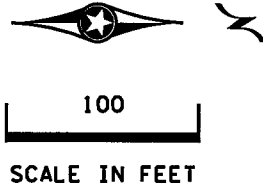
TRAFFIC CONTROL PLAN
 PHASE 1B: BRIDGE REMOVAL

FILE NO. RAMSE129594	126
TC33 OF TC33	367

9:06:06 AM

1/13/2016

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DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

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 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

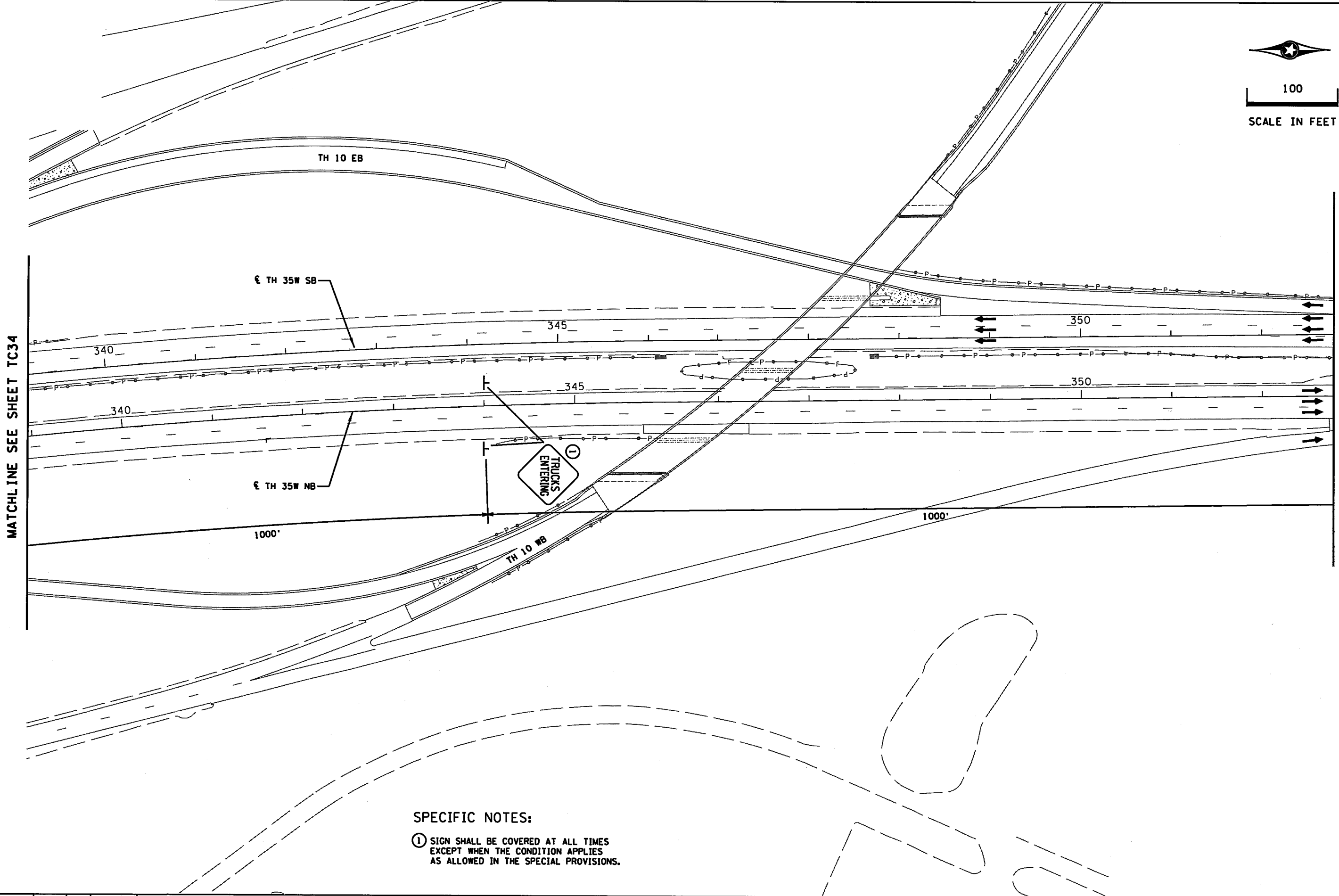
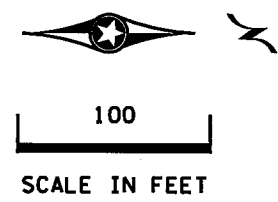
TRAFFIC CONTROL PLAN
 PHASE 1C: CENTER
 PIER CONSTRUCTION

FILE NO. RAMSE129594	127
TC34 OF TC35	367

9:06:07 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CPH\CAD\Plan Sheets\CD6284162_tc35.dgn



MATCHLINE SEE SHEET TC34

MATCHLINE SEE SHEET TC36

SPECIFIC NOTES:

- ① SIGN SHALL BE COVERED AT ALL TIMES EXCEPT WHEN THE CONDITION APPLIES AS ALLOWED IN THE SPECIAL PROVISIONS.

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

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RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1C: CENTER
 PIER CONSTRUCTION

FILE NO. RAMSE129594	128
TC35 OF TC53	367

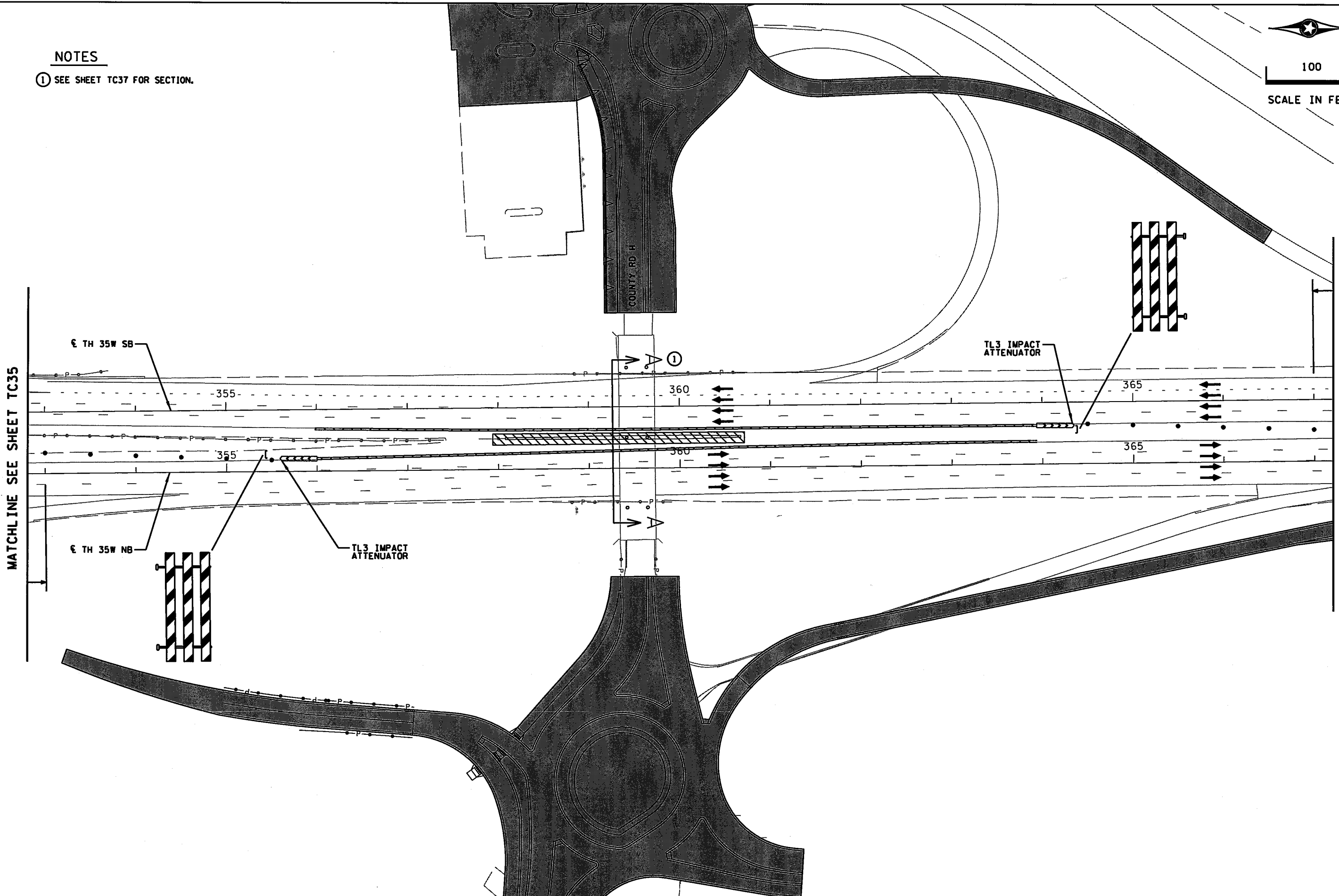
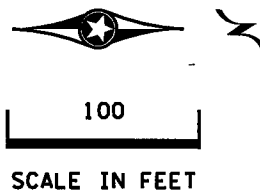
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1/13/2016

K:\ATWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162.tc36.dgn

NOTES

① SEE SHEET TC37 FOR SECTION.



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

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Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1C: CENTER
 PIER CONSTRUCTION

FILE NO. RAMSE129594	129
TC36 OF TC35	367

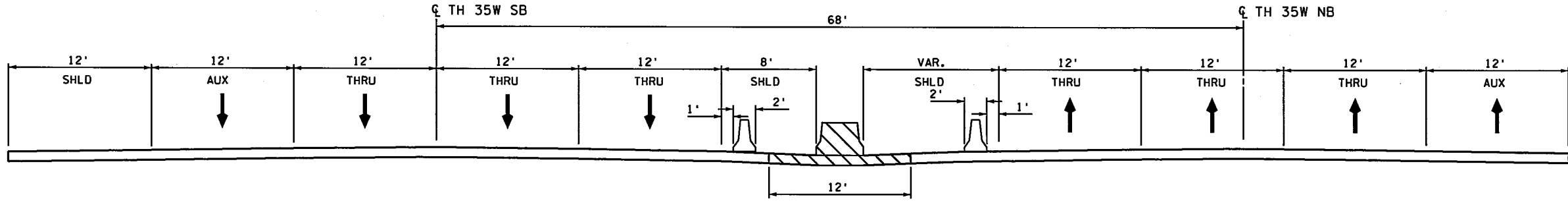
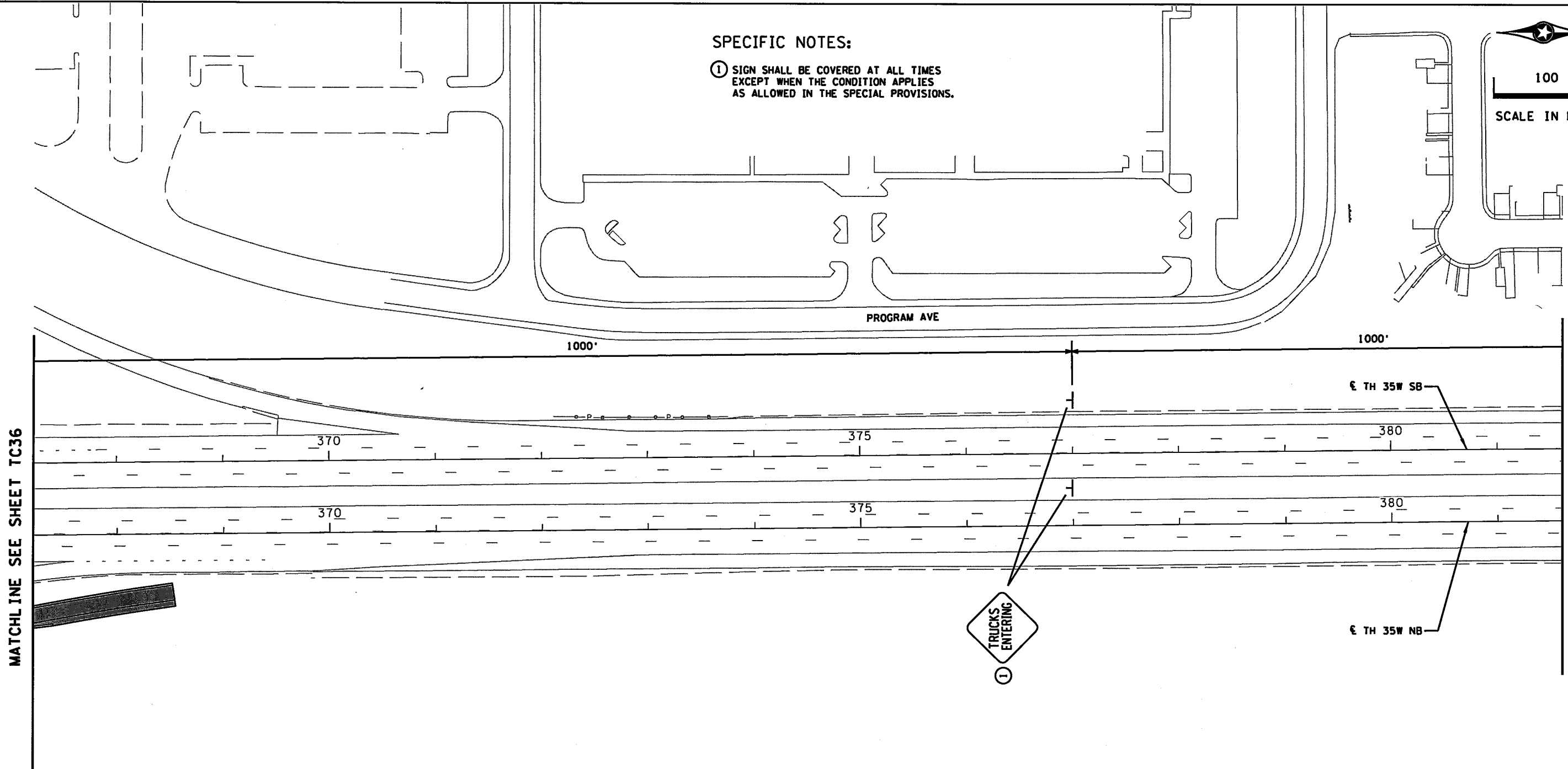
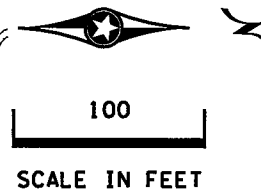
9:06:08 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162.tc37.dgn

SPECIFIC NOTES:

- ① SIGN SHALL BE COVERED AT ALL TIMES EXCEPT WHEN THE CONDITION APPLIES AS ALLOWED IN THE SPECIAL PROVISIONS.



SECTION A-A

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

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Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer

Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

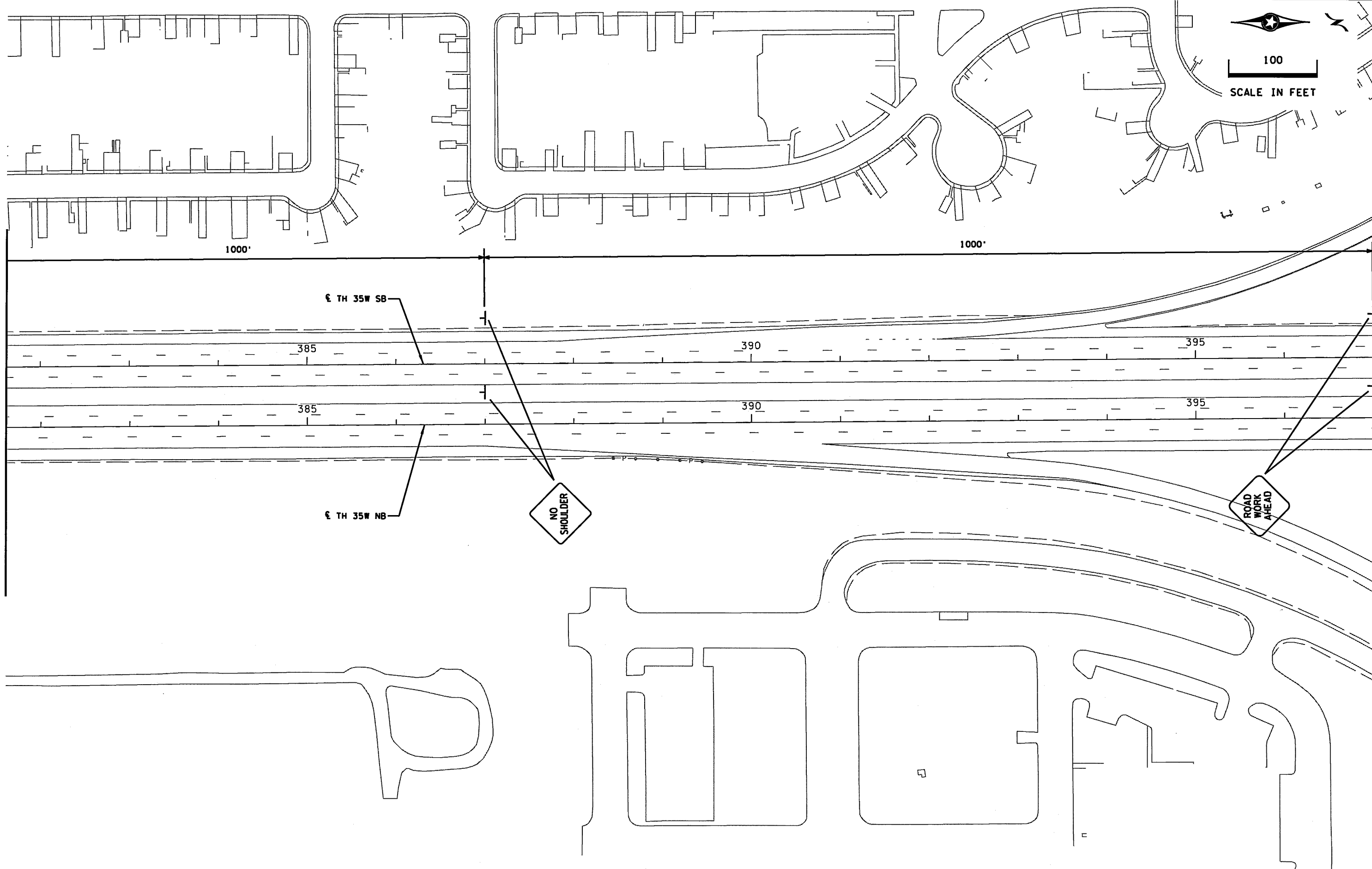
TRAFFIC CONTROL PLAN
 PHASE 1C: CENTER
 PIER CONSTRUCTION

FILE NO.	130
RAMSEI29594	
TC37	367
OF TC53	

9:06:08 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162_tc38.dgn



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
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 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

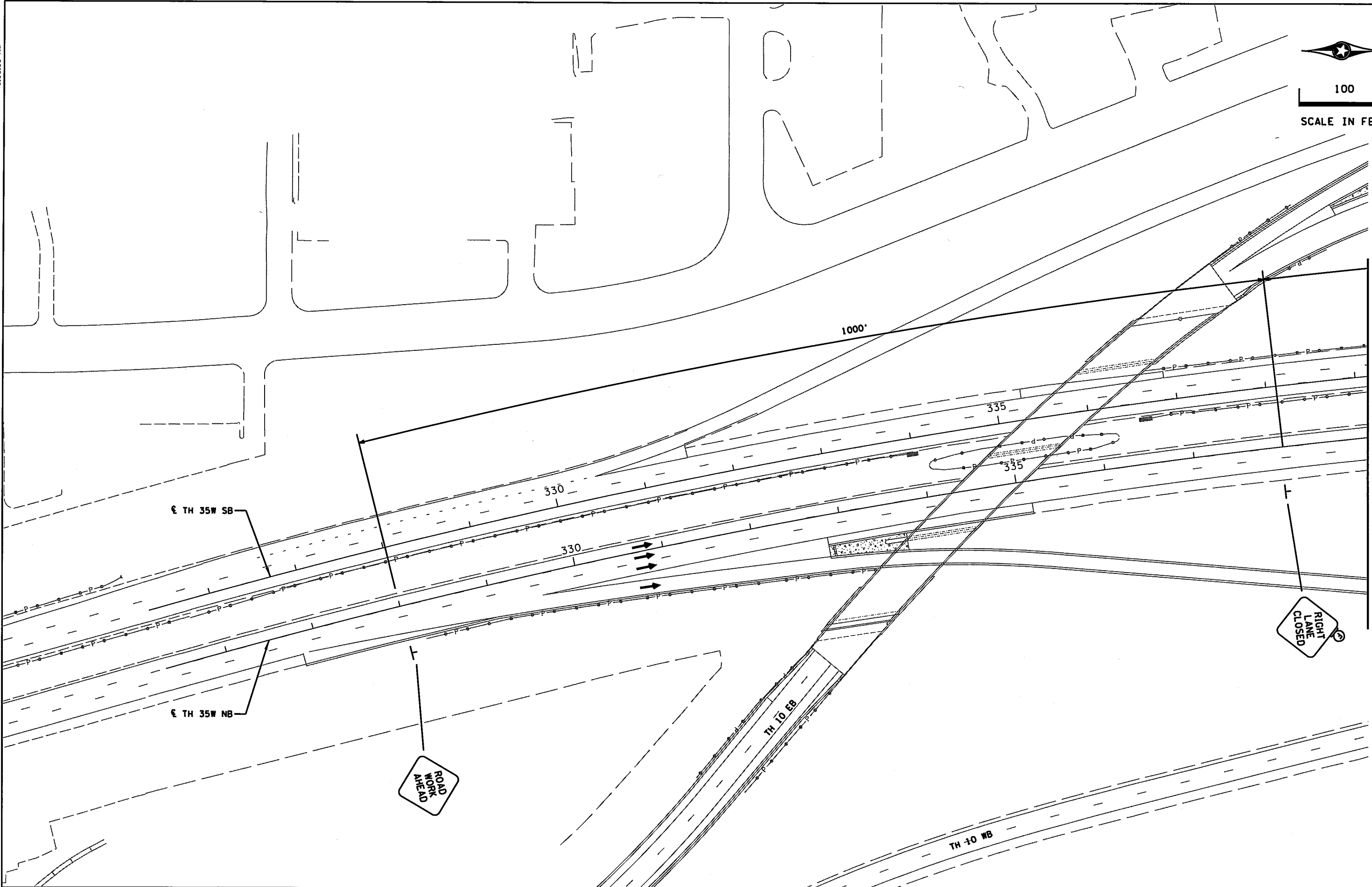
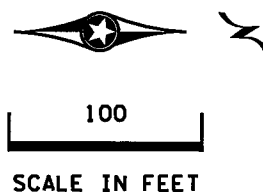
TRAFFIC CONTROL PLAN
 PHASE 1C: CENTER
 PIER CONSTRUCTION

FILE NO. RAMSEI29594	131
TC38 OF TC35	367

9:06:09 AM

1/13/2016

K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162_fc39.dgn
\$MODELNAME\$



MATCHLINE SEE SHEET TC40

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
	NO.	BY	DATE
			REVISIONS

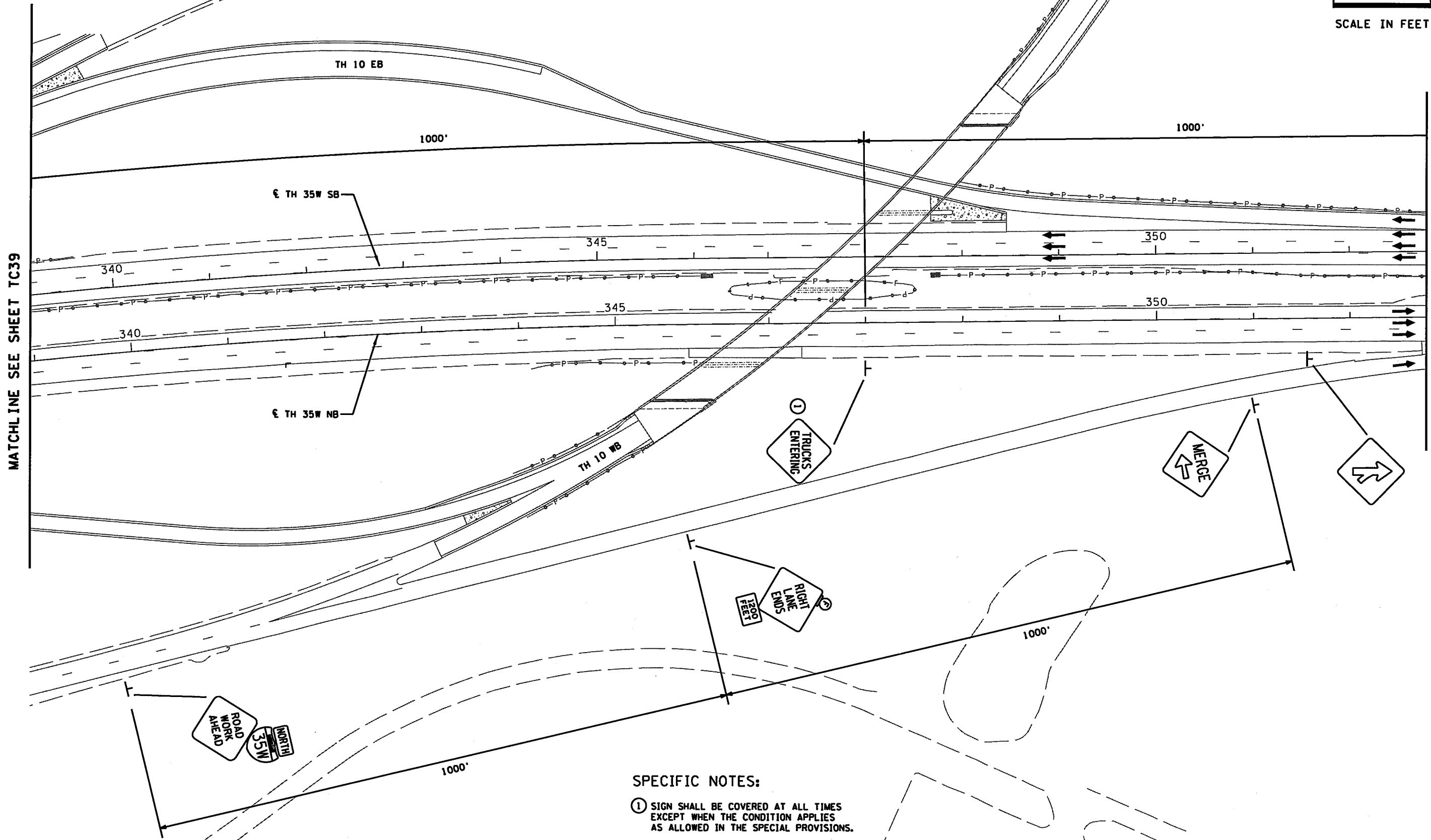
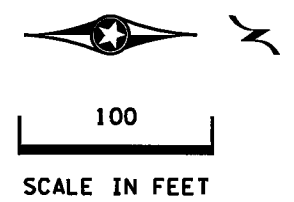
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1D: AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSEI29594	132
TC39 OF TC53	367



MATCHLINE SEE SHEET TC39

MATCHLINE SEE SHEET TC41

SPECIFIC NOTES:

- ① SIGN SHALL BE COVERED AT ALL TIMES EXCEPT WHEN THE CONDITION APPLIES AS ALLOWED IN THE SPECIAL PROVISIONS.

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

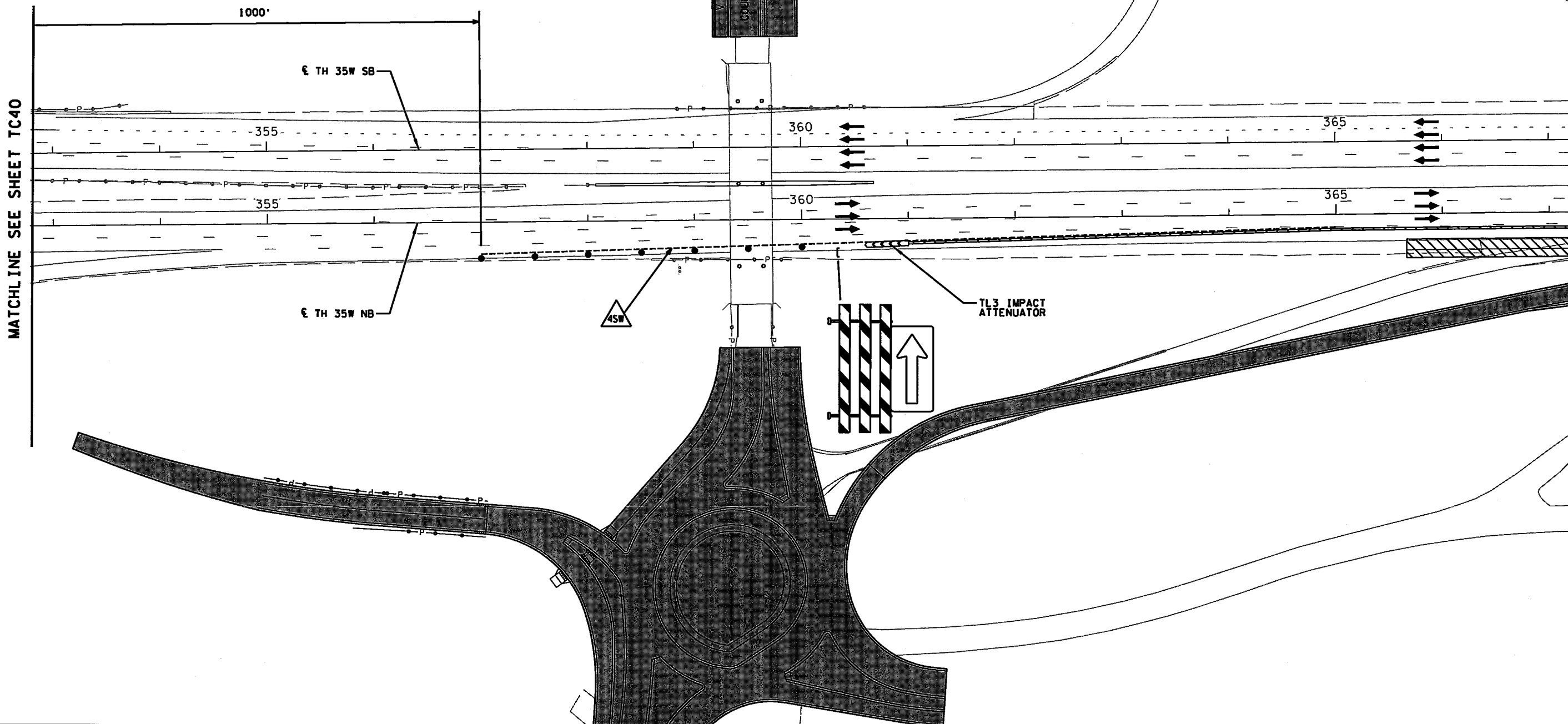
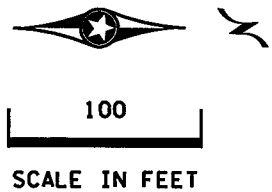
TRAFFIC CONTROL PLAN
 PHASE 1D: AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSEI29594	133
TC40 OF TC53	367

9:06:10 AM

1/13/2016

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\$MODELNAME\$



MATCHLINE SEE SHEET TC40

MATCHLINE SEE SHEET TC42

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

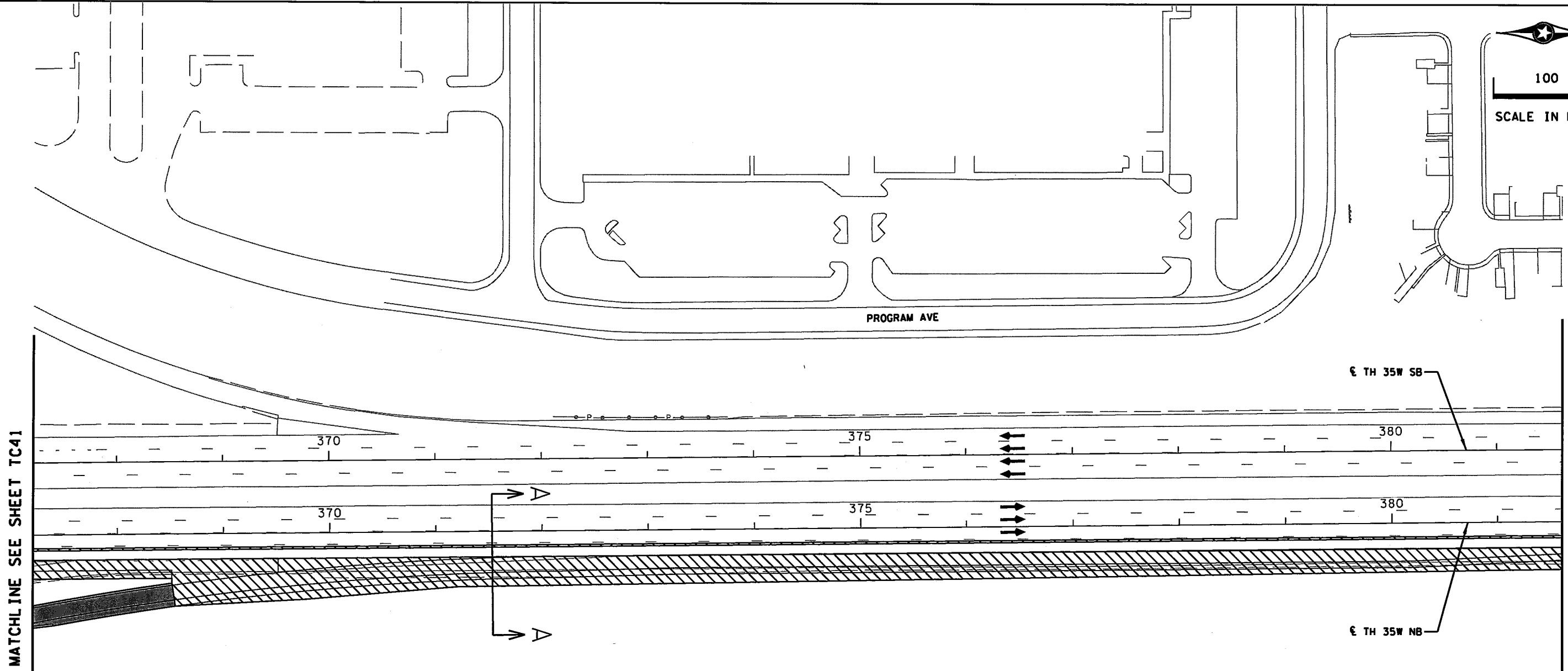
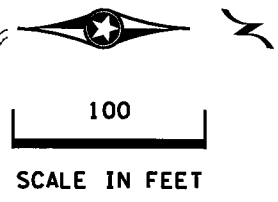
TRAFFIC CONTROL PLAN
 PHASE 1D: AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSEI29594	134
TC41 OF TC53	367

9:06:10 AM

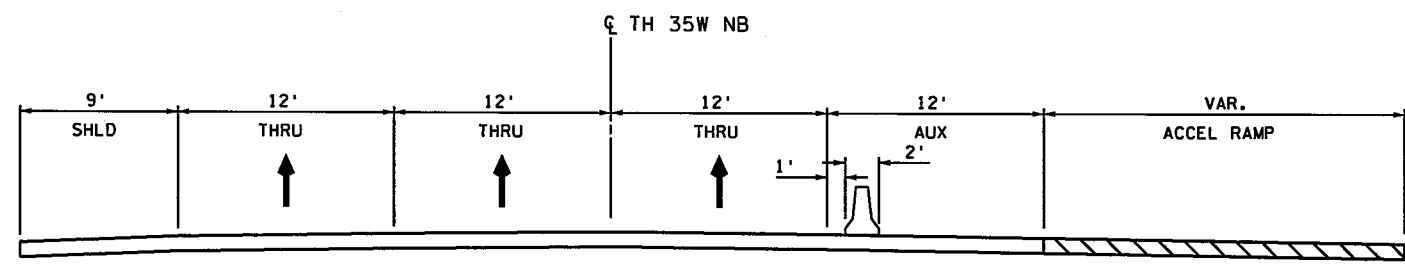
1/13/2016

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MATCHLINE SEE SHEET TC41

MATCHLINE SEE SHEET TC43



SECTION A-A

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

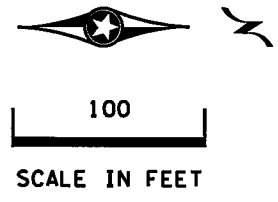
TRAFFIC CONTROL PLAN
 PHASE 1D: AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSEY129594	135
TC42 OF TC53	367

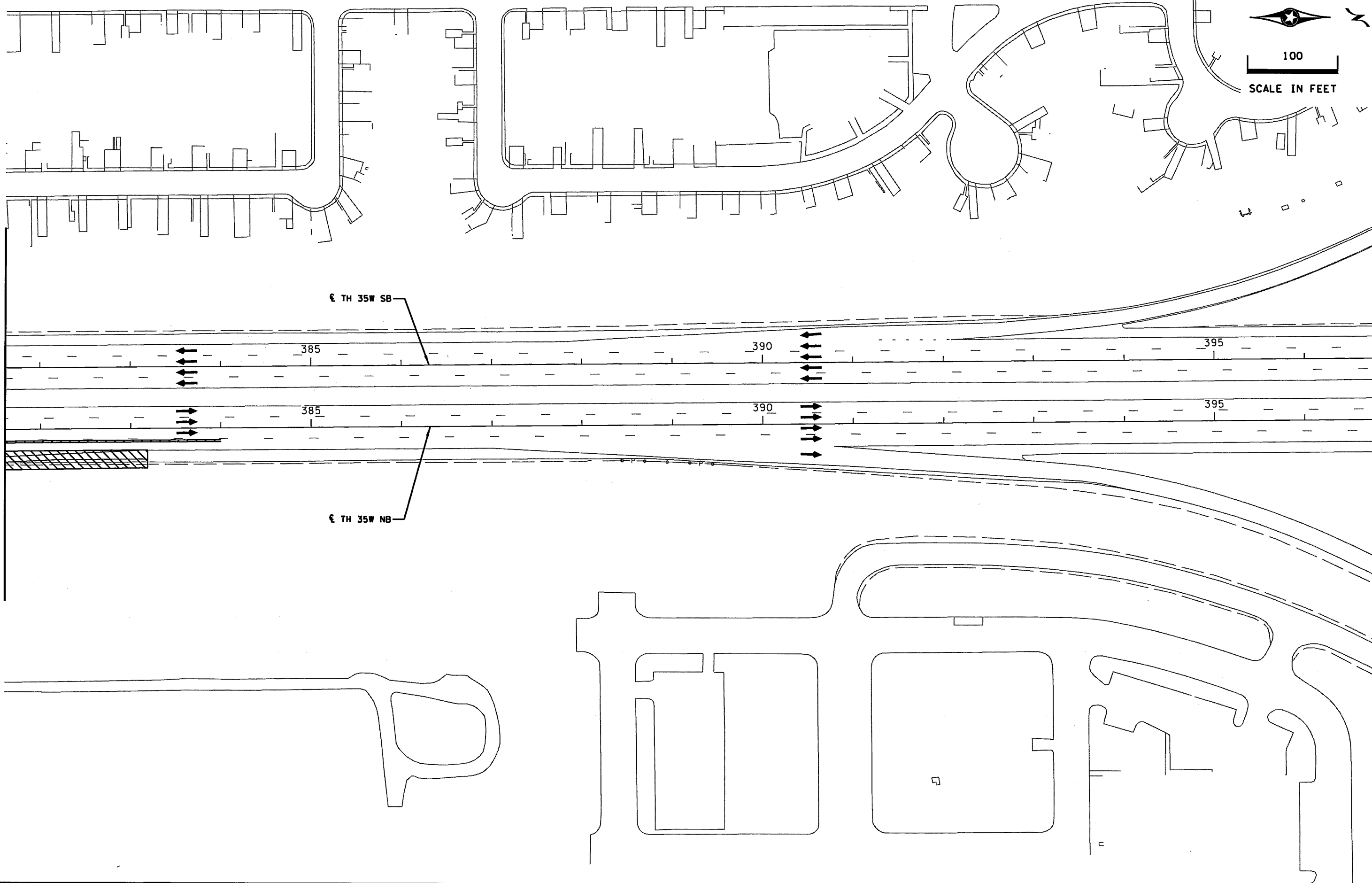
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1/13/2016

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MATCHLINE SEE SHEET TC42



DESIGN TEAM				
DRAWN BY:	JAH			
DESIGNER:	JAH			
CHECKED BY:	BJB			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 1D: AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSE129594	136
TC43 OF TC53	367

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

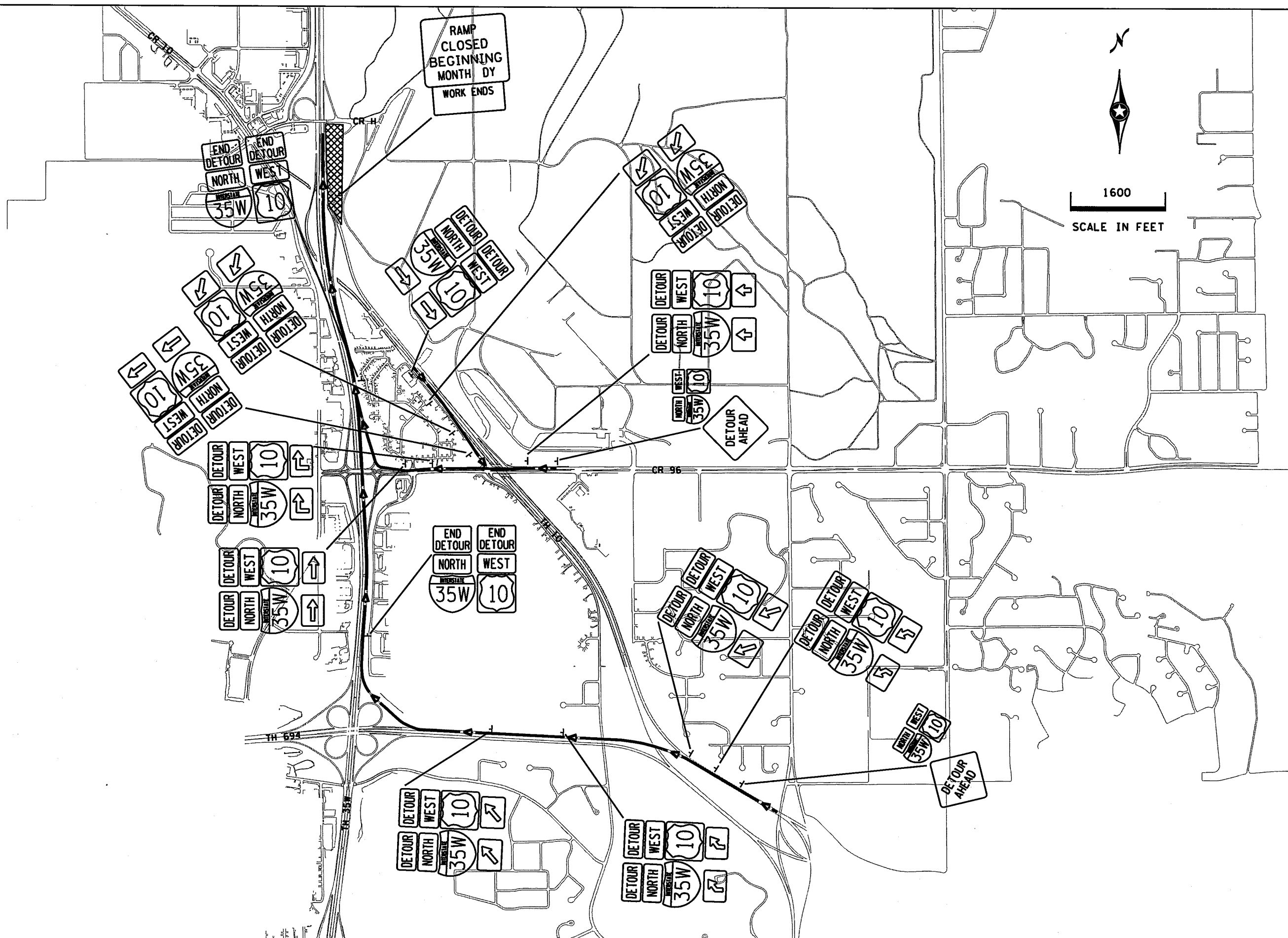
Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

DETOUR PLAN
 PHASES 2A & 2B: TH 10 AND TH 35W
 RAMP CONSTRUCTION, AND TH 35W
 AUXILIARY LANE CONSTRUCTION

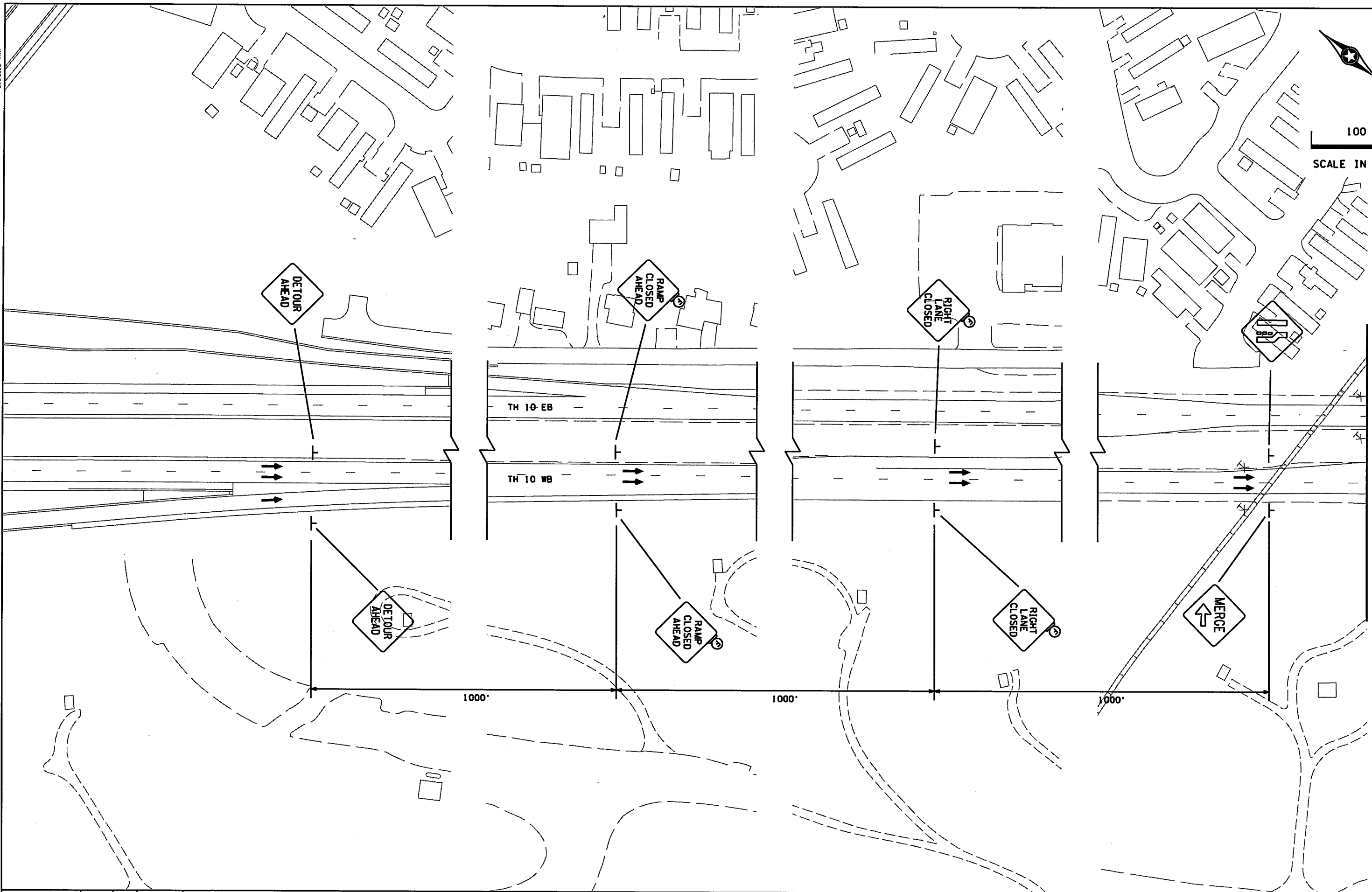
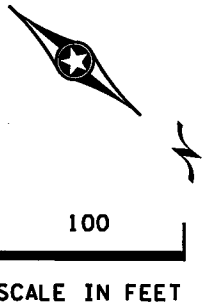
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TC44 OF TC53	367



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1/13/2016

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\$MODELNAME\$



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 2A: TH 10 ADN TH 35W
 RAMP CONSTRUCTION

FILE NO. RAMSE129594	138
TC45 OF TC53	367

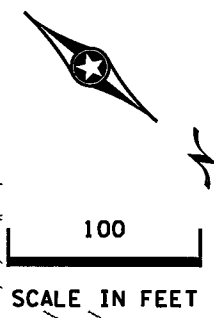
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1/13/2016

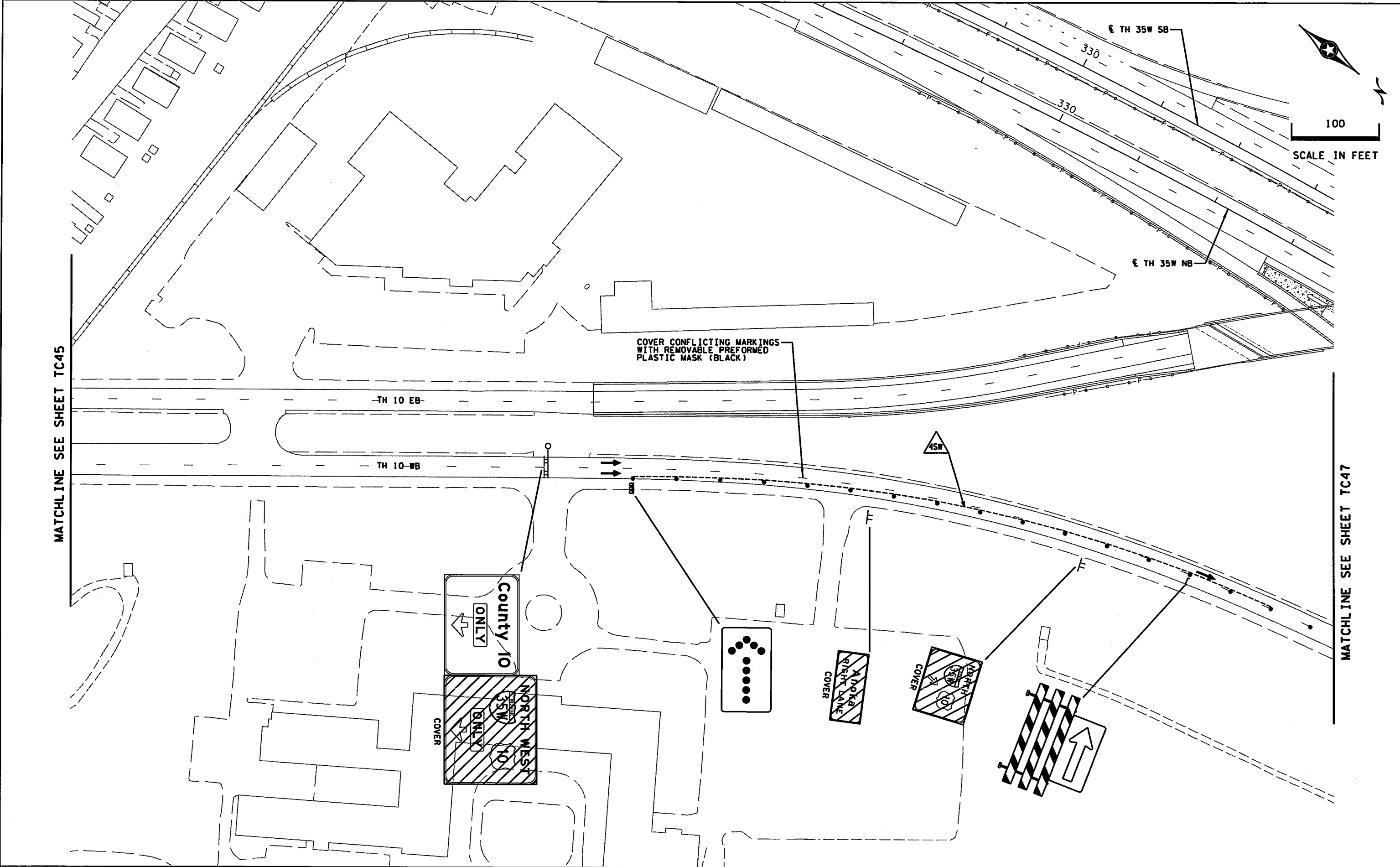
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\$MODELNAME\$



MATCHLINE SEE SHEET TC45

MATCHLINE SEE SHEET TC47



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



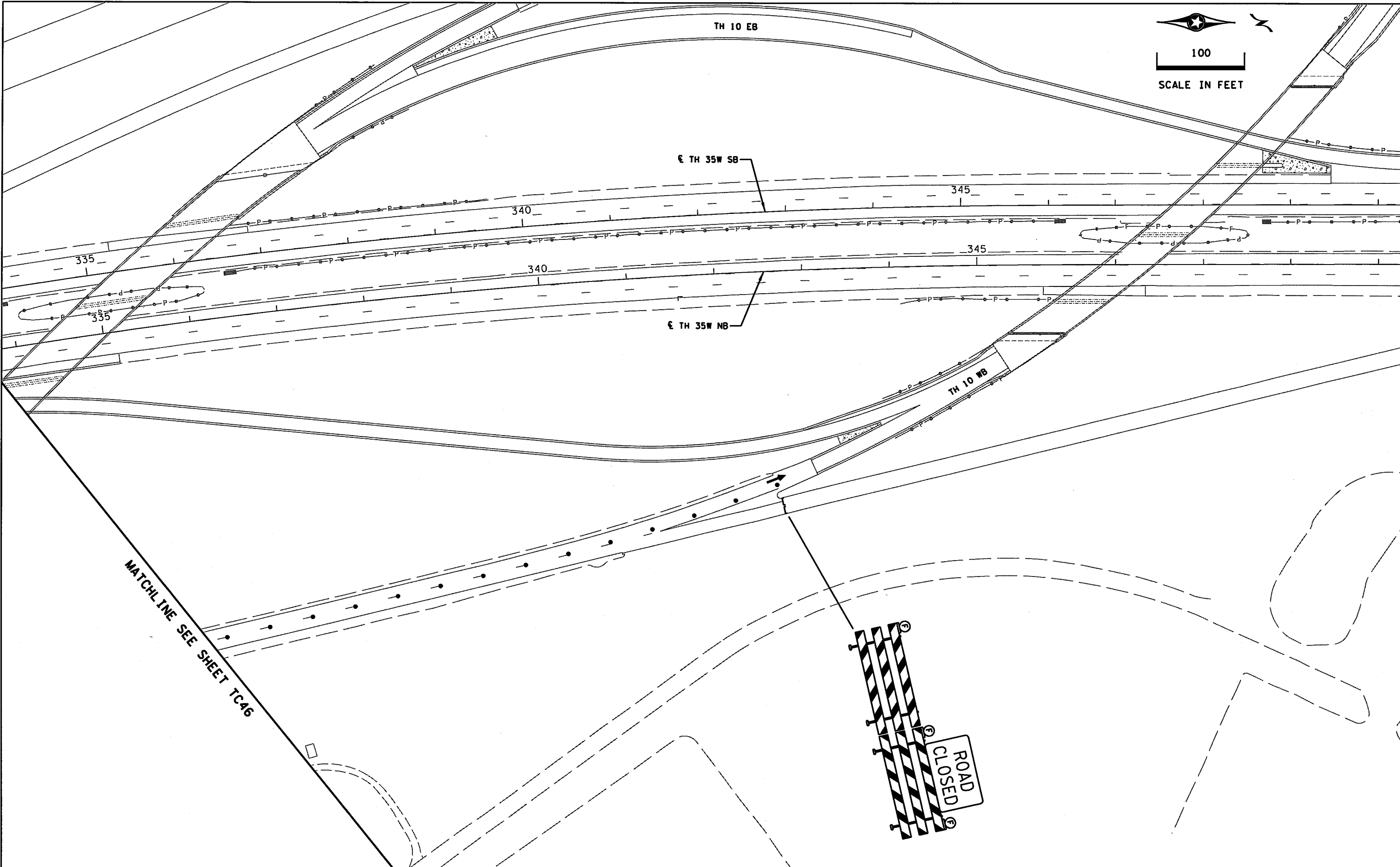
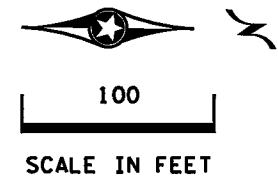
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN		FILE NO.	139
PHASE 2A: TH 10 AND TH 35W RAMP CONSTRUCTION		RAMSE129594	
TC46			367
OF TC53			

9/06/16 AM

1/13/2016

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\$MODELNAME\$



MATCHLINE SEE SHEET TC46

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

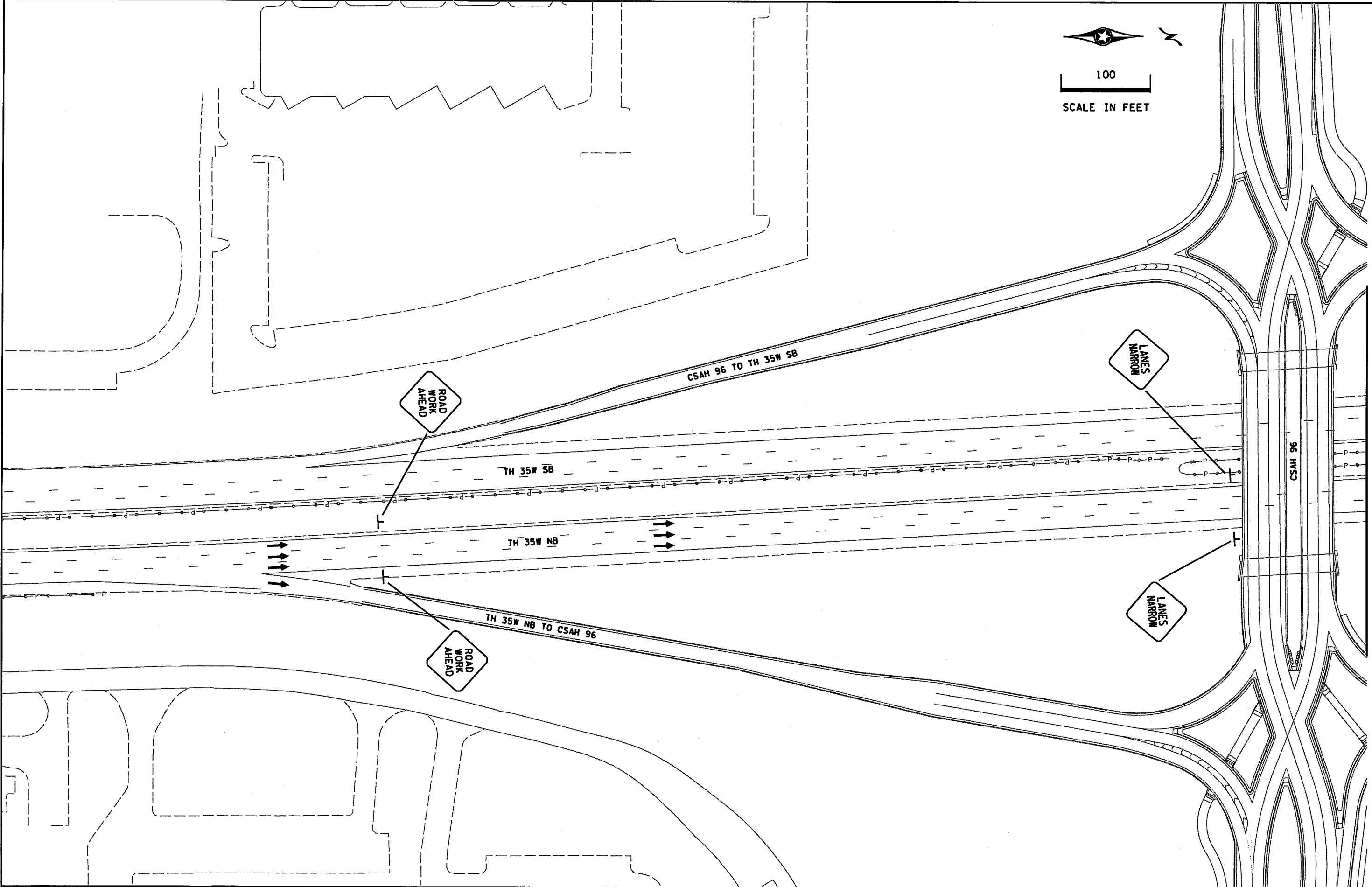
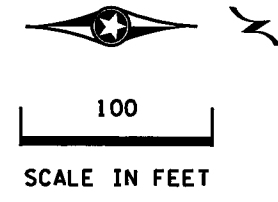
TRAFFIC CONTROL PLAN
 PHASE 2A: TH 10 AND TH 35W
 RAMP CONSTRUCTION

FILE NO. RAMSE129594	140
TC47 OF TC53	367

9:06:17 AM

1/13/2016

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\$MODELNAME\$



MATCHLINE SEE SHEET TC49

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 2B: TH 35W AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSE129594	141
TC48 OF TC53	367

9:06:18 AM

1/13/2016

K:\TWC_Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162_tc49.dgn

DESIGN TEAM				REVISIONS			
NO.	BY	DATE		NO.	BY	DATE	
1	JAH						
2	JAH						
3	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

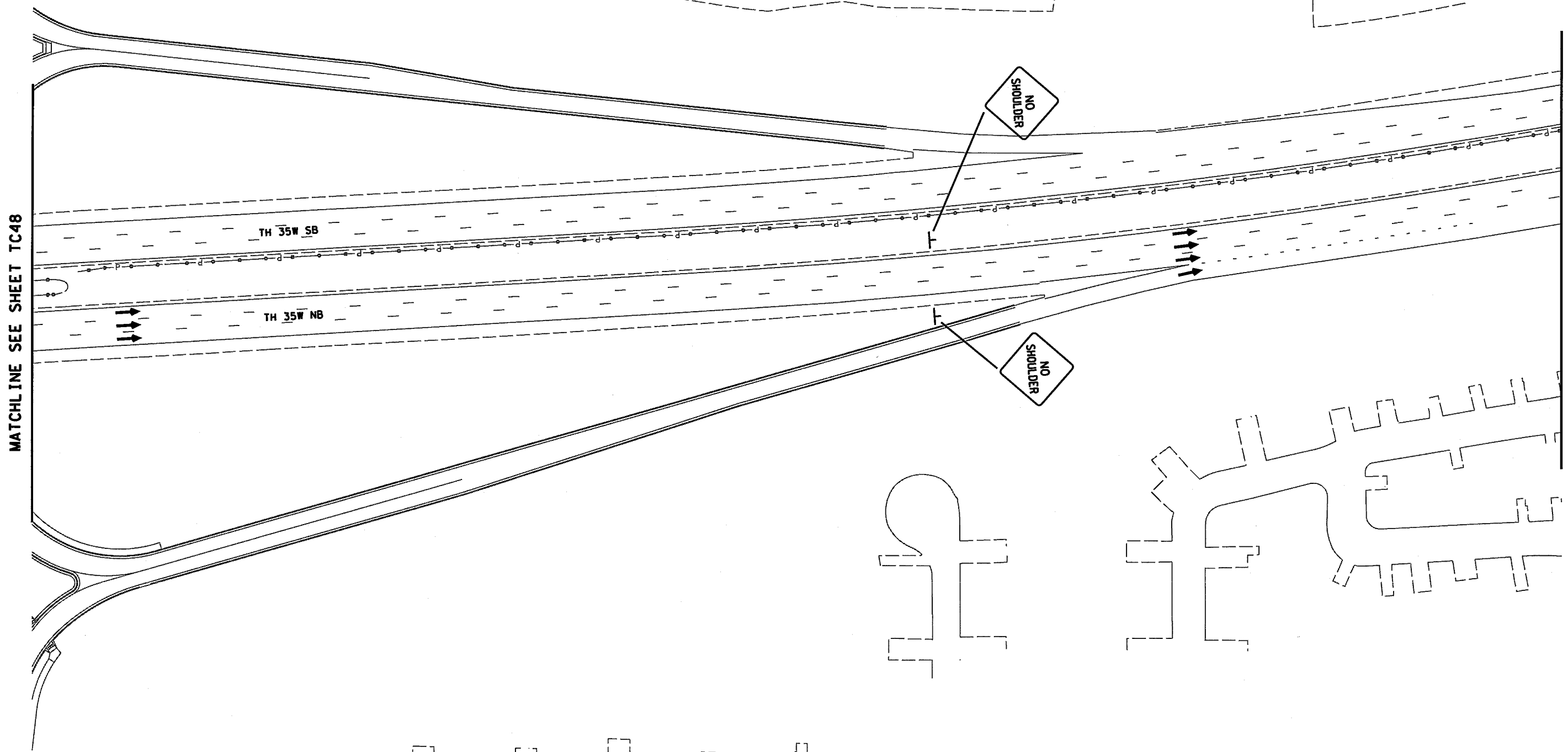
Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 2B: TH 35W AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSEY129594	142
TC49 OF TC53	367



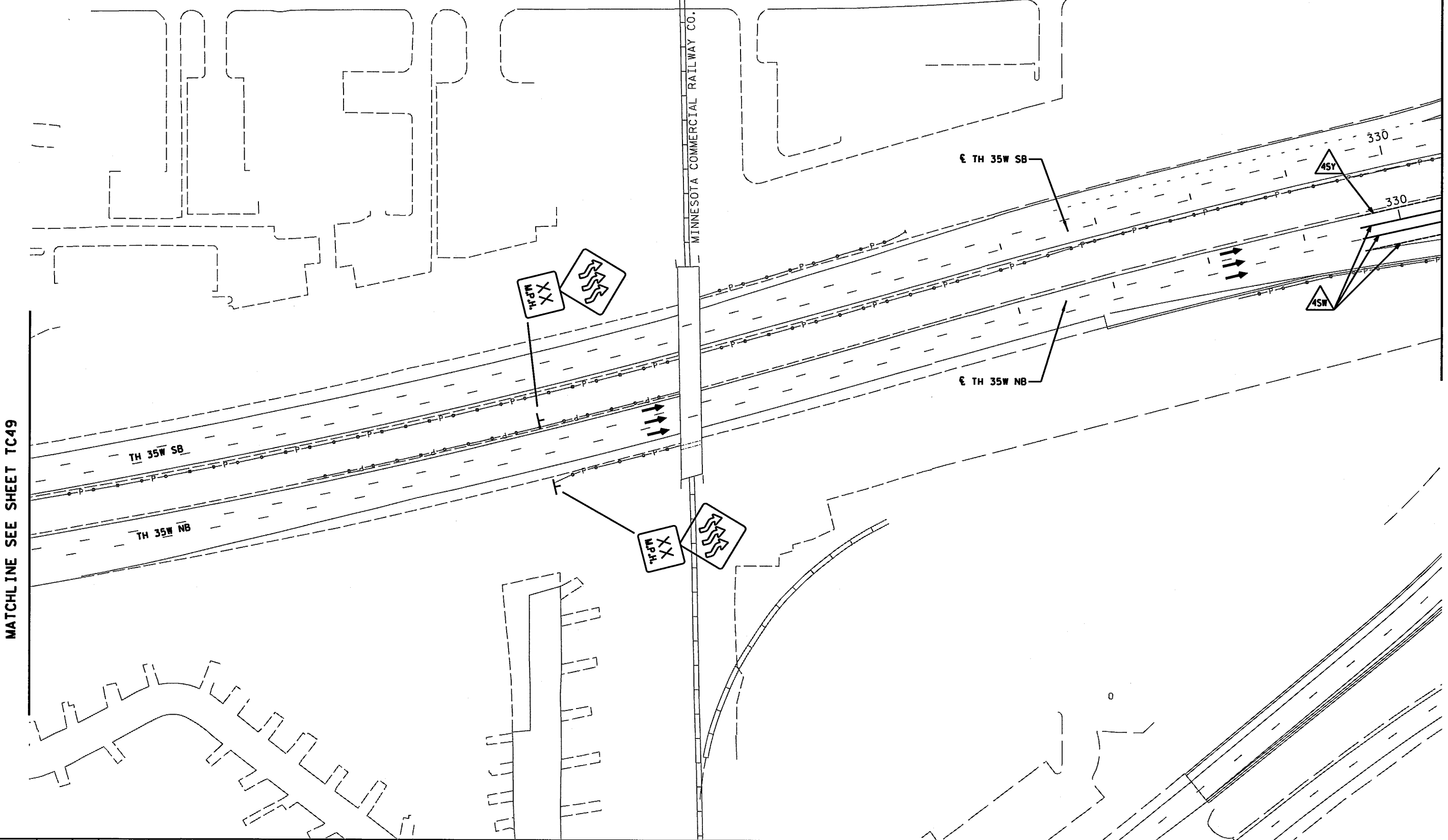
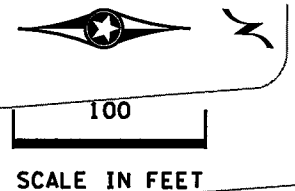
MATCHLINE SEE SHEET TC48

MATCHLINE SEE SHEET TC50

9:06:18 AM

1/13/2016

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MATCHLINE SEE SHEET TC49

MATCHLINE SEE SHEET TC51

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

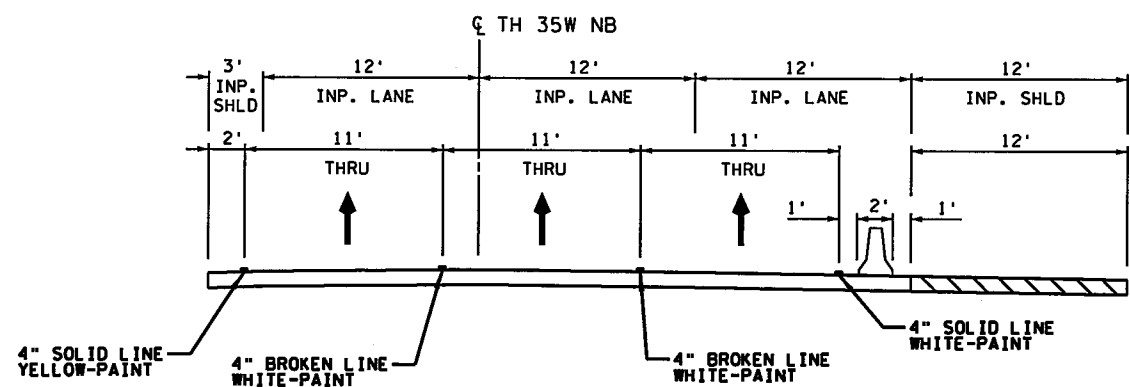
TRAFFIC CONTROL PLAN
 PHASE 2B: TH 35W AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSE129594	143
TC50 OF TC53	367

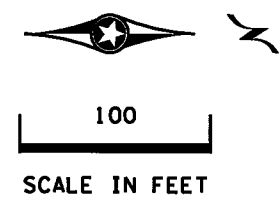
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1/13/2016

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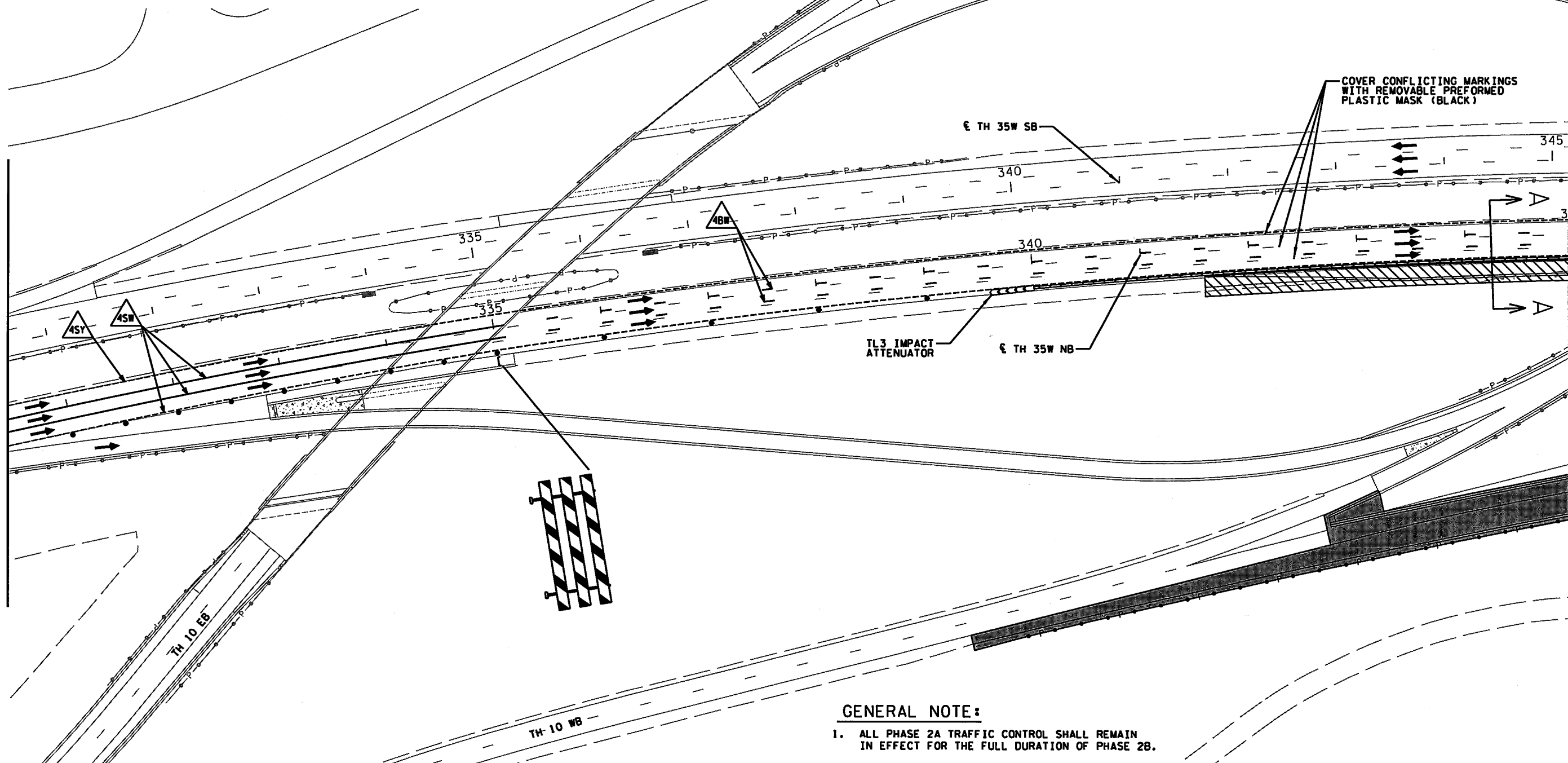


SECTION A-A



MATCHLINE SEE SHEET TC50

MATCHLINE SEE SHEET TC52



GENERAL NOTE:

- 1. ALL PHASE 2A TRAFFIC CONTROL SHALL REMAIN IN EFFECT FOR THE FULL DURATION OF PHASE 2B.

DESIGN TEAM				REVISIONS			
DRAWN BY:	JAH			NO.	BY	DATE	
DESIGNER:	JAH						
CHECKED BY:	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

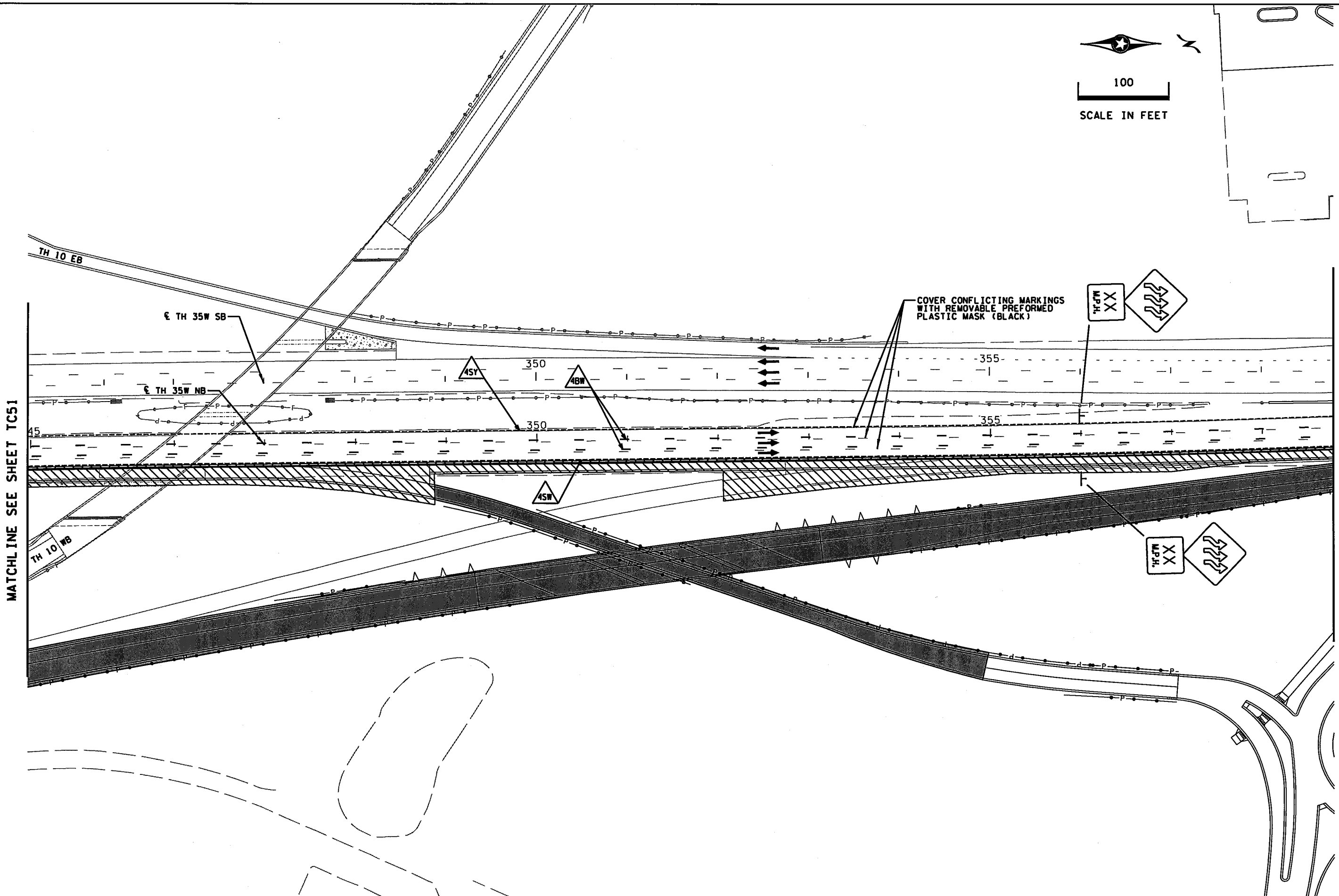
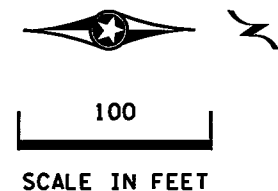
TRAFFIC CONTROL PLAN
 PHASE 2B: TH 35W AUXILIARY
 LANE CONSTRUCTION

FILE NO.	144
RAMSEI29594	
TC51	367
OF TC53	

9:06:20 AM

1/13/2016

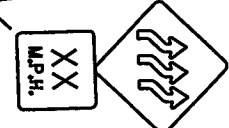
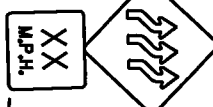
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MATCHLINE SEE SHEET TC51

MATCHLINE SEE SHEET TC53

COVER CONFLICTING MARKINGS WITH REMOVABLE PREFORMED PLASTIC MASK (BLACK)



DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
	NO.	BY	DATE
			REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

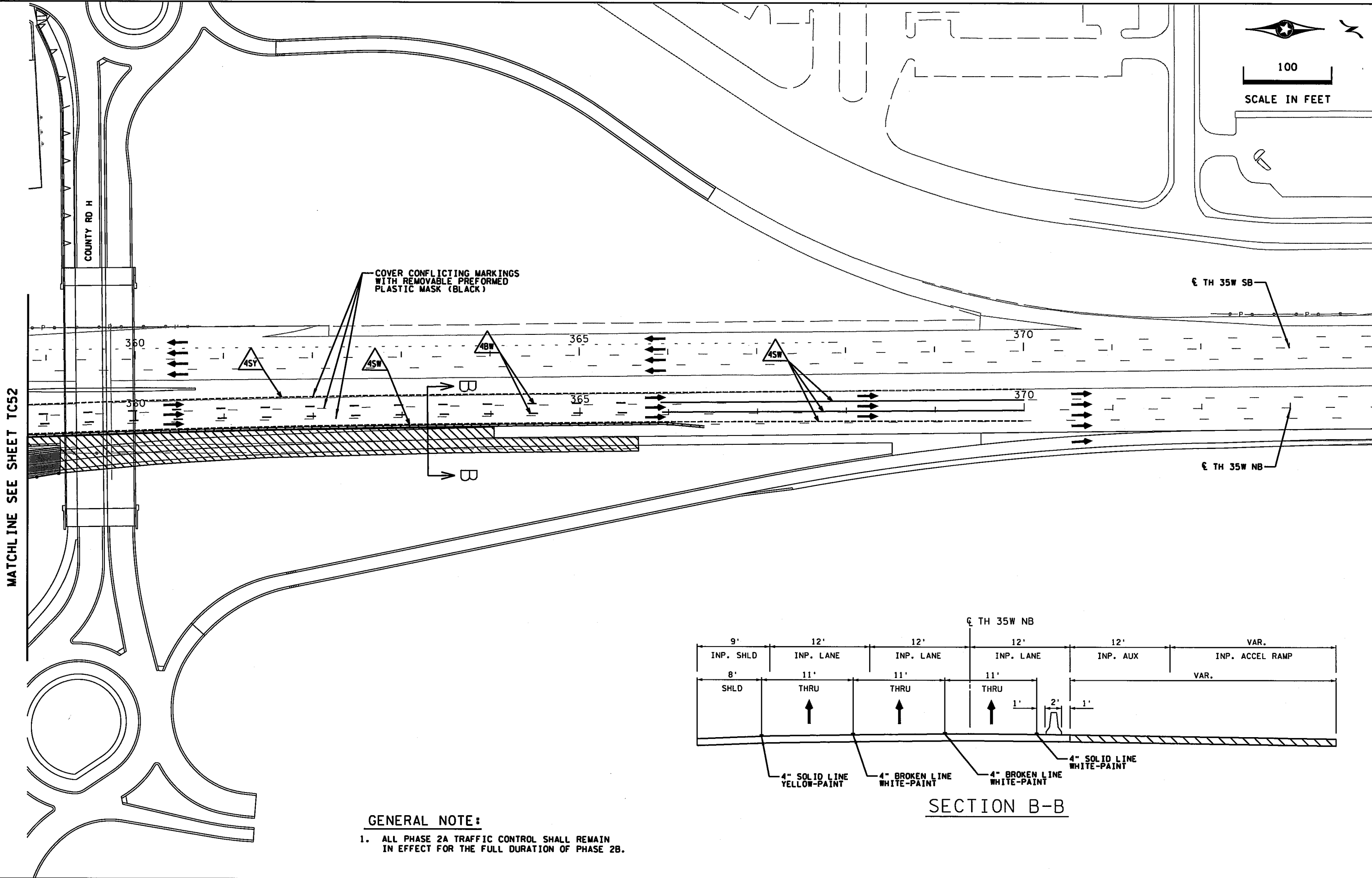
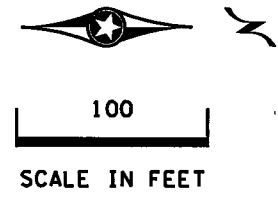
Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 2B: TH 35W AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSEI29594	145
TC52 OF TC53	367

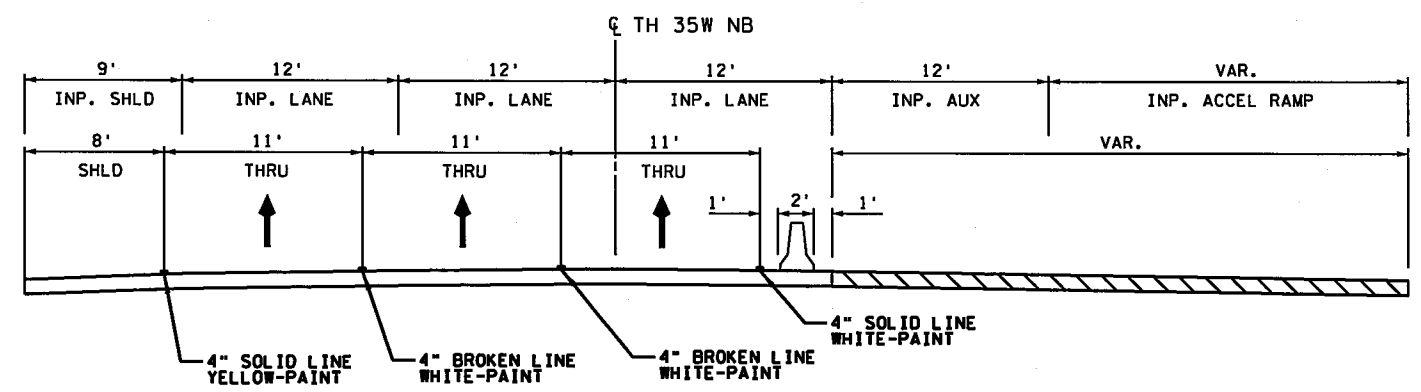


MATCHLINE SEE SHEET TC52

COVER CONFLICTING MARKINGS WITH REMOVABLE PREFORMED PLASTIC MASK (BLACK)

TH 35W SB

TH 35W NB



SECTION B-B

GENERAL NOTE:
 1. ALL PHASE 2A TRAFFIC CONTROL SHALL REMAIN IN EFFECT FOR THE FULL DURATION OF PHASE 2B.

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* P.E. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 1/13/2016

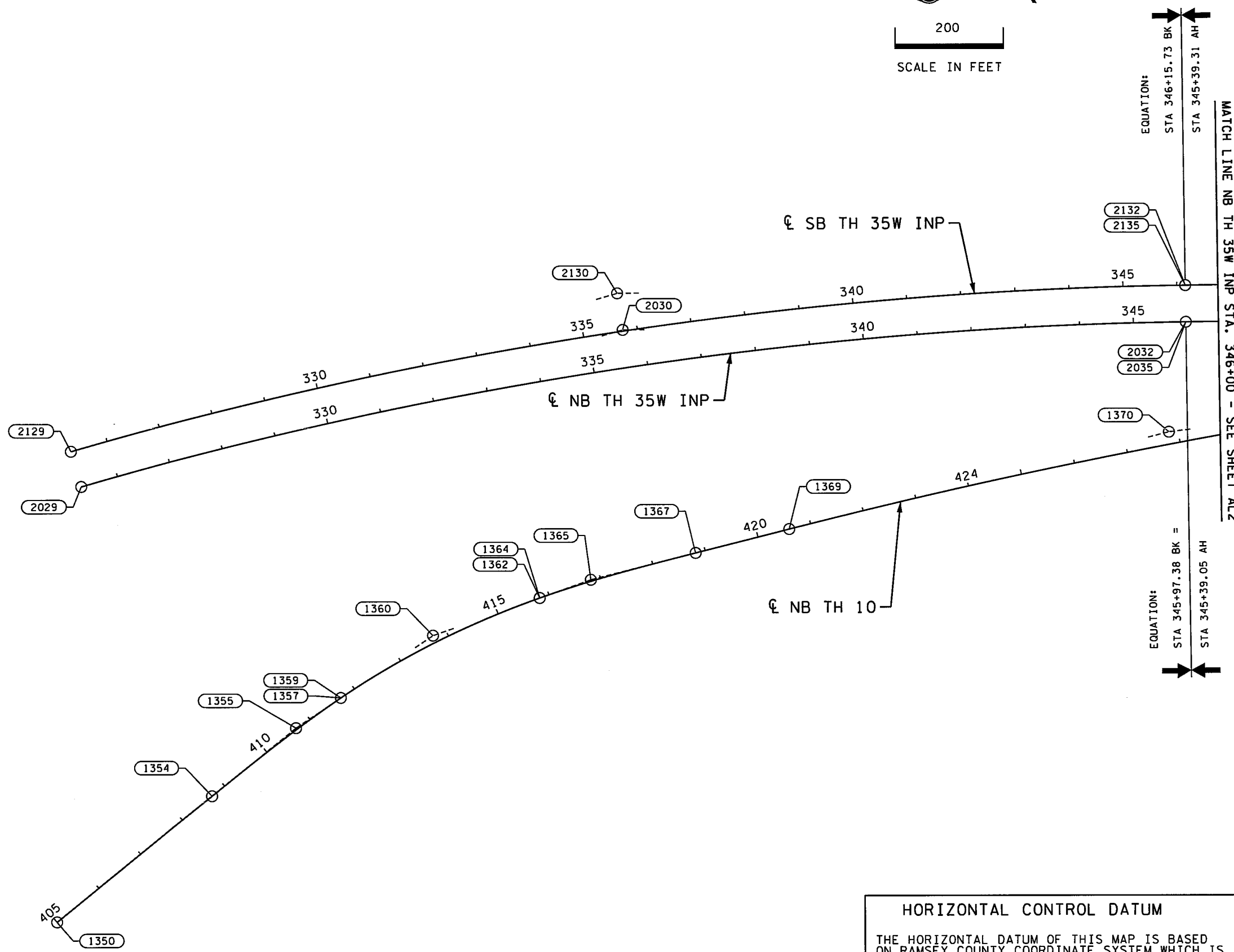
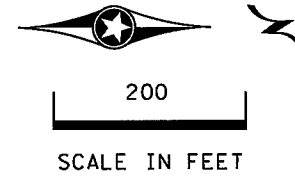


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL PLAN
 PHASE 2B: TH 35W AUXILIARY
 LANE CONSTRUCTION

FILE NO. RAMSEI29594	146
TC53 OF TC53	367

11:05:51 AM
12/8/2015
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HORIZONTAL CONTROL DATUM
 THE HORIZONTAL DATUM OF THIS MAP IS BASED ON RAMSEY COUNTY COORDINATE SYSTEM WHICH IS RELATED TO THE MINNESOTA STATE PLANE COORDINATE SYSTEM NAD 1983 (1996) ADJUSTMENT SOUTH ZONE.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

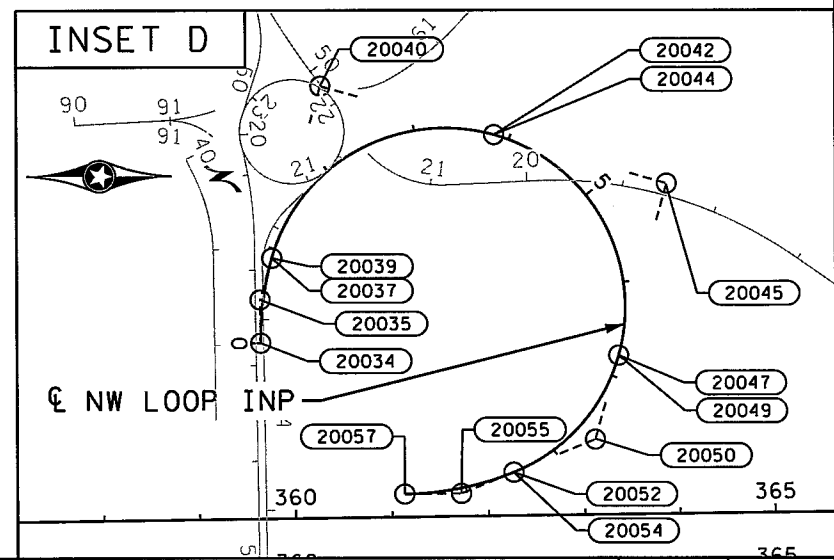
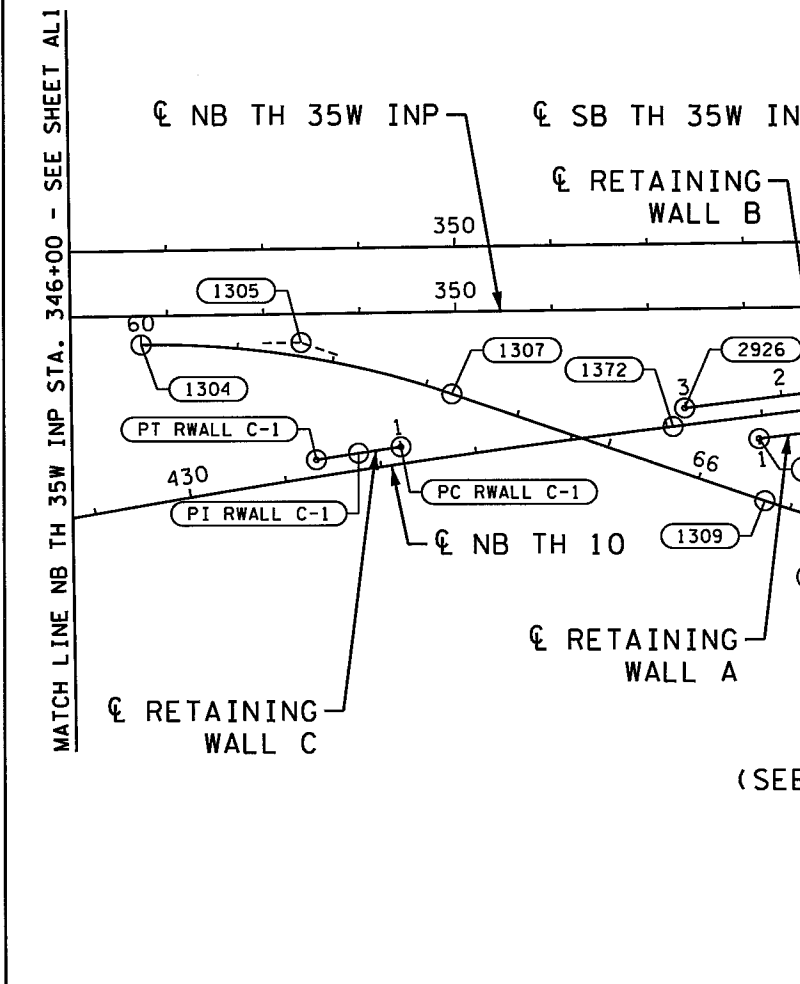
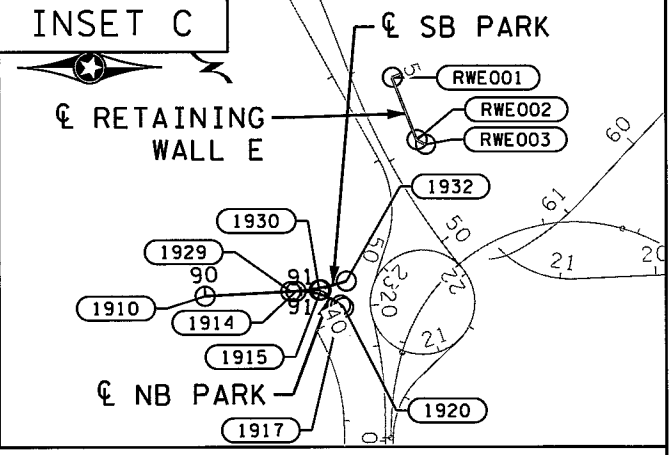
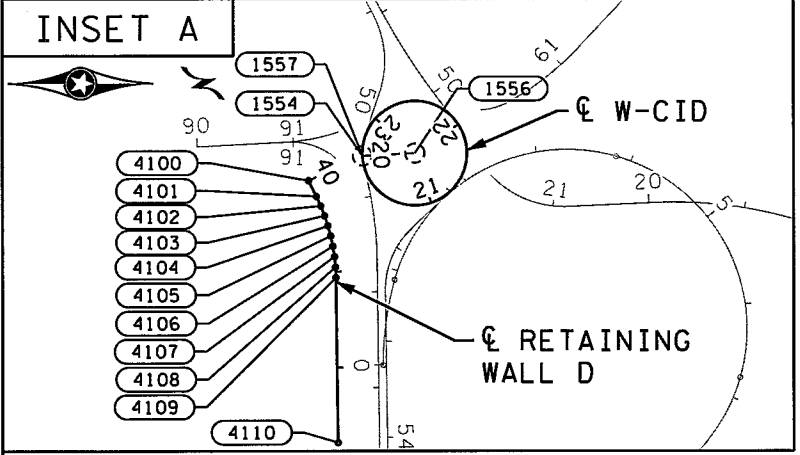
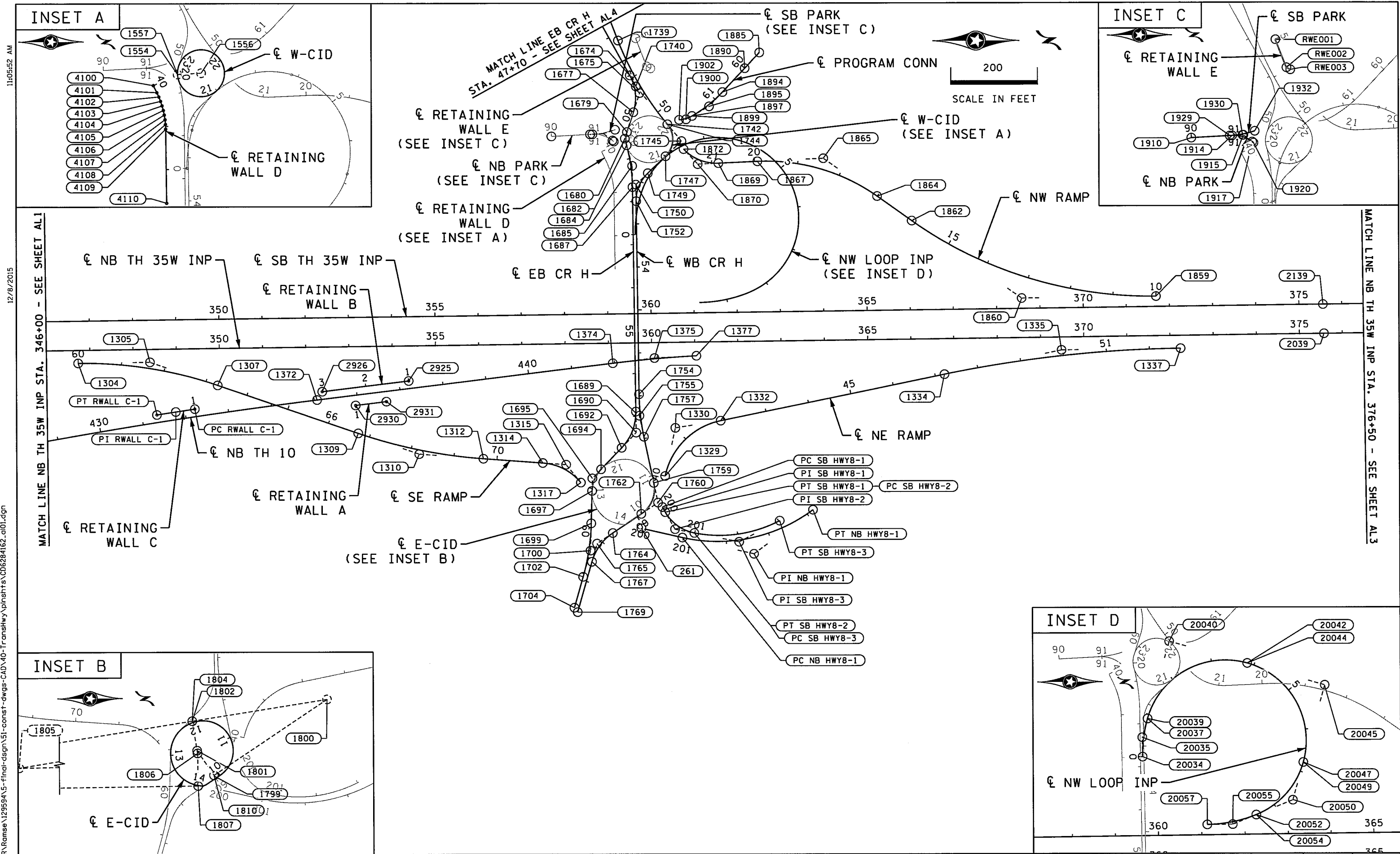
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

ALIGNMENT PLAN

FILE NO. 147
 RAMSE129594
 AL 1 OF ALIO
 367



DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	RDH						
CHECKED BY:	HLR						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



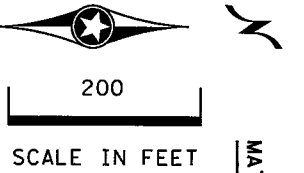
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	148
RAMSEY129594	
AL2	
OF ALIO	367

1100552 ALM
 12/8/2015
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 AL2

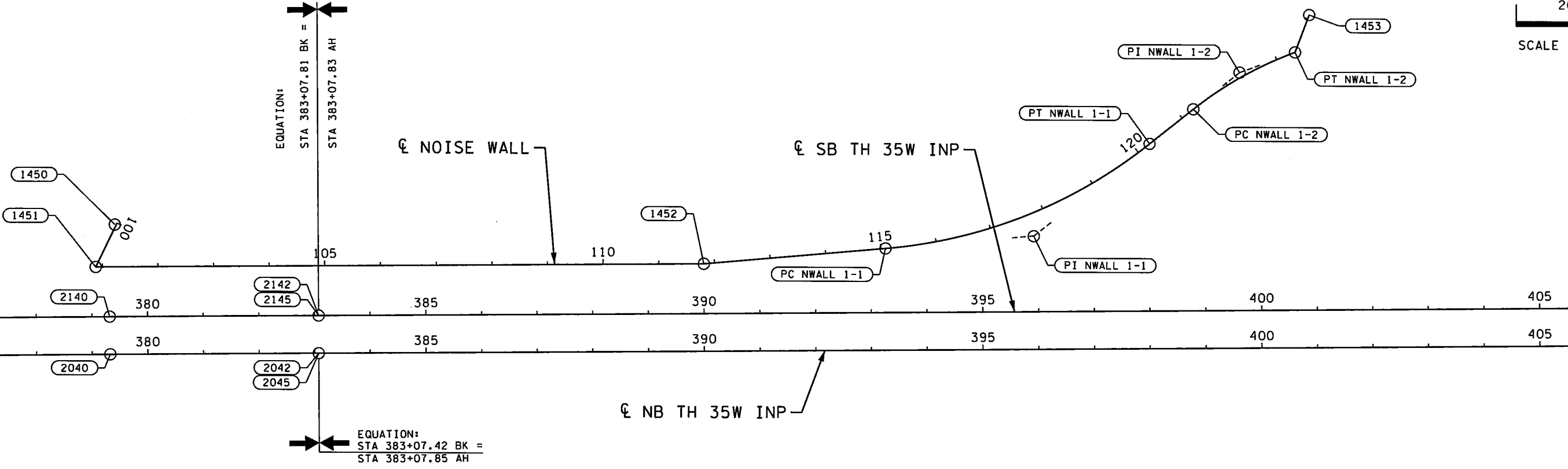
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12/8/2015

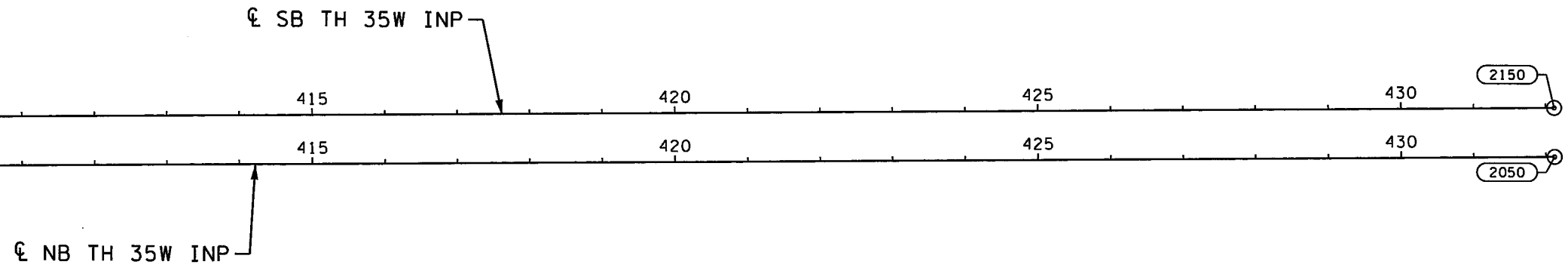


MATCH LINE NB TH 35W INP STA. 376+50 - SEE SHEET AL2

MATCH LINE NB TH 35W INP STA. 407+00 - SEE LOWER LEFT



MATCH LINE NB TH 35W INP STA. 407+00 - SEE UPPER RIGHT



S:\PT\RAM\Romse\129594\5-final-dsgn\51-const-dwgs-CAD\40-Transhwy\plans\CD6284162_001.dgn

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

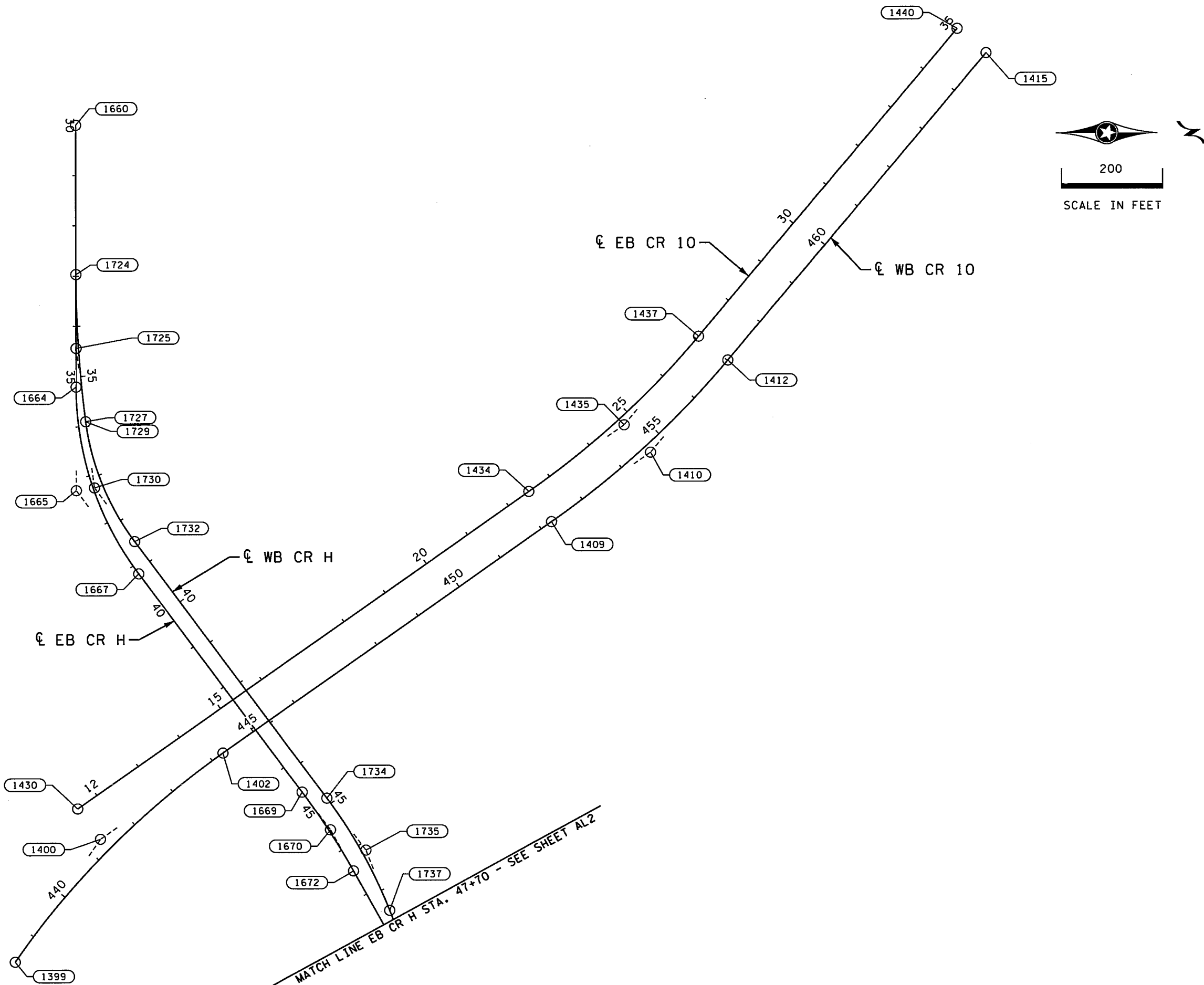
ALIGNMENT PLAN

FILE NO. 149
 RAMSEI29594
 AL3 OF AL10
 367

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12/8/2015

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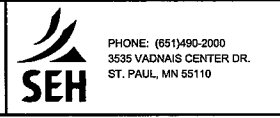


MATCH LINE EB CR H STA. 47+70 -- SEE SHEET AL2

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

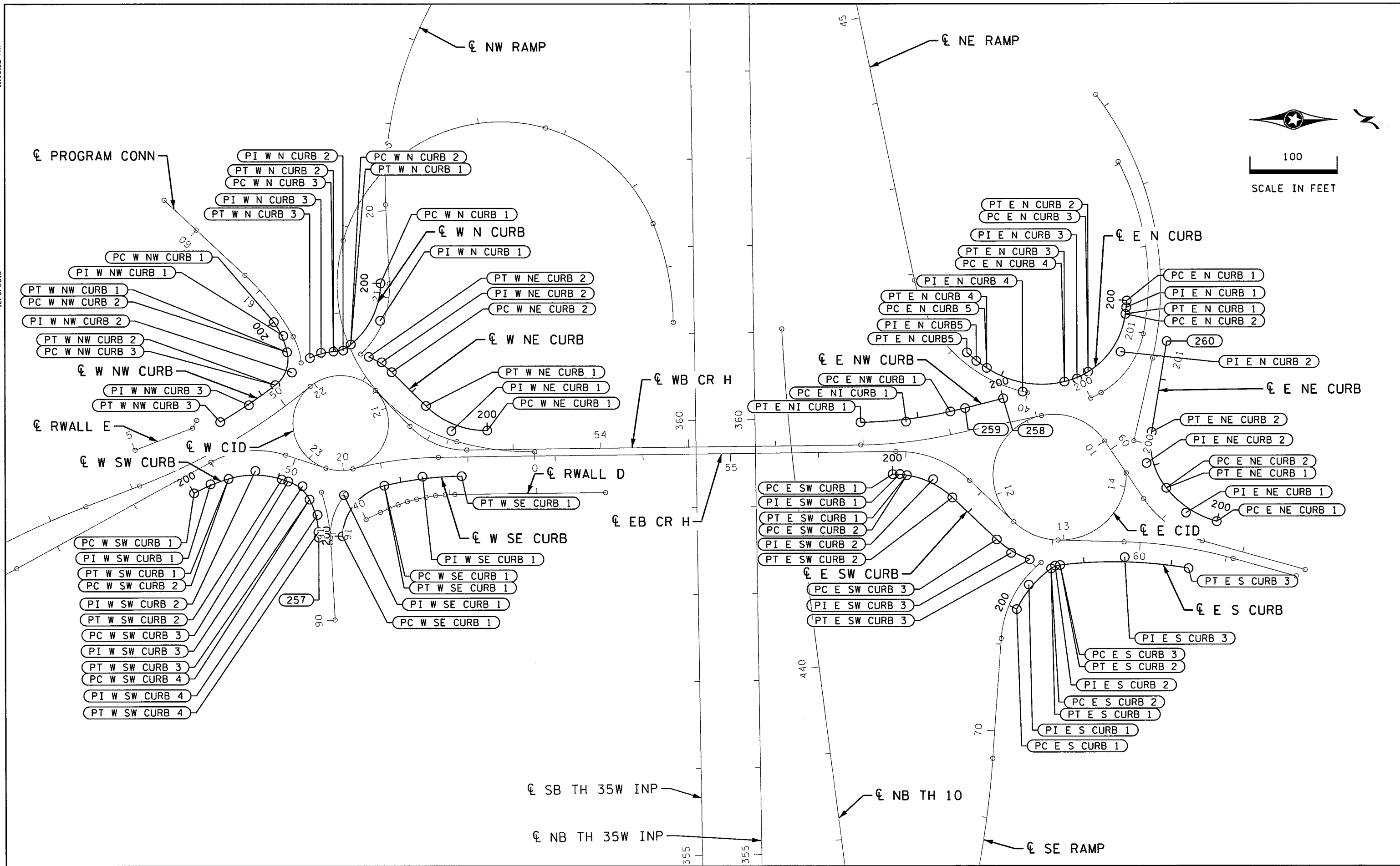
ALIGNMENT PLAN

FILE NO. RAMSE129594	150
AL 4 OF ALIO	367

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12/8/2015

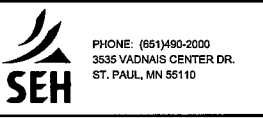
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DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

ALIGNMENT PLAN		FILE NO. RAMSE129594	151
		AL5 OF ALIO	367

SRAPTR Ramse \129594\5-final-dsgn\51-constr-dwg-cad\40-Transhwy\plnshts\CD6284162.dwg

12/8/2015

11:05:53 AM

ALIGNMENT TABULATION

0

Table with 10 columns: POINT NUMBER, POINT, STATION, DELTA, DEGREE, RADIUS, TANGENT, LENGTH, COORDINATES (X, Y), AZIMUTH. Contains sections for NB TH 35W INP (CHAIN: 35WNB), SB TH 35W INP (CHAIN: 35WSB), and NB TH 10 (CHAIN: NBTH10).

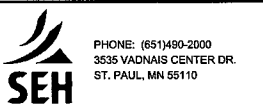
ALIGNMENT TABULATION

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Table with 12 columns: POINT NUMBER, POINT, STATION, DELTA, DEGREE, RADIUS, TANGENT, LENGTH, COORDINATES (X, Y), AZIMUTH. Contains sections for SE RAMP (CHAIN: SERAMP), NE RAMP (CHAIN: NERAMP), and NW RAMP (CHAIN: NWRAMP).

DESIGN TEAM, DRAWN BY: CIF, DESIGNER: RDH, CHECKED BY: HLR, REVISIONS table with columns NO., BY, DATE.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Certified By: Heather Redetzke Lic. No. 44267 Printed Name: HEATHER L. REDEZTKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA TH 35W / COUNTY ROAD H S.P. NO. 6284-162 (TH35W), S.P. 062-609-006, S.A.P. 062-593-003

ALIGNMENT TABULATION

0

Table with columns: POINT NUMBER, POINT, STATION, CIRCULAR CURVE DATA (DELTA, DEGREE, RADIUS, TANGENT, LENGTH), COORDINATES (X, Y), AZIMUTH. Includes sections for EB CR H (CHAIN: EBCRH) and NB PARK (CHAIN: NBPARK).

ALIGNMENT TABULATION

0

Table with columns: POINT NUMBER, POINT, STATION, CIRCULAR CURVE DATA (DELTA, DEGREE, RADIUS, TANGENT, LENGTH), COORDINATES (X, Y), AZIMUTH. Includes sections for WB CR H (CHAIN: WBCRH) and SB PARK (CHAIN: SBPARK).

11:05:53 AM

12/8/2015

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DESIGN TEAM table with columns: DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE.

REVISIONS table with columns: NO., BY, DATE.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Certified By: Heather L. Redetzke, Lic. No. 44267. Printed Name: HEATHER L. REDETZKE Date: 12/8/2015.



RAMSEY COUNTY, MINNESOTA TH 35W / COUNTY ROAD H S.P. NO. 6284-162 (TH35W), S.P. 062-609-006, S.A.P. 062-593-003

ALIGNMENT TABULATIONS EB CR H, NB PARK, WB CR H, SB PARK

FILE NO. RAMSE129594 153 AL7 OF ALIO 367

ALIGNMENT TABULATION

0

Table with columns: POINT NUMBER, POINT, STATION, CIRCULAR CURVE DATA (DELTA, DEGREE, RADIUS, TANGENT, LENGTH), COORDINATES (X, Y), AZIMUTH. Includes sections for RETAINING WALL D, RETAINING WALL E, NB HWY B, and SB HWY B.

ALIGNMENT TABULATION

0

Table with columns: POINT NUMBER, POINT, STATION, CIRCULAR CURVE DATA (DELTA, DEGREE, RADIUS, TANGENT, LENGTH), COORDINATES (X, Y), AZIMUTH. Includes sections for W SW CURB, W NW CURB, and W N CURB.

11:05:54 AM
12/8/2015
S:\P\T\AR\Ramse\129594\5-final-dsgn\31-const-dwgs-CAD\40-TransHWY\plns\shrs\CD6284162.a101.dgn

DESIGN TEAM table with columns: NO., BY, DATE, REVISIONS. Includes fields for DRAWN BY, DESIGNER, and CHECKED BY.

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Certified By: Heather L. Redetzke, Lic. No. 44267
Printed Name: HEATHER L. REDEZKE, Date: 12/8/2015



PHONE: (651)460-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

ALIGNMENT TABULATIONS
RETAINING WALL D, RETAINING WALL E,
NB HWY 8, SB HWY 8,
W SW CURB, W NW CURB, W N CURB,

FILE NO. 155
RAMSE129594
AL9 OF ALIO 367

ALIGNMENT TABULATION

0

Table with columns: POINT NUMBER, POINT, STATION, CIRCULAR CURVE DATA (DELTA, DEGREE, RADIUS, TANGENT, LENGTH), COORDINATES (X, Y), AZIMUTH. Includes sections for W NE CURB, W SE CURB, E SW CURB, E NW CURB, and POT points 258 and 259.

ALIGNMENT TABULATION

0

Table with columns: POINT NUMBER, POINT, STATION, CIRCULAR CURVE DATA (DELTA, DEGREE, RADIUS, TANGENT, LENGTH), COORDINATES (X, Y), AZIMUTH. Includes sections for E N CURB, E NE CURB, and E S CURB.

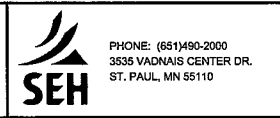
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12/8/2015

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DESIGN TEAM table with columns: DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

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RAMSEY COUNTY, MINNESOTA TH 35W / COUNTY ROAD H S.P. NO. 6284-162 (TH35W), S.P. 062-609-006, S.A.P. 062-593-003

ALIGNMENT TABULATIONS W NE CURB, W SE CURB, E SW CURB, E NW CURB, E N CURB, E NE CURB, E S CURB. FILE NO. RAMSEI29594 156. AL10 OF AL10 367.

11:05:59 AM

12/8/2015

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NOTES:

1. THE RIGHT OF WAY SHOWN IN THIS PLAN GIVES A GRAPHICAL LOCATION WITH RESPECT TO THE GEOMETRIC DESIGN AND MAP DATA. THE EXACT RIGHT OF WAY, EASEMENTS, AND BOUNDARY CORNERS ARE LOCATED BY REFERENCE TO THE RIGHT OF WAY PLATS AND ARE IDENTIFIED ON THE RIGHT OF WAY MAP.
2. SEE TITLE SHEET FOR LEGEND OF EXISTING UTILITY LINES AND SYMBOLS, SHOWN IN THE PLAN.
3. THE EXACT LOCATION OF UNDERGROUND UTILITIES SUCH AS GAS, TELEPHONE, FIBER OPTIC, PIPE LINES, ELECTRIC, AND CABLE TV ARE UNKNOWN. THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL (1-800-252-1166) BEFORE COMMENCING EXCAVATION.

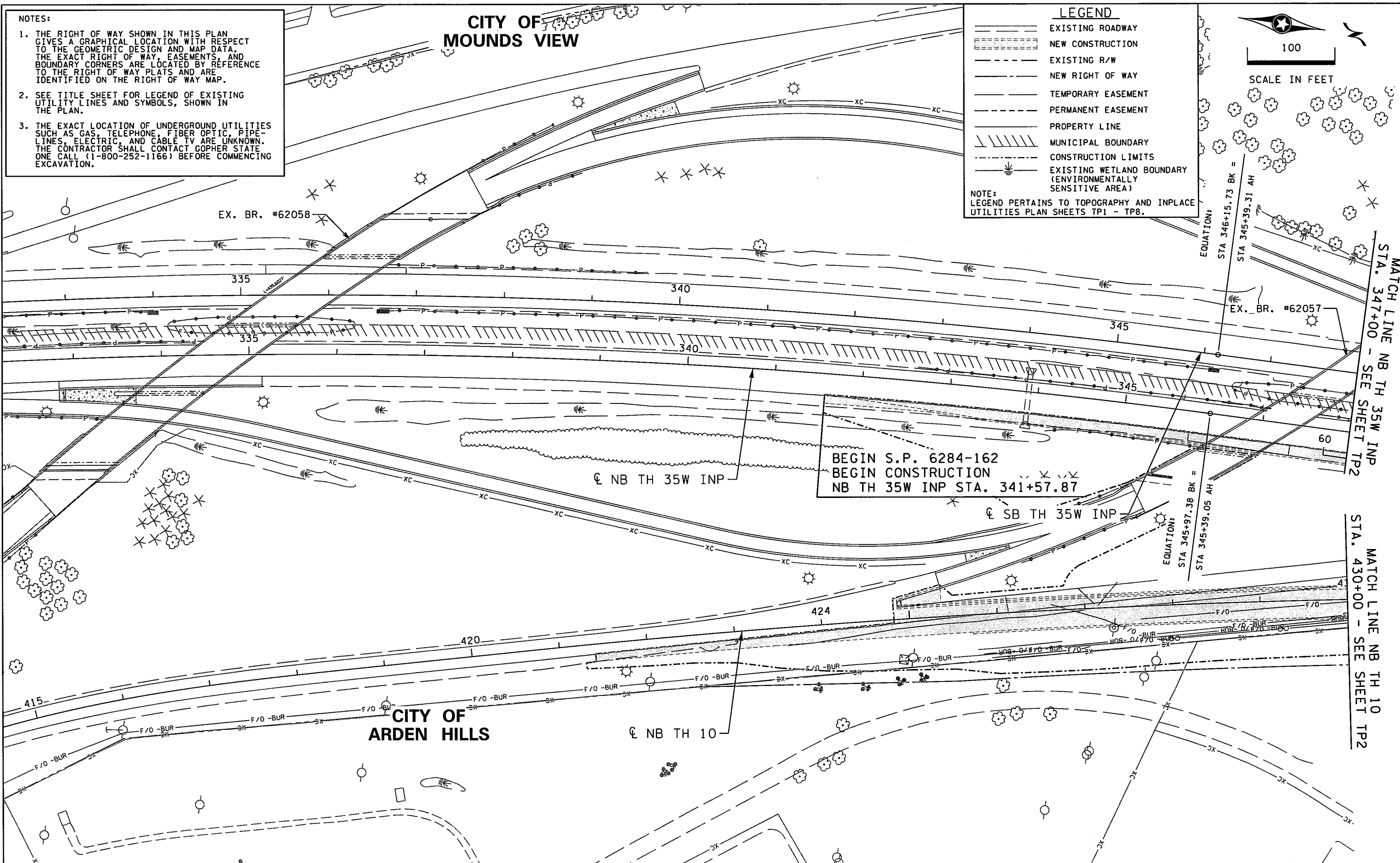
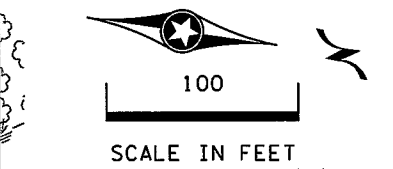
CITY OF MOUNDS VIEW

CITY OF ARDEN HILLS

LEGEND

- EXISTING ROADWAY
- NEW CONSTRUCTION
- EXISTING R/W
- NEW RIGHT OF WAY
- TEMPORARY EASEMENT
- PERMANENT EASEMENT
- PROPERTY LINE
- MUNICIPAL BOUNDARY
- CONSTRUCTION LIMITS
- EXISTING WETLAND BOUNDARY (ENVIRONMENTALLY SENSITIVE AREA)

NOTE:
LEGEND PERTAINS TO TOPOGRAPHY AND INPLACE UTILITIES PLAN SHEETS TP1 - TP8.



BEGIN S.P. 6284-162
 BEGIN CONSTRUCTION
 NB TH 35W INP STA. 341+57.87

MATCH LINE NB TH 35W INP
 STA. 347+00 - SEE SHEET TP2

MATCH LINE NB TH 10
 STA. 430+00 - SEE SHEET TP2

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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Certified By: *Heather L. Reetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REETZKE Date: 12/8/2015

PHONE: (651)480-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

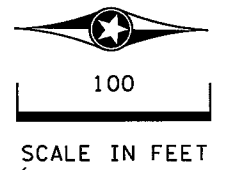
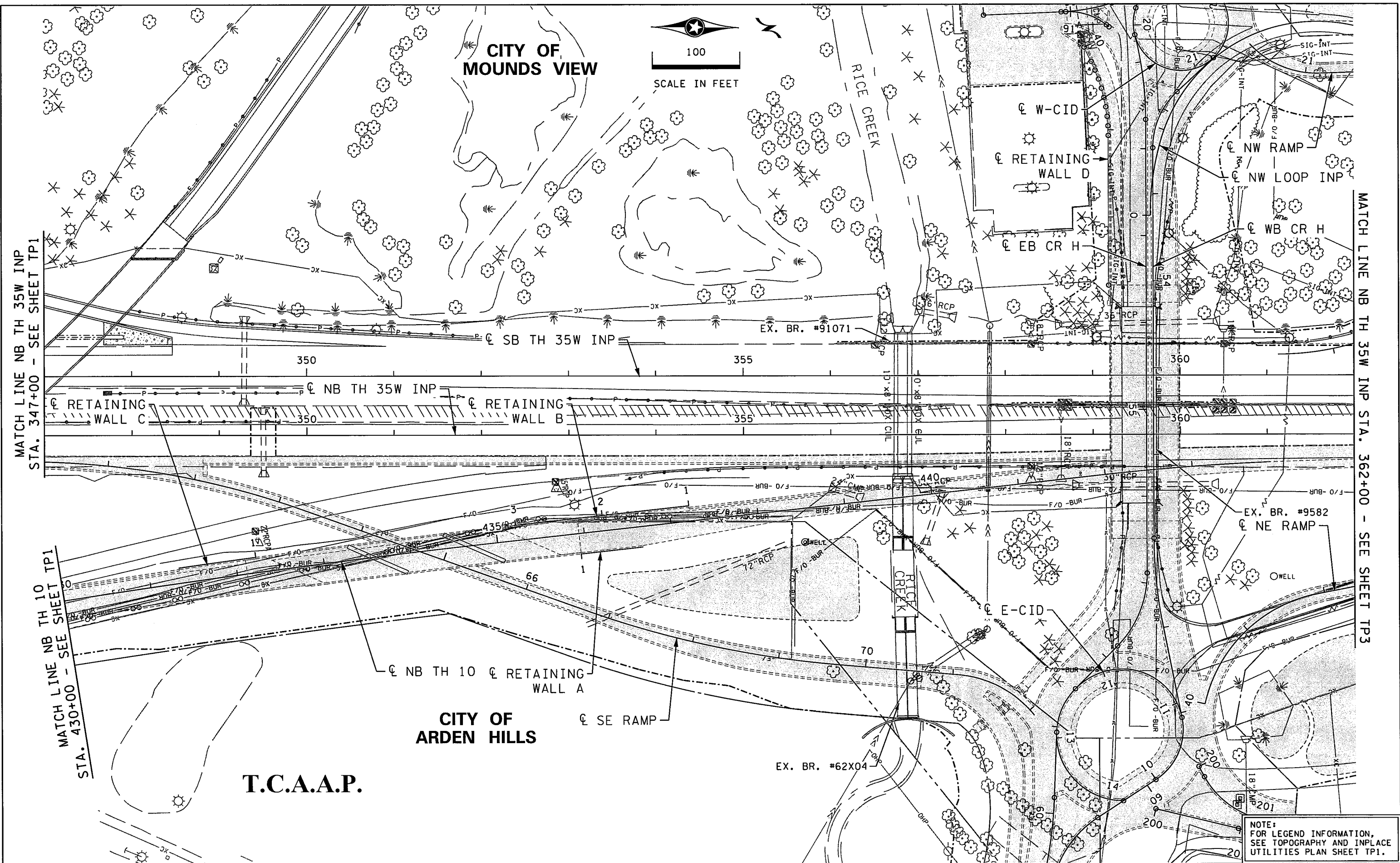
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TOPOGRAPHY AND INPLACE UTILITIES PLAN		FILE NO.
NB TH 35W INP STA. 341+57 - 347+00		157
NB TH 10 STA. 421+41 - 430+00		TP1
		OF TP8

11:06:00 AM

12/8/2015

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CITY OF
MOUNDS VIEW

CITY OF
ARDEN HILLS

T.C.A.A.P.

MATCH LINE NB TH 35W INP
STA. 347+00 - SEE SHEET TP1

MATCH LINE NB TH 10
STA. 430+00 - SEE SHEET TP1

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET TP3

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	RDH			
CHECKED BY:	HLR			
	NO.	BY	DATE	REVISIONS

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PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**TOPOGRAPHY AND
 INPLACE UTILITIES PLAN**
 NB TH 35W INP STA. 347+00 - 362+00
 NB TH 10 STA. 430+00 - 442+01

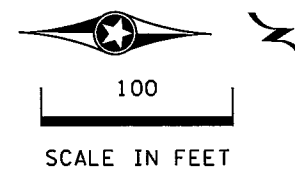
FILE NO. RAMSEI29594	158
TP2 OF TP8	367

NOTE:
 FOR LEGEND INFORMATION,
 SEE TOPOGRAPHY AND INPLACE
 UTILITIES PLAN SHEET TP1.

11:06:00 AM

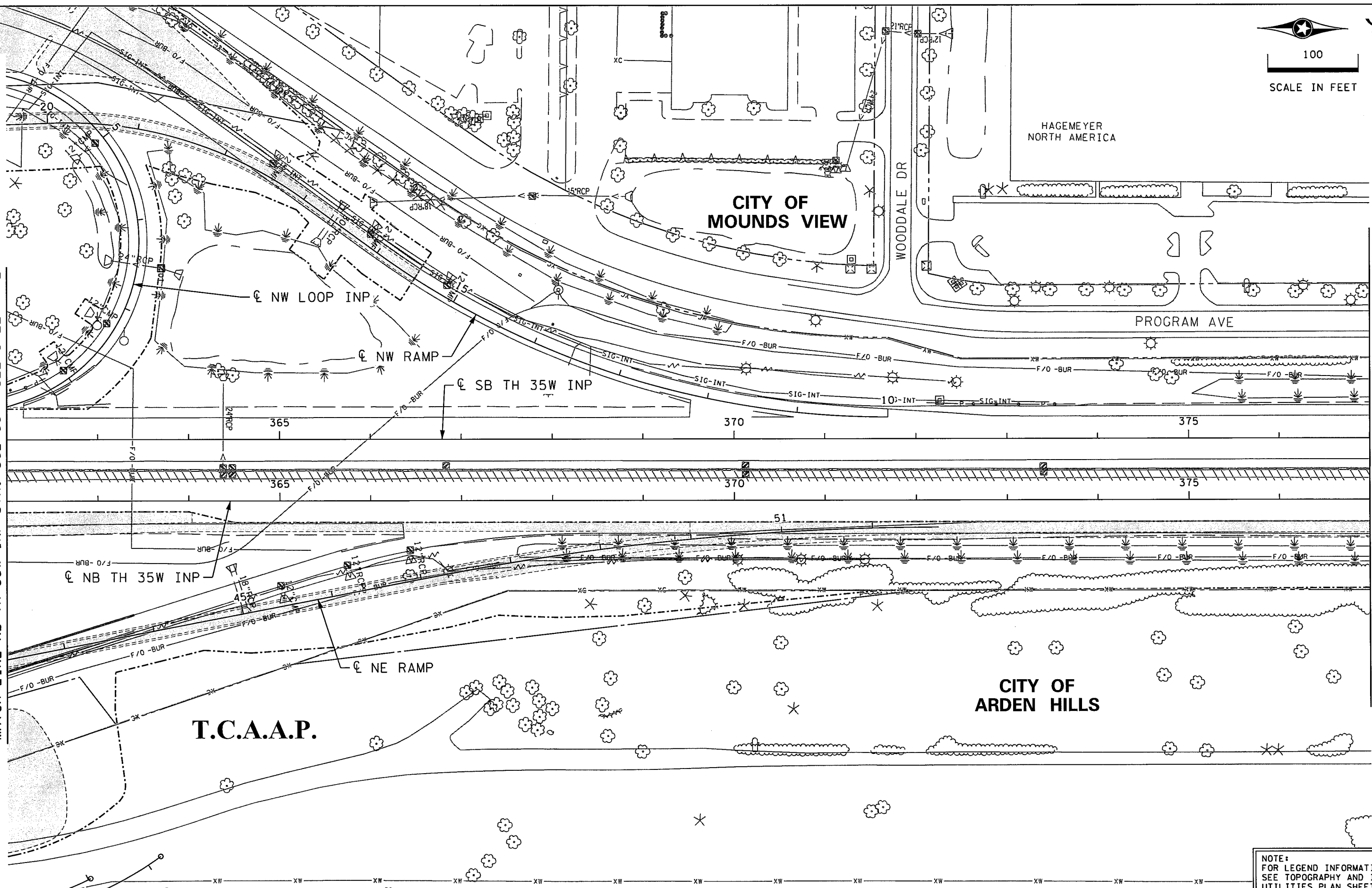
12/8/2015

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MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET TP2

MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET TP4



DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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PHONE: (651)490-2000
 3835 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**TOPOGRAPHY AND
 INPLACE UTILITIES PLAN**
 NB TH 35W INP STA. 362+00 - 377+00

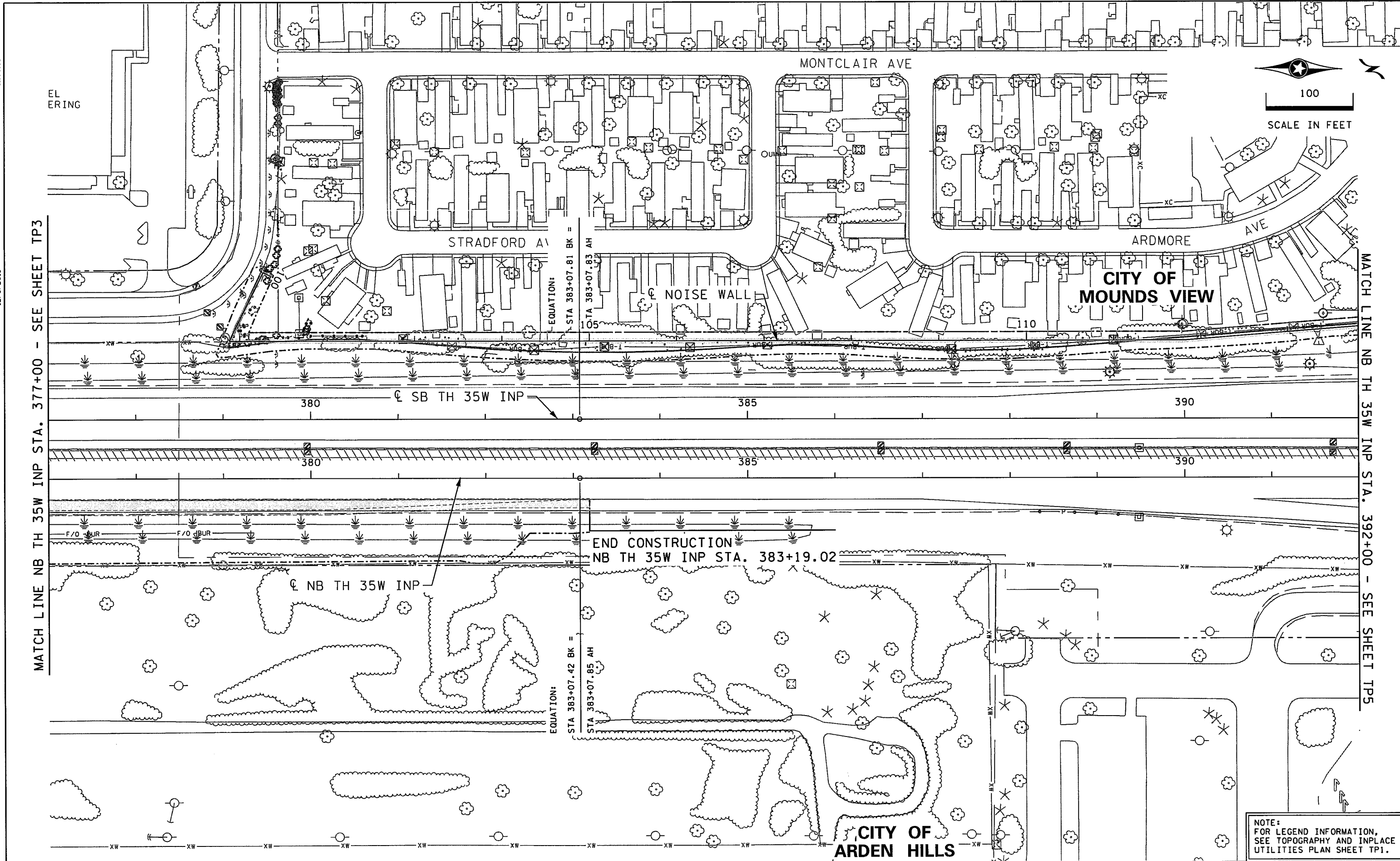
FILE NO. RAMSEI29594	159
TP3 OF TP8	367

NOTE:
 FOR LEGEND INFORMATION,
 SEE TOPOGRAPHY AND INPLACE
 UTILITIES PLAN SHEET TP1.

11:06:01 AM

12/8/2015

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MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET TP3

MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET TP5

NOTE:
 FOR LEGEND INFORMATION,
 SEE TOPOGRAPHY AND INPLACE
 UTILITIES PLAN SHEET TP1.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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 Printed Name: HEATHER L. REDEITZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TOPOGRAPHY AND
 INPLACE UTILITIES PLAN
 NB TH 35W INP STA. 377+00 - 392+00

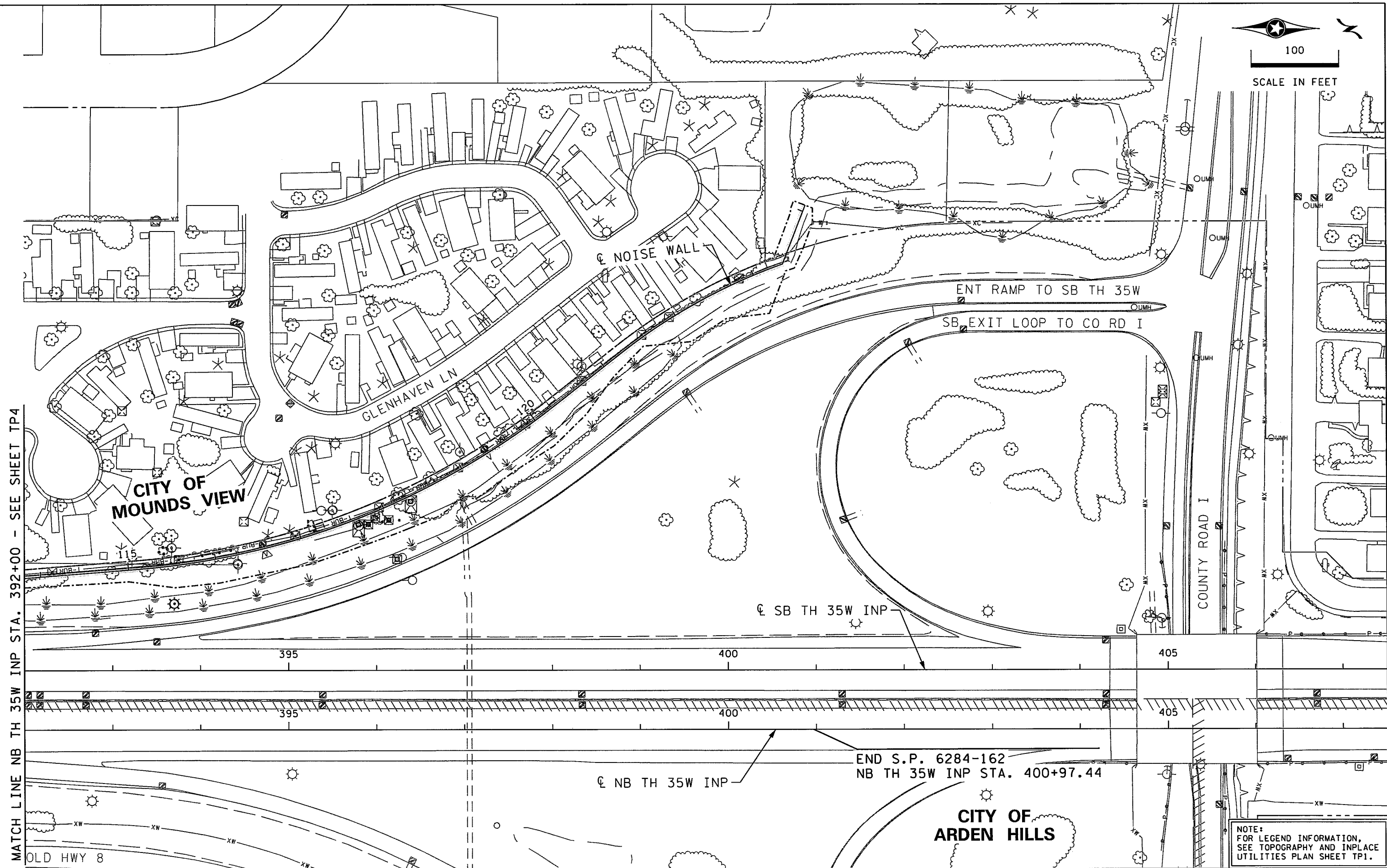
FILE NO.	160
RAMSEI29594	
TP4	
OF TP8	367

11:06:01 AM

12/8/2015

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TP5



MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET TP4

CITY OF MOUNDS VIEW

€ NB TH 35W INP

€ SB TH 35W INP

CITY OF ARDEN HILLS

END S.P. 6284-162
NB TH 35W INP STA. 400+97.44

NOTE:
FOR LEGEND INFORMATION,
SEE TOPOGRAPHY AND INPLACE
UTILITIES PLAN SHEET TP1.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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 Printed Name: HEATHER L. REDEITZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TOPOGRAPHY AND
 INPLACE UTILITIES PLAN
 NB TH 35W INP STA. 392+00 - 400+97

FILE NO. RAMSE129594	161
TP5 OF TP8	367

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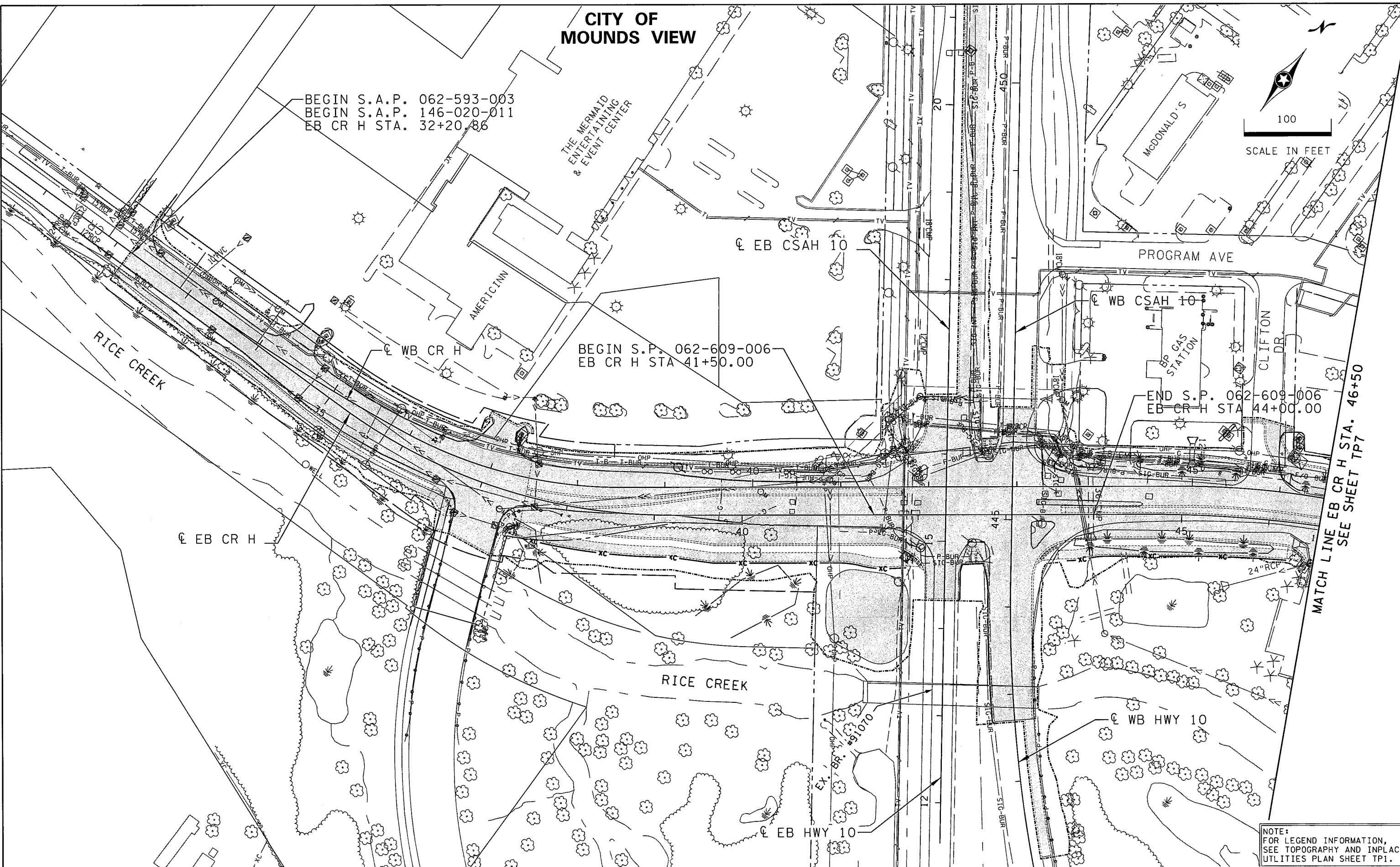
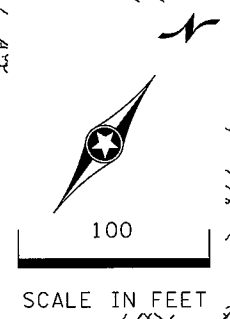
12/4/2015

K:\TWC-Civil\County\RAMSEY\135W_CRR\CAD\Plan_Sheets\CD6284162_top06.dgn
\$MODELNAME\$

CITY OF MOUNDS VIEW

BEGIN S.A.P. 062-593-003
BEGIN S.A.P. 146-020-011
EB CR H STA. 32+20.86

THE MERMAID
ENTERTAINING
& EVENT CENTER



BEGIN S.P. 062-609-006
EB CR H STA. 41+50.00

END S.P. 062-609-006
EB CR H STA. 44+00.00

MATCH LINE EB CR H STA. 46+50
SEE SHEET TP7

NOTE:
FOR LEGEND INFORMATION,
SEE TOPOGRAPHY AND INPLACE
UTILITIES PLAN SHEET TP1.

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
Printed Name: NICOLE GULLICK, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TOPOGRAPHY AND
INPLACE UTILITIES PLAN
EB CR H STA. 32+20 - 46+50

FILE NO. RAMSEY129594	162
TP6 OF TP8	367

2:44:24 PM

12/4/2015

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\$MODELNAME\$

CITY OF MOUNDS VIEW

PROGRAM CONNECTOR

CITY OF ARDEN HILLS

T.C.A.A.P.



100

SCALE IN FEET

PROGRAM AVE

35W AUTO REPAIR & WASH

R. J. RICHES

MATCH LINE EB CR H
SEE SHEET TP6

END S.A.P. 146-020-011
BEGIN S.A.P. 187-020-019

EX. BR. #9582

E CID

END S.A.P. 062-593-003
END S.A.P. 187-020-019
EB CR H STA 61+20.82

EX. BR. #62X04

CITY OF ARDEN HILLS

T.C.A.A.P.

SE RAMP

NOTE:
FOR LEGEND INFORMATION,
SEE TOPOGRAPHY AND INPLACE
UTILITIES PLAN SHEET TP1.

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

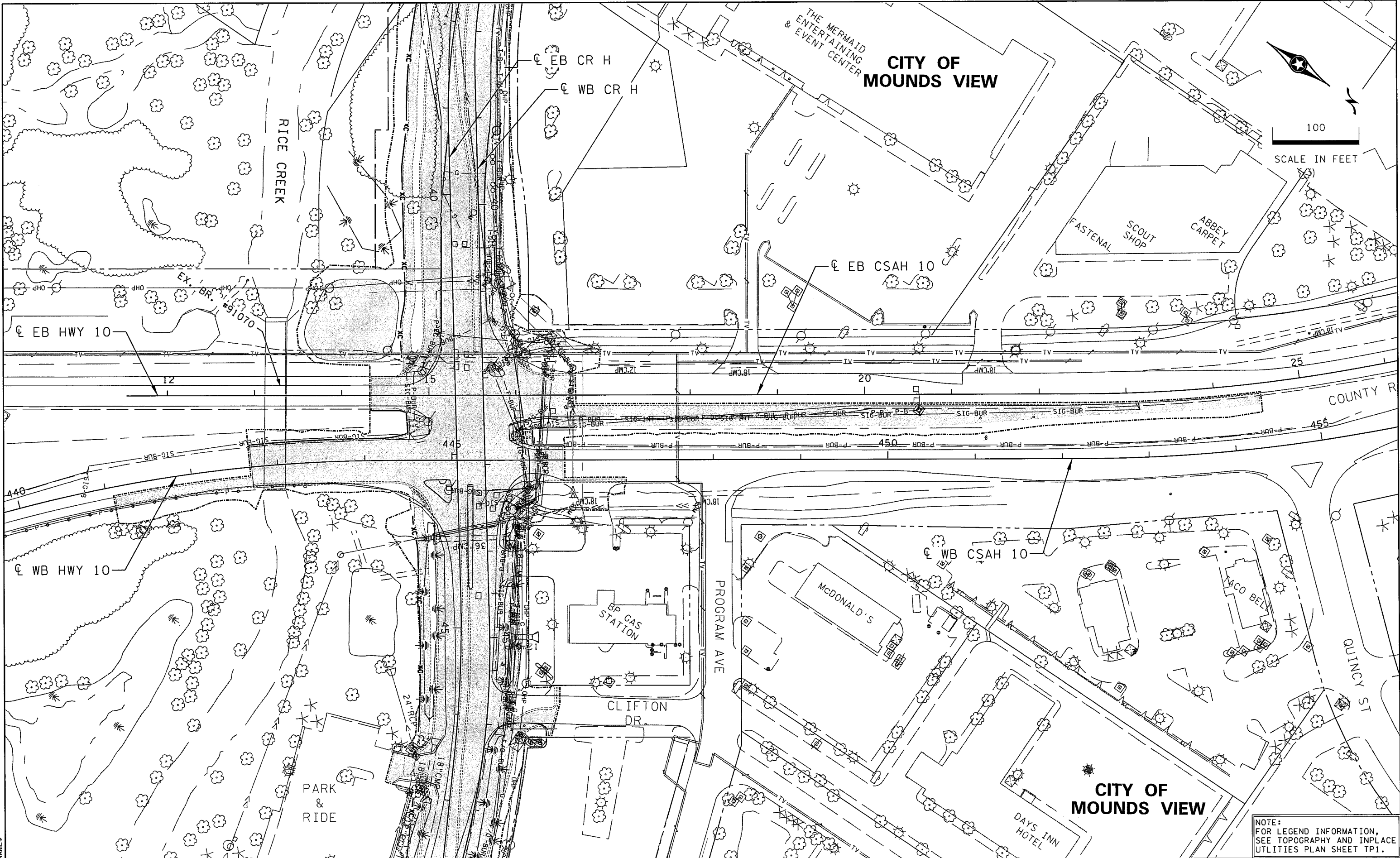
TOPOGRAPHY AND
INPLACE UTILITIES PLAN
EB CR H STA. 46+50 - 61+21

FILE NO. RAMSEI29594	163
TP7 OF TP8	367

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12/4/2015

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\$MODELNAME\$



NOTE:
FOR LEGEND INFORMATION,
SEE TOPOGRAPHY AND INPLACE
UTILITIES PLAN SHEET TP1.

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

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 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TOPOGRAPHY AND
 INPLACE UTILITIES PLAN
 WB CSAH 10 STA. 441+00 - 455+00

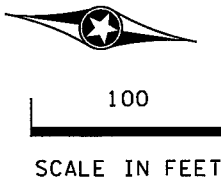
FILE NO. RAMSEI29594	164
TP8 OF TP8	367

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12/8/2015

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CITY OF MOUNDS VIEW



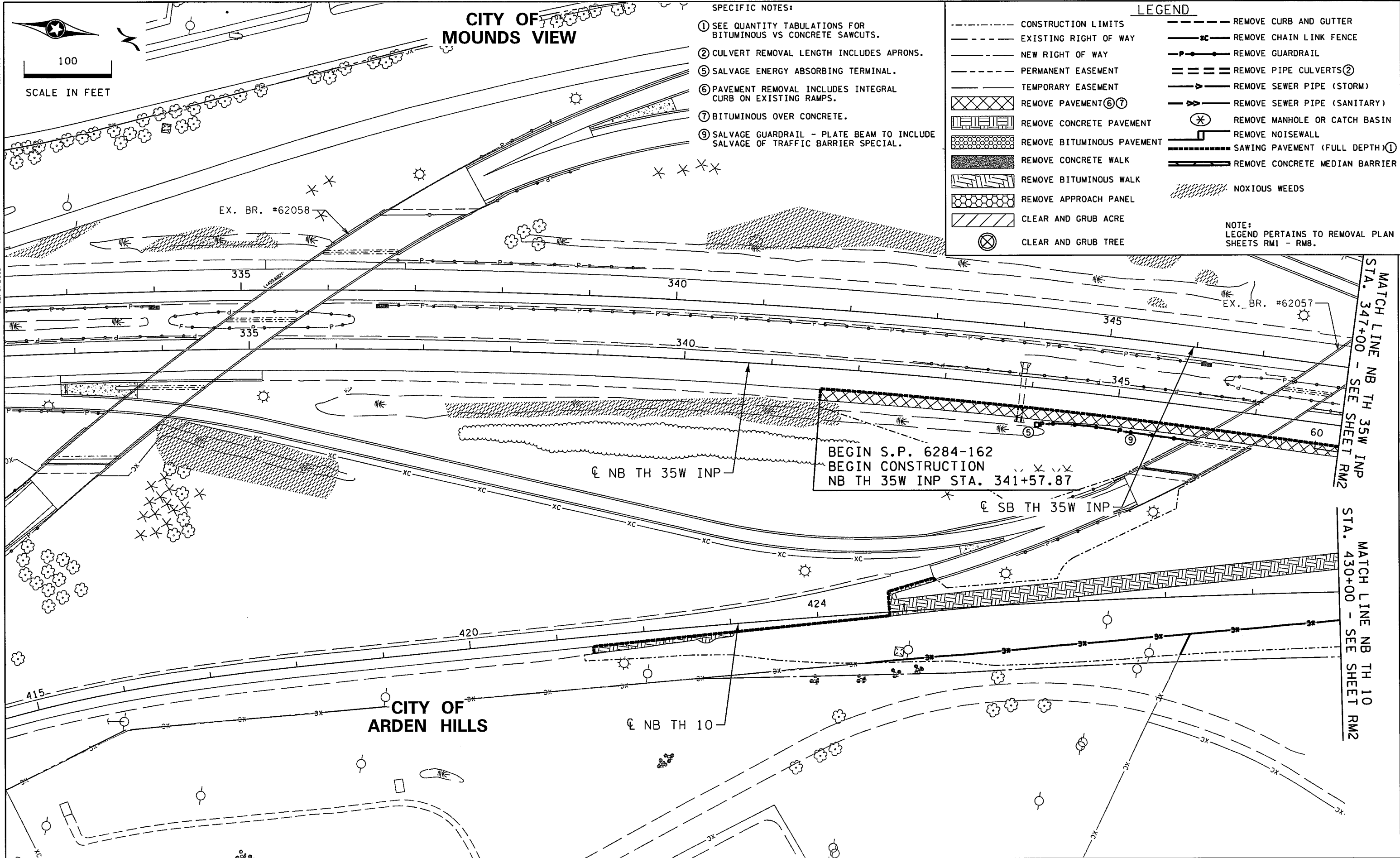
SPECIFIC NOTES:

- ① SEE QUANTITY TABULATIONS FOR BITUMINOUS VS CONCRETE SAWCUTS.
- ② CULVERT REMOVAL LENGTH INCLUDES APRONS.
- ⑤ SALVAGE ENERGY ABSORBING TERMINAL.
- ⑥ PAVEMENT REMOVAL INCLUDES INTEGRAL CURB ON EXISTING RAMPS.
- ⑦ BITUMINOUS OVER CONCRETE.
- ⑨ SALVAGE GUARDRAIL - PLATE BEAM TO INCLUDE SALVAGE OF TRAFFIC BARRIER SPECIAL.

LEGEND

- CONSTRUCTION LIMITS
- - - EXISTING RIGHT OF WAY
- NEW RIGHT OF WAY
- - - PERMANENT EASEMENT
- - - TEMPORARY EASEMENT
- [X] REMOVE PAVEMENT ⑥ ⑦
- [] REMOVE CONCRETE PAVEMENT
- [] REMOVE BITUMINOUS PAVEMENT
- [] REMOVE CONCRETE WALK
- [] REMOVE BITUMINOUS WALK
- [] REMOVE APPROACH PANEL
- [] CLEAR AND GRUB ACRE
- [X] CLEAR AND GRUB TREE
- REMOVE CURB AND GUTTER
- xc- REMOVE CHAIN LINK FENCE
- p- REMOVE GUARDRAIL
- == REMOVE PIPE CULVERTS ②
- > REMOVE SEWER PIPE (STORM)
- > REMOVE SEWER PIPE (SANITARY)
- [*] REMOVE MANHOLE OR CATCH BASIN
- [] REMOVE NOISEWALL
- SAWING PAVEMENT (FULL DEPTH) ①
- REMOVE CONCRETE MEDIAN BARRIER
- [] NOXIOUS WEEDS

NOTE:
LEGEND PERTAINS TO REMOVAL PLAN SHEETS RM1 - RMB.



MATCH LINE NB TH 35W INP STA. 347+00 - SEE SHEET RM2

MATCH LINE NB TH 10 STA. 430+00 - SEE SHEET RM2

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	RDH						
CHECKED BY:	HLR						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Reetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDEITZKE Date: 12/8/2015



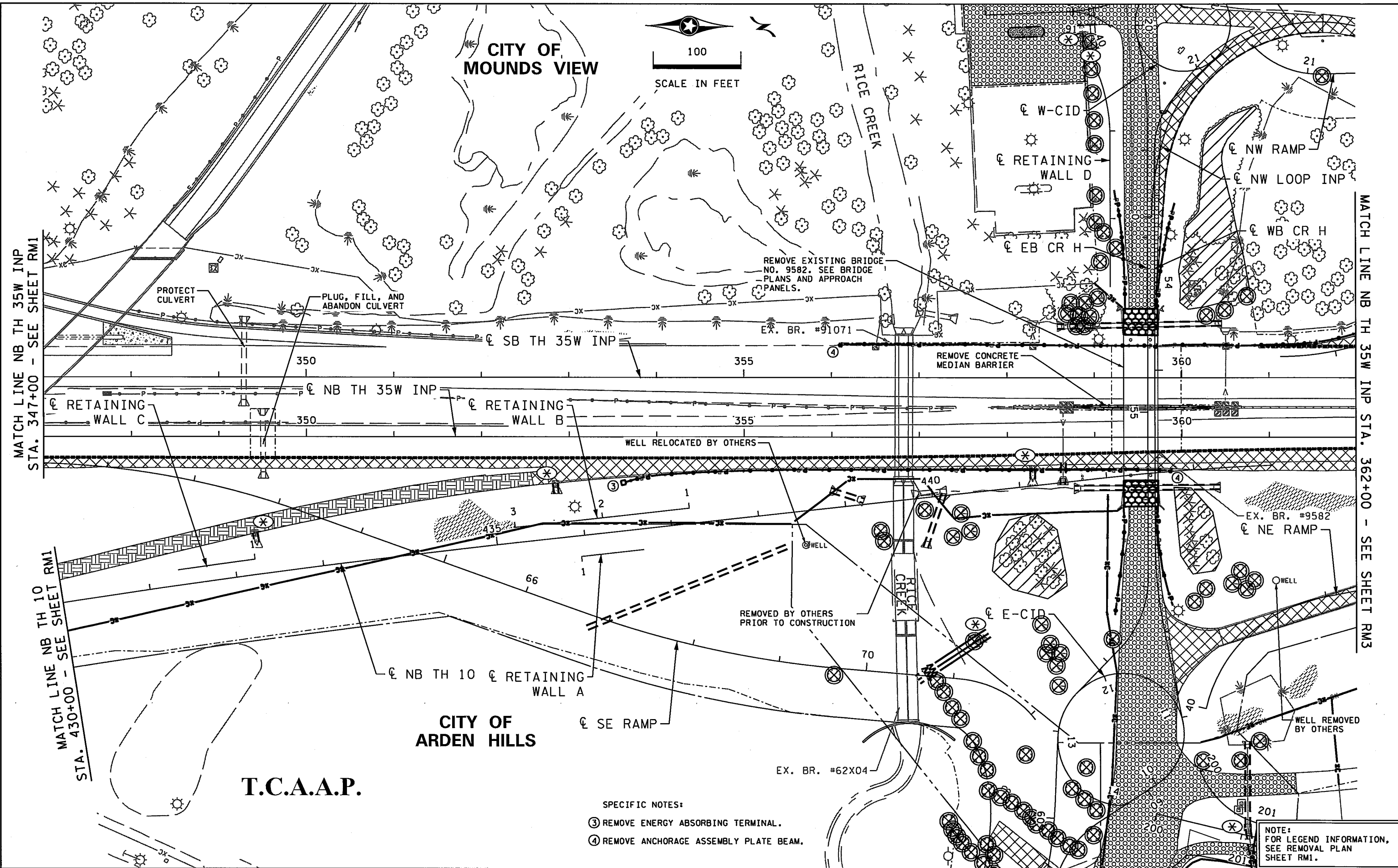
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	165
RAMSE129594	
REMOVAL PLAN	
NB TH 35W INP STA. 341+57 - 347+00	
NB TH 10 STA. 421+41 - 430+00	
RM1 OF RMB	367

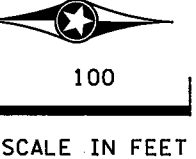
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2/16/2016

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CITY OF MOUNDS VIEW



CITY OF ARDEN HILLS

T.C.A.A.P.

- SPECIFIC NOTES:**
- ③ REMOVE ENERGY ABSORBING TERMINAL.
 - ④ REMOVE ANCHORAGE ASSEMBLY PLATE BEAM.

NOTE:
FOR LEGEND INFORMATION,
SEE REMOVAL PLAN
SHEET RM1.

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	ROH			
CHECKED BY:	HLR			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 2/16/2016

PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

REMOVAL PLAN
 NB TH 35W INP STA. 347+00 - 362+00
 NB TH 10 STA. 430+00 - 442+01

FILE NO. 166
 RAMSEI29594
 RM2 OF RM6
 367

MATCH LINE NB TH 35W INP STA. 347+00 - SEE SHEET RM1

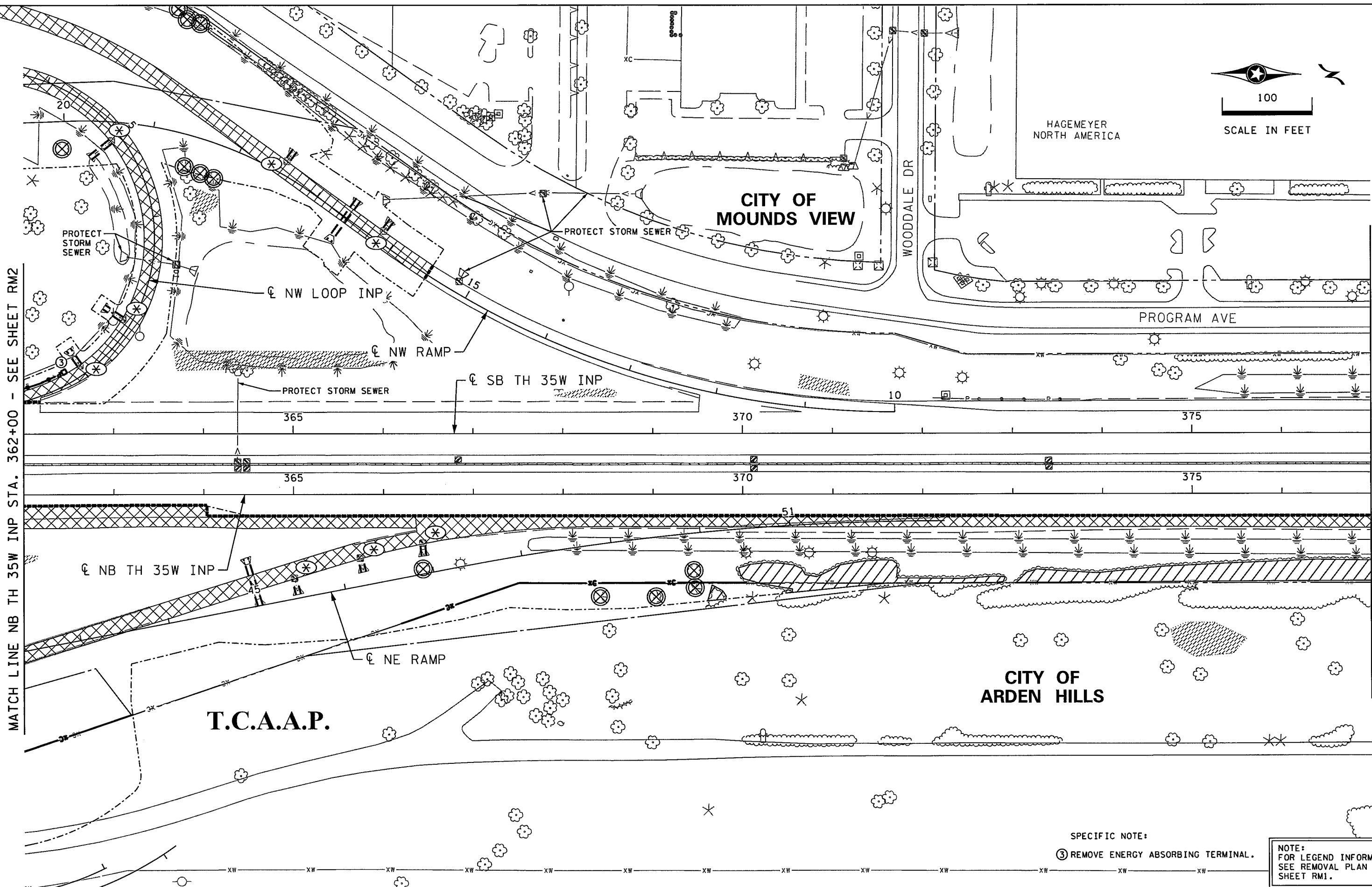
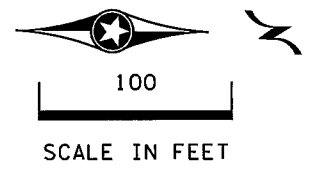
MATCH LINE NB TH 10 STA. 430+00 - SEE SHEET RM1

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET RM3

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12/8/2015

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RM3



MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET RM2

MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET RM4

SPECIFIC NOTE:
③ REMOVE ENERGY ABSORBING TERMINAL.

NOTE:
FOR LEGEND INFORMATION,
SEE REMOVAL PLAN
SHEET RM1.

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF						
DESIGNER:	RDH						
CHECKED BY:	HLR						
	NO.	BY	DATE				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Rebeitzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REBEITZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

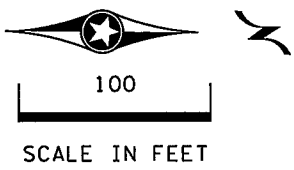
REMOVAL PLAN
 NB TH 35W INP STA. 362+00 - 377+00

FILE NO. 167
 RAMSE129594
 RM3 OF RM8
 367

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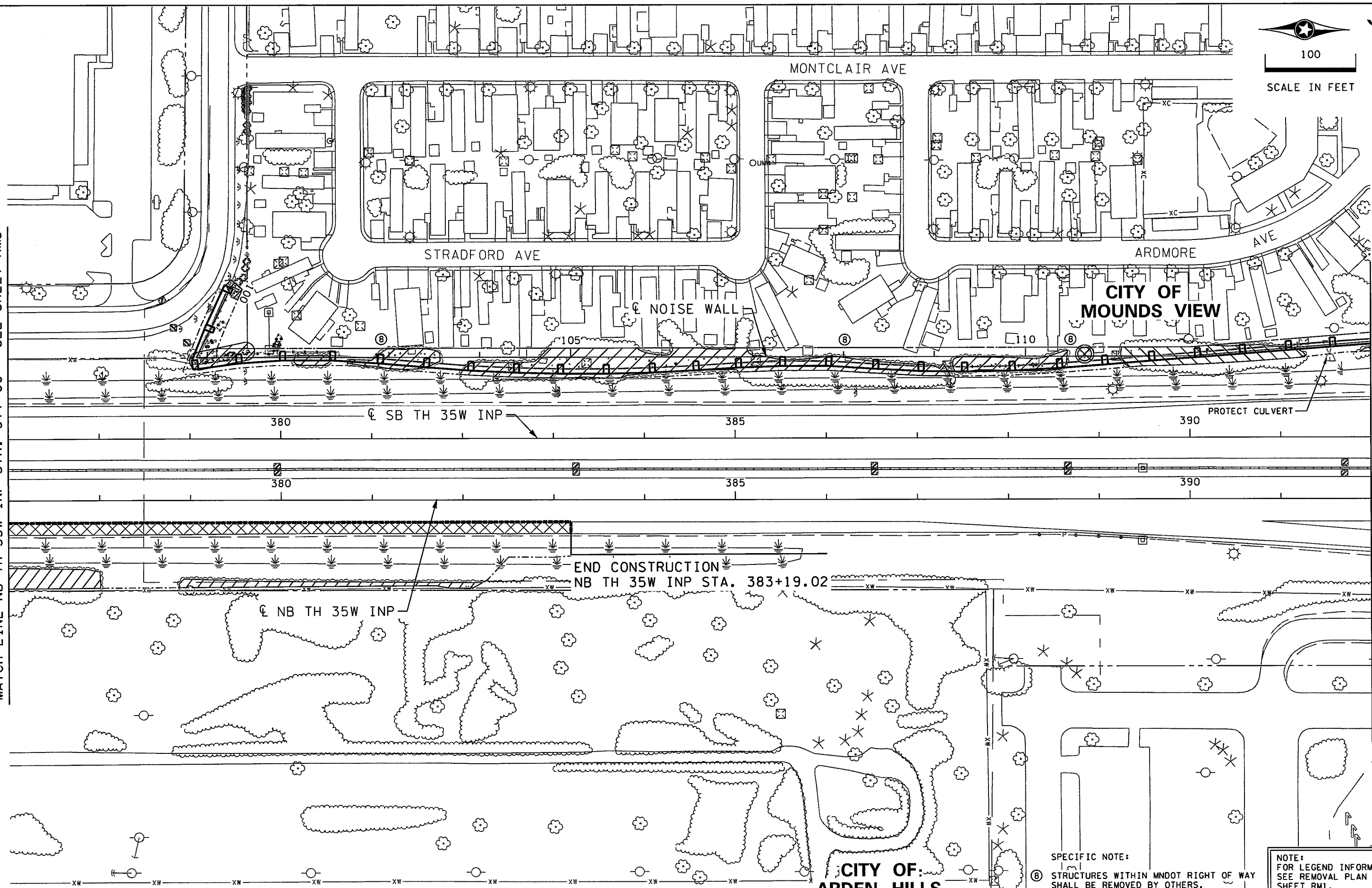
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MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET RM3

MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET RM5



SPECIFIC NOTE:
STRUCTURES WITHIN MNDOT RIGHT OF WAY SHALL BE REMOVED BY OTHERS.

NOTE:
FOR LEGEND INFORMATION, SEE REMOVAL PLAN SHEET RM1.

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	RDH			
CHECKED BY:	HLR			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDEITZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

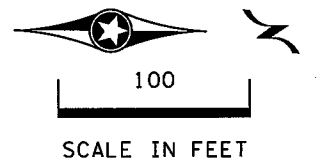
FILE NO.	168
RAMSE129594	
RM4	367
OF RMB	

REMOVAL PLAN
NB TH 35W INP STA. 377+00 - 392+00

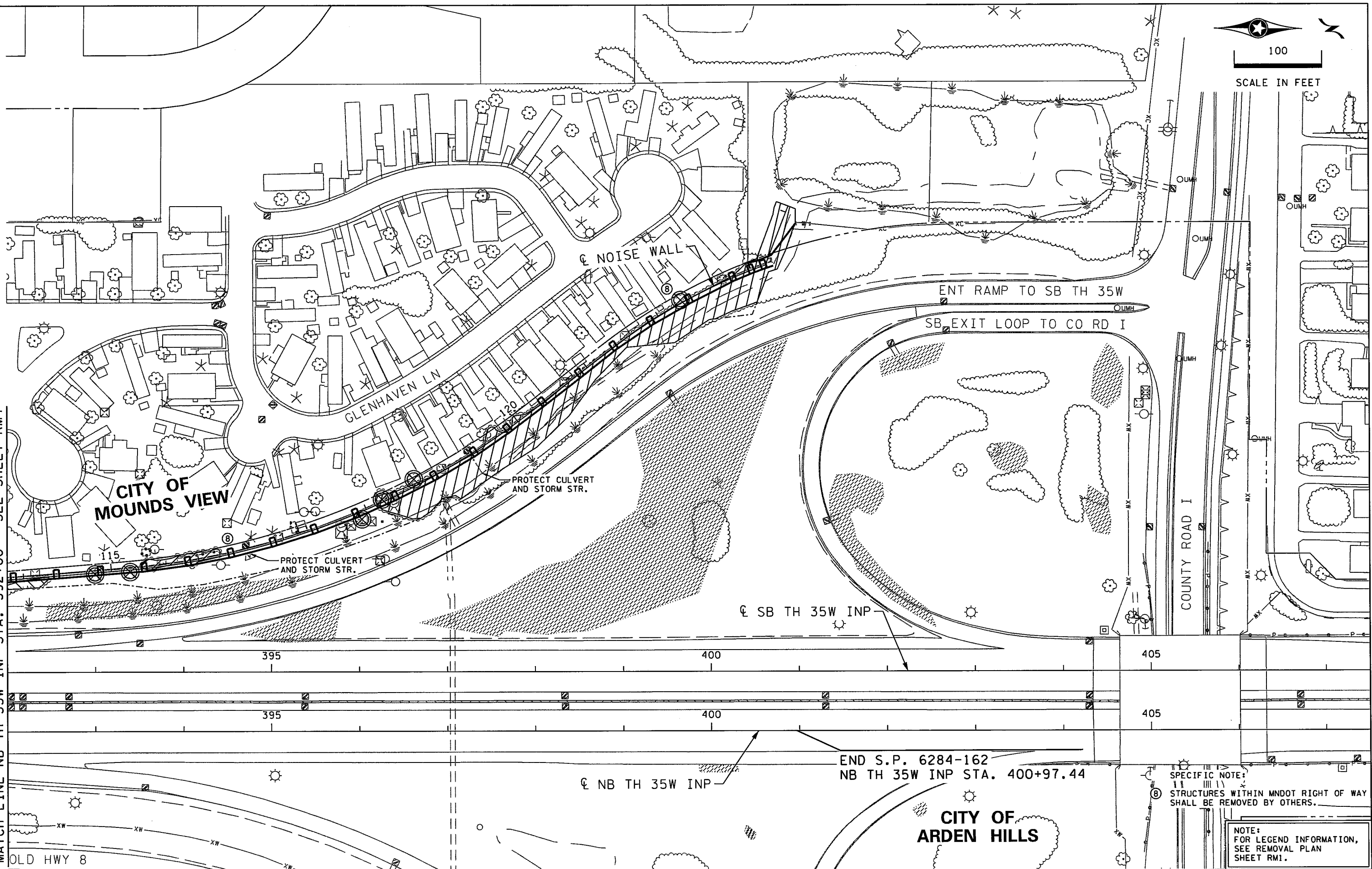
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MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET RM4



END S.P. 6284-162
 NB TH 35W INP STA. 400+97.44

SPECIFIC NOTE:
 STRUCTURES WITHIN MNDOT RIGHT OF WAY SHALL BE REMOVED BY OTHERS.

NOTE:
 FOR LEGEND INFORMATION, SEE REMOVAL PLAN SHEET RM1.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	RDH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

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 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

REMOVAL PLAN		FILE NO.	169
NB TH 35W INP STA. 392+00 - 400+97		RAMSEI29594	
		RM5	367
		OF RMB	

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2/15/2016

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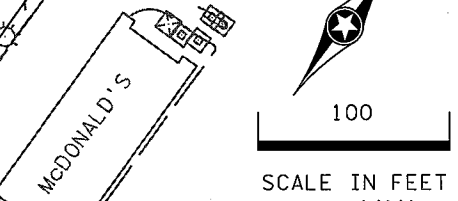
CITY OF MOUNDS VIEW

BEGIN S.A.P. 062-593-003
BEGIN S.A.P. 146-020-011
EB CR H STA 32+20.86

THE MERMAID
ENTERTAINING
& EVENT CENTER

AMERICINN

BEGIN S.P. 062-609-006
EB CR H STA 41+50.00



PROGRAM AVE

WB CSAH 10

END S.P. 062-609-006
EB CR H STA 44+00.00

CLIFTON
DR.

MATCH LINE EB CR H STA. 46+50
SEE SHEET RM7

RICE CREEK

EB CR H

RICE CREEK

EB HWY 10

WB HWY 10

NOTE:
FOR LEGEND INFORMATION,
SEE REMOVAL PLAN
SHEET RM1.

SPECIFIC NOTES:
12 REMOVE ECCENTRIC LOADER BCT

DESIGN TEAM		NO.	BY	DATE	REVISIONS
DRAWN BY:	GDK				
DESIGNER:	NMG				
CHECKED BY:	WCK				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

REMOVAL PLAN

EB CR H STA. 32+20 - 46+50

FILE NO.
RAMSE129594
170
RM6
OF RMB
367

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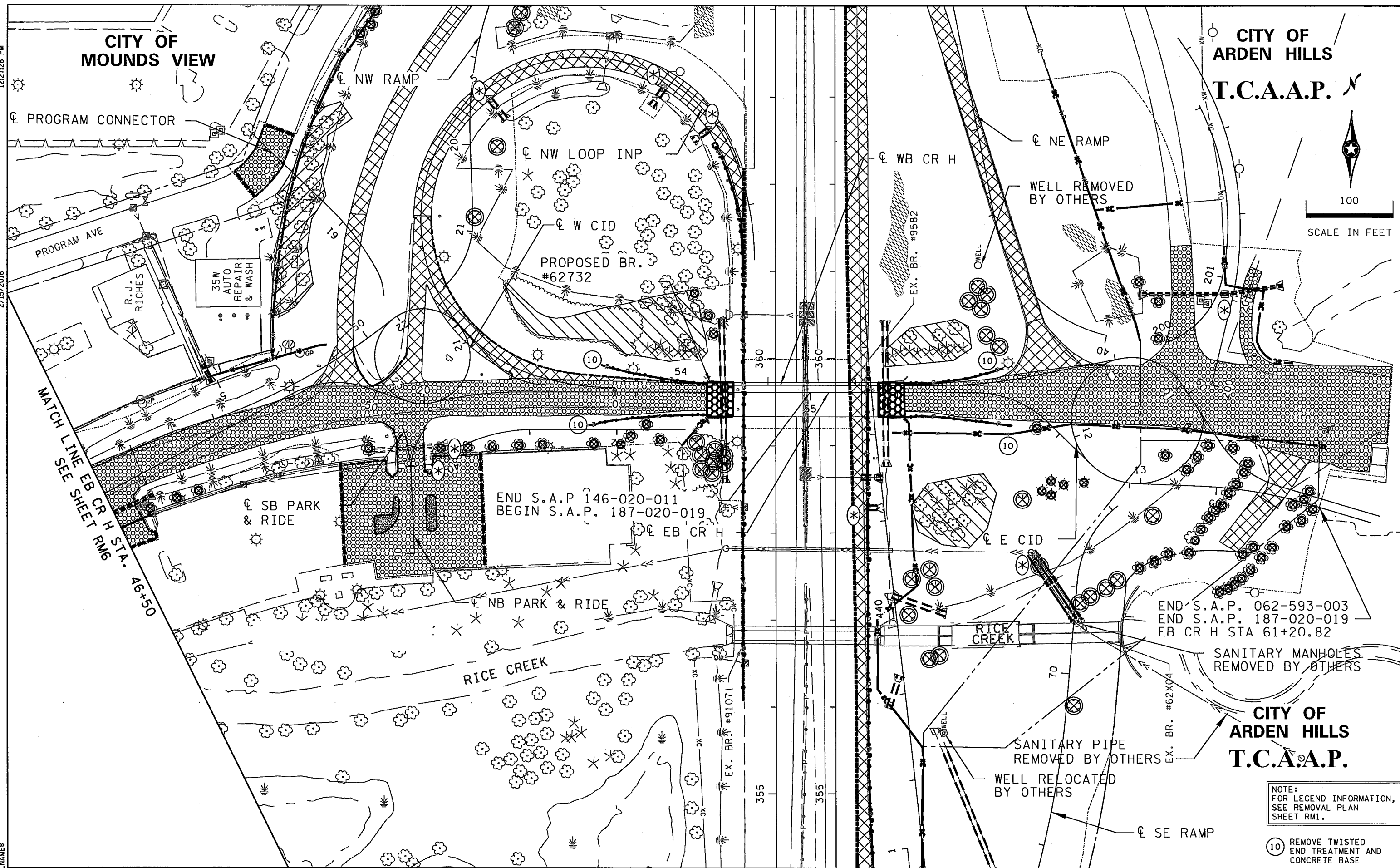
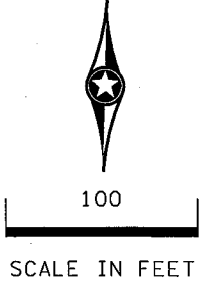
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CITY OF
MOUNDS VIEW

CITY OF
ARDEN HILLS

T.C.A.A.P.



DESIGN TEAM				
DRAWN BY: GDK				
DESIGNER: NMG				
CHECKED BY: WCK				
	NO.	BY	DATE	REVISIONS

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Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

REMOVAL PLAN

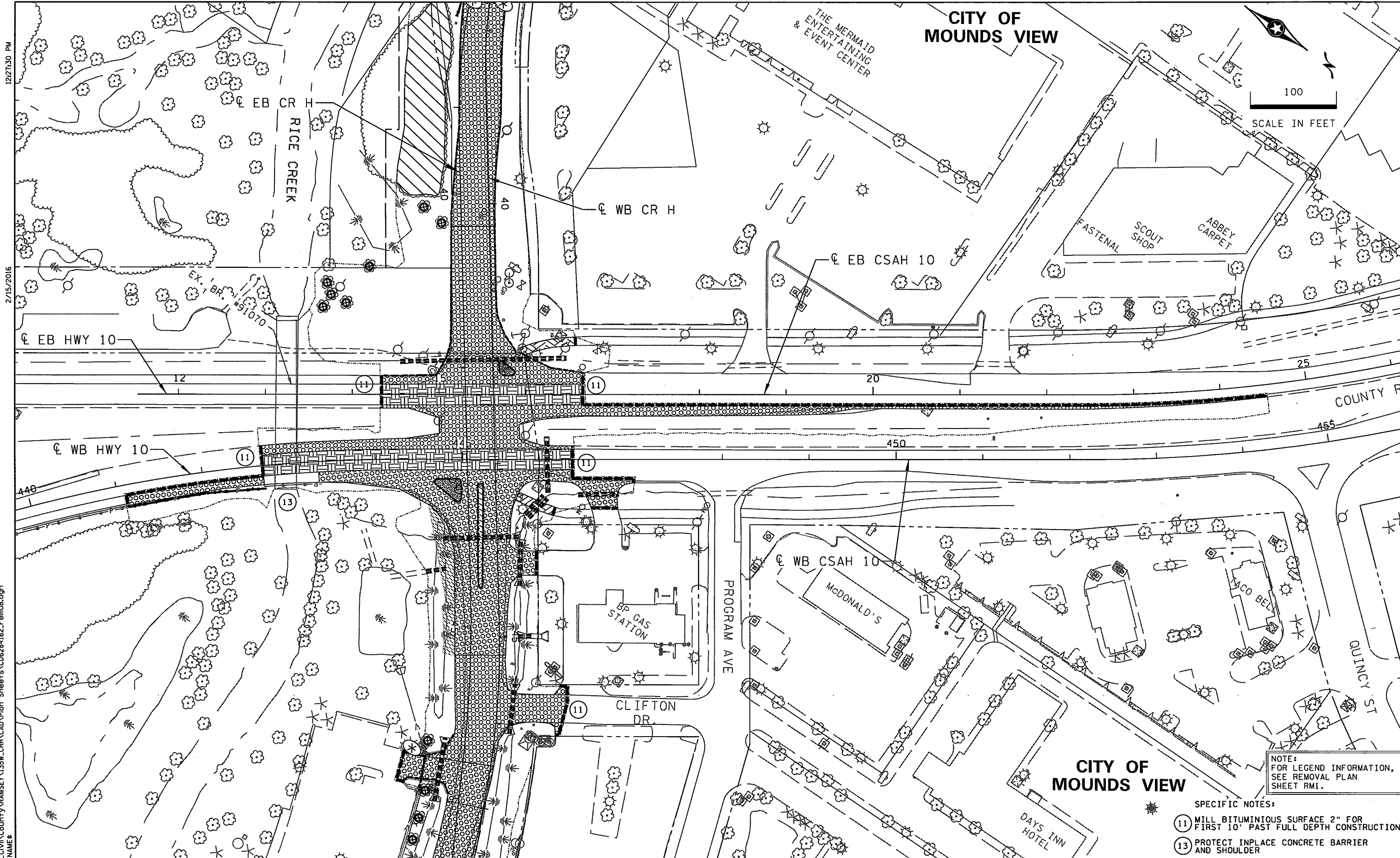
EB CR H STA. 46+50 - 61+21

NOTE:
 FOR LEGEND INFORMATION,
 SEE REMOVAL PLAN
 SHEET RM1.

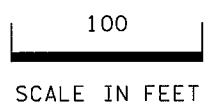
10 REMOVE TWISTED
 END TREATMENT AND
 CONCRETE BASE

FILE NO.
 RAMSE129594
 RM7
 OF RMB

171
 367



CITY OF MOUNDS VIEW



CITY OF MOUNDS VIEW

NOTE:
FOR LEGEND INFORMATION,
SEE REMOVAL PLAN
SHEET RM1.

- SPECIFIC NOTES:
- 11 MILL BITUMINIOUS SURFACE 2" FOR FIRST 10' PAST FULL DEPTH CONSTRUCTION
 - 13 PROTECT INPLACE CONCRETE BARRIER AND SHOULDER

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12/27/30 PM

2/15/2016

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

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Kimley Horn
Certified By: *Nicole Gulick* Lic. No. 45642
L. Licensed Professional Engineer
Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

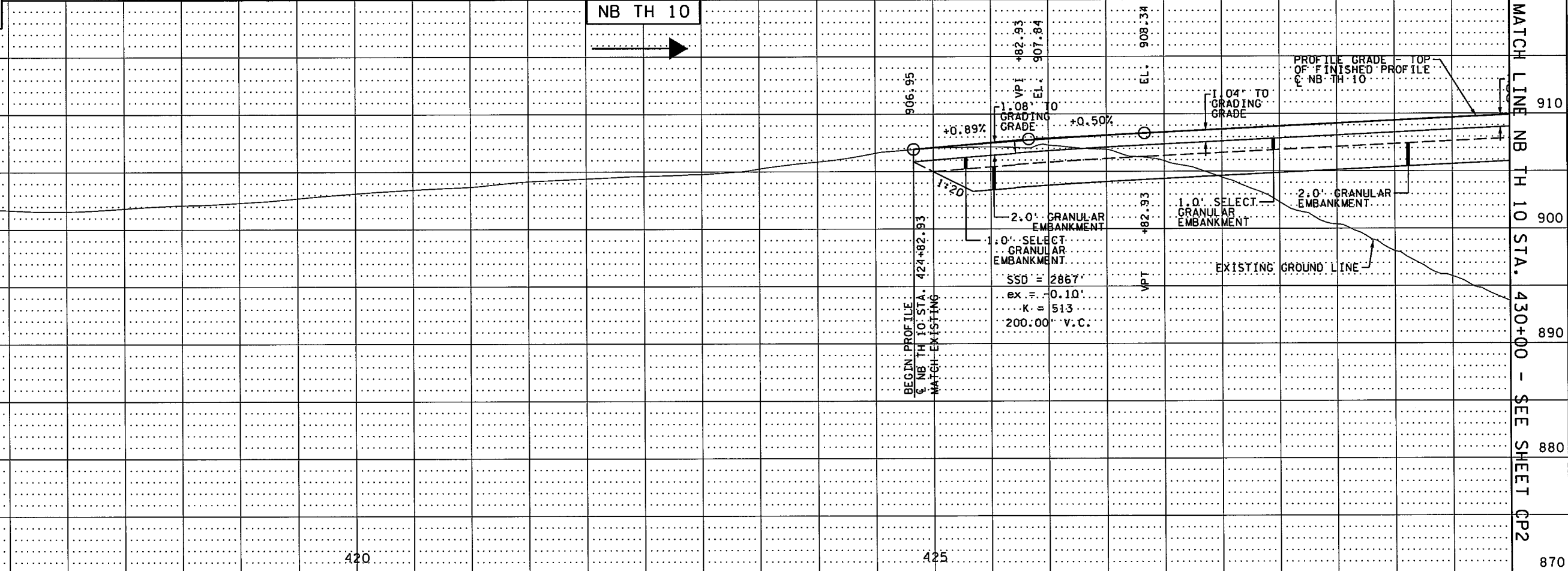
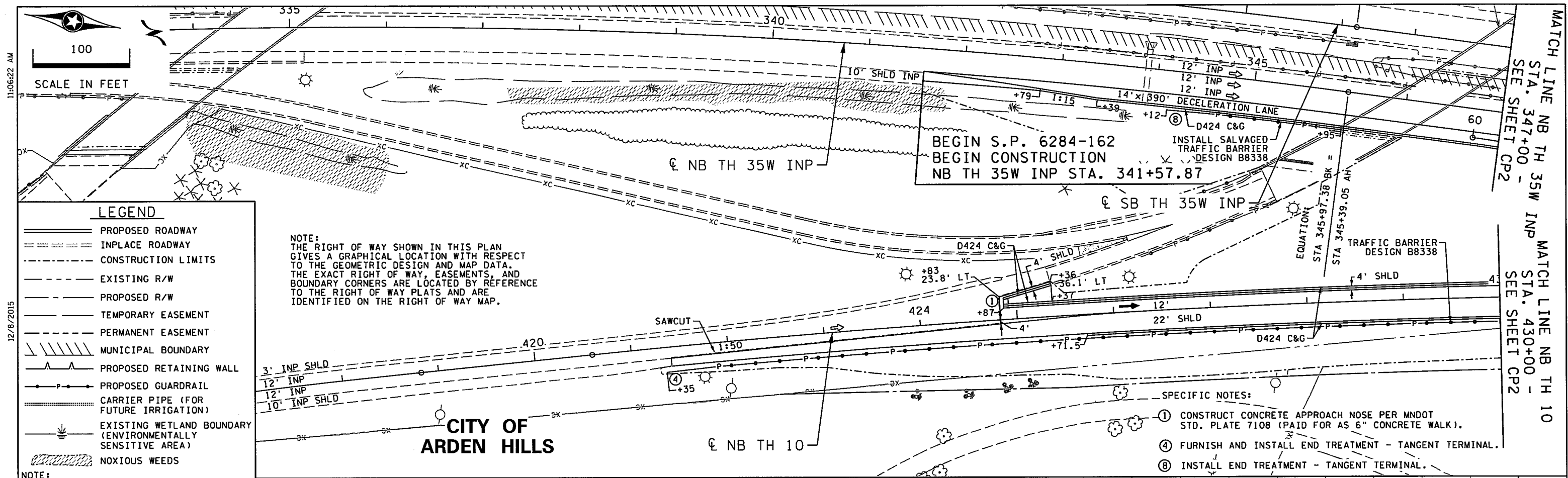
Kimley Horn

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

REMOVAL PLAN

WB CSAH 10 STA. 441+00 - 455+00

FILE NO.	172
RAMSEI29594	
RM8	367
OF RMB	



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NO.	BY	DATE	REVISIONS

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Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDEZKE Date: 12/8/2015

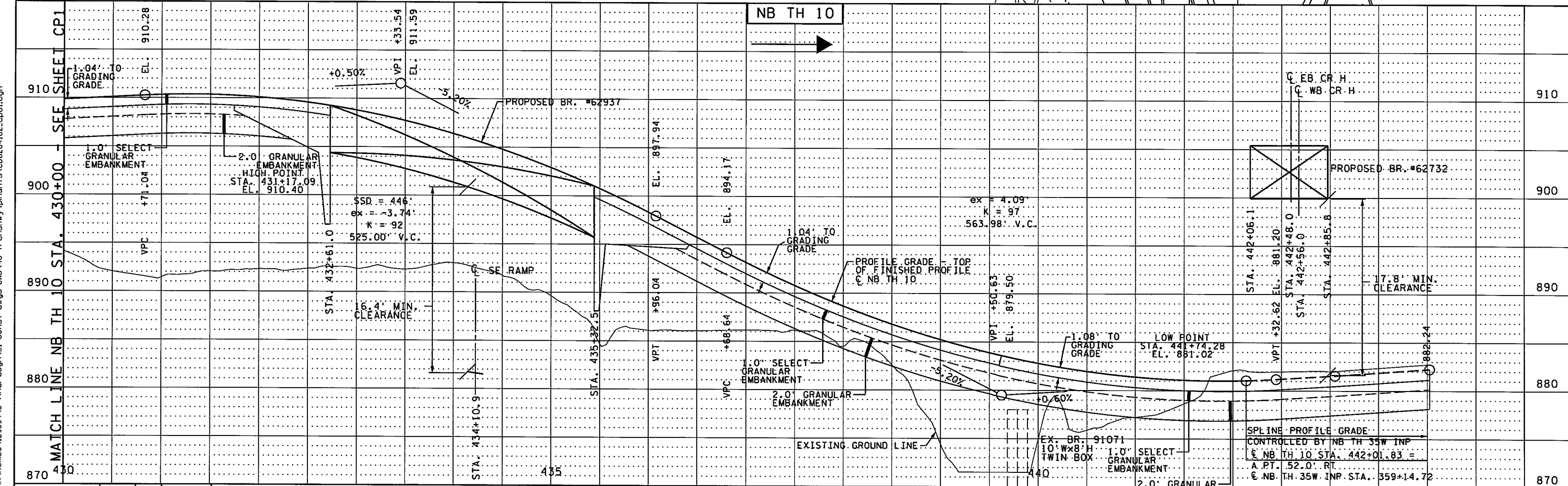
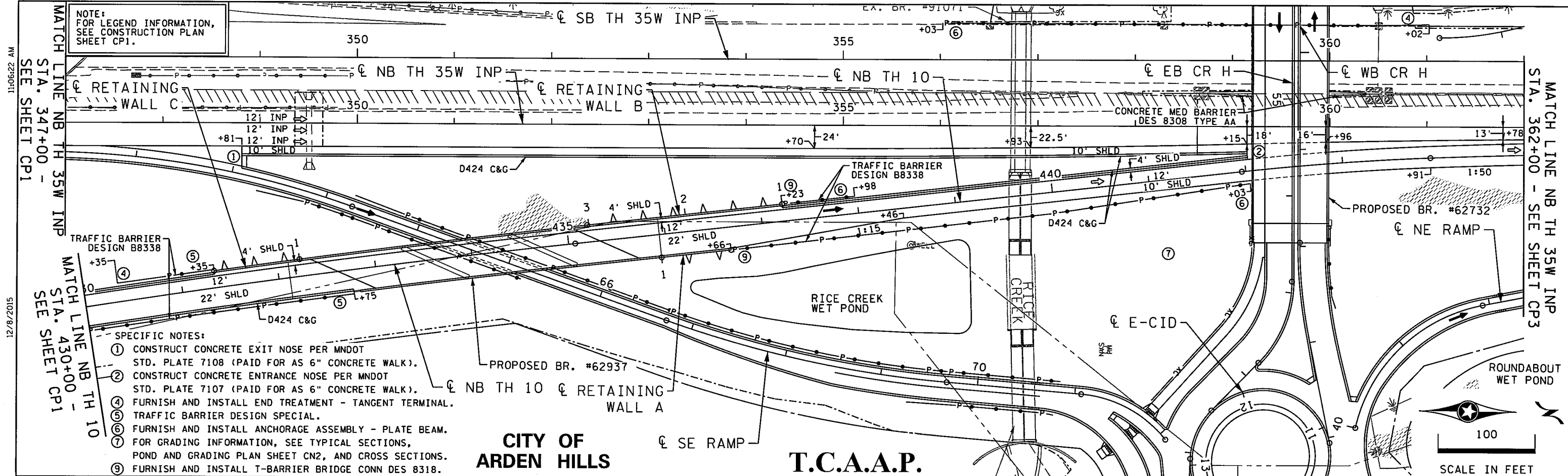


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN AND PROFILE
 NB TH 35W INP STA. 341+57 - 347+00
 NB TH 10 STA. 421+41 - 430+00

FILE NO. RAMSE129594
 CP1 OF CP14

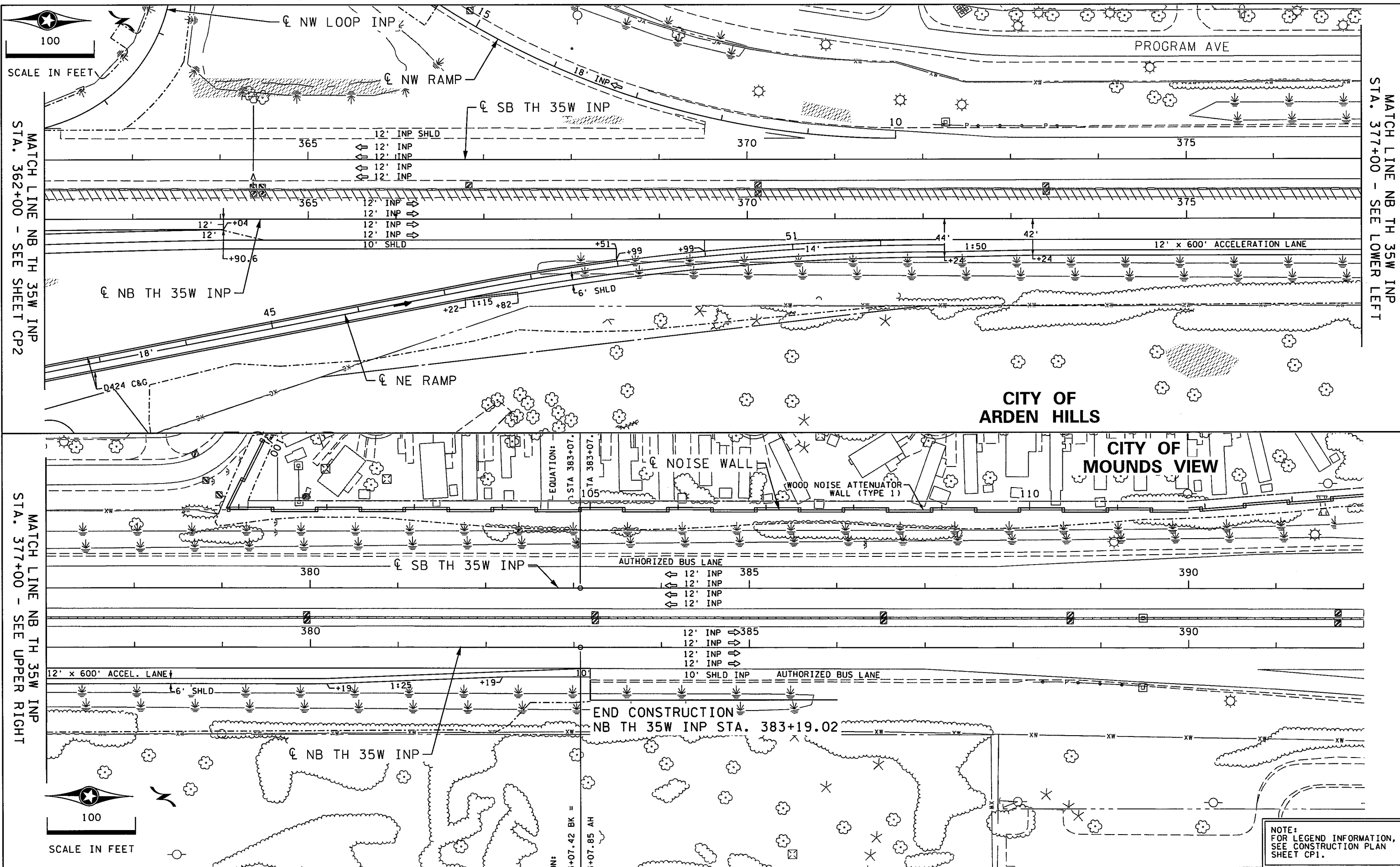
173
 367



DESIGN TEAM			I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Certified By: <i>Heather L. Reetzke</i> Lic. No. 44267 Licensed Professional Engineer Printed Name: HEATHER L. REETZKE Date: 12/8/2015	PHONE: (651)490-2000 3535 VADNAIS CENTER DR. ST. PAUL, MN 55110	RAMSEY COUNTY, MINNESOTA TH 35W / COUNTY ROAD H S.P. NO. 6284-162 (TH35W), S.P. 062-609-006, S.A.P. 062-593-003		CONSTRUCTION PLAN AND PROFILE NB TH 35W INP STA. 347+00 - 362+00 NB TH 10 STA. 430+00 - 442+01		FILE NO. 174 RAMSEI29594
DRAWN BY: CIF	DESIGNER: RDH	CHECKED BY: HLR			CONTROLLED BY NB TH 35W INP NB TH 10 STA. 442+01.83 = A.P.T. 52.0' RT. NB TH 35W INP STA. 359+14.72		CP2 OF CP14		367
NO.	BY	DATE			REVISIONS				

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 12/8/2015 11:06:22 AM

11/06/23 AM
12/8/2015
S:\P\T\Ramsey\129594\5-final-dsgn\51-const-dwgs-CAD\40-Transitwy\planshts\C06284162.cp01.dgn
CP3



DESIGN TEAM				
DRAWN BY:	CF			
DESIGNER:	RDH			
CHECKED BY:	HLR			
	NO.	BY	DATE	REVISIONS

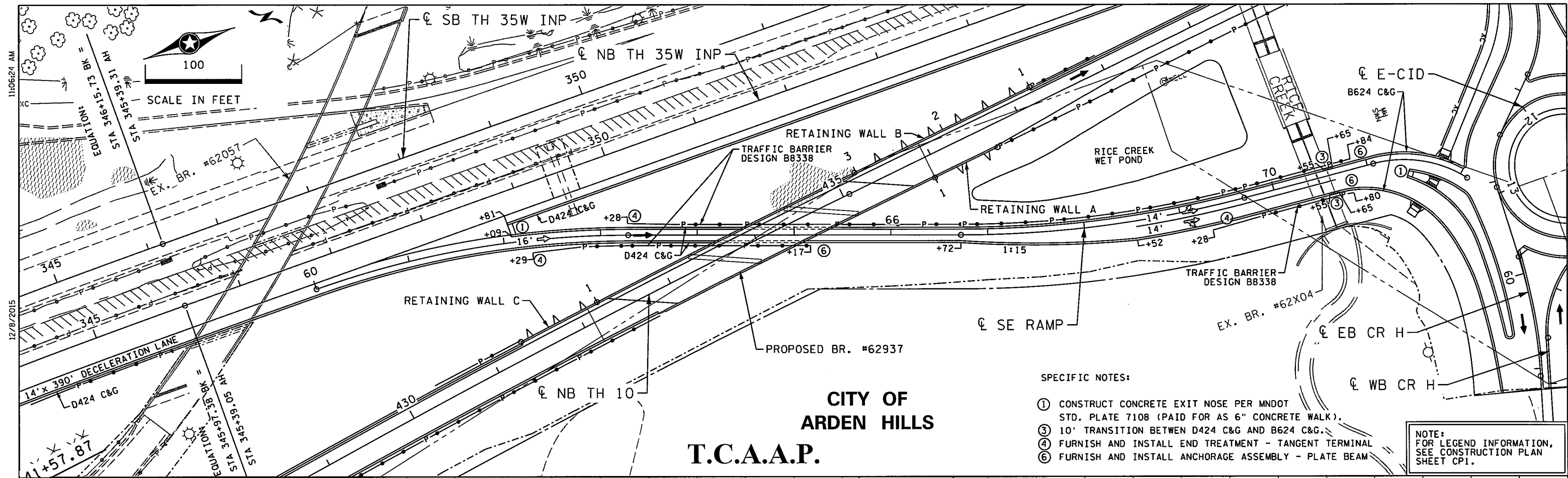
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDEITZKE Date: 12/8/2015

SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN	FILE NO. 175
NB TH 35W INP STA. 362+00 - 392+00	RAMSE129594
	CP3
	OF CP14
	367

NOTE:
 FOR LEGEND INFORMATION,
 SEE CONSTRUCTION PLAN
 SHEET CP1.

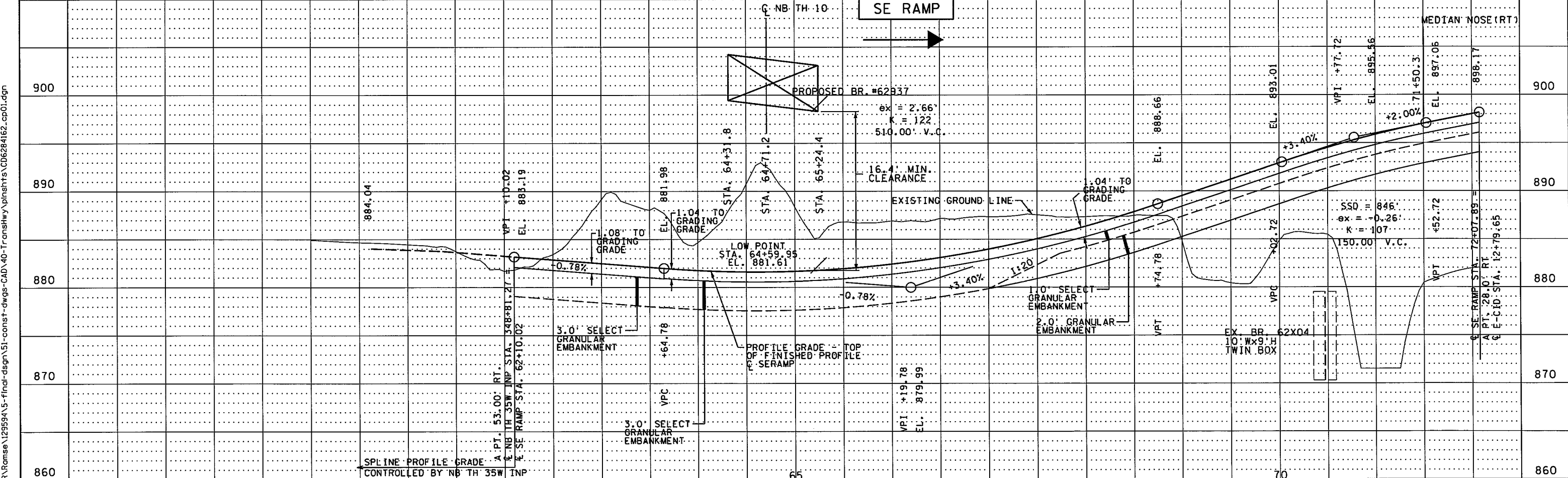


**CITY OF
ARDEN HILLS
T.C.A.A.P.**

SPECIFIC NOTES:

- ① CONSTRUCT CONCRETE EXIT NOSE PER MNDOT STD. PLATE 7108 (PAID FOR AS 6" CONCRETE WALK).
- ③ 10' TRANSITION BETWEEN D424 C&G AND B624 C&G.
- ④ FURNISH AND INSTALL END TREATMENT - TANGENT TERMINAL
- ⑥ FURNISH AND INSTALL ANCHORAGE ASSEMBLY - PLATE BEAM

NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN
SHEET CP1.



DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF	NO.	BY	DATE			
DESIGNER:	RDH						
CHECKED BY:	HLR						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDEZKE Date: 12/8/2015



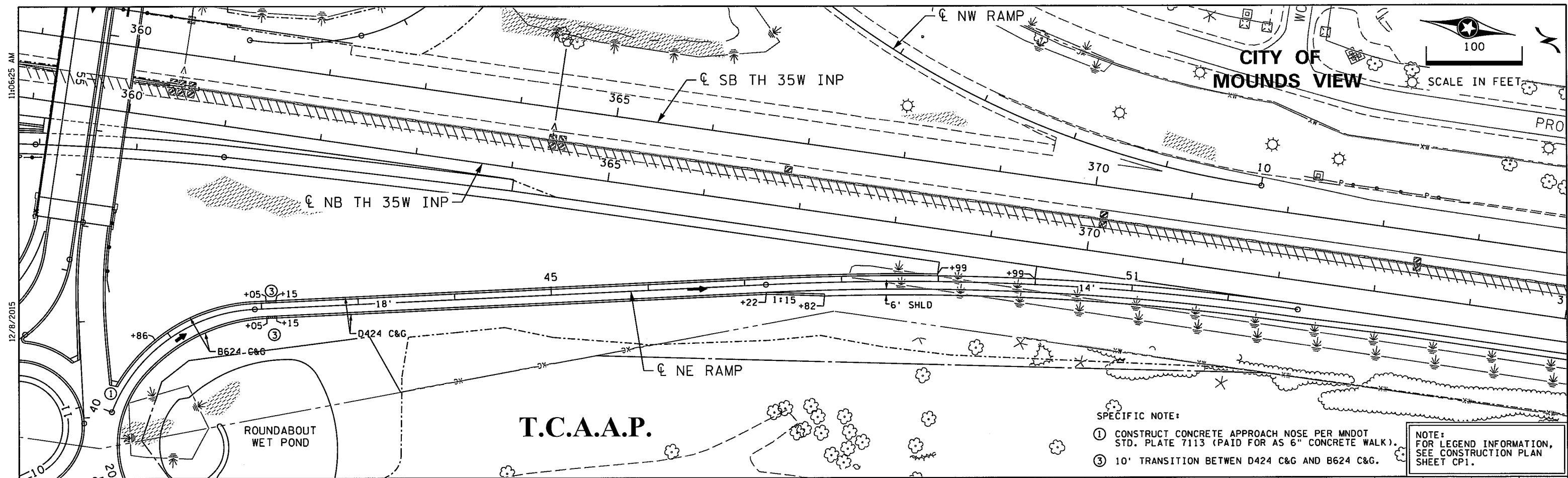
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN AND PROFILE		FILE NO.
SE RAMP		RAMSEY129594
		176
		367

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11/06/24 AM

12/8/2015

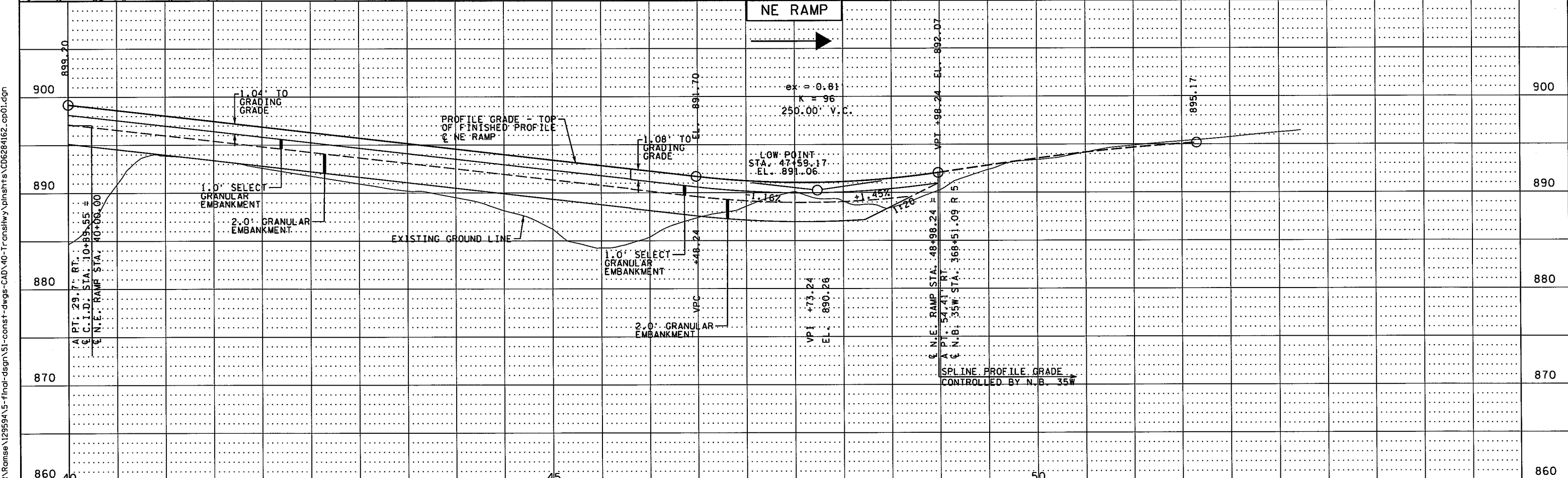


T.C.A.A.P.

SPECIFIC NOTE:

- ① CONSTRUCT CONCRETE APPROACH NOSE PER MNDOT STD. PLATE 7113 (PAID FOR AS 6" CONCRETE WALK).
- ③ 10' TRANSITION BETWEEN D424 C&G AND B624 C&G.

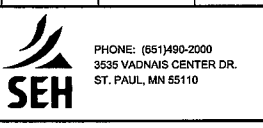
NOTE: FOR LEGEND INFORMATION, SEE CONSTRUCTION PLAN SHEET CP1.



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DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	ROH		
CHECKED BY:	HLR		
NO.	BY	DATE	REVISIONS

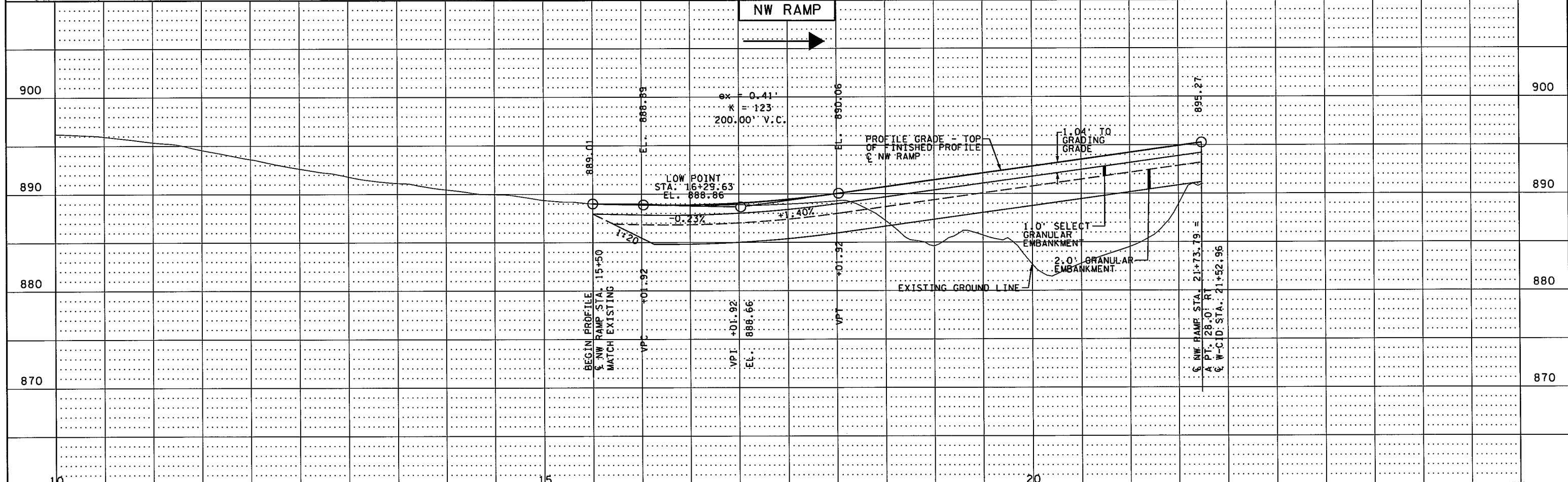
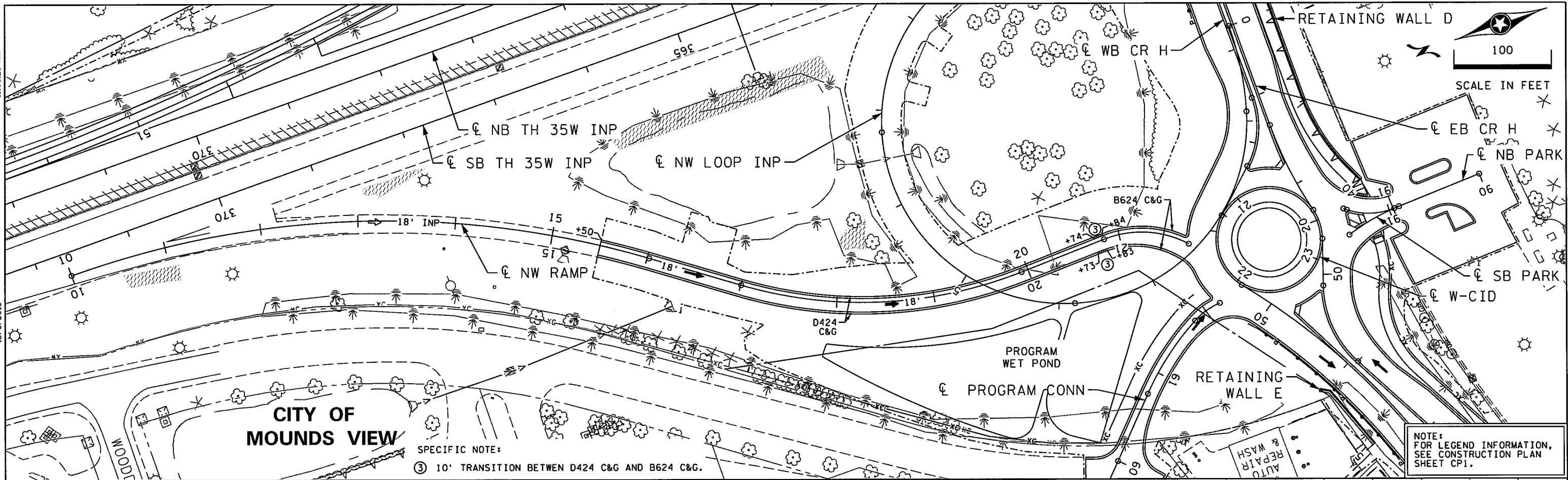
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

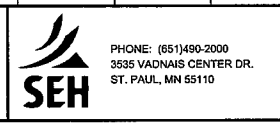
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		CP5 OF CP14	367

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 CP6



DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: RDH				
CHECKED BY: HLR				

I hereby certify that this plan was prepared by me
 or under my direct supervision and that I am a duly
 Licensed Professional Engineer under the laws of
 the State of Minnesota.
 Certified By: *Heather L. Redetzke* Lic. No. 44267
 Licensed Professional Engineer
 Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

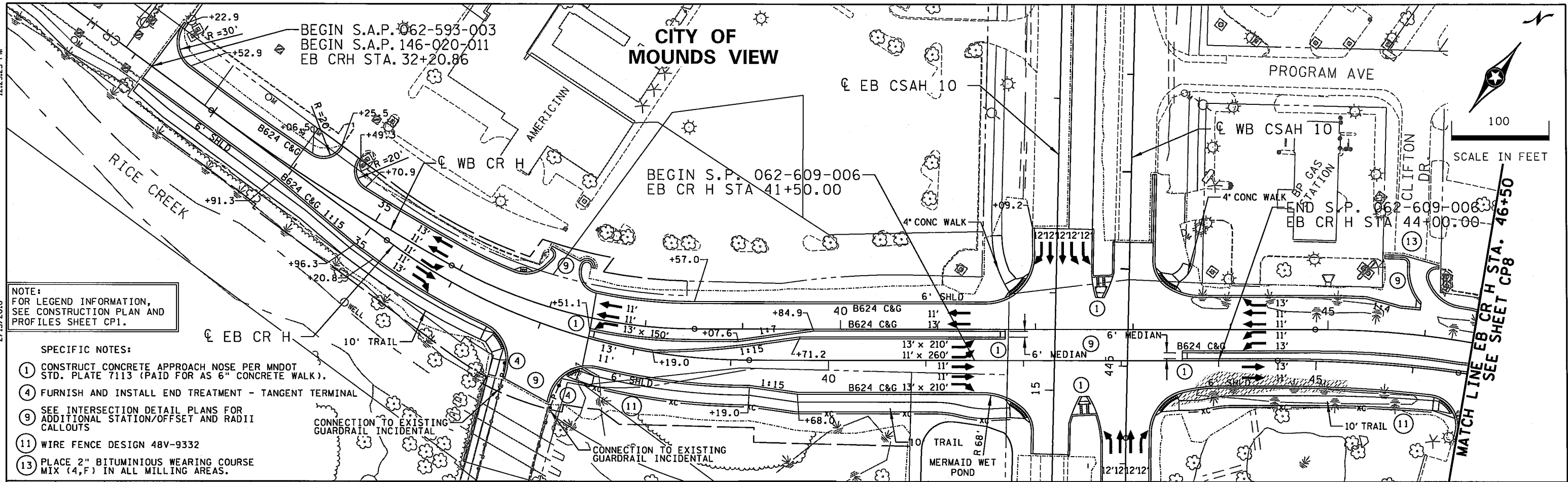
**CONSTRUCTION PLAN
 AND PROFILE**
 NW RAMP

FILE NO. RAMSE129594	178
CP6	367
OF CPM	

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2/15/2016

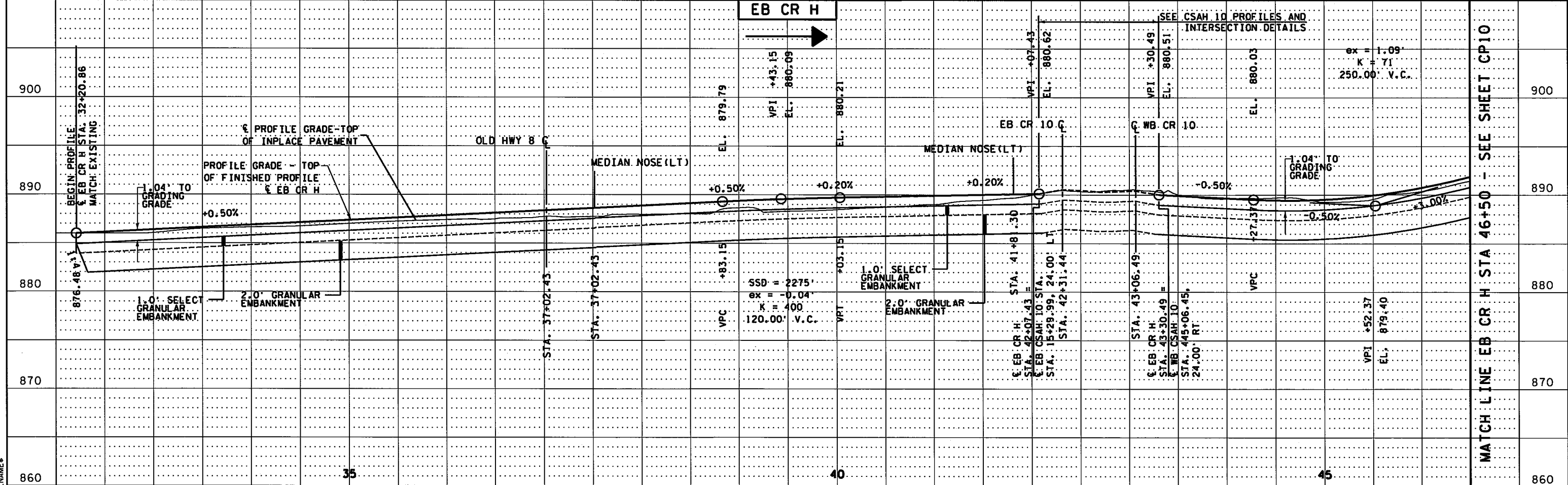
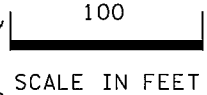
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NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN AND
PROFILES SHEET CP1.

SPECIFIC NOTES:

- ① CONSTRUCT CONCRETE APPROACH NOSE PER MNDOT STD. PLATE 7113 (PAID FOR AS 6" CONCRETE WALK).
- ④ FURNISH AND INSTALL END TREATMENT - TANGENT TERMINAL
- ⑨ SEE INTERSECTION DETAIL PLANS FOR ADDITIONAL STATION/OFFSET AND RADII CALLOUTS
- ⑪ WIRE FENCE DESIGN 48V-9332
- ⑬ PLACE 2" BITUMINOUS WEARING COURSE MIX (4,F) IN ALL MILLING AREAS.



DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45842
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn
 RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN AND PROFILES
 EB CR H STA. 32+20 - 46+50

FILE NO. RAMSEY29594
 CP7 OF CP5

179
 367

MATCH LINE EB CR H STA. 46+50
SEE SHEET CP8

MATCH LINE EB CR H STA 46+50 - SEE SHEET CP10

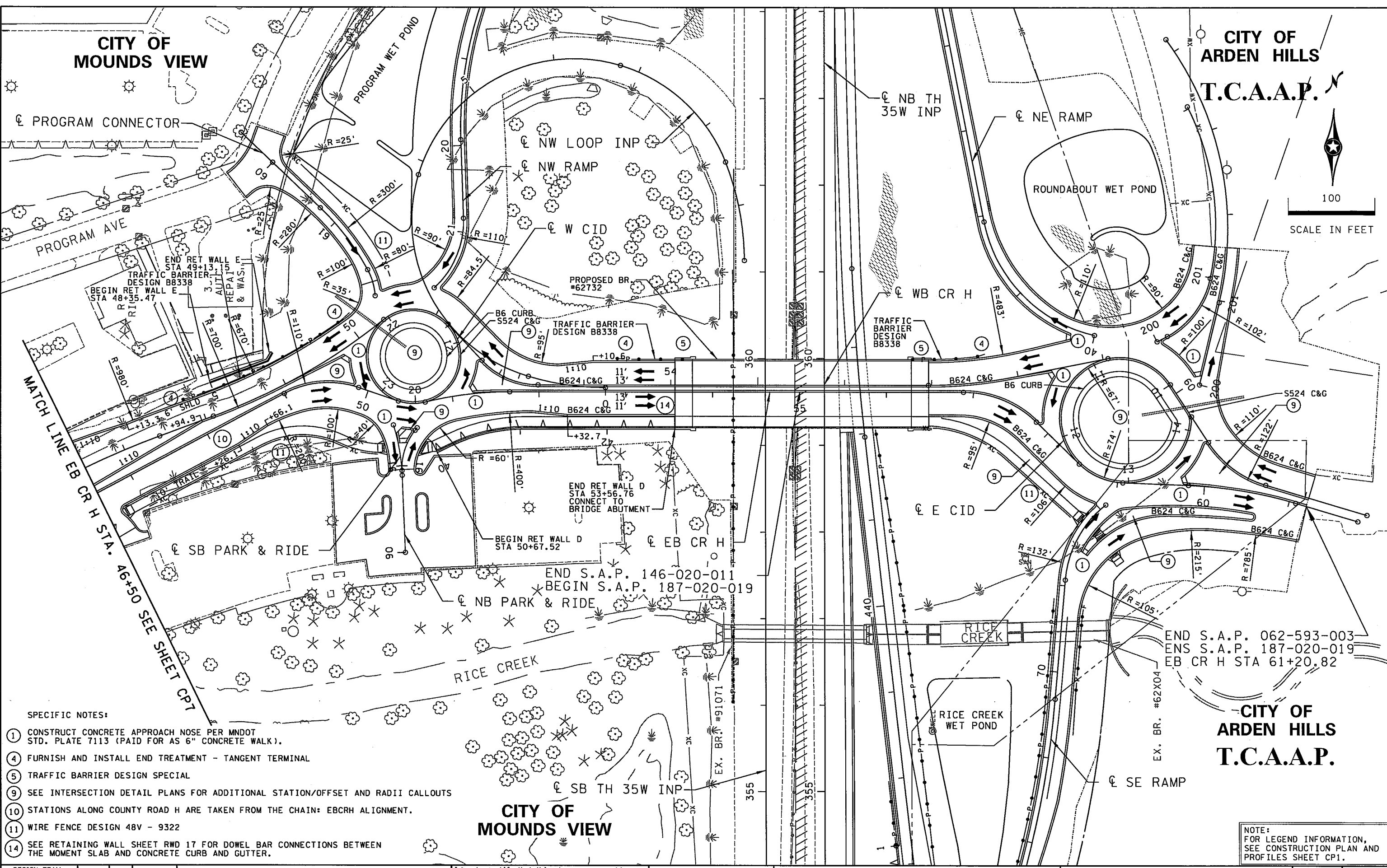
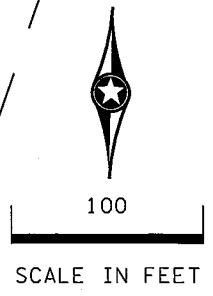
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2/15/2016

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MODELNAME

CITY OF
MOUNDS VIEW

CITY OF
ARDEN HILLS
T.C.A.A.P.



SPECIFIC NOTES:

- ① CONSTRUCT CONCRETE APPROACH NOSE PER MNDOT STD. PLATE 7113 (PAID FOR AS 6" CONCRETE WALK).
- ④ FURNISH AND INSTALL END TREATMENT - TANGENT TERMINAL
- ⑤ TRAFFIC BARRIER DESIGN SPECIAL
- ⑨ SEE INTERSECTION DETAIL PLANS FOR ADDITIONAL STATION/OFFSET AND RADII CALLOUTS
- ⑩ STATIONS ALONG COUNTY ROAD H ARE TAKEN FROM THE CHAIN: EBCRH ALIGNMENT.
- ⑪ WIRE FENCE DESIGN 48V - 9322
- ⑭ SEE RETAINING WALL SHEET RWD 17 FOR DOWEL BAR CONNECTIONS BETWEEN THE MOMENT SLAB AND CONCRETE CURB AND GUTTER.

NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN AND
PROFILES SHEET CP1.

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

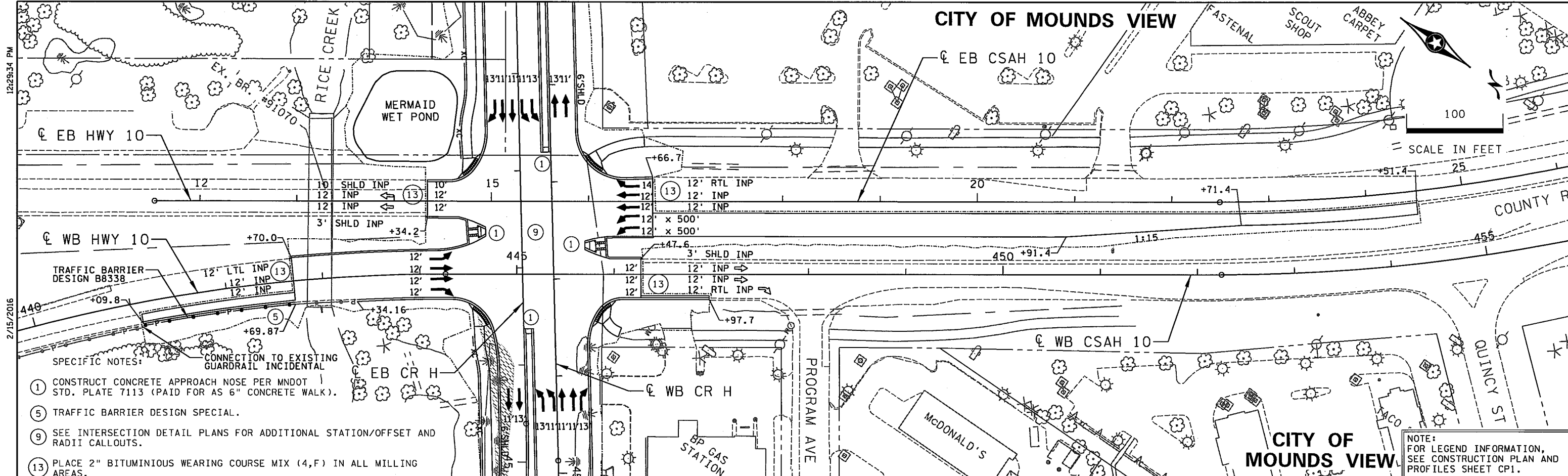
Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

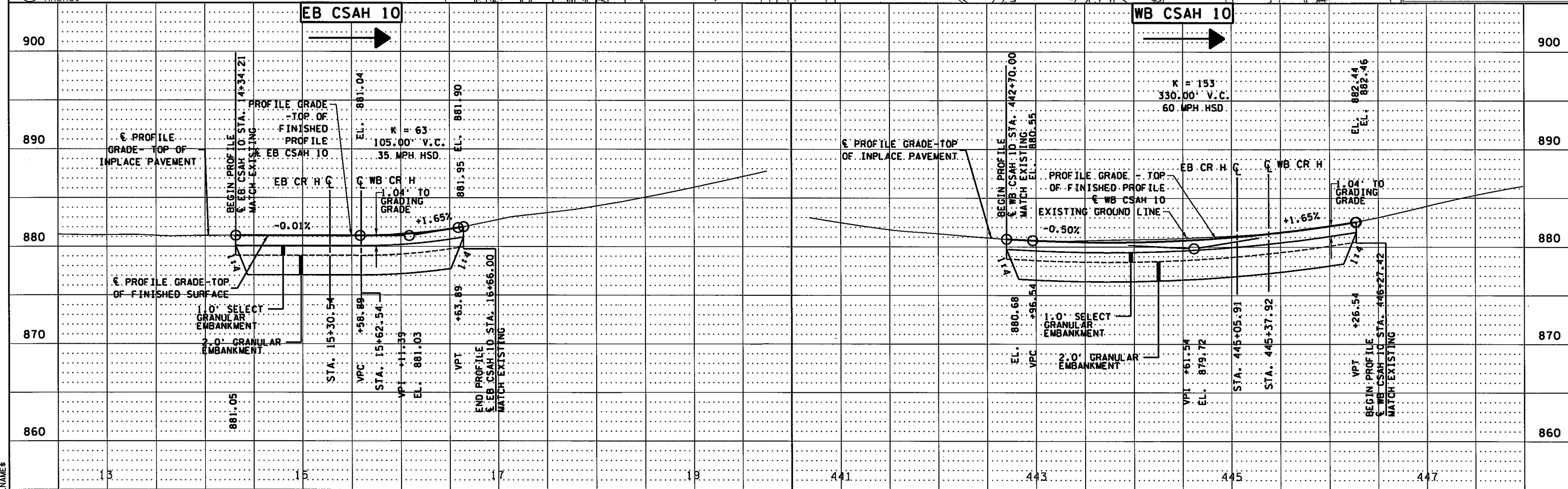
CONSTRUCTION
 PLAN AND PROFILES
 EB CR H STA. 46+50 - 61+21

FILE NO. RAMSEY129594	180
CP8 OF CP15	367



- SPECIFIC NOTES:**
- ① CONSTRUCT CONCRETE APPROACH NOSE PER MNDOT STD. PLATE 7113 (PAID FOR AS 6" CONCRETE WALK).
 - ⑤ TRAFFIC BARRIER DESIGN SPECIAL.
 - ⑨ SEE INTERSECTION DETAIL PLANS FOR ADDITIONAL STATION/OFFSET AND RADII CALLOUTS.
 - ⑬ PLACE 2" BITUMINIOUS WEARING COURSE MIX (4,F) IN ALL MILLING AREAS.
- CONNECTION TO EXISTING GUARDRAIL INCIDENTAL

NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN AND
PROFILES SHEET CP1.



K:\TWC_CIVIL\County\RAMSEY\135W_CRR\CAD\Plan_Sheets\CD6284162_cp09.dgn

NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

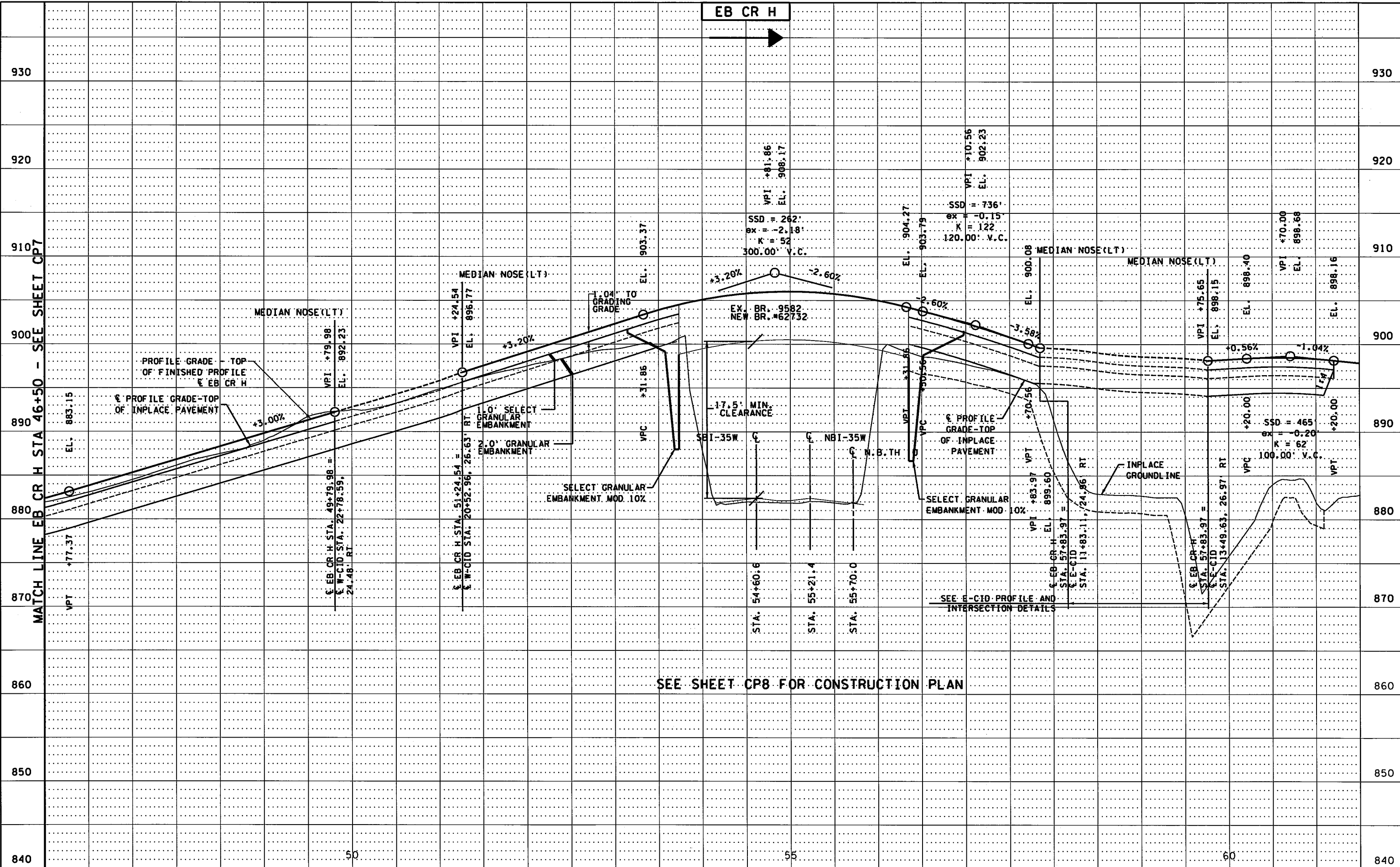
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN AND PROFILES

WB CSAH 10 STA. 441+00 - 455+00

FILE NO. RAMSEY129594
 CP9 OF CP15
 181
 367

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NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

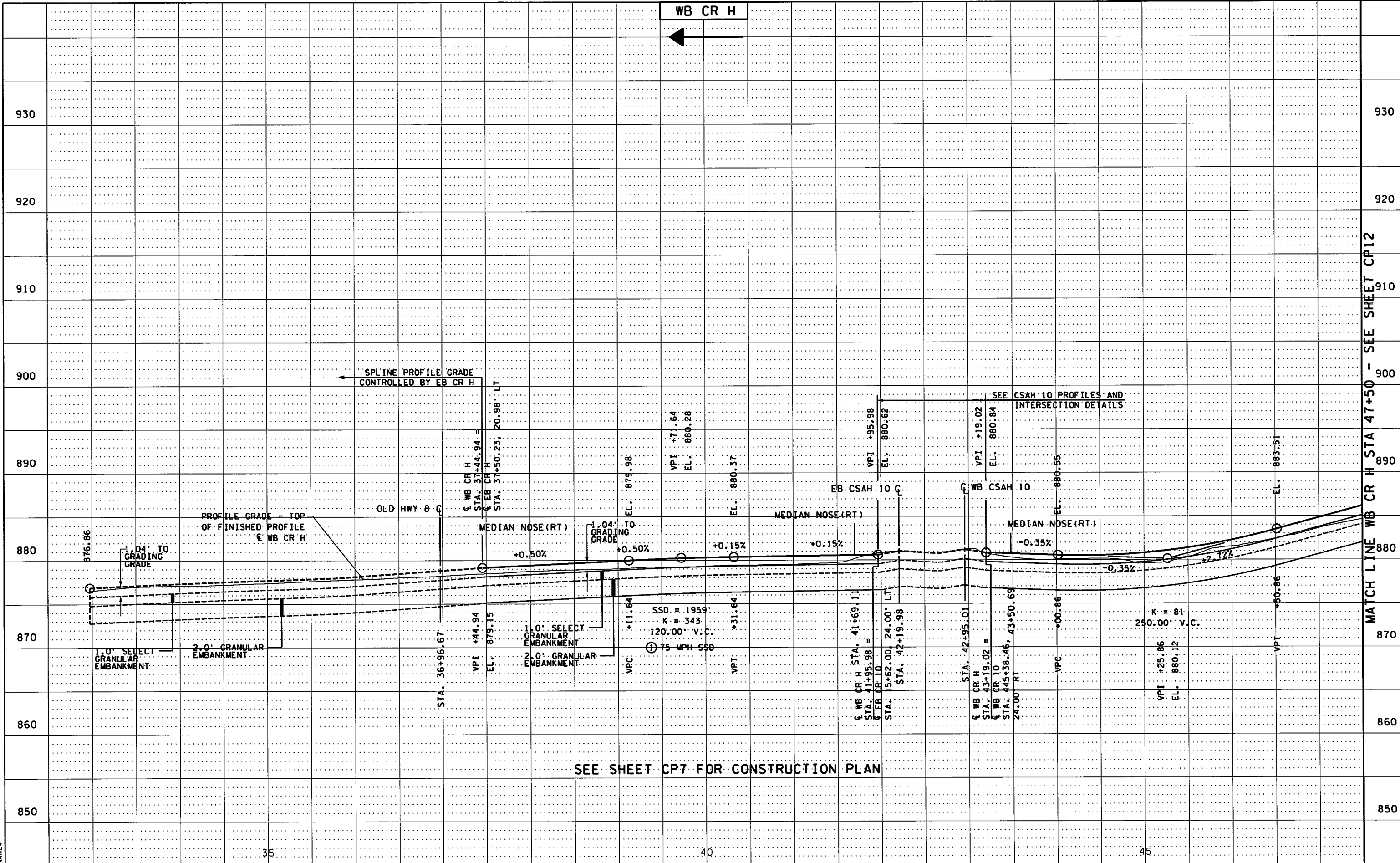
CONSTRUCTION
 PLAN AND PROFILES
 EB CR H STA. 46+50 - 61+50

FILE NO. RAMSEY29594
 CP10 OF CP15
 182
 367

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12/4/2015

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DESIGN TEAM			
DRAWN BY: GDK			
DESIGNER: NMG			
CHECKED BY: WCK			
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer

Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA

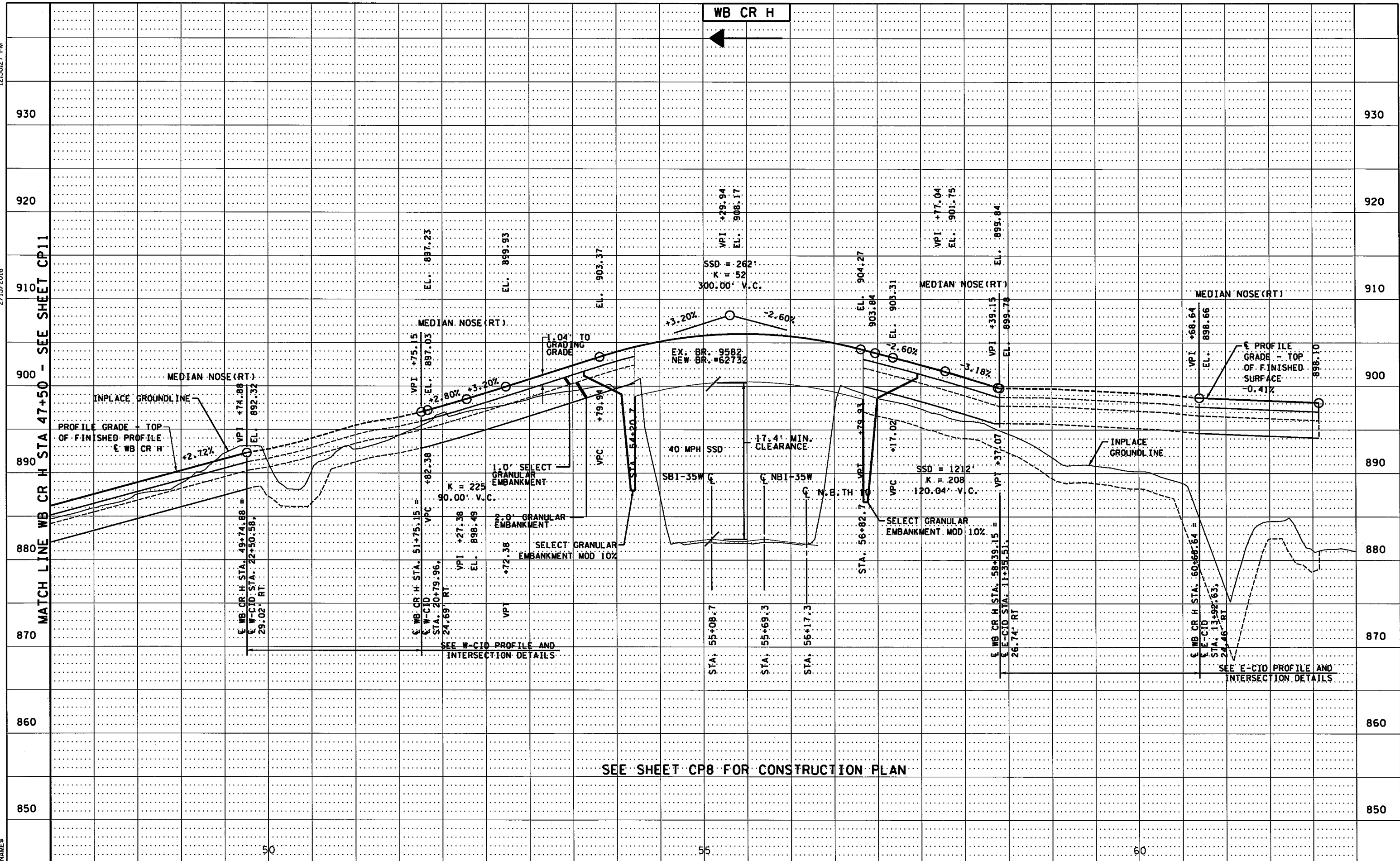
TH 35W / COUNTY ROAD H

S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION
 PLAN AND PROFILES

WB CR H STA. 33+00 - 47+50

FILE NO. RAMSEY129594	183
CP11 OF CP15	367



SEE SHEET CP8 FOR CONSTRUCTION PLAN

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

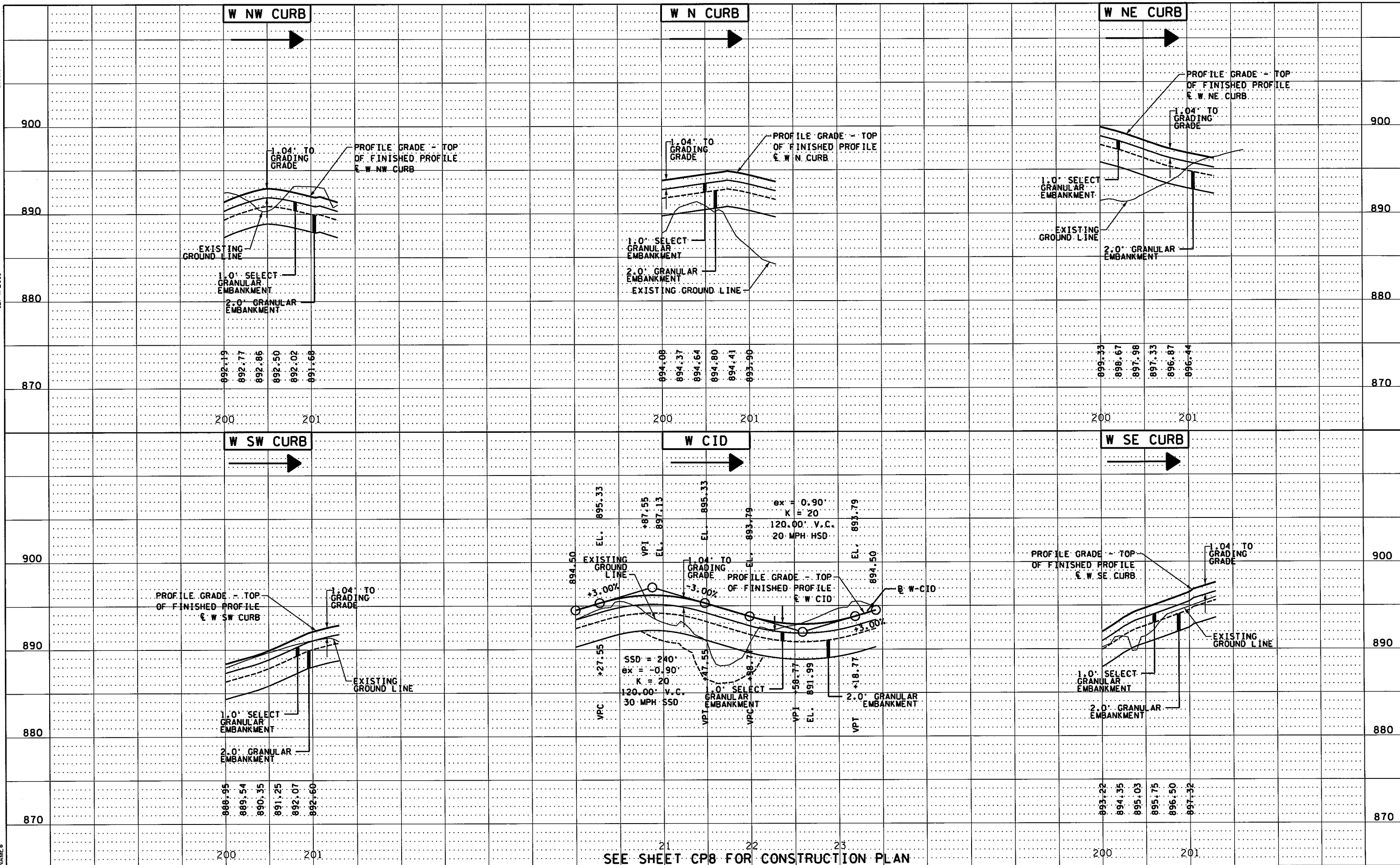
CONSTRUCTION
 PLAN AND PROFILES
 WB CR H STA. 47+50 - 62+50

FILE NO. RAMSEI29594	184
CP12 OF CP15	367

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SEE SHEET CP8 FOR CONSTRUCTION PLAN

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

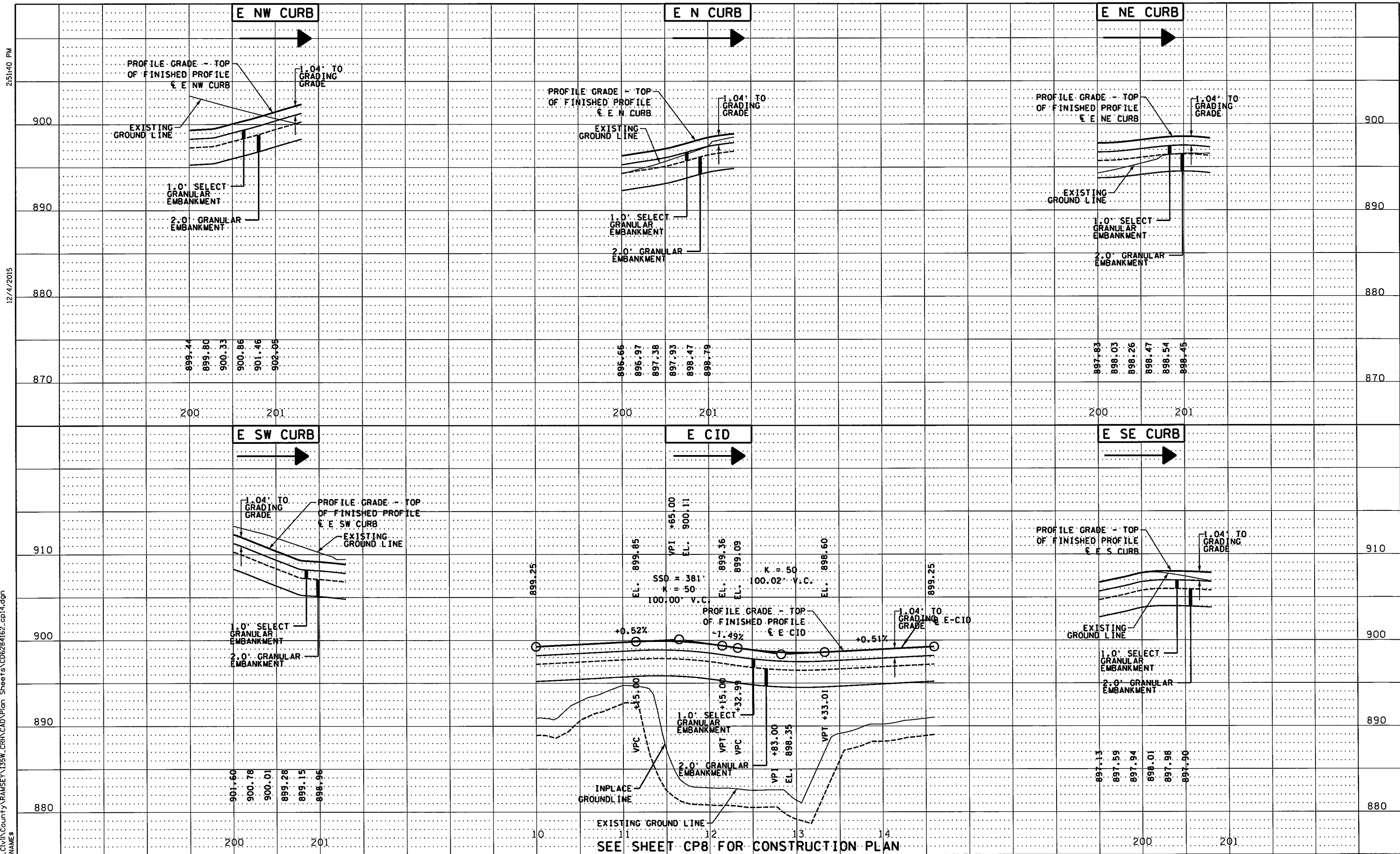
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULLICK, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN AND PROFILES		FILE NO. RAMSE129594	185
EAST ROUNDABOUT AND WEST ROUNDABOUT		CP13	367
		OF CP15	



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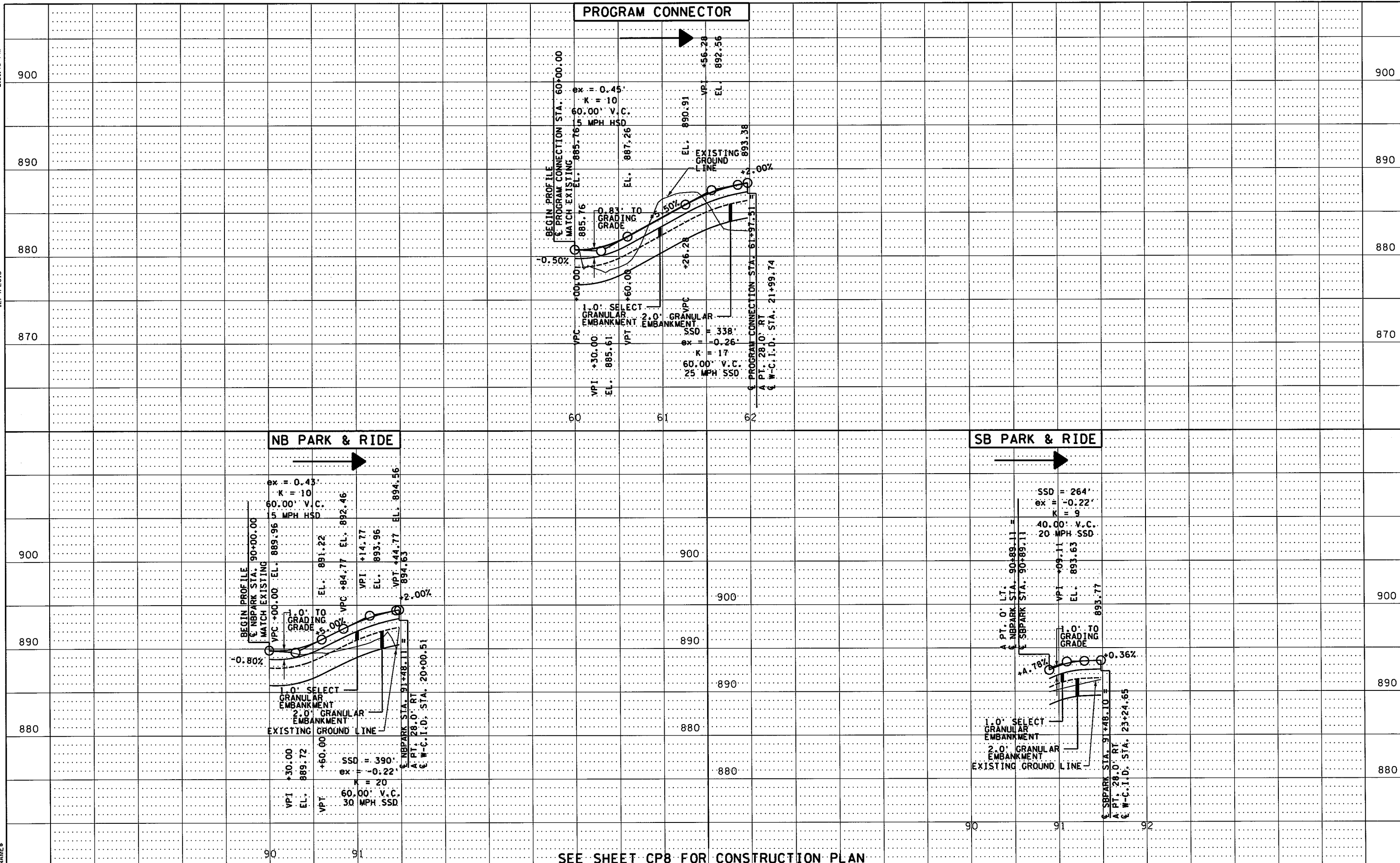
DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

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Certified By: *Nicole Gulick* Lic. No. 45642
Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN AND PROFILES		FILE NO. RAMSE129594	186
EAST ROUNDABOUT AND WEST ROUNDABOUT		CP14 OF CP15	367

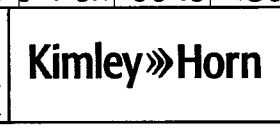


SEE SHEET CP8 FOR CONSTRUCTION PLAN

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gullick* Lic. No. 45642
 Printed Name: NICOLE GULLICK, P.E. Date: 12/4/2015



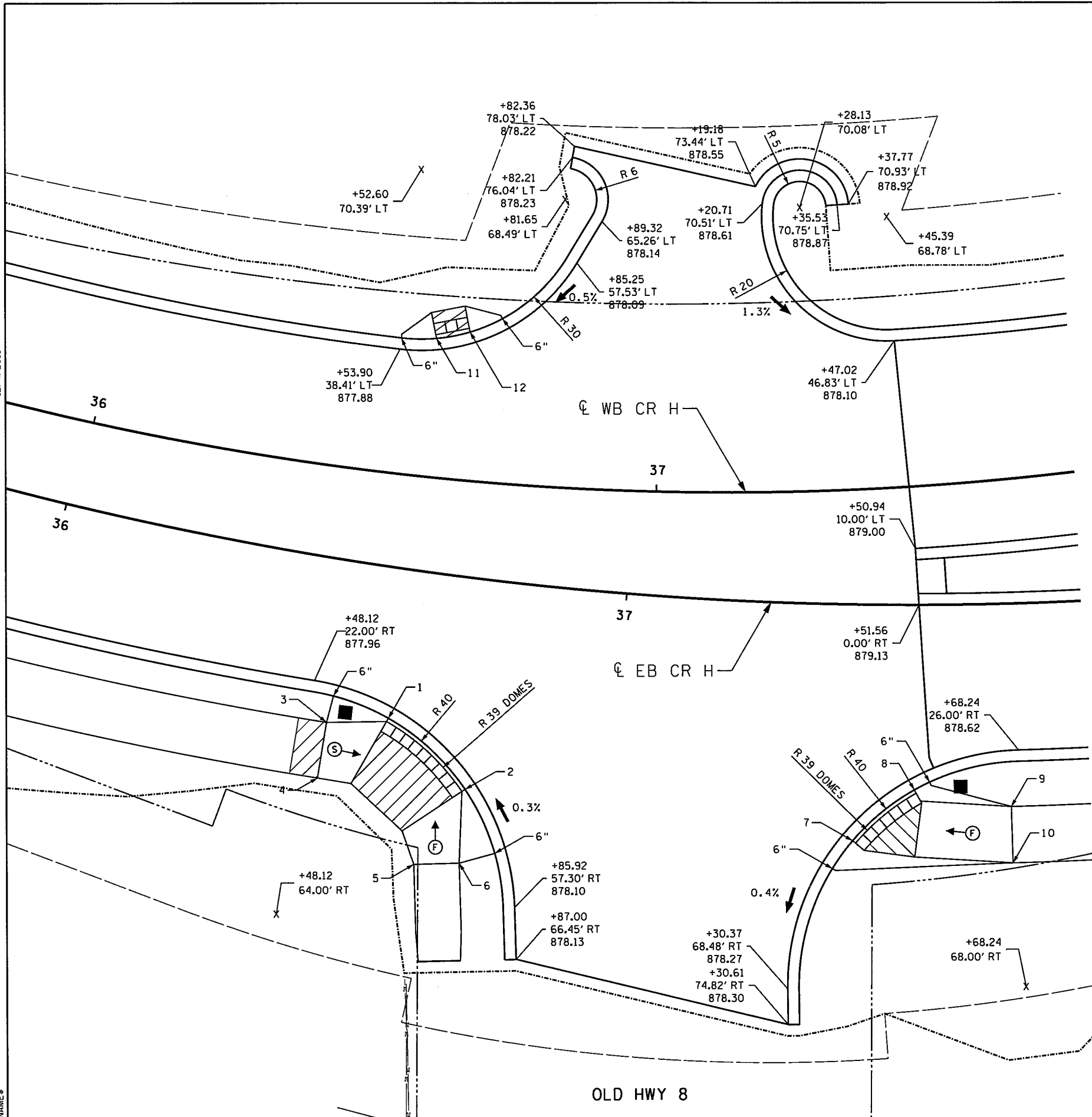
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONSTRUCTION PLAN AND PROFILES		FILE NO. RAMSE129594	187
PROGRAM CONNECTOR, NB/SB PARK & RIDE		CP15 OF CP15	367

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12/4/2015

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LEGEND

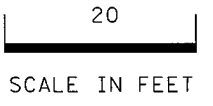
- PROPOSED SIGNAL POLE
- PEDESTRIAN PUSH BUTTON STATION
- PEDESTRIAN PUSH BUTTON
- CONTROL POINTS AT GUTTER FLOW LINE
- TRUNCATED DOMES (SEE STANDARD PLATE 7038)
- CONSTRUCT CONCRETE CURB & GUTTER
- BITUMINOUS TREATMENT-SEE TABULATIONS
- X" CURB HEIGHT
- LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- DRAINAGE FLOW ARROW

NOTE:

1. ALL STATION AND OFFSETS ARE WITH RESPECT TO & EB CR H UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
3. ALL INITIAL LANDINGS SHALL BE FORMED AND PLACED SEPARATELY IN AN INDEPENDENT CONCRETE POUR.
4. SEE SHEET TB4 FOR TABULATIONS.
5. THE OUTSIDE EDGE OF CROSSWALK MARKINGS SHALL LINE UP WITH THE OUTSIDE EDGE OF TRUNCATED DOMES.
6. THE CONTRACTOR SHALL VERIFY ALL GRADES WITH THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE WALK.

POINTS

POINT NO.	DESCRIPTION	STATION	OFFSET	ELEV
1	CURB - H=0"	36+61.48	26.65' RT	877.88
2	CURB - H=0"	36+75.76	37.40' RT	877.94
3	RAMP	36+51.26	29.00' RT	878.50
4	RAMP	36+51.21	39.00' RT	878.65
5	RAMP	36+68.92	51.74' RT	878.53
6	RAMP	36+76.23	50.54' RT	878.45
7	CURB - H=0"	37+40.36	41.91' RT	878.36
8	CURB - H=0"	37+50.61	32.82' RT	878.42
9	RAMP	37+66.75	36.00' RT	879.33
10	RAMP	37+66.75	46.00' RT	879.48
11	CURB - H=0"	36+60.40	41.24' LT	877.92
12	CURB - H=0"	36+66+49	43.17' LT	877.96



OLD HWY 8

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: MFCH				
DESIGNER: NMG				
CHECKED BY: WCK				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

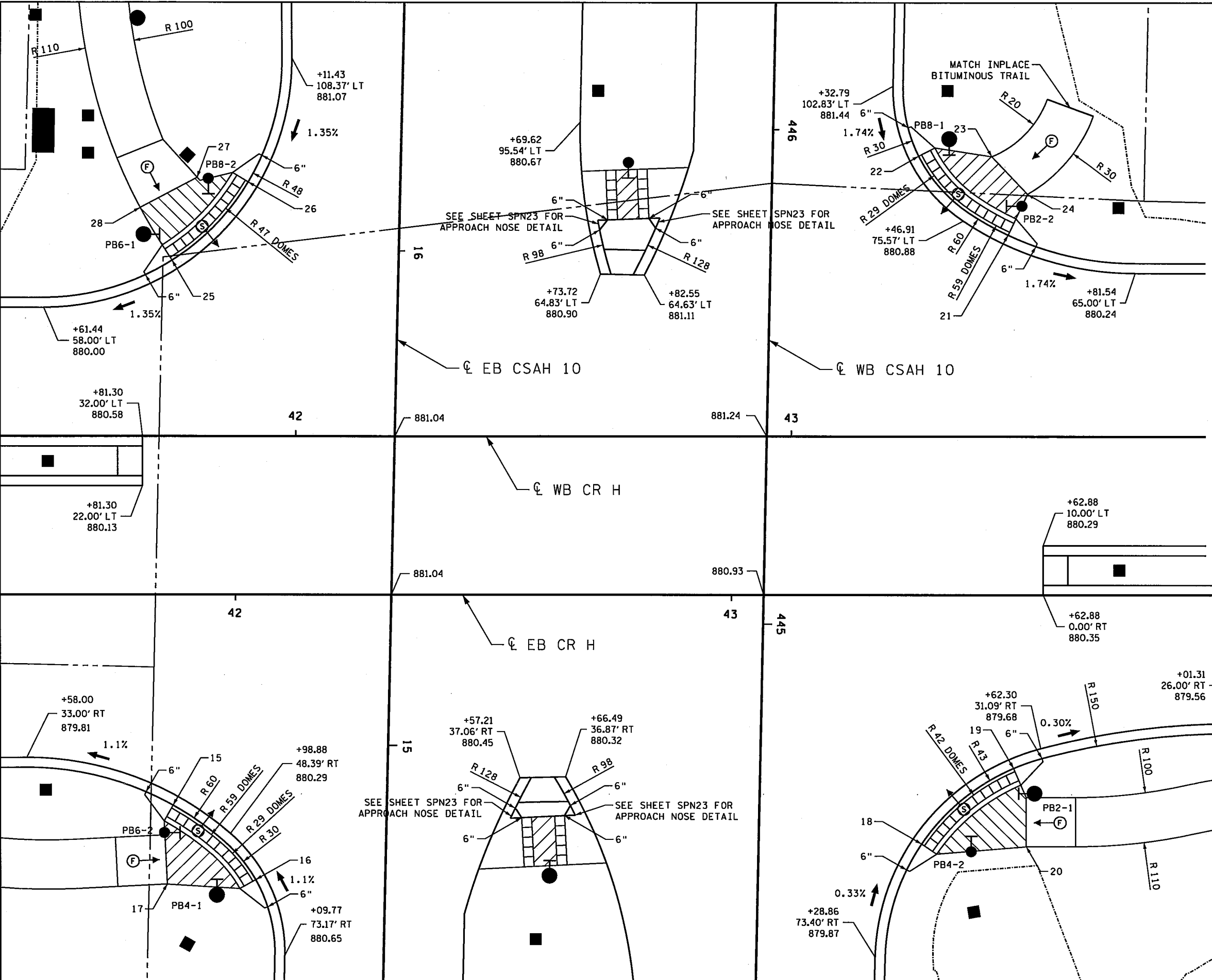
INTERSECTION DETAIL PLAN
 CR H AND OLD HWY 8

FILE NO. RAMSEY129594
 IN1 OF IN8
 188
 367

12/3/2016 PM

2/15/2016

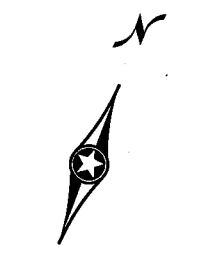
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LEGEND

- PROPOSED SIGNAL POLE
- PEDESTRIAN PUSH BUTTON STATION
- PEDESTRIAN PUSH BUTTON
- CONTROL POINTS AT GUTTER FLOW LINE
- TRUNCATED DOMES (SEE STANDARD PLATE 7038)
- CONSTRUCT CONCRETE CURB & GUTTER
- BITUMINOUS TREATMENT-SEE TABULATIONS
- "X" CURB HEIGHT
- LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- DRAINAGE FLOW ARROW

- NOTE:**
1. ALL STATION AND OFFSETS ARE WITH RESPECT TO ϕ EB CR H UNLESS OTHERWISE NOTED.
 2. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
 3. ALL INITIAL LANDINGS AND LANDINGS ADJACENT TO PUSH BUTTONS SHALL BE FORMED AND PLACED SEPARATELY IN AN INDEPENDENT CONCRETE POUR.
 4. SEE SHEET TB4 FOR TABULATIONS.
 5. SEE SHEET IN3 FOR INTERSECTION STAKING POINTS.
 6. LOCATE ALL NEW HANDHOLES OUTSIDE OF THE PAR.
 7. THE OUTSIDE EDGE OF CROSSWALK MARKINGS SHALL LINE UP WITH THE OUTSIDE EDGE OF TRUNCATED DOMES.
 8. THE CONTRACTOR SHALL VERIFY ALL GRADES WITH THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE WALK.



20
SCALE IN FEET

DESIGN TEAM			
DRAWN BY:	MFCH		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

INTERSECTION DETAIL PLAN
 CR H AND CSAH 10

FILE NO.	189
RAMSEI29594	
IN2	367
OF IN8	

12:32:21 PM

2/15/2016

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\$MODELNAME\$

POINTS				
POINT NO.	DESCRIPTION	STATION	OFFSET	ELEV
15	CURB - H=0"	41+87.38	42.69' RT	880.04
16	CURB - H=0"	42+03.97	57.81' RT	880.34
17	RAMP	41+86.22	58.72' RT	880.54
18	CURB - H=0"	43+38.28	50.43' RT	879.66
19	CURB - H=0"	43+56.82	35.10' RT	879.58
20	RAMP	43+59.35	50.97' RT	880.02
21	CURB - H=0"	43+55.94	72.73' LT	880.60
22	CURB - H=0"	43+37.93	88.74' LT	881.05
23	RAMP	43+52.69	88.62' LT	881.10
24	RAMP	43+59.85	81.02' LT	880.95
25	CURB - H=0"	42+87.23	67.25' LT	880.27
26	CURB - H=0"	43+02.64	83.37' LT	880.58
27	RAMP	41+92.30	84.30' LT	880.84
28	RAMP	41+80.83	78.19' LT	880.69

SIGNAL CONTROL POINTS			DISTANCE TO FRONT OF LANDING (FT)	DISTANCE TO BACK OF LANDING (FT)
SIGNAL NO.	X	Y		
PB6-1	ON POLE 1	ON POLE 1	2	5
PB8-2	549160.6903	210693.1407	3	4
PB8-1	ON POLE 2	ON POLE 2	3	8
PB2-2	549295.9257	210786.3373	2	6
PB2-1	ON POLE 3	ON POLE 3	2	10
PB4-2	549365.1964	210675.1240	6	11
PB4-1	ON POLE 5	ON POLE 5	3	9
PB6-2	549231.6265	210582.2146	2	10
POLE 1	549156.9484	210676.2831		
POLE 2	549276.1238	210788.5645		
POLE 3	549368.4207	210692.2069		
POLE 4	549296.6857	210616.6005		
POLE 5	549248.2100	210577.5027		

DESIGN TEAM				
NO.	BY	DATE	REVISIONS	

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 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016

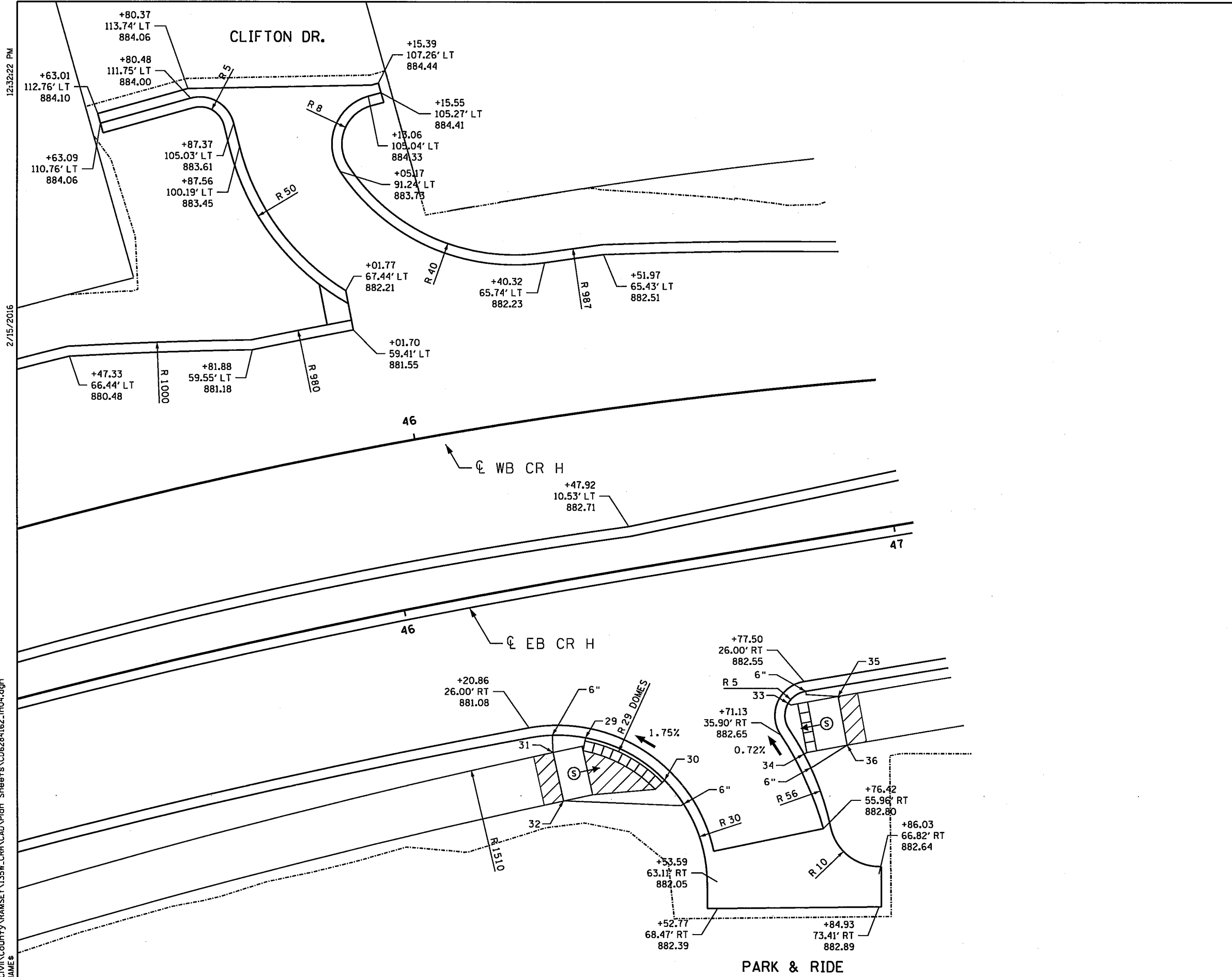


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

INTERSECTION DETAIL PLAN
 CR H AND CSAH 10
 CONTROL STAKING

FILE NO.
 RAMSE129594
 IN3
 OF IN6

190
 367

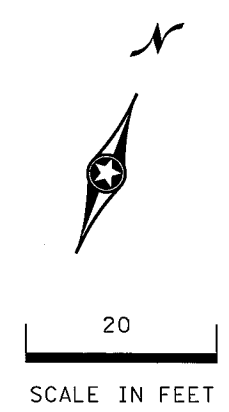


LEGEND

- PROPOSED SIGNAL POLE
- PEDESTRIAN PUSH BUTTON STATION
- PEDESTRIAN PUSH BUTTON
- CONTROL POINTS AT GUTTER FLOW LINE
- TRUNCATED DOMES (SEE STANDARD PLATE 7038)
- CONSTRUCT CONCRETE CURB & GUTTER
- BITUMINOUS TREATMENT-SEE TABULATIONS
- C" CURB HEIGHT
- LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- DRAINAGE FLOW ARROW

- NOTE:**
1. ALL STATION AND OFFSETS ARE WITH RESPECT TO ϕ EB CR H UNLESS OTHERWISE NOTED.
 2. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
 3. ALL INITIAL LANDINGS SHALL BE FORMED AND PLACED SEPARATELY IN AN INDEPENDENT CONCRETE POUR.
 4. SEE SHEET TB4 FOR TABULATIONS.
 5. THE OUTSIDE EDGE OF CROSSWALK MARKINGS SHALL LINE UP WITH THE OUTSIDE EDGE OF TRUNCATED DOMES.
 6. THE CONTRACTOR SHALL VERIFY ALL GRADES WITH THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE WALK.

POINTS				
POINT NO.	DESCRIPTION	STATION	OFFSET	ELEV
29	CURB - H=0"	46+31.94	68.47' RT	881.29
30	CURB - H=0"	46+46.58	41.12' RT	881.57
31	RAMP	46+24.81	31.75' RT	881.95
32	RAMP	46+25.13	41.75' RT	882.10
33	CURB - H=0"	46+73.63	29.83' RT	882.48
34	CURB - H=0"	46+75.06	40.44' RT	882.57
35	RAMP	46+83.78	30.11' RT	883.22
36	RAMP	46+83.96	40.11' RT	883.37



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MODEL\NAMES

DESIGN TEAM			
DRAWN BY:	MFCH		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Ltc. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

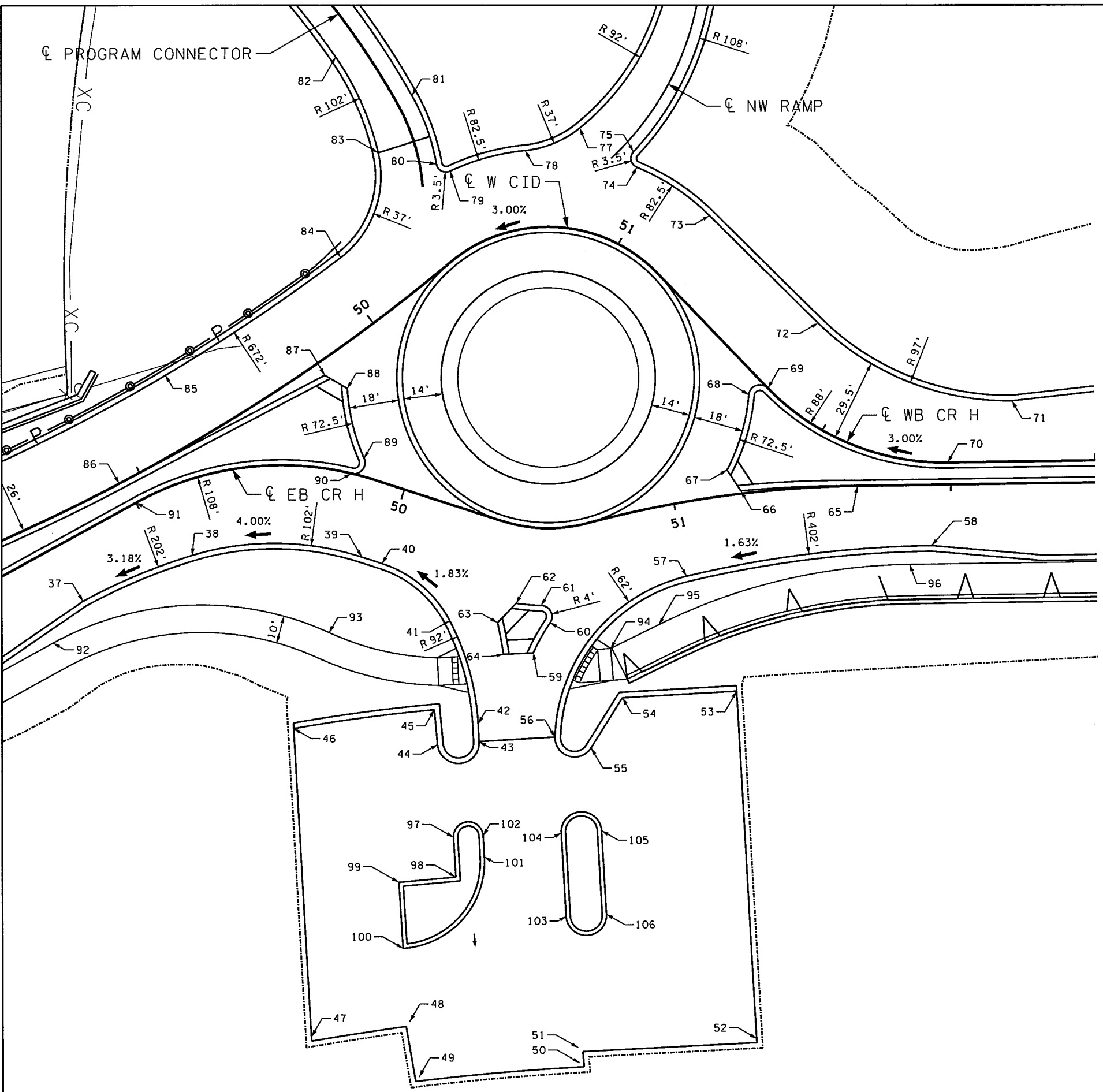
INTERSECTION DETAIL PLAN
 PARK AND RIDE DRIVEWAY

FILE NO. RAMSEY129594	191
IN4 OF IN8	367

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12/4/2015

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DESIGN TEAM				
DRAWN BY: MFCH				
DESIGNER: NMG				
CHECKED BY: WCK				
NO.	BY	DATE	REVISIONS	

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Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSE129594	192
IN5 OF IN8	367

INTERSECTION DETAIL PLAN
 CR H WEST ROUNDABOUT

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2/15/2016

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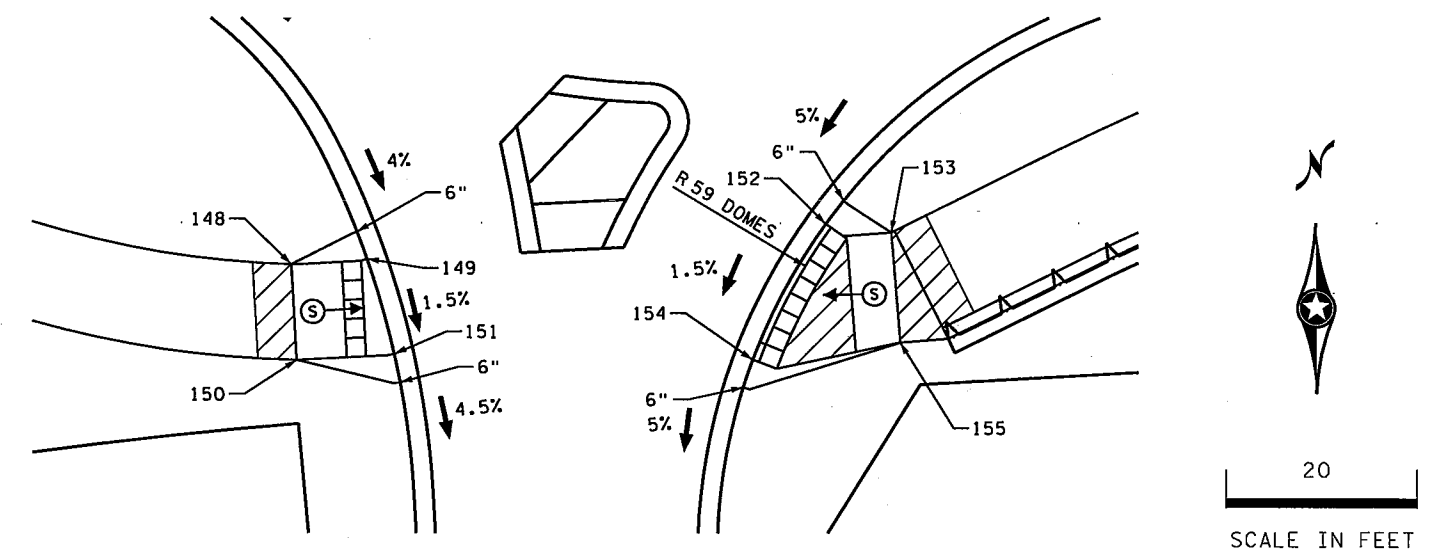
POINTS				
POINT NO.	DESCRIPTION	STATION	OFFSET	ELEV
37	PC - PVMT	48+66.06	22.00' RT	888.37
38	PCC - PVMT	49+11.13	26.07' RT	889.73
39	PT - PVMT	49+92.86	28.00' RT	892.21
40	PC - PVMT	50+00.57	28.00' RT	892.37
41	PCC - PVMT	50+30.09	40.13' RT	892.97
42	PT - PVMT	50+43.01	73.35' RT	891.75
43	PC - PVMT	50+43.66	79.58' RT	891.42
44	PT - PVMT	50+37.94	84.20' RT	890.49
45	PVMT	50+34.71	72.54' RT	890.09
46	PVMT	49+88.54	94.64' RT	887.53
47	PVMT	50+28.72	199.08' RT	888.79
48	PVMT	50+42.29	184.17' RT	889.48
49	PVMT	50+43.88	203.07' RT	889.68
50	PVMT	50+56.23	193.87' RT	890.38
51	PVMT	50+56.18	188.34' RT	890.43
52	PVMT	50+88.07	195.69' RT	890.81
53	PVMT	51+12.02	70.61' RT	889.54
54	PVMT	50+66.12	64.31' RT	890.08
55	PT - PVMT	50+60.01	80.35' RT	890.94
56	PCC - PVMT	50+54.80	75.58' RT	891.67
57	PCC - PVMT	50+99.70	26.59' RT	895.42
58	PT - PVMT	51+92.65	22.00' RT	898.74
59	MEDIAN NOSE	50+50.88	45.22' RT	893.39
60	PCC - PVMT	50+54.23	34.21' RT	893.94
61	PCC - PVMT	50+52.15	28.00' RT	893.95
62	MEDIAN NOSE	50+46.19	28.00' RT	893.72
63	MEDIAN NOSE	50+42.80	36.04' RT	893.45
64	MEDIAN NOSE	50+45.15	46.94' RT	892.93
65	PT - PVMT	51+66.39	0.00'	898.08
66	MEDIAN NOSE	51+24.54	0.99' LT	896.74
67	MEDIAN NOSE	51+20.59	9.11' LT	896.24
68	PCC - PVMT	51+31.01	35.18' LT	896.76
69	PCC - PVMT	51+37.48	36.95' LT	897.02
70	PT - PVMT	51+99.01	8.00' LT	899.14
71	PT - PVMT	52+22.56	30.00' LT	899.23
72	PC - PVMT	51+54.94	59.35' LT	897.40
73	PT - PVMT	51+25.16	101.15' LT	896.19
74	PCC - PVMT	51+06.86	122.17' LT	895.41
75	PCC - PVMT	51+06.65	127.90' LT	895.33
76	PC - PVMT	51+24.67	203.97' LT	893.79
77	PCC - PVMT	50+93.59	139.81' LT	894.79
78	PCC - PVMT	50+03.73	130.07' LT	894.35
79	PCC - PVMT	49+84.57	114.83' LT	893.65
80	PCC - PVMT	49+81.94	116.01' LT	893.51
81	PCC - PVMT	49+75.48	138.16' LT	892.37
82	PCC - PVMT	49+62.93	148.31' LT	891.38
83	PCC - PVMT	49+71.59	115.70' LT	892.73
84	PCC - PVMT	49+67.17	76.29' LT	892.48
85	PCC - PVMT	49+23.52	38.63' LT	890.20
86	PT - PVMT	48+98.12	8.96' LT	889.81
87	MEDIAN NOSE	49+66.55	33.43' LT	892.08
88	MEDIAN NOSE	49+73.29	29.84' LT	892.36
89	PCC - PVMT	49+82.99	6.46' LT	892.41
90	PCC - PVMT	49+79.98	0.00'	892.23
91	PC - PVMT	49+00.12	0.00'	889.83
92	PC - TRAIL	48+49.38	30.00' RT	888.37
93	PCC - TRAIL	49+90.03	57.67' RT	894.03
94	RAMP	50+66.08	45.97' RT	894.96
95	PC - TRAIL	50+85.10	41.76' RT	895.83
96	PT - TRAIL	51+84.64	28.67' RT	899.10
97				
98				
99				
100				
101				
102				
103				
104				
105				
106				

POINTS				
POINT NO.	DESCRIPTION	STATION	OFFSET	ELEV
148	RAMP	50+29.95	54.28' RT	893.45
149	CURB - H=0"	50+37.04	51.32' RT	892.58
150	RAMP	50+33.54	63.65' RT	893.19
151	CURB - H=0"	50+39.76	60.07' RT	892.42
152	CURB - H=0"	50+62.50	43.80' RT	893.05
153	RAMP	50+66.08	45.97' RT	894.96
154	CURB - H=0"	50+57.74	57.08' RT	892.84
155	RAMP	50+65.27	57.40' RT	894.76

LEGEND

- PROPOSED SIGNAL POLE
- PEDESTRIAN PUSH BUTTON STATION
- PEDESTRIAN PUSH BUTTON
- CONTROL POINTS AT GUTTER FLOW LINE
- TRUNCATED DOMES (SEE STANDARD PLATE 7038)
- CONSTRUCT CONCRETE CURB & GUTTER
- BITUMINOUS TREATMENT-SEE TABULATIONS
- "X" CURB HEIGHT
- LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- DRAINAGE FLOW ARROW

- NOTE:**
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 - ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
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 - SEE SHEET TB4 FOR TABULATIONS.
 - THE OUTSIDE EDGE OF CROSSWALK MARKINGS SHALL LINE UP WITH THE OUTSIDE EDGE OF TRUNCATED DOMES.
 - THE CONTRACTOR SHALL VERIFY ALL GRADES WITH THE ENGINEER PRIOR TO PLACEMENT OF CONCRETE WALK.



DESIGN TEAM				
DRAWN BY:	MFCH			
DESIGNER:	NMG			
CHECKED BY:	WCK			
NO.	BY	DATE	REVISIONS	

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Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

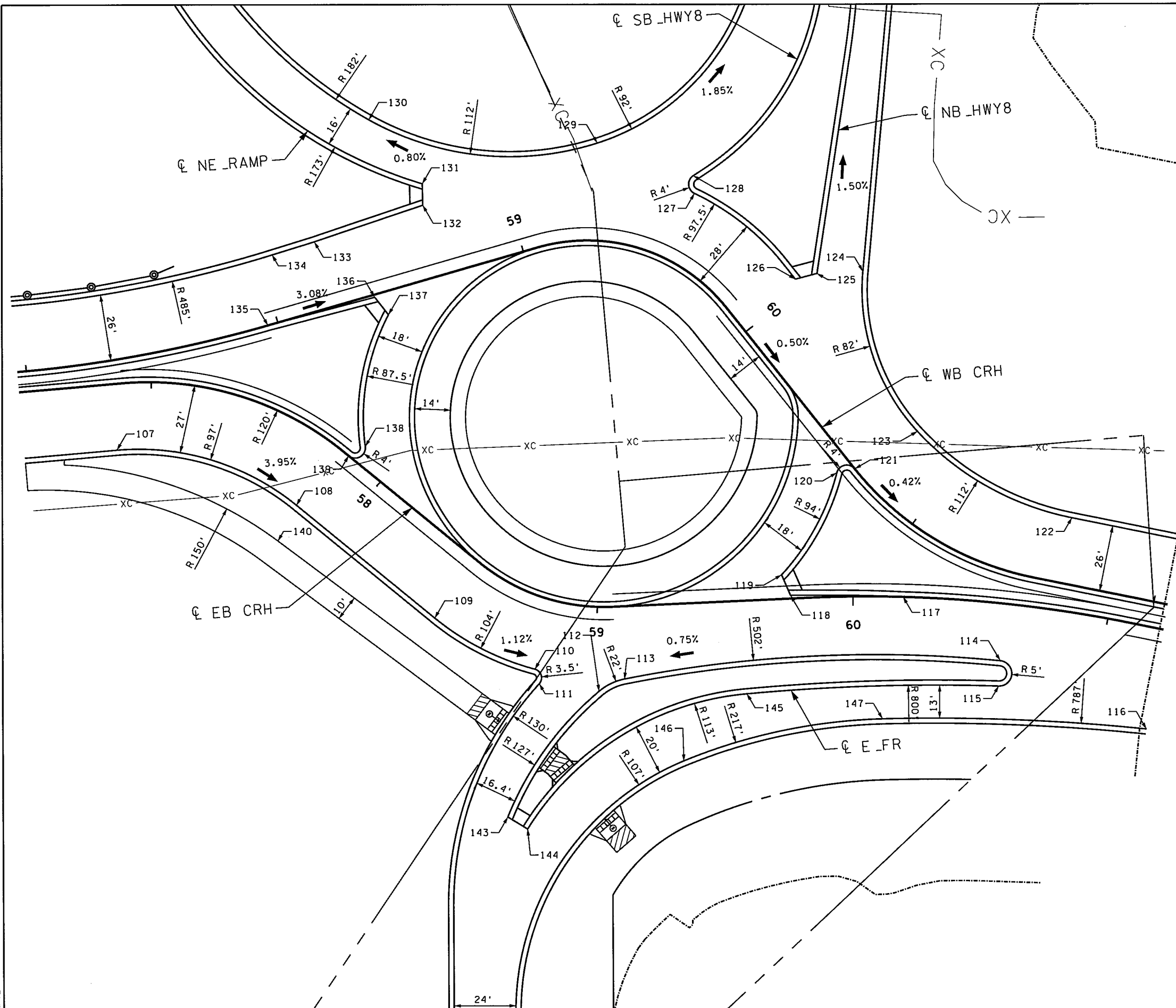
INTERSECTION DETAIL PLAN
 CR H WEST ROUNDABOUT
 CONTROL STAKING AND PEDESTRIAN RAMP DETAIL

FILE NO. 193
 RAMSEI29594
 IN6
 OF INB 367

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12/4/2015

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40
SCALE IN FEET

DESIGN TEAM				
DRAWN BY: MFCH				
DESIGNER: NMG				
CHECKED BY: WCK				
	NO.	BY	DATE	REVISIONS

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Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

INTERSECTION DETAIL PLAN
 CR H EAST ROUNDABOUT

FILE NO. RAMSEI29594	194
IN7 OF IN8	367

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







2/15/2016

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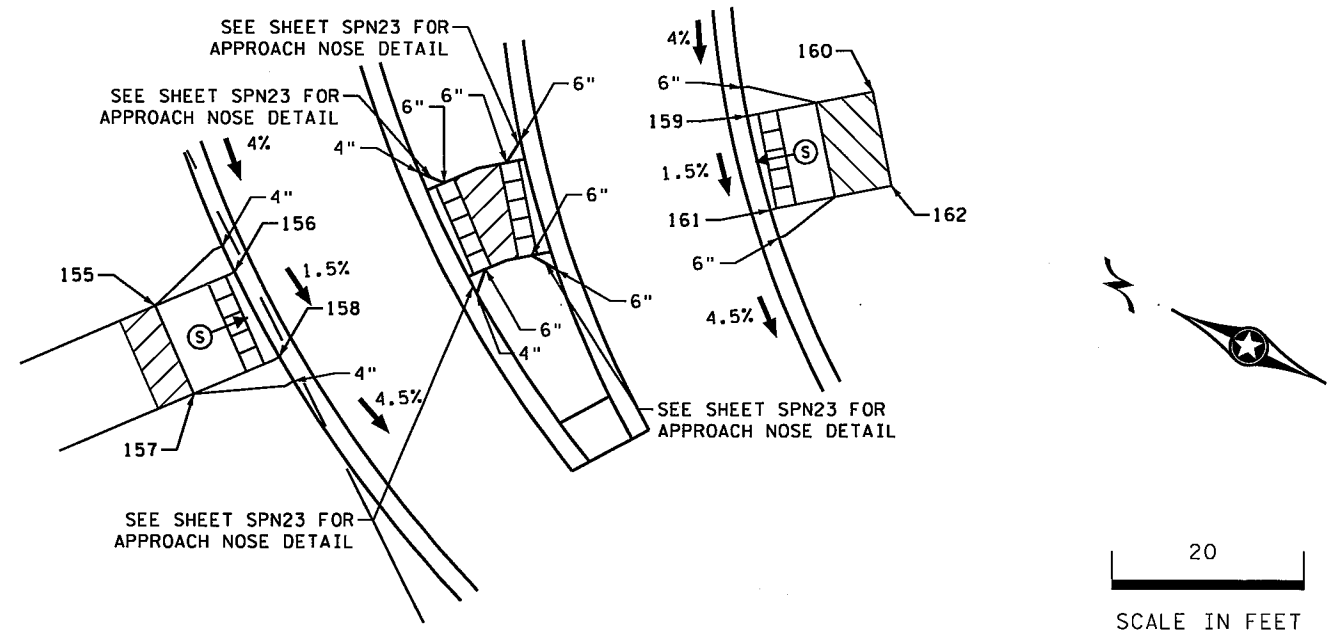
POINTS				
POINT NO.	DESCRIPTION	STATION	OFFSET	ELEV
107	PC - PVMT	56+84.28	26.00' RT	902.34
108	PT - PVMT	57+80.27	28.00' RT	899.41
109	PC - PVMT	58+50.40	28.00' RT	898.66
110	PCC - PVMT	58+82.69	28.00' RT	898.18
111	PCC - PVMT	58+84.86	33.14' RT	898.07
112	PCC - PVMT	59+01.24	33.15' RT	897.95
113	PCC - PVMT	59+09.26	28.58' RT	898.01
114	PCC - PVMT	60+59.98	22.49' RT	897.58
115	PCC - PVMT	60+60.43	32.48' RT	897.17
116	PT - PVMT	61+23.35	39.65' RT	900.08
117	PCC - PVMT	60+19.65	0.00' RT	898.40
118	MEDIAN NOSE	59+75.65	1.30' LT	898.15
119	MEDIAN NOSE	59+72.58	9.45' LT	898.37
120	PCC - PVMT	59+94.82	48.74' LT	898.71
121	PCC - PVMT	60+01.23	50.15' LT	898.66
122	PT - PVMT	60+80.44	36.79' LT	898.28
123	PCC - PVMT	60+23.13	65.23' LT	898.64
124	PVMT	60+04.37	127.72' LT	898.21
125	MEDIAN NOSE	59+89.97	127.22' LT	898.47
126	MEDIAN NOSE	59+83.16	125.30' LT	898.65
127	PCC - PVMT	59+45.90	160.69' LT	898.85
128	PCC - PVMT	59+45.78	167.67' LT	898.74
129	PCC - PVMT	57+81.27	156.60' LT	898.86
130	PCC - PVMT	57+43.11	119.05' LT	898.72
131	MEDIAN NOSE	57+58.37	104.96' LT	899.14
132	MEDIAN NOSE	57+60.66	97.71' LT	899.18
133	PCC - PVMT	57+41.41	66.73' LT	899.93
134	PCC - PVMT	57+32.07	56.68' LT	900.38
135	PCC - PVMT	57+36.88	29.77' LT	901.11
136	MEDIAN NOSE	57+61.60	57.03' LT	899.78
137	MEDIAN NOSE	57+67.18	53.97' LT	899.82
138	PCC - PVMT	57+86.70	6.92' LT	899.65
139	PCC - PVMT	57+83.97	0.00' RT	899.60
140	PT - SIDEWALK	57+83.85	43.47' RT	900.19
141	NOT USED			
142	NOT USED			
143	MEDIAN NOSE	58+84.92	57.01' RT	896.14
144	MEDIAN NOSE	58+88.84	90.07' RT	897.54
145	PCC - PVMT	59+56.81	36.60' RT	897.20
146	PCC - PVMT	59+30.97	61.83' RT	896.58
147	PCC - PVMT	60+12.09	48.10' RT	897.29

POINTS				
POINT NO.	DESCRIPTION	STATION	OFFSET	ELEV
156	RAMP	58+74.15	44.86' RT	898.52
157	CURB - H=0"	58+79.45	47.51' RT	897.67
158	RAMP	58+72.60	54.52' RT	898.37
159	CURB - H=0"	58+77.95	57.16' RT	897.49
160	CURB - H=0"	59+04.37	79.97' RT	896.22
161	RAMP	59+06.98	85.66' RT	897.34
162	CURB - H=0"	58+99.96	89.21' RT	896.15
163	RAMP	59+02.98	91.99' RT	897.00

LEGEND

-  PROPOSED SIGNAL POLE
-  PEDESTRIAN PUSH BUTTON STATION
-  PEDESTRIAN PUSH BUTTON
-  CONTROL POINTS AT GUTTER FLOW LINE
-  TRUNCATED DOMES (SEE STANDARD PLATE 7038)
-  CONSTRUCT CONCRETE CURB & GUTTER
-  BITUMINOUS TREATMENT-SEE TABULATIONS
-  "X" CURB HEIGHT
-  LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
-  INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
-  INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
-  DRAINAGE FLOW ARROW

- NOTE:
- ALL STATION AND OFFSETS ARE WITH RESPECT TO C&EB CR H UNLESS OTHERWISE NOTED.
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DESIGN TEAM				
DRAWN BY: MFCH				
DESIGNER: NMG				
CHECKED BY: WCK				
	NO.	BY	DATE	REVISIONS

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RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

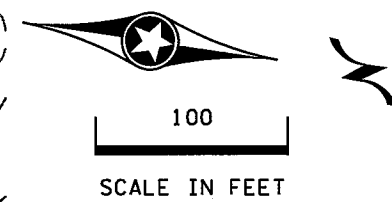
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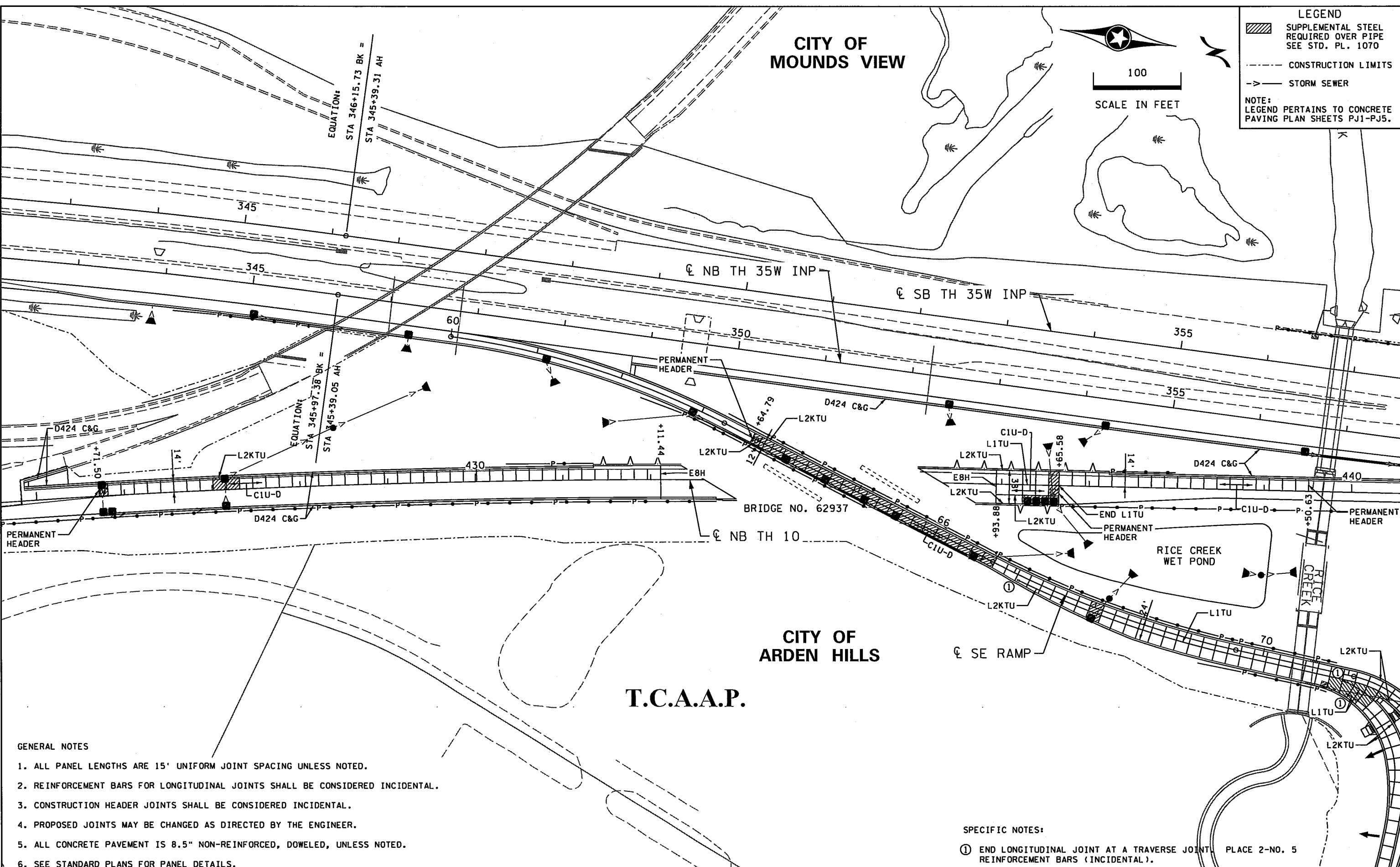
CITY OF MOUNDS VIEW



LEGEND

- SUPPLEMENTAL STEEL REQUIRED OVER PIPE SEE STD. PL. 1070
- CONSTRUCTION LIMITS
- STORM SEWER

NOTE:
LEGEND PERTAINS TO CONCRETE PAVING PLAN SHEETS PJ1-PJ5.



T.C.A.A.P.

- GENERAL NOTES**
1. ALL PANEL LENGTHS ARE 15' UNIFORM JOINT SPACING UNLESS NOTED.
 2. REINFORCEMENT BARS FOR LONGITUDINAL JOINTS SHALL BE CONSIDERED INCIDENTAL.
 3. CONSTRUCTION HEADER JOINTS SHALL BE CONSIDERED INCIDENTAL.
 4. PROPOSED JOINTS MAY BE CHANGED AS DIRECTED BY THE ENGINEER.
 5. ALL CONCRETE PAVEMENT IS 8.5" NON-REINFORCED, DOWELED, UNLESS NOTED.
 6. SEE STANDARD PLANS FOR PANEL DETAILS.

- SPECIFIC NOTES:**
- ① END LONGITUDINAL JOINT AT A TRAVERSE JOINT. PLACE 2-NO. 5 REINFORCEMENT BARS (INCIDENTAL).

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	JEO		
CHECKED BY:	JEO		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Jason F. Owens* Lic. No. 43475
 Printed Name: JASON F. OWENS Date: 2/16/2016

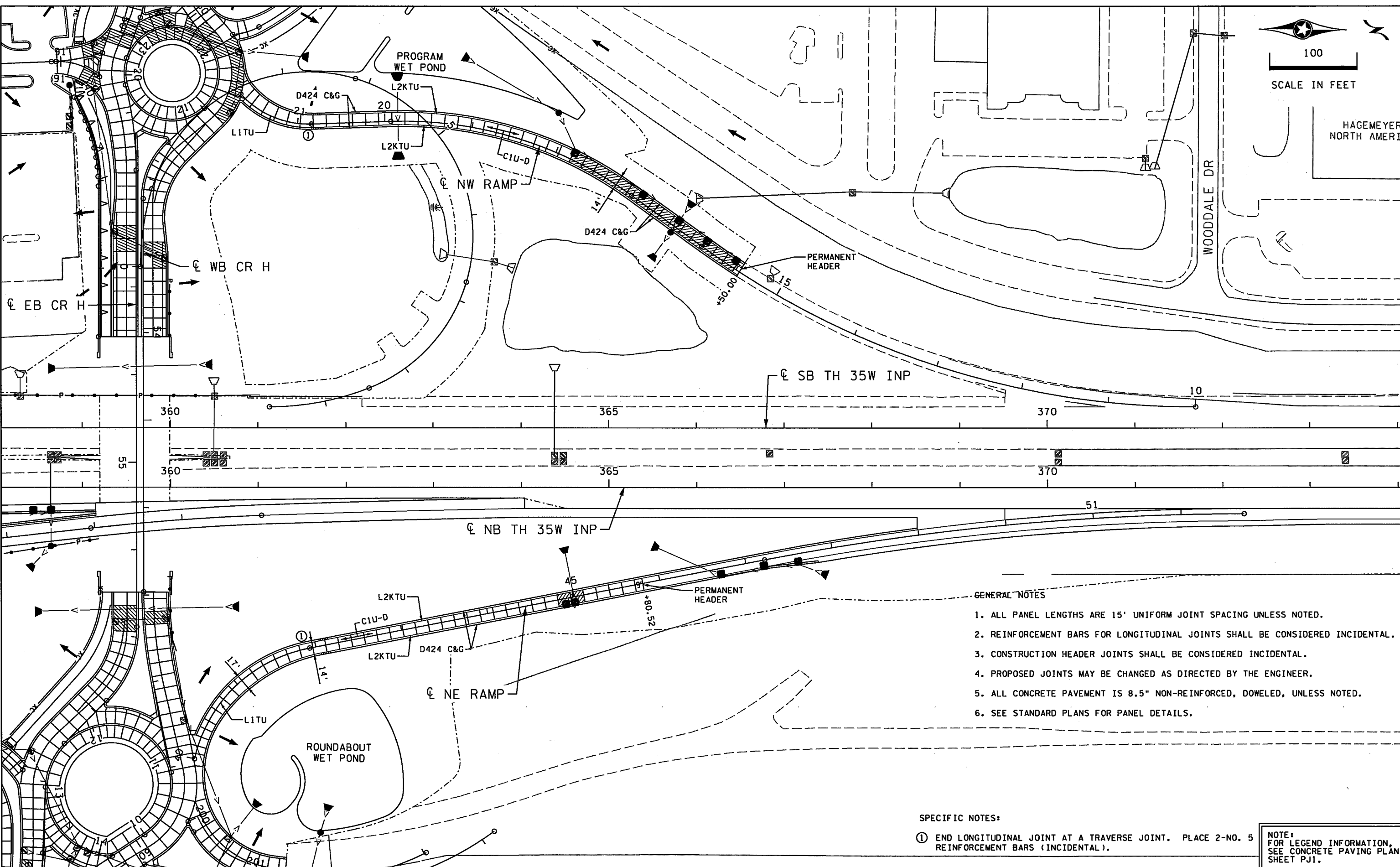
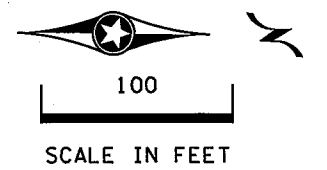


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

CONCRETE PAVING PLAN
 NB TH 10 STA. 424+82 - 440+00
 SE RAMP STA. 60+00 - 71+50

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 PJ02



GENERAL NOTES

1. ALL PANEL LENGTHS ARE 15' UNIFORM JOINT SPACING UNLESS NOTED.
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3. CONSTRUCTION HEADER JOINTS SHALL BE CONSIDERED INCIDENTAL.
4. PROPOSED JOINTS MAY BE CHANGED AS DIRECTED BY THE ENGINEER.
5. ALL CONCRETE PAVEMENT IS 8.5" NON-REINFORCED, DOWELED, UNLESS NOTED.
6. SEE STANDARD PLANS FOR PANEL DETAILS.

SPECIFIC NOTES:

- ① END LONGITUDINAL JOINT AT A TRAVERSE JOINT. PLACE 2-NO. 5 REINFORCEMENT BARS (INCIDENTAL).

NOTE:
 FOR LEGEND INFORMATION,
 SEE CONCRETE PAVING PLAN
 SHEET PJ1.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	JEO		
CHECKED BY:	JEO		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Jason E. Owens* Lic. No. 43475
 Printed Name: JASON E. OWENS Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

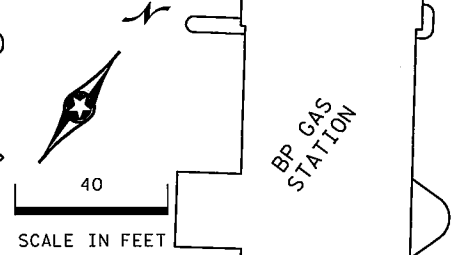
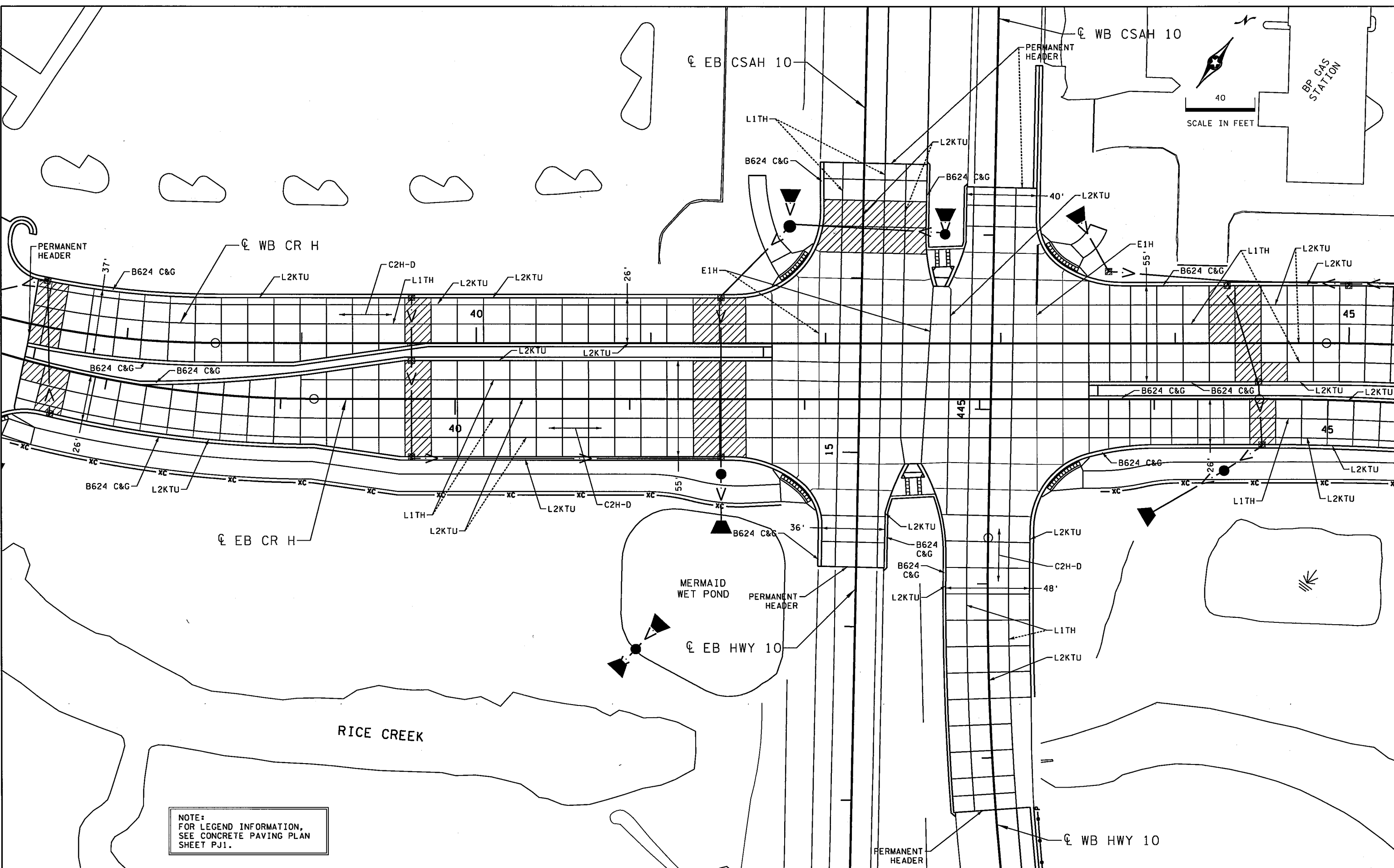
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 NW RAMP STA. 10+00 - 21+74
 NE RAMP STA. 40+00 - 52+72

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NOTE:
FOR LEGEND INFORMATION,
SEE CONCRETE PAVING PLAN
SHEET PJ1.

DESIGN TEAM			
DRAWN BY:	RBC		
DESIGNER:	MFCH		
CHECKED BY:	NMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
Printed Name: NICOLE GULICK, P.E. Date: 2/16/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

CONCRETE
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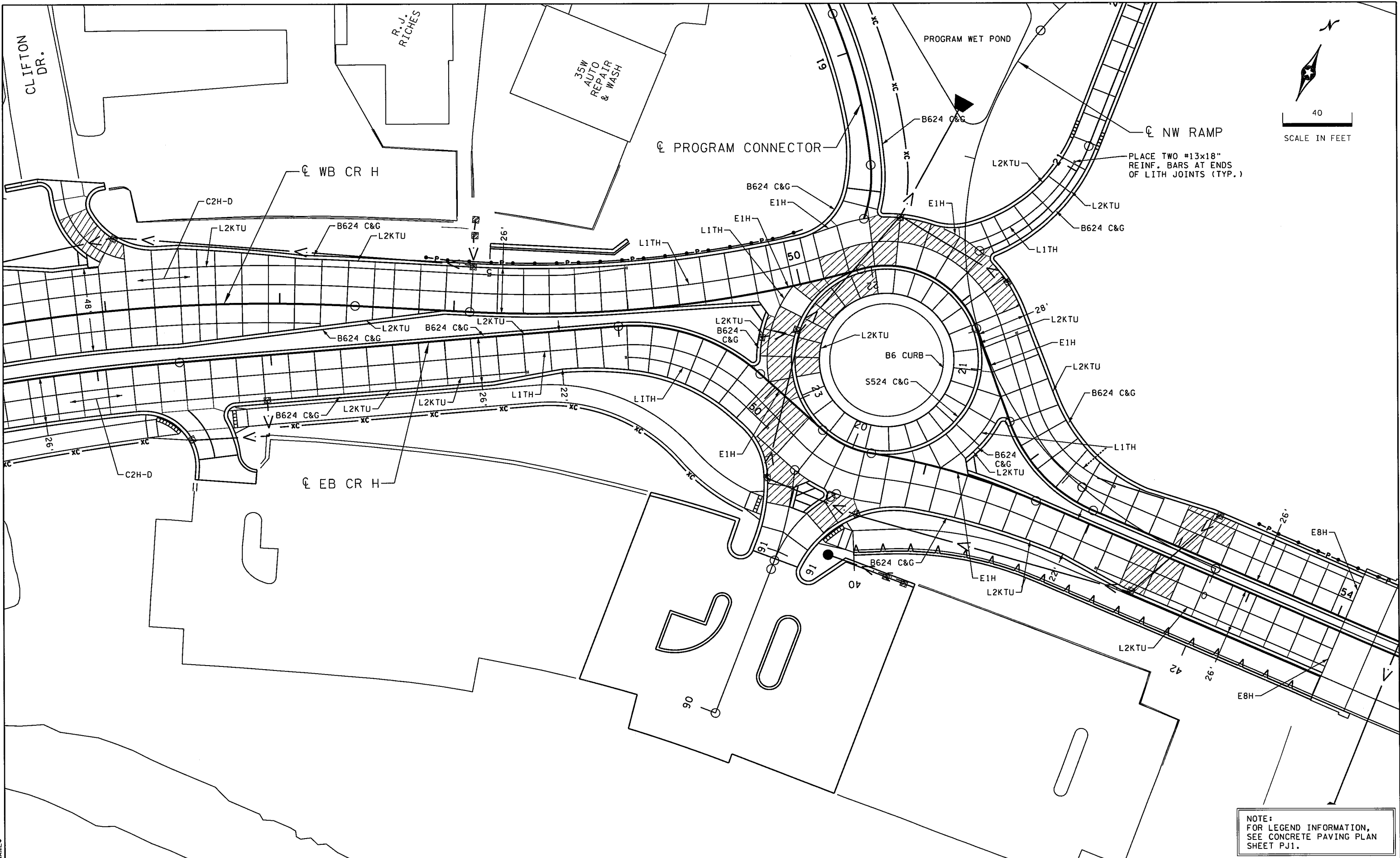
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NOTE:
FOR LEGEND INFORMATION,
SEE CONCRETE PAVING PLAN
SHEET PJ1.

DESIGN TEAM			
DRAWN BY:	RBC		
DESIGNER:	MFCH		
CHECKED BY:	NMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015

Kimley»Horn

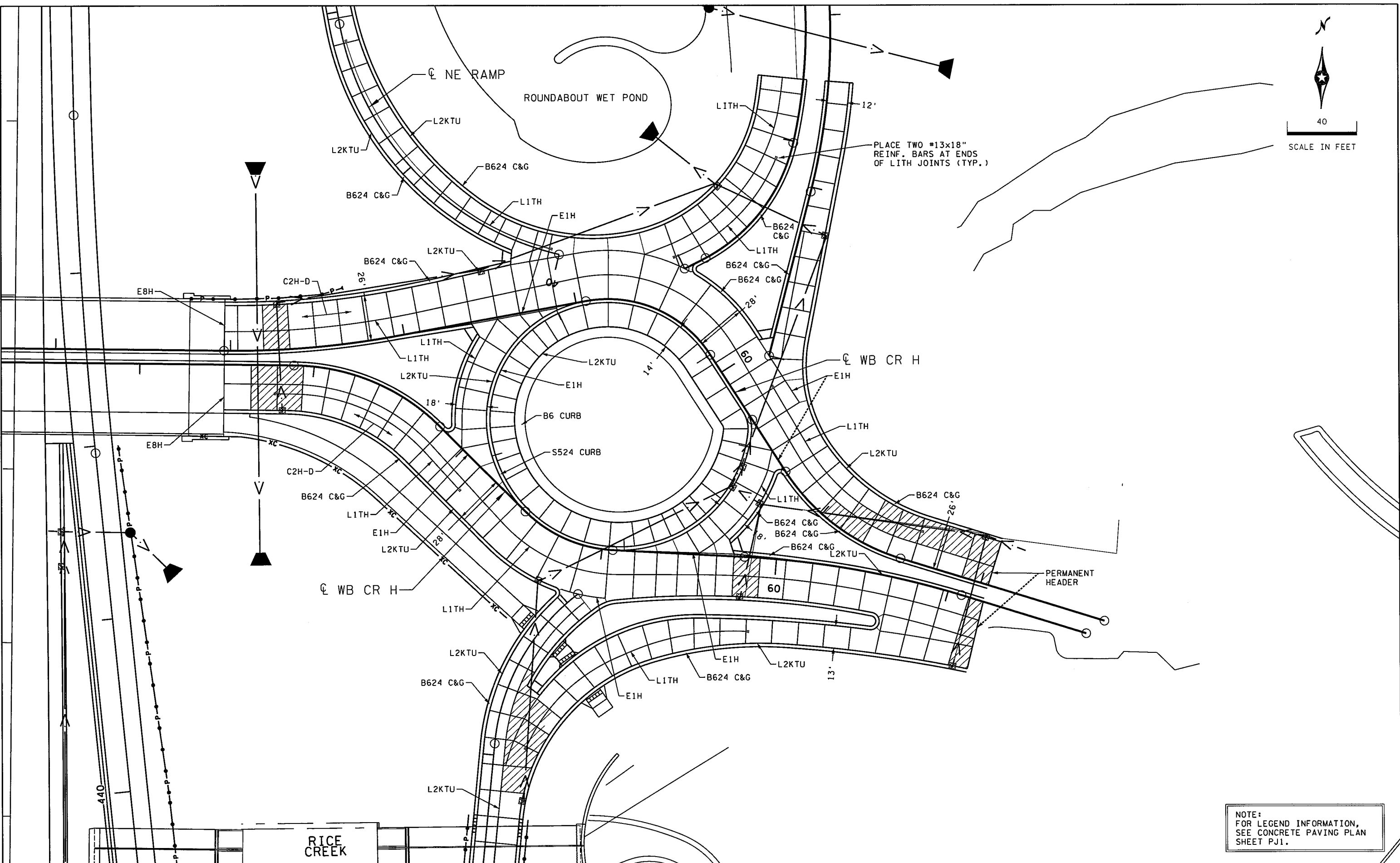
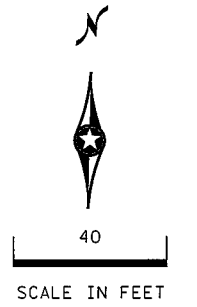
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

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NOTE:
FOR LEGEND INFORMATION,
SEE CONCRETE PAVING PLAN
SHEET PJ1.

DESIGN TEAM			
DRAWN BY:	RBC		
DESIGNER:	MFCH		
CHECKED BY:	NMG		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Nicole Gulick* Lic. No. 45642
Printed Name: NICOLE GULICK, P.E. Date: 12/4/2015

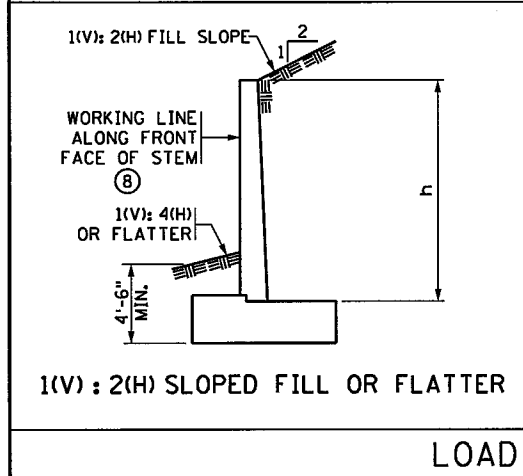
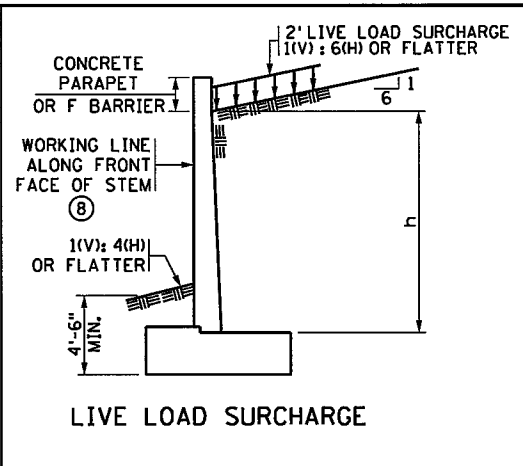
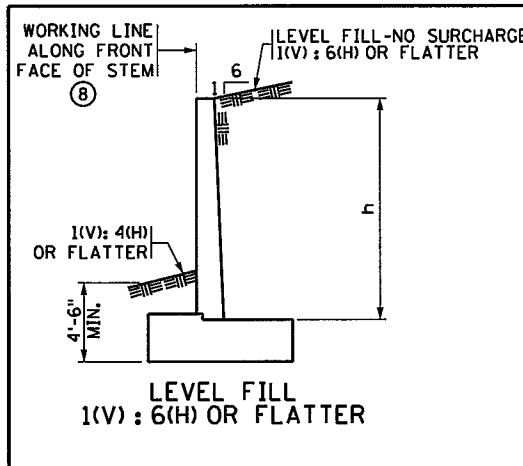


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

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PJ5 OF PJ5	367

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h = STEM HEIGHT, DEFINED AS DISTANCE BETWEEN TOP OF FOOTING TO TOP OF WALL, NOT INCLUDING PARAPET OR BARRIER.

DESIGN CRITERIA

THESE LRFD CIP RETAINING WALL STANDARDS HAVE BEEN DEVELOPED BASED ON THE FIFTH EDITION WITH 2010 INTERIMS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND MDOT DESIGN POLICIES AS STATED IN THE MDOT LRFD BRIDGE DESIGN MANUAL.

$f'_c = 4 \text{ ksi}$
 $f_y = 60 \text{ ksi}$
 $n = 8$

REFER TO STANDARD FIGURE 5-297.639 FOR ADDITIONAL DESIGN CRITERIA.

BAR LAP

BAR SIZE	PLAIN	EPOXY
5	2'-5"	2'-1"
6	2'-11"	3'-1"
7	3'-7"	3'-10"
8	4'-9"	5'-1"
9	6'-0"	6'-5"
10	7'-7"	8'-2"
11	9'-4"	10'-0"

SUMMARY OF QUANTITIES FOR RETAINING WALLS (A,B,C)

PANEL	STRUCTURAL CONCRETE		REINFORCEMENT BARS		STRUCT. EXCAV.	STRUCT. BACKFILL (CV) (1)	CIP CONCRETE PILING DELIVERED 12"	CIP CONCRETE PILING DRIVEN 12"	TYPE F BARRIER CONCRETE (SS2)	ANTI-GRAFFITI COATING	ARCH SURFACE FINISH (MULTI-COLOR)	ARCH CONC TEXTURE (ASHLER STONE)
	FOOTING	STEM	PLAIN	EPOXY								
	CU YD	CU YD	POUND	POUND	CU YD	CU YD	EACH	LIN FT	LIN FT	LIN FT	LIN FT	SQ FT
A1	12.5	10.0	2189	1350			330	330	20.7		90	90
A2	18.5	12.1	2389	1544			220	220	30.5		71	71
A3	18.5	8.9	1948	1254			330	330	30.5		41	41
C1	20.4	22.9	1948	2225			330	330	18.1		186	186
C2	20.8	23.0	1948	2233			330	330	30.5		282	282
C3	18.8	20.4	1904	2103			220	220	30.5		241	241
B1	12.4	15.3	1681	1680			330	330	30.5		152	152
B2	20.8	23.2	1948	2374			220	220	30.5		108	108
B3	18.5	19.7	2930	2116			330	330	30.5		63	63
B4	18.5	16.4	2930	2000								
B5	18.5	13.1	2389	1544			330	330	27.8		56	56
B6	18.5	10.0	2389	1436			330	330	30.5		152	152
B7	18.5	7.7	1948	1198			220	220	30.5		236	236
TOTAL	235	203	28541	23057			3850	3850	372		1874	1874

- NOTES:**
- STRUCTURAL BACKFILL SPEC. 3149.202.
 - COMPACT TO 100% DENSITY IN ACCORDANCE WITH SPEC. 2105.3F1 UNLESS RECOMMENDED OTHERWISE BY THE SOILS ENGINEER.
 - LIMITING CRITERIA.
 - CURVED FORMS MAY BE USED FOR ANY WALL WITH A RADIUS, BUT MUST BE USED ON WALLS WITH RADIUS LESS THAN 23 FEET.
 - DOES NOT INCLUDE DOWELED JOINT/CONSTRUCTION JOINT QUANTITIES, WHICH ARE INCIDENTAL. DOWELED JOINT/CONSTRUCTION JOINT DETAILS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6).
 - QUANTITIES FOR THE FOUNDATION WITH AGGREGATE BACKFILL OPTION ONLY.
 - DOES NOT INCLUDE ADDITIONAL REINFORCING BARS AND STRUCTURAL CONCRETE (1A43) REQUIRED FOR STEPPED FOOTINGS, WHICH IS INCIDENTAL.
 - FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WING WALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.

* (9) INCLUDED IN EARTHWORK QUANTITY TABULATIONS.

CURVED RETAINING WALLS ALLOWABLE CHORD LENGTH

MAXIMUM DEGREE OF CURVE	RADIUS	ALLOWABLE CHORD LENGTH	DEVIATION FROM TRUE RADIUS	MAXIMUM DEFLECTION ANGLE Δ
4°-00'	1432'	30'-6"	± 1/2" (3)	1°-15'
8°-00'	716'	21'-10"	± 1/2" (3)	1°-45'
16°-30'	347'	15'-3"	± 1/2" (3)	2°-30'
23°-00'	249'	12'-11"	± 1/2" (3)	2°-57'
65°-30'	87'	7'-7 1/2"	± 1/2"	5°-00' (3)
114°-30'	50'	4'-4 5/16"	± 1/4"	5°-00' (3)
250°-00'	23'	2'-0"	± 1/8"	5°-00' (3)

GENERAL NOTES:

UTILITIES:
EXISTING AND PROPOSED UTILITIES ARE SHOWN IN THE GRADING PLANS. PRIOR TO EXCAVATION VERIFY THE LOCATION OF EXISTING FACILITIES AND EXERCISE CARE IN ADJACENT CONSTRUCTION.

EXCAVATION AND EARTHWORK:
ALL EXCAVATION AND EMBANKMENT WORK SHALL CONFORM TO SPEC. 2451.

CONCRETE:
ALL CONCRETE SHALL CONFORM TO SPEC. 2461.
TRANSVERSE CONSTRUCTION JOINTS IN FOOTING ARE PERMISSIBLE. KEYWAYS AND CONTINUOUS REINFORCEMENT ARE REQUIRED THROUGH THESE JOINTS.
THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF PATTERN. THE STRUCTURAL CONCRETE 3Y43 QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. CONCRETE NEEDED FOR THE TEXTURING IS INCIDENTAL.

POURING SEQUENCE:
THE POURING SEQUENCE SHALL BE AT THE CONTRACTOR'S OPTION. SUBMIT SEQUENCE (WITHIN 7 CALENDAR DAYS) TO THE ENGINEER FOR APPROVAL PRIOR TO BEGINNING THE FIRST POUR.

CONSTRUCTION:
CONSTRUCT IN ACCORDANCE WITH SPEC. 2411, EXCEPT AS NOTED.
REFER TO STANDARD PLAN 5-297.624 (2 OF 6) FOR WALL CORNER DETAILS AND STEPPED FOOTING DETAILS.
REFER TO STANDARD PLAN 5-297.625 FOR WALL SHEAR LUG DETAILS.
APPLY MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481 TO BACK SIDE OF WALL TO COVER ALL THRU-BOLT FORM HOLES.

REINFORCING STEEL:
USE REINFORCEMENT BARS CONFORMING TO SPEC. 3301, GRADE 60.
BARS MARKED WITH THE SUFFIX "E" TO BE EPOXY COATED.
ALL BARS WHICH EXTEND OUT OF THE FOOTING AND ALL BARS WHICH ARE ABOVE THE FOOTING TO BE EPOXY COATED.
ALL BENT BAR DIMENSIONS ARE GIVEN OUT-TO-OUT.

MAINTAIN CLEAR DISTANCE BETWEEN REINFORCEMENT BARS AND FACE OF CONCRETE OF 3 INCHES IN FOOTINGS, 5 INCHES IN BOTTOM OF SPREAD FOOTINGS, AND 2 INCHES ELSEWHERE UNLESS OTHERWISE NOTED. REFER TO STANDARD PLAN 5-297.624 (1 OF 6) DETAIL "C" FOR COVER REQUIREMENTS ON WALLS WITH ARCHITECTURAL CONCRETE TEXTURE OR RUSTICATION.

THE CONTRACTOR HAS THE OPTION OF SUBSTITUTING 60'-0" LONG BARS FOR THE LONGITUDINAL FOOTING STEEL SHOWN. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT WILL BE BASED ON QUANTITIES SHOWN.

THE CONSTRUCTION JOINT FOR CONCRETE PARAPET OR BARRIER MAY BE LOCATED AT TOP OR BOTTOM OF COPING, AT THE CONTRACTOR'S OPTION. PAYMENT WILL BE BASED ON QUANTITIES SHOWN, WHICH IS BASED ON CONSTRUCTION JOINT ABOVE COPING.

FOR VARIABLE STEM HEIGHTS, VARY THE LAP LENGTH OF THE VERTICAL REINFORCEMENT. MINIMUM LAP LENGTHS ARE GIVEN IN THE TABLE ON THIS SHEET. SMALLER BAR GOVERNS LAP LENGTH.

DOWEL BAR ASSEMBLIES:
DOWELED JOINTS/CONSTRUCTION JOINTS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6). THESE JOINTS ARE INCIDENTAL.

AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 91'-6". PLACE A CORK AND DOWEL JOINT AT ALL VERTICAL FOOTING STEPS.

GEOMETRICS AND GRADES:
DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT, SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL. (8)

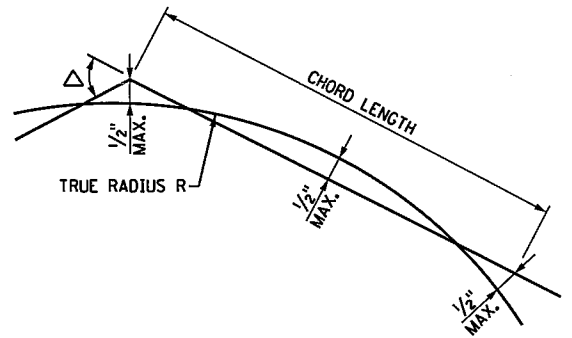
ON UP TO 10% SLOPES, THE CONTRACTOR HAS THE OPTION OF POURING FOOTINGS SLOPED OR STEPPED. ADDITIONAL CONCRETE VOLUMES AND CHANGES TO THE BILL OF REINFORCEMENT WHICH MAY RESULT FROM CONTRACTOR REQUESTED OPTIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE.

QUANTITIES ARE BASED ON ASSUMED TOP OF ROCK ELEVATION. ACTUAL TOP OF ROCK TO BE DETERMINED BY ENGINEER. SEE SHEET 5-297.624 (4 OF 6) FOR PAY LIMITS.

PILE LOADS:
THE PILE LOADS SHOWN IN THE PLANS AND THE CORRESPONDING NOMINAL PILE BEARING RESISTANCES (R_n) WERE COMPUTED USING LRFD METHODOLOGY.

SHEET INDEX

NO.	TITLE
RW1	GENERAL NOTES & SUMMARY OF QUANTITIES
RW2	GENERAL PLAN & ELEVATION WALL A
RW3	GENERAL PLAN & ELEVATION WALLS B & C
RW4-RW5	WALL REINFORCEMENT
RW6-RW9	MISCELLANEOUS DETAILS
RW10-RW11	PANEL TABULATIONS
RW12-RW14	RETAINING WALL DETAILS



REVISION:
APPROVED: AUGUST 27, 2014
Nancy M. Weber
STATE BRIDGE ENGINEER

CERTIFIED BY: *Mark K. Maves* 12/8/2015
LICENSED PROFESSIONAL ENGINEER
PRINTED NAME: MARK K MAVES LIC. NO. 20496

MODIFIED: 5-297.620
STANDARD SHEET NO. 5-297.620
STANDARD APPROVED: AUGUST 27, 2014
TITLE: RETAINING WALL GENERAL NOTES AND SUMMARY OF QUANTITIES RW1 OF RW14
STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. 201 OF 367 SHEETS

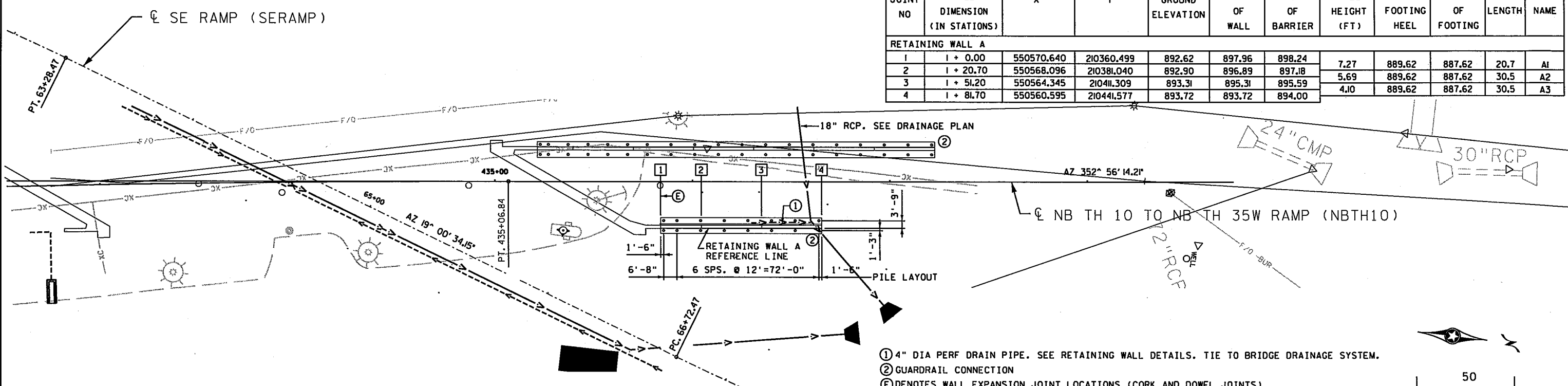
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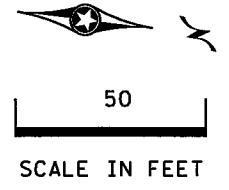
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JOINT NO	WALL DIMENSION (IN STATIONS)	X	Y	GROUND ELEVATION	TOP OF WALL	TOP OF BARRIER	WALL HEIGHT (FT)	TOP OF FOOTING HEEL	BOTTOM OF FOOTING	PANEL LENGTH	PANEL NAME
RETAINING WALL A											
1	1 + 0.00	550570.640	210360.499	892.62	897.96	898.24	7.27	889.62	887.62	20.7	A1
2	1 + 20.70	550568.096	210381.040	892.90	896.89	897.18	5.69	889.62	887.62	30.5	A2
3	1 + 51.20	550564.345	210411.309	893.31	895.31	895.59	4.10	889.62	887.62	30.5	A3
4	1 + 81.70	550560.595	210441.577	893.72	893.72	894.00					

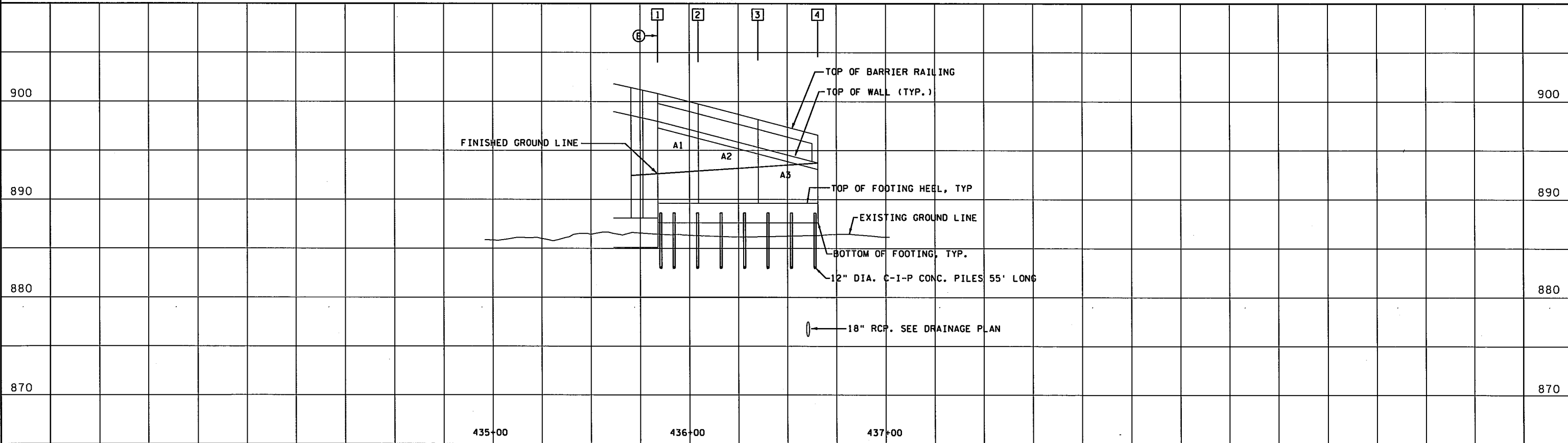


RETAINING WALL A PLAN

- ① 4" DIA PERF DRAIN PIPE. SEE RETAINING WALL DETAILS. TIE TO BRIDGE DRAINAGE SYSTEM.
- ② GUARDRAIL CONNECTION
- ⓔ DENOTES WALL EXPANSION JOINT LOCATIONS (CORK AND DOWEL JOINTS).



WALL IS STANDARD CANTILEVERED 2'-0" LIVE LOAD SURCHARGE, PILED FOOTING, TYPE II DRAINAGE

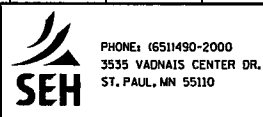


RETAINING WALL A ELEVATION

DESIGN TEAM			
DRAWN BY:	MAW		
DESIGNER:	MAW		
CHECKED BY:			
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark K. Maves* Lic. No. 20496
 Licensed Professional Engineer
 Printed Name: MARK K MAVES Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
T.H. 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W)

FILE NO. RAMSEI29594	202
RW2 OF RW14	367

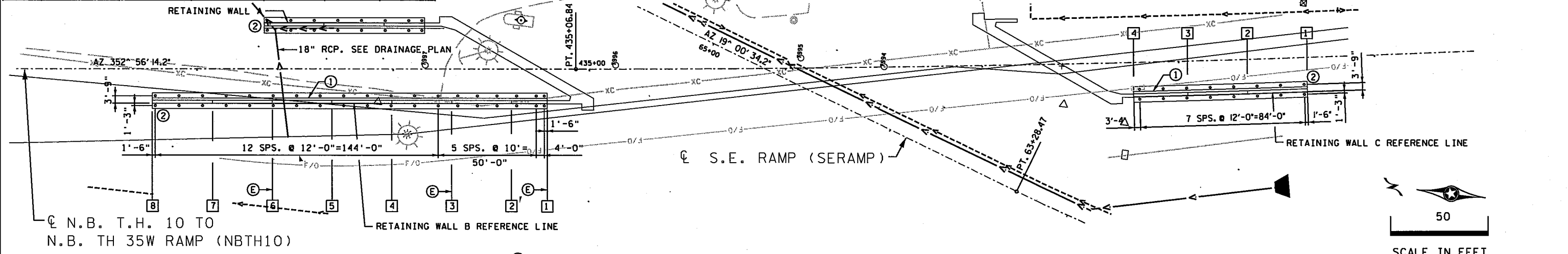
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JOINT NO	WALL DIMENSION (IN STATIONS)	X	Y	GROUND ELEVATION	TOP OF WALL	TOP OF BARRIER	WALL HEIGHT (FT)	TOP OF FOOTING HEEL	BOTTOM OF FOOTING	PANEL LENGTH	PANEL NAME
RETAINING WALL B											
1	1 + 0.00	550537.619	210,293.571	892.34	901.67	904.50					
2	1 + 18.11	550535.392	210,311.545	892.27	900.86	903.69	13.16	888.51	886.51	18.1	B1
3	1 + 48.61	550531.642	210,341.814	892.14	899.41	902.24	12.35	888.51	886.51	30.5	B2
4	1 + 79.11	550527.892	210,372.082	892.01	897.86	900.69	10.90	888.51	886.51	30.5	B3
5	2 + 9.61	550524.142	210,402.351	891.89	896.27	899.10	9.35	888.51	886.51	30.5	B4
6	2 + 40.11	550520.392	210,432.619	891.76	894.69	897.52	7.76	888.51	886.51	30.5	B5
7	2 + 70.61	550516.641	210,462.888	891.64	893.10	895.93	6.18	888.51	886.26	30.5	B6
8	3 + 1.11	550512.891	210,493.156	891.51	891.51	894.35	4.59	888.51	886.26	30.5	B7

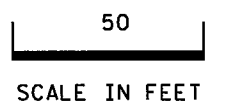
JOINT NO	WALL DIMENSION (IN STATIONS)	X	Y	GROUND ELEVATION	TOP OF WALL	TOP OF BARRIER	WALL HEIGHT (FT)	TOP OF FOOTING HEEL	BOTTOM OF FOOTING	PANEL LENGTH	PANEL NAME
RETAINING WALL C											
1	1 + 0.00	550591.217	209910.129	910.53	910.53	913.36					
2	1 + 27.80	550586.527	209940.266	907.40	910.42	913.25	11.88	898.65	896.40	27.8	C1
3	1 + 58.30	550581.916	209970.416	904.26	910.21	913.04	11.77	898.65	896.40	30.5	C2
4	1 + 88.80	550577.803	209997.780	901.42	909.94	912.77	11.56	898.65	896.40	30.5	C3



RETAINING WALL B PLAN

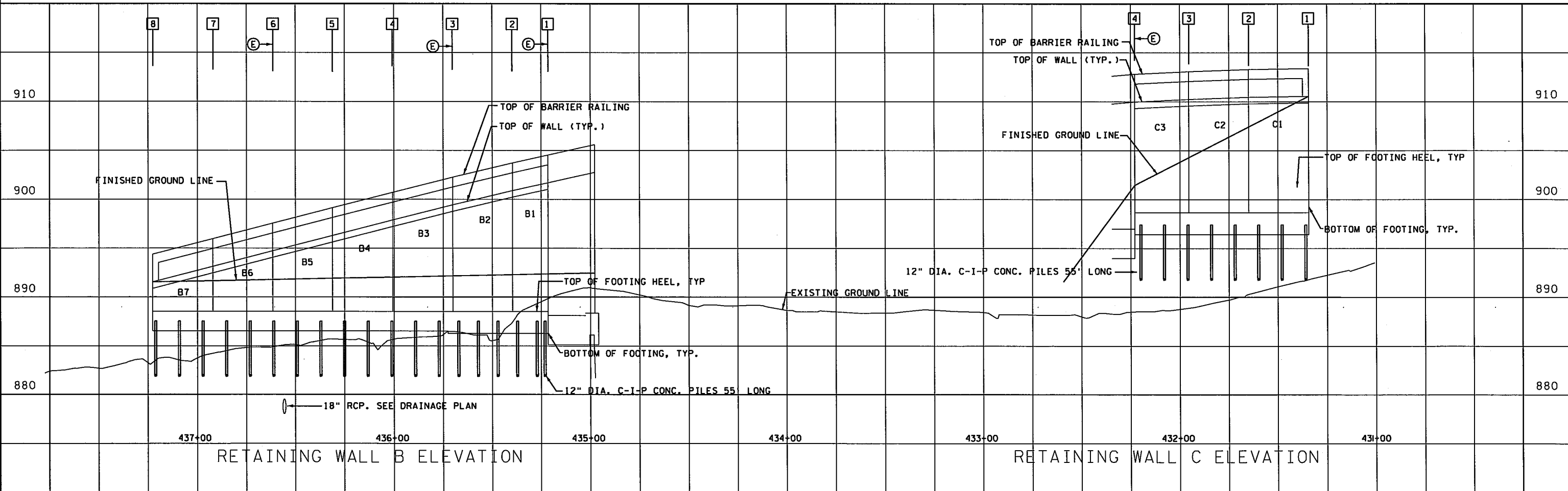
RETAINING WALL C PLAN

- ① 4" DIA PERF DRAIN PIPE. SEE RETAINING WALL DETAILS. TIE TO BRIDGE DRAINAGE SYSTEM.
- ② GUARDRAIL CONNECTION
- ③ DENOTES WALL EXPANSION JOINT LOCATIONS (CORK AND DOWEL JOINTS).



WALL IS STANDARD CANTILEVERED 2'-0" LIVE LOAD SURCHARGE, PILED FOOTING, TYPE II DRAINAGE

WALL IS STANDARD CANTILEVERED 2'-0" LIVE LOAD SURCHARGE, PILED FOOTING, TYPE II DRAINAGE



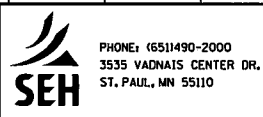
RETAINING WALL B ELEVATION

RETAINING WALL C ELEVATION

DESIGN TEAM			
DRAWN BY:	MAW		
DESIGNER:	MAW		
CHECKED BY:			
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark K. Maves* Lic. No. 20496
 Licensed Professional Engineer
 Printed Name: MARK K MAVES Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
T.H. 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W)

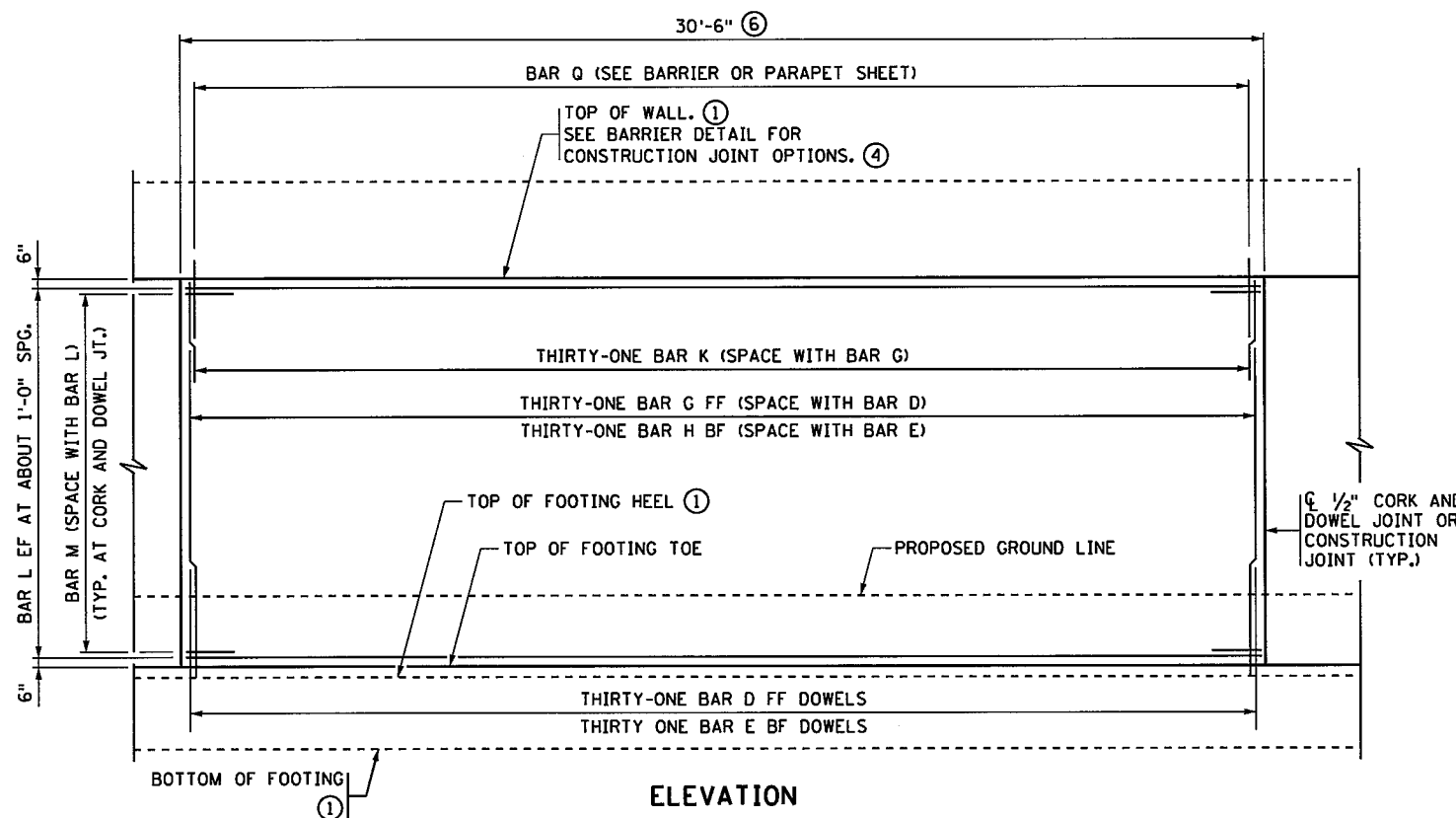
RETAINING WALLS B & C

FILE NO.	203
RAMSE129594	
RW3	367
OF RW4	

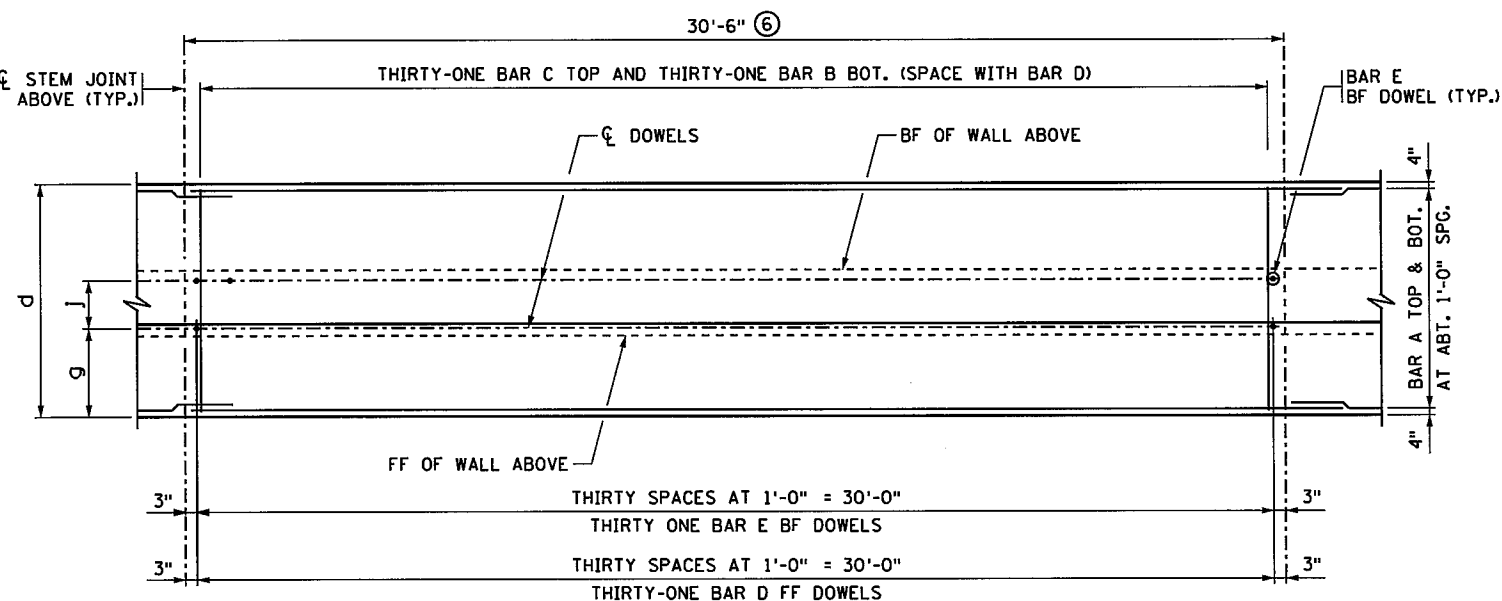
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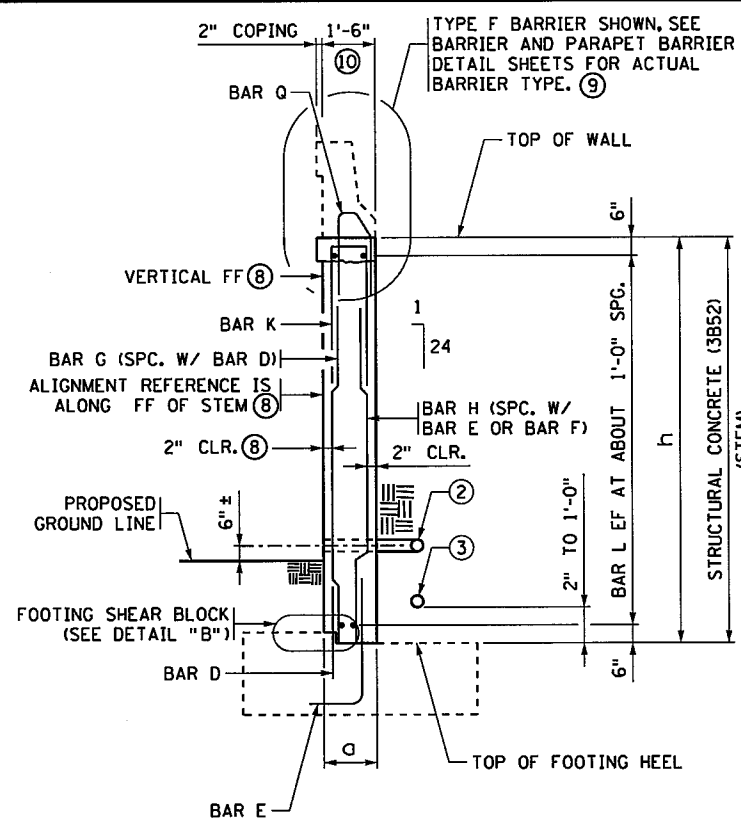
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ELEVATION

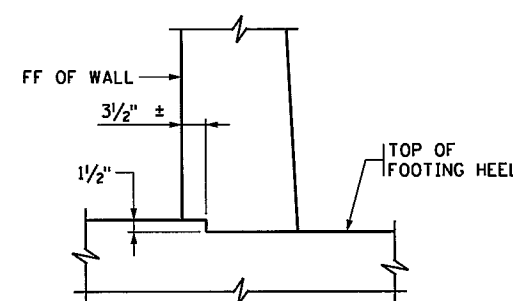


FOOTING PLAN ~ REINFORCEMENT

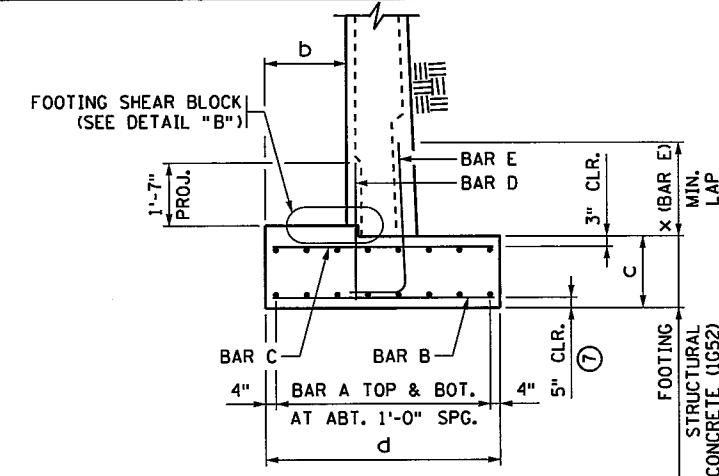


WALL SECTION

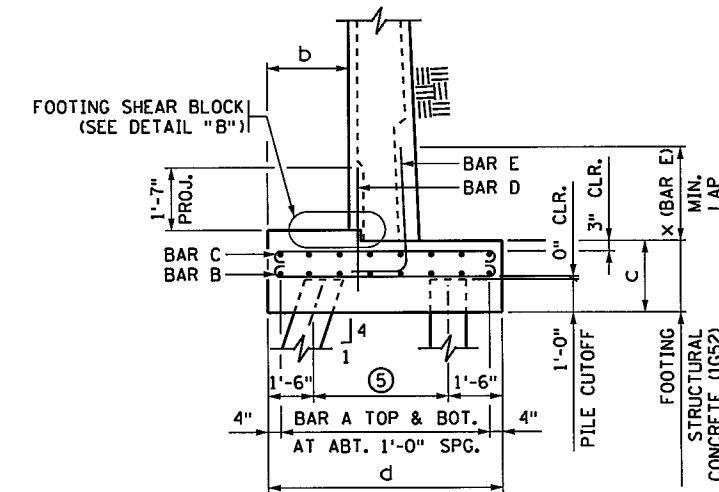
(IF BARRIER AND 2" COPING OPTION SHOWN)



DETAIL "B"



TYPICAL SECTION THROUGH SPREAD FOOTING



TYPICAL SECTION THROUGH PILE FOOTING

NOTES:

- REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".
- STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.
- FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.
- BF DENOTES BACK FACE.
- FF DENOTES FRONT FACE.
- EF DENOTES EACH FACE.
- ① STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.
- ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
- ⑥ AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.
- ⑦ 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.
- ⑧ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING.

REVISIONS:

APPROVED: AUGUST 27, 2014

Nancy S. Amburger
STATE BRIDGE ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION

REVISOR:

Christopher R. By
STATE DESIGN ENGINEER

APPROVED: 8-27-2014

RETAINING WALL REINFORCEMENT DETAILS (SHORT WALLS) RW4 OF RW14

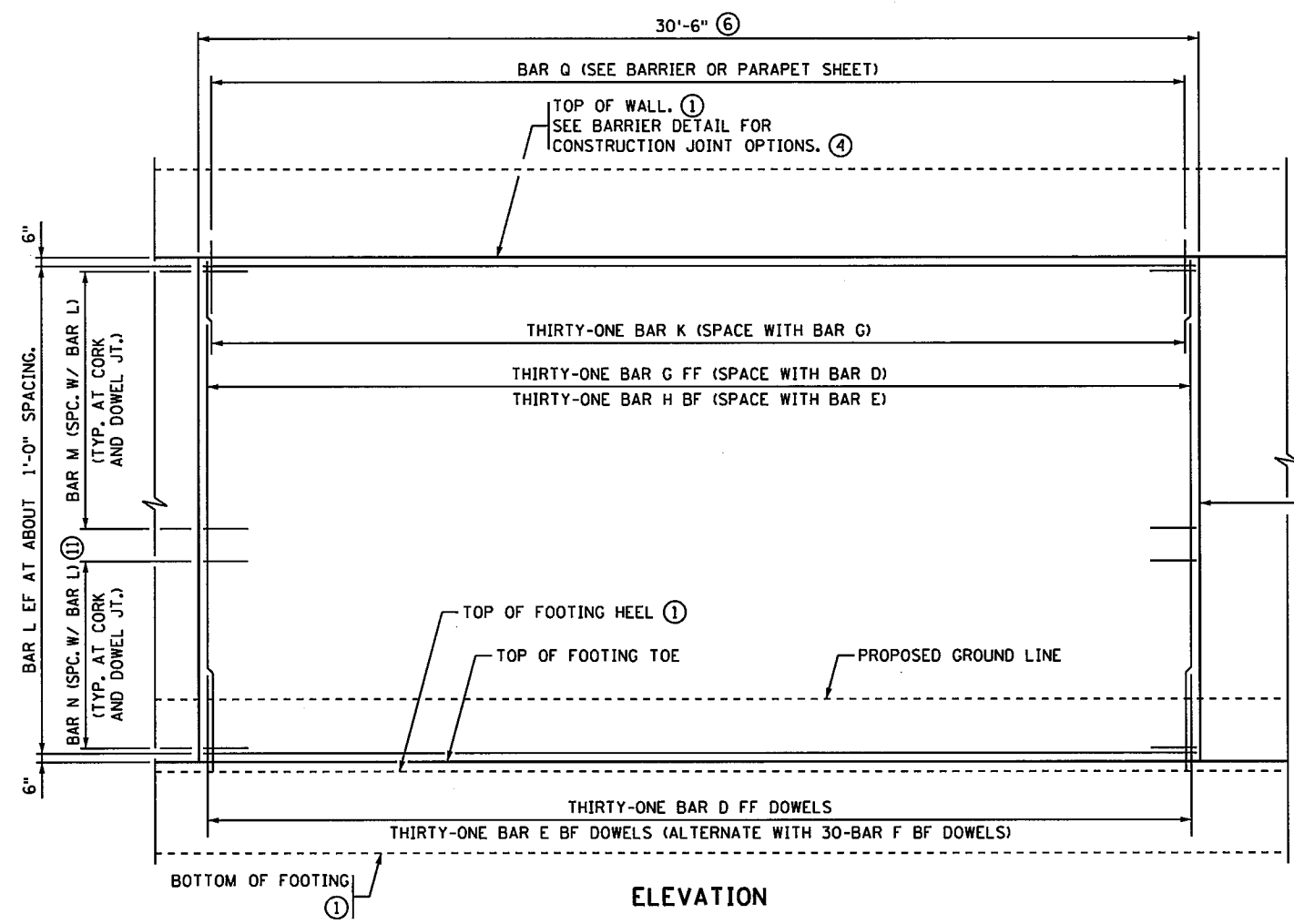
STANDARD PLAN 5-297.621 1 OF 1

S.P. NO. 6284-162 (TH35W) SHEET NO. 204 OF 367 SHEETS

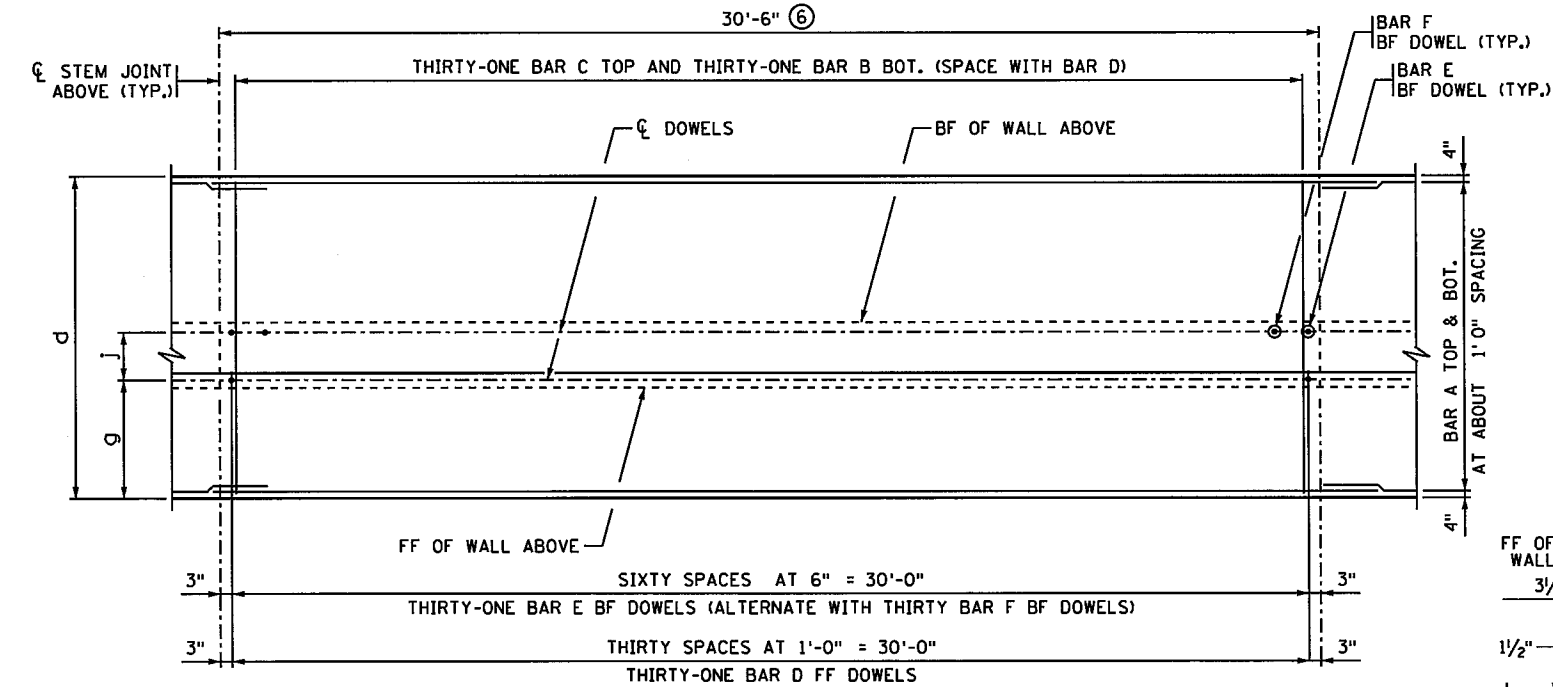
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12/8/2015

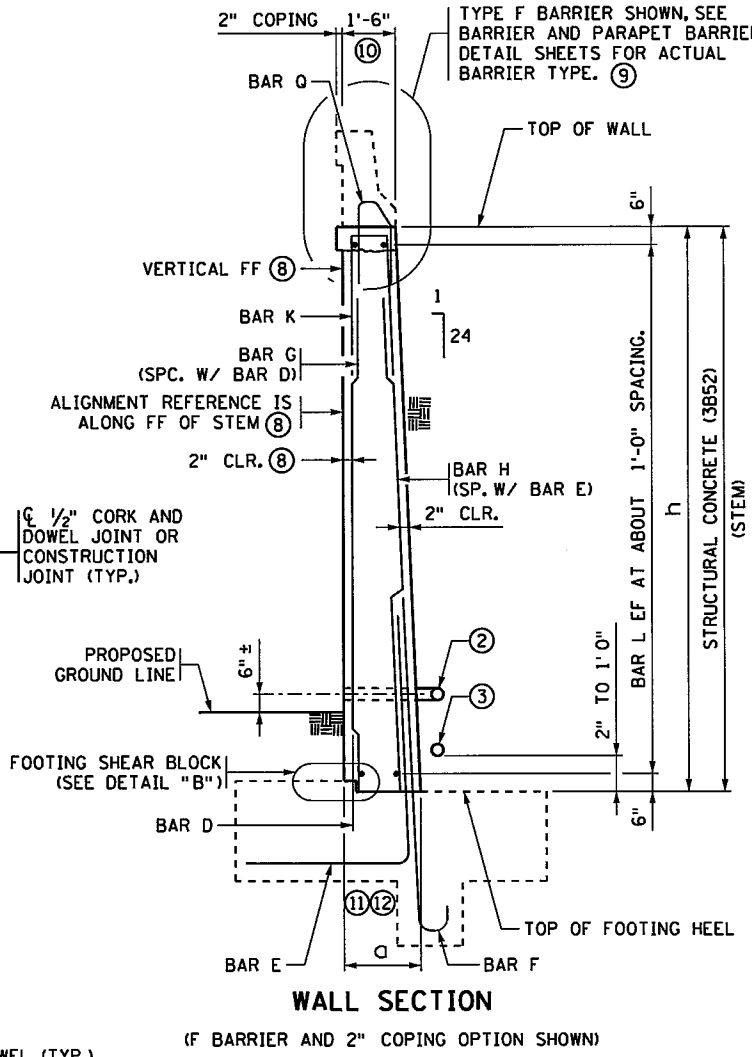
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ELEVATION

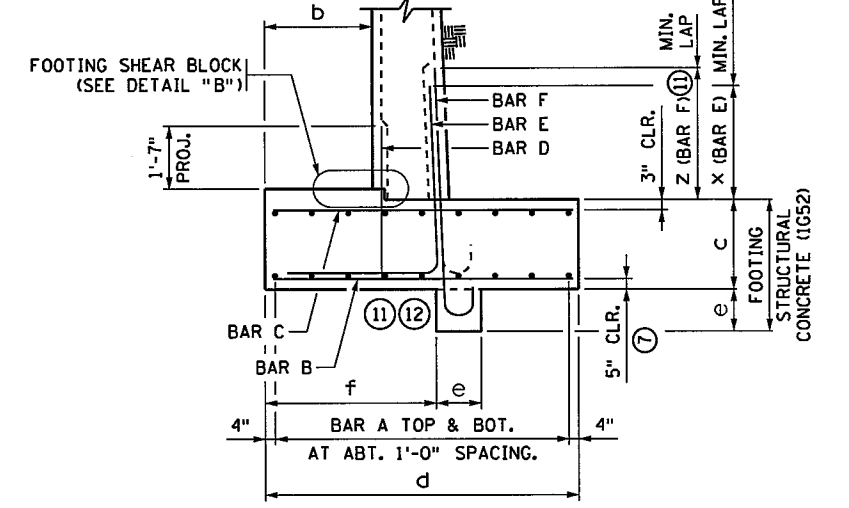


FOOTING PLAN ~ REINFORCEMENT

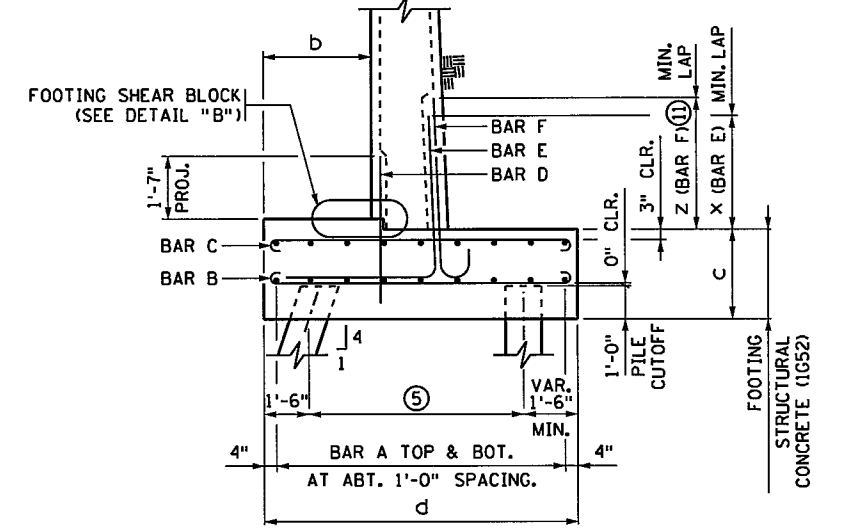


WALL SECTION

(F BARRIER AND 2" COPING OPTION SHOWN)



TYPICAL SECTION THROUGH SPREAD FOOTING



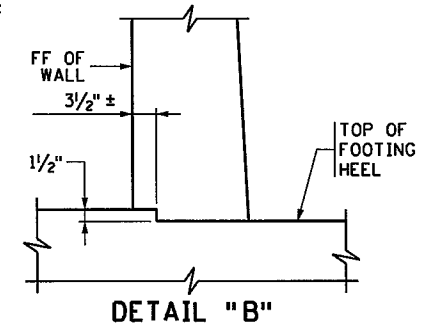
TYPICAL SECTION THROUGH PILE FOOTING

NOTES:

REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".
 STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.
 FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED.
 SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.

BF DENOTES BACK FACE.
 FF DENOTES FRONT FACE.
 EF DENOTES EACH FACE.

- ① STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.
- ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
- ⑥ AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.
- ⑦ 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.
- ⑧ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING.
- ⑪ THIS FEATURE MAY NOT BE PRESENT ON ALL MEDIUM HEIGHT WALLS.
- ⑫ CONTRACTOR MAY CONSTRUCT KEYWAY WITHOUT FORMS, AS APPROVED BY THE ENGINEER.



DETAIL "B"

REVISIONS:
 APPROVED: AUGUST 27, 2014
Nancy D. Berntsen
 STATE BRIDGE ENGINEER

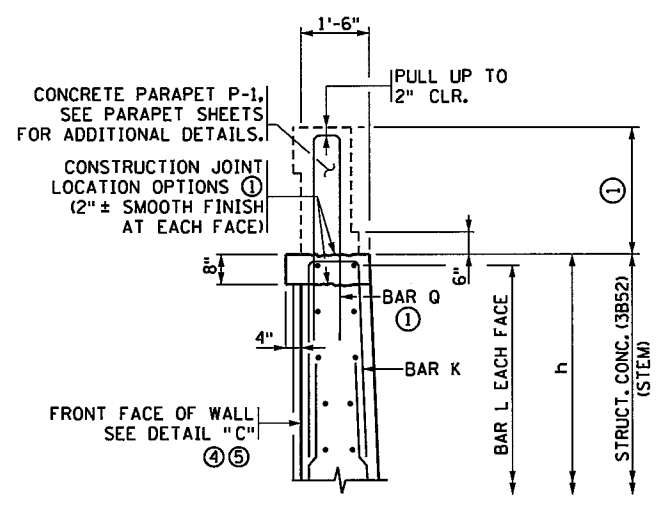
MINNESOTA DEPARTMENT OF TRANSPORTATION
 REVISOR:
Christopher R. ...
 STATE DESIGN ENGINEER
 APPROVED: 8-27-2014

RETAINING WALL REINFORCEMENT DETAILS
 (MEDIUM WALLS)
 RW5 OF RW14
 STANDARD PLAN 5-297.622 1 OF 1
 S.P. NO. 6284-162 (TH35W) SHEET NO. 205 OF 367 SHEETS

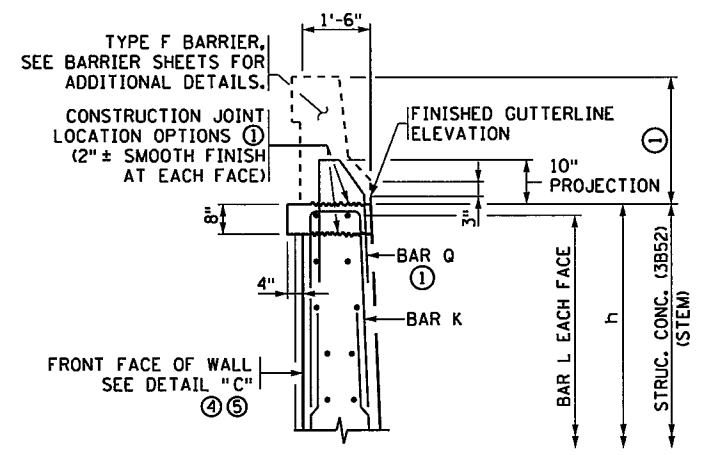
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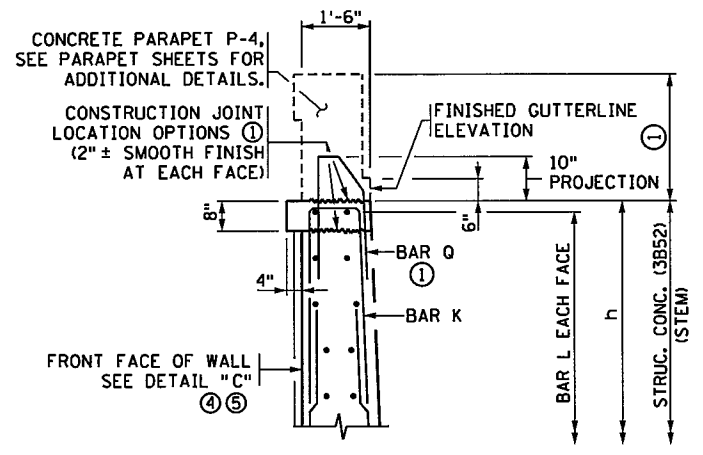
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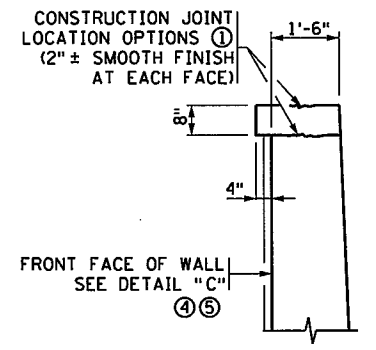
CONCRETE PARAPET P-1 DETAIL
2" COPING OPTION SHOWN



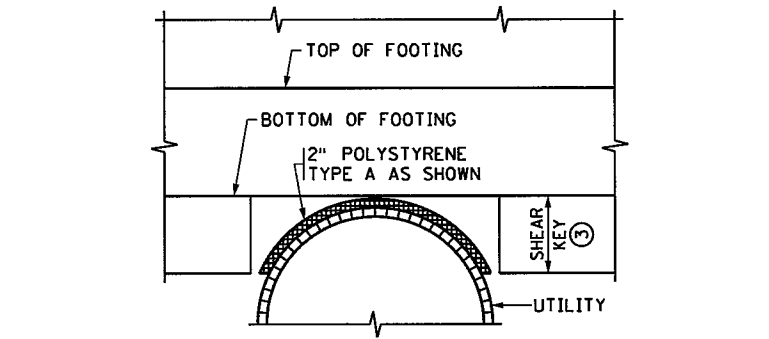
TYPE F BARRIER DETAIL
2" COPING OPTION SHOWN



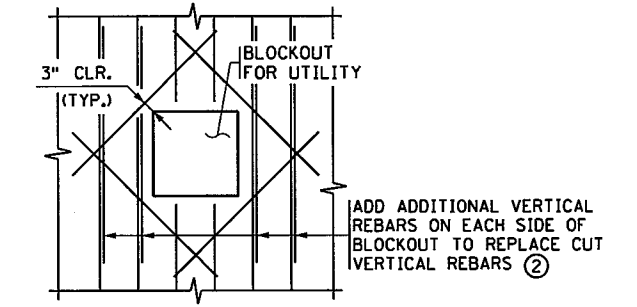
CONCRETE PARAPET P-4 DETAIL
2" COPING OPTION SHOWN



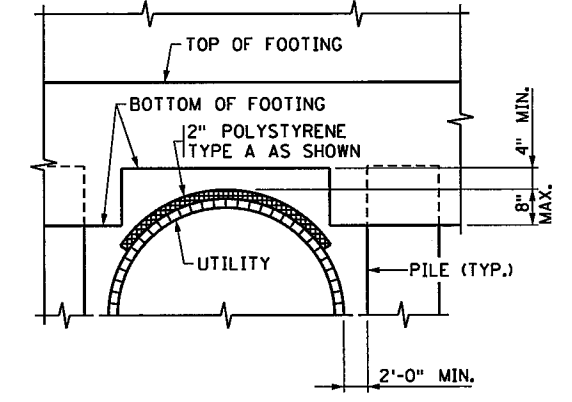
COPING DETAIL



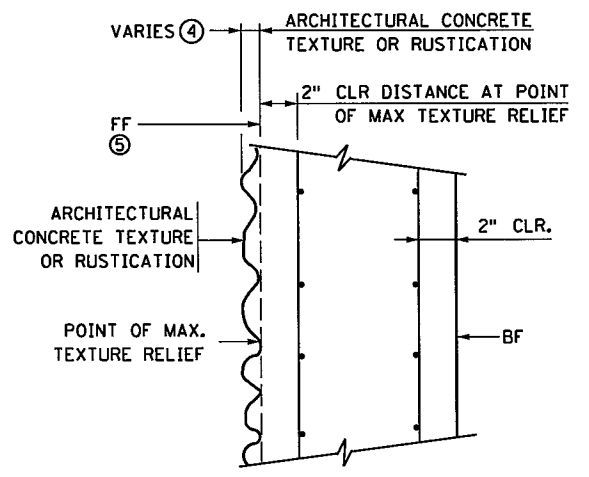
PIPE UNDER SPREAD FOOTING (THROUGH SHEAR KEY)



UTILITY BLOCKOUT DETAIL



PIPE THROUGH PILE FOOTING



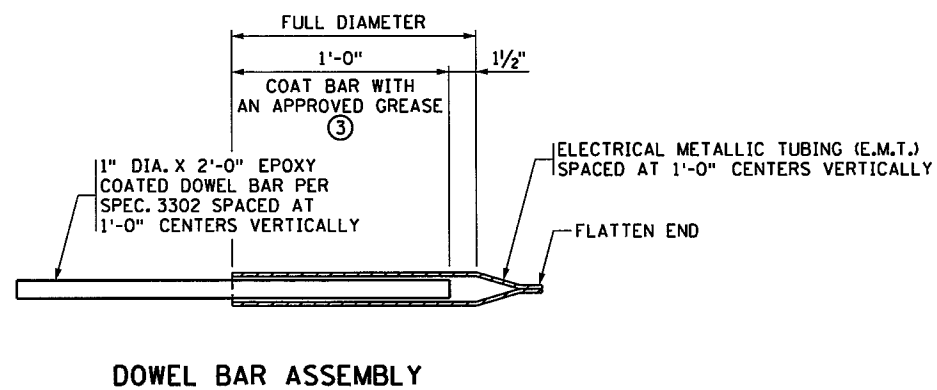
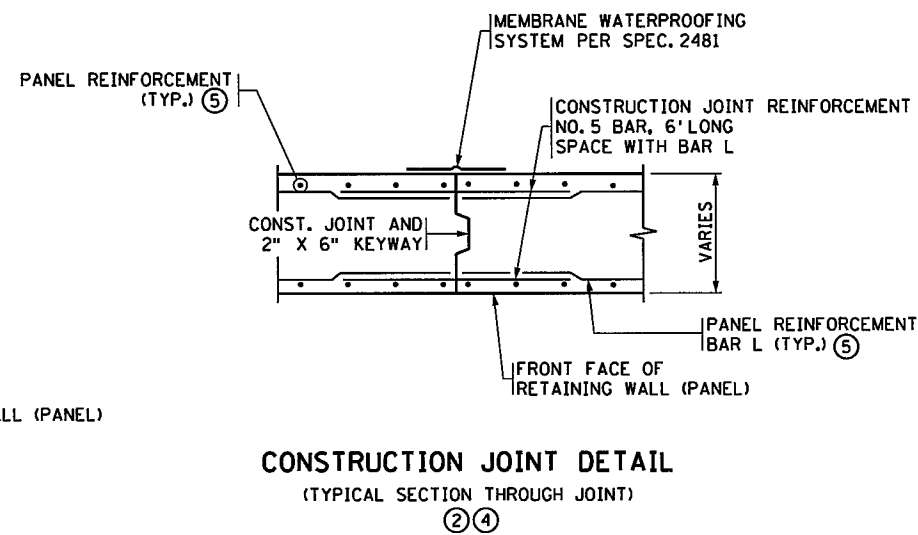
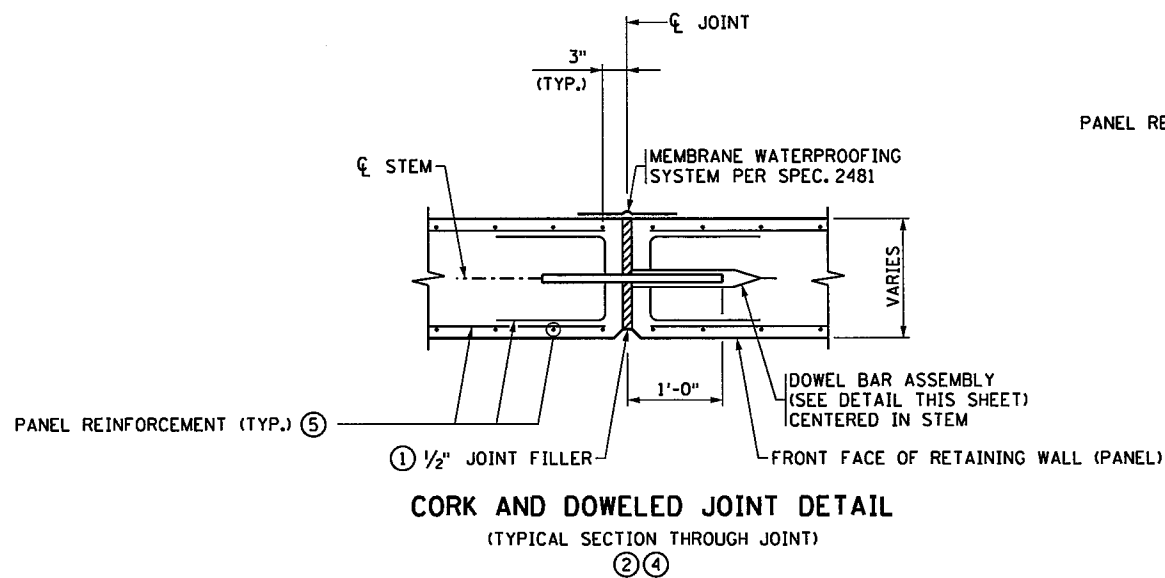
DETAIL "C"

NOTES:

- ARCHITECTURAL TREATMENT OPTION ON FRONT FACE OF RETAINING WALL, INCLUDING COPING OR HORIZONTAL REVEL OPTION TO BE DETERMINED BY MDOT.
- ① REFER TO PARAPET OR BARRIER SHEETS FOR ADDITIONAL INFORMATION INCLUDING Q BAR PLACEMENT DETAILS, AND PAYMENT.
- ② FIELD CUT/ADJUST VERTICAL AND HORIZONTAL REINFORCEMENT AS NECESSARY TO CLEAR BLOCKOUT. PLACE REINFORCEMENT AS SHOWN.
- ③ MODIFY AS NEEDED FOR INTERRUPTION.
- ④ THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF. THE STRUCTURAL CONCRETE 3Y43 QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. MATERIAL NEEDED FOR THE TEXTURING SHALL BE INCIDENTAL. SEE SPECIAL PROVISIONS 2411. TEXTURE RELIEF TO ADHERE TO FHWA CRASH BARRIER GUIDANCE WHENEVER THE WALL FACE IS INSIDE OR NEAR THE CLEAR ZONE.
- ⑤ FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WING WALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.

REVISIONS:
APPROVED: AUGUST 27, 2014
Nancy Dambenberger
STATE BRIDGE ENGINEER

STANDARD SHEET NO. 5-297.624 (1 OF 6)	TITLE: RETAINING WALL MISCELLANEOUS DETAILS
STANDARD APPROVED: AUGUST 27, 2014	RW6 OF RW14
STATE PROJ. NO. 6284-162 (TH35W) SHEET NO.206 OF 367 SHEETS	



NOTES:

THE MATERIALS AND PLACEMENT OF THE CORK AND DOWEL JOINT/ CONSTRUCTION JOINT (DOWEL BAR ASSEMBLIES, NO. 5 REINFORCING BARS, JOINT FILLER, AND JOINT WATERPROOFING) ARE INCIDENTAL.

THE CONTRACTOR SHALL ASSIGN TO THE REINFORCING BAR SUPPLIER THE RESPONSIBILITY OF SUPPLYING THE NECESSARY MATERIALS ASSOCIATED WITH THE DETAILS SHOWN ON THIS SHEET.

- ① JOINT FILLER SHALL BE CORK SPEC. 2401.3E3.
- ② AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 9'-6". A CORK AND DOWEL JOINT IS REQUIRED AT ALL VERTICAL FOOTING STEPS.
- ③ GREASE SHALL BE AN APPROVED HIGH PRESSURE TYPE THAT IS EFFECTIVE OVER THE FULL RANGE OF EXPECTED TEMPERATURES AND RESISTANT TO CHEMICAL ACTION.
- ④ DOWEL BAR ASSEMBLY MUST BE PLACED PERPENDICULAR TO JOINT AND PARALLEL TO THE WALL FACE, AND TO EACH OTHER.
- ⑤ SEE PANEL SHEETS FOR REINFORCING DETAILS.

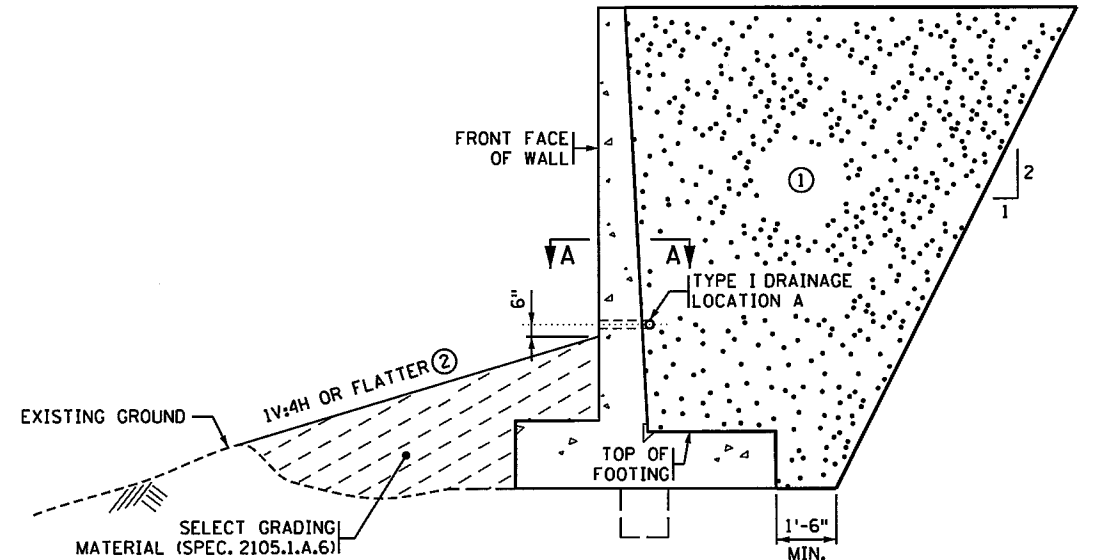
REVISION:
 APPROVED: AUGUST 27, 2014
Nancy S. Ambberger
 STATE BRIDGE ENGINEER

STANDARD SHEET NO. 5-297.624 (3 OF 6)	TITLE: RETAINING WALL MISCELLANEOUS DETAILS
STANDARD APPROVED: AUGUST 27, 2014	RW7 OF RW14
STATE PROJ. NO. 6284-162 (TH35W) SHEET NO.207 OF 367 SHEETS	

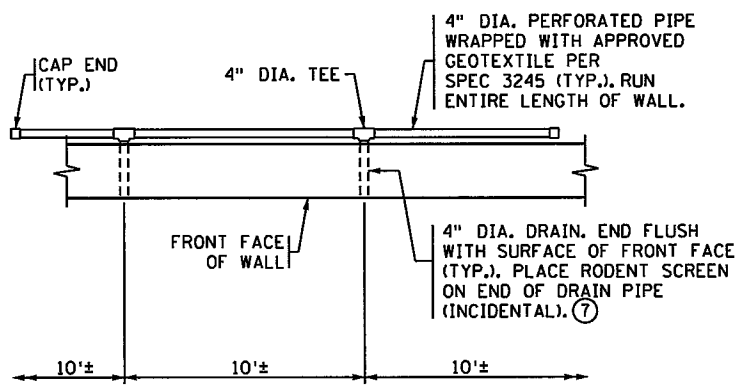
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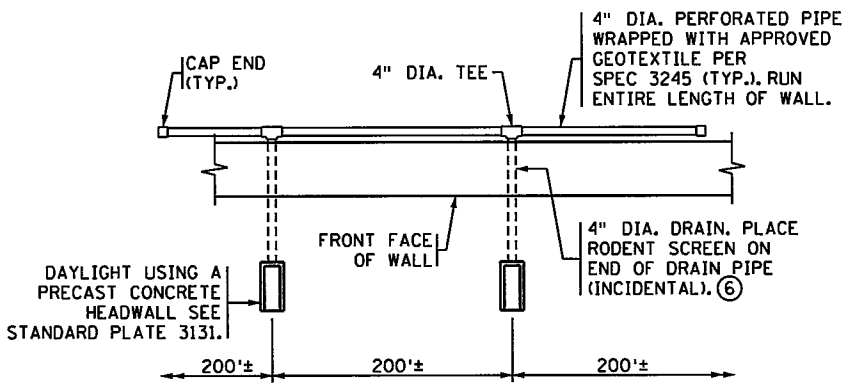
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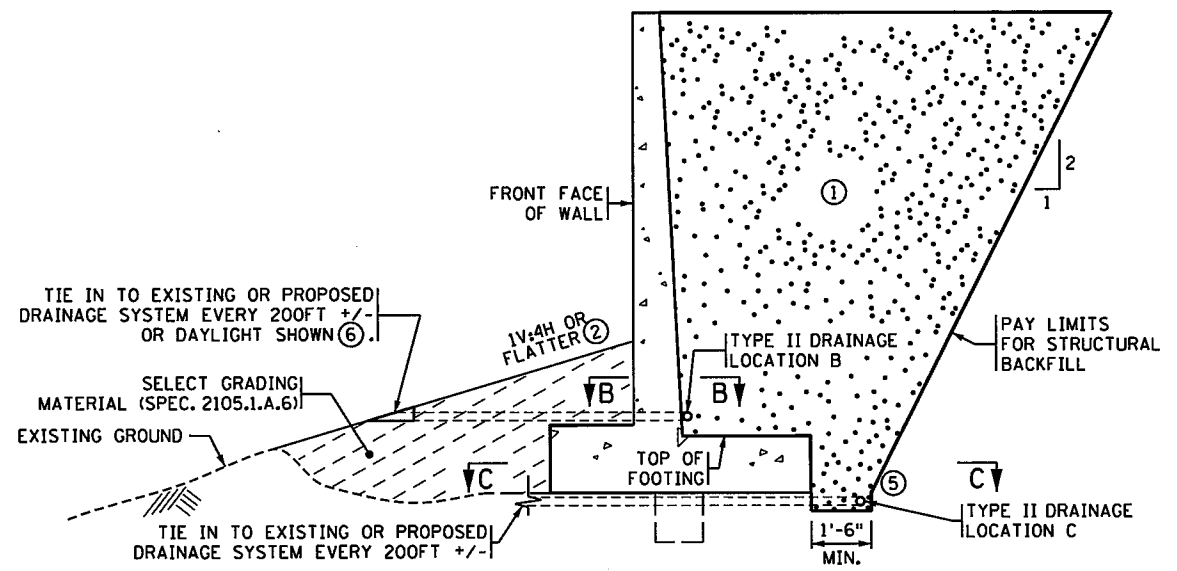
TYPICAL DRAINAGE SYSTEM DETAILS (TYPE I DRAINAGE) ④
(REFER TO SECTION A-A)



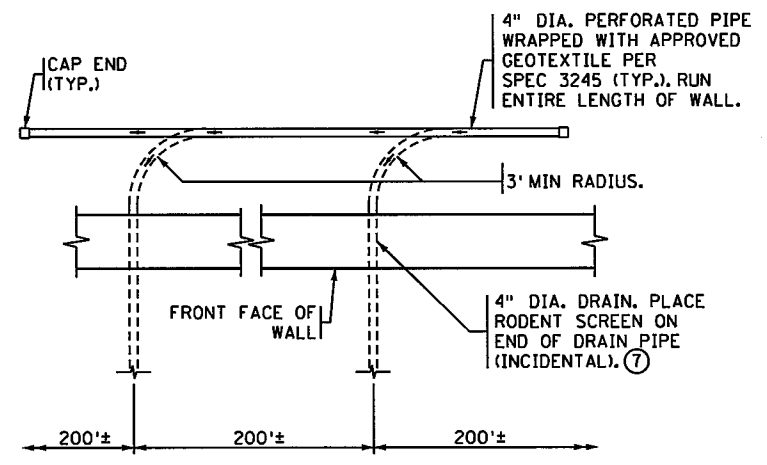
SECTION A-A
TYPE I DRAINAGE DETAIL, LOCATION A



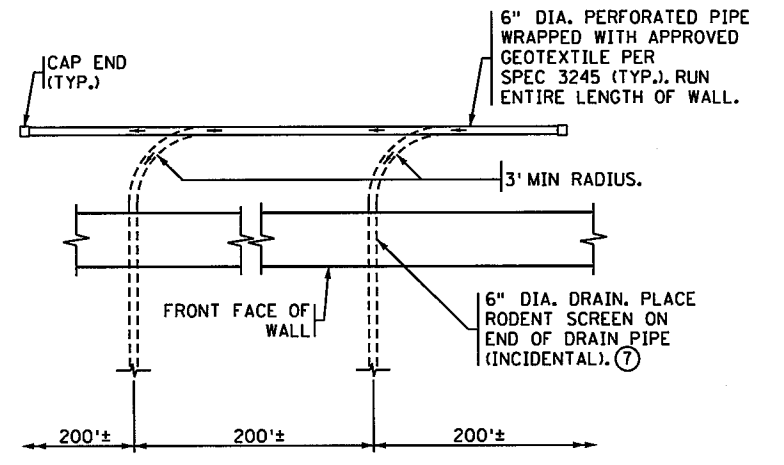
SECTION B-B
TYPE II DRAINAGE DETAIL, LOCATION B



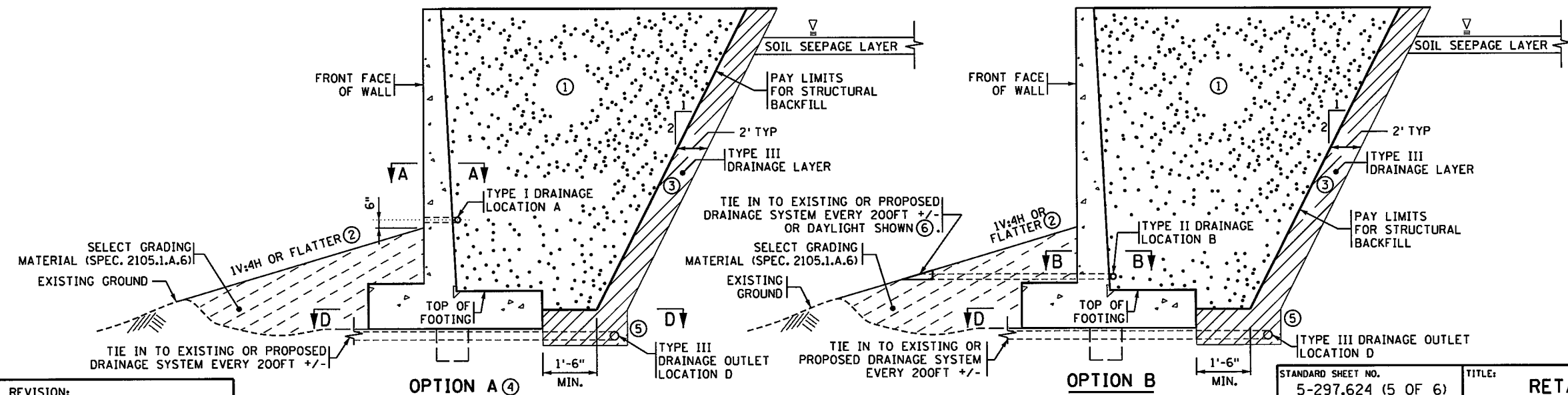
TYPICAL DRAINAGE SYSTEM DETAILS (TYPE II DRAINAGE)
(REFER TO SECTION B-B AND C-C)



SECTION C-C
TYPE II DRAINAGE DETAIL, LOCATION C



SECTION D-D
TYPE III DRAINAGE DETAIL, LOCATION D



OPTION A ④
(REFER TO SECTION A-A AND D-D)

OPTION B
(REFER TO SECTION B-B AND D-D)

TYPICAL DRAINAGE SYSTEM DETAILS (TYPE III DRAINAGE)

- NOTES:**
- BACKFILL MATERIAL SHALL COMPLETELY SURROUND PIPE AT ALL TIMES.
 - SLOPE PIPE TO ENSURE PROPER DRAINAGE AT ALL TIMES.
 - DRAINAGE SYSTEM PAID BY LUMP SUM PER SPEC. 2502.
 - ① STRUCTURAL BACKFILL. SEE SHEET 5-297.620. COMPACT BACKFILL TO SPECIFIED METHOD SPEC. 2105.3.F.1.
 - ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
 - ③ TYPE III DRAINAGE LAYER TO BE FINE FILTER AGGREGATE PER SPEC. 3149.2.J.2. FINE FILTER AGGREGATE MAY BE REPLACED WITH TYPE VI DRAINAGE GEOCOMPOSITE MATERIAL.
 - ④ DRAINAGE SYSTEMS INSTALLED AT LOCATION A SHALL NOT BE USED WHEN A SIDEWALK, TRAIL, OR ROADWAY IS LOCATED ADJACENT TO THE FRONT FACE OF THE WALL TO PREVENT PONDING OR ICE ACCUMULATION.
 - ⑤ EXTEND STRUCTURAL BACKFILL OR FINE FILTER AGGREGATE 8" BELOW BOTTOM OF FOOTING.
 - ⑥ TYPE II LOCATION B DRAINAGE MAY DAYLIGHT DIRECTLY USING PRECAST CONCRETE HEADWALLS OR BE TIED INTO DRAINAGE SYSTEM.
 - ⑦ THE RODENT SCREEN SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE 1/2" NO. 4F. IT SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Dubenberger
STATE BRIDGE ENGINEER

STANDARD SHEET NO.
5-297.624 (5 OF 6)
STANDARD APPROVED:
AUGUST 27, 2014

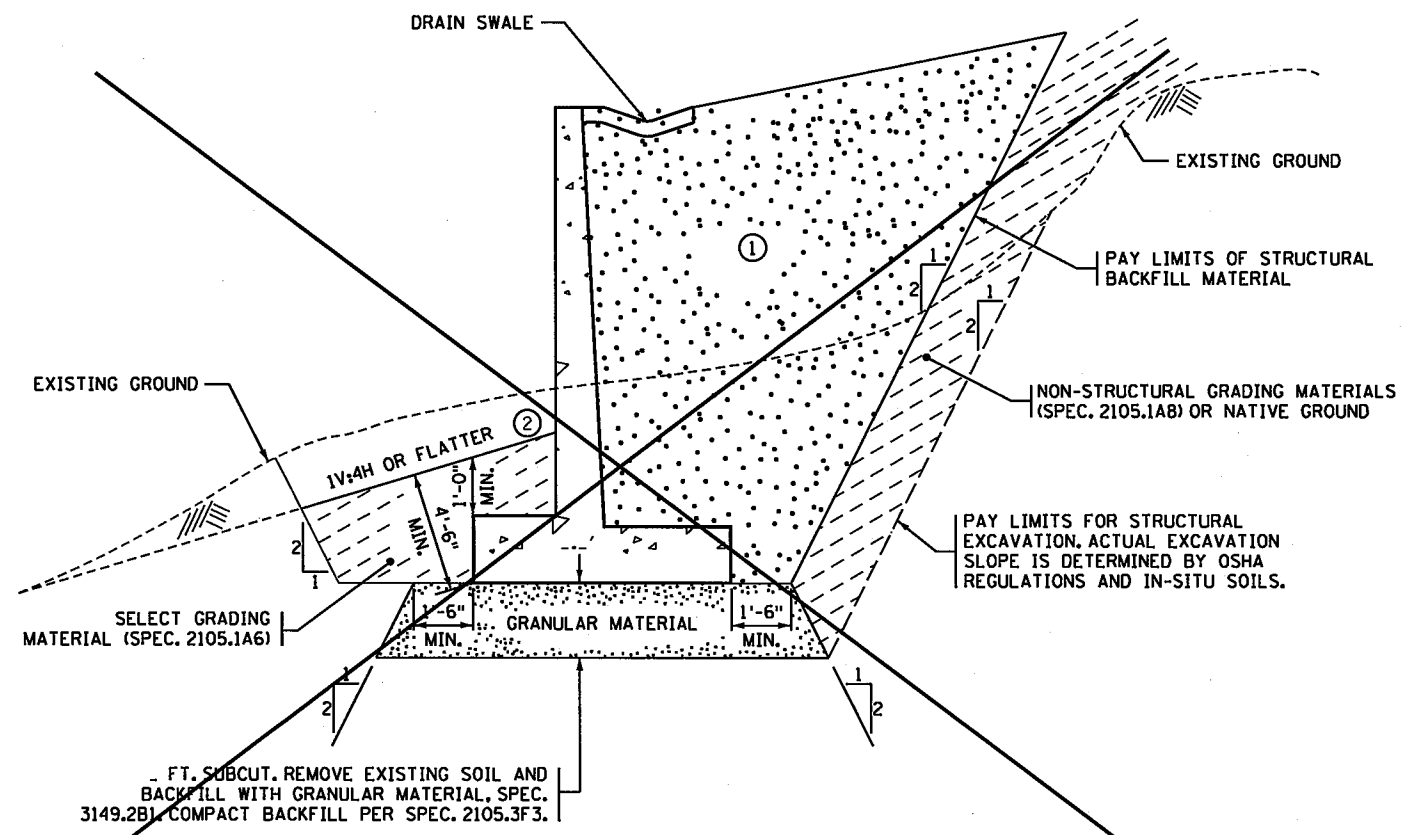
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RETAINING WALL MISCELLANEOUS DETAILS
(GEOTECHNICAL DETAILS)
RW8 OF RW14

STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. 208 OF 367 SHEETS

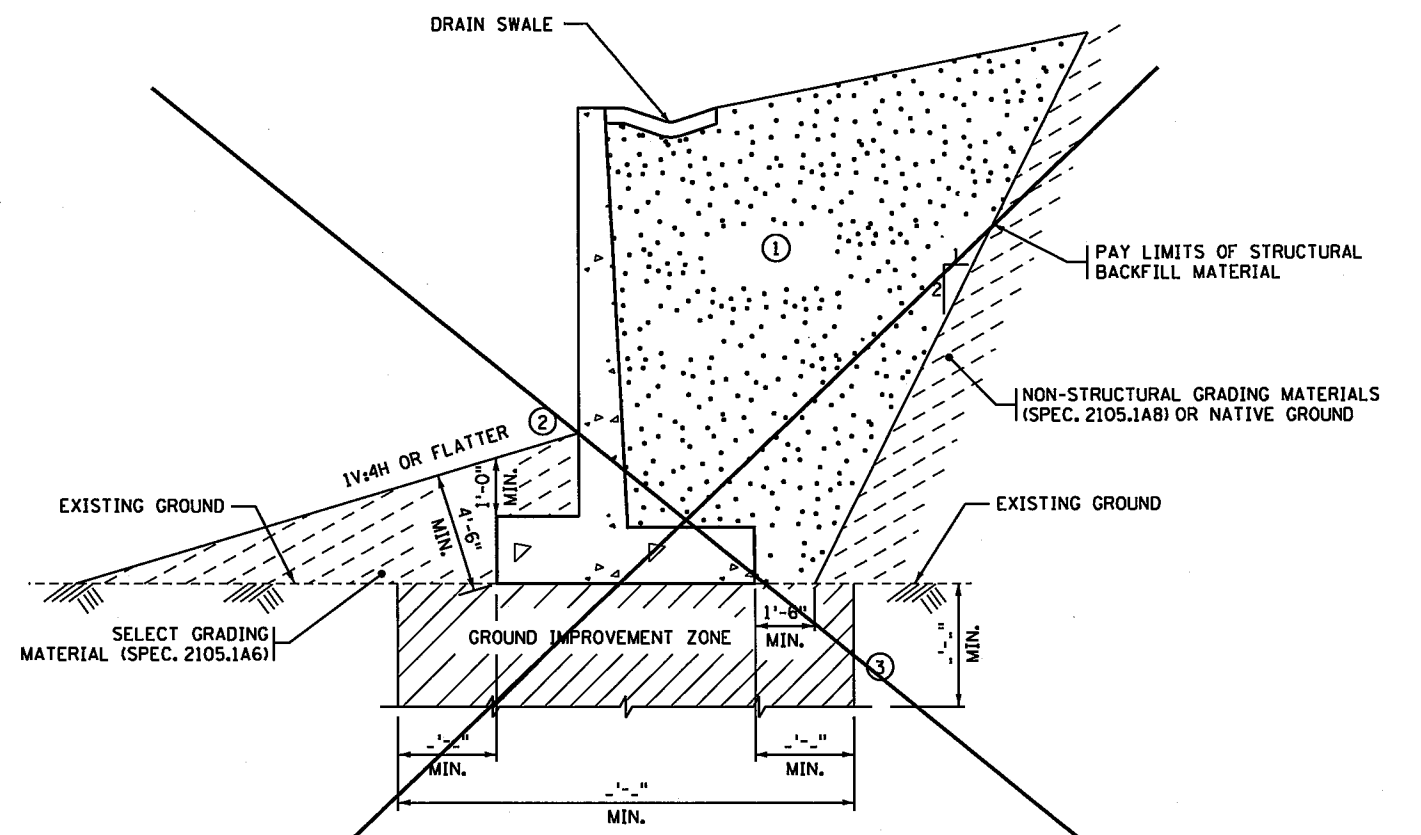
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2/16/2016

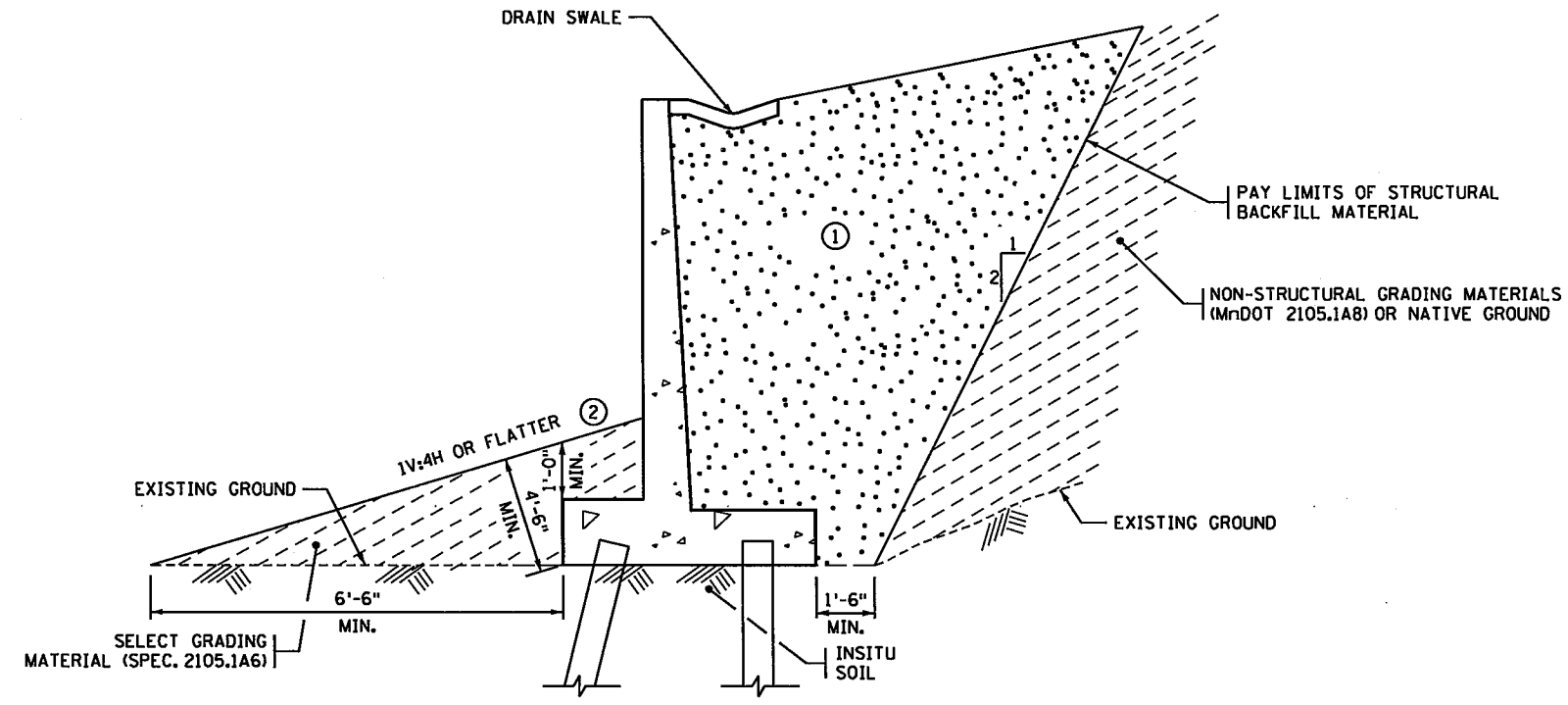
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\$MODELNAME\$



SPREAD FOOTING WITH SOIL SUBCUT
(NOT DRAWN TO SCALE)



SPREAD FOOTING PLACED OVER GROUND IMPROVEMENT
(NOT DRAWN TO SCALE)



PILE FOUNDATION
2-PILE SYSTEM SHOWN, OTHER SIMILAR
(NOT DRAWN TO SCALE)

- ① BACKFILL WITH STRUCTURAL BACKFILL SPEC. 3149.2D2 COMPACT BACKFILL PER SPEC. 2105.3F3.
- ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
- ③ PROVIDE SUFFICIENT COVERAGE AREA AND TREATMENT VOLUME TO GIVE GENERALLY UNIFORM SUPPORT TO THE FOUNDATION. IMPROVED GROUND OR SURFACE PREPARATIONS PLACED TO IMPROVE GROUND SUPPORT ARE TO BE IN IMMEDIATE CONTACT WITH THE FOOTING AND FOUNDATION MATERIAL.

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Saubenberg
STATE BRIDGE ENGINEER

MODIFIED	
DATE	DESCRIPTION

CERTIFIED BY *Mark K. Maves* 2/16/2016
LICENSED PROFESSIONAL ENGINEER DATE
NAME: MARK K MAVES LIC. NO. 20496

MODIFIED
STANDARD SHEET NO. 5-297.624 (6 OF 6)
STANDARD APPROVED: AUGUST 27, 2014

TITLE: **RETAINING WALL MISCELLANEOUS DETAILS (GEOTECHNICAL DETAILS)**
RW9 OF RW14
STATE PROJ. NO. 6284-162 (TH35W) SHEET NO.209 OF 367 SHEETS

BAR	MARK	NO.	LENGTH	A	LOCATION	WT.	DIMENSIONS & QUANTITIES			
h = 9' PANELS: A1 L = 20'-8"							AT LOW END: 7'-3" AT HIGH END: 8'-4"			
PILED FOOTING REINFORCEMENT							DIMENSIONS			
A	F 801	18	35'-4"	STR.	LONG T & B	1698	PILE FOOTING			
B	F 602	22	8'-10"	7'-6"	TRANS BOT	292	b	2'-9"	e	--
C	F 503	22	8'-8"	7'-6"	TRANS TOP	199	c	2'-0"	f	--
							d	8'-0"	g	2'-11 1/4"
							STEM			
							a	1'-10 1/2"	k	2'-1"
							j	1'-5 7/8"	x	--
							TOW THICKNESS 1'-6"			
							RUSTICATION THICK FF 0"			
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES			
D	F 504E	22	3'-0"	STR.	DOWEL FF	69	STRUCTURE CONCRETE (1G52)			
E	F 505E	22	7'-9"	4'-0"	DOWEL BF	178	(FOOTING)			
F	F 506E	-	-	-	DOWEL BF	-	PILE	12.5	CY	
G	S 401E	22	6'-2"	STR.	VERT FF	91				
H	S 502E	22	6'-2"	STR.	VERT BF	142	STRUCTURE CONCRETE (3B52)			
J	S 503E	-	-	-	STR.	VERT BF	-	(STEM)		
K	S 504E	22	10'-8"	4'-9"	TIE	245	10.0 CY			
L	S 405E	18	20'-2"	STR.	HORIZ EF	242	REINFORCEMENT (PLAIN)			
M	S 506E	18	7'-4"	1'-4"	EXP JT TIE	138	PILE	2189	LB	
N	S 507E	-	7'-9"	1'-9"	EXP JT TIE	-				
P	S 508E	-	8'-2"	2'-2"	EXP JT TIE	-	REINFORCEMENT (EPOXY)			
Q	S 509E	34	6'-11"	3'-1"	J-RAIL DOWEL	245	1350 LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT.	DIMENSIONS & QUANTITIES			
h = 12' PANELS: C1 L = 30'-0"							AT LOW END: 11'-9" AT HIGH END: 11'-10"			
PILED FOOTING REINFORCEMENT							DIMENSIONS			
A	F 701	18	34'-2"	STR.	LONG T & B	1257	PILE FOOTING			
B	F 602	31	8'-10"	7'-6"	TRANS BOT	411	b	2'-9"	e	--
C	F 503	31	8'-8"	7'-6"	TRANS TOP	280	c	2'-3"	f	--
							d	8'-0"	g	2'-11 1/4"
							STEM			
							a	2'-0"	k	2'-1"
							j	1'-7 3/8"	x	2'-3"
							TOW THICKNESS 1'-6"			
							RUSTICATION THICK FF 0"			
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES			
D	F 504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURE CONCRETE (1G52)			
E	F 505E	31	8'-1"	4'-2"	DOWEL BF	261	(FOOTING)			
F	F 506E	30	4'-3"	3'-2"	DOWEL BF	133	PILE	20.4	CY	
G	S 401E	31	9'-2"	STR.	VERT FF	190				
H	S 502E	31	9'-2"	STR.	VERT BF	296	STRUCTURE CONCRETE (3B52)			
J	S 503E	-	-	-	STR.	VERT BF	-	(STEM)		
K	S 504E	31	10'-8"	4'-9"	TIE	345	22.9 CY			
L	S 405E	24	29'-6"	STR.	HORIZ EF	473	REINFORCEMENT (PLAIN)			
M	S 506E	20	7'-4"	1'-4"	EXP JT TIE	153	PILE	1948	LB	
N	S 507E	4	7'-9"	1'-9"	EXP JT TIE	32				
P	S 508E	-	8'-2"	2'-2"	EXP JT TIE	-	REINFORCEMENT (EPOXY)			
Q	S 509E	34	6'-11"	3'-1"	J-RAIL DOWEL	245	2225 LB			

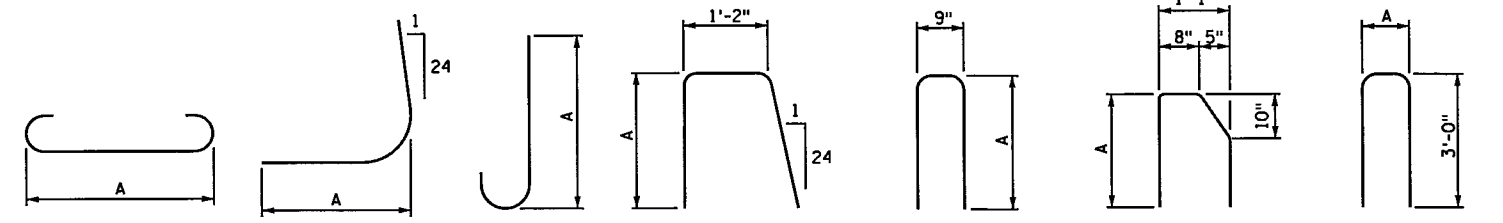
BAR	MARK	NO.	LENGTH	A	LOCATION	WT.	DIMENSIONS & QUANTITIES			
h = 8' PANELS: A2 L = 30'-6"							AT LOW END: 5'-8" AT HIGH END: 7'-3"			
PILED FOOTING REINFORCEMENT							DIMENSIONS			
A	F 801	18	35'-4"	STR.	LONG T & B	1698	PILE FOOTING			
B	F 602	31	8'-10"	7'-6"	TRANS BOT	411	b	2'-9"	e	--
C	F 503	31	8'-8"	7'-6"	TRANS TOP	280	c	2'-0"	f	--
							d	8'-0"	g	2'-11 1/4"
							STEM			
							a	1'-10"	k	2'-1"
							j	1'-5 3/8"	x	--
							TOW THICKNESS 1'-6"			
							RUSTICATION THICK FF 0"			
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES			
D	F 504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURE CONCRETE (1G52)			
E	F 505E	31	4'-4"	0'-10"	DOWEL BF	140	(FOOTING)			
F	F 506E	-	-	-	DOWEL BF	-	PILE	18.5	CY	
G	S 401E	31	5'-2"	STR.	VERT FF	107				
H	S 502E	31	5'-2"	STR.	VERT BF	167	STRUCTURE CONCRETE (3B52)			
J	S 503E	-	-	-	STR.	VERT BF	-	(STEM)		
K	S 504E	31	10'-8"	4'-9"	TIE	345	12.1 CY			
L	S 405E	16	30'-0"	STR.	HORIZ EF	321	REINFORCEMENT (PLAIN)			
M	S 506E	16	7'-4"	1'-4"	EXP JT TIE	122	PILE	2389	LB	
N	S 507E	-	7'-9"	1'-9"	EXP JT TIE	-				
P	S 508E	-	8'-2"	2'-2"	EXP JT TIE	-	REINFORCEMENT (EPOXY)			
Q	S 509E	34	6'-11"	3'-1"	J-RAIL DOWEL	245	1544 LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT.	DIMENSIONS & QUANTITIES			
h = 12' PANELS: C2 L = 30'-6"							AT LOW END: 11'-7" AT HIGH END: 11'-9"			
PILED FOOTING REINFORCEMENT							DIMENSIONS			
A	F 701	18	34'-2"	STR.	LONG T & B	1257	PILE FOOTING			
B	F 602	31	8'-10"	7'-6"	TRANS BOT	411	b	2'-9"	e	--
C	F 503	31	8'-8"	7'-6"	TRANS TOP	280	c	2'-3"	f	--
							d	8'-0"	g	2'-11 1/4"
							STEM			
							a	2'-0"	k	2'-1"
							j	1'-7 3/8"	x	2'-3"
							TOW THICKNESS 1'-6"			
							RUSTICATION THICK FF 0"			
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES			
D	F 504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURE CONCRETE (1G52)			
E	F 505E	31	8'-1"	4'-2"	DOWEL BF	261	(FOOTING)			
F	F 506E	30	4'-3"	3'-2"	DOWEL BF	133	PILE	20.8	CY	
G	S 401E	31	9'-2"	STR.	VERT FF	190				
H	S 502E	31	9'-2"	STR.	VERT BF	296	STRUCTURE CONCRETE (3B52)			
J	S 503E	-	-	-	STR.	VERT BF	-	(STEM)		
K	S 504E	31	10'-8"	4'-9"	TIE	345	23.0 CY			
L	S 405E	24	30'-0"	STR.	HORIZ EF	481	REINFORCEMENT (PLAIN)			
M	S 506E	20	7'-4"	1'-4"	EXP JT TIE	153	PILE	1948	LB	
N	S 507E	4	7'-9"	1'-9"	EXP JT TIE	32				
P	S 508E	-	8'-2"	2'-2"	EXP JT TIE	-	REINFORCEMENT (EPOXY)			
Q	S 509E	34	6'-11"	3'-1"	J-RAIL DOWEL	245	2233 LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT.	DIMENSIONS & QUANTITIES			
h = 6' PANELS: A3 L = 30'-6"							AT LOW END: 4'-1" AT HIGH END: 5'-8"			
PILED FOOTING REINFORCEMENT							DIMENSIONS			
A	F 701	18	34'-2"	STR.	LONG T & B	1257	PILE FOOTING			
B	F 602	31	8'-10"	7'-6"	TRANS BOT	411	b	2'-9"	e	--
C	F 503	31	8'-8"	7'-6"	TRANS TOP	280	c	2'-0"	f	--
							d	8'-0"	g	2'-11 1/4"
							STEM			
							a	1'-9"	k	2'-1"
							j	1'-4 3/8"	x	--
							TOW THICKNESS 1'-6"			
							RUSTICATION THICK FF 0"			
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES			
D	F 504E	31	3'-0"	STR.	DOWEL FF	97	STRUCTURE CONCRETE (1G52)			
E	F 505E	31	4'-4"	0'-10"	DOWEL BF	140	(FOOTING)			
F	F 506E	-	-	-	DOWEL BF	-	PILE	18.5	CY	
G	S 401E	31	3'-11"	STR.	VERT FF	81				
H	S 502E	31	3'-11"	STR.	VERT BF	127	STRUCTURE CONCRETE (3B52)			
J	S 503E	-	-	-	STR.	VERT BF	-	(STEM)		
K	S 504E	31	7'-2"	3'-0"	TIE	232	8.9 CY			
L	S 405E	12	30'-0"	STR.	HORIZ EF	240	REINFORCEMENT (PLAIN)			
M	S 506E	12	7'-4"	1'-4"	EXP JT TIE	92	PILE	1948	LB	
N	S 507E	-	7'-9"	1'-9"	EXP JT TIE	-				
P	S 508E	-	8'-2"	2'-2"	EXP JT TIE	-	REINFORCEMENT (EPOXY)			
Q	S 509E	34	6'-11"	3'-1"	J-RAIL DOWEL	245	1254 LB			

BAR	MARK	NO.	LENGTH	A	LOCATION	WT.	DIMENSIONS & QUANTITIES			
h = 12' PANELS: C3 L = 27'-8"							AT LOW END: 11'-3" AT HIGH END: 11'-7"			
PILED FOOTING REINFORCEMENT							DIMENSIONS			
A	F 701	18	34'-2"	STR.	LONG T & B	1257	PILE FOOTING			
B	F 602	29	8'-10"	7'-6"	TRANS BOT	385	b	2'-9"	e	--
C	F 503	29	8'-8"	7'-6"	TRANS TOP	262	c	2'-3"	f	--
							d	8'-0"	g	2'-11 1/4"
							STEM			
							a	2'-0"	k	2'-1"
							j	1'-7 3/8"	x	2'-3"
							TOW THICKNESS 1'-6"			
							RUSTICATION THICK FF 0"			
FOOTING DOWELS & STEM REINFORCEMENT							QUANTITIES			
D	F 504E	29	3'-0"	STR.	DOWEL FF	91	STRUCTURE CONCRETE (1G52)			
E	F 505E	29	8'-1"	4'-2"	DOWEL BF	244	(FOOTING)			
F	F 506E	28	4'-3"	3'-2"	DOWEL BF	124	PILE	18.8	CY	
G	S 401E	29	9'-2"	STR.	VERT FF	178				
H	S 502E	29	9'-2"	STR.	VERT BF	277	STRUCTURE CONCRETE (3B52)			
J	S 503E	-	-	-	STR.	VERT BF	-	(STEM)		
K	S 504E	29	10'-8"	4'-9"	TIE	323	20.4 CY			
L	S 405E	24	27'-2"	STR.	HORIZ EF	436	REINFORCEMENT (PLAIN)			
M	S 506E	20	7'-4"	1'-4"	EXP JT TIE	153	PILE	1904	LB	
N	S 507E	4	7'-9"	1'-9"	EXP JT TIE	32				
P	S 508E	-	8'-2"	2'-2"	EXP JT TIE	-	REINFORCEMENT (EPOXY)			
Q	S 509E	34	6'-11"	3'-1"	J-RAIL DOWEL	245	2103 LB			

* BAR LISTS SHOW REINFORCEMENT FOR PILED FOOTINGS ONLY AND ARE FOR SPECIFIC INDIVIDUAL PANELS AS SHOWN. QUANTITIES REFLECT ACTUAL INDIVIDUAL PANEL DIMENSIONS.



- NOTES:
- L = DENOTES PANEL LENGTH.
 - FF = DENOTES FRONT FACE.
 - BF = DENOTES BACK FACE.
 - EF = DENOTES EACH FACE.
 - DWL = DENOTES DOWEL.
 - BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED.
 - x = PROJECTION OF BAR E INTO STEM.
 - z = PROJECTION OF BAR F INTO STEM.

* DENOTES MODIFICATION FROM STANDARD PLAN

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Rubenberger
STATE BRIDGE ENGINEER

CERTIFIED BY: *Mark K. Maves*
LIC. NO. 20496
PRINTED NAME: MARK K MAVES
LIC. NO. 20496

MODIFIED
REVISOR:
APPROVED: *Christina Ky*
8-27-2014
STATE DESIGN ENGINEER

RETAINING WALL PANEL TABULATIONS (LIVE LOAD SURCHARGE) RW10 OF RW14
STANDARD PLAN 5-297.628 1 OF 3
S.P. NO. 6284-162 (TH35W) SHEET NO. 2100F 367 SHEETS

11/06/11 AM

12/8/2015

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Table for Panel B1 (h=14', L=18'-2") showing dimensions and quantities for reinforcement bars (A-Q).

Table for Panel B2 (h=13', L=30'-6") showing dimensions and quantities for reinforcement bars (A-Q).

Table for Panel B3 (h=11', L=30'-6") showing dimensions and quantities for reinforcement bars (A-Q).

Table for Panel B4 (h=10', L=30'-6") showing dimensions and quantities for reinforcement bars (A-Q).

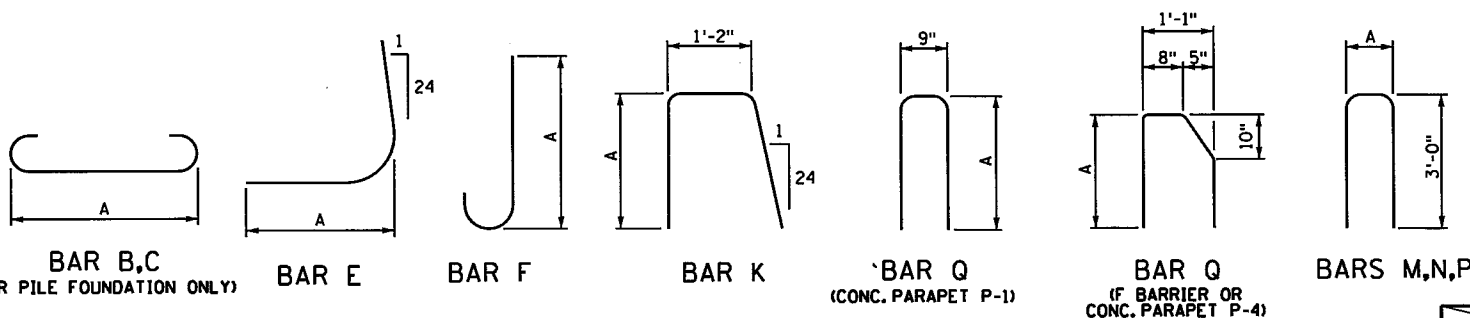
Table for Panel B5 (h=8', L=30'-6") showing dimensions and quantities for reinforcement bars (A-Q).

Table for Panel B6 (h=7', L=30'-6") showing dimensions and quantities for reinforcement bars (A-Q).

Table for Panel B7 (h=5', L=30'-6") showing dimensions and quantities for reinforcement bars (A-Q).

Table for Panel B8 (h=5', L=30'-6") showing dimensions and quantities for reinforcement bars (A-Q).

* BAR LISTS SHOW REINFORCEMENT FOR PILED FOOTINGS ONLY AND ARE FOR SPECIFIC INDIVIDUAL PANELS AS SHOWN. QUANTITIES REFLECT ACTUAL INDIVIDUAL PANEL DIMENSIONS.



NOTES: L = DENOTES PANEL LENGTH. FF = DENOTES FRONT FACE. BF = DENOTES BACK FACE. EF = DENOTES EACH FACE. DWL = DENOTES DWEL. BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED. X = PROJECTION OF BAR E INTO STEM. Z = PROJECTION OF BAR F INTO STEM.

REVISION: APPROVED: AUGUST 27, 2014 [Signature]

CERTIFIED BY [Signature] MARK K MAVES LIC. NO. 20496

MINNESOTA DEPARTMENT OF TRANSPORTATION STATE DESIGN ENGINEER [Signature] 8-27-2014

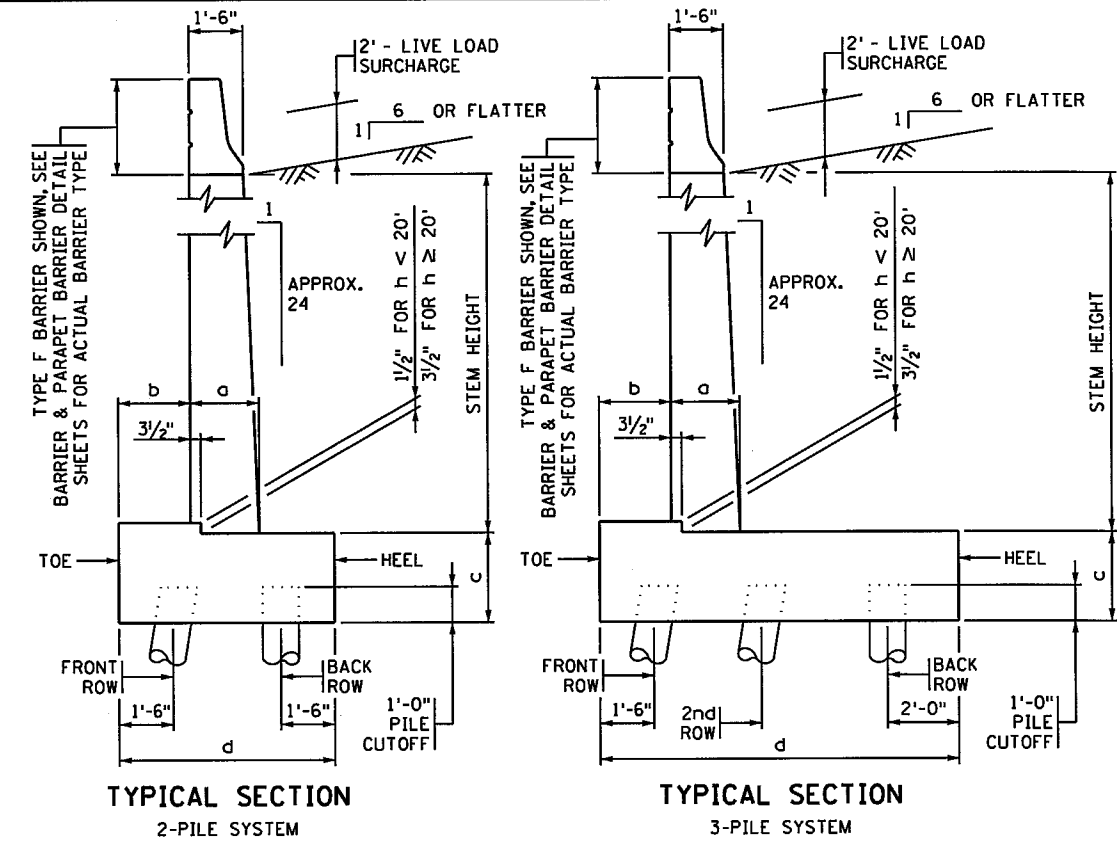
RETAINING WALL PANEL TABULATIONS (LIVE LOAD SURCHARGE) STANDARD PLAN 5-297.628 1 OF 3 S.P. NO. 6284-162 (TH35W) SHEET NO. 211 OF 367 SHEETS

**PILE FOOTING DIMENSIONS AND PILE SPACING - 100 TON FACTORED RESISTANCE PILE
LIVE LOAD SURCHARGE**

SHORT WALL (5'-8')
MEDIUM WALL (9'-16')
TALL WALL (17'-27')

STEM HEIGHT	PILE SPACING										QUANTITIES				WALL DETAILING SCHEME		
	FOOTING GEOMETRY				TRANSVERSE				LONGITUDINAL (3)				PER FOOT				
	DIM. a	DIM. b	DIM. c	DIM. d	FRONT ROW TO BACK ROW	FRONT ROW TO 2ND ROW	2ND ROW TO 3RD ROW	3RD ROW TO BACK ROW	BACK ROW TO HEEL	FRONT ROW	2ND ROW	3RD ROW	BACK ROW	STEEL PLAIN (POUND)		CONCRETE 1652 CU. YD.	NO. OF PILES
5	1'-8 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	63.87	0.61	0.167	SHORT
6	1'-9"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	63.87	0.61	0.167	SHORT
7	1'-9 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	78.33	0.61	0.167	SHORT
8	1'-10"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	78.33	0.61	0.167	SHORT
9	1'-10 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	78.33	0.61	0.167	MEDIUM
10	1'-11"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	96.07	0.61	0.167	MEDIUM
11	1'-11 1/2"	2'-9"	2'-0"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	12'-0"	N.A.	N.A.	12'-0"	96.07	0.61	0.167	MEDIUM
12	2'-0"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
13	2'-0 1/2"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
14	2'-1"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
15	2'-1 1/2"	2'-9"	2'-3"	8'-0"	5'-0"	N.A.	N.A.	N.A.	1'-6"	10'-0"	N.A.	N.A.	10'-0"	63.87	0.68	0.200	MEDIUM
16	2'-2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	N.A.	8'-0"	77.74	0.99	0.375	MEDIUM
17	2'-2 1/2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	N.A.	8'-0"	77.74	0.99	0.375	TALL
18	2'-3"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	N.A.	8'-0"	77.74	0.99	0.375	TALL
19	2'-3 1/2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	N.A.	8'-0"	77.74	0.99	0.375	TALL
20	2'-4"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	N.A.	8'-0"	77.74	1.02	0.375	TALL
21	2'-4 1/2"	4'-0"	2'-6"	10'-6"	N.A.	3'-6"	3'-6"	N.A.	2'-0"	8'-0"	8'-0"	N.A.	8'-0"	77.74	1.02	0.375	TALL
22	2'-5"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
23	2'-5 1/2"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
24	2'-6"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
25	2'-6 1/2"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	112.03	1.44	0.615	TALL
26	2'-7"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	125.34	1.44	0.615	TALL
27	2'-7 1/2"	5'-6"	2'-9"	13'-6"	N.A.	3'-3"	3'-3"	3'-6"	2'-0"	6'-6"	6'-6"	6'-6"	6'-6"	138.66	1.44	0.615	TALL

N.A. = NOT APPLICABLE



TYPICAL SECTION
2-PILE SYSTEM

TYPICAL SECTION
3-PILE SYSTEM

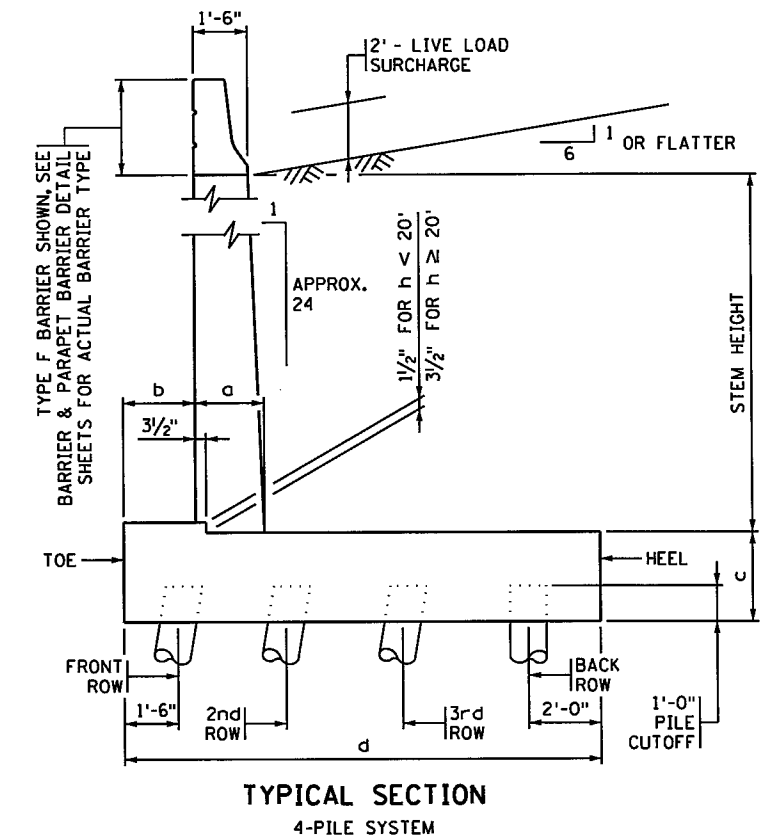
STEM HEIGHT	REINFORCEMENT - PILE FOUNDATION			
	STEM	FOOTING		
		DOWEL SIZE AND SPACING	TOE (BOTTOM TRANSVERSE)	HEEL (TOP TRANSVERSE)
5	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
6	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
7	5 @ 12"	6 @ 12"	5 @ 12"	8 @ 12"
8	5 @ 12"	6 @ 12"	5 @ 12"	8 @ 12"
9	5 @ 12"	6 @ 12"	5 @ 12"	8 @ 12"
10	5 @ 12"	6 @ 12"	5 @ 12"	9 @ 12"
11	5 @ 12"	6 @ 12"	5 @ 12"	9 @ 12"
12	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
13	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
14	5 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
15	6 @ 12"	6 @ 12"	5 @ 12"	7 @ 12"
16	6 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
17	6 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
18	6 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
19	7 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
20	7 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
21	8 @ 12"	7 @ 12"	6 @ 12"	6 @ 12"
22	8 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
23	9 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
24	9 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
25	9 @ 12"	8 @ 12"	8 @ 12"	5 @ 12"
26	10 @ 12"	8 @ 12"	9 @ 12"	5 @ 12"
27	10 @ 12"	9 @ 12"	9 @ 12"	5 @ 12"

REQUIRED NOMINAL PILE BEARING RESISTANCE R _n - TONS/PILE				
FIELD CONTROL METHOD	CIP PILES		H PILES	
	φ dyn	* R _n	φ dyn	* R _n
MnDOT PILE FORMULA 2012 (MPF12)	0.50	200	0.60	167
PDA	0.65	154	0.65	154

* R_n = (FACTORED DESIGN LOAD) / φ dyn

NOTES

- ALL PILES TO BE BATTERED 4(V):1(H) EXCEPT BACK ROW WHICH IS TO BE DRIVEN VERTICAL
 - FOOTING CONCRETE, FOR STEM CONCRETE (3B52) SEE APPROPRIATE WALL/PANEL TABULATION.
 - SEE STANDARD PLANS 5-297.621 TO .623 FOR REINFORCING DETAILS.
 - THIS IS THE MAXIMUM PERMITTED LONGITUDINAL PILE SPACING; REFER TO THE PILE LAYOUT SHEETS FOR THE FINAL PILE SPACING.
- FOOTING BAR SIZE: NO. 5 BAR MINIMUM FOR TRANSVERSE REINFORCEMENT.
NO. 6 BAR MINIMUM FOR LONGITUDINAL REINFORCEMENT.



TYPICAL SECTION
4-PILE SYSTEM

**RETAINING WALL (LIVE LOAD SURCHARGE)
PILE FOUNDATION GEOMETRY AND DATA**

RW12 OF RW14

STANDARD PLAN 5-297.632 2 OF 2

S.P. NO. 6284-162 (TH35W) SHEET NO. 212 OF 367 SHEETS

REVISIONS:

APPROVED: AUGUST 27, 2014
Nancy Auberberger
STATE BRIDGE ENGINEER

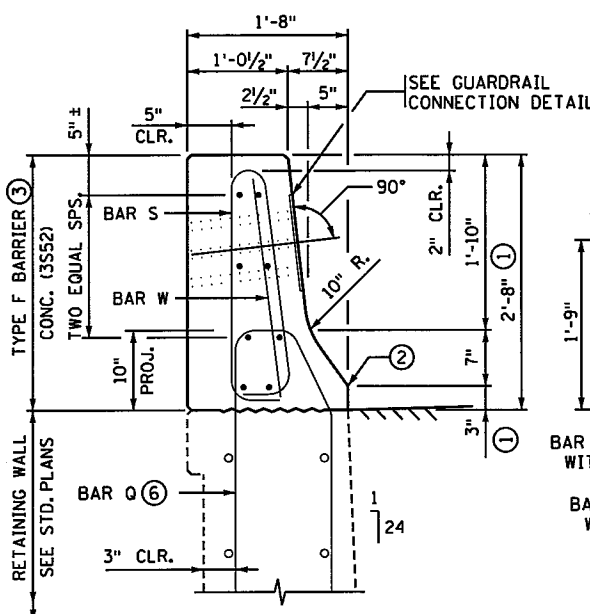
REVISOR: *Christopher Ry*
STATE DESIGN ENGINEER
APPROVED: 8-27-2014

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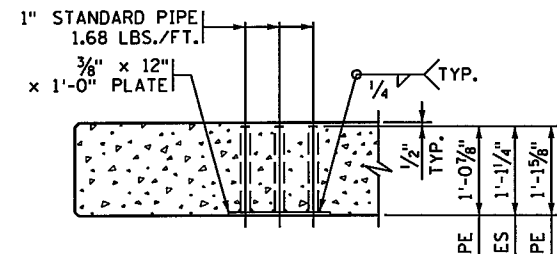
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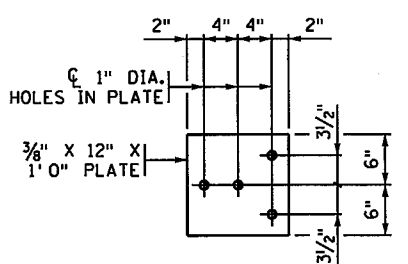


SECTION B-B



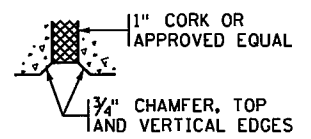
SECTION C-C

(REINFORCEMENT NOT SHOWN)
TRIM GUARDRAIL BOLTS SUCH THAT NO MORE THAN 1/2" PROTRUDES FROM BACK FACE OF BARRIER.

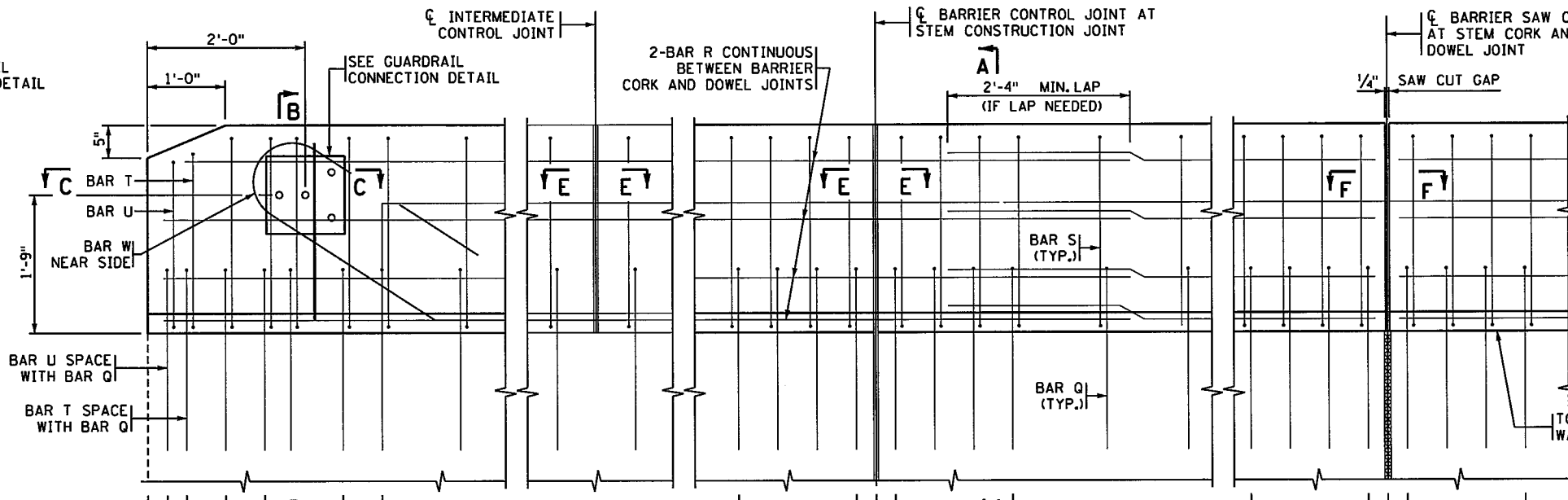


GUARDRAIL CONNECTION DETAIL

GALVANIZE AFTER FABRICATION PER SPEC. 3394. ESTIMATED WEIGHT = 23 LBS

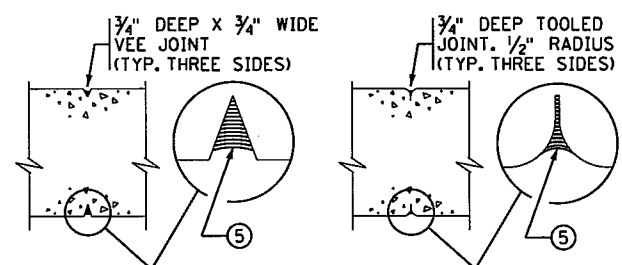


SECTION D-D



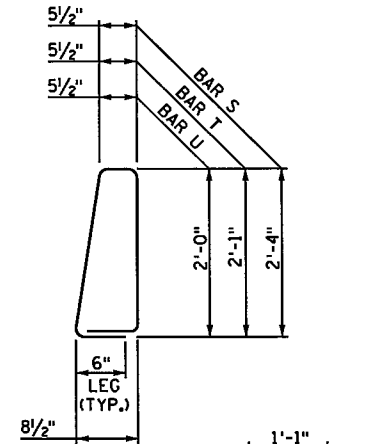
INSIDE ELEVATION OF BARRIER

BARRIER MEETS TEST LEVEL 4 REQUIREMENTS OF NCHRP REPORT 350

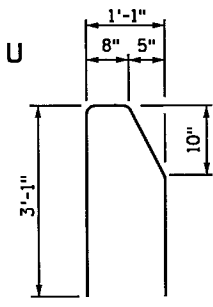


SECTION E-E
CONTRACTOR OPTION 1 CONTRACTOR OPTION 2

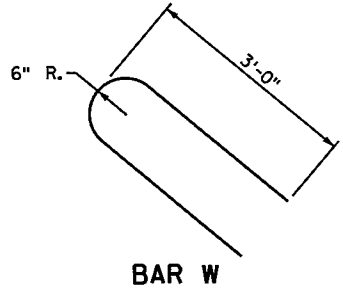
CONTROL JOINT DETAILS
WHEN USING SLIP FORM METHOD TO PLACE THE CONCRETE, CUT JOINT 3 INCHES DEEP USING MARGIN TROWEL OR SIMILAR MEANS IMMEDIATELY AFTER CONCRETE PLACEMENT (TYP. THREE SIDES)



BAR S, T, U



BAR Q



BAR W

NOTES:

MATCH BARRIER SAW CUT JOINTS WITH RETAINING WALL STEM CORK AND DOWEL JOINTS.

MATCH BARRIER CONTROL JOINTS WITH RETAINING WALL STEM CONSTRUCTION JOINTS. PLACE INTERMEDIATE BARRIER CONTROL JOINTS AT 10'-0" MAXIMUM SPACING.

REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A SAW CUT JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE.

BARS MARKED WITH THE SUFFIX "E" SHALL BE EPOXY COATED IN ACCORDANCE WITH SPEC. 3301.

THE GUARDRAIL CONNECTION IS INCLUDED IN THE PRICE BID FOR TYPE F BARRIER CONCRETE (3552).

GUARDRAIL CONNECTION SHALL BE STRUCTURAL STEEL, SPEC. 3306 AND GALVANIZED AFTER FABRICATION PER SPEC. 3394.

FOR TYPICAL RETAINING WALL REINFORCEMENT AND DETAILS, SEE STANDARD RETAINING WALL SHEETS.

CONCRETE BARRIER: 464 LBS/FT (0.115 CU YD/FT) 2'-8" HEIGHT
502 LBS/FT (0.124 CU YD/FT) 2'-10" HEIGHT

CONCRETE BARRIER (TYPE F) SHALL BE PAID FOR ON A LINEAR FOOT BASIS.

1 USE 2'-10" BARRIER HEIGHT WHEN RETAINING WALL IS ADJACENT TO A BRIDGE WITH LOW SLUMP WEARING COURSE, 3" DIMENSION BECOMES 5".

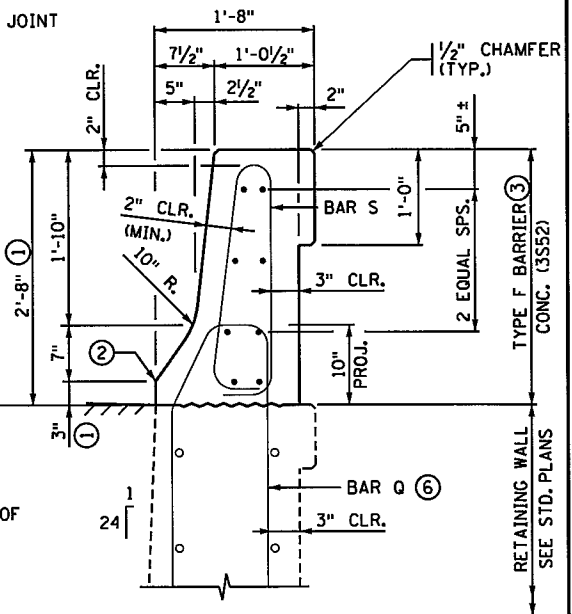
2 NO CHAMFER.

3 REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER (TYPE F, TL-4, 2'-8" BARRIER HEIGHT).

4 DIMENSIONS INCLUDE 3/8" PLATE.

5 JOINT SEALANT PER MDOT APPROVED/QUALIFIED PRODUCT LIST - CRACK AND JOINT MATERIALS - SILICONE JOINT SEALERS.

6 BAR Q SPACING AND CLEARANCES ARE SHOWN ON THIS SHEET. BAR Q QUANTITIES ARE INCLUDED IN THE WALL PANEL TABULATIONS, EXCEPT FOR A SMALL QUANTITY OF ADDED BARS NEEDED AT A GUARDRAIL CONNECTION.



SECTION A-A

BILL OF REINFORCEMENT

TYPICAL BARRIER ON RETAINING WALL
30'-6" PANEL LENGTH, PANELS: A2, B2-B6, C2

BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R404E	8	30'-2"		BARRIER - HORIZONTAL
S	R501E	34	6'-2"		BARRIER - VERTICAL
TYPE F BARRIER CONC. (3Y46)					REINFORCEMENT BARS (EPOXY)
3.5 CU YD ③					380 POUND ③

30'-6" PANEL LENGTH
WITH GUARDRAIL CONNECTION, PANELS: A3, B7, C1

BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
Q	S509E	2	6'-11"		BARRIER DOWEL
R	R404E	8	30'-2"		BARRIER - HORIZONTAL
S	R501E	34	6'-2"		BARRIER - VERTICAL
T	R502E	1	5'-8"		BARRIER - VERTICAL
U	R503E	1	5'-6"		BARRIER - VERTICAL
W	R705E	1	6'-7"		BARRIER - VERTICAL
TYPE F BARRIER CONC. (3Y46)					REINFORCEMENT BARS (EPOXY)
3.5 CU YD ③					420 POUND ③

TYPICAL BARRIER ON RETAINING WALL
20'-8" PANEL LENGTH, PANELS: A1

BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R404E	8	20'-4"		BARRIER - HORIZONTAL
S	R501E	25	6'-2"		BARRIER - VERTICAL
TYPE F BARRIER CONC. (3Y46)					REINFORCEMENT BARS (EPOXY)
2.6 CU YD ③					270 POUND ③

TYPICAL BARRIER ON RETAINING WALL
18'-2" PANEL LENGTH, PANELS: B1

BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R404E	8	17'-10"		BARRIER - HORIZONTAL
S	R501E	22	6'-2"		BARRIER - VERTICAL
TYPE F BARRIER CONC. (3Y46)					REINFORCEMENT BARS (EPOXY)
2.3 CU YD ③					240 POUND ③

TYPICAL BARRIER ON RETAINING WALL
27'-8" PANEL LENGTH, PANELS: C3

BAR	MARK	NO.	LENGTH	SHAPE	LOCATION
R	R404E	8	27'-4"		BARRIER - HORIZONTAL
S	R501E	32	6'-2"		BARRIER - VERTICAL
TYPE F BARRIER CONC. (3Y46)					REINFORCEMENT BARS (EPOXY)
3.4 CU YD ③					350 POUND ③

REVISION:
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Nancy Subenberger
STATE BRIDGE ENGINEER

BARRIER SAW CUT JOINT
MATCH BARRIER SAW CUT JOINTS WITH RETAINING WALL STEM CORK AND DOWEL JOINTS.

CERTIFIED BY *Mark K. Maves* 12/8/2015
LICENSED PROFESSIONAL ENGINEER DATE
NAME: MARK K MAVES LIC. NO. 20496

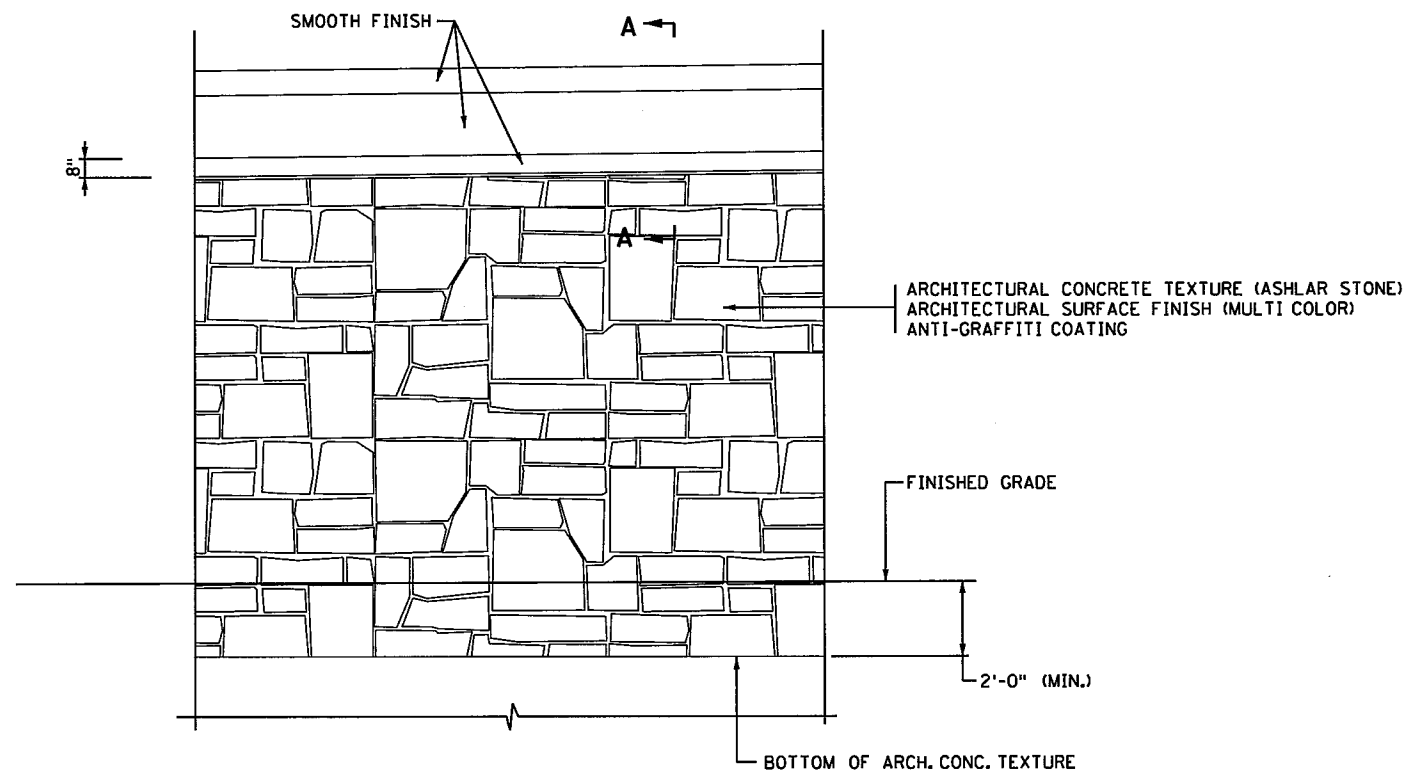
STANDARD SHEET NO. 5-297.635
STANDARD APPROVED: AUGUST 27, 2014
STATE PROJ. NO. 6284-162 (TH35W)

TITLE: RETAINING WALL CONCRETE BARRIER (TYPE F, TL-4)
RW13 OF RW14
SHEET NO. 213 OF 367 SHEETS

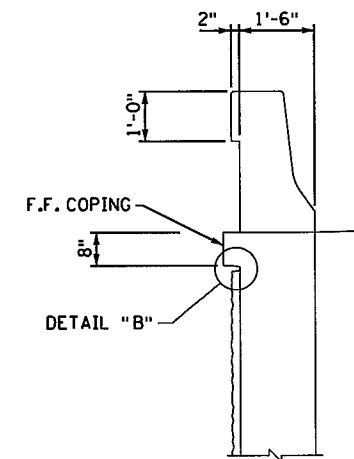
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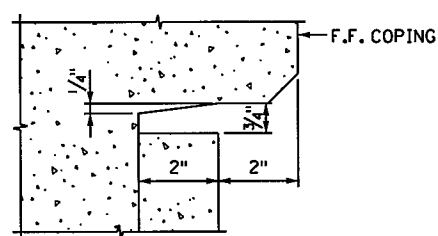
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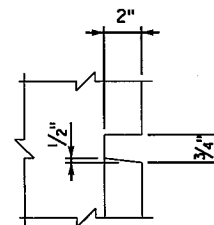
RETAINING WALL ELEVATION
SIMILAR TO BRIDGE 62937



SECTION A-A



DETAIL "B"



DETAIL "C"
REVEAL

NOTES:

UNLESS OTHERWISE NOTED, PROVIDE 3/4" CHAMFER ON ALL HORIZONTAL OR VERTICAL CORNERS / EDGES OF 90° OR LESS.

THE PATTERN OF PANELS SHALL BE ADJUSTED SO THAT ALL EXPANSION, CONTRACTION AND CONSTRUCTION JOINTS WILL BE RUSTICATIONS. ALL CONSTRUCTION JOINTS SHALL BE REPAIRED AND POINTED TO PRESENT A SATISFACTORY APPEARANCE.

MODIFIED

REVISED:



CERTIFIED BY *Mark Maves*
LICENSED PROFESSIONAL ENGINEER
PRINTED NAME: MARK K MAVES LIC. NO. 20496

Christopher
APPROVED: 8-27-2014
STATE DESIGN ENGINEER

CONCRETE RETAINING WALL RUSTICATION

RW14 OF RW14

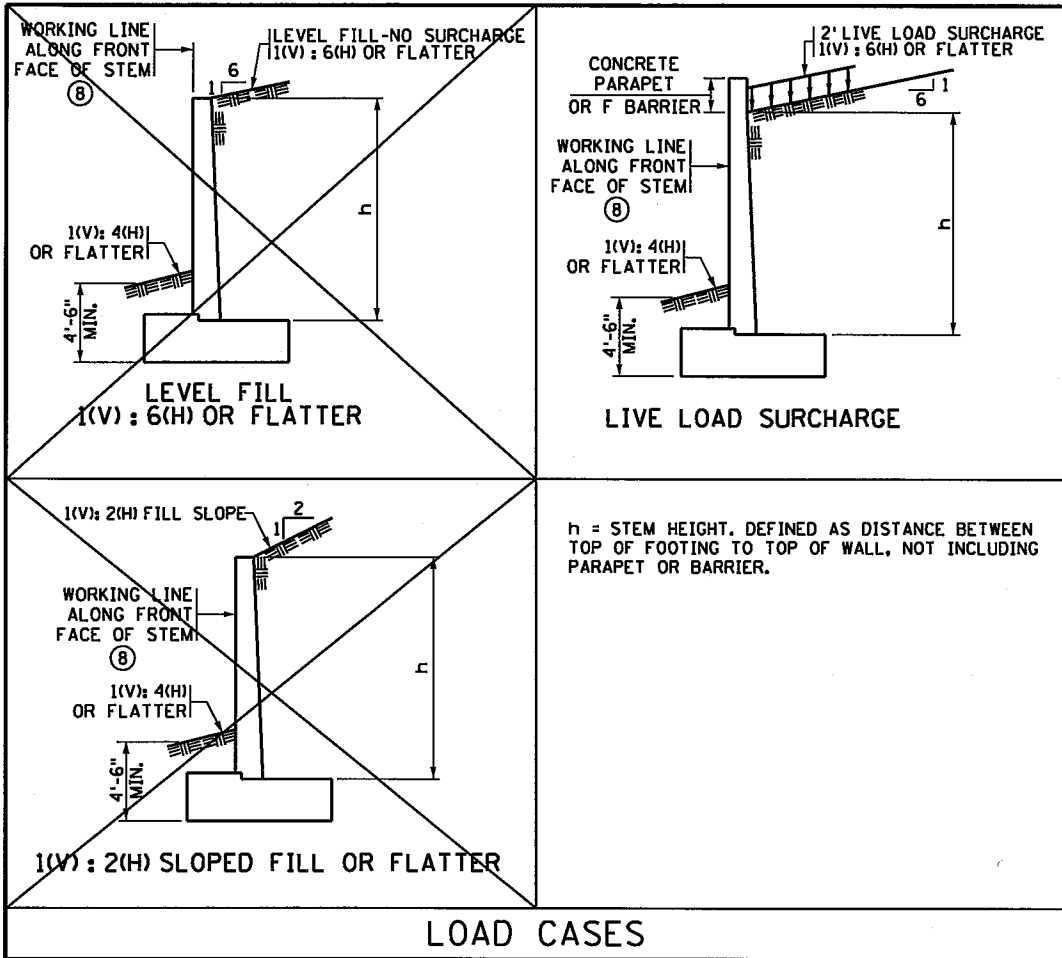
STANDARD PLAN 5-297.638

1 OF 1

S.P. NO. 6284-162 (TH35W) SHEET NO. 2140F 367 SHEETS

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Subenberger
STATE BRIDGE ENGINEER

PLOTTED/REVISED: \$\$\$@DATE\$\$\$



DESIGN CRITERIA

THESE LRFD CIP RETAINING WALL STANDARDS HAVE BEEN DEVELOPED BASED ON THE FIFTH EDITION WITH 2010 INTERIMS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, AND MnDOT DESIGN POLICIES AS STATED IN THE MnDOT LRFD BRIDGE DESIGN MANUAL.

$f'_c = 4 \text{ ksi}$
 $f_y = 60 \text{ ksi}$
 $n = 8$

REFER TO STANDARD FIGURE 5-297.639 FOR ADDITIONAL DESIGN CRITERIA.

BAR LAP

BAR SIZE	PLAIN	EPOXY
5	2'-5"	2'-1"
6	2'-11"	3'-1"
7	3'-7"	3'-10"
8	4'-9"	5'-1"
9	6'-0"	6'-5"
10	7'-7"	8'-2"
11	9'-4"	10'-0"

SUMMARY OF QUANTITIES FOR RETAINING WALL WALL D (SPREAD FOOTING)

PANEL	STRUCTURAL CONCRETE		REINFORCEMENT BARS		STRUC. EXCAV. CLASS U	STRUCTURAL BACKFILL (CV) (1)(6)	AGGREGATE BEDDING (CV) (2)(6)	ANTI-GRAFFITI COATING	ARCH. SURFACE FINISH (MULTI COLOR)	ARCH. CONCRETE TEXTURE (ASHLAR STONE)	MOMENT SLAB		
	FOOTING	STEM	PLAIN (7)	EPOXY (8)							TYPE P-1 BARRIER CONC. (3852)	ORNAMENTAL METAL RAILING TYPE SPECIAL	CONDUIT SYSTEM
D1	8.4	6.5	706	766	-	-	9	55	55	55	-	-	-
D2	5.1	4.4	452	516	-	-	6	39	39	39	-	-	-
D3	5.1	4.7	452	566	-	-	6	44	44	44	-	-	-
D4	5.1	4.9	452	566	-	-	6	47	47	47	-	-	-
D5	5.1	5.2	452	566	-	-	6	48	48	48	-	-	-
D6	5.1	5.5	452	659	-	-	6	47	47	47	-	-	-
D7	5.1	5.8	452	659	-	-	6	47	47	47	-	-	-
D8	5.1	5.0	452	566	-	-	6	48	48	48	-	-	-
D9	5.1	5.2	452	566	-	-	6	50	50	50	-	-	-
D10	14.0	15.5	1138	1519	-	-	15	156	156	156	-	-	-
D11	14.0	16.9	1138	1755	-	-	15	179	179	179	-	-	-
D12	14.0	18.6	1138	1871	-	-	15	203	203	203	-	-	-
D13	14.0	21.0	1249	1988	-	-	15	231	231	231	-	-	-
D14	14.0	23.2	1249	2129	-	-	15	269	269	269	-	-	-
D15	9.0	10.1	841	1486	-	-	10	189	189	189	-	-	-
MOMENT SLAB	-	144	-	20550	-	-	-	-	-	-	280	280	1
TOTAL	129.0	309	11070	36730	-	-	142	1652	1652	1652	280	280	1

NOTES:

- ① STRUCTURAL BACKFILL SPEC. 3149.2D2.
- ② COMPACT TO 100% DENSITY IN ACCORDANCE WITH SPEC. 2105.3F1 UNLESS RECOMMENDED OTHERWISE BY THE SOILS ENGINEER.
- ③ LIMITING CRITERIA.
- ④ CURVED FORMS MAY BE USED FOR ANY WALL WITH A RADIUS, BUT MUST BE USED ON WALLS WITH RADIUS LESS THAN 23 FEET.
- ⑤ DOES NOT INCLUDE DOWELED JOINT/CONSTRUCTION JOINT QUANTITIES, WHICH ARE INCIDENTAL. DOWELED JOINT/CONSTRUCTION JOINT DETAILS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6).
- ⑥ QUANTITIES FOR THE FOUNDATION WITH AGGREGATE BACKFILL OPTION ONLY.
- ⑦ DOES NOT INCLUDE ADDITIONAL REINFORCING BARS AND STRUCTURAL CONCRETE 4443-(1G52) REQUIRED FOR STEPPED FOOTINGS, WHICH IS INCIDENTAL.
- ⑧ FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WING WALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.
- * ⑨ INCLUDED IN EARTHWORK QUANTITY TABULATIONS.

CURVED RETAINING WALLS ALLOWABLE CHORD LENGTH ④

MAXIMUM DEGREE OF CURVE	RADIUS	ALLOWABLE CHORD LENGTH	DEVIATION FROM TRUE RADIUS	MAXIMUM DEFLECTION ANGLE Δ
4°-00'	1432'	30'-6"	± 1/2" (3)	1°-15'
8°-00'	716'	21'-10"	± 1/2" (3)	1°-45'
16°-30'	347'	15'-3"	± 1/2" (3)	2°-30'
23°-00'	249'	12'-11"	± 1/2" (3)	2°-57'
65°-30'	87'	7'-7 1/2"	± 1/2"	5°-00' (3)
114°-30'	50'	4'-4 1/8"	± 1/4"	5°-00' (3)
250°-00'	23'	2'-0"	± 1/8"	5°-00' (3)

GENERAL NOTES:

UTILITIES: EXISTING AND PROPOSED UTILITIES ARE SHOWN IN THE GRADING PLANS. PRIOR TO EXCAVATION VERIFY THE LOCATION OF EXISTING FACILITIES AND EXERCISE CARE IN ADJACENT CONSTRUCTION.

EXCAVATION AND EARTHWORK: ALL EXCAVATION AND EMBANKMENT WORK SHALL CONFORM TO SPEC. 2451.

CONCRETE: ALL CONCRETE SHALL CONFORM TO SPEC. 2461.

TRANSVERSE CONSTRUCTION JOINTS IN FOOTING ARE PERMISSIBLE. KEYWAYS AND CONTINUOUS REINFORCEMENT ARE REQUIRED THROUGH THESE JOINTS.

THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF PATTERN. THE STRUCTURAL CONCRETE 3443-3852 QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. CONCRETE NEEDED FOR THE TEXTURING IS INCIDENTAL.

POURING SEQUENCE: THE POURING SEQUENCE SHALL BE AT THE CONTRACTOR'S OPTION. SUBMIT SEQUENCE (WITHIN 7 CALENDAR DAYS) TO THE ENGINEER FOR APPROVAL PRIOR TO BEGINNING THE FIRST POUR.

CONSTRUCTION: CONSTRUCT IN ACCORDANCE WITH SPEC. 2411, EXCEPT AS NOTED. REFER TO STANDARD PLAN 5-297.624 (2 OF 6) FOR WALL CORNER DETAILS AND STEPPED FOOTING DETAILS.

REFER TO STANDARD PLAN 5-297.625 FOR WALL SHEAR LUG DETAILS.

APPLY MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481 TO BACK SIDE OF WALL TO COVER ALL THRU-BOLT FORM HOLES.

REINFORCING STEEL: USE REINFORCEMENT BARS CONFORMING TO SPEC. 3301, GRADE 60. BARS MARKED WITH THE SUFFIX "E" TO BE EPOXY COATED. ALL BARS WHICH EXTEND OUT OF THE FOOTING AND ALL BARS WHICH ARE ABOVE THE FOOTING TO BE EPOXY COATED. ALL BENT BAR DIMENSIONS ARE GIVEN OUT-TO-OUT.

MAINTAIN CLEAR DISTANCE BETWEEN REINFORCEMENT BARS AND FACE OF CONCRETE OF 3 INCHES IN FOOTINGS, 5 INCHES IN BOTTOM OF SPREAD FOOTINGS, AND 2 INCHES ELSEWHERE UNLESS OTHERWISE NOTED. REFER TO STANDARD PLAN 5-297.624 (1 OF 6) DETAIL "C" FOR COVER REQUIREMENTS ON WALLS WITH ARCHITECTURAL CONCRETE TEXTURE OR RUSTICATION.

THE CONTRACTOR HAS THE OPTION OF SUBSTITUTING 60'-0" LONG BARS FOR THE LONGITUDINAL FOOTING STEEL SHOWN. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR. PAYMENT WILL BE BASED ON QUANTITIES SHOWN.

~~THE CONSTRUCTION JOINT FOR CONCRETE PARAPET OR BARRIER MAY BE LOCATED AT TOP OR BOTTOM OF COPING, AT THE CONTRACTOR'S OPTION. PAYMENT WILL BE BASED ON QUANTITIES SHOWN, WHICH IS BASED ON CONSTRUCTION JOINT ABOVE COPING.~~

FOR VARIABLE STEM HEIGHTS, VARY THE LAP LENGTH OF THE VERTICAL REINFORCEMENT. MINIMUM LAP LENGTHS ARE GIVEN IN THE TABLE ON THIS SHEET. SMALLER BAR GOVERNS LAP LENGTH.

DOWEL BAR ASSEMBLIES: DOWELED JOINTS/CONSTRUCTION JOINTS ARE SHOWN ON STANDARD PLAN 5-297.624 (3 OF 6). THESE JOINTS ARE INCIDENTAL.

AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 9'-6". PLACE A CORK AND DOWEL JOINT AT ALL VERTICAL FOOTING STEPS.

GEOMETRICS AND GRADES: DATA FOR BASELINE GEOMETRY IS TABULATED FOR WALL ALIGNMENT. SEE LAYOUT SHEETS. WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL. (8)

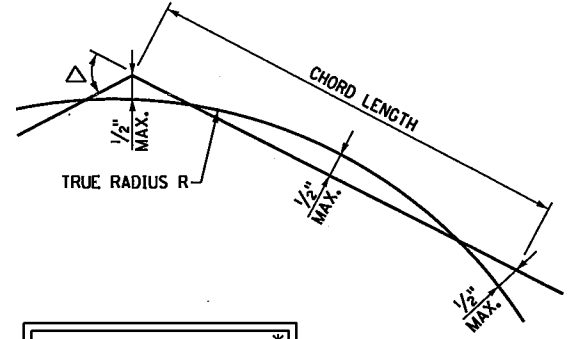
ON UP TO 10% SLOPES, THE CONTRACTOR HAS THE OPTION OF POURING FOOTINGS SLOPED OR STEPPED. ADDITIONAL CONCRETE VOLUMES AND CHANGES TO THE BILL OF REINFORCEMENT WHICH MAY RESULT FROM CONTRACTOR REQUESTED OPTIONS ARE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL PAYMENT WILL BE MADE.

QUANTITIES ARE BASED ON ASSUMED TOP OF ROCK ELEVATION. ACTUAL TOP OF ROCK TO BE DETERMINED BY ENGINEER. SEE SHEET 5-297.624 (4 OF 6) FOR PAY LIMITS.

PILE LOADS: THE PILE LOADS SHOWN IN THE PLANS AND THE CORRESPONDING NOMINAL PILE BEARING RESISTANCES (R_n) WERE COMPUTED USING LRFD METHODOLOGY.

SHEET INDEX *

NO.	TITLE
RWD1	GENERAL NOTES & SUMMARY OF QUANTITIES
RWD2	GENERAL PLAN & ELEVATION
RWD3-RWD7	WALL REINFORCEMENT DETAILS
RWD8-RWD9	PANEL TABULATIONS
RWD10-RWD15	MISCELLANEOUS DETAILS
RWD16-RWD18	MOMENT SLAB
RWD19	CONCRETE PARAPET (TYPE P-1)
RWD20	ORNAMENTAL METAL RAILING



ADDED SHEET NUMBERS *
ADDED EARTHWORK NOTE

DISTRICT #: \$\$\$DISTRICT\$\$\$
 USER NAME: \$\$\$USER\$\$\$
 PATH & FILENAME: \$\$\$PATH\$\$\$
 FILE NAME: \$\$\$FILENAME\$\$\$

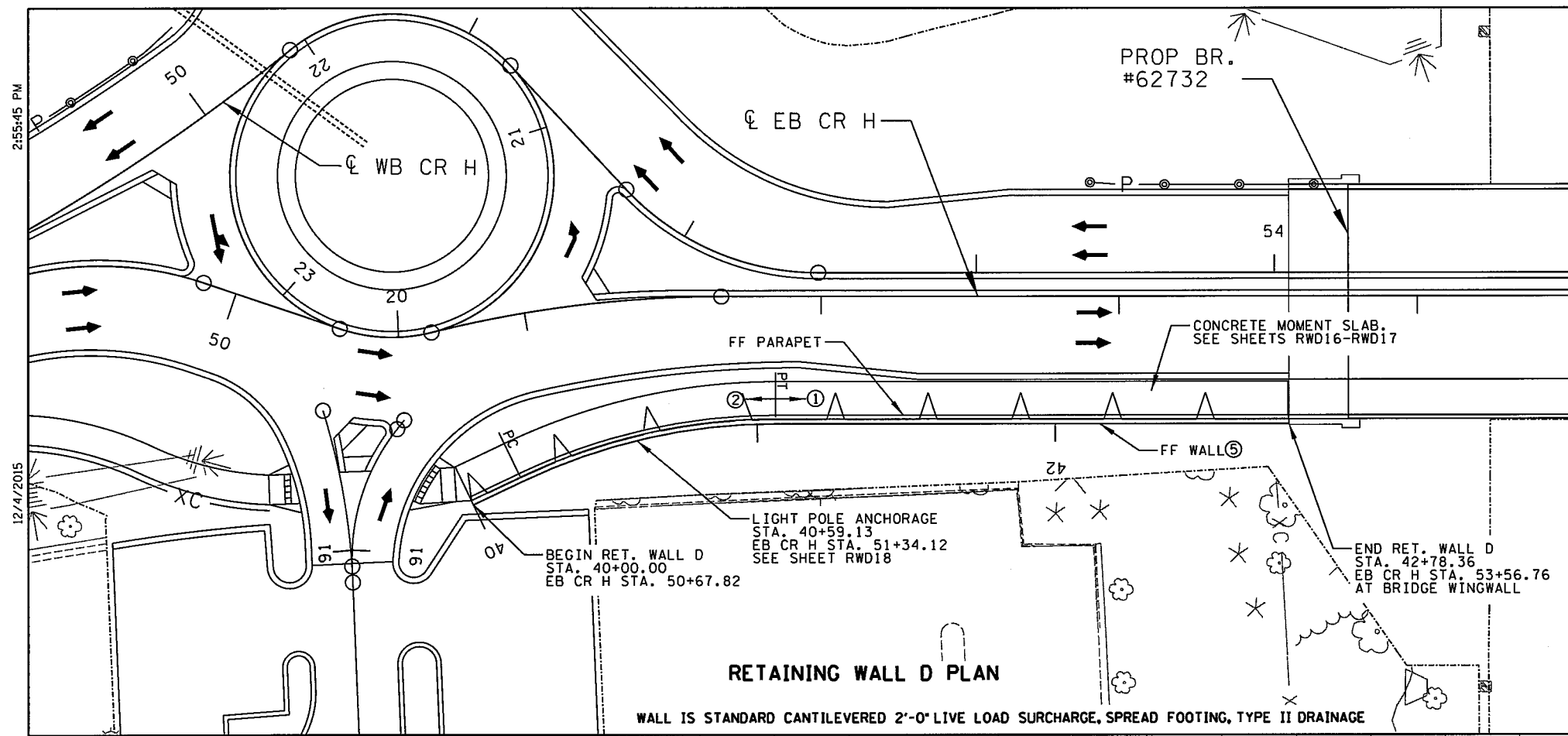
REVISION:
 APPROVED: AUGUST 27, 2014
 [Signature]
 STATE BRIDGE ENGINEER

* DENOTES MODIFICATION FROM STANDARD PLAN
 I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: [Signature] Lic. No. 49486
 Printed Name: BRIAN L. FLEMING, PE Date: 2/16/2016

MODIFIED
 STANDARD SHEET NO. 5-297.620
 STANDARD APPROVED: AUGUST 27, 2014

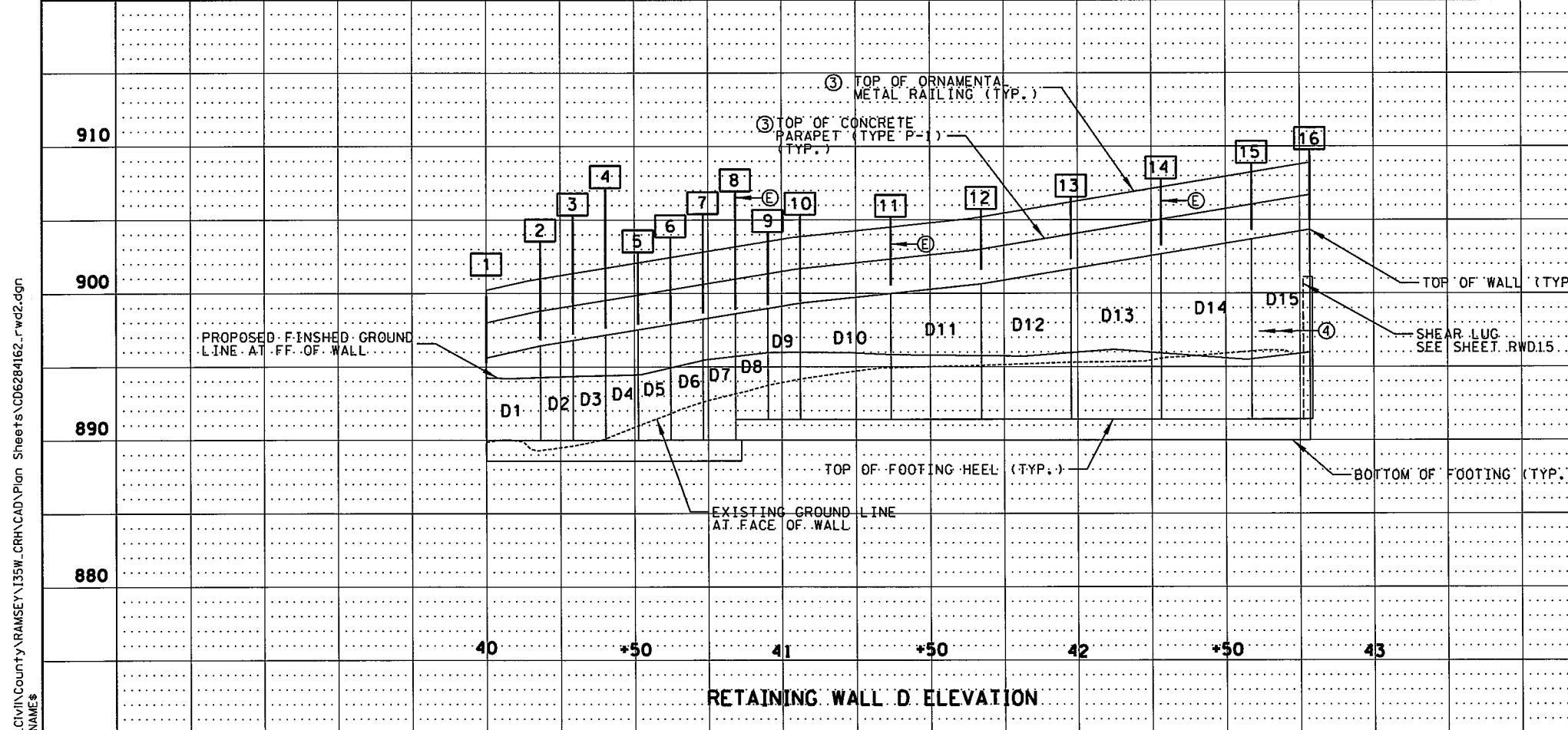
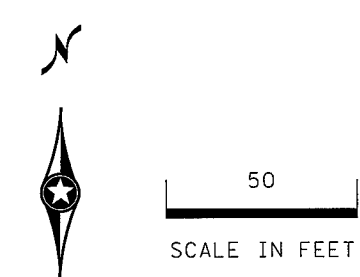
RETAINING WALL GENERAL NOTES AND SUMMARY OF QUANTITIES
 STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. 215 OF 367 SHEETS

RWD1 OF RWD20



GEOMETRICS FOR RETAINING WALL 5

JOINT NO.	WALL STA.	COORDINATES		EB CR H STA.	OFFSET RIGHT (FT.)	GROUND ELEV. AT FF WALL	TOP OF WALL ELEV. ⑥	PANEL	STEM HEIGHT (h) (FT.)	TOP OF FOOTING HEEL ELEV.	BOT. OF FOOTING ELEV.	PANEL LENGTH (FT.)
		X	Y									
1	40+00.00	549980.194	210940.599	50+67.82	59.76	894.25	895.61	D1	6.24	890.00	888.58	18.25
2	40+18.25	549996.564	210948.663	50+88.19	55.72	894.27	896.24	D2	6.80	890.00	888.58	11.00
3	40+29.25	550006.547	210953.283	51+00.56	53.11	894.35	896.80	D3	7.16	890.00	888.58	11.00
4	40+40.25	550016.773	210957.336	51+12.92	50.76	894.40	897.16	D4	7.52	890.00	888.58	11.00
5	40+51.25	550027.211	210960.807	51+25.27	48.68	894.46	897.52	D5	7.89	890.00	888.58	11.00
6	40+62.25	550037.827	210963.688	51+37.60	46.87	894.93	897.89	D6	8.25	890.00	888.58	11.00
7	40+73.25	550048.588	210965.967	51+49.92	48.71	895.44	898.25	D7	8.62	890.00	888.58	11.00
8	40+84.25	550059.461	210967.639	51+62.23	44.09	895.71	898.62	D8	7.55	891.42	890.00	11.00
9	40+95.25	550070.410	210968.697	51+73.66	43.18	895.96	898.97	D9	7.92	891.42	890.00	11.00
10	41+06.25	550081.402	210969.097	51+84.66	42.92	895.98	899.34	D10	8.57	891.42	890.00	30.50
11	41+36.75	550111.900	210969.469	52+15.16	42.92	895.82	899.99	D11	9.22	891.42	890.00	30.50
12	41+67.25	550142.398	210969.840	52+45.66	42.92	895.75	900.64	D12	10.24	891.42	890.00	30.50
13	41+97.75	550172.896	210970.211	52+76.16	42.92	895.96	901.66	D13	11.25	891.42	890.00	30.50
14	42+28.25	550203.393	210970.582	53+06.66	42.92	895.92	902.67	D14	12.27	891.42	890.00	30.50
15	42+58.75	550233.891	210970.954	53+37.16	42.92	895.52	903.69	D15	12.92	891.42	890.00	19.61
16	42+78.36	550253.499	210971.192	53+56.76	42.92	895.98	904.34					



NOTES:

- ① DENOTES WALL EXPANSION JOINT LOCATIONS (CORK AND DOWEL JOINTS).
- ② 4" DIA. PER. DRAIN PIPE... SEE RETAINING WALL DETAILS... TIE TO BRIDGE DRAINAGE SYSTEM.
- ③ 4" DIA. PER. DRAIN PIPE... SEE RETAINING WALL DETAILS... TIE TO DRAINAGE STRUCTURE CB-1301, SEE ROADWAY PLANS.
- ④ CONCRETE PARAPET AND ORNAMENTAL METAL RAILING LOCATED ON CONCRETE MOMENT SLAB DIRECTLY BEHIND RETAINING WALL.
- ⑤ LIMITS OF ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE) IS FROM BOTTOM OF COPE TO A POINT 2'-0" BELOW PROPOSED FINISHED GROUND LINE AT FRONT FACE OF WALL. LIMITS OF ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) AND ANTI-GRAFFITI COATING IS FROM BOTTOM OF COPE TO A POINT 2'-0" BELOW PROPOSED FINISHED GROUND LINE AT FRONT FACE OF WALL.
- ⑥ RETAINING WALL ALIGNMENTS LOCATED ALONG REFERENCE LINE WHICH IS FRONT FACE OF RETAINING WALL, EXCEPT AS NOTED.
- ⑦ TOP OF WALL ELEVATIONS ARE LOCATED AT BACK FACE OF RETAINING WALL COPE.

DESIGN TEAM			
DRAWN BY: LMT			
DESIGNER: BLF			
CHECKED BY: BAW			
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian Fleming* Lic. No. 49486
 Printed Name: BRIAN L. FLEMING, PE Date: 12/4/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

RETAINING WALL D
 GENERAL PLAN & ELEVATION

FILE NO. RAMSE129594
 RWD2
 OF RWD20

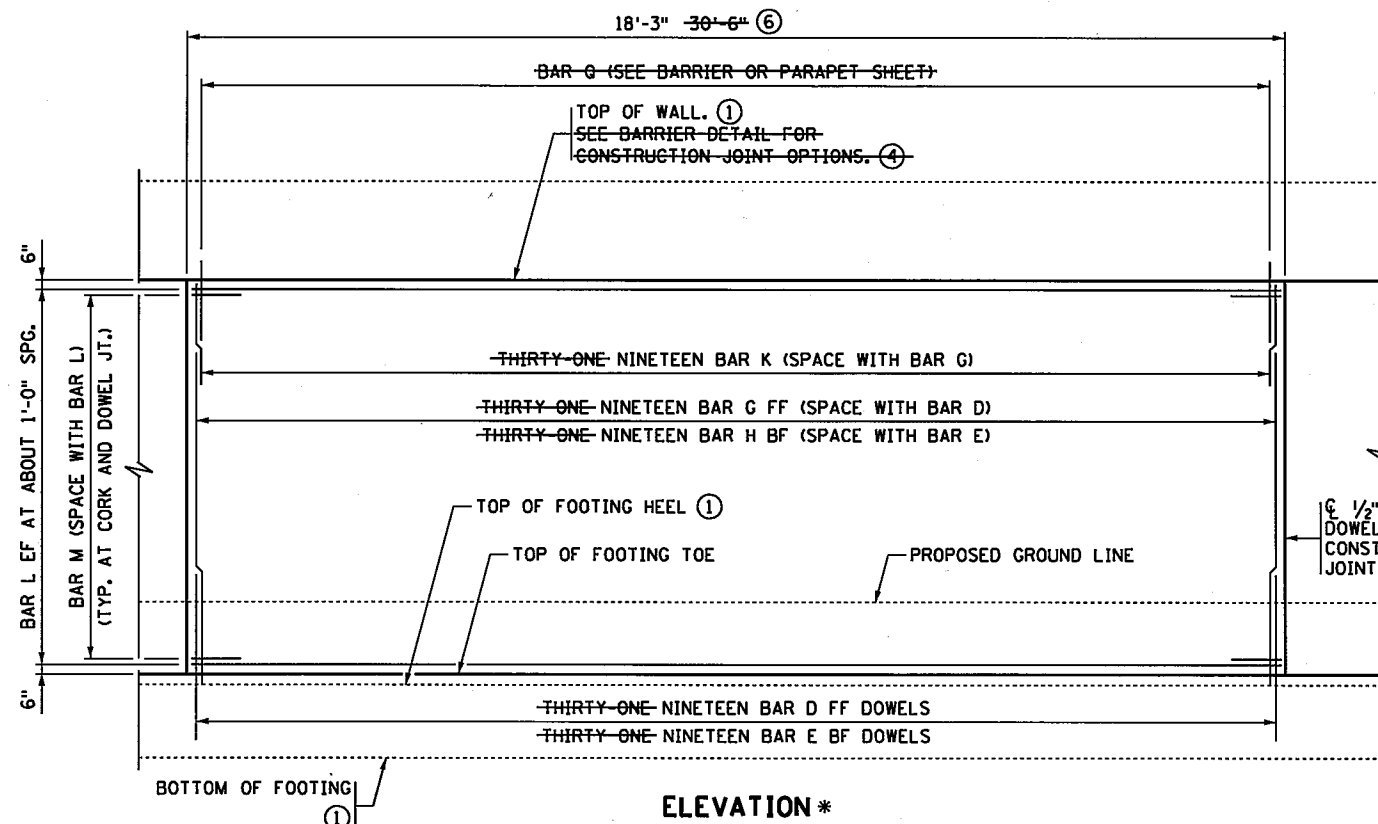
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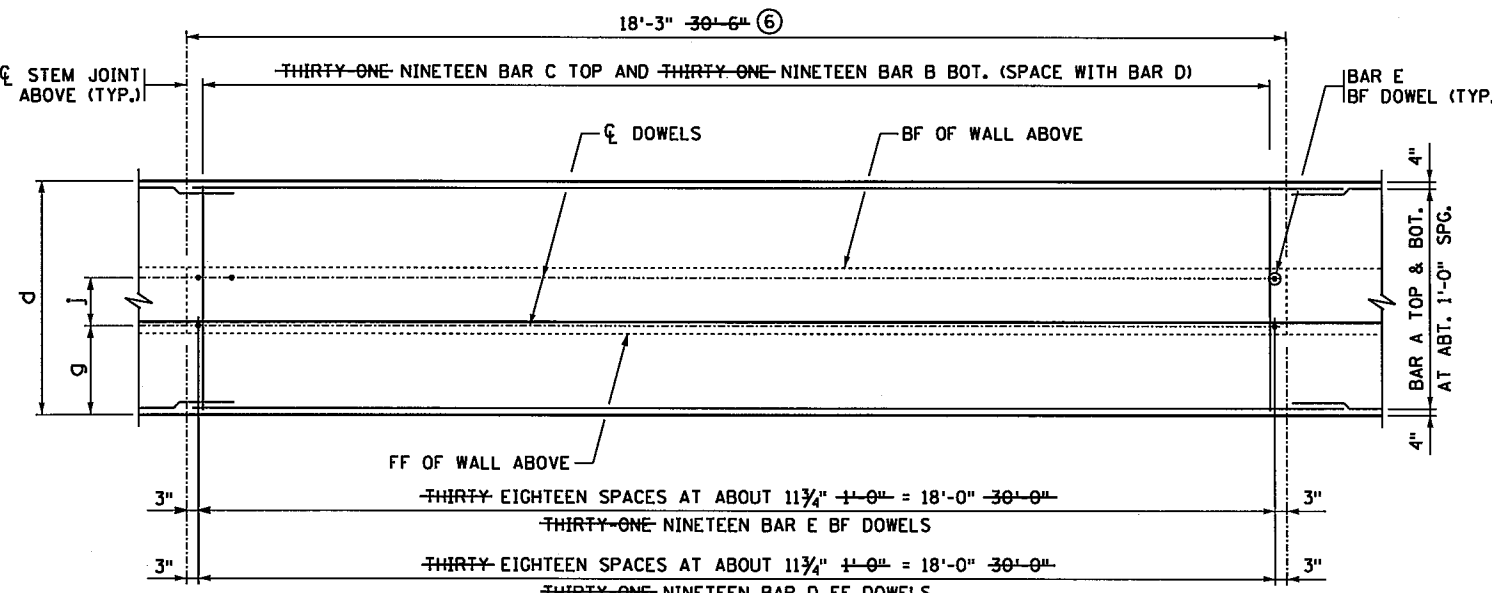
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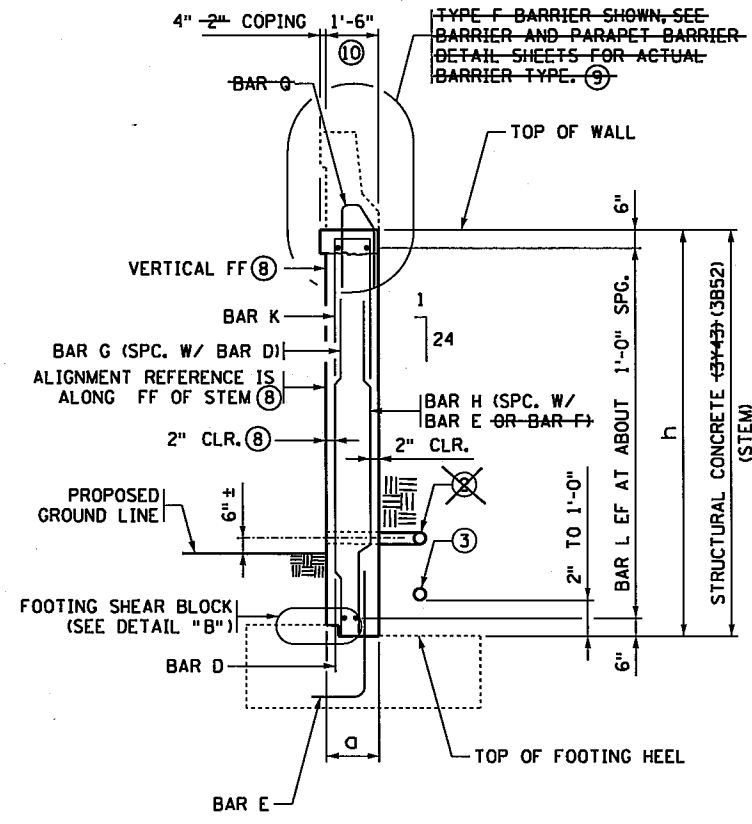
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ELEVATION *

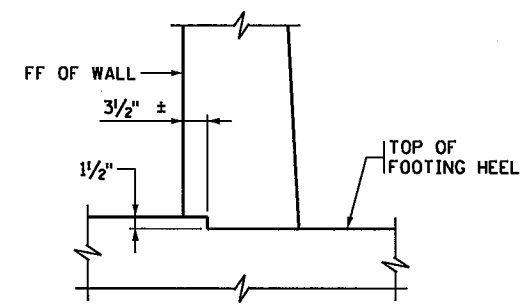


FOOTING PLAN ~ REINFORCEMENT *

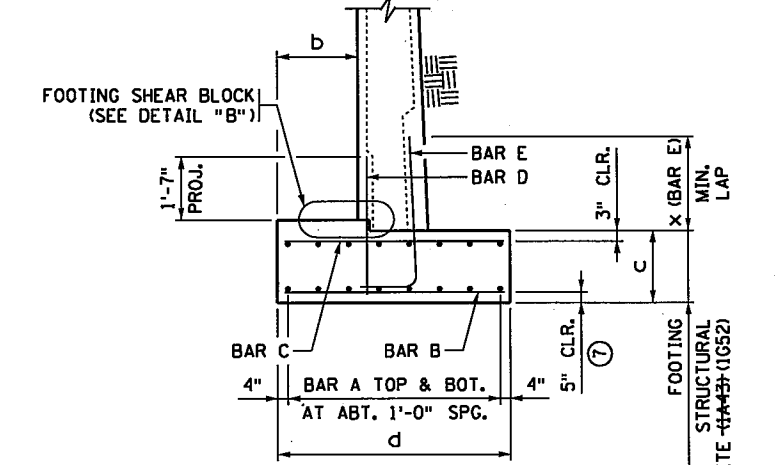


WALL SECTION *

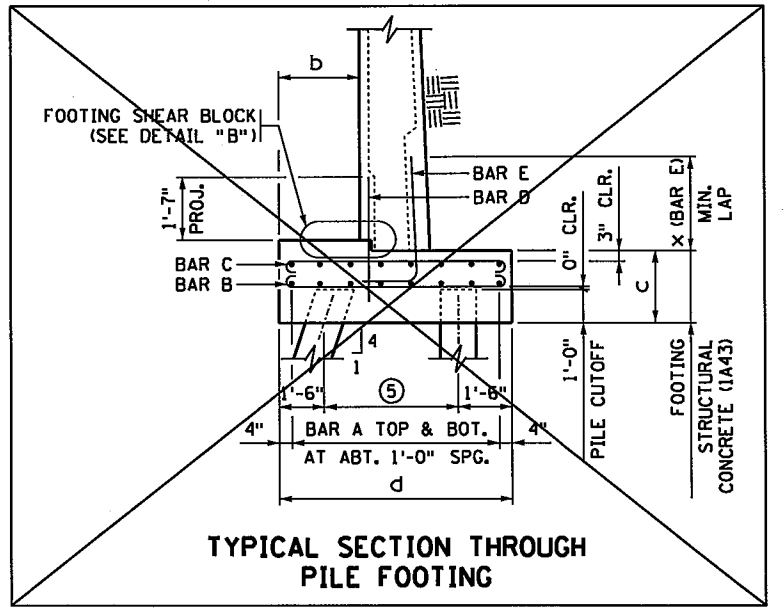
(IF BARRIER AND 2" 4" COPING OPTION SHOWN)



DETAIL "B"



TYPICAL SECTION THROUGH SPREAD FOOTING *



TYPICAL SECTION THROUGH PILE FOOTING

NOTES:

- REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".
- STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.
- FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.
- BF DENOTES BACK FACE.
FF DENOTES FRONT FACE.
EF DENOTES EACH FACE.
- ① STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.
- ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
- ⑥ AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.
- ⑦ 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.
- ⑧ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING.

MODIFIED LENGTH AND QUANTITY FOR
PANEL ADJUSTMENT FROM 30'-6" TO 18'-3" *
CROSSED OUT BARRIER REFERENCES
ADJUSTED COPE DIMENSION
ADJUSTED CONCRETE MIX DESIGN

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Weber
STATE BRIDGE ENGINEER

* DENOTES MODIFICATION FROM STANDARD PLAN
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Brian Fleming* Lic. No. 49486
Printed Name: BRIAN L. FLEMING, PE Date: 2/15/2016

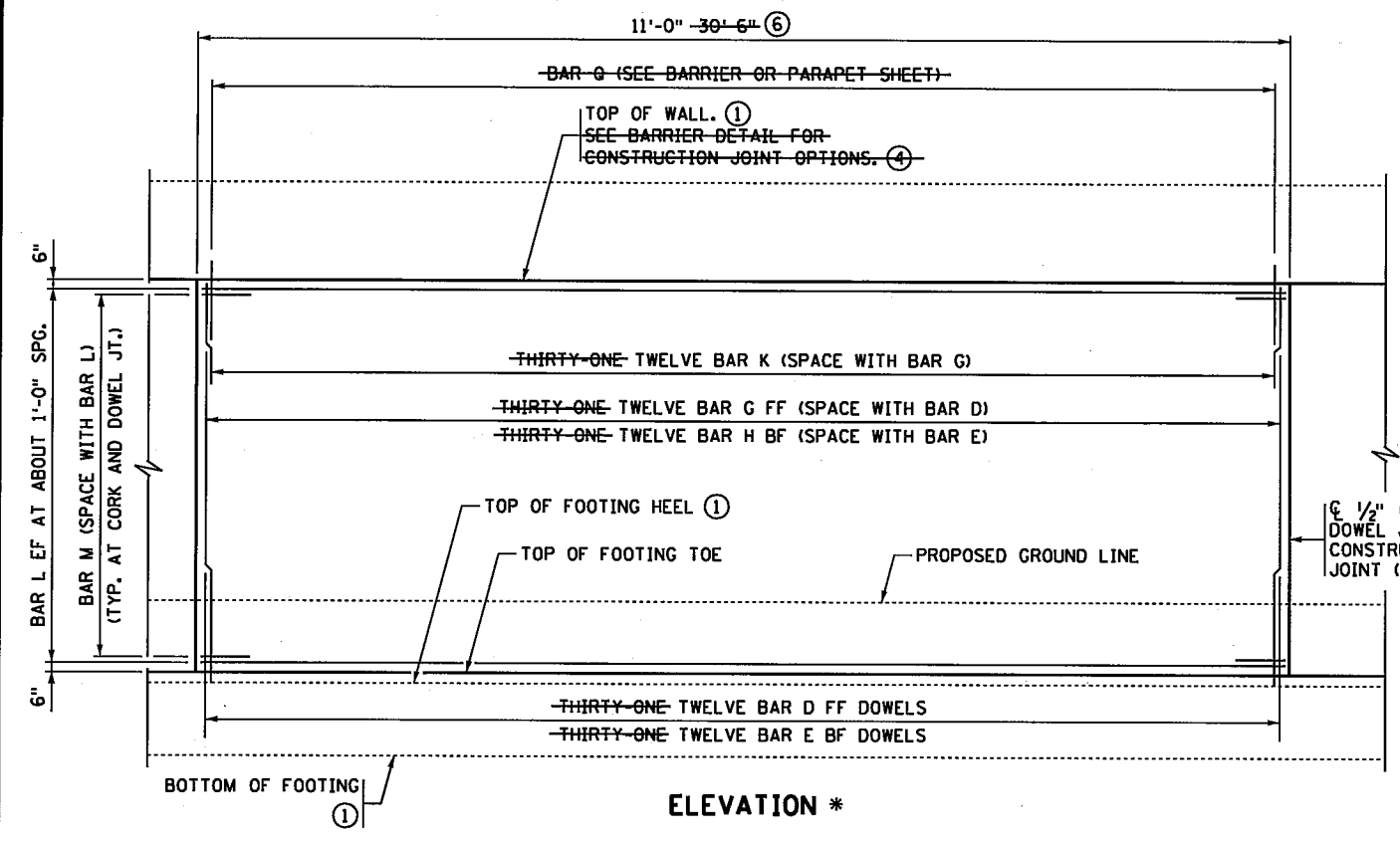
MINNESOTA DEPARTMENT OF TRANSPORTATION
APPROVED: *Brian Fleming*
8-27-2014
STATE DESIGN ENGINEER

REVISION:
RETAINING WALL REINFORCEMENT DETAILS
(SHORT WALLS) (PANEL D1)
STANDARD PLAN 5-297.621 217 OF 367
RWD3 OF RWD20

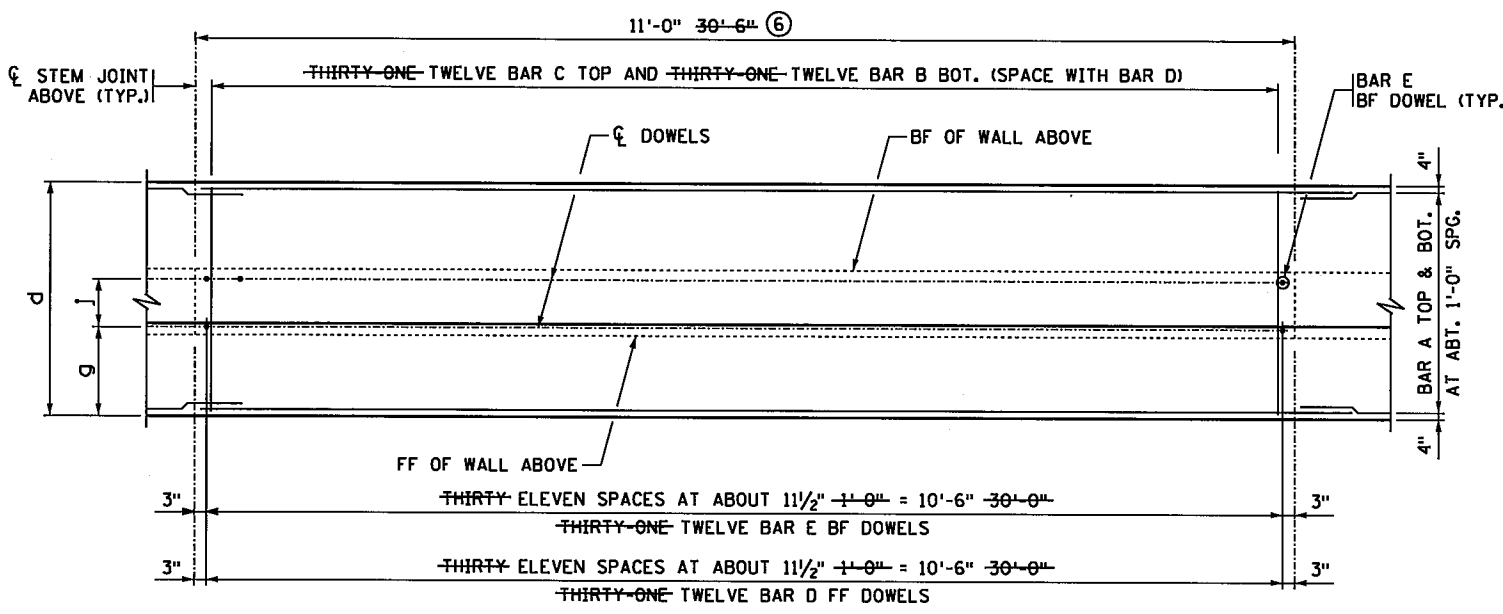
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ELEVATION *



FOOTING PLAN ~ REINFORCEMENT *

MODIFIED LENGTH AND QUANTITY FOR
PANEL ADJUSTMENT FROM 30'-6" TO 11'-0" *

CROSSED OUT BARRIER REFERENCES

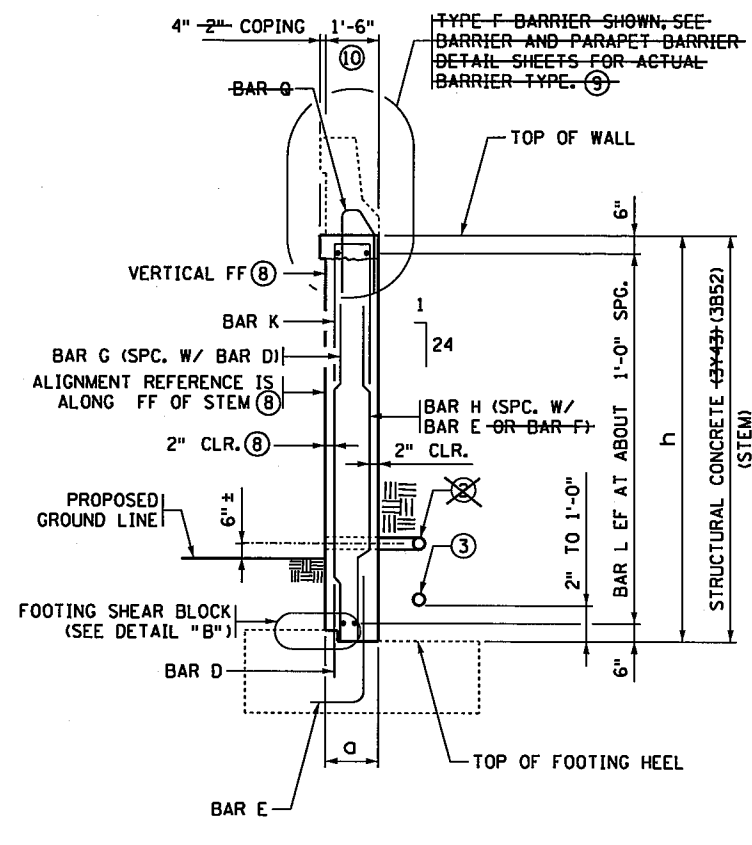
ADJUSTED COPE DIMENSION

ADJUSTED CONCRETE MIX DESIGN

* DENOTES MODIFICATION FROM STANDARD PLAN

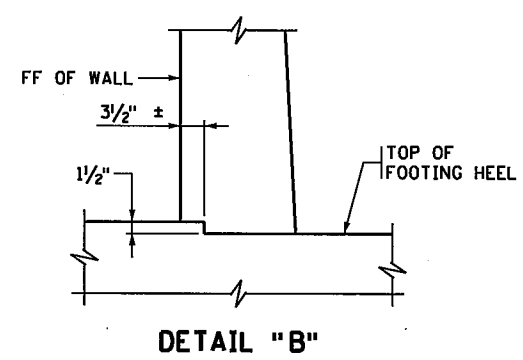
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian L Fleming* Lic. No. 49486
Printed Name: BRIAN L FLEMING, PE Date: 2/15/2015

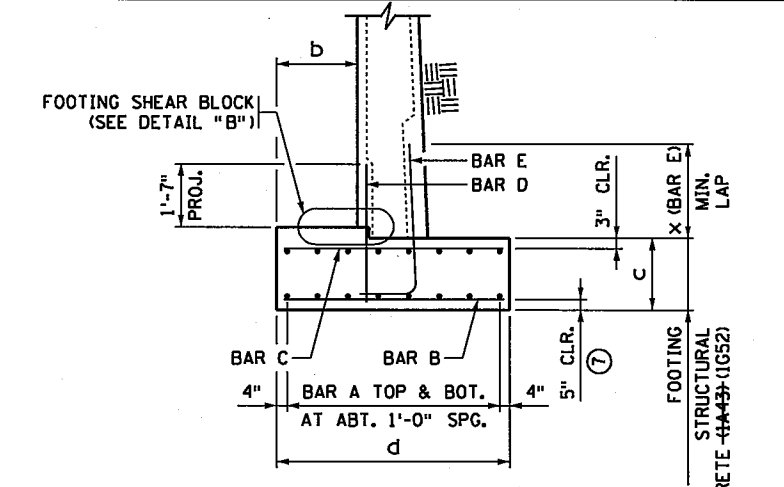


WALL SECTION *

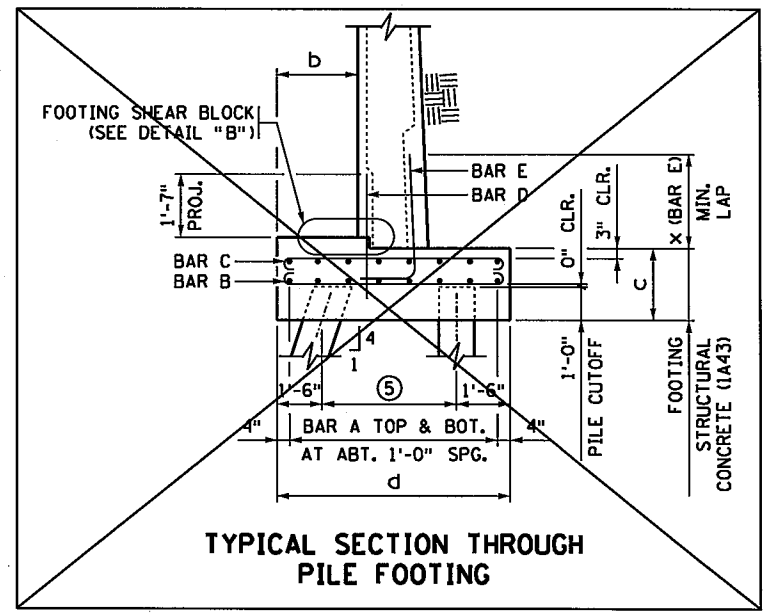
(IF BARRIER AND 2" 4" COPING OPTION SHOWN)



DETAIL "B"



TYPICAL SECTION THROUGH SPREAD FOOTING *



TYPICAL SECTION THROUGH PILE FOOTING

NOTES:

- REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".
- STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.
- FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.
- BF DENOTES BACK FACE. FF DENOTES FRONT FACE. EF DENOTES EACH FACE.
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- ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
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- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING.

MODIFIED

RWD4
OF RWD20

REVISION:

APPROVED: AUGUST 27, 2014
Nancy Amburger
STATE BRIDGE ENGINEER

REVISOR:

APPROVED:
Christine
8-27-2014
STATE DESIGN ENGINEER

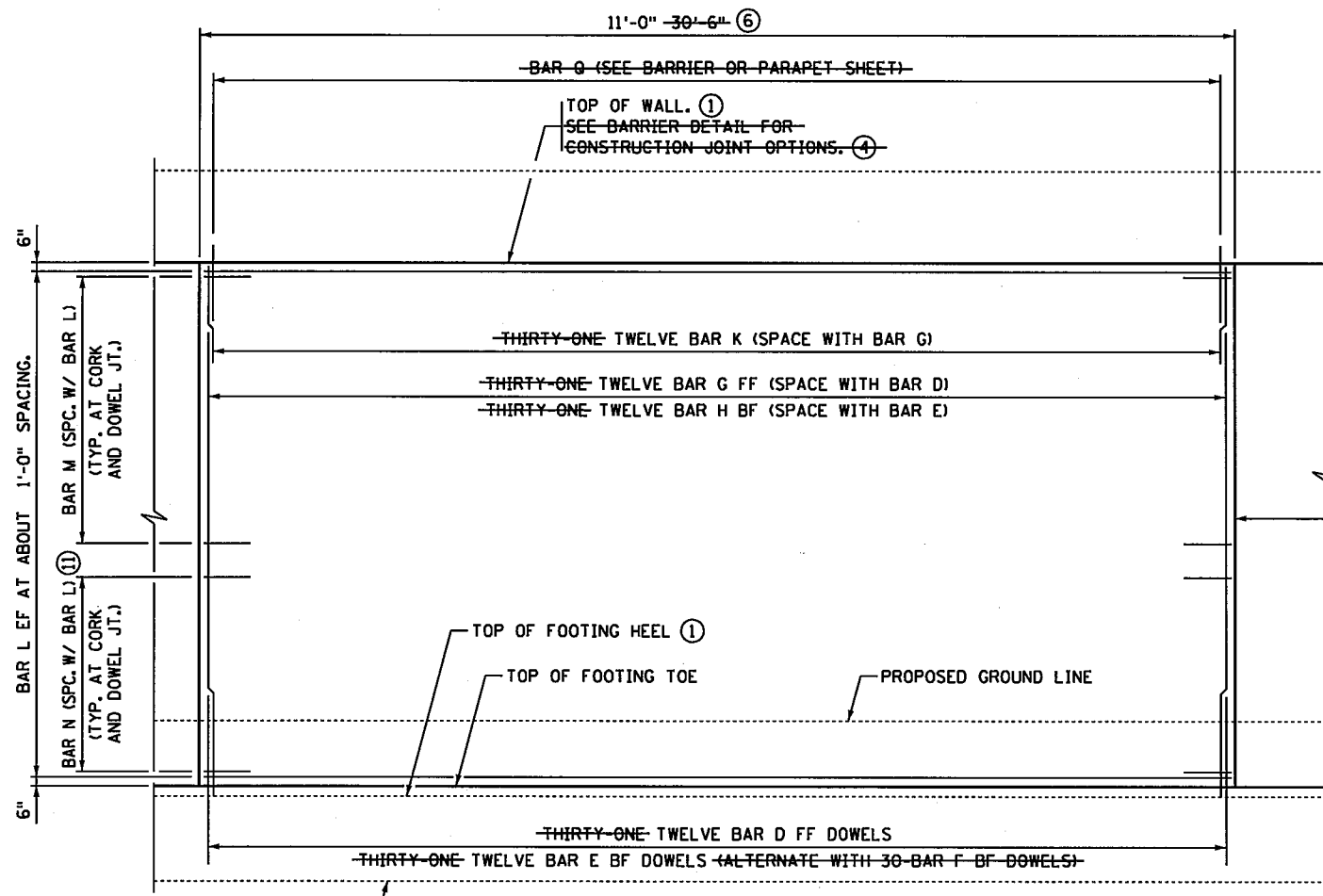
RETAINING WALL REINFORCEMENT DETAILS
(SHORT WALLS) (PANEL D2-D5, D8-D9)

STANDARD PLAN 5-297.621 218 OF 367

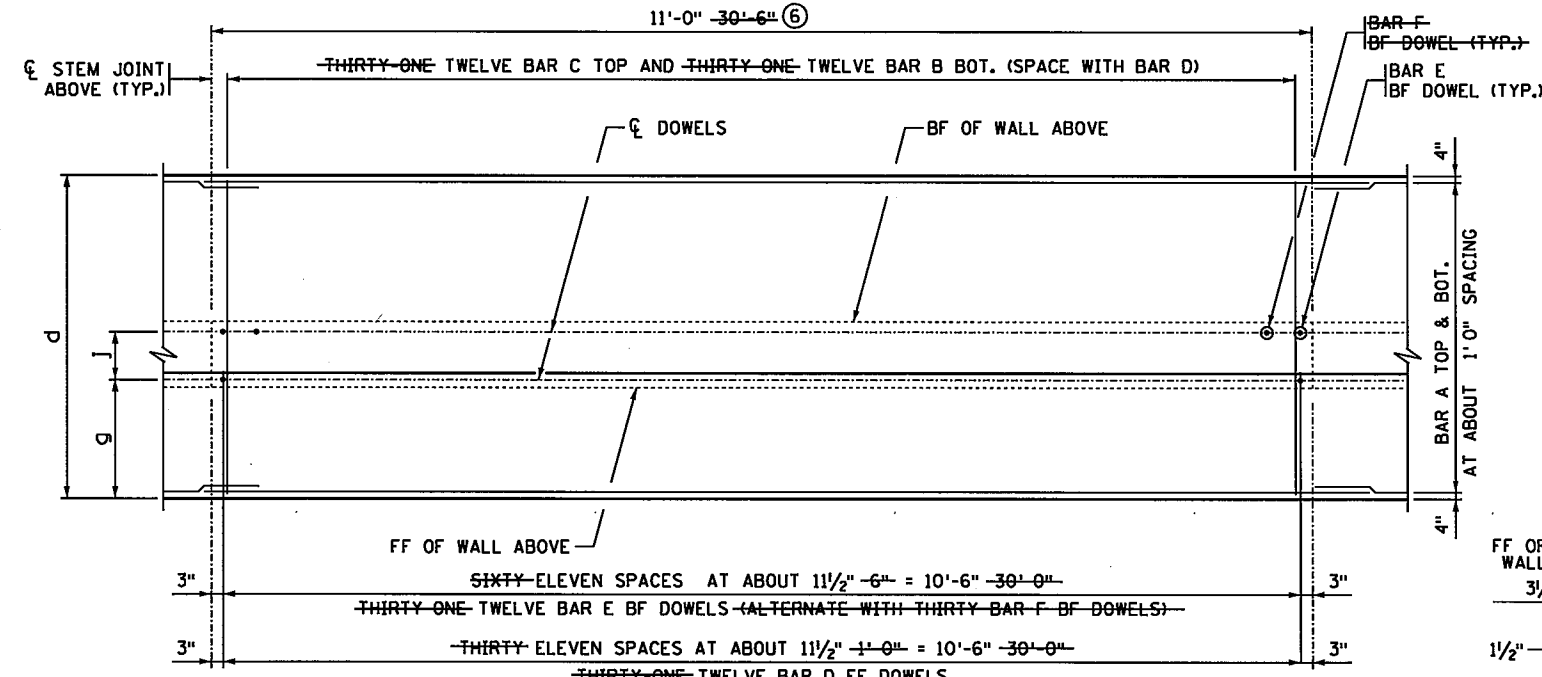
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ELEVATION *



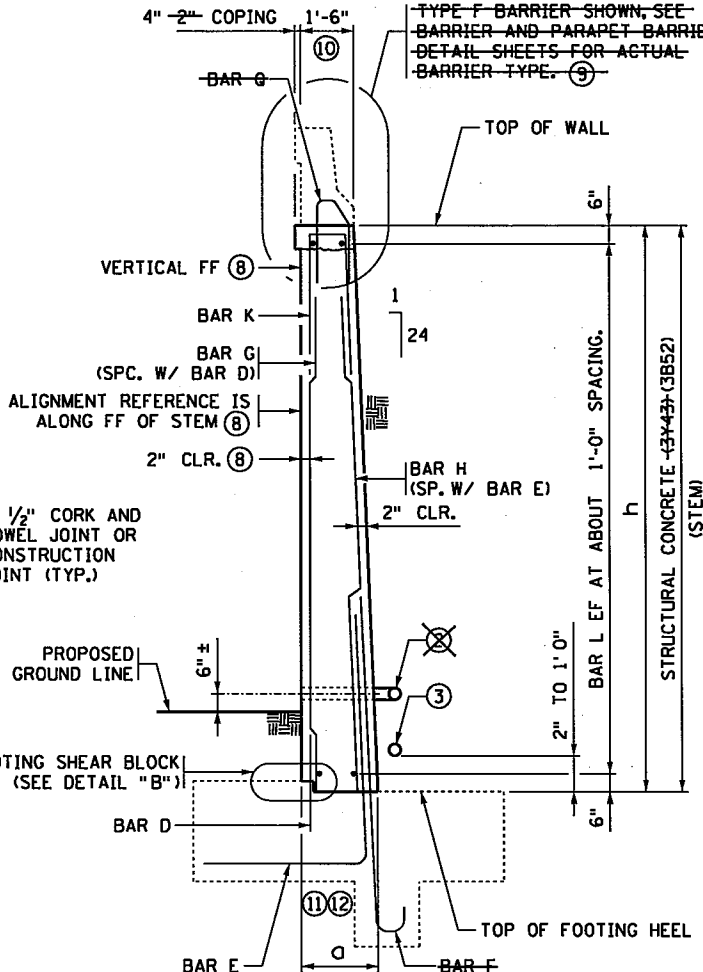
FOOTING PLAN ~ REINFORCEMENT *

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Suberberger
STATE BRIDGE ENGINEER

MODIFIED LENGTH AND QUANTITY FOR
PANEL ADJUSTMENT FROM 30'-6" TO 11'-0" *
CROSSED OUT BARRIER REFERENCES
ADJUSTED COPE DIMENSION
ADJUSTED CONCRETE MIX DESIGN

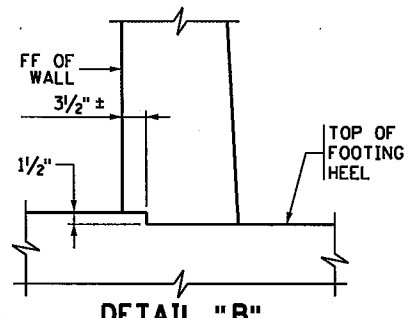
* DENOTES MODIFICATION FROM STANDARD PLAN
I hereby certify that this plan was prepared by me
or under my direct supervision and that I am a duly
Licensed Professional Engineer under the laws of
the State of Minnesota.
Certified By: *Brian L Fleming* Lic. No. 49486
Printed Name: BRIAN L FLEMING, PE Date: 2/15/2016

MODIFIED

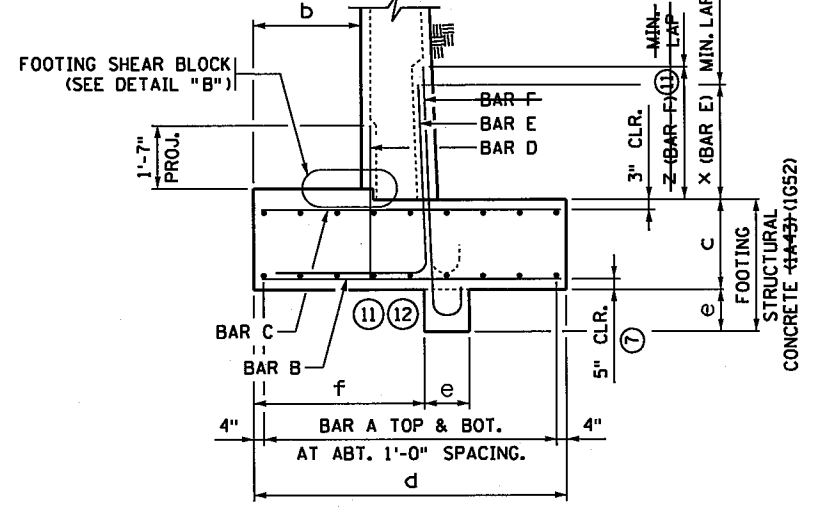


WALL SECTION *

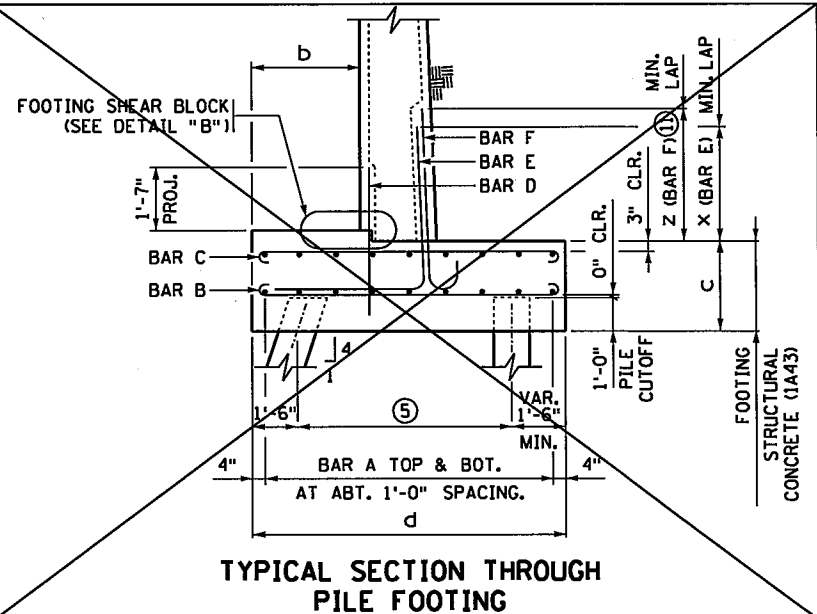
(F BARRIER AND 2" 4" COPING OPTION SHOWN)



DETAIL "B"



TYPICAL SECTION THROUGH SPREAD FOOTING *



TYPICAL SECTION THROUGH PILE FOOTING

NOTES:

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- ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
- ⑥ AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.
- ⑦ 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.
- ⑧ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING.
- ⑪ THIS FEATURE MAY NOT BE PRESENT ON ALL MEDIUM HEIGHT WALLS.
- ⑫ CONTRACTOR MAY CONSTRUCT KEYWAY WITHOUT FORMS, AS APPROVED BY THE ENGINEER.

RWD5
OF RWD20

REVISION:
APPROVED: 8-27-2014
Brian L Fleming
STATE DESIGN ENGINEER

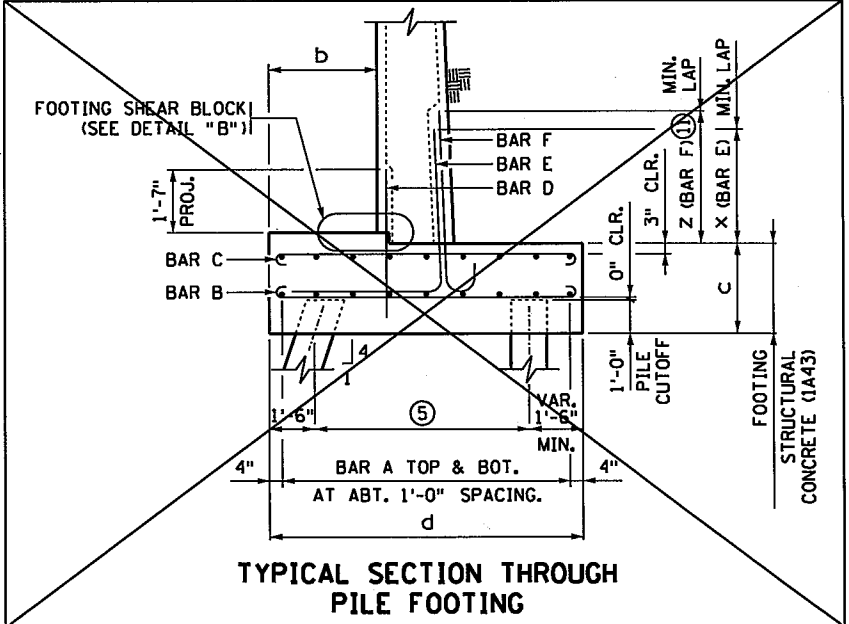
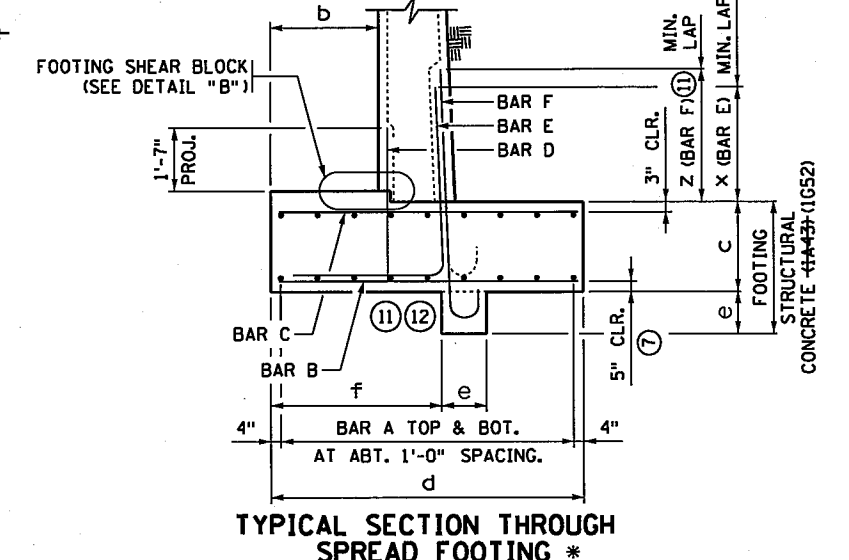
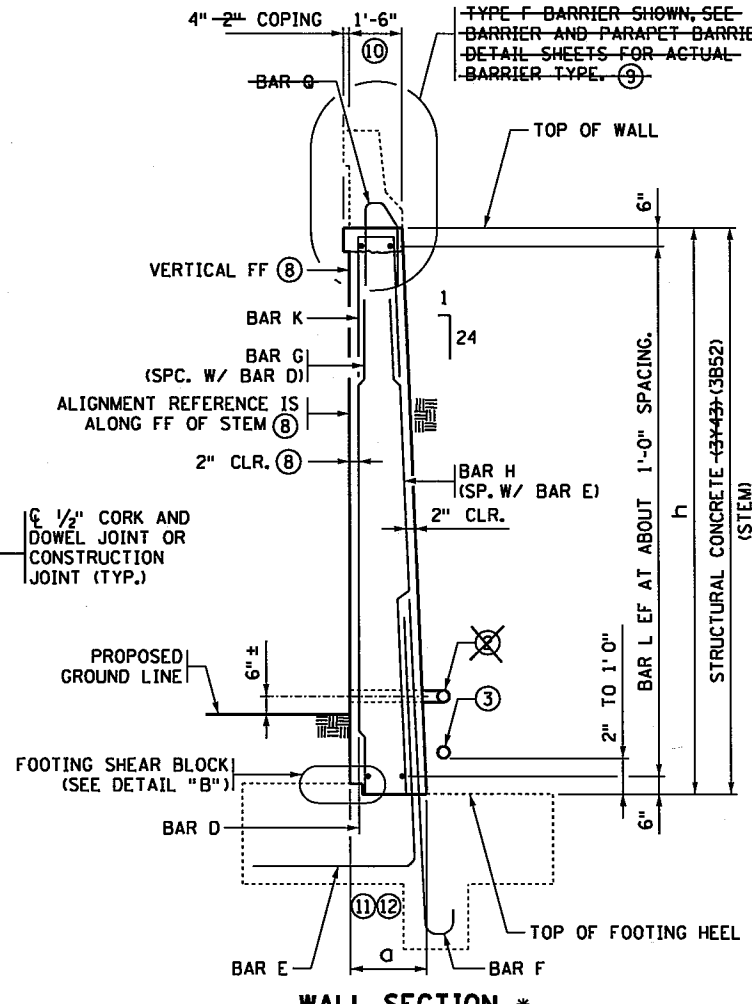
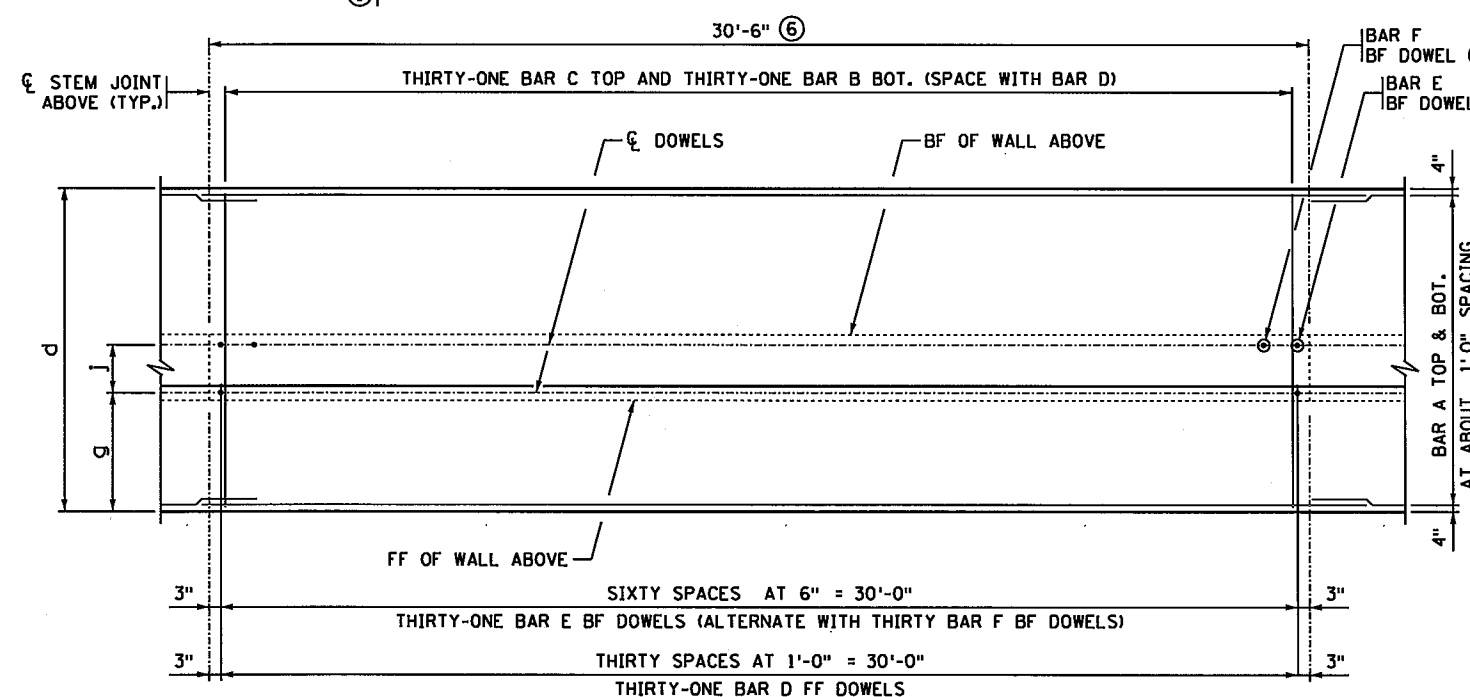
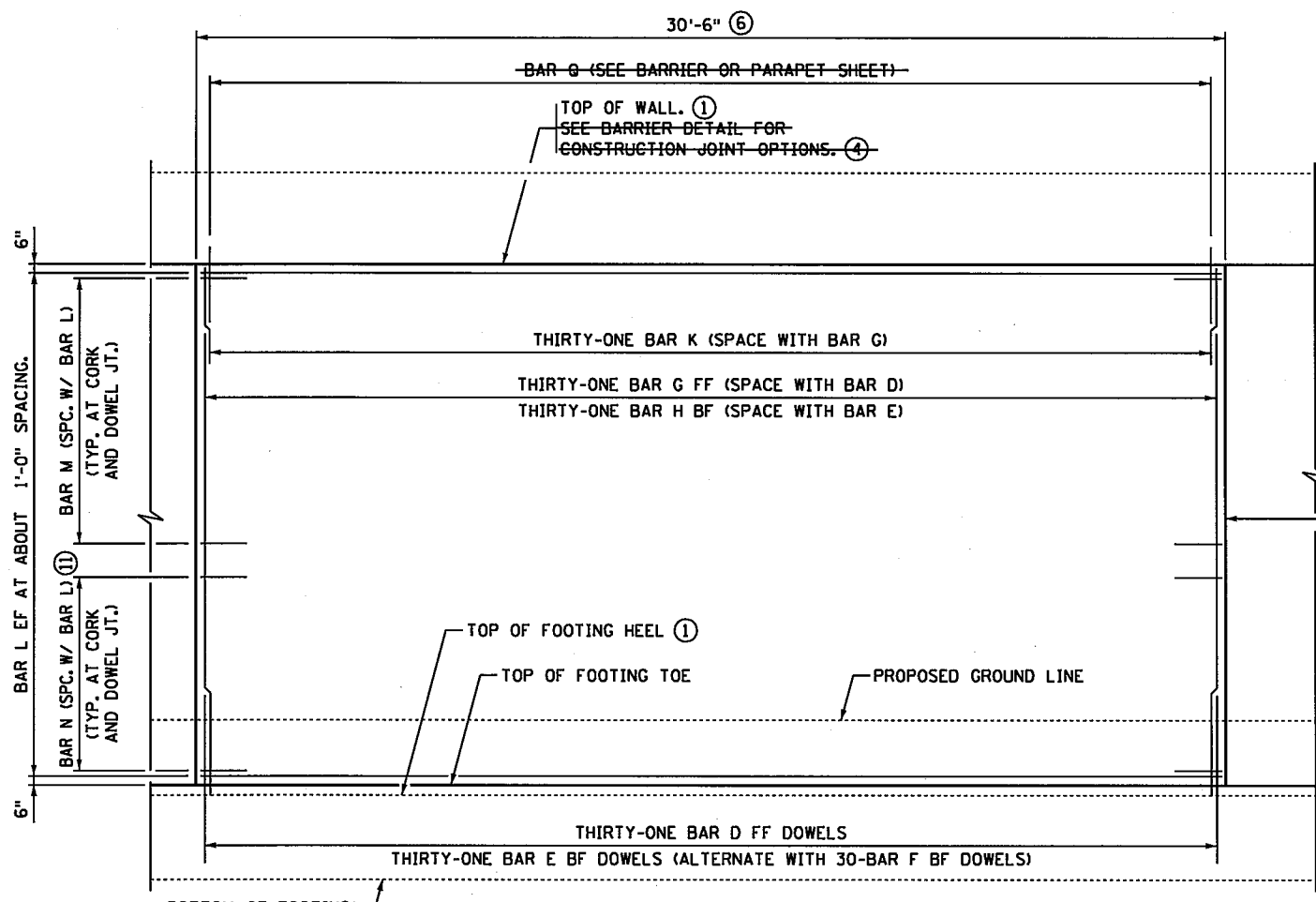
RETAINING WALL REINFORCEMENT DETAILS
(MEDIUM WALLS) (PANEL D6-D7)

STANDARD PLAN 5-297.622 219 OF 367

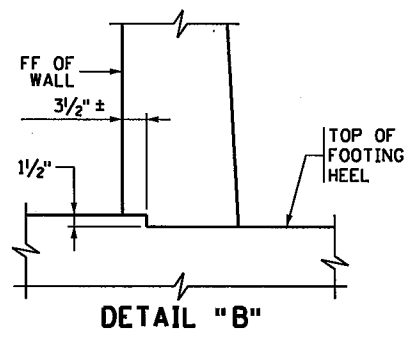
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@FILENAME@



- NOTES:**
- REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".
- STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.
- FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.
- BF DENOTES BACK FACE.
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- STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.
 - TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
 - TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
 - SEE STANDARD PLAN 5-297.624 (1 OF 6).
 - SEE GENERAL PLAN FOR PILE SPACING.
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 - REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
 - REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
 - WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING.
 - THIS FEATURE MAY NOT BE PRESENT ON ALL MEDIUM HEIGHT WALLS.
 - CONTRACTOR MAY CONSTRUCT KEYWAY WITHOUT FORMS, AS APPROVED BY THE ENGINEER.



CROSSED OUT BARRIER REFERENCES *
ADJUSTED COPE DIMENSION
ADJUSTED CONCRETE MIX DESIGN

MODIFIED

* DENOTES MODIFICATION FROM STANDARD PLAN

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian Fleming* Lic. No. 49486
Printed Name: BRIAN L. FLEMING, PE Date: 2/15/2016

REVISOR:

APPROVED: *Christine* 8-27-2014
STATE DESIGN ENGINEER

RWD6 OF RWD20

RETAINING WALL REINFORCEMENT DETAILS (MEDIUM WALLS) (PANEL D10-D14)

STANDARD PLAN 5-297.622 220 OF 367

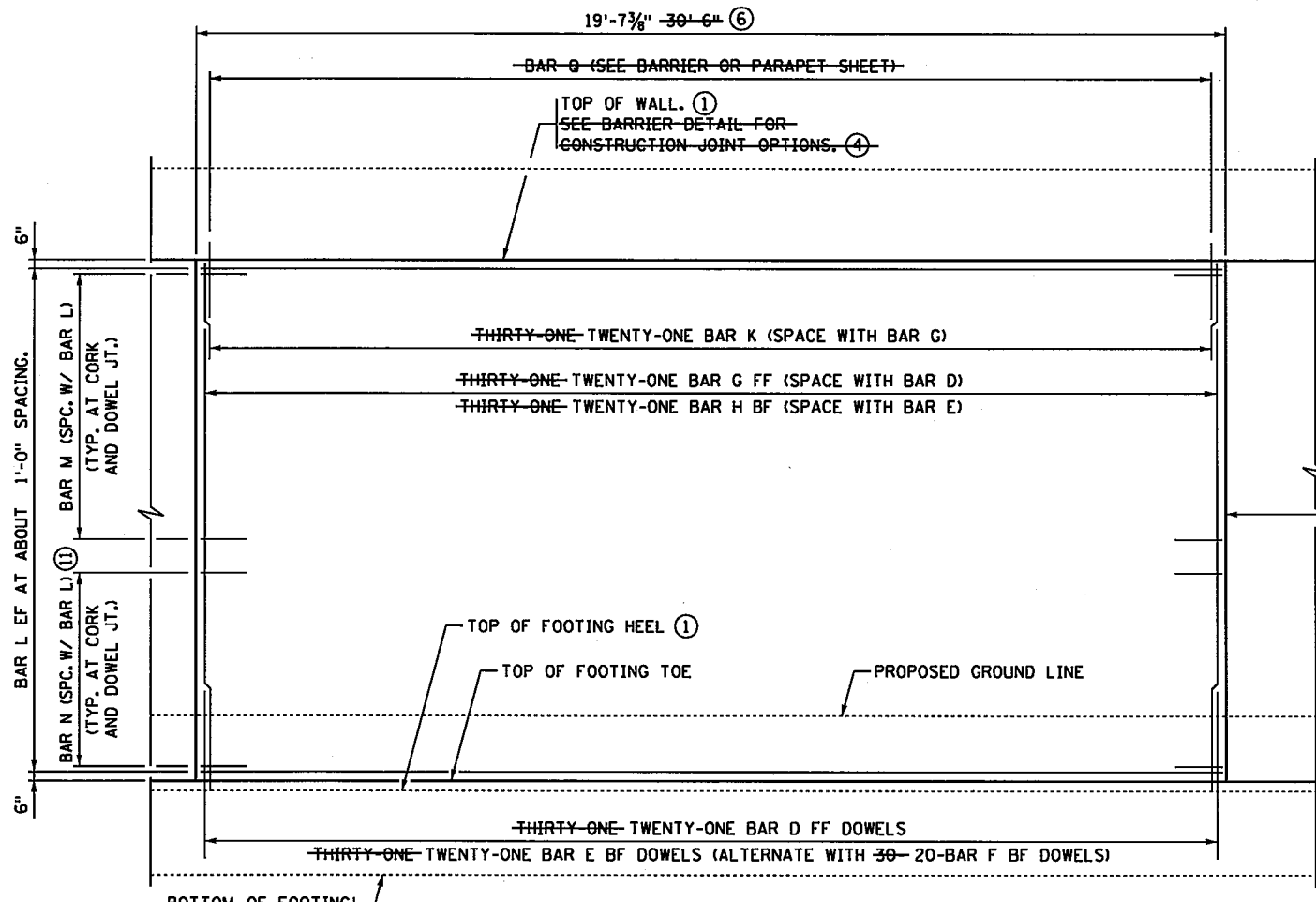
REVISION:

APPROVED: AUGUST 27, 2014
Nancy Weberberger
STATE BRIDGE ENGINEER

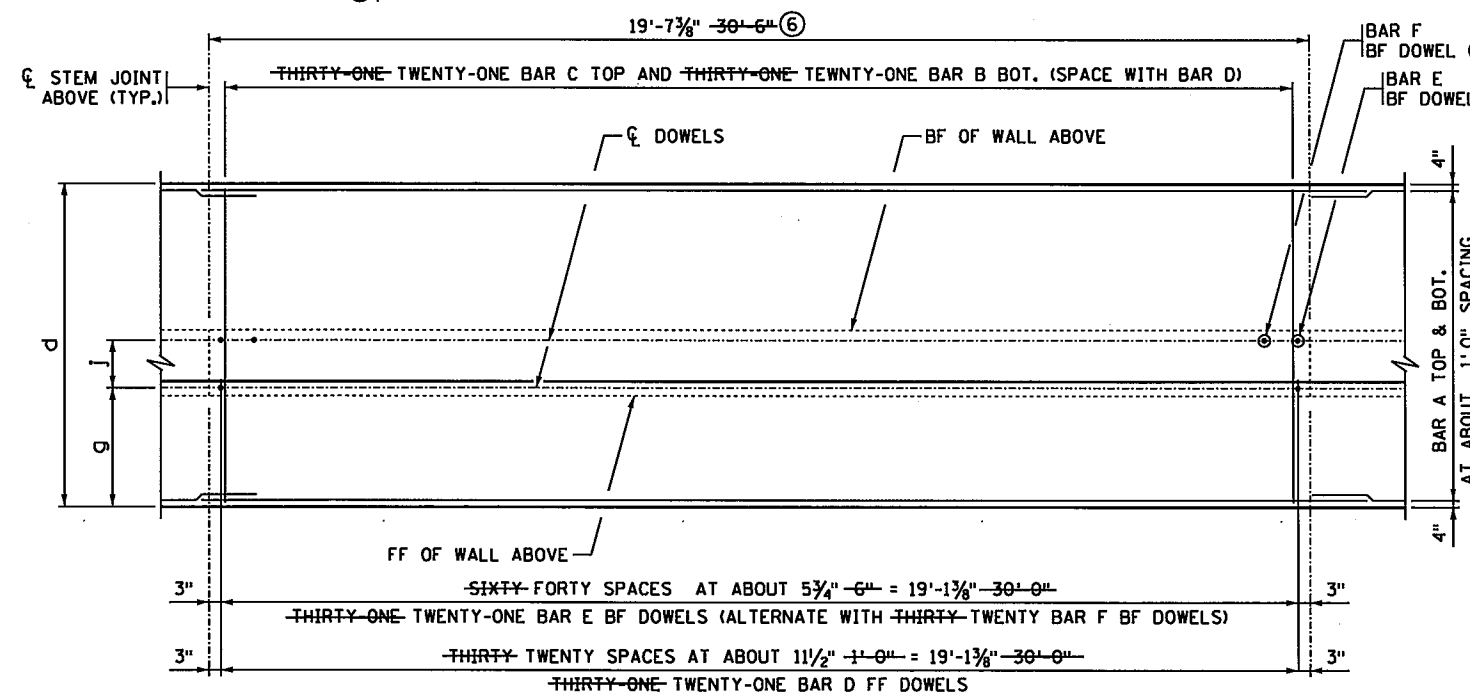
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ELEVATION *



FOOTING PLAN ~ REINFORCEMENT *

MODIFIED LENGTH AND QUANTITY FOR PANEL*
ADJUSTMENT FROM 30'-6" TO 19'-7 7/8"

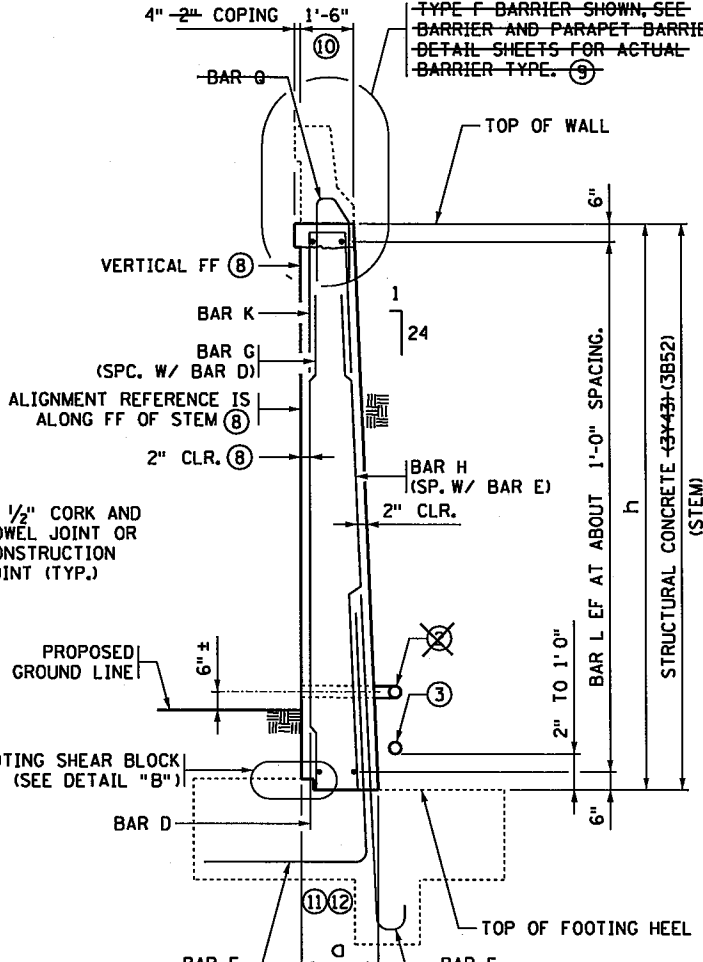
CROSSED OUT BARRIER REFERENCES
ADJUSTED COPE DIMENSION
ADJUSTED CONCRETE MIX DESIGN

MODIFIED

* DENOTES MODIFICATION FROM STANDARD PLAN

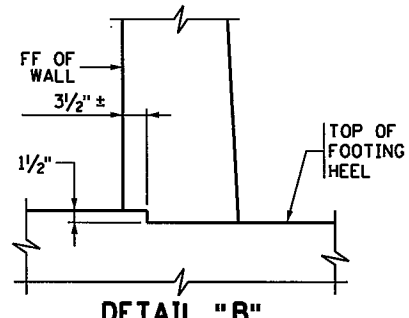
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian L. Fleming* Lic. No. 49486
Printed Name: BRIAN L. FLEMING, PE Date: 2/15/2016

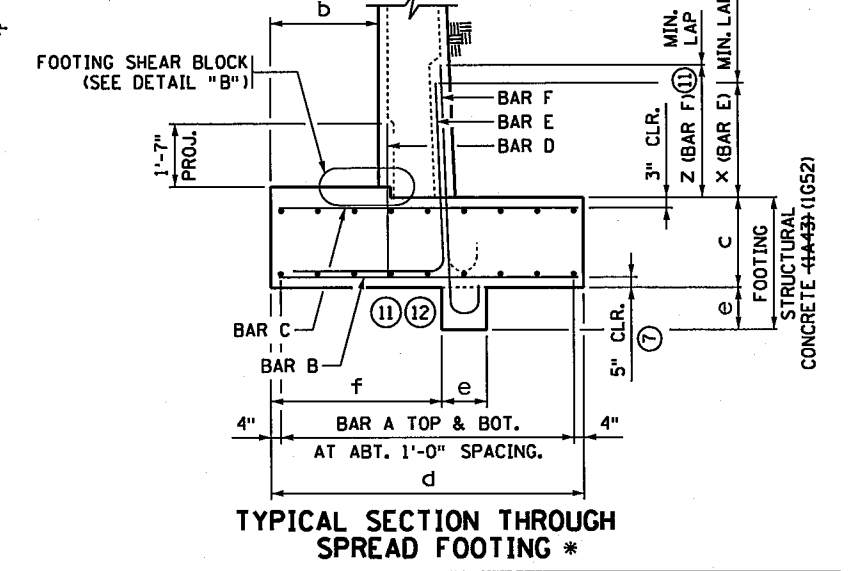


WALL SECTION *

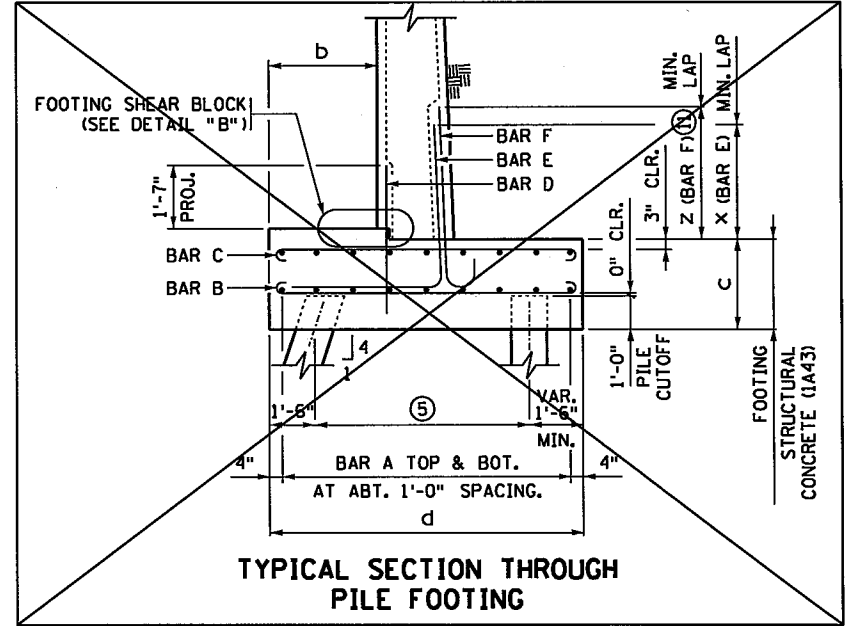
(F-BARRIER AND 2" - 4" COPING OPTION SHOWN)



DETAIL "B"



TYPICAL SECTION THROUGH SPREAD FOOTING *



TYPICAL SECTION THROUGH PILE FOOTING *

NOTES:

- REFER TO RETAINING WALL PANEL TABULATIONS FOR DIMENSIONS "a" THROUGH "x".
- STEM REINFORCEMENT IS TO BE SYMMETRICALLY/EQUALLY SPACED BETWEEN STEM JOINTS.
- FOOTING REINFORCEMENT SYMMETRICAL ABOUT STEM JOINT ABOVE UNLESS OTHERWISE NOTED. SEE RETAINING WALL TABLES FOR PILE SPACING AND LAYOUT.
- BF DENOTES BACK FACE.
FF DENOTES FRONT FACE.
EF DENOTES EACH FACE.
- ① STRAIGHT LINE BETWEEN ELEVATIONS SHOWN ON WALL ELEVATION (EXCEPT FOR STEPPED CONDITIONS). IF A BARRIER IS NOT USED, TOPS OF RETAINING WALL COULD BE USED.
- ② TYPE I DRAINAGE. SEE SECTION A-A ON STANDARD PLAN 5-297.624 (5 OF 6).
- ③ TYPE II DRAINAGE. SEE SECTION B-B ON STANDARD PLAN 5-297.624 (5 OF 6).
- ④ SEE STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ SEE GENERAL PLAN FOR PILE SPACING.
- ⑥ AT THE CONTRACTOR'S OPTION, PANEL LENGTH MAY VARY UP TO ± 1'-0". BAR CUTTING LISTS SHALL BE REVISED ACCORDINGLY BY THE CONTRACTOR.
- ⑦ 5" BOTTOM OF FOOTING CLEARANCE FOR ALL BARS EXCEPT BAR D. BAR D BOTTOM OF FOOTING CLEARANCE VARIES.
- ⑧ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑨ REBAR AND CONCRETE ARE INCLUDED IN THE PAY ITEM BY LINEAR FEET FOR THE BARRIER OR PARAPET.
- ⑩ WALL THICKNESS AT TOP OF STEM, NOT INCLUDING COPING.
- ⑪ THIS FEATURE MAY NOT BE PRESENT ON ALL MEDIUM HEIGHT WALLS.
- ⑫ CONTRACTOR MAY CONSTRUCT KEYWAY WITHOUT FORMS, AS APPROVED BY THE ENGINEER.

RWD7
OF RWD20

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Suberberger
STATE BRIDGE ENGINEER

REVISION:
APPROVED:
Brian L. Fleming
STATE DESIGN ENGINEER
8-27-2014

RETAINING WALL REINFORCEMENT DETAILS
(MEDIUM WALLS) (PANEL D15)

STANDARD PLAN 5-297.622 221 OF 367

2:55:55 PM

12/4/2015

K:\TWC_Civil\County\RAMSEY\135W_CRR\CAD\Plan_Sheets\CD6284162_rwd8.dgn

Table for Panel D1: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D2: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D3: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

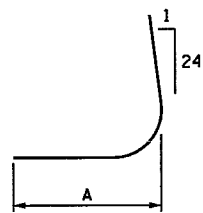
Table for Panel D4: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D5: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

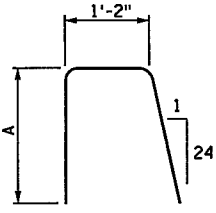
Table for Panel D6: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D7: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

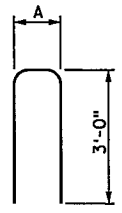
Table for Panel D8: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Sub-sections include SPREAD FOOTING REINFORCEMENT, DIMENSIONS, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.



BAR E



BAR K



BARS M,N,P

NOTES:

- L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.

Table with columns for DESIGN TEAM, DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, and REVISIONS.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Brian Fleming, L.C. No. 49486
Printed Name: BRIAN L. FLEMING, PE Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

RETAINING WALL D
PANEL TABULATIONS

Table with columns for FILE NO. (RAMSEY129594), 222, RWD8, 367, and OF RWD20.

Table for Panel D9: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Contains sub-tables for SPREAD FOOTING REINFORCEMENT, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D10: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Contains sub-tables for SPREAD FOOTING REINFORCEMENT, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

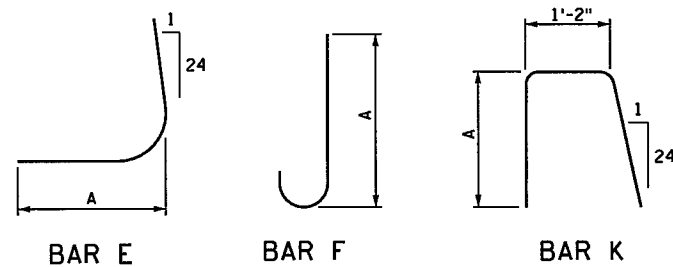
Table for Panel D11: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Contains sub-tables for SPREAD FOOTING REINFORCEMENT, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D12: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Contains sub-tables for SPREAD FOOTING REINFORCEMENT, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D13: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Contains sub-tables for SPREAD FOOTING REINFORCEMENT, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D14: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Contains sub-tables for SPREAD FOOTING REINFORCEMENT, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.

Table for Panel D15: Dimensions & Quantities. Includes columns for BAR, MARK, NO., LENGTH, A, LOCATION, WT., and DIMENSIONS & QUANTITIES. Contains sub-tables for SPREAD FOOTING REINFORCEMENT, STEM, and FOOTING DOWELS & STEM REINFORCEMENT.



NOTES:
L = DENOTES PANEL LENGTH.
FF = DENOTES FRONT FACE.
BF = DENOTES BACK FACE.
EF = DENOTES EACH FACE.
DWL = DENOTES DOWEL.
BARS MARKED WITH THE SUFFIX "E" ARE EPOXY COATED.
x = PROJECTION OF BAR E INTO STEM.
z = PROJECTION OF BAR F INTO STEM.

DESIGN TEAM table with columns for DESIGNER, CHECKED BY, NO., BY, DATE, and REVISIONS.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Brian L. Fleming, License No. 49486
Printed Name: BRIAN L. FLEMING, PE Date: 12/4/2015

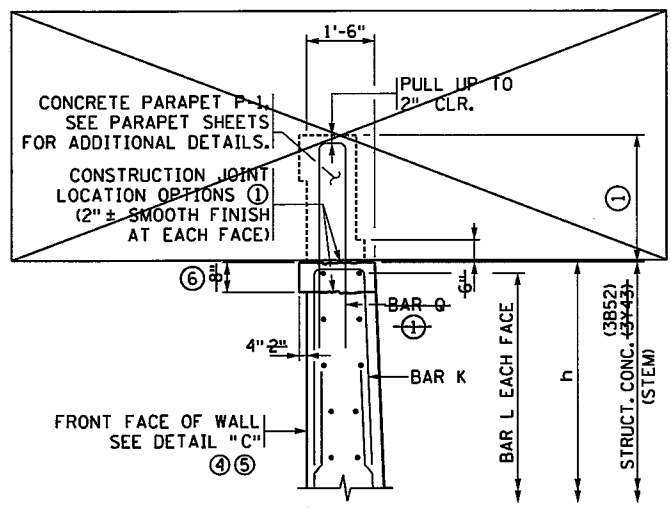
KimleyHorn logo and contact information:
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

Table with project title 'RETAINING WALL D PANEL TABULATIONS', sheet number '223/367', and file information including 'FILE NO. RAMSEI29594' and 'RWD9 OF RWD20'.

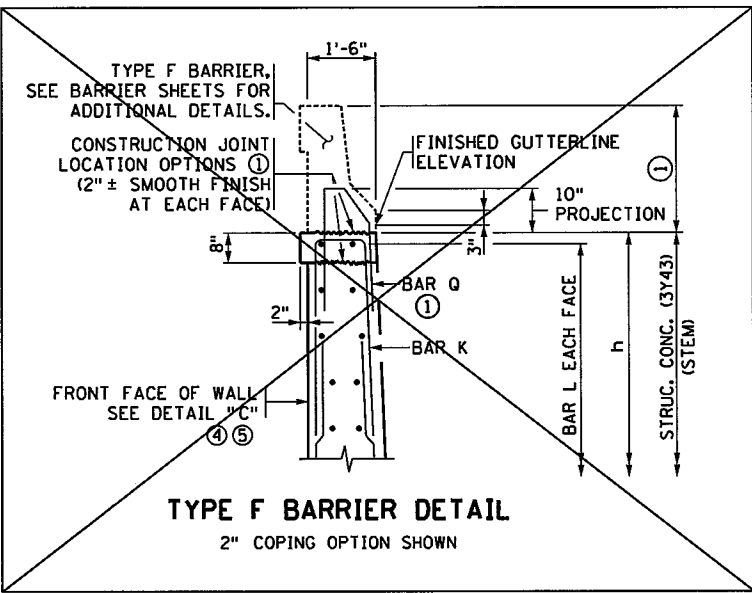
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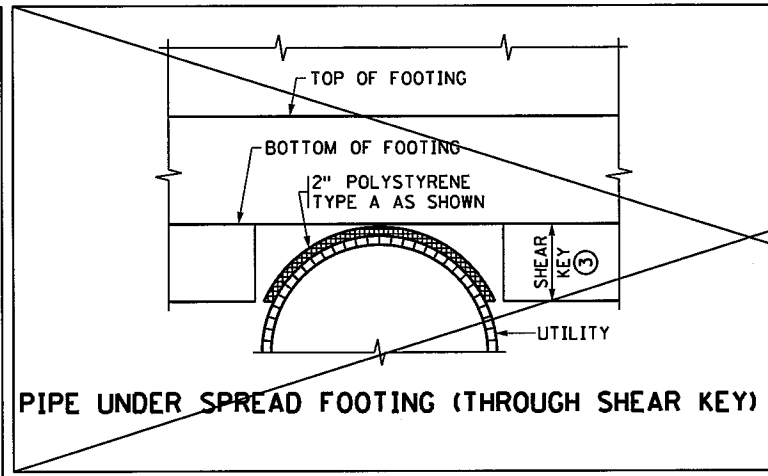
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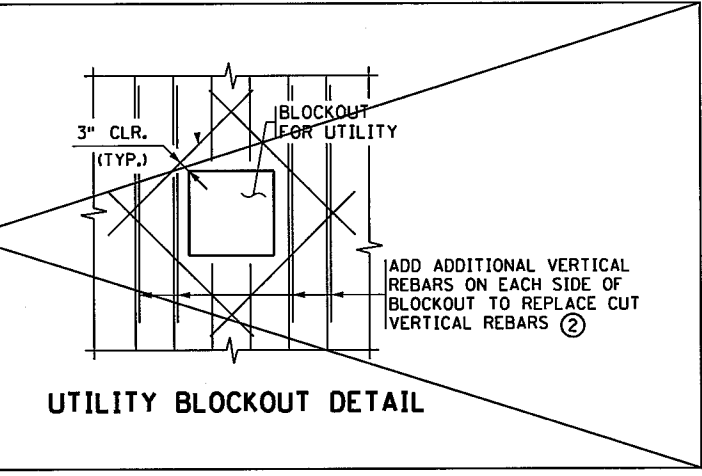
CONCRETE PARAPET P-1 DETAIL *
 4" 2nd COPING OPTION SHOWN



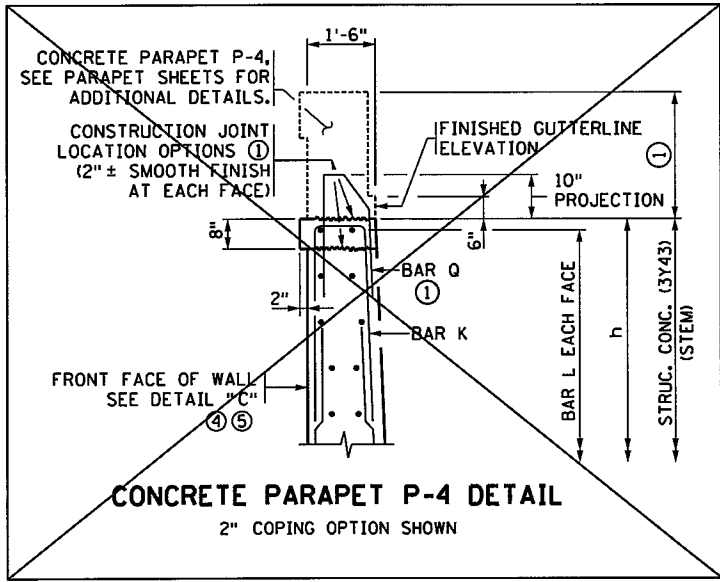
TYPE F BARRIER DETAIL
 2" COPING OPTION SHOWN



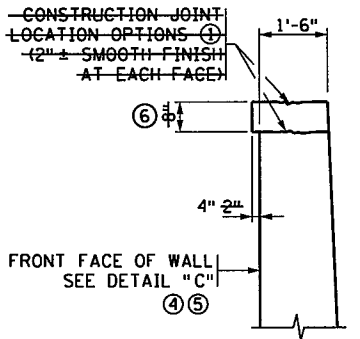
PIPE UNDER SPREAD FOOTING (THROUGH SHEAR KEY)



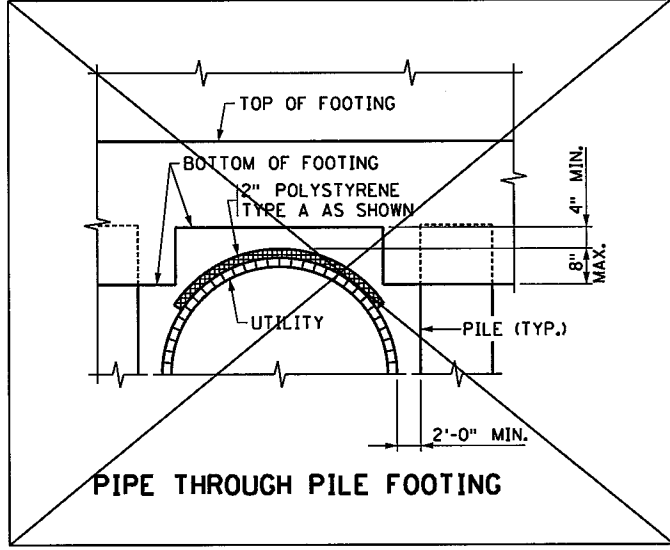
UTILITY BLOCKOUT DETAIL



CONCRETE PARAPET P-4 DETAIL
 2" COPING OPTION SHOWN



COPING DETAIL *

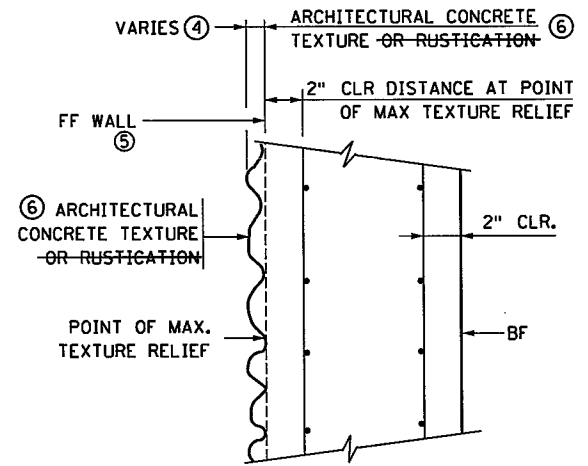


PIPE THROUGH PILE FOOTING

NOTES:

~~ARCHITECTURAL TREATMENT OPTION ON FRONT FACE OF RETAINING WALL, INCLUDING COPING OR HORIZONTAL REVEL OPTION TO BE DETERMINED BY MNDOT.~~

- ① REFER TO PARAPET OR BARRIER SHEETS FOR ADDITIONAL INFORMATION INCLUDING Q BAR PLACEMENT DETAILS, AND PAYMENT.
- ② FIELD CUT/ADJUST VERTICAL AND HORIZONTAL REINFORCEMENT AS NECESSARY TO CLEAR BLOCKOUT. PLACE REINFORCEMENT AS SHOWN.
- ③ MODIFY AS NEEDED FOR INTERRUPTION.
- ④ THE THICKNESS OF THE ARCHITECTURAL CONCRETE TEXTURE VARIES WITH THE TEXTURE RELIEF. THE STRUCTURAL CONCRETE 3Y43-3B52 QUANTITIES DO NOT INCLUDE THE MATERIAL WITHIN THE ARCHITECTURAL CONCRETE TEXTURE. MATERIAL NEEDED FOR THE TEXTURING SHALL BE INCIDENTAL. SEE SPECIAL PROVISIONS 2411. TEXTURE RELIEF TO ADHERE TO FHWA CRASH BARRIER GUIDANCE WHENEVER THE WALL FACE IS INSIDE OR NEAR THE CLEAR ZONE.
- ⑤ FOR RETAINING WALLS THAT ABUT A BRIDGE OR BRIDGE WING WALL, NOTE THAT THE DESIGNATION OF "FRONT FACE" MAY VARY FROM THE BRIDGE PLANS TO THE RETAINING WALL PLANS.
- * ⑥ SEE SHEET RWD18 FOR ADDITIONAL DETAILS.



DETAIL "C" *

CROSSED OUT BARRIER REFERENCES *
 ADDED COPE NOTE

REVISION:
 APPROVED: AUGUST 27, 2014
Nancy M. ...
 STATE BRIDGE ENGINEER

* DENOTES MODIFICATION FROM STANDARD PLAN
 I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brian L. Fleming* Lic. No. 49486
 Printed Name: **BRIAN L. FLEMING, PE** Date: 12/4/2015

MODIFIED
 STANDARD SHEET NO.
5-297.624 (1 OF 6)
 STANDARD APPROVED:
AUGUST 27, 2014

TITLE:
RETAINING WALL MISCELLANEOUS DETAILS

PLOTTED/REVISED:
\$\$\$\$@DATE\$\$\$\$

DISTRICT #: \$\$\$\$@DISTRICT\$\$\$
USER NAME: \$\$\$\$@USER\$NAME\$\$\$
PATH & FILENAME: \$\$\$\$@PATH\$FILENAME\$\$\$

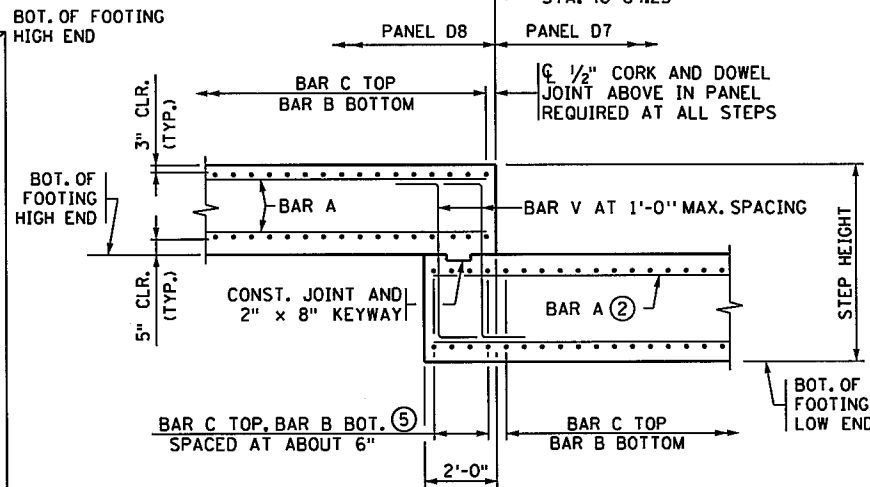
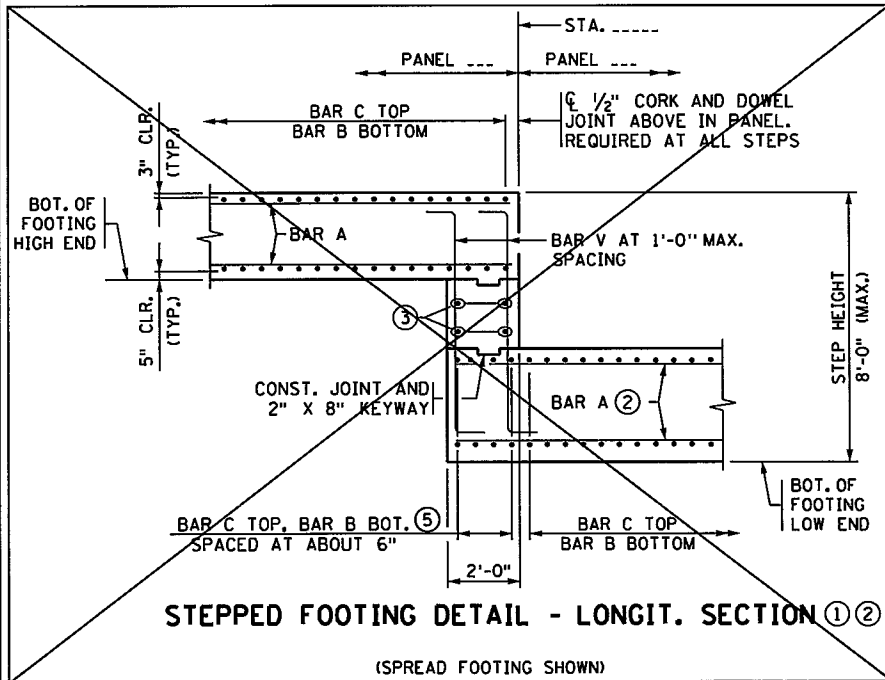
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@FILENAME@

BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS ①②*									
STATION	STEP TYPE (VAR. OF MIN.)	JOINT	BOT. OF FOOTING EL. LOW END	BOT. OF FOOTING EL. HIGH END	BAR (B, C, V)	MARK	NO.	LENGTH	A- DIMENSION
40+84.25	TYPE 2	8	888.58	890.00	B (8)				N.A.
					C (8)	4		N.A.	
					V (7)				
					B (8)			N.A.	
					C (8)	4		N.A.	
					V (7)				
					B (8)			N.A.	
					C (8)	4		N.A.	
					V (7)				
					B (8)			N.A.	
					C (8)	4		N.A.	
					V (7)				
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									
B (8)			N.A.						
C (8)	4		N.A.						
V (7)									

N.A. = NOT APPLICABLE

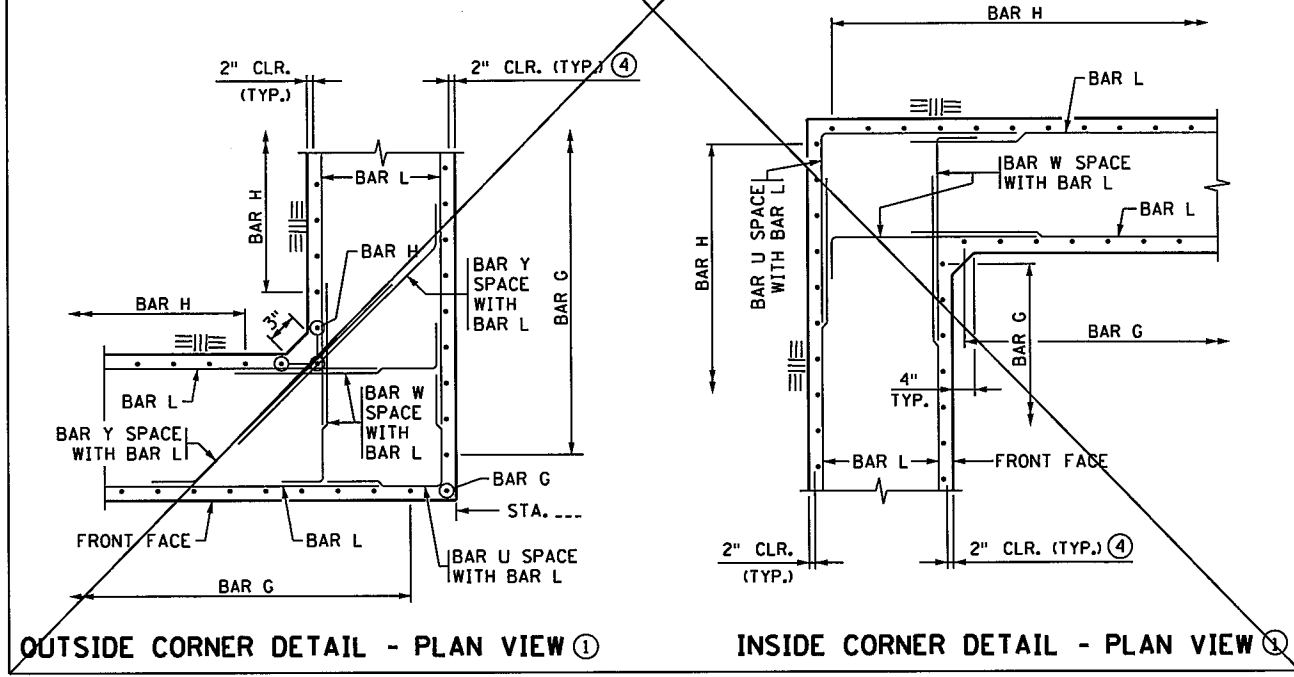
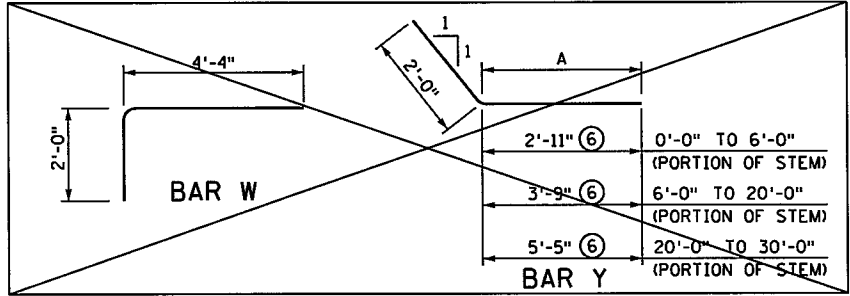
BILL OF REINFORCEMENT FOR CORNER DETAILS ①									
STATION	JOINT	INSIDE OR OUTSIDE CORNER	BAR	MARK	NO.	LENGTH	SHAPE	A- DIMENSION	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	┌	N.A.	
			Y	C4 E		4'-11"	┌	2'-11"	
			Y	C4 E		5'-9"	┌	3'-9"	
			Y	C4 E		7'-5"	┌	5'-5"	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	┌	N.A.	
			Y	C4 E		4'-11"	┌	2'-11"	
			Y	C4 E		5'-9"	┌	3'-9"	
			Y	C4 E		7'-5"	┌	5'-5"	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	┌	N.A.	
			Y	C4 E		4'-11"	┌	2'-11"	
			Y	C4 E		5'-9"	┌	3'-9"	
			Y	C4 E		7'-5"	┌	5'-5"	
			U	C4 E		8'-8"	┌	N.A.	
			W	C4 E		6'-4"	┌	N.A.	
			Y	C4 E		4'-11"	┌	2'-11"	
			Y	C4 E		5'-9"	┌	3'-9"	
			Y	C4 E		7'-5"	┌	5'-5"	

N.A. = NOT APPLICABLE



STEPPED FOOTING DETAIL - LONGIT. SECTION ①②*

TYPE 2 - MINIMUM STEP HEIGHT (SPREAD FOOTING SHOWN)



OUTSIDE CORNER DETAIL - PLAN VIEW ①

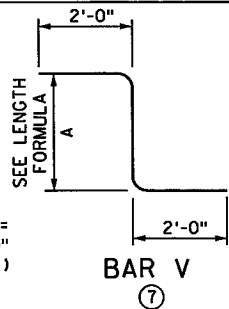
INSIDE CORNER DETAIL - PLAN VIEW ①

NOTES:

- ADDITIONAL REINFORCING BARS, STRUCTURAL CONCRETE, AND OTHER COMPONENTS REQUIRED TO CONSTRUCT CORNERS AND STEPPED FOOTINGS ARE INCIDENTAL.
- ① CONTRACTOR IS REQUIRED TO COMPLETE THE BILL OF REINFORCEMENT TABLE AND SUBMIT TO PROJECT ENGINEER AT LEAST 3 WEEKS PRIOR TO REBAR FABRICATION.
- ② FOR THE LOWER OF THE TWO FOOTINGS AT A STEP, THE CONTRACTOR IS RESPONSIBLE FOR MODIFYING THE LENGTH OF BAR A TO EXTEND BENEATH THE STEP OR USE SPLICED BARS.
- ③ 6 INCH MAX. SPACING. BARS TO BE SAME TYPE AS BAR B OF THE LOWER FOOTING.
- ④ REFER TO DETAIL "C" AND NOTES ON STANDARD PLAN 5-297.624 (1 OF 6).
- ⑤ REFER TO TABLE LABELED "BILL OF REINFORCEMENT FOR STEPPED FOOTING DETAILS" FOR ADDITIONAL B AND C BARS IN LOWER FOOTING.
- ⑥ USE THE BAR Y LEG DIMENSION FOR THE PORTION OF STEM LOCATION INDICATED IN THE BAR BEND IN DETAIL. ⑥ REPRESENTS TOP OF THE STEM.
- ⑦ BAR V SIZE TO MATCH BAR B. SEE PANEL TABULATIONS FOR SIZE.
- ⑧ SEE PANEL TABULATIONS FOR BAR SIZE AND LENGTH.

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Subenberger
STATE BRIDGE ENGINEER

BAR V LENGTH FORMULA =
STEP HEIGHT MINUS 10"
(A-DIMENSION)



* DENOTES MODIFICATION FROM STANDARD PLAN
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Brian L Fleming* Lic. No. 49486
Printed Name: BRIAN L FLEMING, PE Date: 12/4/2015

STANDARD SHEET NO.
5-297.624 (2 OF 6)
STANDARD APPROVED:
AUGUST 27, 2014

RETAINING WALL MISCELLANEOUS DETAILS

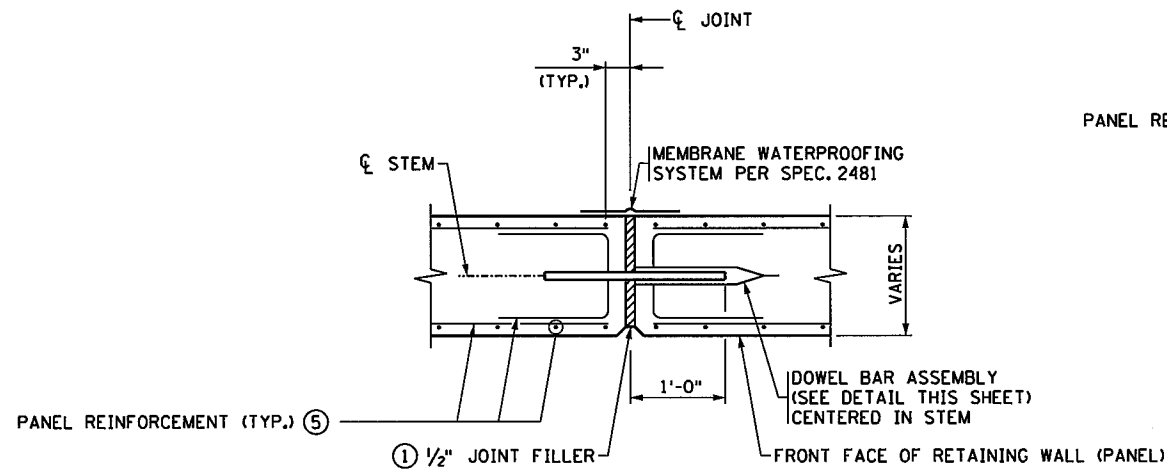
STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. 225 OF 367 SHEETS

RWD11
OF RWD20

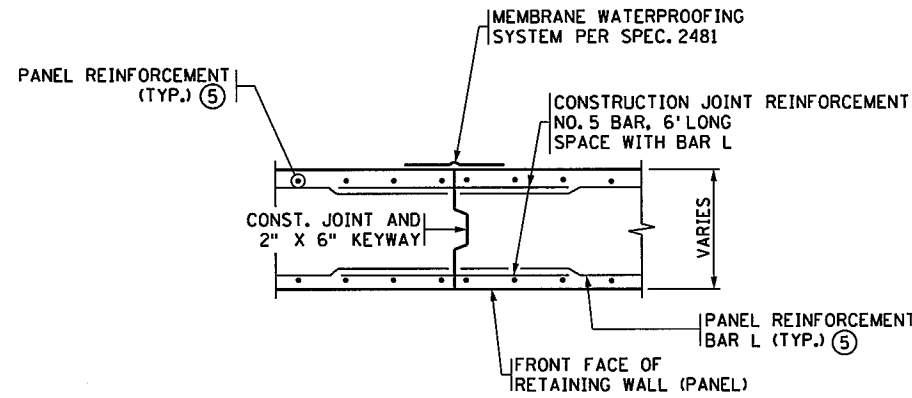
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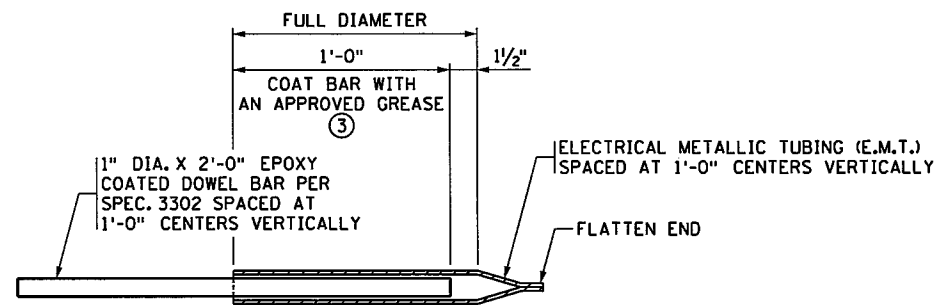
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CORK AND DOWELED JOINT DETAIL
(TYPICAL SECTION THROUGH JOINT)
②④



CONSTRUCTION JOINT DETAIL
(TYPICAL SECTION THROUGH JOINT)
②④



DOWEL BAR ASSEMBLY

NOTES:

THE MATERIALS AND PLACEMENT OF THE CORK AND DOWEL JOINT/ CONSTRUCTION JOINT (DOWEL BAR ASSEMBLIES, NO. 5 REINFORCING BARS, JOINT FILLER, AND JOINT WATERPROOFING) ARE INCIDENTAL.

THE CONTRACTOR SHALL ASSIGN TO THE REINFORCING BAR SUPPLIER THE RESPONSIBILITY OF SUPPLYING THE NECESSARY MATERIALS ASSOCIATED WITH THE DETAILS SHOWN ON THIS SHEET.

- ① JOINT FILLER SHALL BE CORK SPEC. 2401.3E3.
- ② AT THE CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED IN LIEU OF CORK AND DOWEL JOINTS. REINFORCEMENT QUANTITIES WERE COMPUTED ASSUMING A CORK AND DOWEL JOINT BETWEEN EVERY PANEL. CHANGES IN THE BILL OF REINFORCEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND NO ADDITIONAL PAYMENT WILL BE MADE. AT A MINIMUM, PLACE CORK AND DOWEL JOINTS EVERY 9'-6". A CORK AND DOWEL JOINT IS REQUIRED AT ALL VERTICAL FOOTING STEPS.
- ③ GREASE SHALL BE AN APPROVED HIGH PRESSURE TYPE THAT IS EFFECTIVE OVER THE FULL RANGE OF EXPECTED TEMPERATURES AND RESISTANT TO CHEMICAL ACTION.
- ④ DOWEL BAR ASSEMBLY MUST BE PLACED PERPENDICULAR TO JOINT AND PARALLEL TO THE WALL FACE, AND TO EACH OTHER.
- ⑤ SEE PANEL SHEETS FOR REINFORCING DETAILS.

RWD12
OF RWD20

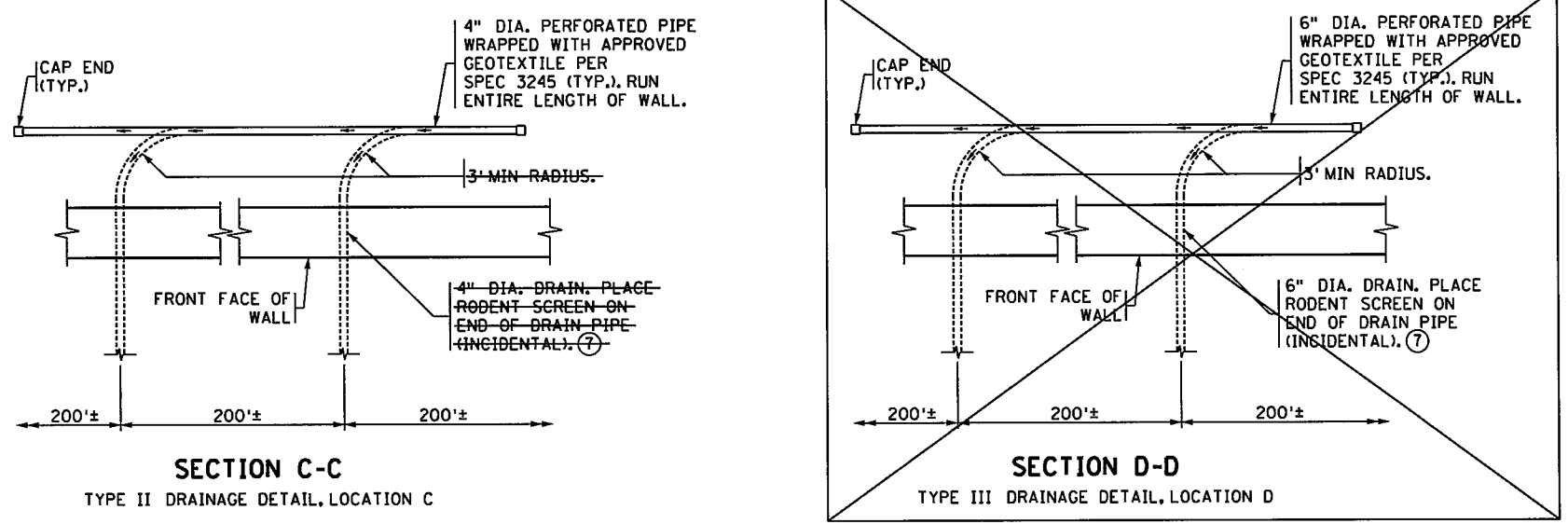
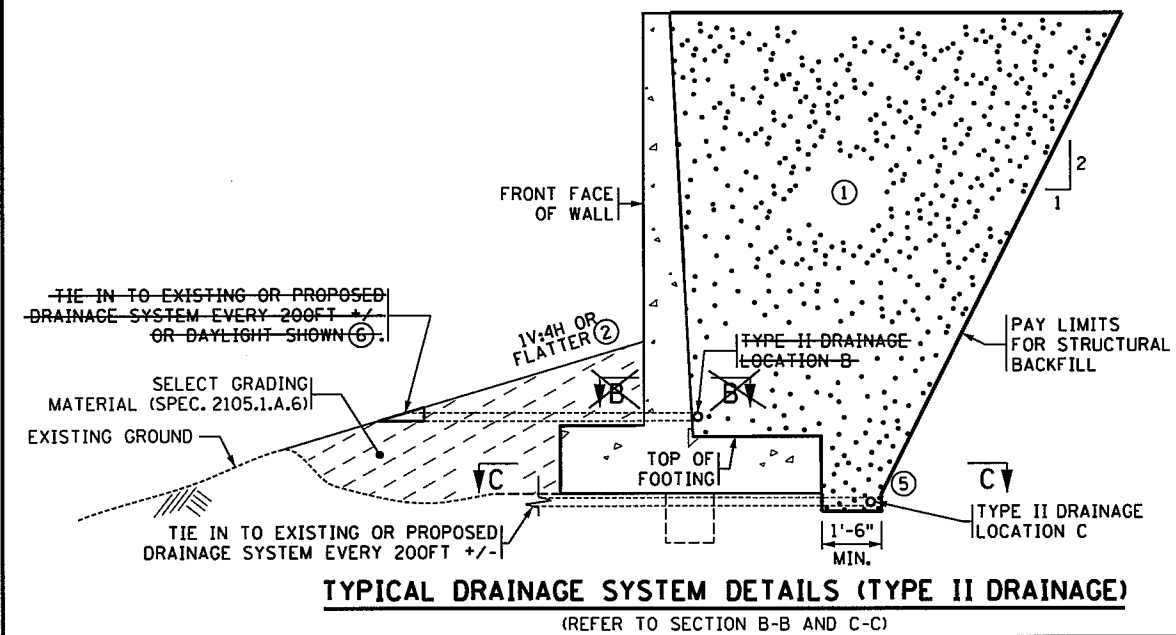
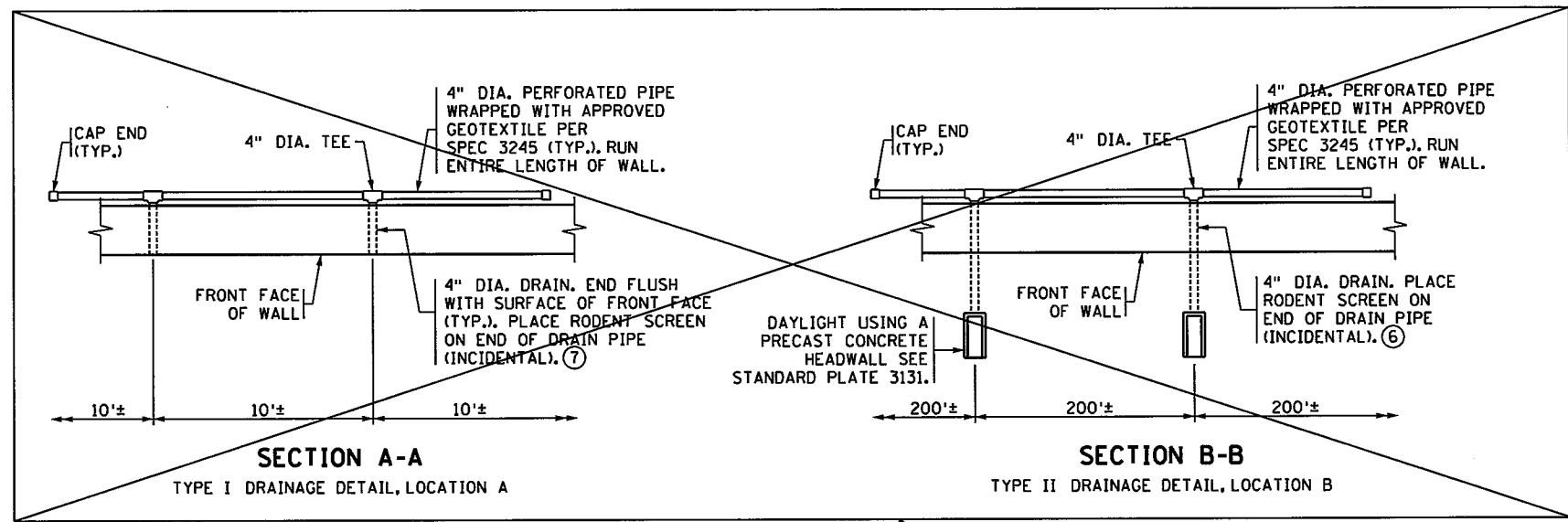
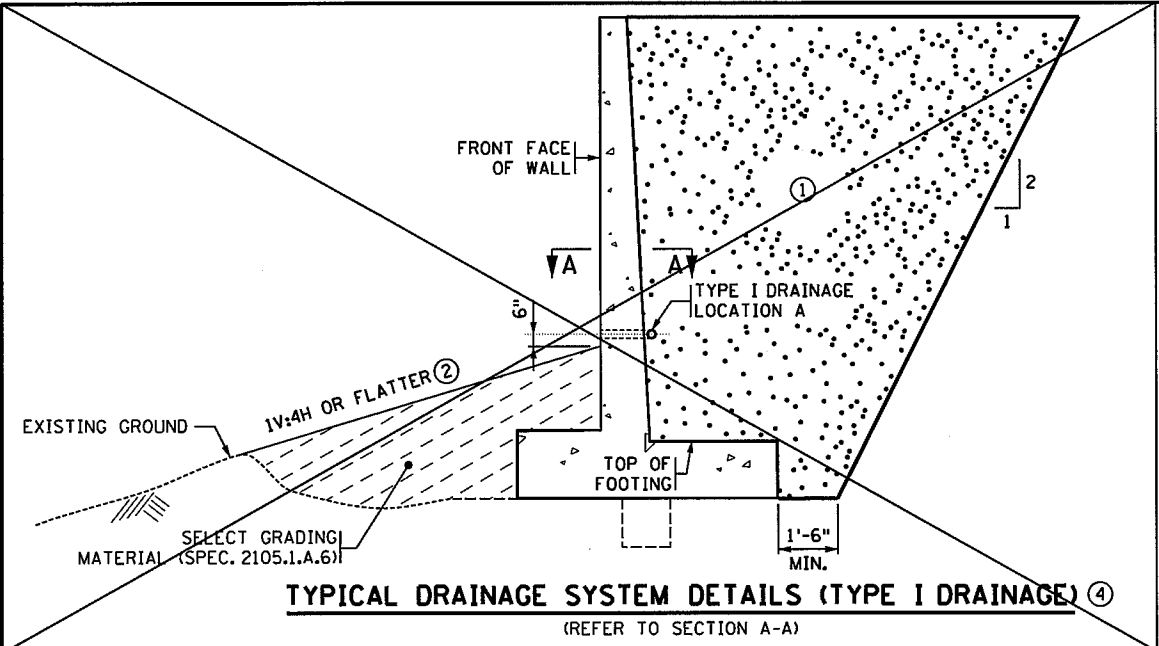
REVISION:
APPROVED: AUGUST 27, 2014
Nancy Dambenberger
STATE BRIDGE ENGINEER

STANDARD SHEET NO.
5-297.624 (3 OF 6)
STANDARD APPROVED:
AUGUST 27, 2014

TITLE:
RETAINING WALL MISCELLANEOUS DETAILS

STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. 226 OF 367 SHEETS

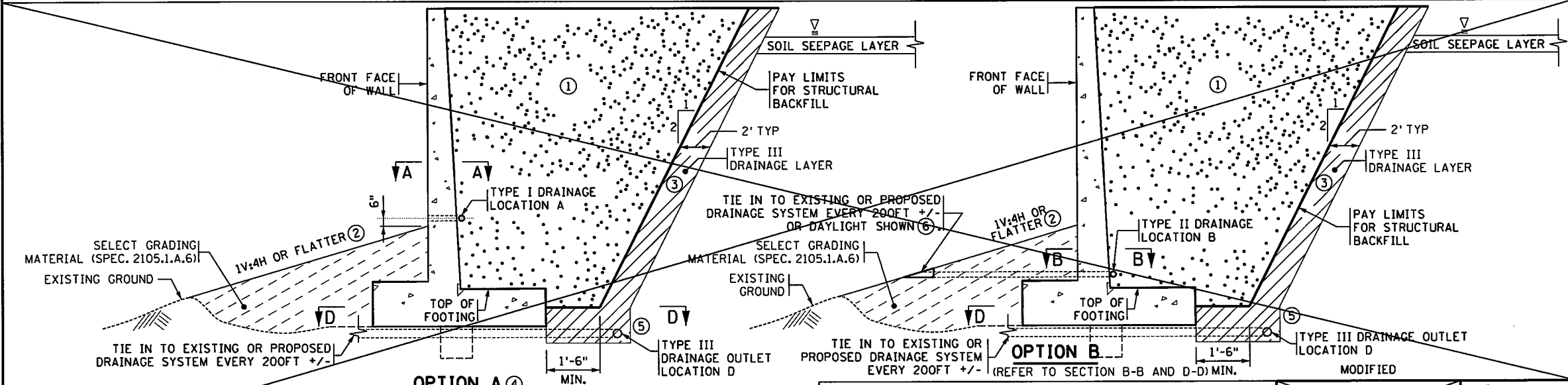
PLOTTED/REVISED:
\$\$\$\$DATE\$\$\$\$



CROSSED OUT DETAILS

NOTES:

- BACKFILL MATERIAL SHALL COMPLETELY SURROUND PIPE AT ALL TIMES.
- SLOPE PIPE TO ENSURE PROPER DRAINAGE AT ALL TIMES.
- DRAINAGE SYSTEM PAID BY LUMP SUM PER SPEC. 2502.
- ① STRUCTURAL BACKFILL. SEE SHEET 5-297.620. COMPACT BACKFILL TO SPECIFIED DENSITY METHOD SPEC. 2105.3.F.1.
- ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
- ③ TYPE III DRAINAGE LAYER TO BE FINE FILTER AGGREGATE PER SPEC. 3149.2.J.2. FINE FILTER AGGREGATE MAY BE REPLACED WITH TYPE VI DRAINAGE GEOTEXTILE MATERIAL.
- ④ DRAINAGE SYSTEMS INSTALLED AT LOCATION A SHALL NOT BE USED WHEN A SIDEWALK, TRAIL, OR ROADWAY IS LOCATED ADJACENT TO THE FRONT FACE OF THE WALL TO PREVENT PONDING OR ICE ACCUMULATION.
- ⑤ EXTEND STRUCTURAL BACKFILL OR FINE FILTER AGGREGATE 8" BELOW BOTTOM OF FOOTING.
- ⑥ TYPE II LOCATION B DRAINAGE MAY DAYLIGHT DIRECTLY USING PRECAST CONCRETE HEADWALLS OR BE TIED INTO DRAINAGE SYSTEM.
- ⑦ THE RODENT SCREEN SHALL BE FABRICATED FROM CARBON STEEL FLATTENED EXPANDED METAL, STYLE 1/2" NO. 4F. IT SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.



DISTRICT #: \$@DISTRICT@
USER NAME: \$@USER\$NAME@
PATH & FILENAME: \$@PATH\$FILENAME@

REVISION:
APPROVED: AUGUST 27, 2014
Nancy Subenberger
STATE BRIDGE ENGINEER

(REFER TO SECTION A-A AND D-D)
TYPICAL DRAINAGE SYSTEM DETAILS (TYPE III DRAINAGE)

* DENOTES MODIFICATION FROM STANDARD PLAN

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian L Fleming* Lic. No. 49486
Printed Name: BRIAN L FLEMING, PE Date: 12/4/2015

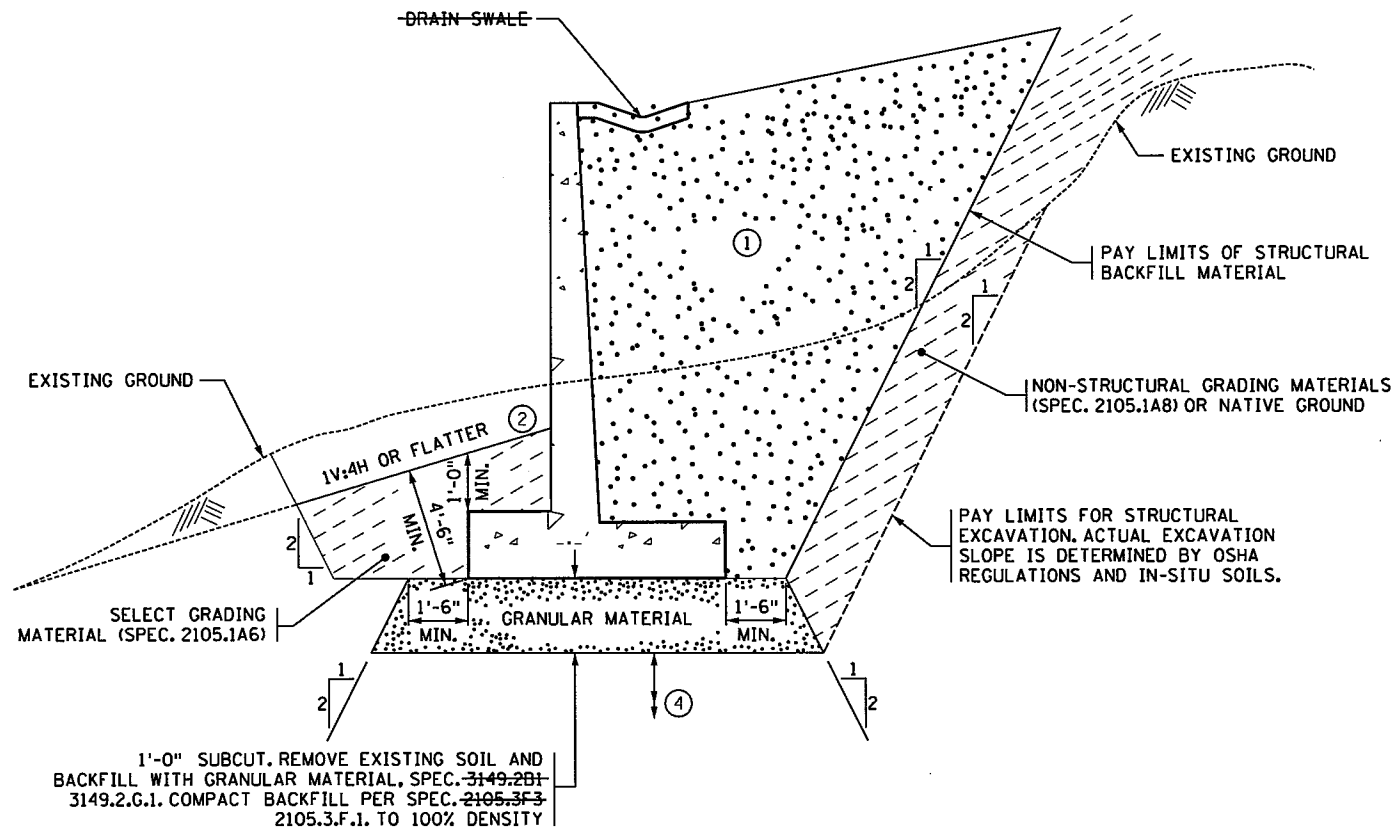
STANDARD SHEET NO.
5-297.624 (5 OF 6)
STANDARD APPROVED:
AUGUST 27, 2014

TITLE:
RETAINING WALL MISCELLANEOUS DETAILS (GEOTECHNICAL DETAILS)

STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. 227 OF 367 SHEETS.

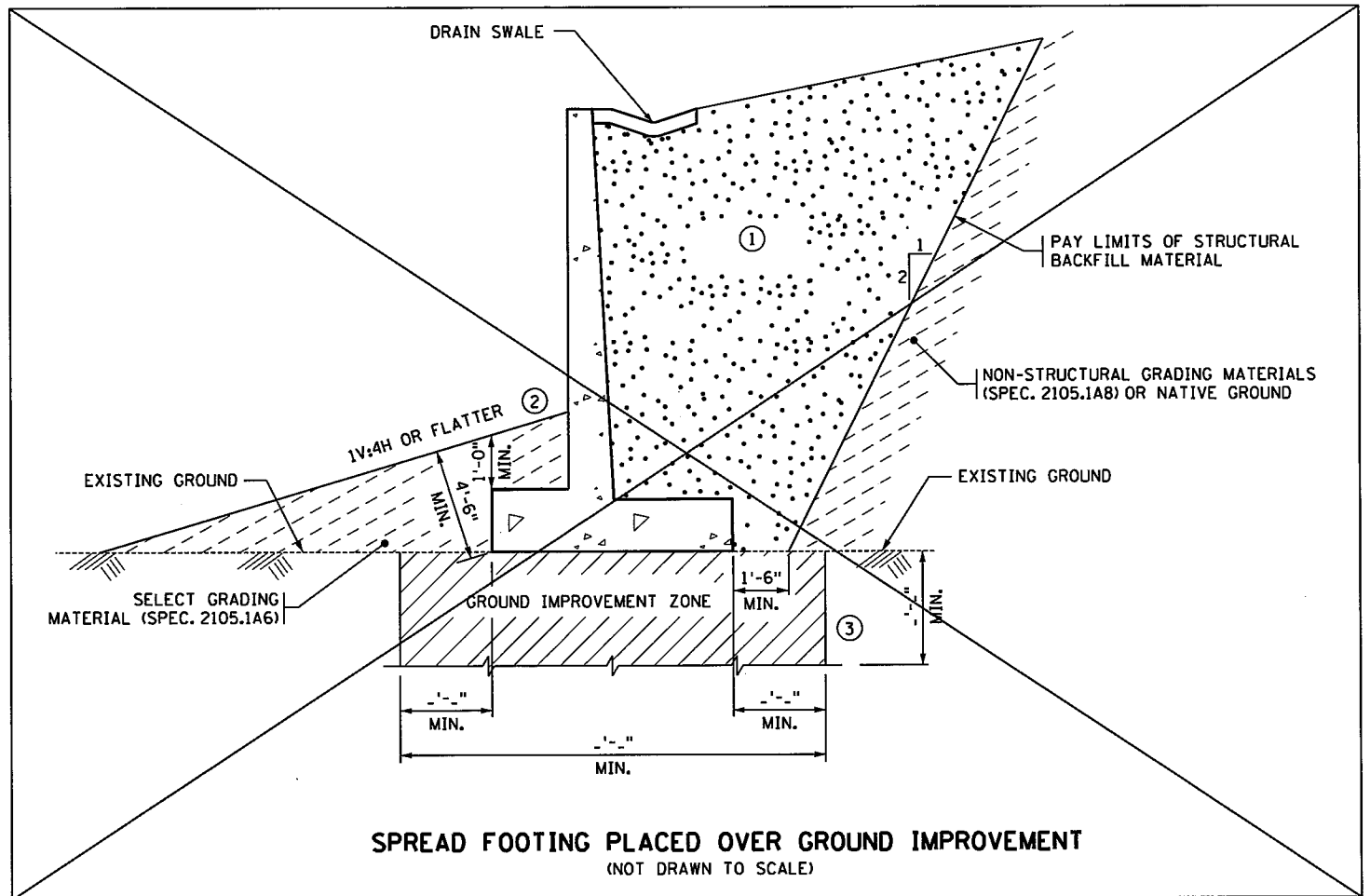
RWD 13 OF RWD20

PLOTTED/REVISED:
\$\$\$\$DATE\$\$\$\$

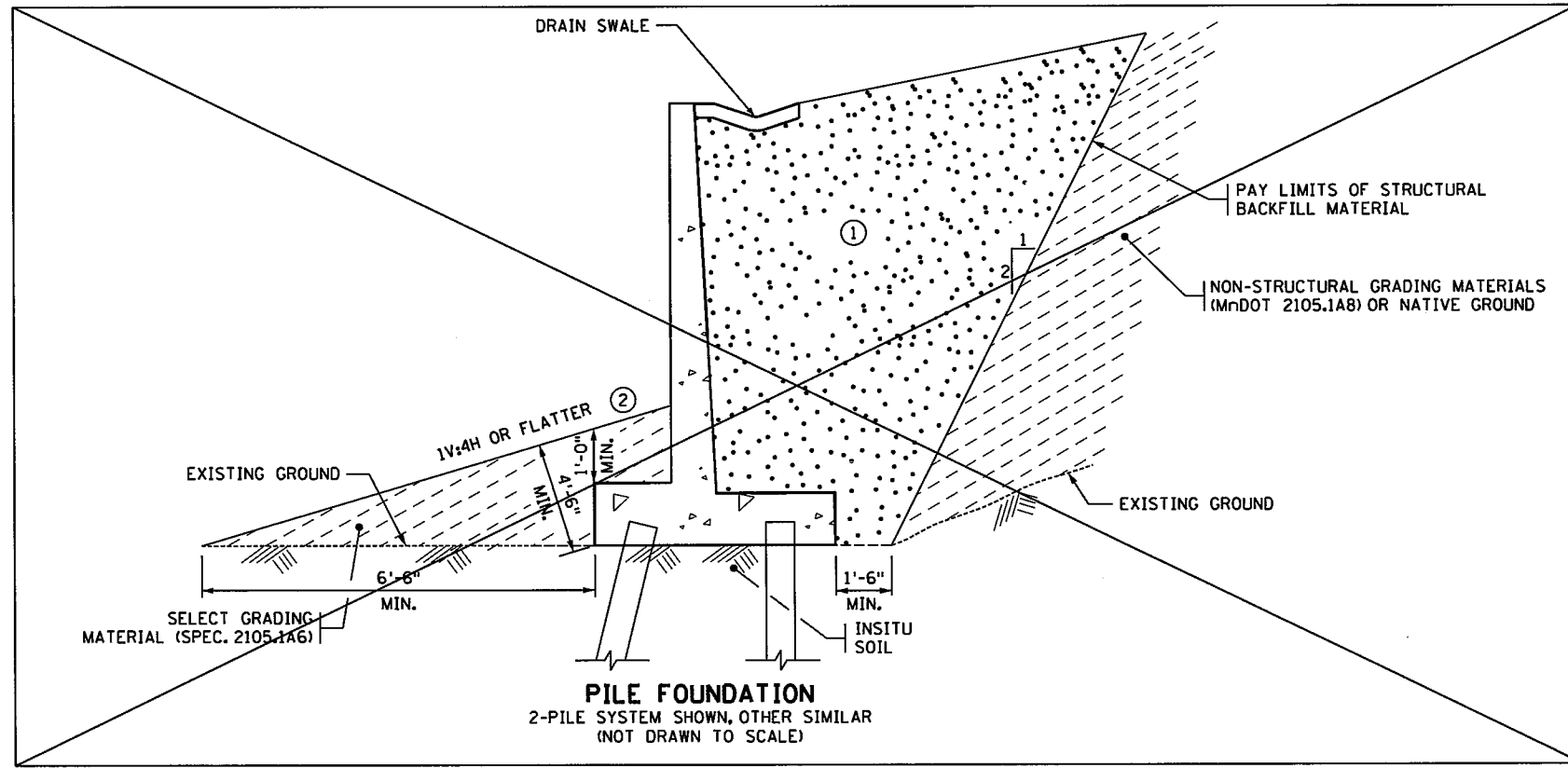


1'-0" SUBCUT. REMOVE EXISTING SOIL AND BACKFILL WITH GRANULAR MATERIAL, SPEC. 3149.2.D.1-3149.2.G.1. COMPACT BACKFILL PER SPEC. 2105.3.F.3-2105.3.F.1. TO 100% DENSITY

SPREAD FOOTING WITH SOIL SUBCUT *
(NOT DRAWN TO SCALE)



SPREAD FOOTING PLACED OVER GROUND IMPROVEMENT
(NOT DRAWN TO SCALE)



PILE FOUNDATION
2-PILE SYSTEM SHOWN, OTHER SIMILAR
(NOT DRAWN TO SCALE)

- * ① BACKFILL WITH STRUCTURAL BACKFILL SPEC. 3149.2.D.2. COMPACT TO 100% DENSITY IN ACCORDANCE WITH SPEC. 2105.3.F.1.
- * ② PROVIDE SLOPE OF 1V:24H TO 1V:4H FOR PROPER DRAINAGE.
- * ③ PROVIDE SUFFICIENT COVERAGE AREA AND TREATMENT VOLUME TO GIVE GENERALLY UNIFORM SUPPORT TO THE FOUNDATION. IMPROVED GROUND OR SURFACE PREPARATIONS PLACED TO IMPROVE GROUND SUPPORT ARE TO BE IN IMMEDIATE CONTACT WITH THE FOOTING AND FOUNDATION MATERIAL.
- * ④ EXCAVATE TO SUITABLE MATERIAL AS APPROVED BY THE ENGINEER IN THE FIELD. BACKFILL WITH AGGREGATE BEDDING, SPEC. 3149.2.G.1. COMPACT AGGREGATE BEDDING IN ACCORDANCE WITH SPEC. 2105.3.F.1 TO 100% DENSITY.

DISTRICT #: \$@DISTRICT@
USER NAME: \$@USER\$NAME@
PATH & FILENAME: \$\$\$@PATH\$FILENAME@\$\$\$
FILE NAME: @FILENAME@

REVISION:
APPROVED: AUGUST 27, 2014
Nancy A. Subenberger
STATE BRIDGE ENGINEER

ADDED UNSUITABLE MATERIAL NOTE *
ADDED COMPACTION REQUIREMENT

* DENOTES MODIFICATION FROM STANDARD PLAN
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Brian L. Fleming* Lic. No. 49486
Printed Name: BRIAN L. FLEMING, PE Date: 12/4/2015

MODIFIED
STANDARD SHEET NO. 5-297.624 (6 OF 6)
STANDARD APPROVED: AUGUST 27, 2014

TITLE: **RETAINING WALL MISCELLANEOUS DETAILS (GEOTECHNICAL DETAILS)**

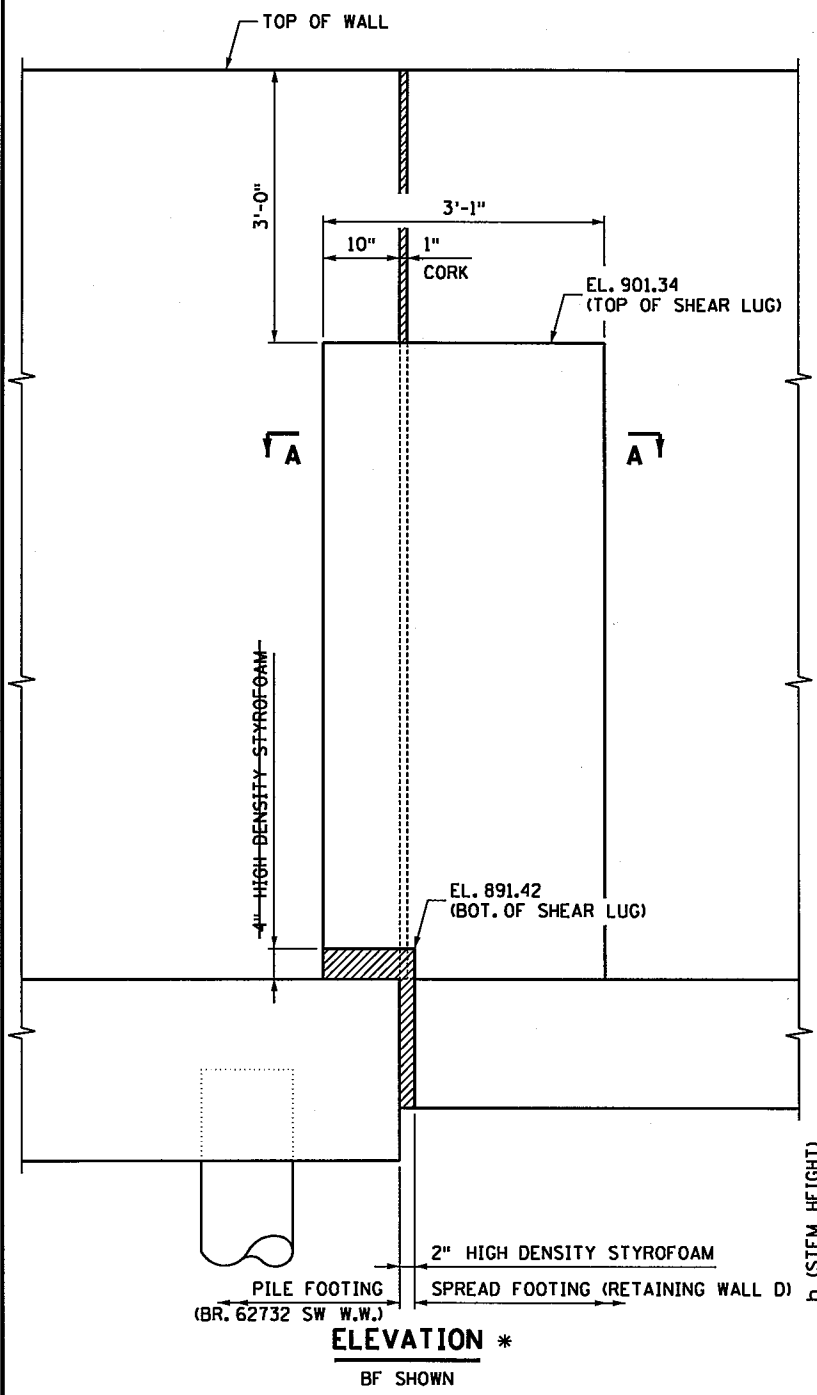
STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. 228 OF 367 SHEETS

RWD14
OF RWD20

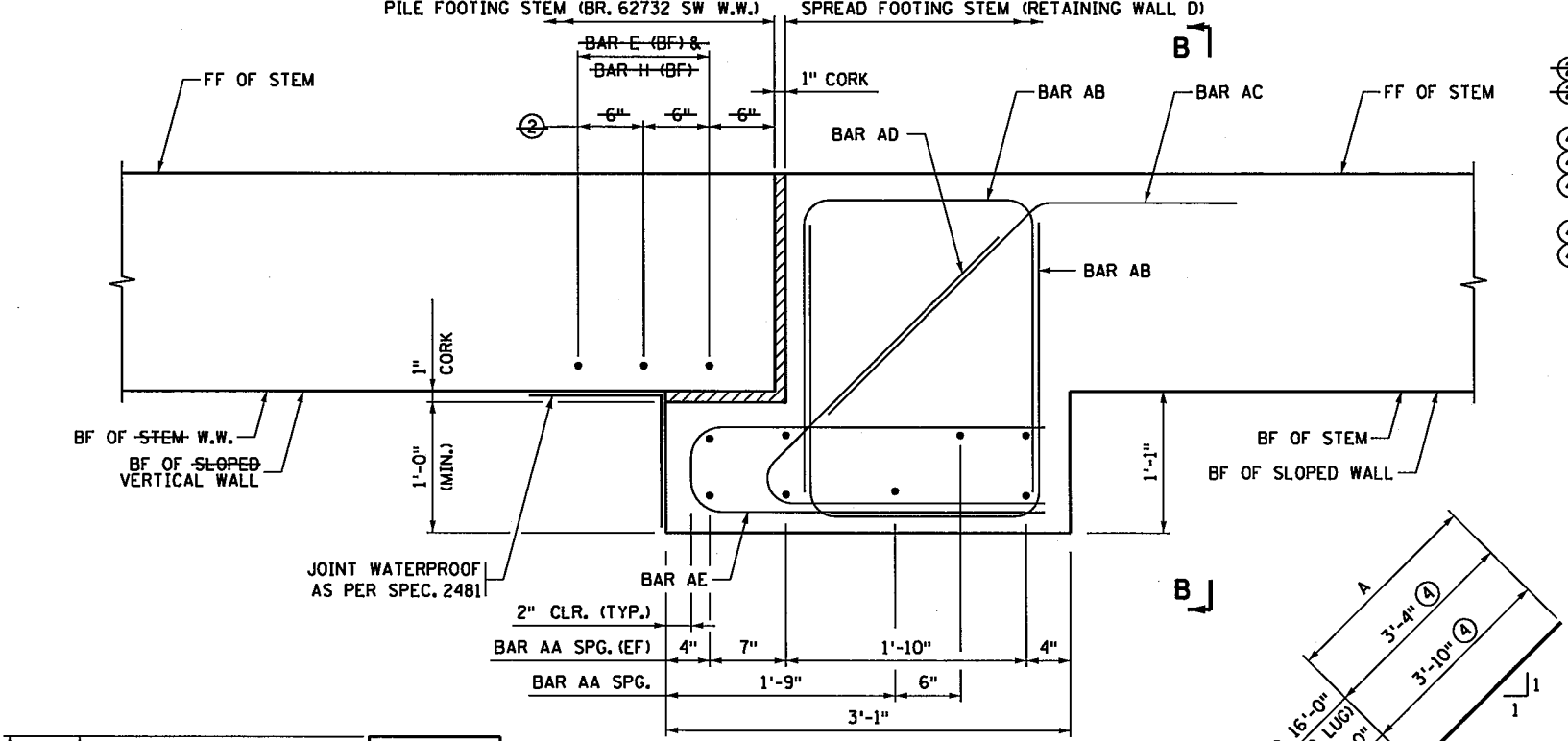
PLOTTED/REVISED:
 \$\$\$DATE@\$\$\$

DISTRICT #: \$@DISTRICT@\$
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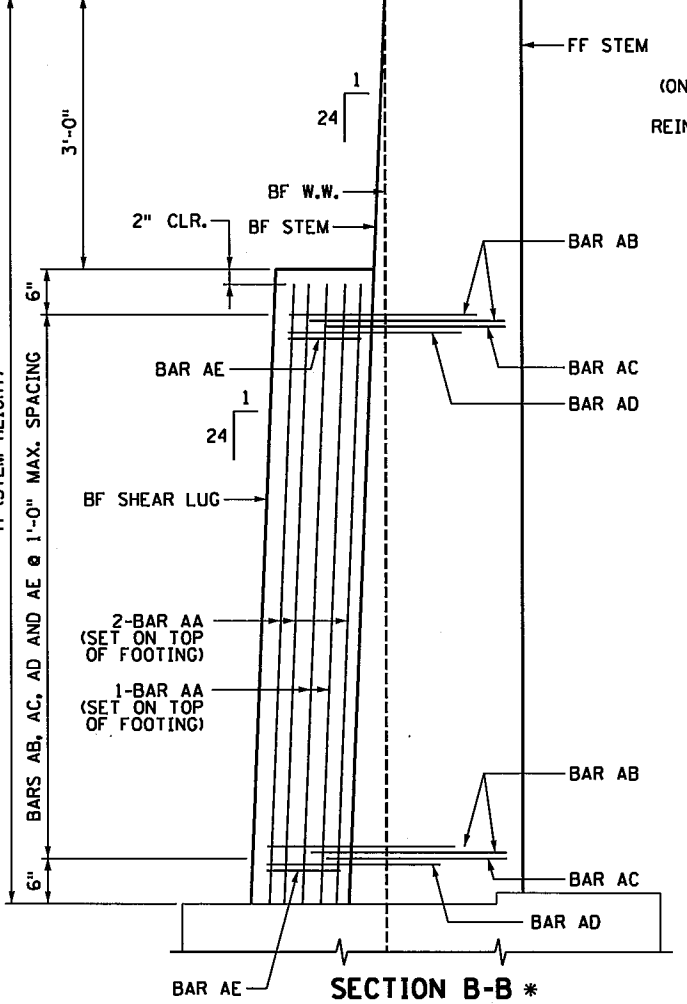


ELEVATION *
 BF SHOWN



SECTION A-A *

FOOTINGS NOT SHOWN
 (ONLY SHEAR LUG REINFORCEMENT
 SHOWN. SEE WALL
 REINFORCEMENT PANEL SHEETS FOR
 OTHER REINFORCEMENT.)

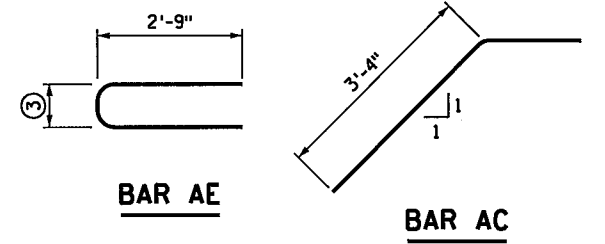


SECTION B-B *

ONLY SHEAR LUG REINFORCEMENT SHOWN
 (BF OF SLOPED WALL SHOWN)

BILL OF REINFORCEMENT ① FOR SHEAR LUG					
BAR	MARK	NO.	LENGTH	SHAPE	A - DIMENSION
②	E	F--05E	3	②	N.A.
②	H	S--02E	3		N.A.
	AA	S503E	8		N.A.
④	AB	S504E	6'-6"	U	2'-4"
④	AB	S505E	7'-0"	U	2'-7"
④	AB	S506E	8'-0"	U	3'-1"
④	AC	S407E	4'-10"	Z	N.A.
④	AD	S408E	4'-10"	Z	3'-4"
④	AD	S409E	5'-4"	Z	3'-10"
	AE	S410E	6'-2"	U	N.A.

N.A. = NOT APPLICABLE



NOTES:

USE THIS DETAIL AT A RETAINING WALL JOINT WHEN THE WALL OR BRIDGE IS SUPPORTED ON PILE FOUNDATION ON ONE SIDE OF THE JOINT AND SPREAD FOOTING ON THE OTHER SIDE.

THE SHEAR LUG SHALL BE PROVIDED ON THE SPREAD FOOTING WALL AS SHOWN.

SHEAR LUG IS NOT REQUIRED IF:

- WALL HEIGHT FROM TOP OF FOOTING TO TOP OF WALL IS LESS THAN 14 FEET WITHOUT A NOISE BARRIER.

- THE COMBINED HEIGHT OF RETAINING WALL AND NOISE BARRIER IS LESS THAN 23 FEET AND WALL HEIGHT FROM TOP OF FOOTING TO GRADE IS LESS THAN 13 FEET.

ADDITIONAL REINFORCING BARS, STRUCTURAL CONCRETE, SHOP DRAWINGS, AND ALL OTHER COMPONENTS REQUIRED TO CONSTRUCT SHEAR LUGS ARE INCIDENTAL.

BF DENOTES BACK FACE.
 FF DENOTES FRONT FACE.
 EF DENOTES EACH FACE.

① CONTRACTOR IS REQUIRED TO FILL THE BILL OF REINFORCEMENT TABLE AND SUBMIT IT TO THE PROJECT ENGINEER AT LEAST 3 WEEKS PRIOR TO REBAR FABRICATION.

② SEE PANEL TABULATIONS FOR BAR SIZE AND LENGTH. THESE BARS ARE IN ADDITION TO TYPICAL WALL REINFORCEMENT.

③ 8" WHEN BACK FACE OF WALL ON PILE FOOTING AND SHEAR LUG HAVE UNIFORM SLOPE. VARIES (8" MINIMUM) WHEN BACK FACE OF WALL ON PILE FOOTING AND SHEAR LUG HAVE NON-UNIFORM SLOPE.

④ USE THE BAR LEG DIMENSION FOR THE PORTION OF SHEAR LUG LOCATION INDICATED IN THE BAR BEND IN DETAIL. (0'-0" REPRESENTS TOP OF THE SHEAR LUG).

MODIFIED

RWD15
 OF RWD20

LOCATED SHEAR LUG *
 NOTED WINGWALL COMPONENTS

* DENOTES MODIFICATION FROM STANDARD PLAN

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian L. Fleming* Lic. No. 49485
 Printed Name: BRIAN L. FLEMING, PE Date: 2/15/2016

MINNESOTA SOCIETY OF PROFESSIONAL ENGINEERS

APPROVED: *Christine* 8-27-2014
 STATE DESIGN ENGINEER

REVISIONS

RETAIING WALL SHEAR LUG DETAILS

STANDARD PLAN 5-297.625 229 OF 367

REVISION:

APPROVED: AUGUST 27, 2014
Nancy Suberberger
 STATE BRIDGE ENGINEER

2:56:16 PM

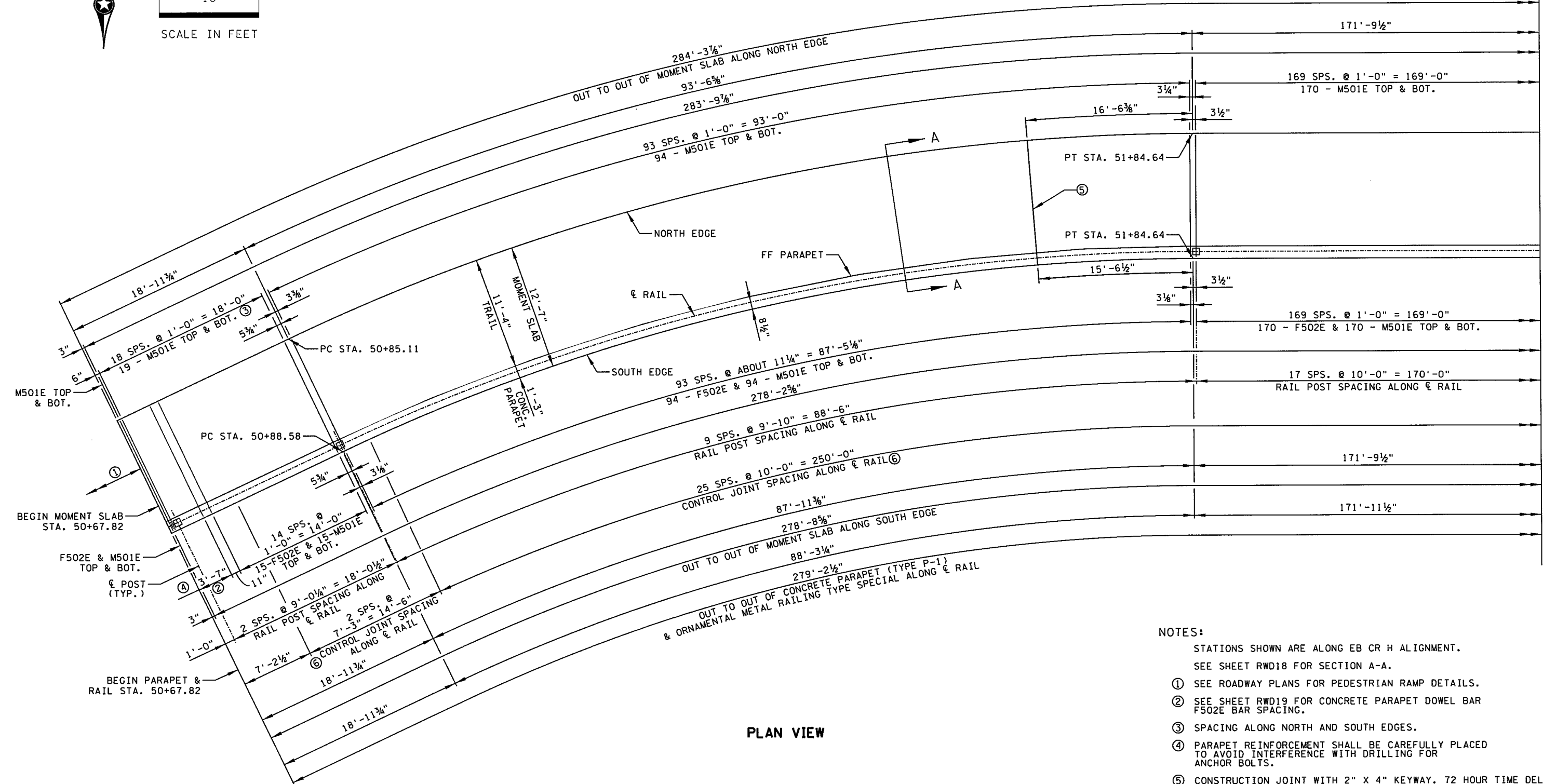
12/4/2015

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10
SCALE IN FEET

MATCHLINE
SEE NEXT SHEET



PLAN VIEW

NOTES:

- STATIONS SHOWN ARE ALONG EB CR H ALIGNMENT.
- SEE SHEET RWD18 FOR SECTION A-A.
- ① SEE ROADWAY PLANS FOR PEDESTRIAN RAMP DETAILS.
- ② SEE SHEET RWD19 FOR CONCRETE PARAPET DOWEL BAR F502E BAR SPACING.
- ③ SPACING ALONG NORTH AND SOUTH EDGES.
- ④ PARAPET REINFORCEMENT SHALL BE CAREFULLY PLACED TO AVOID INTERFERENCE WITH DRILLING FOR ANCHOR BOLTS.
- ⑤ CONSTRUCTION JOINT WITH 2" X 4" KEYWAY. 72 HOUR TIME DELAY REQUIRED BETWEEN ADJACENT POURS TO ALLOW FOR SHRINKAGE. SEE SHEET RWD18 FOR DETAILS.
- ⑥ CONTROL JOINTS SHALL BE LOCATED IN PARAPET AND MOMENT SLAB EXCEPT AS NOTED. ALL JOINTS SHALL BE PERPENDICULAR TO FACE OF PARAPET.

DESIGN TEAM				
DRAWN BY: LMT				
DESIGNER: BLF				
CHECKED BY: RAW				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian Fleming* Lic. No. 49486
 Printed Name: BRIAN L. FLEMING, PE Date: 12/4/2015

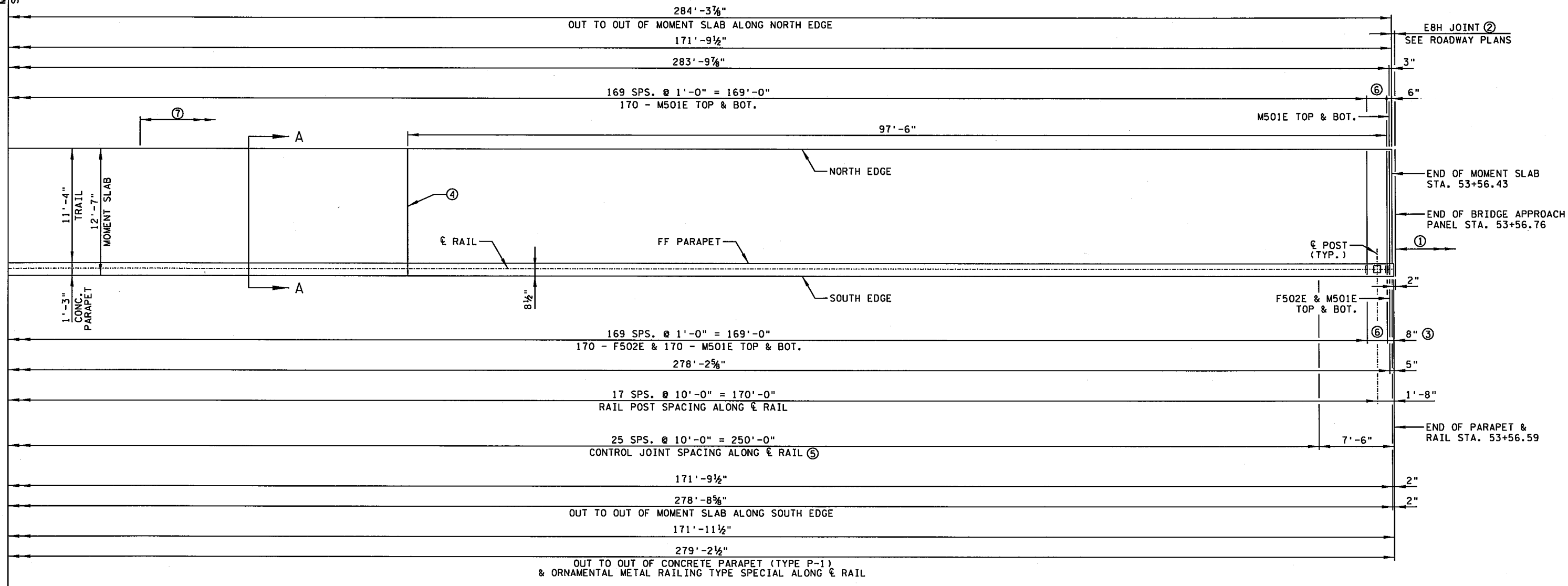
Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO. RAMSE129594	230
RWD16 OF RWD20	367

RETAINING WALL D
MOMENT SLAB

MATCHLINE
SEE PREVIOUS SHEET



PLAN VIEW



10
SCALE IN FEET

NOTES:

- STATIONS SHOWN ARE ALONG EB CR H ALIGNMENT.
- SEE NEXT SHEET FOR SECTION A-A.
- ① SEE BRIDGE PLANS FOR ADDITIONAL DETAILS.
- ② SIDEWALK AND RAIL COVER PLATE. SEE APPROACH PANEL STD. 5-297.229 IN RDWY. PLANS.
- ③ PARAPET REINFORCEMENT SHALL BE CAREFULLY PLACED TO AVOID INTERFERENCE WITH DRILLING FOR ANCHOR BOLTS.
- ④ CONSTRUCTION JOINT WITH 2" X 4" KEYWAY. 72 HOUR TIME DELAY REQUIRED BETWEEN ADJACENT POURS TO ALLOW FOR SHRINKAGE. SEE NEXT SHEET FOR DETAILS.
- ⑤ CONTROL JOINTS SHALL BE LOCATED IN PARAPET AND MOMENT SLAB EXCEPT AS NOTED. ALL JOINTS SHALL BE PERPENDICULAR TO FACE OF PARAPET.
- ⑥ 4 SPA. @ 6" = 2'-0". 4-F502E & 4-M501E TOP & BOT.
- ⑦ FURNISH AND INSTALL 3'-0" LONG #4 EPOXY COATED DOWEL BARS AT 1'-0" MAXIMUM SPACING FOR THE FIRST 124' WEST OF THE BRIDGE APPROACH PANEL. DOWEL BARS TO CONNECT MOMENT SLAB AND CONCRETE CURB AND GUTTER. ALL WORK AND MATERIALS REQUIRED TO PLACE DOWEL BARS IS INCIDENTAL.

DESIGN TEAM				
DRAWN BY: LMT				
DESIGNER: BLF				
CHECKED BY: BAW				
	NO.	BY	DATE	REVISIONS

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Certified By: *Brian L. Fleming* Lic. No. 49486
 Licensed Professional Engineer
 Printed Name: BRIAN L. FLEMING, PE Date: 2/16/2016

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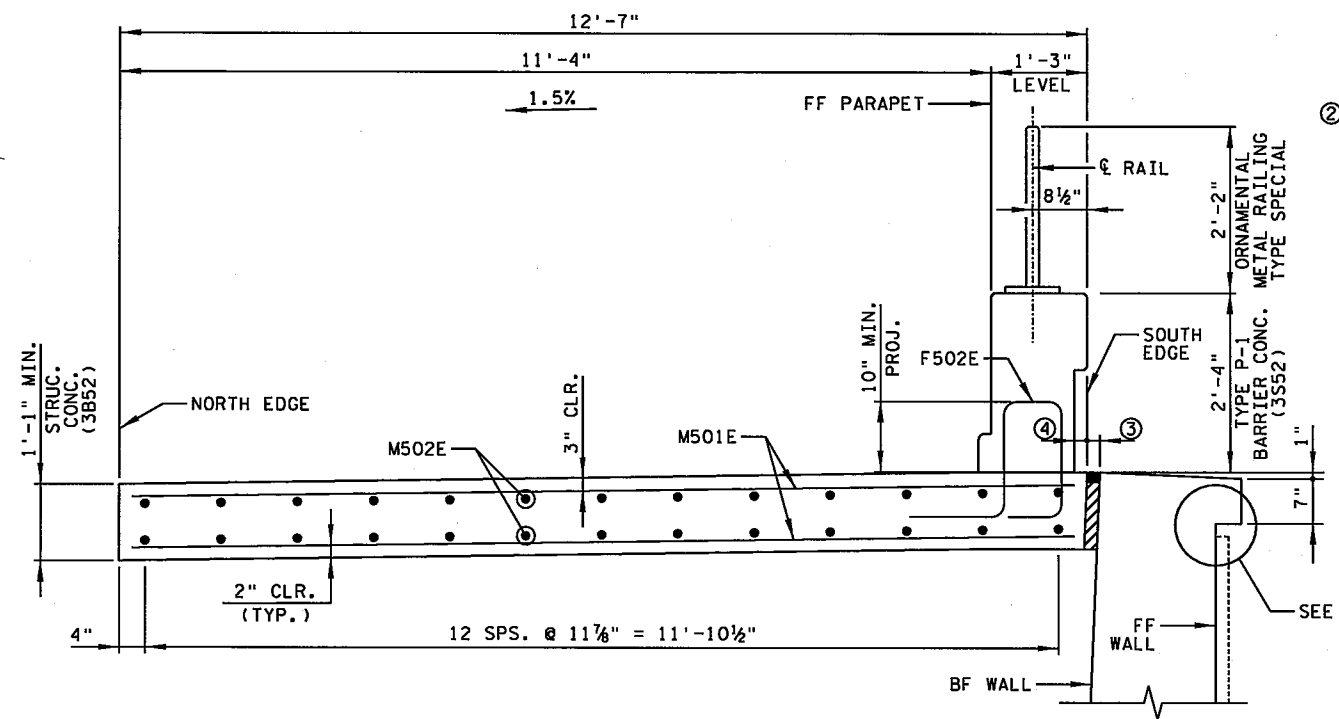
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

RETAINING WALL D
MOMENT SLAB

FILE NO. RAMSE129594	231
RWD17 OF RWD20	367

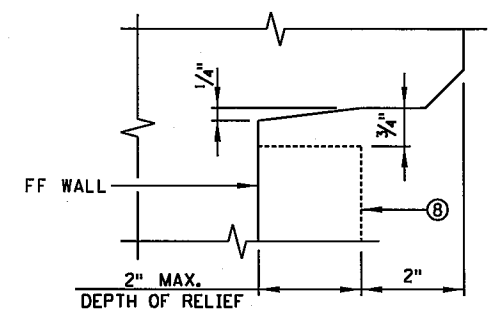
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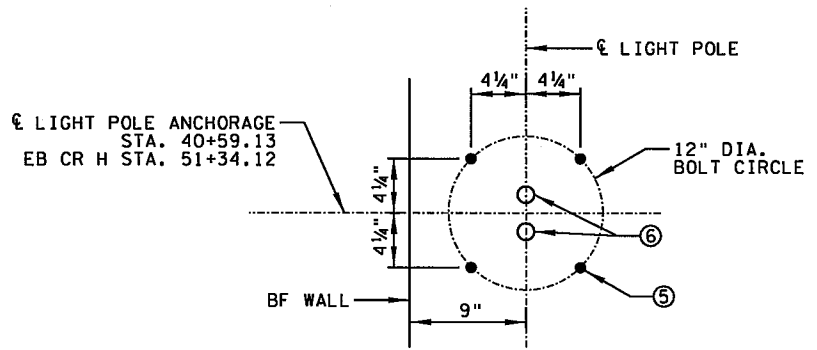
SECTION A-A

BILL OF REINFORCEMENT FOR MOMENT SLAB				
BAR	NO.	LENGTH	SHAPE	LOCATION
M501E	578	12'-2"	STR.	SLAB TRANS. TOP & BOT.
M502E	130	58'-6"	STR.	SLAB LONGIT. TOP & BOT.

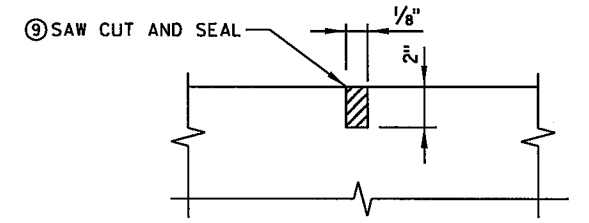


DETAIL "A" REVEAL

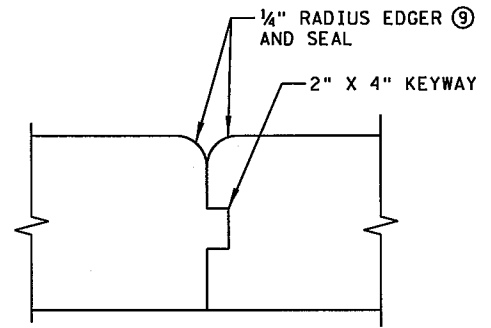
SUMMARY OF QUANTITIES - MOMENT SLAB		
ITEM	UNIT	QUANTITY
TYPE P-1 BARRIER CONCRETE (3S52)	LIN. FT.	280
STRUCTURAL CONCRETE (3B52)	CU. YD.	144
ORNAMENTAL METAL RAILING TYPE SPECIAL	LIN. FT.	280
REINFORCEMENT BARS (EPOXY COATED)	POUND	20550
CONDUIT SYSTEM	LUMP SUM	1



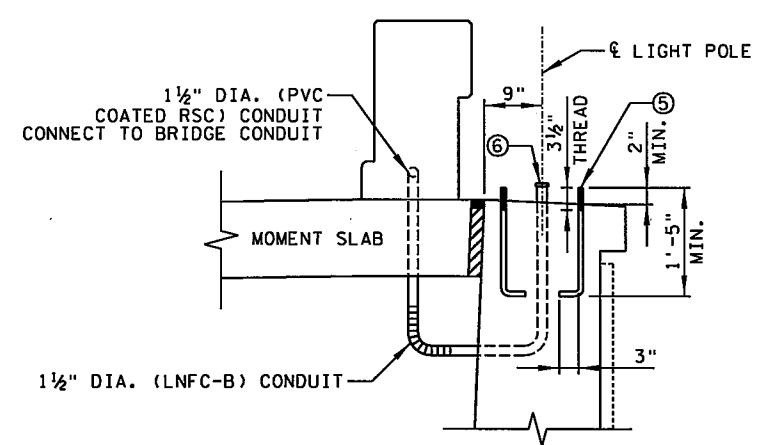
CONDUIT AND ANCHOR ROD PLACEMENT DETAIL



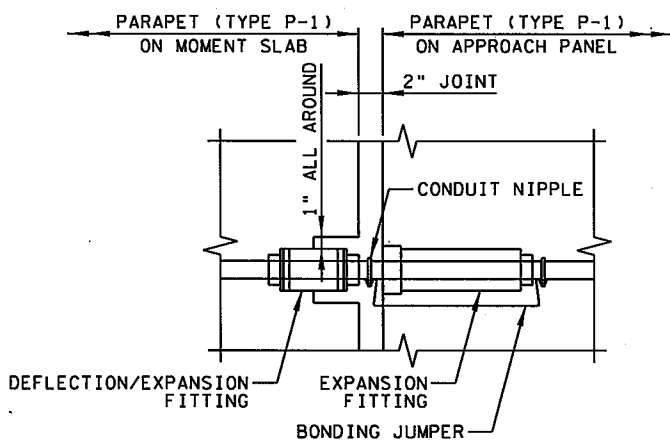
MOMENT SLAB CONTROL JOINT



MOMENT SLAB CONSTRUCTION JOINT



PART TRANSVERSE SECTION AT LIGHT POLE



COMBINATION DEFLECTION/EXPANSION FITTING

NOTES:

- INCLUDES REINFORCEMENT FOR MOMENT SLAB AND CONCRETE PARAPET (TYPE P-1).
- 5 BARS PER LINE WITH 2'-1" MIN. LAP.
- 2" POLYSTYRENE TYPE B PLACED DIRECTLY AGAINST BACK FACE OF RETAINING WALL. SET TOP OF POLYSTYRENE A 1/2" BELOW TOP OF RETAINING WALL. SEAL WITH SELF-LEVELING SILICONE PER MDOT 3722 FLUSH WITH TOP OF RETAINING WALL. ALL WORK AND MATERIAL TO BE CONSIDERED INCIDENTAL.
- 2" MIN. DIMENSION FROM SOUTH EDGE OF MOMENT SLAB TO BACKFACE OF CONCRETE PARAPET. ACTUAL DIMENSION MAY VARY IN CURVED RETAINING WALL SECTION.
- (4) 3/4"-10NC GALV. STL. ANCHOR BOLTS AASHTO M314-90 GRADE 55, 10" OF THREADED END GALV. PER ASTM A153
(4) 3/4"-10NC GALV. STL. HEX. NUTS
(4) 3/4" GALV. STL. LOCKWASHERS
(4) 3/4" GALV. STL. FLATWASHERS
- THE 1 1/2" DIA. (PVC COATED RSC) CONDUIT SHALL EXTEND 3" MIN. ABOVE TOP OF RETAINING WALL AND BE CAPPED.
- BID ITEM "CONDUIT SYSTEM" INCLUDES BUT IS NOT LIMITED TO 1 1/2" DIA. (PVC COATED RSC) CONDUIT, 1 1/2" DIA. (LFNC-B) CONDUIT, CAPS, ANCHORS BOLTS AND HARDWARE, AND COMBINATION DEFLECTION/EXPANSION FITTING.
- ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR), AND ANTI-GRAFFITI COATING
- JOINT SEALANT PER MDOT APPROVED/QUALIFIED PRODUCTS LIST - CRACK AND JOINT MATERIALS - SILICONE JOINT SEALERS. WHEN SEALING, THE JOINT FACES SHALL BE CLEANED AND DRIED BY SANDBLASTING AND AIR BLASTING.

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DESIGN TEAM			
DRAWN BY:	LMT		
DESIGNER:	BLF		
CHECKED BY:	BAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian L. Fleming* Lic. No. 49486
 Licensed Professional Engineer
 Printed Name: BRIAN L. FLEMING, PE Date: 2/16/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

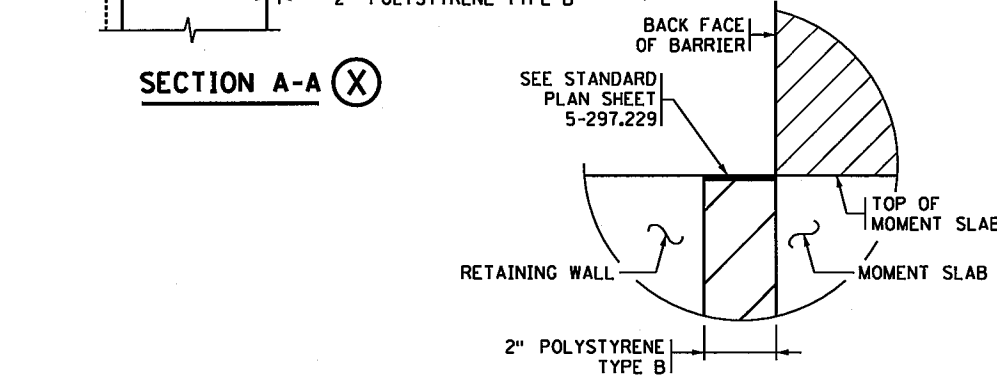
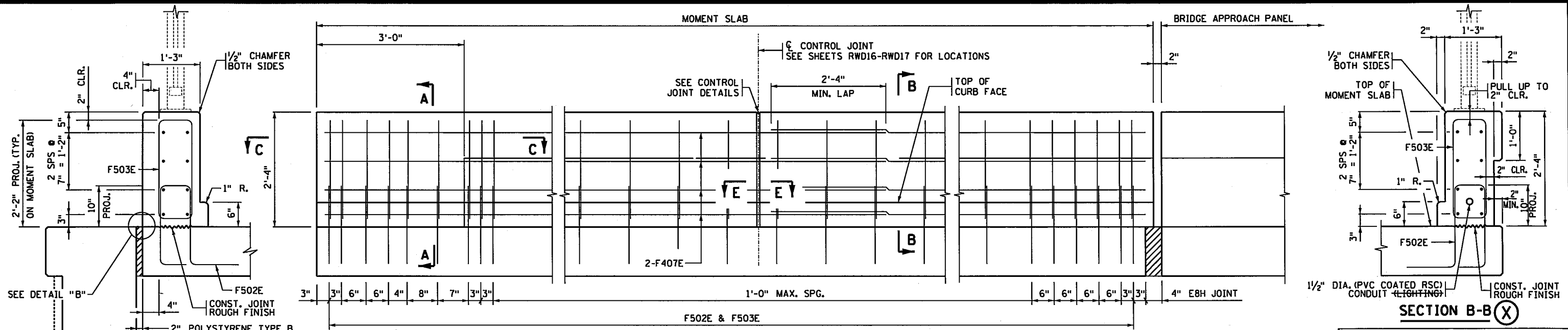
RETAINING WALL D
 MOMENT SLAB

FILE NO.	232
RAMSEI29594	
RWD18	367
OF RWD20	

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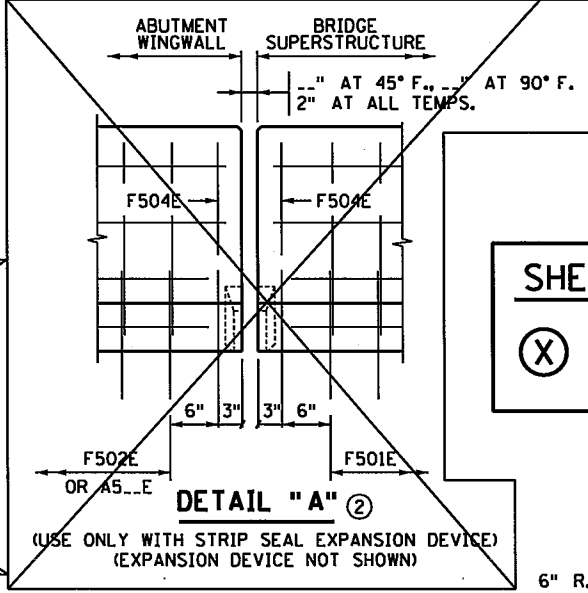
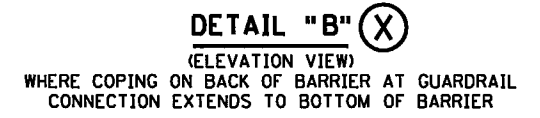
CONTROL JOINT
OUTSIDE ELEVATION OF PARAPET (X)

(INTEGRAL OR SEMI-INTEGRAL ABUTMENT) SEE DETAIL "A" FOR PARAPET ABUTMENT

BILL OF REINFORCEMENT FOR PARAPET

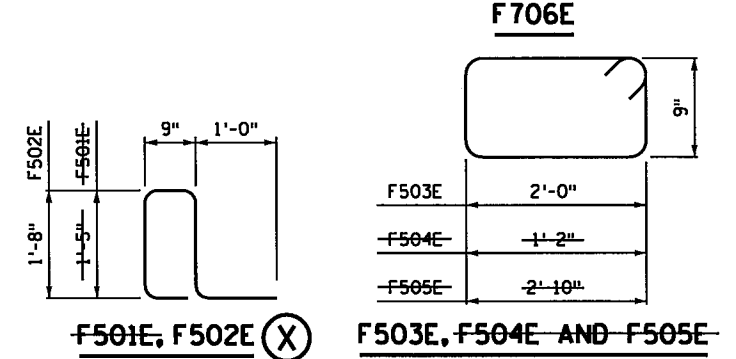
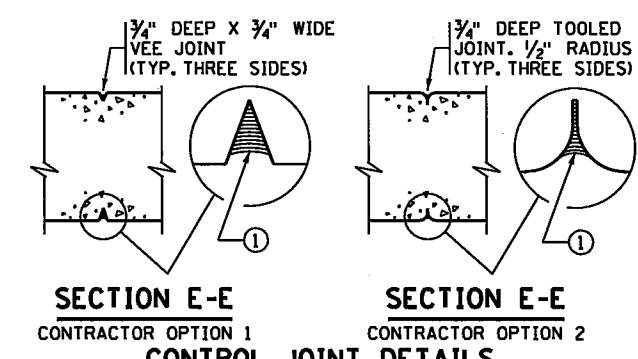
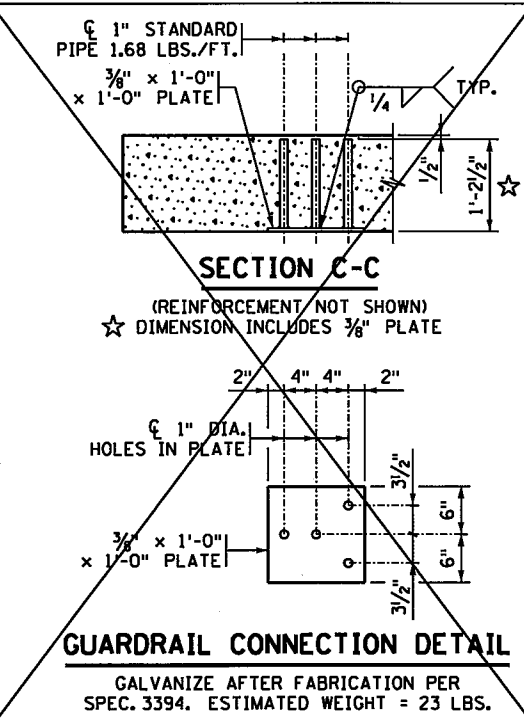
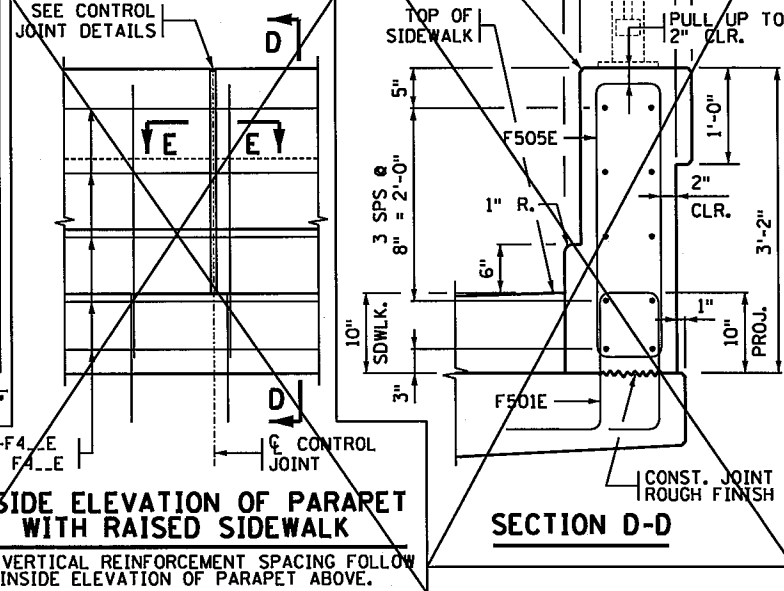
BAR	NO.	LENGTH	SHAPE	LOCATION
F501E		5'-2"	U	PARAPET VERTICAL
F502E	293	5'-8"	U	PARAPET VERTICAL
F503E	293	6'-5"	U	PARAPET VERTICAL
* F504E		4'-9"	U	PARAPET VERTICAL
F505E		8'-1"	U	PARAPET VERTICAL
F706E	1	6'-7"	U	PARAPET VERTICAL
③ F407E	64	37'-0"	—	PARAPET LONGIT.
F4...E				PARAPET LONGIT.
F4...E				PARAPET LONGIT.

* F504E WHEN STRIP SEAL EXPANSION DEVICE IS USED, WITHOUT RAISED SIDEWALK. (SEE DETAIL "A")



SHEET MODIFICATION

(X) DENOTES MODIFICATION TO STANDARD SHEET



GENERAL NOTES

CONTINUOUSLY GROUND ALL METAL RAILINGS; SEE THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.

PAYMENT LENGTH SHALL BE MEASURED BETWEEN THE OUTSIDE FACES OF THE CONCRETE PARAPET.

CONCRETE PARAPET = 416 LBS./FT. (0.103 CU. YDS./FT.)

CONCRETE PARAPET W/ADJACENT SIDEWALK (BASED ON A 10" SIDEWALK HEIGHT) = 573 LBS./FT. (0.141 CU. YDS./FT.)

FINISH ALL EDGES OF PARAPET WITH 1/2" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.

MAXIMUM SPACING OF CONTROL JOINTS ON SUPERSTRUCTURE, APPROACH AND WINGWALL SHALL BE 10 FT. SEE SUPERSTRUCTURE SHEETS RWD16-RWD17 FOR JOINT SPACING.

GUARDRAIL CONNECTION TO BE STRUCTURAL STEEL, SPEC. 3306. GUARDRAIL CONNECTION AND NAME PLATE TO BE CONSIDERED INCIDENTAL TO "TYPE P-1 BARRIER CONCRETE (3552)".

SEE STANDARD FIGURE 5-397 FOR LIGHT BLISTER DETAILS.

(X) PARAPET QUANTITIES ARE LISTED IN SUMMARY OF QUANTITIES FOR MOMENT SLAB.

① JOINT SEALANT PER MDOT APPROVED/QUALIFIED PRODUCTS LIST - CRACK AND JOINT MATERIALS - SILICONE JOINT SEALERS.

② REFER TO STANDARD FIGURE 5-397.632 FOR COVER PLATE DETAILS.

③ 8 BARS PER LINE WITH 2'-4" MIN. LAP.

REVISION:

APPROVED: NOVEMBER 6, 2013

Nancy Amburger

STATE BRIDGE ENGINEER

WHEN USING SLIP FORM METHOD TO PLACE THE CONCRETE, CUT JOINT 3 INCHES DEEP USING MARGIN TROWEL OR SIMILAR MEANS IMMEDIATELY AFTER CONCRETE PLACEMENT (TYP. THREE SIDES)

CERTIFIED BY *Brian Fleming* 2/16/2016 DATE

LICENSED PROFESSIONAL ENGINEER

NAME: BRIAN L. FLEMING, PE LIC. NO. 49486

TITLE: **CONCRETE PARAPET (TYPE P-1)**
WITH INTEGRAL END POST
(WITHOUT CONCRETE WEARING COURSE)

DES: BLF DR: LMT

CHK: BAW CHK: BLF

APPROVED: *RWD19*

SHEET NO. 233 OF 367 SHEETS

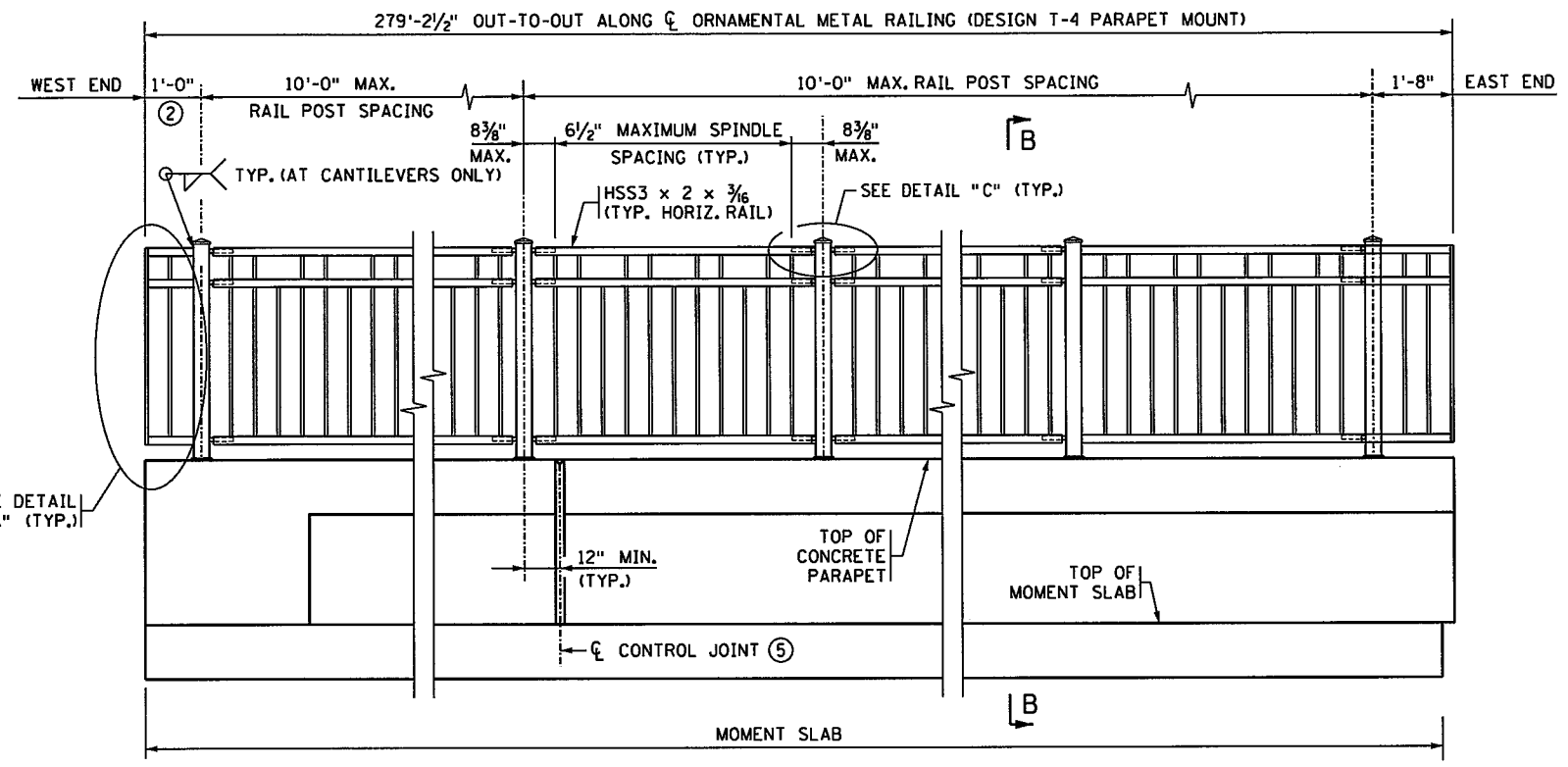
OF RWD20

MODIFIED FIG. 5-397.166

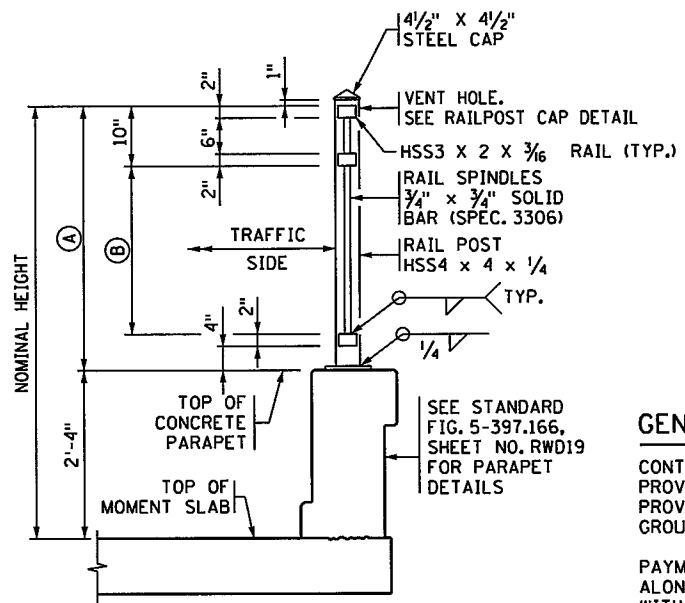
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TIME: \$\$\$@TIME@\$\$\$
 PLOTTED: \$\$\$@DATE@\$\$\$
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OUTSIDE ELEVATION OF RAILING (X)



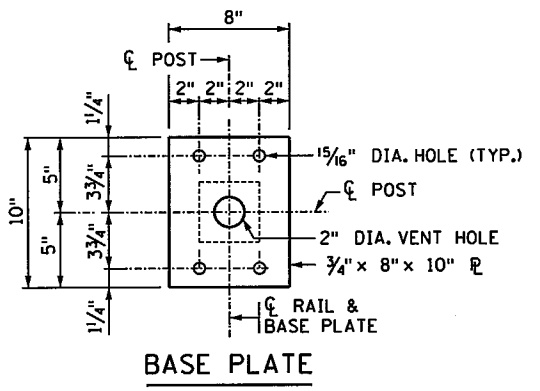
SECTION B-B (X)
 (6'-0" TALL OPTION SHOWN)

NOMINAL HEIGHT	(A)	(B)
4'-6"	2'-2"	10"
6'-0"	3'-8"	2'-4"
8'-0"	5'-8"	4'-4"

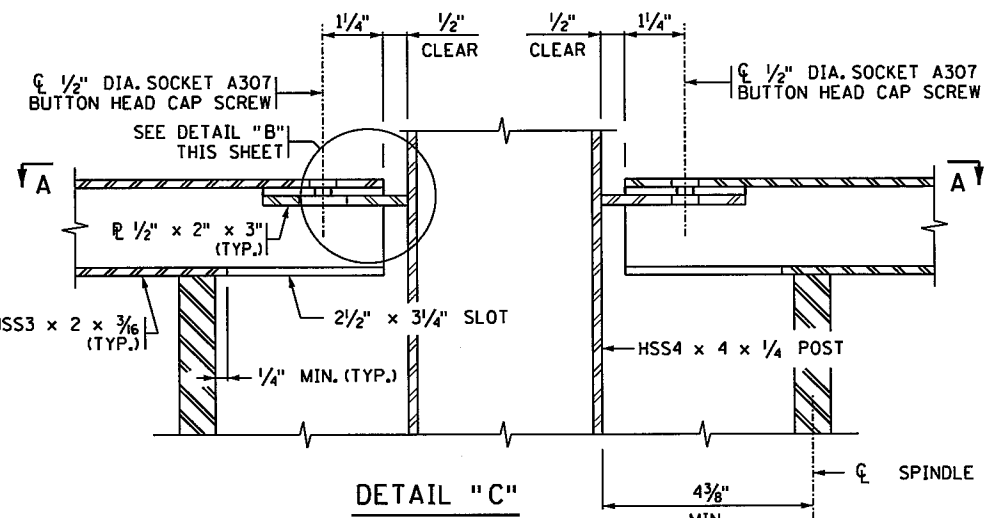
SHEET MODIFICATION
 (X) DENOTES MODIFICATION TO STANDARD SHEET

GENERAL NOTES

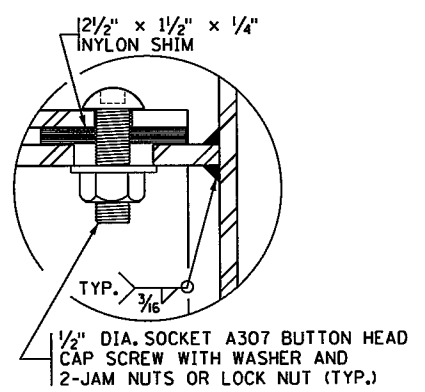
- CONTINUOUSLY GROUND ALL METAL RAILINGS; SEE THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.
- PAYMENT LENGTH SHALL BE MEASURED AS THE OUT TO OUT LENGTH ALONG THE CENTERLINE OF THE RAILING BETWEEN THE OUTSIDE ENDS, WITH DEDUCTIONS FOR THE LENGTH OF CONCRETE POSTS, IF PRESENT.
- USE A500, GRADE B STRUCTURAL STEEL TUBING (HSS) IN THE RAIL CONFORMING TO SPEC. 3361. FINIAL CAPS SHALL BE SPEC. 3322. ALL OTHER STEEL SHALL CONFORM TO SPEC. 3306.
- GALVANIZE BOLTS, NUTS, WASHERS AND ANCHORS PER SPEC. 3392. GALVANIZE ALL OTHER STRUCTURAL STEEL PER SPEC. 3394, AFTER FABRICATION.
- COAT THE GALVANIZED RAILING, BASE PLATES, AND PROTRUDING PORTIONS OF BOLTS, NUTS, ANCHORS, AND WASHERS.
- INSTALL RAIL POSTS AND SPINDLES NORMAL TO GRADE OR PLUMB.



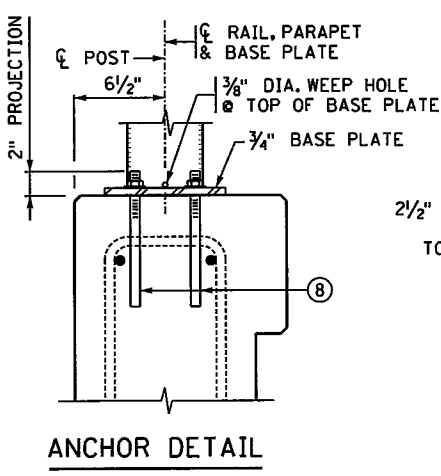
BASE PLATE



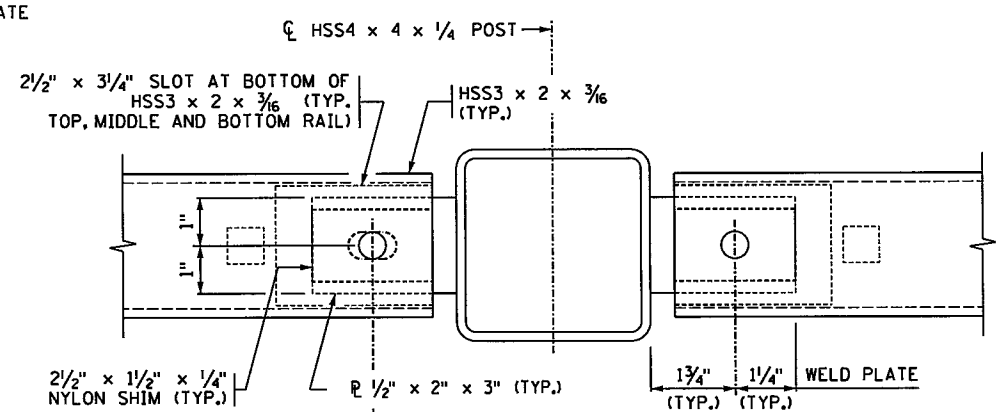
DETAIL "C"



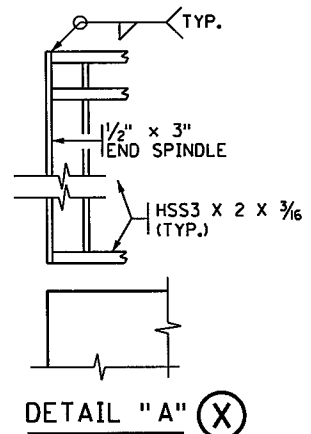
DETAIL "B"



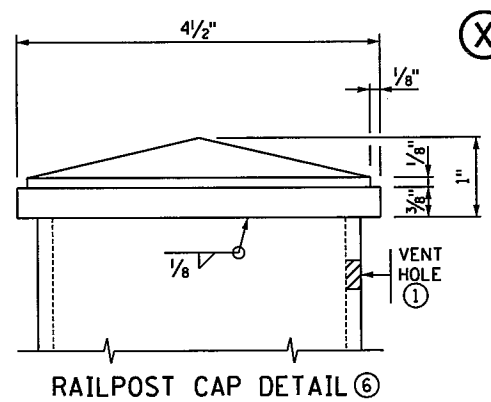
ANCHOR DETAIL



SECTION A-A



DETAIL "A" (X)



RAILPOST CAP DETAIL (6)

- (X) CURVE HORIZONTAL RAILS WHERE APPLICABLE AND PLACE RAILS PARALLEL TO THE EDGE OF MOMENT SLAB PROFILE.
- SEE SPECIAL PROVISIONS FOR REQUIREMENTS NOT INCLUDED ON THIS SHEET.
- DRILL 1/2" DIA. MAX. VENT HOLES ON THE UNDERSIDE OF RAIL TUBES AS NECESSARY TO FACILITATE GALVANIZING.
- (1) DRILL VENT HOLE IN THE RAIL POST WITHIN 2" OF THE UNDERSIDE OF THE CAP, ON THE NON-TRAFFIC SIDE OF THE POST AS NECESSARY TO FACILITATE GALVANIZING. MAXIMUM HOLE SIZE IS 1/2" DIA.
- (2) PLACE C OF END POST 12" FROM END OF CONCRETE PARAPET IF GUARDRAIL CONNECTION PLATE IS PRESENT.
- (3) IF LIGHT POLE IS MOUNTED ON BLISTER, RAILING MAY BE CONTINUOUS IN FRONT OF LIGHT POLE (SEE PARAPET & LIGHT POLE DETAILS).
- (4) CONTRACTOR TO COORDINATE LIGHT POLE DETAILS WITH THE RAILING FABRICATOR TO ENSURE PROPER CLEARANCES AND RAILING CONFIGURATION ADJACENT TO THE POLE.
- (X) (5) SEE MOMENT SLAB SHEETS AND STANDARD FIGURE 5-397.166 FOR CONTROL JOINT SPACING AND DETAILS.
- (6) PROVIDE A PYRAMID TOP STYLE STEEL CAP WELDED TO TOP OF POST WITH A SURFACE FINISH OF 1000 MICRO-INCH, OR SMOOTHER, PRIOR TO GALVANIZING.
- (7) IF TOP OF RAISED SIDEWALK, SEE SECTION D-D ON STANDARD FIGURE 5-397.166.
- (8) ADHESIVE ANCHORAGE WITH 5/8" DIA. ANCHOR ROD PER SPEC. 3385, TYPE A WITH HEX NUT AND WASHER. PROVIDE AN ADHESIVE WITH A MINIMUM CHARACTERISTIC BOND STRENGTH IN UNCRACKED CONCRETE OF 1.5 KSI. EMBED THE ANCHORAGE NO LESS THAN 5" REGARDLESS OF CHARACTERISTIC BOND STRENGTH. DRILL THROUGH REINFORCEMENT (IF ENCOUNTERED) TO ACHIEVE MINIMUM EMBEDMENT. ENSURE HEX NUT IS IN CONTACT WITH THE ADJACENT SURFACE AND TORQUE TO 60 FT-LBS UNLESS A HIGHER TORQUE IS RECOMMENDED BY THE MANUFACTURER. PROOF LOAD TO 6.9 KIPS. SEE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.

REVISION: 11-20-2014
 APPROVED: NOVEMBER 6, 2013
 NAME: *Nancy Subberger*
 STATE BRIDGE ENGINEER

5/8" DIA. HOLE IN TUBE.
 3/8" DIA. x 1" SLOTTED HOLE IN
 PLATE ONE END OF PANEL ONLY.
 (TYP. TOP, MIDDLE AND BOTTOM RAIL)

CERTIFIED BY: *Brian Fleming*
 LICENSED PROFESSIONAL ENGINEER
 DATE: 12/4/2015
 NAME: BRIAN L FLEMING, PE
 LIC. NO. 49486

TITLE: ORNAMENTAL METAL RAILING
 (DESIGN T-4 PARAPET MOUNT)

DES: BLF
 DR: LMT
 CHK: BAW
 CHK: BLF
 APPROVED:
 SHEET NO. 234 OF 367 SHEETS

MODIFIED
 FIG 5-397.162

RWD20
 OF RWD20

12:37:19 PM

2/15/2016

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SMODELNAME\$

GENERAL NOTES:

UTILITIES:

EXISTING AND PROPOSED UTILITIES ARE SHOWN IN THE GRADING PLANS. THE CONTRACTOR SHALL VERIFY THE LOCATION OF EXISTING FACILITIES AND SHALL EXERCISE CARE IN ADJACENT CONSTRUCTION.

EXCAVATION AND EARTHWORK:

ALL EXCAVATION AND EMBANKMENT WORK SHALL CONFORM TO Mn/DOT 2451.

CAST-IN-PLACE CONCRETE:

ALL CONCRETE SHALL CONFORM TO Mn/DOT 2461, EXCEPT AS NOTED.

CONSTRUCTION:

CONSTRUCTION SHALL BE IN ACCORDANCE WITH Mn/DOT 2411, EXCEPT AS NOTED.

GEOMETRICS AND GRADES:

WALL ALIGNMENT REFERENCE IS ALONG FRONT FACE OF WALL AT BASE OF BOTTOM BLOCK.

COMPACTION REQUIREMENTS:

COMPACT REINFORCED WALL FILL TO 100% DENSITY IN ACCORDANCE WITH Mn/DOT SPEC. 2105.3.F.1 UNLESS RECOMMENDED OTHERWISE BY THE SOILS ENGINEER.

COMPACT GRANULAR BEDDING TO 100% DENSITY IN ACCORDANCE WITH Mn/DOT SPEC. 2105.3.F.1 UNLESS RECOMMENDED OTHERWISE BY THE SOILS ENGINEER.

DESIGN CRITERIA:

DESIGN CRITERIA FOLLOWS THE AASHTO BRIDGE DESIGN SPECIFICATIONS, LATEST, WITH ALL INTERIMS. DESIGN CRITERIA ARE IN ACCORDANCE WITH MnDOT POLICY, AS RECORDED IN THE MnDOT ROAD DESIGN MANUAL. SEE SPECIAL PROVISIONS FOR SPECIFIC DESIGN CRITERIA.

ALL DESIGN AND MATERIALS SHALL CONFORM TO REQUIREMENTS IN THE SPECIAL PROVISIONS.

NOTES TO CONTRACTOR:

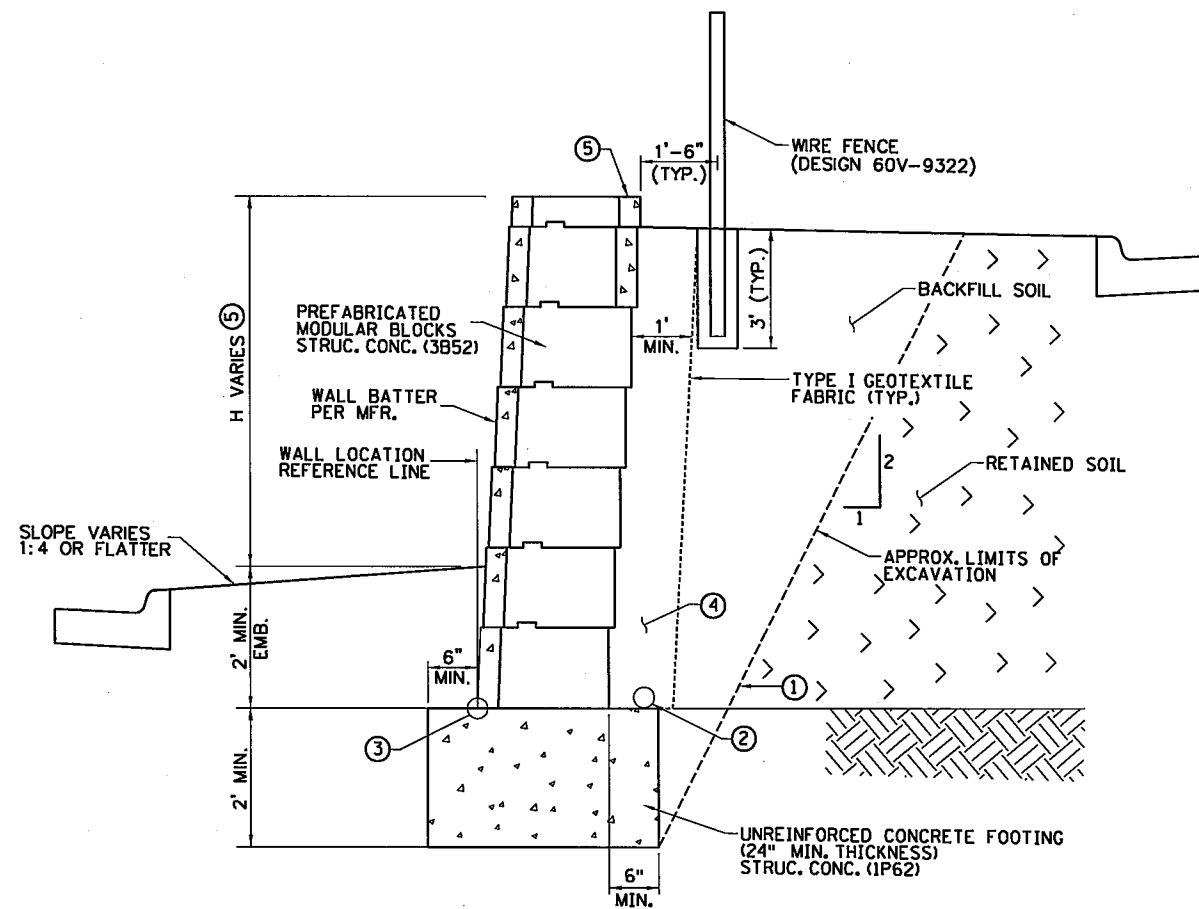
PROVIDE DETAILED DRAWINGS FOR CONSTRUCTION CONTAINING:

- ELEVATION VIEW WITH FOUNDATION AND WALL PLACEMENT REQUIREMENTS, WALL FACING LAYOUT, AND GEOMETRIC INFORMATION. TOP OF WALL MAY EXTEND UP TO 4" ABOVE PLAN TOP OF WALL ELEVATION.
- PLAN VIEW WITH BOTTOM AND TOP OF WALL ALIGNMENT, AND PLAN LIMITS OF WALL ALIGNMENT.
- CROSS SECTIONS DETAILING BATTER, VERTICAL SPACING, SUBSURFACE DRAINAGE, SURFACE DRAINAGE, AND WATER RUNOFF COLLECTION ABOVE WALL.
- NOTE BLOCK, FILL PLACEMENT METHODS AND REQUIREMENTS.
- DETAILS THAT ARE SPECIFIC TO VENDOR PRODUCTS AND THEIR INTERACTION WITH OTHER PROJECT COMPONENTS.
- DETAILS OF CAP UNITS AND INSTALLATION/FASTENING INSTRUCTIONS FOR THE CAPS. CAP UNITS SHALL BE SET IN A BED OF ADHESIVE DESIGNED TO WITHSTAND MOISTURE AND TEMPERATURE EXTREMES, REMAIN FLEXIBLE, AND SHALL BE SPECIFICALLY FORMULATED FOR BONDING MASONRY TO MASONRY.
- CERTIFICATION BY PROFESSIONAL ENGINEER THAT THE CONSTRUCTION LAYOUT MEETS THE REQUIREMENTS OF PLANS AND SPECIFICATIONS.
- RETAINING WALL TO HAVE TEXTURED FINISH, MULTI COLOR FINISH, AND ANTI-GRAFFITI COATING ON ALL EXPOSED FACES.

SUMMARY OF QUANTITIES RETAINING WALL E		
ITEM	UNIT	QUANTITY
DRAINAGE SYSTEM	LUMP SUM	1
(A) (B) PREFABRICATED MODULAR BLOCK WALL	SQ. FT.	450
(C) ANTI-GRAFFITI COATING	SQ. FT.	770
(C) ARCHITECTURAL SURFACE FINISH (MULTI COLOR)	SQ. FT.	770
(D) WIRE FENCE DESIGN 60V-9322	LIN. FT.	80

NOTES:

- VERTICAL FRONT FACE AREA OF MODULAR BLOCK AS SHOWN ON THE PLANS; FROM TOP OF WALL CAP TO 2'-0" BELOW FINISHED GROUND AT BOTTOM OF WALL.
- EXCAVATION, CONCRETE FOOTING, BLOCKS, BACKFILL, COARSE AGGREGATE, GEOTEXTILE FABRIC TO BE INCLUDED IN PRICE BID "PREFABRICATED MODULAR BLOCK WALL".
- VERTICAL FRONT FACE AREA OF MODULAR BLOCK AS SHOWN ON THE PLANS; FROM TOP OF WALL CAP TO 2'-0" BELOW FINISHED GROUND AT BOTTOM OF WALL. QUANTITY INCLUDES PLAN AREA AN ASSUMED TOP CAP WIDTH OF 2'-0" AND VERTICAL BACK FACE AREA FROM 2'-0" BELOW TOP OF WALL CAP.
- INCLUDES CONCRETE FOOTINGS FOR ALL POSTS.



- PAY LIMIT (2v TO 1h) ACTUAL EXCAVATION SLOPE IS DETERMINED BY DESIGNER PREFERENCE OR OSHA REGULATIONS OF IN-SITU SOILS; EXCAVATION BEYOND THESE LIMITS AT CONTRACTORS EXPENSE.
- 4" THERMOPLASTIC PERFORATED PIPE, SPEC. 3245. WRAP WITH TYPE 1 GEOTEXTILE SPEC. 3733 (TYP.), INSTALLATION AS PER SPEC. 2502. CONNECT TO DRAINAGE SYSTEM.
- RETAINING WALL ALIGNMENTS LOCATED ALONG REFERENCE LINE WHICH IS ALONG FRONT FACE OF WALL AT BASE OF BOTTOM BLOCK.
- 1'-0" COARSE AGGREGATE PER MnDOT SPEC. ASTM D 448-12, SIZE NUMBER 5 BEHIND THE BLOCK.
- EXPOSED FACES OF MODULAR BLOCKS SHALL BE TEXTURED. SEE SPECIAL PROVISIONS.

TYPICAL LARGE BLOCK (WETCAST) RETAINING WALL

DESIGN TEAM			
DRAWN BY:	LMT		
DESIGNER:	BLF		
CHECKED BY:	BAW		
	NO.	BY	DATE
			REVISIONS

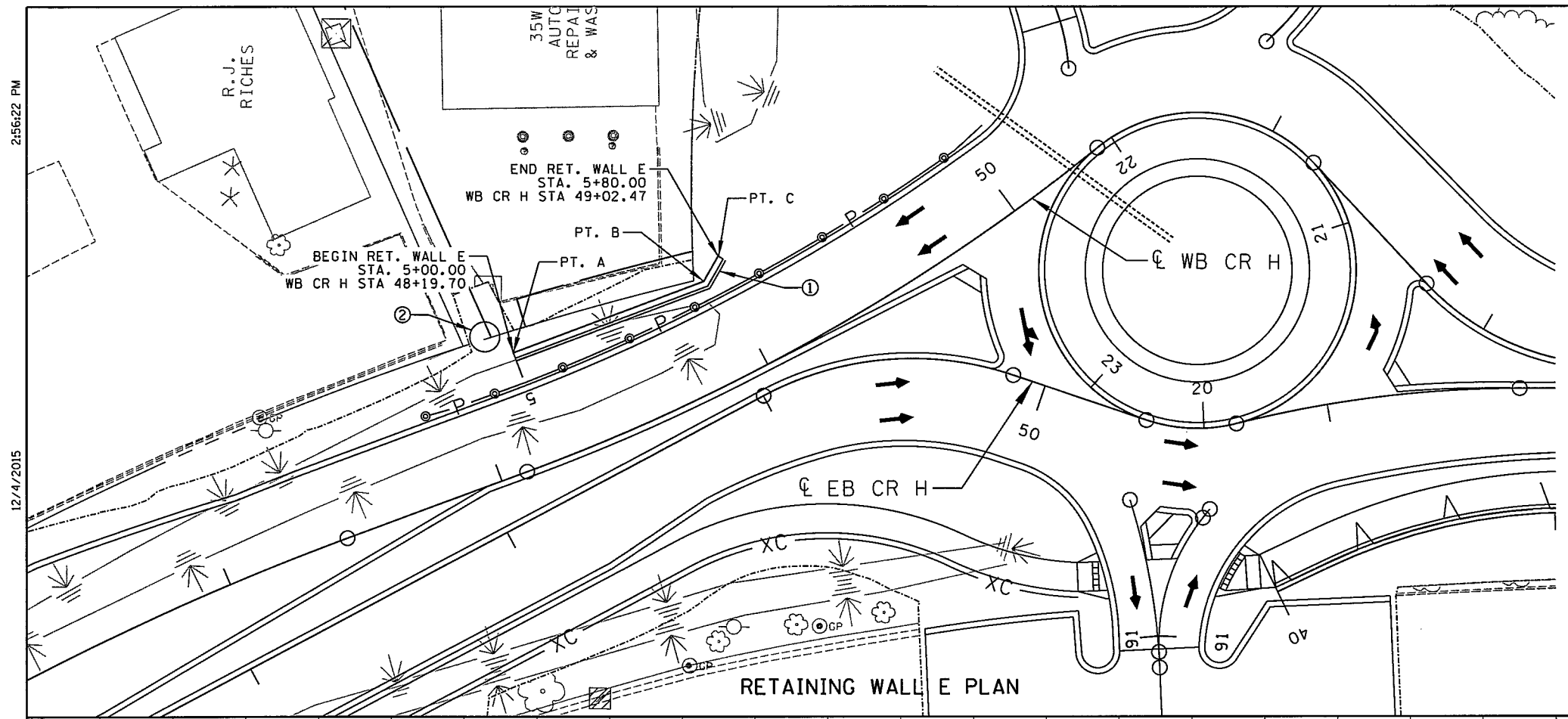
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brian L. Fleming* Lic. No. 49485
 Licensed Professional Engineer
 Printed Name: BRIAN L. FLEMING, PE Date: 2/15/2016

Kimley»Horn

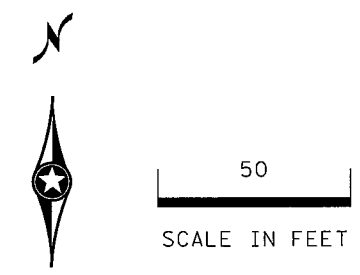
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	235
RAMSEY129594	
RWE1	367
OF RWE2	

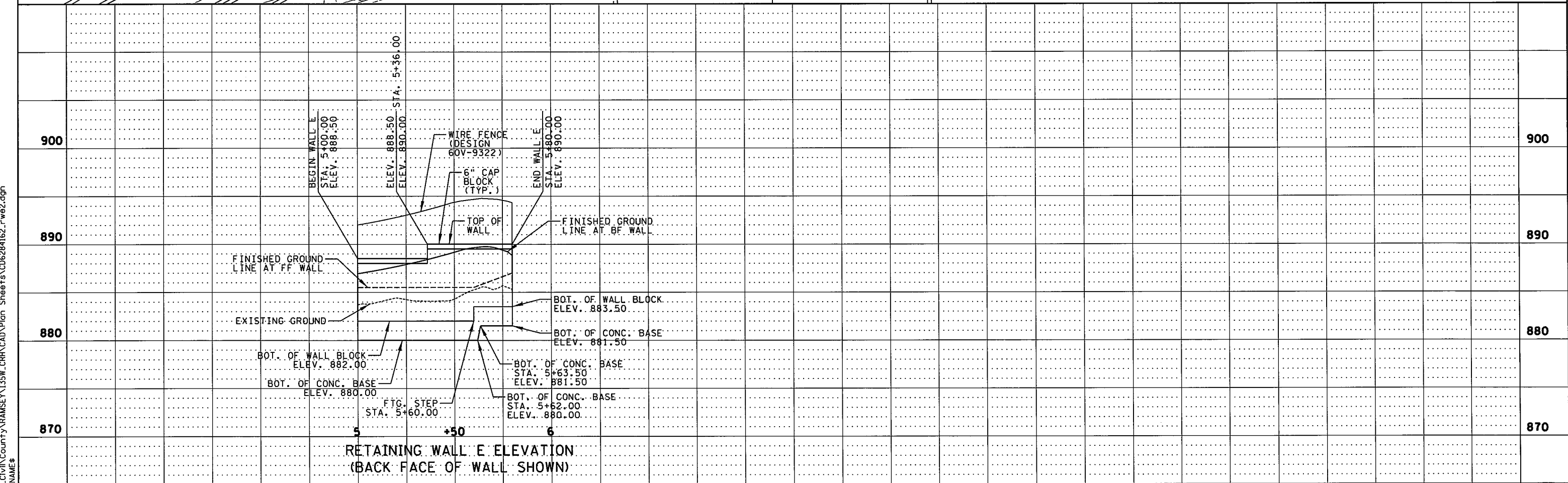


GEOMETRICS FOR RETAINING WALL E

POINT	WALL STA.	COORDINATES		WB CR H STA.	OFFSET LEFT (FT.)
		X	Y		
A	5+00.00	549716.876	211020.048	48+19.70	40.02
B	5+70.00	549782.111	211045.434	48+93.58	35.50
C	5+80.00	549786.919	211054.203	49+02.47	40.93



- NOTES:
 ① WIRE FENCE (DESIGN 60V-9322)
 ② 4" DIA. PERF. DRAIN PIPE. SEE DETAILS PREVIOUS SHEET. TIE TO DRAINAGE STRUCTURE DI-1201, SEE ROADWAY PLANS.



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DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: LMT				
DESIGNER: BLF				
CHECKED BY: BAW				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

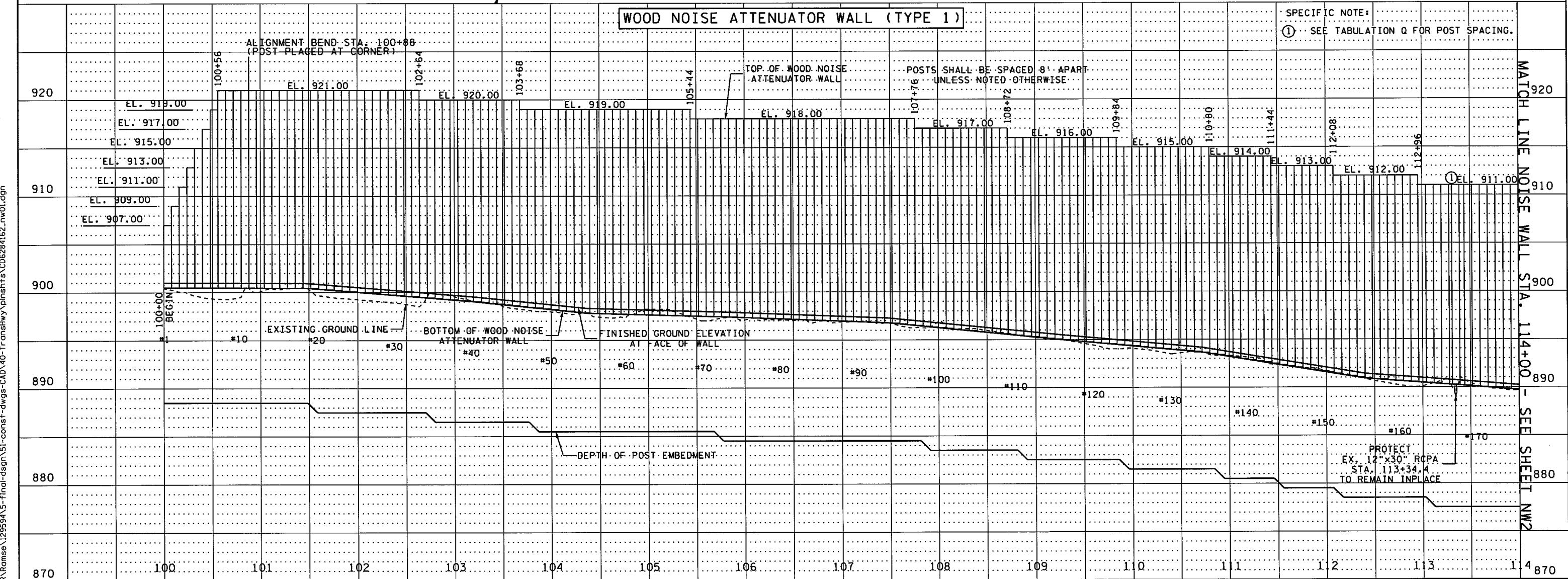
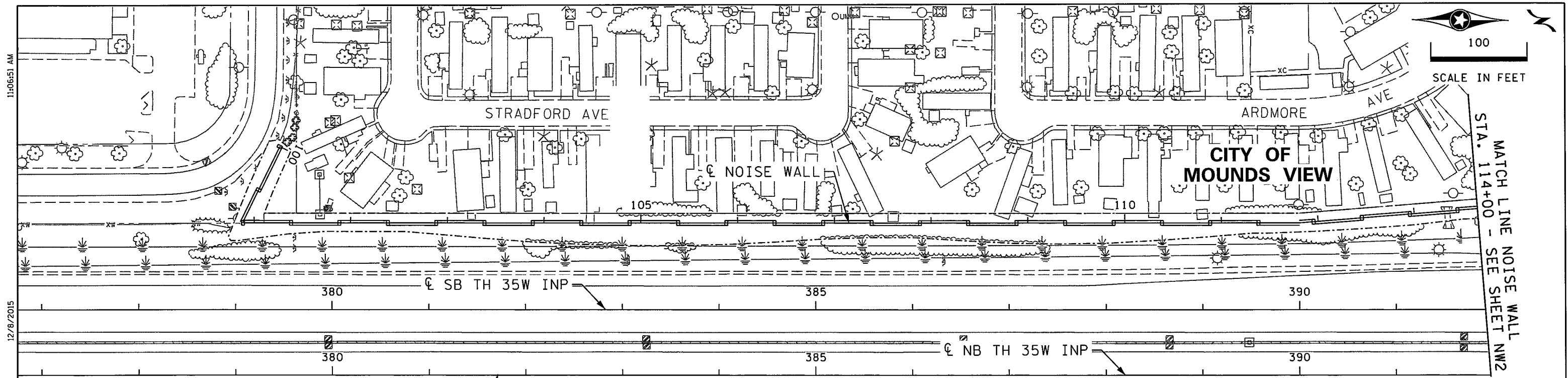
Certified By: *Brian Fleming* Lic. No. 49486
 Licensed Professional Engineer
 Printed Name: BRIAN L. FLEMING, PE Date: 12/4/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**RETAINING WALL E
 GENERAL PLAN & ELEVATION**

FILE NO. RAMSEY129594	236
RWE2 OF RWE2	367



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DESIGN TEAM			
DRAWN BY: CIF			
DESIGNER: RDH			
CHECKED BY: HLR			
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Heather L. Redetzke* Lic. No. 44267
Printed Name: HEATHER L. REDETZKE Date: 12/8/2015

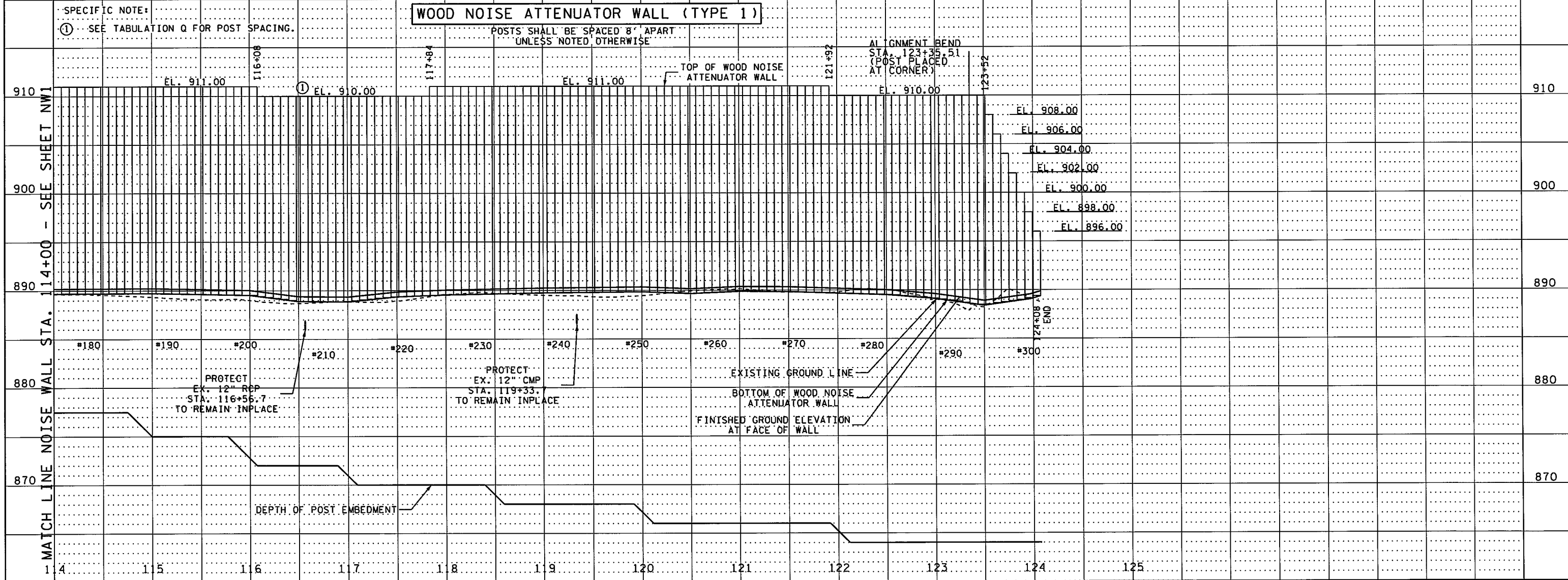
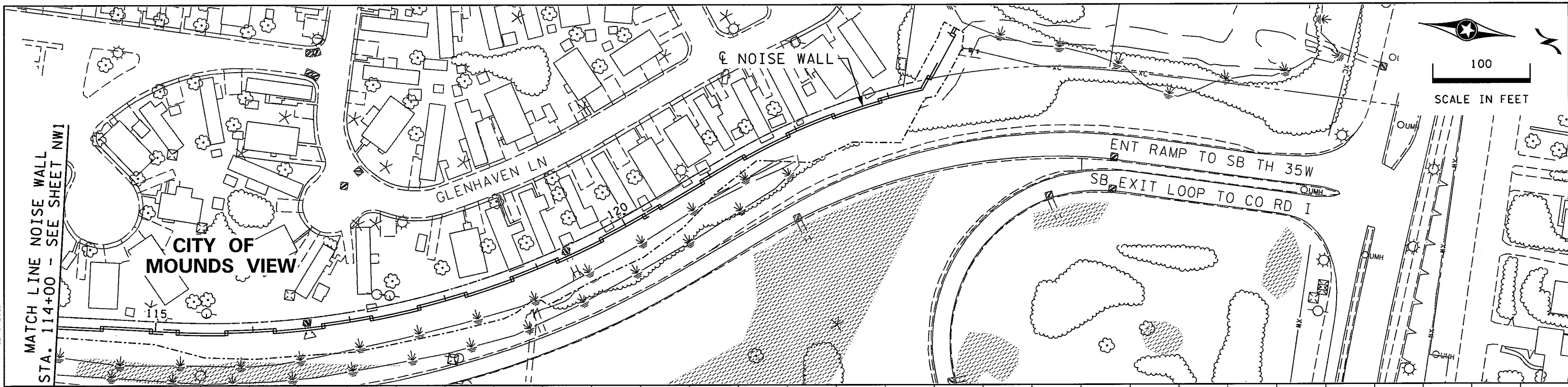


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

NOISE WALL PLAN AND PROFILE
NOISE WALL STA. 100+00 - 114+00

FILE NO. RAMSEI29594	237
NW1 OF NW4	367

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12/8/2015
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NW2



SPECIFIC NOTE:
① SEE TABULATION Q FOR POST SPACING.

WOOD NOISE ATTENUATOR WALL (TYPE 1)

POSTS SHALL BE SPACED 8' APART UNLESS NOTED OTHERWISE

DESIGN TEAM			REVISIONS		
DRAWN BY:	CJF		NO.	BY	DATE
DESIGNER:	RDH				
CHECKED BY:	HLR				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Heather L. Redetzke* Lic. No. 44267
Printed Name: HEATHER L. REDEITZKE Date: 12/8/2015
SEH
PHONE: (651)490-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

NOISE WALL PLAN AND PROFILE
NOISE WALL STA. 114+00 - 124+08
FILE NO. RAMSEI29594
NW2 OF NW4
238
367

11/28/24 AM

2/16/2016

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NOISEWALL TABULATION

NOISEWALL TABULATION

NOISEWALL TABULATION

Table with 11 columns: POST NO., WALL STATION, GROUND ELEV., SLOPE, TOP OF WALL ELEV., PLANKING AREA, ROUNDED POST LENGTH, ACTUAL POST EMBEDMENT, BOTTOM OF EMBEDEDMENT ELEV., GRANULAR BACKFILL, STRUCTURAL CONCRETE (3G52).

Table with 11 columns: POST NO., WALL STATION, GROUND ELEV., SLOPE, TOP OF WALL ELEV., PLANKING AREA, ROUNDED POST LENGTH, ACTUAL POST EMBEDMENT, BOTTOM OF EMBEDEDMENT ELEV., GRANULAR BACKFILL, STRUCTURAL CONCRETE (3G52).

Table with 11 columns: POST NO., WALL STATION, GROUND ELEV., SLOPE, TOP OF WALL ELEV., PLANKING AREA, ROUNDED POST LENGTH, ACTUAL POST EMBEDMENT, BOTTOM OF EMBEDEDMENT ELEV., GRANULAR BACKFILL, STRUCTURAL CONCRETE (3G52).

GENERAL NOTES:
QUANTITIES FOR EXCAVATION AND FILL ARE INCLUDED IN EARTHWORK TABULATIONS.
CONCRETE BACKFILL SHALL BE USED IN AREAS WHERE GROUND WATER IS PRESENT.
CONCRETE SHALL BE PLACED USING THE TREMIE METHOD.

Table with 4 columns: DESIGN TEAM, DRAWN BY, DESIGNER, CHECKED BY.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Heather L. Redetzke, L.C. No. 44267
Printed Name: HEATHER L. REDEZKE Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

Table with 2 columns: NOISE WALL PLAN AND PROFILE TABULATION, FILE NO. (239, NW3 OF NW4, 367).

11/28/2015 AM

2/16/2016

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NOISEWALL TABULATION

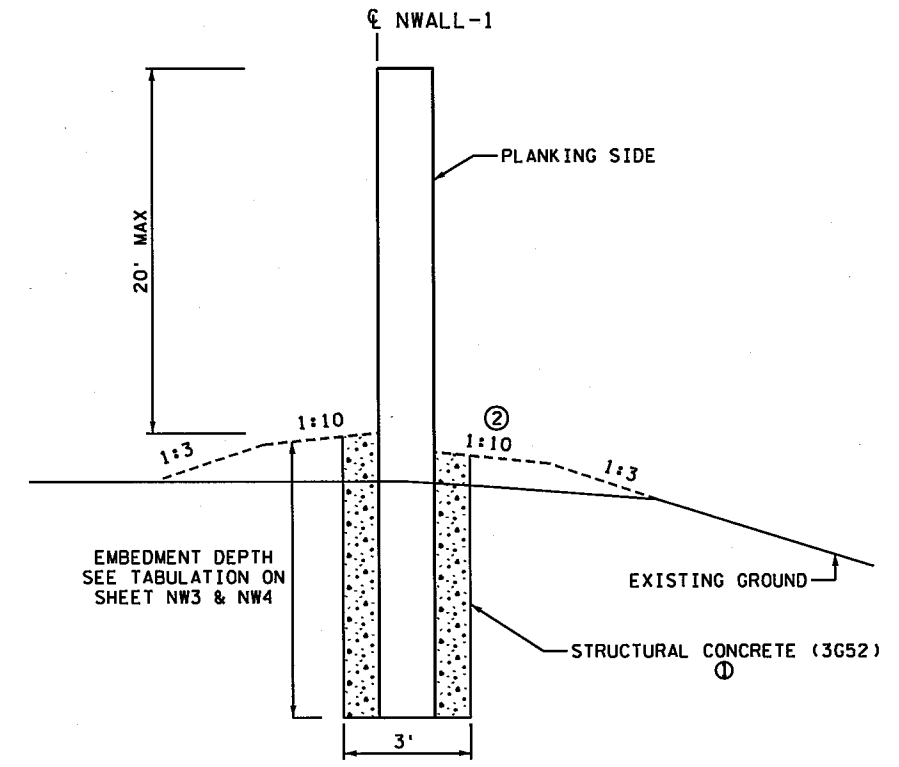
Table with 12 columns: POST NO., WALL STATION, GROUND ELEV., SLOPE, TOP OF WALL ELEV., PLANKING AREA (SQ FT, LIN FT), ROUNDED POST LENGTH (LIN FT), ACTUAL POST EMBEDMENT (LIN FT), BOTTOM OF EMBEDMENT ELEV., GRANULAR BACKFILL (CU YD), STRUCTURAL CONCRETE (3G52) (CU YD). Rows 186-255.

NOISEWALL TABULATION

Table with 12 columns: POST NO., WALL STATION, GROUND ELEV., SLOPE, TOP OF WALL ELEV., PLANKING AREA (SQ FT, LIN FT), ROUNDED POST LENGTH (LIN FT), ACTUAL POST EMBEDMENT (LIN FT), BOTTOM OF EMBEDMENT ELEV., GRANULAR BACKFILL (CU YD), STRUCTURAL CONCRETE (3G52) (CU YD). Rows 256-304.

NOISEWALL SUMMARY

Summary table with 6 columns: PROJECT, ALIGNMENT & STATION, GRANULAR BACKFILL (CU YD), CONCRETE POST 12" X 18" (LIN FT), WOOD NOISE ATTENUATOR WALL (SQ FT), STRUCTURAL CONCRETE (3G52) (CU YD). Rows for NWALL_1 and SUBTOTAL.



SPECIFIC NOTES:

- 1 STRUCTURAL CONCRETE (3G52) SHALL BE USED IN AREAS WITH GROUND WATER PRESENT.
2 SLOPE 1:6 FROM STA. 114+00 TO 124+08

DESIGN TEAM table with columns: DRAWN BY, DESIGNER, CHECKED BY, NO., BY, DATE, REVISIONS.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: Heather L. Redetzke, L.C. No. 44267
Printed Name: HEATHER L. REDETZKE Date: 2/16/2016



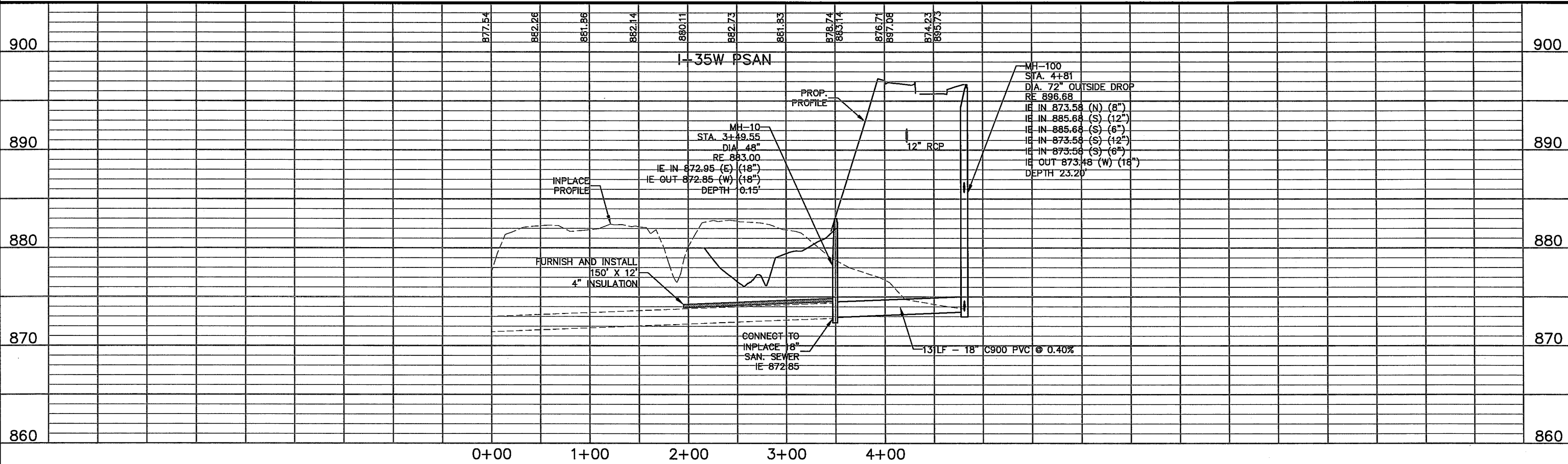
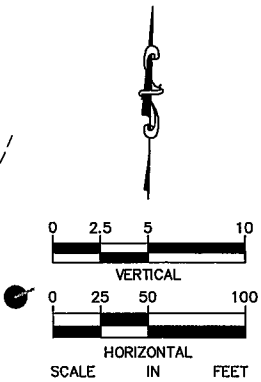
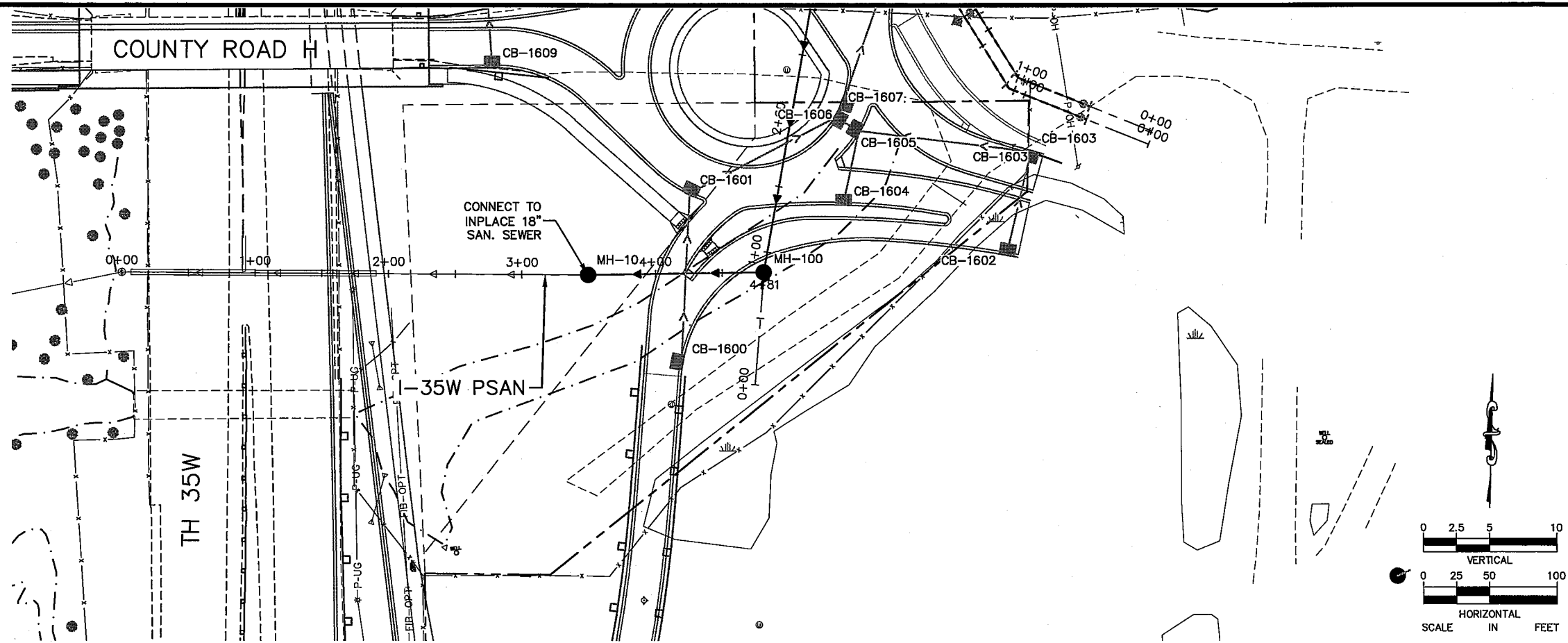
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

NOISE WALL PLAN AND PROFILE
TABULATION

FILE NO. 240
RAMSEY129594
NW4 OF NW4 367

K:\TWC_Civil\County\RAMSEY\TCAAP_Spine Rd BP2\CAD\Plan Sheets\Construction Plans\CO RD H UTILITIES\TCAAP_CO RD H_UTIL.dwg Layout01 February 15, 2016 - 11:11am

- NOTES:**
1. STRUCTURE LOCATIONS ARE TO CENTER OF CASTING FOR MH.
 2. CONTRACTOR TO VERIFY INPLACE INVERT ELEVATIONS AND ADJUST PERCENT OF GRADE ACCORDINGLY.
 3. SEE CITY OF ARDEN HILLS STANDARD SPECIFICATIONS FOR ALL STRUCTURE AND PIPE DETAILS.



DESIGN TEAM			
DRAWN BY:	RJG		
DESIGNER:	RJG		
CHECKED BY:	TJL		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

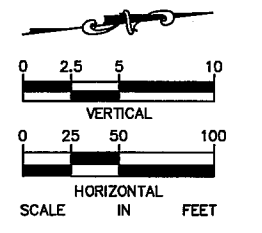
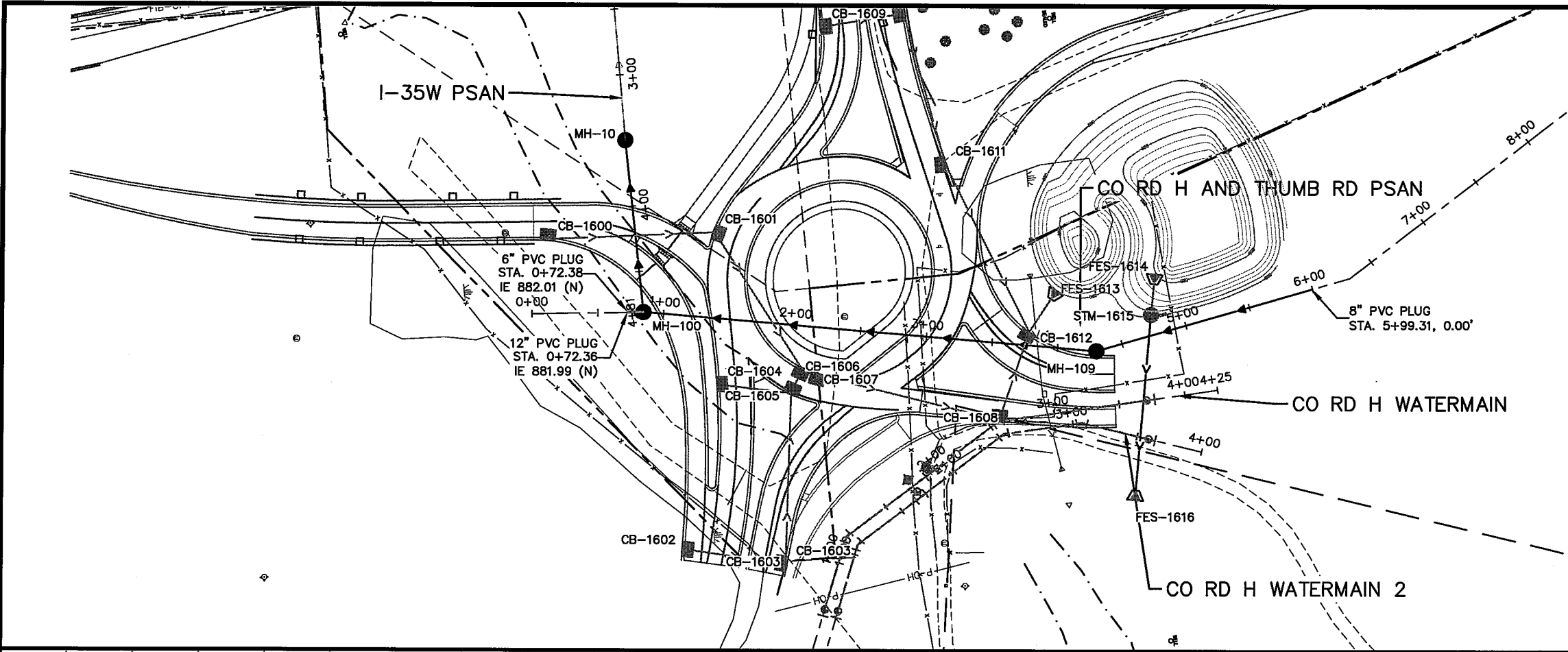
Certified By: *Nicole Gulick* Lic. No. 43835
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 12/07/15



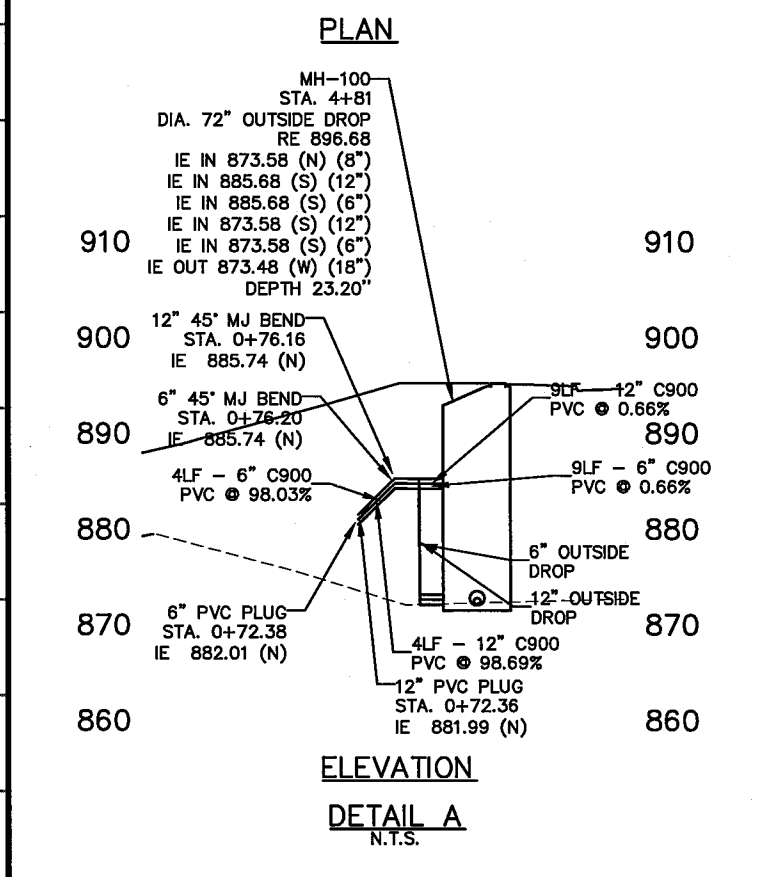
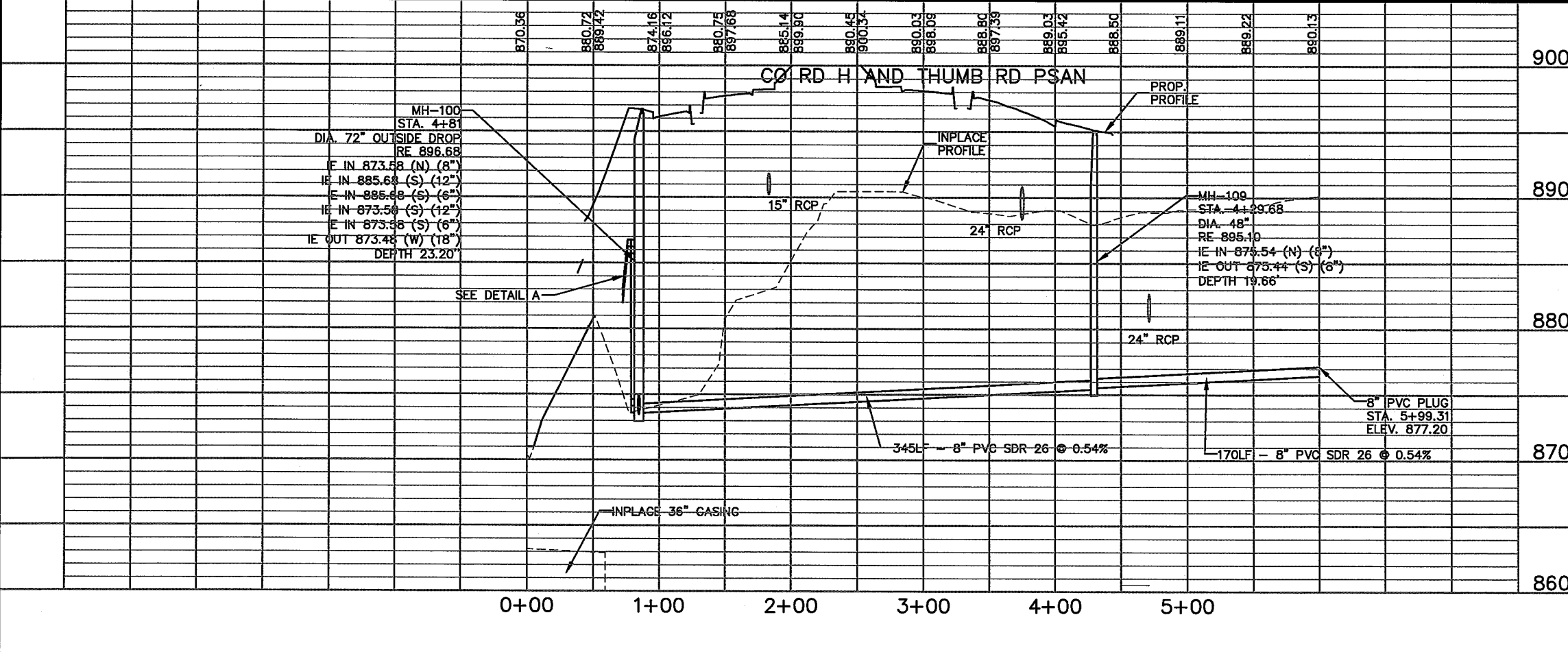
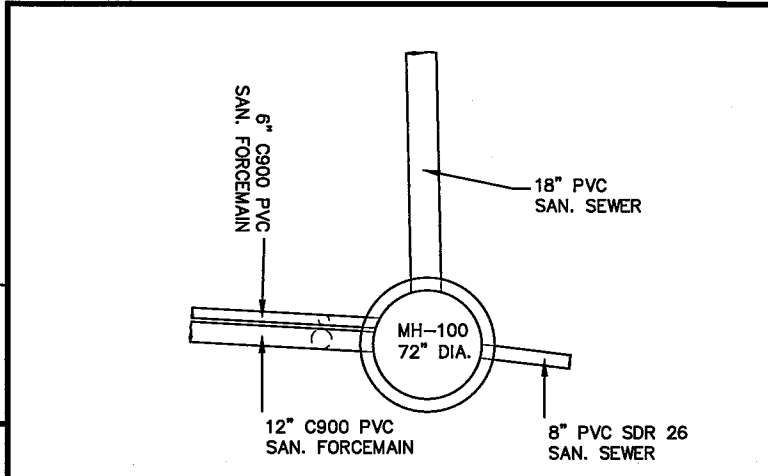
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SANITARY SEWER PLAN AND PROFILE		FILE NO. TCAAP_CO RD H_UTIL	241
SW1 OF SW3			367

K:\TWC_Civil\County\RAMSEY\TCAAP_Spine Rd BP2\CAD\Plan Sheets\Construction Plans\CO RD H UTILITIES\TCAAP_CO RD H UTIL.dwg Layout2 January 12, 2016 - 3:19pm



- NOTES:
- STRUCTURE LOCATIONS ARE TO CENTER OF CASTING FOR MH.
 - CONTRACTOR TO VERIFY INPLACE INVERT ELEVATIONS AND ADJUST PERCENT OF GRADE ACCORDINGLY.



DESIGN TEAM			
DRAWN BY:	RJG		
DESIGNER:	RJG		
CHECKED BY:	TJL		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

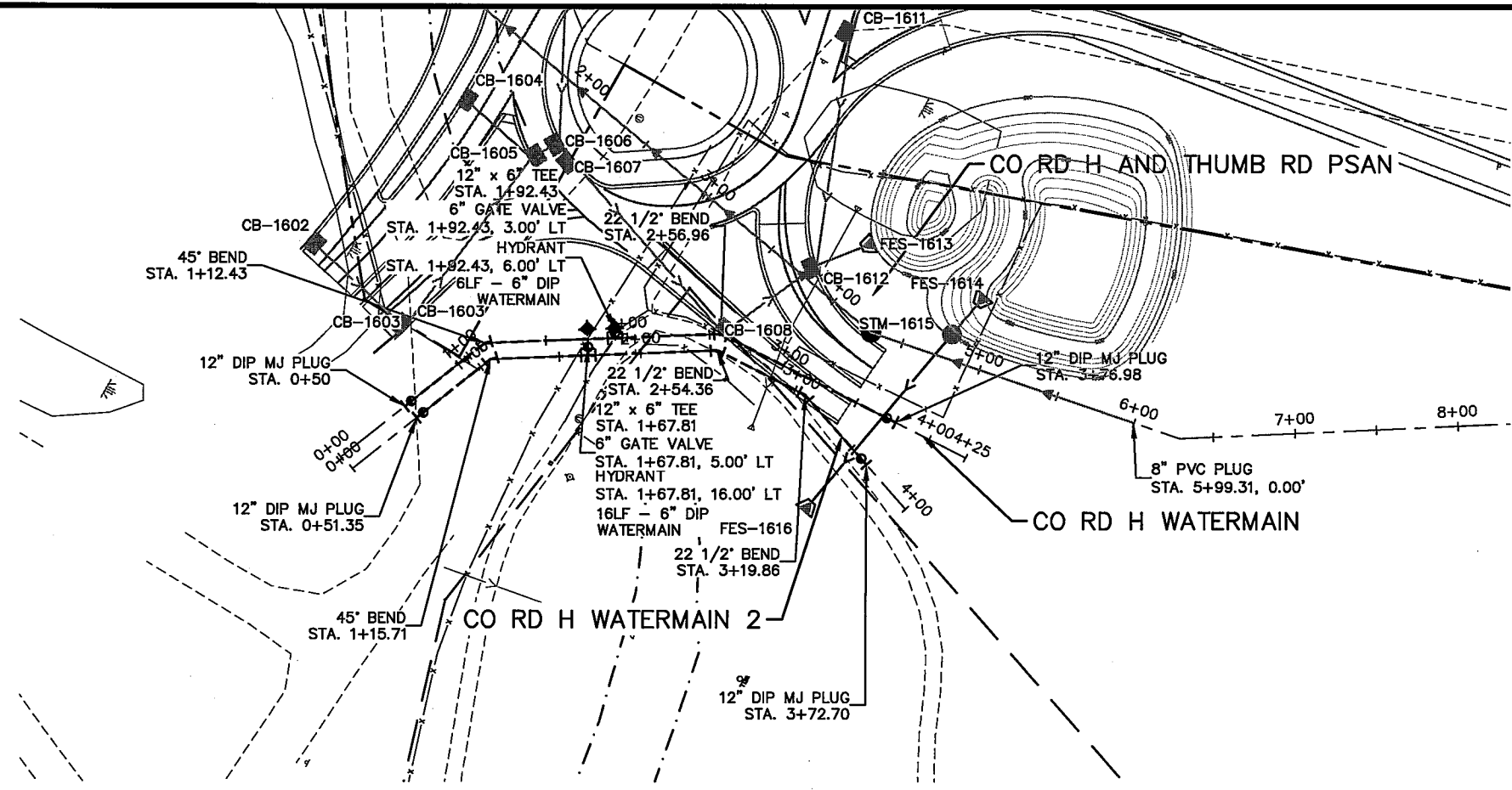
Certified By: *Nicole Gulick* Lic. No. 43835
 Printed Name: NICOLE GULICK, P.E. Date: 12/07/15



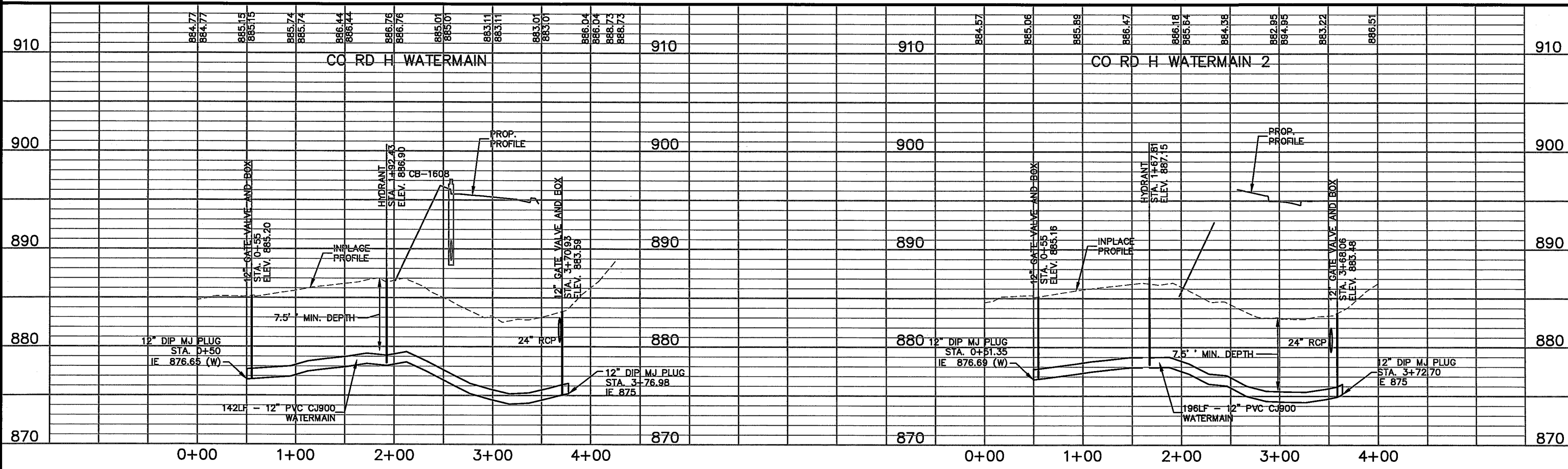
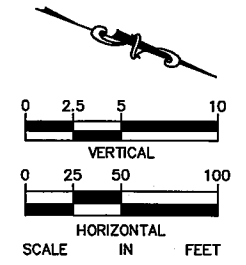
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SANITARY SEWER PLAN AND PROFILE		FILE NO. 242
SW2 OF SW3		367

K:\TWC_Civil\County\RAMSEY\TCAAP_Spine Rd BP2\CAD\Plan Sheets\Construction Plans\CO RD H UTILITIES\TCAAP_CO RD H UTIL.dwg Layout3 January 12, 2016 - 3:19pm



- NOTES:**
1. STRUCTURE LOCATIONS ARE TO CENTER OF CASTING FOR MH.
 2. CONTRACTOR TO VERIFY INPLACE INVERT ELEVATIONS AND ADJUST



DESIGN TEAM			
DRAWN BY:	RJG		
DESIGNER:	RJG		
CHECKED BY:	TJL		
NO.	BY	DATE	REVISIONS

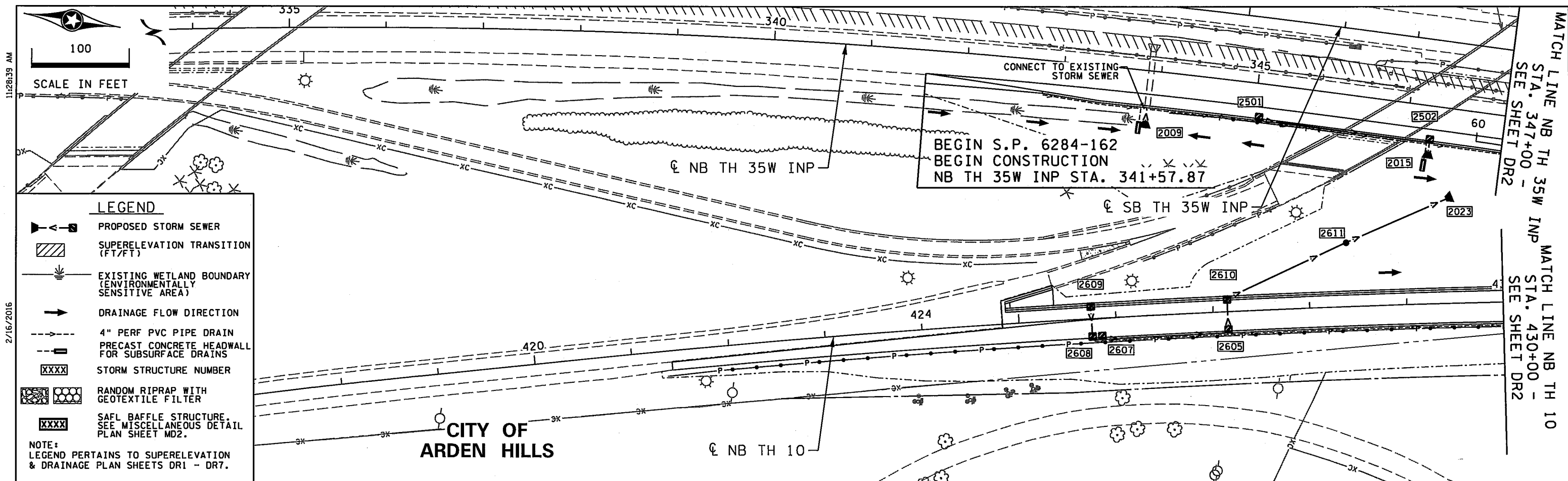
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 43835
 Printed Name: NICOLE GULICK, P.E. Date: 12/07/15



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

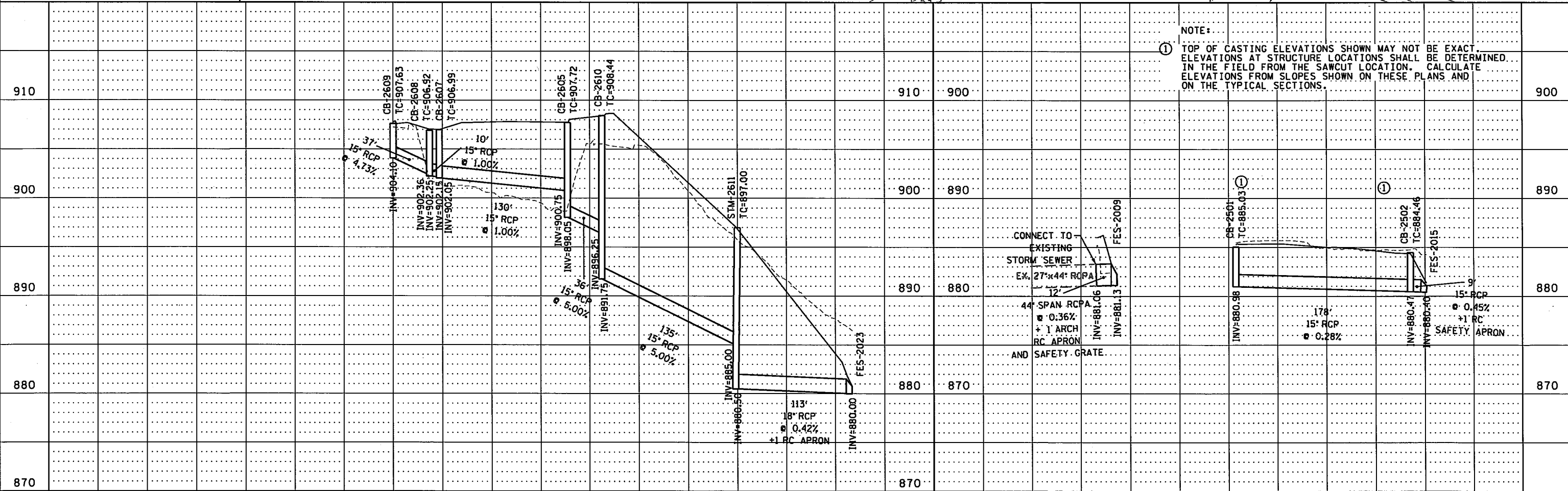
WATERMAIN PLAN AND PROFILE		FILE NO. TCAAP_CO RD H UTIL. 243
SW3 OF SW3		367



LEGEND

- PROPOSED STORM SEWER
- SUPERELEVATION TRANSITION (FT/FT)
- EXISTING WETLAND BOUNDARY (ENVIRONMENTALLY SENSITIVE AREA)
- DRAINAGE FLOW DIRECTION
- 4" PERF PVC PIPE DRAIN
- PRECAST CONCRETE HEADWALL FOR SUBSURFACE DRAINS
- STORM STRUCTURE NUMBER
- RANDOM RIPRAP WITH GEOTEXTILE FILTER
- SAFL BAFFLE STRUCTURE. SEE MISCELLANEOUS DETAIL PLAN SHEET MD2.

NOTE: LEGEND PERTAINS TO SUPERELEVATION & DRAINAGE PLAN SHEETS DR1 - DR7.



NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

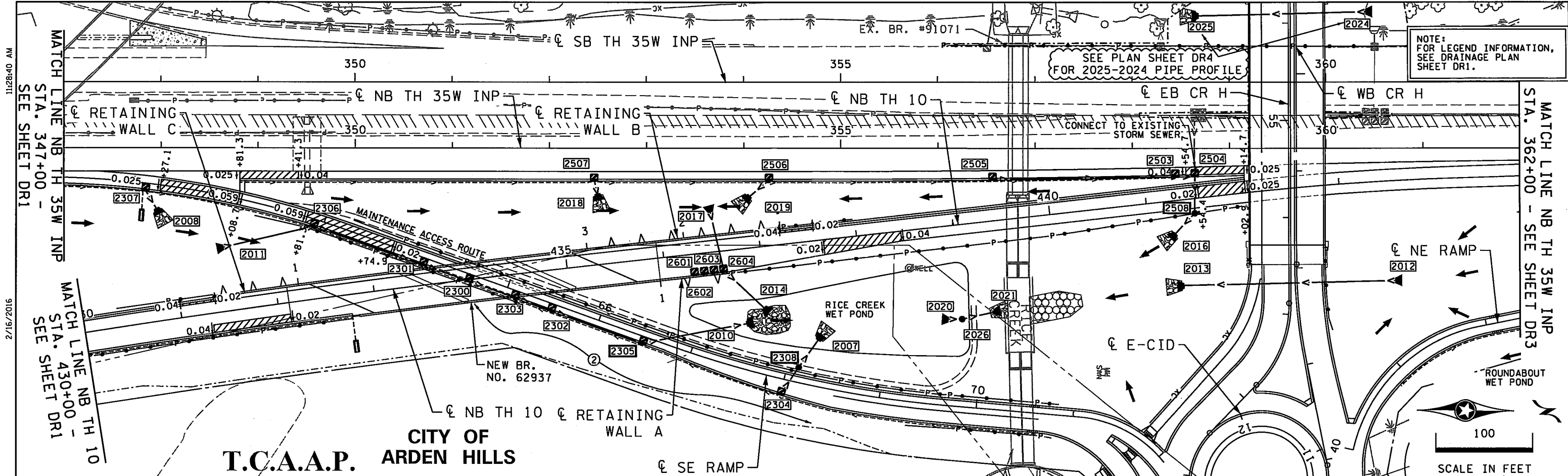
SUPERELEVATION & DRAINAGE PLAN AND PROFILE
 NB TH 35W INP STA. 341+57 - 347+00
 NB TH 10 STA. 421+41 - 430+00

FILE NO. 244
 RAMSEI29594
 DR1 OF DR9
 367

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2/16/2016

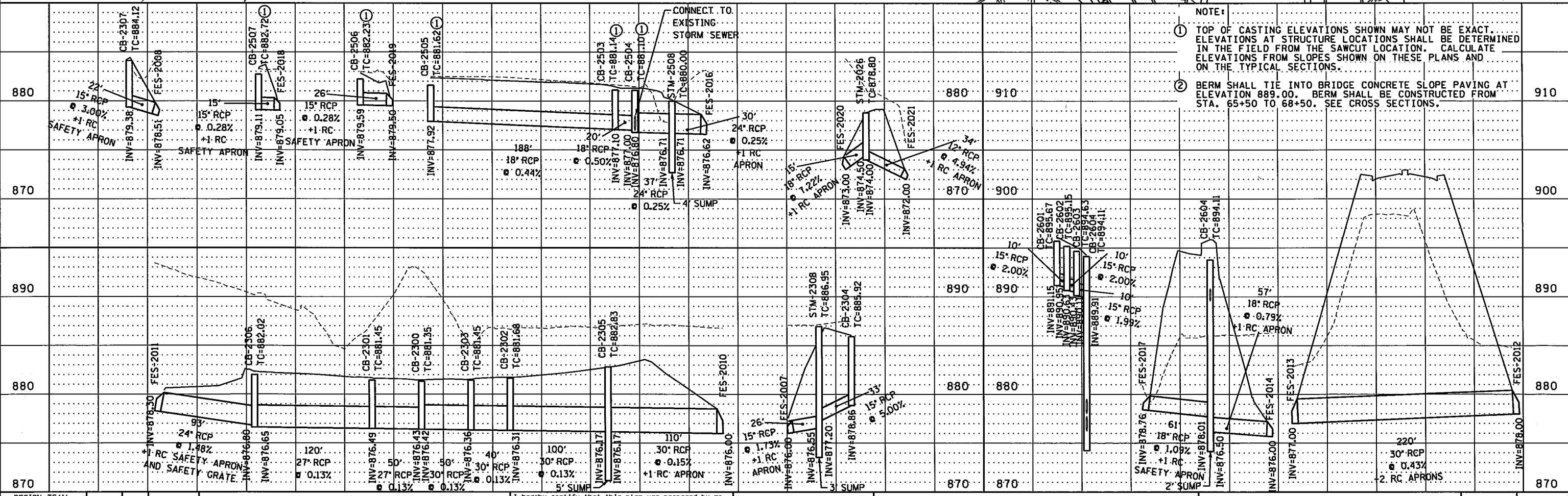
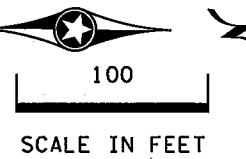
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T.C.A.A.P. CITY OF ARDEN HILLS

NOTE: FOR LEGEND INFORMATION, SEE DRAINAGE PLAN SHEET DR1.

SEE PLAN SHEET DR4 FOR 2025-2024 PIPE PROFILE

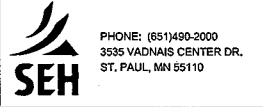


NOTE:
 ① TOP OF CASTING ELEVATIONS SHOWN MAY NOT BE EXACT. ELEVATIONS AT STRUCTURE LOCATIONS SHALL BE DETERMINED IN THE FIELD FROM THE SAWCUT LOCATION. CALCULATE ELEVATIONS FROM SLOPES SHOWN ON THESE PLANS AND ON THE TYPICAL SECTIONS.
 ② BERM SHALL TIE INTO BRIDGE CONCRETE SLOPE PAVING AT ELEVATION 889.00. BERM SHALL BE CONSTRUCTED FROM STA. 65+50 TO 68+50. SEE CROSS SECTIONS.

S:\P\T\Ramsey\129594\5-Final-dsgn\51-const-dwgs-CAD\40-Transhwy\plan\shnts\CH6284162-dr01.dgn

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	REP		
CHECKED BY:	REP		
NO.	BY	DATE	REVISIONS

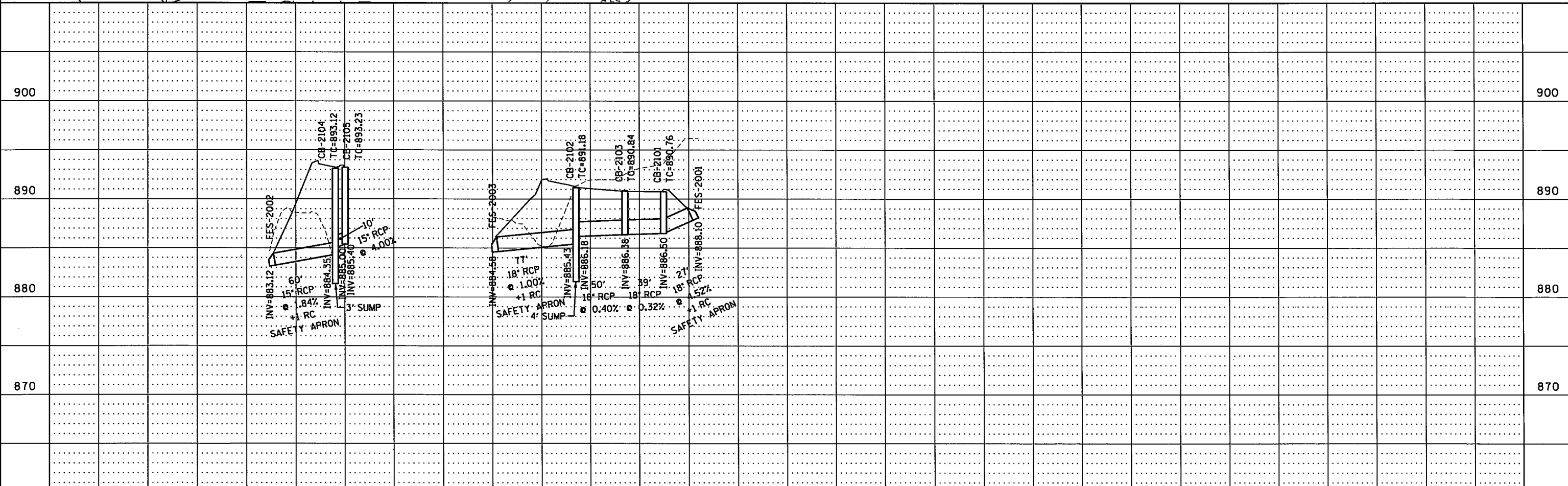
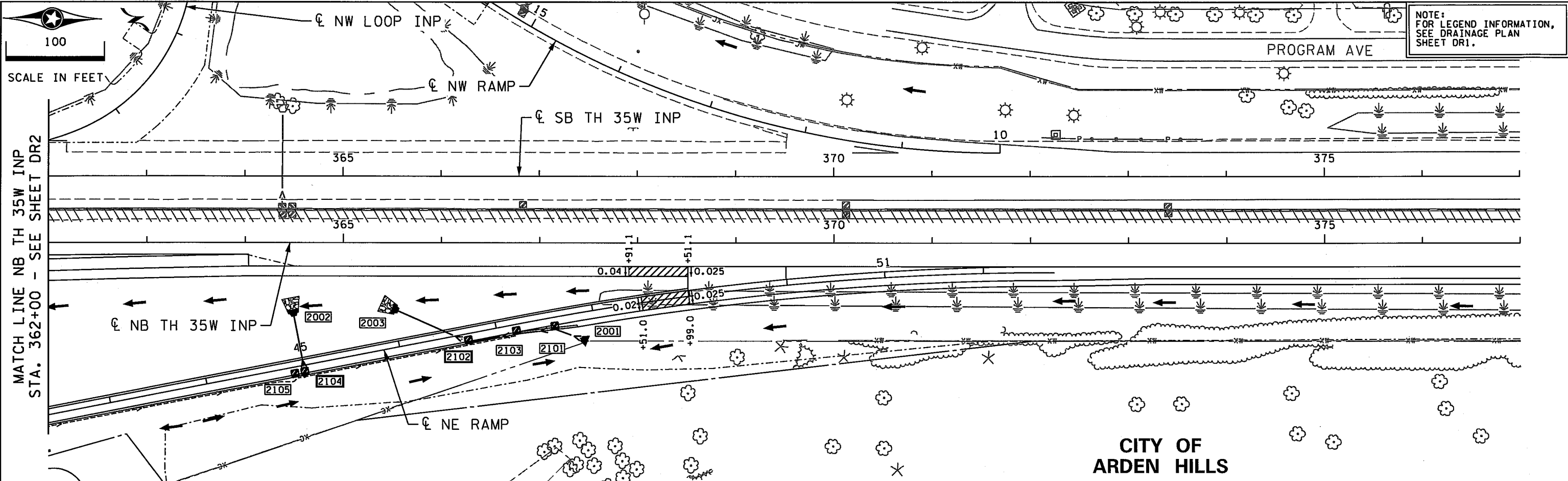
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Rachel Pichlmann* Lic. No. 51315
 Printed Name: RACHEL E. PICHLMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SUPERELEVATION & DRAINAGE PLAN AND PROFILE
 NB TH 35W INP STA. 347+00 - 362+00
 NB TH 10 STA. 430+00 - 442+01

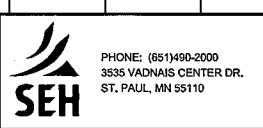
FILE NO.	245
RAMSEY129594	
DR2	367
OF DR9	



DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	REP			
CHECKED BY:	REP			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Pichlmann* Lic. No. 51315
 Printed Name: RACHEL E. PICHLMANN Date: 2/16/2016

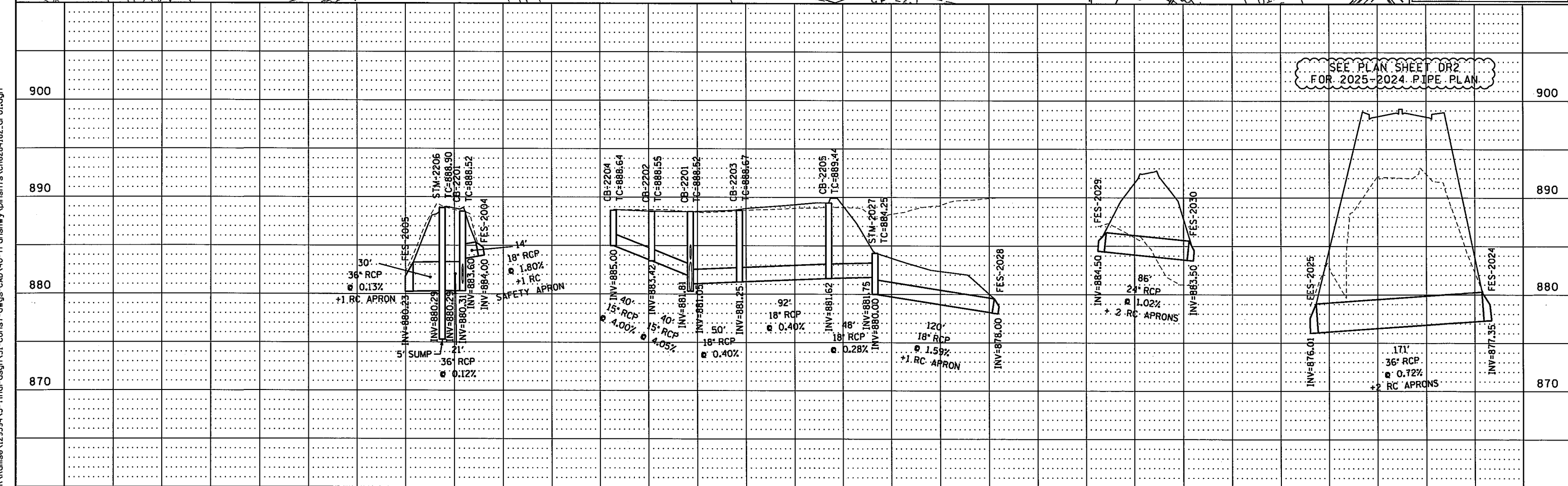
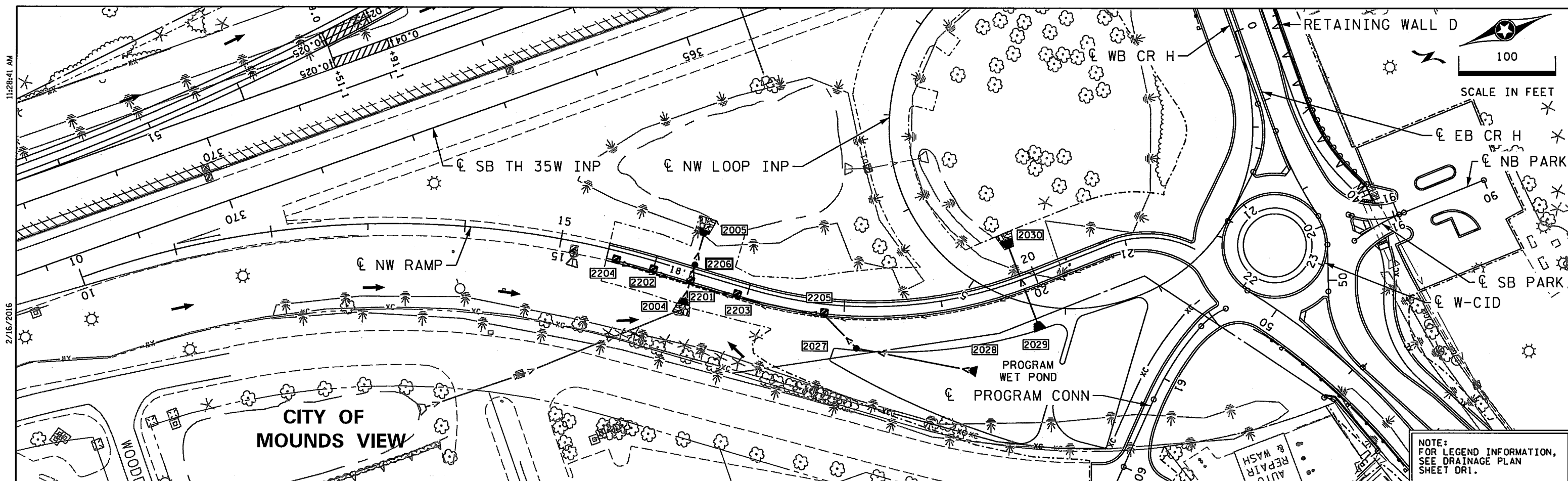


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SUPERELEVATION & DRAINAGE PLAN AND PROFILE	FILE NO.	246
	RAMSEI29594	
NB TH 35W INP STA. 362+00 - 392+00	DR3 OF DR9	367

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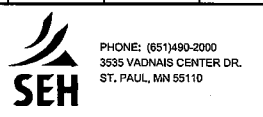
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2/16/2016



DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	REP		
CHECKED BY:	REP		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**SUPERELEVATION & DRAINAGE
 PLAN AND PROFILE**
 NW RAMP

FILE NO. **247**
 RAMSEI29594
 DR4
 OF DR9 **367**

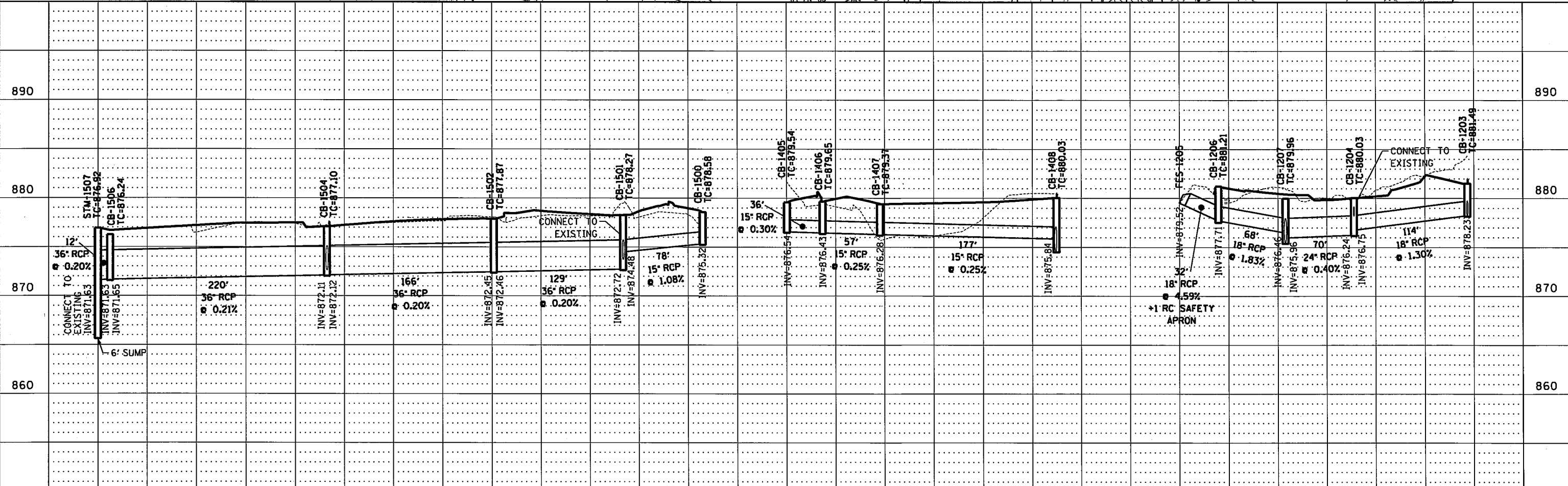
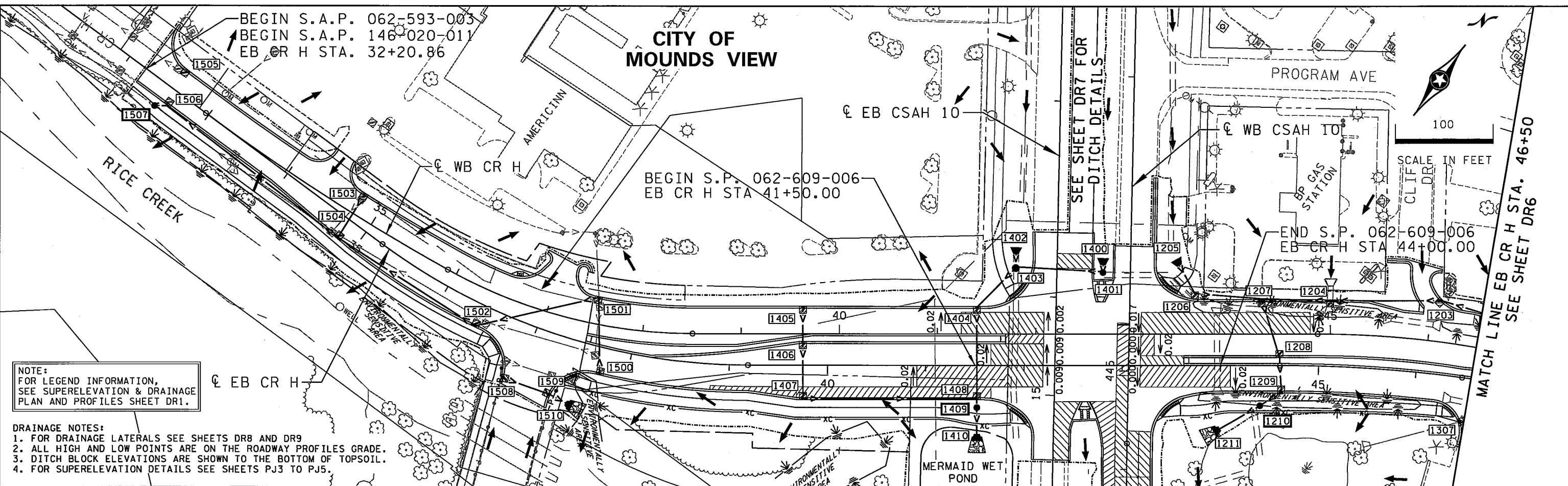
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2/16/2016

9:03:11 AM
 1/26/2016
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 \$MODELNAME\$

CITY OF MOUNDS VIEW



DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

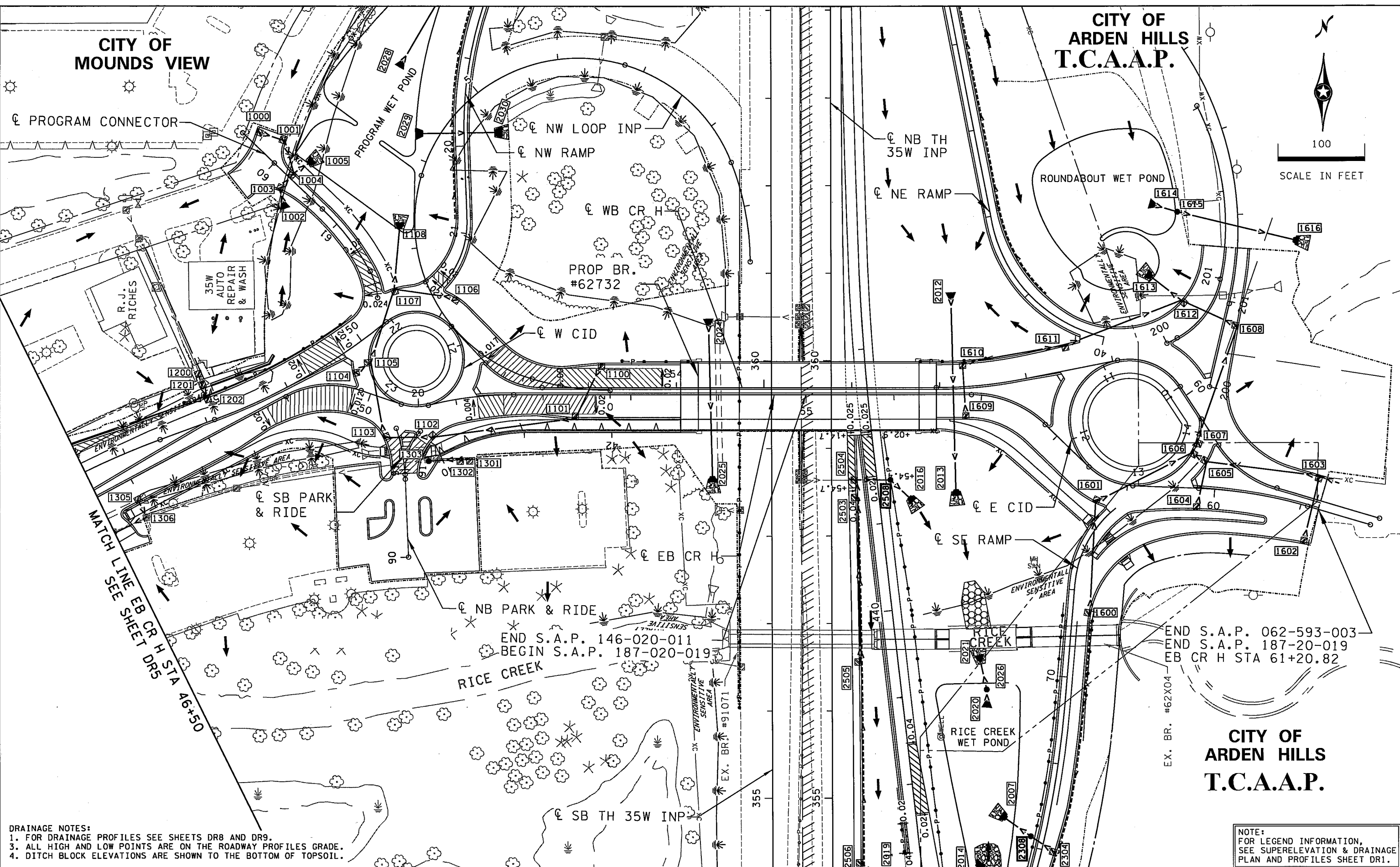
Certified By: *Nicole Gulick* Lic. No. 45842
 Printed Name: NICOLE GULICK, P.E. Date: 1/26/2016

Kimley»Horn
 RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**SUPERELEVATION & DRAINAGE
 PLAN AND PROFILES**
 EB CR H STA. 32+20 - 46+50

FILE NO. RAMSE129594	248
DR5 OF DR9	367

K:\TWC\Civil\County\RAMSEY\135W_CRH\CAD\Plan_Sheets\CD6284162_dr06.dgn
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 \$MODELNAME\$



DRAINAGE NOTES:
 1. FOR DRAINAGE PROFILES SEE SHEETS DR8 AND DR9.
 2. ALL HIGH AND LOW POINTS ARE ON THE ROADWAY PROFILES GRADE.
 3. ALL HIGH AND LOW POINTS ARE ON THE ROADWAY PROFILES GRADE.
 4. DITCH BLOCK ELEVATIONS ARE SHOWN TO THE BOTTOM OF TOPSOIL.

NOTE:
 FOR LEGEND INFORMATION,
 SEE SUPERELEVATION & DRAINAGE
 PLAN AND PROFILES SHEET DR1.

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

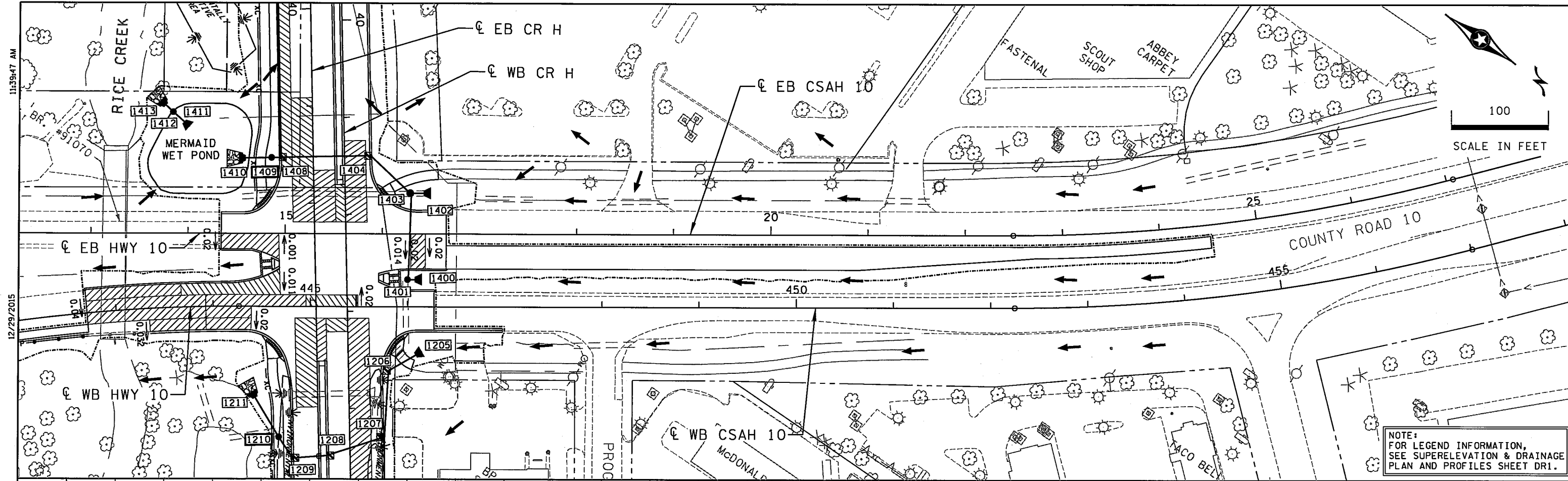
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45842
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016



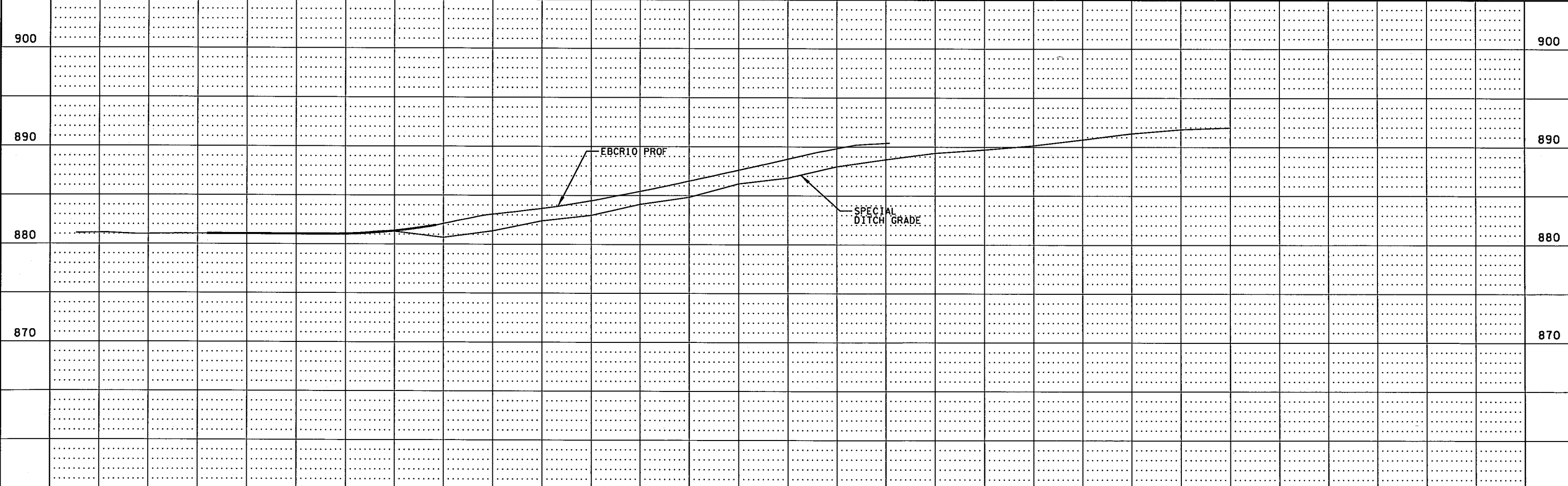
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**SUPERELEVATION & DRAINAGE
 PLAN AND PROFILES**
 EB CR H STA. 46+50 - 61+21

FILE NO. RAMSEY129594	249
DR6 OF DR9	367



NOTE:
FOR LEGEND INFORMATION,
SEE SUPERELEVATION & DRAINAGE
PLAN AND PROFILES SHEET DR1.



K:\AT\WC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162_dr07.dgn
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DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

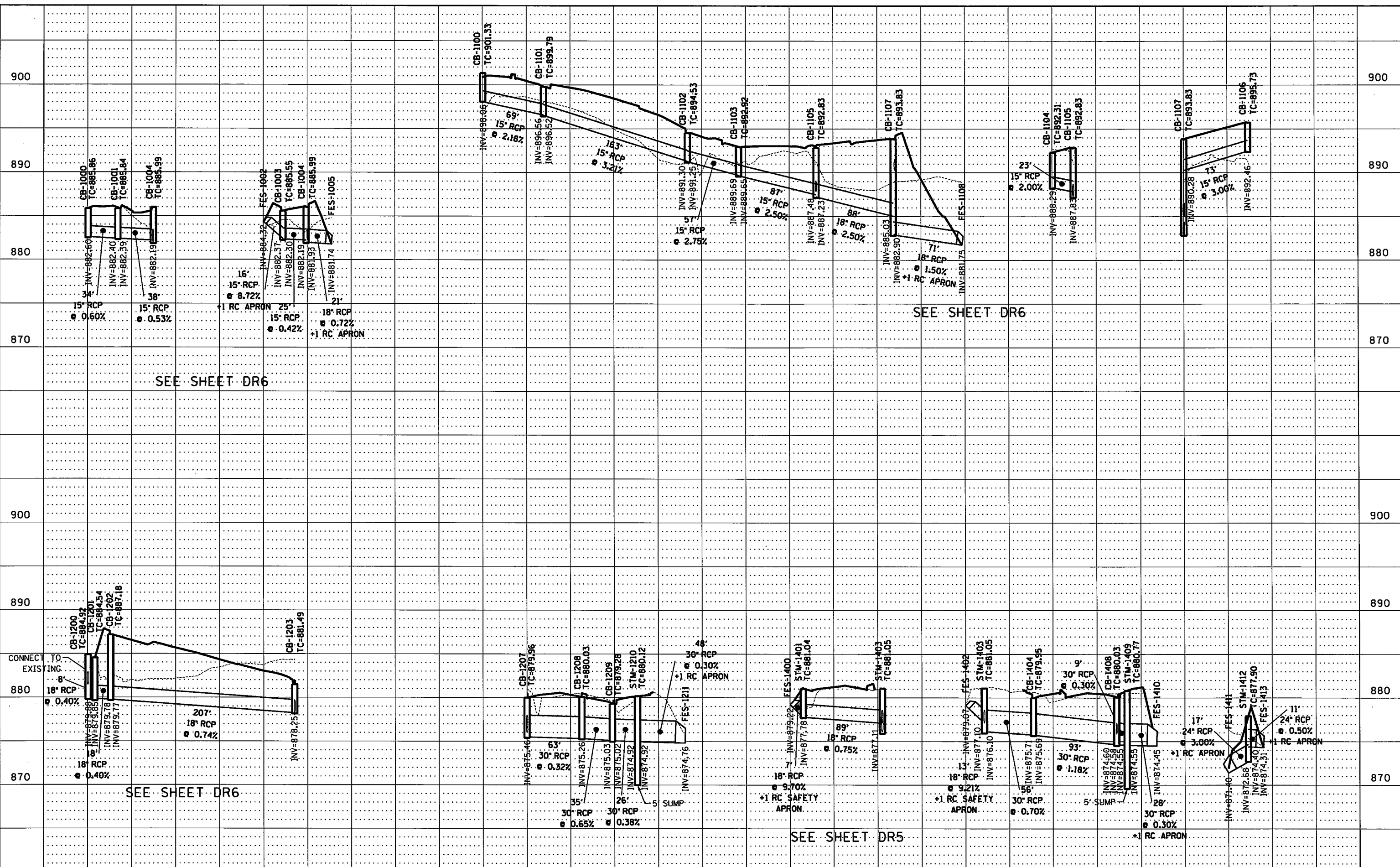
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Nicole Gulick* Lic. No. 45642
Printed Name: NICOLE GULICK, P.E. Date: 12/29/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

**SUPERELEVATION & DRAINAGE
PLAN AND PROFILES**
WB CSAH 10 STA. 441+00 - 455+00

FILE NO. RAMSE129594	250
DR7 OF DR9	367



DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

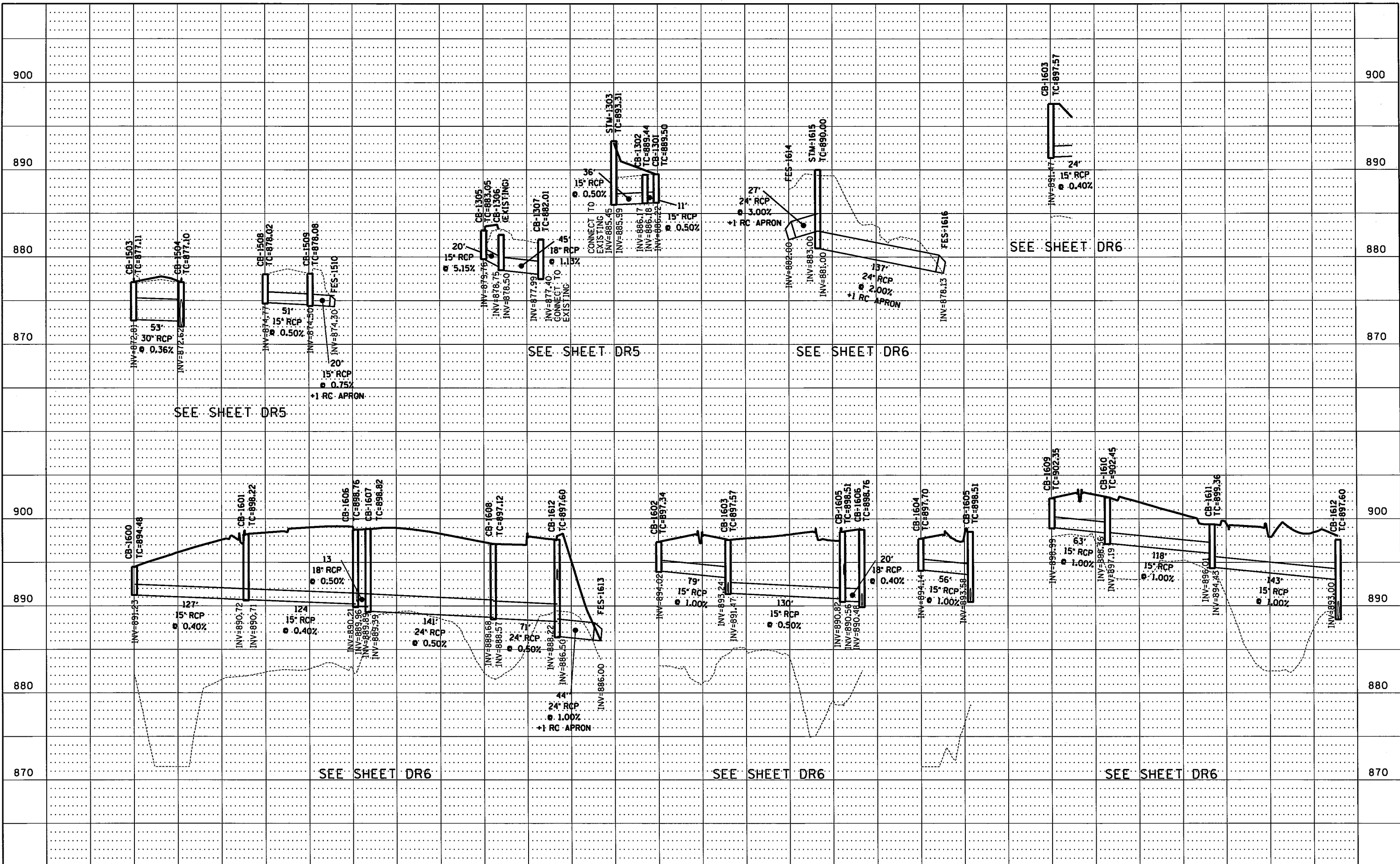
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 1/26/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SUPERELEVATION & DRAINAGE PLAN AND PROFILES		FILE NO. RAMSE129594	251
DRAINAGE PROFILES		DR8 OF DR9	367



DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

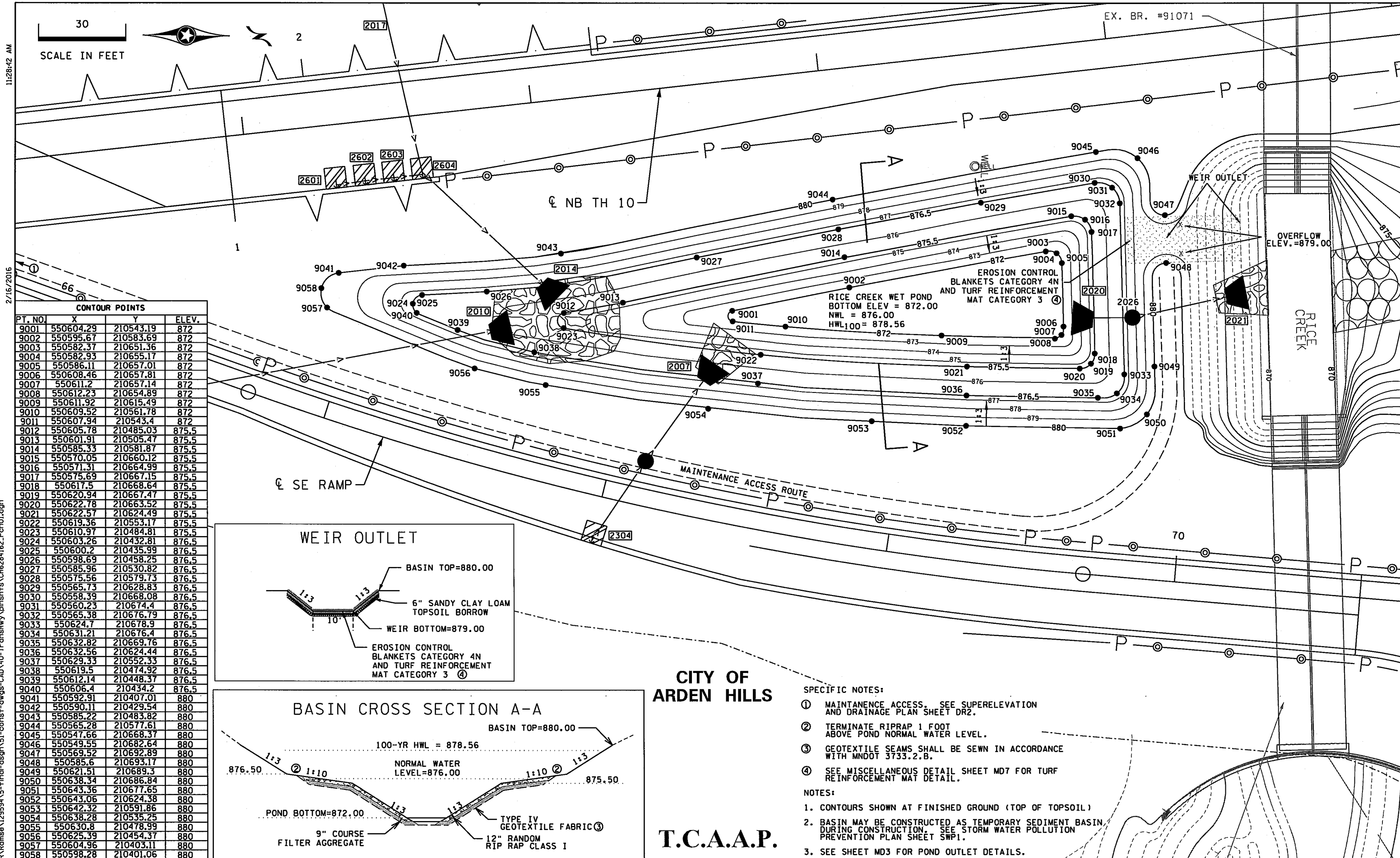
Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 1/26/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**SUPERELEVATION & DRAINAGE
 PLAN AND PROFILES**
 DRAINAGE PROFILES

FILE NO. RAMSE129594	252
DR9 OF DR9	367

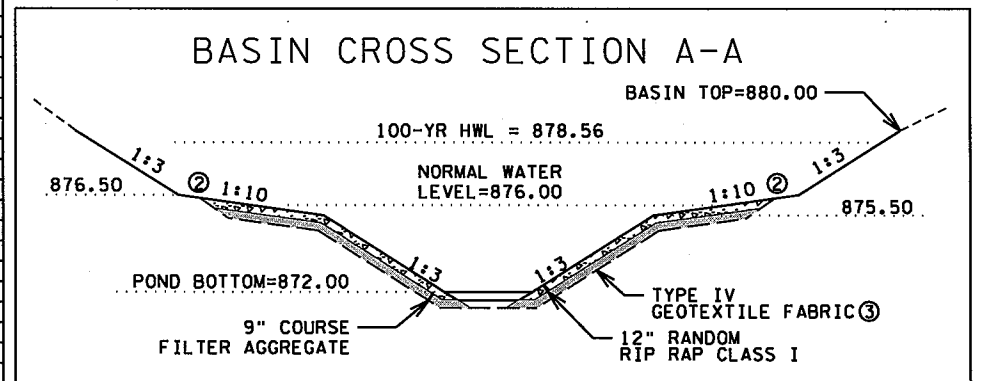
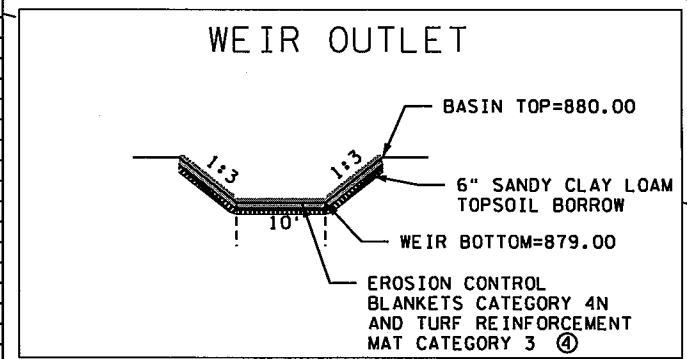


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9005	550586.11	210657.01	872
9006	550608.46	210657.81	872
9007	550611.2	210657.14	872
9008	550612.23	210654.89	872
9009	550611.92	210615.49	872
9010	550609.52	210561.78	872
9011	550607.94	210543.4	872
9012	550605.78	210485.03	875.5
9013	550601.91	210505.47	875.5
9014	550585.33	210581.87	875.5
9015	550570.05	210660.12	875.5
9016	550571.31	210664.99	875.5
9017	550575.69	210667.15	875.5
9018	550617.5	210668.64	875.5
9019	550620.94	210667.47	875.5
9020	550622.78	210663.52	875.5
9021	550622.57	210624.49	875.5
9022	550619.36	210553.17	875.5
9023	550610.97	210484.81	875.5
9024	550603.26	210432.81	876.5
9025	550600.2	210435.99	876.5
9026	550598.69	210458.25	876.5
9027	550585.96	210530.82	876.5
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9052	550643.06	210624.38	880
9053	550642.32	210591.86	880
9054	550638.28	210535.25	880
9055	550630.8	210478.99	880
9056	550625.39	210454.37	880
9057	550604.96	210403.11	880
9058	550598.28	210401.06	880



CITY OF ARDEN HILLS

T.C.A.A.P.

- SPECIFIC NOTES:**
- ① MAINTANENCE ACCESS. SEE SUPERELEVATION AND DRAINAGE PLAN SHEET DR2.
 - ② TERMINATE RIPRAP 1 FOOT ABOVE POND NORMAL WATER LEVEL.
 - ③ GEOTEXTILE SEAMS SHALL BE SEWN IN ACCORDANCE WITH MNDOT 3733.2.B.
 - ④ SEE MISCELLANEOUS DETAIL SHEET MD7 FOR TURF REINFORCEMENT MAT DETAIL.
- NOTES:**
1. CONTOURS SHOWN AT FINISHED GROUND (TOP OF TOPSOIL)
 2. BASIN MAY BE CONSTRUCTED AS TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION. SEE STORM WATER POLLUTION PREVENTION PLAN SHEET SWP1.
 3. SEE SHEET MD3 FOR POND OUTLET DETAILS.

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: REP				
CHECKED BY: REP				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016

SEH

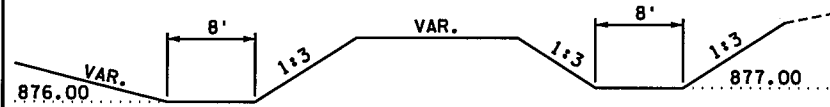
PHONE: (651)490-2000
 3535 WADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

POND CONTOUR AND GRADING PLAN
 RICE CREEK WET POND

FILE NO. **253**
 RAMSEI29594
 P01
 OF P05 **367**

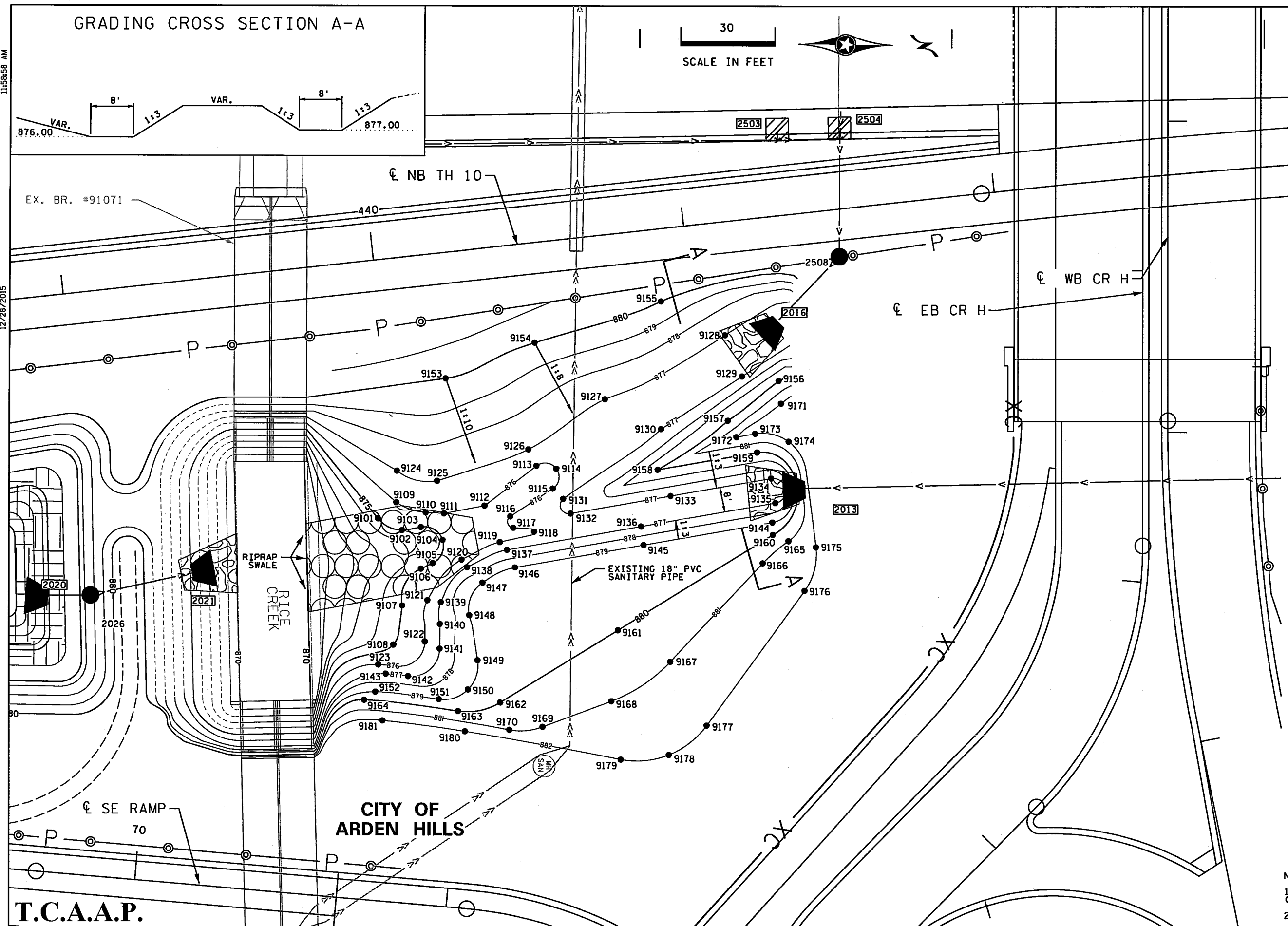
GRADING CROSS SECTION A-A



30
SCALE IN FEET



CONTOUR POINTS			
PT. NO.	X	Y	ELEV.
9101	210773.17	550578.95	875.00
9102	210780.95	550582.67	875.00
9103	210786.99	550581.59	875.00
9104	210794.00	550585.64	875.00
9105	210790.92	550593.13	875.00
9106	210787.20	550594.98	875.00
9107	210781.30	550606.84	875.00
9108	210778.60	550619.44	875.00
9109	210779.02	550573.75	876.00
9110	210788.49	550576.85	876.00
9111	210794.34	550577.10	876.00
9112	210807.34	550574.44	876.00
9113	210823.74	550561.43	876.00
9114	210830.12	550562.26	876.00
9115	210829.04	550568.65	876.00
9116	210815.57	550577.77	876.00
9117	210816.60	550581.42	876.00
9118	210823.27	550582.58	876.00
9119	210812.32	550586.07	876.00
9120	210800.22	550591.85	876.00
9121	210789.39	550605.07	876.00
9122	210788.72	550618.30	876.00
9123	210773.85	550625.89	876.00
9124	210779.01	550563.59	877.00
9125	210792.00	550566.69	877.00
9126	210821.05	550556.19	877.00
9127	210845.29	550539.76	877.00
9128	210883.55	550518.71	877.00
9129	210889.16	550531.88	877.00
9130	210863.52	550549.11	877.00
9131	210832.42	550571.91	877.00
9132	210834.83	550576.57	877.00
9133	210866.85	550570.53	877.00
9134	210898.87	550564.48	877.00
9135	210900.35	550572.35	877.00
9136	210857.50	550580.43	877.00
9137	210814.66	550588.52	877.00
9138	210802.02	550594.29	877.00
9139	210793.71	550605.65	877.00
9140	210793.46	550612.63	877.00
9141	210793.48	550620.55	877.00
9142	210783.46	550629.51	877.00
9143	210776.33	550628.84	877.00
9144	210899.46	550578.62	879.00
9145	210858.38	550586.37	879.00
9146	210817.30	550594.12	879.00
9147	210806.98	550599.15	879.00
9148	210802.91	550609.66	879.00
9149	210805.69	550624.13	879.00
9150	210802.74	550633.57	879.00
9151	210793.41	550636.83	879.00
9152	210773.02	550634.66	879.00
9153	210794.31	550533.78	880.00
9154	210822.60	550521.94	880.00
9155	210862.88	550508.12	880.00
9156	210900.88	550533.19	880.00
9157	210884.83	550546.14	880.00
9158	210862.59	550562.17	880.00
9159	210894.30	550556.19	880.00
9160	210899.63	550582.60	880.00
9161	210850.42	550613.84	880.00
9162	210813.05	550637.60	880.00
9163	210799.61	550640.54	880.00
9164	210769.48	550637.33	880.00
9165	210904.66	550584.53	881.00
9166	210896.54	550591.72	881.00
9167	210867.36	550623.77	881.00
9168	210848.59	550636.68	881.00
9169	210826.69	550645.24	881.00
9170	210816.06	550646.33	881.00
9171	210901.74	550540.45	882.00
9172	210887.60	550551.35	882.00
9173	210893.59	550550.22	882.00
9174	210904.33	550552.58	882.00
9175	210913.48	550586.35	882.00
9176	210910.01	550600.44	882.00
9177	210879.26	550644.12	882.00
9178	210867.23	550653.73	882.00
9179	210851.79	550655.42	882.00
9180	210801.96	550647.03	882.00
9181	210775.92	550643.87	882.00



CITY OF ARDEN HILLS

- NOTE:
- CONTOURS SHOWN AT FINISHED GROUND (TOP OF TOPSOIL)
 - SEE MISCELLANEOUS DETAIL SHEET MDB FOR RIPRAP SWALE DETAIL.

T.C.A.A.P.

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	REP			
CHECKED BY:	REP			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Rachel E. Pichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 12/28/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

POND CONTOUR AND GRADING PLAN		FILE NO. 254
RICE CREEK NORTH TO CR H GRADING AREA		RAMSEI29594
P02 OF P05		367

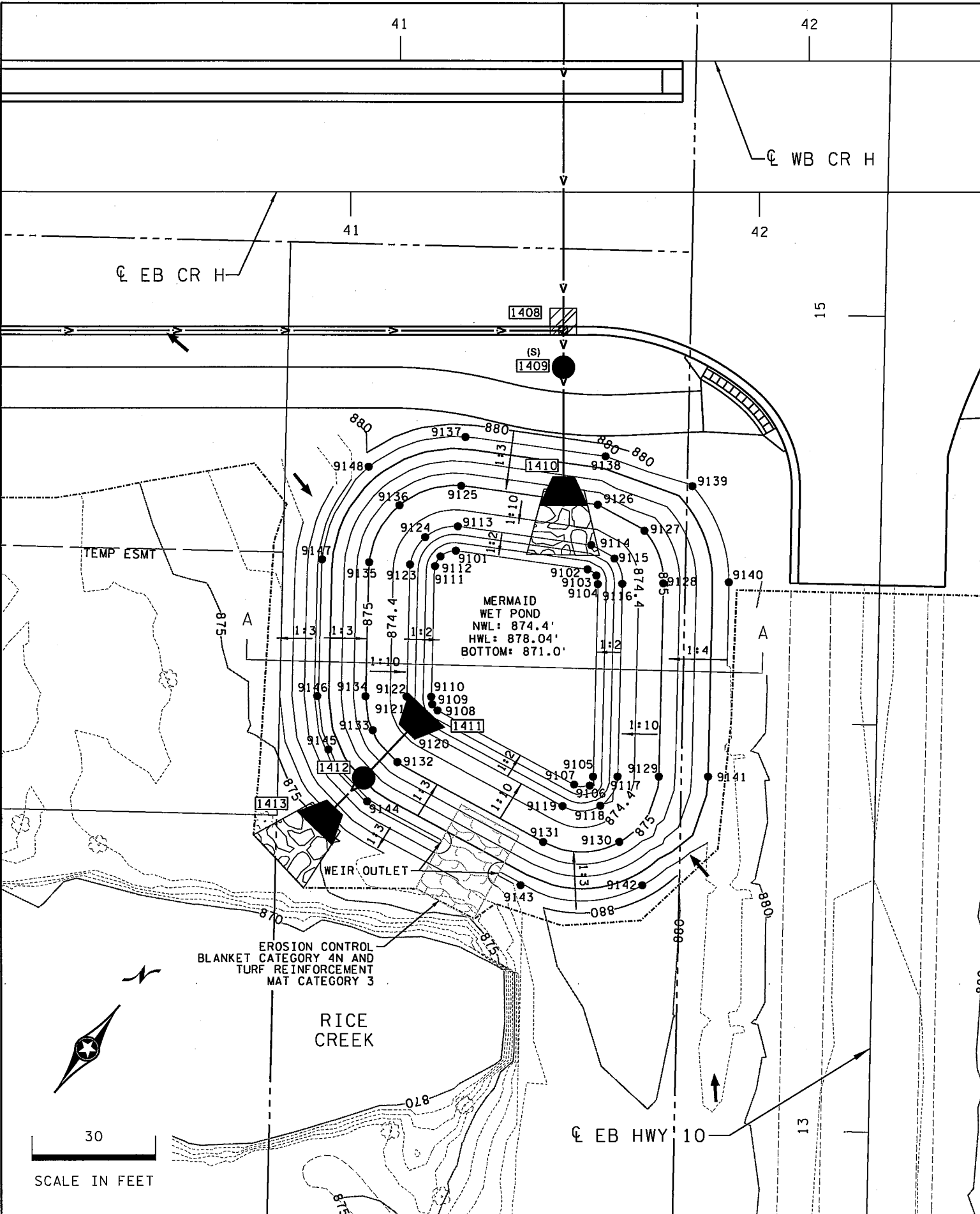
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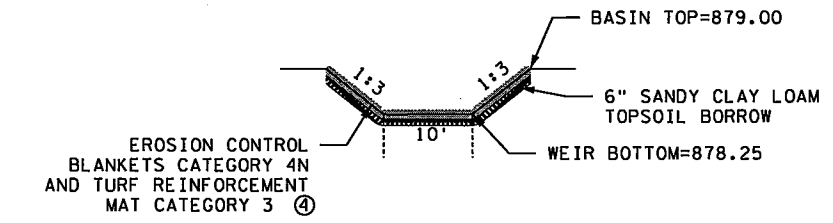
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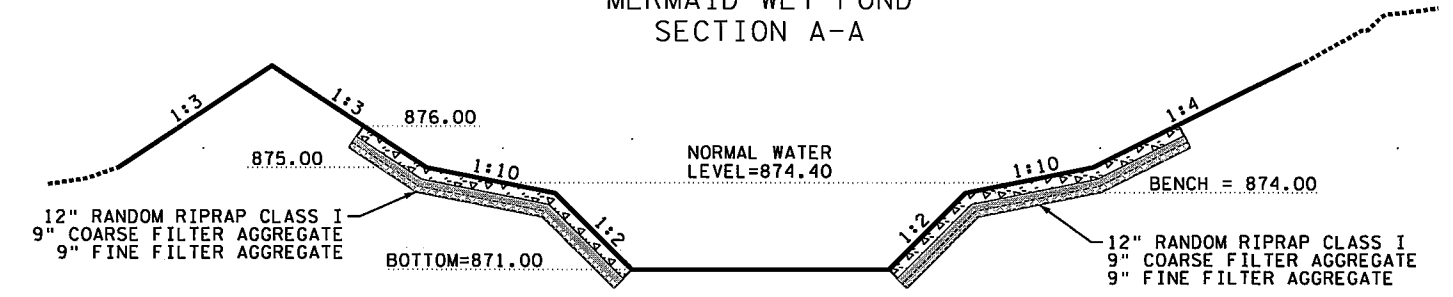


CRH-CR10-1 CONTOUR POINTS			
9101	210513.83	549207.52	871.00
9102	210529.39	549236.15	871.00
9103	210529.47	549238.76	871.00
9104	210527.89	549240.38	871.00
9105	210489.26	549267.39	871.00
9106	210487.10	549267.99	871.00
9107	210484.99	549264.75	871.00
9108	210479.72	549227.12	871.00
9109	210480.14	549225.17	871.00
9110	210481.49	549223.88	871.00
9111	210507.77	549205.64	871.00
9112	210510.51	549205.33	871.00
9113	210518.93	549204.39	874.00
9114	210534.72	549233.40	874.00
9115	210535.42	549239.88	874.00
9116	210531.61	549245.10	874.00
9117	210492.93	549272.14	874.00
9118	210484.67	549272.98	874.00
9119	210479.05	549265.59	874.00
9120	210473.71	549226.99	874.00
9121	210474.98	549222.21	874.00
9122	210477.95	549219.04	874.00
9123	210504.46	549200.55	874.00
9124	210512.05	549199.51	874.00
9125	210527.43	549199.18	875.00
9126	210543.59	549228.78	875.00
9127	210545.26	549241.74	875.00
9128	210537.67	549253.06	875.00
9129	210498.89	549280.21	875.00
9130	210480.29	549281.98	875.00
9131	210469.15	549266.97	875.00
9132	210463.70	549226.76	875.00
9133	210466.37	549217.28	875.00
9134	210472.04	549210.97	875.00
9135	210499.00	549192.19	875.00
9136	210514.61	549189.84	875.00
9137	210537.63	549192.92	879.00
9138	210554.27	549223.28	879.00
9139	210560.98	549244.70	879.00
9140	210547.37	549265.79	879.00
9141	210506.01	549289.86	878.00
9142	210475.03	549292.77	879.00
9143	210457.29	549268.82	879.00
9144	210451.58	549226.49	879.00
9145	210456.14	549211.42	879.00
9146	210465.08	549201.47	879.00
9147	210492.69	549182.51	879.00
9148	210517.69	549178.25	879.00

MERMAID WET POND WEIR OUTLET



MERMAID WET POND SECTION A-A



SPECIFIC NOTES:
 ④ SEE MISCELLANEOUS DETAIL SHEET MD7 FOR TURF REINFORCEMENT MAT DETAIL.

NOTE:
 1: CONTOURS SHOWN AT FINISHED GROUND (TOP OF TOPSOIL)
 2: BASIN MAY BE CONSTRUCTED AS A TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION. SEE STORM WATER POLLUTION PREVENTION PLAN SHEET SWP1
 3: SEE SHEET MD3 FOR POND OUTLET DETAILS.

DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 2/16/2016

Kimley»Horn

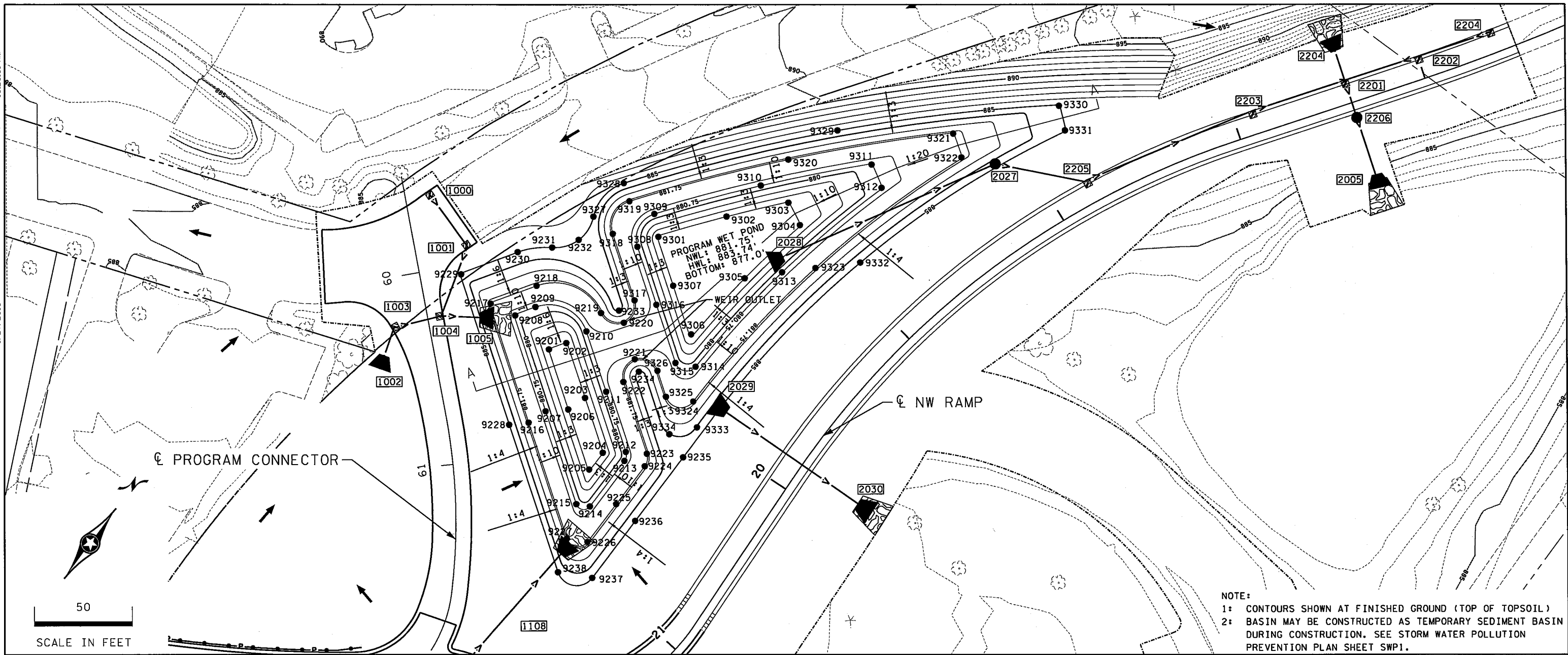
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

POND CONTOUR AND GRADING PLAN
 MERMAID WET POND

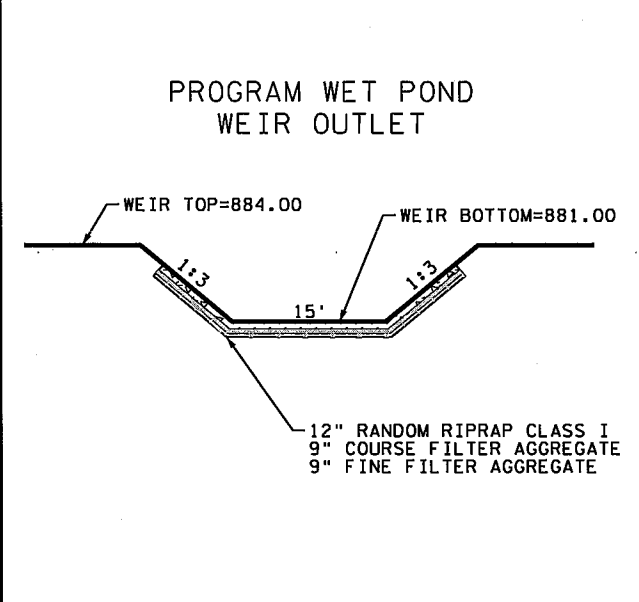
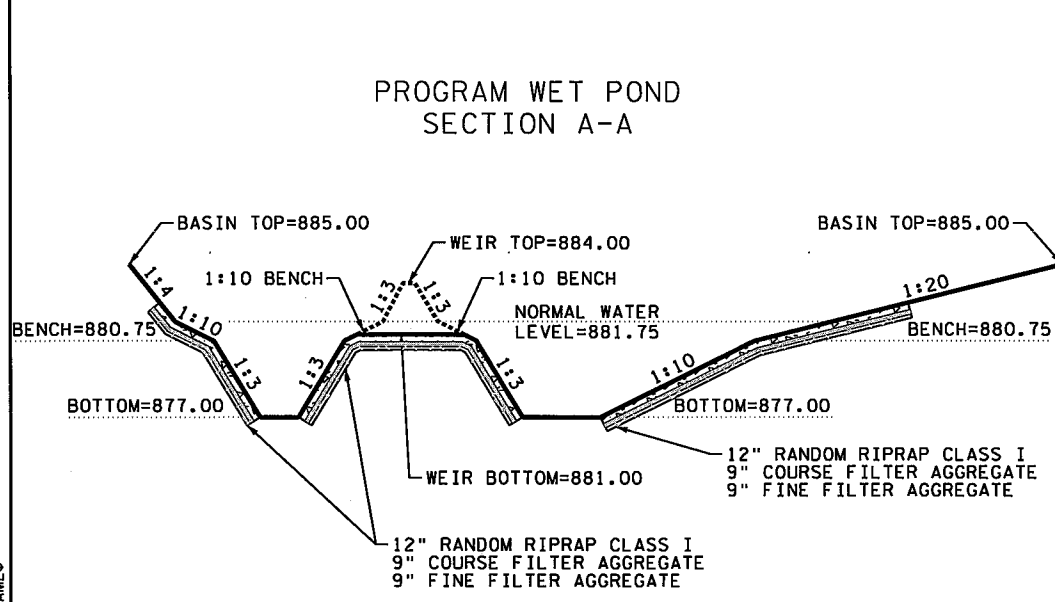
FILE NO. RAMSEI29594	255
P03 OF P05	367

10/26/01 AM

1/27/2016



NOTE:
 1: CONTOURS SHOWN AT FINISHED GROUND (TOP OF TOPSOIL)
 2: BASIN MAY BE CONSTRUCTED AS TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION. SEE STORM WATER POLLUTION PREVENTION PLAN SHEET SWP1.



W-ROUND-H-1 CONTOUR POINTS

9201	211280.49	549863.62	877.00
9202	211288.35	549868.83	877.00
9203	211271.36	549893.18	877.00
9204	211254.18	549917.09	877.00
9205	211243.10	549916.53	877.00
9206	211261.52	549889.76	877.00
9207	211253.91	549881.05	880.75
9208	211284.23	549839.48	880.75
9209	211293.92	549845.19	880.75
9210	211299.21	549873.50	880.75
9211	211280.36	549899.94	880.75
9212	211264.51	549926.39	880.75
9213	211257.38	549928.49	880.75
9214	211228.07	549928.14	880.75
9215	211224.86	549921.82	880.75
9216	211244.13	549877.55	881.75
9217	211281.69	549825.82	881.75
9218	211303.03	549839.21	881.75
9219	211311.24	549873.92	881.75
9220	211314.25	549886.32	881.75
9221	211302.58	549901.93	881.75
9222	211289.68	549904.09	881.75
9223	211267.22	549935.60	881.75
9224	211261.44	549938.54	881.75
9225	211237.04	549938.25	881.75
9226	211212.65	549937.95	881.75
9227	211207.83	549928.47	881.75
9228	211237.37	549870.23	885.00
9229	211284.79	549804.66	885.00

W-ROUND-H-1 CONTOUR POINTS

9230	211311.18	549821.24	885.00
9231	211323.51	549833.93	885.00
9232	211334.72	549842.48	885.00
9233	211317.80	549880.58	884.00
9234	211298.66	549907.42	884.00
9235	211276.85	549951.72	885.00
9236	211235.94	549951.18	885.00
9237	211199.24	549950.80	885.00
9238	211191.21	549934.99	885.00
9301	211360.31	549874.51	877.00
9302	211389.58	549896.49	877.00
9303	211414.04	549917.66	877.00
9304	211408.23	549929.18	877.00
9305	211369.55	549922.70	877.00
9306	211330.09	549917.66	877.00
9307	211344.63	549895.48	877.00
9308	211349.83	549868.80	880.75
9309	211368.55	549865.87	880.75
9310	211412.73	549901.10	880.75
9311	211455.14	549940.28	880.75
9312	211448.53	549951.40	880.75
9313	211383.37	549936.23	880.75

W-ROUND-H-1 CONTOUR POINTS

9314	211318.09	549929.32	880.75
9315	211313.45	549919.85	880.75
9316	211331.64	549894.32	881.75
9317	211326.78	549883.91	881.75
9318	211347.59	549854.72	881.75
9319	211366.17	549851.70	881.75
9320	211431.90	549904.50	881.75
9321	211492.84	549964.52	881.75
9322	211485.48	549975.19	881.75
9323	211395.26	549948.61	881.75
9324	211303.00	549938.93	881.75
9325	211296.58	549926.28	881.75
9326	211304.75	549914.83	881.75
9327	211348.80	549841.50	885.00
9328	211371.91	549843.82	885.00
9329	211458.80	549915.86	885.00
9330	211536.41	549999.52	885.00
9331	211528.16	550009.55	885.00
9332	211411.21	549965.38	885.00
9333	211293.46	549948.38	884.00
9334	211282.18	549938.99	884.00

K:\TWC\Civil\County\RAMSEY\135W_CRRH\CAD\Plan_Sheets\CD6284162_c002.dgn
 \$MODELNAME\$

DESIGN TEAM				
DRAWN BY: <u>GDK</u>				
DESIGNER: <u>NMG</u>				
CHECKED BY: <u>WCK</u>				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: Nicole Gulick Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 1/27/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

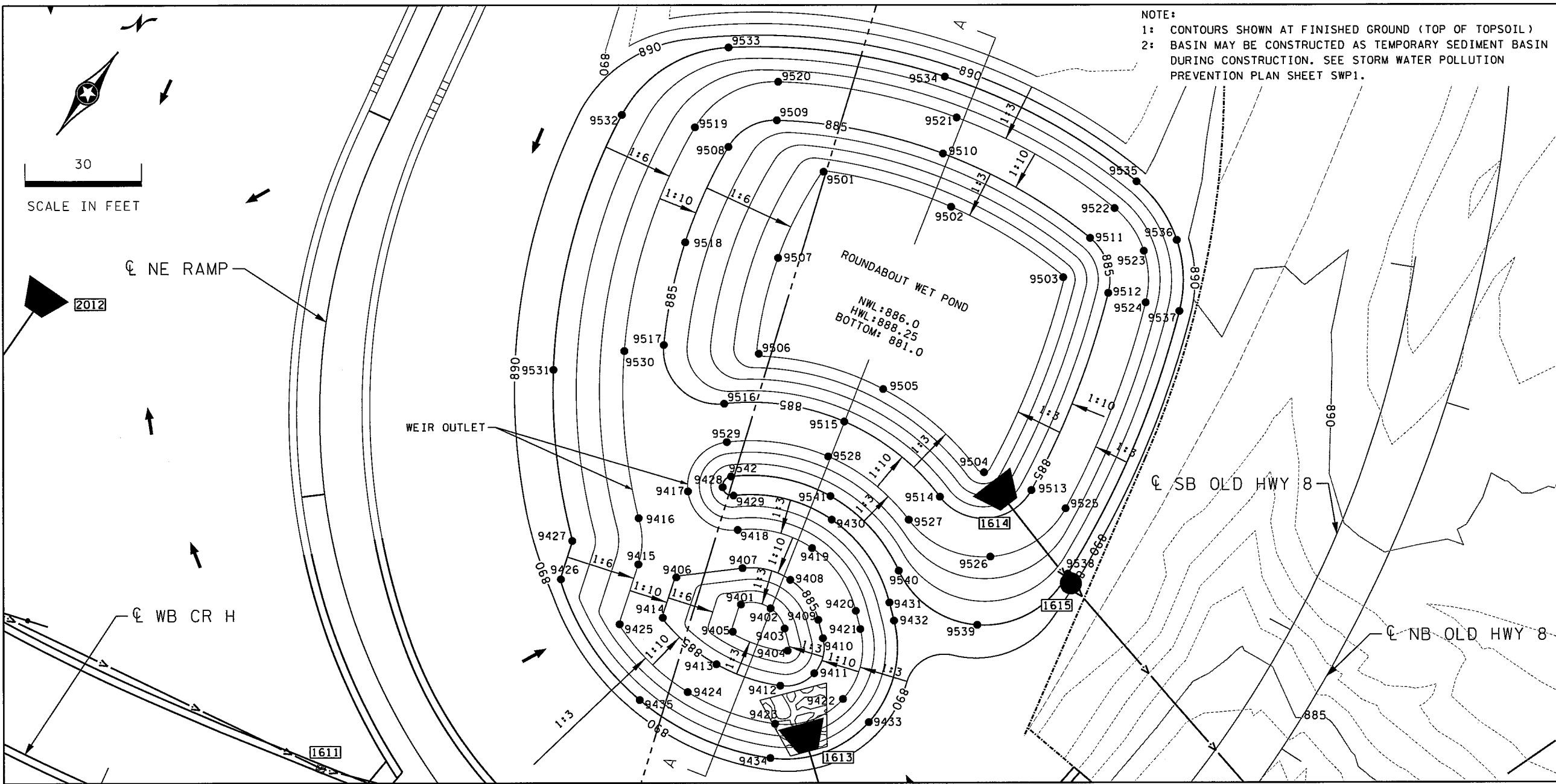
POND CONTOUR AND GRADING PLAN
 PROGRAM WET POND

FILE NO. 256
 RAMSEY29594
 P04
 OF P05
 367

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12/7/2015

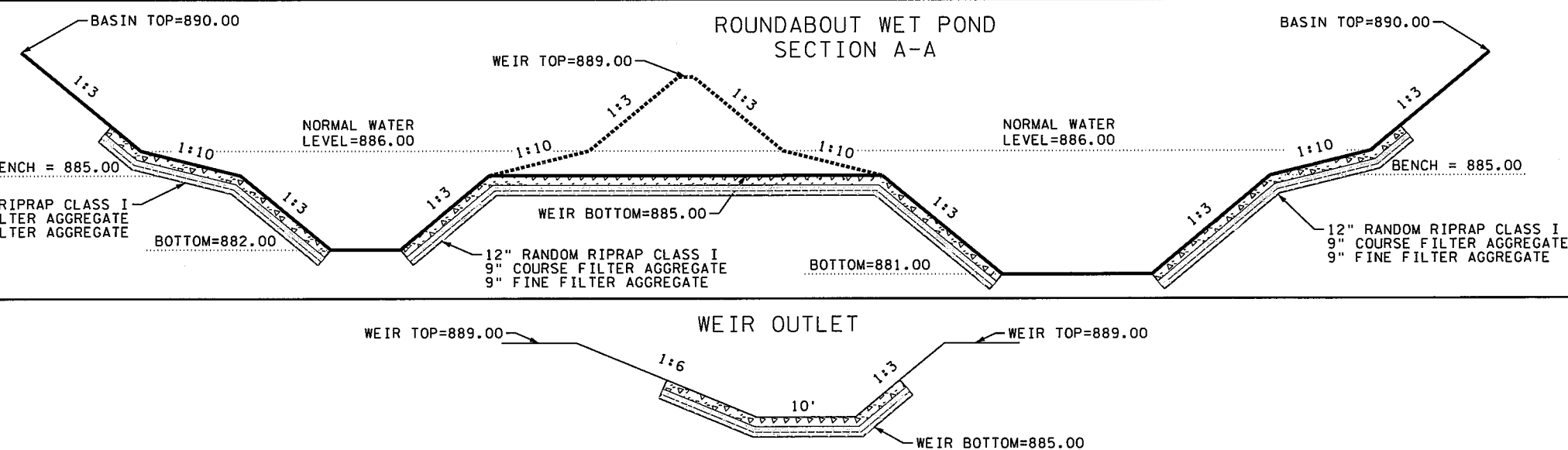
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NOTE:
 1: CONTOURS SHOWN AT FINISHED GROUND (TOP OF TOPSOIL)
 2: BASIN MAY BE CONSTRUCTED AS TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION. SEE STORM WATER POLLUTION PREVENTION PLAN SHEET SWP1.

E-ROUND-H-1 CONTOUR POINTS			
9401	211174.40	550752.13	882.00
9402	211178.15	550758.92	882.00
9403	211176.09	550764.96	882.00
9404	211171.87	550769.00	882.00
9405	211167.43	550754.62	882.00
9406	211170.19	550734.56	885.00
9407	211182.24	550746.86	885.00
9408	211187.14	550758.63	885.00
9409	211183.06	550770.65	885.00
9410	211179.92	550774.44	885.00
9411	211171.25	550778.01	885.00
9412	211163.43	550772.83	885.00
9413	211158.11	550756.25	885.00
9414	211159.67	550738.01	885.00
9415	211167.10	550724.72	886.00
9416	211176.84	550717.67	886.00
9417	211189.97	550723.74	886.00
9418	211189.51	550739.99	886.00
9419	211197.14	550758.30	886.00
9420	211190.72	550777.07	886.00
9421	211187.63	550780.81	886.00
9422	211170.28	550787.97	886.00
9423	211154.64	550777.60	886.00
9424	211147.90	550754.58	886.00
9425	211151.72	550730.08	886.00
9426	211152.11	550710.95	889.00
9427	211161.89	550707.40	889.00
9428	211196.15	550730.28	889.00
9429	211196.05	550733.81	889.00
9430	211206.13	550758.01	889.00
9431	211197.66	550782.81	889.00
9432	211194.56	550786.55	889.00
9433	211169.41	550796.92	889.00
9434	211146.73	550781.89	889.00
9435	211138.91	550745.89	889.00

E-ROUND-H-1 CONTOUR POINTS			
9501	211277.63	550702.77	881.00
9502	211289.89	550734.66	881.00
9503	211292.29	550768.74	881.00
9504	211239.39	550782.34	881.00
9505	211241.38	550748.62	881.00
9506	211229.67	550747.24	881.00
9507	211252.63	550706.52	881.00
9508	211268.22	550679.08	885.00
9509	211281.23	550685.09	885.00
9510	211299.77	550724.77	885.00
9511	211304.64	550758.30	885.00
9512	211295.94	550780.55	885.00
9513	211242.89	550794.90	885.00
9514	211227.51	550776.96	885.00
9515	211228.59	550745.52	885.00
9516	211213.86	550717.71	885.00
9517	211216.93	550696.18	885.00
9518	211241.64	550684.83	885.00
9519	211267.18	550669.13	886.00
9520	211289.48	550679.45	886.00
9521	211309.40	550722.07	886.00
9522	211314.63	550768.82	886.00
9523	211310.22	550781.49	886.00
9524	211299.71	550789.81	886.00
9525	211244.30	550804.80	886.00
9526	211222.69	550796.66	886.00
9527	211217.95	550774.06	886.00
9528	211218.80	550747.55	886.00
9529	211206.23	550724.20	886.00
9530	211209.63	550688.92	886.00
9531	211194.84	550677.08	889.00
9532	211258.59	550652.08	889.00
9533	211289.01	550663.82	889.00
9534	211316.14	550713.33	889.00
9535	211323.62	550769.28	889.00
9536	211317.56	550786.70	889.00
9537	211303.10	550798.15	889.00
9538	211230.97	550815.34	889.00
9539	211206.38	550804.44	889.00
9540	211205.75	550779.83	889.00
9541	211210.84	550754.11	889.00
9542	211199.69	550730.38	889.00



DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/7/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

POND CONTOUR AND GRADING PLAN
 ROUNDABOUT WET POND

FILE NO.	257
RAMSEY29594	
P05	367
OF P05	

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

SWPPP SUMMARY/OVERVIEW:

THIS STORM WATER POLLUTION PREVENTION PLAN (SWPPP) HAS BEEN DEVELOPED TO ADDRESS THE REQUIREMENTS OF NPDES PERMIT MN R100001, PART III, SUBPART A. THIS SWPPP INCLUDES A COMBINATION OF NARRATIVE AND PLAN SHEETS THAT DESCRIBE THE TEMPORARY AND PERMANENT STORM WATER MANAGEMENT PLAN FOR THE PROJECT.

PROJECT INFORMATION:

LOCATION: COUNTY ROAD H & I-35W
 LATITUDE/LONGITUDE: 45.09/-93.17
 PROJECT DESCRIPTION: RECONSTRUCTION OF INTERCHANGE
 SOIL DISTURBING ACTIVITIES: CLEARING, GRADING, EXCAVATION

CONTACTS:

OWNER: RAMSEY COUNTY
 CONTACT: BETH ENGUM, PE
 PHONE: 651.266.7115
 EMAIL: BETH.ENGUM@CO.RAMSEY.MN.US

ENGINEER: SHORT ELLIOTT HENDRICKSON INC.
 CONTACT: HEATHER L. REDEZKE
 PHONE: 651-765-2969
 EMAIL: HREDEZKE@SEHINC.COM

KNOWLEDGEABLE PERSON/CHAIN OF RESPONSIBILITY:

THE CONTRACTOR SHALL IDENTIFY A PERSON KNOWLEDGEABLE AND EXPERIENCED IN THE APPLICATION OF EROSION PREVENTION AND SEDIMENT CONTROL BMPs WHO WILL OVERSEE THE IMPLEMENTATION OF THE SWPPP, INCLUDING: INSTALLATION, INSPECTION AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMPs. THE GENERAL CONTRACTOR SHALL ATTACH CONTACT INFORMATION TO THE SWPPP PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY.

CONTRACTOR: _____
 CONTACT: _____
 PHONE: _____
 EMAIL: _____

THE CONTRACTOR SHALL ESTABLISH A CHAIN OF RESPONSIBILITY FOR ALL CONTRACTORS AND SUB-CONTRACTORS ON SITE TO ENSURE THE SWPPP IS BEING PROPERLY IMPLEMENTED AND MAINTAINED. THE CONTRACTOR SHALL PROVIDE THE CHAIN OF RESPONSIBILITY TO THE OWNER AND ATTACH TO THE SWPPP PRIOR TO ANY CONSTRUCTION ACTIVITY.

GENERAL SWPPP RESPONSIBILITIES:

THE CONTRACTOR SHALL KEEP THE SWPPP, INCLUDING ALL AMENDMENTS AND INSPECTION AND MAINTENANCE RECORDS ON SITE DURING CONSTRUCTION.

THE SWPPP WILL BE AMENDED AS NEEDED AND/OR AS REQUIRED BY PROVISIONS OF THE PERMIT. AMENDMENTS WILL BE APPROVED BY BOTH THE OWNER AND CONTRACTOR AND WILL BE ATTACHED OR OTHERWISE INCLUDED WITH THE SWPPP DOCUMENTS. THE SWPPP AMENDMENTS SHALL BE INITIATED, FACILITATED, AND PROCESSED BY THE CONTRACTOR. THE SWPPP AND AMENDMENTS SHALL BE KEPT ON SITE BY THE CONTRACTOR WHENEVER CONSTRUCTION ACTIVITY IS IN PROGRESS.

THE CONTRACTOR SHALL DOCUMENT AMENDMENTS TO THE SWPPP AS A RESULT OF INSPECTION(S) WITHIN 7 DAYS.

BOTH THE OWNER AND CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER TERMINATION AND/OR TRANSFER OF THE PERMIT.

LONG TERM OPERATION AND MAINTENANCE:

THE LONG TERM OPERATION AND MAINTENANCE RESPONSIBILITIES OF THE PERMANENT STORMWATER MANAGEMENT SYSTEM(S) ARE SPLIT BETWEEN MNDOT AND RAMSEY COUNTY AS DESCRIBED IN COOPERATIVE AGREEMENT 1001458.

RESPONSIBLE PARTIES (AS DEFINED IN COOPERATIVE AGREEMENT 1001458) WILL PREPARE AND IMPLEMENT A PERMANENT STORMWATER TREATMENT SYSTEM(S) MAINTENANCE PLAN.

TRAINING DOCUMENTATION:

PREPARED BY: REBECCA NESTINGEN, PE
 EMPLOYER: SHORT ELLIOTT HENDRICKSON INC.
 TRAINING OBTAINED: UNIVERSITY OF MINNESOTA, DESIGN OF SWPPP, MAY 1-2, 2013

THE CONTRACTOR (OPERATOR) SHALL ADD TO THE SWPPP TRAINING RECORDS FOR THE FOLLOWING PERSONNEL:
 - INDIVIDUALS OVERSEEING THE IMPLEMENTATION OF, REVISING, AND AMENDING THE SWPPP
 - INDIVIDUALS PERFORMING INSPECTIONS
 - INDIVIDUALS PERFORMING OR SUPERVISING THE INSTALLATION, MAINTENANCE AND REPAIR OF BMPs

TRAINING MUST RELATE TO THE INDIVIDUAL'S JOB DUTIES AND RESPONSIBILITIES AND SHALL INCLUDE:

- 1) DATES OF TRAINING
- 2) NAME OF INSTRUCTORS
- 3) CONTENT AND HOURS OF TRAINING

THE CONTRACTOR SHALL ENSURE THAT THE INDIVIDUALS ARE TRAINED BY LOCAL, STATE, FEDERAL AGENCIES, PROFESSIONAL ORGANIZATIONS, OR OTHER ENTITIES WITH EXPERTISE IN EROSION PREVENTION, SEDIMENT CONTROL, PERIMETER CONTROL, PERMANENT STORMWATER MANAGEMENT AND THE MINNESOTA NPDES/SDS CONSTRUCTION STORMWATER PERMIT.

PROJECT SUMMARY:

TOTAL PROJECT AREA: 31.3 AC
 TOTAL DISTURBED AREA: 31.3 AC
 PRE-CONSTRUCTION IMPERVIOUS AREA: 9.3 AC
 POST-CONSTRUCTION IMPERVIOUS AREA: 13.1 AC
 IMPERVIOUS AREA ADDED: 3.8 AC

RECEIVING WATERS WITHIN ONE MILE FROM PROJECT BOUNDARIES:

(http://pca-gis02.pca.state.mn.us/CSW/index.html)

RICE CREEK RIVER SEGMENT 07010206-583
 THIS SEGMENT OF RICE CREEK IS IMPAIRED AND REQUIRES A TMDL PLAN TO BE WRITTEN FOR AQUATIC MACROINVERTEBRATE AND FISHES BIOASSESSMENTS.

RICE CREEK RIVER SEGMENT 07010206-584
 THIS SEGMENT OF RICE CREEK IS IMPAIRED AND REQUIRES A TMDL PLAN TO BE WRITTEN FOR AQUATIC MACROINVERTEBRATE AND FISHES BIOASSESSMENTS AND E. COLI.

LONG LAKE 62-0067-00
 THIS LAKE HAS AN EPA-APPROVED TMDL PLAN FOR MERCURY IN FISH TISSUE. THIS LAKE REQUIRES A TMDL PLAN TO BE WRITTEN FOR NUTRIENT/EUTROPHICATION BIOLOGICAL INDICATORS.

DOES THIS PROJECT DISCHARGE TO A CALCAREOUS FEN: NO
 IS THE PROJECT LOCATED IN A KARST AREA: NO

THIS PROJECT HAS A MAXIMUM SOIL EXPOSURE LIMIT OF 7 DAYS.

SITE SOIL INFORMATION:

(http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)
 ZIMMERMAN FINE SAND, 1 TO 6 PERCENT SLOPES (HSG A)
 ANOKA LOAMY FINE SAND, 3 TO 9 PERCENT SLOPES (HSG A)
 URBAN LAND - ZIMMERMAN COMPLEX 1 TO 8 PERCENT SLOPES (HSG A)
 URBAN LAND - HAYDEN-KINGSLEY COMPLEX, 3 TO 15 PERCENT SLOPES (HSG B)
 URBAN LAND - LINO COMPLEX, 0 TO 3 PERCENT SLOPES (HSG A/D)
 (SOIL INFORMATION PROVIDED IS FOR NPDES PERMIT INFORMATION ONLY. SOIL INFORMATION WAS OBTAINED FROM THE USGS WEBSITE. THE CONTRACTOR SHALL NOT RELY ON THIS SOIL INFORMATION FOR CONSTRUCTION PURPOSES.)

RELATED REVIEWS & PERMITS:

ENVIRONMENTAL, WETLAND, ENDANGERED OR THREATENED SPECIES, ARCHAEOLOGICAL, LOCAL, STATE, AND/OR FEDERAL REVIEWS/PERMITS:

RICE CREEK WATERSHED DISTRICT
 WETLAND CONSERVATION ACT/ARMY CORPS OF ENGINEERS
 MINNESOTA DNR PERMIT FOR WORK IN PUBLIC WATERS

IMPLEMENTATION SEQUENCE:

THE CONTRACTOR SHALL COMPLY WITH THE FOLLOWING SEQUENCE. THE ENGINEER MAY APPROVE ADJUSTMENTS TO THE SEQUENCE AS NEEDED.

1. PLACE ROCK CONSTRUCTION ENGRANCE(S)
2. PLACE PERIMETER CONTROL AND STABILIZE DOWN GRADIENT BOUNDARIES
3. COMPLETE INITIAL POND EXCAVATION.
4. COMPLETE ALL OTHER SITE GRADING.
5. PLACE UTILITIES, STORM SEWER, INLET PROTECTION, CURB & GUTTER, AND PAVING.
6. STABILIZE ALL AREAS UPSTREAM OF PONDS.
7. COMPLETE FINAL GRADING ON POND AREAS.
8. STABILIZE POND AREAS.
9. AFTER CONSTRUCTION IS COMPLETED AND THE SITE IS STABILIZED REMOVE ACCUMULATED SEDIMENT FROM PONDS. REMOVE BMPs AND RE-SEED ANY AREAS DISTURBED BY THEIR REMOVAL.

THE FOLLOWING DOCUMENTS ARE CONSIDERED PART OF THE SWPPP:

PLAN AND PROFILE PLAN SHEETS: DRI-DR9
 EROSION AND SEDIMENT CONTROL PLAN SHEETS: EC1-EC8
 TURF ESTABLISHMENT PLAN SHEETS: EC1-EC8
 GRADING PLAN SHEETS: P01-P05
 DETAIL PLAN SHEETS: MD1-MD8
 SWPPP NOTE AND DETAIL SHEETS: SWP1-SWP2
 STATEMENTS OF ESTIMATED QUANTITIES: E01-E06
 QUANTITY TABULATIONS: TB1-TB12
 PROJECT SPECIFICATIONS: PROJECT MANUAL
 PROJECT BID FORM: PROJECT MANUAL
 SPECIAL PROVISIONS: PROJECT MANUAL

LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN

DESCRIPTION	TITLE	LOCATION
TEMPORARY EROSION CONTROL MEASURES	TURF ESTABLISHMENT & EROSION CONTROL PLAN	EC1-EC8
PERMANENT EROSION CONTROL MEASURES	TURF ESTABLISHMENT & EROSION CONTROL PLAN	EC1-EC8
DIRECTION OF FLOW	SUPERELEVATION & DRAINAGE PLAN AND PROFILES	DR1-DR7
DRAINAGE TABULATION	QUANTITY TABULATIONS	TB8-TB12
EROSION AND SEDIMENT CONTROL DETAILS	STANDARD PLANS	MD6-7, SPN25-31
TEMPORARY EROSION AND SEDIMENT CONTROL TABULATION	QUANTITY TABULATIONS	TB6
POND TABULATION	QUANTITY TABULATIONS	TB6
TURF ESTABLISHMENT TABULATION	QUANTITY TABULATIONS	TB5
PERMANENT EROSION AND SEDIMENT CONTROL TABULATION	QUANTITY TABULATIONS	TB5

TEMPORARY SEDIMENT BASINS:

PROPOSED POND AREAS MAY BE USED FOR CONSTRUCTION OF TEMPORARY SEDIMENT BASINS.

THE CONTRACTOR SHALL INSTALL TEMPORARY SEDIMENT BASINS REQUIRED BY THE NPDES CONSTRUCTION PERMIT WHERE FIVE ACRES OR MORE OF DISTURBED SOIL DRAIN TO A COMMON LOCATION.

TEMPORARY SEDIMENT BASIN OUTLETS SHALL BE CONSTRUCTED TO PREVENT SHORT-CIRCUITING AND PREVENT THE DISCHARGE OF FLOATING DEBRIS.

BASINS MUST HAVE THE ABILITY TO ALLOW COMPLETE DRAWDOWN, INCLUDE A STABILIZED EMERGENCY OVERFLOW, WITHDRAW WATER FROM THE SURFACE, AND PROVIDE ENERGY DISSIPATION AT THE OUTLET.

TEMPORARY SEDIMENT BASINS SHALL BE PROVIDED WITH ENERGY DISSIPATION AT ANY BASIN OUTLET TO PREVENT SOIL EROSION.

SEDIMENT BASINS MUST BE SITUATED OUTSIDE OF SURFACE WATERS AND ANY BUFFER ZONES, AND MUST BE DESIGNED TO AVOID THE DRAINING WATER FROM WETLANDS.

TEMPORARY SEDIMENT BASINS SHALL BE CONSTRUCTED AND MADE OPERATIONAL CONCURRENT OR PRIOR TO SOIL DISTURBANCE THAT IS UPGRADIENT AND CONTRIBUTES RUNOFF TO THE BASIN.

PERMANENT STORMWATER MANAGEMENT SYSTEM:

PERMANENT STORMWATER MANAGEMENT SYSTEM IS DESIGNED TO MEET THE REQUIREMENTS OF NPDES GENERAL STORMWATER PERMIT FOR CONSTRUCTION ACTIVITY.

NEW (ADDED) IMPERVIOUS:	3.8 AC	
WATER QUALITY VOLUME (WQV):	0.32 AC-FT	
PERMANENT MANGEMENT SYSTEM	WQV INFILTRATED	WQV TREATED (NOT INFILTRATED)
MERMAID WET POND	0.00 AC-FT	0.04 AC-FT
PROGRAM WET POND	0.00 AC-FT	0.58 AC-FT
ROUNDAABOUT WET POND	0.00 AC-FT	0.87 AC-FT
RICE CREEK WET POND	0.00 AC-FT	0.27 AC-FT
TOTAL WQV INFILTRATED/TREATED	0.00 AC-FT	1.76 AC-FT

REASON FOR NOT INFILTRATING FULL WQV:
 INADEQUATE SEPARATION FROM SEASONAL HIGH GROUNDWATER LEVEL.

SOIL BORING LOCATION	BOTTOM OF WET POND	SEASONAL HIGH GROUNDWATER LEVEL
MERMAID WET POND	871.0	875.5
PROGRAM WET POND	877.0	887.0
ROUNDAABOUT WET POND	883.0	887.0
RICE CREEK WET POND	872.0	878.5

STORMWATER CALCULATIONS ARE KEPT ON FILE AT THE ENGINEER'S OFFICE. WQV TREATED WAS COMPUTED BY DETERMINING THE LIVE VOLUME WHEN THE DISCHARGE/AREA IS 5.66 CFS/ACRE.

EROSION PREVENTION MEASURES AND TIMING:

THE CONTRACTOR IS RESPONSIBLE FOR ALL EROSION PREVENTION MEASURES FOR THE PROJECT.

EROSION PREVENTION MEASURES SHOWN ON PLANS ARE THE ABSOLUTE MINIMUM REQUIREMENTS. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL EROSION PREVENTION MEASURES AS NECESSARY TO PROPERLY MANAGE THE PROJECT AREA.

THE CONTRACTOR SHALL PLAN AND IMPLEMENT APPROPRIATE CONSTRUCTION PRACTICES AND CONSTRUCTION PHASING TO MINIMIZE EROSION AND RETAIN VEGETATION WHENEVER POSSIBLE.

THE CONTRACTOR SHALL DELINEATE AREAS NOT TO BE DISTURBED AND/OR TO BE PROTECTED WITH FLAGS, STAKES, SIGNS, SILT FENCE, OR OTHER MEANS NECESSARY TO PROTECT THESE AREAS BEFORE CONSTRUCTION BEGINS ON THE SITE.

THE CONTRACTOR SHALL STABILIZE ALL EXPOSED SOILS IMMEDIATELY TO LIMIT SOIL EROSION. IN NO CASE SHALL ANY EXPOSED AREAS, INCLUDING STOCK PILES, HAVE EXPOSED SOILS FOR MORE THAN 7 DAYS WITHOUT PROVIDING TEMPORARY OR PERMANENT STABILIZATION.

DRAINAGE PATHS, DITCHES, AND/OR SWALES SHALL HAVE TEMPORARY OR PERMANENT STABILIZATION WITHIN 24 HOURS OF CONNECTING TO A SURFACE WATER OR 24 HOURS AFTER CONSTRUCTION ACTIVITY IN THE DITCH/SWALE HAS TEMPORARILY OR PERMANENTLY CEASED.

THE CONTRACTOR SHALL COMPLETE THE STABILIZATION OF ALL EXPOSED SOILS WITHIN 24 HOURS THAT LIE WITHIN 200 FEET OF PUBLIC WATERS PROMULGATED "WORK IN WATER RESTRICTIONS" BY THE MN DNR DURING SPECIFIED FISH SPAWNING TIMES.

THE CONTRACTOR SHALL IMPLEMENT STORMWATER CONVEYANCE CHANNELS WHEN APPROPRIATE TO ROUTE WATER AROUND UNSTABILIZED AREAS ON SITE TO REDUCE EROSION.

THE CONTRACTOR SHALL IMPLEMENT EROSION CONTROL BMPs AND VELOCITY DISSIPATION DEVICES ALONG CONSTRUCTED STORMWATER CONVEYANCE CHANNELS AND OUTLETS.

THE CONTRACTOR SHALL STABILIZE TEMPORARY AND/OR PERMANENT DRAINAGE DITCHES OR SWALES WITHIN 200 LINEAL FEET FROM PROPERTY EDGE, OR DISCHARGE POINT(S) WITHIN 24 HOURS AFTER CONNECTING TO A SURFACE WATER OR PROPERTY EDGE.

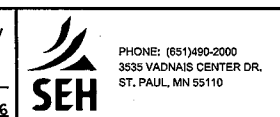
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DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: <u> CJF </u>				
DESIGNER: <u> REP </u>				
CHECKED BY: <u> REP </u>				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: Rachel E. Pichelmann Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

STORM WATER POLLUTION PREVENTION PLAN

FILE NO. RAMSEI29594	258
SWP1 OF SWP2	367

TEMPORARY OR PERMANENT DITCHES OR SWALES USED AS A SEDIMENT CONTAINMENT SYSTEM DURING CONSTRUCTION MUST BE STABILIZED WITHIN 24 HOURS AFTER NO LONGER BEING USED AS A SEDIMENT CONTAINMENT SYSTEM.

THE CONTRACTOR SHALL NOT UTILIZE HYDROMULCH, TACKIFIER, POLYACRYLAMIDE OR SIMILAR EROSION PREVENTION PRACTICES AS A FORM OF STABILIZATION FOR TEMPORARY OR PERMANENT DRAINAGE DITCHES OR SWALES.

THE CONTRACTOR SHALL ENSURE PIPE OUTLETS HAVE TEMPORARY OR PERMANENT ENERGY DISSIPATION WITHIN 24 HOURS OF CONNECTION TO A SURFACE WATER.

THE CONTRACTOR SHALL DIRECT DISCHARGES FROM BMPs TO VEGETATED AREAS TO INCREASE SEDIMENT REMOVAL AND MAXIMIZE STORMWATER INFILTRATION. VELOCITY DISSIPATION DEVICES MUST BE USED TO PREVENT EROSION WHEN DIRECTING STORMWATER TO VEGETATED AREAS.

SEDIMENT CONTROL MEASURES AND TIMING:

THE CONTRACTOR IS RESPONSIBLE FOR ALL SEDIMENT CONTROL MEASURES FOR THE PROJECT.

SEDIMENT CONTROL MEASURES SHOWN ON PLANS ARE THE ABSOLUTE MINIMUM REQUIREMENTS. THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL SEDIMENT CONTROL MEASURES AS NECESSARY TO PROPERLY MANAGE THE PROJECT AREA.

THE CONTRACTOR SHALL ENSURE SEDIMENT CONTROL MEASURES ARE ESTABLISHED ON ALL DOWN GRADIENT PERIMETERS BEFORE ANY UPGRADIENT LAND DISTURBING ACTIVITIES BEGIN. THESE MEASURES SHALL REMAIN IN PLACE UNTIL FINAL STABILIZATION HAS BEEN ESTABLISHED.

THE CONTRACTOR SHALL ENSURE THERE ARE NO UNBROKEN SLOPE LENGTH GREATER THAN 75 FEET ON SLOPES 3:1 OR STEEPER.

THE CONTRACTOR SHALL ENSURE SEDIMENT CONTROL PRACTICES REMOVED OR ADJUSTED FOR SHORT-TERM ACTIVITIES BE RE-INSTALLED IMMEDIATELY AFTER THE SHORT-TERM ACTIVITY HAS BEEN COMPLETED. SEDIMENT CONTROL PRACTICES MUST BE REINSTALLED BEFORE THE NEXT PRECIPITATION EVENT EVEN IF THE SHORT-TERM ACTIVITY IS NOT COMPLETE.

THE CONTRACTOR SHALL ENSURE STORM DRAIN INLETS AND CULVERT INLETS ARE PROTECTED BY APPROPRIATE BMPs DURING CONSTRUCTION UNTIL ALL SOURCES WITH POTENTIAL FOR DISCHARGING TO THE INLET HAS BEEN STABILIZED. INLET AND CULVERT PROTECTION SHALL CONFORM TO THE 2016 MNDOT SPECIFICATIONS 2573.

THE CONTRACTOR SHALL ENSURE STOCK PILES ARE PROVIDED WITH AN EFFECTIVE SEDIMENT PERIMETER CONTROL AND STOCK PILES SHALL NOT BE PLACED IN ANY TYPE OF SURFACE WATER OR NATURAL BUFFER.

THE CONTRACTOR SHALL INSTALL PERIMETER CONTROL AROUND ALL STAGING AREAS, BORROW PITS, AND AREAS CONSIDERED ENVIRONMENTALLY SENSITIVE.

THE CONTRACTOR SHALL ENSURE VEHICLE TRACKING BE MINIMIZED WITH EFFECTIVE BMPs. WHERE THE BMPs FAIL TO PREVENT SEDIMENT FROM TRACKING ONTO STREETS THE CONTRACTOR SHALL CONDUCT STREET SWEEPING TO REMOVE ALL TRACKED SEDIMENT.

THE CONTRACTOR SHALL IMPLEMENT CONSTRUCTION PRACTICES TO MINIMIZE SOIL COMPACTION.

THE CONTRACTOR SHALL ENSURE ALL CONSTRUCTION ACTIVITY REMAIN WITHIN PROJECT LIMITS AND THAT ALL IDENTIFIED RECEIVING WATER BUFFERS ARE MAINTAINED.

THE CONTRACTOR SHALL NOT UTILIZE SEDIMENT CONTROL CHEMICALS ON SITE.

EROSION PREVENTION BMP SUMMARY:

SEE EROSION AND SEDIMENT CONTROL PLAN SHEET AND BID FORM FOR TYPE, LOCATION, AND QUANTITY OF EROSION PREVENTION BMPs.

SEDIMENT CONTROL BMP SUMMARY:

SEE EROSION AND SEDIMENT CONTROL PLAN SHEETS AND BID FORM FOR TYPE, LOCATION, AND QUANTITY OF SEDIMENT CONTROL BMPs.

DEWATERING AND BASIN DRAINING ACTIVITIES:

THE CONTRACTOR IS RESPONSIBLE FOR ADHERING TO ALL DEWATERING AND SURFACE DRAINAGE REGULATIONS.

WATER FROM DEWATERING ACTIVITIES SHALL BE TREATED IN ACCORDANCE WITH THE SPECIAL PROVISIONS FOR THIS PROJECT TO ELIMINATE TURBIDITY, AS DETERMINED BY VISUAL INSPECTION. WATER FROM DEWATERING ACTIVITIES SHALL DISCHARGE TO A TEMPORARY AND/OR PERMANENT SEDIMENT BASIN. IF WATER CANNOT BE DISCHARGED TO A SEDIMENTATION BASIN, IT SHALL BE TREATED WITH OTHER APPROPRIATE BMPs TO EFFECTIVELY REMOVE SEDIMENT.

DISCHARGE THAT CONTAINS OIL OR GREASE MUST BE TREATED WITH AN OIL-WATER SEPARATOR OR SUITABLE FILTRATION DEVICE PRIOR TO DISCHARGE.

DISCHARGE POINTS SHALL BE PROTECTED FROM EROSION AND SCOUR.

DISCHARGE WATER SHALL BE DISPERSED OVER AN ACCEPTED ENERGY DISSIPATION MEASURE.

WATER FROM DEWATERING SHALL BE DISCHARGED IN A MANNER THAN DOES NOT CAUSE NUISANCE CONDITIONS, EROSION, OR INUNDATION OF WETLANDS.

BACKWASH WATER USED FOR FILTERING SHALL BE HAULED AWAY FOR DISPOSAL, RETURNED TO THE BEGINNING OF TREATMENT PROCESS, OR INCORPORATED INTO THE SITE IN A MANNER THAT DOES NOT CAUSE EROSION. THE CONTRACTOR SHALL REPLACE AND CLEAN FILTER MEDIAS USED IN DEWATERING DEVICES WHEN REQUIRED TO MAINTAIN ADEQUATE FUNCTION.

DUST CONTROL:

THE CONTRACTOR IS REMINDED TO READ AND UNDERSTAND MINNESOTA RULE 7011.0150 AND THE FOLLOWING:

NO PERSON MAY CAUSE OR PERMIT THE HANDLING, TRANSPORTING OR STORING OF ANY MATERIAL IN A MANNER WHICH ALLOWS OR MAY ALLOW CONTROLABLE PARTICULATE MATTER TO BECOME AIRBORNE. EXCEPT AS OTHERWISE PROVIDED, THE CONTRACTOR MAY NOT CAUSE OR PERMIT THE CONSTRUCTION, REPAIR, DEMOLITION, OR USE OF UNPAVED OR UNTREATED AREAS WITHOUT FIRST PUTTING INTO EFFECT AN ONGOING PROGRAM USING THE BEST PRACTICAL METHODS TO PREVENT PARTICULATE MATTER FROM BECOMING AIRBORNE.

THE CONTRACTOR SHALL DEVELOP A DUST CONTROL PLAN, ADMINISTERED BY THE EROSION CONTROL SUPERVISOR THAT USES ALL REASONABLE PRECAUTIONS TO PREVENT DUST EMISSIONS FOR THE ENGINEER'S APPROVAL. THE PLAN MUST (1) IDENTIFY ALL POTENTIAL FUGITIVE DUST EMISSION SOURCES, (2) ASSIGN DUST CONTROL METHODS, (3) DETERMINE FREQUENCY OF APPLICATION, (4) RECORD ALL DUST CONTROL ACTIVITIES, AND (5) MONITOR DUST CONTROL EFFORTS.

THE PLAN SHALL HAVE PROVISIONS FOR NOTIFICATION OF SUBCONTRACTORS AND OTHERS ACCESSING THE DISTURBED AREAS OF THEIR RESPONSIBILITIES TO CONTROL FUGITIVE DUST (I.E. OBSERVING ONSITE VEHICLE SPEED LIMITS, TRACK OUT, BEST PRACTICAL METHODS OF DUST CONTROL BEING USED ONSITE WHEN WORKING ON PAVEMENTS AND IN DISTURBED AREAS, KEEPING OFF DISTURBED AREAS THAN HAVE BEEN STABILIZED, ETC.).

THE PLAN SHALL ADDRESS THE TYPE OF BEST PRACTICAL METHODS OF FUGITIVE DUST CONTROL TO BE USED BY CONTRACTOR TO CONTROL FUGITIVE DUST IN DETAIL. MORE THAN ONE TYPE OF FUGITIVE DUST CONTROL METHOD MAY BE NECESSARY TO PREVENT FUGITIVE DUST GENERATION, AND USE OF MULTIPLE FUGITIVE DUST CONTROL METHODS MUST BE ADDRESSED IF APPLICABLE. THE CONTRACTOR IS RESPONSIBLE FOR ADHERING TO THE PROVISIONS CONTAINED IN THEIR DEVELOPED PLAN. FAILURE TO CONTROL FUGITIVE DUST GENERATION AT THE PROJECT SITE IS A VIOLATION OF FEDERAL CLEAN AIR ACT AND MINNESOTA RULES. REGARDLESS OF THE BEST PRACTICAL METHOD(S) OF FUGITIVE DUST CONTROL SELECTED, THE PERMITTEE IS RESPONSIBLE TO PREVENT CONTROLLABLE FUGITIVE DUST FROM BECOMING AIRBORNE.

THE PLAN SHALL INCLUDE TRAINING OF THE PROJECT SUBCONTRACTORS AND EQUIPMENT OPERATORS TO RECOGNIZE WHEN THE DUST CONTROLS BEING USED ARE NOT PREVENTING THE GENERATION OF FUGITIVE DUST AND TO FOLLOW THE REQUIREMENTS OF THE PROJECT'S FUGITIVE DUST CONTROL PLAN. A LOG OF SUCH TRAINING SHALL BE KEPT ONSITE WITH THE DAILY OPERATIONS LOG.

THE PLAN SHALL INCLUDE IDENTIFICATION OF THE PROJECT ONSITE PERSON(S) AUTHORIZED TO CEASE OPERATIONS WHEN WIND OR OTHER METEOROLOGICAL CONDITIONS COMPROMISE THE CONTROL OF FUGITIVE DUST WHEN EMPLOYING THE BEST PRACTICAL METHODS SPECIFIED IN THE PLAN.

THE PLAN SHALL HAVE PROVISIONS FOR UPDATING THE PLAN IN THE EVENT MATERIAL CHANGES TO THE PROJECT OCCUR AND RESUBMITAL OF THE PLAN TO THE PROJECT ENGINEER.

INSPECTION AND MAINTENANCE:

ALL INSPECTIONS, MAINTENANCE, REPAIRS, REPLACEMENTS, AND REMOVAL OF BMPs IS TO BE CONSIDERED INCIDENTAL TO THE BMP BID ITEMS.

THE CONTRACTOR IS RESPONSIBLE FOR COMPLETING SITE INSPECTIONS, AND BMP MAINTENANCE TO ENSURE COMPLIANCE WITH THE PERMIT REQUIREMENTS.

THE CONTRACTOR SHALL INSPECT THE CONSTRUCTION SITE ONCE EVERY 7 DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS.

THE CONTRACTOR SHALL DOCUMENT A WRITTEN SUMMARY OF ALL INSPECTIONS AND MAINTENANCE ACTIVITIES CONDUCTED WITHIN 24 HOURS OF OCCURRENCE. RECORDS OF EACH ACTIVITY SHALL INCLUDE THE FOLLOWING:

- DATE AND TIME OF INSPECTIONS;
-NAME OF PERSON(S) CONDUCTING INSPECTION;
-FINDINGS AND RECOMMENDATIONS FOR CORRECTIVE ACTIONS IF NECESSARY;
-CORRECTIVE ACTIONS TAKEN;
-DATE AND AMOUNT OF RAINFALL EVENTS;
-POINTS OF DISCHARGE OBSERVED DURING INSPECTION AND DESCRIPTION OF THE DISCHARGE
-AMENDMENTS MADE TO THE SWPPP.

THE CONTRACTOR SHALL SUBMIT A COPY OF THE WRITTEN INSPECTIONS TO THE ENGINEER AND OWNER ON A MONTHLY BASIS. IF MONTHLY INSPECTION REPORTS ARE NOT SUBMITTED, MONTHLY PAYMENTS MAY BE HELD.

THE CONTRACTOR SHALL KEEP THE SWPPP, ALL INSPECTION REPORTS, AND AMENDMENTS ONSITE. THE CONTRACTOR SHALL DESIGNATE A SPECIFIC ONSITE LOCATION TO KEEP THE RECORDS.

THE CONTRACTOR IS RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF TEMPORARY AND PERMANENT WATER QUALITY BMPs, AS WELL AS EROSION AND SEDIMENT CONTROL BMPs.

THE CONTRACTOR SHALL INSPECT EROSION PREVENTION AND SEDIMENTATION CONTROL BMPs TO ENSURE INTEGRITY AND EFFECTIVENESS. ALL NONFUNCTIONAL BMPs SHALL BE REPAIRED, REPLACED, OR SUPPLEMENTED WITH FUNCTIONAL BMPs WITHIN 24 HOURS OF FINDING. THE CONTRACTOR SHALL INVESTIGATE AND COMPLY WITH THE FOLLOWING INSPECTION AND MAINTENANCE REQUIREMENTS:

PERIMETER CONTROL DEVICES, INCLUDING SILT FENCE SHALL BE REPAIRED, OR REPLACED, WHEN THEY BECOME NONFUNCTIONAL OR THE SEDIMENT REACHES 1/3 OF THE DEVICE HEIGHT. THESE REPAIRS SHALL BE MADE WITHIN 24 HOURS OF DISCOVERY.

TEMPORARY AND PERMANENT SEDIMENT BASINS SHALL BE DRAINED AND THE SEDIMENT REMOVED WHEN THE DEPTH OF SEDIMENT COLLECTED IN THE BASIN REACHES 1/2 THE STORAGE VOLUME. DRAINAGE AND REMOVAL MUST BE COMPLETED WITHIN 72 HOURS OF DISCOVERY.

SURFACE WATERS, INCLUDING DRAINAGE DITCHES AND CONVEYANCE SYSTEMS, MUST BE INSPECTED FOR EVIDENCE OF EROSION AND SEDIMENT DEPOSITION. THE CONTRACTOR SHALL REMOVE ALL DELTAS AND SEDIMENT DEPOSITED IN SURFACE WATERS, INCLUDING DRAINAGE WAYS, CATCH BASINS, AND OTHER DRAINAGE SYSTEMS. THE CONTRACTOR SHALL RE-STABILIZE THE AREAS WHERE SEDIMENT REMOVAL RESULTS IN EXPOSED SOIL. REMOVAL AND STABILIZATION MUST TAKE PLACE WITHIN 7 DAYS OF DISCOVERY, UNLESS PRECLUDED BY LEGAL, REGULATORY, OR PHYSICAL CONSTRAINTS. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL LOCAL, REGIONAL, STATE AND FEDERAL AUTHORITIES AND OBTAIN ANY APPLICABLE PERMITS, PRIOR TO CONDUCTING ANY WORK IN SURFACE WATERS.

CONSTRUCTION SITE VEHICLE EXIT LOCATIONS SHALL BE INSPECTED DAILY FOR EVIDENCE OF SEDIMENT TRACKING ONTO PAVED SURFACES. TRACKED SEDIMENT MUST BE REMOVED FROM ALL PAVED SURFACES WITHIN 24 HOURS OF DISCOVERY.

IF SEDIMENT ESCAPES THE CONSTRUCTION SITE, OFF-SITE ACCUMULATIONS OF SEDIMENT MUST BE REMOVED IN A MANNER AND AT A FREQUENCY SUFFICIENT TO MINIMIZE OFF-SITE IMPACTS.

POLLUTION PREVENTION MANAGEMENT MEASURES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL POLLUTION PREVENTION MANAGEMENT MEASURES.

ALL POLLUTION PREVENTION MEASURES ARE CONSIDERED INCIDENTAL TO THE MOBILIZATION BID ITEM, UNLESS OTHERWISE NOTED.

THE CONTRACTOR IS RESPONSIBLE FOR INFORMING ALL VISITORS AND/OR PERSONNEL ON-SITE OF THE POLLUTION PREVENTION MANAGEMENT MEASURES. POLLUTION PREVENTION MANAGEMENT MEASURES INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:

THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER DISPOSAL, IN COMPLIANCE WITH MPCA DISPOSAL REQUIREMENTS, OF ALL HAZARDOUS MATERIALS, SOLID WASTE, AND PRODUCTS ON-SITE.

THE CONTRACTOR SHALL ENSURE BUILDING PRODUCTS THAT HAVE THE POTENTIAL TO LEACH POLLUTANTS ARE KEPT UNDER COVER TO PREVENT THE DISCHARGE OF POLLUTANTS.

THE CONTRACTOR SHALL ENSURE PESTICIDES, HERBICIDES, INSECTICIDES, FERTILIZERS, TREATMENT CHEMICALS, AND LANDSCAPE MATERIALS ARE COVERED TO PREVENT THE DISCHARGE OF POLLUTANTS.

THE CONTRACTOR SHALL ENSURE HAZARDOUS MATERIALS AND TOXIC WASTE IS PROPERLY STORED IN SEALED CONTAINERS TO PREVENT SPILLS, LEAKS, OR OTHER DISCHARGE. STORAGE AND DISPOSAL OF HAZARDOUS WASTE OR HAZARDOUS MATERIALS MUST BE IN COMPLIANCE WITH MINN. R. CH. 7045 INCLUDING SECONDARY CONTAINMENT AS APPLICABLE.

THE CONTRACTOR SHALL ENSURE ASPHALT SUBSTANCES USED ON-SITE SHALL ARE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

THE CONTRACTOR SHALL ENSURE PAINT CONTAINERS AND CURING COMPOUNDS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT AND/OR CURING COMPOUNDS SHALL NOT BE DISCHARGED INTO THE STORM SEWER SYSTEM AND SHALL BE PROPERLY DISPOSED OF ACCORDING TO MANUFACTURER'S INSTRUCTION.

THE CONTRACTOR SHALL ENSURE SOLID WASTE BE STORED, COLLECTED AND DISPOSED OF PROPERLY IN COMPLIANCE WITH MINN. R. CH. 7035.

THE CONTRACTOR SHALL ENSURE PORTABLE TOILETS ARE POSITIONED SO THAT THEY ARE SECURE AND WILL NOT BE TIPPED OR KNOCKED OVER. SANITARY WASTE MUST BE DISPOSED OF PROPERLY IN ACCORDANCE WITH MINN. R. CH. 7041.

PORTABLE TOILETS MUST BE PLACED MORE THAN 25 FEET FROM ANY ACTIVE CATCH BASIN OR STORM SEWER INLET.

THE CONTRACTOR SHALL MONITOR ALL VEHICLES ON-SITE FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE.

EXTERNAL WASHING OF TRUCKS AND OTHER CONSTRUCTION VEHICLES AND ENGINE DEGREASING ARE PROHIBITED AT THE CONSTRUCTION SITE.

THE CONTRACTOR SHALL ENSURE WASHOUT WASTE MUST NOT CONTACT THE GROUND AND SHALL BE PROPERLY DISPOSED OF IN COMPLIANCE WITH MPCA RULES.

THE CONTRACTOR SHALL INCLUDE SPILL KITS WITH ALL FUELING SOURCES AND MAINTENANCE ACTIVITIES. SECONDARY CONTAINMENT MEASURES SHALL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR.

THE CONTRACTOR SHALL ENSURE SPILLS ARE CONTAINED AND CLEANED UP IMMEDIATELY UPON DISCOVERY. SPILLS LARGE ENOUGH TO REACH THE STORM WATER CONVEYANCE SYSTEM SHALL BE REPORTED TO THE MINNESOTA DUTY OFFICER AT 1.800.422.0798.

FINAL STABILIZATION:

THE CONTRACTOR IS RESPONSIBLE FOR ENSURING FINAL STABILIZATION OF THE ENTIRE SITE. FINAL STABILIZATION INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

ALL SOIL DISTURBING ACTIVITIES HAVE BEEN COMPLETED.

ALL EXPOSED SOILS HAVE BEEN UNIFORMLY STABILIZED WITH AT LEAST 70% VEGETATION COVERAGE.

PERMANENT STORM WATER MANAGEMENT SYSTEM(S) ARE CONSTRUCTED AND ARE OPERATING AS DESIGNED.

ALL DRAINAGE DITCHES, PONDS, AND ALL STORMWATER CONVEYANCE SYSTEMS HAVE BEEN CLEARED OF SEDIMENT AND STABILIZED WITH PERMANENT COVER TO PRECLUDE EROSION.

ALL TEMPORARY BMPs HAVE BEEN REMOVED AND PROPERLY DISPOSED OF.

FINAL STABILIZATION SHALL BE PERFORMED IN ACCORDANCE WITH MNDOT 2016 SPECIFICATION 2575.

Table with columns: DESIGN TEAM, DRAWN BY: CJP, DESIGNER: REP, CHECKED BY: REP, NO., BY, DATE, REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Certified By: Rachel E. Pichelmann, L.C. No. 51315. Printed Name: RACHEL E. PICHELMMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

STORM WATER POLLUTION PREVENTION PLAN
FILE NO. RAMSEI29594
259
SWP2 OF SWP2
367

CITY OF MOUNDS VIEW



100

SCALE IN FEET

TURF ESTABLISHMENT AND PERMANENT EROSION CONTROL LEGEND

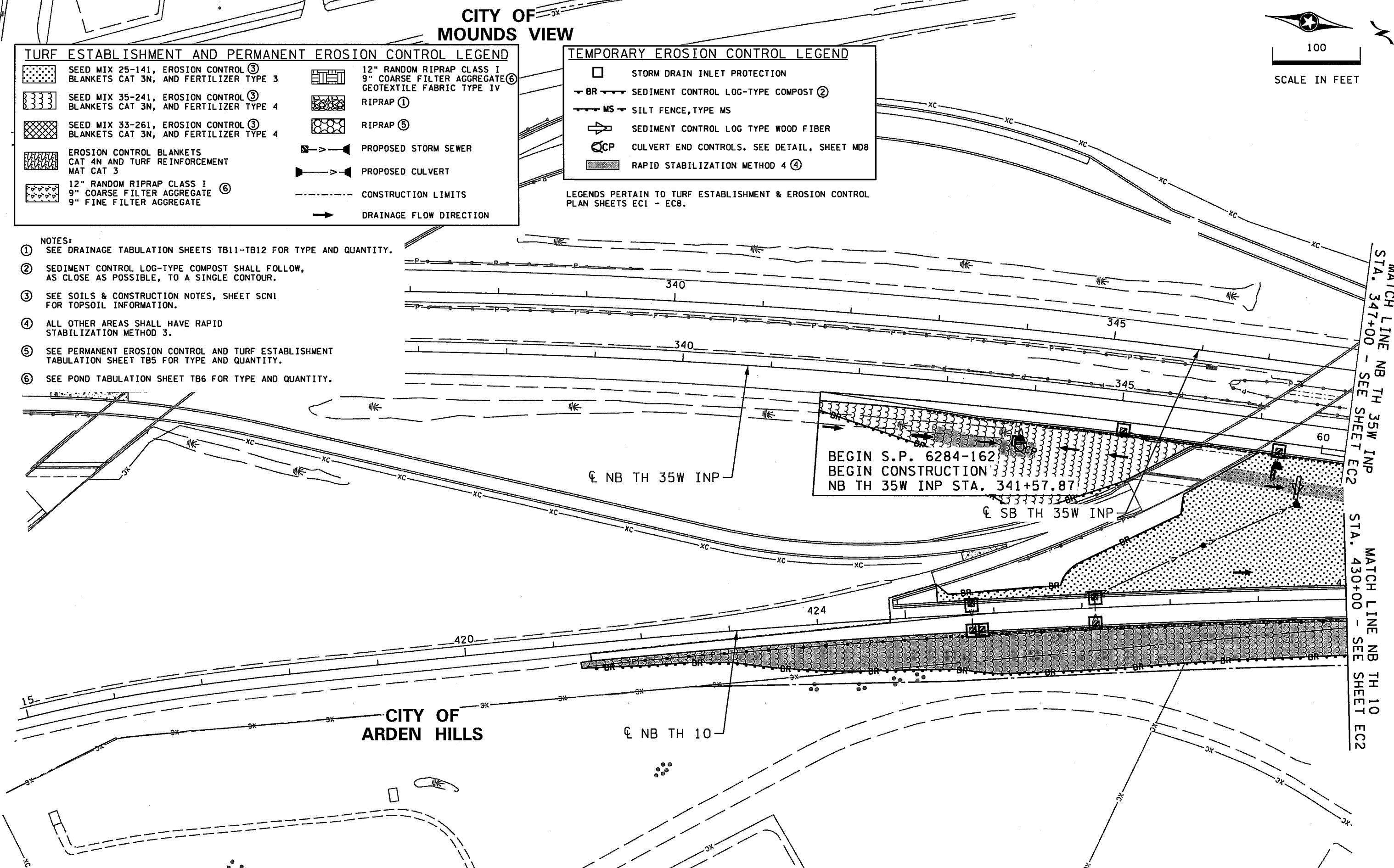
	SEED MIX 25-141, EROSION CONTROL ③ BLANKETS CAT 3N, AND FERTILIZER TYPE 3		12" RANDOM RIPRAP CLASS I 9" COARSE FILTER AGGREGATE GEOTEXTILE FABRIC TYPE IV ⑥
	SEED MIX 35-241, EROSION CONTROL ③ BLANKETS CAT 3N, AND FERTILIZER TYPE 4		RIPRAP ①
	SEED MIX 33-261, EROSION CONTROL ③ BLANKETS CAT 3N, AND FERTILIZER TYPE 4		RIPRAP ⑤
	EROSION CONTROL BLANKETS CAT 4N AND TURF REINFORCEMENT MAT CAT 3		PROPOSED STORM SEWER
	12" RANDOM RIPRAP CLASS I 9" COARSE FILTER AGGREGATE 9" FINE FILTER AGGREGATE ⑥		PROPOSED CULVERT
			CONSTRUCTION LIMITS
			DRAINAGE FLOW DIRECTION

TEMPORARY EROSION CONTROL LEGEND

	STORM DRAIN INLET PROTECTION
	SEDIMENT CONTROL LOG-TYPE COMPOST ②
	SILT FENCE, TYPE MS
	SEDIMENT CONTROL LOG TYPE WOOD FIBER
	CULVERT END CONTROLS. SEE DETAIL, SHEET MD8
	RAPID STABILIZATION METHOD 4 ④

LEGENDS PERTAIN TO TURF ESTABLISHMENT & EROSION CONTROL
PLAN SHEETS EC1 - EC8.

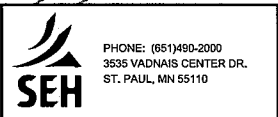
- NOTES:**
- SEE DRAINAGE TABULATION SHEETS TB11-TB12 FOR TYPE AND QUANTITY.
 - SEDIMENT CONTROL LOG-TYPE COMPOST SHALL FOLLOW, AS CLOSE AS POSSIBLE, TO A SINGLE CONTOUR.
 - SEE SOILS & CONSTRUCTION NOTES, SHEET SCN1 FOR TOPSOIL INFORMATION.
 - ALL OTHER AREAS SHALL HAVE RAPID STABILIZATION METHOD 3.
 - SEE PERMANENT EROSION CONTROL AND TURF ESTABLISHMENT TABULATION SHEET TB5 FOR TYPE AND QUANTITY.
 - SEE POND TABULATION SHEET TB6 FOR TYPE AND QUANTITY.



**CITY OF
ARDEN HILLS**

DESIGN TEAM				
DRAWN BY:	CJF			
DESIGNER:	REP			
CHECKED BY:	REP			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Rachel Pichelmann* Lic. No. 51315
Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

**TURF ESTABLISHMENT &
EROSION CONTROL PLAN**
NB TH 35W INP STA. 341+57 - 347+00
NB TH 10 STA. 421+41 - 430+00

FILE NO. RAMSE129594	260
EC1 OF EC8	367

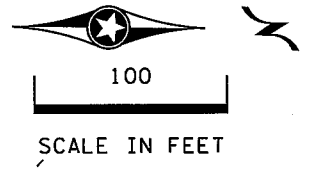
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CITY OF
MOUNDS VIEW



RICE CREEK

W-CID

RETAINING WALL D

EB CR H

NW RAMP

NW LOOP INP

WB CR H

MATCH LINE NB TH 35W INP
STA. 347+00 - SEE SHEET EC1

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET EC3

MATCH LINE NB TH 10
STA. 430+00 - SEE SHEET EC1

350

355

360

RETAINING WALL C

RETAINING WALL B

NE RAMP

E-CID

NB TH 10 RETAINING WALL A

SE RAMP

CITY OF
ARDEN HILLS

T.C.A.A.P.

NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN
SHEET EC1.

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	REP						
CHECKED BY:	REP						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Rachel Fichelmann* Lic. No. 51315
 Licensed Professional Engineer
 Printed Name: RACHEL E. FICHELMMANN Date: 12/8/2015

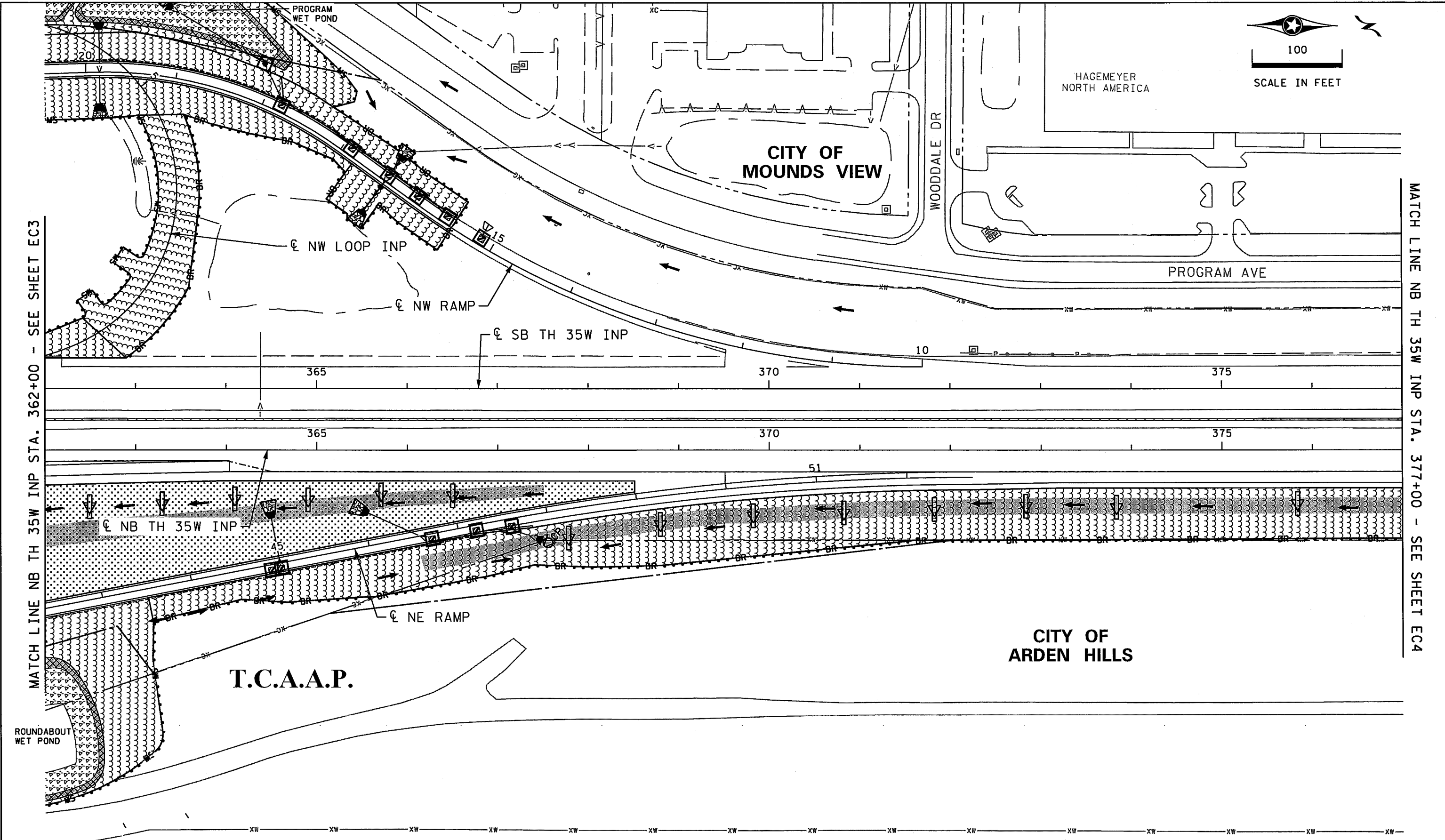


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TURF ESTABLISHMENT &
 EROSION CONTROL PLAN
 NB TH 35W INP STA. 347+00 - 362+00
 NB TH 10 STA. 430+00 - 442+01

FILE NO. RAMSE129594
 EC2 OF EC8
 261
 367


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NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN
SHEET EC1.

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PHONE: (651)450-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

**TURF ESTABLISHMENT &
EROSION CONTROL PLAN**
NB TH 35W INP STA. 362+00 - 377+00

FILE NO. RAMSEI29594	262
EC3 OF EC8	367

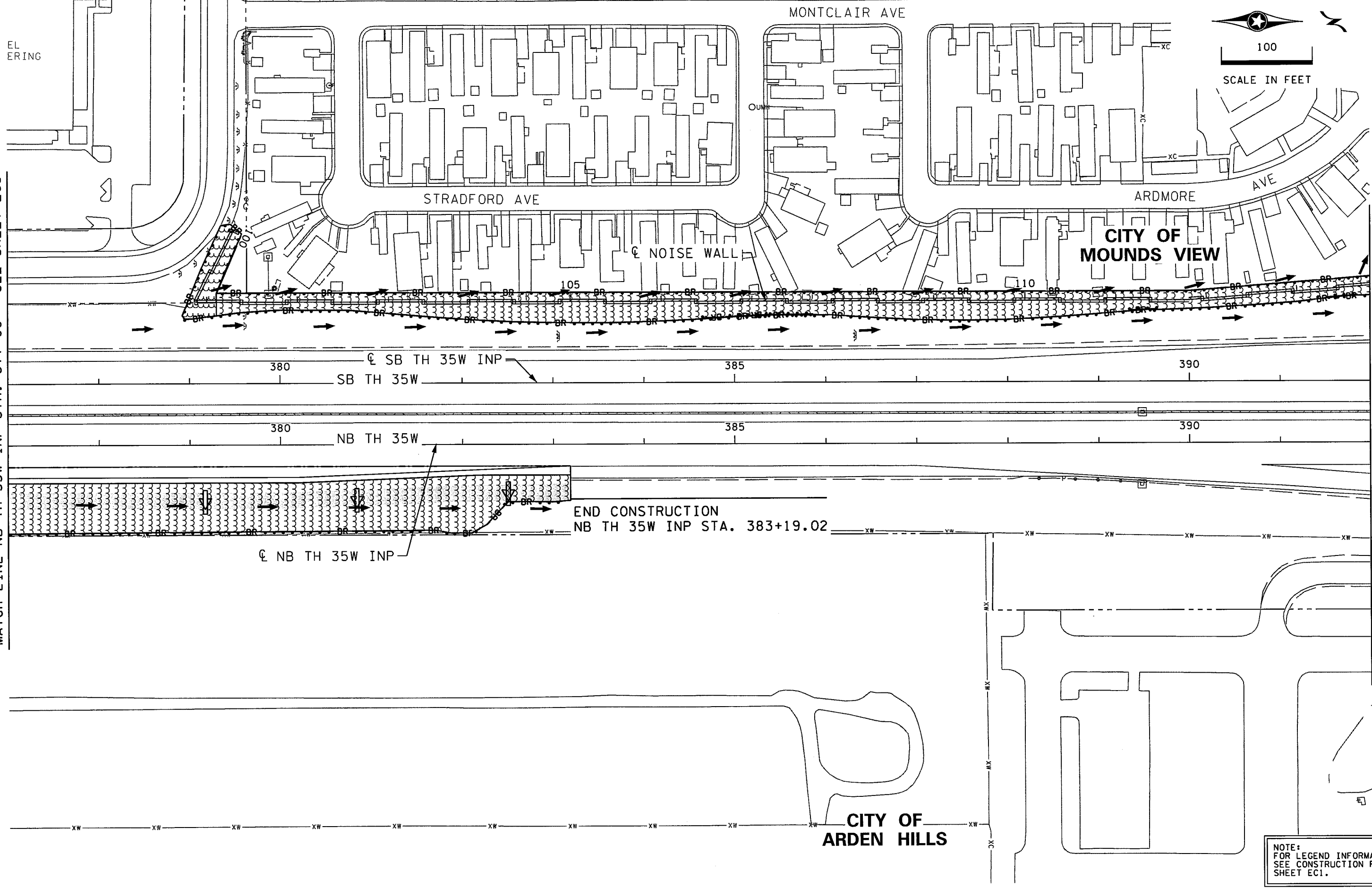
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EC4

MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET EC3

MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET EC5



END CONSTRUCTION
NB TH 35W INP STA. 383+19.02

NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN
SHEET EC1.

DESIGN TEAM					
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DESIGNER:	REP				
CHECKED BY:	REP				
	NO.	BY	DATE		REVISIONS

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 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

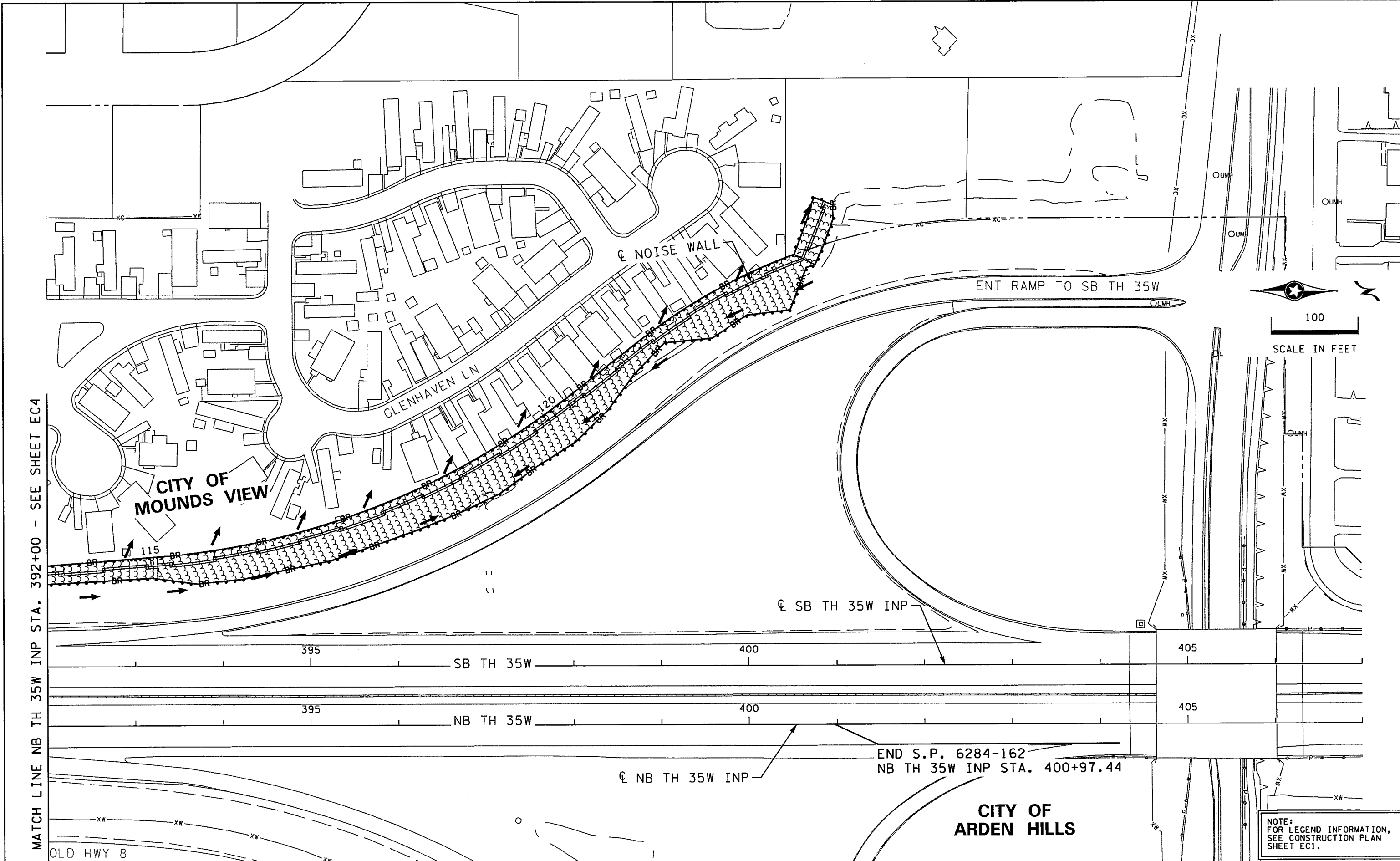
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 NB TH 35W INP STA. 377+00 - 392+00

FILE NO.	263
RAMSEI29594	
EC4	
OF EC8	367

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MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET EC4

CITY OF MOUNDS VIEW

NOISE WALL

ENT RAMP TO SB TH 35W

GLENHAVEN LN

SB TH 35W INP

SB TH 35W

NB TH 35W

NB TH 35W INP

END S.P. 6284-162
NB TH 35W INP STA. 400+97.44

CITY OF ARDEN HILLS

OLD HWY 8



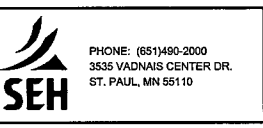
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SCALE IN FEET

NOTE:
FOR LEGEND INFORMATION,
SEE CONSTRUCTION PLAN
SHEET EC1.

DESIGN TEAM			
DRAWN BY:	CJF		
DESIGNER:	REP		
CHECKED BY:	REP		
NO.	BY	DATE	REVISIONS

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 Licensed Professional Engineer
 Printed Name: RACHEL E. PICHELMANN Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

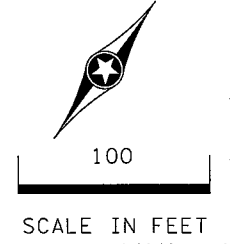
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NB TH 35W INP STA. 392+00 - 400+97		EC5 OF EC8	367

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12/8/2015

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\$MODELNAME\$

CITY OF MOUNDS VIEW



BEGIN S.A.P. 062-593-003
 BEGIN S.A.P. 146-020-011
 EB CR H STA 32+20.86

THE MERMAID
 ENTERTAINING
 & EVENT CENTER

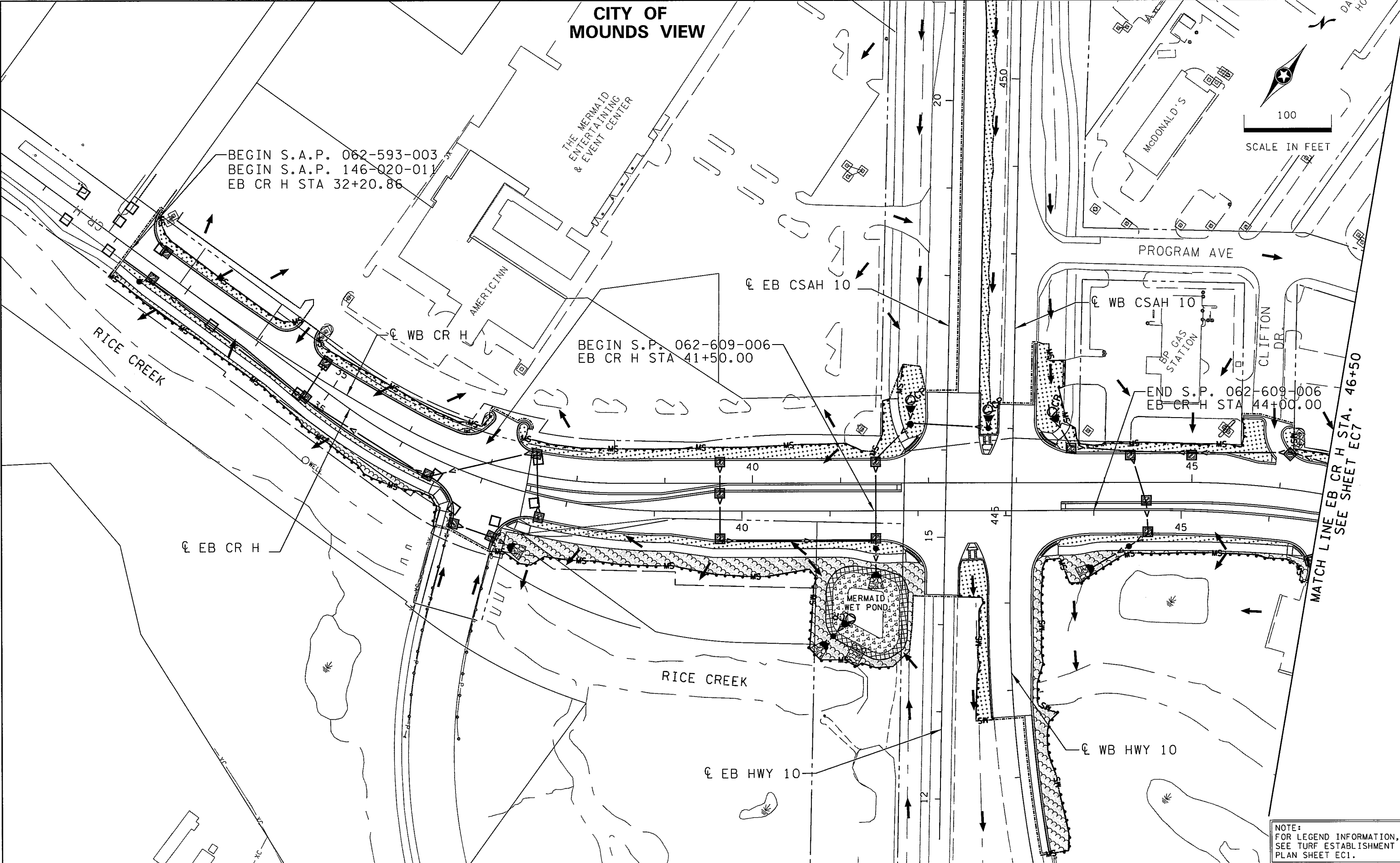
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PROGRAM AVE

BP GAS
 STATION

END S.P. 062-609-006
 EB CR H STA 44+00.00

MATCH LINE EB CR H STA. 46+50
 SEE SHEET EC7



DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TURF ESTABLISHMENT AND
 EROSION CONTROL PLAN
 EB CR H STA. 32+20 - 46+50

FILE NO. RAMSE129594	265
EC6 OF EC8	367

NOTE:
 FOR LEGEND INFORMATION,
 SEE TURF ESTABLISHMENT
 PLAN SHEET EC1.

10/23/139 AM

1/27/2016

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CITY OF
MOUNDS VIEW

CITY OF
ARDEN HILLS

T.C.A.A.P.



100

SCALE IN FEET

PROGRAM CONNECTOR

PROGRAM
POND

NW LOOP INP

W CID

PROP BR.
#62732

WB CR H

ROUNDAABOUT
WET POND

35W
AUTO
REPAIR
& WASH

R.J.
RICHES

MATCH LINE SEE SHEET EC6
EB CR H STA. 46+50

SB PARK
& RIDE

EB CR H

NB PARK & RIDE

END S.A.P. 146-020-011
BEGIN S.A.P. 187-020-019

RICE CREEK

RICE CREEK

RICE CREEK
WET POND

END S.A.P. 062-593-003
END S.A.P. 187-20-019
EB CR H STA 61+20.82

CITY OF
ARDEN HILLS
T.C.A.A.P.

SE RAMP

NOTE:
FOR LEGEND INFORMATION,
SEE TURF ESTABLISHMENT
PLAN SHEET EC1.

DESIGN TEAM				
DRAWN BY: GDK				
DESIGNER: NMG				
CHECKED BY: WCK				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 1/27/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA

TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

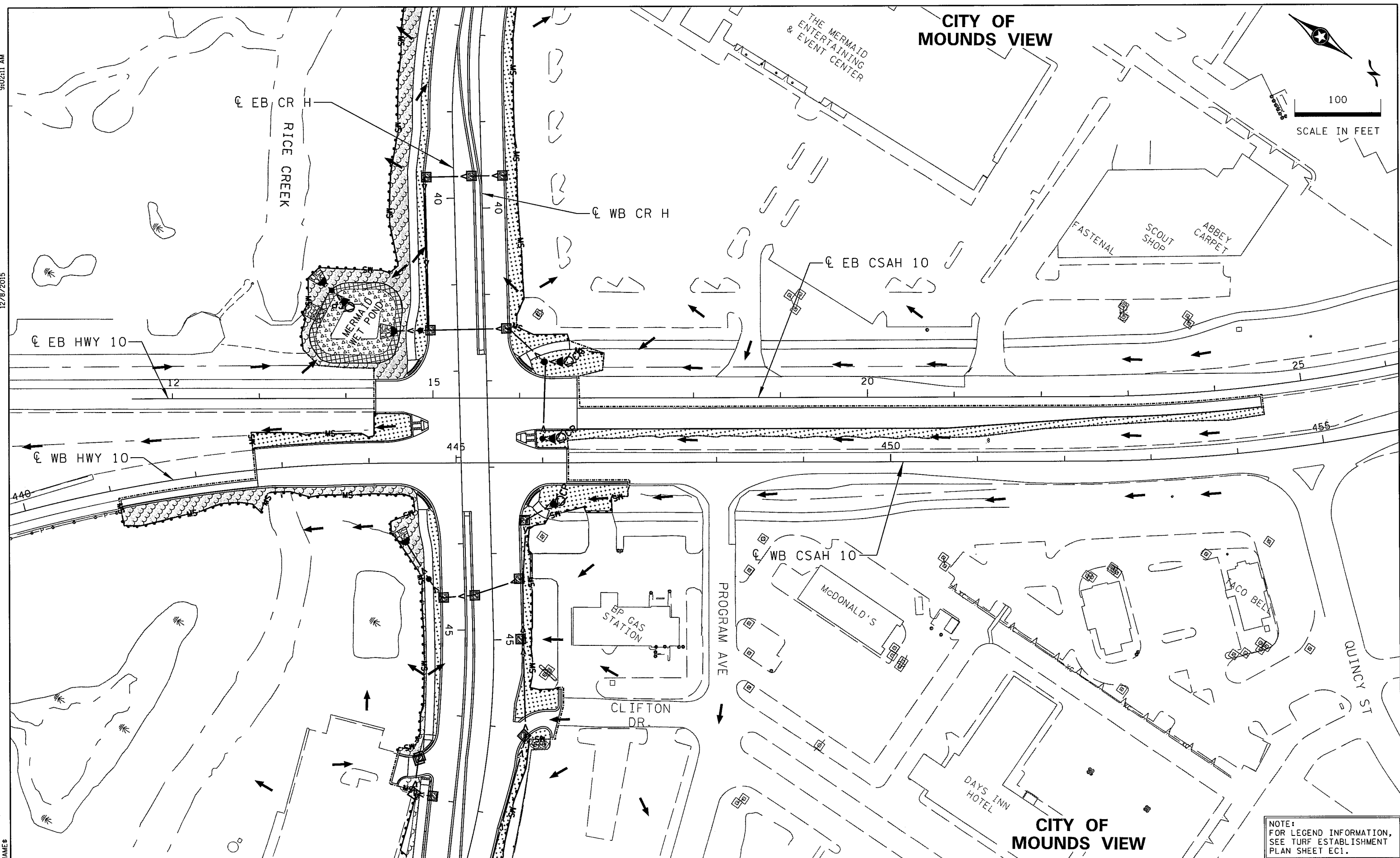
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EROSION CONTROL PLAN
EB CR H STA. 46+50 - 61+21

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EC7 OF EC8	367

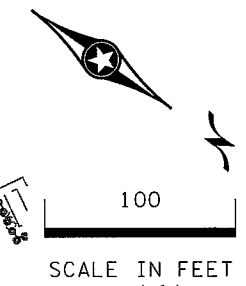
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\$MODELNAME\$



CITY OF MOUNDS VIEW



CITY OF MOUNDS VIEW

NOTE:
FOR LEGEND INFORMATION,
SEE TURF ESTABLISHMENT
PLAN SHEET EC1.

DESIGN TEAM			
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DESIGNER:	NMG		
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Kimley»Horn

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TURF ESTABLISHMENT AND EROSION CONTROL PLAN		FILE NO. RAMSE129594	267
WB CSAH 10 STA. 441+00 - 455+00		EC8 OF EC8	367

PERMANENT PAVEMENT MARKING PLAN

NOTES & GUIDELINES

GENERAL INFORMATION:

THE ENGINEER'S INVOLVEMENT IN THE APPLICATION OF THE MATERIAL SHALL BE LIMITED TO FIELD CONSULTATION AND INSPECTION. THE CONTRACTOR WILL PLACE NECESSARY 'SPOTTING' AT APPROPRIATE POINTS TO PROVIDE HORIZONTAL CONTROL FOR STRIPING AND TO DETERMINE NECESSARY STARTING AND CUTOFF POINTS. LONGITUDINAL JOINTS, PAVEMENT EDGES AND EXISTING MARKINGS MAY SERVE AS HORIZONTAL CONTROL WHEN SO DIRECTED.

EDGE LINES AND LANE LINES ARE TO BE BROKEN ONLY AT INTERSECTIONS WITH PUBLIC ROADS AND AT PRIVATE ENTRANCES IF THEY ARE CONTROLLED BY A YIELD SIGN, STOP SIGN OR TRAFFIC SIGNAL. THE BREAK POINT IS TO BE AT THE START OF THE RADIUS FOR THE INTERSECTION OR AT MARKED STOP LINES OR CROSSWALKS.

A TOLERANCE OF 1/4 INCH UNDER OR 1/4 INCH OVER THE SPECIFIED WIDTH WILL BE ALLOWED FOR STRIPING PROVIDED THE VARIATION IS GRADUAL AND DOES NOT DETRACT FROM THE GENERAL APPEARANCE. BROKEN LINE SEGMENTS MAY VARY UP TO 3 INCHES FROM THE SPECIFIED LENGTHS PROVIDED THE OVER AND UNDER VARIATIONS ARE REASONABLY COMPENSATORY. ALIGNMENT DEVIATIONS FROM THE CONTROL GUIDE SHALL NOT EXCEED 1 INCH. MATERIAL SHALL NOT BE APPLIED OVER LONGITUDINAL JOINTS. ESTABLISHMENT OF APPLICATION TOLERANCES SHALL NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO COMPLY AS CLOSELY AS PRACTICABLE WITH THE PLANNED DIMENSIONS.

JUST PRIOR TO THE PLACEMENT OF PAVEMENT MARKINGS THE ROAD SURFACE SHALL BE CLEANED AND FREE OF CONTAMINATION AS RECOMMENDED BY THE MATERIAL MANUFACTURER AND ACCEPTABLE TO THE ENGINEER. PORTLAND CEMENT CONCRETE SURFACES SHALL BE SANDBLAST CLEANED TO REMOVE ANY SURFACE TREATMENTS AND/OR LAITANCE.

APPLY ALL PAVEMENT MARKINGS AS RECOMMENDED BY THE MATERIAL MANUFACTURER. PERMANENT PAVEMENT MARKINGS SHALL NOT BE PLACED OVER TEMPORARY TAPE MARKINGS. THE FILLING OF TANKS, POURING OF MATERIALS OR CLEANING OF EQUIPMENT SHALL NOT BE PERFORMED ON UNPROTECTED PAVEMENT SURFACES UNLESS ADEQUATE PROVISIONS ARE MADE TO PREVENT SPILLAGE OF MATERIAL.

CONTRAST MARKINGS:

STANDARD LINEAR PAVEMENT MARKINGS, CROSSWALK MARKINGS AND PAVEMENT MESSAGES WITH 1.5 INCH NON REFLECTIVE BLACK BORDERS.

EPOXY:

THE ROAD SURFACE SHALL BE CLEANED AT THE DIRECTION OF THE ENGINEER JUST PRIOR TO APPLICATION. PAVEMENT CLEANING SHALL CONSIST OF AT LEAST BRUSHING WITH A ROTARY BROOM (NON-METALLIC) OR AS RECOMMENDED BY THE MATERIAL MANUFACTURER AND ACCEPTABLE TO THE ENGINEER. NEW PORTLAND CEMENT CONCRETE SURFACES SHALL BE SANDBLAST CLEANED TO REMOVE ANY SURFACE TREATMENTS AND/OR LAITANCE.

THE EPOXY MARKING APPLICATION SHALL IMMEDIATELY FOLLOW THE PAVEMENT CLEANING. GLASS BEADS SHALL BE APPLIED IMMEDIATELY AFTER APPLICATION OF THE EPOXY RESIN LINE. APPLY EPOXY MARKINGS WITH A MINIMUM THICKNESS OF 20 MILS, GLASS BEADS SHALL BE APPLIED AT A RATE OF AT LEAST 25 LB/GAL. THE 'NO-TRACKING' CONDITION SHALL BE DETERMINED ON AN APPLICATION OF SPECIFIED THICKNESS TO THE PAVEMENT AND COVERED WITH GLASS BEADS AT THE RATE OF AT LEAST 25 LB/GAL. PAVEMENT MARKINGS SHALL ONLY BE APPLIED IN SEASONABLE WEATHER WHEN AIR AND PAVEMENT SURFACE TEMPERATURES ARE 40°F OR HIGHER AND SHALL NOT BE APPLIED WHEN THE WIND OR OTHER CONDITIONS CAUSE A FILM OF DUST TO BE DEPOSITED ON THE PAVEMENT SURFACE AFTER CLEANING AND BEFORE THE MARKING MATERIAL CAN BE APPLIED.

PERFORMED MARKINGS:

MANUFACTURER CERTIFICATIONS ARE REQUIRED FOR INSTALLERS. DO NOT USE LINE MATERIAL TO PIECE TOGETHER WIDER LINES, LETTERS, SYMBOLS, OR CROSSWALK BLOCKS

PERFORMED MARKINGS GROUND IN APPLICATION:

CONCRETE PAVEMENT SURFACES AND BITUMINOUS PAVEMENT SURFACES WHERE PAVEMENT MARKINGS CANNOT BE INLAID IN THE HOT MAT, SHALL HAVE A RECESS GROUND IN FOR THE PLACEMENT OF DURABLE REFLECTORIZED PAVEMENT MARKINGS. SEE CONSTRUCTION SPECIFICATIONS.

PERMANENT PAVEMENT MARKING PLAN INDEX

SS1	SIGNING AND PAVEMENT MARKING PLAN TITLE SHEET
SS2-SS6	SIGNING TABULATIONS
SS7-SS18	EXISTING SIGNING PLANS
SS19-SS35	PROPOSED SIGNING AND STRIPING PLANS
SS36-SS41	SIGNING PANEL SHEETS
SS42-SS46	PAVEMENT MARKING DETAILS
SS47-SS48, SS48A, SS49-SS68	SIGNING DETAILS

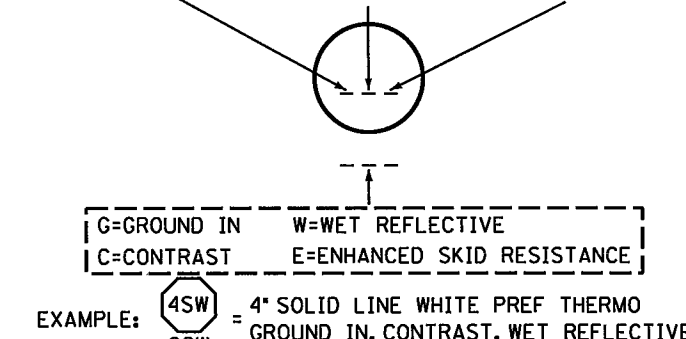
SYMBOLS & MATERIALS LEGEND

	CROSSWALK BLOCK PREF THERMO GR IN OR PREF TAPE GR IN AS NOTED
	PAVEMENT MESSAGE (LEFT ARROW) PREF THERMO GR IN OR PREF TAPE GR IN AS NOTED
	PAVEMENT MESSAGE (RIGHT ARROW) PREF THERMO GR IN OR PREF TAPE GR IN AS NOTED
	PAVEMENT MESSAGE (LT-THRU ARROW) PREF THERMO GR IN OR PREF TAPE GR IN AS NOTED
	PAVEMENT MESSAGE (RT-THRU ARROW) PREF THERMO GR IN OR PREF TAPE GR IN AS NOTED

STRIPING KEY

	CIRCLE-EPOXY		SQUARE-PREF TAPE
	OCTAGON-PREF THERMO		

1ST DIGIT WIDTH 4", 8", ETC.	2ND DIGIT PATTERN S - SOLID B - BROKEN D - DOTTED/DOUBLE	3RD DIGIT COLOR W - WHITE Y - YELLOW B - BLACK
------------------------------------	--	--



PAVEMENT MARKING TABULATION

PAY ITEM	UNIT	S.P. 6284-162						S.A.P. 062-609-006		S.A.P. 062-593-003		TOTAL QUANT.
		YELLOW		WHITE		YELLOW	WHITE	YELLOW	WHITE			
4" SOLID LINE EPOXY GR IN (WR)	LIN FT	1758	7048	2970	5300	5027	6742			28845		
8" SOLID LINE EPOXY GR IN (WR)	LIN FT				155					155		
12" SOLID LINE EPOXY GR IN (WR)	LIN FT						202			202		
24" SOLID LINE EPOXY GR IN (WR)	LIN FT			72	60					132		
(1) 4" BROKEN LINE EPOXY GR IN (WR)	LIN FT		115		419		234			768		
(2) 4" DOTTED LINE EPOXY GR IN (WR)	LIN FT		240				240			480		
(2) 8" DOTTED LINE EPOXY GR IN (WR)	LIN FT				49					49		
4" DOUBLE SOLID LINE EPOXY GR IN (WR)	LIN FT			753						753		
8" SOLID LINE PREF TAPE GR IN CONTRAST	LIN FT		2100				2100			4200		
4" DOTTED LINE PREF TAPE GR IN CONTRAST	LIN FT						132			132		
(3) 12" DOTTED LINE PREF THERMO GR IN CONTRAST	LIN FT						258			258		
MOBILE RETROREFLECTOMETER MEASUREMENTS	LIN FT	1758	9503	3795	5983	5027	9908			35974		

PAVEMENT MESSAGE TABULATION

PAY ITEM	UNIT	S.P. 6284-162		S.A.P. 062-609-006		S.A.P. 062-593-003		TOTAL QUANT.
(4) PAVT MSSG PREF TAPE GR IN	SQ FT			240		82.32		322.32
(5) PAVT MSSG PREF THERMO GR IN	SQ FT					493.61		493.61
CROSSWALK MARKING-PREF TAPE GR IN	SQ FT			1020				1020
CROSSWALK MARKING-PREF THERMO GR IN	SQ FT					135		135

GENERAL NOTES:

1. LENGTHS ARE APPROXIMATE AND DO NOT INCLUDE GAPS.

SPECIFIC NOTES:

(1) 10' STRIPE, 40' GAP	(4) 11 LT ARROW (165 SQ FT)	(5) 1 LT ARROW (15 SQ FT)
(2) 6' STRIPE, 3' GAP	7 RT ARROW (105 SQ FT)	5 THRU ARROW (60.05 SQ FT)
(3) 3' STRIPE, 3' GAP	2 LT-THRU ARROW (52.32 SQ FT)	12 LT-THRU ARROW (313.92 SQ FT)
		4 RT-THRU ARROW (104.64 SQ FT)

I HEREBY CERTIFY THAT SHEETS SS1 THROUGH SS68 OF THIS PLAN WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: MARK A. WAGNER LICENSE # 51660

DATE: 1/6/2016 SIGNATURE: *Mark Wagner*

DESIGNER CORY I. FLOR

TITLE:

PERMANENT PAVEMENT MARKING
TITLE SHEET

SS1 OF SS68

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2/16/2016

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SIGN PANELS TYPE C

5

SIGN NO.	S.P. 6284-162 (I35W)	S.P. 062-609-006	S.A.P. 062-593-003	TOTAL QUANT.	POSTS			(1) MTG. HT. (FT)	PANELS					TOTAL AREA (SQ FT)	CODE NO.	PANEL LEGEND
					NO. & TYPE	KNEE BRACES QUANT.	LENGTH (FT)		SIZE (IN.)	AREA (SQ FT)	S.P. 6284-162 (I35W)	S.A.P. 062-609-006	S.A.P. 062-593-003			
C-1		1		1	2-U	1	14	7	36 x 36	9.00			9.00	W6-3	TWO-WAY TRAFFIC	
C-2		1		1	2-U	1	13	7	54 x 30	11.25			11.25	R3-30ACA	L-T-R	
C-3		3		3	2-U	1	14	7	36 x 36	9.00			27.00	R3-7	RIGHT LANE MUST TURN RIGHT	
C-4		1		1	2-U	1	14	7	36 x 36	9.00			9.00	R1-1	STOP	
(3) C-5		5		5	1-U		11	7	24 x 30	5.00			25.00	R4-7	KEEP RIGHT	
									18 x 18					X4-13	CYLINDER DELINEATOR	
(3) C-6		3		3	1-U		10	7	36 x 36	9.00			27.00	R5-1	DO NOT ENTER	
C-7		1		1	2-U	1	13	7	48 x 30	10.00			10.00	R3-30ACD	L-T-TR	
C-8		3		3	2-U	1	13	7	54 x 30	11.25			33.75	R3-30CCA	T-T-R	
(3) C-9		2		2	1-U		10	7	36 x 30	7.50			15.00	R3-30AB	L-L	
C-10	2	2	1	5	2-U	1	14	7	36 x 36	9.00	18.00		45.00	R5-1	DO NOT ENTER	
C-11		1		1	2-U		13	7	36 x 30	7.50			7.50	R3-30AB	L-L	
C-12																
C-13	1			1	2-U	1	15	7	24 x 12	2.00	2.00		2.00	M3-1a	NORTH	
									30 x 24	5.00	5.00		5.00	M1-1	35W	
									21 x 15	2.19	2.19		2.19	M6-3a	UP ARROW	
C-14			4	4	2-U	1	16	7	36 x 12	3.00			12.00	W16-17P	ROUNDABOUT	
									30 x 30	6.25			25.00	W2-6a	ROUNDABOUT ARROWS	
									18 x 18	2.25			9.00	W13-1P	ADVISORY SPEED	
(3) C-15		2		2	2-U		14	7	30 x 36	7.50			15.00	D4-2	PARK AND RIDE (60 DEG ARROW)	
C-16			6	6	1-U		14	7	48 x 48 x 48	6.93			41.58	R1-2	YIELD	
									30 x 36	7.50			45.00	R6-2R	ONE WAY RIGHT	
C-17			9	9	2-U	1	15	7	48 x 48 x 48	6.93			62.37	R1-2	YIELD	
(3) C-18			9	9	1-U		11	7	54 x 18	6.75			60.75	R6-1R	ONE WAY RIGHT	
									60 x 24	10.00			90.00	R6-4b	4 CHEVRONS	
C-19			3	3	2-U	2	17	7	48 x 48 x 48	6.93			20.79	R1-2	YIELD	
									30 x 36	7.50			22.50	R6-2R	ONE WAY RIGHT	
C-20			2	2	2-U	1	13	7	42 x 30	8.75			0.00	R5-1a	WRONG WAY	
C-21			2	2	1-U		13	7	18 x 24	3.00			0.00	R5-10d	PEDESTRIANS BICYCLES PROHIBITED	
(6) C-22	1			1	2-U	1	15	7	24 x 12	2.00	2.00		2.00	M3-1a	NORTH	
									30 x 24	5.00	5.00		5.00	M1-1	35W	
									24 x 18	3.00	3.00		3.00	M5-4a	LEFT LANE	
C-23			2	2	2-U	1	16	7	36 x 36	9.00			18.00	W11-2	PEDESTRIAN	
									30 x 24	5.00			10.00	W16-7mPL	DOWN LEFT ARROW	
C-24	1		1	2	2-U	1	14	7	36 x 36	9.00	9.00		9.00	R16-X4	EMERGENCY STOPPING ONLY	
(3) C-25			1	1	1-U		11	7	48 x 48 x 48	6.93			6.93	R1-2	YIELD	
C-26			1	1	2-U	1	14	7	36 x 36	9.00			9.00	W3-2	YIELD AHEAD	
C-27			1	1	2-U	1	15	7	21 x 15	2.19			2.19	M2-1a	JCT	
									24 x 12	2.00			2.00	M3-1a	NORTH	
									30 x 24	5.00			5.00	M1-1	35W	
C-28	1			1	2-U	1	14	7	36 x 36	9.00	9.00		9.00	W12-1	DIAGONAL DOWN ARROWS	
C-29	1		1	2	2-U	1	14	7	30 x 36	7.50	7.50		7.50	W14-X9	WATCH FOR BUSES ON SHOULDER	
(4) C-30	1			1	1-ST	1	15	7	48 x 48	16.00	16.00		16.00	W4-3R	LANE ADDED RIGHT	
C-31	1			1	1-ST	1	15	7	48 x 48	16.00	16.00		16.00	W4-1R	MERGING TRAFFIC RIGHT	
C-32	1			1	2-U	1	19	7	48 x 96	32.00	32.00		32.00	R2-4B	SPEED LIMIT 65 MINIMUM 40	
C-33			4	4	2-U		13	7	36 x 30	7.50			30.00	R3-30EE	LT-TR	
(5) C-34			2	2	1-ST		10	7	36 x 30	7.50			15.00	R3-30DC	LT-T	
C-35			1	1	2-U		13	7	36 x 30	7.50			7.50	R3-30DA	LT-R	
C-36			2	2	2-U	1	15	7	48 x 48	16.00			32.00	W3-2	YIELD AHEAD	
C-37			2	2	2-U	1	17	7	36 x 12	3.00			6.00	W16-17P	ROUNDABOUT	
									36 x 36	9.00			18.00	W2-6a	ROUNDABOUT ARROWS	
									30 x 30	6.25			12.50	W13-1P	ADVISORY SPEED	
									TOTAL		126.69	207.50	572.11	906.30		

SPECIFIC NOTES:

- (1) MOUNTING HEIGHT IS MINIMUM (WITH A +6 INCH TOLERANCE) SEE SHEET NO. 318 FOR TYPICAL MOUNTING.
- (2) FOR PUNCHING AND MOUNTING DETAILS, SEE SHEET NO. 319.
- (3) MOUNT IN CONCRETE, SEE SHEET NO. 321.
- (4) PLACE PER MANUFACTURER'S DETAIL USING A 10 GAUGE, 2-1/2" x 2-1/2" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE POST WITH A 10 GAUGE, 2-3/16" x 2-3/16" x 8', PRE-PUNCHED GALVANIZED STEEL INTERNAL SQUARE TUBE INSERT. THIS ASSEMBLY REQUIRES STRINGERS AND SLIP BASES.
- (5) MOUNT IN CONCRETE ON BRIDGE, SEE SHEET NO. 321.
- (6) MOUNT ON WALL. CONTRACTOR SHALL SUBMIT MOUNTING DETAIL TO THE ENGINEER PRIOR TO INSTALLATION.

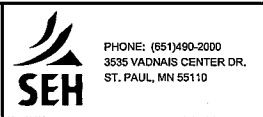
GENERAL NOTES:

1. POST LENGTHS ARE APPROXIMATE AND INCLUDE EMBEDMENT, BUT DO NOT INCLUDE ADDITIONAL LENGTH REQUIRED FOR SPLICE.
2. SEE SHEETS 317 TO 319 FOR STRUCTURAL DETAILS.
3. SEE STANDARD SIGNS MANUAL FOR PUNCHING CODE AND DETAILED DRAWINGS OF TYPE C SIGN PANELS.
4. SIGNS PAID FOR UNDER S.A.P. 062-593-003 AND S.A.P. 062-609-006 SHALL BE FURNISHED AND INSTALLED ACCORDING TO DETAILS ON SHEET 321.

REMOVE SIGN TYPE C				
	S.P. 6284-162	S.A.P. 062-696-030	S.A.P. 062-593-003	TOTAL QUANTITY
QUANTITY	12	15	35	62

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	MAW			
CHECKED BY:	MAW			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.A.P. 062-609-006, S.A.P. 062-593-003

SIGNING & STRIPING PLAN
 TABULATIONS

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REMOVE SIGN TYPE A											
SIGN NO.	S.P. 6284-162	S.P. 062-609-006	S.A.P. 062-593-003	TOTAL QUANTITY	LOCATION	PANEL SIZE (IN.)		POSTS			
						EXTRUDED TYPE	FLAT SHEET	SIZE		L1 (FT.)	L2 (FT.)
								BREAK-AWAY	NON BREAK-AWAY		
A 135W-022	1			1	379+25 NB	162 x 72		W6 x 20	16.0	18.0	
TOTAL	1			1							

SIGN PANEL OVERLAY TYPE A (1)							
SIGN NO.	LOCATION	OVERLAY (IN.)	AREA (SQ. FT.)	S.P. 6284-162 AREA (SQ. FT.)	S.P. 062-609-006 AREA (SQ. FT.)	S.A.P. 062-593-003 AREA (SQ. FT.)	TOTAL AREA (SQ. FT.)
A 135W-020	321+85 NB	186 x 90	116.25	116.25			116.25
TOTAL			116.25	116.25			116.25

SPECIFIC NOTES:
 (1) SEE SHEET 304 FOR SIGN PANEL OVERLAYS.

SIGN PANELS TYPE A (2)			
SIGN NO.	LOCATION	SIZE (IN.)	AREA (SQ FT)
A 135W-047	237+00 NB	186 x 96	124.00
A 135W-018	278+50 NB	186 x 96	124.00
TOTAL			248.00

SPECIFIC NOTES:
 (2) PAID FOR UNDER S.P. 6284-162.
 (3) SEE SHEET 304 FOR SIGN PANELS.
 (4) SEE SHEET 315A FOR STRUCTURAL DETAILS.

REMOVE SIGN PANEL TYPE A (5)			
SIGN NO.	LOCATION	PANEL SIZE (IN.)	
		EXTRUDED TYPE	FLAT SHEET
A 135W-047	237+00 NB	126 x 96	
A 135W-018	278+50 NB	156 x 96	
TOTAL	2		

SPECIFIC NOTES:
 (5) PAID FOR UNDER S.P. 6284-162

REMOVE SIGN TYPE EO (1)					
SIGN NO.	QUANTITY	LOCATION	POST NO. & TYPE	PANEL SIZE (IN.)	LEGEND
EO-101	2	OH 135W-065, OH 135W-069	3-U	114 x 30	EXIT 28C
TOTAL	2				

SPECIFIC NOTES:
 (1) PAID FOR UNDER S.P. 6284-162.

SIGN PANELS TYPE EO (2)								
SIGN NO.	QUANTITY	LOCATION	PANELS			POSTS		LEGEND
			SIZE (IN.)	AREA (SQ FT)	TOTAL AREA (SQ FT)	NO.	SPACING (IN.)	
EO-1	1	OH 135W-457	114 x 30	23.75	23.75	3	42	EXIT 28B
EO-2	1	OH 135W-454	114 x 30	23.75	23.75	3	42	EXIT 28C
EO-3	2	OH 135W-454, OH 135W-455	114 x 30	23.75	47.50	3	42	EXIT 28D
EO-4	2	OH 135W-065, OH 135W-069	138 x 30	28.75	57.50	3	48	EXIT 28D-C
EO-5	1	OH 135W-455	96 x 30	20.00	20.00	2	54	EXIT 29
EO-6	1	OH 135W-453	96 x 30	20.00	20.00	2	54	EXIT 30
TOTAL					192.50			

SPECIFIC NOTES:
 (2) PAID FOR UNDER S.P. 6284-162.
 GENERAL NOTES:
 1. SEE SHEET 320 FOR STRUCTURAL DETAIL.
 2. POST SPACING MAY BE VARIED TO MISS MEMBERS OF OH SIGN STRUCTURES.
 3. SEE SHEET 308 FOR SIGN PANELS.

SIGN PANELS TYPE OH (1)(2)						
SIGN NO.	LOCATION	PANEL		PANEL		TOTAL AREA (SQ FT)
		SIZE (IN.)	AREA (SQ FT)	SIZE (IN.)	AREA (SQ FT)	
OH 135W-457	360+00 SB	168 x 120	140.00			140.00
OH 135W-453	299+77 NB	132 x 108	99.00			99.00
OH 135W-454	329+00 NB	144 x 78	78.00	192 x 78	104.00	182.00
OH 135W-455	345+50 NB	132 x 78	71.50	180 x 78	97.50	169.00
OH 135W-456	359+20 NB	276 x 90	172.50			172.50
TOTAL						762.50

SPECIFIC NOTE:
 (1) SEE SHEETS 306 TO 307 FOR SIGN PANELS
 (2) PAID FOR UNDER S.P. 6284-162

SALVAGE SIGN TYPE OH (3)					
OH SIGN NO.	LOCATION	TYPE	POST TYPE	SPAN	REMARKS
OH 135W-436	329+00 NB	CANTILEVER	2E	23'-0"	SEE SPECIAL PROVISIONS
TOTAL	1				

SPECIFIC NOTES:
 (3) PAID FOR UNDER S.P. 6284-162.

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: MAW				
CHECKED BY: MAW				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 1/6/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

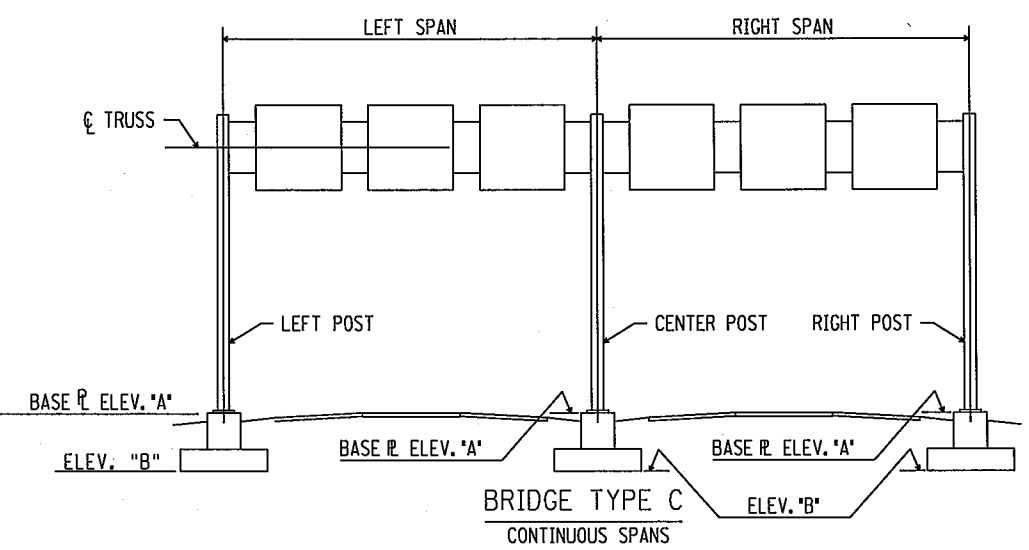
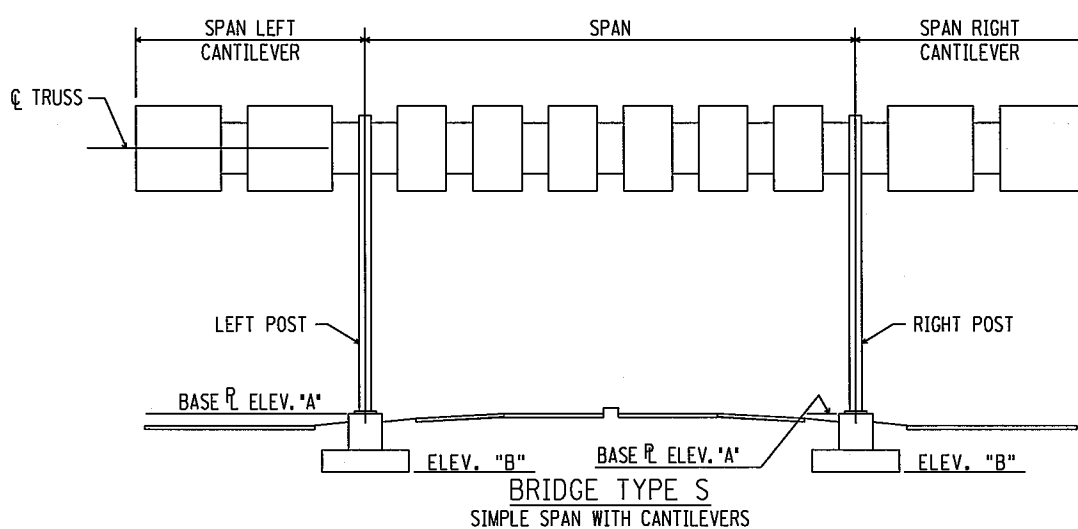
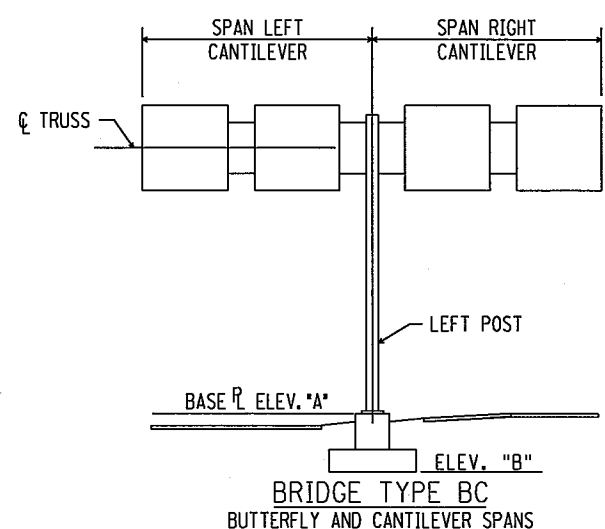
SIGNING & STRIPING PLAN
 TABULATIONS

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OVERHEAD SIGN STRUCTURES

SIGN NO.	STATION	BRIDGE TYPE	TRUSS TYPE	SPAN LENGTHS				LOW STEEL ELEVATION SEE ST-1	LEFT POST		CENTER POST		RIGHT POST			
				LEFT CANT.	RIGHT CANT.	SPAN OR LEFT SPAN	RIGHT SPAN		ELEVATION (3)		TYPE	ELEVATION (3)		TYPE	ELEVATION (3)	
									A	B		A	B		A	B
OH I35W-454	NB 329+00	BC	A	34				908.78	890.26	(4)	4E					
OH I35W-455	NB 345+50	BC	A	34				904.24	886.08	(4)	4E					

TABULATION OF OVERHEAD SIGN STRUCTURE QUANTITIES (3)(5)

SIGN NO.	OH I35W-454	OH I35W-455	TOTALS
STRUCT. STEEL POSTS	LBS. 4290	4152	8442
STRUCT. STEEL TRUSSES	LBS. 4182	4182	8364
STRUCT. STEEL PANEL MTG. POSTS	LBS. 350	350	700
CONCRETE FOOTINGS (SHAFT)	CU. YD. 6.9	6.9	13.8

SPECIFIC NOTES:

- (3) BASED ON TABULATED ELEVATIONS AND DIMENSIONS. REVISE AS NECESSARY USING QUANTITY TABLES ON SHEET 323 .
- (4) SHAFT FOOTING
- (5) PAID FOR UNDER S.P. 6284-162

GENERAL NOTES:

- 1. THE SUBSCRIPTION E ON THE POST TYPE DENOTES THE POST WHICH HAS THE HAND HOLE AND PROVISIONS FOR GROUNDING, I.E. POST TYPE 3E.
- 2. TABULATED ELEVATIONS AND DIMENSIONS ARE APPROXIMATE ONLY. FABRICATION DEPENDENT ON THESE ELEVATIONS AND DIMENSIONS SHALL NOT BE STARTED UNTIL THE ENGINEER HAS MADE FINAL DETERMINATION OF THEM IN THE FIELD.
- 3. LEFT AND RIGHT DESIGNATIONS ARE SHOWN IN DIRECTION OF TRAFFIC FLOW. WHEN TWO DIRECTIONS OF TRAFFIC ARE SPANNED THE DESIGNATIONS ARE SHOWN LOOKING UP STATIONING.
- 4. SEE SHEETS 322 TO 330 FOR DETAILS.
- 5. SEE SHEET 334 TO 334 FOR CROSS SECTIONS.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: Mark A. Wagner Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SIGNING & STRIPING PLAN
 TABULATIONS

FILE NO. 272
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 SS5
 OF 5568 367

SIGN PANELS OVERLAY TYPE OH (6)(7) [S]						
SIGN NO.	LOCATION	PANEL		PANEL		TOTAL AREA (SQ FT)
		SIZE (IN.)	AREA (SQ FT)	SIZE (IN.)	AREA (SQ FT)	
OH I35W-061(L)	286+95 NB	144 x 84	84.00			84.00
OH I35W-065(R)	372+50 SB	186 x 84	108.50			108.50
OH I35W-069(L)	404+15 SB	144 x 96	96.00			96.00
TOTAL						288.50

SPECIFIC NOTE:
 (6) SEE SHEET 305 FOR SIGN PANELS
 (7) PAID FOR UNDER S.P. 6284-162

OH SIGN IDENTIFICATION PLATE (8)(9) [S]			
OH SIGN NO.	QUANTITY (EACH)	LOCATION	IDENTIFICATION PLATE NO.
OH I35W-457	1	360+00 SB	35W-457
OH I35W-453	1	299+77 NB	35W-453
OH I35W-454	1	329+00 NB	35W-454
OH I35W-455	1	345+50 NB	35W-455
OH I35W-456	1	359+20 NB	35W-456
TOTAL		5	

SPECIFIC NOTES:
 (8) SEE MNDOT STANDARD SIGNS MANUAL FOR OVERHEAD IDENTIFICATION PLATE (X5-1) SIGN. SEE SHEET 316 FOR MOUNTING DETAILS.
 (9) PAID FOR UNDER 2564 (STRUCTURAL STEEL-POSTS FOR OH SIGNS).
 GENERAL NOTE:
 1. OH SIGN IDENTIFICATION PLATE ARE INCLUSIVE TO THE STRUCTURAL STEEL.

STRUCT. STEEL TRUSSES TYPE OH BR. MTD (7)(10)[S]		
OH SIGN NO.	BRIDGE NO.	POUNDS
OH I35W-457	62732	758.38
OH I35W-453	62911	656.92
OH I35W-456	62732	999.07
TOTAL		2414.37

SPECIFIC NOTES:
 (7) PAID FOR UNDER S.P. 6284-162
 (10) INCLUDES F. & I. OH SIGN IDENTIFICATION PLATE (X5-1)
 GENERAL NOTE:
 1. THE QUANTITIES SHOWN IN THIS TAB ARE INCLUDED IN THOSE SHOWN ON SHEET 272.

REMOVE EXT. PANEL SECTIONS TYPE OH (11)[S]			
SIGN NO.	LOCATION	PANEL SIZE (IN.)	
		REMOVE	MODIFIED
OH I35W-061(L)	286+95 NB	144 x 24	144 x 84

SPECIFIC NOTE:
 (11) PAID FOR UNDER 2564 SIGN PANEL OVERLAY TYPE OH.

MODIFY PANEL MOUNTING POST (12)(13) [S]				
SIGN NO.	PANEL MOUNTING POSTS			
	NO.	SIZE	EXTEND APPROX. (IN.)	SHORTEN APPROX. (IN.)
OH I35W-061	2	S4x7.7		24

SPECIFIC NOTES:
 (12) SEE SHEET 316 FOR DETAIL.
 (13) PAID FOR UNDER 2564 SIGN PANEL OVERLAY TYPE OH.

SIGN PANELS TYPE OVERLAY (1)(2) [S]					
SIGN NO.	QUANTITY	PANELS			PANEL LEGEND
		SIZE (IN.)	AREA (SQ FT)	TOTAL AREA (SQ FT)	
M1-1	3	22.5x 18	2.81	8.44	INTERSTATE 35W
M1-1	1	30 x 24	5.00	5.00	INTERSTATE 694
M1-4A	1	24 x 24	4.00	4.00	US 10
M1-4A	2	36 x 36	9.00	18.00	US 10
M1-6A	2	24 x 24	4.00	8.00	COUNTY 96
TOTAL				43.44	

SPECIFIC NOTES:
 (1) PAID FOR UNDER S.P. 6284-162.
 (2) SEE SHEETS 303 TO 307 FOR SIGN PANELS.

DELINEATORS & MARKERS [S]				
CODE NO.	S.P. 6284-162	S.P. 062-609-006	S.A.P. 062-593-003	LOCATION
(1),(2) OBJECT MARKER X4-4C	2			SEE SHEET SS31, SS32
(1),(3) YELLOW X4-6	9			SEE SHEET SS31, SS32
(1),(4) WHITE X4-6	4			SEE SHEET SS31, SS32
(1),(5) YELLOW X4-13		5		SEE SHEET SS19
TOTAL		15	5	

GENERAL NOTES:
 1. FOR DELINEATOR AND MARKER PLACEMENT, SEE SHEET 315.
 2. SEE MNDOT STANDARD SIGNS MANUAL FOR DELINEATOR AND MARKER SIGN DESIGN.

SPECIFIC NOTES:
 (1) PLACE ON 3LB/FT POST (MNDOT 3401).
 (2) SIZE SHALL BE 12 INCH BY 24 INCH.
 (3) ONE IS MOUNTED BELOW TYPE C SIGN.
 (4) ONE IS MOUNTED BELOW TYPE C SIGN.
 (5) MOUNTED BELOW TYPE C SIGN.

REMOVE MARKER [S]			
	S.P. 6284-162	S.P. 062-609-006	S.A.P. 062-593-003
TOTAL	1		

REMOVE DELINEATOR [S]			
	S.P. 6284-162	S.P. 062-609-006	S.A.P. 062-593-003
TOTAL	3		

REFERENCE LOCATION SIGN (6) [S]			
CODE NO.	TOTAL QUANTITY	SIZE (IN.)	LEGEND
D10-3	1	12 X 36	MILE 29
TOTAL		1	

GENERAL NOTES:
 1. FOR DELINEATOR AND MARKER PLACEMENT, SEE SHEET 315.
 2. SEE MNDOT STANDARD SIGNS MANUAL FOR DELINEATOR AND MARKER SIGN DESIGN.

SPECIFIC NOTES:
 (6) PLACE ON 3LB/FT POST (MNDOT 3401).

DESIGN TEAM				
DRAWN BY: CIE				
DESIGNER: MAW				
CHECKED BY: MAW				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

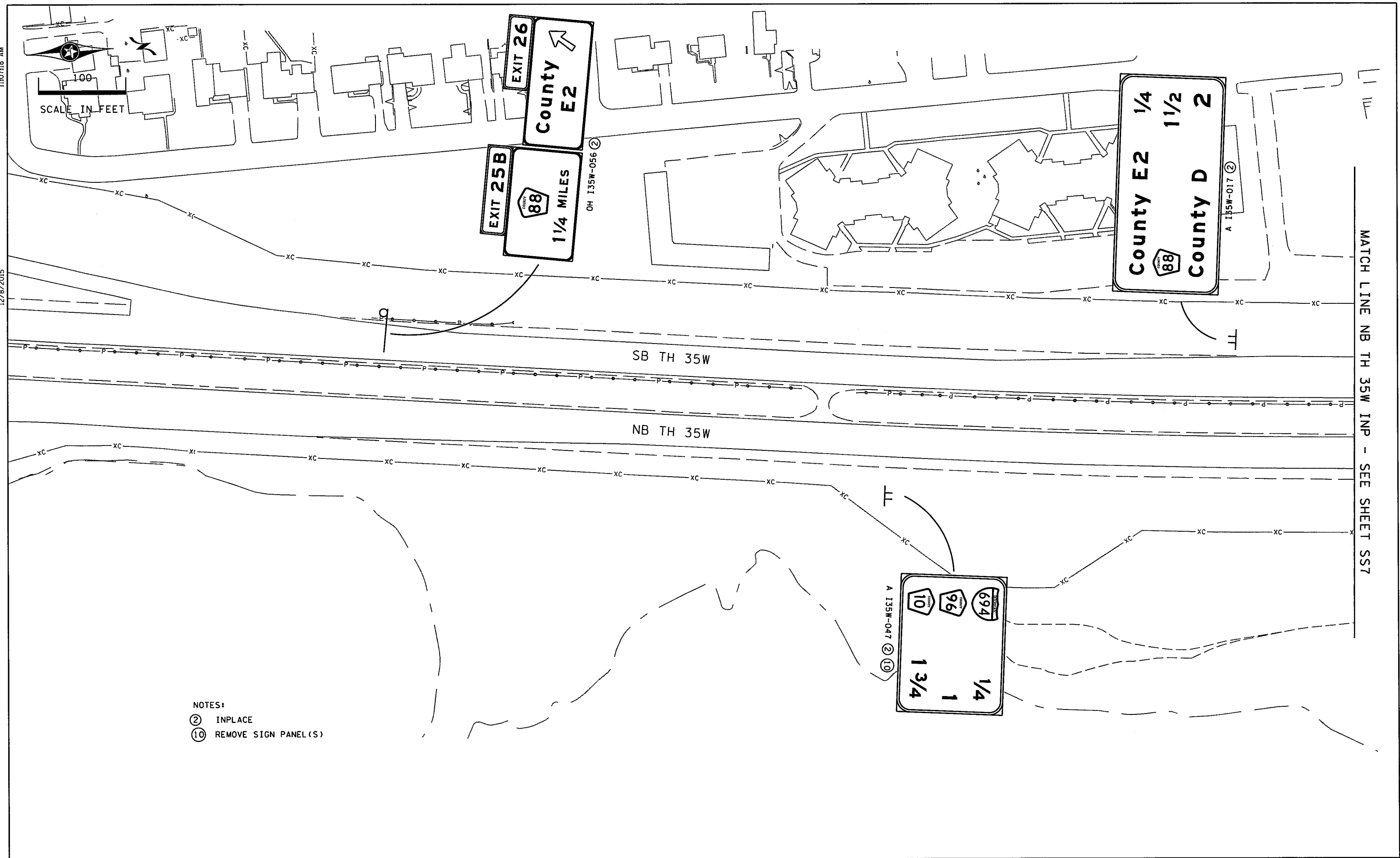
SIGNING & STRIPING PLAN
 TABULATIONS

FILE NO. RAMSEI29594	273
SS6 OF 5568	367

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12/8/2015

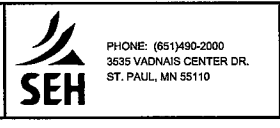
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NOTES:
 ② INPLACE
 ⑩ REMOVE SIGN PANEL(S)

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

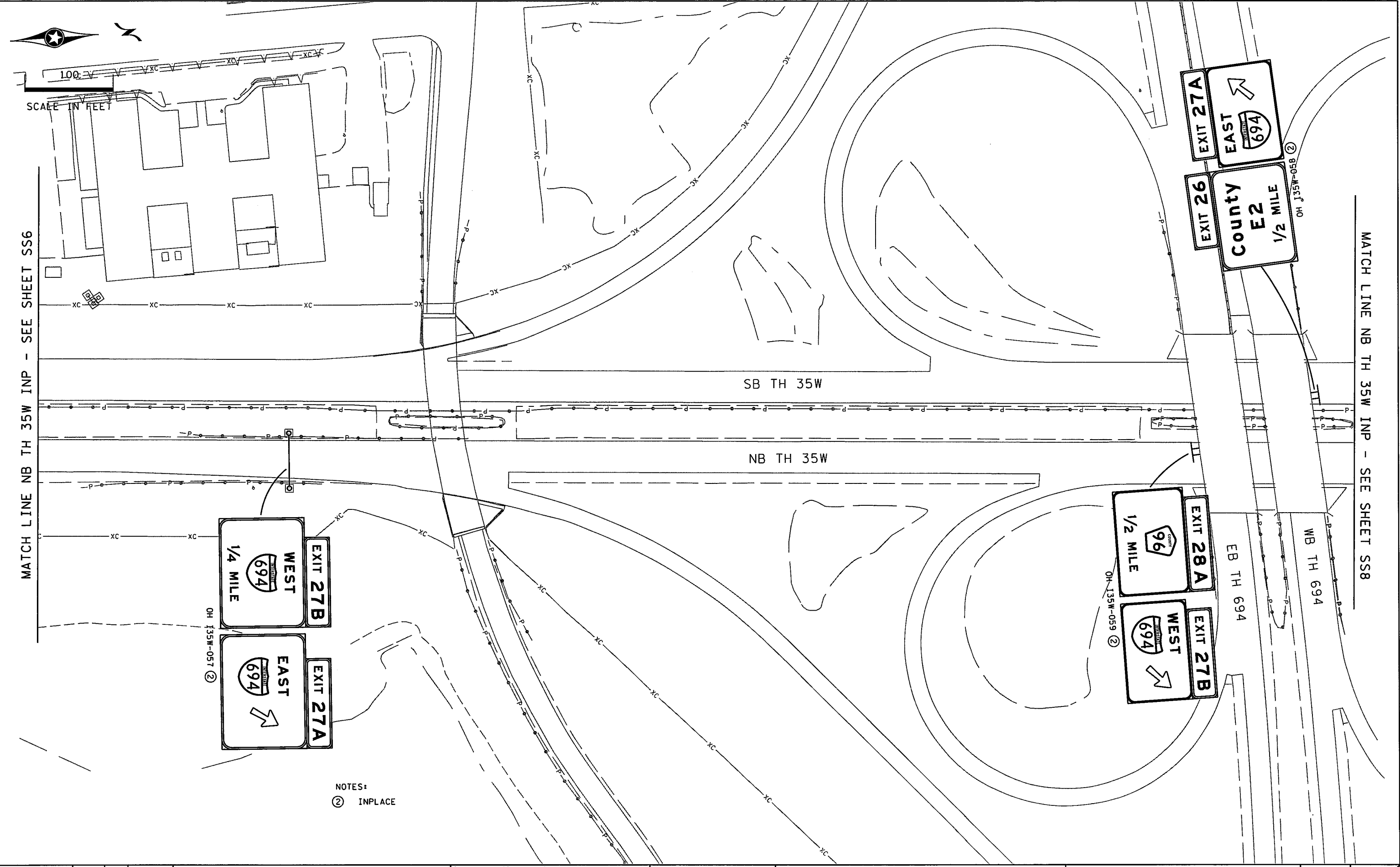


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN
 NB TH 35W INP

FILE NO.	274
RAMSE129594	
SS7	
OF SS65	367

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MATCH LINE NB TH 35W INP - SEE SHEET SS6

MATCH LINE NB TH 35W INP - SEE SHEET SS8

NOTES:
 ② INPLACE

DESIGN TEAM		NO.	BY	DATE	REVISIONS
DRAWN BY:	CIF				
DESIGNER:	MAW				
CHECKED BY:	MAW				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN
 NB TH 35W INP

FILE NO. RAMSEI29594	275
SS8 OF SS65	367

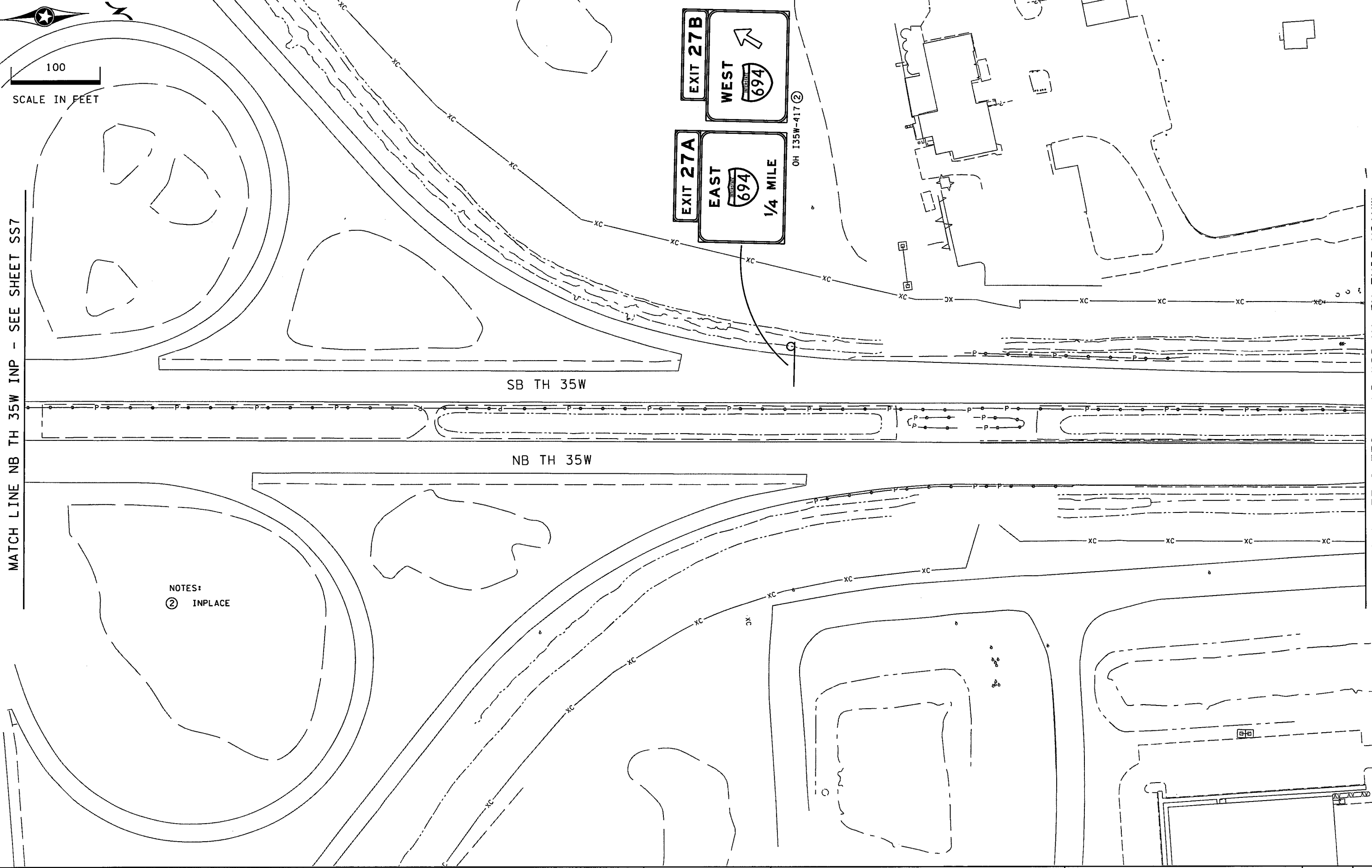
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12/8/2015

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MATCH LINE NB TH 35W INP - SEE SHEET SS7

MATCH LINE NB TH 35W INP - SEE SHEET SS9

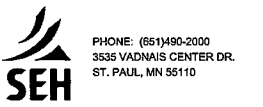


NOTES:
② INPLACE

DESIGN TEAM				
DRAWN BY:	CJF			
DESIGNER:	MAW			
CHECKED BY:	MAW			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

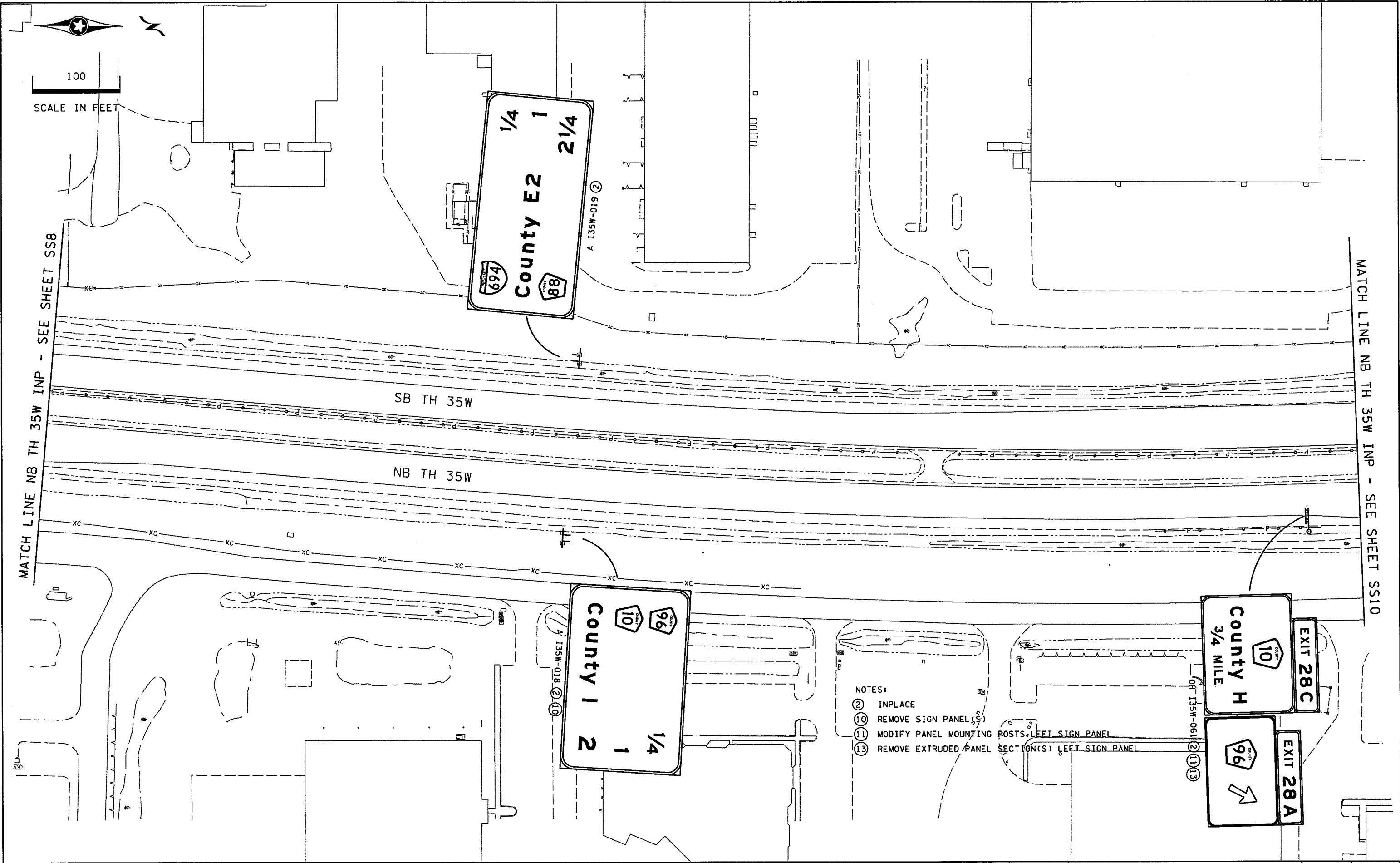


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN
 NB TH 35W INP

FILE NO. RAMSE129594	276
SS9 OF SS65	367

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- NOTES:
- (2) INPLACE
 - (10) REMOVE SIGN PANEL(S)
 - (11) MODIFY PANEL MOUNTING POSTS, LEFT SIGN PANEL
 - (13) REMOVE EXTRUDED PANEL SECTION(S) LEFT SIGN PANEL

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	MAW			
CHECKED BY:	MAW			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

SEH
 PHONE: (651)990-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

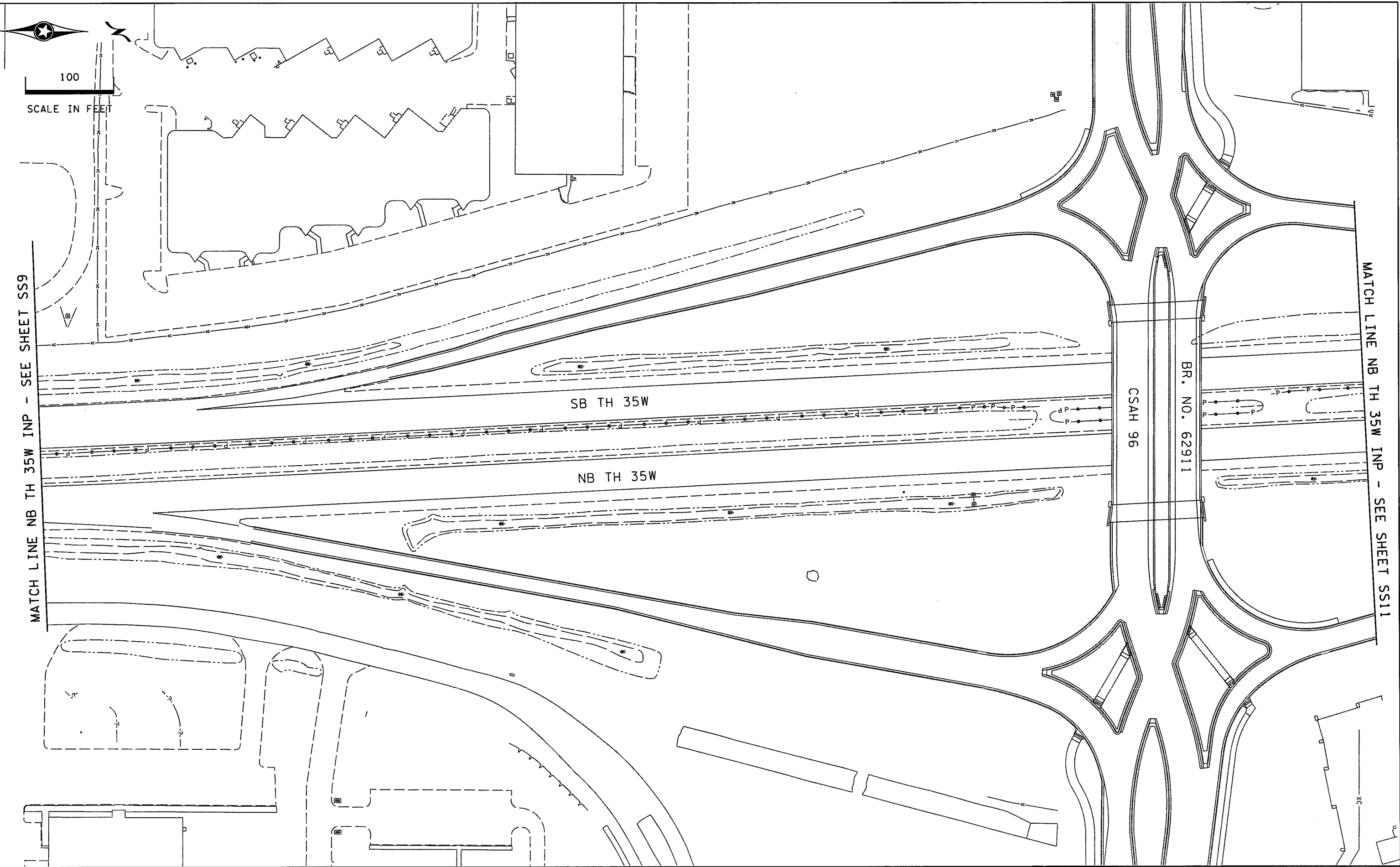
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN	FILE NO. 277
NB TH 35W INP	RAMSEI29594
	SS10
	OF 5565
	367

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12/8/2015

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es11



DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF						
DESIGNER:	MAW						
CHECKED BY:	MAW						
	NO.	BY	DATE				

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Certified By: *Mark A. Wagner* Lic. No. 51660
 Licensed Professional Engineer
 Printed Name: MARK A. WAGNER Date: 12/8/2015



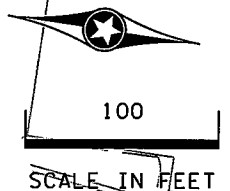
PHONE: (651) 998-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

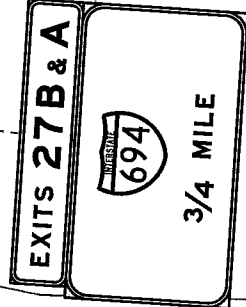
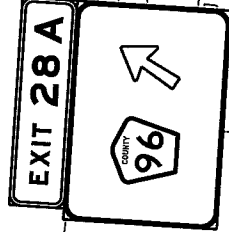
EXISTING SIGNING PLAN
 NB TH 35W INP

FILE NO.	278
RAMSE129594	
SS11	367
OF SS65	

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 es12



NOTES:
 ② INPLACE



OH 135W-062 ②

MATCH LINE NB TH 35W INP - SEE SHEET SS10

MATCH LINE NB TH 35W INP - SEE SHEET SS12

SB TH 35W

NB TH 35W

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
	NO.	BY	DATE
			REVISIONS

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 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



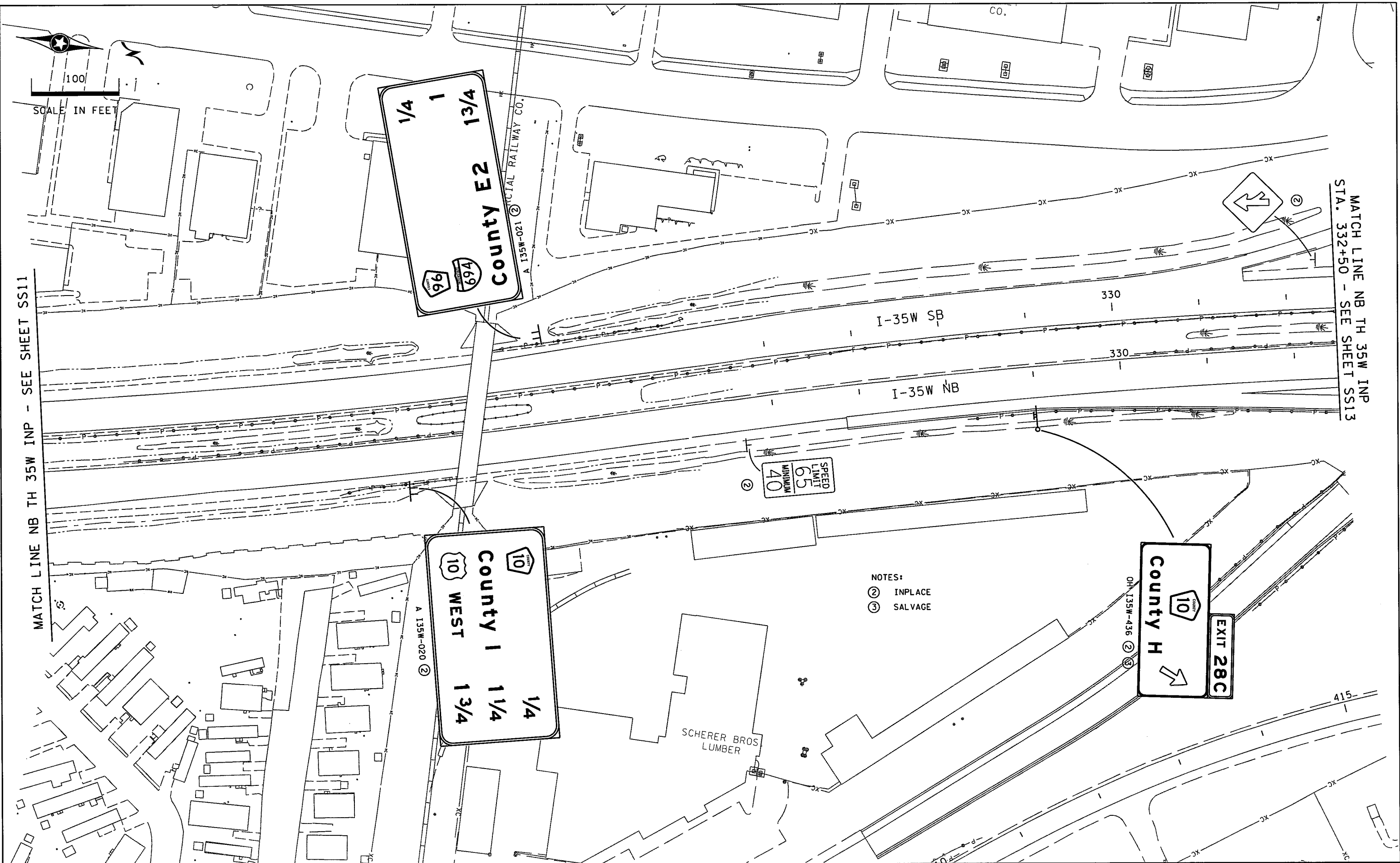
PHONE: (651)480-2000
 3635 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN
 NB TH 35W INP

FILE NO.	279
RAMSE129594	
SS12	367
OF 5565	

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12/8/2015
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es13



DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	MAW						
CHECKED BY:	MAW						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

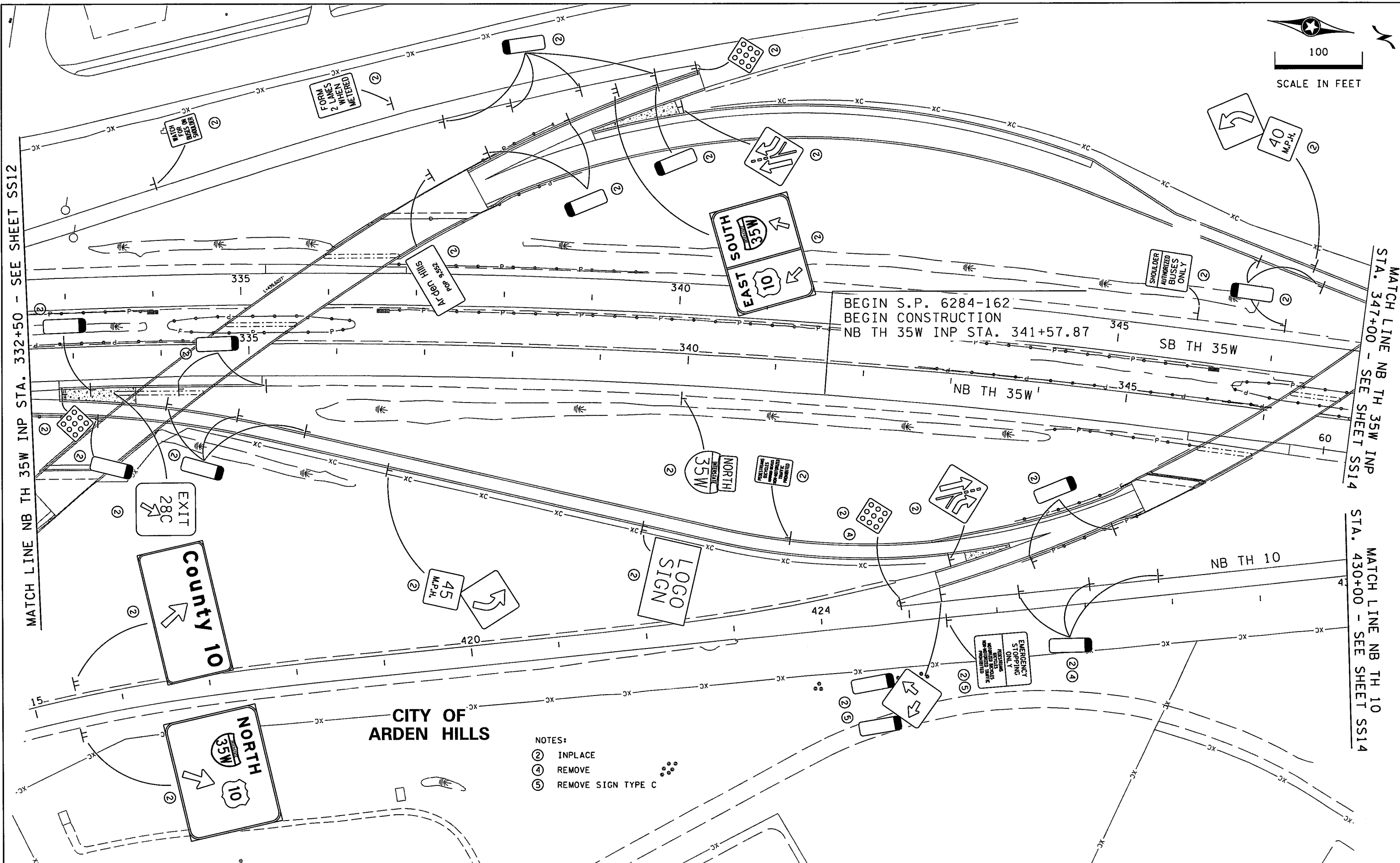
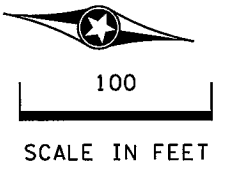
SEH
 PHONE: (651)490-2000
 3635 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN
 NB TH 35W INP STA. 326+00 - 332+50
 NB TH 10 STA. 405+00 - 415+50

FILE NO.	280
RAMSEI29594	
SS13	367
OF SS65	

11:07:21 AM
12/8/2015
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es14



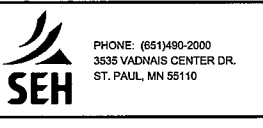
BEGIN S.P. 6284-162
BEGIN CONSTRUCTION
NB TH 35W INP STA. 341+57.87

**CITY OF
ARDEN HILLS**

- NOTES:
 ② INPLACE
 ④ REMOVE
 ⑤ REMOVE SIGN TYPE C

DESIGN TEAM			
DRAWN BY:	CF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



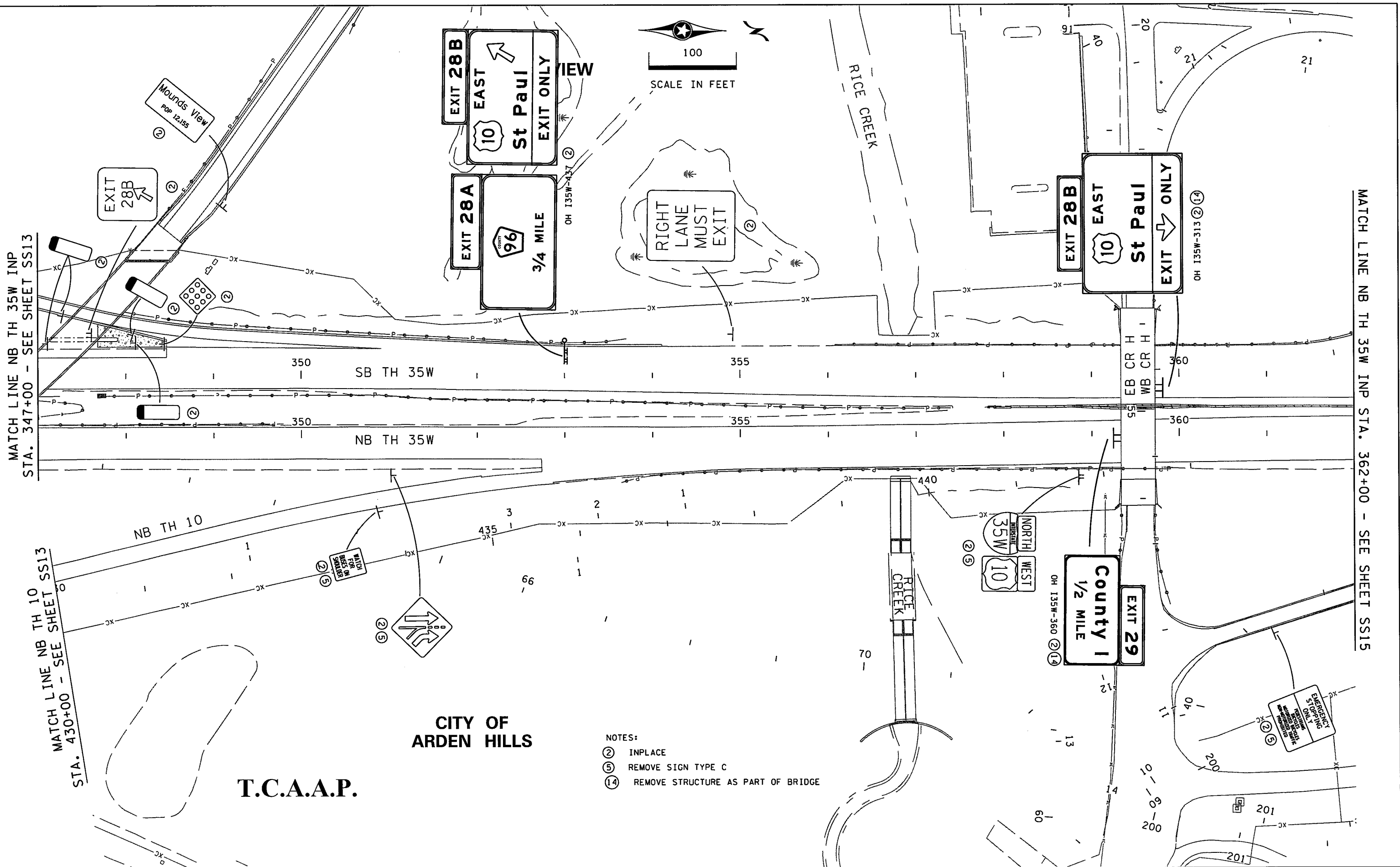
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	281
RAMSEY129594	
SS14	367
OF 5565	

11:07:22 AM

12/8/2015

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DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN
 NB TH 35W INP STA. 347+00 - 362+00
 NB TH 10 STA. 430+00 - 442+01

FILE NO.	282
RAMSE129594	
SS15	
OF SS65	367

- NOTES:
- (2) INPLACE
 - (5) REMOVE SIGN TYPE C
 - (14) REMOVE STRUCTURE AS PART OF BRIDGE

T.C.A.A.P.

CITY OF ARDEN HILLS

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET SS15

MATCH LINE NB TH 35W INP STA. 347+00 - SEE SHEET SS13

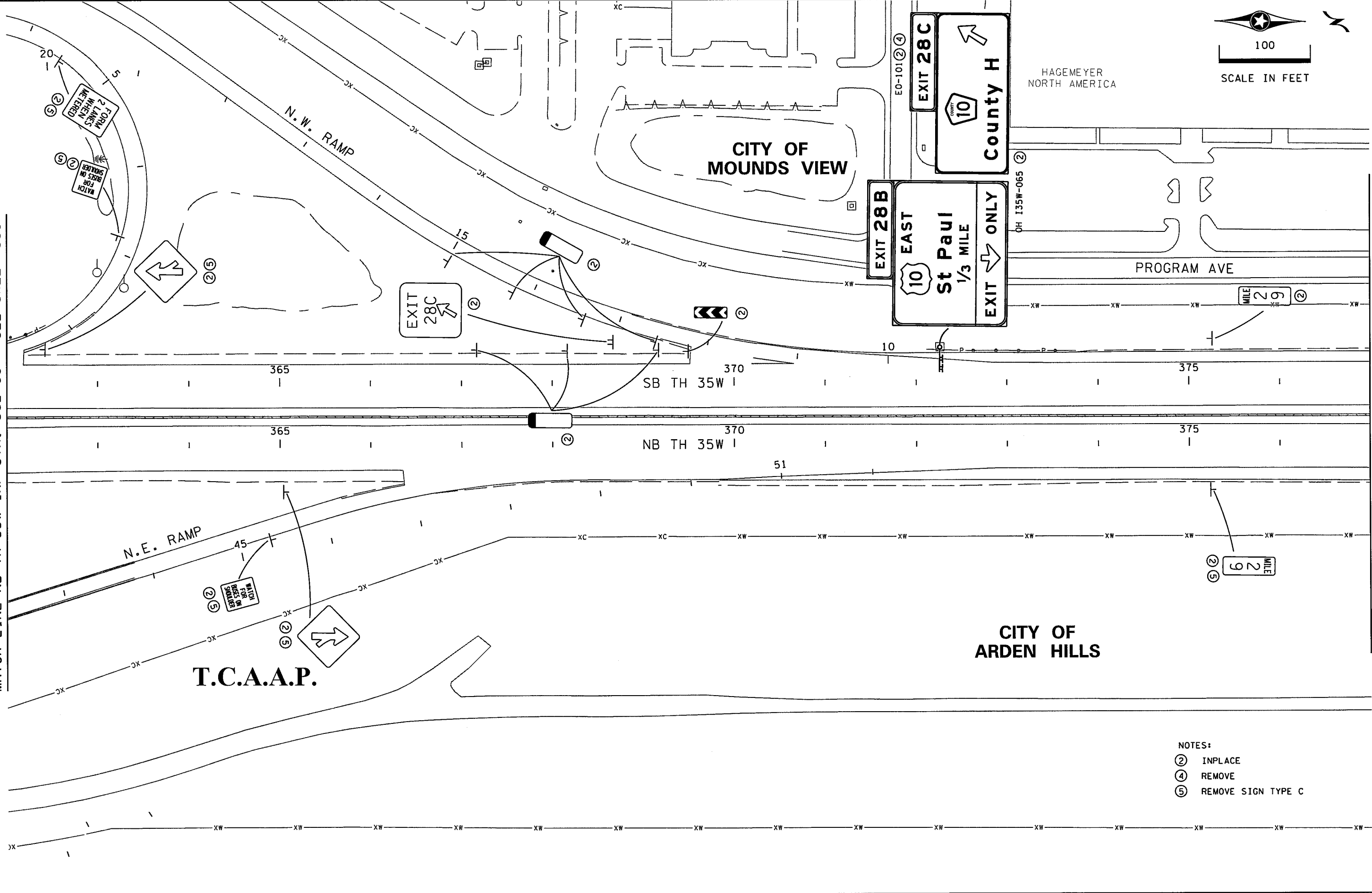
MATCH LINE NB TH 10 STA. 430+00 - SEE SHEET SS13

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12/8/2015 11:07:22 AM

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET SS14

MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET SS16



- NOTES:**
- ② INPLACE
 - ④ REMOVE
 - ⑤ REMOVE SIGN TYPE C

DESIGN TEAM					
DRAWN BY:	CIF				
DESIGNER:	MAW				
CHECKED BY:	MAW				
NO.	BY	DATE	REVISIONS		

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: Mark A. Wagner Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

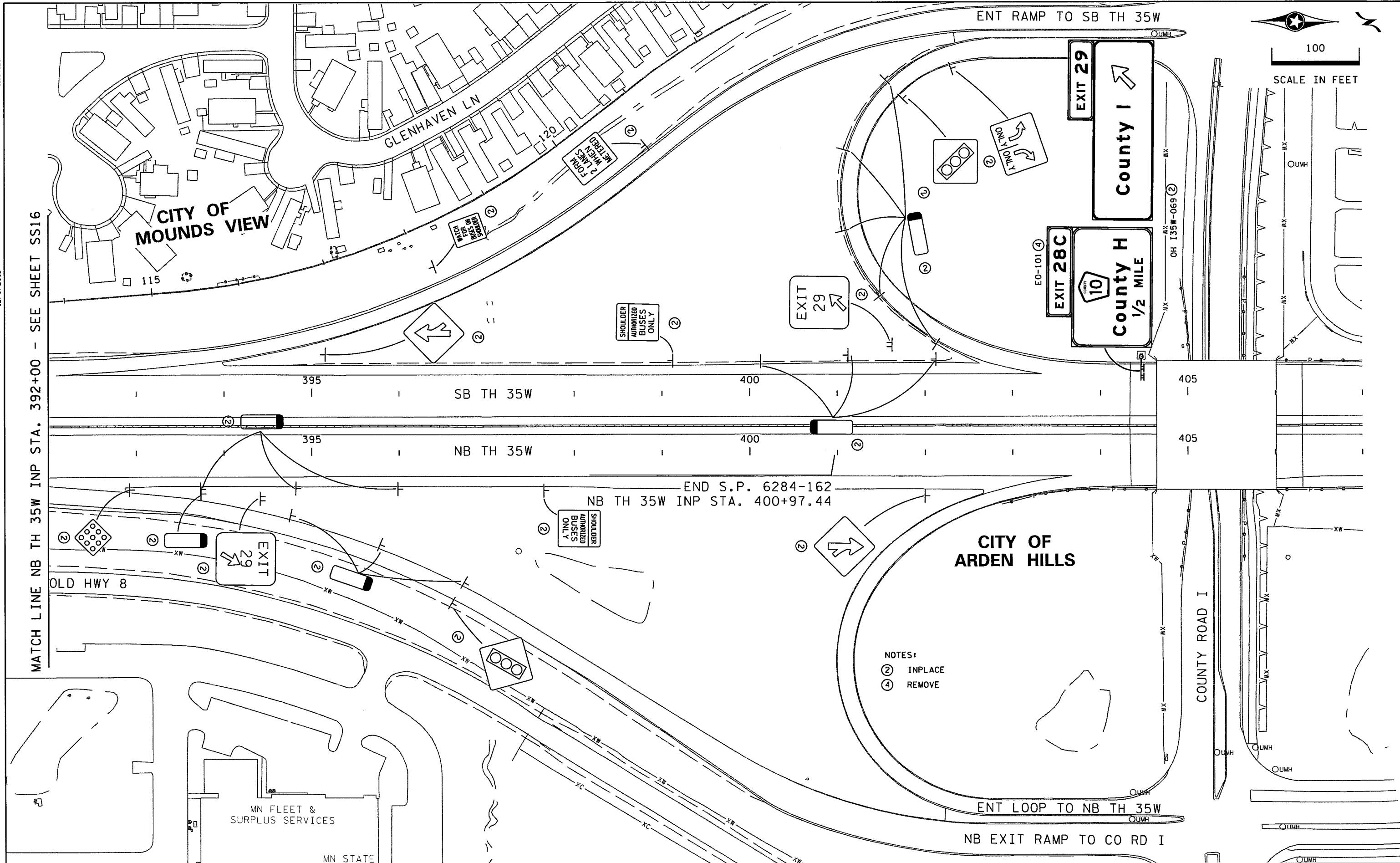
EXISTING SIGNING PLAN
 NB TH 35W INP STA. 362+00 - 377+00

FILE NO. 283
 RAMSE129594
 SS16 OF SS65
 367

11:07:23 AM

12/8/2015

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MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET SS16

OLD HWY 8

CITY OF MOUNDS VIEW

GLENHAVEN LN

SB TH 35W

NB TH 35W

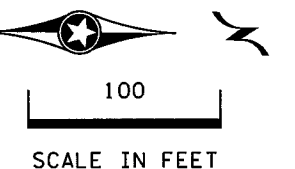
END S.P. 6284-162
NB TH 35W INP STA. 400+97.44

CITY OF ARDEN HILLS

COUNTY ROAD I

ENT LOOP TO NB TH 35W
NB EXIT RAMP TO CO RD I

ENT RAMP TO SB TH 35W



- NOTES:
- ② INPLACE
 - ④ REMOVE

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
	NO.	BY	DATE
			REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

EXISTING SIGNING PLAN		FILE NO.	285
		RAMSEI29594	
		SS18	367
		OF SS68	
NB TH 35W INP STA. 392+00 - 406+00			

10:43:40 AM

12/7/2015

K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\06284162_ss01.dgn

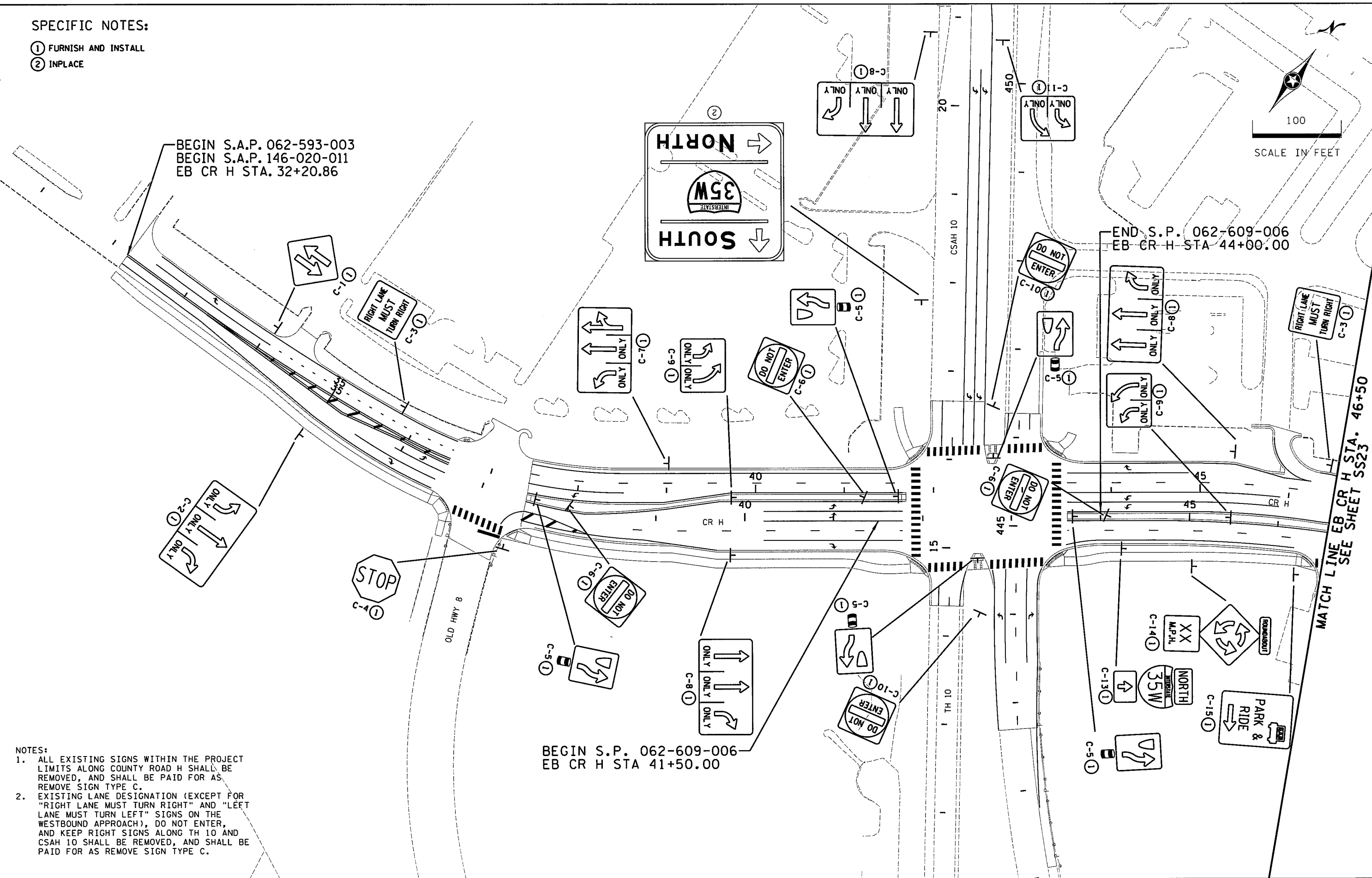
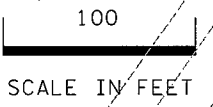
SPECIFIC NOTES:

- ① FURNISH AND INSTALL
- ② INPLACE

BEGIN S.A.P. 062-593-003
 BEGIN S.A.P. 146-020-011
 EB CR H STA. 32+20.86

END S.P. 062-609-006
 EB CR H STA. 44+00.00

BEGIN S.P. 062-609-006
 EB CR H STA. 41+50.00



- NOTES:**
1. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS ALONG COUNTY ROAD H SHALL BE REMOVED, AND SHALL BE PAID FOR AS REMOVE SIGN TYPE C.
 2. EXISTING LANE DESIGNATION (EXCEPT FOR "RIGHT LANE MUST TURN RIGHT" AND "LEFT LANE MUST TURN LEFT" SIGNS ON THE WESTBOUND APPROACH), DO NOT ENTER, AND KEEP RIGHT SIGNS ALONG TH 10 AND CSAH 10 SHALL BE REMOVED, AND SHALL BE PAID FOR AS REMOVE SIGN TYPE C.

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/7/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

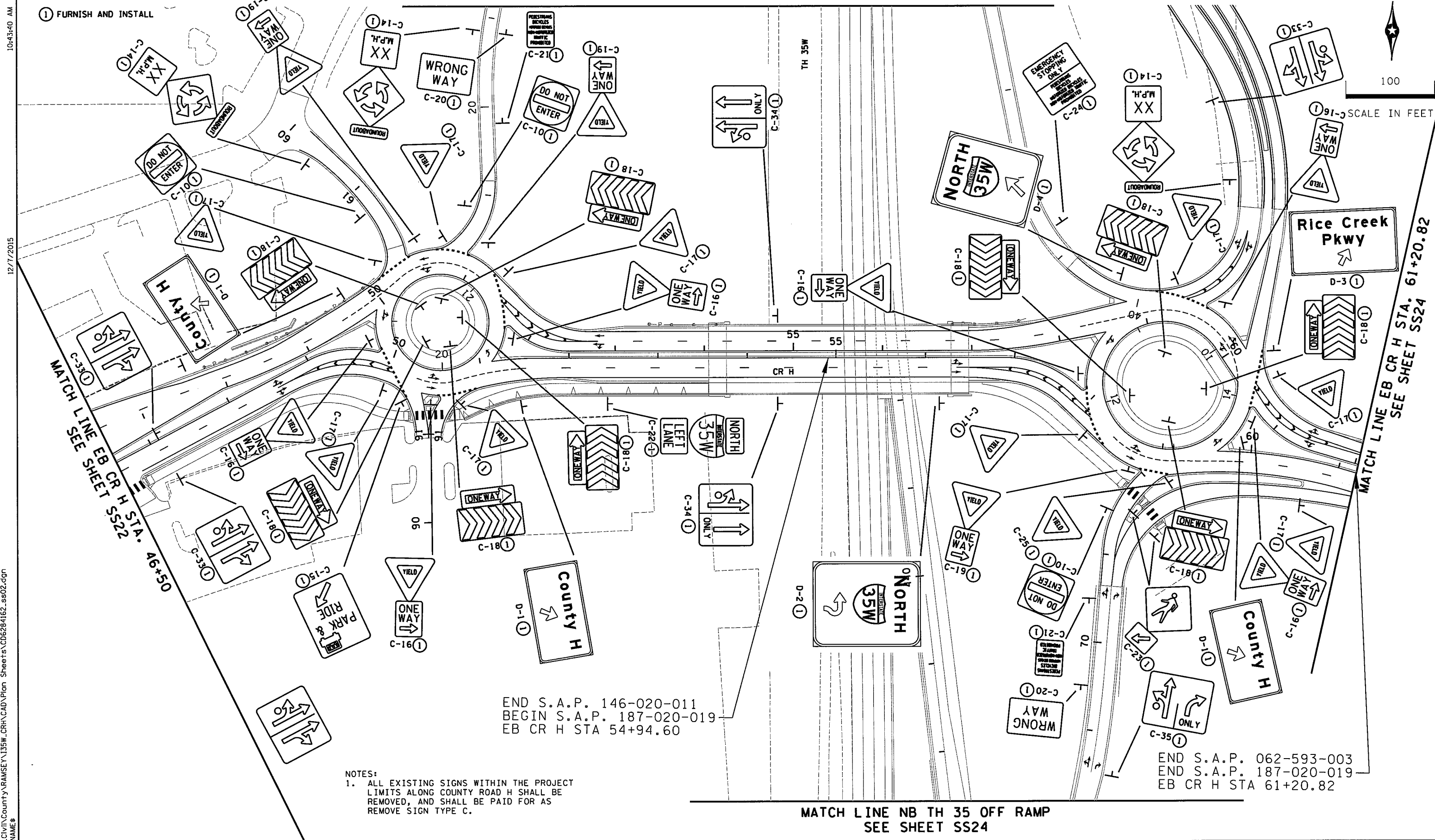
SIGNING PLAN
 EB CR H STA. 32+20 - 46+50

FILE NO.	286
RAMSE129594	
SS19	367
OF 568	

MATCH LINE SB TH 35 OFF RAMP
SEE SHEET SS24

SPECIFIC NOTES:

① FURNISH AND INSTALL



END S.A.P. 146-020-011
BEGIN S.A.P. 187-020-019
EB CR H STA 54+94.60

END S.A.P. 062-593-003
END S.A.P. 187-020-019
EB CR H STA 61+20.82

NOTES:
1. ALL EXISTING SIGNS WITHIN THE PROJECT LIMITS ALONG COUNTY ROAD H SHALL BE REMOVED, AND SHALL BE PAID FOR AS REMOVE SIGN TYPE C.

MATCH LINE NB TH 35 OFF RAMP
SEE SHEET SS24

10-43-40 AM
12/7/2015
K:\TWC\Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162_ss02.dgn
SMODELNAME\$

DESIGN TEAM				
DRAWN BY:	JAH			
DESIGNER:	JAH			
CHECKED BY:	BJR			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Brandon J. Bourdon* Lic. No. 43789
Printed Name: BRANDON J. BOURDON, P.E. Date: 12/7/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

SIGNING PLAN
EB CR H STA. 46+50 - 61+21

FILE NO.	287
RAMSEY129594	
SS20	367
OF 568	

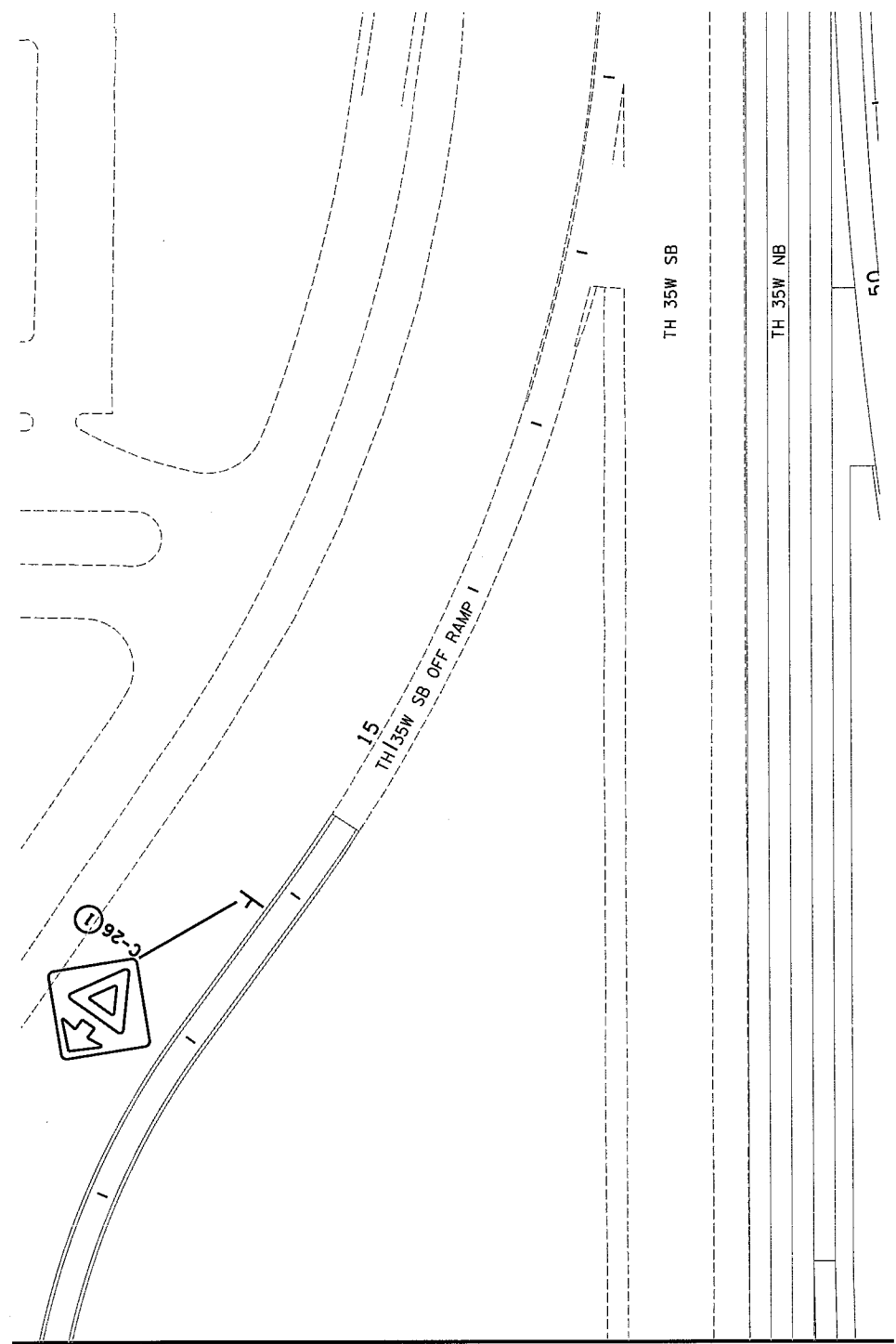
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 12/7/2015
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SPECIFIC NOTES:

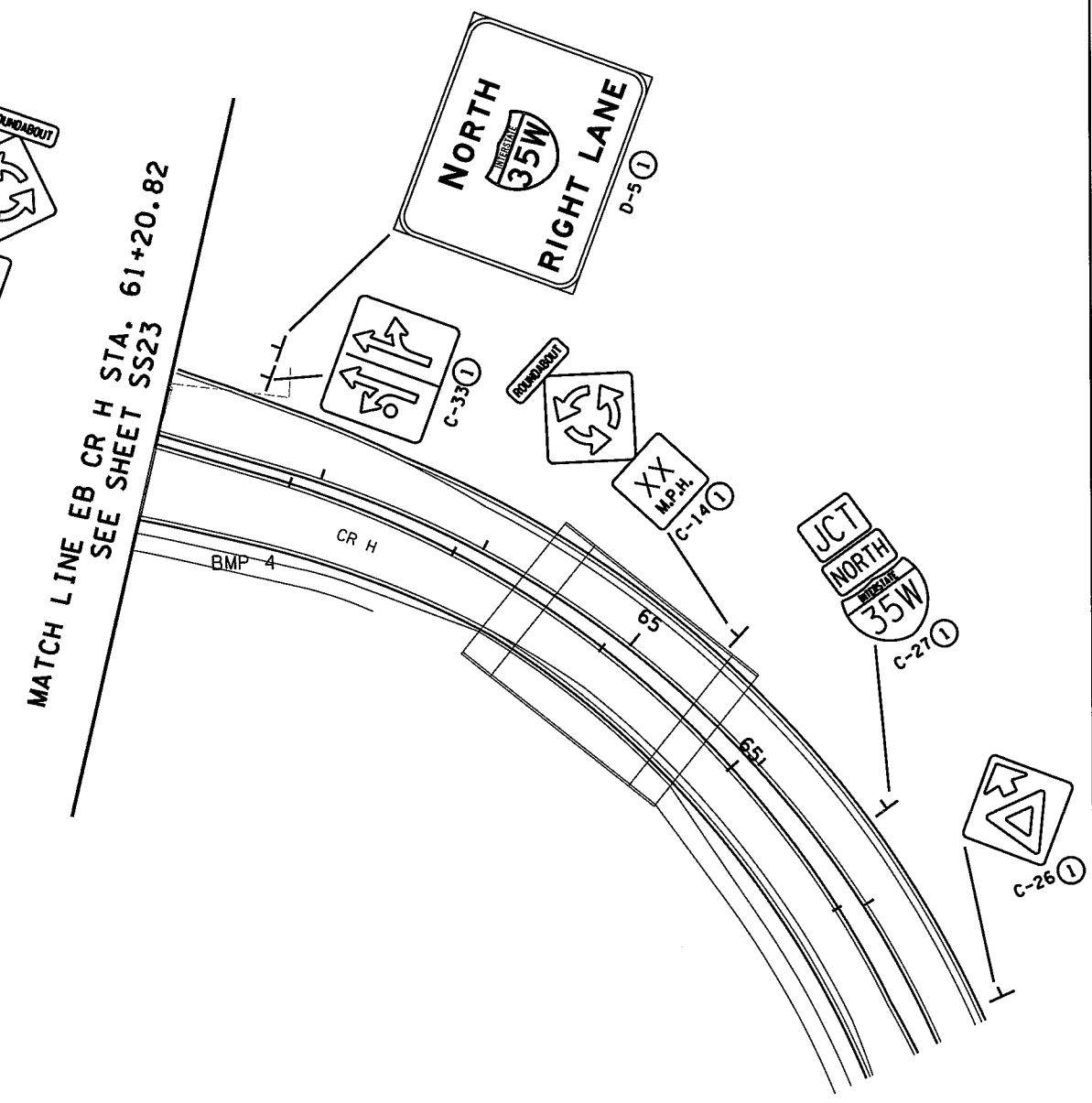
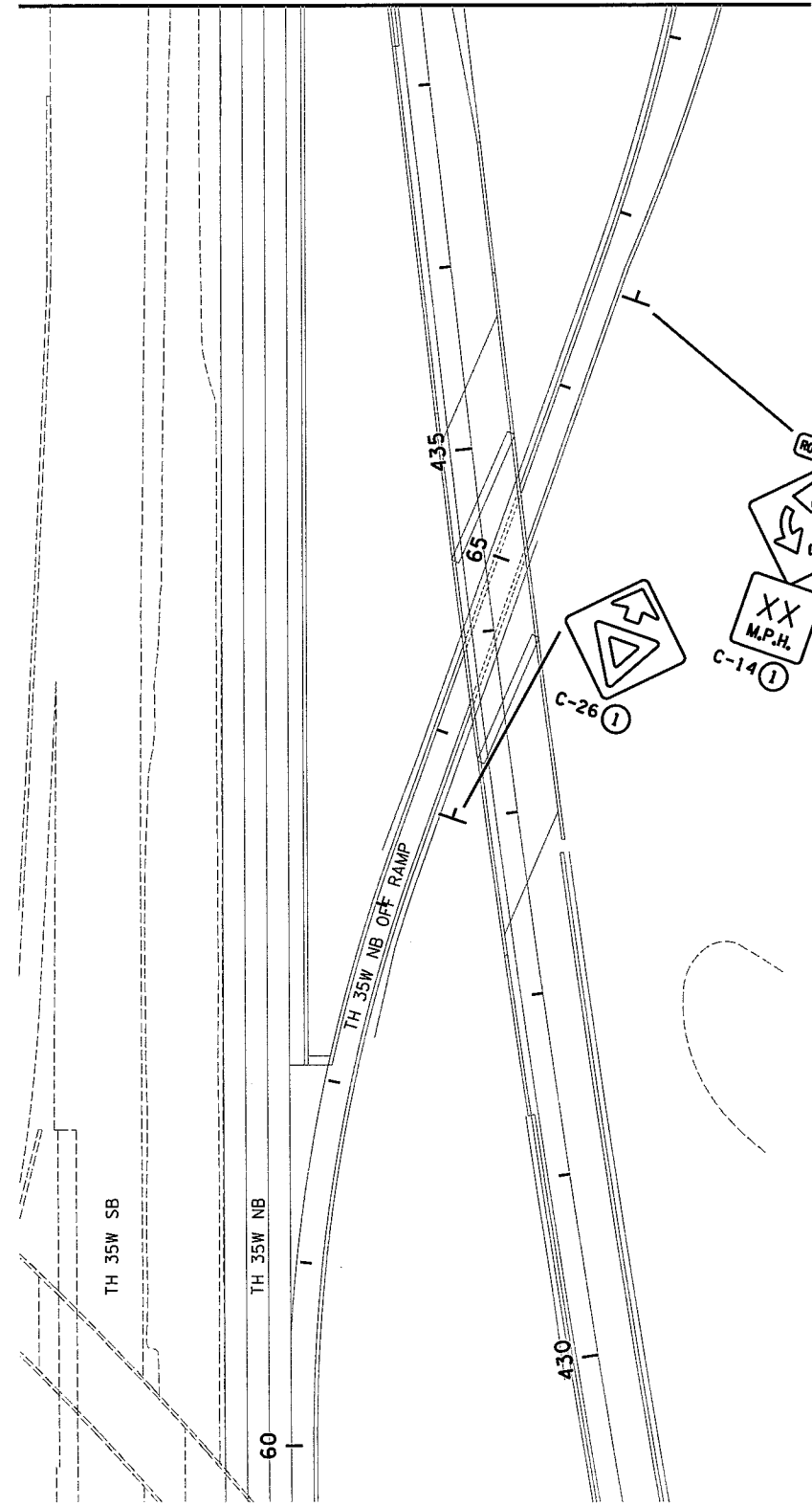
- ① FURNISH AND INSTALL



MATCH LINE NB TH 35 OFF RAMP
SEE SHEET SS23



MATCH LINE SB TH 35 OFF RAMP
SEE SHEET SS23



DESIGN TEAM				REVISIONS			
DRAWN BY:	JAH			NO.	BY	DATE	
DESIGNER:	JAH						
CHECKED BY:	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/7/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

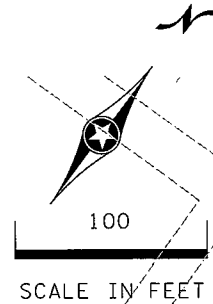
SIGNING PLAN
 EB CR H STA. 46+50 - 61+21

FILE NO. RAMSE129594	288
SS21 OF 5568	367

LEGEND

- ⑥ PREF TAPE GR IN.
- ⑧ CROSSWALK MARKING - PREF THERMO GR IN.

MATCH LINE - SEE INSET



BEGIN S.A.P. 062-593-003
 BEGIN S.A.P. 146-020-011
 EB CR H STA. 32+20.86

BEGIN S.P. 062-609-006
 EB CR H STA 41+50.00

END S.P. 062-609-006
 EB CR H STA 44+00.00

MATCH LINE EB CR H STA. 46+50
 SEE SHEET SS26

MATCH LINE - SEE ABOVE

10:43:41 AM

12/7/2015

K:\TWC_Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162.ss05.dgn
 \$MODELNAME\$

DESIGN TEAM				
DRAWN BY:	JAH			
DESIGNER:	JAH			
CHECKED BY:	BJB			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/7/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

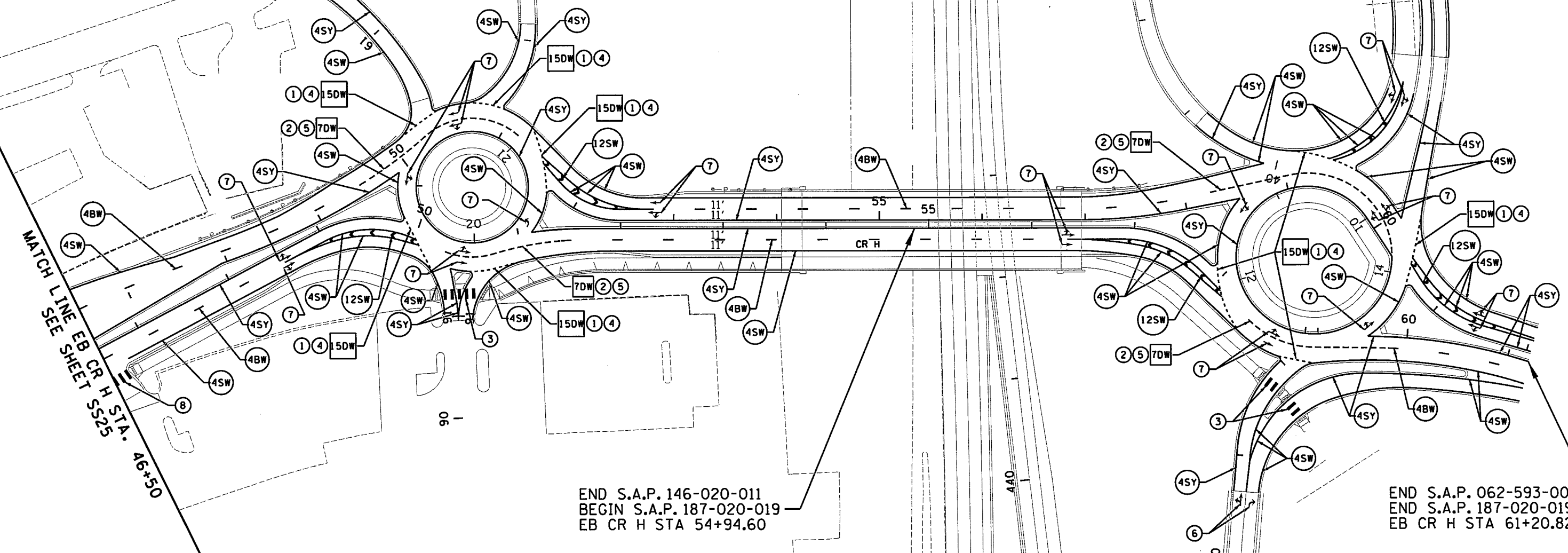
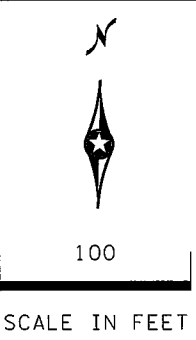
PAVEMENT MARKING PLAN
 EB CR H STA. 32+20 - 46+50

FILE NO.	289
RAMSEY29594	
SS22	367
OF SS68	

10:43:42 AM

12/7/2015

K:\TWC_Civil\County\RAMSEY\135W_CRH\CAD\Plan Sheets\CD6284162_ss06.dgn
\$MODELNAME\$



- LEGEND**
- ① 3' LINE, 3' GAP, 15" WIDTH DENOTES WIDTH OF CONTRAST MARKING.
 - ② 6' LINE, 3' GAP, 7" WIDTH DENOTES WIDTH OF CONTRAST MARKING.
 - ③ CROSSWALK MARKING - PREF TAPE GR IN.
 - ④ PREF THERMO GR IN CONTRAST.
 - ⑤ PREF TAPE GR IN CONTRAST.
 - ⑥ PREF TAPE GR IN.
 - ⑦ PREF THERMO GR IN.
 - ⑧ CROSSWALK MARKING - PREF THERMO GR IN.

END S.A.P. 146-020-011
 BEGIN S.A.P. 187-020-019
 EB CR H STA 54+94.60

END S.A.P. 062-593-003
 END S.A.P. 187-020-019
 EB CR H STA 61+20.82

DESIGN TEAM				
DRAWN BY: JAH				
DESIGNER: JAH				
CHECKED BY: BJR				
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/7/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

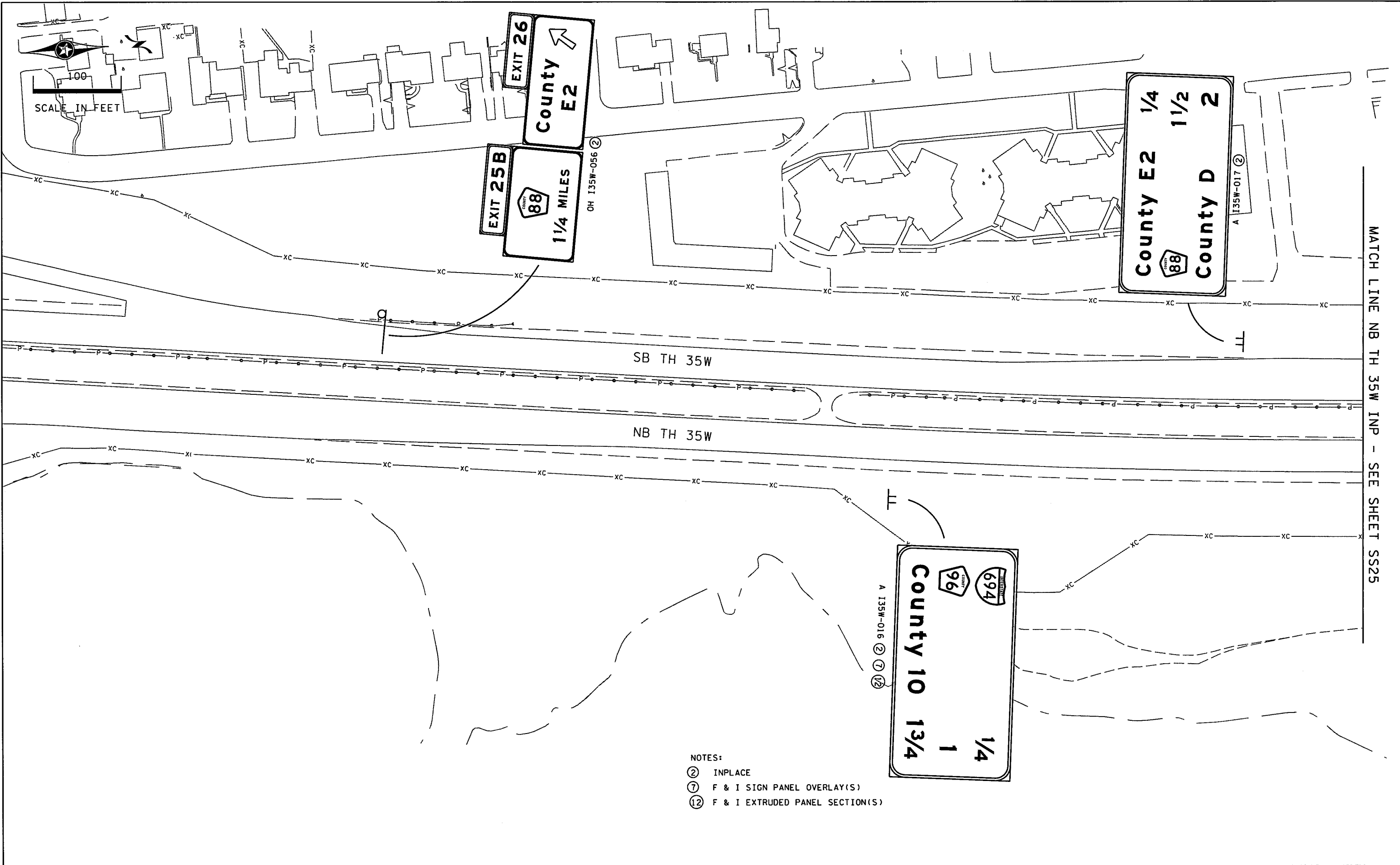
PAVEMENT MARKING PLAN
 EB CR H STA. 46+50 - 61+21

FILE NO. RAMSE129594	290
SS23 OF SS68	367

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12/8/2015

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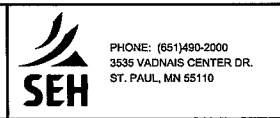


- NOTES:
- ② INPLACE
 - ⑦ F & I SIGN PANEL OVERLAY(S)
 - ⑫ F & I EXTRUDED PANEL SECTION(S)

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

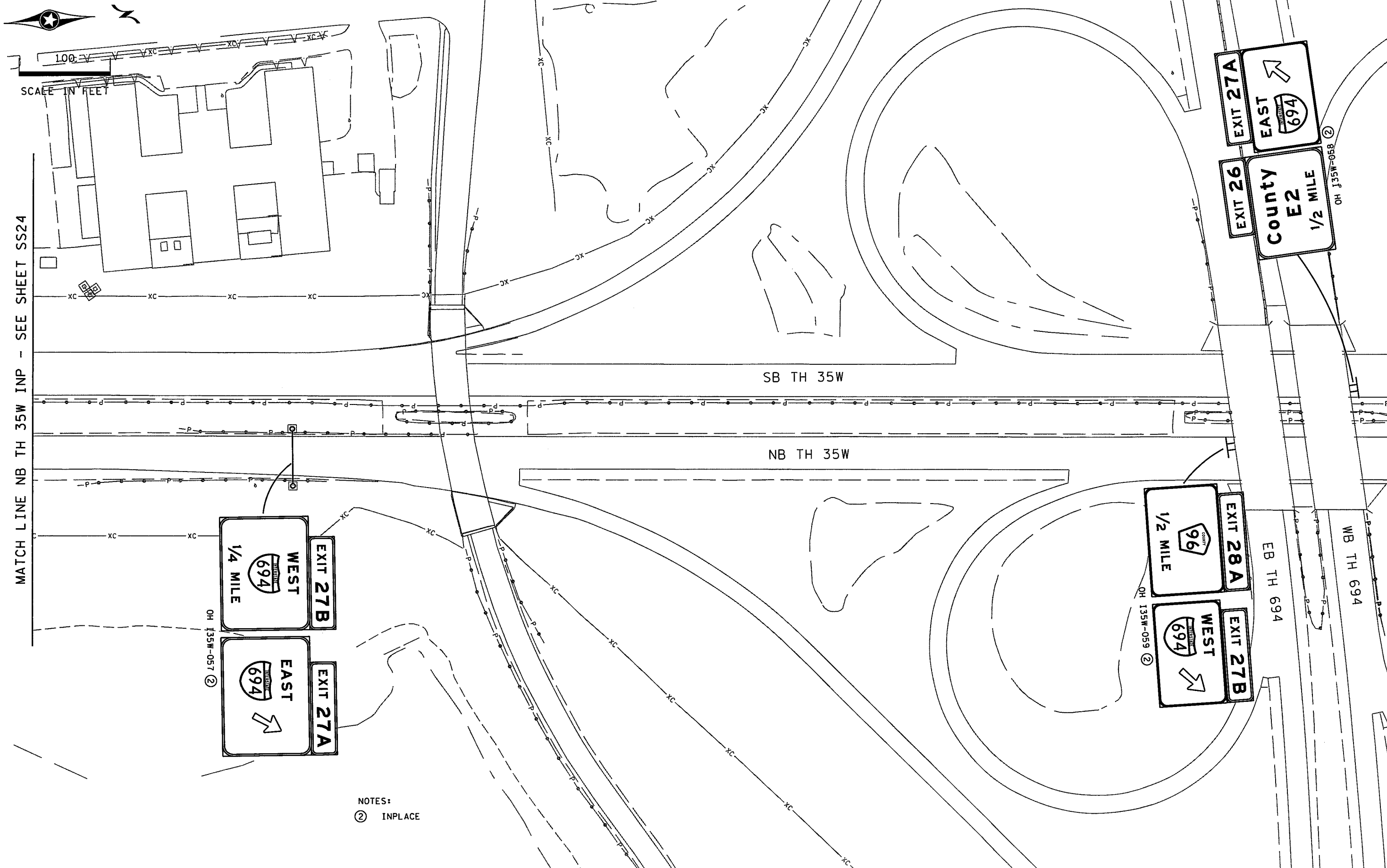
Certified By: *Mark Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	291
RAMSE129594	
SS24	367
OF SS68	

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 SS25



MATCH LINE NB TH 35W INP - SEE SHEET SS24

MATCH LINE NB TH 35W INP - SEE SHEET SS26

NOTES:
 ② INPLACE

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	MAW						
CHECKED BY:	MAW						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



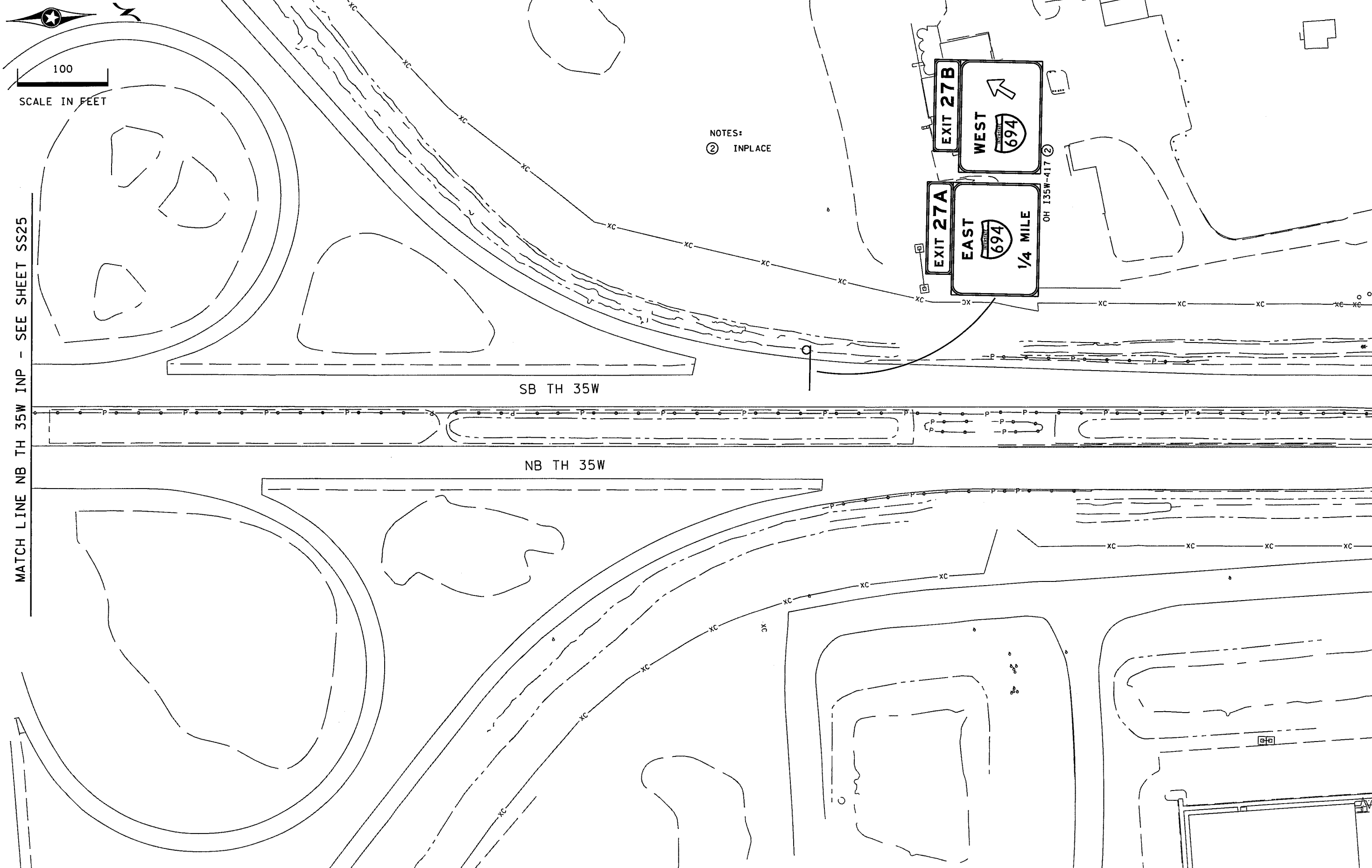
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SIGNING AND STRIPING PLAN		FILE NO.	292
NB TH 35W INP		RAMSE129594	
		SS25	367
		OF SS68	

11:07:27 AM

12/8/2015

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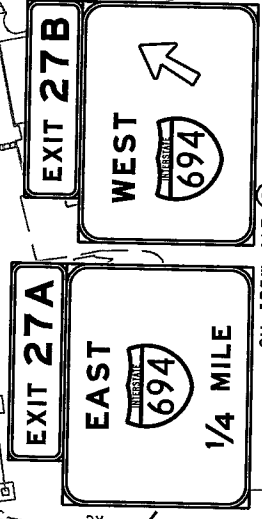
NOTES:
 ② INPLACE

MATCH LINE NB TH 35W INP - SEE SHEET SS25

MATCH LINE NB TH 35W INP - SEE SHEET SS27

SB TH 35W

NB TH 35W



DESIGN TEAM			
DRAWN BY:	CJF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Licensed Professional Engineer
 Printed Name: MARK A. WAGNER Date: 12/8/2015

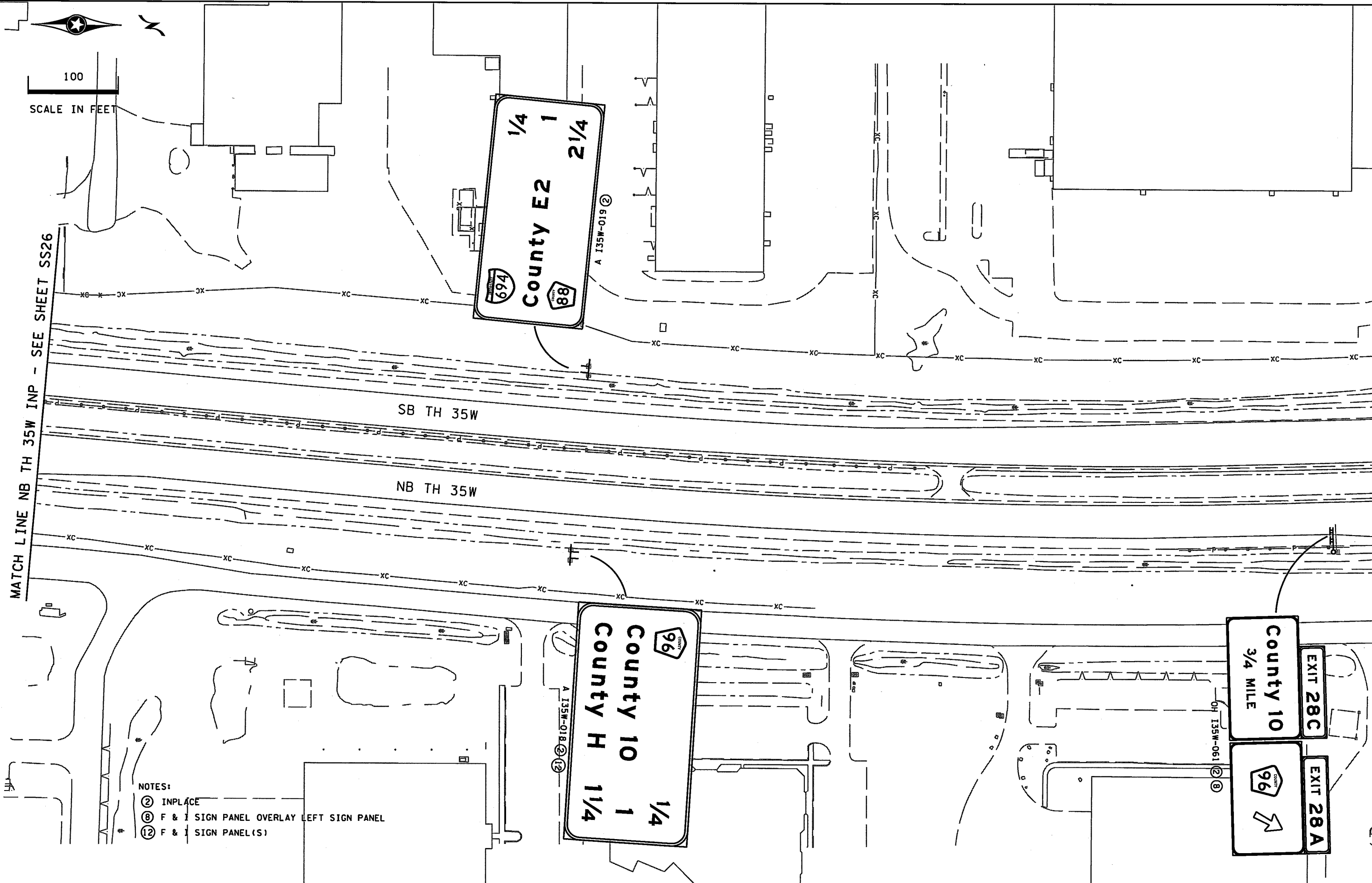
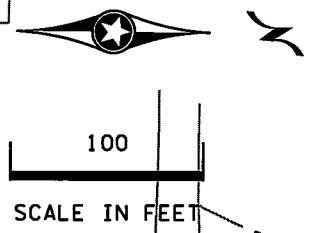
PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SIGNING AND STRIPING PLAN
 NB TH 35W INP

FILE NO.	293
RAMSE129594	
SS26	367
OF SS68	

1/6/2016 1:33:46 PM
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NOTES:
 (2) INPLACE
 (8) F & I SIGN PANEL OVERLAY LEFT SIGN PANEL
 (12) F & I SIGN PANEL(S)

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 1/6/2016

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

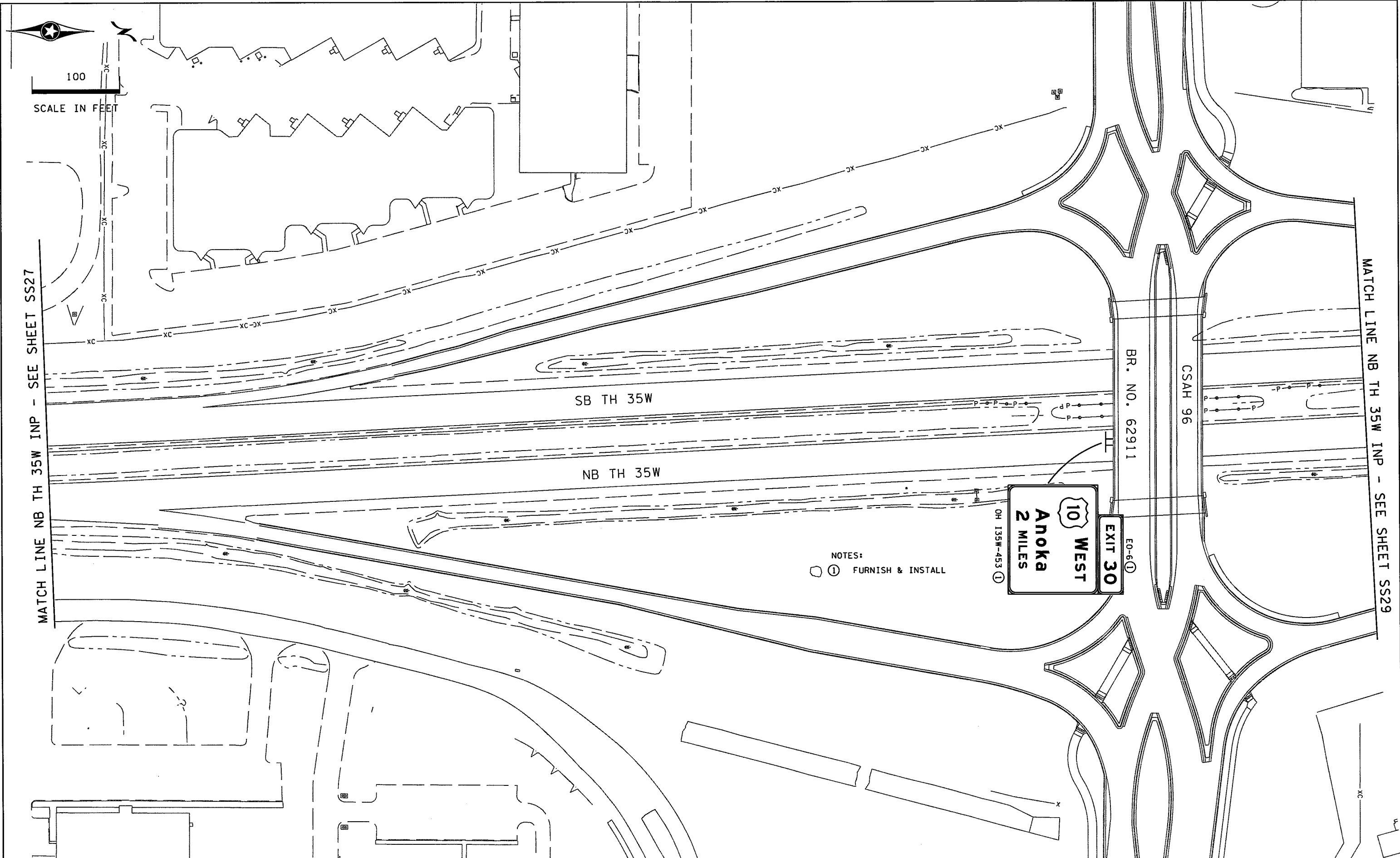
SIGNING AND STRIPING PLAN
 NB TH 35W INP

FILE NO.	294
RAMSEI29594	
SS27	367
OF 557	

11/07/28 AM

12/8/2015

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SS28



NOTES:
 (1) FURNISH & INSTALL

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF						
DESIGNER:	MAW						
CHECKED BY:	MAW						
	NO.	BY	DATE				

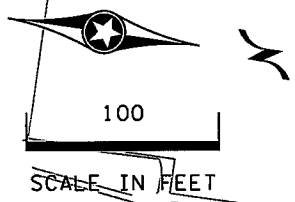
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

SEH
 PHONE: (651)490-2000
 3635 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

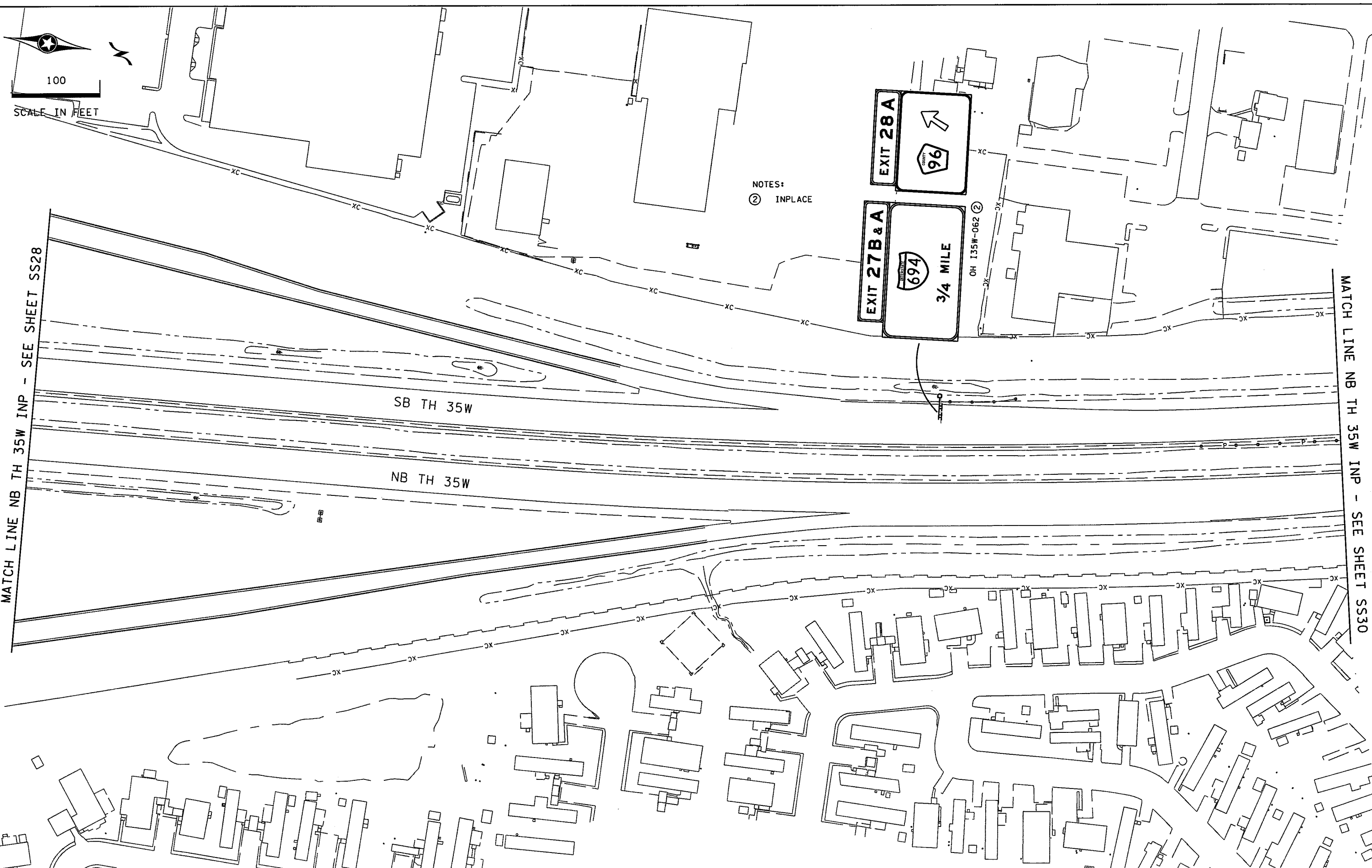
SIGNING AND STRIPING PLAN
 NB TH 35W INP

FILE NO.	295
RAMSE129594	
SS28	367
OF SS68	

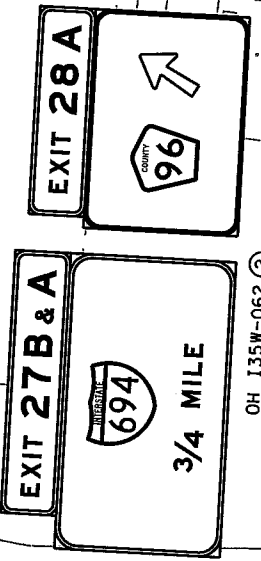


MATCH LINE NB TH 35W INP - SEE SHEET SS28

MATCH LINE NB TH 35W INP - SEE SHEET SS30



NOTES:
② INPLACE



SB TH 35W

NB TH 35W

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	MAW						
CHECKED BY:	MAW						

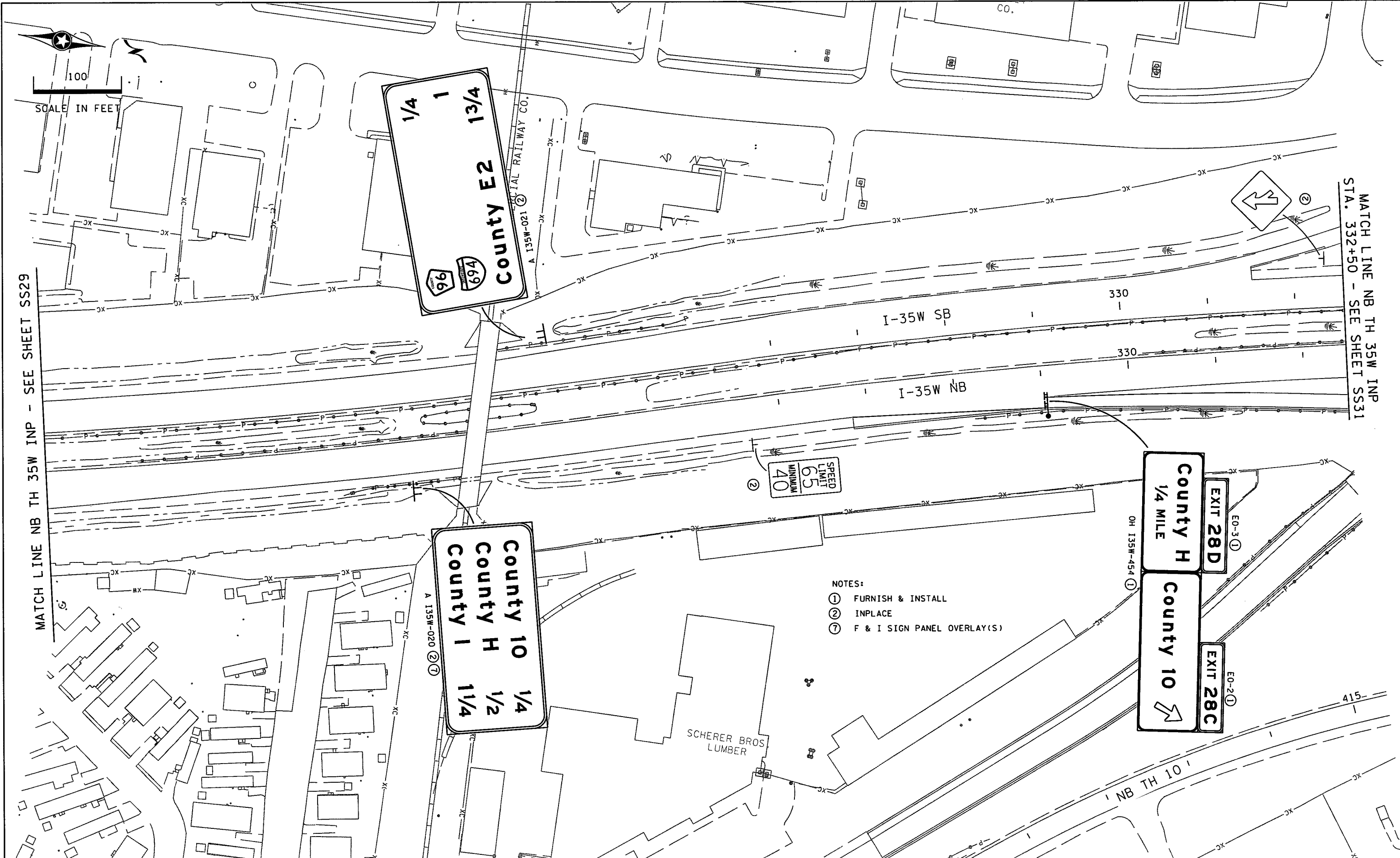
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SIGNING AND STRIPING PLAN
 NB TH 35W INP

FILE NO. RAMSE129594	296
SS29 OF SS68	367



MATCH LINE NB TH 35W INP - SEE SHEET SS29

MATCH LINE NB TH 35W INP STA. 332+50 - SEE SHEET SS31

SPEED LIMIT 65 MINIMUM 40

County E2
1/4 1 13/4
96 69A
A 135W-021 ②
RAILWAY CO.

County 10
County H
County 1
1/4 1/2 1/4
A 135W-020 ⑦

County H
1/4 MILE
EXIT 28D
EXIT 28C
EO-3 ①
EO-2 ①
OH 135W-454 ①

- NOTES:
- ① FURNISH & INSTALL
 - ② INPLACE
 - ⑦ F & I SIGN PANEL OVERLAY(S)

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	MAW						
CHECKED BY:	MAW						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

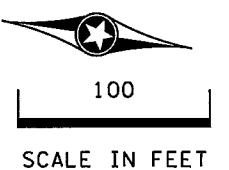
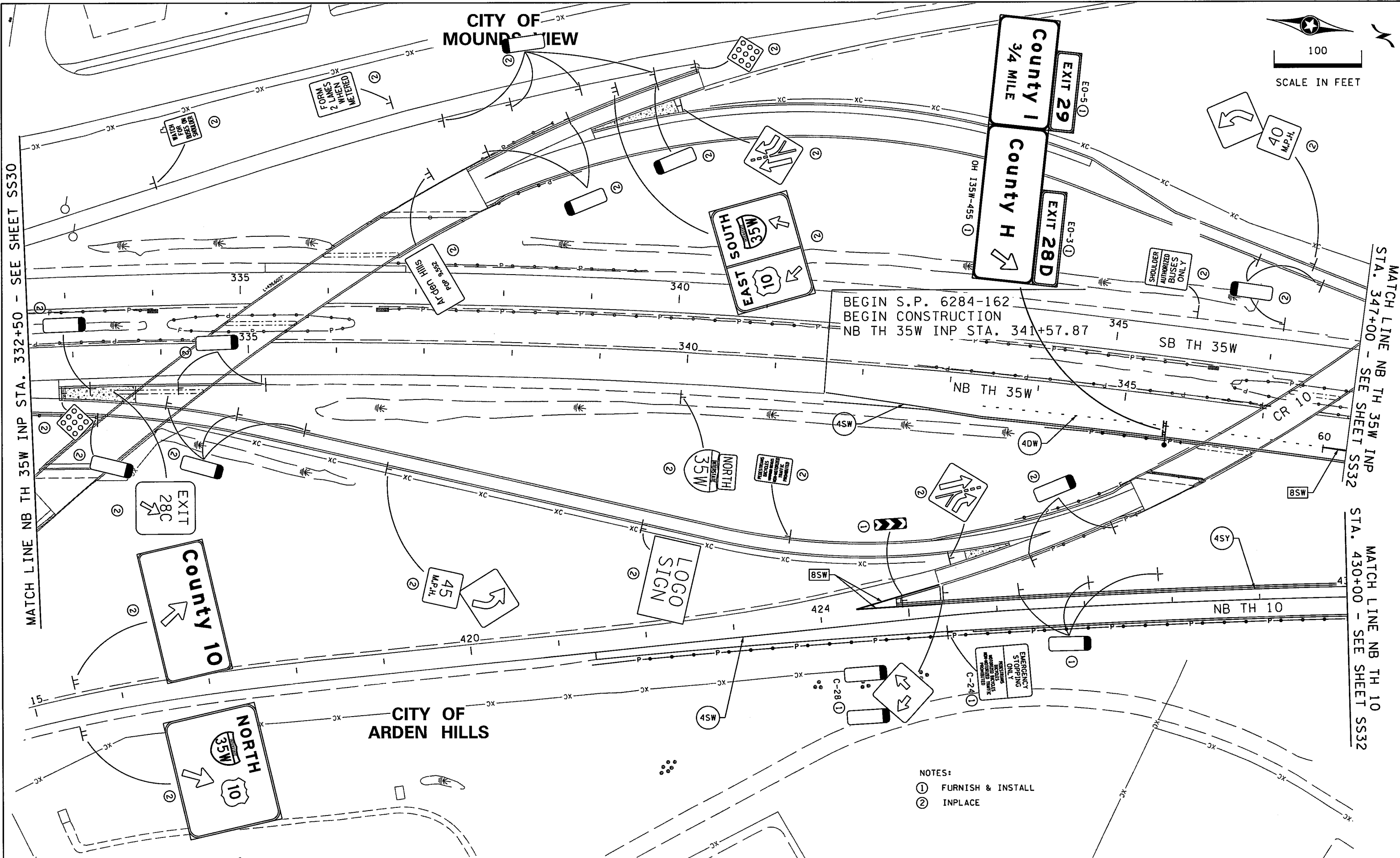
SEH
 PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SIGNING AND STRIPING PLAN
 NB TH 35W INP STA. 326+00 - 332+50
 NB TH 10 STA. 405+00 - 415+50

FILE NO. RAMSE129594	297
SS30 OF SS68	367

11:07:30 AM
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 ss31



- NOTES:
- ① FURNISH & INSTALL
 - ② INPLACE

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	MAW						
CHECKED BY:	MAW						

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Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

SEH

PHONE: (651)490-2000
 3635 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

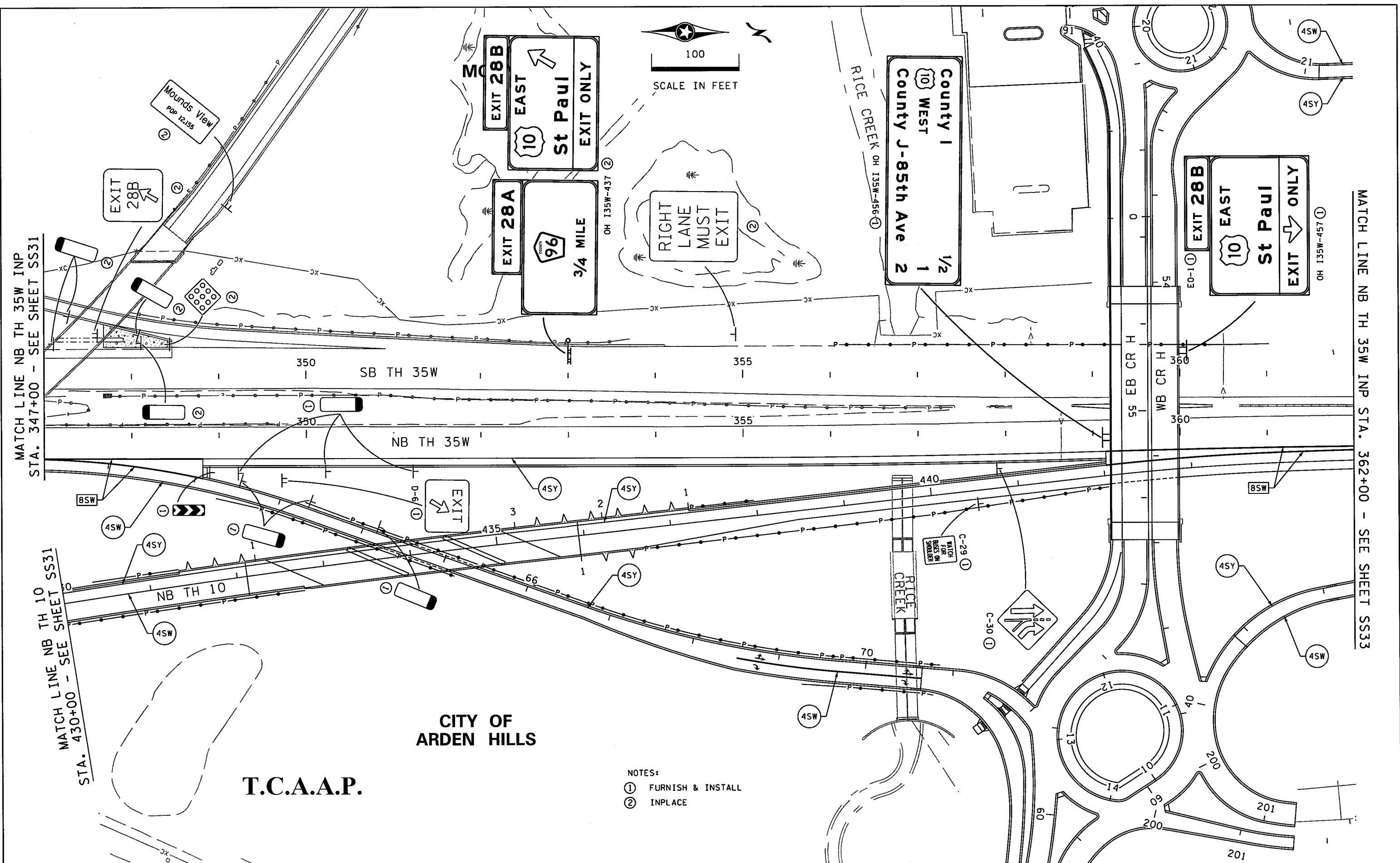
FILE NO. RAMSE129594	298
SS31 OF SS68	367

SIGNING AND STRIPING PLAN
 NB TH 35W INP STA. 341+57 - 347+00
 NB TH 10 STA. 424+82 - 430+00

11/07/31 AM

12/8/2015

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MATCH LINE NB TH 35W INP STA. 347+00 - SEE SHEET SS31

MATCH LINE NB TH 10 STA. 430+00 - SEE SHEET SS31

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET SS33

T.C.A.A.P.

CITY OF ARDEN HILLS

- NOTES:
- ① FURNISH & INSTALL
 - ② INPLACE

DESIGN TEAM				REVISIONS			
DRAWN BY:	CF			NO.	BY	DATE	
DESIGNER:	MAW						
CHECKED BY:	MAW						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

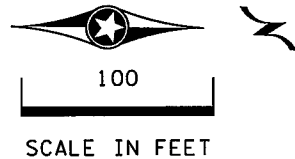
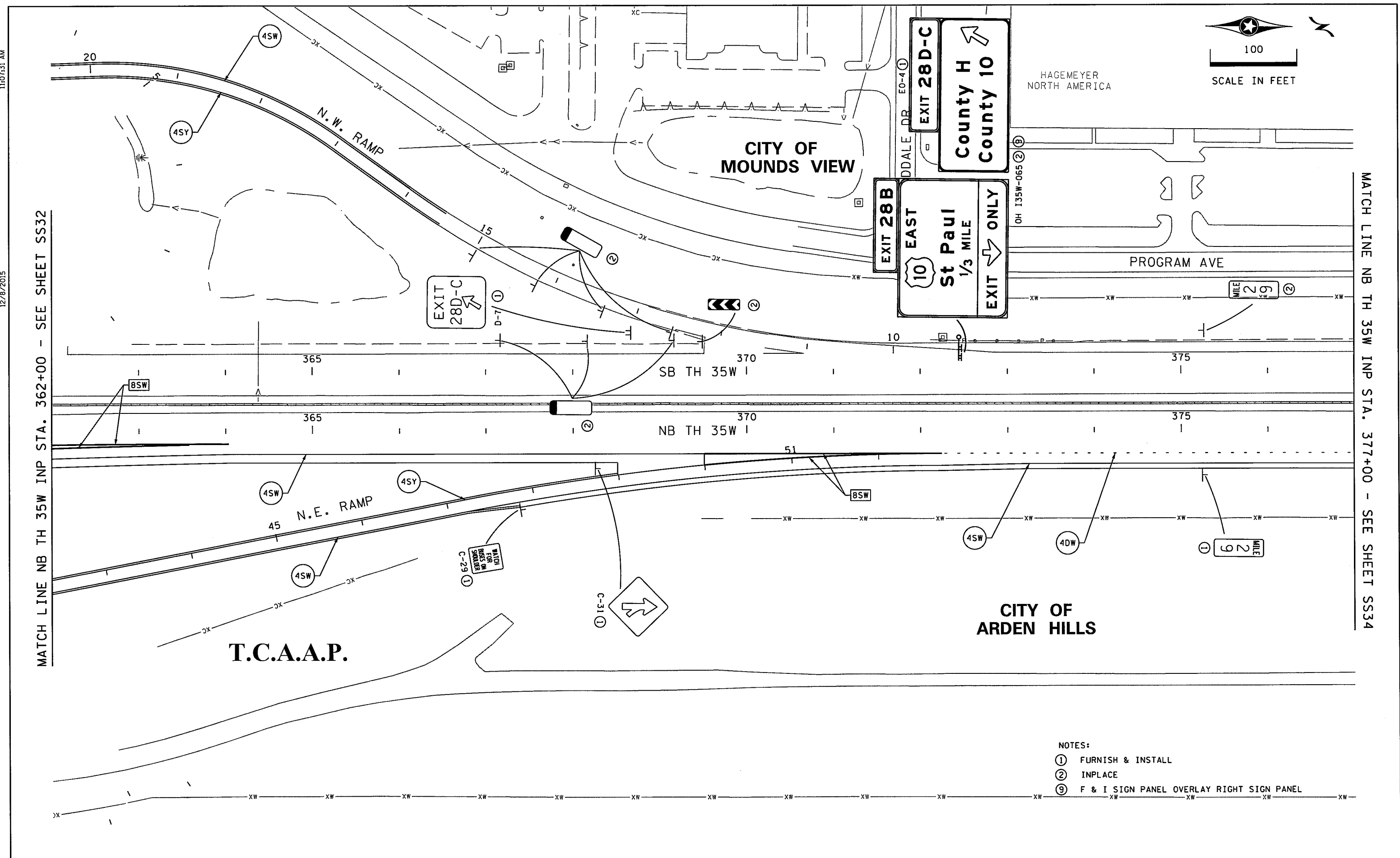
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	299
RAMSE129594	
SS32	367
OF 5568	

11:07:31 AM

12/8/2015

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MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET SS32

MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET SS34

- NOTES:
- ① FURNISH & INSTALL
 - ② INPLACE
 - ⑨ F & I SIGN PANEL OVERLAY RIGHT SIGN PANEL

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

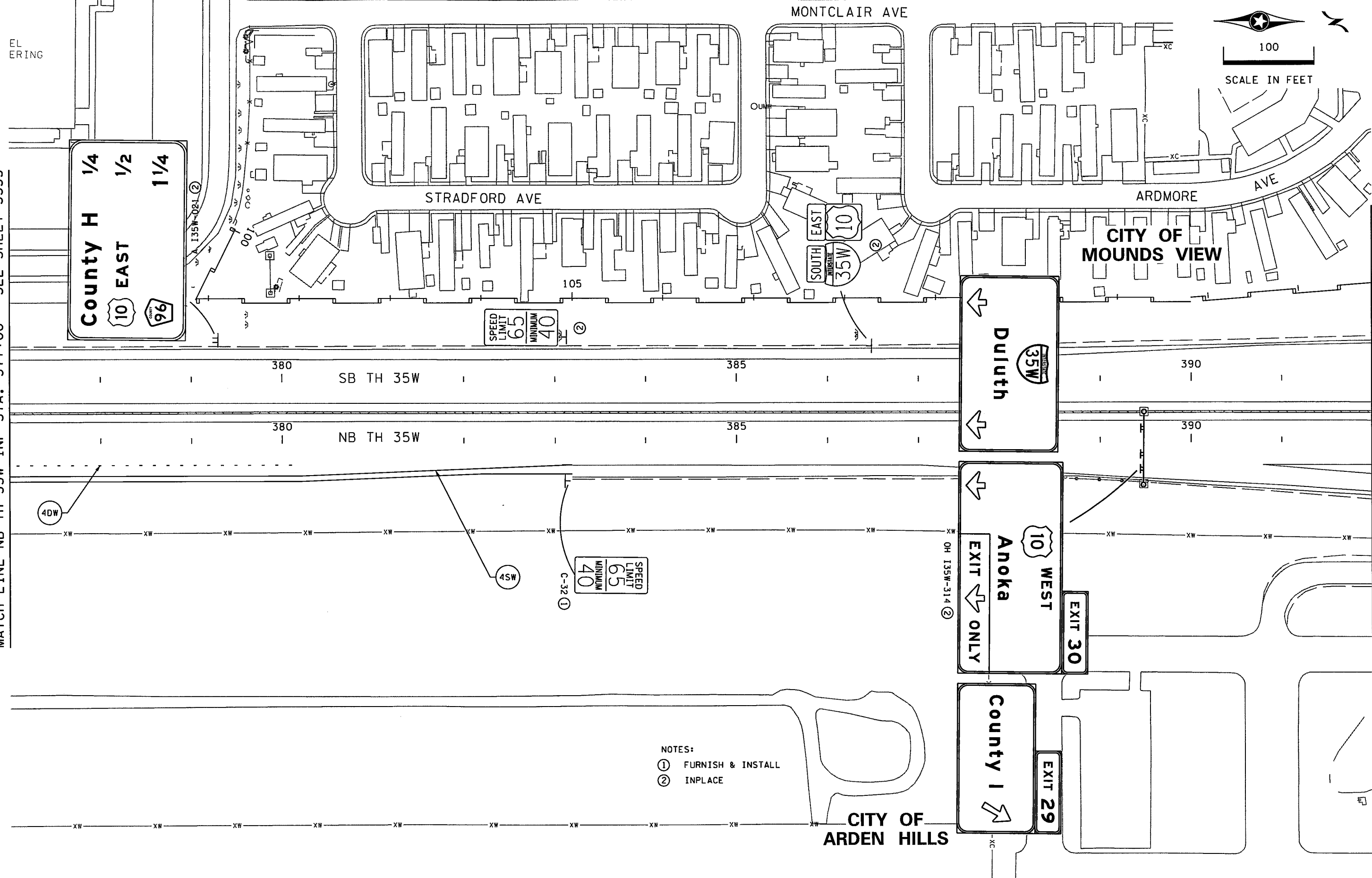
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RAMSEI29594	
SS33	367
OF 5568	

SIGNING AND STRIPING PLAN
 NB TH 35W INP STA. 362+00 - 377+00

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 SS34

MATCH LINE NB TH 35W INP STA. 377+00 - SEE SHEET SS33

MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET SS35



DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

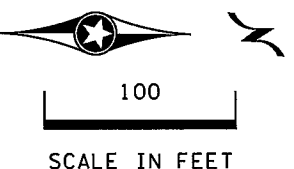
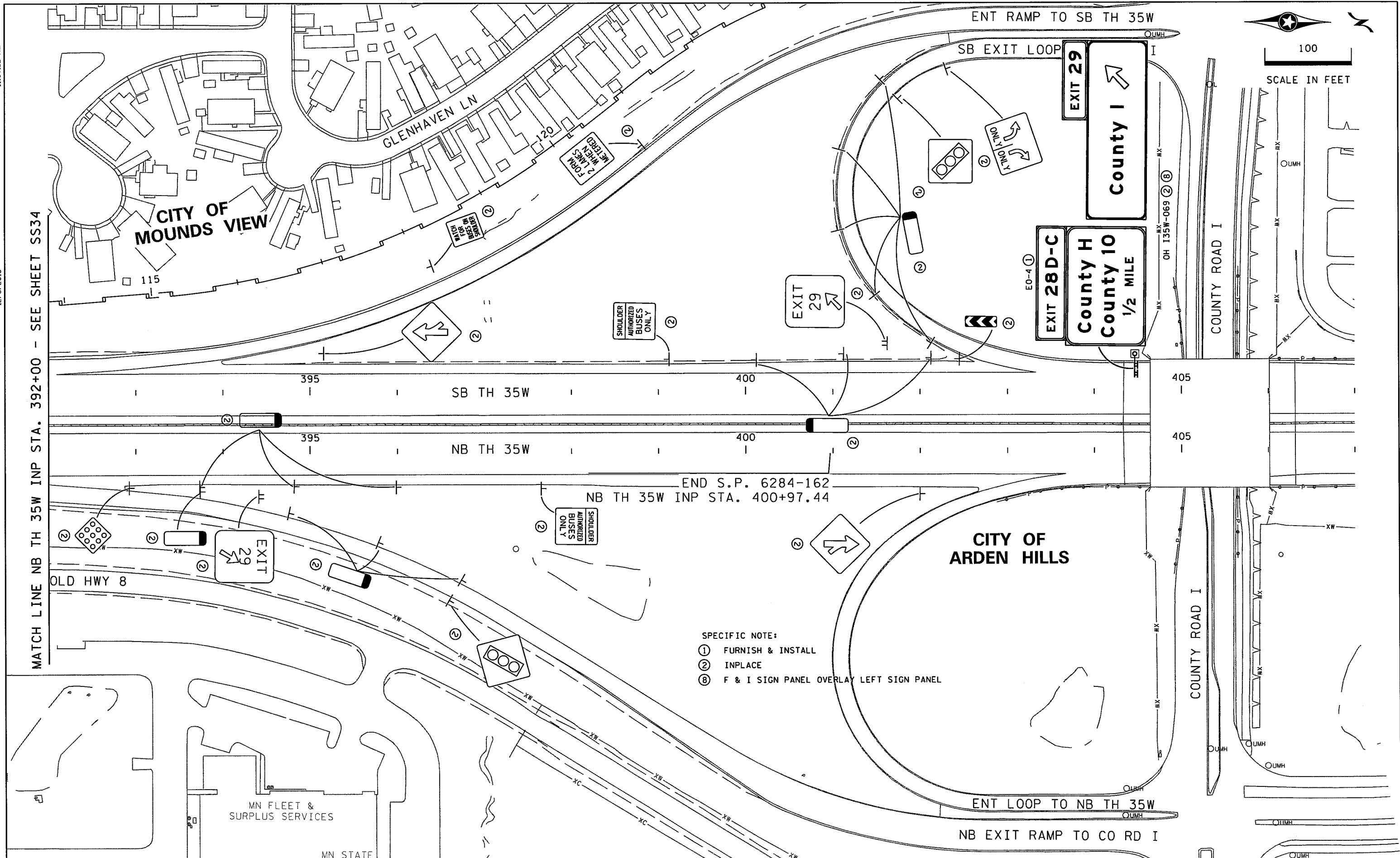
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SIGNING AND STRIPING PLAN
 NB TH 35W INP STA. 377+00 - 392+00

FILE NO. RAMSE129594
 SS34 OF 568
 301
 367



MATCH LINE NB TH 35W INP STA. 392+00 - SEE SHEET SS34

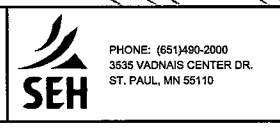
END S.P. 6284-162
NB TH 35W INP STA. 400+97.44

- SPECIFIC NOTE:**
- ① FURNISH & INSTALL
 - ② INPLACE
 - ③ F & I SIGN PANEL OVERLAY LEFT SIGN PANEL

DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	MAW						
CHECKED BY:	MAW						

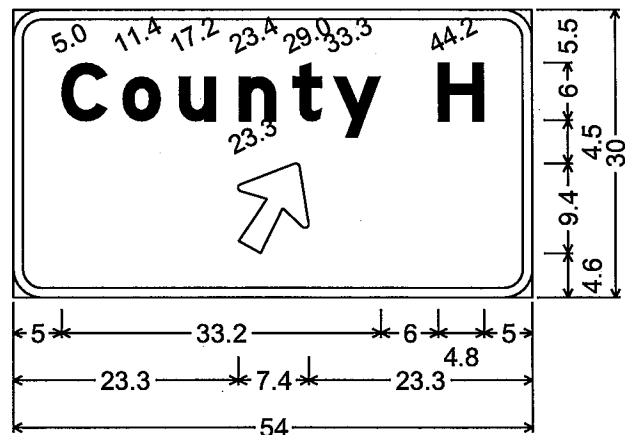
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Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

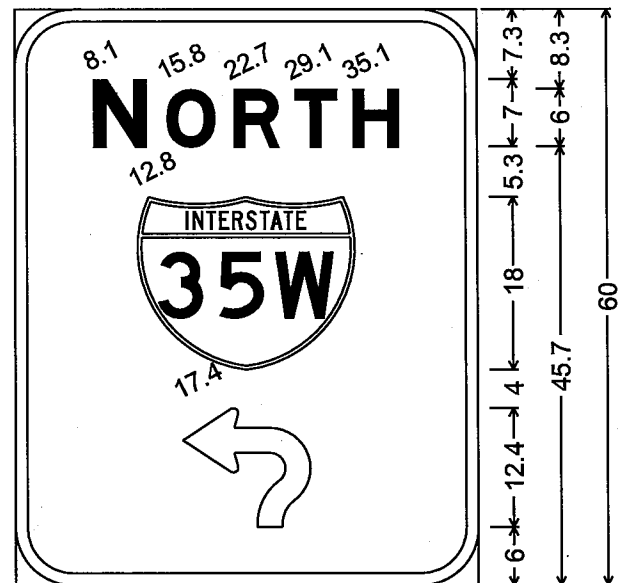


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

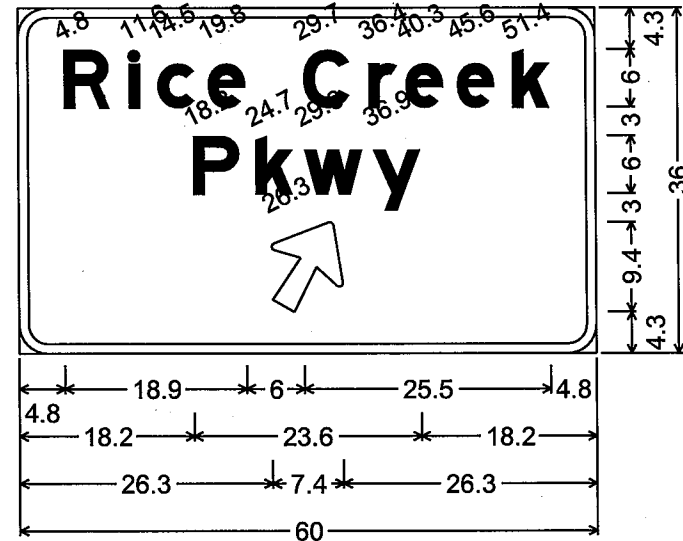
SIGNING AND STRIPING PLAN		FILE NO. RAMSE129594	302
NB TH 35W INP STA. 392+00 - 406+00		SS35 OF SS68	367



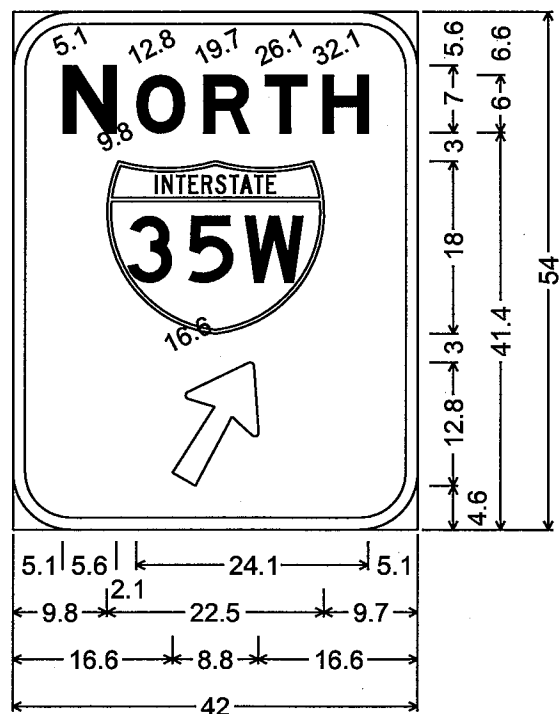
D-1;
 3.0" Radius, 1.0" Border, White on Green;
 [County H] E Mod;
 Arrow 3 - 10.0" 60°;



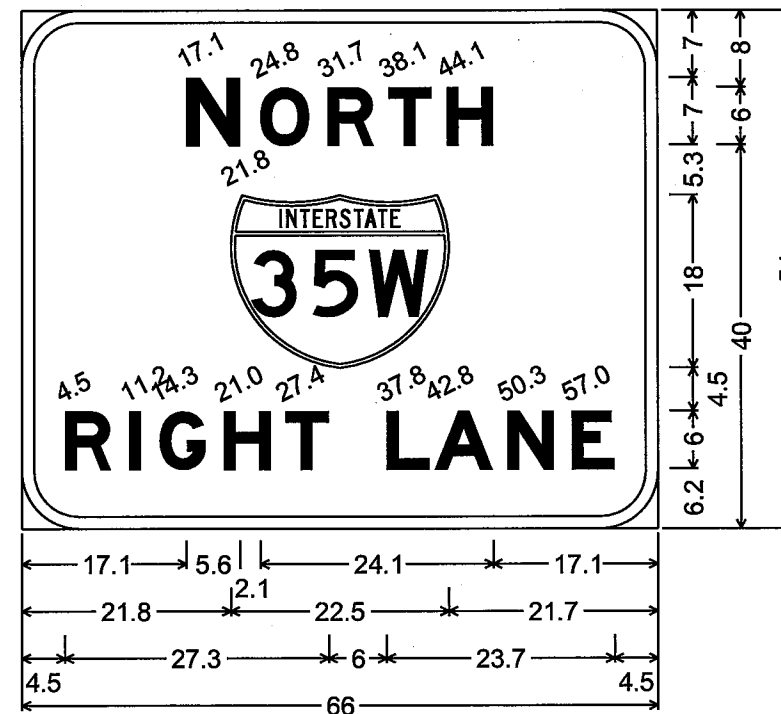
D-2;
 6.0" Radius, 1.3" Border, White on Green;
 [NORTH] E Mod;



D-3;
 3.0" Radius, 1.0" Border, White on Green;
 [Rice Creek] E Mod; [Pkwy] E Mod;
 Arrow 3 - 10.0" 60°;



D-4;
 6.0" Radius, 1.3" Border, White on Green;
 [NORTH] E Mod;
 Arrow 13 - 14.0" 60°;



D-5; 6.0" Radius, 1.3" Border, White on Green;
 [NORTH] E Mod; [RIGHT LANE] E Mod;

DESIGN TEAM				REVISIONS			
DRAWN BY:	JAH			NO.	BY	DATE	
DESIGNER:	JAH						
CHECKED BY:	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 13709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/8/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

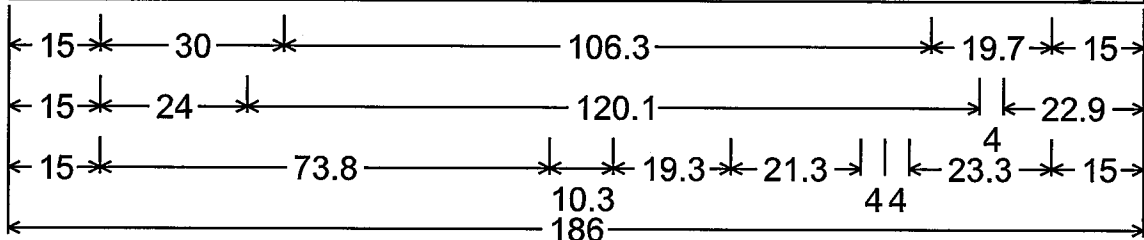
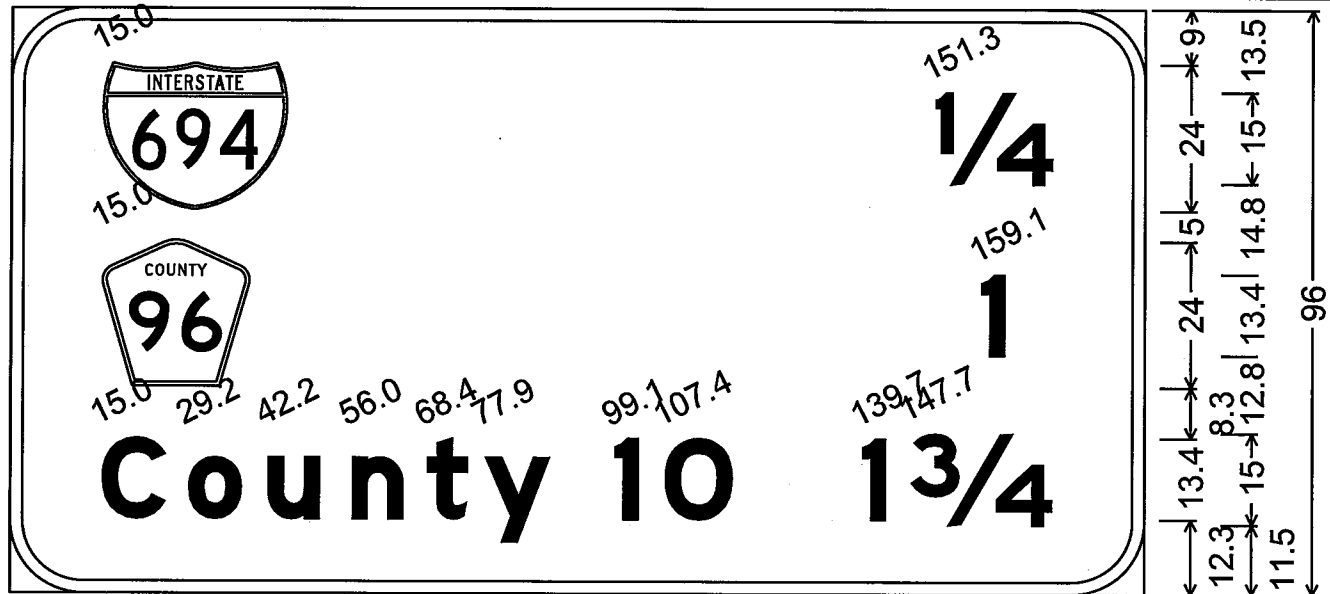
TYPE D SIGN PANELS

FILE NO.	303
RAMSEI29594	
SS36	367
OF 5568	

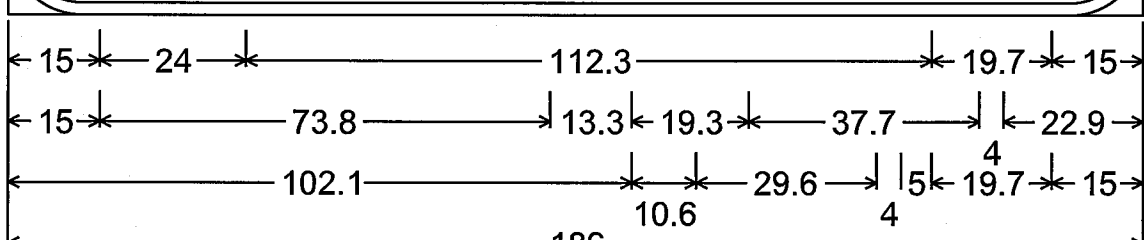
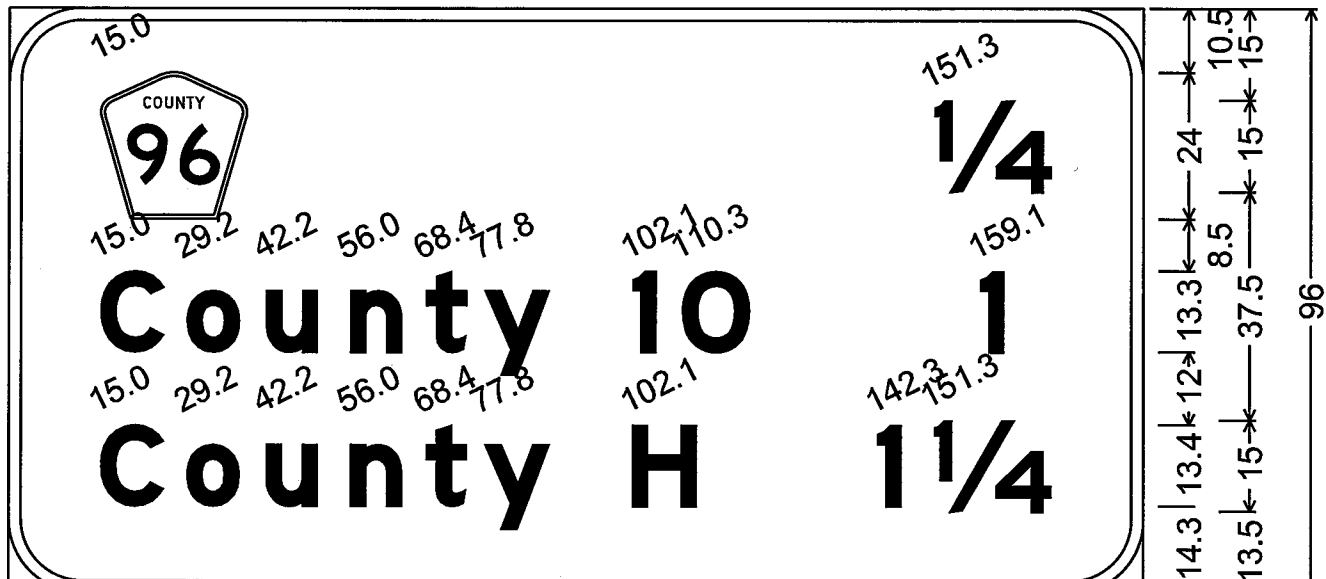
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1/6/2016

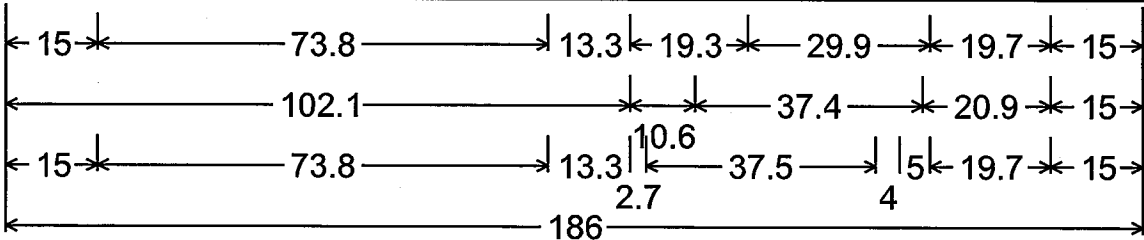
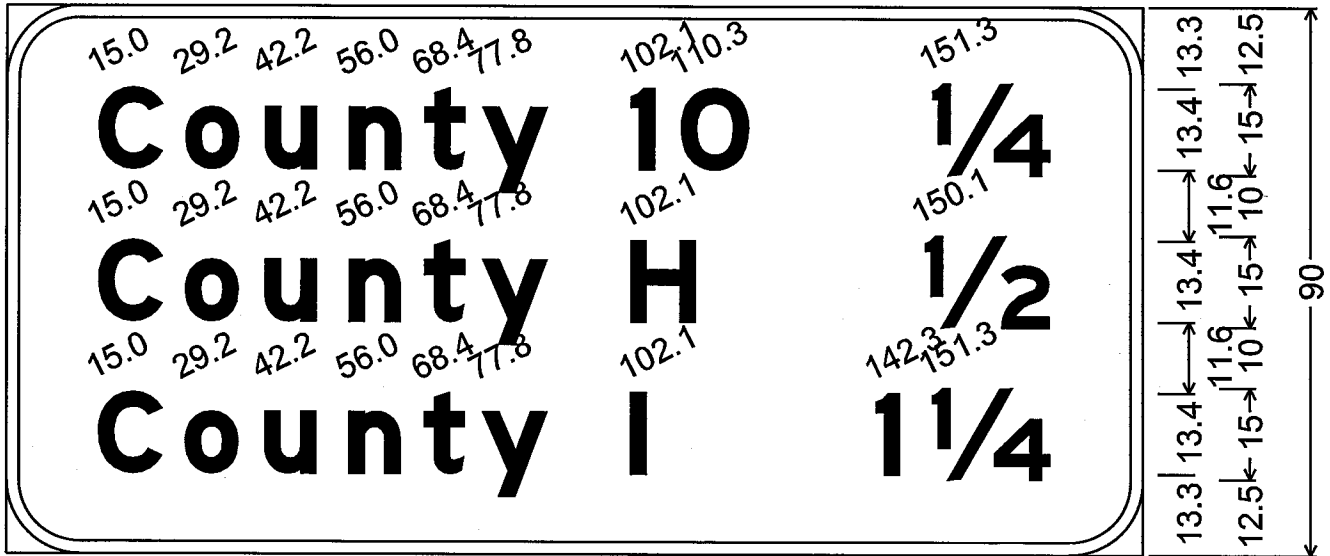
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C:\A-01 SIGN PANELS



A I35W-047; 12.0" Radius, 2.0" Border, White on Green;
 [1/4] E Mod; [1] E Mod; [County 10] E Mod; [1 3/4] E Mod;



A I35W-018; 12.0" Radius, 2.0" Border, White on Green;
 [1/4] E Mod; [County 10] E Mod; [1] E Mod; [County H] E Mod;
 [1 1/4] E Mod;



A I35W-020; 12.0" Radius, 2.0" Border, White on Green;
 [County 10] E Mod; [1/4] E Mod; [County H] E Mod; [1/2] E Mod;
 [County I] E Mod; [1 1/4] E Mod;

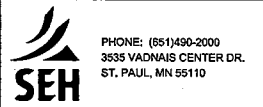
SIGN PANELS
TYPE A

SIGN PANEL OVERLAY
TYPE A

- NOTES:
 1. SEE STANDARD SIGNS MANUAL FOR ARROW, FRACTION, AND OVERLAY DETAILS.
 2. CORNERS OF SIGN PANEL EXTENDING BEYOND BORDER SHALL NOT BE TRIMMED.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
	NO.	BY	DATE
			REVISIONS

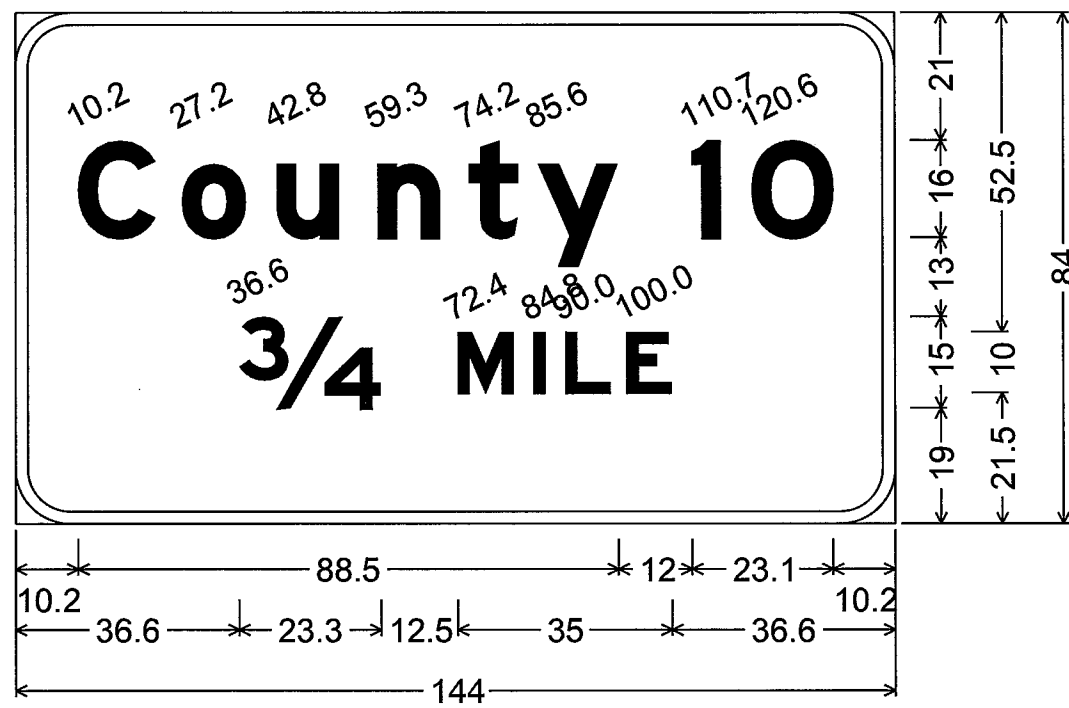
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 1/6/2016



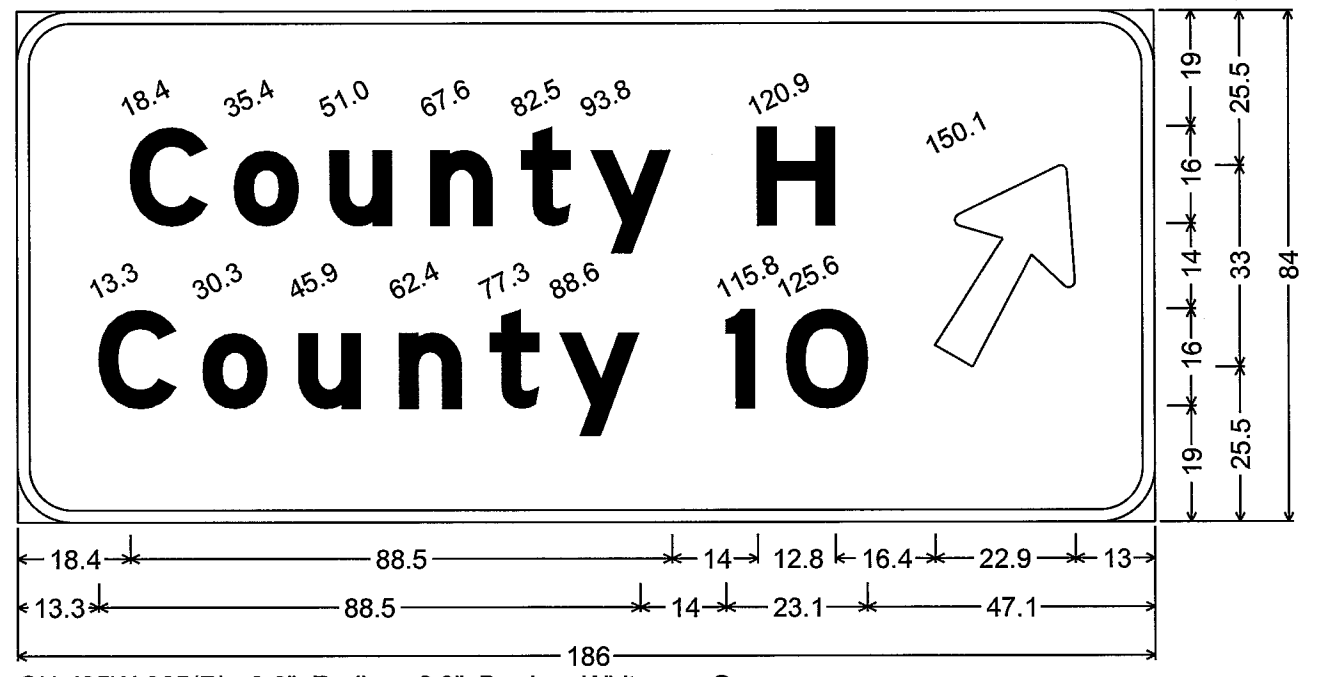
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SIGN PANEL
DETAILS

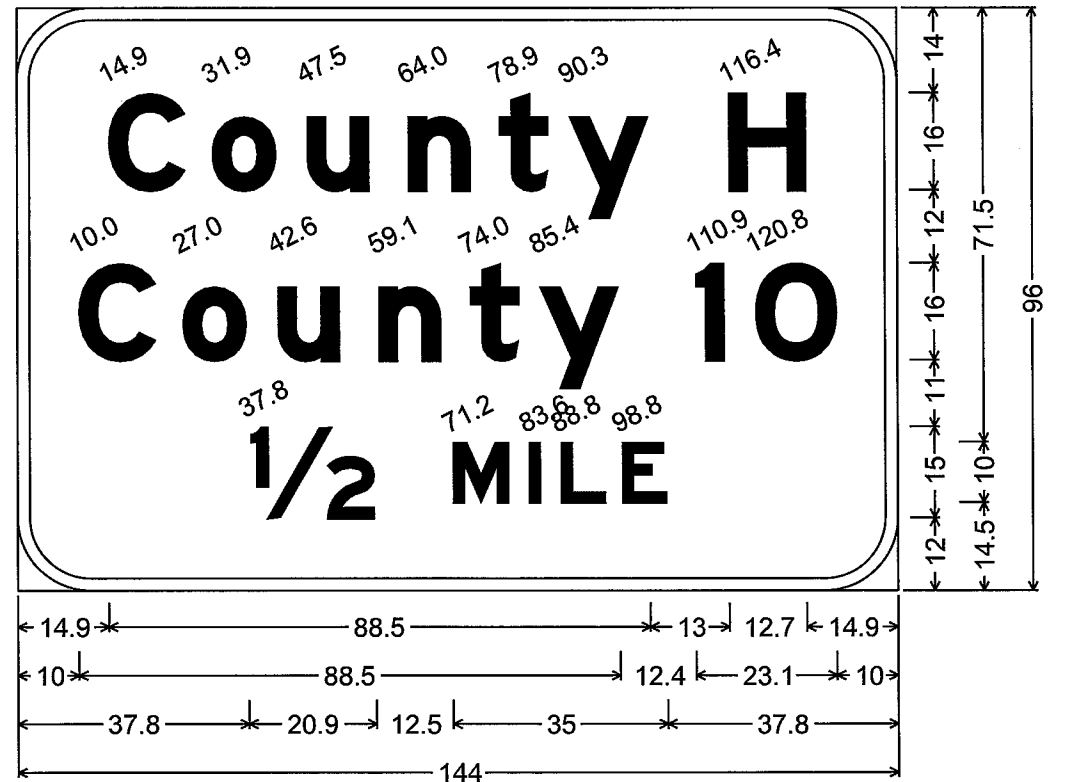
FILE NO.	304
RAMSEI29594	
SS37	
OF 5568	367



OH I35W-061(L);
 9.0" Radius, 2.0" Border, White on Green;
 [County 10] E Mod; [3/4 MILE] E Mod;



OH I35W-065(R); 9.0" Radius, 2.0" Border, White on Green;
 [County H] E Mod; [County 10] E Mod; Arrow 17 - 36.0" 60°;



OH I35W-069(L); 12.0" Radius, 2.0" Border, White on Green;
 [County H] E Mod; [County 10] E Mod; [1/2 MILE] E Mod;

- NOTES:
 1. SEE STANDARD SIGNS MANUAL FOR ARROW, FRACTION, AND OVERLAY DETAILS.
 2. CORNERS OF SIGN PANEL EXTENDING BEYOND BORDER SHALL NOT BE TRIMMED.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

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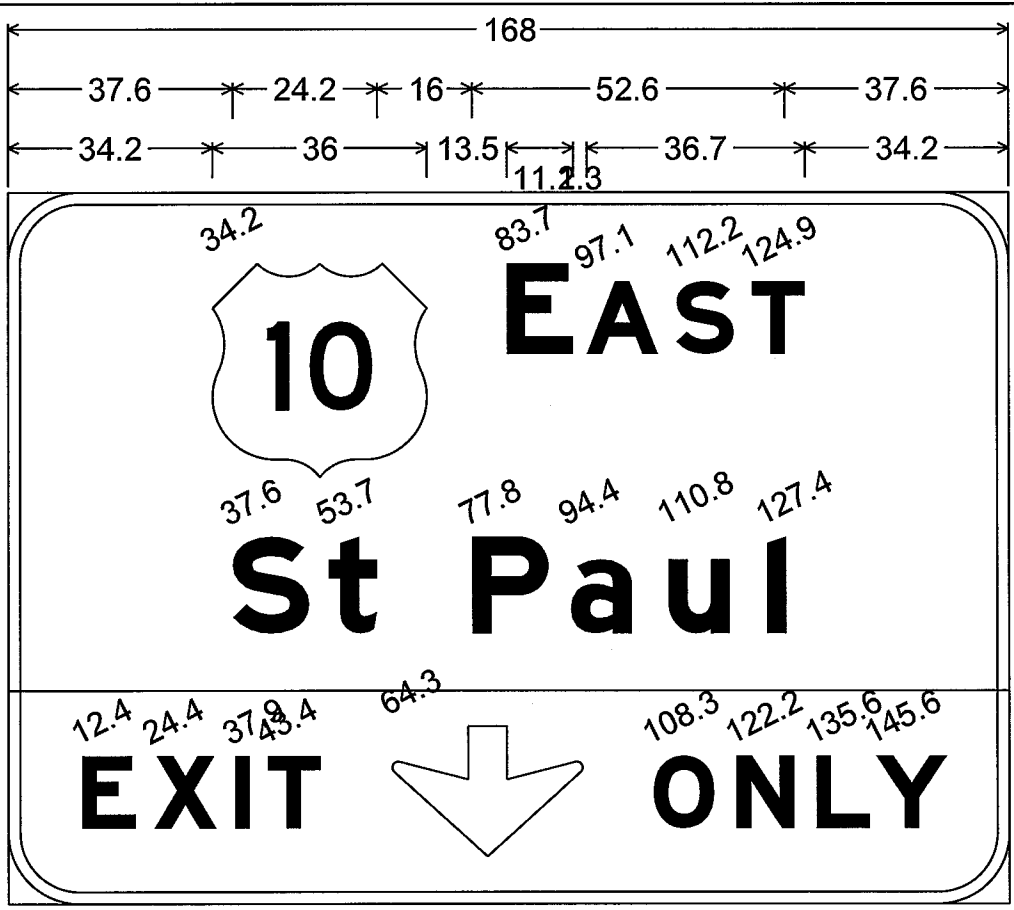


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

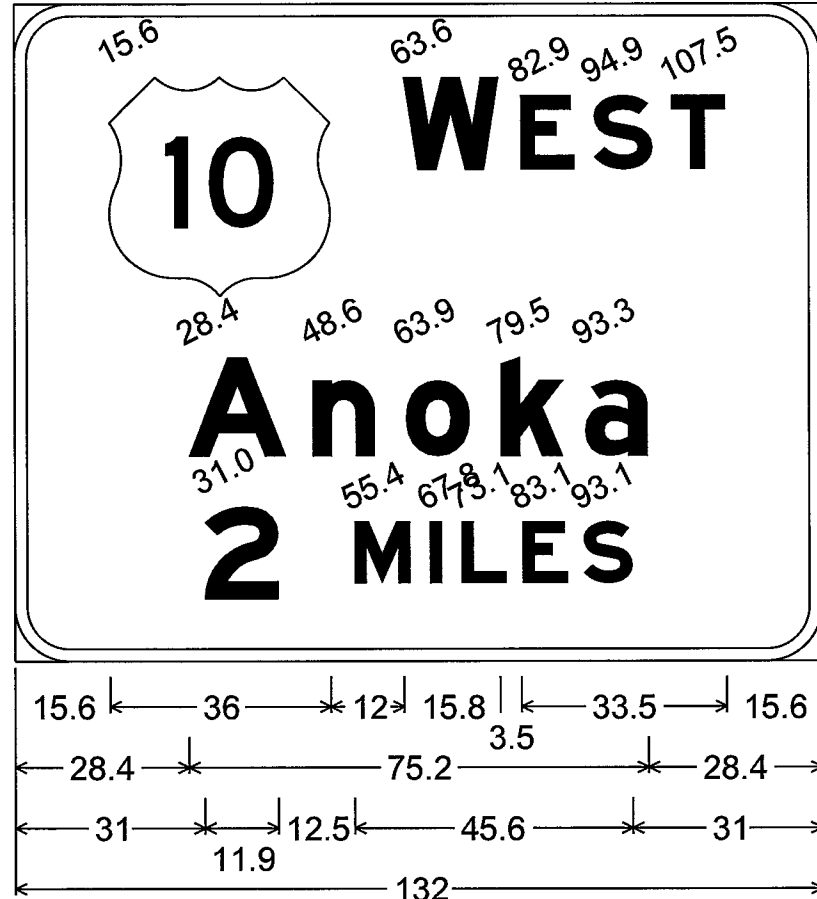
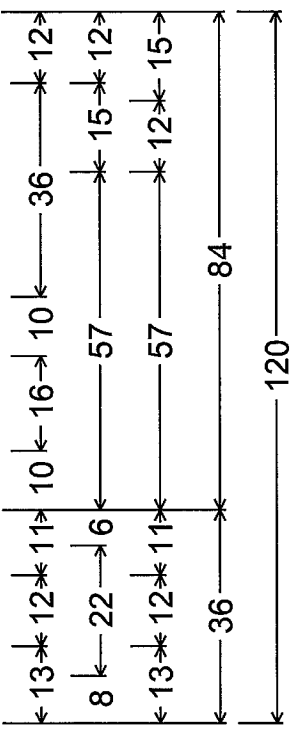
SIGN PANEL OVERLAYS
 TYPE OH

FILE NO. RAMSE129594	305
SS38 OF 5568	367

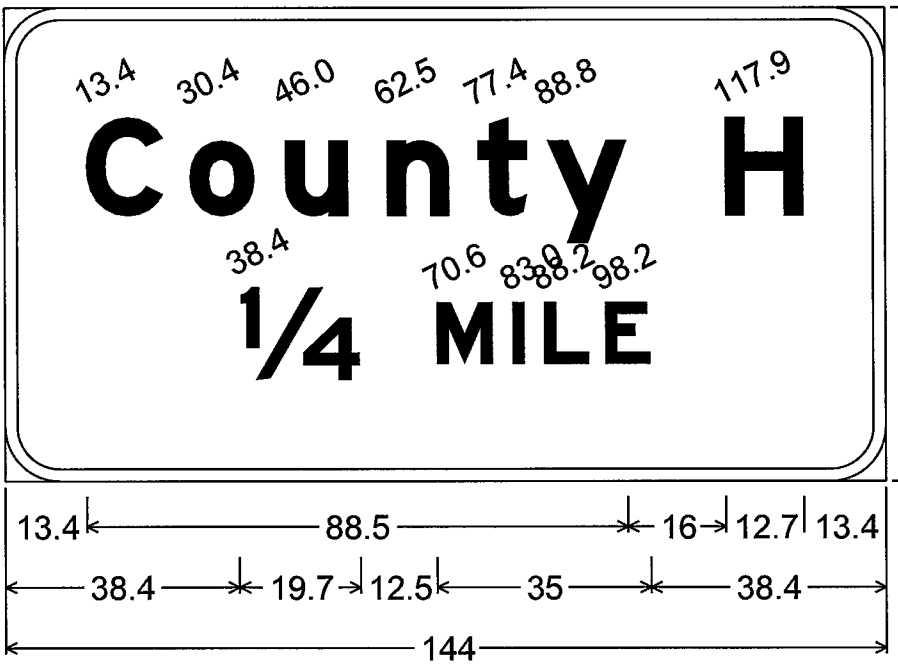
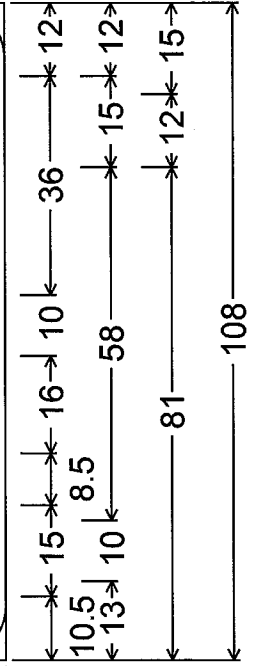
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 O_A-OH SIGN PANELS



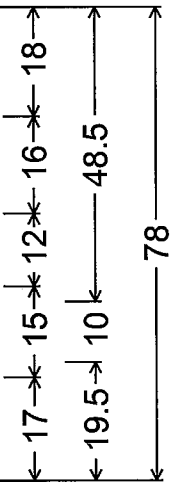
12.4 39.9 12 32 12 49.3
 OH I35W-457; 12.0" Radius, 2.0" Border, White on Green; 10.4
 [EAST] E Mod; [St Paul] E Mod;
 12.0" Radius, 2.0" Border, Black on Yellow;
 [EXIT] E Mod; Down Arrow 22.0" 270°; [ONLY] E Mod;



OH I35W-453;
 9.0" Radius, 2.0" Border, White on Green;
 [WEST] E Mod; [Anoka] E Mod;
 [2 MILES] E Mod;



OH I35W-454(L);
 9.0" Radius, 2.0" Border, White on Green;
 [County H] E Mod; [1/4 MILE] E Mod;



NOTES:
 1. SEE STANDARD SIGNS MANUAL FOR ARROW, FRACTION, AND OVERLAY DETAILS.
 2. CORNERS OF SIGN PANEL EXTENDING BEYOND BORDER SHALL NOT BE TRIMMED.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

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 Printed Name: MARK A. WAGNER Date: 12/8/2015



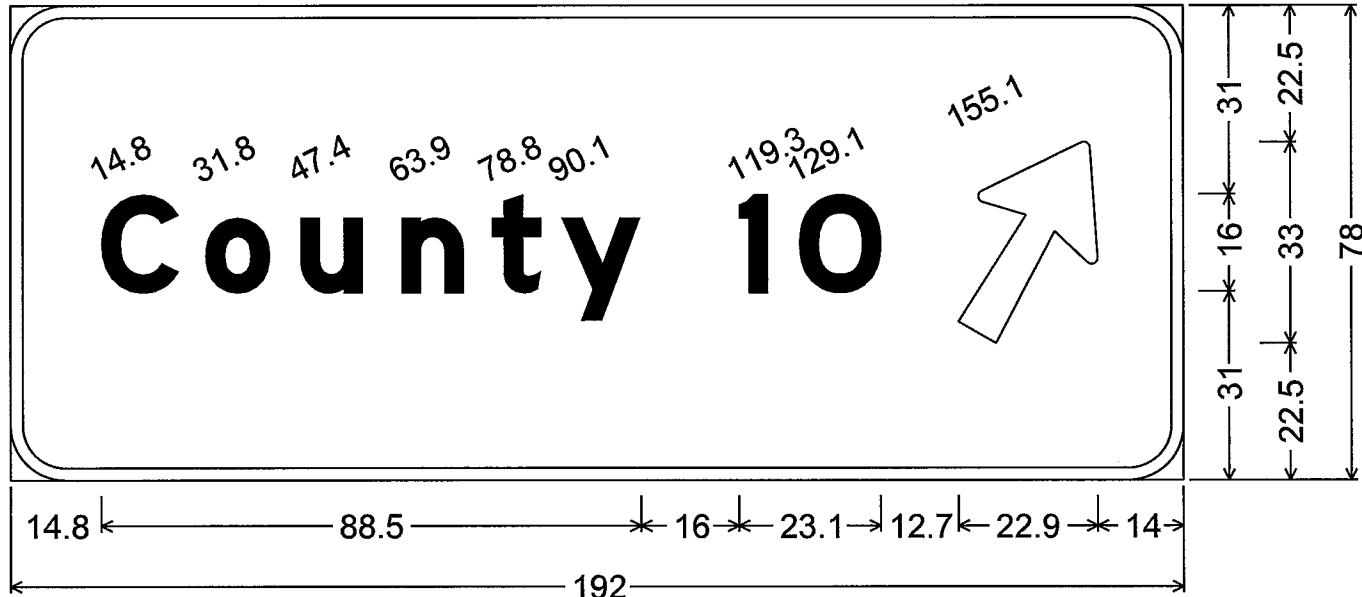
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

FILE NO.	306
RAMSE129594	
SS39	367
OF 5568	

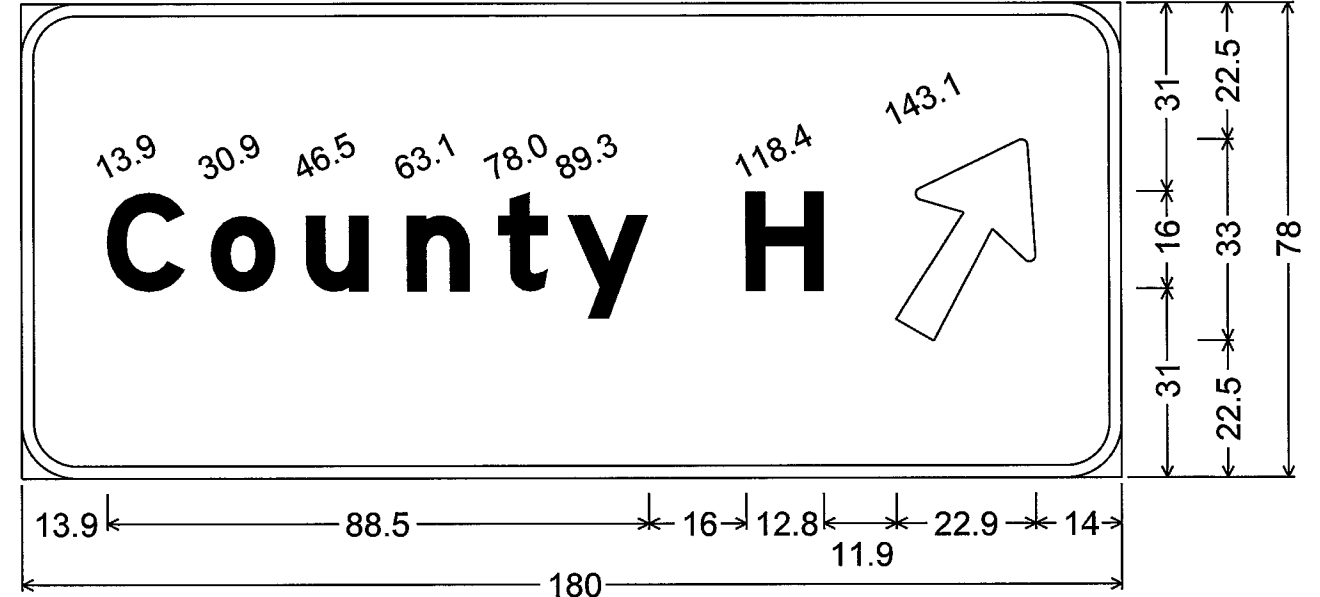
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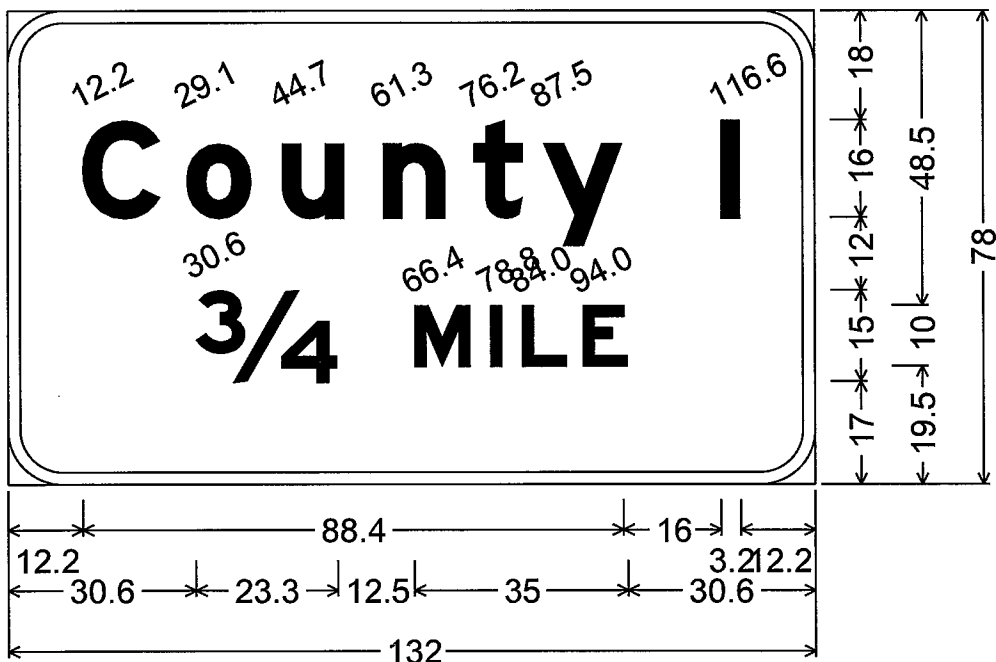
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O.-A-OH SIGN PANELS



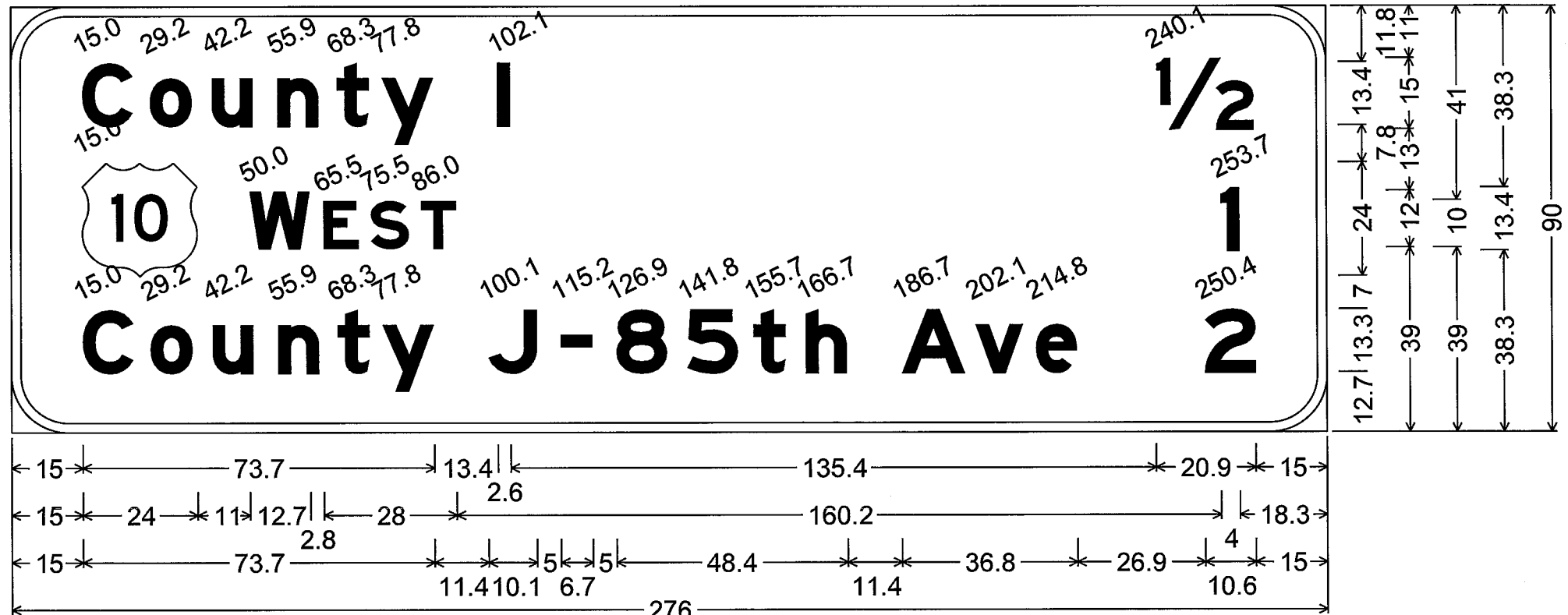
OH I35W-454(R); 9.0" Radius, 2.0" Border, White on Green;
[County 10] E Mod; Arrow 17 - 36.0" 60°;



OH I35W-455(R); 9.0" Radius, 2.0" Border, White on Green;
[County H] E Mod; Arrow 17 - 36.0" 60°;



OH I35W-455(L);
9.0" Radius, 2.0" Border, White on Green;
[County I] E Mod; [3/4 MILE] E Mod;



OH I35W-456; 12.0" Radius, 2.0" Border, White on Green;
[County I] E Mod; [1/2] E Mod; [WEST] E Mod; [1] E Mod; [County J - 85th Ave] E Mod;
[2] E Mod;

- NOTES:
1. SEE STANDARD SIGNS MANUAL FOR ARROW, FRACTION, AND OVERLAY DETAILS.
2. CORNERS OF SIGN PANEL EXTENDING BEYOND BORDER SHALL NOT BE TRIMMED.

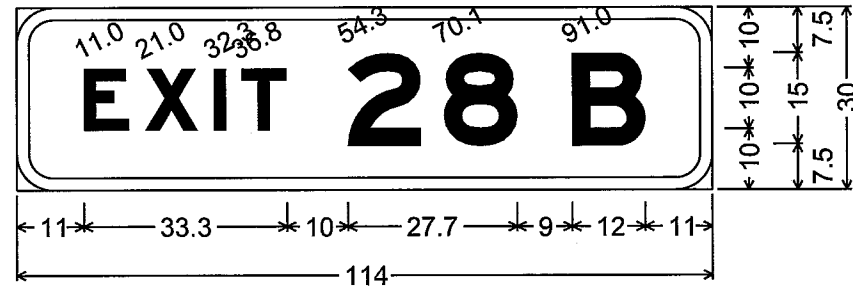
DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: MAW				
CHECKED BY: MAW				
NO.	BY	DATE	REVISIONS	

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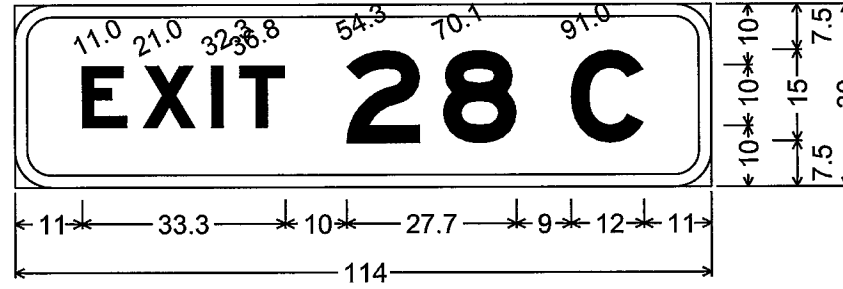


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

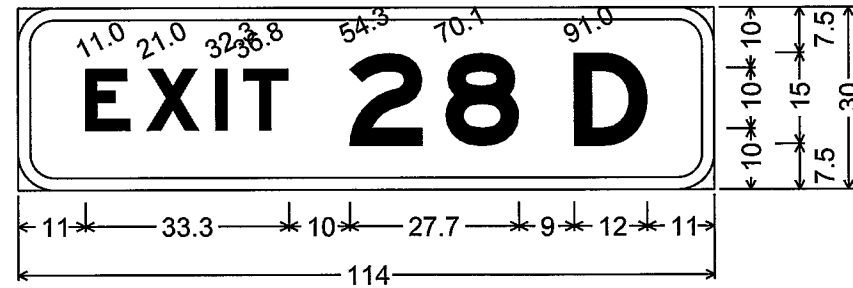
FILE NO. RAMSE129594	307
SS40 OF 5568	367



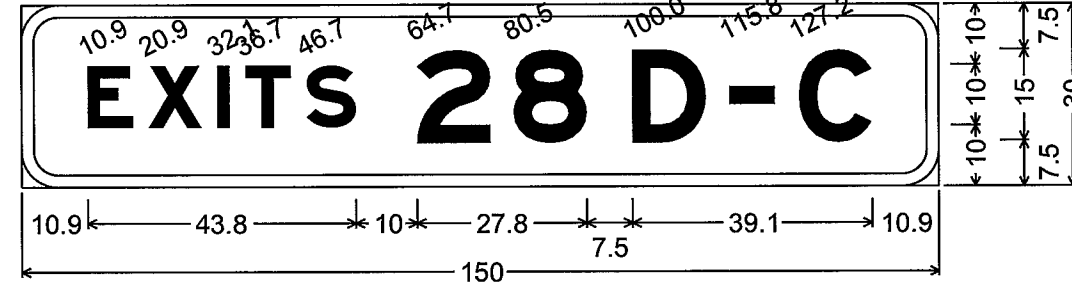
EO-1; 6.0" Radius, 2.0" Border, White on Green;
[EXIT 28 B] E Mod;



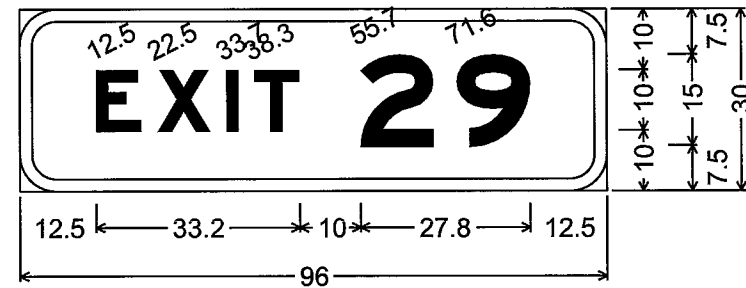
EO-2; 6.0" Radius, 2.0" Border, White on Green;
[EXIT 28 C] E Mod;



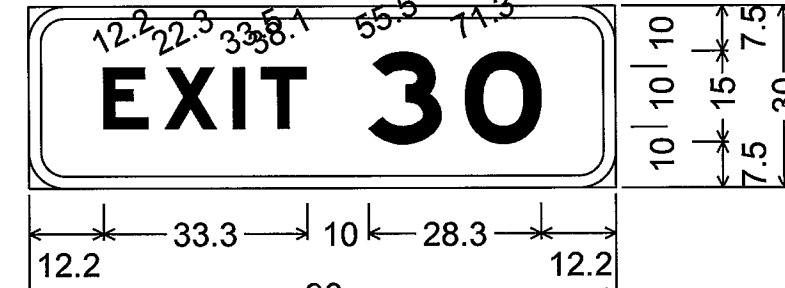
EO-3; 6.0" Radius, 2.0" Border, White on Green;
[EXIT 28 D] E Mod;



EO-4; 6.0" Radius, 2.0" Border, White on Green;
[EXITS 28 D-C] E Mod;



EO-5;
6.0" Radius, 2.0" Border, White on Green;
[EXIT 29] E Mod;



EO-6;
6.0" Radius, 2.0" Border, White on Green;
[EXIT] E Mod; [30] E Mod;

NOTES:

- SEE STANDARD SIGNS MANUAL FOR ARROW, FRACTION, AND OVERLAY DETAILS.
- CORNERS OF SIGN PANEL EXTENDING BEYOND BORDER SHALL NOT BE TRIMMED.

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

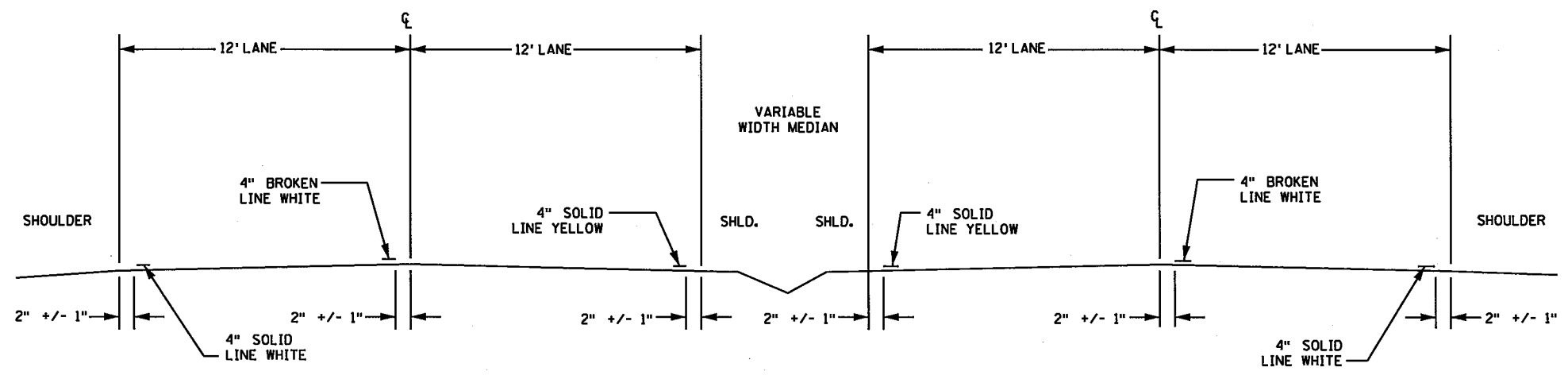
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 12/8/2015

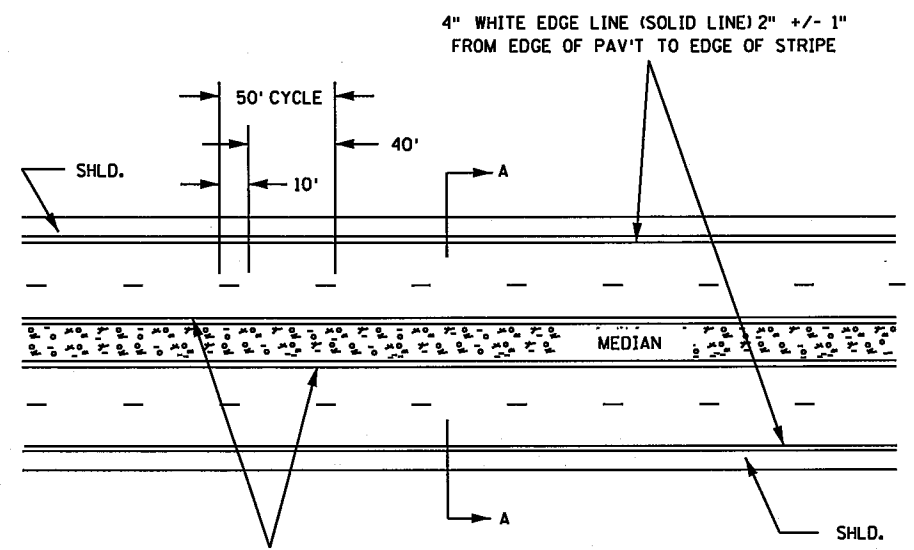


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

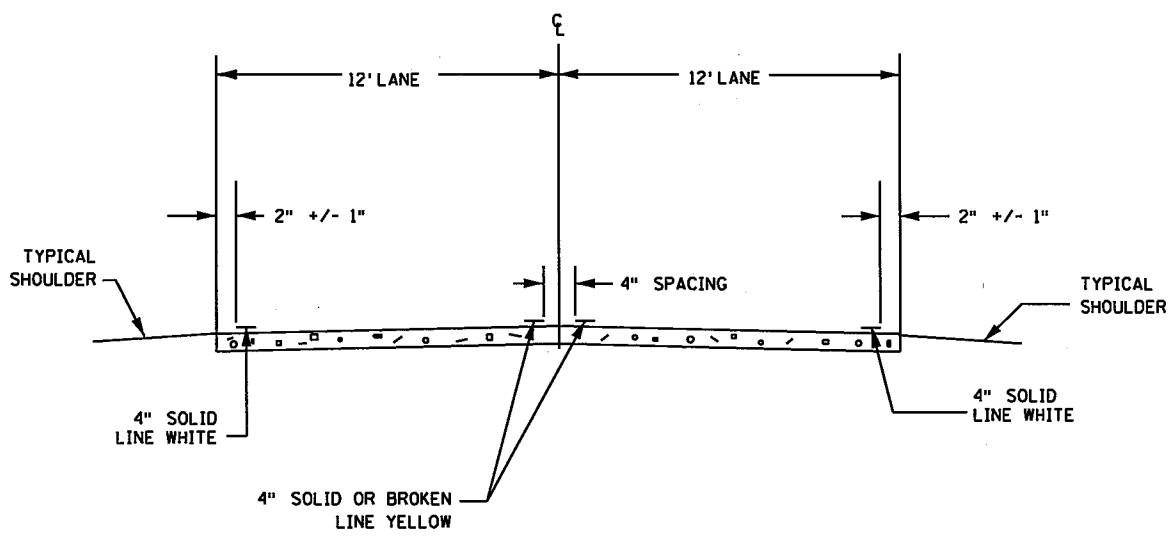
FILE NO. RAMSEI29594	308
SS41 OF 5568	367



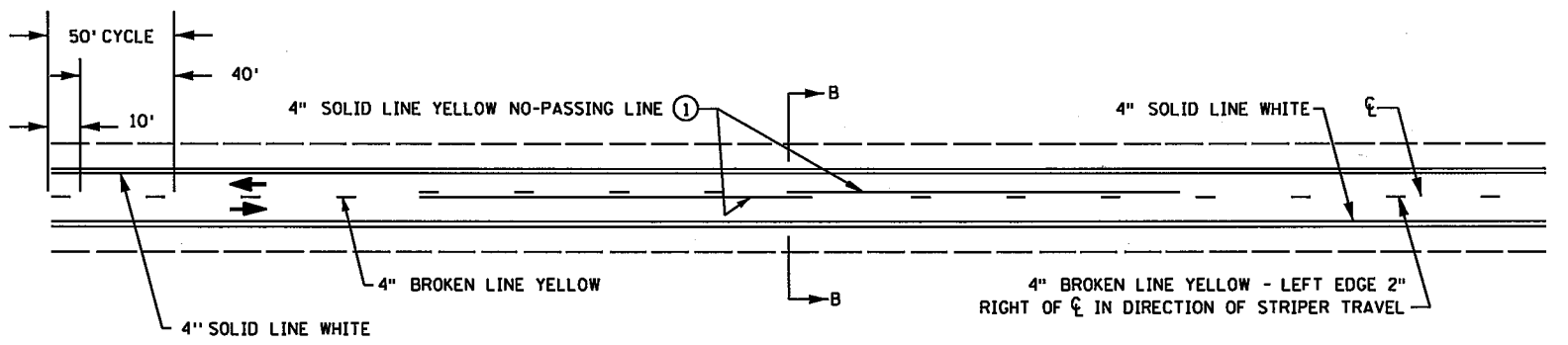
**SECTION A-A
FOUR LANES**



TYPICAL 4-LANE DIVIDED LANE MARKINGS

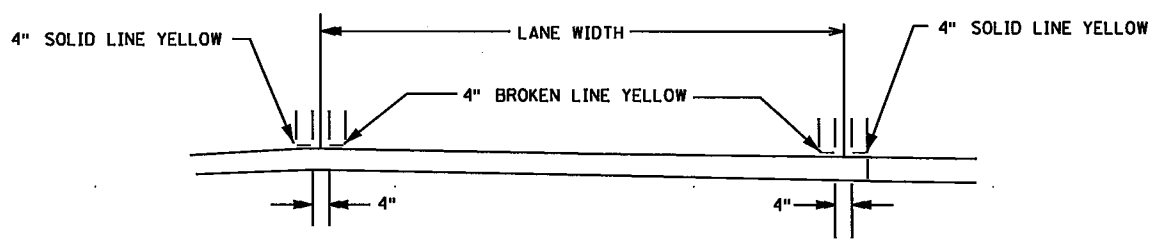


SECTION B-B

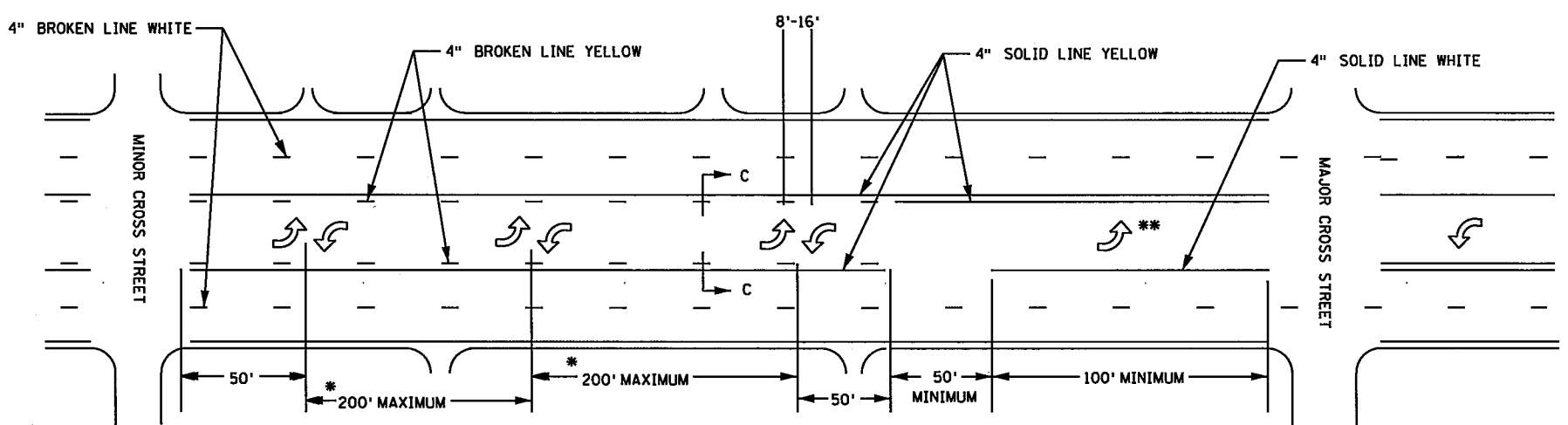


TWO LANE-TWO WAY TRAFFIC MARKINGS

① CONTACT TRAFFIC ENGINEER FOR NO PASSING ZONE SURVEY.



**SECTION C-C
TWO WAY LEFT TURN LANE**



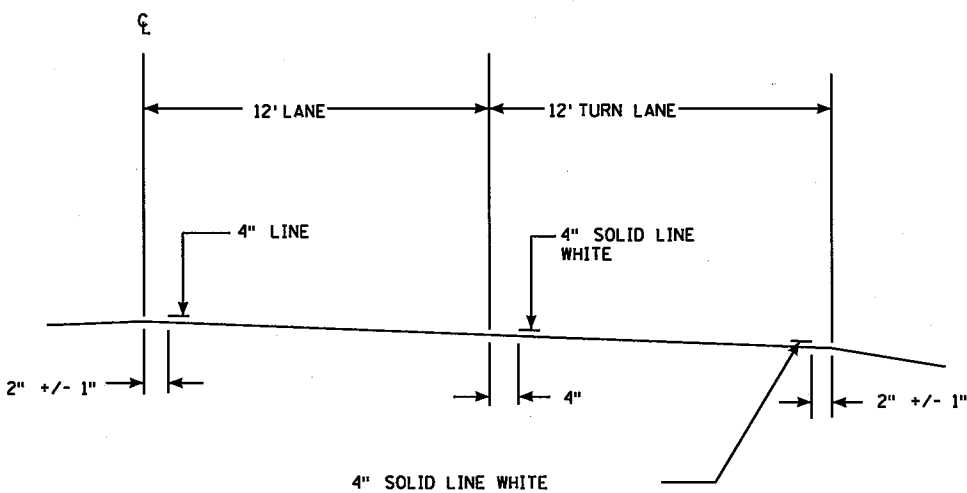
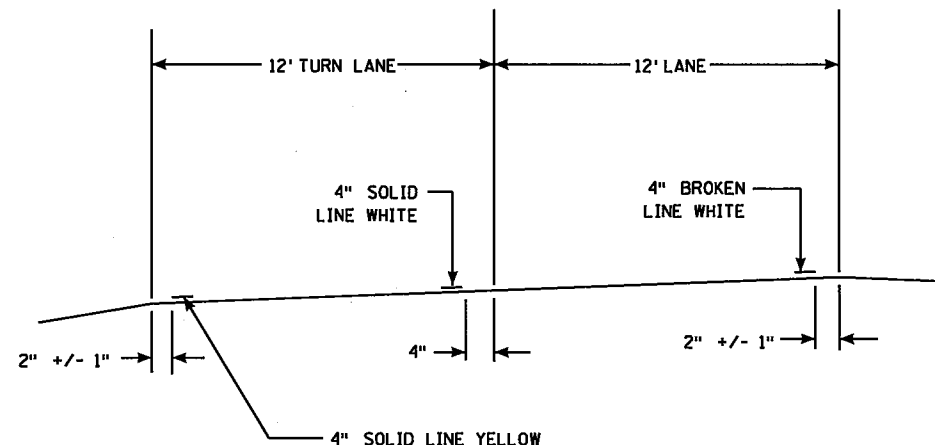
TWO WAY LEFT TURN LANE

* THESE DISTANCES SHOULD BE EQUAL. THE PAVEMENT ARROWS ARE PLACED TO SHOW THE OPERATION AND DO NOT HAVE TO LINE UP WITH ANY OF THE DRIVEWAYS.

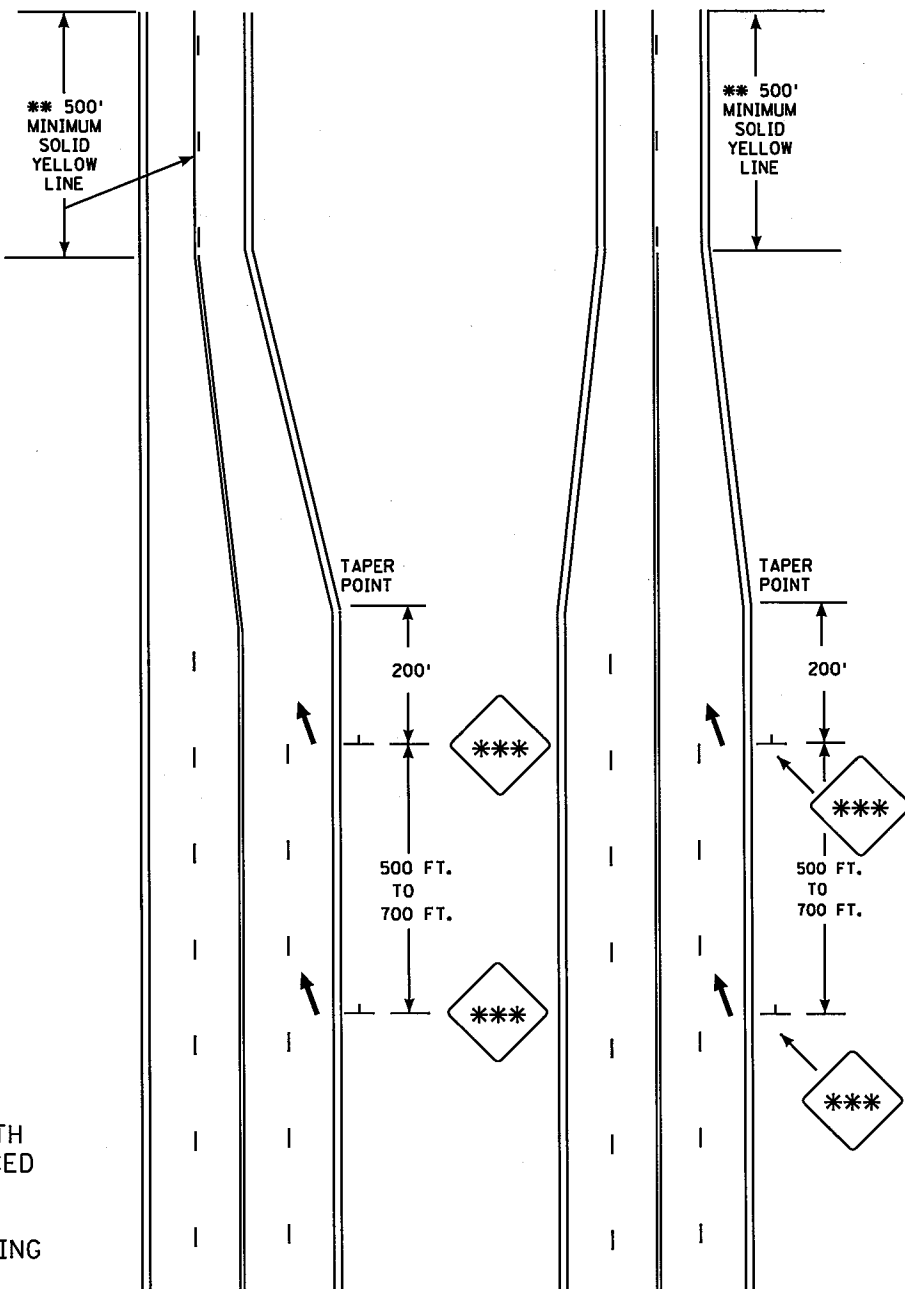
NOTE:
SINGLE-DIRECTION LEFT-TURN ARROWS SHALL NOT BE USED IN LANES BORDERED ON BOTH SIDES BY TWO-WAY LEFT-TURN LANE MARKINGS

** SEE "TYPICAL MESSAGE PLACEMENT FOR TURN LANES" FOR NUMBER AND PLACEMENT OF ARROWS.

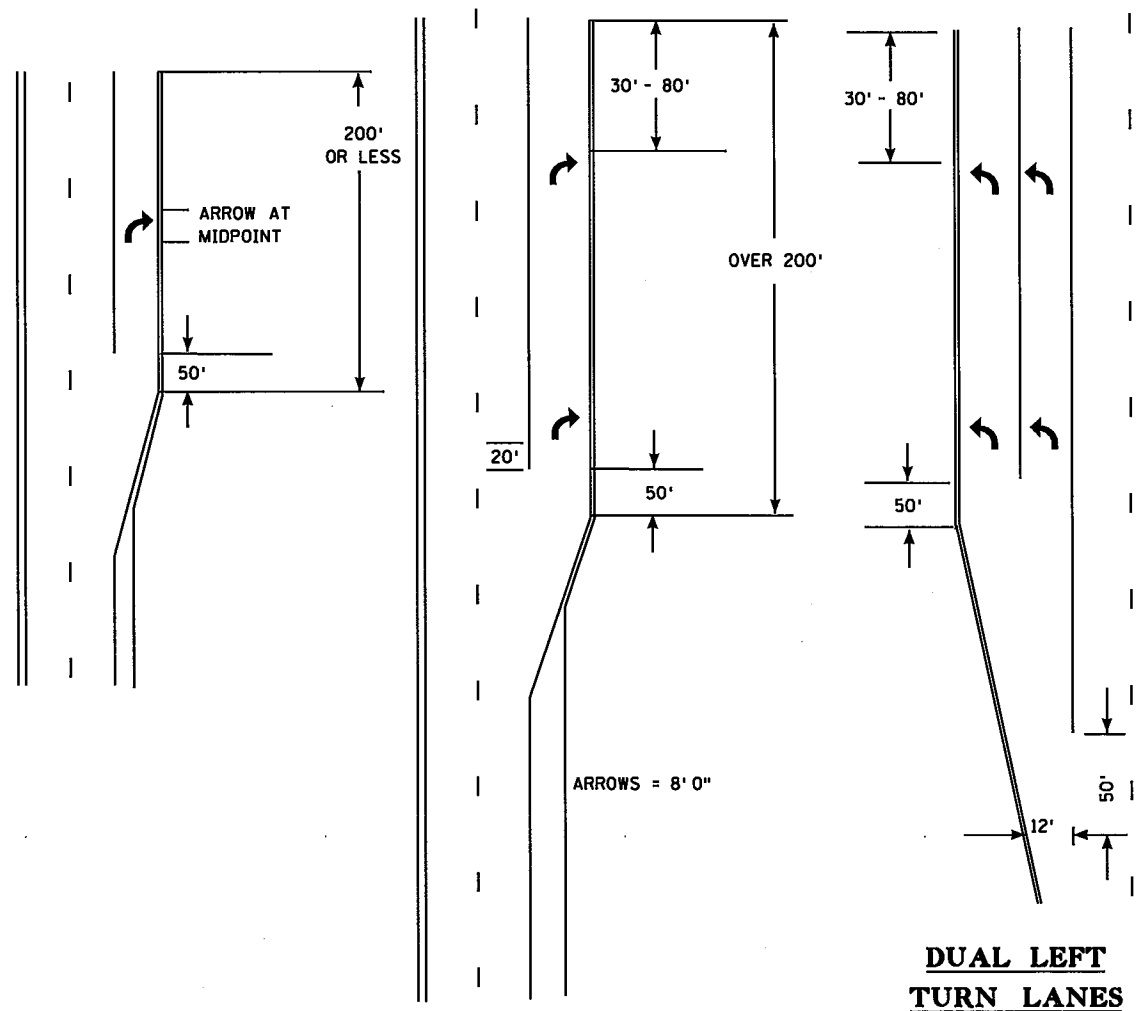
TYPICAL LEFT TURN LANE



TYPICAL LANE REDUCTION TRANSITION

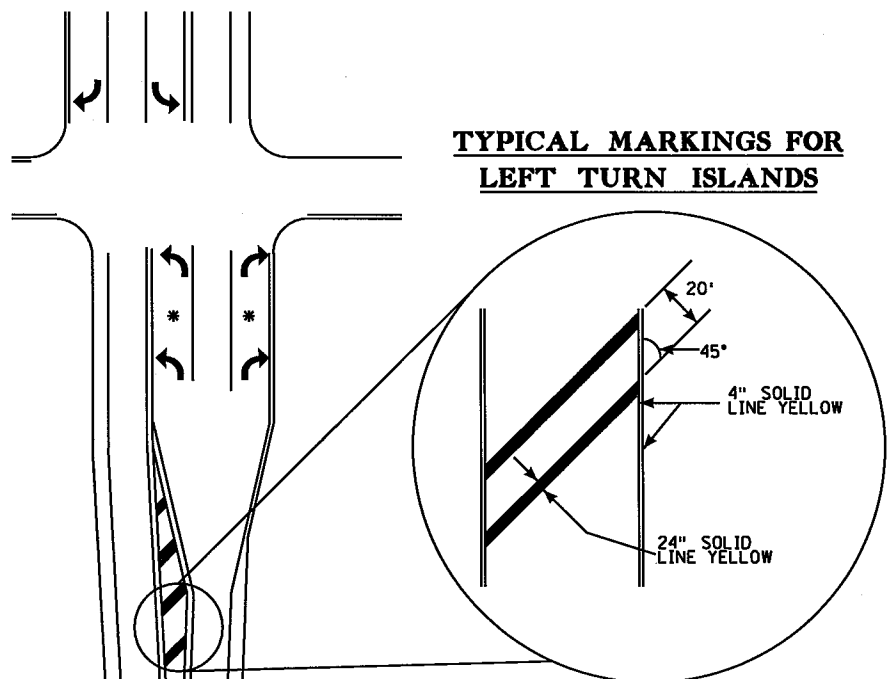


TYPICAL MESSAGE PLACEMENT FOR TURN LANES



DUAL LEFT TURN LANES

TYPICAL MARKINGS FOR LEFT TURN ISLANDS



AT SPEEDS LESS THAN 40 MPH THE WIDTH OF THE CROSSHATCH LINE MAY BE REDUCED TO 12".

AT SPEEDS 40 MPH AND OVER THE SPACING MAY BE INCREASED TO 30' BETWEEN CROSSHATCH LINES.

** 500' SOLID YELLOW

* SEE "TYPICAL MESSAGE PLACEMENT FOR TURN LANES" FOR NUMBER OF ARROWS.

** IF THE DISTANCE BETWEEN THE BEGINNING OF THE SOLID LINE YELLOW IS LESS THAN THE DISTANCES IN THE CHART BELOW FROM THE END OF A PRECEDING SOLID LINE YELLOW IN THE SAME LANE, THE SOLID LINE SHALL BE EXTENDED BETWEEN THEM.

- 39 MPH SPEED LIMIT OR LESS..... 500'
- 40-54 MPH SPEED LIMIT..... 650'
- 55 MPH SPEED LIMIT..... 800'

*** PLACE TRANSITION ARROWS ADJACENT TO LANE REDUCTION SIGNS. REFER TO SIGNING TYPICALS FOR SIGN DETAILS AND PLACEMENT.

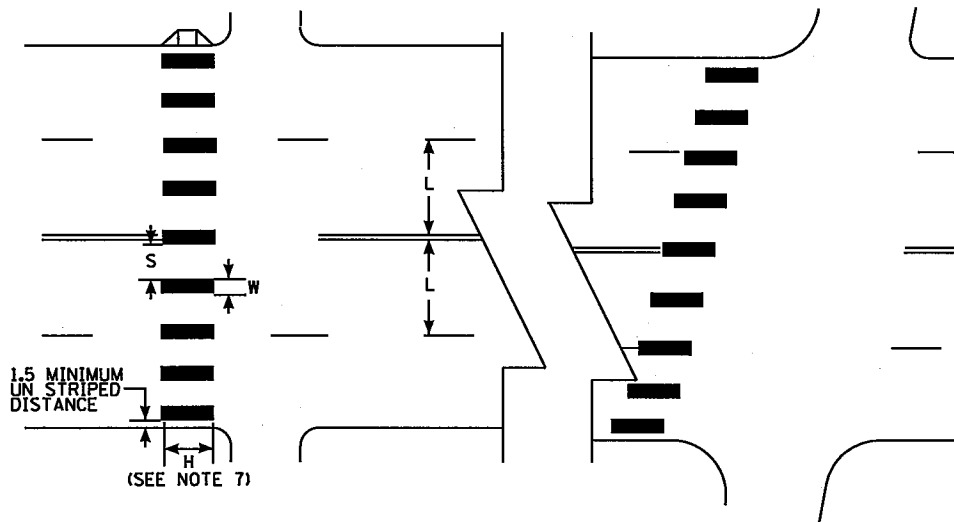
**** LANE REDUCTION TRANSITION ARROWS ARE OPTIONAL FOR SPEEDS LESS THAN 45 MPH.

PAVEMENT MARKING TYPICALS

11:37:21 AM
 2/16/2016
 (USERNAME)
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MARKINGS FOR PEDESTRIAN CROSSWALKS

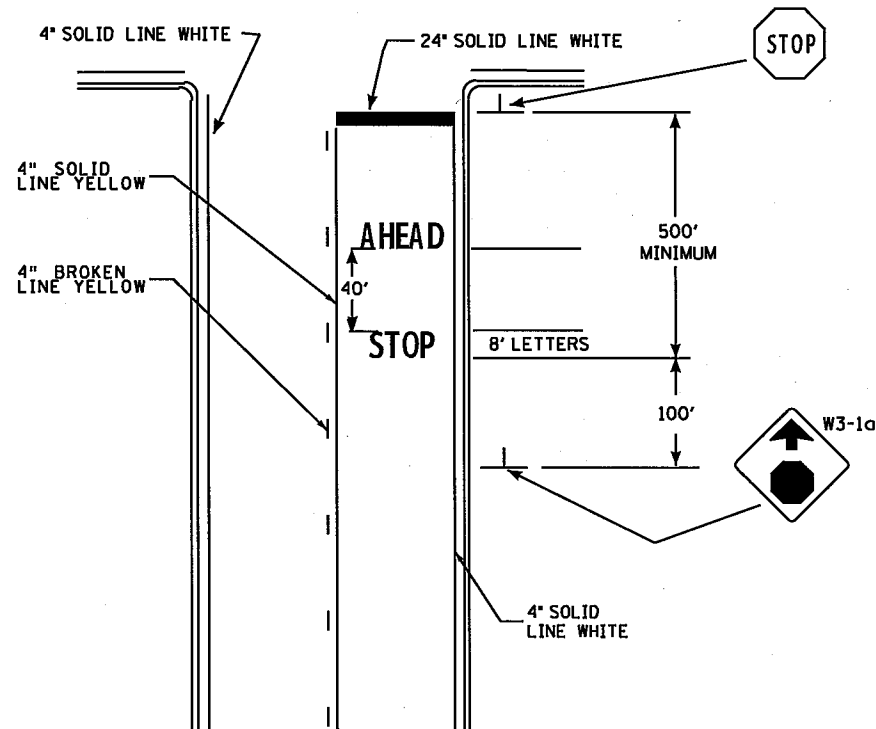
(L) WIDTH OF INSIDE LANE	(W) WIDTH OF PAINTED AREA	(S) WIDTH OF SPACE	ALTERNATE (W) WIDTH OF PAINTED AREA	ALTERNATE (S) WIDTH OF PAINTED AREA
9'	2.0'	2.5'	—	—
10'	2.5'	2.5'	2.0'	3.0'
11'	2.5'	3.0'	2.0'	3.5'
12'	3.0'	3.0'	2.5'	3.5'
13'	3.0'	3.5'	—	—



NOTES:

- PAINTED AREAS TO BE CENTERED ON CENTERLINE AND LANE LINES.
- A MINIMUM OF 1.5 FT. CLEAR DISTANCE SHALL BE LEFT ADJACENT TO THE CURB. IF LAST PAINTED AREA FALLS INTO THIS DISTANCE IT MUST BE OMITTED.
- ON TWO LANE TWO WAY STREETS, USE SPACING SHOWN FOR AN 11 FT. INSIDE LANE.
- FOR DIVIDED ROADWAYS, ADJUSTMENTS IN SPACING OF THE BLOCKS SHOULD BE MADE IN THE MEDIAN SO THAT THE BLOCKS ARE MAINTAINED IN THEIR PROPER LOCATION ACROSS THE TRAVELED PORTION OF THE ROADWAY.
- AT SKEWED CROSSWALKS, THE BLOCKS ARE TO REMAIN PARALLEL TO THE LANE LINES AS SHOWN.
- THE BLOCKS SHALL BE PLACED SO THAT THEY ARE NOT LOCATED IN THE WHEEL PATH OF THE VEHICLES
- THE BLOCKS SHALL BE A MINIMUM OF 6' LONG AND AT LEAST AS LONG AS THE TRUNCATED DOMES. FOR FANNED TRUNCATED DOMES THE BLOCKS SHALL BE AT LEAST AS LONG AS THE APPROACHING SIDEWALK OR SHARED USE PATH.
- THE ALTERNATE (W) AND (S) MAY BE USED WHEN BLOCKS LONGER THAN 6' (H) ARE USED.

PLACEMENT FOR "STOP AHEAD" MARKINGS AND STOP LINES

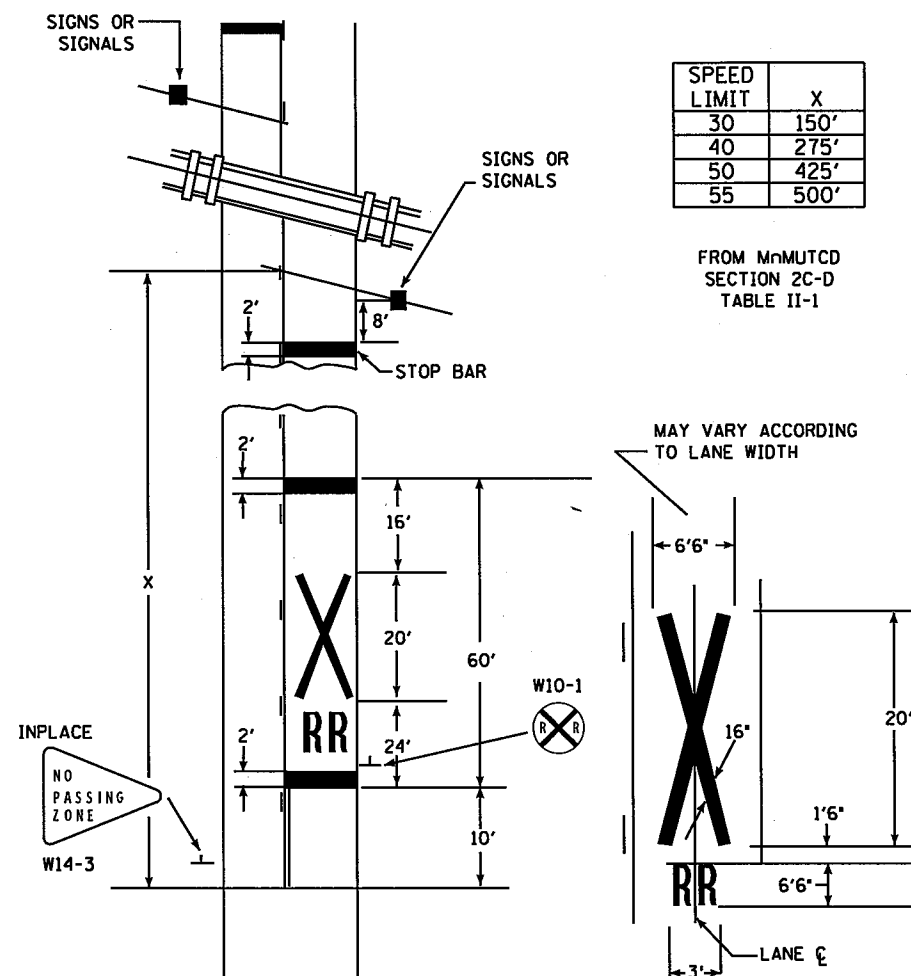


NOTES:

- DO NOT INSTALL A STOP AHEAD PAVEMENT MESSAGE IF THE INTERSECTION HAS ADEQUATE LIGHTING
- INSTALL ONLY ONE SET OF STOP AHEAD PAVEMENT MESSAGES. IF A STOP AHEAD SIGN NEEDS TO BE INSTALLED MORE THAN 1000 FEET FROM THE STOP SIGN, CONTACT DISTRICT TRAFFIC ENGINEER TO DETERMINE IF, AND WHERE, A SECOND SET OF STOP AHEAD PAVEMENT MESSAGES SHOULD BE INSTALLED.
- THE STOP LINE SHOULD ORDINARILY BE PLACED 4 FEET IN ADVANCE OF AND PARALLEL TO THE NEAREST CROSSWALK LINE. IN THE ABSENCE OF A MARKED CROSSWALK, THE STOP LINE SHOULD BE PLACED AT THE DESIRED STOPPING POINT, AND IN NO CASE NO MORE THAN 30 FEET OR LESS THAN 4 FEET FROM THE NEAREST EDGE OF THE INTERSECTING CURB LINE OR THE NEAR EDGE OF THE THRU LANE.
- IF A STOP LINE IS USED IN CONJUNCTION WITH A STOP SIGN, IT SHOULD ORDINARILY BE PLACED IN LINE WITH THE STOP SIGN. HOWEVER, IF THE SIGN CANNOT BE LOCATED EXACTLY WHERE VEHICLES ARE EXPECTED TO STOP, THE STOP LINE SHOULD BE PLACED AT THE STOPPING POINT.
- IF THE DISTANCE BETWEEN THE BEGINNING OF THE SOLID LINE YELLOW IS LESS THAN THE DISTANCES IN THE CHART BELOW FROM THE END OF A PRECEDING SOLID LINE YELLOW IN THE SAME LANE, THE SOLID LINE SHALL BE EXTENDED BETWEEN THEM.

35 MPH SPEED LIMIT OR LESS
 40-50 MPH SPEED LIMIT
 55 MPH SPEED LIMIT

MARKINGS FOR RAILROAD CROSSINGS



NOTES:

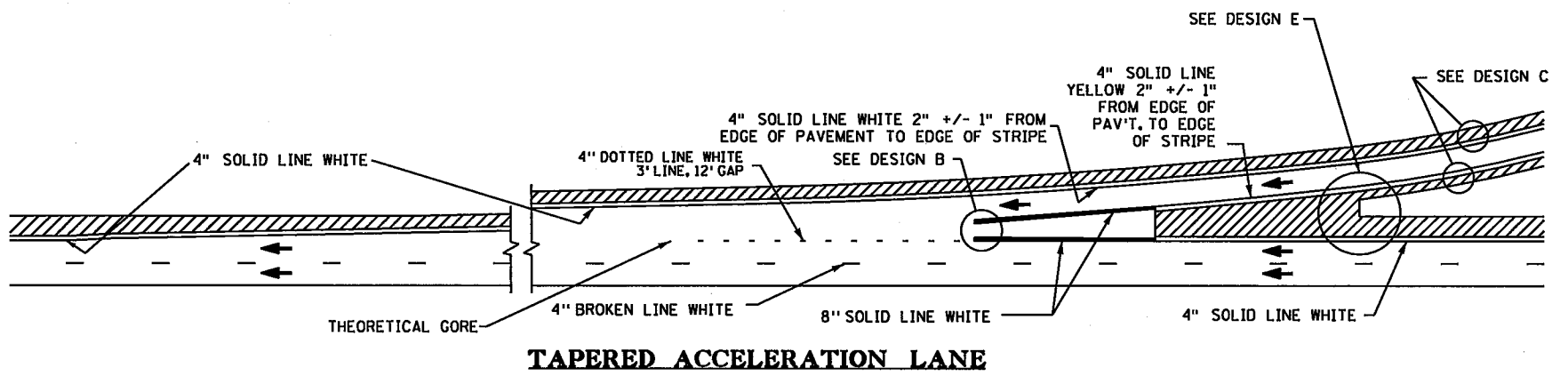
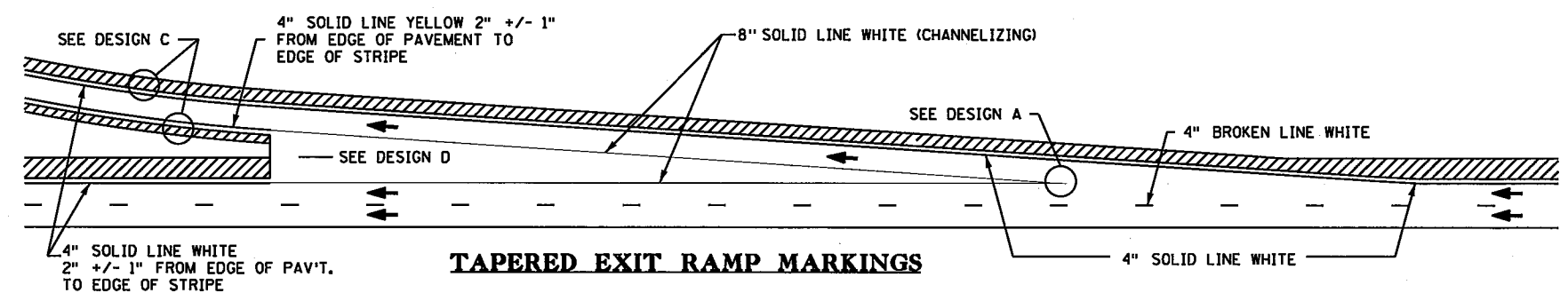
- THE DISTANCE FROM THE RAILROAD CROSSING MARKING TO THE NEAREST TRACK WILL VARY ACCORDING TO THE APPROACH SPEED AND SIGHT DISTANCE OF THE VEHICULAR TRAFFIC APPROACHING, BUT SHOULD NOT BE LESS THAN 50 FEET.
- ON MULTI-LANE ROADS THE TRANSVERSE BANDS SHOULD EXTEND ACROSS ALL APPROACH LANES, AND INDIVIDUAL R X R SYMBOLS SHOULD BE USED IN EACH APPROACH LANE.
- THE STOP LINE MAY BE PARALLEL TO AND 15 FEET FROM THE TRACKS WHERE THERE ARE RAILROAD CROSSBUCK SIGNS.

DOUBLE PAVEMENT MESSAGE AS SHOWN SHOULD BE INSTALLED WHENEVER THE STOP AHEAD SIGN IS PLACED A MINIMUM OF 1100' IN ADVANCE OF THE STOP SIGN

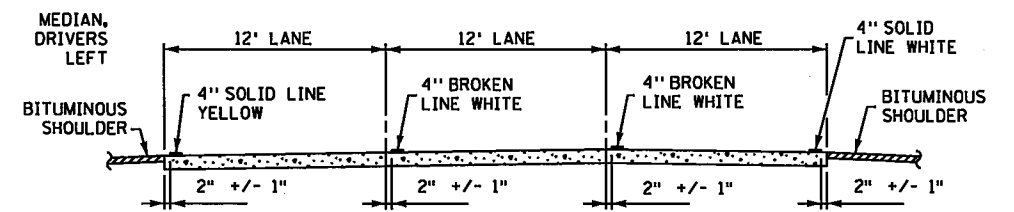
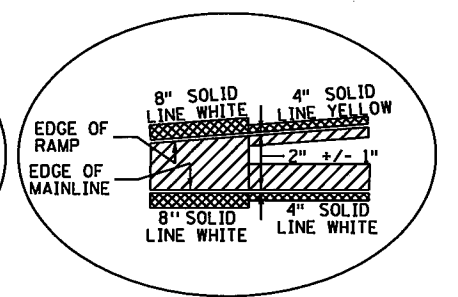
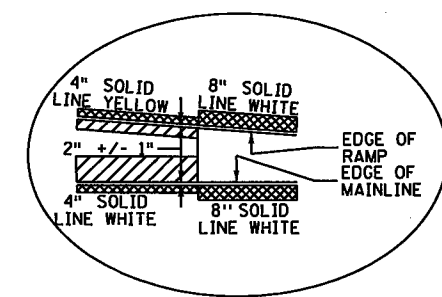
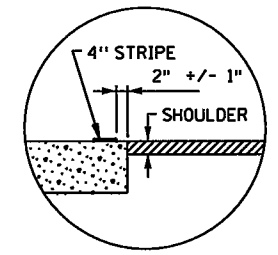
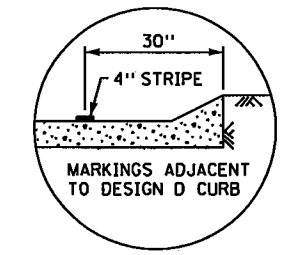
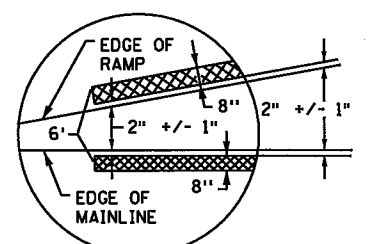
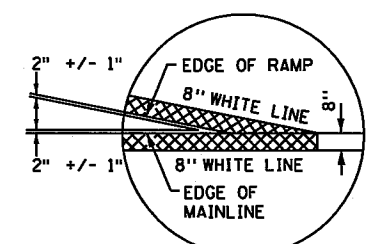
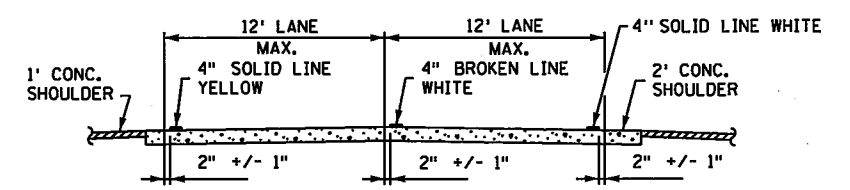
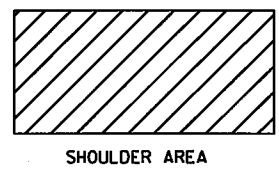
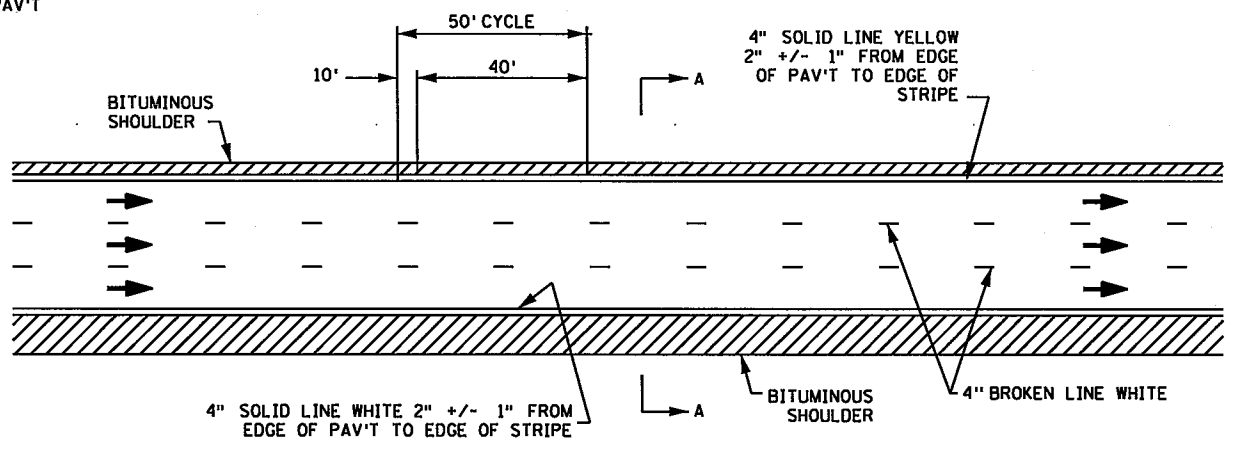
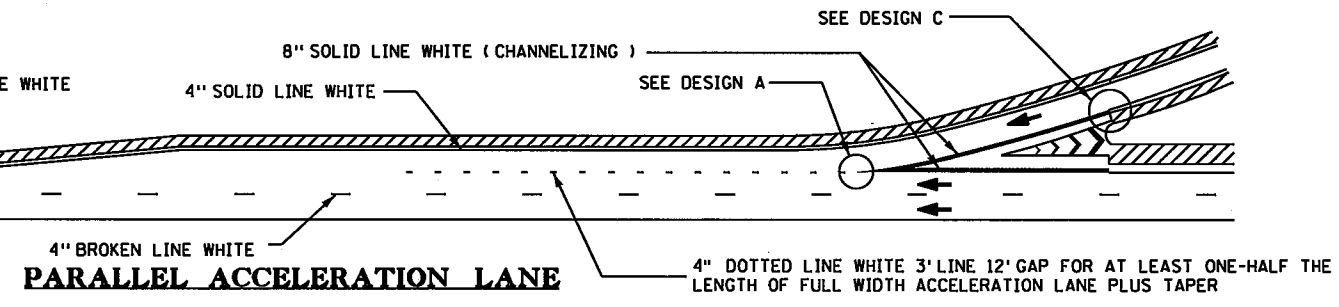
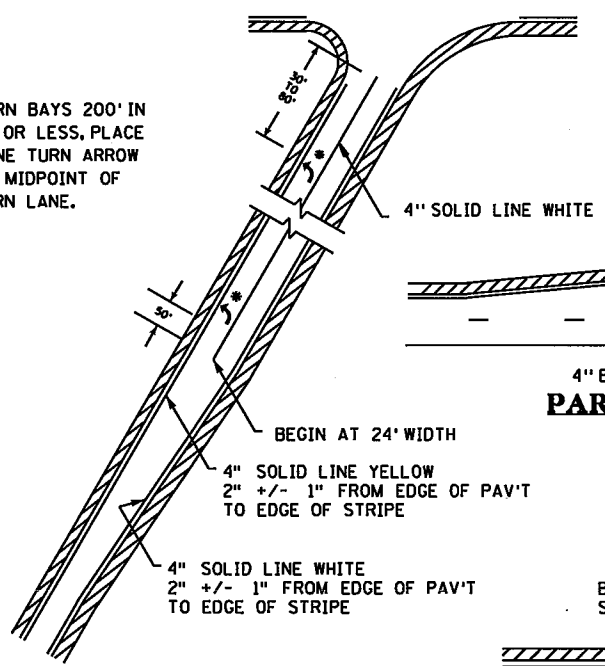
IF THE DISTANCE BETWEEN THE BEGINNING OF THE SOLID LINE YELLOW IS LESS THAN THE DISTANCES IN THE CHART BELOW FROM THE END OF A PRECEDING SOLID LINE YELLOW IN THE SAME LANE, THE SOLID LINE SHALL BE EXTENDED BETWEEN THEM.

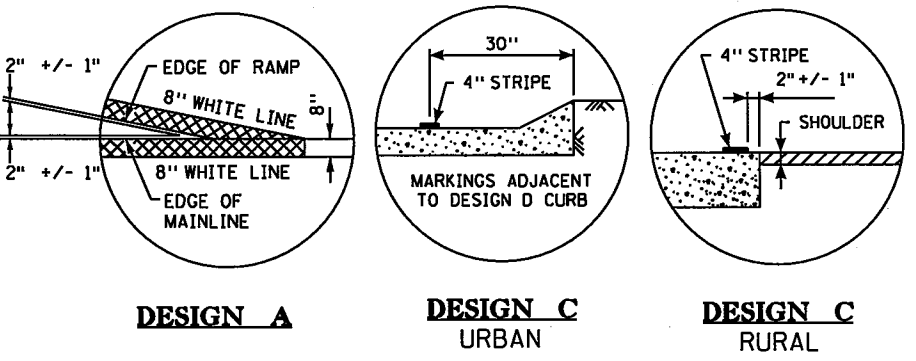
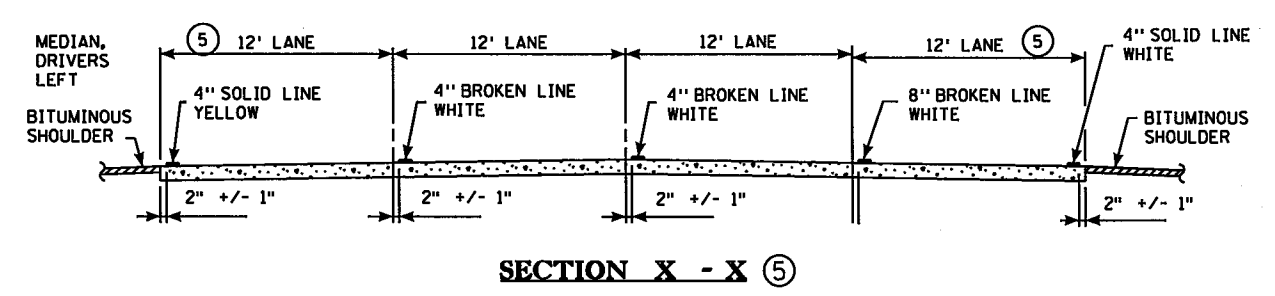
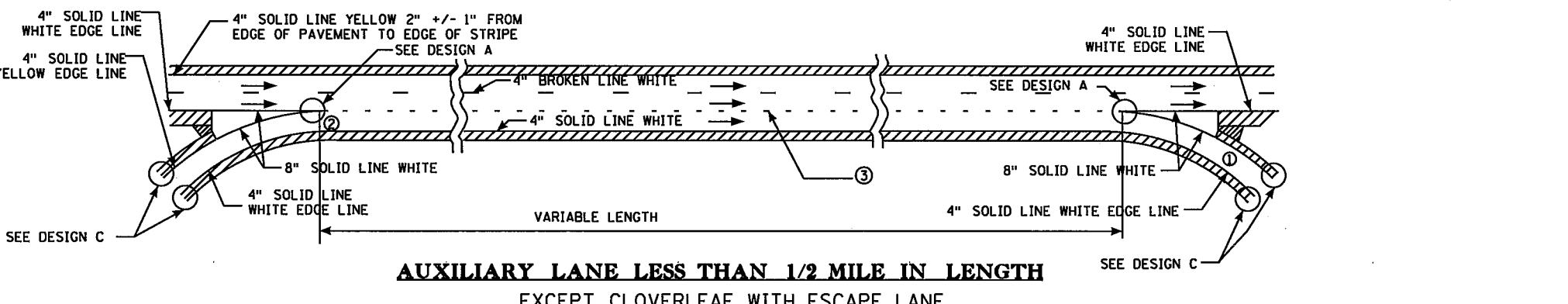
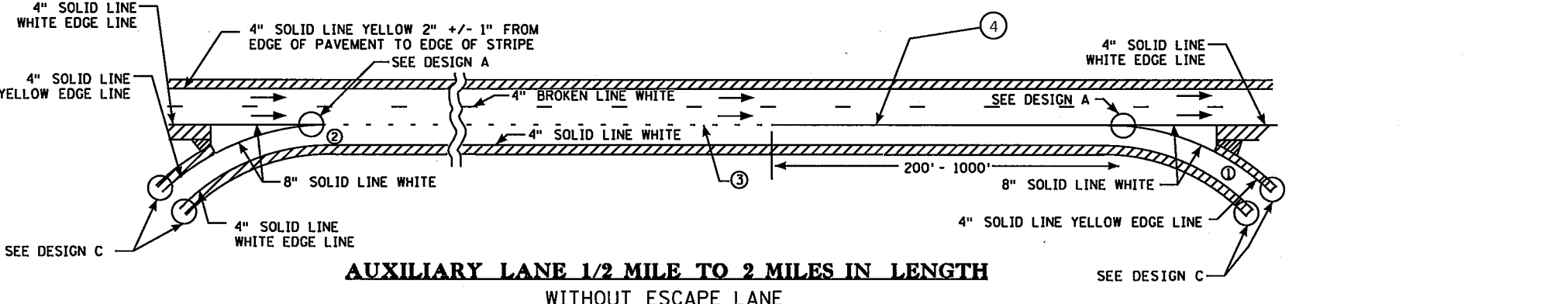
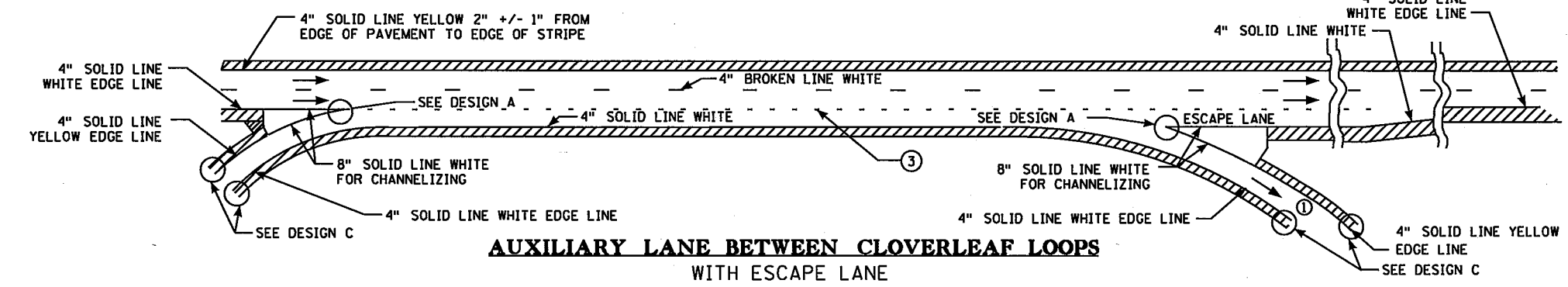
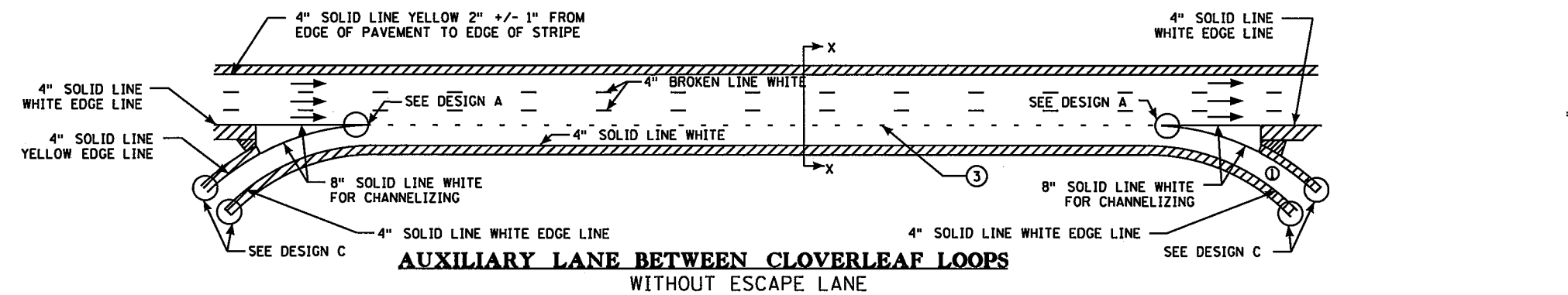
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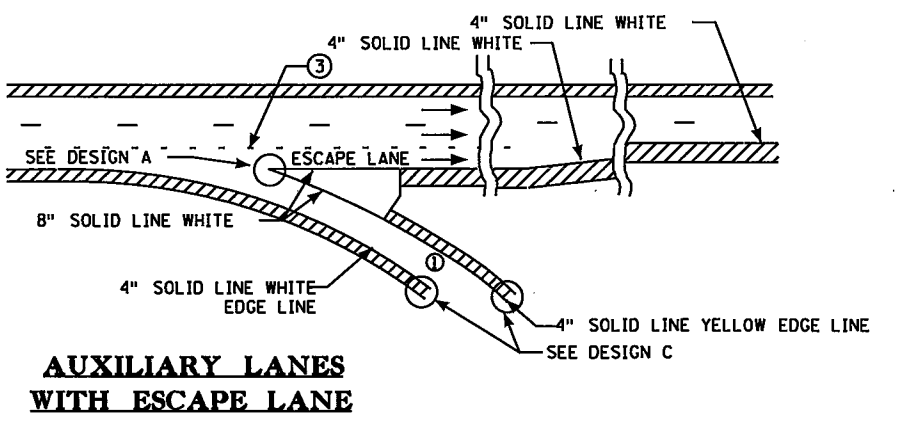
* FOR TURN BAYS 200' IN LENGTH OR LESS, PLACE ONLY ONE TURN ARROW AT THE MIDPOINT OF THE TURN LANE.





NOTES:

- ① EXTEND 8" SOLID LINE WHITE 50' MIN. BEYOND GORE AREA TO COMPENSATE FOR SHARP CURVATURE.
- ② EXTEND 8" SOLID LINE WHITE FOR 200' TO 300' AT DISCRETION OF DISTRICT TRAFFIC ENGINEER. ON CURVATURE OR FOR OTHER SITUATIONS WHERE NEEDED FOR BETTER DELINEATION.
- ③ 8" DOTTED LINE WHITE 3' LINES WITH 12' GAPS AS DETAILED IN FIGURE 3B-10 OF THE MMUTCD.
- ④ EXTEND 8" SOLID LINE WHITE 200' TO 1000' FROM INTERSECTION OF GORE STRIPES, DEPENDING ON LENGTH OF LANE BEING DROPPED, AS DETERMINED BY DISTRICT TRAFFIC ENGINEER.
- ⑤ ON PAVEMENTS OVER 24' WIDE (I.E. 27') EDGE LINES WILL BE PLACED SO LANES ARE A MAXIMUM OF 12' WIDE.



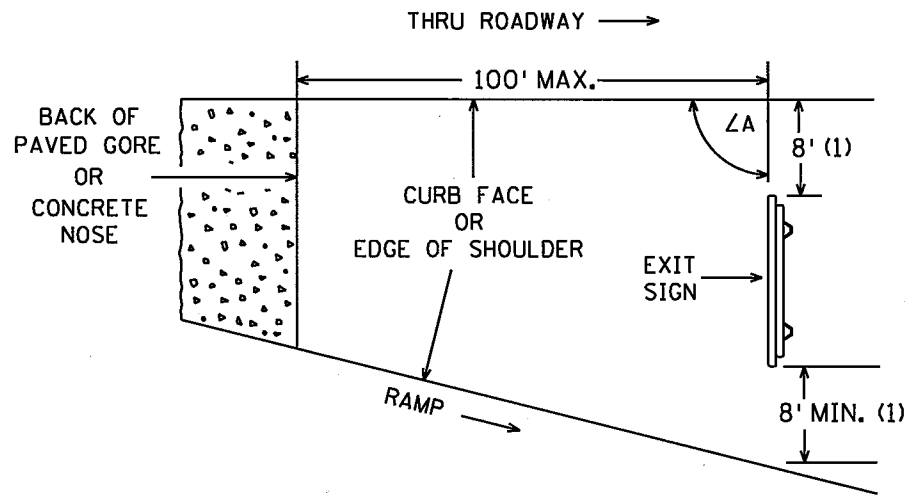
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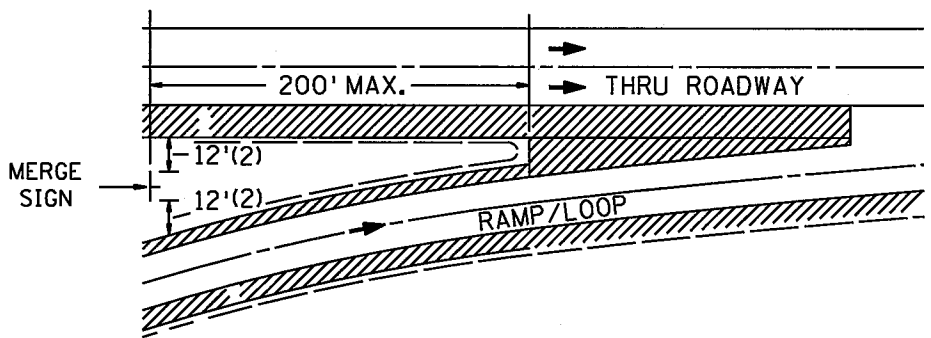
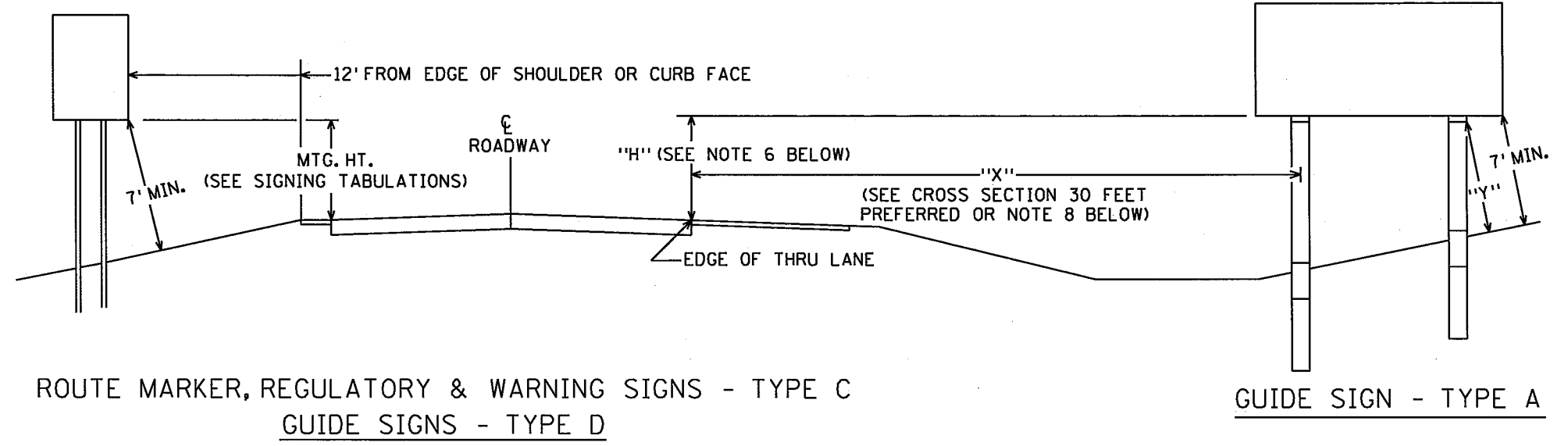
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GORE PLACEMENT



ROADSIDE PLACEMENT



SPECIFIC NOTES:

(1) EXIT SIGNS

IF THESE OFFSETS CANNOT BE ATTAINED WITHIN 100 FEET OF THE PAVED GORE, A 4 FOOT OFFSET IS ACCEPTABLE. IF THE 4 FOOT OFFSETS CANNOT BE ATTAINED WITHIN 100 FEET OF THE PAVED GORE, CONTACT THE PROJECT ENGINEER.

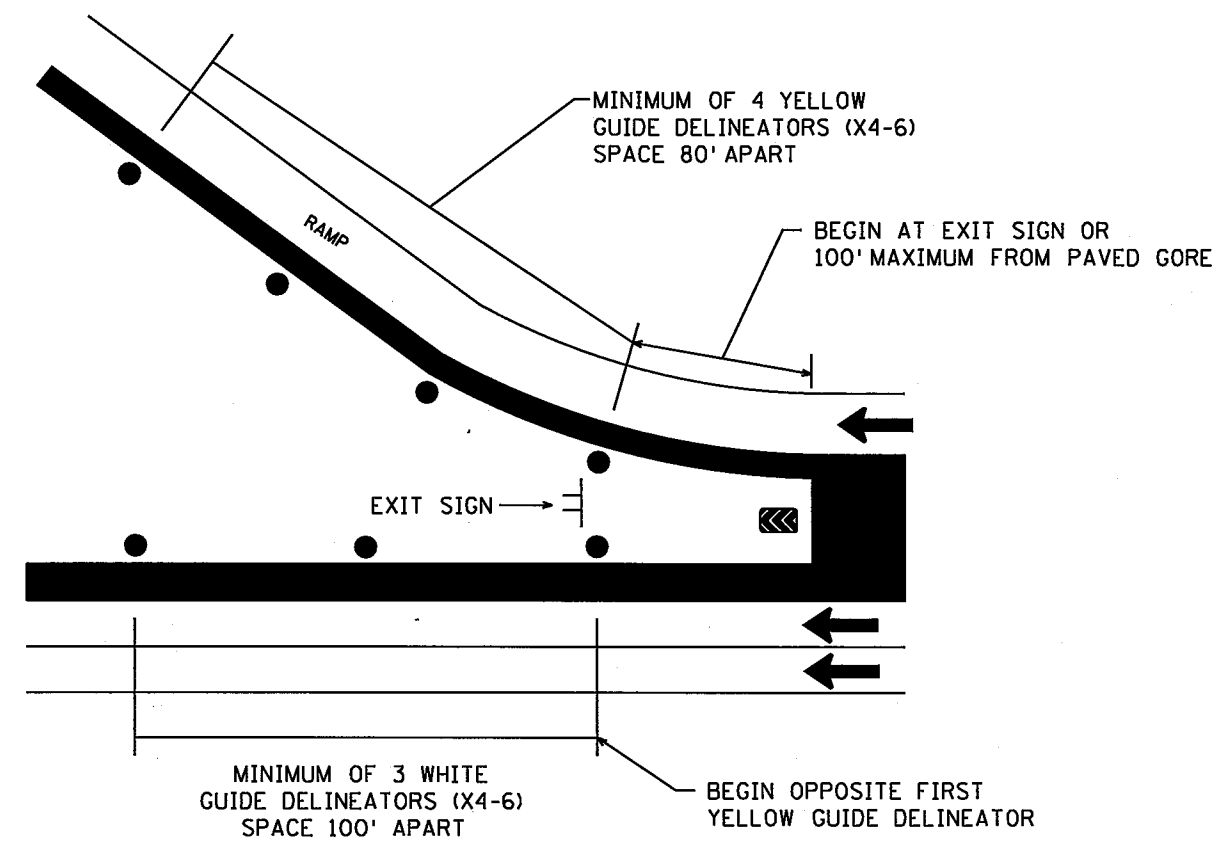
(2) MERGE SIGNS

IF THESE OFFSETS CANNOT BE ATTAINED WITHIN 200 FEET OF THE PAVED GORE, A 4 FOOT OFFSET IS ACCEPTABLE. IF THE 4 FOOT OFFSETS CANNOT BE ATTAINED WITHIN 200 FEET OF THE PAVED GORE, CONTACT THE PROJECT ENGINEER.

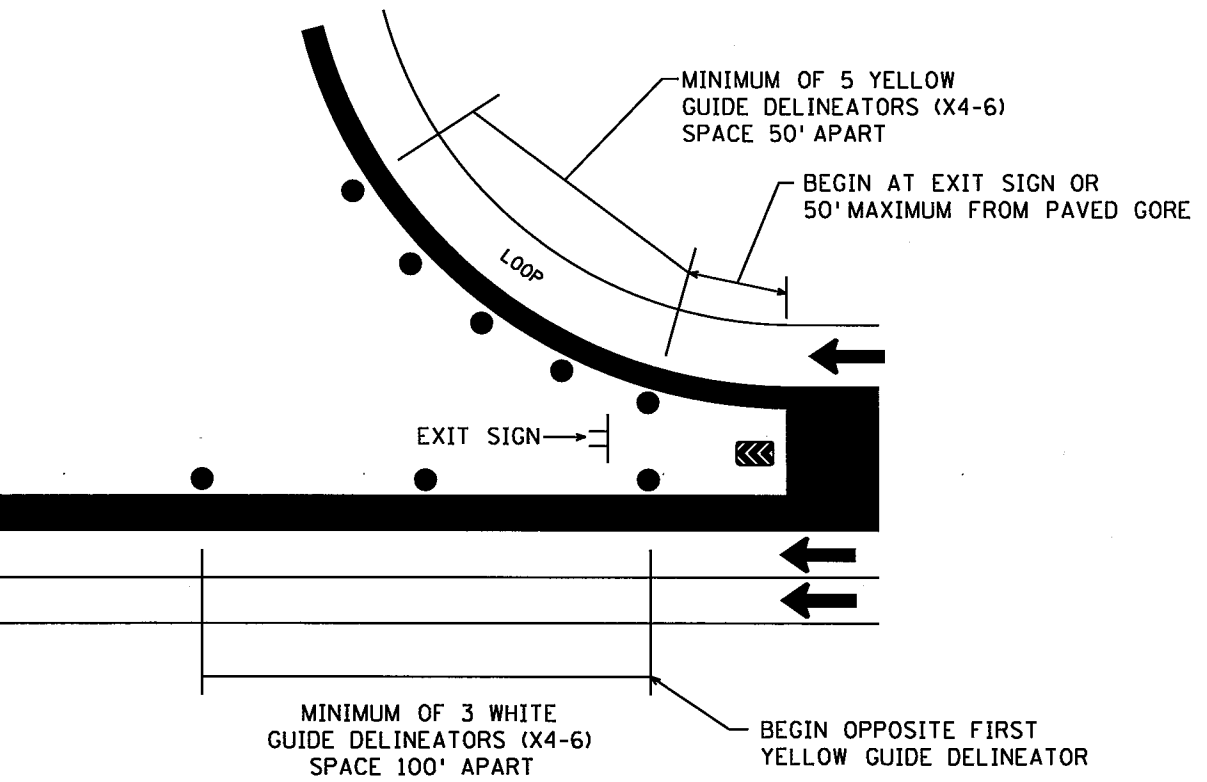
NOTES:

1. ALL TYPE C AND D MOUNTING HEIGHTS ARE MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE ELEVATION OF THE NEAR EDGE OF PAVEMENT IN RURAL AREAS OR TO THE TOP OF THE CURB OR IN THE ABSCENCE OF CURB, TO THE NEAR EDGE OF THE TRAVELED WAY.
2. SIGN FACES SHALL BE VERTICAL.
3. OVERHEAD SIGNS SHALL BE POSITIONED AT RIGHT ANGLES TO THE THRU ROADWAY UNLESS OTHERWISE NOTED.
4. TO AVOID SPECULAR GLARE, ΔA SHALL BE APPROXIMATELY 93° FOR SIGNS LOCATED LESS THAN 30' FROM THE EDGE OF THRU LANE AND APPROXIMATELY 92° FOR SIGNS LOCATED 30' OR MORE FROM EDGE OF THRU LANE. THIS APPLIES TO SIGNS TYPE A, C, & D AND INCLUDES SIGNS IN THE GORE.
5. "Y" IS THE PERPENDICULAR DISTANCE FROM THE GROUND LINE TO THE FRICTION FUSE ON THE POST. THIS DISTANCE SHALL BE AT LEAST 7'.
6. WHERE "X" IS LESS THAN 30', "H" SHALL BE 7'. WHERE "X" IS 30' OR GREATER, MINIMUM AND PREFERRED "H" IS 5'.
7. LATERAL CLEARANCES GIVEN APPLY TO RIGHT AND OR LEFT SIDE INSTALLATION.
8. WHEN A TYPE A SIGN IS INSTALLED DIRECTLY BEHIND TRAFFIC BARRIER, THE LEFT EDGE OF THE SIGN PANEL SHALL BE LOCATED A MINIMUM OF 8 FEET BEHIND THE FACE OF THE TRAFFIC BARRIER.

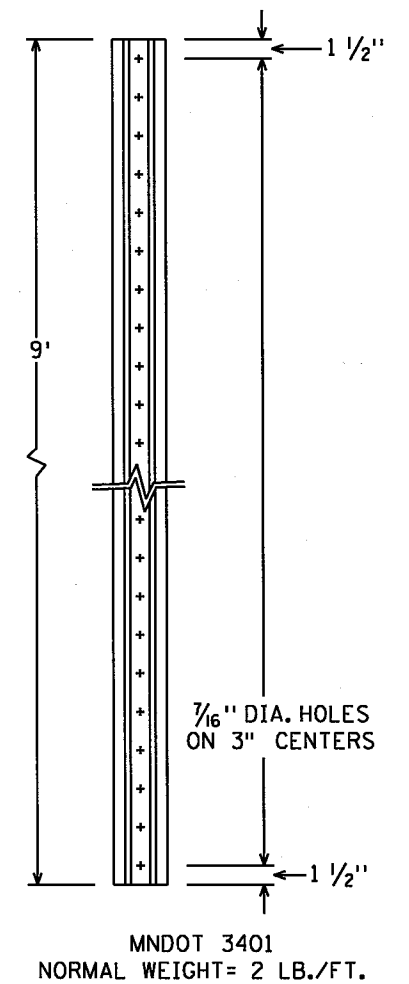
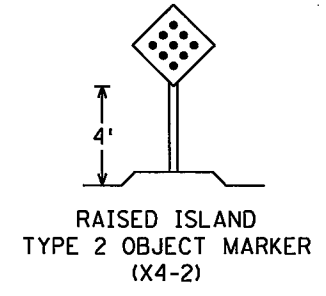
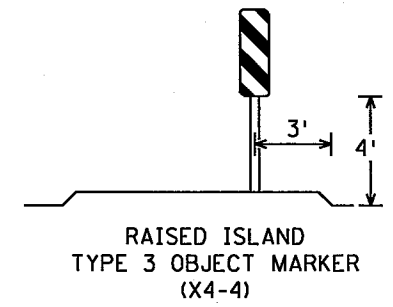
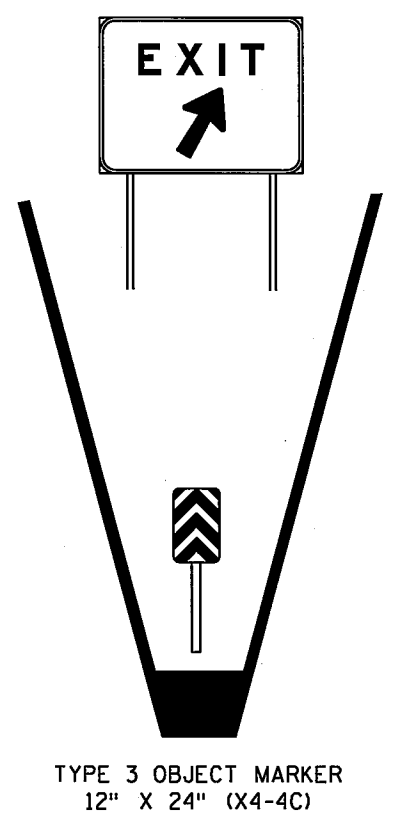
SIGN PLACEMENT



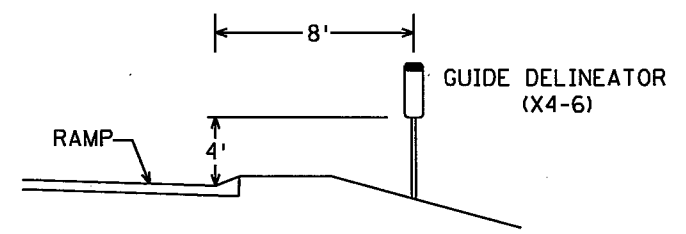
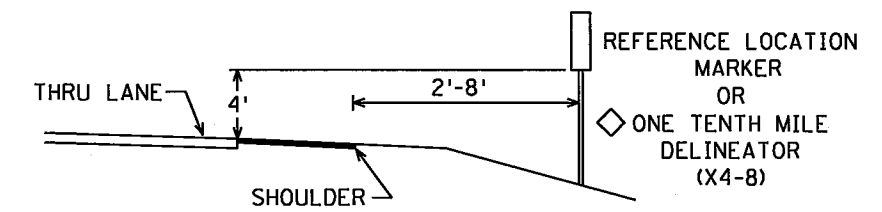
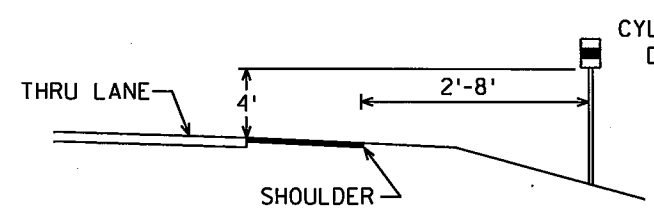
PLAN A
RAMP DELINEATION



PLAN B
LOOP DELINEATION



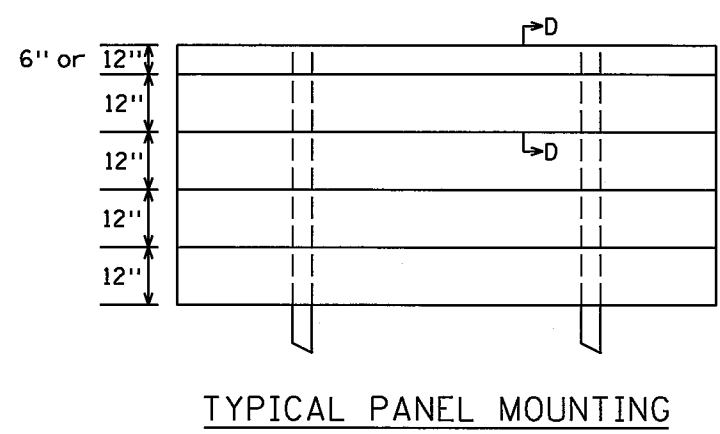
DELINEATOR POST



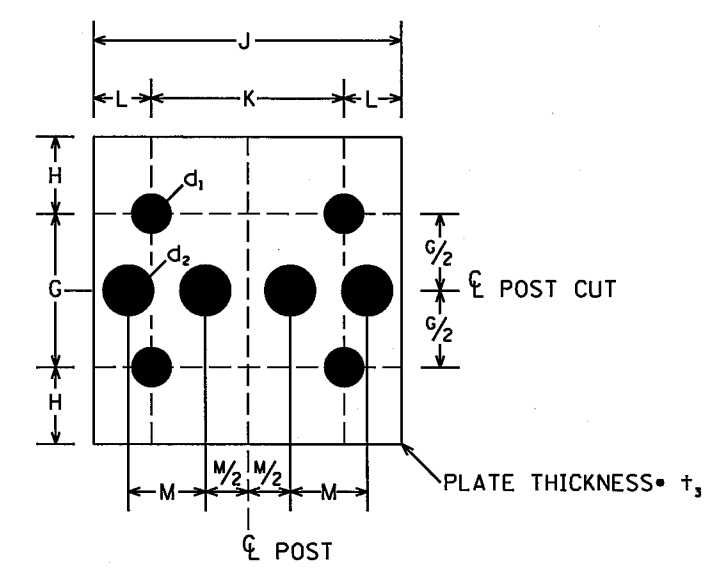
TYPICAL PLACEMENT

DELINEATORS AND MARKERS

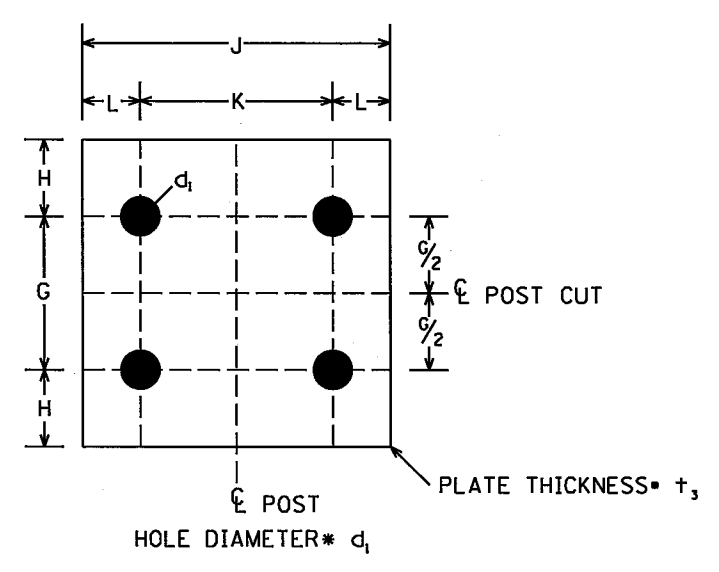
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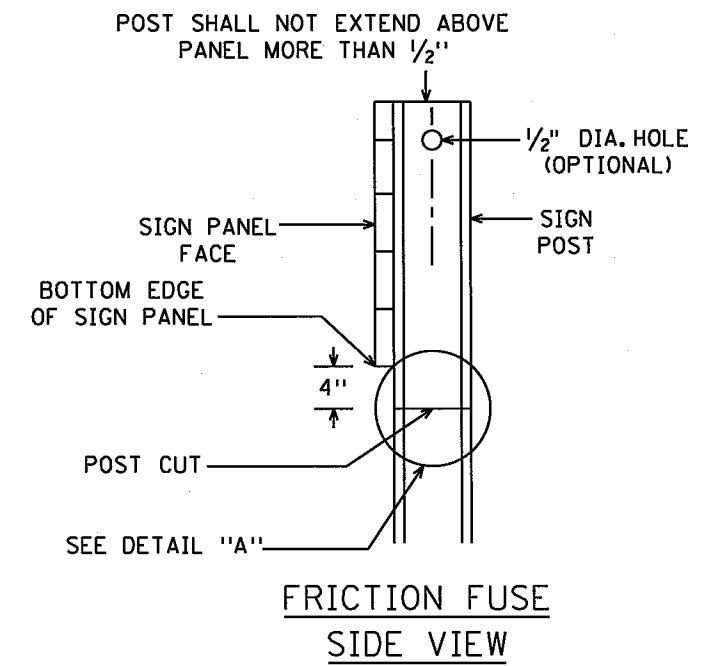
TYPICAL PANEL MOUNTING



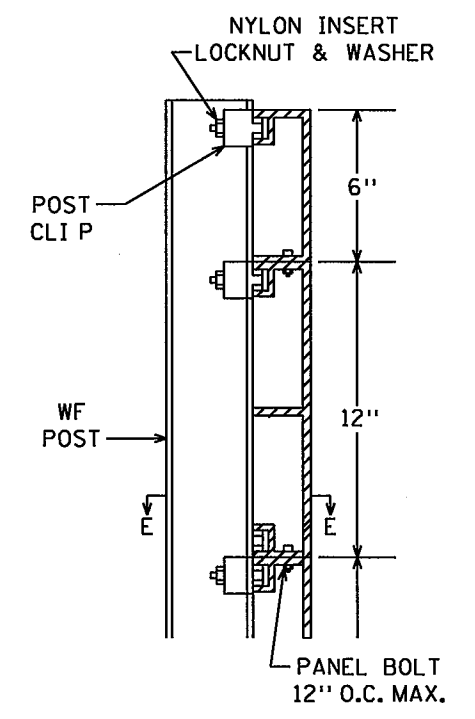
FRICTION FUSE PLATE DETAIL
(SEE TABLE ON SHEET 1 OF 2 FOR DIMENSIONS)



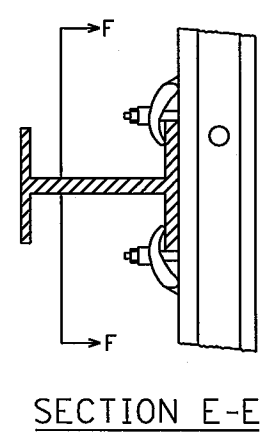
HINGE PLATE DETAIL
(SEE TABLE ON SHEET 1 OF 2 FOR DIMENSIONS)



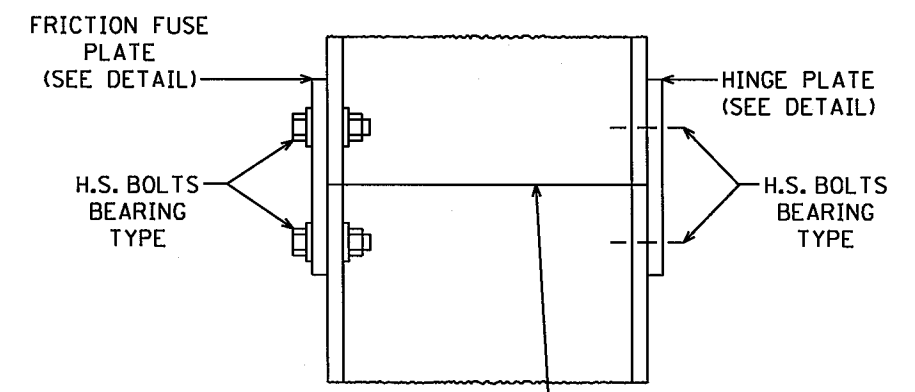
FRICTION FUSE
SIDE VIEW



SECTION D-D



SECTION E-E



POST SHALL BE SAW CUT BEFORE GALVANIZING.
USE H.S. BOLTS WITH HEX. HD., HEX. NUT,
AND TWO FLAT WASHERS.

DETAIL "A" FRICTION FUSE

CONTRACTOR NOTE: ALL FRICTION FUSE BOLTS SHALL BE TORQUE WRENCH TIGHTENED IN THE FIELD IN THE PRESENCE OF THE ENGINEER OR HIS REPRESENTATIVE. NUTS SHALL HAVE BEEN RETAPPED AND BOLT THREADS SHALL HAVE BEEN CLEANED WITH A 1/64" OVERSIZED RETHREADING DIE AFTER GALVANIZING. BEFORE TIGHTENING MAY BEGIN, THE TORQUE WRENCH SHALL BE CALIBRATED WITH A BOLT-TENSION-CALIBRATOR USING TYPICAL BOLT-NUT-WASHER ASSEMBLIES OF EACH SIZE AND LOT TO BE USED SO AS TO SHOW THE TORQUE NECESSARY TO OBTAIN THE FOLLOWING MINIMUM RESIDUAL TENSION IN EACH BOLT.

BOLT SIZE	MIN. RESIDUAL, BOLT TENSION
1/2" DIA.	12,050*
5/8" DIA.	19,200*
3/4" DIA.	28,400*
7/8" DIA.	39,250*
1" DIA.	51,500*
1-1/8" DIA.	56,450*

- GENERAL NOTES:
- STRUCTURAL STEEL SHALL CONFORM TO MNDOT 3308. REINFORCING BARS SHALL CONFORM TO MNDOT 3301. SPIRALS SHALL CONFORM TO MNDOT 3305-NO SPLICES. HIGH STRENGTH BOLTS SHALL CONFORM TO A.S.T.M.-A325.
 - FORMS WILL BE REQUIRED FOR THE EXPOSED VERTICAL SURFACES OF THE FOOTINGS.
 - REFER TO "SIGN DATA" SHEET FOR SPECIFIC DATA ON EACH INDIVIDUAL SIGN INSTALLATION.
 - FRICTION FUSE PLATE SHALL BE INSTALLED ON SIDE OF POST FACING TRAFFIC.
 - ALL POST CUTS SHALL BE SAW CUTS. PLATES MAY BE SHEARED OR FLAME CUT USING A MECHANICALLY GUIDED CUTTING TORCH. EDGE PREPARATION SHALL BE IN ACCORDANCE WITH MNDOT 2471.3.C.4 AND MNDOT 2471.3.D4.

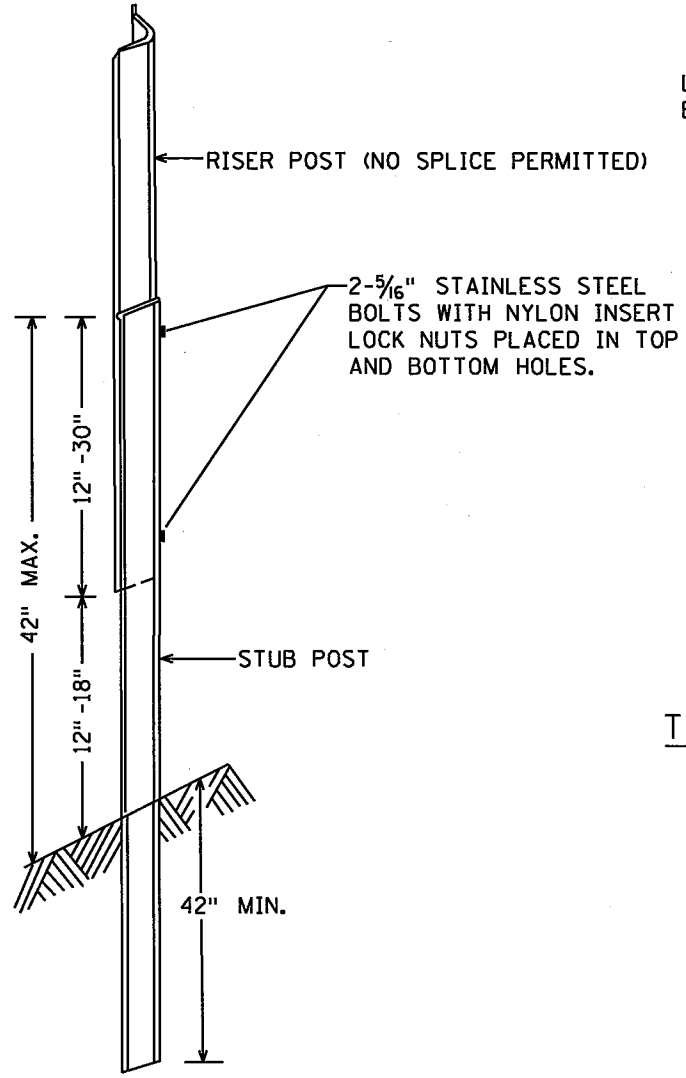
NOTE: POST CLIPS SHALL BE INSTALLED ON BOTH SIDES OF EACH POST AT EACH PANEL JOINT AS INDICATED.

SECTION F-F

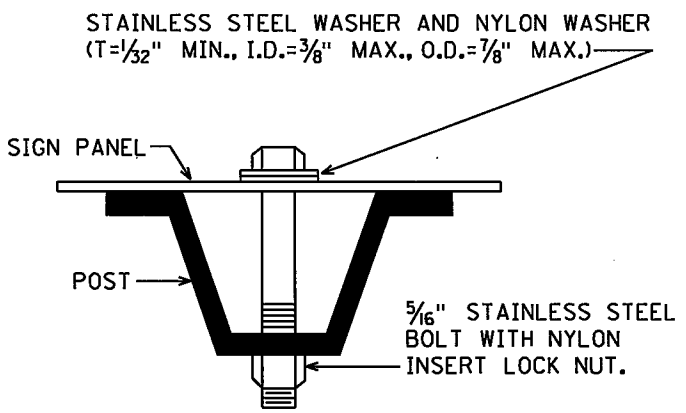
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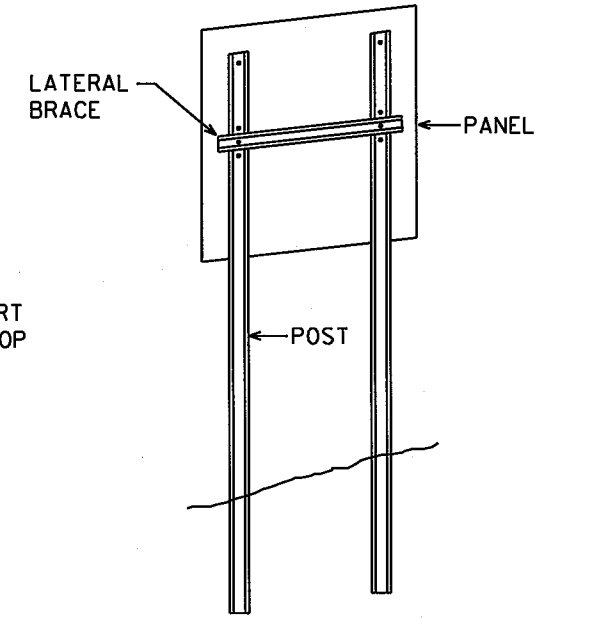
TYPE C & D POST



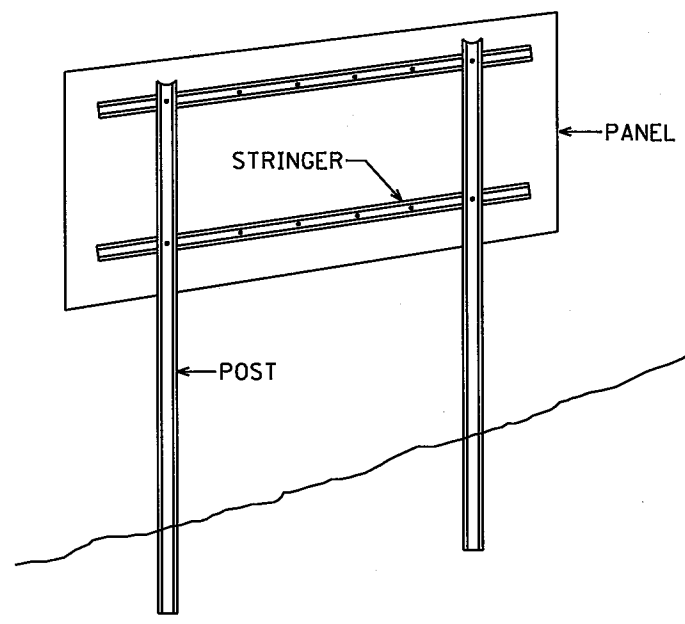
U POST BREAKAWAY SPLICE



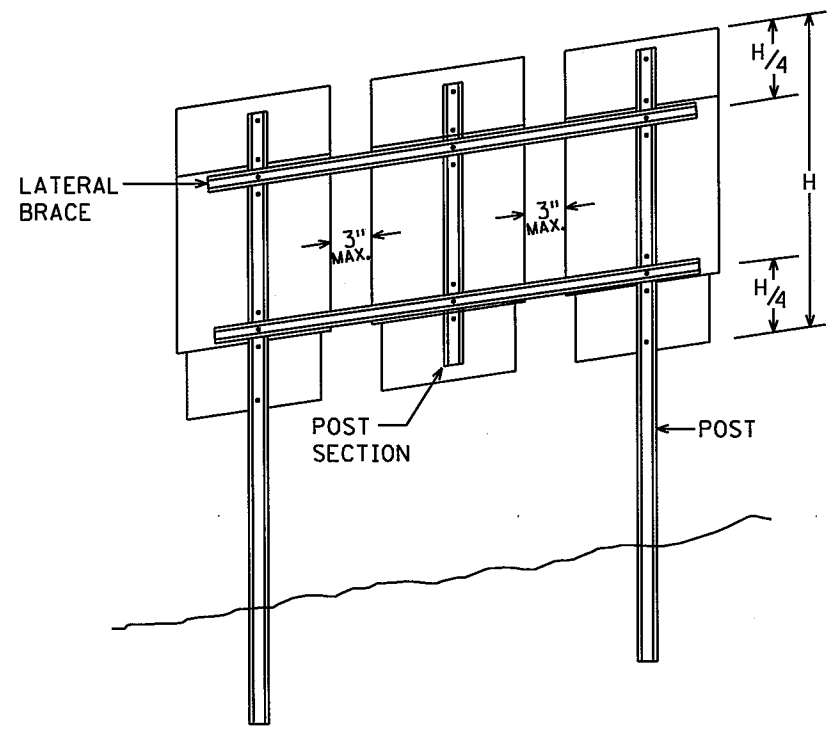
U POST MOUNTING
TYPE C SIGNS



TYPICAL TYPE C INSTALLATION



TYPICAL TYPE D INSTALLATION



MODIFIED TYPE C INSTALLATION

NOTES:

1. USE 3 LB/FT STUB POSTS. SHALL CONFORM TO MNDOT 3401.
2. USE 2.5 LB/FT RISER POSTS, STRINGERS, KNEE BRACES AND LATERAL BRACES. ALL SHALL CONFORM TO MNDOT 3401.
3. SEE SIGN DATA SHEETS FOR NUMBER OF POSTS, KNEE BRACES, POST LENGTHS AND SPACINGS, AS DETERMINED FROM TEM CHARTS 6.3 AND 6.4.
4. IF MORE THAN TWO POSTS ARE NEEDED, THE MINIMUM SPACING SHALL BE 45" BETWEEN POSTS.
5. TYPE D SIGN PANELS SHALL BE BOLTED TO STRINGERS AT 24" MAXIMUM INTERVALS IN ACCORDANCE WITH THE TYPE D STRINGER AND PANEL-JOINT DETAIL (SEE STANDARD SIGNS MANUAL).
6. MOUNTING (PUNCH CODE) FOR TYPE C SIGN PANELS SHALL BE AS INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
7. ALL RISER (VERTICAL) U POSTS SHALL BE SPLICED. DRIVEN STUB POSTS SHALL BE AT LEAST 7' LONG.
8. USE STAINLESS STEEL 5/16" BOLTS, WASHERS AND NYLON INSERT LOCK NUTS AS SHOWN FOR ALL GROUND MOUNTED AND OVERHEAD MOUNTED SIGNS.
9. STAINLESS STEEL WASHER WITH SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL NYLON WASHERS AND BOLT HEADS.
10. BRACING STUBS SHALL BE NO MORE THAN 4" ABOVE GROUND AND EMBEDDED AT LEAST 42".
11. A-FRAME BRACKET SHALL BE STEEL CONFORMING TO MNDOT 3306 AND GALVANIZED IN ACCORDANCE WITH MNDOT 3394.
12. COLLARS SHALL BE USED TO SHIM OVERLAYS AND LEGEND COMPONENTS AWAY FROM PANEL WHERE INTERFERENCE WITH BOLT HEADS IS ENCOUNTERED. MNDOT 3352.2A6.
13. 2 POST TYPE C SIGNS SHALL BE REINFORCED WITH AT LEAST ONE LATERAL BRACE. INSTALLATIONS WHERE THE TOTAL PANEL HEIGHT IS 60" OR MORE SHALL HAVE TWO LATERAL BRACES LOCATED APPROXIMATELY AT THE QUARTER POINTS.
14. WHERE 2 SINGLE POST TYPE C SIGNS ARE INSTALLED SIDE BY SIDE, THEY SHALL BE REINFORCED Laterally BY AT LEAST 2 BRACES, BOLTED AT EACH POST AND LOCATED APPROXIMATELY AT THE QUARTER POINTS.
15. WHERE 3 OR MORE TYPE C SIGNS ARE INSTALLED SIDE BY SIDE, THEY SHALL BE REINFORCED Laterally BY AT LEAST 2 BRACES, BOLTED AT EACH POST AND POST SECTION AND LOCATED APPROXIMATELY AT THE QUARTER POINTS AS SHOWN IN MODIFIED TYPE C INSTALLATION.

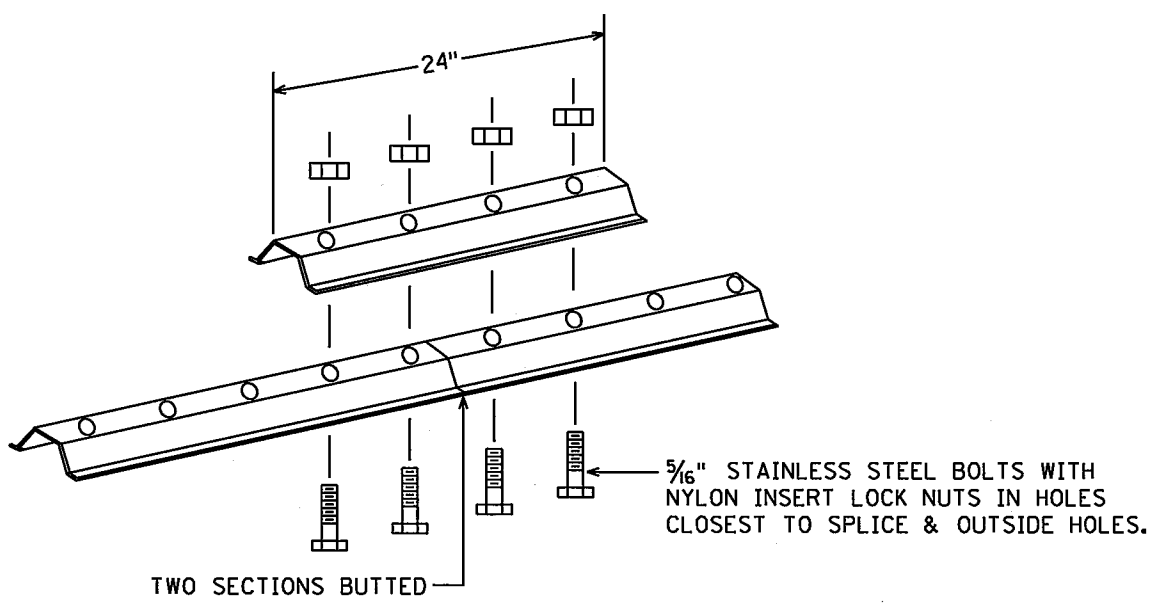
TYPE C & D SIGN
STRUCTURAL DETAILS

11:37:25 AM

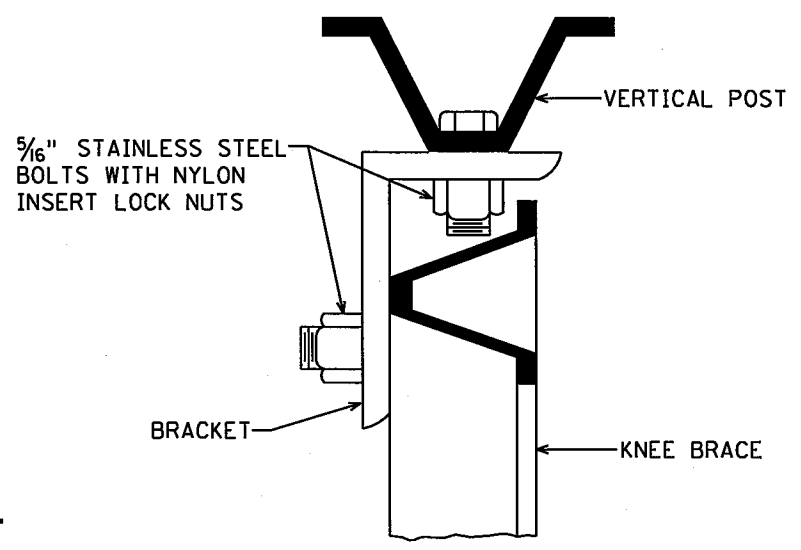
2/16/2016

(USERNAME)

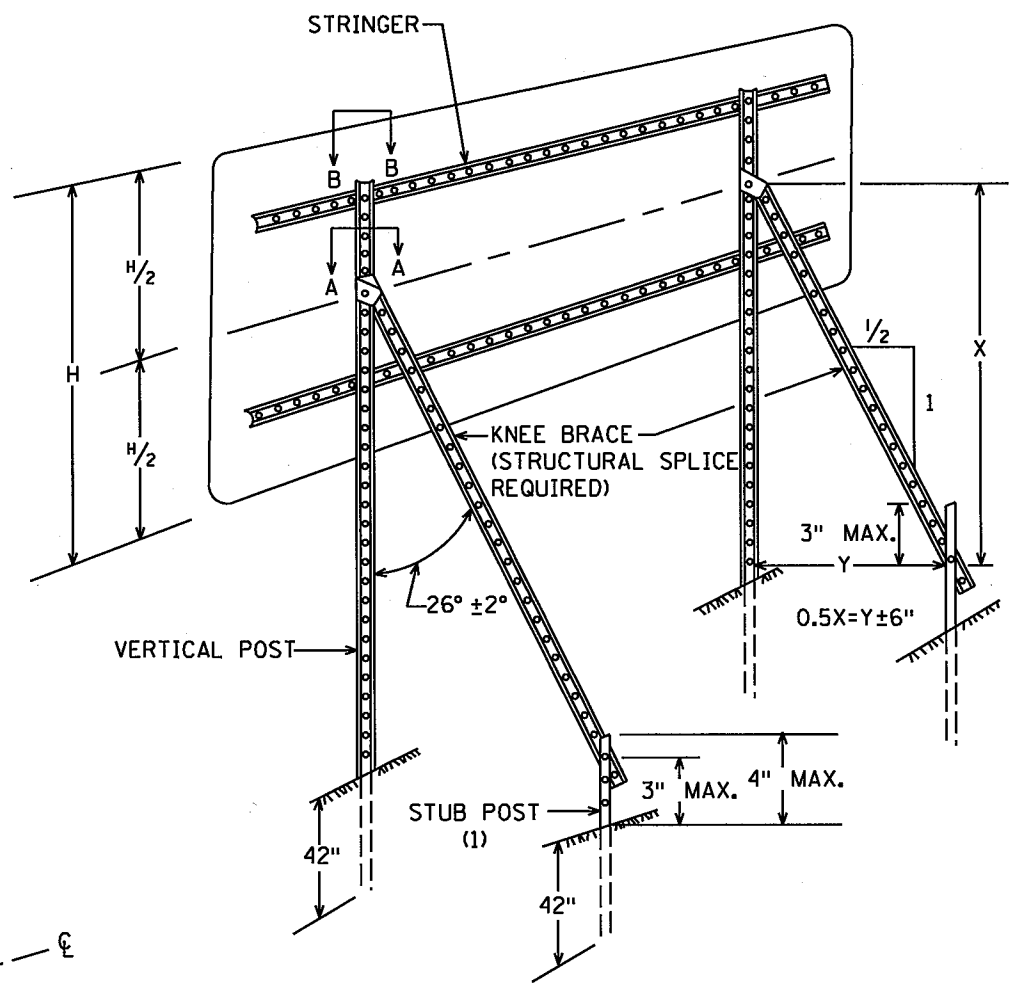
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MODEL: L.C-D SIGN BASE



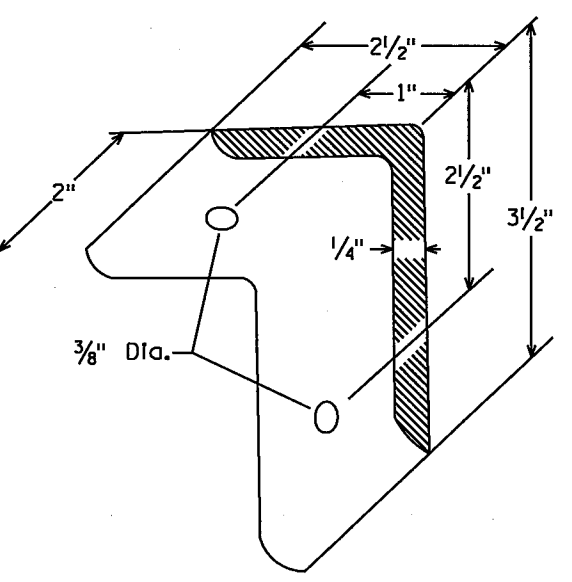
LATERAL BRACE OR STRINGER SPLICE DETAIL (EXPLODED VIEW)



SECTION A-A

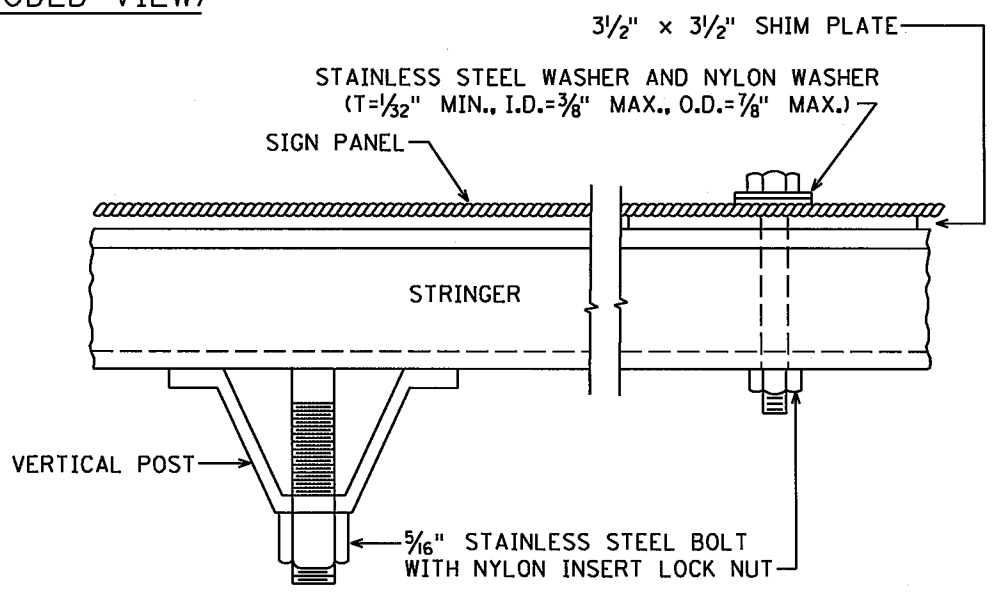


TYPICAL "A-FRAME" INSTALLATION TYPE "D" SIGNS

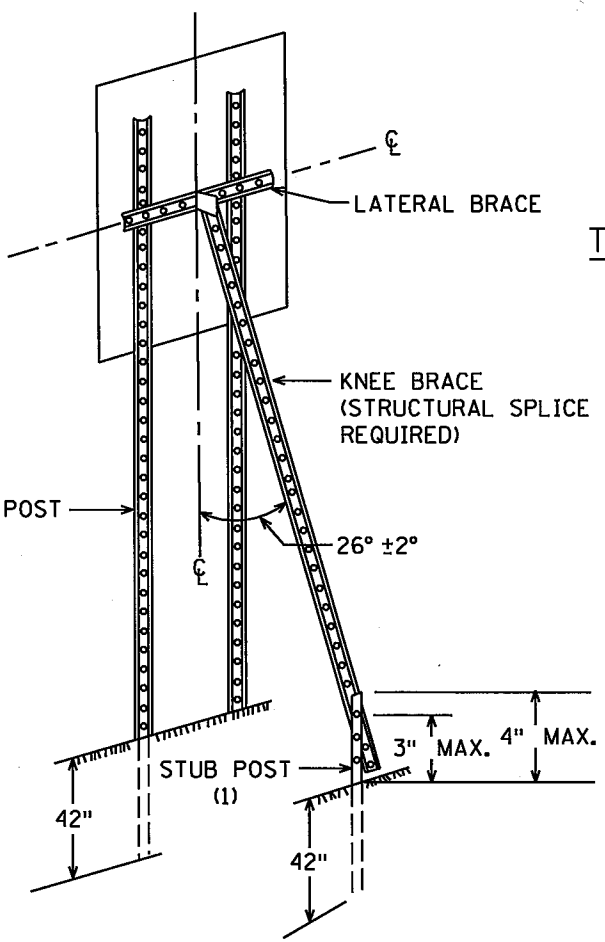


A-FRAME BRACKET

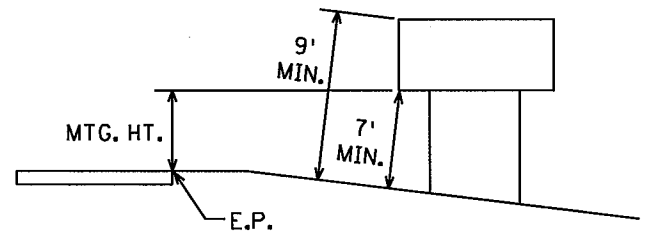
(STEEL MNDOT 3306 GALVANIZED PER MNDOT 3394)



SECTION B-B



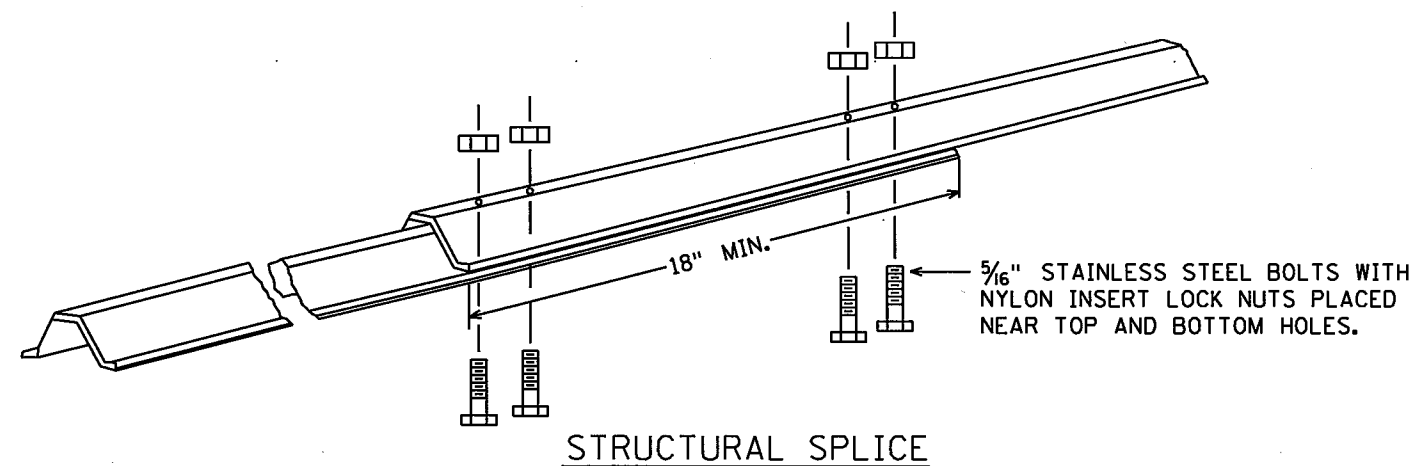
TYPICAL "A-FRAME" INSTALLATION TYPE "C" SIGNS



TYPICAL MOUNTING

(1) OFFSET STUB POST 1' TOWARD ROADWAY RELATIVE TO VERTICAL POST. ATTACH STUB POST AND KNEE BRACE BACK TO BACK.

TYPE C & D SIGN STRUCTURAL DETAILS



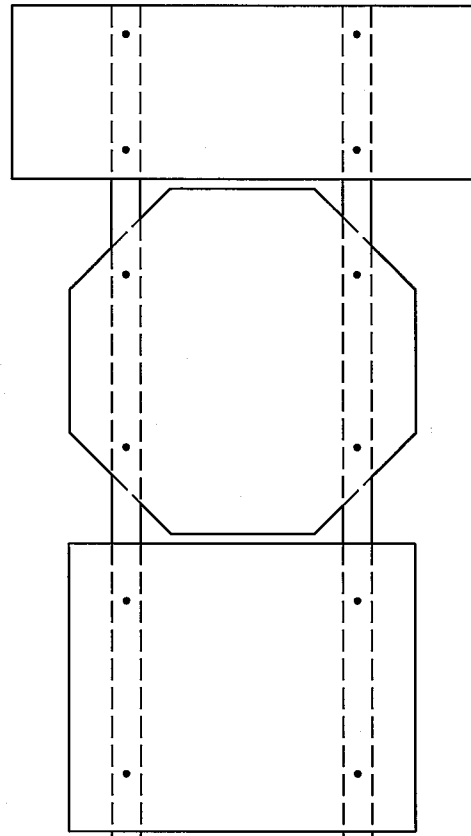
STRUCTURAL SPLICE

(USE WHEN IT IS NECESSARY TO FABRICATE THE CORRECT LENGTH OF POST FROM TWO PIECES)

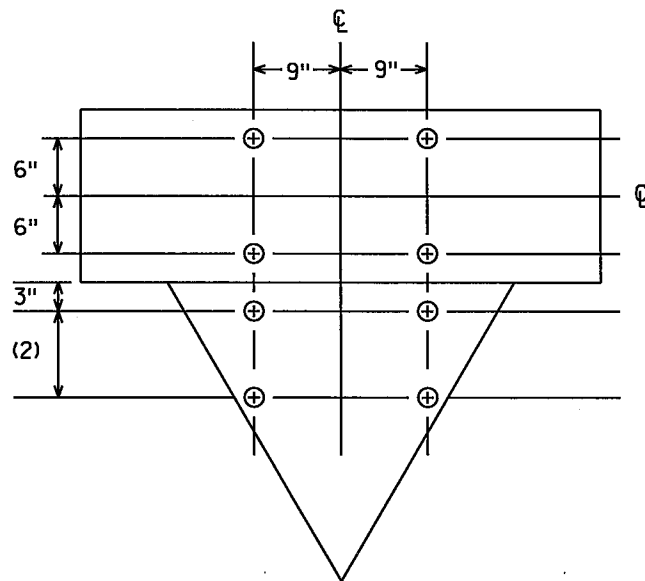
REVISED: 12-4-2013

Sheet 2 of 3

SS51 OF SS68

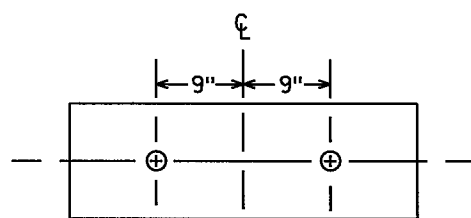


R6-1, R1-1 & (R6-3 OR R6-3a)
MOUNTING

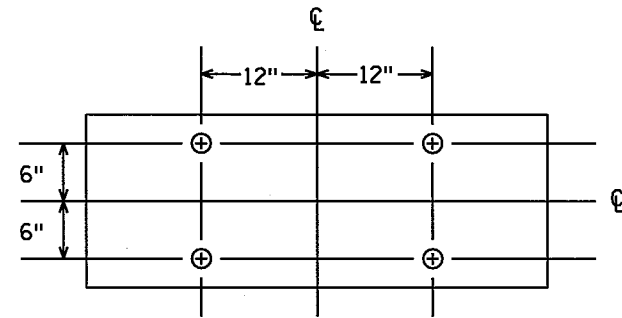


PUNCHING FOR R6-1 (54" x 18") AND
R1-2 (36" x 36" x 36" OR 48" x 48" x 48")

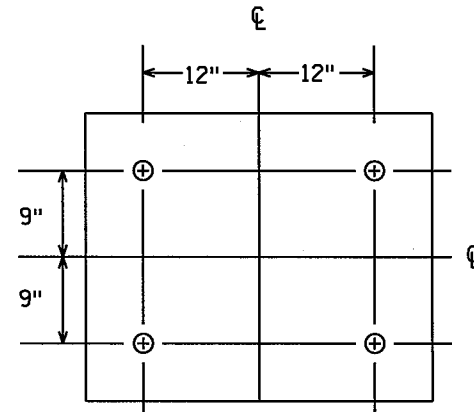
- (2) 9" FOR 36" x 36" x 36"
- 18" FOR 48" x 48" x 48"



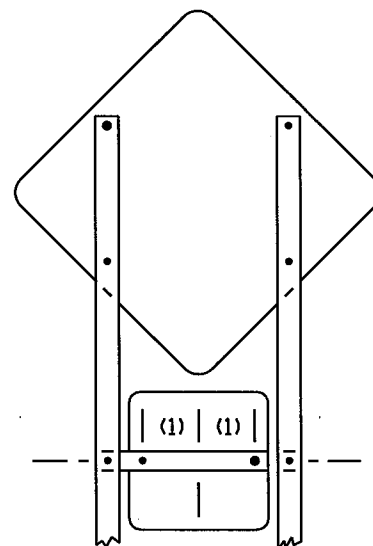
PUNCHING FOR R6-1 (36" x 12")



PUNCHING FOR R6-1 (54" x 18")

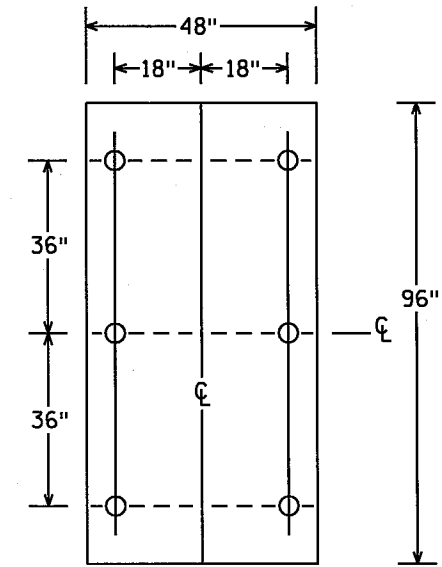


PUNCHING FOR R6-3 OR R6-3a (36" x 30")

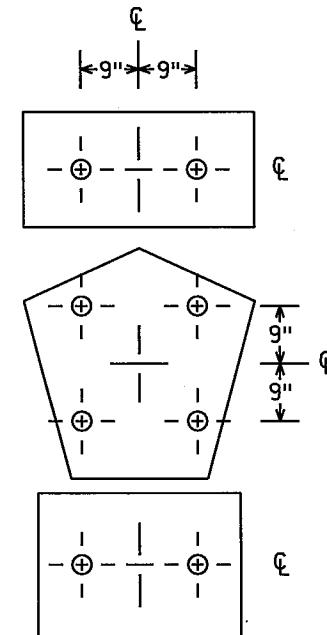


WARNING SIGN [30" x 30 OR 48" x 48"] AND
WARNING PLAQUE [18" x 18" OR 30" x 30"]
PUNCHING AND MOUNTING

- (1) 6" FOR WARNING PLAQUE (18" x 18")
- 12" FOR WARNING PLAQUE (30" x 30")

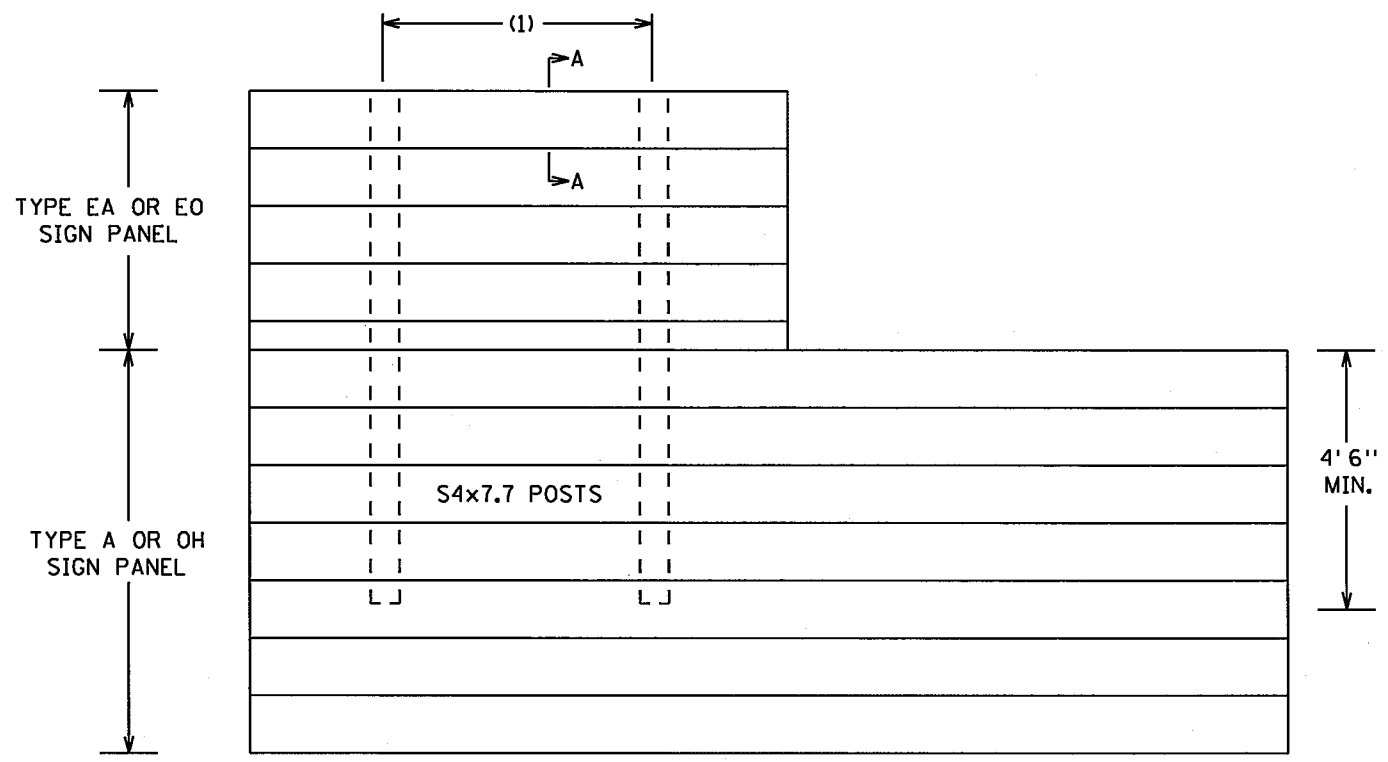


PUNCHING FOR R2-4b
SPEED LIMIT

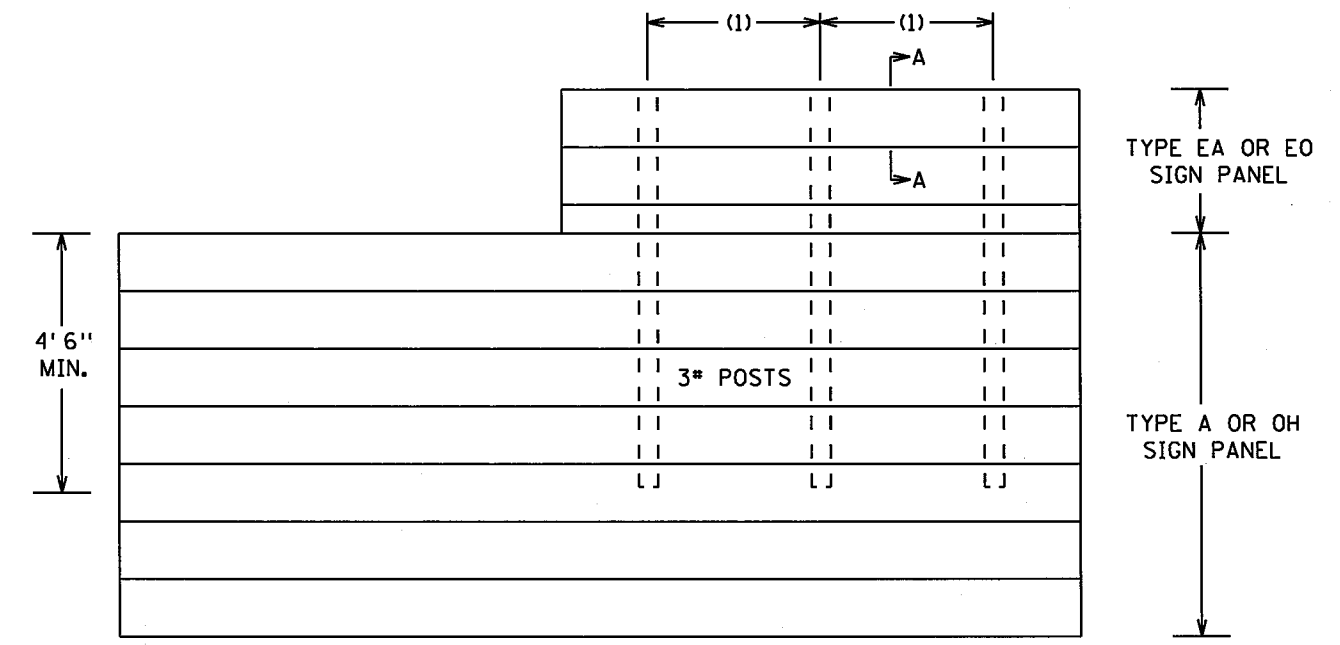


(M3-1A, M3-2A, M3-3A OR M3-4A) [36" x 18"] AND
M1-6 [36" x 36"] AND
(M5-1A, M5-2A, M6-1A, M6-2A, M6-3A M6-4A, M6-5A OR M6-6A) [30" x 24"]
PUNCHING

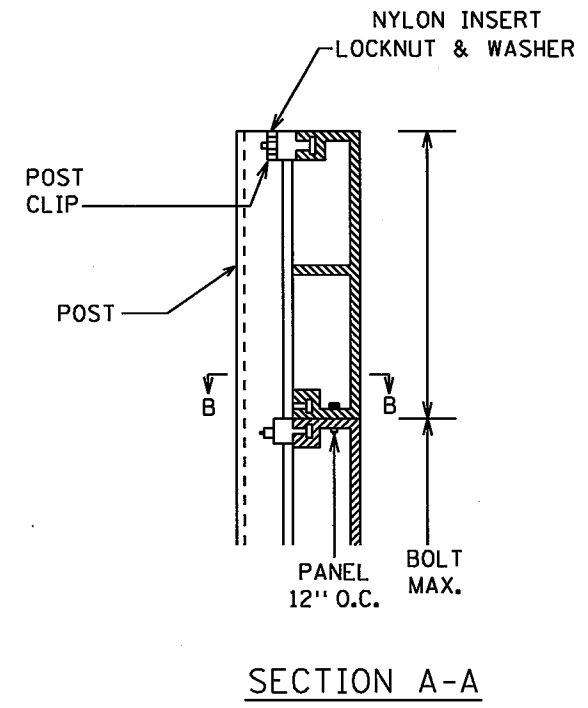
TYPE C & D SIGN
STRUCTURAL DETAILS



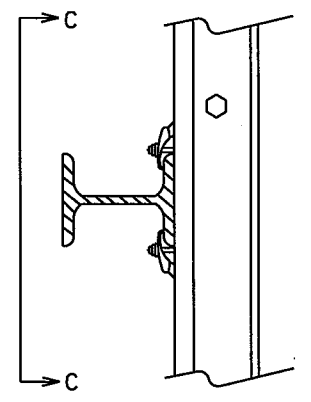
LEFT JUSTIFIED PANEL MOUNTING



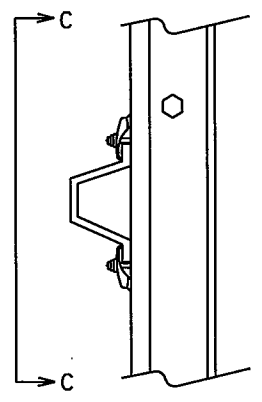
RIGHT JUSTIFIED PANEL MOUNTING



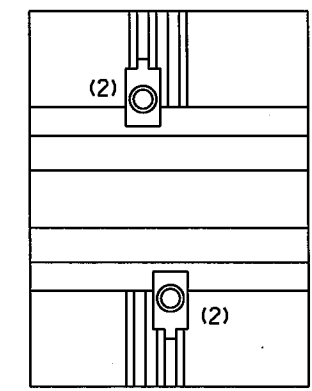
SECTION A-A



SECTION B-B
S4x7.7 POST



SECTION B-B
3* POST
(Mn/DOT 3401)



VIEW C-C

SPECIFIC NOTES:

- (1) SEE TABULATION SHEET FOR NUMBER AND SPACING OF POSTS. SPACING AND LOCATION CAN BE ADJUSTED WHERE NECESSARY.
- (2) POST CLIPS SHALL BE ATTACHED ON BOTH SIDES OF EACH POST AT EACH PANEL JOINT AS INDICATED.

GENERAL NOTE:

- 1. TYPE EA OR EO SIGN PANEL SHALL BE LEFT JUSTIFIED FOR LEFT EXITS AND RIGHT JUSTIFIED FOR RIGHT EXITS ON TYPE A OR OH SIGN PANEL.

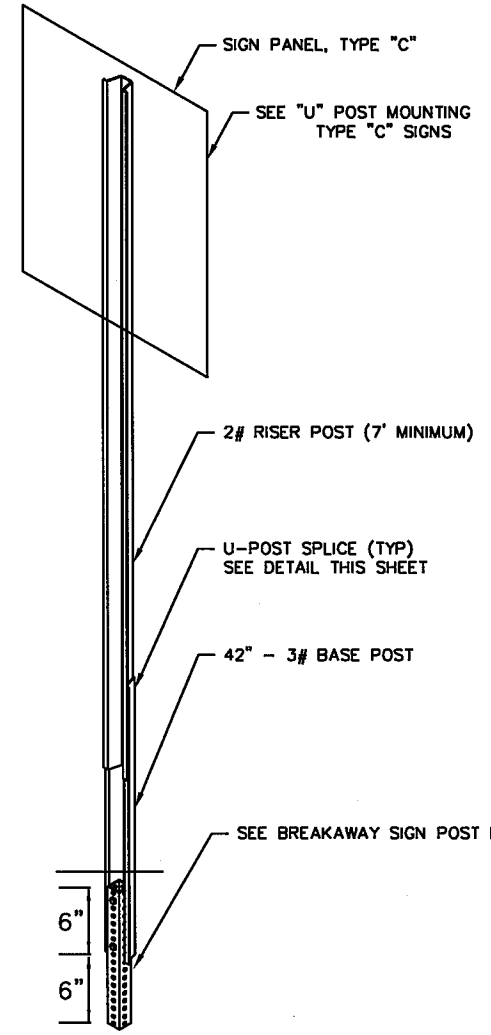
TYPE EA & EO SIGN
STRUCTURAL DETAILS

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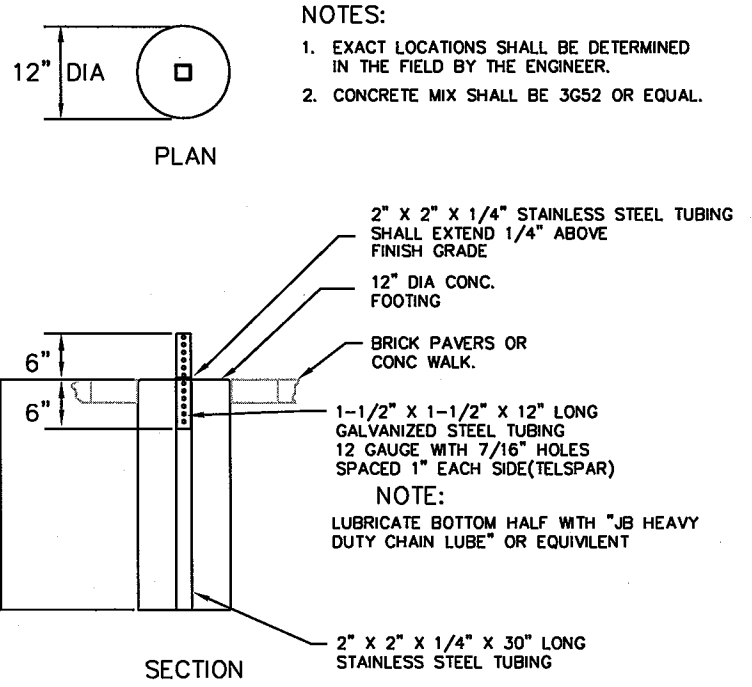
2/16/2016

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BREAKAWAY SIGN POST (FOR TYPE "C" SIGNS PLACED IN CONCRETE)

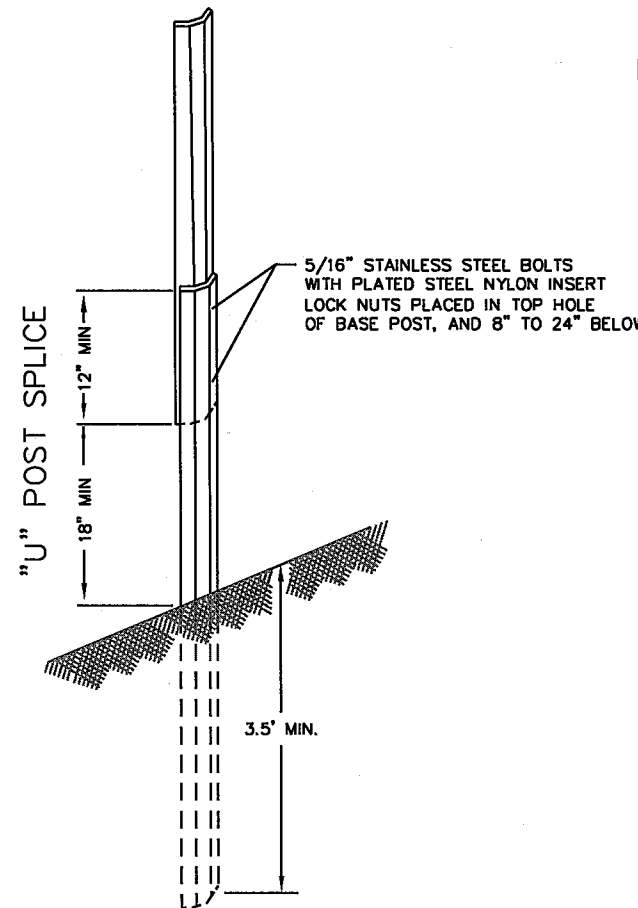


BREAKAWAY SIGN POST FOUNDATION (FOR TYPE "C" SIGNS PLACED IN CONCRETE)



- NOTES:
1. EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER.
 2. CONCRETE MIX SHALL BE 3G52 OR EQUAL.

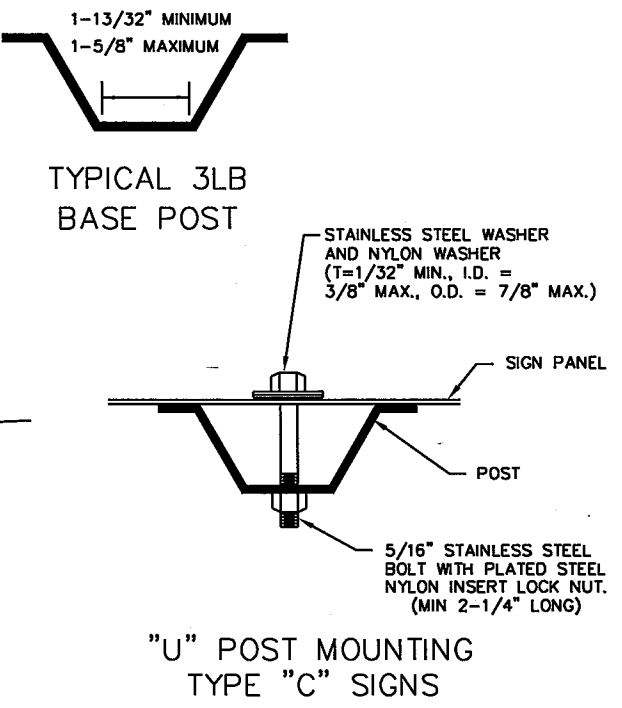
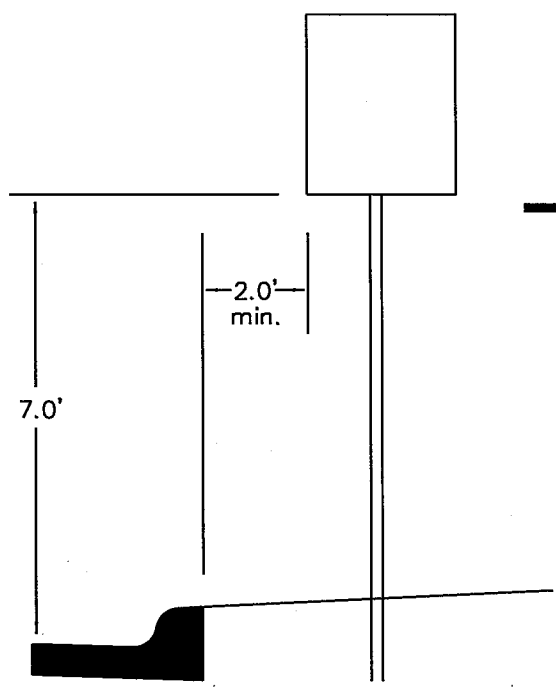
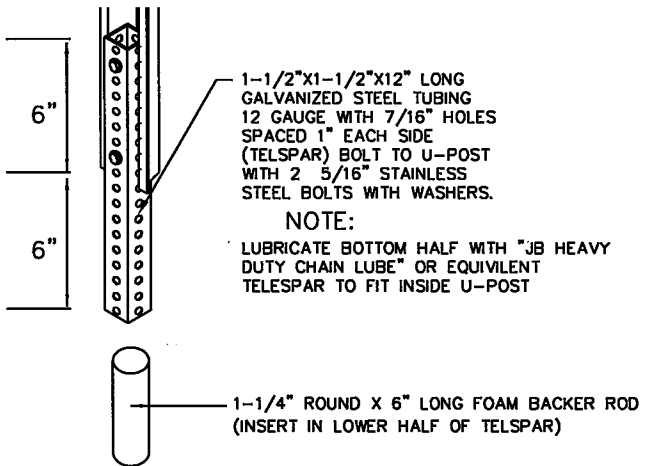
TYPE "C" POST (GROUND INSTALLATION)



NOTES:

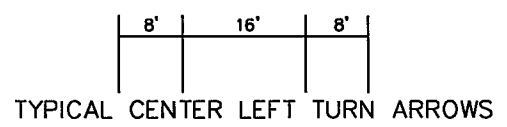
1. USE 3# RISER STUB POSTS, WITH 2# RISER POSTS, ALL SHALL CONFORM TO MN/DOT SPECIFICATION 3401.
2. MOUNTING (PUNCHING CODE) FOR TYPE "C" SIGN PANELS SHALL BE AS INDICATED IN THE STANDARD SIGNS MANUAL UNLESS OTHERWISE SPECIFIED.
3. ALL RISER (VERTICAL) "U" POSTS SHALL BE SPLICED. DRIVEN STUB POSTS SHALL BE AT LEAST 7 FEET LONG.
4. USE STAINLESS STEEL 5/16" BOLTS AND WASHERS WITH PLATED STEEL NYLON INSERT LOCK NUTS AS SHOWN.
5. STAINLESS STEEL WASHER WITH THE SAME DIMENSIONS SHALL BE PROVIDED BETWEEN ALL NYLON WASHERS AND BOLT HEADS.
6. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS - JANUARY 2004 OR NEWER.
7. ALL TRAFFIC CONTROL DEVICES SHALL HAVE DIAMOND GRADE CUBED RETROREFLECTIVE SHEETING.

BREAKAWAY SIGN POST BASE DETAIL (FOR TYPE "C" SIGNS INSTALLED IN CONCRETE)



STRIPING DETAILS

- *4" SKIP CYCLE (10' LINE with 40' SPACE - 50' OVERALL)
- *8" SKIP CYCLE (3' LINE with 12' SPACE - 15' OVERALL)



- *CROSSWALK BLOCKS ARE CENTERED ON AND BETWEEN LANE LINES (DISTANCE BETWEEN IS VARIABLE)
- *CROSSWALK BLOCKS ARE 2.5' WIDE 6' LONG AT CONTROLLED INTERSECTIONS 8' LONG AT MIDBLOCK LOCATIONS 8' LONG AT UN-CONTROLLED INTERSECTIONS

DIMENSIONS ARE IN ENGLISH UNITS

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	MAW			
CHECKED BY:	MAW			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660

Printed Name: MARK A. WAGNER Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

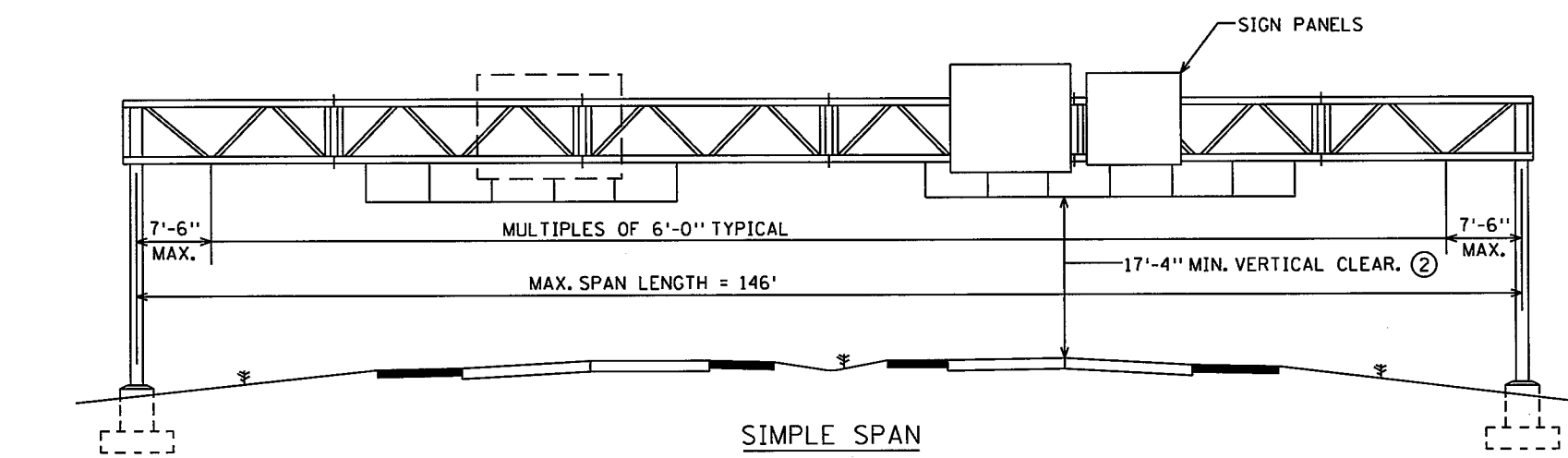
SIGNING AND STRIPING PLAN
COUNTY SIGNING AND STRIPING DETAILS

FILE NO. 321
RAMSEY129594
SS54
OF 568
367

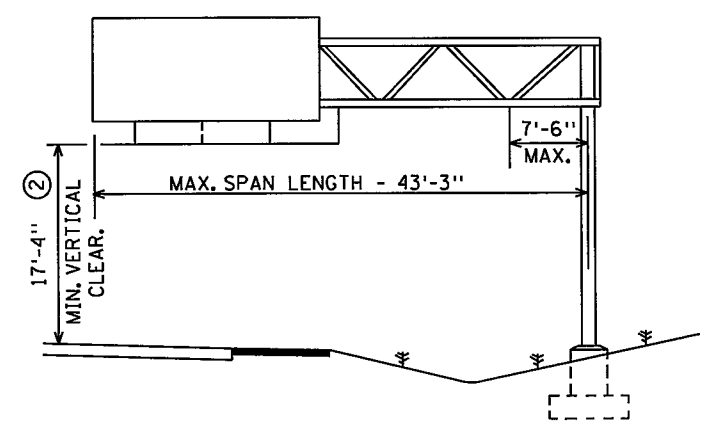
11/07/12 AM

12/8/2015

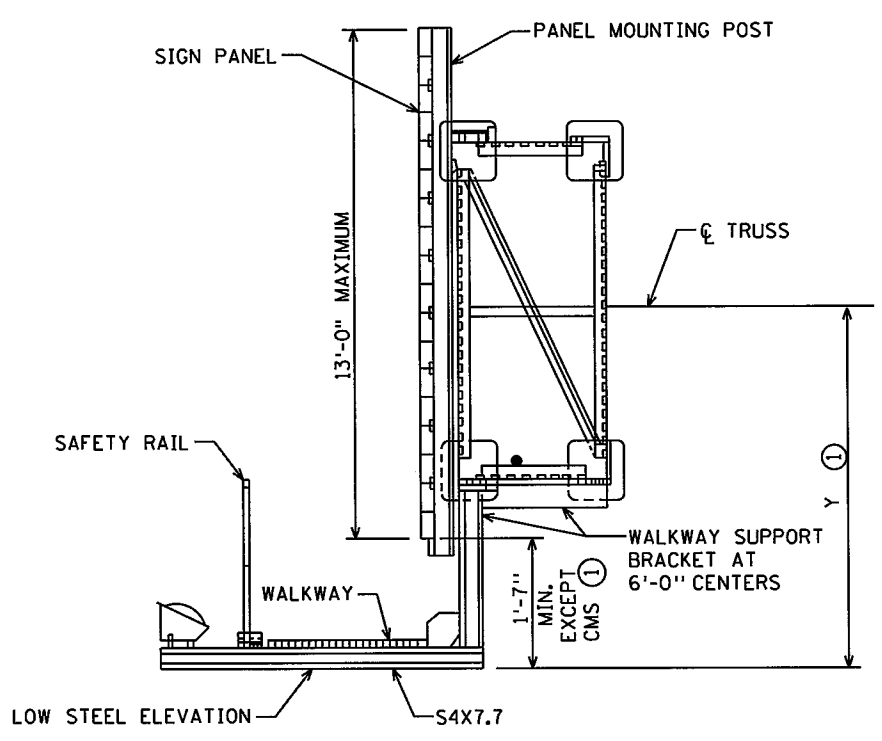
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5.OH DETAILS
REV. 10-2-2013



SIMPLE SPAN



CANTILEVER



SECTION

INDEX OF STANDARD SIGN DRAWINGS

DRAWING	TITLE
ST-1	GENERAL ELEVATION AND NOTES
ST-2	CAMBER, POST IDENTIFICATION AND ESTIMATED QUANTITIES
ST-3	FOUNDATIONS AND ANCHOR RODS
ST-4	TRUSS/POST CONNECTION & BASEPLATE
ST-5	SIGN TRUSS DETAILS - TYPE A
ST-6	SIGN TRUSS DETAILS - TYPE B
ST-7	SIGN TRUSS DETAILS - TYPE C
ST-8	WALKWAY DETAILS
ST-9	FOLDING HANDRAIL
ST-10	SIGN PANEL AND PANEL MOUNTING POST DETAILS
ST-11	ELECTRICAL DETAILS
ST-12	ELECTRICAL DETAILS
ST-13	ELECTRICAL DETAILS (CMS SIGNS)

SIGN HEIGHT	Y ①	
6'-6"	4'-4"	CMS (NEW LED)
7'-0"	4'-7"	
7'-6"	4'-10"	
8'-0"	5'-1"	CMS (LED)
8'-6"	5'-4"	
9'-0"	5'-7"	CMS (DRUM)
9'-6"	5'-10"	
10'-0"	6'-1"	
10'-6"	6'-4"	
11'-0"	6'-7"	
11'-6"	6'-10"	
12'-0"	7'-1"	
12'-6"	7'-4"	
13'-0"	7'-7"	

SPECIFIC NOTES:

- ① DIMENSION Y IS CONSTANT AND BASED ON THE DEEPEST SIGN PANEL ABOVE THAT WALKWAY. WHEN STANDARD SIGN PANEL(S) AND CMS ARE MOUNTED ON THE SAME SPAN, DIMENSION Y SHALL BE GOVERNED BY THE CMS.
- ② MINIMUM CLEARANCE WILL BE MEASURED FROM THE HIGHEST ELEVATION OF PAVEMENT, SHOULDERS, AND MOUNTABLE CURBS, OR IF INSURMOUNTABLE CURBS ARE USED, THE HIGHEST ELEVATION BETWEEN CURB LINES.

GENERAL NOTES:

DESIGN SPECIFICATIONS:

TRUSS, POST, & HARDWARE:
AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS DATED 1999.

LOADING:

WIND LOAD 90 M.P.H. NORMAL TO SIGN FACE IN COMBINATION WITH OTHER LOADS OUTLINED IN THE DESIGN SPECIFICATIONS.

UNIT STRESSES:

CONCRETE----- F_c = 1,600 PSI
REINFORCEMENT STEEL----- F_s = 24,000 PSI
FOOTING SOIL PRESSURE----- 1-1/4 TONS PER SQ. FT.

MATERIALS:

STRUCTURAL STEEL (EXCEPT POST, TUBES)- MNDOT 3306
POST STEEL----- VARIES
HIGH STRENGTH BOLTS----- MNDOT 3391.2B
ANCHOR RODS----- MNDOT 3385
CASTINGS----- MNDOT 3322
REINFORCEMENT
BARS----- MNDOT 3301
SPIRAL----- MNDOT 3305 NO SPLICES
WALKWAY GRATING----- FEDERAL SPECIFICATIONS RR-G-661b, TYPE 1, STEEL
CONCRETE----- MNDOT 2461 (MIX 3Y43)

FINISH:

ALL COMPONENTS SHALL BE GALVANIZED AFTER FABRICATION EXCEPT REINFORCEMENT BARS, LOWER PORTION OF ANCHOR RODS, ALUMINUM, AND OTHER NON FERROUS INCIDENTALS. GALVANIZING SHALL CONFORM TO MNDOT 3392 OR MNDOT 3394 AS APPLICABLE. BEARING SURFACES MUST BE SMOOTH.

FABRICATION:

FABRICATION OF STRUCTURAL METALS SHALL BE IN ACCORDANCE WITH MNDOT 2471, MNDOT 2564 AND THE APPLICABLE SPECIAL PROVISIONS. ALL WELDING TO BE CONTINUOUS. ALL CONTACT SURFACES MUST BE COMPLETELY SEALED.

INSPECTION:

INSPECTION BEFORE AND AFTER GALVANIZING PER MNDOT 1511 AND MNDOT 2471.

SS55 OF SS68

STANDARD OVERHEAD SIGN SUPPORTS
INTERIM DESIGN B

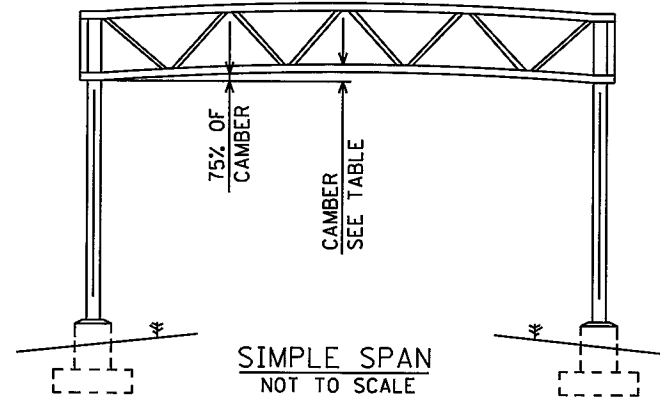
GENERAL ELEVATIONS
AND NOTES

DRAWING ST-1

SIMPLE SPAN

SIMPLE SPAN TRUSS CAMBER												
SPAN	40	50	60	70	80	90	100	110	120	130	140	150
CAMBER	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 5/8	1 3/4
DL DEFLECTION	0	1/16	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4
RESIDUAL CAMBER	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 5/8	1 3/4

NOTE:
CAMBER AND DEFLECTIONS SHOWN ARE AT @ SPAN. THE DEFLECTIONS AND CAMBER AT THE QUARTER POINTS SHALL BE APPROXIMATELY 75% OF THESE VALUES.



TRUSS QUANTITIES		
USE LENGTH FROM @ POST WHEN CALCULATING TOTAL WEIGHTS.		
TRUSS TYPE A	TRUSS TYPE B	TRUSS TYPE C
123 LBS./FT.	168 LBS./FT.	196 LBS./FT.

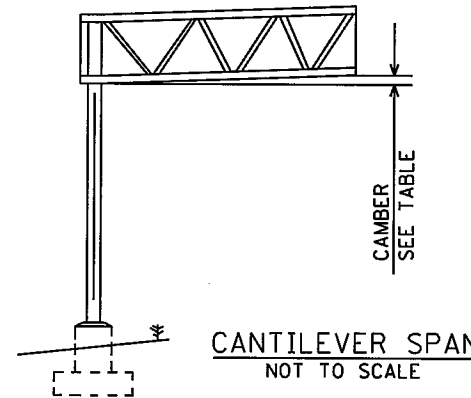
PANEL MOUNTING POST QUANTITIES INCLUDES MOUNTING ANGLES	
PANEL HEIGHT	WEIGHT/POST
6'-6"	70
7'-0"	74
7'-6"	78
8'-0"	82
8'-6"	86
9'-0"	90
9'-6"	93
10'-0"	97
10'-6"	101
11'-0"	105
11'-6"	160
12'-0"	166
12'-6"	172
13'-0"	178

CANTILEVER SPAN

CANTILEVER SPAN TRUSS CAMBER					
SPAN	15'	20'	30'	40'	45'
CAMBER	1/8	1/4	3/8	1/2	3/4
DL DEFLECTION	0	0	1/16	3/16	1/4
RESIDUAL CAMBER	1/8	1/4	3/8	1/2	3/4

NOTE:
CAMBER AND DEFLECTIONS SHOWN ARE SHOWN AT END OF CANTILEVER.

WHEN ERECTING CANTILEVER TRUSSES, THE POSTS SHALL BE SET 1/8" PER FOOT OUT OF PLUMB TO COMPENSATE FOR THE BENDING OF THE POSTS.



WALKWAY SUPPORT QUANTITIES			
USE MAXIMUM PANEL HEIGHT ON SPAN TO CALCULATE QUANTITIES. WHEN CONVENTIONAL SIGN PANEL(S) AND CMS ARE MOUNTED ON THE SAME SPAN, QUANTITIES SHALL BE GOVERNED BY THE CMS.			
PANEL HEIGHT	TRUSS TYPE (WEIGHT/SUPPORT)		
	A	B	C
6'-6"	99	105	113
7'-0"	101	107	115
7'-6"	103	109	117
8'-0"	105	111	119
8'-6"	107	113	121
9'-0"	109	115	123
9'-6"	111	117	125
10'-0"	113	119	127
10'-6"	115	121	129
11'-0"	135	142	151
11'-6"	138	144	153
12'-0"	141	147	156
12'-6"	143	150	159
13'-0"	146	153	162

TABLE 1 - POST IDENTIFICATION					
POST IDENTIFICATION NUMBER	BASEPLATE DESIGN	PERMISSIBLE PIPE SECTIONS			
		MIN. YIELD=35 KSI		MIN. YIELD=42 KSI	
		OUTSIDE DIAMETER (INCH)	WALL THICKNESS (INCH)	OUTSIDE DIAMETER (INCH)	WALL THICKNESS (INCH)
1	A	N.A.	N.A.	18	0.250
2	A	18	0.375	18	0.312
3	A	18	0.500	18	0.375
4	A	18	0.562	18	0.500
5	B	18	0.938	18	0.750
6	B	20	0.594	20	0.500
7	B	N.A.	N.A.	20	0.812

WALL THICKNESS IS MINIMUM, THINNER WALLS WILL NOT BE APPROVED

POST IDENTIFICATION NOTES:

POST MATERIAL SHALL CONFORM TO ONE OF THE FOLLOWING SPECIFICATIONS:

- ASTM A709, GRADE 36
- ASTM A53, GRADE B
- API 5L, GRADES B, X42, X46, X52, X56, X60, X65

CONTRACTOR SHALL DEMONSTRATE THAT THE POST MATERIAL MEETS THE REQUIREMENTS OF ONE OF THE ABOVE CITED SPECIFICATIONS AND THE MINIMUM YIELD STRENGTH.

NO SPLICES OF ANY KIND WILL BE PERMITTED IN POSTS INTENDED FOR USE IN CANTILEVER TYPE STRUCTURES (BRIDGE TYPE BC).

ONE OF TWO POSTS FOR SIMPLE SPAN STRUCTURES (BRIDGE TYPE S) MAY INCORPORATE ONE WELDED CIRCUMFERENTIAL BUTT SPLICE CONFORMING TO AWS D1.1 DETAIL B-U2 IN THE UPPER 1/3 OF ITS LENGTH. BACK UP RINGS FOR THESE WELDED SPLICES SHALL BE COMMERCIAL PRODUCTS. BUTT WELDS REQUIRE RADIOGRAPHIC INSPECTION (MNDOT 2471.3).

ALL RADIOGRAPHIC INSPECTIONS AND MAGNETIC PARTICLE TESTING REPORTS AND RADIOGRAPHIC FILMS SHALL BECOME THE PROPERTY OF THE DEPARTMENT.

SEE DRAWING ST-4 FOR BASEPLATE DETAILS.

FOR FOUNDATION QUANTITIES SEE DRAWING ST-3

WALKWAY WEIGHTS:

- USE 3'-4 3/4" WIDE GRATING @ 44 LBS/FT.
- WEIGHT INCLUDES HANDRAIL (12 LBS/FT.) AND FIXTURE MOUNTING CHANNELS (4 LBS/FT.).

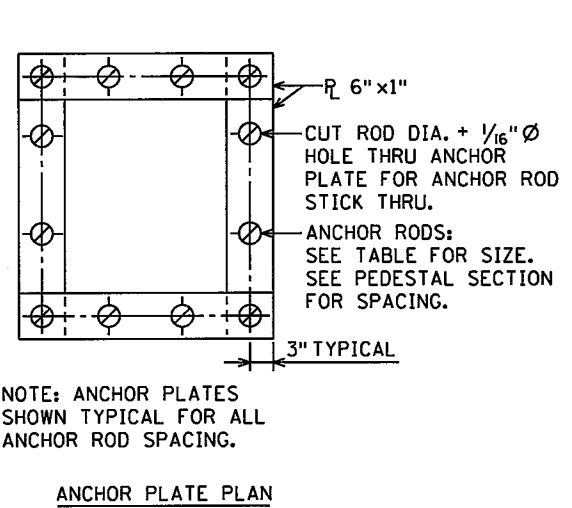
POST QUANTITIES					
QUANTITIES INCLUDE ANCHORAGE ASSEMBLY AND TRUSS CONNECTION PLATES. PAY LENGTH OF POSTS IS FROM THE BOTTOM OF THE BASE PLATE (ELEV. A) TO THE TOP OF THE TRUSS. POST QUANTITIES ARE BASED ON GRADE 42 STEEL. NO ADJUSTMENTS WILL BE MADE IN THE QUANTITIES FOR THE USE OF GRADE 35 STEEL POSTS.					
POST TYPE	CANTILEVER		SIMPLE SPAN		
	TRUSS TYPE A	TRUSS TYPE B	TRUSS TYPE A	TRUSS TYPE B	TRUSS TYPE C
1	1880+47 LBS/FT	1910+47 LBS/FT	1870+47 LBS/FT	1890+47 LBS/FT	1915+47 LBS/FT
2	1880+59 LBS/FT	1910+59 LBS/FT	1870+59 LBS/FT	1890+59 LBS/FT	1915+59 LBS/FT
3	1880+71 LBS/FT	1910+71 LBS/FT	1870+71 LBS/FT	1890+71 LBS/FT	1915+71 LBS/FT
4	1880+94 LBS/FT	1910+94 LBS/FT	1870+94 LBS/FT	1890+94 LBS/FT	1915+94 LBS/FT
5	2470+138 LBS/FT	2500+138 LBS/FT	2460+138 LBS/FT	2480+138 LBS/FT	2505+138 LBS/FT
6	N/A	2500+104 LBS/FT	N/A	2545+104 LBS/FT	2570+104 LBS/FT
7	N/A	2500+167 LBS/FT	N/A	2545+167 LBS/FT	2570+167 LBS/FT

SS56 OF SS68

STANDARD OVERHEAD SIGN SUPPORTS
INTERIM DESIGN B

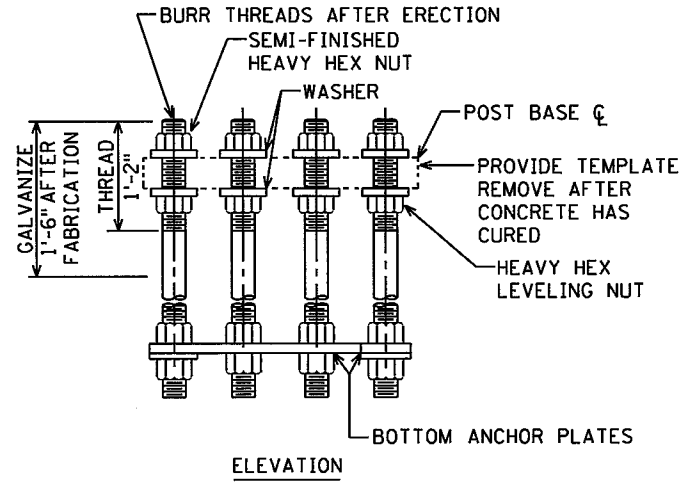
CAMBER, POST IDENTIFICATION
AND ESTIMATED QUANTITIES

DRAWING ST-2

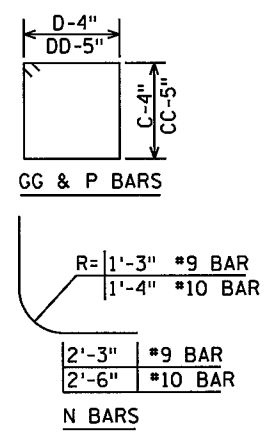


NOTE: ANCHOR PLATES SHOWN TYPICAL FOR ALL ANCHOR ROD SPACING.

ANCHOR PLATE PLAN



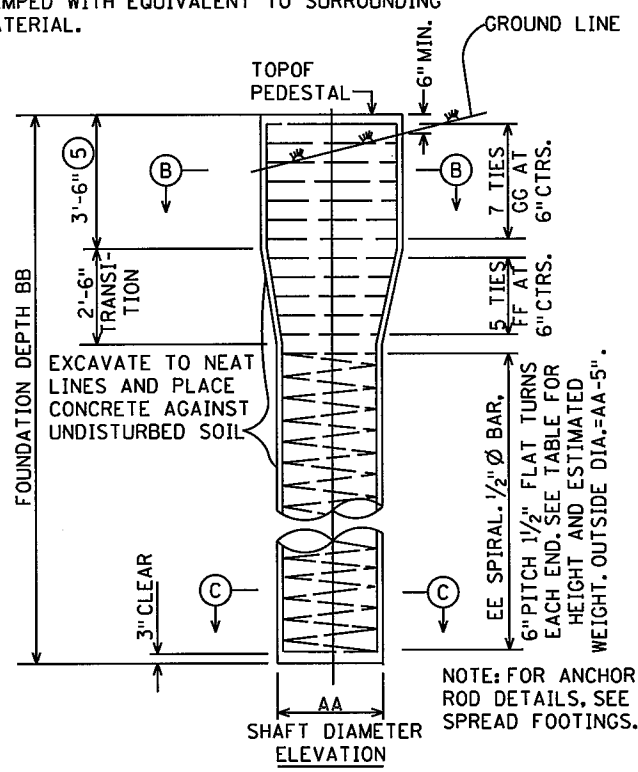
ELEVATION



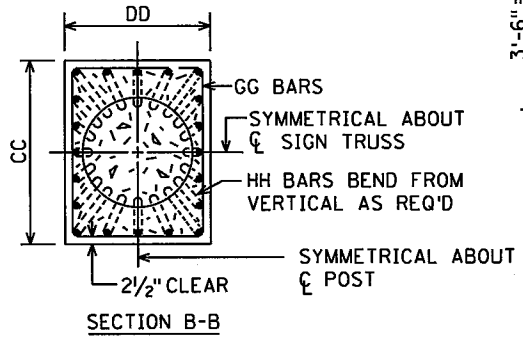
J, K, L, M, FF AND HH ARE STRAIGHT BARS
BAR BENDING DIAGRAMS

ANCHOR ROD DETAILS

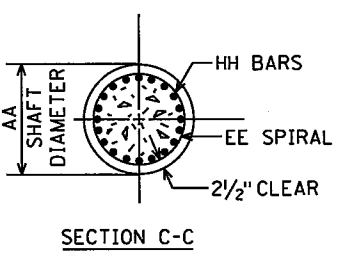
NOTE (5): MUST BE FORMED A MINIMUM OF 6" BELOW THE GROUND SURFACE. THE EXCAVATED AREA FOR FORMING SHALL BE BACKFILLED AND TAMPED WITH EQUIVALENT TO SURROUNDING MATERIAL.



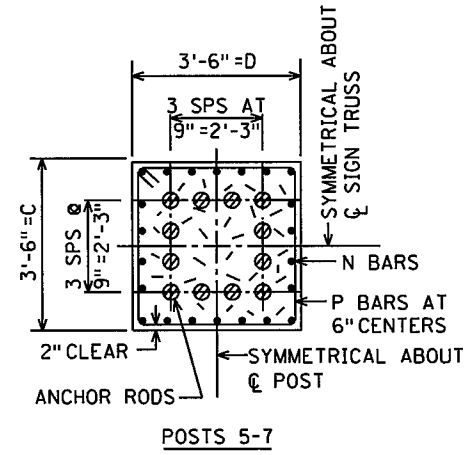
DRILLED SHAFT



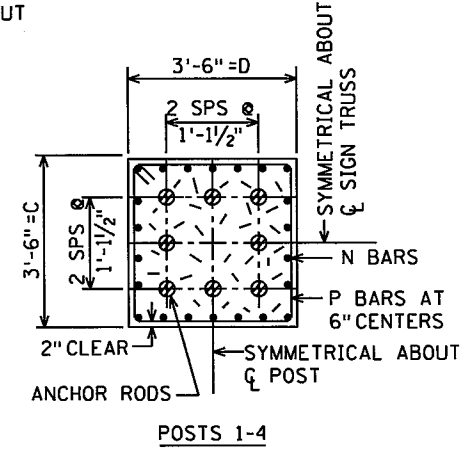
SECTION B-B



SECTION C-C

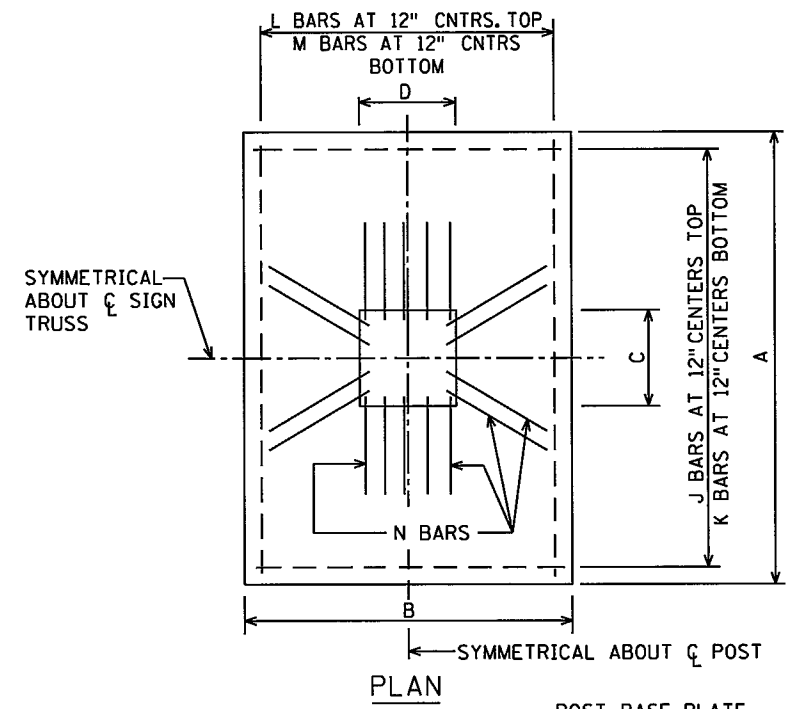


POSTS 5-7

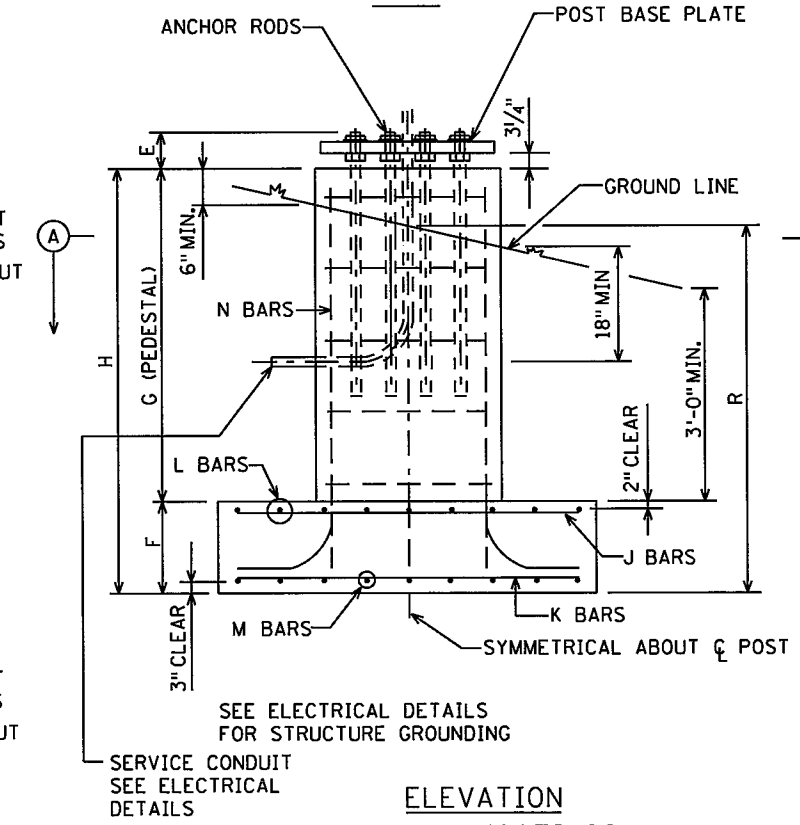


POSTS 1-4

PEDESTAL CROSS SECTIONS A-A



PLAN



ELEVATION
SPREAD FOOTINGS

SPECIFIC NOTES:

- G IS IN FEET. ROUND UP TO WHOLE NUMBER. E.G. G=4.10/2G=8.2 NO. REQ'D=9.
- G AND R ARE IN FEET.
- BEND AS REQUIRED TO FORM A CLOSED LOOP.
- FOR STRUCTURE STEEL SEE SPREAD FOOTING.
- MUST BE FORMED A MIN. OF 6" BELOW THE GROUND SURFACE. THE SOIL EXCAVATED FOR FORMING SHALL BE BACKFILLED AND TAMPED TO EQUIVALENT COMPACTION AS SURROUNDING MATERIAL.
- SPECIAL LARGE RADIUS BENDS ARE REQUIRED. SEE "BAR BENDING DIAGRAMS" FOR SIZES OF RADII.

GENERAL NOTES:

- SEE THE FORMAT SHEET FOR FOOTING LOCATIONS, POST DESIGNATIONS, TOP OF PEDESTAL ELEVATIONS AND BOTTOM OF FOOTING ELEVATIONS.
- ALL CONCRETE SHALL CONFORM TO CONCRETE MIX 3Y43 (MNDOT 2461).
- ALL BAR DIMENSIONS ARE OUT TO OUT OF BARS.
- ALL SPREAD FOOTINGS HAVE AN ALLOWABLE DESIGN BEARING PRESSURE OF 1 1/4 T PER SQUARE FOOT.
- DRILLED SHAFTS SHALL BE USED ONLY WHEN SPECIFIED IN THE CONTRACT PLANS.
- THE DRILLED SHAFTS HAVE AN ALLOWABLE DESIGN LATERAL BEARING PRESSURE OF 250 LBS. PER SQ. FT. PER FOOT OF DEPTH.
- UNLESS OTHERWISE NOTED, ALL REINFORCEMENT BARS SHALL BE EPOXY COATED IN ACCORDANCE WITH MNDOT3301. SPIRAL BARS AND J, K, L, & M BARS NEED NOT BE EPOXY COATED.
- THE FOLLOWING TORQUE VALUES SHALL BE USED WHEN INSTALLING ALL ANCHOR NUTS FOR OVERHEAD SIGN STRUCTURES:
ANCHOR
BOLT DIAMETER TORQUE (FT./LBS.)
2 1/4" 375
2 1/2" 450
THE CONTRACTOR SHALL BURR THE THREADS OF THE ANCHOR BOLTS IN ACCORDANCE WITH MNDOT 2402.3H AFTER TORQUEING NUTS.

POST NO.	DIMENSIONS				REINFORCING BARS				ESTIMATED QUANTITIES (4)		SUMMARY OF ESTIMATED QUANTITIES			
	AA	BB	CC	DD	EE	FF (3)	GG	HH	CONCRETE CY	REIN STEEL LBS.	CONCRETE CY (2)	REIN. STEEL LBS. (2)	ANCH. ASSM. LBS	ST. EXC. C.Y. (2)
1-4	3'-0"	23'-0"	3'-6"	3'-6"	16'-6" x 197 LBS.	5 #5x 14'-1"	7 #5x 14'-1"	20 #9x 22'-7"	6.9	1910	9.3 + 0.46 G	945 + 98G	781	7.4 R
5-7	4'-0"	29'-0"	4'-0"	4'-0"	22'-6" x 362 LBS.	5 #5x 16'-1"	7 #5x 16'-1"	24 #10x 28'-7"	14.1	3490	16.7 + 0.46 G	2333 + 133G	1320	12.1 R

POST NO.	ANCHOR RODS						J REIN. BARS		K REIN. BARS		L REIN. BARS		M REIN. BARS		(6) N REIN. BARS		P REIN. BARS (1)										
	A	B	C	D	E	F	NO. REQ'D	DIA.	LENGTH	NO. REQ'D	SIZE	LENGTH	NO. REQ'D	SIZE	LENGTH	NO. REQ'D	SIZE	LENGTH									
1-4	14'-0"	9'-0"	3'-6"	3'-6"	8 1/2"	2'-0"	8	2 1/4"	3'-10 1/2"	14	#4	8'-6"	14	#6	8'-6"	10	#5	13'-6"	10	#7	13'-6"	20	#9	H + 2'-6"	2G	#5	14'-3"
5-7	18'-0"	12'-6"	3'-6"	3'-6"	9"	2'-0"	12	2 1/2"	4'-0"	19	#4	12'-0"	19	#6	12'-0"	13	#6	17'-6"	13	#10	17'-6"	24	#10	H + 2'-9"	2G	#5	14'-3"

SS57 OF SS68

STANDARD OVERHEAD SIGN SUPPORTS
INTERIM DESIGN B

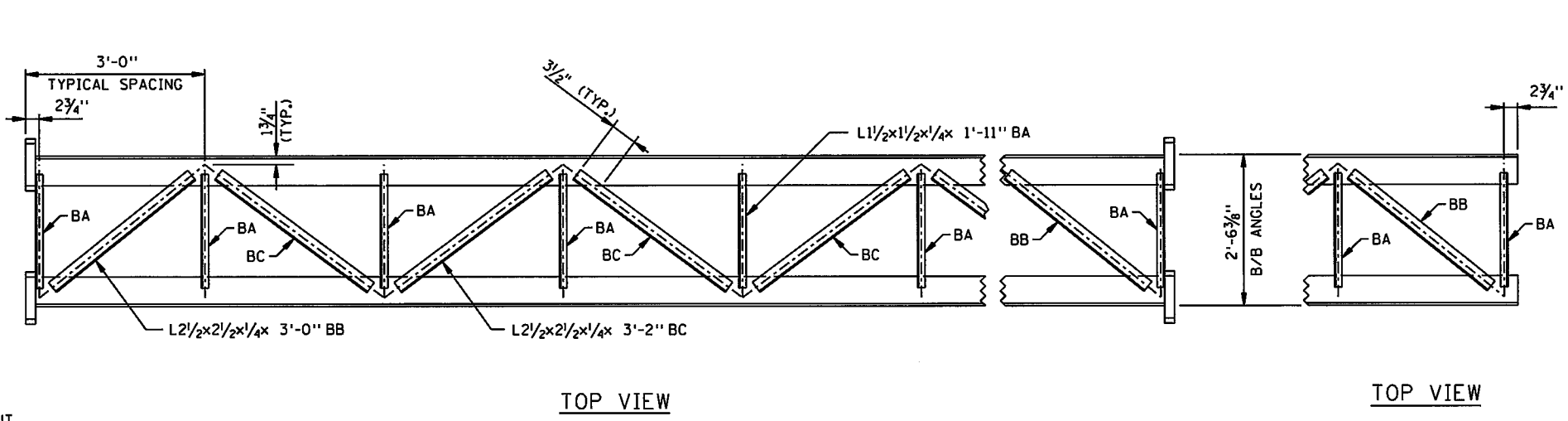
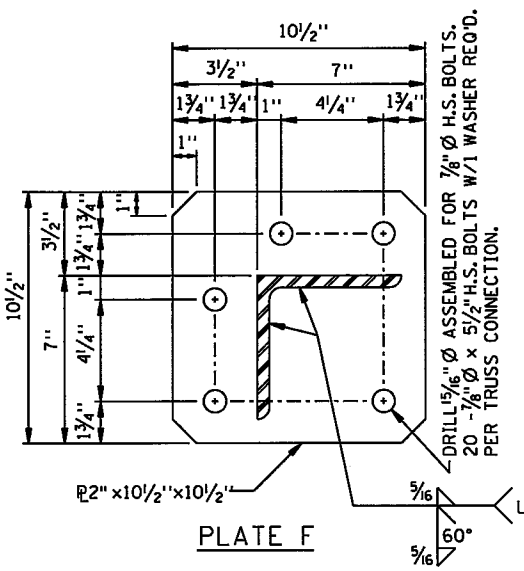
FOUNDATIONS AND
ANCHOR RODS

DRAWING ST-3

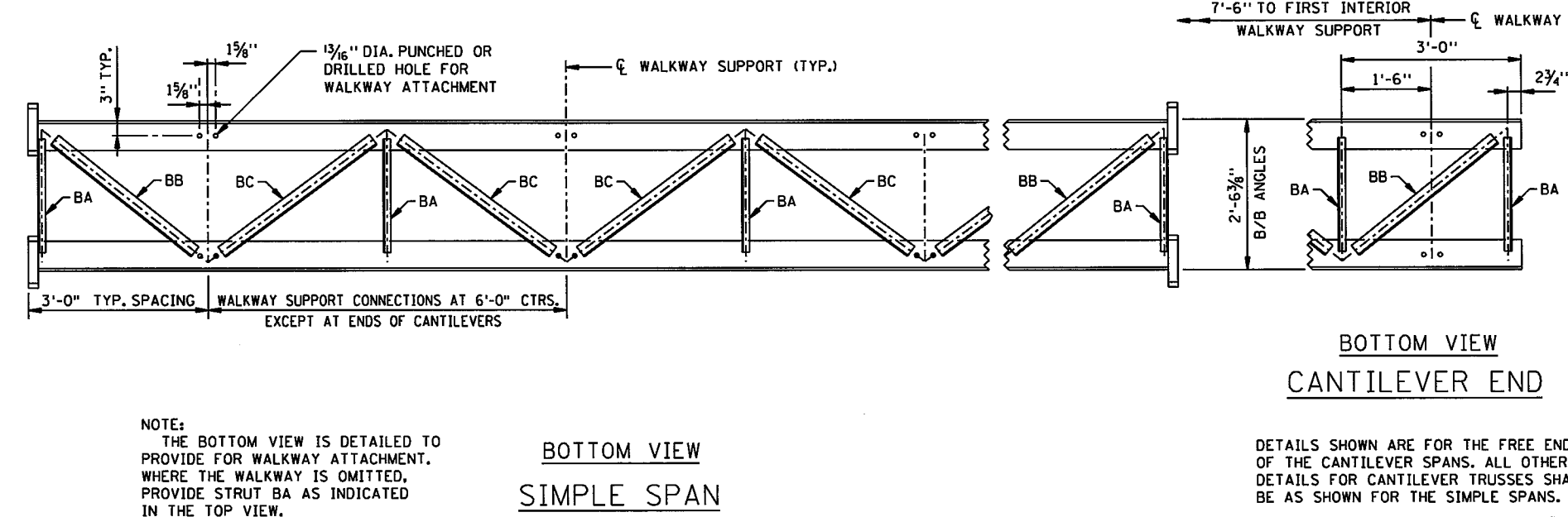
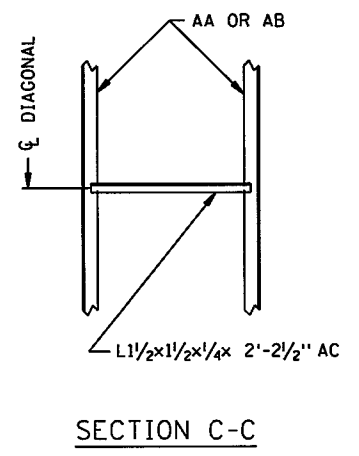
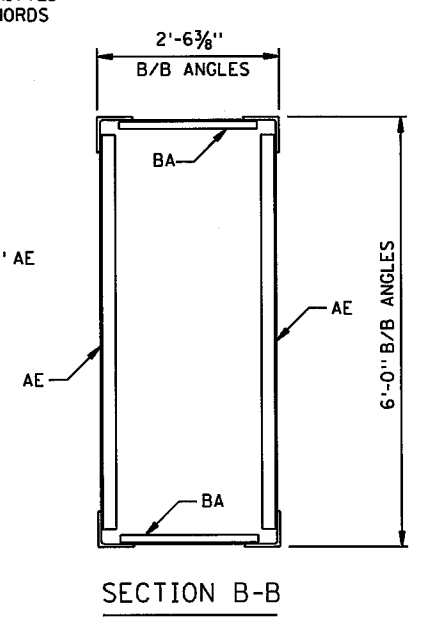
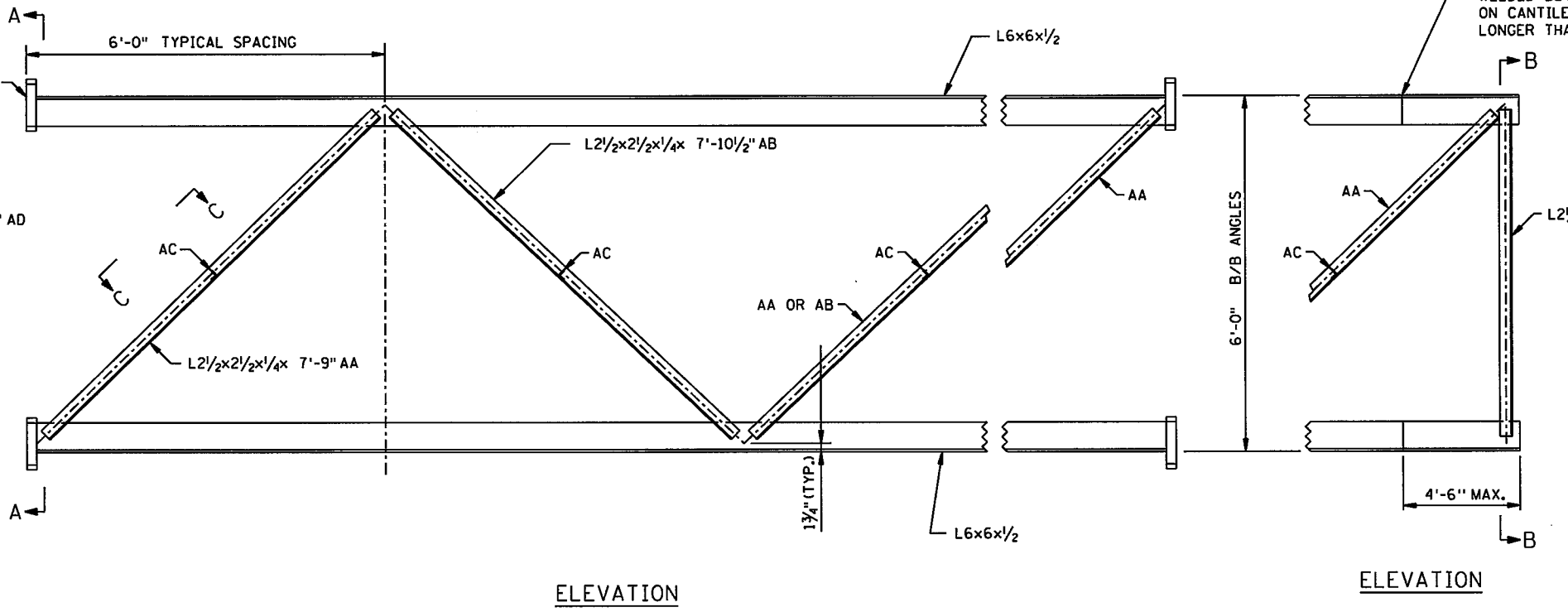
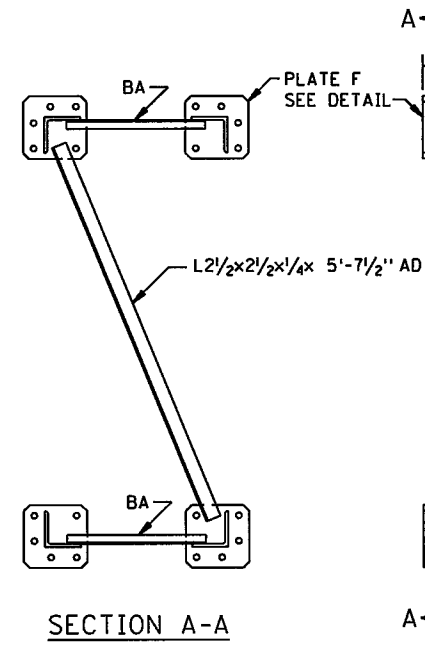
11/07/43 AM

12/8/2015

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S:\OH DETAILS
REV. 10-2-2013



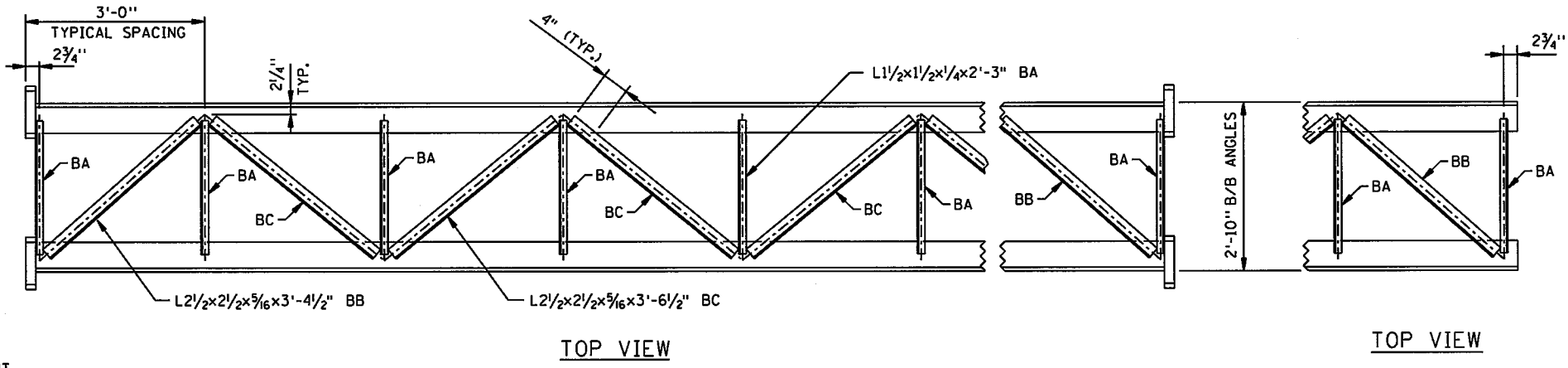
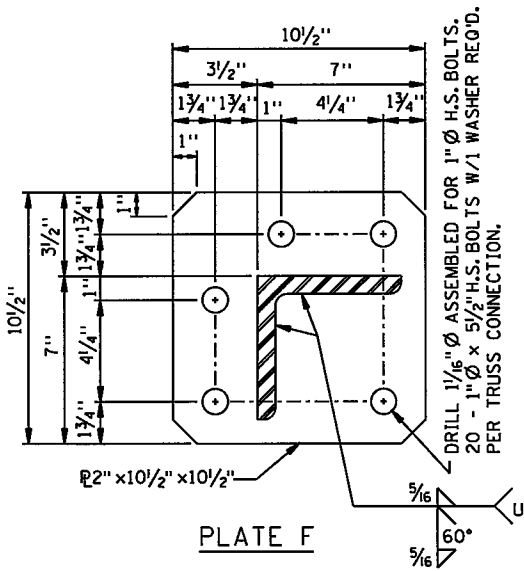
NOTES:
TRUSS SECTIONS SHALL BE MADE IN MULTIPLES OF 6'-0", EXCEPT THAT THE BRACING PANEL NEAREST EACH POST MAY VARY TO MAKE UP THE NEEDED SECTION LENGTH. WELDED CHORD SPLICES ARE NOT PERMITTED EXCEPT IN CANTILEVER TRUSSES AS NOTED BELOW.
CANTILEVER TRUSSES SHALL BE SUPPLIED AS A SINGLE UNIT WHENEVER POSSIBLE. WHEN CANTILEVER TRUSS LENGTH EXCEEDS 40'-0" CHORDS MAY BE SPLICED, AS SHOWN, IN THE END BRACING PANEL ONLY. CHORD SPLICE WELD SHALL BE COMPLETE PENETRATION, WITH 100% UT AND MT TESTING PER 2471.3M.
UNLESS OTHERWISE SHOWN, ALL WELDS SHALL BE 1/4" FILLET WELDS ALL AROUND.
BOLTED SPLICES SHALL NOT BE LOCATED BEHIND CMS SIGNS.
PROVIDE 2 - 1/16" BRASS, STAINLESS STEEL OR GALVANIZED STEEL SHIMS AT EACH FLANGE TO BRING TRUSS INTO CORRECT CAMBER AND ALIGNMENT.
TRUSSES SHALL BE SHOP ASSEMBLED AND MATCH MARKED.
ALL VIEWS OF THE TRUSSES ARE DRAWN FROM THE INSIDE OF THE TRUSS LOOKING OUT.
SEE DRAWING ST-4 FOR POST CONNECTION DETAILS.



NOTE:
THE BOTTOM VIEW IS DETAILED TO PROVIDE FOR WALKWAY ATTACHMENT. WHERE THE WALKWAY IS OMITTED, PROVIDE STRUT BA AS INDICATED IN THE TOP VIEW.
BOTTOM VIEW
SIMPLE SPAN

DETAILS SHOWN ARE FOR THE FREE ENDS OF THE CANTILEVER SPANS. ALL OTHER DETAILS FOR CANTILEVER TRUSSES SHALL BE AS SHOWN FOR THE SIMPLE SPANS.

SS59 OF SS68
STANDARD OVERHEAD SIGN SUPPORTS INTERIM DESIGN B
SIGN TRUSS DETAILS TRUSS TYPE A
DRAWING ST-5



NOTES:

TRUSS SECTIONS SHALL BE MADE IN MULTIPLES OF 6'-0", EXCEPT THAT THE BRACING PANEL NEAREST EACH POST MAY VARY TO MAKE UP THE NEEDED SECTION LENGTH. WELDED CHORD SPLICES ARE NOT PERMITTED EXCEPT IN CANTILEVER TRUSSES AS NOTED BELOW.

CANTILEVER TRUSSES SHALL BE SUPPLIED AS A SINGLE UNIT WHENEVER POSSIBLE. WHEN CANTILEVER TRUSS LENGTH EXCEEDS 40'-0" CHORDS MAY BE SPLICED, AS SHOWN, IN THE END BRACING PANEL ONLY. CHORD SPLICE WELD SHALL BE COMPLETE PENETRATION, WITH 100% UT AND MT TESTING PER 2471.3M.

UNLESS OTHERWISE SHOWN, ALL WELDS SHALL BE 1/4" FILLET WELDS ALL AROUND.

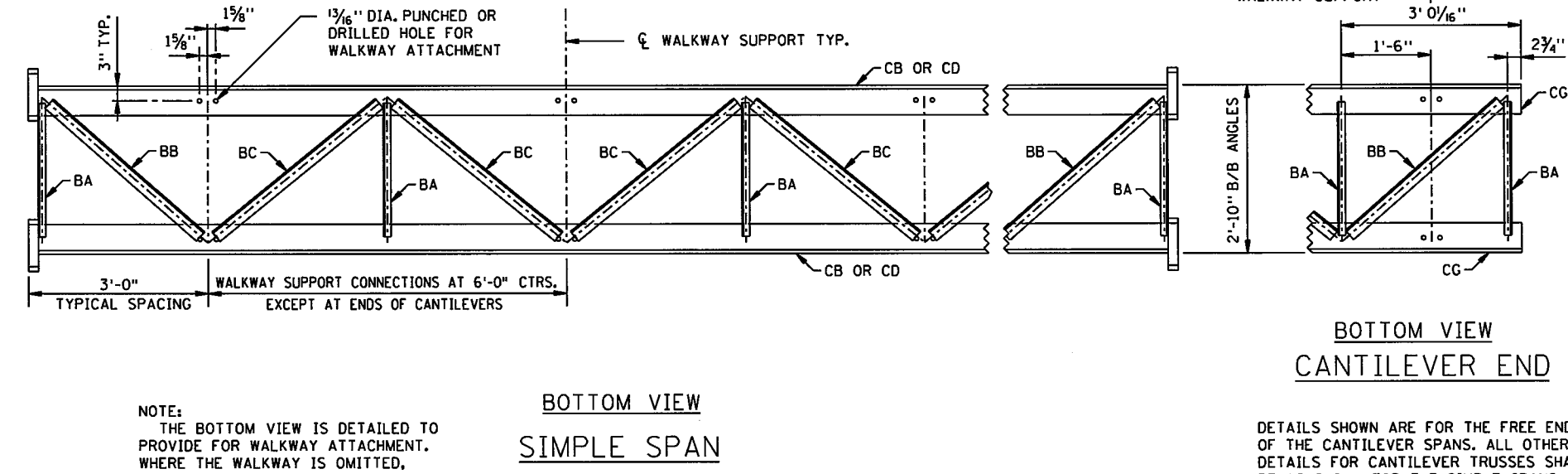
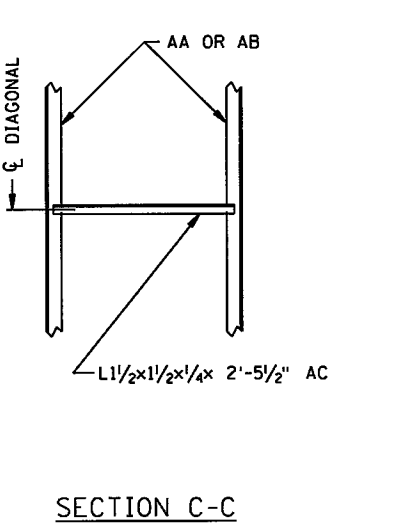
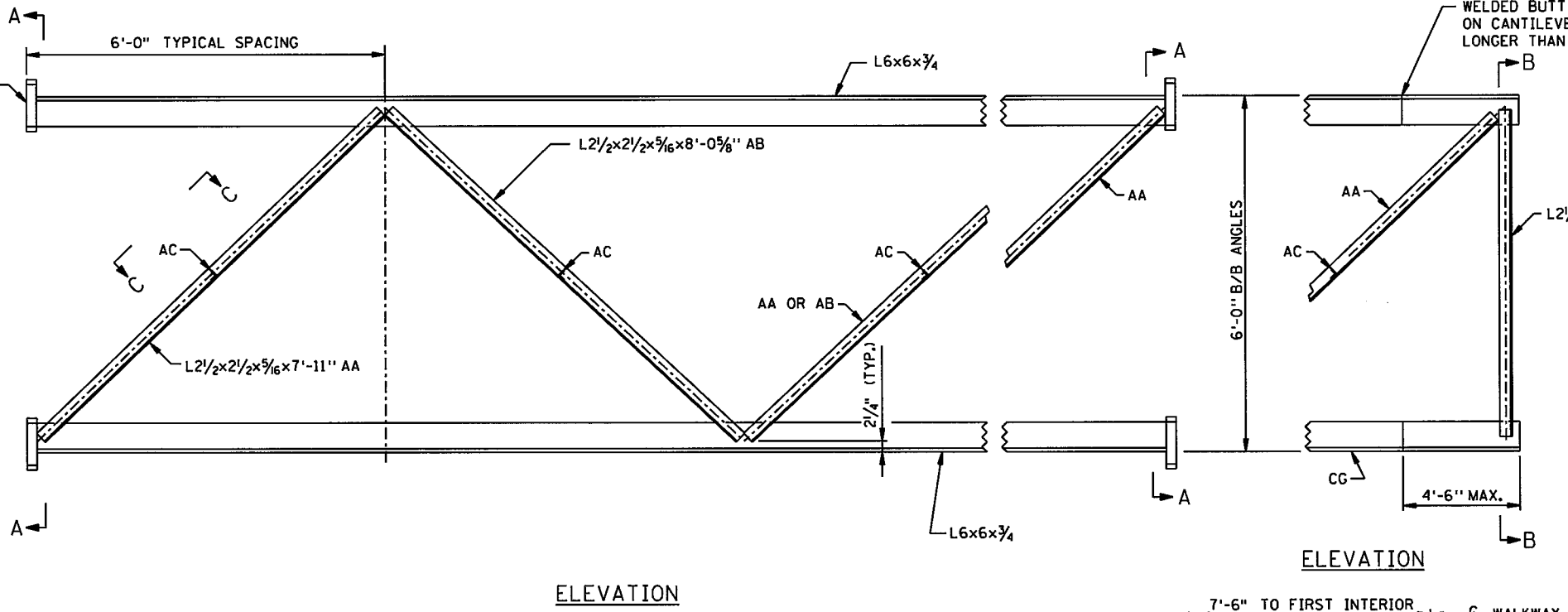
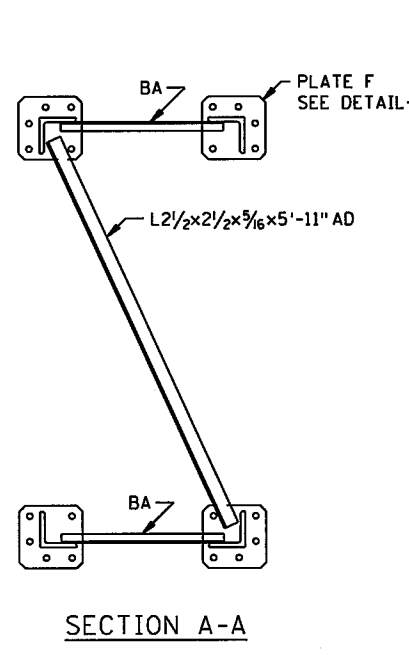
BOLTED SPLICES SHALL NOT BE LOCATED BEHIND CMS SIGNS.

PROVIDE 2- 1/16" BRASS, STAINLESS STEEL OR GALVANIZED STEEL SHIMS AT EACH FLANGE TO BRING TRUSS INTO CORRECT CAMBER AND ALIGNMENT.

TRUSSES SHALL BE SHOP ASSEMBLED AND MATCH MARKED.

ALL VIEWS OF THE TRUSSES ARE DRAWN FROM THE INSIDE OF THE TRUSS LOOKING OUT.

SEE DRAWING ST-4 FOR POST CONNECTION DETAILS.



NOTE:
THE BOTTOM VIEW IS DETAILED TO PROVIDE FOR WALKWAY ATTACHMENT. WHERE THE WALKWAY IS OMITTED, PROVIDE STRUT BA AS INDICATED IN THE TOP VIEW.

BOTTOM VIEW SIMPLE SPAN

DETAILS SHOWN ARE FOR THE FREE ENDS OF THE CANTILEVER SPANS. ALL OTHER DETAILS FOR CANTILEVER TRUSSES SHALL BE AS SHOWN FOR THE SIMPLE SPANS.

SS60 OF SS68

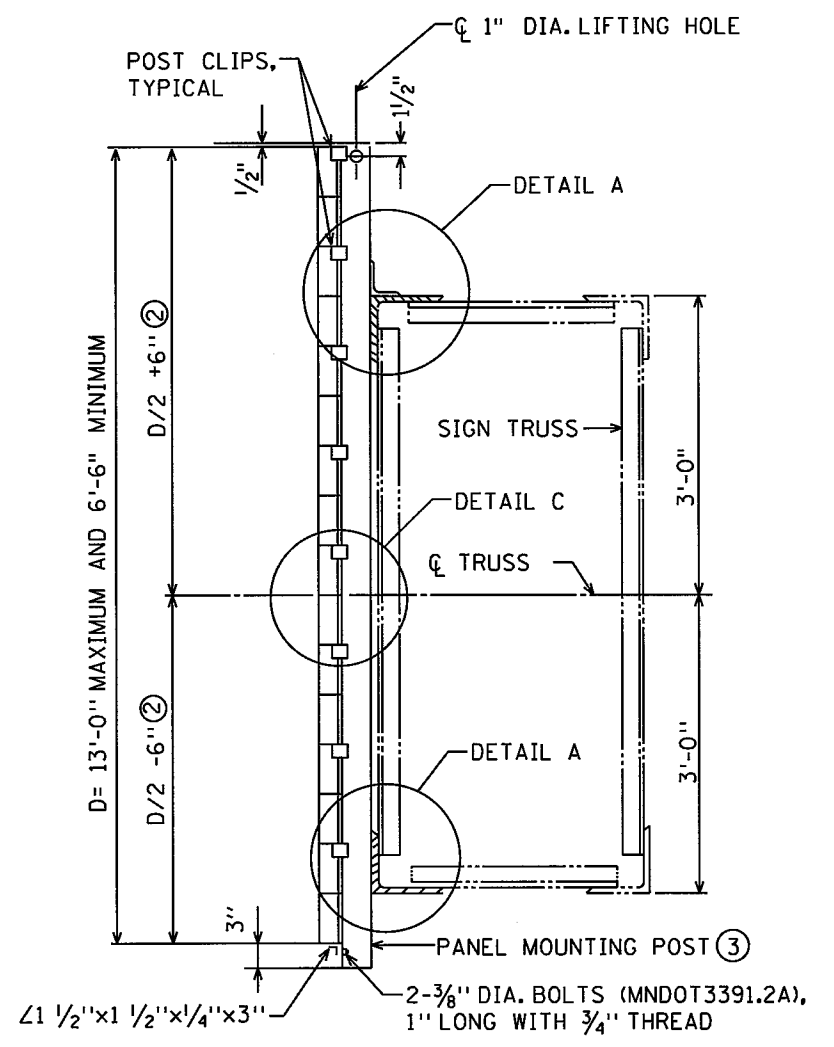
STANDARD OVERHEAD SIGN SUPPORTS INTERIM DESIGN B
SIGN TRUSS DETAILS TRUSS TYPE B
DRAWING ST-6

11/07/44 AM

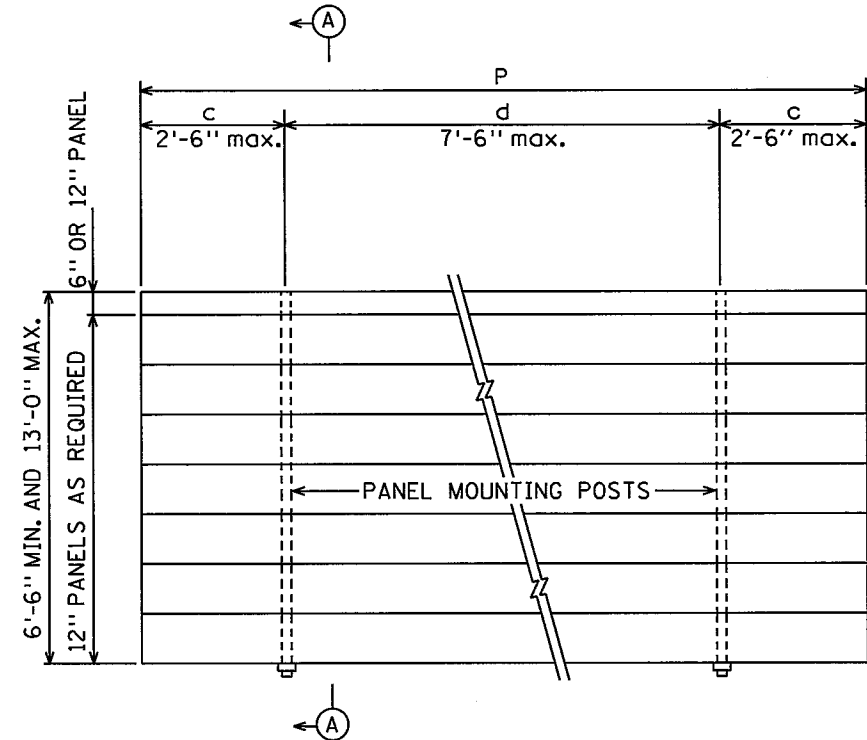
12/8/2015

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5_OH DETAILS

REV. 10-2-2013



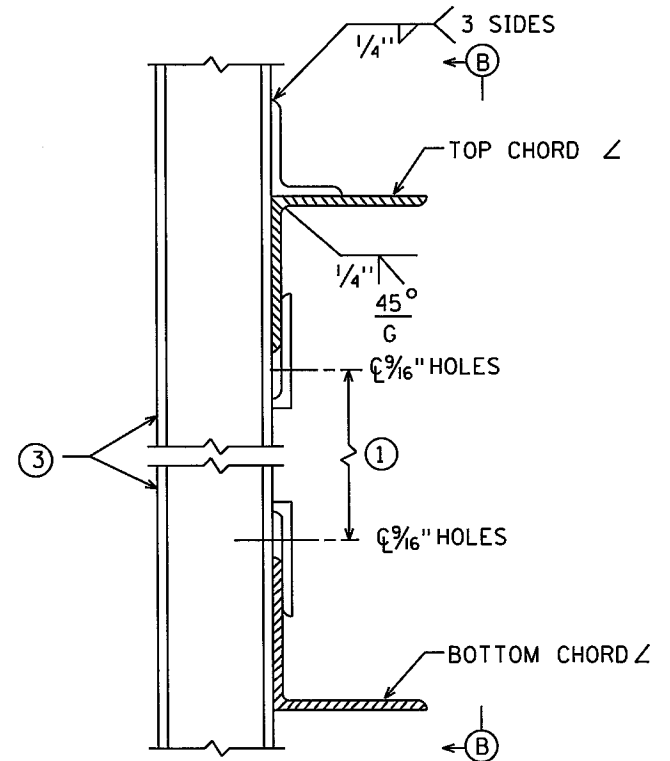
SECTION A-A



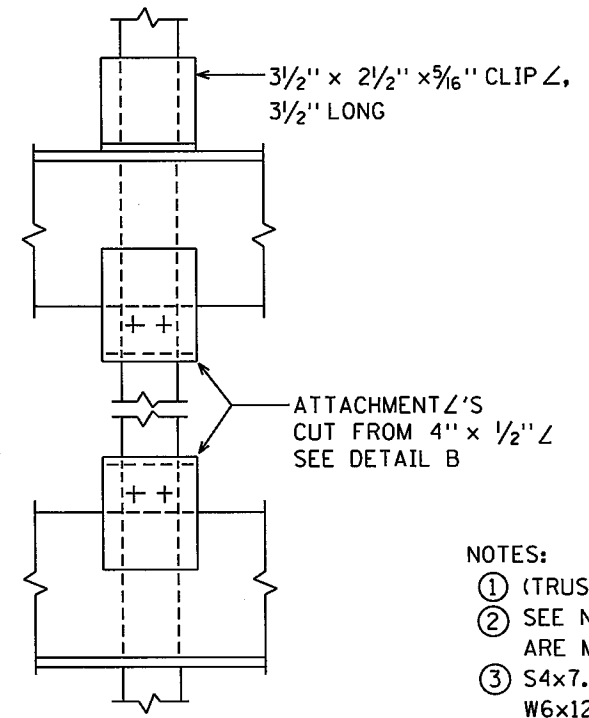
PANEL MOUNTING POST	
NO. OF POSTS	
2	P=144" OR LESS, c=.207P, d=.586P
3	P=150" THRU 204", c=.145P, d=.355P
4	P=210" THRU 276", c=.107P, d=.262P
5	P=282" THRU 348", c=.084P, d=.208P
6	P=354" THRU 420", c=.070P, d=.172P
7	P=426" THRU 492", c=.059P, d=.147P

POST SPACING MAY BE ADJUSTED AS REQUIRED IF CONFLICT WITH TRUSS DETAILS IS ENCOUNTERED.

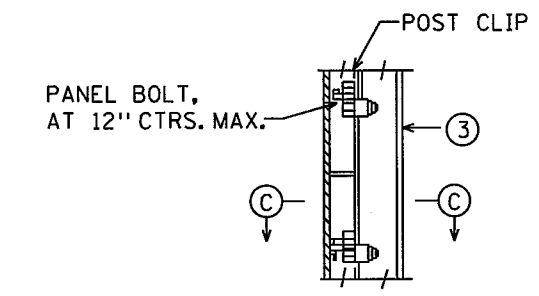
SIGN PANEL ELEVATION



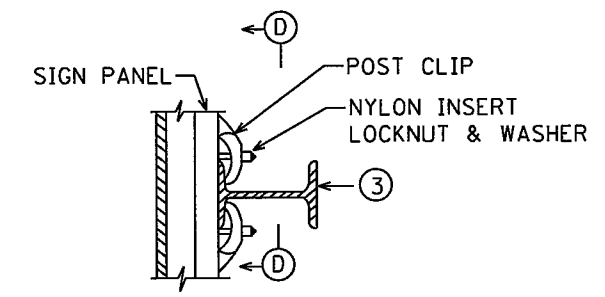
DETAIL A



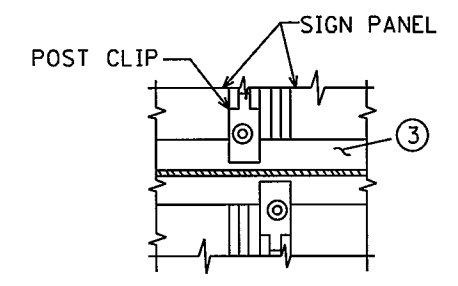
VIEW B-B



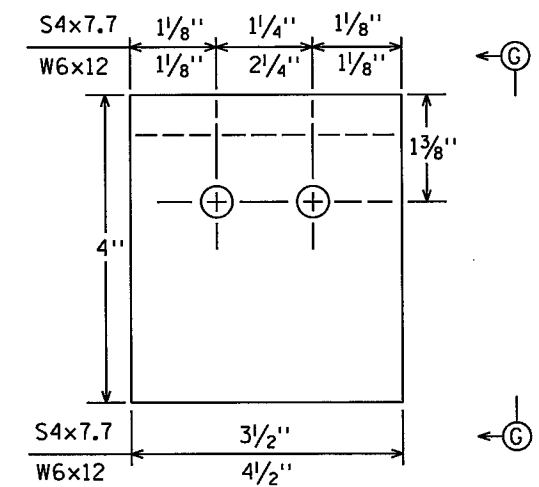
DETAIL C



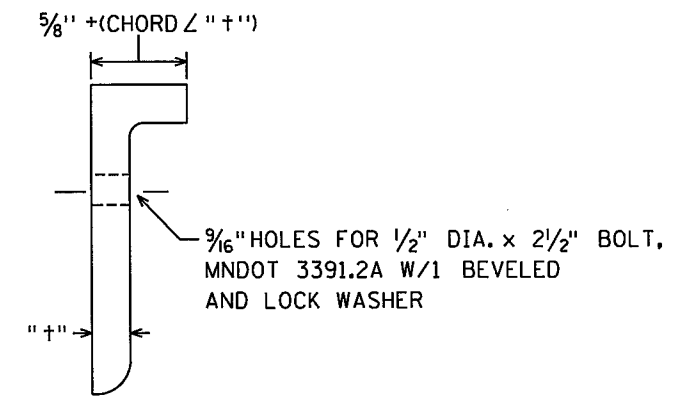
SECTION C



SECTION D-D



DETAIL B



VIEW G-G

- NOTES:
- ① (TRUSS DEPTH)-(TOP & BOTTOM CHORD LEGS)-1/4"
 - ② SEE NOTE 1 ON ST-1 WHEN STANDARD PANELS AND CMS ARE MOUNTED ON THE SAME SPAN
 - ③ S4x7.7 FOR SIGN HEIGHTS ≤ 11'-0"
W6x12 FOR SIGN HEIGHTS OVER 11'-0"

SS62 OF SS68

STANDARD OVERHEAD SIGN SUPPORTS
INTERIM DESIGN B

SIGN PANEL AND PANEL
MOUNTING POST DETAILS

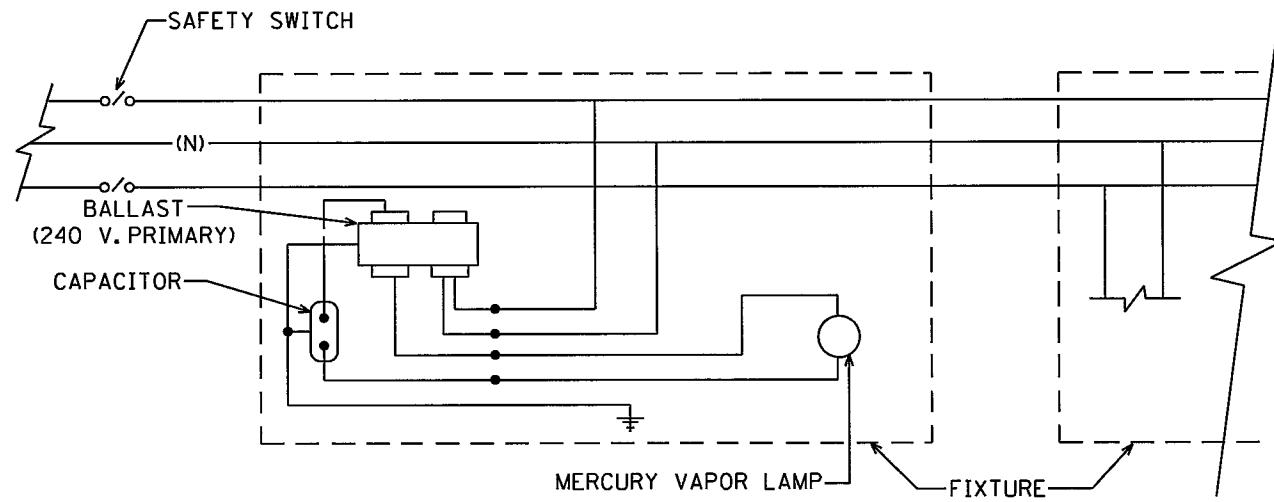
DRAWING ST-10

11/07/45 AM

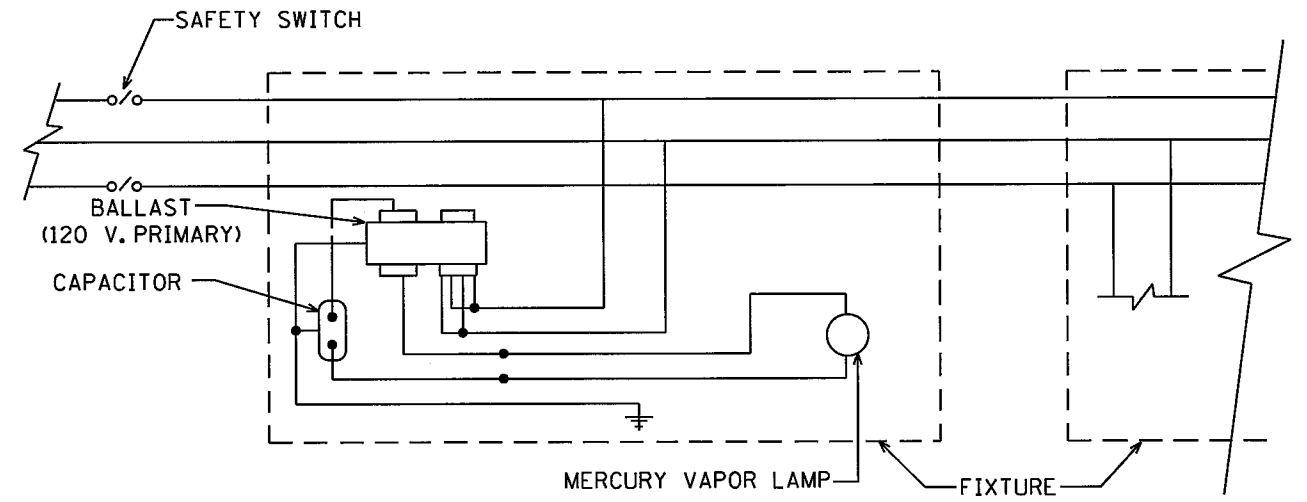
12/8/2015

S:\PTV\Remse\129594\5-final-dsgn\51-const-dwgs-CAD\40-Transhtwy\pinshfts\CT6284162.sgn def01.dgn

REV. 10-2-2013

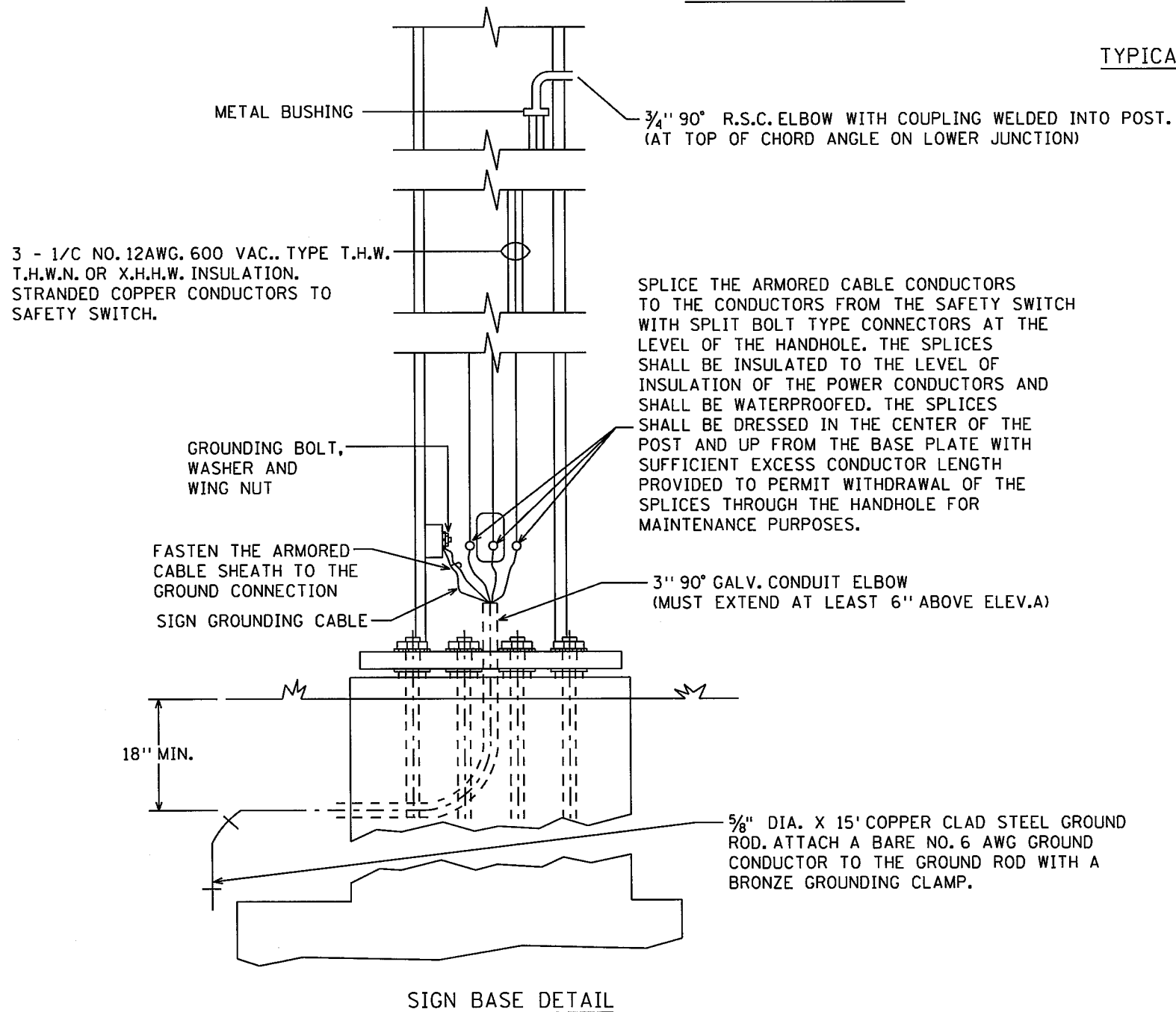


240/480 V. CIRCUIT



120/240 V. CIRCUIT

TYPICAL CIRCUIT DIAGRAMS



SIGN BASE DETAIL

ELECTRICAL NOTES:

1. WHEN SIGN LIGHTING SYSTEMS HAVE BEEN COMPLETED, THE CONTRACTOR SHALL, WITHOUT FURTHER COMPENSATION, CONDUCT BURNING AND RESISTANCE TESTS FOR FINAL ACCEPTANCE. THE RESISTANCE TO GROUND OF EACH UNGROUNDED CONDUCTOR SHALL BE NOT LESS THAN 8 MEGOHMS.
2. ALL FITTINGS, HUBS, UNIONS, BUSHINGS, ETC. SHALL BE SUPPLIED AS PART OF CONDUIT, CONDUIT ENTERING SIGN POSTS SHALL HAVE INSULATED GROUNDING BUSHINGS INSTALLED BEFORE PULLING WIRE.
3. CONDUIT ON STRUCTURE SHALL BE SURFACED MOUNTED, STRAPPED AT EVERY ANGLE BRACE WITH U-BOLT TYPE CLAMPS.
4. SUCCESSIVE LIGHTING FIXTURES SHALL BE CONNECTED ON ALTERNATE SIDES OF THE 3-WIRE CIRCUIT.
5. THE CABLE SHEATH SHALL EXTEND AT LEAST 4" ABOVE THE TOP OF THE CONDUIT END AND THE TAPE ARMOR OF ARMORED CABLE SHALL BE CONNECTED TO THE GROUNDING BOLT IN THE SIGN POSTS.
6. WIRING FROM THE SAFETY SWITCH TO LIGHTING FIXTURES SHALL BE 1/C NO. 12 AWG AND SHALL BE RUN IN 3/4" R.S.C. ALL SPLICING SHALL BE ACCOMPLISHED WITH A WIRE NUT AND WATERPROOF COATING. ALL CONDUIT CONNECTIONS SHALL BE RAIN TIGHT.

SS63 OF SS68

STANDARD OVERHEAD SIGN SUPPORTS INTERIM DESIGN B

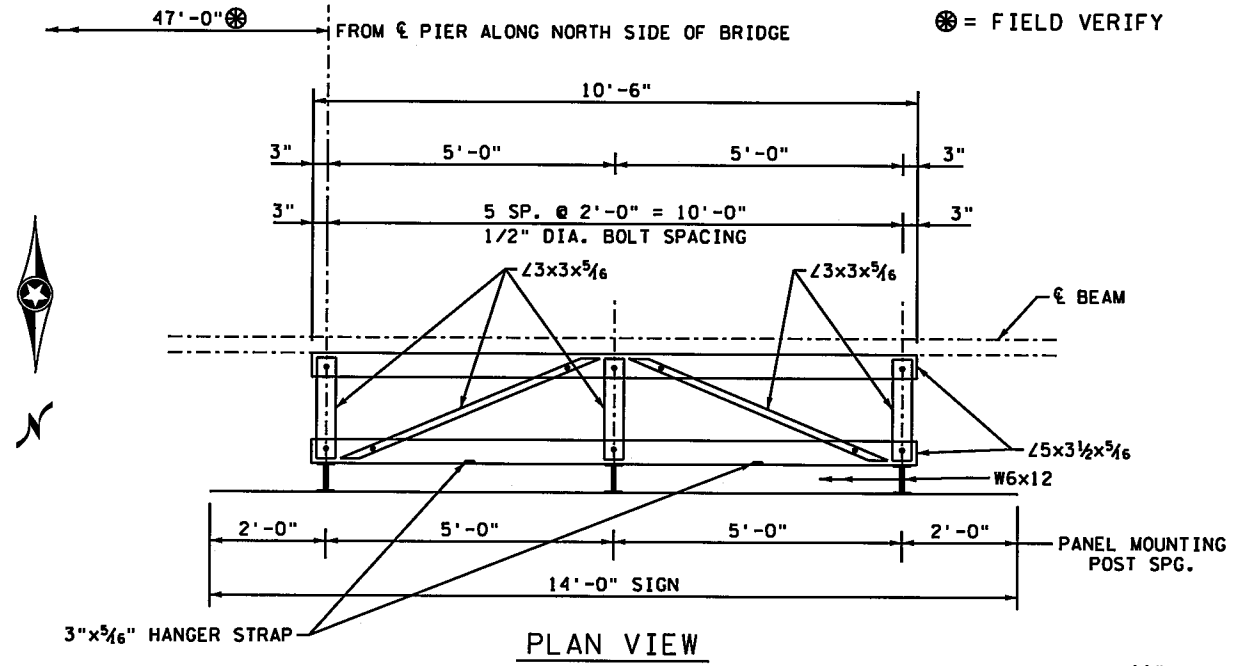
ELECTRICAL DETAILS

DRAWING ST-12

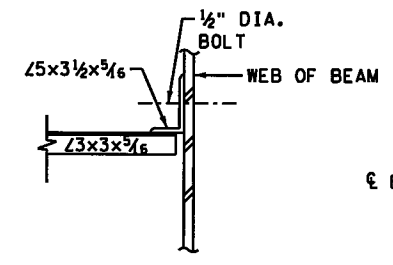
4/11/15 PM

1/21/2016

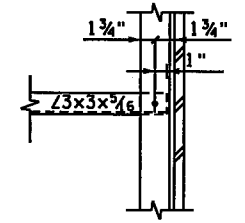
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B OH SIGN XS



PLAN VIEW

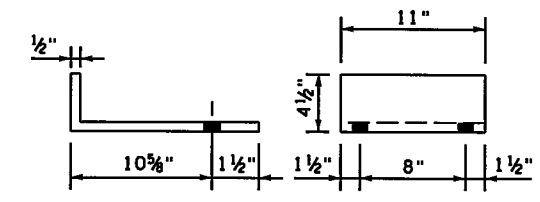


ELEVATION

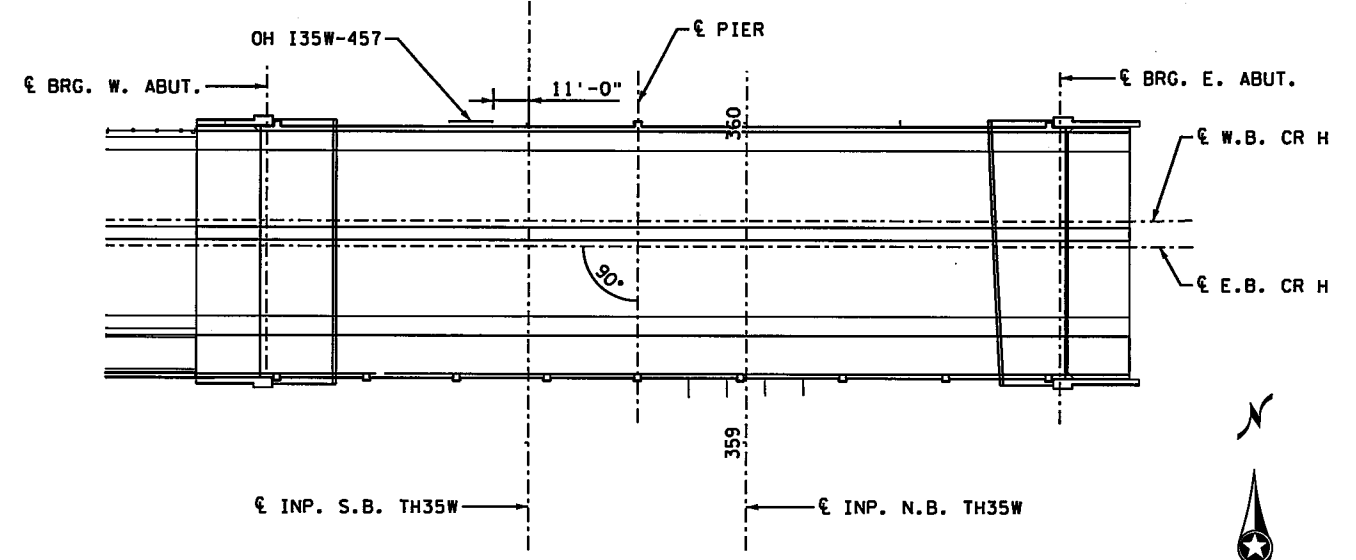


PLAN

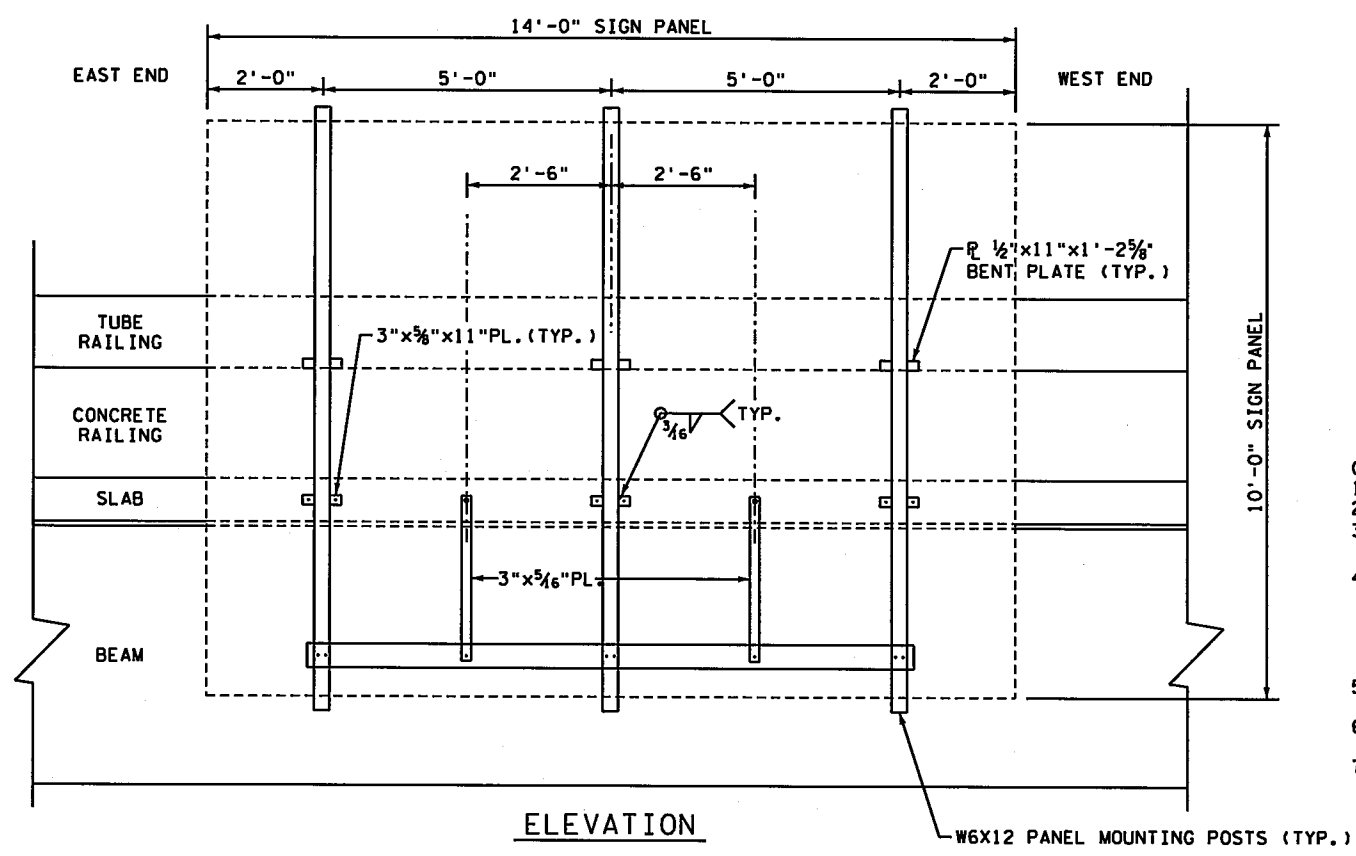
DETAIL "B"



BENT PLATE DETAIL
TYP. AT PANEL MOUNTING POST

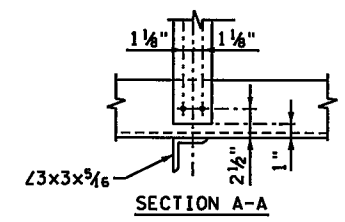


SIGN LOCATION OH I35W-457
BRIDGE NO. 62732 - I-35W UNDER CO. RD. H

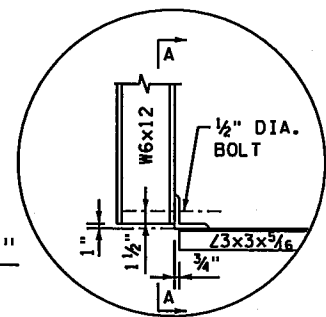


ELEVATION

LOOKING SOUTH AT BR. NO. 62732

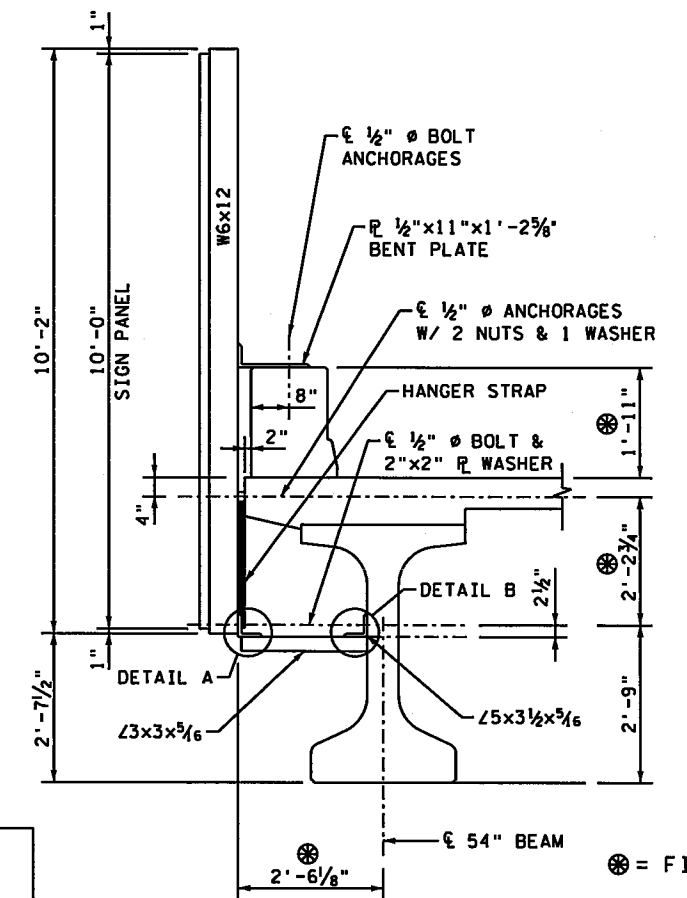


SECTION A-A
TYP. AT PANEL MOUNTING POST
DETAIL "A"



- GENERAL NOTES:
- SIGN SUPPORTS SHALL BE VERTICAL.
 - SIGN TO BE PLACED IN A HORIZONTAL POSITION.
 - ALL CONNECTIONS TO BE 1/2" DIA. BOLTS PER MNDOT 3391 (A325), HOLES TO BE 3/16" DIA. EXCEPT AS NOTED.
 - CONCRETE ANCHORAGES SHALL BE CHEMICAL ADHESIVES TYPE AS APPROVED BY THE ENGINEER. ANCHOR RODS, PER 3385 TYPE A, SHALL BE 1/2" DIA. WITH A MIN. EMBEDMENT DEPTH OF 4 1/2", AND SHALL HAVE A MIN. ULTIMATE PULL-OUT STRENGTH OF 8000#.
 - CONTRACTOR SHALL VERIFY DIMENSIONS BEFORE FABRICATION.
 - FOR GENERAL NOTES AND DETAILS NOT SHOWN SEE STANDARD SHEETS.
 - NO WALKWAY REQUIRED.

TRUSS QUANTITY	
POUNDS	758



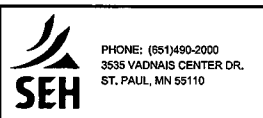
TYPICAL SECTION

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	MAW			
CHECKED BY:	MAW			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660

Printed Name: MARK A. WAGNER Date: 1/21/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.A.P. 062-609-006, S.A.P. 062-593-003

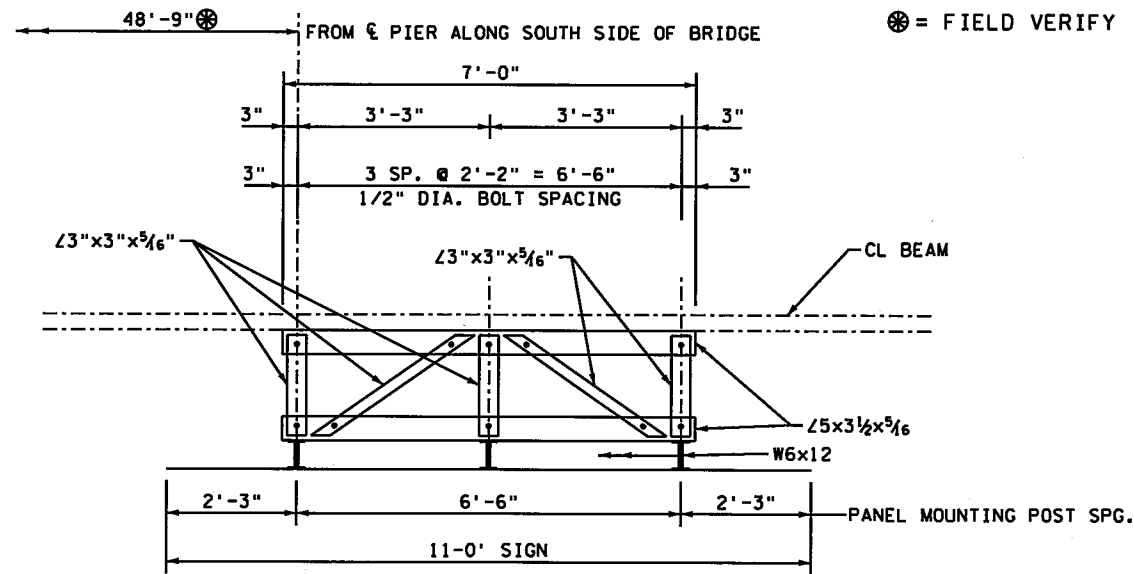
OVERHEAD SIGN DETAILS
OH I35W-457

FILE NO.	331
RAMSEI29594	
SS64 OF SS68	367

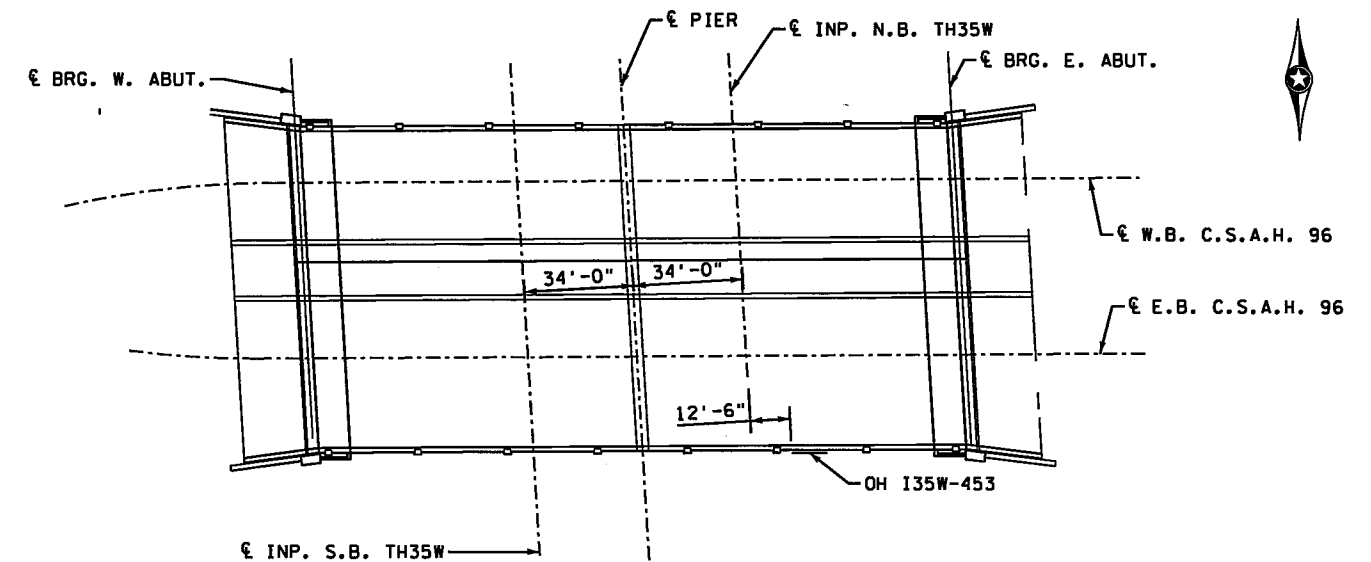
4/11/15 PM

1/21/2016

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B OH SIGN XS



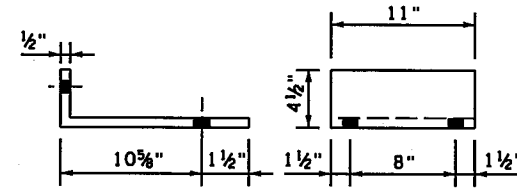
PLAN VIEW



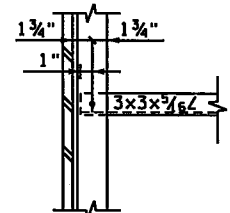
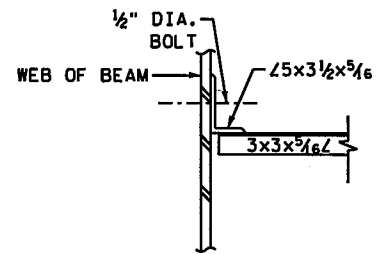
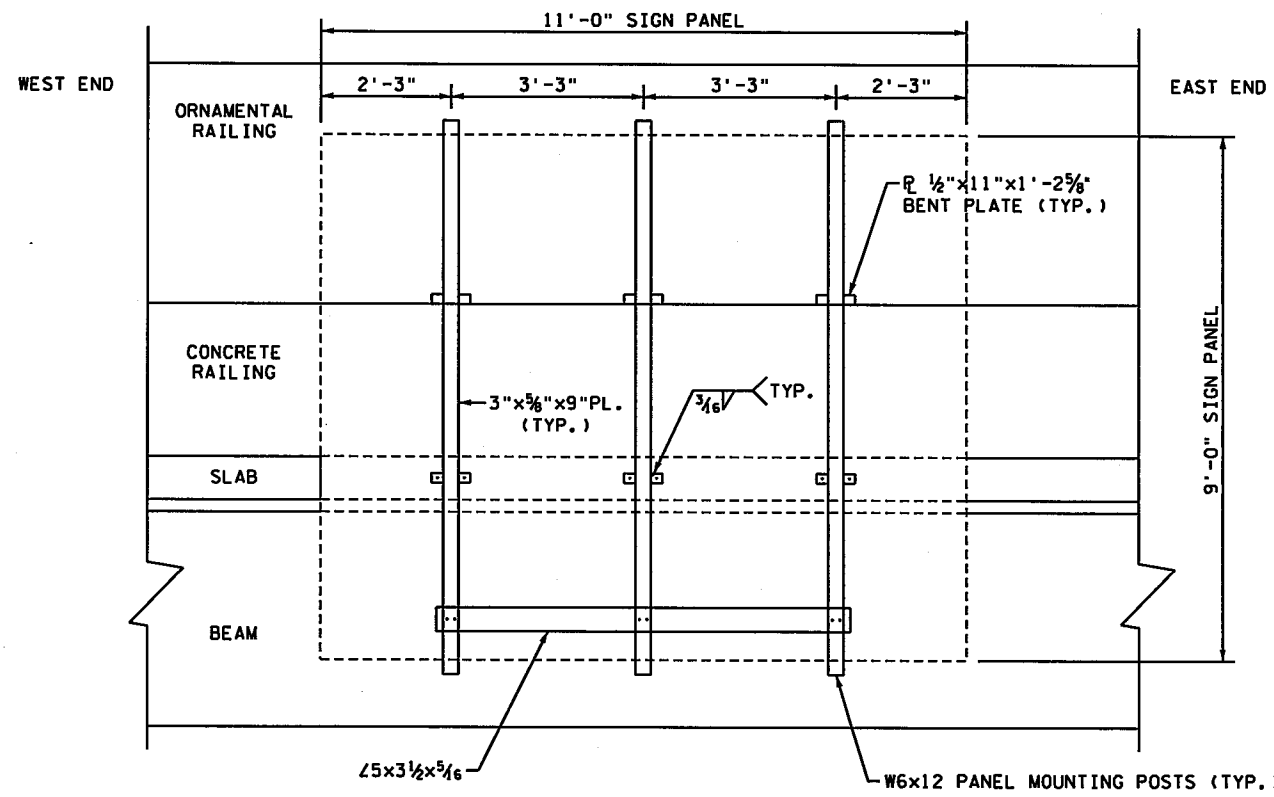
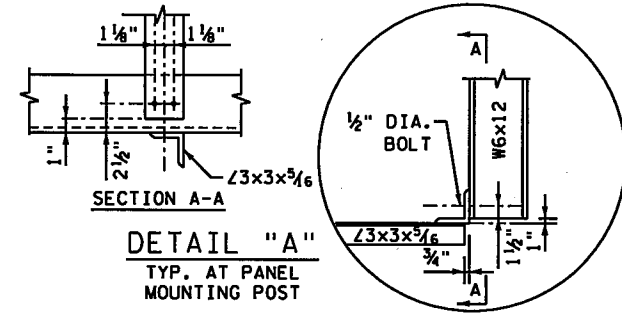
SIGN LOCATION OH I35W-453

BRIDGE NO. 62911 - I-35W UNDER C.S.A.H. 96

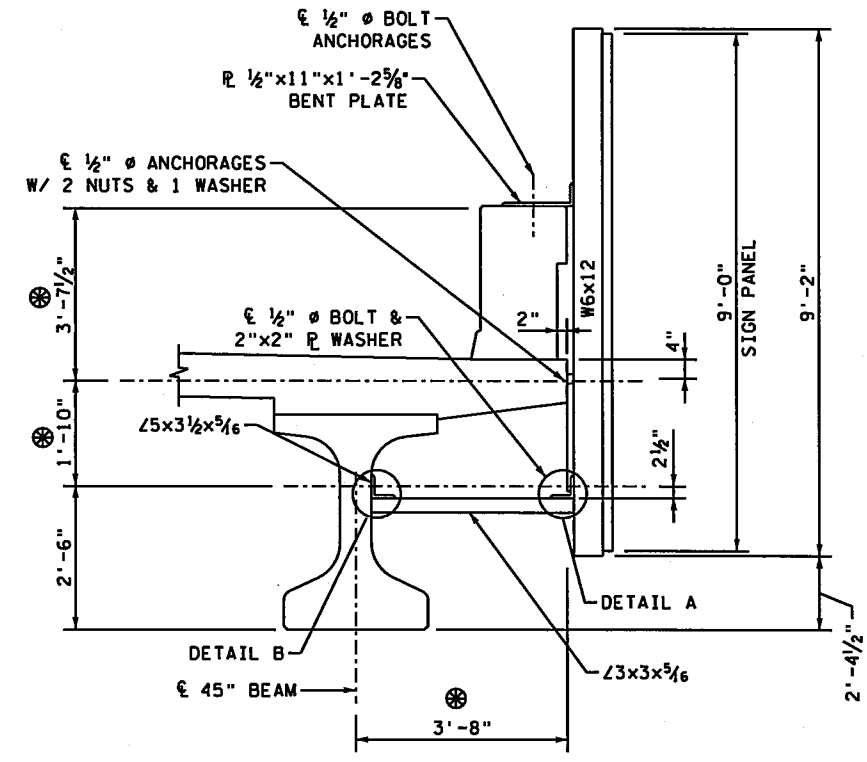
- GENERAL NOTES:
- SIGN SUPPORTS SHALL BE VERTICAL.
 - SIGN TO BE PLACED IN A HORIZONTAL POSITION.
 - ALL CONNECTIONS TO BE 1/2" DIA. BOLTS PER MNDOT 3391 (A325), HOLES TO BE 3/16" DIA. EXCEPT AS NOTED.
 - CONCRETE ANCHORAGES SHALL BE CHEMICAL ADHESIVES TYPE AS APPROVED BY THE ENGINEER. ANCHOR RODS, PER 3385 TYPE A, SHALL BE 1/2" DIA. WITH A MIN. EMBEDMENT DEPTH OF 4 1/2", AND SHALL HAVE A MIN. ULTIMATE PULL-OUT STRENGTH OF 8000#.
 - CONTRACTOR SHALL VERIFY DIMENSIONS BEFORE FABRICATION.
 - FOR GENERAL NOTES AND DETAILS NOT SHOWN SEE STANDARD SHEETS.
 - NO WALKWAY REQUIRED.



BENT PLATE DETAIL
TYP. AT PANEL MOUNTING POST



DETAIL "B"



TYPICAL SECTION

TRUSS QUANTITY
POUNDS 657

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: MAW				
CHECKED BY: MAW				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
Printed Name: MARK A. WAGNER Date: 1/21/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

OVERHEAD SIGN DETAILS
OH I35W-453

FILE NO. 332
RAMSEI29594
SS65 OF SS68
367

9:24:30 AM

1/18/2016

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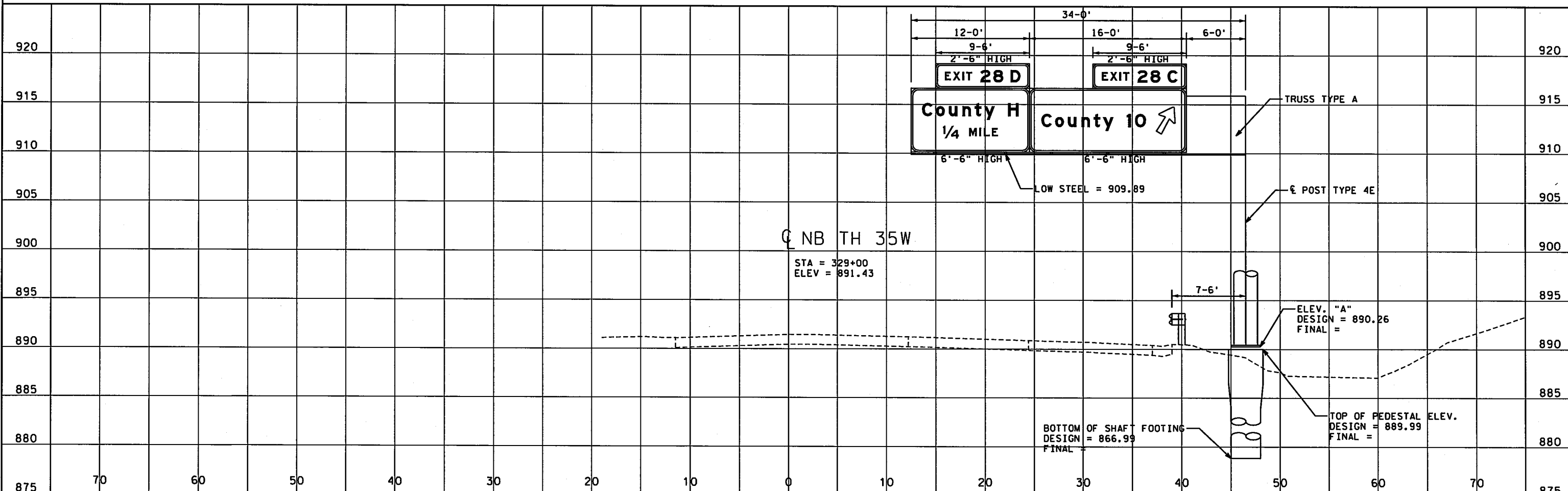
OH I35W-454
N.B. T.H. 35W
329+00

QUANTITIES

	DESIGN	FINAL
POST STEEL	4290 LBS	
TRUSS STEEL	4182 LBS	
WALKWAY SUPPORT STEEL	0 LBS	
WALKWAY GRATING STEEL	0 LBS	
PANEL MOUNTING POST STEEL	350 LBS	
CONCRETE (SHAFT) FOOTING	6.9 CU YDS	
SIGN PANELS TYPE OH	182 SQ FT	
SIGN PANELS TYPE EO	47.5 SQ FT	

NOTES:

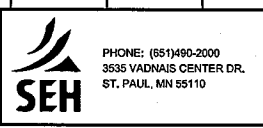
1. LOW STEEL IS BOTTOM OF PANEL MOUNTING POSTS ON THE TALLEST PANEL.
2. STRUCTURE IS DESIGNED FOR FUTURE WALKWAY.



DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	MAW		
CHECKED BY:	MAW		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 1/18/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

OVERHEAD SIGN DETAILS
 OH I35W-454

FILE NO. RAMSEI29594
 SS66 OF SS68
 333
 367

10:23:32 AM

1/12/2016

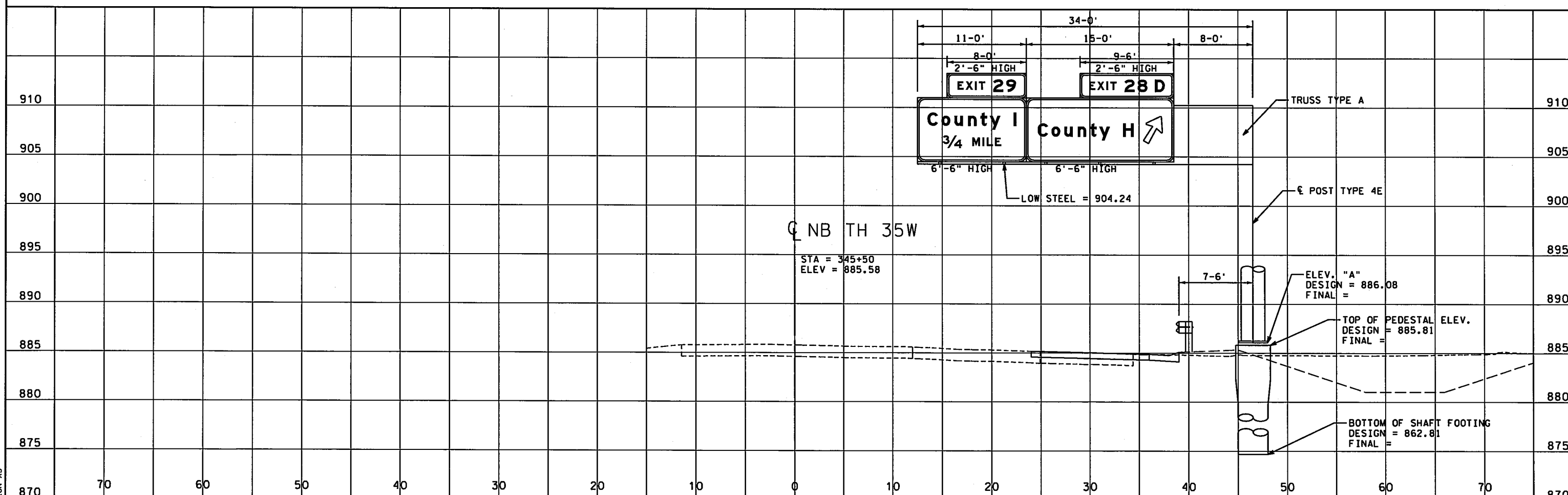
OH I35W-455
N.B. T.H. 35W
345+50.00

QUANTITIES

	DESIGN	FINAL
POST STEEL	4152 LBS	
TRUSS STEEL	4182 LBS	
WALKWAY SUPPORT STEEL	0 LBS	
WALKWAY GRATING STEEL	0 LBS	
PANEL MOUNTING POST STEEL	350 LBS	
CONCRETE (SHAFT) FOOTING	6.9 CU YDS	
SIGN PANELS TYPE OH	169 SQ FT	
SIGN PANELS TYPE EO	43.75 SQ FT	

NOTES:

1. LOW STEEL IS BOTTOM OF PANEL MOUNTING POSTS ON THE TALLEST PANEL.
2. STRUCTURE IS DESIGNED FOR FUTURE WALKWAY.

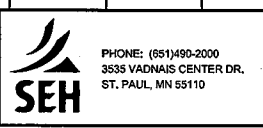


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DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: <u>CIF</u>				
DESIGNER: <u>MAW</u>				
CHECKED BY: <u>MAW</u>				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: Mark A. Wagner Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 1/12/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

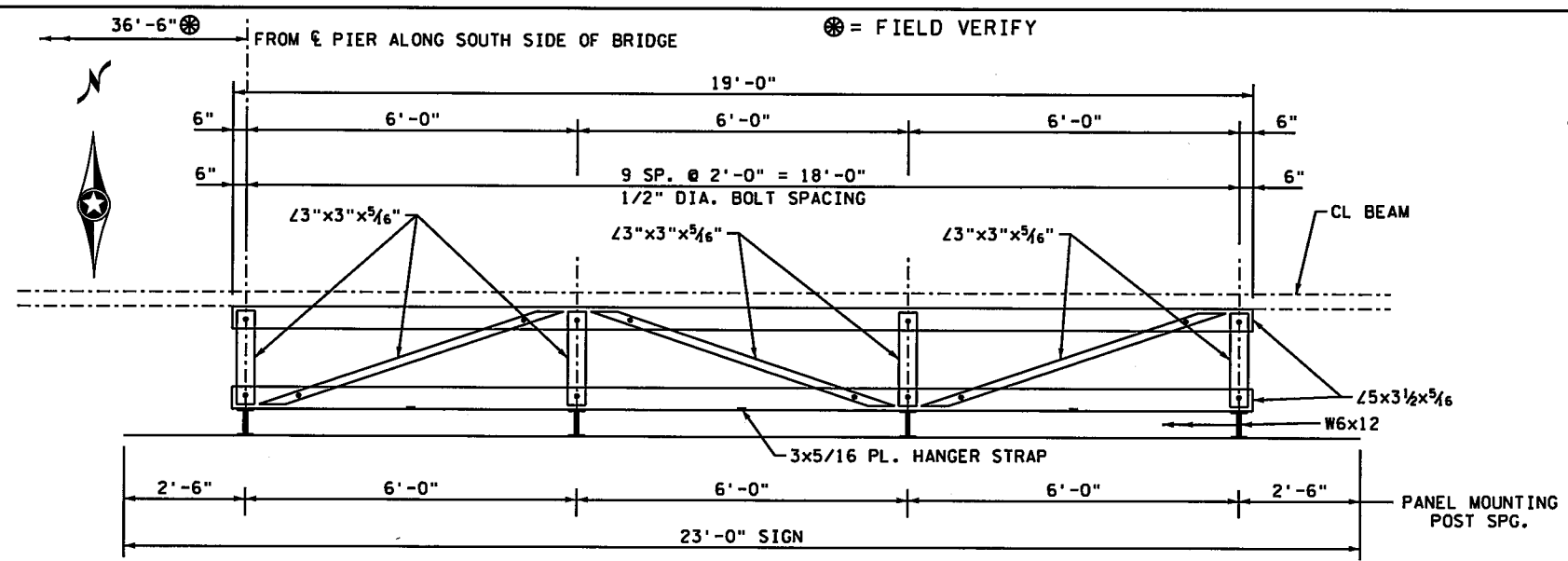
OVERHEAD SIGN DETAILS
 OH I35W-455

FILE NO. RAMSEI29594
 SS67 OF 568
 334 / 367

4/11/15 2 PM

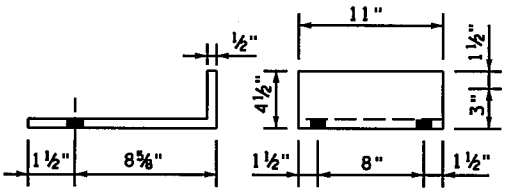
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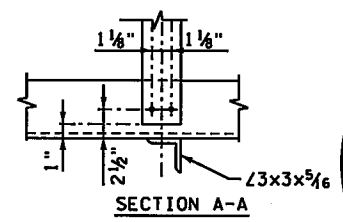


PLAN VIEW

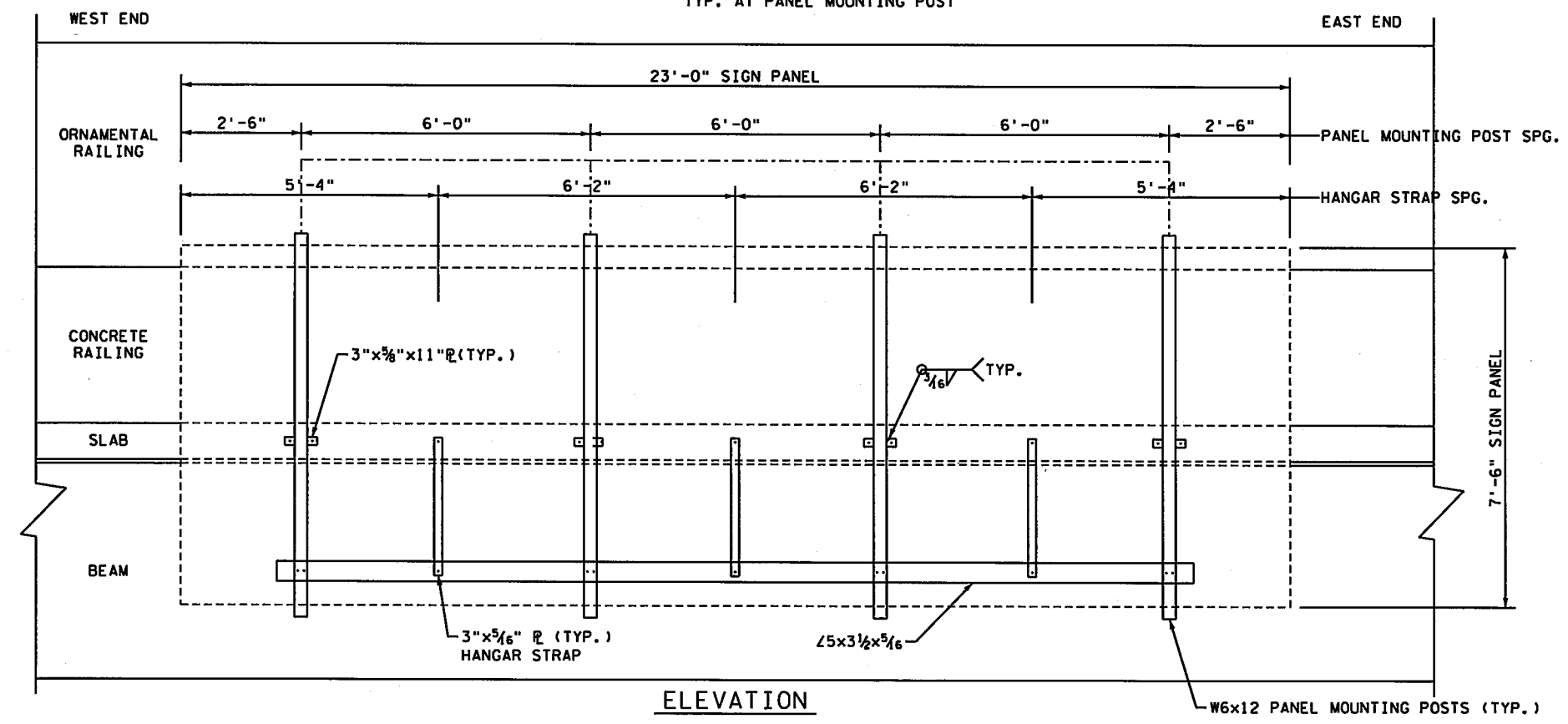
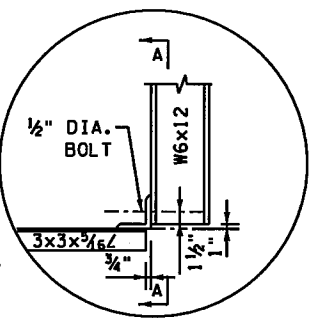
- GENERAL NOTES:**
1. SIGN SUPPORTS SHALL BE VERTICAL.
 2. SIGN TO BE PLACED IN A HORIZONTAL POSITION.
 3. ALL CONNECTIONS TO BE 1/2" DIA. BOLTS PER MNDOT 3391 (A325), HOLES TO BE 3/16" DIA. EXCEPT AS NOTED.
 4. CONCRETE ANCHORAGES SHALL BE CHEMICAL ADHESIVES TYPE AS APPROVED BY THE ENGINEER. ANCHOR RODS, PER 3385 TYPE A, SHALL BE 1/2" DIA. WITH A MIN. EMBEDMENT DEPTH OF 4 1/2", AND SHALL HAVE A MIN. ULTIMATE PULL-OUT STRENGTH OF 8000#.
 5. CONTRACTOR SHALL VERIFY DIMENSIONS BEFORE FABRICATION.
 6. FOR GENERAL NOTES AND DETAILS NOT SHOWN SEE STANDARD SHEETS.
 7. NO WALKWAY REQUIRED.



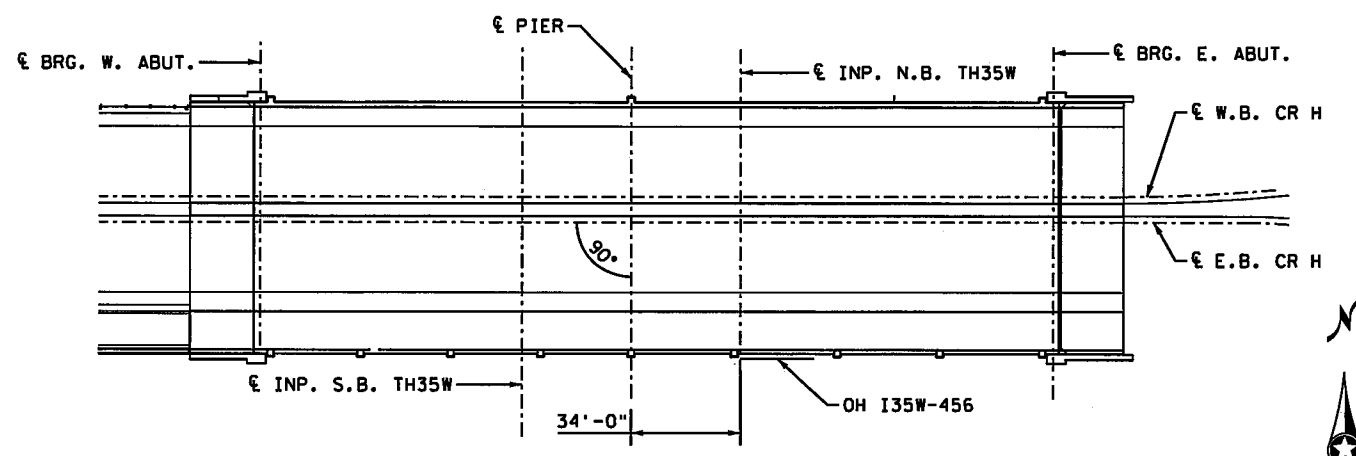
BENT PLATE DETAIL
TYP. AT PANEL MOUNTING POST



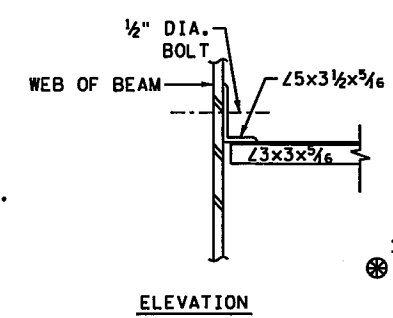
SECTION A-A
DETAIL "A"
TYP. AT PANEL MOUNTING POST



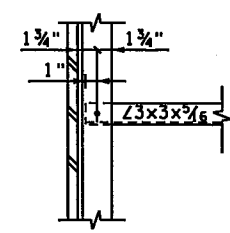
ELEVATION
LOOKING NORTH AT BR. NO. 62732



SIGN LOCATION OH I35W-456
BRIDGE NO. 62732 - I-35W UNDER CO. RD. H

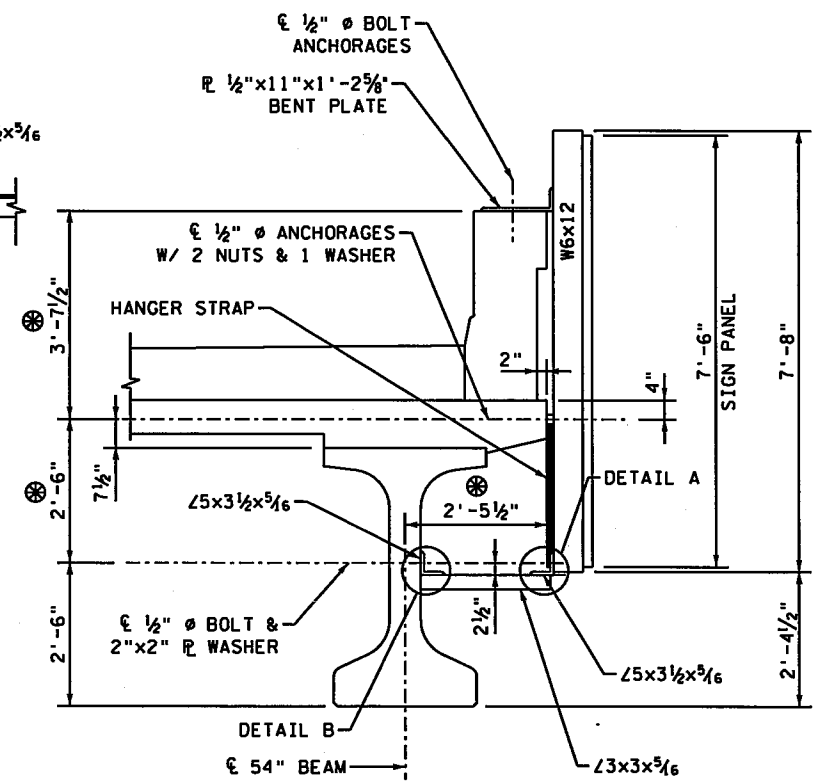


ELEVATION



PLAN

DETAIL "B"



TYPICAL SECTION

TRUSS QUANTITY	
POUNDS	999

⊗ = FIELD VERIFY

DESIGN TEAM					
DRAWN BY:	CIF				
DESIGNER:	MAW				
CHECKED BY:	MAW				
	NO.	BY	DATE		REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

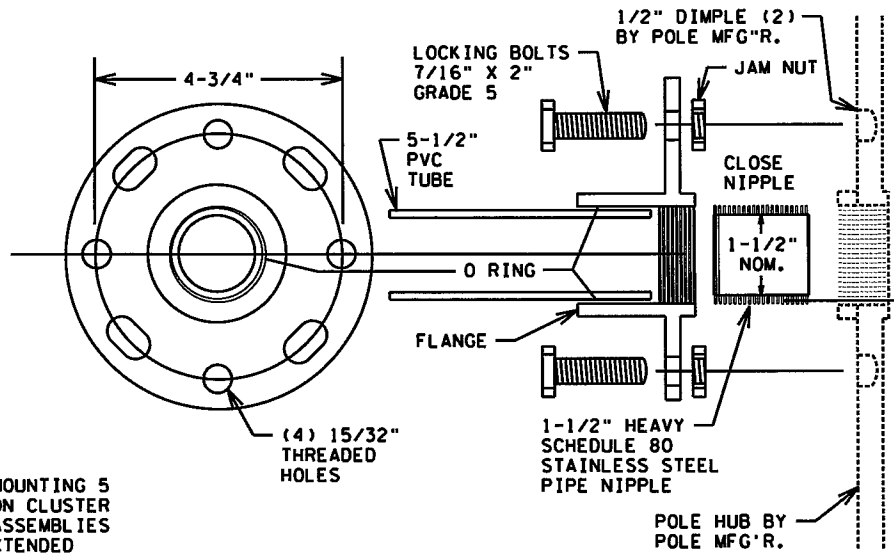
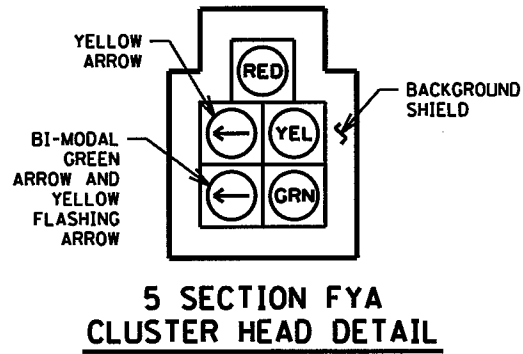
Certified By: *Mark A. Wagner* Lic. No. 51660
 Printed Name: MARK A. WAGNER Date: 1/21/2016



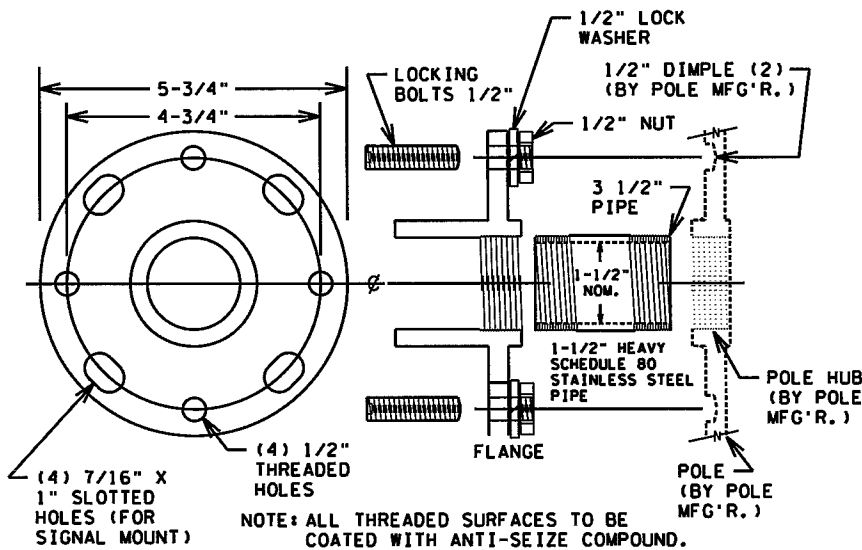
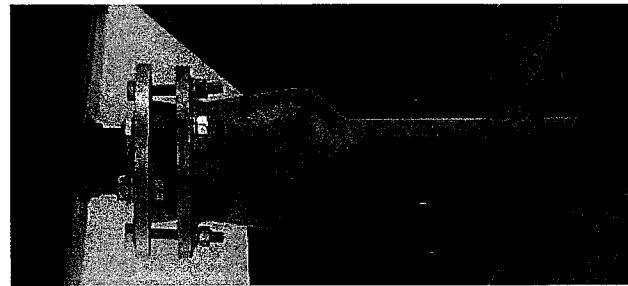
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

OVERHEAD SIGN DETAILS
 OH I35W-456

FILE NO.	335
RAMSEI29594	
SS68	
OF 5568	
	367

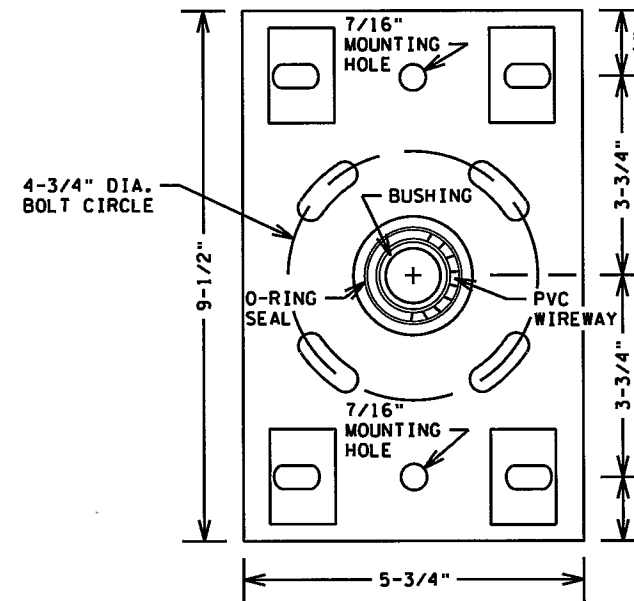


THREADED HUB AND FLANGE POLE ADAPTOR

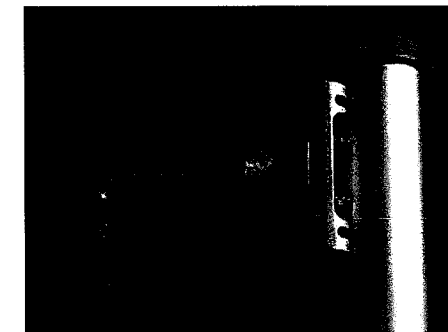
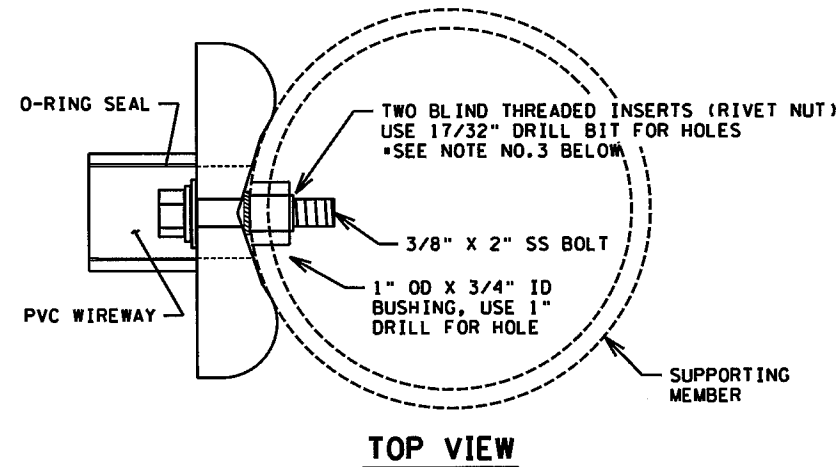


EXTENDED THREADED POLE ADAPTER

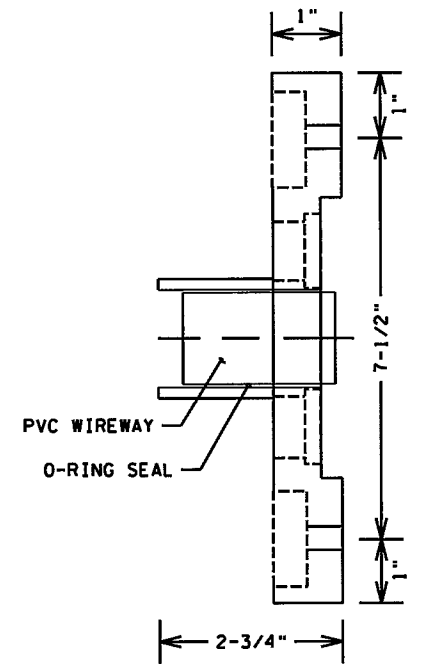
- NOTES:
1. ALL THREADED SURFACES TO BE COATED WITH ANTI-SEIZE COMPOUND.
 2. USE SIGNAL HEAD MOUNTED SPACERS FOR 4 SECTION POLY HEADS.
 3. SEE STANDARD PLATE NUMBER 8123 FOR ADDITIONAL SIGNAL POLE DETAILS.
 4. EXTENDED THREADED POLE ADAPTOR ONLY USED WITH 5 SECTION CLUSTER HEADS.



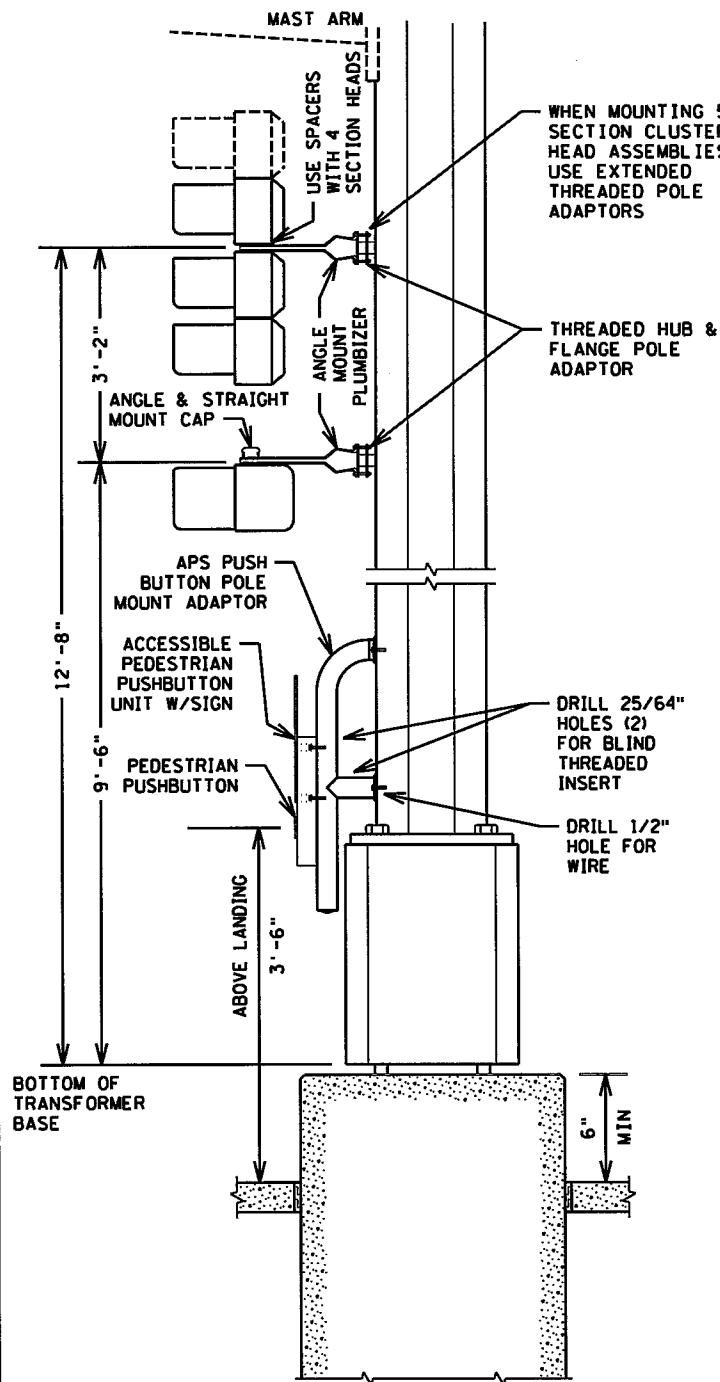
BOLT ON HUB & FLANGE



- NOTES:
1. ALL THREADED SURFACES TO BE COATED WITH ANTI-SEIZE COMPOUND.
 2. USE SIGNAL HEAD MOUNTED SPACERS FOR 4 SECTION POLY HEADS.
 3. BLIND THREADED INSERTS (RIVET NUT) MUST BE INSERTED USING MANUFACTURERS SPECIFIC INSERTION TOOL. NO OTHER METHOD IS ACCEPTABLE.
 4. SEE STANDARD PLATE NUMBER 8122 FOR ADDITIONAL PEDESTAL POLE DETAILS.

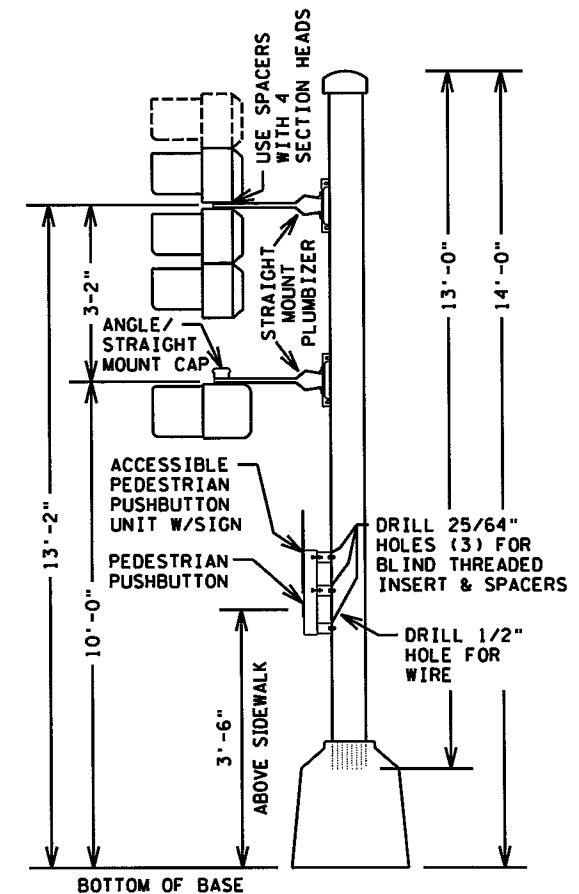


SIDE VIEW



TYPICAL SIGNAL POLE MOUNTING

NOT TO SCALE



TYPICAL PEDESTAL MOUNTING

NOT TO SCALE

DESIGN TEAM				REVISIONS			
DRAWN BY:	JAH			NO.	BY	DATE	
DESIGNER:	JAH						
CHECKED BY:	BJB						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015

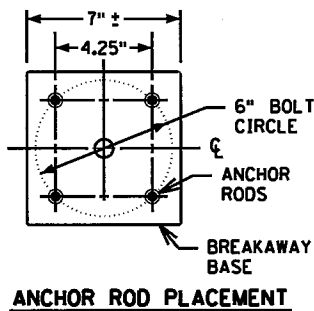
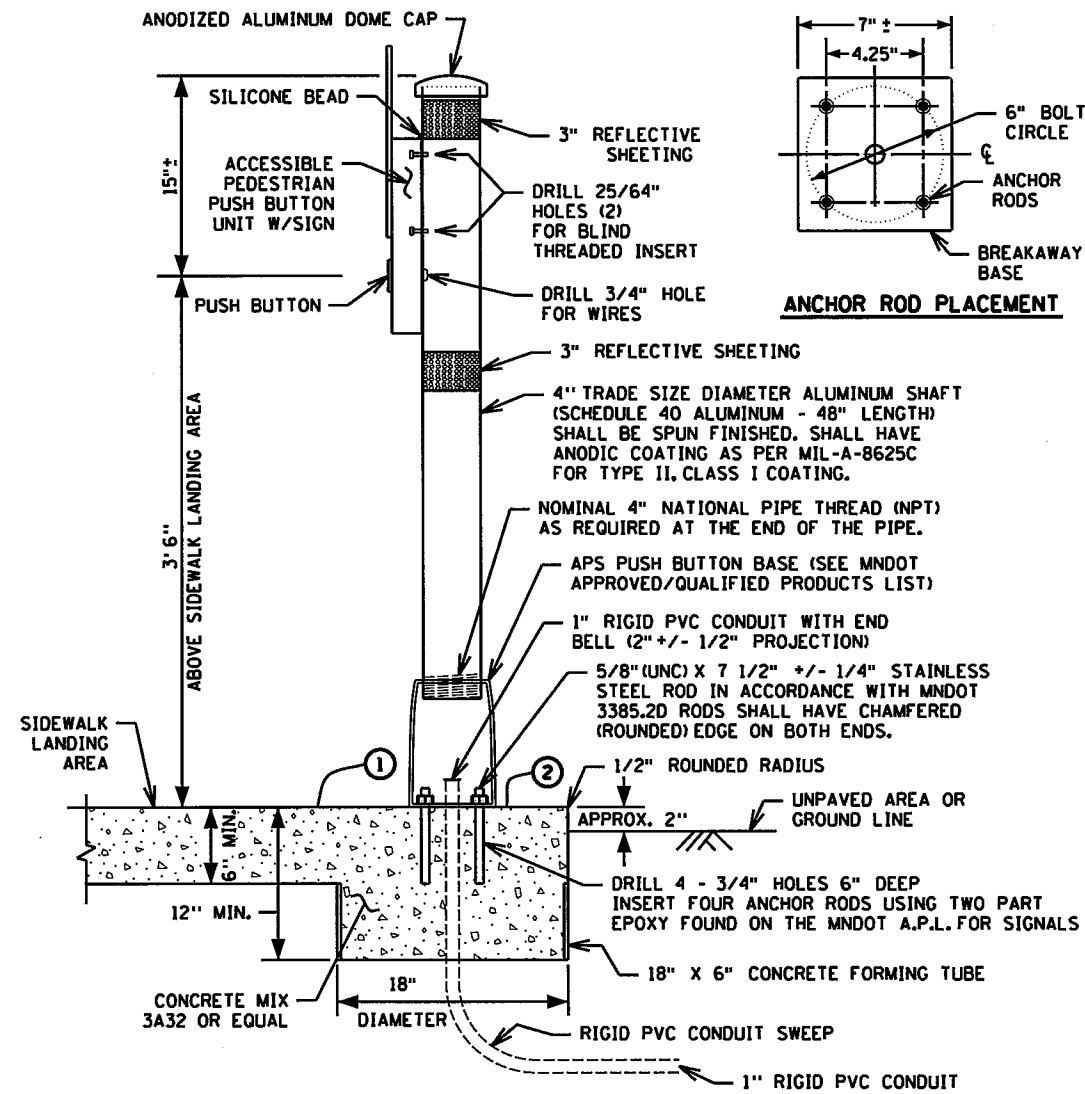
Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC SIGNAL PLANS
 POLE MOUNT DETAIL

FILE NO. RAMSEI29594	336
SG1 OF SGI7	367

APS PUSH BUTTON STATION



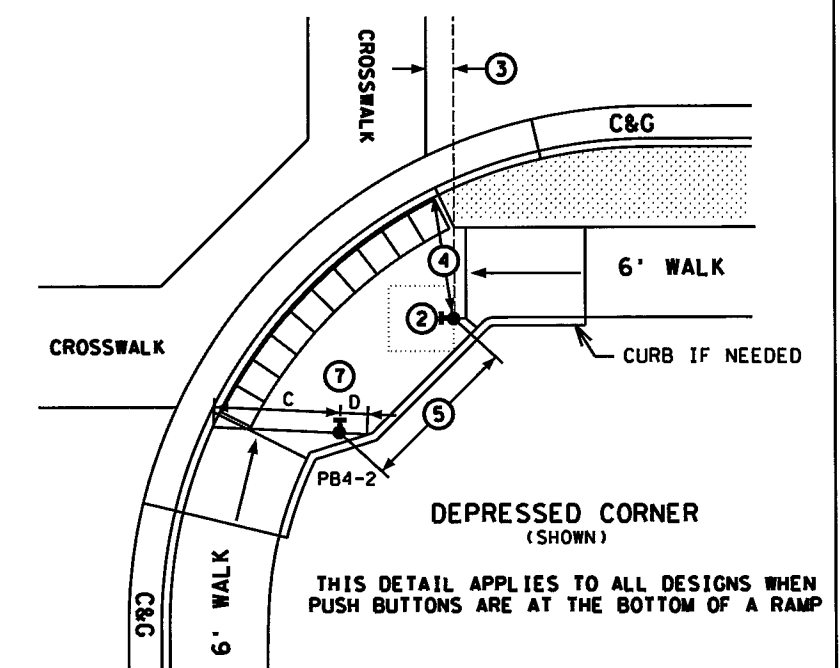
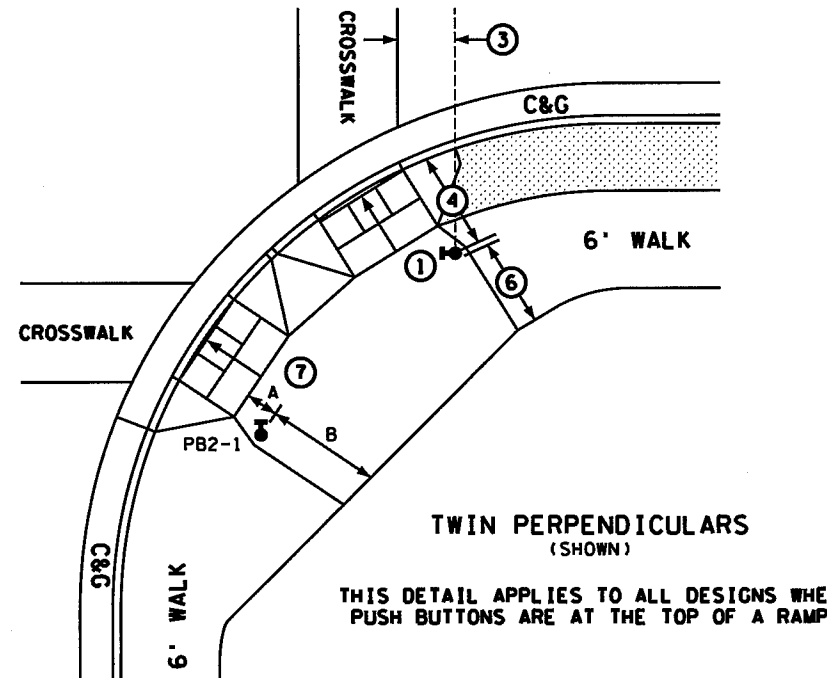
- NOTES:**
- PLACEMENT AND ORIENTATION OF THE PUSH BUTTON STATION IS CRITICAL. MOUNT THE BUTTON SO THAT THE FACE IS PARALLEL WITH THE ASSOCIATED CROSSWALK. SCREW IN POST TO A TIGHTENED POSITION BEFORE MOUNTING ACCESSIBLE PEDESTRIAN PUSH BUTTON UNIT TO THE POST.
 - ORIENT ACCESS OPENING ON THE BREAKAWAY PEDESTAL DIRECTLY BELOW THE APS BUTTON.
 - PLUMB THE PUSH BUTTON STATION WITH LEVELING SHIMS IN ACCORDANCE WITH STANDARD PLATE 8129.
 - BLIND THREADED INSERTS (RIVET NUT) MUST BE INSERTED USING MANUFACTURERS SPECIFIC INSERTION TOOL. NO OTHER METHOD IS ACCEPTABLE.
 - BLIND THREADED INSERTS SHALL BE ZINC PLATED STEEL WITH 1/4 - 20 UNC THREADS. INSERT SHALL BE SUITABLE FOR USE ON A MOUNTING SURFACE WALL THICKNESS OF .337". APPROVED BLIND THREADED INSERTS CAN BE FOUND ON THE MN/DOT QUALIFIED PRODUCTS LIST FOR SIGNALS.
 - A.P.S. MOUNTING BOLTS SHALL BE 1/4 - 20 STAINLESS STEEL. APPLY BRUSH ON ANTI SEIZE COMPOUND TO BOLTS PRIOR TO ASSEMBLY.
 - APPLY A BEAD OF 100% SILICONE SEALANT ALONG THE TOP OF THE PUSH BUTTON UNIT WHERE IT COMES IN CONTACT WITH THE 4" POST.
 - THE REFLECTIVE SHEETING SHALL BE WHITE AT INTERSECTION CORNERS AND SHALL BE YELLOW WHEN USED IN CENTER MEDIANS. SEE MN/DOT SIGNING QUALIFIED PRODUCTS LIST (OPL) FOR APPROVED TUBE DELINEATOR SHEETING.
 - ANTI-SEIZE COMPOUND MUST BE USED ON ALL THREADED BOLTS WHEN ASSEMBLING PEDESTRIAN PUSH BUTTON STATIONS.
- 1 THE PUSH BUTTON STATION FOUNDATION IS CONSTRUCTED AS PART OF THE SIDEWALK. INCREASE THE SIDEWALK THICKNESS TO 12" THICK (MIN.) TO PROVIDE FOR THE PUSH BUTTON STATION FOUNDATION.
 - 2 ALL JOINTS SHALL BE A MINIMUM OF 9" FROM THE CENTER OF THE PUSH BUTTON FOUNDATION.

TYPICAL APS PEDESTRIAN PUSH BUTTON LOCATION

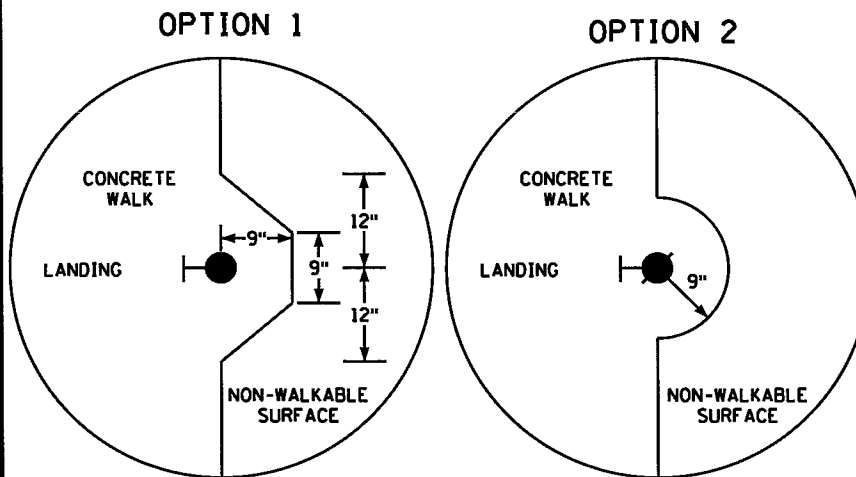
THIS IS A GENERAL DETAIL INTENDED TO SHOW THE REQUIREMENTS OF APS PUSH BUTTON LOCATION. FOR PROJECT SPECIFIC INFORMATION REGARDING PEDESTRIAN RAMP LAYOUT AND PUSH BUTTON LOCATIONS, SEE THE PLAN.

SUPPLEMENTAL GUIDANCE FOR CONSTRUCTING COMPLIANT APS PUSH BUTTONS:

- 1 THE FACE OF THE BUTTON SHALL BE PARALLEL WITH THE OUTSIDE EDGE OF CROSSWALK.
- 2 A MINIMUM 4 FT X 4 FT LANDING AREA SHALL BE PROVIDED ADJACENT TO EACH BUTTON, WITH A 2 PERCENT MAXIMUM SLOPE IN ALL DIRECTIONS.
- 3 BUTTONS SHALL BE WITHIN 5 FT OF THE OUTSIDE EDGE OF THE CROSSWALK.
- 4 BUTTONS SHALL BE BETWEEN 1.5 FT AND 10 FT FROM THE BACK OF CURB OR EDGE OF ROADWAY, MEASURED IN THE DIRECTION OF TRAVEL. STANDALONE PUSH BUTTON STATIONS SHOULD BE 4' MINIMUM FROM THE BACK OF CURB TO AVOID KNOCKDOWNS.
- 5 BUTTONS SHALL BE AT LEAST 10 FT APART.
- 6 PROVIDE A MAINTENANCE ACCESS ROUTE (MAR) WHEREVER POSSIBLE FOR SNOW REMOVAL PURPOSES. A MAR REQUIRES A 6 FT MINIMUM CLEAR DISTANCE BETWEEN A PUSH BUTTON AND ANY OBSTRUCTIONS, INCLUDING BUILDINGS, V-CURB, ELECTRICAL FOUNDATIONS, SIGNAL CABINETS, OR ANOTHER PUSH BUTTON.
- 7 BUTTON SHOULD BE 2 FT MINIMUM FROM RAMP GRADE BREAK AND BACK OF WALK.



CONTRACTOR MUST USE OPTION 1 OR 2 WHEN THE APS PUSH BUTTON IS SHOWN AT THE EDGE OF WALK. OPTION USED (OR SELECTED) MUST BE THE SAME THROUGHOUT THE ENTIRE PROJECT.



SIGNAL CONTROL POINTS	DISTANCE TO FRONT OF LANDING (FT)		DISTANCE TO BACK OF LANDING (FT)	
SIGNAL NO.	X	Y	A	B
PB2-1	-	-	A	B
PB4-2	-	-	C	D

- A - DISTANCE MEASURED FROM THE PUSH BUTTON TO THE FRONT OF LANDING/TOP OF RAMP
- B - CLEAR DISTANCE MEASURED FROM THE PUSH BUTTON TO THE BACK OF LANDING/EDGE OF WALK
- C - CLEAR DISTANCE MEASURED FROM THE PUSH BUTTON TO THE OUTSIDE EDGE OF DOMES IN THE DIRECTION OF TRAVEL
- D - CLEAR DISTANCE FROM THE PUSH BUTTON TO THE BACK OF LANDING MEASURED IN THE OPPOSITE DIRECTION OF TRAVEL

2/3/11 PM 12/4/2015 K:\TWC-Civil\County\RAMSEY\135W_CRR\CAD\Plan Sheets\CD6284162.sgn02.dgn \$MODELNAME\$

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: JAH				
DESIGNER: JAH				
CHECKED BY: BJB				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* P.E. No. 43789
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

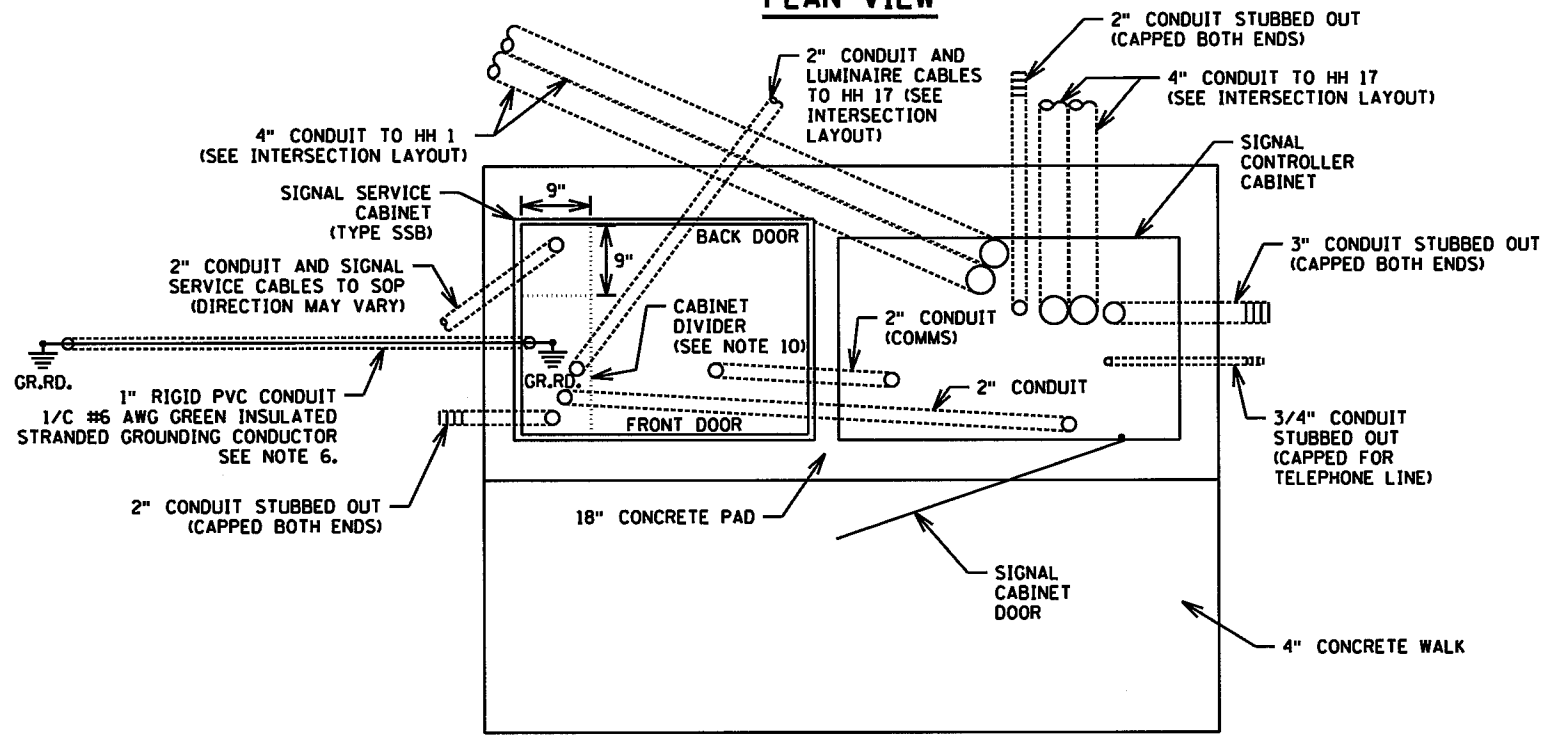
TRAFFIC SIGNAL PLANS
 PEDESTRIAN PUSH BUTTON
 STATION DETAILS

FILE NO. RAMSE129594	337
SG2 OF SG17	367

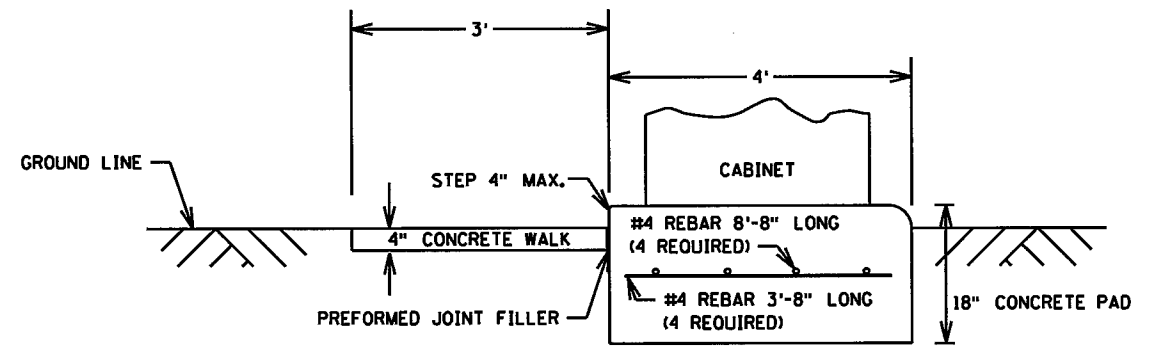
TYPICAL PAD WITH CONTROLLER CABINET AND SERVICE CABINET

SEE INTERSECTION LAYOUT FOR CABLE INFORMATION (NOT TO SCALE)

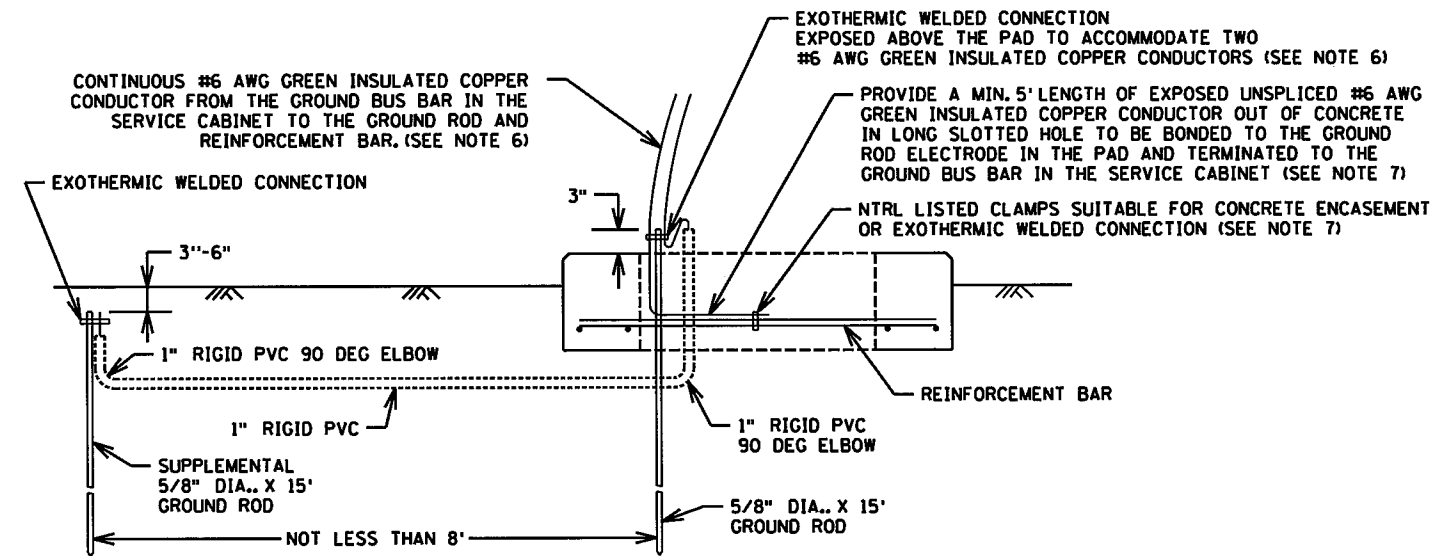
PLAN VIEW



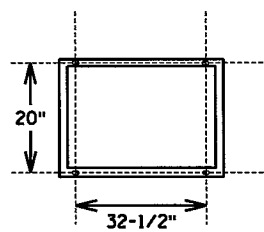
SIDE VIEW



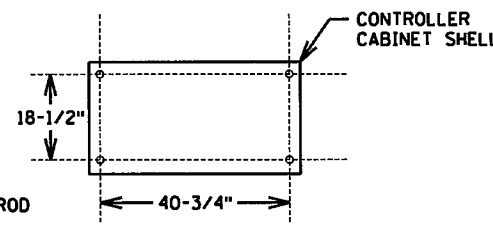
GROUNDING ELECTRODE SYSTEM



S.S.B. SERVICE CABINET BOLT PATTERN



CONTROLLER CABINET TYPE \"P\" & \"R\" BOLT PATTERN

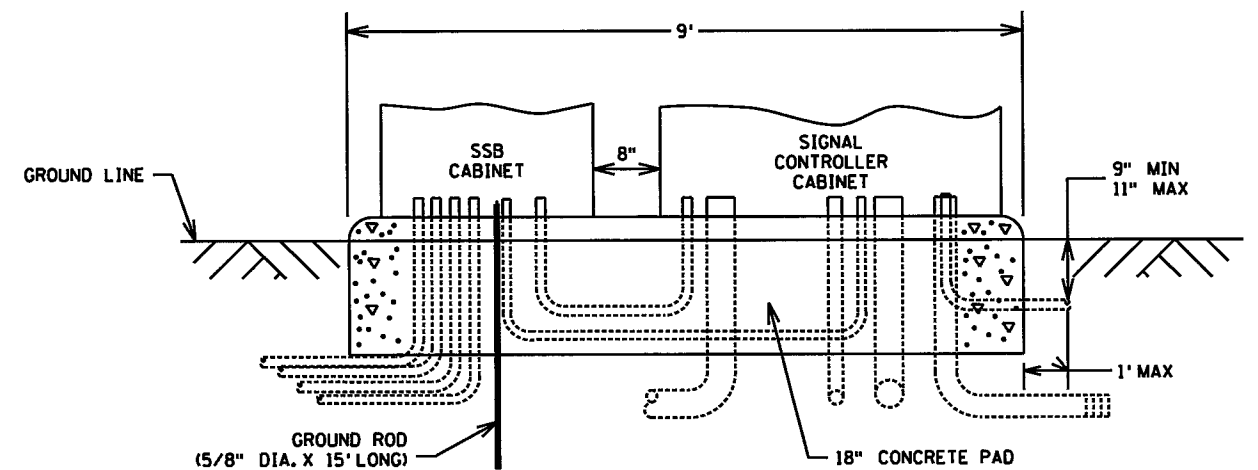


DIMENSION SHOWN ARE CENTER ROD TO CENTER ROD

- NOTES:**
1. THE ANCHOR RODS, NUTS, WASHERS AND RUBBER GASKET FOR THE CONTROLLER CABINET SHALL BE FURNISHED BY MNDOT.
 2. THE OUTER EDGE OF THE ENTIRE EQUIPMENT PAD AND CONCRETE WALK SHALL BE BEVELED OR CHAMFERED IN A NEAT MANNER AS DIRECTED BY THE ENGINEER.
 3. THE TOP OF THE CONDUITS SHALL BE CAPPED UNTIL CABLES ARE PULLED IN.
 4. CONDUIT SHALL PROJECT A MINIMUM OF 2\"/>

7. BOND A #6 AWG GREEN INSULATED GROUNDING CONDUCTOR TO THE REBAR CAGE PRIOR TO CONCRETE POURING OPERATIONS. ENSURE THE CONDUCTOR IS PLACED IN THE LOAD SIDE OF THE CABINET. TERMINATE THE GREEN INSULATED 6 AWG GROUND CONDUCTOR ON THE GROUND BUS IN THE SERVICE CABINET WITHOUT SPLICES.
8. CONDUITS WITH BOTH ENDS TERMINATING WITHIN THE PAD SHALL NOT BE PLACED BELOW THE CONCRETE.
9. THE EXACT LOCATION OF CONDUITS WITHIN THE PAD SHALL BE DETERMINED BY THE ENGINEER IN THE FIELD.
10. CORRECT PLACEMENT OF CONDUIT TO THE LEFT OF THE CABINET DIVIDER IS CRITICAL.
11. ANCHOR RODS SHALL PROJECT A MINIMUM OF 3\"/>

FRONT VIEW



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DESIGNER: JAH				
CHECKED BY: BJB				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* License No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015

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 RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

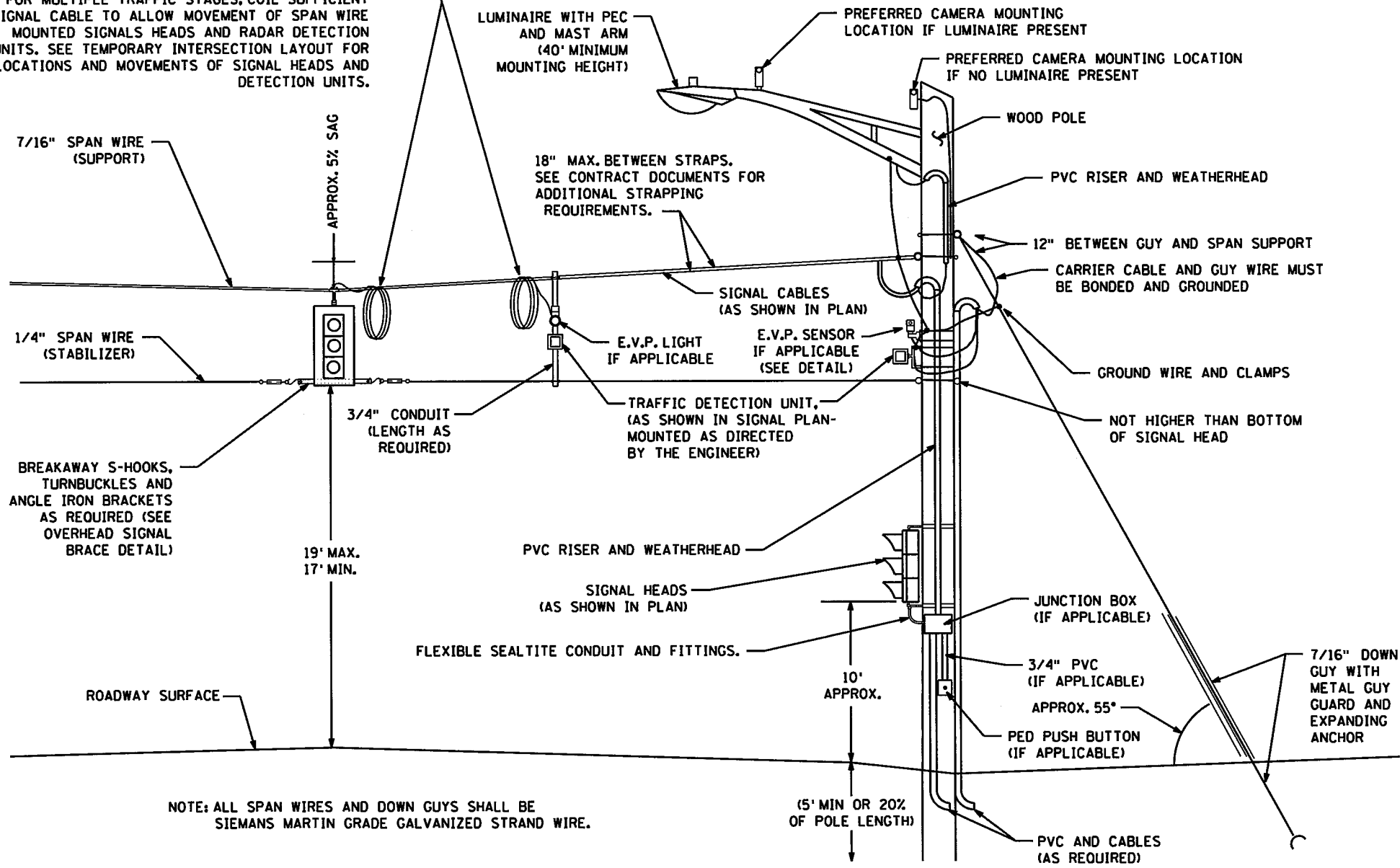
TRAFFIC SIGNAL PLANS
 EQUIPMENT PAD DETAIL

FILE NO. RAMSEI29594	338
SG3 OF SG17	367

TYPICAL WOOD POLE AND SPAN WIRE MOUNTED TRAFFIC SIGNALS

(NOT TO SCALE)

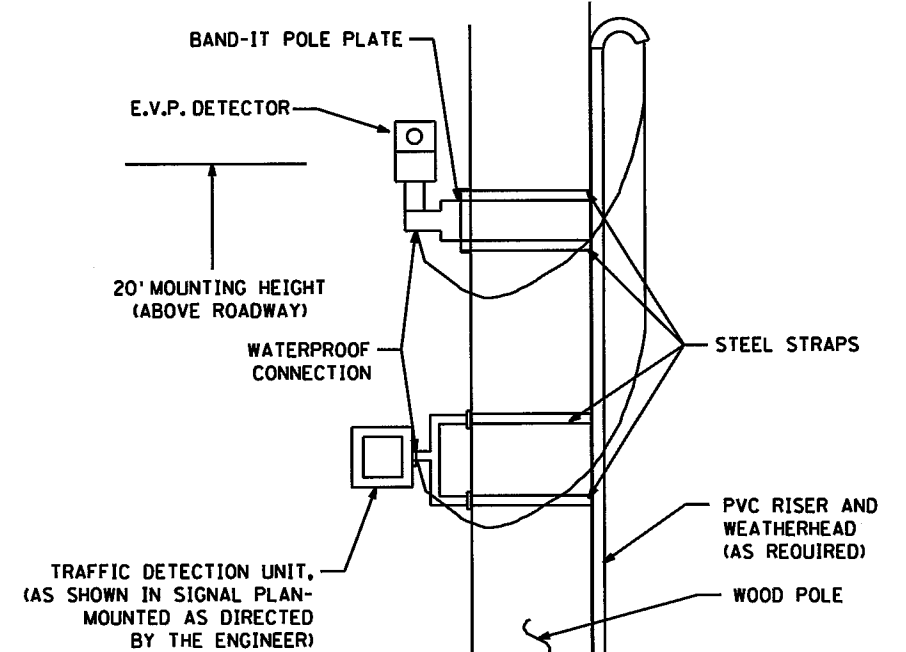
FOR MULTIPLE TRAFFIC STAGES, COIL SUFFICIENT SIGNAL CABLE TO ALLOW MOVEMENT OF SPAN WIRE MOUNTED SIGNAL HEADS AND RADAR DETECTION UNITS. SEE TEMPORARY INTERSECTION LAYOUT FOR LOCATIONS AND MOVEMENTS OF SIGNAL HEADS AND DETECTION UNITS.



NOTE: ALL SPAN WIRES AND DOWN GUYS SHALL BE SIEMANS MARTIN GRADE GALVANIZED STRAND WIRE.

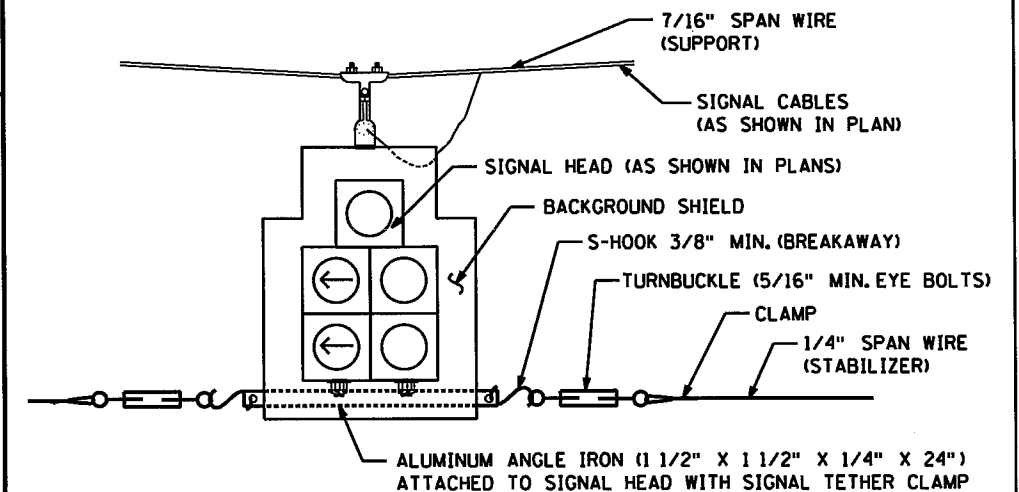
E.V.P. OR TRAFFIC DETECTOR WOOD POLE MOUNT

(NOT TO SCALE)



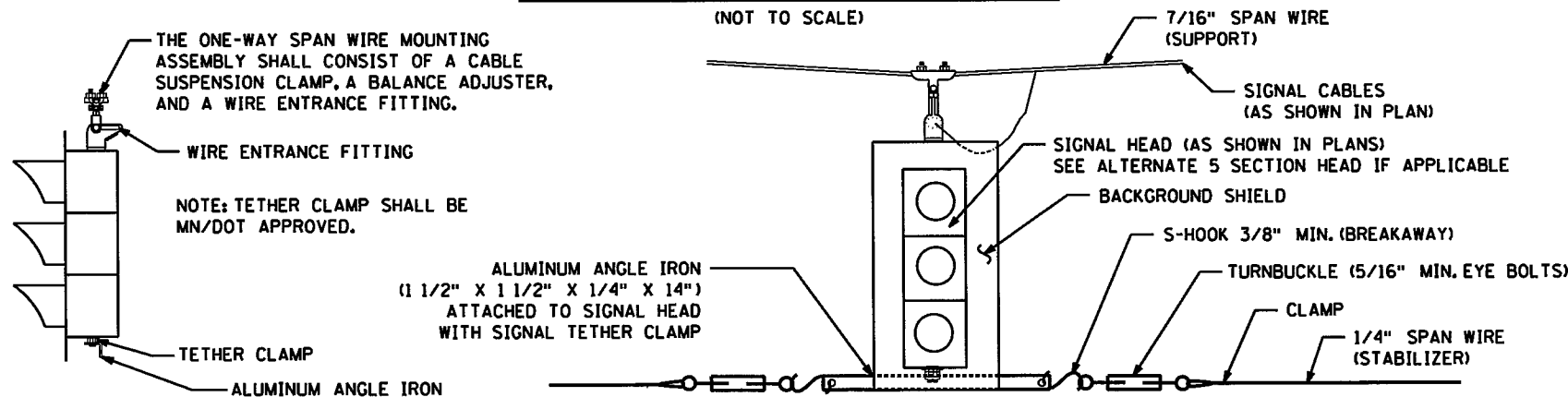
5 SECTION HEAD OVERHEAD SIGNAL BRACE DETAIL

(NOT TO SCALE)



OVERHEAD SIGNAL BRACE DETAIL

(NOT TO SCALE)



THE ONE-WAY SPAN WIRE MOUNTING ASSEMBLY SHALL CONSIST OF A CABLE SUSPENSION CLAMP, A BALANCE ADJUSTER, AND A WIRE ENTRANCE FITTING.

WIRE ENTRANCE FITTING

NOTE: TETHER CLAMP SHALL BE MN/DOT APPROVED.

TETHER CLAMP

ALUMINUM ANGLE IRON

ALUMINUM ANGLE IRON (1 1/2" X 1 1/2" X 1/4" X 14") ATTACHED TO SIGNAL HEAD WITH SIGNAL TETHER CLAMP

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Certified By: *Brandon J. Bourdon* Lic. No. 43709
Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015

RAMSEY COUNTY, MINNESOTA

TH 35W / COUNTY ROAD H

S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC SIGNAL PLANS
TYPICAL WOOD POLE/SPAN WIRE
SIGNAL SYSTEM DETAIL

FILE NO.
RAMSEI29594
SG4
OF SGT

339
367

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12/4/2015

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DESIGNER: JAH				
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2/15/2016

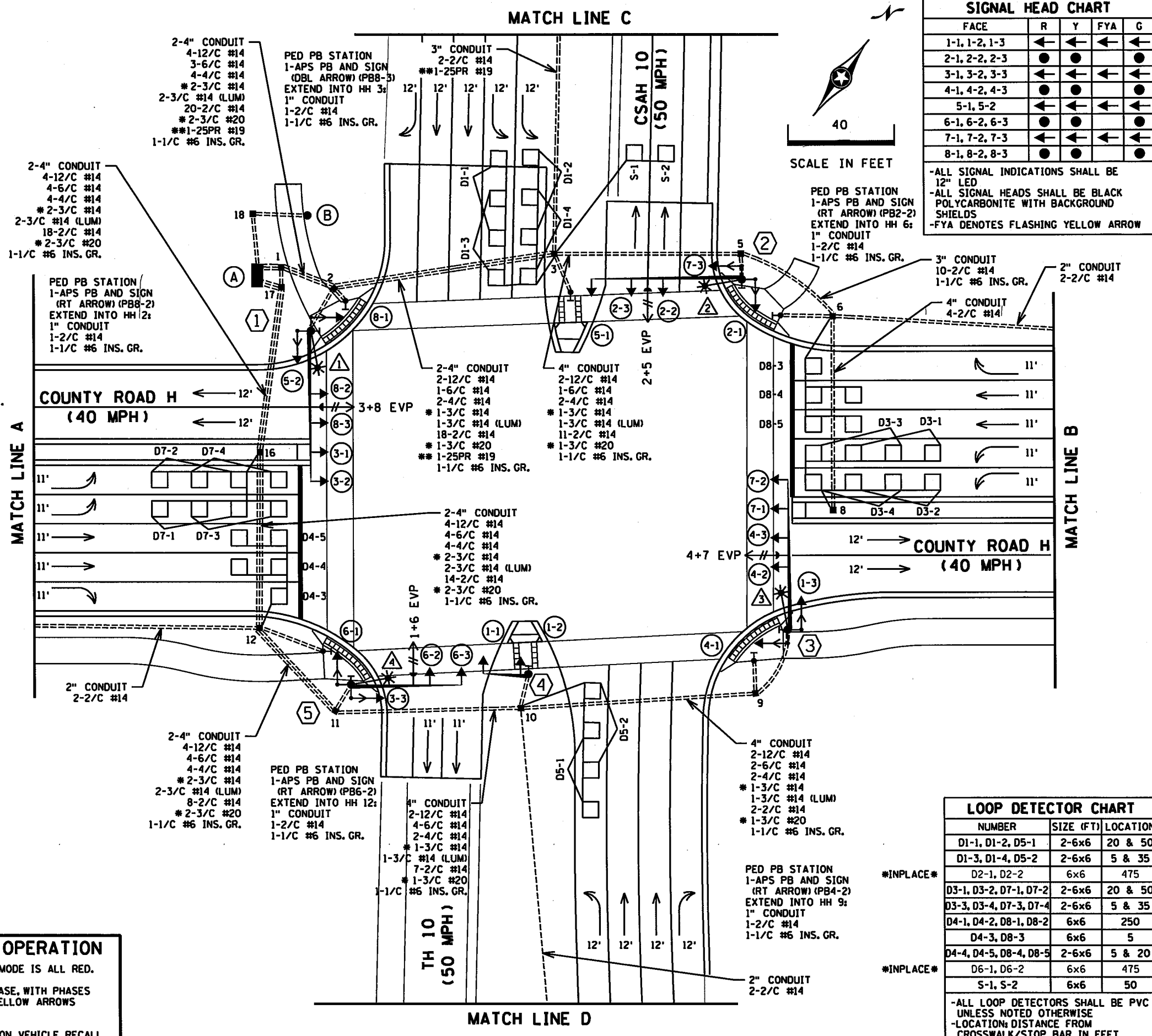
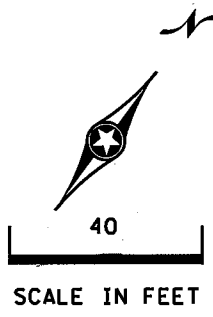
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- NOTES:**
1. THE EXACT LOCATION OF FOUNDATIONS, EQUIPMENT PAD, AND HANDHOLES SHALL BE DETERMINED IN THE FIELD BY ENGINEER.
 2. SEE SPECIAL PROVISIONS FOR INFORMATION REGARDING PEDESTRIAN INDICATIONS, PAINTED POLES, AND ACCESSIBLE PEDESTRIAN SIGNALS (APS).
 3. ALL VEHICLE AND PEDESTRIAN SIGNAL INDICATIONS SHALL BE LED.
 4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE CONNECTION OF POWER FOR THE NEW PERMANENT SIGNAL SYSTEM.
 5. THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, & GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD.
 6. ALL NEW CONDUIT SHALL BE PVC SCHEDULE 80 OR HDPE SCHEDULE 80 (EXCEPT AS OTHERWISE NOTED) AND CARRY 1/C#6 GREEN INSULATED GROUNDING CONDUCTOR AS SHOWN IN PLANS.
 7. ITEMS DENOTED WITH AN (*) ARE INCLUDED IN PAYMENT FOR THE EVP SYSTEM PAY ITEM.
 8. ITEMS DENOTED WITH AN (**) DENOTES INTERCONNECTION ITEM.
 9. SEE DETAIL FOR POLE MOUNTED SIGNAL, APS, EQUIPMENT PAD LAYOUT, AND TRAFFIC SIGNAL SIGNING.
 10. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAKING OPERATIONAL THE TRAFFIC SIGNAL CONTROLLER CABINET. SEE SPECIAL PROVISIONS.
 11. CONTRACTOR SHALL VERIFY GROUNDWATER LEVELS WHEN INSTALLING POLE FOUNDATIONS AND SHALL DE-WATER AS NECESSARY DURING FOUNDATION INSTALLATION (INCIDENTAL).
 12. ALL VEHICLE AND PEDESTRIAN SIGNAL INDICATIONS SHALL BE FABRICATED WITH BLACK POLYCARBONATE MATERIALS (INCLUDING BACKGROUND SHIELDS AND VISORS). SEE SPECIAL PROVISIONS.
 13. THE SIGNAL POLES SHALL BE PAINTED. SEE SPECIAL PROVISIONS FOR PAINT REQUIREMENTS.
 14. REFER TO "FOR INFORMATION ONLY" SHEETS FOR INPLACE SIGNAL COMPONENTS.
 15. INTERCEPT 1-25PR#19 DIRECT BURY CABLE AND CREATE 10' OF SLACK AND COIL IN FIBER PULL VAULT 4A FURNISHED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR SHALL FURNISH AND INSTALL 2" CONDUIT TO HH 4. CONTRACTOR SHALL SPLICE EXISTING 1-25PR#19 TO NEW 1-25PR#19 CABLE IN FIBER PULL VAULT USING RAMSEY COUNTY APPROVED SPLICE KIT. THE CONTRACTOR SHALL GRADE AROUND FIBER PULL VAULT 4A TO ENSURE IT IS NOT IN A LOW SPOT. GRADING SHALL BE APPROVED BY THE ENGINEER. GRADING SHALL BE INCIDENTAL.
 16. THE CONTRACTOR SHALL REMOVE AND SALVAGE THE EXISTING SIGNAL SYSTEM. ALL WORK SHALL BE INCIDENTAL. SEE SPECIAL PROVISIONS FOR FURTHER INFORMATION.

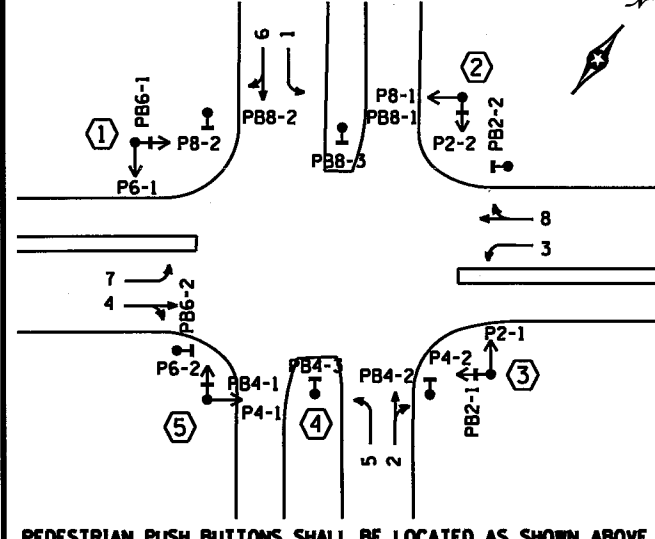
SIGNAL HEAD CHART

FACE	R	Y	FYA	G
1-1, 1-2, 1-3	←	←	←	←
2-1, 2-2, 2-3	●	●	●	●
3-1, 3-2, 3-3	←	←	←	←
4-1, 4-2, 4-3	●	●	●	●
5-1, 5-2	←	←	←	←
6-1, 6-2, 6-3	●	●	●	●
7-1, 7-2, 7-3	←	←	←	←
8-1, 8-2, 8-3	●	●	●	●

-ALL SIGNAL INDICATIONS SHALL BE 12" LED
-ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BACKGROUND SHIELDS
-FYA DENOTES FLASHING YELLOW ARROW



CONTROLLER PHASING, PEDESTRIAN INDICATIONS AND PUSH BUTTONS



SIGNAL SYSTEM OPERATION

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 8 PHASE, WITH PHASES 1, 3, 5, & 7 BEING FLASHING YELLOW ARROWS BY TIME OF DAY.
- PHASES 2 AND 6 SHALL BE ON VEHICLE RECALL.

LOOP DETECTOR CHART

NUMBER	SIZE (FT)	LOCATION
D1-1, D1-2, D5-1	2-6x6	20 & 50
D1-3, D1-4, D5-2	2-6x6	5 & 35
D2-1, D2-2	6x6	475
D3-1, D3-2, D7-1, D7-2	2-6x6	20 & 50
D3-3, D3-4, D7-3, D7-4	2-6x6	5 & 35
D4-1, D4-2, D8-1, D8-2	6x6	250
D4-3, D8-3	6x6	5
D4-4, D4-5, D8-4, D8-5	2-6x6	5 & 20
D6-1, D6-2	6x6	475
S-1, S-2	6x6	50

-ALL LOOP DETECTORS SHALL BE PVC UNLESS NOTED OTHERWISE
-LOCATION: DISTANCE FROM CROSSWALK/STOP BAR IN FEET

DESIGN TEAM

NO.	BY	DATE	REVISIONS

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DESIGNER: JAH
CHECKED BY: BJB

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon* P.E. No. 43789
Printed Name: BRANDON J. BOURDON, P.E. Date: 2/15/2016

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RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

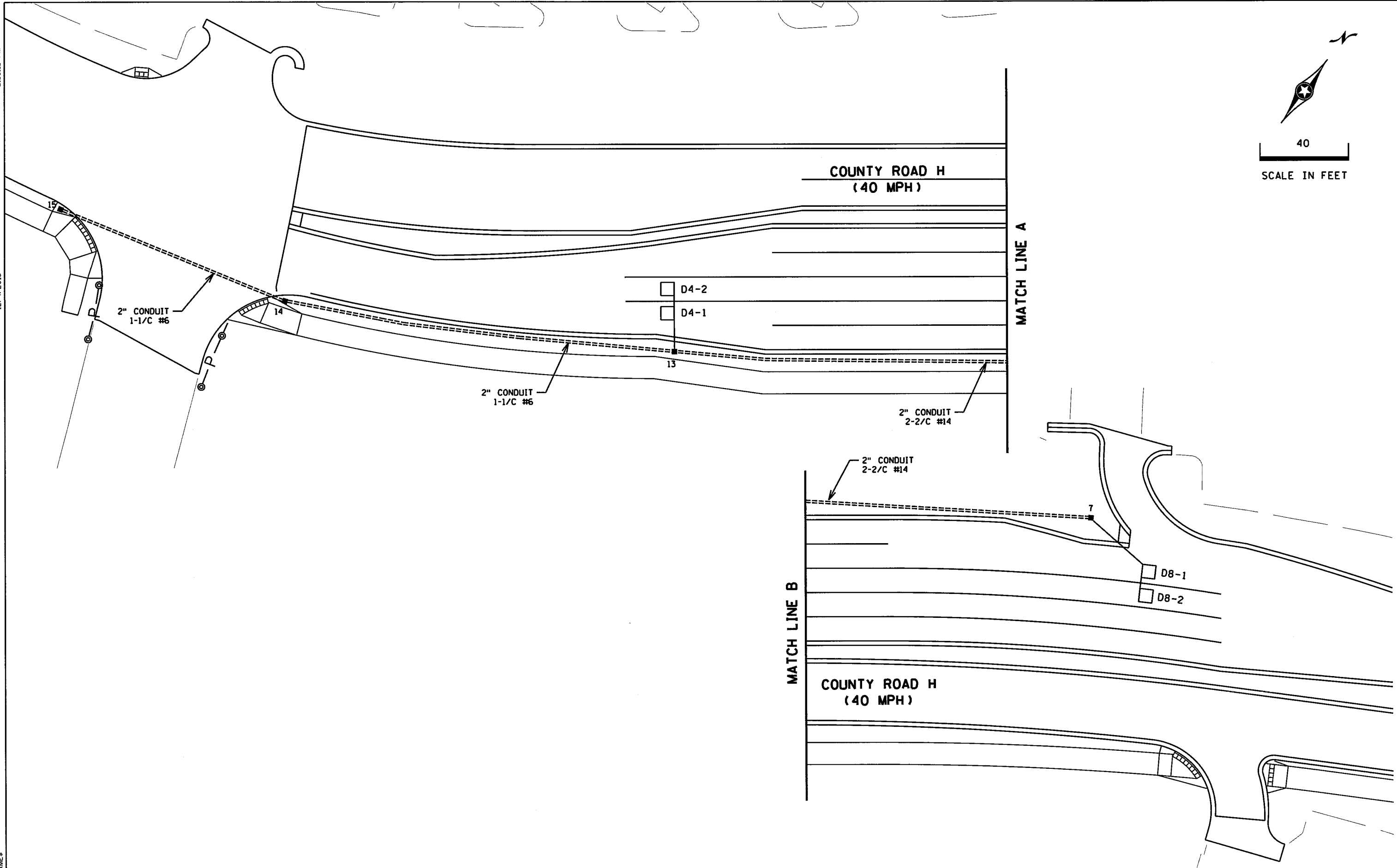
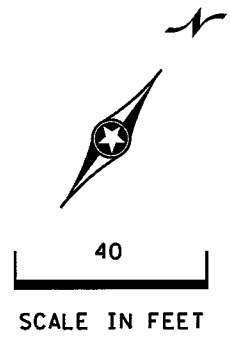
TRAFFIC CONTROL SIGNAL SYSTEM INTERSECTION LAYOUT
C.R. H AT T.H. 10
IN MOUNDS VIEW, RAMSEY COUNTY

FILE NO. 340
RAMSEI29594
SG5
OF SG7
367

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DESIGNER:	JAH						
CHECKED BY:	BJB						

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 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

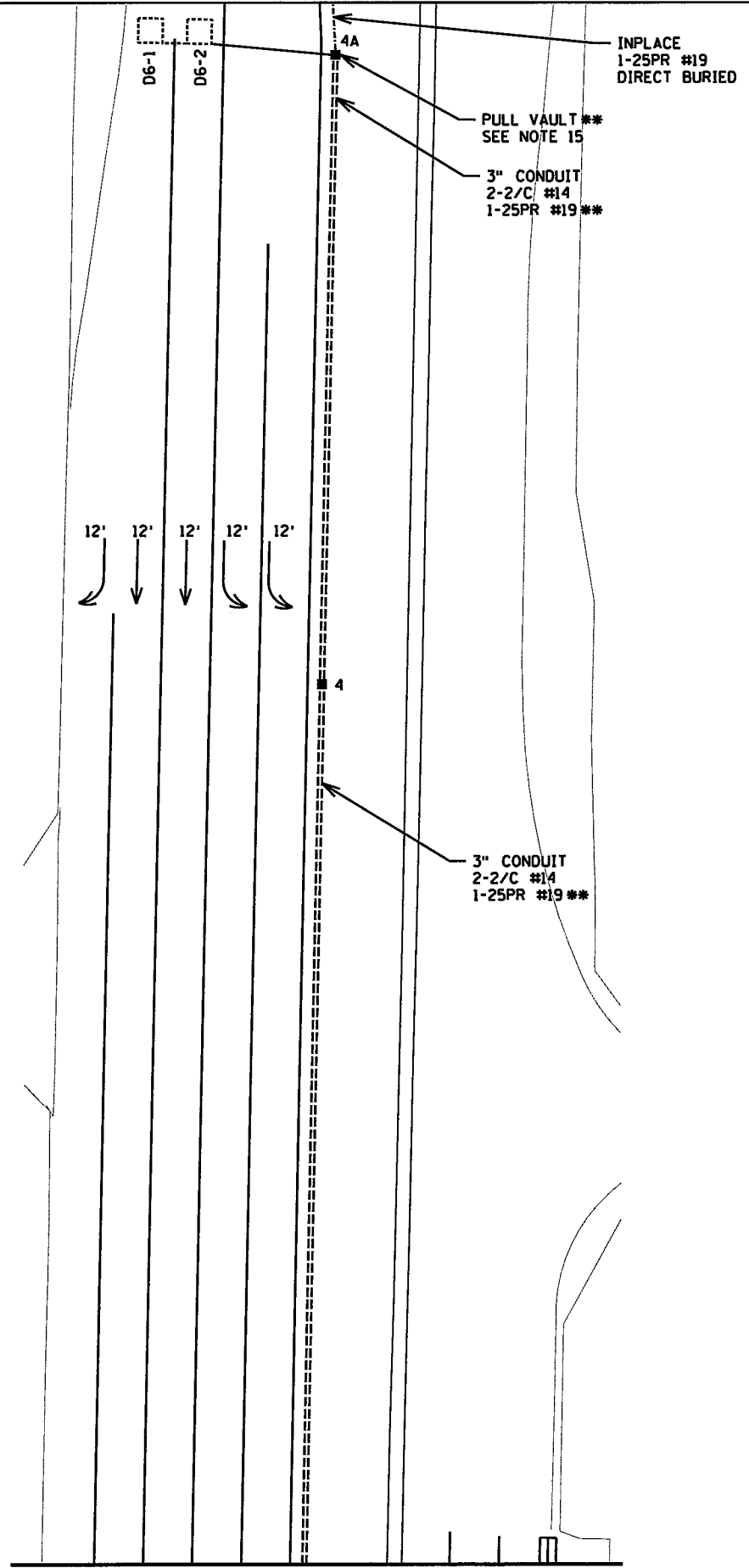
TRAFFIC CONTROL SIGNAL SYSTEM
 MATCH LINES LAYOUT
 C.R. H AT T.H. 10
 IN MOUNDS VIEW, RAMSEY COUNTY

FILE NO. RAMSE129594	341
SG6 OF SG7	367

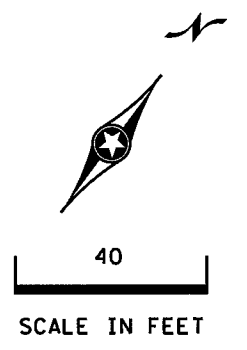
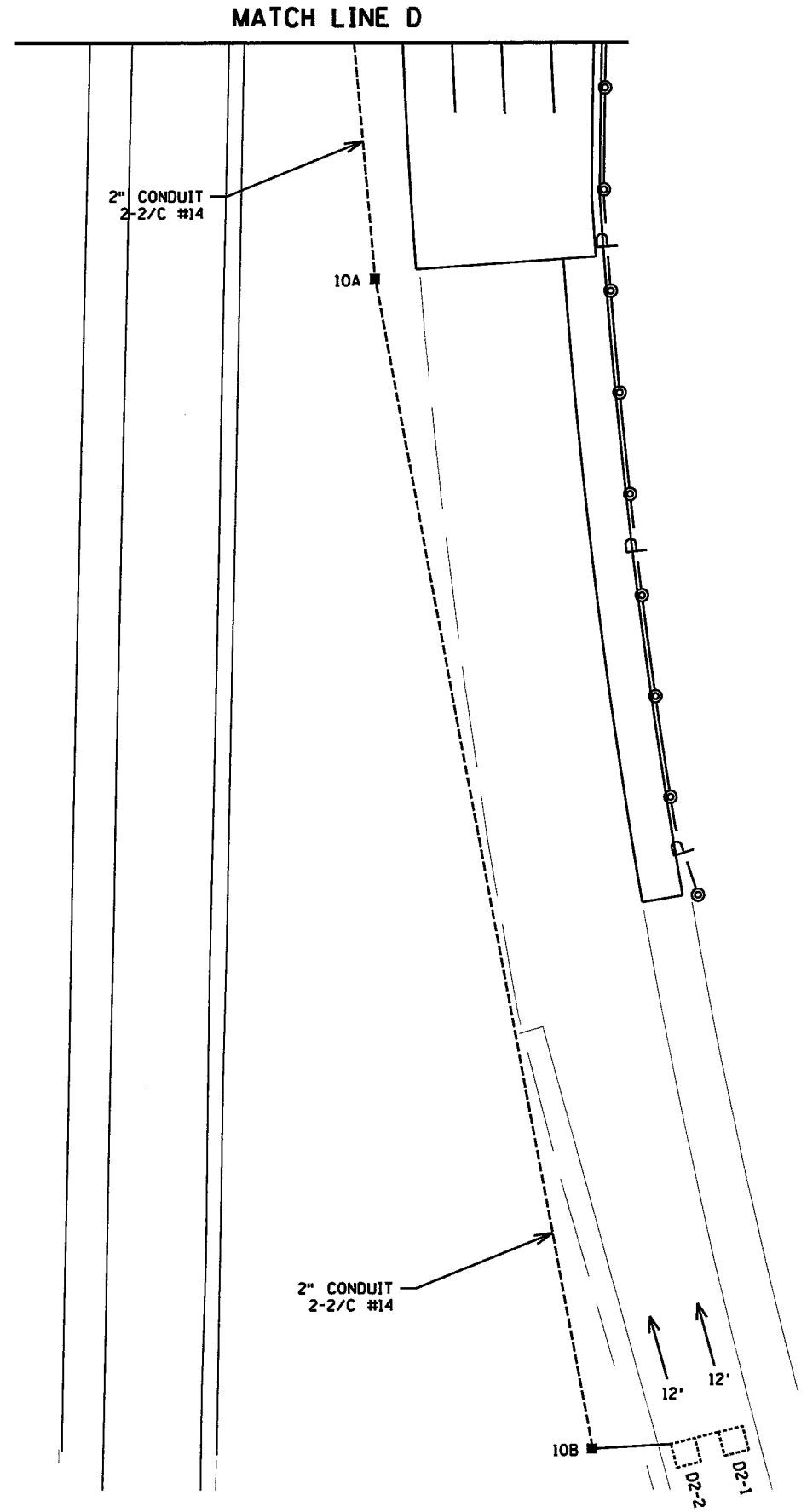
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MATCH LINE C



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Licensed Professional Engineer

Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL SIGNAL SYSTEM MATCH LINES LAYOUT C.R. H AT T.H. 10 IN MOUNDS VIEW, RAMSEY COUNTY	FILE NO. RAMSE129594	342
	SG7 OF SGT	367

INTERSECTION NOTES

① PA100 POLE FOUNDATION
 TYPE PA100-A-55-D40-9 (DAVIT AT 350 DEG)
 1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
 3-STRAIGHT MOUNT SIGNALS OVERHEAD
 AT 11', 22' AND 33'
 2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
 2-ANGLE MOUNT C.D. PED HEADS
 AT 90 AND 180 DEG
 * 1-ONE WAY EVP DETECTOR AND
 CONFIRMATORY LIGHT (PHASES 3+8)
 LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)
 1-APS PB AND SIGN (LT ARROW)(PB6-1)
 1-R10-X12 SIGN ADJACENT TO HEAD (3-2)
 1-TYPE D SIGN (D-1)(SEE SIGN DETAILS)
 3" CONDUIT TO HH 2:
 2-12/C #14
 2-6/C #14
 2-4/C #14
 * 1-3/C #14
 1-3/C #14 (LUM)
 1-2/C #14
 * 1-3/C #20
 1-1/C #6 INS. GR.

⑤ PA100 POLE FOUNDATION
 TYPE PA100-A-40-D40-9 (DAVIT AT 350 DEG)
 1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
 1-STRAIGHT MOUNT SIGNAL OVERHEAD AT 11'
 2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
 * 2-ANGLE MOUNT C.D. PED HEADS
 AT 90 AND 180 DEG
 1-ONE WAY EVP DETECTOR AND
 CONFIRMATORY LIGHT (PHASES 1+6)
 LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)
 1-APS PB AND SIGN (LT ARROW)(PB4-1)
 * 1-TYPE D SIGN (D-2)(SEE SIGN DETAILS)
 * 3" CONDUIT TO HH 11:
 2-12/C #14
 2-4/C #14
 * 1-3/C #14
 1-3/C #14 (LUM)
 1-2/C #14
 * 1-3/C #20
 1-1/C #6 INS. GR.

④ PA90 POLE FOUNDATION
 TYPE PA90-A-15
 2-ANGLE MOUNT SIGNALS OVERHEAD AT 0' & 14'
 1-APS PB AND SIGN (DBL ARROW)(PB4-3)
 3" CONDUIT TO HH 10:
 2-6/C #14
 1-2/C #14
 1-1/C #6 INS. GR.

② PA100 POLE FOUNDATION
 TYPE PA100-A-55-D40-9
 1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
 2-STRAIGHT MOUNT SIGNALS OVERHEAD
 AT 15' & 27'
 2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
 2-ANGLE MOUNT C.D. PED HEADS
 AT 90 AND 180 DEG
 * 1-ONE WAY EVP DETECTOR AND
 CONFIRMATORY LIGHT (PHASES 2+5)
 LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)
 1-APS PB AND SIGN (LT ARROW)(PB8-1)
 1-R10-X12 SIGN ADJACENT TO HEAD (5-1)
 1-TYPE D SIGN (D-2)(SEE SIGN DETAILS)
 3" CONDUIT TO HH 5:
 2-12/C #14
 1-6/C #14
 2-4/C #14
 * 1-3/C #14
 1-3/C #14 (LUM)
 1-2/C #14
 * 1-3/C #20
 1-1/C #6 INS. GR.

③ PA100 POLE FOUNDATION
 TYPE PA100-A-55-D40-9
 1-ANGLE MOUNT SIGNAL OVERHEAD AT 0'
 3-STRAIGHT MOUNT SIGNALS OVERHEAD
 AT 11', 22' & 33'
 2-ANGLE MOUNT SIGNALS AT 90 AND 180 DEG
 2-ANGLE MOUNT C.D. PED HEADS
 AT 90 AND 180 DEG
 * 1-ONE WAY EVP DETECTOR AND
 CONFIRMATORY LIGHT (PHASES 4+7)
 LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)
 1-APS PB AND SIGN (LT ARROW)(PB2-1)
 1-R10-X12 SIGN ADJACENT TO HEAD (7-2)
 1-TYPE D SIGN (D-1)(SEE SIGN DETAILS)
 3" CONDUIT TO HH 9:
 2-12/C #14
 2-6/C #14
 2-4/C #14
 * 1-3/C #14
 1-3/C #14 (LUM)
 1-2/C #14
 * 1-3/C #20
 1-1/C #6 INS. GR.

Ⓐ EQUIPMENT PAD (SEE DETAIL SHEET)
 SERVICE CABINET (SSB) (NO BATTERIES)
 CONTROLLER AND CABINET
 4" CONDUIT TO HH 17: 4" CONDUIT TO HH 1:
 2-12/C #14 2-12/C #14
 2-6/C #14 1-6/C #14
 2-4/C #14 2-4/C #14
 * 1-3/C #14 * 1-3/C #14
 9-2/C #14 10-2/C #14
 * 1-3/C #20 * 1-3/C #20
 ** 1-25PR #19
 4" CONDUIT TO HH 17: 4" CONDUIT TO HH 1:
 2-12/C #14 2-12/C #14
 2-6/C #14 2-6/C #14
 2-4/C #14 2-4/C #14
 * 1-3/C #14 * 1-3/C #14
 9-2/C #14 10-2/C #14
 * 1-3/C #20 * 1-3/C #20
 1-1/C #6 INS. GR. 1-1/C #6 INS. GR.
 GROUND WIRE AND GROUND ROD - MIN 8' OUT FROM PAD
 2-2" AND 1-3" CONDUIT STUBBED OUT (CAPPED BOTH ENDS
 ** 3/4" CONDUIT STUBBED OUT (FOR TELEPHONE LINE)
 CONTROLLER CABINET TO SERVICE CABINET:
 2" CONDUIT
 2-1/C #6
 1-1/C #6 INS. GR.
 CONTROLLER CABINET TO SERVICE CABINET (COMMS):
 2" CONDUIT
 SERVICE CABINET TO HH 17:
 2" CONDUIT
 4-3/C #14 (LUM)
 SERVICE CABINET TO HH 18:
 2" CONDUIT
 3-1/C #2
 SERVICE CABINET TO EXTERNAL GR. RD.:
 1" CONDUIT
 1-1/C #6 INS. GR.
 (SEE EQUIPMENT PAD LAYOUT)
 HH 17 TO HH 1:
 2" CONDUIT
 2-3/C #14 (LUM)

Ⓑ S.O.P.-WOOD POLE (BY NORTHERN STATES
 POWER COMPANY)
 120/240 TRANSFORMER
 2" RSC RISER, WEATHERHEAD & PVC TO HH 18:
 2-1/C #2
 1-1/C #2 INS. GR.

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DESIGNER: JAH				
CHECKED BY: BJB				
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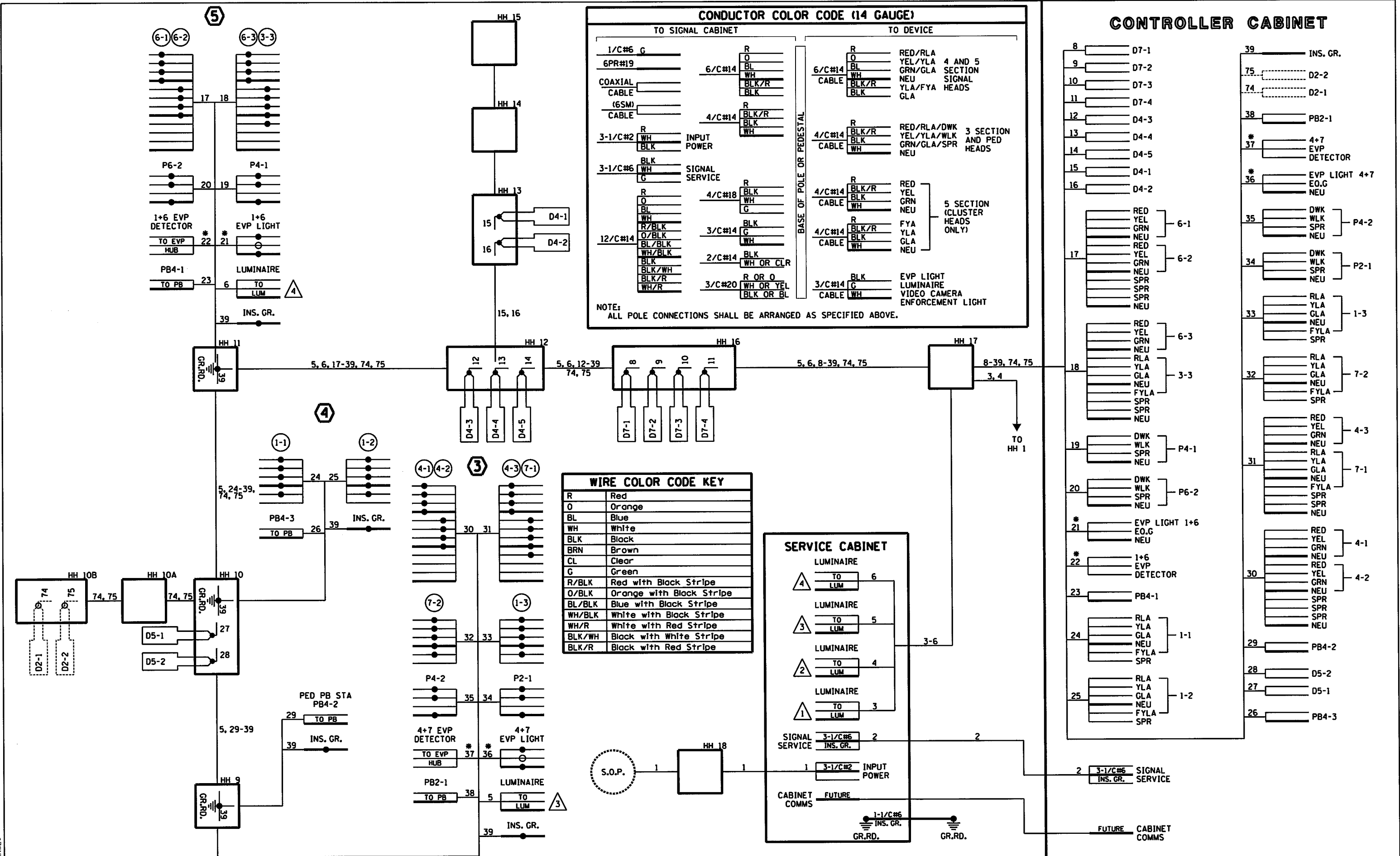
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RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL SIGNAL SYSTEM
 INTERSECTION NOTES
 C.R. H AT T.H. 10
 IN MOUNDS VIEW, RAMSEY COUNTY

FILE NO. RAMSE129594	343
SG8 OF SGI7	367



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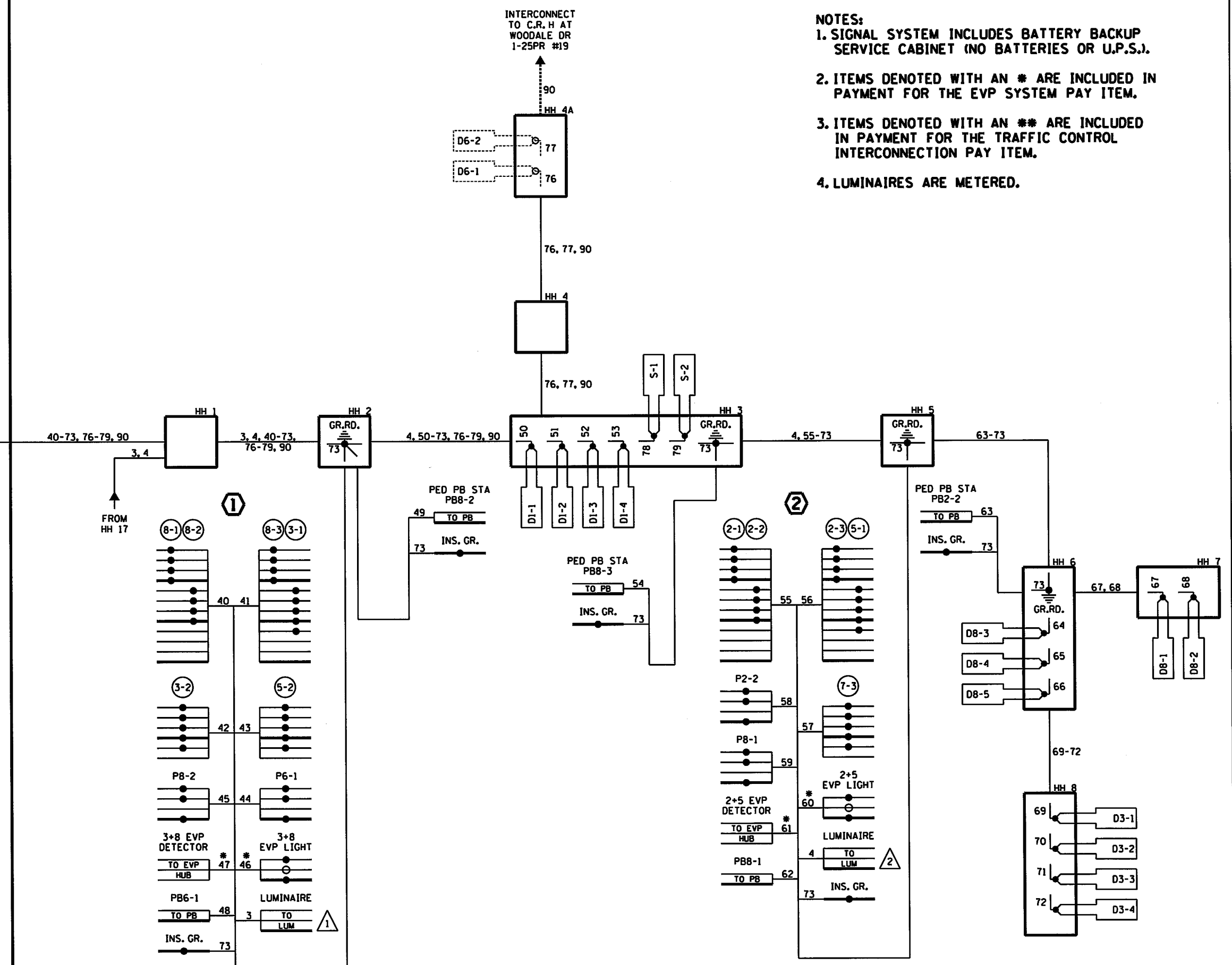
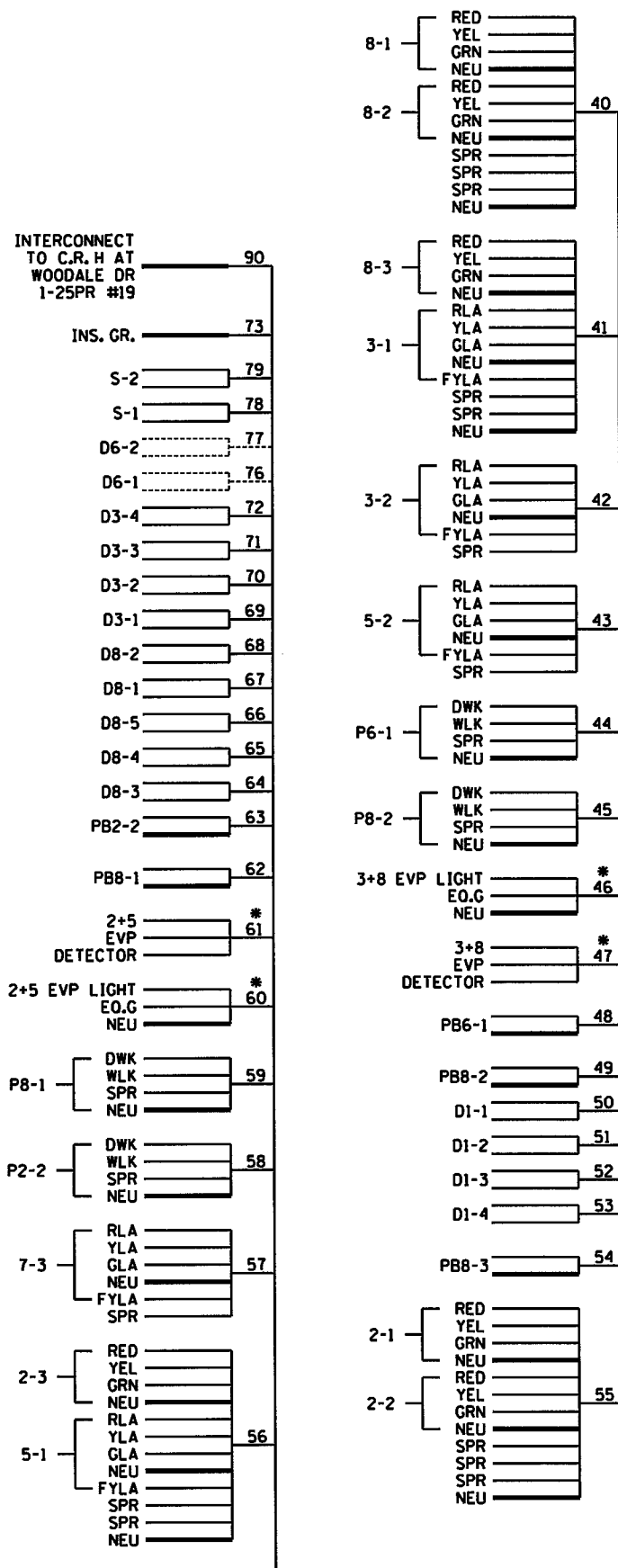
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 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL SIGNAL SYSTEM FIELD WIRING DIAGRAM C.R. H AT T.H. 10 IN MOUNDS VIEW, RAMSEY COUNTY		FILE NO. RAMSE129594	344
		SG9 OF SG17	367

CONTROLLER CABINET



- NOTES:**
1. SIGNAL SYSTEM INCLUDES BATTERY BACKUP SERVICE CABINET (NO BATTERIES OR U.P.S.).
 2. ITEMS DENOTED WITH AN * ARE INCLUDED IN PAYMENT FOR THE EVP SYSTEM PAY ITEM.
 3. ITEMS DENOTED WITH AN ** ARE INCLUDED IN PAYMENT FOR THE TRAFFIC CONTROL INTERCONNECTION PAY ITEM.
 4. LUMINAIRES ARE METERED.

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DESIGNER:	JAH			
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	NO.	BY	DATE	REVISIONS

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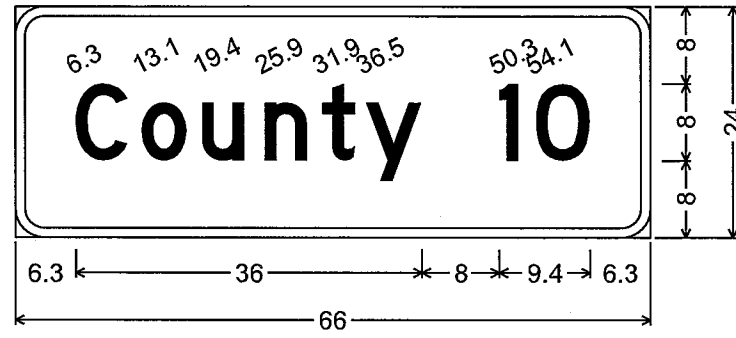
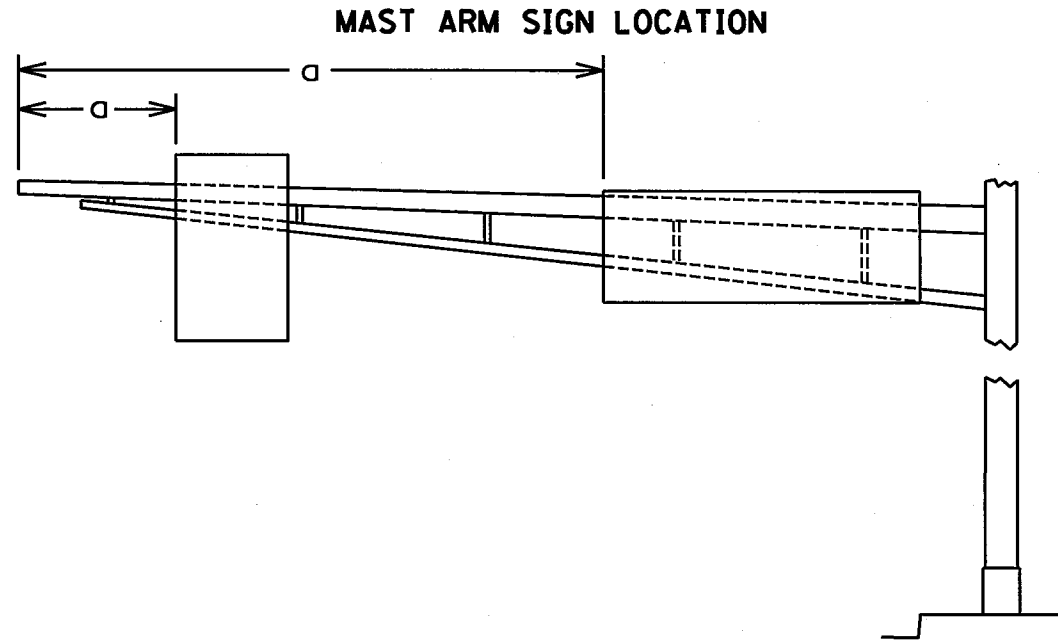
Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015

Kimley»Horn

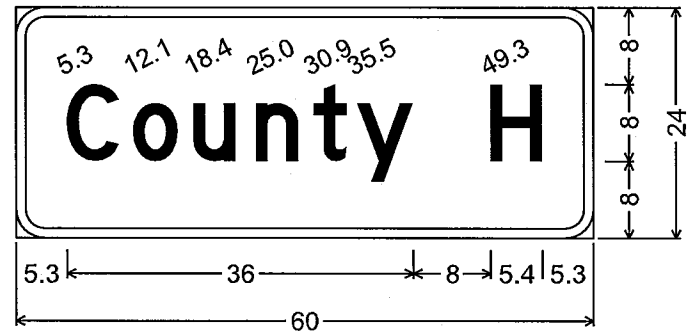
RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC CONTROL SIGNAL SYSTEM FIELD WIRING DIAGRAM C.R. H AT T.H. 10 IN MOUNDS VIEW, RAMSEY COUNTY	FILE NO. RAMSE129594	345
	SG10 OF SGT	367

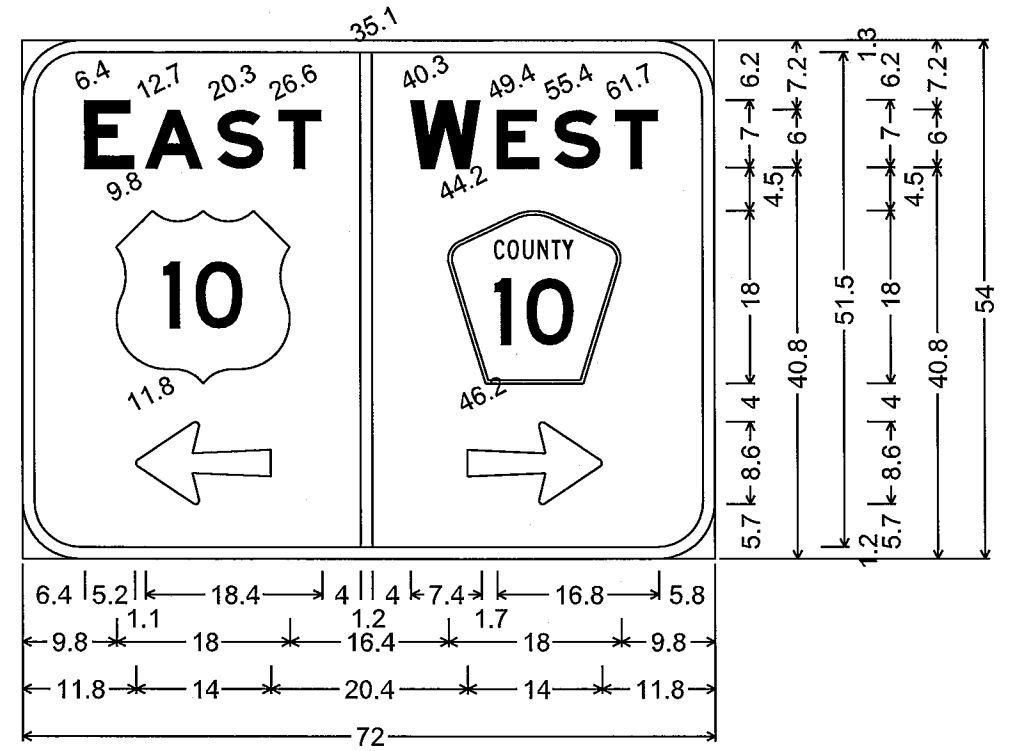
SIGN DETAILS



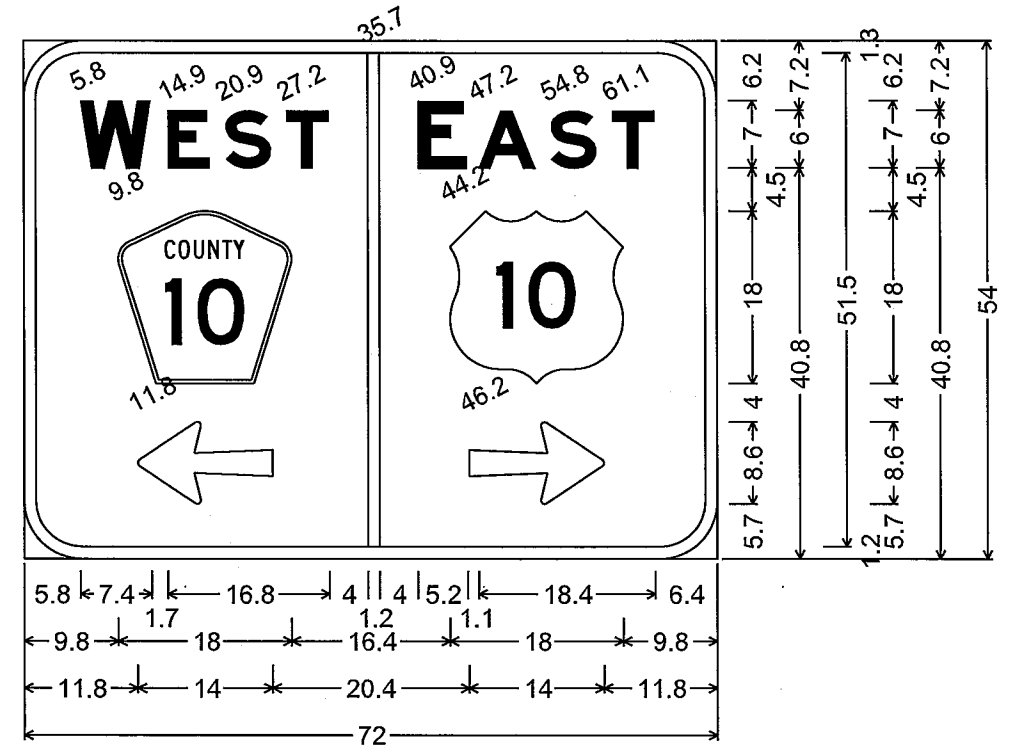
D-1; 3.0" Radius, 1.0" Border, White on Green;
[County 10] D;



D-2;
3.0" Radius, 1.0" Border, White on Green;
[County H] D;



D-3; 6.0" Radius, 1.3" Border, White on Green;
[EAST] E Mod; Arrow 13 - 14.0" 180°;
[WEST] E Mod; Arrow 13 - 14.0" 0°;



D-4; 6.0" Radius, 1.3" Border, White on Green;
[WEST] E Mod; Arrow 13 - 14.0" 180°;
[EAST] E Mod; Arrow 13 - 14.0" 0°;

MAST ARM MOUNTED SIGNS

SIGN NO	POLE NO	QTY	a	PANEL				MOUNTING		PANEL LEGEND
				SIZE		AREA	TOTAL AREA	NUMBER	SPACING	
				INCH	SQ FT	SQ FT	(1)			
D-1	1,3	2	37	66 x 24	11.00	22.00	3	24	County 10	
D-2	2,5	2	32	60 x 24	10.00	20.00	3	24	County H	
D-3	1	1	14	72 x 54	27.00	27.00	4	18	EAST TH 10 LT ARROW WEST CR 10 RT ARROW	
D-4	3	1	14	72 x 54	27.00	27.00	4	18	WEST CR 10 LT ARROW EAST TH 10 RT ARROW	
R10-X12	1,3	2	4	42 x 48	14.00	28.00	2	36	LEFT TURN YIELD ON FLASHING YELLOW ARROW	

- SPECIFIC NOTES:**
 (1) SPACING BETWEEN STIFFENERS SHALL NOT EXCEED 36 INCHES AND SHALL BE UNIFORMLY SPACED. SEE STANDARD SIGNS MANUAL, PAGE 105A FOR BRACKET SPACING REQUIREMENTS.
- GENERAL NOTES:**
 1. CORNERS OF STANDARD SIGN PANELS WITH MARGINS SHALL BE TRIMMED.
 2. FOR STRUCTURAL DETAILS OF MAST ARM MOUNTED SIGNS SEE STANDARD SIGNS MANUAL, PAGE 105A.
 3. FOR TYPE D STRINGER AND PANEL JOINT DETAILS SEE STANDARD SIGNS MANUAL, PAGE 105.
 4. THE MAST ARM MOUNTED SIGNS ARE INCIDENTAL.
 5. AT INTERSECTIONS WITH MEDIAN WIDTHS LESS THAN 30', ONE WAY (R6-1) SIGNS SHALL NOT BE PLACED AS PART OF THE SIGNALS PLAN.

10:39:53 AM

2/12/2016

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DESIGN TEAM				
DRAWN BY: JAH				
DESIGNER: JAH				
CHECKED BY: BJB				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Brandon J. Bourdon* Lic. No. 43789
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 2/12/2016

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TRAFFIC SIGNAL PLANS
 SIGN DETAILS

FILE NO.	346
RAMSEI29594	
SG11	367
OF SG7	

NOTES:

- 1) EACH LUMINAIRE SHALL HAVE A PHOTOELECTRIC CELL AND PULSE SWITCH.
- 2) A MID-MAST ARM MOUNT SHALL BE LOCATED 12' FROM THE END OF THE MAST ARM AT POLES 3 AND 6.
- 3) A 3/4" HALF COUPLING, 3/4" PIPE NIPPLE AND CONDUIT OUTLET BOOT FOR EMERGENCY VEHICLE PRE-EMPTION EQUIPMENT SHALL BE FURNISHED AND INSTALLED 4' FROM THE END OF THE MAST ARM AT POLES 3 AND 6, AND 2' FROM THE END OF THE MAST AT POLES 1 AND 4.
- 4) INPLACE HANDHOLES 23, 24, AND 25 ARE PVC HANDHOLES WITH CONCRETE COVERS. ALL REMAINING INPLACE HANDHOLES ARE CONCRETE HANDHOLES WITH CONCRETE COVERS.

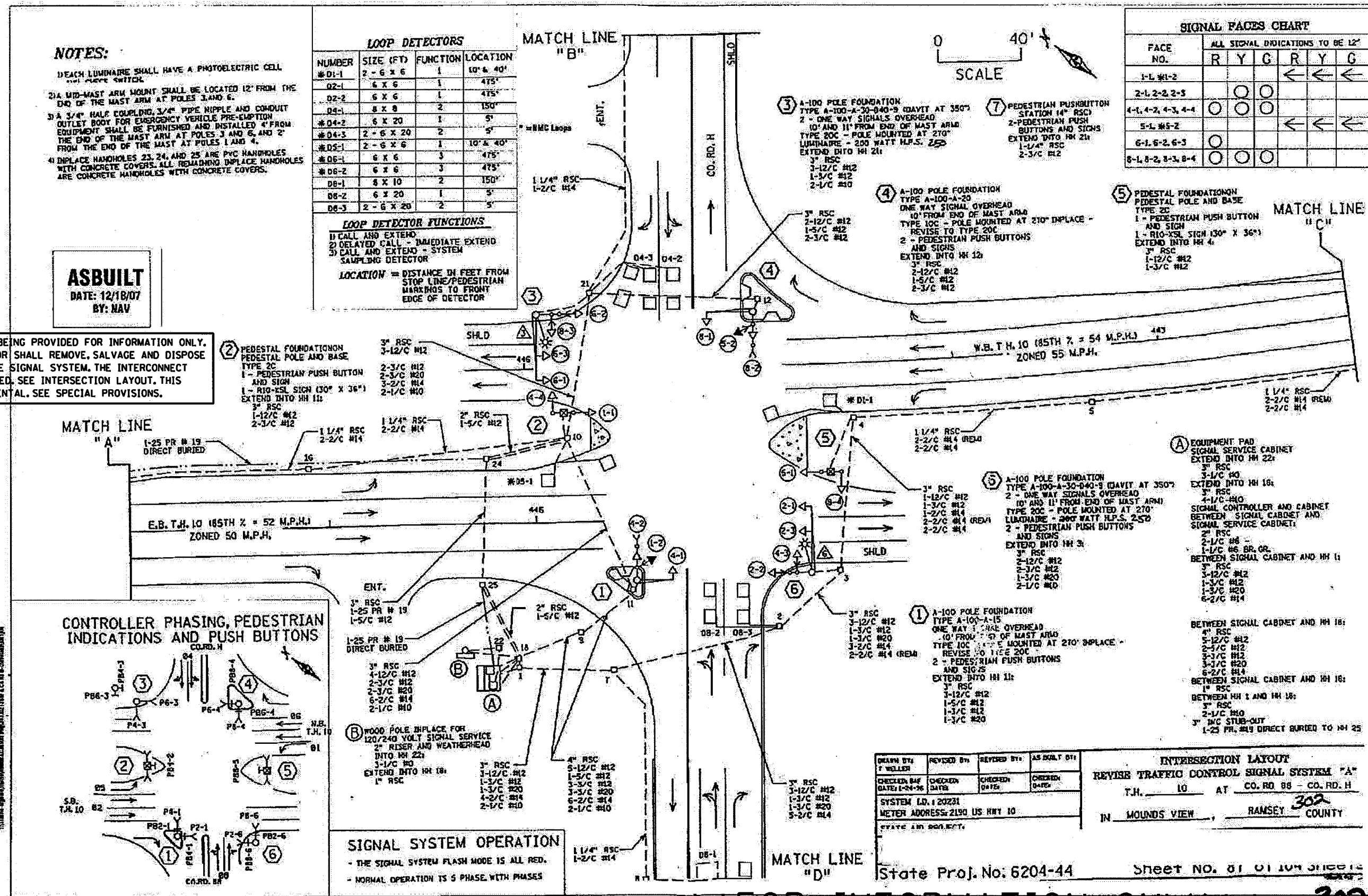
ASBUILT
DATE: 12/18/07
BY: NAV

LOOP DETECTORS			
NUMBER	SIZE (FT)	FUNCTION	LOCATION
#D1-1	2 - 6 x 6	1	10' & 40'
D2-1	6 x 6	1	475'
D2-2	6 x 6	1	475'
D4-1	8 x 8	2	150'
#D4-2	6 x 20	1	5'
#D4-3	2 - 6 x 20	2	5'
#D5-1	2 - 6 x 6	1	10' & 40'
#D6-1	6 x 6	3	475'
#D6-2	6 x 6	3	475'
D8-1	8 x 10	2	150'
D8-2	6 x 20	1	5'
D8-3	2 - 6 x 20	2	5'

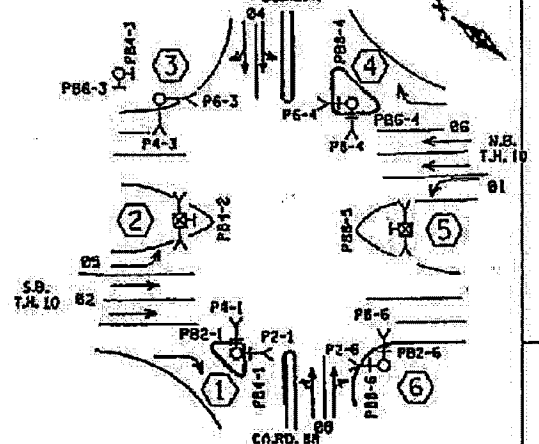
LOOP DETECTOR FUNCTIONS
1) CALL AND EXTEND
2) DELAYED CALL - IMMEDIATE EXTEND
3) CALL AND EXTEND - SYSTEM SAMPLING DETECTOR
LOCATION = DISTANCE IN FEET FROM STOP LINE/PEDESTRIAN MARKINGS TO FRONT EDGE OF DETECTOR

SIGNAL FACES CHART						
FACE NO.	ALL SIGNAL INDICATIONS TO BE 12"					
	R	Y	G	R	Y	G
1-L #1-2				←	←	←
2-L 2-2 2-5		○	○			
4-L 4-2, 4-3, 4-4	○	○	○			
5-L #5-2				←	←	←
6-L 6-2, 6-3	○					
8-L 8-2, 8-3, 8-4	○	○	○			

THIS PLAN IS BEING PROVIDED FOR INFORMATION ONLY. THE CONTRACTOR SHALL REMOVE, SALVAGE AND DISPOSE OF THE INPLACE SIGNAL SYSTEM. THE INTERCONNECT SHALL BE REUSED. SEE INTERSECTION LAYOUT. THIS WORK IS INCIDENTAL. SEE SPECIAL PROVISIONS.



CONTROLLER PHASING, PEDESTRIAN INDICATIONS AND PUSH BUTTONS



SIGNAL SYSTEM OPERATION
- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 5 PHASE WITH PHASES

DESIGN BY	REVISION BY	REVISION DATE	AS BUILT BY
J.WELLS			
CHECKED BY	CHECKED DATE	CHECKED DATE	CHECKED DATE
GATE 1-24-06			

INTERSECTION LAYOUT
REVISE TRAFFIC CONTROL SIGNAL SYSTEM "A"
T.H. 10 AT CO. RD 88 - CO. RD. H
IN MOUNDS VIEW, RAMSEY COUNTY

State Proj. No. 6204-44 Sheet No. 81 of 104 sheets

****FOR INFORMATION ONLY****

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BUB		
NO.	BY	DATE	REVISIONS

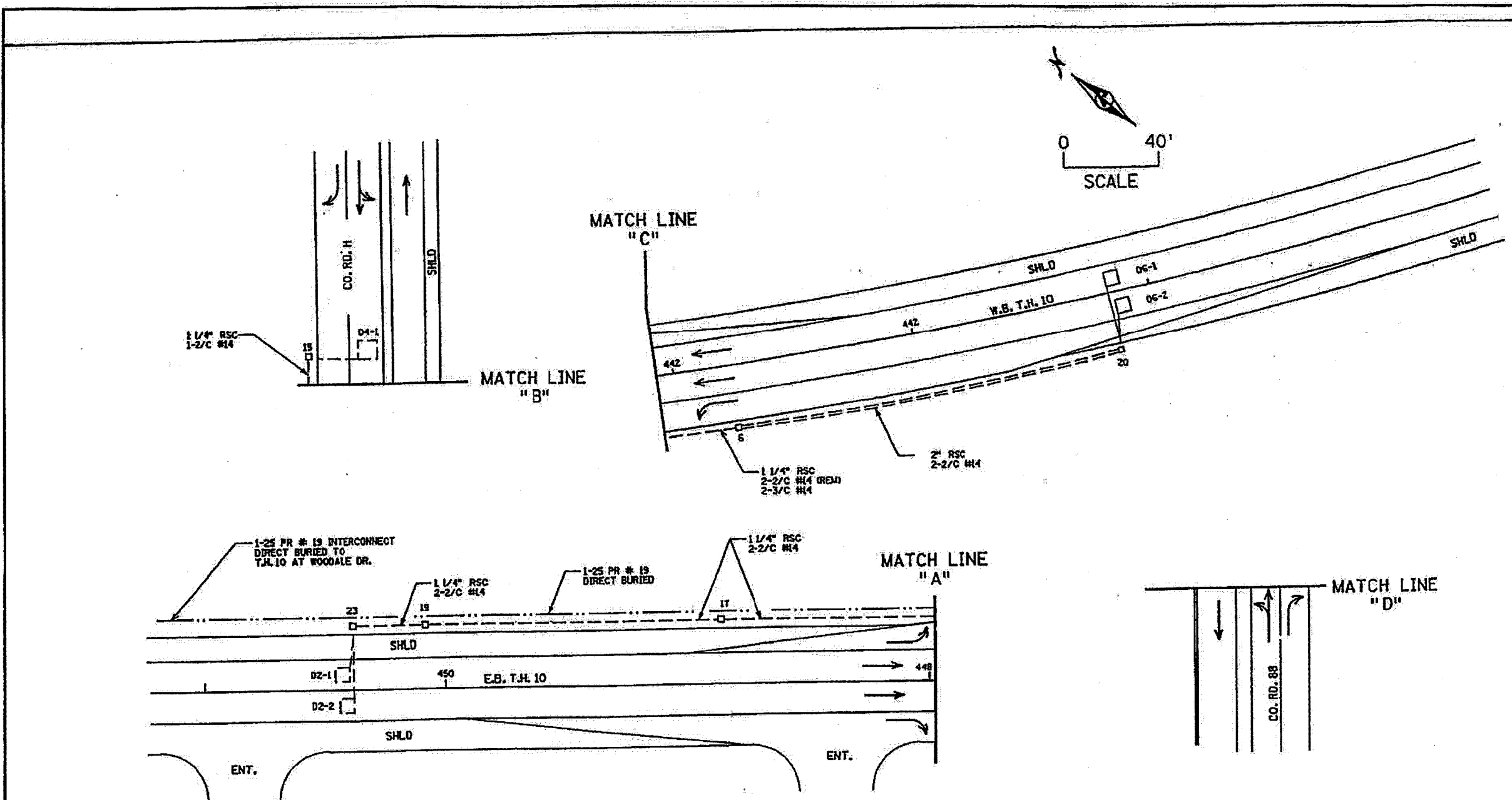
RAMSEY COUNTY, MINNESOTA
Kimley»Horn

TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

****FOR INFORMATION ONLY****
TRAFFIC CONTROL SIGNAL SYSTEM
INTERSECTION LAYOUT
C.R. H AT T.H. 10
IN MOUNDS VIEW, RAMSEY COUNTY

FILE NO.	347
RAMSEY129594	
SG12	367
OF SG17	

1317616-Signal\Traffic\Signal\Substation.dwg 154522:135W & Co Rd H - Cleveland.dwg



THIS PLAN IS BEING PROVIDED FOR INFORMATION ONLY. THE CONTRACTOR SHALL REMOVE, SALVAGE AND DISPOSE OF THE INPLACE SIGNAL SYSTEM. THE INTERCONNECT SHALL BE REUSED. SEE INTERSECTION LAYOUT. THIS WORK IS INCIDENTAL. SEE SPECIAL PROVISIONS.

TRAFFIC SIGNAL REVISION:
JUNE 2005

▲ INDICATES NEW WORK

****FOR INFORMATION ONLY****
300
3 of 25

<p>St. Paul Office 2335 West Highway 36 St. Paul, MN 55113 Phone: 651-836-4600 Fax: 651-836-1311</p>	<p>Bonestroo Rosenie Anderlik & Associates Engineers & Architects</p>	<p>CITY OF MOUNDS VIEW, MN EVP INSTALLATION PROJECT CSAH 10 & CR H INTERSECTION LAYOUT MATCH LINES</p>	<p>DATE: JUN 3 2005 DRAWN BY: JAH CHECKED BY: BJB SCALE: 1"=40'</p>
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DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

****FOR INFORMATION ONLY****
TRAFFIC CONTROL SIGNAL SYSTEM
INTERSECTION LAYOUT
C.R.H AT T.H.10
IN MOUNDS VIEW, RAMSEY COUNTY

FILE NO. RAMSE129594	348
SG13 OF SG17	367

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12/14/2015

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DETECTORS		
NUMBER	MOUNTING TYPE	LOCATION
M1-1	SPAN WIRE	40
S1-1	SPAN WIRE	15
M2-1	POLE 5	400
M3-1	SPAN WIRE	40
M4-1	SPAN WIRE	40
S4-1	SPAN WIRE	15
M5-1	SPAN WIRE	40
S5-1	SPAN WIRE	15
M6-1	POLE 2	400
M7-1	SPAN WIRE	40
S7-1	SPAN WIRE	15
M8-1	SPAN WIRE	40
S8-1	SPAN WIRE	15

TYPE M MICROWAVE UNIT TC26B
S SONIC UNIT TC30
LOCATION = DISTANCE IN FEET FROM STOP BAR TO FRONT OF DETECTION AREA

NOTE: THIS PLAN IS INTENDED TO SHOW WOOD POLE LOCATION AND EQUIPMENT THAT IS TO BE USED AS PART OF THE TEMPORARY SIGNAL SYSTEM INSTALLATION. SPECIFIC ROADWAY ELEMENTS MAY OR MAY NOT BE IN PLACE AT THE TIME THE TEMPORARY SIGNAL IS IN OPERATION. THE LOCATION OF OVERHEAD SIGNALS AND DETECTORS FOR EACH STAGE OR PHASE WILL NEED TO BE ADJUSTED ACCORDINGLY.

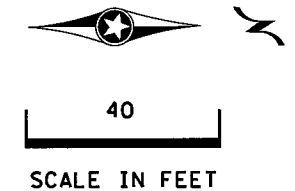
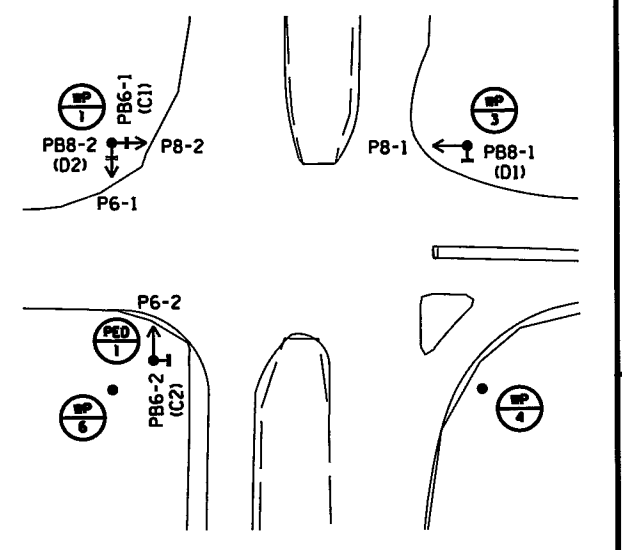
(A) F&I: TEMPORARY SIGNAL CABINET BASE
INSTALL: TEMP CABINET WITH CONTROLLER (STATE FURNISHED)
CONTROLLER CABINET TO HH 3:
4" CONDUIT 4" CONDUIT
12-4/C#14 2-6/C#14
2-3/C#14 7-4/C#14
3-2/C#14 2-3/C#14
5-4/C#18 1-2/C#14
2-3/C#20 7-4/C#18
1-1/C #6 INS. GR. 2-3/C#20
1-1/C #6 INS. GR. 1-1/C #20

(B) INPLACE: 45' WOOD POLE WITH SERVICE EQUIPMENT AND DISCONNECT
F&I: 2" CONDUIT FROM INPLACE SERVICE EQUIPMENT TO HH 1:
3-1/C#6
2" CONDUIT FROM HH 1 TO CONTROLLER CABINET
3-1/C#6
2" CONDUIT, RISER AND WEATHERHEAD FROM INPLACE SERVICE EQUIPMENT TO HH 2:
4-3/C#14 (LUM)
FROM HH 2 TO ABOVE SPAN WIRE ON POLE 1:
2" CONDUIT
4-3/C#14 (LUM)

CONTROLLER CABINET TO HH 1:
2" CONDUIT
3-1/C#6

- NOTES:
- CONDUIT SHALL BE SCHEDULE 80 PVC OR SCHEDULE 80 HDPE.
 - SEE THE SPECIAL PROVISIONS FOR STATE FURNISHED MATERIALS, COUNT DOWN PEDESTRIAN HEADS, VEHICLE HEADS, AND EMERGENCY VEHICLE PREEMPTION (EVP).
 - THE EXACT LOCATION OF HANDHOLES, POLES, DETECTORS AND TEMPORARY CABINET BASE SHALL BE DETERMINED IN THE FIELD BY MNDOT TRAFFIC OFFICE PERSONNEL.
 - THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING THE POWER COMPANY TO ARRANGE FOR THE POWER CONNECTION.
 - THE CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
 - ALL NEW CONDUIT SHALL BE PVC - SCHEDULE 80 OR HDPE SCHEDULE 80 AND CARRY 1-1/C #6 INSULATED GROUNDING CONDUCTOR AS SHOWN IN PLAN.
 - PAVEMENT MARKINGS BY OTHERS. (SEE STRIPING PLAN FOR REFERENCE)
 - REMOVAL OF THE EXISTING SIGNAL SYSTEM IS INCIDENTAL.
 - THE CONTRACTOR SHALL FURNISH AND INSTALL SPAN WIRE MOUNTED TYPE R10-12 SIGNS ADJACENT TO HEADS 4-3 AND 8-3.
 - SEE THE CONSTRUCTION PLAN FOR STAGING, MOVEMENT OF HEADS AND DETECTORS FOR EACH STAGE OR PHASE OF CONSTRUCTION SHALL BE COMPLETED BY THE CONTRACTOR.
 - COIL A SUFFICIENT LENGTH OF CABLE AT ALL SPAN WIRE MOUNTED SIGNAL FACES, EVP DETECTORS AND INDICATOR LIGHTS, AND MICROWAVE DETECTORS TO COORDINATE STAGING SHIFTS.
 - SEE DETAIL SHEET FOR WOOD POLE AND SPAN WIRE MOUNTING DETAILS.

CONTROLLER PHASING, PEDESTRIAN INDICATIONS AND PUSH BUTTONS



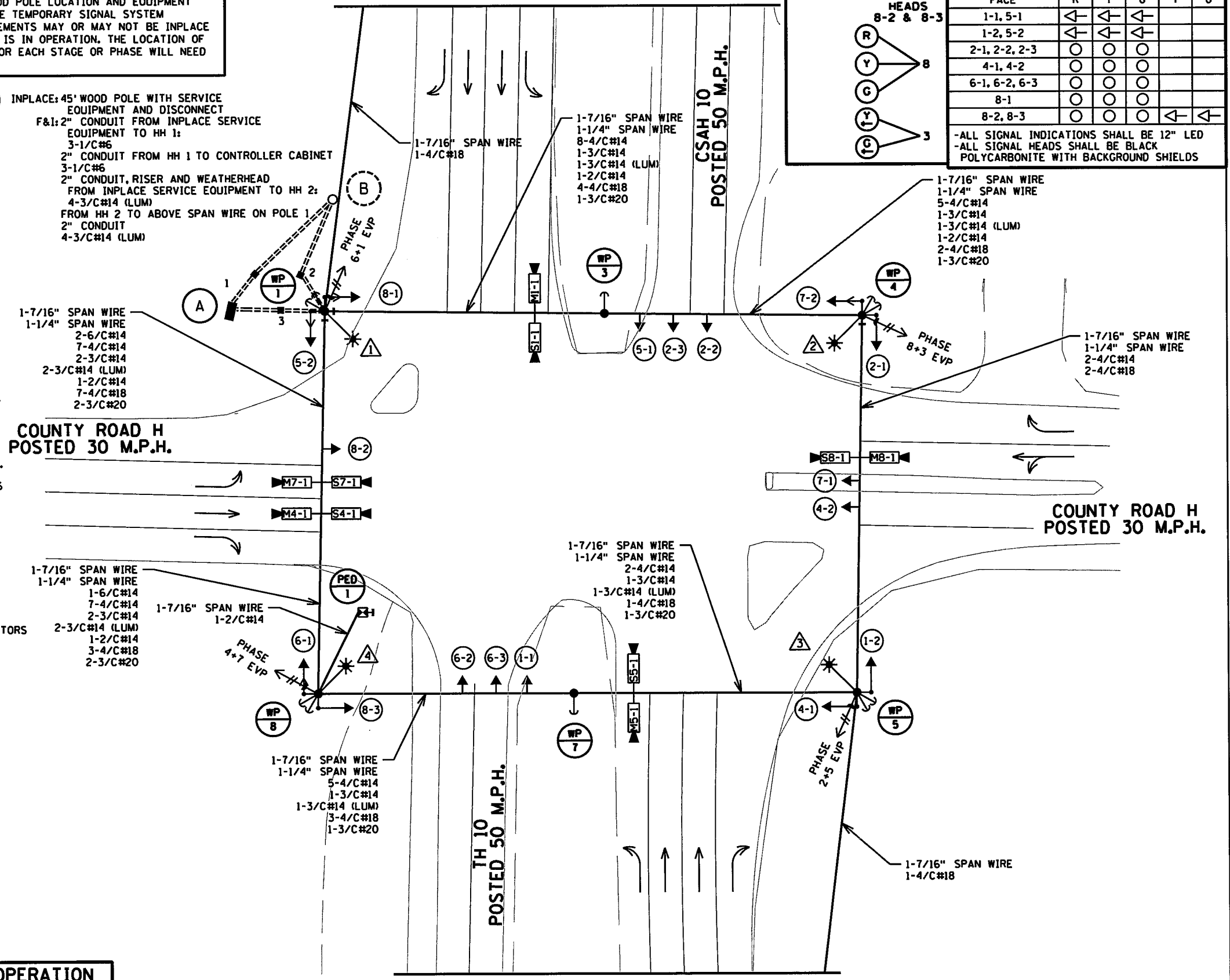
SIGNAL SYSTEM OPERATION

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 8 PHASE, WITH PHASES 1 AND 5 OPERATED AS PROTECTED LEFT TURN PHASES AND PHASES 3 AND 7 OPERATED AS PROTECTED PERMISSIVE.
- PHASE 2 AND 6 ON VEHICLE RECALL.

MATCH LINE A

SIGNAL HEAD PHASING		SIGNAL HEAD CHART					
HEADS 8-2 & 8-3		FACE	R	Y	G	Y	G
	1-1, 5-1	←	←	←			
	1-2, 5-2	←	←	←			
	2-1, 2-2, 2-3	○	○	○			
	4-1, 4-2	○	○	○			
	6-1, 6-2, 6-3	○	○	○			
	8-1	○	○	○			
	8-2, 8-3	○	○	○	←	←	

- ALL SIGNAL INDICATIONS SHALL BE 12" LED
- ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONITE WITH BACKGROUND SHIELDS



MATCH LINE B

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Brandon J. Bourdon* Lic. No. 43709
Printed Name: BRANDON J. BOURDON, P.E. Date: 12/14/2015

Kimley»Horn

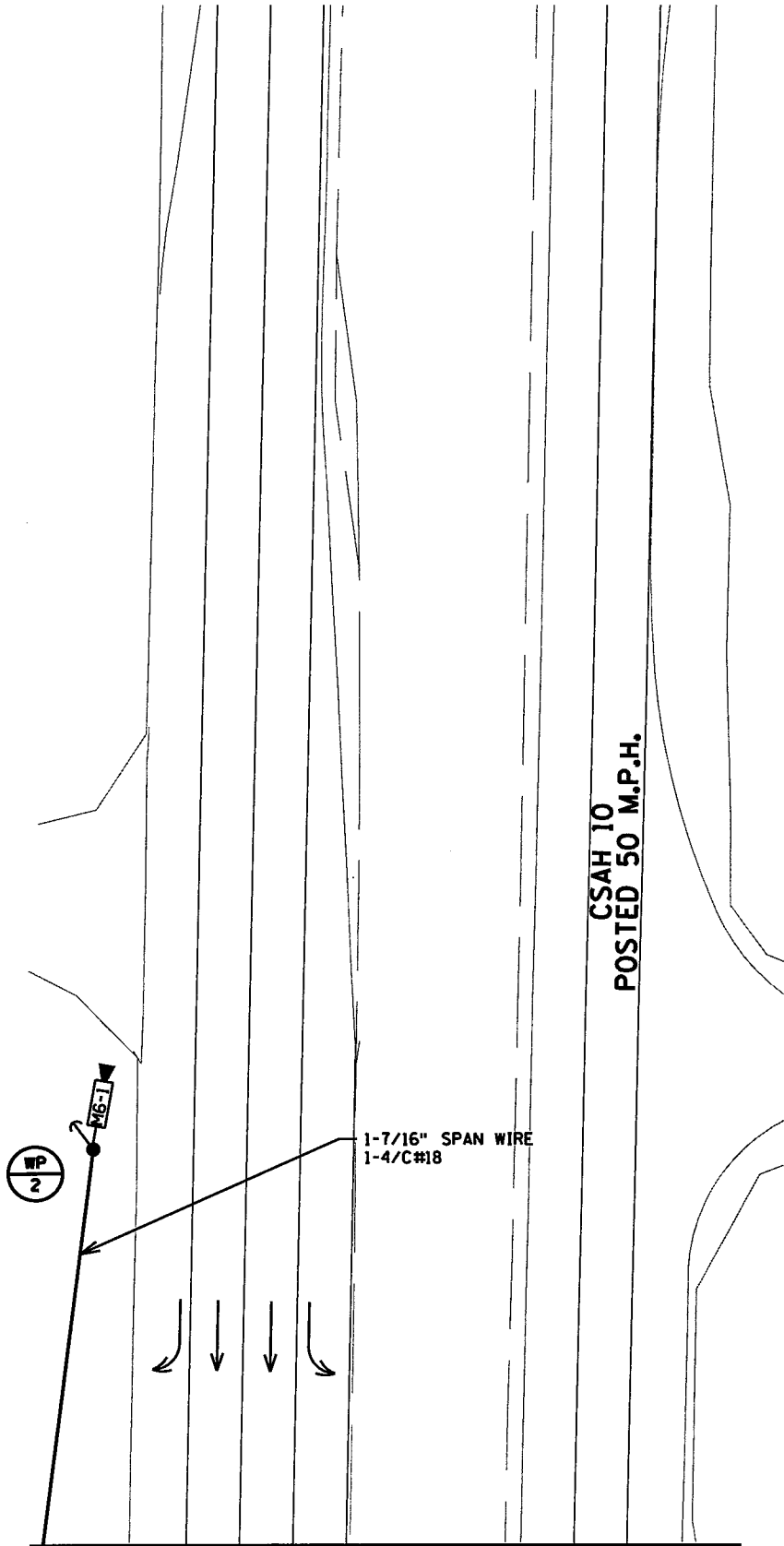
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TEMPORARY SIGNAL SYSTEM INTERSECTION LAYOUT C.R. H AT T.H. 10 IN MOUNDS VIEW, RAMSEY COUNTY		FILE NO.	
		RAMSE129594	349
		SG14	367
		OF SGI7	

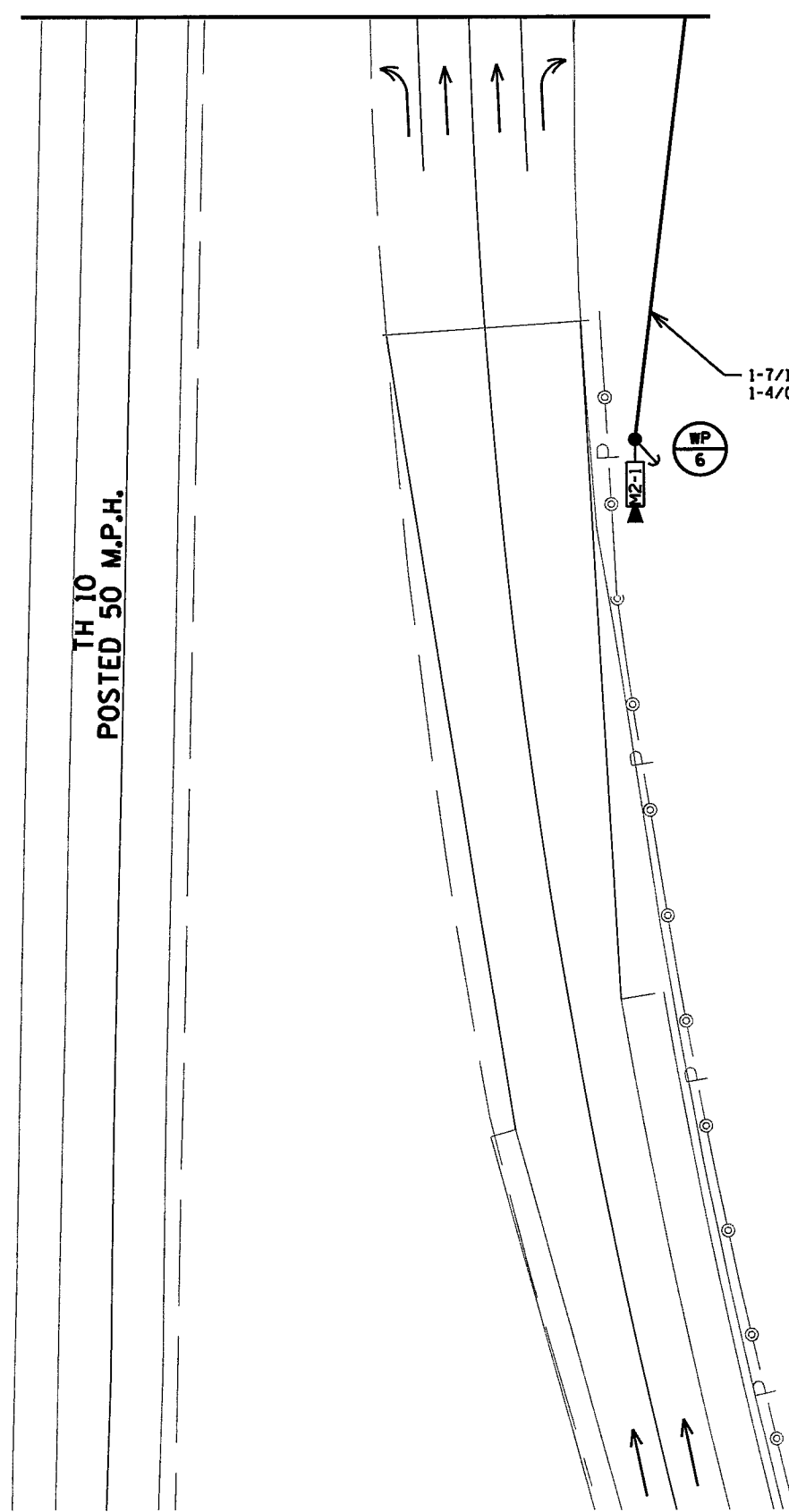
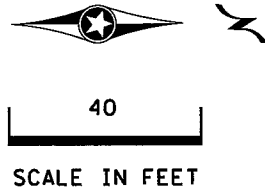
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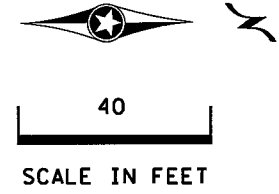
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\$MODELNAME\$



MATCH LINE A



MATCH LINE B



DESIGN TEAM				
DRAWN BY:	JAH			
DESIGNER:	JAH			
CHECKED BY:	BJB			
	NO.	BY	DATE	REVISIONS

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Certified By: *Brandon J. Bourdon* Lic. No. 43709
 Licensed Professional Engineer
 Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

TEMPORARY SIGNAL SYSTEM
 MATCH LINES LAYOUT
 C.R. H AT T.H. 10
 IN MOUNDS VIEW, RAMSEY COUNTY

FILE NO. RAMSE129594	350
SG15 OF SGT	367

WP
1

45' WOOD POLE
2-DOWN GUYS, GUARDS AND ANCHORS
2-TYPE 10B-WOOD POLE MOUNTED AT 90° AND 180°
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 6+1) POLE MOUNTED
15' MAST ARM AND LUMINAIRE (250W HPS) WITH PEC.
2-PEDESTRIAN PUSH BUTTONS AND SIGNS
(R10-4b)1 EA. LT AND RT ARROW
METAL JUNCTION BOX WITH TERMINAL BLOCK

4" CONDUIT RISER AND WEATHERHEAD FROM HH 3 TO SPAN WIRES WITH:

8-4/C#14 2-6/C#14
1-3/C#14 7-4/C#14
1-2/C#14 2-3/C#14
4-4/C#18 1-2/C#14
1-3/C#20 7-4/C#18
1-1/C #6 INS. GR. 2-3/C#20
 1-1/C #6 INS. GR.

3" CONDUIT ABOVE JUNCTION BOX TO SPAN WIRES WITH:

4-4/C#14
1-3/C#14
2-2/C#14
1-3/C#20

1" CONDUIT RISER AND WEATHERHEAD ABOVE SPAN WIRE WITH:
1-3/C#14 (LUM)

WP
2

30' WOOD POLE
200 FT. FROM STOP BAR
1-DOWN GUY, GUARD AND ANCHOR
1-MICROWAVE DETECTOR

WP
3

45' WOOD POLE
1-DOWN GUY, GUARD AND ANCHOR

WP
4

45' WOOD POLE
2-DOWN GUYS, GUARDS AND ANCHORS
1-TYPE 20B-WOOD POLE MOUNTED AT 90°
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 8+3) POLE MOUNTED
15' MAST ARM AND LUMINAIRE (250W HPS) WITH PEC.
1-PEDESTRIAN PUSH BUTTON AND SIGN
(R10-4b)1 EA. LT AND RT ARROW
1-R9-3 SIGN FACING WOOD POLE 4
METAL JUNCTION BOX WITH TERMINAL BLOCK

3" CONDUIT ABOVE JUNCTION BOX TO SPAN WIRES WITH:

3-4/C#14
1-2/C#14
1-3/C#14
1-3/C#20

1" CONDUIT RISER AND WEATHERHEAD ABOVE SPAN WIRE WITH:
1-3/C#14 (LUM)

WP
8

45' WOOD POLE
2-DOWN GUYS, GUARDS AND ANCHORS
1-TYPE 20B-WOOD POLE MOUNTED AT 90°
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 4+7) POLE MOUNTED
15' MAST ARM AND LUMINAIRE (250W HPS) WITH PEC.
1-R9-3 SIGN FACING WOOD POLE 4
METAL JUNCTION BOX WITH TERMINAL BLOCK

3" CONDUIT ABOVE JUNCTION BOX TO SPAN WIRES WITH:

1-6/C#14
2-4/C#14
1-3/C#14
1-3/C#20

1" CONDUIT RISER AND WEATHERHEAD ABOVE SPAN WIRE WITH:
1-3/C#14 (LUM)

PED
1

16' ALUMINUM POST ON TEMPORARY FOUNDATION
1-PEDESTRIAN PUSH BUTTON AND SIGN (R10-4b)RT ARROW
1-2/C #14

WP
7

45' WOOD POLE
1-DOWN GUY, GUARD AND ANCHOR

WP
5

45' WOOD POLE
2-DOWN GUYS, GUARDS AND ANCHORS
1-TYPE 20A-WOOD POLE MOUNTED AT 90°
1-ONE WAY EVP DETECTOR AND
CONFIRMATORY LIGHT (PHASES 2+5) POLE MOUNTED
15' MAST ARM AND LUMINAIRE (250W HPS) WITH PEC.
2-R9-3 SIGNS FACING WOOD POLES 3 AND 6
METAL JUNCTION BOX WITH TERMINAL BLOCK

3" CONDUIT ABOVE JUNCTION BOX TO SPAN WIRES WITH:

2-4/C#14
1-3/C#14
1-3/C#20

1" CONDUIT RISER AND WEATHERHEAD ABOVE SPAN WIRE WITH:
1-3/C#14 (LUM)

WP
6

30' WOOD POLE
200 FT. FROM STOP BAR
1-DOWN GUY, GUARD AND ANCHOR
1-MICROWAVE DETECTOR

DESIGN TEAM				
DRAWN BY: JAH				
DESIGNER: JAH				
CHECKED BY: BJB				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Brandon J. Bourdon*, No. 43709
Licensed Professional Engineer

Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015

Kimley»Horn

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
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TEMPORARY SIGNAL SYSTEM
INTERSECTION NOTES
C.R. H AT T.H. 10
IN MOUNDS VIEW, RAMSEY COUNTY

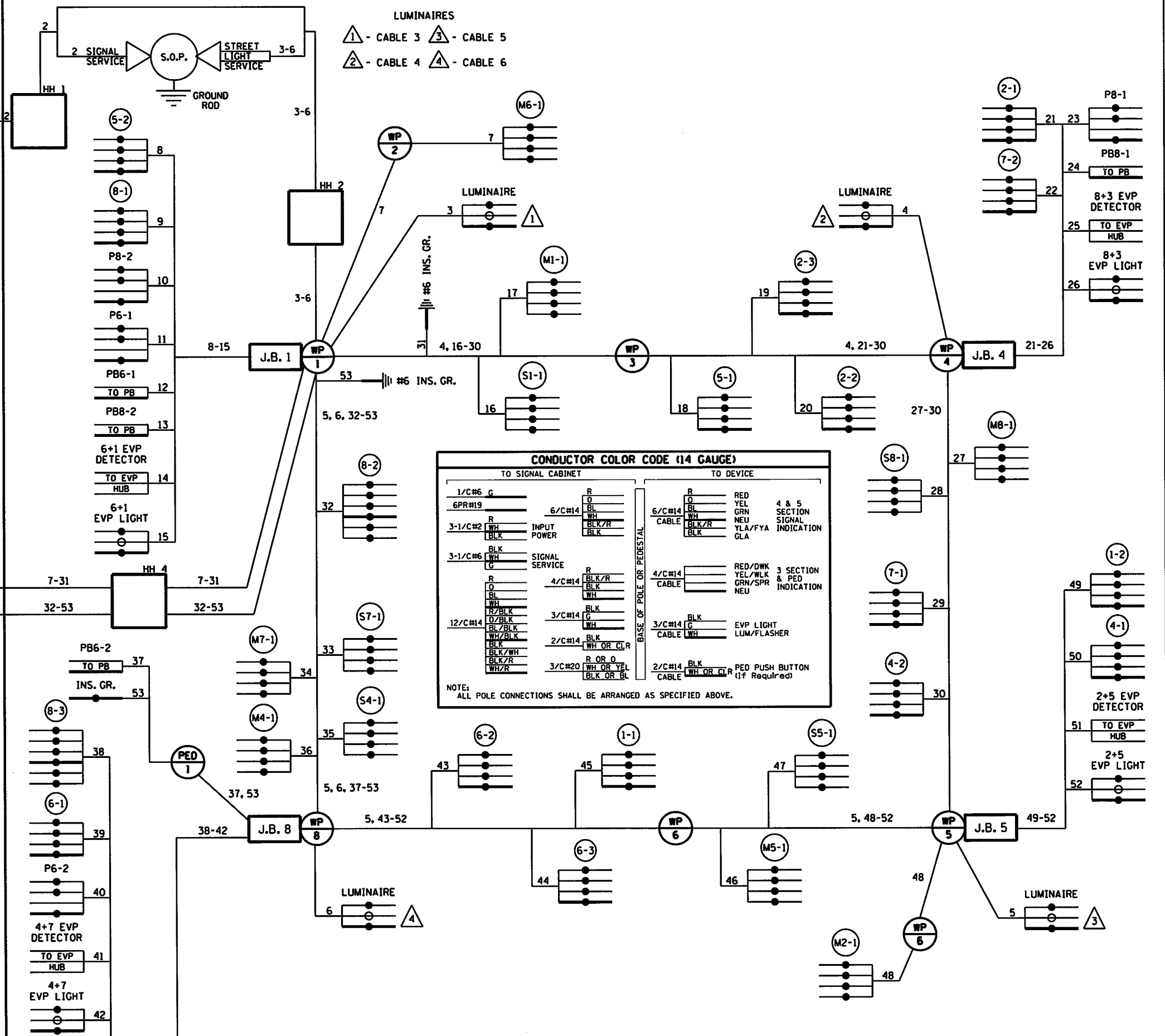
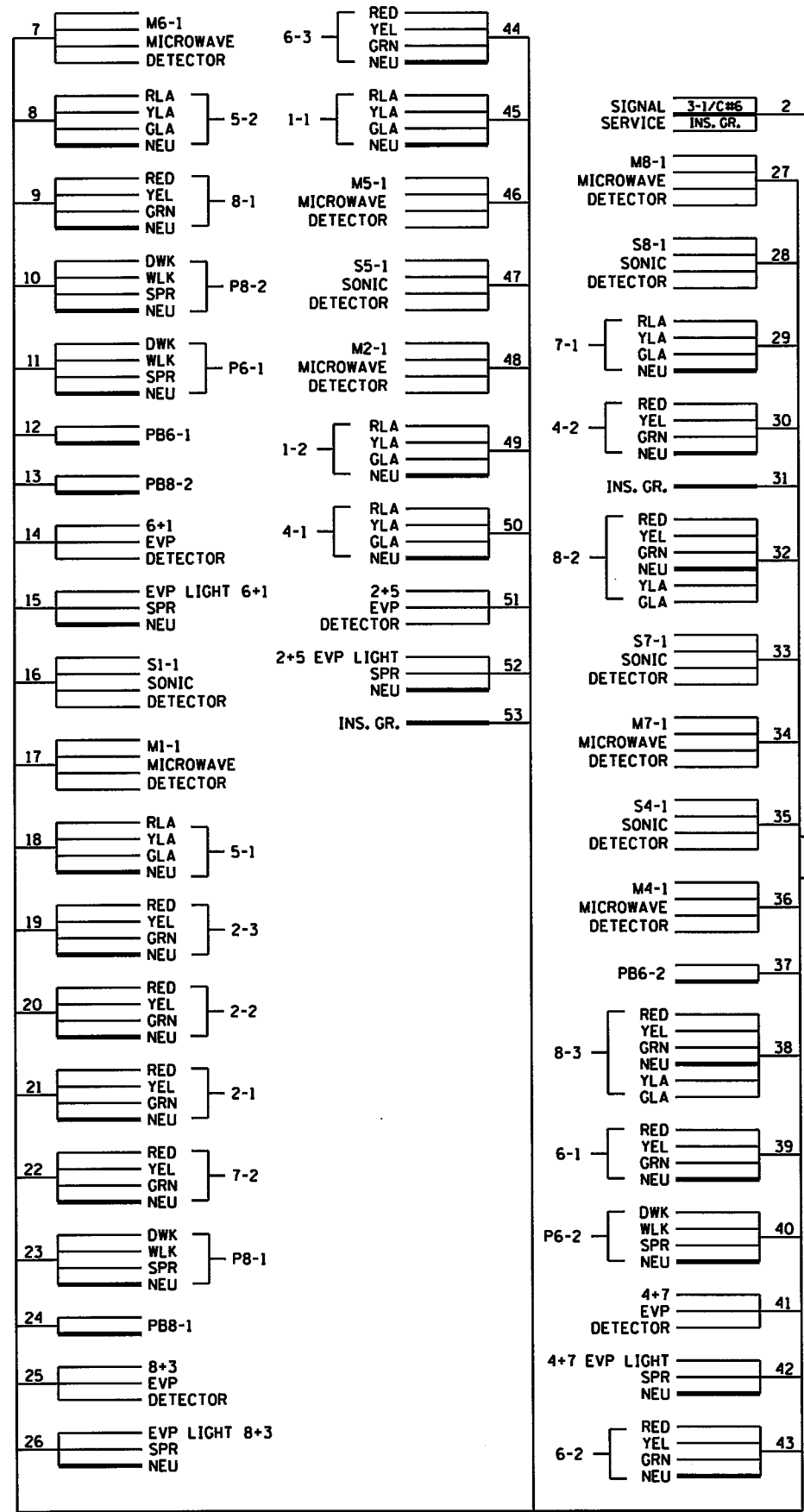
FILE NO. RAMSE129594	351
SG16 OF SGT	367

CONTROLLER CABINET

24/05 PM

12/4/2015

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SMODELNAME\$



CONDUCTOR COLOR CODE (14 GAUGE)

TO SIGNAL CABINET		TO DEVICE	
1/C#6 G	R	R	RED 4 & 5 SECTION SIGNAL INDICATION
6PR#19	O	BL	YEL GRN NEU YLA/FYA GLA
	BL	WH	RED/DWK 3 SECTION & PED INDICATION
	BLK	BLK/R	YEL/WLK GRN/SPR NEU
3-1/C#2 WH	6/C#14 BLK	6/C#14 CABLE BLK/R	
BLK	WH	BLK	
3-1/C#6 LG	BLK	BLK	
	WH	BLK	
R	4/C#14 BLK/R	4/C#14 CABLE	
O	BLK	WH	
BL	WH	3/C#14 G	
RZ/BLK	3/C#14 WH	3/C#14 CABLE	
O/BLK	2/C#14 BLK	WH	
BL/BLK	WH OR CLR	2/C#14 CABLE	
WH/BLK	BLK	WH	
BLK/WH	WH OR CLR	2/C#14 CABLE	
BLK/R	R OR O	2/C#14 CABLE	
WH/R	WH OR YEL	WH OR CLR	
	BLK OR BL		

NOTE: ALL POLE CONNECTIONS SHALL BE ARRANGED AS SPECIFIED ABOVE.

DESIGN TEAM			
DRAWN BY:	JAH		
DESIGNER:	JAH		
CHECKED BY:	BJB		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Brandon J. Bourdon* Lic. No. 43709
Printed Name: BRANDON J. BOURDON, P.E. Date: 12/4/2015



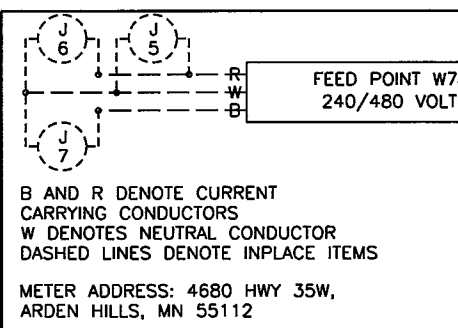
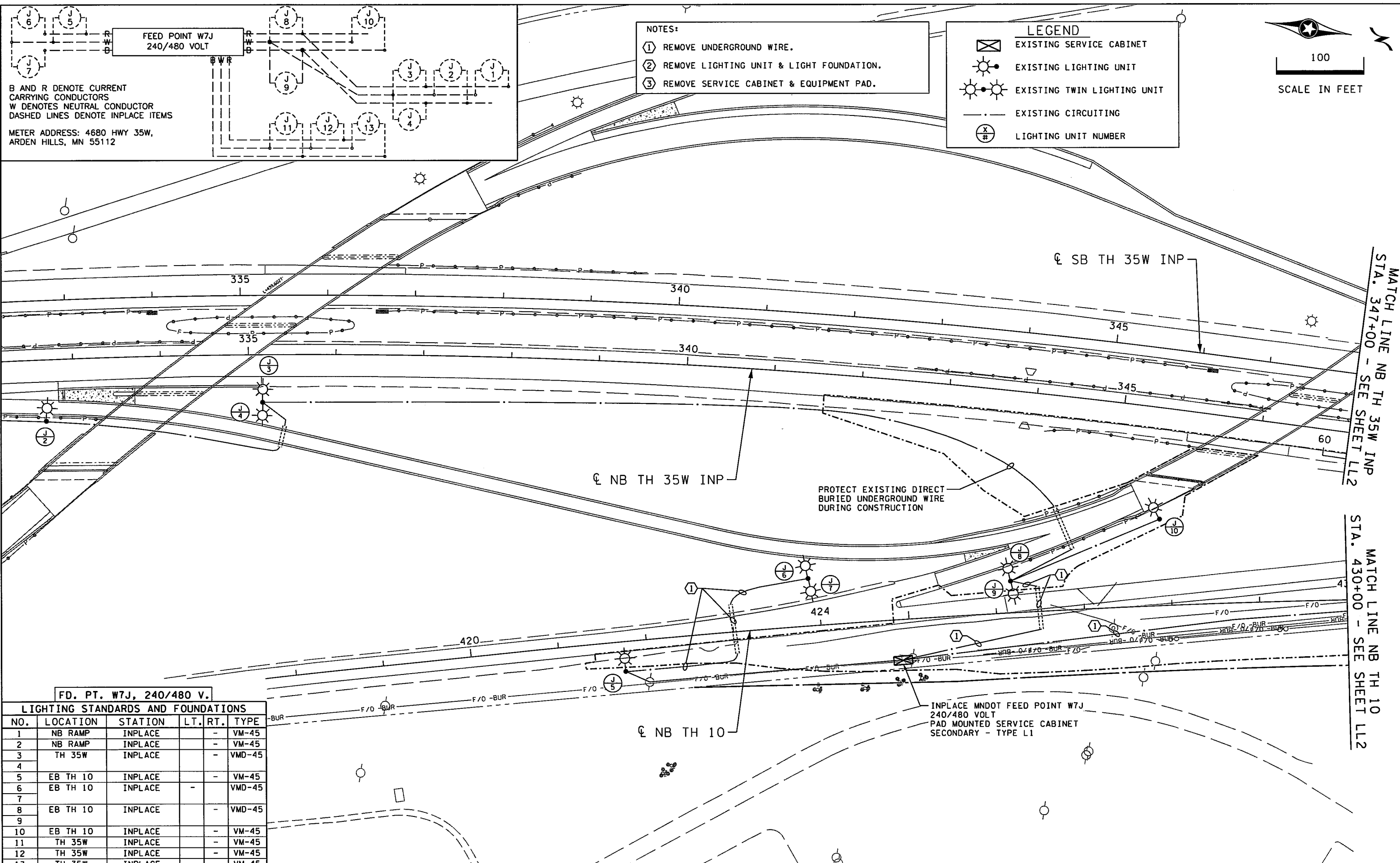
RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

TEMPORARY SIGNAL SYSTEM FIELD WIRING DIAGRAM C.R. H AT T.H. 10 IN MOUNDS VIEW, RAMSEY COUNTY	
FILE NO. RAMSE129594	352
SG17 OF SG17	367

11/08/01 AM

12/8/2015

S:\PT\VR\Ramsey\129594\5-f\nd-dsgn\51-const-dwg-cad\40-Transitwy-plnshts\C06284162_101.dgn

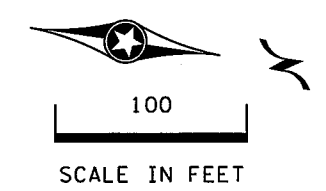


B AND R DENOTE CURRENT CARRYING CONDUCTORS
 W DENOTES NEUTRAL CONDUCTOR
 DASHED LINES DENOTE INPLACE ITEMS

METER ADDRESS: 4680 HWY 35W,
 ARDEN HILLS, MN 55112

- NOTES:
- ① REMOVE UNDERGROUND WIRE.
 - ② REMOVE LIGHTING UNIT & LIGHT FOUNDATION.
 - ③ REMOVE SERVICE CABINET & EQUIPMENT PAD.

- LEGEND
- EXISTING SERVICE CABINET
 - EXISTING LIGHTING UNIT
 - EXISTING TWIN LIGHTING UNIT
 - EXISTING CIRCUITING
 - LIGHTING UNIT NUMBER



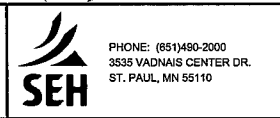
FD. PT. W7J, 240/480 V.

LIGHTING STANDARDS AND FOUNDATIONS					
NO.	LOCATION	STATION	LT.	RT.	TYPE
1	NB RAMP	INPLACE			VM-45
2	NB RAMP	INPLACE			VM-45
3	TH 35W	INPLACE			VMD-45
4					
5	EB TH 10	INPLACE			VM-45
6	EB TH 10	INPLACE			VMD-45
7					
8	EB TH 10	INPLACE			VMD-45
9					
10	EB TH 10	INPLACE			VM-45
11	TH 35W	INPLACE			VM-45
12	TH 35W	INPLACE			VM-45
13	TH 35W	INPLACE			VM-45

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	AKF		
CHECKED BY:	KST		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

LIGHTING PLAN
 REMOVALS
 NB TH 35W INP STA. 341+57 - 347+00
 NB TH 10 STA. 424+82 - 430+00

FILE NO.	353
RAMSE129594	
LL1	367
OF LL14	

11:08:02 AM

12/8/2015

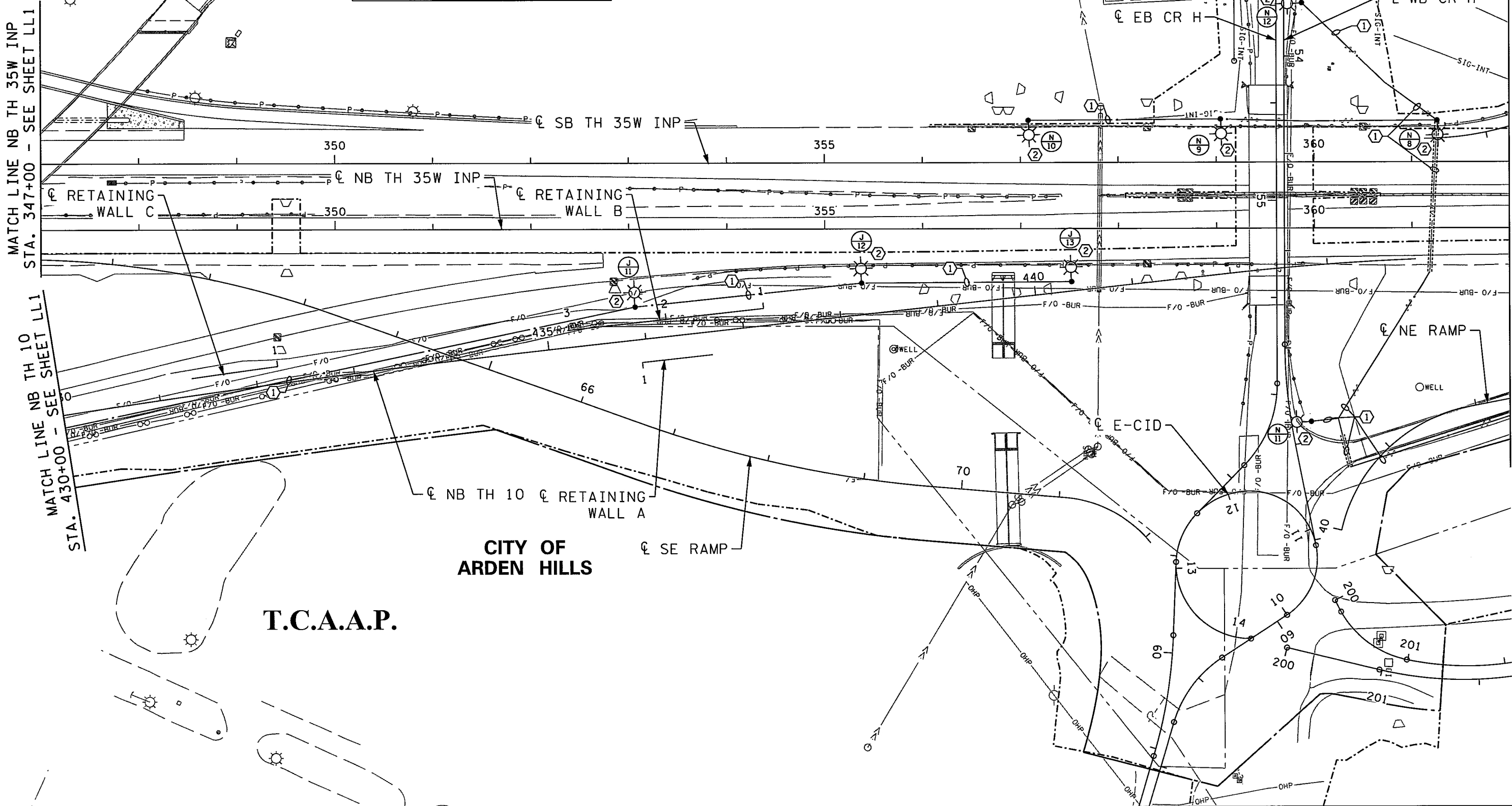
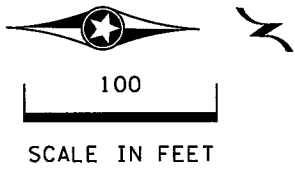
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NOTES:

- ① REMOVE UNDERGROUND WIRE.
- ② REMOVE LIGHTING UNIT & LIGHT FOUNDATION.
- ③ REMOVE SERVICE CABINET & EQUIPMENT PAD.

LEGEND

- EXISTING SERVICE CABINET
- EXISTING LIGHTING UNIT
- EXISTING TWIN LIGHTING UNIT
- EXISTING CIRCUITING
- LIGHTING UNIT NUMBER



MATCH LINE EB CR H STA. 52+00 - SEE SHEET LL4

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET LL3

T.C.A.A.P.

CITY OF ARDEN HILLS

DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	AKF			
CHECKED BY:	KST			
	NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 12/8/2015

PHONE: (651)490-2000
 3635 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

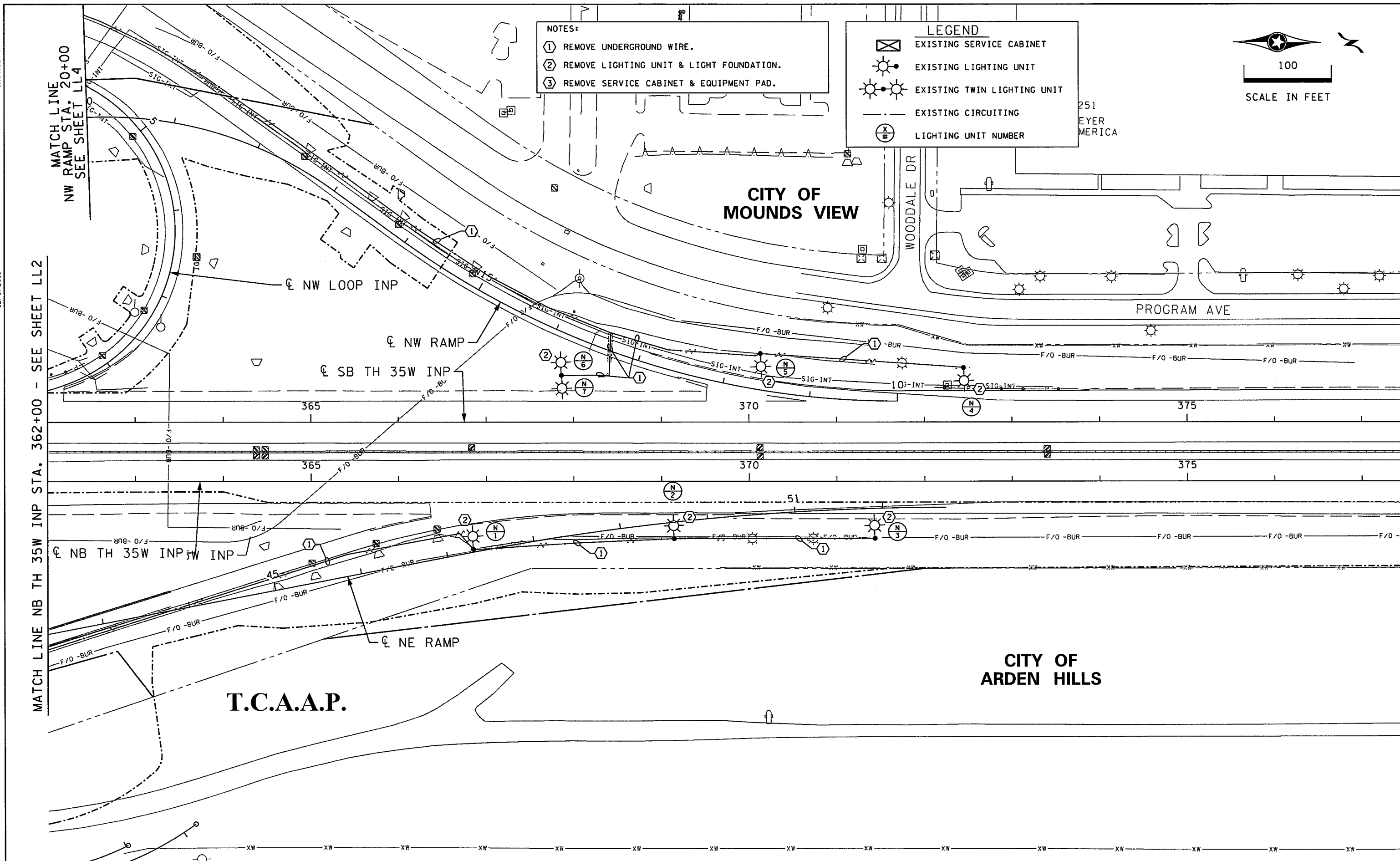
LIGHTING PLAN
 REMOVALS
 NB TH 35W INP STA. 347+00 - 362+00
 NB TH 10 STA. 430+00 - 442+01

FILE NO. 354
 RAMSE129594
 LL2
 OF LL14
 367

11:08:02 AM

12/8/2015

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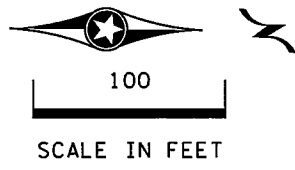


NOTES:

- 1 REMOVE UNDERGROUND WIRE.
- 2 REMOVE LIGHTING UNIT & LIGHT FOUNDATION.
- 3 REMOVE SERVICE CABINET & EQUIPMENT PAD.

LEGEND

- EXISTING SERVICE CABINET
- EXISTING LIGHTING UNIT
- EXISTING TWIN LIGHTING UNIT
- EXISTING CIRCUITING
- LIGHTING UNIT NUMBER



MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET LL2

MATCH LINE NW RAMP STA. 20+00 SEE SHEET LL4

T.C.A.A.P.

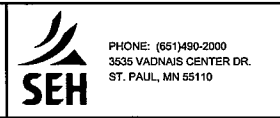
CITY OF MOUNDS VIEW

CITY OF ARDEN HILLS

DESIGN TEAM					
DRAWN BY:	CIF				
DESIGNER:	AKF				
CHECKED BY:	KST				
	NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

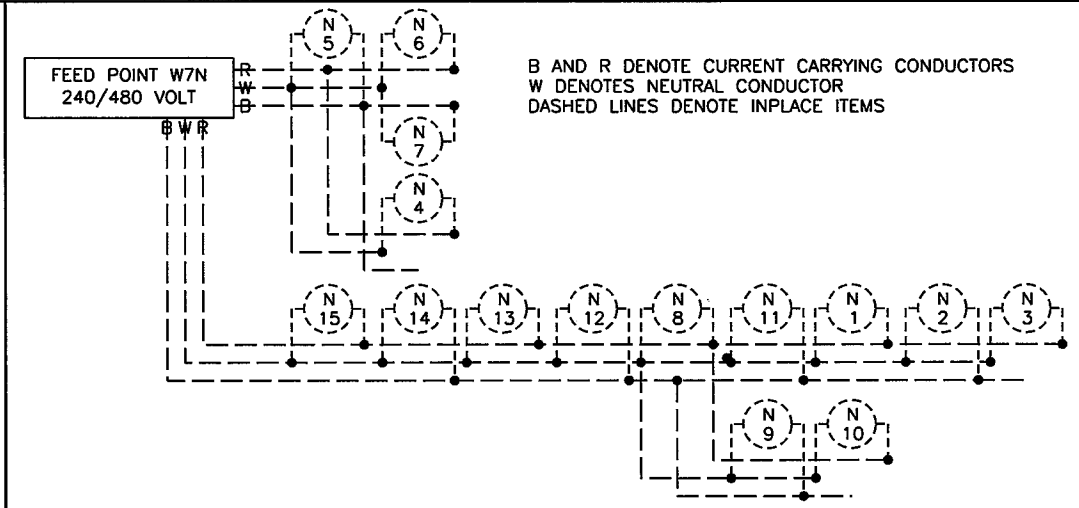
LIGHTING PLAN		FILE NO.	355
REMOVALS		RAMSEI29594	
NB TH 35W INP STA. 362+00 - 377+00		LL3	367
		OF LL14	

11:08:03 AM
12/8/2015
S:\PT\RAMSEY\12959\5-final-dsgn\51-const-dwgs-CAD\40-Transitwy\plnshfts\C06284162_LL4.dgn

FD. PT. W7N, 240/480 V.

LIGHTING STANDARDS AND FOUNDATIONS

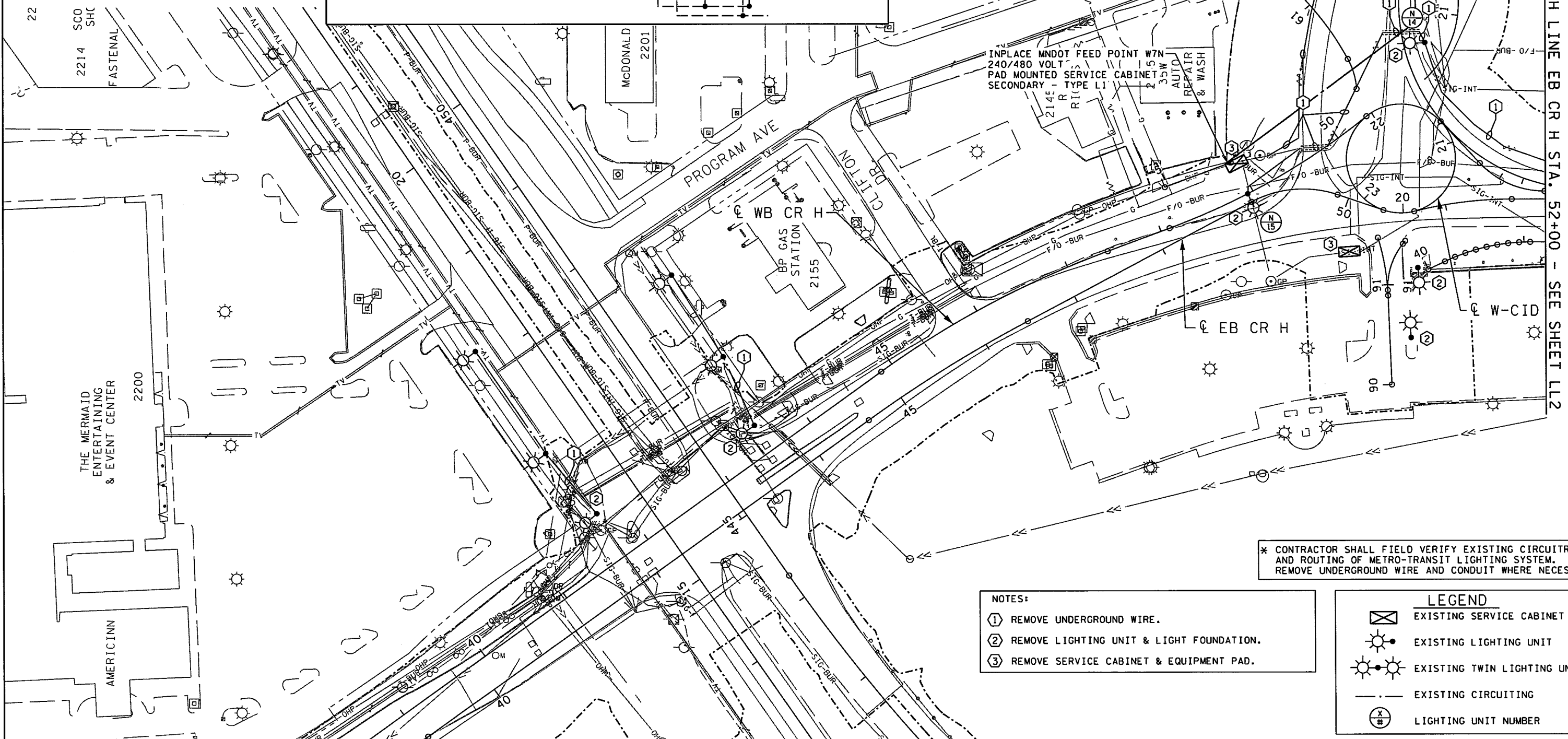
NO.	LOCATION	STATION	LT.	RT.	TYPE
1	NB TH 35W	INPLACE	-	-	VM-45
2	NB TH 35W	INPLACE	-	-	VM-45
3	NB TH 35W	INPLACE	-	-	VM-45
4	SB TH 35W	INPLACE	-	-	VM-45
5	SB TH 35W	INPLACE	-	-	VM-45
6	SB TH 35W	INPLACE	-	-	VMD-45
7					
8	SB TH 35W	INPLACE	-	-	VM-45
9	SB TH 35W	INPLACE	-	-	VM-45
10	SB TH 35W	INPLACE	-	-	VM-45
11	CO RD H	INPLACE	-	-	9-40
12	CO RD H	INPLACE	-	-	9-40
13	CO RD H	INPLACE	-	-	9-40
14	CO RD H	INPLACE	-	-	9-40
15	CO RD H	INPLACE	-	-	9-40



100
SCALE IN FEET

MATCH LINE
NW RAMP STA. 20+00
SEE SHEET LL3

MATCH LINE EB CR H STA. 52+00 - SEE SHEET LL2



* CONTRACTOR SHALL FIELD VERIFY EXISTING CIRCUITRY AND ROUTING OF METRO-TRANSIT LIGHTING SYSTEM. REMOVE UNDERGROUND WIRE AND CONDUIT WHERE NECESSARY.

- NOTES:**
- ① REMOVE UNDERGROUND WIRE.
 - ② REMOVE LIGHTING UNIT & LIGHT FOUNDATION.
 - ③ REMOVE SERVICE CABINET & EQUIPMENT PAD.

LEGEND

	EXISTING SERVICE CABINET
	EXISTING LIGHTING UNIT
	EXISTING TWIN LIGHTING UNIT
	EXISTING CIRCUITING
	LIGHTING UNIT NUMBER

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	AKF		
CHECKED BY:	KST		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Thomas D. Honer* Lic. No. 45519
Printed Name: THOMAS D. HONER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

LIGHTING PLAN		FILE NO. RAMSE129594	356
REMOVALS EB CR H STA. 40+00 - 52+00		LL4 OF LL4	367

3/3/2016

2/16/2016

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① MNDOT LIGHTING ITEMS

ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY
2104	REMOVE UNDERGROUND WIRE	LIN FT	7450
2104	REMOVE LIGHTING UNIT	EACH	21
2104	REMOVE LIGHT FOUNDATION	EACH	21
2104	REMOVE SERVICE CABINET	EACH	2
2104	REMOVE EQUIPMENT PAD	EACH	2
2545	LIGHTING UNIT TYPE 9-40	EACH	3
2545	LIGHTING UNIT TYPE 9-49	EACH	13
2545	UNDERPASS LUMINAIRES TYPE LED	EACH	3
2545	LIGHT FOUNDATION DESIGN E	EACH	1
2545	LIGHT FOUNDATION DESIGN H	EACH	13
2545	LIGHT FOUNDATION DESIGN SPECIAL	EACH	2
2545	2" NON-METALLIC CONDUIT	LIN FT	600
2545	3" NON-METALLIC CONDUIT	LIN FT	300
2545	3" NON-METALLIC CONDUIT (DIRECTIONAL BORE)	LIN FT	300
2545	UNDERGROUND WIRE 1 COND NO 8	LIN FT	1800
2545	UNDERGROUND WIRE 1 COND NO 10	LIN FT	2550
2545	DIRECT BURIED LIGHTING CABLE 4 COND NO 4	LIN FT	5300
2545	SERVICE CABINET TYPE L1	EACH	1
2545	SERVICE CABINET TYPE L1 (MOD)	EACH	1
2545	UNDERGROUND CABLE SPLICE	EACH	8
2545	SERVICE EQUIPMENT	EACH	2
2545	EQUIPMENT PAD B	EACH	1
2545	EQUIPMENT PAD B (MOD)	EACH	1
2545	HANDHOLE	EACH	2

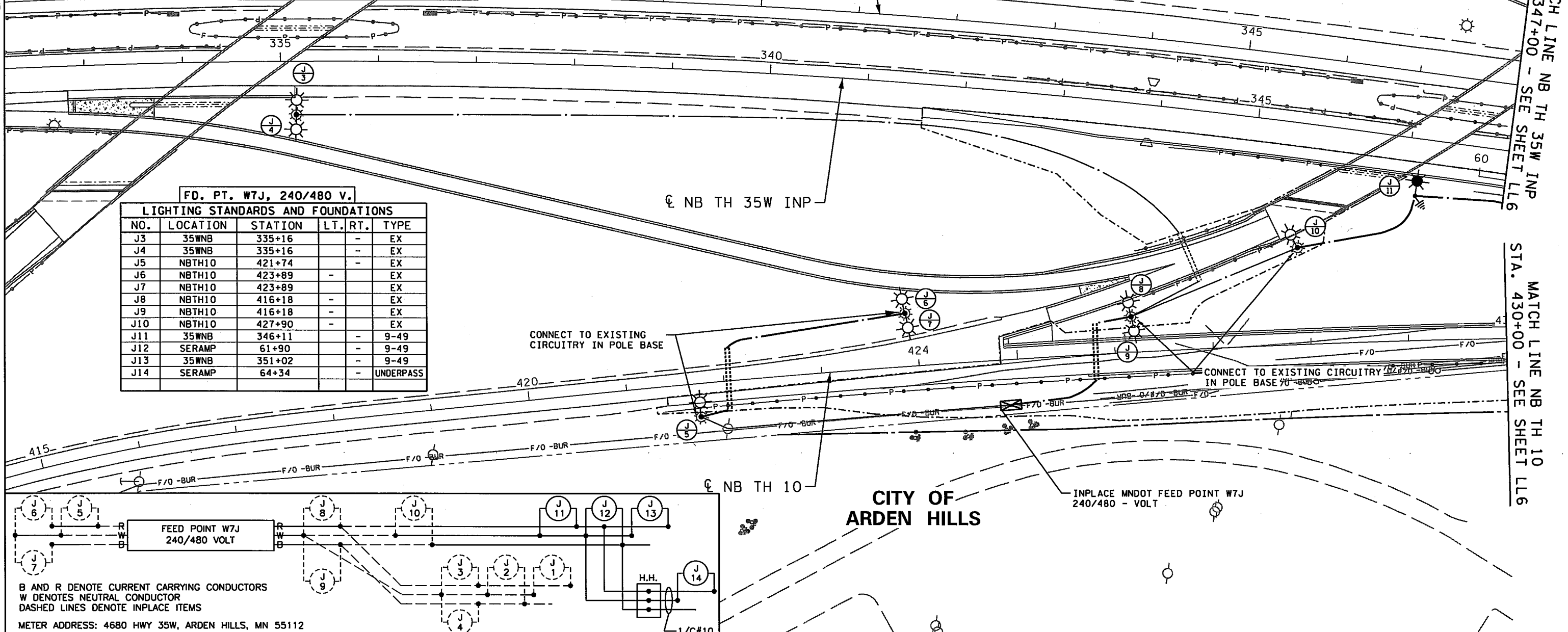
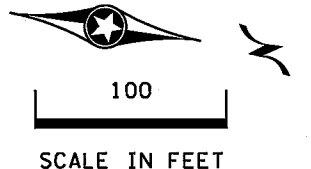
CITY OF MOUNDS VIEW

SPECIFIC NOTE:
① PAID FOR UNDER S.P. 6284-162.

- GENERAL NOTES:
- CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE 2" NMC SCHEDULE 40 UNLESS OTHERWISE NOTED.
 - PROVIDE 2" CAPPED CONDUIT STUB AS INDICATED. (INCIDENTAL)
 - LIGHTING UNITS SHALL BE SET BACK AS DIRECTED BY THE ENGINEER.
 - CONDUCTORS IN CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE COPPER, TYPE XHHW-2, (2)*4 & (1)*6 GND UNLESS OTHERWISE NOTED.

LEGEND

	EXISTING LIGHTING UNIT		SERVICE CABINET
	EXISTING TWIN LIGHTING UNIT		DIRECT BURIED LIGHTING CABLE 4 COND. NO. 4
	EXISTING CIRCUITING		UNDERGROUND WIRING IN CONDUIT
	LIGHTING UNIT NUMBER		CONDUIT STUB
	LIGHTING UNIT TYPE SPECIAL 1 OR SPECIAL 2		LIGHTING UNIT TYPE 9-40, 9-49 OR SPECIAL
			UNDERPASS LIGHTING UNIT
			GROUND ROD (25 OHM OR LESS)
			HANDHOLE
			3" NMC SCH. 80
			S.O.P. SOURCE OF POWER



FD. PT. W7J, 240/480 V.

NO.	LOCATION	STATION	LT.	RT.	TYPE
J3	35WNB	335+16	-	-	EX
J4	35WNB	335+16	-	-	EX
J5	NBTH10	421+74	-	-	EX
J6	NBTH10	423+89	-	-	EX
J7	NBTH10	423+89	-	-	EX
J8	NBTH10	416+18	-	-	EX
J9	NBTH10	416+18	-	-	EX
J10	NBTH10	427+90	-	-	EX
J11	35WNB	346+11	-	-	9-49
J12	SERAMP	61+90	-	-	9-49
J13	35WNB	351+02	-	-	9-49
J14	SERAMP	64+34	-	-	UNDERPASS

B AND R DENOTE CURRENT CARRYING CONDUCTORS
W DENOTES NEUTRAL CONDUCTOR
DASHED LINES DENOTE INPLACE ITEMS
METER ADDRESS: 4680 HWY 35W, ARDEN HILLS, MN 55112

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: CIF				
DESIGNER: AKF				
CHECKED BY: KST				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Thomas D. Honer* Lic. No. 45519
Printed Name: THOMAS D. HONER Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

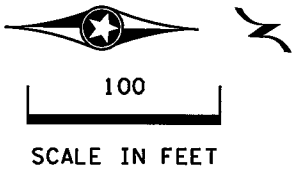
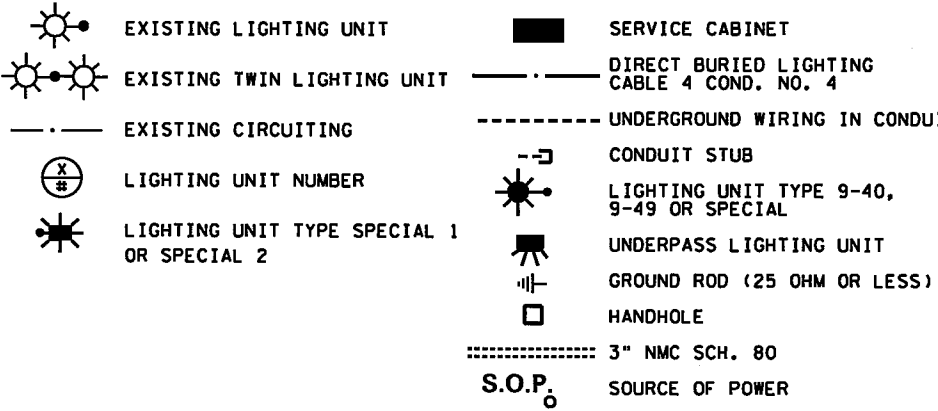
LIGHTING PLAN
PROPOSED
NB TH 35W INP STA. 341+57 - 347+00
NB TH 10 STA. 424+82 - 430+00

FILE NO. RAMSEY129594	357
LL5 OF LL4	367

NOTES:

- CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE 2" NMC SCHEDULE 40 UNLESS OTHERWISE NOTED.
- PROVIDE 2" CAPPED CONDUIT STUB AS INDICATED. (INCIDENTAL)
- LIGHTING UNITS SHALL BE SET BACK AS DIRECTED BY THE ENGINEER.
- CONDUCTORS IN CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE COPPER, TYPE XHHW-2, (2) #4 & (1) #6 GND UNLESS OTHERWISE NOTED.

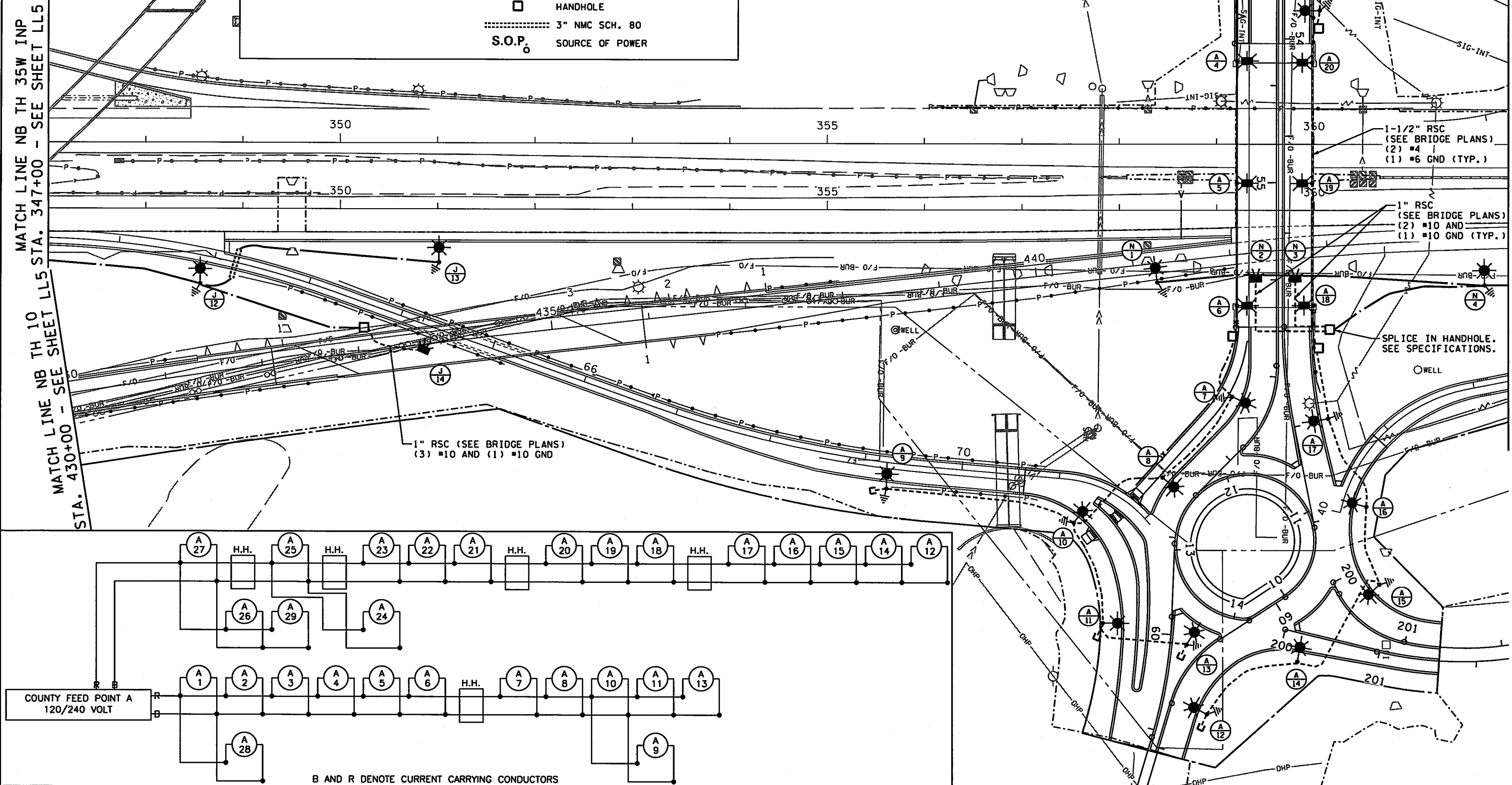
LEGEND



MATCH LINE EB CR H STA. 52+00 - SEE SHEET LL8

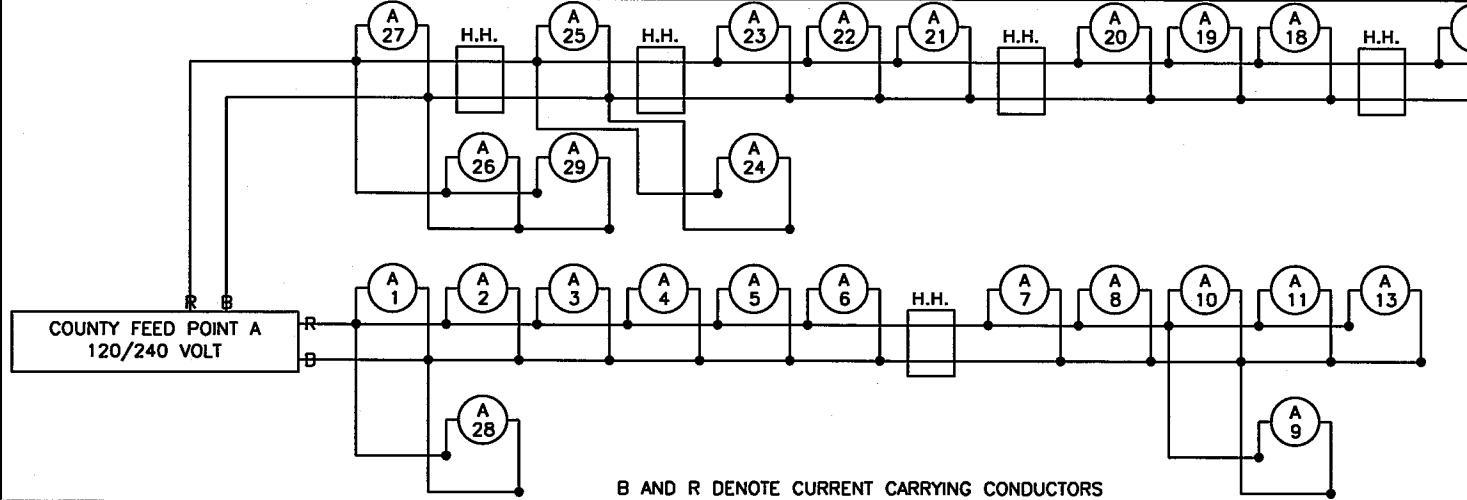
1-1/2" RSC (SEE RETAINING WALL PLANS)
(2) #4 AND
(1) #6 GND (TYP.)

MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET LL7



9:41:35 AM
1/12/2016
MATCH LINE NB TH 35W INP
STA. 347+00 - SEE SHEET LL5

MATCH LINE NB TH 10
STA. 430+00 - SEE SHEET LL5



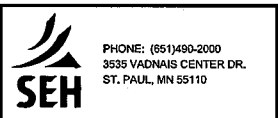
DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	AKF			
CHECKED BY:	KST			
	NO.	BY	DATE	REVISIONS

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

LIGHTING PLAN
PROPOSED
NB TH 35W INP STA. 347+00 - 362+00
NB TH 10 STA. 430+00 - 442+01

FILE NO.	358
RAMSEI29594	
LL6 OF LL4	367

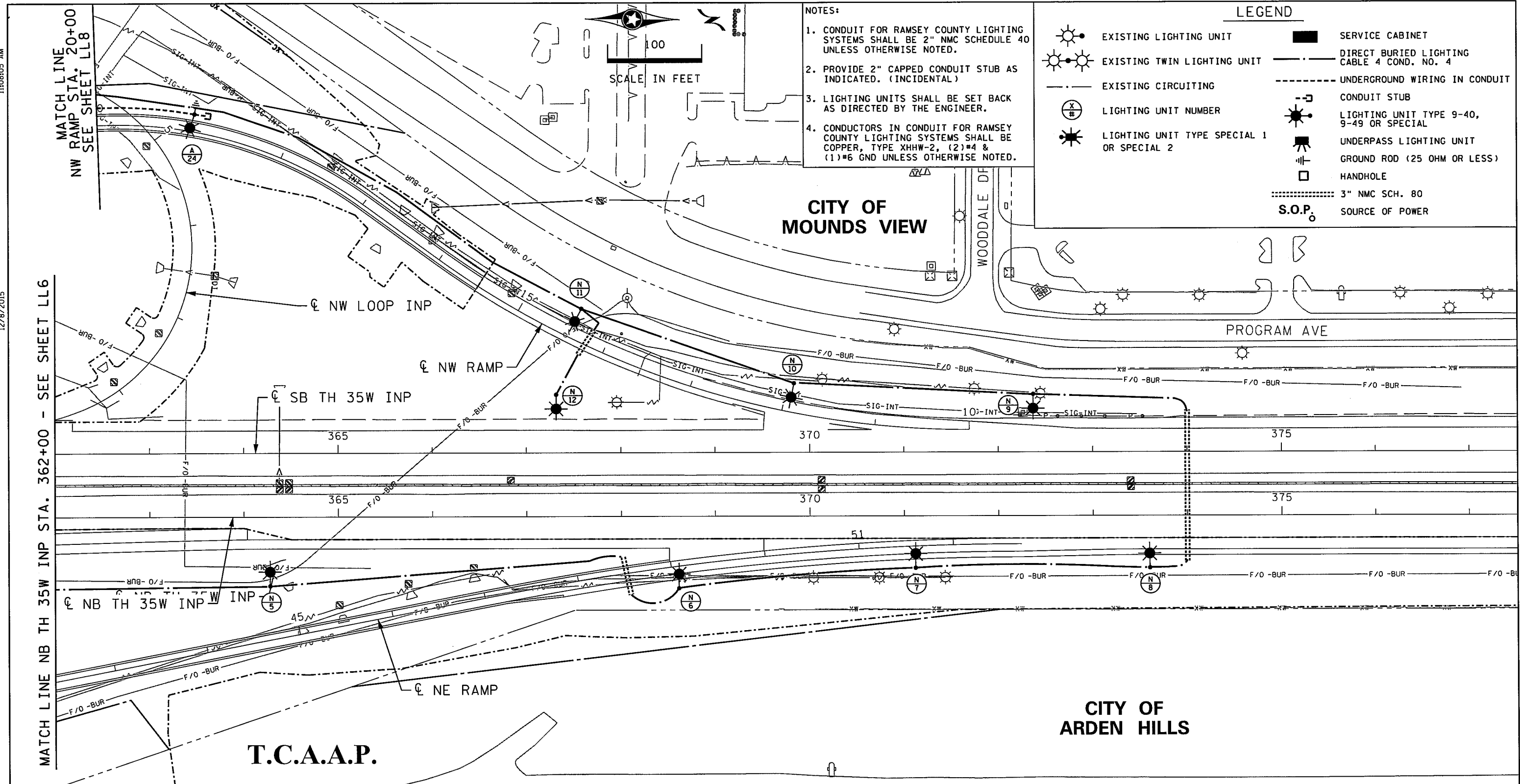
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *[Signature]* Lic. No. 45519
Printed Name: THOMAS D. HONER Date: 1/12/2016



11:08:05 AM

12/8/2015

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- NOTES:**
1. CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE 2" NMC SCHEDULE 40 UNLESS OTHERWISE NOTED.
 2. PROVIDE 2" CAPPED CONDUIT STUB AS INDICATED. (INCIDENTAL)
 3. LIGHTING UNITS SHALL BE SET BACK AS DIRECTED BY THE ENGINEER.
 4. CONDUCTORS IN CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE COPPER, TYPE XHHW-2, (2)*4 & (1)*6 GND UNLESS OTHERWISE NOTED.

LEGEND

- EXISTING LIGHTING UNIT
- EXISTING TWIN LIGHTING UNIT
- EXISTING CIRCUITING
- LIGHTING UNIT NUMBER
- LIGHTING UNIT TYPE SPECIAL 1 OR SPECIAL 2
- SERVICE CABINET
- DIRECT BURIED LIGHTING CABLE 4 COND. NO. 4
- UNDERGROUND WIRING IN CONDUIT
- CONDUIT STUB
- LIGHTING UNIT TYPE 9-40, 9-49 OR SPECIAL
- UNDERPASS LIGHTING UNIT
- GROUND ROD (25 OHM OR LESS)
- HANDHOLE
- 3" NMC SCH. 80
- S.O.P. SOURCE OF POWER

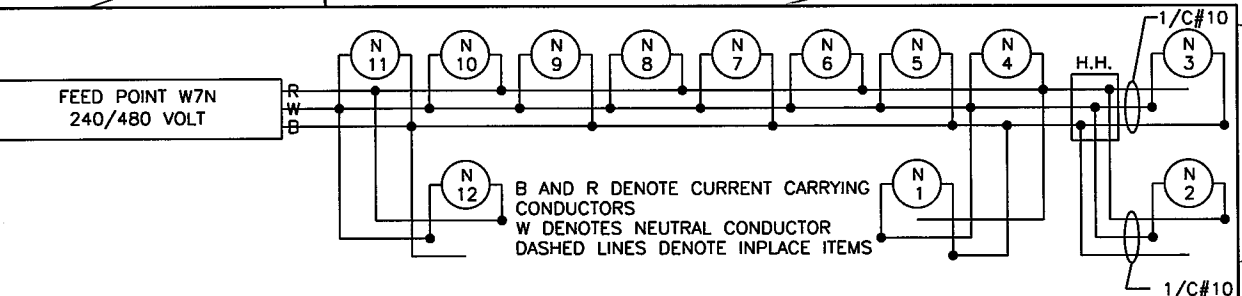
MATCH LINE NB TH 35W INP STA. 362+00 - SEE SHEET LL6

MATCH LINE NW RAMP STA. 20+00 SEE SHEET LL8

T.C.A.A.P.

CITY OF ARDEN HILLS

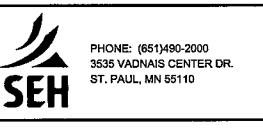
CITY OF MOUNDS VIEW



DESIGN TEAM				REVISIONS			
DRAWN BY:	CIF			NO.	BY	DATE	
DESIGNER:	AKF						
CHECKED BY:	KST						

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

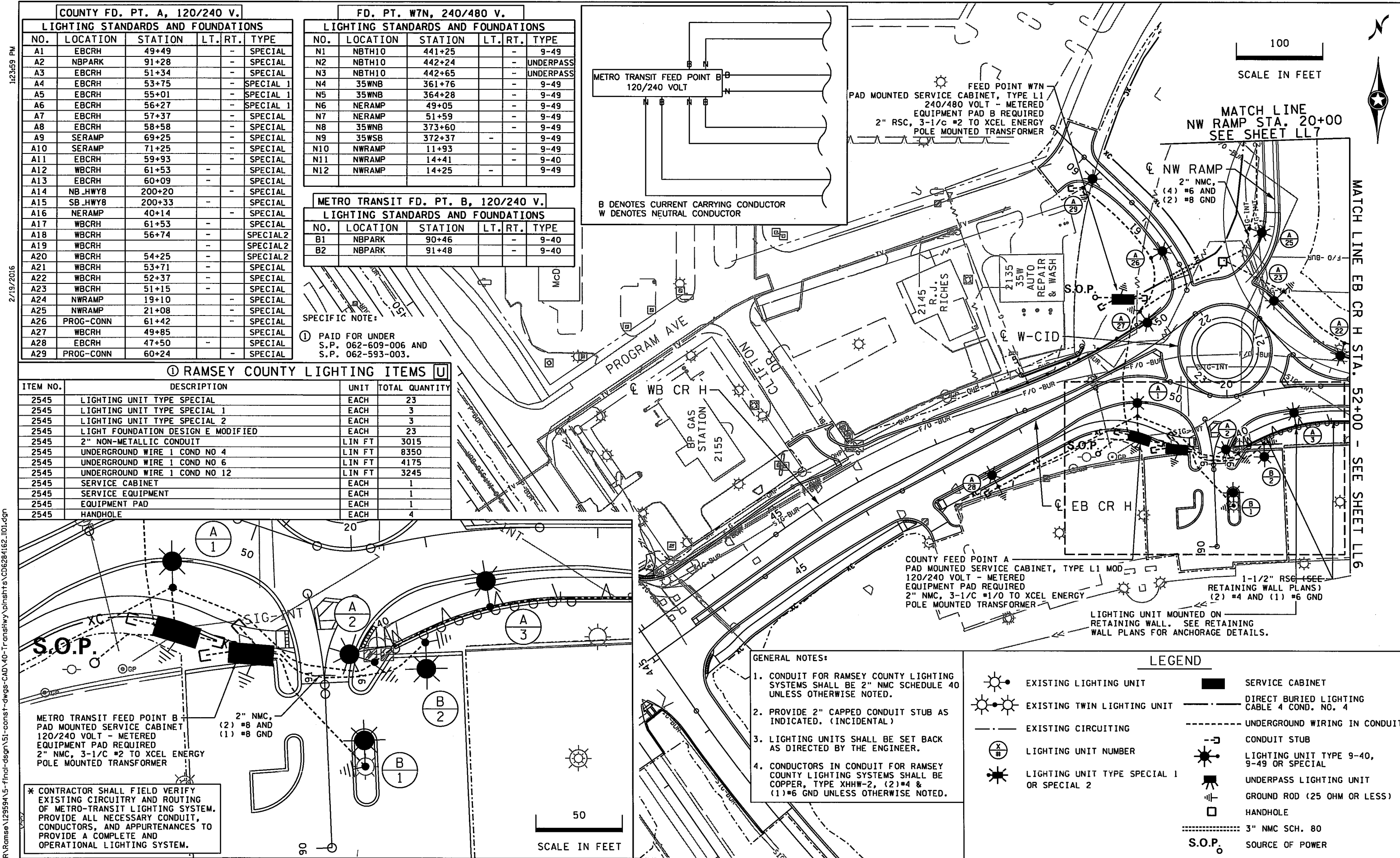
Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

LIGHTING PLAN
 PROPOSED
 NB TH 35W INP STA. 362+00 - 377+00

FILE NO. RAMSE129594
 LL7 OF LL14
 359
 367



COUNTY FD. PT. A, 120/240 V.

FD. PT. W7N, 240/480 V.

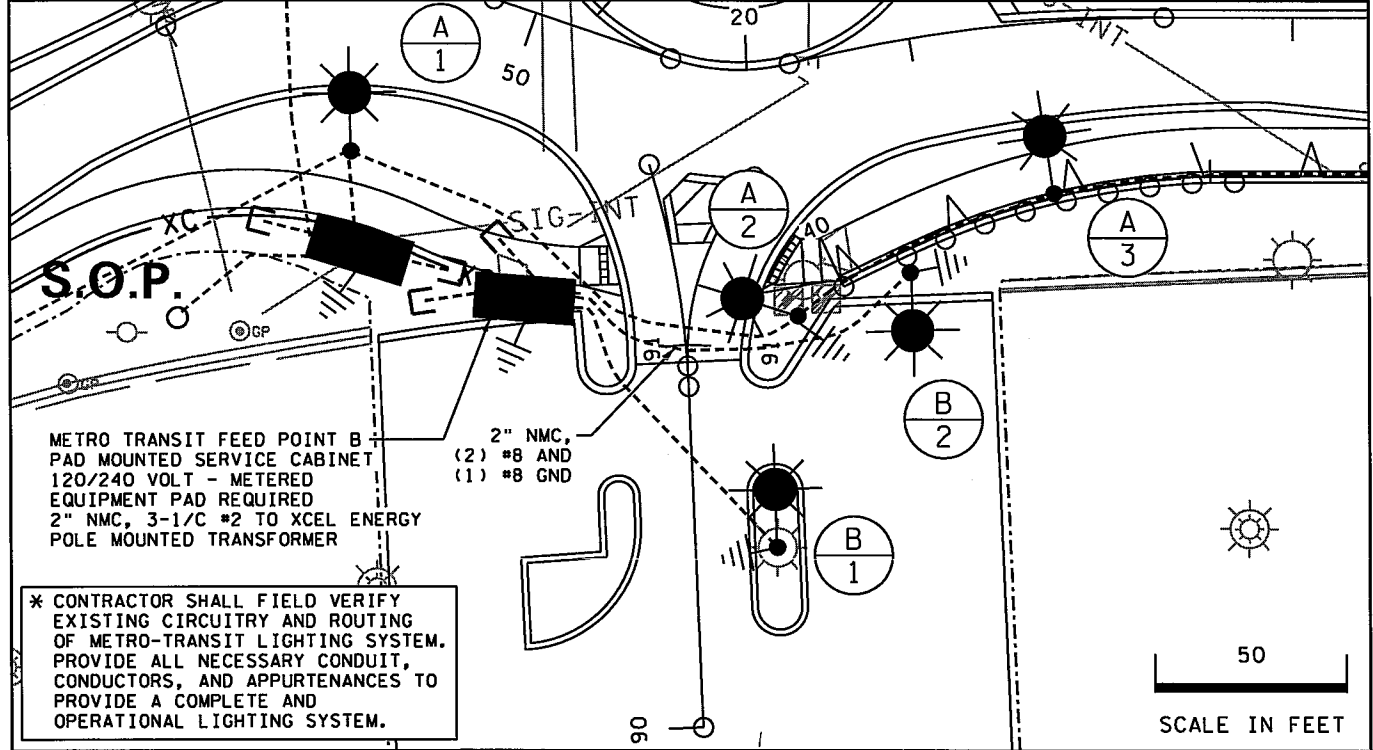
LIGHTING STANDARDS AND FOUNDATIONS				
NO.	LOCATION	STATION	LT. RT.	TYPE
A1	EBCRH	49+49	-	SPECIAL
A2	NBPARK	91+28	-	SPECIAL
A3	EBCRH	51+34	-	SPECIAL
A4	EBCRH	53+75	-	SPECIAL 1
A5	EBCRH	55+01	-	SPECIAL 1
A6	EBCRH	56+27	-	SPECIAL 1
A7	EBCRH	57+37	-	SPECIAL
A8	EBCRH	58+58	-	SPECIAL
A9	SERAMP	69+25	-	SPECIAL
A10	SERAMP	71+25	-	SPECIAL
A11	EBCRH	59+93	-	SPECIAL
A12	WBCRH	61+53	-	SPECIAL
A13	EBCRH	60+09	-	SPECIAL
A14	NB_HWY8	200+20	-	SPECIAL
A15	SB_HWY8	200+33	-	SPECIAL
A16	NERAMP	40+14	-	SPECIAL
A17	WBCRH	61+53	-	SPECIAL
A18	WBCRH	56+74	-	SPECIAL 2
A19	WBCRH	-	-	SPECIAL 2
A20	WBCRH	54+25	-	SPECIAL 2
A21	WBCRH	53+71	-	SPECIAL
A22	WBCRH	52+37	-	SPECIAL
A23	WBCRH	51+15	-	SPECIAL
A24	NWRAMP	19+10	-	SPECIAL
A25	NWRAMP	21+08	-	SPECIAL
A26	PROG-CONN	61+42	-	SPECIAL
A27	WBCRH	49+85	-	SPECIAL
A28	EBCRH	47+50	-	SPECIAL
A29	PROG-CONN	60+24	-	SPECIAL

LIGHTING STANDARDS AND FOUNDATIONS				
NO.	LOCATION	STATION	LT. RT.	TYPE
N1	NBTH10	441+25	-	9-49
N2	NBTH10	442+24	-	UNDERPASS
N3	NBTH10	442+65	-	UNDERPASS
N4	35WNB	361+76	-	9-49
N5	35WNB	364+28	-	9-49
N6	NERAMP	49+05	-	9-49
N7	NERAMP	51+59	-	9-49
N8	35WNB	373+60	-	9-49
N9	35WSB	372+37	-	9-49
N10	NWRAMP	11+93	-	9-49
N11	NWRAMP	14+41	-	9-40
N12	NWRAMP	14+25	-	9-49

METRO TRANSIT FD. PT. B, 120/240 V.				
LIGHTING STANDARDS AND FOUNDATIONS				
NO.	LOCATION	STATION	LT. RT.	TYPE
B1	NBPARK	90+46	-	9-40
B2	NBPARK	91+48	-	9-40

SPECIFIC NOTE:
 ① PAID FOR UNDER S.P. 062-609-006 AND S.P. 062-593-003.

① RAMSEY COUNTY LIGHTING ITEMS U			
ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITY
2545	LIGHTING UNIT TYPE SPECIAL	EACH	23
2545	LIGHTING UNIT TYPE SPECIAL 1	EACH	3
2545	LIGHTING UNIT TYPE SPECIAL 2	EACH	3
2545	LIGHT FOUNDATION DESIGN E MODIFIED	EACH	23
2545	2" NON-METALLIC CONDUIT	LIN FT	3015
2545	UNDERGROUND WIRE 1 COND NO 4	LIN FT	8350
2545	UNDERGROUND WIRE 1 COND NO 6	LIN FT	4175
2545	UNDERGROUND WIRE 1 COND NO 12	LIN FT	3245
2545	SERVICE CABINET	EACH	1
2545	SERVICE EQUIPMENT	EACH	1
2545	EQUIPMENT PAD	EACH	1
2545	HANDHOLE	EACH	4



B DENOTES CURRENT CARRYING CONDUCTOR
 W DENOTES NEUTRAL CONDUCTOR

FEED POINT W7N
 PAD MOUNTED SERVICE CABINET, TYPE L1
 240/480 VOLT - METERED
 EQUIPMENT PAD B REQUIRED
 2" NMC, 3-1/2" #2 TO XCEL ENERGY
 POLE MOUNTED TRANSFORMER

COUNTY FEED POINT A
 PAD MOUNTED SERVICE CABINET, TYPE L1 MOD
 120/240 VOLT - METERED
 EQUIPMENT PAD REQUIRED
 2" NMC, 3-1/2" #1/0 TO XCEL ENERGY
 POLE MOUNTED TRANSFORMER

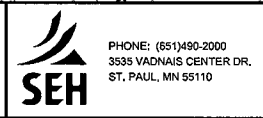
LIGHTING UNIT MOUNTED ON
 RETAINING WALL. SEE RETAINING
 WALL PLANS FOR ANCHORAGE DETAILS.

- GENERAL NOTES:
- CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE 2" NMC SCHEDULE 40 UNLESS OTHERWISE NOTED.
 - PROVIDE 2" CAPPED CONDUIT STUB AS INDICATED. (INCIDENTAL)
 - LIGHTING UNITS SHALL BE SET BACK AS DIRECTED BY THE ENGINEER.
 - CONDUCTORS IN CONDUIT FOR RAMSEY COUNTY LIGHTING SYSTEMS SHALL BE COPPER, TYPE XHHW-2, (2)#4 & (1)#6 GND UNLESS OTHERWISE NOTED.

LEGEND	
	EXISTING LIGHTING UNIT
	EXISTING TWIN LIGHTING UNIT
	EXISTING CIRCUITING
	LIGHTING UNIT NUMBER
	LIGHTING UNIT TYPE SPECIAL 1 OR SPECIAL 2
	SERVICE CABINET
	DIRECT BURIED LIGHTING CABLE 4 COND. NO. 4
	UNDERGROUND WIRING IN CONDUIT
	CONDUIT STUB
	LIGHTING UNIT TYPE 9-40, 9-49 OR SPECIAL
	UNDERPASS LIGHTING UNIT
	GROUND ROD (25 OHM OR LESS)
	HANDHOLE
	3" NMC SCH. 80
	S.O.P. SOURCE OF POWER

* CONTRACTOR SHALL FIELD VERIFY EXISTING CIRCUITRY AND ROUTING OF METRO-TRANSIT LIGHTING SYSTEM. PROVIDE ALL NECESSARY CONDUIT, CONDUCTORS, AND APPURTENANCES TO PROVIDE A COMPLETE AND OPERATIONAL LIGHTING SYSTEM.

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 2/19/2016

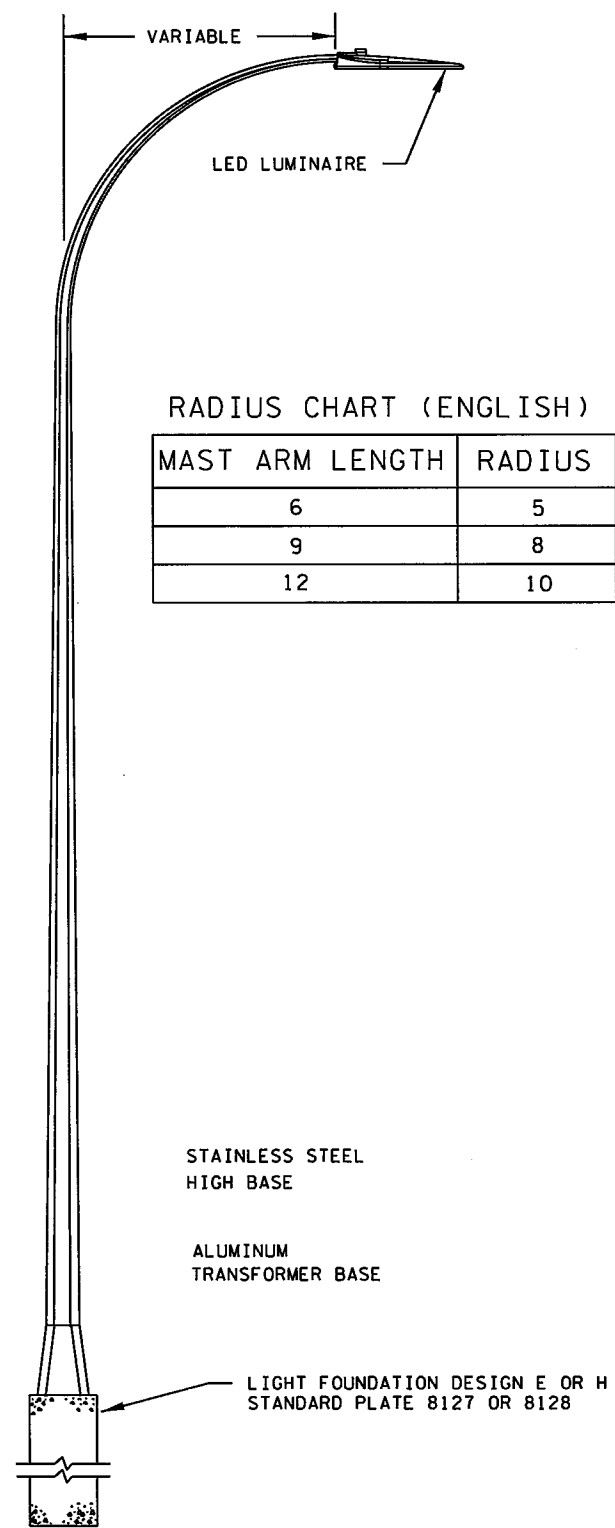


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

LIGHTING PLAN
 PROPOSED
 EB CR H STA. 40+00 - 52+00

FILE NO.	360
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LL8 OF LL14	367

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 2/19/2016
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RADIUS CHART (ENGLISH)

MAST ARM LENGTH	RADIUS
6	5
9	8
12	10

LIGHTING UNIT TYPE 9-40 OR 9-49 (BREAKAWAY)

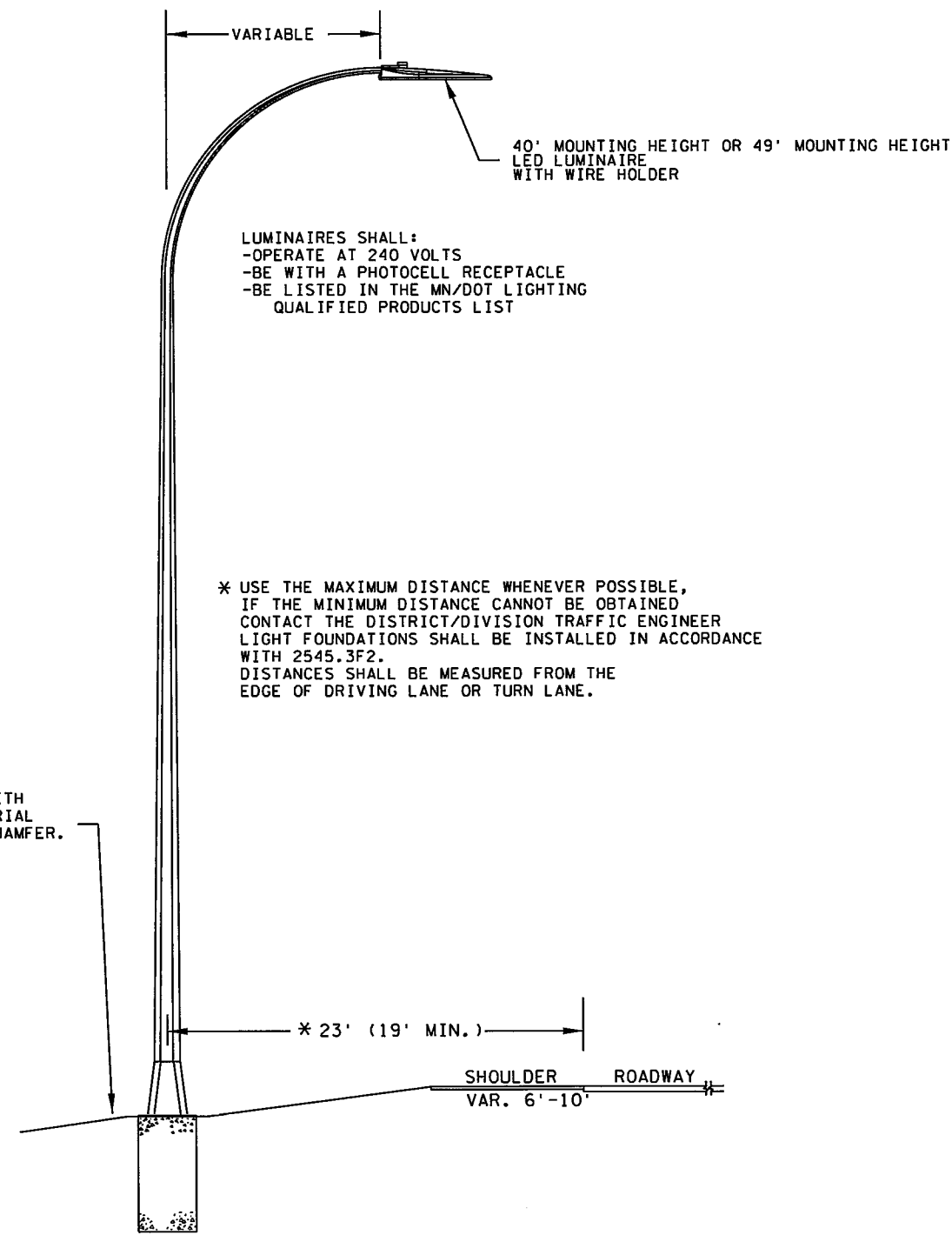
FILL AROUND TOP OF FOUNDATION WITH EXCAVATED MATERIAL. GRADE MATERIAL LEVEL WITH BOTTOM OF CONCRETE CHAMFER. (INCIDENTAL)

STAINLESS STEEL HIGH BASE

ALUMINUM TRANSFORMER BASE

LIGHT FOUNDATION DESIGN E OR H STANDARD PLATE 8127 OR 8128

LED LUMINAIRES



LUMINAIRES SHALL:

- OPERATE AT 240 VOLTS
- BE WITH A PHOTOCELL RECEPTACLE
- BE LISTED IN THE MN/DOT LIGHTING QUALIFIED PRODUCTS LIST

* USE THE MAXIMUM DISTANCE WHENEVER POSSIBLE, IF THE MINIMUM DISTANCE CANNOT BE OBTAINED CONTACT THE DISTRICT/DIVISION TRAFFIC ENGINEER LIGHT FOUNDATIONS SHALL BE INSTALLED IN ACCORDANCE WITH 2545.3F2. DISTANCES SHALL BE MEASURED FROM THE EDGE OF DRIVING LANE OR TURN LANE.

LIGHTING UNIT TYPE 9-40 OR 9-49 PLACEMENT DETAIL

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	AKF		
CHECKED BY:	KST		
NO.	BY	DATE	REVISIONS

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Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 12/8/2015



PHONE: (651)490-2000
 3535 VADNAIS CENTER DR.
 ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

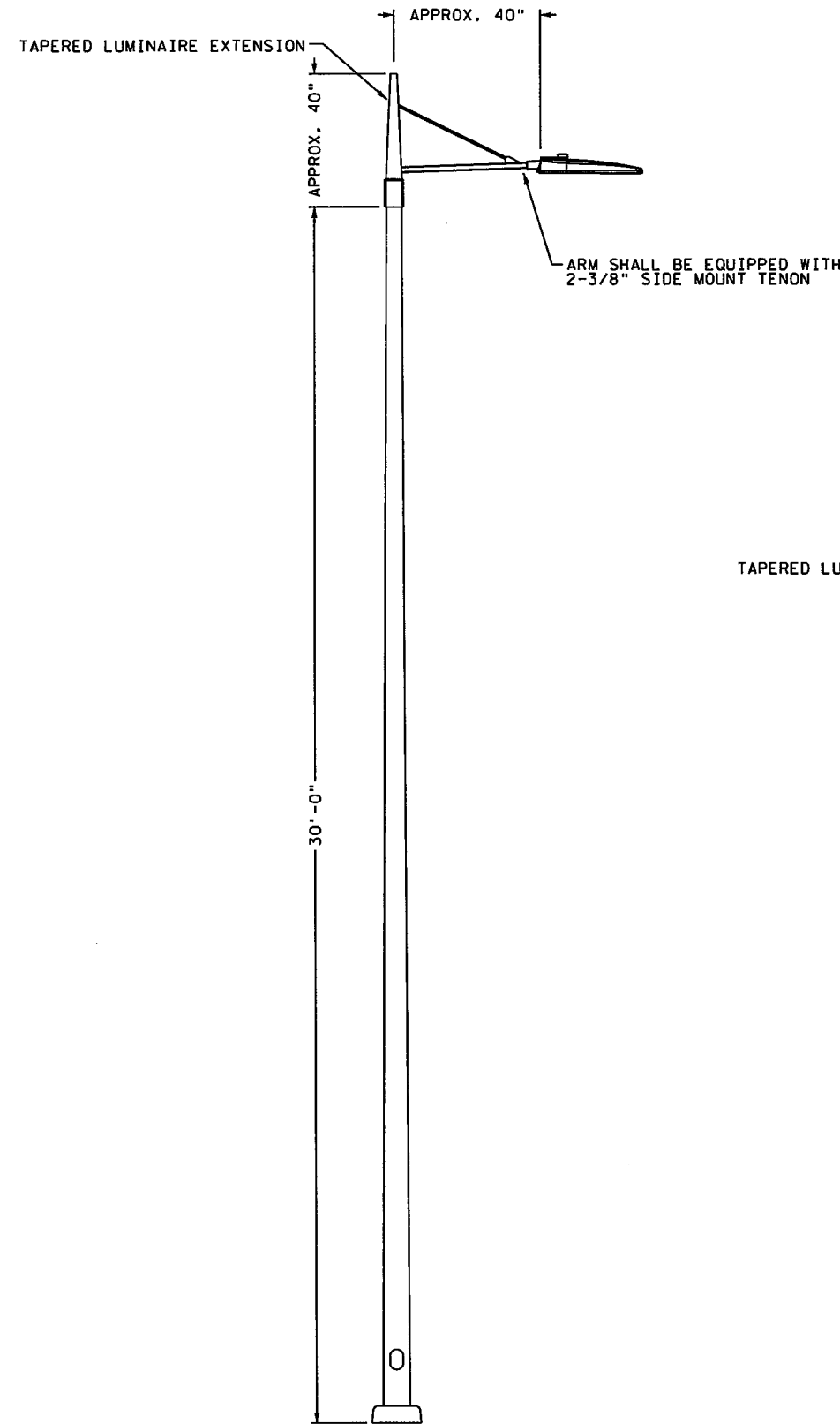
LIGHTING PLAN
 LIGHTING DETAILS

FILE NO. RAMSE129594	361
LL9 OF LL14	367

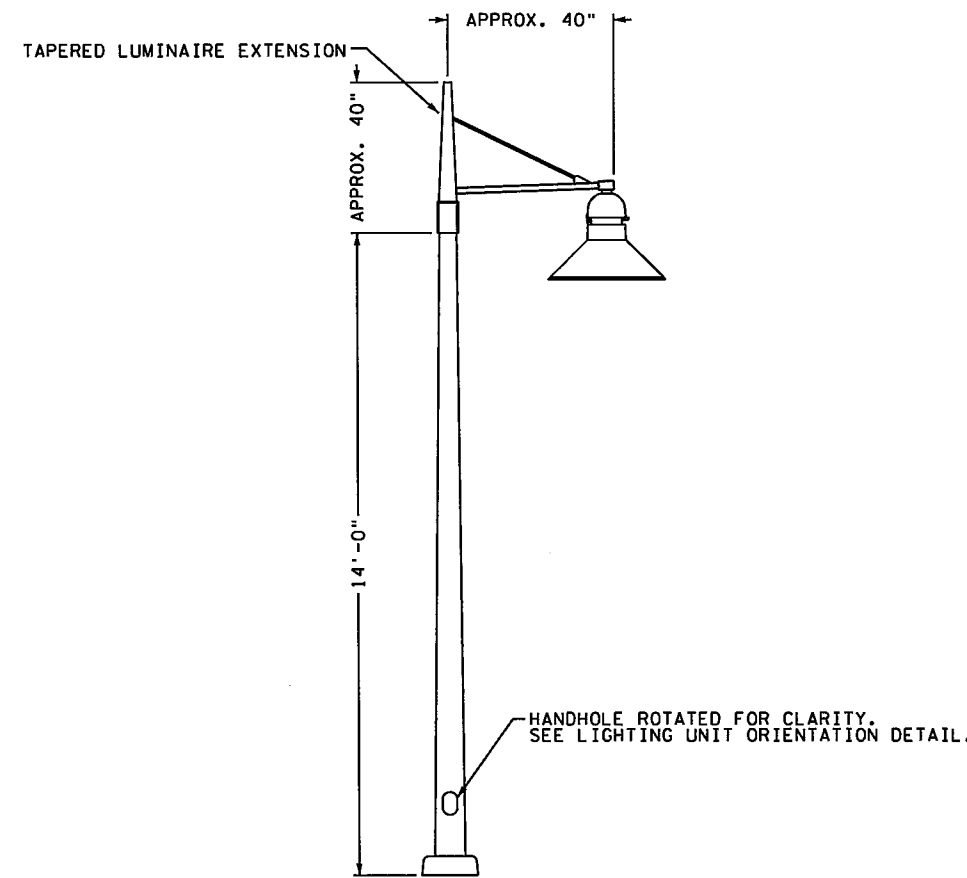
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12/8/2015

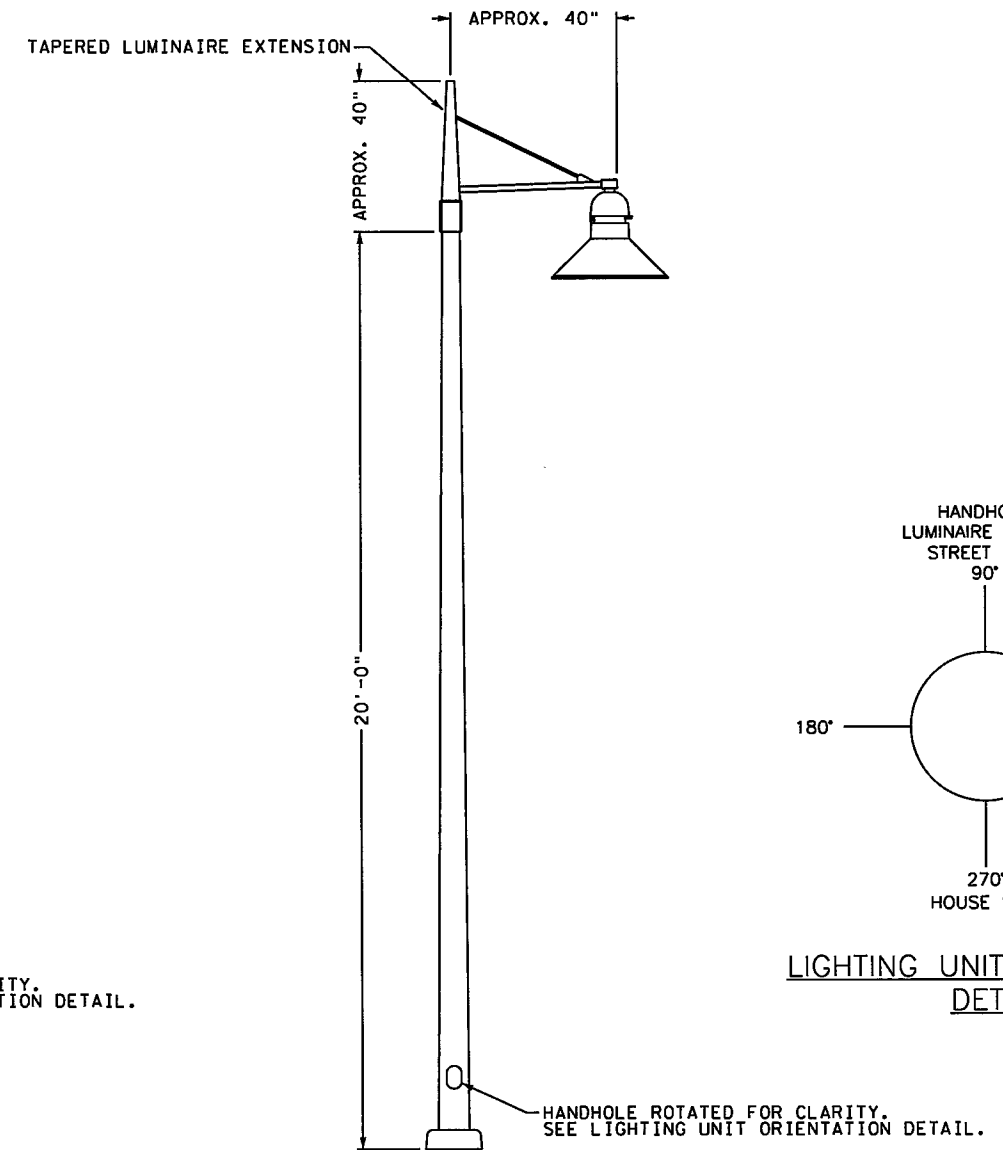
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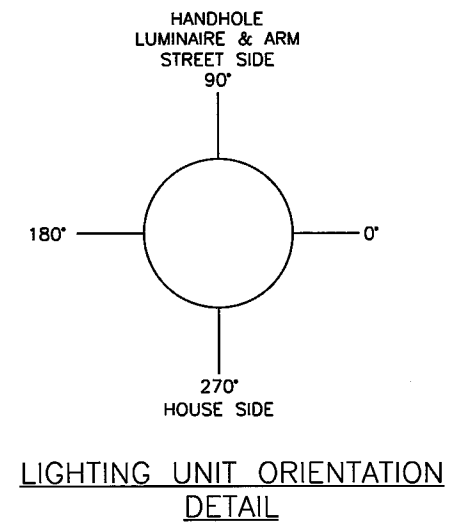
LIGHTING UNIT TYPE SPECIAL
DETAIL



LIGHTING UNIT TYPE SPECIAL 1
DETAIL



LIGHTING UNIT TYPE SPECIAL 2
DETAIL



DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	AKF		
CHECKED BY:	KST		
NO.	BY	DATE	REVISIONS

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Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

LIGHTING PLAN
 LIGHTING DETAILS

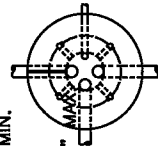
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LL10 OF LL14	367

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2/16/2016

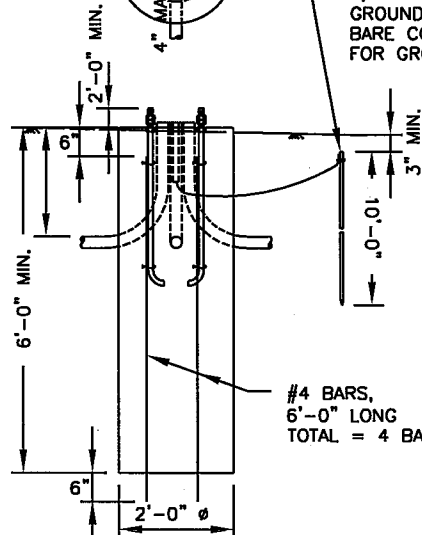
24" DIA. CONCRETE BASE W/
2" FOUNDATION EXPOSURE
AND 3/4" CHAMFERED EDGE.
BRUSH FINISH ALL EXPOSED
SURFACES. 4000 PSI
CONCRETE W/ AIR
ENTRAINMENT, MNDOT MIX
3Y43.

BOLT CIRCLE PER
POLE MANUFACTURER

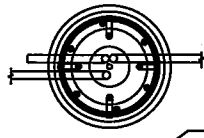


ANCHOR BOLT BY POLE SUPPLIER
TWO GALVANIZED HEX NUTS AND
WASHERS PER ANCHOR BOLT.

5/8" Ø COPPER COATED
GROUND ROD WITH CLAMP & #6
BARE COPPER WIRE, SEE PLAN
FOR GROUND ROD LOCATIONS



LIGHT FOUNDATION DESIGN E MODIFIED DETAIL



CAPPED 2" NMC FOR FUTURE
AT 24" BELOW GRADE WHERE
SHOWN ON PLAN.

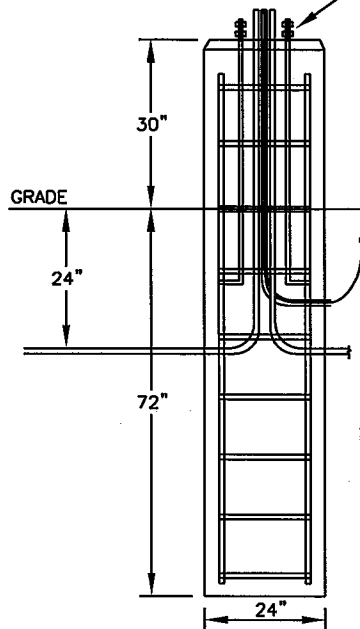
BOLT CIRCLE PER POLE MANUFACTURER

24" DIA. CONCRETE BASE W 30" EXPOSURE ABOVE
GRADE, AND 1" CHAMFERED EDGE. BRUSH FINISH
ALL EXPOSED SURFACES 4000 PSI CONCRETE W/
AIR ENTRAINMENT, MNDOT MIX 3Y43

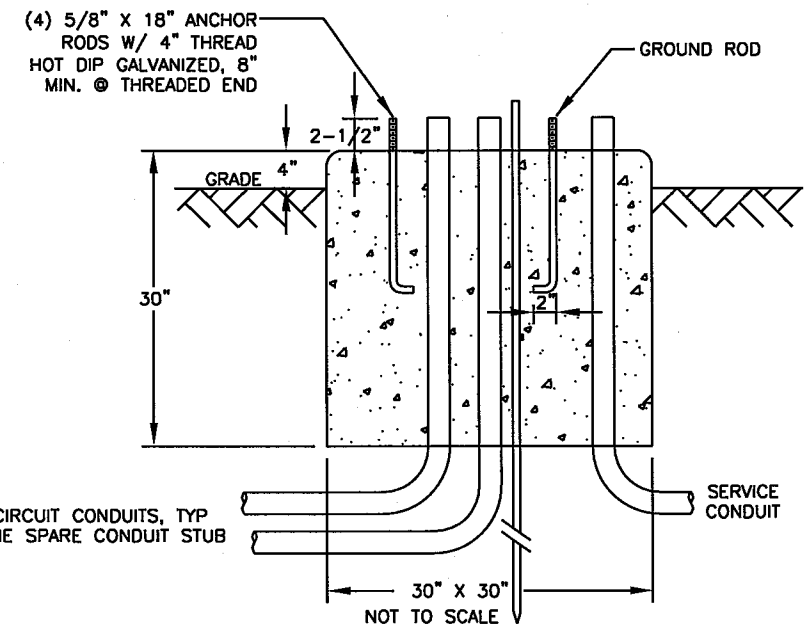
ANCHOR BOLTS BY POLE SUPPLIER
TWO GALVANIZED HEX NUTS AND
WASHERS PER ANCHOR BOLT.

(6)#7 REBAR VERTICALS, W/ #3 TIES ON 12" CENTERS.
WELD INTO ASSEMBLY, VERIFY W/ POLE SUPPLIER

10'-0" X 5/8" COPPER CLAD STEEL GROUND ROD
WITH CODE APPROVED GROUNDING CLAMP. ROUTE
BARE #6 CU CONDUCTOR VIA 1/2" PVC C. TO
GROUND LUG IN POLE BASE AT HANDHOLE.

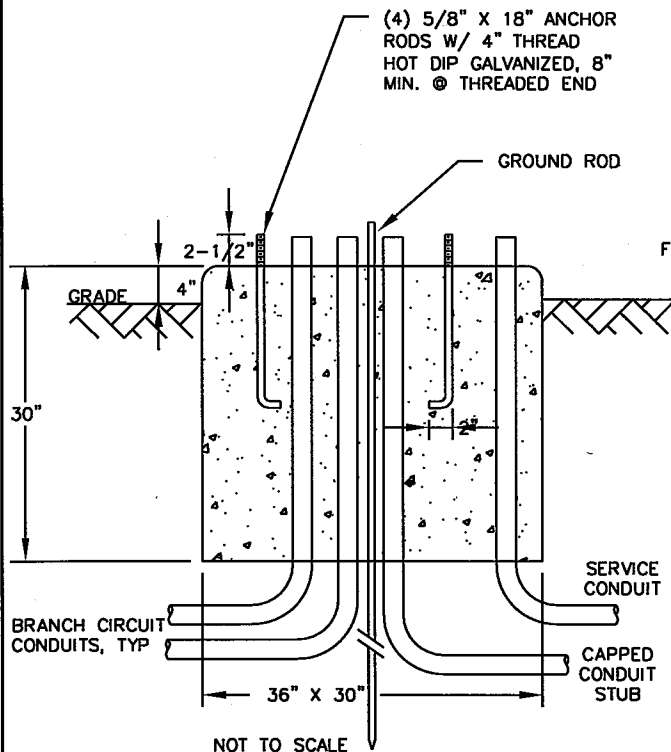


LIGHT FOUNDATION DESIGN SPECIAL DETAIL
(METRO TRANSIT PARK-N-RIDE)

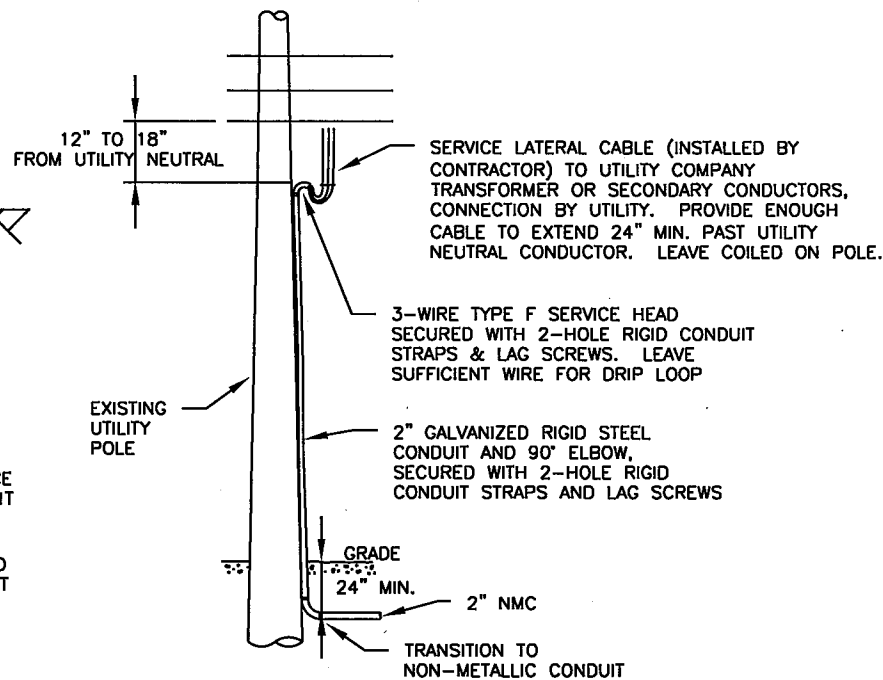


BRANCH CIRCUIT CONDUITS, TYP
PROVIDE ONE SPARE CONDUIT STUB

EQUIPMENT PAD B MODIFIED DETAILS
(SERVICE CABINET FOUNDATION - COUNTY)



EQUIPMENT PAD DETAILS
(SERVICE CABINET FOUNDATION - METRO TRANSIT)



SERVICE EQUIPMENT DETAIL

EQUIPMENT SCHEDULE					
SYMBOL	DESCRIPTION	LAMP SOURCE	MOUNTING	OPTICS	MANUFACTURER & SERIES #
☼	LIGHTING UNIT TYPE 9-40 AND 9-49	40' AND 49' MOUNTING HEIGHT LED LUMINAIRE	40' POLE ON LIGHT FOUNDATION DESIGN E AND 49' POLE ON LIGHT FOUNDATION DESIGN H	TYPE II OR TYPE III	SEE MNDOT'S APPROVED PRODUCTS LIST
☼	LIGHTING UNIT TYPE SPECIAL LED LUMINAIRE ON ALUMINUM POLE WITH 11-1/2" BOLT CIRCLE	138 WATT 60 LED 4000K	30' POLE ON LIGHT FOUNDATION DESIGN E MODIFIED	TYPE III	LUMINAIRE - AMERICAN ELECTRIC LIGHTING: ATB2-60BLEDE70-MVOLT-R3--DM ARM - HOLOPHANE & CYCLONE: SEE LIGHTING UNIT DETAIL AND REQUIREMENTS*** STRUCTURA: CATELAM*** POLE - HOLOPHANE, LYTE POLES, & HAPCO: 30' - SEE DETAIL AND SPECIFICATIONS
☼	LIGHTING UNIT TYPE SPECIAL 1 PENDANT STYLE LED LUMINAIRE ON TRUSS STYLE LUMINAIRE EXTENSION AND ROUND TAPERED ALUMINUM POLE	LED 4000K	14' POLE ON BRIDGE PILASTER - SEE BRIDGE PLANS	TYPE III	LUMENAREA - LUMINAIRE: ALLEGRA 7220-LE3-87L-240-CC* STRUCTURA - ARM: CATELAM*** LYTE POLES - POLE: 14' - SEE REQUIREMENTS** CYCLONE - LUMINAIRE: CNM55P1-GAL-3-80W-4K-240-GCN15* ARM: SEE LIGHTING UNIT DETAIL AND REQUIREMENTS*** HAPCO - POLE: 14' - SEE REQUIREMENTS** HOLOPHANE - LUMINAIRE: GSLF2-053-4K-AS-4-CMC*-L3 ARM: SEE LIGHTING UNIT DETAIL AND REQUIREMENTS*** POLE: 14' - SEE REQUIREMENTS**
☼	LIGHTING UNIT TYPE SPECIAL 2 PENDANT STYLE LED LUMINAIRE ON TRUSS STYLE LUMINAIRE EXTENSION AND ROUND TAPERED ALUMINUM POLE	LED 4000K	20' POLE ON BRIDGE BLISTER - SEE BRIDGE PLANS	TYPE III	LUMENAREA - LUMINAIRE: ALLEGRA 7220-LE3-87L-240-CC* STRUCTURA - ARM: CATELAM*** LYTE POLES - POLE: 20' - SEE REQUIREMENTS** CYCLONE - LUMINAIRE: CNM55P1-GAL-3-80W-4K-240-GCN15* ARM: SEE LIGHTING UNIT DETAIL AND REQUIREMENTS*** HAPCO - POLE: 20' - SEE REQUIREMENTS** HOLOPHANE - LUMINAIRE: GSLF2-053-4K-AS-4-CMC*-L3 ARM: SEE LIGHTING UNIT DETAIL AND REQUIREMENTS*** POLE: 20' - SEE REQUIREMENTS**

*NOTE - LUMINAIRE COLOR SHALL BE A NON-STANDARD RAL COLOR WITH A TEXTURED FINISH.
**NOTE - POLE COLOR SHALL BE A NON-STANDARD RAL COLOR WITH A TEXTURED FINISH. BOLT CIRCLE SHALL BE A 9.5" CIRCLE AND HAVE A SQUARE PATTERN RELATIVE TO THE CURB. ANCHOR BOLT SIZE SHALL BE 1". SEE BRIDGE PLANS FOR ANCHORAGE DETAILS.
***NOTE - ARM SHALL HAVE SAME APPEARANCE AND CHARACTERISTICS AS SHOWN IN THE LIGHTING UNIT DETAIL. ARM SHALL HAVE A NON-STANDARD RAL COLOR WITH A TEXTURED FINISH.

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DESIGN TEAM				
DRAWN BY:	CIF			
DESIGNER:	AKF			
CHECKED BY:	KST			
	NO.	BY	DATE	REVISIONS

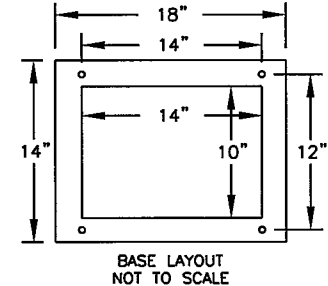
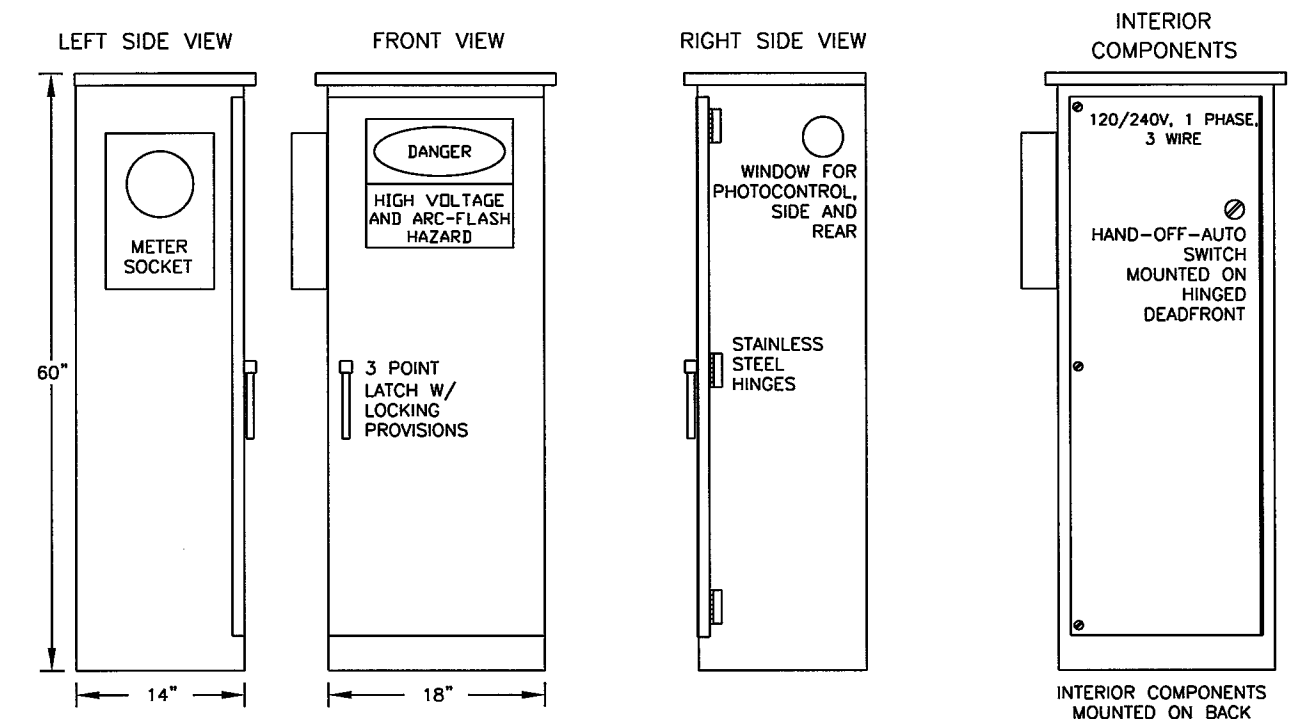
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Thomas D. Honer* Lic. No. 45519
Printed Name: THOMAS D. HONER Date: 2/16/2016

SEH
PHONE: (651)460-2000
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110

RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

LIGHTING PLAN
LIGHTING DETAILS

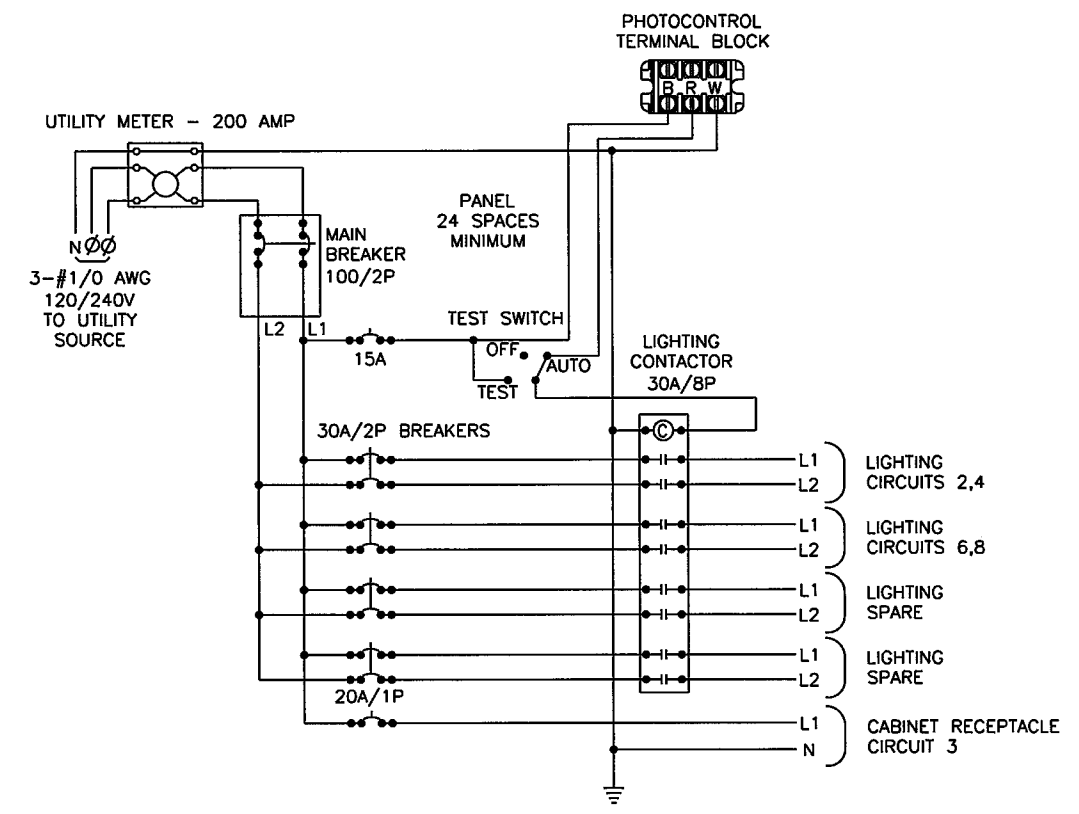
FILE NO. 364
RAMSE129594
LL12
OF LL14
367



CABINET CONSTRUCTION

- NEMA 3R
- INTERIOR COMPONENTS MOUNTED ON BACK PANEL BEHIND DEAD FRONT
- 1/8" ANODIZED ALUMINUM (DURANODIC #314)
- NEOPRENE GASKETED DOORS
- STAINLESS STEEL HARDWARE
- ETL LISTED IN ACCORDANCE WITH UL508A

- SERVICE CABINET NOTES:**
- PROVIDE METER SOCKET PER UTILITY COMPANY REQUIREMENTS.
 - CIRCUIT BREAKERS SHALL BE 120/240 VOLT AC, 60Hz AND SHALL BE CLEARLY MARKED WITH THE "ON" AND "OFF" POSITIONS AND IDENTIFIED WITH THE LOAD WHICH IT IS CARRYING.
 - SHORT CIRCUIT RATING - 22,000 AIC SYMMETRICAL.
 - THREE POSITION TYPE 800T-J2A NON-ILLUMINATED SELECTOR SWITCH WITH 1-N.O. AND 1-N.C. MAINTAINED CONTACTS. SHALL HAVE TYPE 4/13 OPERATORS.
 - CIRCUIT CONTACTORS SHALL HAVE A 240 VOLT RATING, WITH 120 VOLT COIL.
 - PROVIDE PANEL WITH DIMENSIONS AS REQUIRED TO FIT EQUIPMENT PROPOSED.
 - PROVIDE A 25-OHM GROUND AT CABINET AS PER NEC.
 - PROVIDE 20A WR-RATED GFCI RECEPTACLE MOUNTED TO CABINET BACK-PANEL.
 - BOTH PHOTOCONTROL AND ITS SOCKET SHALL BE 3 TERMINAL, POLARIZED, TWIST-LOCK TYPE. IT SHALL BE EQUIPPED WITH A MOVRO TYPE LIGHTNING ARRESTER.
 - COORDINATE SERVICE CONNECTIONS WITH XCEL ENERGY.



SERVICE CABINET TYPE L1 MODIFIED SCHEMATIC
(COUNTY CABINET)

SERVICE CABINET TYPE L1 MODIFIED DETAILS
(COUNTY LIGHTING CABINET)

DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	AKF		
CHECKED BY:	KST		
NO.	BY	DATE	REVISIONS

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 Printed Name: THOMAS D. HONER Date: 12/8/2015

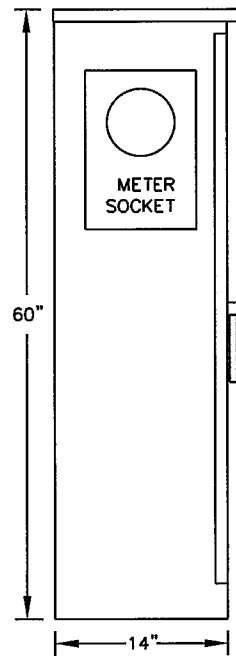


RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

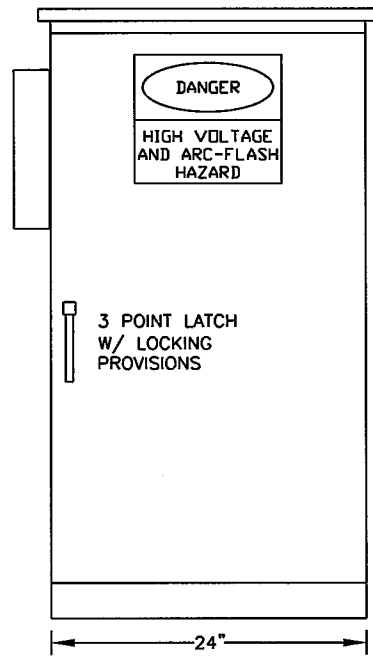
FILE NO.	365
RAMSEY129594	
LL13	367
OF LL14	

LIGHTING PLAN
LIGHTING DETAILS

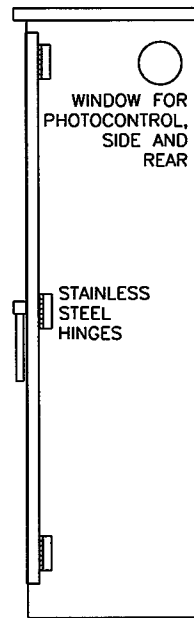
LEFT SIDE VIEW



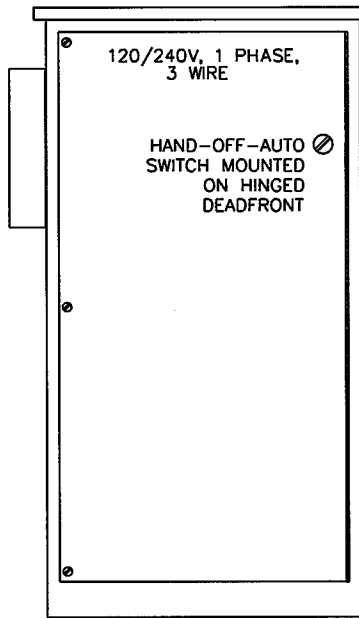
FRONT VIEW



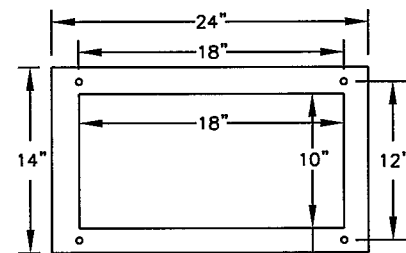
RIGHT SIDE VIEW



INTERIOR COMPONENTS



INTERIOR COMPONENTS MOUNTED ON BACK PANEL BEHIND HINGED DEAD FRONT



BASE LAYOUT NOT TO SCALE

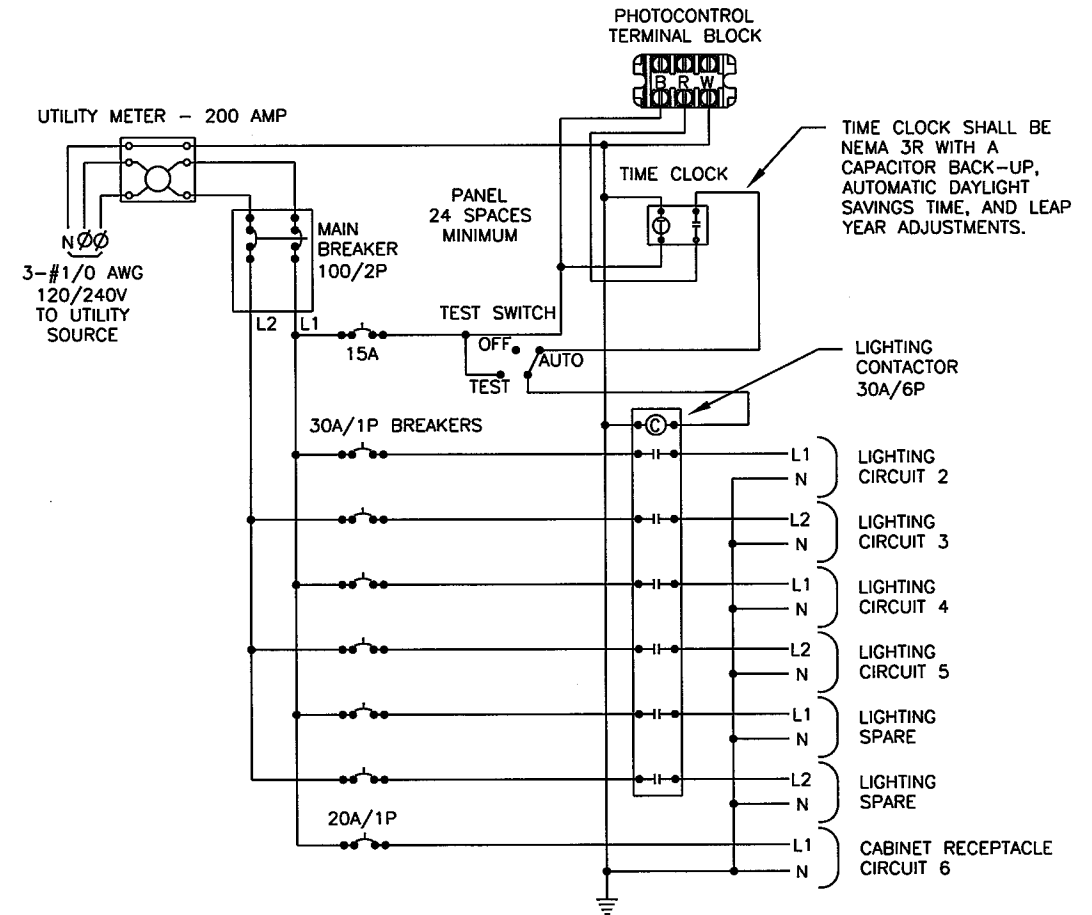
CABINET CONSTRUCTION

- NEMA 3R
- INTERIOR COMPONENTS MOUNTED ON BACK PANEL BEHIND DEAD FRONT
- 1/8" ANODIZED ALUMINUM (60 MIN. CLEAR)
- NEOPRENE GASKETED DOORS
- STAINLESS STEEL HARDWARE
- ETL LISTED IN ACCORDANCE WITH UL508A

SERVICE CABINET NOTES:

- A. PROVIDE METER SOCKET PER UTILITY COMPANY REQUIREMENTS.
- B. CIRCUIT BREAKERS SHALL BE 120/240 VOLT AC, 60Hz AND SHALL BE CLEARLY MARKED WITH THE "ON" AND "OFF" POSITIONS AND IDENTIFIED WITH THE LOAD WHICH IT IS CARRYING.
- C. SHORT CIRCUIT RATING - 22,000 AIC SYMMETRICAL.
- D. THREE POSITION TYPE 800T-J2A NON-ILLUMINATED SELECTOR SWITCH WITH 1-N.O. AND 1-N.C. MAINTAINED CONTACTS. SHALL HAVE TYPE 4/13 OPERATORS.
- E. CIRCUIT CONTACTORS SHALL HAVE A 240 VOLT RATING, WITH 120 VOLT COIL.
- F. PROVIDE PANEL WITH DIMENSIONS AS REQUIRED TO FIT EQUIPMENT PROPOSED.
- G. PROVIDE A 25-OHM GROUND AT CABINET AS PER NEC.
- H. PROVIDE 20A WR-RATED GFCI RECEPTACLE MOUNTED TO CABINET BACK-PANEL.
- I. TIME CLOCK SHALL BE NEMA 3R WITH A CAPACITOR BACK-UP, AUTOMATIC DAYLIGHT SAVINGS TIME, AND LEAP YEAR ADJUSTMENTS
- J. BOTH PHOTOCONTROL AND ITS SOCKET SHALL BE 3 TERMINAL, POLARIZED, TWIST-LOCK TYPE. IT SHALL BE EQUIPPED WITH A MOVRO TYPE LIGHTNING ARRESTER.
- K. COORDINATE SERVICE CONNECTIONS WITH XCEL ENERGY.
- L. COODINATE WITH OWNER FOR TIME CLOCK SCHEDULING.

SERVICE CABINET DETAILS (METRO TRANSIT LIGHTING CABINET)



SERVICE CABINET SCHEMATIC (METRO TRANSIT CABINET)

DESIGN TEAM				
DRAWN BY: CIF				
DESIGNER: AKF				
CHECKED BY: KST				
NO.	BY	DATE	REVISIONS	

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Certified By: *Thomas D. Honer* Lic. No. 45519
 Printed Name: THOMAS D. HONER Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

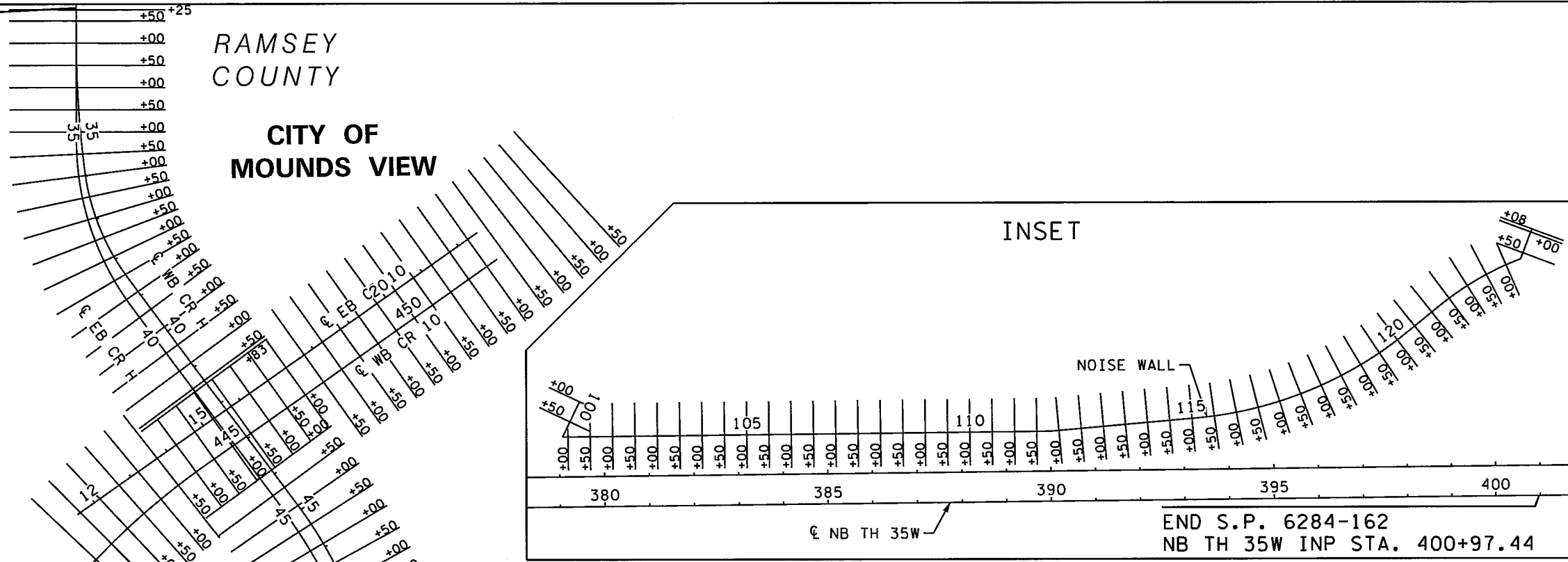
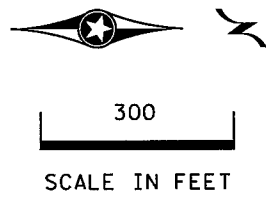
LIGHTING PLAN
 LIGHTING DETAILS

FILE NO. RAMSE129594	366
LL14 OF LL14	367

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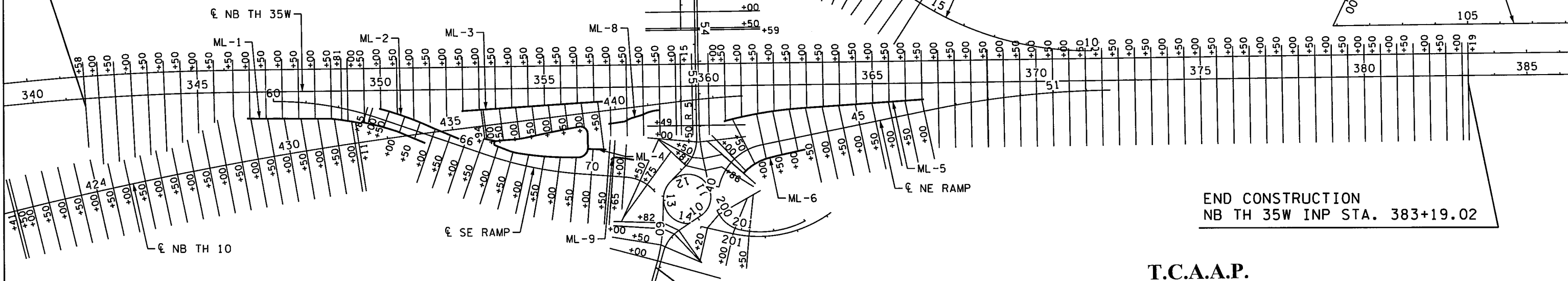
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BEGIN S.A.P. 062-593-003
EB CR H STA. 32+20.86

CROSS SECTION INDEX	
ALIGNMENT	SHEET NO.
35WNB	XS1-XS20
NBTH10	XS21-XS31
SERAMP	XS32-XS37
NERAMP	XS38-XS41
NWRAMP	XS42-XS44
NOISEWALL	XS45-XS54
EB CR H	XS55-XS66
WB CR 10	XS67-XS73
PROGRAM CONNECTION	XS74
NB HWY 8	XS75



END S.P. 062-609-006
EB CR H STA. 48+00.00

BEGIN S.P. 6284-162
BEGIN CONSTRUCTION
NB TH 35W INP STA. 341+57.87



END CONSTRUCTION
NB TH 35W INP STA. 383+19.02

T.C.A.A.P.

RAMSEY COUNTY

END S.A.P. 062-593-003
EB CR H STA. 61+20.82

CITY OF ARDEN HILLS

T.C.A.A.P.

DESIGN TEAM			
DRAWN BY:	CJF		
DESIGNER:	ROH		
CHECKED BY:	HJR		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Certified By: *Heather L. Redetzke* Lic. No. 44267
Printed Name: HEATHER L. REDETZKE Date: 12/8/2015



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

CROSS SECTION MATCH
LINE LAYOUT

FILE NO. RAMSE129594	367
XSL1 OF XSLI	367

LEGEND OF SYMBOLS	
-----	CONDUIT - INPLACE
-----	CONDUIT - F&I
-----	CONDUIT FIBER ONLY - INPLACE
-----	CONDUIT FIBER ONLY - F&I
-----	DIRECT BURIED COMMUNICATION CABLE - INPLACE
-----	DIRECT BURIED POWER CABLE - INPLACE
□	LOOP DETECTOR-DESIGN (SPECIFY)
P	LOOP DETECTOR- DESIGN PREFORMED
S	LOOP DETECTOR- DESIGN SAWCUT
N	LOOP DETECTOR- DESIGN NMC
V	LOOP DETECTOR- DESIGN VIRTUAL
⊠→	WARNING FLASHER - INPLACE
⊠↔	WARNING FLASHER - F&I
⌋	GATE ARM - INPLACE
⌋	FOUNDATION INPLACE, GATE ARM - F&I
⌋	FOUNDATION F&I, GATE ARM - F&I
☀	TOLLING BEACON - INPLACE
☀	TOLLING BEACON - F&I
⌚	TOLLING READER
⊕	HANDHOLE - INPLACE
⊕	HANDHOLE - F&I
⊠	JUNCTION BOX OR CONDULET - INPLACE
⊠	JUNCTION BOX OR CONDULET - F&I
⌋	OVERHEAD SIGN STRUCTURE - INPLACE
⌋	OVERHEAD SIGN STRUCTURE - F&I
T	SIGN (TYPE DMS) - (SPECIFY)
□	FOUNDATION/CABINET (SPECIFY) - INPLACE
■	FOUNDATION/CABINET (SPECIFY) - F&I

-----GPS----- LINSTYLES WITH GPS DESIGNATION
 HAVE BEEN FIELD LOCATED

LEGEND OF SYMBOLS	
⊠	PEDESTAL - INPLACE
⊠	PEDESTAL - F&I
⊠→	RAMP CONTROL SIGNAL (DESIGN ONE-WAY) - INPLACE
⊠↔	RAMP CONTROL SIGNAL (DESIGN ONE-WAY) - F&I
⊠→	RAMP CONTROL SIGNAL (DESIGN TWO-WAY) - INPLACE
⊠↔	RAMP CONTROL SIGNAL (DESIGN TWO-WAY) - F&I
⊠→	RAMP CONTROL SIGNAL (DESIGN ONE-WAY)(SCREW IN BASE) - INPLACE
□	SHELTER CABINET (TMS) - INPLACE
■	SHELTER CABINET (TMS) - F&I
⊠	SPLICE CABINET - (SPECIFY)
⊠	SPLICE VAULT (FIBER OPTIC) - (SPECIFY)
TV	TELEVISION CAMERA (CCTV) - (SPECIFY)
⌋	NON-INTRUSIVE DETECTION/POLE - INPLACE
⌋	NON-INTRUSIVE DETECTION/POLE - F&I
TV	NON-INTRUSIVE DETECTION/POLE & CAMERA
I	INTELLIGENT LANE CONTROL SIGN - INPLACE
I	INTELLIGENT LANE CONTROL SIGN - F&I
LCS	LANE CONTROL SIGNAL - SPECIFY
○	WOOD POLE - INPLACE
●	WOOD POLE - F&I
⊠	WOOD POLE INPLACE, SERVICE INSTALLATION - INPLACE
⊠	WOOD POLE INPLACE, SERVICE INSTALLATION - F&I
PV	PULL VAULT - INPLACE
PV	PULL VAULT - F&I
E	ELECTRICAL SERVICE - INPLACE
E	ELECTRICAL SERVICE - F&I
T	POWER COMPANY TRANSFORMER/PEDESTAL
GEN	GENERATOR
⊠	PEDESTRIAN GATE - F&I

STANDARD PLATES

THE FOLLOWING STANDARD PLATES, APPROVED BY THE FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT	
PLATE NO.	DESCRIPTION
3131C	PRECAST CONCRETE HEADWALL FOR SUBSURFACE DRAINS
8150C	INSTALLATION OF CULVERT MARKERS

TMS CONSTRUCTION STAGING NOTES:

THE TH35W & TH10 TRUNK FO CABLES SHALL BE SPLICED TO THE NEW LOCATION ON THE WEST SIDE OF TH35W BEFORE REMOVAL OR IMPACTS. THE TH10 TRUNK FO CABLE SHALL HAVE A JUMPER CABLE TO THE 35W TRUNK FO CABLE TO KEEP IT OPERATIONAL DURING CONSTRUCTION.

BRIDGE WORK AT THE CO. RD. H/TH10 RAMP IMPACTING THE TH10/TH35W TRUNK FO CABLES SHALL NOT BE BEGIN UNTIL THE TRUNK FO CABLES HAVE BEEN RELOCATED TO THE WEST SIDE OF TH35W AS DESCRIBED ABOVE.

PERMANENT INSTALLATION OF THE TH10 TRUNK FO CABLE ON THE EAST SIDE OF TH35W IS TO BE PLACED AFTER EMBANKMENTS AND BRIDGE WORK IS COMPLETED.

CONTRACTOR REQUESTS FOR WORKING IN AREAS THAT IMPACT THE TRUNK FO CABLES BEFORE RELOCATING AS DIRECTED ABOVE SHALL REQUIRE TEMPORARY FIBER CONNECTIONS AND SHALL BE AT THE CONTRACTORS EXPENSE.

SEE TMS PLANSHEETS AND FIBER SCHEMATICS

I HEREBY CERTIFY THAT SHEETS SZ1 THROUGH SZ33 OF THIS PLAN WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Geoffrey M. Preled
 GEOFFREY M. PRELED
 DATE OCT 15, 2015 LIC. NO. 26530
 DESIGNER Scott Coozenoy

REV. NO.	DATE: / /
REV. NO.	DATE: / /

V

TABULATION OF TMS ESTIMATED QUANTITIES
 SP 6284-162 (TH 35W/CO. RD. H)

ITEM NO.	ITEM	NOTES	UNIT	TOTAL TMS ESTIMATED QUANTITIES
2104	REMOVE SERVICE INSTALLATION		EACH	2
2104	REMOVE RAMP CONTROL SIGNAL FOUNDATION		EACH	2
2104	REMOVE HANDHOLE		EACH	22
2104	REMOVE CABINET FOUNDATION		EACH	1
2104	REMOVE SERVICE FOUNDATION		EACH	1
2104	REMOVE CABINET		EACH	1
2104	REMOVE FIBER OPTIC VAULT		EACH	2
2104	SALVAGE RAMP CONTROL SIGNAL		EACH	2
2104	REMOVE CABLES		LUMP SUM	1
2104	HAUL SALVAGED MATERIAL	(3)	LUMP SUM	1
2550	FIBEROPTIC SPLICE VAULT		EACH	3
2550	OUTDOOR FIBER SPLICE ENCLOSURE		EACH	3
2550	BURIED CABLE SIGN		EACH	29
2550	1.5" NON-METALLIC CONDUIT		LIN FT	6505
2550	2" NON-METALLIC CONDUIT		LIN FT	470
2550	3" NON-METALLIC CONDUIT		LIN FT	50
2550	POWER CABLE 1 CONDUCTOR NO 6		LIN FT	1320
2550	LEAD-IN CABLE 2 CONDUCTOR NO 14		LIN FT	1175
2550	LOOP DETECTOR SPLICE		EACH	1
2550	SERVICE INSTALLATION TYPE A		EACH	1
2550	FIBER OPTIC CABLE TESTING		LUMP SUM	1
2550	FIBER OPTIC CABLE SPLICING		EACH	5
2550	PULL VAULT	(2)	EACH	3
2550	LOOP DETECTOR DESIGN PREFORMED		EACH	3
2550	1.5" BORED CONDUIT		LIN FT	2535
2550	REROUTE CABLE	(1)	LIN FT	300
2550	FIBER OPTIC TRUNK CABLE 72SM		LIN FT	10230

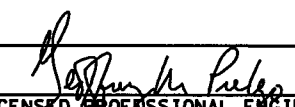
GENERAL NOTES:

TURF ESTABLISHMENT & EROSION CONTROL FOR TRAFFIC MANAGEMENT SYSTEM
 PLACEMENT SHALL BE CONSIDERED INCIDENTAL, APPLIED TO ALL DISTURBED
 AREAS, IN ACCORDANCE WITH MN/DOT 2575.1, 2575.2, 2575.3

NOTES:

- (1) INCLUDES FO CABLE AND CONDUITS
- (2) PULL VAULTS WITHOUT SPLICING WILL NOT REQUIRE DRAINS OR SHEATH GROUNDING UNITS
- (3) DELIVER SALVAGED RAMP CONTROL SIGNALS TO A METRO FACILITY

TABULATION OF ESTIMATED QUANTITIES

REV. NO.	DATE: / /	CERTIFIED BY 	LIC. NO. 26530	OCT 15 2015	STATE PROJ. NO. 6284-162 (TH 35W)	SHEET NO. SZ2	OF SZ33	SHEETS
REV. NO.	DATE: / /							

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① INPLACE LOOP DETECTOR

② INPLACE 3" RSC & 1-2/C NO.14
REMOVE 1-2/C NO.14

③ ABANDON LOOP DETECTOR

④ ABANDON 2" NMC & REMOVE 1-2/C NO.14

⑤ ABANDON 2" NMC & REMOVE 2-2/C NO.14

⑥ INPLACE 2" NMC, 2-2/C NO.14 & 1-FO PIGTAIL (12SM)
REMOVE CABLES
INPLACE 3" NMC (EMPTY)

⑦ REMOVE HANDHOLES 1,2 & 3
(NOTE:CONDUIT AT HH3 TO BE
EXTENDED-SEE SHT SZ6)

⑧ REMOVE FO SPLICE VAULT
(DELIVER OUTDOOR FIBER SPLICE ENCL. TO TMS INTEGRATOR-INCIDENTAL)

⑨ ABANDON 1.5" NMC & REMOVE 1-FO CABLE (72SM-TH10)
(NOTE: SEE SHEET SZ5 FOR SOUTHERLY REMOVAL LIMITS)

⑩ ABANDON 1.5" NMC & REMOVE 1-FO CABLE (12MM-60SM TH35W)
(NOTE:SEE SHEET SZ5 FOR SOUTHERLY REMOVAL LIMITS)

⑪ ABANDON 1.5" NMC & REMOVE 1-FO PIGTAIL (12SM)

⑫ ABANDONED FO CABLE

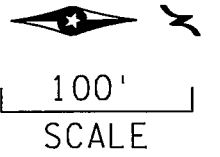
⑬ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)

⑭ ABANDON INPLACE 1.5" NMC (EMPTY)

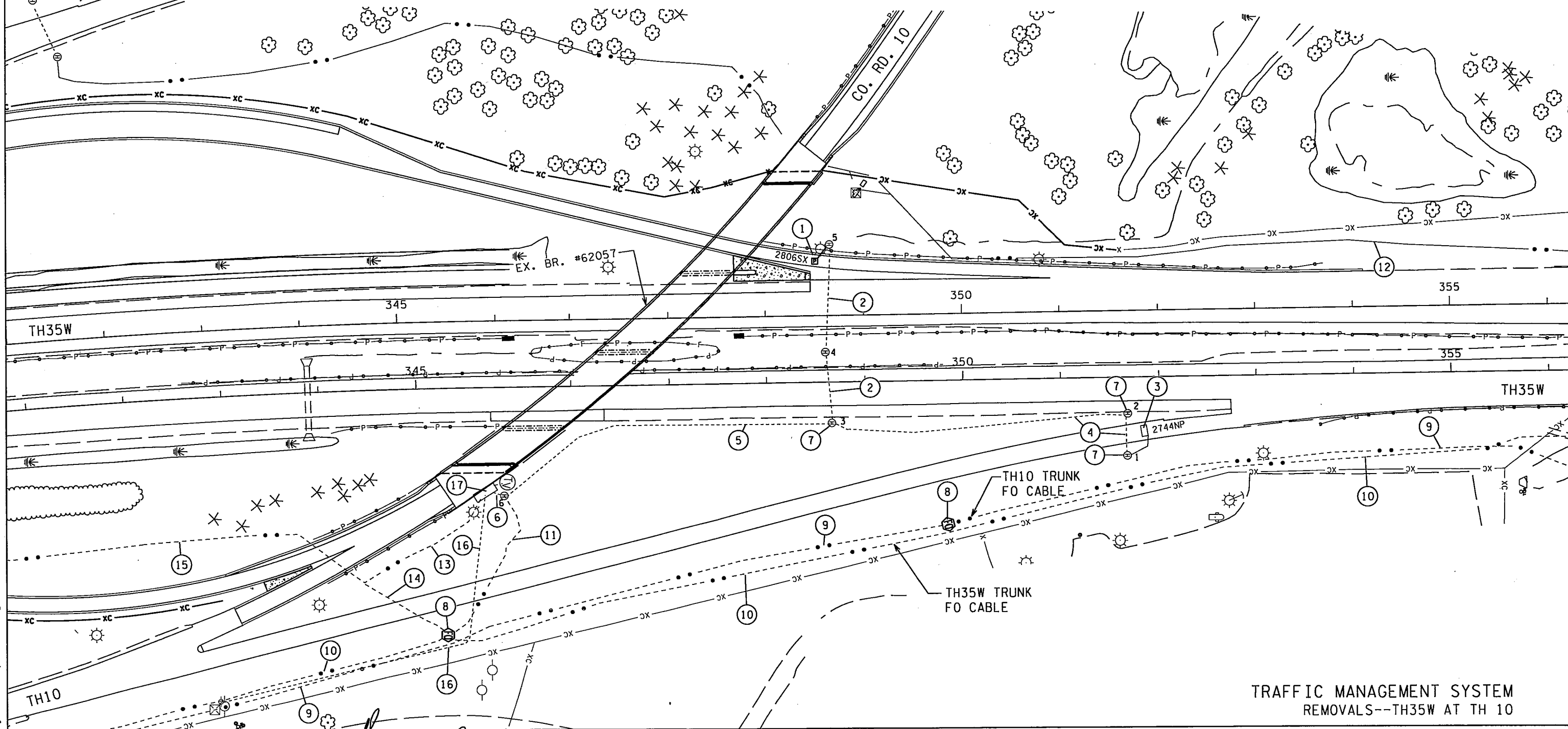
⑮ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)
INPLACE 1.5" NMC (EMPTY)

⑯ INPLACE 2" NMC & 3-1/C NO.6
REMOVE CABLES

⑰ INPLACE 334Z-14 CAB. (35W-28.50)



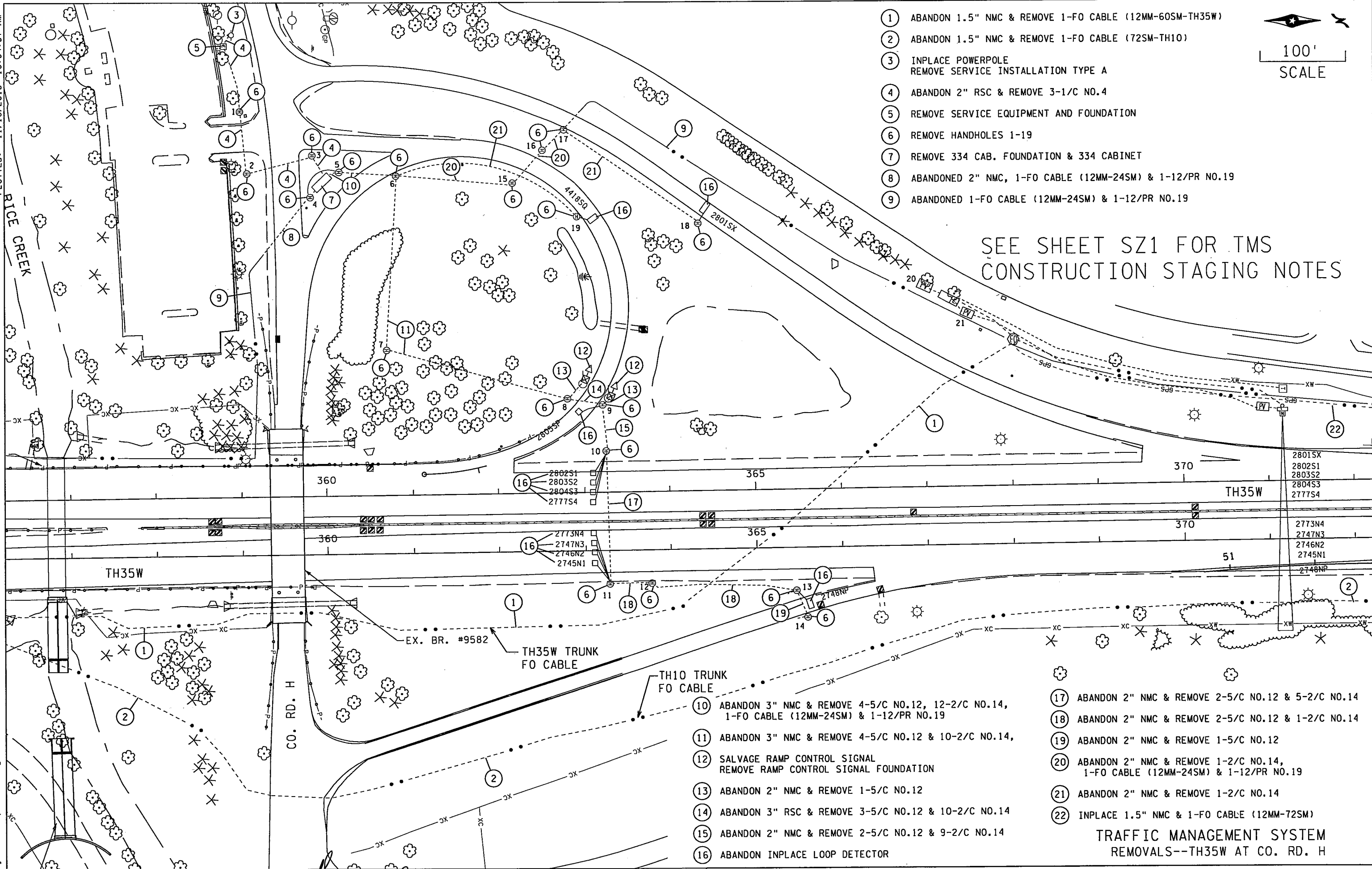
SEE SHEET SZ1 FOR TMS
CONSTRUCTION STAGING NOTES



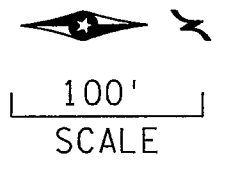
TRAFFIC MANAGEMENT SYSTEM
REMOVALS--TH35W AT TH 10

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- ① ABANDON 1.5" NMC & REMOVE 1-FO CABLE (12MM-60SM-TH35W)
- ② ABANDON 1.5" NMC & REMOVE 1-FO CABLE (72SM-TH10)
- ③ INPLACE POWERPOLE
REMOVE SERVICE INSTALLATION TYPE A
- ④ ABANDON 2" RSC & REMOVE 3-1/C NO.4
- ⑤ REMOVE SERVICE EQUIPMENT AND FOUNDATION
- ⑥ REMOVE HANDHOLES 1-19
- ⑦ REMOVE 334 CAB. FOUNDATION & 334 CABINET
- ⑧ ABANDONED 2" NMC, 1-FO CABLE (12MM-24SM) & 1-12/PR NO.19
- ⑨ ABANDONED 1-FO CABLE (12MM-24SM) & 1-12/PR NO.19



SEE SHEET SZ1 FOR TMS
CONSTRUCTION STAGING NOTES

- ① 2802S1
- ① 2803S2
- ① 2804S3
- ① 2777S4

- 2801SX
- 2802S1
- 2803S2
- 2804S3
- 2777S4

- ① 2773N4
- ① 2747N3
- ① 2746N2
- ① 2745N1

- 2773N4
- 2747N3
- 2746N2
- 2745N1
- 2748NP

- ⑩ ABANDON 3" NMC & REMOVE 4-5/C NO.12, 12-2/C NO.14, 1-FO CABLE (12MM-24SM) & 1-12/PR NO.19
- ⑪ ABANDON 3" NMC & REMOVE 4-5/C NO.12 & 10-2/C NO.14,
- ⑫ SALVAGE RAMP CONTROL SIGNAL
REMOVE RAMP CONTROL SIGNAL FOUNDATION
- ⑬ ABANDON 2" NMC & REMOVE 1-5/C NO.12
- ⑭ ABANDON 3" RSC & REMOVE 3-5/C NO.12 & 10-2/C NO.14
- ⑮ ABANDON 2" NMC & REMOVE 2-5/C NO.12 & 9-2/C NO.14
- ⑯ ABANDON INPLACE LOOP DETECTOR

- ⑰ ABANDON 2" NMC & REMOVE 2-5/C NO.12 & 5-2/C NO.14
- ⑱ ABANDON 2" NMC & REMOVE 2-5/C NO.12 & 1-2/C NO.14
- ⑲ ABANDON 2" NMC & REMOVE 1-5/C NO.12
- ⑳ ABANDON 2" NMC & REMOVE 1-2/C NO.14, 1-FO CABLE (12MM-24SM) & 1-12/PR NO.19
- ㉑ ABANDON 2" NMC & REMOVE 1-2/C NO.14
- ㉒ INPLACE 1.5" NMC & 1-FO CABLE (12MM-72SM)

TRAFFIC MANAGEMENT SYSTEM
REMOVALS--TH35W AT CO. RD. H

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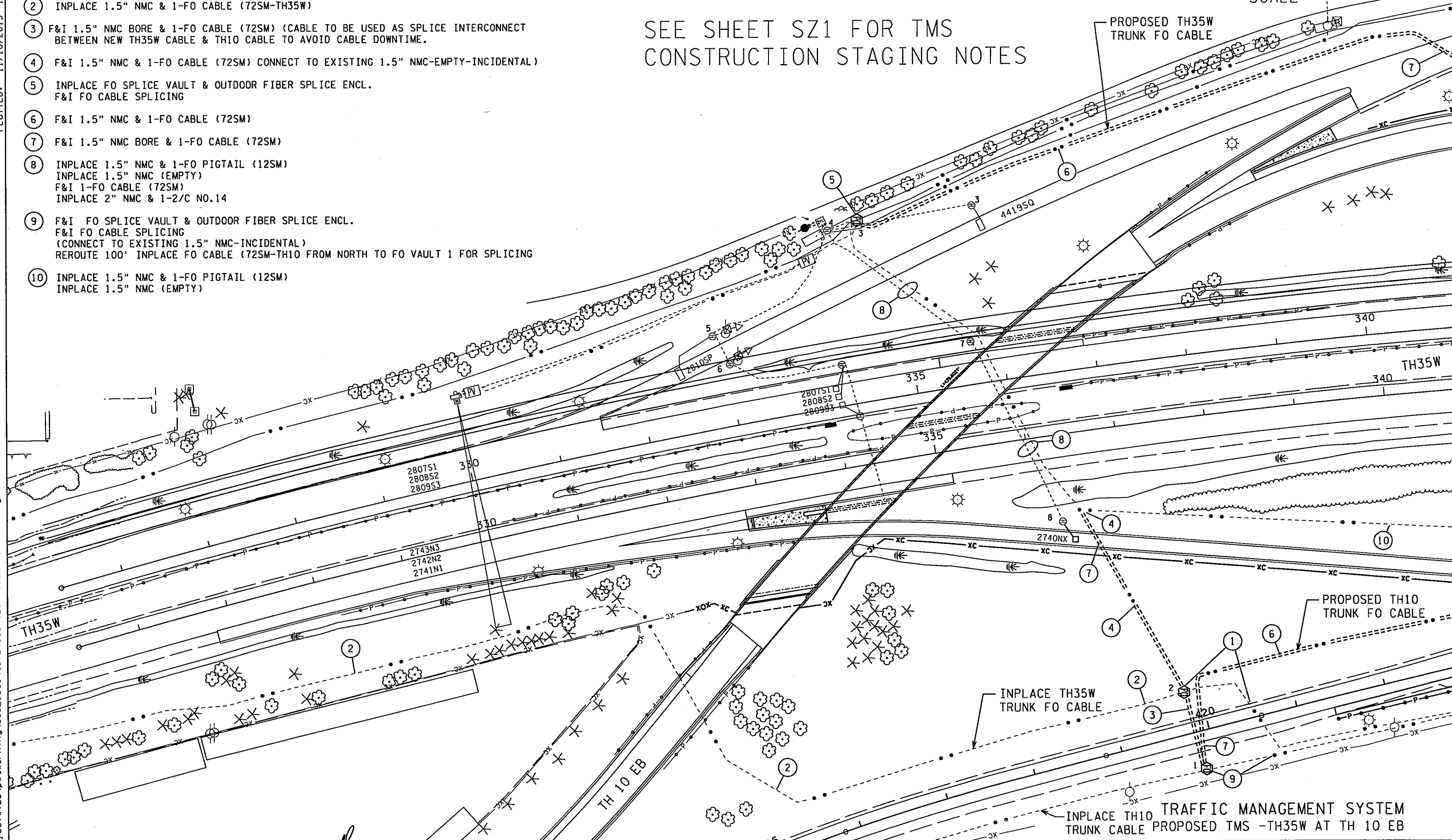
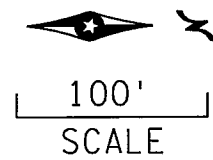
CERTIFIED BY *[Signature]* LIC. NO. 26530 OCT 15 2015

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- ① F&I SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.
F&I FO CABLE SPLICING
(CONNECT TO EXISTING 1.5" NMC-INCIDENTAL)
REROUTE 100' INPLACE FO CABLE (72SM-TH10) FROM NORTH TO FO VAULT 2 FOR SPLICING
- ② INPLACE 1.5" NMC & 1-FO CABLE (72SM-TH35W)
- ③ F&I 1.5" NMC BORE & 1-FO CABLE (72SM) (CABLE TO BE USED AS SPLICE INTERCONNECT
BETWEEN NEW TH35W CABLE & TH10 CABLE TO AVOID CABLE DOWNTIME.)
- ④ F&I 1.5" NMC & 1-FO CABLE (72SM) CONNECT TO EXISTING 1.5" NMC-EMPTY-INCIDENTAL)
- ⑤ INPLACE FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.
F&I FO CABLE SPLICING
- ⑥ F&I 1.5" NMC & 1-FO CABLE (72SM)
- ⑦ F&I 1.5" NMC BORE & 1-FO CABLE (72SM)
- ⑧ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)
INPLACE 1.5" NMC (EMPTY)
F&I 1-FO CABLE (72SM)
INPLACE 2" NMC & 1-2/C NO.14
- ⑨ F&I FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.
F&I FO CABLE SPLICING
(CONNECT TO EXISTING 1.5" NMC-INCIDENTAL)
REROUTE 100' INPLACE FO CABLE (72SM-TH10 FROM NORTH TO FO VAULT 1 FOR SPLICING
- ⑩ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)
INPLACE 1.5" NMC (EMPTY)

SEE SHEET SZ1 FOR TMS CONSTRUCTION STAGING NOTES



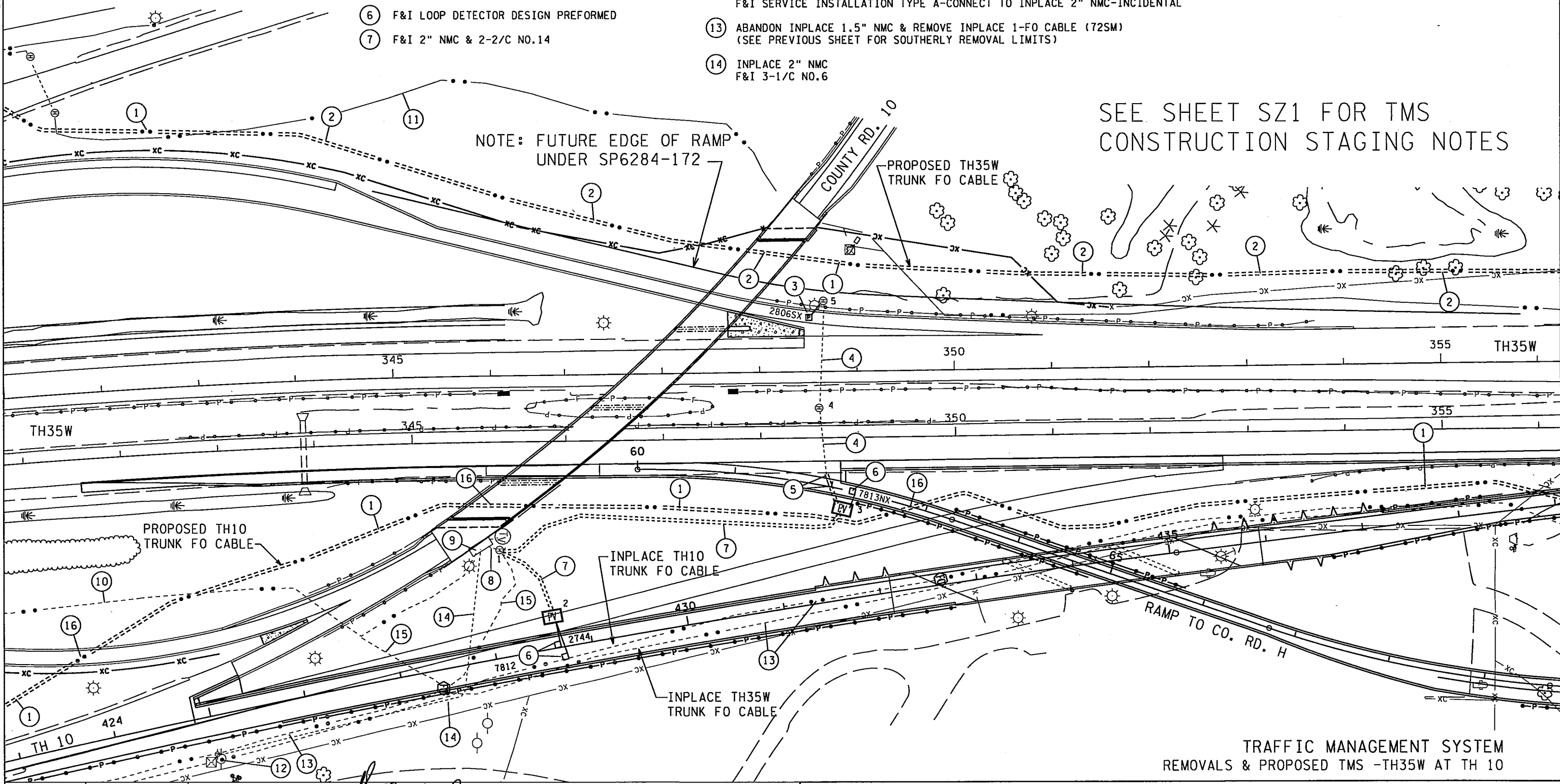
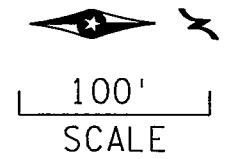
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REV. NO.	DATE: / /						

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- ① F&I 1.5" NMC & 1-FO CABLE (72SM)
- ② F&I 1.5" NMC BORE & 1-FO CABLE (72SM)
NOTE:BORE BENEATH INPLACE POND SUFFICIENT
DISTANCE FROM FUTURE EDGE OF RAMP
- ③ INPLACE LOOP DETECTOR
F&I LOOP SPLICE
- ④ INPLACE 3" RSC
F&I 1-2/C NO.14
- ⑤ F&I 3" NMC & 1-2/C NO.14
(CONNECT TO EXISTING 3" RSC-INCIDENTAL)
- ⑥ F&I LOOP DETECTOR DESIGN PREFORMED
- ⑦ F&I 2" NMC & 2-2/C NO.14

- ⑧ INPLACE 3" NMC (EMPTY)
INPLACE 2" NMC
F&I 4-2/C NO.14
- ⑨ INPLACE 334Z-14 CAB (35W-28.50)
- ⑩ INPLACE 1.5" NMC & 1-FO PIGTAIL (12SM)
INPLACE 1.5" NMC (EMPTY)
- ⑪ ABANDONED FO CABLE & 1-12/PR NO.19
- ⑫ INPLACE POWERPOLE-TMS SOURCE OF POWER-TO BE RELOCATED
REMOVE INPLACE SERVICE INSTALLATION
VERIFY NEW POLE LOCATION WITH XCEL ENERGY
F&I SERVICE INSTALLATION TYPE A-CONNECT TO INPLACE 2" NMC-INCIDENTAL
- ⑬ ABANDON INPLACE 1.5" NMC & REMOVE INPLACE 1-FO CABLE (72SM)
(SEE PREVIOUS SHEET FOR SOUTHERLY REMOVAL LIMITS)
- ⑭ INPLACE 2" NMC
F&I 3-1/C NO.6

- ⑮ ABANDONED CONDUITS-SEE
REMOVAL PLANS
- ⑯ F&I 1.5" NMC BORE & 1-FO CABLE (72SM)



SEE SHEET SZ1 FOR TMS
CONSTRUCTION STAGING NOTES

TRAFFIC MANAGEMENT SYSTEM
REMOVALS & PROPOSED TMS -TH35W AT TH 10

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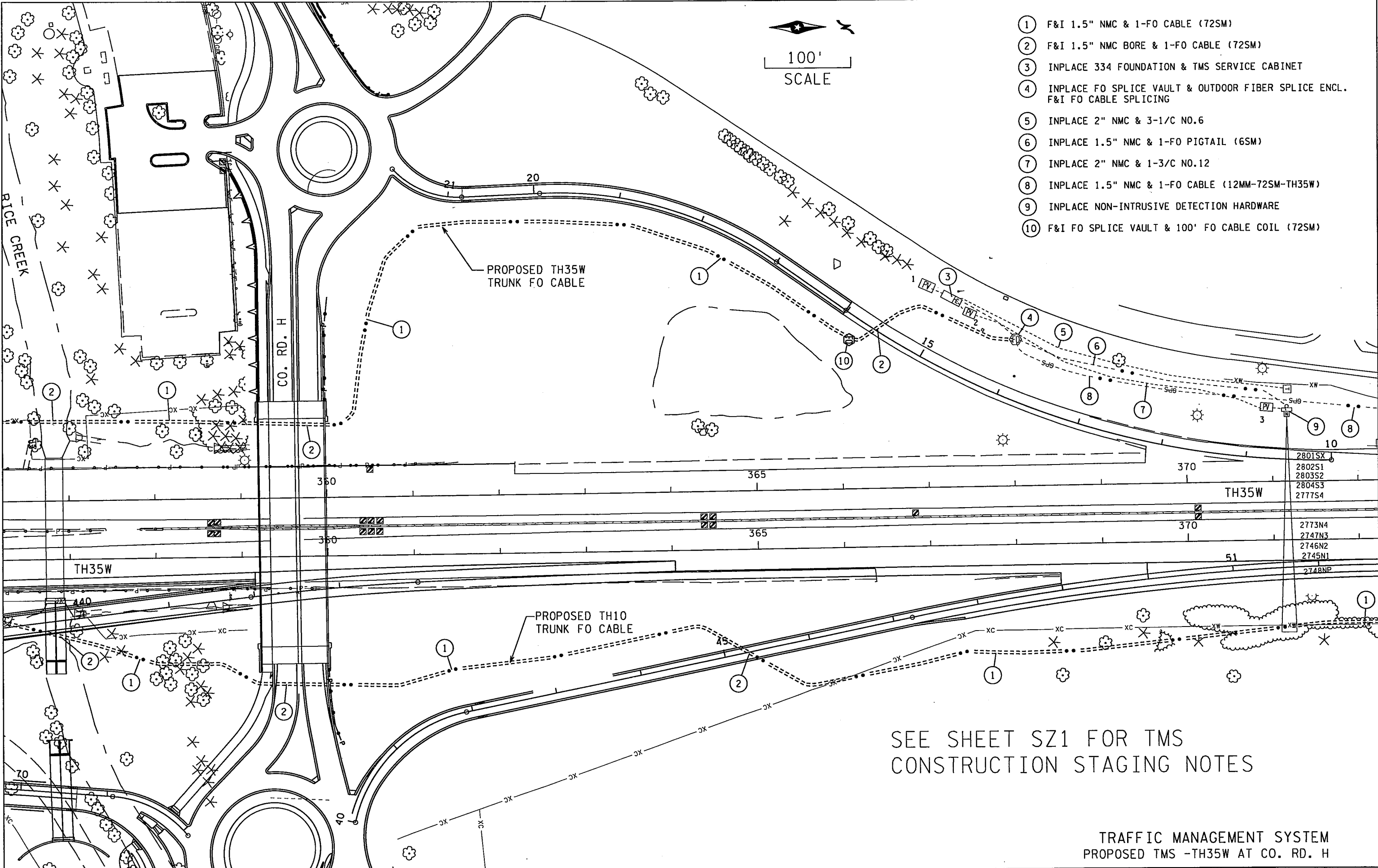
CERTIFIED BY *Jeffrey M. Puello*
LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

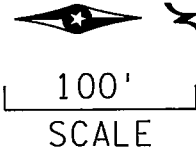
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- ① F&I 1.5" NMC & 1-FO CABLE (72SM)
- ② F&I 1.5" NMC BORE & 1-FO CABLE (72SM)
- ③ INPLACE 334 FOUNDATION & TMS SERVICE CABINET
- ④ INPLACE FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL. F&I FO CABLE SPLICING
- ⑤ INPLACE 2" NMC & 3-1/C NO.6
- ⑥ INPLACE 1.5" NMC & 1-FO PIGTAIL (6SM)
- ⑦ INPLACE 2" NMC & 1-3/C NO.12
- ⑧ INPLACE 1.5" NMC & 1-FO CABLE (12MM-72SM-TH35W)
- ⑨ INPLACE NON-INTRUSIVE DETECTION HARDWARE
- ⑩ F&I FO SPLICE VAULT & 100' FO CABLE COIL (72SM)



PROPOSED TH35W TRUNK FO CABLE

PROPOSED TH10 TRUNK FO CABLE

SEE SHEET SZ1 FOR TMS CONSTRUCTION STAGING NOTES

TRAFFIC MANAGEMENT SYSTEM
PROPOSED TMS -TH35W AT CO. RD. H

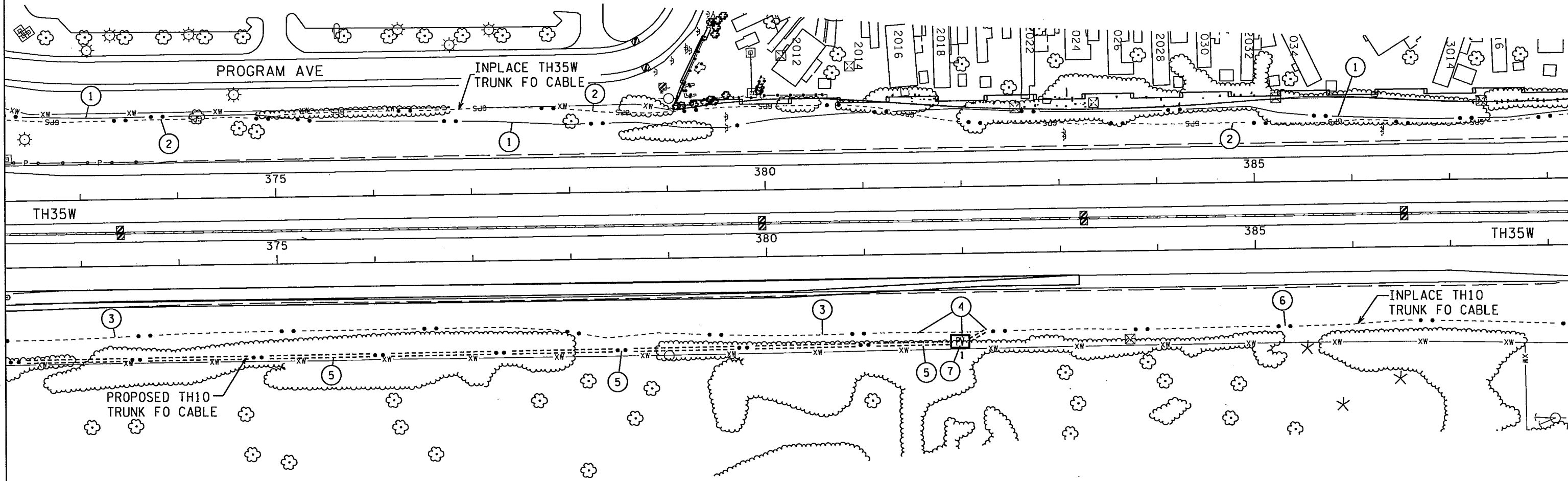
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100'
SCALE

- ① ABANDONED FO CABLE (12MM-24SM) & 1-12/PR NO.19
- ② INPLACE 1.5" NMC & 1-FO CABLE (12MM-72SM-TH35W)
- ③ ABANDON 1.5" NMC & REMOVE 1-FO CABLE (72SM)
(SEE NOTE 4)
- ④ REROUTE INPLACE 1.5" NMC & 1-FO CABLE (72SM) TO
PROPOSED FO SPLICE VAULT LOCATION.
NOTE: PULL 100' OF INPLACE FO CABLE (72SM) FROM SOUTH
INTO PROPOSED PULL VAULT. (SEE NOTE 3)
- ⑤ F&I 1.5" NMC & 1-FO CABLE (72SM)
NOTE: PLACE CABLE ADJACENT TO FENCE TO ACCOMODATE FUTURE TH35W WIDENING
- ⑥ INPLACE 1.5" NMC & 1-FO CABLE (72SM)
- ⑦ F&I FO PULL VAULT & OUTDOOR FIBER SPLICE ENCL.
F&I FO CABLE SPLICING

SEE SHEET SZ1 FOR TMS
CONSTRUCTION STAGING NOTES



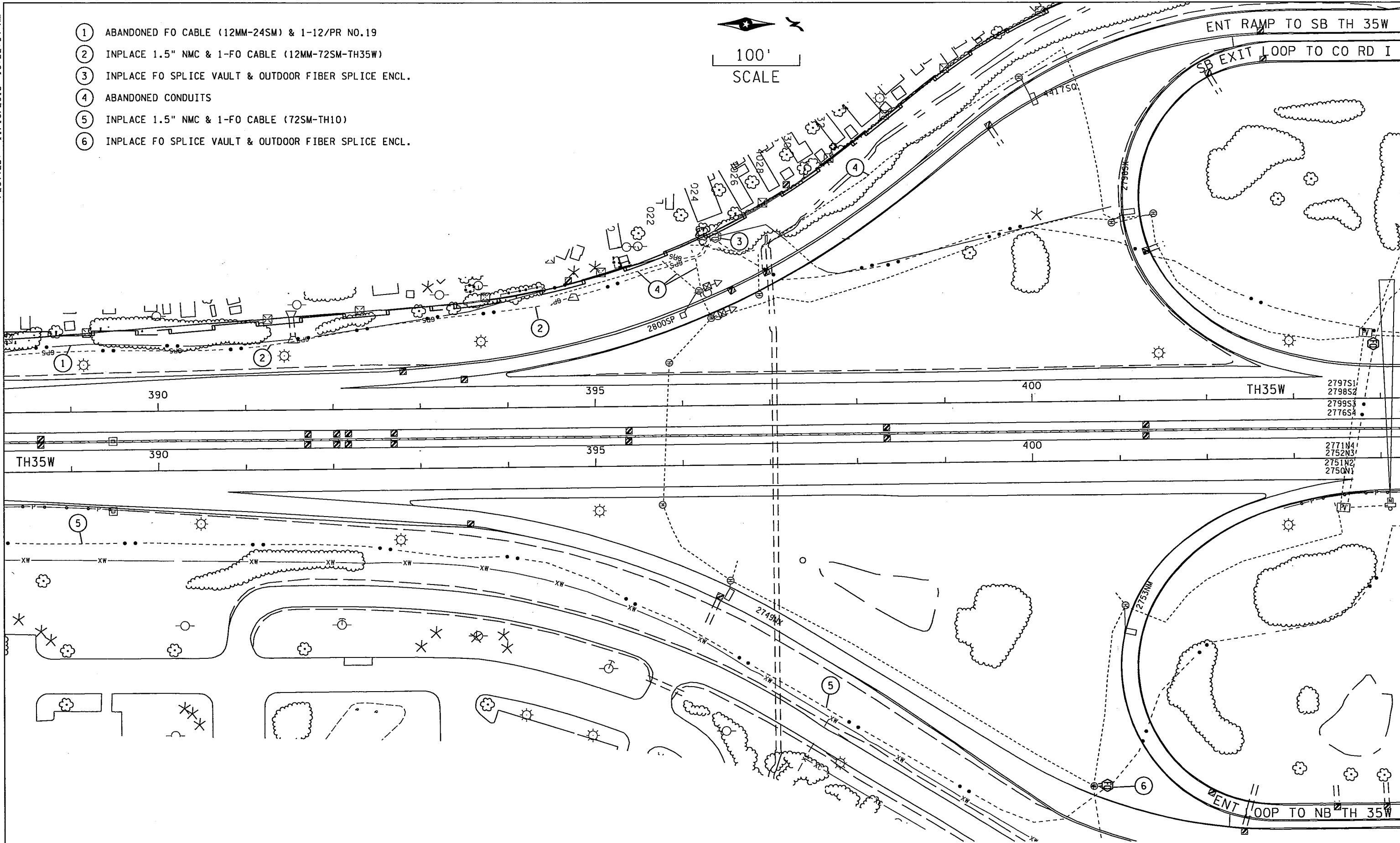
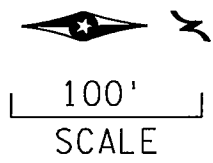
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TRAFFIC MANAGEMENT SYSTEM
REMOVALS & PROPOSED TMS -TH35W NORTH OF CO. RD. H

REV. NO.	DATE: / /	CERTIFIED BY <i>Stephen M. Puleo</i> LIC. NO. 26530	OCT 15 2015	STATE PROJ. NO. 6284-162 (TH 35W)	SHEET NO. SZ8	OF SZ33	SHEETS
REV. NO.	DATE: / /						

COOZ1SCO MDROSRW7D023 TMS
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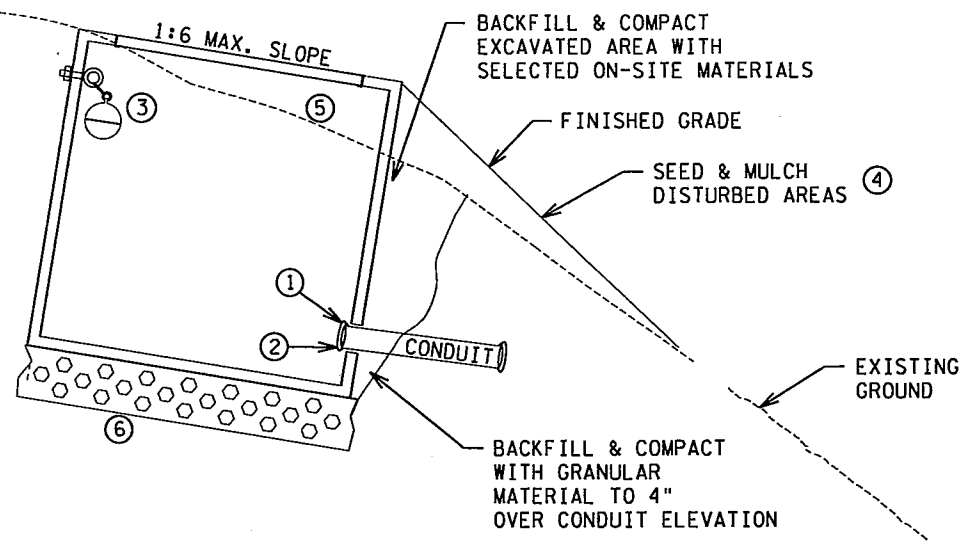
- ① ABANDONED FO CABLE (12MM-24SM) & 1-12/PR NO.19
- ② INPLACE 1.5" NMC & 1-FO CABLE (12MM-72SM-TH35W)
- ③ INPLACE FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.
- ④ ABANDONED CONDUITS
- ⑤ INPLACE 1.5" NMC & 1-FO CABLE (72SM-TH10)
- ⑥ INPLACE FO SPLICE VAULT & OUTDOOR FIBER SPLICE ENCL.



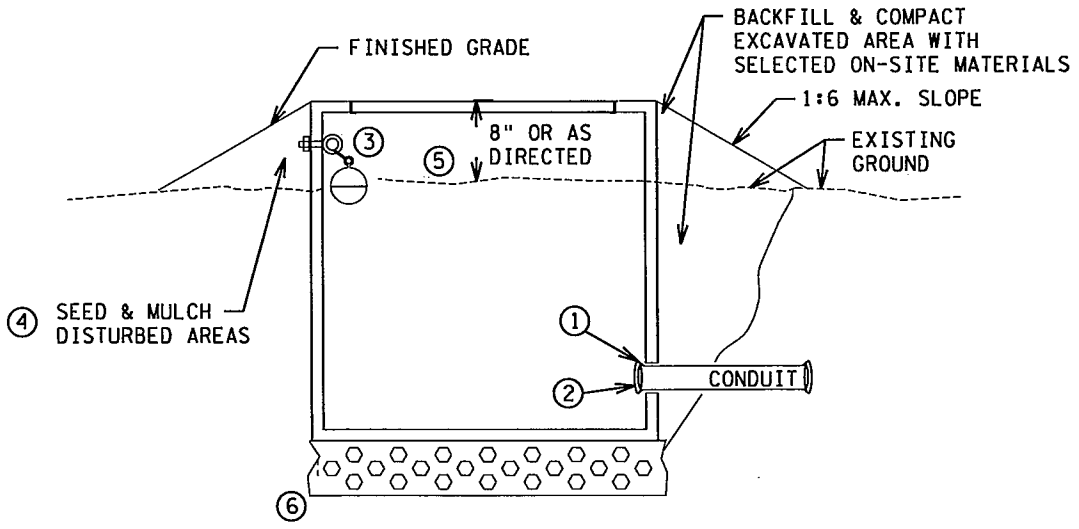
TRAFFIC MANAGEMENT SYSTEM
 PROPOSED TMS -TH35W SOUTH OF CO. RD. I

REV. NO.	DATE: / /	CERTIFIED BY <i>[Signature]</i> LICENCED PROFESSIONAL ENGINEER	LIC.NO. 26530	OCT 15 2015	STATE PROJ. NO. 6284-162 (TH 35W)	SHEET NO. SZ9	OF SZ33	SHEETS
REV. NO.	DATE: / /							

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VAULT INSTALLATION (SLOPED AREAS)

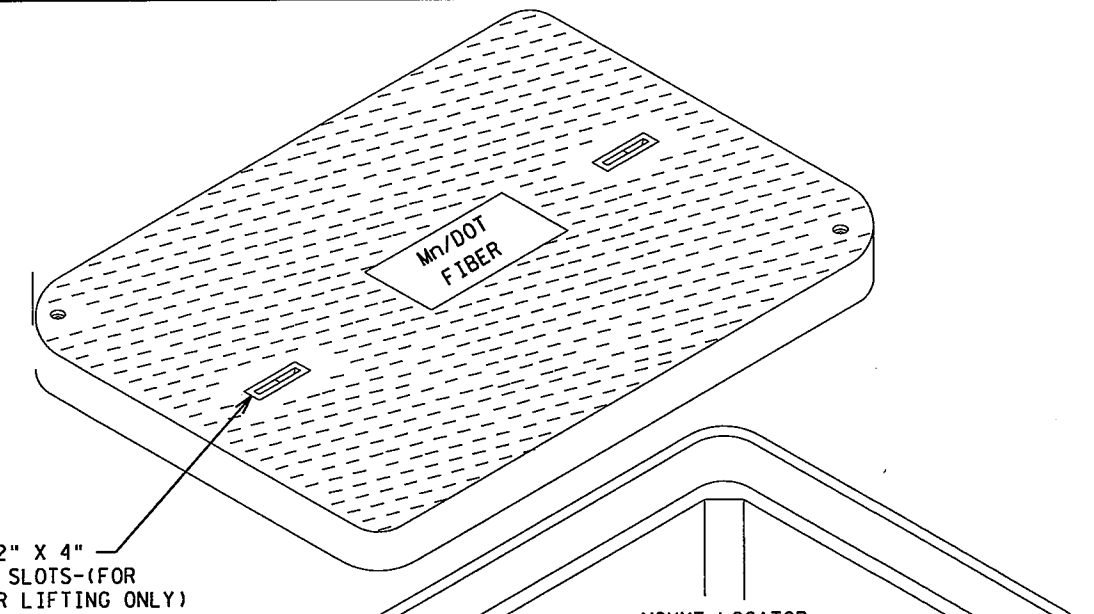
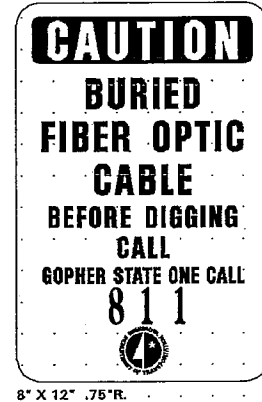


VAULT INSTALLATION (LEVEL GROUND)

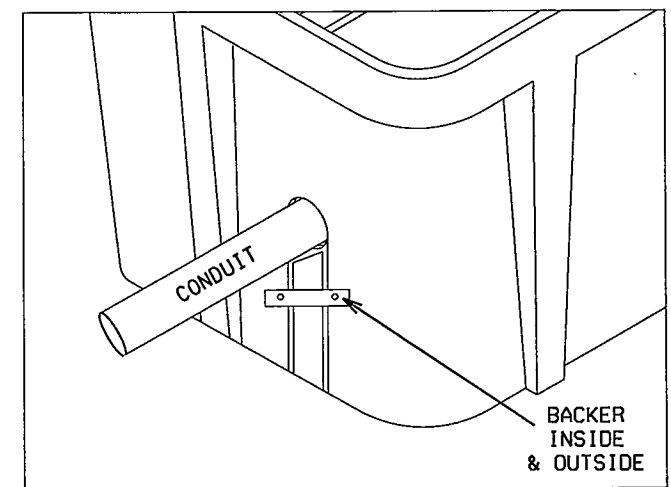
SPECIFIC NOTES

- ① OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT. (INCIDENTAL)
- ② F&I BELL ENDS ON THE CONDUITS. PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND AT VAULTS WITH ACCESS TO CABINETS & POLES (INCIDENTAL)
- ③ MOUNT LOCATOR BALL WITH TIE WRAP TO EYE BOLT
- ④ RESTORE DISTURBED AREAS FOR TMS INSTALLATION WITH SEED AND TYPE I MULCH PER MNDOT 2575.3 (INCIDENTAL)
- ⑤ STRIP TOPSOIL FROM VAULT AND SLOPE AREAS PRIOR TO VAULT INSTALLATION (INCIDENTAL)
- ⑥ F&I 1.0' COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MN/DOT 3149.2H.
- ⑦ F&I TWO TYPE 2 SHOULDER SS EYEBOLTS, 3/8" DIA. X 1 1/4" SHANK LENGTH, WITH HEX. NUTS (FOR LOOP SPLICE, LOCATING BALL MOUNTING)

F&I BURIED CABLE SIGN WITHIN 2.0' OF PULL VAULT AT LOCATIONS WHERE NO SPLICING OCCURS



PULL VAULT INSTALLATION OVER INPLACE CONDUIT



INSTALLATION NOTES

1. REMOVE APPROX. A 2' SECTION OF THE CONDUIT TO BE INTERCEPTED. USE CAUTION NOT TO DAMAGE INPLACE CABLES.
2. F&I BELL ENDS TO THE CONDUITS.
3. CUT A SLOT THE WIDTH OF THE CONDUIT AS HIGH ON THE PULL VAULT SIDE WALL AS NEEDED.
4. SET THE PULL VAULT OVER THE CONDUIT.
5. SET THE CUT OUT PIECE BACK INTO THE OPENING.
6. SCREW/BOLT A BACKER TO THE INSIDE AND OUTSIDE OF THE PULL VAULT TO HOLD THE CUTOUT PIECE IN-PLACE.
7. APPLY A FIBERGLASS RESIN AND MAT OR BODY FILLER ACROSS THE ENTIRE CUTOUT ON THE INSIDE OF THE PULL VAULT.

GENERAL NOTES

1. DO NOT LIFT ENTIRE PULL VAULT WITH COVER ATTACHED BY COVER LIFTING SLOTS.

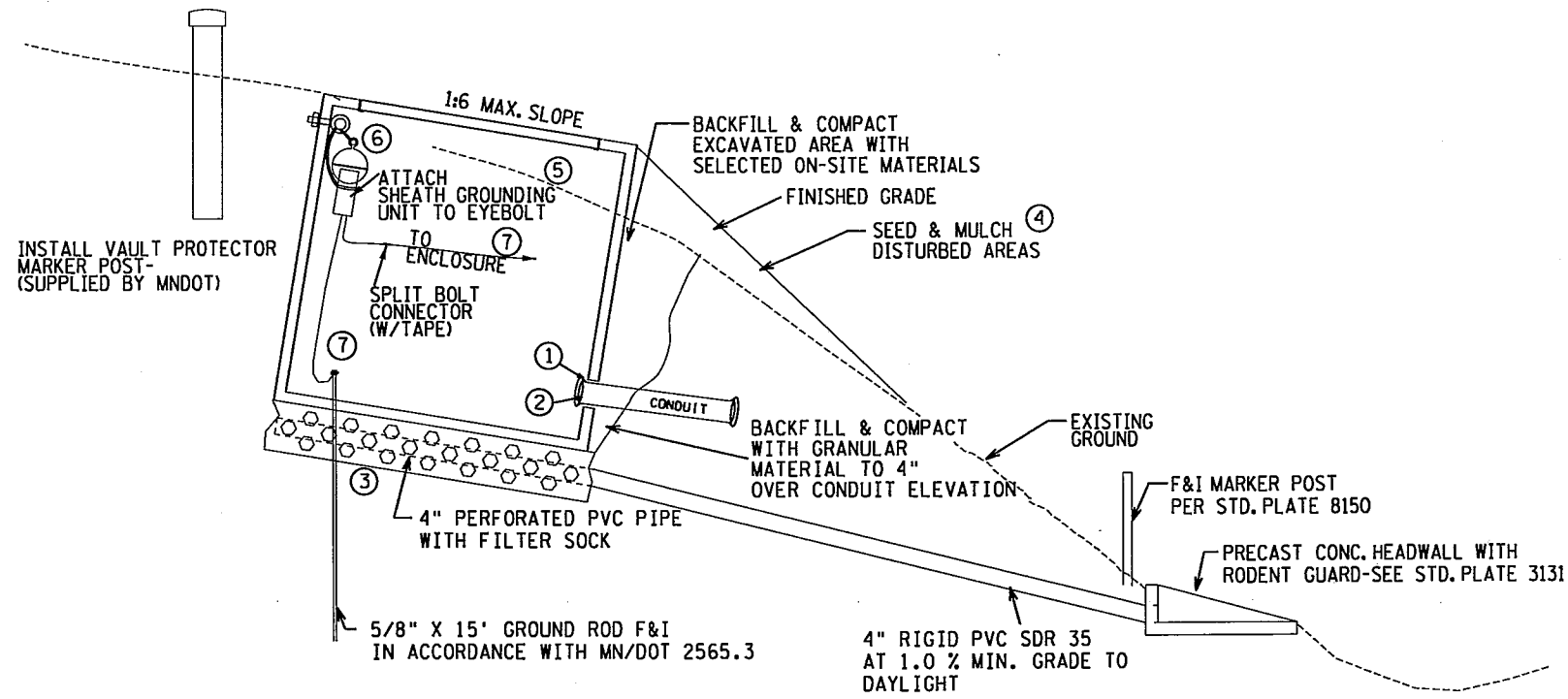
PULL VAULT INSTALLATION DETAIL

REV. NO.	DATE: / /
REV. NO.	DATE: / /

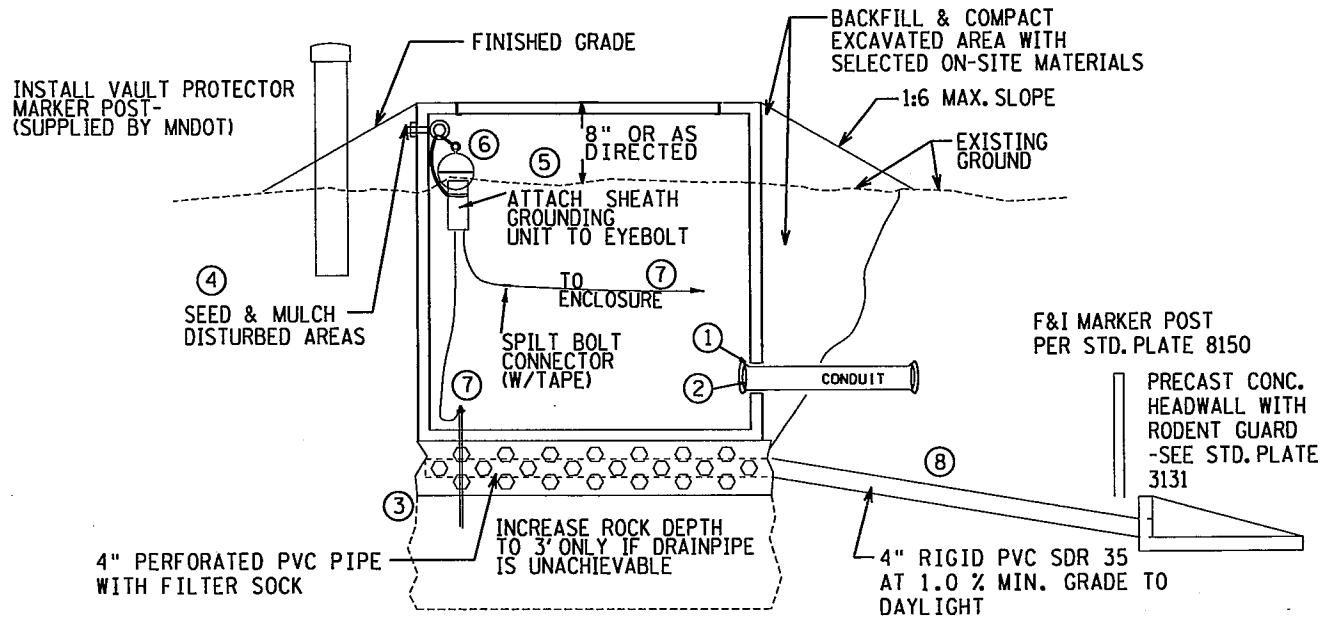
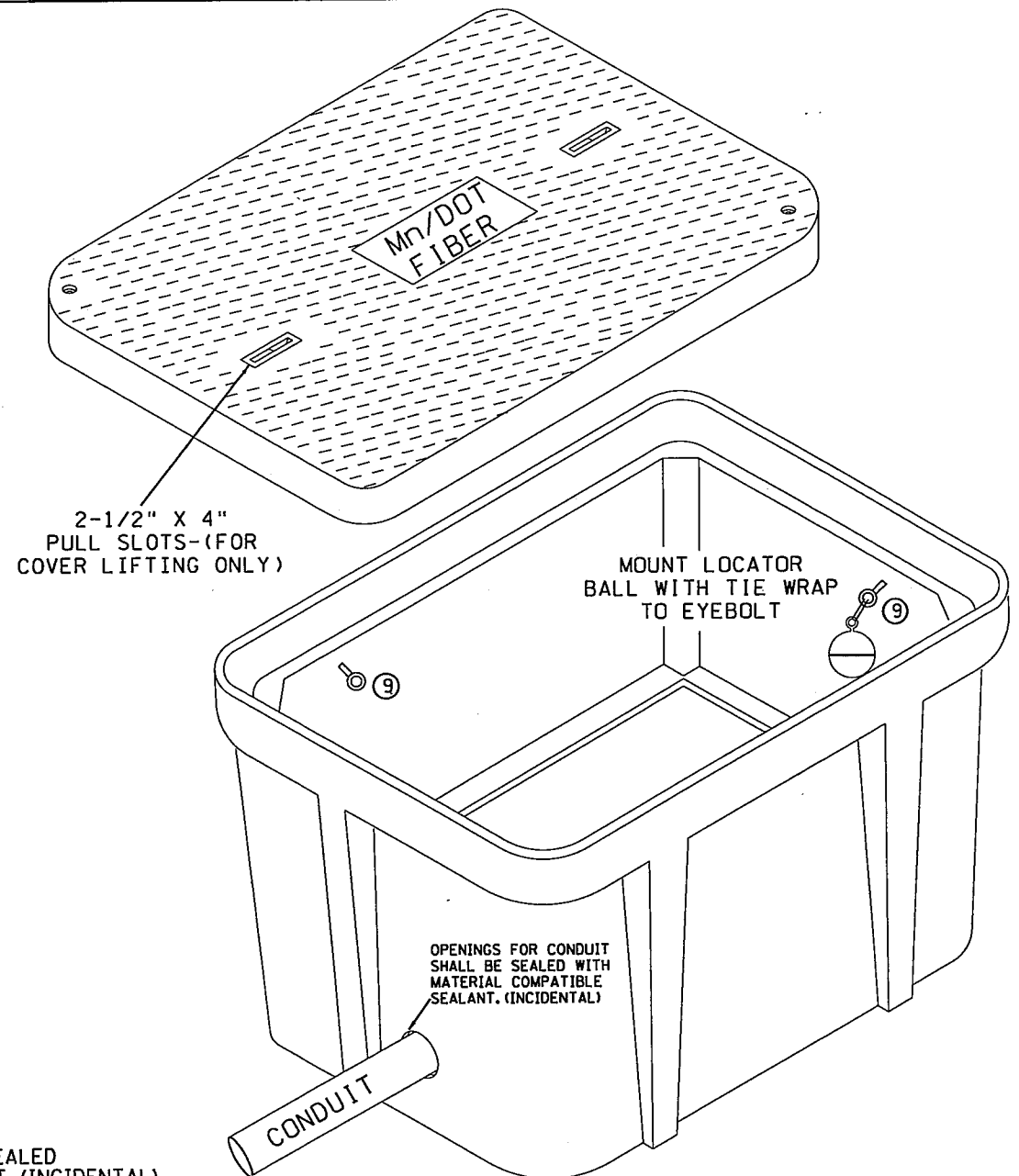
CERTIFIED BY *[Signature]*
 LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ11 OF SZ33 SHEETS.



VAULT INSTALLATION & DRAINAGE SYSTEM (SLOPED AREAS)



VAULT INSTALLATION & DRAINAGE SYSTEM (LEVEL GROUND & ACHIEVABLE DRAINAGE AREAS)

SPECIFIC NOTES

- ① OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT. (INCIDENTAL)
- ② PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND (INCIDENTAL)
- ③ F&I 1.0' COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MN/DOT 3149.2H. F&I 4" PERFORATED PVC PIPE WITH FILTER SOCK TO PROVIDE DRAINAGE. (INCIDENTAL)
- ④ RESTORE DISTURBED AREAS FOR TMS INSTALLATION WITH SEED AND TYPE I MULCH PER MNDOT 2575.3 (INCIDENTAL)
- ⑤ STRIP TOPSOIL FROM VAULT AND SLOPE AREAS PRIOR TO VAULT INSTALLATION (INCIDENTAL)
- ⑥ MOUNT LOCATOR BALL WITH TIE WRAP TO EYE BOLT
- ⑦ 6' OF NO.6 GREEN INSULATED STRANDED WIRE
- ⑧ DRAIN PIPE MAY BE PLACED IN SIDEWALL OF PULL VAULT TO ACHIEVE DRAINAGE IN AREAS WHERE MINIMUM PIPE OUTFALL IS AVAILABLE
- ⑨ F&I TWO TYPE 2 SHOULDER SS EYEBOLTS, 3/8" DIA. X 1-1/4" SHANK LENGTH, WITH HEX. NUTS (FOR LOOP SPLICE, LOCATING BALL MOUNTING)

GENERAL NOTES

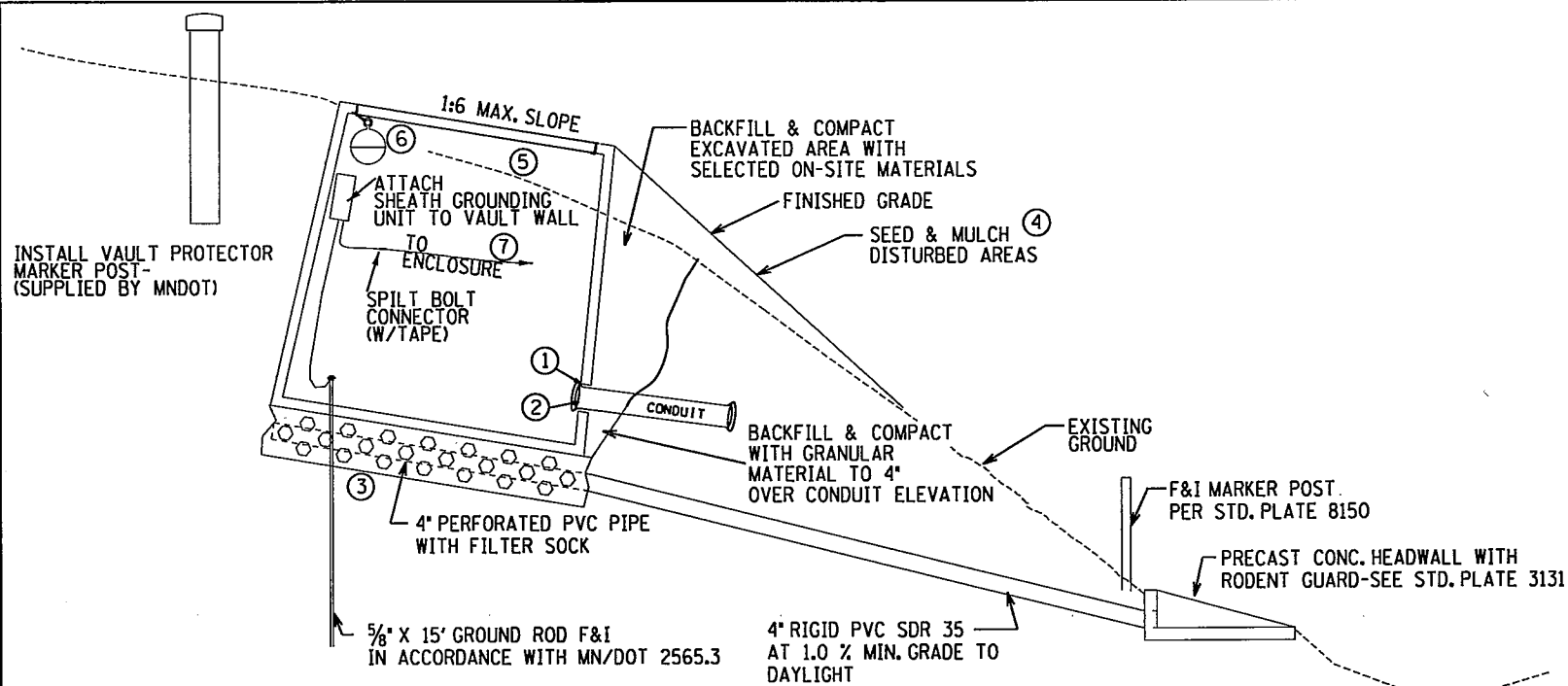
1. GROUND CONNECTIONS SHALL BE COATED WITH OXIDATION PROHIBITING COMPOUND.
2. CABLE SHALL ENTER BELOW THE SUPPORT BRACKETS WITH MIN. 70' OF SLACK FOR EACH CABLE OUTSIDE OF THE ENCLOSURE. CABLES SHALL BE COILED AROUND INSIDE OF SUPPORT BRACKETS. CABLES SHALL BE CUT TO THE SAME LENGTH AT THE ENCLOSURE.
3. DO NOT LIFT ENTIRE PULL VAULT WITH COVER ATTACHED BY COVER LIFTING SLOTS.
4. SHEATH GROUNDING DEVICE AND GROUND ROD ARE NOT PLACED IN VAULTS WHERE SPLICING DOES NOT TAKE PLACE.

FIBER OPTIC PULL VAULT AT SPLICING LOCATIONS INSTALLATION DETAIL

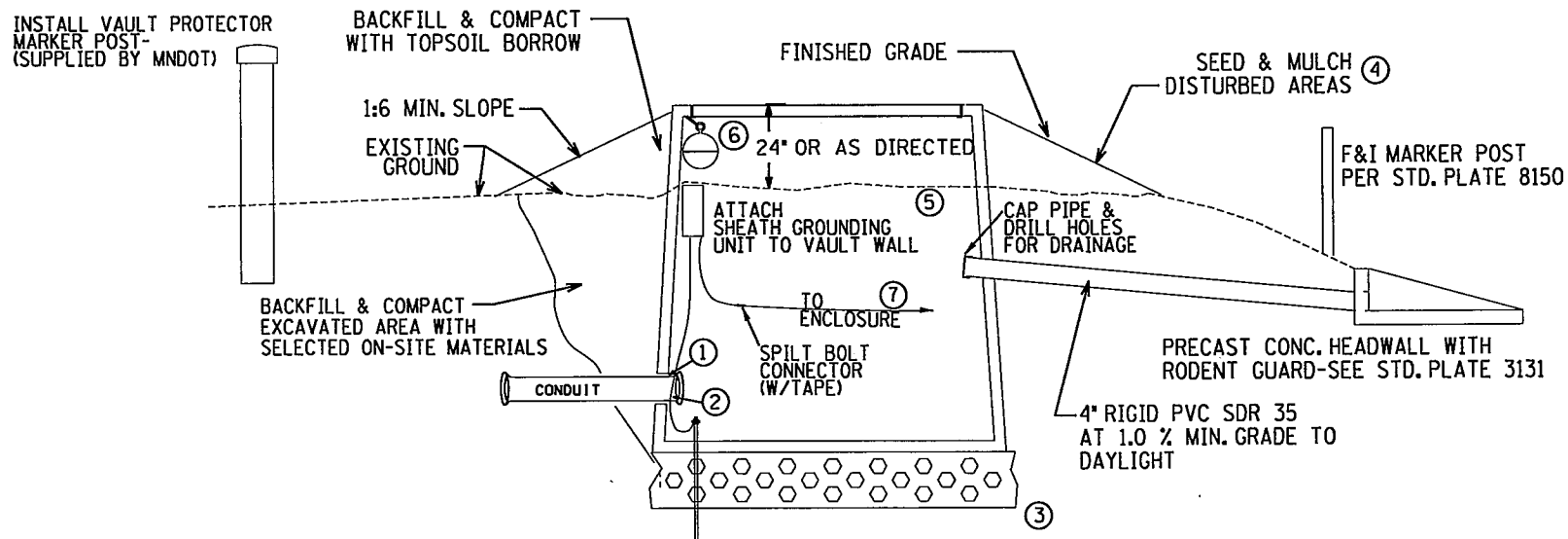
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STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ12 OF SZ33 SHEETS



VAULT INSTALLATION & DRAINAGE SYSTEM (SLOPED AREAS)



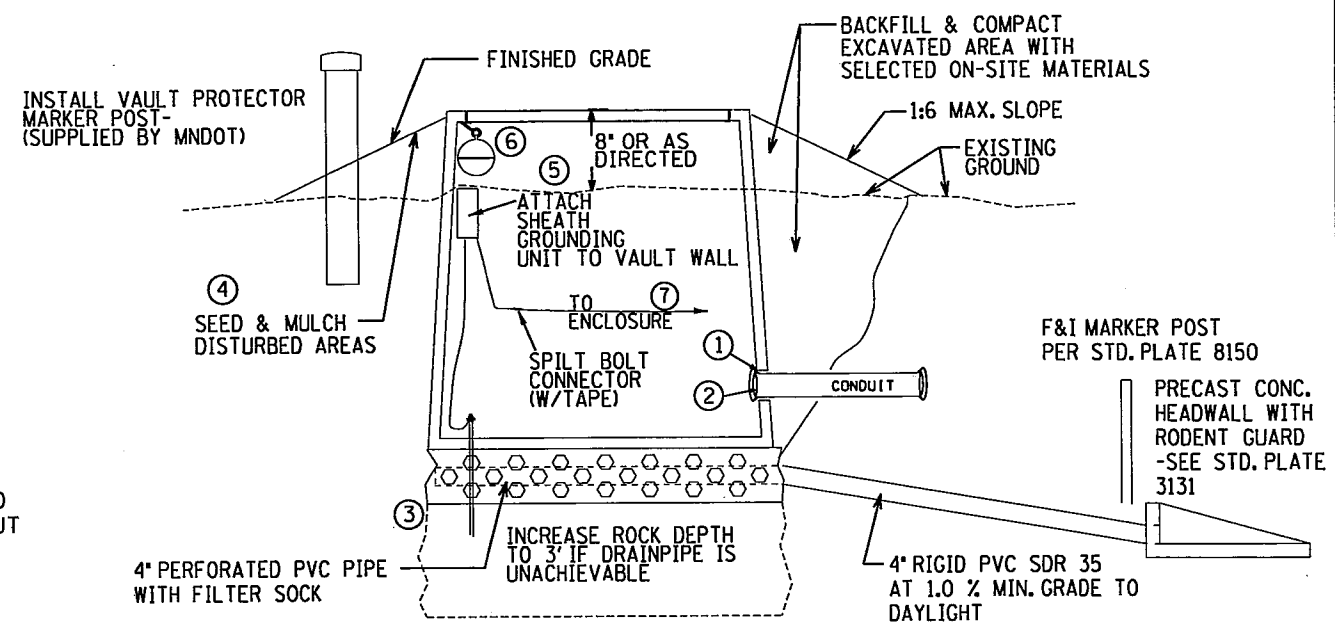
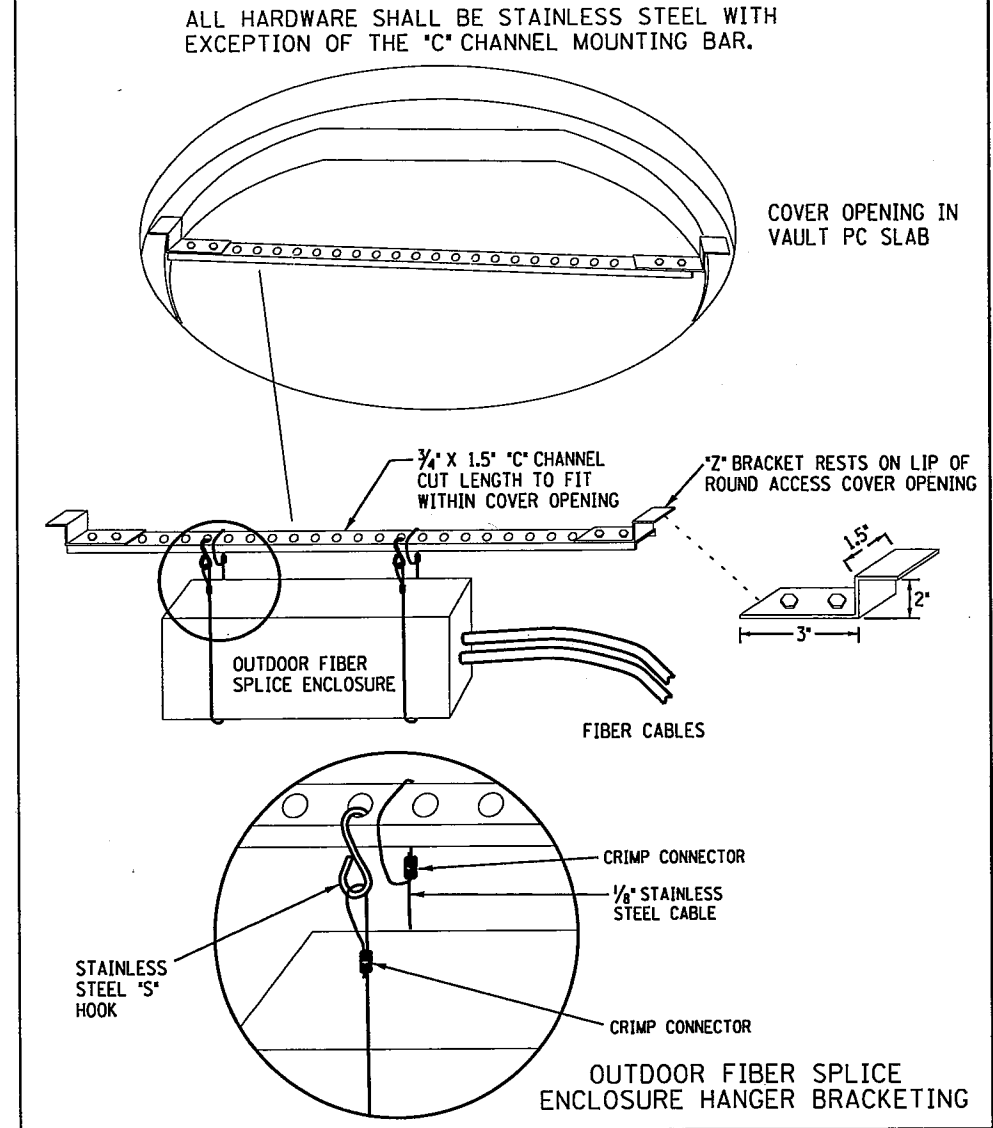
VAULT INSTALLATION & DRAINAGE SYSTEM
 (LEVEL GROUND & MINIMUM ACHIEVABLE DRAINAGE AREAS)

SPECIFIC NOTES

- ① OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT. (INCIDENTAL)
- ② PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND (INCIDENTAL)
- ③ F&I 1.0' COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MN/DOT 3149.2H. F&I 4" PERFORATED PVC PIPE WITH FILTER SOCK TO PROVIDE DRAINAGE. (INCIDENTAL)
- ④ RESTORE DISTURBED AREAS FOR TMS INSTALLATION WITH SEED AND TYPE I MULCH PER MNDOT 2575.3 (INCIDENTAL)
- ⑤ STRIP TOPSOIL FROM VAULT AND SLOPE AREAS PRIOR TO VAULT INSTALLATION (INCIDENTAL)
- ⑥ MOUNT LOCATOR BALL WITH TIE WRAP TO COVER LEDGE
- ⑦ 6' OF NO.6 AWG GREEN INSULATED STRANDED WIRE

GENERAL NOTES

1. GROUND CONNECTIONS SHALL BE COATED WITH OXIDATION PROHIBITING COMPOUND.
2. CABLE SHALL ENTER BELOW THE SUPPORT BRACKETS WITH MIN. 70' OF SLACK FOR EACH CABLE OUTSIDE OF THE ENCLOSURE. CABLE SHALL BE COILED AROUND INSIDE OF SUPPORT BRACKETS. CABLES SHALL BE CUT TO THE SAME LENGTH AT THE ENCLOSURE.
3. ALL HARDWARE SHALL BE STAINLESS STEEL WITH EXCEPTION OF THE 'C' CHANNEL MOUNTING BAR.



VAULT INSTALLATION & DRAINAGE SYSTEM
 (LEVEL GROUND & ACHIEVABLE DRAINAGE AREAS)
 FIBER OPTIC SPLICE VAULT INSTALLATION

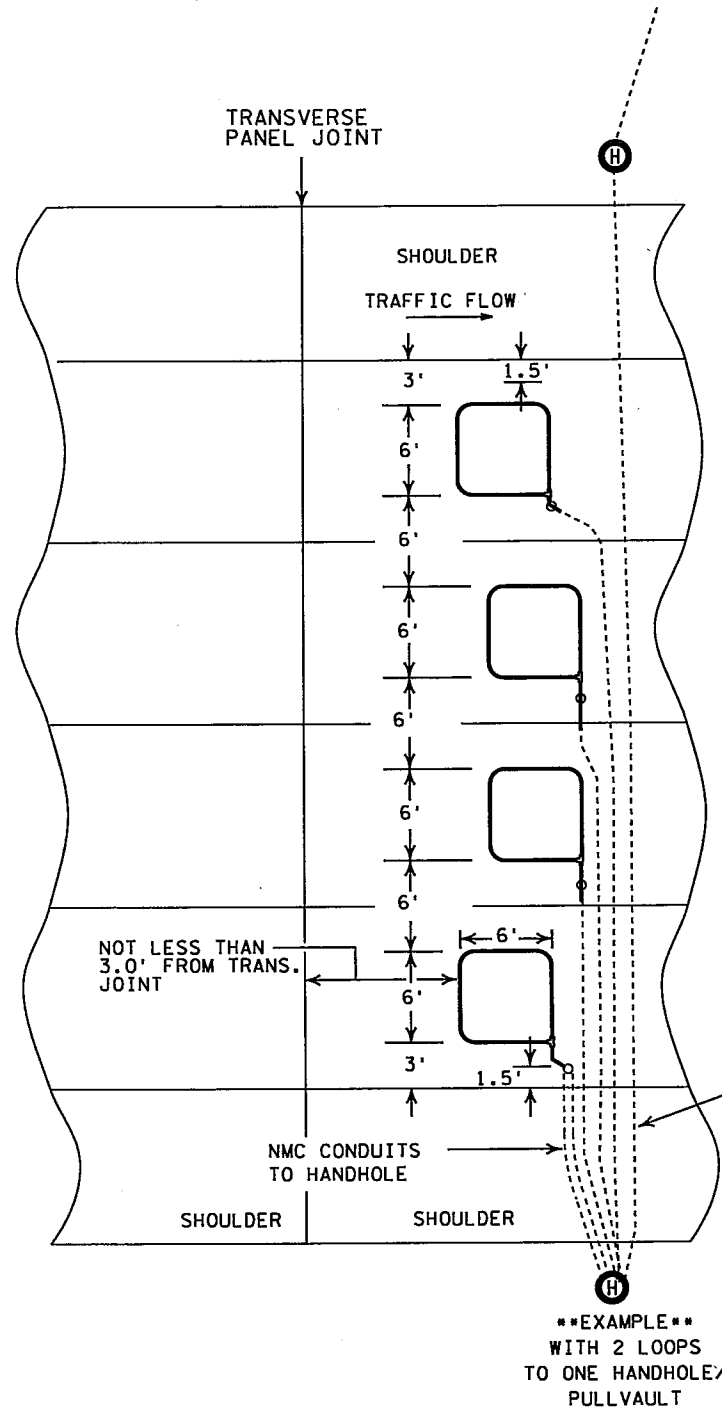
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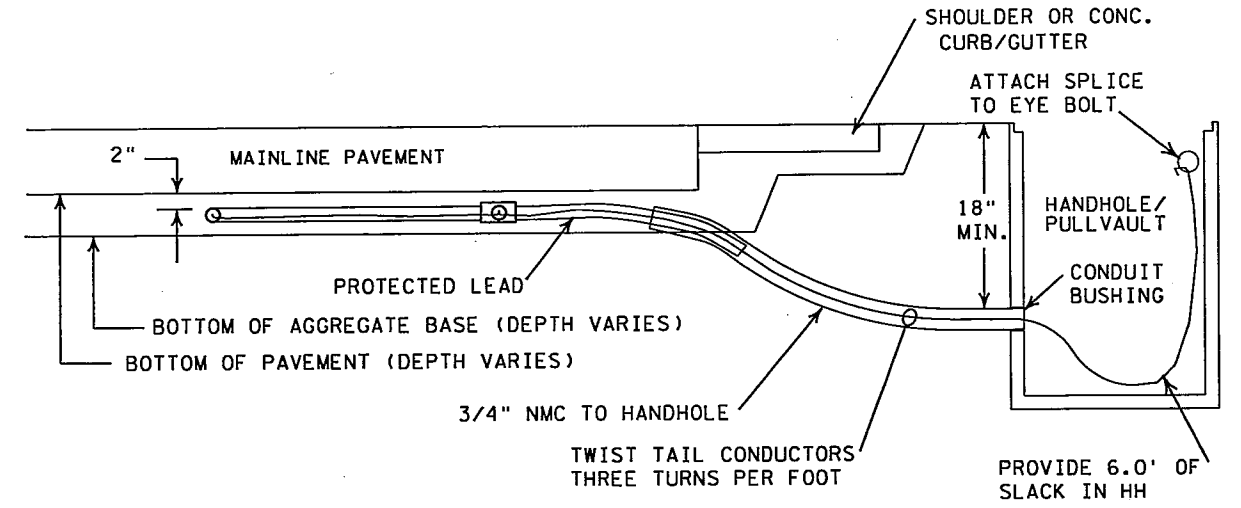
STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ13 OF SZ33 SHEETS.

GENERAL NOTES:

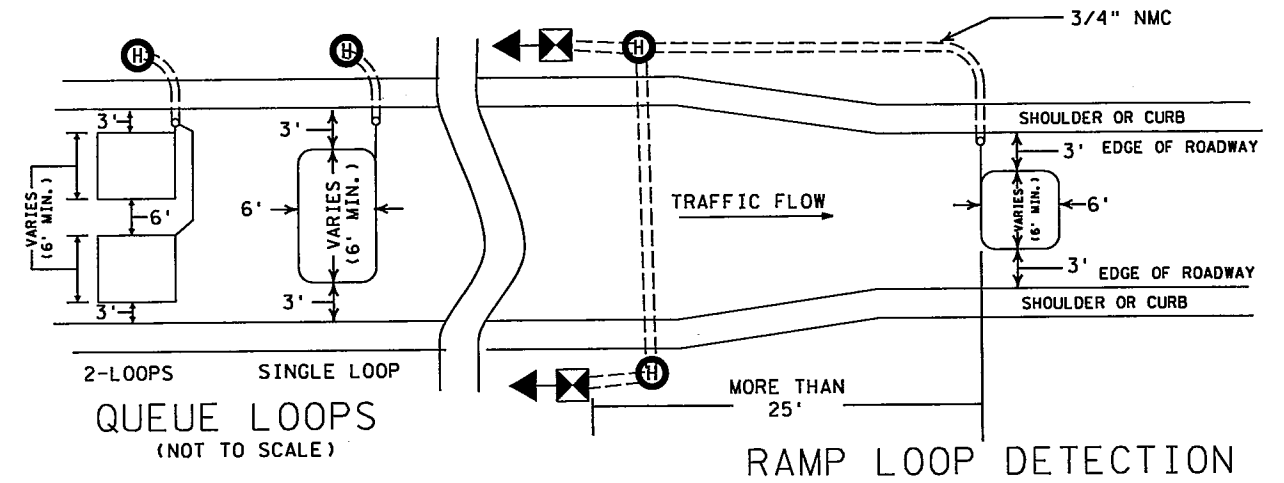
1. SEE SPECIAL PROVISIONS FOR REQUIRED LOOP DETECTOR AND CONDUCTOR SPLICE KIT REQUIREMENTS.
2. PREFORMED LOOP DETECTORS ARE VARIABLE SIZED DEPENDING ON ROADWAY LOCATION AND SHALL BE INSTALLED IN THE CENTER OF THE LANE. PAVEMENT JOINTS FOR CONCRETE PAVING SHALL BE ESTABLISHED BEFORE LOOP PLACEMENT TO MAINTAIN A MIN. OF 3.0' FROM DOWEL BASKET PLACEMENT
3. THE PROTECTED LEAD PORTION OF LOOP SHALL EXTEND FROM THE TEE CONNECTOR, ENDING A MIN. OF 1.0' INSIDE THE NMC CONDUIT
4. THE LOOP DETECTOR CONDUCTORS SHALL BE TWISTED THREE TURNS PER FOOT FROM THE NMC TEE CONNECTOR TO THE HANDHOLE.
5. EACH LOOP DETECTOR CONDUIT TO THE HANDHOLE SHALL BE SLOPED TOWARDS THE HANDHOLE UNDER THE SHOULDER AND/OR CONC. CURB.
6. THE LOOP DETECTOR CONDUCTORS SHALL END IN THE HANDHOLE.
7. NO SPLICES ALLOWED IN LOOP CONDUCTOR EXCEPT AT HANDHOLE
8. SEE SPECIAL PROVISIONS FOR TESTING REQUIREMENTS OF LOOP DETECTORS
9. THE LOOP DETECTOR CONDUCTORS AND THE LOOP DETECTOR LEAD-IN CABLE CONDUCTORS SHALL BE PROPERLY PREPARED AND CLEANED BEFORE SPLICING. SOLDER THE LOOP CONDUCTOR TO LEAD-IN CONDUCTORS, THEN PLACE IT INTO THE SPLICE ENCAPSULATOR
10. PLACE THE SPLICE IN A PLASTIC TUBE WITH END CAPS THAT FUNCTION AS SPOUTS. USE A TWO PART INSULATING RESIN, CONFINED IN A UNIPAK, THAT TURNS BLACK WHEN MIXED AND BECOMES HARD WHEN CURED. INSTALL BOTH LOOP CONDUCTORS AND LEAD-IN INTO THE SAME END OF THE TUBE AND ENCAPSULATE THE SPLICE.
11. THE LOOP INSULATION RESISTANCE READING MUST BE GREATER THAN 100 MEG OHM.



MAINLINE DETECTORS

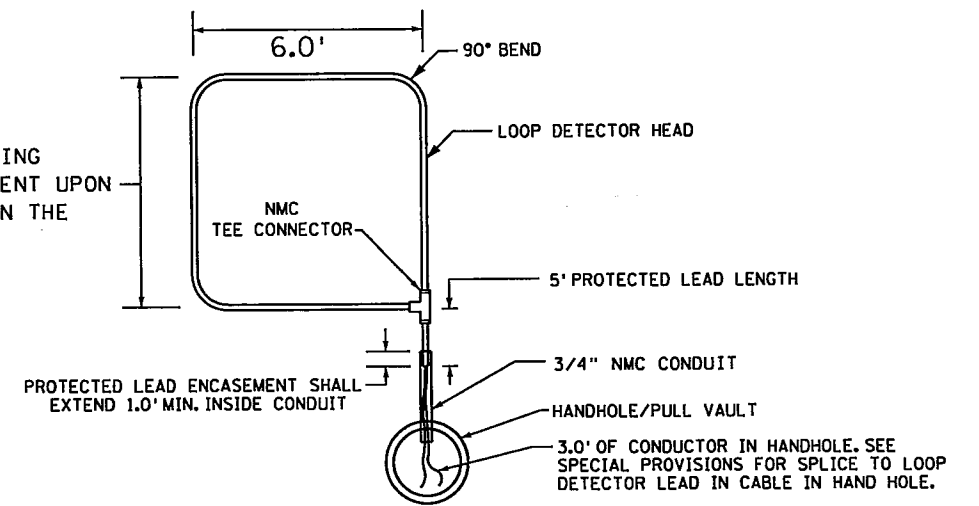


CONDUIT/HANDHOLE INSTALLATION



RAMP LOOP DETECTION

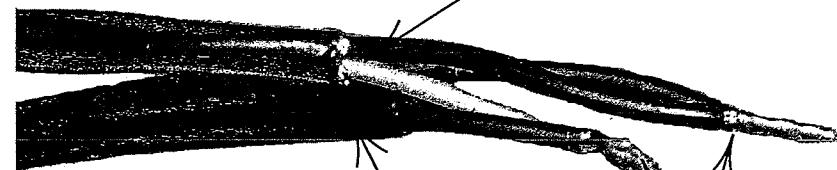
THIS DIMENSION VARIES ACCORDING TO DETECTOR SIZE & IS DEPENDENT UPON THE DETECTORS LOCATION WITHIN THE ROADWAY, RAMP, OR LOOP



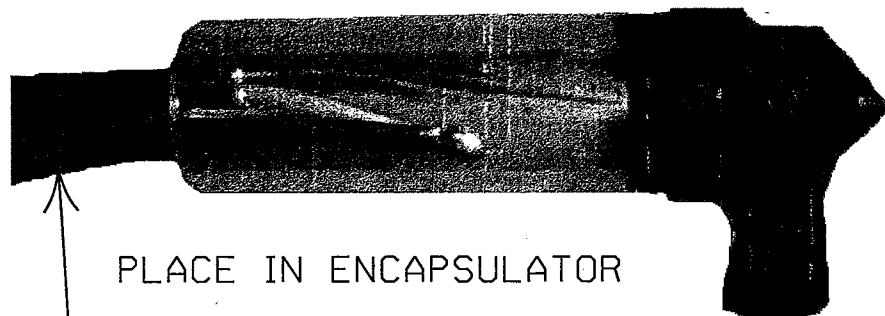
TYPICAL PREFORMED LOOP DETECTOR DETAIL

TMS "PREFORMED" LOOP DETECTOR - PART ONE

CUT & REMOVE DRAIN WIRE

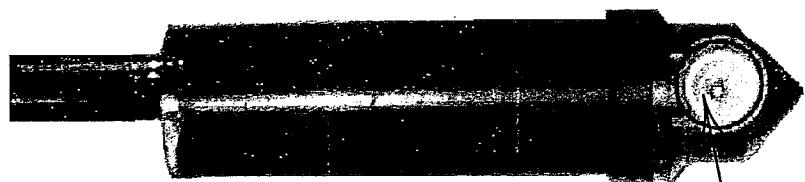


ROUGHEN 5" OF CABLE JACKET WITH SANDPAPER
 STAGGER SOLDERED BUTT SPLICE

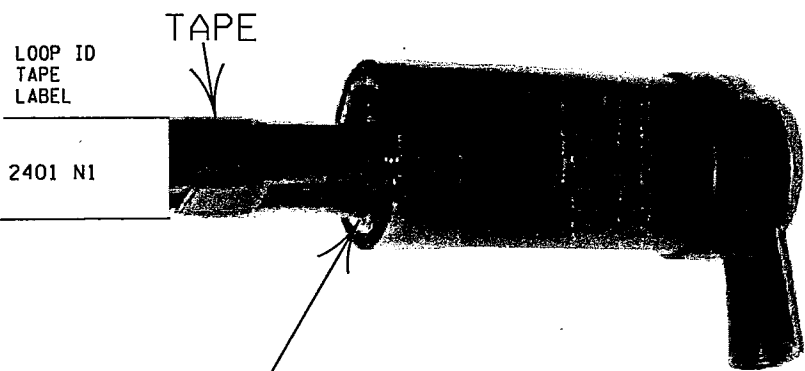


PLACE IN ENCAPSULATOR

TAPE WIRE TOGETHER BEFORE SPLICE



PLACE WIRE NUT IN ONE END TO BLOCK OPENING



LOOP ID TAPE LABEL

2401 N1

FILL ENCAPSULATOR COMPLETELY-ALLOW FINISHED SPLICE TO CURE SO EPOXY DOES NOT RUN OUT

LOOP DETECTOR SPLICE FOR SAWCUT AND PREFORMED LOOPS

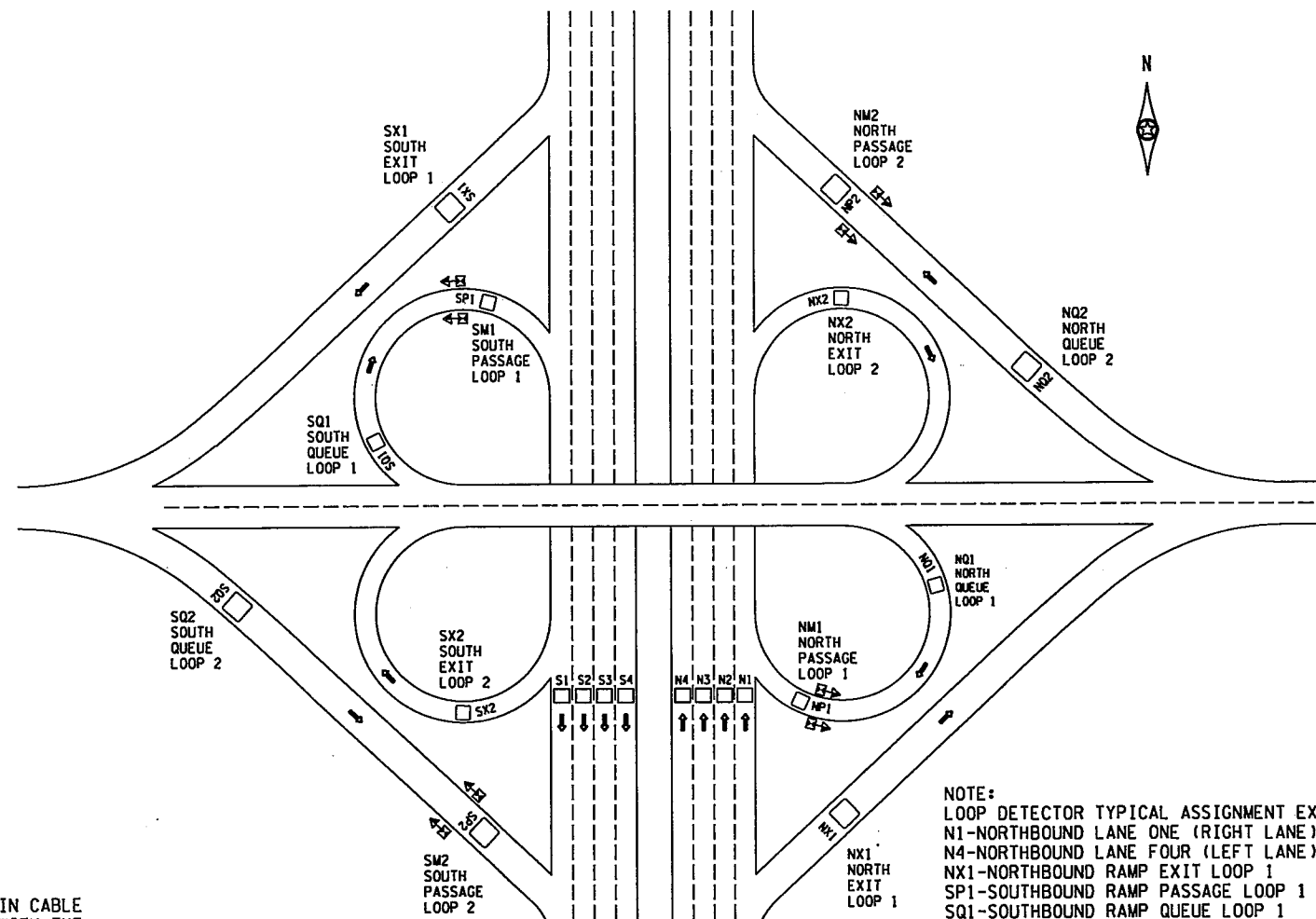
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CERTIFIED BY

Jeffrey M. Puleo
 LICENSED PROFESSIONAL ENGINEER

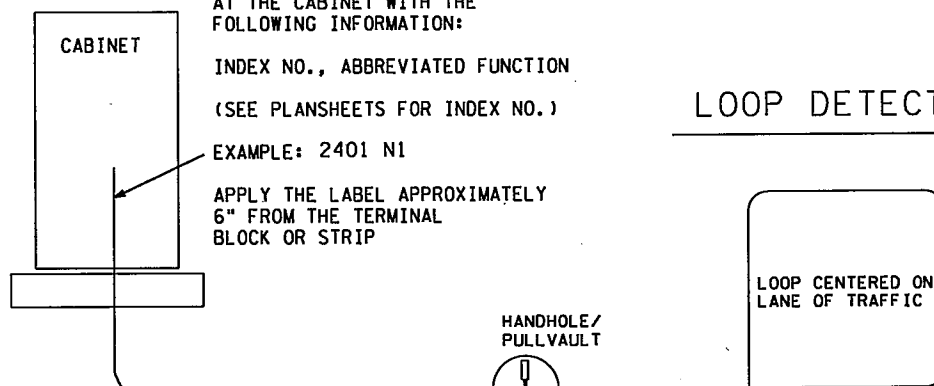
LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ15 OF SZ33 SHEETS



NOTE:
 LOOP DETECTOR TYPICAL ASSIGNMENT EXAMPLES
 N1-NORTHBOUND LANE ONE (RIGHT LANE) POSITION
 N4-NORTHBOUND LANE FOUR (LEFT LANE) POSITION
 NX1-NORTHBOUND RAMP EXIT LOOP 1
 SP1-SOUTHBOUND RAMP PASSAGE LOOP 1
 SQ1-SOUTHBOUND RAMP QUEUE LOOP 1
 (SAME METHOD SHALL APPLY TO EASTBOUND & WESTBOUND ROADS)

LOOP DETECTOR FUNCTION DESIGNATIONS



LABEL THE LEAD-IN CABLE AT THE CABINET WITH THE FOLLOWING INFORMATION:

INDEX NO., ABBREVIATED FUNCTION
 (SEE PLANSHEETS FOR INDEX NO.)

EXAMPLE: 2401 N1

APPLY THE LABEL APPROXIMATELY 6" FROM THE TERMINAL BLOCK OR STRIP

LABEL BOTH THE LEAD-IN CABLE AND LOOP WIRE AT THE HANDHOLE WITH THE FOLLOWING INFORMATION:

INDEX NO., ABBREVIATED FUNCTION
 (SEE PLANSHEETS FOR INDEX NO.)

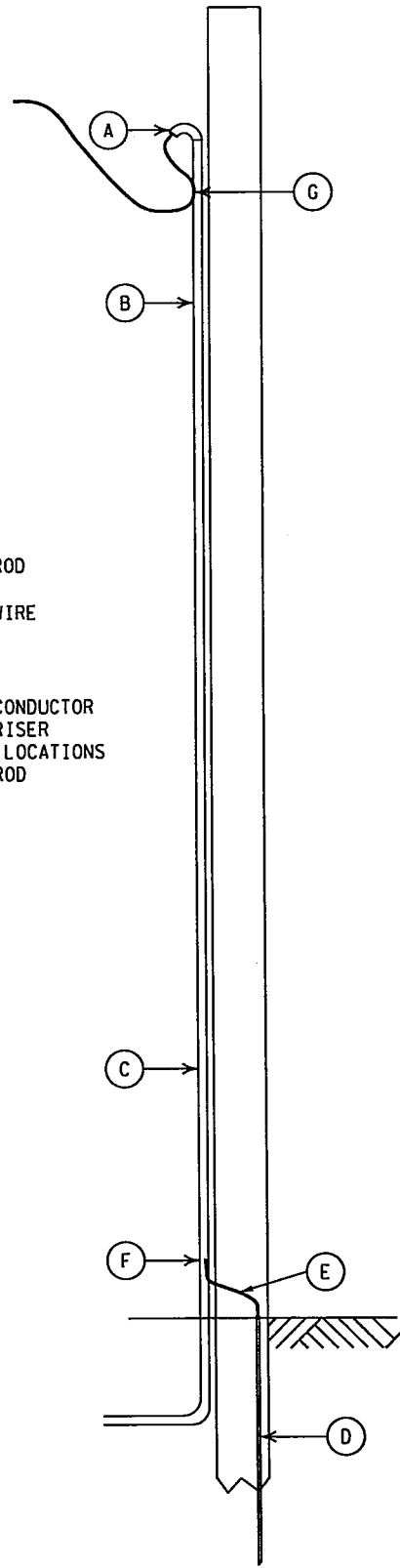
EXAMPLE: 2401 N1

APPLY THE LABELS APPROXIMATELY 6" FROM THE SPLICE

APPLY WHITE ELECTRICAL TAPE AND LABEL USING BLACK PERMANENT MARKER

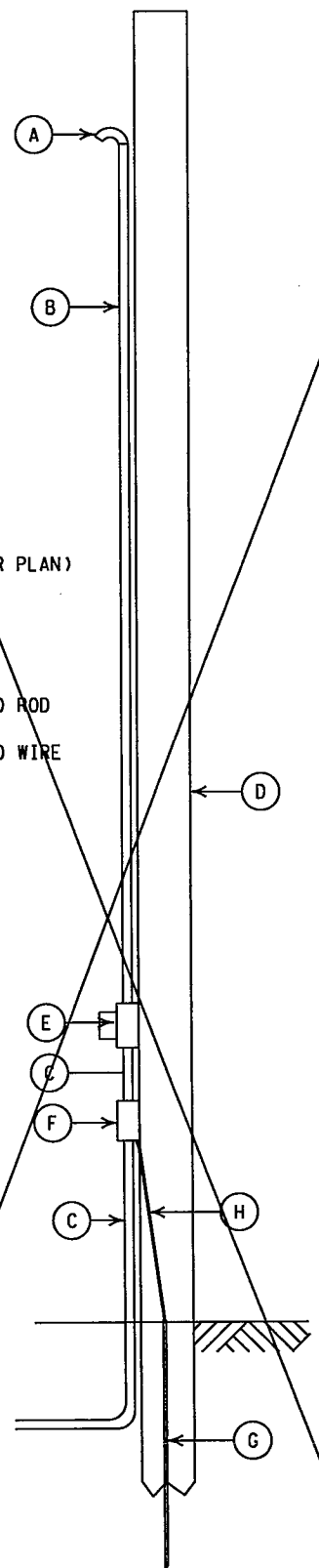
LOOP DETECTOR CABLE LABELING

- (A) WEATHERHEAD
- (B) RISER
- (C) 2.0" RSC
- (D) 5/8" X 15' GROUND ROD
- (E) No. 4 BARE GROUND WIRE
- (F) GROUNDING CLAMP
- (G) NEUTRAL/GROUNDING CONDUCTOR
 MAY BE CLAMPED TO RISER
 AT UTILITY SERVICE LOCATIONS
 IN LIEU OF GROUND ROD



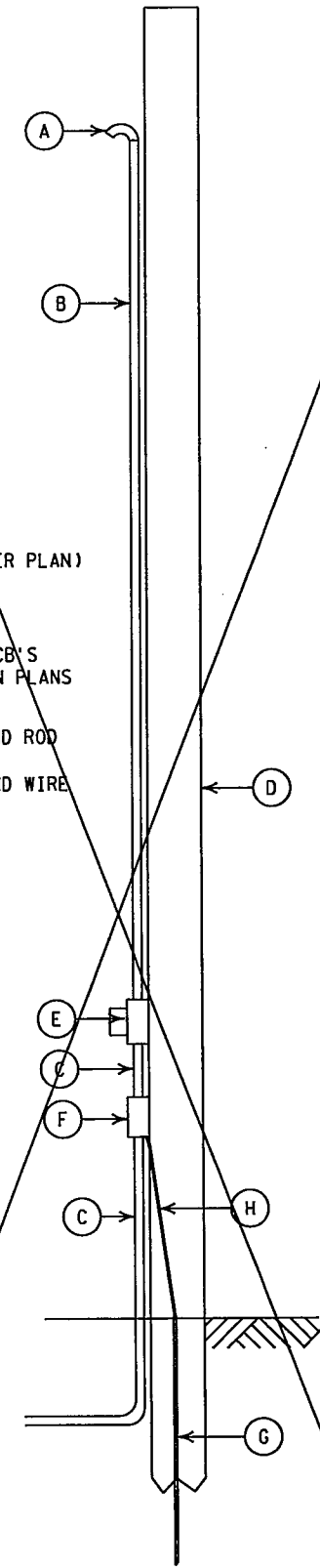
SERVICE INSTALLATION
 TYPE A

- (A) WEATHERHEAD
- (B) RISER
- (C) 2.0" RSC
- (D) WOOD POLE (AS PER PLAN)
- (E) METERSOCKET
- (F) DISCONNECT
- (G) 5/8" X 15' GROUND ROD
- (H) No. 4 BARE GROUND WIRE



SERVICE INSTALLATION
 TYPE C

- (A) WEATHERHEAD
- (B) RISER
- (C) 2.0" RSC
- (D) WOOD POLE (AS PER PLAN)
- (E) METERSOCKET
- (F) CB ENCLOSURE & CB'S
 AS CALLED OUT ON PLANS
- (G) 5/8" X 15' GROUND ROD
- (H) No. 4 BARE GROUND WIRE



SERVICE INSTALLATION
 TYPE D

SERVICE INSTALLATIONS

CAUTION
BURIED
FIBER OPTIC
CABLE
BEFORE DIGGING
CALL
GOPHER STATE ONE CALL
8 1 1

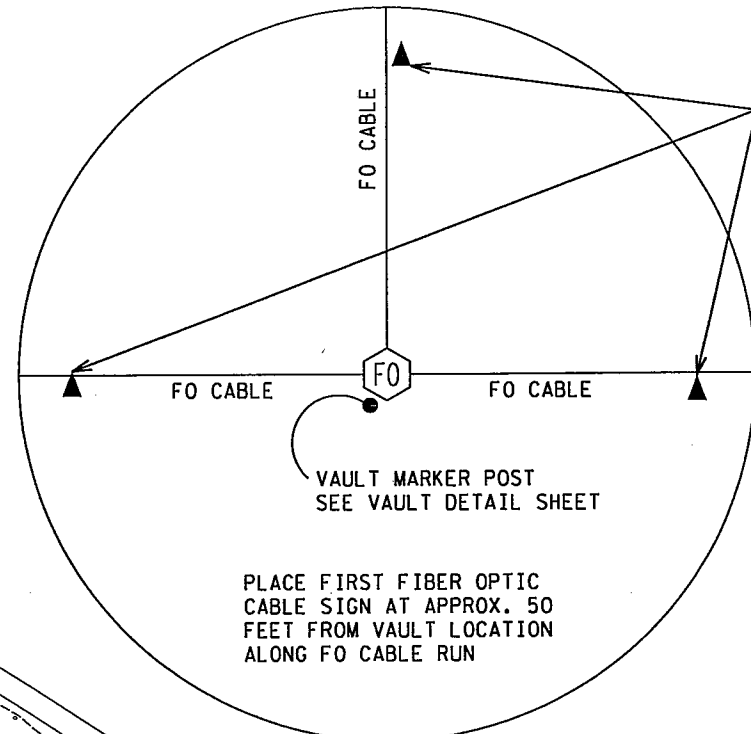


8" X 12" .75"R.

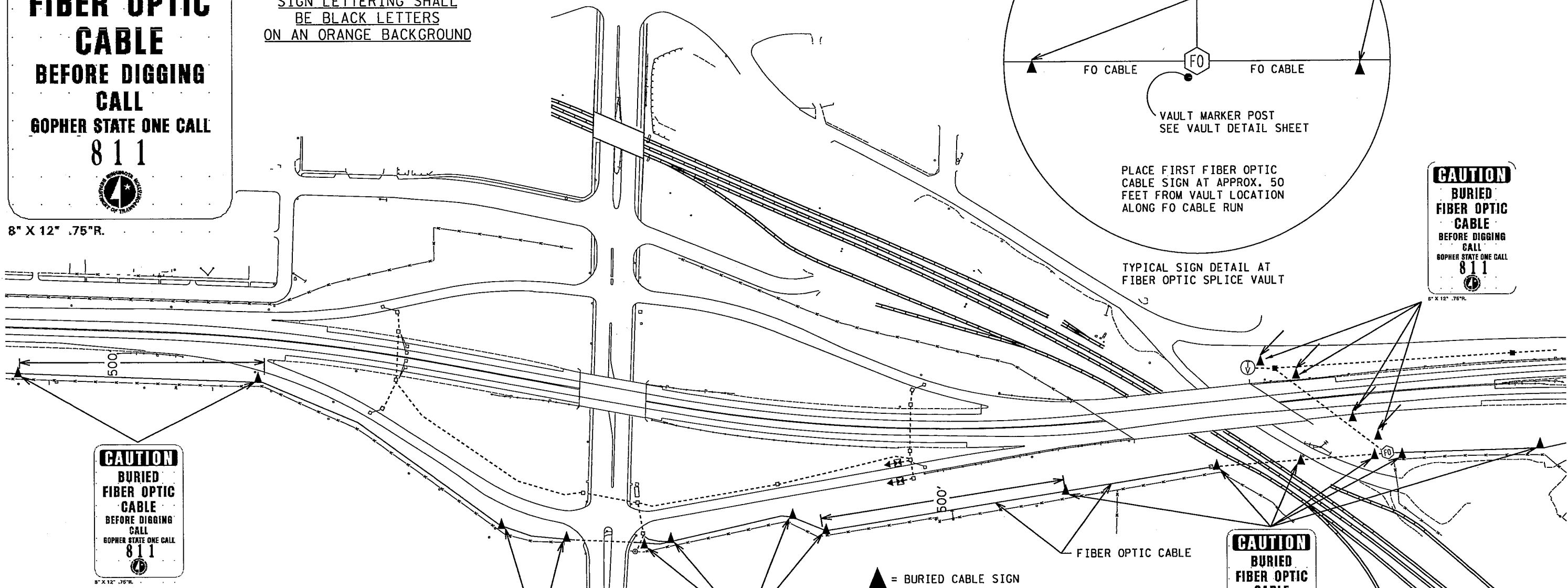
SIGN LETTERING SHALL
 BE BLACK LETTERS
 ON AN ORANGE BACKGROUND

CAUTION
BURIED
FIBER OPTIC
CABLE
BEFORE DIGGING
CALL
GOPHER STATE ONE CALL
8 1 1

CAUTION
BURIED
FIBER OPTIC
CABLE
BEFORE DIGGING
CALL
GOPHER STATE ONE CALL
8 1 1

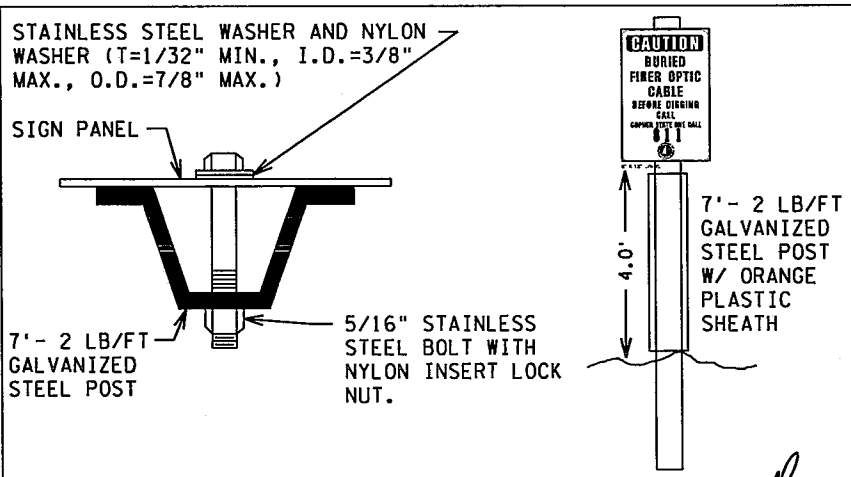


TYPICAL SIGN DETAIL AT
 FIBER OPTIC SPLICE VAULT



CAUTION
BURIED
FIBER OPTIC
CABLE
BEFORE DIGGING
CALL
GOPHER STATE ONE CALL
8 1 1

CAUTION
BURIED
FIBER OPTIC
CABLE
BEFORE DIGGING
CALL
GOPHER STATE ONE CALL
8 1 1



CAUTION
BURIED
FIBER OPTIC
CABLE
BEFORE DIGGING
CALL
GOPHER STATE ONE CALL
8 1 1

CAUTION
BURIED
FIBER OPTIC
CABLE
BEFORE DIGGING
CALL
GOPHER STATE ONE CALL
8 1 1

F&I BURIED CABLE SIGN A MAXIMUM OF 500 FEET APART.
 F&I ONE SIGN AT CHANGE IN CABLE DIRECTION TO
 INDICATE CHANGE POINT AND NEW DIRECTION.
 F&I BURIED CABLE SIGNS 16 FEET BEHIND CURB
 OR EDGE OF ROADWAY AT ROADWAY CROSSINGS.
 F&I BURIED CABLE SIGNS 25 FEET FROM RAILROAD
 OR AS DIRECTED IN CROSSING PERMIT.
 AT VAULT LOCATIONS MARKER POST IS PER VAULT DETAIL.
 F&I ADDITION BURIED CABLE SIGN IF UNABLE TO SEE
 FROM SIGN TO SIGN (THIS INCLUDES CHANGES IN ELEVATION).
 F&I BURIED CABLE SIGNS BETWEEN CABLE AND R/W FENCE,
 3.0' FROM CABLE WITH SIGN PANEL PARALLEL TO BURIED CABLE
 NOTE: SIGNS MAY BE MOUNTED ON FACE OF WALLS WHERE NECESSARY
 AND AS APPROVED BY THE ENGINEER

BURIED CABLE SIGN PLACEMENT TYPICAL

GENERAL NOTES

* Add cable identifiers to color coded electrical tape with a permanent marker as shown on this detail.

e.g.: 94.41 East 24SM 01467M.
 94.41 = Cable ID#
 East = Direction
 24SM = Cable fiber count
 01467 = Nearest cable length marking to where the tape is applied.

* Electrical tape colors:
 NB (Blue)
 SB (Green)
 EB (Yellow)
 WB (Orange)
 Pigtails (White)

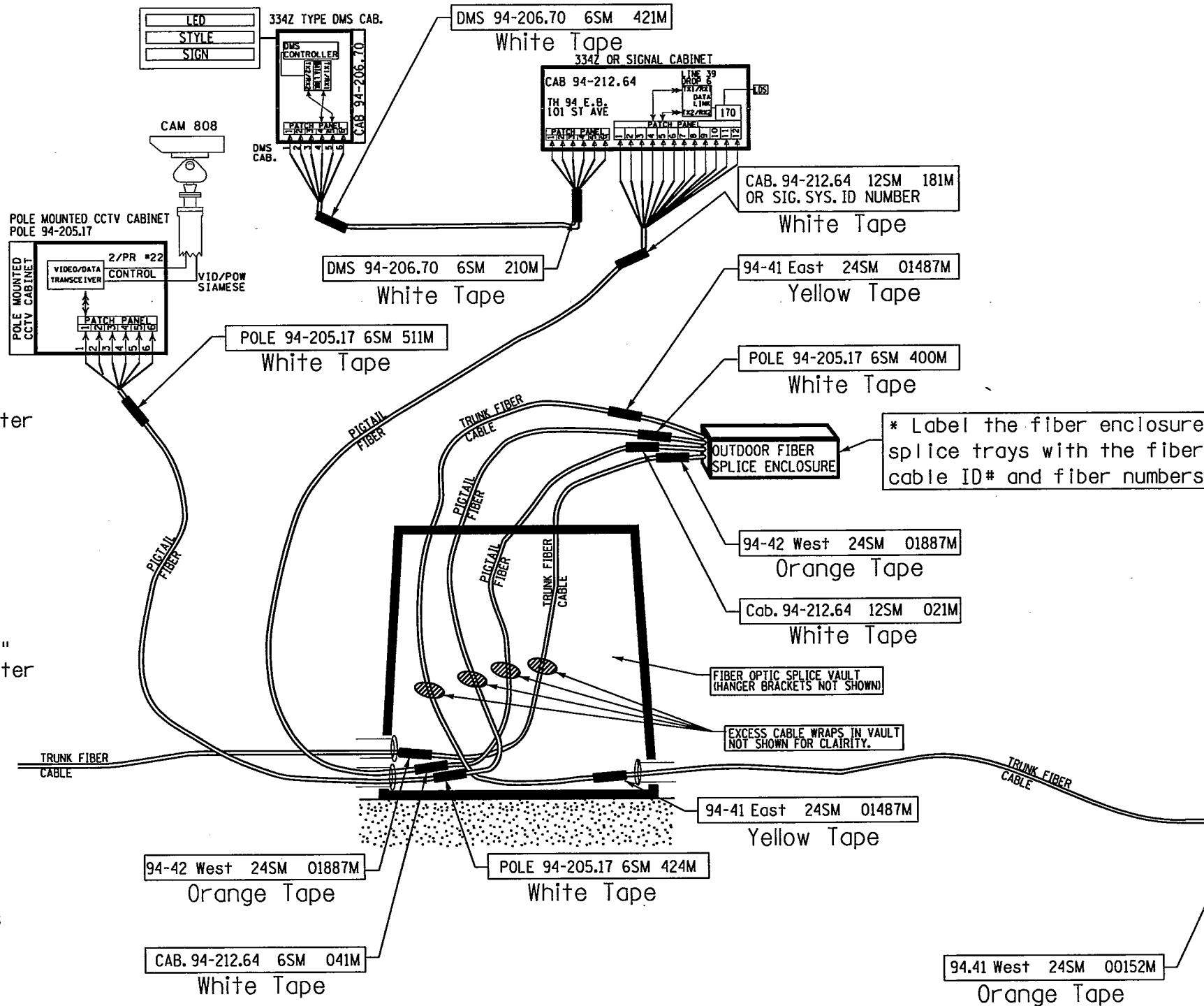
* The electrical tape with the identifiers is added to:

- 334Z-Type Cabinets to within 18" of the entrance conduit on the outer jacket of the fiber optic cable.
- Pole Mounted CCTV Cabinet between the entrance point and the fiber termination panel.
- FO Splice Vaults to within 18" of the splice enclosure and the entrance conduit.
- TMS Shelter Cabinets to within 18" of the entrance conduit on the outer jacket of the fiber optic cable and again to within 18" of the splice panel on the inner jacket of the fiber optic cable.

* Neatly tape the fiber optic cables together as needed near the fiber enclosure then throughout the length of slack.

* Neatly coil the fiber optic cables into the fiber optic hanger brackets inside the vault.

* This drawing is not intended to show the fiber optic cables in their final position.

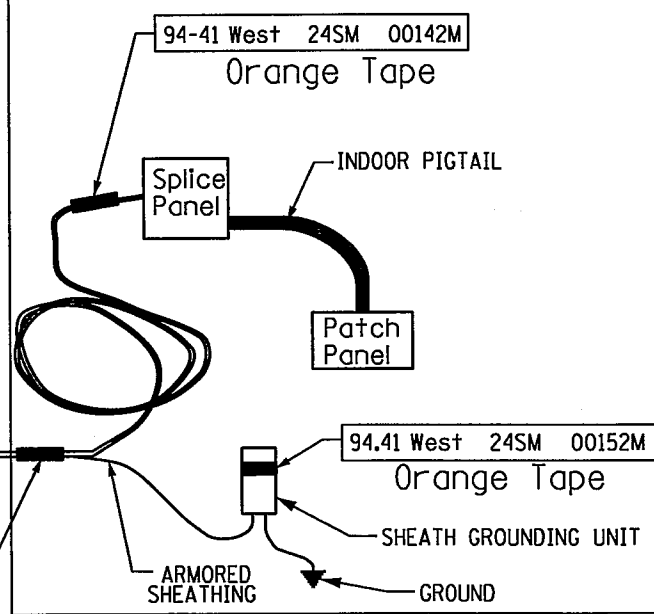


PLEASE NOTE: OUTDOOR FIBER SPLICE ENCLOSURE IS SHOWN OUTSIDE OF THE SPLICE VAULT. THE ACTUAL PLACEMENT IS WITHIN THE VAULT HANGING ON BRACKETS (NOT SHOWN)

TMS SHELTER CABINET

SHELTER NOTES

- * Label the indoor pigtail six-paks on the outer jacket at both the splice tray/wheel and inside the patch panel to indicate the fiber cable ID # and which six fibers the six-paks are spliced to: (e.g. 94-12 SM7-12)
- * Label the front of the splice panels with the fiber cable ID#, direction, and fiber count.
- * Label splice trays/wheels with the fiber cable ID# and the fiber count.
- * Label the front of patch panels with the fiber cable ID#, direction and fiber count.
- * Label the sheath grounding unit with the fiber cable ID#, direction and fiber count.



FIBER OPTIC CABLE LABELING DETAIL

REV. NO.	DATE: / /
REV. NO.	DATE: / /

CERTIFIED BY *[Signature]* LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ18 OF SZ33 SHEETS.

cooz1sco MDROSRW7D023 TMS
 PLOTTED: 11/10/2015 10:35:56 AM

INDEX OF REFRACTION

PROVIDE CABLE MANUFACTURERS INDEX OF REFRACTION USED FOR TESTING ON PROJECT.

U = FURNISHED SPLICE, NO SPLICE OTDR READING REQUIRED AT THIS LOCATION

X.X POWER METER TEST POINT
 INSERT OPTICAL LINK LOSS IN dB
 (TEST MULTI MODE FIBER AT 1300)
 (TEST SINGLE MODE FIBER AT 1550)

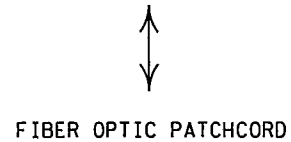
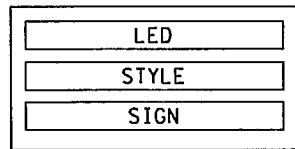
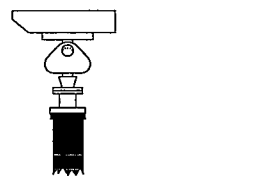
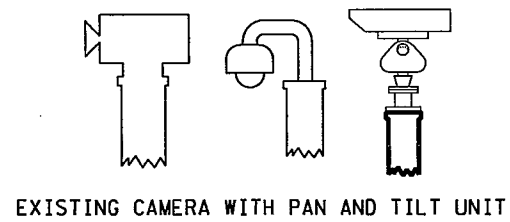
INSERT OTDR SPLICE LOSS SHOT FROM THIS DIRECTION
 INSERT OTDR SPLICE LOSS SHOT FROM THIS DIRECTION

FO CABLE SPLICE POINT & OTDR TEST SPLICE READING

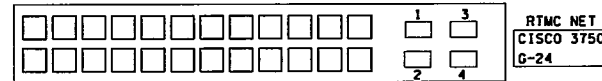
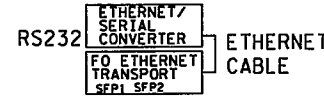
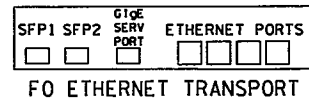
OTDR TEST SPLICE READING ON INPLACE CABLE

PIGTAIL OTDR LENGTH km
 OTDR LENGTH km TO SHELTER
 PROVIDE TRUNK AND PIGTAIL OTDR FIBER LENGTH MEASUREMENTS USING OTDR READINGS FROM CONNECTORS AT SHELTER OR CABINETS TO SPLICE POINTS IN VAULTS

FIBER OPTIC CABLE MARKINGS @
 SPLICE ENCLOSURE VAULT ENTRY
 PROVIDE TRUNK CABLE OUTER JACKET LENGTH MARKINGS AT ENTRY TO VAULT AND AT ENTRY TO OUTDOOR FIBER SPLICE ENCLOSURE

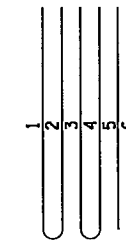
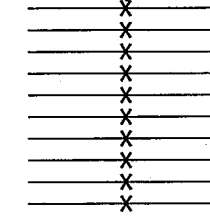


FACTORY PRE-TERMINATED/ARMORED FIBER OPTIC PIGTAIL



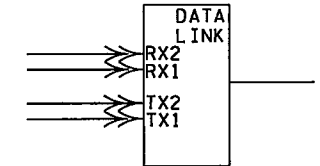
COMMON ETHERNET EQUIPMENT

EXISTING FO CABLE SPLICE POINT

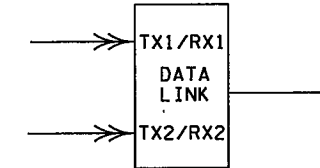


FIBER OPTIC PIGTAIL SPLICE DIAGRAM

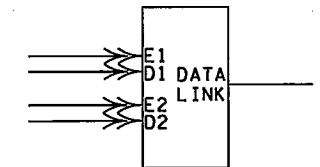
(SPLICE UNUSED FIBERS TOGETHER IN THE SPLICE VAULT SO THAT THE FIBERS CAN BE TESTED)



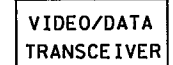
FORCE TRANS. MODEL 2869 DATA LINK



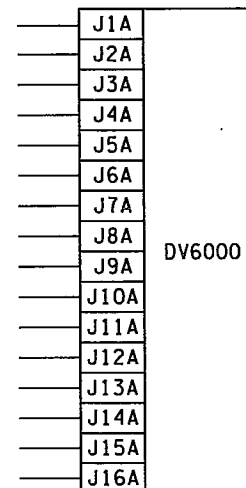
OPTELECOM MODEM DATA LINK



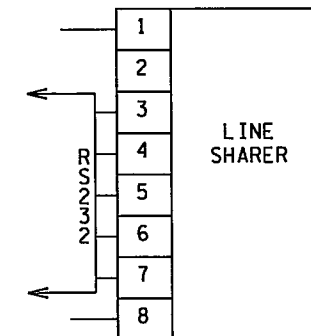
EIA/TIA 232 DATA LINK



VIDEO & DATA TRANSCEIVER TRANSMITTER



DTS EQUIPMENT



RS 232 LINE SHARER

- [170] 170 CONTROLLER
- [DMS] CHANGEABLE MESSAGE SIGN
- [FLS] FLASHER
- [RCS] RAMP CONTROL SIGNAL
- [LDS] LOOP DETECTOR STATION
- [LD] LOOP DETECTOR(S)
- [ILCS] INTELLIGENT LANE CONTROL SIGN

LEGEND FOR COMMUNICATION SCHEMATICS

REV. NO.	DATE: / /
REV. NO.	DATE: / /

CERTIFIED BY

[Signature]
 LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ19 OF SZ33 SHEETS

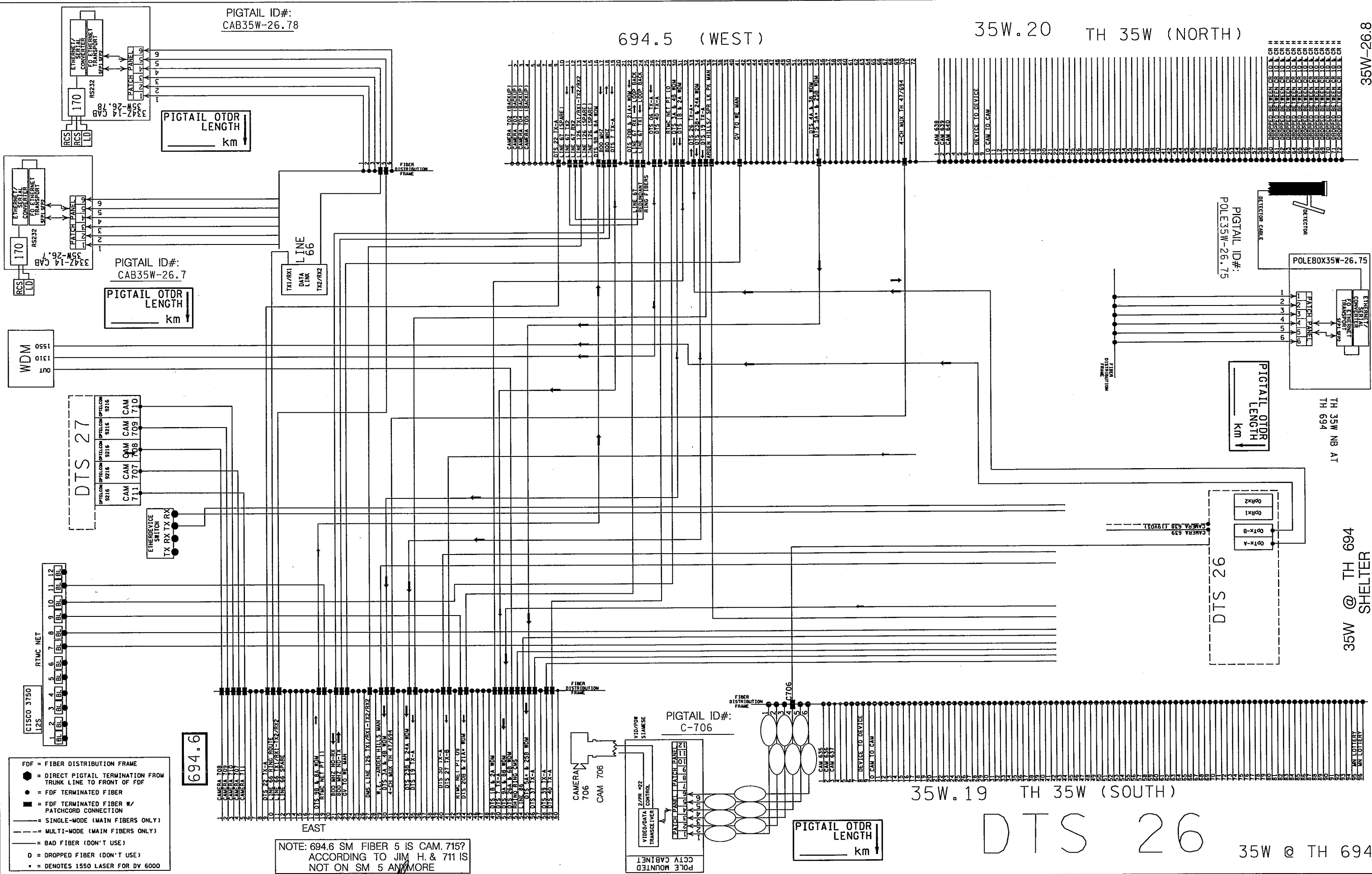
c:\projectwise\pw_work\ing\cooz1sco\dl1724859\6284-162_dtl1.dgn

PIGTAIL ID#: CAB35W-26.78

694.5 (WEST)

35W.20 TH 35W (NORTH)

35W-26.8



PIGTAIL ID#: CAB35W-26.7

PIGTAIL ID#: POLE35W-26.75

PIGTAIL ID#: C-706

35W.19 TH 35W (SOUTH)

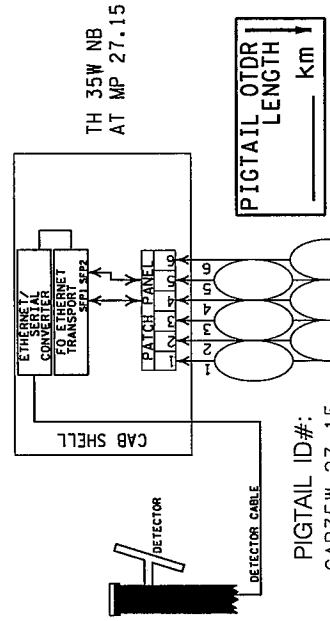
DTS 26

35W @ TH 694

- FD = FIBER DISTRIBUTION FRAME
- = DIRECT PIGTAIL TERMINATION FROM TRUNK LINE TO FRONT OF FDF
- = FDF TERMINATED FIBER
- = FDF TERMINATED FIBER W/ PATCHCORD CONNECTION
- = SINGLE-MODE (MAIN FIBERS ONLY)
- - - = MULTI-MODE (MAIN FIBERS ONLY)
- - - = BAD FIBER (DON'T USE)
- D = DROPPED FIBER (DON'T USE)
- L = DENOTES 1550 LASER FOR DV 6000

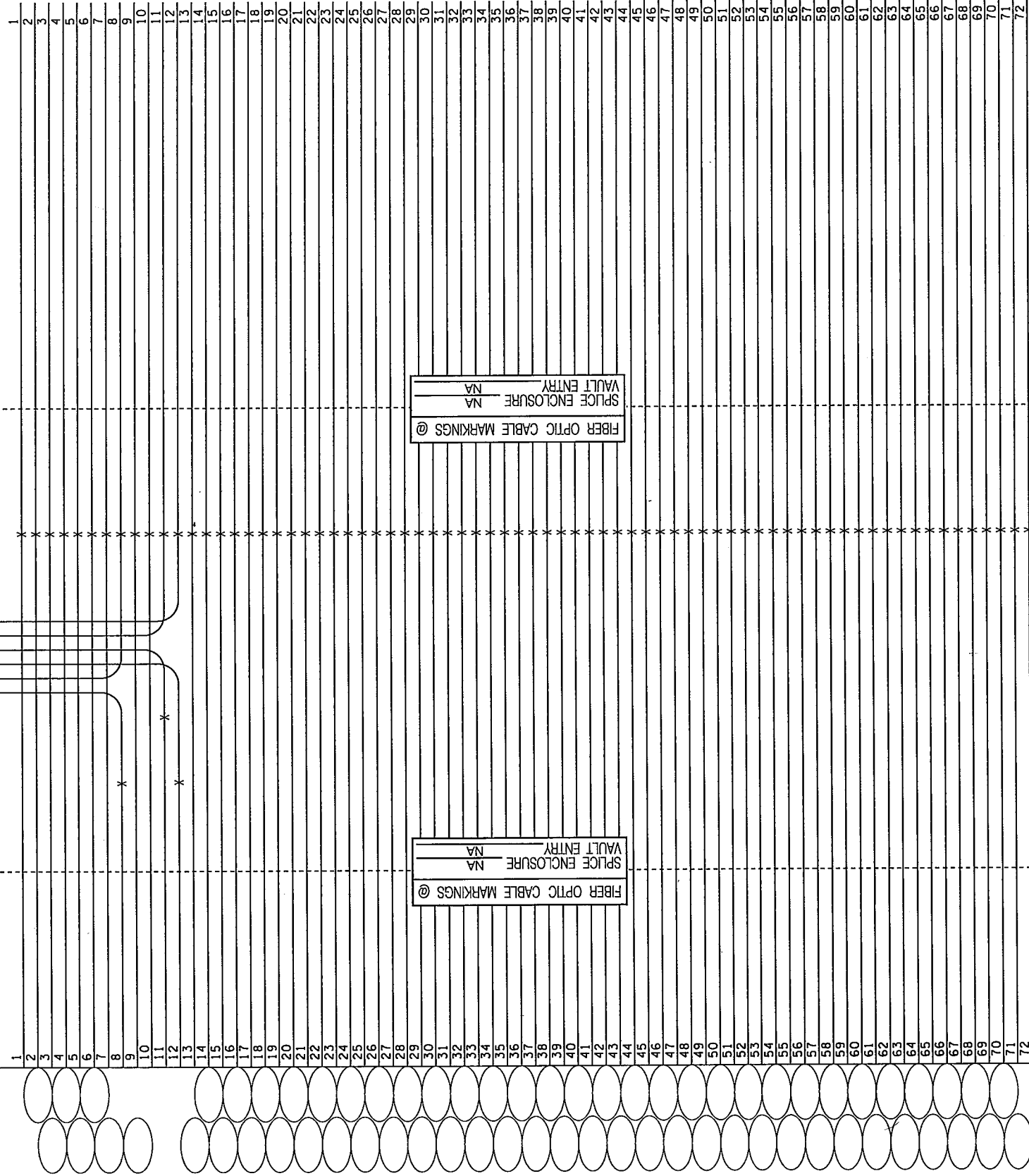
NOTE: 694.6 SM FIBER 5 IS CAM. 715? ACCORDING TO JIM H. & 711 IS NOT ON SM 5 ANYMORE

REV. NO. 1	DATE: 08/25/15
REV. NO.	DATE: / /



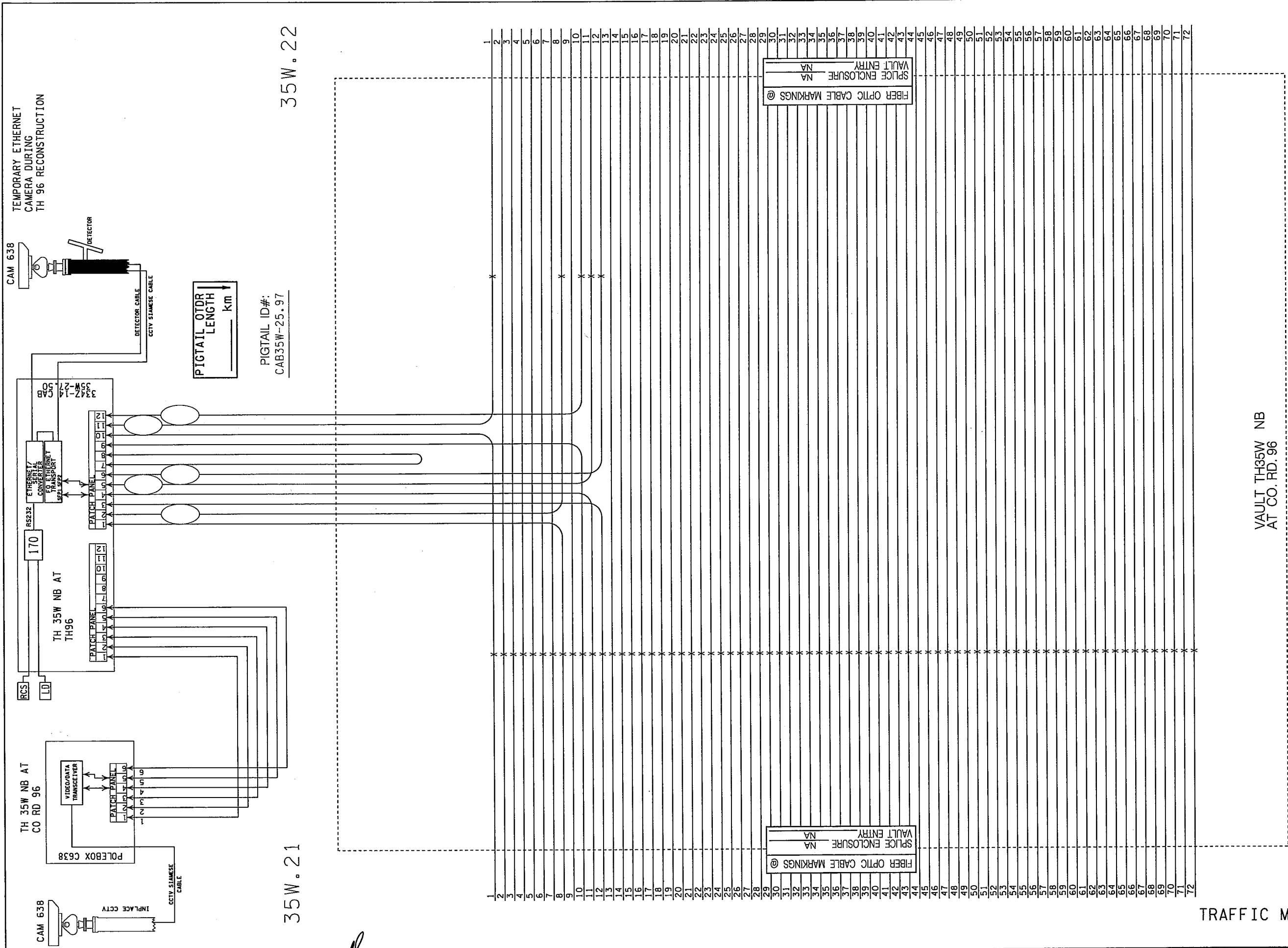
35W.21

35W.20



TH35W/TH694 SHELTER

TRAFFIC MANAGEMENT SYSTEM
 FIBER SCHEMATICS



PIGTAIL OTR
 LENGTH
 km

PIGTAIL ID#:
 CAB35W-25.97

35W.22

35W.21

VAULT TH35W NB
 AT CO. RD. 96

TRAFFIC MANAGEMENT SYSTEM
 FIBER SCHEMATICS

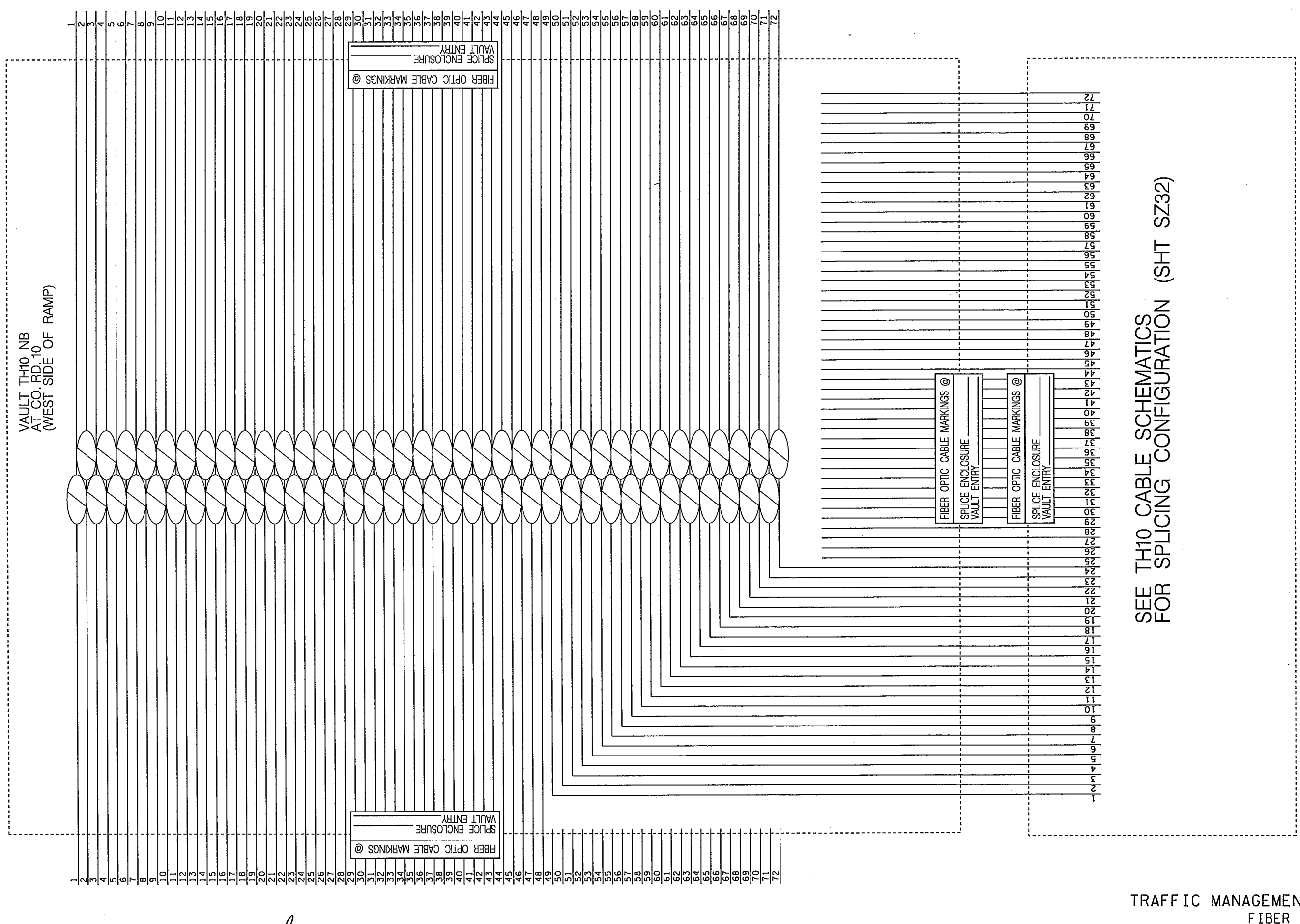
REV. NO. 01	DATE: 08/17/15
REV. NO.	DATE: / /

CERTIFIED BY *Stephen M. Puelo* LIC. NO. 26530 OCT 15 2015
 LICENSED PROFESSIONAL ENGINEER

35W.22A

35W.22

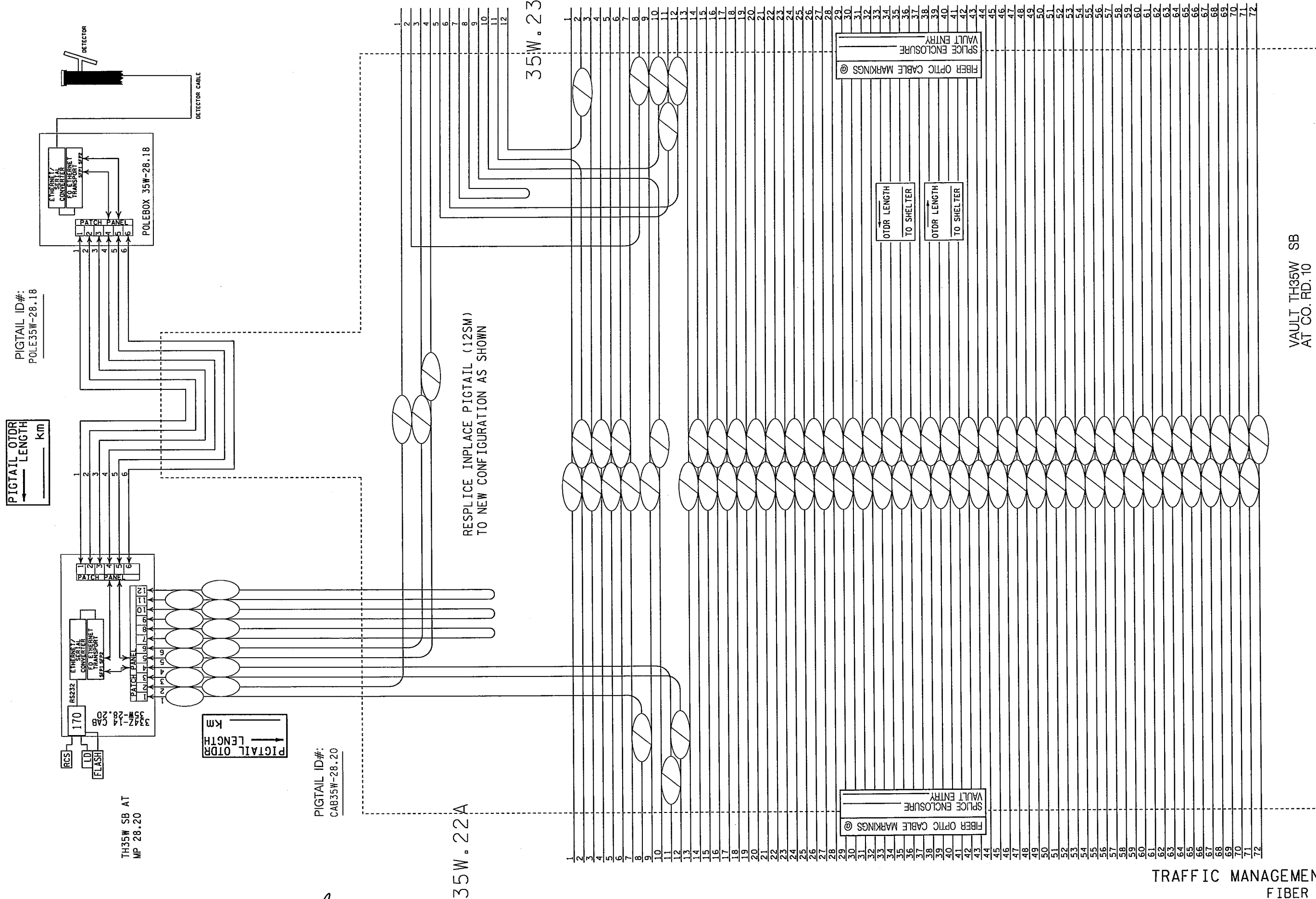
VAULT TH10 NB
AT CO. RD. 10
(WEST SIDE OF RAMP)



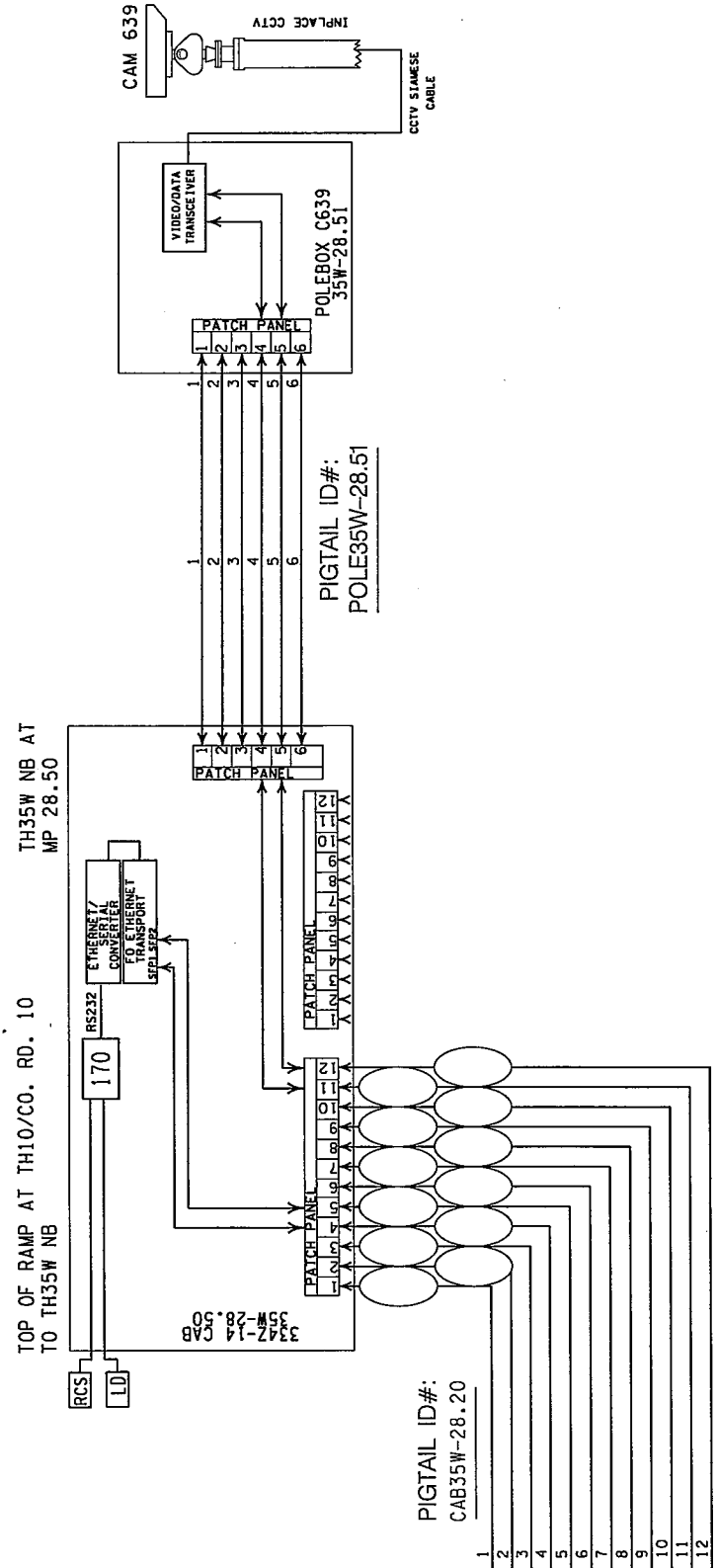
SEE TH10 CABLE SCHEMATICS
FOR SPLICING CONFIGURATION (SHT SZ32)

VAULT TH10 NB
AT CO. RD. 10
(EAST SIDE OF RAMP)

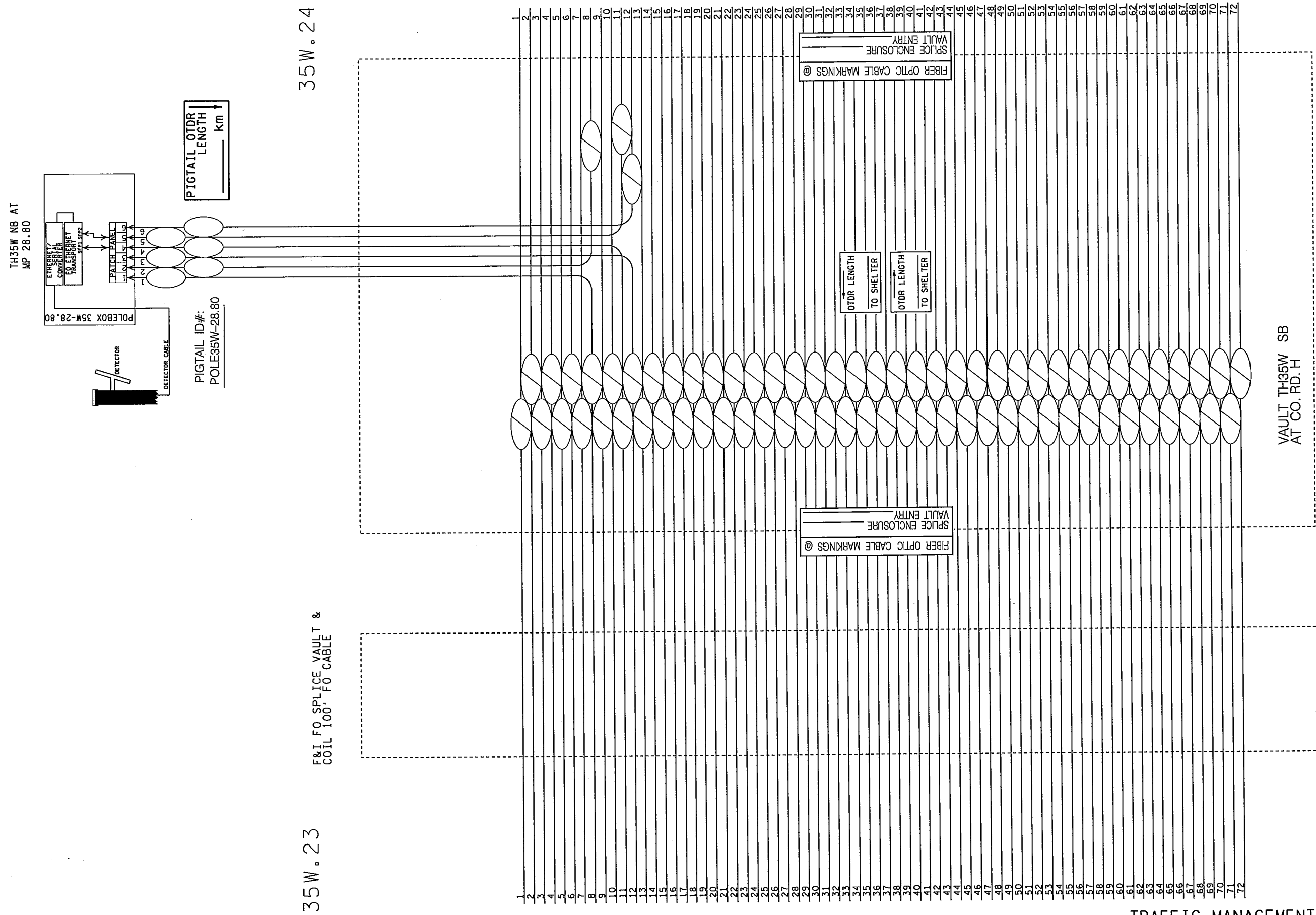
TRAFFIC MANAGEMENT SYSTEM
FIBER SCHEMATICS



TRAFFIC MANAGEMENT SYSTEM
 FIBER SCHEMATICS



TRAFFIC MANAGEMENT SYSTEM
 FIBER SCHEMATICS



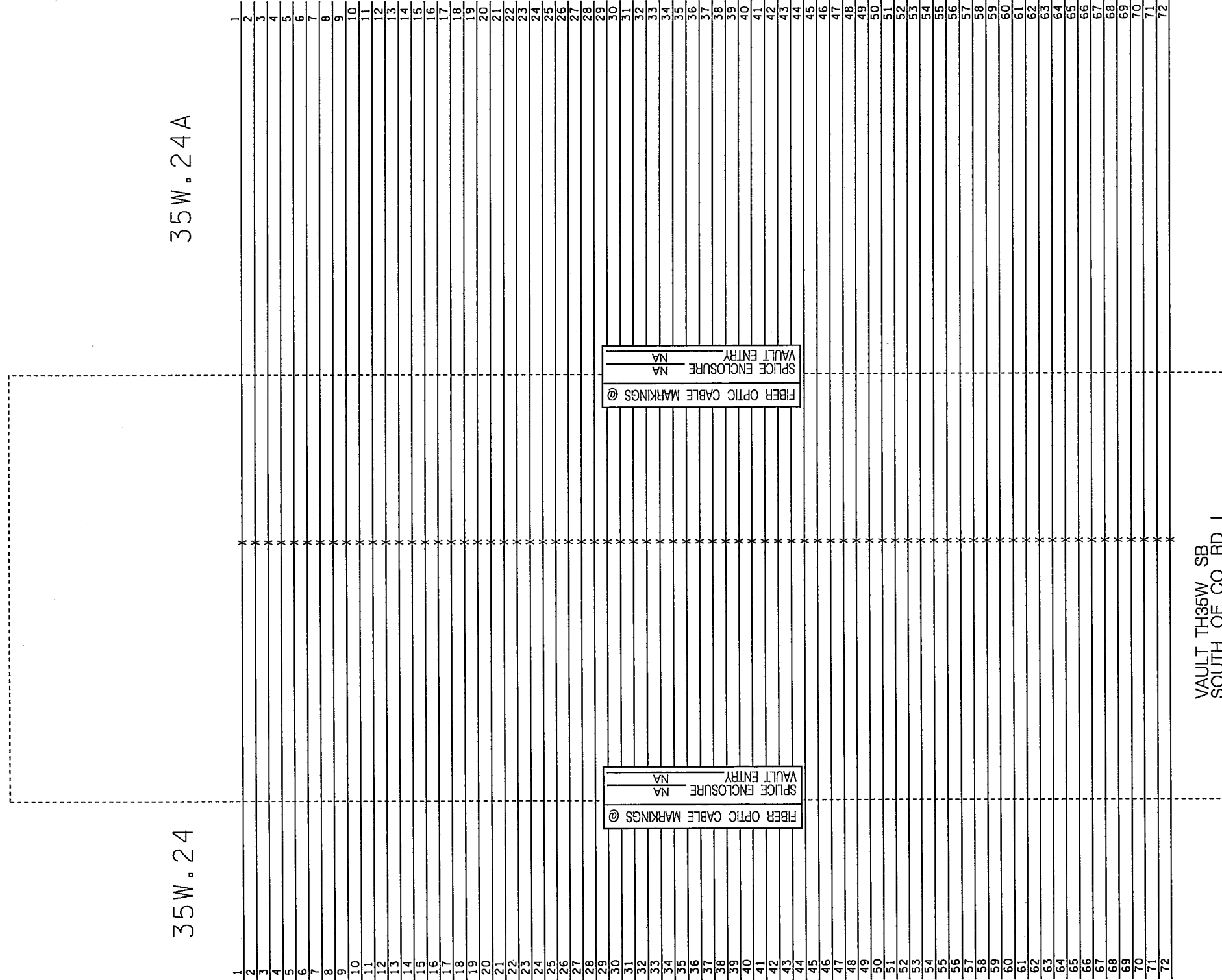
TRAFFIC MANAGEMENT SYSTEM
 FIBER SCHEMATICS

REV. NO. 01	DATE: 08/05/15
REV. NO.	DATE: / /

CERTIFIED BY *Jeffrey M. Puleo*
 LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ26 OF SZ33 SHEETS.



TRAFFIC MANAGEMENT SYSTEM
 FIBER SCHEMATICS

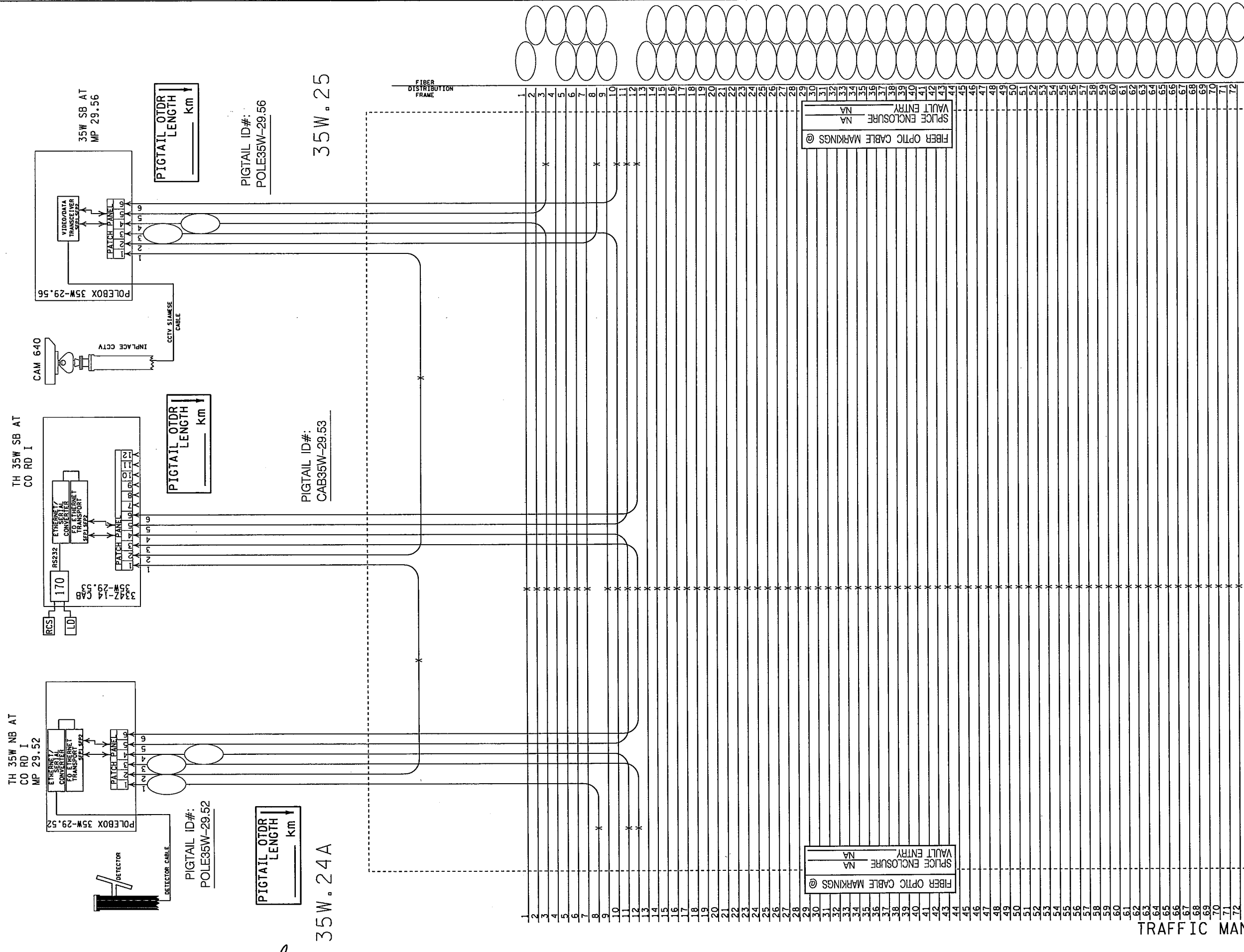
REV. NO.	DATE: / /
REV. NO.	DATE: / /

CERTIFIED BY

[Signature]
 LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ27 OF SZ33 SHEETS.



FIBER OPTIC CABLE MARKINGS @
SPLICE ENCLOSURE NA
VAULT ENTRY NA

FIBER OPTIC CABLE MARKINGS @
SPLICE ENCLOSURE NA
VAULT ENTRY NA

TRAFFIC MANAGEMENT SYSTEM
FIBER SCHEMATICS

VAULT TH35W SB
AT CO. RD. 1

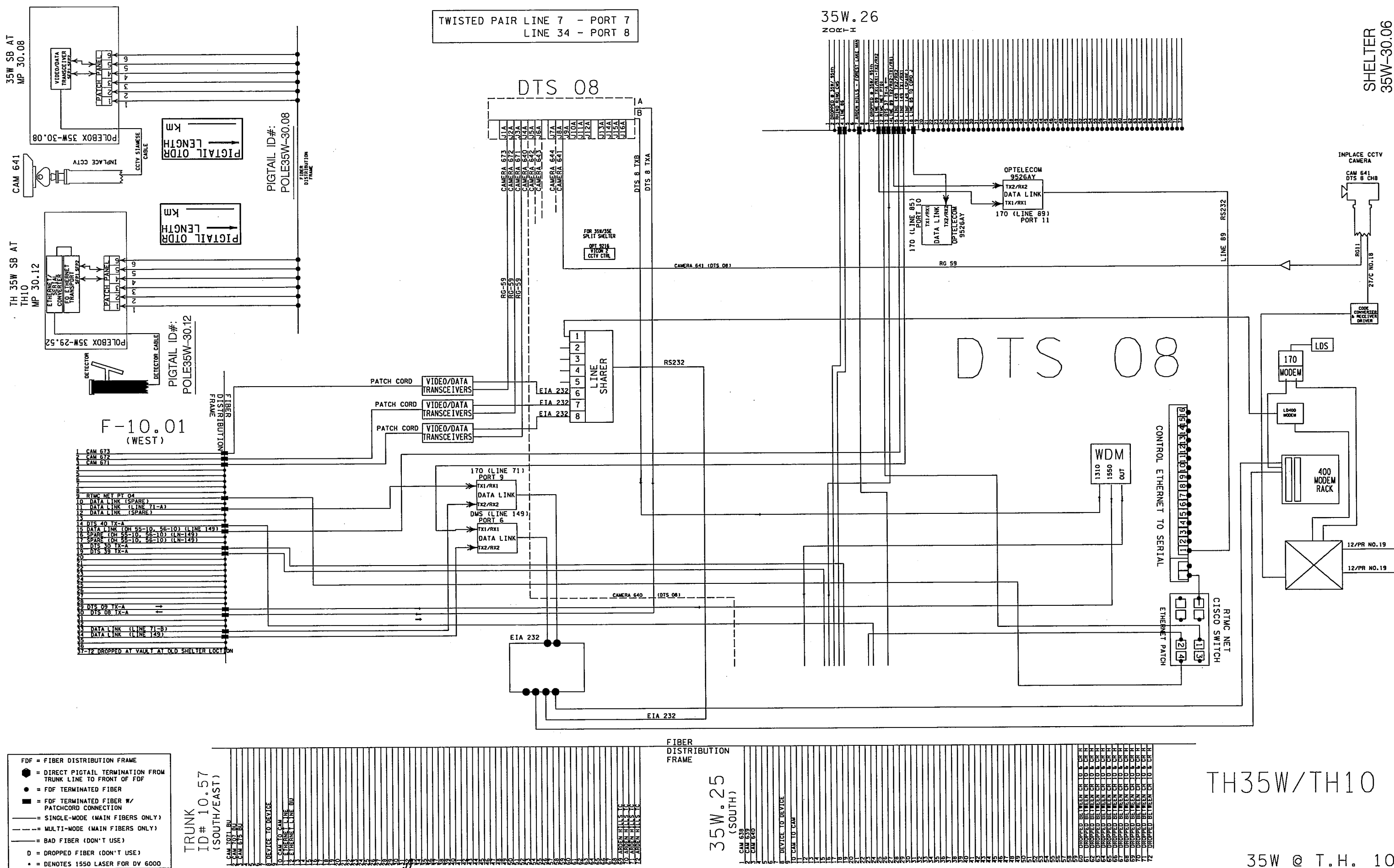
REV. NO. 01	DATE: 08/25/15
REV. NO.	DATE: / /

CERTIFIED BY

Joseph M. Puelzo
LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH 35W) SHEET NO. SZ28 OF SZ33 SHEETS.



- FD = FIBER DISTRIBUTION FRAME
- = DIRECT PIGTAIL TERMINATION FROM TRUNK LINE TO FRONT OF FDF
- = FDF TERMINATED FIBER
- = FDF TERMINATED FIBER W/ PATCHCORD CONNECTION
- = SINGLE-MODE (MAIN FIBERS ONLY)
- - - = MULTI-MODE (MAIN FIBERS ONLY)
- - - = BAD FIBER (DON'T USE)
- D = DROPPED FIBER (DON'T USE)
- * = DENOTES 1550 LASER FOR DV 6000

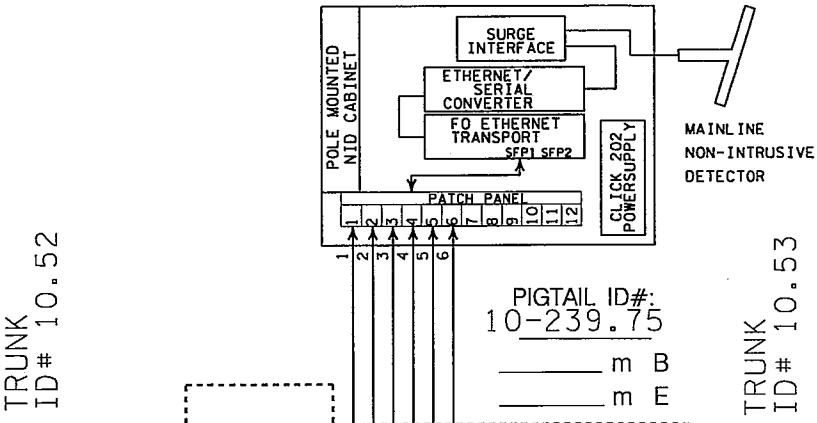
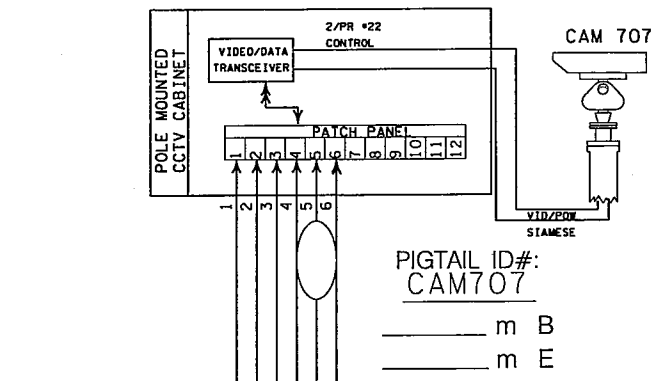
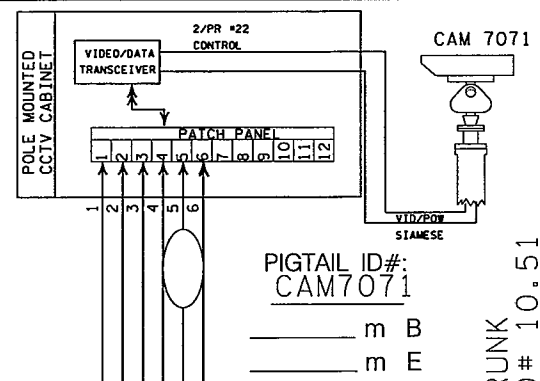
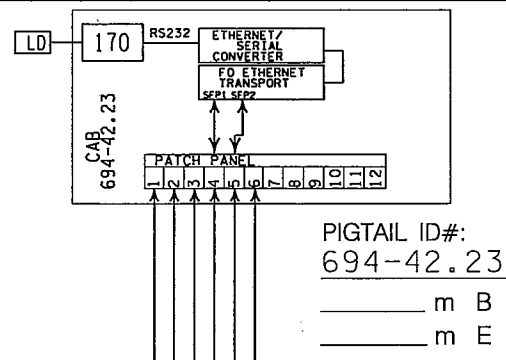
TRUNK ID# 10.57 (SOUTH/EAST)

SHELTER
 TH 694 @ SNELLING AV (SE QUAD)

FIBER OPTIC CABLE MARKINGS @
 SHELTER FIBER RACK
 SHELTER ENTRY

FIBER DISTRIBUTION FRAME

TRUNK ID# 10.50



- 1
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FIBER OPTIC CABLE MARKINGS @
 SPlice ENCLOSURE NA
 VAULT ENTRY NA

FIBER OPTIC CABLE MARKINGS @
 SPlice ENCLOSURE NA
 VAULT ENTRY NA

FIBER OPTIC CABLE MARKINGS @
 SPlice ENCLOSURE NA
 VAULT ENTRY NA

FIBER OPTIC CABLE MARKINGS @
 SPlice ENCLOSURE NA
 VAULT ENTRY NA

FIBER OPTIC CABLE MARKINGS @
 SPlice ENCLOSURE NA
 VAULT ENTRY NA

FIBER OPTIC CABLE MARKINGS @
 SPlice ENCLOSURE NA
 VAULT ENTRY NA

SPLICE VAULT - TH 10 & SNELLING AV

SPLICE VAULT - TH 10 & TH 694

SPLICE VAULT - N OF TH 10 & TH 694 SPLIT

REV. NO. 1	DATE: 6/12/14
REV. NO.	DATE: / /

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Jeffrey M. Puleo
 LICENSED PROFESSIONAL ENGINEER

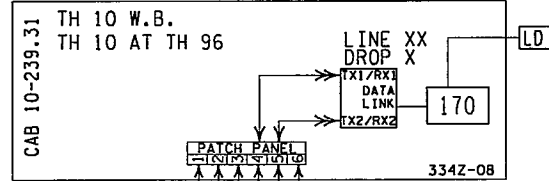
LIC. NO. 26530

OCT 15 2015

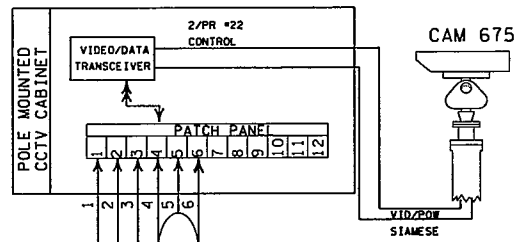
STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. SZ30 OF SZ33 SHEETS

FIBER OPTIC SCHEMATICS

TRUNK
 ID# 10.53

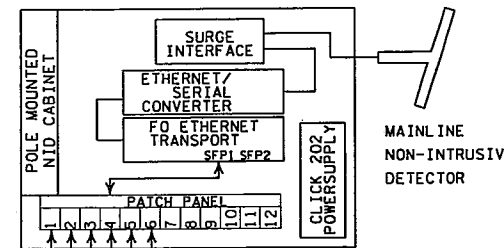


PIGTAIL ID#:
 10-239.31
 _____ m B
 _____ m E



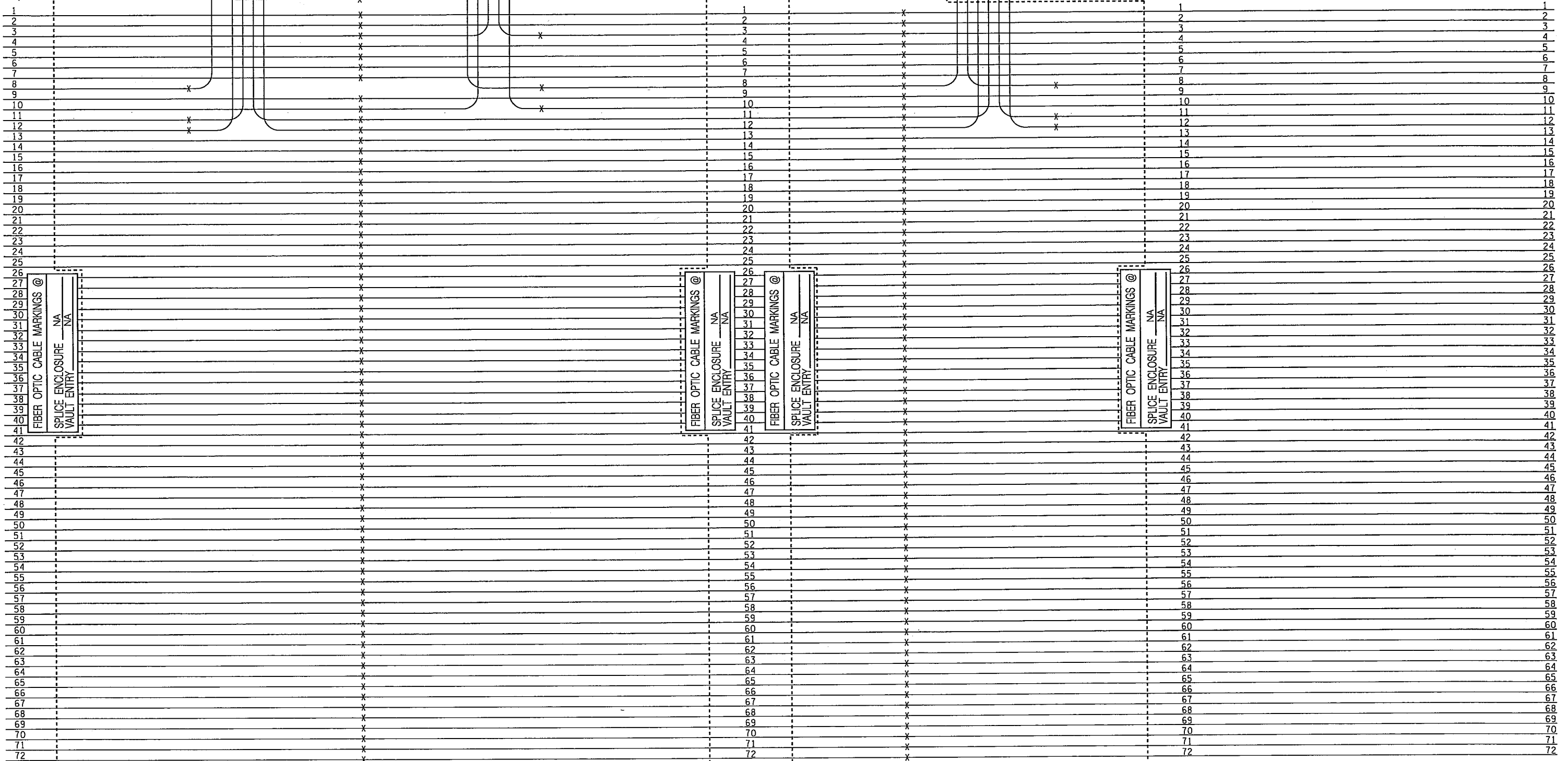
PIGTAIL ID#:
 CAM675
 _____ m B
 _____ m E

TRUNK
 ID# 10.54



PIGTAIL ID#:
 10-238.68
 _____ m B
 _____ m E

TRUNK
 ID# 10.55



SPLICE VAULT - TH 10 & TH 96

SPLICE VAULT - TH 10 1/2 MI. N OF TH 96

REV. NO.	DATE: / /
REV. NO.	DATE: / /

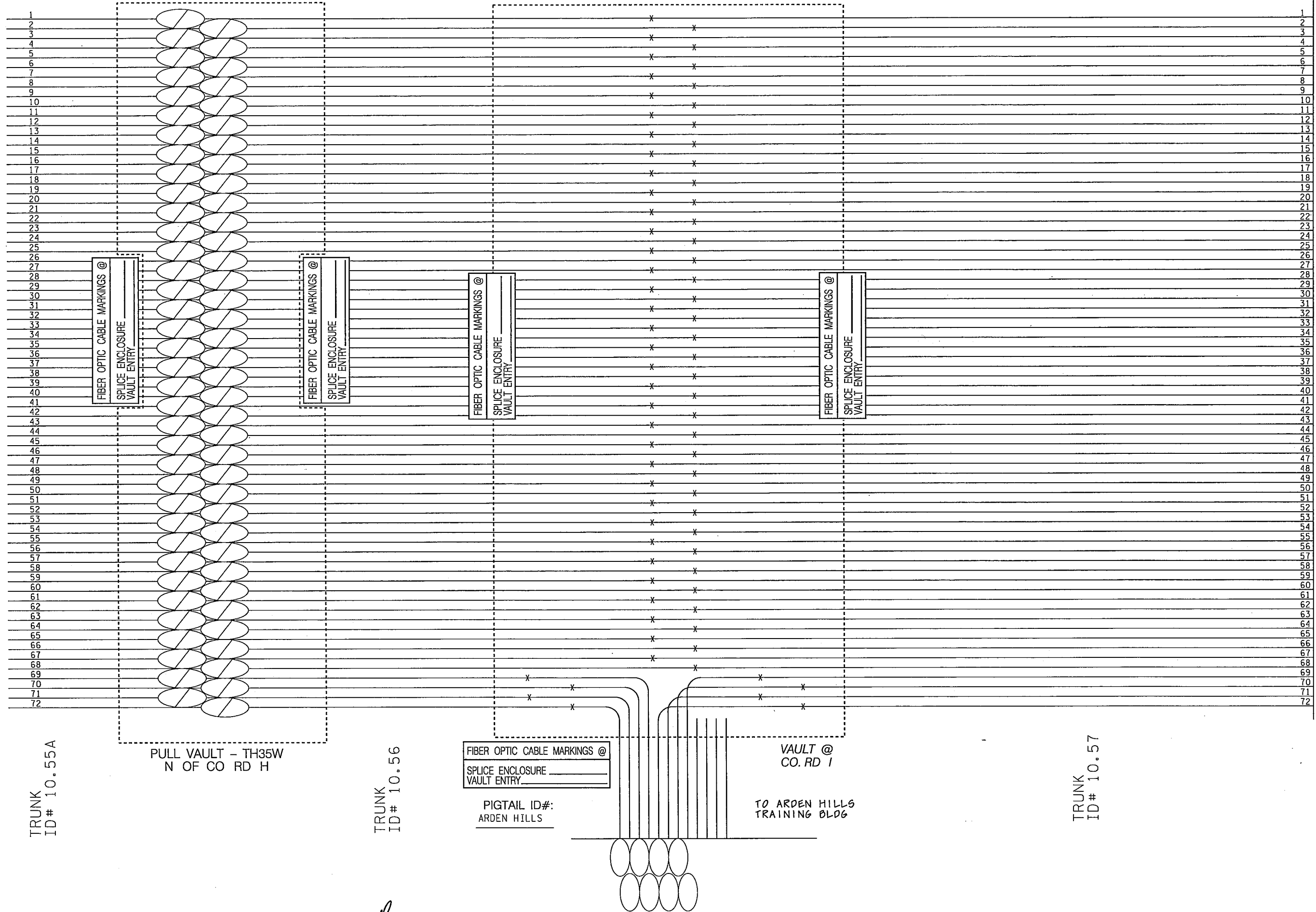
CERTIFIED BY

Jeffrey M. Puelo
 LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162 (TH35W) SHEET NO. SZ31 OF SZ33 SHEETS.

FIBER OPTIC SCHEMATICS



TRUNK
ID# 10.55A

PULL VAULT - TH35W
N OF CO RD H

TRUNK
ID# 10.56

FIBER OPTIC CABLE MARKINGS @
SPlice ENCLOSURE
VAULT ENTRY

PIGTAIL ID#:
ARDEN HILLS

VAULT @
CO. RD 1

TO ARDEN HILLS
TRAINING BLDG

TRUNK
ID# 10.57

FIBER OPTIC SCHEMATICS SHELTER TH35W AT TH10

REV. NO. 01	DATE: 07/29/15
REV. NO.	DATE: / /

CERTIFIED BY

Jeffrey M. Puelgo
 LICENSED PROFESSIONAL ENGINEER

LIC. NO. 26530 OCT 15 2015

STATE PROJ. NO. 6284-162

SHEET NO. SZ33 OF SZ33 SHEETS.

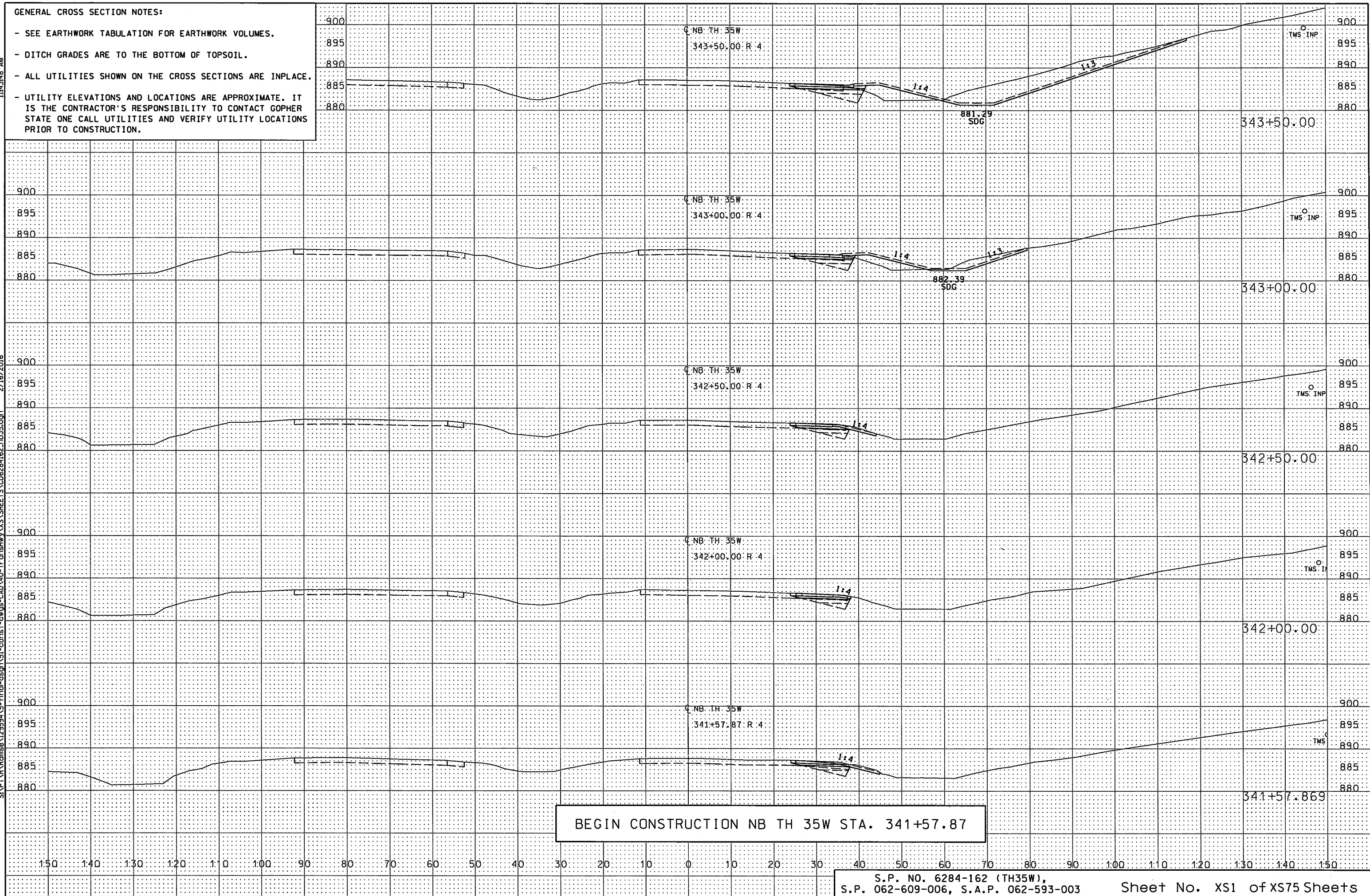
GENERAL CROSS SECTION NOTES:

- SEE EARTHWORK TABULATION FOR EARTHWORK VOLUMES.
- DITCH GRADES ARE TO THE BOTTOM OF TOPSOIL.
- ALL UTILITIES SHOWN ON THE CROSS SECTIONS ARE INPLACE.
- UTILITY ELEVATIONS AND LOCATIONS ARE APPROXIMATE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT GOPHER STATE ONE CALL UTILITIES AND VERIFY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

11:43:48 AM

2/16/2016

S:\PT\Ramsey\129594\5-final-dwg\51-const-dwgs-CAD\40-Transhwy\XS\SHEET\5\CD6284162.nb35.dgn



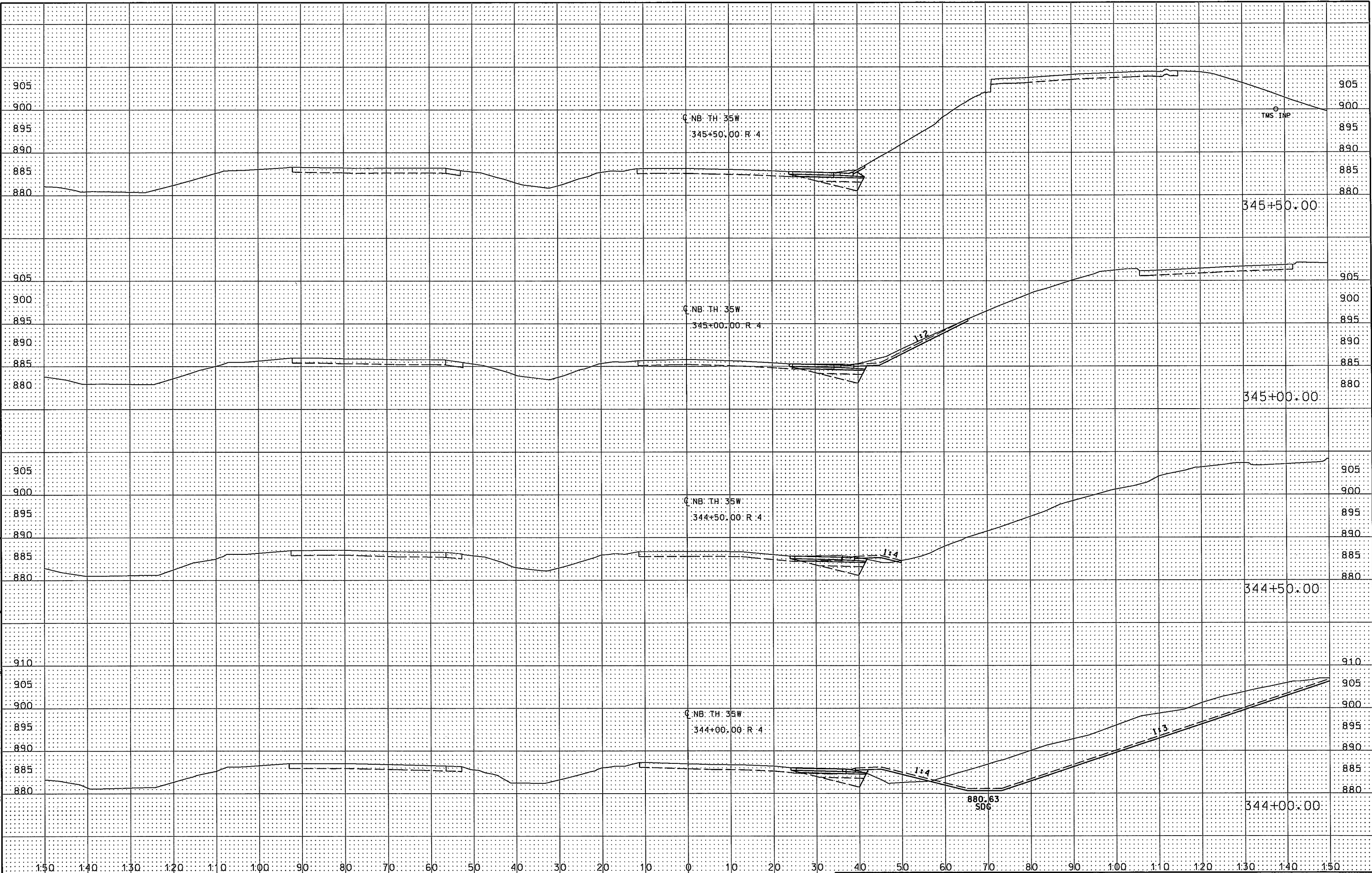
BEGIN CONSTRUCTION NB TH 35W STA. 341+57.87



11:43:49 AM

2/16/2016

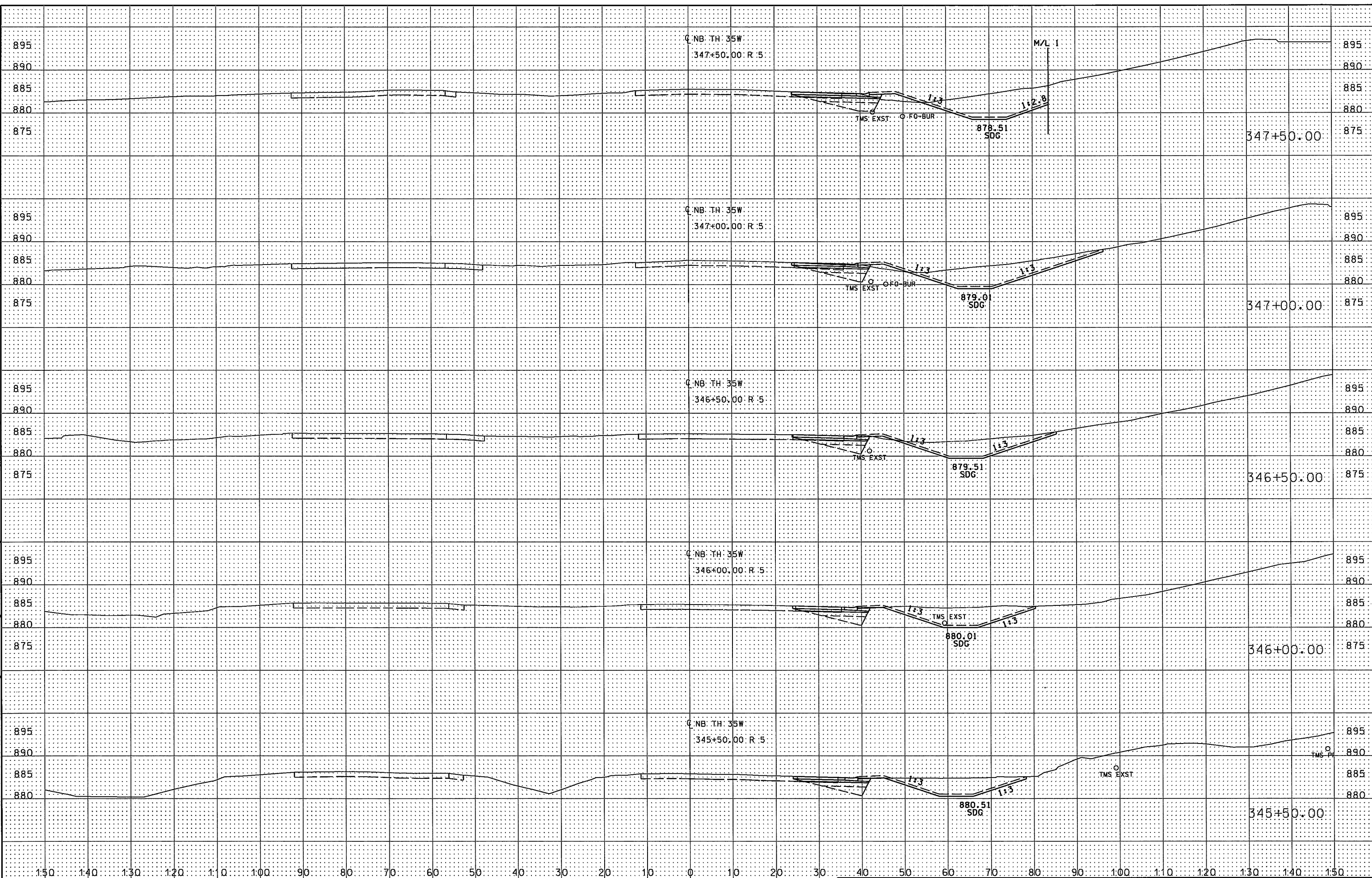
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11:43:50 AM

2/16/2016

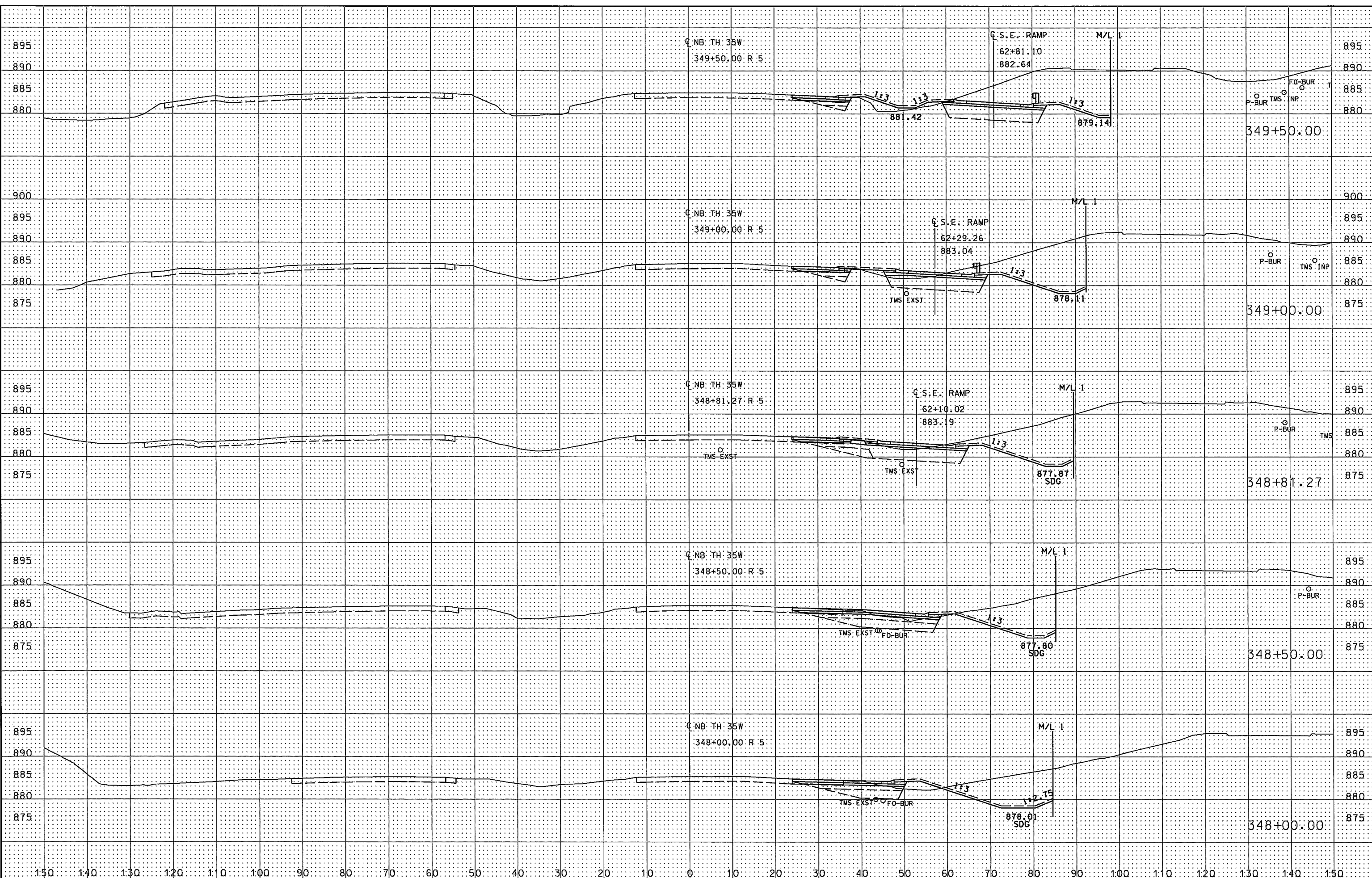
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11/3/52 AM

2/16/2016

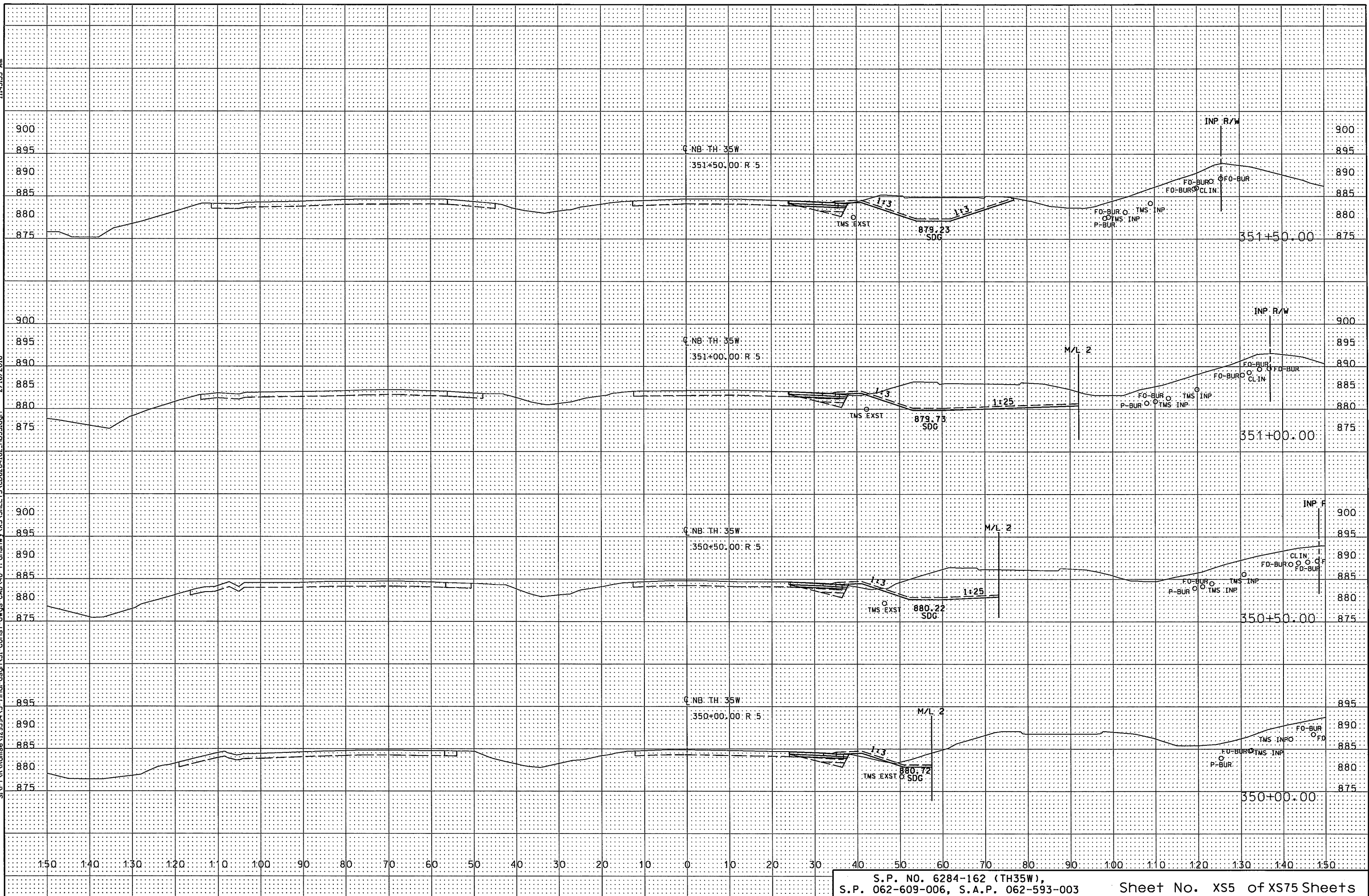
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11/4/15 5:53 AM

2/16/2016

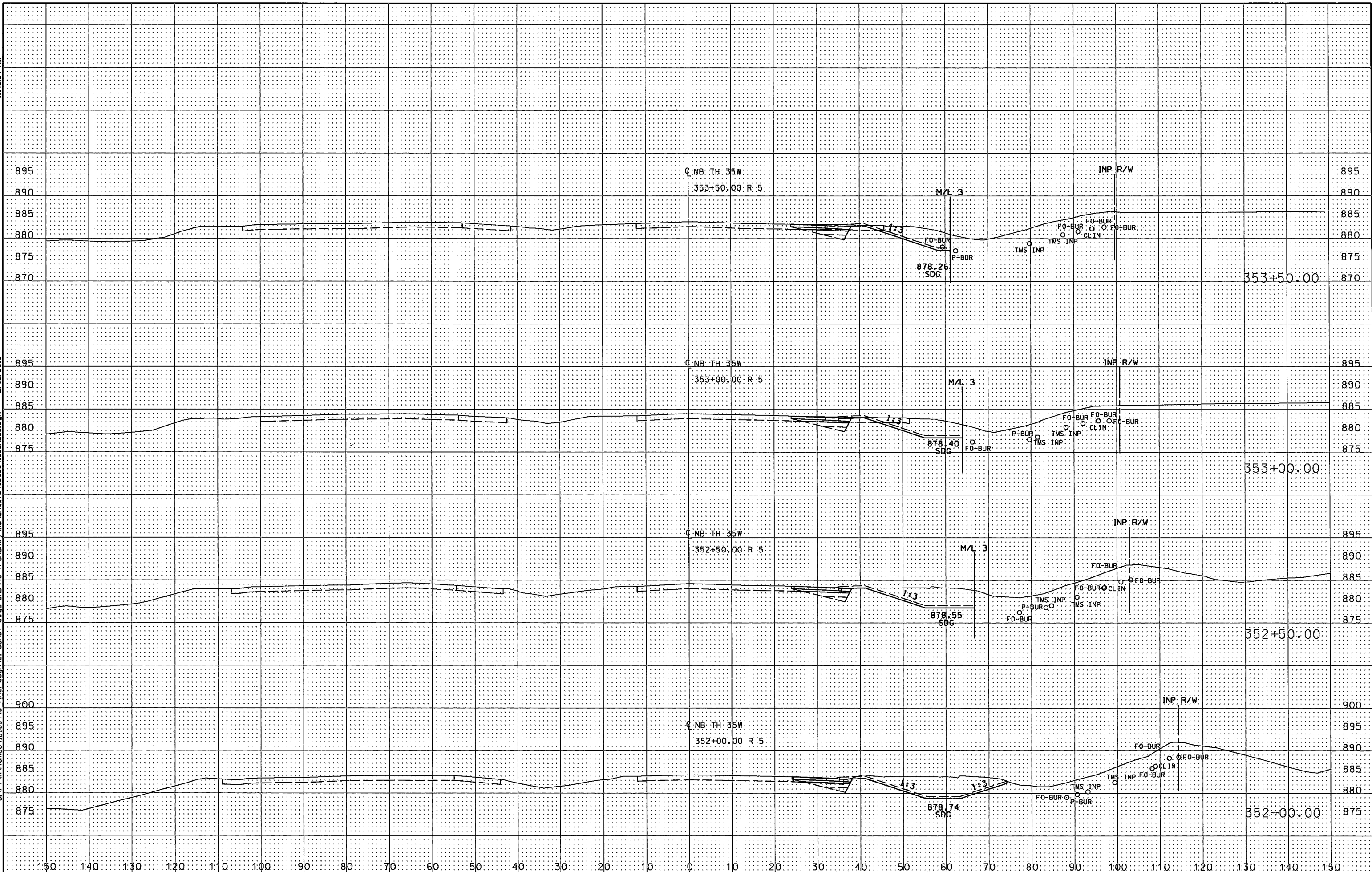
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11/4/354 AM

2/16/2016

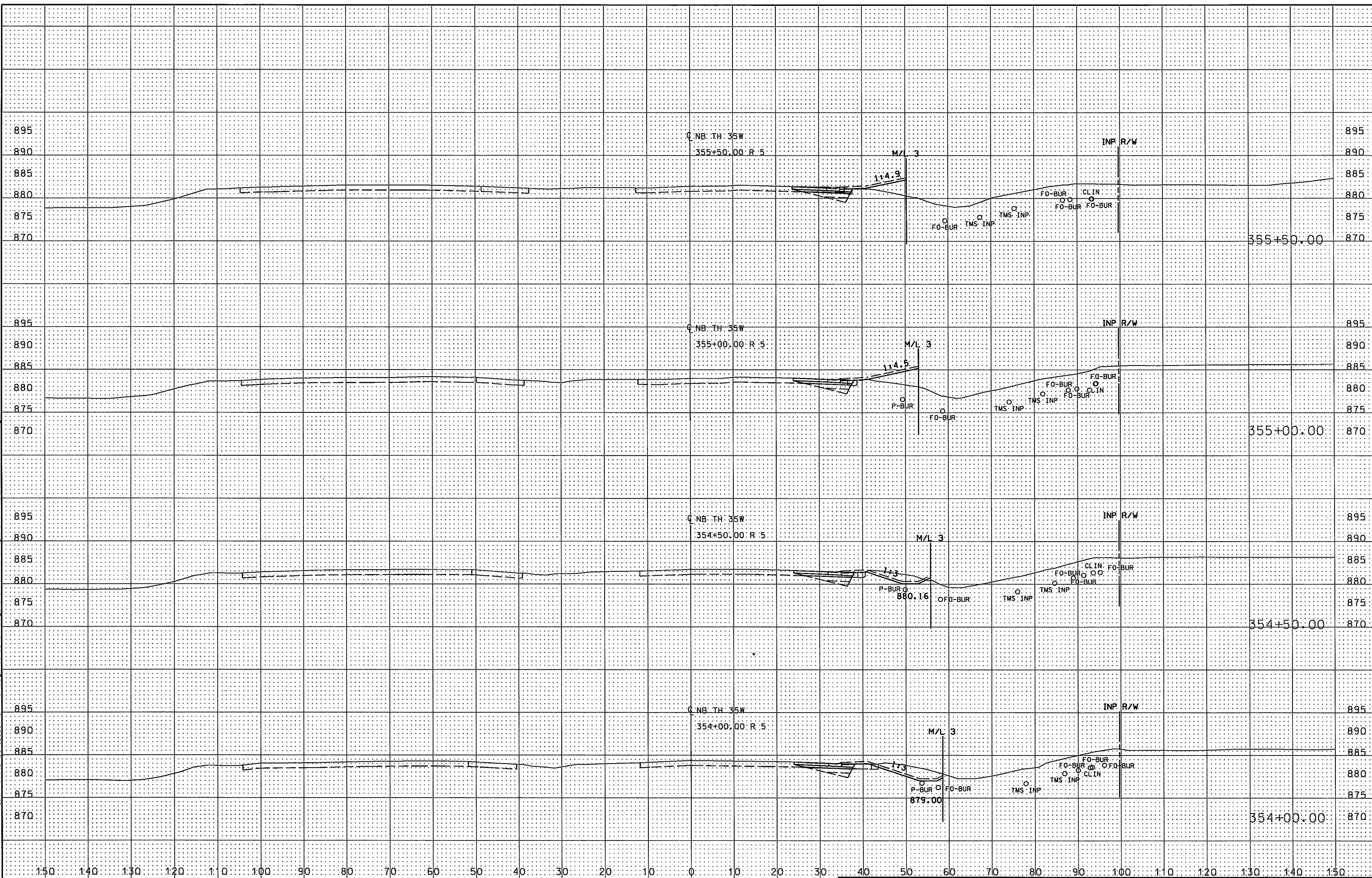
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11:43:56 AM

2/16/2016

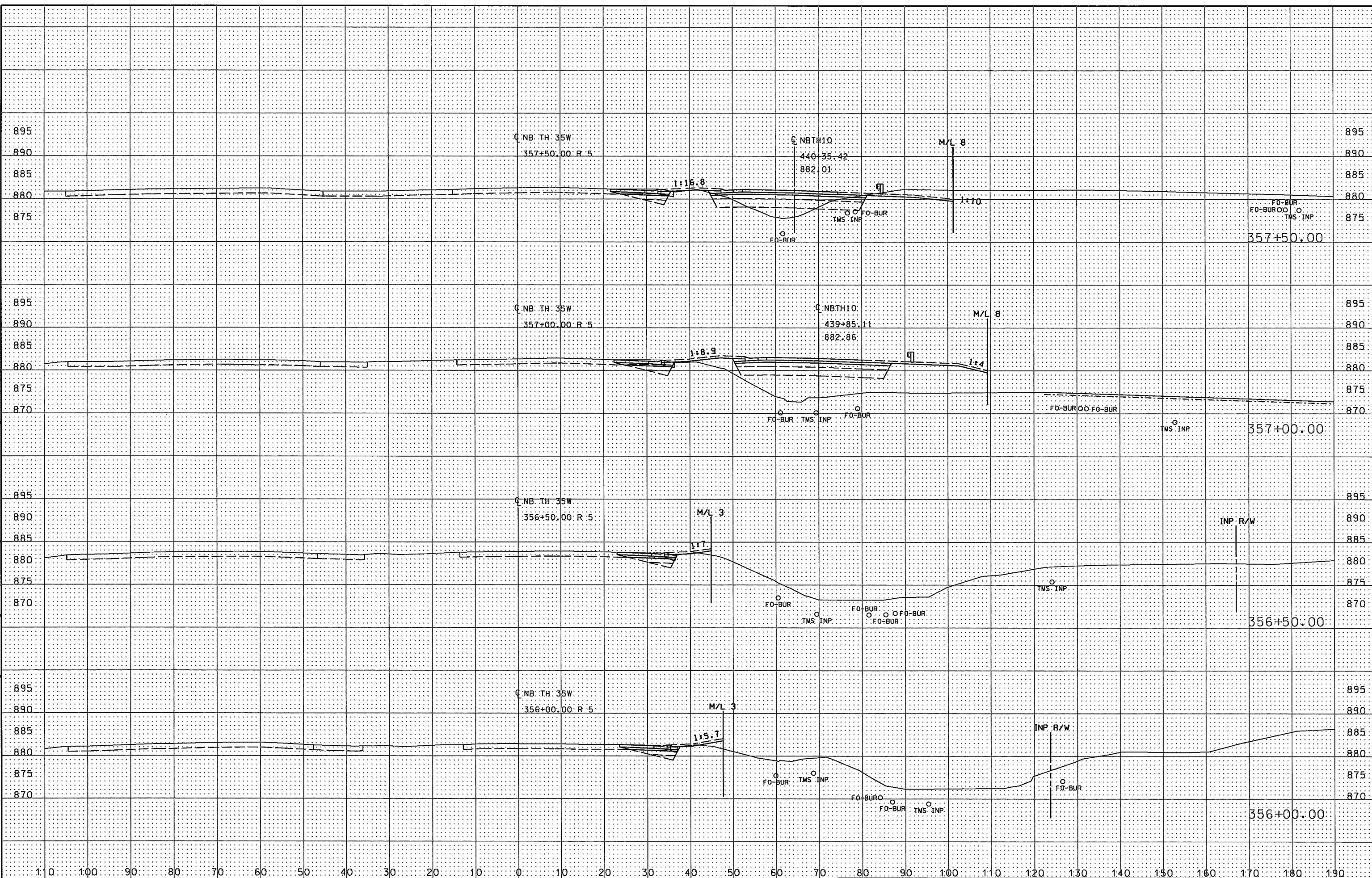
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11/4/57 AM

2/16/2016

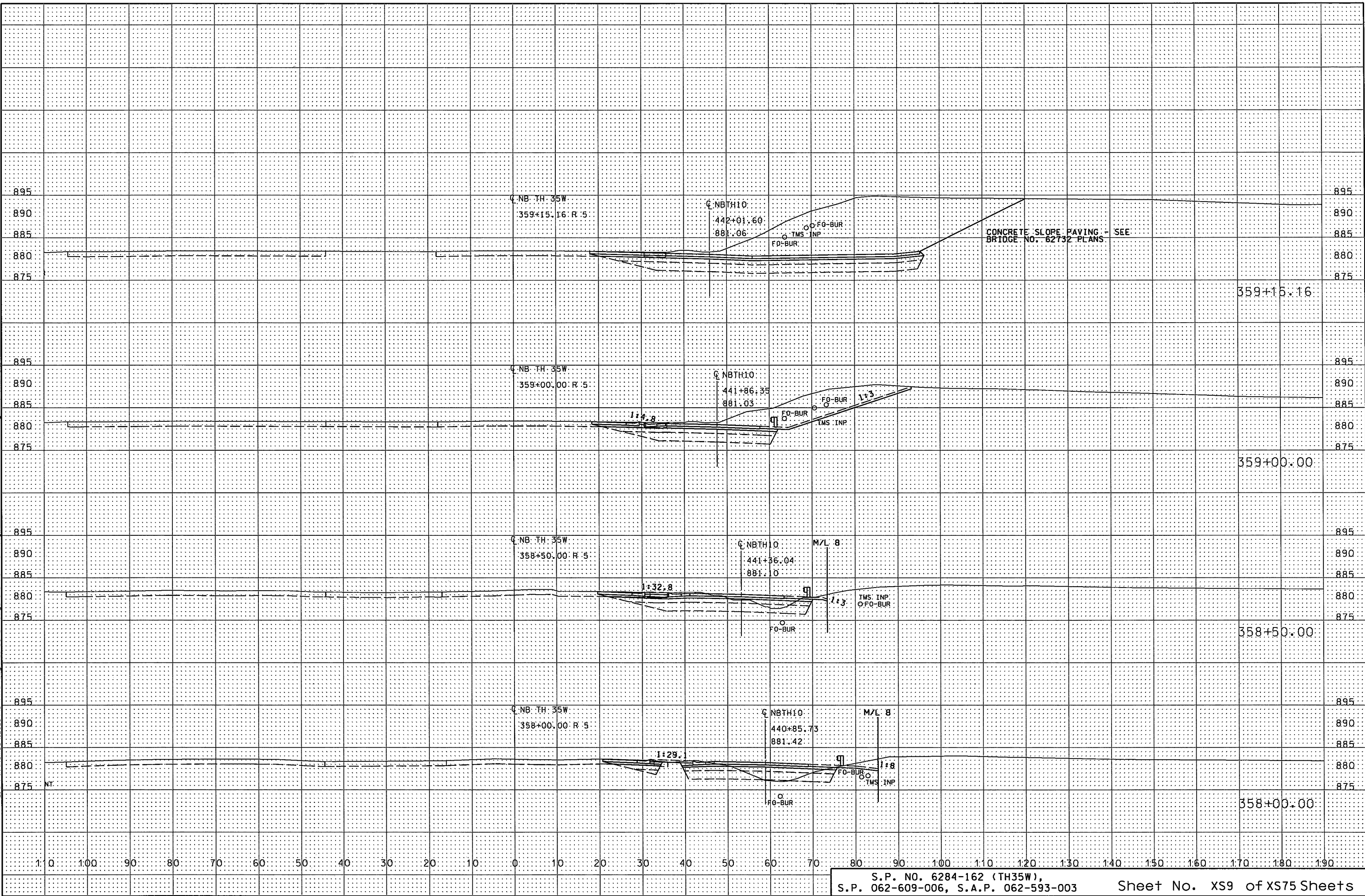
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11:43:58 AM

2/16/2016

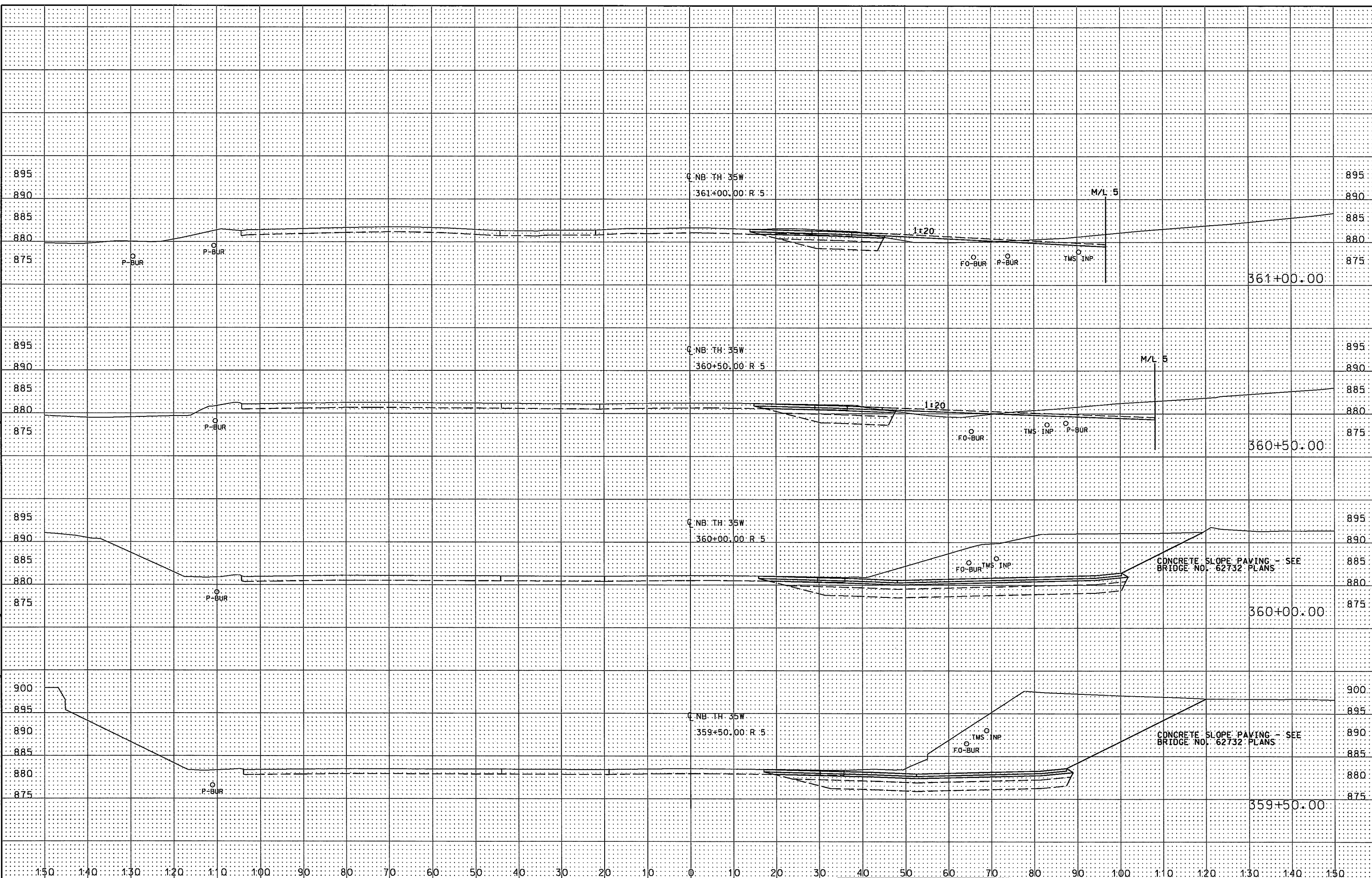
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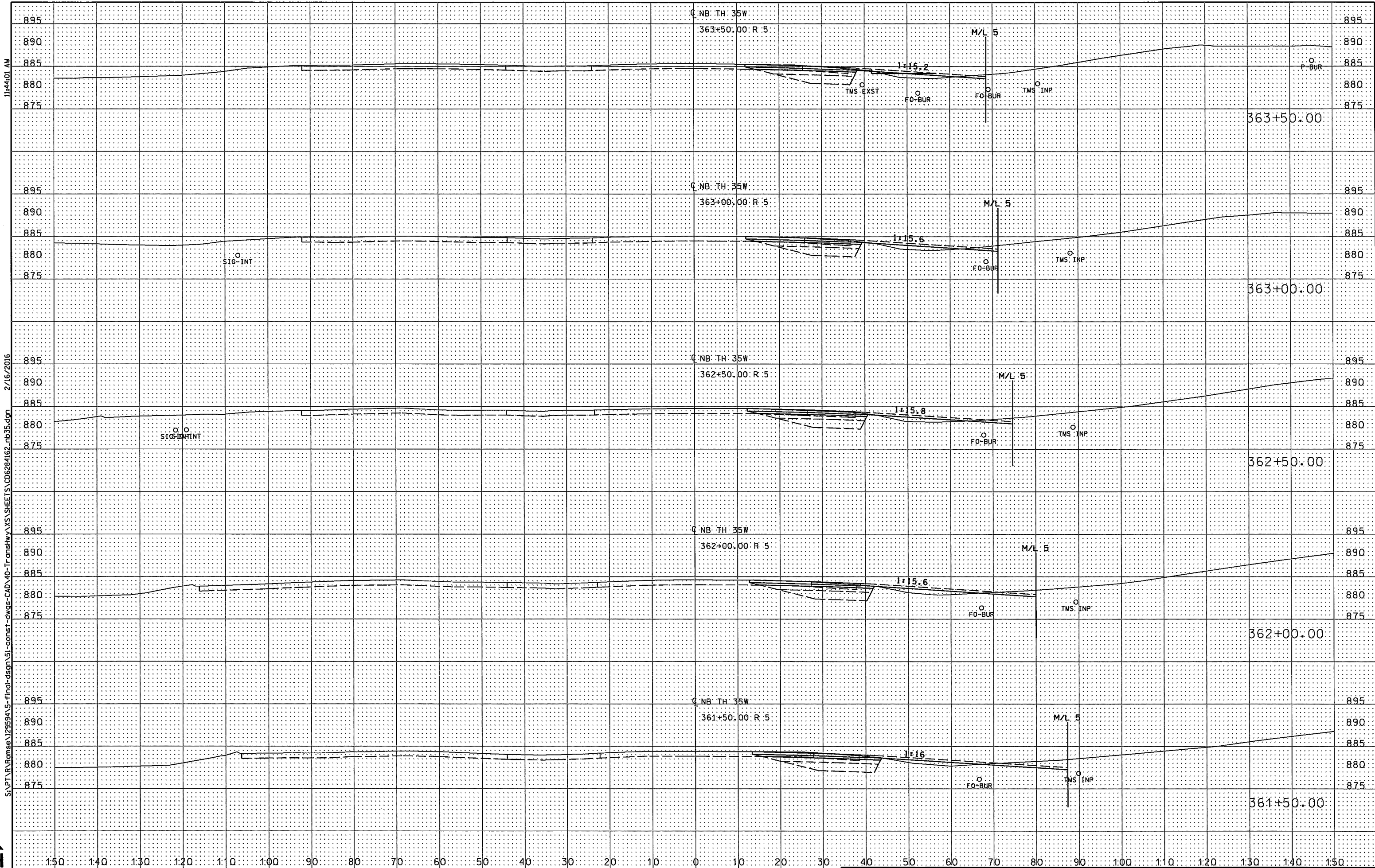


11/4/00 AM

2/16/2016

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11:44:01 AM

2/16/2016

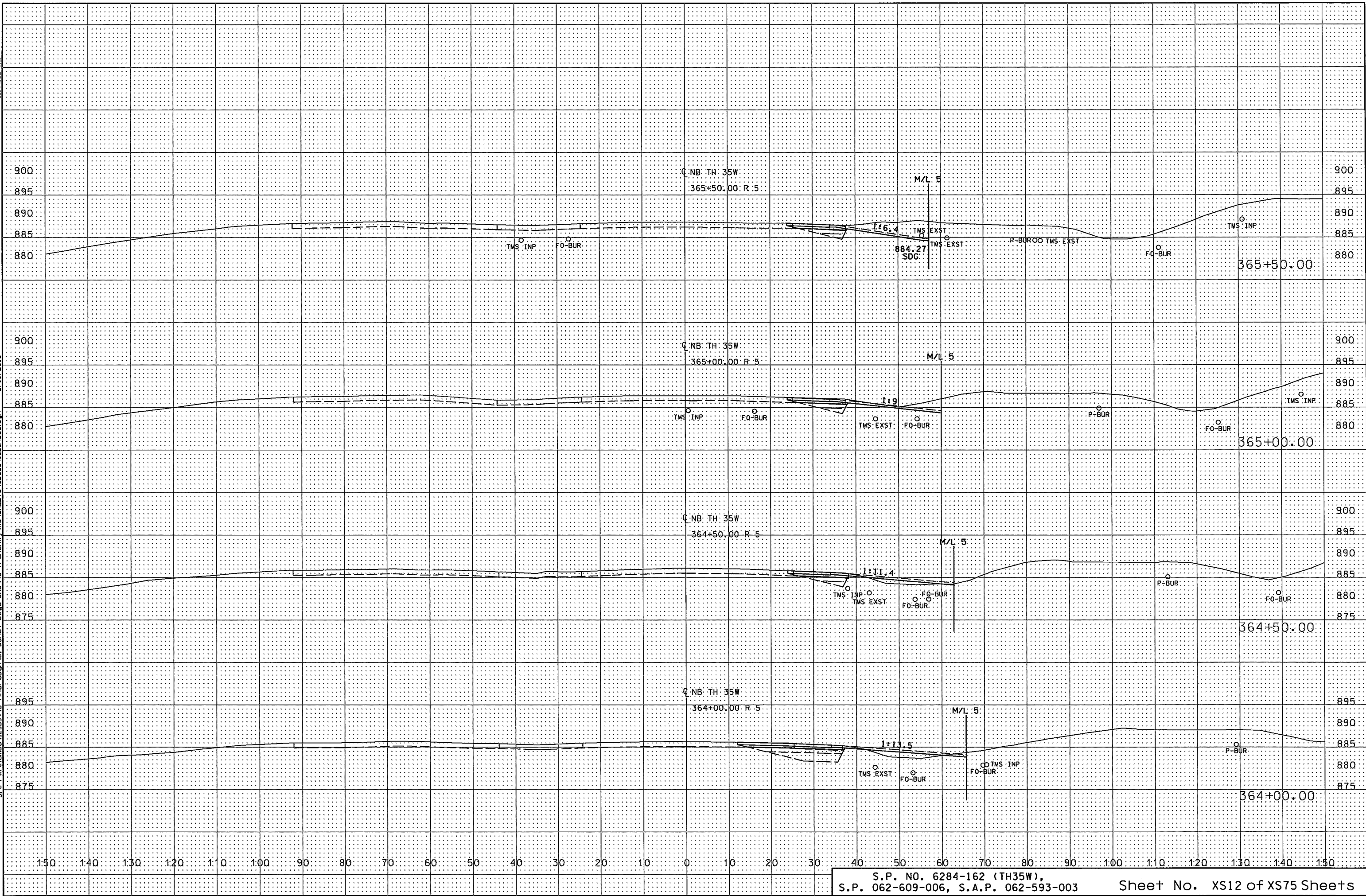
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11:44:02 AM

2/16/2016

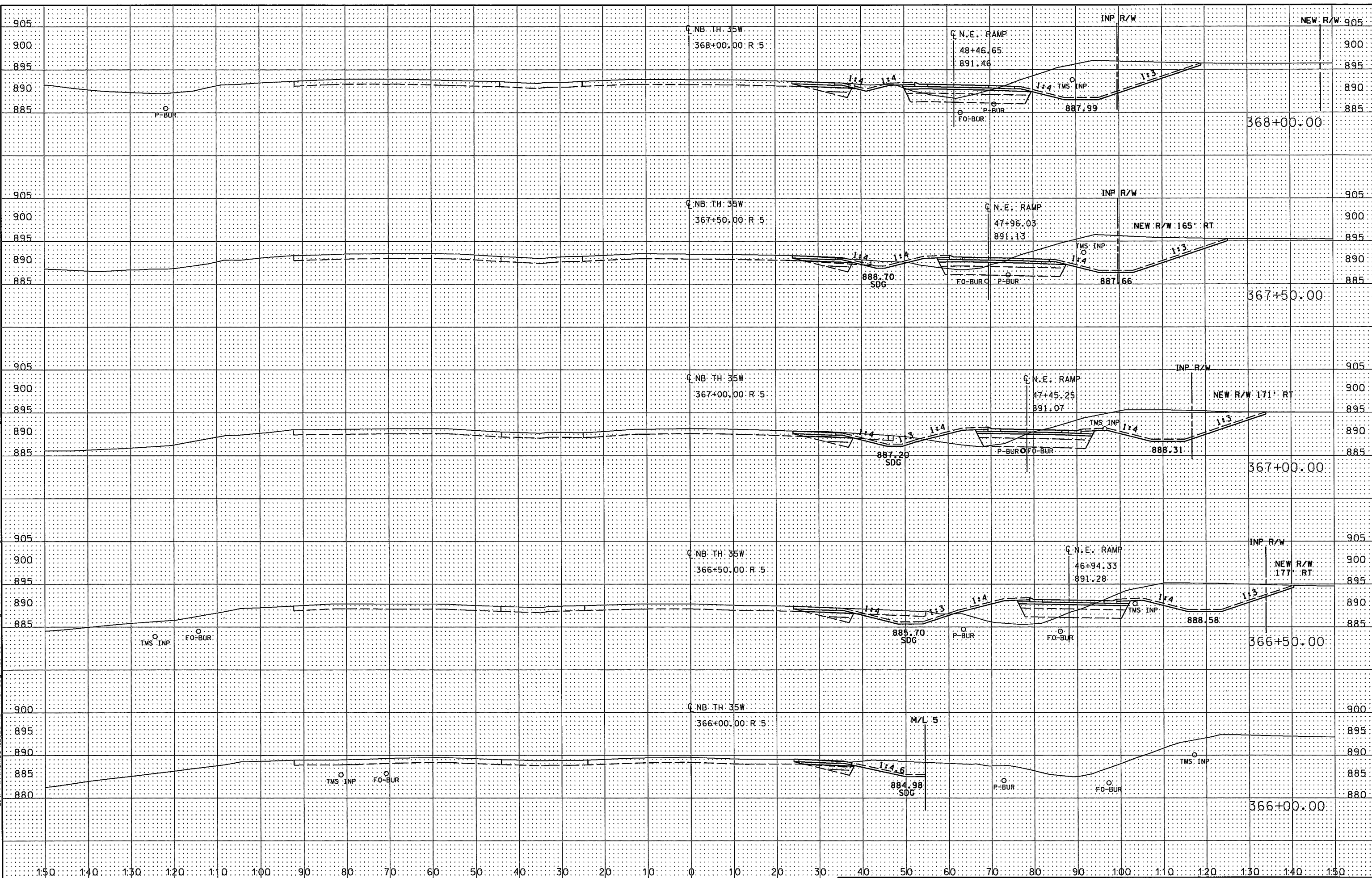
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11:44:04 AM

2/16/2016

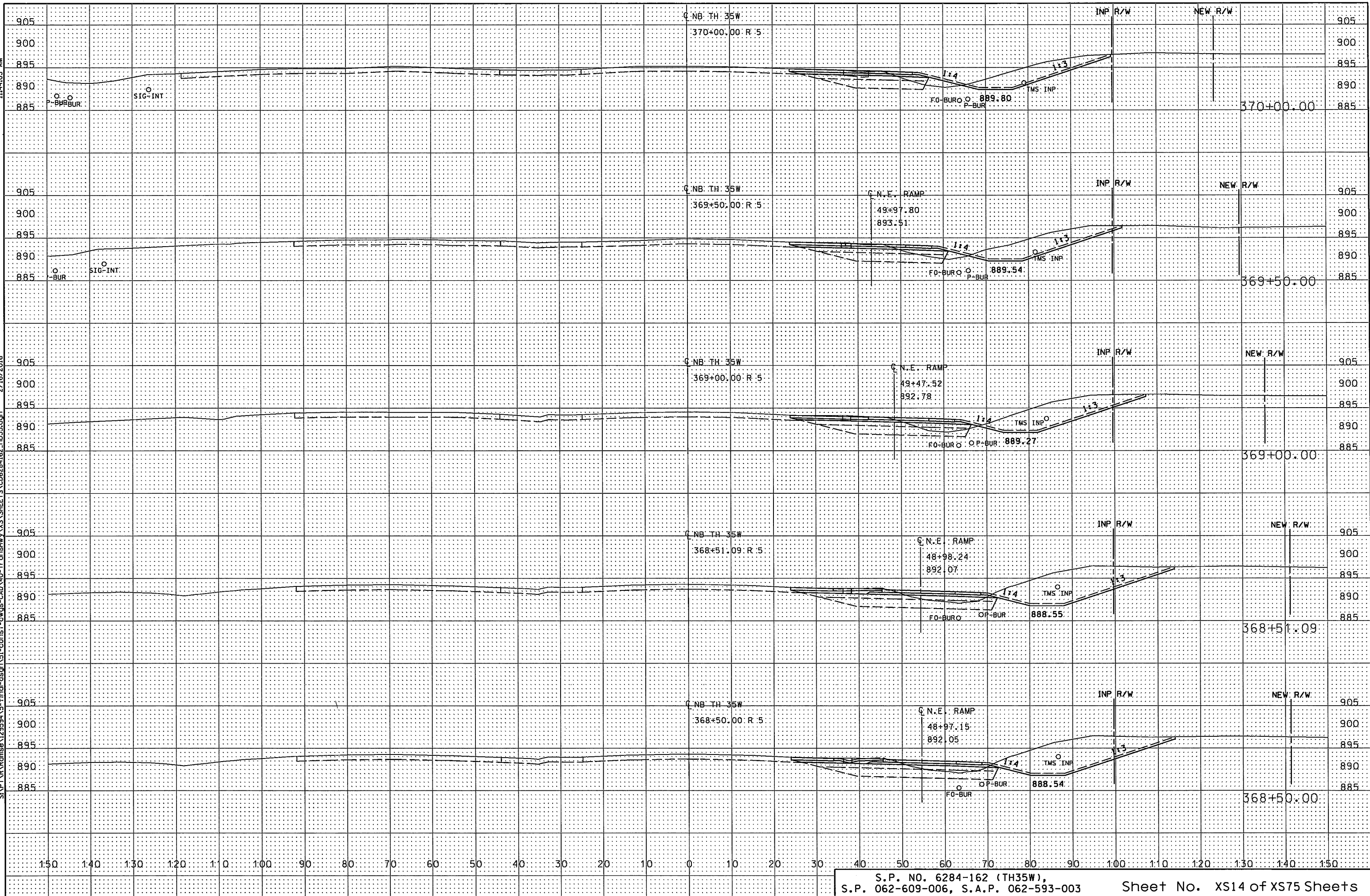
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11/4/05 AM

2/16/2016

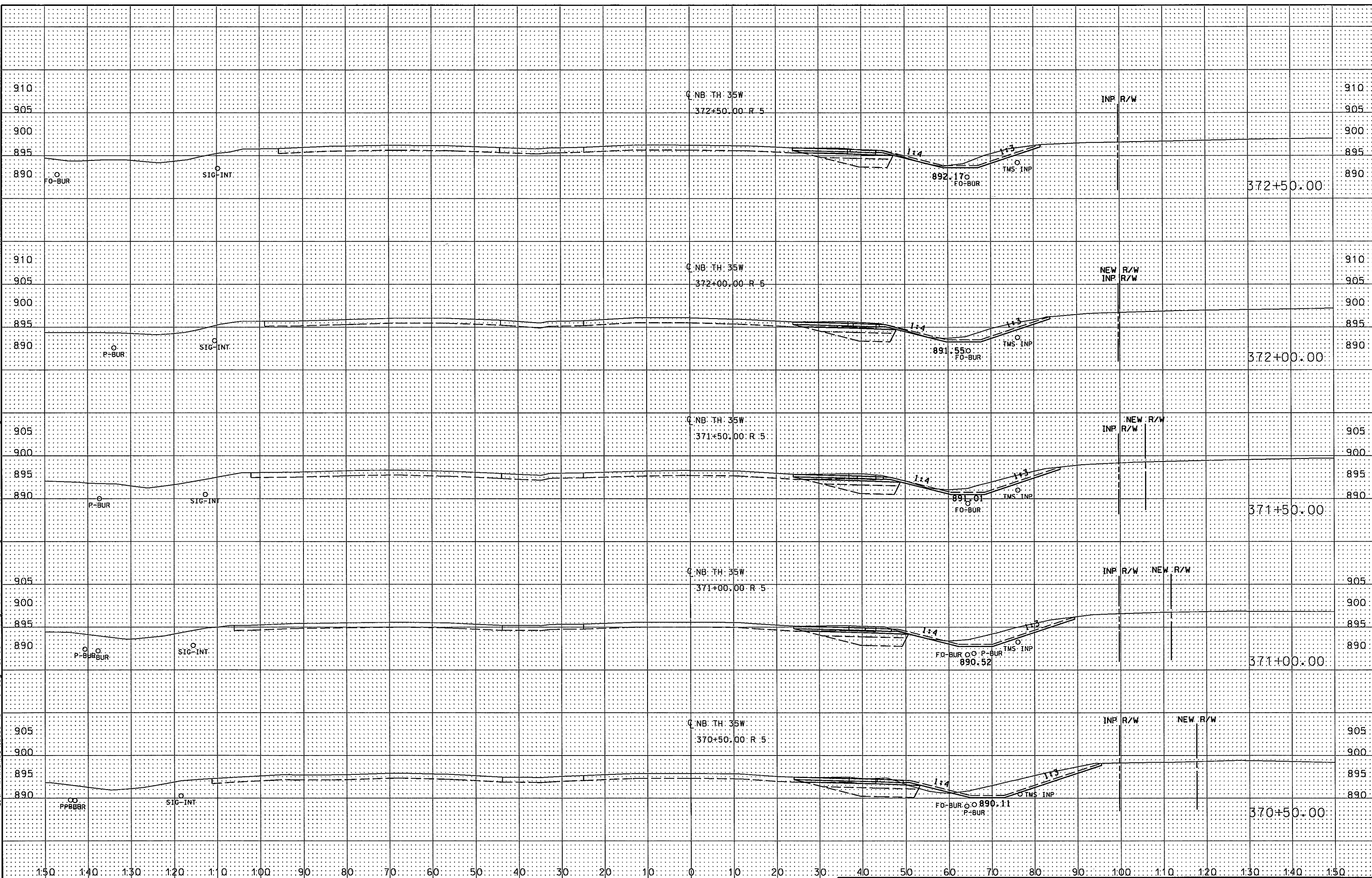
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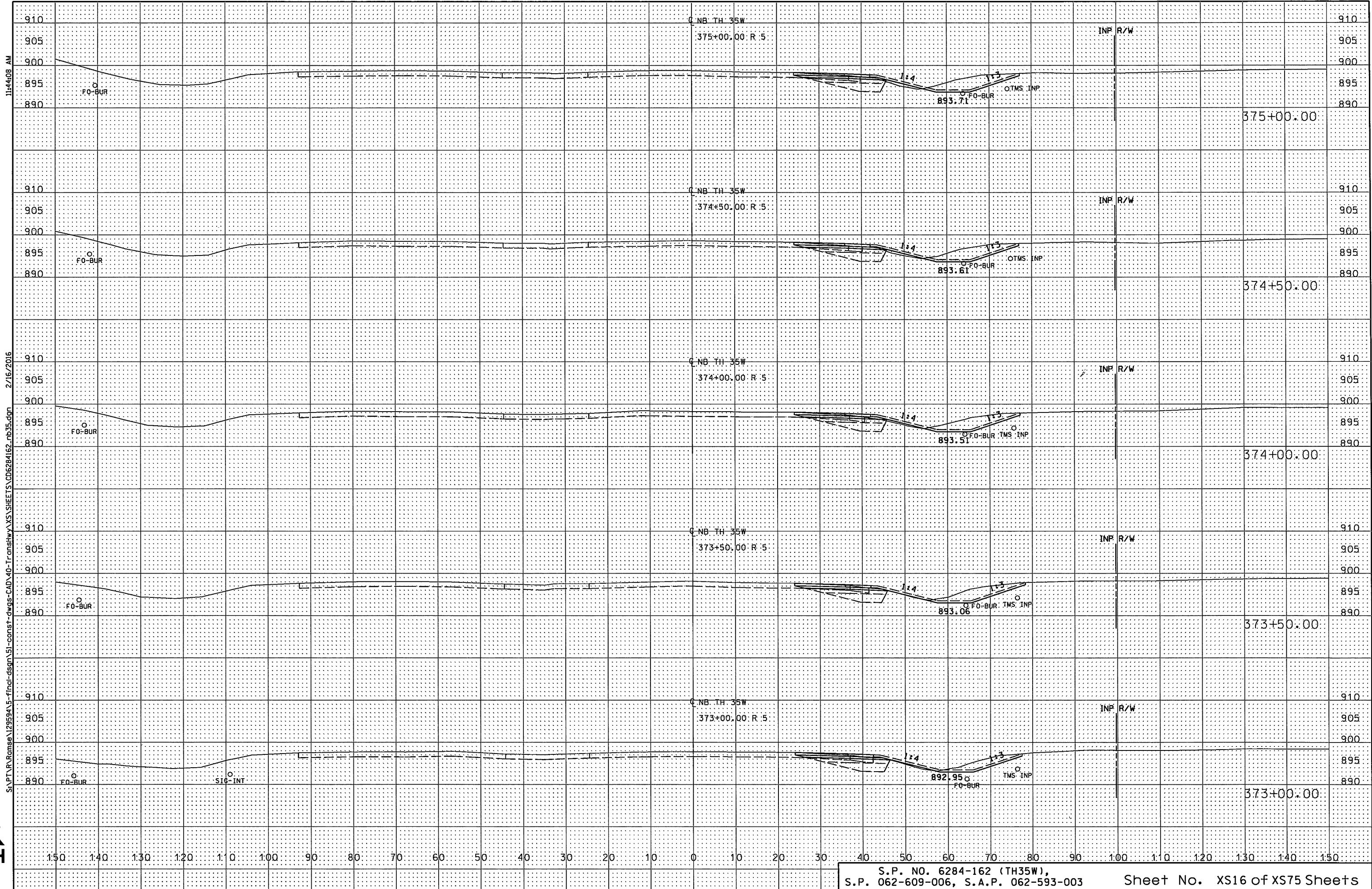


J1:4407 AM

2/16/2016

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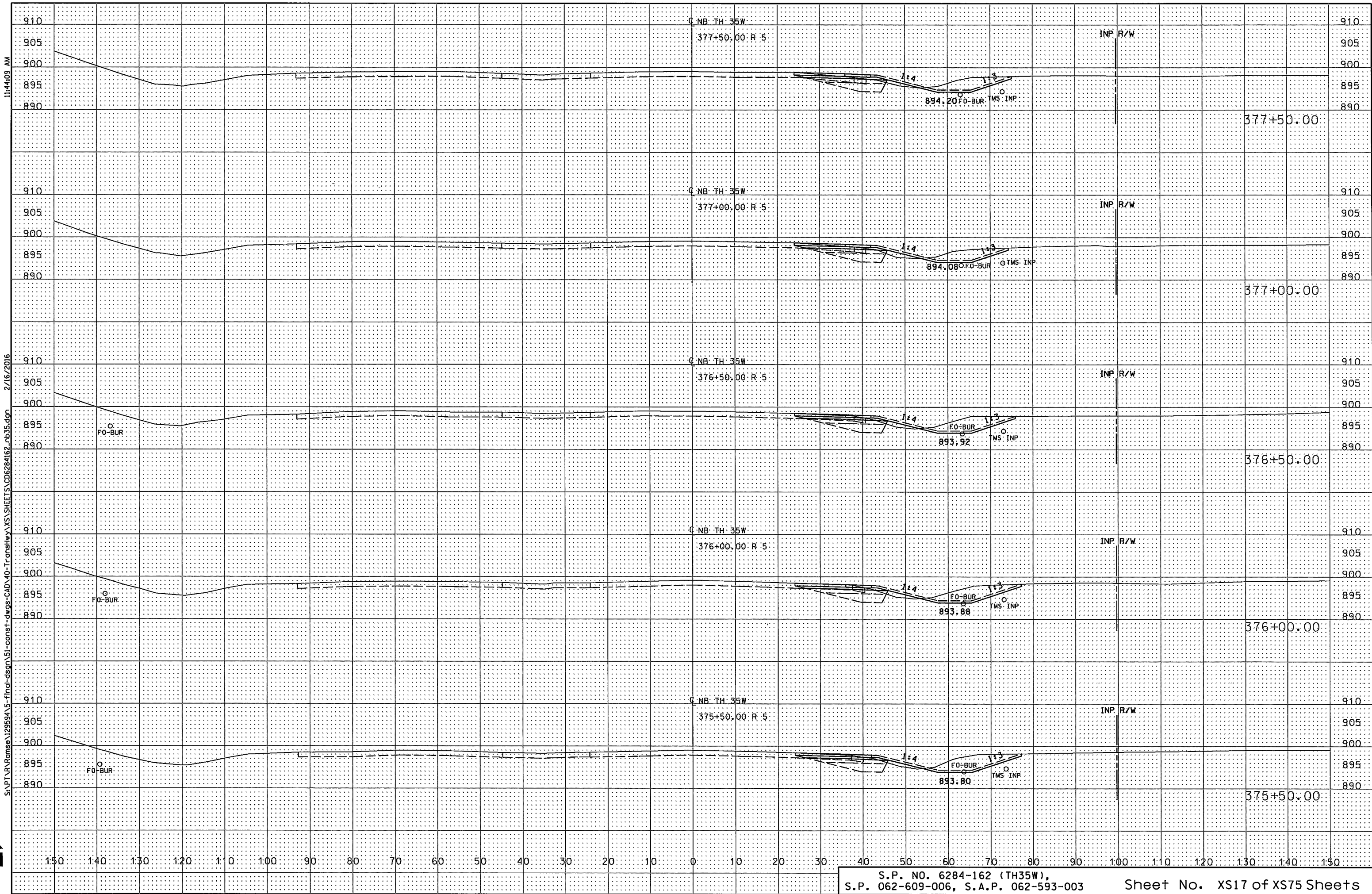


11:44:08 AM

2/16/2016

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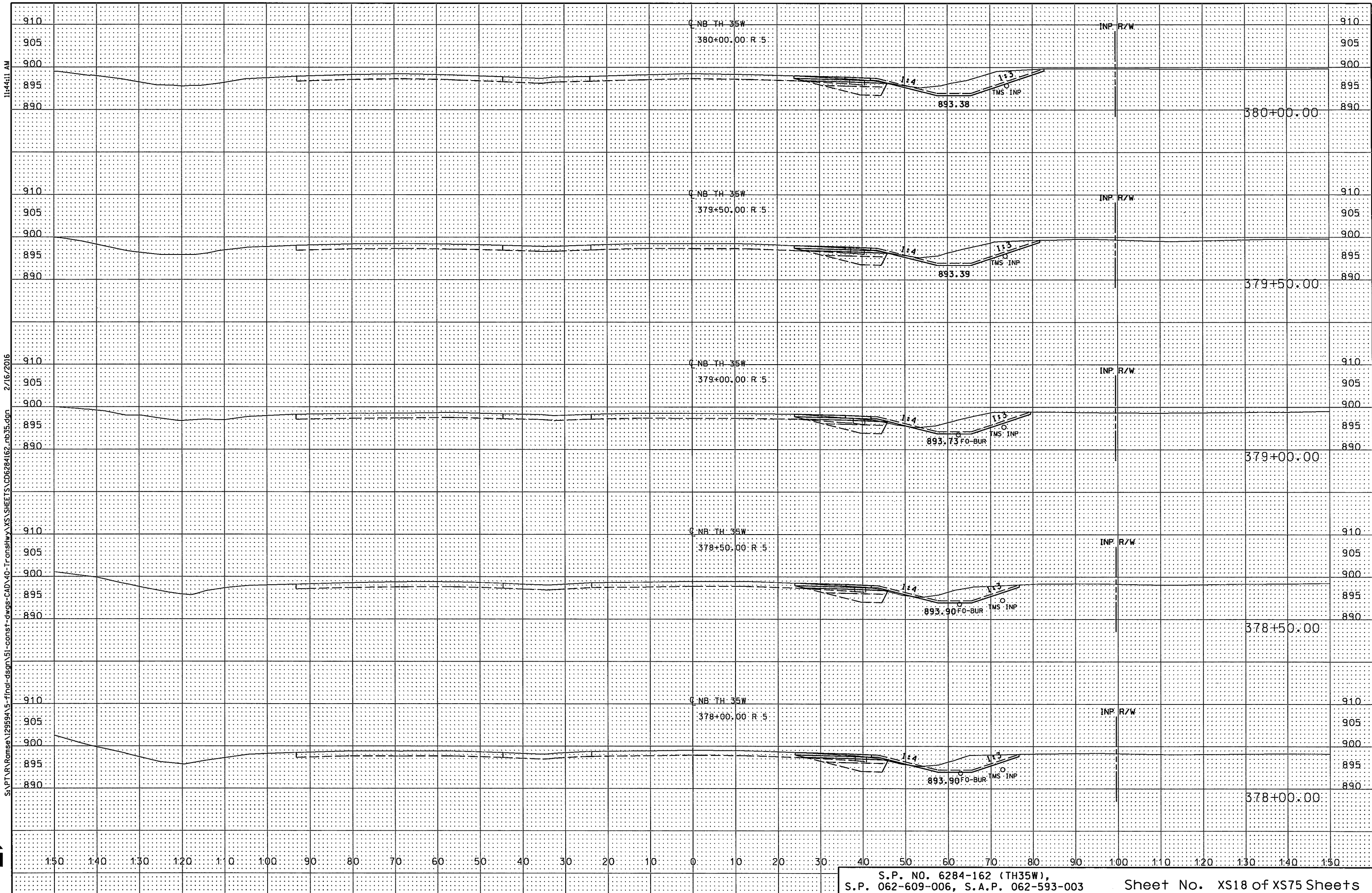


11/4/09 AM

2/16/2016

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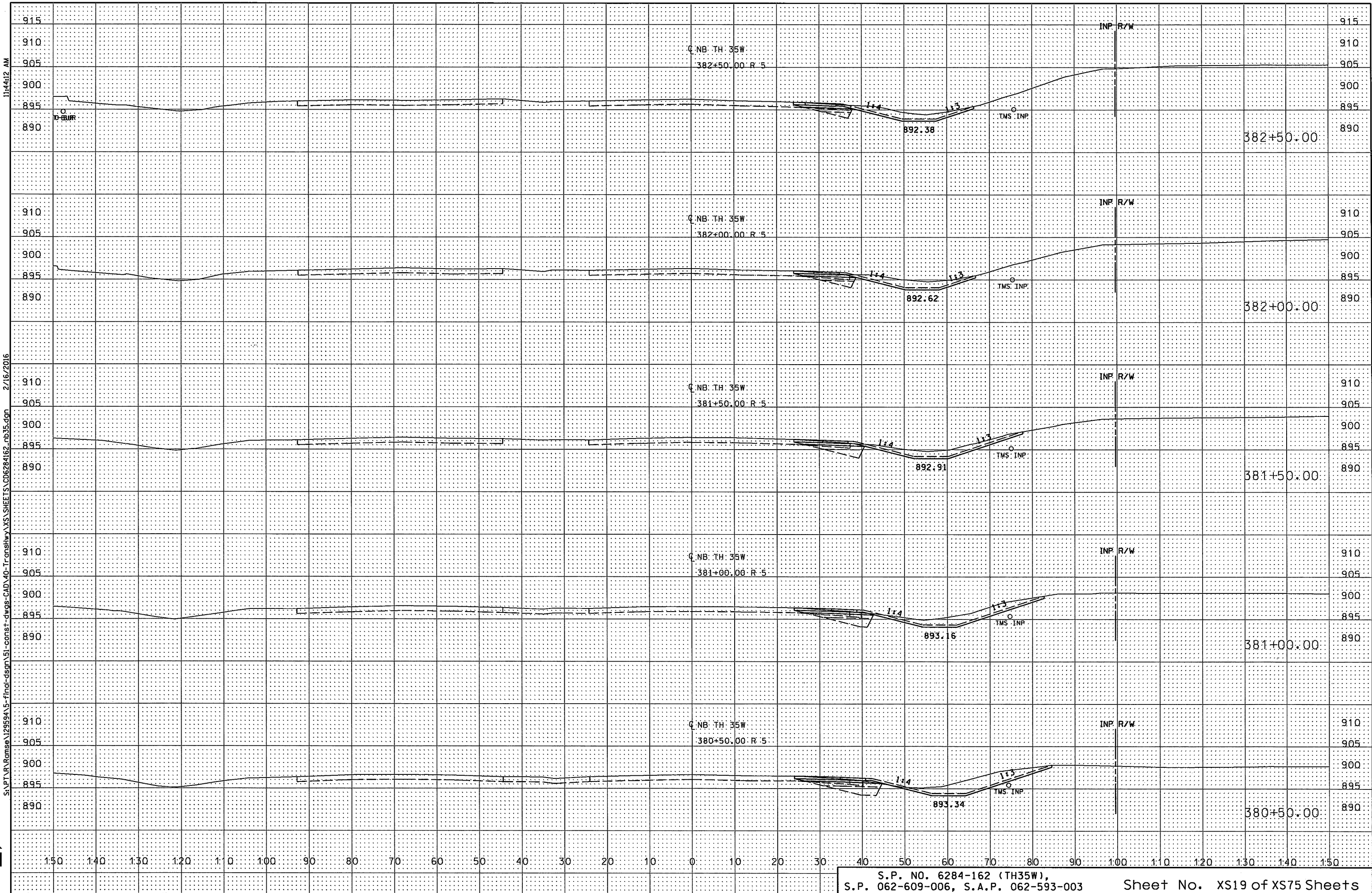


11:44:11 AM

2/16/2016

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11:44:12 AM

2/16/2016

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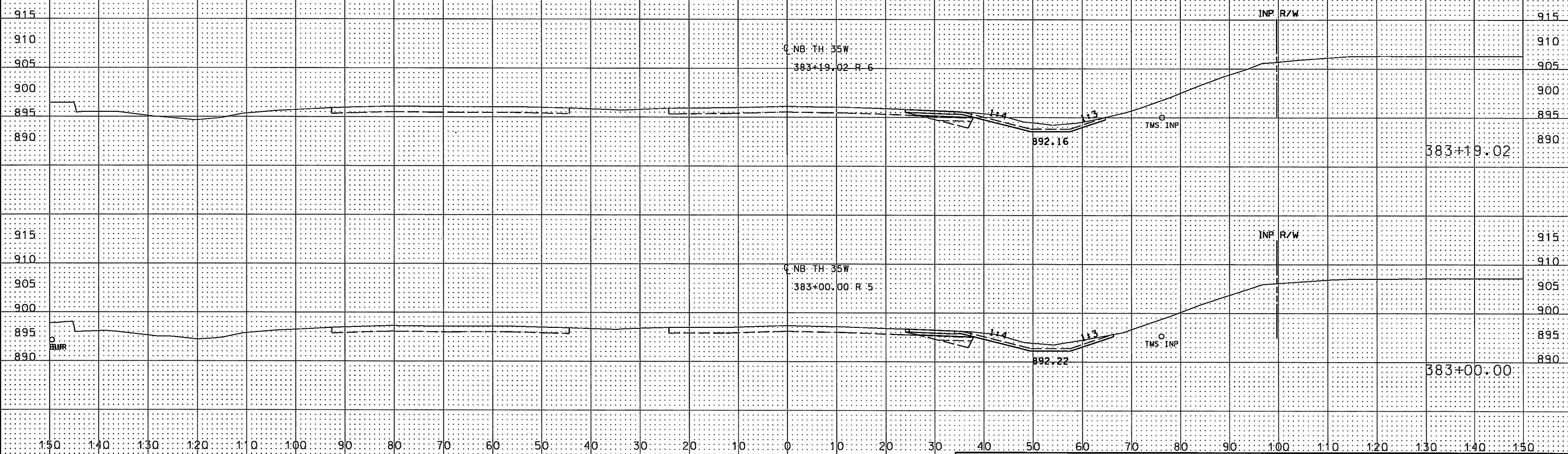


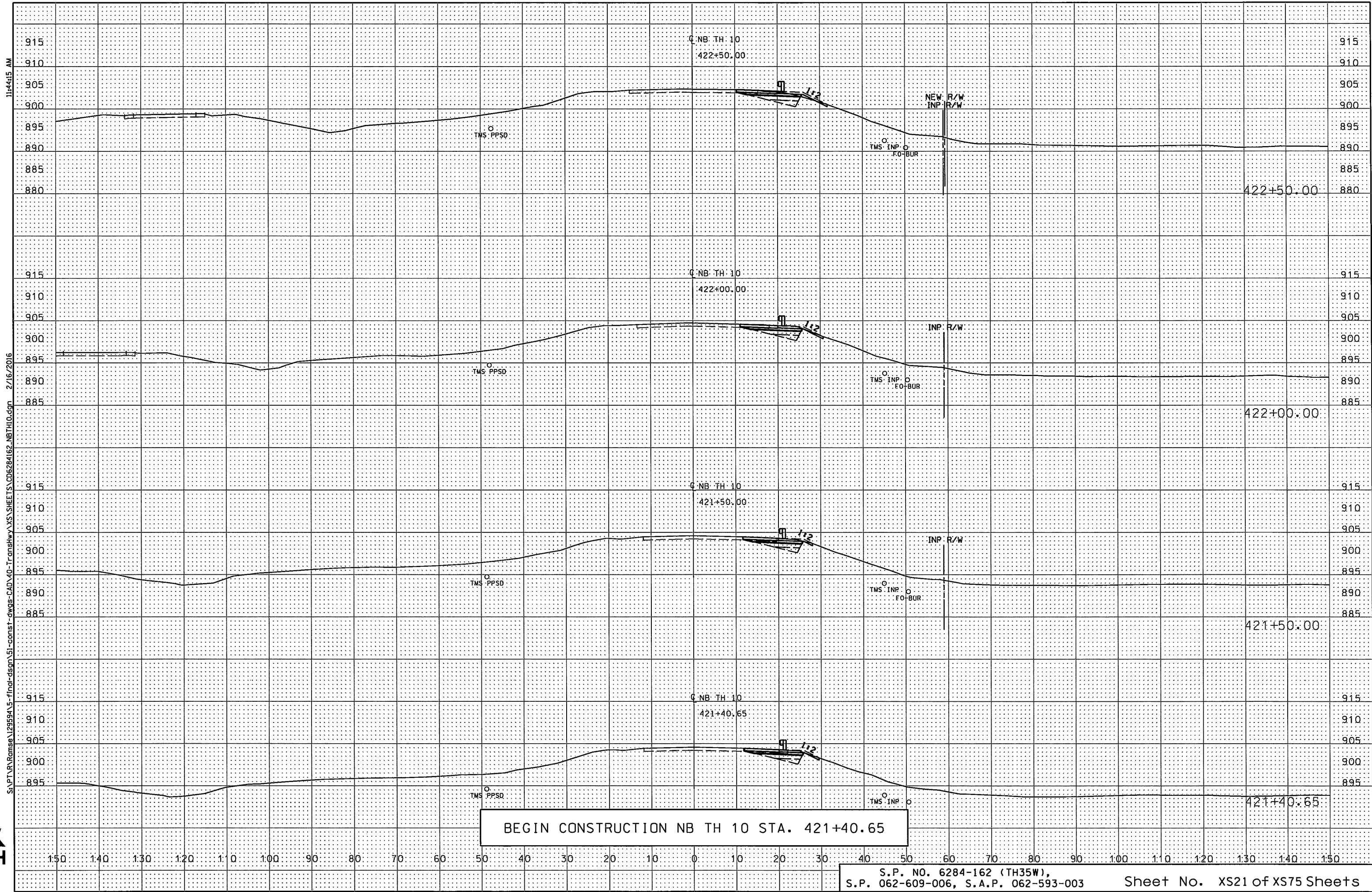
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2/16/2016

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END CONSTRUCTION NB TH 35W STA. 383+19.02





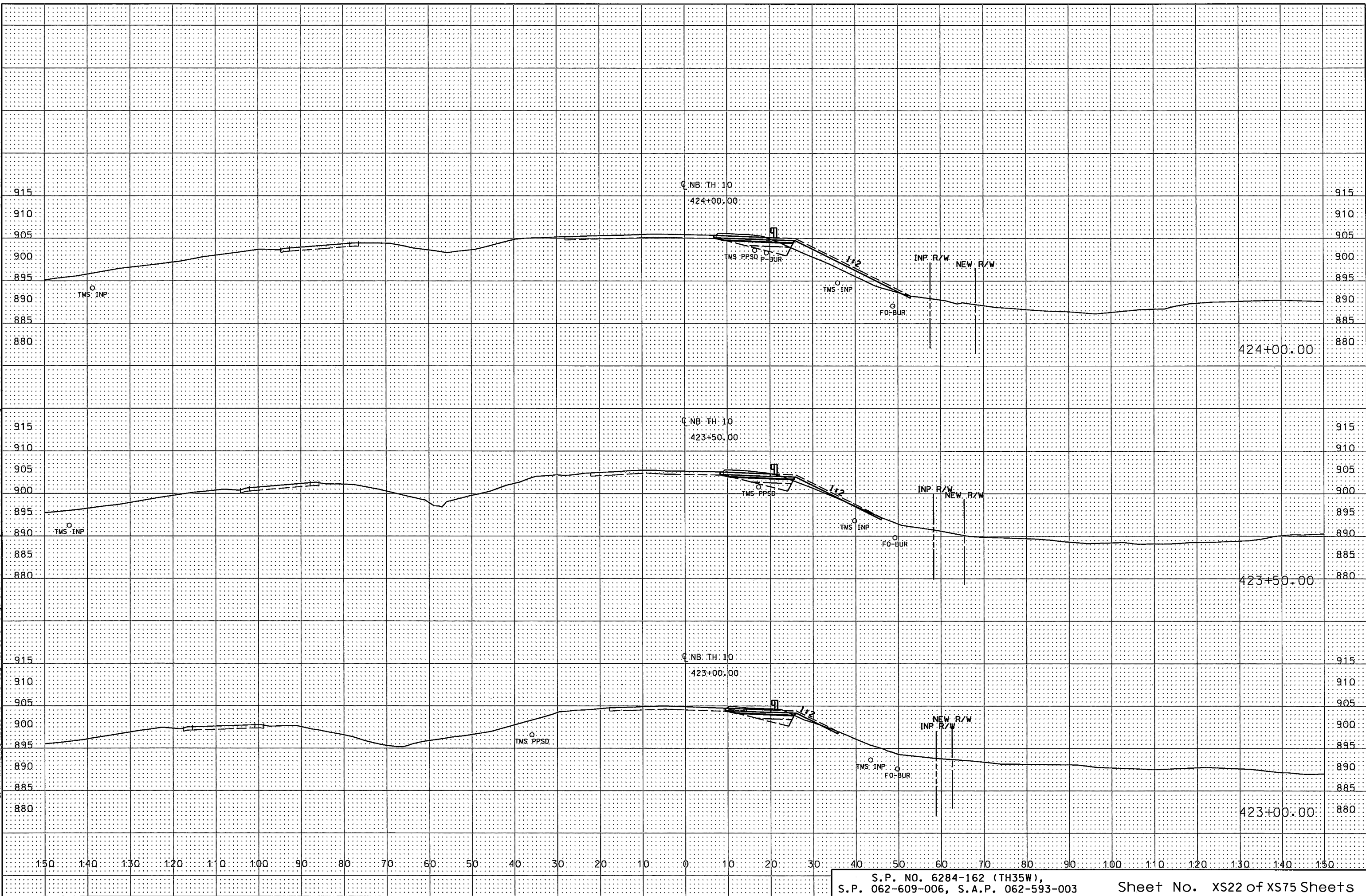
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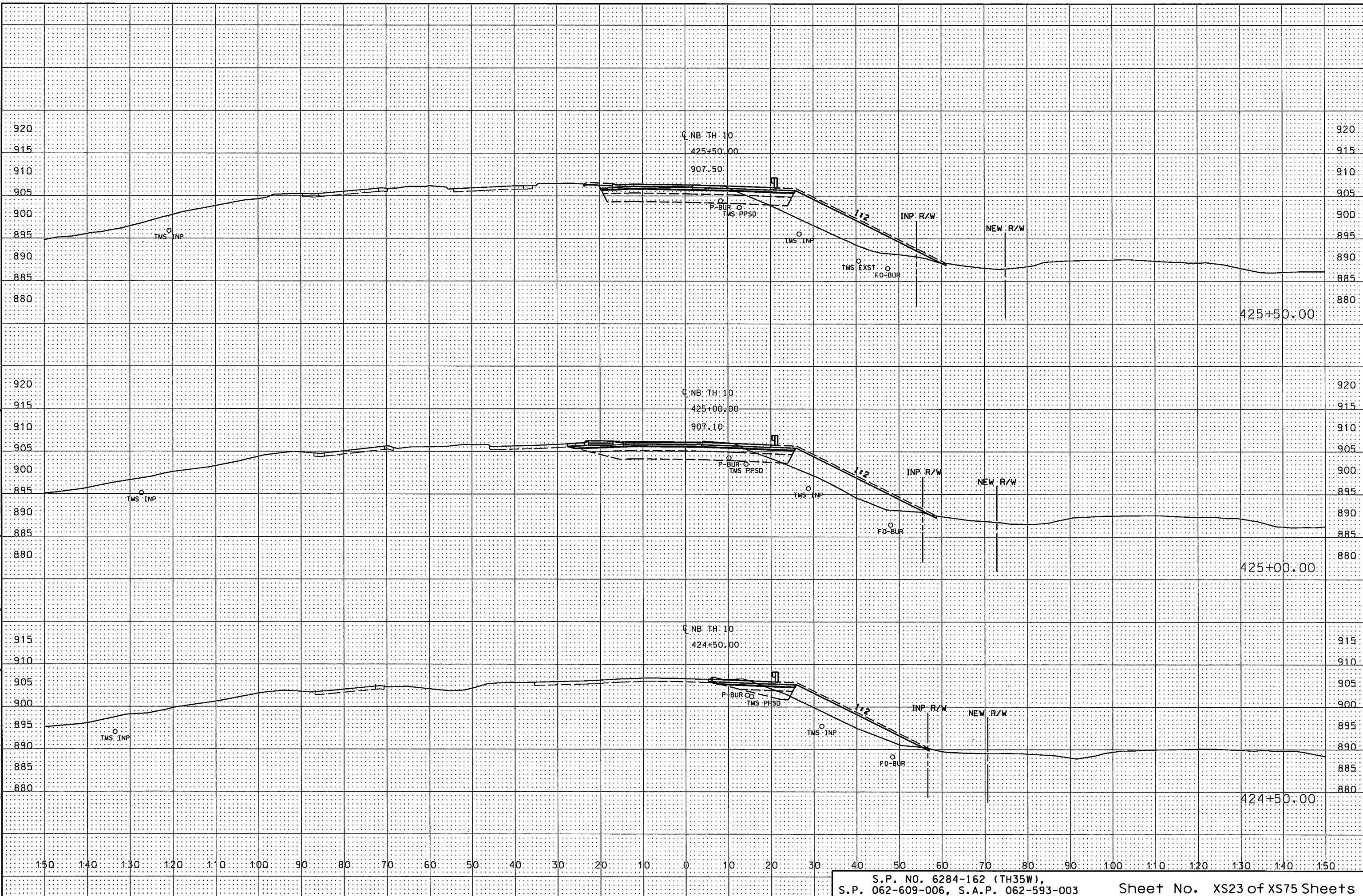
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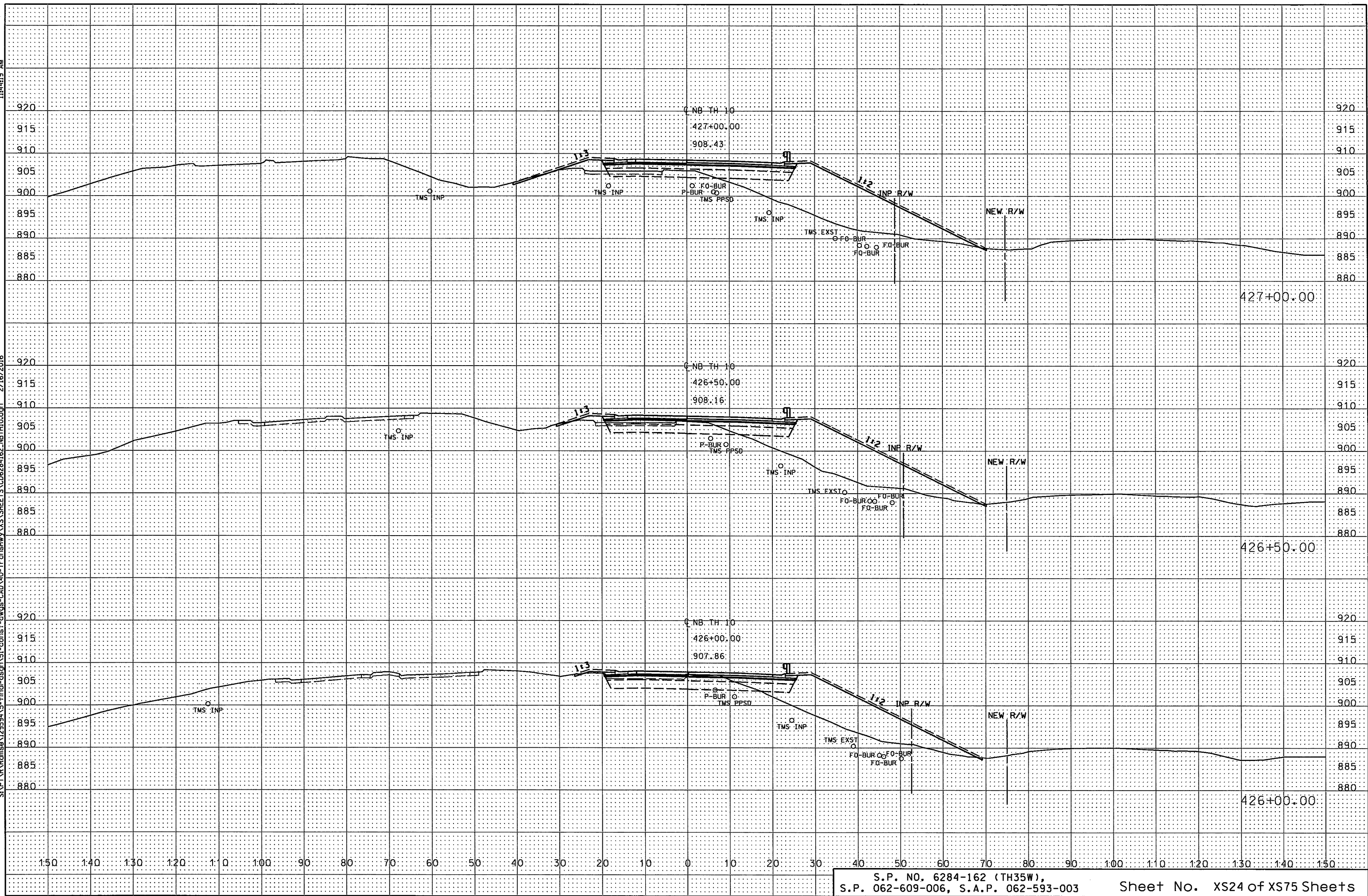
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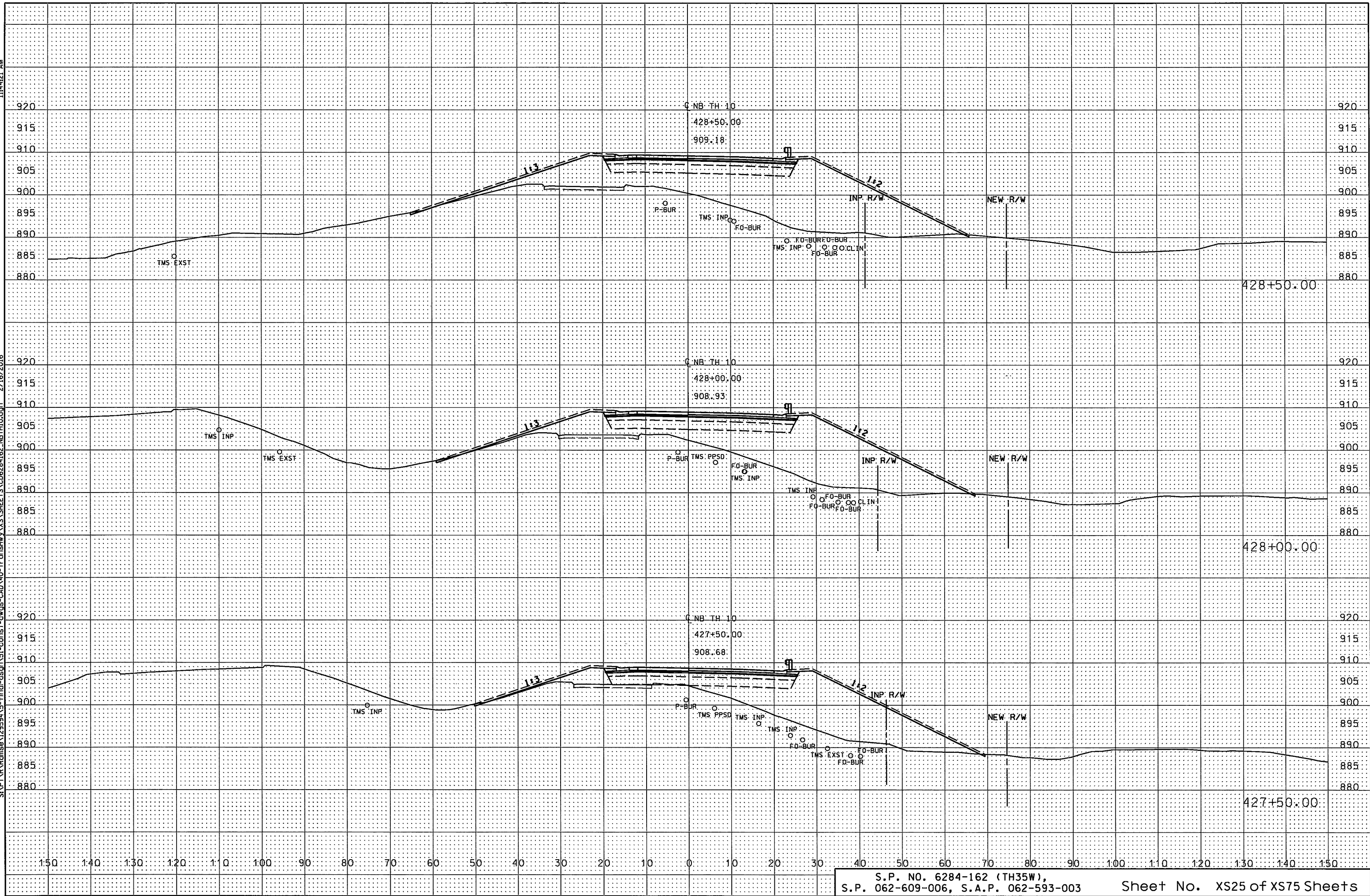
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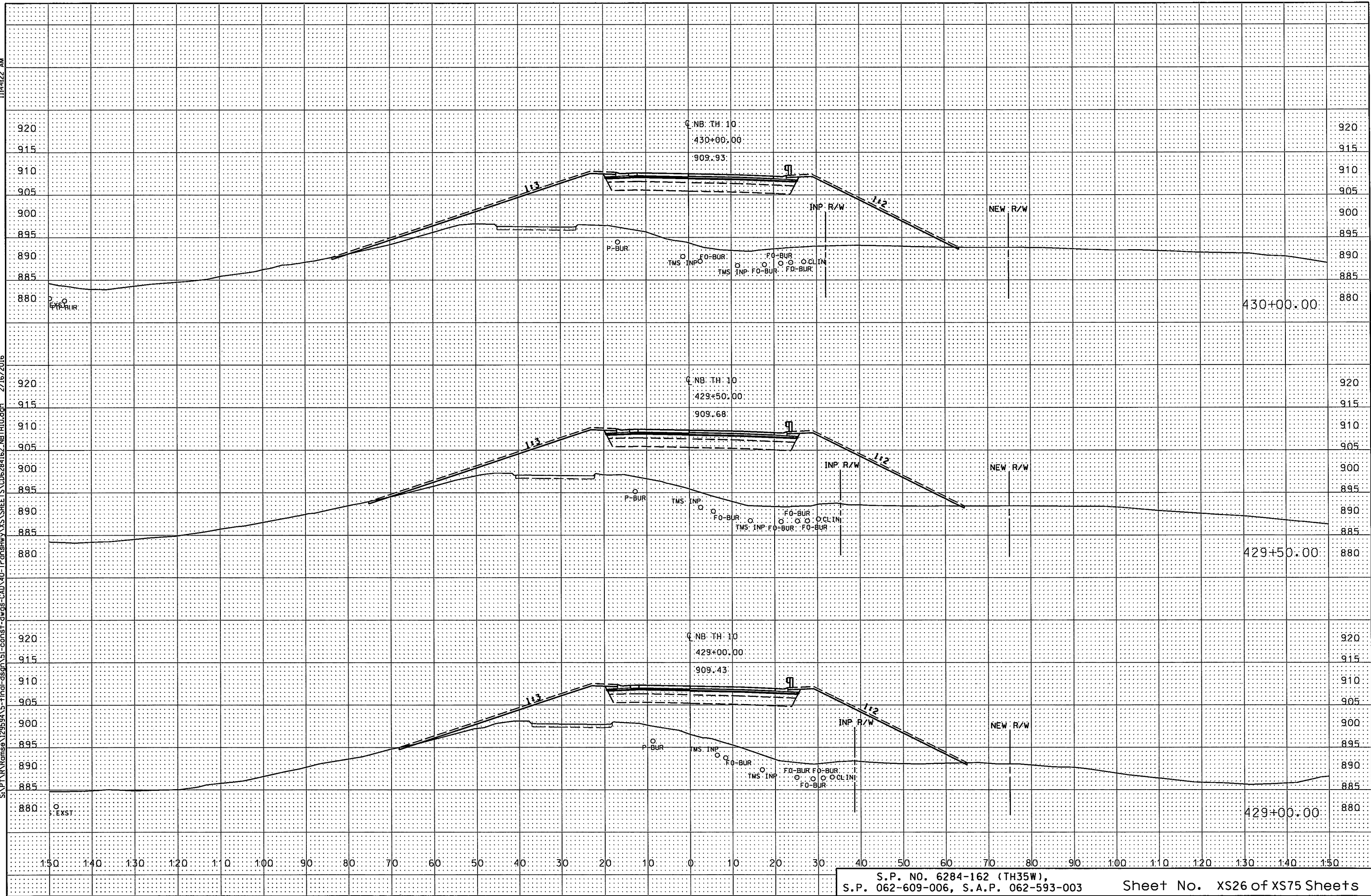
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11:44:22 AM

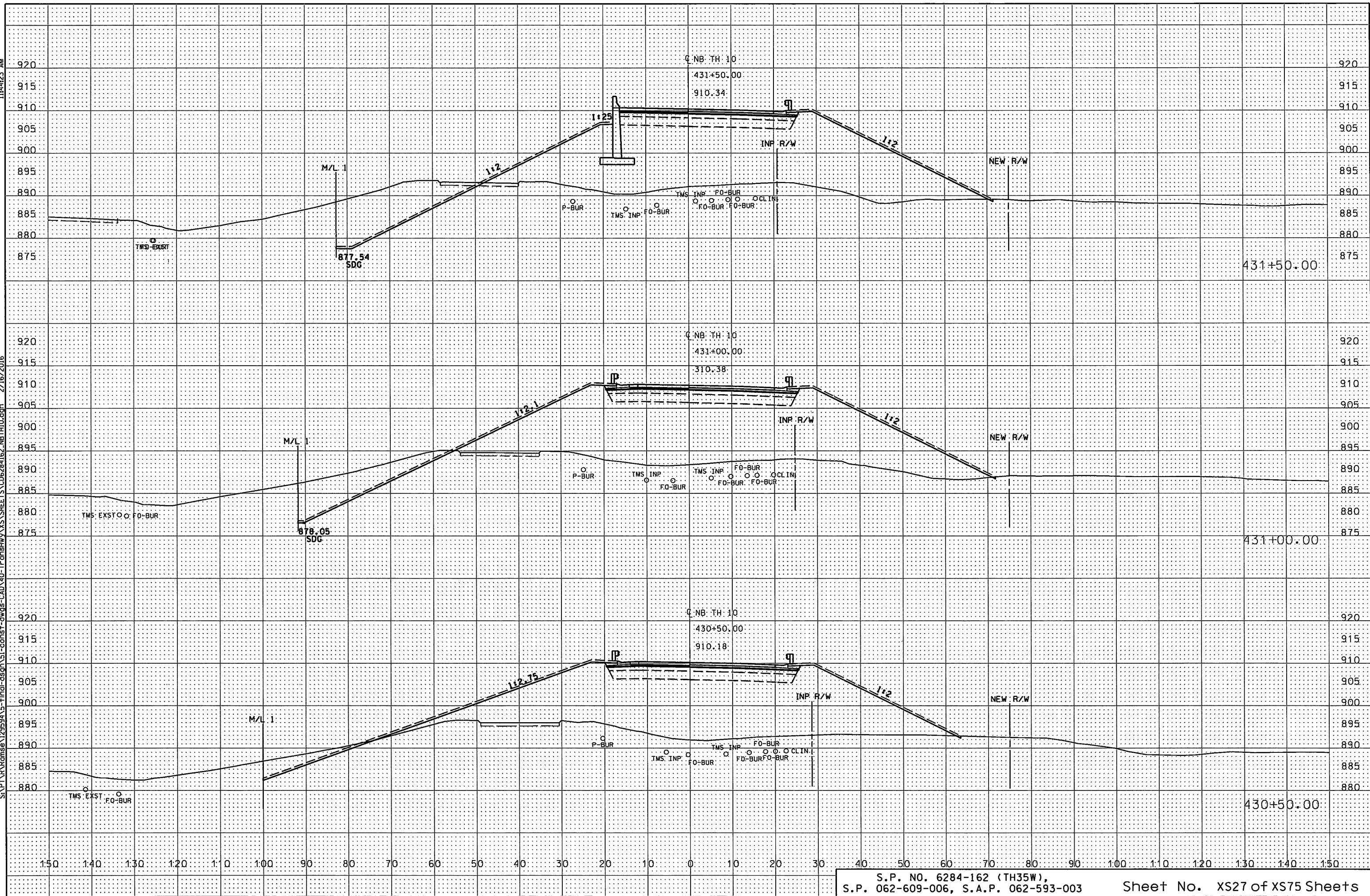
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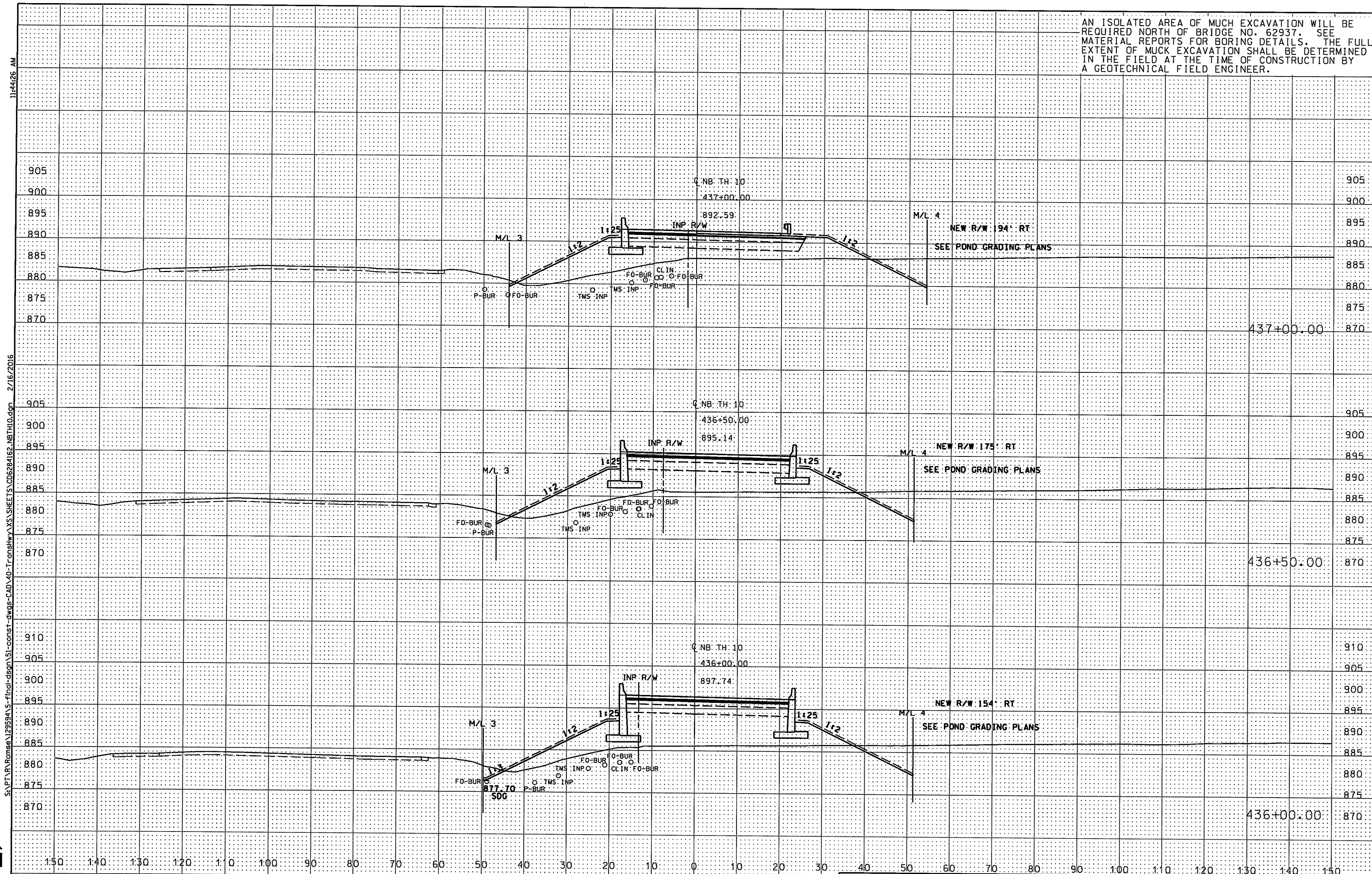
11/4/23 AM

2/16/2016

S:\PT\RA\omise\12959\A-5-final-dsgn\51-const-dwg-CAD\40-Transhwy.XSS\SHEETS\CD6284162_NB\TH10.dgn



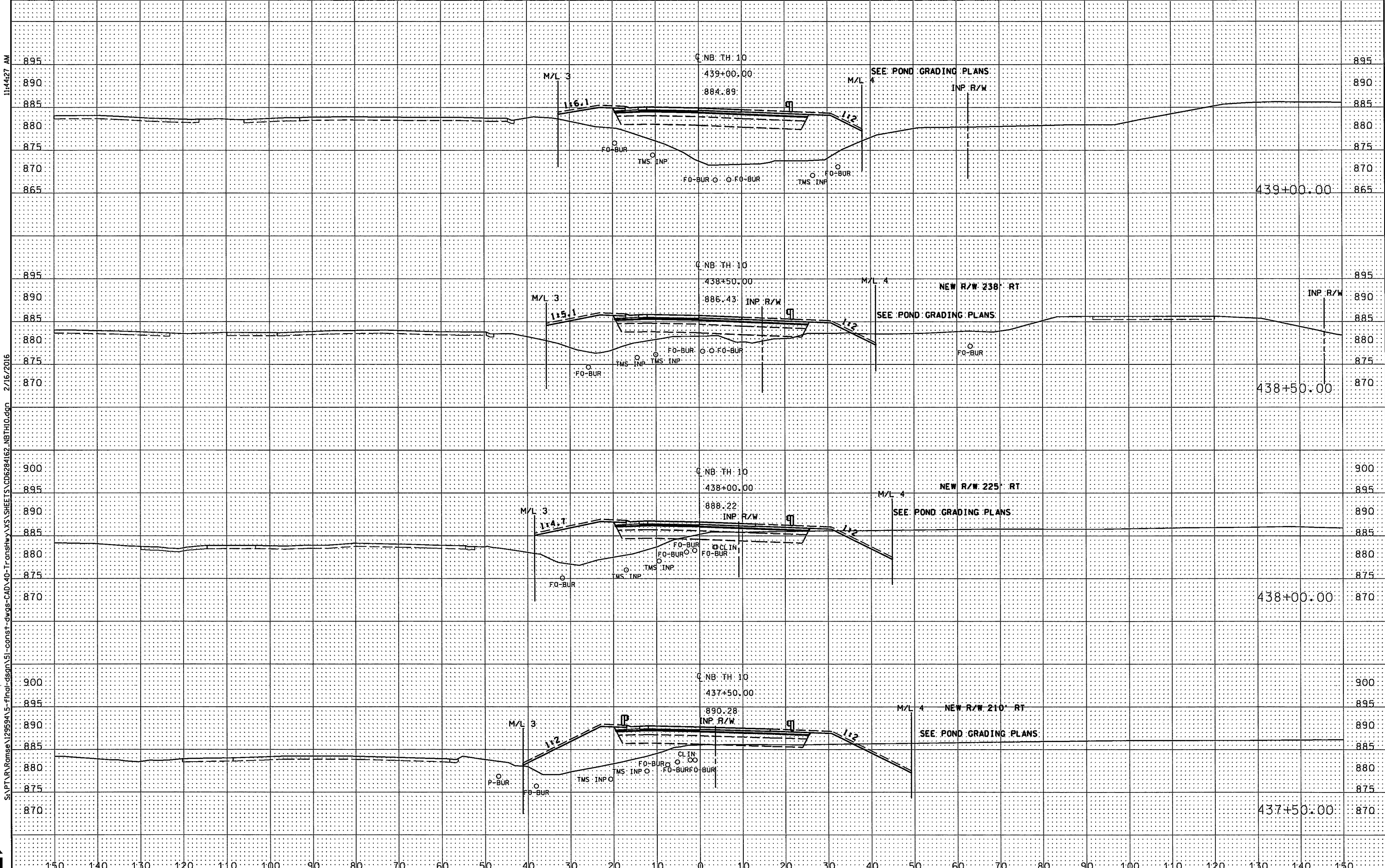
AN ISOLATED AREA OF MUCH EXCAVATION WILL BE REQUIRED NORTH OF BRIDGE NO. 62937. SEE MATERIAL REPORTS FOR BORING DETAILS. THE FULL EXTENT OF MUCK EXCAVATION SHALL BE DETERMINED IN THE FIELD AT THE TIME OF CONSTRUCTION BY A GEOTECHNICAL FIELD ENGINEER.



11:44:26 AM

S:\PT\AR\Ramse\129594\5-f\incl-dsop\51-const-dwg-cad\40-TransHWY\XS\SHEETS\CD6284162-NBTH10.dgn 2/16/2016





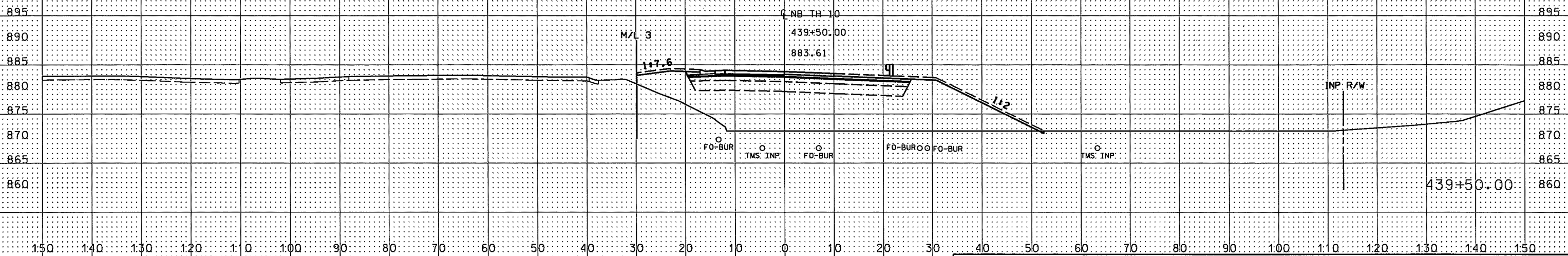
11/4/27 AM

2/16/2016

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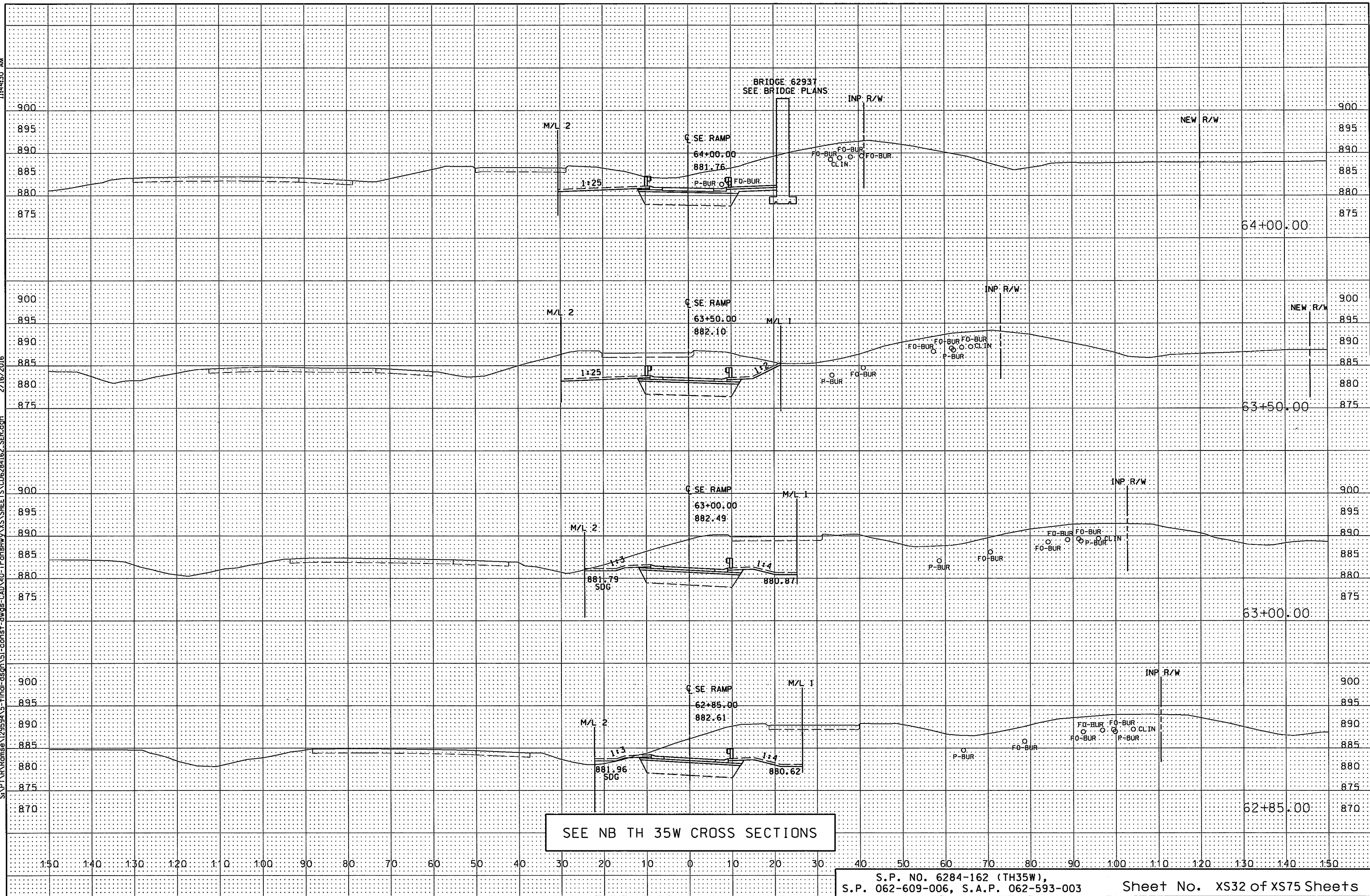
SEE NB TH 35W CROSS SECTIONS



11:44:30 AM

2/16/2016

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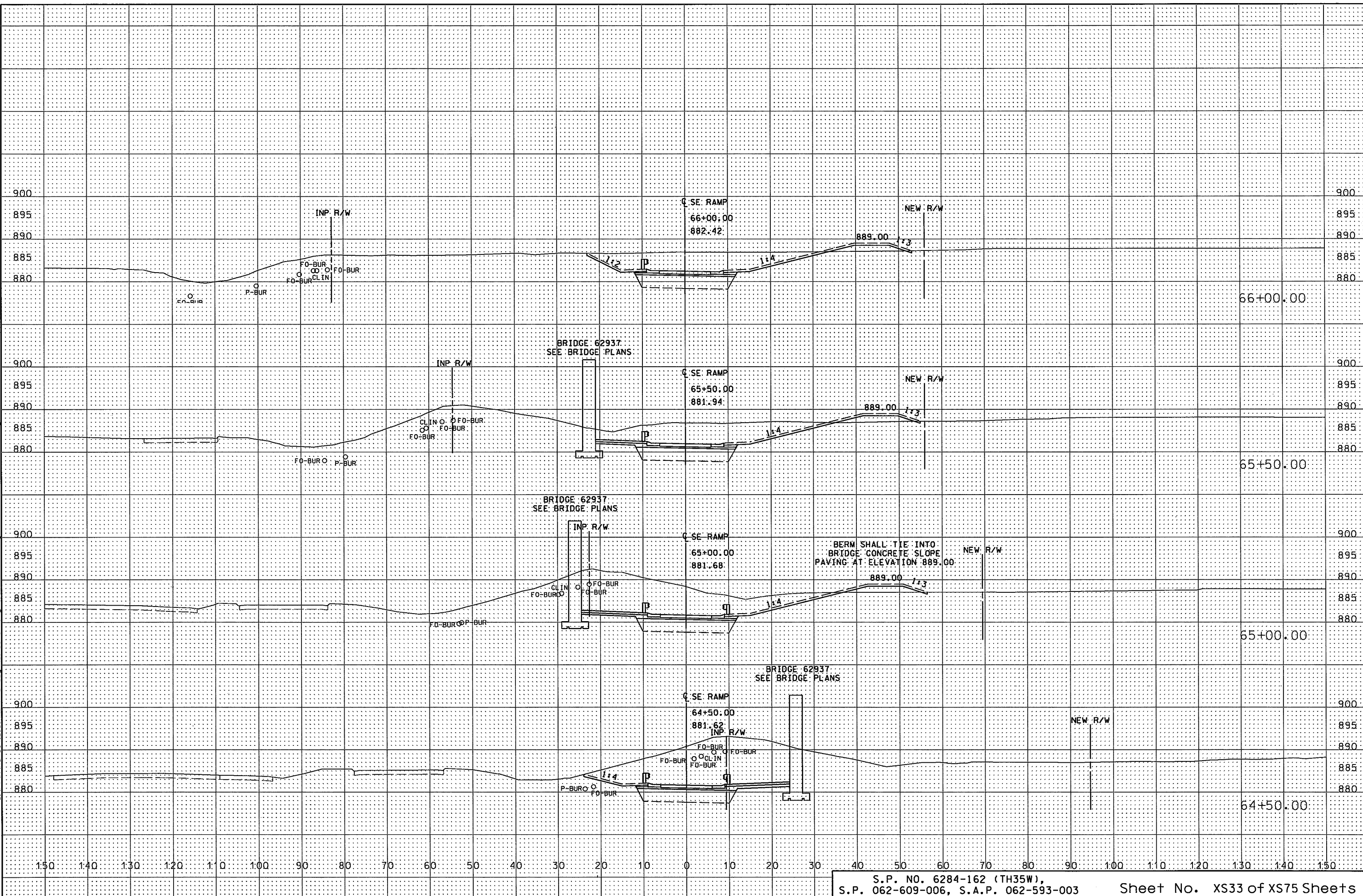
SEE NB TH 35W CROSS SECTIONS



11/4/16 AM

2/16/2016

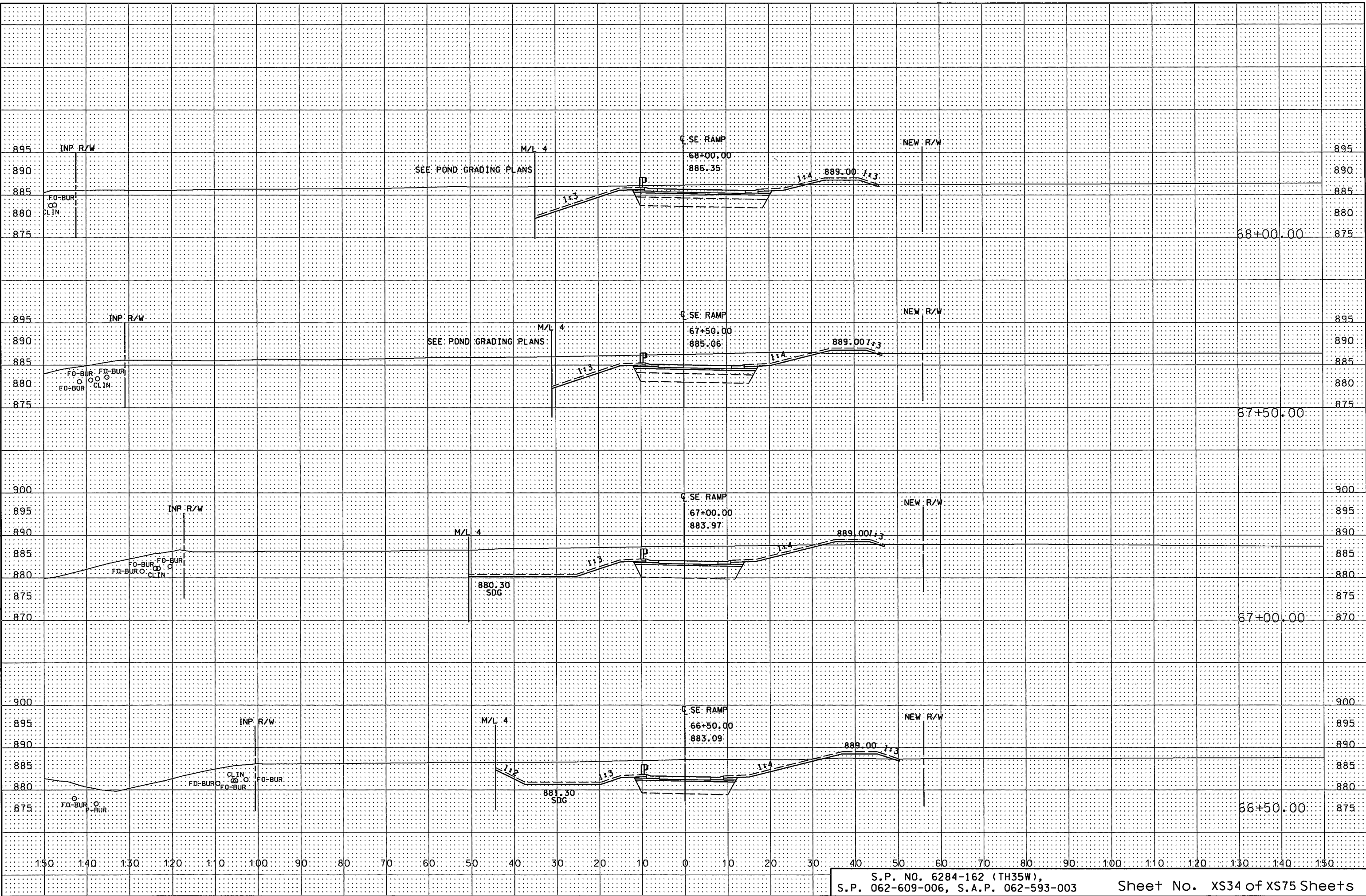
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11:44:33 AM

2/16/2016

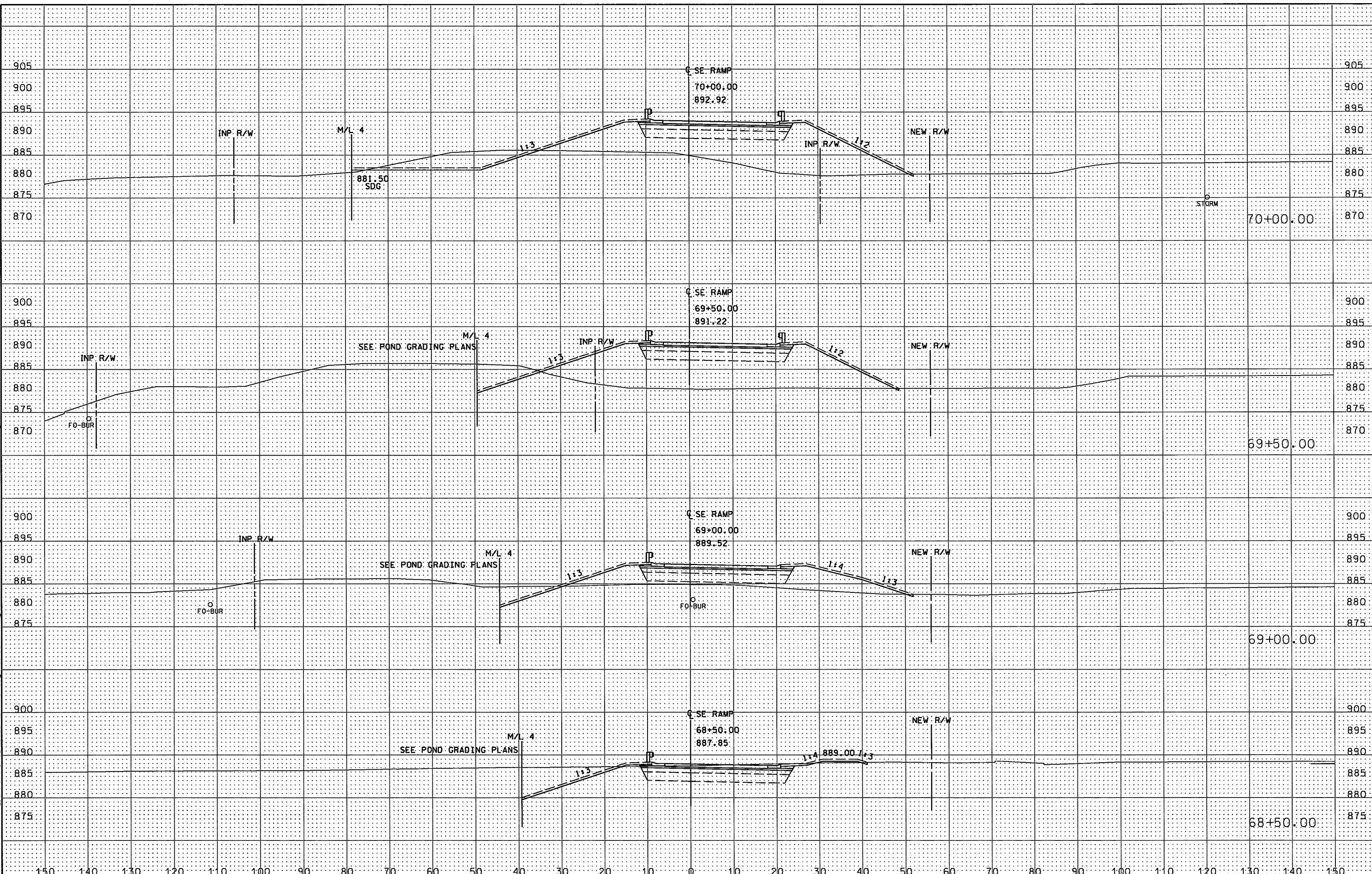
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11:44:34 AM

2/16/2016

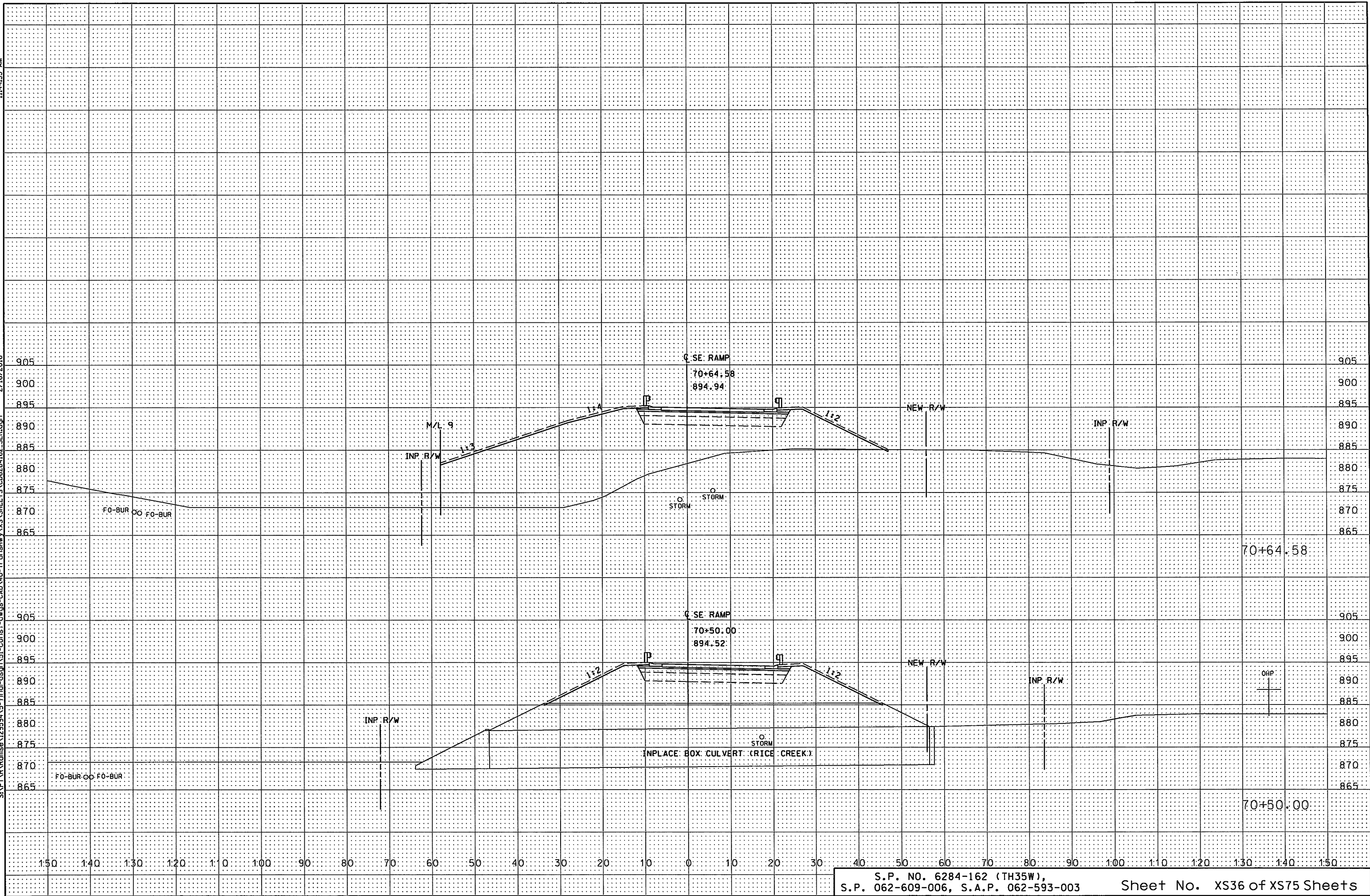
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11:44:35 AM

2/16/2016

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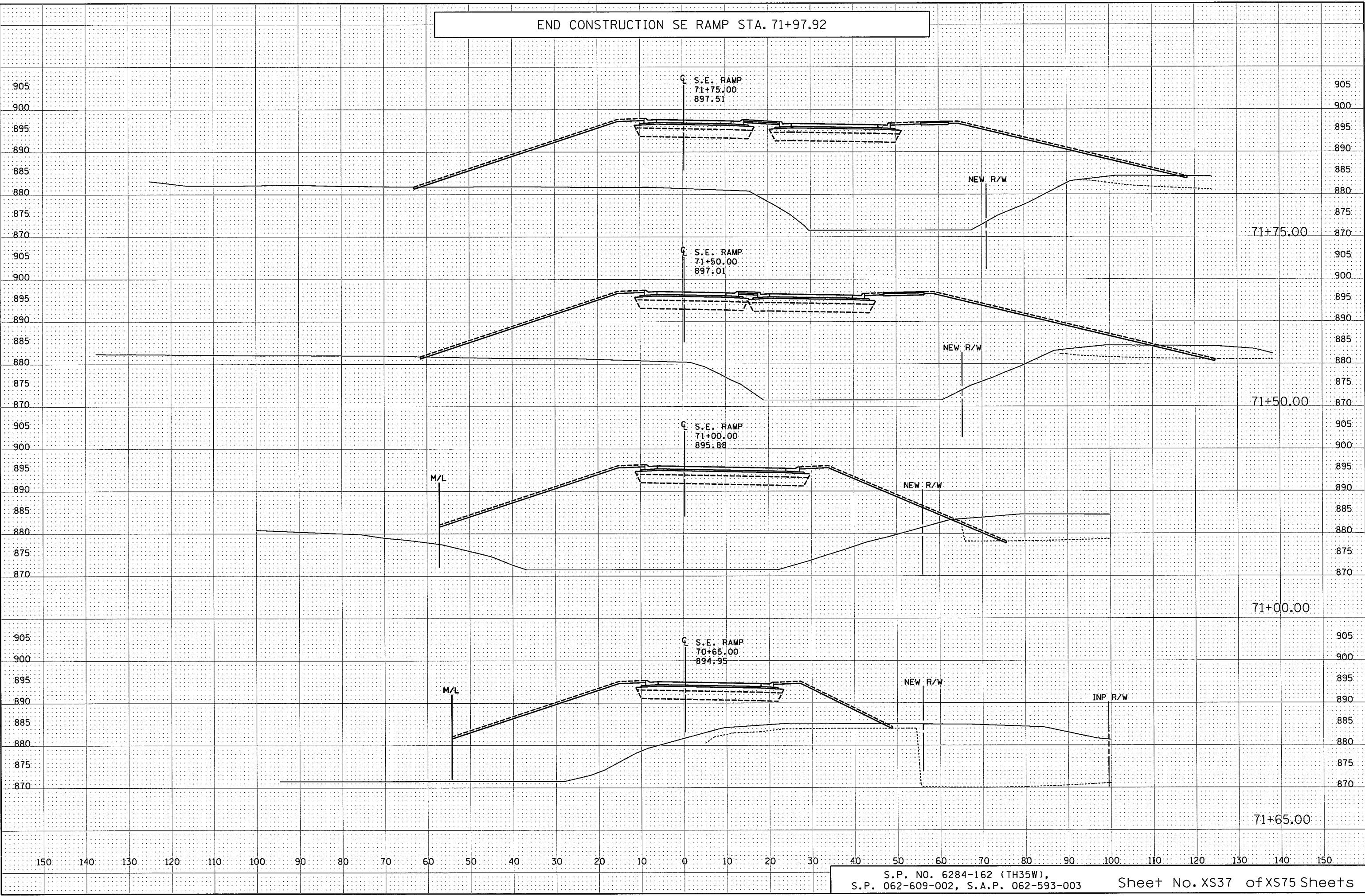
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9/4/929 AM

12/4/2015

K:\TWC_CIVIL\Count\RAMSEY\135W_CRH\CAD\Design_Files\GDK_Cross_Sections\CD6284162_xp_SERamp.dgn

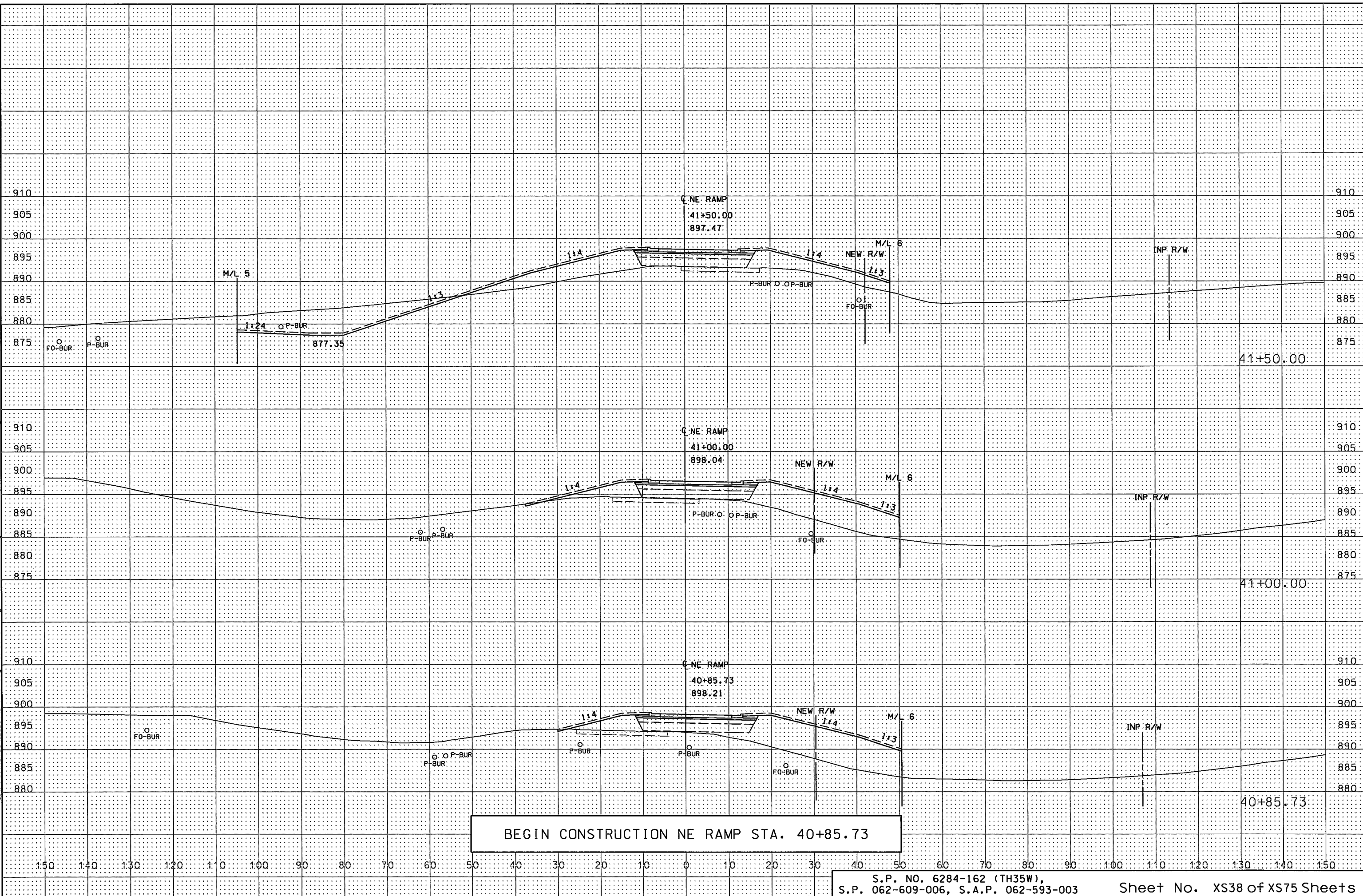
Kimley-Horn



11:44:37 AM

2/16/2016

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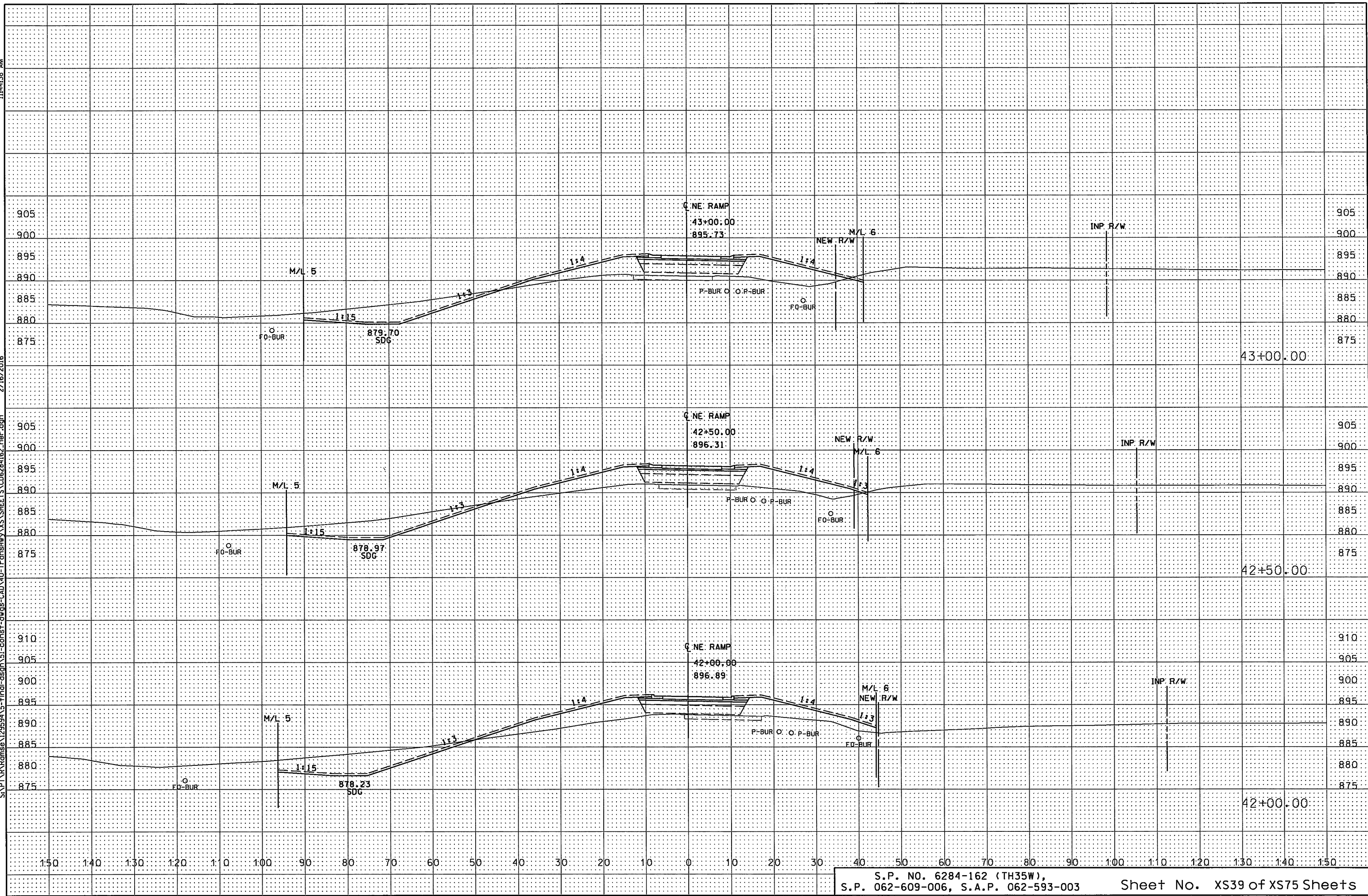
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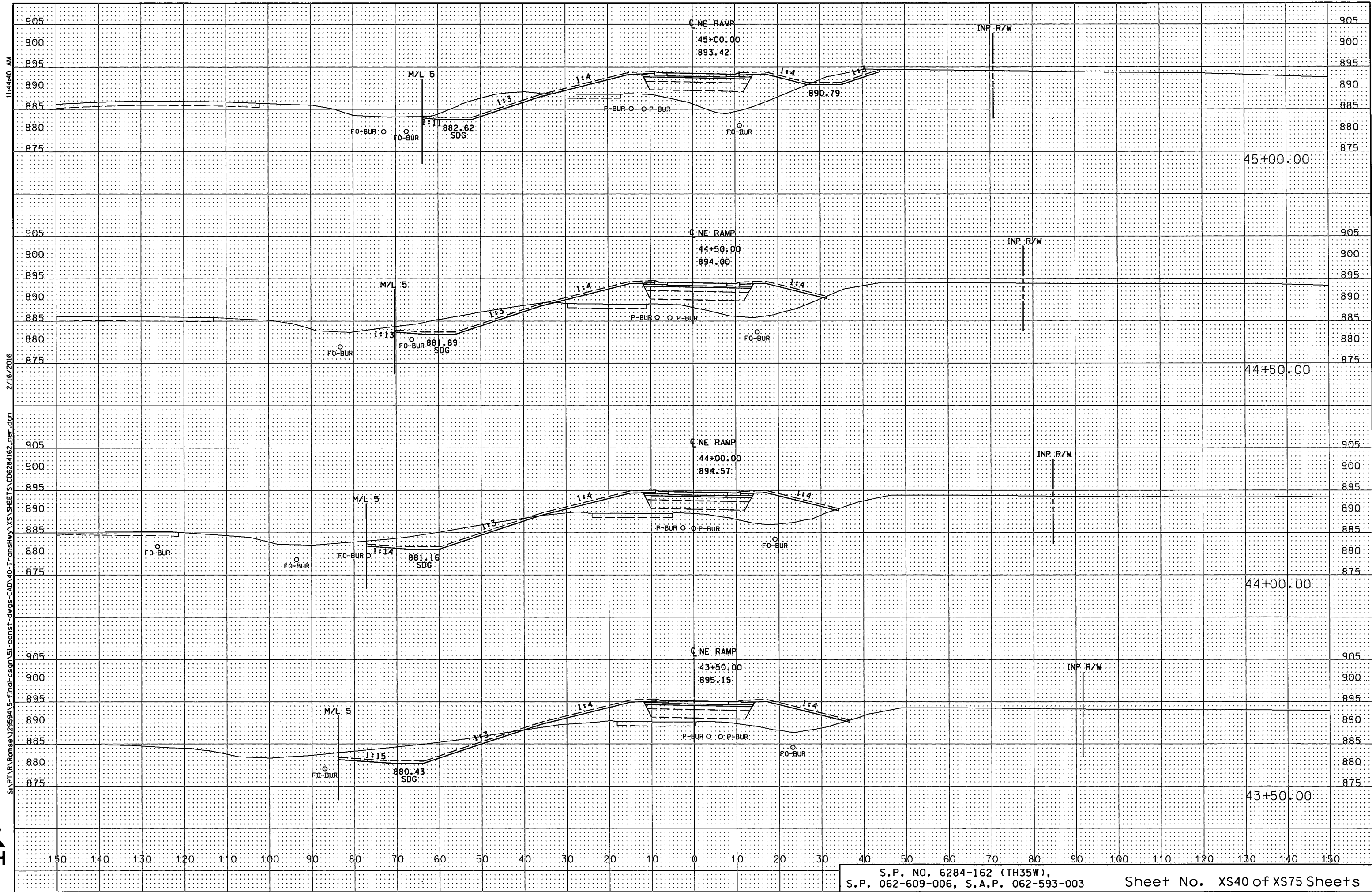


11:44:38 AM

2/16/2016

S:\PT\AR\Ramse\129594\5-final-dsgn\51-const-dwgs-CAD\40-Transhwy\X5 SHEETS\CD6284162_ner.dgn





11:44:40 AM

2/16/2016

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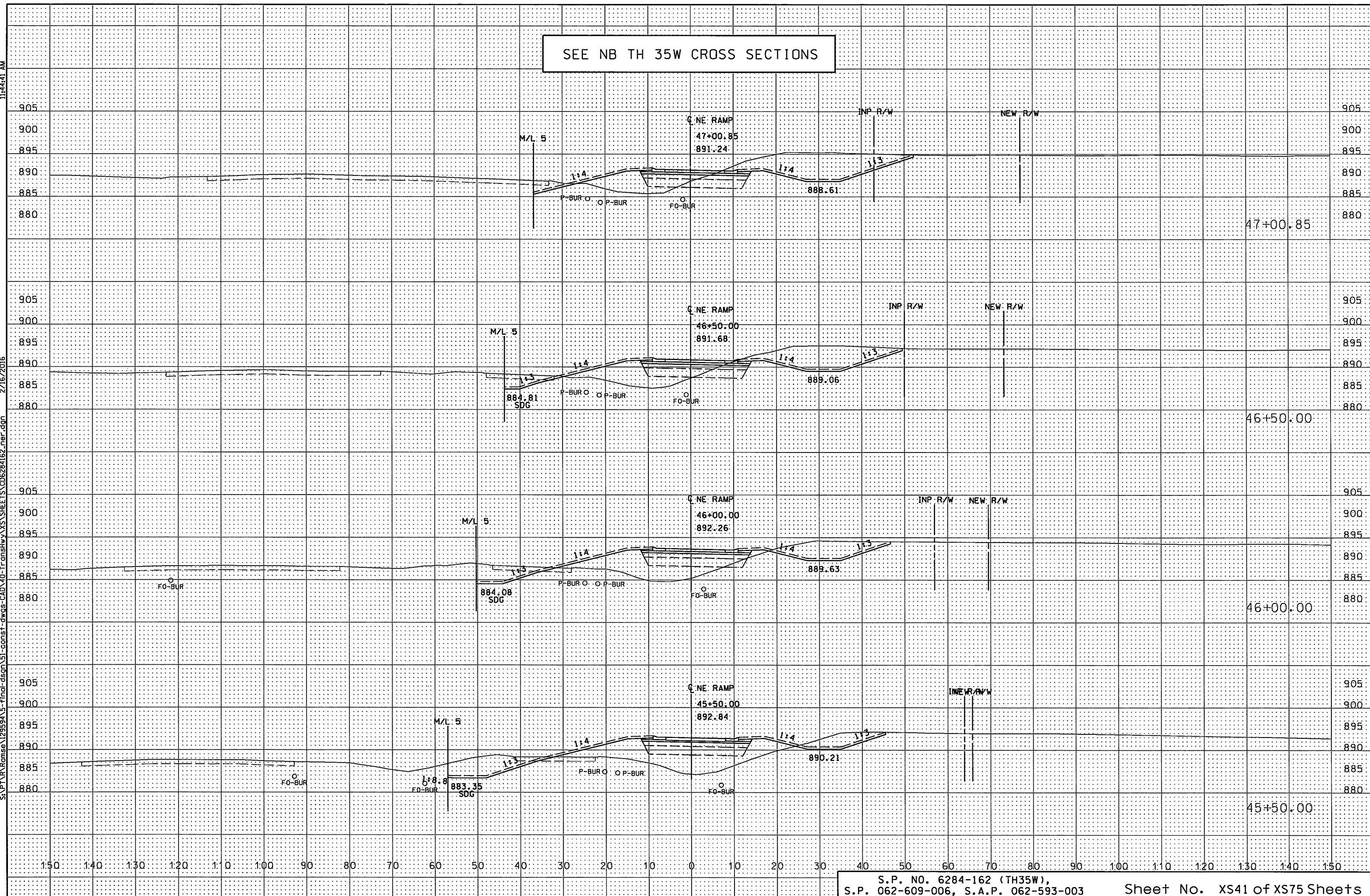


SEE NB TH 35W CROSS SECTIONS

11/4/41 AM

2/16/2016

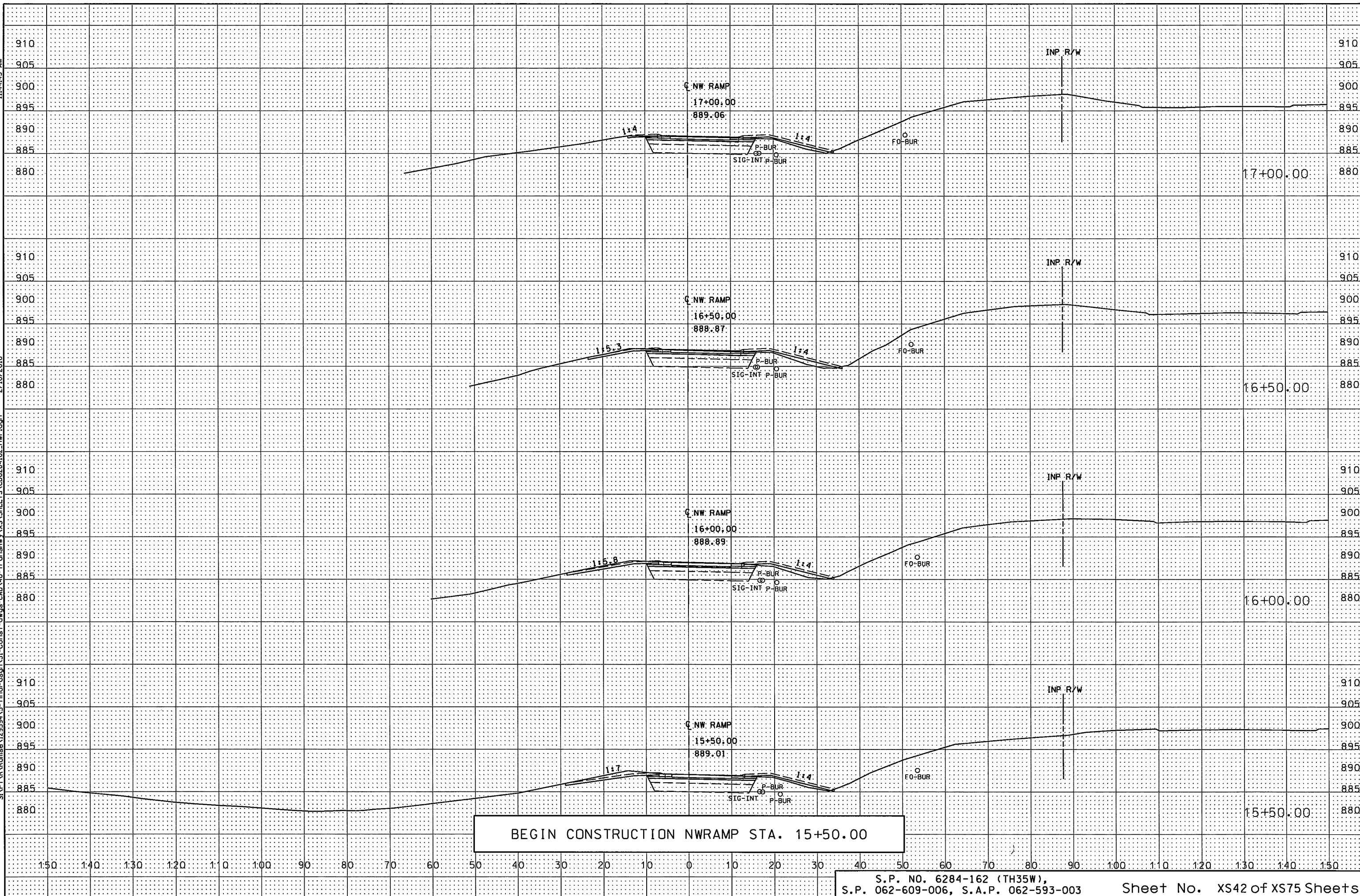
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11:44:43 AM

2/16/2016

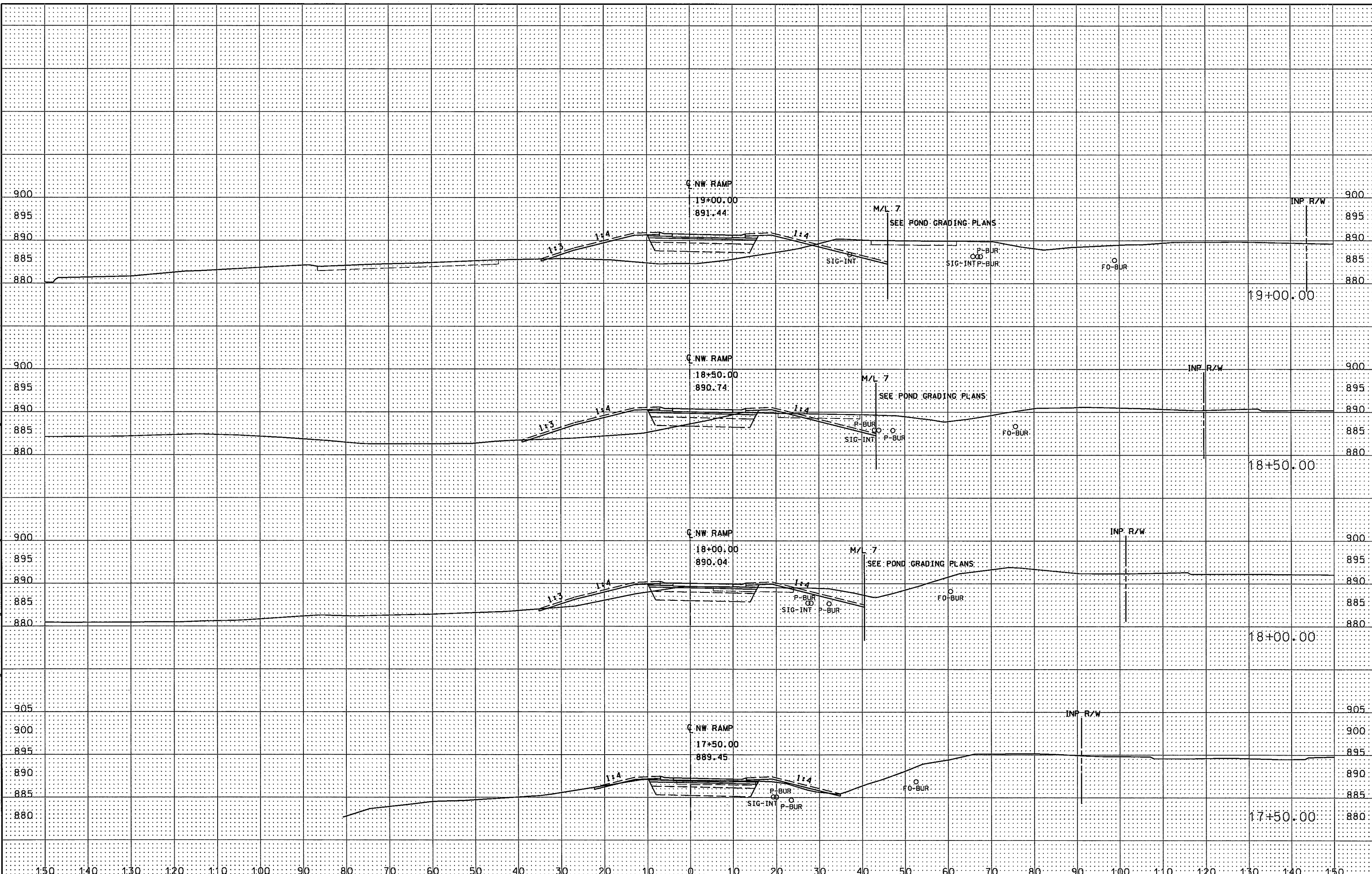
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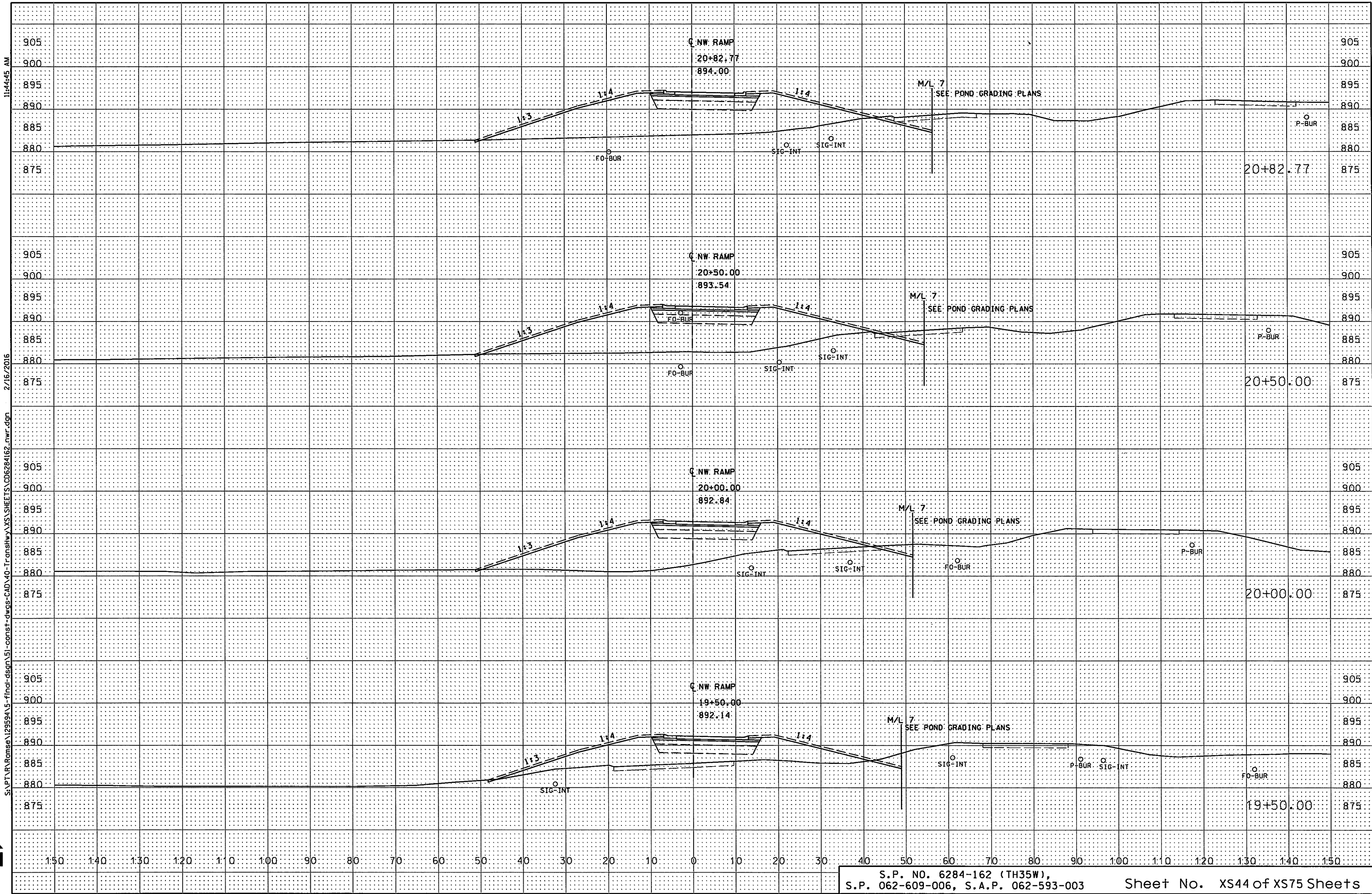


11/4/14 AM

2/16/2016

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11/4/15 AM

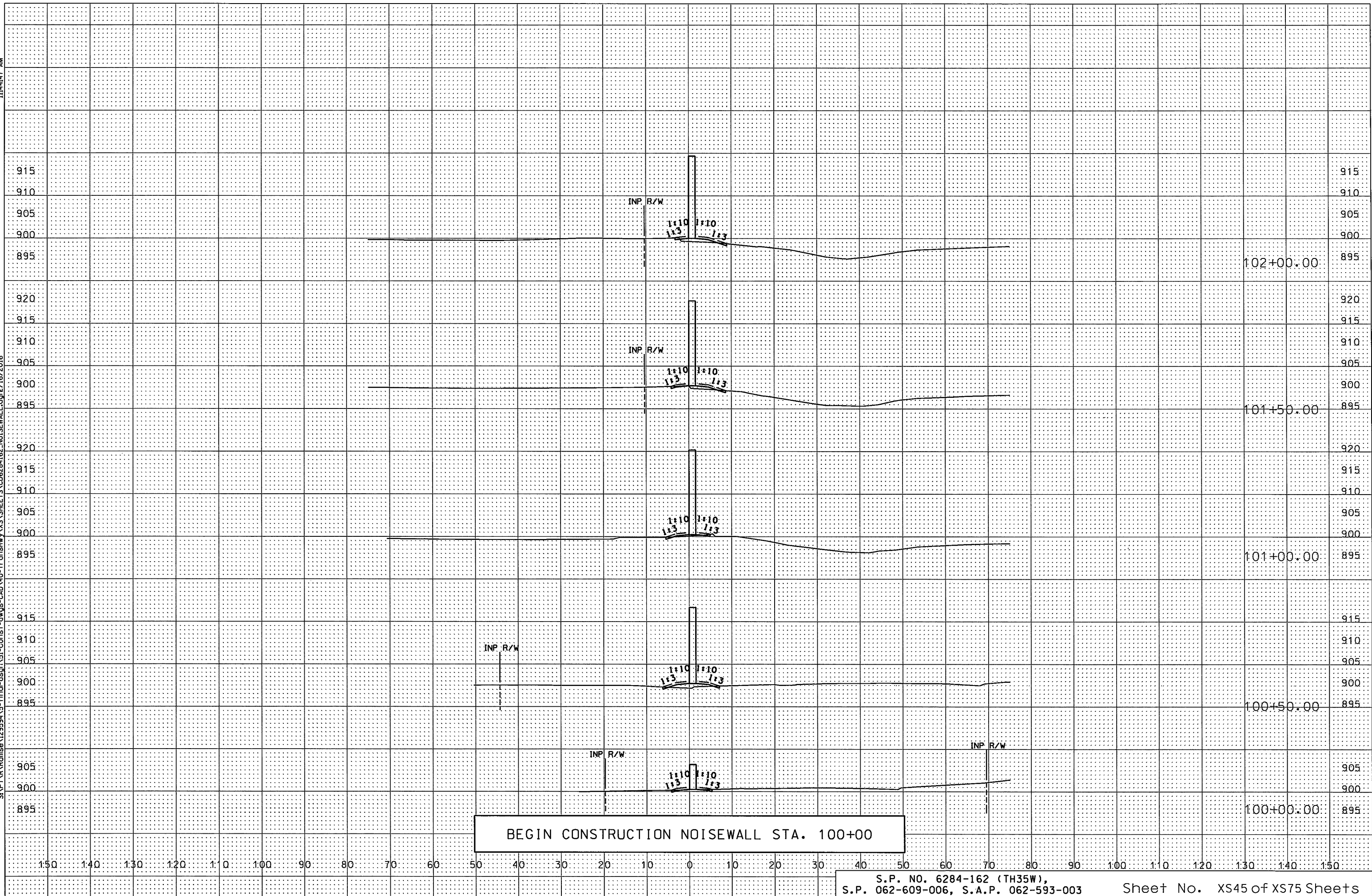
2/16/2016

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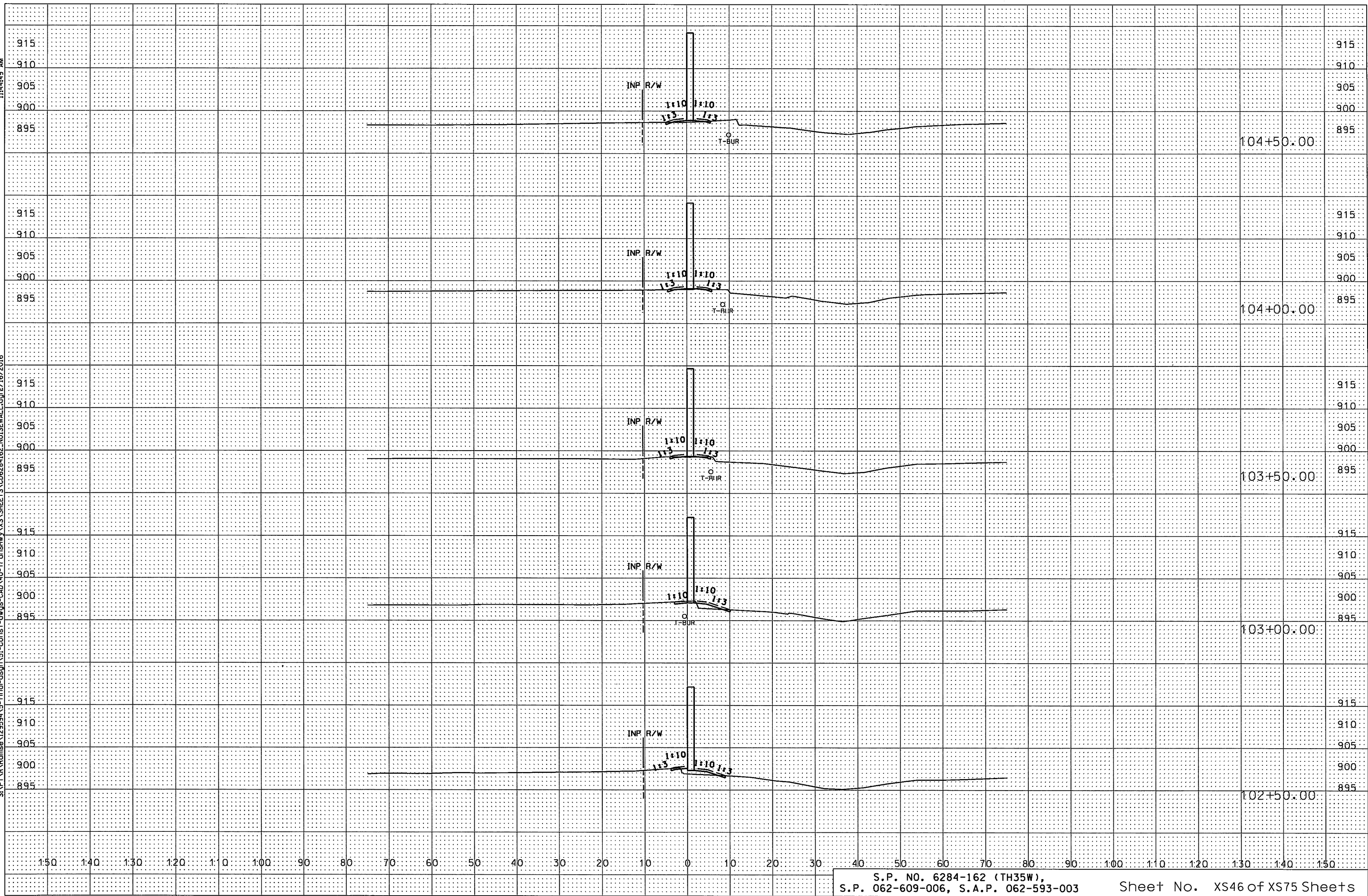
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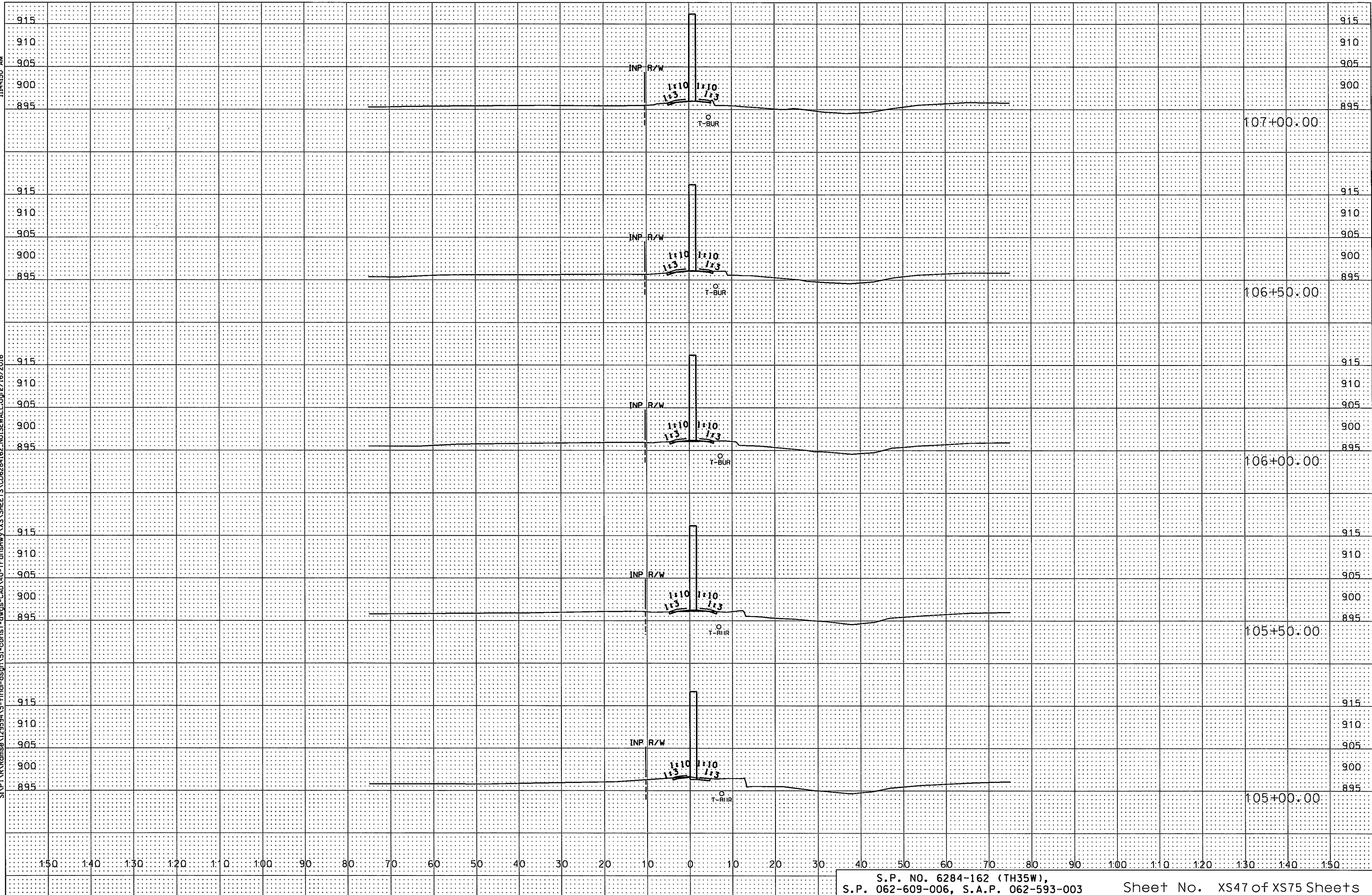
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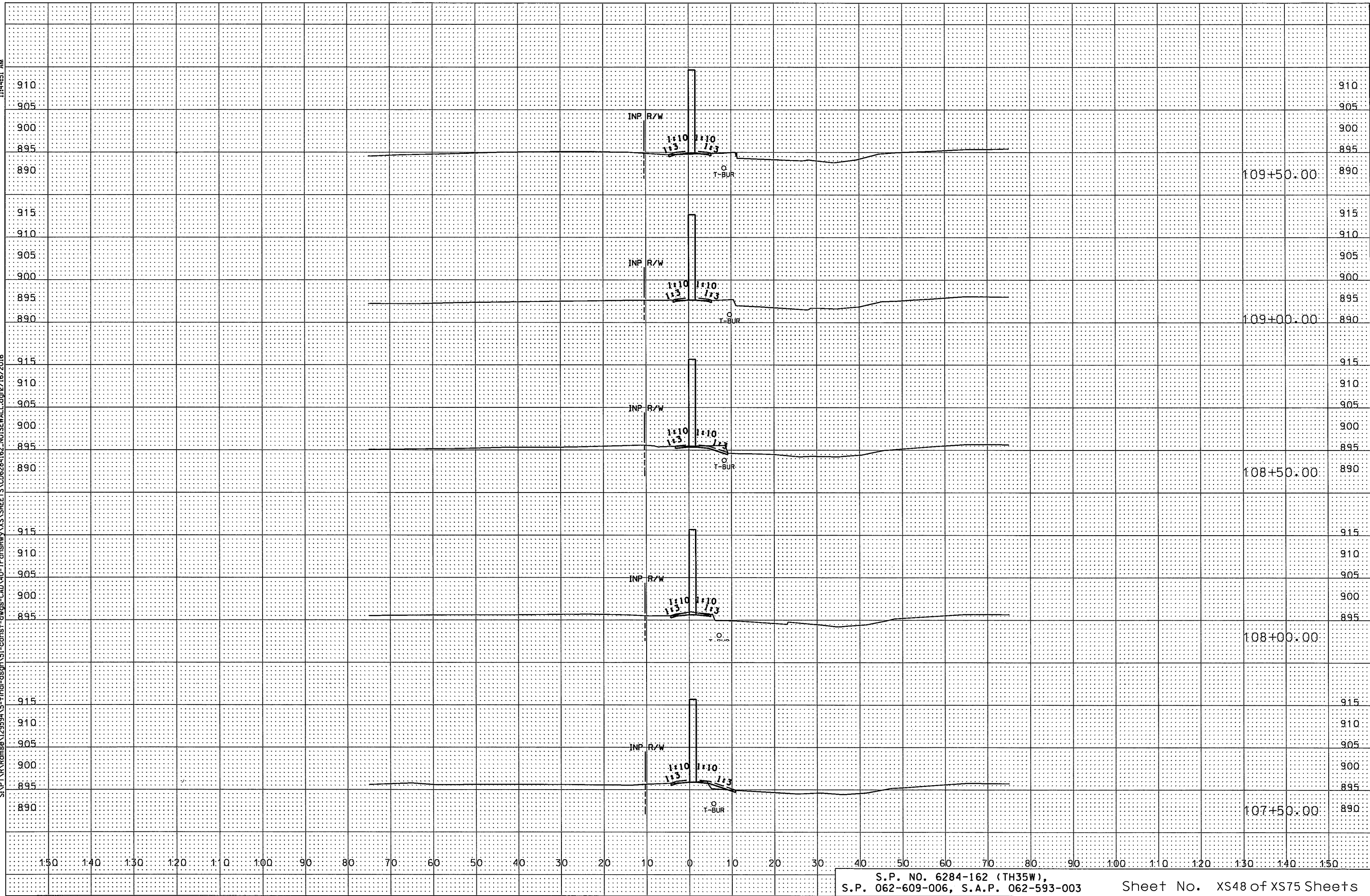
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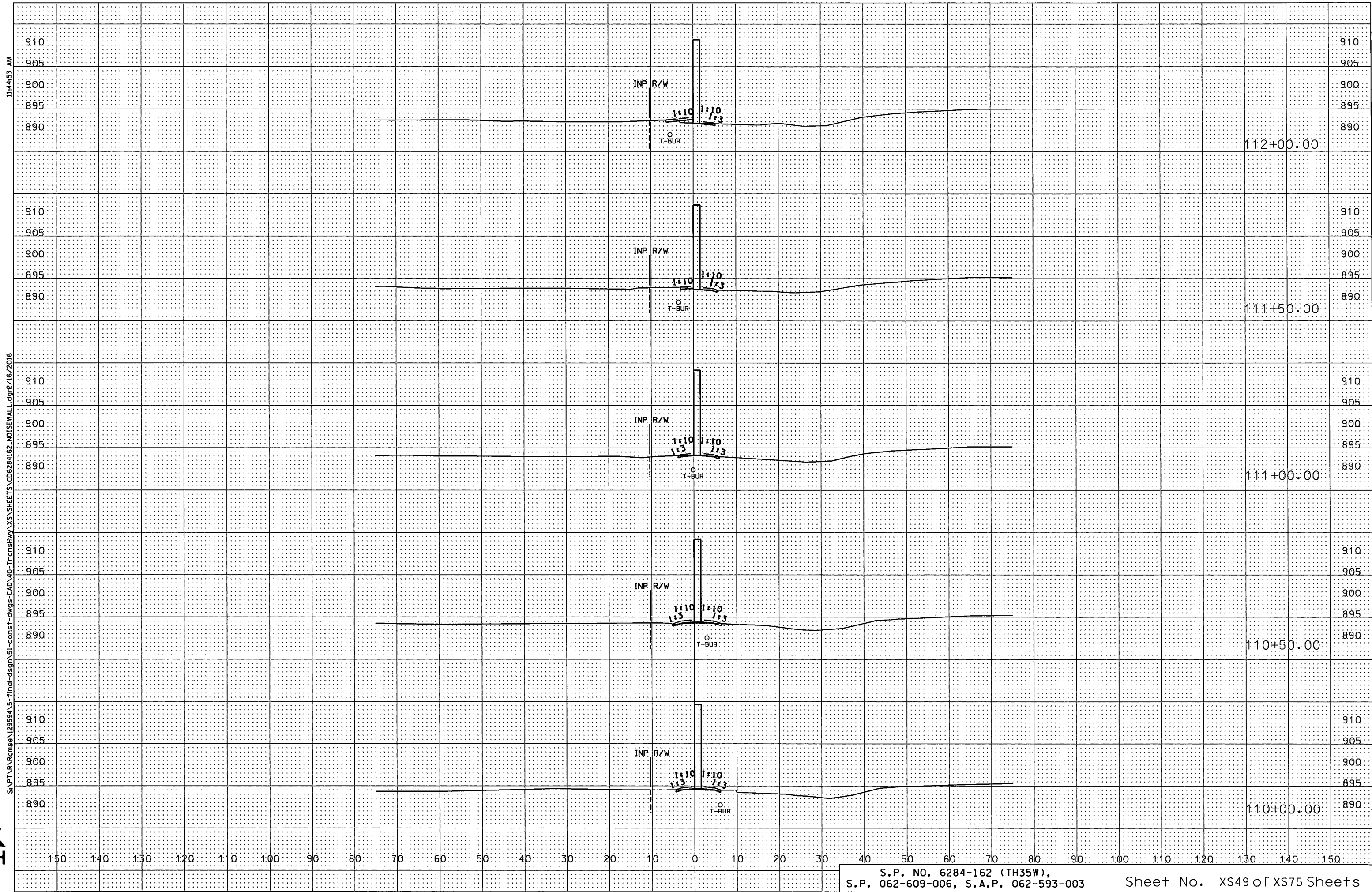
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11:44:51 AM

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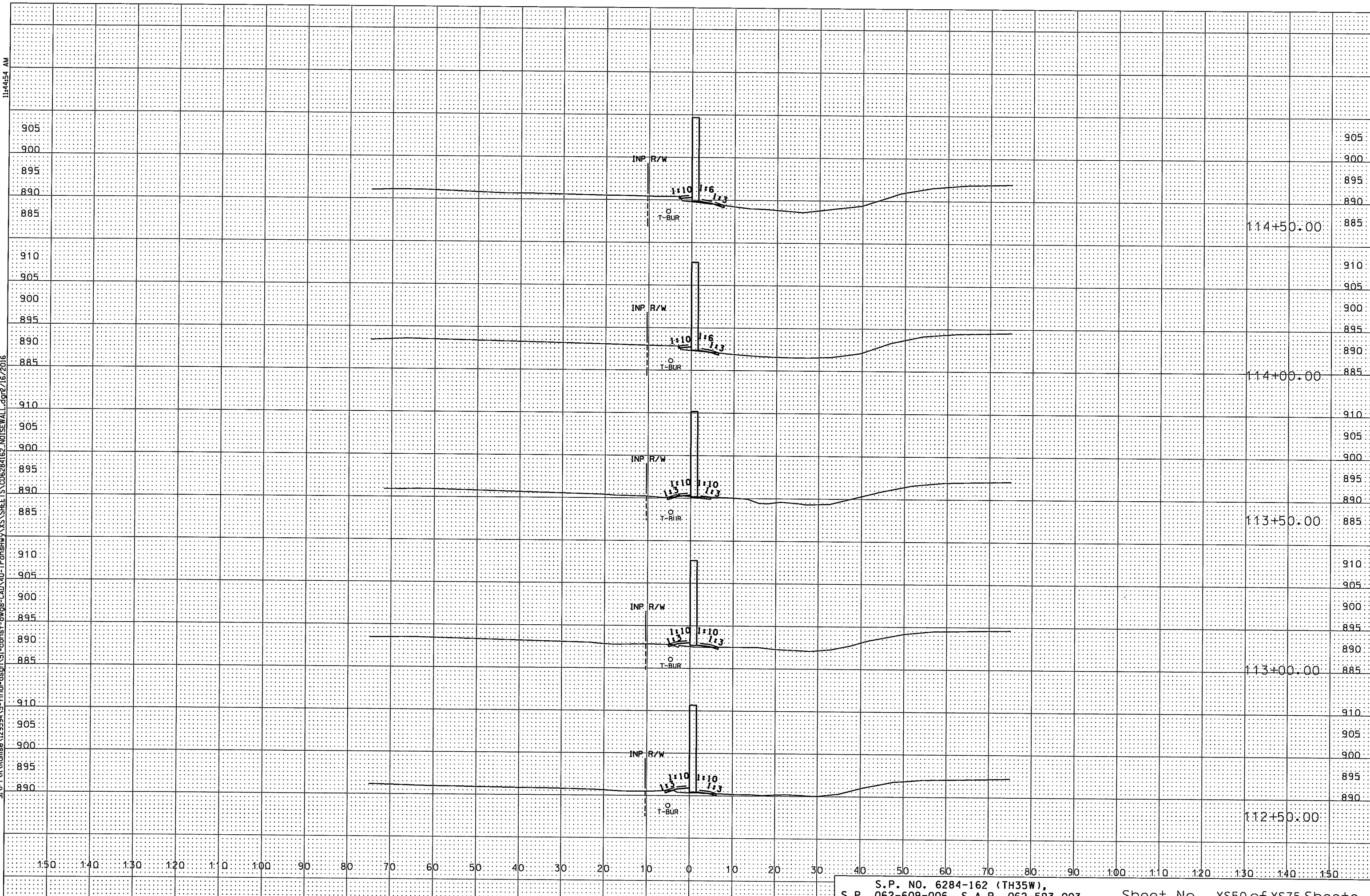
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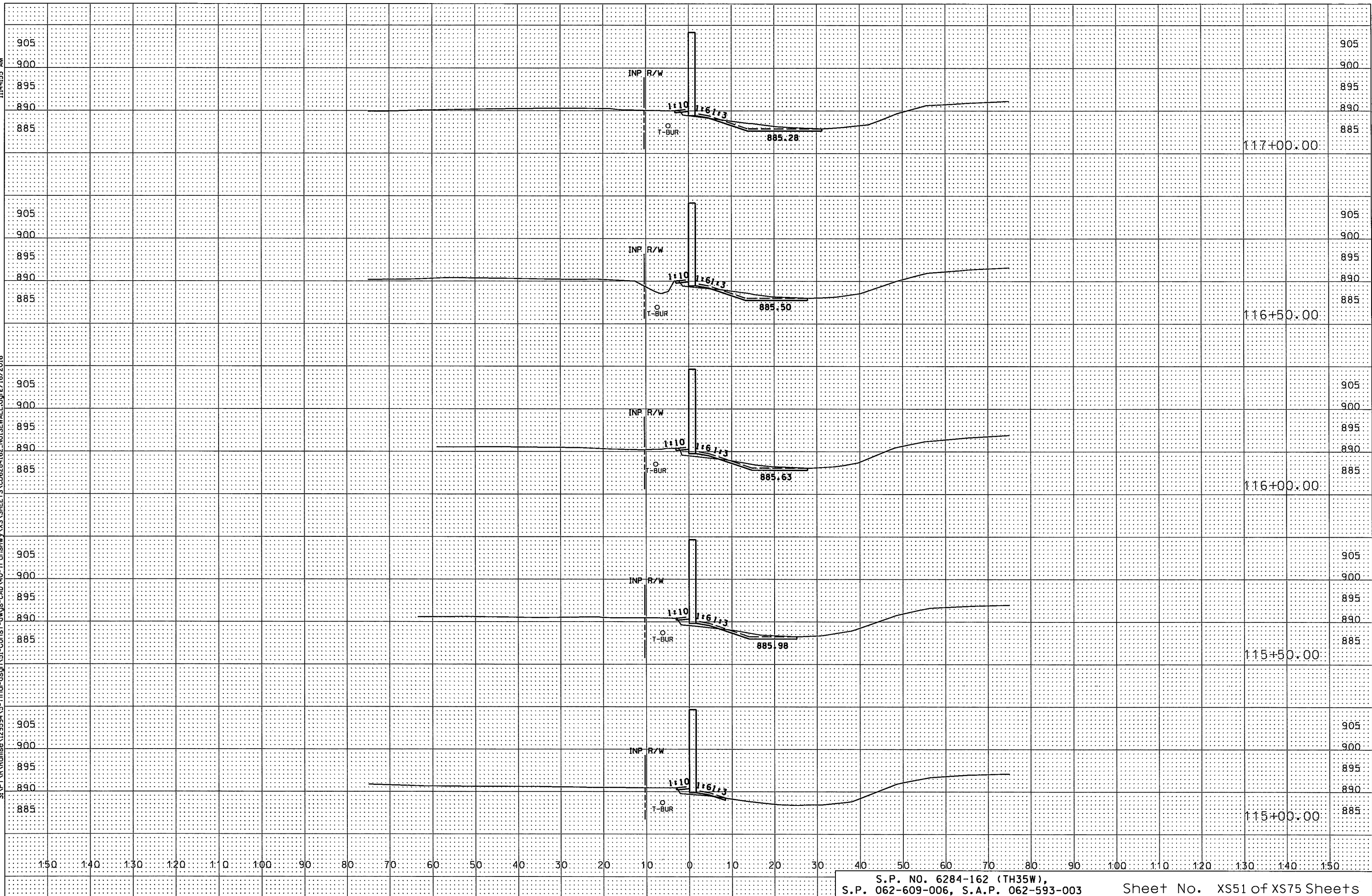
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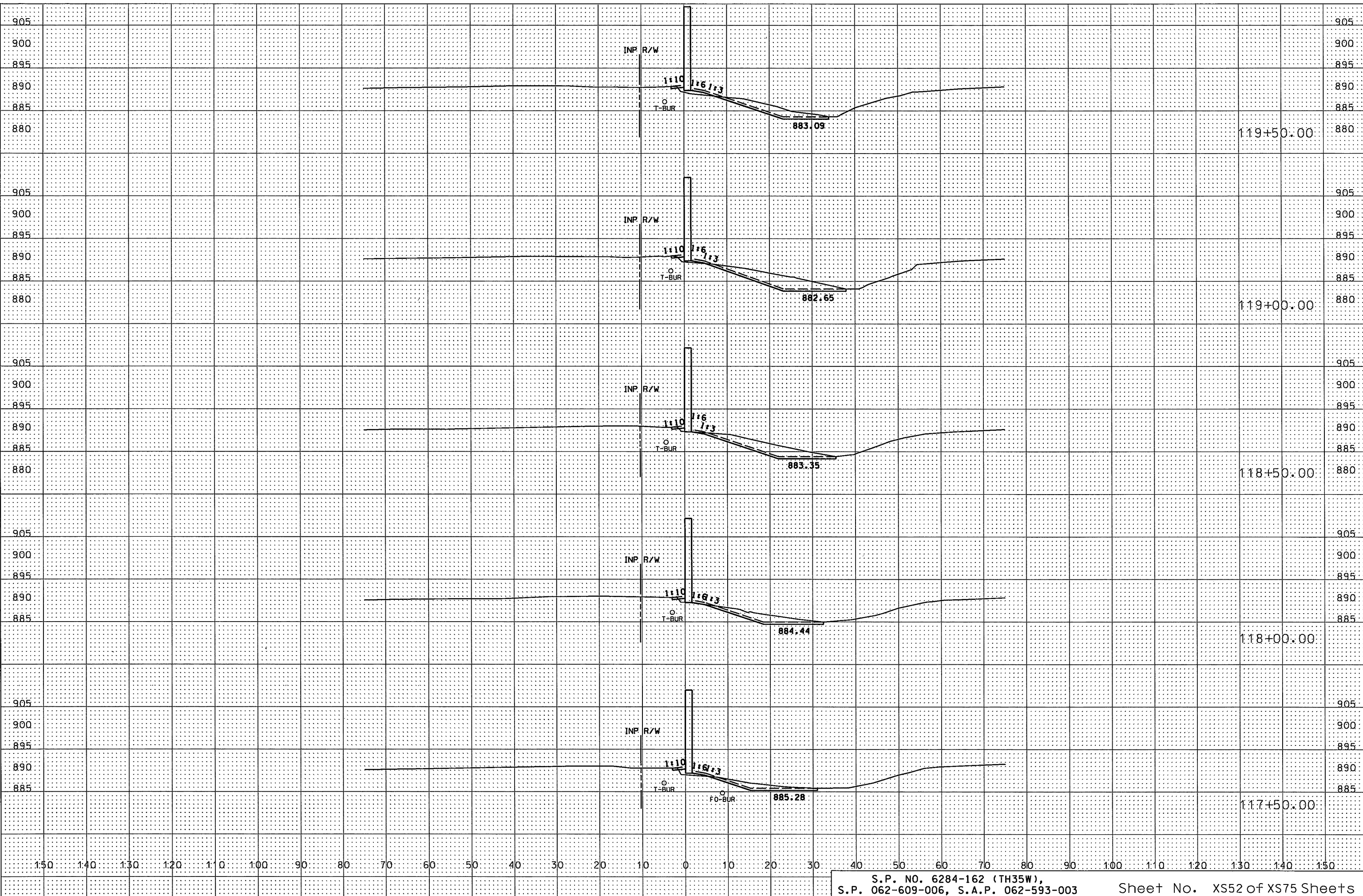
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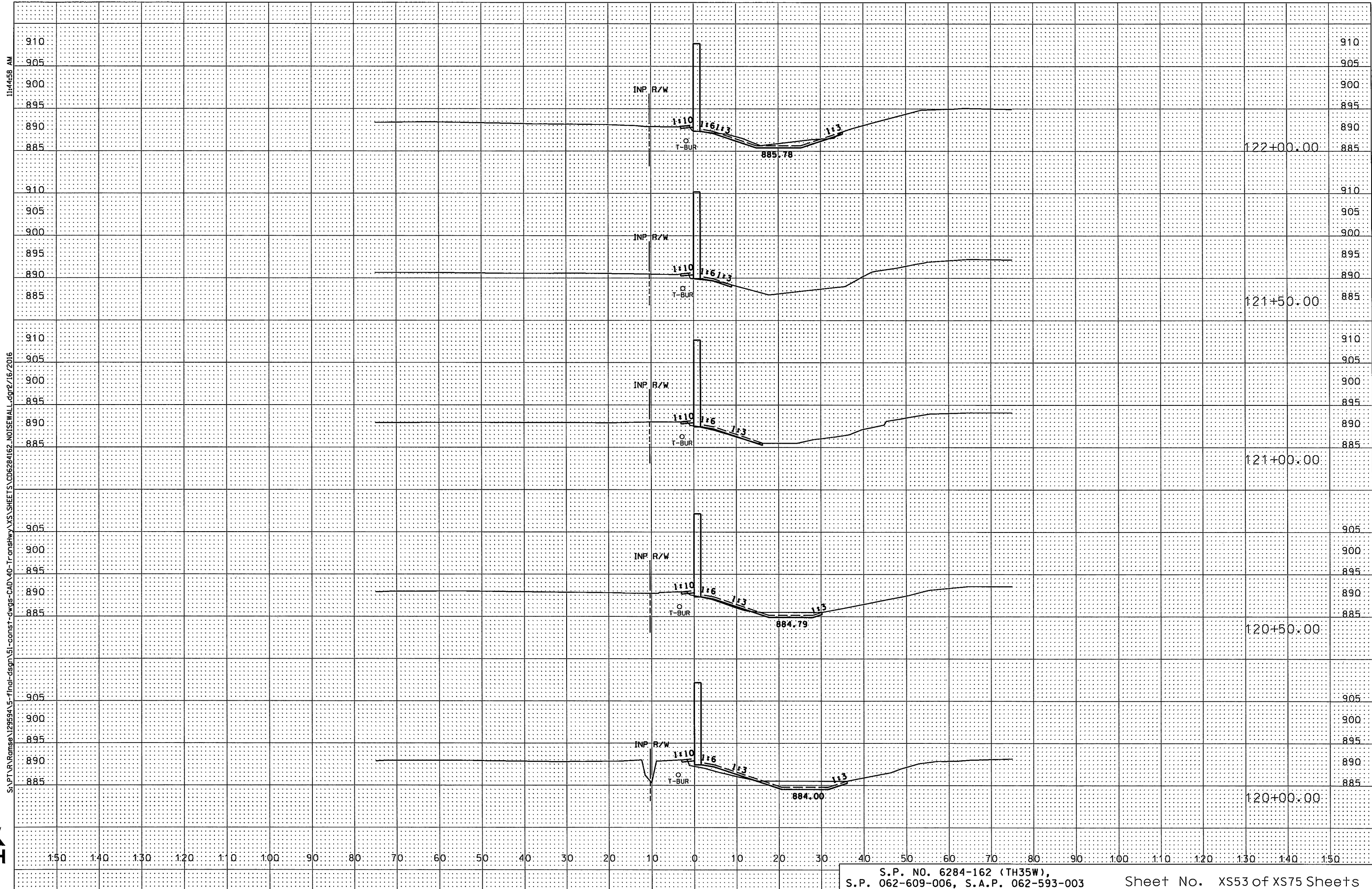
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11:44:57 AM

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11:44:58 AM

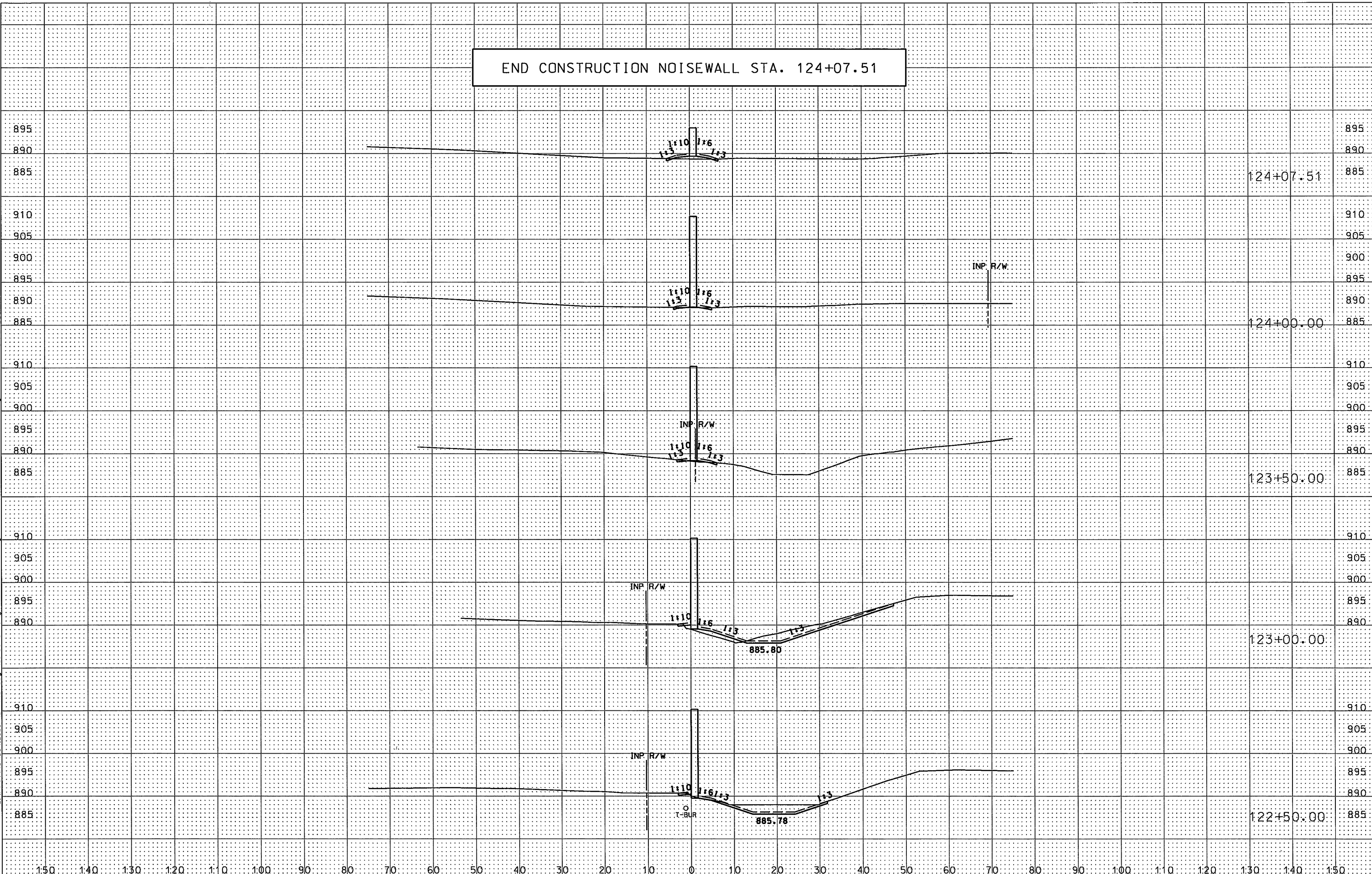
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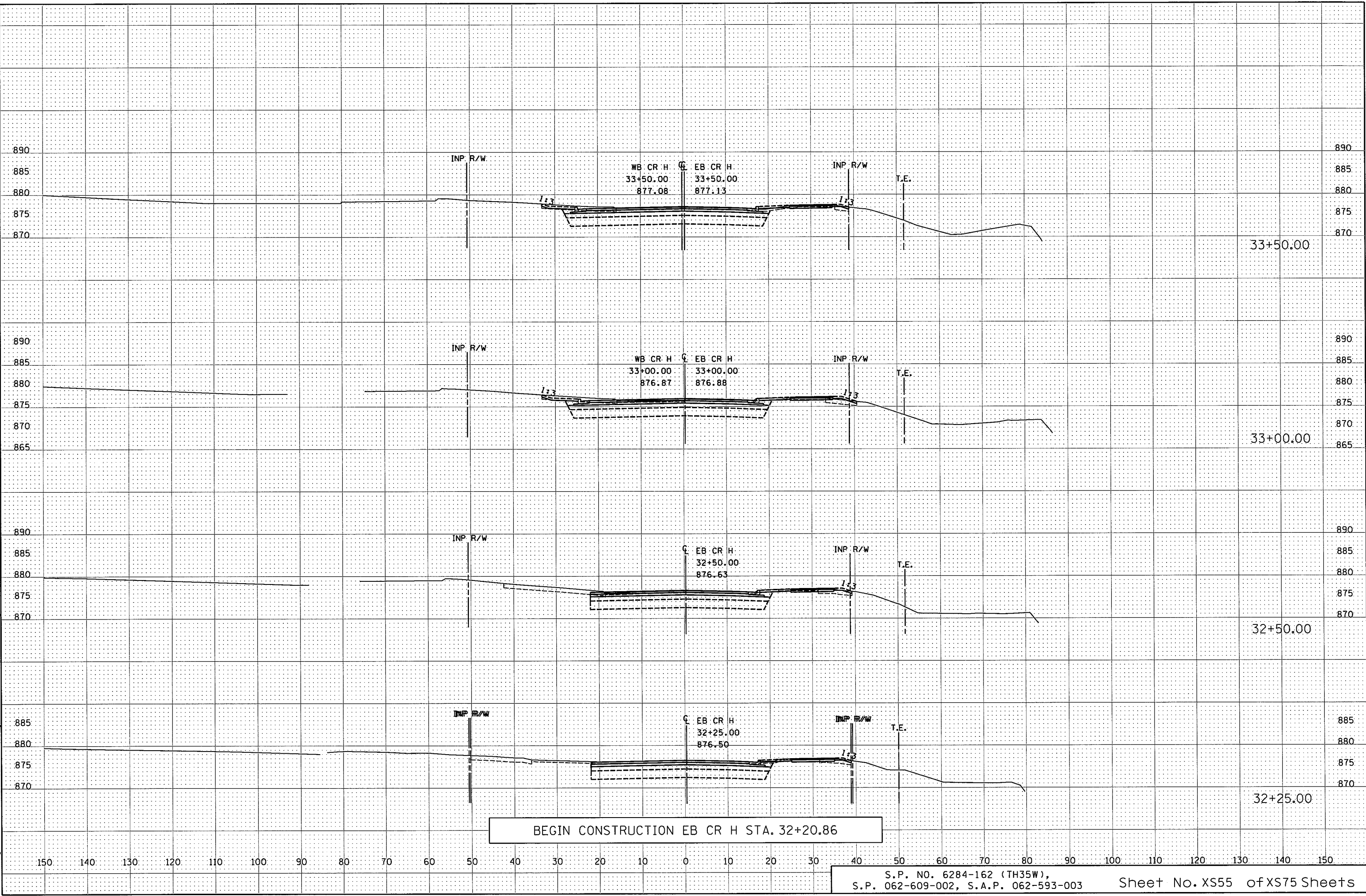


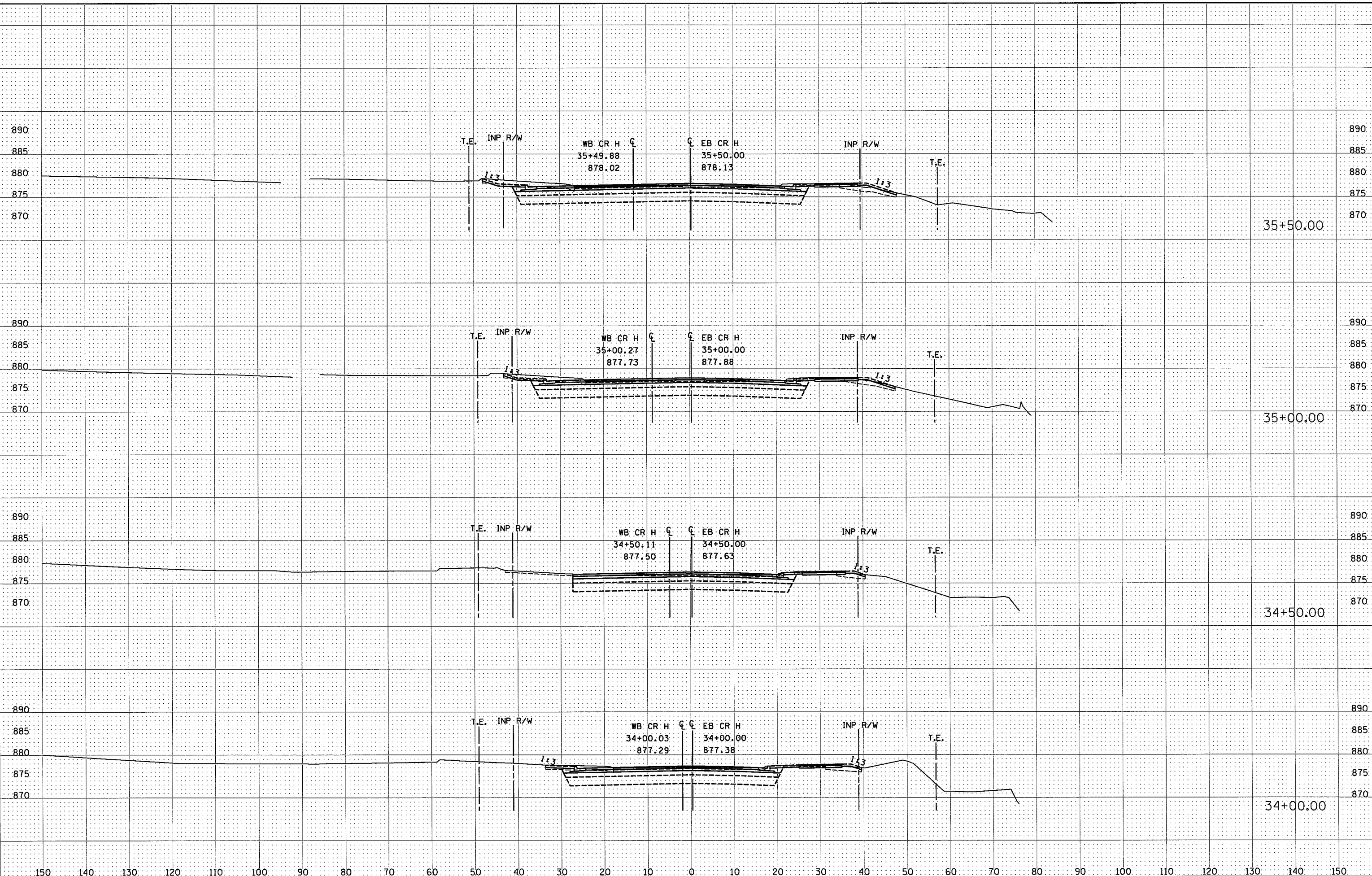
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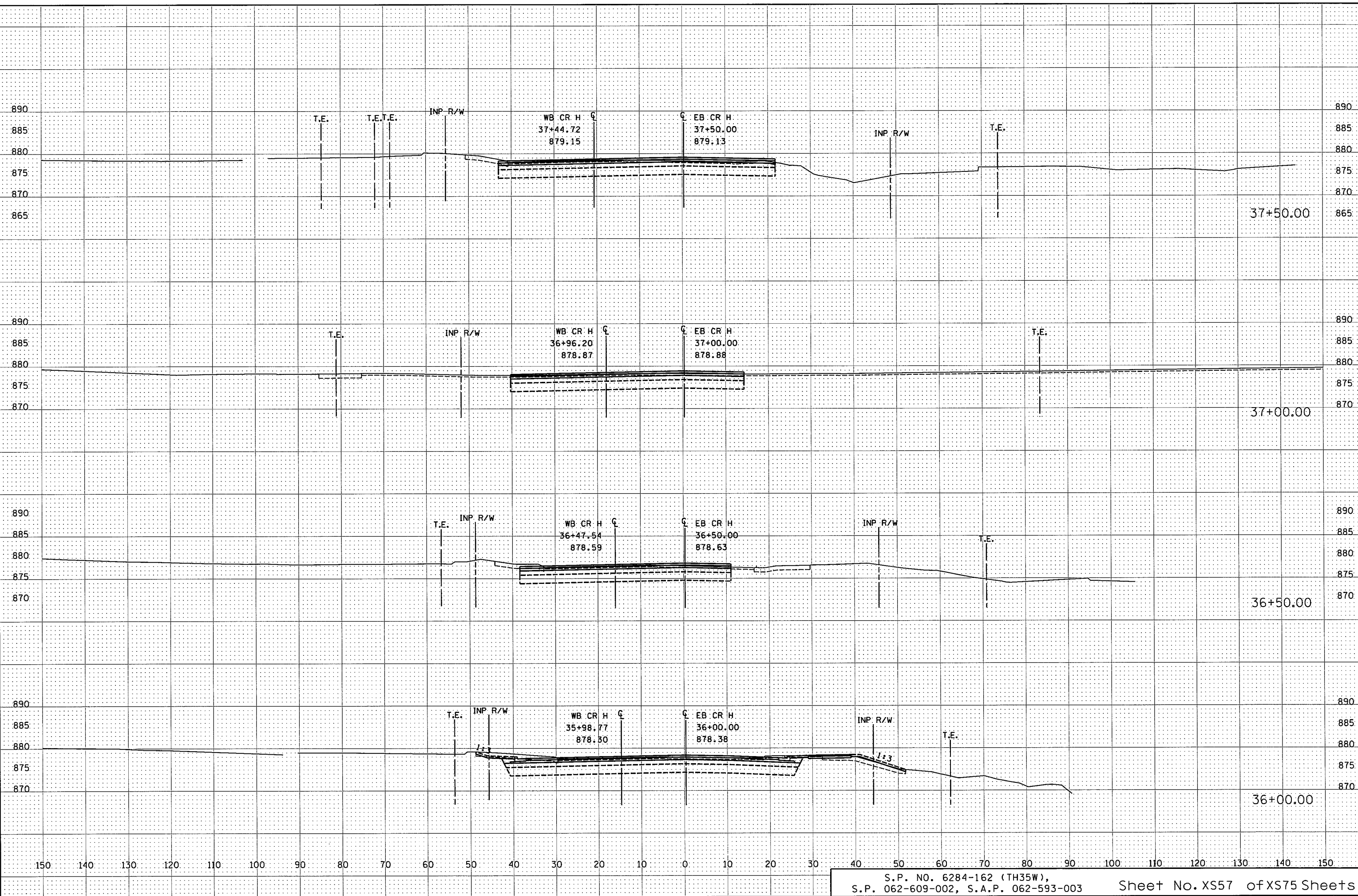
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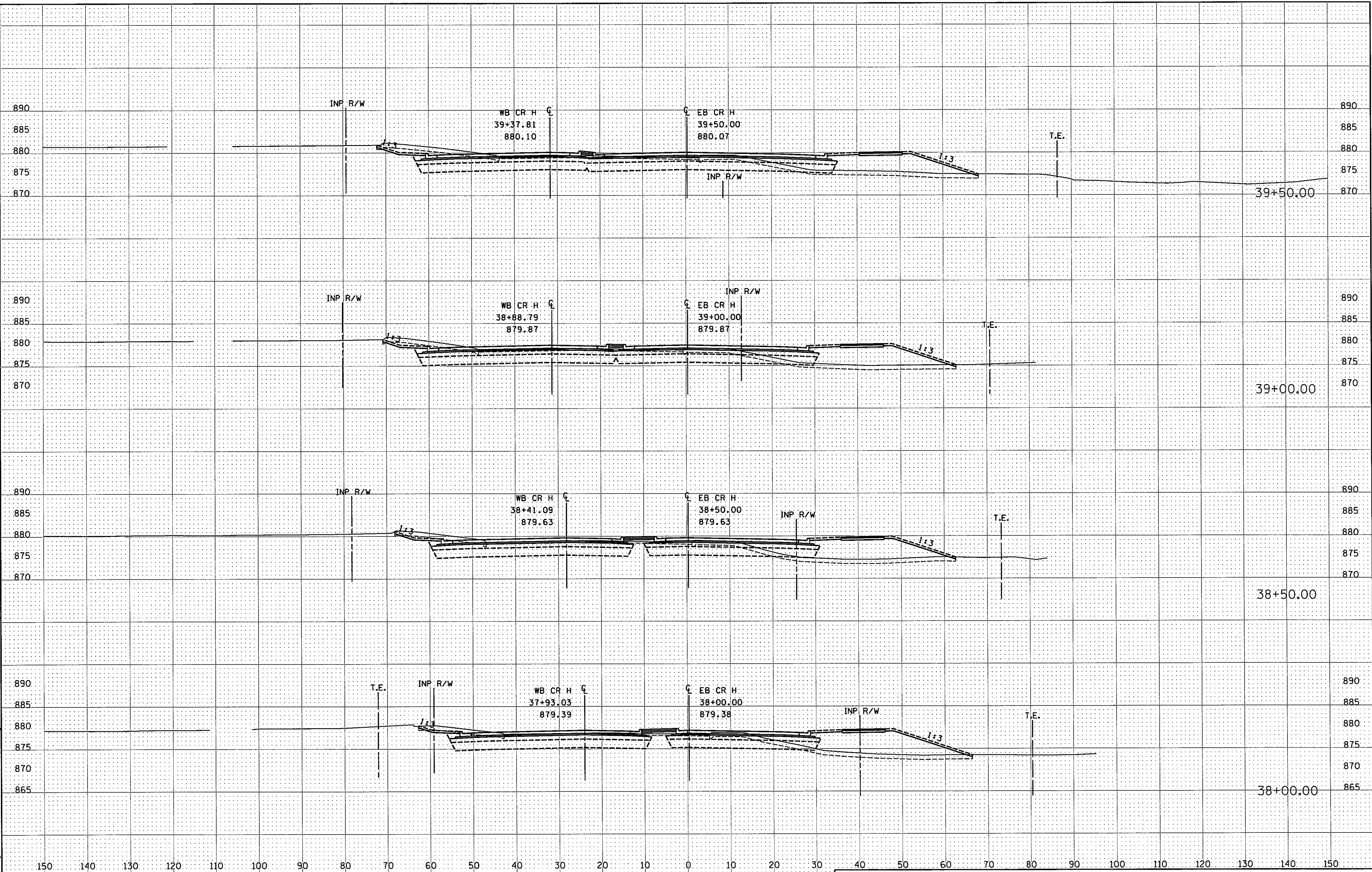


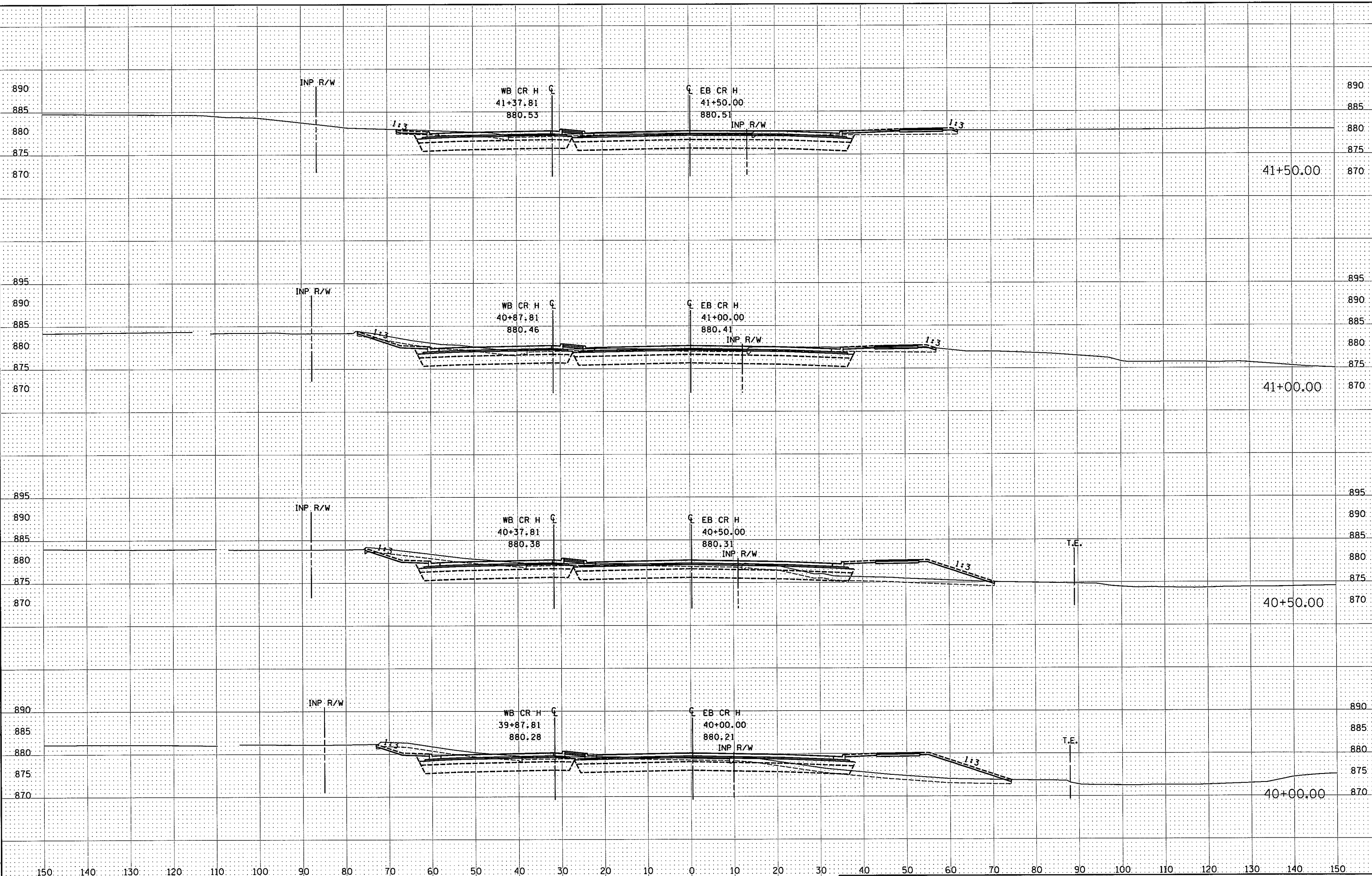
9/5/21 AM

12/4/2015

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Kimley»Horn



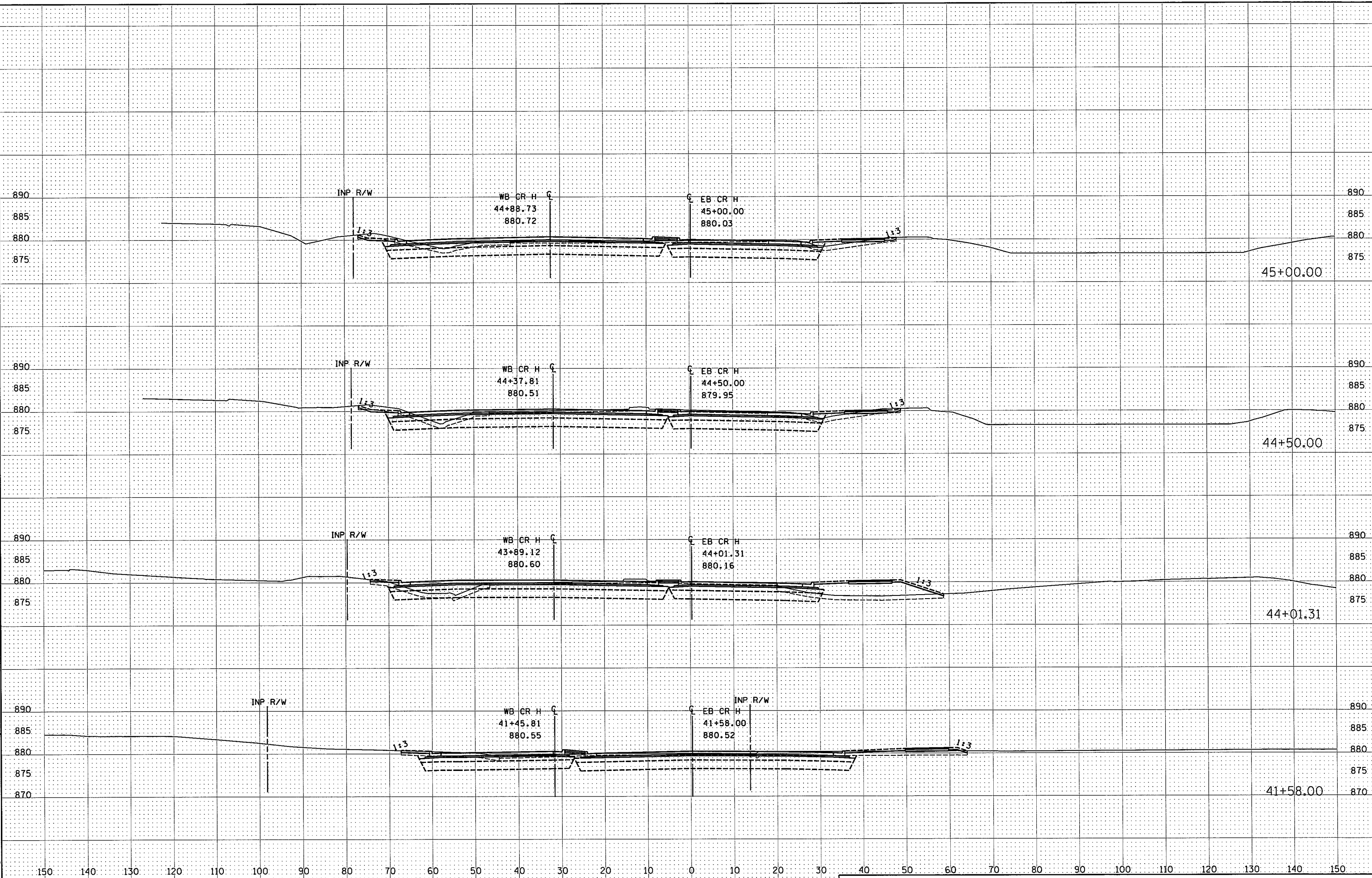


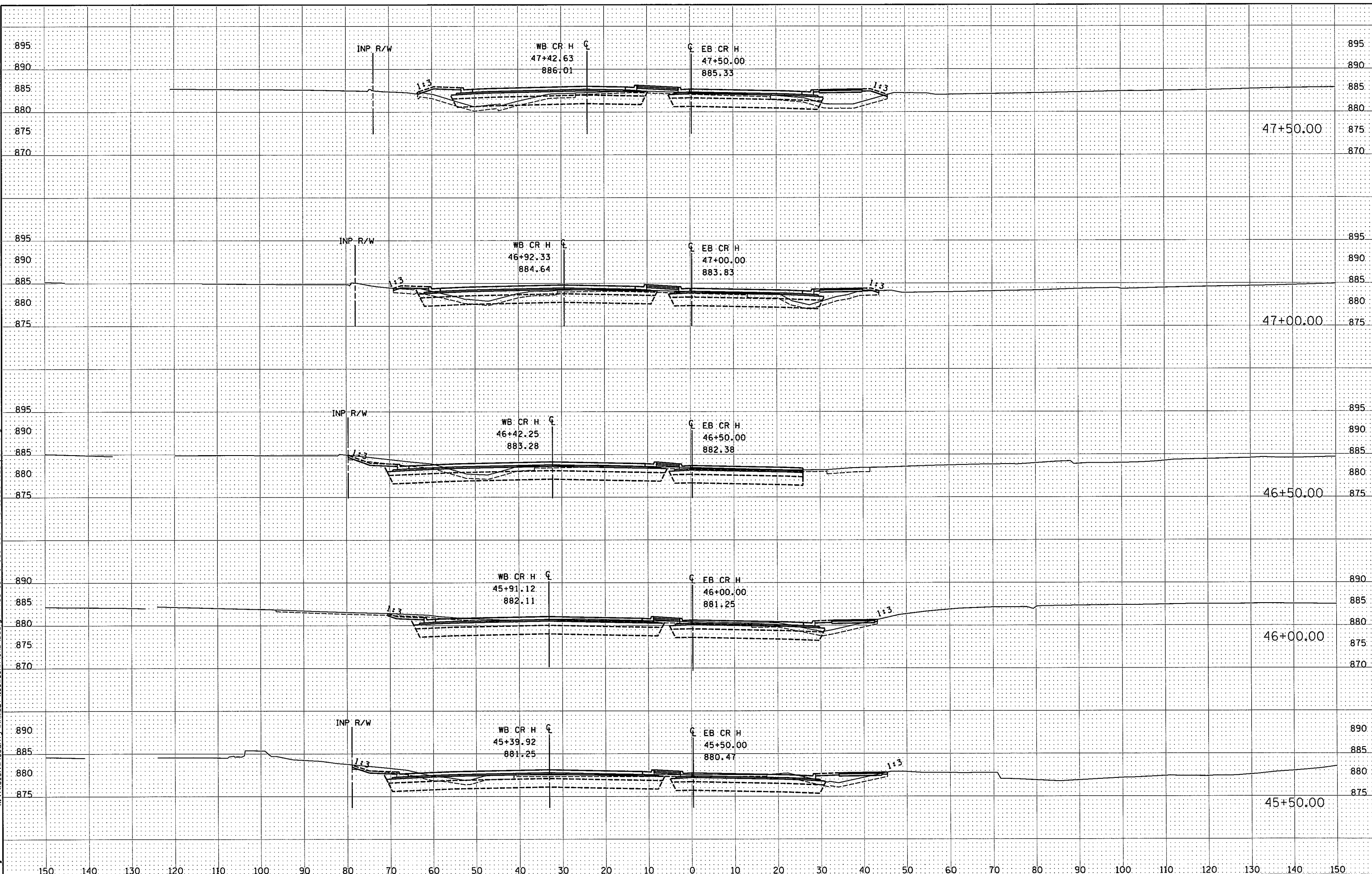
11/5/14 AM

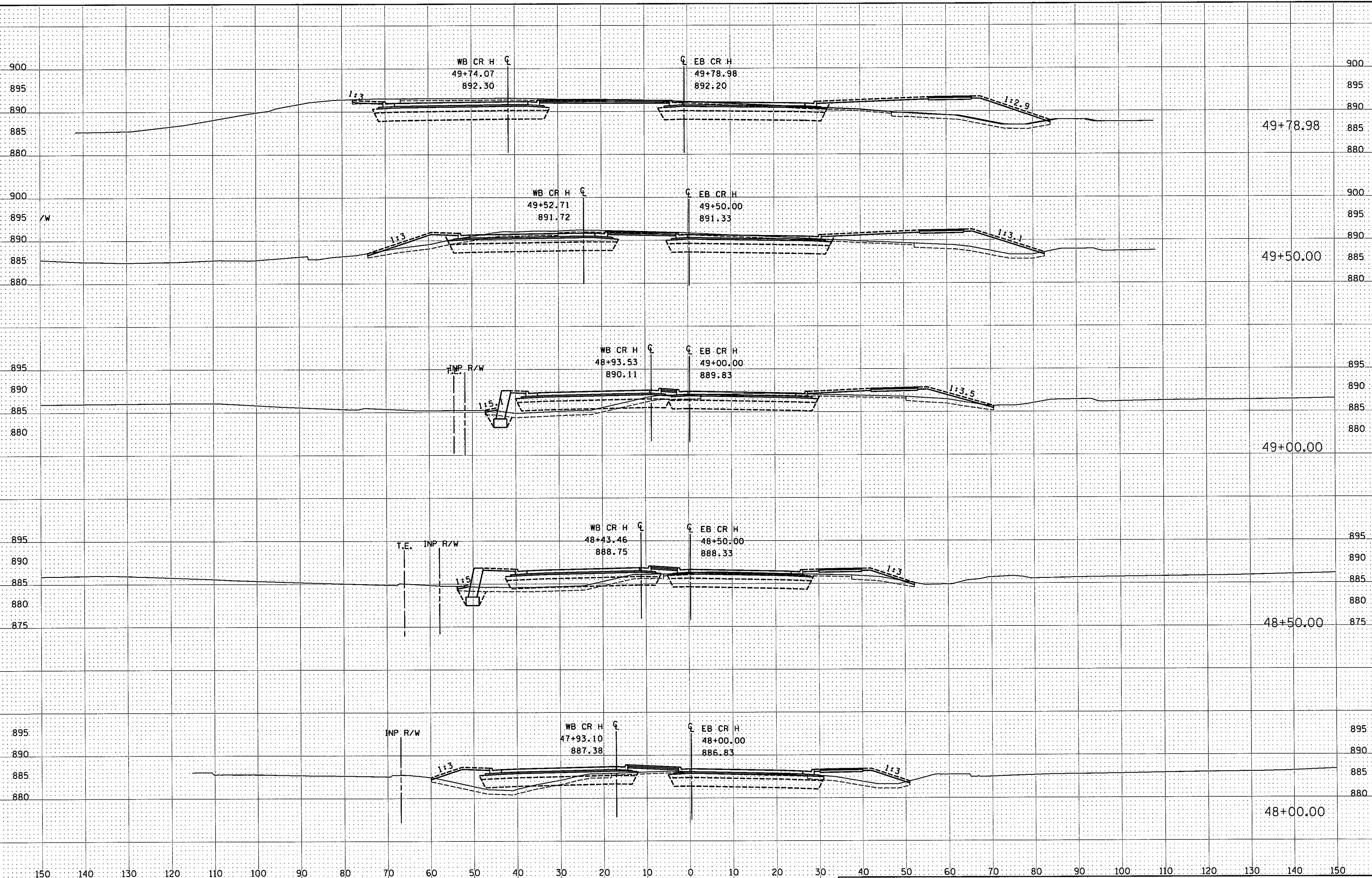
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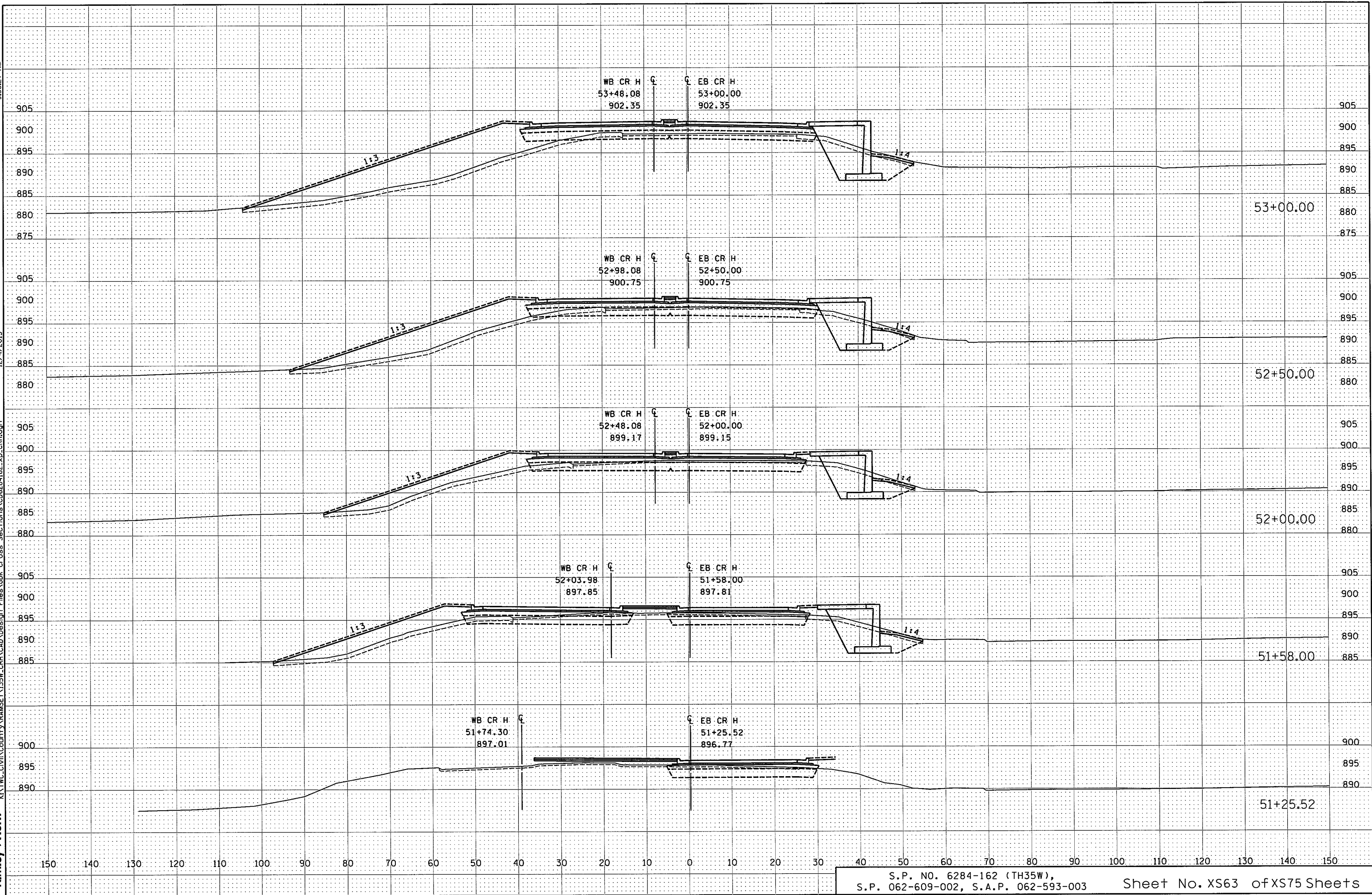
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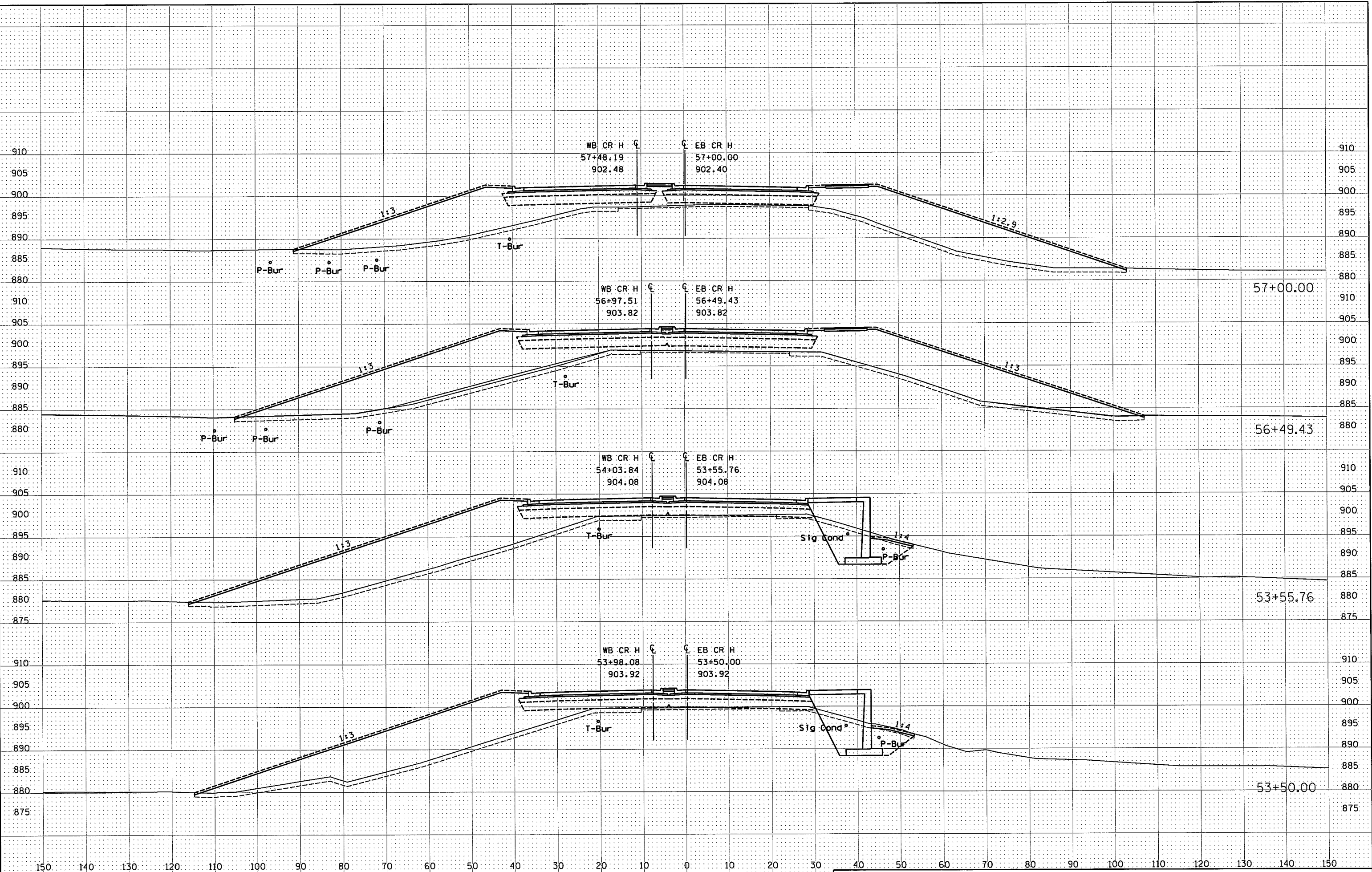
Kimley»Horn









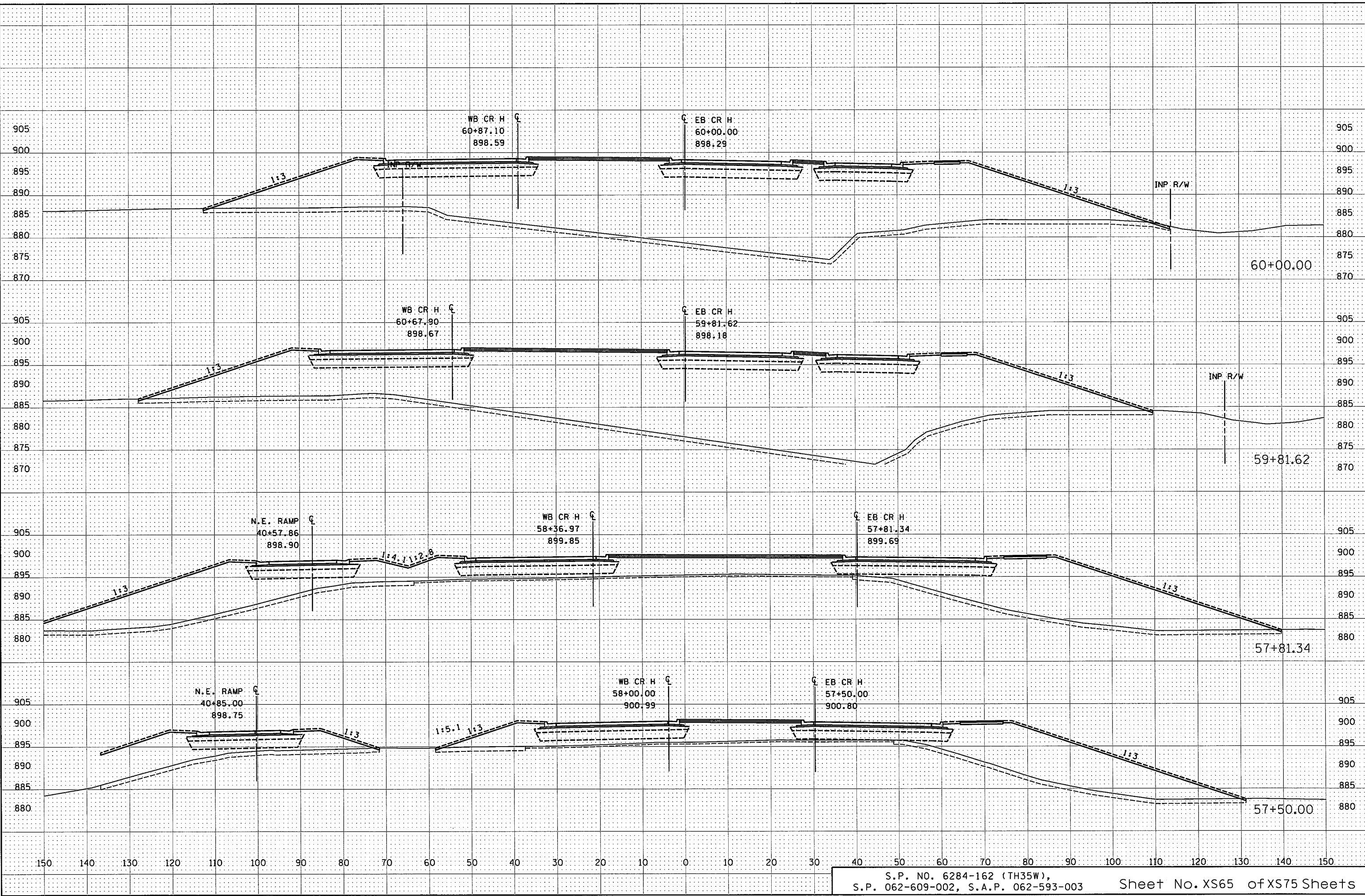


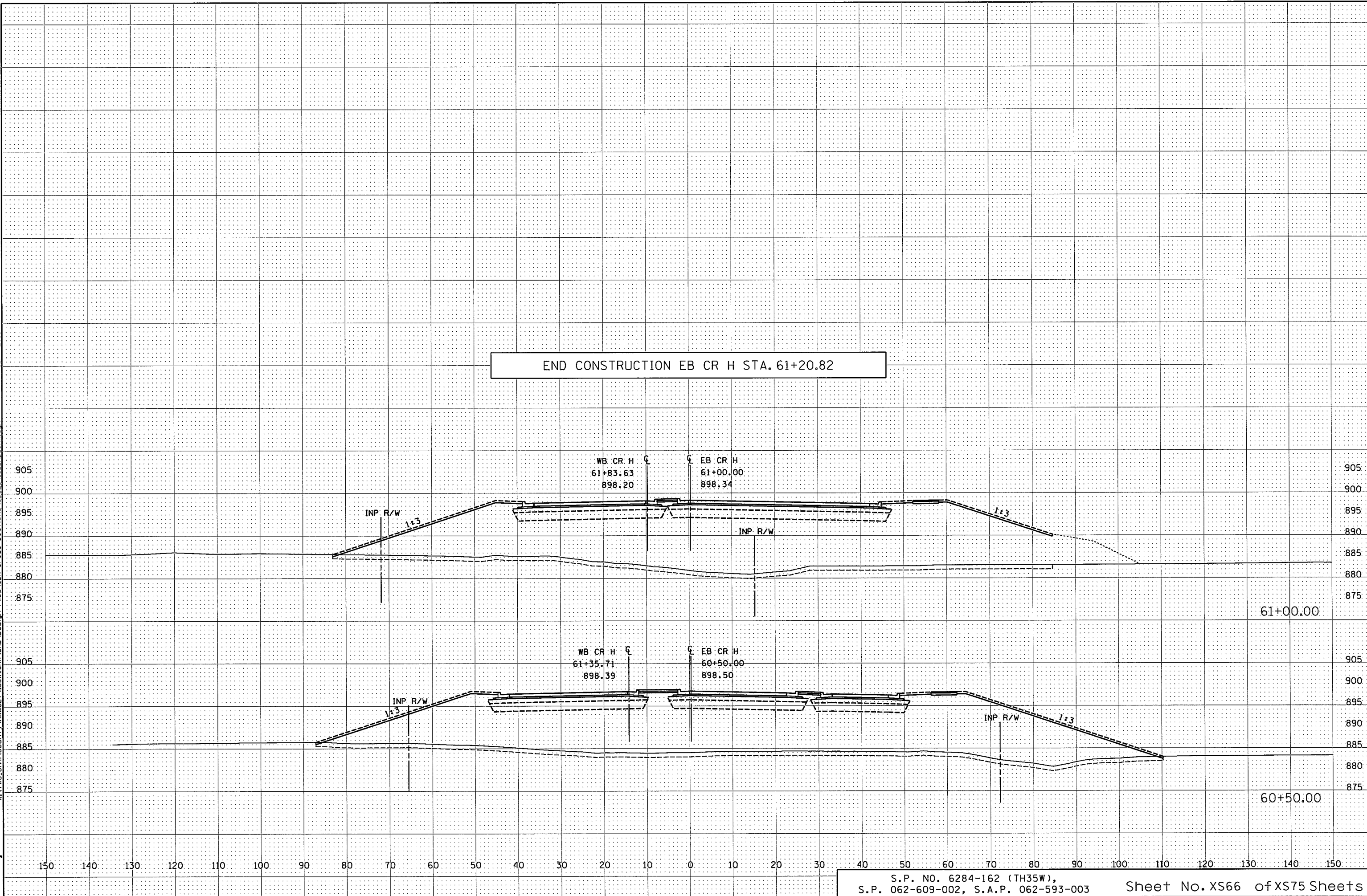
9:56:35 AM

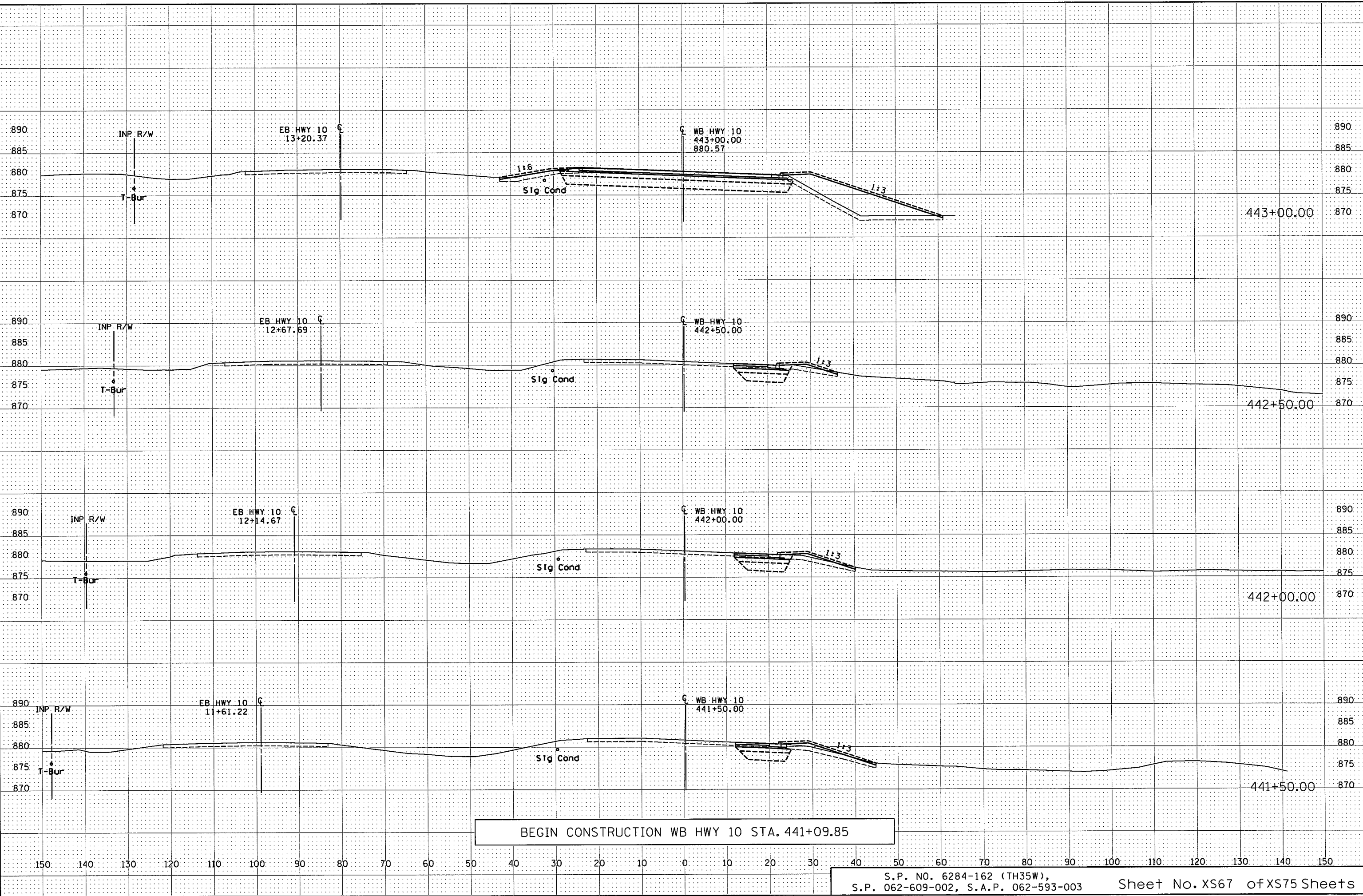
12/4/2015

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Kimley-Horn







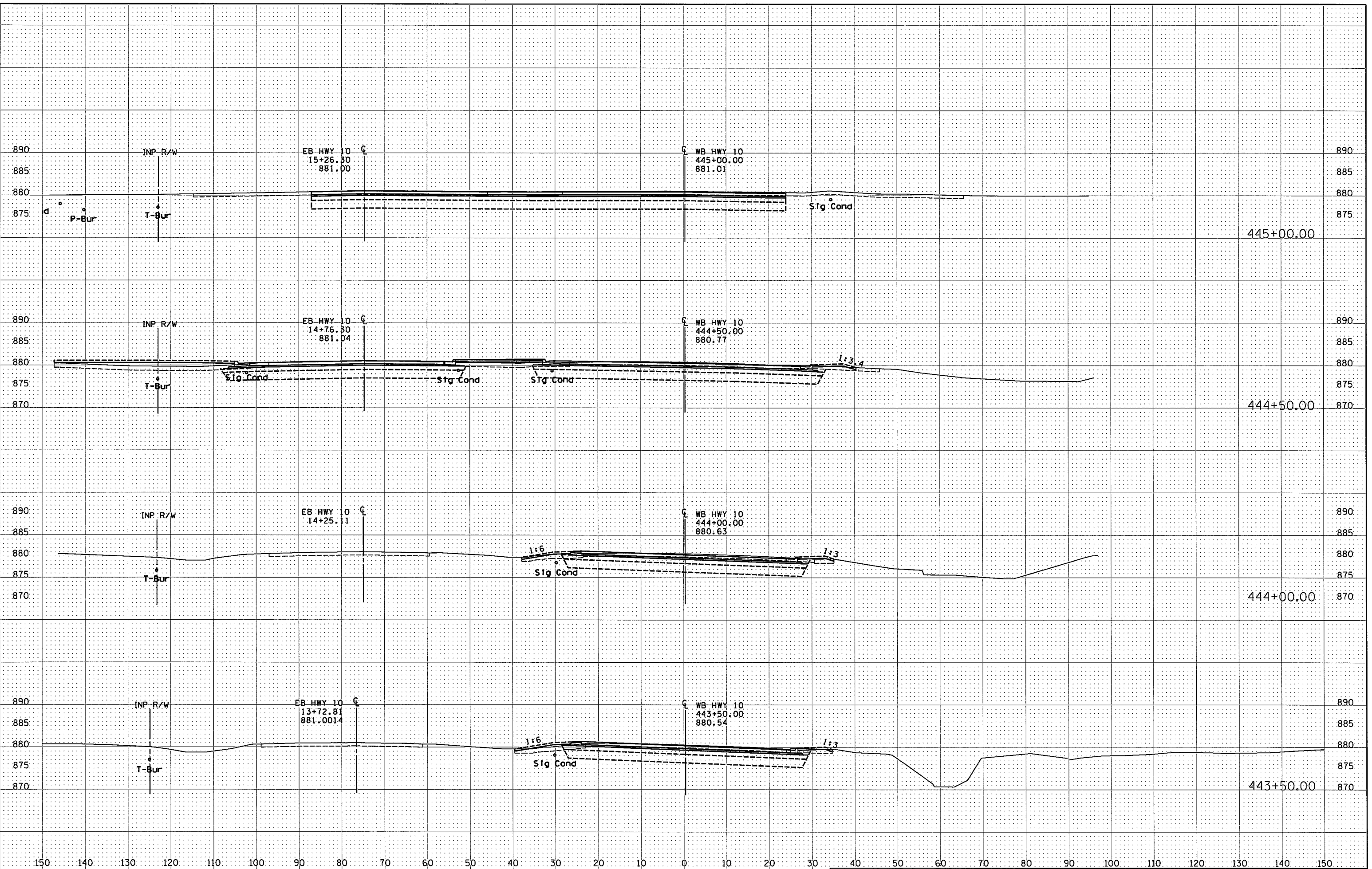
BEGIN CONSTRUCTION WB HWY 10 STA. 441+09.85

9:56:50 AM

12/4/2015

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Kimley»Horn

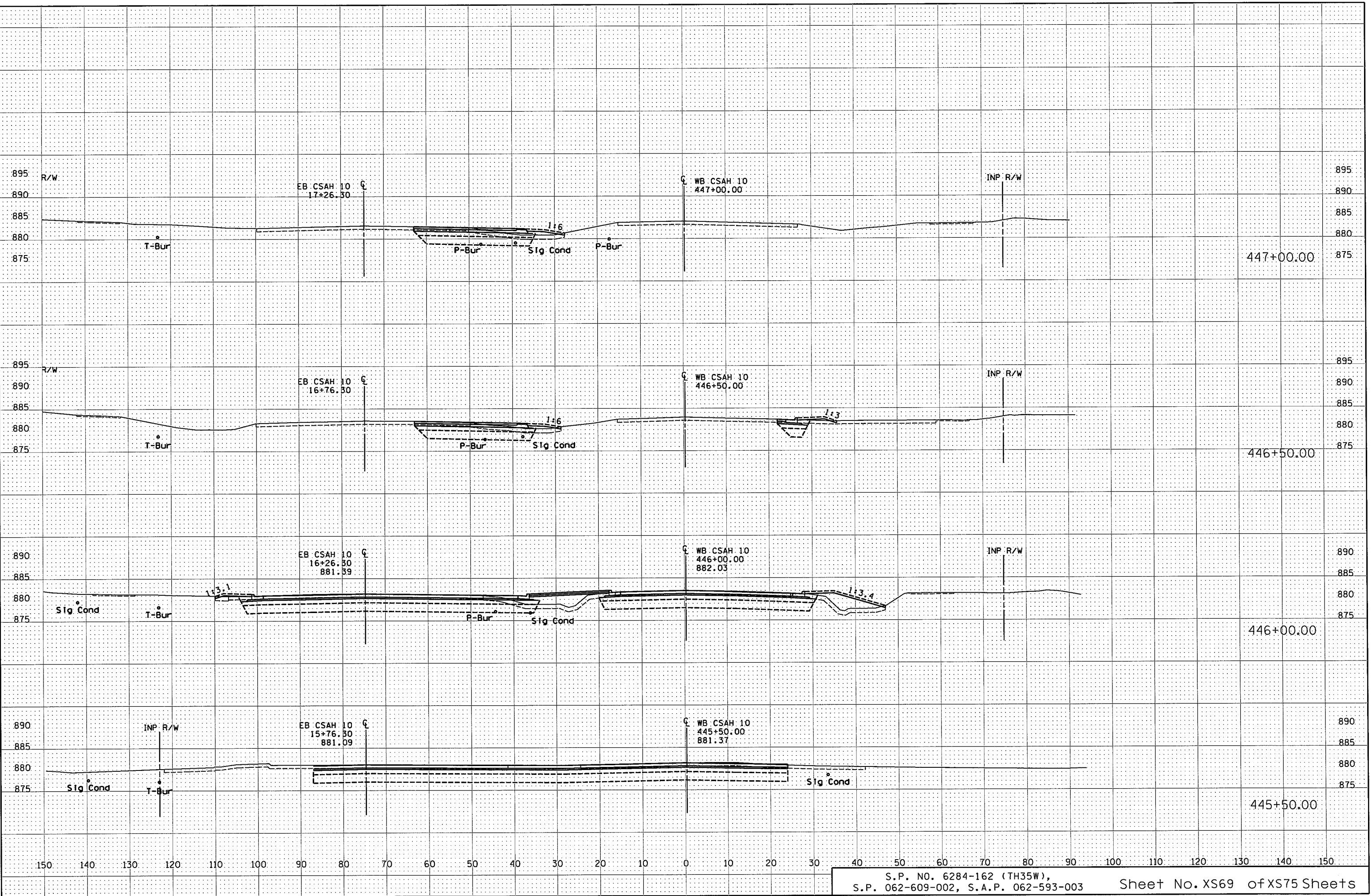


9:56:52 AM

12/4/2015

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Kimley-Horn

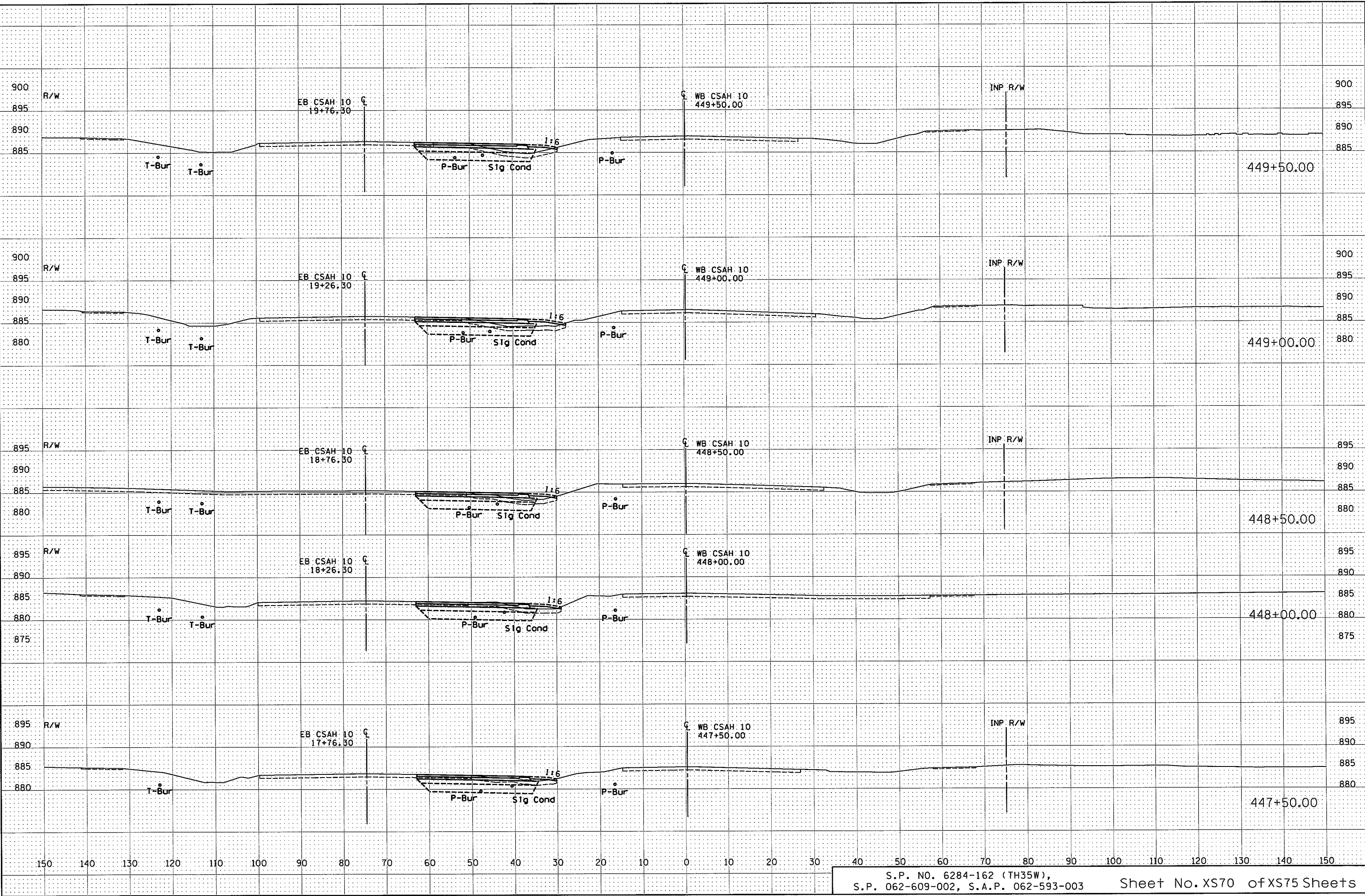


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12/4/2015

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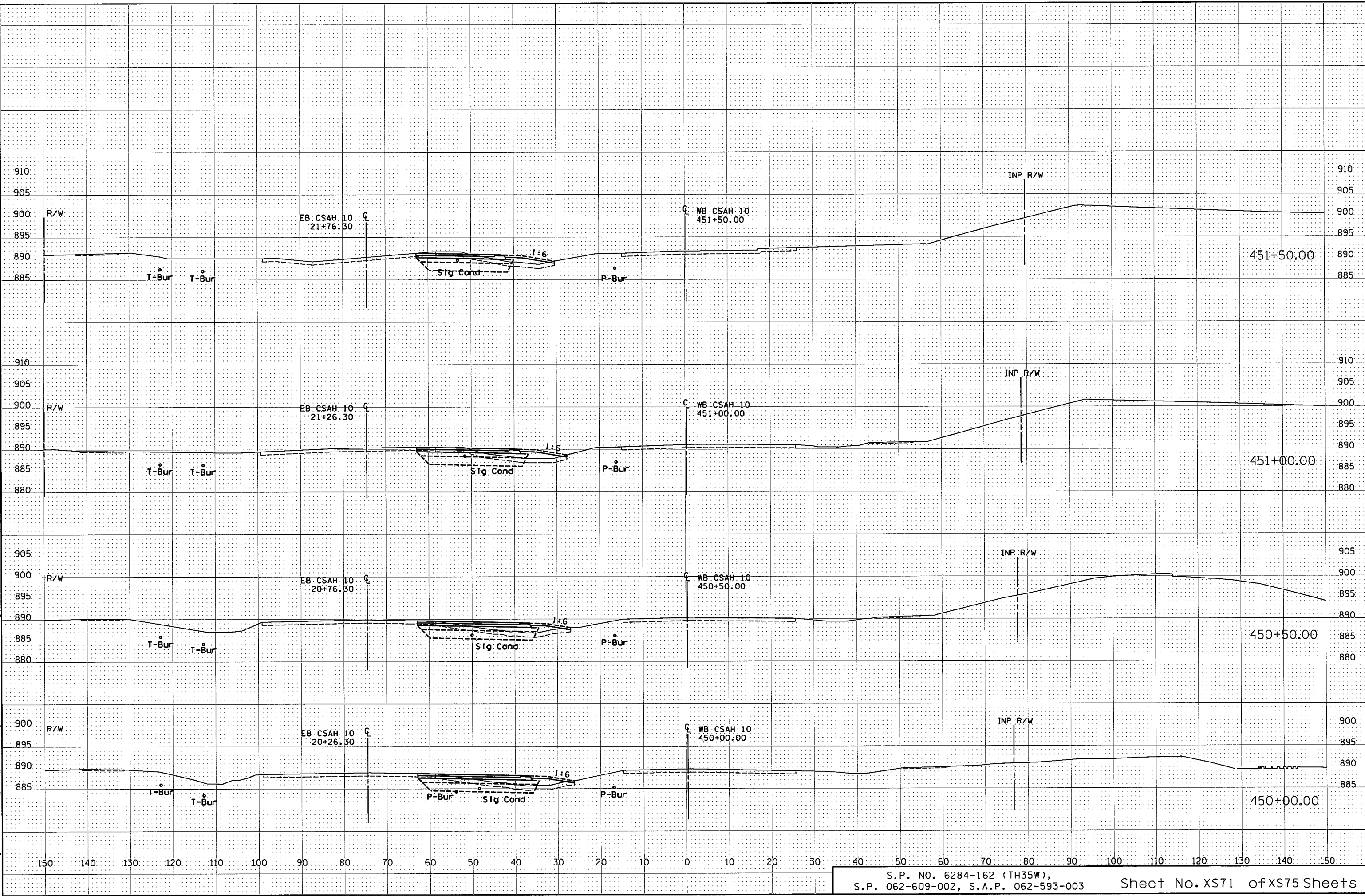


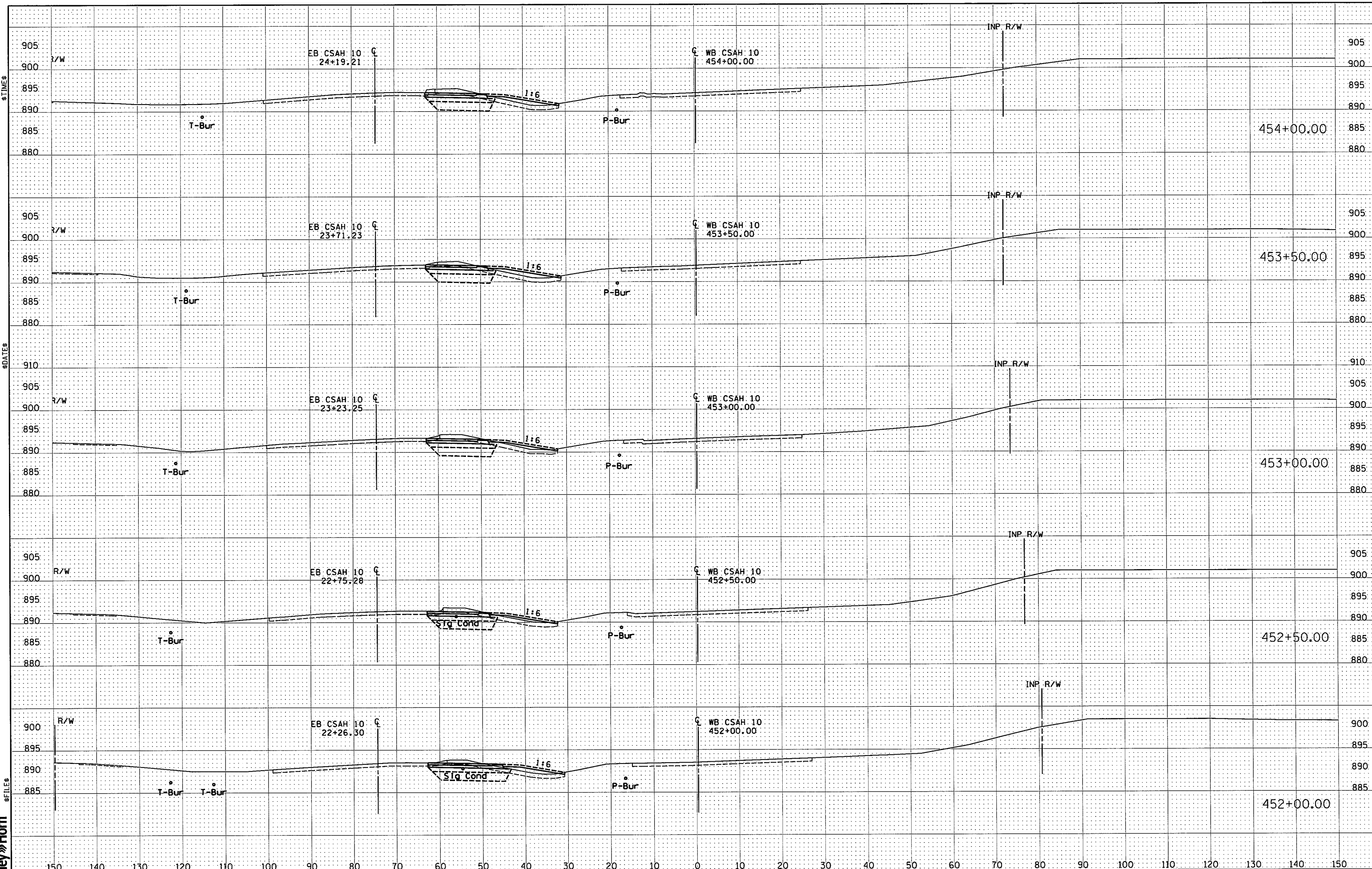
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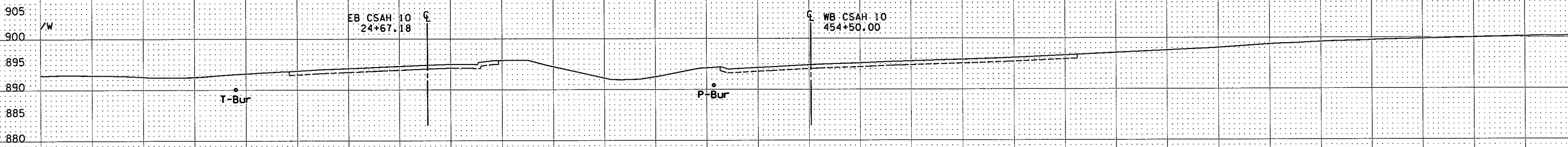
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Kimley-Horn





END CONSTRUCTION WB CSAH 10 STA. 454+33.53



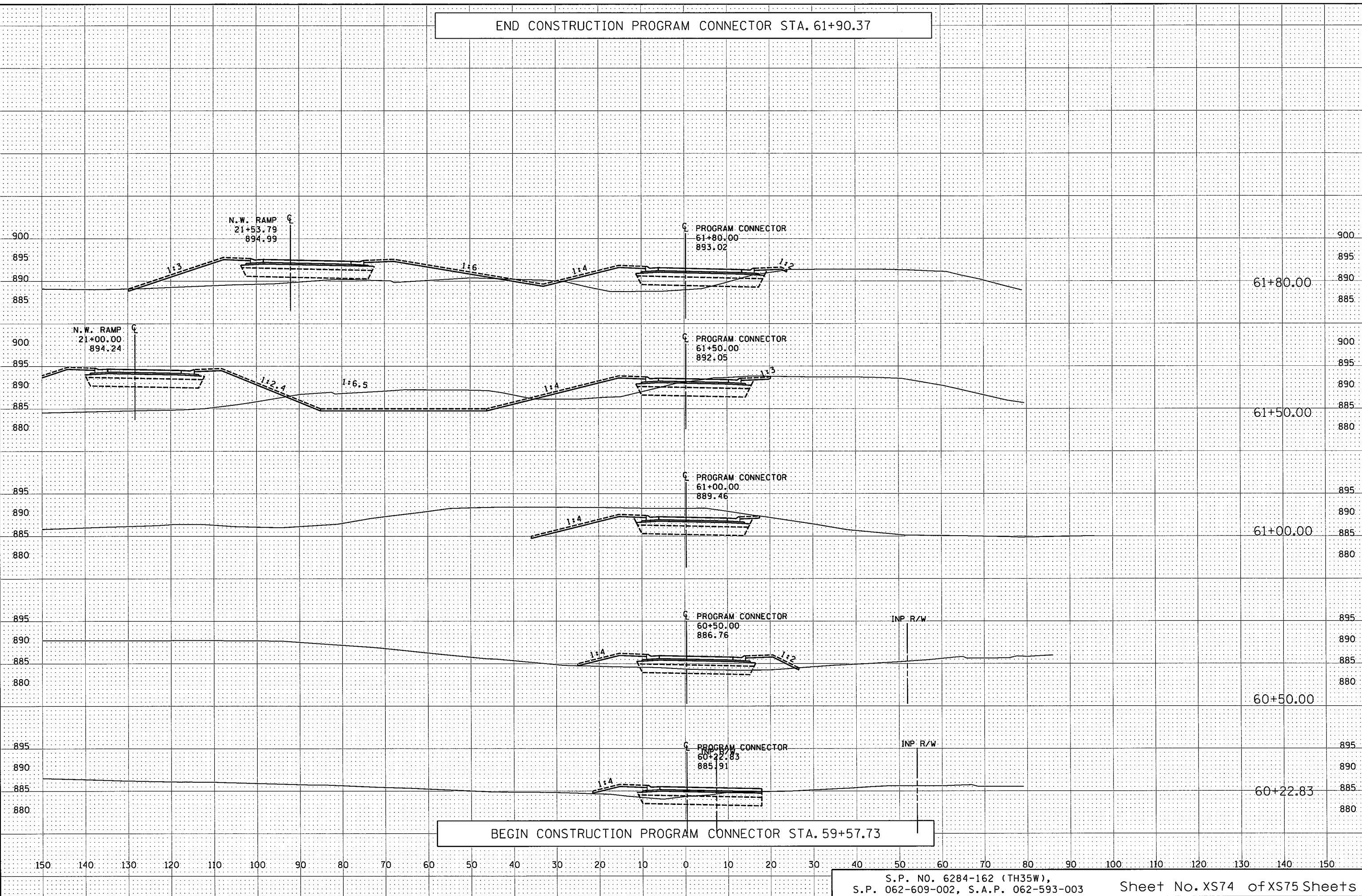
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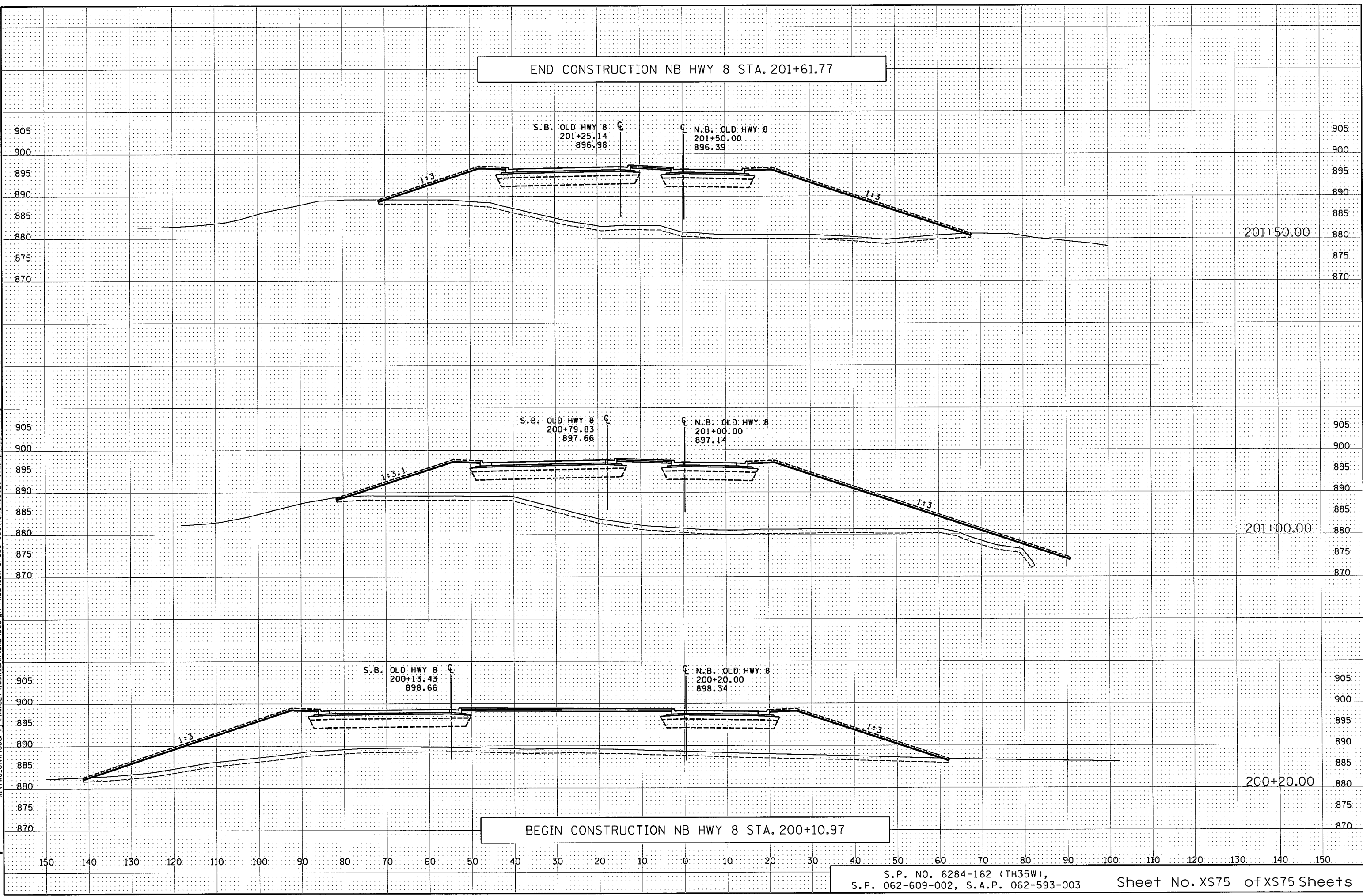
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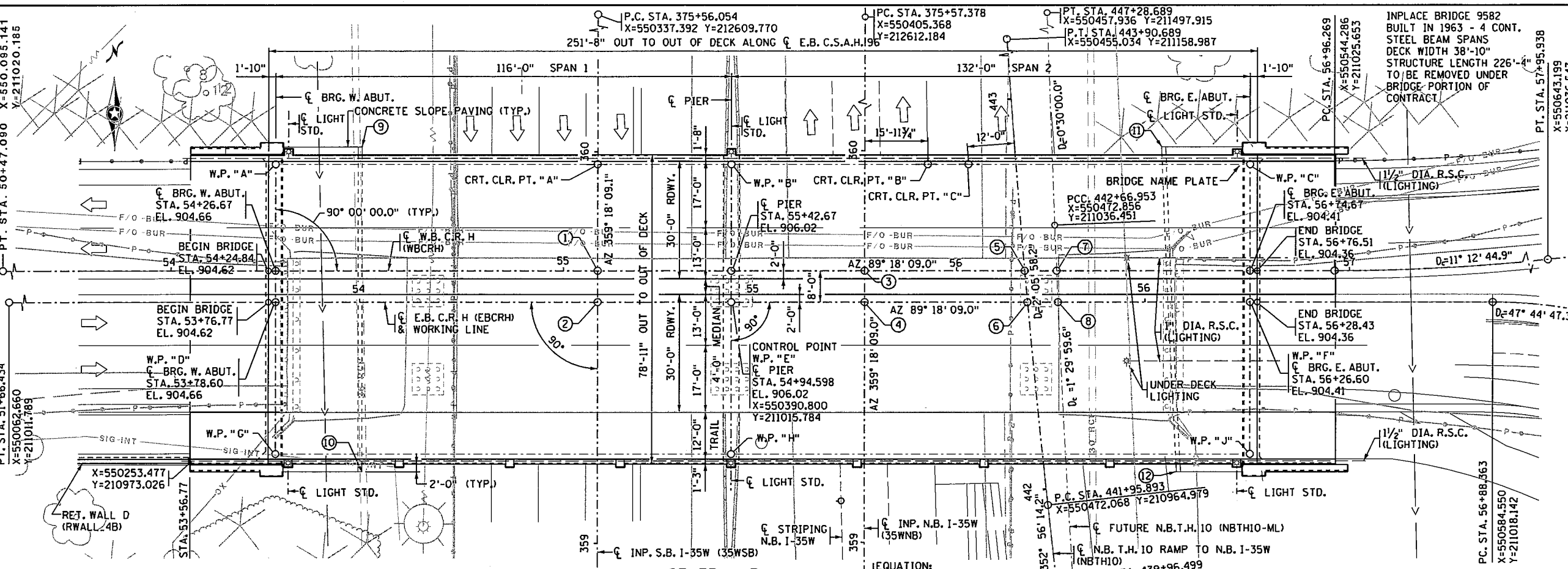
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Kimley»Horn

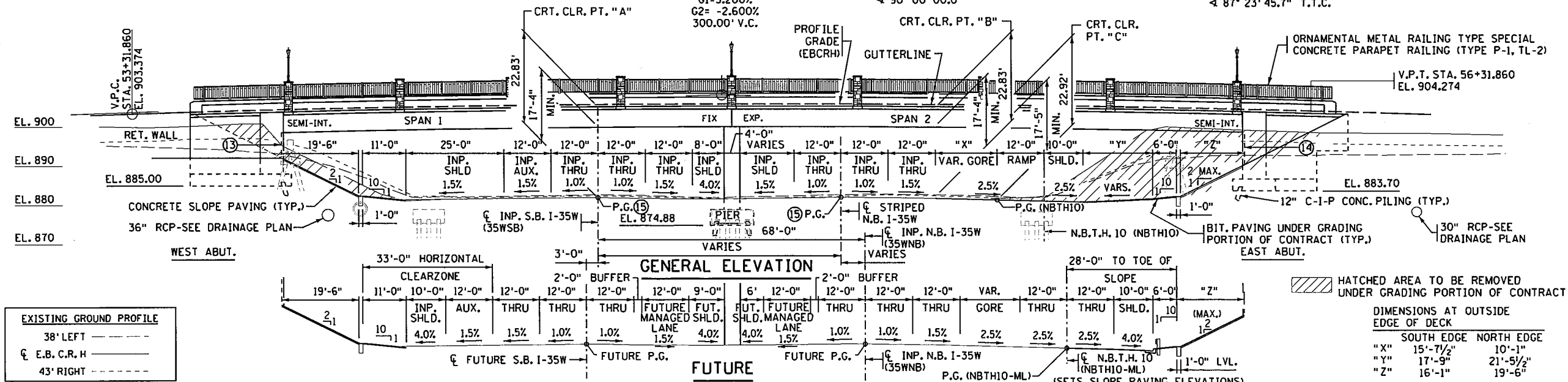




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- NOTES:**
- TRAFFIC TO BE DETOURED DURING CONSTRUCTION. SEE BORING SHEET FOR INPLACE UTILITIES. AESTHETICS TO FOLLOW THE I-35W CORRIDOR. UTILITIES TO BE RELOCATED BY OTHERS. PROFILES SET TO ACCOMMODATE FUTURE 10" OVERLAY.
 - A PT. 60.00' LT. (35WSB) STA. 360+01.21 BOTTOM OF SLOPE EL. 882.70 TOP OF SLOPE EL. 892.46
 - A PT. 60.00' LT. (35WSB) STA. 359+18.29 BOTTOM OF SLOPE EL. 882.40 TOP OF SLOPE EL. 892.14
 - A PT. 75.54' RT. (35WNB) STA. 360+00.93 BOTTOM OF SLOPE EL. 882.48 - CALCULATED FROM (NBTHIO-ML) TOP OF SLOPE EL. 892.46
 - A PT. 79.41' RT. (35WNB) STA. 359+18.02 BOTTOM OF SLOPE EL. 882.12 - CALCULATED FROM (NBTHIO-ML) TOP OF SLOPE EL. 890.16
 - NOT USED
 - NOT USED
 - FROM SURVEY SHOTS



STATE FUNDS DESIGN DATA

2014 AND CURRENT INTERIM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
LOAD AND RESISTANCE FACTOR DESIGN METHOD HL93 LIVE LOAD
DEAD LOAD INCLUDES 20 PSF ALLOWANCE FOR FUTURE WEARING COURSE MODIFICATIONS
MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4 KSI n = 8
fy = 60 KSI REINFORCEMENT
PRESTRESSED CONCRETE:
f'c = 9 KSI n = 1
fpu = 270 KSI LOW RELAXATION STRANDS
0.75 fpu FOR INITIAL PRESTRESS
DESIGN SPEED:
OVER = 30 MPH UNDER = 70 MPH
DECK AREA = 19860 SQ. FT.
HL93 LRFR BRIDGE OPERATING RATING: RF = 1.83

2036 PROJECTED TRAFFIC VOLUMES

ROADWAY OVER (C.R.H)	ROADWAY UNDER (I35W)
10000	2014 A.D.T. 116000
24900	2036 A.D.T. 133600

LIST OF SHEETS

NO.	DESCRIPTION
B1	GENERAL PLAN AND ELEVATION
B2	BRIDGE QUANTITIES & TRANSVERSE SECTIONS
B3	BRIDGE LAYOUT
B4-B12	WEST ABUTMENT DETAILS
B13-B21	EAST ABUTMENT DETAILS
B22-B28	PIER DETAILS
B29	FRAMING PLAN
B30-B31	BEAM DETAILS
B32-B43	SUPERSTRUCTURE DETAILS
B44	CONCRETE SLOPE PAVING
B45-B47	CONDUIT SYSTEMS
B48-B53	B-DETAILS
B54	AS-BUILT
B55	BRIDGE SURVEY
B56	PROFILES
B57-B58	BORINGS

APPROVED: *[Signature]* RAMSEY COUNTY ENGINEER
DATE: 12/11/15

3535 VAONAS CENTER DRIVE
ST PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNED: *[Signature]* DATE 12-4-15
NAME: MARK K MAVES LIC NO 20496

MINNESOTA DEPARTMENT OF TRANSPORTATION

BRIDGE NO. 62732
CO. RD. H OVER
I-35W N.B. AND S.B. LANES
0.4 MILES NORTH OF THE SOUTH JUNCTION OF T.H. 10 IN ARDEN HILLS
116'-0", 132'-0" PRESTRESSED CONC. BM. SPANS
0° SKEW, 60' ROWY., TYPE P-1 AND TYPE P-2 BARRIERS
IDENTIFICATION NO. 501

GENERAL PLAN AND ELEVATION
SEC. 8/9 TWP. 030 N. R. 23 W.
CITY OF ARDEN HILLS RAMSEY CO.

APPROVED: *[Signature]* STATE BRIDGE ENGINEER
DATE: 12/14/15

DIMENSIONS AT OUTSIDE EDGE OF DECK	SOUTH EDGE	NORTH EDGE
"X"	15'-7 1/2"	10'-1"
"Y"	17'-9"	21'-5 1/2"
"Z"	16'-1"	19'-6"

DES. MAW DR. MAW 62732
CHK. MKM CHK. MKM

CONSTRUCTION NOTES

THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

BRIDGE SEAT REINFORCEMENT SHALL BE CAREFULLY PLACED TO AVOID INTERFERENCE WITH DRILLING HOLES FOR ANCHOR RODS. THE BEAMS SHALL BE ERECTED IN FINAL POSITION PRIOR TO DRILLING HOLES FOR AND PLACING ANCHOR RODS.

THE BAR SIZES SHOWN IN THIS PLAN ARE IN U.S. CUSTOMARY DESIGNATIONS.

BAR SIZES MARKED WITH THE SUFFIX "E" SHALL BE EPOXY COATED IN ACCORDANCE WITH SPEC. 3301.

BAR SIZES MARKED WITH THE SUFFIX "S" SHALL BE STAINLESS STEEL IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA". SEE BORING SHEETS FOR INPLACE UTILITIES.

THE PILE LOADS SHOWN IN THE PLANS AND THE CORRESPONDING NOMINAL PILE BEARING RESISTANCE (R_n) WERE COMPUTED USING LRFD METHODOLOGY. PILE BEARING RESISTANCE DETERMINED IN THE FIELD SHALL INCORPORATE THE METHODS AND/OR FORMULAS DESCRIBED IN THE SPECIAL PROVISIONS.

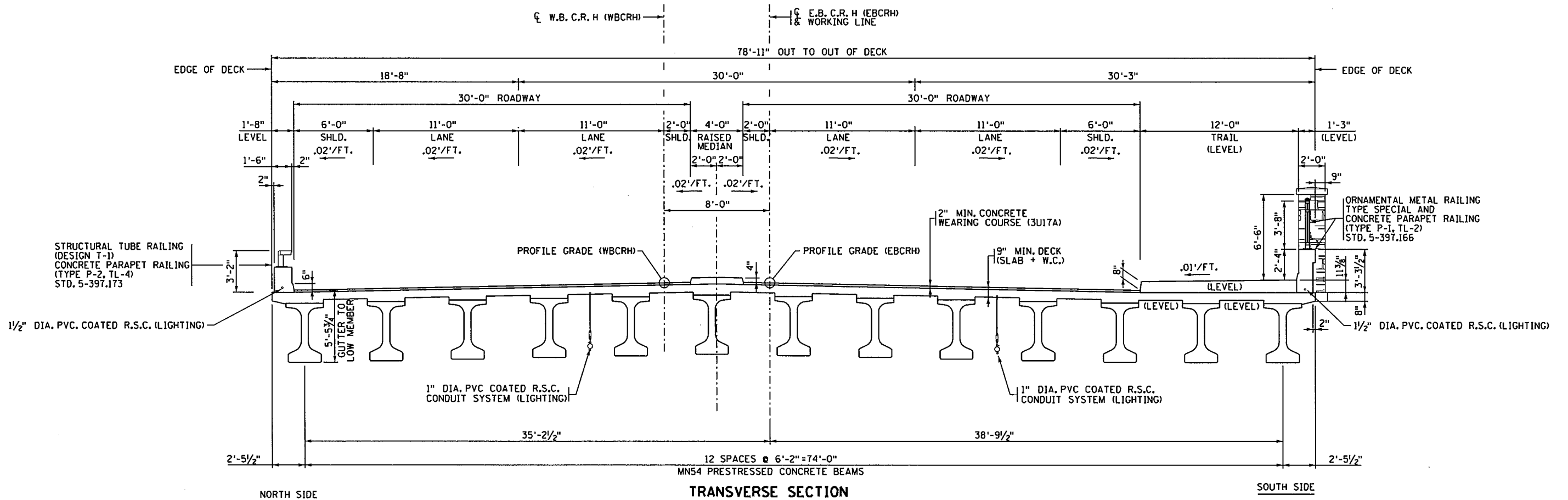
CONSTRUCTION OF EACH ABUTMENT SHALL NOT BE STARTED UNTIL THE APPROACH FILL AT THAT ABUTMENT HAS BEEN CONSTRUCTED TO THE FULL HEIGHT AND CROSS SECTION AND ALLOWED TO SETTLE FOR 72 HOURS.

QUANTITY NOTES:

- ① QUANTITY INCLUDES BRIDGE DECK AREA AND APPROACH PANELS.
- ② FORM LINER. SEE SPECIAL PROVISIONS.
- ③ 0.3125" MIN. WALL THICKNESS.
- ④ INCLUDES CONCRETE PILASTERS.

SCHEDULE OF QUANTITIES FOR ENTIRE BRIDGE

ITEM NO	ITEM	UNIT	QUANTITY
2104.601	REMOVE REGULATED WASTE MATERIAL (BRIDGE)	LUMP SUM	1
2401.501	STRUCTURAL CONCRETE (IG52)	CU. YD.	359 (P)
2401.501	STRUCTURAL CONCRETE (3B52)	CU. YD.	547 (P)
④ 2401.513	TYPE P-1 BARRIER CONCRETE (3S52)	LIN. FT.	292 (P)
④ 2401.513	TYPE P-2 (TL-4) BARRIER CONCRETE (3S52)	LIN. FT.	292 (P)
2401.515	SIDEWALK CONCRETE (3S52)	SQ. FT.	3451 (P)
2401.516	RAISED MEDIAN CONCRETE (3S52)	SQ. FT.	1167 (P)
2401.541	REINFORCEMENT BARS	POUND	24460 (P)
2401.541	REINFORCEMENT BARS (EPOXY COATED)	POUND	211210 (P)
2401.541	REINFORCEMENT BARS (STAINLESS-6OKS1)	POUND	830 (P)
2401.601	STRUCTURE EXCAVATION	LUMP SUM	1
2401.618	BRIDGE SLAB CONCRETE (3YHPC-S)	SQ. FT.	19892 (P)
2402.583	ORNAMENTAL METAL RAILING TYPE SPECIAL	LIN. FT.	268 (P)
2402.584	STRUCTURAL TUBE RAILING DESIGN T-1	LIN. FT.	286 (P)
2402.595	BEARING ASSEMBLY	EACH	52
① 2404.501	CONCRETE WEARING COURSE (3U17A)	SQ. FT.	17500 (P)
2405.502	PRESTRESSED CONCRETE BEAMS MN54	LIN. FT.	3238 (P)
2405.511	DIAPHRAGMS FOR TYPE MN54 PREST BEAMS	LIN. FT.	444 (P)
2411.602	PRECAST CONCRETE CAP	EACH	9 (P)
2411.618	ANTI-GRAFFITI COATING	SQ. FT.	2164 (P)
2411.618	ARCHITECTURAL SURFACE FINISH (MULTI COLOR)	SQ. FT.	2164 (P)
② 2411.618	ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE)	SQ. FT.	2164 (P)
2442.501	REMOVE EXISTING BRIDGE	LUMP SUM	1
③ 2452.507	C-I-P CONCRETE PILING DELIVERED 12"	LIN. FT.	7700
③ 2452.508	C-I-P CONCRETE PILING DRIVEN 12"	LIN. FT.	7700
③ 2452.519	C-I-P CONC TEST PILE 95 FT LONG 12"	EACH	2
③ 2452.519	C-I-P CONC TEST PILE 100 FT LONG 12"	EACH	2
③ 2452.519	C-I-P CONC TEST PILE 110 FT LONG 12"	EACH	2
2452.527	PILE REDRIVING	EACH	6
2452.528	PILE ANALYSIS	EACH	6
2502.502	DRAINAGE SYSTEM TYPE (B910)	LUMP SUM	1
2514.501	CONCRETE SLOPE PAVING	SQ. YD.	407 (P)
2545.509	CONDUIT SYSTEM TYPE 1	LUMP SUM	1



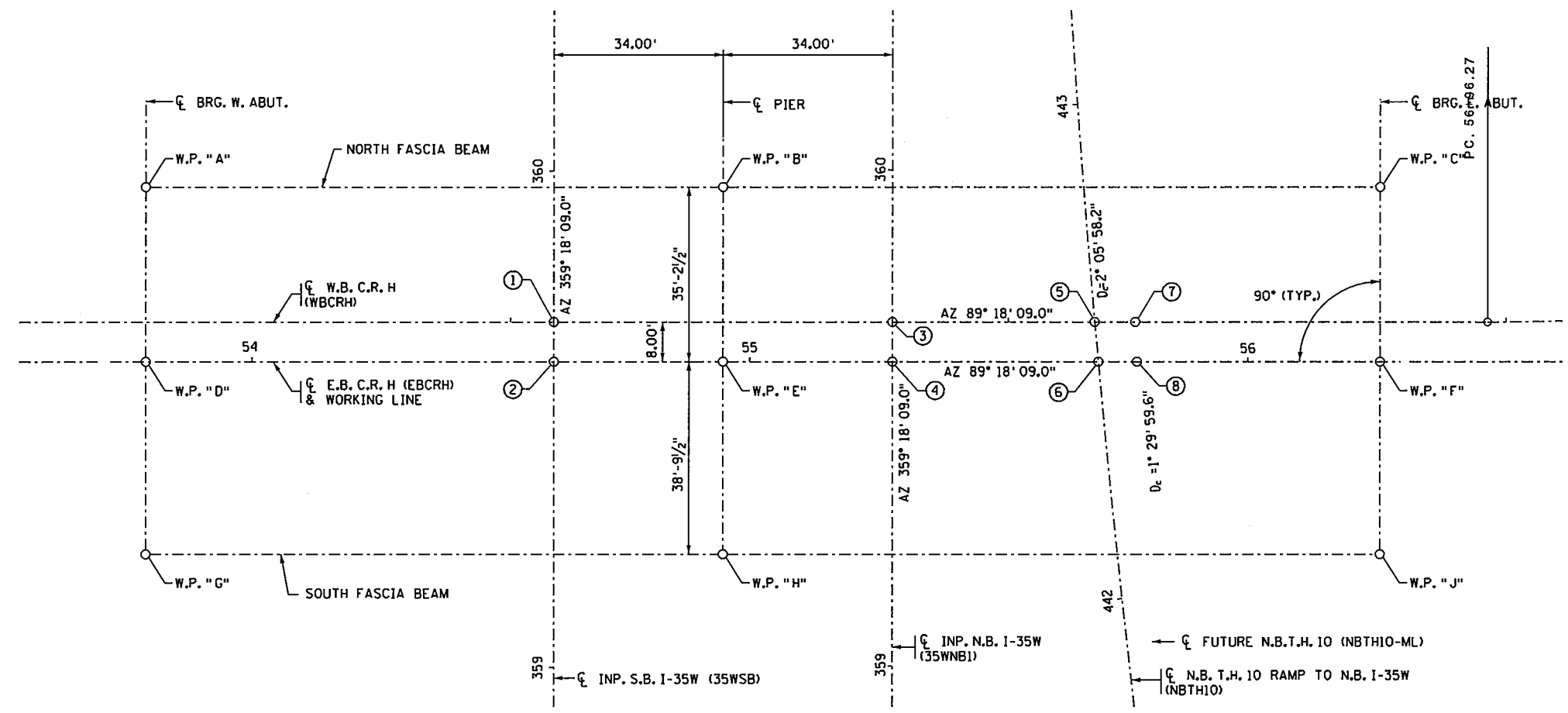
SEH
3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (650) 490-2000
FAX (650) 490-2150

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Mark K. Maves* Date: 12-4-15
Printed Name: MARK K MAVES Lic. No. 20496

TRANSVERSE SECTION

DES: MAW	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62732
CHK: MKM	CHK: MKM		
SHEET NO. B2 OF B58 SHEETS			

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BRIDGE LAYOUT

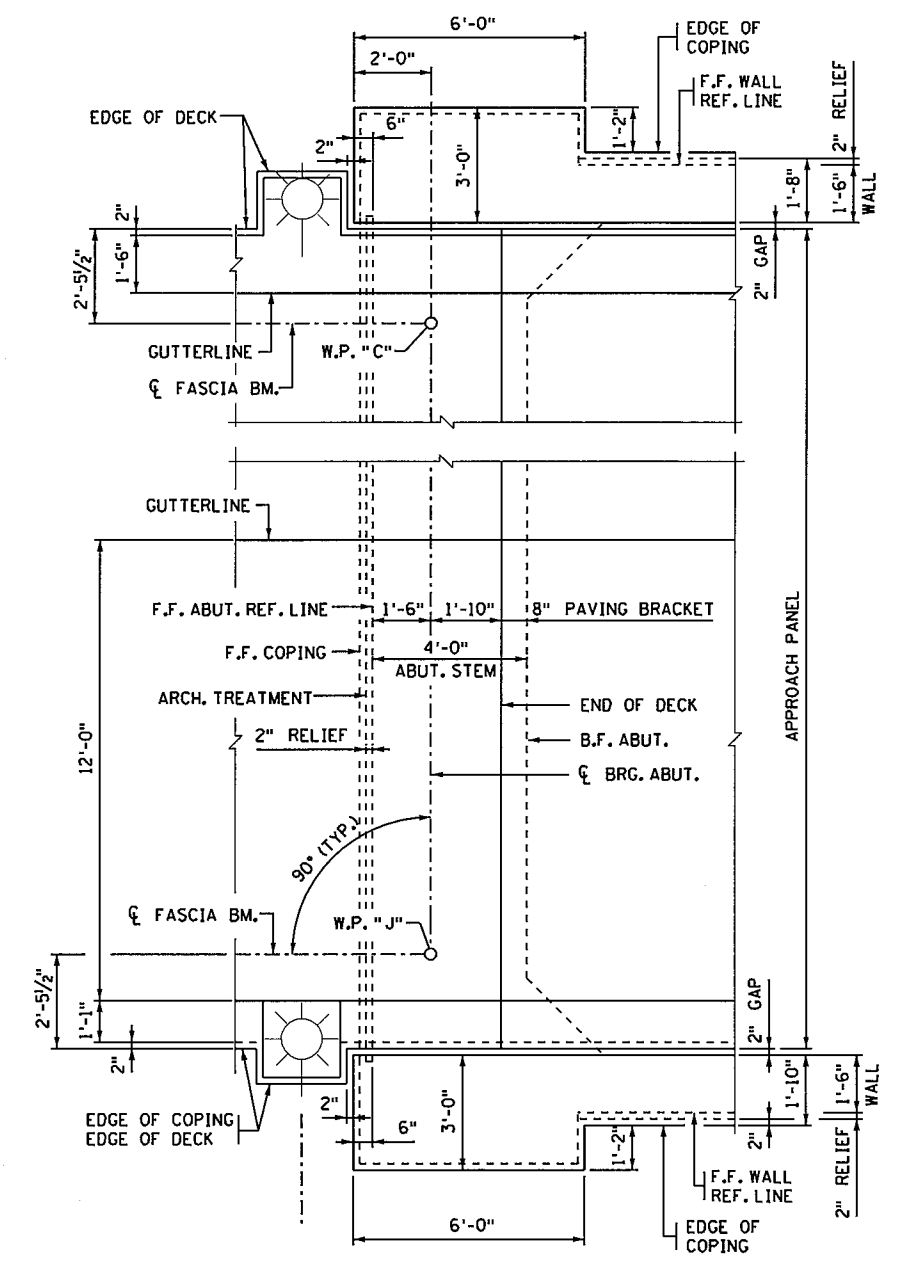
NOTES
ALL WORKING POINT STATIONS AND ELEVATIONS ARE BASED OFF OF E.B. C.R. H (EBCRH) ALIGNMENT

- ① W.B. C.R. H (WBCRH) P.O.T. STA. 55+08.673=
INP. S.B. 135W (35WSB) P.O.T. STA.= 359+69.536
X=550356.705 Y=211023.369
∠ 90° 00' 00.1"
- ② E.B. C.R. H (EBCRH) P.O.T. STA. 54+60.598=
INP. S.B. 135W (35WSB) P.O.T. STA.= 359+61.536
X=550356.802 Y=211015.370
∠ 90° 00' 00.1"
- ③ W.B. C.R. H (WBCRH) P.O.T. STA. 55+76.674=
INP. N.B. I-35W (35WNB) P.O.T. STA.= 359+69.273
X=550424.700 Y=211024.197
∠ 90° 00' 00.0"
- ④ E.B. C.R. H (EBCRH) P.O.T. STA. 55+28.598=
INP. N.B. I-35W (35WNB) P.O.T. STA.= 359+61.273
X=550424.798 Y=211016.198
∠ 90° 00' 00.0"
- ⑤ W.B. C.R. H (WBCRH) P.O.T. STA. 56+17.313=
INP. N.B. T.H. 10 RAMP (NBTH10) P.O.C. STA.= 442+55.986
X=550465.337 Y=211024.692
∠ 84° 53' 47.1" T.T.C.
- ⑥ E.B. C.R. H (EBCRH) P.O.T. STA. 55+69.964=
INP. N.B. T.H. 10 RAMP (NBTH10) P.O.C. STA.= 442+47.953
X=550466.160 Y=211016.701
∠ 84° 43' 40.0" T.T.C.
- ⑦ W.B. C.R. H (WBCRH) P.O.T. STA. 56+25.463=
FUTURE N.B. T.H. 10 RAMP (NBTH10-ML) P.O.C. STA.= 442+55.275
X=550473.486 Y=211024.791
∠ 87° 30' 58.1" T.T.C.
- ⑧ E.B. C.R. H (EBCRH) P.O.T. STA. 55+77.744=
FUTURE N.B. T.H. 10 RAMP (NBTH10-ML) P.O.C. STA.= 442+47.267
X=550473.939 Y=211016.796
∠ 87° 23' 45.7" T.T.C.

TOP OF ROADWAY TO BRIDGE SEAT			
	W. ABUT.	PIER	E. ABUT.
SLAB THICKNESS	9"	9"	9"
STOOL HEIGHT	2.5"	2.5"	2.5"
BEAM HEIGHT	54"	54"	54"
BEARING HEIGHT	5.875"	3.25"	5.875"
TOTAL (IN)	71.375"	68.75"	71.375"
TOTAL (FT)	5.95'	5.73'	5.95'

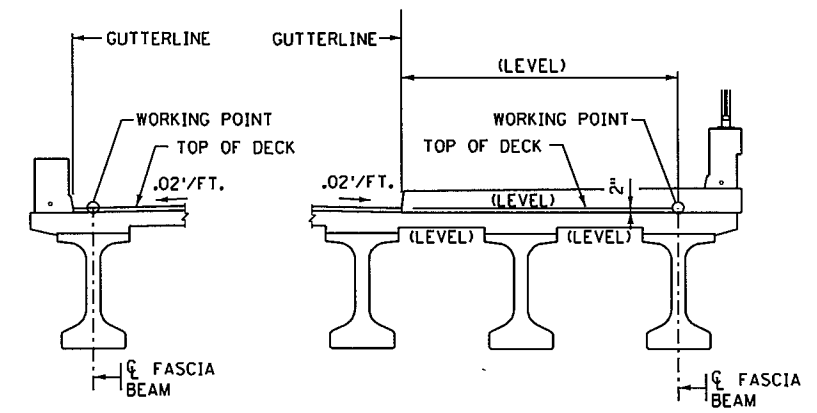
DIMENSIONS BETWEEN WORKING POINTS												ELEVATIONS				
POINT	STATION	X-COORDINATE	Y-COORDINATE	A	B	C	D	E	F	G	H	J	TOP OF SLAB	TOP OF SLAB TO BR. SEAT	BRIDGE SEAT	POINT
A	53+78.60	550274.380	211049.577		116.00		35.21	121.23			137.59	128.81	904.11	5.95	898.17	A
B	54+94.60	550390.371	211050.990			132.00		35.21	136.61	137.59		151.33	905.48	5.73	899.75	B
C	56+26.60	550522.362	211052.596						35.21	258.80	151.33		903.86	5.95	897.92	C
D	53+78.60	550274.809	211014.372					116.00		38.79	122.31		904.66			D
E	54+94.60	550390.800	211015.784						132.00		38.79	137.58	906.02			E
F	56+26.60	550522.790	211017.391								38.79		904.41			F
G	53+78.60	550275.281	210975.583								116.00		904.10	5.95	898.15	G
H	54+94.60	550391.272	210976.995									132.00	905.46	5.73	899.73	H
J	56+26.60	550523.262	210978.602										903.85	5.95	897.90	J

ALL DISTANCES ARE ALONG STRAIGHT LINES BETWEEN WORKING POINTS AND ARE GIVEN IN DECIMALS OF A FOOT.
COORDINATES BASED ON RAMSEY COUNTY COORDINATE SYSTEM.

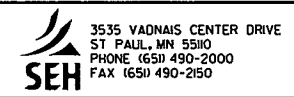


CORNER LAYOUT

EAST END SHOWN
WEST END MIRROR IMAGE
F.F. = FRONT FACE
B.F. = BACK FACE



WORKING POINT SCHEMATIC

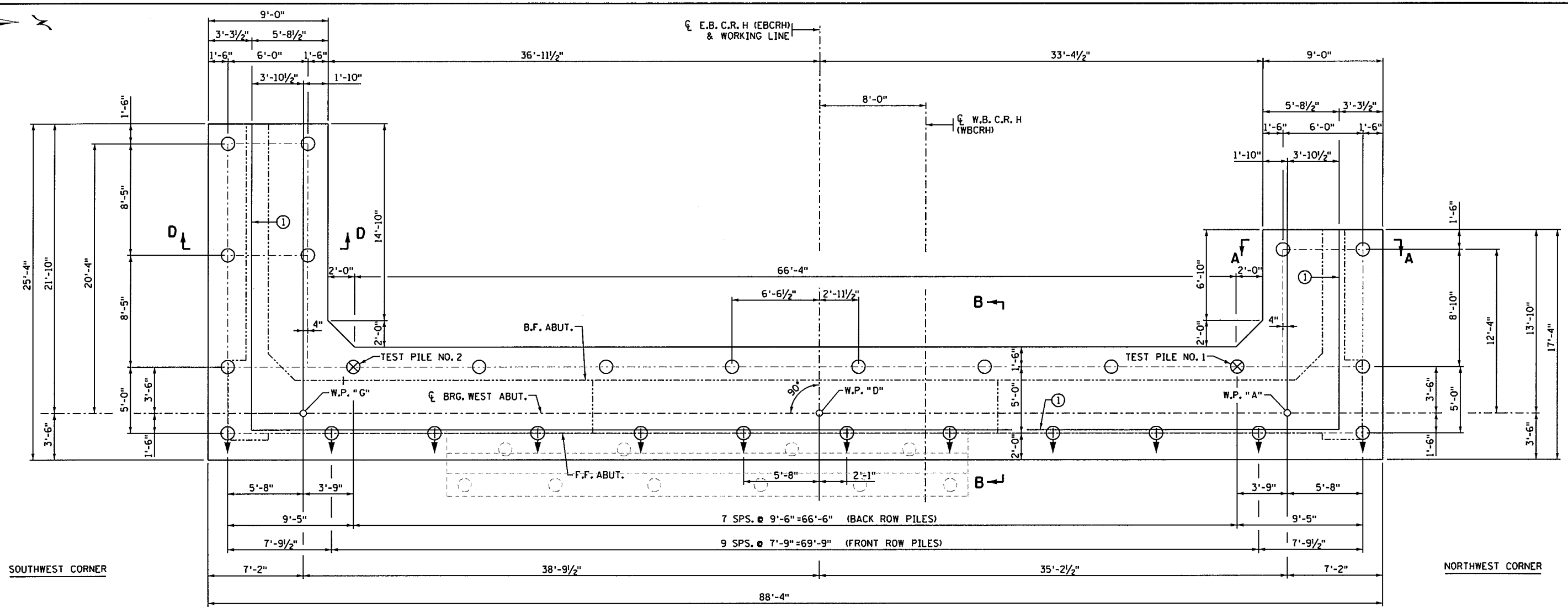


I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Mark K. Maves* Date: 12-4-15
Printed Name: MARK K MAVES Lic. No. 20496

BRIDGE LAYOUT

DES: MAW	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62732
CHK: MKM	CHK: MKM		
SHEET NO. B3 OF B58 SHEETS			

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FOOTING PLAN

WEST ABUTMENT COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD + EARTH PRESSURE	100.6
FACTORED LIVE LOAD	18.8
*FACTORED DESIGN LOAD = PILE BEARING RESISTANCE	119.4

WEST ABUTMENT REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R _n - Tons/Pile		
FIELD CONTROL METHOD	φ _{dyn}	*R _n
MnDOT Pile Formula 2012 (MPF12) R _n = 20 √(WxH/1000) x log(10/3)	0.50	(A) 238.8
PDA	0.65	183.7

*R_n = (Factored Design Load) / φ_{dyn}

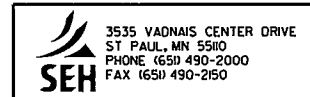
PILE NOTES:

- 2 12" C-I-P CONCRETE TEST PILE 95 FT. LONG
- 26 12" C-I-P CONCRETE PILES EST. LENGTH 85 FT.
- 28 12" C-I-P CONCRETE PILES REQ'D FOR W. ABUT.
- PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
- FOR PILE SPLICE DETAILS SEE DETAIL B201.
- PILES MARKED THUS ○ TO BE BATTERED 3" PER FOOT IN DIRECTION SHOWN.
- PILES TO HAVE 0.3125" MIN. WALL THICKNESS.

(A) NEW MNDOT MPF12 PILE DRIVING FORMULA AND TABLE MUST BE USED FOR THIS BRIDGE. USE OF OLDER FORMULA WILL RESULT IN INADEQUATE PILE CAPACITY.

NOTES:

- SEE SHEET B7 FOR SECTIONS A-A, B-B & D-D.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM
- ① EDGE OF 3" VERTICAL KEY.



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael F. Dupont* Date: 12-4-15
 Printed Name: MICHAEL F. DUPONT Lic. No. 43375

WEST ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62732
CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B4 OF B58 SHEETS			

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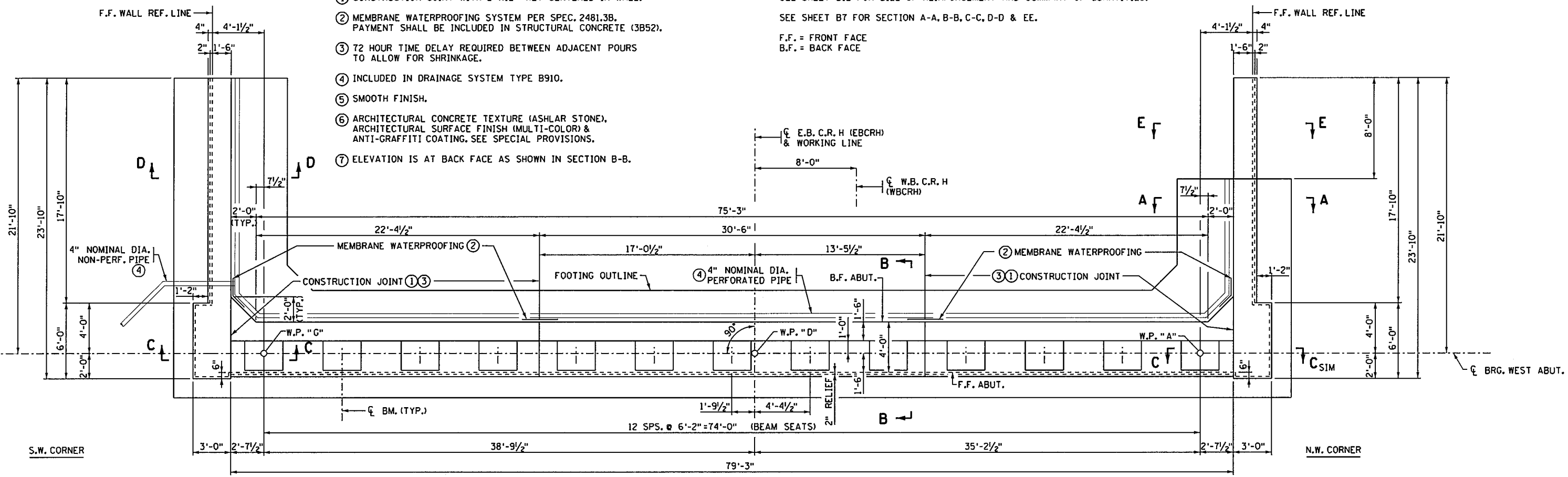


NOTES:

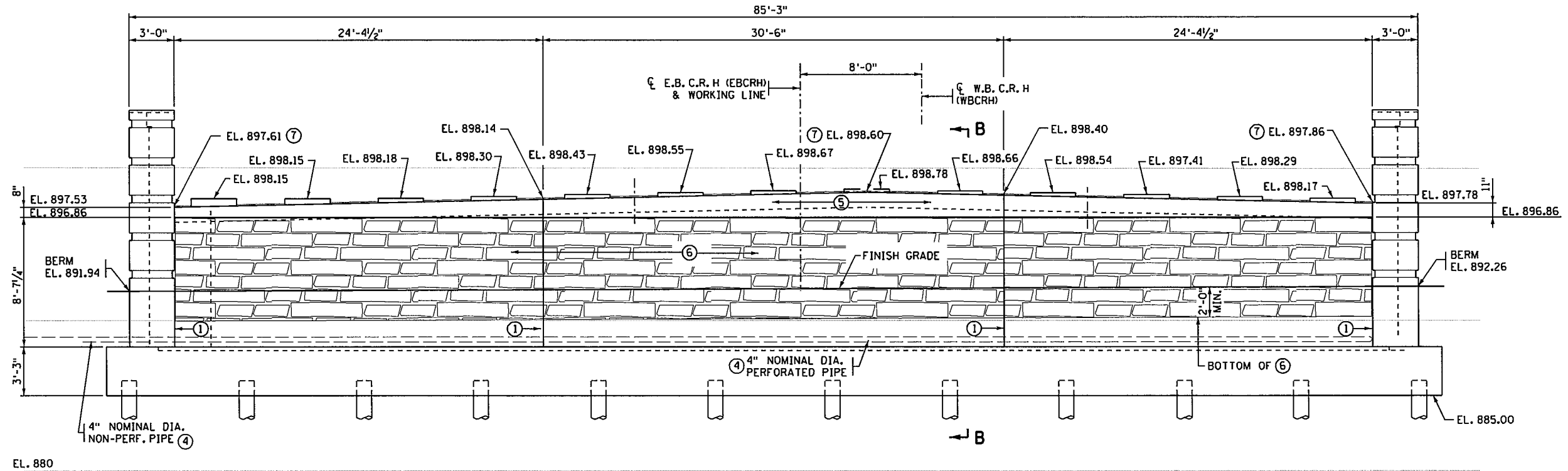
- ① CONSTRUCTION JOINT WITH 2" x 12" KEY CENTERED IN WALL.
- ② MEMBRANE WATERPROOFING SYSTEM PER SPEC. 2481.3B. PAYMENT SHALL BE INCLUDED IN STRUCTURAL CONCRETE (3B52).
- ③ 72 HOUR TIME DELAY REQUIRED BETWEEN ADJACENT POURS TO ALLOW FOR SHRINKAGE.
- ④ INCLUDED IN DRAINAGE SYSTEM TYPE B910.
- ⑤ SMOOTH FINISH.
- ⑥ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) & ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.
- ⑦ ELEVATION IS AT BACK FACE AS SHOWN IN SECTION B-B.

NOTES:

SEE SHEET B12 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
SEE SHEET B7 FOR SECTION A-A, B-B, C-C, D-D & E-E.
F.F. = FRONT FACE
B.F. = BACK FACE



PLAN



ELEVATION

SEH
3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

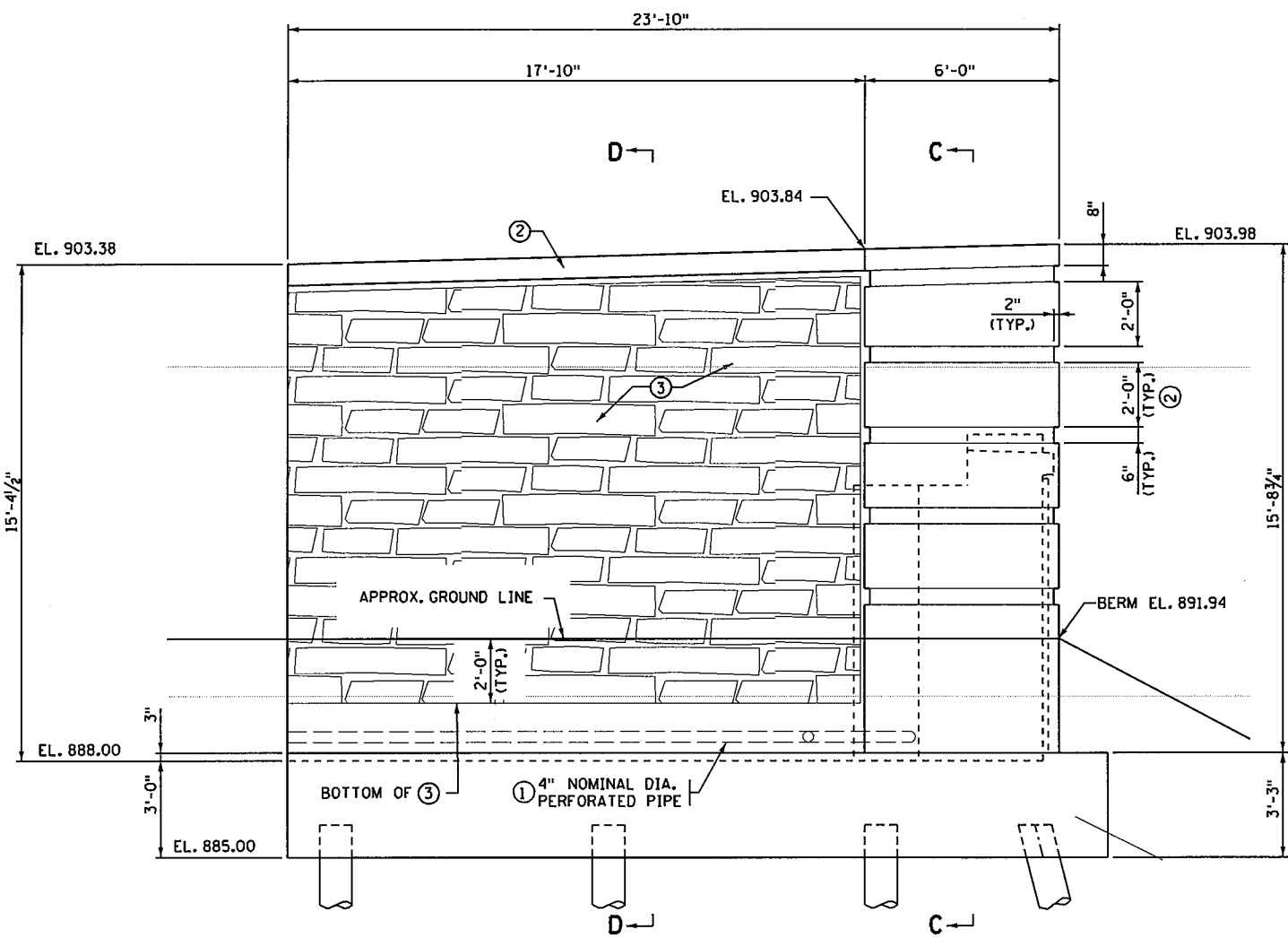
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

WEST ABUTMENT DETAILS

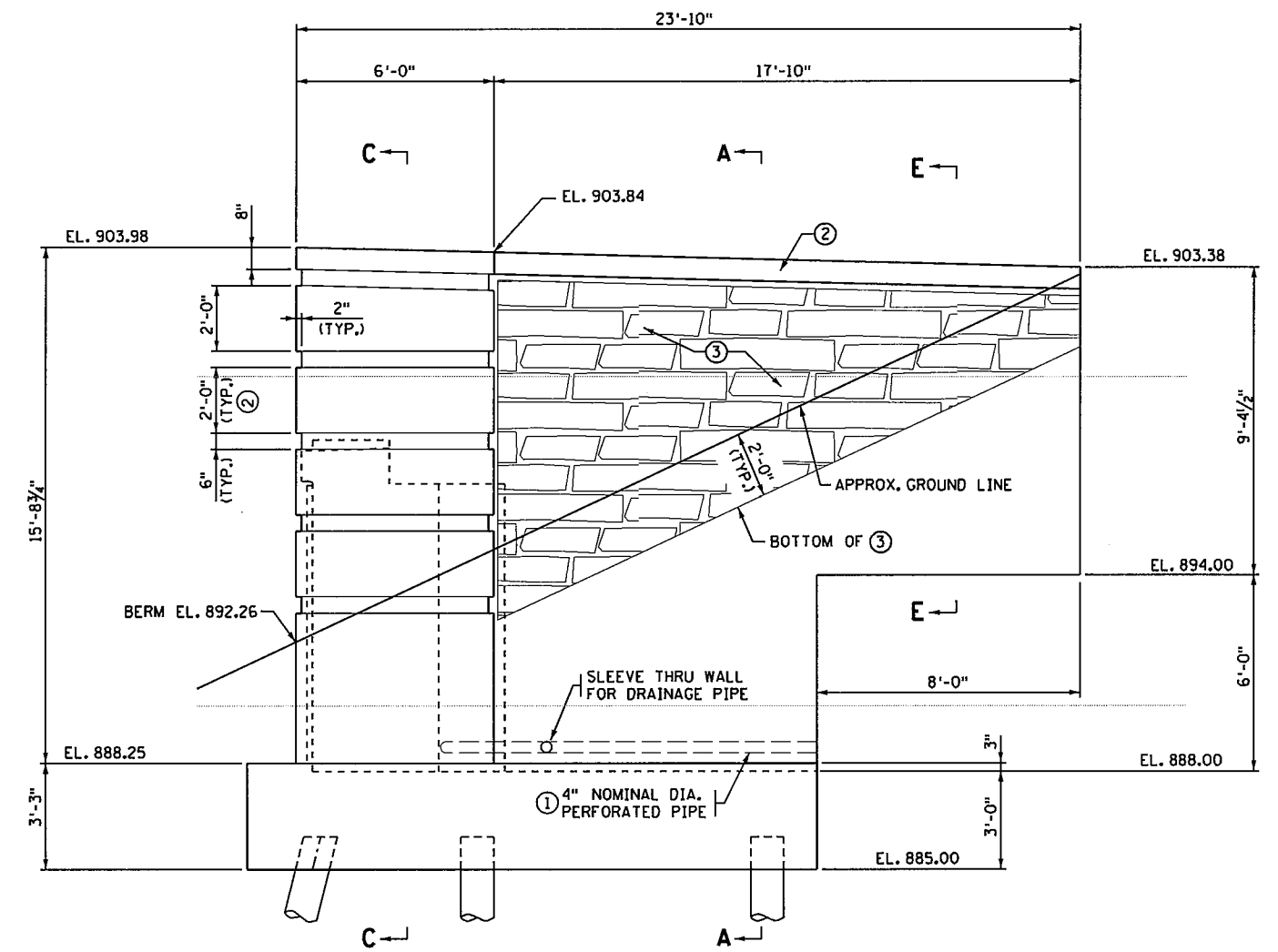
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CHK: NCK	CHK: MHD	12/14/15
SHEET NO. B5 OF B58 SHEETS		

BRIDGE NO
62732

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S.W. WINGWALL ELEVATION



N.W. WINGWALL ELEVATION

- NOTES:**
- SEE SHEET B12 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
 - SEE SHEET B7 FOR SECTION A-A, B-B, C-C, D-D & E-E.
 - F.F. = FRONT FACE
 - B.F. = BACK FACE
 - ① INCLUDED IN DRAINAGE SYSTEM TYPE B910.
 - ② SMOOTH FINISH.
 - ③ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) & ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.


 3535 VADNAIS CENTER DRIVE
 ST PAUL, MN 55110
 PHONE (651) 490-2000
 FAX (651) 490-2150

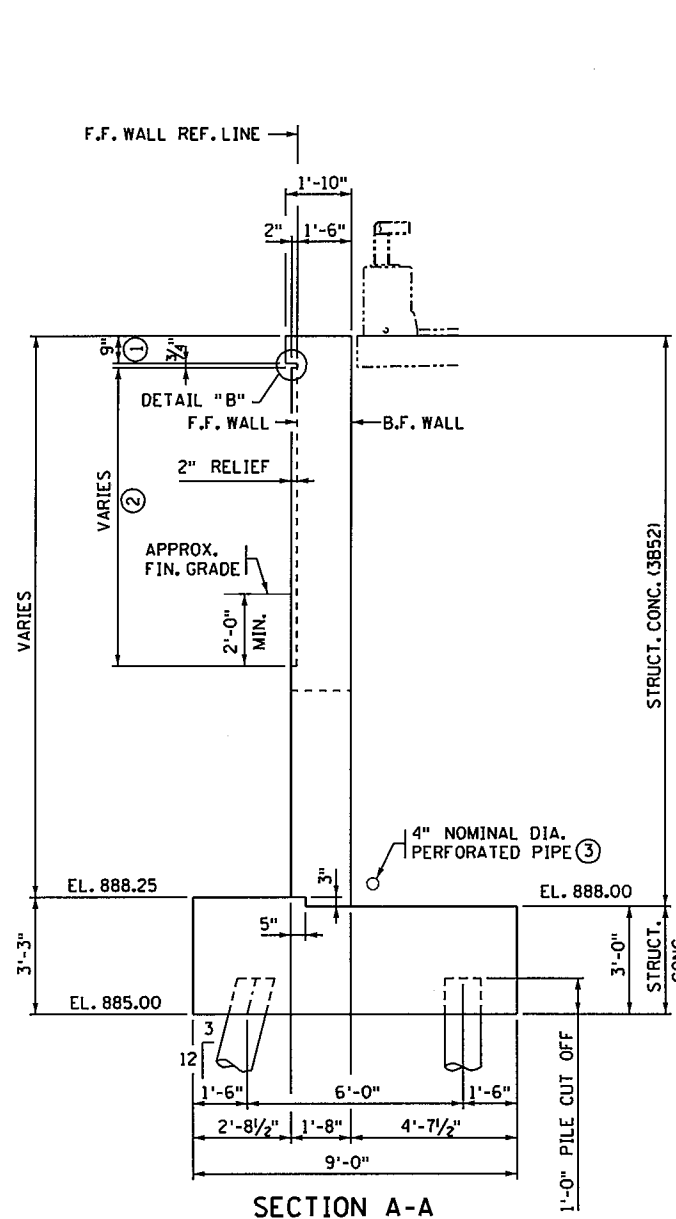
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

WEST ABUTMENT DETAILS

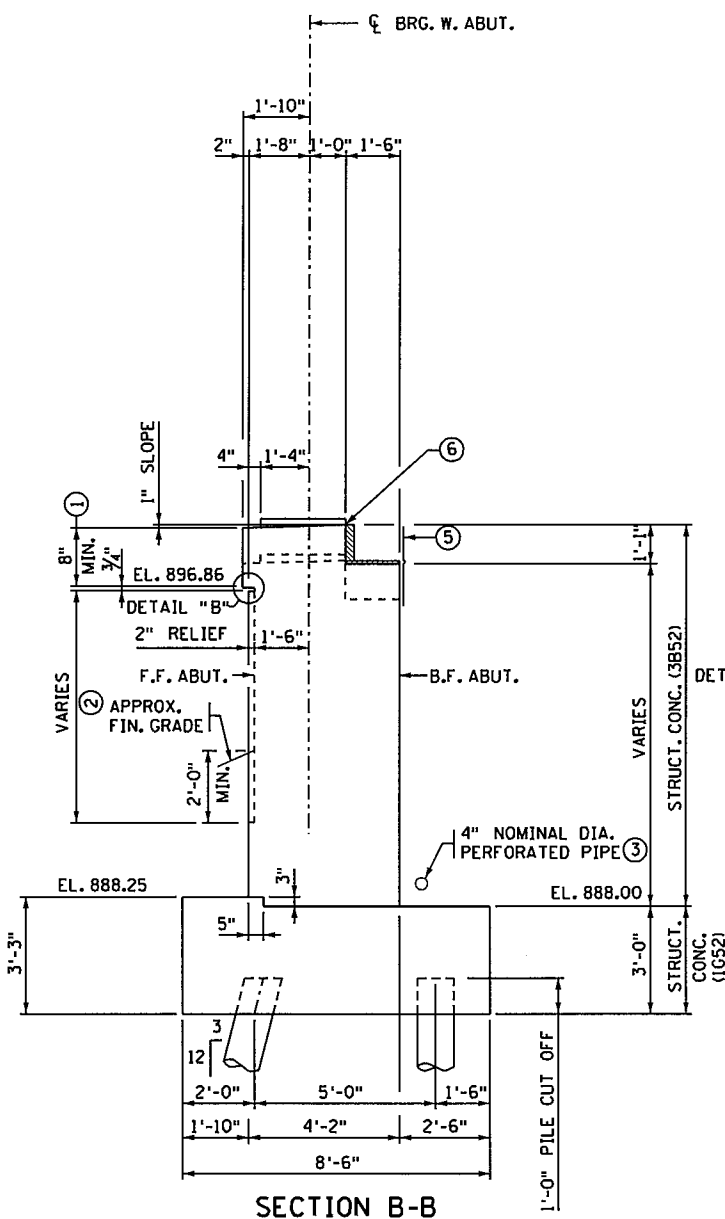
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CHK: NCK	CHK: MHD	12/4/15
SHEET NO. B6 OF B58 SHEETS		

BRIDGE NO 62732

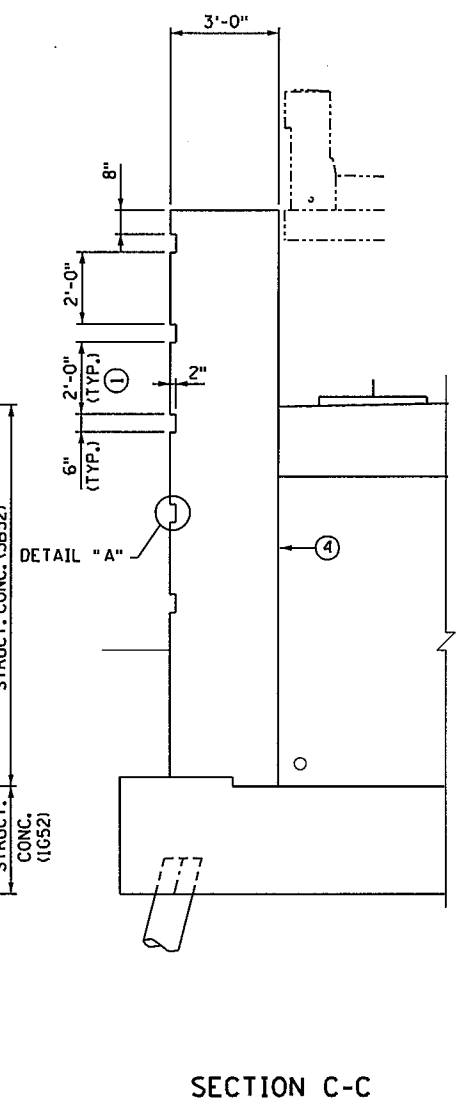
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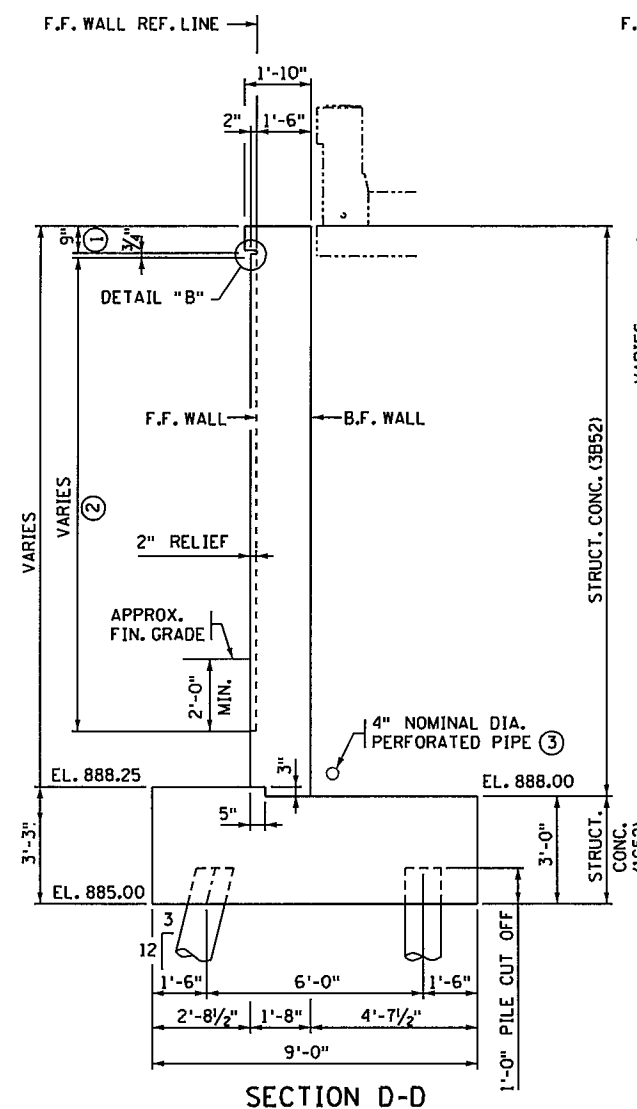
SECTION A-A



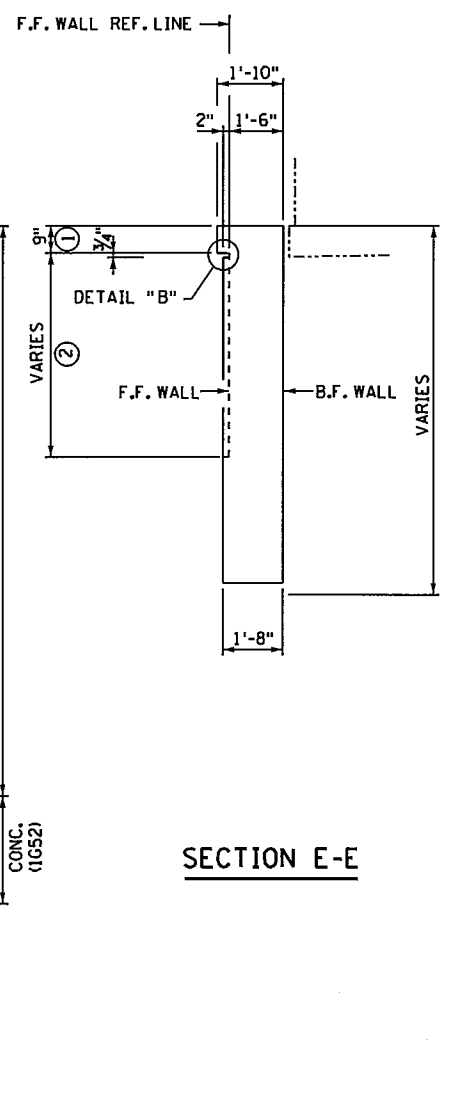
SECTION B-B



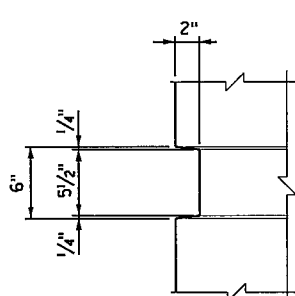
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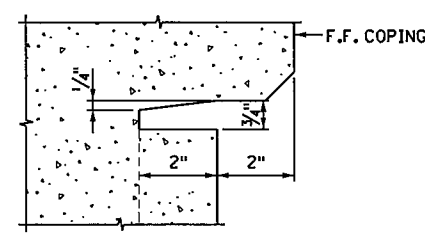
SECTION D-D



SECTION E-E



DETAIL "A"



DETAIL "B"

NOTES:

- ① SMOOTH FINISH.
 - ② ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) & ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.
 - ③ INCLUDED IN DRAINAGE SYSTEM B910.
 - ④ CONSTRUCTION JOINT WITH 2" x 12" KEYWAY.
 - ⑤ MEMBRANE WATERPROOFING SYSTEM PER MnDOT SPEC. 2481.3B, EXCEPT THE STRIP SHALL BE 24" WIDE TO ALLOW MOVEMENT. PAYMENT SHALL BE CONSIDERED INCIDENTAL TO STRUCTURAL CONCRETE (3B52).
 - ⑥ ELEVATION IS AT BACK FACE AS SHOWN IN SECTION B-B.
SEE SHEETS B4 & B5 FOR SECTION A-A CUT LOCATION.
SEE SHEET B6 FOR SECTIONS B-B, C-C, D-D & E-E CUT LOCATIONS.
- F.F. = FRONT FACE
B.F. = BACK FACE

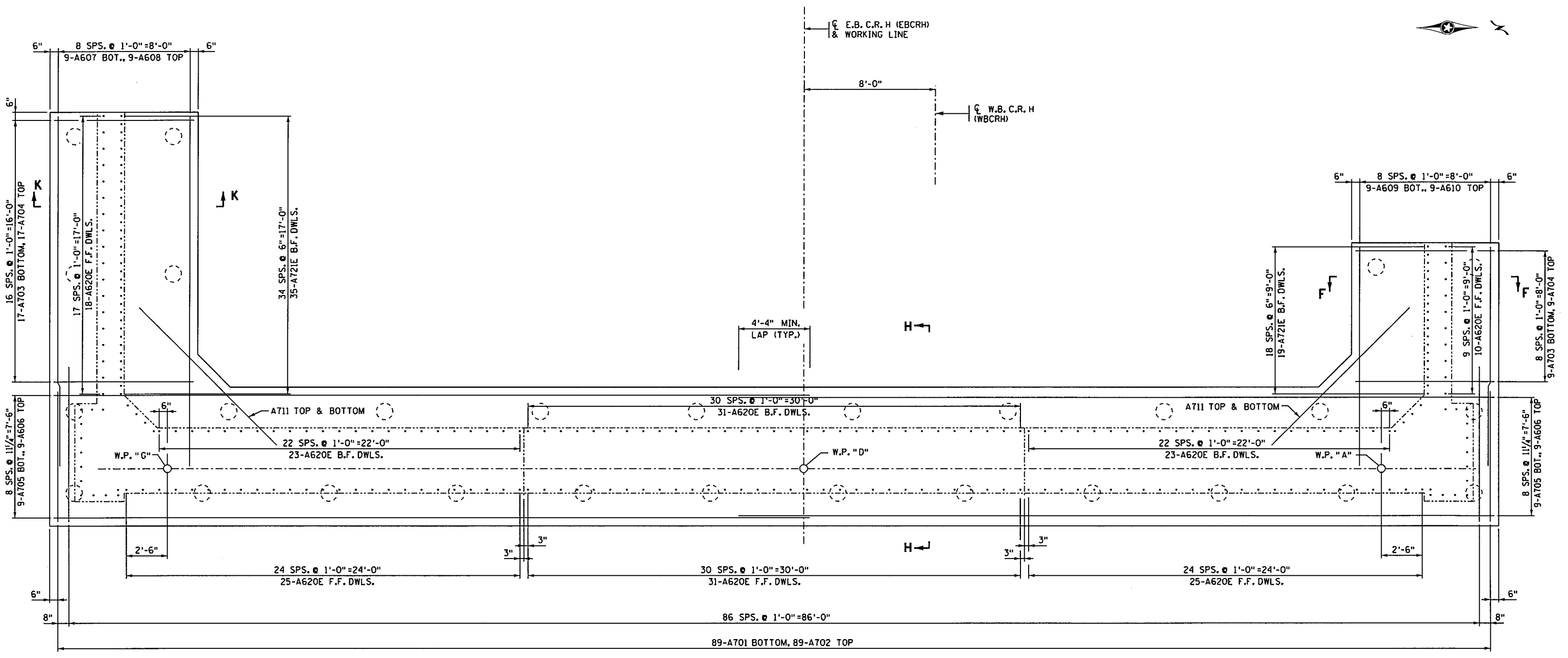
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 Printed Name: MICHAEL H. DUPONT Ltc. No. 43375

WEST ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:	12/14/15	BRIDGE NO 62732
CHK: NCK	CHK: MHD	SHEET NO. B7 OF B58 SHEETS		

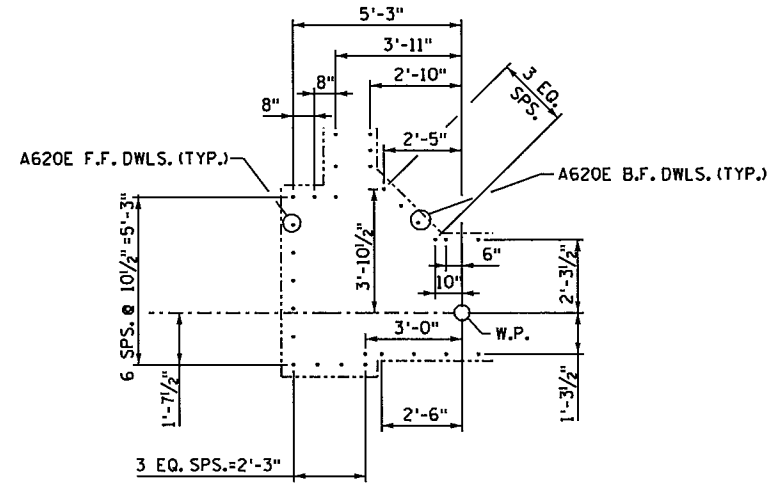
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FOOTING REINFORCEMENT PLAN

SOUTHWEST END

NORTHWEST END



CORNER DETAIL

NOTES:

- SEE SHEET B12 FOR BILL OF REINFORCEMENT.
- SEE SHEET B11 FOR SECTIONS F-F, H-H, & K-K.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM

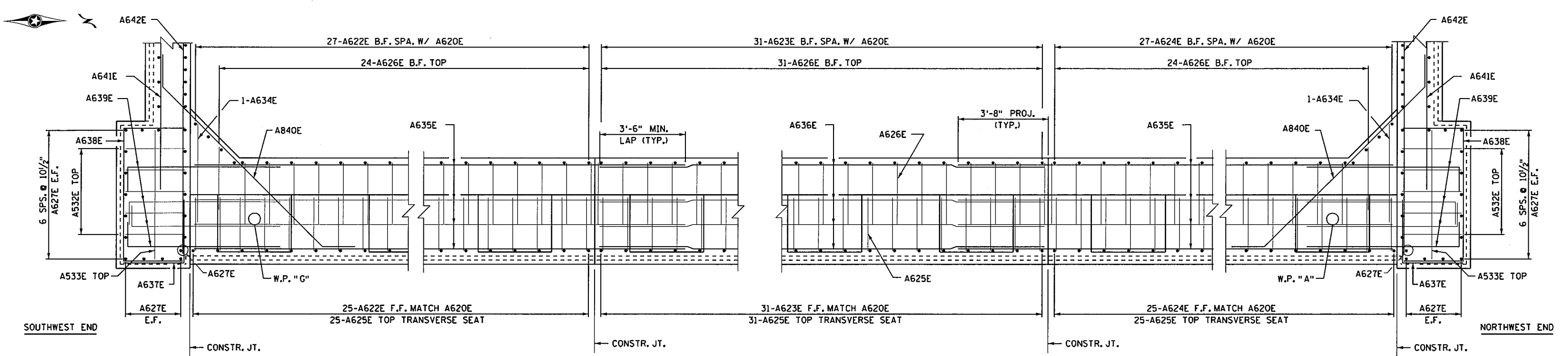
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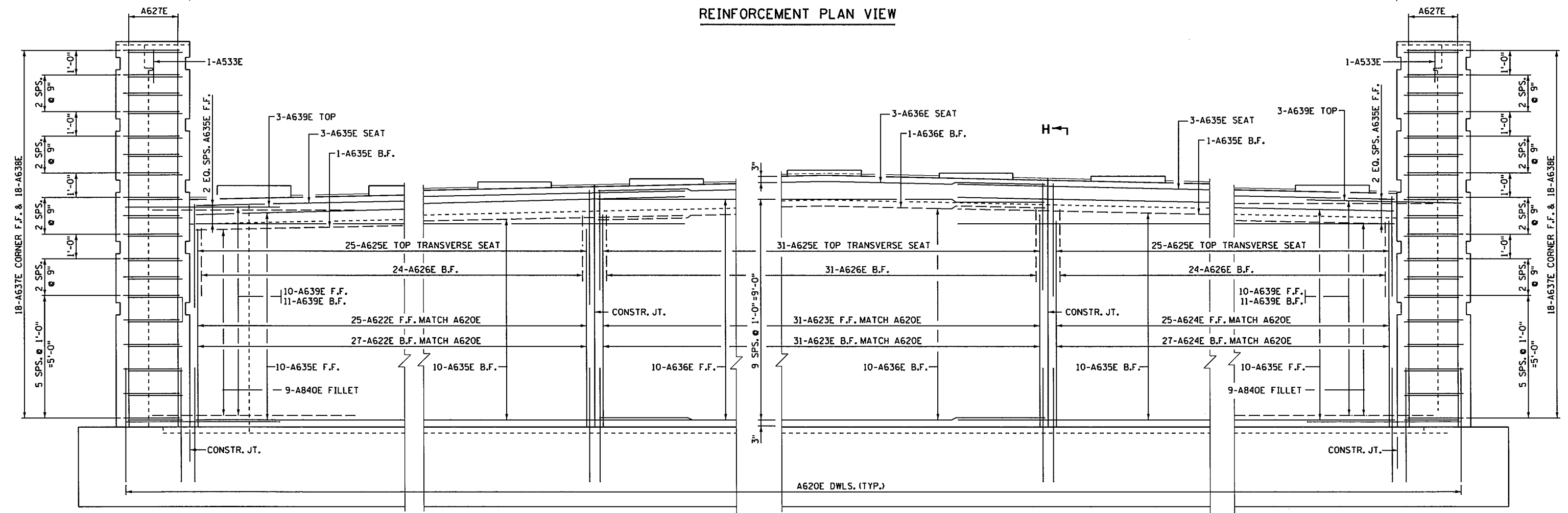
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SHEET NO. B8 OF B58 SHEETS				

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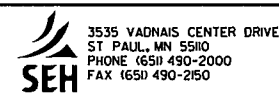
REINFORCEMENT PLAN VIEW



REINFORCEMENT ELEVATION

NOTES:

- SEE SHEET B12 FOR BILL OF REINFORCEMENT.
- SEE SHEET B11 FOR SECTION H-H.
- F.F.=FRONT FACE
- B.F.=BACK FACE

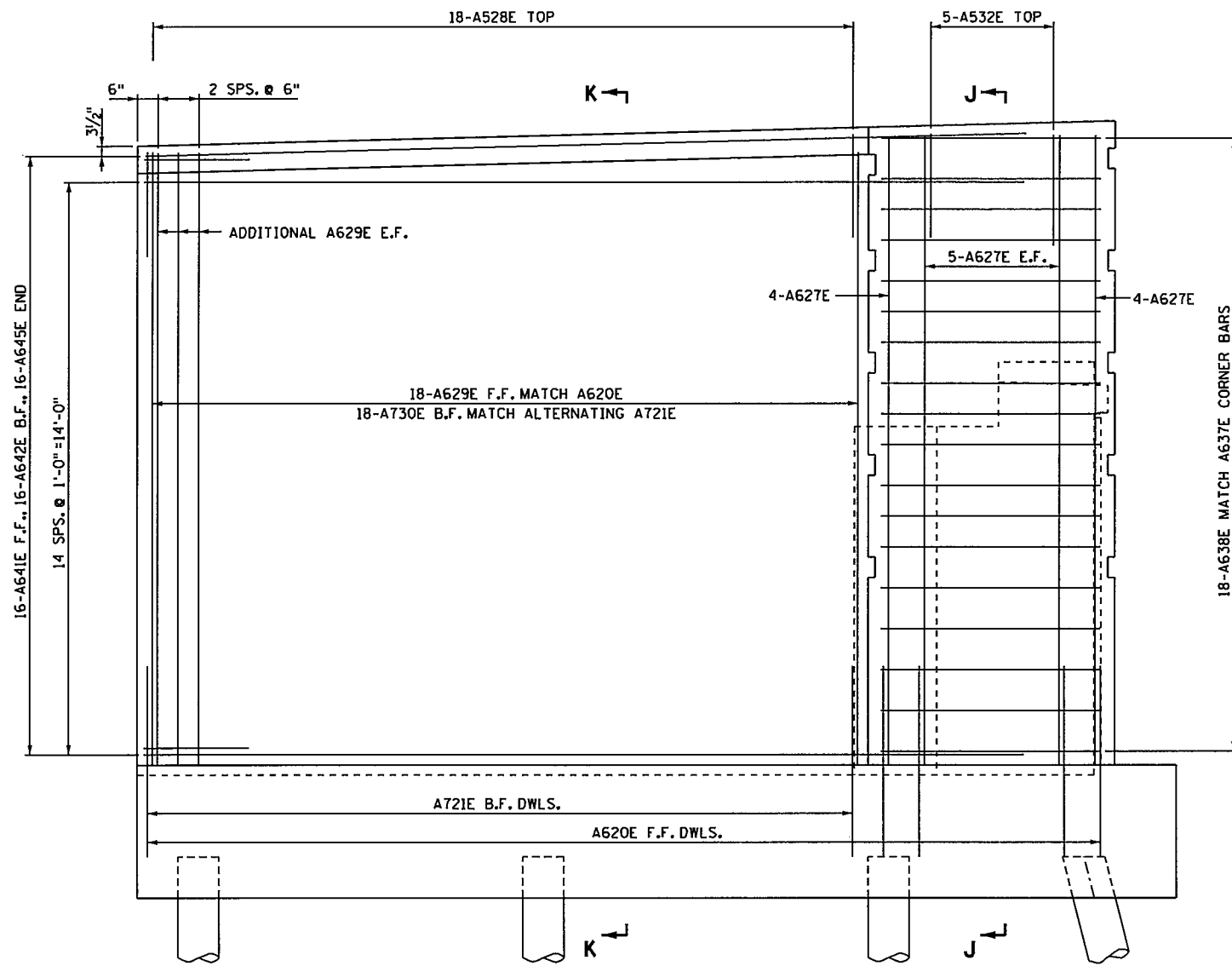


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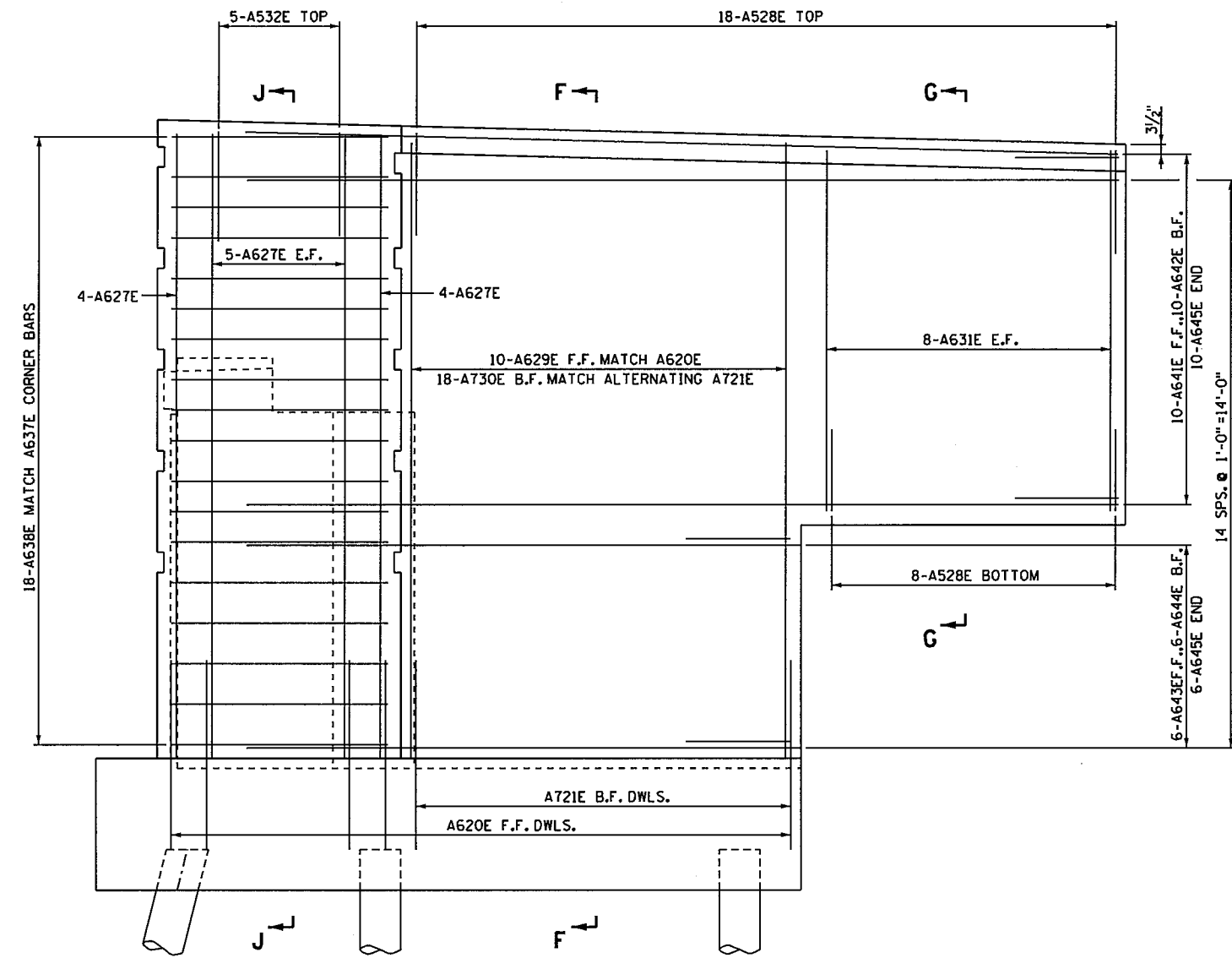
WEST ABUTMENT DETAILS

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CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B9 OF B58 SHEETS			

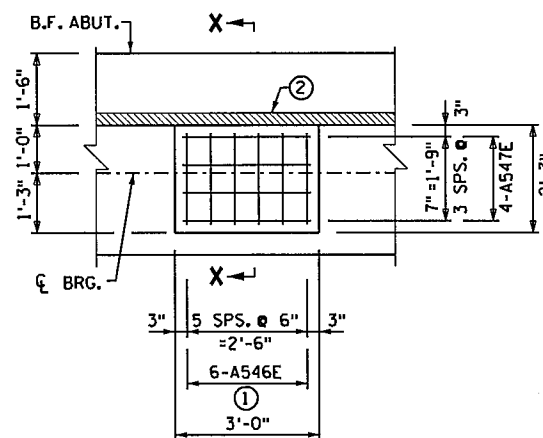
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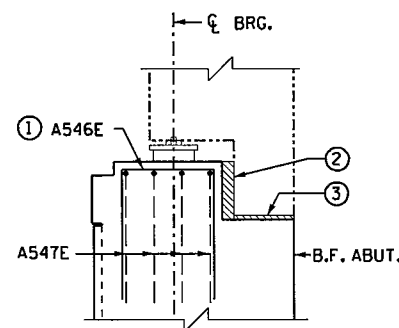
SOUTH WEST WINGWALL REINFORCEMENT ELEVATION



NORTH WEST WINGWALL REINFORCEMENT ELEVATION



TYPICAL BEARING SEAT



SECTION X-X

NOTES:

- SEE SHEET B12 FOR BILL OF REINFORCEMENT.
- SEE SHEET B11 FOR SECTIONS F-F, G-G, H-H, J-J & K-K.
- F.F.=FRONT FACE
- B.F.=BACK FACE
- ① PULL UP TO 2" CLEAR.
- ② 3" LOW DENSITY POLYSTYRENE.
- ③ 1" HIGH DENSITY POLYSTYRENE.

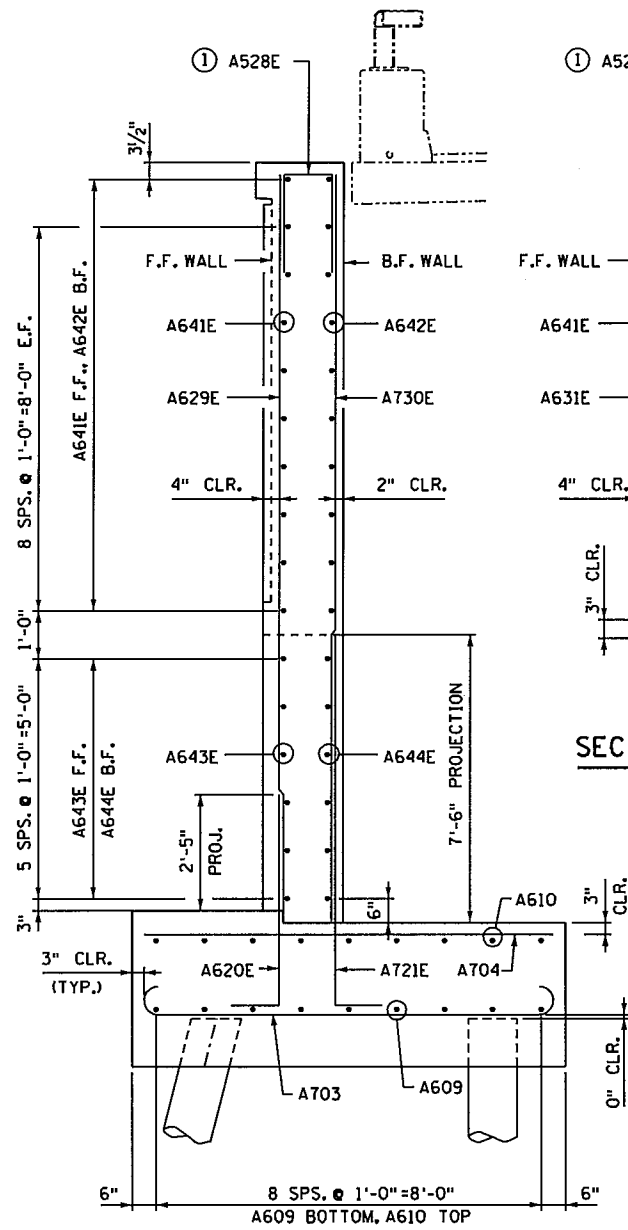
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ST PAUL, MN 55110
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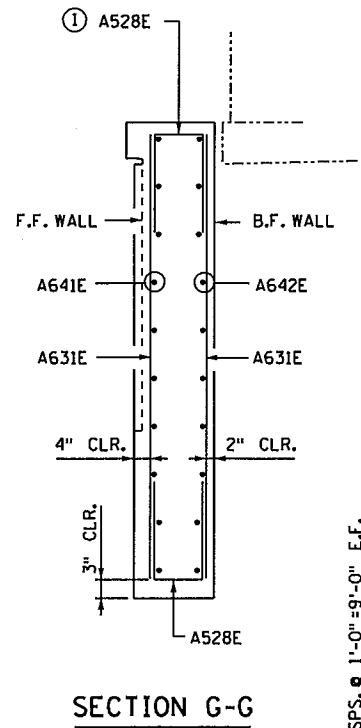
WEST ABUTMENT DETAILS

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SHEET NO. B10 OF B58 SHEETS		

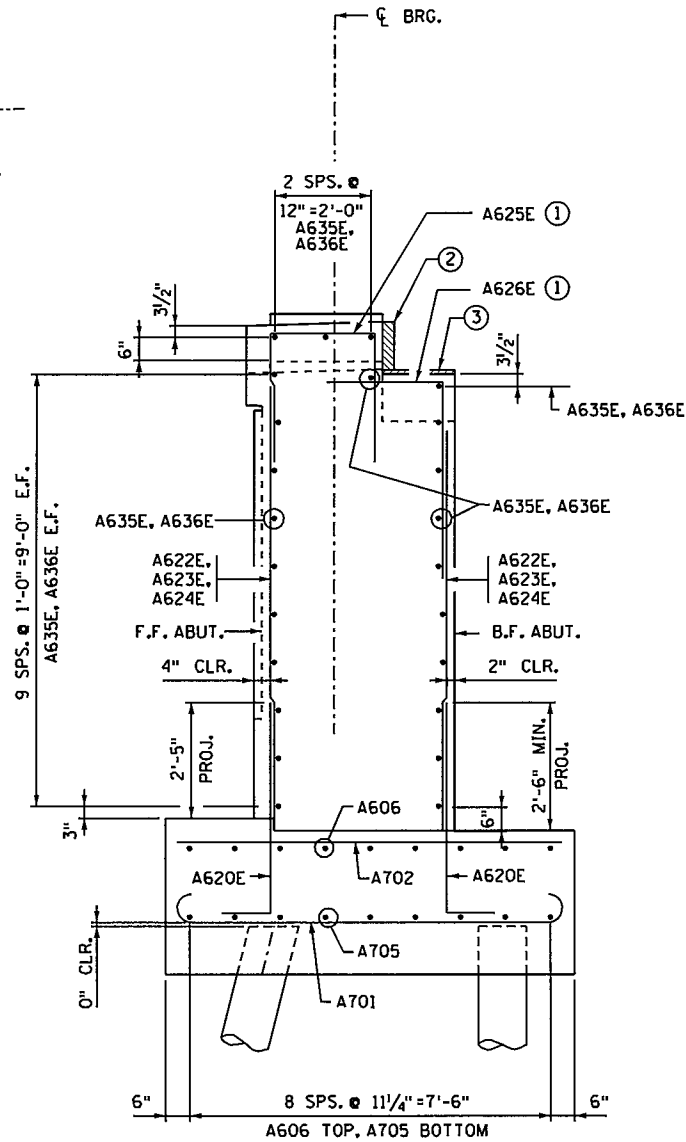
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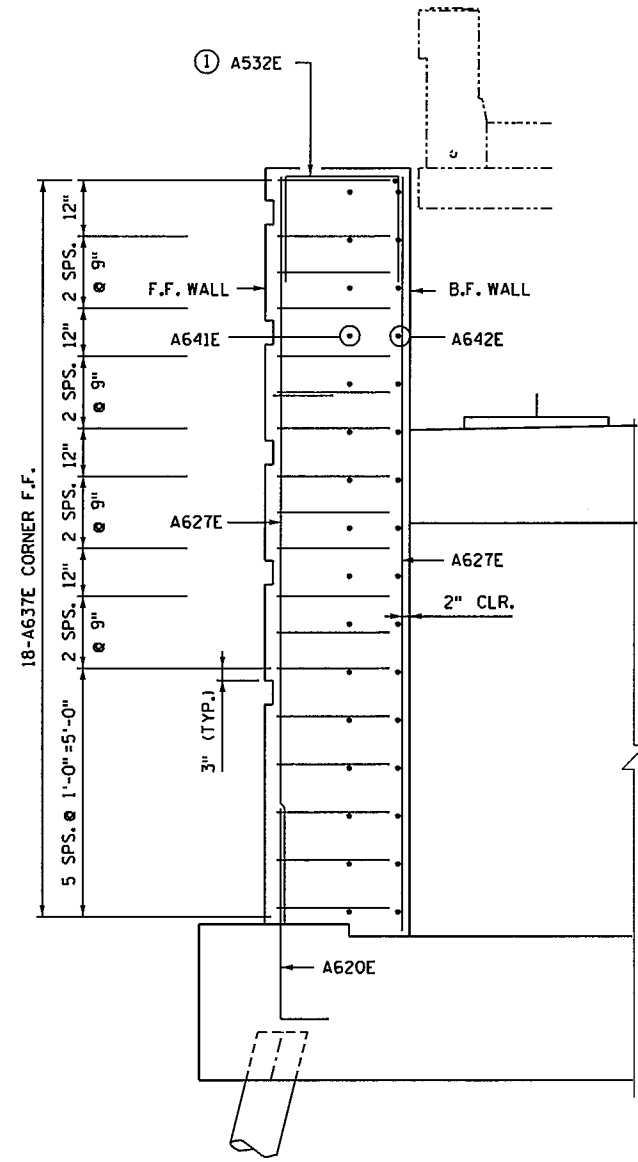
SECTION F-F



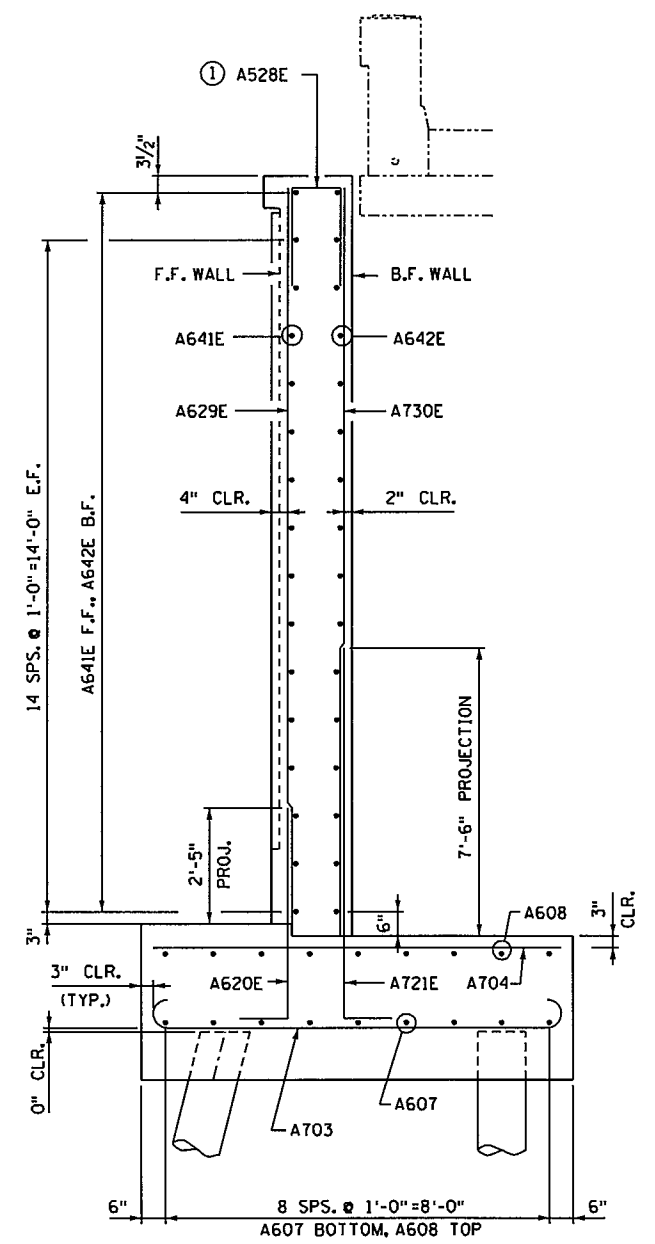
SECTION G-G



SECTION H-H



SECTION J-J



SECTION K-K

- NOTES:**
- SEE SHEET B12 FOR BILL OF REINFORCEMENT.
 - SEE SHEETS B8 & B9 FOR SECTION H-H CUT LOCATION.
 - SEE SHEET B10 FOR SECTIONS F-F, G-G, J-J & K-K CUT LOCATIONS.
 - F.F.=FRONT FACE
B.F.=BACK FACE
 - ① PULL UP TO 2" CLEAR.
 - ② 3" LOW DENSITY POLYSTYRENE.
 - ③ 1" HIGH DENSITY POLYSTYRENE.

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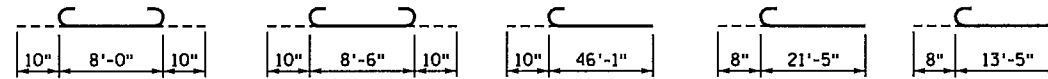
WEST ABUTMENT DETAILS

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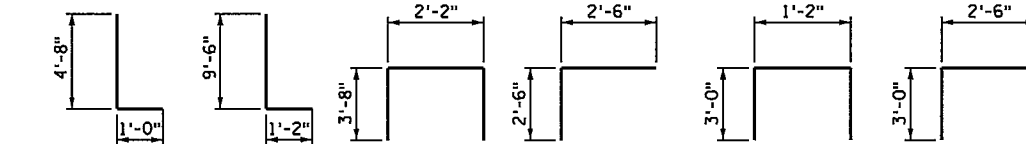
BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
WEST ABUTMENT				
BLACK BARS				
A701	89	9'-8"	BENT	FOOTING TRANSVERSE BOTTOM
A702	89	8'-0"	STR	FOOTING TRANSVERSE TOP
A703	26	10'-2"	BENT	WING FOOTING TRANSVERSE BOTTOM
A704	26	8'-6"	STR	WING FOOTING TRANSVERSE TOP
A705	18	46'-11"	BENT	FOOTING TRANSVERSE BOTTOM
A606	18	46'-11"	STR	FOOTING TRANSVERSE TOP
A607	9	22'-1"	BENT	WING FOOTING LONGIT. BOTTOM
A608	9	21'-5"	STR	WING FOOTING LONGIT. TOP
A609	9	14'-1"	BENT	WING FOOTING LONGIT. BOTTOM
A610	9	13'-5"	STR	WING FOOTING LONGIT. TOP
A711	4	12'-0"	STR	FILLET
WEST ABUTMENT				
EPOXY COATED BARS				
A620E	220	5'-8"	BENT	VERT. DWLS.
A721E	54	10'-8"	BENT	VERT. DWLS. WINGWALL
A622E	52	8'-0"	STR	VERT. ABUT.
A623E	62	8'-8"	STR	VERT. ABUT.
A624E	52	8'-5"	STR	VERT. ABUT.
A625E	81	9'-6"	BENT	TRANSVERSE SEAT
A626E	79	5'-0"	BENT	TRANSVERSE SEAT B.F.
A627E	38	15'-7"	STR	VERT. PILASTER
A528E	44	7'-2"	BENT	WING TOP OR BOTTOM
A629E	34	15'-0"	STR	VERTICAL WING
A730E	28	15'-0"	STR	VERTICAL WING
A631E	16	8'-11"	STR	VERTICAL WING
A532E	10	8'-4"	BENT	PILASTER TOP
A533E	2	11'-4"	BENT	PILASTER TOP
A634E	2	6'-5"	BENT	TRANSVERSE SEAT B.F. FILLET
A635E	48	27'-10"	STR	HORIZ. ABUTMENT
A636E	24	30'-2"	STR	HORIZ. ABUTMENT
A637E	36	4'-10"	BENT	HORIZ. PILASTER
A638E	36	10'-3"	BENT	HORIZ. PILASTER
A639E	48	7'-3"	BENT	HORIZ. PILASTER DWLS.
A840E	18	12'-0"	BENT	HORIZ. FILLET
A641E	26	20'-6"	STR	HORIZ. WALL
A642E	26	23'-0"	STR	HORIZ. WALL
A643E	6	12'-6"	STR	HORIZ. WALL
A644E	6	15'-0"	STR	HORIZ. WALL
A645E	32	5'-0"	BENT	HORIZ. WALL END
A546E	78	7'-5"	BENT	BEARING SEAT
A547E	52	8'-2"	BENT	BEARING SEAT

* BAR USES STANDARD STIRRUP AND TIE HOOKS.

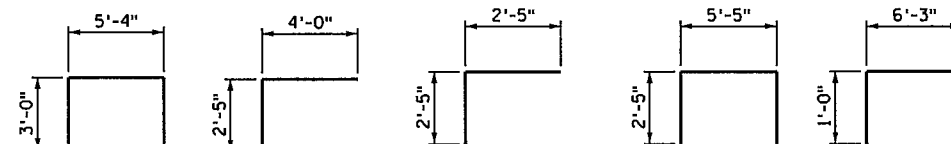
NOTE:
BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT.



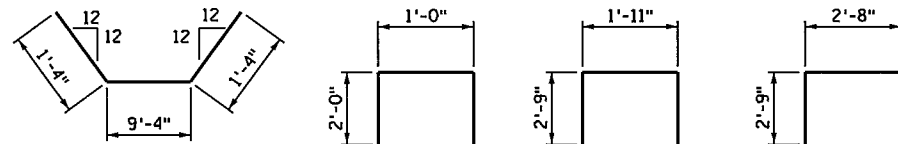
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A620E A721E A625E A626E A528E A532E



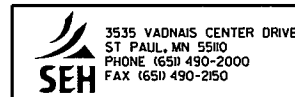
A533E A634E A637E A638E A639E



A840E A645E A546E A547E

SUMMARY OF QUANTITIES FOR WEST ABUTMENT		
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (1G52)	CU YD	113
STRUCTURAL CONCRETE (3B52)	CU YD	175
REINFORCEMENT BARS	POUND	8240
REINFORCEMENT BARS (EPOXY COATED)	POUND	18320
ANTI-GRAFFITI COATING	SQ FT	880
ARCH. CONC. TEXTURE (ASHLAR STONE)	SQ FT	880
ARCH. SURFACE FINISH (MULTI COLOR)	SQ FT	880
C-I-P CONCRETE PILING DELIVERED 12"	LIN FT	2210
C-I-P CONCRETE PILING DRIVEN 12"	LIN FT	2210
C-I-P CONC TEST PILE 95 FT LONG 12"	EACH	2
PILE REDRIVING	EACH	2
PILE ANALYSIS	EACH	2

PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
① DOES NOT INCLUDE TEST PILES.



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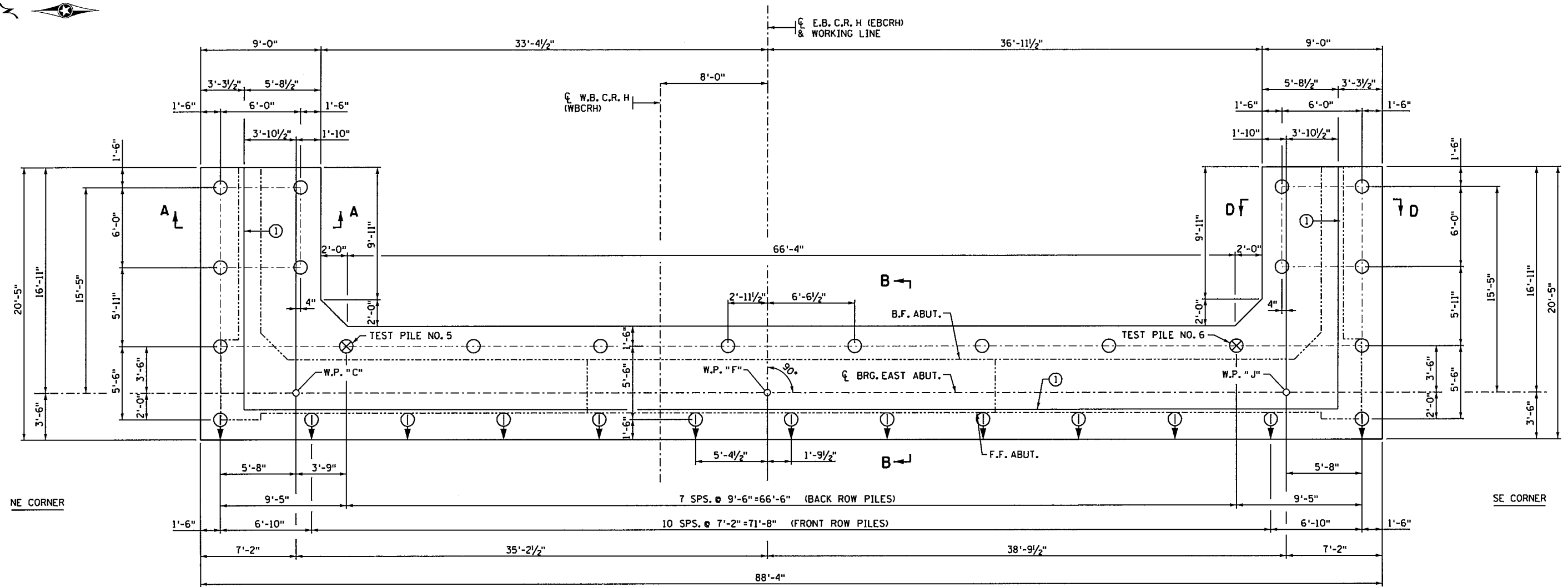
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

WEST ABUTMENT BILL OF REINFORCEMENT AND QUANTITIES

DES: MHD DR: MAW APPROVED: 12/14/15
CHK: NCK CHK: MHD
SHEET NO. B12 OF B58 SHEETS

BRIDGE NO 62732

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FOOTING PLAN

EAST ABUTMENT COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD + EARTH PRESSURE	106.3
FACTORED LIVE LOAD	18.6
* FACTORED DESIGN LOAD = PILE BEARING RESISTANCE	124.9

*BASED ON STRENGTH I LOAD COMBINATION.

EAST ABUTMENT REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R _n - Tons/Pile		
FIELD CONTROL METHOD	φ _{dyn}	*R _n
MnDOT Pile Formula 2012 (MPF12) R _n = 20 √(WxH/1000) x log(10/S)	0.50	(A) 249.8
PDA	0.65	192.2

*R_n = (Factored Design Load) / φ_{dyn}

PILE NOTES:

2 12" C-I-P CONCRETE TEST PILE 110 FT. LONG
 29 12" C-I-P CONCRETE PILES EST. LENGTH 90 FT.
 31 12" C-I-P CONCRETE PILES REQ'D FOR E. ABUT.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
 FOR PILE SPLICE DETAILS SEE DETAIL B201.
 PILES MARKED THIS TO BE BATTERED 3" PER FOOT IN DIRECTION SHOWN.
 PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
 DRIVE TEST PILES TO PRODUCTION PILE LENGTH OR BEARING WHICH EVER COMES FIRST. PERFORM PILE REDRIVING AFTER 48 HOURS TO CONFIRM 115% BEARING, AS REQUIRED FOR TEST PILE IS ACHIEVED. CONTINUE REDRIVING IF 115% BEARING IS NOT ACHIEVED.

(A) NEW MNDOT MPF12 PILE DRIVING FORMULA AND TABLE MUST BE USED FOR THIS BRIDGE. USE OF OLDER FORMULA WILL RESULT IN INADEQUATE PILE CAPACITY.

NOTES:

SEE SHEET B16 FOR SECTIONS A-A, B-B & D-D.
 F.F. = FRONT FACE
 B.F. = BACK FACE
 E.F. = EACH FACE
 T&B = TOP AND BOTTOM
 EDGE OF 3" VERTICAL KEY.

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 3535 VADNAIS CENTER DRIVE
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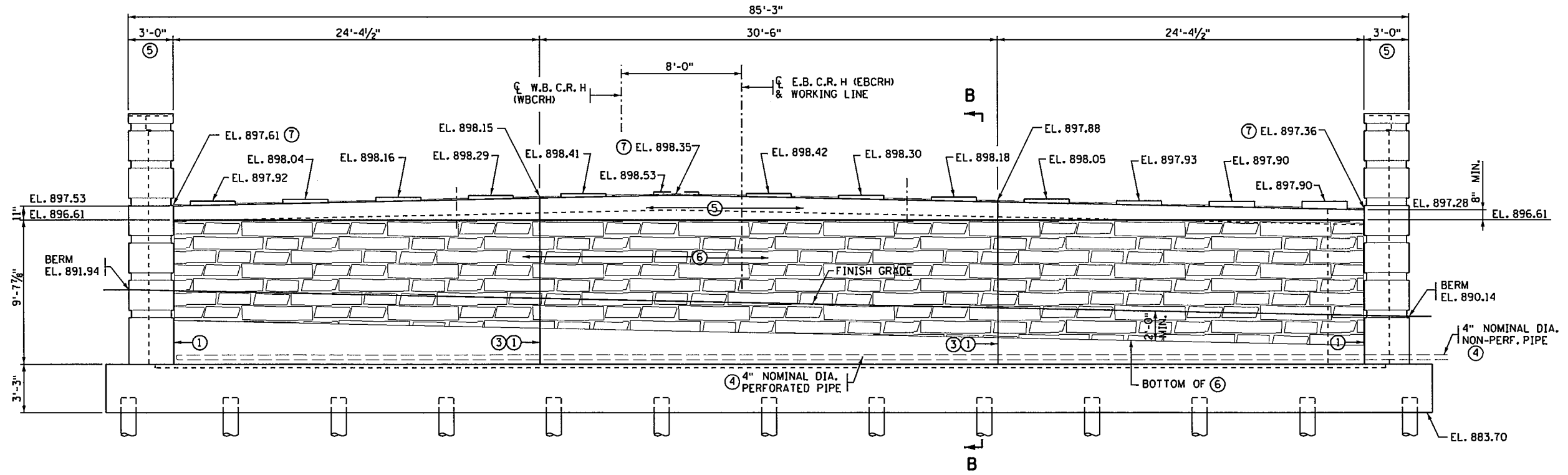
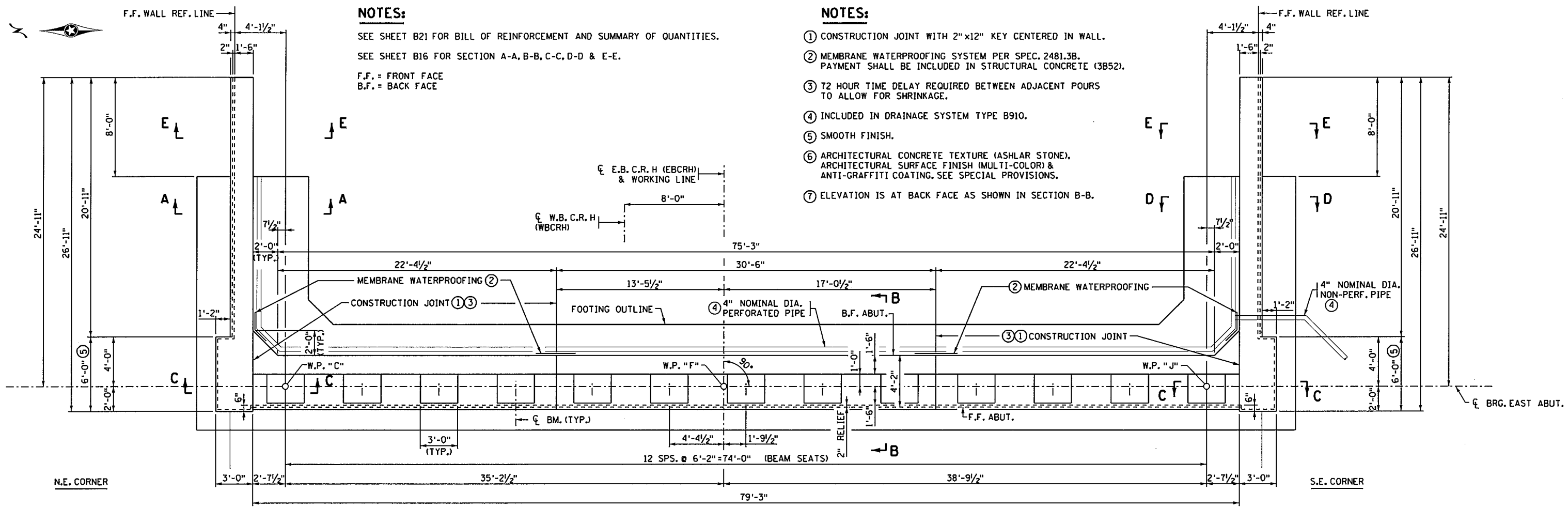
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 Printed Name: MICHAEL J. DUPONT Lic. No. 43375

EAST ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:
CHK: NCK	CHK: MHD	12/14/15
SHEET NO. B13 OF B58 SHEETS		

BRIDGE NO
62732

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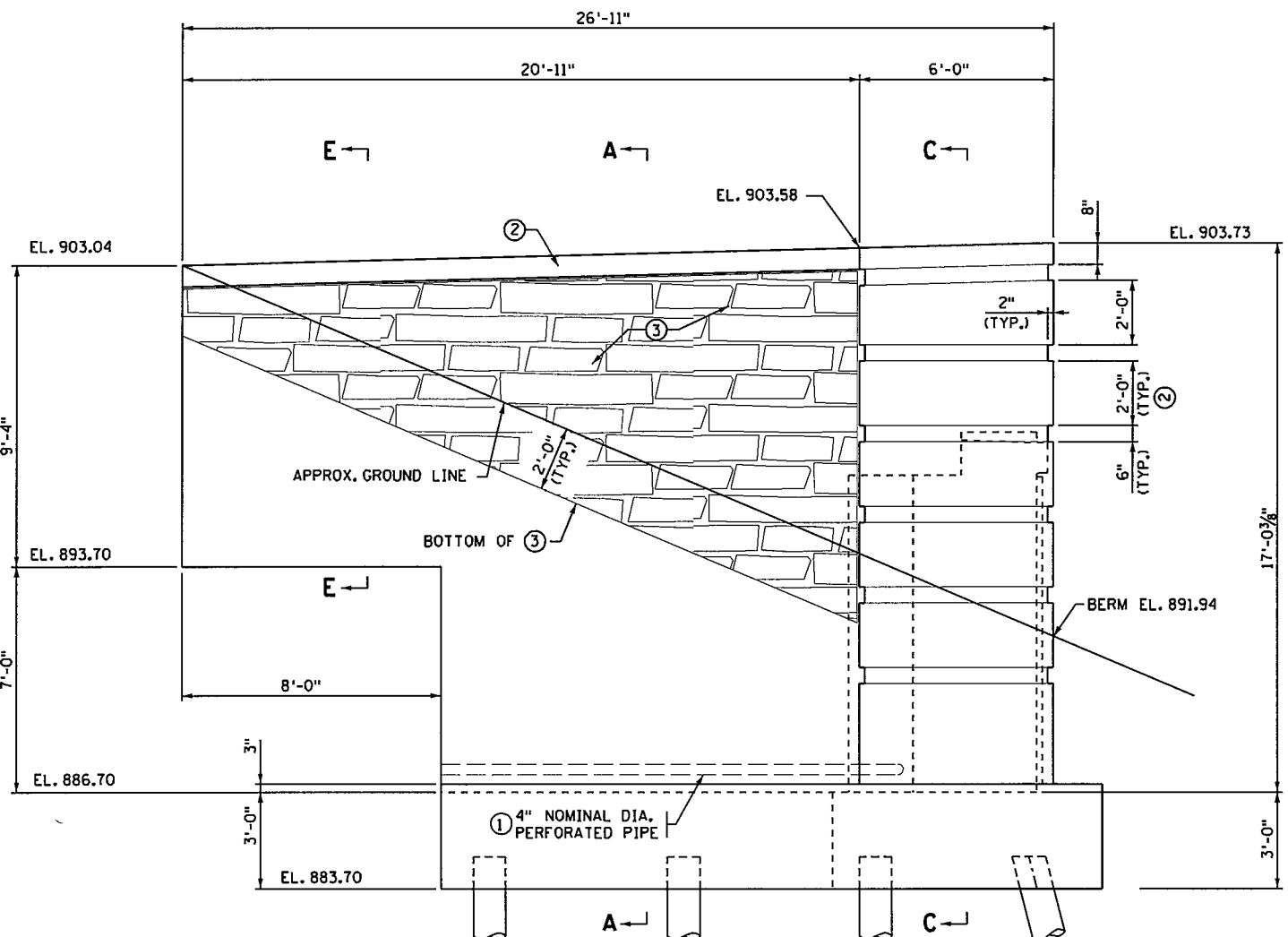
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Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

EAST ABUTMENT DETAILS

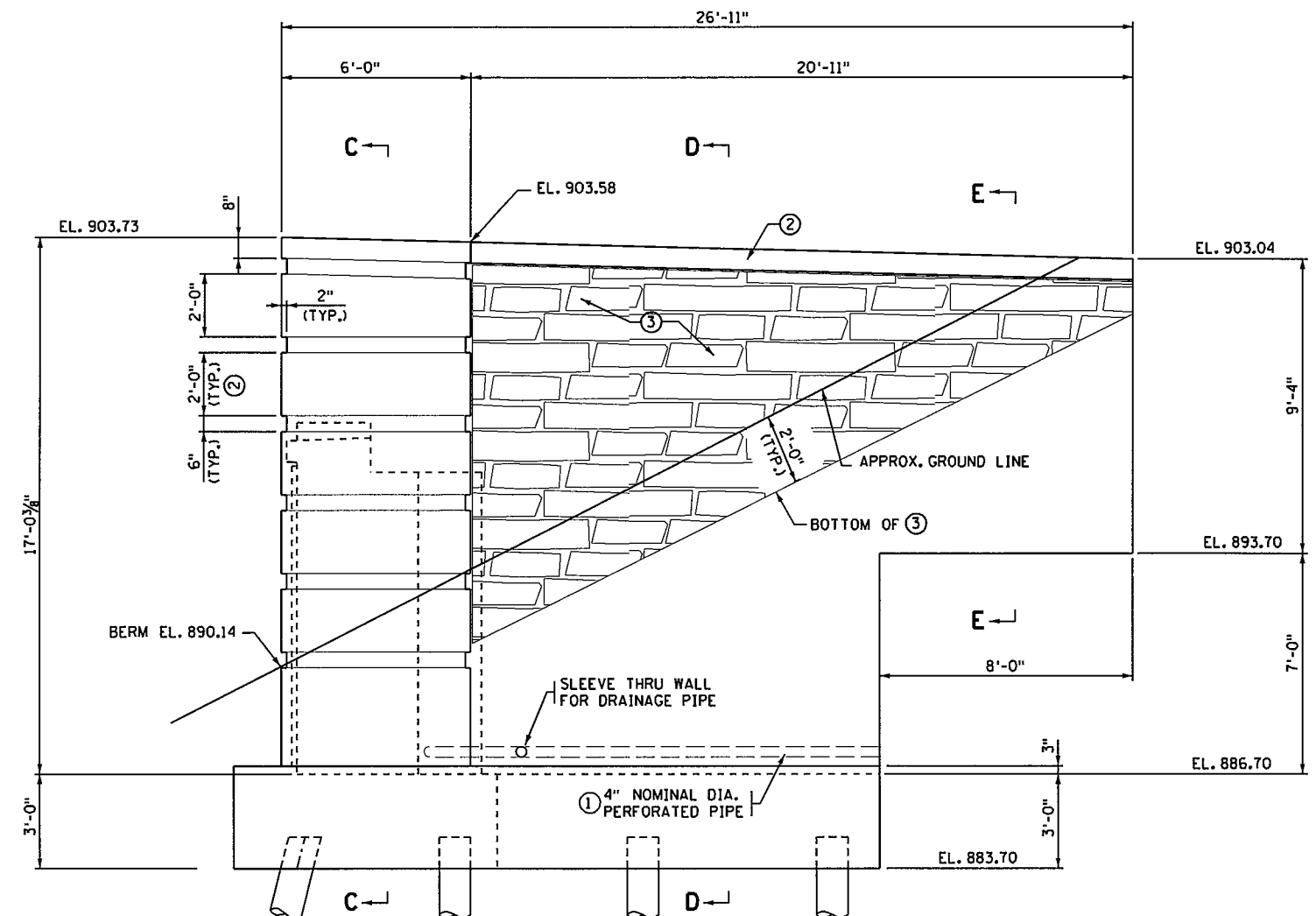
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SHEET NO. B14 OF B58 SHEETS

BRIDGE NO 62732

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N.E. WINGWALL ELEVATION



S.E. WINGWALL ELEVATION

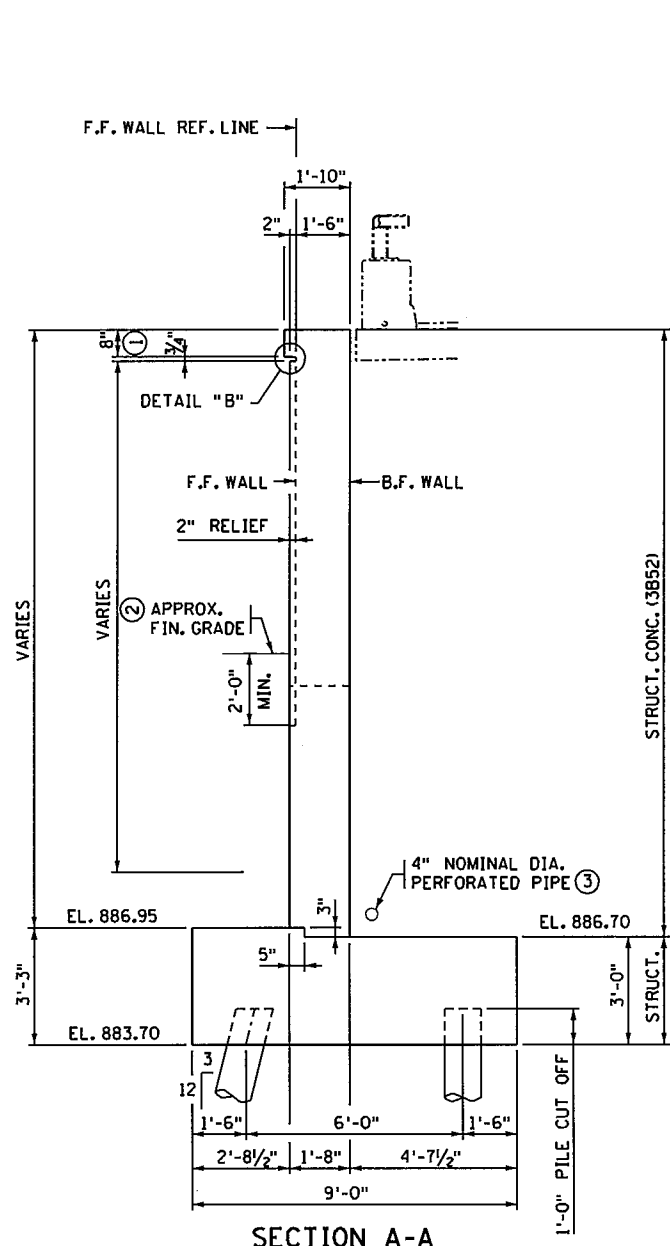
- NOTES:**
- SEE SHEET B21 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
 - SEE SHEET B16 FOR SECTION A-A, C-C, D-D & E-E.
 - F.F. = FRONT FACE
 - B.F. = BACK FACE
 - ① INCLUDED IN DRAINAGE SYSTEM TYPE B910.
 - ② SMOOTH FINISH.
 - ③ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) & ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.

	3535 VADNAIS CENTER DRIVE ST PAUL, MN 55100 PHONE (650) 490-2000 FAX (650) 490-2150	I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
	Signature: <i>Michael H. Dupont</i> Date: 12-4-15	Printed Name: MICHAEL H. DUPONT Lic. No. 43375

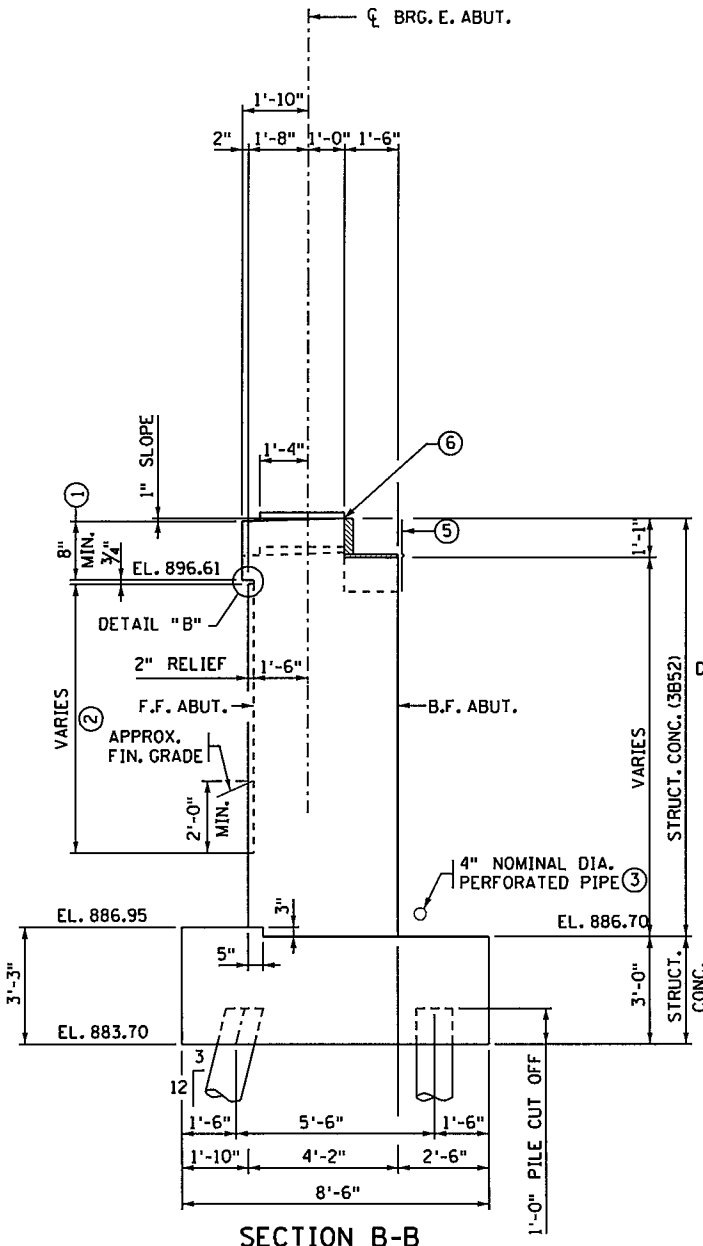
EAST ABUTMENT DETAILS

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SHEET NO. B15 OF B58 SHEETS			

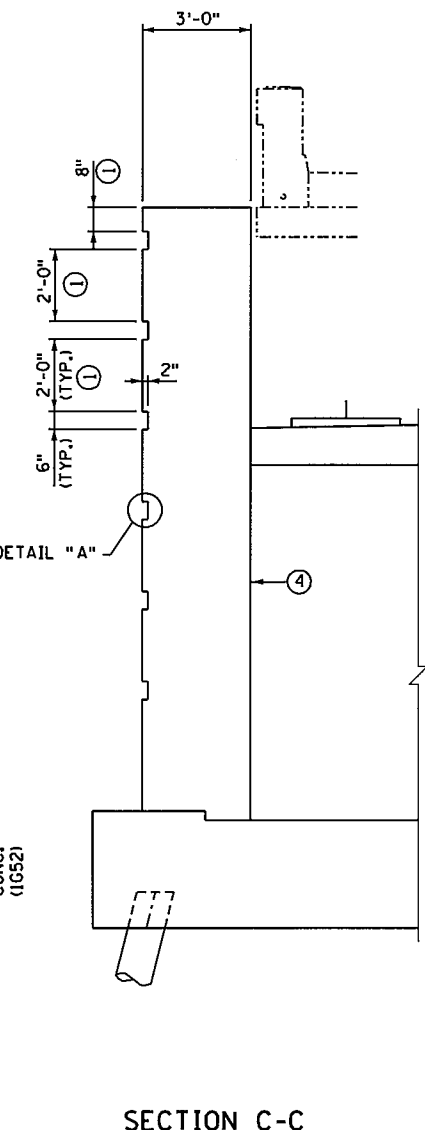
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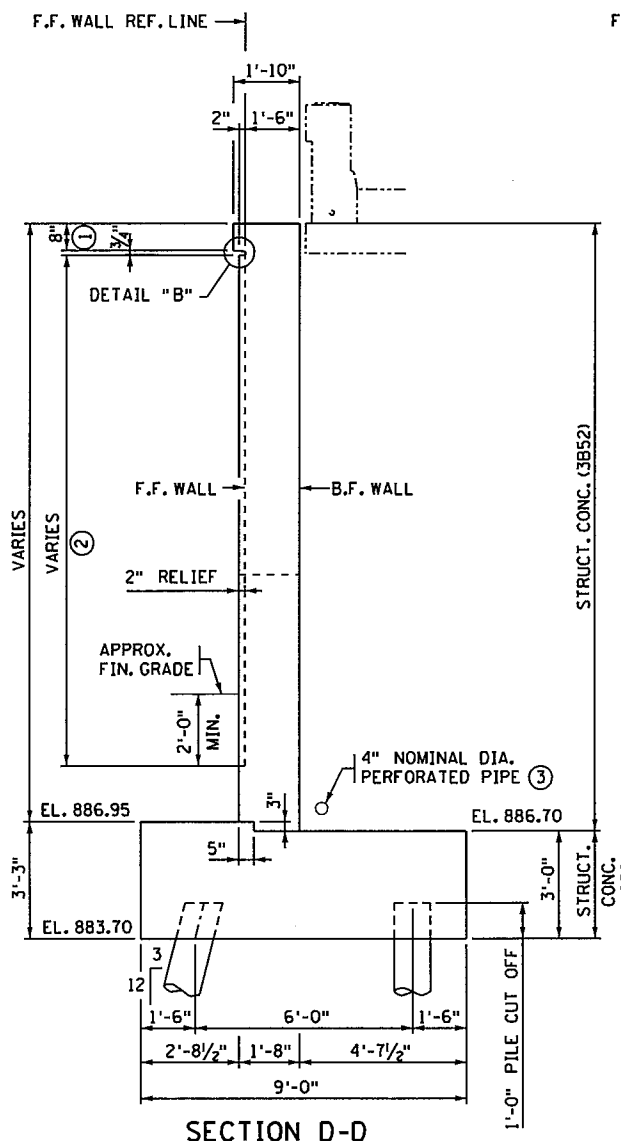
SECTION A-A



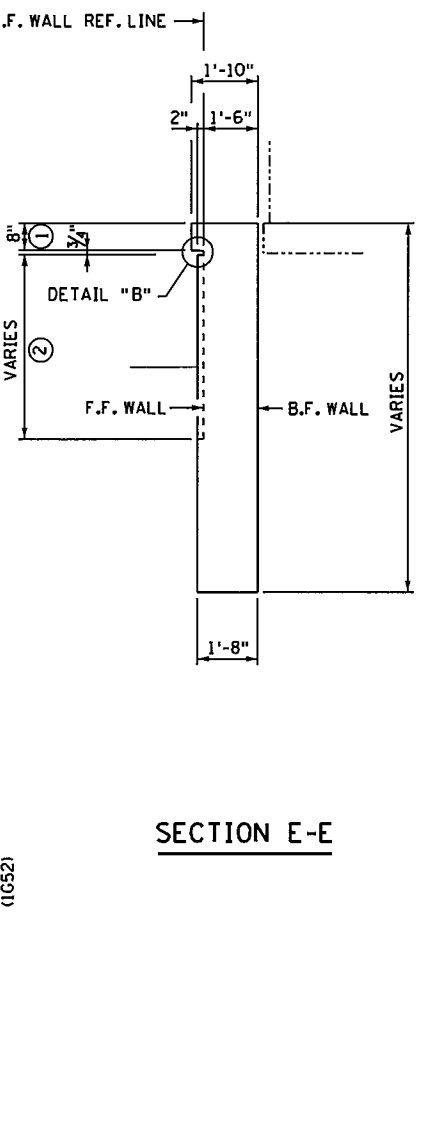
SECTION B-B



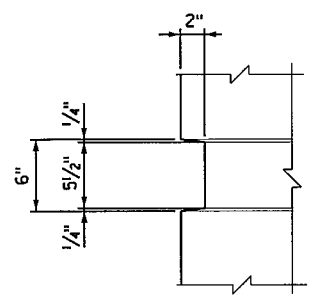
SECTION C-C



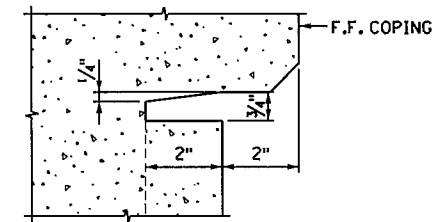
SECTION D-D



SECTION E-E



DETAIL "A"



DETAIL "B"

NOTES:

- SEE SHEETS B13, B14 & B15 FOR SECTION CUT LOCATIONS.
- ① SMOOTH FINISH.
- ② ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) & ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.
- ③ INCLUDED IN DRAINAGE SYSTEM B910.
- ④ CONSTRUCTION JOINT WITH 2" x 12" KEYWAY.
- ⑤ MEMBRANE WATERPROOFING SYSTEM PER MNDOT SPEC. 2481.3B, EXCEPT THE STRIP SHALL BE 24" WIDE TO ALLOW MOVEMENT. PAYMENT SHALL BE CONSIDERED INCIDENTAL TO STRUCTURAL CONCRETE (3B52).
- ⑥ ELEVATION IS AT BACK FACE AS SHOWN IN SECTION B-B.

F.F. = FRONT FACE
B.F. = BACK FACE

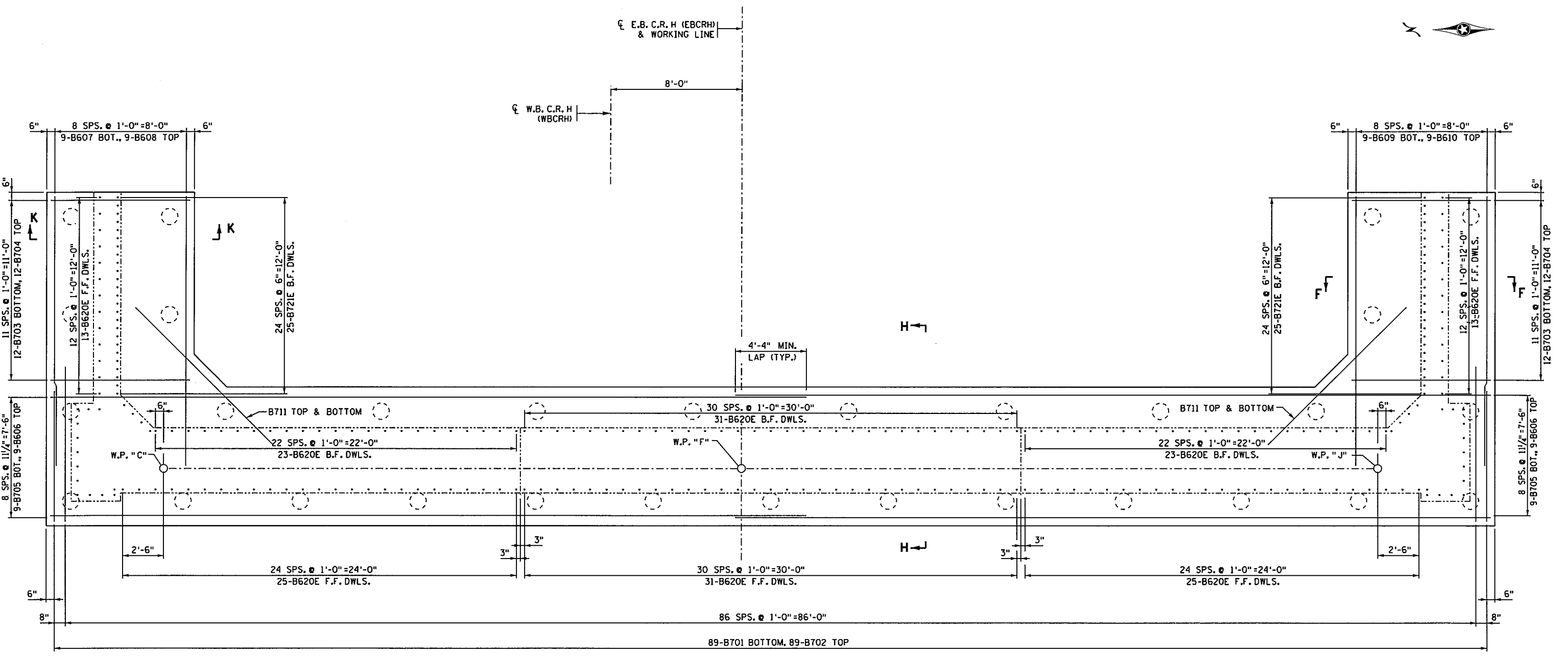
3535 VADNAIS CENTER DRIVE
 ST PAUL, MN 55110
 PHONE (650) 490-2000
 FAX (650) 490-2150

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

EAST ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62732
CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B16 OF B58 SHEETS			

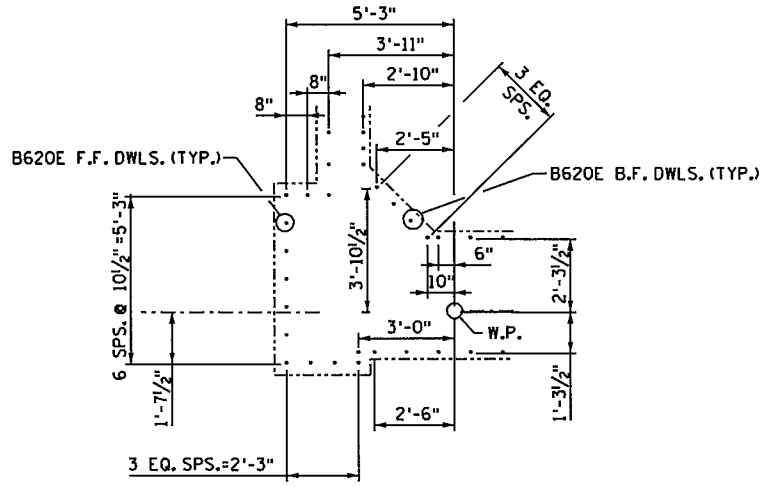
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FOOTING REINFORCEMENT PLAN

NORTHEAST END


SOUTHEAST END



CORNER DETAIL

NOTES:

- SEE SHEET B21 FOR BILL OF REINFORCEMENT.
- SEE SHEET B20 FOR SECTIONS F-F, H-H, & K-K.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM


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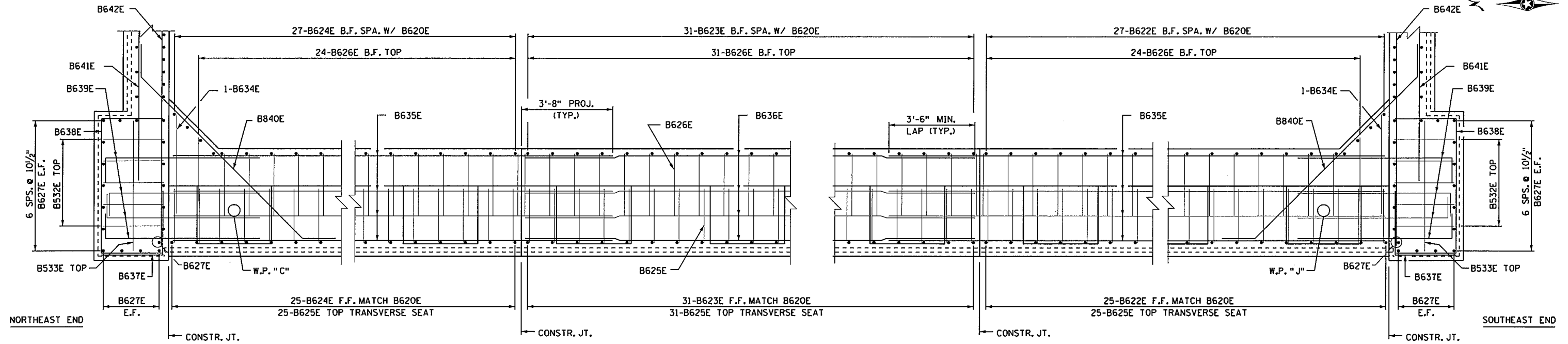
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SHEET NO. B17 OF B58 SHEETS			

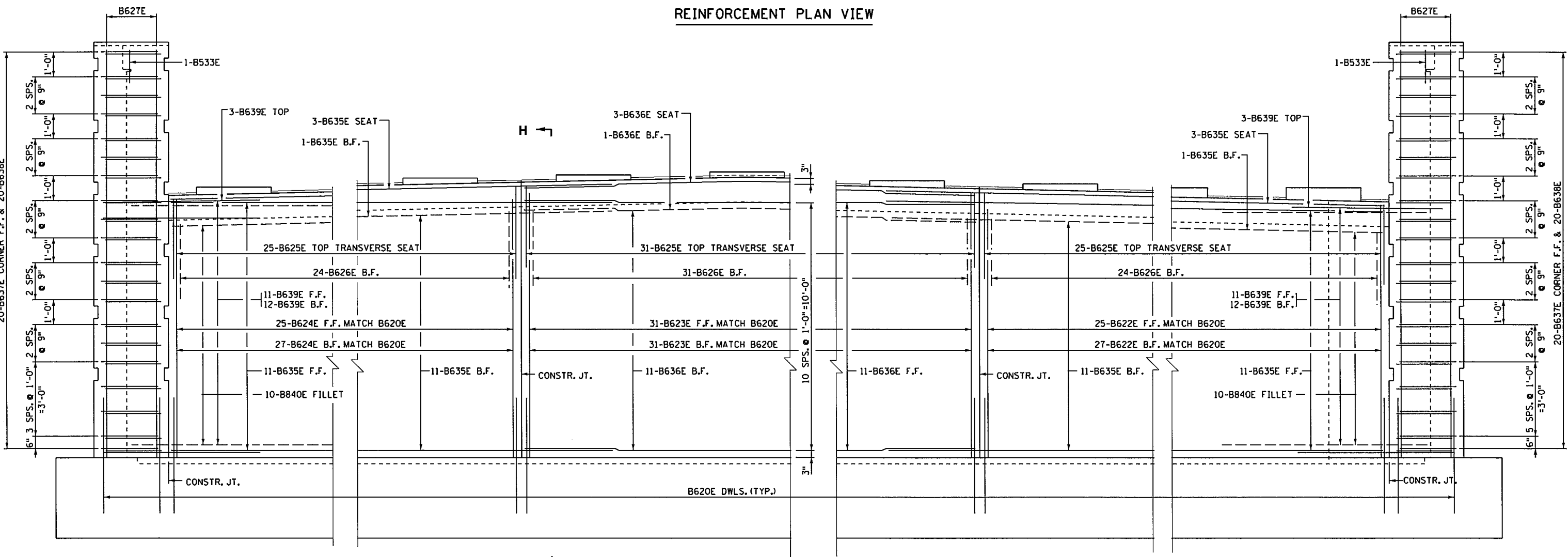
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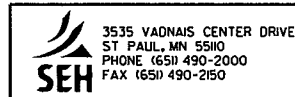
REINFORCEMENT PLAN VIEW



REINFORCEMENT ELEVATION

NOTES:

- SEE SHEET B21 FOR BILL OF REINFORCEMENT.
- SEE SHEET B20 FOR SECTION H-H.
- F.F.=FRONT FACE
- B.F.=BACK FACE



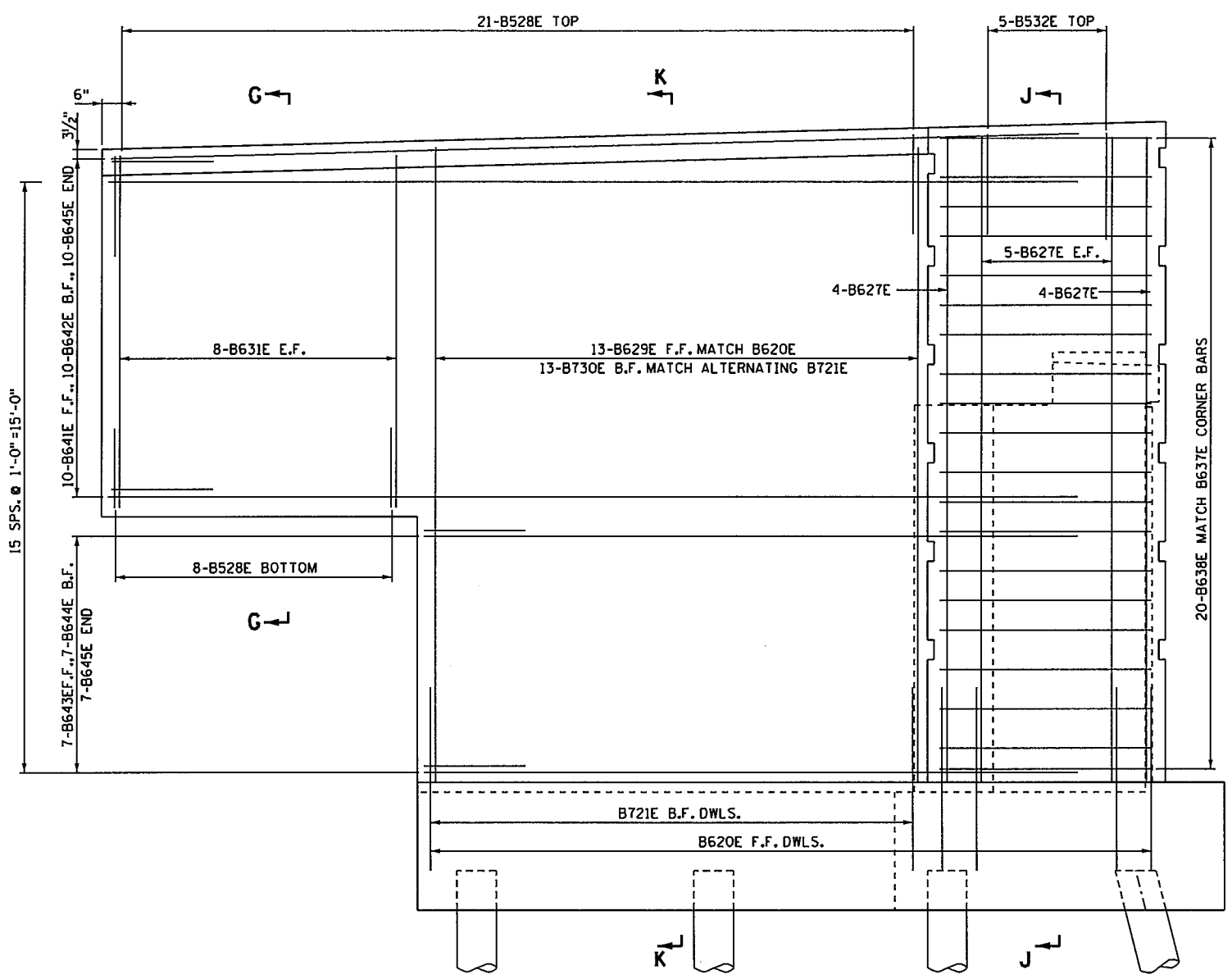
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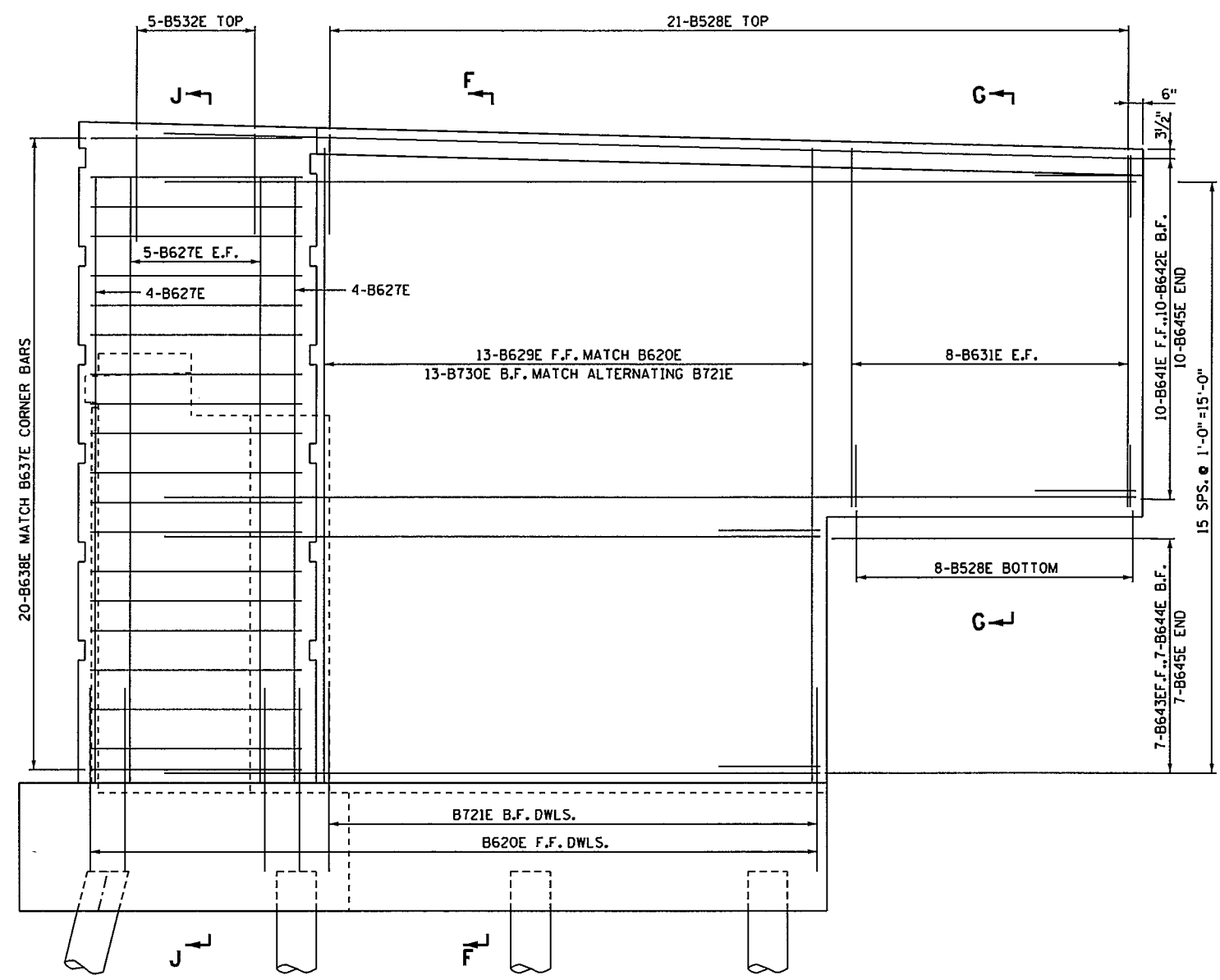
EAST ABUTMENT DETAILS

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CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B18 OF B58 SHEETS			

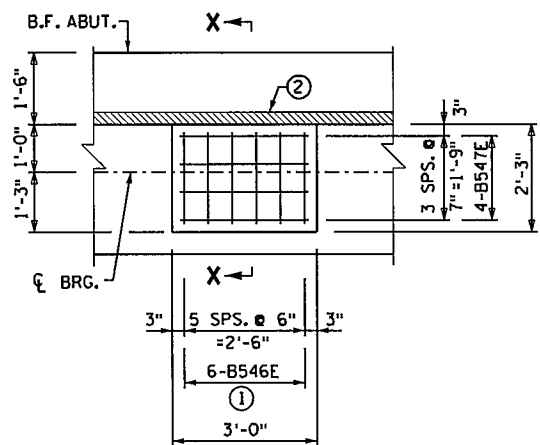
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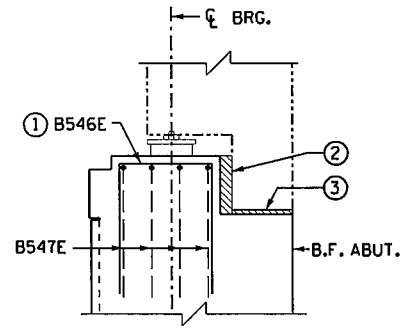
NORTHEAST WINGWALL REINFORCEMENT ELEVATION



SOUTHEAST WINGWALL REINFORCEMENT ELEVATION



TYPICAL BEARING SEAT



SECTION X-X

NOTES:

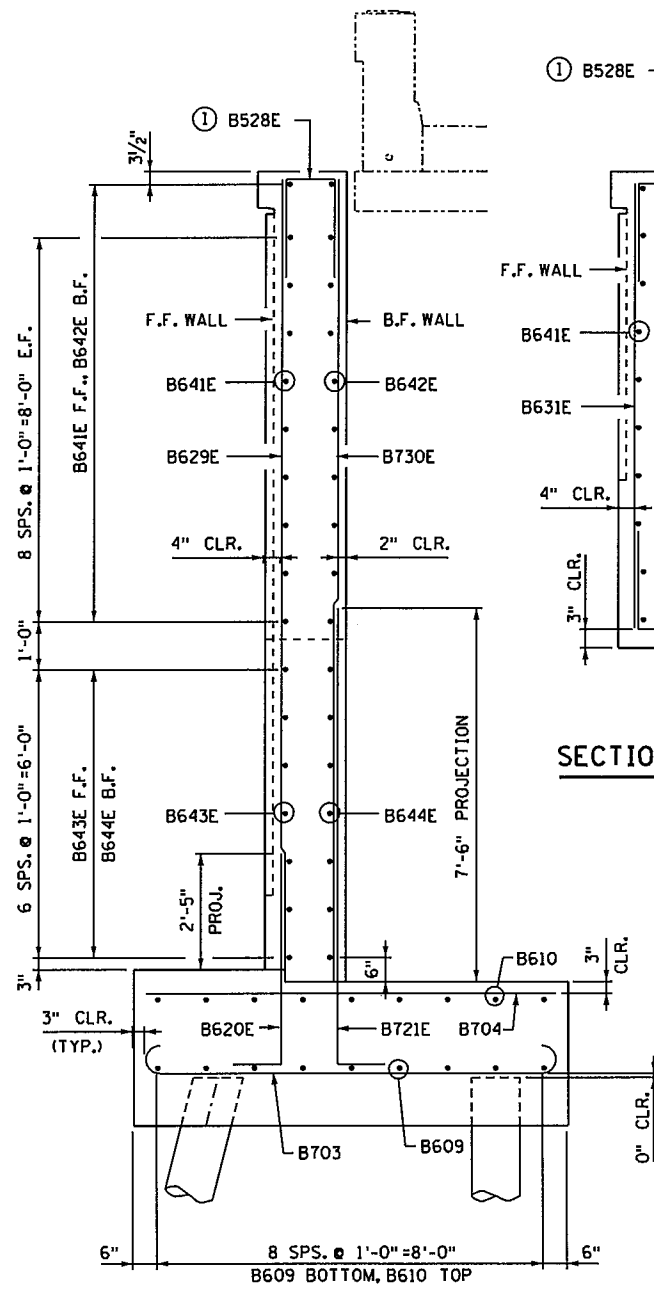
- SEE SHEET B21 FOR BILL OF REINFORCEMENT.
- SEE SHEET B20 FOR SECTIONS F-F, G-G, H-H, J-J & K-K.
- F.F.=FRONT FACE
- B.F.=BACK FACE
- ① PULL UP TO 2" CLEAR.
- ② 3" LOW DENSITY POLYSTYRENE.
- ③ 1" HIGH DENSITY POLYSTYRENE.

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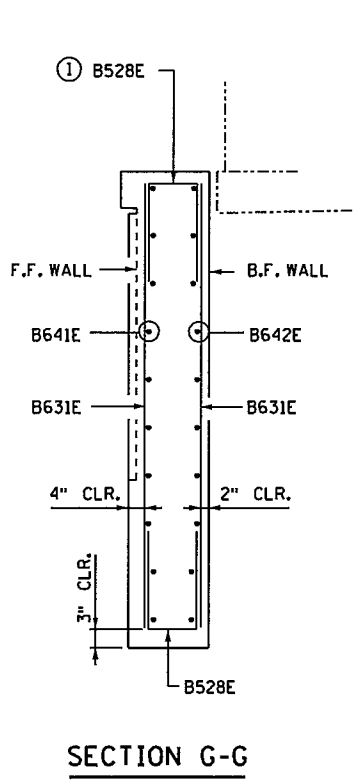
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 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

EAST ABUTMENT DETAILS

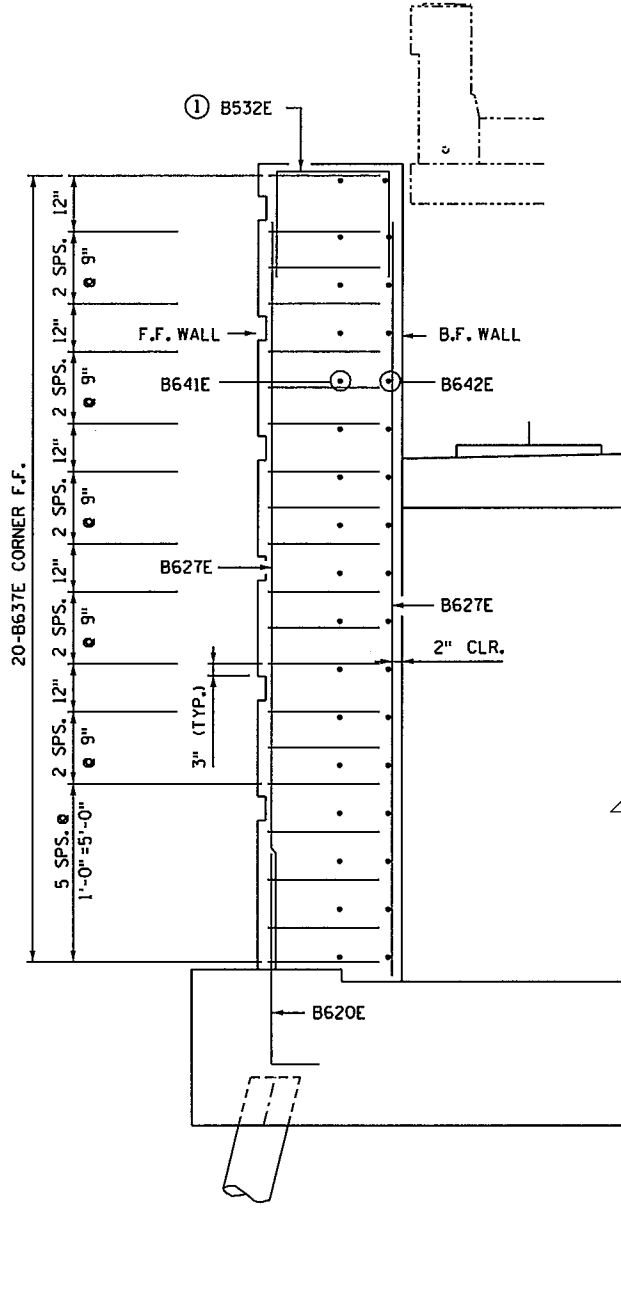
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CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B19 OF B58 SHEETS			



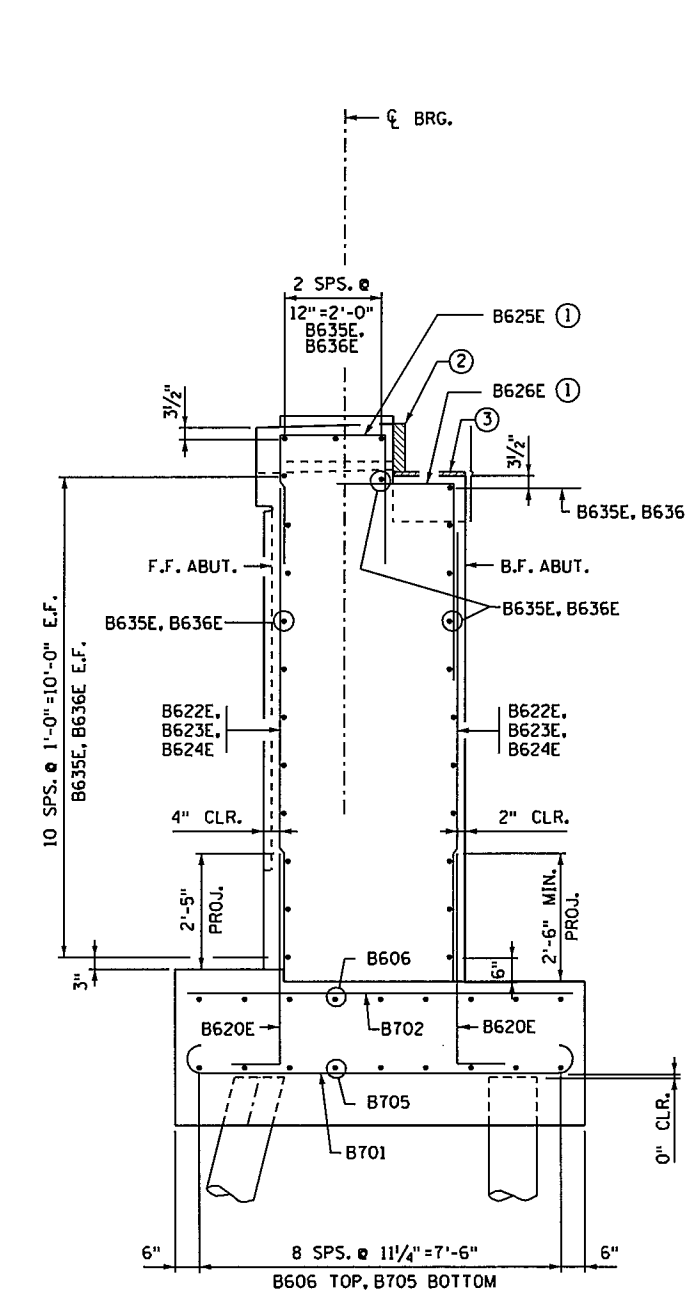
SECTION F-F



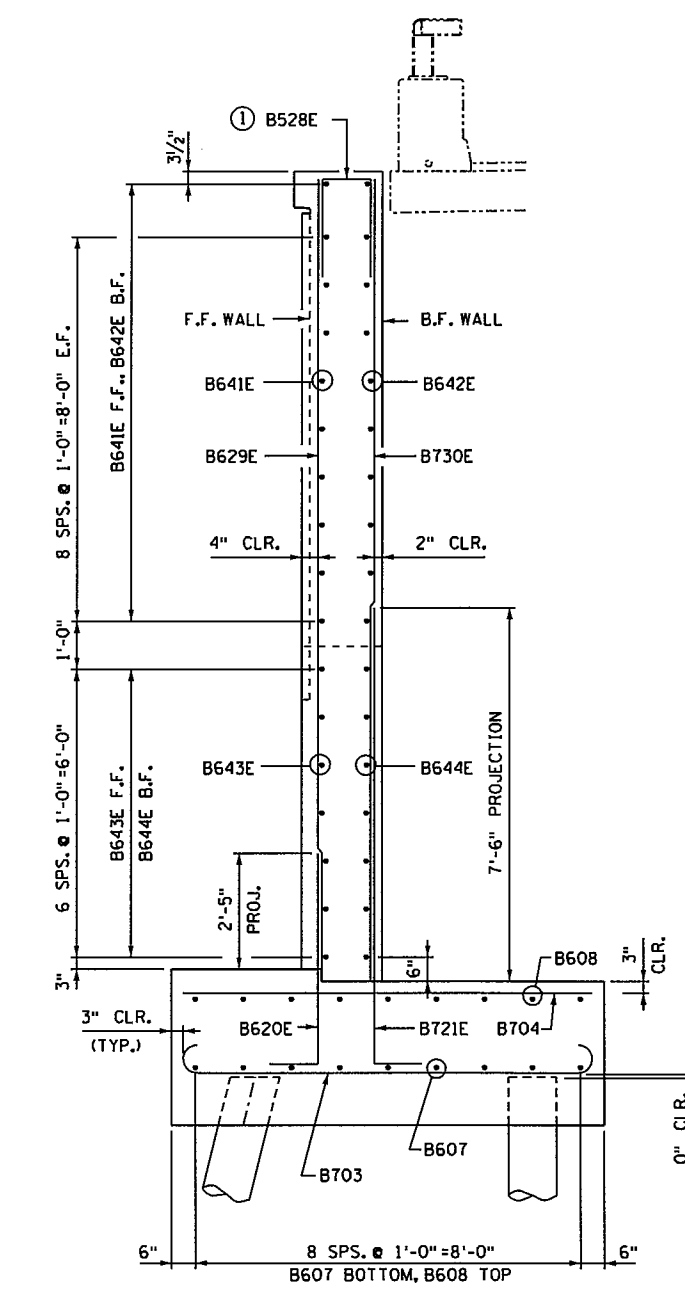
SECTION G-G



SECTION J-J



SECTION H-H



SECTION K-K

- NOTES:**
- SEE SHEET B21 FOR BILL OF REINFORCEMENT.
 - SEE SHEETS B17 & B18 FOR SECTION H-H CUT LOCATION.
 - SEE SHEET B19 FOR SECTIONS F-F, G-G, J-J & K-K CUT LOCATIONS.
 - F.F.=FRONT FACE
B.F.=BACK FACE
 - ① PULL UP TO 2" CLEAR.
 - ② 3" LOW DENSITY POLYSTYRENE.
 - ③ 1" HIGH DENSITY POLYSTYRENE.

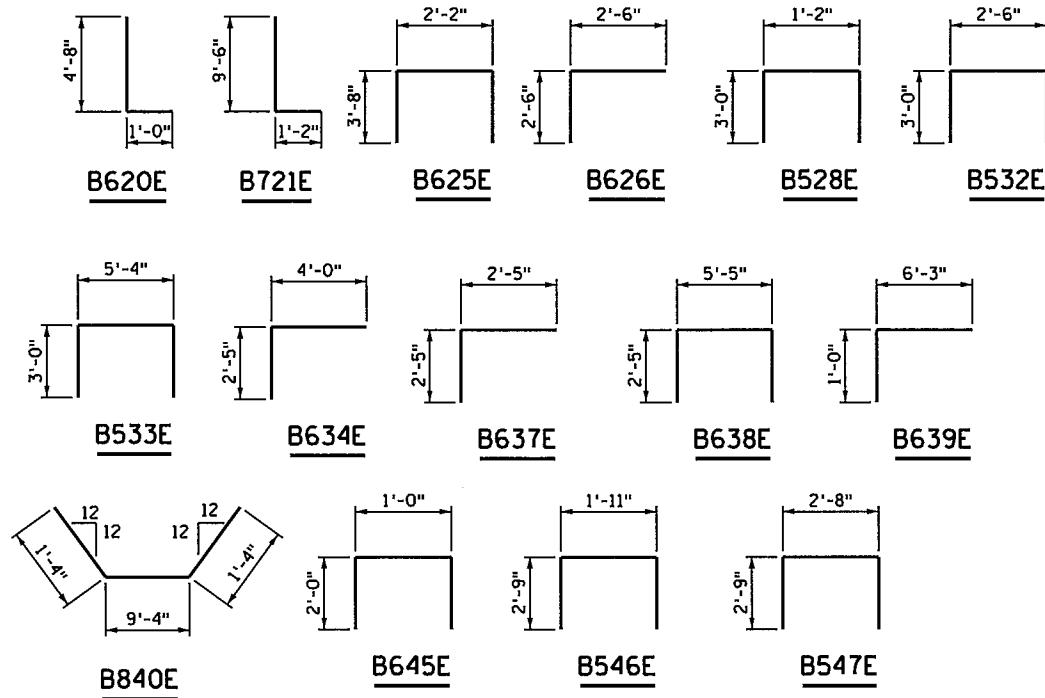
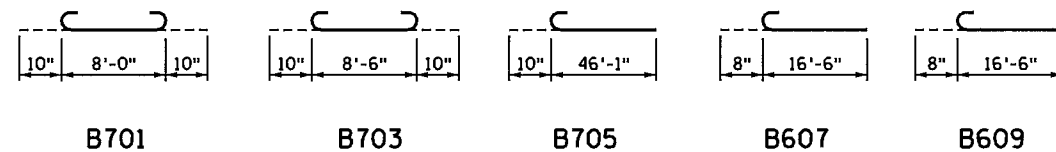
	3535 YADONIS CENTER DRIVE ST PAUL, MN 55110 PHONE (651) 490-2000 FAX (651) 490-2150	I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
	Signature: <i>Michael H Dupont</i> Date: 12-4-15	Printed Name: MICHAEL H DUPONT Lic. No. 43375
	EAST ABUTMENT DETAILS	

DES: MHD	DR: MAW	APPROVED:	12/14/15 BRIDGE NO 62732
CHK: NCK	CHK: MHD		
SHEET NO. B20 OF B58 SHEETS			

BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
EAST ABUTMENT BLACK BARS				
B701	89	9'-8"	BENT	FOOTING TRANSVERSE BOTTOM
B702	89	8'-0"	STR	FOOTING TRANSVERSE TOP
B703	24	10'-2"	BENT	WING FOOTING TRANSVERSE BOTTOM
B704	24	8'-6"	STR	WING FOOTING TRANSVERSE TOP
B705	18	46'-11"	BENT	FOOTING LONGIT. BOTTOM
B606	18	46'-1"	STR	FOOTING LONGIT. TOP
B607	9	17'-2"	BENT	WING FOOTING LONGIT. BOTTOM
B608	9	16'-6"	STR	WING FOOTING LONGIT. TOP
B609	9	17'-2"	BENT	WING FOOTING LONGIT. BOTTOM
B610	9	16'-6"	STR	WING FOOTING LONGIT. TOP
B711	4	12'-0"	STR	FILLET
EAST ABUTMENT EPOXY COATED BARS				
B620E	218	5'-8"	BENT	VERT. DWLS.
B721E	50	10'-8"	BENT	VERT. DWLS. WINGWALL
B622E	52	9'-4"	STR	VERT. ABUT.
B623E	62	9'-8"	STR	VERT. ABUT.
B624E	52	9'-7"	STR	VERT. ABUT.
B625E	81	9'-6"	BENT	TRANSVERSE SEAT
B626E	79	5'-0"	BENT	TRANSVERSE SEAT B.F.
B627E	38	16'-3"	STR	VERT PILASTER
B528E	58	7'-2"	BENT	WING TOP OR BOTTOM
B629E	26	16'-0"	STR	VERTICAL WING
B730E	26	16'-0"	STR	VERTICAL WING
B631E	32	8'-11"	STR	VERTICAL WING
B532E	10	8'-6"	BENT	PILASTER TOP
B533E	2	11'-4"	BENT	PILASTER TOP
B634E	2	6'-5"	BENT	TRANSVERSE SEAT B.F. FILLET
B635E	52	27'-10"	STR	HORIZ. ABUTMENT
B636E	26	30'-2"	STR	HORIZ. ABUTMENT
B637E	40	4'-10"	BENT	HORIZ. PILASTER
B638E	40	10'-3"	BENT	HORIZ. PILASTER
B639E	52	7'-3"	BENT	HORIZ. PILASTER DWLS.
B840E	20	12'-0"	BENT	HORIZ. FILLET
B641E	20	24'-6"	STR	HORIZ. WALL
B642E	20	26'-5"	STR	HORIZ. WALL
B643E	14	16'-6"	STR	HORIZ. WALL
B644E	14	18'-5"	STR	HORIZ. WALL
B645E	34	5'-0"	BENT	HORIZ. WALL END
B546E	78	7'-5"	BENT	BEARING SEAT
B547E	52	8'-2"	BENT	BEARING SEAT

* BAR USES STANDARD STIRRUP AND TIE HOOKS.

NOTE: BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT.



ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (1G52)	CU YD	111
STRUCTURAL CONCRETE (3B52)	CU YD	193
REINFORCEMENT BARS	POUND	8110
REINFORCEMENT BARS (EPOXY COATED)	POUND	19500
ANTI-GRAFFITI COATING	SQ FT	870
ARCH. CONC. TEXTURE (ASHLAR STONE)	SQ FT	870
ARCH. SURFACE FINISH (MULTI COLOR)	SQ FT	870
C-I-P CONCRETE PILING DELIVERED 12"	LIN FT	2610
C-I-P CONCRETE PILING DRIVEN 12"	LIN FT	2610
C-I-P CONC TEST PILE 110 FT LONG 12"	EACH	2
PILE REDRIVING	EACH	2
PILE ANALYSIS	EACH	2

PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
① DOES NOT INCLUDE TEST PILES.

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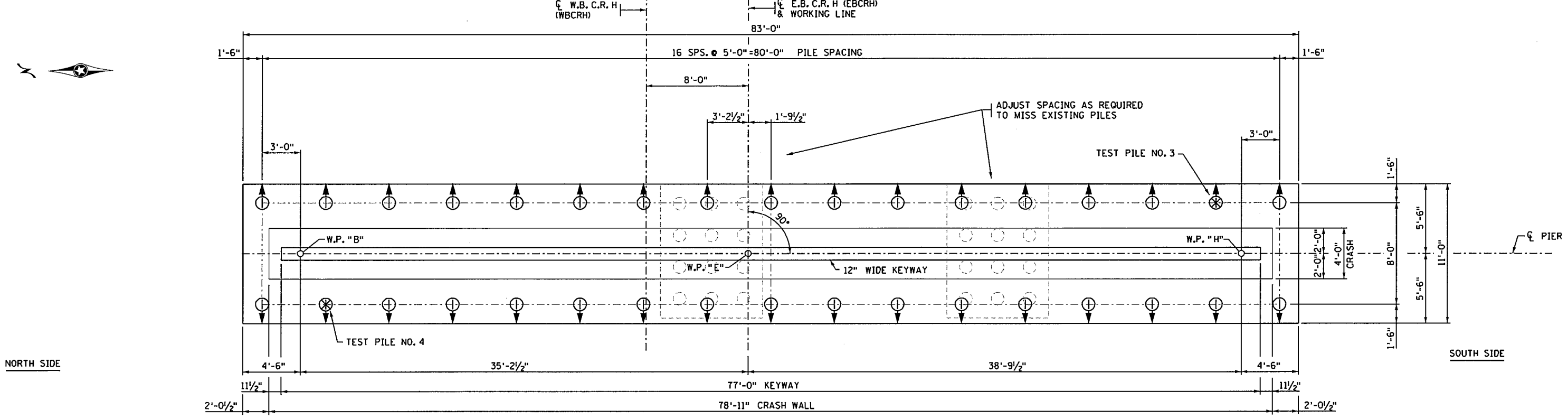
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

EAST ABUTMENT BILL OF REINFORCEMENT AND QUANTITIES

DES: MHD DR: MAW APPROVED: 12/14/15
CHK: NCK CHK: MHD
SHEET NO. B21 OF B58 SHEETS

BRIDGE NO 62732

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12/10/2015
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FOOTING PLAN

PIER COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD	84.0
FACTORED LIVE LOAD	28.5
FACTORED OVERTURNING	11.6
*FACTORED DESIGN LOAD	124.1

* BASED ON STRENGTH I LOAD COMBINATION

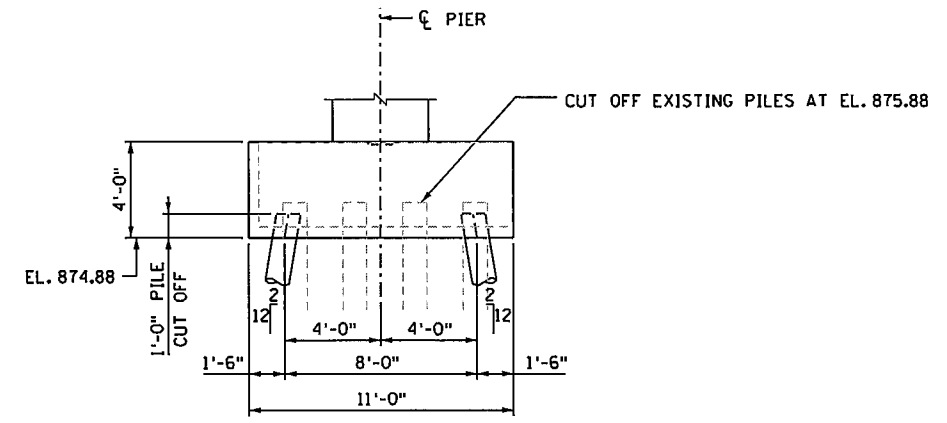
PIER REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R _n - Tons/Pile		
FIELD CONTROL METHOD	φ _{dyn}	*R _n
MnDOT Pile Formula 2012 (MPF12) R _n = 20 √(WxH/1000) × log(10/S)	0.50	① 248.2
PDA	0.65	190.9

* R_n = (Factored Design Load) / φ_{dyn}

PILE NOTES:

2 12" C-I-P CONCRETE TEST PILE 100 FT. LONG
 32 12" C-I-P CONCRETE PILES EST. LENGTH 90 FT.
 34 12" C-I-P CONCRETE PILES REQ'D FOR PIER.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
 FOR PILE SPLICE DETAILS SEE DETAIL B201.
 PILES MARKED THUS ⊙ TO BE BATTERED 2" PER FOOT IN DIRECTION SHOWN.
 PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
 DRIVE TEST PILE TO PRODUCTION PILE LENGTH OR BEARING WHICH EVER COMES FIRST, PERFORM PILE REDRIVING AFTER 48 HOURS TO CONFIRM 115% BEARING, AS REQUIRED FOR TEST PILE IS ACHIEVED. CONTINUE REDRIVING IF 115% BEARING IS NOT ACHIEVED.

① NEW MNDOT MPF12 PILE DRIVING FORMULA AND TABLE MUST BE USED FOR THIS BRIDGE. USE OF OLDER FORMULA WILL RESULT IN INADEQUATE PILE CAPACITY.



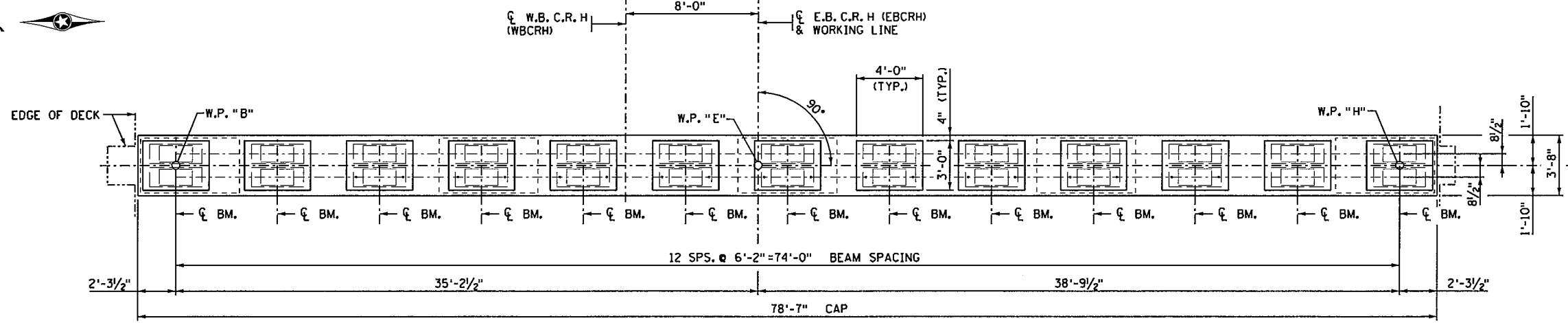
PIER DETAILS

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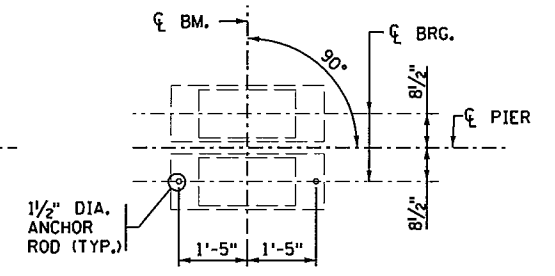
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DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62732
CHK: NCK	CHK: MHD		
SHEET NO. B22 OF B58 SHEETS			

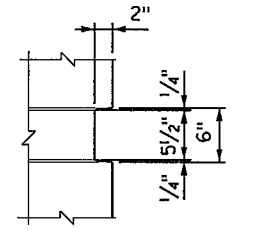
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PIER CAP PLAN

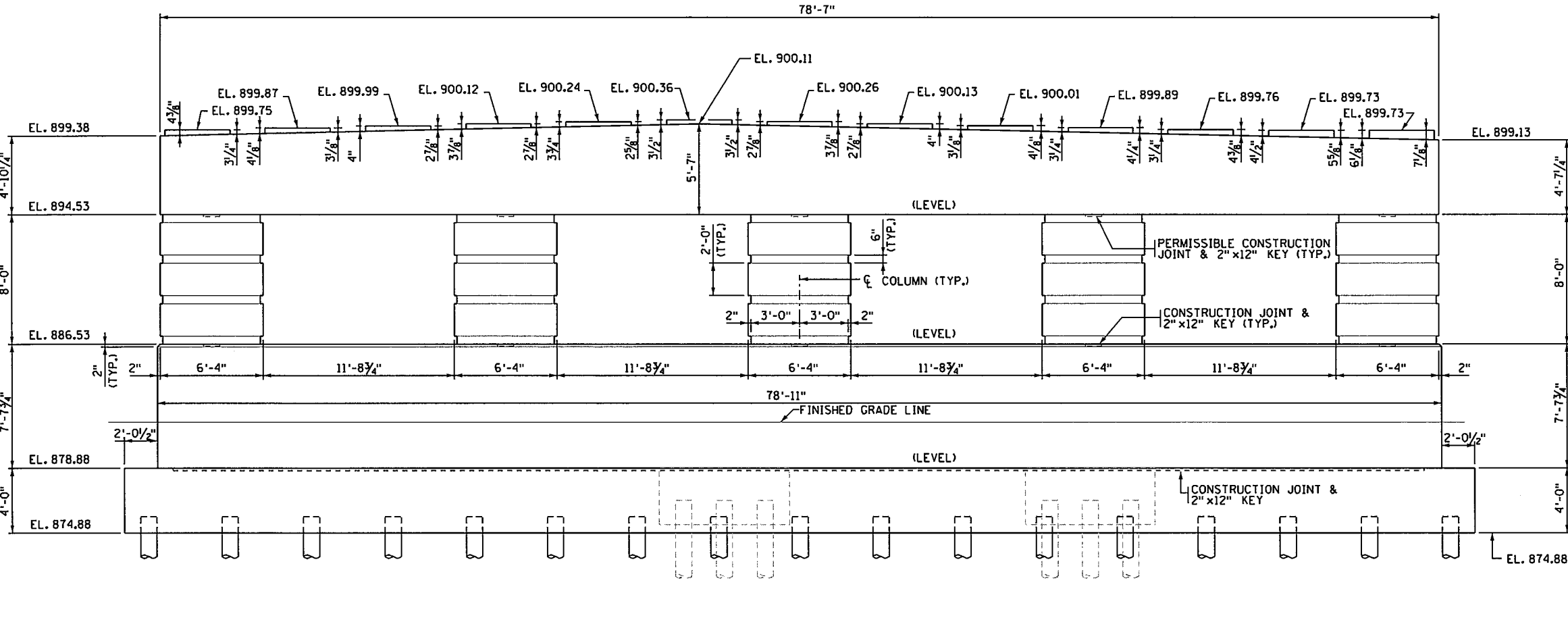


TYPICAL ANCHOR ROD LAYOUT

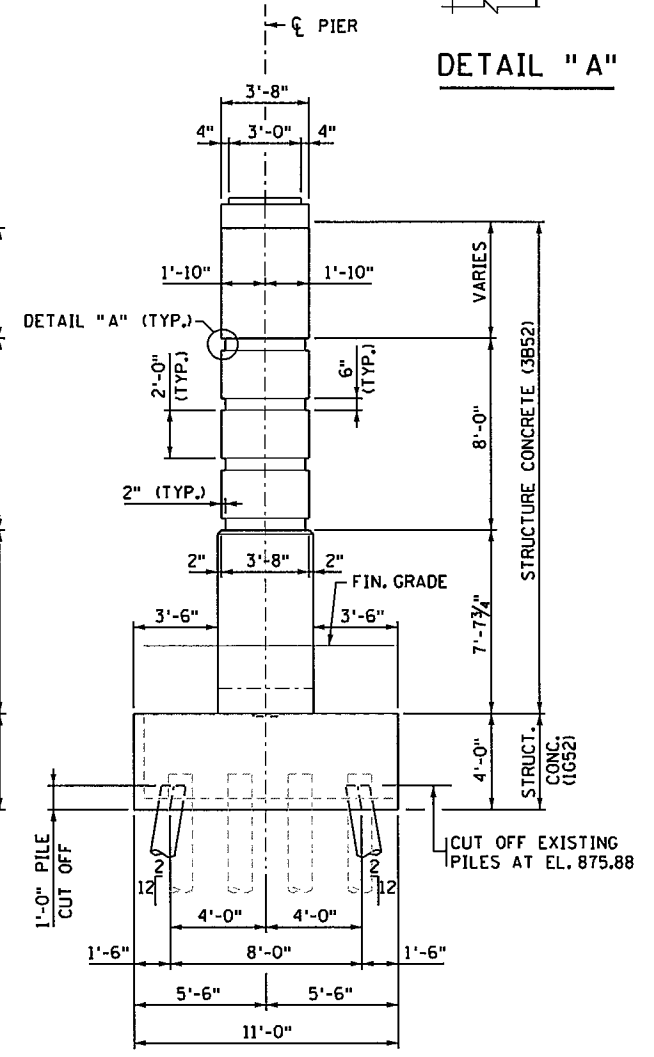


DETAIL "A"

NORTH SIDE SOUTH SIDE



ELEVATION



END ELEVATION

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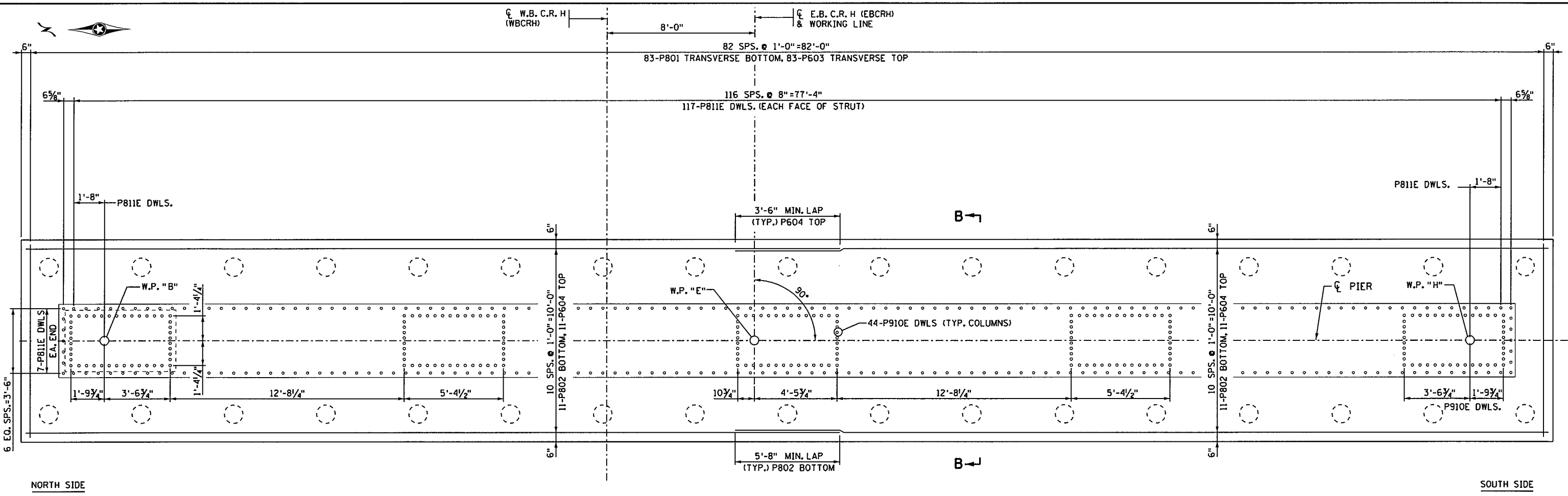
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CHK: NCK	CHK: MHD	

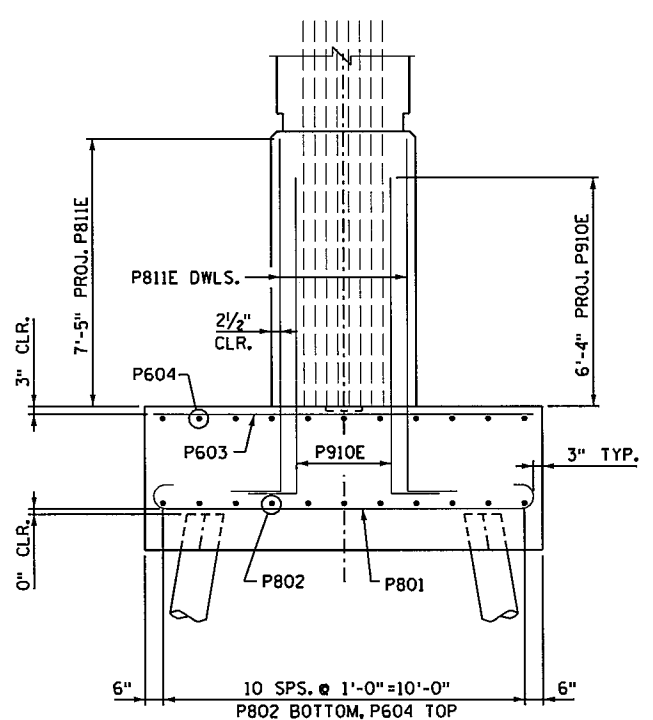
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BRIDGE NO 62732

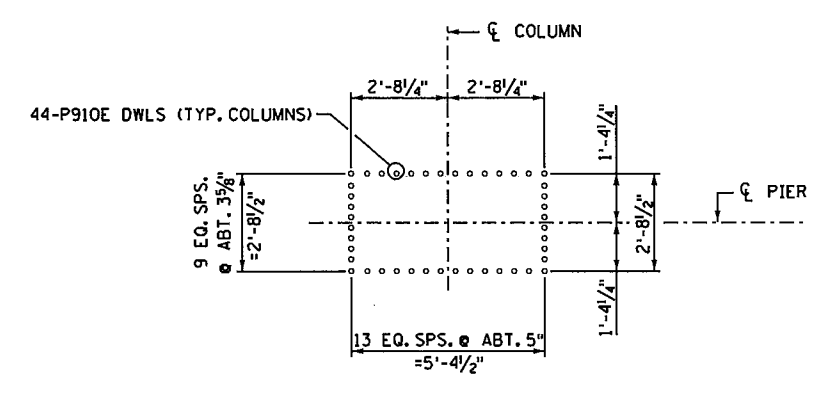
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FOOTING REINFORCEMENT PLAN



SECTION B-B



TYP. COLUMN DOWEL PLACEMENT

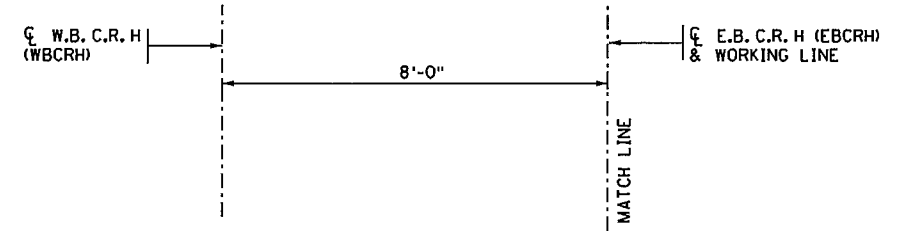
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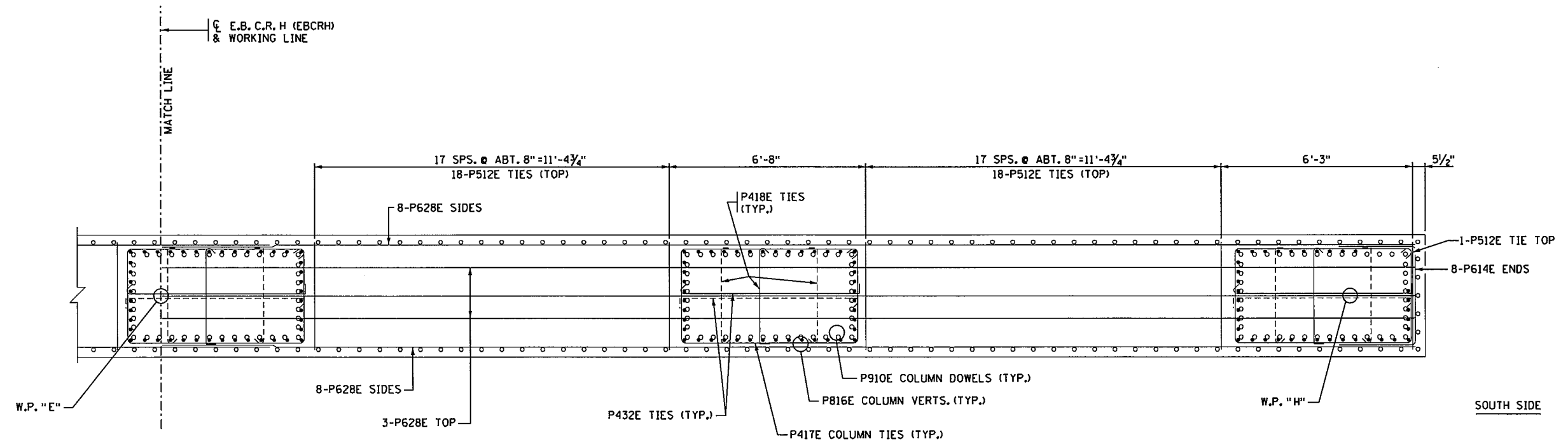
PIER REINFORCEMENT

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62732
CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B24 OF B58 SHEETS			

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NORTH SIDE



SOUTH SIDE

STRUT PLAN

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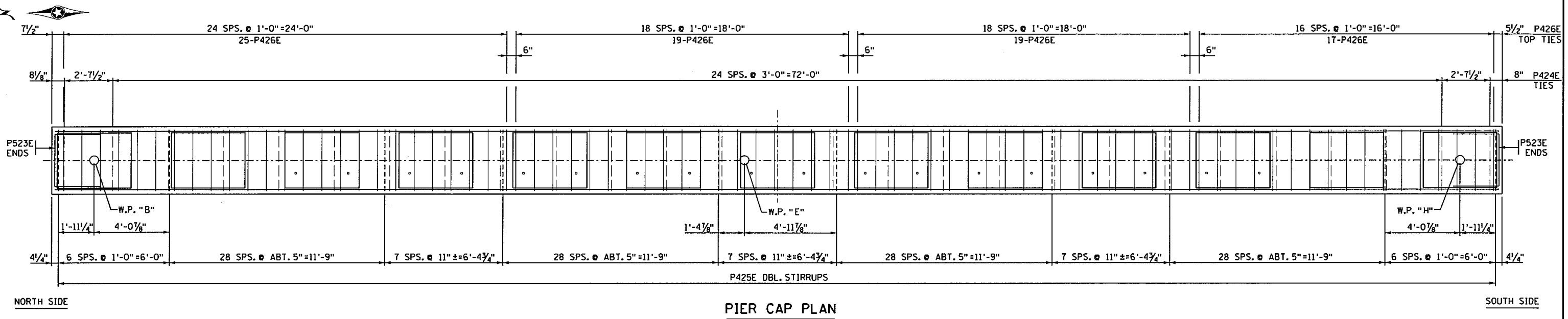
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 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

PIER REINFORCEMENT

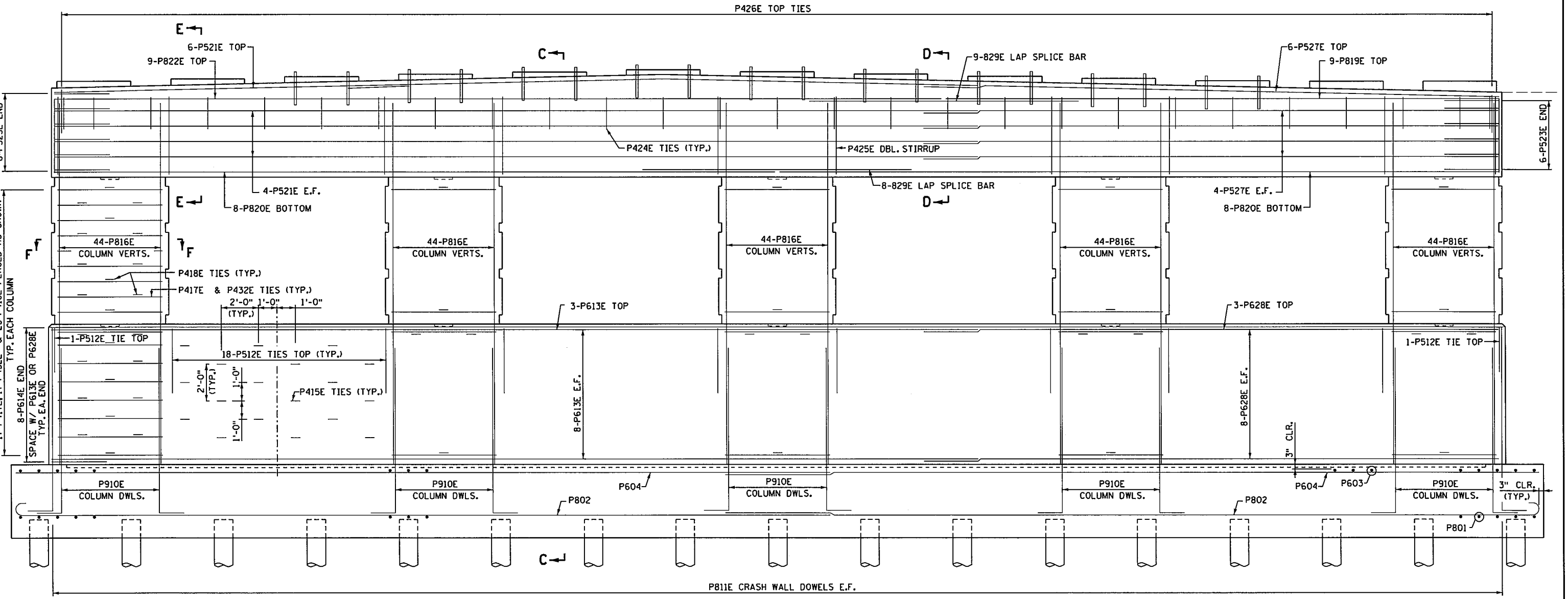
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SHEET NO. B25 OF B58 SHEETS		

BRIDGE NO 62732

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PIER CAP PLAN



ELEVATION

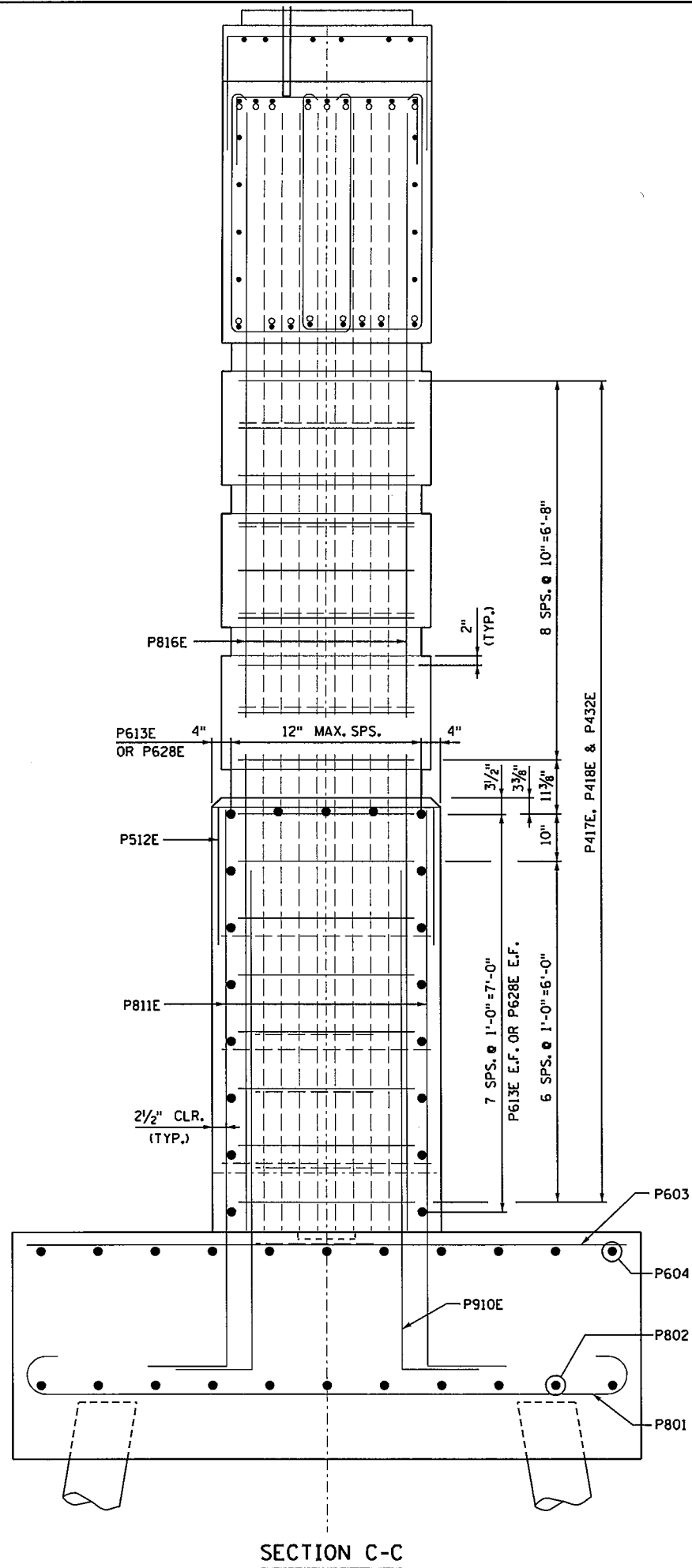
NOTES:
 SEE SHEET B28 FOR BILL OF REINFORCEMENT.
 SEE SHEET B27 FOR SECTIONS C-C, D-D, E-E & F-F.


 3535 VADNAIS CENTER DRIVE
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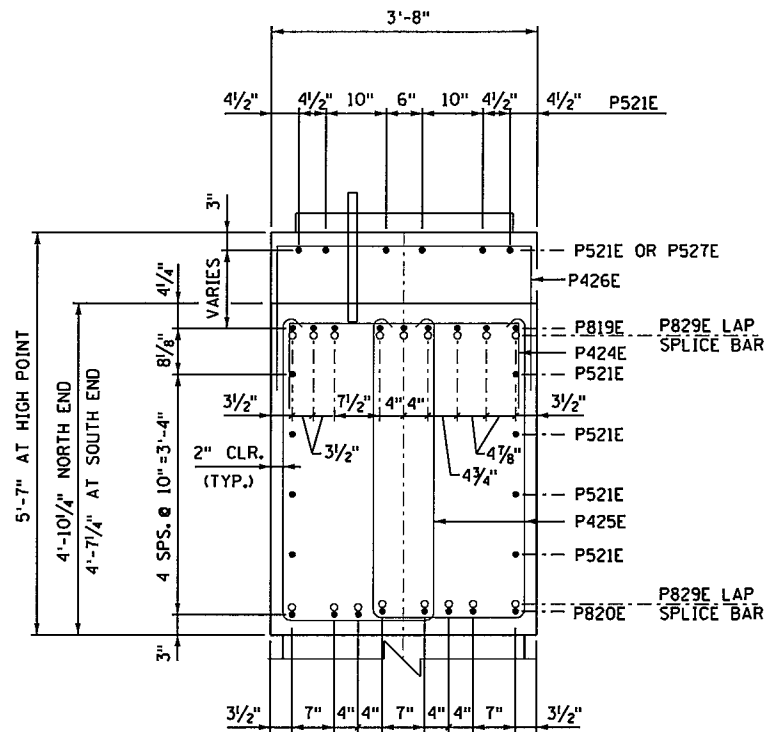
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 Signature:  Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

PIER REINFORCEMENT

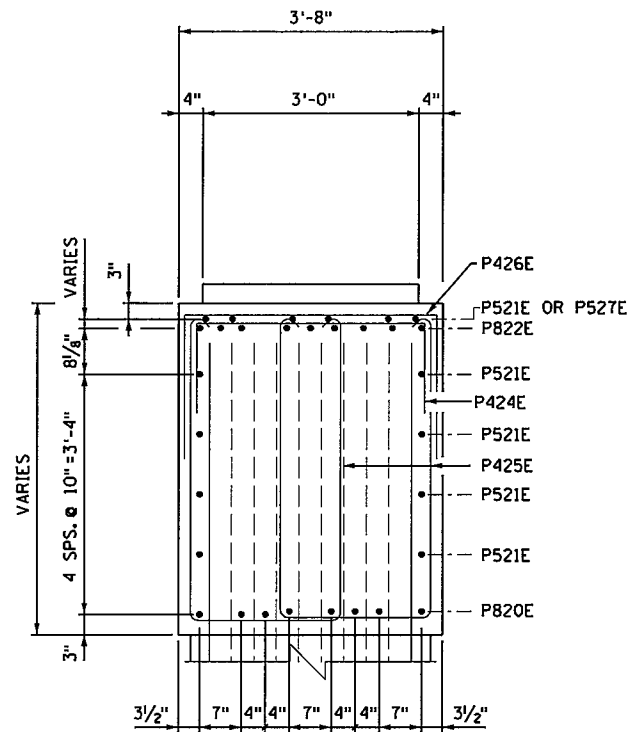
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CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B26 OF B58 SHEETS			



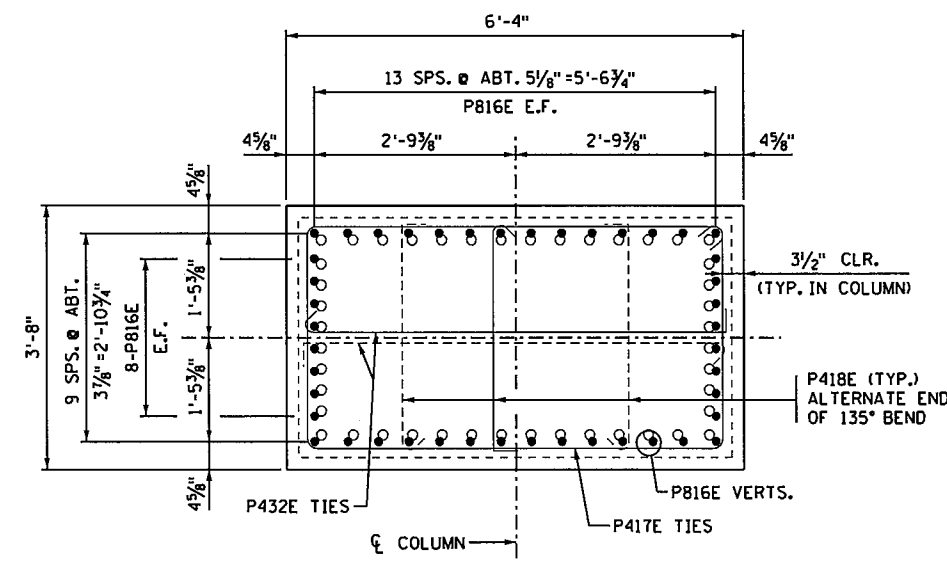
SECTION C-C



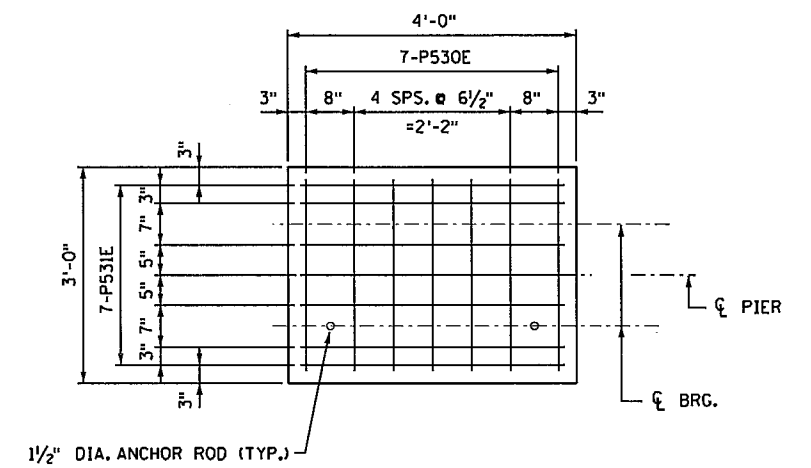
SECTION D-D



SECTION E-E



COLUMN SECTION F-F



TYPICAL SEAT DETAIL
ANCHOR RODS AT BEAM LINES B3 THRU B11

NOTES:

- SEE SHEET B28 FOR BILL OF REINFORCEMENT.
- SEE SHEET B26 FOR LOCATION OF SECTIONS C-C, D-D, E-E & F-F.

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Printed Name: MICHAEL H. DUPONT Ltc. No. 43375

PIER REINFORCEMENT

DES: MHD	DR: MAW	APPROVED: 12/14/15
CHK: NCK	CHK: MHD	

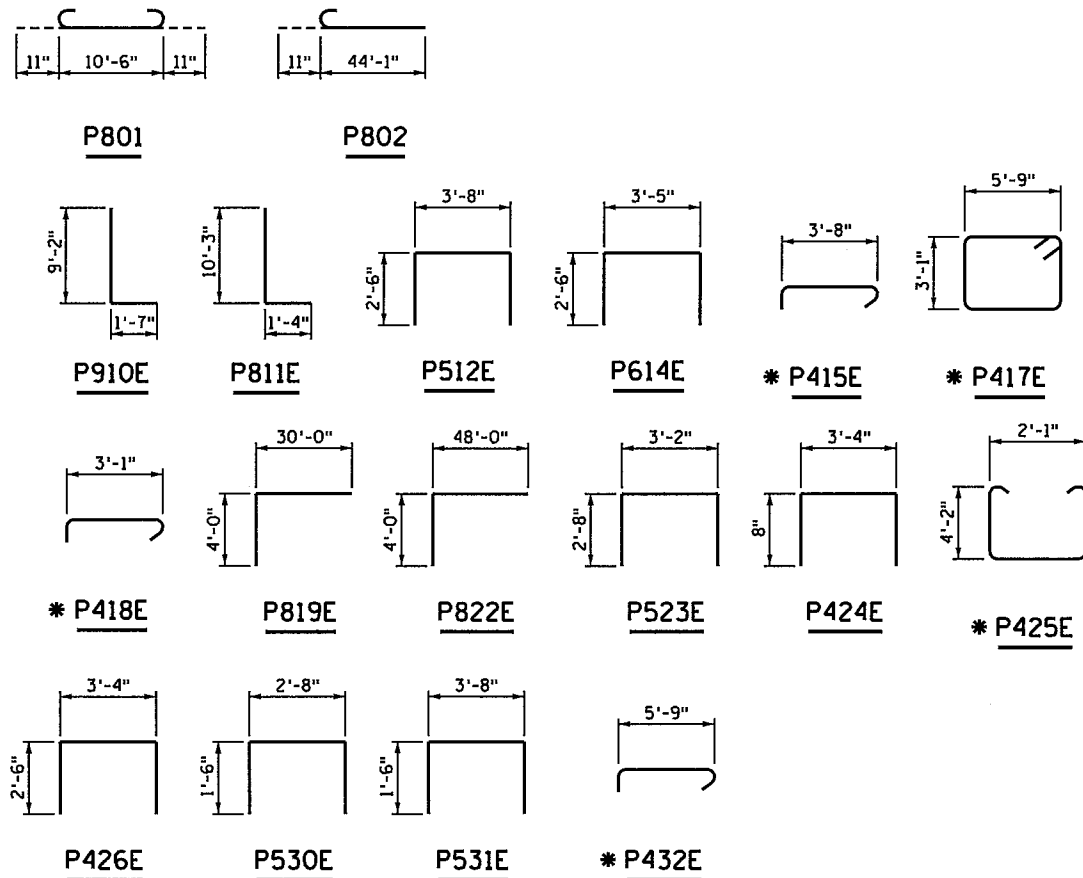
BRIDGE NO
62732

SHEET NO. B27 OF B58 SHEETS

BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
PIER				
BLACK BARS				
P801	83	12'-4"	BENT	FOOTING TRANSVERSE BOTTOM
P802	22	45'-0"	BENT	FOOTING LONGITUDINAL BOTTOM
P603	83	10'-6"	STR	FOOTING TRANSVERSE TOP
P604	22	43'-0"	STR	FOOTING LONGITUDINAL TOP
PIER				
EPOXY COATED BARS				
P910E	220	10'-9"	BENT	VERT. COLUMN DWLS.
P811E	248	11'-7"	BENT	VERT. CRASH WALL DWLS.
P512E	74	8'-8"	BENT	CRASH STRUT TOP TIE
P613E	19	50'-0"	STR	CRASH STRUT SIDES
P614E	16	8'-5"	BENT	CRASH STRUT ENDS
P415E	72	4'-5"	BENT	CRASH STRUT TIES
P816E	220	19'-8"	STR	VERT. COLUMN
P417E	85	18'-5"	BENT	COLUMN TIES
P418E	125	3'-10"	BENT	COLUMN TIES
P819E	9	34'-0"	BENT	CAP LONGITUDINAL TOP
P820E	16	39'-0"	STR	CAP LONGITUDINAL BOTTOM
P521E	14	50'-0"	STR	CAP LONGITUDINAL SIDES & TOP
P822E	9	52'-0"	BENT	CAP LONGITUDINAL TOP
P523E	12	8'-6"	BENT	CAP LONGITUDINAL ENDS
P424E	27	4'-8"	BENT	CAP TRANSVERSE TIE
P425E	292	11'-2"	BENT	CAP DBL. STIRRUP
P426E	80	8'-4"	BENT	CAP TRANSVERSE TIE TOP
P527E	14	31'-2"	STR	CAP LONGITUDINAL SIDES & TOP
P628E	19	31'-0"	STR	CRASH STRUT SIDES
P829E	17	14'-7"	STR	LAP SPLICE BAR
P530E	91	5'-8"	BENT	BEARING SEAT
P531E	91	6'-8"	BENT	BEARING SEAT
P432E	85	6'-6"	BENT	COLUMN TIES

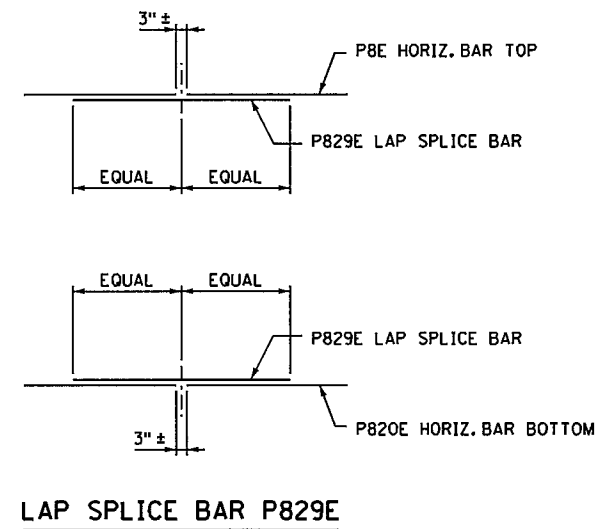
* BAR USES STANDARD STIRRUP AND TIE HOOKS.

NOTE:
BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT.



SUMMARY OF QUANTITIES FOR PIER		
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (IG52)	CU YD	135
STRUCTURAL CONCRETE (3B52)	CU YD	179
REINFORCEMENT BARS	POUND	8110
REINFORCEMENT BARS (EPOXY COATED)	POUND	41960
C-I-P CONCRETE PILING DELIVERED 12"	LIN FT	2880
C-I-P CONCRETE PILING DRIVEN 12"	LIN FT	2880
C-I-P CONC TEST PILE 100 FT LONG 12"	EACH	2
PILE REDRIVING	EACH	2
PILE ANALYSIS	EACH	2

PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
① DOES NOT INCLUDE TEST PILES.



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Printed Name: MICHAEL H DUPONT Lic. No. 43375

PIER REINFORCEMENT

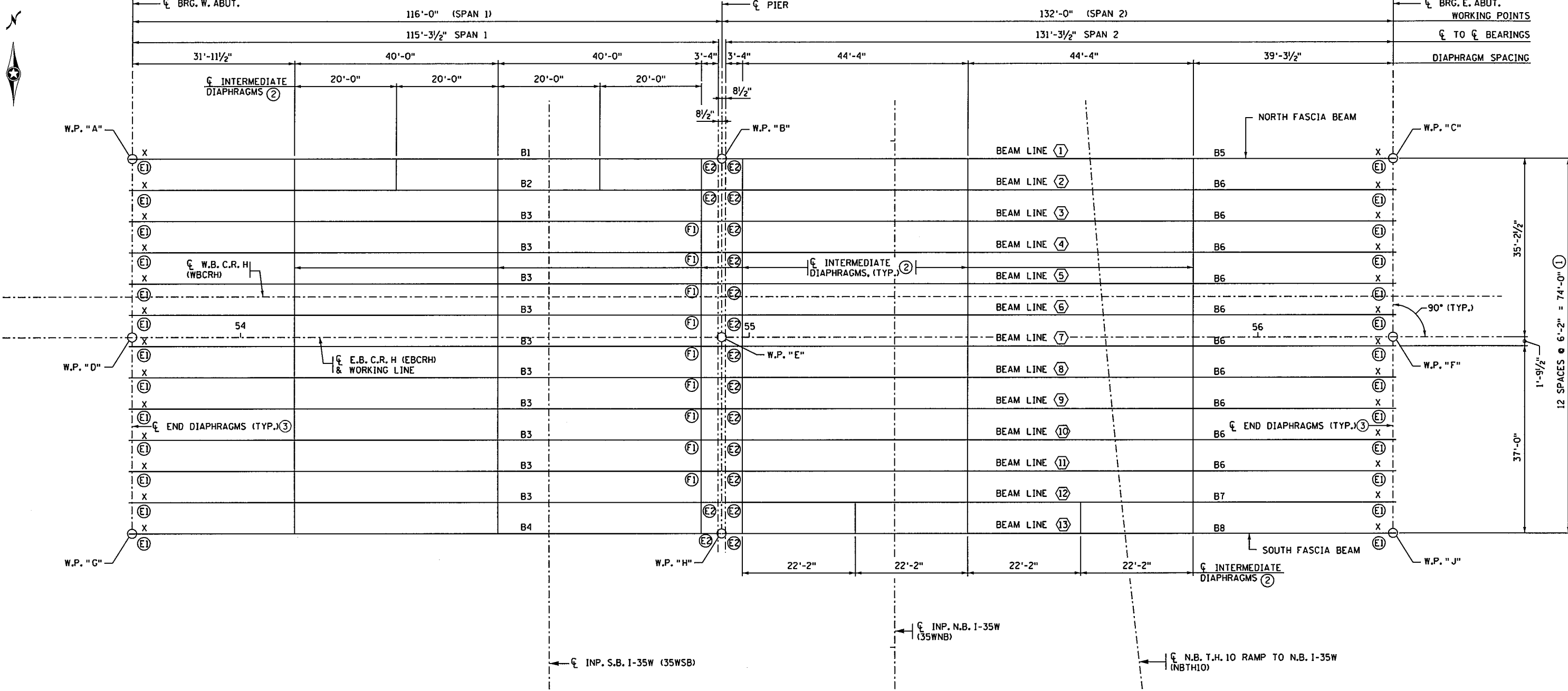
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SHEET NO. B28 OF B58 SHEETS BRIDGE NO 62732

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BRIDGE LAYOUT

① BEAM TABLE		
SPAN	BEAM	LENGTH
1	B1 THRU B4	116'-6 1/2"
2	B5 THRU B8	132'-6 1/2"

NOTES

- "X" DENOTES END OF BEAM.
- ALL BEAMS SET PARALLEL TO WORKING LINE.
- ALL DIMENSIONS SHOWN ARE MEASURED ON A HORIZONTAL PLANE.
- MARKS SHOWN (E1) & (E2) DENOTE EXPANSION BEARING ASSEMBLIES.
- MARKS SHOWN (F1) DENOTE FIXED BEARING ASSEMBLIES.
- SEE DETAILS SHEET B50 FOR BEARING DETAILS B310 AND B311.
- ANCHOR RODS NOT REQUIRED AT BEARING (E2).
- ① SEE SHEETS B30 & B31 FOR BEAM DETAILS.
- ② SEE SHEET B51 FOR INTERMEDIATE DIAPHRAGM DETAIL B403.
- ③ SEE SHEETS B34-B35 FOR END DIAPHRAGM DETAILS.
- (X) BEAM LINE ()

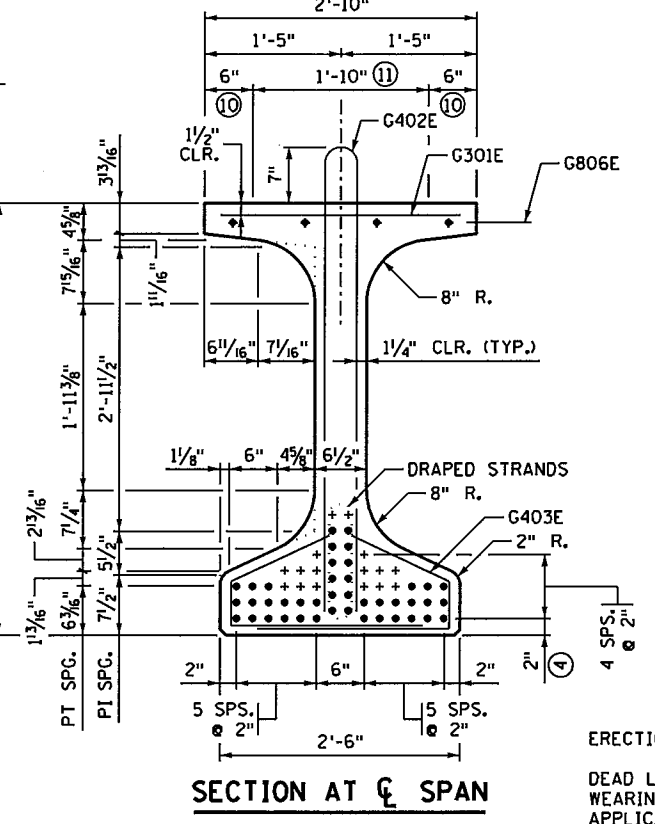
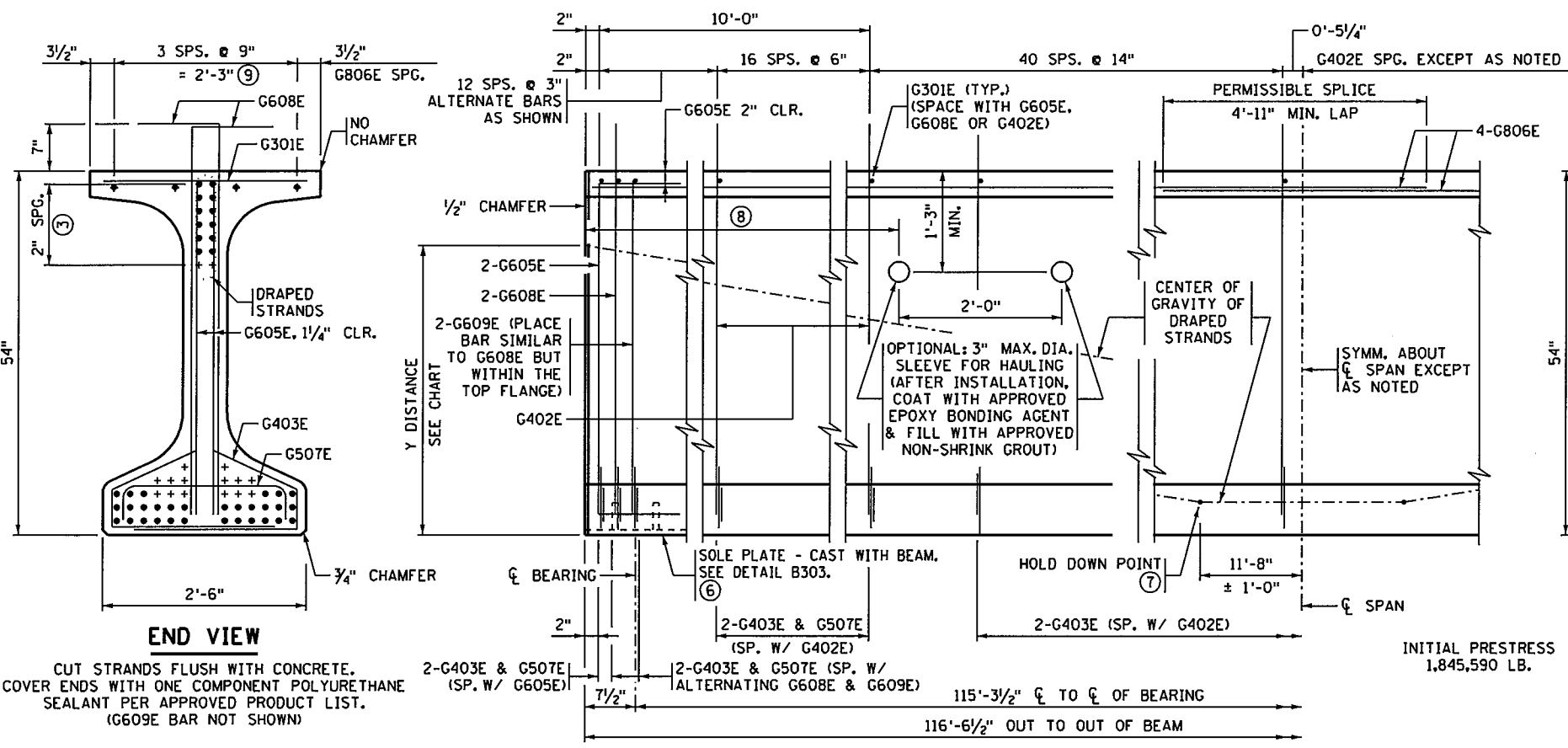
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FRAMING PLAN

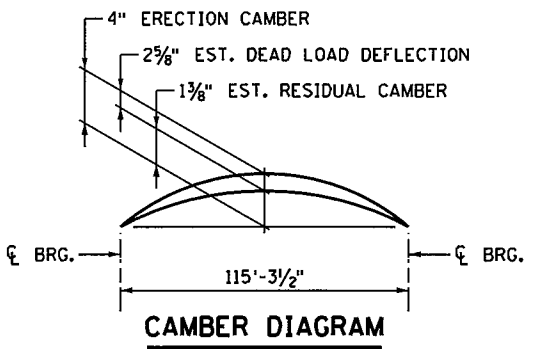
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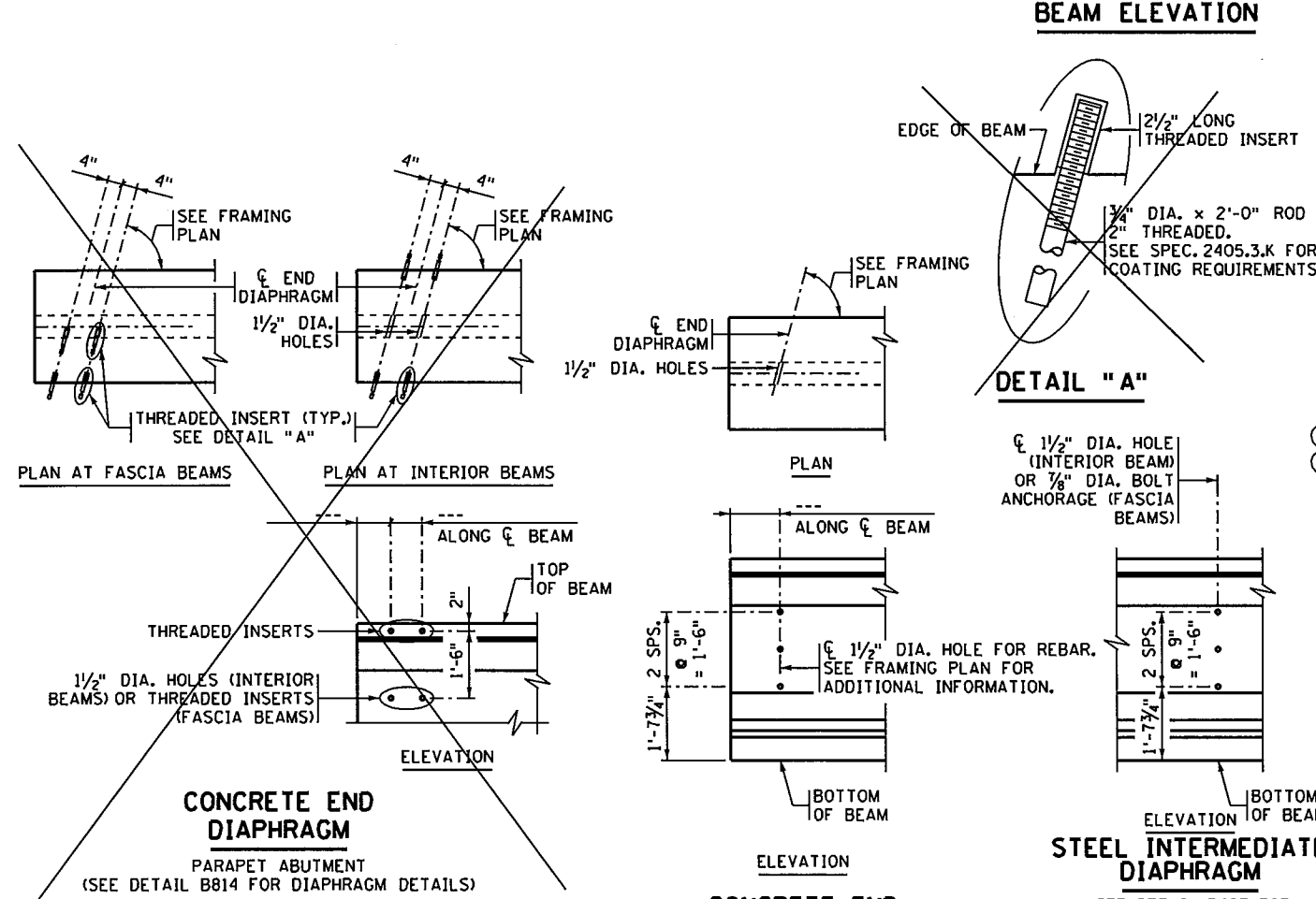


Y DISTANCES (INCHES)			
	NO.	CL SPAN	END
STRAIGHT STRANDS	30	3.60	
DRAPED STRANDS	12	8.0	46.0
TOTAL STRANDS	42	4.86	

Y = DISTANCE TO CENTER OF GRAVITY OF STRANDS FROM BOTTOM OF BEAM. ALL STRANDS SPACED 2" CENTER TO CENTER, HORIZONTALLY AND VERTICALLY, EXCEPT AS NOTED.
 A TOLERANCE OF ± 1" WILL BE PERMITTED IN THIS DIMENSION.



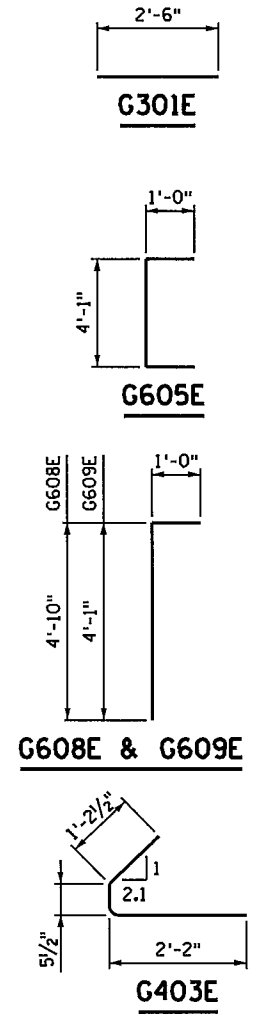
ERECTION CAMBER SHOWN IS AFTER DIAPHRAGMS ARE IN PLACE.
 DEAD LOAD DEFLECTION SHOWN IS FOR WEIGHT OF SLAB, WEARING COURSE, BARRIER, SIDEWALK AND MEDIAN WHERE APPLICABLE.
 CONTRACTOR WILL TAKE ELEVATIONS AT TOP OF BEAMS AFTER ERECTION AND WILL ALLOW FOR DEFLECTION SHOWN TO ENABLE BUILDING FORMS TO CORRECT GRADE AND SPECIFIED SLAB THICKNESS. PROVIDE COPY OF ELEVATIONS TO THE ENGINEER.



CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	22.43 KSI
LONG TERM LOSSES	26.09 KSI
TOTAL LOSSES	48.52 KSI

MINIMUM CONCRETE STRENGTH - K.S.I.	
① f'c1	② f'c
6.5 KSI	8.0 KSI

PRESTRESSING STRAND DIAMETER	
⑤	1/2" □
⑤	0.60" ☒



GENERAL NOTES

- PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.
- MARK EACH BEAM SHOWING BRIDGE NUMBER, CASTING DATE, AND INDIVIDUAL IDENTIFICATION LETTERS AND NUMBERS ON THE FACE OF THE BEAM, NEAR THE END, SO LOCATED THAT THEY WILL BE EXPOSED AFTER THE END DIAPHRAGMS HAVE BEEN CAST. MARK FASCIA BEAMS ON THE INSIDE FACE. ENSURE ALL MARKINGS ARE STENCILED AND CLEARLY LEGIBLE. FOR LOCATION OF BEAMS, SEE FRAMING PLAN.
- ALL MATERIAL AND WORK SHOWN OR NOTED ON THIS SHEET IS INCLUDED IN UNIT PRICE BID FOR PRESTRESSED CONCRETE BEAMS. SEE SPEC. 2405.
- SEE FRAMING PLAN FOR BEAM END MARKED "X" AND DIAPHRAGM SPACING.
- APPROXIMATE WEIGHT OF BEAM IS 47 TONS.
- AS AN ALTERNATE TO THE END DIAPHRAGM ANCHORAGES SHOWN, THE CONTRACTOR MAY SUBMIT DETAILS OF A CAST-IN-PLACE ANCHORAGE TO THE ENGINEER FOR APPROVAL. ANCHORAGE MUST PROVIDE AN ULTIMATE PULL OUT STRENGTH OF 15 KIPS PER ANCHORAGE.
- APPLY AN APPROVED SEALER TO THE SIDES OF THE BEAM NEAR EACH END PER THE SPECIAL PROVISIONS.
- ① MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.
- ② MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.
- ③ DRAPED STRANDS.
- ④ STRAIGHT STRANDS.
- ⑤ USE 7-WIRE LOW RELAXATION PRESTRESSING STRAND, CONFORMING TO ASTM A416, GRADE 270.
- ⑥ FOR INTEGRAL ABUTMENT, SOLE PLATE CAN BE ELIMINATED OR REPLACED WITH AN APPROVED PROTECTION PLATE. BEAMS DETAILED TO INCLUDE A TAPERED PLATE PER STANDARD FIGURE B309 MUST INCLUDE SOLE PLATE.
- ⑦ CENTER OF GRAVITY OF HOLD DOWNS WHEN MULTIPLE HOLD DOWNS ARE USED.
- ⑧ DIMENSION DETERMINED BY CONTRACTOR. MAINTAIN 2" MINIMUM CLEAR FROM STRANDS.
- ⑨ TWO INSIDE BARS MAY BE PLACED ADJACENT TO VERTICAL STIRRUP FOR TYING CONVENIENCE.
- ⑩ STEEL TROWEL TO SMOOTH FINISH AND APPLY BOND BREAKER PER APPROVED PRODUCTS LIST.
- ⑪ ROUGH FLOAT AND BROOM TRANSVERSELY FOR BOND PER SPEC. 2405.3.D.

REVISED:
 APPROVED: JANUARY 13, 2015
Nancy Dubenberger
 STATE BRIDGE ENGINEER

SEE SUPERSTRUCTURE DETAILS AND REINFORCEMENT FOR DIAPHRAGM DETAILS.

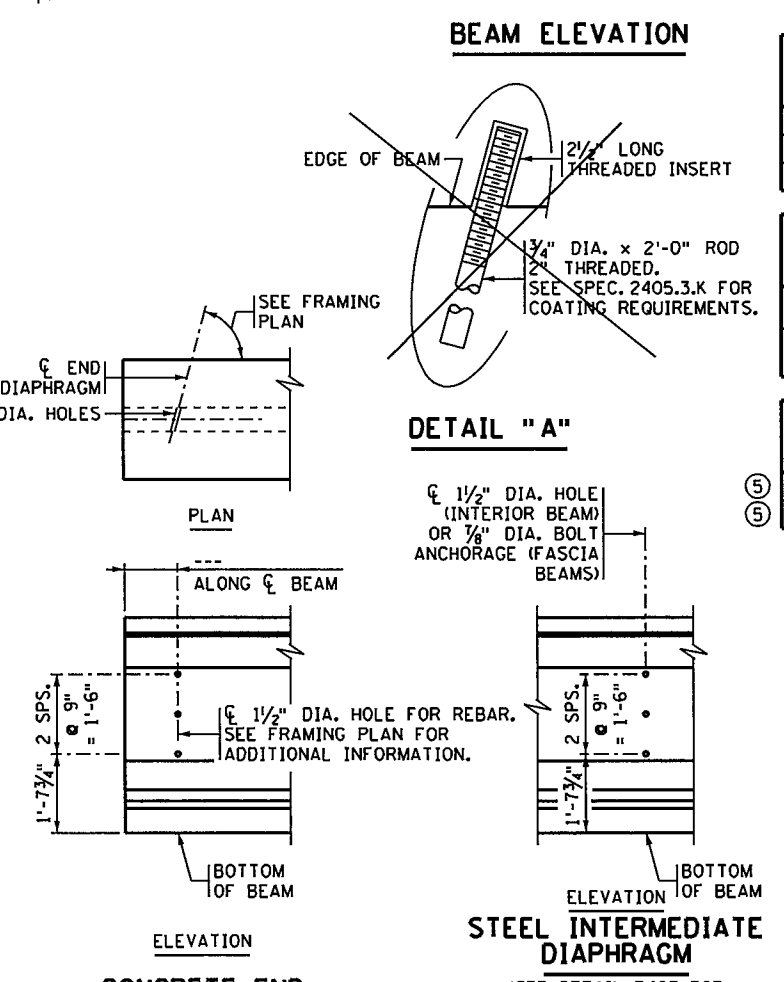
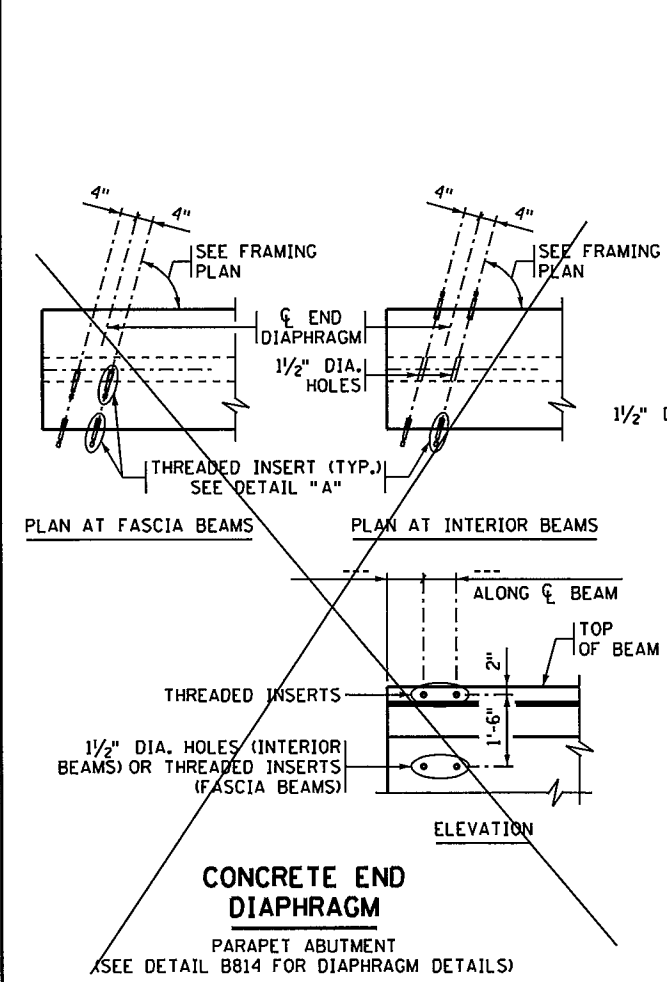
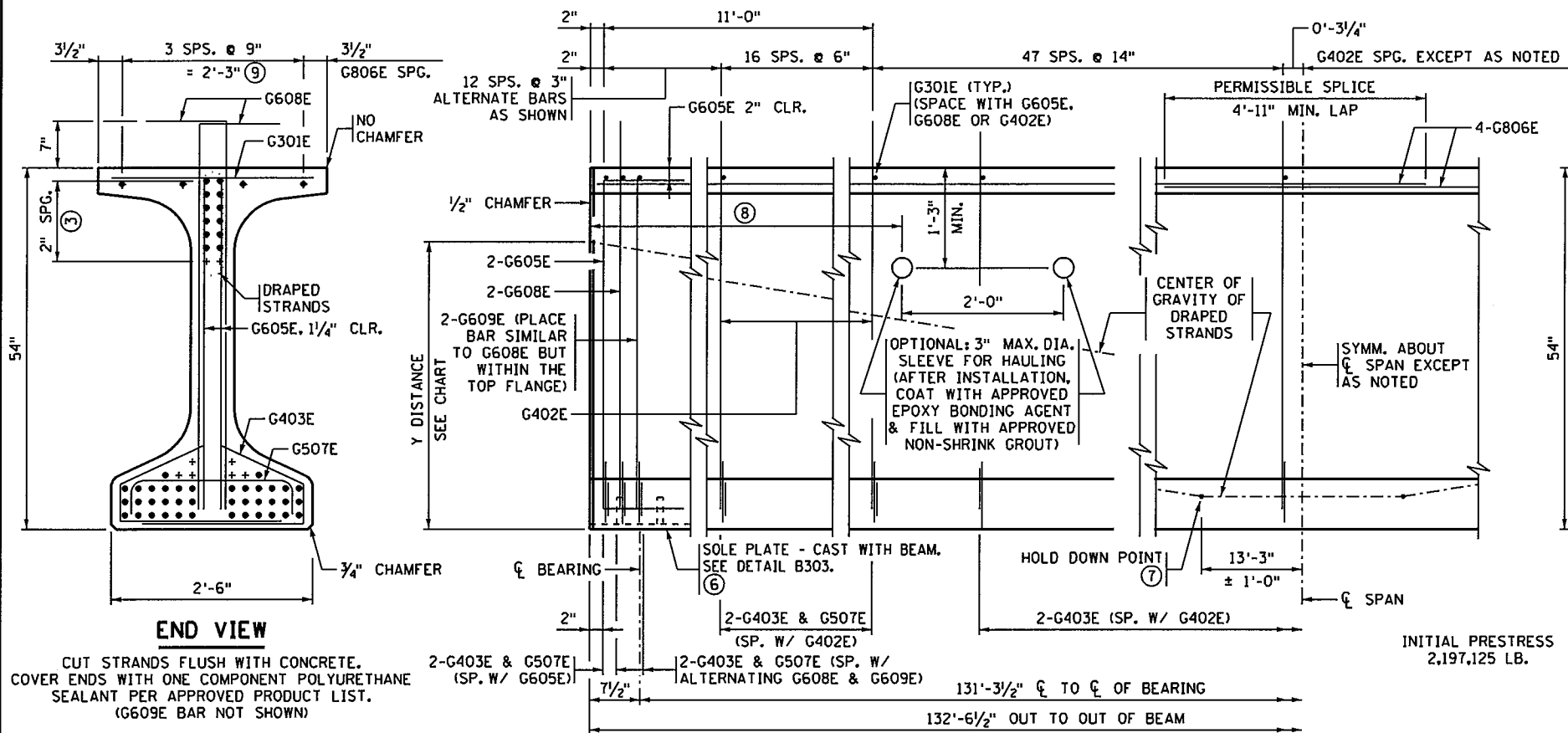
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MN54" PRESTRESSED CONCRETE BEAM (PRETENSIONED) MN54-117

BEAMS B1-B4		FIG. 5-397.508	
DES: MHD	DR: MHD	APPROVED: 12/14/15	BRIDGE NO 62732
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CALCULATED PRESTRESS LOSSES

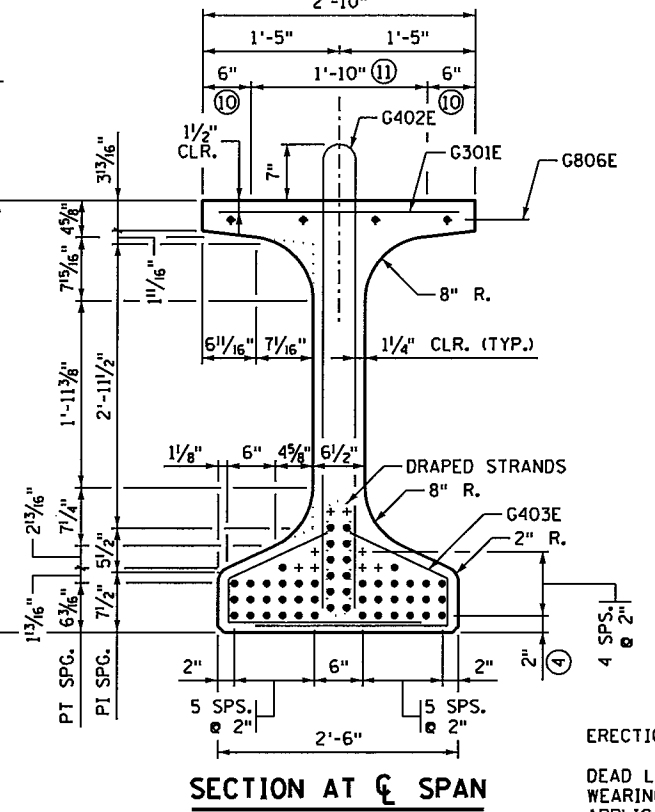
ELASTIC SHORTENING LOSS	23.91 KSI
LONG TERM LOSSES	25.98 KSI
TOTAL LOSSES	49.90 KSI

MINIMUM CONCRETE STRENGTH - K.S.I.

① f'ci	② f'c
7.5 KSI	9.0 KSI

PRESTRESSING STRAND DIAMETER

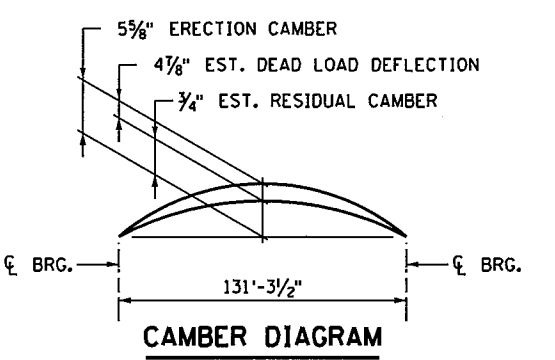
⑤	1/2" □
⑤	0.60" ☒



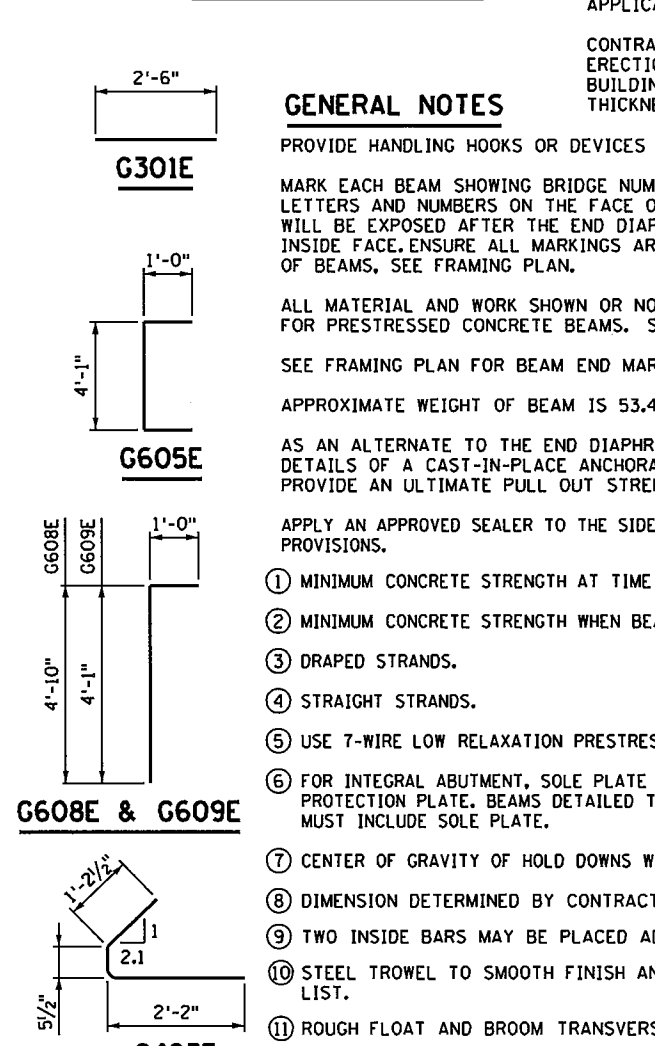
Y DISTANCES (INCHES)

	NO.	CL SPAN	END
STRAIGHT STRANDS	38	4.21	46.0
DRAPED STRANDS	12	8.0	46.0
TOTAL STRANDS	50	5.12	

Y = DISTANCE TO CENTER OF GRAVITY OF STRANDS FROM BOTTOM OF BEAM. ALL STRANDS SPACED 2" CENTER TO CENTER, HORIZONTALLY AND VERTICALLY, EXCEPT AS NOTED.
 □ A TOLERANCE OF ± 1" WILL BE PERMITTED IN THIS DIMENSION.



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 DEAD LOAD DEFLECTION SHOWN IS FOR WEIGHT OF SLAB, WEARING COURSE, BARRIER, SIDEWALK AND MEDIAN WHERE APPLICABLE.
 CONTRACTOR WILL TAKE ELEVATIONS AT TOP OF BEAMS AFTER ERECTION AND WILL ALLOW FOR DEFLECTION SHOWN TO ENABLE BUILDING FORMS TO CORRECT GRADE AND SPECIFIED SLAB THICKNESS. PROVIDE COPY OF ELEVATIONS TO THE ENGINEER.



REVISED:
 APPROVED: JANUARY 13, 2015
Nancy Dubenberger
 STATE BRIDGE ENGINEER

SEE SUPERSTRUCTURE DETAILS AND REINFORCEMENT FOR DIAPHRAGM DETAILS.

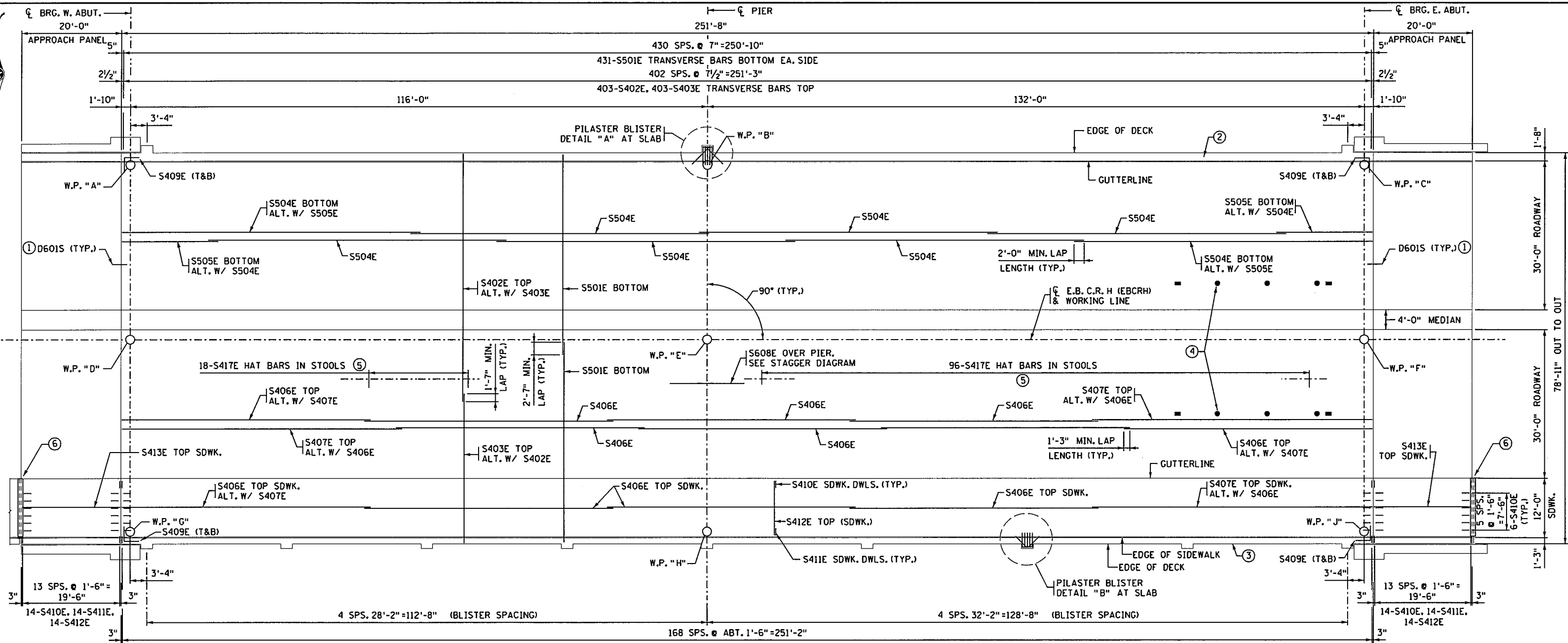
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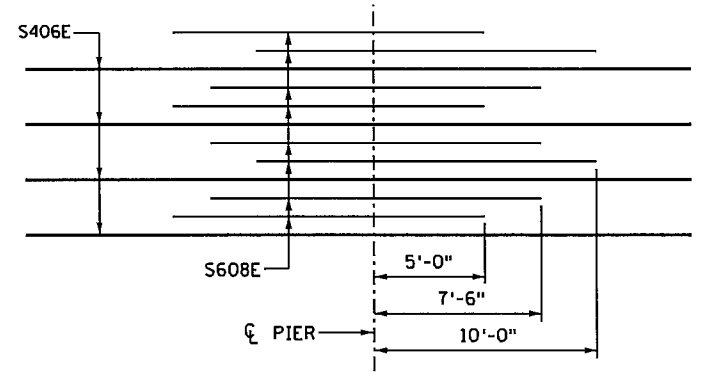
MN54" PRESTRESSED CONCRETE BEAM (PRETENSIONED) MN54-133

BEAMS B5-B8
 DES: MHD DR: MHD
 CHK: NCK CHK: NCK
 APPROVED: 12/14/15
FIG. 5-397.508
SHEET NO. B31 OF B58 SHEETS
BRIDGE NO 62732

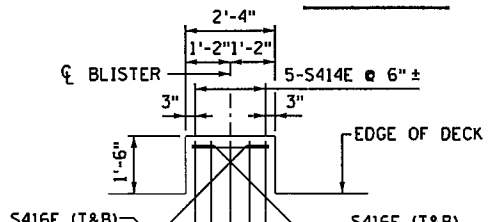
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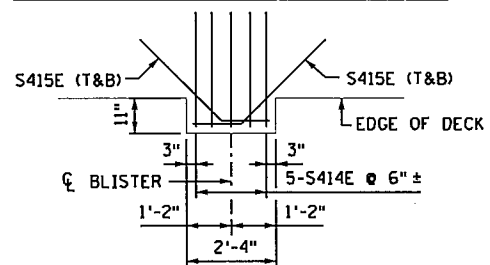
DECK PLAN



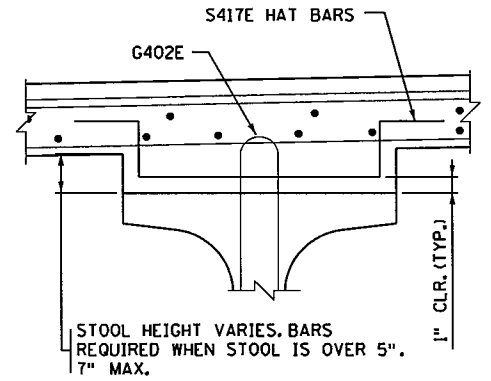
STAGGER DIAGRAM



PILASTER BLISTER DETAIL "A"



PILASTER BLISTER DETAIL "B"



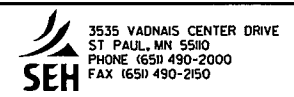
SECTION X-X

S417E HAT BARS

(T) DENOTES TOP
(B) DENOTES BOTTOM
(T&B) DENOTES TOP & BOTTOM

NOTES:

- SEE SHEET B43 FOR BILL OF REINFORCEMENT AND QUANTITIES.
- SEE SHEET B33 FOR TYPICAL TRANSVERSE SECTION.
- SEE SHEETS B34 & B35 FOR END DIAPHRAGM DETAILS.
- ① APPROACH PANEL TIES (D601S) TO BE STAINLESS STEEL. SEE SPECIAL PROVISIONS.
- ② SEE SHEETS B36 & B37 FOR CONCRETE BARRIER TYPE (TYPE P-2, TL-4) DETAILS.
- ③ SEE SHEETS B38 THRU B42 FOR CONCRETE PARAPET TYPE (TYPE P-2) DETAILS.
- ④ INSERTS IN DECK BOTTOM FOR CONDUIT HANGER ASSEMBLIES. SEE CONDUIT SYSTEM SHEETS B45 - B47.
- ⑤ MATCH G402E BEAM STIRRUPS TYP. EACH BEAM.
- ⑥ SIDEWALK AND RAIL COVER PLATE AT WEST END. SIDEWALK COVER PLATE AT EAST END. SEE APPROACH PANEL STD. 5-297.229 IN RDWY. PLANS

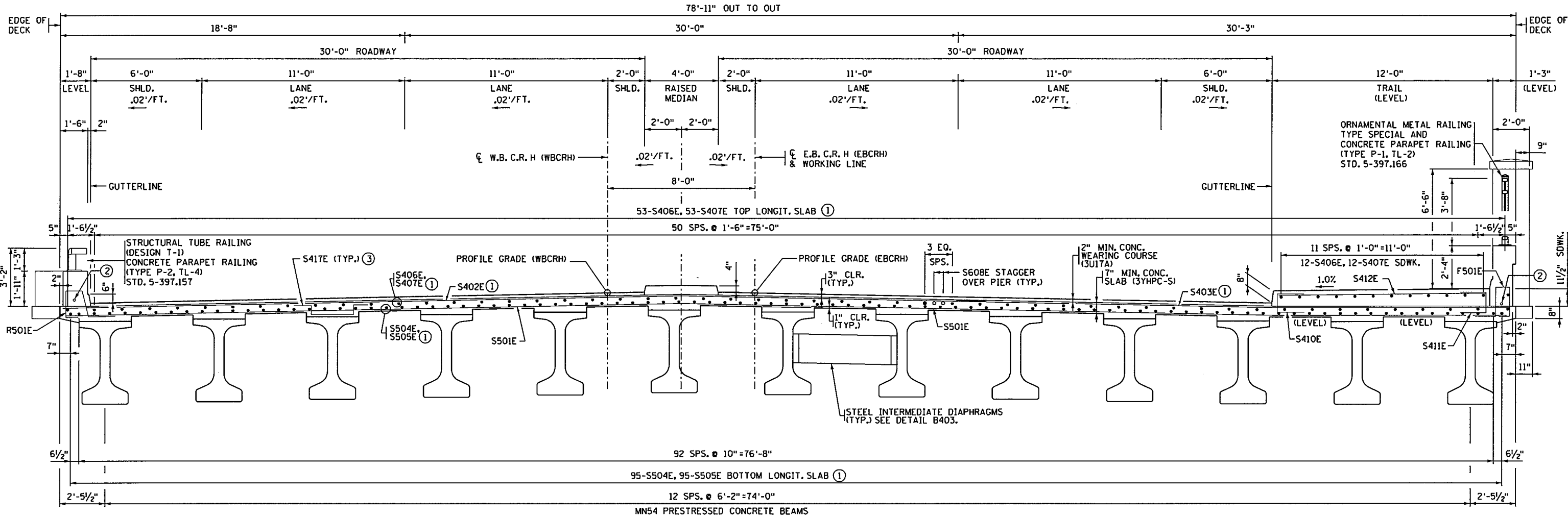


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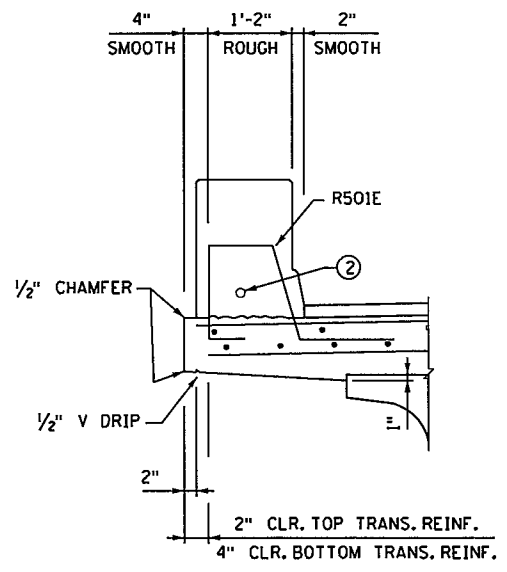
SUPERSTRUCTURE DETAILS

DES: MHD	DR: MAW	APPROVED:	12/14/15
CHK: NCK	CHK: MHD		
SHEET NO. B32 OF B58 SHEETS			BRIDGE NO 62732

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TRANSVERSE SECTION
 NORTH SIDE SOUTH SIDE



PARTIAL SECTION THRU DECK

- NOTES:**
- ① ALTERNATE BARS FROM END TO END TO STAGGER LAPS.
 - ② 1/2" DIA. P.V.C. COATED R.S.C. (LIGHTING)
 - ③ SEE SHEET B32 FOR LOCATION OF S417E HAT BARS.

3535 VAONAS CENTER DRIVE
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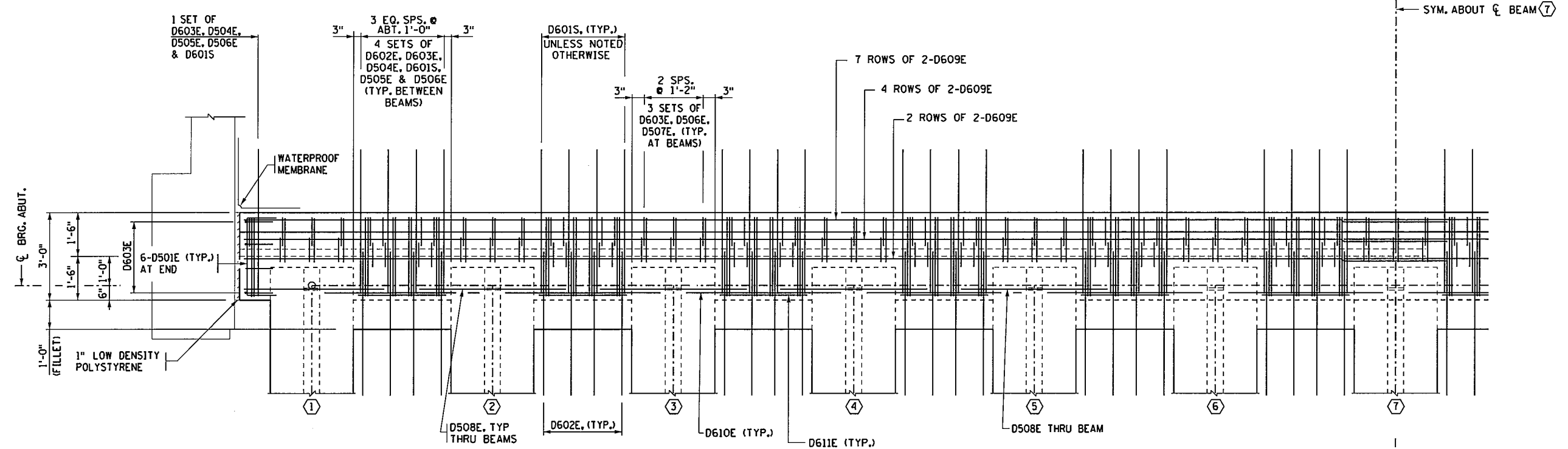
SUPERSTRUCTURE DETAILS

DES: MHD	DR: MAW	APPROVED:	
CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B33 OF B58 SHEETS			BRIDGE NO 62732

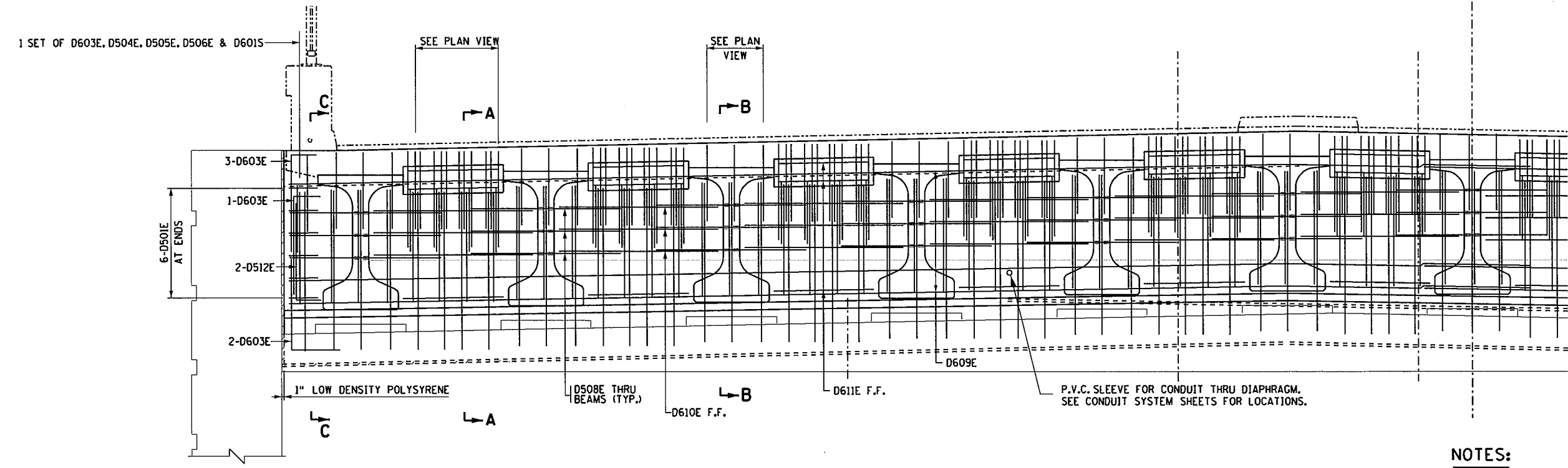
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12/10/2015

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END DIAPHRAGM PLAN VIEW



END DIAPHRAGM ELEVATION VIEW

NOTES:

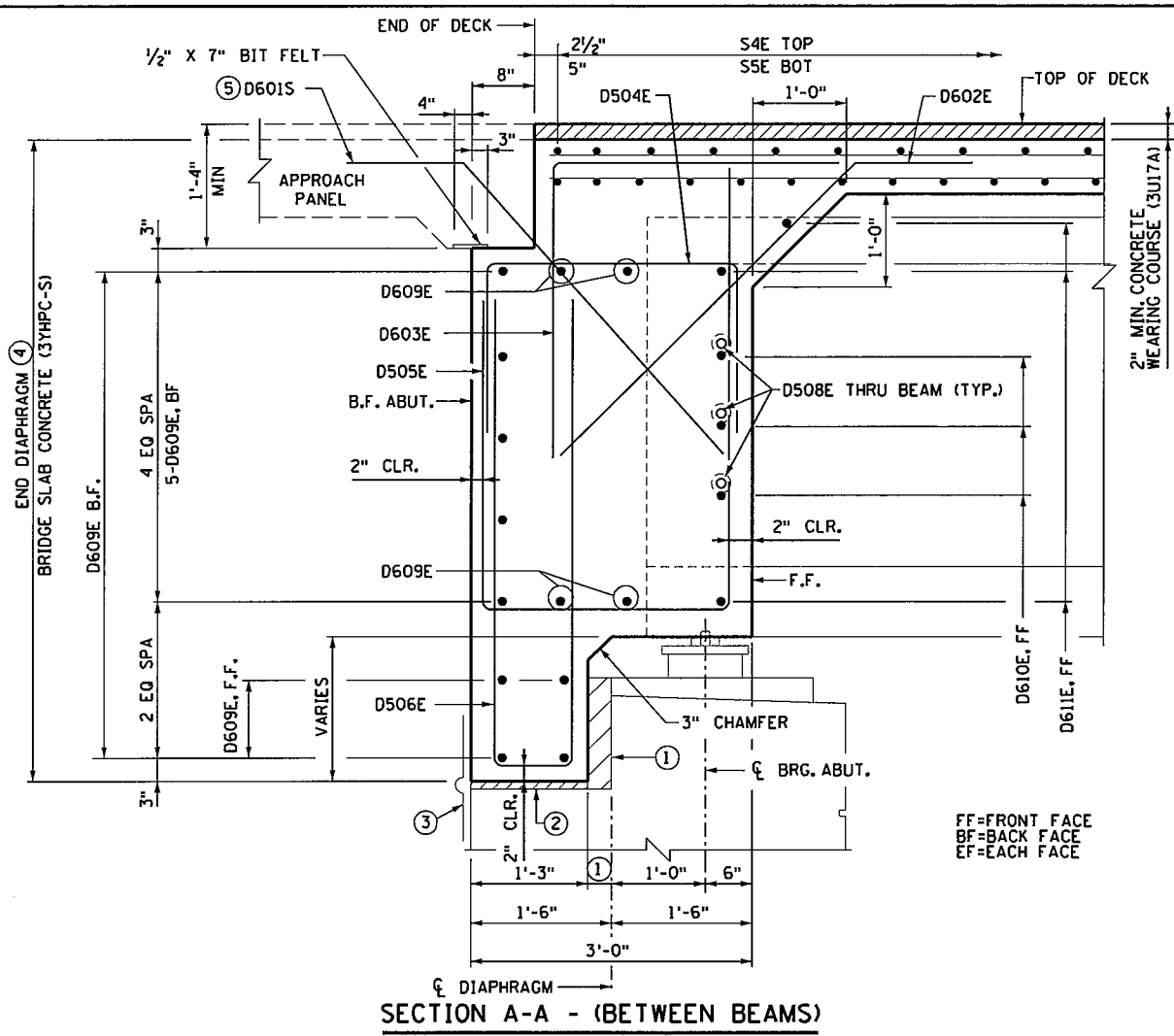
- F.F.=FRONT FACE
- B.F.=BACK FACE
- E.F.=EACH FACE
- SEE SHEET B35 FOR SECTIONS A-A, B-B & C-C.
- SEE SHEET B43 FOR BAR LIST AND SUMMARY OF QUANTITIES.
- ⑤ INDICATES BEAM LINE.

	3535 VADNAIS CENTER DRIVE ST. PAUL, MN 55100 PHONE (650) 490-2000 FAX (650) 490-2150	I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
	Signature: <i>Michael H Dupont</i> Date: 12-4-15	
	Printed Name: MICHAEL H DUPONT Lic. No. 43375	

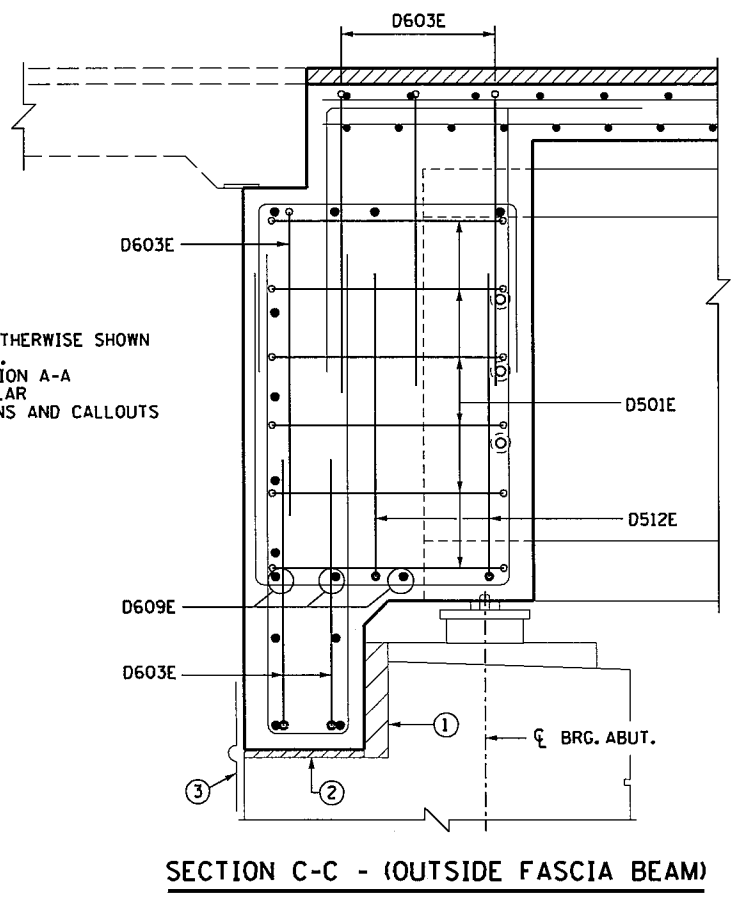
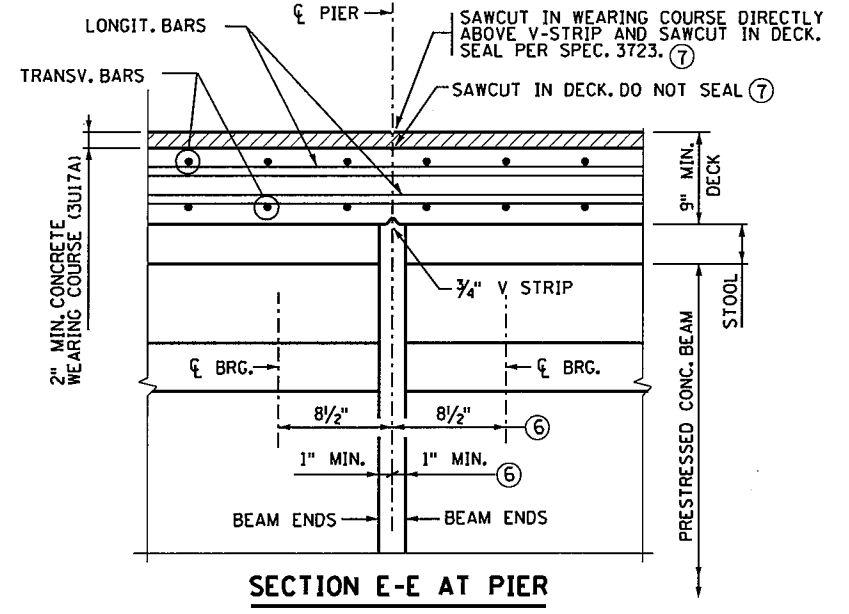
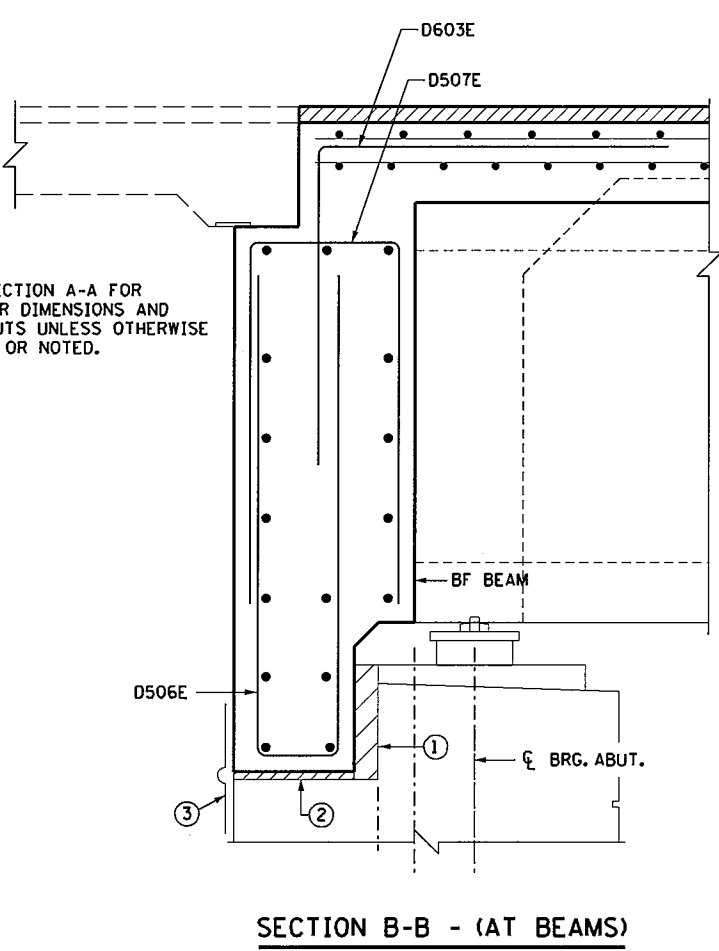
SUPERSTRUCTURE DETAILS

DES: MHD	DR: MAW	APPROVED: <i>12/14/15</i>	BRIDGE NO 62732
CHK: NCK	CHK: MHD		
SHEET NO. B34 OF B58 SHEETS			

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12/10/2015
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NOTE:
SEE SECTION A-A FOR
SIMILAR DIMENSIONS AND
CALLOUTS UNLESS OTHERWISE
SHOWN OR NOTED.



NOTE:
UNLESS OTHERWISE SHOWN
OR NOTED,
SEE SECTION A-A
FOR SIMILAR
DIMENSIONS AND CALLOUTS

NOTES:

- ① 3" LOW DENSITY POLYSTYRENE.
- ② 1" HIGH DENSITY POLYSTYRENE.
- ③ WATERPROOF MEMBRANE PER MN/DOT SPEC 2481.3B EXCEPT THE STRIP SHALL BE 24" WIDE, TO ALLOW MOVEMENT, MEMBRANE PLACEMENT SHALL BE SUCH THAT A 1" WRINKLE IN THE MEMBRANE WILL BE FORMED OVER THE JOINT OPENING. ALL COSTS ASSOCIATED CONSIDERED INCIDENTAL.
- ④ END DIAPHRAGM CONCRETE TO BE CAST WITH DECK. SEE SPECIAL PROVISIONS.
- ⑤ APPROACH PANEL TIES (D601S) TO BE STAINLESS STEEL. SEE SPECIAL PROVISIONS.
- ⑥ MEASURED ALONG CL. OF BEAM.
- ⑦ 1" DEEP BY 3/8" WIDE SAW CUTS. MAKE SAWCUTS AS SOON AS CUTTING CAN BE DONE WITHOUT RAVELING THE CONCRETE. SEE SHEET B34 FOR SECTION LOCATIONS. SEE SHEET B43 FOR BAR LIST AND SUMMARY OF QUANTITIES.

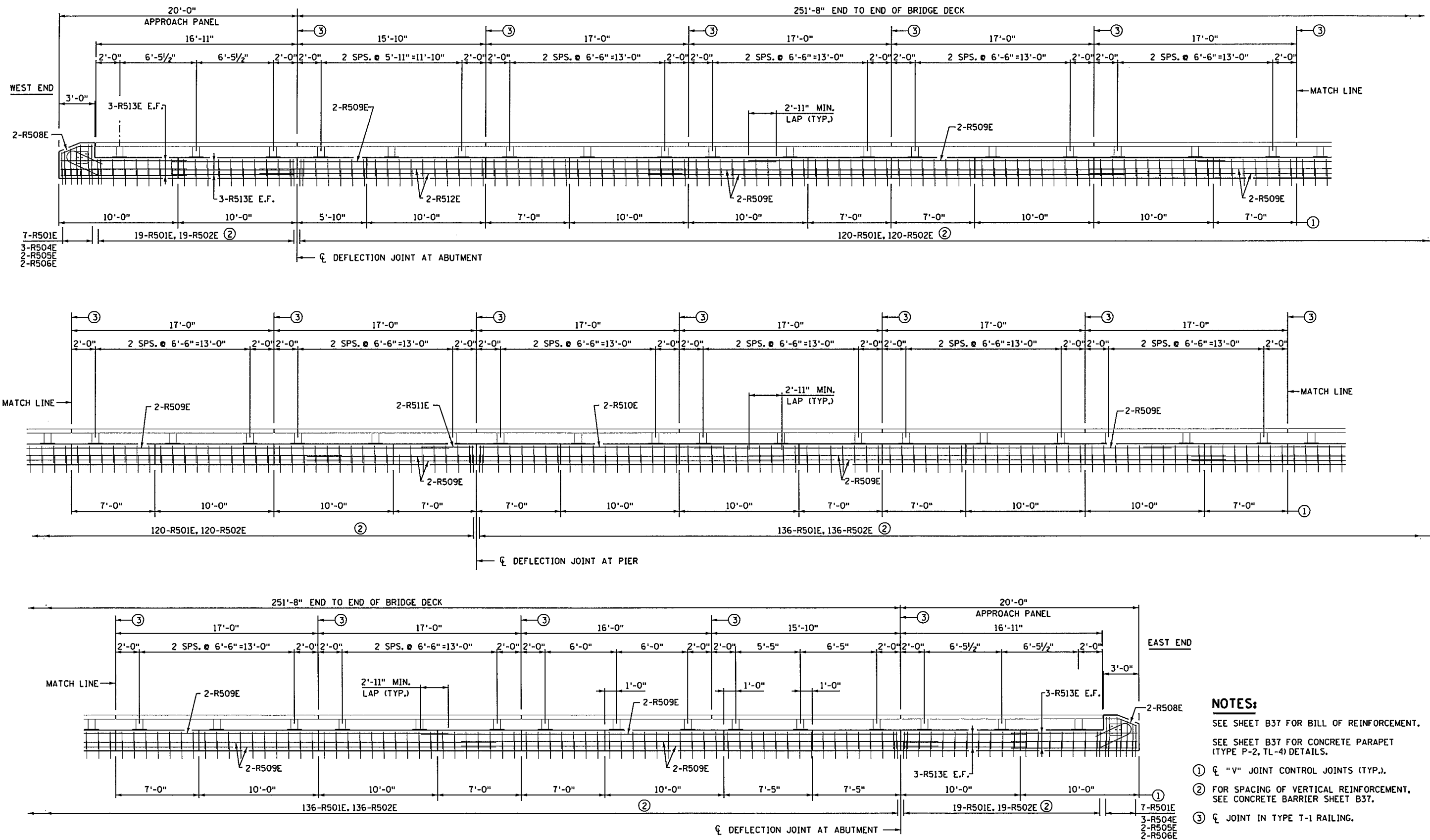
SEH
3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (650) 490-2000
FAX (650) 490-2150

I hereby certify that this specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

SUPERSTRUCTURE DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62732
CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B35 OF B58 SHEETS			

11:02:12 AM
12/10/2015
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- NOTES:**
- SEE SHEET B37 FOR BILL OF REINFORCEMENT.
 - SEE SHEET B37 FOR CONCRETE PARAPET (TYPE P-2, TL-4) DETAILS.
 - ① "V" JOINT CONTROL JOINTS (TYP.).
 - ② FOR SPACING OF VERTICAL REINFORCEMENT, SEE CONCRETE BARRIER SHEET B37.
 - ③ "C" JOINT IN TYPE T-1 RAILING.

INSIDE FACE OF BARRIER ELEVATION
NORTH BARRIER

SEH
3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
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FAX (651) 490-2150

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Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

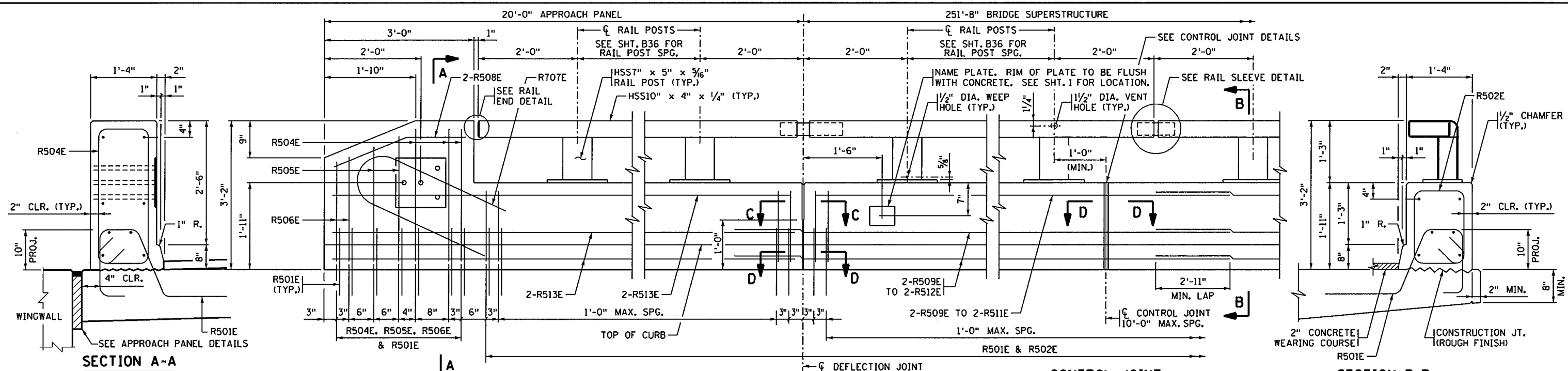
STRUCTURAL TUBE RAILING (DESIGN T-1) AND CONCRETE PARAPET (TYPE P-2, TL-4) ELEVATION

DES: MAW	DR: MAW	APPROVED: 12/14/15
CHK: MHD	CHK: MHD	

SHEET NO. B36 OF B58 SHEETS

BRIDGE NO 62732

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12/10/2015
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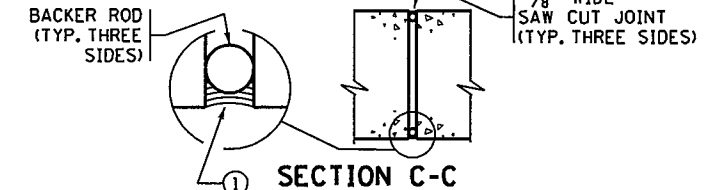


SECTION A-A

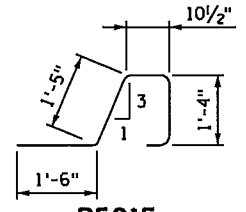
SECTION B-B

JOINT AT ABUTMENT

CONTROL JOINT

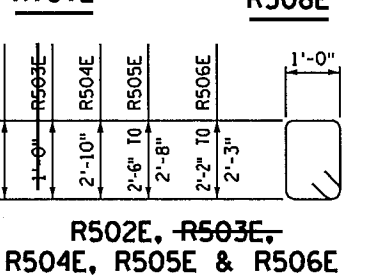
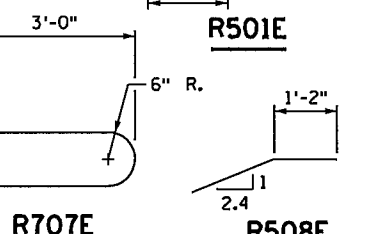
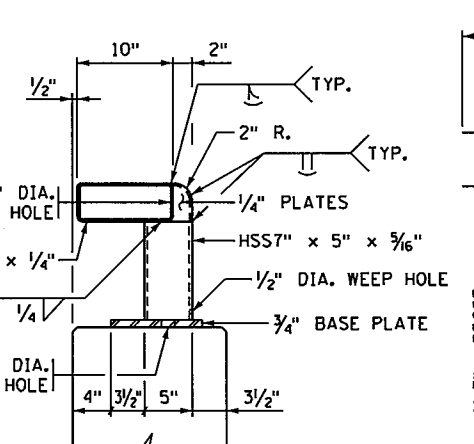
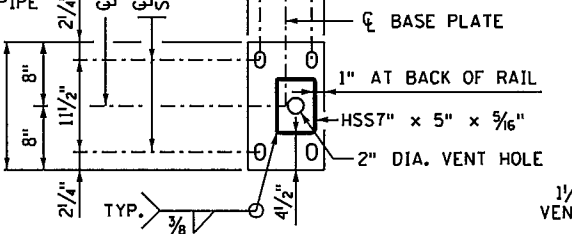
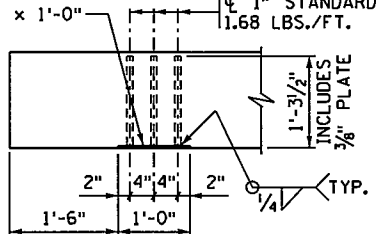
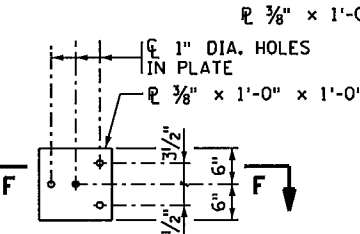


INSIDE ELEVATION OF RAILING
CONCRETE WEARING COURSE NOT SHOWN
RAIL MEETS TEST LEVEL 4 REQUIREMENTS OF NCHRP REPORT 350



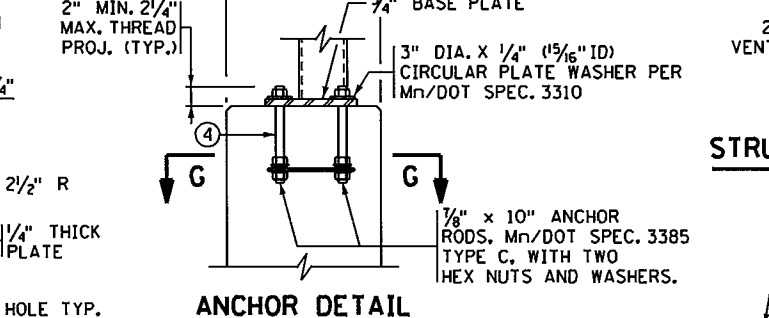
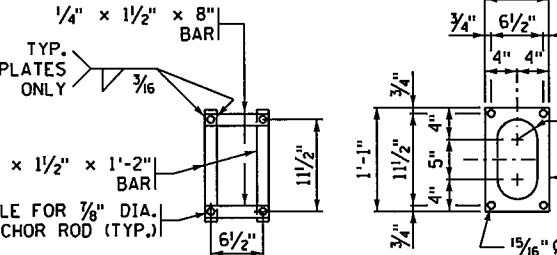
GENERAL NOTES

- FOR PAYMENT OF "TYPE P-2 (TL-4) BARRIER CONCRETE (3552)" MEASURE LENGTH OF CONCRETE BARRIER BETWEEN END FACES. CONCRETE PARAPET = 396 LBS./FT. (0.098 CU. YDS./FT.)
- FOR PAYMENT OF "STRUCTURAL TUBE RAILING DESIGN T-1" MEASURE LENGTH OF RAIL FROM END TO END OF TUBING. DO NOT DEDUCT FOR JOINTS.
- FINISH ALL EDGES OF RAIL WITH 1/2" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.
- MAX. SPACING OF CONCRETE CONTROL JOINTS SHALL BE 10 FT. SEE SHEET B36 FOR CONCRETE CONTROL JOINT SPACING.
- PROVIDE CORRECT ALIGNMENT FOR ANCHORAGES BY PLACING THEM ACCURATELY AND NORMAL TO GRADE. SEE SPECIAL PROVISIONS.
- PROVIDE STRUCTURAL STEEL AND PLATE WASHERS PER Mn/DOT SPEC. 3310. PROVIDE STRUCTURAL TUBES PER A.S.T.M. A500, GRADE B AS SPECIFIED IN Mn/DOT SPEC. 3361.
- GALVANIZE BOLTS, NUTS, AND WASHERS PER Mn/DOT SPEC. 3392.
- GALVANIZE ALL OTHER STRUCTURAL STEEL PER Mn/DOT SPEC. 3394, AFTER FABRICATION.
- PROVIDE GUARDRAIL CONNECTION STRUCTURAL STEEL PER Mn/DOT SPEC. 3306.
- GUARDRAIL CONNECTION AND NAME PLATE IS INCIDENTAL TO "TYPE P-2 (TL-4) BARRIER CONCRETE (3552)".
- PRICE BID FOR "STRUCTURAL TUBE RAILING DESIGN T-1" INCLUDES ANCHORAGES AND ALL MATERIAL ABOVE TOP OF CONCRETE BARRIER.
- ALL MATERIAL IN THE CONCRETE BARRIER IS LISTED IN SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE.
- SEE SPECIAL PROVISIONS FOR PAINT REQUIREMENTS.
- CONTINUOUSLY GROUND THE METAL RAILING AS DIRECTED IN THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.

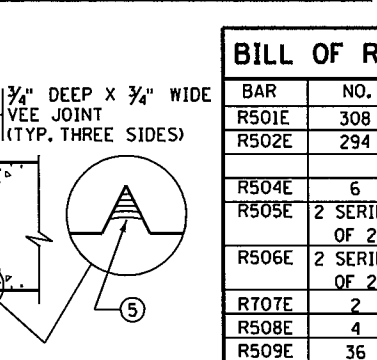


GUARDRAIL CONNECTION DETAIL

GALVANIZE AFTER FABRICATION PER Mn/DOT SPEC. 3394
ESTIMATED WEIGHT = 22 LBS.

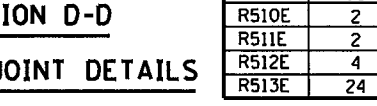
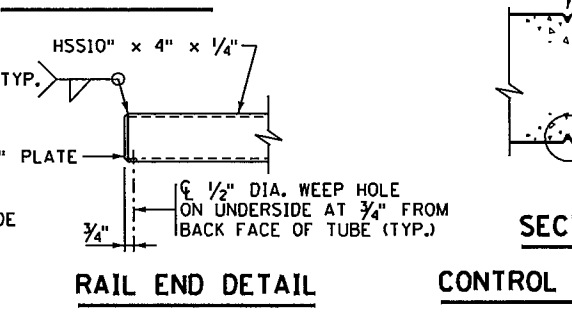
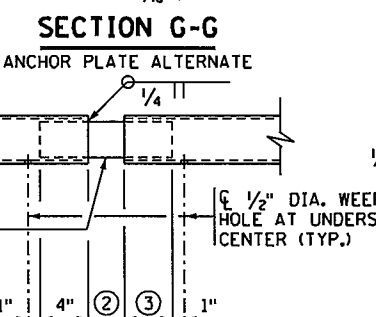
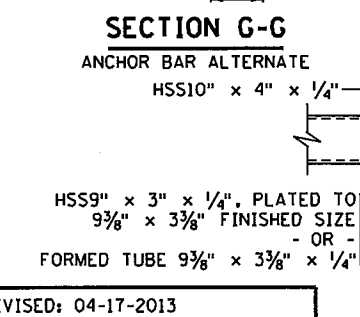


STRUCTURAL TUBE RAIL DETAIL



BILL OF REINFORCEMENT FOR PARAPET

BAR	NO.	LENGTH	SHAPE	LOCATION
R501E	308	5'-7"	BENT	PARAPET VERTICAL
R502E	294	6'-1"	BENT	PARAPET VERTICAL
R504E	6	8'-7"	BENT	PARAPET VERTICAL
R505E	2 SERIES OF 2	7'-11" TO 8'-3"	BENT	PARAPET VERTICAL
R506E	2 SERIES OF 2	7'-3" TO 7'-5"	BENT	PARAPET VERTICAL
R707E	2	6'-7"	BENT	PARAPET END
R508E	4	2'-9"	BENT	PARAPET END LONGIT.
R509E	36	40'-0"	STR	PARAPET LONGITUDINAL
R510E	2	22'-1"	STR	PARAPET LONGITUDINAL
R511E	2	6'-1"	STR	PARAPET LONGITUDINAL
R512E	4	35'-6"	STR	PARAPET LONGITUDINAL
R513E	24	11'-3"	STR	PARAPET LONGITUDINAL



REVISED: 04-17-2013
APPROVED: MARCH 30, 2010
STATE BRIDGE ENGINEER

RAIL SLEEVE DETAIL

RAIL END DETAIL

3535 VADNAIS CENTER DRIVE
ST PAUL, MN 5510
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FAX (650) 490-2150

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Signature: MICHAEL DUPONT
Date: 12-4-15
Printed Name: MICHAEL DUPONT
Lic. No. 43375

STRUCTURAL TUBE RAILING (DESIGN T-1) AND CONCRETE PARAPET (TYPE P-2, TL-4) (WITH INTEGRAL END POST)

DES: MAW DR: MAW
CHK: MHD CHK: MHD

APPROVED: 12/14/15

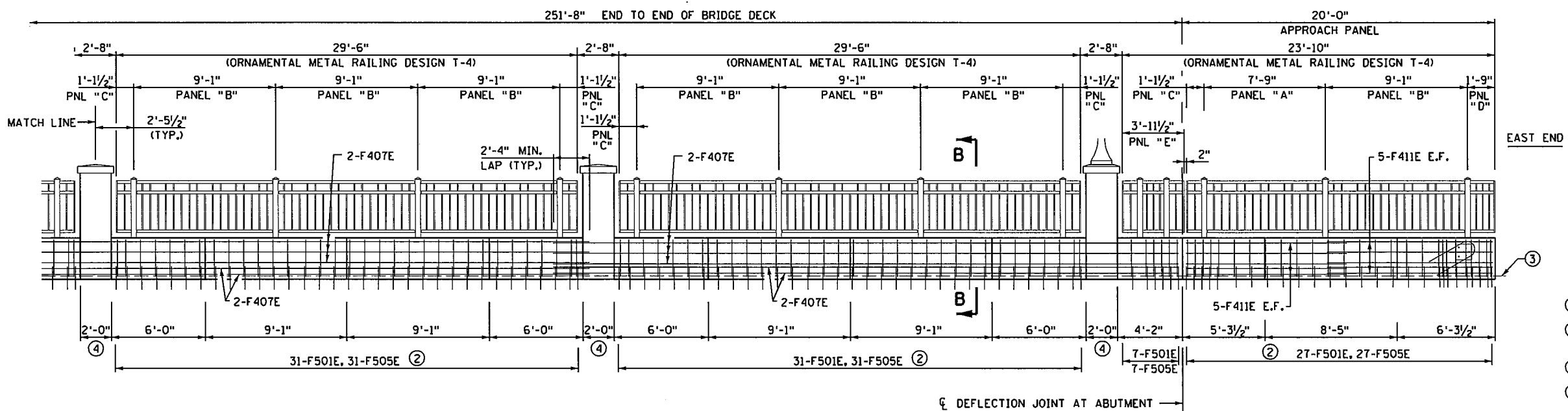
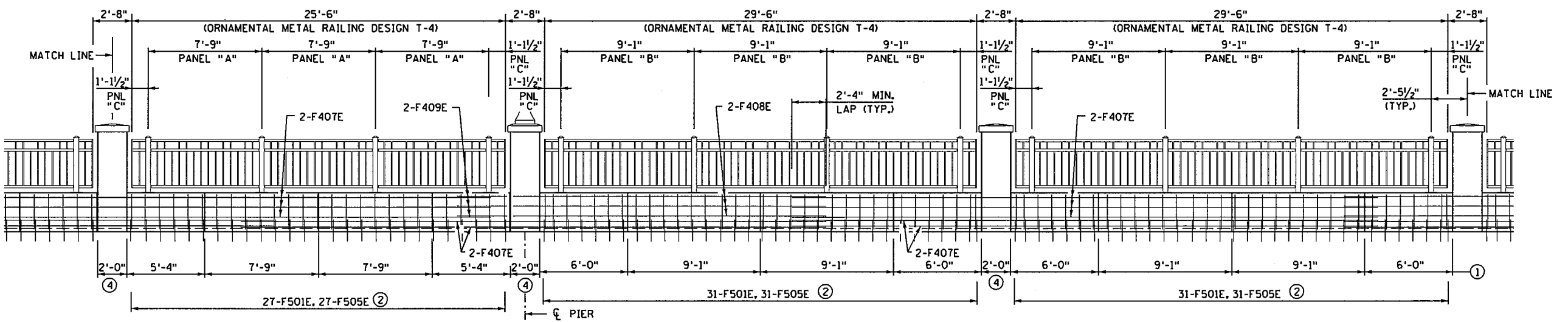
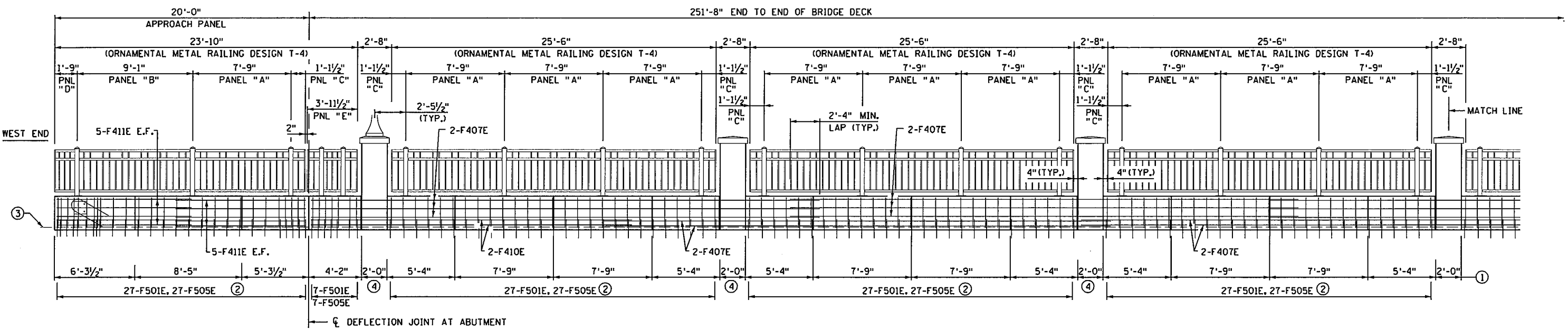
BRIDGE NO 62732

NORTH BARRIER

FIG. 5-397.157

SHEET NO. B37 OF B58 SHEETS

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 12/10/2015
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OUTSIDE FACE OF BARRIER ELEVATION
SOUTH BARRIER TYPE P-1

- NOTES:**
- SEE SHEET B39 FOR BILL OF REINFORCEMENT.
 - SEE SHEET B39 FOR CONCRETE PARAPET (TYPE P-1) DETAILS.
 - SEE SHEET B41 & B42 FOR ORNAMENTAL METAL RAILING DETAILS.
 - ① 1/4" JOINT CONTROL JOINTS (TYP.).
 - ② FOR SPACING OF VERTICAL REINFORCEMENT, SEE CONCRETE BARRIER SHEET B39.
 - ③ CONDUIT SYSTEM TYPE 1. SEE SHEET B45.
 - ④ SEE SHEET B40 FOR POST DETAILS.

3535 VADNAIS CENTER DRIVE
 ST PAUL, MN 5510
 PHONE (650) 490-2000
 FAX (650) 490-2150

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 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

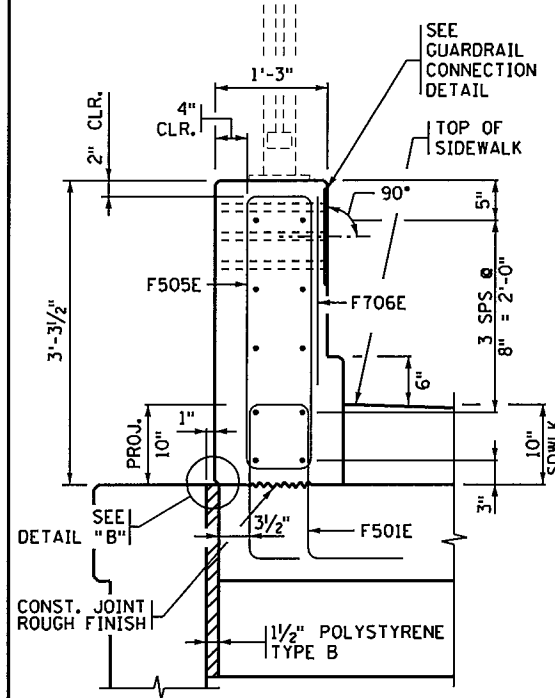
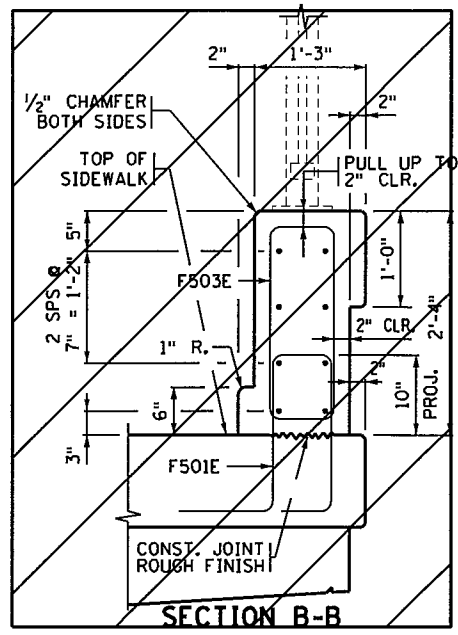
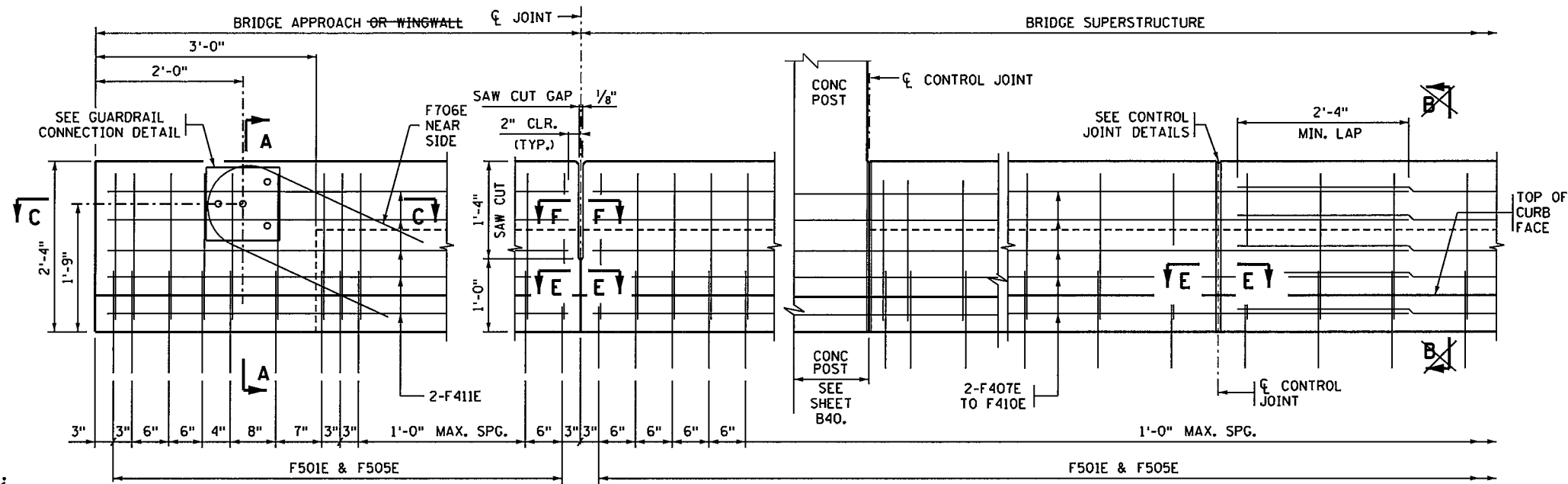
TYPE P-1 AND ORNAMENTAL METAL RAILING TYPE SPECIAL ELEVATION

DES: MAW	DR: MAW	APPROVED: 12/14/15
CHK: MHD	CHK: MHD	

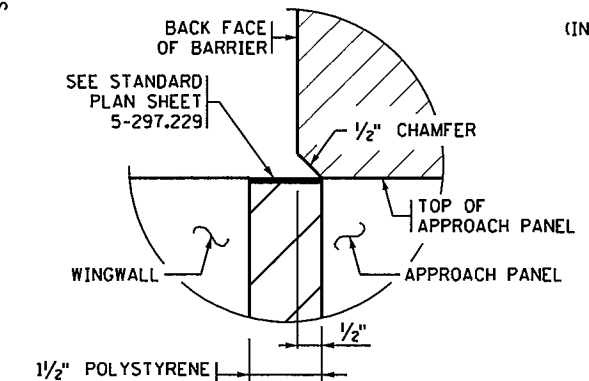
SHEET NO. B38 OF B58 SHEETS

BRIDGE NO 62732

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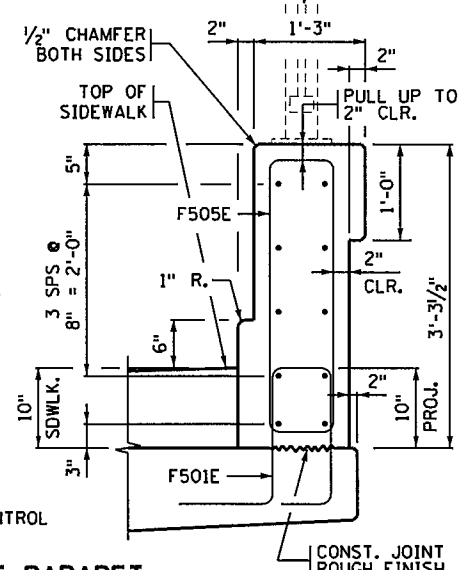
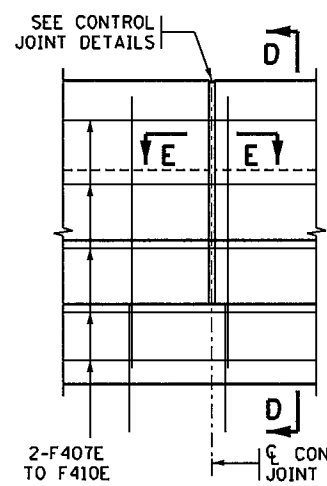
JOINT AT ABUTMENT
(INTEGRAL OR SEMI-INTEGRAL ABUTMENT) SEE DETAIL "A" FOR PARAPET ABUTMENT



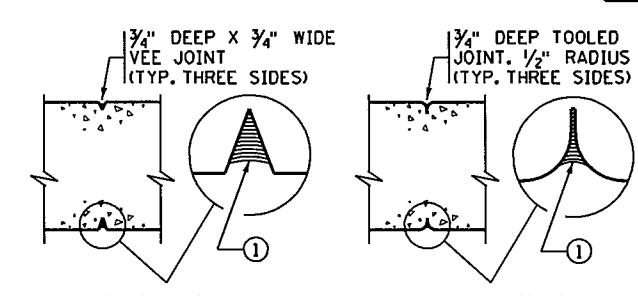
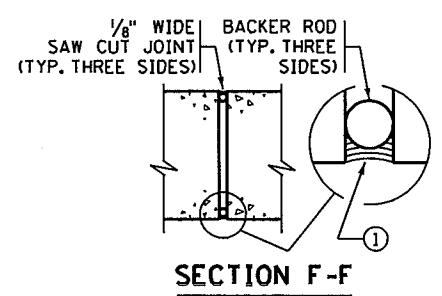
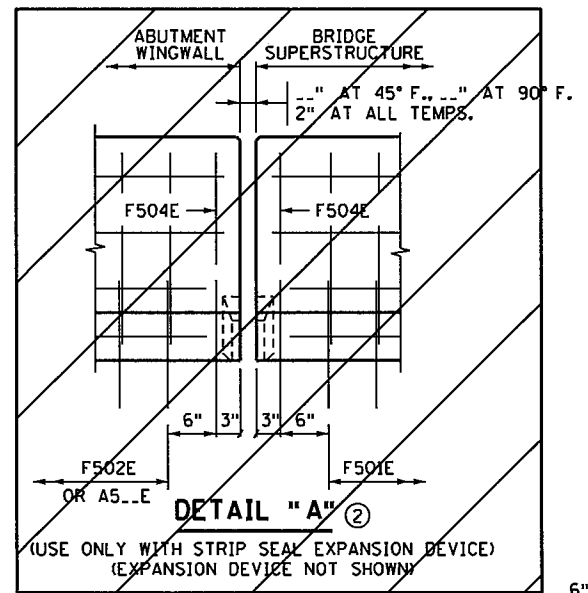
PARAPET MEETS TEST LEVEL 2 REQUIREMENTS OF NCHRP REPORT 350

BILL OF REINFORCEMENT FOR PARAPET

BAR	NO.	LENGTH	SHAPE	LOCATION
F501E	336	5'-6"	BENT	RAIL BASE DWLS.
F505E	336	8'-3"	BENT	RAIL BASE VERTS.
F706E	2	6'-7"	BENT	AT GUARDRAIL CONN.
F407E	60	40'-0"	STR	RAIL BASE LONGIT.
F408E	6	21'-8"	STR	RAIL BASE LONGIT.
F409E	6	4'-6"	STR	RAIL BASE LONGIT.
F410E	4	25'-6"	STR	RAIL BASE LONGIT.
F411E	40	10'-11"	STR	RAIL BASE LONGIT.
F612E	36	4'-6"	BENT	POST DWL.
F513E	90	7'-3"	STR	VERT. POST
F414E	72	6'-3"	BENT	POST TIES
F615E	12	1'-6"	STR	PC CAP DWL.

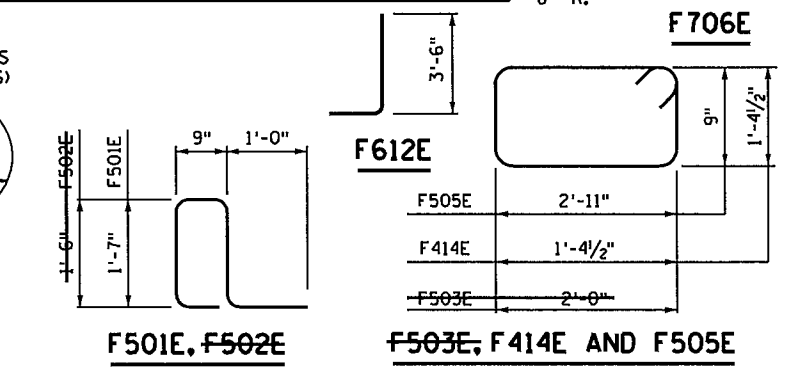


DETAIL "B"
(ELEVATION VIEW)
WHERE COPING ON BACK OF BARRIER AT GUARDRAIL CONNECTION EXTENDS TO BOTTOM OF BARRIER



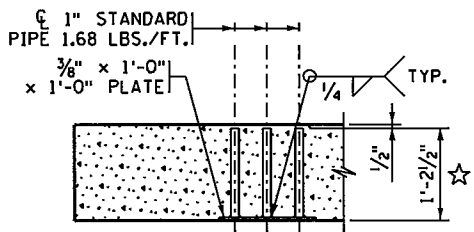
SECTION E-E
CONTRACTOR OPTION 1
SECTION E-E
CONTRACTOR OPTION 2
CONTROL JOINT DETAILS

WHEN USING SLIP FORM METHOD TO PLACE THE CONCRETE, CUT JOINT 3 INCHES DEEP USING MARGIN TROWEL OR SIMILAR MEANS IMMEDIATELY AFTER CONCRETE PLACEMENT (TYP. THREE SIDES)

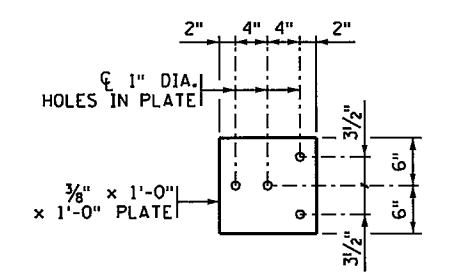


GENERAL NOTES

- CONTINUOUSLY GROUND ALL METAL RAILINGS; SEE THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.
- PAYMENT LENGTH SHALL BE MEASURED BETWEEN THE OUTSIDE FACES OF THE CONCRETE PARAPET.
- CONCRETE PARAPET - 416 LBS./FT. (0.103 CU. YDS./FT.)
- CONCRETE PARAPET W/ADJACENT SIDEWALK (BASED ON A 10" SIDEWALK HEIGHT) = 573 LBS./FT. (0.141 CU. YDS./FT.)
- FINISH ALL EDGES OF PARAPET WITH 1/2" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.
- MAXIMUM SPACING OF CONTROL JOINTS ON SUPERSTRUCTURE, APPROACH AND WINGWALL SHALL BE 10 FT. SEE SUPERSTRUCTURE SHEET B58 FOR CONTROL JOINT SPACING.
- GUARDRAIL CONNECTION TO BE STRUCTURAL STEEL, SPEC. 3306. GUARDRAIL CONNECTION AND NAME PLATE TO BE CONSIDERED INCIDENTAL TO "TYPE P-1" BARRIER CONCRETE (3552)".
- SEE STANDARD FIGURE 5-397 FOR LIGHT BLISTER DETAILS.
- PARAPET QUANTITIES ARE LISTED IN SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE.
- ① JOINT SEALANT PER MNDOT APPROVED/QUALIFIED PRODUCTS LIST - CRACK AND JOINT MATERIALS - SILICONE JOINT SEALERS.
- ② REFER TO STANDARD FIGURE 5-397.632 FOR COVER PLATE DETAILS.



SECTION C-C
(REINFORCEMENT NOT SHOWN)
★ DIMENSION INCLUDES 3/8" PLATE



GUARDRAIL CONNECTION DETAIL
GALVANIZE AFTER FABRICATION PER SPEC. 3394. ESTIMATED WEIGHT = 23 LBS.

REVISION:
APPROVED: NOVEMBER 6, 2013
Nancy Duberberger
STATE BRIDGE ENGINEER

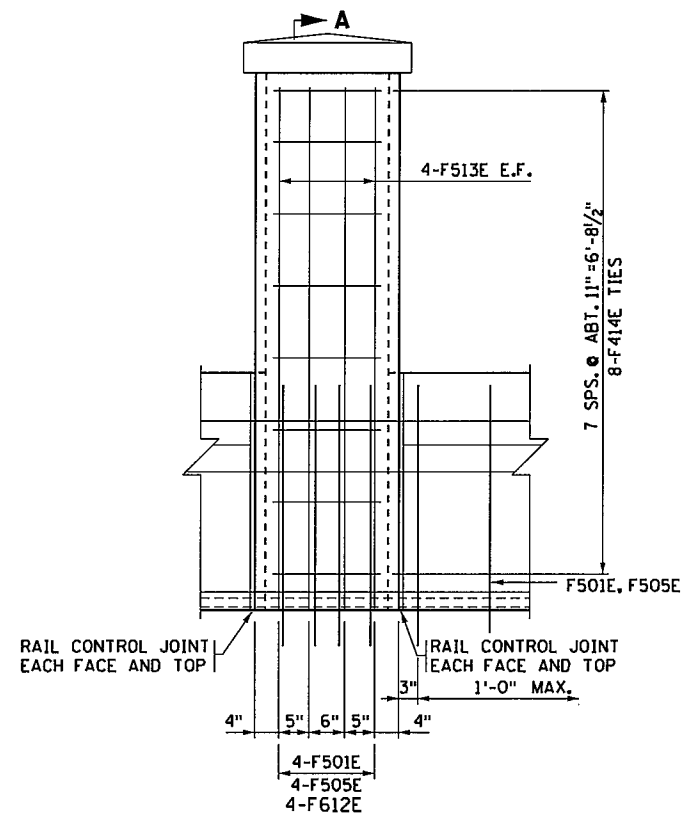
3535 VADNAIS CENTER DRIVE
ST PAUL, MN 5510
PHONE (650) 490-2000
FAX (650) 490-2150
SEH

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Printed Name: MICHAEL H. DUPONT Lic. No. 43375

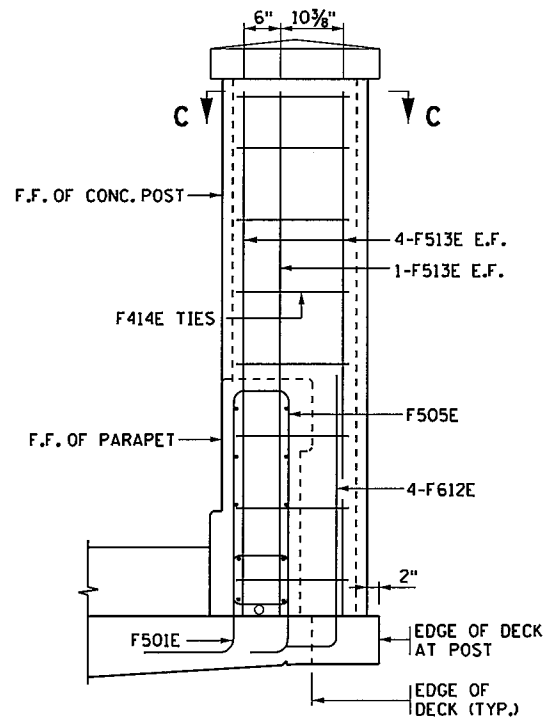
CONCRETE PARAPET (TYPE P-1)
WITH INTEGRAL END POST
(WITHOUT CONCRETE WEARING COURSE)

DES: MAW DR: MAW
CHK: MHD CHK: MHD
APPROVED: 12/14/15
SHEET NO. B39 OF B58 SHEETS
BRIDGE NO 62732

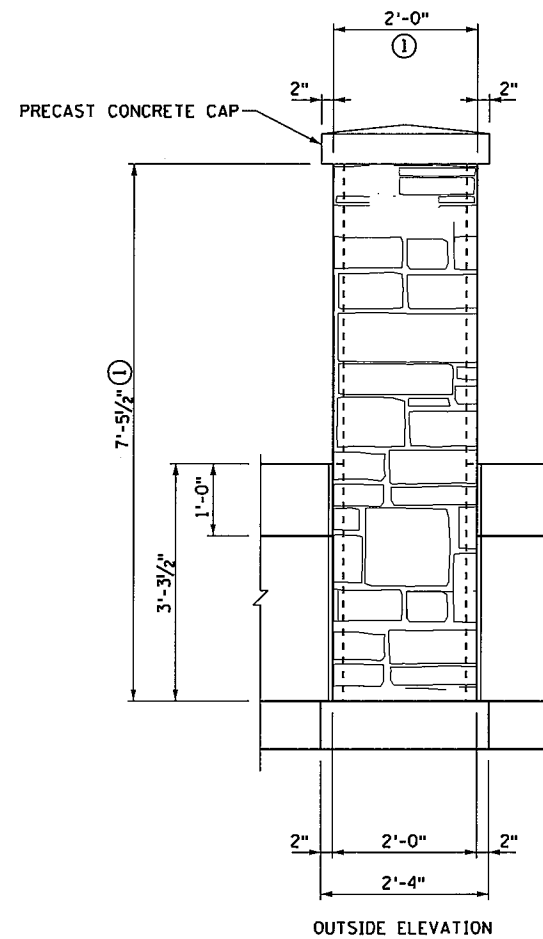
MODIFIED SECTION A-A TO BRIDGE 62732
MODIFIED
FIG. 5-397.166



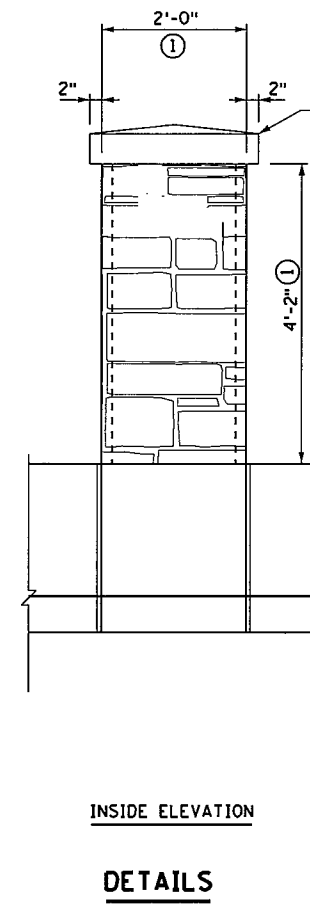
TYP. CONCRETE RAIL POST
OUTSIDE ELEVATION



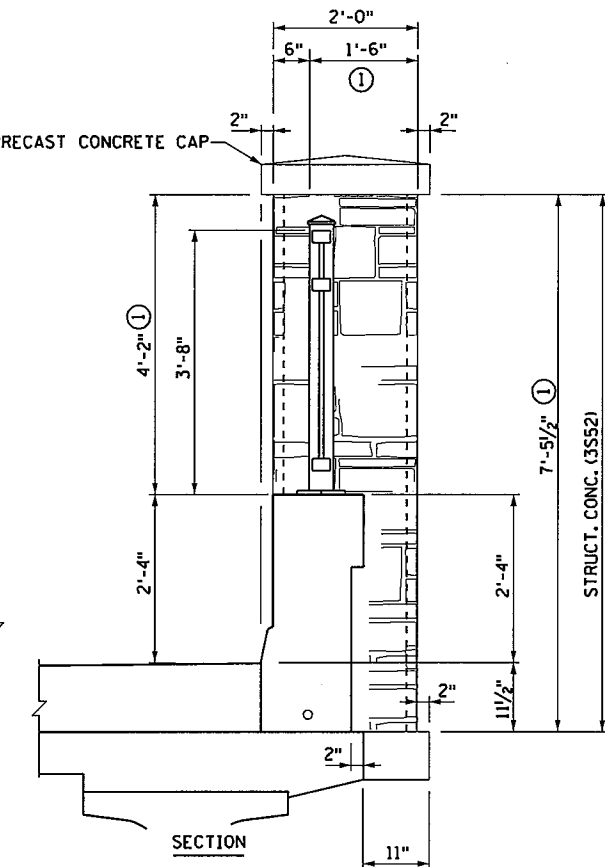
SECTION A-A



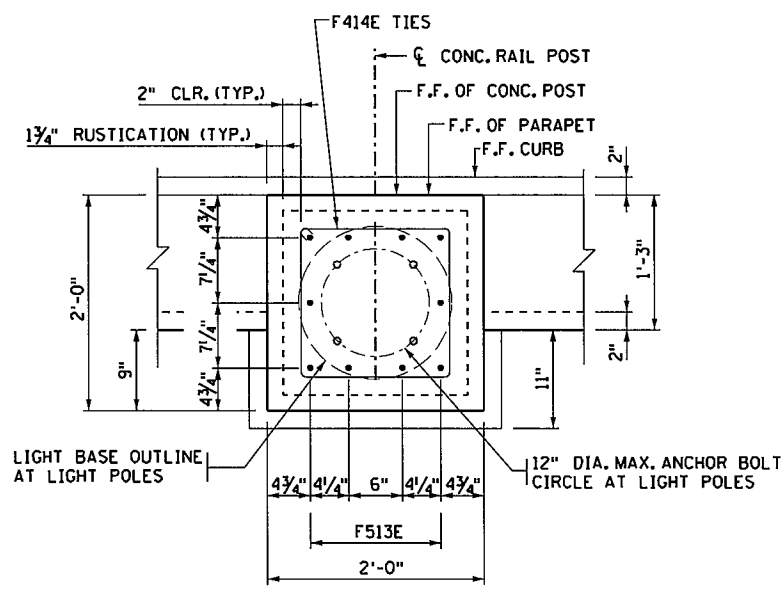
OUTSIDE ELEVATION



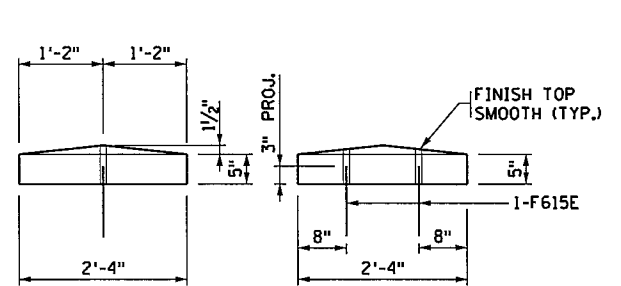
INSIDE ELEVATION
DETAILS



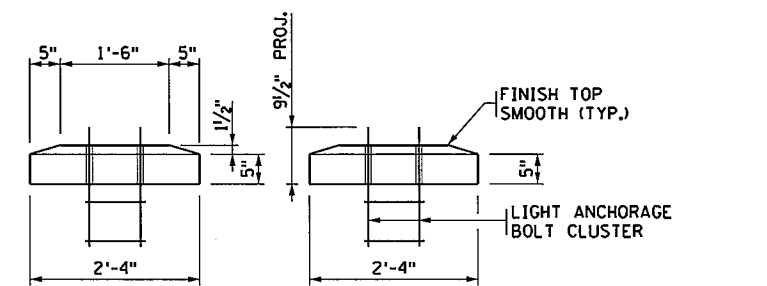
SECTION



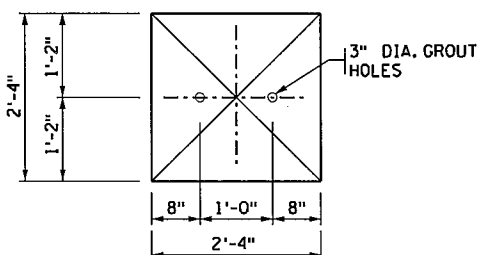
SECTION C-C



TYPICAL AT
TYPE P-1 RAILING
(6 COUNT)



AT LIGHT POLES (3 COUNT)
FOR TYPE P-1 RAILING



PRECAST CAP DETAIL

- NOTES:**
- CONCRETE RAIL POSTS TO BE INCLUDED IN PRICE BID FOR "TYPE P-1 PARAPET CONCRETE (3S52).
 - F.F. INDICATES FRONT FACE.
 - SEE SHEETS B39 FOR ADDITIONAL BARRIER DETAILS AND BILL OF REINFORCEMENT.
 - F.F.=FRONT FACE
B.F.=BACK FACE
 - ① LIMITS OF ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) AND ANTI GRAFFITI COATING.
 - ② SEE LIGHT POLE AND POLE ANCHORAGE DETAILS SHEET B53.

3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

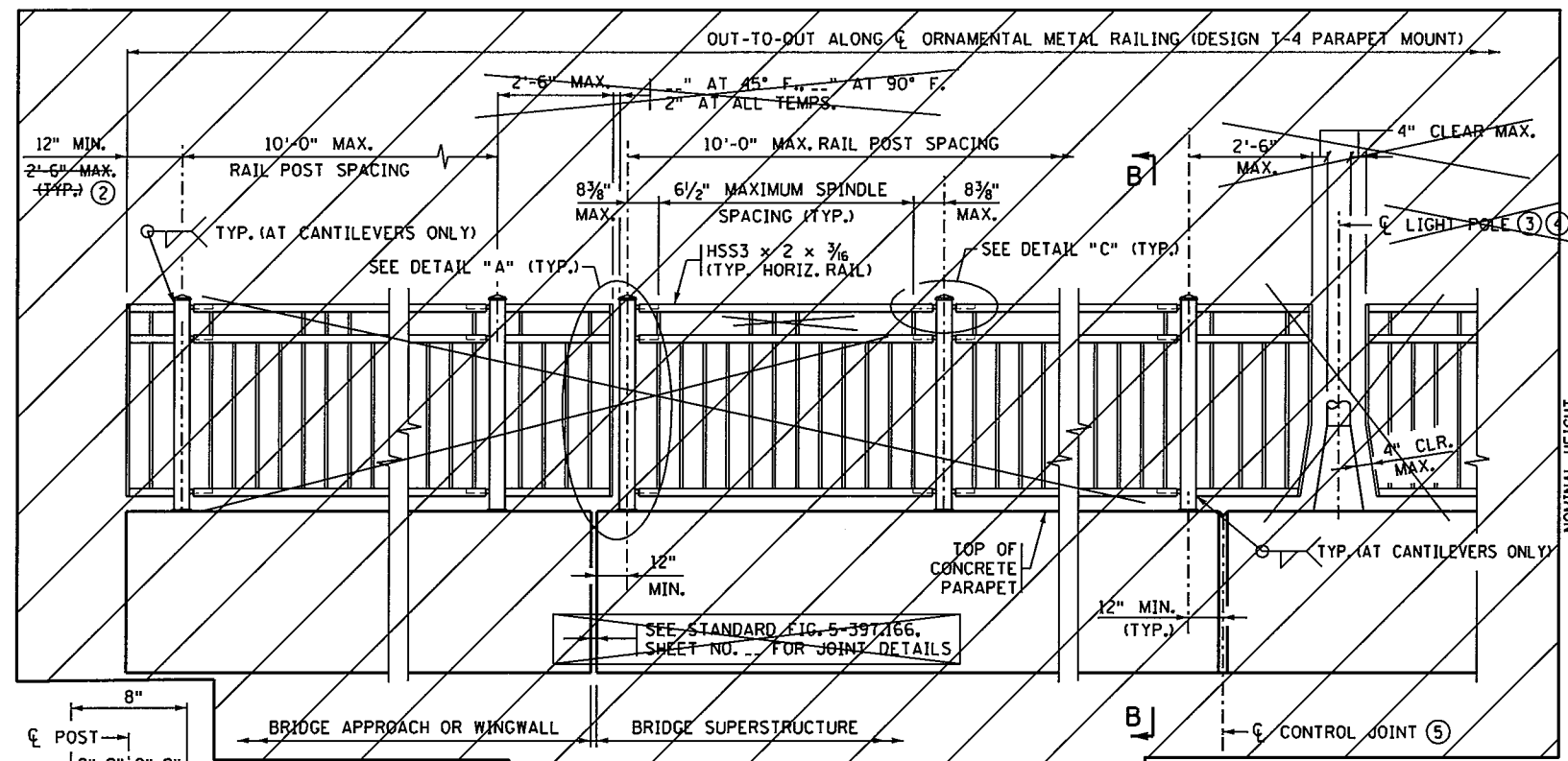
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

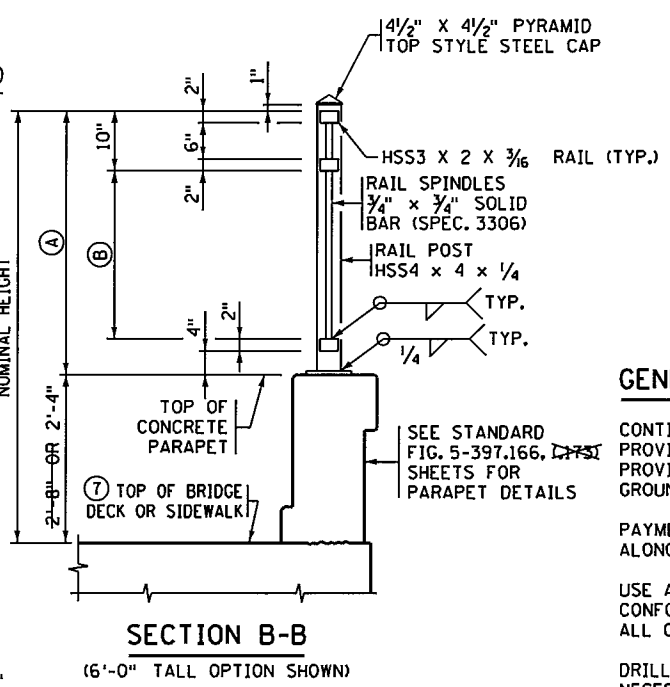
RAILING DETAILS TYPE P-1

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62732
CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B40 OF B58 SHEETS			

11:02:17 AM
12/10/2015
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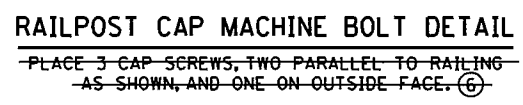
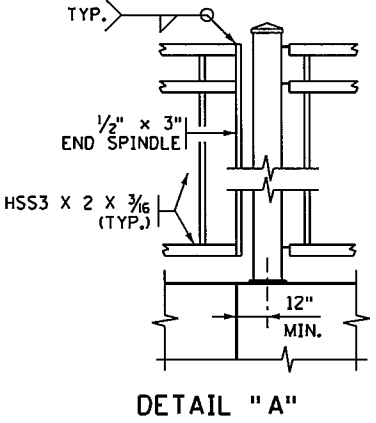
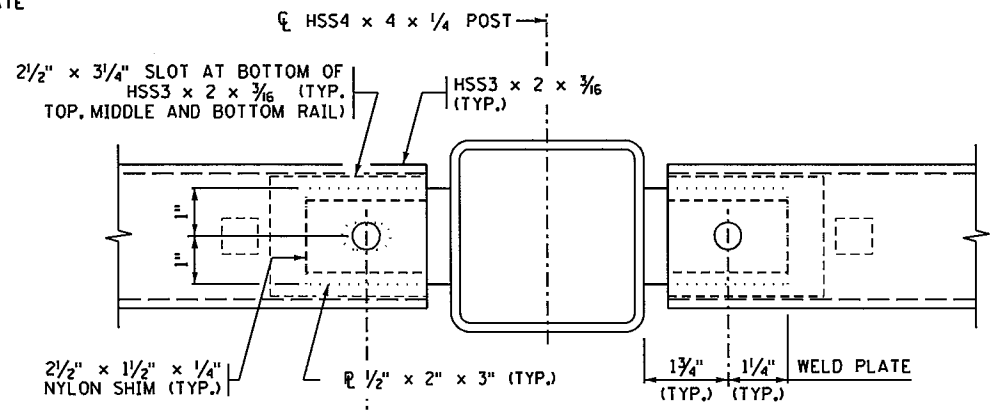
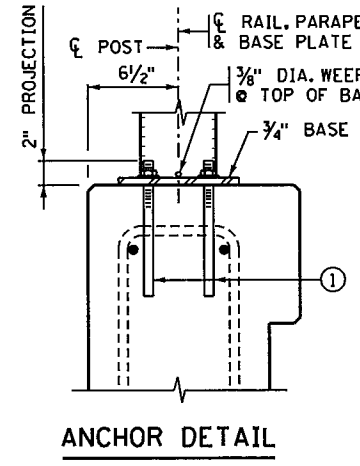
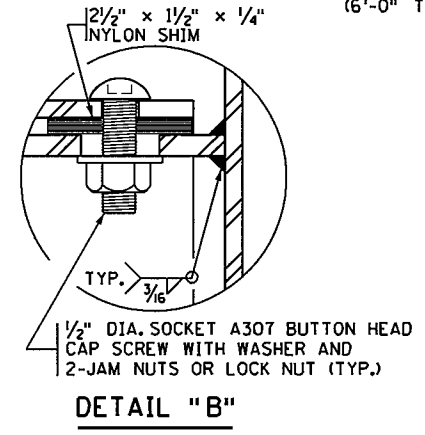
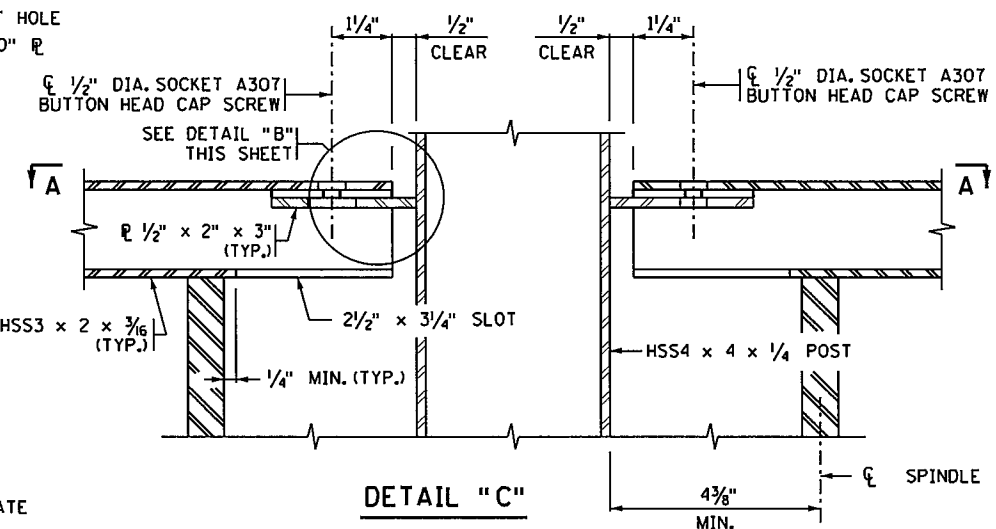
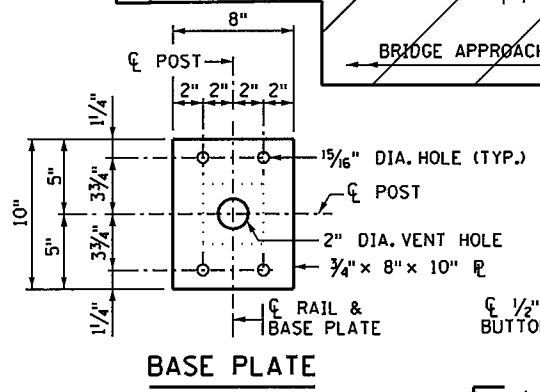


RAILING HEIGHT TABLE		
NOMINAL HEIGHT	(A)	(B)
4'-6"	2'-2"	10"
6'-0" OR 6'-4"	3'-8"	2'-4"
8'-0"	5'-8"	4'-4"



GENERAL NOTES

- CONTINUOUSLY GROUND ALL METAL RAILINGS; SEE THE SPECIAL PROVISIONS. REFER TO THE ELECTRICAL PLANS AND ELECTRICAL SPECIAL PROVISIONS FOR DETAILS REGARDING BONDING MULTIPLE ELECTRICAL GROUNDING SYSTEMS.
 - PAYMENT LENGTH SHALL BE MEASURED AS THE OUT TO OUT LENGTH ALONG THE CENTERLINE OF THE RAILING BETWEEN THE OUTSIDE ENDS.
 - USE A500, GRADE B STRUCTURAL STEEL TUBING (HSS) IN THE RAIL CONFORMING TO SPEC. 3361. FINIAL CAPS SHALL BE SPEC. 3322. ALL OTHER STEEL SHALL CONFORM TO SPEC. 3306.
 - DRILL VENT HOLES IN THE RAIL POST BASE AND THE RAIL TUBES AS NECESSARY TO FACILITATE GALVANIZING.
 - GALVANIZE BOLTS, NUTS, WASHERS AND ANCHORS PER SPEC. 3392. GALVANIZE ALL OTHER STRUCTURAL STEEL PER SPEC. 3394, AFTER FABRICATION.
 - PAINT THE RAILING, BASE PLATES, AND PROTRUDING PORTIONS OF BOLTS, NUTS, ANCHORS, AND WASHERS IN ACCORDANCE WITH THE SPECIAL PROVISIONS.
 - INSTALL RAIL POSTS AND SPINDLES PLUMB.
 - CURVE HORIZONTAL RAILS WHERE APPLICABLE AND PLACE RAILS PARALLEL TO THE EDGE OF SIDEWALK PROFILE.
 - SEE SPECIAL PROVISIONS FOR REQUIREMENTS NOT INCLUDED ON THIS SHEET AND FOR BASIS OF PAYMENT.
- ① ADHESIVE ANCHORAGE WITH 5/8" DIA. ANCHOR ROD PER SPEC. 3385, TYPE A WITH HEX NUT AND WASHER. PROVIDE AN ADHESIVE WITH A MINIMUM CHARACTERISTIC BOND STRENGTH IN UNCRACKED CONCRETE OF 1.5 KSI. EMBED THE ANCHORAGE NO LESS THAN 5" REGARDLESS OF CHARACTERISTIC BOND STRENGTH. DRILL THROUGH REINFORCEMENT (IF ENCOUNTERED) TO ACHIEVE MINIMUM EMBEDMENT. ENSURE HEX NUT IS IN CONTACT WITH THE ADJACENT SURFACE AND TORQUE TO 60 FT-LBS UNLESS A HIGHER TORQUE IS RECOMMENDED BY THE MANUFACTURER. PROOF LOAD TO 6.9 KIPS. SEE SPECIAL PROVISIONS FOR ADDITIONAL REQUIREMENTS.
 - ② PLACE C OF END POST 12" FROM END OF CONCRETE PARAPET IF GUARDRAIL CONNECTION PLATE IS PRESENT.
 - ③ IF LIGHT POLE IS MOUNTED ON BLISTER, RAILING MAY BE CONTINUOUS IN FRONT OF LIGHT POLE (SEE PARAPET & LIGHT POLE DETAILS).
 - ④ THE CONTRACTOR SHALL COORDINATE LIGHT POLE DETAILS WITH THE RAILING FABRICATOR TO ENSURE PROPER CLEARANCES AND RAILING CONFIGURATION ADJACENT TO THE POLE.
 - ⑤ SEE SUPERSTRUCTURE SHEETS AND STANDARD FIGURE 5-397.166 & 5-397.173 FOR CONTROL JOINT SPACING AND DETAILS.
 - ⑥ SHOP INSTALL CAST STEEL CAP FIRMLY SEATED TO TOP OF POST SUCH THAT THE CAP DOES NOT ROCK OR WOBBLE.
 - ⑦ IF TOP OF RAISED SIDEWALK, SEE SECTION D-D ON STANDARD FIGURE 5-397.166.



REVISION:
APPROVED: NOVEMBER 6, 2013
Nancy Dubenberger
STATE BRIDGE ENGINEER

5/8" DIA. HOLE IN TUBE.
3/8" DIA. x 1" SLOTTED HOLE IN PLATE ONE END OF PANEL ONLY. (TYP. TOP, MIDDLE AND BOTTOM RAIL)

SECTION A-A

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Llc. No. 43375

ORNAMENTAL METAL RAILING (DESIGN T-4 (MOD.) PARAPET MOUNT)

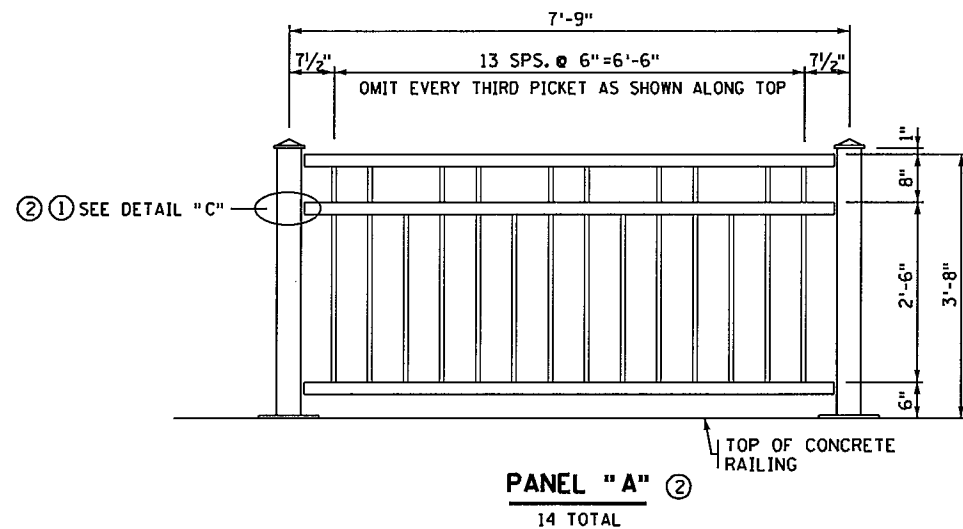
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CHK: MHD	CHK: MHD		

SHEET NO. B41 OF B58 SHEETS

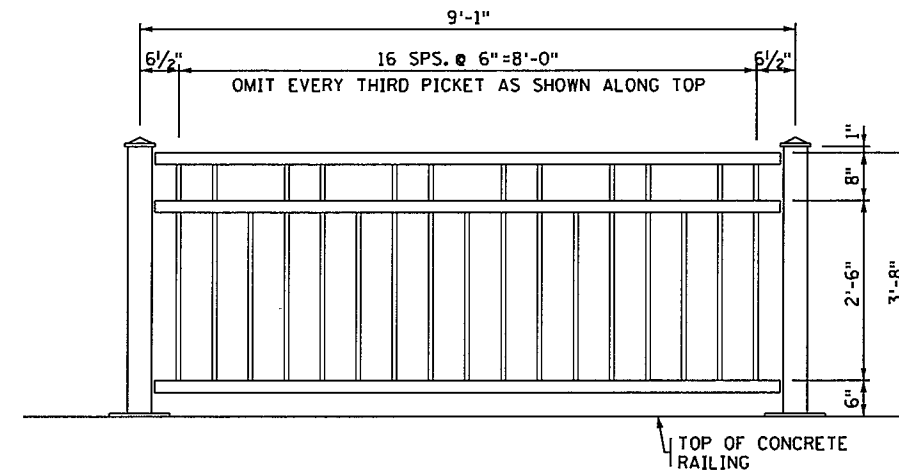
MODIFIED DETAIL "A" AT JOINT

MODIFIED

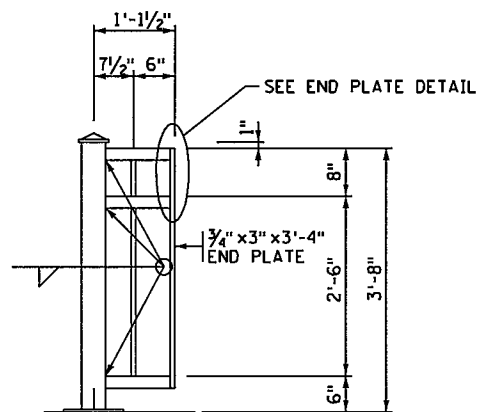
FIG. 5-397.162



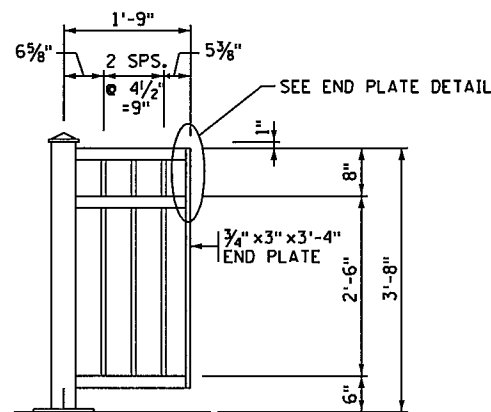
PANEL "A" ②
14 TOTAL



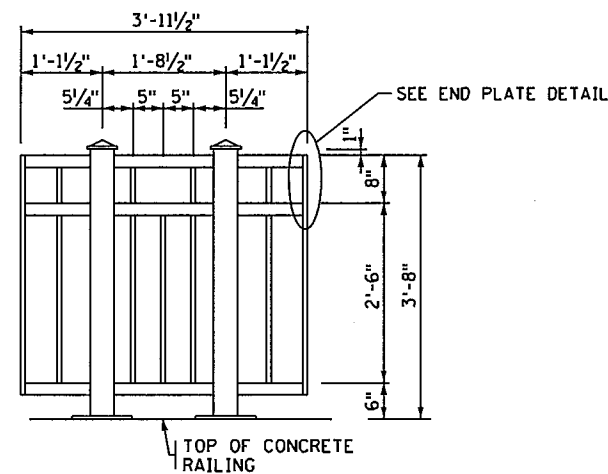
PANEL "B" ②
14 TOTAL



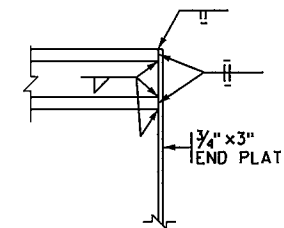
END PANEL "C" ②
18 TOTAL



END PANEL "D" ②
2 TOTAL



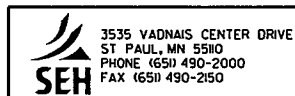
END PANEL "E" ②
2 TOTAL



TYP. END PLATE DETAIL

NOTES:

- ① TYPICAL AT ALL HORIZONTAL TUBES.
- ② ORNAMENTAL METAL RAILING DESIGN T-4 (MOD.). SEE SHEET B41 FOR DETAILS AND NOTES.



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

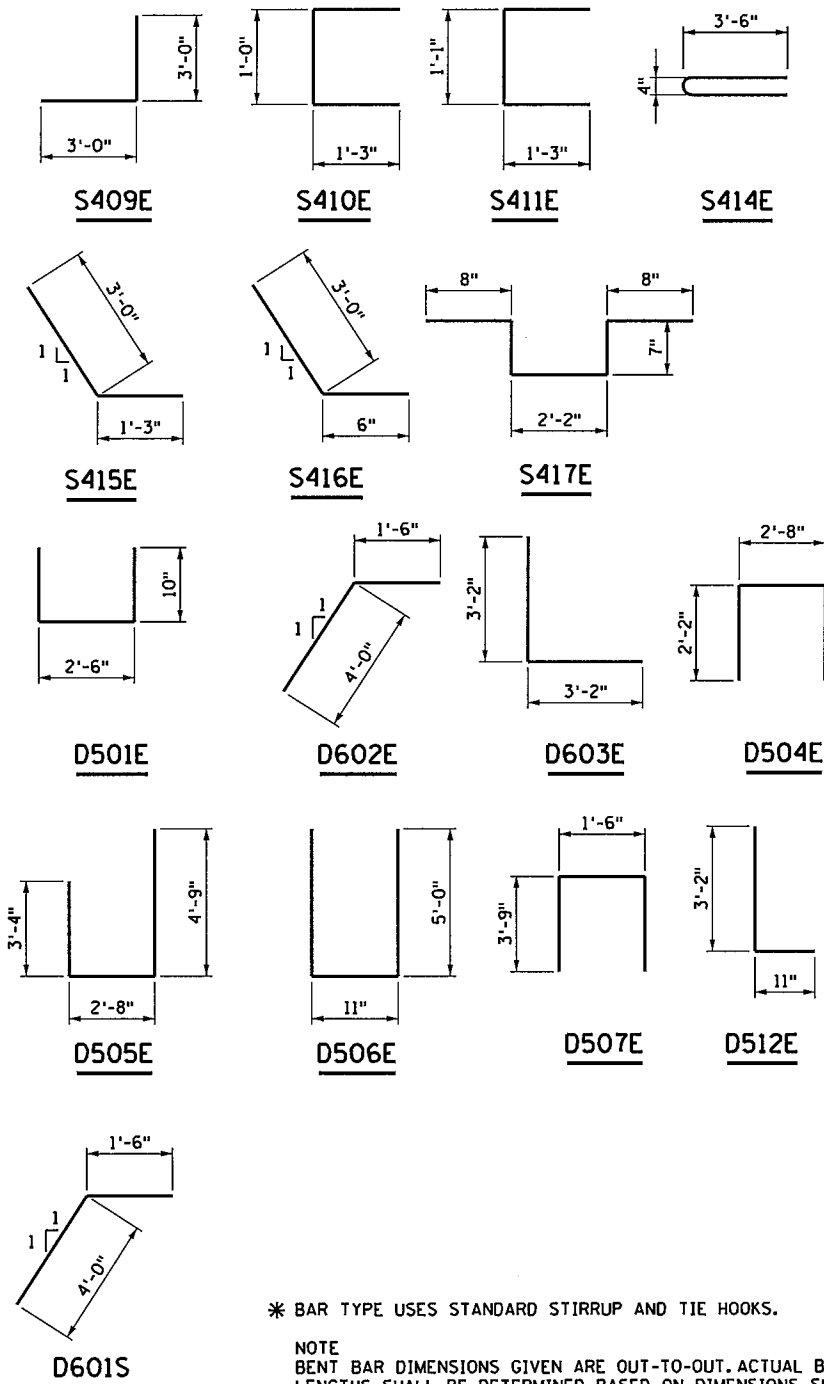
ORNAMENTAL METAL RAILING DETAILS

DES: MAW	DR: MAW	APPROVED: <i>12/14/15</i>
CHK: MHD	CHK: MHD	
SHEET NO. B42 OF B58 SHEETS		

BRIDGE NO
62732

BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
SUPERSTRUCTURE DECK				
EPOXY COATED BARS				
S501E	862	40'-6"	STR	TRANSVERSE BOTTOM
S402E	403	50'-0"	STR	TRANSVERSE TOP
S403E	403	30'-4"	STR	TRANSVERSE TOP
S504E	380	60'-0"	STR	LONGITUDINAL BOTTOM
S505E	95	19'-4"	STR	LONGITUDINAL BOTTOM
S406E	260	50'-0"	STR	LONGIT. TOP SLAB & SDWK
S407E	65	56'-4"	STR	LONGIT. TOP SLAB & SDWK
S608E	104	15'-0"	STR	LONGIT. OVER PIER
S409E	8	6'-0"	BENT	CORNERS
S410E	221	3'-6"	BENT	SDWK DWLS
S411E	197	3'-7"	BENT	SDWK DWLS
S412E	197	11'-3"	STR	SDWK TRANSVERSE TOP
S413E	28	19'-8"	STR	LONGIT. TOP SLAB & SDWK
S414E	60	7'-2"	BENT	BLISTER
S415E	36	4'-3"	BENT	BLISTER, SOUTH RAIL
S416E	12	3'-6"	BENT	BLISTER, NORTH RAIL
S417E	1482	4'-8"	BENT	HAT BARS IN STOOLS
END DIAPHRAGM				
EPOXY COATED BARS				
D501E	24	4'-2"	BENT	HORIZ. END TIE
D602E	96	5'-6"	BENT	VERT. DOWEL
D603E	202	6'-4"	BENT	VERT. DOWEL
D504E	100	7'-0"	BENT	VERT. TIE
D505E	100	10'-9"	BENT	STIRRUP
D506E	178	10'-11"	BENT	STIRRUP
D507E	78	9'-0"	BENT	STIRRUP
D508E	78	5'-0"	STR	THRU BEAM
D609E	52	41'-0"	STR	LONGIT DIAPH B.F.
D610E	72	5'-4"	STR	LONGIT DIAPH BTWN BMS
D611E	72	3'-0"	STR	LONGIT DIAPH BTWN BMS
D512E	8	4'-1"	BENT	VERT. DOWEL
END DIAPHRAGM				
STAINLESS STEEL BARS				
D601S	100	5'-6"	BENT	END DIAPH APPROACH TIE

BAR BENDING DIAGRAMS



* BAR TYPE USES STANDARD STIRRUP AND TIE HOOKS.

NOTE
BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT ONLY.

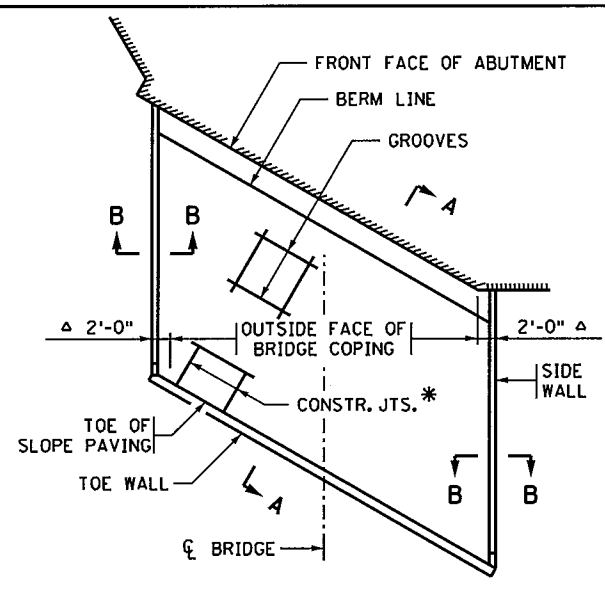
SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE

ITEM	UNIT	QUANTITY
① TYPE P-2 (TL-4) BARRIER CONCRETE (3S52)	LIN. FT.	292
① TYPE P-1 BARRIER CONCRETE (3S52)	LIN. FT.	292
⑥ SIDEWALK CONCRETE (3S52)	SQ. FT.	3451
⑧ RAISED MEDIAN CONCRETE (3S52)	SQ. FT.	1167
② REINFORCEMENT BARS (EPOXY COATED)	POUND	131430
③ REINFORCEMENT BARS (STAINLESS-60KSI)	POUND	830
④ BRIDGE SLAB CONCRETE (3YHPC-S)	SQ. FT.	19892
① ORNAMENTAL METAL RAILING TYPE SPECIAL	LIN FT	268
⑩ STRUCTURAL TUBE RAILING DESIGN T-1	LIN FT	286
⑤ EXP CURVED PLATE BEARING ASSEMBLY TYPE E1	EACH	26
⑤ EXP CURVED PLATE BEARING ASSEMBLY TYPE E2	EACH	17
⑤ FIXED CURVED PLATE BEARING ASSEMBLY TYPE F1	EACH	9
⑨ CONCRETE WEARING COURSE (3U17A)	SQ. FT.	17500
PRESTRESSED CONCRETE BEAMS MN54	LIN FT	3238
DIAPHRAGMS FOR TYPE MN54 PREST BEAMS	LIN FT	444
PRECAST CONCRETE CAP	EACH	9
ANTI-GRAFFITI COATING	SQ. FT.	414
ARCHITECTURAL SURFACE FINISH (MULTI COLOR)	SQ. FT.	414
ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE)	SQ. FT.	414
⑦ BRIDGE NAME PLATE	EACH	1

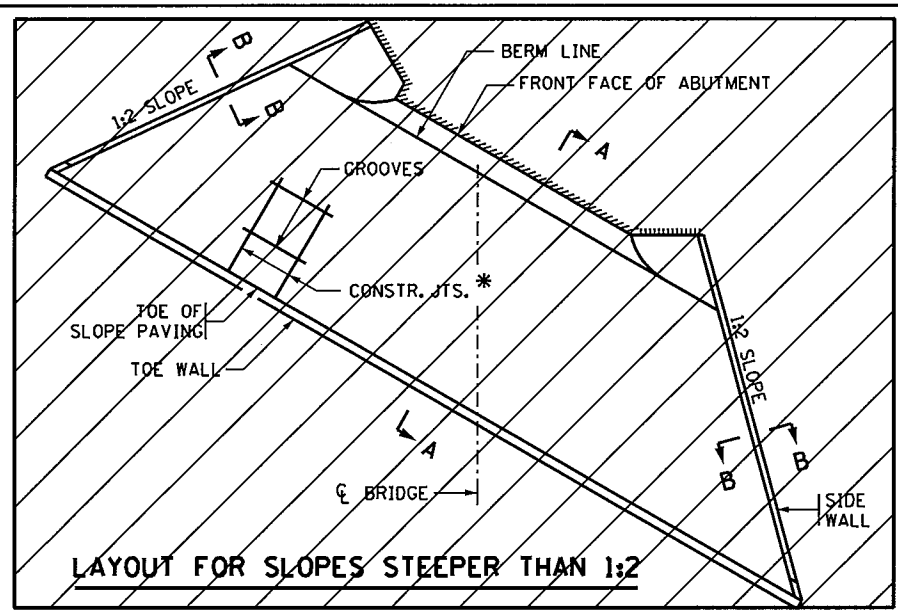
QUANTITY NOTES:

- ① INCLUDES 40 LIN. FT. ON BRIDGE APPROACH PANELS.
- ② INCLUDES END DIAPHRAGMS, RAILINGS & DECK REINF.
- ③ APPROACH PANEL TIE BAR.
- ④ INCLUDES CONCRETE FOR DECK SLAB AND END DIAPHRAGM.
- ⑤ PAYMENT FOR BEARINGS INCLUDED IN ITEM "BEARING ASSEMBLY" PER EACH.
- ⑥ INCLUDES 433 S.F. ON BRIDGE APPROACH PANELS.
- ⑦ BRIDGE NAME PLATE TO BE CONSIDERED INCIDENTAL TO "TYPE P-2 (TL-4) BARRIER CONCRETE (3S52)".
- ⑧ INCLUDES 160 S.F. ON BRIDGE APPROACH PANELS.
- ⑨ INCLUDES 2400 S.F. ON BRIDGE APPROACH PANELS.
- ⑩ INCLUDES 34 LIN. FT. ON BRIDGE APPROACH PANELS.

11:02:20 AM



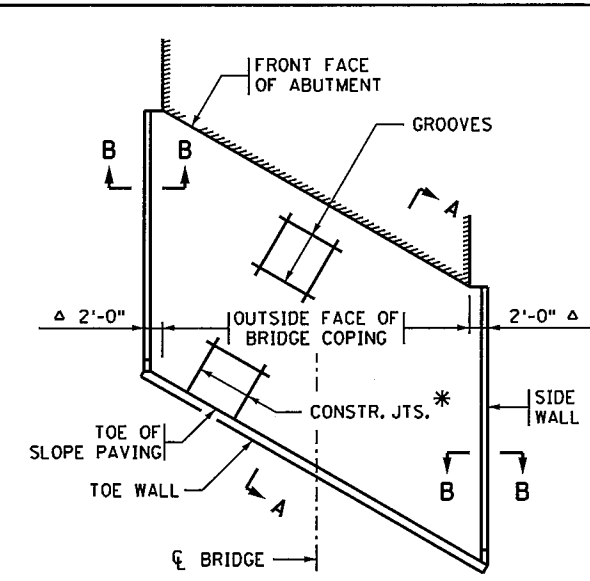
LAYOUT FOR SLOPES 1:2 OR FLATTER



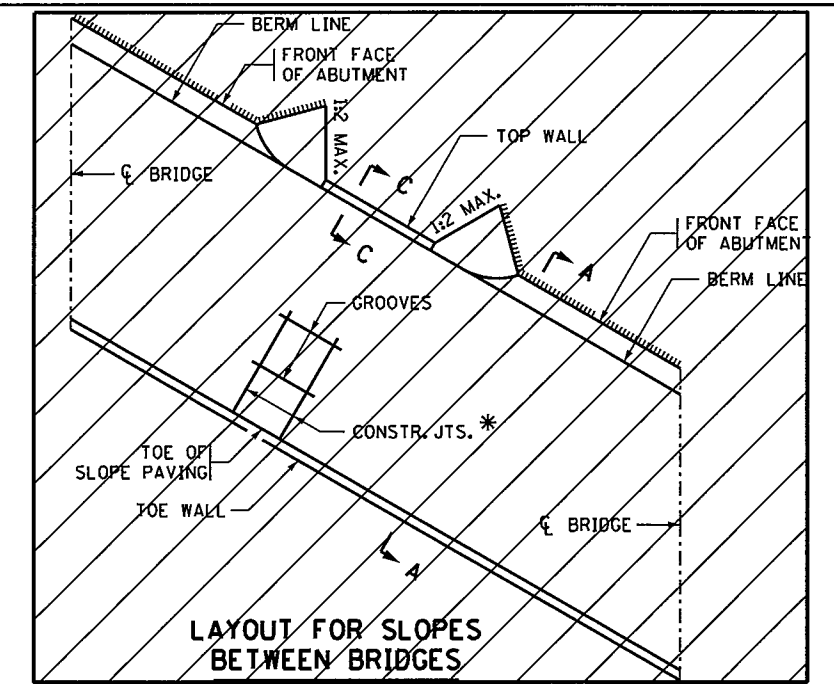
LAYOUT FOR SLOPES STEEPER THAN 1:2

Δ 2'-0" FOR TANGENT BRIDGE SUPERSTRUCTURES. VARIES 2'-0" MINIMUM FOR CURVED BRIDGE SUPERSTRUCTURE.

* VERTICAL CONSTRUCTION JOINTS MAY BE CONSTRUCTED PARALLEL TO CL OF BRIDGE FOR SKEWS TO 10° ONLY.

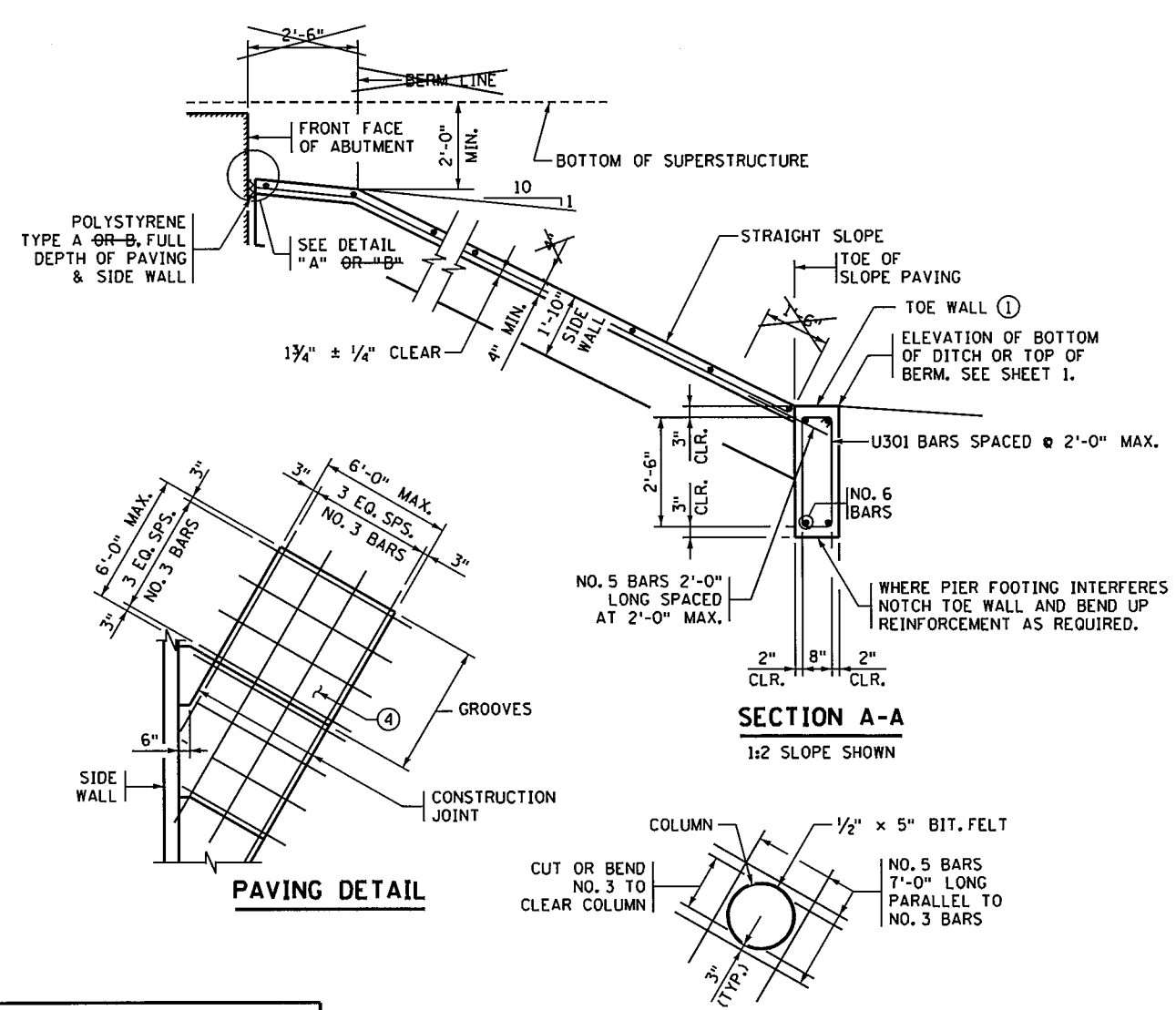


LAYOUT FOR SLOPES AT ABUTMENTS WITH 8' OR GREATER EXPOSURE

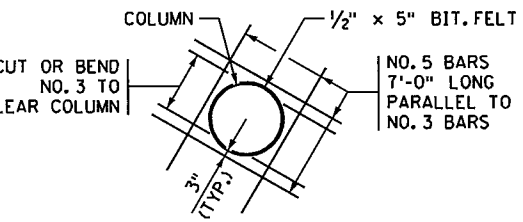


LAYOUT FOR SLOPES BETWEEN BRIDGES

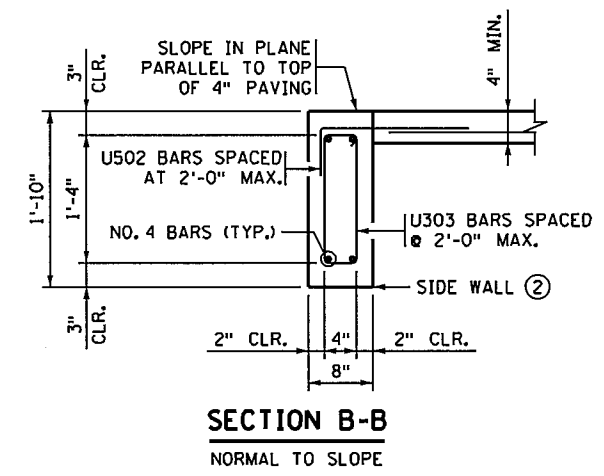
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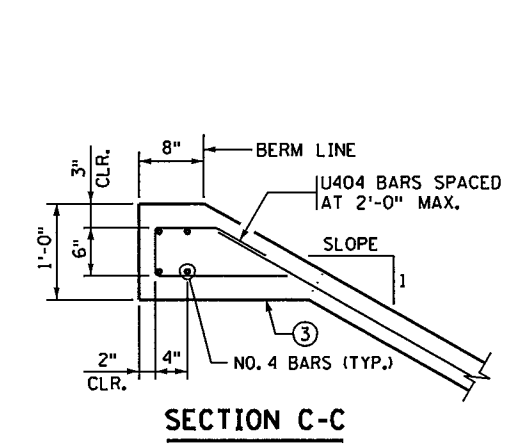
SECTION A-A 1:2 SLOPE SHOWN



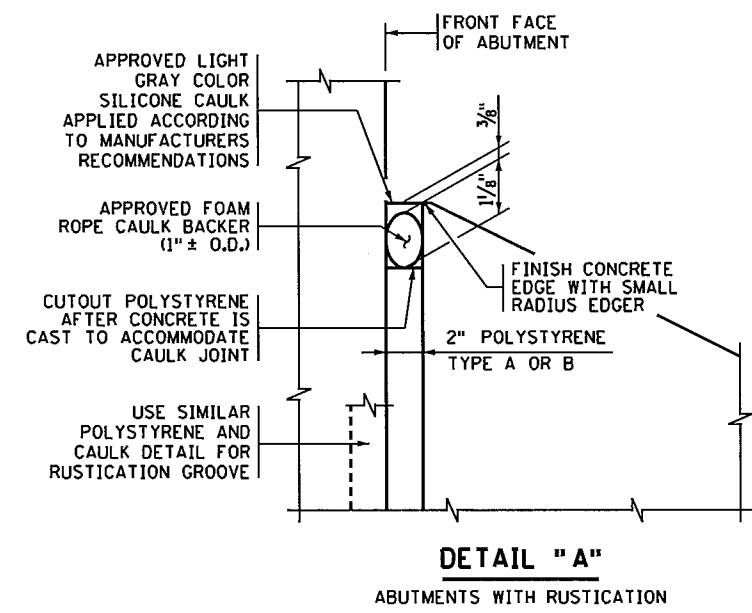
DETAIL WHERE PIER COLUMN EXTENDS THROUGH SLOPE PAVING



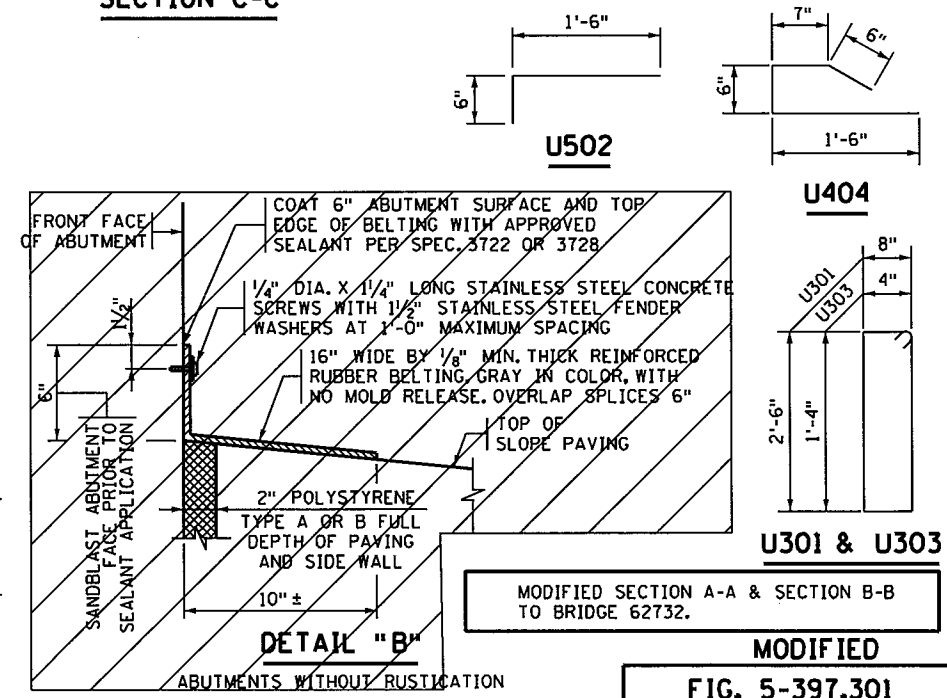
SECTION B-B NORMAL TO SLOPE



SECTION C-C



DETAIL "A" ABUTMENTS WITH RUSTICATION



DETAIL "B" ABUTMENTS WITHOUT RUSTICATION

MODIFIED SECTION A-A & SECTION B-B TO BRIDGE 62732.

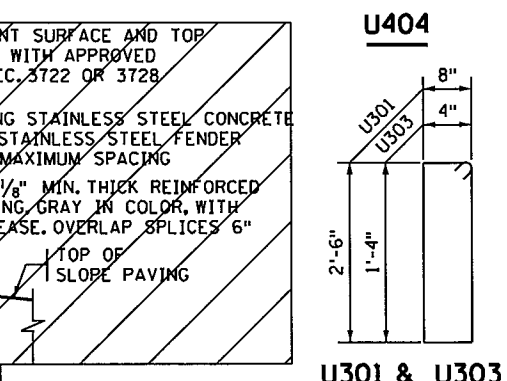
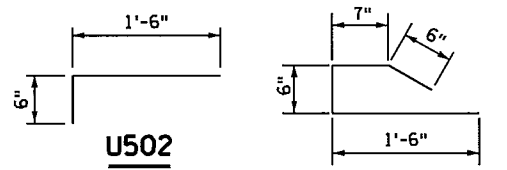
MODIFIED

CONCRETE & REINFORCEMENT UNIT QUANTITIES

- ① 0.111 CU. YD. OF CONCRETE/LIN. FT. 8.37 LBS. OF REINFORCEMENT/LIN. FT.
- ② 0.046 CU. YD. OF CONCRETE/LIN. FT. 4.46 LBS. OF REINFORCEMENT/LIN. FT.
- ③ 0.058 CU. YD. OF CONCRETE/LIN. FT. 3.70 LBS. OF REINFORCEMENT/LIN. FT. BASED ON A SLOPE OF 1:2.
- ④ 0.111 CU. YD. OF CONCRETE/SQ. YD. 4.50 LBS. OF REINFORCEMENT/SQ. YD.

GENERAL NOTE

SLOPES ARE EXPRESSED AS A RATIO OF VERTICAL DISTANCE: HORIZONTAL DISTANCE. SLOPE PAVING PER SPEC. 2514.



REVISION: 09-11-2014
 APPROVED: SEPTEMBER 26, 2003
 Daniel J. Peterson
 STATE BRIDGE ENGINEER

SEH
 3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 5510
 PHONE (651) 490-2000
 FAX (651) 490-2150

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

CONCRETE SLOPE PAVING UNDER BRIDGES

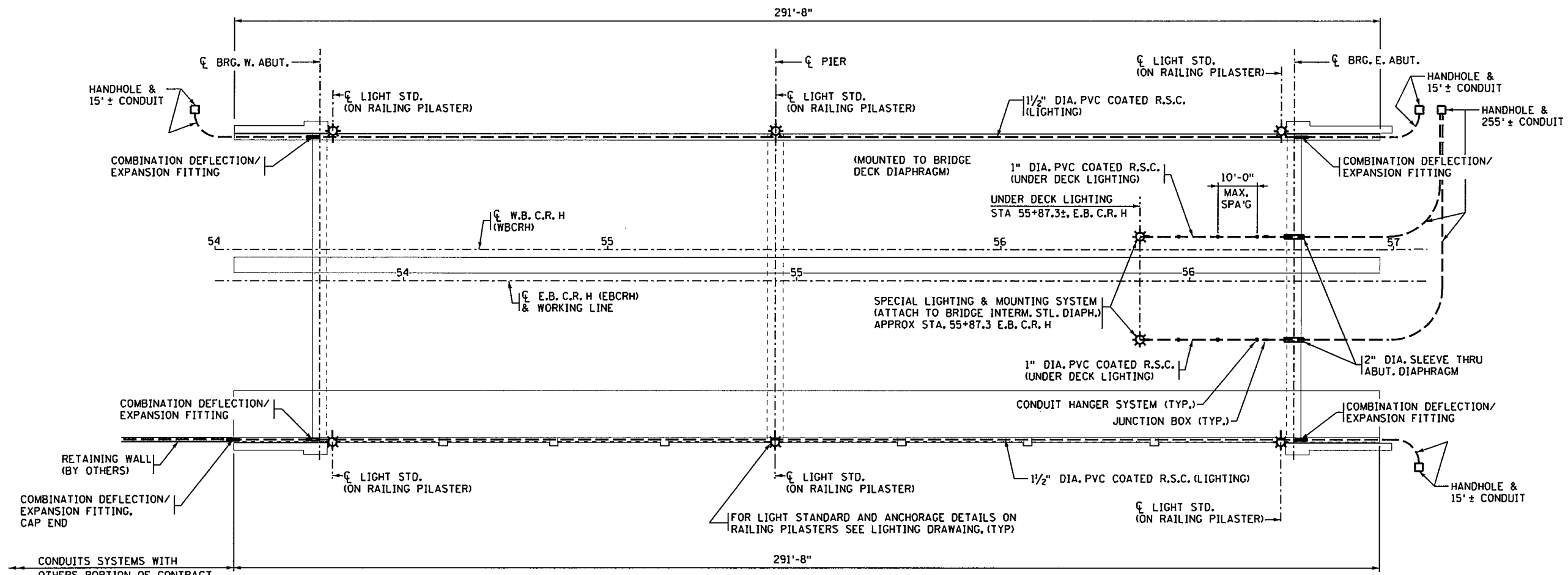
DES: MAW DR: MAW APPROVED: 12/14/15
 CHK: MHD CHK: MHD
 SHEET NO. B44 OF B58 SHEETS
 BRIDGE NO 62732

FIG. 5-397.301

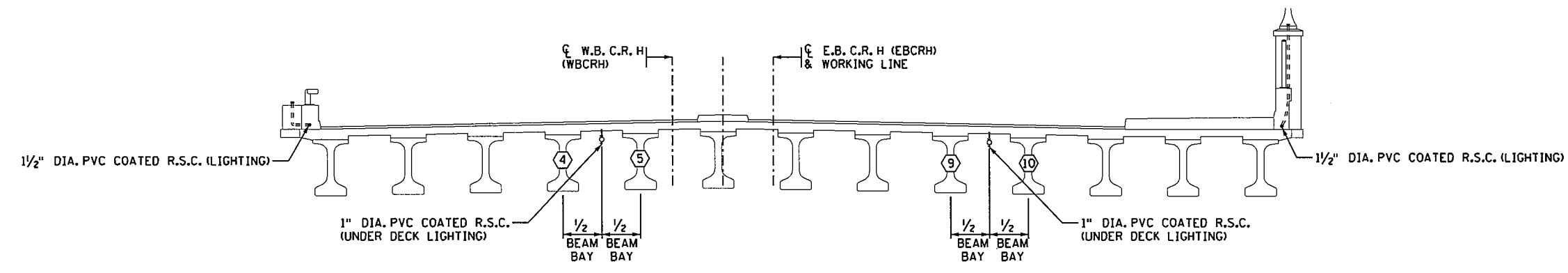
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12/10/2015


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CONDUIT SYSTEM PLAN



SECTION THRU BRIDGE - UNDER DECK LIGHTING
LOOKING UP STATION

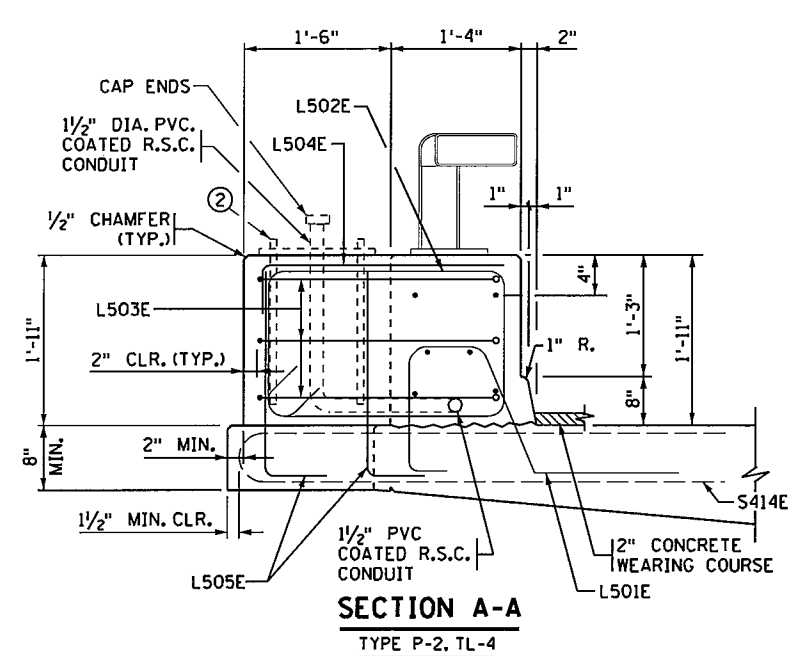

 3535 VADNAIS CENTER DRIVE
 ST PAUL, MN 55110
 PHONE (650) 490-2000
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 Printed Name: MICHAEL H DUPONT Lic. No. 43375

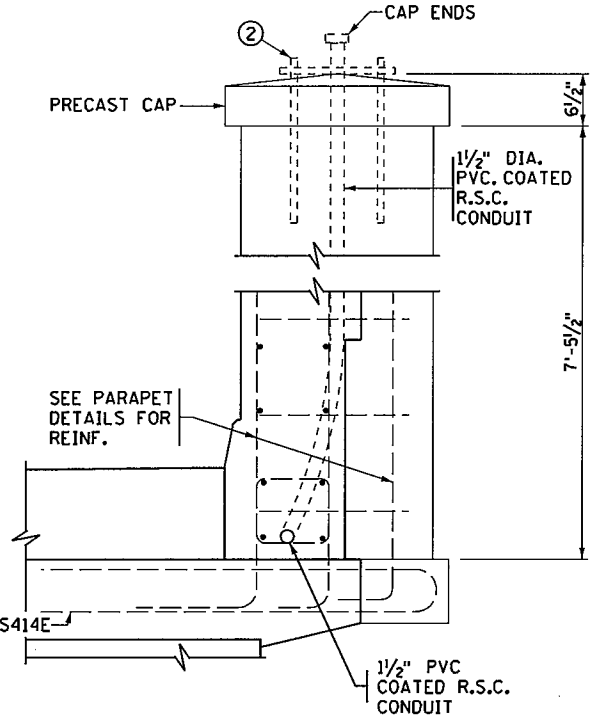
CONDUIT SYSTEM LAYOUT

DES: MAW	DR: DLF	APPROVED:	BRIDGE NO 62732
CHK: MHD	CHK: MHD	12/14/15	
SHEET NO. B45 OF B58 SHEETS			

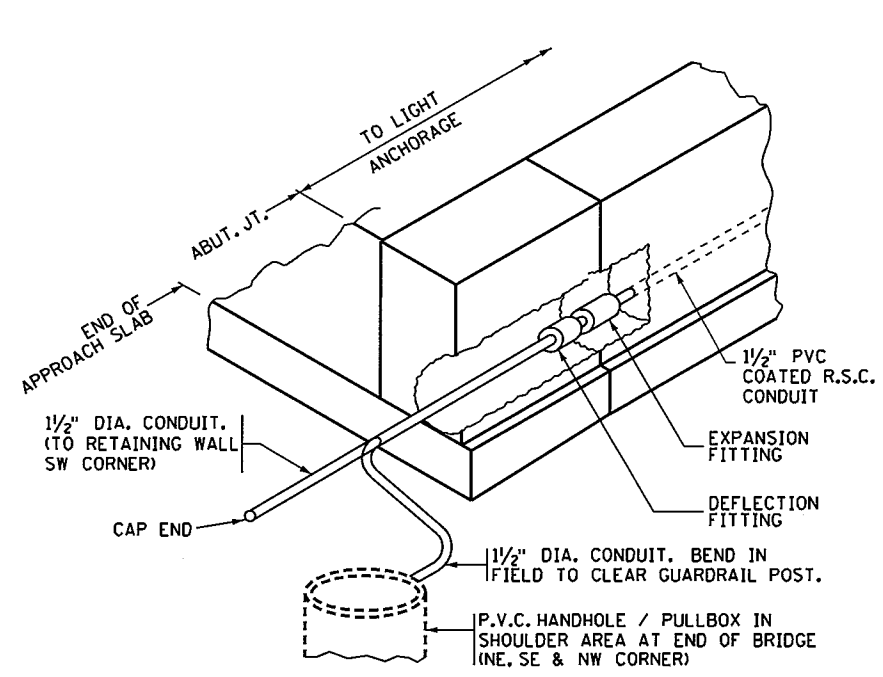
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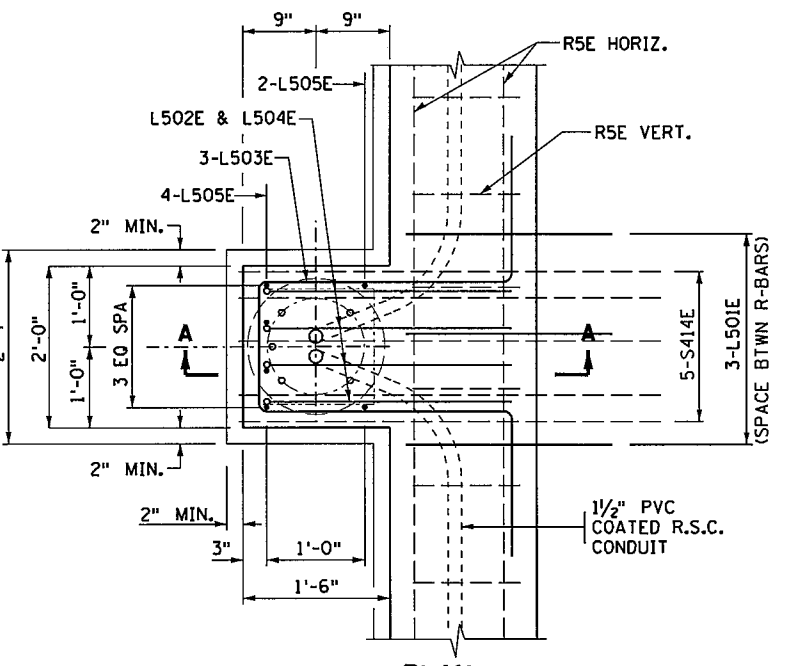
SECTION A-A
TYPE P-2, TL-4



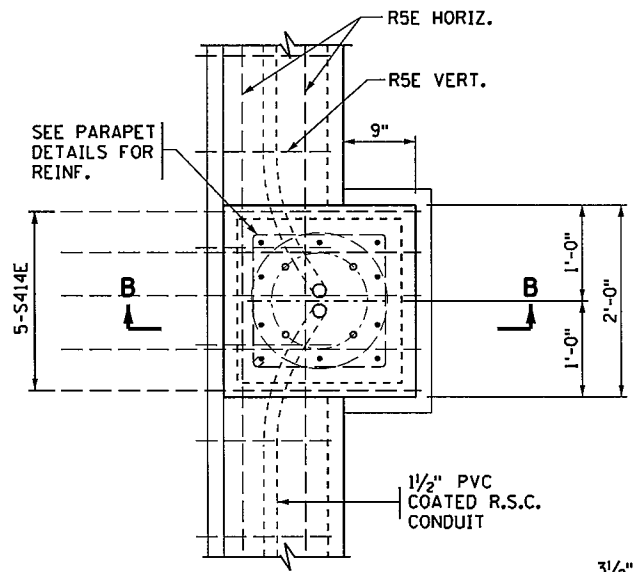
SECTION B-B
TYPE P-1, TL-2



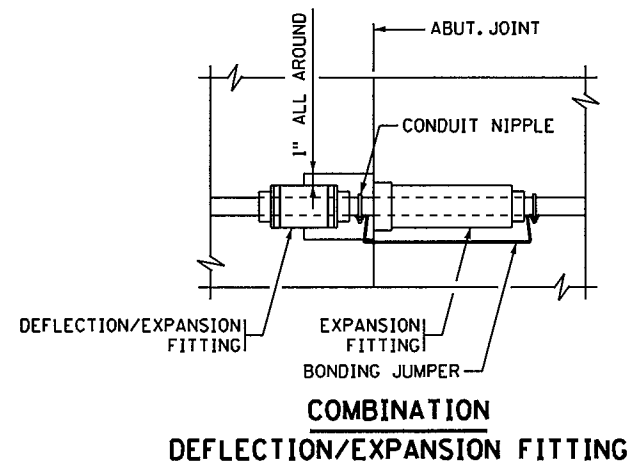
VIEW AT END OF BRIDGE
APPROACH SLAB NOT SHOWN



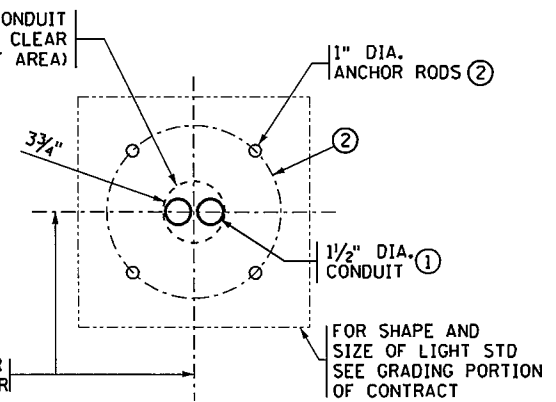
PLAN
LIGHT STANDARD ANCHORAGE
TYPE P-2, TL-4



PLAN
LIGHT STANDARD ANCHORAGE
TYPE P-1, TL-2



COMBINATION
DEFLECTION/EXPANSION FITTING

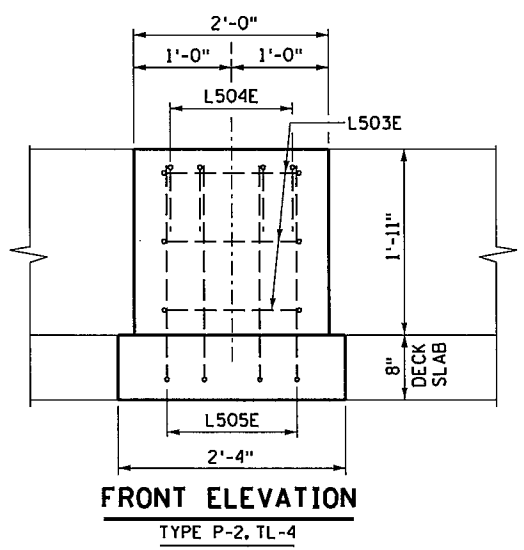
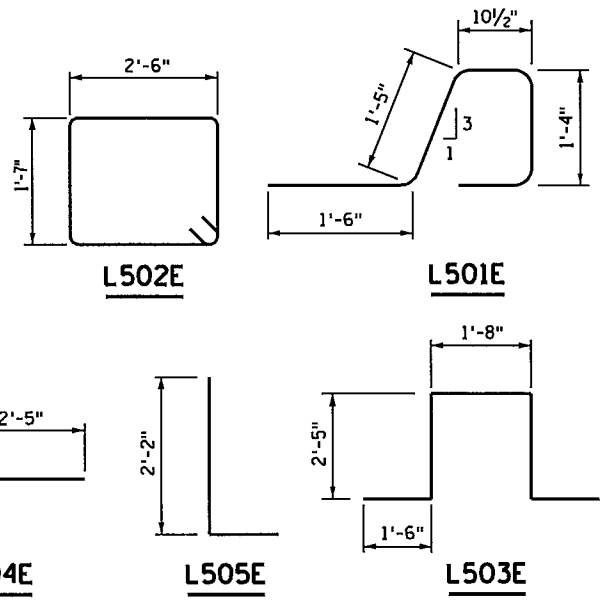


CONDUIT PLACEMENT DETAIL

GENERAL NOTES

- BOND AND GROUND THE CONDUIT SYSTEM (LIGHTING) IN ACCORDANCE WITH THE APPLICABLE PORTIONS OF Mn/DOT SPEC 2545.3R.
- THE 1/2" DIA. CONDUIT SHALL EXTEND 3" ABOVE THE RAILING AND BE CAPPED.
 - SEE LIGHT STANDARD ANCHORAGE DETAILS.
 - SEE CONCRETE BARRIER SHEETS FOR TYPICAL BARRIER REINFORCEMENT.

BILL OF REINFORCEMENT FOR BARRIER AT ONE LIGHT POLE ③				
BAR	NO.	LENGTH	SHAPE	LOCATION
L501E	9	5'-7"	BENT	BARRIER DOWEL
L502E	12	9'-1"	BENT	BARRIER VERTICAL
L503E	9	9'-6"	BENT	LONGITUDINAL TIE
L504E	12	4'-0"	BENT	VERTICAL TIE
L505E	18	4'-0"	BENT	VERTICAL DOWEL



FRONT ELEVATION
TYPE P-2, TL-4

REVISED: 04-17-2013
APPROVED: MAY 24, 2011
Nancy Dubenberger
STATE BRIDGE ENGINEER

3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150
SEH

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

CONDUIT SYSTEM (LIGHTING)
TYPE F CONCRETE BARRIER BLISTER,
WITH OR WITHOUT WEARING COURSE

DES: MAW DR: DLF
CHK: MHD CHK: MHD

APPROVED: 12/14/15

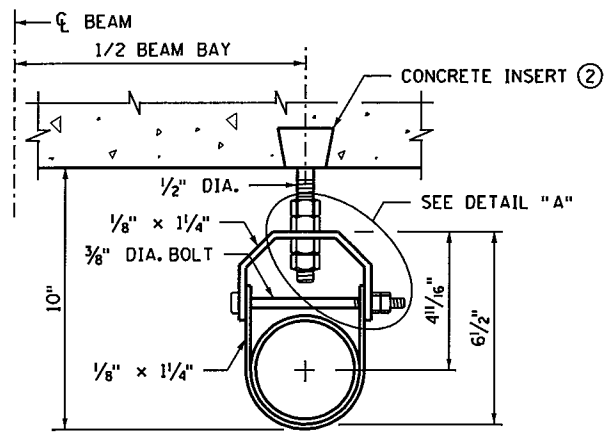
BRIDGE NO 62732

ENTIRE SHEET MODIFIED TO BRIDGE 62732

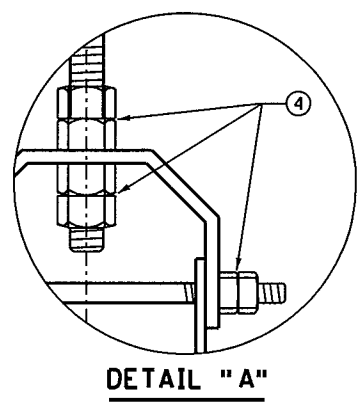
MODIFIED
FIG. 5-397.406

SHEET NO. B46 OF B58 SHEETS

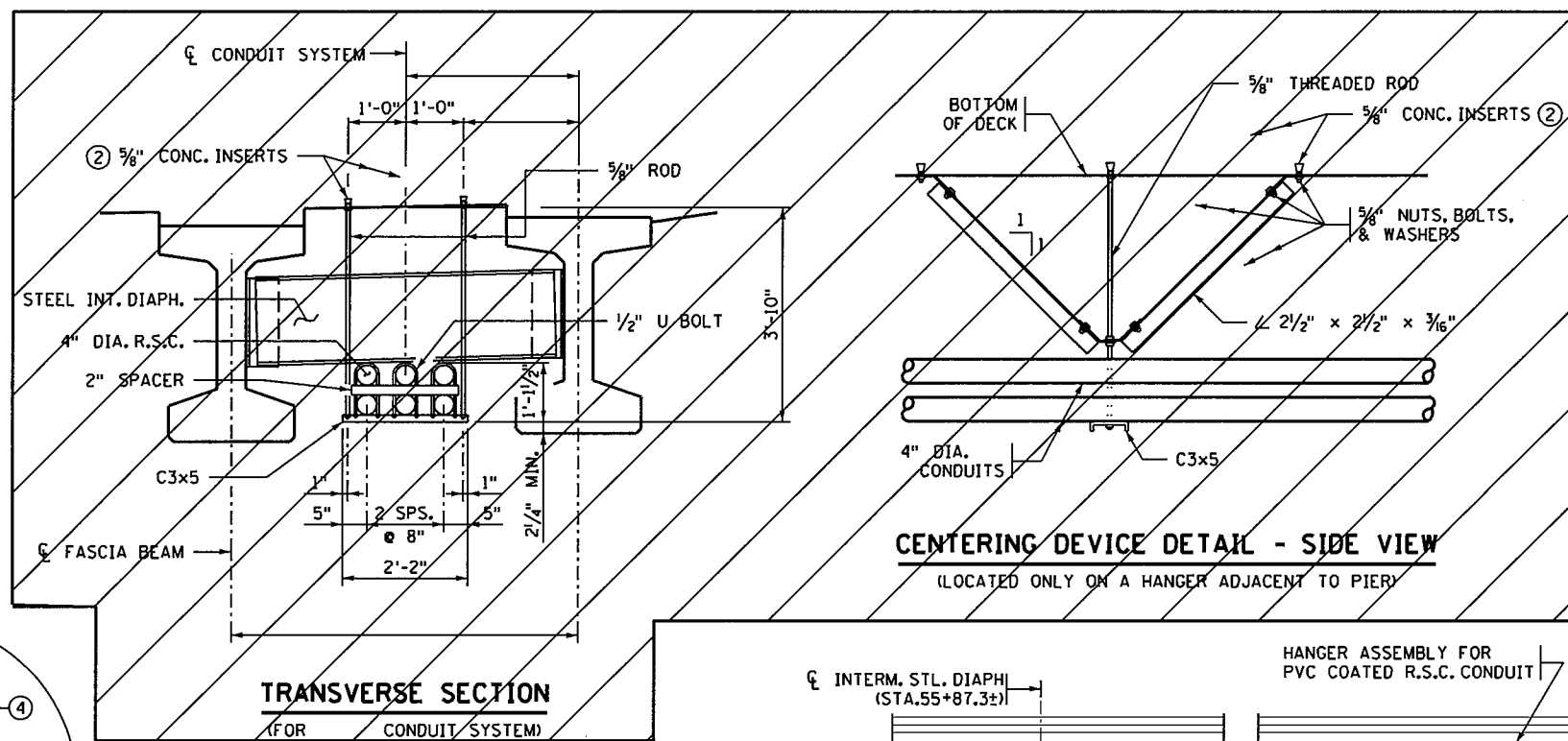
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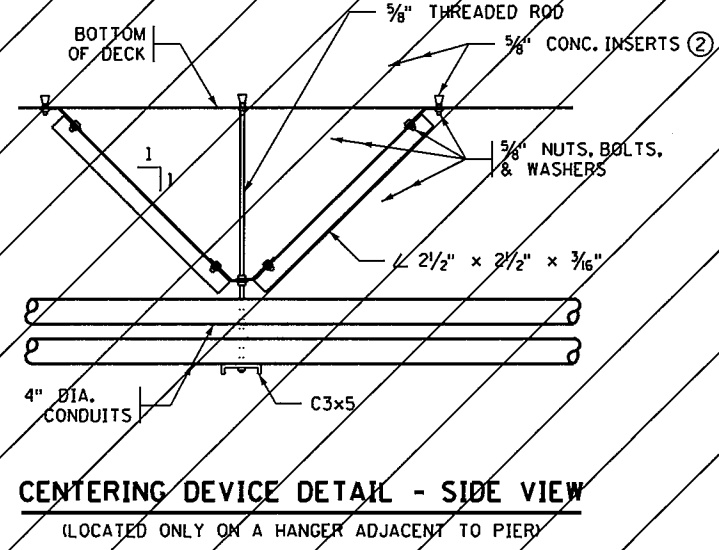
CONDUIT HANGER DETAIL
(FOR CONDUIT SYSTEM)



DETAIL "A"

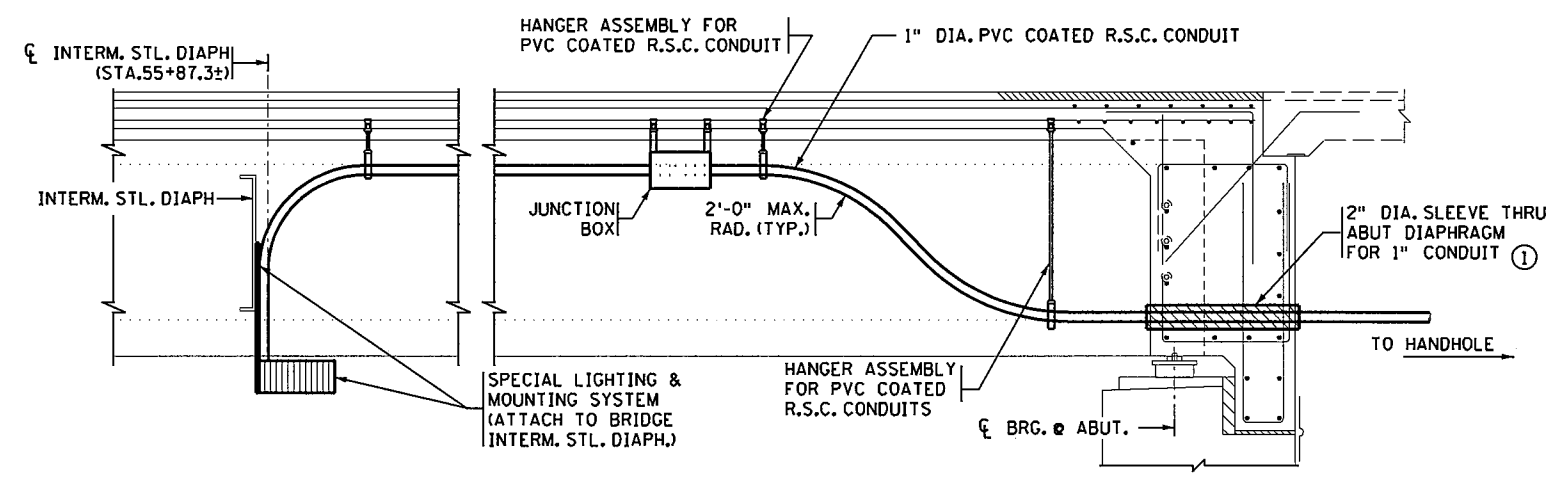


TRANSVERSE SECTION
(FOR CONDUIT SYSTEM)

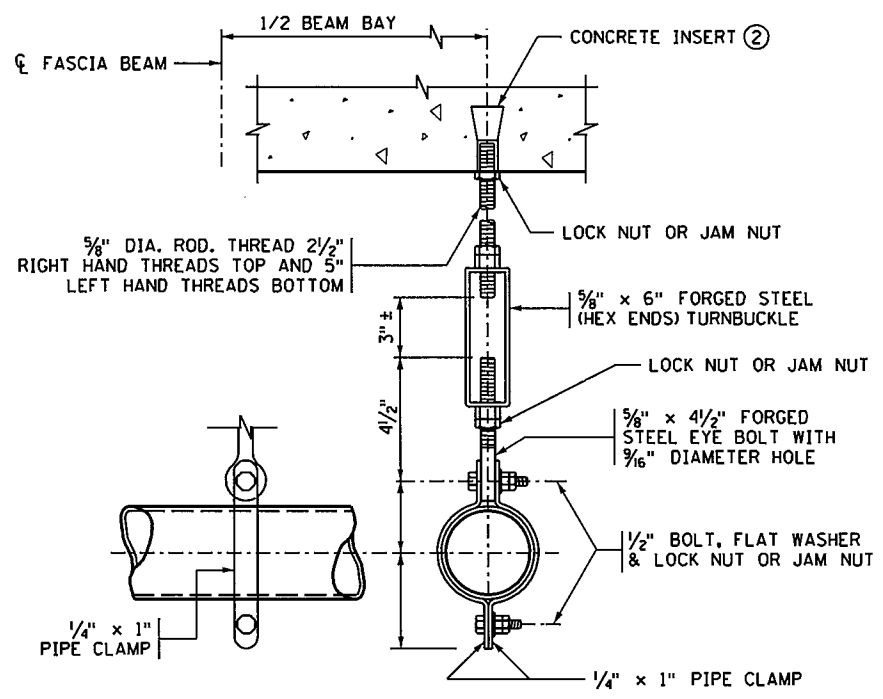


CENTERING DEVICE DETAIL - SIDE VIEW
(LOCATED ONLY ON A HANGER ADJACENT TO PIERY)

① SEE ABUTMENT SHEETS FOR LOCATION AND DETAILS.

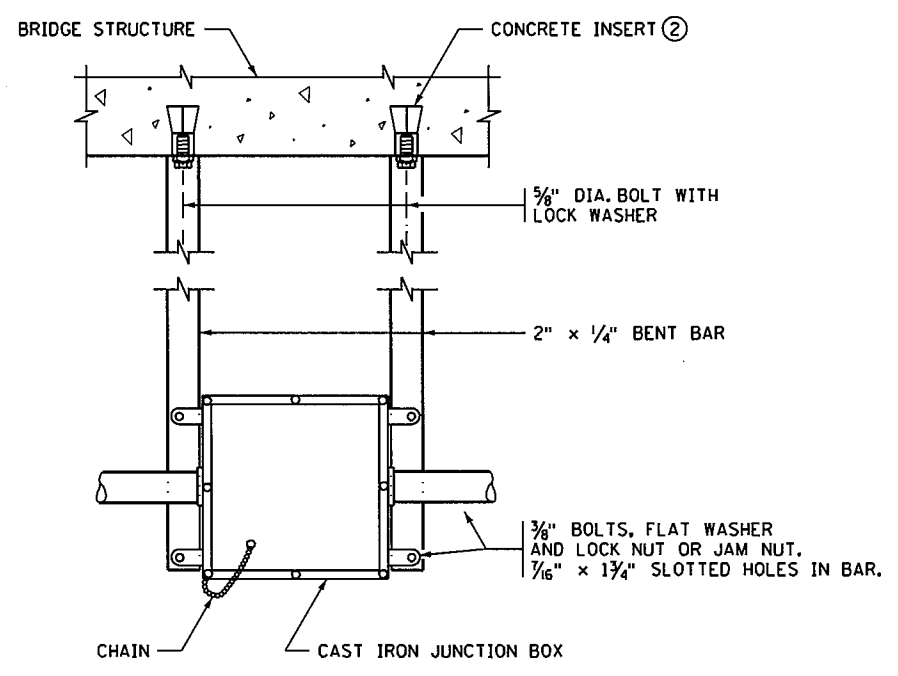


LONGITUDINAL SECTION
(FOR UNDER DECK LIGHTING SYSTEM)



HANGER ASSEMBLY

EACH HANGER ASSEMBLY SHALL CONSIST OF CONCRETE INSERT, 5/8" DIA. ROD, PIPE CLAMPS, NUTS, BOLTS, WASHERS, TURNBUCKLE AND EYE BOLT



JUNCTION BOX DETAILS

GENERAL NOTES

- RODS, EYE BOLTS AND PIPE CLAMPS SHALL COMPLY WITH SPEC. 3313, TYPE I.
- TURNBUCKLES AND EYE BOLTS SHALL COMPLY WITH A.S.T.M. A235 CLASS A MINIMUM REQUIREMENTS.
- FLAT BARS AND ANCHORAGES SHALL COMPLY WITH SPEC. 3306.
- CONCRETE INSERTS SHALL BE APPROVED TYPE MALLEABLE IRON, MATERIAL AS PER SPEC. 3324, GRADE 35018, TAP AFTER GALVANIZING.
- GALVANIZE BOLTS, NUTS, WASHERS, TURNBUCKLES, RODS, EYE BOLTS, AND INSERTS AS PER SPEC. 3392. GALVANIZE OTHER MATERIAL AS PER SPEC. 3394 AFTER FABRICATION.
- PIPE SLEEVES SHALL COMPLY WITH SPEC. 3362.
- ② SPACE INSERTS AT 10'-0" MAXIMUM CENTERS.
- ③ CAP ENDS.
- ④ DOUBLE NUTS OR JAM NUTS OR LOCK NUT.

LONGITUDINAL SECTION MODIFIED TO BRIDGE 62732

MODIFIED

FIG. 5-397.402

REVISION: 05-24-2012
APPROVED: SEPTEMBER 26, 2003
Daniel A. Hanson
STATE BRIDGE ENGINEER

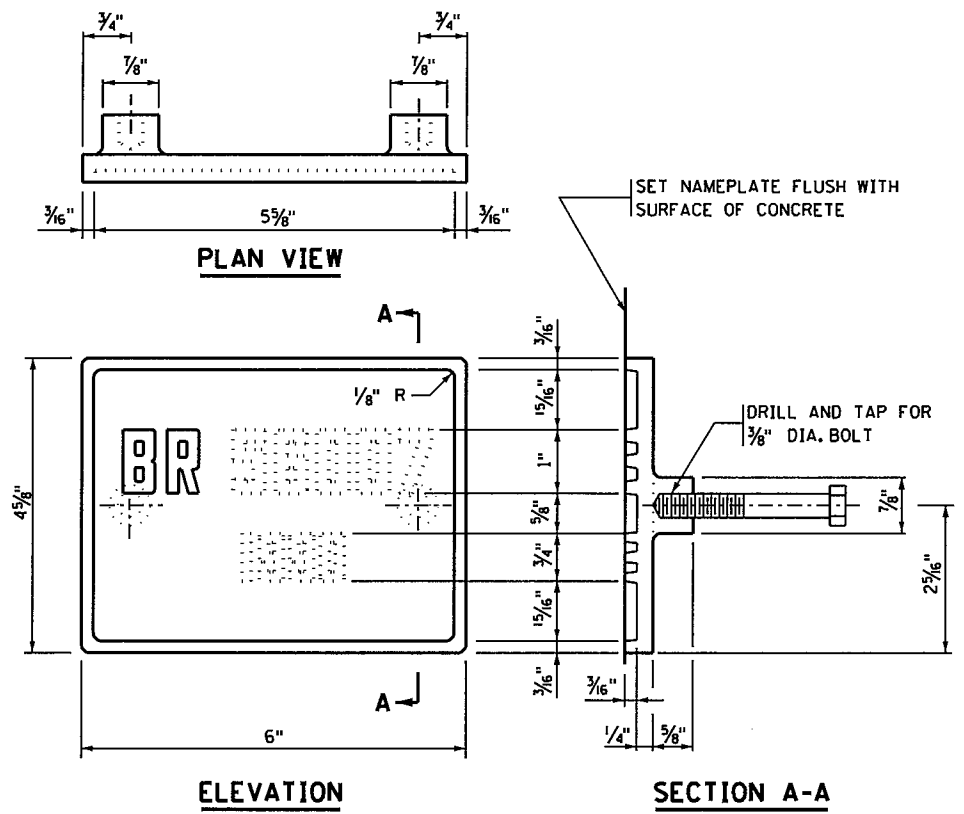
3535 VADNAIS CENTER DRIVE
ST PAUL, MN 5510
PHONE (651) 490-2000
FAX (651) 490-2150
SEH

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

CONDUIT SYSTEM FOR UNDER DECK LIGHTING

DES: MAW	DR: DLF	APPROVED: 12/14/15	BRIDGE NO 62732
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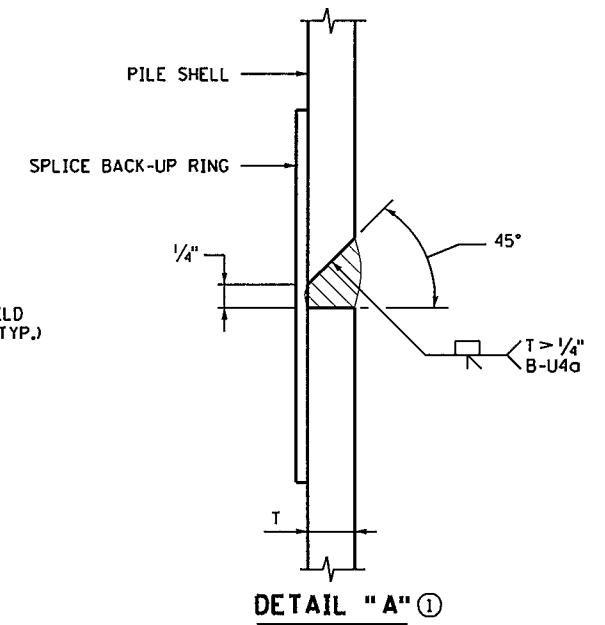
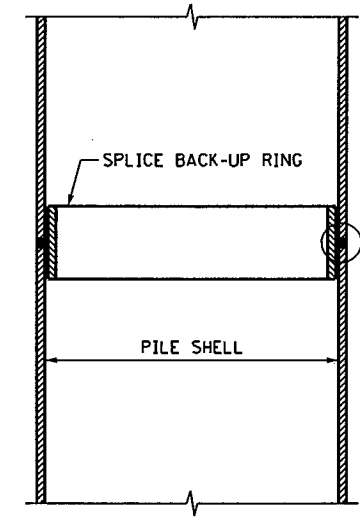
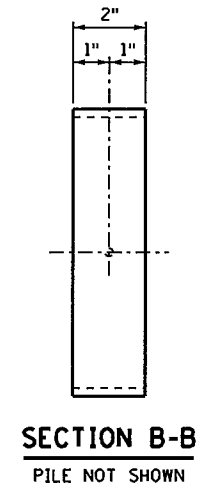
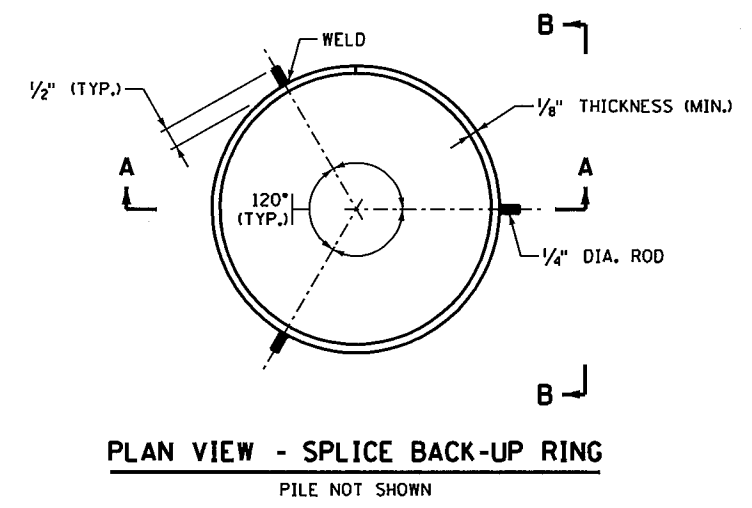
THE DASHED NUMBERS SHOWN ABOVE ARE FOR ILLUSTRATION. DATA TO BE SHOWN ON NAMEPLATE IS AS FOLLOWS:

BRIDGE 62732
YEAR 2016



NOTES:
MATERIAL SHALL COMPLY WITH SPEC. 3327.
LETTERS AND NUMBERS SHALL CONFORM TO THOSE SHOWN.
DRAFT ON LETTERS AND NUMBERS SHALL NOT BE MORE THAN 3" IN 12".
HORIZONTAL SPACING OF LETTERS AND NUMBERS SHALL PRODUCE A BALANCED LAYOUT IN PROPORTION TO SPACING SHOWN.
TOP SURFACE OF LETTERS, NUMBERS AND FRAMES SHALL BE BURNISHED.
FURNISH 2 STEEL BOLTS 3/8" DIA. x 3" LONG WITH EACH PLATE.
ALL DIMENSIONS FOR 3/4" HIGH LETTERS AND NUMBERS SHALL BE IN DIRECT PROPORTION TO THOSE SHOWN FOR THE 1" HIGH LETTERS AND NUMBERS.

APPROVED: NOVEMBER 22, 2002 <i>Daniel J. Morgan</i> STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION BRIDGE NAMEPLATE (FOR NEW BRIDGES)	REVISION 09-11-2014	DETAIL NO. B101
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NOTES:
APPROVED COMMERCIAL PILE SPLICE BACK-UP RING MAY BE USED IN LIEU OF THE TYPE DETAILED, PROVIDED THAT 1/4" ROOT IS MAINTAINED. BACK-UP RING SHALL HAVE A TIGHT FIT.
WELDING ELECTRODES SHALL BE CELLULOSIC TYPE ELECTRODES E-6010 OR E-6011.
ELECTRODES WHICH HAVE BECOME WET, SOILED OR DAMAGED SHALL NOT BE USED.
WELDING SHALL NOT BE DONE WHEN THE AMBIENT TEMPERATURE IS LOWER THAN 0° F., OR WHEN THE PILE IS WET OR EXPOSED TO FALLING RAIN OR SNOW. WHEN THE PILE METAL TEMPERATURE IS BELOW 32° F., THE PILE METAL IN THE AREA OF THE WELD SHALL BE HEATED TO A MINIMUM TEMPERATURE OF 70° F. AND MAINTAINED AT THIS TEMPERATURE DURING WELDING.
① FOR PILE SHELL THICKNESSES GREATER THAN 1/4", USE A B-U4a WELD CONFIGURATION. SEE DETAIL "A".

APPROVED: NOVEMBER 22, 2002 <i>Daniel J. Morgan</i> STATE BRIDGE ENGINEER	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION PILE SPLICE (CAST-IN-PLACE CONCRETE PILES)	REVISION: 11-06-2013	DETAIL NO. B201
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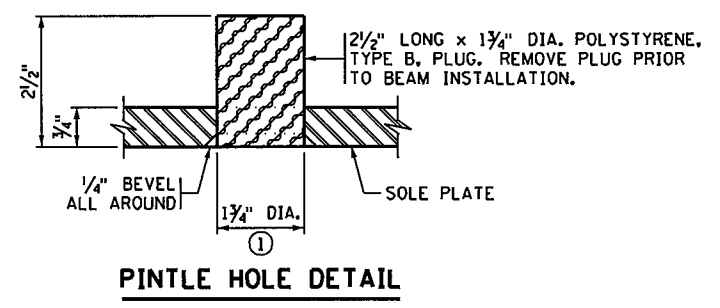
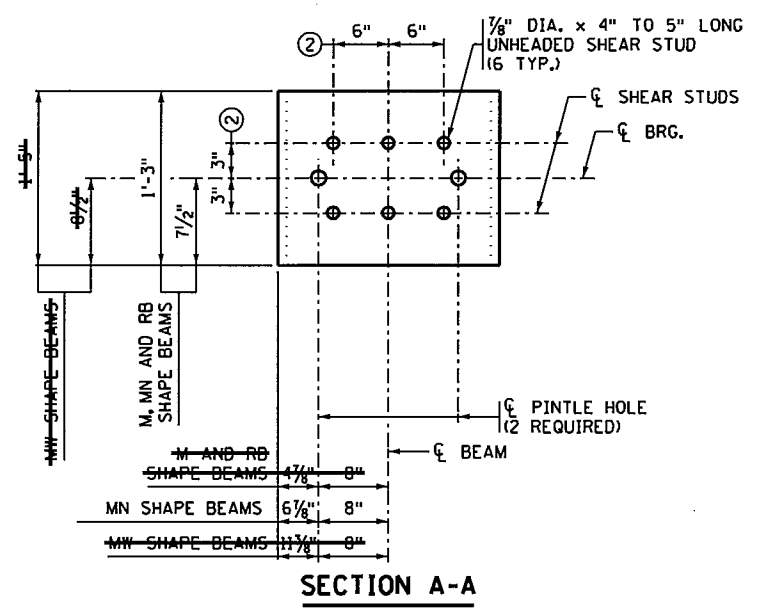
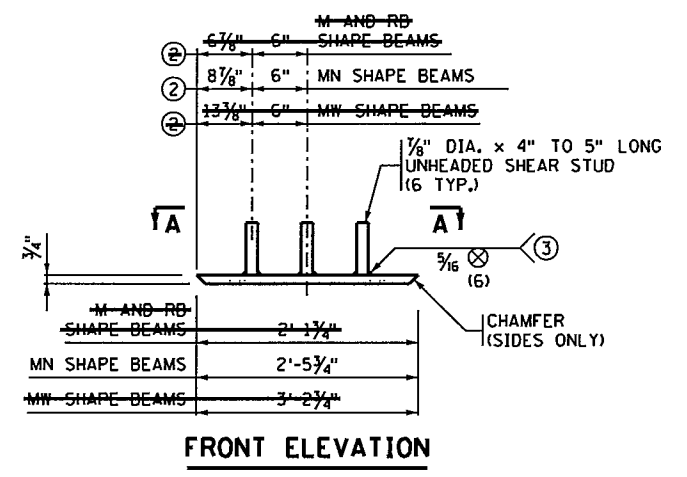
SEH
3535 VADNAIS CENTER DRIVE
ST PAUL, MN 5510
PHONE (650) 490-2000
FAX (650) 490-2150

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

B-DETAILS

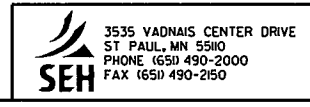
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SHEET NO. B48 OF B58 SHEETS			

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12/10/2015
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- NOTES:**
- MATERIAL TO BE STRUCTURAL STEEL PER MnDOT SPEC. 3306.
 - WELDED STUDS TO BE WELDABLE CARBON STEEL PER MnDOT SPEC. 3391.2D.
 - SOLE PLATE FOR BEARING ASSEMBLY TO BE GALVANIZED PER MnDOT SPEC. 3394 AFTER FABRICATION.
 - PINTLE HOLES SHALL BE FREE OF ZINC BUILD UP FROM GALVANIZING.
 - SOLE PLATES ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.
 - ① FOR 1 1/2" DIA. PINTLES.
 - ② THESE DIMENSIONS MAY BE MODIFIED TO CLEAR PRESTRESSED STRANDS. HOWEVER, CHANGES MUST BE APPROVED BY THE ENGINEER.
 - ③ THE REQUIREMENTS FOR WELDING STUDS SHALL COMPLY WITH AASHTO/AWS D1.1.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED	DETAIL NO.
<i>Nancy Saubenberg</i> STATE BRIDGE ENGINEER	SOLE PLATE (PRESTRESSED CONCRETE BEAMS) (FOR BEARINGS WITH PINTLES)		B303



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H Dupont* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

B-DETAILS

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SHEET NO. B49 OF B58 SHEETS			

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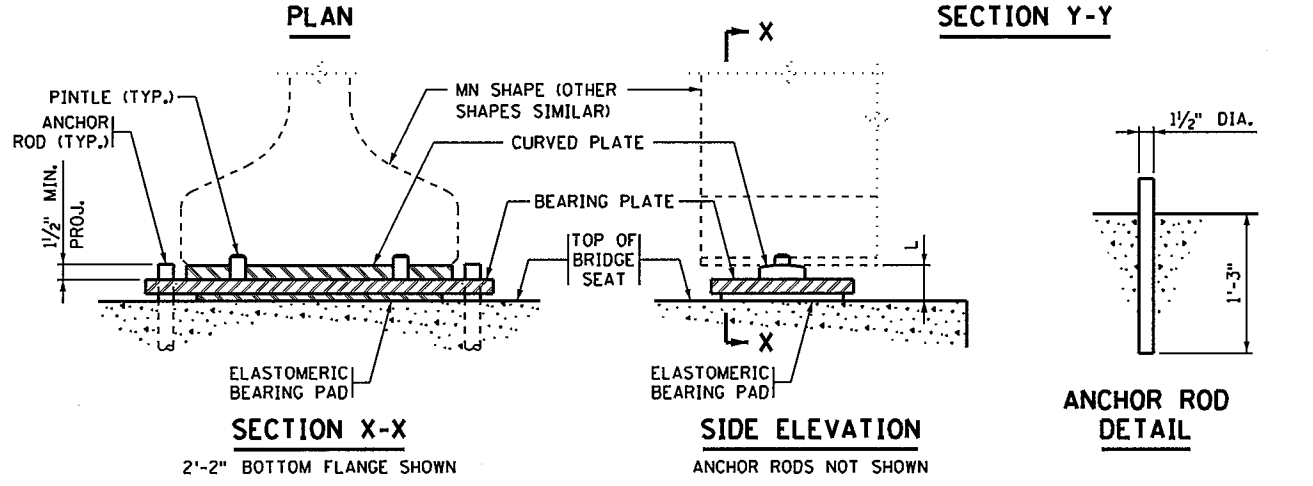
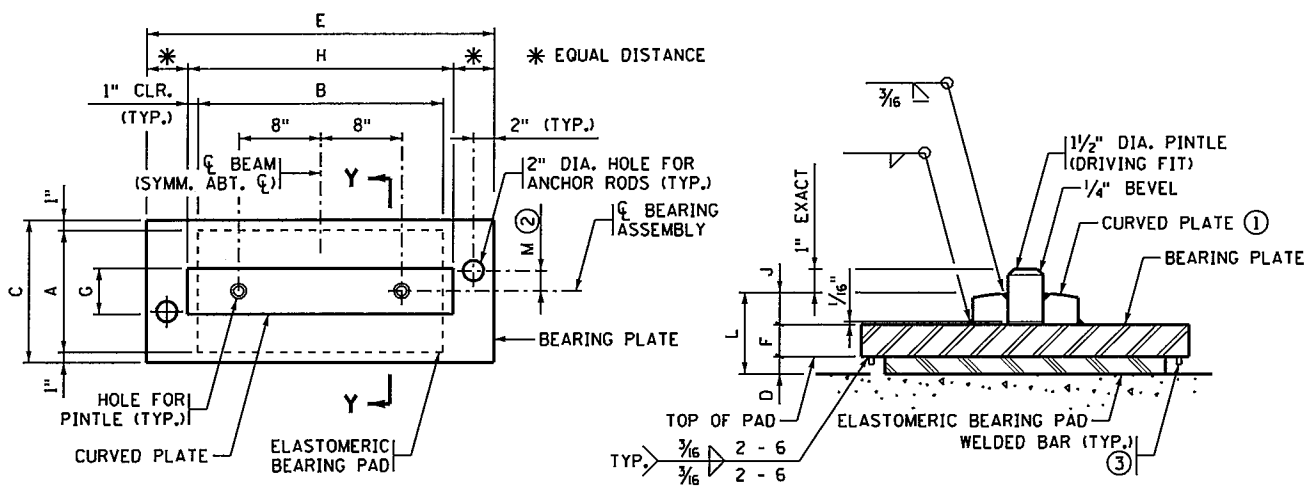


TABLE																
ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE			ANCHOR ROD OFFSET	ASSY. HEIGHT	CURVED PLATE	
			A	B	D		C	E	F	G	H	J				+/- (2)
F1	PIER	MN54	12"	24"	1/2"	8.0	14"	38"	1 1/2"	4 1/2"	26"	1 1/4"	-	0"	3 1/4"	16"

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE A. GALVANIZE PER SPEC. 3392.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL.

(1) THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

(2) "+" DENOTES OFFSET AS SHOWN. "-" DENOTES OFFSET OPPOSITE OF SHOWN.

(3) 3/8" X 3/8" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = 1/2".

DESIGN DATA:
MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1/2" PINTLES.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 11-06-2013 11-03-2015	DETAIL NO.
<i>Nancy Dubenberger</i> STATE BRIDGE ENGINEER	CURVED PLATE BEARING ASSEMBLY (PRESTRESSED CONCRETE BEAMS) (FIXED)		B310

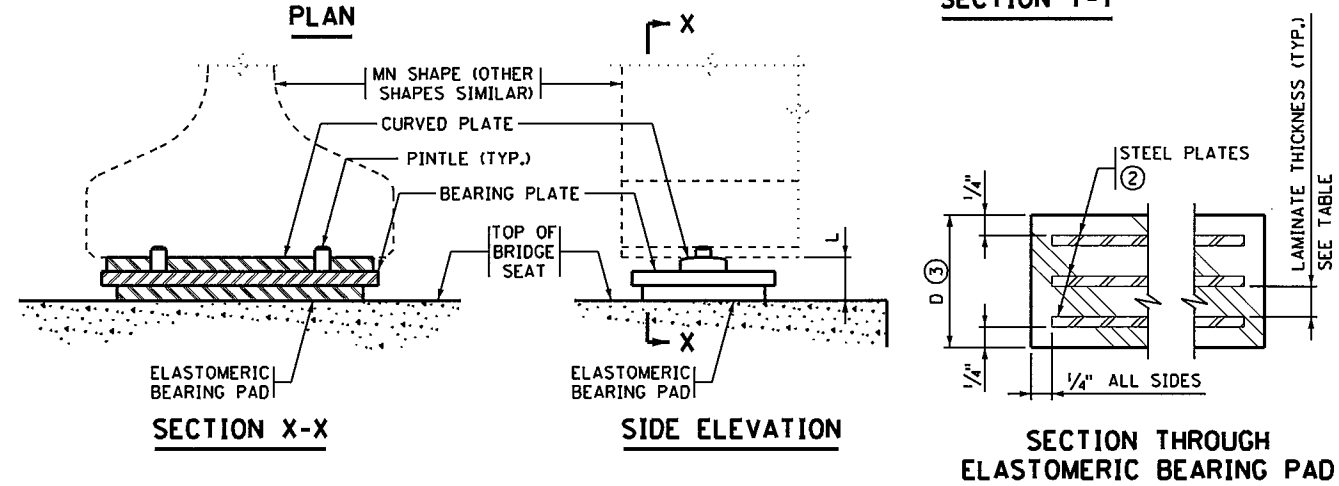
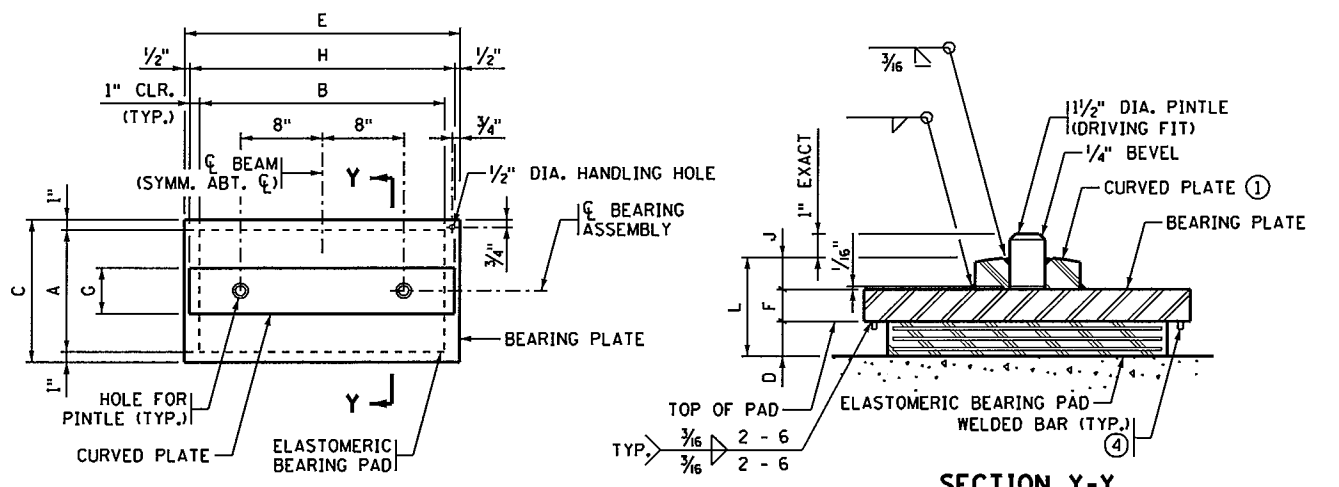


TABLE																	
ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			STEEL PLATES	LAMINATES	SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE			ASSY. HEIGHT	CURVED PLATE	
			A	B	D				C	E	F	G	H	J			L
E1	ABUTS.	MN54	12"	24"	3/8"	5	1/8"	4	1/2"	14"	27"	1 1/2"	4 1/2"	26"	1 1/4"	5 1/8"	16"
E2	PIER	MN54	12"	24"	1/2"	-	-	-	8.0	14"	27"	1 1/2"	4 1/2"	26"	1 1/4"	3 1/4"	16"

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL.

(1) THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

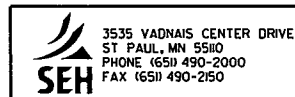
(2) DO NOT GALVANIZE THESE PLATES.

(3) THE TOTAL THICKNESS SHOWN INCLUDES THE STEEL PLATES.

(4) 3/8" X 3/8" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = 1/2".

DESIGN DATA:
MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1/2" PINTLES.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 11-03-2015	DETAIL NO.
<i>Nancy Dubenberger</i> STATE BRIDGE ENGINEER	CURVED PLATE BEARING ASSEMBLY (PRESTRESSED CONCRETE BEAMS) (EXPANSION)		B311



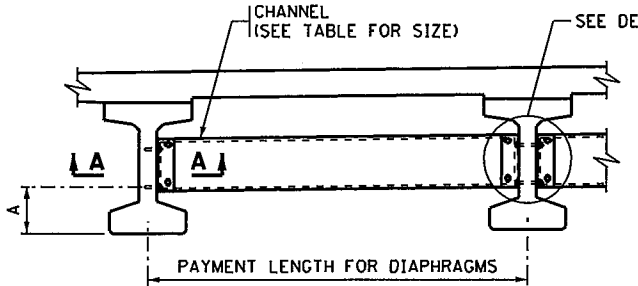
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: *Michael H Duront* Date: 12-4-15
Printed Name: MICHAEL H DURONT Lic. No. 43375

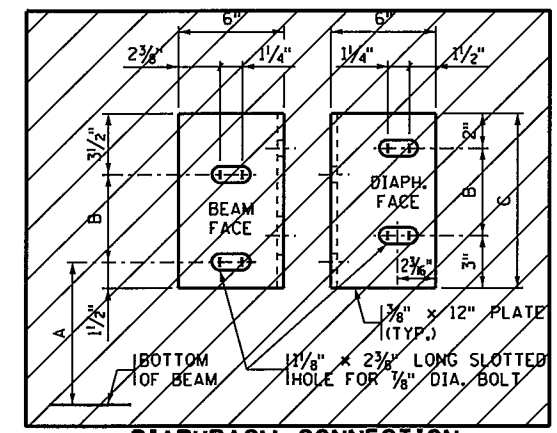
B-DETAILS

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CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. B50 OF B58 SHEETS			62732

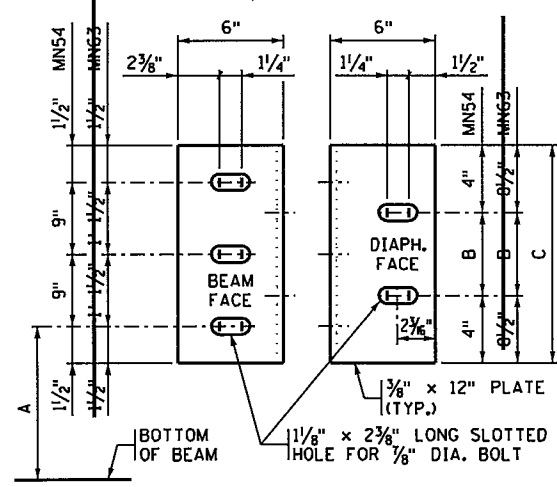
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PART TRANSVERSE SECTION AT DIAPHRAGM

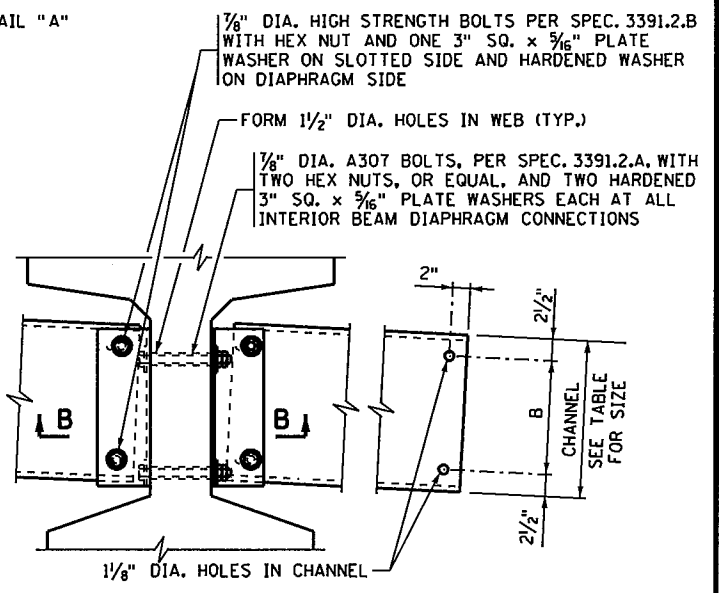


DIAPHRAGM CONNECTION
FOR 36M AND MN45 BEAMS



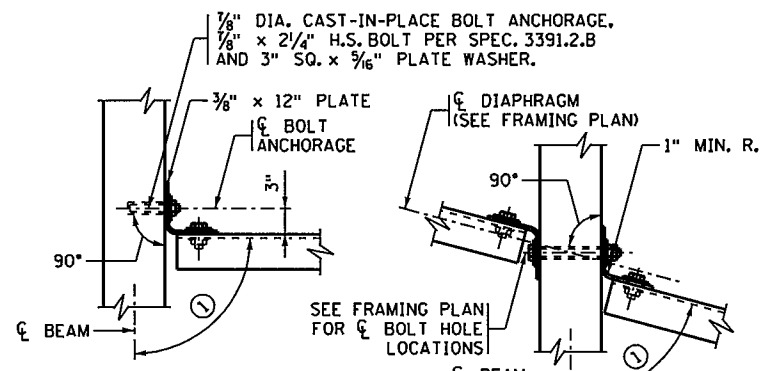
DIAPHRAGM CONNECTION
FOR MN54 AND MN63 BEAMS

BEAM HEIGHT	DISTANCE			CHANNEL SIZE
	A	B	C	
36M	1'-3"	7"	1'-0"	C12x20.7
MN45	1'-7 1/4"	7"	1'-0"	C12x20.7
MN54	1'-7 3/4"	1'-1"	1'-9"	MC18x42.7
MN63	1'-7 3/4"	1'-1"	2'-6"	MC18x42.7



DETAIL "A"

INTERIOR BEAM WITH CONTINUOUS LINE OF DIAPHRAGMS



SECTION A-A
TYPICAL SECTION AT ALL FASCIA BEAMS

SECTION B-B

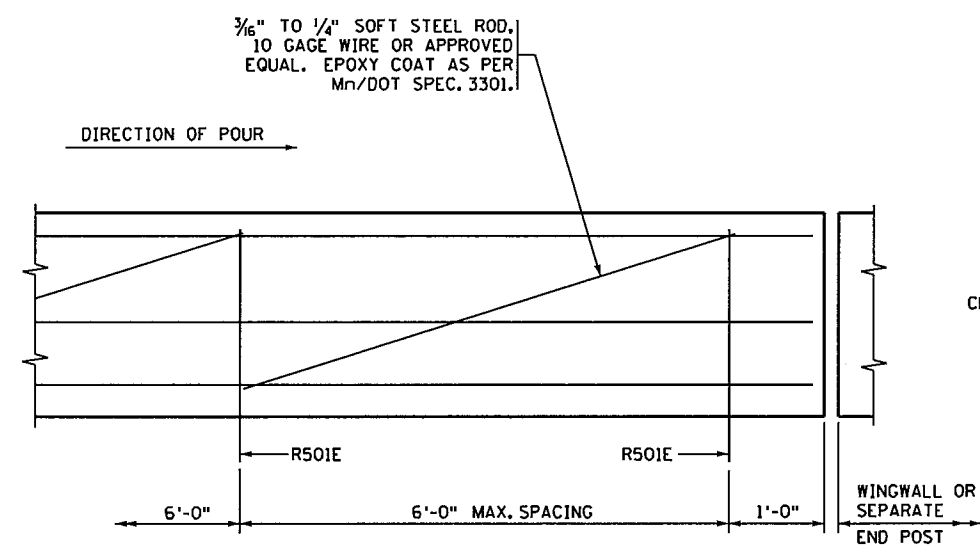
TYPICAL SECTION AT INTERIOR BEAM WITH CONTINUOUS OR STAGGERED INTERMEDIATE DIAPHRAGMS

- NOTES:**
- PROVIDE STEEL PER SPEC. 3306.
 - INSTALL PER SPEC. 2405.3.K.
 - TORQUE ALL BOLTS, INCLUDING ANCHOR BOLTS TO 80 FT.-LBS.
 - SHOP BEND THE LEG OF THE 12" PLATE TO CONFORM TO THE DIAPHRAGM. A 3/8" x 6" x 6" ANGLE MAY BE USED FOR DIAPHRAGMS PERPENDICULAR TO BEAMS.
 - INCLUDE ALL STRUCTURAL STEEL SHOWN ON THIS DETAIL, INCLUDING BOLTS AND WASHERS, IN UNIT PRICE BID FOR DIAPHRAGMS FOR PRESTRESSED BEAMS.
 - BENT PLATES MAY BE USED IN PLACE OF CHANNELS IF THE BENT PLATES HAVE THE SAME HEIGHT AS THE CHANNELS THEY REPLACE, ARE 3/8" IN THICKNESS, AND HAVE LEGS 5" LONG.
 - GALVANIZE STEEL PLATES AND SHAPES PER SPEC. 3394.
 - GALVANIZE BOLTS, NUTS AND WASHERS PER SPEC. 3392.
 - ① FOR SKEW ANGLES UNDER 20°, USE 90° LESS THE SKEW ANGLE. FOR SKEW ANGLES OVER 20°, USE 90°.

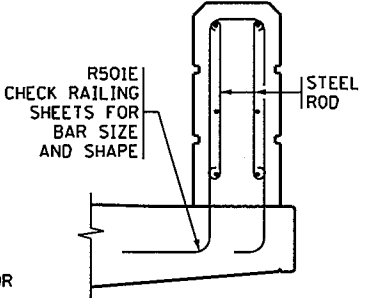
APPROVED: NOVEMBER 03, 2015
Kevin A. J. Egan
STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
STEEL INTERMEDIATE DIAPHRAGM
(FOR 36M, MN45 - MN63 PRESTRESSED CONCRETE BEAMS)

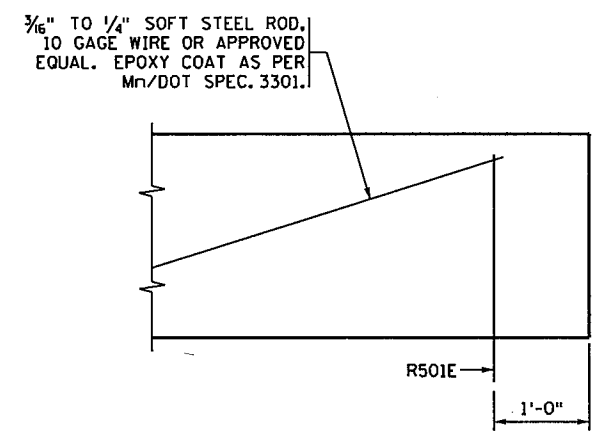
REVISED
DETAIL NO.
B403



INSIDE ELEVATION OF RAILING



RAILING SECTION
FENCE NOT SHOWN



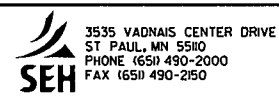
INSIDE ELEVATION OF RAILING
AT END OF WINGWALL

- NOTES:**
- CONTRACTOR WILL TOOL V-GROOVE AT DEFLECTION JOINTS AT TIME RAIL IS CAST AND SHALL EXTEND V-GROOVE AROUND ENTIRE PERIMETER OF RAIL.
 - FOR ADDITIONAL DIMENSIONS, DETAILS, REINFORCEMENT AND NOTES SEE RAILING SHEET.
 - FORM RAIL FOR A MINIMUM OF 2' ON EACH SIDE OF EXPANSION DEVICES, LIGHT STANDARDS AND DECK DRAIN BOX OUTS.
 - PAY QUANTITIES WILL NOT BE ADJUSTED AS A RESULT OF SELECTING THIS ALTERNATE.
 - USE A SIMILAR METHOD FOR TALLER RAILINGS OR MODIFIED VERSIONS OF THIS RAILING.

APPROVED: NOVEMBER 22, 2002
Daniel J. Morgan
STATE BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION
CONCRETE PARAPET RAILING
(SLIPFORM ALTERNATE)

REVISION 4-17-2013
DETAIL NO.
B831

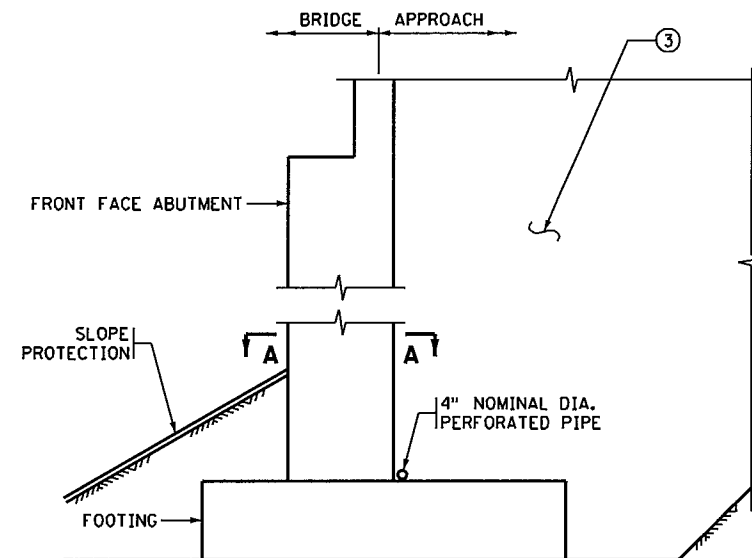


I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

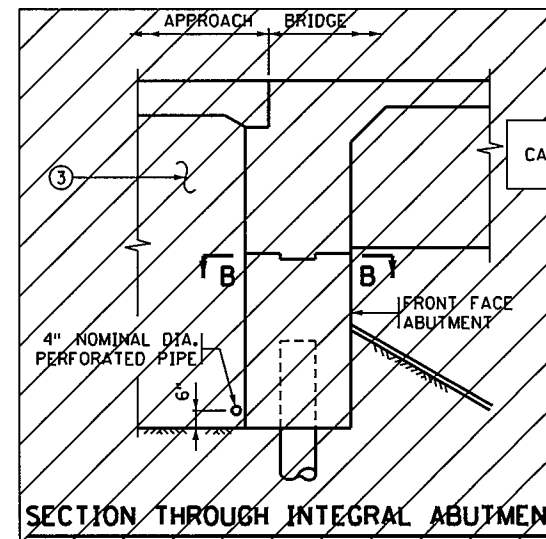
B-DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62732
CHK: NCK	CHK: MHD		
SHEET NO. B51 OF B58 SHEETS			

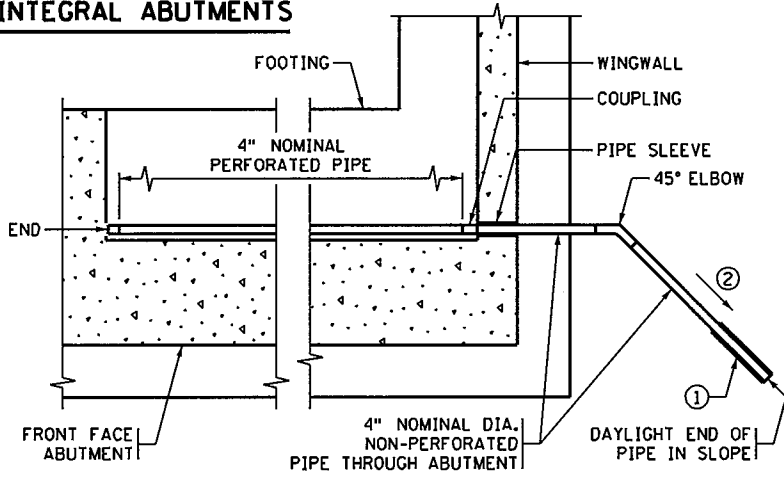
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12/10/2015
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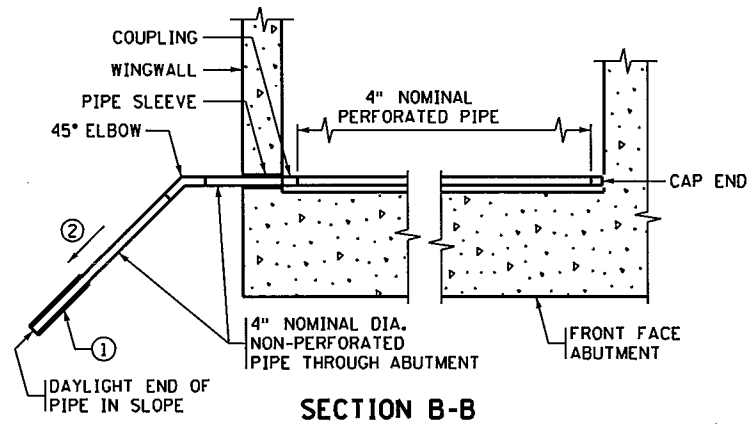
SECTION THROUGH PARAPET AND SEMI-INTEGRAL ABUTMENTS



SECTION THROUGH INTEGRAL ABUTMENT



SECTION A-A



SECTION B-B

NOTES:

PAYMENT WILL BE INCLUDED IN THE SINGLE LUMP SUM PRICE FOR "DRAINAGE SYSTEM TYPE (B910)", INCLUDES BUT IS NOT LIMITED TO 4" DIAMETER PERFORATED AND NON-PERFORATED PIPE, ELBOWS, END CAPS, COUPLINGS, SLEEVES AND PRECAST CONCRETE HEADWALLS.

ALL PIPE TO COMPLY WITH SPEC. 3245.

WRAP PERFORATED PIPE WITH GEOTEXTILE PER SPEC. 3733, TYPE 1. ATTACH TO PIPE PER SPEC. 2502.

① AT CONTRACTORS OPTION, MAY TIE APPROACH PANEL DRAINAGE SYSTEM AND ABUTMENT DRAINAGE SYSTEM INTO A SINGLE PRECAST CONCRETE HEADWALL OR INTO A CATCH BASIN AS LONG AS A MINIMUM OF 1% POSITIVE SLOPE CAN BE MAINTAINED.

USE PRECAST CONCRETE HEADWALL WITH RODENT SCREEN. SEE STANDARD PLATE 3131 FOR DETAILS.

② 1/8" PER FT. MINIMUM SLOPE.

③ REFER TO GRADING PLANS FOR ABUTMENT BACKFILL REQUIREMENTS.

APPROVED: JANUARY 13, 2015

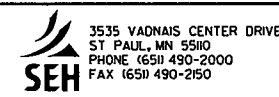
Nancy Dubenberger
STAFF BRIDGE ENGINEER

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

DRAINAGE SYSTEM

REVISED DETAIL NO.

B910

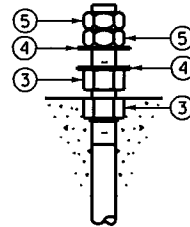
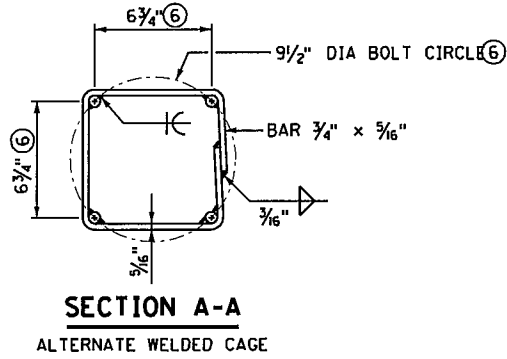
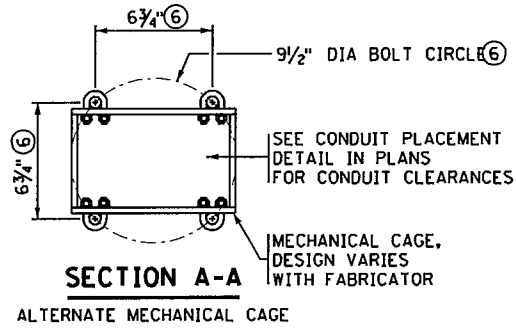


I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

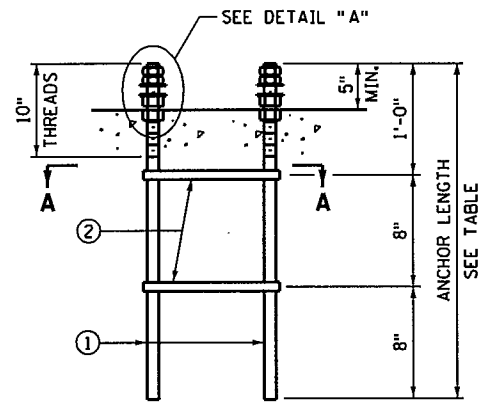
B-DETAILS

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DETAIL "A"



ELEVATION

NOTES:

- ALL RODS ARE TO BE 1" NOMINAL DIA. WITH 1 - BUNC - 2A THREADS. HEAVY HEX NUTS, JAM NUTS, AND FLAT WASHERS PER Mn/DOT SPEC. 3391.2A FOR 1" DIA. THREADED RODS. NUTS TO BE TAPPED 1/64" OVERSIZED PRIOR TO GALVANIZING, AND RETAPPED TO STANDARD SIZE AFTER GALVANIZING.
- GALVANIZE THREADED RODS, CAGES, AND NUTS AFTER FABRICATION AS PER Mn/DOT SPEC. 3392.
- TOP OF THE LOWER NUTS SHALL BE FLUSH WITH TOP OF CONCRETE RAILING.
- SUBSTITUTE MATERIALS PER Mn/DOT SPEC. 1605.
- ① THREADED RODS, STEEL AS PER Mn/DOT SPEC. 3309, 3310, OR 3385 TYPE B (4 REQUIRED).
 - ② PROVIDE A MECHANICAL OR WELDED CAGE FOR ROD ALIGNMENT. STEEL AS PER Mn/DOT SPEC. 3306 (2 REQUIRED).
 - ③ HEAVY HEX NUTS FOR 1" DIA. RODS (8 REQUIRED).
 - ④ FLAT WASHERS FOR 1" DIA. RODS (8 REQUIRED).
 - ⑤ JAM NUTS FOR 1" DIA. RODS (8 REQUIRED).
 - ⑥ VERIFY WITH LIGHT STD. MANUFACTURER.

STANDARD RAIL TYPES (SEE PLANS FOR TYPE)	ANCHOR LENGTH
TYPE "F" MEDIAN	3'-0"
TYPE "F" W/O CONCRETE WEARING COURSE	3'-0"
TYPE "F" W/ CONCRETE WEARING COURSE	3'-2"
TYPE "F" WITH SIDEWALK/ BRIDGE SLAB	3'-10"
TYPE "F" ON RETAINING WALL	3'-0"
CONCRETE PARAPET WITH FENCE	2'-8"
CONCRETE PARAPET P-2	2'-4"

MODIFIED TO BRIDGE 62732

MODIFIED

APPROVED: NOVEMBER 22, 2002

Daniel J. Morgan
 STATE BRIDGE ENGINEER

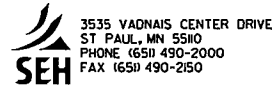
STATE OF MINNESOTA
 DEPARTMENT OF TRANSPORTATION

ANCHOR BOLT CLUSTER FOR LIGHT POLES

REVISED
 10-26-2004
 03-02-2005

DETAIL NO.

B950



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

B-DETAILS

DES: MHD DR: MAW APPROVED: 12/14/15
 CHK: NCK CHK: MHD
 SHEET NO. B53 OF B58 SHEETS

BRIDGE NO
 62732

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12/10/2015
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CONCRETE WEARING COURSE

LOW SLUMP
 OTHER _____
TYPE OR MANUFACTURER

EXPANSION JOINTS

JOINT MANUFACTURER _____
MANUFACTURER'S IDENTIFICATION _____
MFR'S No. AND/OR LETTER DESIGNATION FOR JOINT USED
GLAND MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)
SIZE OF GLAND _____
MANUFACTURER'S IDENTIFICATION _____
MFR'S No. AND/OR LETTER DESIGNATION FOR GLAND USED

ELASTOMERIC BEARING PADS

PAD MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)

SPECIAL SURFACE FINISH

SYSTEM: _____ COLOR: _____

FINISHING ROADWAY FACES OF BARRIER RAILING

TYPE: _____ COLOR: _____

ANTI-GRAFFITI COATING

MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)
PRODUCT NAME: _____ LOCATION: _____

PAINT SYSTEM

Mn/DOT SPECIFICATION NUMBER _____
2478 OR 2479 OR OTHER
MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE)
PRIME COAT _____
Mn/DOT MATERIAL SPECIFICATION NUMBER
INTERMEDIATE COAT _____
Mn/DOT MATERIAL SPECIFICATION NUMBER
FINISH COAT _____
Mn/DOT MATERIAL SPECIFICATION NUMBER COLOR

PLAN QUALITY

RATE 1 (AGREE), 2 (NEUTRAL), OR 3 (DISAGREE, PLEASE COMMENT BELOW)
DIMENSIONING AND DETAILING ADEQUATELY DESCRIBED REQUIRED CONSTRUCTION. _____
BAR LISTS AND QUANTITIES WERE TYPICALLY COMPLETE AND FREE OF ERRORS. _____
SCALE OF DRAWINGS AND OVERALL LEGIBILITY OF LINES AND TEXT WAS GOOD. _____
(SB) SPECIAL PROVISIONS ADEQUATELY DESCRIBED SPECIAL WORK AND PAYMENT. _____
COMMENTS: _____
NUMBER OF BRIDGE SUPPLEMENTAL AGREEMENTS: _____ COST: \$ _____
LIST SIGNIFICANT ERRORS OR OMISSIONS IN PLAN DETAILS OR PAY QUANTITIES IN THE SPACE PROVIDED AT RIGHT.

BRIDGE REMOVAL / BRIDGE OPENING

NUMBER OF AND DATE OLD BRIDGE WAS REMOVED (IF APPLICABLE):
BRIDGE NUMBER _____ DATE REMOVED _____
DATE NEW BRIDGE WAS OPENED TO TRAFFIC _____
NOTIFY THE BRIDGE OFFICE BRIDGE MANAGEMENT UNIT WITH THIS INFORMATION AS SOON AS POSSIBLE. (651) 366-4557

OTHER ITEMS ①

① UTILITIES ADDED DURING CONSTRUCTION AND SPECIALTY ITEMS.
FINAL QUANTITIES ENTERED ON SCHEDULE OF QUANTITIES: YES NO

SUMMARY OF SIGNIFICANT AS-BUILT CHANGES

THE AS-BUILT INFORMATION WAS ADDED TO THE PLAN BY:

INSPECTOR(S) SIGNATURE _____ DATE _____
CHECKED BY: _____ PROJECT ENGINEER/SUPERVISOR SIGNATURE _____ DATE _____

AT THE TIME OF THE FINAL, THIS COMPLETED AS-BUILT BRIDGE DATA SHEET MUST BE SUBMITTED TO THE BRIDGE OFFICE - ATTN: REGIONAL CONSTRUCTION ENGINEER (MS610).

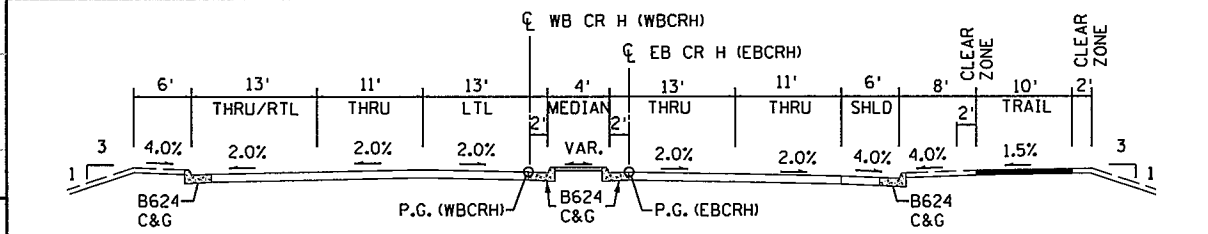
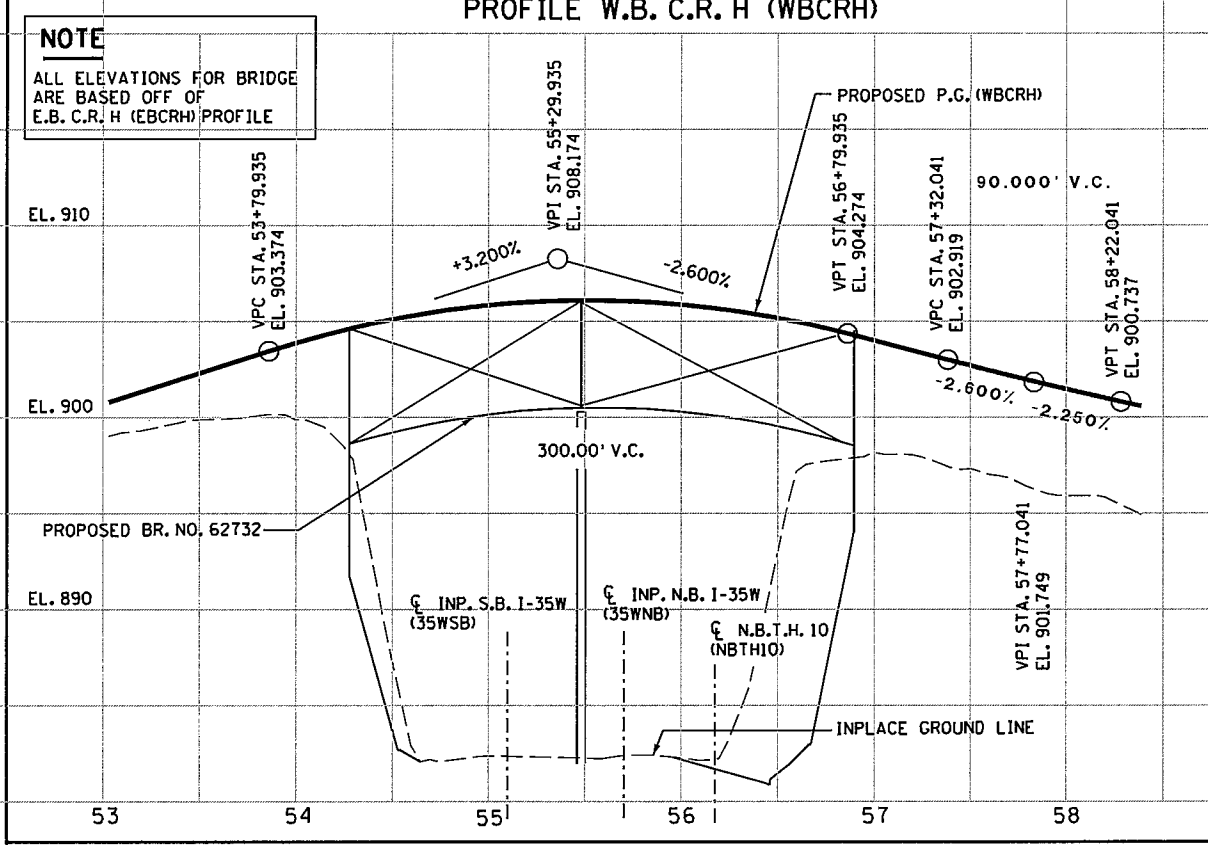
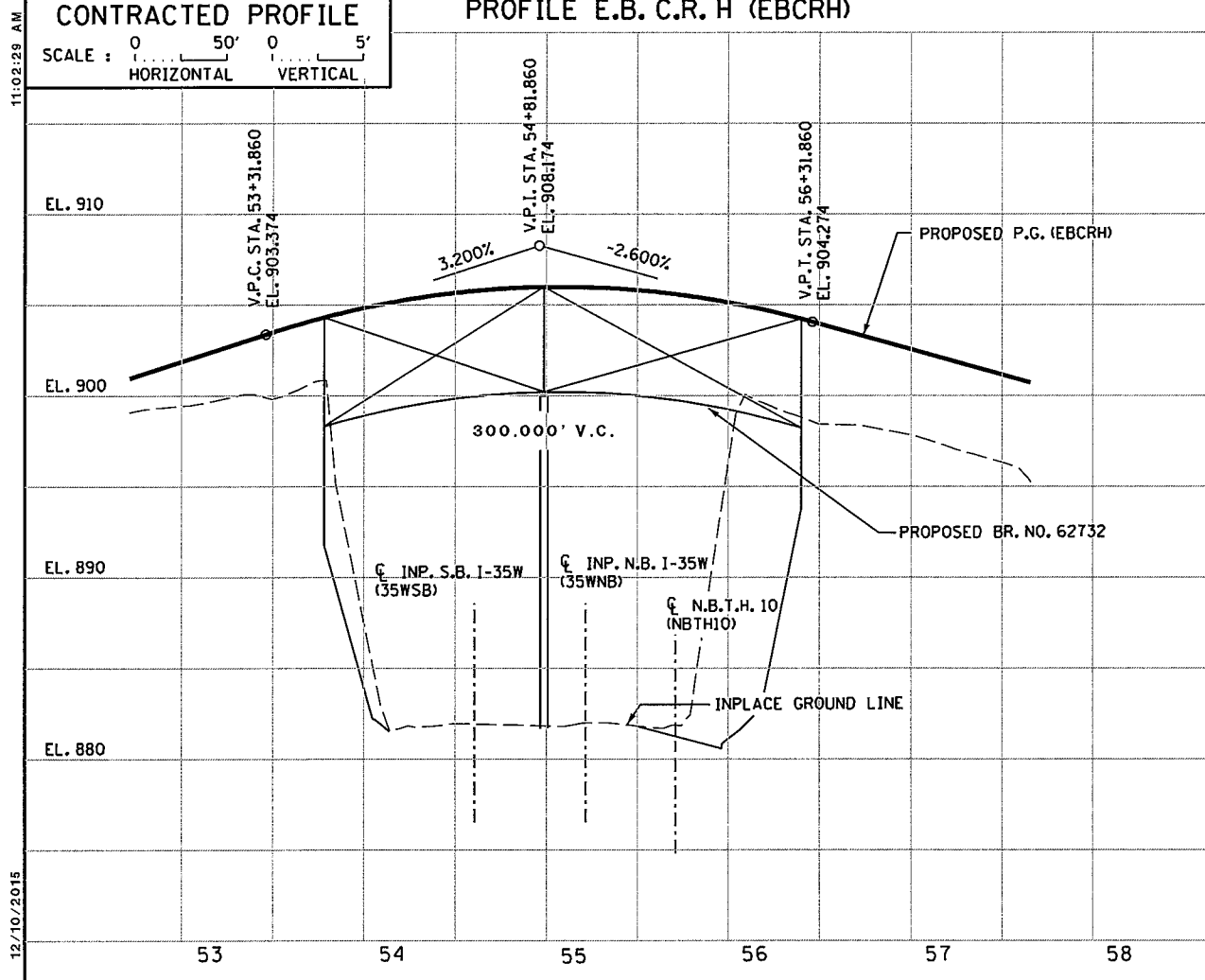
REVISION: 10-28-2008
APPROVED: SEPTEMBER 26, 2003
Daniel A. Johnson
STATE BRIDGE ENGINEER

**AS-BUILT DETAILS
(AS NEEDED)**

AS-BUILT BRIDGE DATA

DES: _____ DR: _____ APPROVED: 12/14/15
CHK: _____ CHK: _____
SHEET NO. B54 OF B58 SHEETS BRIDGE NO 62732

FIG. 5-397.900



- NOTE**
ALL ELEVATIONS FOR BRIDGE ARE BASED OFF OF E.B. C.R. H (EBCRH) PROFILE
- 1** W.B. C.R. H (WBCRH) P.O.T. STA. 55+08.673=
INP. S.B. I-35W (35WSB) P.O.T. STA. 359+69.536
X=550356.705 Y=211023.369
4 90° 00' 00.1"
- 2** E.B. C.R. H (EBCRH) P.O.T. STA. 54+60.598=
INP. S.B. I-35W (35WSB) P.O.T. STA. 359+61.536
X=550356.802 Y=211015.370
4 90° 00' 00.1"
- 3** W.B. C.R. H (WBCRH) P.O.T. STA. 55+76.674=
INP. N.B. I-35W (35WNB) P.O.T. STA. 359+69.273
X=550424.700 Y=211024.197
4 90° 00' 00.0"
- 4** E.B. C.R. H (EBCRH) P.O.T. STA. 55+28.598=
INP. N.B. I-35W (35WNB) P.O.T. STA. 359+61.273
X=550424.798 Y=211016.198
4 90° 00' 00.0"
- 5** W.B. C.R. H (WBCRH) P.O.T. STA. 56+17.313=
FUTURE N.B.T.H. 10 RAMP (NBTH10-ML) P.O.C. STA. 442+55.986
X=550465.337 Y=211024.692
4 84° 53' 47.1" T.T.C.
- 6** E.B. C.R. H (EBCRH) P.O.T. STA. 55+69.964=
INP. N.B.T.H. 10 RAMP (NBTH10) P.O.C. STA. 442+47.953
X=550466.160 Y=211016.701
4 84° 43' 40.0" T.T.C.
- 7** W.B. C.R. H (WBCRH) P.O.T. STA. 56+25.463=
FUTURE N.B.T.H. 10 RAMP (NBTH10-ML) P.O.C. STA. 442+55.275
X=550473.486 Y=211024.791
4 87° 30' 58.1" T.T.C.
- 8** E.B. C.R. H (EBCRH) P.O.T. STA. 55+77.744=
FUTURE N.B.T.H. 10 RAMP (NBTH10-ML) P.O.C. STA. 442+47.267
X=550473.939 Y=211016.796
4 87° 23' 45.7" T.T.C.

LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

- SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS, SLIDING BANKS, RECREATIONAL BOATING.
- OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARLY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY); GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
- APPARENT HIGHWATER ELEVATION OBTAINED FROM:
- OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEERS RECOMMENDATION
DATE: X-XX-20XX

STREAM OR DITCH DESIGNATION: X
DRAINAGE AREA: X.X SQ. MI.
MAX. FLOOD ON RECORD: XX.X C.F.S. (XX-XX-XX)
MAXIMUM OBSERVED HIGHWATER ELEVATION: XXX.X FT.
DESIGN FLOOD (100 YR. FREQ.): XXXX C.F.S.
HEADWATER ELEVATION: XXX.X FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE: X.X F.P.S.
TOTAL STAGE INCREASE: X.X FT.
LOW MEMBER AT OR ABOVE ELEVATION: XXX.XX FT.
WATERWAY AREA REQUIRED BELOW ELEV. XXX.X = XXX SQ. FT. AT RIGHT ANGLES TO CHANNEL
BASIC FLOOD (100 YR. FREQ.): XXXX C.F.S.
HEADWATER ELEVATION XXX.X FT.
TOTAL STAGE INCREASE: X.X FT.
MEAN VELOCITY THROUGH STRUCTURE: XX F.P.S.
FLOWLINE ELEVATION: XXX.X'

SKEW ANGLE: X°

ESTIMATED PRELIMINARY TOTAL SCOUR AT PIER EL. N/A (500 OR 0T YR. FREQ.)

SCOUR CONFIRMATION RECOMMENDATION
DATE: XX-XX-XX

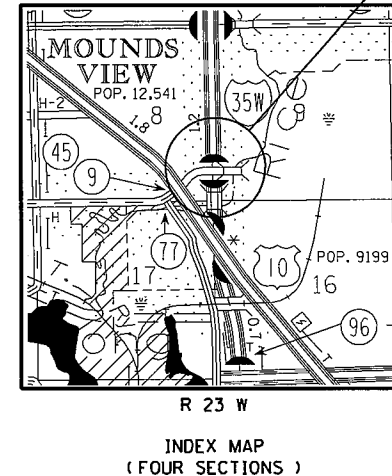
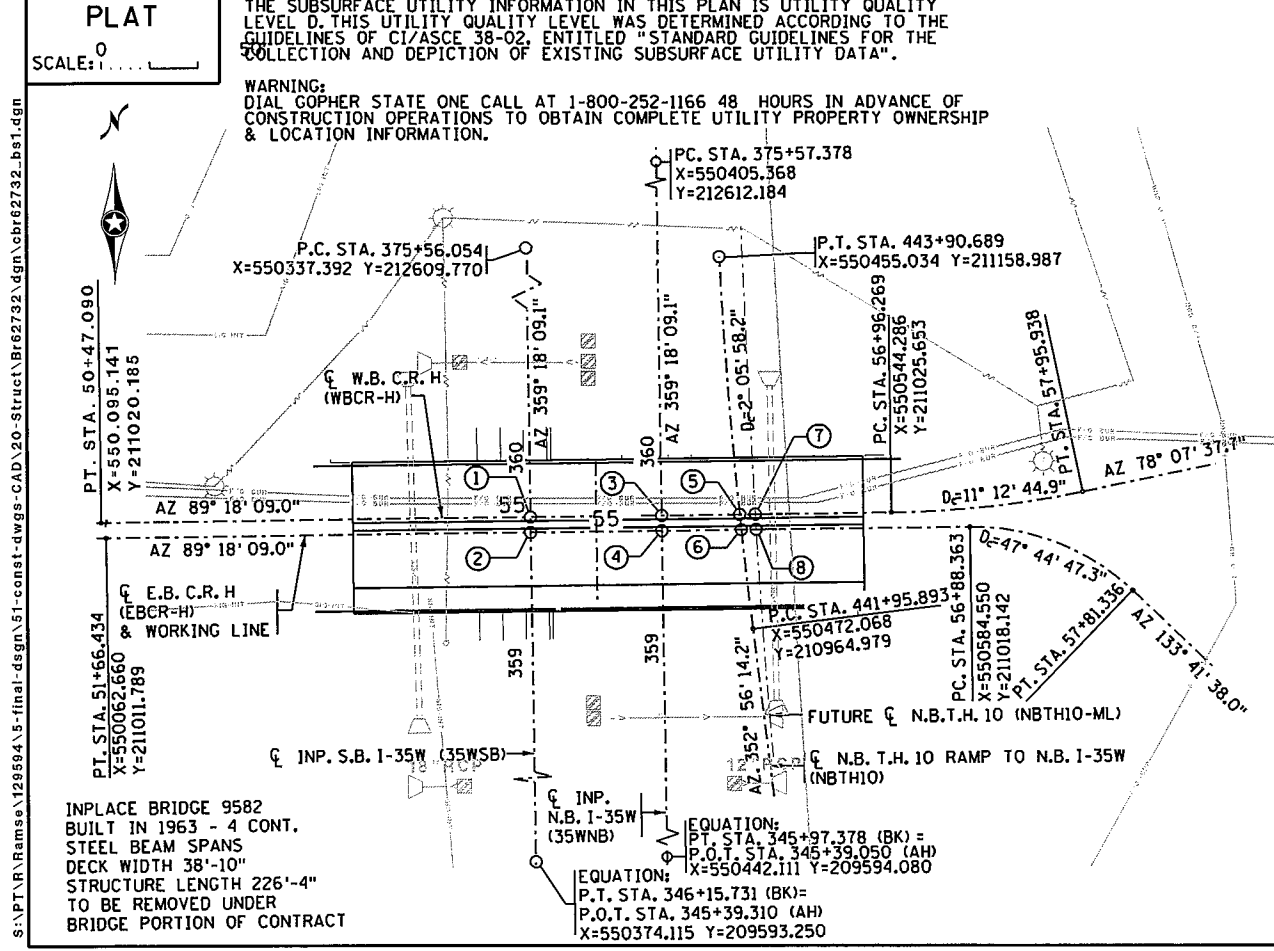
TOTAL SCOUR AT PIER EL. N/A (500 OR 0T YR. FREQ.)
SCOUR CODE: L

BRIDGE SURVEY SHEETS MADE FROM :
RAMSEY COUNTY SURVEY DATA

BENCH MARK ELEVATION 905.070 (N.A.V.D. 88 ADJ.)
GISD STATION 24710 6204 D
IRON ROD (DEPTH 8 FT.)

IN MOUNDS VIEW, 0.8 MILE NORTHWEST ALONG TRUNK HIGHWAY 10 FROM THE JUNCTION OF EASTBOUND TRUNK HIGHWAY 10 BRIDGE NUMBER 9586 OVER I-35W, AT TRUNK HIGHWAY 10 MILEPOINT 237.6, 55.0 FEET SOUTHWEST OF EASTBOUND TRUNK HIGHWAY 10, 66.0 FEET SOUTHWEST OF DRIVEWAY OF HOUSE AT 2280 TRUNK HIGHWAY 10, 55.0 FEET NORTHWEST OF DRIVEWAY, 14.0 FEET NORTHEAST POWER POLE, 8.0 FEET NORTH OF TELEPHONE MANHOLE, 3.0 FEET NORTHEAST OF WITNESS POST.

2nd BENCH MARK ELEVATION 880.051 (N.A.V.D. 88 ADJ.)
GISD STATION 24955 6284 N 1
IN ARDEN HILLS, IN NORTHWEST CORNER OF I-35W BOX CULVERT OVER RICE CREEK, 1.0 MILE NORTH ON I-35W FROM THE JUNCTION OF I-35W AND TRUNK HIGHWAY 96, 50 FEET WEST OF I-35W, 1 FOOT WEST OF WITNESS POST.



MINNESOTA
DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY

CO. RD. H OVER
I-35W N.B. AND S.B. LANES
0.4 MILES NORTH OF THE SOUTH JUNCTION
OF T.H. 10 IN ARDEN HILLS

SEC 8/9 T 030 N R 23 W

COUNTY: RAMSEY
CITY: ARDEN HILLS

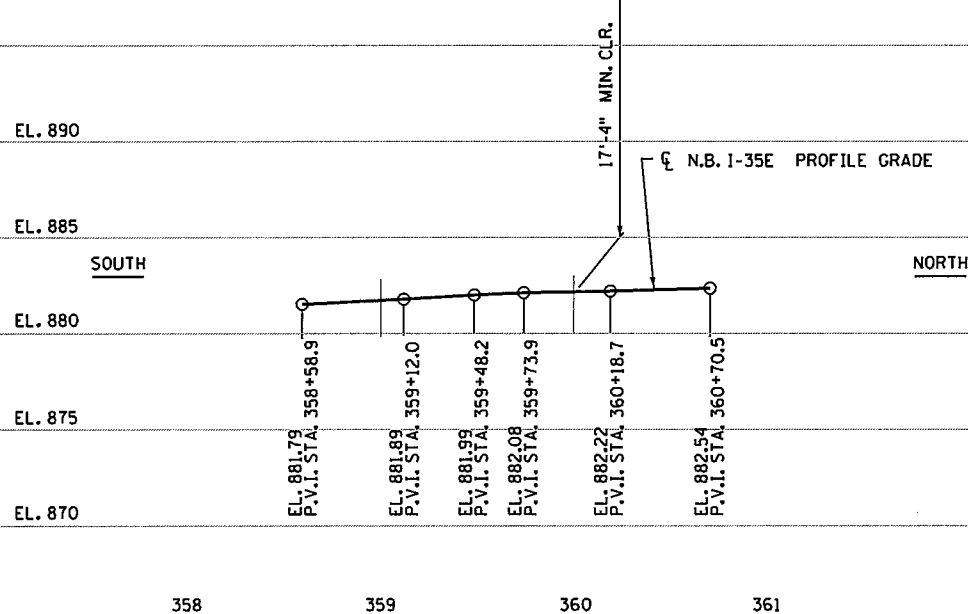
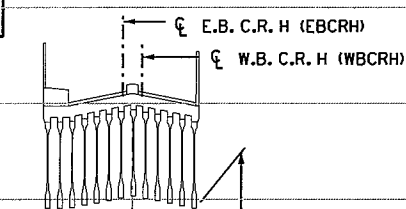
BRIDGE NO. 62732

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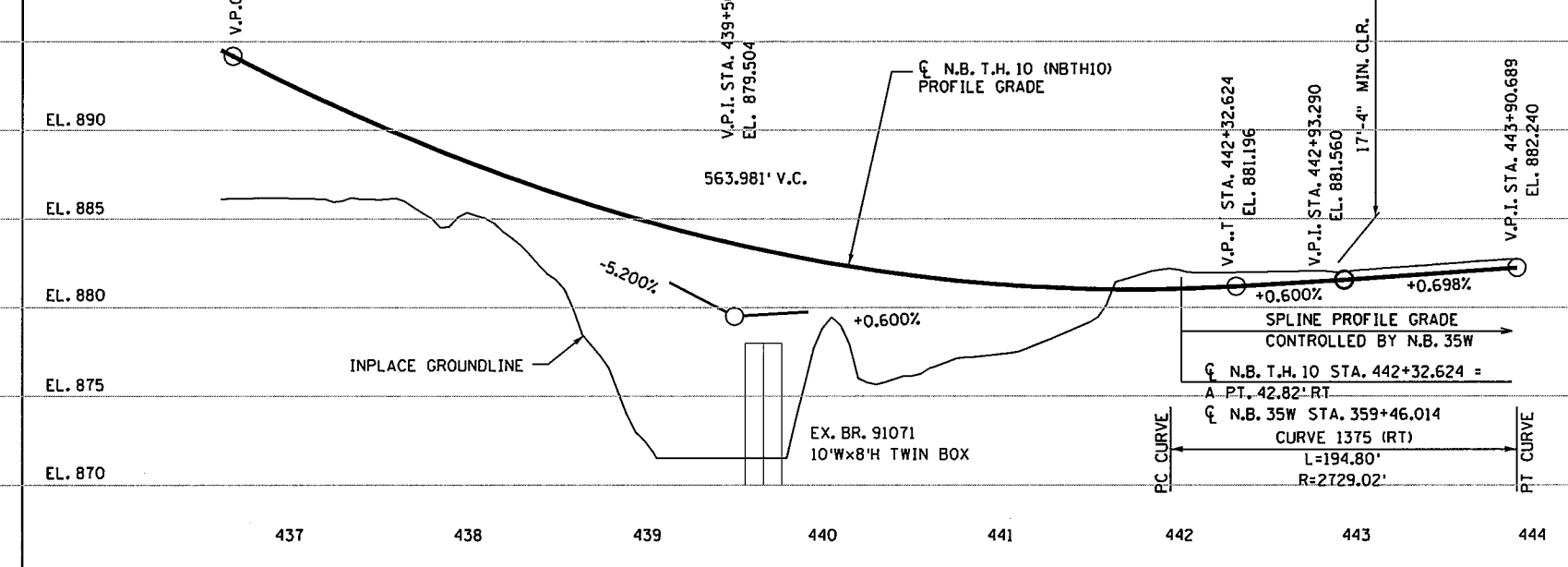
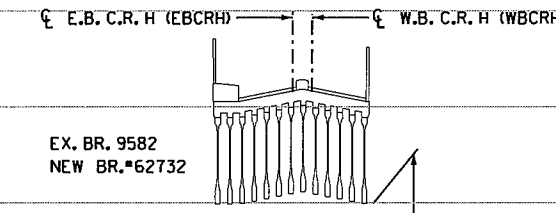
CONTRACTED PROFILE

SCALE : 0 50' 0 5'
HORIZONTAL VERTICAL

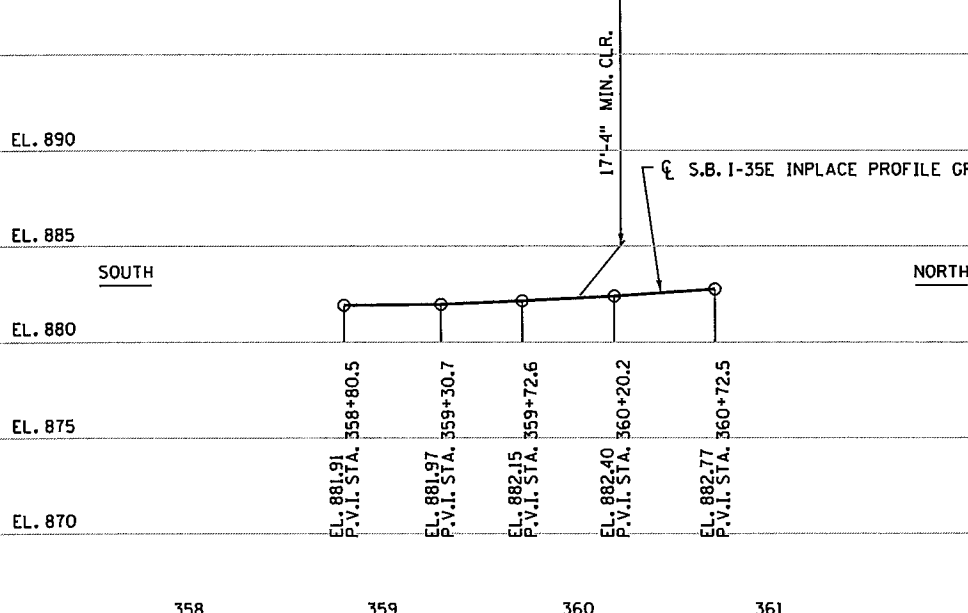
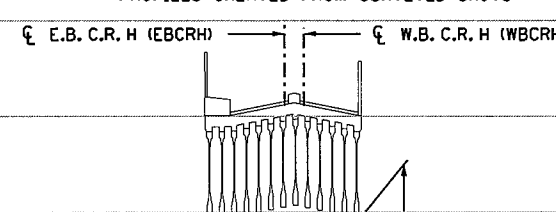
PROFILE INP. I35W N.B.
PROFILES CREATED FROM SURVEYED SHOTS



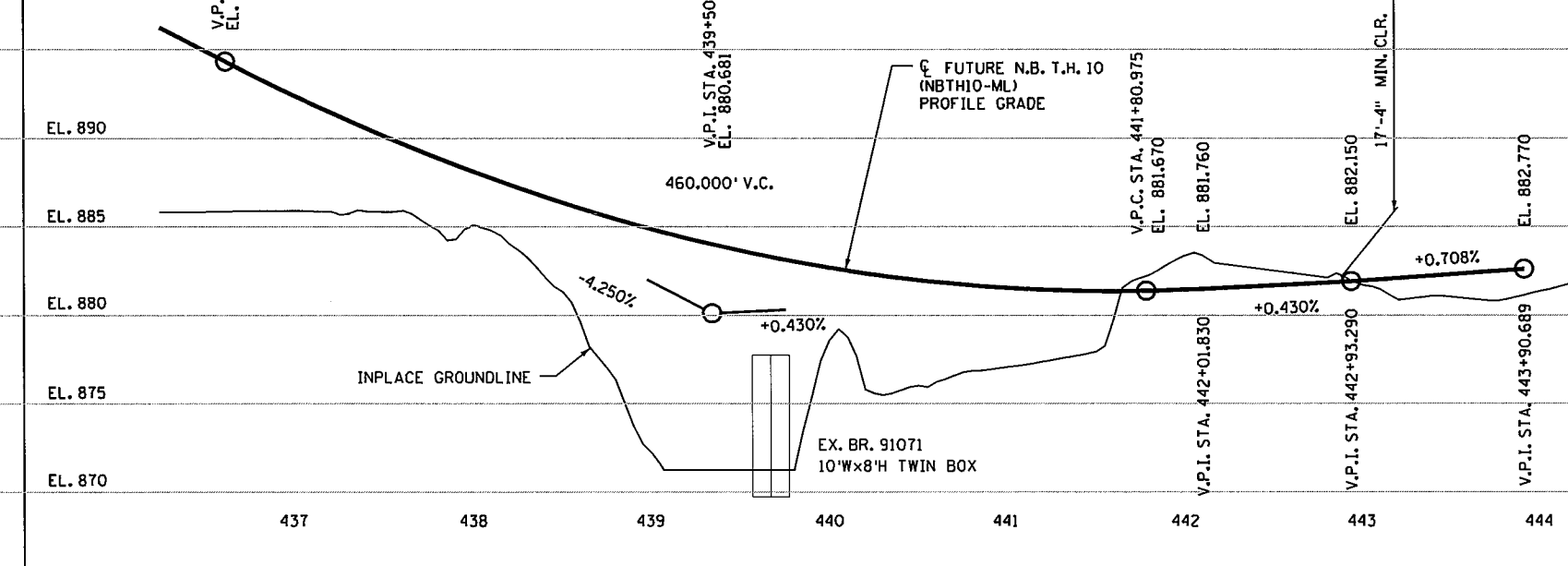
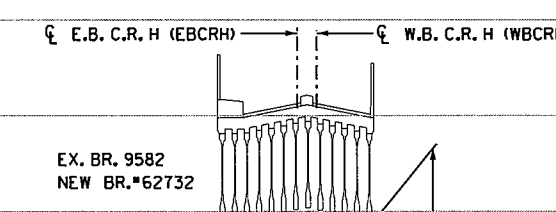
PROFILE N.B. T.H. 10 (NBTH10)



PROFILE INP. I35W S.B.
PROFILES CREATED FROM SURVEYED SHOTS

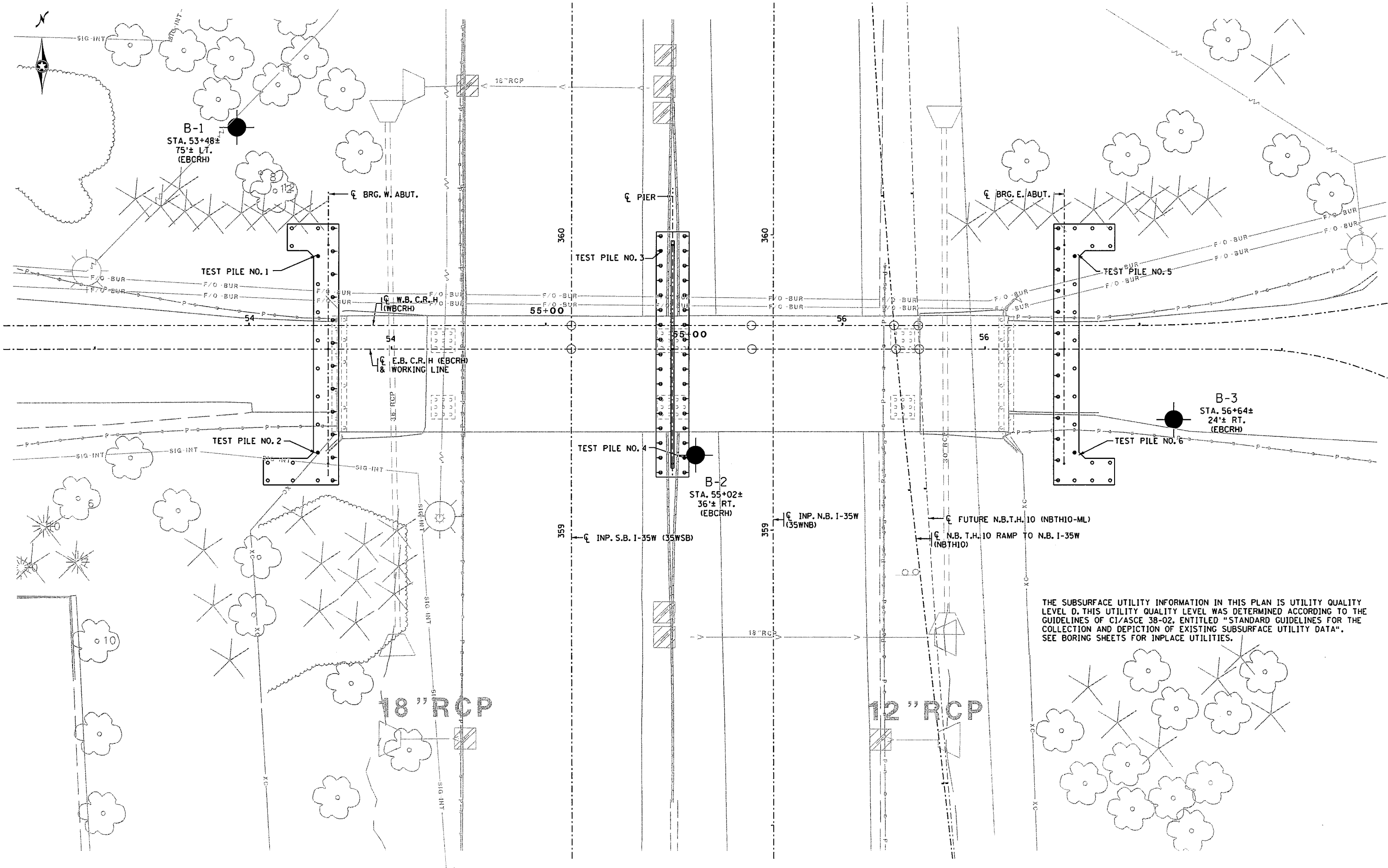


PROFILE FUTURE N.B. T.H. 10 (NBTH10-ML)



PROFILES

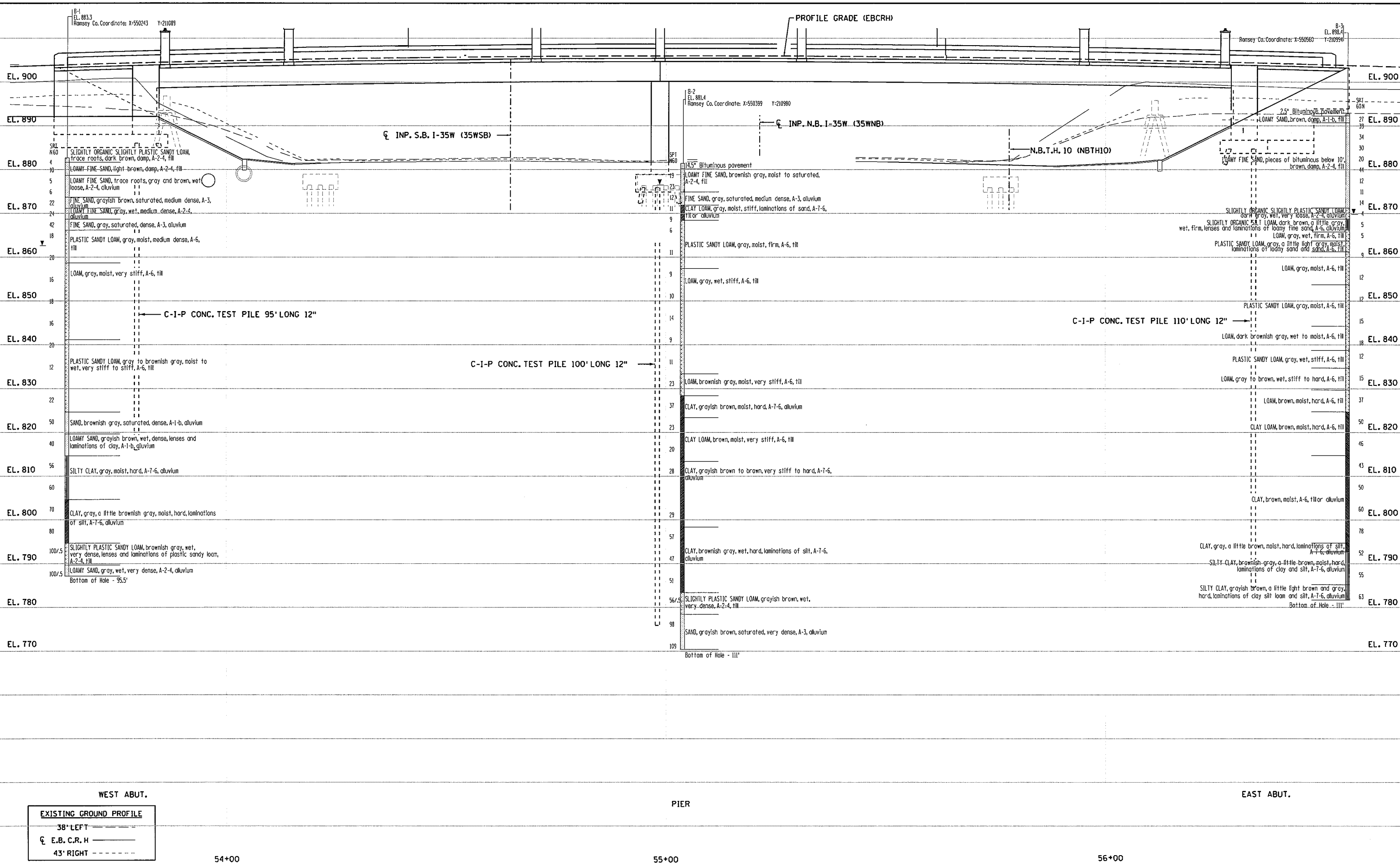
DES: MAW	DR: MAW	APPROVED:	BRIDGE NO 62732
CHK: MKM	CHK: MKM	12/14/15	
SHEET NO. B56 OF B58 SHEETS			



THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA". SEE BORING SHEETS FOR INPLACE UTILITIES.

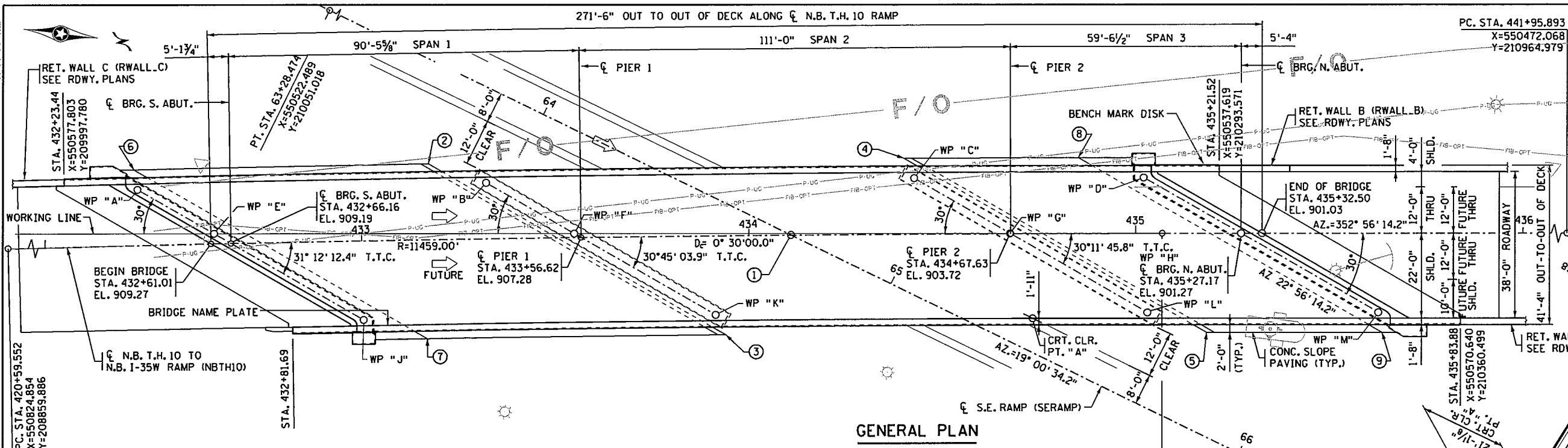
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	CHK: MKM	12/14/15	
SHEET NO. B57 OF B58 SHEETS			

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BORINGS	DR: MAW	APPROVED:	BRIDGE NO 62732
	CHK: MKM	12/14/15	
SHEET NO. B58 OF B58 SHEETS			

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12/10/2015
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GENERAL PLAN

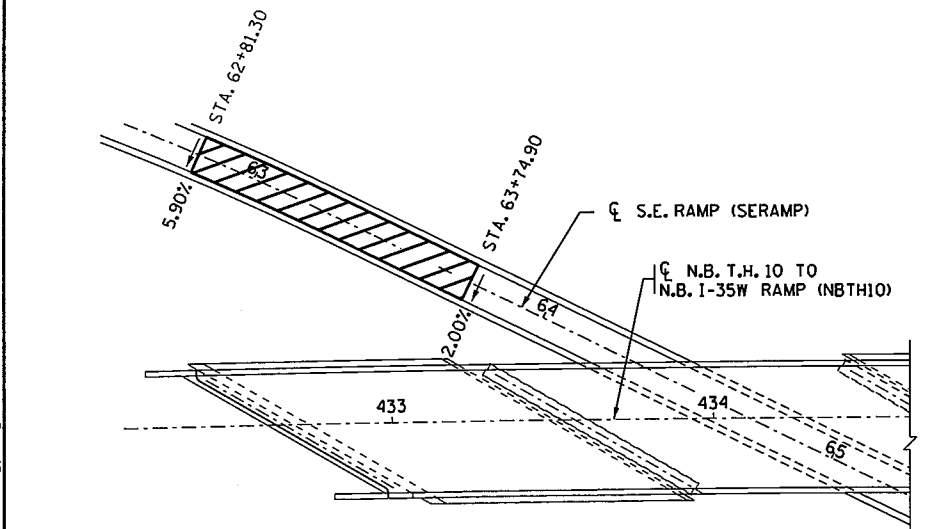
STATE FUNDS

2014 AND CURRENT INTERIM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS
LOAD AND RESISTANCE FACTOR DESIGN METHOD
HL93 LIVE LOAD

DEAD LOAD INCLUDES 20 PSF ALLOWANCE FOR FUTURE WEARING COURSE MODIFICATIONS

MATERIAL DESIGN PROPERTIES:
REINFORCED CONCRETE:
f'c = 4 KSI n = 8
fy = 60 KSI REINFORCEMENT
PRESTRESSED CONCRETE:
f'c = 9 KSI n = 1
fpu = 270 KSI LOW RELAXATION STRANDS
0.75 fpu FOR INITIAL PRESTRESS

DESIGN SPEED:
OVER = 55 MPH UNDER = 55 MPH
DECK AREA = 11222 SQ. FT.
HL93 LRFR BRIDGE OPERATING RATING: RF=1.60



S.E. RAMP SUPER ELEVATION DIAGRAM

- ① ϕ N.B. T.H. 10 TO N.B. I-35W RAMP (NBTH10)
P.O.C. STA. 434+10.893= ϕ S.E. RAMP (SERAMP) P.O.T. STA. 64+71.226
X=550568.987 Y=210185.985
4 153° 26' 53.0"
- ② A PT. 24.54' RT. ϕ S.E. RAMP (SERAMP) STA. 63+78.96
BOTTOM OF SLOPE EL. 882.63
- ③ A PT. 30.62' RT. ϕ S.E. RAMP (SERAMP) STA. 64+67.41
BOTTOM OF SLOPE EL. 882.61
- ④ A PT. 30.7' LT. ϕ S.E. RAMP (SERAMP) STA. 64+88.73
BOTTOM OF SLOPE EL. 882.88
- ⑤ A PT. 24.5' LT. ϕ S.E. RAMP (SERAMP) STA. 65+78.81
BOTTOM OF SLOPE EL. 883.18
- ⑥ A PT. 61.3' RT. ϕ S.E. RAMP (SERAMP) STA. 63+05.37
TOP OF SLOPE EL. 901.86
- ⑦ A PT. 67.6' RT. ϕ S.E. RAMP (SERAMP) STA. 63+94.50
TOP OF SLOPE EL. 900.15
- ⑧ A PT. 52.8' LT. ϕ S.E. RAMP (SERAMP) STA. 65+33.57
TOP OF SLOPE EL. 892.19
- ⑨ A PT. 46.6' LT. ϕ S.E. RAMP (SERAMP) STA. 66+24.02
TOP OF SLOPE EL. 892.19

CONSTRUCTION NOTES

THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

BRIDGE SEAT REINFORCEMENT SHALL BE CAREFULLY PLACED TO AVOID INTERFERENCE WITH DRILLING HOLES FOR ANCHOR RODS. THE BEAMS SHALL BE ERECTED IN FINAL POSITION PRIOR TO DRILLING HOLES FOR AND PLACING ANCHOR RODS.

THE BAR SIZES SHOWN IN THIS PLAN ARE IN U.S. CUSTOMARY DESIGNATIONS.

BAR MARKED WITH THE SUFFIX "E" SHALL BE EPOXY COATED IN ACCORDANCE WITH SPEC. 3301.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C1/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA". SEE BORING SHEETS FOR INPLACE UTILITIES.

THE PILE LOADS SHOWN IN THE PLANS AND THE CORRESPONDING NOMINAL PILE BEARING RESISTANCE (R_n) WERE COMPUTED USING LRFD METHODOLOGY. PILE BEARING RESISTANCE DETERMINED IN THE FIELD SHALL INCORPORATE THE METHODS AND/OR FORMULAS DESCRIBED IN THE SPECIAL PROVISIONS.

CONSTRUCTION OF EACH ABUTMENT SHALL NOT BE STARTED UNTIL THE APPROACH FILL AT THAT ABUTMENT HAS BEEN CONSTRUCTED TO THE FULL HEIGHT AND CROSS SECTION AND ALLOWED TO SETTLE FOR 72 HOURS.

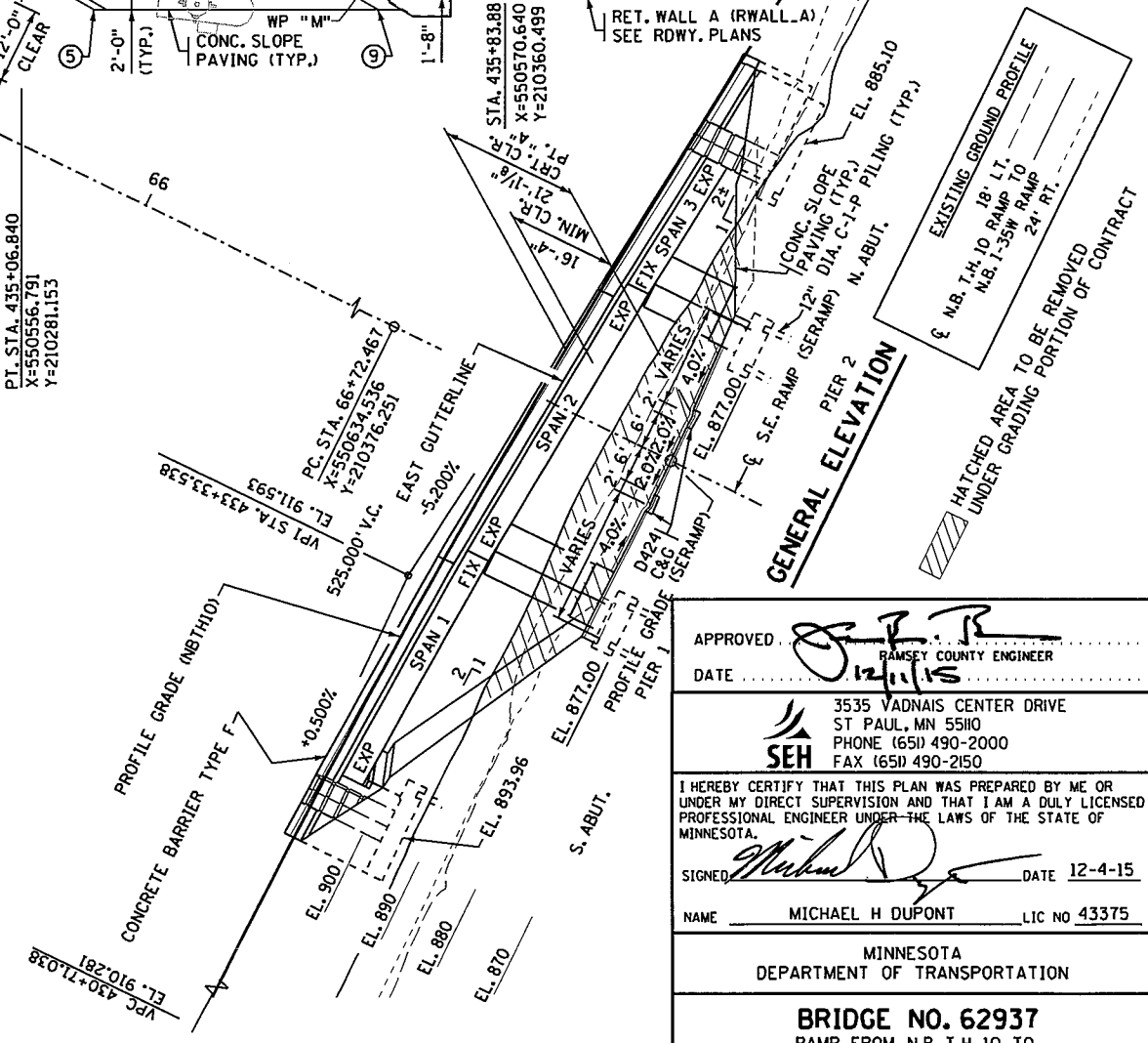
NOTES:

TRAFFIC TO BE DETOURED DURING CONSTRUCTION.

SUBSTRUCTURES SET PARALLEL AT AZ 22° 56' 14.2"

UTILITIES TO BE RELOCATED BY OTHERS.
SEE BRIDGE SURVEY SHEET FOR INPLACE UTILITIES.

LIST OF SHEETS	
NO.	DESCRIPTION
D1	GENERAL PLAN AND ELEVATION
D2	BRIDGE QUANTITIES & TRANSVERSE SECTIONS
D3	BRIDGE LAYOUT
D4-D15	SOUTH ABUTMENT DETAILS
D16-D27	NORTH ABUTMENT DETAILS
D28-D34	PIER 1 DETAILS
D35-D41	PIER 2 DETAILS
D42	FRAMING PLAN
D43-D45	BEAM DETAILS
D46-D54	SUPERSTRUCTURE DETAILS
D55	CONCRETE SLOPE PAVING
D56-D57	WATERPROOF EXPANSION DEVICE
D58-D62	DETAILS
D63	AS-BUILT BRIDGE DATA
D64	BRIDGE SURVEY
D65-D66	BORINGS



APPROVED: *[Signature]*
RAMSEY COUNTY ENGINEER
DATE: 12/14/15

3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNED: *[Signature]* DATE: 12-4-15
NAME: MICHAEL H DUPONT LIC NO 43375

MINNESOTA DEPARTMENT OF TRANSPORTATION

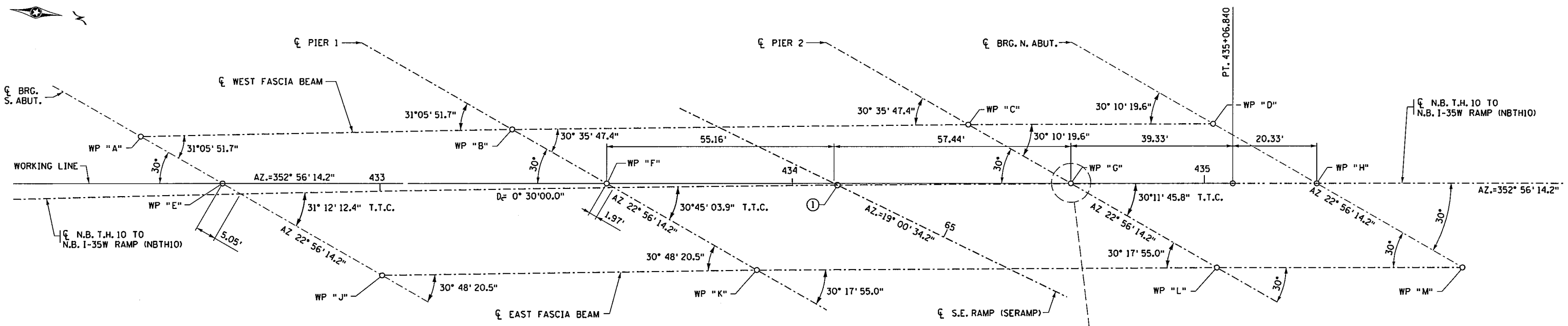
BRIDGE NO. 62937
RAMP FROM N.B. T.H. 10 TO I-35W N.B. OVER RAMP FROM I-35W N.B. TO CO. RD. H 1.8 MILES NORTH OF THE JUNCTION OF I-694 IN ARDEN HILLS
90'-111'-60' PRESTRESSED CONC. BM. SPANS
38' ROADWAY, VARIABLE SKEW, TYPE F BARRIER
IDENTIFICATION NO. 501

GENERAL PLAN AND ELEVATION
SEC. 16 TWP. 030 N. R. 23 W.
CITY OF ARDEN HILLS RAMSEY CO.
APPROVED: *[Signature]*
STATE BRIDGE ENGINEER
DATE: 12/14/15

2036 PROJECTED TRAFFIC VOLUMES

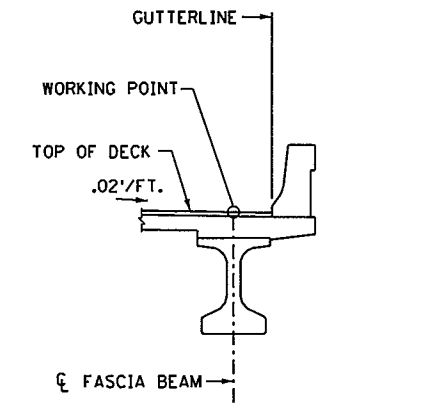
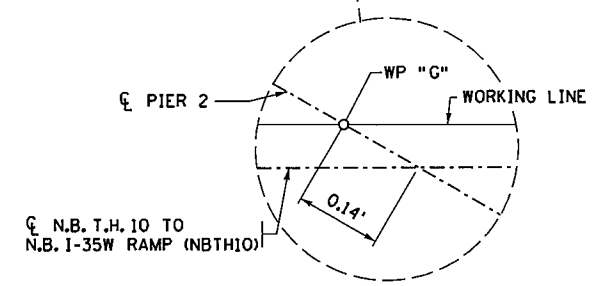
ROADWAY OVER (NBTH10)	2014 A.D.T.	2036 A.D.T.	ROADWAY UNDER (SERAMP)	2014 A.D.T.	2036 A.D.T.
16700	20000	0	0	5800	0

DES. MAW DR. MAW
CHK. MKM CHK. MKM 62937



① \bar{C} N.B. T.H. 10 TO N.B. I-35W RAMP (NBTH10)
 P.O.C. STA. 434+10.893= \bar{C} S.E. RAMP (SERAMP) P.O.T. STA. 64+71.226
 X=550568.987 Y=210185.985
 \angle 153° 26' 53.0"

BRIDGE LAYOUT



WORKING POINT SCHEMATIC

TOP OF ROADWAY TO BRIDGE SEAT				
	S. ABUT.	PIER 1	PIER 2	N. ABUT.
SLAB THICKNESS	9"	9"	9"	9"
STOOL HEIGHT	1.875"	2"	1.875"	2"
BEAM HEIGHT	45"	45"	45"	45"
BEARING HEIGHT	4.625"	3.25"	3.25"	4.625"
TOTAL (IN)	60.5"	59.25"	59.125"	60.625"
TOTAL (FT)	5.04'	4.94'	4.93'	5.05'

DIMENSIONS BETWEEN WORKING POINTS																ELEVATIONS			POINT
POINT	STATION	X-COORDINATE	Y-COORDINATE	A	B	C	D	E	F	G	H	J	K	L	M	TOP OF SLAB	TOP OF SLAB TO BR. SEAT	BRIDGE SEAT	
A	432+42.283	550578.000	210016.888		90.15			22.89	113.53				152.97	263.00		909.83	5.04	904.79	WP A
B	433+32.319	550565.203	210106.125			110.60			26.35	136.04		47.54	174.21	233.02		908.17	4.94	903.23	WP B
C	434+42.781	550550.462	210215.740				59.35			28.65	85.67	146.83	62.30	124.93		904.93	4.93	(C)	WP C
D	435+02.055	550542.988	210274.616								29.00		116.19	35.02		902.64	5.05	897.59	WP D
E	432+61.833	550586.921	210037.969						93.13			44.73	131.35						WP E
F	433+54.930	550575.471	210130.387							112.59			42.17	149.52					WP F
G	434+67.511	550561.627	210242.123								59.66			41.01	97.35				WP G
H	435+27.168	550554.292	210301.328												41.01				WP H
J	433+00.150	550604.352	210079.160									90.92				908.17	5.04	903.12	WP J
K	433+91.233	550591.906	210169.224										111.58			905.91	4.94	900.97	WP K
L	435+03.018	550577.609	210279.888											59.66		901.90	4.93	(L)	WP L
M	435+62.681	550570.273	210339.092													899.21	5.05	894.16	WP M

Ⓒ SPAN 2 EL. 900.03
 SPAN 3 EL. 899.97

Ⓓ SPAN 2 EL. 897.00
 SPAN 3 EL. 896.94

ALL DISTANCES ARE ALONG STRAIGHT LINES BETWEEN WORKING POINTS AND ARE GIVEN IN DECIMALS OF A FOOT.
 COORDINATES BASED ON RAMSEY COUNTY COORDINATE SYSTEM.

3535 VAONAI CENTER DRIVE
 ST. PAUL, MN 5510
 PHONE (651) 490-2000
 FAX (651) 490-2150

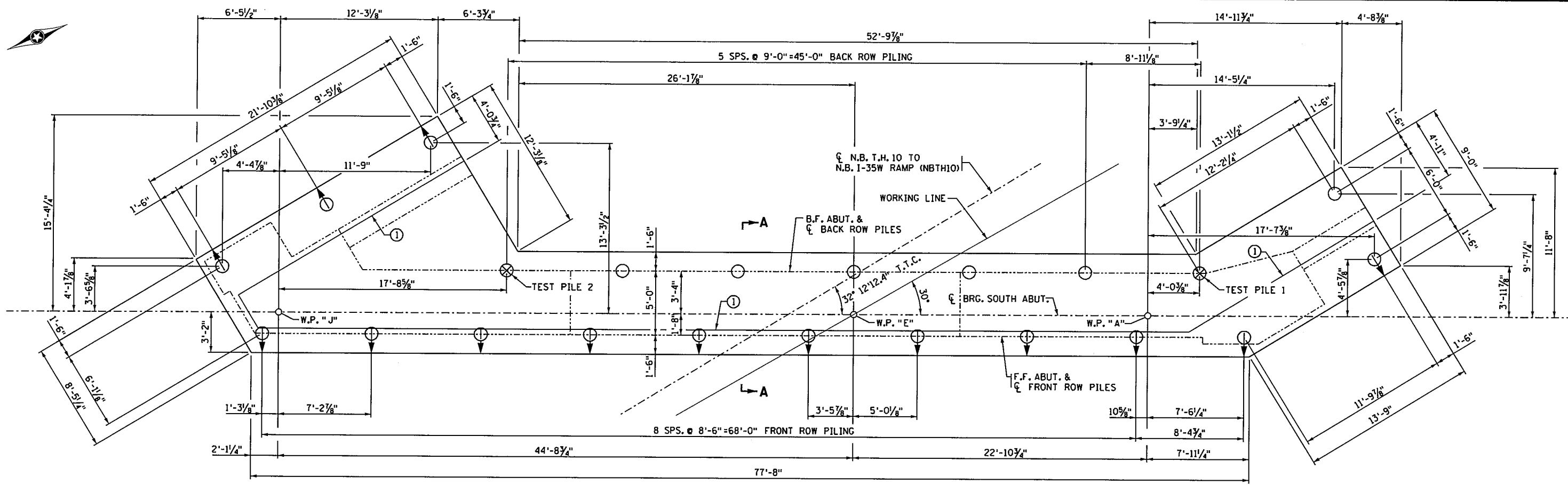
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

BRIDGE LAYOUT

DES: MAW	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: MHD	CHK: MKM		
SHEET NO. D3 OF D66 SHEETS			

11:14:08 AM
12/10/2015
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SOUTHEAST END

SOUTHWEST END

FOOTING PLAN

SOUTH ABUTMENT COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD + EARTH PRESSURE	91.1
FACTORED LIVE LOAD	0
*FACTORED DESIGN LOAD = PILE BEARING RESISTANCE	91.1

*BASED ON STRENGTH III LOAD COMBINATION.

SOUTH ABUTMENT REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R _n - Tons/Pile		
FIELD CONTROL METHOD	φ _{dyn}	*R _n
MnDOT Pile Formula 2012 (MPF12) $R_n = 20 \sqrt{\frac{W \times H}{1000}} \times \log\left(\frac{10}{S}\right)$	0.50	(A) 182.2
PDA	0.65	140.2

*R_n = (Factored Design Load) / φ_{dyn}

PILE NOTES:

2 12" C-I-P CONCRETE TEST PILE 65 FT. LONG
 20 12" C-I-P CONCRETE PILES EST. LENGTH 55 FT.
 22 12" C-I-P CONCRETE PILES REQ'D FOR S. ABUT.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
 FOR PILE SPLICE DETAILS SEE DETAIL B201.
 PILES MARKED THIS TO BE BATTERED 3" PER FOOT IN DIRECTION SHOWN.
 PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
 COMMERCIAL DRIVE-FIT SPLICES WILL NOT BE PERMITTED ON THIS BRIDGE.

(A) NEW MNDOT MPF12 PILE DRIVING FORMULA AND TABLE MUST BE USED FOR THIS BRIDGE. USE OF OLDER FORMULA WILL RESULT IN INADEQUATE PILE CAPACITY.

NOTES:

SEE SHEET D7 FOR SECTION A-A.
 F.F. = FRONT FACE
 B.F. = BACK FACE
 E.F. = EACH FACE
 T&B = TOP AND BOTTOM
 (1) EDGE OF 3" VERTICAL KEY.

SEH
 3535 VADNAIS CENTER DRIVE
 ST PAUL, MN 55110
 PHONE (651) 490-2000
 FAX (651) 490-2150

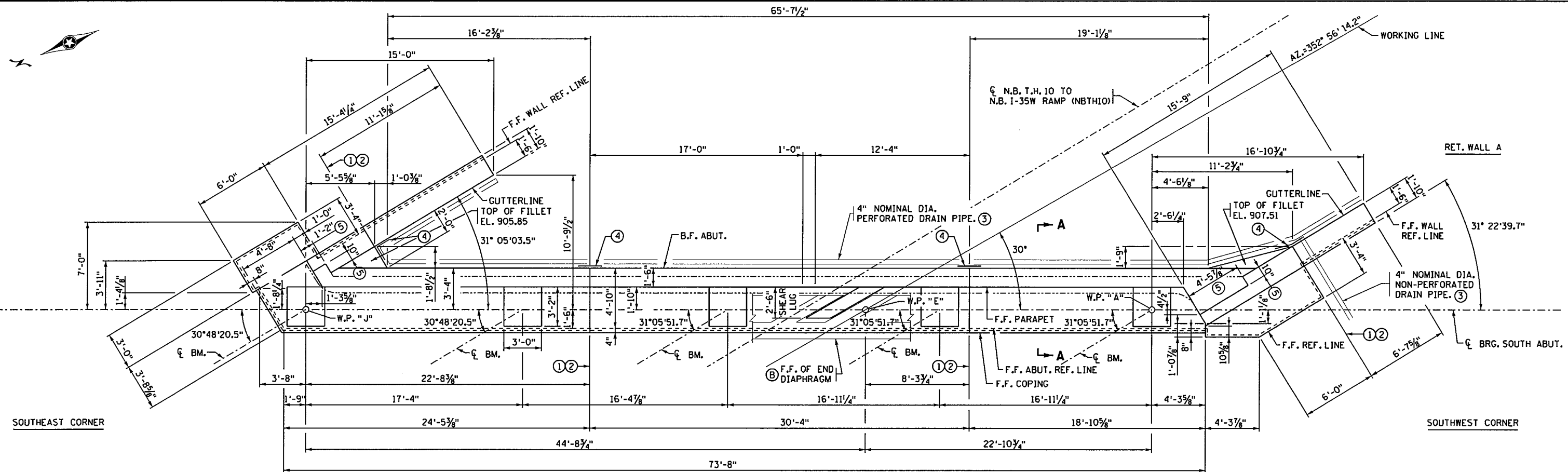
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

SOUTH ABUTMENT DETAILS

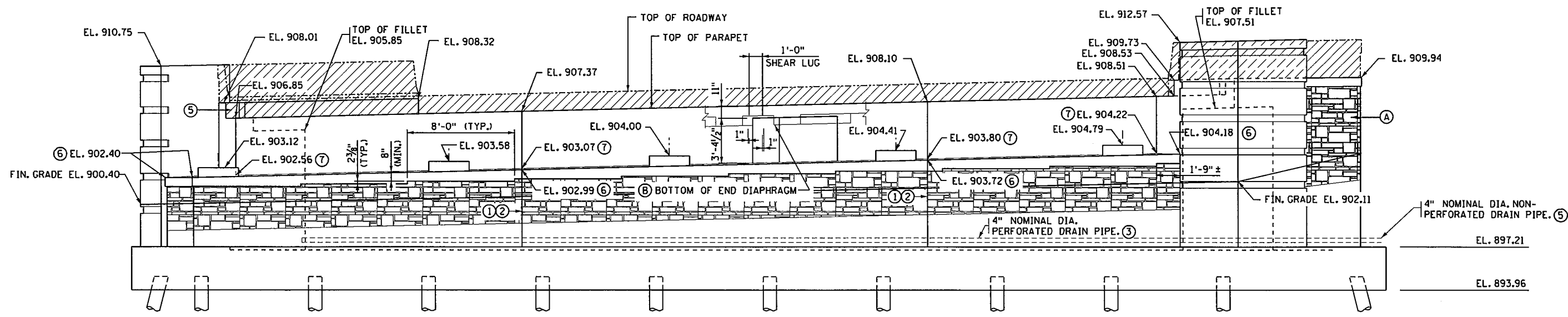
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CHK: NCK	CHK: MKM	
SHEET NO. D4 OF D66 SHEETS		

BRIDGE NO
62937

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SOUTH ABUTMENT PLAN



SOUTH ABUTMENT ELEVATION

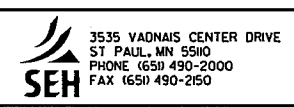
NOTES:

- ① CONSTRUCTION JOINT WITH VERTICAL KEY CENTERED IN WALL. 72 HOUR TIME DELAY REQUIRED BETWEEN ADJACENT POURS TO ALLOW FOR SHRINKAGE.
- ② 2" x 12" KEYWAY IN STEM.
- ③ INCLUDED IN DRAINAGE SYSTEM TYPE B910.
- ④ MEMBRANE WATERPROOFING SYSTEM PER MnDOT SPEC. 2481.3B. PAYMENT SHALL BE CONSIDERED INCIDENTAL.
- ⑤ BLOCKOUT FOR PAVING BLOCK.
- ⑥ ELEVATION IS AT F.F. COPING EDGE.
- ⑦ ELEVATION IS AT F.F. PARAPET (HORIZ. CONSTR. JT.)

- Ⓐ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) & ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.
- Ⓑ END DIAPHRAGM LUGS TO BE CONSTRUCTED AROUND ABUTMENT SHEAR LUG. SEE END DIAPHRAGM DETAILS.

NOTES:

- SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- SEE SHEET D7 FOR SECTION A-A.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE

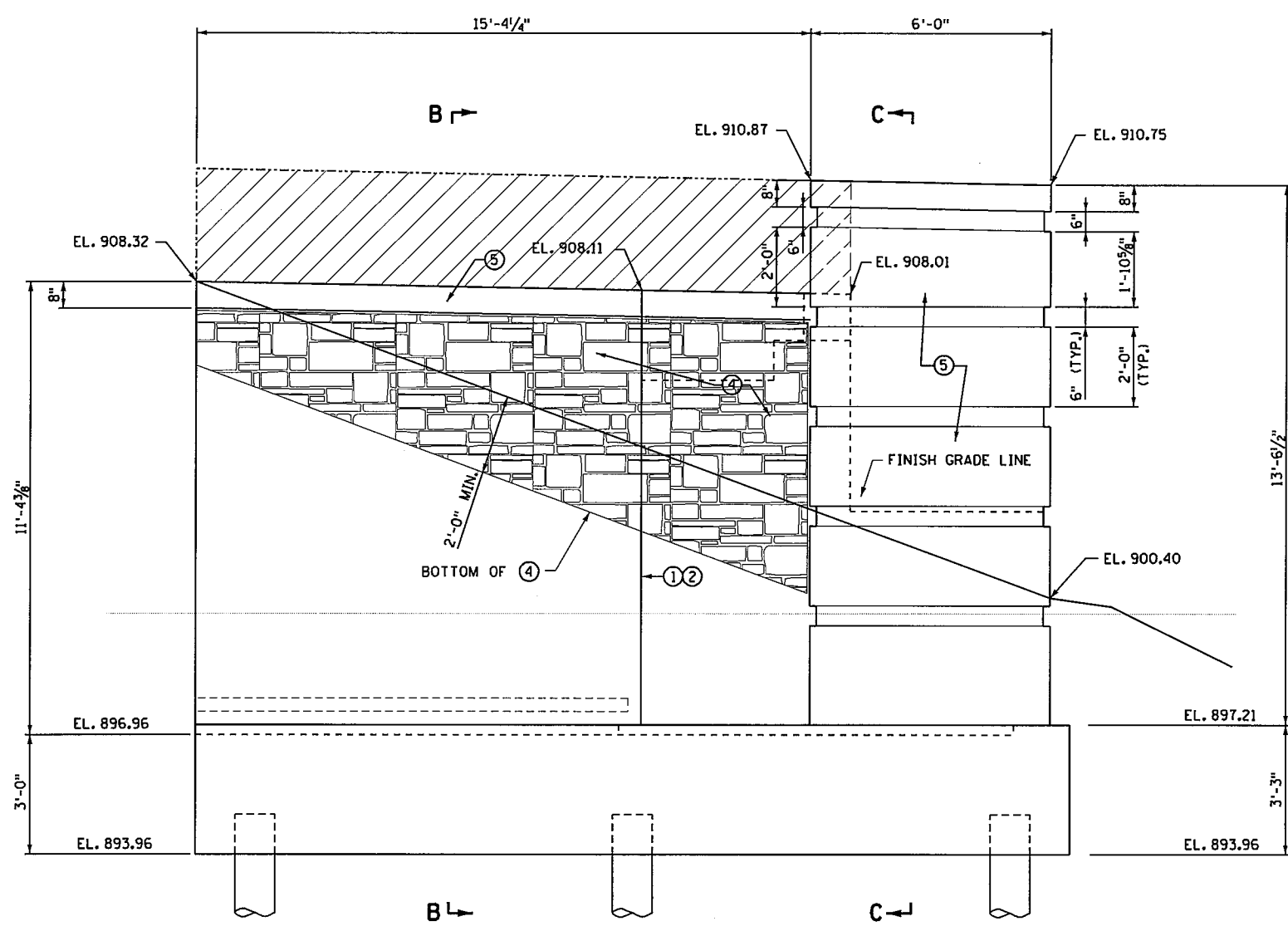


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 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

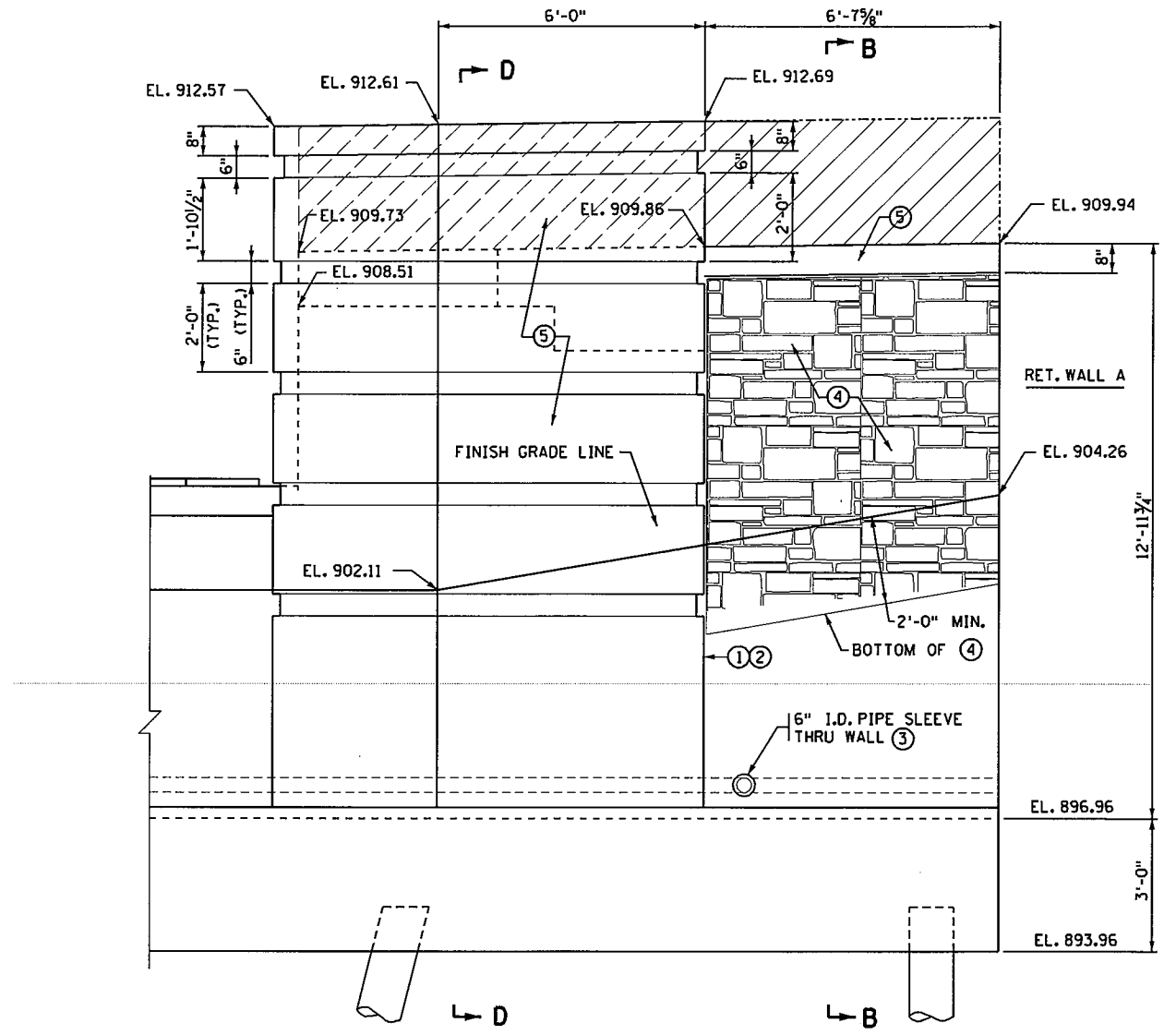
SOUTH ABUTMENT DETAILS

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SOUTHEAST WINGWALL ELEVATION



SOUTHWEST WINGWALL ELEVATION

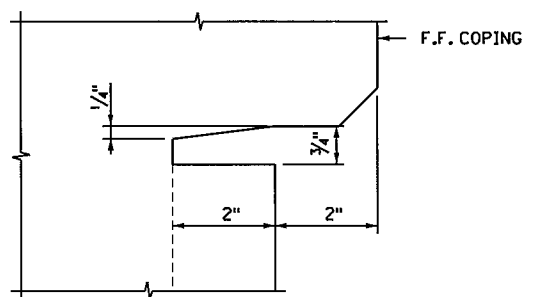
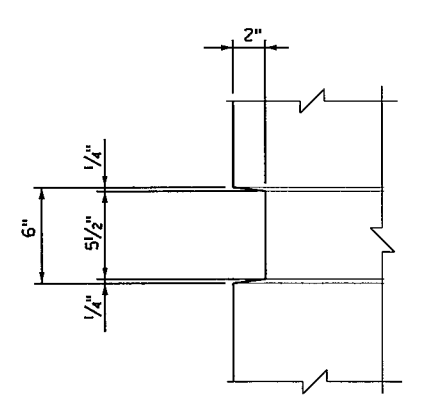
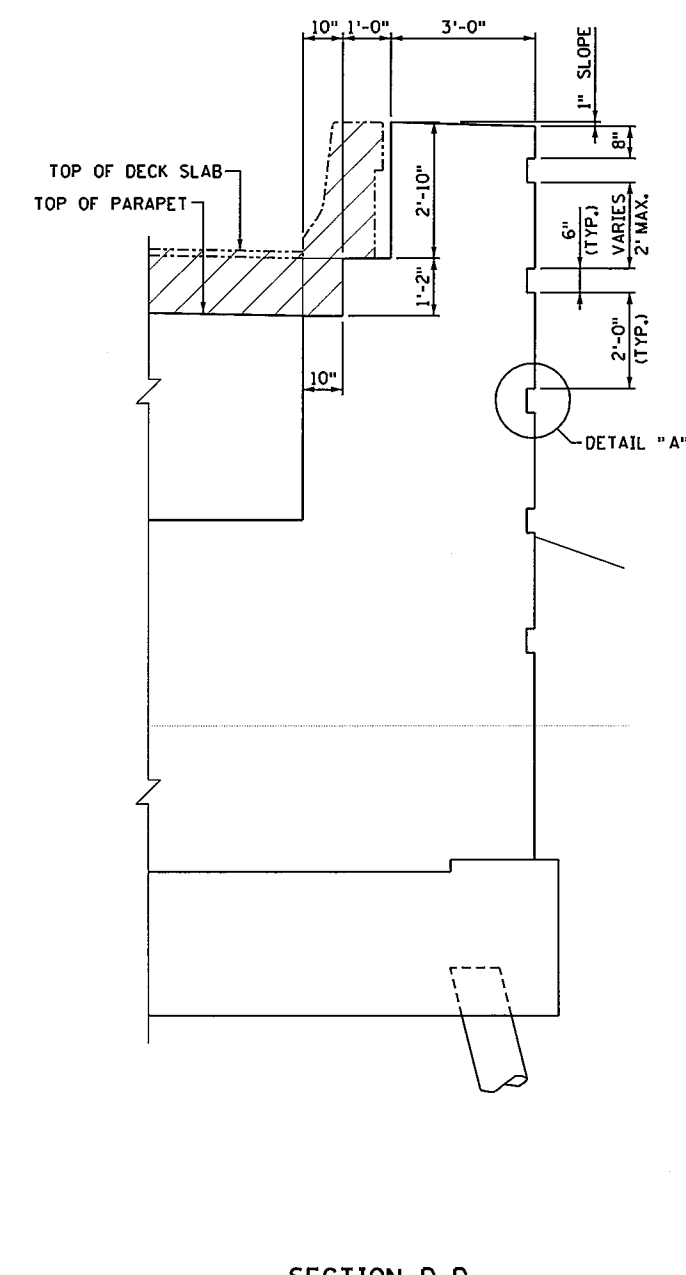
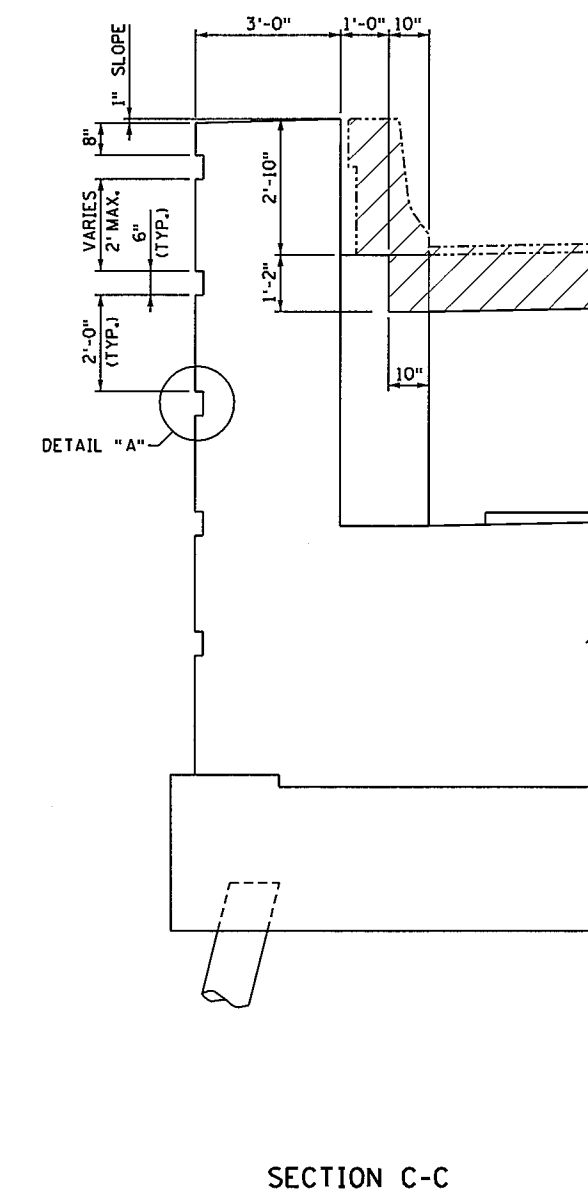
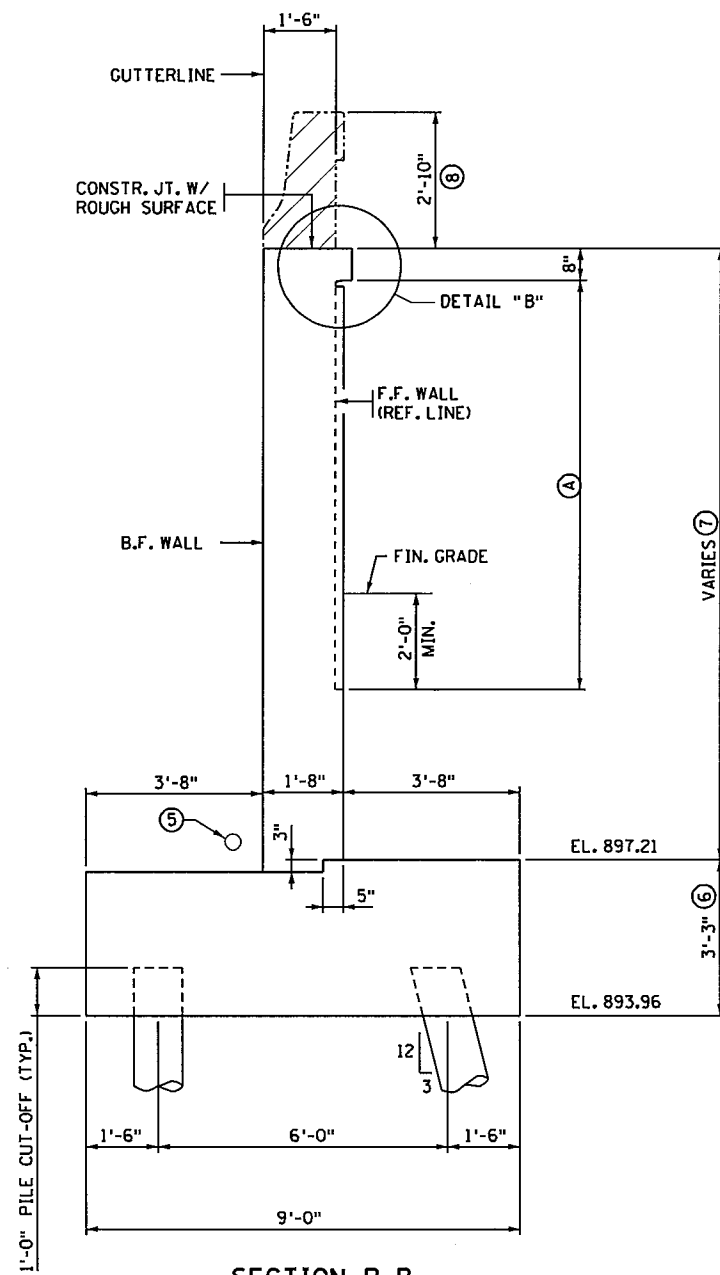
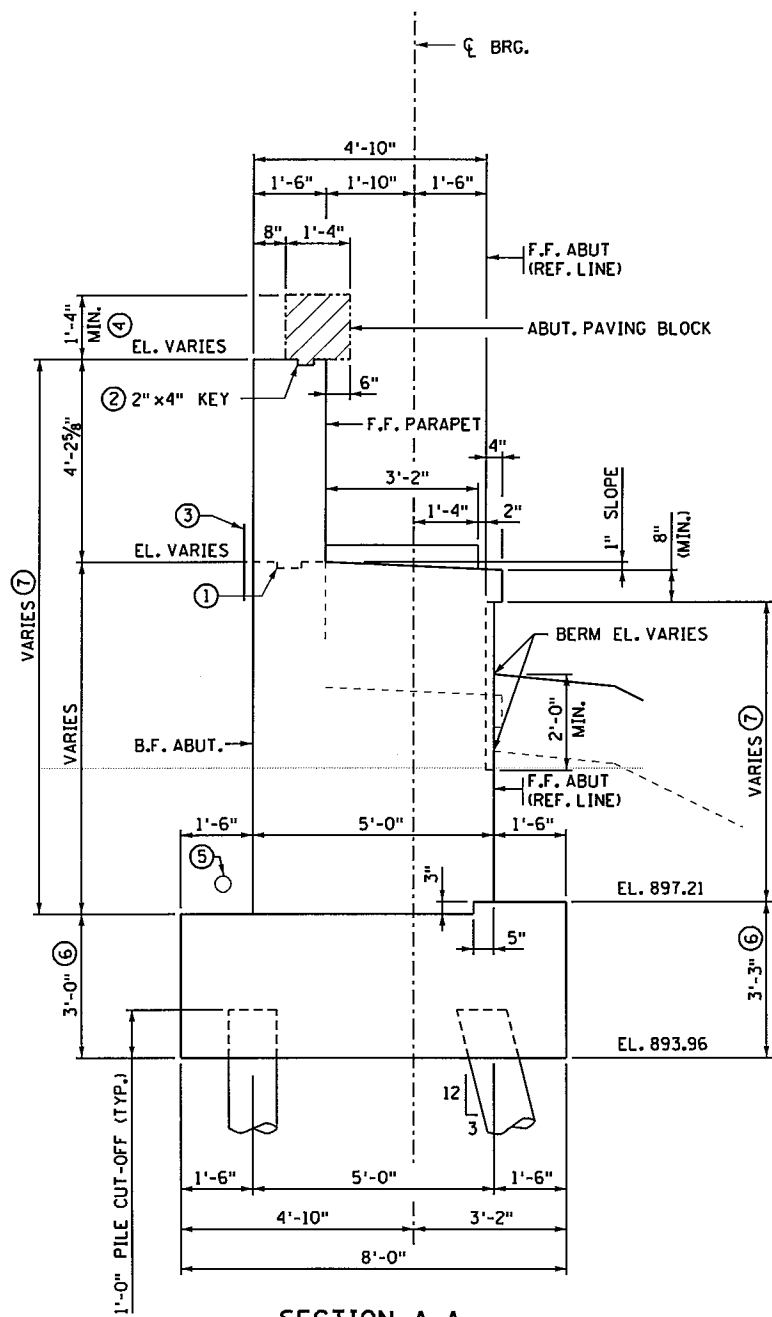
- NOTES:**
- ① CONSTRUCTION JOINT WITH VERTICAL KEY CENTERED IN WALL. 72 HOUR TIME DELAY REQUIRED BETWEEN ADJACENT POURS TO ALLOW FOR SHRINKAGE.
 - ② 2" x 6" KEYWAY IN WALL.
 - ③ INCLUDED IN DRAINAGE SYSTEM TYPE B910.
 - ④ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI COLOR) AND ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.
 - ⑤ SMOOTH FINISH.
- SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
 HATCHED AREA INDICATES THAT PORTION TO BE PLACED WITH THE SUPERSTRUCTURE CONCRETE.
 SEE SHEET D7 FOR SECTION B-B, C-C & D-D.
 F.F. = FRONT FACE
 B.F. = BACK FACE
 E.F. = EACH FACE

3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 55100
 PHONE (651) 490-2000
 FAX (651) 490-2150

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

SOUTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MKM		
SHEET NO. D6 OF D66 SHEETS			



NOTES:

- SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- HATCHED AREA INDICATES THAT PORTION TO BE PLACED WITH THE SUPERSTRUCTURE CONCRETE.
- SEE SHEETS D4 TO D6 FOR SECTION CUT LOCATIONS.
- F.F. = FRONT FACE
B.F. = BACK FACE
E.F. = EACH FACE
- ① PERMISSIBLE CONSTRUCTION JOINT WITH 2x6 KEY CENTERED IN WALL.
- ② CONSTRUCTION JOINT WITH KEYWAY.
- ③ MEMBRANE WATERPROOFING SYSTEM PER MnDOT SPEC. 2481.3B. PAYMENT SHALL BE CONSIDERED INCIDENTAL TO STRUCTURAL CONCRETE (3B52).
- ④ BRIDGE SLAB CONC. (3YHPC-S).

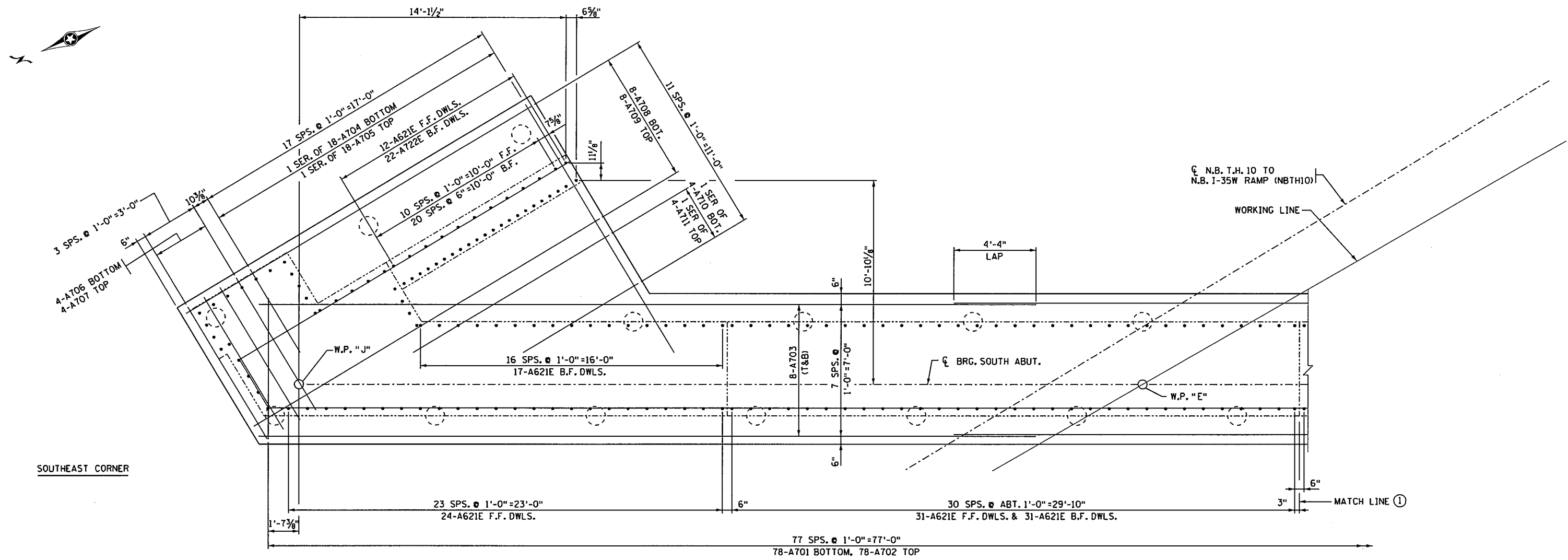
- ⑤ 4" NOMINAL DIA. PERFORATED DRAIN PIPE. INCLUDED IN DRAINAGE SYSTEM TYPE B910.
- ⑥ STRUCTURE CONCRETE (1G52).
- ⑦ STRUCTURE CONCRETE (3B52).
- ⑧ STRUCTURE CONCRETE (3S52). SEE SUPERSTRUCTURE DETAILS.
- Ⓐ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE). ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) AND ANTI-GRAFFITI COATING.

3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

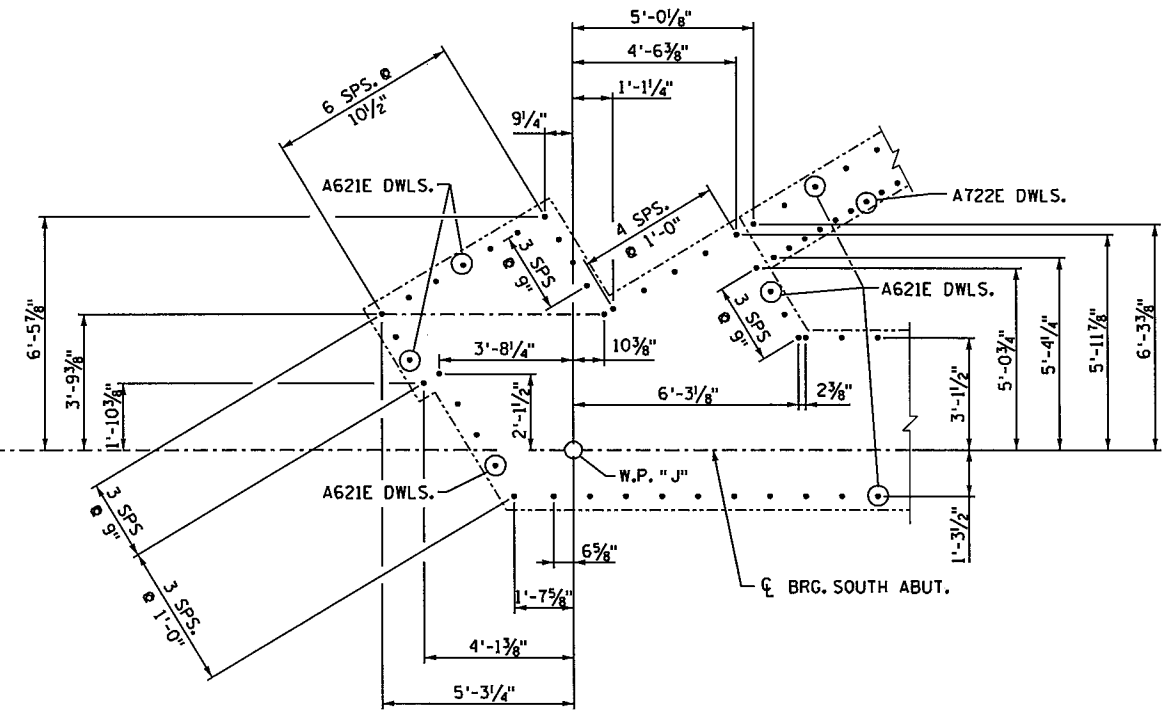
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Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

SOUTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MKM		
SHEET NO. D7 OF D66 SHEETS			



FOOTING REINFORCEMENT PLAN



SOUTHEAST CORNER DETAIL

- NOTES:**
- ① SEE SHEET D9.
 - SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
 - F.F. = FRONT FACE
 - B.F. = BACK FACE
 - E.F. = EACH FACE
 - T&B = TOP AND BOTTOM

3535 VADNAIS CENTER DRIVE
ST PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

SEH

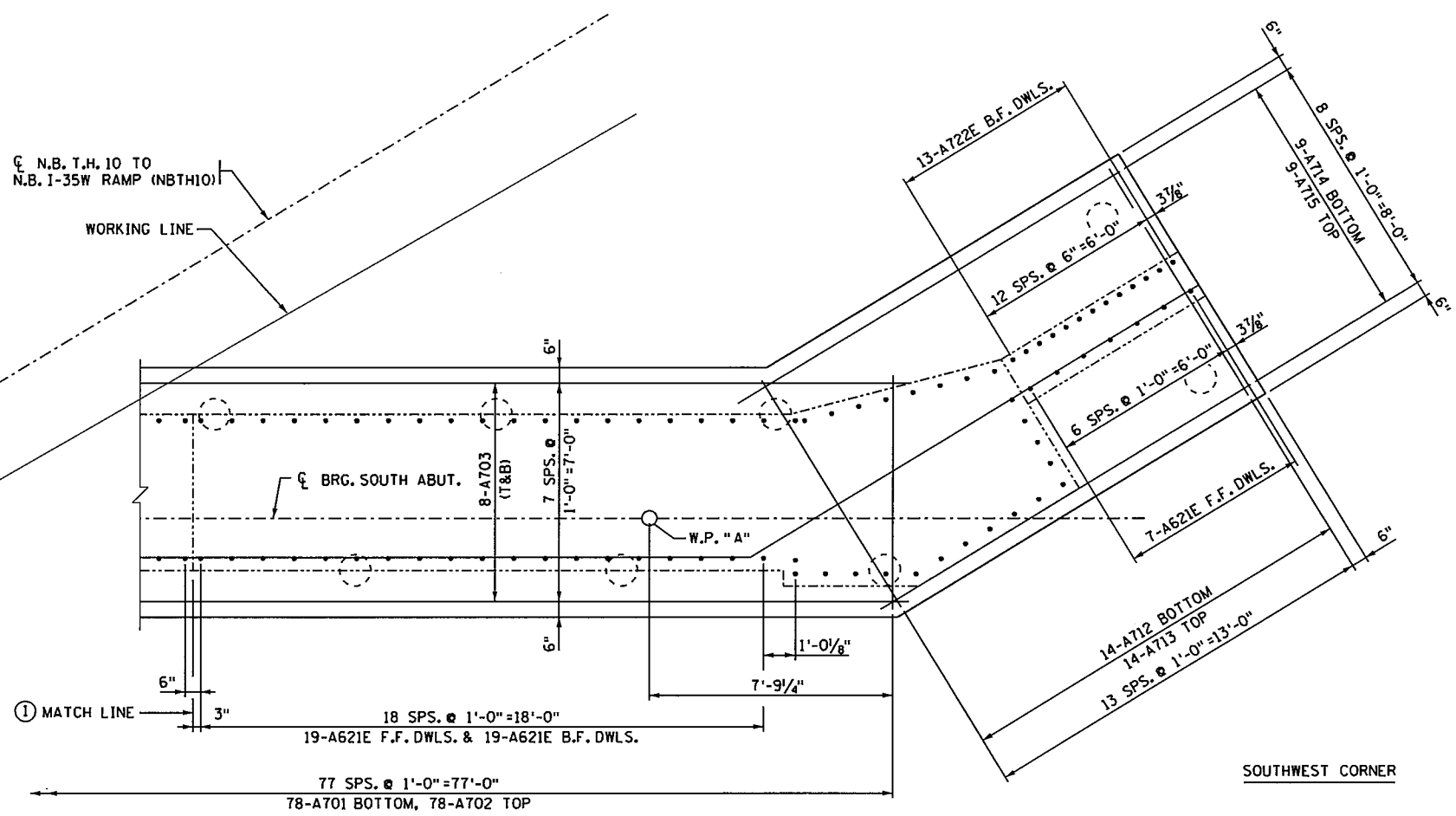
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

SOUTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62937
CHK: NCK	CHK: MKM	12/14/15	
SHEET NO. D8 OF D66 SHEETS			

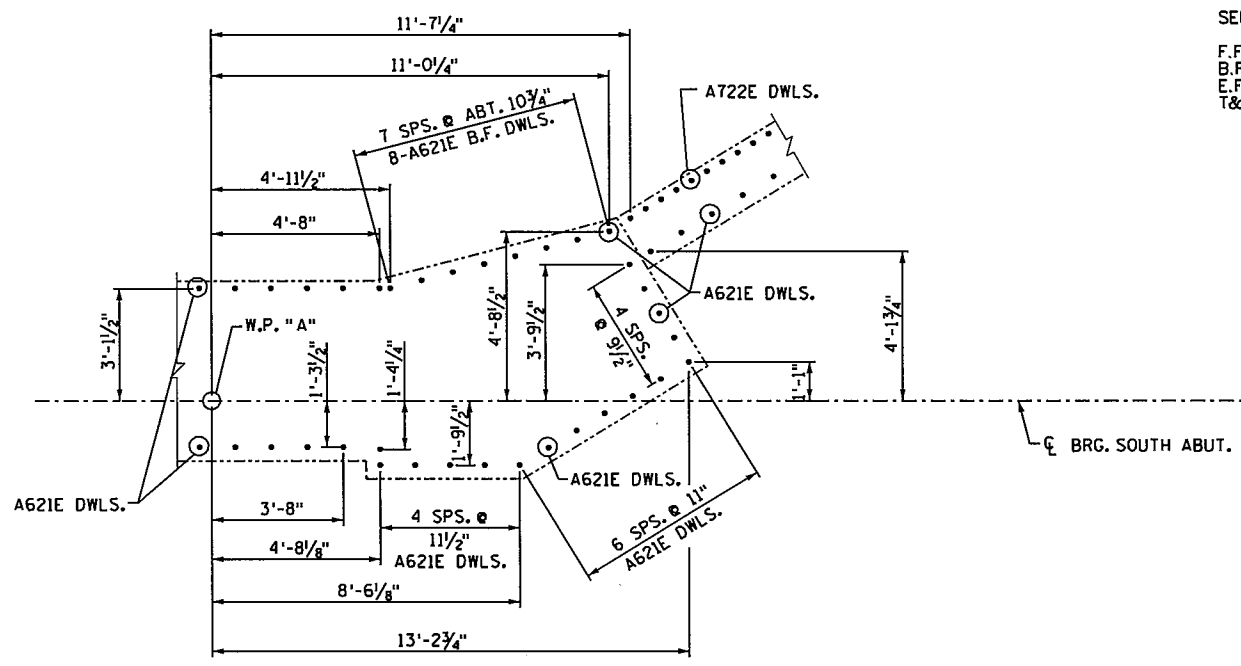
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12/10/2015
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FOOTING REINFORCEMENT PLAN

NOTES:

- ① SEE SHEET D8.
- SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM



SOUTHWEST CORNER DETAIL

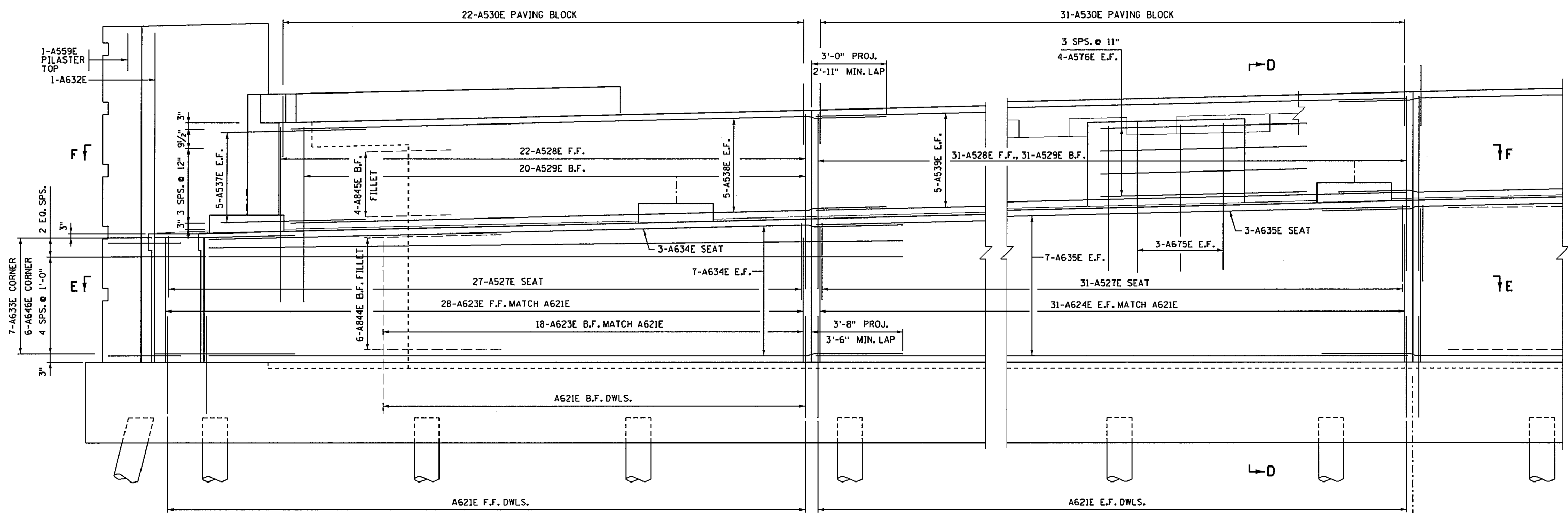
SEH
3535 VADNAIS CENTER DRIVE
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (651) 490-2150

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

SOUTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62937
CHK: NCK	CHK: MKM	12/14/15	
SHEET NO. D9 OF D66 SHEETS			

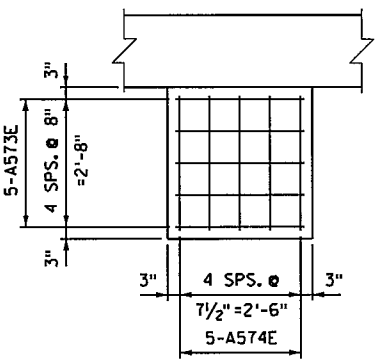
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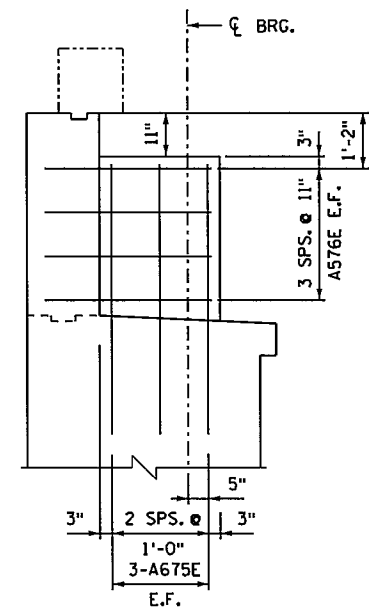
SOUTHEAST CORNER

MATCH LINE ①

PARTIAL REINFORCEMENT ELEVATION



TYP. BEARING SEAT



SHEAR LUG DETAIL

NOTES:

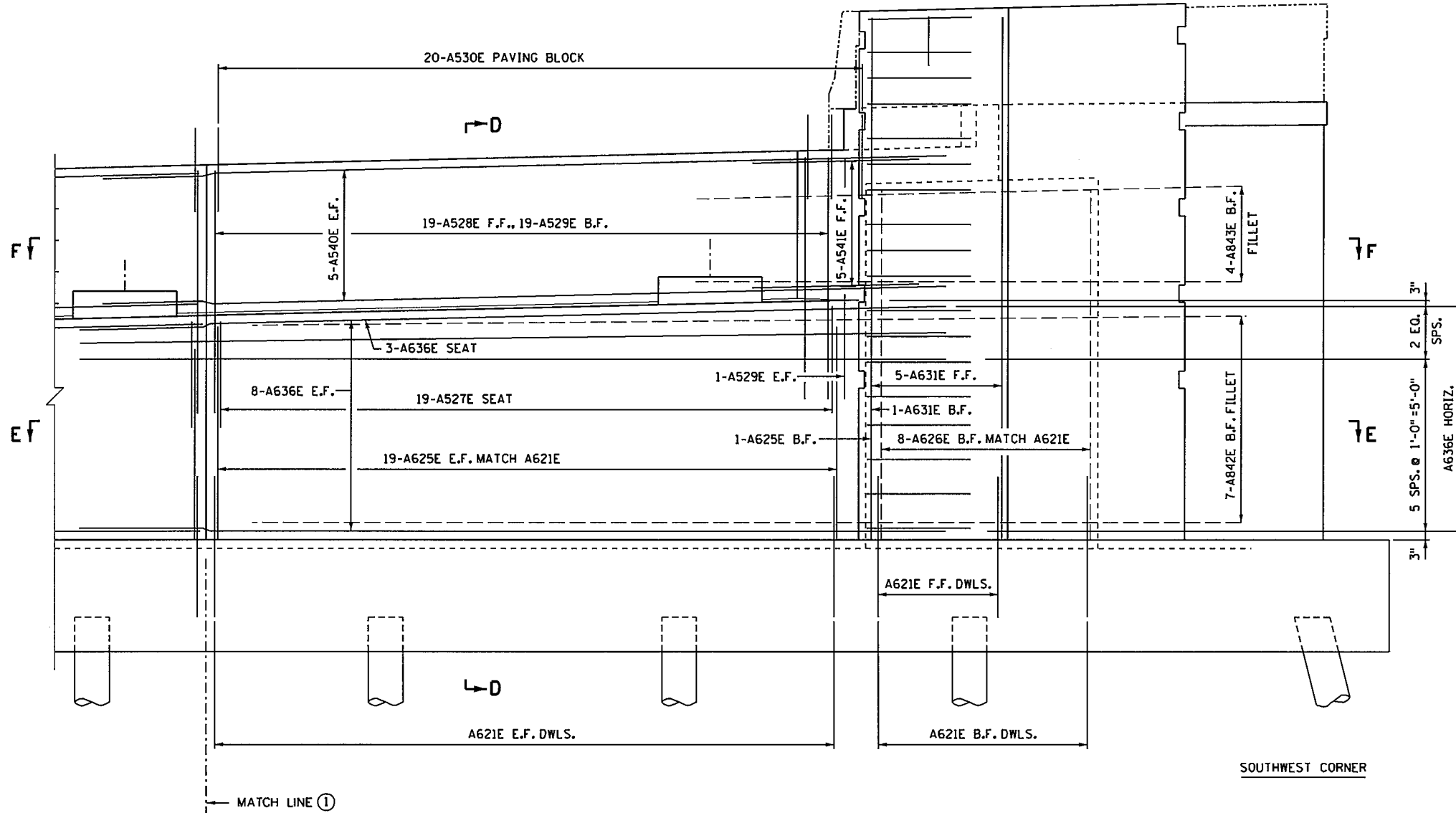
- SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- SEE SHEET D11 FOR SECTION D-D.
- SEE SHEET D13 FOR SECTIONS E-E & F-F.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM
- ① SEE SHEET D11.

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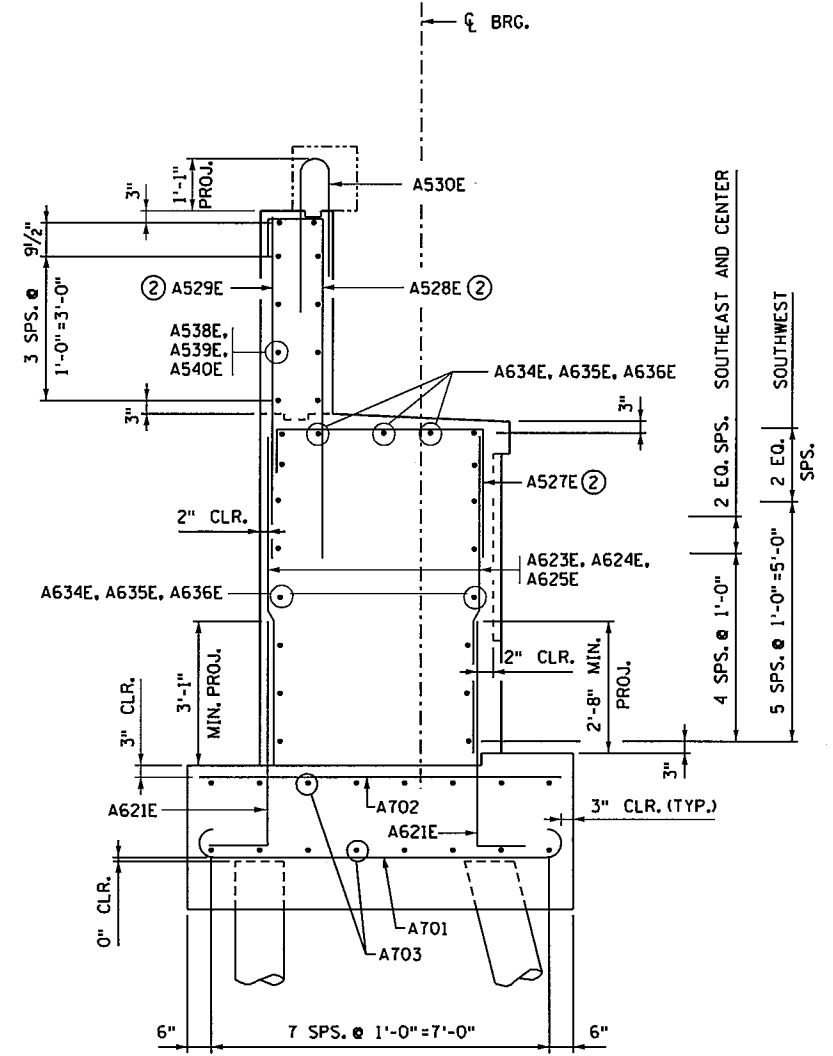
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SOUTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MKM		
SHEET NO. D10 OF D66 SHEETS			



PARTIAL REINFORCEMENT ELEVATION



SECTION D-D

NOTES:

- SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- SEE SHEET D13 FOR SECTIONS E-E & F-F.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM
- ① SEE SHEET D10.
- ② PULL UP TO 2" CLR.

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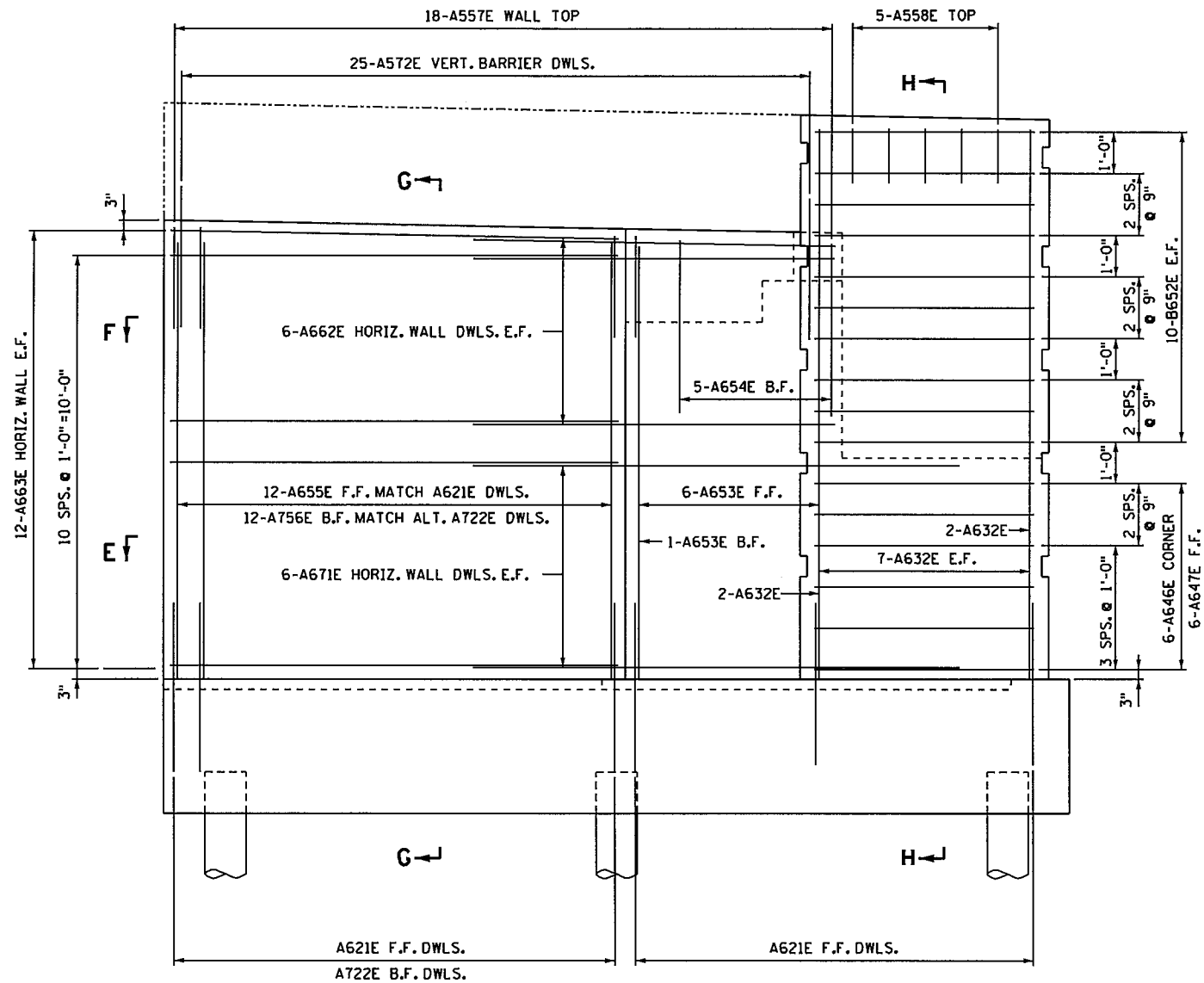
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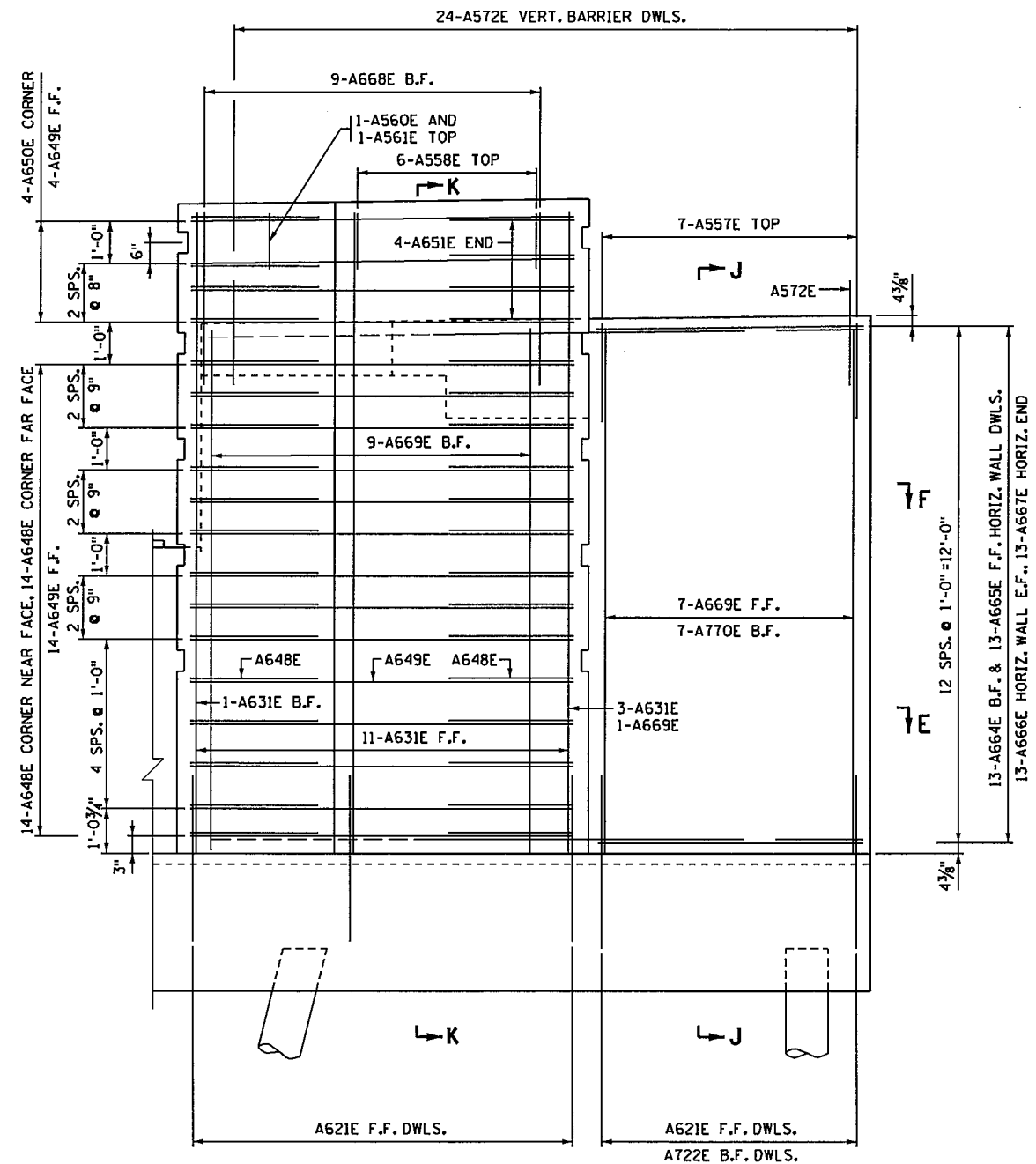
BRIDGE NO
62937

SHEET NO. D11 OF D66 SHEETS

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SOUTHEAST WINGWALL REINFORCEMENT



SOUTHWEST WINGWALL REINFORCEMENT

NOTES:
 SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
 SEE SHEET D13 FOR SECTIONS E-E & F-F.
 F.F. = FRONT FACE
 B.F. = BACK FACE
 E.F. = EACH FACE
 T&B = TOP AND BOTTOM
 ① SEE SHEET D10.

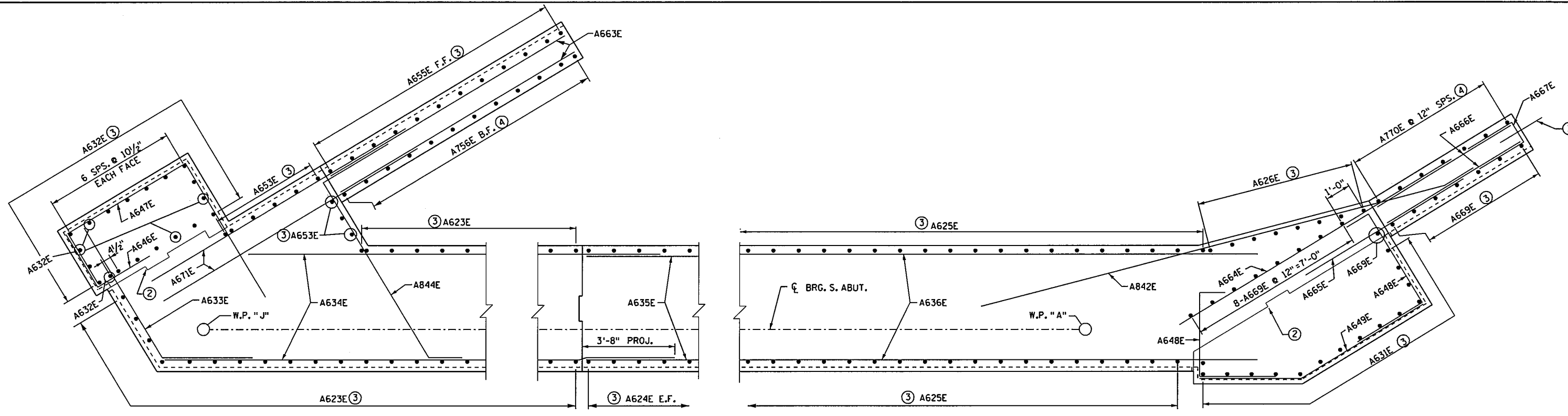
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SEH

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SOUTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:
CHK: NCK	CHK: MKM	12/14/15
SHEET NO.D12 OF D66 SHEETS		

BRIDGE NO
62937



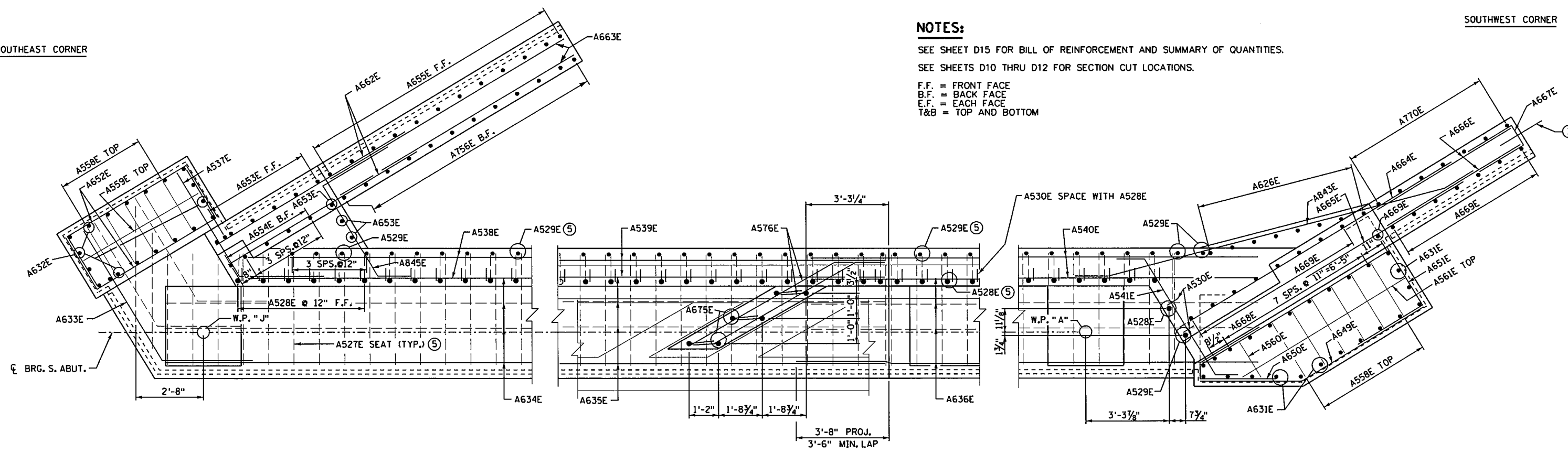
SECTION E-E

SOUTHEAST CORNER

SOUTHWEST CORNER

NOTES:

SEE SHEET D15 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
SEE SHEETS D10 THRU D12 FOR SECTION CUT LOCATIONS.
F.F. = FRONT FACE
B.F. = BACK FACE
E.F. = EACH FACE
T&B = TOP AND BOTTOM



SECTION F-F

NOTES:

- ① DOWEL BAR ASSEMBLY INCLUDED WITH RETAINING WALLS. SEE ROADWAY PLANS.
- ② PERMISSIBLE CONSTRUCTION JOINT WITH 2x12 KEYWAY.
- ③ MATCH A621E DOWELS.
- ④ MATCH A722E DOWELS.
- ⑤ MATCH A623E, A624E, A625E VERTICAL BARS.

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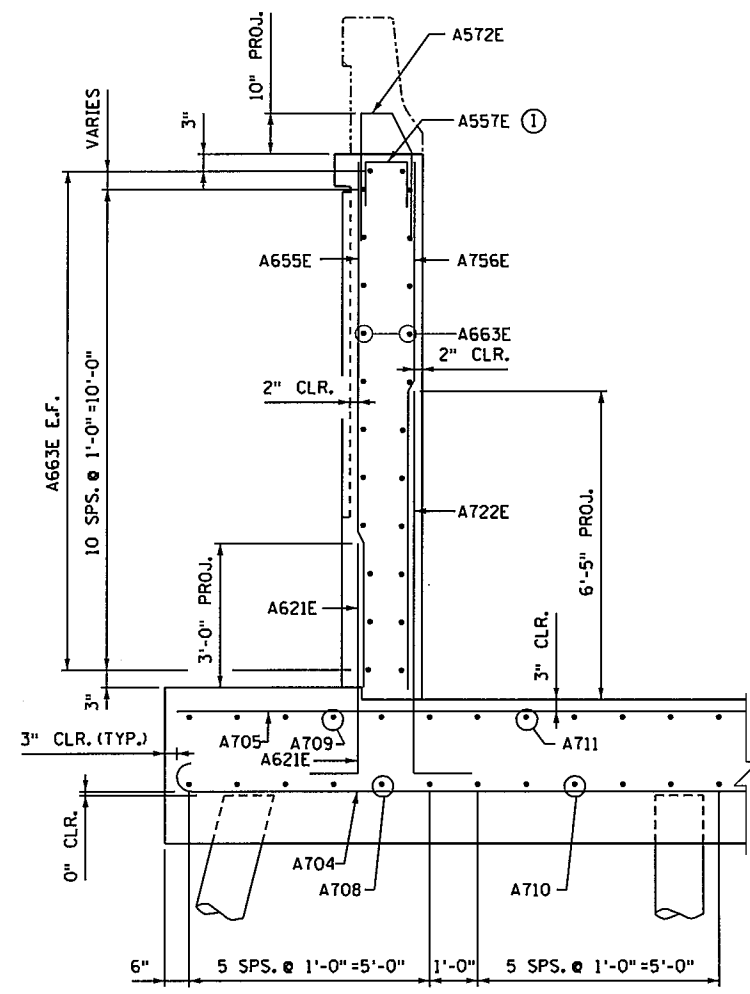
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Printed Name: MICHAEL J. DUPONT Lic. No. 43375

SOUTH ABUTMENT DETAILS

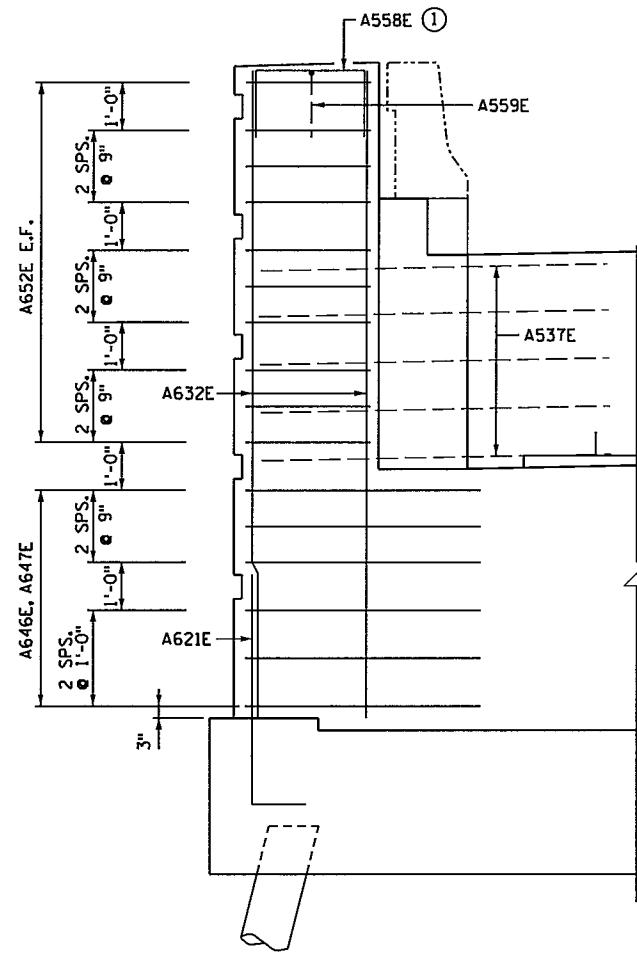
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CHK: NCK	CHK: MKM	12/14/15
SHEET NO. D13 OF D66 SHEETS		

BRIDGE NO
62937

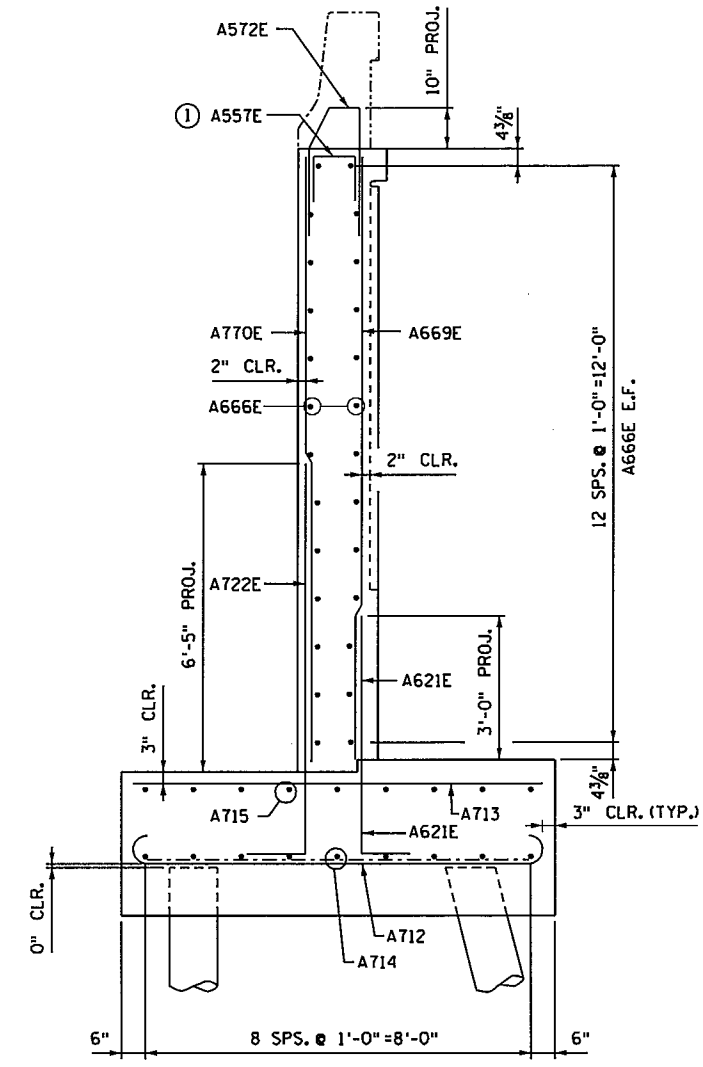
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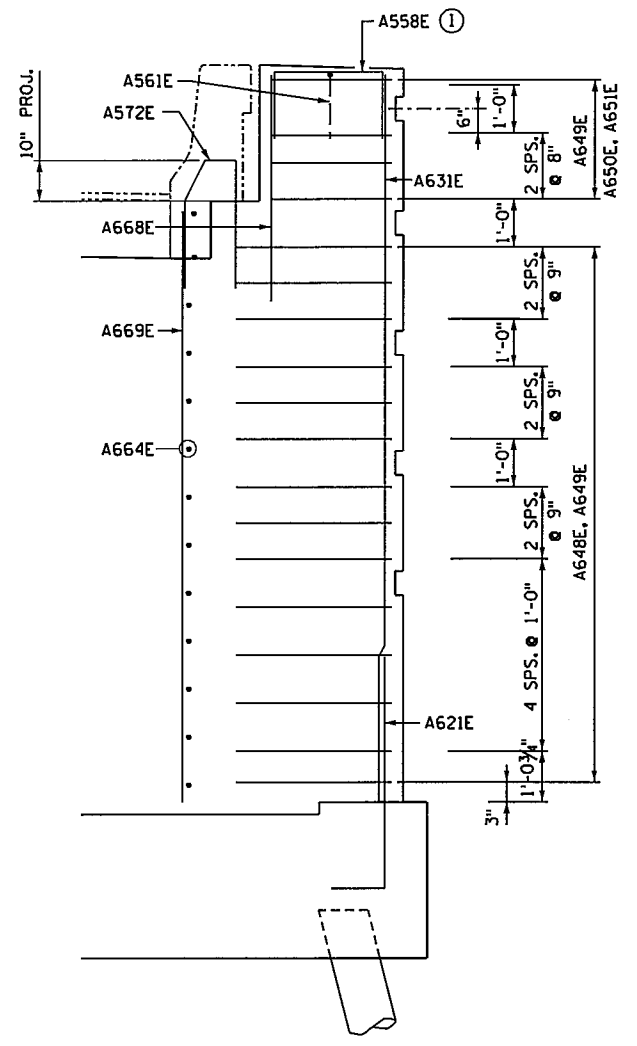
SECTION G-G



SECTION H-H



SECTION J-J



SECTION K-K

- NOTES:**
- ① PULL UP TO 2" CLEAR.
 - SEE SHEET D15 FOR BAR LIST AND SUMMARY OF QUANTITIES.
 - SEE SHEETS D10 THRU D12 FOR SECTION CUT LOCATIONS.

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 Printed Name: MICHAEL H DUPONT Lic. No. 43375

SOUTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MKM		
SHEET NO. D14 OF D66 SHEETS			

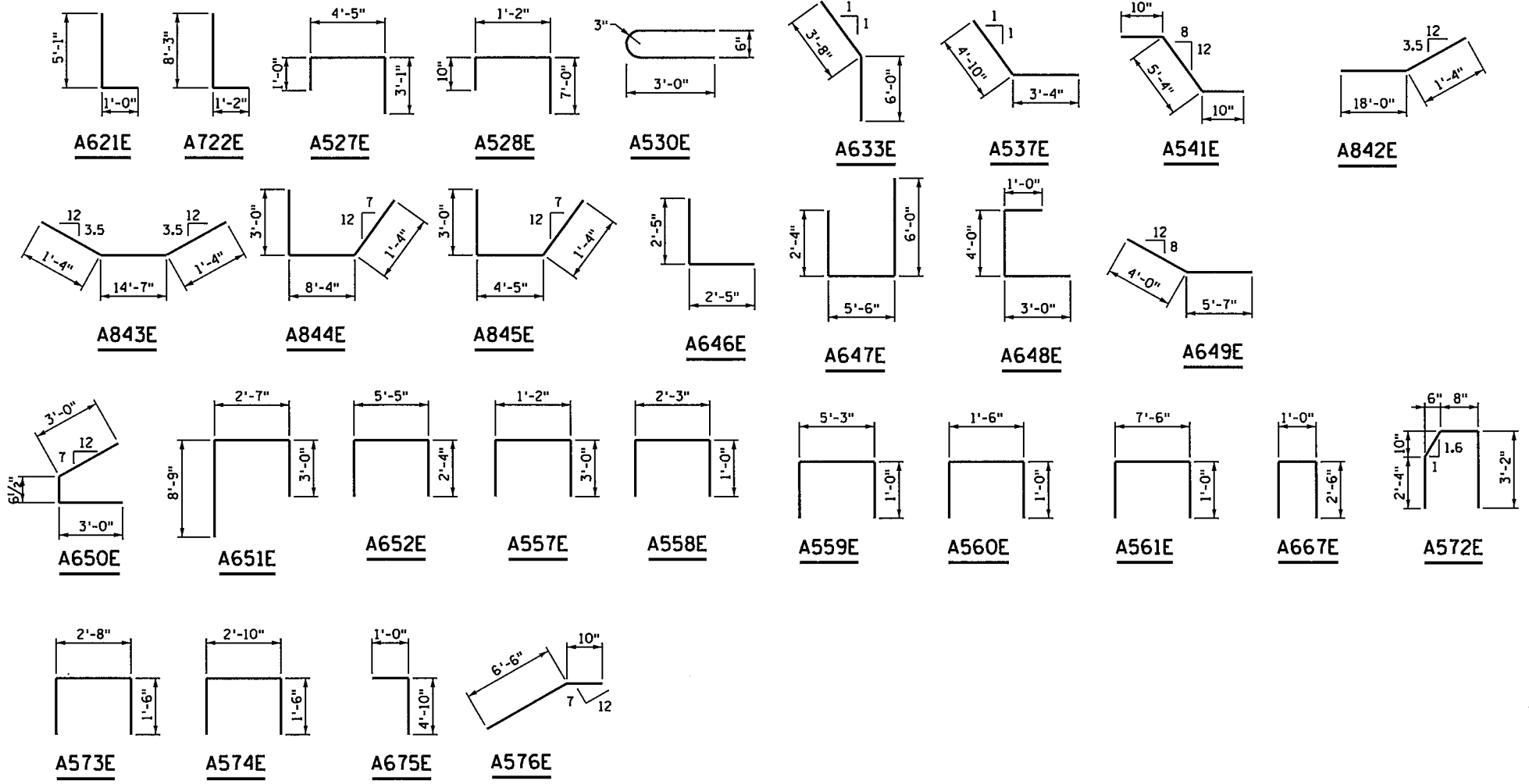
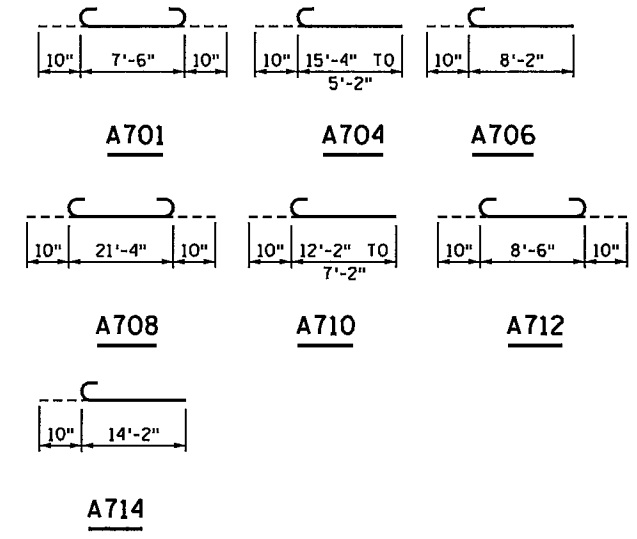
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BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
SOUTH ABUTMENT				
EPOXY COATED BARS				
A621E	213	6'-1"	BENT	VERT. DWLS.
A722E	35	9'-5"	BENT	VERT. DWLS.
A623E	46	5'-0"	STR	VERT. ABUT.
A624E	62	5'-6"	STR	VERT. ABUT.
A625E	39	6'-2"	STR	VERT. ABUT.
A626E	8	10'-2"	STR	VERT. ABUT. FILLET
A527E	77	8'-6"	BENT	ABUT. SEAT
A528E	72	9'-0"	BENT	PARAPET VERT. F.F.
A529E	74	7'-0"	STR	PARAPET VERT. B.F.
A530E	72	6'-0"	BENT	PAVING BLOCK
A631E	15	14'-11"	STR	PILASTER VERT. S.W.
A632E	18	13'-1"	STR	PILASTER VERT. S.E.
A633E	7	9'-8"	BENT	PILASTER HORIZ. S.E.
A634E	17	27'-11"	STR	HORIZ. ABUT.
A635E	17	30'-0"	STR	HORIZ. ABUT.
A636E	19	25'-0"	STR	HORIZ. ABUT.
A537E	5	8'-2"	STR	HORIZ. PARAPET END S.E.
A538E	10	24'-0"	STR	HORIZ. PARAPET
A539E	10	30'-0"	STR	HORIZ. PARAPET
A540E	10	24'-6"	STR	HORIZ. PARAPET
A541E	5	7'-0"	BENT	HORIZ. PARAPET S.W.
A842E	7	19'-4"	BENT	HORIZ. FILLET S.W.
A843E	4	17'-3"	BENT	HORIZ. FILLET S.W.
A844E	6	12'-8"	BENT	HORIZ. FILLET S.E.
A845E	4	8'-9"	BENT	HORIZ. FILLET S.E.
A646E	6	4'-10"	BENT	HORIZ. PILASTER S.E.
A647E	6	13'-10"	BENT	HORIZ. PILASTER S.E.
A648E	28	8'-0"	BENT	HORIZ. PILASTER S.W.
A649E	18	9'-7"	BENT	HORIZ. PILASTER S.W.
A650E	4	6'-7"	BENT	HORIZ. PILASTER S.W.
A651E	4	14'-4"	BENT	HORIZ. PILASTER S.W.
A652E	20	10'-1"	BENT	HORIZ. PILASTER S.E.
A653E	9	10'-5"	STR	VERT. WINGWALL F.F. S.E.
A654E	5	4'-0"	STR	VERT. WINGWALL B.F. S.E.
A655E	12	10'-7"	STR	VERT. WINGWALL F.F. S.E.
A756E	12	10'-7"	STR	VERT. WINGWALL B.F. S.E.
A557E	25	7'-2"	BENT	WALL TOP
A558E	11	4'-3"	BENT	PILASTER TOP
A559E	1	7'-3"	BENT	PILASTER TOP S.E.
A560E	1	3'-6"	BENT	PILASTER TOP S.W.
A561E	1	9'-6"	BENT	PILASTER TOP S.W.
A662E	12	8'-8"	STR	WINGWALL HORIZ. S.E.
A663E	24	10'-7"	STR	WINGWALL HORIZ. S.E.
A664E	13	12'-8"	STR	WINGWALL HORIZ. S.W.
A665E	13	7'-4"	STR	WINGWALL HORIZ. S.W.
A666E	26	6'-2"	STR	WINGWALL HORIZ. S.W.
A667E	13	6'-0"	BENT	WINGWALL END S.W.
A668E	9	4'-0"	STR	VERT. PILASTER S.W.
A669E	16	12'-4"	STR	VERT. WINGWALL F.F. & PILASTER S.W.
A770E	7	12'-4"	STR	VERT. WINGWALL B.F. S.W.
A671E	12	11'-9"	STR	WINGWALL HORIZ. S.E.
A572E	49	7'-2"	BENT	VERT. BARRIER DWLS.
A573E	25	5'-8"	BENT	BEARING SEAT
A574E	25	5'-10"	BENT	BEARING SEAT
A675E	6	5'-10"	STR	SHEAR LUG
A576E	8	4'-4"	BENT	SHEAR LUG

BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
SOUTH ABUTMENT				
BLACK BARS				
A701	78	9'-2"	BENT	FOOTING TRANSVERSE BOTTOM
A702	78	7'-6"	STR	FOOTING TRANSVERSE TOP
A703	32	41'-4"	STR	FOOTING LONGITUDINAL T&B
A704	1 SERIES	16'-2" TO	BENT	FOOTING TRANSVERSE BOTTOM
	OF 18	6'-0"		
A705	1 SERIES	15'-4" TO	STR	FOOTING TRANSVERSE TOP
	OF 18	5'-2"		
A706	4	9'-0"	BENT	FOOTING TRANSVERSE BOTTOM
A707	4	8'-2"	STR	FOOTING TRANSVERSE TOP
A708	8	23'-0"	BENT	FOOTING LONGITUDINAL BOTTOM
A709	8	21'-4"	STR	FOOTING LONGITUDINAL TOP
A710	1 SERIES	13'-0" TO	BENT	FOOTING LONGITUDINAL BOTTOM
	OF 4	8'-0"		
A711	1 SERIES	12'-2" TO	STR	FOOTING LONGITUDINAL TOP
	OF 4	7'-2"		
A712	14	10'-2"	BENT	FOOTING TRANSVERSE BOTTOM
A713	14	8'-6"	STR	FOOTING TRANSVERSE TOP
A714	9	15'-0"	BENT	FOOTING LONGITUDINAL BOTTOM
A715	9	14'-2"	STR	FOOTING LONGITUDINAL TOP

* BAR USES STANDARD STIRRUP AND TIE HOOKS.

NOTE:
BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT.



SUMMARY OF QUANTITIES FOR SOUTH ABUTMENT		
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (1G52)	CU YD	100
STRUCTURAL CONCRETE (3B52)	CU YD	156
REINFORCEMENT BARS	POUND	8250
REINFORCEMENT BARS (EPOXY COATED)	POUND	15880
ANTI-GRAFFITI COATING	SQ FT	364
ARCH. CONC. TEXTURE (ASHLAR STONE)	SQ FT	364
ARCH. SURFACE FINISH (MULTI COLOR)	SQ FT	364
C-I-P CONCRETE PILING DELIVERED 12"	LIN FT	1100
C-I-P CONCRETE PILING DRIVEN 12"	LIN FT	1100
C-I-P CONC TEST PILE 65 FT LONG 12"	EACH	2
PILE REDRIVING	EACH	2
PILE ANALYSIS	EACH	2

- ① DOES NOT INCLUDE TEST PILES.
- ② CONCRETE QUANTITY INCLUDES PORTIONS OF STRUCTURE THAT MUST ADHERE TO MASS CONCRETE PROVISIONS. SEE SPECIAL PROVISIONS. TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS.

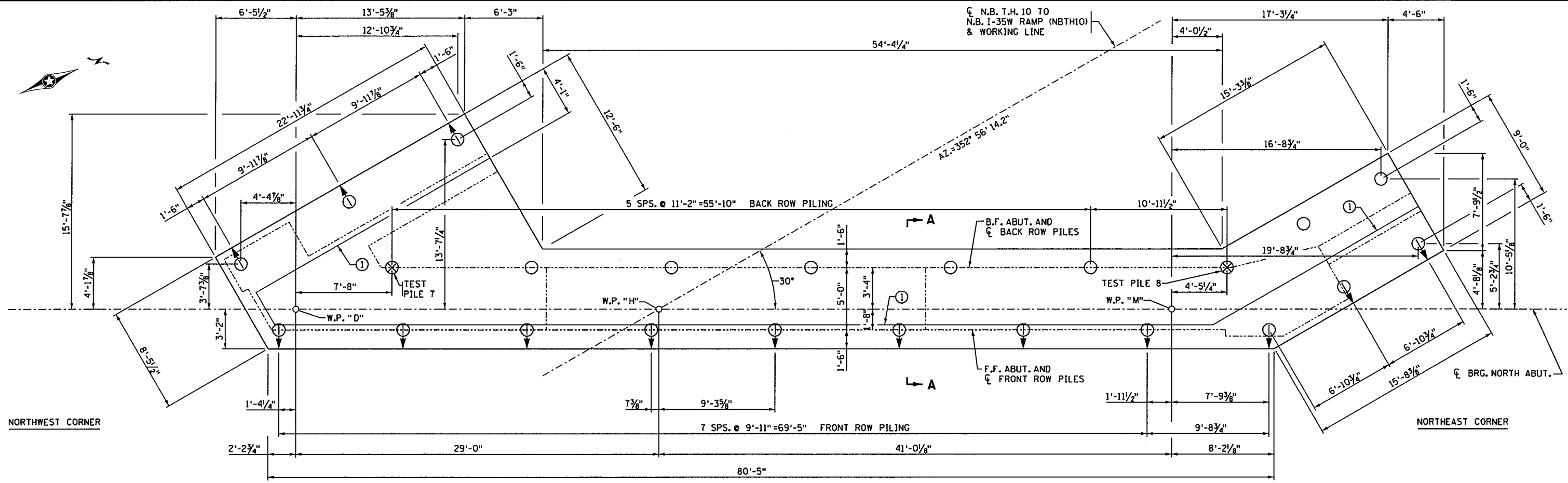
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SOUTH ABUTMENT BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES

DES: MHD DR: MAW APPROVED: 12/14/15
CHK: NCK CHK: MKM
SHEET NO. D15 OF D66 SHEETS BRIDGE NO 62937

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FOOTING PLAN

NORTH ABUTMENT COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD + EARTH PRESSURE	79.5
FACTORED LIVE LOAD	14.7
*FACTORED DESIGN LOAD = PILE BEARING RESISTANCE	94.2

*BASED ON STRENGTH I LOAD COMBINATION.

NORTH ABUTMENT REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R _n - Tons/Pile		
FIELD CONTROL METHOD	φ _{dyn}	*R _n
MnDOT Pile Formula 2012 (MPF12) R _n = 20 √(WxH/1000) x log(10/S)	0.50	(A) 188.4
PDA	0.65	144.9

*R_n = (Factored Design Load) / φ_{dyn}

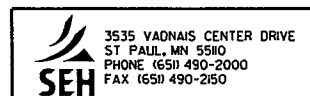
PILE NOTES:

2 12" C-I-P CONCRETE TEST PILE 65 FT. LONG
 21 12" C-I-P CONCRETE PILES EST. LENGTH 55 FT.
 23 12" C-I-P CONCRETE PILES REQ'D FOR N. ABUT.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
 FOR PILE SPLICE DETAILS SEE DETAIL B201.
 PILES MARKED THIS ○ TO BE BATTERED 3" PER FOOT IN DIRECTION SHOWN.
 PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
 COMMERCIAL DRIVE-FIT SPLICES WILL NOT BE PERMITTED ON THIS BRIDGE.

(A) NEW MNDOT MPF12 PILE DRIVING FORMULA AND TABLE MUST BE USED FOR THIS BRIDGE. USE OF OLDER FORMULA WILL RESULT IN INADEQUATE PILE CAPACITY.

NOTES:

SEE SHEET D19 FOR SECTION A-A.
 F.F. = FRONT FACE
 B.F. = BACK FACE
 E.F. = EACH FACE
 T&B = TOP AND BOTTOM
 (1) EDGE OF 3" VERTICAL KEY.

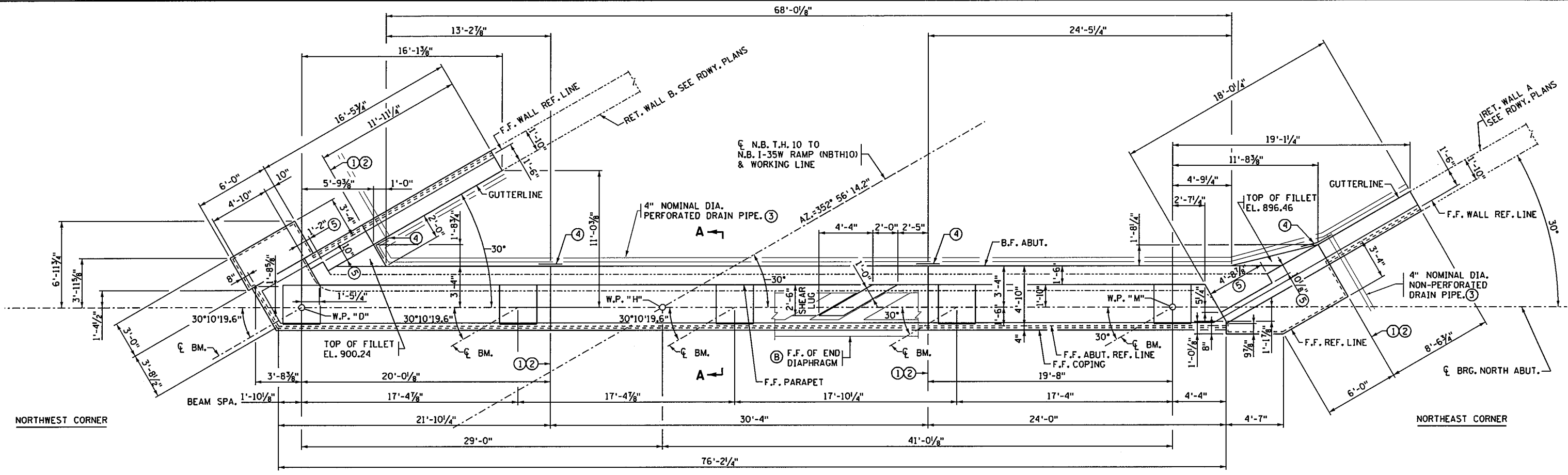


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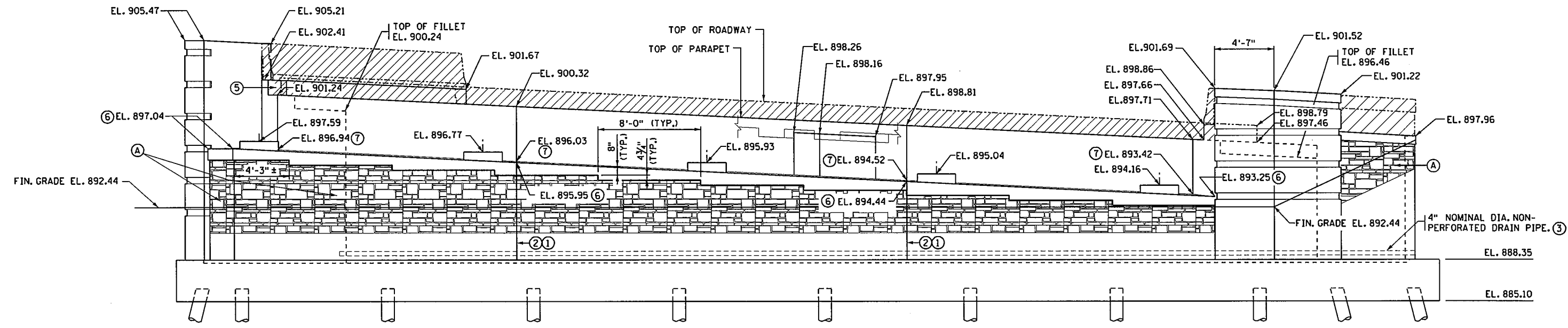
NORTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62937
CHK: NCK	CHK: MKM	12/14/15	
SHEET NO. D16 OF D66 SHEETS			

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NORTH ABUTMENT PLAN



NORTH ABUTMENT ELEVATION

- NOTES:**
- ① CONSTRUCTION JOINT WITH VERTICAL KEY CENTERED IN WALL. 72 HOUR TIME DELAY REQUIRED BETWEEN ADJACENT POURS TO ALLOW FOR SHRINKAGE.
 - ② 2" x 12" KEYWAY IN STEM.
 - ③ INCLUDED IN DRAINAGE SYSTEM TYPE B910.
 - ④ MEMBRANE WATERPROOFING SYSTEM PER MNDOT SPEC. 2481.3B. PAYMENT SHALL BE CONSIDERED INCIDENTAL.
 - ⑤ BLOCKOUT FOR PAVING BLOCK.
 - ⑥ ELEVATION IS AT F.F. COPING EDGE.
 - ⑦ ELEVATION IS AT F.F. PARAPET (HORIZ. CONSTR. JT.)

- (A) ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) & ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.
- (B) END DIAPHRAGM LUGS TO BE CONSTRUCTED AROUND ABUTMENT SHEAR LUG. SEE END DIAPHRAGM DETAILS.

- NOTES:**
- SEE SHEET D27 FOR SUMMARY OF QUANTITIES.
- F.F. = FRONT FACE
B.F. = BACK FACE
E.F. = EACH FACE

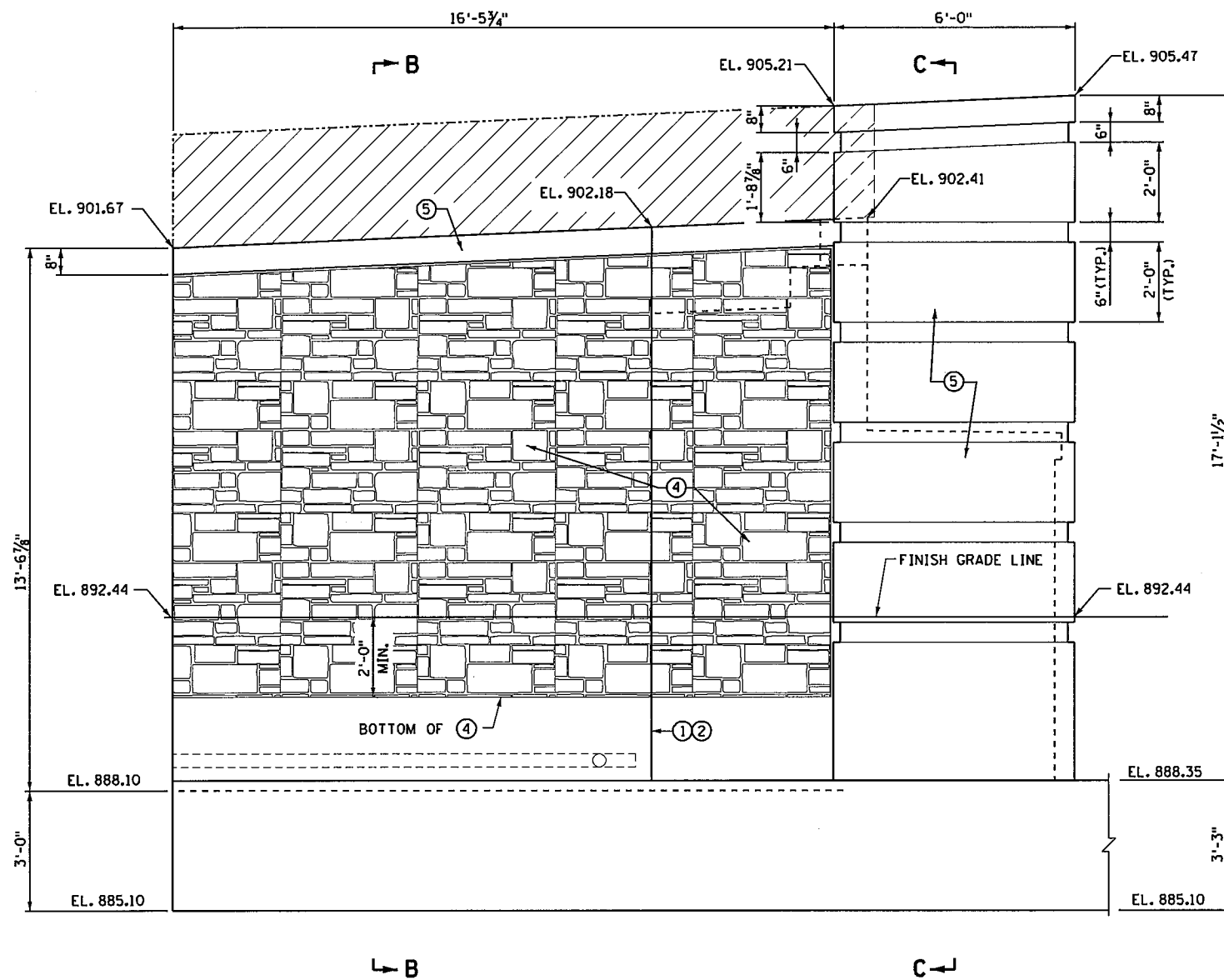
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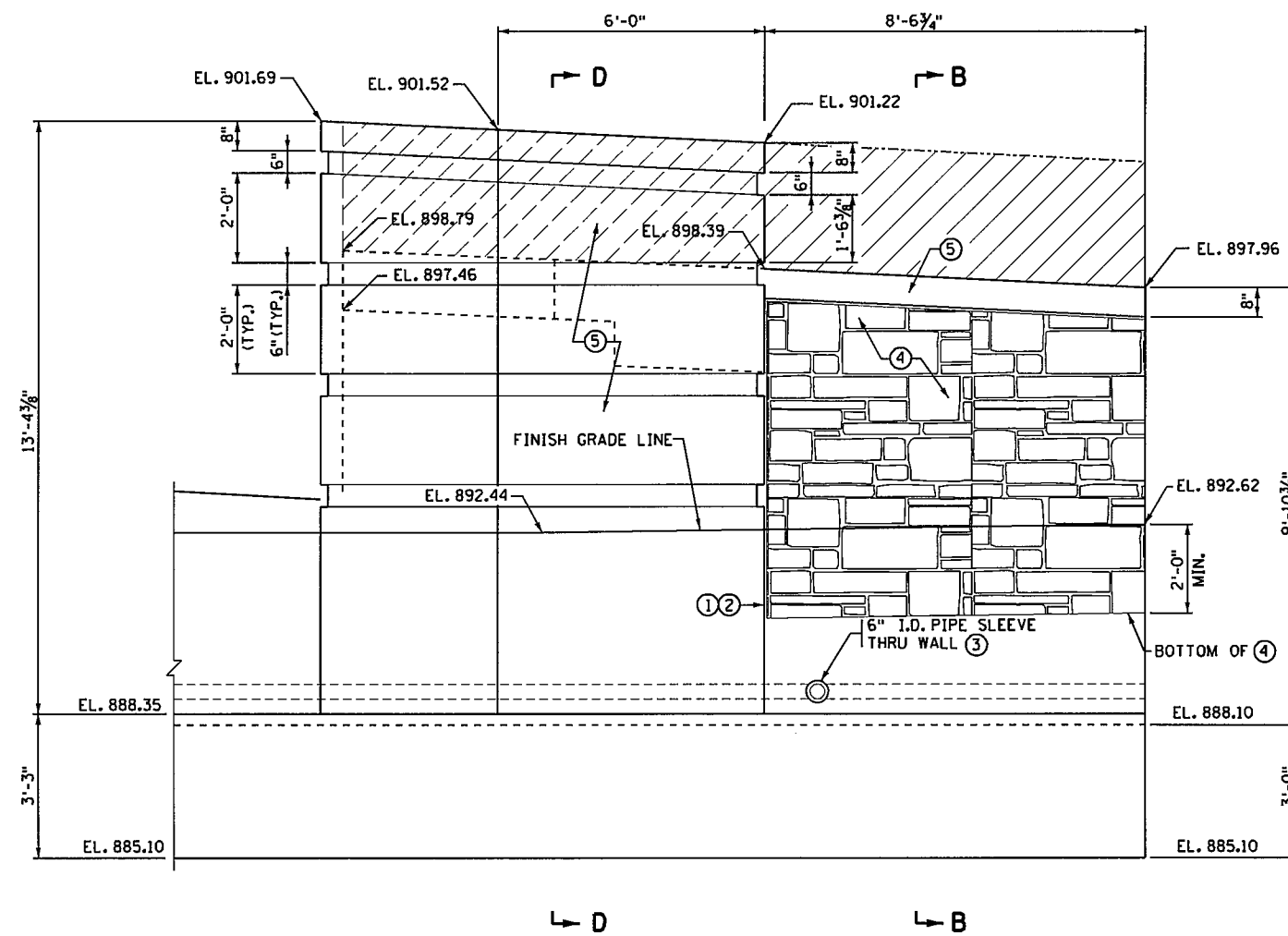
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

NORTH ABUTMENT DETAILS

DES: MHD	DR: DLF	APPROVED:	BRIDGE NO 62937
CHK: NCK	CHK: MKM	12/14/15	
SHEET NO. D17 OF D66 SHEETS			



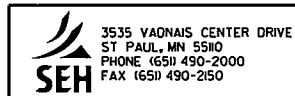
NORTHWEST WINGWALL ELEVATION



NORTHEAST WINGWALL ELEVATION

NOTES:

- ① CONSTRUCTION JOINT WITH VERTICAL KEY CENTERED IN WALL. 72 HOUR TIME DELAY REQUIRED BETWEEN ADJACENT POURS TO ALLOW FOR SHRINKAGE.
 - ② 2"x6" KEYWAY IN WALL.
 - ③ INCLUDED IN DRAINAGE SYSTEM TYPE B910.
 - ④ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI COLOR) AND ANTI-GRAFFITI COATING. SEE SPECIAL PROVISIONS.
 - ⑤ SMOOTH FINISH.
- SEE SHEET D27 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- HATCHED AREA INDICATES THAT PORTION TO BE PLACED WITH THE SUPERSTRUCTURE CONCRETE.
- SEE SHEET D19 FOR SECTIONS B-B, C-C & D-D.
- F.F. = FRONT FACE
B.F. = BACK FACE
E.F. = EACH FACE



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

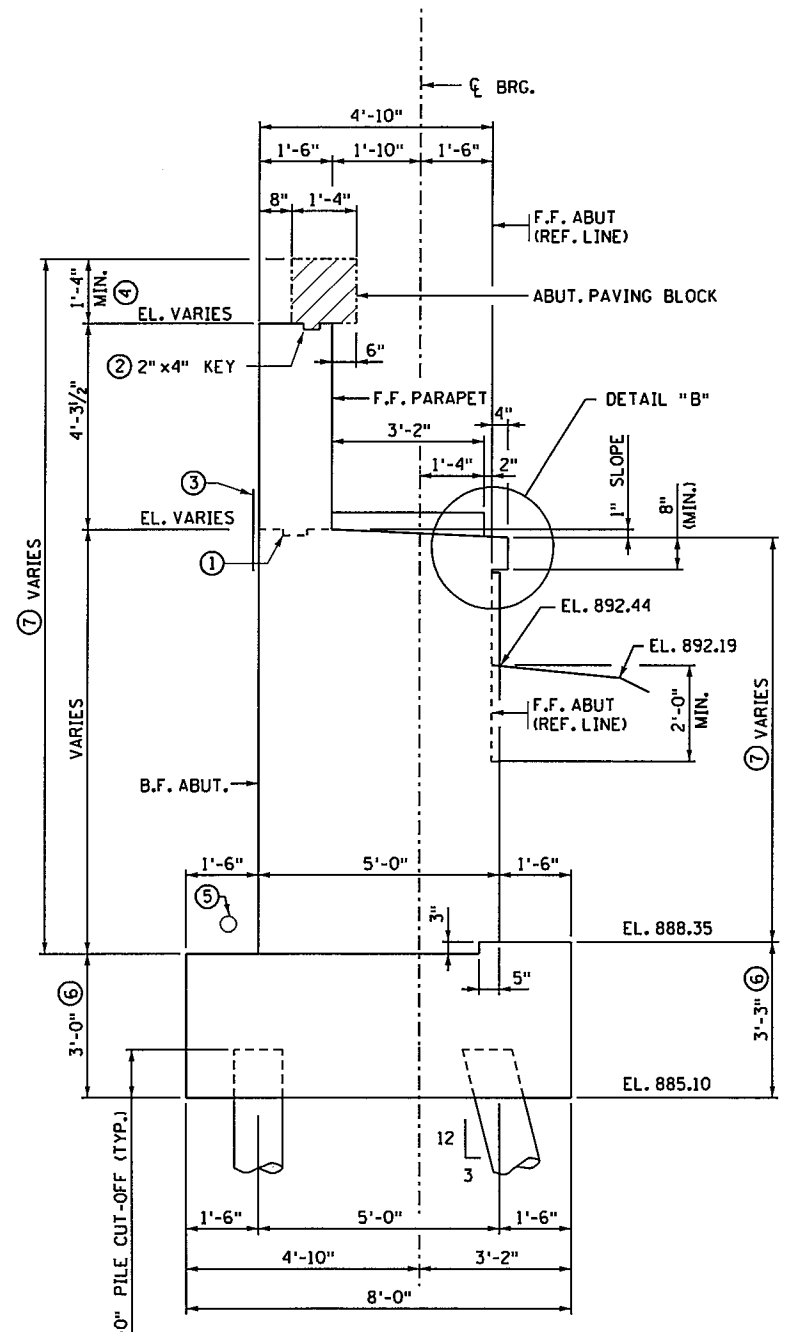
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

NORTH ABUTMENT DETAILS

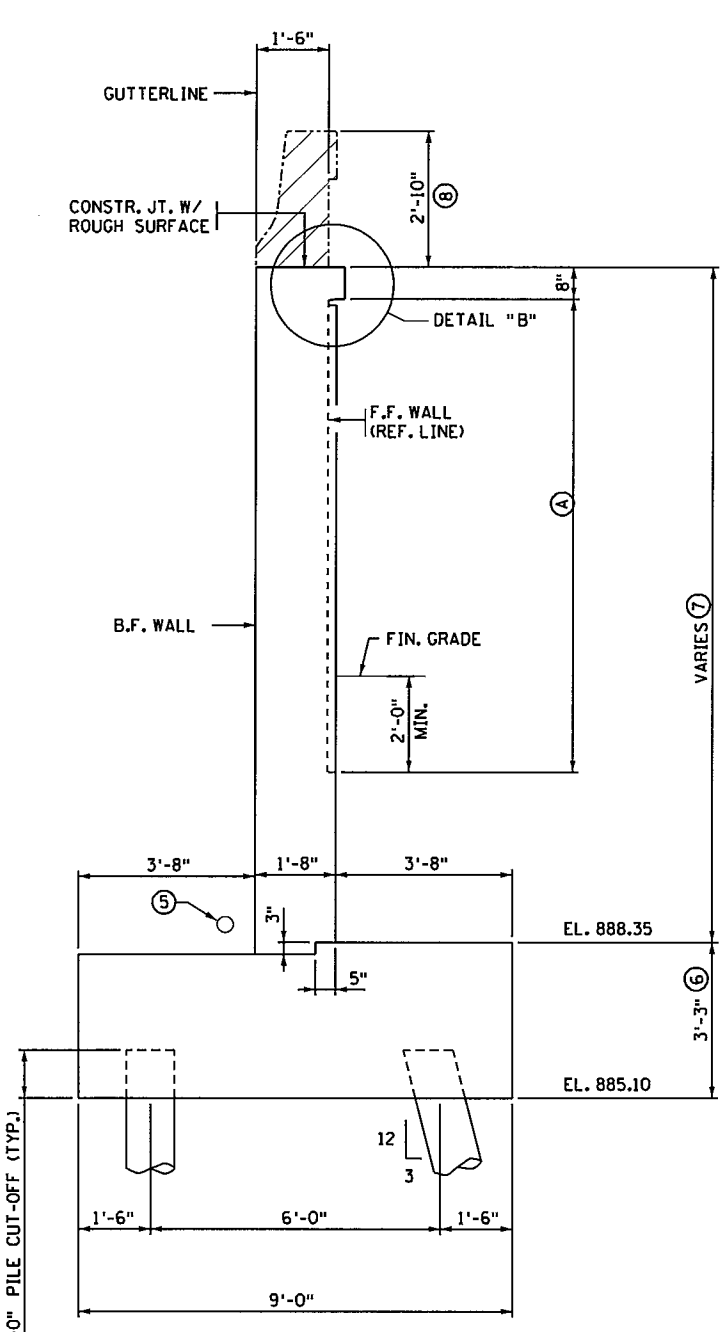
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CHK: NCK	CHK: MKM	12/14/15
SHEET NO. D18 OF D66 SHEETS		

BRIDGE NO 62937

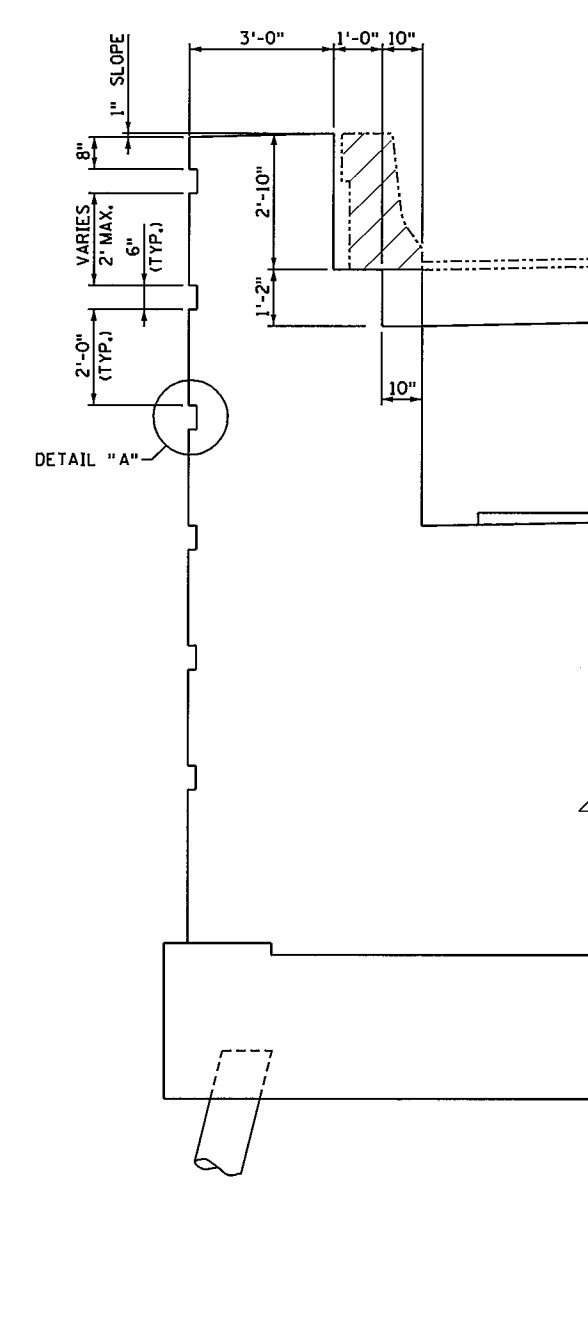
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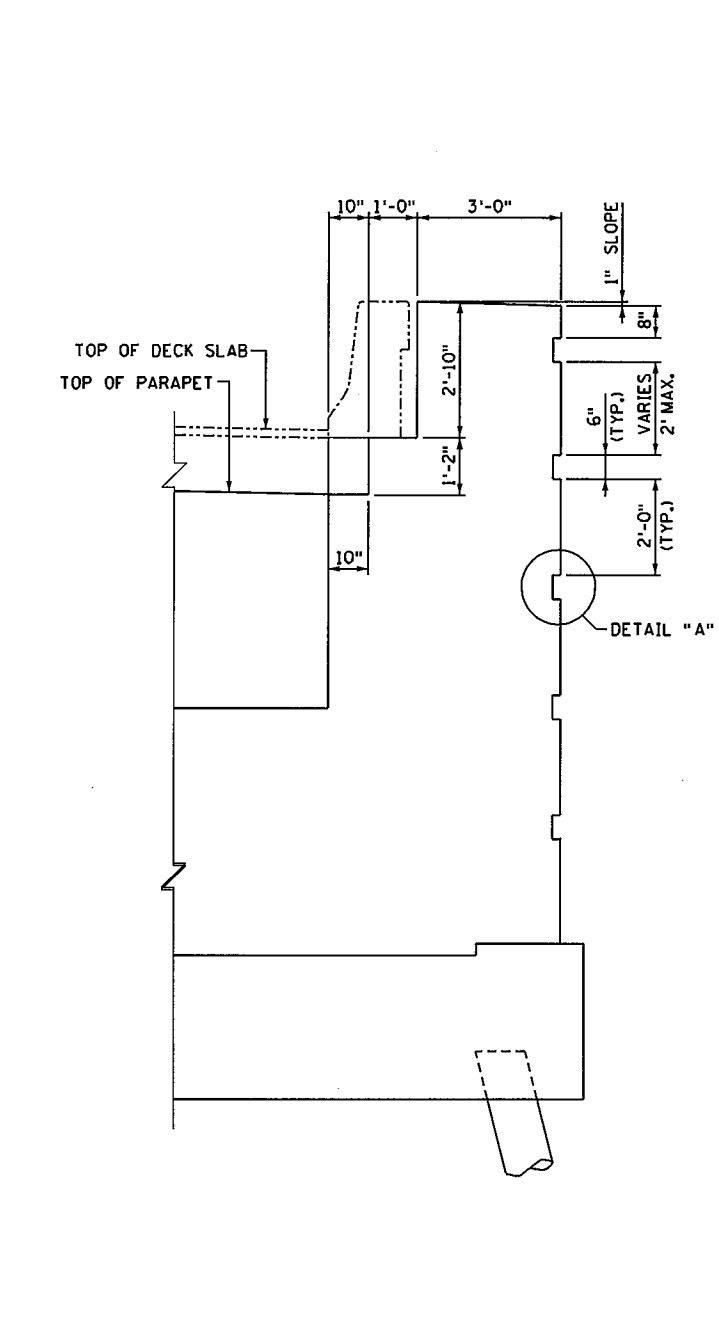
SECTION A-A



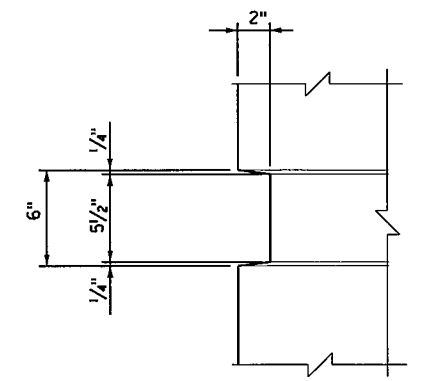
SECTION B-B



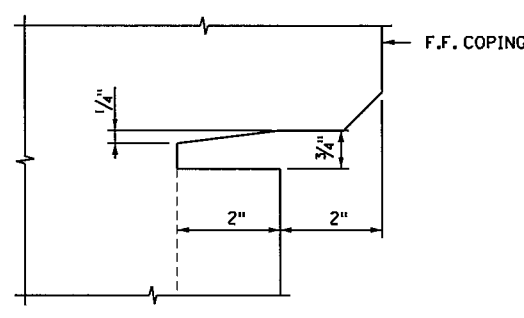
SECTION C-C



SECTION D-D



DETAIL "A"



DETAIL "B"

NOTES:

- SEE SHEET D27 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- HATCHED AREA INDICATES THAT PORTION TO BE PLACED WITH THE SUPERSTRUCTURE CONCRETE.
- SEE SHEETS D16 TO D18 FOR SECTION CUT LOCATIONS.
- F.F. = FRONT FACE
B.F. = BACK FACE
E.F. = EACH FACE
- ① PERMISSIBLE CONSTRUCTION JOINT WITH 2x6 KEY CENTERED IN WALL.
- ② CONSTRUCTION JOINT WITH KEYWAY.
- ③ MEMBRANE WATERPROOFING SYSTEM PER MnDOT SPEC. 2481.3B. PAYMENT SHALL BE CONSIDERED INCIDENTAL TO STRUCTURAL CONCRETE (3B52).
- ④ BRIDGE SLAB CONC. (3YHPC-S).

- ⑤ 4" NOMINAL DIA. PERFORATED DRAIN PIPE, INCLUDED IN DRAINAGE SYSTEM TYPE B910.
- ⑥ STRUCTURE CONCRETE (1G52).
- ⑦ STRUCTURE CONCRETE (3B52).
- ⑧ STRUCTURE CONCRETE (3S52). SEE SUPERSTRUCTURE DETAILS.

- Ⓐ ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE), ARCHITECTURAL SURFACE FINISH (MULTI-COLOR) AND ANTI-GRAFFITI COATING.

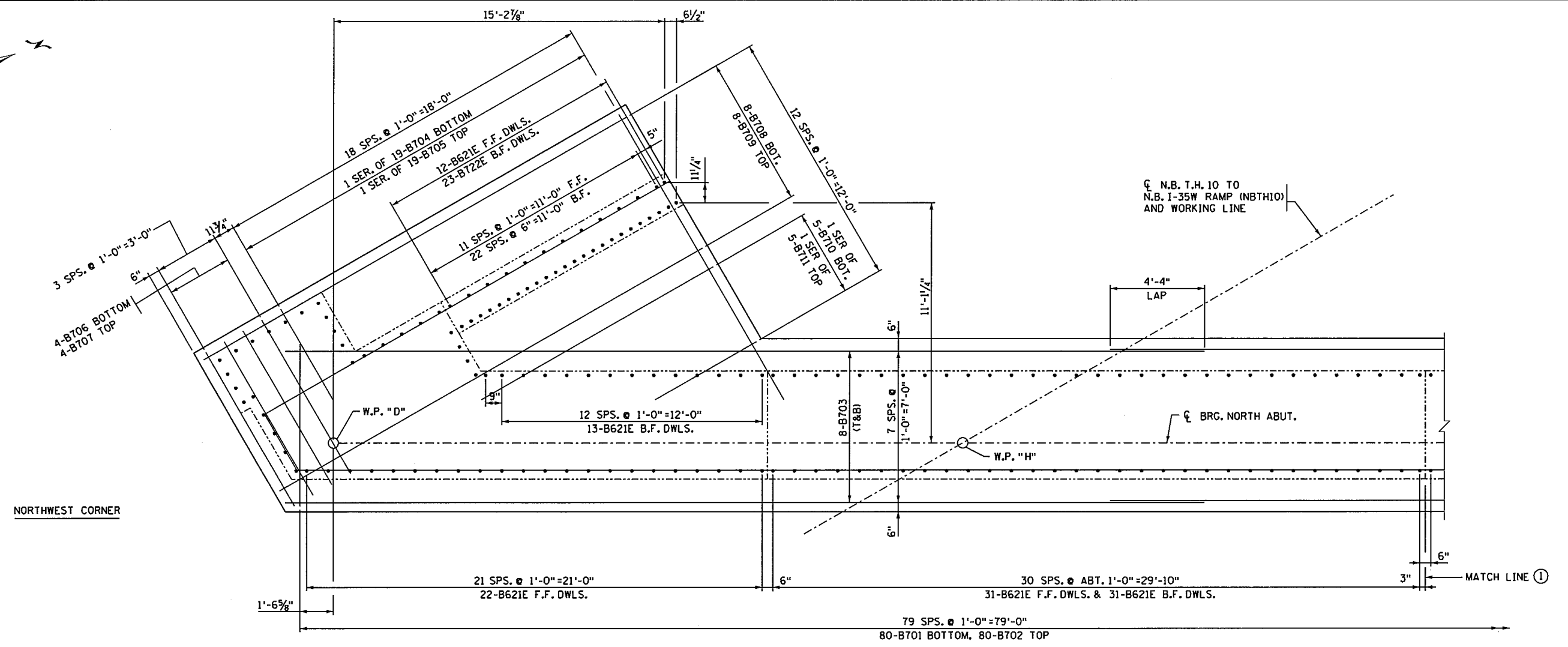
3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 55103
 PHONE: (650) 490-2000
 FAX: (650) 490-2500

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

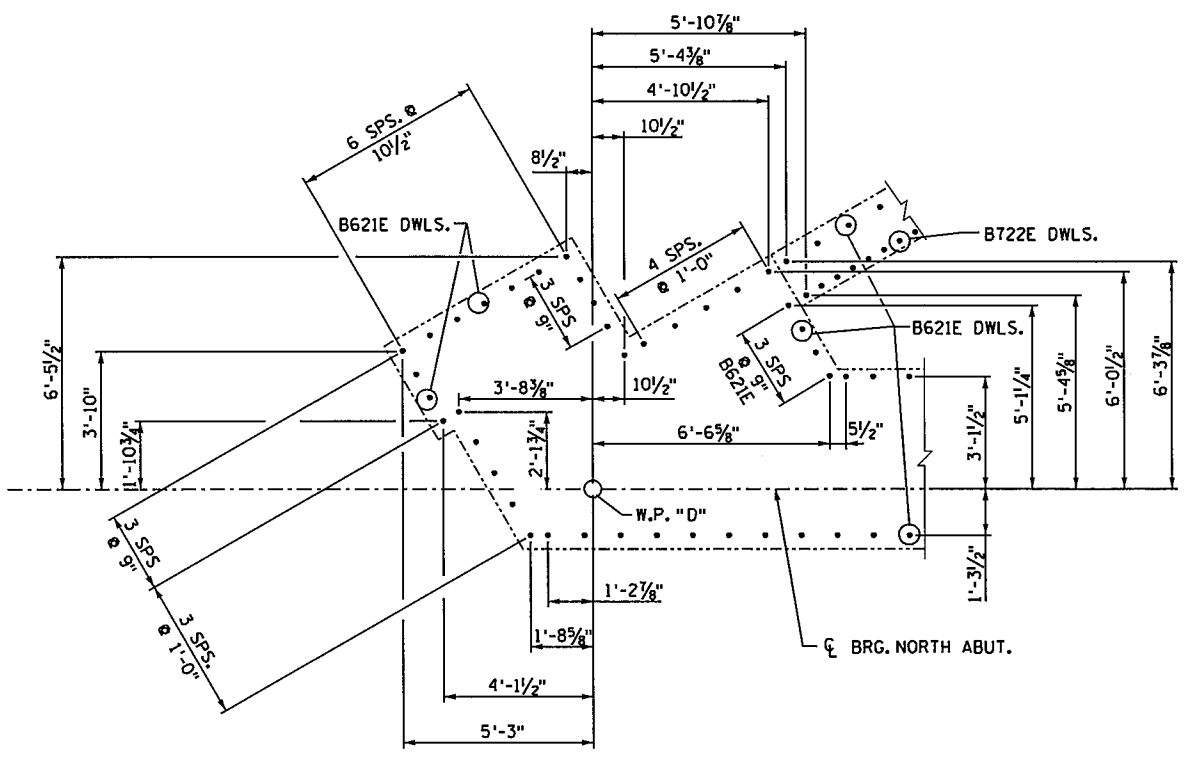
NORTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MKM		
SHEET NO. D19 OF D66 SHEETS			

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12/10/2015
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FOOTING REINFORCEMENT PLAN



NORTHWEST CORNER DETAIL

- NOTES:**
- ① SEE SHEET D21.
 - SEE SHEET D27 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
 - F.F. = FRONT FACE
 - B.F. = BACK FACE
 - E.F. = EACH FACE
 - T&B = TOP AND BOTTOM

3535 VADNAIS CENTER DRIVE
ST. PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

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Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

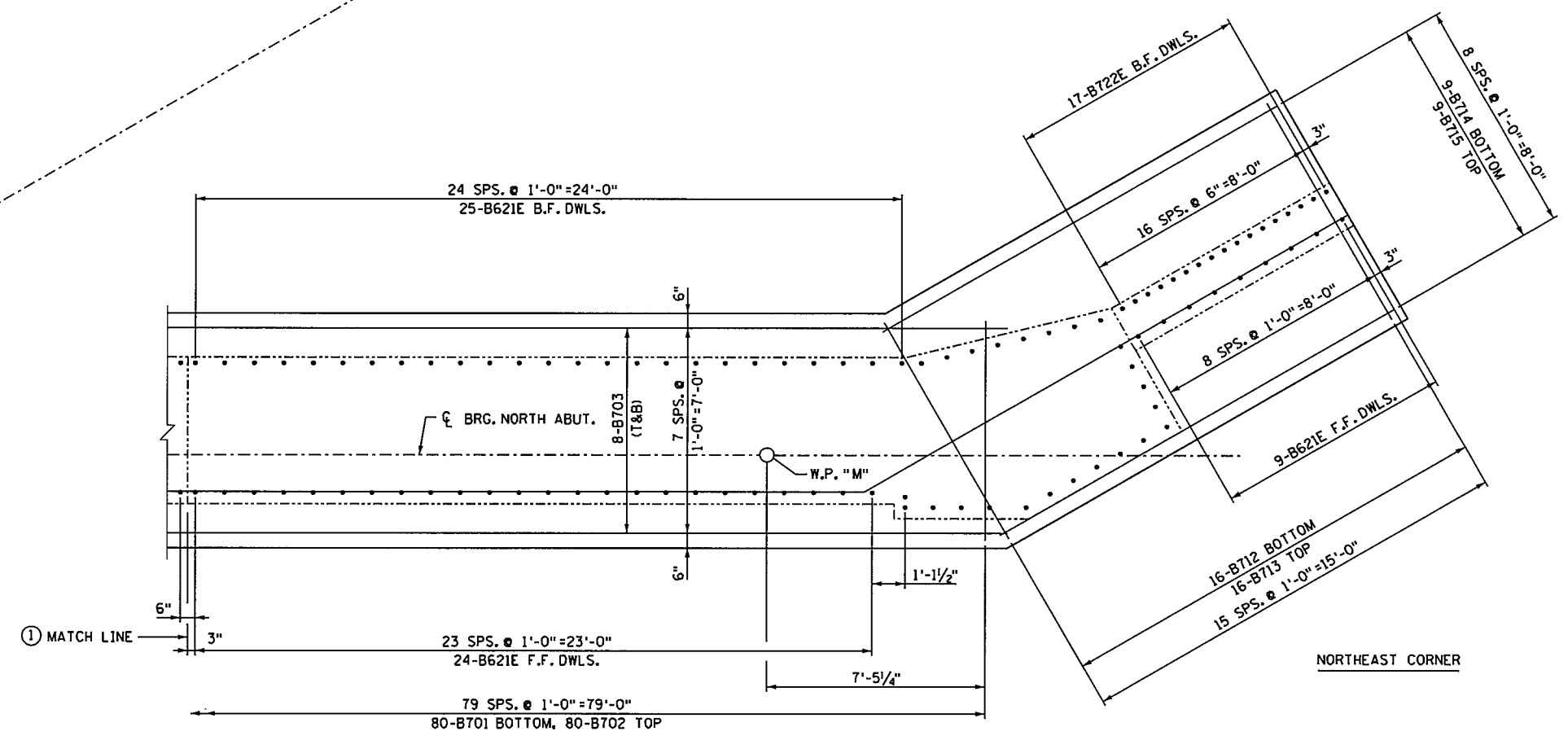
NORTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MKM		
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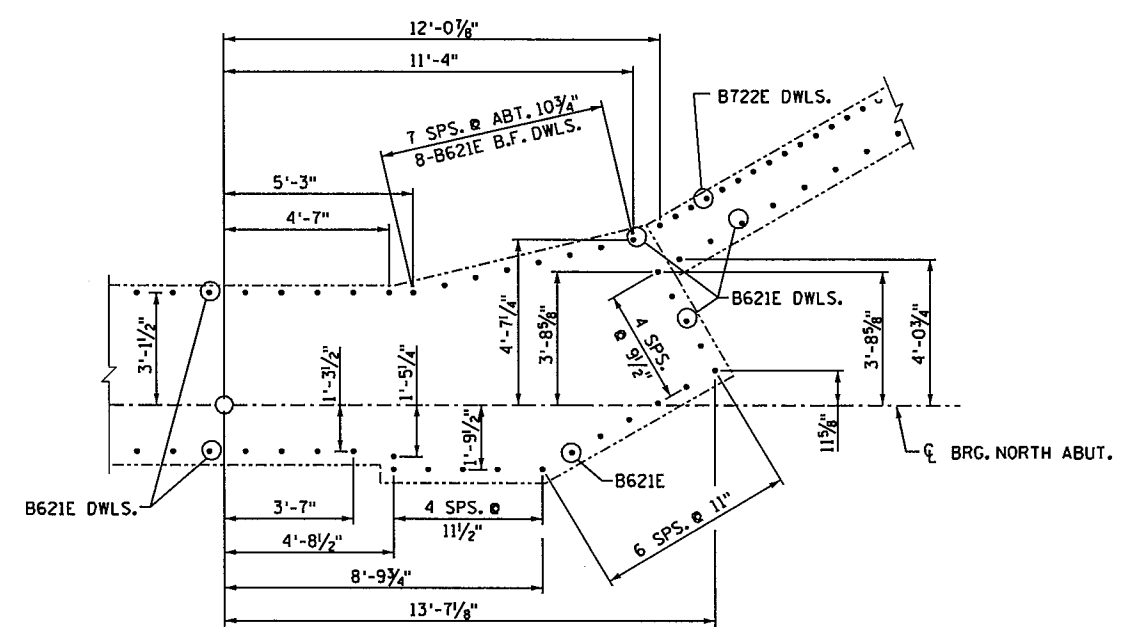
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☐ N.B. T.H. 10 TO
N.B. I-35W RAMP (NBTH10)
AND WORKING LINE



FOOTING REINFORCEMENT PLAN



NORTHEAST CORNER DETAIL

NOTES:

- ① SEE SHEET D20.
- SEE SHEET D27 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM

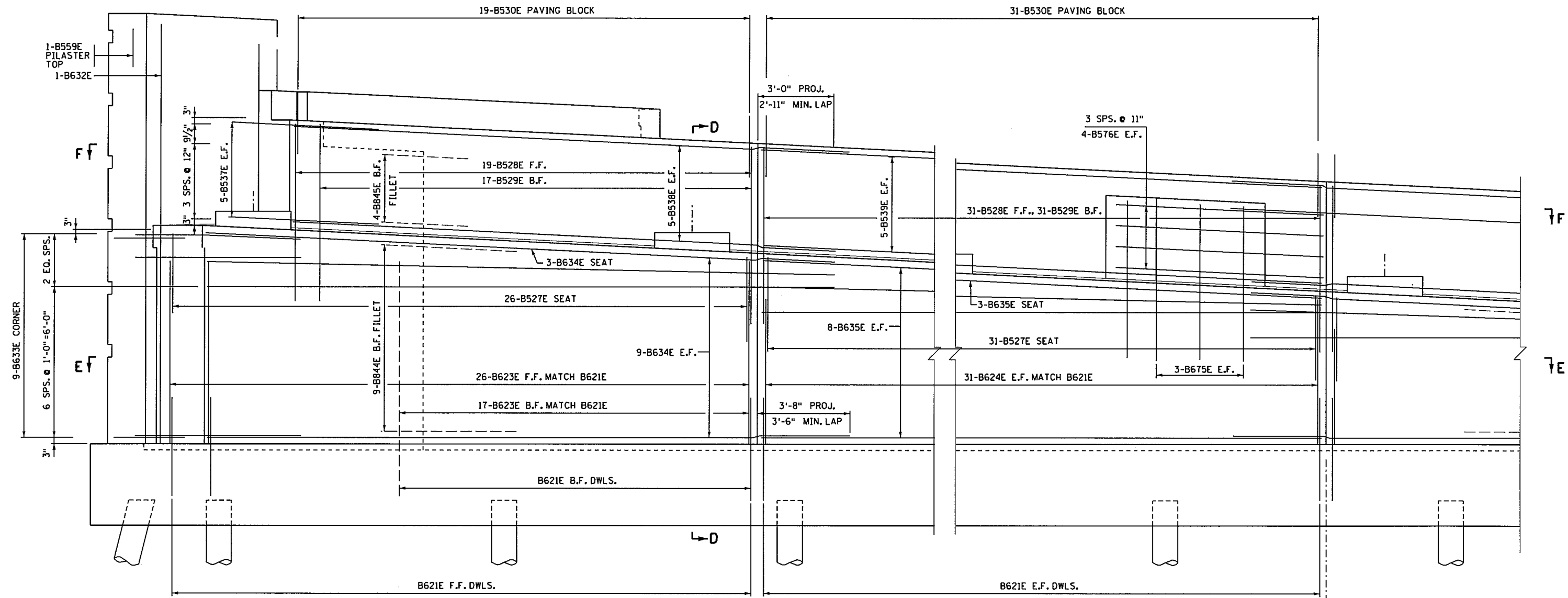
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3535 VADNAIS CENTER DRIVE
ST. PAUL, MN 55109
PHONE (651) 490-2000
FAX (651) 490-2150

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Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

NORTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:
CHK: NCK	CHK: MKM	12/14/15
SHEET NO. D21 OF D66 SHEETS		

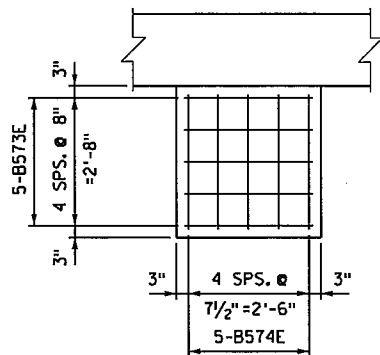
BRIDGE NO
62937



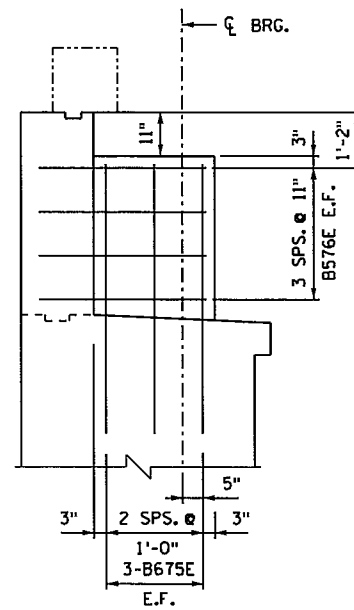
NORTHWEST CORNER

MATCH LINE ①

PARTIAL REINFORCEMENT ELEVATION



TYP. BEARING SEAT



SHEAR LUG DETAIL

NOTES:

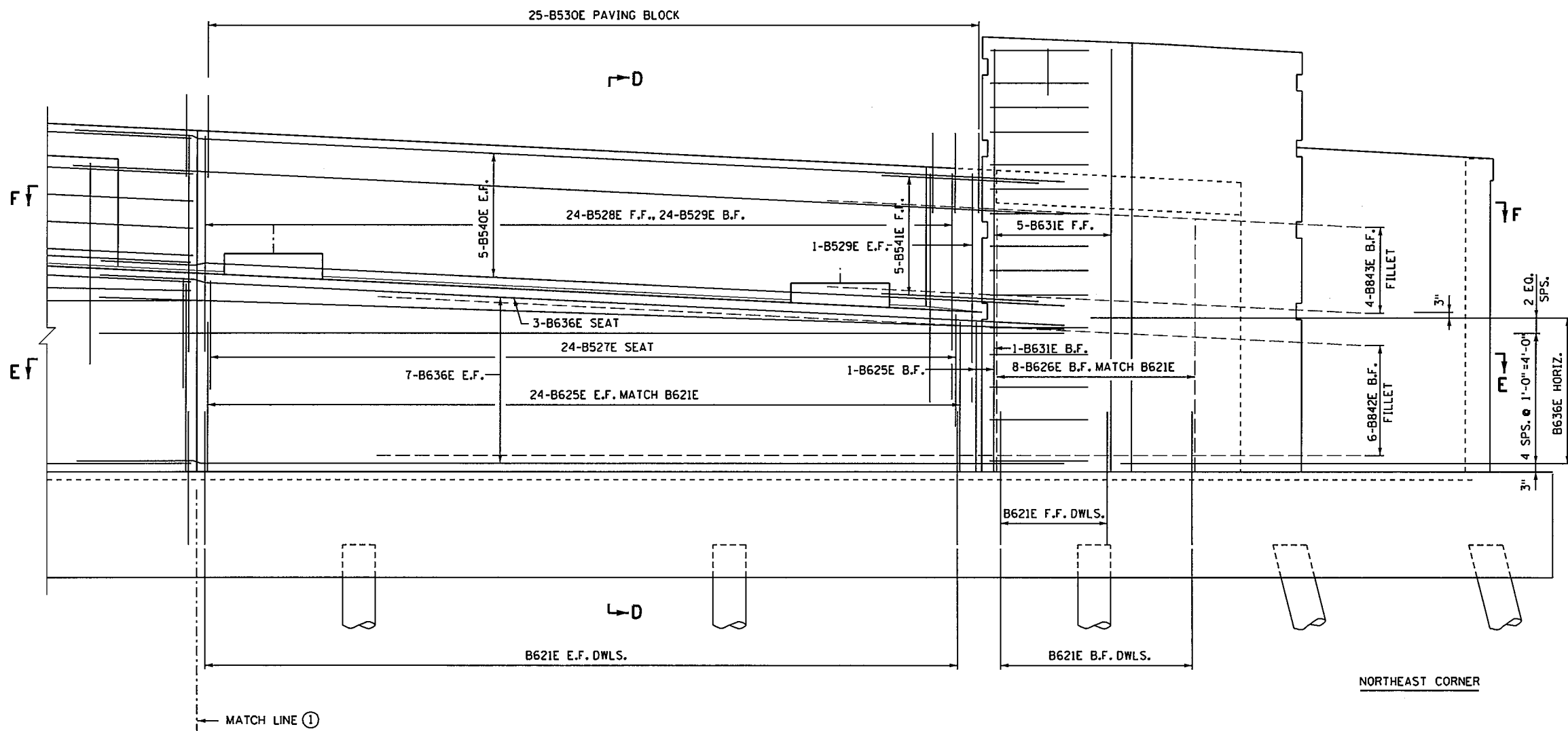
- SEE SHEET D27 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- SEE SHEET D23 FOR SECTION D-D.
- SEE SHEET D25 FOR SECTIONS E-E & F-F.
- F.F. = FRONT FACE
- B.F. = BACK FACE
- E.F. = EACH FACE
- T&B = TOP AND BOTTOM
- ① SEE SHEET D23.

SEH
 3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 55100
 PHONE (651) 490-2000
 FAX (651) 490-2150

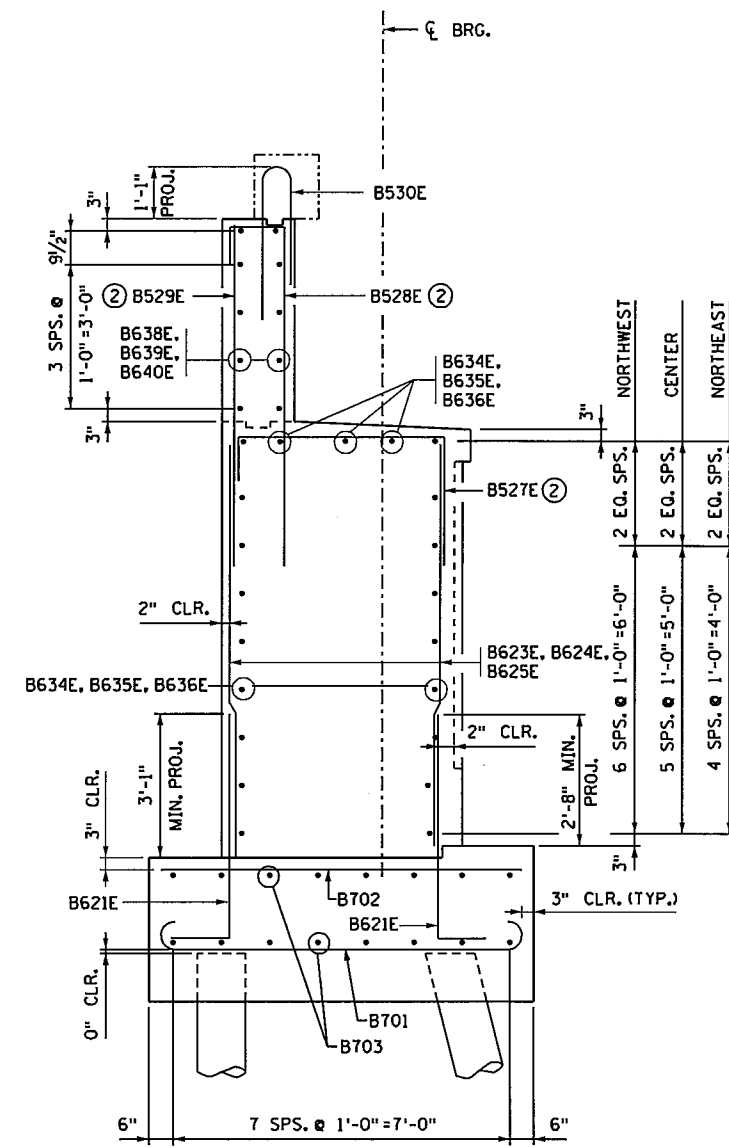
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 Signature: *[Signature]* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

NORTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62937
CHK: NCK	CHK: MKM	12/14/15	
SHEET NO. D22 OF D66 SHEETS			



PARTIAL REINFORCEMENT ELEVATION



SECTION D-D

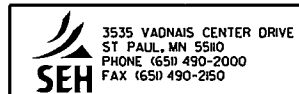
NOTES:

SEE SHEET D27 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.

SEE SHEET D13 FOR SECTIONS E-E & F-F.

F.F. = FRONT FACE
B.F. = BACK FACE
E.F. = EACH FACE
T&B = TOP AND BOTTOM

- ① SEE SHEET D22.
- ② PULL UP TO 2" CLR.



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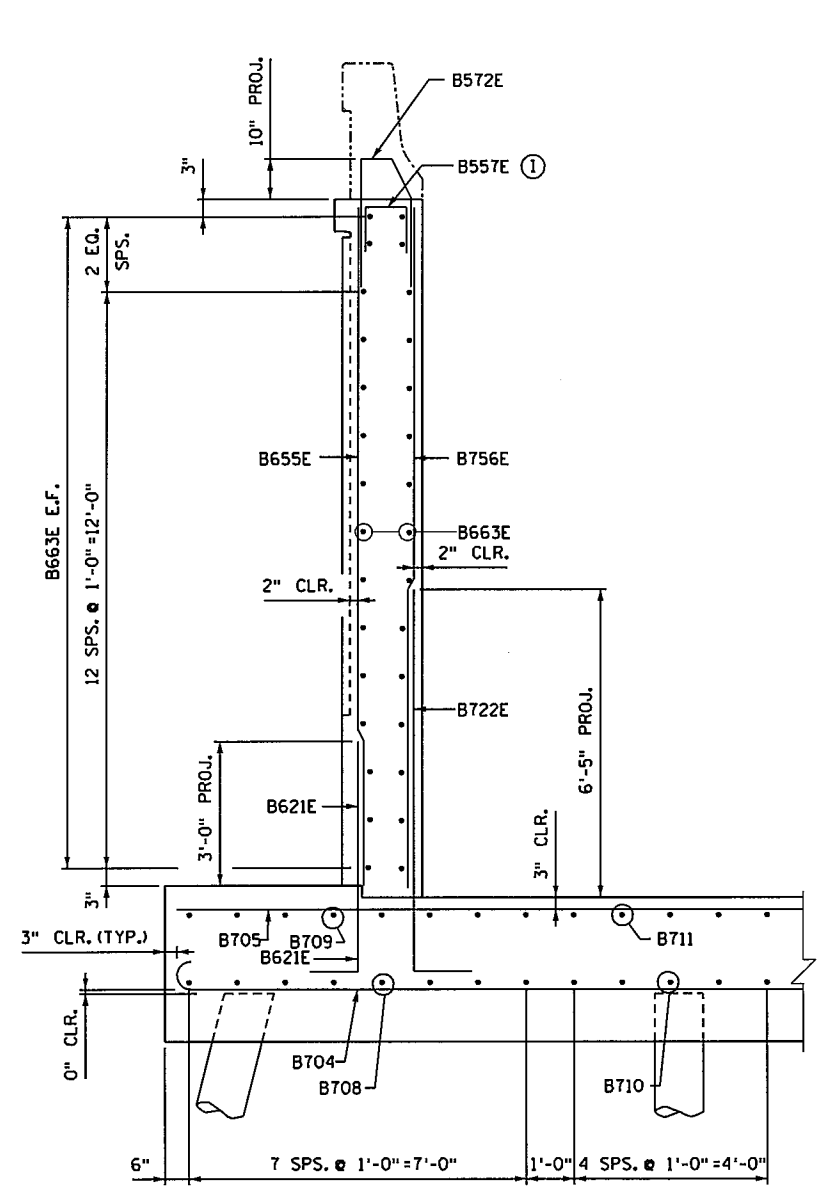
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

NORTH ABUTMENT DETAILS

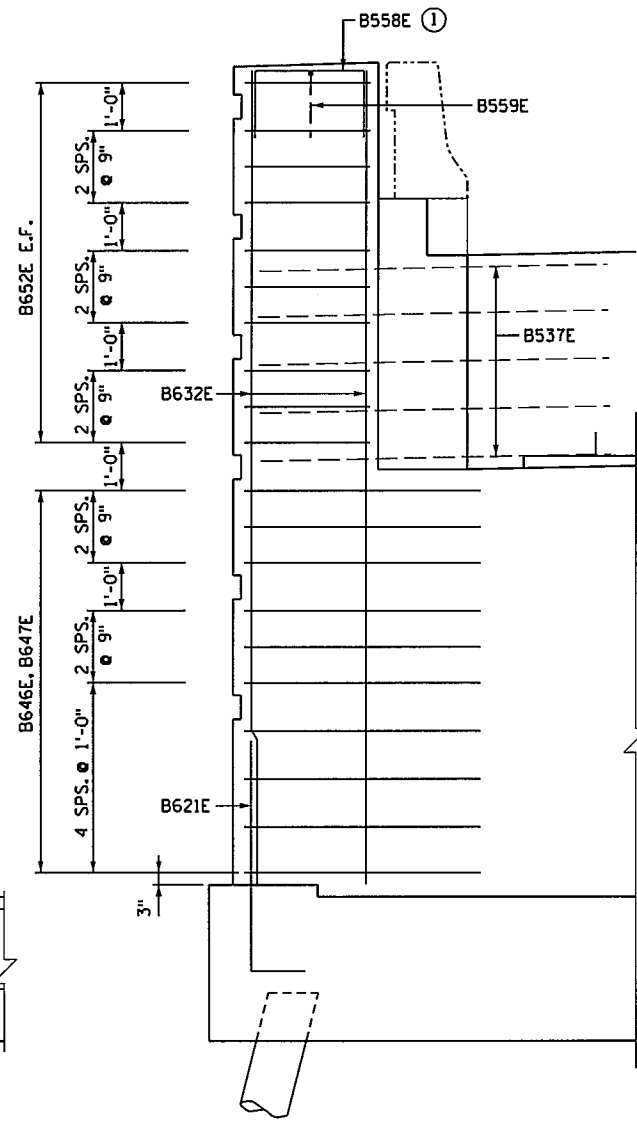
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CHK: NCK	CHK: MKM	12/14/15
SHEET NO. D23 OF D66 SHEETS		

BRIDGE NO
62937

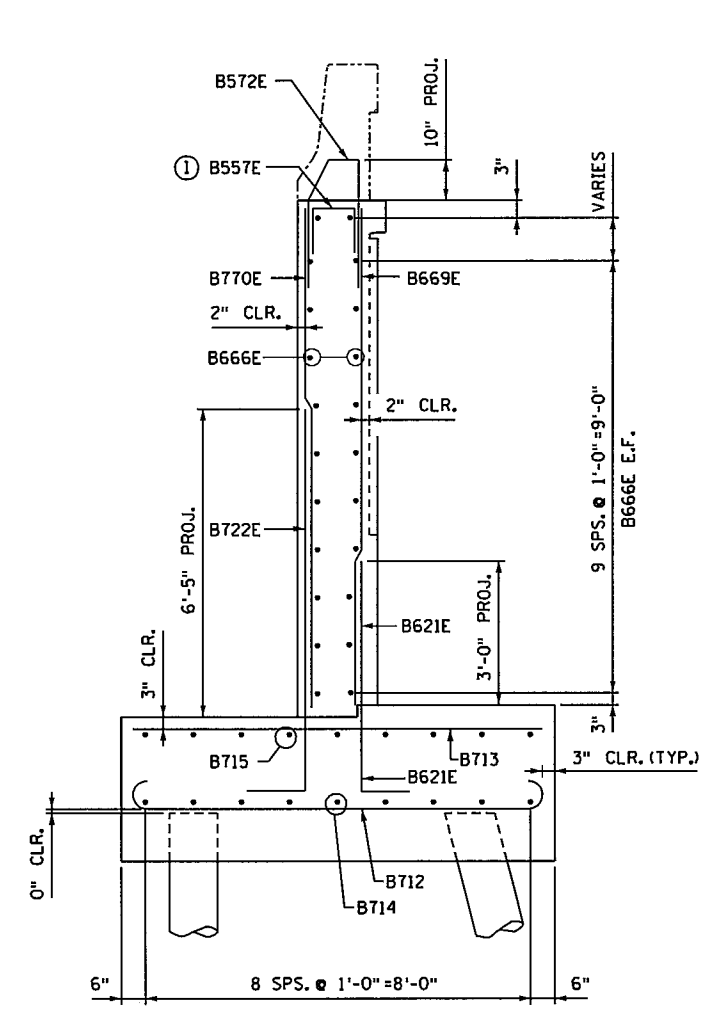
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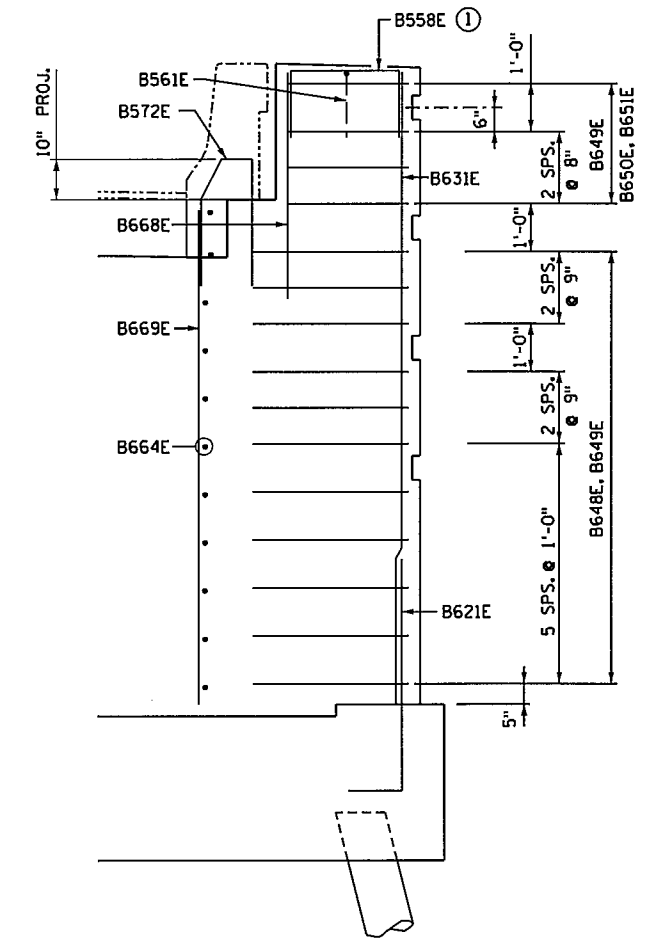
SECTION G-G



SECTION H-H



SECTION J-J



SECTION K-K

NOTES:
 ① PULL UP TO 2" CLEAR.
 SEE SHEET D27 FOR BAR LIST AND SUMMARY OF QUANTITIES.
 SEE SHEETS D22 THRU D24 FOR SECTION CUT LOCATIONS.

3535 VADNAIS CENTER DRIVE ST. PAUL, MN 55102 PHONE (651) 490-2000 FAX (651) 490-2150	I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
	Signature: <i>Michael H Dupont</i> Date: 12-4-15 Printed Name: MICHAEL H DUPONT Lic. No. 43375
	Date: 12-4-15 Lic. No. 43375

NORTH ABUTMENT DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MKM	SHEET NO. D26 OF D66 SHEETS	

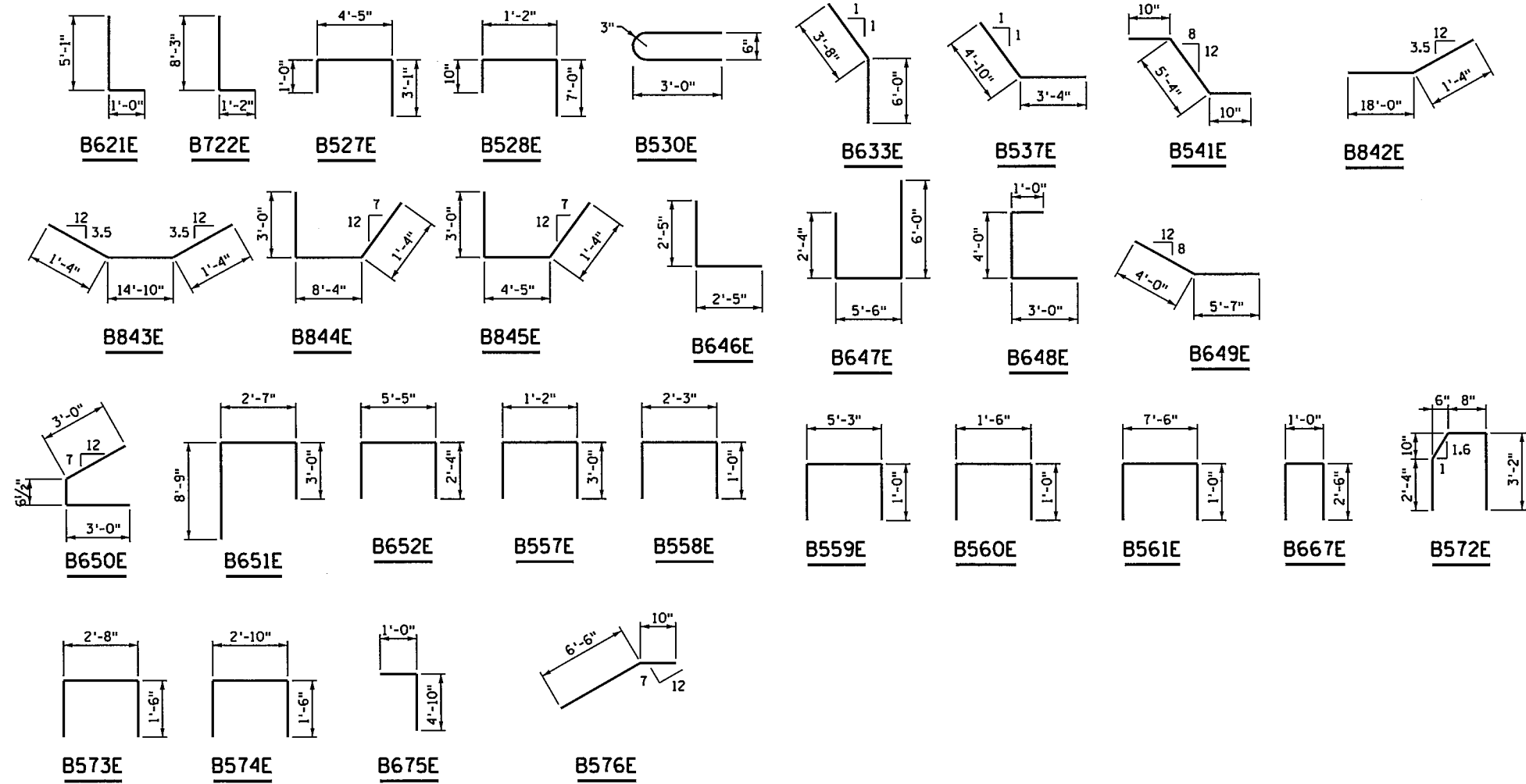
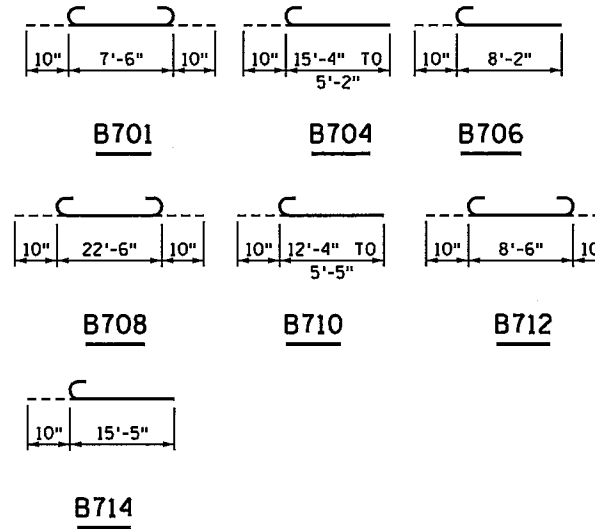
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BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
NORTH ABUTMENT				
EPOXY COATED BARS				
B621E	220	6'-1"	BENT	VERT. DWLS.
B722E	40	9'-5"	BENT	VERT. DWLS.
B623E	43	7'-3"	STR	VERT. ABUT.
B624E	62	5'-9"	STR	VERT. ABUT.
B625E	50	4'-7"	STR	VERT. ABUT.
B626E	8	7'-9"	STR	VERT. ABUT. FILLET
B527E	81	8'-6"	BENT	ABUT. SEAT
B528E	74	9'-0"	BENT	PARAPET VERT. F.F.
B529E	74	7'-0"	STR	PARAPET VERT. B.F.
B530E	75	6'-0"	BENT	PAVING BLOCK
B631E	15	12'-11"	STR	PILASTER VERT. N.E.
B632E	19	16'-7"	STR	PILASTER VERT. N.W.
B633E	9	9'-8"	BENT	PILASTER HORIZ. N.W.
B634E	21	25'-0"	STR	HORIZ. ABUT.
B635E	19	30'-0"	STR	HORIZ. ABUT.
B636E	17	29'-7"	STR	HORIZ. ABUT.
B537E	5	8'-2"	BENT	HORIZ. PARAPET END N.W.
B538E	10	22'-0"	STR	HORIZ. PARAPET
B539E	10	30'-0"	STR	HORIZ. PARAPET
B540E	10	30'-4"	STR	HORIZ. PARAPET
B541E	5	7'-0"	BENT	HORIZ. PARAPET N.E.
B842E	6	19'-4"	BENT	HORIZ. FILLET N.E.
B843E	4	17'-6"	BENT	HORIZ. FILLET N.E.
B844E	9	12'-8"	BENT	HORIZ. FILLET N.W.
B845E	4	8'-9"	BENT	HORIZ. FILLET N.W.
B646E	10	4'-10"	BENT	HORIZ. PILASTER N.W.
B647E	10	13'-10"	BENT	HORIZ. PILASTER N.W.
B648E	22	8'-0"	BENT	HORIZ. PILASTER N.E.
B649E	15	9'-7"	BENT	HORIZ. PILASTER N.E.
B650E	4	3'-7"	BENT	HORIZ. PILASTER N.E.
B651E	4	14'-4"	BENT	HORIZ. PILASTER N.E.
B652E	20	10'-1"	BENT	HORIZ. PILASTER N.W.
B653E	9	13'-8"	STR	VERT. WINGWALL F.F. N.W.
B654E	5	4'-0"	STR	VERT. WINGWALL B.F. N.W.
B655E	13	13'-2"	STR	VERT. WINGWALL F.F. N.W.
B756E	23	13'-2"	STR	VERT. WINGWALL B.F. N.W.
B557E	28	7'-2"	BENT	WALL TOP
B558E	11	4'-3"	BENT	PILASTER TOP
B559E	1	7'-3"	BENT	PILASTER TOP N.W.
B560E	1	3'-6"	BENT	PILASTER TOP N.E.
B561E	1	9'-6"	BENT	PILASTER TOP N.E.
B662E	12	8'-8"	STR	WINGWALL HORIZ. N.W.
B663E	30	11'-8"	STR	WINGWALL HORIZ. N.W.
B664E	11	12'-10"	STR	WINGWALL HORIZ. N.E.
B665E	11	7'-4"	STR	WINGWALL HORIZ. N.E.
B666E	22	8'-2"	STR	WINGWALL HORIZ. N.E.
B667E	26	6'-0"	BENT	WINGWALL END N.E.
B668E	9	4'-0"	STR	VERT. PILASTER N.E.
B669E	18	9'-6"	STR	VERT. WINGWALL F.F. & PILASTER N.E.
B770E	17	9'-6"	STR	VERT. WINGWALL B.F. N.E.
B671E	18	11'-9"	STR	WINGWALL HORIZ. N.W.
B572E	52	7'-2"	BENT	VERT. BARRIER DWLS.
B573E	25	5'-8"	BENT	BEARING SEAT
B574E	25	5'-10"	BENT	BEARING SEAT
B675E	6	5'-10"	BENT	SHEAR LUG
B576E	8	7'-3"	BENT	SHEAR LUG

BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
NORTH ABUTMENT				
BLACK BARS				
B701	80	9'-2"	BENT	FOOTING TRANSVERSE BOTTOM
B702	80	7'-6"	STR	FOOTING TRANSVERSE TOP
B703	32	42'-4"	STR	FOOTING LONGITUDINAL T&B
B704	1 SERIES	16'-2" TO 6'-0"	BENT	FOOTING TRANSVERSE BOTTOM
B705	1 SERIES	15'-4" TO 5'-2"	STR	FOOTING TRANSVERSE TOP
B706	4	9'-0"	BENT	FOOTING TRANSVERSE BOTTOM
B707	4	8'-2"	STR	FOOTING TRANSVERSE TOP
B708	8	24'-2"	BENT	FOOTING LONGITUDINAL BOTTOM
B709	8	22'-6"	STR	FOOTING LONGITUDINAL TOP
B710	1 SERIES	14'-2" TO 6'-3"	BENT	FOOTING LONGITUDINAL BOTTOM
B711	1 SERIES	12'-4" TO 5'-5"	STR	FOOTING LONGITUDINAL TOP
B712	16	10'-2"	BENT	FOOTING TRANSVERSE BOTTOM
B713	16	8'-6"	STR	FOOTING TRANSVERSE TOP
B714	9	16'-3"	BENT	FOOTING LONGITUDINAL BOTTOM
B715	9	15'-5"	STR	FOOTING LONGITUDINAL TOP

* BAR USES STANDARD STIRRUP AND TIE HOOKS.

NOTE:
BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT.



SUMMARY OF QUANTITIES FOR NORTH ABUTMENT		
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (1652)	CU YD	105
STRUCTURAL CONCRETE (3B52)	CU YD	172
REINFORCEMENT BARS	POUND	8610
REINFORCEMENT BARS (EPOXY COATED)	POUND	17590
ANTI-GRAFFITI COATING	SQ FT	553
ARCH. CONC. TEXTURE (ASHLAR STONE)	SQ FT	553
ARCH. SURFACE FINISH (MULTI COLOR)	SQ FT	553
C-I-P CONCRETE PILING DELIVERED 12"	LIN FT	1155
C-I-P CONCRETE PILING DRIVEN 12"	LIN FT	1155
C-I-P CONC TEST PILE 65 FT LONG 12"	EACH	2
PILE REDRIVING	EACH	2
PILE ANALYSIS	EACH	2

- ① DOES NOT INCLUDE TEST PILES.
- ② CONCRETE QUANTITY INCLUDES PORTIONS OF STRUCTURE THAT MUST ADHERE TO MASS CONCRETE PROVISIONS. SEE SPECIAL PROVISIONS. TO BE INCLUDED IN PRICE BID FOR OTHER ITEMS.

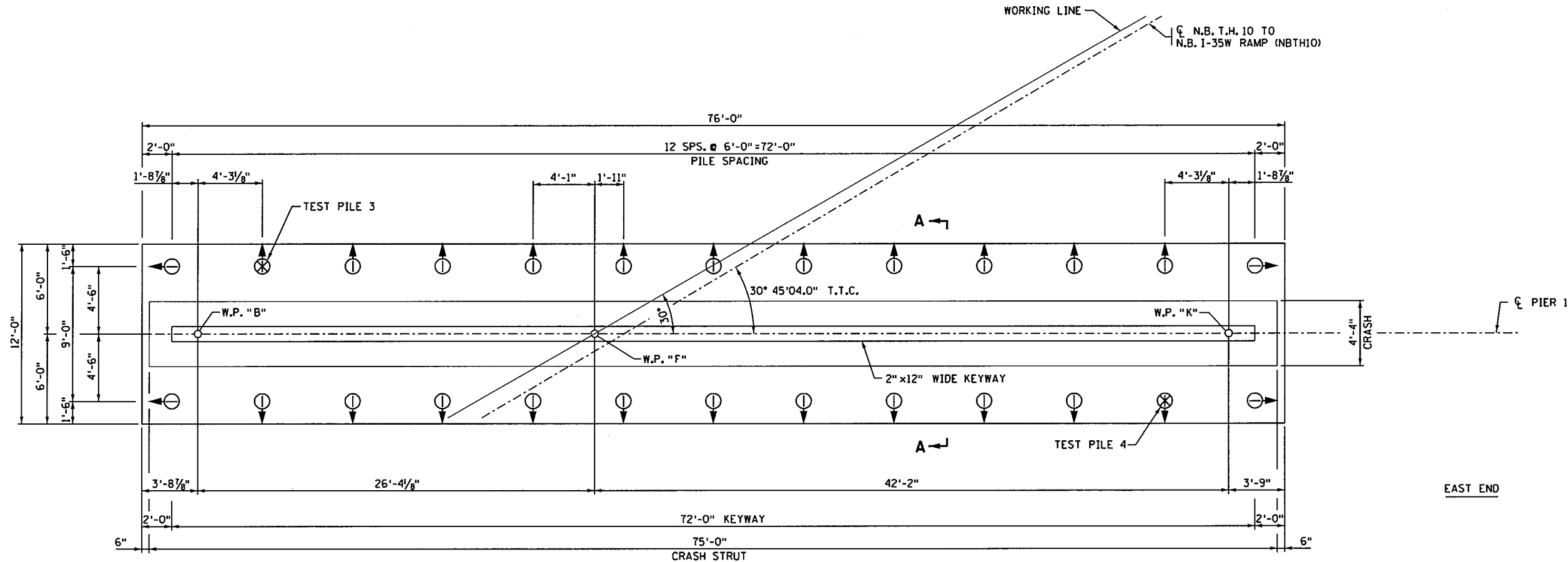
3535 VADNAIS CENTER DRIVE
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PHONE (651) 490-2000
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Printed Name: MICHAEL H DUPONT Lic. No. 43375

NORTH ABUTMENT BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES

DES: MHD DR: MAW APPROVED: 12/14/15
CHK: NCK CHK: MKM
SHEET NO. D27 OF D66 SHEETS

BRIDGE NO 62937



FOOTING PLAN

PIER 1 COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD	58.8
FACTORED LIVE LOAD	15.6
FACTORED OVERTURNING	18.6
*FACTORED DESIGN LOAD	93.0

* BASED ON STRENGTH I LOAD COMBINATION

PIER 1 REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R _n - Tons/Pile		
FIELD CONTROL METHOD	φ _{dyn}	*R _n
MnDOT Pile Formula 2012 (MPF12) $R_n = 20 \sqrt{\frac{W \times H}{1000}} \times \log\left(\frac{10}{S}\right)$	0.50	① 186.0
PDA	0.65	143.1

* R_n = (Factored Design Load) / φ_{dyn}

PILE NOTES:

2 12" C-I-P CONCRETE TEST PILE 60 FT. LONG
 24 12" C-I-P CONCRETE PILES EST. LENGTH 50 FT.
 26 12" C-I-P CONCRETE PILES REQ'D FOR PIER 1.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.

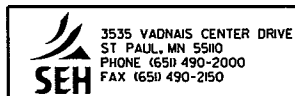
FOR PILE SPLICE DETAILS SEE DETAIL B201.

PILES MARKED THUS ○➔ TO BE BATTERED 2" PER FOOT IN DIRECTION SHOWN.

PILES TO HAVE 0.3125" MIN. WALL THICKNESS.

COMMERCIAL DRIVE-FIT SPLICES WILL NOT BE PERMITTED ON THIS BRIDGE.

① NEW MNDOT MPF12 PILE DRIVING FORMULA AND TABLE MUST BE USED FOR THIS BRIDGE. USE OF OLDER FORMULA WILL RESULT IN INADEQUATE PILE CAPACITY.



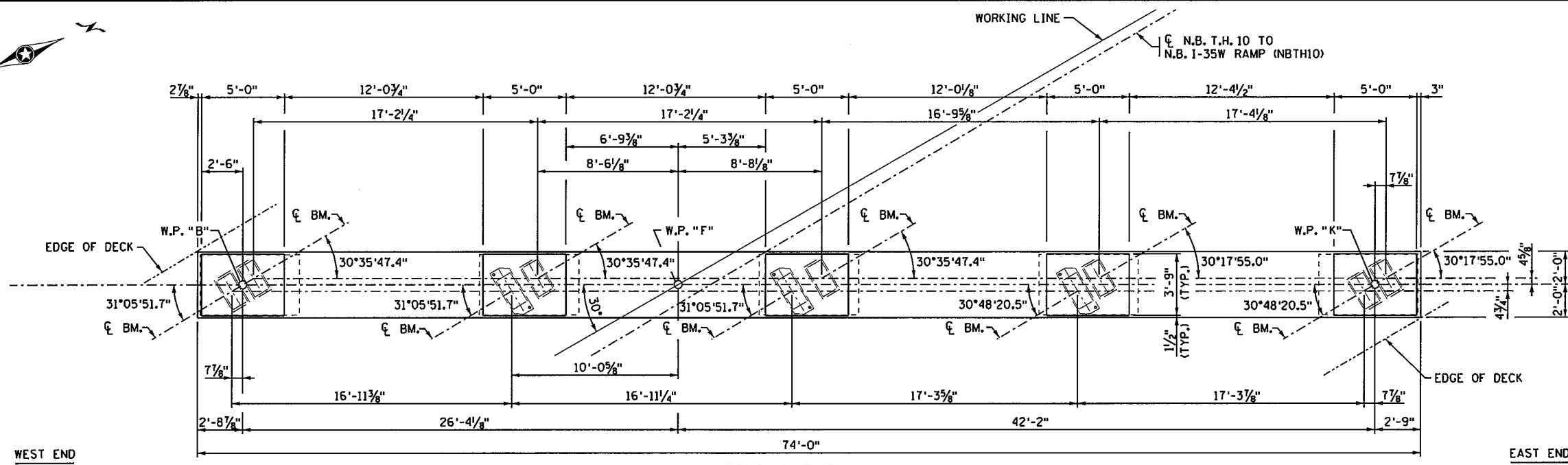
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PIER 1 DETAILS

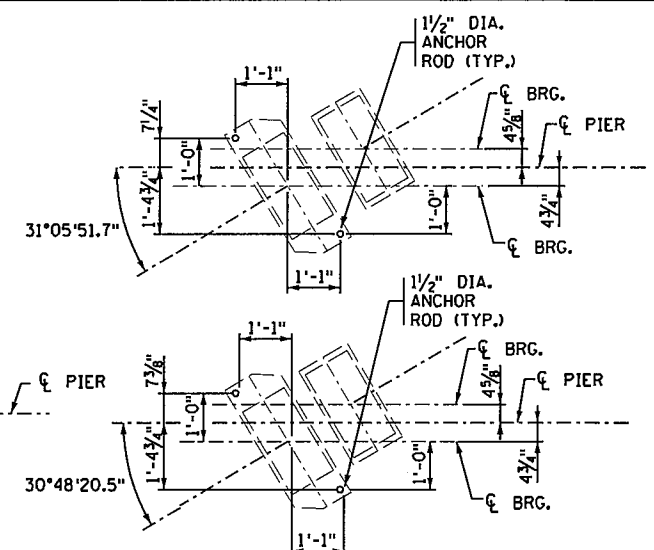
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SHEET NO. D28 OF D66 SHEETS		

BRIDGE NO
62937

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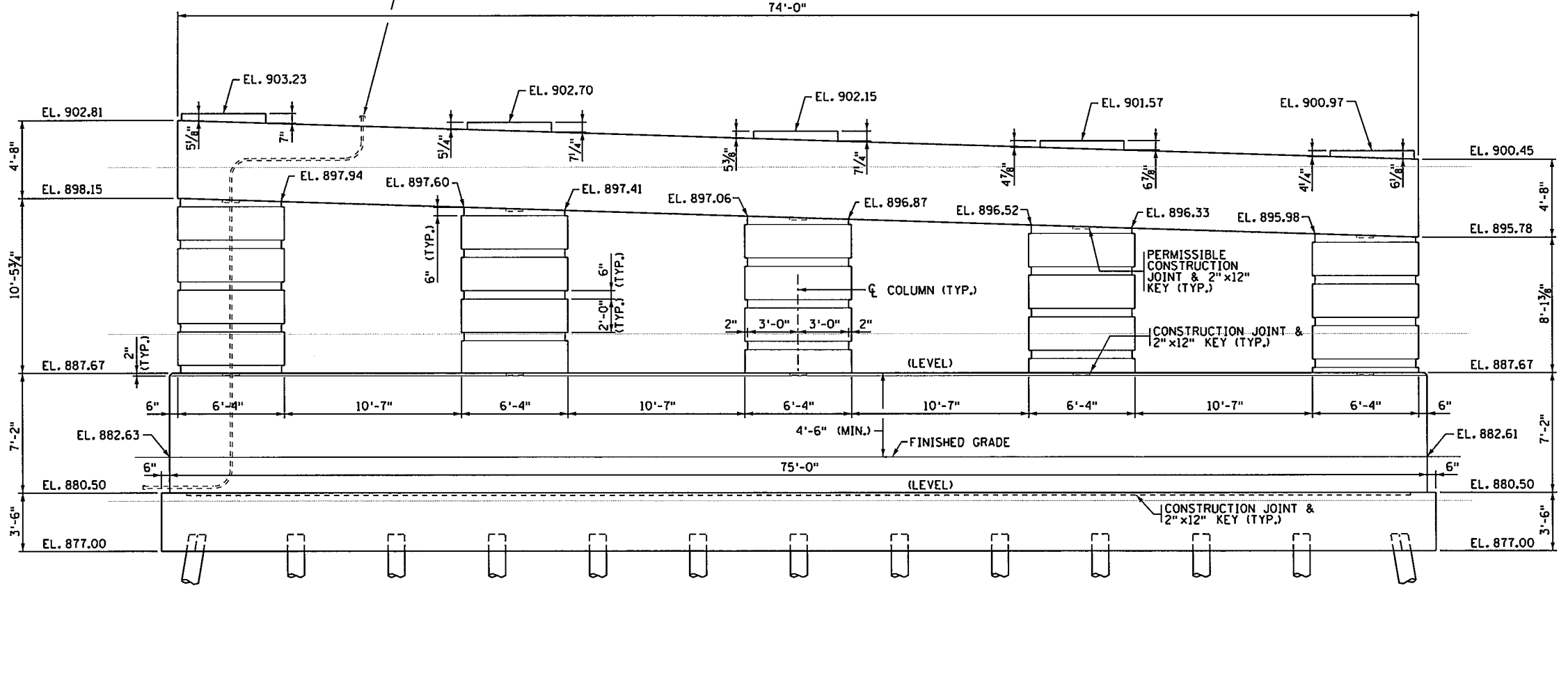


PIER CAP PLAN

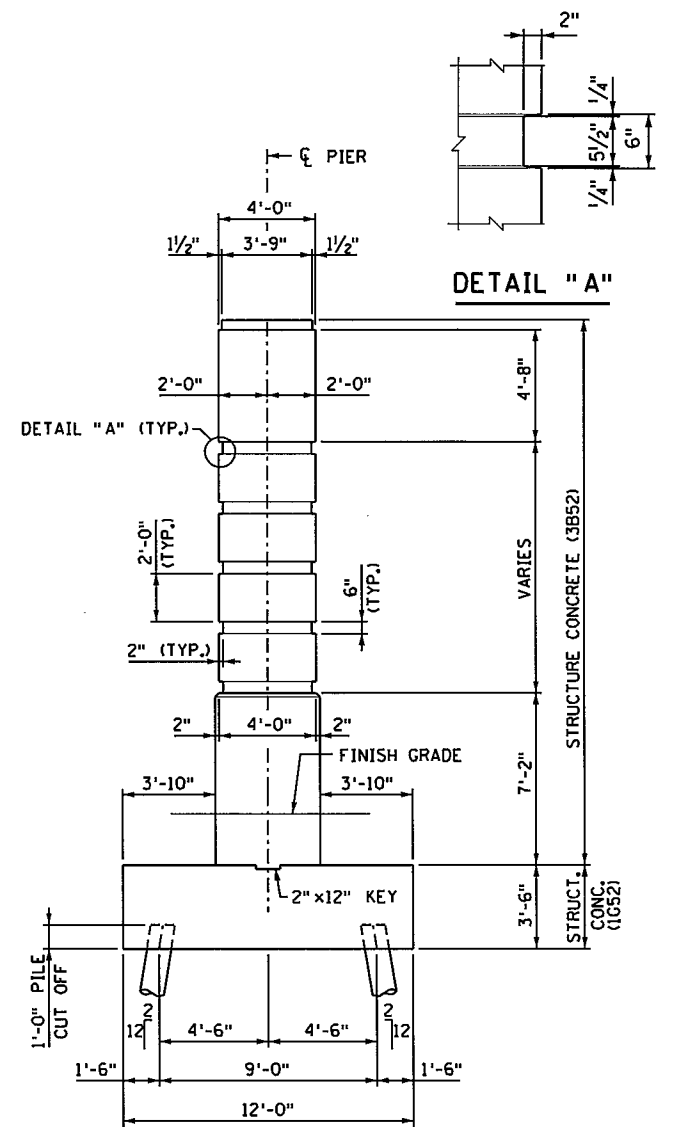


TYPICAL ANCHOR ROD LAYOUT

1/2" DIA. PVC COATED R.S. CONDUIT.
 EXTEND 6" PASSED CONCRETE FACE AND CAP
 (CONDUIT SYSTEM TYPE 1)



ELEVATION



END ELEVATION

DETAIL "A"

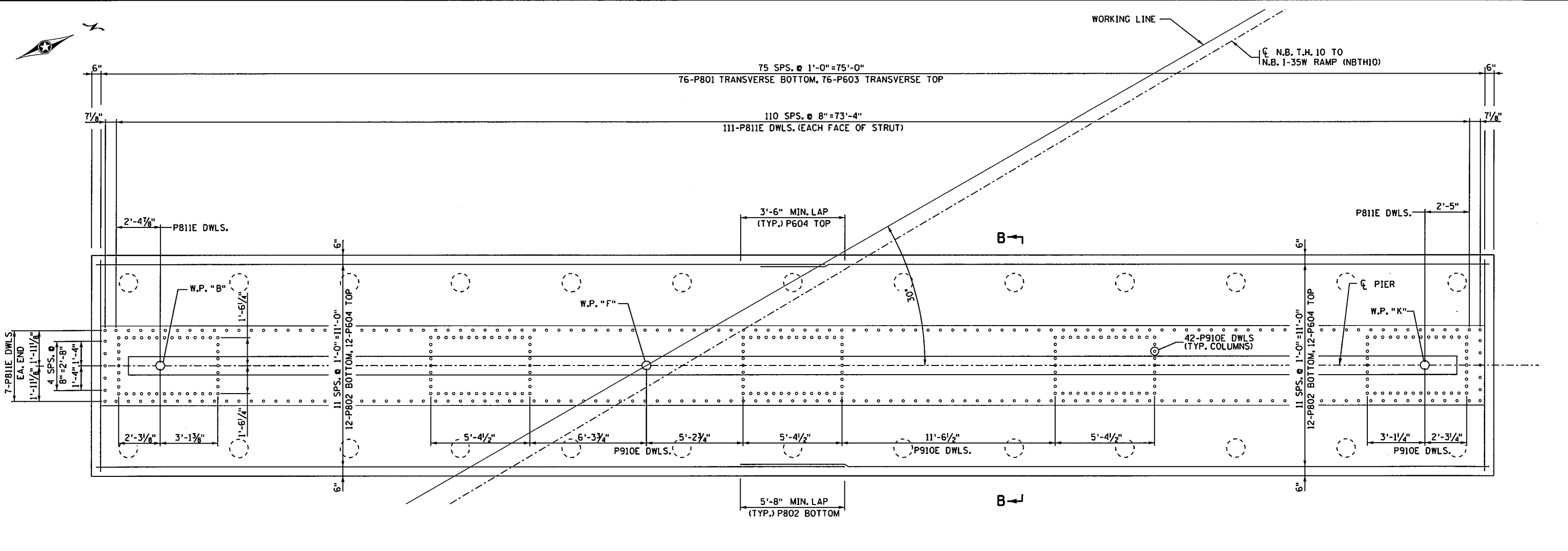
3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 5510
 PHONE (651) 490-2000
 FAX (651) 490-2150

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H Dupont* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

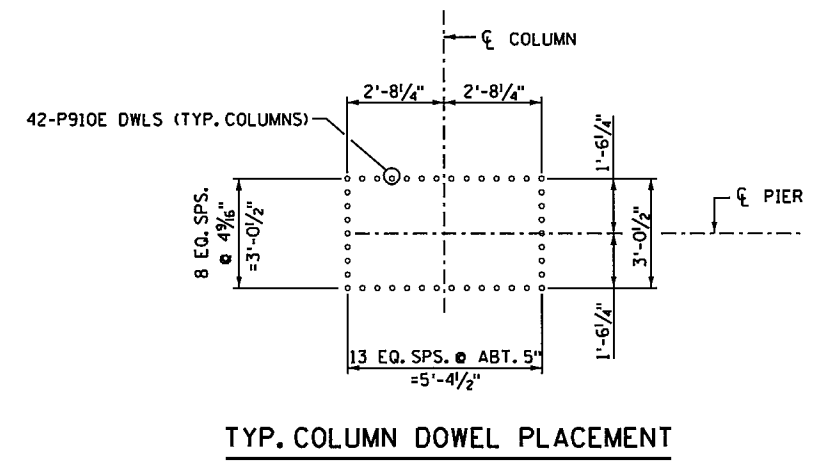
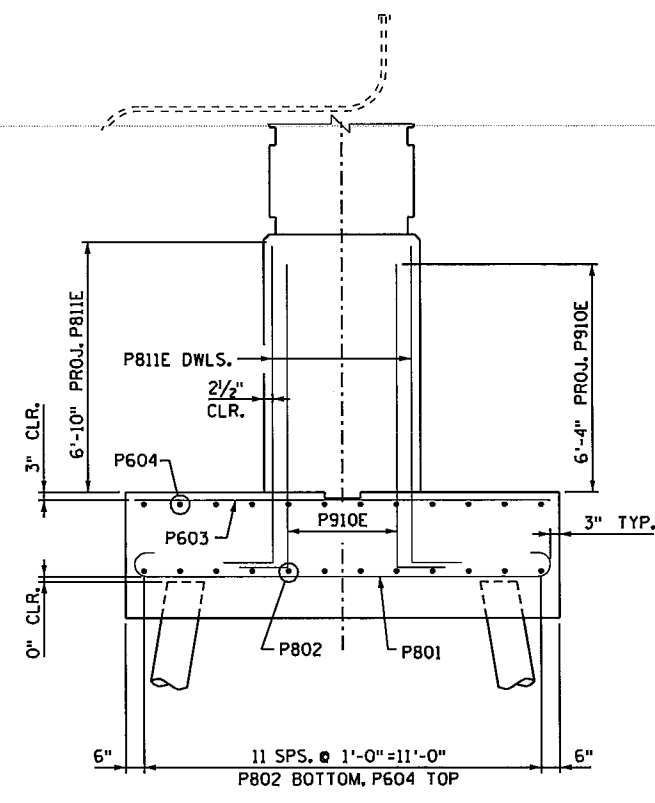
PIER 1 DETAILS

DES: MHD	DR: MAW	APPROVED:	12/14/15	BRIDGE NO 62937
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FOOTING REINFORCEMENT PLAN



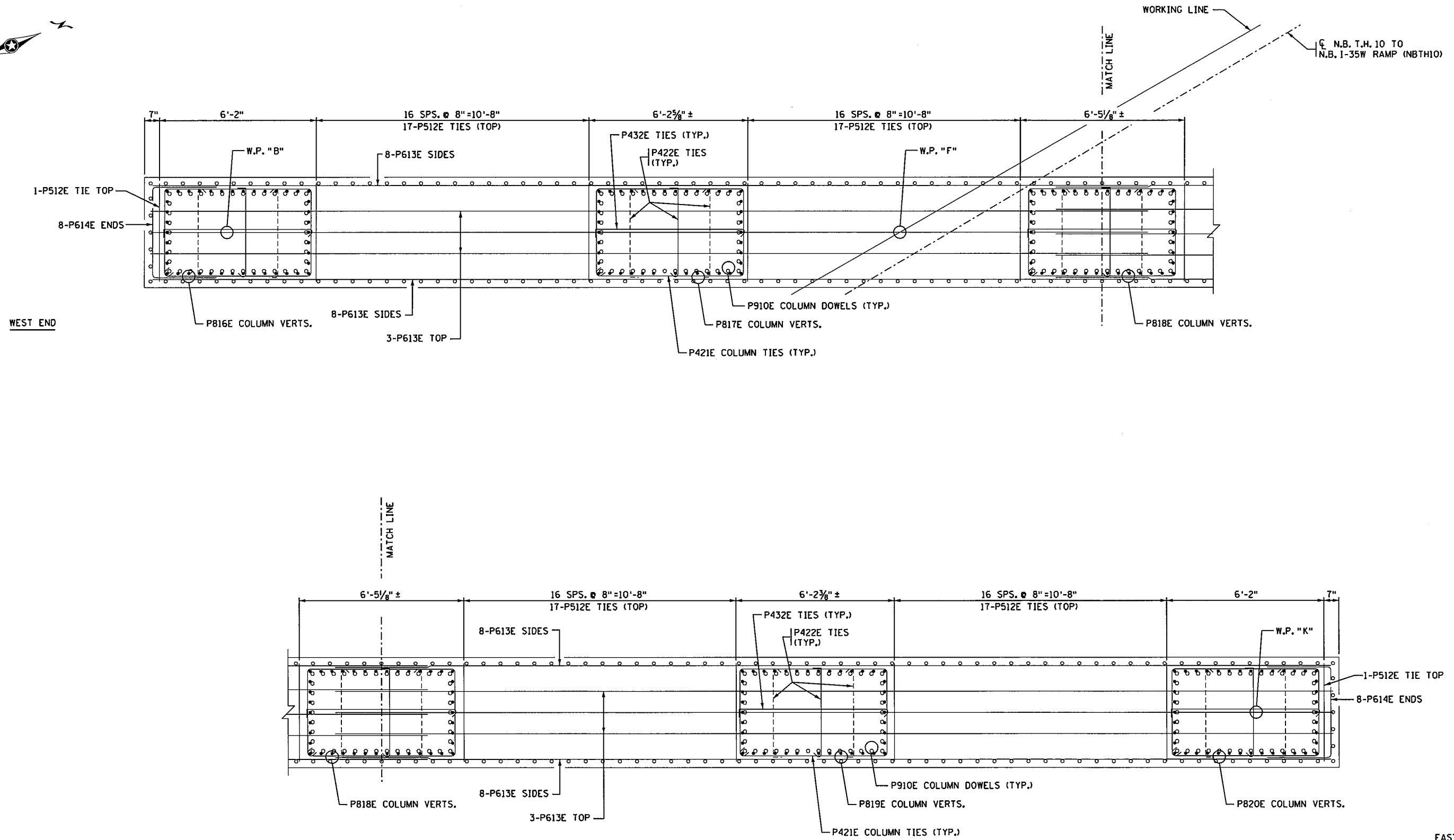
SEH
3535 VADNAIS CENTER DRIVE
ST. PAUL, MN 5510
PHONE (651) 490-2000
FAX (651) 490-2150

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PIER 1 REINFORCEMENT

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
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SHEET NO. D30 OF D66 SHEETS			

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STRUT PLAN


 3535 VAONNAIS CENTER DRIVE
 ST. PAUL, MN 55110
 PHONE (651) 490-2000
 FAX (651) 490-2150

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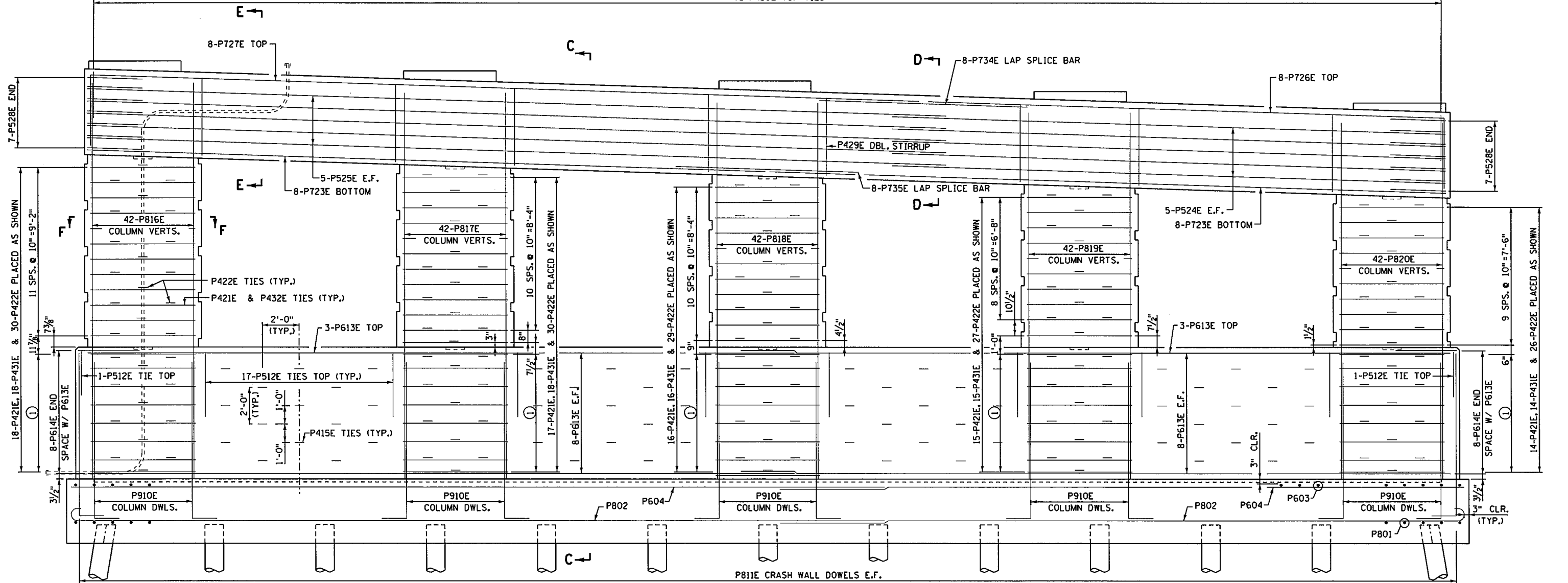
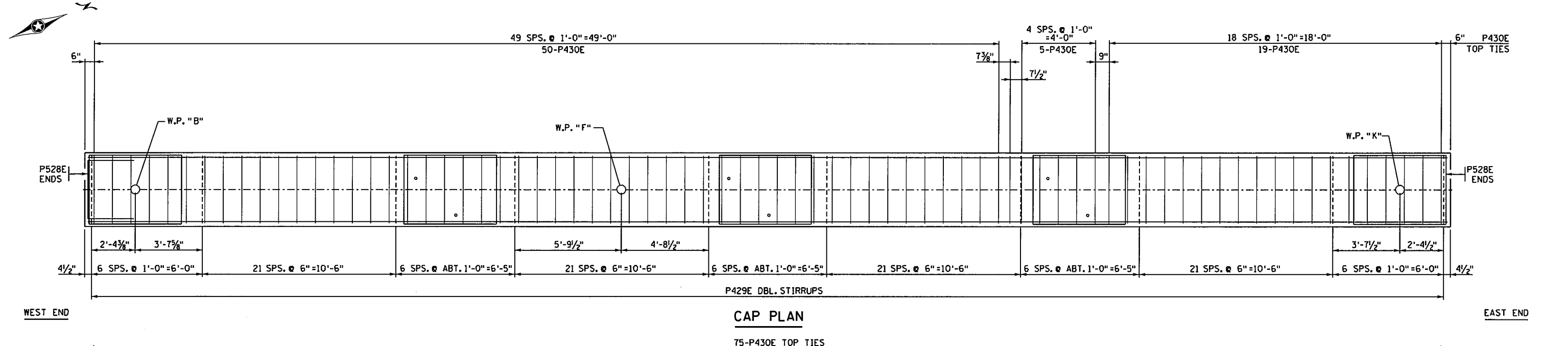
PIER 1 REINFORCEMENT

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CHK: NCK	CHK: MHD	

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BRIDGE NO 62937

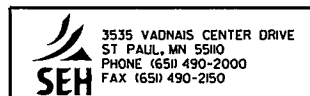
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NOTES:
SEE SHEET D34 FOR BILL OF REINFORCEMENT.
SEE SHEET D33 FOR SECTIONS C-C, D-D, E-E & F-F.

- ① SEE SECTION C-C SHEET D33 FOR SPACINGS OF P421E, P431E & P422E TIES LOCATED IN CRASH STRUT.

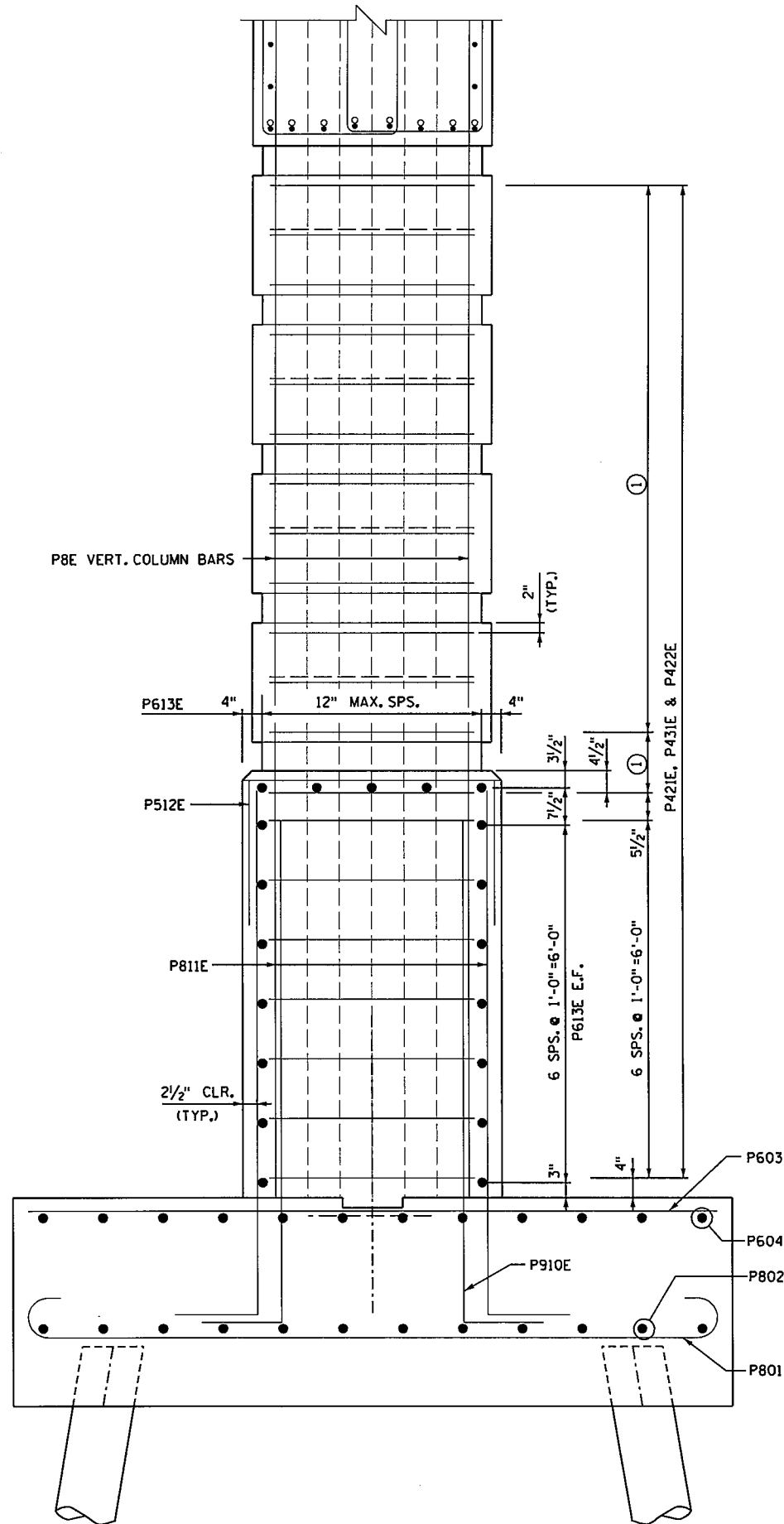
ELEVATION



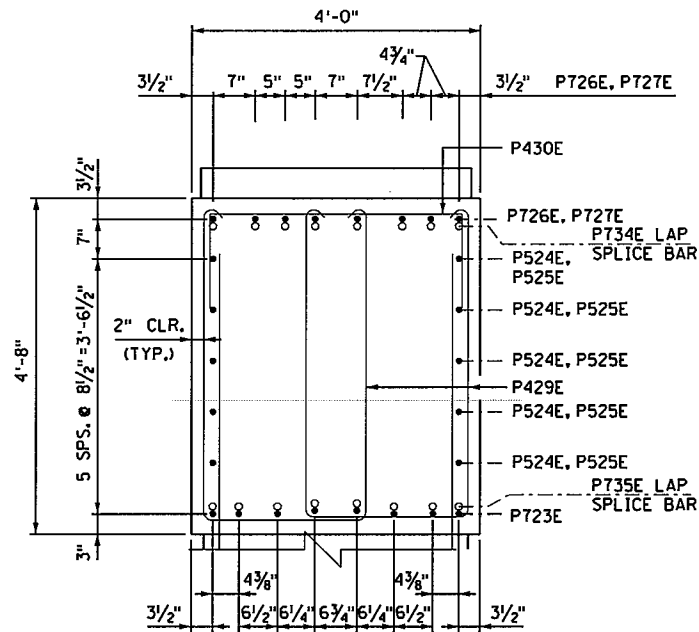
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Printed Name: MICHAEL H DUPONT Lic. No. 43375

PIER 1 REINFORCEMENT

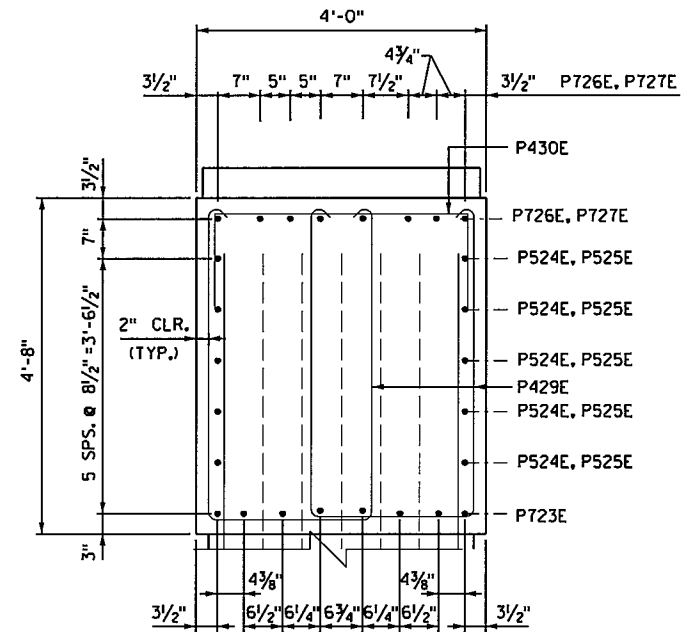
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CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. D32 OF D66 SHEETS			



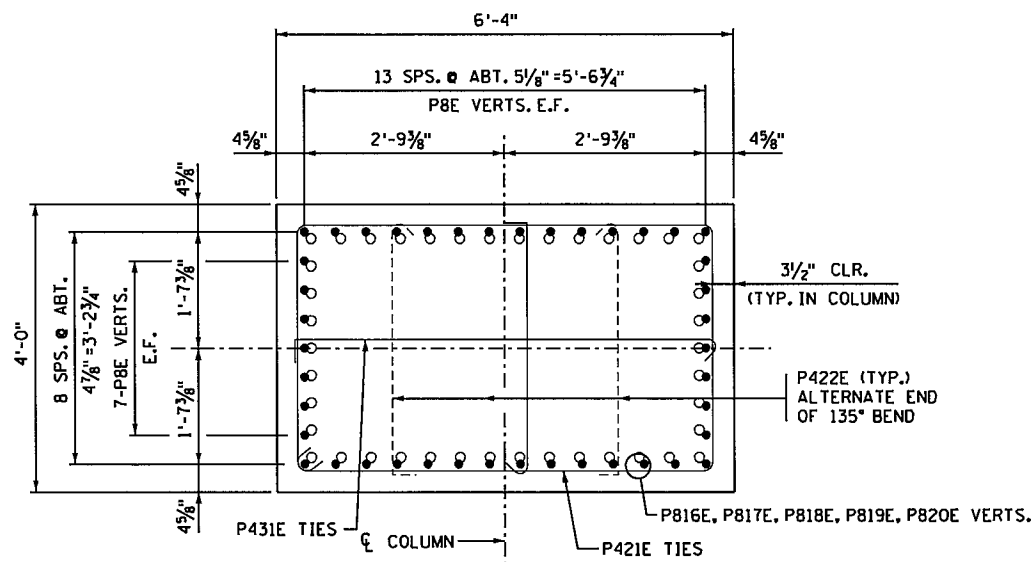
SECTION C-C



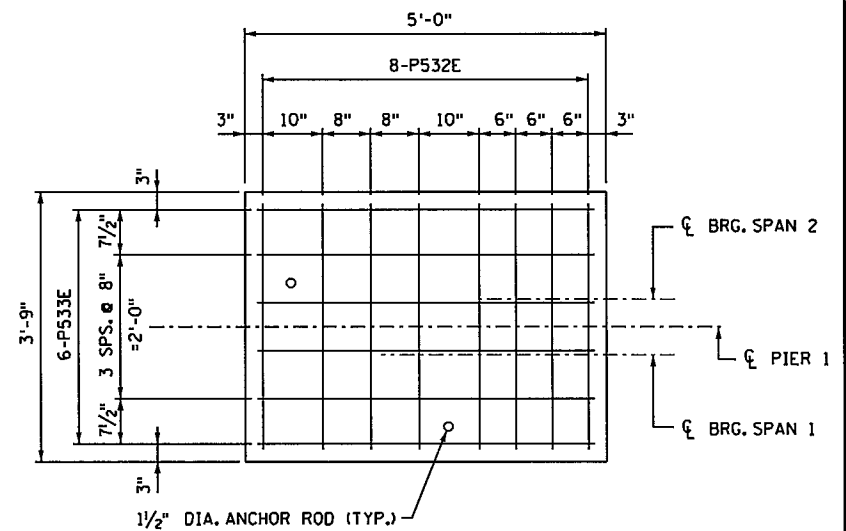
SECTION D-D



SECTION E-E




COLUMN SECTION F-F



TYPICAL SEAT DETAIL
ANCHOR RODS AT BEARINGS F1

NOTES:

- SEE SHEET D34 FOR BILL OF REINFORCEMENT.
- SEE SHEET D32 FOR LOCATION OF SECTIONS C-C, D-D, E-E & F-F.
- ① SEE SHEET D32 FOR SPACING.


 3535 VAONAS CENTER DRIVE
 ST. PAUL, MN 55109
 PHONE (651) 490-2000
 FAX (651) 490-2150

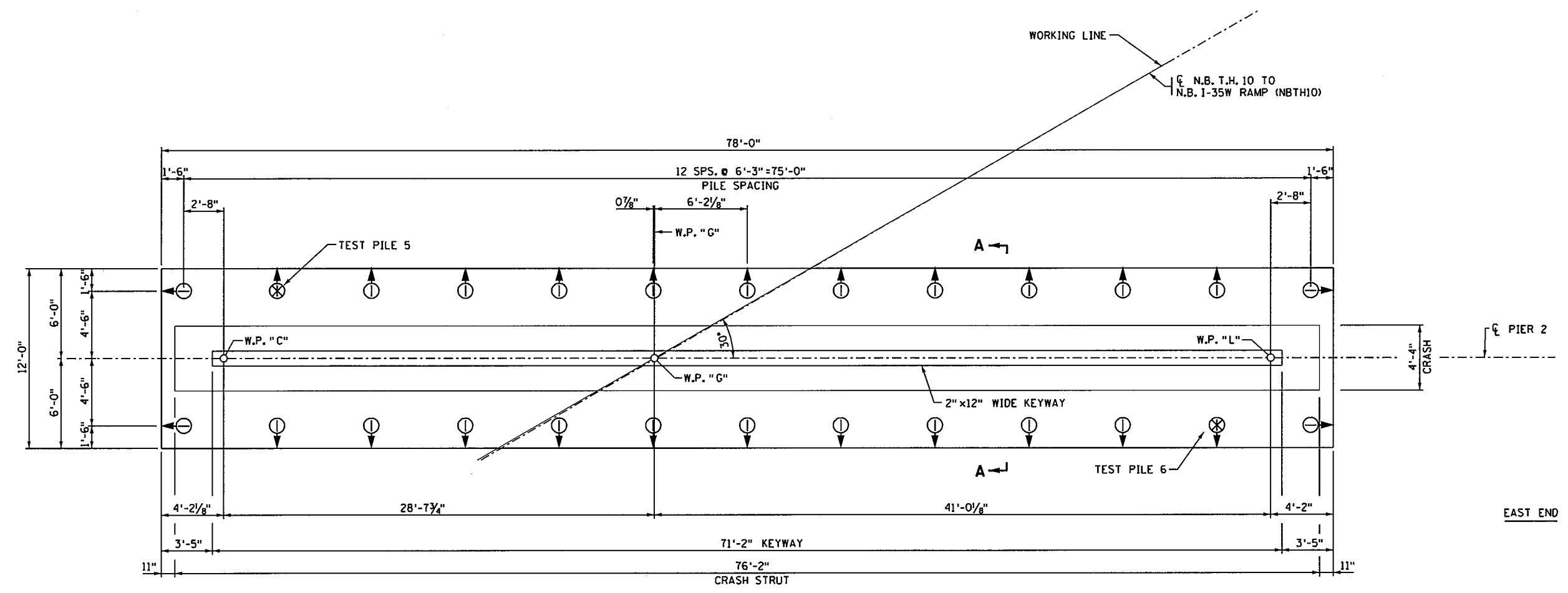
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PIER 1 REINFORCEMENT

DES: MHD	DR: MAW	APPROVED: <i>12/14/15</i>
CHK: NCK	CHK: MHD	
SHEET NO. D33 OF D66 SHEETS		

BRIDGE NO
62937

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PIER 2 COMPUTED PILE LOAD - TONS/PILE	
FACTORED DEAD LOAD	56.5
FACTORED LIVE LOAD	13.5
FACTORED OVERTURNING	22.5
*FACTORED DESIGN LOAD	92.5

* BASED ON STRENGTH I LOAD COMBINATION

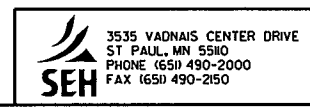
PIER 2 REQUIRED NOMINAL PILE BEARING RESISTANCE FOR CIP PILES R _n - Tons/Pile		
FIELD CONTROL METHOD	φ _{dyn}	*R _n
MnDOT Pile Formula 2012 (MPF12) $R_n = 20 \sqrt{\frac{W \times H}{1000}} \times \log\left(\frac{10}{5}\right)$	0.50	① 185.0
PDA	0.65	142.3

*R_n = (Factored Design Load) / φ_{dyn}

PILE NOTES:

2 12" C-I-P CONCRETE TEST PILE 60 FT. LONG
 24 12" C-I-P CONCRETE PILES EST. LENGTH 50 FT.
 26 12" C-I-P CONCRETE PILES REQ'D FOR PIER 2.
 PILE SPACING SHOWN IS AT BOTTOM OF FOOTING.
 FOR PILE SPLICE DETAILS SEE DETAIL B201.
 PILES MARKED THUS TO BE BATTERED 2" PER FOOT IN DIRECTION SHOWN.
 PILES TO HAVE 0.3125" MIN. WALL THICKNESS.
 COMMERCIAL DRIVE-FIT SPLICES WILL NOT BE PERMITTED ON THIS BRIDGE.

① NEW MNDOT MPF12 PILE DRIVING FORMULA AND TABLE MUST BE USED FOR THIS BRIDGE. USE OF OLDER FORMULA WILL RESULT IN INADEQUATE PILE CAPACITY.



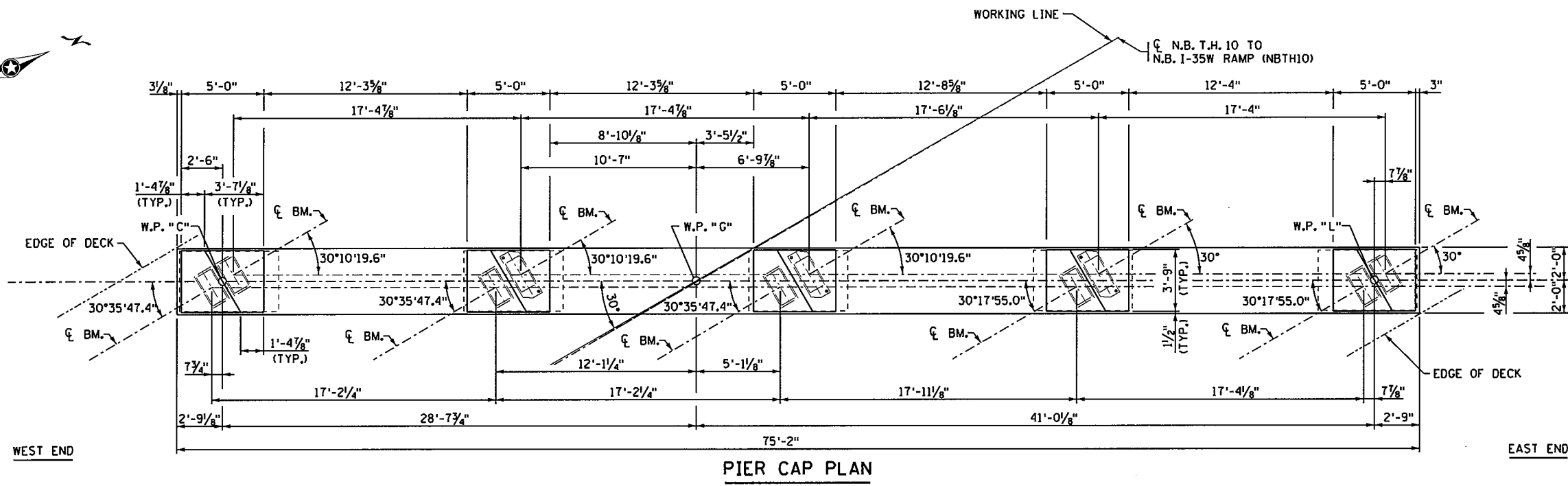
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PIER 2 DETAILS

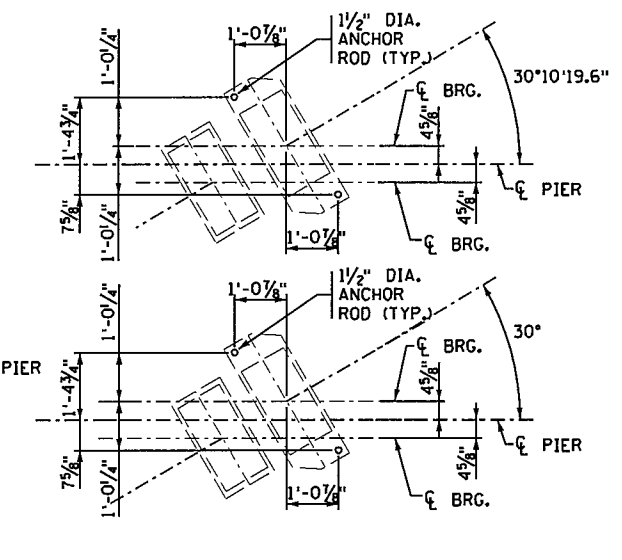
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BRIDGE NO
62937

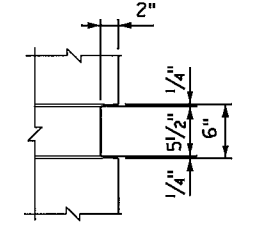
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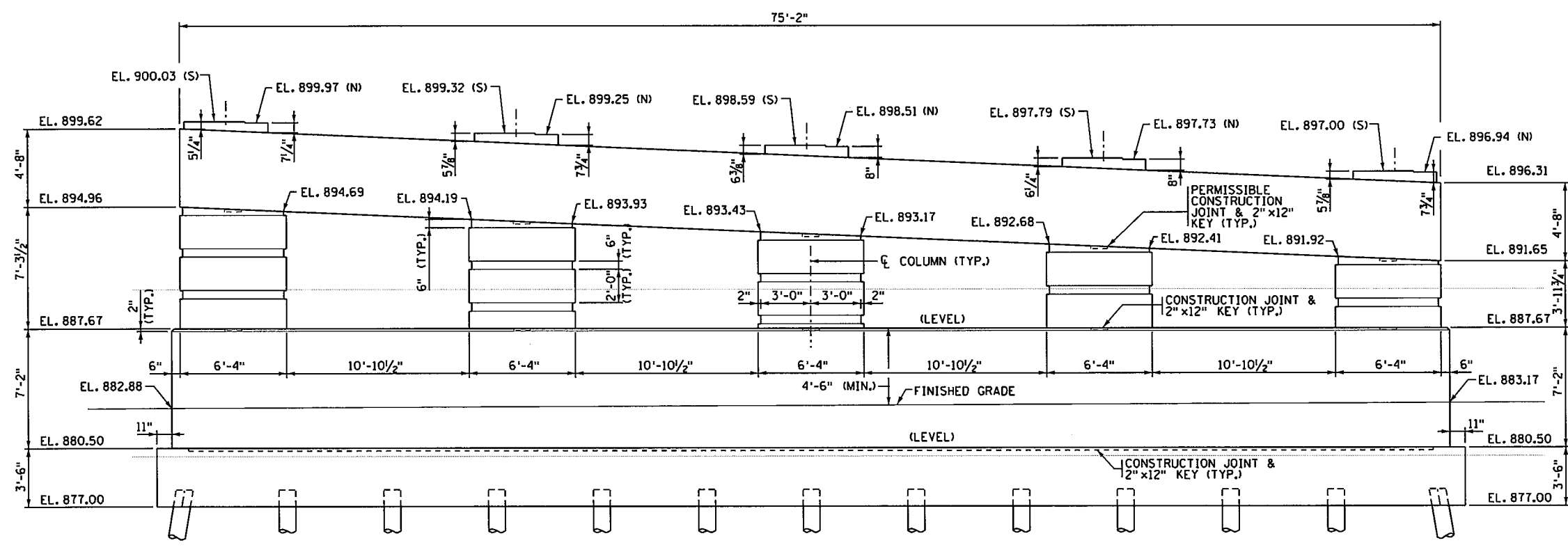
PIER CAP PLAN



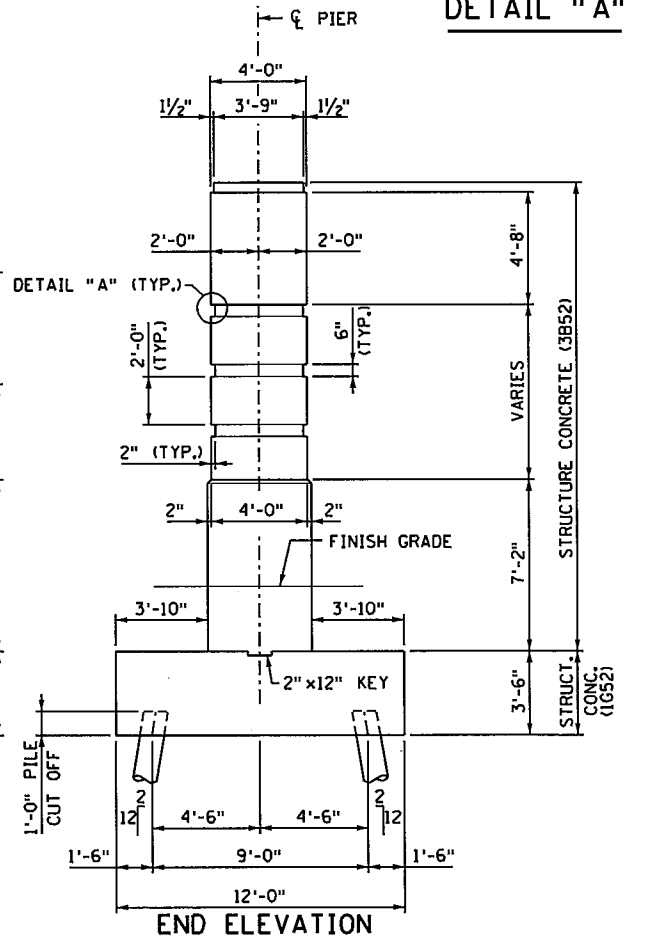
TYPICAL ANCHOR ROD LAYOUT



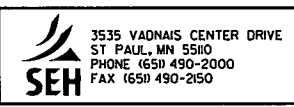
DETAIL "A"



ELEVATION



END ELEVATION

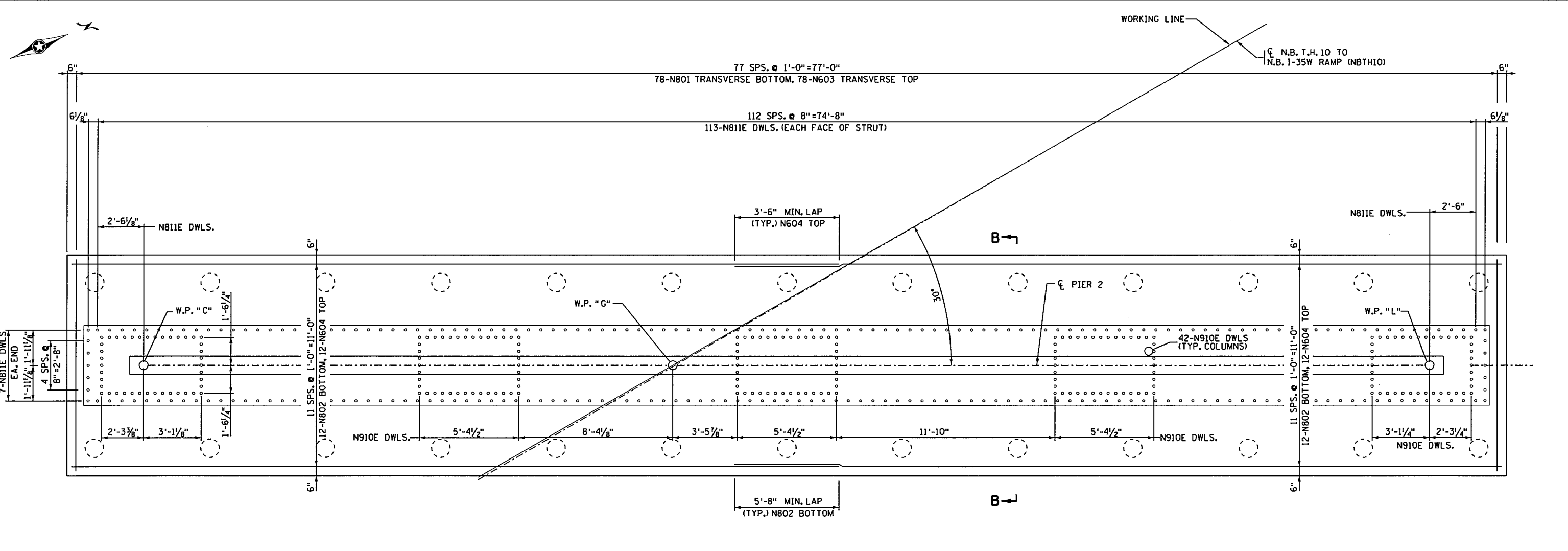


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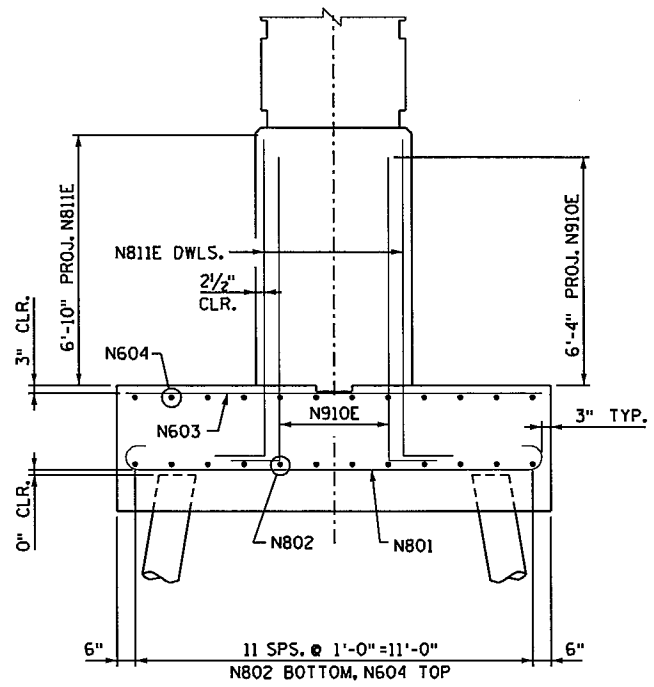
PIER 2 DETAILS

DES: MHD	DR: MAW	APPROVED:	BRIDGE NO 62937
CHK: NCK	CHK: MHD	12/14/15	
SHEET NO. D36 OF D66 SHEETS			

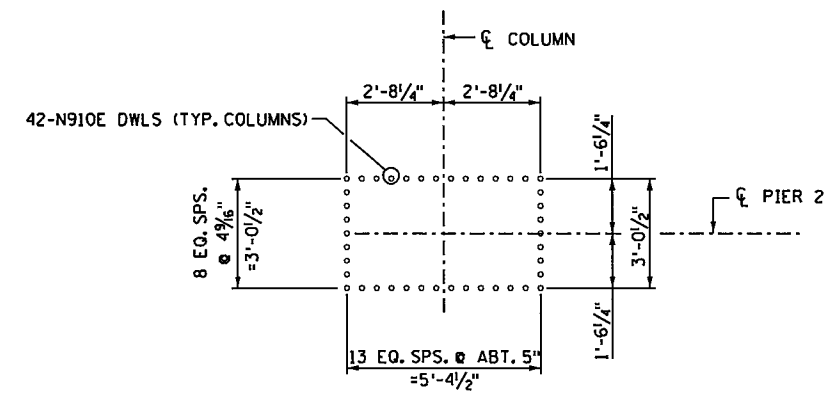
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FOOTING REINFORCEMENT PLAN



SECTION B-B



TYP. COLUMN DOWL PLACEMENT

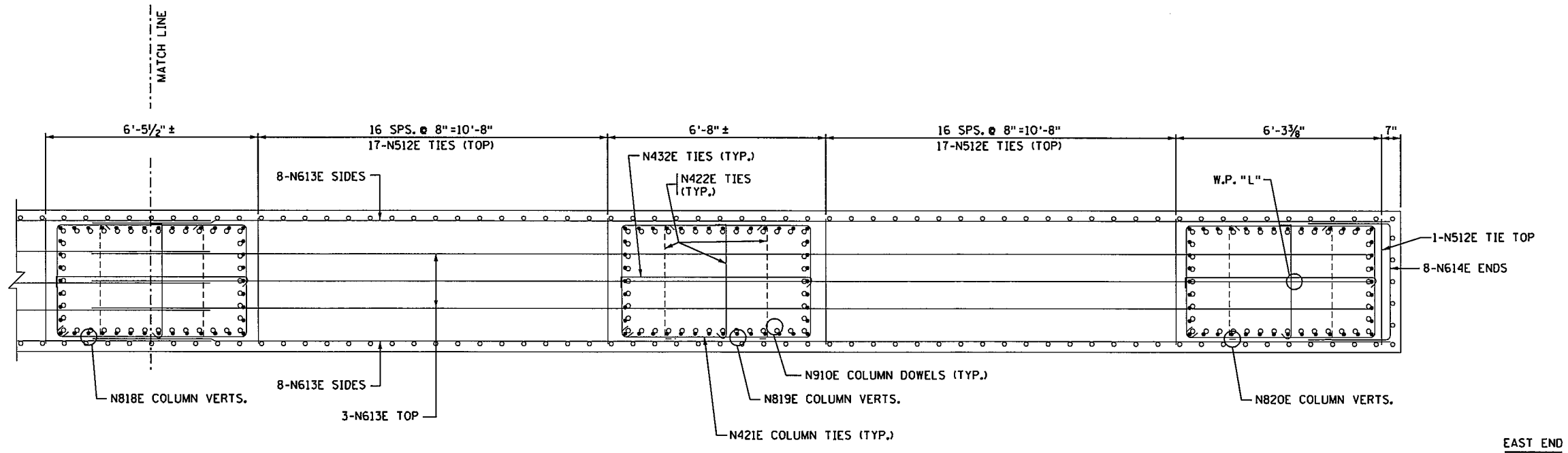
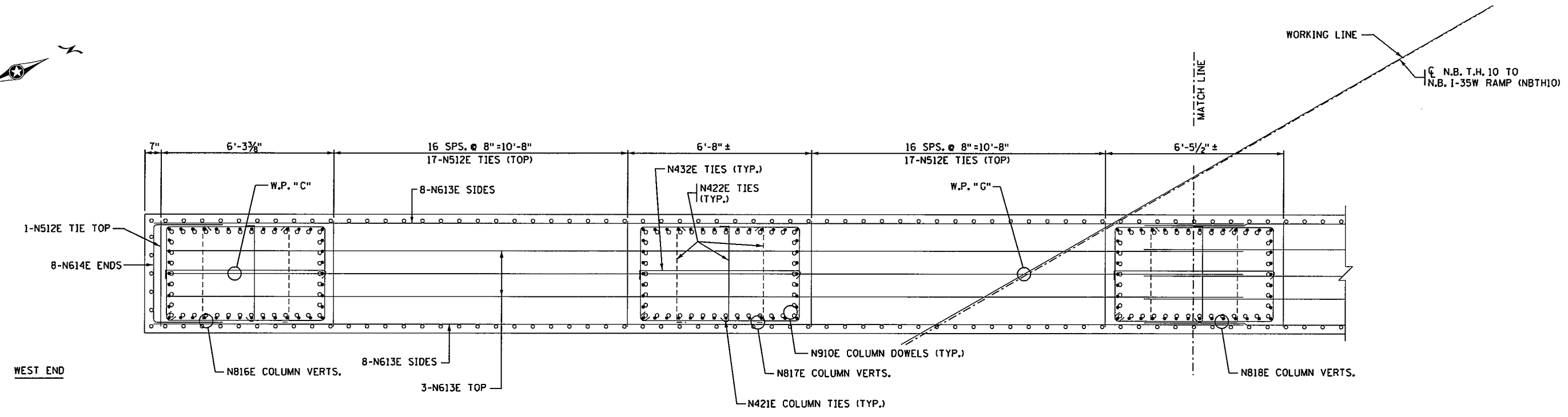
3535 VADNAIS CENTER DRIVE
ST. PAUL, MN 5510
PHONE (651) 490-2000
FAX (651) 490-2150

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PIER 2 REINFORCEMENT

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MHD	SHEET NO. D37 OF D66 SHEETS	



STRUT PLAN


 3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 55110
 PHONE (651) 490-2000
 FAX (651) 490-2150

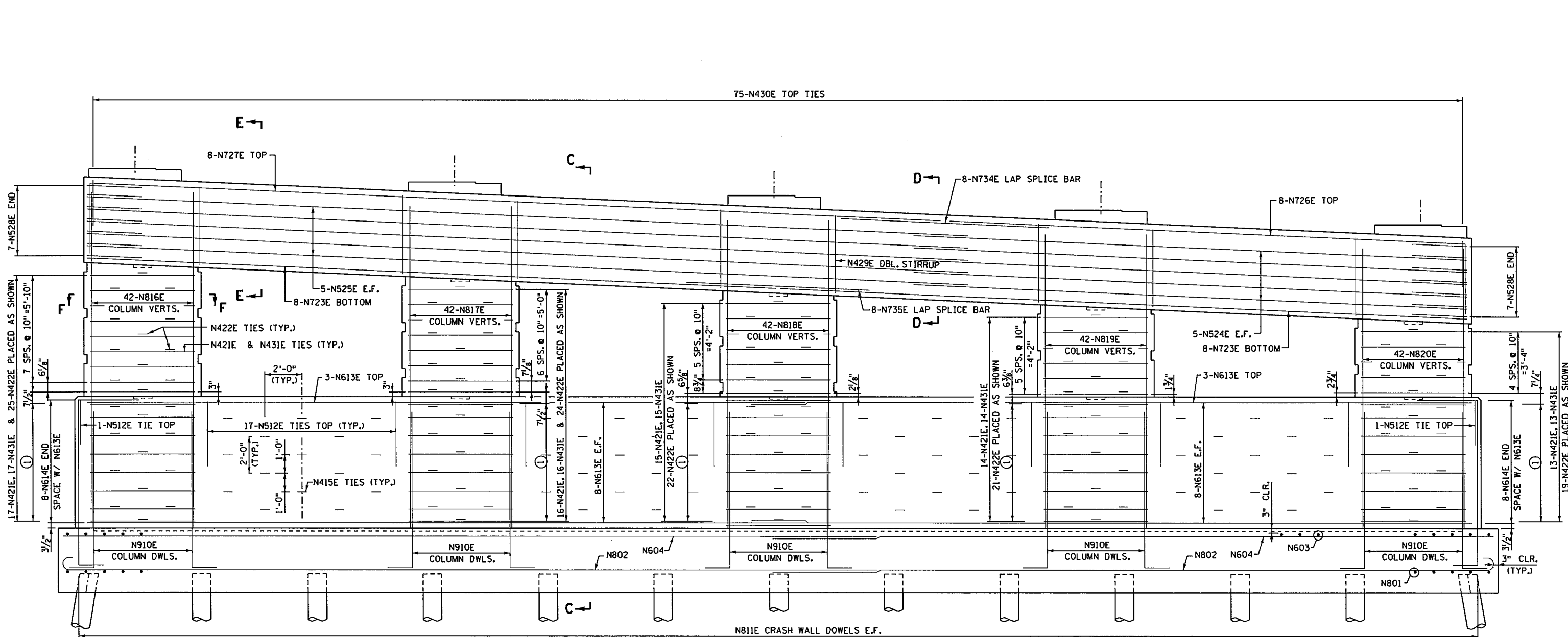
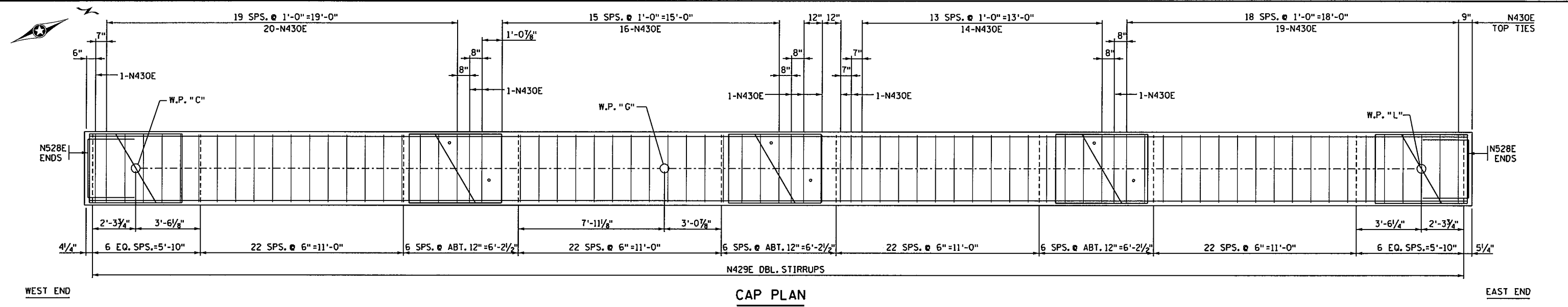
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PIER 2 REINFORCEMENT

DES: MHD	DR: MAW	APPROVED:
CHK: NCK	CHK: MHD	12/14/15
SHEET NO. D38 OF D66 SHEETS		

BRIDGE NO 62937

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NOTES:
 SEE SHEET D41 FOR BILL OF REINFORCEMENT.
 SEE SHEET D40 FOR SECTIONS C-C, D-D, E-E & F-F.

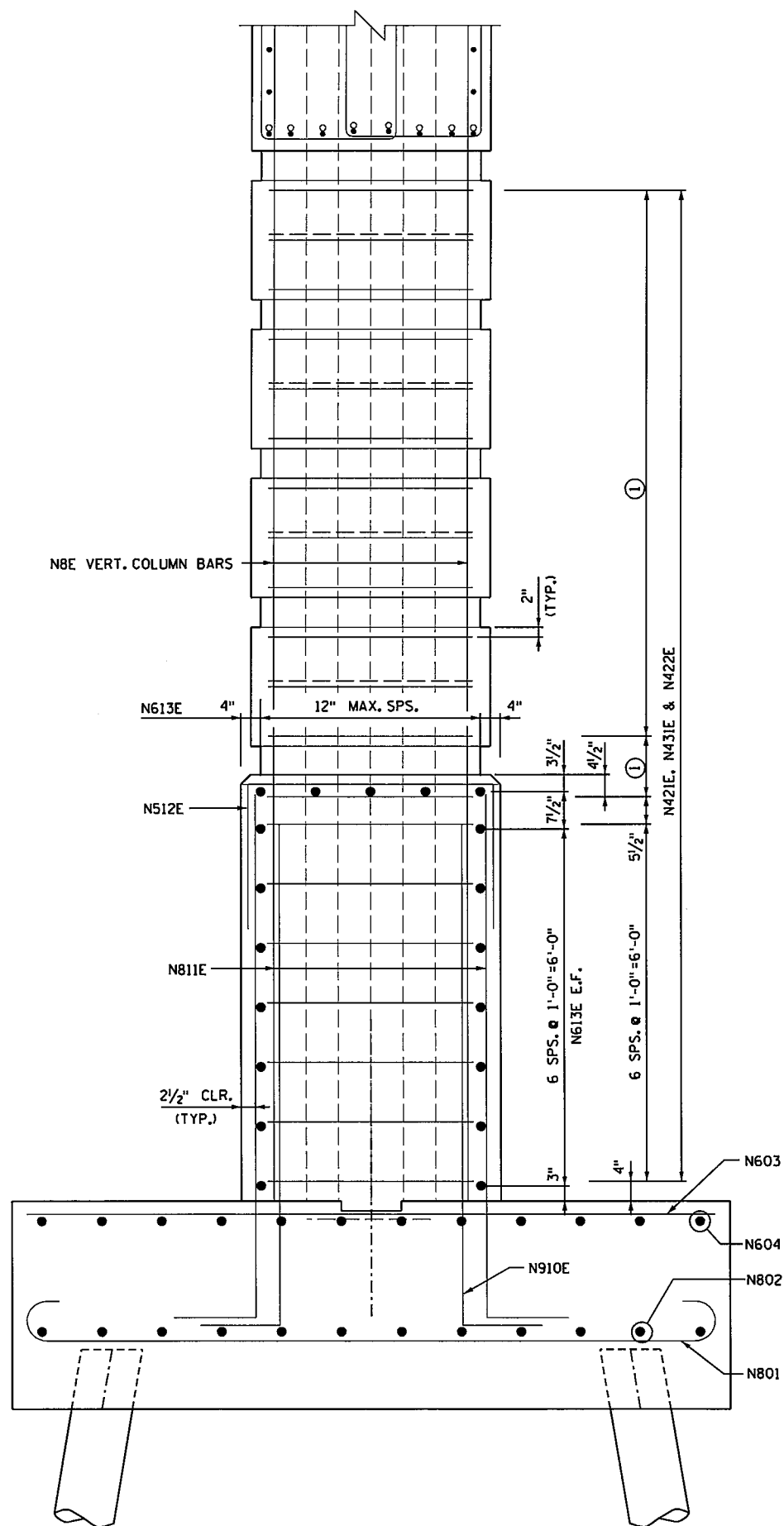
① SEE SECTION C-C SHEET D40 FOR SPACINGS OF N421E, N431E & N422E TIES LOCATED IN CRASH STRUT.

SEH
 3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 55110
 PHONE (651) 490-2000
 FAX (651) 490-2150

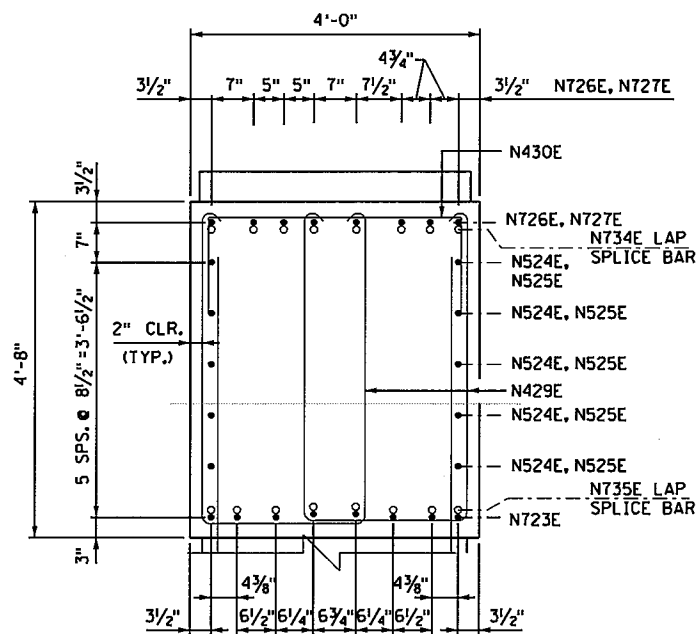
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PIER 2 REINFORCEMENT

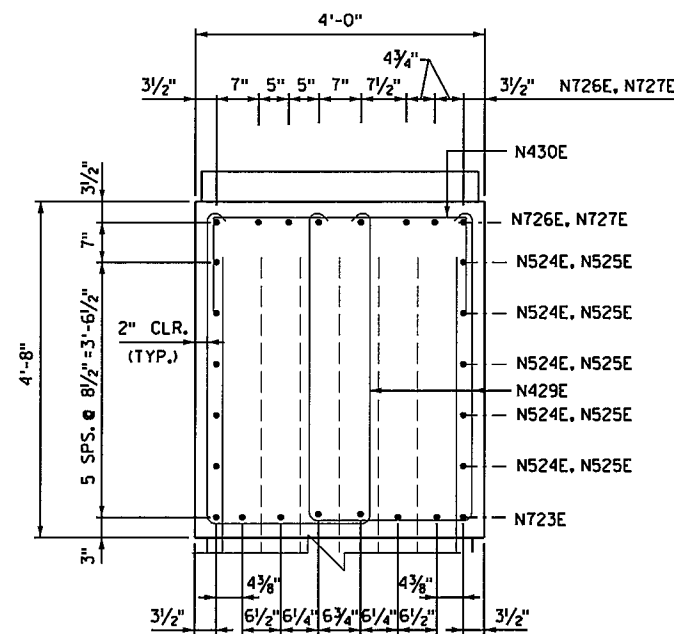
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SHEET NO. D39 OF D66 SHEETS			



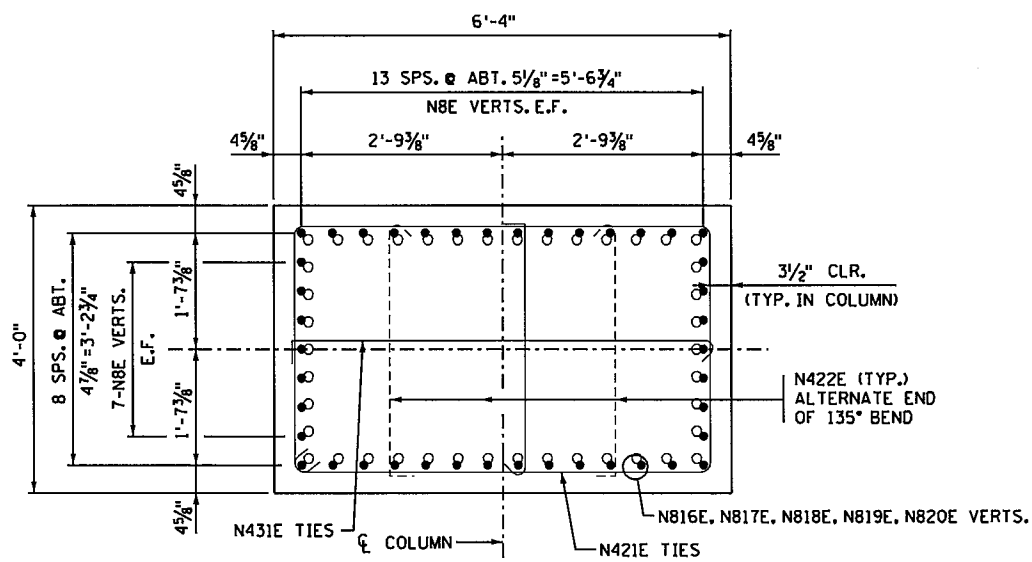
SECTION C-C



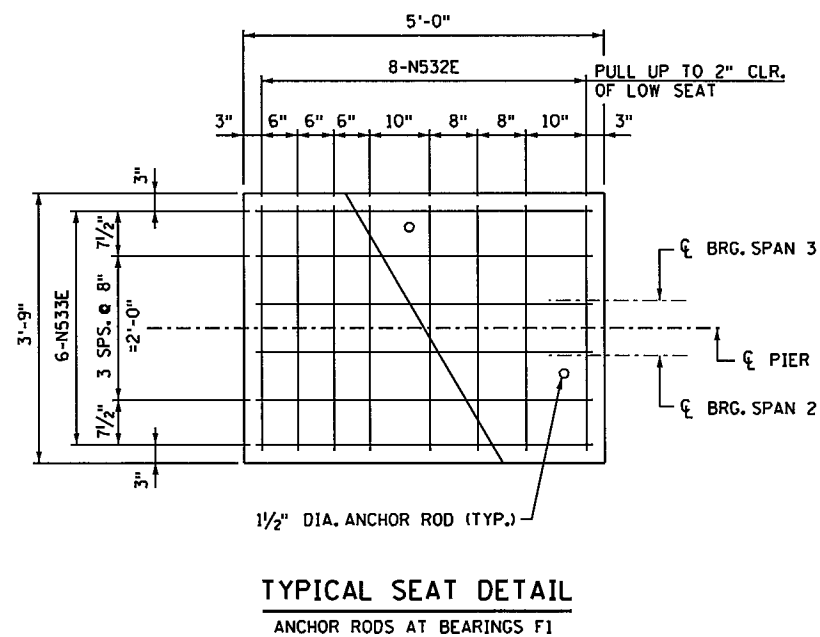
SECTION D-D



SECTION E-E



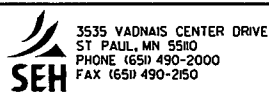
COLUMN SECTION F-F



TYPICAL SEAT DETAIL
ANCHOR RODS AT BEARINGS F1

NOTES:

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- SEE SHEET D39 FOR LOCATION OF SECTIONS C-C, D-D, E-E & F-F.
- ① SEE SHEET D39 FOR SPACING.



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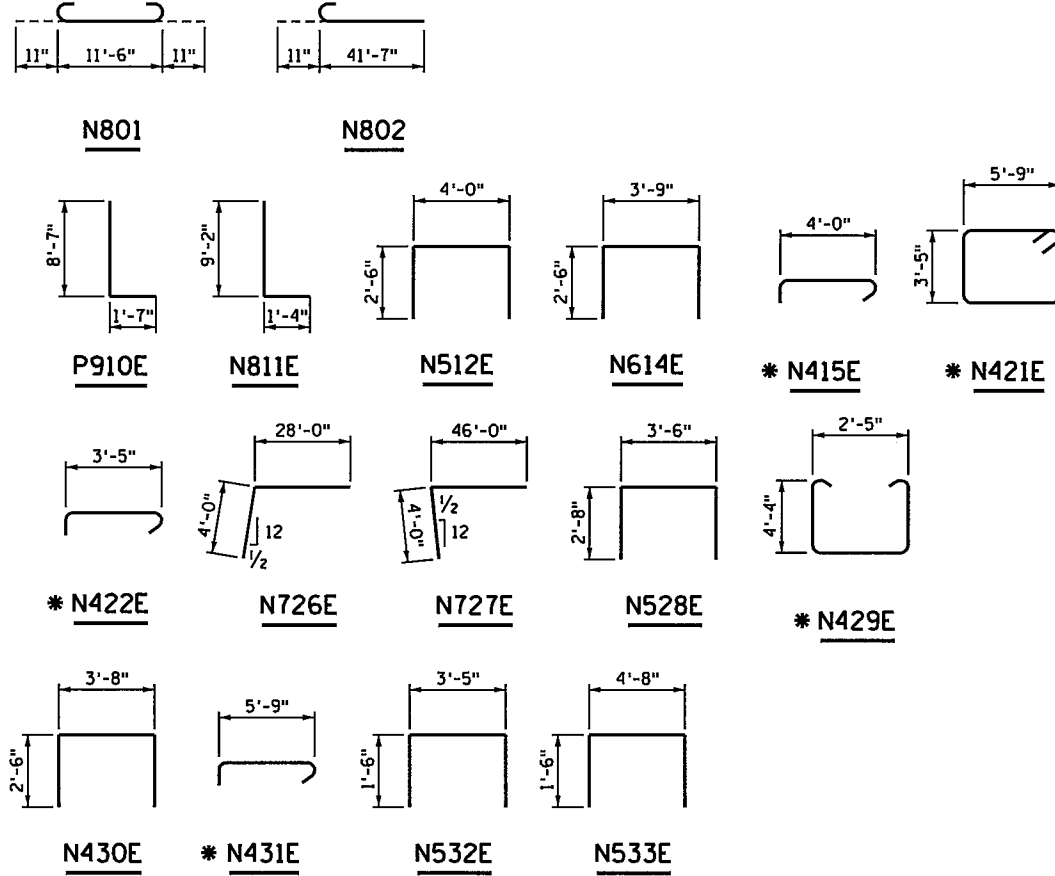
PIER 2 REINFORCEMENT

DES: MHD	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: MHD		
SHEET NO. D40 OF D66 SHEETS			

BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
PIER 2				
BLACK BARS				
N801	78	13'-4"	BENT	FOOTING TRANSVERSE BOTTOM
N802	24	42'-6"	BENT	FOOTING LONGITUDINAL BOTTOM
N603	78	11'-6"	STR	FOOTING TRANSVERSE TOP
N604	24	40'-6"	STR	FOOTING LONGITUDINAL TOP
PIER 2				
EPOXY COATED BARS				
N910E	210	10'-2"	BENT	VERT. COLUMN DWLS.
N811E	240	10'-3"	BENT	VERT. CRASH WALL DWLS.
N512E	70	9'-0"	BENT	CRASH STRUT TOP TIE
N613E	38	39'-6"	STR	CRASH STRUT SIDES & TOP
N614E	16	8'-9"	BENT	CRASH STRUT ENDS
N415E	80	4'-9"	BENT	CRASH STRUT TIES
N816E	42	18'-3"	STR	VERT. COLUMN
N817E	42	17'-6"	STR	VERT. COLUMN
N818E	42	16'-9"	STR	VERT. COLUMN
N819E	42	16'-0"	STR	VERT. COLUMN
N820E	42	15'-3"	STR	VERT. COLUMN
N421E	75	19'-1"	BENT	COLUMN TIES
N422E	111	4'-2"	BENT	COLUMN TIES
N723E	16	37'-4"	STR	CAP LONGITUDINAL BOTTOM
N524E	10	30'-0"	STR	CAP LONGITUDINAL SIDES
N525E	10	47'-9"	STR	CAP LONGITUDINAL SIDES
N726E	8	32'-0"	BENT	CAP LONGITUDINAL TOP
N727E	8	50'-0"	BENT	CAP LONGITUDINAL TOP
N528E	14	8'-10"	BENT	CAP LONGITUDINAL ENDS
N429E	238	11'-10"	BENT	CAP DBL. STIRRUP
N430E	78	8'-8"	BENT	CAP TRANSVERSE TIE TOP
N431E	75	6'-6"	BENT	COLUMN TIES
N532E	40	6'-5"	BENT	BEARING SEAT
N533E	30	7'-8"	BENT	BEARING SEAT
N734E	8	11'-3"	STR	LAP SPLICE BAR
N735E	8	9'-11"	STR	LAP SPLICE BAR

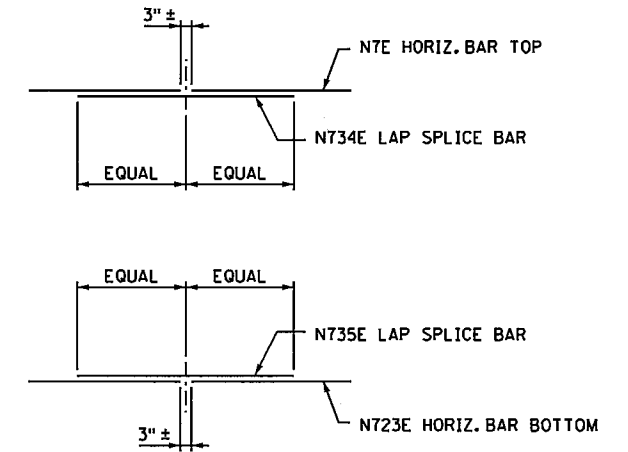
* BAR USES STANDARD STIRRUP AND TIE HOOKS.

NOTE:
BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT.



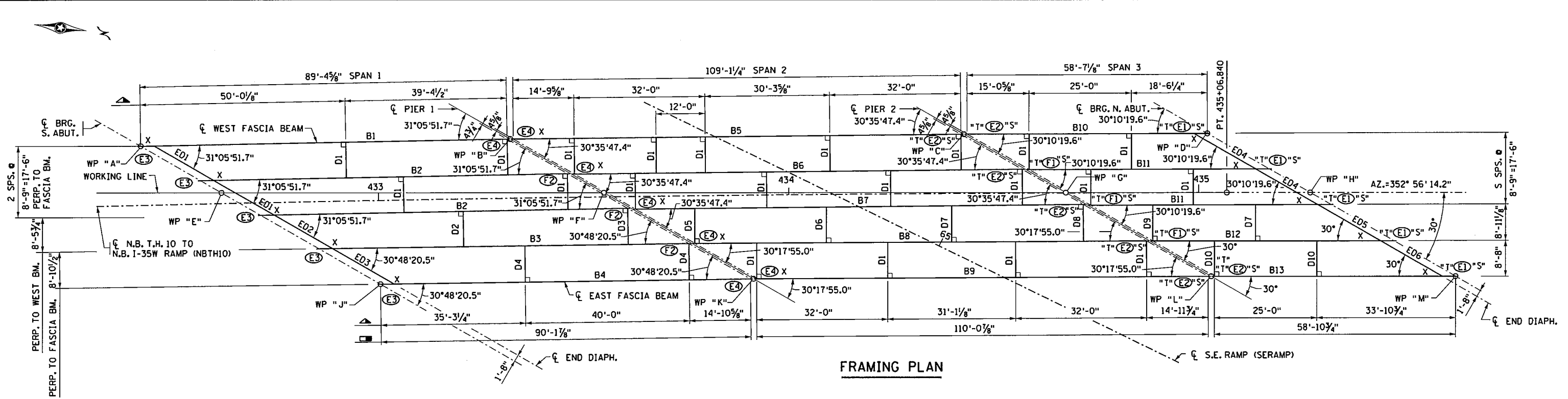
SUMMARY OF QUANTITIES FOR PIER 2		
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (1G52)	CU YD	121
STRUCTURAL CONCRETE (3B52)	CU YD	167
REINFORCEMENT BARS	POUND	8310
REINFORCEMENT BARS (EPOXY COATED)	POUND	34870
C-I-P CONCRETE PILING DELIVERED 12"	LIN FT	1200
C-I-P CONCRETE PILING DRIVEN 12"	LIN FT	1200
C-I-P CONC TEST PILE 60 FT LONG 12"	EACH	2
PILE REDRIVING	EACH	2
PILE ANALYSIS	EACH	2

PILES TO HAVE 0.25" MIN. WALL THICKNESS.
① DOES NOT INCLUDE TEST PILES.



LAP SPLICE BAR DETAIL
N734E AND N735E

11/18/15 AM
12/10/2015
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END DIAPHRAGMS ③		
MARK	NO.	LENGTH
ED1	2	16'-11 1/4"
ED2	1	16'-5 1/4"
ED3	1	17'-4"
ED4	2	17'-4 1/8"
ED5	1	17'-10 1/4"
ED6	1	17'-4"

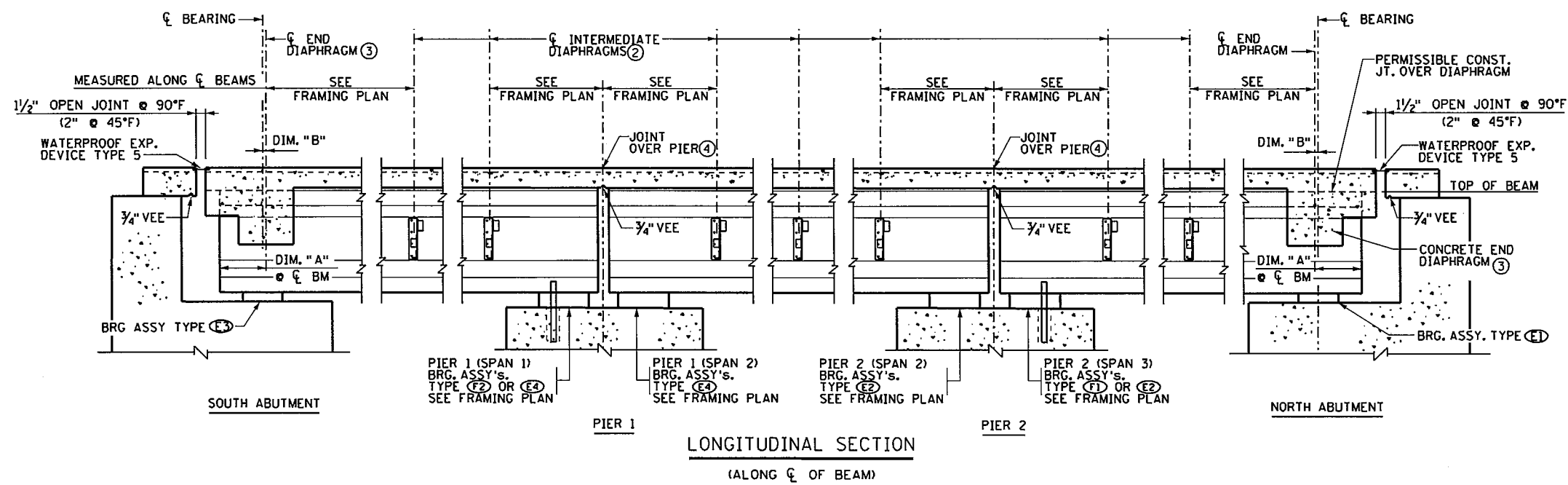
INTERMEDIATE DIAPHRAGMS ②		
MARK	NO.	LENGTH
D1	21	8'-9"
D2	1	8'-7 7/8"
D3	1	8'-10 1/4"
D4	2	8'-10 1/2"
D5	1	8'-6 5/8"
D6	1	8'-8 5/8"
D7	2	8'-10 1/2"
D8	1	9'-0 1/2"
D9	1	8'-9 1/2"
D10	2	8'-8"

▲ ① BEAM TABLE				
SPAN	BEAM	LENGTH	DIM. "A"	DIM. "B"
1	B1 - B2	90'-7 5/8"	3'-10 1/4"	3'-2 3/4"
1	B3 - B4	91'-4 7/8"	3'-10 1/2"	3'-3"
2	B5 - B7	110'-4 1/4"	-	-
2	B8 - B9	111'-3 7/8"	-	-
3	B10 - B11	59'-10 1/8"	3'-11 3/8"	3'-3 3/8"
3	B12 - B13	60'-1 3/4"	3'-11 1/2"	3'-4"

▲ BEAM LENGTHS ARE END TO END OF BEAM.

NOTES:

- "X" DENOTES END OF BEAM.
- "T" ○ "S" DENOTES TALL END AND SHORT END OF TAPERED BEARING PLATE. SEE BEARING ASSEMBLY DETAILS ON SHEET D60.
- ▲ = INDICATES DIAPHRAGM SPACING ALONG CL BEAM.
- ▣ = INDICATES CL BEARING TO CL BEARING ALONG CL BEAM.
- ⊥ = INDICATES DIAPHRAGM PERPENDICULAR TO BEAM
- DIMENSIONS ARE TO INTERSECTIONS WITH CL BEARING LINES, TYP.
- ALL DIMENSIONS SHOWN ARE MEASURED ON A HORIZONTAL PLANE.
- MARKS SHOWN (E1) THRU (E4) DENOTE EXPANSION BEARING ASSEMBLIES. MARKS SHOWN (F1) (F2) DENOTE FIXED BEARING ASSEMBLIES. SEE DETAILS SHEET D60 FOR BEARING DETAILS B310 AND B311.
- U.N. = UNLESS OTHERWISE SHOWN OR NOTED.
- ① SEE SHEETS D43-D45 FOR BEAM DETAILS.
- ② SEE SHEET D61 FOR INTERMEDIATE DIAPHRAGM DETAIL B403.
- ③ SEE SHEET D50 FOR END DIAPHRAGM DETAILS.
- ④ SEE DETAIL ON SHEET D49 FOR JOINT OVER PIER.
- ⑤ LAYOUT OF THE INTERMEDIATE DIAPHRAGMS ARE PERPENDICULAR (90°) TO THE FASCIA BEAM OF EACH SPAN.
- ⑥ SKEW ANGLE AT WORKING LINE = 30°-00'-00.0" (TYPICAL ALL SUBSTRUCTURES & END DIAPHRAGMS).



3535 VAUGHAN CENTER DRIVE
ST. PAUL, MN 55110
PHONE (651) 490-2000
FAX (651) 490-2150

SEH

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

FRAMING PLAN

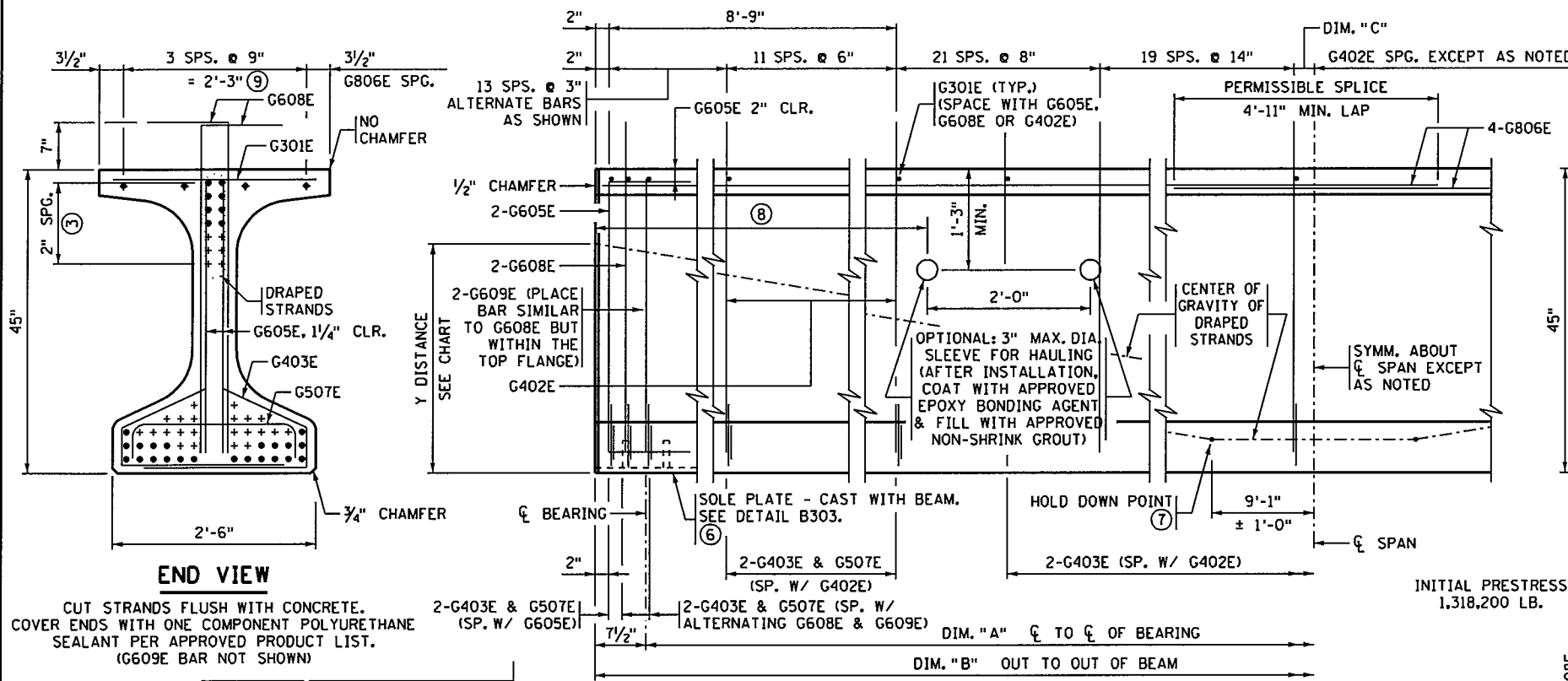
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CHK: NCK	CHK: MKM	12/14/15	

SHEET NO. D42 OF D66 SHEETS

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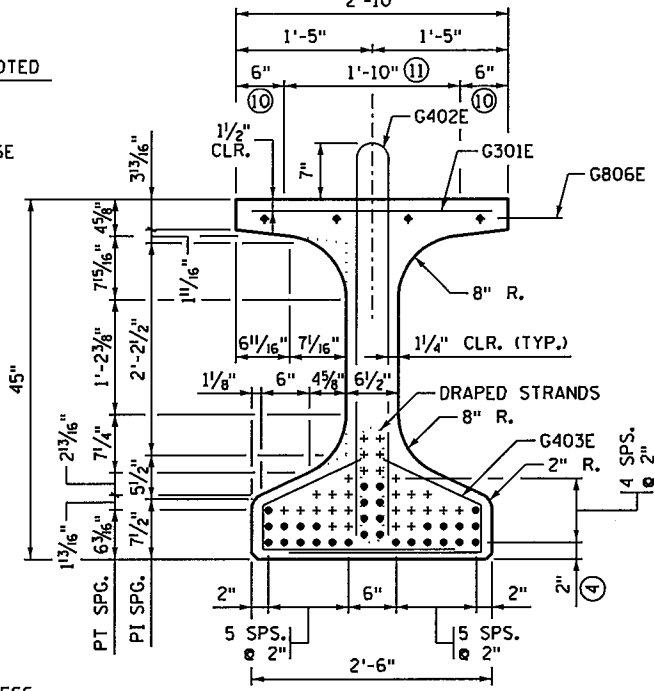
12/10/2015

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END VIEW
 CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH ONE COMPONENT POLYURETHANE SEALANT PER APPROVED PRODUCT LIST. (G609E BAR NOT SHOWN)

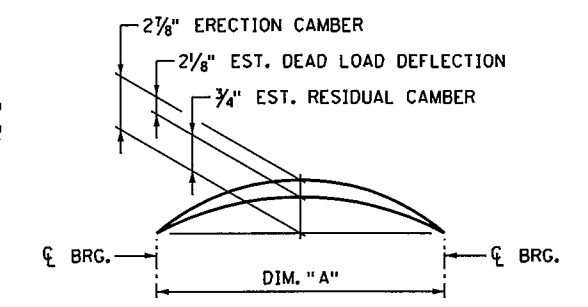
BEAM ELEVATION
 DIM. "A" ϕ TO ϕ OF BEARING
 DIM. "B" OUT TO OUT OF BEAM



SECTION AT ϕ SPAN

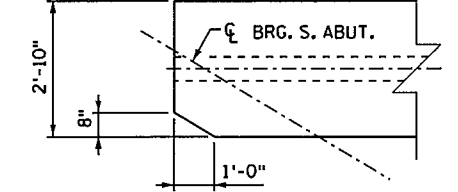
Y DISTANCES (INCHES)			
	NO.	ϕ SPAN	END
STRAIGHT STRANDS	22	3.09	
DRAPED STRANDS	8	6.0	39.0
TOTAL STRANDS	30	3.87	

Y = DISTANCE TO CENTER OF GRAVITY OF STRANDS FROM BOTTOM OF BEAM. ALL STRANDS SPACED 2" CENTER TO CENTER, HORIZONTALLY AND VERTICALLY, EXCEPT AS NOTED.
 A TOLERANCE OF $\pm 1"$ WILL BE PERMITTED IN THIS DIMENSION.



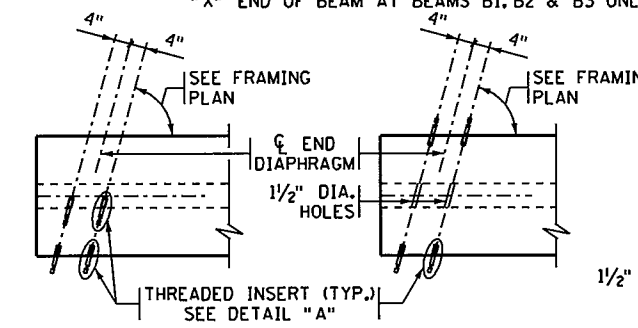
CAMBER DIAGRAM

ERECTION CAMBER SHOWN IS AFTER DIAPHRAGMS ARE IN PLACE.
 DEAD LOAD DEFLECTION SHOWN IS FOR WEIGHT OF SLAB, WEARING COURSE, BARRIER, SIDEWALK AND MEDIAN WHERE APPLICABLE.
 CONTRACTOR WILL TAKE ELEVATIONS AT TOP OF BEAMS AFTER ERECTION AND WILL ALLOW FOR DEFLECTION SHOWN TO ENABLE BUILDING FORMS TO CORRECT GRADE AND SPECIFIED SLAB THICKNESS. PROVIDE COPY OF ELEVATIONS TO THE ENGINEER.

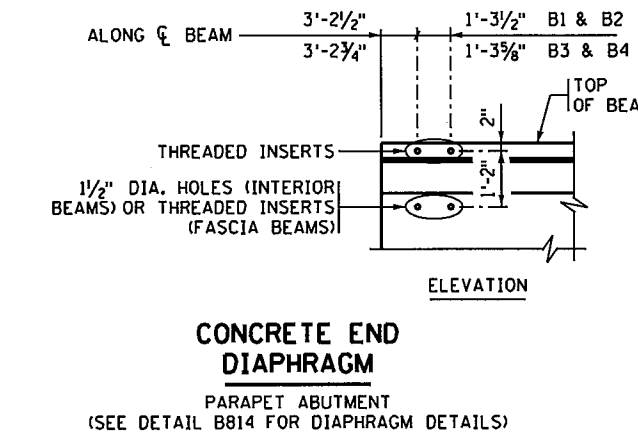


TOP FLANGE COPE DETAIL

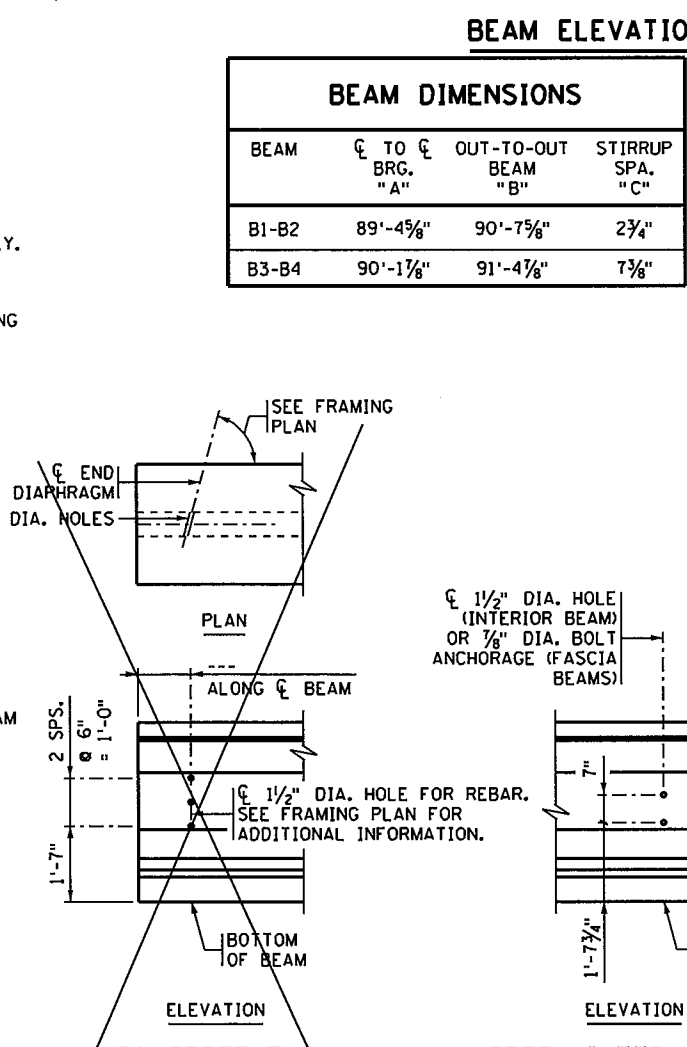
"X" END OF BEAM AT BEAMS B1, B2 & B3 ONLY.



CONCRETE END DIAPHRAGM



STEEL INTERMEDIATE DIAPHRAGM



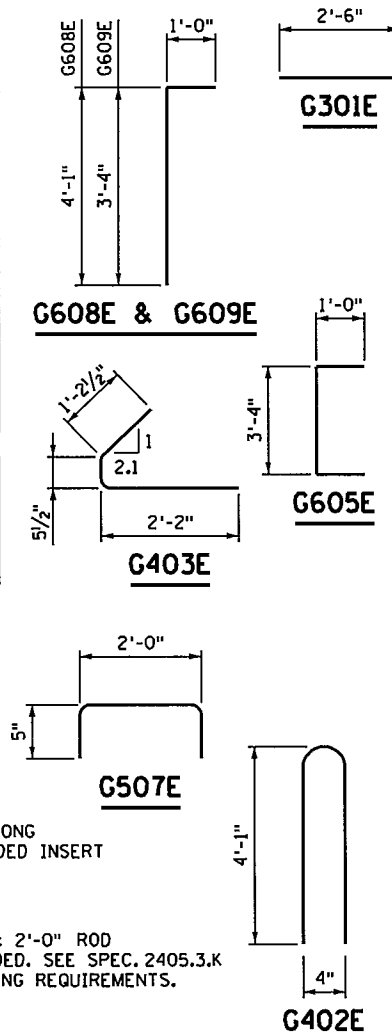
DETAIL "A"

BEAM DIMENSIONS			
BEAM	ϕ TO ϕ BRG. "A"	OUT-TO-OUT BEAM "B"	STIRRUP SPA. "C"
B1-B2	89'-4 $\frac{5}{8}$ "	90'-7 $\frac{5}{8}$ "	2 $\frac{3}{4}$ "
B3-B4	90'-1 $\frac{1}{8}$ "	91'-4 $\frac{7}{8}$ "	7 $\frac{3}{8}$ "

CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	19.77 KSI
LONG TERM LOSSES	25.61 KSI
TOTAL LOSSES	45.38 KSI

MINIMUM CONCRETE STRENGTH - K.S.I.	
① f'cI	② f'c
5.5 KSI	6.5 KSI

PRESTRESSING STRAND DIAMETER	
⑤ $\frac{1}{2}$ " <input type="checkbox"/>	
⑤ 0.60" <input checked="" type="checkbox"/>	



GENERAL NOTES

- PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.
- MARK EACH BEAM SHOWING BRIDGE NUMBER, CASTING DATE, AND INDIVIDUAL IDENTIFICATION LETTERS AND NUMBERS ON THE FACE OF THE BEAM, NEAR THE END, SO LOCATED THAT THEY WILL BE EXPOSED AFTER THE END DIAPHRAGMS HAVE BEEN CAST. MARK FASCIA BEAMS ON THE INSIDE FACE. ENSURE ALL MARKINGS ARE STENCILLED AND CLEARLY LEGIBLE. FOR LOCATION OF BEAMS, SEE FRAMING PLAN.
- ALL MATERIAL AND WORK SHOWN OR NOTED ON THIS SHEET IS INCLUDED IN UNIT PRICE BID FOR PRESTRESSED CONCRETE BEAMS. SEE SPEC. 2405.
- SEE FRAMING PLAN FOR BEAM END MARKED "X" AND DIAPHRAGM SPACING.
- APPROXIMATE WEIGHT OF BEAM IS 33.9 TONS.
- AS AN ALTERNATE TO THE END DIAPHRAGM ANCHORAGES SHOWN, THE CONTRACTOR MAY SUBMIT DETAILS OF A CAST-IN-PLACE ANCHORAGE TO THE ENGINEER FOR APPROVAL. ANCHORAGE MUST PROVIDE AN ULTIMATE PULL OUT STRENGTH OF 15 KIPS PER ANCHORAGE.
- APPLY AN APPROVED SEALER TO THE SIDES OF THE BEAM NEAR EACH END PER THE SPECIAL PROVISIONS.
- ① MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.
- ② MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.
- ③ DRAPED STRANDS.
- ④ STRAIGHT STRANDS.
- ⑤ USE 7-WIRE LOW RELAXATION PRESTRESSING STRAND, CONFORMING TO ASTM A416, GRADE 270.
- ⑥ FOR INTEGRAL ABUTMENT, SOLE PLATE CAN BE ELIMINATED OR REPLACED WITH AN APPROVED PROTECTION PLATE. BEAMS DETAILED TO INCLUDE A TAPERED PLATE PER STANDARD FIGURE B309 MUST INCLUDE SOLE PLATE.
- ⑦ CENTER OF GRAVITY OF HOLD DOWNS WHEN MULTIPLE HOLD DOWNS ARE USED.
- ⑧ DIMENSION DETERMINED BY CONTRACTOR. MAINTAIN 2" MINIMUM CLEAR FROM STRANDS.
- ⑨ TWO INSIDE BARS MAY BE PLACED ADJACENT TO VERTICAL STIRRUP FOR TYING CONVENIENCE.
- ⑩ STEEL TROWEL TO SMOOTH FINISH AND APPLY BOND BREAKER PER APPROVED PRODUCTS LIST.
- ⑪ ROUGH FLOAT AND BROOM TRANSVERSELY FOR BOND PER SPEC. 2405.3.D.

REVISED:
 APPROVED: JANUARY 13, 2015
 Nancy A. Rubenberger
 STATE BRIDGE ENGINEER

SEE SUPERSTRUCTURE DETAILS AND REINFORCEMENT FOR DIAPHRAGM DETAILS.
 (SEE DETAIL B403 FOR DIAPHRAGM DETAILS)

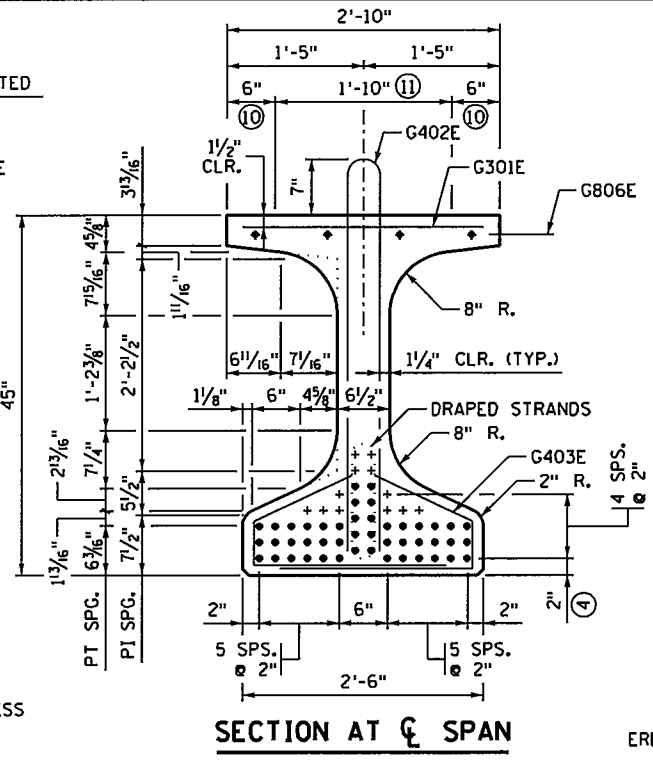
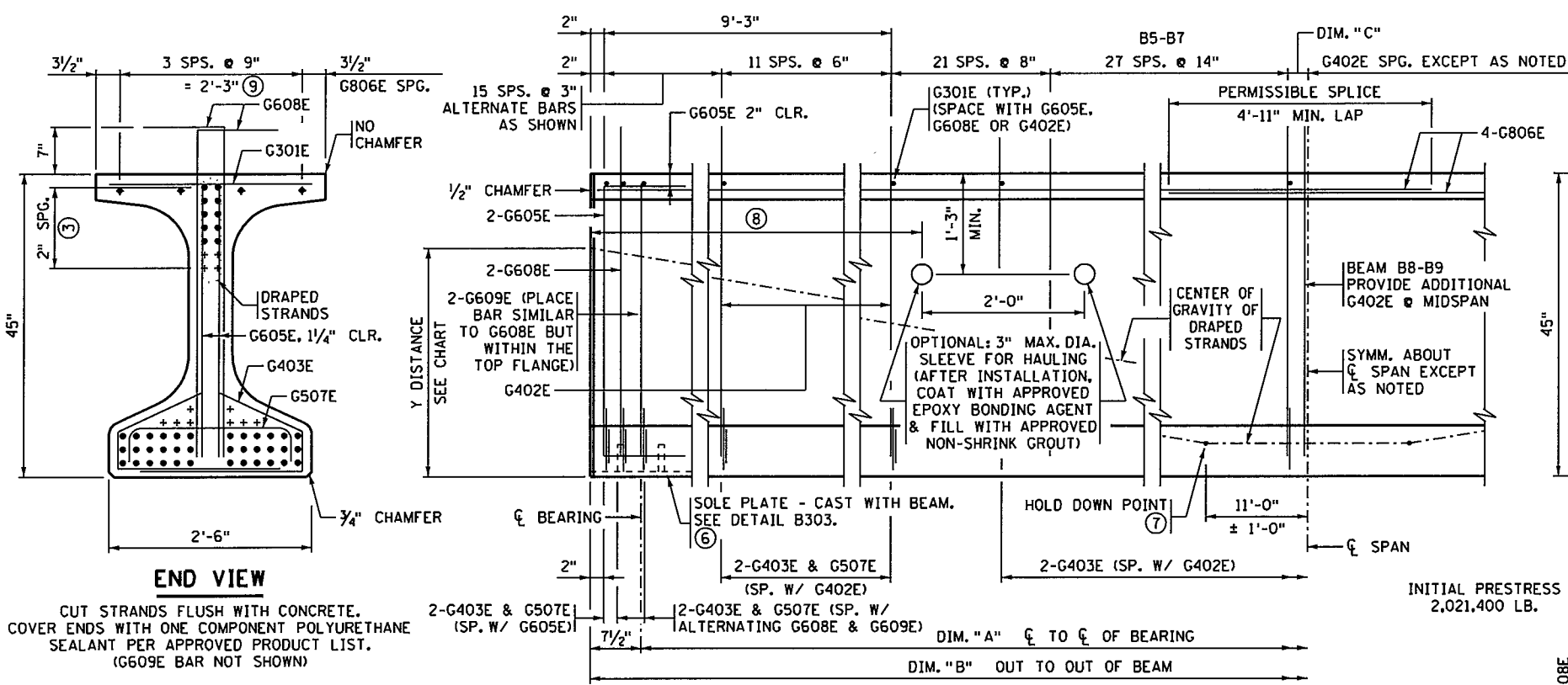
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

MN45" PRESTRESSED CONCRETE BEAM (PRETENSIONED) MN45-92

DES: MHD	DR: MHD	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: NCK	SHEET NO. D43 OF D66 SHEETS	

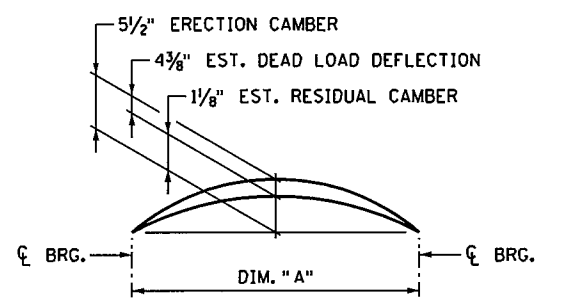
BEAMS B1-B4 FIG. 5-397.507

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12/10/2015
S:\P\1\129594\5-final-dsgn\51-const-dwgs-CAD\20-Struct\Bri2837.dgn\cbre2837_s12fige2.dgn



Y DISTANCES (INCHES)			
	NO.	CL SPAN	END
STRAIGHT STRANDS	36	4.0	
DRAPED STRANDS	10	7.0	38.0
TOTAL STRANDS	46	4.65	

Y = DISTANCE TO CENTER OF GRAVITY OF STRANDS FROM BOTTOM OF BEAM. ALL STRANDS SPACED 2" CENTER TO CENTER, HORIZONTALLY AND VERTICALLY, EXCEPT AS NOTED.
 A TOLERANCE OF ± 1" WILL BE PERMITTED IN THIS DIMENSION.



END VIEW
 CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH ONE COMPONENT POLYURETHANE SEALANT PER APPROVED PRODUCT LIST. (G609E BAR NOT SHOWN)

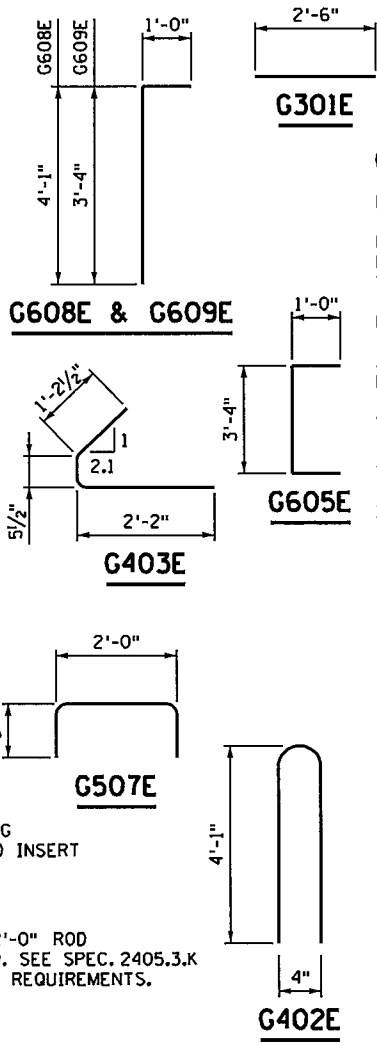
BEAM ELEVATION
 DIM. "A" CL TO CL OF BEARING
 DIM. "B" OUT TO OUT OF BEAM
 INITIAL PRESTRESS 2,021,400 LB.

BEAM DIMENSIONS				BEAM DIMENSIONS			
SLOPE LENGTH			STIRRUP SPA.	HORIZONTAL LENGTH			STIRRUP SPA.
BEAM	CL TO CL BRG. "A"	OUT-TO-OUT BEAM "B"	"C"	BEAM	CL TO CL BRG. "A"	OUT-TO-OUT BEAM "B"	"C"
B5-B7	109'-2"	110'-5"	7"	B5-B7	109'-1 1/4"	110'-4 1/4"	7"
B8-B9	110'-1 1/2"	111'-4 1/2"	9 1/4"	B8-B9	110'-0 7/8"	111'-3 3/8"	9 1/4"

CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	24.89 KSI
LONG TERM LOSSES	25.96 KSI
TOTAL LOSSES	50.86 KSI

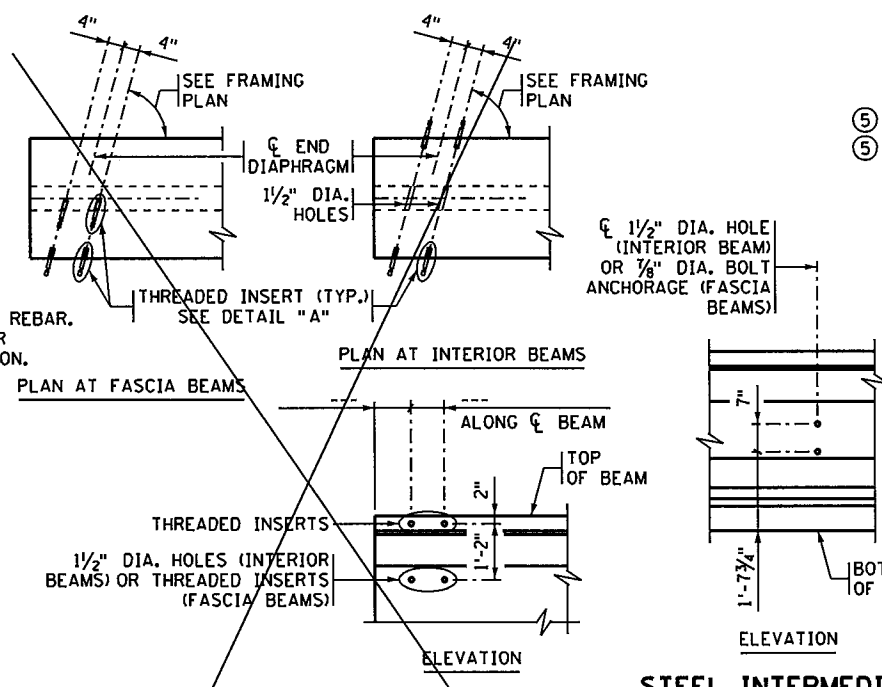
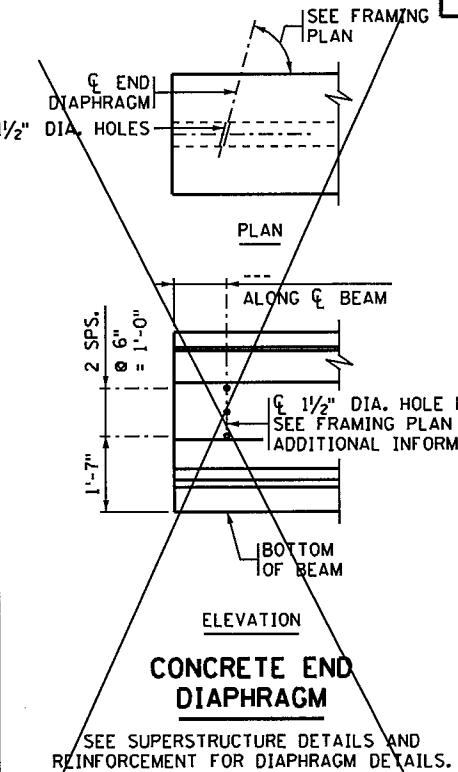
MINIMUM CONCRETE STRENGTH - K.S.I.	
① f'cl	② f'c
7.5 KSI	9.0 KSI

PRESTRESSING STRAND DIAMETER	
⑤	1/2" □
⑤	0.60" ☒



GENERAL NOTES

- PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.
- MARK EACH BEAM SHOWING BRIDGE NUMBER, CASTING DATE, AND INDIVIDUAL IDENTIFICATION LETTERS AND NUMBERS ON THE FACE OF THE BEAM, NEAR THE END, SO LOCATED THAT THEY WILL BE EXPOSED AFTER THE END DIAPHRAGMS HAVE BEEN CAST. MARK FASCIA BEAMS ON THE INSIDE FACE. ENSURE ALL MARKINGS ARE STENCILLED AND CLEARLY LEGIBLE. FOR LOCATION OF BEAMS, SEE FRAMING PLAN.
- ALL MATERIAL AND WORK SHOWN OR NOTED ON THIS SHEET IS INCLUDED IN UNIT PRICE BID FOR PRESTRESSED CONCRETE BEAMS. SEE SPEC. 2405.
- SEE FRAMING PLAN FOR BEAM END MARKED "X" AND DIAPHRAGM SPACING.
- APPROXIMATE WEIGHT OF BEAM IS 41.4 TONS.
- AS AN ALTERNATE TO THE END DIAPHRAGM ANCHORAGES SHOWN, THE CONTRACTOR MAY SUBMIT DETAILS OF A CAST-IN-PLACE ANCHORAGE TO THE ENGINEER FOR APPROVAL. ANCHORAGE MUST PROVIDE AN ULTIMATE PULL OUT STRENGTH OF 15 KIPS PER ANCHORAGE.
- APPLY AN APPROVED SEALER TO THE SIDES OF THE BEAM NEAR EACH END PER THE SPECIAL PROVISIONS.
- ① MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.
- ② MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.
- ③ DRAPED STRANDS.
- ④ STRAIGHT STRANDS.
- ⑤ USE 7-WIRE LOW RELAXATION PRESTRESSING STRAND, CONFORMING TO ASTM A416, GRADE 270.
- ⑥ FOR INTEGRAL ABUTMENT, SOLE PLATE CAN BE ELIMINATED OR REPLACED WITH AN APPROVED PROTECTION PLATE. BEAMS DETAILED TO INCLUDE A TAPERED PLATE PER STANDARD FIGURE B309 MUST INCLUDE SOLE PLATE.
- ⑦ CENTER OF GRAVITY OF HOLD DOWNS WHEN MULTIPLE HOLD DOWNS ARE USED.
- ⑧ DIMENSION DETERMINED BY CONTRACTOR. MAINTAIN 2" MINIMUM CLEAR FROM STRANDS.
- ⑨ TWO INSIDE BARS MAY BE PLACED ADJACENT TO VERTICAL STIRRUP FOR TYING CONVENIENCE.
- ⑩ STEEL TROWEL TO SMOOTH FINISH AND APPLY BOND BREAKER PER APPROVED PRODUCTS LIST.
- ⑪ ROUGH FLOAT AND BROOM TRANSVERSELY FOR BOND PER SPEC. 2405.3.D.



REVISED:
 APPROVED: JANUARY 13, 2015
 Nancy Dubenberger
 STATE BRIDGE ENGINEER

CONCRETE END DIAPHRAGM
 PARAPET ABUTMENT
 (SEE DETAIL B814 FOR DIAPHRAGM DETAILS)

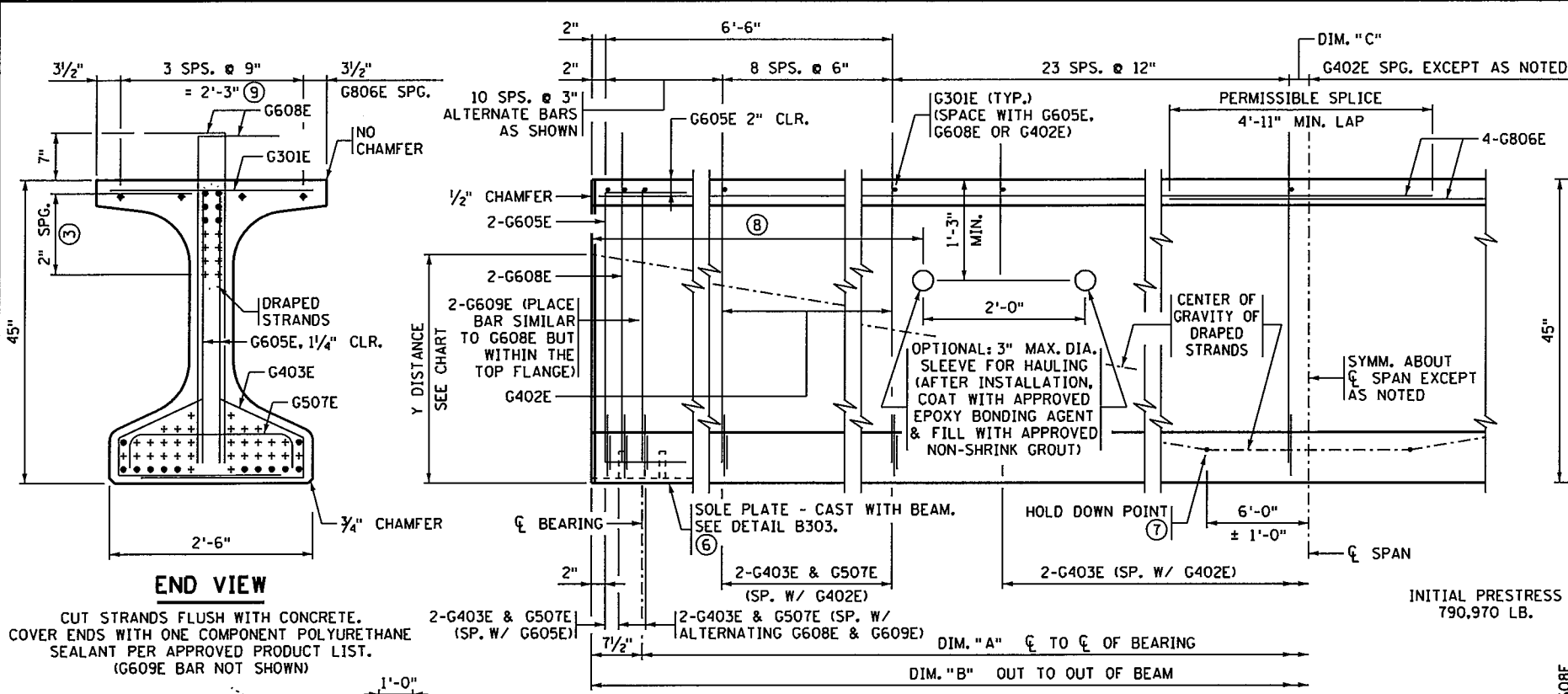
STEEL INTERMEDIATE DIAPHRAGM
 (SEE DETAIL B403 FOR DIAPHRAGM DETAILS)

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

MN45" PRESTRESSED CONCRETE BEAM (PRE TENSIONED) MN45-112

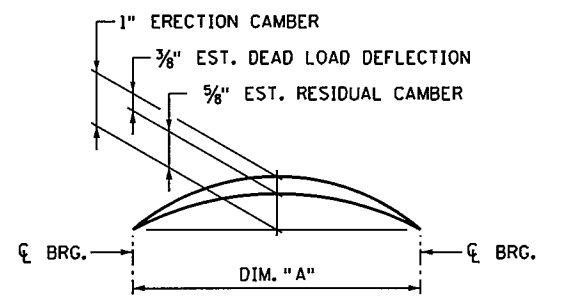
BEAMS B5-B9 **FIG. 5-397.507**
 DES: MHD DR: MHD APPROVED: 12/14/15
 CHK: NCK CHK: NCK
SHEET NO. D44 OF D66 SHEETS **BRIDGE NO 62937**

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12/10/2015
S:\PT\A\B\p\129594.5-final-dwg\1-const-dwgs-CAD\20-Struct\B\ref2937.dgn\cbr2937_s121fig3.dgn



Y DISTANCES (INCHES)			
	NO.	CL SPAN	END
STRAIGHT STRANDS	12	2.67	
DRAPED STRANDS	6	5.0	40.0
TOTAL STRANDS	18	3.44	

Y = DISTANCE TO CENTER OF GRAVITY OF STRANDS FROM BOTTOM OF BEAM. ALL STRANDS SPACED 2" CENTER TO CENTER, HORIZONTALLY AND VERTICALLY, EXCEPT AS NOTED.
 A TOLERANCE OF ± 1" WILL BE PERMITTED IN THIS DIMENSION.

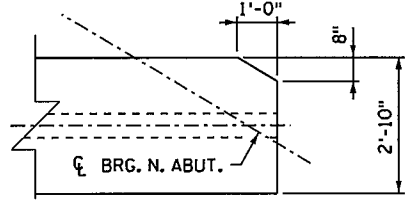


CAMBER DIAGRAM

ERECTION CAMBER SHOWN IS AFTER DIAPHRAGMS ARE IN PLACE.
 DEAD LOAD DEFLECTION SHOWN IS FOR WEIGHT OF SLAB, WEARING COURSE, BARRIER, SIDEWALK AND MEDIAN WHERE APPLICABLE.
 CONTRACTOR WILL TAKE ELEVATIONS AT TOP OF BEAMS AFTER ERECTION AND WILL ALLOW FOR DEFLECTION SHOWN TO ENABLE BUILDING FORMS TO CORRECT GRADE AND SPECIFIED SLAB THICKNESS. PROVIDE COPY OF ELEVATIONS TO THE ENGINEER.

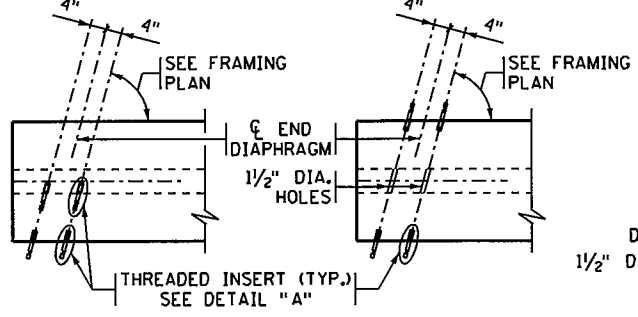
END VIEW

CUT STRANDS FLUSH WITH CONCRETE. COVER ENDS WITH ONE COMPONENT POLYURETHANE SEALANT PER APPROVED PRODUCT LIST. (G609E BAR NOT SHOWN)

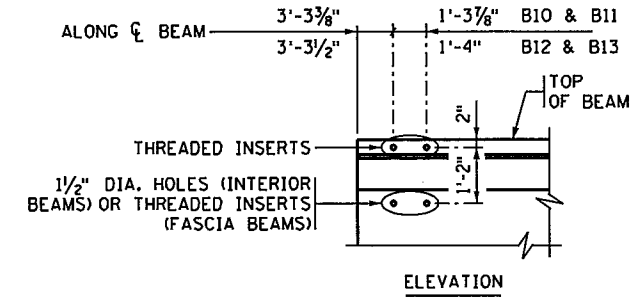


TOP FLANGE COPE DETAIL

"X" END OF BEAM AT BEAMS B11, B12 & B13 ONLY.

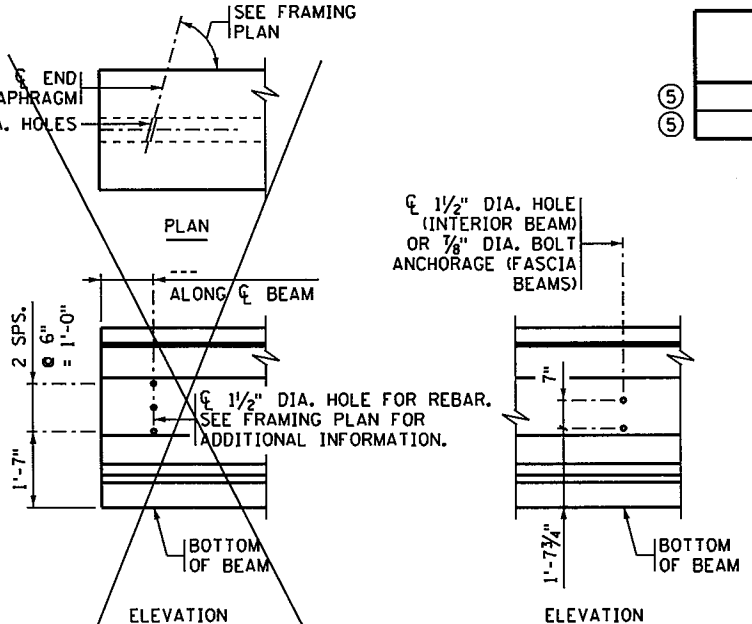


PLAN AT FASCIA BEAMS **PLAN AT INTERIOR BEAMS**



CONCRETE END DIAPHRAGM

PARAPET ABUTMENT (SEE DETAIL B814 FOR DIAPHRAGM DETAILS)



CONCRETE END DIAPHRAGM

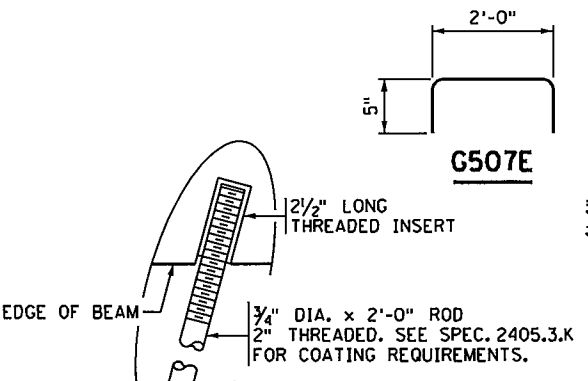
SEE SUPERSTRUCTURE DETAILS AND REINFORCEMENT FOR DIAPHRAGM DETAILS.

BEAM DIMENSIONS			
BEAM	CL TO CL BRG. "A"	OUT-TO-OUT BEAM "B"	STIRRUP SPA. "C"
B10-B11	58'-7 1/8"	59'-10 1/8"	3"
B12-B13	58'-10 3/4"	60'-1 3/4"	4 1/8"

CALCULATED PRESTRESS LOSSES	
ELASTIC SHORTENING LOSS	13.55 KSI
LONG TERM LOSSES	25.16 KSI
TOTAL LOSSES	38.71 KSI

MINIMUM CONCRETE STRENGTH - K.S.I.	
① f'cl	② f'c
4.5 KSI	5.5 KSI

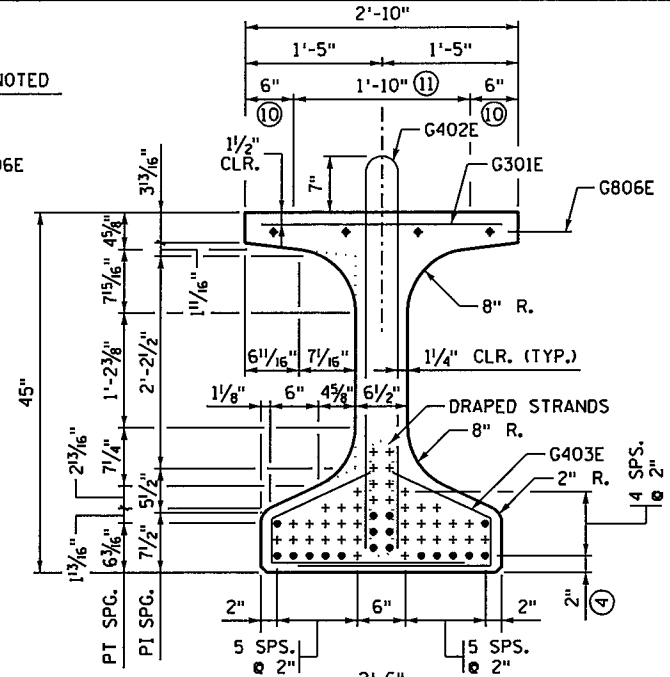
PRESTRESSING STRAND DIAMETER	
⑤ 1/2" □	
⑤ 0.60" ☒	



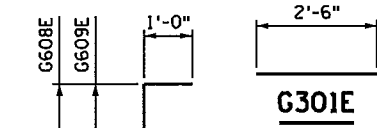
DETAIL "A"

STEEL INTERMEDIATE DIAPHRAGM

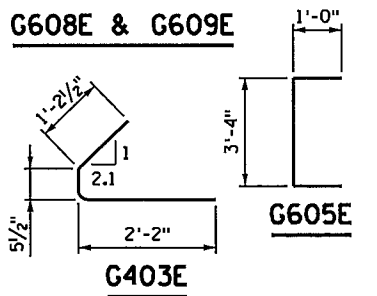
(SEE DETAIL B403 FOR DIAPHRAGM DETAILS)



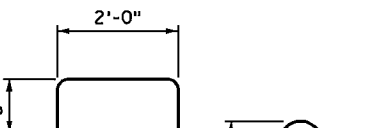
SECTION AT CL SPAN



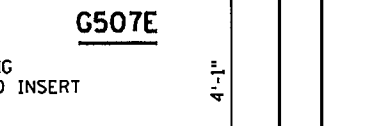
G301E



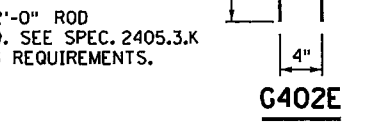
G608E & G609E



G403E



G507E



G402E

GENERAL NOTES

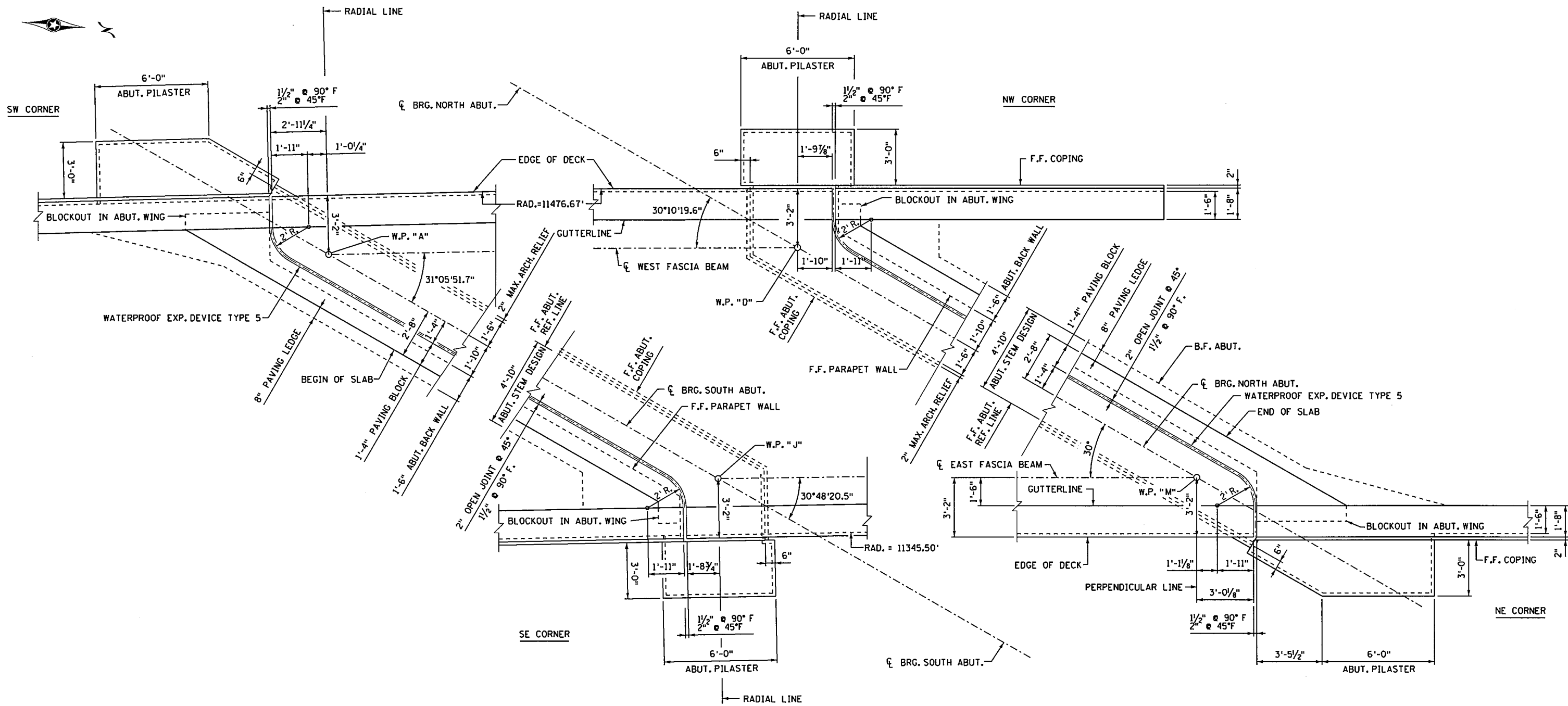
- PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY CONTRACTOR.
- MARK EACH BEAM SHOWING BRIDGE NUMBER, CASTING DATE, AND INDIVIDUAL IDENTIFICATION LETTERS AND NUMBERS ON THE FACE OF THE BEAM, NEAR THE END, SO LOCATED THAT THEY WILL BE EXPOSED AFTER THE END DIAPHRAGMS HAVE BEEN CAST. MARK FASCIA BEAMS ON THE INSIDE FACE. ENSURE ALL MARKINGS ARE STENCILLED AND CLEARLY LEGIBLE. FOR LOCATION OF BEAMS, SEE FRAMING PLAN.
- ALL MATERIAL AND WORK SHOWN OR NOTED ON THIS SHEET IS INCLUDED IN UNIT PRICE BID FOR PRESTRESSED CONCRETE BEAMS. SEE SPEC. 2405.
- SEE FRAMING PLAN FOR BEAM END MARKED "X" AND DIAPHRAGM SPACING.
- APPROXIMATE WEIGHT OF BEAM IS 22.3 TONS.
- AS AN ALTERNATE TO THE END DIAPHRAGM ANCHORAGES SHOWN, THE CONTRACTOR MAY SUBMIT DETAILS OF A CAST-IN-PLACE ANCHORAGE TO THE ENGINEER FOR APPROVAL. ANCHORAGE MUST PROVIDE AN ULTIMATE PULL OUT STRENGTH OF 15 KIPS PER ANCHORAGE.
- APPLY AN APPROVED SEALER TO THE SIDES OF THE BEAM NEAR EACH END PER THE SPECIAL PROVISIONS.
- ① MINIMUM CONCRETE STRENGTH AT TIME OF PRESTRESS TRANSFER.
- ② MINIMUM CONCRETE STRENGTH WHEN BEAM CAN BE TRANSPORTED AND INSTALLED.
- ③ DRAPED STRANDS.
- ④ STRAIGHT STRANDS.
- ⑤ USE 7-WIRE LOW RELAXATION PRESTRESSING STRAND, CONFORMING TO ASTM A416, GRADE 270.
- ⑥ FOR INTEGRAL ABUTMENT, SOLE PLATE CAN BE ELIMINATED OR REPLACED WITH AN APPROVED PROTECTION PLATE. BEAMS DETAILED TO INCLUDE A TAPERED PLATE PER STANDARD FIGURE B309 MUST INCLUDE SOLE PLATE.
- ⑦ CENTER OF GRAVITY OF HOLD DOWNS WHEN MULTIPLE HOLD DOWNS ARE USED.
- ⑧ DIMENSION DETERMINED BY CONTRACTOR. MAINTAIN 2" MINIMUM CLEAR FROM STRANDS.
- ⑨ TWO INSIDE BARS MAY BE PLACED ADJACENT TO VERTICAL STIRRUP FOR TYING CONVENIENCE.
- ⑩ STEEL TROWEL TO SMOOTH FINISH AND APPLY BOND BREAKER PER APPROVED PRODUCTS LIST.
- ⑪ ROUGH FLOAT AND BROOM TRANSVERSELY FOR BOND PER SPEC. 2405.3.D.

REVISED:
 APPROVED: JANUARY 13, 2015
Nancy Dubenberger
 STATE BRIDGE ENGINEER


I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dubont* Date: 12-4-15
 Printed Name: MICHAEL H. DUBONT Lic. No. 43375

MN45" PRESTRESSED CONCRETE BEAM (PRETENSIONED) MN45-61

BEAMS B10-B13		FIG. 5-397.507	
DES: MHD	DR: MHD	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: NCK	CHK: NCK		
SHEET NO. D45 OF D66 SHEETS			



CORNER DETAILS


 3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 55110
 PHONE (651) 490-2000
 FAX (651) 490-2150

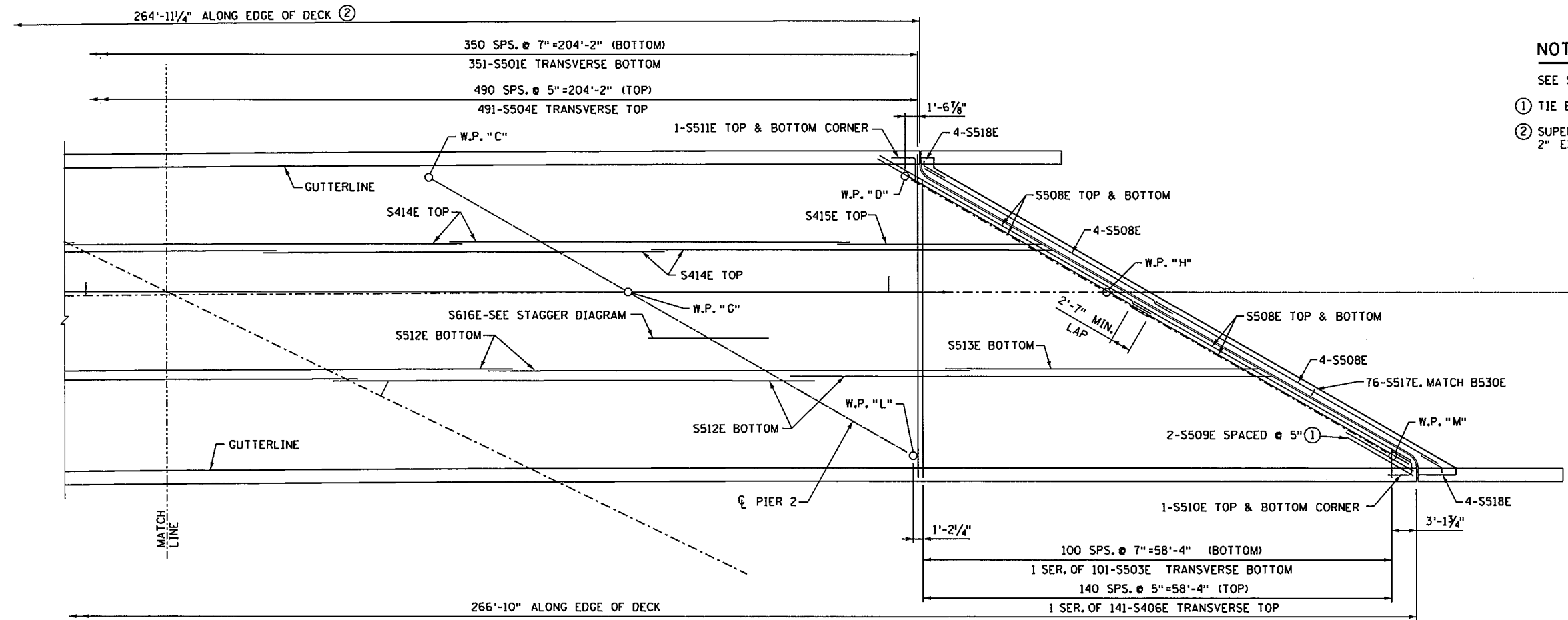
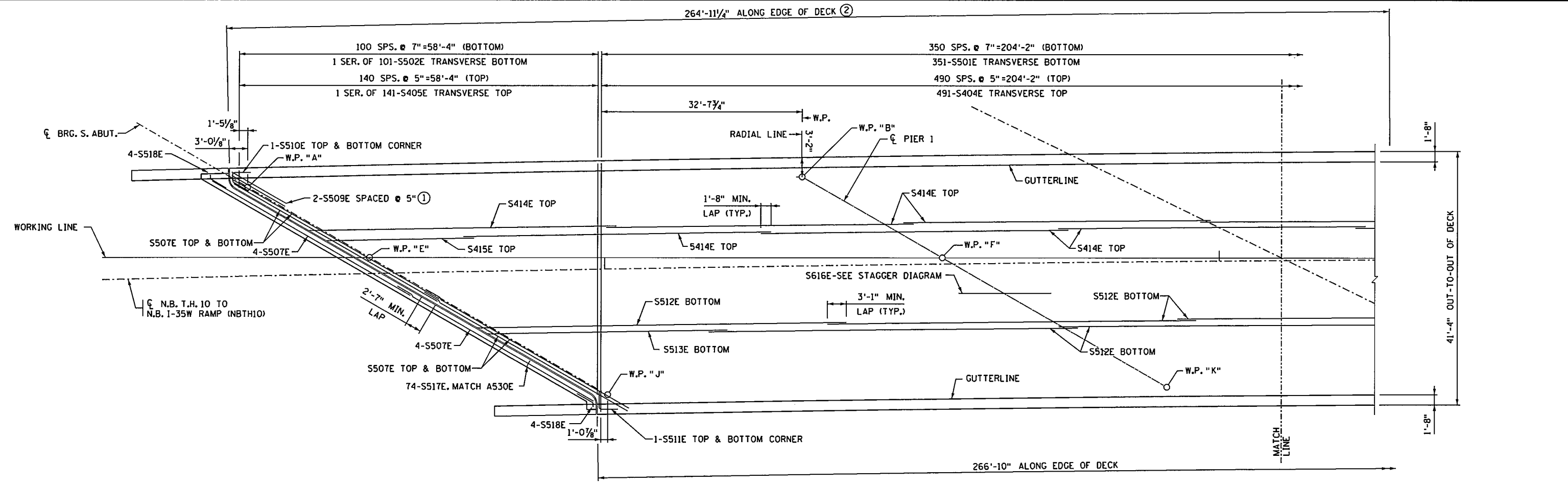
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 Signature: *Michael H Dupont* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

CORNER DETAILS

DES: MAW	DR: MAW	APPROVED: 12/14/15
CHK: MHD	CHK: MHD	
SHEET NO. D46 OF D66 SHEETS		


BRIDGE NO 62937

11/20/15 12/10/2015 S:\PT\RAM\129594\5-final-dsgn\51-const-dwgs-CAD\20-Struct\Br62937\dgn\br62937-ssi1.dgn



- NOTES:**
- SEE SHEET D54 FOR BILL OF REINFORCEMENT.
 - ① TIE BELOW TOP LONGITUDINAL BARS
 - ② SUPERSTRUCTURE DIMENSIONS ARE BASED ON A 2" EXPANSION JOINT OPENING.

DECK REINFORCEMENT

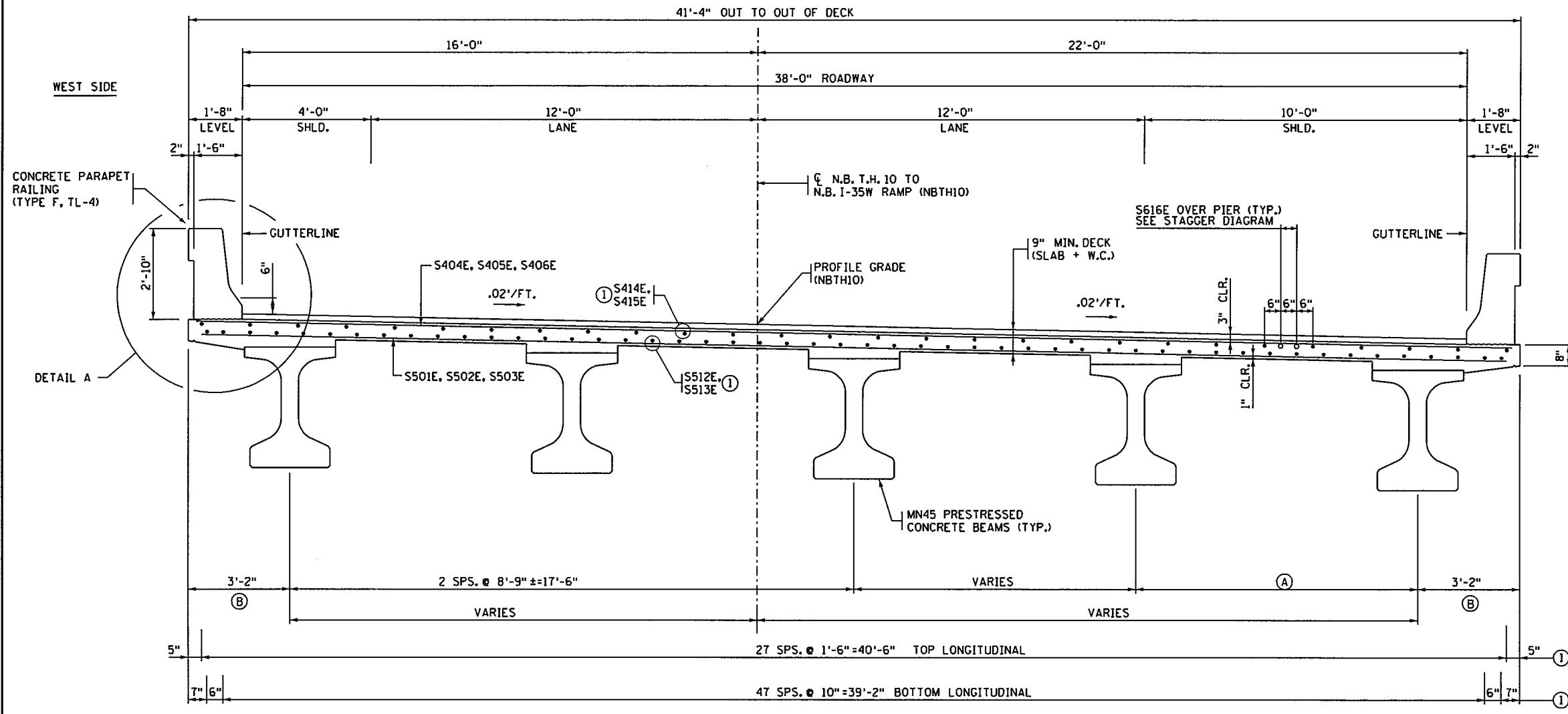

 3535 YADNAIS CENTER DRIVE
 ST. PAUL, MN 55103
 PHONE (650) 490-2000
 FAX (650) 490-2150

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 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

SUPERSTRUCTURE DETAILS

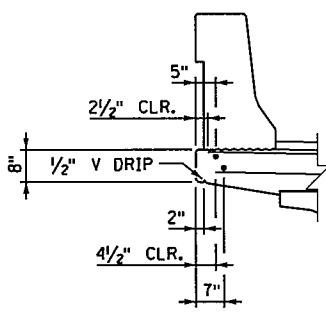
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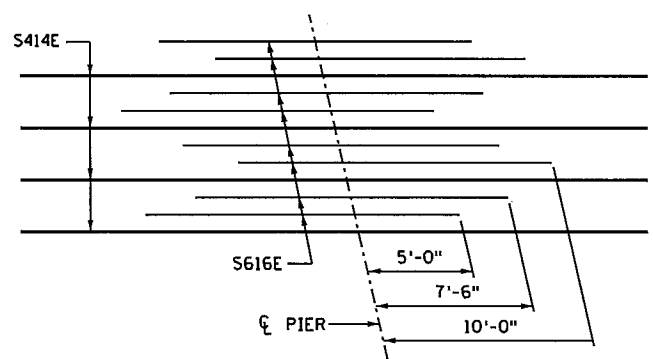


TRANSVERSE SECTION A-A

- (A) 8'-10 1/2" (SPAN 1)
8'-9" (SPAN 2)
8'-8" (SPAN 3)
- (B) DIMENSION AT WORKING POINT LOCATION



DETAIL A



STAGGER DIAGRAM

ALTERNATE STAGGER S616E AT ABOUT 6" CENTERS BETWEEN S414E TOP LONGITUDINAL REINFORCEMENT. PLACE FULL WIDTH OF DECK.

- NOTES:**
- SEE SHEET D54 FOR BILL OF REINFORCEMENT.
 - (1) ALTERNATE BARS FROM END TO END TO STAGGER LAPS.

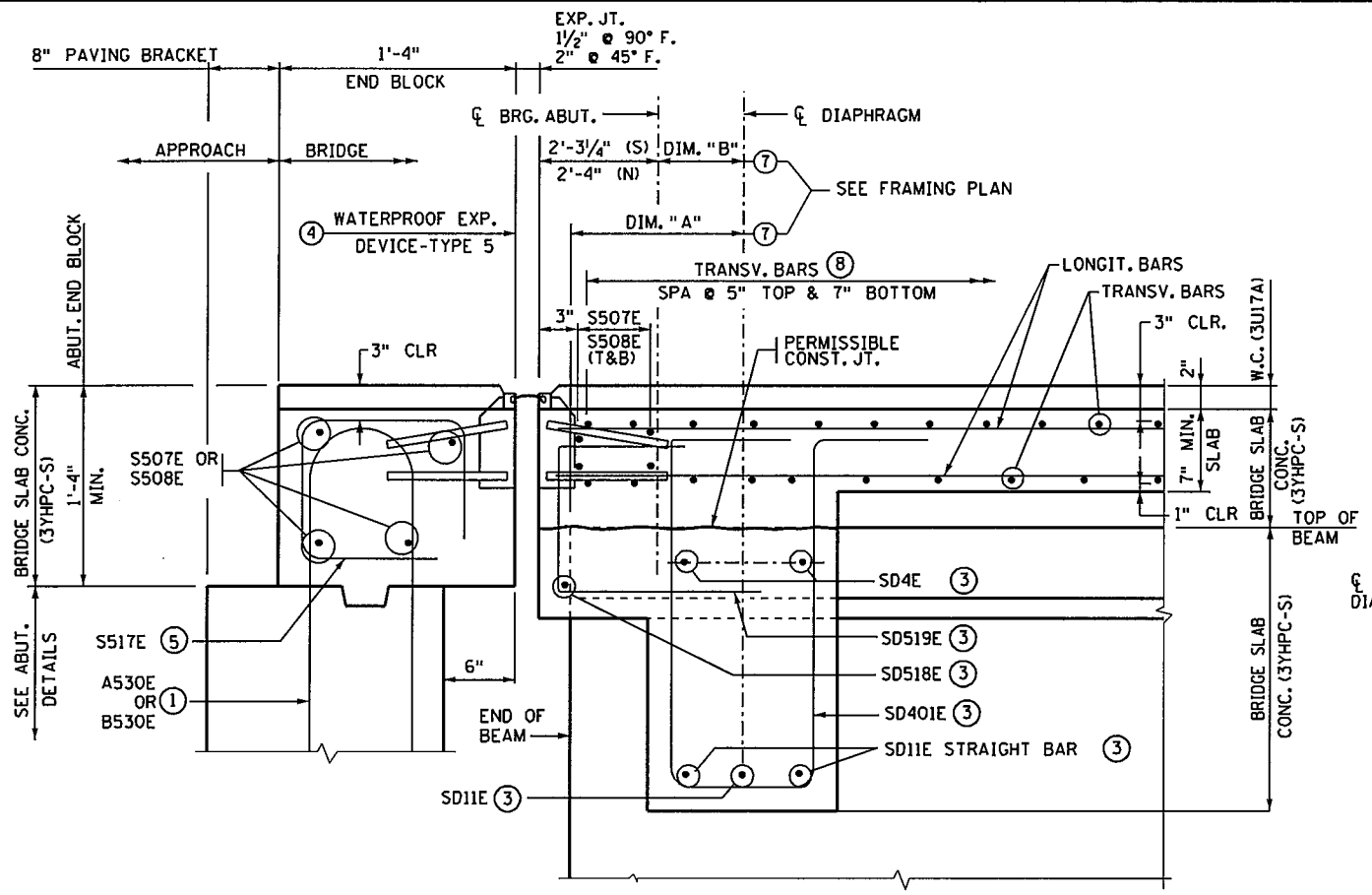
3535 VAONNAIS CENTER DRIVE
 ST. PAUL, MN 5510
 PHONE (651) 490-2000
 FAX (651) 490-2150

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 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

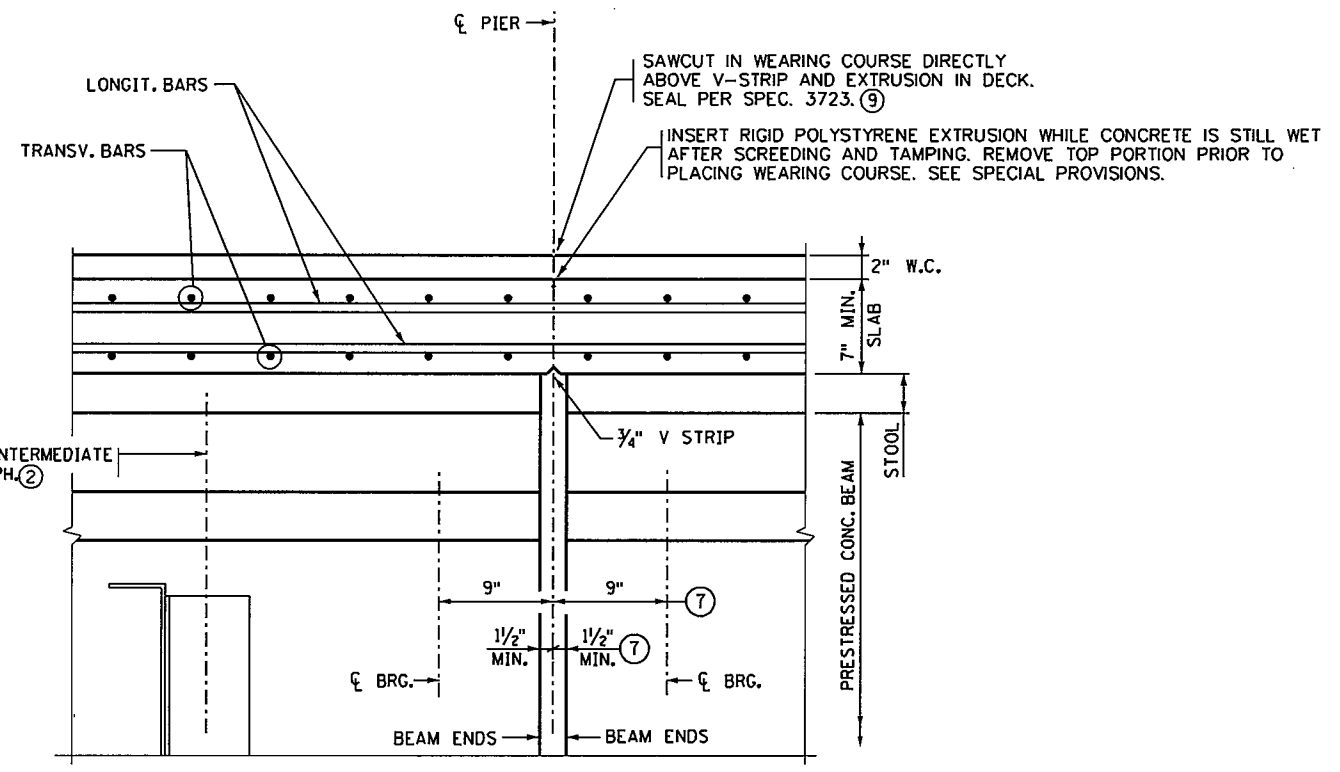
SUPERSTRUCTURE DETAILS

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CHK: NCK	CHK: MHD	SHEET NO. D48 OF D66 SHEETS	

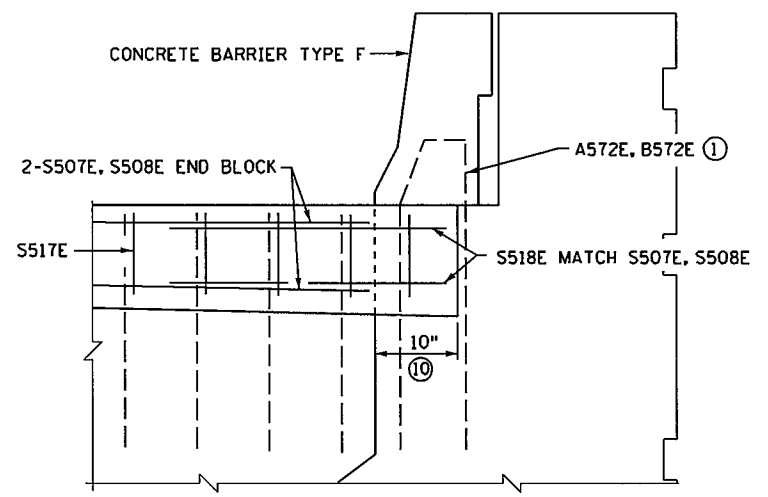
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12/10/2015
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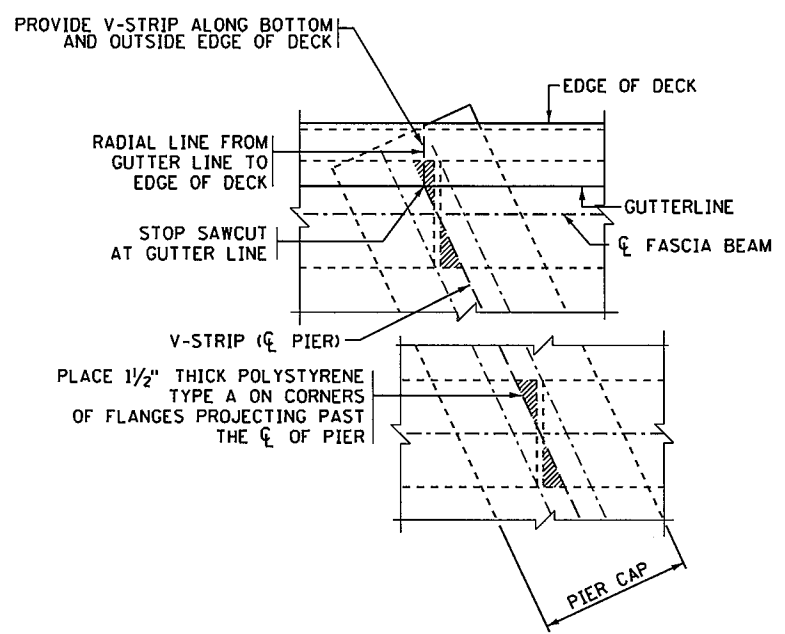
SECTION B-B AT ABUTMENT 6



SECTION C-C AT PIER



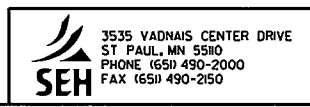
PARTIAL END BLOCK ELEVATION AT ABUTMENT



SAWCUT DETAIL

NOTES:

- SEE SHEET D54 FOR BILL OF REINFORCEMENT AND SUMMARY OF QUANTITIES.
- ALL DIMENSIONS SHOWN ARE MEASURED ON A HORIZONTAL PLANE.
- SUPERSTRUCTURE DIMENSIONS ARE BASED ON A 2" EXPANSION JOINT OPENING.
- F.F. DENOTES FRONT FACE
B.F. DENOTES BACK FACE
(T) DENOTES TOP
(B) DENOTES BOTTOM
(T&B) DENOTES TOP & BOTTOM
- ① SEE ABUTMENT SHEETS FOR DETAILS.
- ② SEE SHEET D61 FOR INTERMEDIATE DIAPHRAGM DETAIL B403.
- ③ SEE SHEET D50 FOR END DIAPHRAGM DETAILS. END DIAPH. CONCRETE (AT ABUTMENTS) IS PAID FOR AS "BRIDGE SLAB CONCRETE (3YHPC-S)".
- ④ SEE SHEETS D56 & D57 FOR WATERPROOF EXPANSION DEVICE DETAILS.
- ⑤ SPACE WITH A530E OR B530E ABUTMENT BARS.
- ⑥ SECTION IS TAKEN NORMAL TO JOINT.
- ⑦ MEASURED ALONG ϕ OF BEAM.
- ⑧ TRANSVERSE BAR SPACING ALONG EDGE OF DECK.
- ⑨ MAKE SAWCUT AS SOON AS CUTTING CAN BE DONE WITHOUT RAVELING THE CONCRETE. SEE SAWCUT DETAIL.
- ⑩ BLOCKOUT IN ABUTMENT WINGWALL TO ACCEPT PAVING BLOCK.



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

SUPERSTRUCTURE DETAILS

DES: MHD	DR: MAW	APPROVED: 12/14/15
CHK: NCK	CHK: MHD	

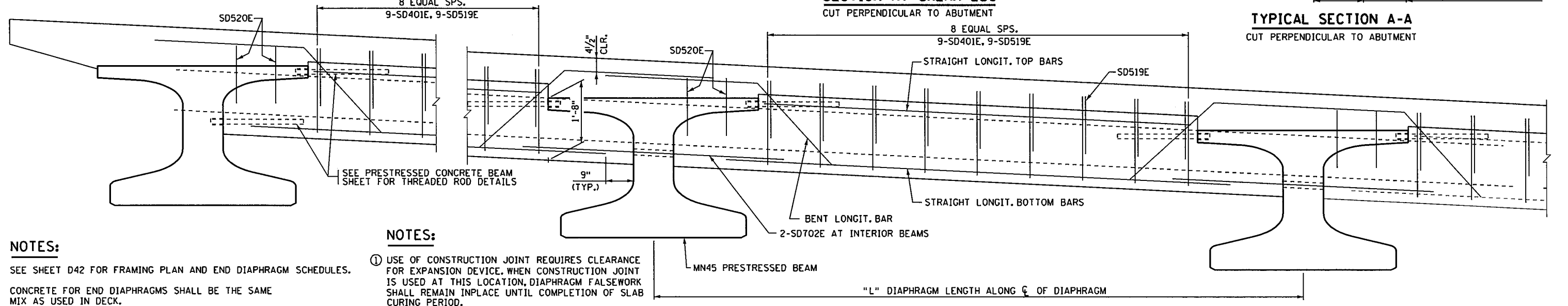
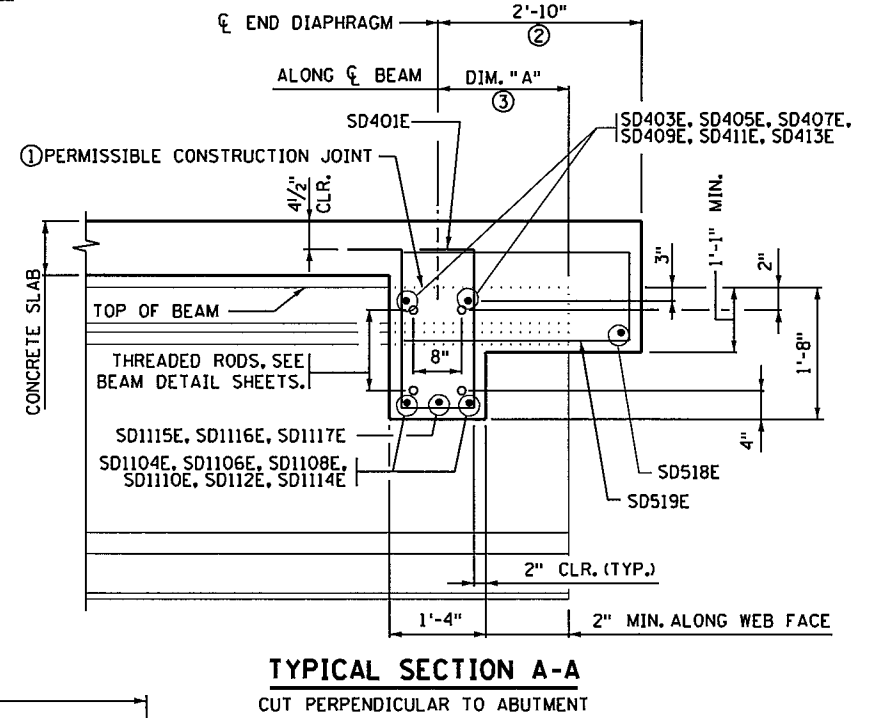
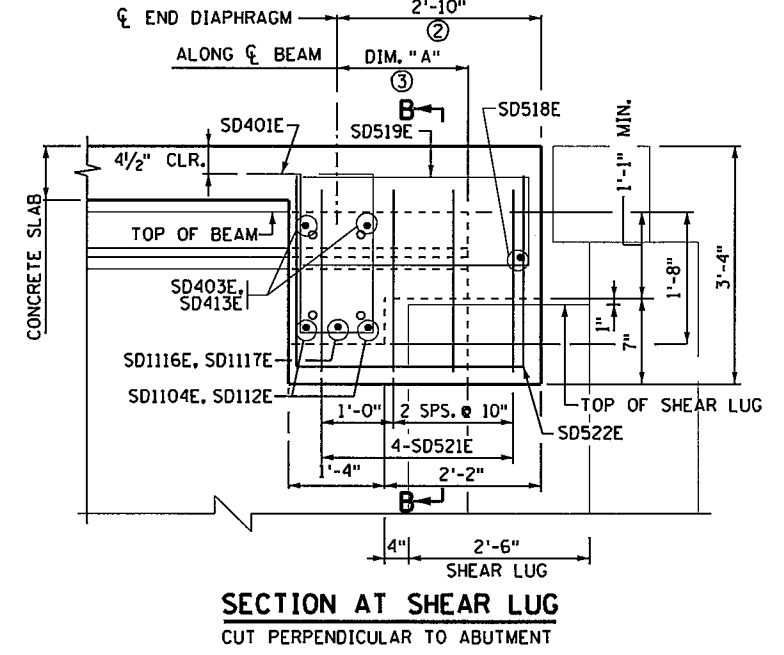
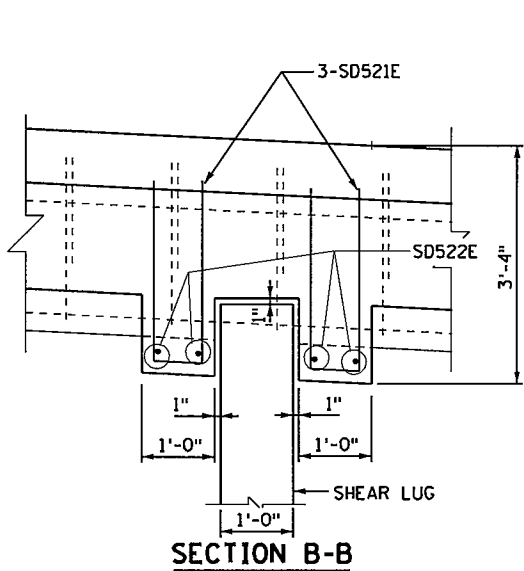
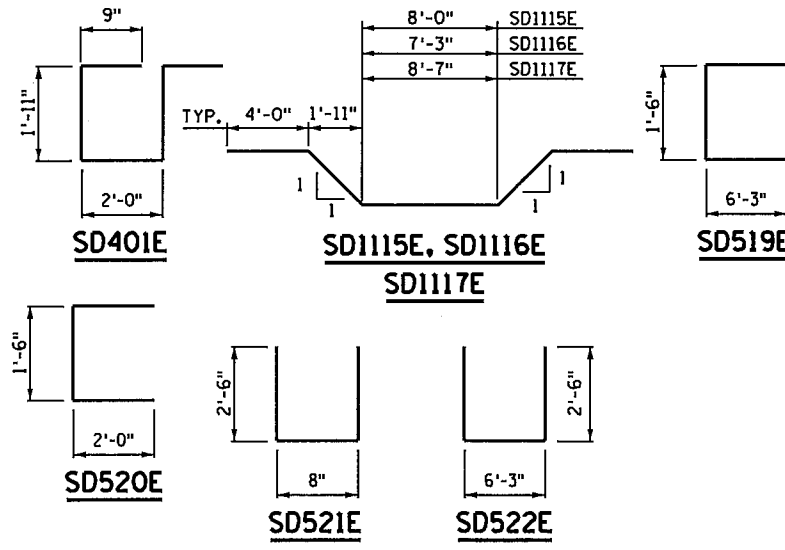
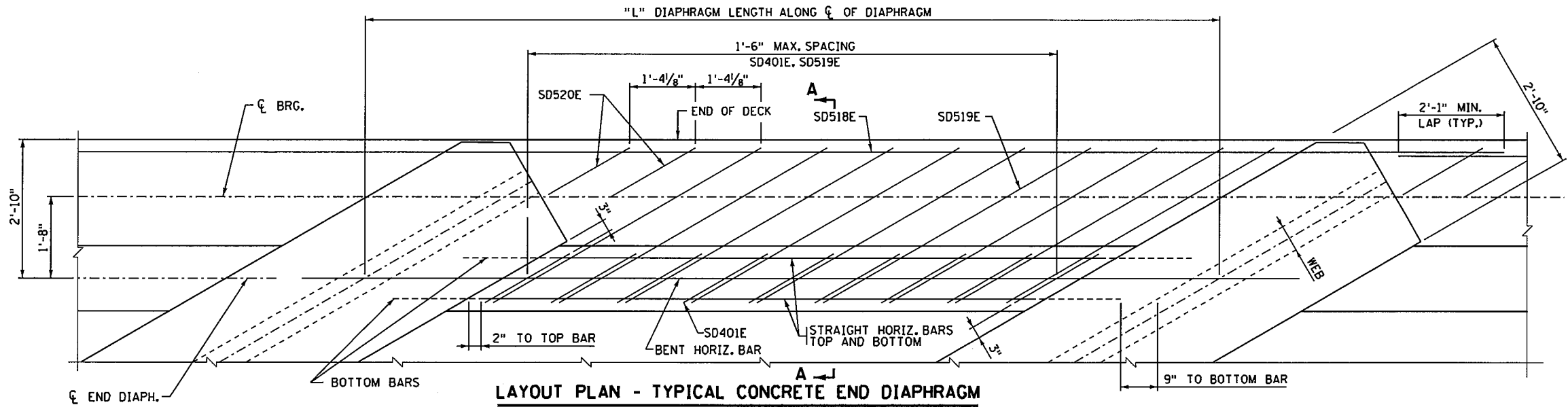
SHEET NO. D49 OF D66 SHEETS

BRIDGE NO 62937

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12/10/2015
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**BILL OF REINFORCEMENT
FOR END DIAPHRAGM**

BAR	NO.	LENGTH	SHAPE	LOCATION
SD401E	72	7'-4"	BENT	HORIZ. END TIE
SD702E	12	5'-0"	STR	LONGIT. THRU BEAM
SD403E	4	10'-10"	STR	LONG. TOP ED1
SD1104E	4	14'-2"	STR	LONG. BOTTOM ED1
SD405E	2	10'-3"	STR	LONG. TOP ED2
SD1106E	2	13'-9"	STR	LONG. BOTTOM ED2
SD407E	2	10'-11"	STR	LONG. TOP ED3
SD1108E	2	14'-7"	STR	LONG. BOTTOM ED3
SD409E	4	11'-0"	STR	LONG. TOP ED4
SD1110E	4	14'-8"	STR	LONG. BOTTOM ED4
SD411E	2	11'-5"	STR	LONG. TOP ED5
SD1112E	2	15'-1"	STR	LONG. BOTTOM ED5
SD413E	2	10'-11"	STR	LONG. TOP ED6
SD1114E	2	14'-7"	STR	LONG. BOTTOM ED6
SD1115E	4	21'-5"	BENT	LONGITUDINAL ED3 ED4 ED6
SD1116E	3	20'-8"	BENT	LONGITUDINAL ED1 ED2
SD1117E	1	22'-0"	BENT	LONGITUDINAL ED5
SD518E	4	36'-6"	STR	LONGITUDINAL
SD519E	72	14'-0"	BENT	VERTICAL TIE
SD520E	20	5'-6"	BENT	VERTICAL TIE AT BM END
SD521E	16	5'-8"	BENT	SHEAR LUG
SD522E	8	11'-3"	BENT	SHEAR LUG



NOTES:
 SEE SHEET D42 FOR FRAMING PLAN AND END DIAPHRAGM SCHEDULES.
 CONCRETE FOR END DIAPHRAGMS SHALL BE THE SAME MIX AS USED IN DECK.
 QUANTITIES FOR END DIAPHRAGM CONCRETE AND REINFORCEMENT SHOWN ON THIS DETAIL SHALL BE LISTED IN SUPERSTRUCTURE QUANTITIES.
 THREADED RODS ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.

NOTES:
 ① USE OF CONSTRUCTION JOINT REQUIRES CLEARANCE FOR EXPANSION DEVICE. WHEN CONSTRUCTION JOINT IS USED AT THIS LOCATION, DIAPHRAGM FALSEWORK SHALL REMAIN INPLACE UNTIL COMPLETION OF SLAB CURING PERIOD.
 ② PERPENDICULAR TO CENTERLINE OF DIAPHRAGM.
 ③ SEE FRAMING PLAN FOR DIM. "A".

SEH
 3535 VADNAIS CENTER DRIVE
 ST. PAUL, MN 5510
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 FAX (651) 490-2150

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 Signature: *Michael H Dupont* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

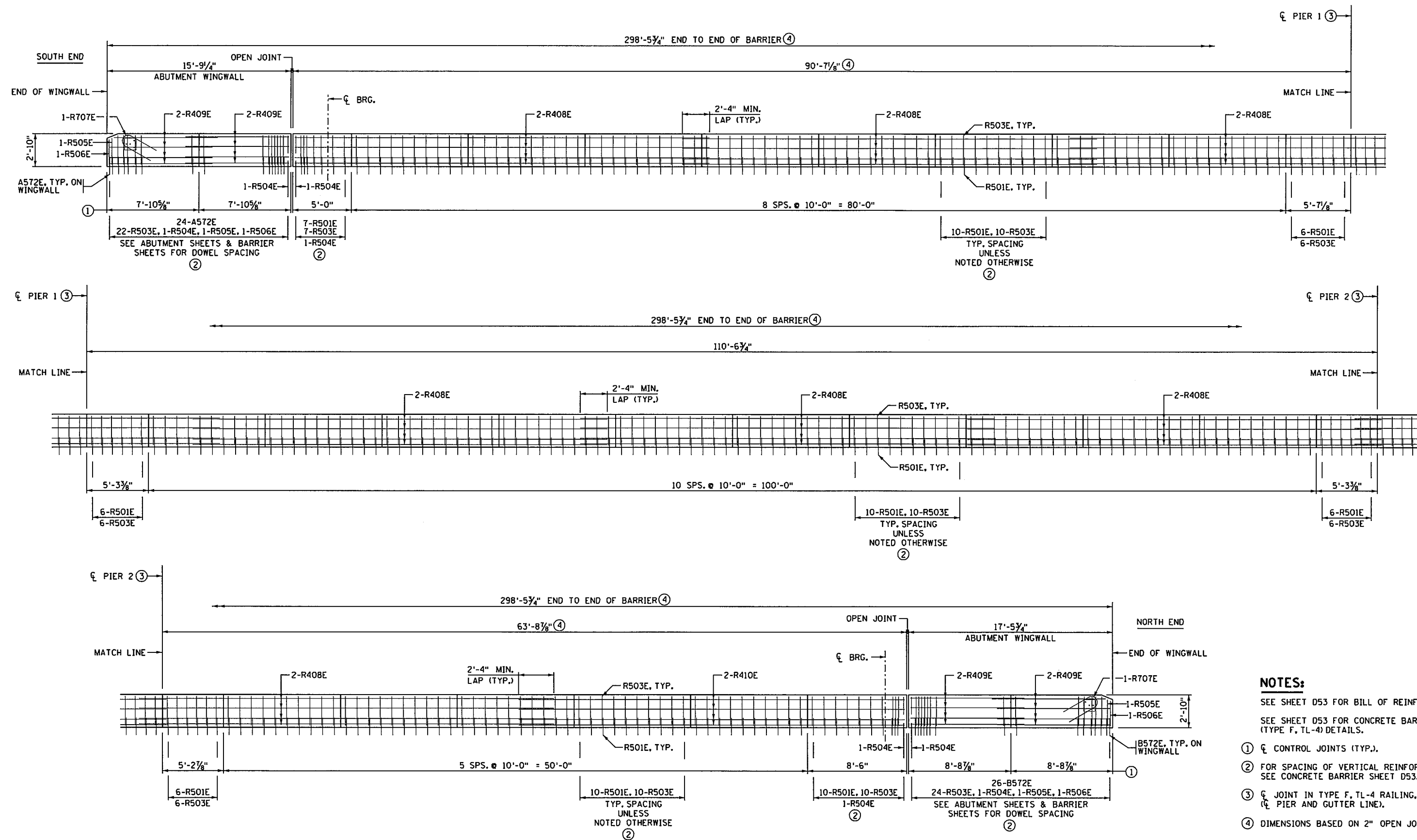
SUPERSTRUCTURE DETAILS

DES: MAW	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: MHD	CHK: MHD	SHEET NO. D50 OF D66 SHEETS	

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12/10/2015

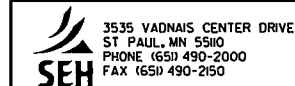
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- NOTES:**
- SEE SHEET D53 FOR BILL OF REINFORCEMENT.
 - SEE SHEET D53 FOR CONCRETE BARRIER, (TYPE F, TL-4) DETAILS.
 - ① ϕ CONTROL JOINTS (TYP.).
 - ② FOR SPACING OF VERTICAL REINFORCEMENT, SEE CONCRETE BARRIER SHEET D53.
 - ③ ϕ JOINT IN TYPE F, TL-4 RAILING, (ϕ PIER AND GUTTER LINE).
 - ④ DIMENSIONS BASED ON 2" OPEN JOINT

INSIDE FACE OF BARRIER ELEVATION

WEST BARRIER
MEASURED ALONG GUTTER LINE



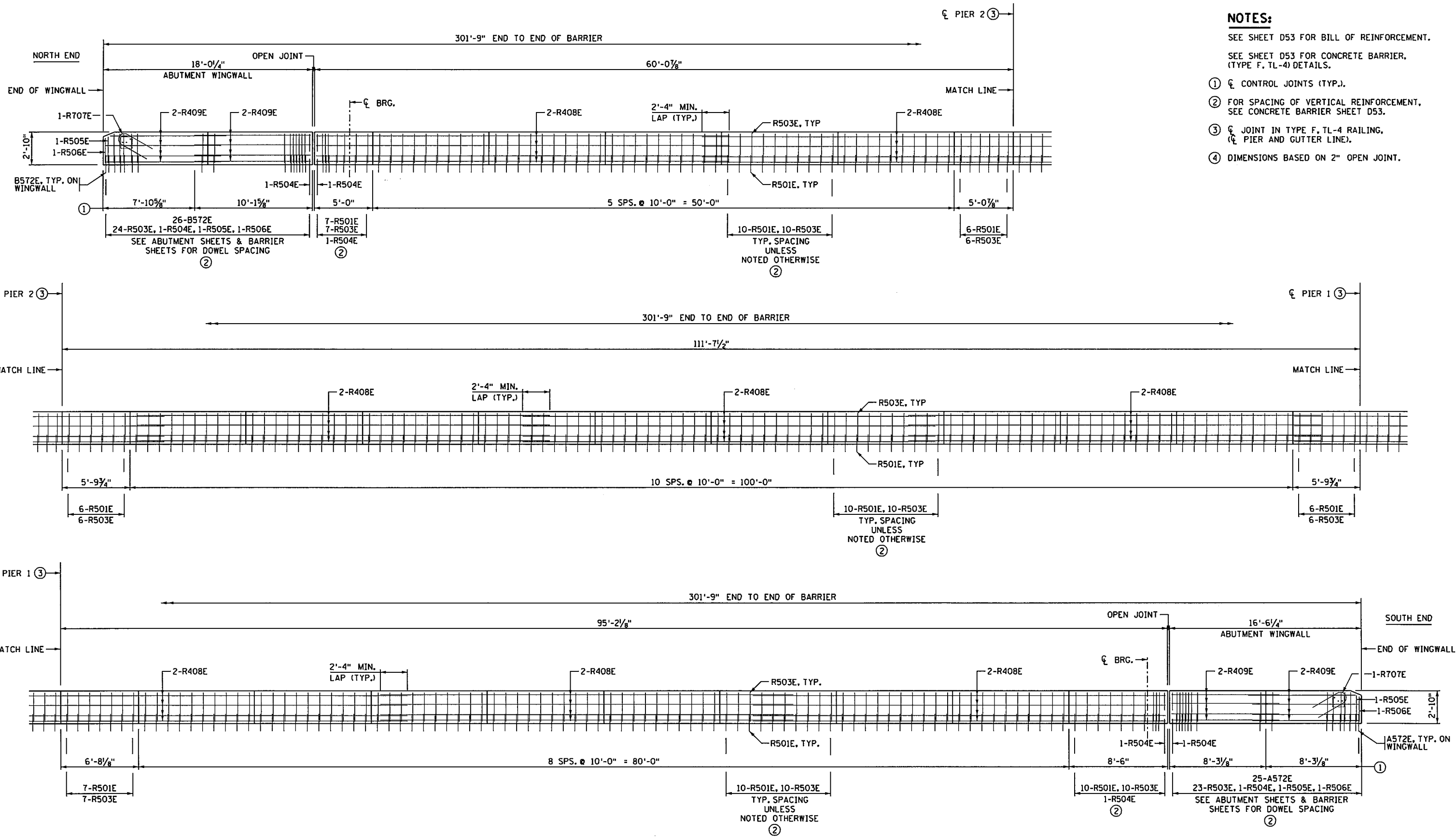
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Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

**CONCRETE BARRIER (TYPE F, TL-4)
ELEVATION
WEST BARRIER**

DES: MAW	DR: DLF	APPROVED: 12/14/15
CHK: MHD	CHK: MHD	

SHEET NO. D51 OF D66 SHEETS

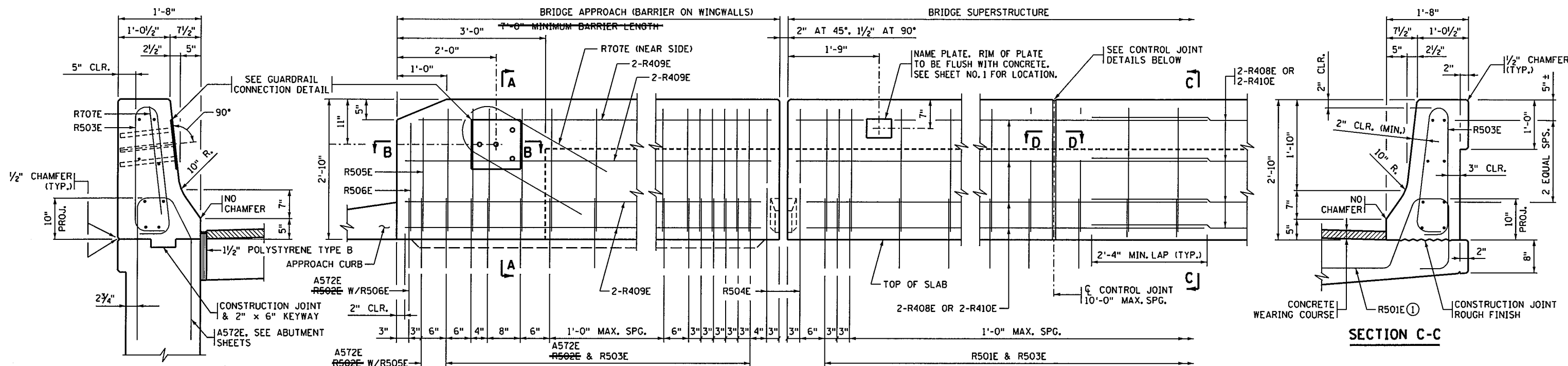
**BRIDGE NO
62937**



- NOTES:**
- SEE SHEET D53 FOR BILL OF REINFORCEMENT.
 - SEE SHEET D53 FOR CONCRETE BARRIER, (TYPE F, TL-4) DETAILS.
 - ① ϕ CONTROL JOINTS (TYP.).
 - ② FOR SPACING OF VERTICAL REINFORCEMENT, SEE CONCRETE BARRIER SHEET D53.
 - ③ ϕ JOINT IN TYPE F, TL-4 RAILING, (ϕ PIER AND GUTTER LINE).
 - ④ DIMENSIONS BASED ON 2" OPEN JOINT.

INSIDE FACE OF BARRIER ELEVATION
EAST BARRIER
MEASURED ALONG GUTTER LINE

3535 VADNAIS CENTER DRIVE ST. PAUL, MN 55110 PHONE (651) 490-2000 FAX (651) 490-2150	I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota. Signature: <i>Michael H Dupont</i> Date: 12-4-15 Printed Name: MICHAEL H DUPONT Lic. No. 43375	CONCRETE BARRIER (TYPE F, TL-4) ELEVATION EAST BARRIER	DES: MAW DR: DLF CHK: MHD CHK: MHD APPROVED: 12/14/15 SHEET NO. D52 OF D66 SHEETS	BRIDGE NO 62937
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SECTION A-A

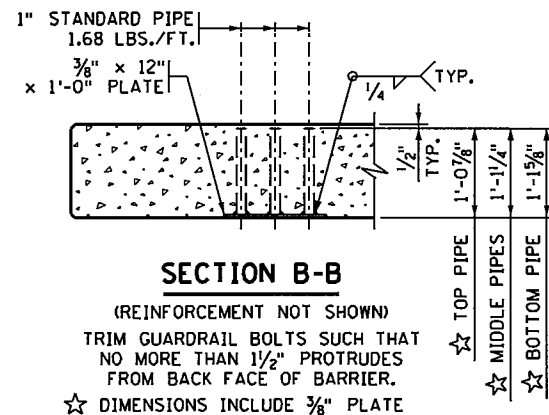
EXPANSION JOINT

CONTROL JOINT

INSIDE ELEVATION OF BARRIER

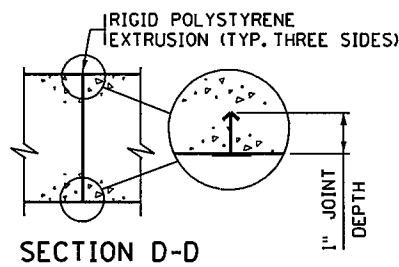
CONCRETE WEARING COURSE NOT SHOWN
(7'-0" BARRIER ON APPROACH SHOWN)
(BARRIER ON WINGWALLS)

BARRIER MEETS TEST LEVEL 4 REQUIREMENTS OF NCHRP REPORT 350



SECTION B-B

(REINFORCEMENT NOT SHOWN)
TRIM GUARDRAIL BOLTS SUCH THAT NO MORE THAN 1/2" PROTRUDES FROM BACK FACE OF BARRIER.
☆ DIMENSIONS INCLUDE 3/8" PLATE

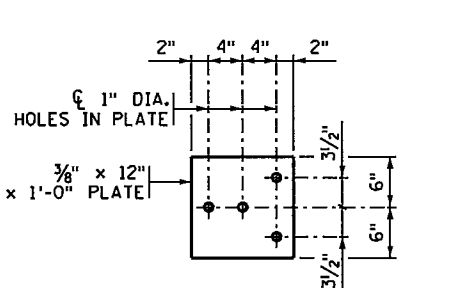
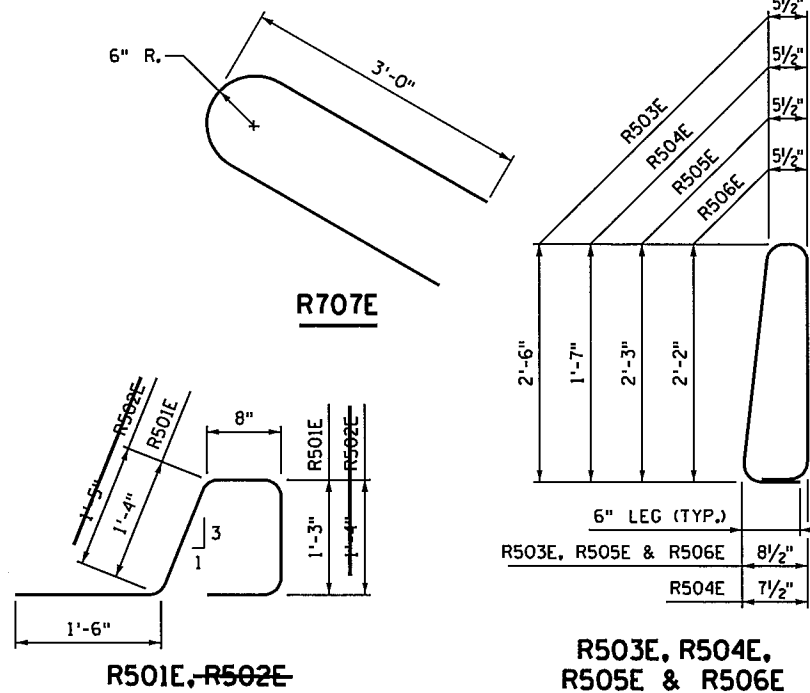


SECTION D-D

CONTROL JOINT DETAILS

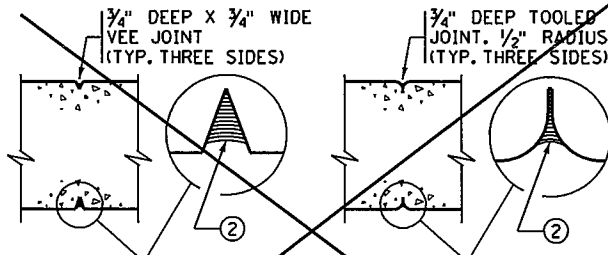
TYPICAL ALL THREE SIDES

INSERT RIGID POLYSTYRENE EXTRUSION WHILE CONCRETE IS STILL WET AFTER SCREEDING AND TAMPING. REMOVE THE TOP PORTION PRIOR TO BEGINNING SURFACE FINISHING OPERATIONS.



GUARDRAIL CONNECTION DETAIL

GALVANIZE AFTER FABRICATION PER SPEC. 3394
ESTIMATED WEIGHT = 23 LBS



SECTION D-D

SECTION D-D

CONTROL JOINT DETAILS

WHEN USING SLIP FORM METHOD TO PLACE THE CONCRETE, CUT JOINT 3 INCHES DEEP USING MARGIN TROWEL OR SIMILAR MEANS IMMEDIATELY AFTER CONCRETE PLACEMENT (TYP. THREE SIDES)

BILL OF REINFORCEMENT FOR BARRIER				
BAR	NO.	LENGTH	SHAPE	LOCATION
R501E	636	5'-3"		BARRIER DOWEL
R502E		5'-5"		BARRIER DOWEL
R503E	543	6'-6"		BARRIER VERTICAL
R504E	8	4'-8"		BARRIER VERTICAL
R505E	4	6'-0"		BARRIER VERTICAL
R506E	4	5'-10"		BARRIER VERTICAL
R707E	4	6'-6"		BARRIER VERTICAL
R408E	120	35'-6"		BARRIER LONGIT.
R409E	64	10'-0"		BARRIER LONGIT.
R410E	8	33'-1"		BARRIER LONGIT.
R4...E				BARRIER LONGIT.
R4...E				BARRIER LONGIT.

GENERAL NOTES

MEASURE PAYMENT LENGTH BETWEEN THE OUTSIDE FACES OF THE BARRIER.

CONCRETE BARRIER = 502 LBS./FT. (0.124 CU. YDS./FT.)

FINISH ALL EDGES OF BARRIER AND END POST WITH 1/2" CHAMFER, EXCEPT WHERE OTHERWISE NOTED.

SPACE OF CONTROL JOINTS AT BE 10 FT. MAXIMUM. SEE SUPERSTRUCTURE SHEET FOR JOINT SPACING, BARRIER ELEVATION SHEETS

GUARDRAIL CONNECTION TO BE STRUCTURAL STEEL, SPEC. 3306.

GUARDRAIL CONNECTION AND NAME PLATE TO BE CONSIDERED INCIDENTAL TO BARRIER.

BARRIER QUANTITIES ARE LISTED IN SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE.

- ① PLACE BAR ON TOP OF BOTTOM REINFORCEMENT MAT.
- ② JOINT SEALANT PER MNDOT APPROVED/QUALIFIED PRODUCTS LIST - CRACK AND JOINT MATERIALS - SILICONE JOINT SEALERS.

MODIFIED SECTION A-A TO BARRIER ON WINGWALL.
RIGID POLYSTYRENE EXTRUSION CONTROL JOINT DETAIL

MODIFIED

FIG. 5-397.117(B)

REVISION:
APPROVED: JANUARY 13, 2015
Nancy Subenberger
STATE BRIDGE ENGINEER

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SEH

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Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

CONCRETE BARRIER (TYPE F, TL-4)
PARAPET ABUTMENT WITH INTEGRAL END POST
(WITH CONCRETE WEARING COURSE)

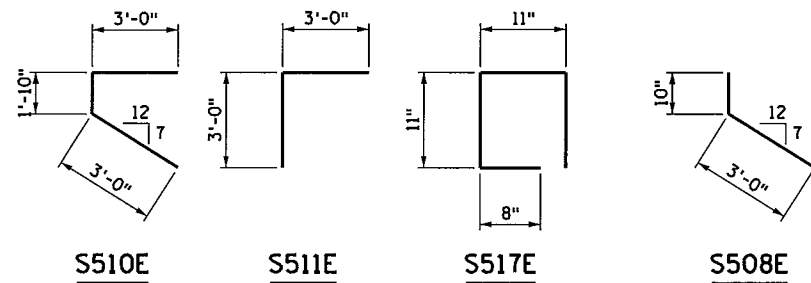
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CHK: MHD CHK: MHD
APPROVED: 12/14/15
SHEET NO. D53 OF D66 SHEETS

BRIDGE NO
62937

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12/10/2015
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BAR MARK	NO. OF BARS	LENGTH	SHAPE	LOCATION
SUPERSTRUCTURE DECK EPOXY COATED BARS				
S501E	351	40'-6"	STR	TRANSVERSE BOTTOM
S502E	1 SERIES OF 101	3'-0" TO 37'-9"	STR	TRANSVERSE BOTTOM
S503E	1 SERIES OF 101	3'-9" TO 37'-5"	STR	TRANSVERSE BOTTOM
S404E	491	40'-10"	STR	TRANSVERSE TOP
S405E	1 SERIES OF 141	3'-2" TO 38'-1"	STR	TRANSVERSE TOP
S406E	1 SERIES OF 141	4'-1" TO 37'-9"	STR	TRANSVERSE TOP
S507E	16	38'-0"	STR	TRANSVERSE AT JOINT
S508E	16	39'-6"	STR	TRANSVERSE AT JOINT
S509E	4	10'-0"	STR	TRANSVERSE AT JOINT
S510E	4	7'-10"	BENT	CORNERS
S511E	4	6'-0"	BENT	CORNERS
S512E	200	60'-0"	STR	LONGIT. BOTTOM
S513E	50	37'-6"	STR	LONGIT. BOTTOM
S414E	140	50'-0"	STR	LONGIT. TOP
S415E	28	23'-6"	STR	LONGIT. TOP
S616E	108	15'-0"	STR	LONGIT. TOP OVER PIERS
S517E	150	3'-5"	BENT	END BLOCK
S518E	16	3'-10"	BENT	END BLOCK ENDS

BAR BENDING DIAGRAMS



* BAR TYPE USES STANDARD STIRRUP AND TIE HOOKS.

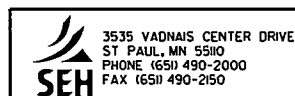
NOTE
BENT BAR DIMENSIONS GIVEN ARE OUT-TO-OUT. ACTUAL BAR LENGTHS SHALL BE DETERMINED BASED ON DIMENSIONS SHOWN IN THE BAR BENDING DIAGRAMS. TOTAL BAR LENGTHS SHOWN ARE FOR USE IN COMPUTING REINFORCEMENT BAR WEIGHTS FOR PAYMENT ONLY.

SUMMARY OF QUANTITIES FOR SUPERSTRUCTURE

ITEM	UNIT	QUANTITY
① TYPE F (TL-4) BARRIER CONCRETE (3S52)	LIN. FT.	600
② REINFORCEMENT BARS (EPOXY COATED)	POUND	75450
③ BRIDGE SLAB CONCRETE (3YHPC-S)	SQ. FT.	11220
EXPANSION JOINT DEVICE TYPE 5	LIN. FT.	148
④ EXP CURVED PLATE BEARING ASSEMBLY TYPE E1	EACH	5
④ EXP CURVED PLATE BEARING ASSEMBLY TYPE E2	EACH	7
④ EXP CURVED PLATE BEARING ASSEMBLY TYPE E3	EACH	5
④ EXP CURVED PLATE BEARING ASSEMBLY TYPE E4	EACH	7
④ FIXED CURVED PLATE BEARING ASSEMBLY TYPE F1	EACH	3
④ FIXED CURVED PLATE BEARING ASSEMBLY TYPE F2	EACH	3
⑤ CONCRETE WEARING COURSE (3U17A)	SQ. FT.	14525
PRESTRESSED CONCRETE BEAMS MN45	LIN FT	1308
DIAPHRAGMS FOR TYPE MN45 PREST BEAMS	LIN FT	289
⑥ BRIDGE NAME PLATE	EACH	1

QUANTITY NOTES:

- ① INCLUDES 68 LIN. FT ON ABUTMENT WINGWALLS.
- ② INCLUDES END DIAPHRAGMS, RAILINGS & DECK REINF.
- ③ INCLUDES CONCRETE FOR DECK SLAB AND END DIAPHRAGM.
- ④ PAYMENT FOR BEARINGS INCLUDED IN ITEM "BEARING ASSEMBLY" PER EACH.
- ⑤ INCLUDES 4200 S.F. ON BRIDGE APPROACH PANELS.
- ⑥ BRIDGE NAME PLATE TO BE CONSIDERED INCIDENTAL TO "TYPE F (TL-4) BARRIER CONCRETE (3S52)".

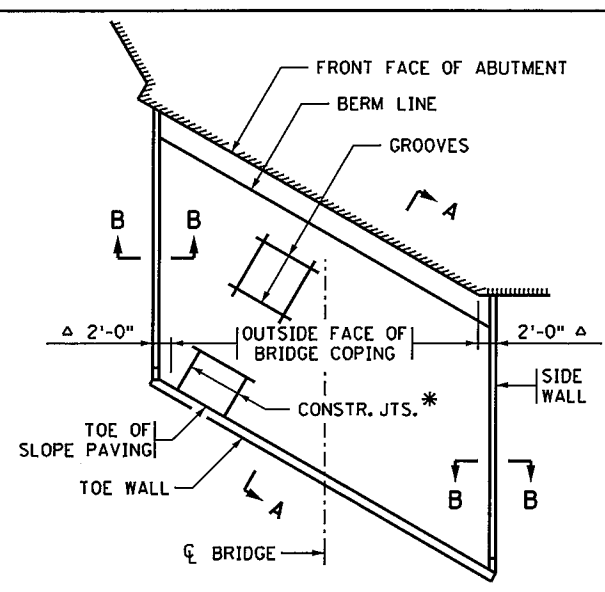


I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H Dupont* Date: 12-4-15
Printed Name: MICHAEL H DUPONT Lic. No. 43375

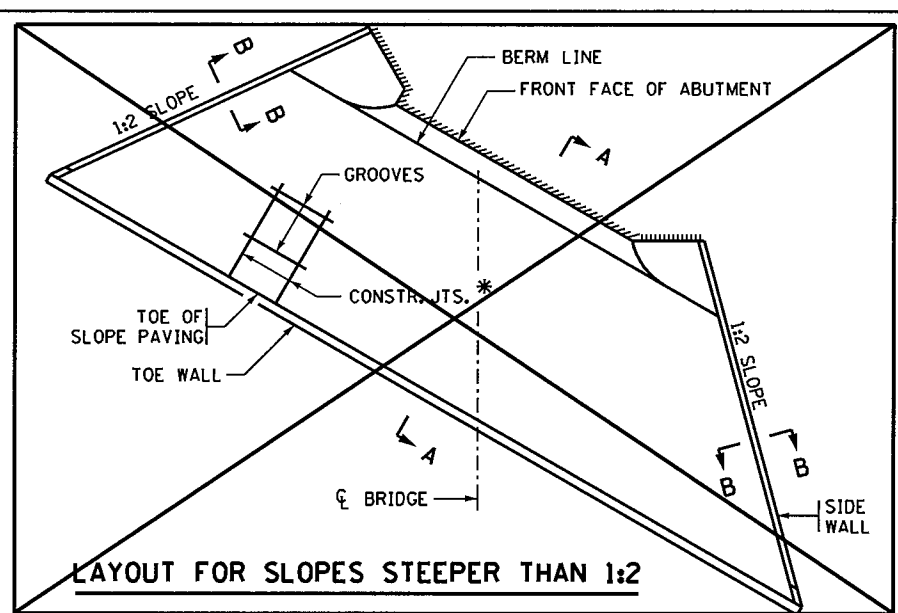
SUPERSTRUCTURE BILL OF REINFORCEMENT AND QUANTITIES

DES: MAW	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: MHD	CHK: MHD	SHEET NO. D54 OF D66 SHEETS	

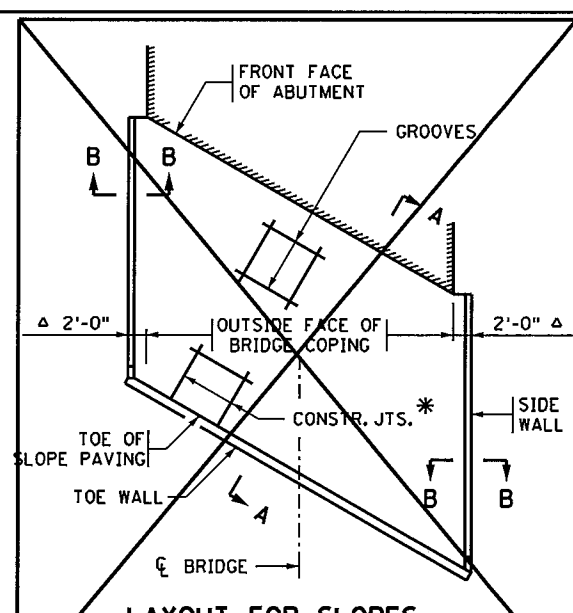
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12/10/2015
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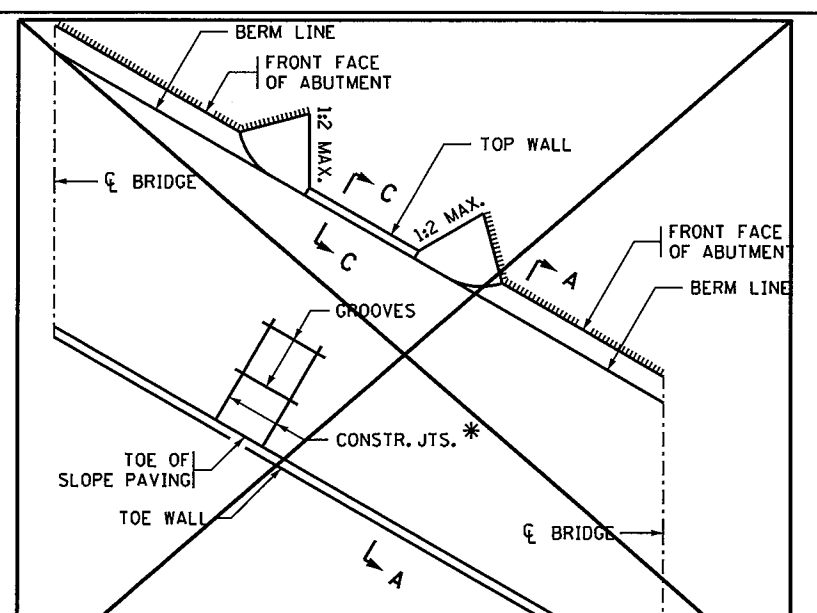
LAYOUT FOR SLOPES 1:2 OR FLATTER



LAYOUT FOR SLOPES STEEPER THAN 1:2

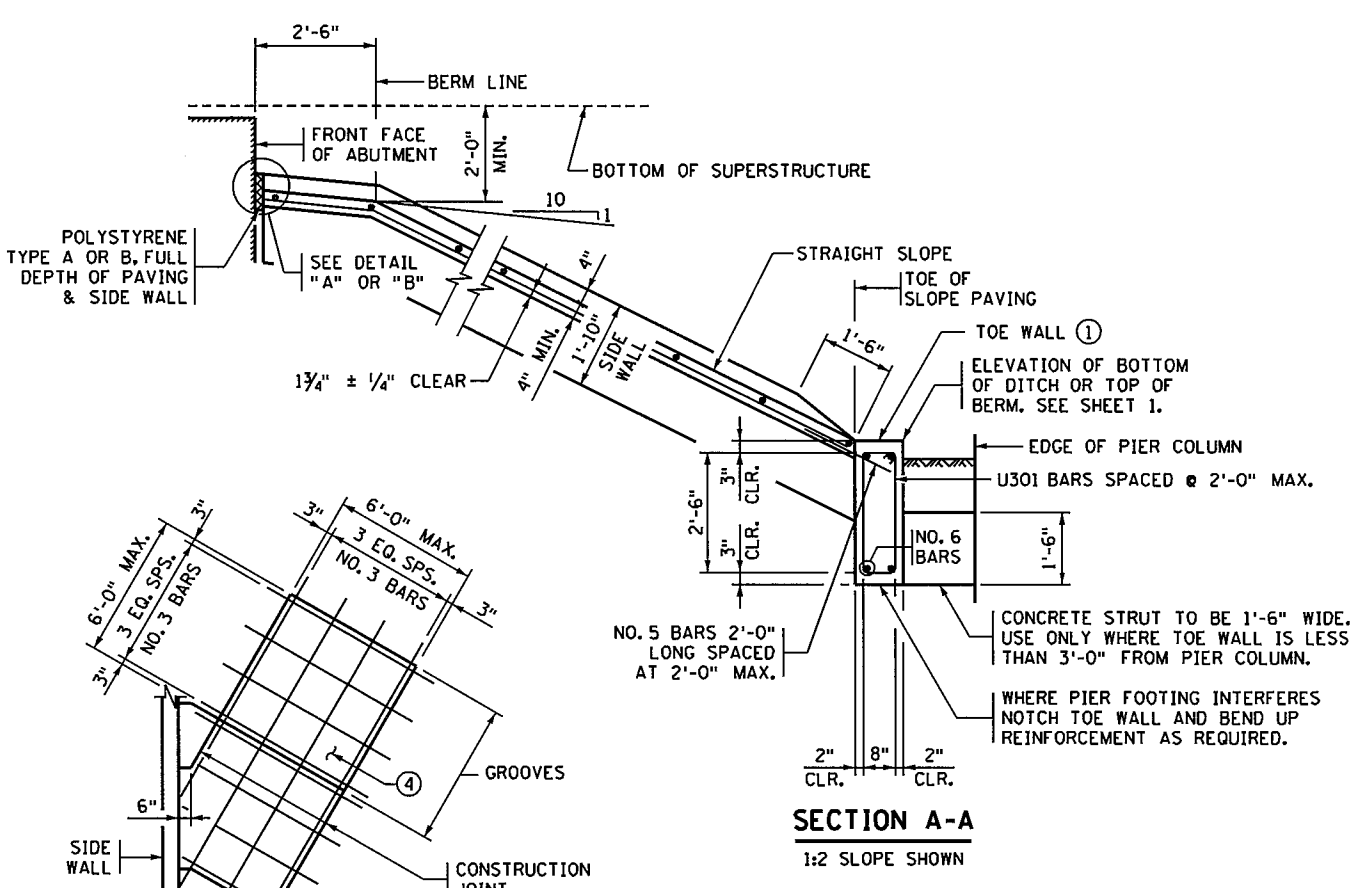


LAYOUT FOR SLOPES AT ABUTMENTS WITH 8' OR GREATER EXPOSURE

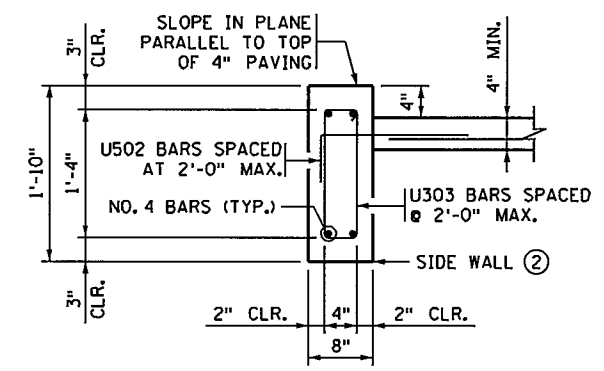


LAYOUT FOR SLOPES BETWEEN BRIDGES

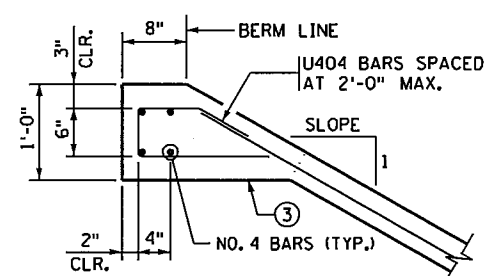
Δ 2'-0" FOR TANGENT BRIDGE SUPERSTRUCTURES. VARIES 2'-0" MINIMUM FOR CURVED BRIDGE SUPERSTRUCTURE.
* VERTICAL CONSTRUCTION JOINTS MAY BE CONSTRUCTED PARALLEL TO ξ OF BRIDGE FOR SKEWS TO 10° ONLY.



SECTION A-A
1:2 SLOPE SHOWN



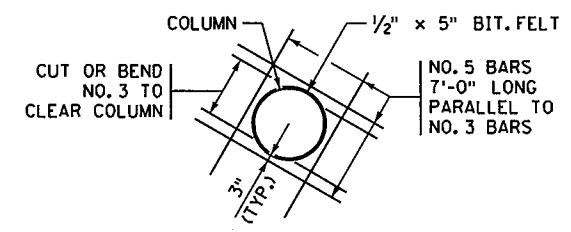
SECTION B-B
NORMAL TO SLOPE



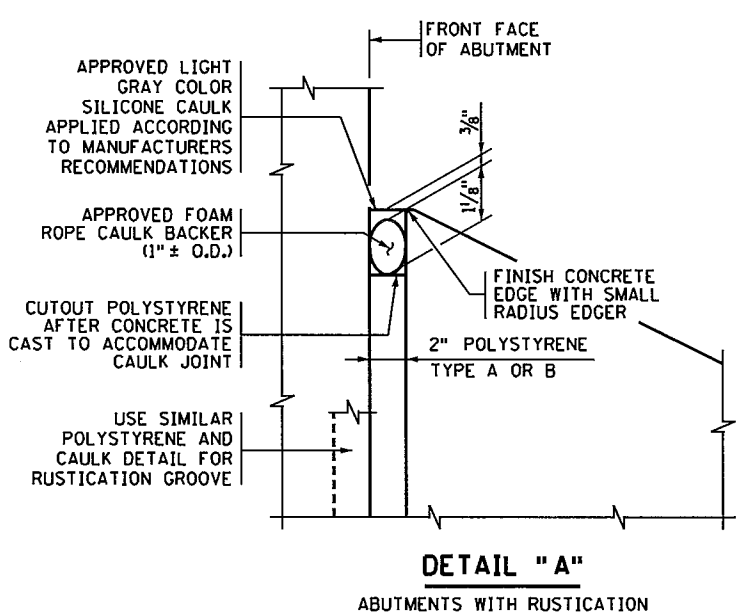
SECTION C-C



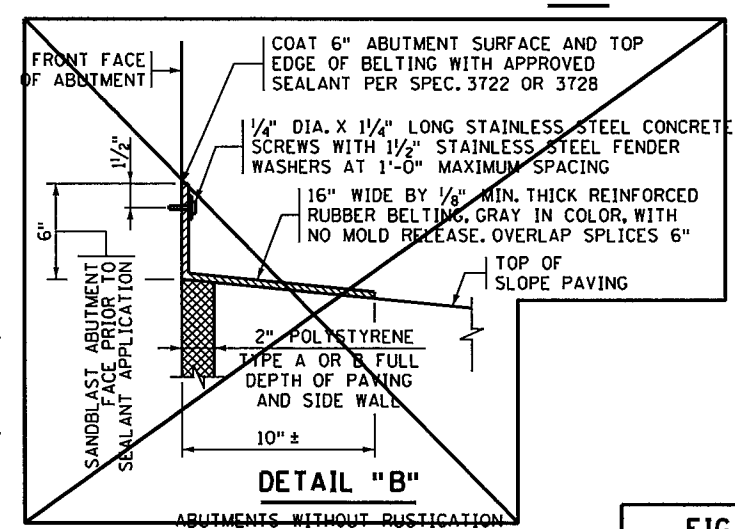
PAVING DETAIL



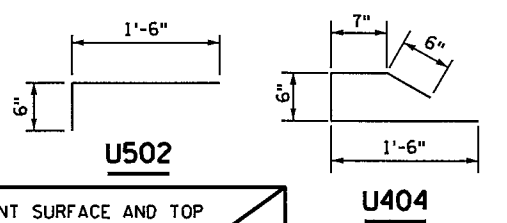
DETAIL WHERE PIER COLUMN EXTENDS THROUGH SLOPE PAVING



DETAIL "A"
ABUTMENTS WITH RUSTICATION

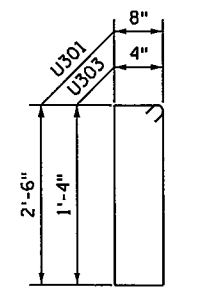


DETAIL "B"
ABUTMENTS WITHOUT RUSTICATION



U502

U404



U301 & U303

CONCRETE & REINFORCEMENT UNIT QUANTITIES

- ① 0.111 CU. YD. OF CONCRETE/LIN. FT. 8.37 LBS. OF REINFORCEMENT/LIN. FT.
- ② 0.046 CU. YD. OF CONCRETE/LIN. FT. 4.46 LBS. OF REINFORCEMENT/LIN. FT.
- ③ 0.058 CU. YD. OF CONCRETE/LIN. FT. 3.70 LBS. OF REINFORCEMENT/LIN. FT. BASED ON A SLOPE OF 1:2.
- ④ 0.111 CU. YD. OF CONCRETE/SQ. YD. 4.50 LBS. OF REINFORCEMENT/SQ. YD.

GENERAL NOTE

SLOPES ARE EXPRESSED AS A RATIO OF VERTICAL DISTANCE: HORIZONTAL DISTANCE.
SLOPE PAVING PER SPEC. 2514.

REVISION: 09-11-2014
APPROVED: SEPTEMBER 26, 2003
Samuel H. Johnson
STATE BRIDGE ENGINEER

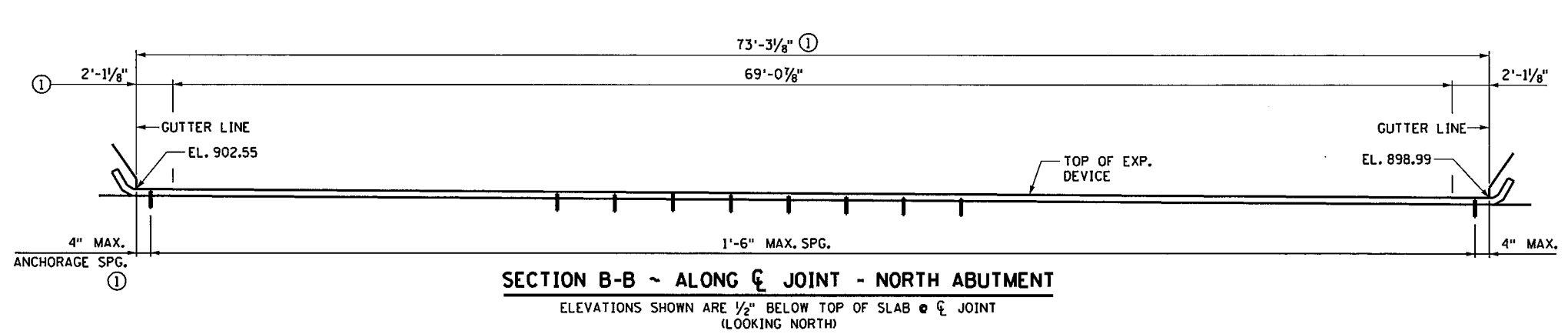
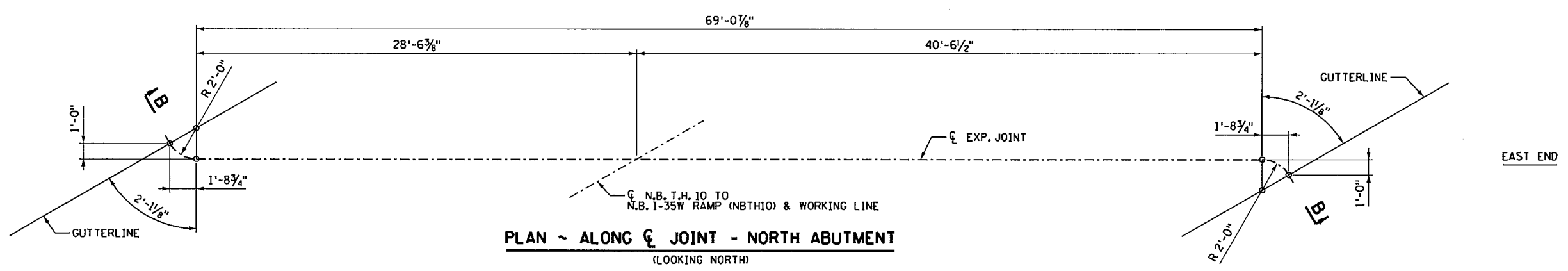
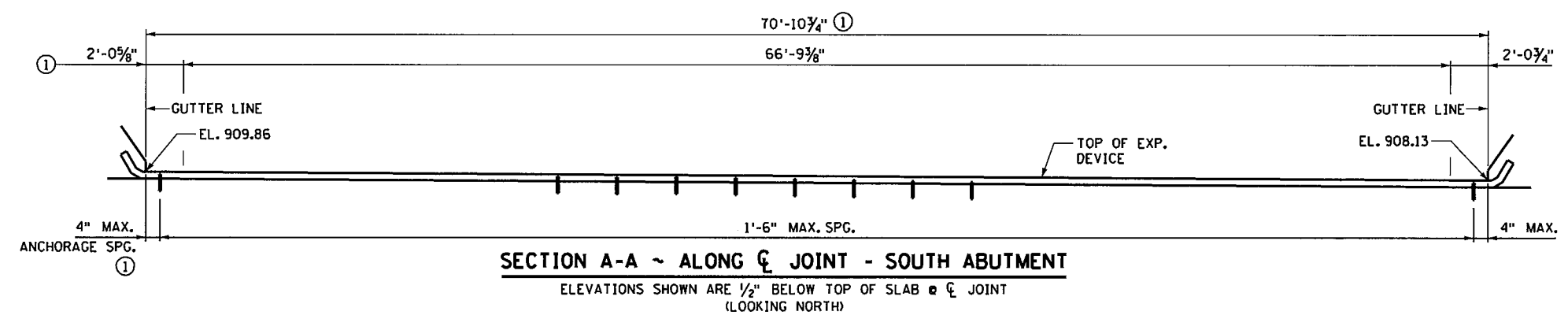
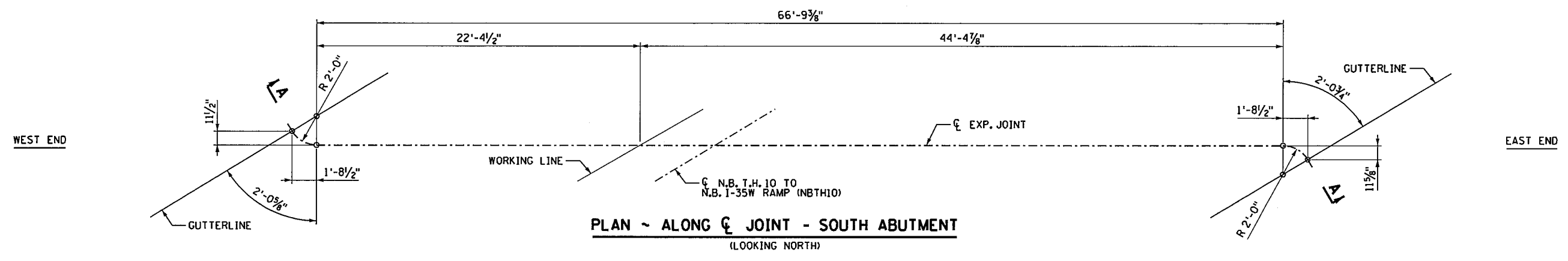
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael J. Dupont* Date: 12-4-15
Printed Name: MICHAEL J. DUPONT Lic. No. 43375

CONCRETE SLOPE PAVING UNDER BRIDGES

DES: MAW DR: MAW APPROVED: 12/14/15
CHK: MHD CHK: MHD
SHEET NO. D55 OF D66 SHEETS
BRIDGE NO 62937

FIG. 5-397.301

11:16:58 AM
 12/10/2015
 S:\PT\AR\Ramse\129594\5-final-dsgh\51-const-dwgs-CAD\20-Struct\Br62937.dgn\cbr62937-ssWED.dgn



NOTES:
 ① DIMENSIONS ARE ALONG CENTERLINE OF JOINT.



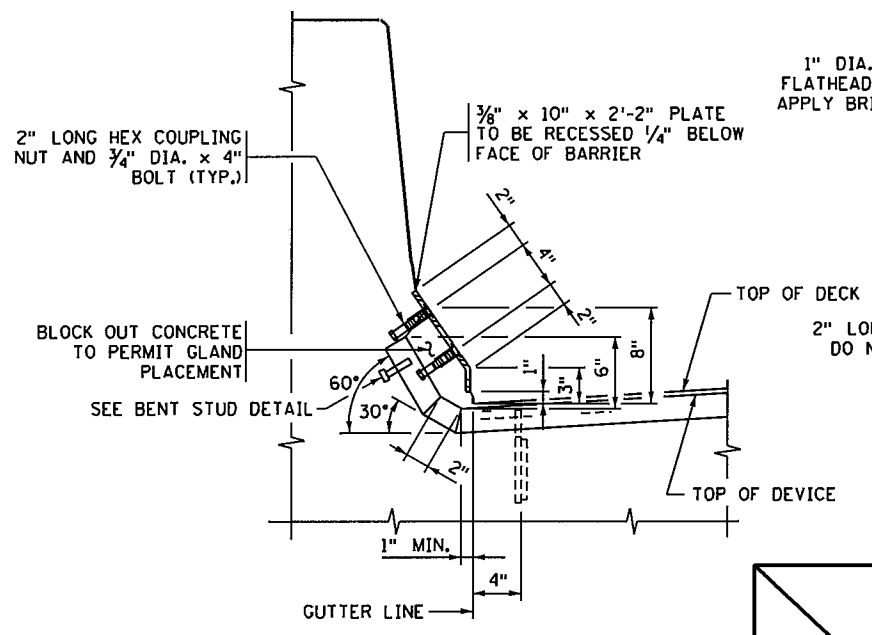
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H Dupont* Date: 12-4-15
 Printed Name: MICHAEL H DUPONT Lic. No. 43375

WATERPROOF EXPANSION DEVICE

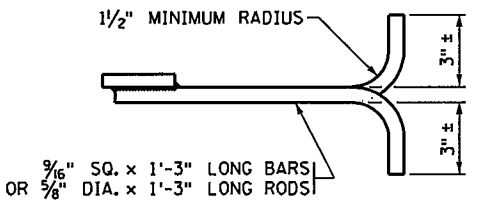
DES: MAW	DR: DLF	APPROVED: 12/14/15
CHK: MHD	CHK: MHD	
SHEET NO. D56 OF D66 SHEETS		

BRIDGE NO
 62937

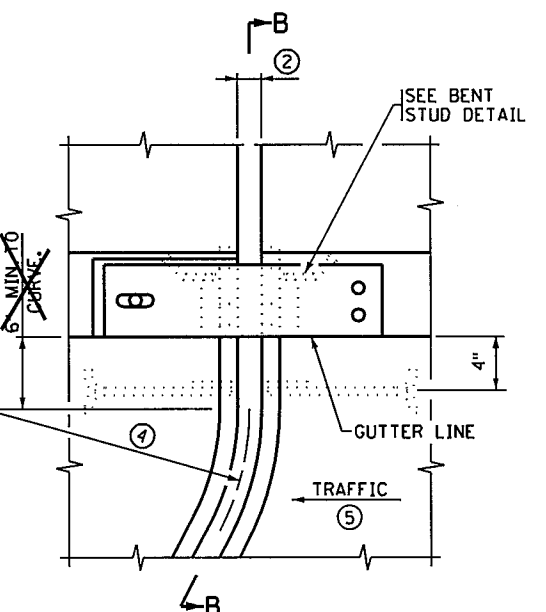
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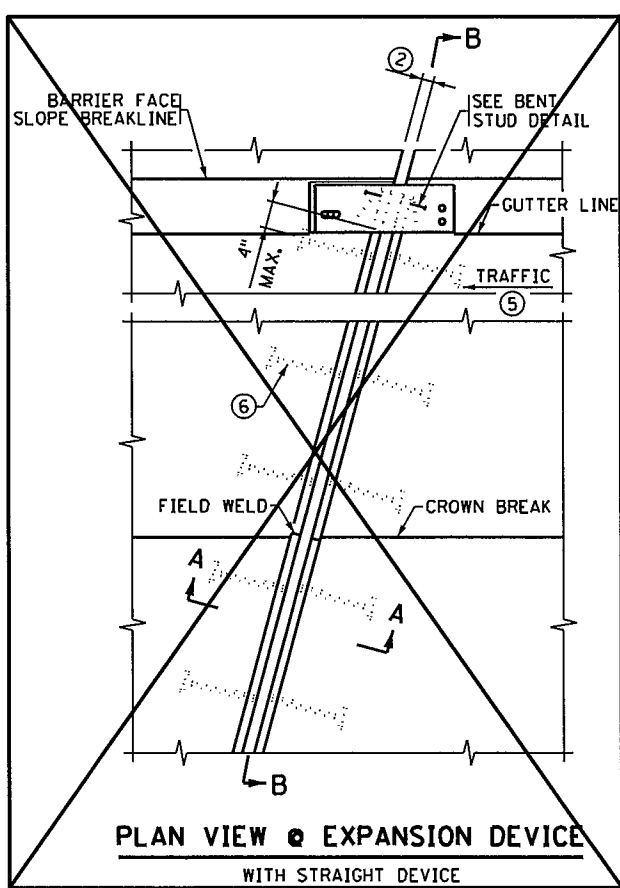
SECTION THROUGH BARRIER
TYPE F BARRIER



BAR-ROD DETAIL

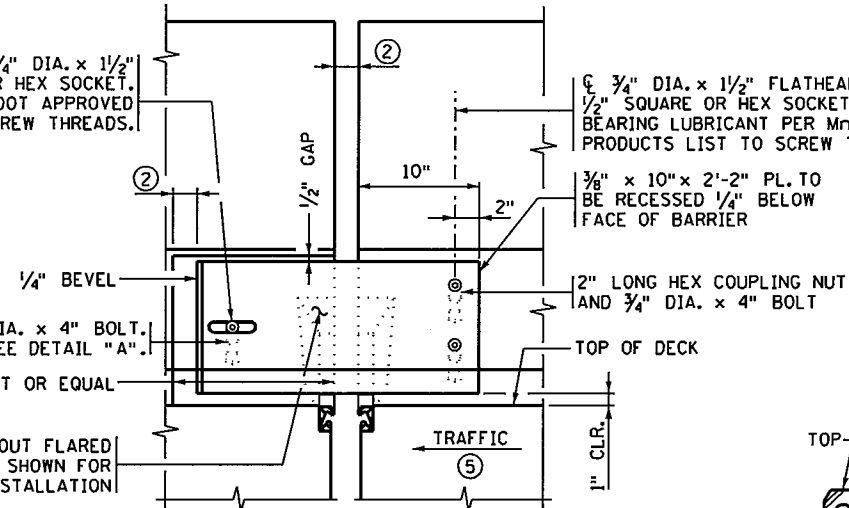


PLAN VIEW @ EXPANSION DEVICE
WITH CURVED DEVICE ALTERNATE

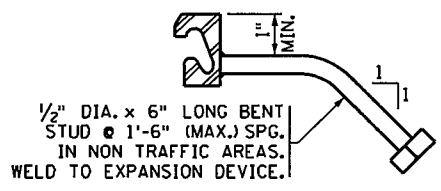


PLAN VIEW @ EXPANSION DEVICE
WITH STRAIGHT DEVICE

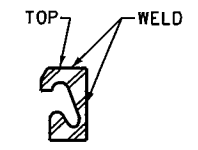
1" DIA. x 6" LONG SLOTTED HOLE FOR 3/4" DIA. x 1/2" FLATHEAD CAP SCREW WITH 1/2" SQUARE OR HEX SOCKET. APPLY BRIDGE BEARING LUBRICANT PER MNDOT APPROVED PRODUCTS LIST TO SCREW THREADS.



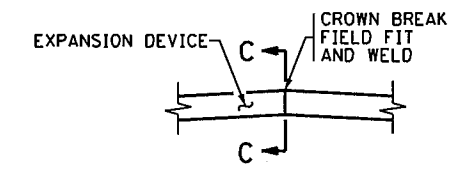
BARRIER ELEVATION



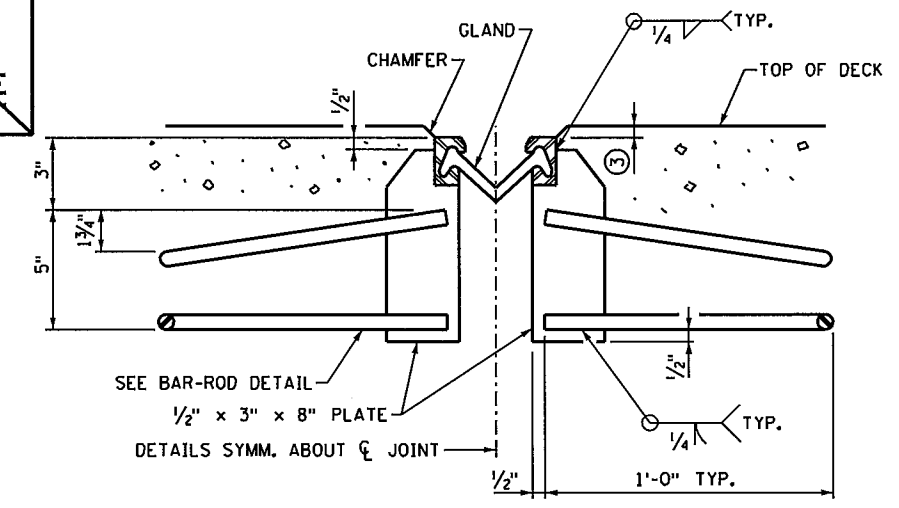
BENT STUD DETAIL



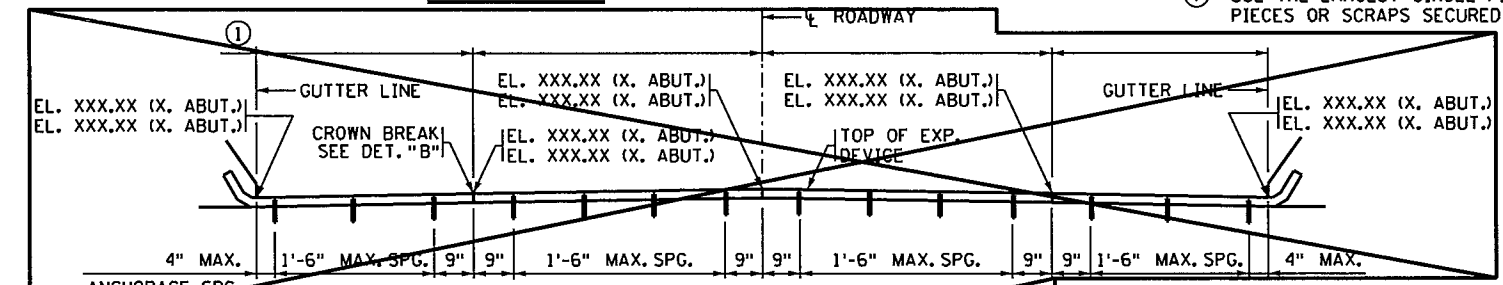
SECTION C-C



DETAIL "B"

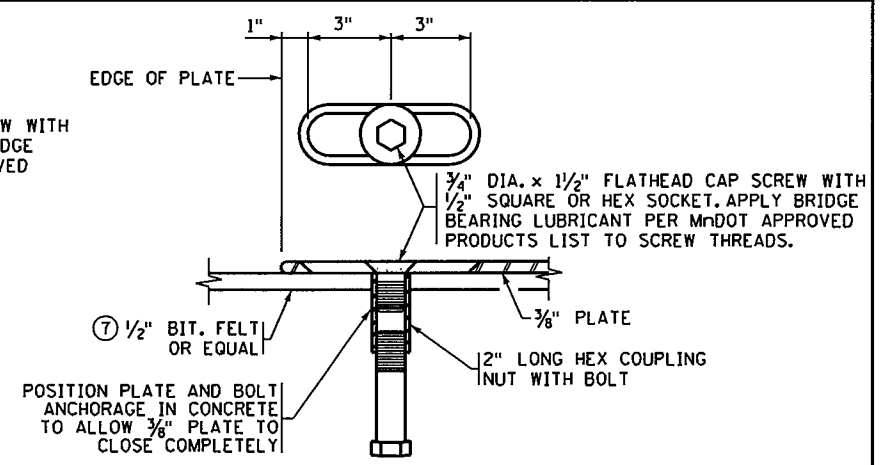


SECTION A-A



SECTION B-B ~ ALONG @ JOINT

ELEVATIONS SHOWN ARE 1/8" BELOW TOP OF SLAB @ JOINT
ELEVATIONS SHOWN ARE 1/2" BELOW TOP OF SLAB @ JOINT



DETAIL "A"

GENERAL NOTES

- GALVANIZE STRUCTURAL STEEL AFTER FABRICATION AS PER SPEC. 3394. GALVANIZE FASTENERS AS PER SPEC. 3392.
- JOINTS IN EXTRUSION SHALL BE LOCATED AT BREAKS IN TRANSVERSE PROFILE AND AS OTHERWISE REQUIRED. JOINTS SHALL BE CLOSE FIT AND WELDED. REPAIR AFTER WELDING AS PER SPEC. 2471.3L.
- STRUCTURAL STEEL SHALL COMPLY WITH SPEC. 3306 OR SPEC. 3309.
- EXPANSION DEVICE SHALL BE STRAIGHTENED TO A TOLERANCE OF 1/8" IN 10 FT.
- 3/4" DIA. x 1 1/2" FLATHEAD CAP SCREW WITH 1/2" SQUARE OR HEX SOCKET PER SPEC 3391. CAP SCREWS SHALL BE COUNTERSUNK 1/16" BELOW TOP OF PLATE. APPLY BRIDGE BEARING LUBRICANT PER MNDOT APPROVED PRODUCTS LIST TO SCREW THREADS
- LENGTH OF PAYMENT FOR DEVICE IS FROM OUTER END TO OUTER END OF EXTRUSION ALONG CENTERLINE OF JOINT. REFER TO THE SPECIAL PROVISIONS FOR MORE SPECIFIC PAYMENT INFORMATION.
- ① DIMENSIONS ARE ALONG CENTERLINE OF JOINT.
- ② 2" AT 45° F; 1 1/2" AT 90° F.
- ③ 1/8" (1/4" MAX.), 1/2" (3/4" MAX.) WHEN SNOWPLOW FINGERS ARE USED. SNOWPLOW FINGERS ARE REQUIRED FOR SKEWS OVER 15° AND LESS THAN 50°.
- ④ SEE SUPERSTRUCTURE DETAILS FOR RADIUS.
- ⑤ SEE SHEET NO. D1 FOR DIRECTION OF TRAFFIC.
- ⑥ PLACE BAR-ROD NORMAL TO JOINT ON NEW BRIDGES AND JOINT REPLACEMENTS. ON JOINT REPLACEMENTS WHEN SKEW IS OVER 15° AND LESS THAN 50° BEND RODS PARALLEL TO @ ROADWAY.
- ⑦ USE THE LARGEST SINGLE PIECE POSSIBLE. USE OF SMALL PIECES OR SCRAPS SECURED TOGETHER IS PROHIBITED.

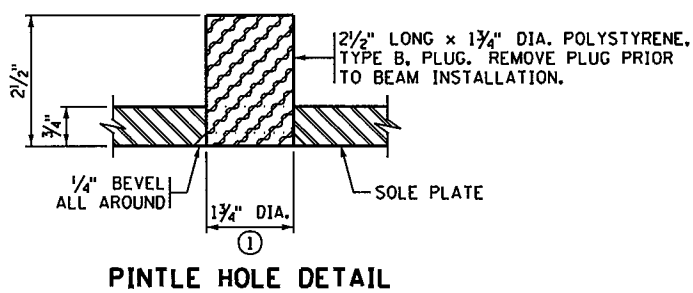
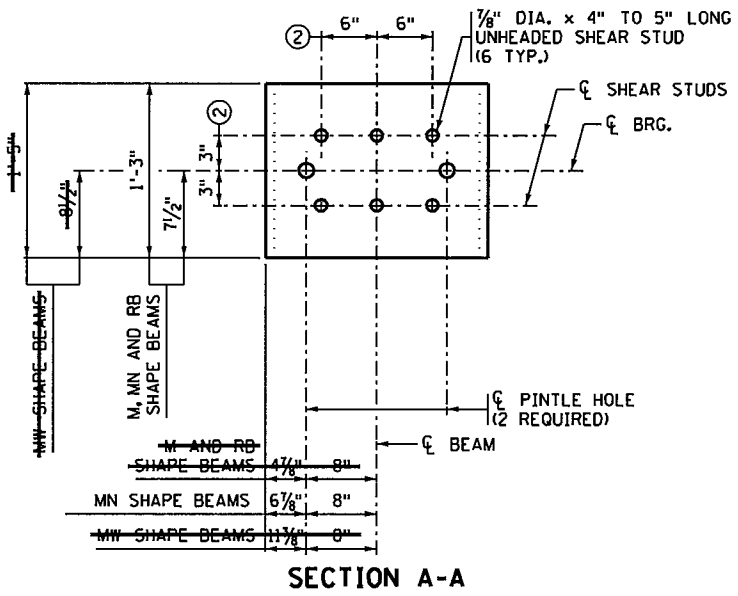
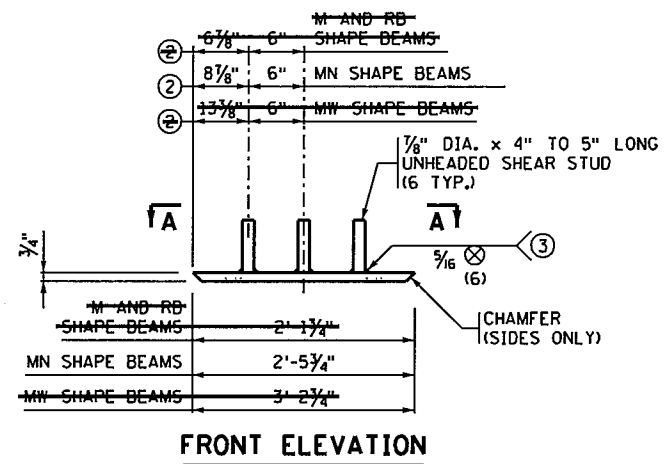
REVISION: 09-11-2014
APPROVED: NOVEMBER 6, 1995
Donald J. Fleming
STATE BRIDGE ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

WATERPROOF EXPANSION DEVICE
(WITH TYPE F BARRIER)

DES: MAW DR: DLF
CHK: MHD CHK: MHD
APPROVED: 12/14/15
SHEET NO. D57 OF D66 SHEETS
BRIDGE NO 62937

MODIFIED
FIG. 5-397.627



NOTES:

- MATERIAL TO BE STRUCTURAL STEEL PER MnDOT SPEC. 3306.
- WELDED STUDS TO BE WELDABLE CARBON STEEL PER MnDOT SPEC. 3391.2D.
- SOLE PLATE FOR BEARING ASSEMBLY TO BE GALVANIZED PER MnDOT SPEC. 3394 AFTER FABRICATION.
- PINTLE HOLES SHALL BE FREE OF ZINC BUILD UP FROM GALVANIZING.
- SOLE PLATES ARE INCIDENTAL TO PRESTRESSED CONCRETE BEAMS.
- ① FOR 1 1/2" DIA. PINTLES.
- ② THESE DIMENSIONS MAY BE MODIFIED TO CLEAR PRESTRESSED STRANDS. HOWEVER, CHANGES MUST BE APPROVED BY THE ENGINEER.
- ③ THE REQUIREMENTS FOR WELDING STUDS SHALL COMPLY WITH AASHTO/AWS D1.1.

APPROVED: SEPTEMBER 22, 2011

Nancy Subenberger
STAFF BRIDGE ENGINEER

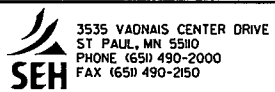
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

SOLE PLATE
(PRESTRESSED CONCRETE BEAMS)
(FOR BEARINGS WITH PINTLES)

REVISED

DETAIL NO.

B303



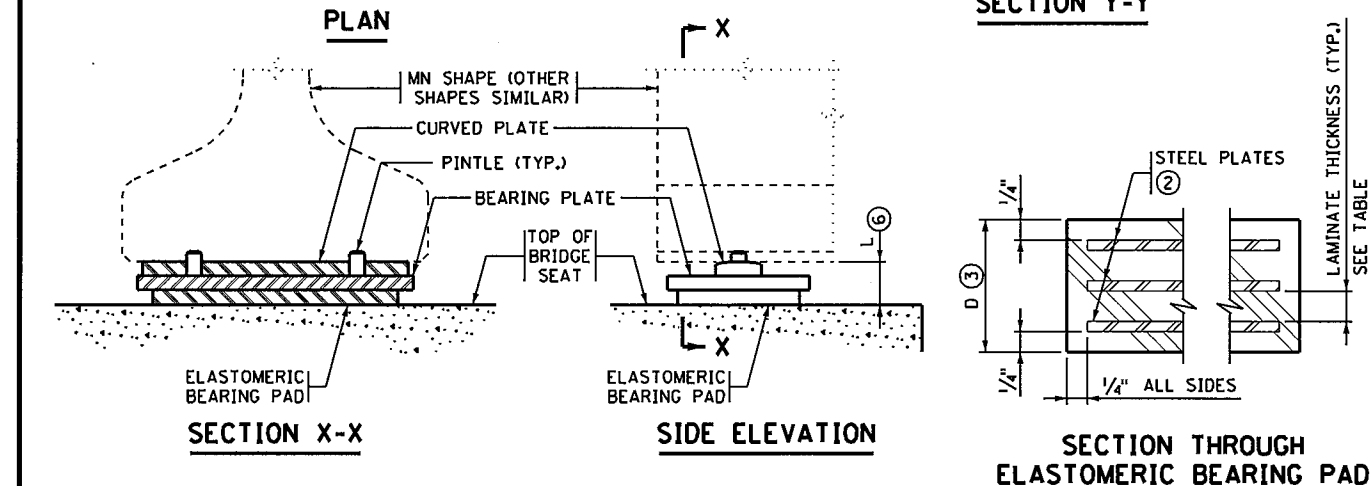
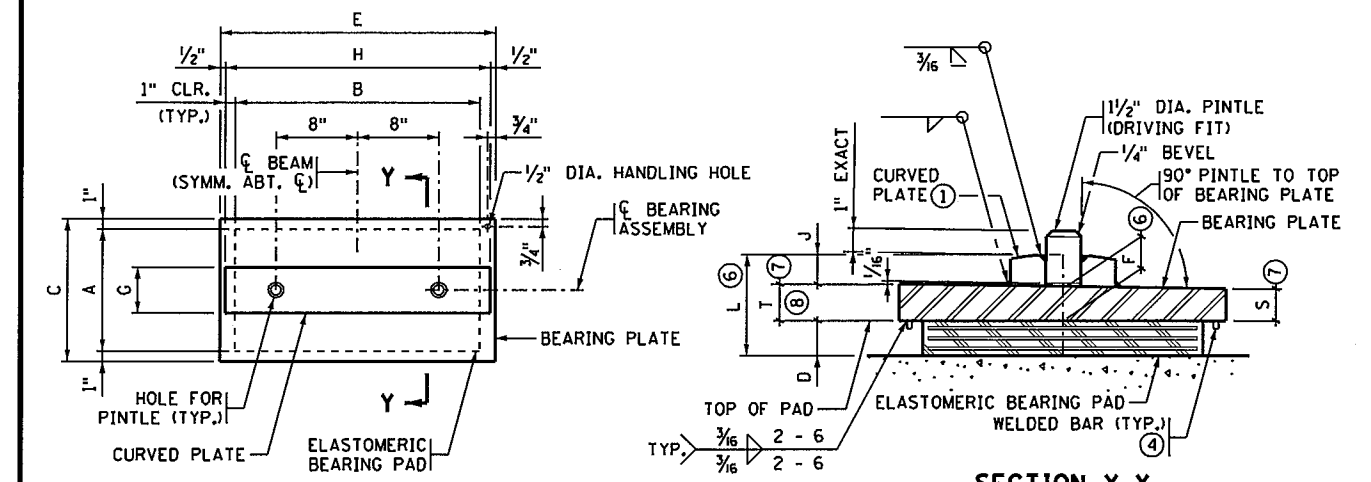
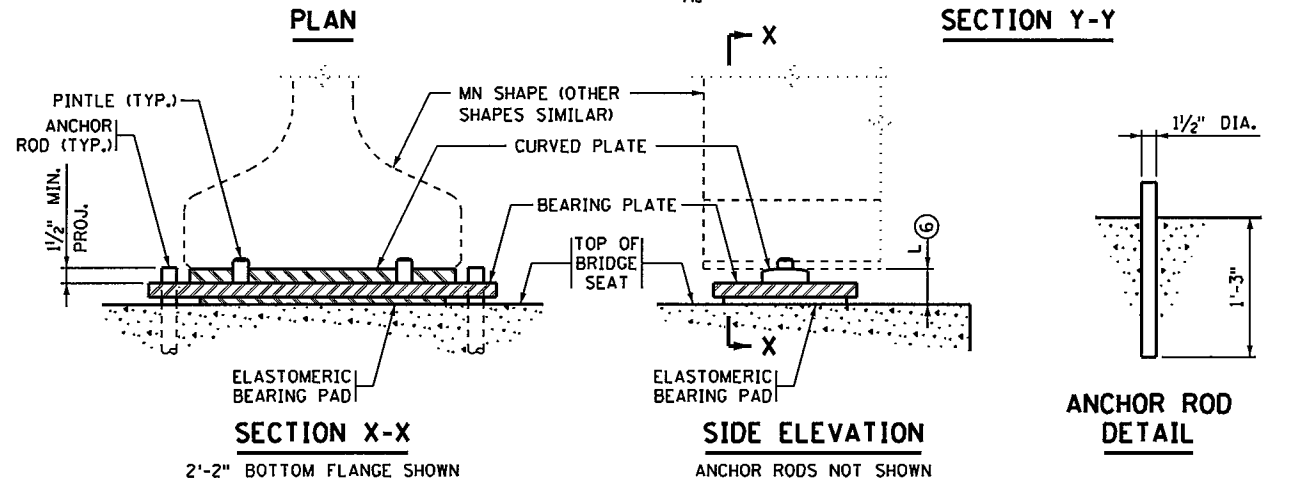
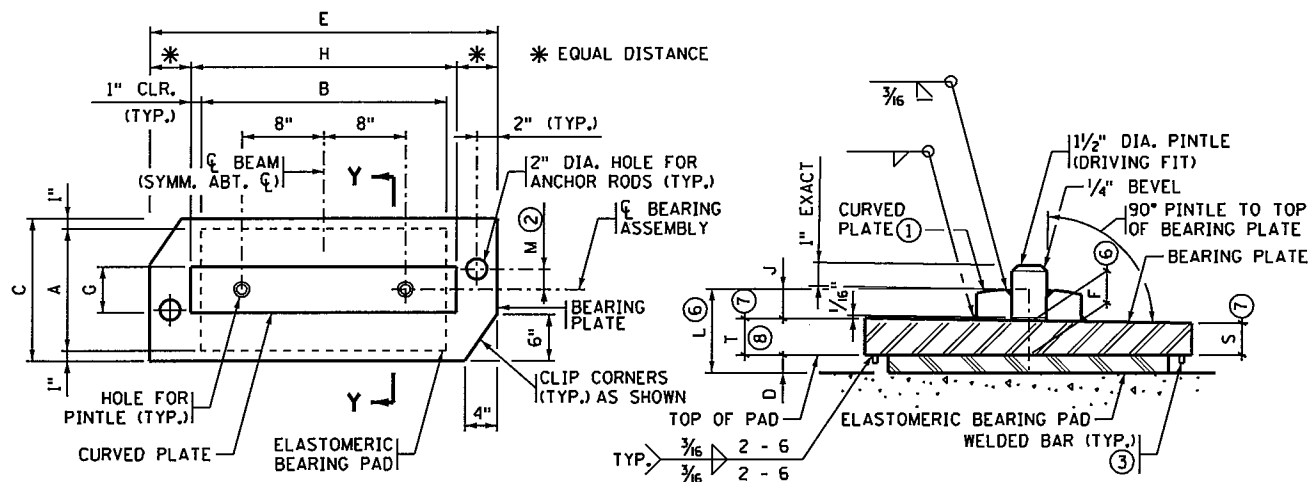
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the state of Minnesota.
Signature: *Michael H. Dupont* Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

B-DETAILS

DES: MAW DR: MAW APPROVED: 12/14/15
CHK: MHD CHK: MHD
SHEET NO. D59 OF D66 SHEETS

BRIDGE NO
62937

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12/10/2015
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DESIGN SLOPE %	ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE			ANCHOR ROD OFFSET	ASSY. HEIGHT	CURVED PLATE	SLOPED BRG. PL. (1)		
				A	B	D		C	E	F(6)	G	H	J				L(6)	R(1)	S
4	F1	(5)	MN45	12"	24"	1/2"	8.0	14"	34"	1 1/2"	4 1/2"	26"	1 1/4"	+	5"	3 1/4"	16"	1 1/4"	1 3/4"
LEVEL	F2	(5)	MN45	12"	24"	1/2"	8.0	14"	34"	1 1/2"	4 1/2"	26"	1 1/4"	+	5"	3 1/4"	16"	-	-

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306.

PROVIDE ANCHOR RODS PER SPEC. 3385, TYPE A. GALVANIZE PER SPEC. 3392.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL.

(5) SEE FRAMING PLAN

(6) AT CENTERLINE BEARING

(7) DIMENSIONS FOR BEARINGS WITH TAPERED BEARING PLATES

(8) MARK THICKER SIDE OF SLOPED PLATES WITH A "T" FOR PLACEMENT. SEE FRAMING PLAN SHEET D42.

(1) THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

(2) "+" DENOTES OFFSET AS SHOWN. "-" DENOTES OFFSET OPPOSITE OF SHOWN.

(3) 3/8" X 3/8" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = 1/2".

MODIFIED FOR TAPERED BEARING PLATES WITH CLIPPED CORNERS

DESIGN DATA:
MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1/2" PINTLES.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 11-06-2013 11-03-2015	DETAIL NO. MODIFIED B310
 NANCY DUBENBERGER STATE BRIDGE ENGINEER		CURVED PLATE BEARING ASSEMBLY (PRESTRESSED CONCRETE BEAMS) (FIXED)	

DESIGN SLOPE %	ASSEMBLY TYPE	LOCATION	BEAM SIZE	BEARING PAD SIZE			STEEL PLATES	LAMINATES	SHAPE FACTOR	BEARING PLATE SIZE			CURVED PLATE SIZE			ASSY. HEIGHT	CURVED PLATE	SLOPED BRG. PL. (1)			
				A	B	D				NO. THICK.	NO. THICK.	C	E	F(6)	G			H	J	L(6)	R(1)
4.5	E1	(5)	MN45	12"	24"	1 7/8"	3	1/8"	2	1/2"	8.0	14"	27"	1 1/2"	4 1/2"	26"	1 1/4"	4 9/16"	16"	1 3/16"	1 3/16"
4	E2	(5)	MN45	16"	24"	1/2"	-	-	-	8.0	14"	27"	1 1/2"	4 1/2"	26"	1 1/4"	3 1/4"	16"	1 1/4"	1 3/4"	
LEVEL	E3	(5)	MN45	16"	24"	1/2"	-	-	-	8.0	14"	27"	1 1/2"	4 1/2"	26"	1 1/4"	3 1/4"	16"	-	-	
LEVEL	E4	(5)	MN45	16"	24"	1/2"	-	-	-	8.0	14"	27"	1 1/2"	4 1/2"	26"	1 1/4"	3 1/4"	16"	-	-	

NOTES:

PROVIDE ELASTOMERIC MATERIALS AND PAD CONSTRUCTION PER SPEC. 3741.

PROVIDE STEEL PLATES PER SPEC. 3306.

PROVIDE PINTLES PER SPEC. 3309.

GALVANIZE STRUCTURAL STEEL BEARING ASSEMBLY AFTER FABRICATION PER SPEC. 3394, EXCEPT AS NOTED.

PAYMENT FOR BEARING ASSEMBLY INCLUDES ALL MATERIAL ON THIS DETAIL.

(5) SEE FRAMING PLAN

(6) AT CENTERLINE BEARING

(7) DIMENSIONS FOR BEARINGS WITH TAPERED BEARING PLATES

(8) MARK THICKER SIDE OF SLOPED PLATES WITH A "T" FOR PLACEMENT. SEE FRAMING PLAN SHEET D42.

(1) THE MIN. RADIUS IS 16" UNLESS OTHERWISE SPECIFIED IN THE TABLE. THE MAX. RADIUS IS 24". FINISH TO 250 MICRO. THE FINISHED THICKNESS OF THE PLATE MAY BE 1/16" LESS THAN SHOWN.

(2) DO NOT GALVANIZE THESE PLATES.

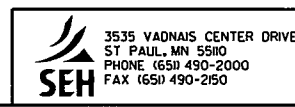
(3) THE TOTAL THICKNESS SHOWN INCLUDES THE STEEL PLATES.

(4) 3/8" X 3/8" BAR INSTALLED ON BEARING PLATE AROUND PERIMETER OF BEARING PAD. BAR LENGTH IS 2" LESS THAN ADJACENT PAD DIMENSION, CENTERED ON PAD. CENTERLINE OF BAR TO EDGE OF PAD DIMENSION = 1/2".

MODIFIED FOR TAPERED BEARING PLATES

DESIGN DATA:
MAXIMUM HORIZONTAL LOAD IS 70 KIPS FOR 1/2" PINTLES.

APPROVED: SEPTEMBER 22, 2011	STATE OF MINNESOTA DEPARTMENT OF TRANSPORTATION	REVISED 11-03-2015	DETAIL NO. MODIFIED B311
 NANCY DUBENBERGER STATE BRIDGE ENGINEER		CURVED PLATE BEARING ASSEMBLY (PRESTRESSED CONCRETE BEAMS) (EXPANSION)	



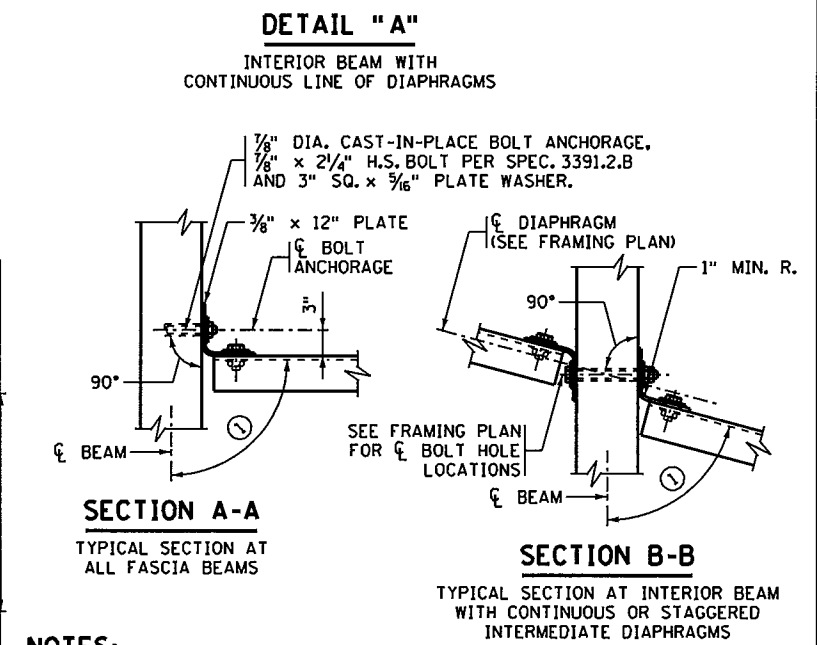
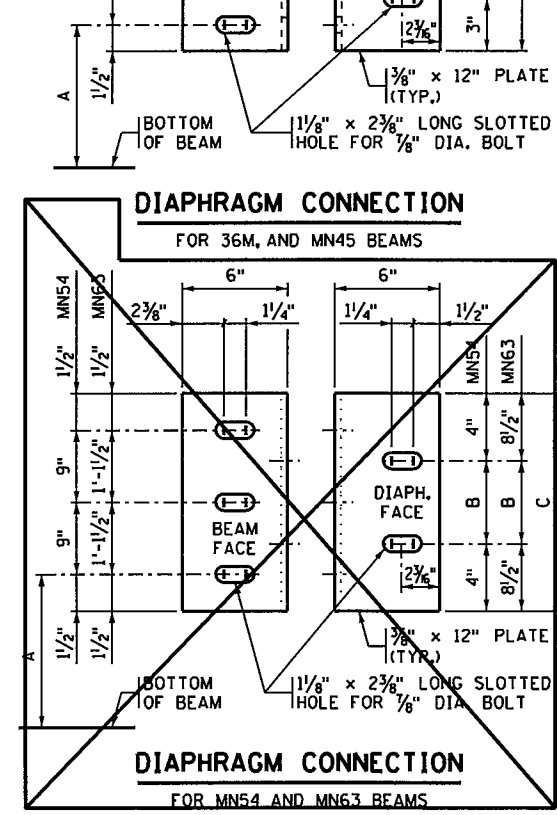
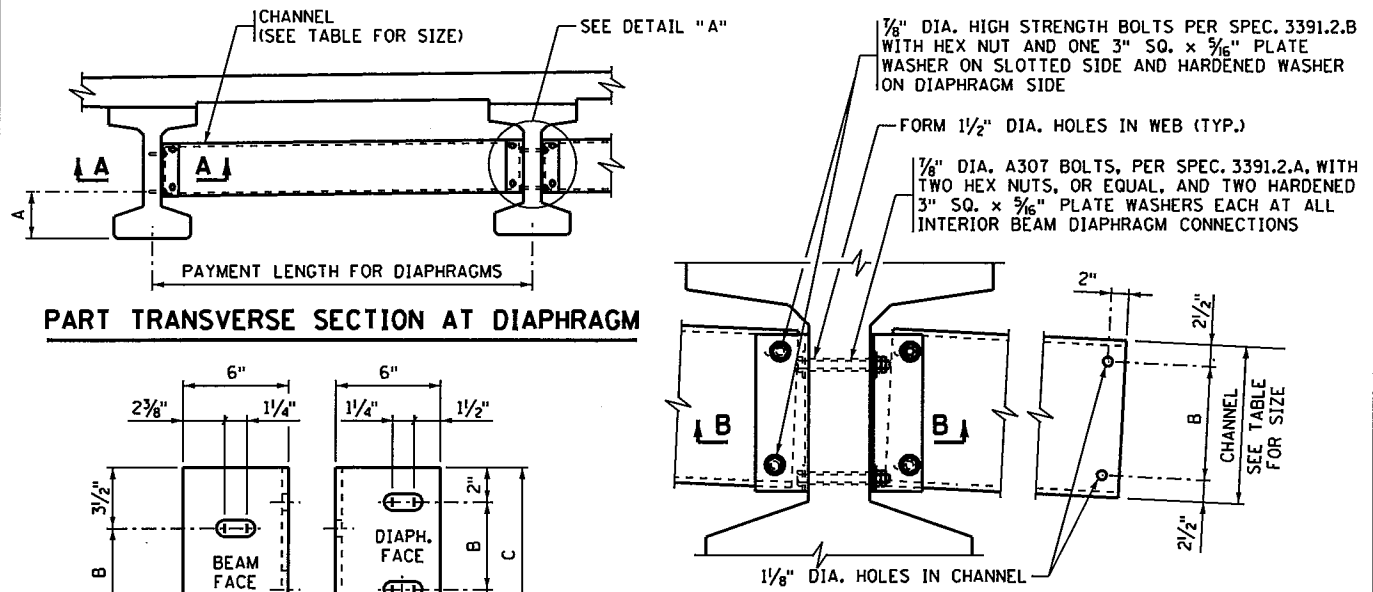
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: Date: 12-4-15
Printed Name: MICHAEL H. DUPONT Lic. No. 43375

B-DETAILS

DES: MAW	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: MHD	CHK: MHD		
SHEET NO. D60 OF D66 SHEETS			

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 12/10/2015
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NOTES:

PROVIDE STEEL PER SPEC. 3306.

INSTALL PER SPEC. 2405.3.K.

TORQUE ALL BOLTS, INCLUDING ANCHOR BOLTS TO 80 FT.-LBS.

SHOP BEND THE LEG OF THE 12" PLATE TO CONFORM TO THE DIAPHRAGM. A 3/8" x 6" x 6" ANGLE MAY BE USED FOR DIAPHRAGMS PERPENDICULAR TO BEAMS.

INCLUDE ALL STRUCTURAL STEEL SHOWN ON THIS DETAIL, INCLUDING BOLTS AND WASHERS, IN UNIT PRICE BID FOR DIAPHRAGMS FOR PRESTRESSED BEAMS.

BENT PLATES MAY BE USED IN PLACE OF CHANNELS IF THE BENT PLATES HAVE THE SAME HEIGHT AS THE CHANNELS THEY REPLACE, ARE 5/16" IN THICKNESS, AND HAVE LEGS 5" LONG.

GALVANIZE STEEL PLATES AND SHAPES PER SPEC. 3394.

GALVANIZE BOLTS, NUTS AND WASHERS PER SPEC. 3392.

① FOR SKEW ANGLES UNDER 20°, USE 90° LESS THE SKEW ANGLE. FOR SKEW ANGLES OVER 20°, USE 90°.

BEAM HEIGHT	DISTANCE			CHANNEL SIZE
	A	B	C	
36M	1'-3"	7"	1'-0"	C12x20.7
MN45	1'-7 3/4"	7"	1'-0"	C12x20.7
MN54	1'-7 3/4"	1'-1"	1'-9"	MC10x42.7
MN63	1'-7 3/4"	1'-1"	2'-6"	MC10x42.7

APPROVED: NOVEMBER 03, 2015

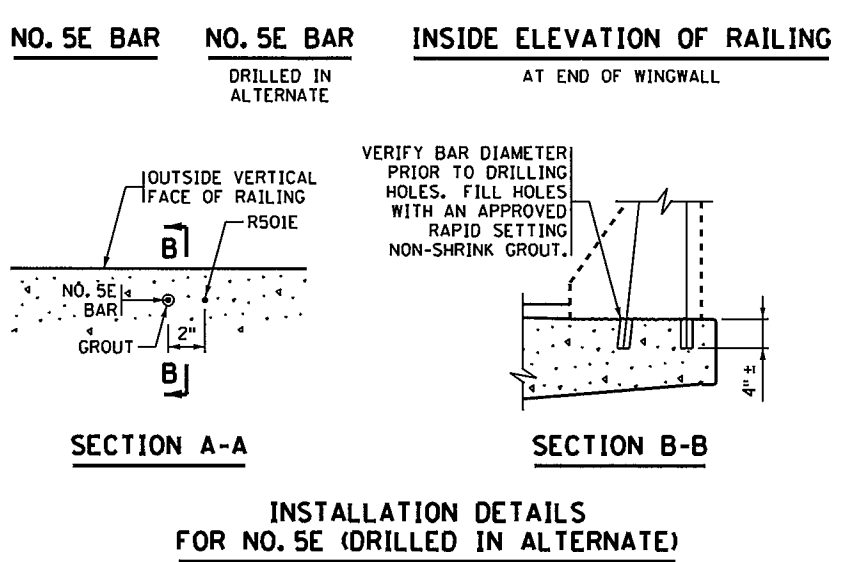
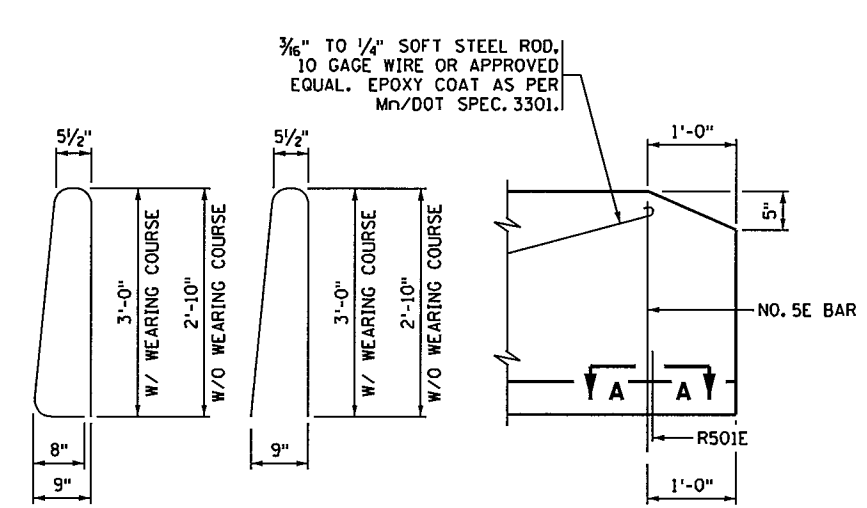
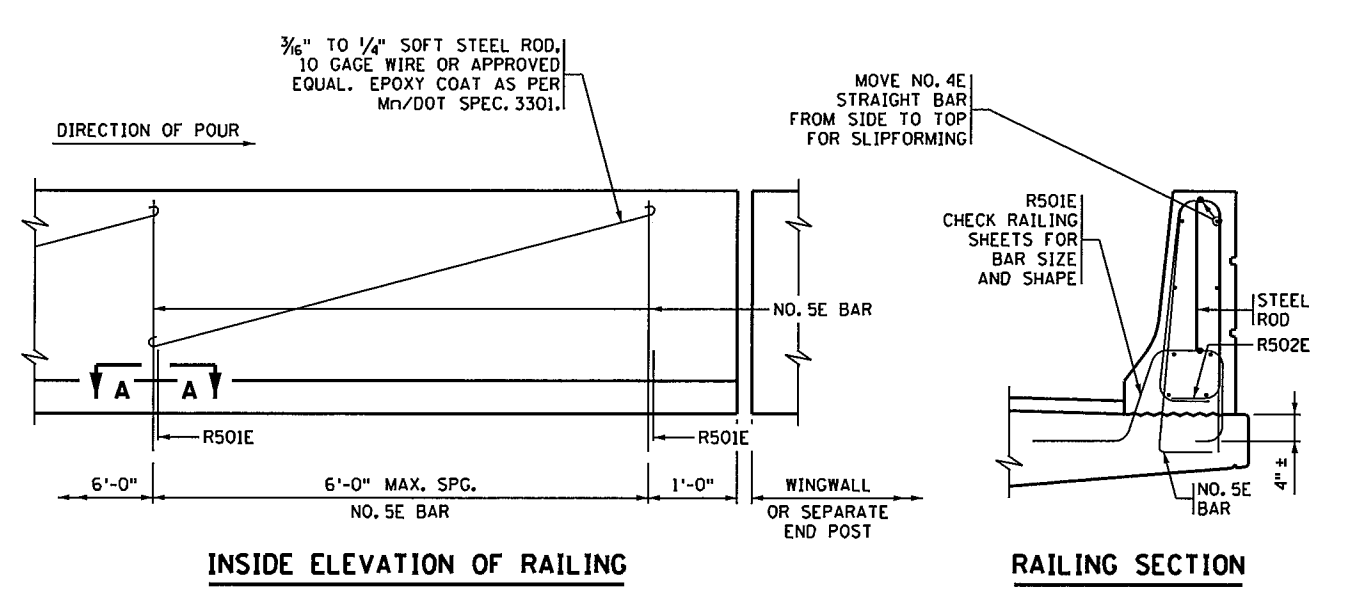
STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

REVISOR

DETAIL NO. **B403**

STEEL INTERMEDIATE DIAPHRAGM
(FOR 36M, MN45 - MN63 PRESTRESSED CONCRETE BEAMS)

STATE BRIDGE ENGINEER



APPROVED: NOVEMBER 22, 2002

STATE OF MINNESOTA
DEPARTMENT OF TRANSPORTATION

REVISION 4-17-2013

DETAIL NO. **B830**

CONCRETE RAILING (TYPE F)
(SLIPFORM ALTERNATE)

STATE BRIDGE ENGINEER

NOTES:

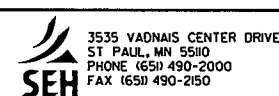
CONTRACTOR WILL TOOL V-GROOVE AT DEFLECTION JOINTS AT TIME RAIL IS CAST AND SHALL EXTEND V-GROOVE AROUND ENTIRE PERIMETER OF RAIL.

FOR ADDITIONAL DIMENSIONS, DETAILS, REINFORCEMENT AND NOTES SEE RAILING SHEET.

FORM RAIL FOR A MINIMUM OF 2' ON EACH SIDE OF EXPANSION DEVICES, LIGHT STANDARDS AND DECK DRAIN BOX OUTS.

PAY QUANTITIES WILL NOT BE ADJUSTED AS A RESULT OF SELECTING THIS ALTERNATE.

USE A SIMILAR METHOD FOR TALLER RAILINGS OR MODIFIED VERSIONS OF THIS RAILING.



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: *Michael H Dupont* Date: 12-4-15

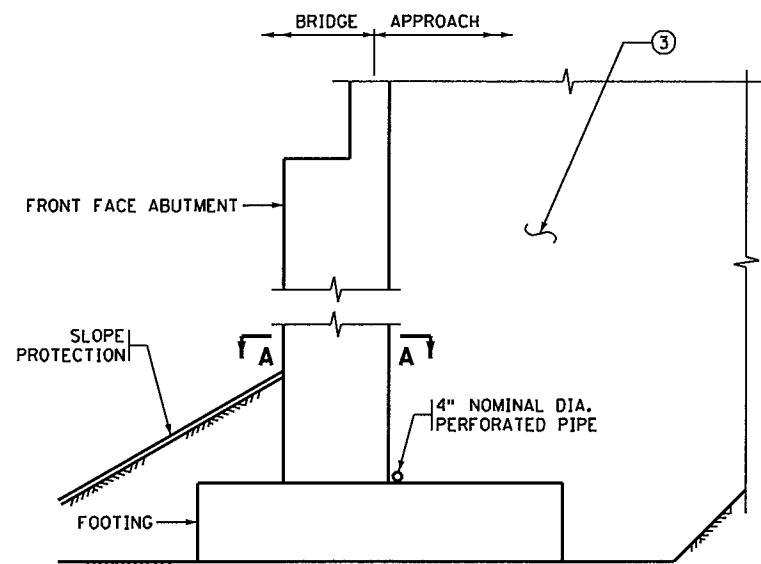
Printed Name: MICHAEL H DUPONT Lic. No. 43375

B-DETAILS

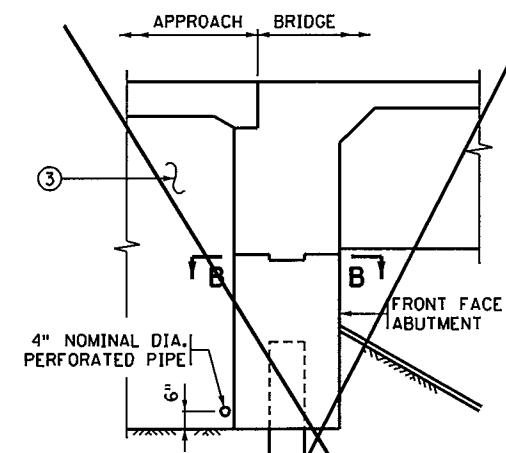
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CHK: MHD	CHK: MHD		

SHEET NO. D61 OF D66 SHEETS

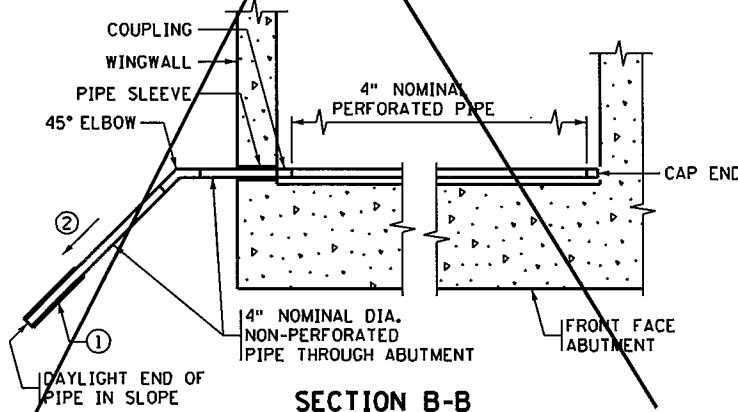
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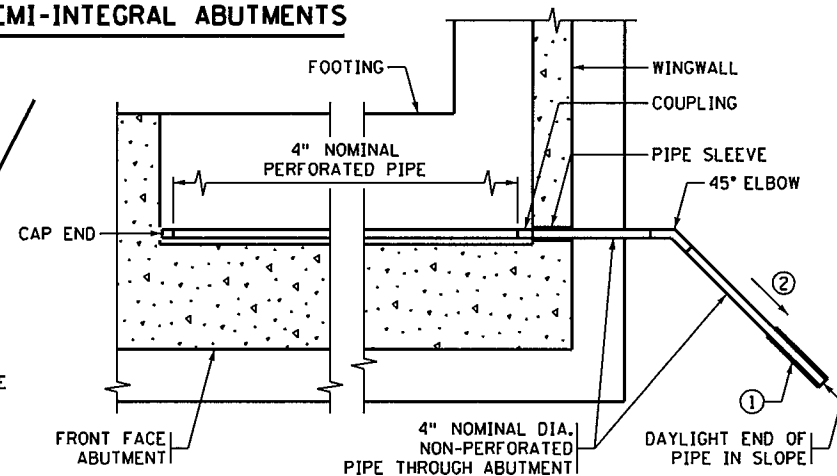
SECTION THROUGH PARAPET AND SEMI-INTEGRAL ABUTMENTS



SECTION THROUGH INTEGRAL ABUTMENT



SECTION B-B



SECTION A-A

NOTES:

PAYMENT WILL BE INCLUDED IN THE SINGLE LUMP SUM PRICE FOR "DRAINAGE SYSTEM TYPE (B910)", INCLUDES BUT IS NOT LIMITED TO 4" DIAMETER PERFORATED AND NON-PERFORATED PIPE, ELBOWS, END CAPS, COUPLINGS, SLEEVES AND PRECAST CONCRETE HEADWALLS.

ALL PIPE TO COMPLY WITH SPEC. 3245.

WRAP PERFORATED PIPE WITH GEOTEXTILE PER SPEC. 3733, TYPE 1. ATTACH TO PIPE PER SPEC. 2502.

① AT CONTRACTORS OPTION, MAY TIE APPROACH PANEL DRAINAGE SYSTEM AND ABUTMENT DRAINAGE SYSTEM INTO A SINGLE PRECAST CONCRETE HEADWALL OR INTO A CATCH BASIN AS LONG AS A MINIMUM OF 1% POSITIVE SLOPE CAN BE MAINTAINED.

USE PRECAST CONCRETE HEADWALL WITH RODENT SCREEN. SEE STANDARD PLATE 3131 FOR DETAILS.

② 1/8" PER FT. MINIMUM SLOPE.

③ REFER TO GRADING PLANS FOR ABUTMENT BACKFILL REQUIREMENTS.

APPROVED: JANUARY 13, 2015

Nancy Dubenberger
 STATE BRIDGE ENGINEER

STATE OF MINNESOTA
 DEPARTMENT OF TRANSPORTATION

DRAINAGE SYSTEM

REVISED

DETAIL NO.

B910



I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
 Signature: *Michael H. Dupont* Date: 12-4-15
 Printed Name: MICHAEL H. DUPONT Lic. No. 43375

B-DETAILS

DES: MAW	DR: MAW	APPROVED: 12/14/15	BRIDGE NO 62937
CHK: MHD	CHK: MHD		
SHEET NO. D62 OF D66 SHEETS			

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12/10/2015
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CONCRETE WEARING COURSE

LOW SLUMP
 OTHER _____
TYPE OR MANUFACTURER _____

EXPANSION JOINTS

JOINT MANUFACTURER _____
MANUFACTURER'S IDENTIFICATION _____
MFR'S No. AND/OR LETTER DESIGNATION FOR JOINT USED _____
GLAND MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE) _____
SIZE OF GLAND _____
MANUFACTURER'S IDENTIFICATION _____
MFR'S No. AND/OR LETTER DESIGNATION FOR GLAND USED _____

ELASTOMERIC BEARING PADS

PAD MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE) _____

SPECIAL SURFACE FINISH

SYSTEM: _____ COLOR: _____

FINISHING ROADWAY FACES OF BARRIER RAILING

TYPE: _____ COLOR: _____

ANTI-GRAFFITI COATING

MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE) _____
PRODUCT NAME: _____ LOCATION: _____

PAINT SYSTEM

Mn/DOT SPECIFICATION NUMBER _____ 2478 OR 2479 OR OTHER _____
MANUFACTURER _____
NAME AND ADDRESS (CITY, STATE) _____
PRIME COAT _____
Mn/DOT MATERIAL SPECIFICATION NUMBER _____
INTERMEDIATE COAT _____
Mn/DOT MATERIAL SPECIFICATION NUMBER _____
FINISH COAT _____
Mn/DOT MATERIAL SPECIFICATION NUMBER _____ COLOR _____

PLAN QUALITY

RATE 1 (AGREE), 2 (NEUTRAL), OR 3 (DISAGREE, PLEASE COMMENT BELOW)

DIMENSIONING AND DETAILING ADEQUATELY DESCRIBED REQUIRED CONSTRUCTION. _____
BAR LISTS AND QUANTITIES WERE TYPICALLY COMPLETE AND FREE OF ERRORS. _____
SCALE OF DRAWINGS AND OVERALL LEGIBILITY OF LINES AND TEXT WAS GOOD. _____
(SB) SPECIAL PROVISIONS ADEQUATELY DESCRIBED SPECIAL WORK AND PAYMENT. _____

COMMENTS: _____

NUMBER OF BRIDGE SUPPLEMENTAL AGREEMENTS: _____ COST: \$ _____

LIST SIGNIFICANT ERRORS OR OMISSIONS IN PLAN DETAILS OR PAY QUANTITIES IN THE SPACE PROVIDED AT RIGHT.

BRIDGE REMOVAL / BRIDGE OPENING

NUMBER OF AND DATE OLD BRIDGE WAS REMOVED (IF APPLICABLE): _____
BRIDGE NUMBER _____ DATE REMOVED _____
DATE NEW BRIDGE WAS OPENED TO TRAFFIC _____
NOTIFY THE BRIDGE OFFICE BRIDGE MANAGEMENT UNIT WITH THIS INFORMATION AS SOON AS POSSIBLE. (651) 366-4557

OTHER ITEMS ①

① UTILITIES ADDED DURING CONSTRUCTION AND SPECIALTY ITEMS.

FINAL QUANTITIES ENTERED ON SCHEDULE OF QUANTITIES: YES NO

SUMMARY OF SIGNIFICANT AS-BUILT CHANGES

THE AS-BUILT INFORMATION WAS ADDED TO THE PLAN BY:

INSPECTOR(S) SIGNATURE _____ DATE _____
CHECKED BY: _____ PROJECT ENGINEER/SUPERVISOR SIGNATURE _____ DATE _____

AT THE TIME OF THE FINAL, THIS COMPLETED AS-BUILT BRIDGE DATA SHEET MUST BE SUBMITTED TO THE BRIDGE OFFICE - ATTN: REGIONAL CONSTRUCTION ENGINEER (MS610).

REVISION: 10-28-2008
APPROVED: SEPTEMBER 26, 2003
Samuel A. Johnson
STATE BRIDGE ENGINEER

AS-BUILT DETAILS
(AS NEEDED)

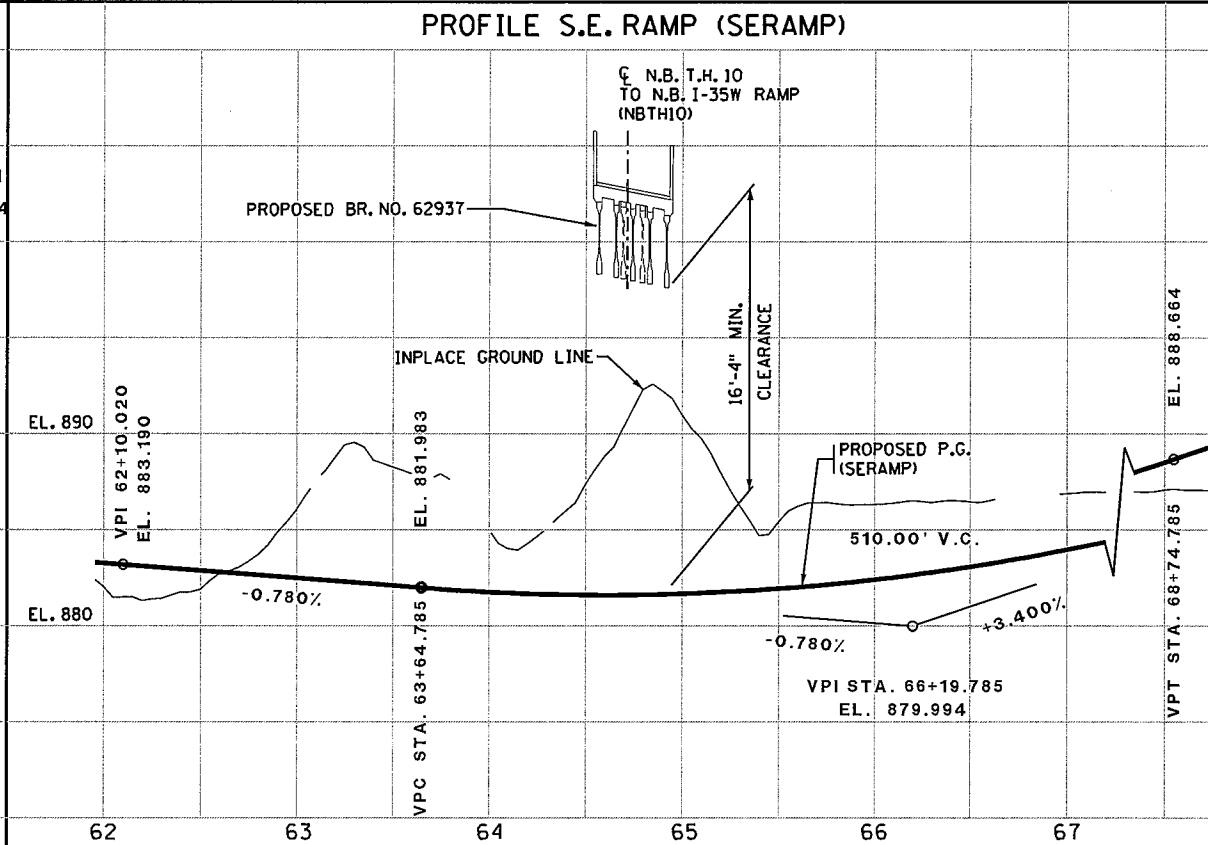
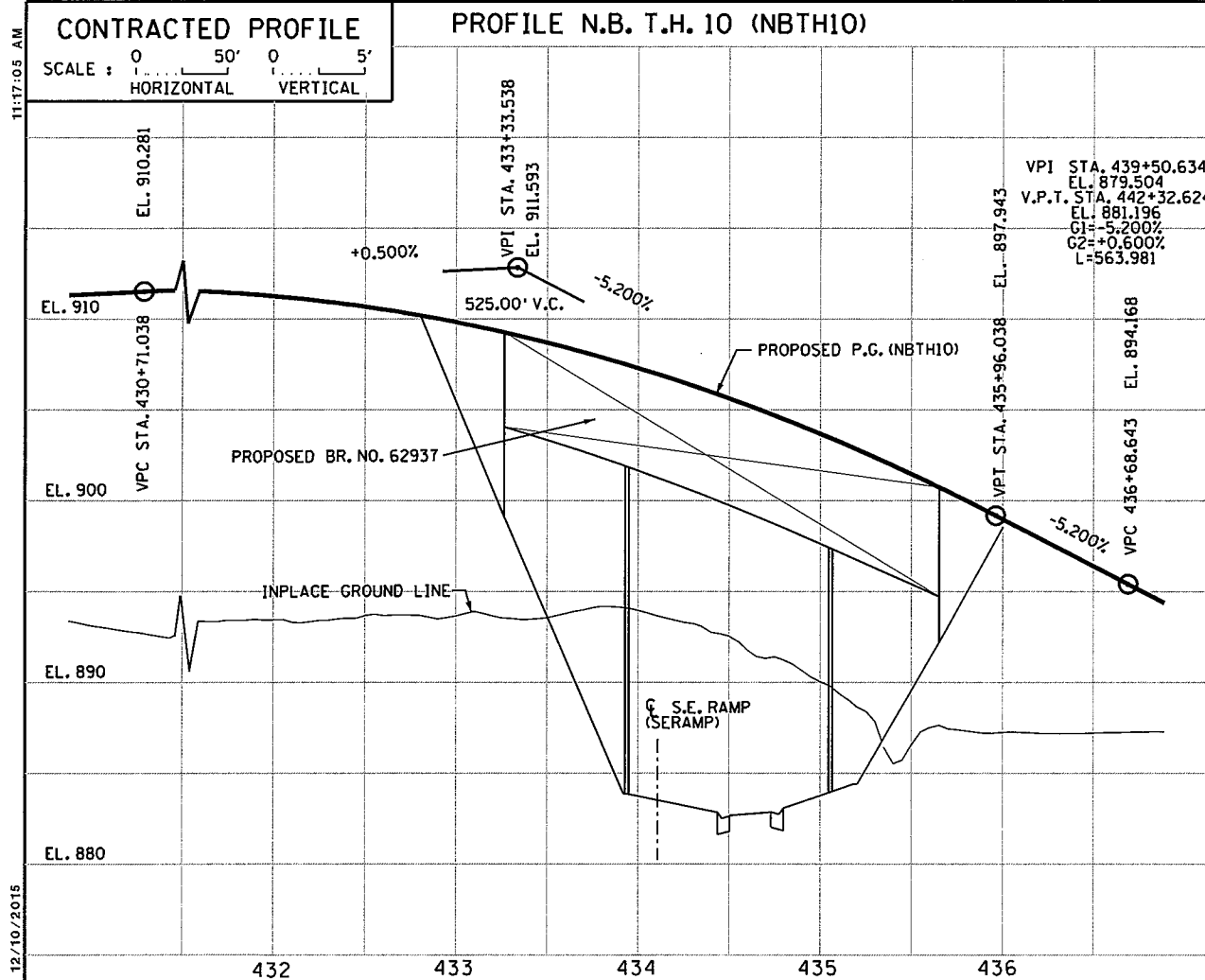
AS-BUILT BRIDGE DATA

DES: _____ DR: _____
CHK: _____ CHK: _____
APPROVED: 12/14/15

FIG. 5-397.900

BRIDGE NO
62937

SHEET NO. D63 OF D66 SHEETS

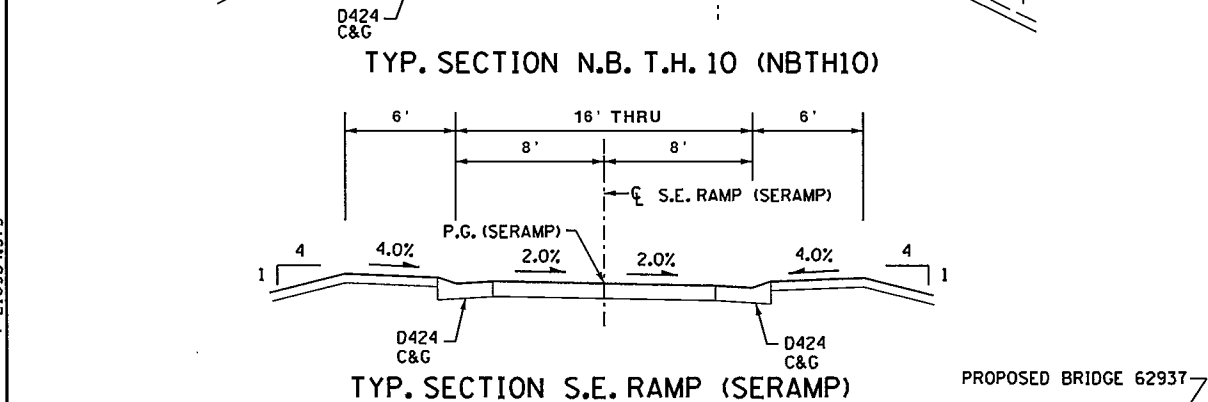
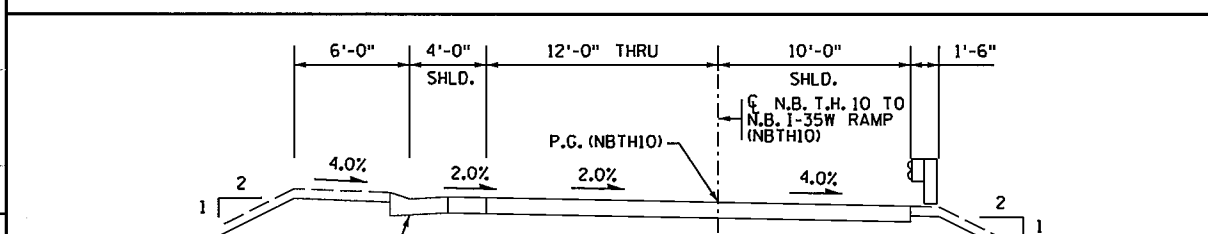


LOCATION ENGINEER'S OBSERVATIONS AT BRIDGE SITE

- SPECIAL FEATURES: WATERFALLS, DAMS, FLOODS, ICE, DEBRIS, SLIDING BANKS, RECREATIONAL BOATING.
- OTHER BRIDGES OR CULVERTS OVER THE SAME STREAM (PARTICULARLY STRUCTURES WHICH CARRY HIGH WATER WITHOUT OVERFLOW OF ROADWAY); GIVEN LOCATION, TYPE, LENGTH, HEIGHT ABOVE HIGH WATER, CROSS-SECTIONAL AREA ETC.
- APPARENT HIGHWATER ELEVATION OBTAINED FROM:
- OTHER DATA: APPROX. VELOCITY OF WATER AT TIME OF SURVEY.

HYDRAULIC ENGINEERS RECOMMENDATION
DATE: X-XX-20XX

STREAM OR DITCH DESIGNATION: X
DRAINAGE AREA: X.X SQ. MI.
MAX. FLOOD ON RECORD: XX.X C.F.S. (XX-XX-XX)
MAXIMUM OBSERVED HIGHWATER ELEVATION: XXX.X FT.
DESIGN FLOOD (100 YR. FREQ.): XXXX C.F.S.
HEADWATER ELEVATION: XXX.X FT.
DESIGN MEAN VELOCITY THROUGH STRUCTURE: X.X F.P.S.
TOTAL STAGE INCREASE: X.X FT.
LOW MEMBER AT OR ABOVE ELEVATION: XXX.XX FT.
WATERWAY AREA REQUIRED BELOW ELEV. XXX.X = XXX SQ. FT. AT RIGHT ANGLES TO CHANNEL
BASIC FLOOD (100 YR. FREQ.): XXXX C.F.S.
HEADWATER ELEVATION: XXX.X FT.
TOTAL STAGE INCREASE: X.X FT.
MEAN VELOCITY THROUGH STRUCTURE: XX F.P.S.
FLOWLINE ELEVATION: XXX.X'
SKEW ANGLE: X°
ESTIMATED PRELIMINARY TOTAL SCOUR AT PIER EL. N/A (500 OR 0T YR. FREQ.)



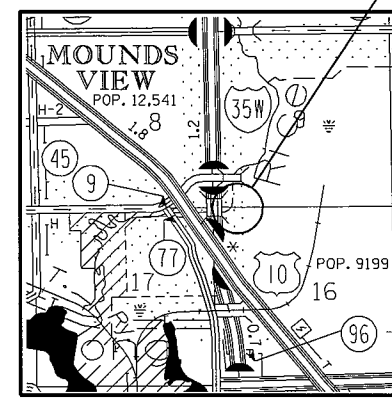
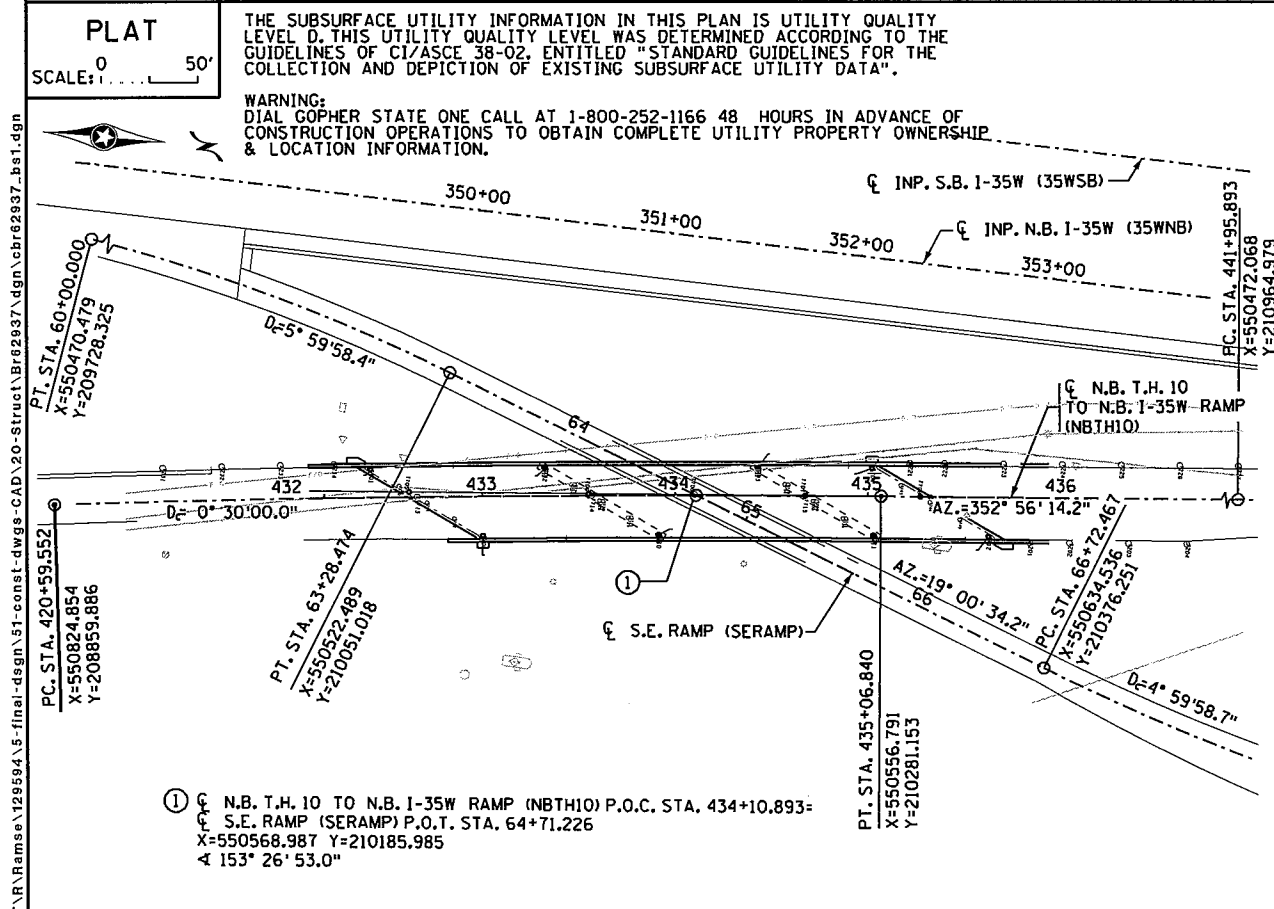
SCOUR CONFIRMATION RECOMMENDATION
DATE: XX-XX-XX
TOTAL SCOUR AT PIER EL. N/A (500 OR 0T YR. FREQ.)
SCOUR CODE: L

BRIDGE SURVEY SHEETS MADE FROM :
RAMSEY COUNTY SURVEY DATA

BENCH MARK ELEVATION 905.070 (N.A.V.D. 88 ADJ.)
GISD STATION 24710 6204 D
IRON ROD (DEPTH 8 FT.)

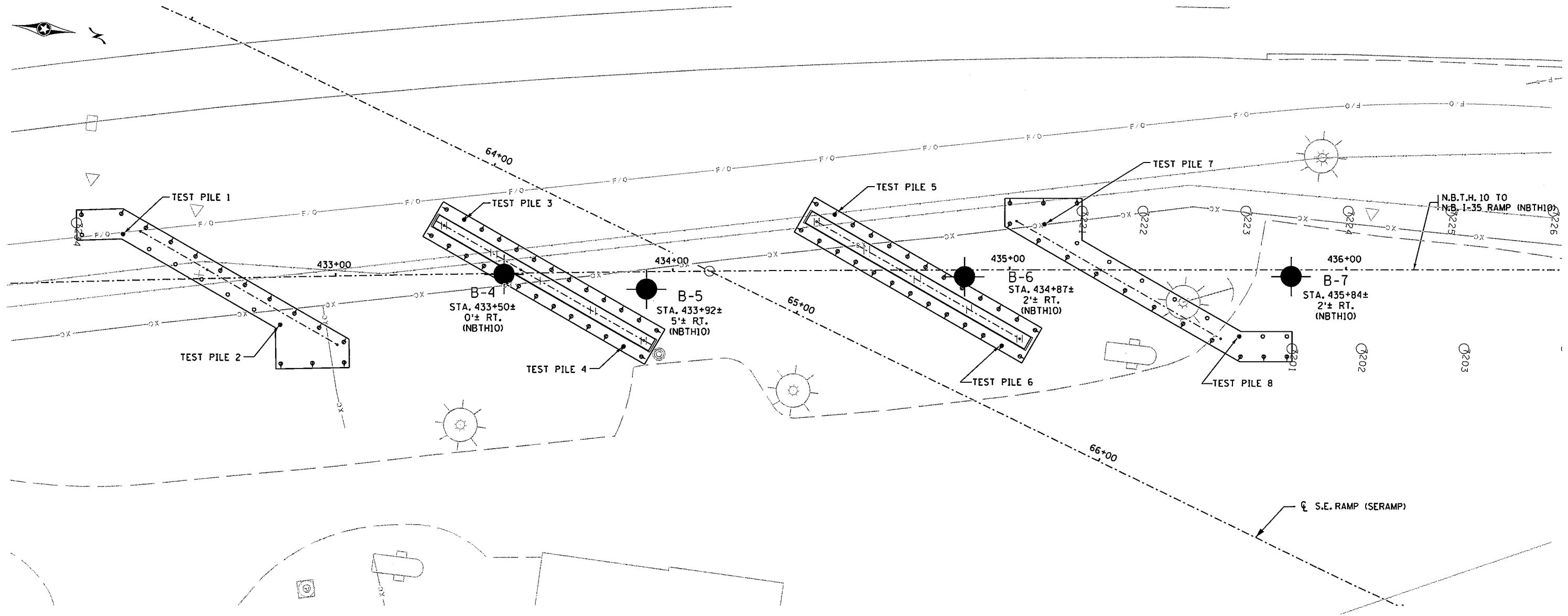
IN MOUNDS VIEW, 0.8 MILE NORTHWEST ALONG TRUNK HIGHWAY 10 FROM THE JUNCTION OF EASTBOUND TRUNK HIGHWAY 10 BRIDGE NUMBER 9586 OVER I-35W, AT TRUNK HIGHWAY 10 MILEPOINT 237.6, 55.0 FEET SOUTHWEST OF EASTBOUND TRUNK HIGHWAY 10, 66.0 FEET SOUTHWEST OF DRIVEWAY OF HOUSE AT 2280 TRUNK HIGHWAY 10, 55.0 FEET NORTHWEST OF DRIVEWAY, 14.0 FEET NORTHEAST POWER POLE, 8.0 FEET NORTH OF TELEPHONE MANHOLE, 3.0 FEET NORTHEAST OF WITNESS POST.

2nd BENCH MARK ELEVATION 880.051 (N.A.V.D. 88 ADJ.)
GISD STATION 24955 6284 N 1
IN ARDEN HILLS, IN NORTHWEST CORNER OF I-35W BOX CULVERT OVER RICE CREEK, 1.0 MILE NORTH ON I-35W FROM THE JUNCTION OF I-35W AND TRUNK HIGHWAY 96, 50 FEET WEST OF I-35W, 1 FOOT WEST OF WITNESS POST.



MINNESOTA
DEPARTMENT OF TRANSPORTATION

BRIDGE SURVEY
RAMP FROM N.B. T.H. 10 TO
I-35W N.B. OVER RAMP FROM
I-35W N.B. TO CO. RD. H
1.8 MILES NORTH OF THE JUNCTION OF
I-694 IN ARDEN HILLS
SEC 16 T 030 N R 23 W
COUNTY: RAMSEY
CITY: ARDEN HILLS
BRIDGE NO. 62937

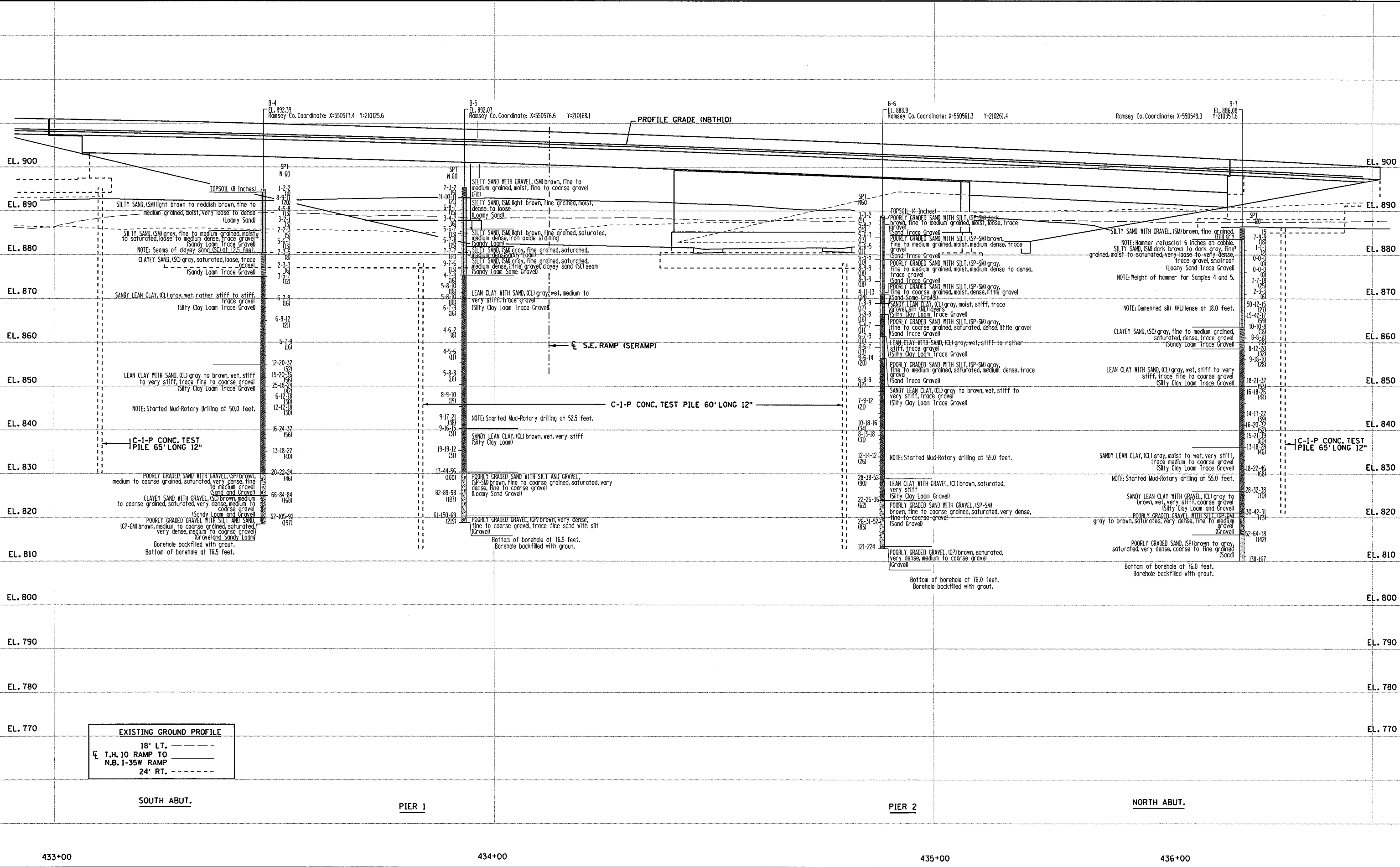


NOTES

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".

BORINGS	DR: MAW	APPROVED:	BRIDGE NO 62937
	CHK: MKM	12/14/15	
SHEET NO. D65 OF D66 SHEETS			

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12/10/2015
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PROJECT MANUAL

Ramsey County Road H and 35W Interchange

TABLE OF CONTENTS

TITLE SHEET

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ADMINISTRATIVE DOCUMENTS

To the City Council/County Board of Commissioners
Notice to All Bidders (Bid Rigging)
Limitation on Use of Contract Funds for Lobbying
Federal Aid Project Notice
Notice to Bidders (Traffic Control)
Notice to Bidders (Debarment Notice)
Special Provisions Division A -Labor
Wage Rates (Federal)
Notice to Bidders (Prompt Payments to Sub-Contractors)
Wage Rates (State)
Truck Rental Rates
Stipulation for Foreign Iron or Steel Materials
(1910) Fuel Escalation Clause
MPCA Bridge Demo Form
Notification Form for Disposal of Bridge Steel
MnDOT Schedule of Materials Control
Disadvantaged Business Enterprise (DBE) Special Provisions
Appendix A – Short Version
EEO Special Provision
Abbreviations Schedule of Prices
Form 21126D with DBE Goal
CM 32-34
Non-Collusion Affidavit
Responsible Contractor Certification

SPECIAL PROVISIONS

Division S - Roadway
Division SB - Bridge
Division SL - Lighting
Division SS – Signals

Division ST – Traffic

Division SZ – Traffic Management System

3400 - Watermain

4000 - Sanitary Sewer

SPECIAL PROVISION ATTACHMENTS

Asbestos and Regulated Waste Inspection Report – Bridge No. 9582

RCWD Permit Application Form

To Ramsey County Board of Commissioners:

According to the advertisement of Ramsey County inviting proposals for the improvement of the section of highway hereinbefore named, and in conformity with the Contract, Plans, Specifications and Special Provisions pertaining thereto, all on file in the office of the (Auditor/Clerk) of Ramsey County:

(I)(We) hereby certify that (I am)(we are) the only person(s) interested in this proposal as principal(s); that this proposal is made and submitted without fraud or collusion with any other person, firm or corporation at all; that an examination has been made of the site of the work and the Contract form, with the Plans, Specifications and Special Provisions for the improvement.

(I)(We) understand that the quantities of work shown herein are approximate only and are subject to increase or decrease; that all quantities of work, whether increased or decreased within the limits specified in MnDOT 1903 and 1402, are to be done at the unit prices shown on the attached schedule; that, at the time of opening bids, totals only will be read, but that comparison of bids will be based on the correct summation of item totals obtained from the unit prices bid, as provided in MnDOT 1301.

(I)(We) propose to furnish all necessary machinery, equipment, tools, labor and other means of construction and to furnish all materials specified, in the manner and at the time prescribed, all according to the terms of the Contract and Plans, Specifications, and the Special Provisions forming a part of this.

(I)(We) further propose to do all Extra Work that may be required to complete the contemplated improvement, at unit prices or lump sums to be agreed upon in writing before starting such work, or if such prices or sums cannot be agreed upon, to do such work on a Force Account basis, as provided in MnDOT 1904.

(I)(We) further propose to execute the form of Contract within 10 days after receiving written notice of award, as provided in MnDOT 1306.

(I)(We) further propose to furnish a Payment Bond and a Performance Bond each equal to the Contract Amount as required by MN Statute § 574.26, as security for the construction and completion of the improvement according to the Plans, Specifications and Special Provisions as provided in MnDOT 1305.

(I)(We) further propose to do all work according to the Plans, Specifications and Special Provisions, and to renew or repair any work that may be rejected due to defective materials or workmanship, before completion and acceptance of the Project by Ramsey County.

(I)(We) agree to all provisions of Minnesota Statutes, Section 181.59.

(I)(We) further propose to begin work and to prosecute and complete the same according to the time schedule set forth in the Special Provisions for the improvement.

(I)(We) assign to Ramsey County all claims for overcharges as to goods and materials purchased in connection with this Project resulting from antitrust violations that arise under the antitrust laws of the United States and the antitrust laws of the State of Minnesota. This clause also applies to subcontractors and first tier suppliers under this Contract.

NOTICE TO ALL BIDDERS

To report bid rigging activities call:

1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

LIMITATION ON USE OF CONTRACT FUNDS FOR LOBBYING

Appendix C to Part ____ - Contract Clause

NEW RESTRICTIONS ON LOBBYING

(a) Definitions. As used in this clause,

"Agency", as defined in 5 U.S.C. 552(f), includes Federal Executive departments and agencies as well as independent regulatory commissions and Government corporations, as defined in 31 U.S.C. 9101(1).

"Covered Federal action" means any of the following Federal actions:

- (1) The awarding of any Federal contract;
- (2) The making of any Federal grant;
- (3) The making of any Federal loan;
- (4) The entering into of any cooperative agreement; and,
- (5) The extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

Covered Federal action does not include receiving from an agency a commitment providing for the United States to insure or guarantee a loan.

"Indian tribe" and "tribal organization" have the meaning provided in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450B). Alaskan Natives are included under the definitions of Indian tribes in that Act.

"Influencing or attempting to influence" means making, with the intent to influence, any communication to or appearance before an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any covered Federal action.

"Local government" means a unit of government in a State and, if chartered, established, or otherwise recognized by a State for the performance of a governmental duty, including a local public authority, a special district, an intrastate district, a council of governments, a sponsor group representative organization, and any other instrumentality of a local government.

"Officer or employee of an agency" includes the following individuals who are employed by an agency:

- (1) An individual who is appointed to a position in the Government under title 5, U.S. Code, including a position under a temporary appointment;
- (2) A member of the uniformed services as defined in section 101(3), title 37, U.S. Code;
- (3) A special Government employee as defined in section 202, title 18, U.S. Code; and,
- (4) An individual who is a member of a Federal advisory committee, as defined by the Federal Advisory Committee Act, title 5, U.S. Code appendix 2.

"Person" means an individual, corporation, company, association, authority, firm, partnership, society, State, and local government, regardless of whether such entity is operated for profit or not for profit. This term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Reasonable compensation" means, with respect to a regularly employed officer or employee of any person, compensation that is consistent with the normal compensation for such officer or employee for work that is not furnished to, not funded by, or not furnished in cooperation with the Federal Government.

"Reasonable payment" means, with respect to professional and other technical services, a payment in an amount that is consistent with the amount normally paid for such services in the private sector.

"Recipient" includes all contractors and subcontractors at any tier in connection with a Federal contract. The term excludes an Indian tribe, tribal organization, or any other Indian organization with respect to expenditures specifically permitted by other Federal law.

"Regularly employed" means, with respect to an officer or employee of a person requesting or receiving a Federal contract, an officer or employee who is employed by such person for at least 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person for receipt of such contract. An officer or employee who is employed by such person for less than 130 working days within one year immediately preceding the date of the submission that initiates agency consideration of such person shall be considered to be regularly employed as soon as he or she is employed by such person for 130 working days.

"State" means a State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, a territory or possession of the United States, an agency or instrumentality of a State, and a multi-State, regional, or interstate entity having governmental duties and powers.

(b) Prohibition.

(1) Section 1352 of title 31, U.S. Code provides in part that no appropriated funds may be expended by the recipient of a Federal contract, grant, loan, or cooperative agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) The prohibition does not apply as follows:

(i) Agency and legislative liaison by Own Employees.

(A) The prohibition on the use of appropriated funds, in paragraph (1) of this section, does not apply in the case of a payment of reasonable

compensation made to an officer or employee of a person requesting or receiving a Federal activities not directly related to a covered Federal action.

- (B) For purposes of paragraph (A) of this section, providing any information specifically requested by an agency or Congress is allowable at any time.
- (C) For purposes of paragraph (A) of this section, the following agency and legislative liaison activities are allowable at any time only where they are not related to a specific solicitation for any covered Federal action:
 - (i) Discussing with an agency (including individual demonstrations) the qualities and characteristics of the person's products or services, conditions or terms of sale, and service capabilities; and,
 - (ii) Technical discussions and other activities regarding the application or adaptation of the person's products or services for an agency's use.
- (D) For purposes of paragraph (A) of this section, the following agency and legislative liaison activities are allowable only where they are prior to formal solicitation of any covered Federal action:
 - (i) Providing any information not specifically requested but necessary for an agency to make an informed decision about initiation of a covered Federal action;
 - (ii) Technical discussions regarding the preparation of an unsolicited proposal prior to its official submission; and,
 - (iii) Capability presentations by persons seeking awards from an agency pursuant to the provisions of the Small Business Act, as amended by Public Law 95-507 and other subsequent amendments.
- (E) Only those activities expressly authorized by paragraph (i) of this section are allowable under paragraph (i).

(ii) Professional and Technical Services by Own Employees.

- (A) The prohibition on the use of appropriated funds, in paragraph (1) of this section, does not apply in the case of a payment of reasonable compensation made to an officer or employee of a person requesting or receiving a Federal contract or an extension, continuation, renewal, amendment, or modification of a Federal contract if payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract.
- (B) For purposes of paragraph (A) of this section, "professional and technical services" shall be limited to advice and analysis directly

applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer), or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise and unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.

- (C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.
- (D) Only those services expressly authorized by paragraph (ii) of this section are allowable under paragraph (ii).

(iii) Reporting for Own Employees.

No reporting is required with respect to payments of reasonable compensation made to regularly employed officers or employees of a person.

(iv) Professional and technical services by Other than Own Employees.

- (A) The prohibition on the use of appropriated funds, in paragraph (1) of this section, does not apply in the case of any reasonable payment to a person, other than an officer or employee of a person requesting or receiving a covered Federal action, if the payment is for professional or technical services rendered directly in the preparation, submission, or negotiation of any bid, proposal, or application for that Federal contract or for meeting requirements imposed by or pursuant to law as a condition for receiving that Federal contract.

- (B) For purposes of paragraph (A) of this section, "professional and technical services" shall be limited to advice and analysis directly applying any professional or technical discipline. For example, drafting of a legal document accompanying a bid or proposal by a lawyer is allowable. Similarly, technical advice provided by an engineer on the performance or operational capability of a piece of equipment rendered directly in the negotiation of a contract is allowable. However, communications with the intent to influence made by a professional (such as a licensed lawyer) or a technical person (such as a licensed accountant) are not allowable under this section unless they provide advice and analysis directly applying their professional or technical expertise unless the advice or analysis is rendered directly and solely in the preparation, submission or negotiation of a covered Federal action. Thus, for example, communications with the intent to influence made by a lawyer that do not provide legal advice or analysis directly and solely related to the legal aspects of his or her client's proposal, but generally advocate one proposal over another are not allowable under this section because the lawyer is not providing professional legal services. Similarly, communications with the intent to influence made by an engineer providing an engineering analysis prior to the preparation or submission of a bid or proposal are not allowable under this section since the engineer is providing technical services but not directly in the preparation, submission or negotiation of a covered Federal action.
- (C) Requirements imposed by or pursuant to law as a condition for receiving a covered Federal award include those required by law or regulation, or reasonably expected to be required by law or regulation, and any other requirements in the actual award documents.
- (D) Persons other than officers or employees of a person requesting or receiving a covered Federal action include consultants and trade associations.
- (E) Only those services expressly authorized by paragraph (iv) of this section are allowable under paragraph (iv).

(c) Disclosure.

(1) Each person who requests or receives from an agency a Federal contract shall file with that agency a certification, set forth in _____, that the person has not made, and will not make, any payment prohibited by paragraph (b) of this clause.

(2) Each person who requests or receives from an agency a Federal contract shall file with that agency a disclosure form, Standard Form-LLL, "Disclosure of Lobbying Activities," if such person has made or has agreed to make any payment using nonappropriated funds (to include profits from any covered Federal action), which would be prohibited under paragraph (b) of this clause if paid for with appropriated funds.

(3) Each person shall file a disclosure form at the end of each calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed by such person under paragraph (2) of this section. An event that materially affects the accuracy of this information reported includes:

- (i) A cumulative increase of \$25,000 or more in the amount paid or expected to be paid for influencing or attempting to influence a covered Federal action; or
- (ii) A change in the person(s) or individual(s) influencing or attempting to influence a covered Federal action; or,
- (iii) A change in the officer(s), employee(s), or Member(s) contacted to influence or attempt to influence a covered Federal action.

(4) Any person who requests or receives from a person referred to in paragraph (1) of this section a subcontract exceeding \$100,000 at any tier under a Federal contract shall file a certification, and a disclosure form, if required, to the next tier above.

(5) All disclosure forms, but not certifications, shall be forwarded from tier to tier until received by the person referred to in paragraph (1) of this section. That person shall forward all disclosure forms to the agency.

(d) Agreement. In accepting any contract resulting from this solicitation, the person submitting the offer agrees not to make any payment prohibited by this clause.

(e) Penalties.

(1) Any person who makes an expenditure prohibited under paragraph (b) of this clause shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 of each such expenditure.

(2) Any person who fails to file or amend the disclosure form to be filed or amended if required by this clause, shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 or each such failure.

(3) Contractors may rely without liability on the representations made by their subcontractors in the certification and disclosure form.

(f) Cost allowability. Nothing in this clause is to be interpreted to make allowable or reasonable any costs which would be unallowable or unreasonable in accordance with Part 31 or the Federal Acquisition Regulation. Conversely, costs made specifically unallowable by the requirements in this clause will not be made allowable under any of the provisions of Part 31 of the Federal Acquisition Regulation.

(End of Clause)

BILLING CODE 3110-01-M

NOTICE

By signing and submitting this proposal, the prospective primary bidder is providing the certification set out below. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why he/she cannot provide the certification set out below. Certification or explanation will be considered concerning Ramsey County's determination whether to enter this transaction. Failure of the prospective primary participant to furnish a certification or a written explanation why he/she cannot provide the certification shall disqualify such people from participation in this transaction.

The certification in this clause is a material representation of fact upon which reliance was placed when Ramsey County decided to enter this transaction. If it is later decided that the prospective primary participant knowingly rendered an erroneous certification, beyond other remedies available to the Federal Government, Ramsey County may end this transaction for cause of default. The prospective primary participant shall provide immediate written notice to Ramsey County if any time the prospective primary participant learns that his/her certification was erroneous when submitted or has become erroneous due to changed circumstances.

The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded as used in this clause have the meanings set out in the Definition and Coverage sections of the rules carrying out Federal Executive Order 12549 dated February 18, 1986. Bidders may contact MnDOT for assistance in obtaining a copy of these regulations.

The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered, he/she shall not knowingly enter any lower tier covered transaction with a person who is debarred, suspended, declared in-eligible, or voluntarily excluded from participation in this covered transaction unless authorized by Ramsey County and MnDOT. Nothing contained in this shall be construed to require establishment of system of records to render in good faith the certification required by this clause. The knowledge and information of a participant are not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

The prospective primary participant further agrees by submitting this proposal that he/she will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction" provided by MnDOT without modification in all solicitations for lower tier covered transactions. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that he/she and his/her principals are not de-barred, suspended, ineligible, or voluntarily excluded, from the covered transaction by any Federal agency, unless he/she knows that the certification is erroneous. A participant may decide the method and frequency by which he/she decides the eligibility of his/her principals.

Except as authorized by MnDOT, if a participant in a covered transaction knowingly enters a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, beyond other remedies available to the Federal Government, Ramsey County may end this transaction for cause or default.

Certification Regarding Debarment, Suspension, and Other
Responsibility Matters-Primary Covered Transactions

(I)(We) certify that the firm or any person associated with it in the capacity of owner, partner, director, officer, project director, manager auditor, or any position involving the administration of Federal funds:

- are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntary excluded from covered transactions by any Federal department or agency;
- have not within the three-year period preceding this proposal been convicted of or had a civil judgment rendered for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; or violation of Federal or State antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements; or receiving stolen property;
- are not presently indicted for or otherwise criminally or civilly charged by a governmental entity with commission of any of the above-enumerated offenses;
- have not within a three-year period preceding this application/proposal had one or more transactions (Federal, State, or local) terminated for cause or default.

Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participants shall attach an explanation to this proposal.

(I)(We) agree that (my)(our) signatures on this proposal form certification of "status" under penalty of perjury under the laws of the United States.

NOTICE TO BIDDERS
TRAFFIC CONTROL
PREVAILING WAGE COVERAGE

The following defines the United States Department of Labor's interpretation of contract labor provision coverage for employees who work for traffic control companies and /or perform traffic control duties.

Non-covered Supplier Designated Duties:

Employees of bona fide "Material Persons/Suppliers" are not covered. A Material Person/Supplier is limited to supply, delivery, and routine maintenance (once a week) of barricades, cones, flashers, etc. to the job site.

The following functions, except as qualified in "6." below, do not come under the prevailing wage requirements of the contracts:

1. Supply and delivery of traffic control devices such as barricades, cones, barrels, flashers and signboards.
2. Routine and periodic maintenance service (usually once a week).
3. Removal of equipment from job site.
4. In connection with delivery, they may drop the equipment at a central stockpile location or at various locations along the project. Employees of company may set-up the equipment as long as such set-up is by dropping barrels and cones from the back of a moving truck.
5. Maintenance would consist of inspecting and cleaning the equipment, replacing broken or lost equipment, replacing barricades knocked down or out of line, and changing light bulbs and barricades.
6. If an employee spends more than 20% of their workweek performing the above duties on a Davis-Bacon (Federal-Aid) project or other Davis-Bacon (Federal-Aid) projects, prevailing wage rates would apply for the time so spent.

Covered Contractor or Subcontractor Duties:

The following functions are covered under the contract labor provisions. Any contractor performing these duties will need to be listed on a Request to Sublet form and their employees performing the duties will need to be listed on a Certified Payroll form and submitted following the appropriate procedures.

Related and continuing traffic control services such as, but not limited to:

1. Moving barricades and barriers as construction work progresses.
2. Moving barricades for lane closures and changes.
3. Painting traffic lines.
4. Sandblasting to remove traffic lines.
5. Applying and removing traffic tape.
6. Setting up barrels or barricades other than those dropped from the back of a moving truck.
7. Digging postholes to erect temporary warning signs (only).
8. Erection of advance temporary warning signs.
9. Placing temporary signboards.

On Federal-aid Projects (only) when there is no appropriate classification listed under either the state or federal wage determinations, a classification wage rate will be negotiated using the procedures under FHWA 1273, REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS, Part IV. PAYMENT OF PREDETERMINED MINIMUM WAGE, Subp. 2. Classifications.

NOTICE TO BIDDERS
SUSPENSIONS/DEBARMENTS

January 15, 2016
Page 1 of 3

DEPARTMENT OF TRANSPORTATION

NOTICE OF SUSPENSION

NOTICE IS HEREBY GIVEN that MnDOT has ordered that the following vendors be suspended for a period of six (6) months, effective January 14, 2016 until July 14, 2016:

- Jeffrey and Laurie Plzak doing business as Fibertech Incorporated¹, and its affiliates, Loretto, MN

NOTICE OF DEBARMENT

NOTICE IS HEREBY GIVEN that MnDOT has ordered that the following vendors be debarred for a period of three (3) years, effective May 6, 2013 until May 6, 2016:

- Gary Francis Bauerly and his affiliates, Rice, MN
- Gary Bauerly, LLC and its affiliates, Rice, MN
- Watab Hauling Co. and its affiliates, Rice, MN

NOTICE IS HEREBY GIVEN that MnDOT has ordered that the following vendors be debarred for a period of three (3) years, effective September 17, 2014 until September 17, 2017:

- Jeffrey Plzak and his affiliates, Loretto, MN
- Laurie Plzak and her affiliates, Loretto, MN
- Honda Electric Incorporated and its affiliates, Loretto, MN
- Jeffrey and Laurie Plzak doing business as Honda Electric Logistics, and its affiliates, Loretto, MN

NOTICE IS HEREBY GIVEN that MnDOT has ordered that the following vendors be debarred for a period of three (3) years, effective January 12, 2015 until January 12, 2018:

- Marlin Dahl, Granada, MN
- Dahl Trucking, Elmore, MN
- Elmore Truck and Trailer, Inc., Elmore, MN

Minnesota Statute section 161.315 prohibits the Commissioner, counties, towns, or home rule or statutory cities from awarding or approving the award of a contract for goods or services to a person who is suspended or debarred, including:

- 1) any contract under which a debarred or suspended person will serve as a subcontractor or material supplier,
- 2) any business or affiliate which the debarred or suspended person exercises substantial influence or control, and
- 3) 3) any business or entity, which is sold or transferred by a debarred person to a relative or any other party over whose actions the debarred person exercises substantial influence or control, remains ineligible during the duration of the seller's or transfer's debarment.

¹ This notice refers only to Fibertech Incorporated of Loretto, Minnesota and is not to be confused with any other businesses not controlled by Jeffrey and Laurie Plzak, including: FiberTech of Parkers Prairie, Minnesota; Fiber Tech Productions of Nisswa, Minnesota; Fiber Technologies Solutions of Georgia; or Fiber-Tech Industries of Cadillac, Michigan.

**NOTICE TO BIDDERS
SUSPENSIONS/DEBARMENTS**

January 15, 2016
Page 2 of 3

DEPARTMENT OF ADMINISTRATION

As of the date of this notice and in accordance with Minnesota Rules 1230.1150, the Minnesota Department of Administration has debarred and disqualified the following persons and businesses from entering into or receiving a State of Minnesota contract:

NAME	DATE OF SUSPENSION
Devos, Ltd. d/b/a Guaranteed Returns Dean Volkes, Donna Fallon & Ronald Carlino 100 Colin Drive Holbrook, NY	December 5, 2014 through December 31, 2099
NAME	DATE OF DEBARMENT
Best Electric Thomas Clifton and Earl Standafer 9909 S. Shore Drive #155 Plymouth, MN 55441	May 22, 2015 through May 21, 2018 (eligible for reinstatement on May 21, 2019)
Best Used Trucks of Minnesota, Inc. Jason W. Leas 635 Marin Avenue Crookston, MN 56716	Nov. 20, 2012 through Nov. 20, 2015 (eligible for reinstatement on Nov. 20, 2016)
C & S Electric, Inc. Thomas Clifton and Earl Standafer 9909 S. Shore Drive #155 Plymouth, MN 55441	May 22, 2015 through May 21, 2018 (eligible for reinstatement on May 21, 2019)
Dahl Trucking Marlin Dahl 305 Highway 169 South Elmore, MN 56027	Aug.19, 2014 through January 12, 2018
Elmore Truck and Trailer Repair, Inc. Marlin Dahl 305 Highway 169 South Elmore, MN 56027	Aug.19, 2014 through Jan. 12, 2018 (eligible for reinstatement on Jan. 12, 2019)
Groundscape Maintenance, Inc. Rob Sievers 1160 County Road 83 Maple Plain, MN 55359	February 19, 2015 through February 19, 2016 (eligible for reinstatement February 19, 2017)
Honda Electric, Inc. Jeffrey and Laurie Plzak 5075 Nielsen Circle, P.O. Box 236 Loretto, MN 55357	July 24, 2014 through July 23, 2017 (eligible for reinstatement on July 23, 2018)
McCaa, Webster & Associates, Inc. Sammie McCaa 2751 Hennepin Avenue South, #301 Minneapolis, MN 55408-1002	May 1, 2014 through April 30, 2015 (eligible for reinstatement on April 30, 2016)
MG Carlson Construction Company, Inc. Martin Gerald Carlson 701 East First Street Fort Worth, TX 76102-3276	Sept. 5, 2014 through October 5, 2015 (eligible for reinstatement on April 5, 2016)
Ocuture, LLC 11930 Camby Park Drive Houston, TX 77047	Dec. 15, 2014 through Dec. 15, 2015 (eligible for reinstatement Dec. 15, 2016)
Ramco Heating and Air Conditioning Mark and Cheryl Ramquist 605 Ash Street Downing, WI 54734	March 11, 2015 through March 11, 2017 (eligible for reinstatement March 11, 2017)

NOTICE TO BIDDERS
SUSPENSIONS/DEBARMENTS

January 15, 2016
Page 3 of 3

St. Cloud Lawn & Landscaping, Inc. Pat Murphy 10602 County Road 2 Brainerd, MN 56401	February 20, 2015 through February 20, 2016 (eligible for reinstatement on Feb. 20, 2017)
TAC Construction Solutions, Inc. Christina Woods 31767 Deacons Way Pequot Lakes, MN 56472	August 19, 2014 through August 19, 2016 (eligible for reinstatement on August 19, 2017)
Watab Hauling Co. Gary Francis Bauerly 9695 Deerwood Rd. NE Rice, MN 56367	Jan. 14, 2013 through Jan. 14, 2016 (eligible for reinstatement on Jan. 14, 2017)

Minnesota Administrative Rule part 1230.1150, subpart 6 requires the Materials Management Division to maintain a master list of all suspensions and debarments. The master list must retain all information concerning suspensions and debarments as a public record for at least three (3) years following the end of a suspension or debarment. Refer to the following website for the master list: <http://www.mmd.admin.state.mn.us/debarredreport.asp>.

If the project is financed in whole or in part with federal funds, refer to the following website for vendors debarred by federal government agencies: <http://sam.gov>.

This list does not include preclusion actions taken by cities, counties or local authorities. Consult local authorities to ensure that contractors, subcontractors and materials suppliers are not currently suspended or debarred.

FEDERALLY FUNDED CONSTRUCTION CONTRACTS
SPECIAL PROVISIONS DIVISION A - LABOR
February 1, 2006

I. PREAMBLE

It is in the public interest that public buildings and other public works projects be constructed and maintained by the best means and the highest quality of labor reasonably available and that persons working on public works projects be compensated according to the real value of the services they perform.¹

Therefore, the department shall administer this contract pursuant to the **Federal Davis-Bacon and Related Acts, Required Contract Provisions Federal-Aid Construction Contracts, Form-1273, U.S. Department of Labor's Field Operations Handbook, State of Minnesota Statutes and Rules, MN/DOT's Standard Specifications for Construction, MN/DOT's Contract Administration Manual and MN/DOT's State Aid Manual.**

II. DEFINITIONS²

- A. **Contract**: The written agreement between the contracting authority and the prime contractor setting forth their obligations, including, but not limited to, the performance of the work, the furnishing of labor and materials, the basis of payment, and other requirements contained in the contract documents.
- B. **Contracting Authority**: The political subdivision, governmental body, board, department, commission, or officer making the award and execution of contract as the party of the first part.
- C. **Contractor**: The term "contractor" in these provisions shall include the prime contractor, subcontractor, agent, or other person doing or contracting to do all or part of the work under this contract.³
- D. **Department**: The Department of Transportation of the State of Minnesota, or the political subdivision, governmental body, board, commission, office, department, division, or agency constituted for administration of the contract work within its jurisdiction.
- E. **First Tier Subcontractor**: An individual, firm, corporation, or other entity to which the prime contractor sublets part of the contract.
- F. **Independent Truck Owner/Operator (ITO)**: An individual, partnership, or principal stockholder of a corporation who owns or holds a vehicle under lease and who contracts that vehicle and the owner's services to an entity that provides construction services to a public works project.⁴
- G. **Laborer or Mechanic**: A worker in a construction industry labor class identified in or pursuant to Minnesota Rules 5200.1100, Master Job Classifications.⁵
- H. **Plan**: The plan, profiles, typical cross-sections, and supplemental drawings that show the locations, character, dimensions, and details of the work to be done.
- I. **Prime Contractor**: The individual, firm, corporation, or other entity contracting for and undertaking prosecution of the prescribed work; the party of the second part to the contract, acting directly or through a duly authorized representative.

¹ Minnesota Statute 177.41

² MN/DOT Standard Specifications for Construction, Section 1103

³ Minnesota Statute 177.44, Subdivision 1

⁴ Minnesota Rules 5200.1106, Subpart 7(A)

⁵ Minnesota Rules 5200.1106, Subpart 5(A)

- J. **Project**: The specific section of the highway, the location, or the type of work together with all appurtenances and construction to be performed under the contract.
- K. **Second Tier Subcontractor**: An individual, firm, corporation, or other entity to which a first tier subcontractor sublets part of the contract.
- L. **Special Provisions**: Additions and revisions to the standard and supplemental specifications covering conditions peculiar to an individual project.
- M. **Specifications**: A general term applied to all directions, provisions, and requirements pertaining to performance of the work.
- N. **Subcontractor**: An individual, firm, corporation, or other entity to which the prime contractor or subcontractor sublets part of the contract.
- O. **Substantially In Place**: Mineral aggregate is deposited on the project site directly or through spreaders where it can be spread from or compacted at the location where it was deposited.⁶
- P. **Trucking Broker**: An individual or business entity, the activities of which include, but are not limited to: contracting to provide trucking services in the construction industry to users of such services, contracting to obtain such services from providers of trucking services, dispatching the providers of the services to do work as required by the users of the services, receiving payment from the users in consideration of the trucking services provided and making payment to the providers for the services.⁷
- Q. **Trucking Firm/Multiple Truck Owner (MTO)**: Any business entity that owns more than one vehicle and hires the vehicles out for services to brokers or contractors on public works projects.⁸
- R. **Work**: The furnishing of all labor, materials, equipment, and other incidentals necessary or convenient to the successful completion of the project and the carrying out of all the duties and obligations imposed by the contract upon the contractor. Also used to indicate the construction required or completed by the contractor.

III. SCOPE – SPECIAL PROVISIONS DIVISION A & CONTRACT

- A. These provisions shall apply to this contract, which is funded in whole or in part with federal funds⁹ and state funds.¹⁰
- B. These provisions shall apply to the prime contractor and all subcontractors contracting to do all or part of the work under this contract.¹¹
- C. The provisions established in this document do not necessarily represent all federal, state, and local laws, ordinances, rules and regulations. It is the responsibility of the prime contractor to inform itself and all subcontractors about other regulations that may be applicable to this contract.
- D. The prime contractor is responsible to ensure that each subcontractor performing work under this contract receives copies of all required contract provisions.¹² These provisions shall be incorporated into written subcontracts and must be displayed on the poster board.¹³
- E. The department shall administer this contract in accordance with all applicable federal regulations, state statutes and rules¹⁴, along with the plans, specifications and provisions, which are incorporated into and found elsewhere in this contract.

⁶ Minnesota Rules 5200.1106, Subpart 5(C)

⁷ Minnesota Rules 5200.1106, Subpart 7(C)

⁸ Minnesota Rules 5200.1106, Subpart 7(B)

⁹ 29 CFR Part 5.5(a)

¹⁰ Minnesota Statute 177.41

¹¹ Minnesota Statute 177.44, Subdivision 1

¹² 29 CFR Part 5.5(a)(6)

¹³ Minnesota Statute 177.44, Subdivision 5

- F. An unpublished decision from the Minnesota Court of Appeals affirms the authority of the Minnesota Commissioner of Transportation to enforce the Minnesota Prevailing Wage Law on a case-by-case basis.¹⁵ Therefore, the department shall provide enforcement in a manner consistent with the decision notwithstanding any prior notices on the subject.
- G. For additional information refer to: www.dot.state.mn.us/const/labor/.

IV. PAYROLLS AND STATEMENTS

- A. Each week, in which work was performed under this contract, all contractors shall submit a payroll statement to the department.¹⁶ Each statement shall be submitted within seven days after the regular payment date of the payroll period.¹⁷ Each payroll submitted shall include all employees that performed work under this contract and provide at a minimum the following information:¹⁸
1. Contractor's name, address, and telephone number.
 2. State project number.
 3. Payroll report number.
 4. Project location.
 5. Workweek ending date.
 6. Name, social security number, and home address for each employee.
 7. Labor classification(s) and/or three-digit code for each employee.
 8. Hourly straight time and overtime wage rates paid to each employee.
 9. Daily and weekly hours worked in each labor classification, including overtime hours for each employee.
 10. Authorized legal deductions for each employee.
 11. Project gross amount, weekly gross amount and net wages paid to each employee.
- B. Payroll records may be submitted in any form provided it includes all the information contained in **Subpart A (1 - 11)** of this section.¹⁹ However, contractors needing a payroll form may utilize the "front side" of the **U.S. Department of Labor's, WH-347 - Payroll Form**. This form is available by visiting the Labor Compliance website.²⁰
- C. All payroll records must be accompanied with a completed and signed **MN/DOT, 21658 - Statement of Compliance Form**.²¹
- D. The prime contractor is responsible for assuring that its payroll records and those of all subcontractors include all employees that performed work under this contract and accurately reflect the hours worked, regular and overtime rates of pay and classification of work performed.²²
- E. The prime contractor is responsible to maintain all certified payroll records, including those of all subcontractors, throughout the course of a construction project and retain all records for a period of three years after the final contract voucher has been issued.²³

¹⁴ Minnesota Rules 8820.3000, Subpart 2

¹⁵ Minnesota Court of Appeals Case Number: C6-97-1582

¹⁶ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section V, Subpart 2(c)

¹⁷ 29 CFR Part 3.4(a)

¹⁸ Minnesota Rules 5200.1106, Subpart 10

¹⁹ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section V, Subpart 2(c)

²⁰ www.dot.state.mn.us/const/labor/

²¹ Minnesota Rules 5200.1106, Subpart 10

²² 29 CFR Part 5.5(a)(6)

²³ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section V, Subpart 2(a)

- F. At the end of each pay period, each contractor shall provide every employee, in writing, an accurate detailed earnings statement.²⁴
- G. Upon request from the U.S. Department of Labor (U.S. DOL), Federal Highway Administration (FHWA), Minnesota Department of Labor and Industry (MN/DLI) or the Department, the prime contractor shall promptly furnish copies of payroll records for its workers and those of all subcontractors, along with other records, deemed appropriate by the requesting agency to determine compliance with these contract provisions.²⁵
- H. At the department's discretion, the project engineer may administer the submission of payroll records according to MN/DOT's Payroll Maintenance Program. The guidelines for the implementation and administration of this program are outlined in the **MN/DOT Contract Administration Manual, Section A(4)(d)**. The program has not been approved for federal-aid contracts administered by local units of government and will not be allowed for such contracts. However, the program may be utilized for local state-aid contracts.
- I. If, after written notice, the prime contractor fails to submit its payroll reports and certification forms and those of any subcontractor, the department may implement the actions prescribed in section **XVI (NON-COMPLIANCE AND ENFORCEMENT)**.

V. WAGE RATES

- A. The prime contractor is responsible to ensure that its workers and those of all subcontractors are compensated according to the U.S. DOL federal general decision(s) and the MN/DLI state prevailing wage determination(s) incorporated into and found elsewhere in this contract, **whichever is greater**. All contractors shall pay each worker the required minimum total hourly wage rate for all hours worked on the project and for the appropriate classification of labor.
1. Federal building, heavy and highway general decisions are specific to the county in which the construction work is being performed; a decision does not cross county or state lines.²⁶ If a project extends into more than one county or state, the applicable wage decision for each county or state shall be incorporated into and found elsewhere in this contract.
 2. State highway and heavy wage determinations are specific to ten separate regions throughout the state of Minnesota. If a project extends into more than one region, the applicable wage decision for each region shall be incorporated into and found elsewhere in this contract.
 - a. If this contract contains multiple highway and heavy wage determinations, there shall be only one standard of hours of labor and wage rates.²⁷
 3. State commercial wage determinations are specific to the county in which the construction work is being performed. If a project extends into more than one county, the applicable wage determination for each county shall be incorporated into and found elsewhere in this contract.
 - a. If this contract contains multiple commercial wage determinations, there shall be only one standard of hours of labor and wage rates.²⁸
- B. Wage rates listed in the federal and/or state wage determination(s) contain two components: the hourly basic rate and the fringe rate; together they equal the total prevailing wage rate. A

²⁴ Minnesota Statute 181.032

²⁵ Minnesota Statute 177.44, Subdivision 7 and Minnesota Rules 5200.1106, Subpart 10

²⁶ 29 CFR Part 1.7(a)

²⁷ Minnesota Statute 177.44, Subdivision 4

²⁸ Minnesota Statute 177.44, Subdivision 4

- contractor shall compensate a worker at a minimum, a combination of cash and fringe benefits equaling the total prevailing wage rate.²⁹
- C. The applicable certified wage decisions incorporated into and found elsewhere in this contract remain in effect for the life of this contract. The wage decisions do not necessarily represent the workforce that can be obtained at the rates certified by the U.S. DOL or MN/DLI. It is the responsibility of the prime contractor and any subcontractor to inform themselves about local labor conditions and prospective changes or adjustments to the wage rates. No increase in this contract price shall be allowed or authorized due to wage rates that exceed those incorporated into this contract.
- D. A contractor shall not reduce a worker's private, regular rate of pay when the wage rate certified by the U.S. DOL or MN/DLI is less than the worker's normal hourly wage.³⁰
- E. From the time a worker is required to report for duty at the project site until the worker is allowed to leave the site, no deductions shall be made from the worker's hours for any delays of less than twenty consecutive minutes.³¹
1. In situations where a delay may exceed twenty consecutive minutes and the contractor requires a worker to remain on the premises or so close to the premises that the worker cannot use the time effectively for the worker's own purposes, the worker is considered "on-call"³² and shall be compensated in accordance with **Subpart B** of this section, unless the worker is allowed or required to leave the project site.
- F. A contractor making payment to an employee, laborer, mechanic, worker, or truck owner-operator shall not accept a rebate for the purpose of reducing or otherwise decreasing the value of the compensation paid.³³
- G. Any employee who knowingly permits a contractor to pay less than the total prevailing wage or gives up any part of the compensation to which the employee is entitled may be subject to penalties.³⁴

VI. BONA FIDE FRINGE BENEFITS

- A. A "funded" fringe benefit plan is one that allows the contractor to make irrevocable contributions on behalf of an employee to a financially responsible trustee, third person, fund, plan or program, without prior approval from the U.S. Department of Labor. Types of "funded" fringe benefits may include, but are not limited to: pension, health and life insurance.³⁵
- B. An "unfunded" fringe benefit plan or program is one that allows the contractor to furnish an in-house benefit on behalf of an employee. The cost to provide the benefit is funded from the contractor's general assets rather than funded by contributions made to a trustee, third person, fund, plan or program. Types of "unfunded" fringe benefits may include, but are not limited to: holiday plans, vacation plans and sick plans.³⁶
- C. Credit toward the total prevailing wage rate shall be determined for each individual employee and is allowed for bona fide fringe benefits that:³⁷
1. include contributions irrevocably made by a contractor on behalf of an employee to a financially responsible trustee, third person, fund, plan, or program;

²⁹ Minnesota Statute 177.42, Subdivision 6

³⁰ Minnesota Statute 181.03, Subdivision 1(2)

³¹ Minnesota Rules 5200.0120, Subpart 1

³² Minnesota Rules 5200.0120, Subpart 2

³³ Minnesota Rules 5200.1106, Subpart 6

³⁴ Minnesota Statute 177.44, Subdivision 6

³⁵ 29 CFR Parts 5.26 and 5.27

³⁶ 29 CFR Part 5.28

³⁷ 29 CFR Part 5.23

2. are legally enforceable;
 3. have been communicated in writing to the employee; and
 4. are made available to the employee once he/she has met all eligibility requirements.
- D. No credit shall be allowed for benefits required by federal, state or local law, such as: worker's compensation, unemployment compensation, and social security contributions.³⁸
- E. Upon request from the Minnesota Department of Labor and Industry (MN/DLI) or the Department, the prime contractor shall promptly furnish copies of fringe benefit records for its workers and those of all subcontractors, along with other records, deemed appropriate by the requesting agency to determine compliance with these contract provisions.³⁹
- F. In addition to the requirements set forth in **Subpart C** of this section, it is the responsibility of the prime contractor and any subcontractor to inform themselves about other federal and state fringe benefit regulations that may be applicable to this contract.
- G. Contractors shall submit a completed and signed **MN/DOT, 21658 - Statement of Compliance Form**, identifying any fringe contributions made on behalf of a worker.⁴⁰ The form must be submitted in accordance with section **IV (PAYROLLS AND STATEMENTS), Subparts A and C**.
- H. Pursuant with *Minnesota Statute 181.74, Subdivision 1*, a contractor that is obligated to deposit fringe benefit contributions on behalf of its employees into a financially responsible trustee, third person, fund, plan, or program and fails to make timely contributions may be guilty of a gross misdemeanor. A contractor found in violation of the above-mentioned statute shall compel the department to take such actions as prescribed in section **XVI, (NON-COMPLIANCE AND ENFORCEMENT)**.

VII. OVERTIME

- A. A contractor shall not permit or require a worker to work in excess of 40 hours per week unless the worker is compensated at a rate not less than 1-1/2 times the basic hourly rate as determined by the United States Secretary of Labor.⁴¹
- B. A contractor shall not permit or require a worker to work longer than the prevailing hours of labor unless the worker is paid for all hours in excess of the prevailing hours at a rate of at least 1-1/2 times the hourly basic hourly rate of pay.⁴² The prevailing hours of labor is defined as not more than 8 hours per day or more than 40 hours per week.⁴³
- C. In addition to the requirements set forth in **Subparts A and B** of this section, it is the responsibility of the prime contractor and any subcontractor to inform themselves about other federal and state overtime regulations that may be applicable to this contract.

VIII. LABOR CLASSIFICATIONS

- A. All contractors shall refer to the federal general decision or the state wage determination incorporated into and found elsewhere in this contract to obtain an applicable job classification. Workers must be classified and compensated for the actual work performed regardless of the worker's skill level.⁴⁴ The prime contractor shall ensure that all contractors adhere to the following requirements:

³⁸ 29 CFR Part 5.29(f)

³⁹ Minnesota Statute 177.44, Subdivision 7 and Minnesota Rules 5200.1106, Subpart 10

⁴⁰ Minnesota Rules 5200.1106, Subpart 10

⁴¹ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 7

⁴² Minnesota Statute 177.44, Subdivision 1

⁴³ Minnesota Statute 177.42, Subdivision 4

⁴⁴ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 1(a)

1. Prior to performing work under this contract, all contractors shall review the federal general decision and complete a **U.S. DOL, SF-1444 - Request for Authorization of Additional Classification and Wage Rate Form** for any labor classification missing from the decision and submit it to the MN/DOT Labor Compliance Unit for processing.⁴⁵
2. If a contractor cannot determine an appropriate job classification, state law requires that the worker be assigned a job classification that is the "same or most similar".⁴⁶ Contractors should refer to the Master Job Classification List⁴⁷ to obtain an applicable labor classification. Clarification regarding labor classifications should be directed to the MN/DLI or the MN/DOT Labor Compliance Unit.

IX. INDEPENDENT CONTRACTORS, OWNERS, SUPERVISORS AND FOREMAN

- A. An independent contractor performing work as a laborer or mechanic is subject to the contract prevailing wage requirements⁴⁸ for the classification of work performed and shall adhere to the requirements established in sections **IV (PAYROLLS AND STATEMENTS); V (WAGE RATES); VI (FRINGE BENEFITS); VII (OVERTIME) and VIII (LABOR CLASSIFICATIONS)**. In order to ensure compliance, the department may examine the subcontract agreement to determine if the bid price submitted covers the applicable prevailing wage rate for the number of hours worked, along with other records, deemed appropriate by the department.⁴⁹
- B. Pursuant with state regulations, owners, supervisors and foreman performing work under the contract⁵⁰ shall be compensated in accordance with section **V (WAGE RATES)**. Furthermore, the prime contractor and any subcontractor shall adhere to the requirements established in sections **IV (PAYROLLS AND STATEMENTS); VI (FRINGE BENEFITS); VII (OVERTIME) and VIII (LABOR CLASSIFICATIONS)**.
- C. Pursuant with federal regulations, the contract labor provisions do not apply to owners, supervisors or foreman whose duties are primarily associated with bona fide administrative, executive or clerical positions. These individuals are not deemed to be laborers or mechanics.⁵¹
 1. However, working owners, supervisors and/or foreman who devote more than 20 percent of their time during a workweek to laborer or mechanic duties are considered laborers or mechanics for the time so spent and are subject to the requirements established in sections **IV (PAYROLLS AND STATEMENTS); V (WAGE RATES); VI (FRINGE BENEFITS); VII (OVERTIME) and VIII (LABOR CLASSIFICATIONS)**.

X. APPRENTICES, TRAINEES AND HELPERS

- A. An apprentice is not subject to the federal and/or state wage decisions incorporated into and found elsewhere in this contract, provided the contractor can demonstrate compliance with **Subparts (1 - 4)** of this section:⁵²
 1. The apprentice is performing the work of his/her trade.
 2. The apprentice is registered with the U.S. DOL Bureau of Apprenticeship and Training or MN/DLI Division of Voluntary Apprenticeship.
 3. The apprentice is compensated according to the rate specified in the program for the level of progress.

⁴⁵ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 2

⁴⁶ Minnesota Statute 177.44, Subdivision 1

⁴⁷ Minnesota Rules 5200.1100

⁴⁸ 29 CFR Part 5.2(o) and Minnesota Statute 177.41

⁴⁹ Minnesota Statute 177.44, Subdivision 7 and Minnesota Rules 5200.1106, Subpart 10

⁵⁰ Minnesota Statute 177.44, Subdivision 1

⁵¹ 29 CFR Part 5.2(m)

⁵² Minnesota Rules 5200.1070

4. The ratio of apprentices to journeyman workers on the project is not greater than the ratio permitted for the contractor's entire work force under the registered program.⁵³
- B. A trainee is not subject to the federal general decision incorporated into and found elsewhere in this contract, provided the contractor can demonstrate compliance with **Subparts (1 - 4)** of this section:⁵⁴
1. The trainee is performing the work of his/her trade.
 2. The trainee is registered with the U.S. DOL Employment and Training Administration.
 3. The trainee is compensated according to the rate specified in the program for the level of progress.
 4. The ratio of trainees to journeyman workers on the project is not greater than the ratio permitted under the program.
 5. All hours worked in excess of the prescribed hours allowed under the program and/or this contract shall be paid at the journeyman wage rate incorporated into and found elsewhere in this contract.
 6. A trainee is not exempt under state law; the contractor shall assign the trainee a job classification that is the "same or most similar"⁵⁵ and compensate the trainee for the actual work performed regardless of the trainee's skill level, unless the trainee is:⁵⁶
 - a. employed and registered in a bona-fide apprenticeship program; or
 - b. employed in the first 90 days of probationary employment as an apprentice, is not registered in the apprenticeship program, but has been certified by the proper government authorities to be eligible for probationary employment as an apprentice.
- C. A helper may perform work only if the helper classification is specified and defined in the federal general decision incorporated into and found elsewhere in this contract or is approved pursuant to the federal conformance procedure:⁵⁷
1. A helper is not exempt under state law; a contractor shall assign the helper a job classification that is the "same or most similar"⁵⁸ and compensate the helper for the actual work performed regardless of the helper's skill level.⁵⁹
- D. If a contractor fails to demonstrate compliance with the terms established in **Subparts A - C** of this section, the contractor shall compensate the worker not less than the applicable total prevailing wage rate for the actual work performed.⁶⁰

XI. SUBCONTRACTING PART OF THIS CONTRACT⁶¹

- A. If the prime contractor intends to sublet any portion of this contract, it shall complete and submit a **MN/DOT, TP-21834, Request To Sublet Form** to the project engineer 10 days prior to the first day of work for any subcontractor.
- B. The prime contractor shall not subcontract any portion of this contract without prior written consent from the project engineer.

⁵³ MN/DOLI Division of Apprenticeship – April 6, 1995 Memorandum from Jerry Briggs, Director

⁵⁴ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 4(b)

⁵⁵ Minnesota Statute 177.44, Subdivision 1

⁵⁶ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 1(a)

⁵⁷ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 4(c)

⁵⁸ Minnesota Statute 177.44, Subdivision 1

⁵⁹ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 1(a)

⁶⁰ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 4(a)(b)(c)

⁶¹ MN/DOT Standard Specifications for Construction, Section 1801

- C. The prime contractor's organization shall perform work amounting to not less than 40 percent of the total original contract cost. However, contracts with Disadvantaged Business Enterprise (DBE) or Targeted Group Business (TGB) established goals, or both, the contractor's organization shall perform work amounting to not less than 30 percent of the total original contract cost.
- D. A first tier subcontractor shall not subcontract any portion of its work under this contract unless approved by the prime contractor and the project engineer. In addition, a first tier subcontractor may only subcontract up to 50% of its original subcontract.
- E. A second tier subcontractor shall not subcontract any portion of its work under this contract.
- F. Written consent to subcontract any portion of this contract does not relieve the prime contractor of liabilities and obligations under the contract and bonds.
- G. Contractors shall not subcontract with or purchase materials or services from a debarred or suspended person.⁶²

XII. POSTER BOARDS

- A. The prime contractor shall construct and display a poster board, which contains all required posters, is legible and is accessible to all workers from the first day of work until the project is 100 percent complete.⁶³ The prime contractor is not allowed to place a poster board at an off-site location.
 1. The prime contractor can obtain the required posters by contacting MN/DOT at (651) 366-3091. The prime contractor will need to furnish its name, mailing address, the type of posters (federal-aid) and the quantity needed.

XIII. EMPLOYEE INTERVIEWS

- A. At any time the prime contractor shall permit representatives from the U.S. DOL, FHWA, MN/DLI, or the Department to interview its workers and those of any subcontractor during working hours on the project.⁶⁴

XIV. TRUCKING / OFF-SITE FACILITIES

- A. The prime contractor is responsible to ensure that its workers and those of all subcontractors are compensated in accordance with the federal wage decision incorporated into and found elsewhere in this contract for the following work duties:
 1. The processing or manufacturing of material, including the hauling of material to and from an immediately adjacent, dedicated off-site facility.⁶⁵
 2. The hauling of any or all stockpiled or excavated materials on the project work site to other locations on the same project.⁶⁶
- B. The prime contractor is responsible to ensure that its workers and those of all subcontractors, are compensated in accordance with the state wage determination incorporated into and found elsewhere in this contract for the following work duties:
 1. The processing or manufacturing of material, including the hauling of material to and from a prime contractor's material operation that is not a separate commercial establishment.⁶⁷

⁶² Minnesota Statute 161.315, Subdivision 3(3)

⁶³ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 1(a)

⁶⁴ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section V, Subpart 2(g)

⁶⁵ 29 CFR Part 5.2(l)(2)

⁶⁶ 29 CFR Part 5.2(j)(1)

⁶⁷ ALJ Findings of Fact, Conclusions of Law, and Recommendation, Conclusions (7), Case #12-3000-11993-2

2. The processing or manufacturing of material, including the hauling of material to and from an off-site material operation that is not considered a commercial establishment.⁶⁸
 3. The hauling of any or all stockpiled or excavated materials on the project work site to other locations on the same project even if the truck leaves the work site at some point.⁶⁹
 4. The delivery of materials from a non-commercial establishment to the project and the return haul.⁷⁰
 5. The delivery of materials from another construction project site to the public works project and the return haul, either empty or loaded. Construction projects are not considered commercial establishments.⁷¹
 6. The hauling required to remove any materials from the project to a location off the project site and the return haul, either empty or loaded from other than a commercial establishment.⁷²
 7. The delivery of mineral aggregate materials from a commercial establishment, which is deposited "substantially in place" and the return haul, either empty or loaded.⁷³
- C. The work duties prescribed in **Subpart A (1 - 2) and Subpart B (1 - 7)** of this section do not represent all possible hauling activities and/or other work duties that may be performed under this contract. It is the responsibility of the prime contractor to inform itself and all subcontractors about other applicable job duties that may be subject to this contract labor provisions.
- D. A contractor acquiring trucking services from an ITO, MTO and/or Truck Broker to perform and/or provide "covered" hauling activities shall comply with the payment of the certified state truck rental rates,⁷⁴ which are incorporated into and found elsewhere in this contract.
1. Each month, in which hauling activities were performed under this contract, the prime contractor and all subcontractors shall submit a **MN/DOT, TP-90550 - Month-End Trucking Report** and **MN/DOT, TP-90551 - Statement of Compliance Form**, along with each ITOs, MTOs and/or Truck Brokers reports to the department.⁷⁵ The specifications regarding the dates for submission can be found near the bottom of the **MN/DOT, TP-90551 - Statement of Compliance Form**.
- E. A Truck Broker contracting to provide trucking services in the construction industry may charge a reasonable broker fee to the provider of trucking services.⁷⁶ The prime contractor and any subcontractor contracting to receive trucking services shall not assess a broker fee.
- F. A contractor with employee truck drivers shall adhere to the requirements established in **Sections IV (PAYROLLS AND STATEMENTS); V (WAGE RATES); VI (FRINGE BENEFITS); VII (OVERTIME) and VIII (LABOR CLASSIFICATIONS)**.
- G. If after written notice, the prime contractor fails to submit its month-end trucking reports and certification forms and those of any subcontractor, MTO and/or Truck Broker, the department may take such actions as prescribed in section **XVI, (NON-COMPLIANCE AND ENFORCEMENT)**.

⁶⁸ Minnesota Rules 5200.1106, Subpart 3B(2)

⁶⁹ Minnesota Rules 5200.1106, Subpart 3B(1)

⁷⁰ Minnesota Rules 5200.1106, Subpart 3B(2)

⁷¹ Minnesota Rules 5200.1106, Subpart 3B(3)

⁷² Minnesota Rules 5200.1106, Subpart 3B(4)

⁷³ Minnesota Rules 5200.1106, Subpart 3B(5)(6)

⁷⁴ Minnesota Rules 5200.1106, Subpart 1

⁷⁵ Minnesota Rules 5200.1106, Subpart 10

⁷⁶ Minnesota Rules 5200.1106, Subpart 7(C)

XV. CHILD LABOR

- A. No worker under the age of 18 is allowed to perform work on construction projects.⁷⁷
- B. In accordance with state law, a worker under the age of 18, employed in a corporation totally owned by one or both parents that is supervised by the parent(s), may perform work on construction projects.⁷⁸ However, if this contractor is subject to the federal Fair Labor Standards Act, a worker under the age of 18 is not allowed to perform work in a hazardous occupation.⁷⁹
- C. To protect the interests of the department, the project engineer may remove a worker that appears to be under the age of 18 from the construction project until the contractor or worker can demonstrate proof of age⁸⁰ and compliance with all applicable federal and/or state regulations.⁸¹

XVI. NON-COMPLIANCE AND ENFORCEMENT

- A. The prime contractor shall be liable for any unpaid wages to its workers or those of any subcontractor, ITO, MTO and/or Truck Broker.⁸²
- B. If it is determined that a contractor has violated federal and/or state prevailing wage laws, or any portion of this contract, the department may implement, after written notice, one or more of the following sanctions:
 - 1. Withhold or cause to be withheld from the prime contractor under this contract, or any other federally funded contract with the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay workers employed by the prime contractor or any subcontractor the full amount of wages required by this contract.⁸³
 - 2. Withhold or cause to be withheld from the prime contractor such amounts in considerations or assessments against the prime contractor, whether arising from this contract or other contract with the department.⁸⁴
 - 3. The department may reject a bid from a prime contractor that has demonstrated continued or persistent noncompliance with the prevailing wage law on previous or current contracts with the department.⁸⁵
 - 4. The department may take the prosecution of the work out of the hands of the prime contractor, place the contractor in default and terminate this contract for failure to demonstrate compliance with these provisions.⁸⁶
- C. Any contractor who violates the state prevailing wage law is guilty of a misdemeanor and may be fined not more than \$300 or imprisoned not more than 90 days or both. Each day that the violation continues is a separate offense.⁸⁷
- D. All required documents and certification reports are legal documents; willful falsification of the documents may result in civil action and/or criminal prosecution⁸⁸ and may be grounds for debarment proceedings.⁸⁹

⁷⁷ Minnesota Rules 5200.0910, Subpart F

⁷⁸ Minnesota Rules 5200.0930, Subpart 4

⁷⁹ 29 CFR Part 570.2(a)(ii)

⁸⁰ Minnesota Statute 181A.06, Subdivision 4

⁸¹ MN/DOT Standard Specifications for Construction, Section 1701

⁸² MN/DOT Standard Specifications for Construction, Section 1801

⁸³ Required Contract Provisions Federal-Aid Construction Contracts Form-1273, Section IV, Subpart 6

⁸⁴ MN/DOT Standard Specifications for Construction, Section 1906

⁸⁵ Minnesota Statute 161.32, Subdivision 1(d)

⁸⁶ MN/DOT Standard Specifications for Construction, Section 1808

⁸⁷ Minnesota Statute 177.44, Subdivision 6

⁸⁸ Minnesota Statutes 16B, 161.315, Subdivision 2, 177.43, Subdivision 5 177.44, Subdivision 6, 609.63

⁸⁹ Minnesota Statute 161.315

MILLWRIGHT.....	\$ 32.95	19.83
PAINTER (Including Pavement Marking).....	\$ 32.88	18.56
PILEDRIVERMAN.....	\$ 34.79	17.28
POWER EQUIPMENT OPERATOR:		
GROUP 2.....	\$ 32.92	17.20
GROUP 3.....	\$ 32.37	17.20
GROUP 4.....	\$ 32.07	17.20
GROUP 5.....	\$ 29.03	17.20
GROUP 6.....	\$ 27.82	17.20
Special Equipment		
Articulated Hauler.....	\$ 32.07	17.20
Boom Truck.....	\$ 32.07	17.20
Landscaping Equipment (includes hydro seeder or mulcher, sod roller, farm tractor with attachment specifically seeding, sodding ,or plant, and two-framed forklift (excluding front, posit- track, and skid steer loaders), no earthwork or grading for elevations)....		
Off-Road Truck.....	\$ 18.75	13.24
Off-Road Truck.....	\$ 32.07	17.20
OPERATING ENGINEER CLASSIFICATIONS		

GROUP 2: Helicopter Pilot; Concrete Pump; Cranes over 135 ft boom excluding jib; Dragline, Crawler, Hydraulic Backhoe and other similar equipment with shovel-type controls including attachments 3 cu yd & over; Grader or Motor Patrol; Pile Driving

GROUP 3: Asphalt Bituminous Stabilizer Plant; Cableway; Concrete Mixer, Stationary Plant; Derrick (guy or stiff leg)(power)(skids or stationary); Dragline, Crawler, Hydraulic Backhoe and other similar equipment with shovel-type controls including attachments up to 3 cu yd; Dredge or Engineers Dredge (Power); Front end loader 5 cu yd & over including attachments; Locomotive Crane Operator; Mixer (paving) concrete paving, Road Mole including Mucking operations, Conway or similar type; Mechanic, Welder; Tractor, Boom type. Tandem Scraper; Truck Crane, Crawler Crane.

GROUP 4: Air Track Rock Drill; Automatic Road Machine CMI or similar; Backfiller; Concrete Batch Plant; Bituminous Roller Rubber Tire or Steel Drum 8 tons & over; Bituminous Spreader & Finishing Machine (power), including pavers, Macro Surfacing & Micro Surfacing or similar types (Operator & Screed person); Brokk or RTC remote control or similar type with attachments; Cat Challenger Tractor or similar types pulling Rock Wagons; Bulldozer & Scraper; Chip Harvester & Tree Cutter; Concrete Distributor & Spreader Finishing Machine, Longitudinal Float, Joint Machine, Spray Machine; Concrete Mixer on jobsite; Concrete Mobil; Crusing Plant (gravel, stone) or Gravel Washing, Crushing & Screening Plant; Curb Machine; Directional Boring Machine; Drill Rigs, Heavy Rotary or Churn or Cable Drill; Dual Tractor; Elevating Grader; Fork Lift; Front End,

Skid Steer 1 to 5 cu yd; GPS Remote Operating of equipment; Hoist Engineer (power); Hydraulic Tree Planter; Launcher Person; Locomotive; Milling, Grinding, Planing, Fine Grade, or Trimmer Machine; Multiple Machines such as Air Compressors, Welding Machines, Generators, Pumps; Pavement Breaker or Tamping Machine, Mighty Mite or similar type; Pickup Sweeper 1 cu yd & over hopper capacity; Horizontal Boring Machine power actuated over 6 inches; Pugmill; Pumpcrete; Rubber Tired Farm Tractor with Backhoe attachment; Scraper; Self-Propelled Soil Stabilizer; Slip Form (power driven) paving; Tractor, Bulldozer; Wheel type Tractor over 50 hp with PTO; Trenching Machine excludes walk behind Trencher; Tub Grinder, Morbark or similar type; Well Point installation or Dismantling.

GROUP 5: Air Compressor 600 cfm or over; Bituminous Roller under 8 tons; Concrete Saw multiple blade; Form Trench Digger (power); Front End Skid Steer up to 1 cu yd; Gunitite Gunall; Hydraulic Log Splitter; Loader, Barber Greene or similar; Post Hole Driving Machine/Post Hole Auger; Power Actuated Auger & Boring Machine; Power Actuated Jack; Pump; Self-Propelled Chip Spreader (Flaherty or similar); Sheep Foot Compactor with blade 200 hp & over; Shouldering Machine (Power) APSCO or similar type including self-propelled Sand and Chip Spreader; Stump Chipper and Tree Chipper; Tree Farmer (Machine).

GROUP 6: Cat, Challenger or similar tractor when pulling Disk or Roller; Conveyor; Dredge Deck Hand; Fire Person or Tank Car Heater; Gravel Screening Plant (portable, not crushing or washing); Greaser (tractor); Lever Person; Oiler (Power Shovel, Truck Crane, Dragline, Crusher and Milling Machine); Power Sweeper; Sheep Foot Roller & Rollers on Gravel Compaction including vibrating rollers; Wheel type Tractor over 50 hp.

TRUCK DRIVER

GROUP 1.....	\$ 28.10	14.80
GROUP 2.....	\$ 27.55	14.80
GROUP 3.....	\$ 27.45	14.80
GROUP 4.....	\$ 27.20	14.80

TRUCK DRIVER CLASSIFICATIONS:

GROUP 1: Mechanic, Welder; Tractor Trailer; Truck hauling machinery including operation of hand and power operated winches.

GROUP 2: Four or more axle unit straight body truck.

GROUP 3: Bituminous Distributor driver; Bituminous Distributor (one person operation); Three Axle units.

GROUP 4: Bituminous Distributor Spray operator (rear and oiler); Dump Person; Greaser; Pilot Car; Rubber Tire self-propelled Packer under 8 tons; Two Axle unit; Slurry Operator; Tank Truck Tender (gas, road oil, water); Tractor under 50 hp.

Tunnel Miner.....	\$ 28.47	16.52
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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the

interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION



NOTICE TO BIDDERS

Minnesota Statutes that require prompt payment to subcontractors:

471.425 Prompt payment of local government bills.

Subd. 1. Definitions. For the purposes of this section, the following terms have the meanings here given them.

(d) "Municipality" means any home rule charter or statutory city, county, town, school district, political subdivision or agency of local government. "Municipality" means the metropolitan council or any board or agency created under chapter 473.

Subd. 4a. Prompt payment to subcontractors.

Each contract of a municipality must require the prime contractor to pay any subcontractor within ten days of the prime contractor's receipt of payment from the municipality for undisputed services provided by the subcontractor. The contract must require the prime contractor to pay interest of 1-1/2 percent per month or any part of a month to the subcontractor on any undisputed amount not paid on time to the subcontractor. The minimum monthly interest penalty payment for an unpaid balance of \$100 or more is \$10. For an unpaid balance of less than \$100, the prime contractor shall pay the actual penalty due to the subcontractor. A subcontractor who prevails in a civil action to collect interest penalties from a prime contractor must be awarded its costs and disbursements, including attorney's fees, incurred in bringing the action.

HIST: 1985 c 136 s 5; 1995 c 31 s 1

**MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY PREVAILING WAGES FOR STATE
FUNDED CONSTRUCTION PROJECTS**



THIS NOTICE MUST BE POSTED ON THE JOBSITE IN A CONSPICUOUS PLACE

Construction Type: Highway and Heavy

Region Number: 09

Counties within region:

- ANOKA-02
- CARVER-10
- CHISAGO-13
- DAKOTA-19
- HENNEPIN-27
- RAMSEY-62
- SCOTT-70
- WASHINGTON-82

Effective: 2015-10-12 Revised: 2015-12-29

This project is covered by Minnesota prevailing wage statutes. Wage rates listed below are the minimum hourly rates to be paid on this project.

All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at a rate of one and one half (1 1/2) times the basic hourly rate.

Violations should be reported to:

Department of Transportation
Office of Construction
Transportation Building MS650
John Ireland Blvd
St. Paul, MN 55155
(651) 366-4209

Refer questions concerning the prevailing wage rates to:

Department of Labor and Industry
Prevailing Wage Section
443 Lafayette Road N
St Paul, MN 55155
(651) 284-5091
DLI.PrevWage@state.mn.us

LABOR CODE AND CLASS	EFFECT DATE	BASIC RATE	FRINGE RATE	TOTAL RATE
LABORERS (101 - 112) (SPECIAL CRAFTS 701 - 730)				
101 LABORER, COMMON (GENERAL LABOR WORK)	2015-10-12	28.94	16.89	45.83
	2016-05-01	29.95	17.49	47.44
102 LABORER, SKILLED (ASSISTING SKILLED CRAFT JOURNEYMAN)	2015-10-12	28.94	16.89	45.83
	2016-05-01	29.95	17.49	47.44
103 LABORER, LANDSCAPING (GARDENER, SOD LAYER AND NURSERY OPERATOR)	2015-10-12	20.01	13.54	33.55
	2016-05-01	21.17	13.99	35.16
104 FLAG PERSON	2015-10-12	28.94	16.89	45.83
	2016-05-01	29.95	17.49	47.44
105 WATCH PERSON	2015-10-12	25.54	16.34	41.88
	2016-05-01	26.55	16.94	43.49
106 BLASTER	2015-10-12	31.94	16.89	48.83
	2016-05-01	32.95	17.49	50.44
107 PIPELAYER (WATER, SEWER AND GAS)	2015-10-12	31.44	16.89	48.33
	2016-05-01	32.45	17.49	49.94
108 TUNNEL MINER	2015-10-12	29.64	16.89	46.53
	2016-05-01	30.65	17.49	48.14
109 UNDERGROUND AND OPEN DITCH LABORER (EIGHT FEET BELOW STARTING GRADE LEVEL)	2015-10-12	29.64	16.89	46.53
	2016-05-01	30.65	17.49	48.14
110 SURVEY FIELD TECHNICIAN (OPERATE TOTAL STATION, GPS RECEIVER, LEVEL, ROD OR RANGE)	2015-10-12	28.94	16.89	45.83

POLES, STEEL TAPE MEASUREMENT; MARK AND DRIVE STAKES; HAND OR POWER DIGGING FOR AND IDENTIFICATION OF MARKERS OR MONUMENTS; PERFORM AND CHECK CALCULATIONS; REVIEW AND UNDERSTAND CONSTRUCTION PLANS AND LAND SURVEY MATERIALS). THIS CLASSIFICATION DOES NOT APPLY TO THE WORK PERFORMED ON A PREVAILING WAGE PROJECT BY A LAND SURVEYOR WHO IS LICENSED PURSUANT TO MINNESOTA STATUTES, SECTIONS 326.02 TO 326.15.

	2016-05-01	29.95	17.49	47.44
111 TRAFFIC CONTROL PERSON (TEMPORARY SIGNAGE)	2015-10-12	28.94	16.89	45.83
	2016-05-01	29.95	17.49	47.44
112 QUALITY CONTROL TESTER (FIELD AND COVERED OFF-SITE FACILITIES; TESTING OF AGGREGATE, ASPHALT, AND CONCRETE MATERIALS); LIMITED TO MN DOT HIGHWAY AND HEAVY CONSTRUCTION PROJECTS WHERE THE MN DOT HAS RETAINED QUALITY ASSURANCE PROFESSIONALS TO REVIEW AND INTERPRET THE RESULTS OF QUALITY CONTROL TESTERS. SERVICES PROVIDED BY THE CONTRACTOR.	2015-10-12	16.28	4.07	20.35

SPECIAL EQUIPMENT (201 - 204)

201 ARTICULATED HAULER	2015-10-12	31.77	17.20	48.97
202 BOOM TRUCK	2015-10-12	32.93	17.90	50.83
	2016-05-01	33.54	18.90	52.44
203 LANDSCAPING EQUIPMENT, INCLUDES HYDRO SEEDER OR MULCHER, SOD ROLLER, FARM TRACTOR WITH ATTACHMENT SPECIFICALLY SEEDING, SODDING, OR PLANT, AND TWO-FRAMED FORKLIFT (EXCLUDING FRONT, POSIT-TRACK, AND SKID STEER LOADERS), NO EARTHWORK OR GRADING FOR ELEVATIONS	2015-10-12	20.01	13.54	33.55
	2016-05-01	21.17	13.99	35.16
204 OFF-ROAD TRUCK	2015-10-12	32.93	17.90	50.83
	2016-05-01	33.54	18.90	52.44

205 PAVEMENT MARKING OR MARKING REMOVAL EQUIPMENT (ONE OR TWO PERSON OPERATORS); SELF-PROPELLED TRUCK OR TRAILER MOUNTED UNITS.	2015-10-12	32.04	18.26	50.30
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HIGHWAY/HEAVY POWER EQUIPMENT OPERATOR

GROUP 2	2015-10-12	33.78	17.90	51.68
	2016-05-01	34.39	18.90	53.29

- 302 HELICOPTER PILOT (HIGHWAY AND HEAVY ONLY)
- 303 CONCRETE PUMP (HIGHWAY AND HEAVY ONLY)
- 304 ALL CRANES WITH OVER 135-FOOT BOOM, EXCLUDING JIB (HIGHWAY AND HEAVY ONLY)
- 305 DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR OTHER SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS THREE CUBIC YARDS AND OVER MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)
- 306 GRADER OR MOTOR PATROL
- 307 PILE DRIVING (HIGHWAY AND HEAVY ONLY)
- 308 TUGBOAT 100 H.P. AND OVER WHEN LICENSE REQUIRED (HIGHWAY AND HEAVY ONLY)

GROUP 3	2015-10-12	33.23	17.90	51.13
	2016-05-01	33.84	18.90	52.74

- 309 ASPHALT BITUMINOUS STABILIZER PLANT
- 310 CABLEWAY
- 311 CONCRETE MIXER, STATIONARY PLANT (HIGHWAY AND HEAVY ONLY)
- 312 DERRICK (GUY OR STIFFLEG)(POWER)(SKIDS OR STATIONARY) (HIGHWAY AND HEAVY ONLY)
- 313 DRAGLINE, CRAWLER, HYDRAULIC BACKHOE (TRACK OR WHEEL MOUNTED) AND/OR SIMILAR EQUIPMENT WITH SHOVEL-TYPE CONTROLS, UP TO THREE CUBIC YARDS MANUFACTURER.S RATED CAPACITY INCLUDING ALL ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 314 DREDGE OR ENGINEERS, DREDGE (POWER) AND ENGINEER
- 315 FRONT END LOADER, FIVE CUBIC YARDS AND OVER INCLUDING ATTACHMENTS. (HIGHWAY AND HEAVY ONLY)
- 316 LOCOMOTIVE CRANE OPERATOR
- 317 MIXER (PAVING) CONCRETE PAVING, ROAD MOLE, INCLUDING MUCKING OPERATIONS, CONWAY OR SIMILAR TYPE

- 318 MECHANIC . WELDER ON POWER EQUIPMENT (HIGHWAY AND HEAVY ONLY)
- 319 TRACTOR . BOOM TYPE (HIGHWAY AND HEAVY ONLY)
- 320 TANDEM SCRAPER
- 321 TRUCK CRANE . CRAWLER CRANE (HIGHWAY AND HEAVY ONLY)
- 322 TUGBOAT 100 H.P AND OVER (HIGHWAY AND HEAVY ONLY)

GROUP 4	2015-10-12	32.93	17.90	50.83
	2016-05-01	33.54	18.90	52.44

- 323 AIR TRACK ROCK DRILL
- 324 AUTOMATIC ROAD MACHINE (CMI OR SIMILAR) (HIGHWAY AND HEAVY ONLY)
- 325 BACKFILLER OPERATOR
- 326 CONCRETE BATCH PLANT OPERATOR (HIGHWAY AND HEAVY ONLY)
- 327 BITUMINOUS ROLLERS, RUBBER TIRED OR STEEL DRUMMED (EIGHT TONS AND OVER)
- 328 BITUMINOUS SPREADER AND FINISHING MACHINES (POWER), INCLUDING PAVERS, MACRO SURFACING AND MICRO SURFACING, OR SIMILAR TYPES (OPERATOR AND SCREED PERSON)
- 329 BROKK OR R.T.C. REMOTE CONTROL OR SIMILAR TYPE WITH ALL ATTACHMENTS
- 330 CAT CHALLENGER TRACTORS OR SIMILAR TYPES PULLING ROCK WAGONS, BULLDOZERS AND SCRAPERS
- 331 CHIP HARVESTER AND TREE CUTTER
- 332 CONCRETE DISTRIBUTOR AND SPREADER FINISHING MACHINE, LONGITUDINAL FLOAT, JOINT MACHINE, AND SPRAY MACHINE
- 333 CONCRETE MIXER ON JOBSITE (HIGHWAY AND HEAVY ONLY)
- 334 CONCRETE MOBIL (HIGHWAY AND HEAVY ONLY)
- 335 CRUSHING PLANT (GRAVEL AND STONE) OR GRAVEL WASHING, CRUSHING AND SCREENING PLANT
- 336 CURB MACHINE
- 337 DIRECTIONAL BORING MACHINE
- 338 DOPE MACHINE (PIPELINE)
- 339 DRILL RIGS, HEAVY ROTARY OR CHURN OR CABLE DRILL (HIGHWAY AND HEAVY ONLY)
- 340 DUAL TRACTOR
- 341 ELEVATING GRADER
- 342 FORK LIFT OR STRADDLE CARRIER (HIGHWAY AND HEAVY ONLY)
- 343 FORK LIFT OR LUMBER STACKER (HIGHWAY AND HEAVY ONLY)
- 344 FRONT END, SKID STEER OVER 1 TO 5 C YD
- 345 GPS REMOTE OPERATING OF EQUIPMENT
- 346 HOIST ENGINEER (POWER) (HIGHWAY AND HEAVY ONLY)
- 347 HYDRAULIC TREE PLANTER

- 348 LAUNCHER PERSON (TANKER PERSON OR PILOT LICENSE)
- 349 LOCOMOTIVE (HIGHWAY AND HEAVY ONLY)
- 350 MILLING, GRINDING, PLANNING, FINE GRADE, OR TRIMMER MACHINE
- 351 MULTIPLE MACHINES, SUCH AS AIR COMPRESSORS, WELDING MACHINES, GENERATORS, PUMPS (HIGHWAY AND HEAVY ONLY)
- 352 PAVEMENT BREAKER OR TAMPING MACHINE (POWER DRIVEN) MIGHTY MITE OR SIMILAR TYPE
- 353 PICKUP SWEEPER, ONE CUBIC YARD AND OVER HOPPER CAPACITY(HIGHWAY AND HEAVY ONLY)
- 354 PIPELINE WRAPPING, CLEANING OR BENDING MACHINE
- 355 POWER PLANT ENGINEER, 100 KWH AND OVER (HIGHWAY AND HEAVY ONLY)
- 356 POWER ACTUATED HORIZONTAL BORING MACHINE, OVER SIX INCHES
- 357 PUGMILL
- 358 PUMPCRETE (HIGHWAY AND HEAVY ONLY)
- 359 RUBBER-TIRED FARM TRACTOR WITH BACKHOE INCLUDING ATTACHMENTS (HIGHWAY AND HEAVY ONLY)
- 360 SCRAPER
- 361 SELF-PROPELLED SOIL STABILIZER
- 362 SLIP FORM (POWER DRIVEN) (PAVING)
- 363 TIE TAMPER AND BALLAST MACHINE
- 364 TRACTOR, BULLDOZER (HIGHWAY AND HEAVY ONLY)
- 365 TRACTOR, WHEEL TYPE, OVER 50 H.P. WITH PTO UNRELATED TO LANDSCAPING (HIGHWAY AND HEAVY ONLY)
- 366 TRENCHING MACHINE (SEWER, WATER, GAS) EXCLUDES WALK BEHIND TRENCHER (HIGHWAY AND HEAVY ONLY)
- 367 TUB GRINDER, MORBARK, OR SIMILAR TYPE
- 368 WELL POINT DISMANTLING OR INSTALLATION (HIGHWAY AND HEAVY ONLY)

GROUP 5	2015-10-12	29.89	17.90	47.79
	2016-05-01	30.50	18.90	49.40

- 369 AIR COMPRESSOR, 600 CFM OR OVER (HIGHWAY AND HEAVY ONLY)
- 370 BITUMINOUS ROLLER (UNDER EIGHT TONS)
- 371 CONCRETE SAW (MULTIPLE BLADE) (POWER OPERATED)
- 372 FORM TRENCH DIGGER (POWER)
- 373 FRONT END, SKID STEER UP TO 1C YD
- 374 GUNITE GUNALL (HIGHWAY AND HEAVY ONLY)
- 375 HYDRAULIC LOG SPLITTER
- 376 LOADER (BARBER GREENE OR SIMILAR TYPE)

- 377 POST HOLE DRIVING MACHINE/POST HOLE AUGER
- 378 POWER ACTUATED AUGER AND BORING MACHINE
- 379 POWER ACTUATED JACK
- 380 PUMP (HIGHWAY AND HEAVY ONLY)
- 381 SELF-PROPELLED CHIP SPREADER (FLAHERTY OR SIMILAR)
- 382 SHEEP FOOT COMPACTOR WITH BLADE . 200 H.P. AND OVER
- 383 SHOULDERING MACHINE (POWER) APSCO OR SIMILAR TYPE INCLUDING SELF-PROPELLED SAND AND CHIP SPREADER
- 384 STUMP CHIPPER AND TREE CHIPPER
- 385 TREE FARMER (MACHINE)

GROUP 6	2015-10-12	28.68	17.90	46.58
	2016-05-01	29.29	18.90	48.19

- 387 CAT, CHALLENGER, OR SIMILAR TYPE OF TRACTORS, WHEN PULLING DISK OR ROLLER
- 388 CONVEYOR (HIGHWAY AND HEAVY ONLY)
- 389 DREDGE DECK HAND
- 390 FIRE PERSON OR TANK CAR HEATER (HIGHWAY AND HEAVY ONLY)
- 391 GRAVEL SCREENING PLANT (PORTABLE NOT CRUSHING OR WASHING)
- 392 GREASER (TRACTOR) (HIGHWAY AND HEAVY ONLY)
- 393 LEVER PERSON
- 394 OILER (POWER SHOVEL, CRANE, TRUCK CRANE, DRAGLINE, CRUSHERS, AND MILLING MACHINES, OR OTHER SIMILAR HEAVY EQUIPMENT) (HIGHWAY AND HEAVY ONLY)
- 395 POWER SWEEPER
- 396 SHEEP FOOT ROLLER AND ROLLERS ON GRAVEL COMPACTION, INCLUDING VIBRATING ROLLERS
- 397 TRACTOR, WHEEL TYPE, OVER 50 H.P., UNRELATED TO LANDSCAPING

TRUCK DRIVERS

GROUP 1	2015-10-12	29.10	15.20	44.30
	2016-05-01	30.55	15.20	45.75

- 601 MECHANIC . WELDER
- 602 TRACTOR TRAILER DRIVER
- 603 TRUCK DRIVER (HAULING MACHINERY INCLUDING OPERATION OF HAND AND POWER OPERATED WINCHES)

GROUP 2	2015-10-12	28.55	15.20	43.75
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	2016-05-01	30.00	15.20	45.20
604 FOUR OR MORE AXLE UNIT, STRAIGHT BODY TRUCK				
GROUP 3	2015-10-12	28.45	15.20	43.65
	2016-05-01	29.90	15.20	45.10
605 BITUMINOUS DISTRIBUTOR DRIVER				
606 BITUMINOUS DISTRIBUTOR (ONE PERSON OPERATION)				
607 THREE AXLE UNITS				
GROUP 4	2015-10-12	28.20	15.20	43.40
	2016-05-01	29.65	15.20	44.85
608 BITUMINOUS DISTRIBUTOR SPRAY OPERATOR (REAR AND OILER)				
609 DUMP PERSON				
610 GREASER				
611 PILOT CAR DRIVER				
612 RUBBER-TIRED, SELF-PROPELLED PACKER UNDER 8 TONS				
613 TWO AXLE UNIT				
614 SLURRY OPERATOR				
615 TANK TRUCK HELPER (GAS, OIL, ROAD OIL, AND WATER)				
616 TRACTOR OPERATOR, UNDER 50 H.P.				
SPECIAL CRAFTS				
701 HEATING AND FROST INSULATORS	2015-10-12	42.31	20.74	63.05
	2016-06-01	44.26	20.74	65.00
702 BOILERMAKERS	2015-10-12	34.15	26.37	60.52
	2016-01-01	35.55	26.52	62.07
703 BRICKLAYERS	2015-10-12	35.70	18.13	53.83
704 CARPENTERS	2015-10-12	35.85	17.78	53.63
	2016-05-01	37.46	17.78	55.24
705 CARPET LAYERS (LINOLEUM)				
	FOR RATE CALL 651-284-5091 OR EMAIL DLI.PREVVAGE@STATE.MN.US			

706 CEMENT MASONS	2015-10-12	35.54	17.57	53.11
707 ELECTRICIANS	2015-10-12	38.57	26.04	64.61
	2016-05-01	40.47	26.04	66.51
711 GROUND PERSON	2015-10-12	27.44	13.28	40.72
	2016-04-04	28.26	13.92	42.18
712 IRONWORKERS	2015-10-12	35.50	23.45	58.95
713 LINEMAN	2015-10-12	40.95	17.06	58.01
	2016-04-30	42.18	17.82	60.00
714 MILLWRIGHT	2015-10-12	33.93	20.23	54.16
715 PAINTERS (INCLUDING HAND BRUSHED, HAND SPRAYED, AND THE TAPING OF PAVEMENT MARKINGS)	2015-10-12	33.57	20.12	53.69
716 PILEDRIIVER (INCLUDING VIBRATORY DRIVER OR EXTRACTOR FOR PILING AND SHEETING OPERATIONS)	2015-10-12	35.85	17.78	53.63
	2016-05-01	37.46	17.78	55.24
717 PIPEFITTERS . STEAMFITTERS	2015-10-12	42.35	24.49	66.84
719 PLUMBERS	2015-10-12	39.67	26.80	66.47
721 SHEET METAL WORKERS	2015-10-12	38.05	26.13	64.18
723 TERRAZZO WORKERS	FOR RATE CALL 651-284-5091 OR EMAIL DLIPREWAGE@STATE.MN.US			
724 TILE SETTERS	2015-10-12	28.30	21.89	50.19
725 TILE FINISHERS				

FOR RATE CALL 651-284-5091 OR
EMAIL
DLIPREVVAGE@STATE.MN.US

727 WIRING SYSTEM TECHNICIAN	2015-10-12	36.00	14.43	50.43
	2016-07-01	36.90	14.43	51.33

728 WIRING SYSTEMS INSTALLER	2015-10-12	25.21	12.02	37.23
	2016-07-01	25.84	12.02	37.86

729 ASBESTOS ABATEMENT WORKER	2015-10-12	29.13	15.96	45.09
	2016-01-01	30.13	16.41	46.54

730 SIGN ERECTOR	FOR RATE CALL 651-284-5091 OR EMAIL <u>DLIPREVVAGE@STATE.MN.US</u>
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NOTICE OF CERTIFICATION OF TRUCK RENTAL RATES AND EFFECTIVE DATE PURSUANT TO MINNESOTA RULES, PART 5200.1105

From April 6, 2015, to June 5, 2015, the Department of Labor and Industry (DLI) conducted a truck operational cost survey. On January 25, 2016, the Commissioner of DLI certified the minimum truck rental rates for highway projects in the state's ten highway and heavy construction areas for trucks and drivers operating "four or more axle units, straight body trucks," "three axle units," "tractor only" and "tractor trailers." The certification followed publication of the Notice of Determination of Truck Rental Rates in the *State Register* on November 16, 2015, and the informal conference held pursuant to Minnesota Rules, part 5200.1105 on December 3, 2015.

According to Minnesota Rules, part 5200.1105, the purpose of the informal conference is for DLI to obtain further input regarding the proposed rates before the rates are certified. Approximately 8 individuals attended the informal conference. None of the attendees at the informal conference commented on the Determination of the Construction Truck Rental Rates or contacted the department with comments regarding the rates prior to the date of this Certification.

Truck rental rates are determined by adding the certified prevailing wage driver rate in each region to the statewide operating cost survey data. The minimum hourly truck rental rate for the four types of trucks in each area is certified to be as follows:

3 Axle Units				
	Effective Date	Certified 607 Driver Rate	Surveyed Operating Cost	Determined Truck Rental Rate
Region 1	Certification date	\$40.60	\$37.35	\$77.95
Region 2	Certification date	\$34.26	\$37.35	\$71.61
Region 3	Certification date	\$36.91	\$37.35	\$74.26
	May 1, 2016	\$38.36	\$37.35	\$75.71
Region 4	Certification date	\$40.63	\$37.35	\$77.98
Region 5	Certification date	\$43.65	\$37.35	\$81.00
	May 1, 2016	\$44.85	\$37.35	\$82.20
Region 6	Certification date	\$41.45	\$37.35	\$78.80
	May 1, 2016	\$42.90	\$37.35	\$80.25
Region 7	Certification date	\$36.91	\$37.35	\$74.26
	May 1, 2016	\$38.36	\$37.35	\$75.71
Region 8	Certification date	\$13.77	\$37.35	\$51.12
Region 9	Certification date	\$43.65	\$37.35	\$81.00

	May 1, 2016	\$45.10	\$37.35	\$82.45
Region 10	Certification date	\$13.77	\$37.35	\$51.12
4 or More Axle Units				
	Effective Date	Certified 604 Driver Rate	Surveyed Operating Cost	Determined Truck Rental Rate
Region 1	Certification date	\$40.70	\$50.82	\$91.52
Region 2	Certification date	\$37.06	\$50.82	\$87.88
	May 1, 2016	\$38.51	\$50.82	\$89.33
Region 3	Certification date	\$37.06	\$50.82	\$87.88
	May 1, 2016	\$38.51	\$50.82	\$89.33
Region 4	Certification date	\$23.88	\$50.82	\$74.70
Region 5	Certification date	\$28.17	\$50.82	\$78.99
Region 6	Certification date	\$41.55	\$50.82	\$92.37
	May 1, 2016	\$43.00	\$50.82	\$93.82
Region 7	Certification date	\$37.40	\$50.82	\$88.22
Region 8	Certification date	\$16.32	\$50.82	\$67.14
Region 9	Certification date	\$43.75	\$50.82	\$94.57
	May 1, 2016	\$45.20	\$50.82	\$96.02
Region 10	Certification date	\$16.02	\$50.82	\$66.84

Tractor						
	Effective Date	Certified 602 Driver Rate	Surveyed Operating Cost	Determined Tractor Only Truck Rental Rate	Plus Trailer Operating Cost	Determined Tractor Trailer Rental Rate
Region 1	Certification date	\$43.90	\$49.17	\$93.07	\$11.46	\$104.53
	May 1, 2016	\$45.35	\$49.17	\$94.52	\$11.46	\$105.98
Region 2	Certification date	\$37.57	\$49.17	\$86.74	\$11.46	\$98.20
	May 1, 2016	\$39.02	\$49.17	\$88.19	\$11.46	\$99.65
Region 3	Certification date	\$27.10	\$49.17	\$76.27	\$11.46	\$87.73
Region 4	Certification date	\$24.45	\$49.17	\$73.62	\$11.46	\$85.08
Region 5	Certification date	\$26.27	\$49.17	\$75.44	\$11.46	\$86.90
Region 6	Certification date	\$39.45	\$49.17	\$88.62	\$11.46	\$100.08

Region 7	Certification date	\$27.55	\$49.17	\$76.72	\$11.46	\$88.18
Region 8	Certification date	\$37.57	\$49.17	\$86.74	\$11.46	\$98.20
	May 1, 2016	\$39.02	\$49.17	\$88.19	\$11.46	\$99.65
Region 9	Certification date	\$44.30	\$49.17	\$93.47	\$11.46	\$104.93
	May 1, 2016	\$45.75	\$49.17	\$94.92	\$11.46	\$106.38
Region 10	Certification date	\$24.50	\$49.17	\$73.67	\$11.46	\$85.13

The minimum truck rental rate for these four types of trucks in the state's ten highway and heavy construction areas will be effective for all highway and heavy construction projects financed in whole or part with state funds advertised for bid on or after the day the notice of certification is published in the *State Register*.

Ken B. Peterson,

COMMISSIONER

STIPULATION FOR FOREIGN IRON OR STEEL MATERIALS

The attached form is for use when the Contractor plans on using and/or supplying ANY foreign iron or steel materials on a Federal Aid Project. The Contractor is directed to the Proposal to determine if this Stipulation is required for a specific project.

(1910) FUEL ESCALATION CLAUSE

The provisions set forth in Mn/DOT 1910 are hereby supplemented with the following:

These provisions provide for compensation adjustments in the cost of motor fuels (diesel and gasoline) consumed in prosecuting the Contract work. The Engineer will calculate the Fuel Cost Adjustments. Payments or credits will be applied to partial and final payments for work items set forth herein.

For this purpose, the Department will establish a Base Fuel Index (BFI) for fuel to be used on the Project. The Base Fuel Index will be the average of the high and low rack prices shown for No. 2 ultra low sulfur fuel oil in the "OPIS Energy Group" tabulation titled "RackFax, Minneapolis, MN, OPIS Direct Gross No. 2 Distillate Fuels" *for the day of the Contract letting*.

A Current Fuel Index (CFI) in cents per gallon will be established for each month. The CFI will be the average of the high and low rack prices shown for No. 2 ultra low sulfur fuel oil in the "OPIS Energy Group" tabulation titled "RackFax, Minneapolis, MN, OPIS Direct Gross No. 2 Distillate Fuels" averaged for the beginning and ending dates of the monthly period being adjusted.

The Engineer will compute the ratio of the Current Fuel Index to the Base Fuel Index (CFI/BFI) each month. If that ratio falls between 0.85 and 1.15, no fuel adjustment will be made that month. If the ratio is less than 0.85, a credit to the Department will be computed. If the ratio is greater than 1.15, additional payment to the Contractor will be computed.

Credit or additional payment will be computed as follows:

- (1) The Engineer will estimate the quantity of work done in that month under each of the Contract items listed below.
- (2) The Engineer will compute the gallons of fuel used in that month for each of the Contract items listed below by applying the unit fuel usage factors shown.
- (3) The Engineer will summarize the total gallons (Q) of fuel used in that month for the applicable items.
- (4) The Engineer will determine the Fuel Cost Adjustment (FCA) from the following formulas:

If the Current Fuel Index (CFI) is greater than the Base Fuel Index (BFI), the following formula shall be used to determine the amount of Fuel Cost Adjustment to be paid to the Contractor.

$$FCA = [(CFI/BFI) - 1.15] \times Q \times BFI$$

If the Current Fuel Index (CFI) is less than the Base Fuel Index (BFI), the following formula shall be used to determine the amount of Fuel Cost Adjustment to be credited to the Department.

$$FCA = [(CFI/BFI) - 0.85] \times Q \times BFI$$

Where FCA = Fuel Cost Adjustment (cents)
 CFI = Current Fuel Index (cents per gallon)
 BFI = Base Fuel Index (cents per gallon)
 Q = Monthly total gallons of fuel

Basis of Payment

A Fuel Cost Adjustment payment to the Contractor will be made as a lump sum each payment period based on the last published CFI. A Fuel Cost Adjustment credit to the Department will be deducted as a lump sum each payment period from any monies due the Contractor. Upon completion of the work under the Contract, any difference between the estimated quantities previously paid and the final quantities will be determined. The CFI in effect on the day of completion of the Contract will be applied to the quantity differences in accordance with the procedures set forth above.

Schedule of Work Items

(Only items shown will be considered for compensation adjustments.)

Item	Unit	Gallons of Fuel per Unit	Unit	Gallons of Fuel per Unit
(1) Earthwork:				
2105.501	Common Excavation	Cu. Yd	0.17	m ³ 0.22
2105.503	Rock Excavation	Cu. Yd	0.27	m ³ 0.35
2105.505	Muck Excavation	Cu. Yd	0.17	m ³ 0.22
2105.507	Subgrade Excavation	Cu. Yd	0.17	m ³ 0.22
2105.515	Unclassified Excavation	Cu. Yd	0.23	m ³ 0.30
2105.521	Granular Borrow (EV)	Cu. Yd	0.17	m ³ 0.22
	Granular Borrow (CV)	Cu. Yd	0.19	m ³ 0.25
	Granular Borrow (LV)	Cu. Yd	0.14	m ³ 0.18
2105.522	Select Granular Borrow (EV)	Cu. Yd	0.17	m ³ 0.22
	Select Granular Borrow (CV)	Cu. Yd	0.19	m ³ 0.25
	Select Granular Borrow (LV)	Cu. Yd	0.14	m ³ 0.18
2105.523	Common Borrow (EV)	Cu. Yd	0.17	m ³ 0.22
	Common Borrow (CV)	Cu. Yd	0.19	m ³ 0.25
	Common Borrow (LV)	Cu. Yd	0.14	m ³ 0.18
2105.535	Topsoil Borrow (EV)	Cu. Yd	0.17	m ³ 0.22
	Topsoil Borrow (CV)	Cu. Yd	0.19	m ³ 0.25
	Topsoil Borrow (LV)	Cu. Yd	0.14	m ³ 0.18
2106.607	Common Embankment (CV)	Cu. Yd	0.19	m ³ 0.25
2106.607	Granular Embankment (CV)	Cu. Yd	0.19	m ³ 0.25
2106.607	Select Granular Embankment(CV)	Cu. Yd	0.19	m ³ 0.25
2106.607	Select Granular Embankment Modified (___ %) (CV)	Cu. Yd	0.19	m ³ 0.25
2106.607	Excavation – Rock	Cu. Yd	0.27	m ³ 0.35
2106.607	Excavation – Muck	Cu. Yd	0.17	m ³ 0.22

Item	Unit	Gallons of Fuel per Unit	Unit	Gallons of Fuel per Unit
(2) Aggregate Base:				
2211.501	Aggregate Base	Ton	0.55	t 0.61
2211.502	Aggregate Base (LV)	Cu. Yd	0.77	m ³ 1.01
2211.503	Aggregate Base (CV)	Cu. Yd	0.99	m ³ 1.29
2211.607	Open Graded Aggregate Base (CV)	Cu. Yd	0.99	m ³ 1.29
(3) Aggregate Shouldering:				
2221.501	Aggregate Shouldering	Ton	0.55	t 0.61
2221.502	Aggregate Shouldering (LV)	Cu. Yd	0.77	m ³ 1.01
2221.503	Aggregate Shouldering (CV)	Cu. Yd	0.99	m ³ 1.29
(4) Concrete Pavements:				
2301.511	Structural Concrete	Cu. Yd	0.98	m ³ 1.28
2301.513	Structural Concrete HE	Cu. Yd	0.98	m ³ 1.28
2301.604	Structural Concrete	Sq. Yd.	0.027*t	m ² 0.00128*t
(5) Bituminous Pavements:				
2350.501	Type () Wearing Course Mixture ()	Ton	0.90	t 0.99
2350.502	Type () Non-Wearing Course Mixture ()	Ton	0.90	t 0.99
2350.503	Type () () Course (,) (t)" Thick	Sq. Yd	0.051*t	
2350.503	Type () () Course (,) (t) mm Thick			m ² 0.0024*t
2360.501	Type SP () Wearing Course Mixture ()	Ton	0.90	t 0.99
2360.502	Type SP () Non-Wearing Course Mixture (,)	Ton	0.90	t 0.99
2360.503	Type SP () () Course (,) (t)" thick	Sq. Yd	0.051*t	
2360.503	Type SP () () Course (,) (t) mm thick			m ² 0.0024*t
(6) Pipe: ***				
2501.511	___ ___ Pipe Culvert ___	Lin. Ft.	0.70	m 2.30
2501.521	___ ___ Pipe Arch Culvert ___	Lin. Ft.	0.70	m 2.30
2501.561	___ ___ Pipe Culvert Des 3006 ___	Lin. Ft.	0.70	m 2.30
2501.603	___ Pipe Culvert	Lin. Ft.	0.70	m 2.30
2503.511	___ ___ Pipe Sewer ___	Lin. Ft.	0.70	m 2.30
2503.521	___ ___ Pipe Arch Sewer ___	Lin. Ft.	0.70	m 2.30
2503.541	___ ___ Pipe Sewer Des 3006 ___	Lin. Ft.	0.70	m 2.30
2503.603	___ ___ Pipe Sewer	Lin. Ft.	0.70	m 2.30

t = thickness (in inches or mm)

NOTE: No price adjustments will be made on fuel used for drying and heating aggregates.

*** No price adjustment will be made for pipes less than 12" in diameter or jacked pipes.



Minnesota Pollution Control Agency Notification of Intent to Perform a Bridge Demolition For Mn/DOT Operations.



Minnesota Pollution Control Agency

Type of Notification: [] Original [] Amended [] Project Cancellation
Notification must be postmarked or received ten (10) WORKING days before demolition begins.

Demolition Contractor:

Name: _____
Address: _____

City, State, Zip: _____
Contact Person: _____
Phone Number(s): _____

Bridge Information:

Bridge Number: _____
Mile Point/Trunk Highway: _____
Miles and direction (N,E,W,S) From Nearest Town: _____
County: _____
Project Engineer Phone Number(s): _____

Bridge Owner:

Name: _____
Address: _____

City, State, Zip: _____
Contact person: _____
Phone Number(s): _____

Age of Brdg. (years): _____ Size of Brdg. (sq. ft.): _____
Type of Bridge: _____

Suspect Materials to be checked for asbestos: pipes, asphalt underlay, spray-on application, and joint compounds.

Dates when demolition will Begin _____ & End _____.

Both Beginning and Ending dates should be amended in writing as necessary to reflect current project dates.

Check as appropriate:

- There is no Asbestos Containing Material (ACM) present in the structure to be demolished.
- ACM will be removed prior to or during demolition. (Attach MPCA asbestos notification form.)

1. Provide name of company and/or individual that conducted the bridge assessment, MDH certification # and procedure used to determine presence or absence of ACM (including analytic method): _____

2. Description of planned demolition and the specific method(s) that will be used: _____

Demolition Material should be recycled on site or sent to a metal scrap recycler. Information must be provided on the following items 3 and 4 for any material not recycled:

3. Demolition Waste Transporter(s):

Transporter Name: _____
Transporter Contact: _____
Transporter Address: _____
City, State, Zip: _____
Phone Number: _____

4. Demolition Waste Disposal Site:

Landfill Name: _____
Owner/Operator: _____
Address/Location: _____
City, State, Zip: _____
Phone Number: _____

5. I certify that the above information is correct and I am a bonafide representative of the demolition contractor or bridge owner and have authority to enter into agreements for my employer. In event that unexpected asbestos containing material is found, the material will be removed by a MDH certified asbestos abatement contractor.

Signature of Contractor, Owner Agent

Date

Send to: Minnesota Pollution Control Agency 520 Lafayette Road N. St. Paul, MN 55155-4194	CC: MnDOT-Mail Stop 620 395 John Ireland Boulevard St. Paul, MN 55155-3000	For questions call: 651-366-3630 or 651-366-3637
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PCB Removal Information Polychlorinated Biphenyls (PCBs) will be removed from the bridge prior to demolition.

Mercury Removal Information Material containing mercury will be removed from the bridge prior to demolition.

Treated Wood and Lead Plates Will be removed from the bridge prior to demolition or separated during demolition.

Peeling or Loose Lead Paint Will be encapsulated or removed prior to demolition.

NOTIFICATION FORM ON DISPOSAL OF BRIDGE STEEL

The Contractor is required to provide certain information on disposal of bridge steel which has been painted with lead-based paint. By signing this document, the Contractor certifies that information supplied by the Contractor is correct and that the Contractor is familiar with proper handling and disposal of materials with lead-based paint. This information must be furnished to the Project Engineer a minimum of 30 days prior to removal of the bridge steel from the project site. Any change in method or location of disposal would require resubmittal and a 30 day notice.

Mn/DOT Project No. _____ **Bridge No.** _____

Description of Bridge Steel _____

Paint System is Mn/DOT Spec. _____ , _____
(Primer) (Top Coat)

Project Engineer: _____

Contractor/Subcontractor: _____
(Name, mailing address, telephone no.)

I _____ certify that the following information is correct:
(print name of authorized representative)

The above bridge steel will be disposed of by the following method(s): _____
(list name,

address and telephone no. of recipient, estimated delivery date, and intended use.)

I also certify that _____ is familiar with
(Contractor/Subcontractor name)
the requirements in OSHA 29 CFR 1926.62 relating to lead, precautions to be taken when working with lead, and proper handling and disposal of materials with lead-based paint systems and that _____ has been notified of the presence of lead-based paint.
(name of recipient)

(signature)

(date)

Received by Project Engineer/Inspector: _____
(date) (signature)

cc: Project File
Office of Environmental Services

Schedule of Materials Control 2016

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Introduction Page

Minnesota Department of Transportation Schedule of Materials Control (SMC) (Federal Aid, State Funds, County/Municipal Federal Aid Projects and State Aid Projects)

This schedule outlines the minimum sampling and testing required for most materials used in highway construction. Some items that are rarely used or materials of recent development are often covered by special provisions and may not be shown on the schedule. For more information regarding contract requirements for testing, please reference the "Standard Specifications for Construction", Specification 1603 Materials: Specifications, Samples, Tests, and Acceptance.

Laboratories performing acceptance tests for payment shall be accredited by the AASHTO Materials Reference Laboratory (AMRL) or a comparable accreditation program approved by MnDOT and the FHWA for all test procedures performed.

When sample sizes required for testing exceed 35 pounds, please submit multiple containers of the material with no individual container weighing more than 35 pounds.

Small quantities of materials may be accepted without sampling and testing. A small quantity is defined as any total quantity, for the whole project, of one material, which is smaller than the minimum quantity required for testing unless modified by the individual material items. These materials shall be from known, reliable sources, perform satisfactorily and meet the requirements for purpose intended. The inspection report (Form 02415) should include a statement to this effect and show the source. Form 2403 may be used to report small quantities of diverse materials from different sources. Form 02415 and Form 2403 (or approved revisions) are referenced in the Schedule of Materials Control for project record documentation and are required to be maintained in the project file.

Previously approved materials transferred from another project should be reported on Form 02415. The report should include: type of material, quantities involved, source, and supplier of materials. Whenever possible, include the project number for which the material was originally approved.

If Forms 02415 and 2403 are referenced by form number within the Schedule of Materials Control for materials or products received from pre-approved sources, where the field responsibility for acceptance is visual inspection and all information required to complete these forms is contained in other documents in the project file, the use of these forms becomes optional. If these forms are completed and sent to the Project Engineer by off-site inspection personnel from the district or the Office of Materials, they must be retained in the project file.

A Telephone Index is included with the Schedule giving contact information for the specialty areas if further information is required regarding the various materials. A form index is also included.

The Department maintains the Approved/Qualified Products List and the Certified Products and Services List, as well as, the Schedule of Materials Control. All are available electronically on the Office of Materials and Road Research website. www.dot.state.mn.us/materials.html

Products manufactured offsite may be pre-approved; however, final acceptance will be made at the point of incorporation, based upon review of documentation and inspection for shipping or other damage.

Contact the MnDOT District Independent Assurance Inspector when project starts to provide the proper servicing of your project.

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Spec. No.	Minimum Contractor Quality Control (QC) Testing Rate	Minimum Agency Quality Assurance (QA) Testing (See Note 1)		Minimum Companion (Split Lab) Sample (See Note 2)		Form No. (See Note 5)	
				Rate	Size	Rate	Size		
(a) 2118 (b) 2211 (c) 2212 (d) 2221	1. Gradation (a) Aggregate Surfacing (b) Aggregate Base (c) Drainable Aggregate Base (d) Shoulder Base Aggregate	3138 3138 3136 3138	Production: 1/550 yd ³ (CV) Only required for Material On Hand, 1906.2	<p style="text-align: center;">Random Sampling</p> <ul style="list-style-type: none"> • < 280 yd³ (CV) no tests required • ≥ 280 yd³ (CV) to < 1,100 yd³ (CV) <ol style="list-style-type: none"> 1. Lot Size = Total Quantity 2. Divide lot into two equal sublots 3. Collect one random sample from each subplot 4. Review average of lot & subplot results to determine compliance • ≥ 1,100 yd³ (CV) to < 5,500 yd³ (CV) <ol style="list-style-type: none"> 1. Lot Size = Total Quantity 2. Divide Lot into four equal sublots 3. Collect one random sample from each subplot. 4. Review average of lot & subplot results to determine compliance • ≥ 5,500 yd³ (CV) <ol style="list-style-type: none"> 1. #Lots = (total bid quantity/5,500) 2. Round # Lots up to next whole number 3. Lot Size = (total bid quantity/#lots) 4. Divide each Lot into four equal sublots. 5. Collect one random sample from each subplot. 6. Review all averages of lot & subplot results to determine compliance 		30 lb.	1 per project.	30 lb.	G&B-001 G&B-002 G&B-101 G&B-104

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Quality Assurance (QA) Testing		Minimum Companion (Split Lab) Sample (See Note 2)		Form No. (See Note 5)
				Rate	Size	Rate	Size	
(e) 2105 2106	1. Gradation (Continued) (e) Granular Borrow/Embankment, Select Granular Borrow/Embankment, Modified Granular Borrow/Embankment & Stabilizing Aggregate	3149 & Special Provisions	1/10,000 yd ³ (CV) Only required for Material On Hand, 1906.2	1/40,000 yd ³ (CV) (See note 1)	30 lb.	1 per project.	30 lb.	G&B-001 G&B-101 G&B-104
(f) 2215	(f) Full Depth Reclamation (FDR)	Special Provisions & 3135	1/6,000 yd ² (See Note 10)	1/day	30 lb.	NA		G&B-001 G&B-003 G&B-101
(g) 2511	(g) Granular Filter	3601	One per source before delivery on project	1 per source	300 lb.	NA		G&B-001 G&B-101 G&B-104
(h) 2451 (i) 2451 (j) 2451 (k) 2451 (l) 2451 (m) 2502	(h) Granular Backfill (i) Aggregate Backfill (j) Granular Bedding (k) Aggregate Bedding (l) Coarse Filter Aggregate (m) Fine Filter Aggregate	3149	One per source before delivery on project	1 per source	30 lb.	NA		G&B-001 G&B-101 G&B-104

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Quality Assurance (QA) Testing		Minimum Companion (Split Lab) Sample (See Notes 2 & 3)		Form No. (See Note 5)
				Rate	Size	Rate	Size	
2105 2106 2112	<p>2. Proctor Test (Used for optimum moisture & maximum density)</p> <p>Material type: Non-granular embankment and Subgrade Preparation material per 3149.2.B.1</p>	2105 2106 2112	<p>When QA is Specified Density, may use QA result for Target moisture</p> <p>When QA is NOT Specified Density: 1 per major soil type (See Notes 7 & 11) Used for optimum moisture determination</p>	<p>For Specified Density: 1/major soil type.</p> <p>For all other compaction requirements: One Contractor Companion/project</p> <p>(See Note 8)</p>	50 lbs.	1 per project.	25 lb.	<p>G&B-001 G&B-003 G&B-303</p>
2105 2106 2112	<p>3a. Compaction Compliance</p> <p>For non-granular material per 3149.2B.1</p> <p>Specified Density Test (Sand Cone or other) or Light Weight Deflectometer (LWD)</p>	2105 2106 2112		<p>Roadway Embankment (within road core): One test/4,000 yd³ or, one test/8,000 yd³ (CV), if test rolled. (for material outside road core, test at Engineer's discretion)</p> <p>Trenches for Transverse Culverts and Abutments: 1 test per every 2 feet of fill height per 250 feet of trench length</p> <p>Trenches for longitudinal water-main, Storm-sewer, sanitary, and gas & retaining walls & removals: One test per 500 feet of each trench length at various depths.</p> <p>Subgrade Preparation One per 25 Road Stations</p> <p>(See note 8)</p>		NA	NA	<p>G&B-001</p> <p>G&B-304</p>

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Quality Assurance (QA) Testing Rate	Form No. (See Note 5)
(a) 2211 (b) 2221	3b. Compaction Compliance Dynamic Cone Penetration (DCP) Index Method or Light Weight Deflectometer (LWD) (a) Aggregate Base (b) Shoulder Base Aggregate	3138		1 test/500 yd ³ (CV)	G&B-001 G&B-204 G&B-601 G&B-603
(c) 2215	(c) Full Depth Reclamation (FDR)	3135		1 test/3,000 yd ²	G&B-001 G&B-205 G&B-601 G&B-603
(d) 2105 2106 2112	(d) Granular Borrow/Embankment, Select Granular Borrow/Embankment, & Modified Granular Borrow/Embankment and all other granular materials. Subgrade Preparation (for materials meeting 3149.2B1)	3149		Roadway Embankment: One test/2,000 yd ³ (CV) Or, one test/4,000 yd ³ (CV), if test rolled Trenches for Transverse Culverts and Abutments: 1 per every 2 feet of fill height per 250 feet of trench length. Trenches for longitudinal water-main, Storm-sewer, sanitary, and gas & retaining walls & removals: 1 per 500 feet of each trench length at various depths. Subgrade Preparation: 1 per 25 Road Stations.	G&B-001 G&B-203 G&B-601 G&B-602 G&B-603
(a) 2118 (b) 2211 (c) 2212 (d) 2221	4. Moisture Content Test During Compaction Needed for all compaction methods including quality compaction. (See Note 9) (a) Aggregate Surfacing (b) Aggregate Base (c) Draggable Aggregate Base (d) Shoulder Base Aggregate	3138	1/1,000 yd ³	1 per project in this category. Obtain split samples from Contractor.	G&B-001 G&B-003 G&B-105
(e) 2215	(e) Full Depth Reclamation (See Note 9)	2215	1/6,000 yd ²	1 per project in this category. Obtain split sample from Contractor.	
(f) 2105 2106 2112	(f) All embankment materials (See Note 9) (g) Subgrade Preparation	2105, 2106 & Special Provisions	All Embankment Materials 1/10,000 yd ³ Subgrade Preparation 1 per 25 Road Stations	1 per project in this category. Obtain split sample from Contractor	G&B-001 G&B-003 G&B-105

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Pay Item Number	Test Type / Material	Spec. No.	Minimum Contractor Quality Control Testing Rate	Minimum Agency Quality Assurance (QA) Testing		Form No. (See Note 5)
				Rate	Size	
2105 2106 2118 2211 2212 2221	5. Percent Crushing		1/lot, only required for Material On Hand, 1906.2	2 per source (See Notes 3 & 4)		G&B-103 G&B-104
2105 2106 2118 2206 2211 2212 2221 2451 2502	6. Aggregate Quality A: LAR, Insoluble Residue, Lithological Exam & Bitumen Content B: Percentage of Concrete, Masonry Concrete, Glass, Brick and other Objectionable Material in a Recycled Aggregate Sample	3136, 3138, 3149	1/source (See Note 6), only required for Material on Hand, 1906.2	A: 2 per source (See Notes 3, 4 & 6) B: Test at the discretion of the Engineer. See Lab Manual, Section 1209	30 lb.	G&B-104
2215	7. Depth Check Full Depth Reclamation (FDR)		1/1000 feet of machine width	1/day		G&B-003 G&B-401
2111	8. Test Rolling	Contractor perform test rolling at the top of all subgrade and granular layers not meeting the requirements of 3149.2B2 (2105 & 2106), base layers (2211), and non-stabilized FDR (2215). Minimum 12' width and 300' length. Agency to observe test rolling.				

General Notes: Sampling and Testing Procedures are found in the Grading and Base Manual in Section 5-692.200. Obtain all gradation, quality and crushing samples after spreading and before compaction.

Modify testing and sampling protocol for increases in Plan quantities as follows:

Time Plan Quantity Increased	Testing and Sampling
Before Collection of first sample.	Reorder sampling to account for additional quantity.
After Collection of first sample, but before sampling is complete.	Complete testing of current lot, and then reorder the sampling using the remaining quantity.
After collection of all original Plan quantity samples.	Order sampling for additional quantity.

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Note 1: Samples are not required for 280 yd³ (CV) (500 tons) or less. Report small quantities on Form 02415 or Form 2403.
<http://www.dot.state.mn.us/const/tools/forms.html>.

Note 2: Laboratories with AMRL accreditation that perform Agency Assurance testing are not required to submit companion samples. When Quality Assurance testing is not performed in an AMRL accredited facility, obtain the Companion/Lab sample as a split sample from the first Agency Quality Assurance sample, and include the gradation results on the sample card.

Note 3: Companion gradation and proctor, and Quality Assurance crushing and aggregate quality samples are not required for 550 yd³ (CV) (1,000 tons) or less.

Note 4:

- Carbonate aggregates require 50 lb. samples for lab testing.
- Submit the initial aggregate quality and crushing sample from the first day's production; the Engineer may elect to sample from the stockpile.
- The crushing test will not be required when the material is crushed from a quarry.
- A second test is required, when the first test fails. Average both tests to determined compliance, when two tests are performed.
- Not all quality and crushing tests are required for each material, see specifications
- Use the table below as a **guideline, determination of specific required tests is through the Specifications and/or the Special Provisions.**

Note 5: Forms are available on the Grading & Base website at: <http://www.dot.state.mn.us/materials/gradingandbase.html>

Note 6: Use the Centrifuge Method (MnDOT Lab. Manual Method 1852) to determine bitumen content.

Note 7: Major soil types are defined in the Triaxial Chart located in the Grading and Base Manual.

Note 8: Required only for specified density.

Note 9: Required during Compaction. For Quality Compaction of Shoulder Aggregate (2118 or 2221), the Engineer may replace the moisture testing requirement with time stamped photo documentation of water being applied.

Note 10: Provide gradation test results to the Engineer within the first 500 feet (150 m) of production and within 500 feet (150 m) after a failing gradation.

Note 11: The Contractor may use a one point Proctor, or the estimated optimum moisture content formula for granular (Form G&B- 305) to determine the optimum moisture.

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)**Table: Guidelines for Required Crushing and Aggregate Quality Tests**

Material	Crushing	Bitumen Content	LAR	Insoluble Residue	Lithological Exam & Shale Float Test
3136 Drainable Bases	Yes. Not required for quarried sources.	Not applicable	Yes	Yes, if source from a carbonate quarry.	Yes, when not from quarried source.
3138 Aggregate for Surface and Base	Yes for Class 5, 5Q and 6. Test waived if material contains recycled at twice the minimum crushing requirement. Not required for quarried sources.	Yes, if it contains Bitumen.	Yes, if source is carbonate quarry and does not contain bitumen.	Yes, if source from a carbonate quarry, and does not contain bitumen.	Yes for Class 3, 4, 5, 5Q and 6, when not from quarried rock, and does not contain bitumen.
3149 Granular Material *	Yes for Stabilizing Aggregate, Fine Aggregate Bedding and Medium Filter Aggregate. Test waived if material contains recycled at twice the minimum crushing requirement. Not required for quarried sources.	Yes, if it contains Bitumen	Not applicable	Yes, if source from a carbonate quarry, and does not contain bitumen	Yes for Medium Filter Aggregate

* Note for 3149.2D.2 Granular Materials - Structural Backfill, perform all tests required of 3137.2B3, shear angle test (AASHTO T236) and Proctor.

Perform test procedure for determining the amount of concrete, masonry concrete, glass, brick and other objectionable material in a recycled aggregate sample when sample appears to contain more material than allowed by specification. See Lab Manual; Section 1209.

Grading and Base Conversion from Volume (CV) to Weight

If possible, always perform a proctor for the material in question to obtain a conversion factor.

Only use the following conversion factor for materials meeting specifications 3138 or 3149 Stabilizing Aggregate. Material may be composed of crushed limestone, granite, gneiss, quartzite, recycled materials or natural gravel. **Do not** use the conversion factor for crushed basalt, taconite, or other heavy or light-weight aggregates. For other materials or gradations contact the Grading and Base Unit.

To convert from volume to weight use the following: **1 yd³ (CV) = 1.8 tons.**

See the Grading and Base Manual Section .430 for further explanation.

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Contractor Quality Control Tests Requirements for Cold in Place Recycling (CIR) & Stabilized Full Depth Reclamation (SFDR), Specification 2215		
Test Name	Rate	Method/Location
SFDR: Gradation (Simple) Pre-Ground Un-Stabilized Material	1 per mile	G&B Manual .215 & Form G&B-101 Report sieves 3" & 2"
SFDR: Gradation (Entire) (Material to be Stabilized)	One per day, give split sample to Engineer	G&B Manual .215 & Form G&B-101 Report sieves 2", 1.5", 1.25", 1", ¾", 3/8", #4, #10 & #30
CIR & SFDR: Gradation (Simple) (Material to be Stabilized)	1 per mile for SFDR and CIR without top size screening 4 per mile for CIR with machines with top size screen.	G&B Manual .215 & .293, Form G&B-101 Report only sieves 2" and 1.5" for SFDR 1.5" and 1.25" for CIR
CIR & SFDR: Depth Check Unstabilized (SFDR) & Stabilized (CIR & SFDR)	One per 1,000 feet per machine width for each vertical machine face for initial pulverization and stabilization	G&B Manual .284 and Form G&B- 401
SFDR: Moisture during compaction of unstabilized portion	1/6,000 yd ²	G&B Manual .245, Speedy Tester not allowed
SFDR: Penetration Index (DCP) – Unstabilized	One per ½ lane mile	G&B Manual .255 & Form G&B-205
CIR & SFDR (if used): Calibrate mineral stabilizing agent application rate	Once using design rate per vane feeder	G&B Manual .286 or .287
SFDR: Moisture before Injecting Liquid Bituminous Material	One per 5,000 feet of lane of daily anticipated SFDR & one after the addition of water by Contractor or rain or mechanical drying out (disking, etc.).	G&B Manual .281 & Form G&B-105
CIR & SFDR: Yield Mineral Stabilizing Agent (if used) Liquid Bituminous Material	1 per transport 1 per transport	G&B Manual .286 & .287 & Forms G&B 402 & 403
CIR & SFDR: Compaction (Nuclear Density) (SFDR Stabilized and CIR)	1 per 500 feet of lane width <i>(See Note Below)</i>	Grading & Base manual .282
CIR & SFDR: Control Strip (SFDR Stabilized and CIR)	Minimum once per project	
CIR & SFDR (if foaming): Foaming Asphalt Checks Expansion Ratio & Half Life	1 per load	Grading & Base Manual .285
Note: the Engineer may require a Contractor to perform additional Nuclear Density tests in areas that the Engineer believes are failing density requirements. Correlate the nuclear gauge's dry measurement density by direct moisture measurement (microwave oven or equivalent).		

I. Grading, Base and Reclamation Construction Items (www.dot.state.mn.us/materials/gradingandbase.html)

Agency Quality Assurance Tests Requirements for Cold in-Place Recycling and Stabilized Full Depth Reclamation, Specification 2215		
Test Name	Rate	Method/Location
SFDR: Gradation (Simple) Pre-Ground Un-Stabilized Material	Run gradation at the discretion of the Engineer	G&B Manual .215 & Form G&B-101 Report only sieves 3" & 2"
SFDR: Gradation (Entire) (Material to be Stabilized)	Run gradation at the discretion of the Engineer	G&B Manual .215 & Form G&B-101 Report sieves 2", 1.5", 1.25", 1", ¾", 3/8", #4, #10, #40 & #200
CIR & SFDR: Gradation (Simple) (Material to be Stabilized)	Run gradation at the discretion of the Engineer	G&B Manual .215 & Form G&B-101 Report sieves 2" & 1.5" for SFDR 1.5" and 1.25" for CIR
CIR & SFDR: Depth Check Unstabilized (SFDR) & Stabilized (CIR & SFDR)	One per day	G&B Manual .284 and Form G&B-401
SFDR: Moisture during compaction of unstabilized portion	Once per project – Run test in same area as Contractor	G&B Manual .245, Speedy Tester not allowed
SFDR: Penetration Index (DCP) – Unstabilized	1 per lane mile	G & B Manual .255 & Form G&B-205
CIR & SFDR (if used): Calibrate mineral stabilizing agent application rate	Observe the Contractor	
CIR & SFDR: Yield Mineral Stabilizing Agent (if used) Liquid Bituminous Material	1 per day each	G&B Manual .286 & .287 Forms G&B- 402 & 403
CIR & SFDR: Compaction (Nuclear Density) (SFDR Stabilized and CIR)	Observe the Contractor	
CIR & SFDR: Control Strip (SFDR Stabilized and CIR)	Observe the Contractor	
CIR & SFDR: Bituminous Material Samples	First load, then 1 per 50,000 gal	One quart each sample
CIR & SFDR: Mineral Stabilizing Agent Sampling	1 sample	
CIR & SFDR (if foaming): Foaming Asphalt Checks Expansion Ratio & Half Life	Observe the Contractor Once per day	Grading & Base Manual .285
CIR & SFDR: Moisture testing of stabilized layer during curing before placement of HMA	Three daily after Compaction	Grading & Base Manual

II. Bituminous Construction Items for Specification 2360

Note: Projects with bituminous tonnage less than or equal to 300 tons (272 metric tons) per day may be accepted on a small quantity basis at the discretion of the Engineer. Retain Form 02415 or Form 2403 in Project File.

(All plant mixed asphalt from Certified Plants)

DEFINITIONS

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing performed by Contractor. Also known as Process Control Testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor Contractor (mixture) Agency (density cores)	Contractor	Agency
Verification	A sample to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's Verification sample provided to the Contractor. The Contractor <u>is required</u> to test this sample. The results <u>shall be used</u> as part of the QC program.	Agency	Agency	Contractor
IAST	The <u>I</u> ndependent <u>A</u> ssurance <u>S</u> ampling and <u>T</u> esting assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

II. Bituminous Construction Items for Specification 2360 (cont.)

A. Pre-Production Sampling and Testing for Specification 2360 Plant Mixed Asphalt

Minimum Sample Sizes:

Quality Sample Size for Lab Submittal:

Plus #4 aggregate sample for quality testing and Percent Crushing	80 lb. (35 kg)
Minus #4 aggregate for quality testing	35 lb. (15 kg)
Bituminous mixture plus 2 Gyratory specimens for volumetric testing	80 lb. (35 kg)
Bituminous mixture for TSR testing (option A)	80 lb. (35 kg)
Bituminous mixture for TSR testing plus 6 Gyratory specimens (option B)	20 lb. (10 kg)
Mineral filler.	2 lb. (1 kg)
RAP for Quality Testing	80 lb. (35 kg)
RAS (shingles) for Gradation and Quality Testing	10 lb. (5 kg)
Asphalt Binder	1 qt. (1L)

All aggregates and mixtures will be split according to G&B Manual 5-692.141, "Quartering Method of Sample Size Reduction"

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2360	Bituminous Mix Design (QC/QA)	2360	Contractor submits Mix Design Option 1 or Option 2	<p>Option 1- Laboratory Mix Design: In addition to reviewing the Trial Mix data (JMF), test Contractor's mixture (at optimum asphalt content). Also, evaluate TSR per 2360.2E5a(3).</p> <p>Option 2- Laboratory Mix Design: Review submitted Mix data only.</p>	Approved Mix Design Report
2360	Aggregate Quality Testing (QA only)	2360	<p>Provide 24 hour notice of intent to sample aggregates for quality testing. Agency has the option to monitor sampling.</p> <p>Submits to the Bituminous Engineer or the District Materials Engineer one (1) sample of each non-asphaltic aggregate type or class per source per year. Also submit the asphaltic aggregate material when the mixture contains RAP or RAS. Provide documentation that of all RAS /TOSS (Tear Off Shingle) material is from a MPCA certified supplier.</p>	Test as directed by the Bituminous Engineer or the District Materials Engineer.	Test Report
2360	Mineral Filler (QA only)	2360	One (1) sample per shipment of 50 tons (45 metric tons) or less, unless previously inspected.	Testing as directed by the Engineer or the District Materials Engineer.	Test Report
2360	Additives (QA Only)	2360	Sample blended asphalt binder and additive, 1 qt. (1 L). Sample first shipment of each type of material. Then submit one sample per 250,000 gal. (1,000 m3) (approximately 1,000 ton).	Testing as directed by the Engineer or the Chemical Laboratory Director.	Test report

II. Bituminous Construction Items for Specification 2360 (cont.)

B. BITUMINOUS PRODUCTION for Specification 2360

*Verification Testing

Verification Companion testing from Agency split sample is required to be performed and used as the next QC sample that day.

SAMPLE SIZE:	Aggregate for Gradation (QC/QA)	35 lb. (15 kg)
	Plus #4 Aggregate Type for Quality Testing	80 lb. (35 kg) for each source
	Minus #4 Aggregate Type for Quality Testing	35 lb. (15 kg) for each source
	RAP material for Quality Testing	80 lb. (35 kg) for each source
	RAS (Shingles) for Processed Gradation and Quality Testing	10 lb. (5 kg)
	Mixture Properties (QC/QA) 3 full 6" by 12" cylinder molds for QA	65 lb. (30 kg)
	TSR (QC/QA) 4 full 6" by 12" cylinder molds for QA	90 lb. (40 kg)
	Aggregate Specific Gravity (QC/QA)	90 lb. (40 kg)
	Asphalt Binder (QA)	1 qt. (1 L)
	Emulsified Asphalt (QA)	½ gal (2 L)

All aggregates and mixtures will be split according to G&B Manual 5-692.141, "Quartering Method of Sample Size Reduction"

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2360	Aggregate Quality Testing Including aggregate specific gravity (QA Only)	2360		Take additional samples when aggregate qualities approach specification limits or when material variation is observed, take additional field samples as requested by Project Engineer. Take additional samples when material variation is observed in RAP or RAS take additional field samples as requested by Project Engineer.	Lab report
2360	Moisture Content in Mixture (QC/QA) Lab Manual 1855	2360	Sample and test as directed by the Engineer.		Test Summary Sheet (TSS)

II. Bituminous Construction Items for Specification 2360 (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2360	Asphalt Binder Content, % AC, ADD AC, AC/Total AC ratio (QC/QA, Verification*) Lab Manual 1851, 1852, 1853	2360	(a) Incinerator Oven MnDOT Lab Manual 1853 (b) Chemical Extraction MnDOT Lab Manual 1851 or 1852 REMARKS: Contractor selects one method at the beginning of the project (when material is submitted for Trial Mix Review) and use that method for the entire project. The Contractor and Engineer may agree to change test procedures during the construction of the Project. See Note #1, Note #2 & Note #4. A computer file of the plant's control settings is required every 20 minutes of production.	The inspector will witness all QC mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample is split. At the end of the day randomly submit one of the QA-Verification splits to the District Lab for testing. Additional verification samples can be taken at any time or location. When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). The Agency reviews the computer files of the plant's control settings. REMARKS: See Note # 3 & Note #7	TSS
2360	Mixture Properties (QC/QA, Verification*) Maximum Specific Gravity Lab Manual 1807	2360	Contractor performs test 1807 REMARKS: See Note #1, Note #2, & Note #4.	The inspector will witness all QC mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample is split. At the end of the day randomly submit one of the QA-Verification splits to the District Lab for testing. Additional verification samples can be taken at any time or location. When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). REMARKS: Note # 3 & Note #7	TSS
2360	Mixture Properties (QC/QA, Verification*) Gyratory Bulk Specific Gravity - 2 Specimen Average, Lab Manual 1806, 1820	2360	Contractor performs test 1806 REMARKS: See Note #1, Note #2, & Note #6.	The inspector will witness all QC mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample is split. At the end of the day randomly submit one of the QA-Verification splits to the District Lab for testing. Additional verification samples can be taken at any time or location. When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet). REMARKS: See Note #3 & Note #7.	TSS

II. Bituminous Construction Items for Specification 2360 (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2360	Mixture Properties (QC/QA, Verification*) Adjusted Asphalt Film Thickness (AFT), Air Voids, Fines to effective, CAA, FAA and Gradation. Lab Manual 1203, 1206, 1214, 1808, 1854	2360	<p>Verification Companion testing from Agency split sample is required and used as a QC sample once per day.</p> <p>Bituminous mixes composed entirely of Class A and/or Class B aggregates are not required to be tested for CAA (Coarse Aggregate Angularity).</p> <p>REMARKS: See Note #1, Note #2, Note #4, Note #5, & Note #6.</p> <p>The production start-up testing rates for the CAA and FAA are 1 per 1000 tons for the first 2000 tons. After 2000 tons, 2 test per day for at least two days. Then CAA and FAA at a rate of 1 test per week, if the CAA and FAA exceed the requirements by 8% and 5% respectively, otherwise test daily.</p>	<p>The inspector will witness all QC mixture sampling and take possession of their QA-Verification split of this sample immediately after the sample is split. At the end of the day randomly submit one of the QA-Verification splits to the District Lab for testing. Additional verification samples can be taken at any time or location. When additional verification samples are taken the contractor must test the Verification companion split of this sample and include the results in the QC program (Test Summary Sheet).</p> <p>REMARKS: See Note # 3 & Note #7.</p>	TSS
2360	Core Density and Thickness Lab manual 1810	2360	<p>Contractor cuts two cores at each location. In the laboratory, measure, and saw cores into separate lifts. Sawing of cores into separate lifts is required.</p> <p>Schedule the approximate time of testing during normal project work hours so the Agency may observe and record the saturated surface dry and immersed weight of the cores.</p> <p>A completed Core Density Incentive/Disincentive worksheet is to be submitted to the Laboratory (Agency field or District/Division).</p>	<p>Complete core stationing spreadsheet to determine core locations and then mark all coring locations on the pavement.</p> <p>Once the Contractor has measured and sawed the Agency companion cores transport them to the Agency field lab or District Lab for testing. Transport the cores as soon as possible to the testing lab taking care to prevent damage due to improper handling or exposure to heat.</p> <p>Selects at least one of the two companion cores per lot to test for verification.</p> <p>REMARKS: Note #3 & Note #6.</p>	<p>Core Density Worksheet</p> <p>Core Density Incentive/Disincentive worksheet.</p>
2360	Tensile Strength Ratio (T.S.R.) (QC/QA) Lab Manual 1813	2360	<p>Sample as directed by the Engineer. When testing is required, complete testing within 72 hours after the sample is taken.</p>	<p>Test as directed by the Engineer. When testing is required, complete testing within 72 hours after the sample is taken.</p>	TSR Worksheet

II. Bituminous Construction Items for Specification 2360 (cont.)

C. BITUMINOUS MATERIALS for Specification 2360

Only Bituminous Materials from Certified Sources are allowed for use. The most current list of Certified Sources: <http://www.dot.state.mn.us/products/index.html>

Minimum Sample Sizes:

Quality Sample Size for Lab Submittal:

Asphalt Binder (QA)/Cutback Asphalt (QA)	1qt (1 L) Metal can with pressure fit lid
Emulsified Asphalt (QA)	½ gal (2 L) plastic

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2360	Asphalt Binder (QA only)	3151.2	<p><u>Asphalt Supplier</u> QC testing is the responsibility of the bituminous material supplier as part of the Combined State Binder Certification program.</p> <p><u>During Asphalt Mixture Production</u> Obtain asphalt binder samples from a sampling valve located between the pump and the drum. Sample each type of asphalt binder used in mixture production after 50 tons of mixture has been produced, then sample at a rate of one per 250,000 gal [1,000,000 L]. A minimum of 1 gallon of binder must be drawn and wasted from the sampling valve before the actual sample is drawn. For batch plants, obtain the asphalt binder sample from the weigh pod. Provide asphalt binder sample in clean one L (1 qt.) steel container. The Inspector will monitor the sampling the Contractor performs.</p>	<p><u>Asphalt Supplier</u> Random sampling of bituminous material at the asphalt supplier is discussed in the Combined State Binder Certification program arranged by the MnDOT Chemical Laboratory.</p> <p><u>During Asphalt Mixture Production</u> Observe contractor personnel taking sample from sampling valve and submit to MnDOT Chemical Lab</p>	2413 Asphalt Sample Identification Card
2355 2356 2357	Emulsified Asphalt (QA only)	3151.2	<p>QC testing is the responsibility of the bituminous material supplier as part of the Combined State Binder Certification program.</p> <p><u>Tack Coat</u> During mixture production the Contractor will sample first shipment, then submit one sample per 50,000 gal (200,000 L). Sample emulsified asphalt in clean ½ gal (2 L) plastic container with wide screw top and send to MnDOT Chemical Lab within 7 days of sampling. Sample all emulsified asphalt from the distributor.</p>	<p><u>Asphalt Supplier</u> Random sampling of bituminous material at the asphalt supplier is discussed in the Combined State Binder Certification program arranged by the MnDOT Chemical Laboratory.</p> <p><u>Tack Coat</u> Observe contractor personnel taking sample from the distributor and submit to MnDOT Chemical Lab.</p>	2413 Asphalt Sample Identification Card

II. Bituminous Construction Items for Specification 2360 (cont.)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2357 2358	Cutback Asphalt (QA only)	3151.2	<p>QC testing is the responsibility of the bituminous material supplier as part of the Combined State Binder Certification program.</p> <p><u>Tack Coat</u> During mixture production the Contractor will sample first shipment, then submit one sample per 50,000 gal (200,000 L). Sample emulsified asphalt in clean ½ gal (2 L) plastic container with wide screw top and send to MnDOT Chemical Lab within 7 days of sampling. Sample all emulsified asphalt from the distributor.</p>	<p><u>Asphalt Supplier</u> Random sampling of bituminous material at the asphalt supplier is discussed in the Combined State Binder Certification program arranged by the MnDOT Chemical Laboratory.</p> <p><u>Tack Coat</u> Observe contractor personnel taking sample from the distributor. Cutback Asphalt should only be used in cold temperature applications with the Engineer's approval. Contact Bituminous Engineering Unit for cold temperature application guidelines.</p>	2413 Asphalt Sample Identification Card

Note #1 All QA test samples shall be from split samples.

If a member of the monitoring team observes the Contractor Test, note and sign under remarks.

The Project Engineer is responsible for:

- 1.) Reviewing control charts & Test summary sheets for accuracy and completeness,
- 2.) Checking sampling and testing procedures,
- 3.) Discussing QC problems with the Contractor,
- 4.) Obtaining Verification Samples

Note #2 For Mixture Quality Management, acceptance will be based on Contractor's test results as verified by MnDOT test results.

Note #3 When a member of a monitoring team observes the Contractor test, note and sign under remarks.

Note #4

How to calculate the number of tests per day	Production Start-up testing rates (first 2000 tons of production)	Production testing rates (after 2,000 tons of mixture produced)
Divide daily tonnage by 500 and round up to next whole number	1 test/ 500 tons	
Divide daily tonnage by 1000 and round up to next whole number		1 test/ 1000 tons

Note #5 MnDOT projects will require the calculated Adjusted Asphalt Film Thickness (AFT). VMA will still be calculated for informational purposes, but will not be used for acceptance criteria. The adjusted AFT will be calculated each time a gradation test is required.

Note #6 Random number generation and determination of random sample location shall be consistent with the MnDOT Bituminous Manual Section 5-693.7 Table A or Section 5 of ASTM D3665. The Engineer may approve alternate methods of random number generation.

Note #7 QA samples retained for 10 calendar days and tested, if needed.

III. Construction Items for Bituminous Specialty Items include the following:

- **2363 Permeable Asphalt Stabilized Stress Relief Course (PASSRC) and Permeable Asphalt Stabilized Base (PASB)**
- **2354 Micro-Surfacing**
- **2355 Bituminous Fog Seal**
- **2356 Bituminous Seal Coat and Bituminous Underseal Special Provision**
- **2356 Otta Seal**
- **2353 Ultra-Thin Bonded Wearing Course (UTBWC)**
- **2357 Bituminous Tack Coat**
- **2365 Stone Matrix Asphalt (SMA)**

All aggregates and mixtures will be split according to G&B Manual 5-692.141, “Quartering Method of Sample Size Reduction”

Only Bituminous Materials from Certified Sources are allowed for use. The most current list of Certified Sources:

<http://www.dot.state.mn.us/products/index.html>

SAMPLE TYPE	DESCRIPTION	SAMPLE LOCATION DETERMINED BY	SAMPLE TAKEN BY	SAMPLE TESTED BY
QC	Quality Control Testing performed by Contractor. Also known as Process Control Testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor’s QC sample.	Contractor Contractor (mixture) Agency (density cores)	Contractor	Agency
Verification	A sample to assure compliance of the Contractor’s Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency’s Verification sample provided to the Contractor. The Contractor <u>is required</u> to test this sample. The results <u>shall be used</u> as part of the QC program.	Agency	Agency	Contractor
IAST	The <u>I</u> ndependent <u>A</u> ssurance <u>S</u> ampling and <u>T</u> esting assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

III. Construction Items for Bituminous Specialty Items (cont.)

Pay Item Number	Test Type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form No.
(a) 2363 (b) 2363	1. Mix Design (Pre-Production) (a) PASSRC (b) PASB	2363	Complete 1 Job Mix Formula (gradation blend only) per mix Submit to agency: 100 lbs. each coarse agg., 35 lbs. each fine agg. & 4 qt. asphalt binder	Agency Performs Mix Design	Approved Mix Design Report
(c) 2354	(c) Micro-Surfacing	3139.5	Complete one mix design per aggregate source. See specification. Submit to Agency: 150 lbs. aggregate	Review Submitted Mix Design. Perform gradation and sand equivalence test from submitted sample. (See Notes 1 & 5)	Approved Mix Design Report
(d) 2356	(d) Bituminous Seal Coat and Bituminous Underseal	2356	At least two weeks before beginning construction complete 1 design per mix and provide information to Engineer. See 2356.3 for failing or out of tolerance results. Submit to Agency: 150 lbs. aggregate	Review and verify submitted Mix Design by performing gradation and quality tests per Table 3127-1 & Table 3127-2. Gradations and quality tests must meet requirements and tolerances, see 2356.3 for failures. (See Note 5)	
(e) 2353	(e) UTBWC	2353 UTBWC	Complete and submit 1 design per mix	Review Submitted Mix Design	Approved Mix Design Report
(f) 2365	(f) SMA	2365 SMA	Complete 1 design per mix Submit to Agency: 80 lb. (35 kg) - bituminous mixture plus 6 Gyratory specimens for TSR testing. 150lbs +4 aggregate from JMF blend for VCA 80 lbs. each coarse agg. & 30 lbs. each fine agg. for quality testing	Review & verify Submitted Mix Design Test as directed by the Engineer	Approved Mix Design Report
(a) 2363 (b) 2363	2. Production Gradation (a) PASSRC (b) PASB Lab manual 1202, 1203	2363	One per 1,000 ton with a minimum of one per day Submit to Agency: 35 lbs. Note # 2	1/day	Test Report
(c) 2354	(c) Micro-Surfacing Lab manual 1202, 1203	2354	Machine Hopper: 1/500 tons (min. 1/day) Submit to Agency: 30 lbs.	1 at time of production	Test Report

III. Construction Items for Bituminous Specialty Items (cont.)

Pay Item Number	Test Type	Material Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form No.
(d) 2356 (e) 2356	(d) Bituminous Seal Coat and Bituminous Underseal (e) Otta Seal Lab manual 1202, 1203	2356	Stockpile: 1/1,500 tons (min. 1/ day) Placement: Chip Spreader Hopper: 1/day Submit to Agency : 30 lbs. from Hopper See 2356.3 for failing or out of tolerance QC or QA results.	Bituminous Seal Coat and Bituminous Underseal: Stockpile: 1 prior to project beginning, Placement: one/day obtained from Contractor's split sample from Chip Spreader Hopper. All gradations must meet Table 3127-1 requirements and must be within mix design tolerance. See 2356.3 for failing or out of tolerance QC or QA results. Otta Seal: 1/day	Test Report
(a) 2363 (b) 2363	3. Production % Crushing (CAA) (a) PASSRC (b) PASB Lab manual 1214	2363	One per 1,000 tons with a minimum one per day Submit to Agency: 35 lbs. from Belt	1/day	Test Report
(a) 2354	4. Moisture (In Aggregate) (a) Micro-Surfacing Grading & Base manual, 5-692.245.B	2354	Machine Hopper: 1/500 tons (min. 1/day) Submit to Agency: 2 lbs.	1/day	Test Report
(a) 2354	5. Sand Equivalence (a) Micro-Surfacing AASHTO T 176	2354	1/day	1/project from submitted Mix Design sample at Pre-Production	Test Report
(a) 2356	6. Quality Tests (a) Bituminous Seal Coat and Bituminous Underseal Lab Manual 1223	2356	Production: Perform daily flakiness index test, obtain sample from first load. Submit split sample to Agency: 30 lbs. See 2356.3 for failing QC or QA results.	Stockpile: Perform Flakiness Index test and additional quality tests from Table 3127-2 at Engineer's discretion. Production: Perform daily quality tests per Table 3127-2, at the discretion of Engineer. See 2356.3 for failing results.	Test Report
(a) 2353	7. Bituminous Mixture Tests (a) UTBWC Lab Manual 1203, 1807, 1852, 1853, 1854	2353 UTBWC	Tests: % AC, Gradation, Max Gravity, Adjusted AFT Rate: (1/300 tons, min. 1 per day) Note #3: Submit to Agency: 20 lbs. (1 cylinder from truck box)	1 per day	TSS

III. Construction Items for Bituminous Specialty Items (cont.)

Pay Item Number	Test type	Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form
(b) 2363	(b) PASSRC, PASB Bit Manual	3151	Test: Asphalt spot check Rate: minimum 1/day		Test Report
c) 2365	(c) SMA Lab Manual 1203,1204, 1205, 1211, 1214, 1806, 1807, 1808, 1813, 1853, 1854, 1855, AI SP-2 AASHTO T305	2365 SMA	Tests: % AC, Gradation, Max Gravity, Bulk Gravity, Voids, VMA, CAA, Draindown, voids in coarse aggregate (VCA) fines/effective asphalt. Rate: (1/1000 tons, min. 1/day) Aggregate sp. gravity, mix moisture content to be tested as directed by the Engineer See Note: #3 Submit companion 1/day to agency: 65 lb. (30 kg) 3 full 6" by 12" cylinder molds	Tests: % AC, Gradation, Max Gravity, Bulk Gravity, Voids, VMA, CAA, voids in coarse aggregate (VCA) fines/effective asphalt. See Note # 3 & Note #4	TSS
(b) 2353	8. Asphalt Binder (b) UTBWC	2353 UTBWC 3151	QC testing is the responsibility of the bituminous material supplier. Random sampling is arranged by the MnDOT Chemical Laboratory. Asphalt Binder: First load, then 1/250,000 gal. 1 qt. Emulsified Asphalt: First load, then 1/50,000 gal. ½ gal*	Observe contractor personnel taking sample from sampling valve and submit to MnDOT Chemical Lab.	Test Report
(c) 2354 (d) 2356 (e) 2356 (f) 2357	(c) Micro-Surfacing (d) Bituminous Seal Coat and Bituminous Underseal (e) Otta Seal (f) Bituminous Tack Coat	2354, 2356, 3151	QC testing is the responsibility of the bituminous material supplier. Random sampling is arranged by the MnDOT Chemical Laboratory.	First load, then 1 / 50,000 gal. ½ gal*	Test Report
(g) 2363 (h) 2365	(g) PASSRC, PASB (h) SMA	3151, 2365 SMA	QC testing is the responsibility of the bituminous material supplier. Random sampling is arranged by the MnDOT Chemical Laboratory. Asphalt Binder (1 qt.): First load, then 1/250,000 gal. Note: SMA to be test as in Section C. BITUMINOUS MATERIALS for Specification 2365	Observe contractor personnel taking sample and submit to MnDOT Chemical Lab. Note: SMA to be test as in Section C. BITUMINOUS MATERIALS for Specification 2365.	Test Report

III. Construction Items for Bituminous Specialty Items (Cont.)

Pay Item Number	Test type	Spec. No.	Minimum Contractor Quality Control Testing Rate Minimum Sample Size	Minimum Agency QA/Verification (Acceptance)	Form
(a) 2354	9. Asphalt Binder Application Rate (a) Micro-Surfacing	2354	Verify Application rate 3/day	Verify Application rate 1/day	
(b) 2355 (c) 2356 (d) 2356 (e) 2357	(b) Fog Seal (c) Bituminous Seal Coat and Bituminous Underseal (d) Otta Seal (e) Bit Tack Coat	2355, 2356, 2357	Verify Application rate 1/day	Verify Application rate 1/day	21841-02, found on construction tools website

***Use plastic containers for Emulsified Asphalt Samples. Send to MnDOT Chemical Lab within 7 days of sampling.**

Note 1: Agency will test at their discretion.

Note 2: Run test on gradation sample taken from aggregate belt

Note 3: TSR testing on production mixture is at the discretion of the Engineer.

Note 4: Agency is not required to run draindown testing on QA/Verification samples.

Note 5: Submit copy of mix design to Project Engineer and copy Grading and Base Engineer.

IV. Concrete Construction Items (www.dot.state.mn.us/materials/concrete.html)

The testing rates shown in this Schedule of Materials Control are **minimums**. Take as many tests as necessary to ensure quality concrete.

All samples shall be taken in a random manner using an appropriate number generator.

All field samples shall be taken at the point of placement unless otherwise allowed by the Engineer.

It is recommended that the Agency Plant Monitor be present during critical pours, such as superstructure or paving concrete (i.e. 3A21, S mixes, JMF mixes).

If any field test fails, reject the concrete or if the Producer makes adjustments to the load to meet requirements, record the adjustments on the Certificate of Compliance and the Weekly Concrete Report. Retest the load and record the adjusted test results. Make sure the next load is tested before it gets into the work.

If batching adjustments are made at the plant, test the adjusted load, before it gets into the work. Continue to test the concrete when test results are inconsistent or marginal.

The first load of concrete for any pour must have passing air content and slump results, prior to placing.

Material not meeting requirements shall not knowingly be placed in the work. If failing concrete inadvertently gets placed in the work, review either the MnDOT Standard Specifications for Construction or contact the Concrete Engineering Unit for monetary deductions recommendations.

It is recommended that the Agency representative continually monitor the progress of all concrete pours in the field and review Certificates of Compliances. It is not a recommended practice to only perform minimum testing requirements and leave the pour.

Should circumstances arise on a project which makes the testing rate impractical, contact the Concrete Engineering Unit.

DEFINITIONS				
	Description	Sample Location Determined By	Sample Taken By	Sample Tested By
QC	Quality Control Testing performed by Contractor. Also known as Process Control Testing.	Contractor	Contractor	Contractor
QA	Quality Assurance Testing performed by the Agency. This test is performed on a companion sample to the Contractor's QC sample.	Contractor	Contractor	Agency
Verification	A sample to assure compliance of the Contractor's Quality Control program. The results shall be included as part of the QA Testing Program.	Agency	Agency	Agency
Verification Companion	A companion sample to the Agency's Verification sample provided to the Contractor. The Contractor <u>is required</u> to test this sample.	Agency	Agency	Contractor
IAST	The <u>I</u> ndependent <u>A</u> ssurance <u>S</u> ampling and <u>T</u> esting assures testers are sampling and testing properly and that equipment is calibrated correctly.	Agency	Contractor or Agency	Contractor or Agency

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Plant Batching Materials

Remarks:

- (1) All materials must come from certified or qualified sources. All certified sources must state so on the delivery invoice.
- (2) The most current list of certified/approved sources can be found at www.dot.state.mn.us/products.

Sample Sizes:

Cementitious: 5 lb. (2 kg)

Admixture: 1/2 pt. (0.25 L) Producer obtains samples from dispensing tubes. Store samples in a plastic container.

Water: 1 gal (3.5 L) Store sample in a clean glass or plastic container.

Pay Item No.	Material	Spec. No.	Minimum Required Sampling Rate for Laboratory Testing	Form No.
2301 2302	Portland Cement	3101	For certified ready-mix and concrete paving: 1 sample when the plant is certified.	24300 ID Card Cement Samples
2401 2405	Slag	3102	Take an additional sample:	
2411 2412	Blended Cement	3103	1) At 6 months, if producing Agency concrete, 2) If the plant changes sources, or 3) As the Contract requires.	24308 ID Card Fly Ash Samples
2422 2452 2461	Fly Ash	3115	For precast concrete: 1 sample every 3 months during Agency production	
2506 2511 2514 2519			The Producer obtains and stores the sample in a sealed container provided by the Agency, and includes the supplier's delivery invoice from which the sample is obtained.	
2521			Take additional samples as directed by the Concrete Engineer	
2531 2533 2545 2550 2554 2557 2564 2565	Admixtures (Accelerating, Retarding, Water-Reducing, Air-Entraining, etc.)	3113	For all concrete: 1 sample when the plant is certified. Take additional samples: 1) At 3 month intervals during Agency production, 2) If the plant changes sources, or 3) As the Contract requires. The Producer obtains and stores the sample in a sealed container provided by the Agency. Take additional samples as directed by the Concrete Engineer	
	Water	3906	1 sample from any questionable source	2410 Sample ID Card

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Certified Ready-Mix - Concrete Plant Production

Remarks:

- (1) Mix design is provided by MnDOT unless otherwise specified in the Contract.
- (2) All gradation and quality tests require companion samples. Samples taken at location identified on Contact Report located at plant.
- (3) Perform Quality testing as directed by the Concrete Engineer.
- (4) Record all gradation weights in metric.

****Use Certified Ready-Mix - Concrete Plant Production testing rates schedule when:**

- a) The entire concrete paving project is < 3,500 cu. yd. (2,900 m³)
- b) When a secondary plant is used to provide minor work.

Minimum Sample Sizes:

Gradation Test:

(Companion Required, Double Sample Size)

3/4" Plus, #4 (+19 mm)	25 lb. (12 kg)
3/4" Minus, #67 (-19 mm)	10 lb. (5 kg)
#7	6 lb. (2.5 kg)
#89, Sand	1.1 lb. (500 g)

Moisture Test:

Coarse Aggregate	2000 g
Fine Aggregate	500 g

Quality Sample Size for Lab Submittal:

(Companion Required, Double Sample Size)

3/4" Plus, #4 (+19 mm)	50 lb. (24 kg)
3/4" Minus, #67, #7 (-19 mm)	30 lb. (15 kg)
#89, Fine Aggregate	30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2301**	Gradation Testing (QC/QA) (5-694.145 and 5-694.148)	2461	When over 20 yd ³ (m ³) of Agency concrete produced per week: Coarse and Fine: 1 per week or 1 per 400 yd ³ (m ³), whichever is greater If Agency production is 3 or more days per week, a minimum of one additional gradation sampled and tested on or after the third day is required per week. Washing the fine aggregate gradation (QC) sample is not required when the result on the -75µm (#200) sieve of the unwashed sample is less than 1.0%, Hold QA (QC companion) samples until they are picked up by the Agency monitor. Discard after 14 calendar days if not picked up. For Contractor Mix Designs utilizing an approved JMF and all Bridge Deck concrete mixes: Passing aggregate gradations are required prior to the start of concrete pours. Performing testing on representative material at the end of the most recent day of production is allowed.	None	21763 Concrete Aggregate Worksheet (QC/QA) 2449 Weekly Concrete Aggregate Report 21765 Concrete Aggregate Worksheet JMF (QC/QA)
2302					
2401					
2411					
2452					
2461					
2506					
2511					
2514					
2519					
2521					
2531					
2533					
2545					
2550					
2554					
2557					
2564					
2565					

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Certified Ready-Mix - Concrete Plant Production (cont.)					
Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2301** 2302 2401 2411 2452 2461 2506 2511 2514 2519 2521 2531 2533	Gradation Testing (Verification/ Verification Companion) (5-694.145 and 5-694.148)	2461 3126 3137	Test the Verification Companion sample. Complete on the day the sample was taken. Wash all fine aggregate Verification Companion samples.	Coarse and Fine: 1 Verification sample per week when Agency production is 1 or 2 days per week. 2 Verification samples per week when Agency production is 3 or more days per week. For small quantities: When less than 25 yd³ (m³) of Agency concrete is produced per week , Verification samples are not required Include verification companion results on Sample ID Card.	2449 Weekly Concrete Aggregate Report 24143 Weekly Certified Ready-Mix Plant Report (Verification)
2545 2550 2554 2557 2564 2565	Quality Testing <u>including</u> Coarse Aggregate Percent Passing - #200 (-75µm) (5-694.146)	3126 3137	Test at Contractor's Discretion	1 test each fraction per month For all bridge deck concrete poured during the month: If the monthly quality was not tested for 3137.2.D.2, take 1 additional quality sample for each coarse aggregate fraction and test for 3137.2.D.2. Identify quality samples with a "Q" on the Sample ID Card and the Quality companion sample. Write 3137.2.D.2 on bridge deck concrete Sample ID Cards.	2410 Sample ID Card
	Aggregate Moisture Testing (QC) (5-694.142)	2461	When over 20 yd³ (m³) of Agency concrete produced per day: Coarse and Fine: 1 completed every 4 hours. Complete the initial moisture content and adjust the batch water prior to the start of concrete production each day. If weather conditions allow, performing moisture testing on representative material at the end of production the prior evening is allowed. In this event, the four-hour rate will commence with the first pour of the day, regardless if it is placed in Agency or private work.	None	2152 Concrete Batching Report

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production

Remarks:

- (1) Mix Design is Contractor's responsibility with review by MnDOT unless otherwise specified in the Contract.
- (2) **Use Certified Ready-Mix - Concrete Plant Production testing rates schedule when:**
 - a) The entire concrete paving project is < 3,500 cu. yd. (2,900 m³)
 - b) When a secondary plant is used to provide minor work.
- (3) When w/c incentives apply according to 2301:
 - a) Contractor QC Technician and Agency Plant Monitor are required to be present during the entire pour. **If w/c incentives do not apply, the Agency Plant Monitor shall monitor as necessary to ensure compliance with the requirements of the Contract.**
 - b) A certified ready-mix plant shall be **dedicated (provides concrete only to the concrete paving project)**.
- (4) All gradation samples shall be taken in the presence of the Agency, unless otherwise authorized by the Engineer. All samples shall be taken off the belt leading to the weigh hopper unless otherwise approved by the Engineer. All gradation and quality tests require companion samples.
- (5) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:	Moisture Test:	Quality Sample Size for Lab Submittal:	75µm (#200) Coarse Aggregate Sample Size
(Companion Required, Double Sample Size)		(Companion Required, Double Sample Size)	
3/4" Plus, #4 (+19 mm) 25 lb. (12 kg)	Coarse Aggregate 2000 g	3/4" Plus, #4 (+19 mm) 50 lb. (24 kg)	3/4" Plus, #4 (+19 mm) 10 lb. (5000 g)
3/4" Minus, #67 (-19 mm) 10 lb. (5 kg)	Fine Aggregate 500 g	3/4" Minus, #67, #7 (-19 mm) 30 lb. (15 kg)	3/4" Minus, #67, #7 (-19 mm) 6 lb. (2500 g)
#7 6 lb. (2.5 kg)		#89 Fine Aggregate 30 lb. (15 kg)	
#89, Sand 1.1 lb. (500 g)			

Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing		Agency Testing		Form No.
2301	Gradation Testing (QC/QA) (5-694.145 and 5-694.148)	3126 3137	<u>For a concrete paving batch plant:</u>	<u>For a certified ready-mix plant:</u>	Test the first 4 QA samples of production each time the Contractor mobilizes the plant in a new calendar year or changes aggregate sources.		21764 Concrete Aggregate Worksheet JMF Well-graded Concrete Aggregate Worksheet
			<u>When over 250 yd³ (m³) is produced per day:</u> 1 per 1500 yd ³ (m ³) or completed 1 per ½ day, whichever results in the higher sampling rate.	<u>When over 20 yd³ (m³) is produced per day:</u> 1 per 400 yd ³ (m ³) or completed every 4 hours, whichever results in the higher sampling rate.	<u>For a concrete paving batch plant:</u> 1 per day on randomly selected samples thereafter.	<u>For a certified ready-mix plant:</u> 1 per 1000 yd ³ (m ³) or 1 per week, whichever results in higher sampling rate on randomly selected samples thereafter.	
			Performing testing on representative material at the end of the most recent day of production is allowed. If well-graded aggregate incentives apply: Use the Contractor's gradation results for well-graded aggregate incentive calculations as verified by Agency testing		Identify the gradation samples with "QA Gradation" on the Sample ID Card and include the JMF Number and the QC Gradation results. If Coarse Aggregate Quality Incentive/Disincentives apply: The Agency may also use the QA gradation sample for the Coarse Aggregate Quality incentive/disincentive testing. In this case, notify the Producer/Contractor to double the QC/QA gradation sample size.		

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production (cont.)							
Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing		Agency Testing		Form No.
2301	Coarse Aggregate Percent Passing - #200 (-75µm) (QC/QA) (5-694.146)	3137	Test the first sample and then at least 1 of the next 3 samples on the first day of production and each time the Contractor mobilizes the plant, changes aggregate sources, or the cleanliness of the coarse aggregate is in question.		<p><u>For a concrete paving batch plant:</u></p> <p>1 randomly selected sample on the first day of production and each time the Contractor mobilizes the plant, changes aggregate sources, or the cleanliness of the coarse aggregate is in question.</p> <p>1 test per week thereafter</p> <p>Test these samples at the plant.</p>	<p><u>For a certified ready-mix plant:</u></p> <p>1 randomly selected sample on the first day of production and each time the Contractor mobilizes the plant, changes aggregate sources, or the cleanliness of the coarse aggregate is in question.</p> <p>1 per 1000 yd³ (m³) or 1 per week, whichever results in the higher sampling rate on randomly selected samples thereafter.</p>	21764 Concrete Aggregate Worksheet JMF - Paving
			1 test per day thereafter				
			Test these samples at the plant.				
Aggregate Moisture Testing (QC/Verification) (5-694.142)			<p><u>For a concrete paving batch plant:</u></p> <p>If w/c incentives do not apply: 1 per 1000 yd³ (m³) or completed every 4 hours, whichever results in the higher sampling rate.</p>	<p><u>For a certified ready-mix plant:</u></p> <p>If w/c incentives do not apply: 1 completed every 4 hours.</p>	<p><u>For a concrete paving batch plant:</u></p> <p>If w/c incentives apply: 1 per 1000 yd³ (m³) or completed every 4 hours, whichever results in the higher sampling rate. Take initial samples for aggregate moisture testing within the first 250 yd³ (m³).</p>	<p><u>For a certified ready-mix plant:</u></p> <p>If w/c incentives apply: 1 per 200 yd³ (m³) or completed every 4 hours, whichever results in the higher sampling rate. Take initial samples for aggregate moisture testing within the first 100 yd³ (m³).</p>	Concrete W/C Ratio Calculation Worksheet
			Complete the initial moisture content and adjust the batch water prior to the start of concrete production each day.		<p>If w/c incentives apply: Use aggregate moisture results for determining the water content to calculate the w/c ratio incentive/disincentive.</p> <p>Do not leave samples unattended.</p>		
			If weather conditions allow, performing moisture testing on representative material at the end of production the prior evening is allowed.				

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production (cont.)							
Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.		
2301	Water Content Verification Testing (Microwave Oven Verification) (5-694.532)	2301	Obtain the plastic concrete sample at the plant.	<p>If w/c incentives apply: Microwave oven verification testing to verify the w/c ratio is completed in conjunction with Agency aggregate moisture testing.</p> <p>Do not leave samples unattended.</p> <table border="1"> <tr> <td> <p><u>For a concrete paving batch plant:</u></p> <p>Take initial sample for microwave oven verification testing within the first 250 yd³ (m³).</p> <p>At least one additional verification test should be taken if more than 1,000 yd³ (m³) is produced in a day.</p> </td> <td> <p><u>For a certified ready-mix plant:</u></p> <p>Take initial sample for microwave oven verification testing within the first 100 yd³ (m³).</p> <p>At least one additional verification test should be taken if more than 400 yd³ (m³) is produced in a day.</p> </td> </tr> </table>	<p><u>For a concrete paving batch plant:</u></p> <p>Take initial sample for microwave oven verification testing within the first 250 yd³ (m³).</p> <p>At least one additional verification test should be taken if more than 1,000 yd³ (m³) is produced in a day.</p>	<p><u>For a certified ready-mix plant:</u></p> <p>Take initial sample for microwave oven verification testing within the first 100 yd³ (m³).</p> <p>At least one additional verification test should be taken if more than 400 yd³ (m³) is produced in a day.</p>	Concrete W/C Ratio Calculation Worksheet
	<p><u>For a concrete paving batch plant:</u></p> <p>Take initial sample for microwave oven verification testing within the first 250 yd³ (m³).</p> <p>At least one additional verification test should be taken if more than 1,000 yd³ (m³) is produced in a day.</p>	<p><u>For a certified ready-mix plant:</u></p> <p>Take initial sample for microwave oven verification testing within the first 100 yd³ (m³).</p> <p>At least one additional verification test should be taken if more than 400 yd³ (m³) is produced in a day.</p>					
	Unit Weight (QC) (5-694.542)		Test one load of concrete per day at the plant.	None			
Air Content for Type 3 Concrete (QC) (5-694.541)	2301 2461	Test the first load of concrete at the plant.	None				

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production (cont.)					
Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.
2301	Quality Testing including Coarse Aggregate Percent Passing - #200 (-75µm)	3126 3137	<p>Prior to concrete production: Test the Agency's pre-production sample at the Contractor's discretion</p> <p>During concrete production: Test the -#200 (-75µm) on the Quality companion sample the day it was sampled.</p> <p>All other testing is at the Contractor's discretion</p>	<p>Prior to concrete production for the primary concrete plant: Obtain pre-production samples for quality testing at least 16 hours prior to concrete production. Samples may be taken from the stockpile and the -#200 (-75µm) test may be performed at the lab instead of at the plant at the discretion of the Engineer. If the Entire Project is < 3,500 cu. yd. (2,900 m³), pre-production sampling is not required.</p> <p>During concrete production: 1 randomly selected test each fraction every 20,000 yd³ (m³) of production.</p> <p>Split the Quality sample 4 ways:</p> <ol style="list-style-type: none"> 1) Provide 2 quarters of the sample to the Producer/Contractor. 2) Test the -#200 (-75µm) on the quality sample <u>at the plant</u> the day it was sampled. 3) Submit the remaining sample to the lab for quality testing including testing on the -#200 (-75µm) sieve. <p>Identify quality samples with a "Q" and record the QC and QA -#200 (-75µm) test results on the Sample ID Card.</p> <p>Identify the Quality Companion samples with a "Q".</p> <p>See additional requirements for first sand quality sample under ASR Testing.</p>	2410 Sample ID Card
2301	Alkali Silica Reactivity (ASR) Testing	2301	None	<p>1 per paving project per sand source</p> <p>Provide one 5 lb. sample of:</p> <ol style="list-style-type: none"> 1) cement 2) supplementary cementitious material (fly ash or slag), and 3) sand. <p>Write "Project Specific ASR Testing" on all 3 Sample ID cards.</p> <p>ASR Testing is not required if the entire project is <3,500 cu. yd. (2,900 m³).</p>	2410 Sample ID Card 24300 ID Card Cement Samples 24308 ID Card Fly Ash Samples

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Pavement - Concrete Plant Production (cont.)						
Pay Item No.	Test Type	Spec. No.	Producer/Contractor Testing	Agency Testing	Form No.	
2301	Coarse Aggregate Quality Testing for Incentive/Disincentive	3137	Test at Contractor's discretion	<p>If coarse aggregate quality incentives apply: Test the Class B aggregates for % absorption and Class C aggregates for % carbonate including any other tests necessary to make those determinations.</p> <p>Sample the 2 largest fractions in accordance with the following table and 2301:</p>	2410 Sample ID Card Coarse Aggregate Quality Incentive/Disincentive Worksheet	
				Coarse Aggregate Quality Incentive/Disincentive Sampling Rates		
				Plan Concrete cu. yd. [cu. m]		Samples per fraction (n)
				3,500 – 7,500 [2,900 – 6,250]		3
				7,501 – 10,000 [6,251 – 8,500]		5
				10,001 – 25,000 [8,501 – 21,000]		10
				25,001 – 50,000 [21,001 – 42,000]		15
				> 50,000 [42,000]		20
				Identify incentive samples on the Sample ID Card with "I/D"		

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Materials (Refer to Metallic Materials and Metal Products for sampling requirements for concrete reinforcement.)

Sample Sizes:

Joint Materials:

Hot Poured Elastomeric:	5 lb. (2.26 kg)	Take samples from application wand, store in steel (1 gal) container.	Preformed Elastomeric:	6 ft. (2 m)
Silicone Joint Sealer:	1 pt. (0.5 L)	Store sample in steel container.	Preformed:	2 ft ² (0.25 m ²)

Curing Materials:

Burlap:	1 yd ² (m ²)	
Paper and Plastic:	2 ft ² (0.25 m ²)	
Membrane Compound	1 qt. (1 L)	If sampling is required, materials must be thoroughly stirred or agitated immediately prior to taking sample. Store sample in steel container and cover immediately.

Pay Item No.	Material	Spec. No.	Minimum Required Field Sampling Rate	Form No.
2301 2302 2401 2411 2514 2521 2531	Preformed	3702	Visual Inspection	2410 Sample ID Card
2301 2302 2401	Preformed Elastomeric Type	3721	1 per lot	
	Silicone Joint Sealer	3722	Only joint materials from qualified sources are allowed. The most current lists can be found at www.dot.state.mn.us/products	
	Hot Poured Elastomeric Type	3723 3725		
2301 2302 2401 2411 2514 2520 2521 2531 2533	Burlap	3751	Visual Inspection	
	Paper	3752	Visual Inspection - Must be white opaque	
	Membrane Curing Compound	3754 3754AMS 3755	Visual Inspection – Use only Pre-Approved Curing Compounds. Refer to the approved products list of curing compounds for pre-approved lots at http://www.mrrapps.dot.state.mn.us/CuringCompoundProducts/curingcompounds.aspx	
	Plastic	3756	Visual Inspection -Must be white opaque and free from holes. A Certificate of Compliance shall be submitted to the Project Engineer from the Manufacturer certifying that the plastic complies with AASHTO M171.	

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)**Concrete Field Testing –General Concrete Grades F, G, M, P, and R****Sampling Locations for Air, Slump, Temperature and Cylinder Testing**

(1) First load each day per mix - Take sample after discharging approximately $\frac{1}{4}$ yd³, stop further discharge until both slump and air content test are completed.

(2) Subsequent tests - Sample from the middle portion of the load.

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302 2452 2461 2506 2511 2514 2520 2521 2531 2533 2545 2550 2554 2557 2564 2565	Air Content for Type 3 Concrete (Verification) (5-694.541)	2461		1 per 100 yd ³ (m ³) Test first load each day per mix Test when adjustments are made to the m	2448 Weekly Concrete Report
	Slump (Verification) (5-694.531)	2461		Test first load each day per mix, then test as necessary to verify passing slump No slump testing required for slipform placement	
	Air and Concrete Temperature (5-694.550)	2461	Record temperature each time air content, slump, or strength test specimen is performed/fabricated.	Record temperature each time air content, slump, or strength test specimen is performed/fabricated.	
	Compressive Strength (Verification) (5-694.511)	2461	Any additional control cylinders are the responsibility of the Contractor. MnDOT standard cylinder mold size is 4 x 8 inch (100 x 200 mm). If aggregate has a maximum size greater than 1-1/4 inch (31.5 mm), use 6 x 12 inch (150 x 300 mm) molds.	1 set of 3 cylinders per 300 yd ³ (m ³) MnDOT will break 3 cylinders at 28-days MnDOT will cast up to three (3) control cylinders. MnDOT standard cylinder mold size is 4 x 8 inch (100 x 200 mm). If aggregate has a maximum size greater than 1-1/4 inch (31.5 mm), use 6 x 12 inch (150 x 300 mm) molds for the 28-day strengths.	2409 ID Card Concrete Test Cylinder When submitting samples, record all field test results and Batch Ticket Number on the Cylinder ID Card.

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Bridge Concrete Grades B, S, and Y					
Sampling Locations for Air, Slump, Temperature and Cylinder Testing					
(1) First load each day per mix - Take sample after discharging approximately ¼ yd ³ , stop further discharge until both slump and air content test are completed.					
(2) Subsequent tests - Sample from the middle portion of the load.					
Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2401 2406 2411 2461	Air Content for Type 3 Concrete (Verification) (5-694.541)	2461		1 per 100 yd ³ (m ³) Test first load each day per mix Test when adjustments are made to the m	2448 Weekly Concrete Report
	Slump (Verification) (5-694.531)	2461		1 per 100 yd ³ (m ³) Test first load each day per mix Test as necessary to verify passing slump No slump testing required for slipform placement	
	Air and Concrete Temperature (5-694.550)	2461	Record temperature each time air content, slump, or strength test specimen is performed/fabricated.	Record temperature each time air content, slump, or strength test specimen is performed/fabricated.	
	Compressive Strength (Verification) (5-694.511)	2461	Any additional control cylinders are the responsibility of the Contractor. MnDOT standard cylinder mold size is 4 x 8 inch (100 x 200 mm). If aggregate has a maximum size greater than 1-1/4 inch (31.5 mm), use 6 x 12 inch (150 x 300 mm) molds.	1 set of 3 cylinders for 100 yd ³ (m ³), then 1 set of 3 cylinders per 300 yd ³ (m ³) thereafter MnDOT will break 3 cylinders at 28-days MnDOT will cast up to three (3) control cylinders. MnDOT standard cylinder mold size is 4 x 8 inch (100 x 200 mm). If aggregate has a maximum size greater than 1-1/4 inch (31.5 mm), use 1 set of 2 (6 x 12 inch (150 x 300 mm) molds) in lieu of the 1 set of 3 - 4 x 8 cylinders for the 28-day strengths.	2409 ID Card Concrete Test Cylinder When submitting samples, record all field test results and Batch Ticket Number on the Cylinder ID Card.
Concrete Field Testing – Cellular Concrete					
Pay Item No.	Test Type	Spec. No.	Agency Testing		Form No.
2519	Compressive Strength (Verification) (5-694.511)	2461 2519	1 set of 4 cylinders (28-day) per day 4 x 8 inch (100 x 200 mm) cylinders shall be filled in two equal lifts, do not rod the concrete, lightly tap the sides, cover and move to area with minimal or no vibration. Do not disturb for 24 hours.		2409 ID Card Concrete Test Cylinder

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement					
Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2301	Air Content Before Consolidation for Type 3 Concrete (QC/QA) (5-694.541)	2301 2461	1 per 300 yd ³ (m ³) or 1 per hour, whichever results in the lower testing rate is less Test first load each day per mix	1 correlation air test per day	2448 Weekly Concrete Report
	Air Content After Consolidation for Type 3 Concrete (QC/QA) (5-694.541)	2301 2461	Test 1 air content per ½ day of slip form paving to establish an air loss correction factor (ACF). See Special Provisions for additional information.	1 air test per day	
	Slump (QC/QA) (5-694.531)	2461	For fixed form placement: 1 per 300 yd ³ (m ³) and as directed by the Engineer Test first load each day per mix For slipform placement: No slump testing is required	For fixed form placement: 1 slump test per day For slipform placement: No slump testing is required	
	Concrete Temperature (QC/QA) (5-694.550)	2461	Record temperature each time air content, slump or strength test specimen is performed/fabricated by the Contractor.	Record temperature each time air content, slump or strength test specimen is performed/fabricated by the Agency.	
	Flexural Strength (QC) (5-694.521)	2301 2461	1 beam (28-day) per day - Make additional control beams as necessary. - Control beams shall be made <u>within the last hour</u> of concrete poured each day. Fabricate beams, deliver beams to curing site, and clean beam boxes. Cylinders may be substituted for beams at the discretion of the Engineer	Supply beam boxes, cure, and test beams. MnDOT standard beam box size is 6" x 6" x 20" unless other sizes or types are approved by the Concrete Engineer.	2162 Concrete Test Beam Data
Concrete Pavement Texture (QC)	2301	1 per 1000 linear feet per lane of concrete pavement at locations determined by the Agency. All adjoining lanes shall be tested at the same location if paved at the same time. The Contractor supplies all materials necessary to perform the required testing.	Determine texture testing locations using random numbers.	Probing Coring Texture and MIT-SCAN T2 Report	

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement (cont.)					
Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2301	Thickness (QC/Verification)	2301	The Contractor drills concrete cores at locations determined by the Agency. The Contractor probes the plastic concrete at locations determined by the Agency.	Determine probing and coring locations using random numbers. Initial pavement at core locations and re-initial the sides of specimens after coring to clearly verify their authenticity.	24327 Probing Coring Texture and MIT-SCAN T2 Report
2301	Surface Smoothness	2399	Contractor provides MnDOT certified inertial profiler results for the entire project as required by the Contract.	None	Concrete Profile Summary Worksheet

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing - Low Slump Concrete for Bridge Deck Overlays

Remarks:

- (1) Mix design is provided by MnDOT on the back of the Form 21412 Weekly Report of “Low Slump Concrete” unless otherwise specified in the Contract.
- (2) All field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
- (3) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:

(Companion Required, Double Sample Size)

#7 6 lb. (2.5 kg)
Sand 1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:

(Companion Required, Double Sample Size)

Coarse Aggregate 50 lb. (24 kg)
Fine Aggregate 30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2404	Gradation and Quality Testing including Coarse Aggregate Percent Passing - #200 (-75µm) (QC/Verification) (5-694.145, 5-694.146 and 5-694.148))	3126 3137	Prior to concrete production, the Contractor shall provide the Agency with: <ul style="list-style-type: none"> • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source No quality test results are required. Test companion samples at Contractor’s discretion.	1 per aggregate fraction prior to concrete production and each time aggregate is delivered to the site. Identify quality samples with a “Q” on the Sample ID Card and the Quality companion sample.	2410 Sample ID Card 21412 Weekly Report of “Low Slump Concrete”
	Air Content for Type 3 Concrete (Verification) (5-694.541)	2461	None	1 per 15 yd ³ (m ³) Test at beginning of pour each day	
	Slump (Verification) (5-694.531)	2461	None	1 per 15 yd ³ (m ³) Test at beginning of pour each day For concrete from a concrete-mobile, allow mix to hydrate 4 to 5 minutes before slump test to assure all cement is saturated.	
	Compressive Strength (Verification) (5-694.511)	2461	None	1 cylinder (28-day) per 30 yd ³ (m ³)	2409 ID Card Concrete Test Cylinder

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement Repair (CPR) for 3U18

Remarks:

- (1) Mix design is provided in accordance with MnDOT Spec 3105 unless otherwise specified in the Contract.
- (2) Testing rates apply to concrete that is produced on site.
- (3) All field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
- (4) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:

(Companion Required, Double Sample Size)

3/4" Minus, #67 (-19 mm) 10 lb. (5 kg)
 #7 6 lb. (2.5 kg)
 #89, Sand 1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:

(Companion Required, Double Sample Size)

Fine Aggregate 30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Gradation and (QC/Verification) (5-694.145 and 5-694.148)	3126 3137	Prior to concrete production, the Contractor shall provide the Agency with: <ul style="list-style-type: none"> • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source. Test companion samples at Contractor's discretion.	1 per aggregate fraction prior to concrete production and each time aggregate is delivered to the site.	2410 Sample ID Card
	Quality Testing <u>including</u> Coarse Aggregate Percent Passing - #200 (-75µm) (5-694.146)	3126 3137	No quality test results are required.	1 test each aggregate fraction per source The Agency may use the gradation results for the Quality Samples as a substitute for 1 required field gradation. Identify quality samples with a "Q" on the Sample ID Card and the Quality companion sample.	2410 Sample ID Card
	Air Content for Type 3 Concrete (Verification) (5-694.541)	2461	None	1 per 15 yd ³ (m ³) Test at beginning of pour each day.	CPR1 Field Testing Report for CPR

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Concrete Pavement Repair (CPR) for 3U18 (cont.)

Remarks:

- (1) Mix design is provided in accordance with MnDOT Spec 3105 unless otherwise specified in the Contract.
- (2) Testing rates apply to concrete that is produced on site.
- (3) All field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
- (4) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:

(Companion Required, Double Sample Size)

3/4" Minus, #67 (-19 mm) 10 lb. (5 kg)
 #7 6 lb. (2.5 kg)
 #89, Sand 1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:

(Companion Required, Double Sample Size)

Fine Aggregate 30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Slump (Verification) (5-694.531)	2461	None	1 per 15 yd ³ (m ³) Test at beginning of pour each day. Allow mix to hydrate 5 minutes before slump test to assure all cement is saturated.	
	Compressive Strength (Verification) (5-694.511)	2461	None	1 cylinder (28-day) per 30 yd ³ (m ³)	2409 ID Card Concrete Test Cylinder

IV. Concrete Construction Items (cont.) (www.dot.state.mn.us/materials/concrete.html)

Concrete Field Testing – Dowel Bar Retrofit (DBR)

Remarks:

- (1) Mix Design is Contractor's responsibility with review by MnDOT unless otherwise specified in the Contract.
- (2) Testing rates apply to concrete that is produced on site. (Not from a certified ready-mix plant.)
- (3) All field gradation samples shall be taken by the Agency. All gradation and quality tests require companion samples.
- (4) Perform Quality testing as directed by the Concrete Engineer.

Minimum Sample Sizes:

Gradation Test:

(Companion Required, Double Sample Size)

#89, Sand 1.1 lb. (500 g)

Quality Sample Size for Lab Submittal:

(Companion Required, Double Sample Size)

Coarse Aggregate 50 lb. (24 kg)
 Fine Aggregate 30 lb. (15 kg)

Pay Item No.	Test Type	Spec. No.	Contractor Testing	Agency Testing	Form No.
2302	Gradation and Quality Testing <u>including</u> Coarse Aggregate Percent Passing - #200 (-75µm) (QC/Verification) (5-694.145, 5-694.146) and 5-694.148)	3126 3137	Prior to concrete production, the Contractor shall provide the Agency with: <ul style="list-style-type: none"> • Aggregate pit numbers • 1 passing gradation result per aggregate fraction per source. No quality test results are required. Test companion samples at Contractor's discretion.	1 per aggregate fraction prior to concrete production and each time aggregate is delivered to the site. Identify quality samples with a "Q" on the Sample ID Card and the Quality companion sample.	2410 Sample ID Card
	Dowel Bar Retrofit Material Compressive Strength (Verification) (5-694.511)	2301 2302	None	During the pre-production test operations: 1 set of 3 cylinders tested at a rate as directed by the Engineer. Testing may need to be repeated if any problems with the dowel bar retrofit material are encountered. First day of production: 1 set of 3 cylinders tested at a rate as directed by the Concrete Engineer. After the first day of production: 1 cylinder per day during production tested at rate determined by Engineer to determine opening to traffic strength.	2409 ID Card Concrete Test Cylinder

V. Landscaping and Erosion Control Items

Pay Item No	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2571 2574 2575	1. Topsoil borrow ^a	3877.2	None	From each source: One composite sample for the first 765 m ³ (1,000 Cu yd.). Small quantities under 75 m ³ (100 Cu yd.), no sample required.	10 kg (20 lb.)	^a Certificate of Compliance showing meets specifications. Testing for topsoil for fertility by Contractor at a Certified Soils Lab.
2571 2575 2577	2. Plant Stock & Landscape Materials ^b	3861 and 2571.2A1	Field Inspection at Job Site, submit itemized report for each shipment ^c .			^b Preliminary inspection will not be done at the source. Material must be in accordance with the Inspection and Contract Administration Guidelines for MnDOT Landscape Projects. ^c Utilize "Inspection and Contract Administration Guidelines for MnDOT Landscape Projects" to determine and measure minimum and maximum criteria thresholds. The following documentation must be provided: 1. A MnDOT Certificate of Compliance for Plant Stock, Landscape Materials, and Equipment 2. A valid copy of a nursery stock (dealer or grower) certificate registered with the MN Dept. of Agric. And/or a current nursery certificate/license from a state or provincial Dept. of Agric. for each plant stock supplier. 3. A copy of the most recent Certificate of Nursery Inspection for each plant stock supplier. 4. Plant material shipped from out-of-state nursery vendors subject to pest quarantines must be accompanied by documentation certifying all plants shipped are free of regulated pests. 5. Bills of lading (shipping documents) for all materials delivered. 6. Invoices for all materials to be used. 7. Each bundle, bale, or individual plant must be legibly and securely labeled with the name and size of each species or variety.
2502 2573 2575 2577	3. Erosion Control Blanket ^d	3885	Visual Inspection	Random - See Footnote ^d		^d Check Web site for list of approved products.. www.dot.state.mn.us/products

V. Landscaping and Erosion Control Items (cont.)

Pay Item No	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2573 2577	4. Erosion Control Netting ^e	3885	Visual Inspection			^e Check Web site for list of approved products. www.dot.state.mn.us/products
2573	5. Silt Fence ^f	3886	Check Product Label. Obtain Certificate of Compliance with MARV values			^f Check Approved/Qualified Products List (A/QPL) of accepted geotextiles www.dot.state.mn.us/products
2573	6. Flotation Silt Curtain ^g	3887	Visual Inspection			^g Accepted, based on manufacturers' certification of compliance. Check weight of fabric.
2573 2575	7. Erosion Stabilization Mat ^h	3885	Visual Inspection			^h Check Web site for list of approved products. www.dot.state.mn.us/products
2573	8. Sediment Control Logs	3897	Visual Inspection			Meet specifications
2573	9. Flocculants ⁱ	3898	Visual Inspection	None		ⁱ Certificate of Compliance and MSDS to the Engineer.
2571 2575	10. Fertilizer ^j	3881	Visual Inspection			^j Bagged: Inspected on the basis of guaranteed analysis. Rate based on fertility analysis of slope dressing/topsoil. Bulk: Inspector to obtain copy of invoice of blended material stating analysis. Check the type specified.
2571 2575	11. Agricultural Lime ^k	3879	One gradation test for each 180 Metric Ton (200 ton)			^k Contractor must supply amount of ENP (Equivalent Neutralizing Power) for each shipment.
2575 2577	12. Mulch Material A. Type 3 Mulch - Certified Weed Free (Certified sources only) ^l	3882	Visual Inspection, Check if from Certified Vendor by Minnesota Crop Improvement Association. Must be tagged, grain straw only.			^l Certified mulch will be indicated by label.

V. Landscaping and Erosion Control Items (cont.)

Pay Item No	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2571 2575 2577	13. Mulch Material B. Type 6 Mulch – Woodchips	3882	Visual Inspection. Obtain Certificate of Compliance.			All wood chips supplied by a supplier outside the Emerald Ash Borer quarantine area or have an Emerald Ash Borer Compliance Agreement with the MDA.
2502 2575 2577	14. Seeds A. Seeds (Certified Vendors Only) (Mixes 22-000 and 25-000 series) ^m	3876	Check for Certified Vendor tag from Minnesota Crop Improvement Association. If materials are on hand and past the twelve months, testing must be done.			^m Periodic sampling taken by Office of Environmental Services. Any moldy or insect contaminated seed must be rejected.
2502 2575 2577	14. Seeds B. Native Seed (Mixes 30-000 series) certified seed only ⁿ	3876	Check if from Certified Vendor by Minnesota Crop Improvement Association, Must be tagged. If materials are on hand and past the twelve months, testing must be done.			ⁿ Certified seed will be indicated by label on containers. Reject all moldy or insect contaminated seed. Periodic sampling taken by Office of Environmental Services.
2575	15. Sod ^o	3878	A certified tag by Minnesota Crop Improvement Association for Salt tolerant sod. Final Visual Inspection at site.			^o A Certificate of Compliance must be furnished by the producer to the Engineer for the type of sod supplied showing correct grass varieties.
2571 2575	16. Compost A. Compost Certified Source ^p	3890	Visual Inspection			^p Check Approved/Qualified Products List (A/QPL), retain Certificate of Compliance.
2571 2575	17. Compost B. Compost Non-Certified Source ^q	3890	Inspection of source 6 weeks prior to delivery.			^q Retain Certificate of Compliance, 6 weeks prior to delivery.
2575	18. Hydraulic Soil Stabilizer ^r	3884				^r Check Approved/Qualified Products List (A/QPL). Installer needs to show certificate of training.

VI. Chemical Items

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2401	Asphalt Plank	3204	Check for proper type and size as specified in plans. Lab Sample Required	1 per 1,000 plank or less of each thickness in each shipment	3 – 1 m (yd.) pieces samples from different planks	
2131	Calcium Chloride	3911	Check for listing on Qualified Products website. Lab Sample Required (see Notes)	Liquid: 1 per shipment Dry: 1 per shipment	0.5 L (1 pint) or 0.5 kg (1 lb.) in Plastic Container	Provide copy of the BOL with sample.
2131	Magnesium Chloride	3912	Check for listing on Qualified Products website. Lab Sample Required (see Notes)	1 per 40,000 L (1 per 10,000 gal.)	0.5 L (1 pint) in Plastic Container	Provide copy of the BOL with sample.
2331	Hot-Pour Crack Sealant for Crack Sealing/Filling	3719 3723 3725	Check for listing on Qualified Products website. (see Notes) Lab Sample Required	1 per lot. Take samples from application wand. Use caution when handling hot containers	2.26 kg (5 lb.) in a 1gal steel container.	Form 02415 List batch numbers and retain Certificate of Compliance.
2331	Pavement Joint Adhesive	Special Provisions	Lab Sample Required	1 per lot. Take samples from application wand. Use caution when handling hot containers	2.26 kg (5 lb.) in a 1gal steel container	
2481	Waterproofing Materials Membrane Waterproofing System	3757	Check for listing on Qualified Products website. Lab Sample Required	1 per shipment (Membrane Only)	0.1 m ² (1 Sq. Ft)	

VI. Chemical Items (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2481	Waterproofing Materials Three Ply System Asphalt Primer	3165	Verify supplied material meets ASTM D 41 Lab Sample Required	1 per shipment	0.5 L (1 pt.) in steel container	
2481	Waterproofing Materials Three Ply System Waterproofing Asphalt	3166	Verify supplied material meets ASTM D 449 Lab Sample Required	1 per shipment	0.5 L (1 pt.) in steel container	
2481	Waterproofing Materials Three Ply System Fabric	3201	Verify supplied material meets ASTM D 41 Lab Sample Required	1 per shipment	1 m ² (1 Sq. yd.)	
2582	Waterborne Latex Traffic Marking Paint.	3591	Check for listing on Qualified Products website. (see Notes) Lab Sample Required	1 per lot	0.5 L (1 pint)	Form 02415 List batch numbers and retain Certificate of Compliance.
2582	Epoxy Traffic Paint	3590	Check for listing on Qualified Products website. (see Notes) Lab Sample Required	1 Part A per lot 1 Catalyst Part B per lot	0.5 L (1 pint)	Form 02415 List batch numbers and retain Certificate of Compliance.
2582	Traffic Marking Paint	Special Provisions	Check for listing on Qualified Products website. (see Notes) Lab Sample Required	High Build Latex 1 per lot Other Two Part Markings 1 Resin Part A per lot 1 Catalyst Part B per lot	0.5 L (1 pint)	Form 02415 List batch numbers and retain Certificate of Compliance. For traffic marking paints other than Waterborne Latex and Epoxy. See Special Provision for Qualified Products List.
2564	Non-Traffic Marking Paints	3501 3532 3533 Special Provisions	Check for proper material as specified in plans. (see Notes) Lab Sample Required	1 per lot	0.5 L (1 pint)	Form 02415 List batch numbers.

VI. Chemical Items (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2478	Bridge Structural Steel Paint	3520	Check for listing on Approved Products website. (see Notes) No Lab Sample Required			Form 02415 List batch numbers and provide Certificate of Compliance with each batch/lot for each component of the paint system to the Engineer. Confirm that the contractor provided a color "Draw Down" sample to the MnDOT Chemical Laboratory for verification of the finish coat color.
	Exterior Masonry Paint	3584	Check for proper material as specified in plans. (see Notes) Lab Sample Required	1 per lot	0.5 L (1 pint)	Form 02415 List batch numbers.
	Noise Wall Stain	Special Provisions	Check for listing on Approved Products website. (see Notes) No Lab Sample Required	1 per lot	0.5 L (1 pint)	Form 02415 List batch numbers.
2582	Drop-on Glass Beads	3592	Check for listing on Qualified Products website. (see Notes) Lab Sample Required	1 per lot	1 L (qt.)	Form 02415 List lot numbers and retain Certificate of Compliance
2502 2581 2582	Pavement Marking Tape	3354 3355 Special Provisions	Check for listing on Qualified Products website. (see Notes) Lab Sample Required	1 per lot of each color and width	3 m (3 yds.) if 12" or less 1 m (1 yd) if greater than 12"	Form 02415 List lot numbers and retain Certificate of Compliance.

VI. Chemical Items (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2540 2563 2564 2565 2582	Signs and Markers	3352	Check for listing on Approved Products website. No Lab Sample Required	None unless material suspect		

VII. Metallic Materials and Metal Products

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2554	1. Guard Rail A. Fittings - Splicers, Bolts, etc.	3381	Visual Inspection – sample if necessary, see notes	Bolts: One Post bolt and 4 splice bolts with nuts for each 1,000 units or less.		Form 02415 or 2403 To be approved before use. Materials from H&R may be pre-sampled and tested. Call the MnDOT inspector at 218-846-3613 to see if material has been approved. For non-pre-tested, submit laboratory samples at required rate. For small quantities, lab samples are not required, but document on Form 02415 or 2403 and maintain in project file. Small Quantities: Rail Sections - 20 or less Terminals - 10 or less Post Bolts - 100 or less, Splice Bolts - 100 or less
2554	1.B.i. Non-High Tension Guard Rail Cable	3381	Visual Inspection – submit sample	1 sample from each spool	1.2 m (4 ft.)	Form 02415 or 2403 See VII.1.A.
2554	1. B.ii. High Tension Guard Rail Cable	Special Provisions	Visual Inspection – see notes	None, unless material is suspect (see note)	1.2 m (4 ft.)	Sample at the rate of 1/50,000 ft. if the strand appears damaged or suspect (Accepted as part of system)
2554	1. Guard Rail C. Structural Plate Beam	3382	Visual Inspection – see notes	One sample from one end of a section for each 200 (or portion thereof) rail sections or one sample of each 100 terminal sections	Full depth x 0.25 m (full depth x 10")	Form 02415 or 2403 See VII.1.A.
2554	D. Plate Beam Guide Posts	3382	Visual Inspection	None, unless material is suspect		Form 02415 or 2403
2554	E. High Tension Guide Posts	Spec. Provisions	Visual Inspection	None, unless material is suspect		Form 02415 or 2403 (Accepted as part of system)

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2545 2554 2564	2. Steel Sign Posts	3401	Visual Inspection & Certification from Contractor of compliance with Domestic source requirement under 1601, if applicable. Submit sample from material being installed, see notes	One post per shipment of each mass per unit length. Submit shortest full sized length of each weight, not a scrap piece.	See note	Form 02415 or 2403 Check domestic steel requirement under 1601 No Samples for project quantities less than 20
2554 2557	3. Posts for Traffic & Fence A. Steel fence posts, brace bars, and rails	3403 3406	Visual Inspection - submit sample of material being installed, see notes	One sample per 500 pieces. Submit full length for posts used in the ground (line, terminal, "C" and anchor posts), and 5' length of top rail and brace bar. Small Quantity (less than 1000 ft. on entire project): sample line post, top rail, and brace bar only.		Form 02415 or 2403 Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance and certified mill analysis in project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence B. Components: includes cup, cap, nut, bolt, end clamp, tension band, truss rod tightener, hog ring, tie wire, tension stretcher bar, truss rod, clamp, & tension wire	3376	Visual Inspection - submit sample of material being installed, see notes	1 each of cup, cap, nut, bolt, end clamp, tension bands, truss rod tightener, 12 hog rings, 6 tie wires, 1 tension stretcher bar; 1 truss rod, cut to 2-foot min. with threaded section, 3 feet of tension wire. Small quantity (less than 1000 ft. on entire project): no sample required		Form 02415 or 2403 Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence C. Gates	3379	Visual Inspection, see notes	No sample required. See notes.		Form 02415 or 2403 Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence D. Barbed Wire	3376	Visual Inspection – submit sample of material being installed, see notes	One sample per 50 rolls – see notes	1 m (3 ft.)	Form 02415 or 2403 Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for cert. form on right side of page, www.dot.state.mn.us/materials/lab.html

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2557	3. Fence E. Woven Wire Fabric	3376	Visual Inspection - submit sample of materials being installed, see notes	One full height sample per 50 rolls	1 m (3 ft.)	Form 02415 or 2403 Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for cert. form right side of page, www.dot.state.mn.us/materials/lab.html
2557	3. Fence F. Chain Link Fabric	3376	Visual Inspection - submit sample of materials being installed, see notes	One full height sample for each 5,000 ft. of fencing.	0.3 m (1 ft.)	Form 02415 or 2403 Check domestic steel requirement under 1601 Special Provision. Retain Certificate of Compliance in the project file. See link for certification form on right side of page, www.dot.state.mn.us/materials/lab.html
2402	4. Water Pipe and other Piping Materials	3364, 3365, 3366 & Special Provisions	See notes	No sample necessary		Form 02415 or 2403 Check domestic steel requirement under 1601 Special Provision. To be identified & tested if necessary prior to use. See Special Provisions.
2201 2301 2401 2405 2411 2412 2433 2452 2472 2514 2531 2533 2545 2564	5. Reinforcing Steel A. Bars – Uncoated	3301	Visual Check for Size and Grade Marking	No Field Sample Necessary		Form 02415 or 2403 For Uncoated bars - Retain Certificate of Compliance and Certified Mill Analysis in Project File.

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2201 2301 2401 2405 2411 2412 2433 2452 2472 2514 2531 2533 2545 2564	5. Reinforcing Steel B. Bars - Epoxy Coated	3301	Visual Check for Size and Grade Marking and "Inspected" tag. Inspect for damage to coating, verify repairs, if necessary. See notes.	One sample (1 bar) of each size of bar for each day's coating production	1 m (3 ft.)	Form 02415 or 2403 For Epoxy-Coated bars, steel will be tagged "Inspected" when it has been sampled and tested by MnDOT prior to shipment, and it will be tagged "Sampled" when testing has not been completed prior to shipment. If the Epoxy-Coated bars are not tagged "Sampled" or "Inspected", submit samples with copies of the , Certificate of Compliance, and Certified Mill Analysis. Retain originals of the Certificate of Compliance and Certified Mill Analysis in the project file.
2401	5. Reinforcing Steel C. Bars Stainless Steel	Special Provisions	Visual check for size and grade. Send sample bars from shipment. See note.	One sample (2 Bars) per heat per bar size	1 m (3 ft.)	Submit copies of mill test reports with samples, retain originals in project file
2401 2411 2452 2472 2564	5. Reinforcing Steel D. Spirals	3305	Submit sample, inspect for damage to coating, verify repairs, if necessary.	One per shipment	1 m (3 ft.)	Same as 5.B
2201 2301 2401 2411 2412 2472 2531	5. Reinforcing Steel E. Steel Fabric	3303	Visual inspection, see notes.	Field sample not necessary for uncoated fabric. If epoxy-coated, submit 2-ft.-square sample.		Retain Certificate of Compliance in project file. Verify material size, normally shown on metal tag on bundles of fabric. Use caliper or micrometer if there is no metal tag. If fabric is pre-bent, examine outside of bends for cracking. Do not allow cracked material to be installed.
2201 2301 2401 2411	5. Reinforcing Steel F. Dowel Bars	3302	Sample from material being used, including basket. See note.	One Dowel Bar from each shipment	Full Size Dowel Bars	For all types of dowels – Each project shall have a Certificate of Compliance from the Manufacturer certifying that all materials used in fabrication of the dowel bars and baskets comply with all applicable specifications. The Manufacturer shall maintain all records necessary for certification by project. The Certificate of Compliance shall be submitted to the Project Engineer

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2401 2405	5. Reinforcing Steel G. Prestressing or Post-Tensioning Strand	3348	If strand is installed at project site, sample from material being used.	One sample (2 strands) from each heat (see Notes)	1.8 m (6 ft.)	Submit one copy of mill certificate and one copy of the stress-strain curve representative of the lot with the samples. For most manufacturers, a heat equals a production lot, and an individual lot, pack, or reel is a subset of a heat/production lot.
2402 2506 2565	6. Drainage and Electrical Castings	3321 2471 2565	Check Approved/Qualified Products list and visual inspection at the project site. See notes.	All castings: Three tensile bars to be cast with each heat at Foundry and submitted to the lab by an approved Foundry*. See 3321.		Form 02415 or 2403 Verify source of material is listed on APL/QPL Inspect in the field and retain Form 02415 or 2403 in project file, showing name of foundry and quantity
2401 2402 2411 2433 2545 2554 2564 2565	7. Anchor Rods (Cast in Place)	3385 3391 3392	Check Approved/Qualified Products list, mill certifications, and visual inspection at the project site. Take sample if not listed on APL/QPL.	Pre-approved (see notes) or one complete anchor rod assembly including nuts and washers from each lot supplied.		Pre-approved system requires supplier to submit a sample to the Department yearly for each anchor rod grade. Test results of sample must verify compliance to product specifications.
2401 2402 2411 2433 2545 2554 2564 2565	8. Structural Fasteners, both coated and uncoated	3385 3391 3392	Visual inspection and verify material is on APL/QPL, or submit sample for verification testing if not on APL/QPL	Pre-approved (see notes) or two complete assemblies for each size, length, diameter, grade and finish, per increment of 1000 or fraction thereof		Pre-approved system requires the supplier to submit a sample yearly for each fastener size, grade and finish. Test results must verify compliance to specifications. If not on the APL/QPL, submit two complete assemblies for each size, length, grade and finish per increment of 1000 or fraction thereof of fasteners supplied for the project, including nuts and washers from each lot supplied. Obtain passing test results before installation.
2401 2411 2433 2545 2565	9. Anchorages (Drilled In)	Special Provisions, Standard Plates, Plan Sheet Details	Visual Inspection. Before installation, verify listing on APL/QPL.	Laboratory samples not required.		Note: Before installation, verify that anchorages are on the approved/qualified products list www.dot.state.mn.us/products <i>Or</i> Verify that anchorages are in accordance with the Standard Plate or the details in the Plan.

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2402	10. Structural Steel A. For Steel Bridge – Beams, Girders, Diaphragms, etc.	2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402 2405	10. Structural Steel B. For Concrete Girders- Diaphragms and sole plates	2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel C.. Expansion joints	2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel D. Steel Bearings	2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2402	10. Structural Steel E. Railing-Structural tube and ornamental	2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel F. Drainage Systems	2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2402	10. Structural Steel G. Protection Angles	2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/

VII. Metallic Materials and Metal Products (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2564	11. Overhead Sign structures	2564 2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2545	12. High Mast Lighting Structures	2545 2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/
2565	13. Monotube Signal Structures	2565 2471	Structural Metals Inspection Tag and field inspection for damage/defects	None		Structural metals products will be inspected at the plant and will be shipped with a Structural Metals Inspection Tag. An inspection confirmation report will be completed by Structural Metals Inspection staff and sent to the field personnel. Only approved suppliers are allowed to supply Structural Metals products. A list of approved suppliers can be found on the Bridge Office web site: http://www.dot.state.mn.us/bridge/

VIII. Miscellaneous Materials

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2403 2422 2452 2521 2540 2545 2554 2557 2564	1. Timber, Lumber Piling & Posts	3412 to 3471 & 3491	Visual Inspection			Form 02415 or 2403 Untreated materials shall be inspected in the field and the results reported on Form 02415 or 2403. Treated materials shall be Certified on the Invoice or Shipping Ticket. Material is inspected and stamped by an Independent Agency as per Specification 3491. Contact Laboratory for additional information.
2402 2405 2557 Many	2. Miscellaneous pieces and Hardware (Galvanized)	3392 3394		3 samples of each item per shipment. Sample critical items only. (Critical items are load bearing, structurally necessary items.)	Three of each type.	Form 02415 or 2403 Will carry "Inspected" tag if sampled and tested prior to shipment. No sample necessary if "Inspected".
2504	3. Insulation Board	3760	Visual Inspection	None		Form 02415 or 2403
2402	4. Laminated Elastomeric Bearing Pads	3741 and Special Provisions	Structural Metals Inspection Tag and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements.
2402	4. Plain Elastomeric Bearing Pads	3741 and Special Provisions	Structural Metals Inspection Tag and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements.
2402	4. Cotton Duck Bearing Pads	3741 and Special Provisions	Structural Metals Inspection Tag and field inspection for damage/defects	See Notes		See Project Special Provisions for Sampling, Testing, and Acceptance Requirements.

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2402 2422 2501 2503 2506	1. Corrugated Metal Products A. Culvert Pipe Underdrains Erosion control Structures	3225 thru 3229, 3351 and 3399	Visual Inspection: Check for good construction, workmanship, finish requirements and shipping			Form 02415 or 2403 Make certain pipe is Certified on Invoice, retain certificate of compliance and certified mill analysis in project file
2501	1. Corrugated Metal Products B. Structural Plate	3231	Visual Inspection: Invoice shall include notation that material described is in accordance with fabricator's Certificate and Guarantee			Same as 1.A
2501	1. Corrugated Metal Products C. Aluminum Structural Plate	3233				Retain certificate of compliance and certified mill analysis in project file
2503 2506	2. Clay Pipe	3251	No samples required for less than 100 pieces	1 sample per 200 pieces of each size.	Full Size Pipe	Form 02415 or 2403
2501 2503 2506	3. Concrete Pipe A. Reinforced Pipe and Arches, Precast Cattle Pass Units, and Sectional Manhole Units	3236	Field Inspection: Check for damage and defects. Check dimensions as required. Check for producer's "Certified" stamp and signature on the certification document.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5540 for additional information.		Form 02415 or 2403 For Concrete Pipe Both A & B: Product will be certified by producer, only spot checks are done by plant inspector. Make certain the invoice or certification document is signed and the product has the required markings. Maintain Form 2403 or 02415 in project records, showing source of materials and type and quantity used
2501 2503 2506	3. Concrete Pipe Fine Aggregate	3126		1 quality test per month during production for A and B above.	10 kg. (25 lb.)	
2501 2503 2506	3. Concrete Pipe Coarse Aggregate	3137		1 quality test per month during production for A and B above.	10 kg. (25 lb.)	

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2412	4. Precast/Prestressed Concrete Structures A. Reinforced Precast Box Culvert	3238	1 air test per pour (1st load), One set of cylinders per 25 cubic yards, with a minimum of two cylinders per set. Alternate cylinder acceptance systems may be allowed with the approval of the State Materials Engineer.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5540 for additional information.		Precast/prestressed Concrete Structure (beams, posts, etc.) will be inspected and stamped at plant. Field personnel are responsible for checking for plant inspector's stamp, for shipping/handling damage or defects, and dimensions. An inspection report will be completed by plant personnel and sent to the field personnel.
	Fine Aggregate	3126		1 quality test per month during production.	10 kg. (25 lb.)	
	Coarse Aggregate	3137		1 quality test per month during production.	10 kg. (25 lb.)	
2405	4. Precast/Prestressed Concrete Structures B. Precast/Prestressed Concrete Structure (beams, posts, etc.).	2405	1 air test per pour (1st load), One set of cylinders per 25 cubic yards, with a minimum of two cylinders per set, and one set per beam. Alternate cylinder acceptance systems may be allowed with the approval of the State Materials Engineer.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5540 for additional information.		Precast/prestressed Concrete Structure (beams, posts, etc.) will be inspected and stamped at plant. Field personnel are responsible for checking for plant inspector's stamp, for shipping/handling damage or defects, and dimensions. An inspection report will be completed by plant personnel and sent to the field personnel.
	Fine Aggregate	3126	Gradation: 1 per 150 m ³ (200 Cu. yd.) or fraction thereof. 1 per day of production or 3 per week, whichever is less.	1 gradation and 1 quality test per month during production from a split sample. Include producer's gradation results on sample card.	10 kg (25 lb.)	
	Coarse Aggregate	3137	Gradation: 1 per 75 m ³ (100 Cu. yd.) or fraction thereof. 1 per day of production or 3 per week, whichever is less.	1 gradation and 1 quality test per month during production from a split sample. Include producer's gradation results on sample card.	10 kg (25 lb.)	

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2506	5. Manholes and Catch Basins (Construction)	2506 3622	Field Inspection: Check for damage and defects. Check dimensions as required. Check for Producer's "Certified" stamp and signature on the certification document.	1 "companion" cylinder per month per plant during production, or cylinder testing machine, whichever is greater. Call Precast Inspection Engineer at 651-366-5540 for additional information.		Form 02415 or 2403 Product will be certified by producer or inspected, tested and stamped at source. Only spot checks are done by plant inspector. Make certain the invoice or certification document is signed and the product has the required markings. Maintain Form 2403 or 02415 in project records, showing source of materials and type and quantity used (bricks, blocks, precast, or combination).
2502	6. Drain Tile (Clay or Concrete)	3276	Visual Inspection	2 samples of each size from each source		
2502 2503	7. Thermoplastic (TP) Pipe ABS and PVC	3245	Obtain Certificate of compliance. Check for approved marking printed on pipe. Field Inspect for damage or defects.			Form 02415 or 2403 See Spec. 3245 for specific AASHTO or ASTM Pipe types are approved under this specification. If perforated, holes should be 5mm - 10 mm (3/16 - 3/8 inch) diameter, two rows for 4", and four rows for 6" diameter; approximately 75 mm (3 inches) on center.
2502	8. Corrugated Polyethylene Pipe – Single wall for edge drains, etc.	3278	Check for markings (AASHTO M 252) Certificate of Compliance. Field Inspect for damage or defects.	No Laboratory tests required		Form 02415 or 2403
2503	9. Sewer Joint Sealing Compound	3724		One per shipment	0.5 liter (1 pt.)	
2412 2501 2503	10. Preformed Plastic Sealer for Pipe	3726 Type b		One from each source	0.3 m (1 ft.)	
2412 2501 2503	11. Bituminous Mastic Joint Sealer for Pipe	3728	Visual Inspection	Sample, if questionable		

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2105	12. EPS Geofoam	Special Provisions	Visual Inspection Check for yellow aged material, uniformity and dimensions. Weigh 1'x1'x1' cut coupon to verify density every 200 m ³ (250 yd ³)			Form 02415 or 2403
2501 2503	13. Corrugated Polyethylene Pipe – Dual Wall, 12” – 48”	3247				For Specification 3247, Corrugated Polyethylene Pipe (HDPE) manufacturing facilities are required to be reviewed <u>yearly</u> and in compliance with AASHTO's National Transportation Product Evaluation Program (NTPEP) for producers of AASHTO M294 HDPE pipe. To determine if a pipe manufacturing plant is qualified, click on the following link for M294 pipe. http://data.ntpep.org/Module/PIPE/StatusReport.aspx If a plant has a compliant NTPEP audit for AASHTO M294 pipe at the time the pipe is manufactured, then the plant has met requirements. Note that a previous year's audit shall govern until NTPEP issues the next year's audit. A Certificate of Compliance shall be provided in accordance with Specification 1603.

IX. Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete (Cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2105 2411 2412 2501 2502 2511 2512	14. Geotextile Fabric and Geogrid Reinforcement	3733 and Special Provisions	<p>Inspect for damage and uniformity of texture. Rolls of both geotextile and geotextile wrapped PE Tubing must be wrapped in UV protective plastic. (Usually Black). Obtain Certificate of Compliance</p> <p>If using adhesive for seams, see Approved/Qualified Product List available at the Department's website</p>	<p>(a) 1 per project for pipe wrap or trench lining for Permeable base designs.</p> <p>(b) 1 per 50,000 yd² (40,000 m²) or fraction thereof of each type fabric or geogrid for all other uses.</p> <p>(c) Seam, if required, 1 per project minimum, additional as appropriate.</p> <p>Small Quantity Acceptance</p> <ul style="list-style-type: none"> • For fabric totals less than 200 yd² (170 m²) • For pipe wrap totals less than 1000 Lin. Ft • No sampling required • Use Inspection Report for Small Quantities (Form 2403) • Check: <ul style="list-style-type: none"> ○ Certificate of Compliance ○ Identifying label on product ○ Geotextile Small Quantity Acceptance List at http://www.dot.state.mn.us/materials/aggregatedocs/gtxlist.pdf 	<p>(a) 10 Lin. Ft. (3 m)</p> <p>(b) 4 yd² (3 m²)*</p> <p>(c) 10 Lin. Ft. (3 m)**</p>	<p>Certificate of Compliance shall state material identification (e.g. Propex 2002, Miragrid 8XT), and minimum average roll values (MARV) for all specified geotextile properties. MARV values must meet the Specification 3733 Types 1 through 7 requirements for the specific application. Submit copy of Certificate with material samples sent to the Materials Laboratory.</p> <p>Submit additional sample(s), if the manufacturer or model of geotextile or geogrid used changes during construction.</p> <p>Sampling shall be by random selection and no more than one sample shall be taken from an individual roll. For type 6 applications (including geogrids), submit pages of Special Provisions that list required material properties. (Type 6 requirements are job specific.) For Modular Block Walls or Reinforced Soil Slopes, submit page(s) of shop drawings that reference geogrid/geotextile to be used (product name) and/or required properties.</p> <p>* Do not sample first full turn of rolled product. ** Seam sample to include approximately 3 ft. (1 m) of geosynthetic material on each side of seam (in direction perpendicular to seam).</p>

X. Brick, Stone, and Masonry Units

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2506	1. Brick A. Sewer (clay) and Building	3612 to 3615	Visual Inspection	One sample per 50,000 brick or fraction thereof	6 whole bricks	
2506	1. Brick B. Sewer (Concrete)*	3616	Visual Inspection	One sample per shipment.	6 whole bricks	* Air entrainment required. Obtain air content statement from supplier.
2506	2. Concrete Masonry Units A. For Sewer Construction	3621	Visual Inspection	One sample per shipment	6 whole units	Air entrainment required. Obtain air content statement from supplier.
2411	2. Concrete Masonry Units B. For Modular Block Retaining Walls	Special Provisions	Visual Inspection Check for cracks and broken corners	One sample per 10,000 units or fraction thereof, with a minimum of one sample per product (block) type per contract.*	5 whole units	All lots of block upon delivery shall have Manufacturer or Independent laboratory test results to verify passing both compression and freeze-thaw requirements. * Wall units and cap units are considered separate block types.
2422	3. Reinforced Concrete Cribbing	3661	Concrete control tests Air Tests Visual Inspection if previously tested	One cylinder per 100 units, but not less than 5 cylinders for a given contract. Other materials as required herein.	150 x 300mm (6 x 12 in) Cylinders	Form 02415 or 2403 Will be stamped when inspected prior to shipment.
2511 2512 2577	4. Stone for Masonry or Rip-Rap	3601 and Special Provisions	Visual Inspection Submit Form 02415 unless special testing is specified			Form 02415 or 2403 Each source shall be approved by Project Engineer or Supervisor for quality, prior to use. For questions on quality, contact District Materials or Geology Unit.

XI. Electrical, Roadway Lighting, and Traffic Control Signal Equipment Items

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2545	1. Light Poles (Aluminum, Steel, or Stainless Steel)	3811	Visual Inspection			The Fabricator shall submit "Certificate of Compliance", on a per project basis, to the Project Engineer.
2545 2550 2565	2. Hand Holes (Concrete Precast, PVC with Polymer Concrete Ring and Cover, and Polymer Concrete)	2545 2550 2565				Form 02415 or 2403 Traffic control signals and roadway lighting projects require handholes (HH) and frames and covers to be listed on the MnDOT Approved/Qualified Products List (A/QPL) for signals. For precast concrete HH's and cast iron frame and cover: see VII.6, Drainage Castings and Standard Specifications for Construction 3819.2B
2545 2565	3. Foundation	2545	Slump as needed	1 cylinder per 20 m ³ (25 Cu. yd.)		Rebar is required in concrete foundations as specified in the Contract documents for all traffic control signals and roadway lighting projects.
2545 2565	4. Steel Screw In Foundations	2545 2565	Visual Inspection - verify make and model number as shown on MnDOT's APL	None		Steel Screw in Foundations are listed on MnDOT's Approved/Qualified Products List for Roadway Lighting & Signals
2402 2545 2565	5. Conduit and Fittings A. Metallic B. Liquid Tight Flexible Non Metallic Conduit C. PVC Coated Hot Dipped Galvanized Rigid Steel Conduit	3801 3802 3804 3805	Visual Inspection	None		Form 02415 or 2403 Conduit shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL). Retain Form 02415 or 2403 in Project File
2545 2565	5. Conduit and Fittings D. Non-Metallic (Rigid and HDPE)	3803	Visual Inspection			Form 02415 or 2403 Conduit shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL). Retain Form 02415 or 2403 in Project File. For traffic control signals and roadway lighting projects, specific requirements are contained in the Special Provisions for each project.
2545 2565	6a. Anchor bolts (cast in place)	2545 2565				See section VII, 7.
2545	6b. Anchorages (Drilled In)	2545				See section VII, 8.

XI. Electrical, Roadway Lighting, and Traffic Control Signal Equipment Items (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2545 2565	7. Miscellaneous Hardware	2545 2565	Visual Inspection	Sample critical items only. One of each item per shipment. (Critical Items are load bearing, structurally necessary items.)		Will carry "Inspected" tag if sampled and tested prior to shipment. No sample necessary if "Inspected". Do not use if not tested. Field sample at sampling rate for laboratory testing. For traffic control signals and roadway light lighting projects, various miscellaneous hardware is required to be listed on the MnDOT Signals and Lighting Approved/Qualified Products Lists (A/QPL). The Contract documents indicate which items must be on the Signals and/or Lighting APL.
2545 2550 2565	8. Cable and Conductors A. Service, Feeder, and Branch Circuit Conductors Roadway Loop Detector Conductors (No Tubing) Underground Service Entrance (USE) cables	3815.2B1 3815.2B2	Visual Inspection	None		Form 02415 or 2403 Make certain the conductors are the type specified. Submit Field Inspection report showing type and quantities used. Shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL) and type where applicable.
2545 2550 2565	8. Cable and Conductors B. Electrical Cables and Single Conductors with Jacket	3815.2B2(b) 3815.2B3 3815.2B5 3815.2C1 3815.2C3 3815.2C4 3815.2C5 3815.2C6 3815.2C7 3815.2C8 3815.2C14	Visual Inspection	1 sample per size per lot	1.5m (5 ft.)	Form 02415 or 2403 Usually inspected at the distributor. Documentation showing project number, reel number(s), and MnDOT test number(s) will be included with each project shipment. If such documentation is not received from Contractor, submit sample for testing along with material certification from manufacturer. <u>Do not</u> use if <u>not</u> tested. Pre-inspected materials will <u>not</u> be tagged; an inspection report will be sent by the MnDOT inspector for each shipment. Project inspectors should verify that the shipping documents agree with this inspection report. Call Steve Grover at 651-366-5540 or Cindy Schellack at 651-366-5543 with questions. For traffic control signals and roadway lighting projects, the Special Provisions for each project contain electrical cable and conductor specifications.
2545 2550 2565	8. Cable and Conductors C. Fiber Optic Cables	3815.2C13	Visual Inspection - verify make and model number as shown in Special Provisions	None		Form 02415 or 2403 Fiber optic cables shall be listed on the MnDOT Approved/Qualified Products List (A/QPL) for Traffic Management Systems/ITS.

XI. Electrical, Roadway Lighting, and Traffic Control Signal Equipment Items (cont.)

Pay Item No.	Kind of Material	Spec. No.	Minimum Required Acceptance Testing (Field Testing Rate)	Minimum Required Sampling Rate for Laboratory Testing	Sample Size	Notes
2545 2565	9. Grounding Electrodes (Ground Rods) (Plate Electrodes)	2545 2565 3818	Visual Inspection	None.		Form 02415 or 2403 Retain Form 02415 or 2403 in project file. Shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL).
2545	10. Luminaires and Lamps	3810				Form 02415 or 2403 Traffic control signals and roadway lighting projects require luminaires and lamps to be listed on the MnDOT Approved/Qualified Products List (A/QPL) for Lighting. The conductors shall be labeled as being listed by a National Recognized Testing Laboratory (NRTL) and type, where applicable.
2545	11. Air Obstruction Lights	3816	Visual Inspection - verify make and model number as shown on MnDOT's APL	None.		Air Obstruction Lights are listed on MnDOT's Approved/Qualified Products List for Roadway Lighting.
2545	12. Navigation Lanterns	3817	Visual Inspection - verify make and model number as shown on MnDOT's APL	None.		Navigation Lanterns are listed on MnDOT's Approved/Qualified Products List for Roadway Lighting.
2545 2565	13. Sponge Rubber Expansion Joint. Used for wrapping expansion and deflection/expansion conduit joints on bridges.	3841	Visual Inspection			
2545	14. Lighting System	2545				Lighting Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report. To be certified by the Project Engineer.
2545	15. Electrical Systems					Electrical Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report. To be certified by the Project Engineer.
2565	16. Traffic Control Signal Systems	2565				Traffic Control Signal Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report. To be certified by the Project Engineer.

Certifications List

Material	SMC Section	Sub Section	Page	Certification Needed
All Base, Surface, and Granular Materials	I. Grading & Base	Many	2-10	Form G&B-104 (24346) include gradation, crushing, bitumen content, and quality test results
Plant Mixed Asphalt (PMA)	II. Bituminous	Many	11-15	All PMA from certified supplier www.dot.state.mn.us/materials/bituminous.html
Shingles	II. Bituminous		12	Contractor shall provide documentation that of all RAS /TOSS (Tear Off Shingle) material is from a MPCA certified supplier.
Bituminous Material	II. Bituminous		16	Only Bituminous Materials from certified asphalt binder sources are allowed for use. The most current list of Certified Sources can at http://www.dot.state.mn.us/products
Emulsified Asphalt	II. Bituminous		16	Use Emulsion for seal coat from a certified emulsified asphalt source.
Portland Cement Fly Ash Ground Granulated Blast Furnace Slag Cement Admixtures	IV. Concrete		24	Concrete Plant Batching Materials: All materials must come from certified approved, or qualified sources. All certified sources must state so on the Bill of Lading Delivery invoice including MnDOT standardized certification statement for cement, flyash, and slag. The most current list of certified/approved sources can be found at www.dot.state.mn.us/products .
Certified Ready Mix	IV. Concrete	Many	25-26	Contact Report from Ready-Mix Plant. All concrete from certified plant including a computerized certificate of compliance with each load.
Plastic for Curing	IV. Concrete		32	A Certificate of Compliance shall be submitted to the Project Engineer from the Manufacturer certifying that the plastic complies with AASHTO M171.
Profiler	IV. Concrete		36	Contractor provides MnDOT certified Inertial Profiler Results for bumps/dips and/or Areas of Localized Roughness for the entire project.
Aggregate for Low Slump Overlays	IV. Concrete		37	Aggregate pit numbers and 1 passing gradation result per fraction per source
Aggregate for Concrete Pavement Repair	IV. Concrete		38	Aggregate pit numbers and 1 passing gradation result per fraction per source
Aggregate for Dowel Bar Retrofits	IV. Concrete		40	Aggregate pit numbers and 1 passing gradation result per fraction per source

Certifications List (cont.)

Material	SMC Section	Sub Section	Page	Certification Needed
Plant Stock & Landscape Materials	V: Landscaping etc.	2	41	Several certifications
Silt Fence	V: Landscaping etc.	5	42	Certificate of Compliance with MARV values
Flotation Silt Curtain	V: Landscaping etc.	6	42	Manufacturers' certification of compliance
Mulch Type 3	V: Landscaping etc.	12	42	Certified Vendor by Minnesota Crop Improvement Association must be tagged grain straw only on label.
Mulch Type 6 Wood Chips	V: Landscaping etc.	13	43	Emerald Ash Borer Compliance Agreement with the MDA
Seeds	V: Landscaping etc.	14	43	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Seeds - Native	V: Landscaping etc.	14	43	Certified Vendor by Minnesota Crop Improvement Association must be tagged.
Sod	V: Landscaping etc.	15	43	A certified tag by Minnesota Crop Improvement Association for Salt tolerant sod. A certificate of Compliance for all other types of sod listing grass varieties.
Compost	V: Landscaping etc.	16	43	APL/QPL with certified test reports.
Waterproofing material membrane waterproof system	VI: Chemical Items		44	Certificate and test results
Waterborne latex traffic marking paint	VI: Chemical Items		45	Certificate of Compliance
Epoxy traffic paint	VI: Chemical Items		45	Certificate of Compliance
Traffic marking paint	VI: Chemical Items		45	Certificate of Compliance
Non-traffic marking paint	VI: Chemical Items		45	Certificate of Compliance
Bridge structural steel paint	VI: Chemical Items		46	Certificate of Compliance
Exterior masonry paint	VI: Chemical Items		46	Certificate of Compliance
Noise wall stain	VI: Chemical Items		46	Certificate of Compliance
Drop-on glass beads	VI: Chemical Items		46	Certificate of Compliance
Pavement marking tape	VI: Chemical Items		46	Certificate of Compliance
Steel sign posts	VII: Metallic	2	48	Certification of domestic source if applicable under 1601
Posts for traffic or fence	VII: Metallic	3A	48	Certification of domestic source if applicable under 1601 For fence: Fence certification form (Optional)
Fence components	VII: Metallic	3B	48	Fence certification form (Optional)
Fence gates	VII: Metallic	3C	48	Fence certification form (Optional)
Fence barbed wire fabric	VII: Metallic	3D	48	Fence certification form (Optional)
Fence woven wire fabric	VII: Metallic	3E	49	Fence certification form (Optional)
Fence chain link wire fabric	VII: Metallic	3F	49	Fence certification form (Optional)
Reinforcing steel uncoated bars	VII: Metallic	5A	49	Certificate of Compliance & certified mill analysis
Reinforcing steel epoxy bars	VII: Metallic	5B	50	Inspected tag or Certificate of Compliance & certified mill analysis
Steel Fabric	VII: Metallic	5E	50	Certificate of Compliance
Dowel Bars	VII: Metallic	5F	50	Certificate of Compliance
Pre or post tensioning strand	VII: Metallic	5G	51	Mill analysis
Anchor rods & Structural Fasteners	VII: Metallic	7, 8	51	Yearly MnDOT passing test report

Certifications List (cont.)

Material	SMC Section	Sub Section	Page	Certification Needed
Timber & lumber	VIII: Miscellaneous	1	55	Certified on invoice
Bearing pads	VIII: Miscellaneous	4	55	Certificate of Compliance
Corrugated metal pipe	IX: Geosynthetics & Pipe	1A	56	Certified on invoice
Corrugated metal structural plate	IX: Geosynthetics & Pipe	1B	56	Certified on invoice
Corrugated metal aluminum plate	IX: Geosynthetics & Pipe	1C	56	Fabricator's Certificate and guarantee
Concrete pipe	IX: Geosynthetics & Pipe	3A	56	Certified stamp and certification document
Precast box culverts	IX: Geosynthetics & Pipe	4A	57	Stamped & field inspection report
Prestressed beams & posts, etc.	IX: Geosynthetics & Pipe	4B	57	Stamped & field inspection report
Manholes & catch basins	IX: Geosynthetics & Pipe	5	58	Certification document or stamped
Thermoplastic pipe ABS & PVC	IX: Geosynthetics & Pipe	7	58	Certificate of Compliance
Corrugated PE Pipe: Single wall – edge drains	IX: Geosynthetics & Pipe	8	58	Certificate of Compliance
Corrugated PE Pipe: dual wall – 12"-48"	IX: Geosynthetics & Pipe	13	59	Certificate of Compliance
Geotextile fabric	IX: Geosynthetics & Pipe	14	60	Manufacturers' Certification of compliance
Brick sewer concrete	X: Brick, Stone, Masonry	1B	61	Air content statement
Concrete masonry units	X: Brick, Stone, Masonry	2A	61	Air content statement
Light poles	XI: Electrical & Signal	1	62	Certificate of Compliance
Cable & Conductors	XI: Electrical & Signal	7	62	Usually inspected at the distributor. Documentation showing project number, reel number(s), & MnDOT test number(s) will be included with each project shipment. If not received from Contractor, submit sample for testing along with manufacturers' material certification.
Electrical systems	XI: Electrical & Signal	14	64	Electrical Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report.
Traffic control signal systems	XI: Electrical & Signal	15	64	Traffic Control Signal Systems are to be reported as a "System" using the Lighting, Signal, and Traffic Recorder Inspection Report.

Telephone Index for Schedule of Materials Control

Section	Page	Section Name	Contact	Phone
Part I	Page 1	Grading, Base & Reclamation – Specifications 2105, 2106, 2118, 2211, 2212, 2215, and 2221	Terry Beaudry John Bormann Melissa Cole	(651) 366-5456 (651) 366-5596 (651) 366-5432
Website: www.dot.state.mn.us/materials/gradingandbase.html				
Part II	Page 9	Bituminous - Spec. 2360	John Garrity	(651) 366-5577
Part II C	Page 14	Asphalt Binder	Allen Gallistel Jason Szondy	(651) 366-5545 (651) 366-5549
Website: www.dot.state.mn.us/materials/bituminous.html				
Part III	Page 16	Bituminous Specialty Items	Terry Beaudry Greg Schneider Melissa Cole Tom Wood	(651) 366-5456 (651) 366-5403 (651) 366-5432 (651) 366-5573
Part IV	Page 21	Concrete – Aggregates and Mix Design Concrete – Certified Ready Mix Concrete Concrete – Paving Concrete – Bridges Concrete – Pavement Rehabilitation	Wendy Garr Wendy Garr Rob Golish Ron Mulvaney Gordy Bruhn	(651) 366-5423 (651) 366-5423 (651) 366-5576 (651) 366-5575 (651) 366-5523
Website: www.dot.state.mn.us/materials/concrete.html				
Part V	Page 39	Landscaping and Erosion Control Items Erosion Control Landscaping Wood Chips	Lori Belz Scott Bradley Tina Markeson	(651) 366-3607 (651) 366-4612 (651) 366-3619
Part VI	Page 42	Chemical Items	Allen Gallistel Dave Iverson	(651) 366-5545 (651) 366-5550
Part VII	Page 45	Metallic Materials and Metal Products Sampling Test Results Bridge Structural Metals	Steve Grover Laboratory Todd Niemann	(651) 366-5540 (651) 366-5560 (651) 366-4567
Part VIII	Page 53	Miscellaneous Materials Sections 1 thru 3 Section 4 Test Results	Steve Grover Todd Niemann Laboratory	(651) 366-5540 (651) 366-4567 (651) 366-5560
Part IX	Page 54	Geosynthetics, Pipe, Tile, and Precast/Prestressed Concrete Sections 1 thru 11, & 13 Section 12 Section 14 Test Results	Steve Grover Rich Lamb Blake Nelson Laboratory	(651) 366-5540 (651) 366-5595 (651) 366-5599 (651) 366-5560
Part X	Page 59	Brick, Stone and Masonry Units/Modular Retaining Wall Blocks Sections 1, 2A,3, & 4 Section 2B Test Results	Steve Grover Blake Nelson Laboratory	(651) 366-5540 (651) 366-5599 (651) 366-5561
Part XI	Page 60	Electrical & Signal Sections 1, 8-11 Section 2, 4- 7 Section 3 Test Results	Susan Zarling Steve Grover Wendy Garr Laboratory	(651) 234-7052 (651) 366-5540 (651) 366-5423 (651) 366-5560

Form Index

Grading and Base	
Form No.	Form Name
G&B – 001	Grading & Base Report
G&B – 002	Random Sampling Acceptance
G&B – 003	Weekly Grading and Base Testing Summary Report
G&B – 101	Sieve Analysis
G&B – 103	Percent Crushing Report
G&B – 104	Certificate of Aggregates & Granular Materials
G&B – 105	Moisture Test
G&B – 203	(Table 2105-6, 2106-6) DCP Penetration Index Method
G&B – 204	(Table 2211-3) DCP Penetration Index Method
G&B – 205	2215 DCP Penetration Index Form – Full Depth Reclamation
G&B – 303	Moisture - Density (Proctor) Test
G&B – 304	Relative Density Test
G&B – 305	Estimated Optimum Moisture Content
G&B – 401	Depth Report – FDR, CIR, SFDR
Concrete	
Form No.	Form Name
2152	Concrete Batching Report
2162	Concrete Test Beam Data
2409	ID Card Concrete Test Cylinder
2448	Weekly Concrete Report
2449	Weekly Concrete Aggregate Report (QC/QA)
21412	Weekly Report of “Low Slump Concrete”
21763	Concrete Aggregate Worksheet
21764	Concrete Aggregate Worksheet JMF - Paving
21765	Concrete Aggregate Worksheet JMF
24143	Weekly Certified Ready-Mix Plant Report (Verification)
24300	ID Card Cement Samples
24308	ID Card Fly Ash Samples
24327	Field Core Report
	Concrete W/C Ratio Calculation Worksheet
	Incentive/Disincentive Smoothness Worksheet
Bituminous	
Form No.	Form Name
2413	Asphalt Sample Identification Card
Miscellaneous	
Form No.	Form Name
2410	Sample ID Card
02415	Inspection Report for Small Quantities (May be used for documentation or use another method to capture required documentation)
2403	Inspection Report for Small Quantities (May be used for documentation or use another method to capture required documentation)
	Certification Form for Type of Fence used (right side of page at website location below) www.dot.state.mn.us/materials/lab.html

DISADVANTAGED BUSINESS ENTERPRISE (DBE) SPECIAL PROVISIONS

PURPOSE

These provisions (1) provide an explanation of the federal law and information regarding compliance with the DBE requirements applicable to this contract, (2) explain the process Mn/DOT will follow to evaluate bidders' efforts to obtain DBE participation, (3) provide the standards Mn/DOT will use to measure compliance with these requirements, and (4) identifies sanctions.

POLICY STATEMENT

It is the policy of the Minnesota Department of Transportation (Mn/DOT) that DBEs, as defined in 49 C.F.R. § 26, shall have the maximum feasible opportunity to participate in contracts financed in whole or in part with public funds provided by the U.S. Department of Transportation (DOT). Consistent with this policy, Mn/DOT will not allow any person or business to be excluded from participation in, denied the benefits of, or to otherwise be discriminated against in connection with the award and performance of any DOT-assisted contract because of sex, color, race, or national origin. Mn/DOT has established a Disadvantaged Business Enterprise Program in accordance with regulations of the DOT, 49 C.F.R. § 26.

Mn/DOT has received federal financial assistance from DOT for this contract, therefore the DBE requirements of 49 C.F.R. § 26 apply to this contract. As a condition of receiving this assistance, Mn/DOT has provided assurance it will comply with the 49 C.F.R. § 26. This regulation requires that contractors take necessary and reasonable steps to ensure that DBEs have the maximum opportunity to compete for and perform this contract. These special provisions provide detailed information about these requirements, and identify the responsibility the contractor has to demonstrate compliance with the requirements.

CONTRACT ASSURANCE

The contractor, and its subcontractor(s), shall not discriminate on the basis of sex, color, race or national origin in the performance of this contract. The contractor agrees to act in accordance with applicable requirements of 49 C.F.R. § 26 in the execution and award of this contract. Failure by the contractor to comply with these requirements is a material breach of this contract, which may result in the termination of this contract or other such remedy as Mn/DOT deems appropriate.

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BASIC REQUIREMENT

In order to be awarded this contract, the Apparent Low Bidder (ALB) must establish either (1) that it has met the DBE participation goal of the contract; or (2) that it has made adequate good faith efforts (GFE) to meet the DBE goal. This requirement is in addition to all other pre-award requirements.

DBE GOAL OF THIS CONTRACT

The DBE goal on this contract is 12.5 percent.

METHODS TO ATTAIN THE GOAL

The goal may be attained by:

1. Subcontracting with a DBE certified by the Minnesota Unified Certification Program (Mn/UCP). To prove the existence of such a subcontract, the Apparent Low Bidder (ALB) shall submit a signed agreement or a signed affidavit committing it to enter into such a subcontract;
2. Leasing equipment from a Mn/UCP-certified DBE;
3. Entering into a joint venture with a Mn/UCP-certified DBE. This joint venture must be approved in writing by the Mn/DOT Office of Civil Rights prior to bid opening;
4. Purchasing materials and supplies from a Mn/UCP-certified DBE. Generally, sixty percent (60%) of the supplier's contracted amount will be credited toward the DBE goal; however 100% of the amount will be credited towards the DBE goal if the supplies or materials are obtained from a Mn/UCP -certified DBE manufacturer; or
5. Using other services as approved in writing by the Mn/DOT Office of Civil Rights prior to bid opening.

SOLICITING DBEs

All bidders should make every reasonable effort to subcontract work to DBEs through good faith negotiations and solicitations in advance of the dates specified for submitting and opening of bids.

In order to fulfill a DBE goal, the firms utilized as DBE subcontractors or suppliers must be certified as DBEs by the Mn/UCP **prior to the date of the bid opening**. The Mn/UCP DBE directory, which is found on Mn/DOT's Office of Civil Rights website, includes the names and addresses of all certified DBE firms. To be listed in the DBE directory, a DBE needs only to be

certified as a DBE by the Mn/UCP. Neither Mn/DOT nor the Mn/UCP makes any representation as to any DBE's technical or financial ability to perform the work. Prime contractors are solely responsible for performing due diligence in hiring DBE subcontractors. A DBE subcontractor's failure to perform the work will not be considered justification for a compensation increase.

APPARENT LOW BIDDER (ALB) SUBMITTAL OF INFORMATION

The ALB must identify the efforts it made to meet the DBE goal. The ALB must submit the information described in this section to the Mn/DOT Office of Civil Rights. All bidders are required to thoroughly document these solicitation efforts. The ALB shall justify any bids, quotes, or proposals it rejects from properly certified, qualified DBE firms.

THE FOLLOWING INFORMATION MUST BE SUBMITTED ON THE SUBMISSION DUE DATE. The Submission Due Date is the fifth business day after the bid letting date, unless the Mn/DOT Director of the Office of Civil Rights grants a written extension for good cause shown. The five day period starts the business day following the bid letting date. Information sent by fax or personal delivery must be received by the Mn/DOT Office of Civil Rights no later than 4:30PM central time on the Submission Due Date. Information sent by U.S. mail must be postmarked no later than the Submission Due Date. FAILURE TO SUBMIT ALL REQUIRED INFORMATION WITHIN THE ALLOWED FIVE BUSINESS DAY PERIOD WILL RESULT IN REJECTION OF YOUR BID ON THE BASIS THAT YOU ARE NOT A RESPONSIBLE BIDDER. PARTIAL SUBMISSIONS WILL NOT BE CONSIDERED.

The ALB must either (1) identify DBE participation sufficient to meet the DBE goal; or (2) demonstrate that the ALB made adequate good faith efforts to meet the DBE goal. The ALB must submit the following documents to the Mn/DOT Office of Civil Rights:

1. Certificate of Good Faith Efforts Consolidated Form (GFE Consolidated Form)
2. DBE Description of Work and Field Monitoring Report (Exhibit A)
3. Supporting Documentation to Verify Good Faith Efforts

The ALB must complete and submit the attached **Certificate of Good Faith Efforts Consolidated Form** as stated in the form instructions.

Part A - The ALB must provide contact information.

Part B - The ALB must provide project information including the DBE goal and the amount of DBE commitment the ALB obtained.

Part C - The ALB must provide information stating the amount of self-performance and DBE and non-DBE subcontractors' participation in this contract.

Part D - The ALB must list each subcontractor it **solicited**. The information must include all DBE and non-DBE firms (including all subcontractors, service providers and suppliers) from whom the ALB solicited quotes to provide work and supplies for this contract. Part D must be completed only if the ALB did not obtain sufficient DBE participation to meet the DBE goal.

Part E - The ALB must list the DBE firms that it intends to use on this contract and

provide an Exhibit A form and quote.

Part F - The ALB must list all non-DBE firms that provided a quote and indicate whether the non-DBE quote was accepted.

Part G - The ALB must list DBE firms that provided a quote but were not selected. Part G must be completed only if the ALB did not obtain sufficient DBE participation to meet the DBE goal.

Part H - The ALB must complete this **Good Faith Efforts Affidavit** regardless of whether the ALB's list of proposed subcontractors, service providers, and suppliers shows sufficient DBE participation to meet the DBE goal set for this contract.

The ALB must submit **DBE Description of Work and Field Monitoring Report (Exhibit A)**. A separate form must be submitted for each DBE firm the ALB proposes to utilize on the project. This must *be accompanied by proof of commitment to use the DBE firms*, such as copies of signed agreements, affidavits, or letters of intent. These commitments will be used to determine the "commitment rate" (the percentage of DBE participation). The ALB must commit to using the proposed DBE firms for not less than the percentage of the DBE participation shown on the DBE Description of Work and Field Monitoring Report (Exhibit A). An ALB will be deemed a non-responsible bidder if it fails to include in its submission a completed DBE Description of Work and Field Monitoring Report (Exhibit A) for each DBE along with the required signed agreements or affidavits.

The ALB must submit information that demonstrates its adequate good faith efforts to achieve the DBE goal. This information can include, but is not limited to, copies of solicitation letters, faxes, and emails to DBE firms. The ALB must identify the actions it took to achieve the DBE goal, including those actions listed in 49 C.F.R. § 26 Appendix A.

FAILURE TO SUBMIT INFORMATION

If the ALB fails to submit the information required by the previous section the ALB is a non-responsible bidder and Mn/DOT will reject the ALB's bid. **All required information must be submitted by the Submission Due Date.** The information submitted shall state the ALB's commitment to use DBEs for not less than the commitment rate.

IF THE DBE GOAL IS NOT MET, A GOOD FAITH EFFORTS REVIEW WILL BE CONDUCTED

An ALB that does not commit to meeting the DBE goal is thereby not disqualified if the ALB demonstrates that it made adequate good faith efforts (GFE) to meet the DBE goal. An ALB that does not commit to meet the DBE goal and fails to show adequate GFE were made is a non-responsible bidder and Mn/DOT will reject its bid. See 49 C.F.R. § 26.53(a)(2).

A DBE firm that bids as a prime contractor will be deemed to have met the DBE goal if the value of the work performed by its own forces, combined with any work that it has committed to be performed by DBE subcontractors and DBE suppliers, meets or exceeds the DBE goal. See 49 C.F.R. § 26.53(g).

In addition to the GFE activities listed in the following section, Mn/DOT may, as permitted by the Federal regulations, take into account the performance of other bidders in meeting the DBE contract goal. See 49 C.F.R. § 26 Appendix A(V).

EVALUATION OF GOOD FAITH EFFORTS

If an ALB has a DBE commitment rate that is below the DBE goal, then the ALB must demonstrate that it made adequate good faith efforts in attempting to meet the DBE goal. Mn/DOT's Office of Civil Rights (OCR) staff will review the GFE documents submitted by the ALB and the DBE commitment submitted by each bidder to evaluate the ALB's commitment rate.

The ALB must show that it took all necessary and reasonable steps to achieve the DBE goal which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful. In evaluating the ALB's adequate good faith efforts, Mn/DOT will consider the following list of actions. This is not a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases. Compliance with the adequate good faith efforts requirement will be determined on a case-by-case basis.

- A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and /or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract. The ALB must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.
- B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.
- C. Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.
- D(1) Negotiating in good faith with interested DBEs. It is the ALB's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why

additional agreements could not be reached for DBEs to perform the work.

- D(2) An ALB using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the ALB of the responsibility to make the good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.
- E. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.
- F. Making efforts to assist interested DBEs in obtaining bonding , lines of credit, or insurance as required by the recipient or contractor.
- G. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- H. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

Following this review, the OCR staff will make a recommendation to the Director of OCR, or designee, (Director) as to whether the ALB has met the DBE goal or made adequate good faith efforts. The Director of OCR will determine whether the ALB has met the DBE goal or made adequate good faith efforts to meet the goal for this contract in accordance with 49 C.F.R. § 26.53 and 49 C.F.R. § 26 Appendix A. The Director's written determination will be mailed to the ALB informing it of this decision approximately 10-12 business days after the Submission Due Date. If the Director determines that the ALB failed to meet the DBE goal or that it failed to make adequate good faith efforts to do so, the determination notice will be sent by certified U.S. mail.

An ALB that fails to meet the DBE goal or fails to make adequate good faith efforts to meet the goal is a non-responsible bidder and shall not be awarded the contract.

ADMINISTRATIVE RECONSIDERATION

If the Director determines that the ALB failed to make adequate good faith efforts, the ALB may request administrative reconsideration. (49 C.F.R. § 26.53(d)). If the ALB does not make a timely written request for administrative reconsideration as described herein, the ALB will be deemed to have waived its right to request administrative reconsideration.

The ALB's request for administrative reconsideration must be made in writing. Requests sent by fax or personal delivery must be received by the Mn/DOT Office of Civil Rights no later than 4:30 PM on the fifth business day after the ALB receives written notice of the determination. Administrative reconsideration requests sent by U.S. mail must be postmarked no later than the fifth business day after the ALB receives notice of the determination. The ALB is deemed to have notice as of the date indicated on the certified mail receipt signed by the ALB, or its representative, at the time of delivery. The ALB must submit the written request for reconsideration to the attention of **Mn/DOT Deputy Commissioner at MnDOT, 395 John Ireland Blvd. St. Paul, Minnesota 55155; or by fax 651-366-4795. A copy of the request must be sent to the Director of the Office of Civil Rights at the same address or fax 651-366-3129.**

The Mn/DOT Deputy Commissioner, or a designated official, will serve as the Reconsideration Official. The Reconsideration Official shall not have any role in the original determination that the ALB failed to meet the DBE goal or failed to make adequate good faith efforts to do so.

In the reconsideration process, the ALB will have the opportunity to:

- Provide written documentation or argument concerning the issue of whether the ALB met the goal or made adequate good faith efforts to do so. (49 C.F.R. § 26.53(d)(1).
- Meet in person with the Reconsideration Official to discuss the issue of whether the ALB met the goal or made adequate good faith efforts to do so. (49 C.F.R. § 26.53(d)(3).

The Reconsideration Official will reconsider the record documenting the good faith efforts of the ALB. The reconsideration process will include the documents and arguments that the ALB is permitted to submit. The reconsideration process is a review of only the good faith efforts made by the ALB as of the Submission Due Date. Good faith efforts made subsequent to that date will not be considered.

Mn/DOT will provide the ALB with a written decision on reconsideration, explaining the basis for the determination **within 5 business days following the date scheduled for the ALB to meet with the Reconsideration Official to discuss the issue.** In accordance with 49 C.F.R. § 26.53(d)(5), the result of Mn/DOT's reconsideration process is not subject to administrative appeal to the U.S. Department of Transportation.

COUNTING DBE PARTICIPATION & COMMERCIALY USEFUL FUNCTION

In accordance with 49 C.F.R. § 26.55, Mn/DOT will determine the percentage of DBE participation that will be counted toward the overall DBE goal as follows:

- (a) When a DBE participates in a contract, Mn/DOT will only count the value of the work actually performed by the DBE toward DBE goals.
 1. The entire amount of the portion of a construction contract (or other contract not covered by paragraph 49 C.F.R. § 26.55(a)(2)) that is performed by the DBE's own forces. Include the cost of supplies and materials obtained by the DBE for the work of the contract, including supplies purchased or equipment leased by the DBE (except supplies, and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate).
 2. The entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, counts toward DBE goals, provided that Mn/DOT determines the fee to be reasonable and not excessive as compared with fees customarily allowed for similar services.
 3. When a DBE subcontracts part of the work of its contract to another firm, the value of the subcontract work may be counted toward DBE goals only if the DBE's subcontractor is itself a DBE. Work that a DBE subcontracts to a non-DBE firm will not count toward DBE goals.
- (b) When a DBE performs as a participant in a joint venture, Mn/DOT will count a portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its own forces toward DBE goals.
- (c) Mn/DOT will count expenditures of a DBE contractor toward DBE goals only if the DBE is performing a commercially useful function on that contract.
 1. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies used on the Contract, for negotiating price, determining quality and quantity, ordering the materials, and installing (where applicable) and paying for the material itself. To determine whether a DBE is performing a commercially useful function, Mn/DOT will evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the Contract is commensurate with the work it is actually performing and DBE credit claimed for its performance of the work, and other relevant factors.

2. A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which the funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, MnDOT must examine similar transactions, particularly those in which DBEs do not participate.
 3. If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, Mn/DOT must presume that it is not performing a commercially useful function.
 4. When a DBE is presumed not to be performing a commercially useful function as provided in the preceding paragraph, the DBE may present evidence to rebut this presumption. Mn/DOT may determine that the firm is performing a commercially useful function given the type of work involved and normal industry practices.
 5. Mn/DOT decisions on commercially useful function matters are subject to review by the concerned operating administration, but are not administratively appealable to U.S. DOT.
- (d) Mn/DOT will use the following factors in determining whether a DBE trucking company is performing a commercially useful function:
1. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there can not be a contrived arrangement for the purpose of the meeting DBE goals.
 2. The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
 3. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures and operates using drivers it employs.
 4. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract.
 5. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE lessees not to exceed the value of transportation services provided by DBE-owned trucks on the contract. Additional participation by non-DBE lessees receives credit only for the fee or commission it receives as a result of the lease arrangement. If a recipient chooses this approach, it must obtain written consent from the Director of the Office of Civil Rights.

6. For purposes of this section, a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for the use of the leased truck. Leased trucks must display the name and identification number of the DBE.
- (e) Mn/DOT will count expenditures with DBEs for materials or supplies toward DBE goals as provided in the following:
1. Mn/DOT will count 100% of the cost of the materials or supplies toward DBE goals if the materials or supplies are obtained from a DBE manufacturer.
 2. For purposes of this section (e), a manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character described in the specifications.
 3. If the materials or supplies are purchased from a DBE regular dealer, Mn/DOT will count 60% of the cost of the materials or supplies toward DBE goals.
 4. For purposes of this section (e), a regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold to or leased to the public in the usual course of business.
 - A. To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
 - B. A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone or asphalt without owning, operating, or maintaining a place of business as provided in 49 C.F.R. §26.55(e)(2)(ii) if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long -term lease agreement and not on an ad hoc or contract-by-contract basis.
 - C. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this section (e).
 5. With respect to materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, Mn/DOT will count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a

- job site, toward DBE goals, provided Mn/DOT determines the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services. Mn/DOT, however, will not count any portion of the cost of the materials or supplies themselves toward DBE goals.
- (f) If a firm is not currently certified as a DBE in accordance with the standards of 49 C.F.R. § 26 Subpart D at the time of execution of the contract, Mn/DOT will not count the firm's participation toward any DBE goals.
 - (g) The dollar value of the work performed under a contract with a firm after it has ceased to be certified will not be counted toward the overall goal.
 - (h) Mn/DOT will not count the participation of a DBE subcontractor toward the contractor's final compliance with its DBE obligations on a contract until the amount being counted has been actually paid to the DBE.

FAILURE TO FULFILL DBE COMMITMENT

Mn/DOT will invoke appropriate administrative sanctions for non-compliance when a contract has been awarded and performance has begun, but the contractor fails to meet the DBE goal or make an adequate good faith effort to do so. Sanctions for noncompliance may include, but are not limited to, Mn/DOT withholding progress payments and taking a monetary deduction from the contract proceeds. If the contractor fails to complete its work on the contracts executed with DBE firms, as required by this contract, and the failure is through no fault of the DBE firms, MnDOT may deduct a sum equal to the portion of the DBE commitment not fulfilled. This provision will not apply if Mn/DOT reduces the quantity of work subcontracted to the DBE.

Mn/DOT may allow an adjustment of the commitment if the DBE participant that was part of the original commitment fails to perform and cannot be replaced with another DBE subcontractor despite the contractor's adequate good faith efforts to find another DBE to perform the same amount of work.

DBE REPLACEMENT

The contractor must make good faith efforts to replace a DBE subcontractor who is unable to perform successfully with another DBE to perform the same amount of work. The contractor shall not terminate for its convenience a DBE subcontract and then perform the work of the terminated subcontract with its own forces.

Once a contractor submits an affidavit, subcontract or other signed agreement, and the DBE Description of Work and Field Monitoring Report (Exhibit A), the DBE firm cannot be replaced by another DBE or a non-DBE firm for any reason until the following occurs:

1. Mn/DOT's Office of Civil Rights receives a written request for approval of the

substitution, including the reasons for the substitution; and,

2. Mn/DOT's Office of Civil Rights grants the contractor a written approval of the substitution.

Mn/DOT staff may assist the Contractor, when requested, in replacing DBEs. This assistance may include but is not limited to:

1. Providing the contractor with information regarding the availability of other DBEs.
2. Providing the contractor with assistance in locating available DBEs

PROMPT PAYMENT

Minnesota Statutes §16A.1245 requires that the prime contractor agrees to pay each subcontractor within ten (10) days of the prime contractor's receipt of payment from the state for undisputed services provided by the subcontractor. The prime contractor is subject to pay interest charges of 1-1/2 percent per month, or any part of a month, to the subcontractor on any undisputed amount not paid to the subcontractor within the ten (10) day period. This provision applies to DBE and non-DBE subcontractors.

Prime contractors are required to make prompt and full payment of any retainage kept by the prime contractor to the subcontractor within 10 days after the subcontractor's work is satisfactorily completed. Satisfactorily completed means when all the tasks called for in the subcontract have been accomplished and documented as required by Mn/DOT. When Mn/DOT has made incremental acceptances of a portion of a prime contract, the work of a subcontractor covered by that acceptance is deemed to be satisfactorily completed. See 49 C.F.R. § 26.29(b) and (c).

Failure to comply with these payment provisions may result in penalties including the withholding of progress payments to prime contractors. Appropriate penalties will be determined by Mn/DOT. The Contractor Payment Form must be completed for payments to subcontractors regardless of their DBE status.



Prime Contractor _____ State Project # _____

**DBE Description of Work
And Field Monitoring Report (Exhibit A)**

A contract will not be awarded to the Prime Contractor unless this form is submitted with a signed subcontract, purchase order or affidavit for each DBE participating in the contract. This form is complete when the DBE subcontractor has filled in **all of the applicable information in sections A and B and signs in section C.**

PLEASE PRINT CLEARLY OR TYPE.

Section (A): (All DBE Subcontractors, including Trucking firms must complete this Section.)

MUST BE COMPLETED BY THE DBE PRINCIPAL

Letting Date: _____ State Project Number: _____

Prime Contractor: _____ Phone #: _____

DBE Subcontractor: _____ Phone #: _____

DBE Principal Name: _____ Total Subcontract \$: _____

DBE Participation Claimed: Percent _____% Amount \$ _____

1. Did you bid and sign a subcontract agreement with the above-named prime contractor? _____
2. Are the items, quantities, and prices listed on the subcontract agreement or affidavit correct? _____
3. List the line items to be performed: _____

4. Are there any other agreements not addressed in the subcontract? If yes, please explain: _____

5. If equipment to be used is other than what is listed in your DBE certification file please answer the following:
 - a. Will the renting or leasing include any of the following: (Attach a copy of the lease or rental agreement(s).
Equipment _____ Insurance _____ Operator _____ or Maintenance _____
 - b. Lessor's name: _____
Amount to be paid: _____ Number of days to be used: _____
6. Will there be any other firm(s) providing work listed in your (DBE) subcontract?
If yes, answer the following: Firm's Name: _____ \$ amount of the work: _____
7. What is the name of the person supervising your work on this project? _____
Is this your employee? _____
8. How many people will you be employing on this project? _____ Minorities: _____ Females: _____
9. Total dollar amount of materials to be supplied? _____
10. Who are you purchasing the materials from? _____
1. Please submit Purchase Agreement and/or Purchase Order from manufacturer(s) or primary material supplier(s).
NOTE: This Exhibit 'A' will not be approved without the Purchase Agreement/Purchase Order.
2. Please list all subcontracts that your firm will be performing during the current construction season including non-DBE work:
(Attach additional sheet if necessary.)

	Project Number	Prime Contractor	Project Location	# of Working Days
1.				
2.				
3.				

Section (B):

TO BE COMPLETED ONLY BY THE DBE TRUCKER

1. The number of hours contracted or quantities to be hauled on this project? _____
2. How many fully operational units will be used on this Project? _____ (Tractor/trailers: _____ Dump trucks: _____)
3. How many fully operational units will be yours? _____ (Dump trucks: _____ Tractors/trailers: _____)
4. How many other units will be yours? _____ (Tractors: _____ Trailers: _____)
5. If ITO's or trucking companies are to be used on this project answer the following:

Name of ITO/Company		Dollar Amount of Contract/Agreement	Number of Dump Trucks, Tractors/Trailers (specify)
1.			
2.			
3.			
4.			

Section (C): (All DBE Subcontractors, including Trucking firms, must complete Section C.)

I hereby certify that the information presented above is correct. I agree to inform the Office of Civil Rights in writing of any changes within 10 days of the change(s).

DBE Company: _____

DBE Principal: _____
 Signature Title Date

Section (D): TO BE COMPLETED BY Mn/DOT OFFICE OF CIVIL RIGHTS STAFF PERSON

Project Number: _____ District # _____
 Mn/DOT OCR Staff Person: _____ Phone No. _____
 Project Engineer: _____ On-site Phone #: _____
 Office Phone #: _____

Section (E): TO BE COMPLETED BY PROJECT ENGINEER WHEN THE DBE'S PORTION OF WORK IS 1/3 TO 1/2 COMPLETED

1. Does it appear that the DBE firm is performing the work specified in (Exhibit "A") description of work?
 Yes _____ No _____
2. Does it appear that the DBE contractor is managing their portion of the project and using their own company employees?
 Yes _____ No _____
3. Does it appear that the DBE contractor is providing the equipment for their items of work or other work specified?
 Yes _____ No _____
4. Does it appear that the quality of the DBE contractor's performance, scheduling and project management are meeting industry standards?
 Yes _____ No _____
5. Comments: _____

NOTE: If you, as the Project Engineer, have checked "NO" to any of the above questions or have any other comments, it is important that you contact the Mn/DOT Office of Civil Rights Staff Person assigned to this project.

Project Engineer: _____ Date: _____

**Certificate of Good Faith Efforts Consolidated Form (GFE Form) Instructions**

This form consolidates the Certificate of Good Faith Efforts, the Good Faith Efforts Affidavit, and the Bidders List in the DBE Special Provisions and is referred to as the GFE Consolidated form. All parts of this form must be completed unless otherwise stated in the section's heading. The Apparent Low Bidder (ALB) must complete this form and submit it with the Good Faith Efforts Information by the Submission Due Date as defined in the DBE Special Provisions. Prime contractors may also use this form to demonstrate good faith efforts when a DBE is replaced after the contract is awarded.

The ALB should include in its Good Faith Efforts Information a cover letter addressed to the Mn/DOT Office of Civil Rights. The cover letter should identify in detail the efforts the ALB made to meet the DBE goal. The ALB is required to thoroughly document its solicitation efforts and justify any bids, quotes or proposals it rejects from properly certified DBE firms. **THE COVER LETTER SHOULD INCLUDE EACH OF THE FACTORS IDENTIFIED IN 49 C.F.R. Part 26, App. A, SUMMARIZED AS FOLLOWS:**

1. This GFE Consolidated Form must be completed. Please note that **“Part D - SOLICITATION OF SUBCONTRACTORS, SUPPLIERS, AND SERVICE PROVIDERS” on pg. 4, and “Part G – DBES QUOTED BUT NOT SELECTED” on pg. 7 are to be completed ONLY IF the DBE goal is NOT met.**
2. A statement of the ALB's overall plan for obtaining DBE participation noting barriers or challenges the ALB encountered in obtaining DBE participation. Specifically, detailing how all necessary and reasonable steps to achieve the DBE goal or other requirements which, by their scope, intensity, and appropriateness to the objective of achieving the DBE goal, could reasonably be expected to obtain sufficient DBE participation - even if the ALB was not successful.
3. **The solicitation requirement is two-fold and includes the *initial solicitation* and *appropriate follow up* with interested DBEs.** Evidence of solicitation efforts of DBEs such as copies of requests for bids sent to DBE firms with identification of the firms clearly stated; fax confirmation sheets displaying the date, fax number, name of DBE firm, and status; list of all DBE firms called, date, contact name and response; or email distribution lists with date and time clearly indicated. The solicitations to DBEs should provide sufficient information about the type of work available on the project.
4. Identify the efforts made to select portions of work to be performed by DBEs in order to increase the likelihood that the DBE goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation.
5. A detailed explanation of the reason for not accepting DBE quotes. Each non-accepted quote should be addressed individually. Provide an explanation of the efforts the ALB made to negotiate in good faith with interested DBEs. Provide information about any cost comparisons that were considered in the decision to not accept DBE quotes. **The fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for an ALB's failure to meet the contract DBE goal, as long as such costs are reasonable.** The ALB is not required to accept higher quotes from DBEs if the price difference is excessive or unreasonable. If the ALB makes such a determination it should provide a written explanation for this conclusion.
6. A detailed explanation of the ALBs efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance.
7. A detailed explanation of the ALBs efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials or related assistance or services.
8. A detailed explanation of the effective use by the ALB of the services of available minority/women community organizations; minority/women contractor's groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.
9. Provide copies of any advertisements placed on hardcopy or websites. Advertisements should include information about the project(s), type(s) of work for which quotes are being solicited, and specific contact information for the ALB.

Contact the Mn/DOT Office of Civil Rights if you have any questions; main line 651-366-3073



Prime Contractor _____ State Project # _____

Guidelines for Certificate of Good Faith Efforts (GFE) Consolidated Form

The Apparent Low Bidder (ALB) must show that it took all necessary and reasonable steps to achieve the DBE goal which by their scope, intensity and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. The criteria for evaluating good faith efforts is described in 49 CFR, Part 26, Appendix A which can be found at <http://www.osdbu.dot.gov/DBEProgram/>. ALBs submitting good faith efforts information should address the following factors in its Good Faith Efforts Information submission. The information below is not a mandatory list, nor is it exclusive or exhaustive.

Criteria 1: "Solicitation Efforts"

1. Did the ALB use the current DBE Directory to identify DBEs?
2. Did the ALB perform sufficient solicitations given the amount of work to meet the DBE goal?
3. Did the ALB break out and solicit for work in economically feasible units?
4. Did the ALB solicit for work that it otherwise would self-perform?
5. Were DBEs with business operations in close geographic proximity to the project solicited?

Criteria 2: "Timely Notice"

1. Did the ALB send timely written (e-mail/fax) solicitation notices to certified DBE firms?
2. Did the solicitation notice include the following:
 - a. Name and location of project
 - b. Bid date
 - c. Scope of work requested
 - d. Location where DBE's can review plans and specifications
 - e. Date and time to submit quote
 - f. Contact name for technical assistance
 - g. Any special requirements

Criteria 3: "Finance and Bonding Outreach"

1. Did the ALB offer assistance by providing contacts for possible bonding, insurance, and lines of credit?
2. Did the ALB offer assistance by providing technical assistance in these areas?

Criteria 4: "ALB follow-Up"

1. Did the contractor maintain a "follow-up log" from the initial solicitation? The log must show:
 - a. Type of contact (fax, telephone, e-mail)
 - b. Name of contact person
 - c. Name of DBE firm
 - d. Date and time of DBE contacted
 - e. Response received
 - f. Reason for DBE not bidding project (if applicable)

Criteria 5: "ALB DBE Program Outreach and Support"

1. Did the ALB host DBE informational workshops, attend Minnesota Department of Transportation (Mn/DOT) sponsored DBE events; such as networking sessions, DBE conferences, DBE/ALB meetings, etc.?
2. Did the ALB contact minority business organizations about DBE opportunities?

Note: The Submission Due Date is **the fifth business day after the bid letting date** in accordance with the Mn/DOT DBE Special Provisions. Contact the Mn/DOT Office of Civil Rights if you have any questions; main line 651-366-3073

**MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF CIVIL RIGHTS
CERTIFICATE OF GOOD FAITH EFFORTS CONSOLIDATED FORM**

This Certificate of Good Faith Efforts Consolidated form (GFE Consolidated form) is required to demonstrate that the Apparent Low Bidder (ALB) either met the DBE goal, or made adequate good faith efforts to meet the DBE goal pursuant to 49 C.F.R. Part 26, Appendix A. Please refer to the instruction sheet prior to completing the form. This form and all supporting Good Faith Efforts documentation must be provided to the Mn/DOT Office of Civil Rights prior to the Submission Due Date as defined within the DBE Special Provisions.

PART A – PRIME CONTRACTOR’S INFORMATION (All Primes complete this section.)				
COMPANY NAME				
ADDRESS	STREET	CITY	STATE	ZIP CODE
PHONE #	FAX #		EMAIL ADDRESS	
CONTACT PERSON			TITLE	

PART B - PROJECT DESCRIPTION (All Primes complete this section.)				
STATE PROJECT #		CONTRACT # (If Applicable)		<input type="checkbox"/> Attach copy of Mn/DOT Advertisement
ANTICIPATED START DATE (Based on progress schedule)			EXPECTED COMPLETION DATE (Based on progress schedule)	
DBE GOAL	%	VS	DBE COMMITMENT	(Type of GFE Information – Check one only)
			%	<input type="checkbox"/> Pre-award <input type="checkbox"/> Post-award/Execution
TOTAL DBE PARTICIPATION DOLLARS BASED ON ADVERTISED DBE GOAL (Total prime bid \$ * DBE % Goal)				

PART C – PROJECT SUMMARY AMOUNTS (All Primes complete this section.)	
TOTAL PRIME BID	\$
TOTAL DOLLARS COMMITTED TO NON-DBE’S (Not including suppliers)	\$
TOTAL DOLLARS COMMITTED TO DBE’S (Not including suppliers)	\$
TOTAL DOLLARS COMMITTED TO DBE SUPPLIERS (Total paid to DBE suppliers 60%)	\$
WORKED PERFORMED BY PRIME	\$
PERCENT OF WORK PERFORMED BY PRIME	%
TOTAL DBE PARTICIPATION REMAINING (Difference between DBE goal \$ and DBE commitment \$)	\$

PART D – SOLICITATION OF SUBCONTRACTORS, SUPPLIERS, AND SERVICE PROVIDERS (Complete this part only if DBE goal is not met.)

List all subcontractors solicited, both DBE and non-DBE contractors, truckers and suppliers for this specific project. Include initial contact and follow-up dates, as well as methods of contact (Phone, Fax, Email, etc.).

The good faith effort submission should include evidence of the solicitation effort such as; copies of request for bids sent to DBE firms with the name of the DBE firms clearly identified; fax confirmation sheets showing the date, fax number, name of DBE firm, confirmation the fax was sent; list of all DBE firms called time of call, person contacted and response; or email lists with time/day sent clearly indicated etc.

Subcontractor/Supplier/Service provider	DBE?		Phone #	Dates, Method of Contact		Description of Work	Dollar Amount of Quote
	Yes	No		DATES	METHO DS		
1	<input type="checkbox"/>	<input type="checkbox"/>					
2	<input type="checkbox"/>	<input type="checkbox"/>					
3	<input type="checkbox"/>	<input type="checkbox"/>					
4	<input type="checkbox"/>	<input type="checkbox"/>					
5	<input type="checkbox"/>	<input type="checkbox"/>					
6	<input type="checkbox"/>	<input type="checkbox"/>					
7	<input type="checkbox"/>	<input type="checkbox"/>					
8	<input type="checkbox"/>	<input type="checkbox"/>					
9	<input type="checkbox"/>	<input type="checkbox"/>					
10	<input type="checkbox"/>	<input type="checkbox"/>					
	<input type="checkbox"/>	<input type="checkbox"/>					
	<input type="checkbox"/>	<input type="checkbox"/>					

Make additional copies of this page as necessary.

Make additional copies of this page as necessary.

PART E - DBE COMMITMENTS (All Primes complete this section.)		Dollar Amount Of Bid/Proposal.	
DBEs COMMITMENTS List only DBEs who have executed Exhibit A forms. DBE Contractor Information			
1.	DBE Contractor Name	Description of Work	Dollar Amount Of Bid/Proposal.
	Contact Name		
	Address		
	Federal Tax #		
Phone	E-mail		
Fax:			
2.	DBE Contractor Name	Description of Work	Dollar Amount Of Bid/Proposal.
	Contact Name		
	Address		
	Federal Tax #		
Phone	E-mail		
Fax			
3.	DBE Contractor Name	Description of Work	Dollar Amount Of Bid/Proposal.
	Contact Name		
	Address		
	Federal Tax #		
Phone	E-mail		
Fax			
4.	DBE Contractor Name	Description of Work	Dollar Amount Of Bid/Proposal.
	Contact Name		
	Address:		
	Federal Tax #		
Phone	E-mail		
Fax			
5.	DBE Contractor Name	Description of Work	Dollar Amount Of Bid/Proposal.
	Contact Name		
	Address:		
	Federal Tax #		
Phone	E-mail		
Fax			

Make additional copies of this page as necessary.

PART F – NON-DBE QUOTES SUBMITTED (All Primes complete this section.)						Dollar Amount Of Bid/Proposal.	Will Firm Be Used?
NON-DBE COMMITMENTS List all non-DBE firms who provided quotes or bid proposals. Indicate whether the quotes were accepted.							
NON-DBE Contractor Information							
1.	NON-DBE Contractor Name						Y or N
	Contact Name						
	Address						
	Federal Tax #	E-mail					
	Phone	Fax:					
2.	NON-DBE Contractor Name						Y or N
	Contact Name						
	Address						
	Federal Tax #	E-mail					
	Phone	Fax					
3.	NON-DBE Contractor Name						Y or N
	Contact Name						
	Address						
	Federal Tax #	E-mail					
	Phone	Fax					
4.	NON-DBE Contractor Name						Y or N
	Contact Name						
	Address:						
	Federal Tax #	E-mail					
	Phone	Fax					

PART G - DBEs QUOTED BUT NOT SELECTED (Complete this part only if DBE goal is not met.)

If DBE quotes were rejected, attach a separate sheet of paper explaining the specific basis for rejecting any DBE quote.

Note: Additional cost is not in itself sufficient reason for rejecting a DBE quote. However, prime contractors need not accept excessive or unreasonable DBE quotes. The contractor's standing within its industry, membership in specific groups (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bid in the contractor's efforts to meet the project goal. (See Instructions attached to this form.)

QUOTED DOLLARS	DBEs WHO QUOTED, BUT WERE NOT SELECTED	TYPE OF WORK QUOTED	REASON NOT SELECTED
1.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
2.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
3.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
4.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
5.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
6.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
7.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
8.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
9.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
10.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
11.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
12.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
13.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
14.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
15.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
16.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
17.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
18.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
19.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
20.			Clearly state specific basis for rejecting the DBE on a separate sheet of paper
NUMBER OF DBEs SOLICITED			

PART H – CERTIFICATION / GOOD FAITH EFFORTS AFFIDAVIT (All Primes complete this section.)

STATE OF MINNESOTA
COUNTY OF _____

I, _____, being first duly sworn, state as follows:
(Full Name)

1. I am the _____ of _____
(Title) (Name of Individual, Company, Partnership, or Corporation)

that has been identified as the apparent low bidder of the State Project _____.

2. I have the authority to make this affidavit for and on behalf of the apparent low bidder.

3. The information provided in the attached Certificate of Good Faith Efforts is true and accurate to the best of my belief.

SIGNATURE (Bidder or Authorized Representative)	TITLE	DATE

Subscribed and sworn to before me

This _____ day of _____, 20_____

Notary Public

My commission expires _____, 20_____

Under Sec. 26.107 of "49 CFR Part 26," dated February 2, 1999, if at any time, the Department or a recipient has reason to believe that any person or firm has willfully and knowingly provided incorrect information or made false statements, the Department may initiate suspension or debarment proceedings against the person or firm under 49 CFR Part 29, take enforcement action under 49 CFR Part 31, Program Fraud and Civil Remedies, and/or refer the matter to the Department of Justice for criminal prosecution under 18 U.S.C. 1001, which prohibits false statements in Federal programs.



**Minnesota Department of Transportation
Office of Civil Rights**

Page _____ of _____

Contractor Payment Form

State Project Number _____ Prime Contractor: _____ 1st Tier Sub-Contractor: _____

Payment Reporting Period: From: _____ To: _____

Instructions: All Contractors making payments to Contractors/Subcontractors/Suppliers/Service Providers, regardless of their tier or DBE status, are required to complete and submit this form to the Mn/DOT Office of Civil Rights (OCR), each time payments are made to sub-contractors until final payment is made. Failure to comply with this form and Minnesota's prompt payment law may cause progress payments to be withheld. Submit one copy of this form to the Mn/DOT OCR and one copy to the Project Engineer, no later than ten (10) days after receiving payment from Mn/DOT.

Contractor Information		Original Contract Amount	Committed DBE %	Actual DBE % to Date
Name:				
Address:				
Phone:				
Name of Subcontractor/Supplier	DBE? (Check if Yes)	Description of Work	Subcontract Amount	
1.	<input type="checkbox"/>	1.	1.	
2.	<input type="checkbox"/>	2.	2.	
3.	<input type="checkbox"/>	3.	3.	
4.	<input type="checkbox"/>	4.	4.	
5.	<input type="checkbox"/>	5.	5.	
6.	<input type="checkbox"/>	6.	6.	
Amount of Current Payment	Total Sub-Contractor Payment-To-Date	% Paid to date	Final Payment? Yes/No	
1.	1.	1.	1.	
2.	2.	2.	2.	
3.	3.	3.	3.	
4.	4.	4.	4.	
5.	5.	5.	5.	
6.	6.	6.	6.	
Company Officials Signature & Title		Name & Title of Individual Completing Report (Type or Print Clearly)		
Date Signed				
Title:	Title:			
Phone:	Phone:	Fax:		Fax:

**Minnesota Department of Transportation
Office of Civil Rights**

Contractor Payment Form Instructions

All Contractors making payments to Contractors/Subcontractors/Suppliers/Service Providers, regardless of their tier or DBE status, are required to complete and submit this form to the Mn/DOT Office of Civil Rights (OCR), each time payments are made to sub-contractors until final payment is made. Failure to comply with this form and Minnesota's prompt payment law may cause progress payments to be withheld. Submit one copy of this form to the Mn/DOT OCR and one copy to the Project Engineer, no later than ten (10) days after receiving payment from Mn/DOT.

State Project Number: As identified by Mn/DOT

Prime Contractor: The contractor who was awarded the project.

1st Tier Sub-Contractor: If a subcontractor has a subcontractor, list the 1st tier sub here and then list all of the 2nd tier Subcontractor(s) in the Name of Subcontractor/Supplier area. *All areas should be filled in regarding the prime as well.*

Payment Reporting Period: This should reflect the current payment period.

Contractor Information: Contractor's information who is making the payments. This must be filled out completely.

Original Contract Amount: Prime contractor's contract dollar amount.

Committed DBE%: The DBE commitment certified in the prime's bid is the minimum percentage of DBE participation on the project.

Actual DBE % to Date: The percent met to date.

Name of Subcontractor/Supplier: Company who is working for the prime contractor on this project.
(If a sub was contracted for more than one contract, list each contract separately.)

DBE?: Check this box if the subcontractor is a certified DBE in Minnesota. You can find a listing of the DBE firms certified in Minnesota at <http://www.dot.state.mn.us/eoocm/ucpdirectory.html>.

Description of Work: The type of work the subcontractor was contracted for.

Subcontract Amount: The dollar amount the subcontractor was contracted for.

Amount of Current Payment: The current dollar amount being paid to the sub.

Total Sub-Contractor Payment-to-Date: Total dollar amount paid to the sub including the current payment.

% Paid to Date: Percentage of total payments made in comparison to the prime's award amount.

Final Payment?: Indicate whether this is the final payment being made to the sub.

Company Officials Signature & Title: Self explanatory

Name & Title of Individual Completing Report: Self explanatory

If you have questions on completing the form, call the Office of Civil Rights at (651) 366-3073.

DBE Total Payment Affidavit

Pursuant to Mn/DOT Standard Specifications for Construction, Section 1908, the following DBE Total Payment Affidavit shall be executed by the Prime Contractor after all work contracted to be performed by DBEs has been satisfactorily completed. Identify each DBE firm that worked on the project and the dollar amount of the subcontract. If the dollar value of a DBE firm's total work is less than the DBE's original subcontract, please attach an explanation.

State Project Number: _____

STATE OF MINNESOTA
COUNTY OF _____

I, _____, being first duly sworn, state as follows:
(Full Name)

1. I am the authorized representative of _____ (Name of Individual, Company, Partnership or Corporation) and I have the authority to make this affidavit for and on behalf of said Prime Contractor.

2. The following DBE Subcontractors/Suppliers/Service Providers/Sub-Consultants have performed work on the above project with a total dollar value of:

	Name of DBE Firm	Dollar Amount of Subcontract	Total Dollar Amount
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			

3. I have fully informed myself regarding the accuracy of the statements made in this Affidavit.

Signed: _____
(Prime Contractor or Authorized Representative)

Subscribed and sworn to before me
This _____ day of _____, 20____

(Notary Public)

My commission expires _____, 20____

Prepare Affidavit in duplicate. Submit one original to the Project Engineer, and one original to:
Mn/DOT's Office of Civil Rights
395 John Ireland Blvd., MS 170
St. Paul, MN 55155

No. 1908 – Standard Specifications for Construction

Unless the Contractor has presented an Affidavit showing the total dollar amounts of work performed by Disadvantaged Business Enterprises (DBE), final payment may be withheld.

EQUAL EMPLOYMENT OPPORTUNITY (EEO) SPECIAL PROVISIONS

This section of Special Provisions contains the Equal Employment Opportunity (EEO) rules and regulations for highway construction projects in Minnesota which are federally and/or State funded.

The source of funding determines which EEO regulations and goals (Federal and/or State goals) apply to a specific project. When a project contains funding from both Federal and State sources, both sets of regulations apply, and the Minnesota Department of Transportation (MnDOT) monitors and reviews projects at both levels.

If the project contains any Federal funding, and has a total dollar value exceeding \$10,000, Federal EEO regulations and goals apply (pages 2, 6, 7-8, 9-14, 15, 16-17, 22-26, 27-38). The MnDOT Office of Civil Rights monitors and reviews these projects on behalf of the Federal Highway Administration (FHWA), under Federal statutes (23 USC 140) and rules (23 CFR 230).

If the project contains any State funding, and has a total dollar value exceeding \$100,000, State EEO regulations and goals apply (pages 2, 3, 4, 5, 6, 9-14, 16-22). MnDOT's Office of Civil Rights monitors and reviews these projects in conjunction with the Minnesota Department of Human Rights under Minnesota Statutes §363A.36 and its accompanying rules.

MnDOT has established a single review and monitoring process which meets both Federal and State requirements.

Please note that Pages 23-38 of these Special Provisions may be omitted from projects with no Federal funding.

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**NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION
TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY
(23 USC 140, 23 CFR 230 and Minnesota Statute §363A.36)**

1. The offerer's or bidder's attention is called to the "Minnesota Affirmative Action Requirements" (EEO Page 4), the "Specific Federal Equal Employment opportunity Responsibilities" (EEO Pages 7-8), the "Standard Federal and State Equal Employment Opportunity Construction Contract Specifications" (EEO Pages 9-14), the "Equal Opportunity Clause" (EEO Page 15) and "Required Contract Provisions - Federal-Aid Construction Contracts" (EEO Pages 27-38).
2. The goals and timetables for minority and women participation, expressed in percentage terms of hours of labor for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as shown on EEO Pages 16-17.

These goals are applicable to all the Contractor's construction work (whether or not it is State or State assisted, Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the regulations in 41 CFR Part 60-4, and/or Minnesota Statutes §363A.36 and its accompanying rules shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) for Federal or federally assisted projects, and Minnesota Statutes §363A.36, and its accompanying rules for State or State assisted projects, and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and women employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority and women employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4 for Federal or federally-assisted projects and/or Minnesota Statutes §363A.36 and its accompanying rules for state or state-assisted projects. Compliance with the goals will be measured against the total work hours performed.

3. If the contract is federally funded, the Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs (OFCCP) within ten working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. If the contract is state funded, the Contractor shall provide written notification to the Compliance Division, Minnesota Department of Human Rights, Freeman Building, 625 Robert Street North, Saint Paul, Minnesota 55155 within ten working days of award of any construction subcontract in excess of \$100,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the Subcontractor; employer identification number of the Subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is the county or counties of the State of Minnesota where the work is to be performed.

**NOTICE TO ALL PRIME AND SUBCONTRACTORS
PRE-AWARD REPORTING REQUIREMENTS**

In order to ensure compliance with Federal and State laws and regulations (23 USC 140, and 23 CFR 230, and Minnesota Statutes §363A.36) and to ensure Mn/DOT's ability to monitor and enforce compliance efforts, the following requirements apply if the apparent low bid exceeds \$ 5,000,000.00:

- 1) The Apparent Low Bidder ("ALB") must provide to Mn/DOT the "EEO-8 Form" (also entitled "EEO Compliance Review Report"), which must provide detail on the contractor's total company workforce in the State of Minnesota during the twelve month period preceding July 30th of the previous year (Office and/or clerical personnel need not to be included).
- 2) The ALB must provide to Mn/DOT a work plan for meeting the minority and women employment goals established by the Minnesota Department of Human Rights, for the project in question. The work plan must include, at a minimum (1) how the ALB will incorporate its current minority and women employees in the ALB's efforts to meet the established goals; and (2) a contingency plan if the ALB has determined that its current workforce is not sufficient in order to achieve the established employment goals. If the ALB relies in whole or in part upon unions as a source of employees, then the ALB must (1) include a list of established organizations that are likely to yield qualified minority and women candidates if those union(s) are unable to provide a reasonable flow of minority and women candidates in their work plan; and (2) document the method by which these organizations will refer candidates to the ALB for employment opportunities. All bidders are hereby notified that the U.S. Department of Labor has determined that a contractor will not be excused from complying with the Federal and State laws and regulations cited above based solely on the fact that a contractor has a collective bargaining agreement with a union providing for the union to be the exclusive source of referral and that the union failed to refer minority employees. A contractor may obtain a list of organizations likely to yield qualified minority and women candidates from the Mn/DOT Office of Civil Rights.
- 3) The ALB must provide to Mn/DOT the ALB's total workforce and labor projections for the project (represented in hours), the ALB's projected total number of minority hours for the project, and the ALB's projected total number of women hours for the project. The details must include the trade(s) that will be utilized in order to complete the project.

The ALB must submit documents as required to comply with this section no later than five business days after the date that bids for the contract are opened. The five day period starts the business day following the date that bids were opened. The required documents must be received prior to Contract Award, and must be sent to the Mn/DOT Office of Civil Rights – 395 John Ireland Blvd., Mail Stop 170 St. Paul, MN 55155-1899. Submittal of the documents described in (1), (2) and (3) is required for contract award to the ALB. The submitted documents will be used as a tool to assist contractors in meeting employment goals; the content itself will not be evaluated for the purpose of determining contract award.

MINNESOTA AFFIRMATIVE ACTION REQUIREMENTS

1. It is hereby agreed between the parties to this contract that Minnesota Statutes, Section §363A.36, and its accompanying rules are incorporated into any contract between these parties based upon this specification or any modification of it. A copy of Minnesota Statutes, Section §363A.36, and its accompanying rules is available upon request from the contracting agency. The Contractor hereby agrees to comply with the rules and relevant orders of the Minnesota Department of Human Rights issued pursuant to the Minnesota Human Rights Act.
2. It is hereby agreed between the parties to this contract that this agency requires that the Contractor meet affirmative action criteria as provided for by Minnesota Statutes §363A.36 and its accompanying rules. It is the intent of the Minnesota Department of Transportation to fully carry out its responsibility for requiring affirmative action, and to implement sanctions for failure to meet these requirements. Failure by a contractor to implement an affirmative action plan, meet project employment goals for minority and women employment or make a good faith effort to do so may result in revocation of his/her Certificate of Compliance or suspension or revocation of the contract (Minnesota Statutes §363A.36).
3. Under the affirmative action obligation imposed by the Human Rights Act, Minnesota Statutes, Section §363A.36, contractors shall take affirmative action to employ and advance in employment minority, female, and qualified disabled individuals at all levels of employment. Affirmative action must apply to all employment practices, including but not limited to hiring, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship. The Contractor shall recruit, hire, train and promote persons in all job titles, without regard to race, color, creed, religion, sex, national origin, marital status, status with regard to public assistance, physical or mental disability, sexual orientation or age except where such status is a bona fide occupational qualification. These affirmative action requirements of the Minnesota Human Rights Act are consistent with but broader than the Federal requirements as covered in this contract.
4. Affirmative Action for disabled workers. The Contractor shall not discriminate against any employee or applicant for employment because of a physical or mental disability in regard to any position for which the employee or applicant for employment is qualified. The Contractor agrees to take affirmative action to employ, advance in employment, and otherwise treat qualified disabled individuals without discrimination based upon their physical or mental disability in all employment practices such as employment, upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training (including apprenticeship). In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with Minnesota Statutes, section §363A.36 and the rules and relevant orders of the Minnesota Department of Human Rights pursuant to the Minnesota Human Rights Act.
5. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the commissioner of the Minnesota Department of Human Rights. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment minority, women and qualified disabled employees and applicants for employment, and the rights of applicants and employees. **A poster entitled "Contractor Non-discrimination is the Law" may be obtained from: Compliance Unit, Minnesota Department of Human Rights, Freeman Building, 625 Robert Street North, Saint Paul, Minnesota 55155. (651) 539-1100, TTY 296-1283, Toll Free 1-800-657-3704.**
6. The Contractor shall notify each labor union or representative of workers with which he/she has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Minnesota Statutes, section §363A.36 of the Minnesota Human Rights Act, and is committed to take affirmative action to employ and advance in employment minority, women and qualified physically and mentally disabled individuals.

APPROPRIATE WORK PLACE BEHAVIOR ON Mn/DOT CONSTRUCTION PROJECTS UTILIZING STATE FUNDS

It is the Minnesota Department of Transportation's (MnDOT's) policy to provide a workplace free from violence, threats of violence, harassment and discrimination. MnDOT has established a policy of zero tolerance for violence in the workplace. Contractors who perform work on MnDOT construction projects, or local government entities or public agencies utilizing state funds on highway construction projects, shall maintain a workplace free from violence, harassment and discrimination (See definitions, below).

Definitions:

1. Violence is the threatened or actual use of force which results in or has a high likelihood of causing fear, injury, suffering or death. Employees are prohibited from taking reprisal against anyone who reports a violent act or threat.

2. Harassment is the conduct of one employee (toward another employee) which has the purpose or effect of 1) unreasonably interfering with the employee's work performance, and/or 2) creating an intimidating, hostile or offensive work environment. Harassment is not legitimate job-related efforts of supervisor to direct/evaluate an employee or to have an employee improve work performance.

A. Unlawful discriminatory harassment is harassment which is based on these characteristics: race, color, creed, religion, national origin, sex, disability, age, marital status, status with regard to public assistance or sexual orientation. Managers, supervisors and employees shall not take disciplinary or retaliatory action against employees who make complaints of sexual harassment.

Sexual harassment is unwelcome sexual advances, requests for sexual favors, or sexually motivated physical contact, or other verbal or physical conduct or communication of a sexual nature, when submission to that conduct or communication is 1) made a term or condition, either explicitly or implicitly, of obtaining employment; or 2) is used as a factor in decisions affecting an individual's employment; or 3) when that conduct or communication has the purpose or effect of substantially interfering with an individual's employment or creating an intimidating, hostile or offensive work environment, and the employer knows or should have known of the existence of the harassment and fails to take timely and appropriate action. Examples include but are not limited to insulting or degrading sexual remarks or conduct; threats, demands or suggestions that status is contingent upon toleration or acquiescence to sexual advances; displaying in the workplace sexually suggestive objects, publications or pictures, or retaliation against employees for complaining about the behavior cited above or similar behaviors.

B. General harassment is harassment which is not based on the above characteristics. Examples may include, but are not limited to: physically intimidating behavior and/or threats of violence; use of profanity (swearing), vulgarity; ridiculing, taunting, belittling or humiliating another person; inappropriate assignments of work or benefits; derogatory name calling.

3. Discrimination includes actions which cause a person, solely because of race, color, creed, religion, national origin, sex, disability, age, marital status, status with regard to public assistance or sexual orientation to be subject to unequal treatment.

Prime Contractors who work on MnDOT projects shall ensure that their managers, supervisors, foremen/women and employees are familiar with MnDOT's policy on appropriate work place behavior; and shall ensure that their subcontractors are familiar with this policy. Managers, supervisors and foremen/women will respond to, document, and take appropriate action in response to all reports of violence, threats of violence, harassment or discrimination. Failure to comply with this policy may result in cancellation, termination or suspension of contracts or subcontracts currently held and debarment from further such contracts or subcontracts as provided by statute. If you need additional information or training regarding this policy, please contact the Office of Civil Rights at (651) 366-3073.

NOTICE TO ALL PRIME AND SUBCONTRACTORS REPORTING REQUIREMENTS

1. In order to monitor compliance with Federal Statutes 23 USC 140 and 23 CFR 230, and Minnesota Statutes §363A.36, all prime contractors and subcontractors are required to complete a Mn/DOT Monthly Employment Compliance Report each month for each project (Form EEO-13, sample copy at EEO Pages 20-21.) Prime contractors are also required to complete a Contractor Employment Data Report (Form EEO-12, sample copy at EEO Pages 18-19) once prior to work commencing on the project, unless one has been completed already within the calendar year.

The prime contractor of each project collects Monthly Employment Compliance Reports from each subcontractor who performed work during the month, and completes a Monthly Employment Compliance Report on its own work force. **For the month of July only, an EEO-13 is required for each payroll period within the month of July.** The prime contractor submits the EEO-13 forms to the Mn/DOT Project Engineer by the 15th day of the subsequent month.

Failure to submit the required reports in the allowable time frame will be cause for the imposition of contract sanctions.

It is the intent of Mn/DOT to implement monitoring measures on each project to ensure that each prime contractor and subcontractor is promoting the full realization of equal employment opportunities. Any project may be scheduled for an in depth on-site contract compliance review. During the scheduled on-site review, the Contractor will be required to provide to Mn/DOT documentation of its "good faith efforts" as shown in EEO Pages 10-13, at 7 a-p of this contract.

2. If a Federally funded project requires On-the-Job-Training (OJT) participation, information is provided in the contract and can be located by referring to the Table of Contents for Division S. (OJT is also listed as a bid line item under Trainees.) When a contract requires OJT participation, the Prime Contractor shall submit a training plan as indicated in the Proposal. The training plan shall include the job classification titles of trainees, planned training activities and the approximate start date of trainees.
3. When a Contractor selects a trainee applicant for OJT, the Contractor completes an On the Job Training Program-Trainee Assignment form (sample copy at EEO Page 23) and submits it to the Contract Compliance Specialist (CCS) assigned to the project for approval. The CCS notifies the Contractor and Project Engineer when the applicant is approved.
4. Hours of work performed by OJT employees shall be documented on a monthly basis on the Certification of On-The-Job Training Hours form, (Mn/DOT Form No. 21860, sample copy at EEO Page 24). The Contractor shall submit the original and one copy to the Project Engineer, and one copy to the CCS assigned to the project.

Do not remove forms from this contract. Please duplicate forms from the copies in this contract, or the Mn/DOT Office of Civil Rights will provide these forms upon request. Please call the Office of Civil Rights, (651) 366-3073.

SPECIFIC FEDERAL EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES (23 CFR 230, Subpart A, Appendix A, FAPG June 6, 1996)

1. General.

a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required contract Provisions (Form PR-1273 or 1316, as appropriate) and these Special Provisions which are imposed pursuant to Section 140 of title 23, U.S.C., as established by Section 22 of the Federal-Aid Highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract Provisions.

b. The contractor will work with the State highway agencies and the Federal Government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract.

c. The contractor and all his/her subcontractors holding subcontracts not including material suppliers, of \$10,000 or more, will comply with the following minimum specific requirement activities of equal employment Opportunity: (The equal employment opportunity requirements of Executive Order 11246, as set forth in volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway program Manual, are applicable to material suppliers as well as contractors and subcontractors.) The contractor will include these requirements in every subcontract of \$10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

2. Equal Employment Opportunity Policy.

The contractor will accept as his operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote their full realization of equal employment through a positive continuing program:

It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre apprenticeship, and/or on-the-job training.

3. Equal Employment Opportunity Officer. The contractor will designate and make known to State highway agency contracting officers

an equal employment opportunity officer (hereinafter referred to as the EEO Officer) who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. Dissemination of Policy.

a. All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action will be made fully cognizant of, and will implement, the contractor's equal employment opportunity policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

(1). Periodic meetings of supervisory and personnel office staff will be conducted before the start of work and then not less often than once every six months, at which time the contractor's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

(2). All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official, covering all major aspects of the contractor's equal employment opportunity obligations within thirty days following their reporting for duty with the contractor.

(3). All personnel who are engaged in direct recruitment for the project will be instructed by the EEO officer or appropriate company official in the contractor's procedures for locating and hiring minority group employees.

b. In order to make the contractor's equal employment policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the contractor will take the following actions:

(1). Notices and posters setting forth the contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

(2). The contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

5. Recruitment.

a. When advertising for employees, the contractor will include in all advertisements for employees the notation "An Equal Opportunity Employer." All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

b. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the contractor will, through his/her EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where the implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.

6. Personnel Actions. Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, or national origin. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each

SPECIFIC FEDERAL EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES (cont.)

classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his/her obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all his avenues of appeal.

7. Training and Promotion.

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e. apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event the Training Special Provision is provided under this contract, this subparagraph will be superseded as indicated in Attachment 2.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The Contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

8. Unions. If a contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as

agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group members and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the State highway department and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, or national origin; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the State highway agency.

9. Subcontracting.

a. The contractor will use his best efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of minority-owned construction firms from State highway agency personnel.

b. The contractor will use his best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

10. Records and Reports:

a. The contractor shall keep such records as necessary to determine compliance with the contractor's equal employment opportunity obligations. The records kept by the contractor will be designed to indicate:

(1) The number of minority and non minority group members and women employed in each work classification on the project.

(2) The progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to contractor's who rely in whole or in part on unions as a source of their work force),

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and

(4) The progress and efforts being made in securing the services of minority group subcontractors with meaningful minority and female representation among their employees.

b. All such records must be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State highway agency and the Federal Highway Administration.

c. The contractors will submit an annual report to the State highway agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR-1391. If on-the-job training is being required by a "Training Special Provision", the contractor will be required to furnish Form FHWA 1409.

**STANDARD FEDERAL AND STATE EQUAL EMPLOYMENT OPPORTUNITY
CONSTRUCTION CONTRACT SPECIFICATIONS
(41 CFR 60-4.3 and Minnesota Statute §363A.36)**

Unless noted, the following apply to both Federal/federally assisted projects and State/state assisted projects. Item 3 applies to Federal/federally assisted projects only

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c. "Employer Identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 (\$100,000 for State projects) the provisions of these specifications and the Notice which contains the applicable goals for minority and women participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4, 5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work on the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7(a) to (p) of these specifications (itemized as 4 [a] to [o], Minnesota Rules

**STANDARD FEDERAL AND STATE EEO CONSTRUCTION
CONTRACT SPECIFICATIONS (cont.)**

5000.3535). The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minorities and utilization the Contractor should (shall, for State or state assisted projects) reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor shall make substantially uniform progress toward its goals in each craft during the period specified. Covered construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Federal goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any office of Federal Contract Compliance programs or from Federal procurement contracting officers. State goals are published periodically in the State Register in notice form, and may be obtained from the Minnesota Department of Human Rights or the Minnesota Department of Transportation Office of Civil Rights. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement nor the failure by a union, with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications and Executive Order 11246 and its associated rules and regulations for Federal or federally assisted projects, and Minnesota Statutes, Section §363A.36 of the Minnesota Human Rights Act, or the rules adopted under the Act for State or state assisted projects.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees shall be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees shall be trained according to training programs approved by the Minnesota Department of Human Rights, the Minnesota Department of Labor and Industry, or the United States Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications must be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following (referred to in Minnesota Rules 5000.3535 as items 4(a) to (o):
 - (a) Ensure and maintain, or for State or state assisted projects make a good faith effort to maintain, a working environment free of harassment, intimidation, and coercion at all sites and in all facilities at which the Contractor's employees are assigned to work. For

**STANDARD FEDERAL AND STATE EEO CONSTRUCTION
CONTRACT SPECIFICATIONS (cont.)**

Federal or federally assisted projects, the Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or women individuals working at such sites or in such facilities.

- (b) Establish and maintain a current list of minority and women recruitment sources, provide written notification to minority and women recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
- (c) Maintain a current file of the names, addresses, and telephone numbers of each minority and woman off-the-street applicant and minority or woman referral from a union, a recruitment source, or community organization and of what action was taken with respect to each individual. If the individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore along with whatever additional actions the Contractor may have taken.
- (d) Provide immediate written notification to the commissioner of the Minnesota Department of Human Rights for State or state assisted projects, or the director of the Office of Federal Contract Compliance for Federal or federally assisted projects, when the union, or unions with which the Contractor has a collective bargaining agreement, has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
- (e) Develop on-the-job training opportunities and/or participate in training programs for the areas which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the State of Minnesota for State or state assisted projects or the Department of Labor, for Federal or federally assisted projects. The Contractor shall provide notice of these programs to the sources compiled under (b).
- (f) Disseminate the Contractor's equal employment opportunity policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its equal employment opportunity obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and women employees at least once a year; and by posting the company equal employment opportunity policy on bulletin boards accessible to all employees at each location where construction work is performed.

**STANDARD FEDERAL AND STATE EEO CONSTRUCTION
CONTRACT SPECIFICATIONS (cont.)**

- (g) Review, at least annually, the company's equal employment opportunity policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions; including specific review of these items with onsite supervisory personnel such as superintendents, general foremen, etc., prior to the first day of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
- (h) Disseminate the Contractor's equal employment opportunity policy externally by including it in any advertising in the news media, specifically including minority and women news media, and providing written notification to and discussing the Contractor's equal employment opportunity policy with other contractors and subcontractors with whom the Contractor does or anticipates doing business.
- (i) Direct its recruitment efforts, both oral and written, to minority, women, and community organizations; to schools with minority and women students; and to minority and women recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations, such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- (j) Encourage present minority and women employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and women youth, both on the site and in other areas of a Contractor's work force.
- (k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3. (This requirement applies only to Federal and federally assisted projects.)
- (l) Conduct, at least annually, an inventory and evaluation at least of all minority and women personnel for promotional opportunities; and encourage these employees to seek or to prepare for, through appropriate training, such opportunities. (This is Item 4(k) in Minnesota Rules.)
- (m) Ensure that seniority practices, job classifications, work assignments, and other personnel practices do not have a discriminatory effect by continually monitoring all personnel and employment-related activities to ensure that the equal employment opportunity policy and the Contractor's obligations under these specifications are being carried out. (This is item 4(l) in Minnesota Rules.)

**STANDARD FEDERAL AND STATE EEO CONSTRUCTION
CONTRACT SPECIFICATIONS (cont.)**

- (n) Ensure that all facilities and company activities are non segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes. (This is item 4(m) in Minnesota Rules.)
 - (o) Document and maintain a record of all solicitations or offers for subcontracts from minority and women construction contractors and suppliers, including circulation of solicitations to minority and women contractor associations and other business associations. (This is item 4(n) in Minnesota Rules.)
 - (p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's equal employment opportunity policies and affirmative action obligations. (This is item 4(o) in Minnesota Rules.)
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7(a) to (p) for Federal or federally assisted projects, and 4(a)-(o) for State or state assisted projects). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7(a) to (p) or 4(a) to (o) of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and women work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor however, is required to provide equal employment opportunity and to take affirmative action for all minority groups both male and female, and all women both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order for Federal or federally assisted projects, or Minnesota Rules for State or state assisted projects, if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order or Minnesota Rules part 5000.3520 if a specific minority group is under-utilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, creed, religion, sex, or national origin. Minnesota Statutes §363A.36, part 5000.3535 (Subp. 7) also prohibits discrimination with regard to marital status, status with regard to public assistance, disability, age, or sexual orientation.

**STANDARD FEDERAL AND STATE EEO CONSTRUCTION
CONTRACT SPECIFICATIONS (cont.)**

11. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts under the federal Executive Order 11246 or a local human rights ordinance, or whose certificate of compliance has been suspended or revoked pursuant to Minnesota Statutes, Section §363A.36.
12. The Contractor shall carry out such sanctions for violation of these specifications and of the equal opportunity clause, including suspension, termination, and cancellation of existing contracts as may be imposed or ordered pursuant to Minnesota Statutes, Section §363A.36, and its implementing rules for State or state assisted projects, or Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs for Federal or federally assisted projects. Any contractor who fails to carry out such sanctions shall be in violation of these specifications and Minnesota Statutes, Section §363A.36, or Executive Order 11246 as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications (paragraph 4 in Minnesota Rules 5000.3535), so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of these Specifications or Minnesota Statutes, Section §363A.36 and its implementing rules, or Executive Order 11246 and its regulations, the commissioner or the director shall proceed in accordance with Minnesota Rules part 5000.3570 for State or state assisted projects, or 41 CFR 60-4.8 for Federal or federally assisted projects.
14. The Contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Minnesota Department of Human Rights or the Government, and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (for example, mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing provided in this part shall be construed as a limitation upon the application of other state or federal laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents.

EQUAL OPPORTUNITY CLAUSE
(41 CFR Part 60-1.4 b, 7-1-96 Edition)

The applicant hereby agrees that it will incorporate or cause to be incorporated into any contract for construction work, or modification thereof, as defined in the regulations of the Secretary of Labor at 41 CFR Chapter 60, which is paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to a grant, contract, loan, insurance, or guarantee, the following equal opportunity clause:

During the performance of this contract, the Contractor agrees as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoffs or termination; rates of pay or other forms of compensation; and, selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the State Highway Agency (SHA) setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.
3. The Contractor will send to each labor union or representative of workers with which the Contractor has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representative of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The Contractor will comply with all provisions of Executive Order 11246, Equal Employment Opportunity, dated September 24, 1965, and of the rules, regulations (41 CFR Part 60), and relevant orders of the Secretary of Labor.
5. The Contractor will furnish all information and reports required by Executive Order 11246 and by rules, regulations, and orders of the Secretary of Labor, pursuant thereto, and will permit access to its books, records, and accounts by the Federal Highway Administration (FHWA) and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract, or with any of such rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts or federally-assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order 11246 or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
7. The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraph (1) through (7) in every subcontract or purchase order so that such provisions will be binding upon each subcontractor or vendor, unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246. The Contractor will take such action with respect to any subcontract or purchase order as the Secretary of Labor, SHA, or the Federal Highway Administration (FHWA) may direct as a means of enforcing such provisions, including sanctions for noncompliance. In the event a contractor becomes a party to litigation by a subcontractor or vendor as a result of such direction, the contractor may request the SHA to enter into such litigation to protect the interest of the State. In addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: *Provided*, that if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

Minority and Women Employment Goals

County	Federal Goals		State Goals	
	Minority Goal	Women Goal	Minority Goal	Women Goal
Aitkin	2.2%	6.9%	5%	6%
Anoka	2.9%	6.9%	22%	6%
Becker	0.7%	6.9%	6%	6%
Beltrami	2.0%	6.9%	6%	6%
Benton	0.5%	6.9%	3%	6%
Big Stone	2.2%	6.9%	4%	6%
Blue Earth	2.2%	6.9%	4%	6%
Brown	2.2%	6.9%	4%	6%
Carlton	1.2%	6.9%	5%	6%
Carver	2.9%	6.9%	22%	6%
Cass	2.2%	6.9%	6%	6%
Chippewa	2.2%	6.9%	4%	6%
Chisago	2.9%	6.9%	3%	6%
Clay	0.7%	6.9%	6%	6%
Clearwater	2.0%	6.9%	6%	6%
Cook	1.2%	6.9%	5%	6%
Cottonwood	0.8%	6.9%	4%	6%
Crow Wing	2.2%	6.9%	6%	6%
Dakota	2.9%	6.9%	22%	6%
Dodge	0.9%	6.9%	4%	6%
Douglas	2.2%	6.9%	6%	6%
Faribault	2.2%	6.9%	4%	6%
Fillmore	0.9%	6.9%	4%	6%
Freeborn	0.9%	6.9%	4%	6%
Goodhue	2.2%	6.9%	4%	6%
Grant	2.2%	6.9%	6%	6%
Hennepin	2.9%	6.9%	32%	6%
Houston	0.6%	6.9%	4%	6%
Hubbard	2.0%	6.9%	6%	6%
Isanti	2.2%	6.9%	3%	6%
Itasca	1.2%	6.9%	5%	6%
Jackson	0.8%	6.9%	4%	6%
Kanabec	2.2%	6.9%	3%	6%
Kandiyohi	2.2%	6.9%	3%	6%
Kittson	2.0%	6.9%	6%	6%
Koochiching	1.2%	6.9%	5%	6%
Lac Qui Parle	2.2%	6.9%	4%	6%
Lake	1.2%	6.9%	5%	6%
Lake of the Woods	2.0%	6.9%	6%	6%
Le Sueur	2.2%	6.9%	4%	6%
Lincoln	0.8%	6.9%	4%	6%
Lyon	0.8%	6.9%	4%	6%

Minnesota Department of Transportation EEO Special Provisions
Office of Civil Rights

Revised 07/12

County	Federal Goals		State Goals	
	Minority Goal	Women Goal	Minority Goal	Women Goal
Mahnomen	2.0%	6.9%	6%	6%
Marshall	2.0%	6.9%	6%	6%
Martin	2.2%	6.9%	4%	6%
McLeod	2.2%	6.9%	3%	6%
Meeker	2.2%	6.9%	3%	6%
Mille Lacs	2.2%	6.9%	3%	6%
Morrison	2.2%	6.9%	6%	6%
Mower	0.9%	6.9%	4%	6%
Murray	0.8%	6.9%	4%	6%
Nicollet	2.2%	6.9%	4%	6%
Nobles	0.8%	6.9%	4%	6%
Norman	2.0%	6.9%	6%	6%
Olmsted	1.4%	6.9%	4%	6%
Otter Tail	2.2%	6.9%	6%	6%
Pennington	2.0%	6.9%	6%	6%
Pine	2.2%	6.9%	3%	6%
Pipestone	0.8%	6.9%	4%	6%
Polk	1.2%	6.9%	6%	6%
Pope	2.2%	6.9%	6%	6%
Ramsey	2.9%	6.9%	32%	6%
Red Lake	2.0%	6.9%	6%	6%
Redwood	0.8%	6.9%	4%	6%
Renville	2.2%	6.9%	3%	6%
Rice	2.2%	6.9%	4%	6%
Rock	0.8%	6.9%	4%	6%
Roseau	2.0%	6.9%	6%	6%
Scott	2.9%	6.9%	22%	6%
Sherburne	0.5%	6.9%	3%	6%
Sibley	2.2%	6.9%	4%	6%
St. Louis	1.0%	6.9%	5%	6%
Stearns	0.5%	6.9%	3%	6%
Steele	0.9%	6.9%	4%	6%
Stevens	2.2%	6.9%	6%	6%
Swift	2.2%	6.9%	4%	6%
Todd	2.2%	6.9%	6%	6%
Traverse	2.2%	6.9%	6%	6%
Wabasha	0.9%	6.9%	4%	6%
Wadena	2.2%	6.9%	6%	6%
Waseca	2.2%	6.9%	4%	6%
Washington	2.9%	6.9%	22%	6%
Watonwan	2.2%	6.9%	4%	6%
Wilkin	0.7%	6.9%	6%	6%
Winona	0.6%	6.9%	4%	6%
Wright	2.9%	6.9%	3%	6%
Yellow Medicine	2.2%	6.9%	4%	6%

Minnesota Department of Transportation Office of Civil Rights Contractor Employment Data	1. Contractor Name and Address: Phone: _____
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	2. Employment Data a) Name: Last Name, First Name, MI	b) Social Security #	c) New Hire (Y or N)	d) Ethnicity	e) Gender (M or F)	f) Trade/Foreman, Supervisors, Managers	g) Level (A, J, or T)
1.							
2.							
3.							
4.							
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27.							

INSTRUCTIONS FOR EEO-12 CONTRACTOR EMPLOYMENT DATA

This form should be submitted at the Pre-Con to the Project Engineer prior to the start of your first MnDOT construction project for the calendar year (Prime and Subs)

1. Contractor Name and Address self-explanatory.
2. Employment Data information will coincide with your employment records.
 - 2a. Name should be listed First Name, Middle Initial, and Last Name. This will enable MnDOT EEO staff to readily identify individuals on all projects.
 - 2b. Social Security Number self-explanatory.
 - 2c. New Hire is to be indicated with a “Y” for Yes or an “N” for No. “New Hire” is an employee who has not worked for you in any capacity or on any other project within the current calendar year.
 - 2d. Ethnicity can be indicated by Black (B), Hispanic (H), American Indian/Alaskan Native (AI), Asian/Pacific Islander (AP), or White (W).
 - 2e. Gender is to be indicated with an “M” for Males or an “F” for Females.
 - 2f. Trade/Foreman, Supervisors, Managers self-explanatory. List trade that applies unless the employee fits one of the other three categories.
 - 2g. Level “A” is for an Apprentice, “J” is for a Journey Worker, and “T” is for a MnDOT approved Trainee.

If you have questions about filling out this form, contact the Office of Civil Rights at (651) 366-3073.
(Please make copies as you need them.)

This information can be submitted electronically via the web, through MnDOT’s Work force Information Tracking Initiative (WITI) Program. To open a free account to gain access to WITI or to find out more about this possibility please contact MnDOT’s Office of Civil Rights at (651) 366-3015.

Minnesota Department of Transportation EEO Special Provisions
Office of Civil Rights

Revised 07/12

Minnesota Department of Transportation Office of Civil Rights Monthly Employment Compliance Report EEO-13		1. SP <input type="checkbox"/> SAP <input type="checkbox"/> (Check one)		3. Contractor Name:		4. Prime <input type="checkbox"/> Subcontractor <input type="checkbox"/> (check one)		
		SP#		Federal Tax ID:				
		County or City		Street Address:		5. Dollar Amount of Contract:		
		2. Reporting Period to _____		City, State Zip		6. Percent of Completion:		
7. Employment Data a) Name: Last, First Middle Initial		b) Social Security #	c) New Hire (Y or N)	d) Ethnicity	e) Gender M or F	Trade/Foreman, Supervisors, Managers	g) Level (A, J or T)	h) Hours Worked This Period
1.								
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19.								
20.								
8. Contract Goals MINNESOTA GOALS %OBTAINED _____% Minority _____% _____% Women _____%		9. Prepared by: (Signature) _____ Print Name: _____			10. Reviewed by: (Signature) _____ Print Name: _____			
		Title: _____			Title: _____			
		Date: _____			Date: _____			
		Phone: _____			Fax: _____	Phone: _____		Fax: _____

INSTRUCTIONS FOR EEO-13
MONTHLY EMPLOYMENT COMPLIANCE REPORT

- 1.-5. Self-explanatory – State Project #, county project is located in, are you a prime or sub, and contract value.
6. Percent of Completion is the estimated percentage of work completed including this reporting period.
7. Employment Data information will coincide with your employment records. All professional, supervisory and managerial hours actually worked on the project site must be included, whether or not they appear on the certified payroll.
 - 7a. Name should be listed Last Name, First Name, and Middle Initial. This will enable MnDOT EEO staff to readily identify individuals on all projects.
 - 7b. Social Security Number self-explanatory.
 - 7c. New Hire is to be indicated with a “Y” for Yes or an “N” for No. “New Hire” is an employee who has not worked for you in any capacity or on any other project within the current calendar year.
 - 7d. Ethnicity can be indicated by Black (B), Hispanic (H), American Indian/Alaskan Native (AI), Asian/Pacific Islander (AP), or White (W).
 - 7e. Gender is to be indicated with an “M” for Males or an “F” for Females.
 - 7f. Trade/Foreman, Supervisors, Managers list the trade that applies unless the employee fits one of the other three categories.
 - 7g. Level “A” is for an Apprentice, “J” is for a Journey Worker, and “T” is for a MnDOT approved Trainee.
 - 7h. Hours Worked for This Period will be all hours worked by the individual, for each trade, during the specified reporting period.
8. Contract Goals are the percent of total project hours to be worked by minority and women employees. The goals are determined by the geographic location and source of funding for the project. Projects in excess of \$100,000 with any State funding must meet the State Employment Goals. Projects in excess of \$10,000 with any Federal funding must meet the Federal Employment Goals. (See chart on EEO Pages 16-17.) Minority and women employee hours shall be distributed evenly throughout the length of the project and in every trade and craft that performs work on the project.

% Obtained is the percent of the total project hours worked by minority and women employees, up to and including this reporting period.
9. Prepared by Contractor Designee is the signature of the prime or subcontractor’s EEO officer/designee.
10. Reviewed by Project Engineer is the signature of the MnDOT staff monitoring the project.

The Prime Contractor will submit EEO-13 forms for its workforce and all subcontractors to the MnDOT Project Engineer by the 15th day of the month following the month when work was performed. If you have questions about filling out this form, contact the Office of Civil Rights at (651) 366-3073. (Please make copies as you need them.)

This information can be submitted electronically via the web, through MnDOT’s Workforce Information Tracking Initiative (WITI) Program. To open a free account to gain access to WITI or to find out more about this possibility please contact MnDOT’s Office of Civil Rights at (651) 366-3321.

EEO COMPLIANCE REVIEW REPORT

Total Company Workforce
(For 12 Month Period Preceding July 30th of the previous year)

Name and Address of Contractor

Name and Title of Corporate Officer

Name of EEO Officer

Job Categories	Total Employees		Total Minorities		Blacks		Asian/ Pacific Is.		American Indian		Hispanic		On-the-Job Trainees	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Officials (Managers)														
Supervisors														
Foremen/Women														
Clerical														
Equipment Operators														
Mechanics														
Truck Drivers														
Iron Workers														
Carpenters														
Cement Masons														
Electricians														
Pipefitters & Plumbers														
Painters														
Laborers														
Misc. Trades														
Total														
On-the-Job Trainees														



MINNESOTA DEPARTMENT OF TRANSPORTATION
ON-THE-JOB TRAINING PROGRAM
TRAINEE ASSIGNMENT

SP #: _____ Location: _____ District: _____

Project Engineer: _____ Phone: () _____

Prime Contractor: _____ Phone: () _____

Address: _____

City: _____ State: _____ Zip: _____

EEO Officer: _____ Project Manager: _____

Tel: _____

Training Contractor: _____ Phone: () _____

Address: _____

City: _____ State: _____ Zip: _____

EEO Officer: _____ Project Manager: _____

Tel: _____

TRAINEE

Job Title or Trade Classification: _____ Number of Training Hours on this Project: _____

Name: _____ S.S.#: _____

Address: _____ Phone: () _____

City: _____ State: _____ Zip: _____

EEO Officer: _____ Project Manager: _____

Tel: _____

Approximate Start Date: _____

Approximate Completion Date: _____

Is the trainee a member of a certified apprenticeship program?

If YES, verify with Apprenticeship Form or Indenture Number: _____

1. Ethnic Background: Hispanic _____; Black _____; Asian/Pacific Islander _____; White _____; Am. Ind/Alaskan _____ (Verify with Tribal I.D. # or Affiliation _____).
2. Male; _____ Female; _____.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF CIVIL RIGHTS

**CERTIFICATION OF ON-THE-JOB TRAINING HOURS
FEDERAL-AID-PROJECTS**

Contractor: submit original and one copy monthly to the project engineer

CONTRACTOR	REPORTING PERIOD:
ADDRESS	S.P. NO. (LOW):
	F.P. NO.:

TRAINEE	HOURS WORKED PREVIOUSLY	HOURS WORKED THIS PERIOD	TOTAL HOURS TO DATE

AMOUNT OF CLAIM _____ HOURS @ _____ PER HOUR = \$ _____

Progress of Trainee(s) Excellent Very Good Good Below Good

COMMENTS (Please detail any supplementary training offered):

CONTRACTOR:

The undersigned contractor hereby certifies that the listed employees are bonafide trainees as required by the On-the-Job Training Special Provision and that they have worked the hours as reported above.

_____ *Contractor Signature/Title* _____ *Date*

PROJECT ENGINEER:

I hereby certify that the On-the-Job training hours reported above have been reviewed and found correct.

_____ *Engineer Signature/Title* _____ *Date*



Minnesota Department of Transportation EEO Special Provisions
Office of Civil Rights
On-the-Job Training (OJT) Program Approval Form

07/12

The Special Provisions of the contract clearly indicate that training and upgrading of minorities and women toward Journey worker status is the primary objective of the training provisions.

We,		, submit the following training program for (Trade) for approval.
	(Name of Contractor)	

I. Project Information

Contractor Name	S.P. #	County	Prime	Sub
Address	City	State	Zip	
Contact Person/ EEO Officer		Phone #	e-mail address	
Project Goals				
Trainees	Hours			

II. Project Training Plan Information

Trade	# of Trainees Projected	Hourly Assignment per Trainee	Estimated Start Date	Estimated End Date	Recruiting Resource

Planned Training Activities

III. Contractor Acknowledgment Statement.

I understand and will comply fully with the plans and specifications under which this training is being performed, and will report subsequent revisions to the training program as changes occur.

Contractor's Representative Signature	Title	Date

IV. Instruction for the Contractor.

The contractor's proposed training programs must be documented on this form and submitted as indicated in the Proposal. Your Company's compliance with this specification will factor into any and all employment related "Good Faith Effort" determinations.



On-the-Job Training Program Trainee Termination Form

Contractor Name		County	Prime	Sub
Address		City	State	Zip
EEO Officer		Phone #	e-mail address	
Trainee Name		Phone #	Social Security No.	
Address		City	State	Zip
Race/Ethnicity				
<input type="checkbox"/> Hispanic		<input type="checkbox"/> White		<input type="checkbox"/> Asian
<input type="checkbox"/> Black		<input type="checkbox"/> American Indian		<input type="checkbox"/> Other
Gender		Classification/Trade		S.P. #
<input type="checkbox"/> Female	<input type="checkbox"/> Male			
Start Date	Termination Date	Hours Assigned	Hrs Completed	

Reason for Termination/Separation/Layoff:

<input type="checkbox"/> Construction phase completed
<input type="checkbox"/> Death
<input type="checkbox"/> Fired (please explain below)
<input type="checkbox"/> Illness/health problems
<input type="checkbox"/> Lack of transportation and /or travel distance
<input type="checkbox"/> Military duty
<input type="checkbox"/> Relocated
<input type="checkbox"/> Personal
<input type="checkbox"/> Quit to work for another company
<input type="checkbox"/> Other (please explain below)

Please provide comments:

Contractor's Representative Signature	Title	Date
---------------------------------------	-------	------

**MAIL or Fax THE ORIGINAL and MAINTAIN COPY:
395 John Ireland Boulevard
St. Paul, MN 55155-1899
Office of Civil Rights M.S. 170
On-The -Job Training Coordinator
Fax # 651/366-3129**

**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS
Form-1273**

(52 FR 36920, October 2, 1987, revised October 21, 1993, FHWA Electronic Version May 1, 2012)

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

REQUIRED CONTRACT PROVISIONS (cont.)

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

REQUIRED CONTRACT PROVISIONS (cont.)

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

REQUIRED CONTRACT PROVISIONS (cont.)

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any

location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of

REQUIRED CONTRACT PROVISIONS (cont.)

this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit

which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain

REQUIRED CONTRACT PROVISIONS (cont.)

written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the

"Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

REQUIRED CONTRACT PROVISIONS (cont.)

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

REQUIRED CONTRACT PROVISIONS (cont.)

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any

subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its

REQUIRED CONTRACT PROVISIONS (cont.)

own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

REQUIRED CONTRACT PROVISIONS (cont.)

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who

has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

REQUIRED CONTRACT PROVISIONS (cont.)

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier

Covered Transactions" refers to any covered transaction under a

First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently

REQUIRED CONTRACT PROVISIONS (cont.)

debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

APPENDIX A (Short Version)
REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

The Required Contract Provisions for Federal-aid construction contracts, Form FHWA-1273 (Rev. 4-93) is restated here for emphasis:

Section IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

Section IV.2, Classification

2. Classification

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers as defined in Section IV.4(c), when such a classification prevails in the area in which the work is performed.

For implementation reference Section IV.2(c), (d) and (e).

SCHEDULE OF PRICES

NOTICE TO BIDDERS

Particular note should be made in regard to the clarity of numerals (figures) and to the procedure for alterations and the required certificate as directed by Section 1301.

The following abbreviations may be used in item description and unit of measure in the Schedule of Prices.

A	Arch	JA	Jacked
A-S	Antiseepage	LIN FT	Linear Feet
AB	Asbestos Bonded	LG	Long
ACT	Actuated	MAINT	Maintenance
AGG	Aggregate	MATL	Material
ALUM	Aluminum	MGM	1000 Board Feet
ASB	Asbestos	MET	Metal
ASPH	Asphaltic	MOD	Modification
ASSY	Assemblies	MPA	Metal Pipe Arch
B+B	Balled & Burlapped	MTD	Mounted
BC	Bituminous Coated	NON MET	Non Metallic
BIT	Bituminous	NON PERF	Non-Perforated
BLDG	Building	NON REINF	Non-Reinforced
BR	Bridge	OH	Overhead
CAL	Caliper	P-A	Pipe-Arch
CB	Catch Basin	PAVT	Pavement
CEM	Cement	PERF	Perofrated
C and G	Curb and Gutter	PL	Plate
CI	Cast Iron	PNEUM	Pneumatic
C-I-P	Cast-in-Place	PREC	Precast
CL	Class	PREST	Prestressed
COMM	Commercial	PVC	Poly Vinyl Chloride
CONC	Concrete	RCPA	Reinforced Concrete Pipe Arch
COND	Conductor	REINF	Reinforced
CONN	Connection	RELO	Relocation
CONST	Construct	RESTOR	Restoration
CONT	Continuously	RMC	Rigid Metallic Conduit
CP	Cattle Pass	RNMC	Rigid Non Metallic Conduit
CTD	Coated	RDWY	Roadway
CU FT	Cubic Feet	S-G	Sand & Gravel
CU YD	Cubic Yard	SIG	Signal
CULV	Culvert	SPE	Special
CWT	Hundred Weight	SQ FT	Square Feet
DES	Design	SQ YD	Square Yard
DBL	Double	STA	Station
DI	Drop Inlet	STD	Standard
DIAM	Diameter	STL	Steel
DRWY	Driveway	STKPL	Stockpile
EXC	Excavation	STR	Strength
EXP	Expansion	STRUCT	Structural
FAB	Fabric	SPPA	Structural Plate Pipe Arch
FE	Fence	SYS	System
FERT	Fertilizer	T	Traffic
F+I	Furnish & Install	TBR	Timber
FOUND	Foundation	TEMP	Temporary
FT LG	Feet Long	THERMO	Thermoplastic
FURN	Furnish	TRTD	Treated
GA	Gauge	UNDERGRD	Underground
GRAN	Granular	UNTRTD	Untreated
HI	High	VAR	Variable
INP	In Place	VM	Vehicular Measure
INST	Install	WEAR	Wearing

State Project No. SP 6284-162, SP 062-609-006, SAP 062-593-003

GRAND TOTAL \$ _____

The undersigned hereby acknowledges that all requirements included in the hard copy proposal, addenda, amendments, plans, standard specifications, and supplemental specifications are a part of this bid and contract.

Signed: _____

PROPOSAL GUARANTY required by 1208 of the Specifications: "A (certified check) (bond), prepared as required by 1208 of the Specifications and payable to the **Ramsey County** Treasurer, in an amount equal to at least 5% of the total amount of the bid is submitted herewith as a proposal guaranty.

DISADVANTAGED BUSINESS ENTERPRISE CERTIFICATION: Our firm will meet a minimum goal of ____% of this contract to Disadvantaged Business Enterprises. A bidder who fails to indicate a specific goal above must fulfill the total goals indicated in the proposal.

NON-COLLUSION AFFIDAVIT: A Non-Collusion Affidavit is found in this proposal which must be signed by each bidder.

RECEIPT OF ADDENDA as required by 1210 of the Specifications:

The undersigned hereby acknowledges receipt of and has considered:

Addendum No. ____ Dated _____ Addendum No. ____ Dated _____

Addendum No. ____ Dated _____ Addendum No. ____ Dated _____

Signed: _____

EXECUTION OF PROPOSAL as required by 1206 of the Specifications:

This proposal dated the ____ day of _____, 20

Signed: _____, P.O. Address _____ as an individual.

Signed: _____, P.O. Address _____ as an individual.

doing business under the name and style of

Signed: _____, for _____ a partnership.

NAME

BUSINESS ADDRESS

Signed: _____, for _____ a corporation,

incorporated under the laws of the State of Minnesota

Name of President _____ Business Address _____

Name of Vice-President _____ Business Address _____

Name of Secretary _____ Business Address _____

Name of Treasurer _____ Business Address _____

(NOTE: Signatures shall comply with 1206 of the Specifications.)

THE FOLLOWING CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS SHALL BE EXECUTED BY THE BIDDER.

The bidder hereby certifies the he/she has _____, has not _____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114 or 11246, and that he/she has _____, has not _____, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

(Company)

By: _____

(Title)

Date: _____

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41CFR 60-1.7(b)(1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are exempt from the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

NON-COLLUSION AFFIDAVIT

The following Non-Collusion Affidavit shall be executed by the bidder:

State Project No. _____

Federal Project No. _____

State of Minnesota _____)

) ss

County of _____)

I, _____, do state under penalty of
(name of person signing this affidavit)

perjury under 28 U.S.C. 1746 of the laws of the United States:

(1) that I am the authorized representative of _____

(name of person, partnership or corporation submitting this proposal)

and that I have the authority to make this affidavit for and on behalf of said bidder;

(2) that, in connection with this proposal, the said bidder has not either directly or indirectly entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding;

(3) that, to the best of my knowledge and belief, the contents of this proposal have not been communicated by the bidder or by any of his/her employees or agents to any person who is not an employee or agent of the bidder or of the surety on any bond furnished with the proposal and will not be communicated to any person who is not an employee or agent of the bidder or of said surety prior to the official opening of the proposal, and

(4) that I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed: _____
(bidder or his authorized representative)

**ATTACHMENT A
PRIME CONTRACTOR RESPONSE**

RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

STATE PROJECT NUMBER: _____

This form includes changes by statutory references from the Laws of Minnesota 2015, chapter 64, sections 1-9. This form must be submitted with the response to this solicitation. A response received without this form, will be rejected.

<p>Minn. Stat. § 16C.285, Subd. 7. IMPLEMENTATION. ... any prime contractor or subcontractor or motor carrier that does not meet the minimum criteria in subdivision 3 or fails to verify that it meets those criteria is not a responsible contractor and is not eligible to be awarded a construction contract for the project or to perform work on the project...</p>	
<p>Minn. Stat. § 16C.285, Subd. 3. RESPONSIBLE CONTRACTOR, MINIMUM CRITERIA. "Responsible contractor" means a contractor that conforms to the responsibility requirements in the solicitation document for its portion of the work on the project and verifies that it meets the following minimum criteria:</p>	
(1)	<p>The Contractor:</p> <ul style="list-style-type: none">(i) is in compliance with workers' compensation and unemployment insurance requirements;(ii) is in compliance with Department of Revenue and Department of Employment and Economic Development registration requirements if it has employees;(iii) has a valid federal tax identification number or a valid Social Security number if an individual; and(iv) has filed a certificate of authority to transact business in Minnesota with the Secretary of State if a foreign corporation or cooperative.
(2)	<p>The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 177.24, 177.25, 177.41 to 177.44, 181.13, 181.14, or 181.722, and has not violated United States Code, title 29, sections 201 to 219, or United States Code, title 40, sections 3141 to 3148. For purposes of this clause, a violation occurs when a contractor or related entity:</p> <ul style="list-style-type: none">(i) repeatedly fails to pay statutorily required wages or penalties on one or more separate projects for a total underpayment of \$25,000 or more within the three-year period, provided that a failure to pay is "repeated" only if it involves two or more separate and distinct occurrences of underpayment during the three-year period;(ii) has been issued an order to comply by the commissioner of Labor and Industry that has become final;(iii) has been issued at least two determination letters within the three-year period by the Department of Transportation finding an underpayment by the contractor or related entity to its own employees;(iv) has been found by the commissioner of Labor and Industry to have repeatedly or willfully violated any of the sections referenced in this clause pursuant to section 177.27;(v) has been issued a ruling or findings of underpayment by the administrator of the Wage and Hour Division of the United States Department of Labor that have become final or have been upheld by an administrative law judge or the Administrative Review Board; or(vi) has been found liable for underpayment of wages or penalties or misrepresenting a construction worker as an independent contractor in an action brought in a court having jurisdiction. Provided that, if the contractor or related entity contests a determination of underpayment by the Department of Transportation in a contested case proceeding, a violation does not occur until the contested case proceeding has concluded with a determination that the contractor or related entity underpaid wages or penalties;*

(3)	The contractor or related entity is in compliance with and, during the three-year period before submitting the verification, has not violated section 181.723 or chapter 326B. For purposes of this clause, a violation occurs when a contractor or related entity has been issued a final administrative or licensing order;*
(4)	The contractor or related entity has not, more than twice during the three-year period before submitting the verification, had a certificate of compliance under section 363A.36 revoked or suspended based on the provisions of section 363A.36, with the revocation or suspension becoming final because it was upheld by the Office of Administrative Hearings or was not appealed to the office;*
(5)	The contractor or related entity has not received a final determination assessing a monetary sanction from the Department of Administration or Transportation for failure to meet targeted group business, disadvantaged business enterprise, or veteran-owned business goals, due to a lack of good faith effort, more than once during the three-year period before submitting the verification;*
	* Any violations, suspensions, revocations, or sanctions, as defined in clauses (2) to (5), occurring prior to July 1, 2014, shall not be considered in determining whether a contractor or related entity meets the minimum criteria.
(6)	The contractor or related entity is not currently suspended or debarred by the federal government or the state of Minnesota or any of its departments, commissions, agencies, or political subdivisions that have authority to debar a contractor; and
(7)	All subcontractors and motor carriers that the contractor intends to use to perform project work have verified to the contractor through a signed statement under oath by an owner or officer that they meet the minimum criteria listed in clauses (1) to (6).

Minn. Stat. § 16C.285, Subd. 5. **SUBCONTRACTOR VERIFICATION.**

A prime contractor or subcontractor shall include in its verification of compliance under subdivision 4 a list of all of its first-tier subcontractors that it intends to retain for work on the project. Prior to execution of a construction contract, and as a condition precedent to the execution of a construction contract, the apparent successful prime contractor shall submit to the contracting authority a supplemental verification under oath confirming compliance with subdivision 3, clause (7). Each contractor or subcontractor shall obtain from all subcontractors with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each subcontractor.

If a prime contractor or any subcontractor retains additional subcontractors on the project after submitting its verification of compliance, the prime contractor or subcontractor shall obtain verifications of compliance from each additional subcontractor with which it has a direct contractual relationship and shall submit a supplemental verification confirming compliance with subdivision 3, clause (7), within 14 days of retaining the additional subcontractors.

A prime contractor shall submit to the contracting authority upon request copies of the signed verifications of compliance from all subcontractors of any tier pursuant to subdivision 3, clause (7). A prime contractor and subcontractors shall not be responsible for the false statements of any subcontractor with which they do not have a direct contractual relationship. A prime contractor and subcontractors shall be responsible for false statements by their first-tier subcontractors with which they have a direct contractual relationship only if they accept the verification of compliance with actual knowledge that it contains a false statement.

Subd. 5a. **Motor carrier verification.** A prime contractor or subcontractor shall obtain annually from all motor carriers with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each motor carrier. A prime contractor or subcontractor shall require each such motor carrier to provide it with immediate written notification in the event that the motor carrier no longer meets one or more of the minimum criteria in subdivision 3 after submitting its annual verification. A motor carrier shall be ineligible to perform work on a project covered by this section if it does not meet all the minimum criteria in subdivision 3. Upon request, a prime contractor or subcontractor shall submit to the contracting authority the signed verifications of compliance from all motor carriers providing for-hire transportation of materials, equipment, or supplies for a project.

Minn. Stat. § 16C.285, Subd. 4. **VERIFICATION OF COMPLIANCE.**

A contractor responding to a solicitation document of a contracting authority shall submit to the contracting authority a signed statement under oath by an owner or officer verifying compliance with each of the minimum criteria in subdivision 3, with the exception of clause (7), at the time that it responds to the solicitation document.

A contracting authority may accept a signed statement under oath as sufficient to demonstrate that a contractor is a responsible contractor and shall not be held liable for awarding a contract in reasonable reliance on that statement. A prime contractor, subcontractor, or motor carrier that fails to verify compliance with any one of the required minimum criteria or makes a false statement under oath in a verification of compliance shall be ineligible to be awarded a construction contract on the project for which the verification was submitted.

A false statement under oath verifying compliance with any of the minimum criteria may result in termination of a construction contract that has already been awarded to a prime contractor or subcontractor or motor carrier that submits a false statement. A contracting authority shall not be liable for declining to award a contract or terminating a contract based on a reasonable determination that the contractor failed to verify compliance with the minimum criteria or falsely stated that it meets the minimum criteria. A verification of compliance need not be notarized. An electronic verification of compliance made and submitted as part of an electronic bid shall be an acceptable verification of compliance under this section provided that it contains an electronic signature as defined in section 325L.02, paragraph (h).

CERTIFICATION

By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:

- 1) My company meets each of the Minimum Criteria to be a responsible contractor as defined herein and is in compliance with Minn. Stat. § 16C.285, and**
- 2) if my company is awarded a contract, I will submit Attachment A-1 prior to contract execution, and**
- 3) if my company is awarded a contract, I will also submit Attachment A-2 as required.**

Authorized Signature of Owner or Officer:

Printed Name:

Title:

Date:

Company Name:

NOTE: Minn. Stat. § 16C.285, Subd. 2, (c) If only one prime contractor responds to a solicitation document, a contracting authority may award a construction contract to the responding prime contractor even if the minimum criteria in subdivision 3 are not met.

ATTACHMENT A-1

FIRST-TIER SUBCONTRACTORS LIST

SUBMIT PRIOR TO EXECUTION OF A CONSTRUCTION CONTRACT

STATE PROJECT NUMBER: _____

Minn. Stat. § 16C.285, Subd. 5. A prime contractor or subcontractor shall include in its verification of compliance under subdivision 4 a list of all of its first-tier subcontractors that it intends to retain for work on the project. Prior to execution of a construction contract, and as a condition precedent to the execution of a construction contract, the apparent successful prime contractor shall submit to the contracting authority a supplemental verification under oath confirming compliance with subdivision 3, clause (7). Each contractor or subcontractor shall obtain from all subcontractors with which it will have a direct contractual relationship a signed statement under oath by an owner or officer verifying that they meet all of the minimum criteria in subdivision 3 prior to execution of a construction contract with each subcontractor.

FIRST TIER SUBCONTRACTOR NAMES* (Legal name of company as registered with the Secretary of State)	Name of city where company home office is located

*Attach additional sheets as needed for submission of all first-tier subcontractors.

SUPPLEMENTAL CERTIFICATION FOR ATTACHMENT A-1	
<p>By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:</p> <p>All first-tier subcontractors listed on attachment A-1 have verified through a signed statement under oath by an owner or officer that they meet the minimum criteria to be a responsible contractor as defined in Minn. Stat. § 16C.285.</p>	
Authorized Signature of Owner or Officer:	Printed Name:
Title:	Date:
Company Name:	

ATTACHMENT A-2

ADDITIONAL SUBCONTRACTORS LIST

PRIME CONTRACTOR TO SUBMIT AS SUBCONTRACTORS ARE ADDED TO THE PROJECT

STATE PROJECT NUMBER: _____

This form must be submitted to the Project Manager or individual as identified in the solicitation document.

Minn. Stat. § 16C.285, Subd. 5. ... If a prime contractor or any subcontractor retains additional subcontractors on the project after submitting its verification of compliance, the prime contractor or subcontractor shall obtain verifications of compliance from each additional subcontractor with which it has a direct contractual relationship and shall submit a supplemental verification confirming compliance with subdivision 3, clause (7), within 14 days of retaining the additional subcontractors. ...

ADDITIONAL SUBCONTRACTOR NAMES* (Legal name of company as registered with the Secretary of State)	Name of city where company home office is located

*Attach additional sheets as needed for submission of all additional subcontractors.

SUPPLEMENTAL CERTIFICATION FOR ATTACHMENT A-2	
By signing this document I certify that I am an owner or officer of the company, and I swear under oath that:	
All additional subcontractors listed on Attachment A-2 have verified through a signed statement under oath by an owner or officer that they meet the minimum criteria to be a responsible contractor as defined in Minn. Stat. § 16C.285.	
Authorized Signature of Owner or Officer:	Printed Name:
Title:	Date:
Company Name:	

SPECIAL PROVISIONS

DIVISION S – ROADWAY

DIVISION SB – BRIDGE

DIVISION SL – LIGHTING

DIVISION SS – SIGNALS

DIVISION ST – TRAFFIC

3400 - WATERMAIN

4000 - SANITARY SEWER

DIVISION S

CERTIFICATION

I hereby certify that this specification was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



Jeff Rhoda, PE

Date: December 8, 2015

Lic. No. 26377

Reviewed By: Heather Redetzke, PE

Date: December 8, 2015

DIVISION S

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DIVISION S

S-1 CONTACT INFORMATION

SP2016-1

Direct questions about this Project, including pre-bid questions, shall be directed to Ramsey County at 651-266-7100.

S-2 GOVERNING SPECIFICATIONS

The 2016 Edition of the Minnesota Department of Transportation “Standard Specifications for Construction” shall apply on this contract except as modified or altered by the following Project Special Provisions.

Numbering in the Project Special Provisions that begins with “SP2016” and the “Revised” or “New Write Up” date notations reference corresponding sections in the Minnesota Department of Transportation Standard Special Provisions located at <http://www.dot.state.mn.us/pre-letting/prov/>.

The requirements of the Project Special Provisions are in addition to requirements in the Mn/DOT Standard Specifications for Construction, unless otherwise indicated.

Numbers in parenthesis in the section titles, such as S-3 (1103) Definitions, refer to the corresponding specification number in the Minnesota Department of Transportation “Standard Specifications for Construction”.

S-3 EQUAL PAY

SP2016-4

The Department cannot execute a contract in excess of \$500,000 with a business that has 40 or more employees on a single day during the prior 12 months in this state or a state where the business has its primary place of business, unless the business has an equal pay certificate or has certified in the Electronic Bid File that the business is exempt. Bidders may find more information on the Equal Pay Certificate Requirement at Minnesota Statutes Section 363A.44 or at this website:

http://mn.gov/mdhr/compliance/equal_pay.html

S-4 RESPONSIBLE CONTRACTOR

REVISED 06/04/15

The Department cannot award a construction contract in excess of \$50,000 unless the Bidder is a “responsible contractor” as defined in Minnesota Statutes §16C.285, subdivision 3. A Bidder submitting a Proposal for this Project must verify that it meets the minimum criteria specified in that statute by submitting the “Responsible Contractor Verification and Certification of Compliance” form. A company owner or officer must sign the “Responsible Contractor Verification and Certification of Compliance” form under oath verifying compliance with each of the minimum criteria. **THE COMPLETED FORMS MUST BE SUBMITTED WITH THE BID PROPOSAL.**

A bidder must obtain a verification from each subcontractor it will have a direct contractual relationship with. At the Department’s request, a bidder must submit signed subcontractor verifications. A contractor or subcontractor must obtain an annual verification from each motor carrier it has a direct contractual relationship with. A motor carrier must give immediate written notice if it no longer meets the minimum responsible contractor criteria. The requirement for subcontractor verifications does not apply to:

- Design professionals licensed under Minnesota Statutes §326.06; and
- A business or person that supplies materials, equipment, or supplies to a subcontractor on the Project, including performing delivering and unloading services in connection with the supply of materials, equipment, and supplies. But, a business or person must submit a verification if it delivers mineral aggregate such as sand, gravel, or stone that will be incorporated into the Work by depositing the material substantially in place, directly or through spreaders, from the transporting vehicle.

A bidder or subcontractor who does not meet the minimum criteria specified in the statute, or who fails to verify compliance with the criteria, is not a “responsible contractor” and is ineligible to be awarded the Contract for this Project or to work on this Project. Submitting a false verification makes the bidder or subcontractor ineligible to be awarded a construction contract for this Project. Additionally, submitting a false statement may lead to contract termination. If only one bidder submits a bid, the Department may, but is not required to, award a contract even if that bidder does not meet the minimum criteria.

S-5 **COMPLIANCE WITH TAX LAW REQUIREMENTS** **SP2016-6**

The Department cannot make final payment to the Contractor until the Contractor demonstrates that it and all its subcontractors have complied with the Income Tax withholding requirements of Minnesota Statutes, section 290.92 for wages paid for work performed under the contract. To establish compliance, the Contractor must submit a “Contractor Affidavit” either online or in paper form (IC134) to the Minnesota Department of Revenue. The contractor will receive written certification of compliance when the Department of Revenue determines that all withholding tax returns have been filed and all withholding taxes attributable to the work performed on the contract have been paid. The Contractor must then provide this written certification to the Department to receive final payment.

Every subcontractor working on the Project must submit an approved “Contractor Affidavit” from the Minnesota Department of Revenue to the Contractor before the Contractor can file its own Contractor Affidavit. **The Contractor is advised to obtain the certification from each subcontractor as soon as the subcontractor completes work on the Project. Experience has shown that waiting until the project is complete to obtain the forms from all subcontractors is likely to result in significant additional work for the Contractor as it will be difficult or impossible to collect all forms.**

The Department of Revenue, in association with the Department of Employment and Economic Development, offers a free seminar to help contractors understand tax law requirements. The Department strongly urges the Contractor and all subcontractors to attend the “Employment Taxes & Employer Responsibilities Seminar” or similarly offered classes. You can find a schedule and more information on the Department’s website at: www.revenue.state.mn.us/businesses/withholding/Pages/EducationandOutreach.aspx.

Complying with this requirement is considered part of the Work under this contract. The Department will enforce this requirement equally with all other Contract requirements. Contractor delay in complying with this requirement will cause the Department to delay final payment and Contract Acceptance. The Department may also report non-compliance to the Department of Revenue, which may result in enforcement action by the Department of Revenue.

S-6 **EMERALD ASH BORER COMPLIANCE** **SP2016-8**

All or part of this Project is located in a county which the Minnesota Department of Agriculture (MDA) has placed under an Emerald Ash Borer Quarantine. Contractor may contact MDA at 1-888-545-6684 or visit the Emerald Ash Borer website at <http://www.mda.state.mn.us/plants/pestmanagement/eab.aspx> to find more information. The Contractor must comply with the following requirements.

S-6.1 The Contractor **will not**:

- (1) Offer any part of an Ash tree (*Fraxinus* spp.) from a quarantined area to any industry or individual without an Emerald Ash Borer Compliance Agreement with MDA; or
- (2) Make available any part of an ash tree or any non-coniferous (hardwood) species with bark from the quarantined area for use as firewood; or
- (3) Transport any part of an ash trees, in any form, outside of a quarantined county without complying with an Emerald Ash Borer Compliance Agreement with MDA; or
- (4) Transport any part of ash trees, in any form, outside the state of MN without contacting John.o.haanstad@aphis.usda.gov to obtain the United States Department of Agriculture's and the MDA's joint approval of the Emerald Ash Borer Compliance Agreement.

S-6.2 The Contractor **will**:

- (1) Dispose of ash trees according to the Emerald Ash Borer Compliance Agreement; and
- (2) Use the ash wood chips within the construction limits for erosion control, construction exit pads, or other project related needs; and

S-6.3 The Department will not directly compensate the Contractor for compliance with these requirements.

S-7 USE OF ADHESIVE ANCHORS

SP2016-10

Do not use adhesive anchors in sustained tension. Contractor may use adhesive anchors, in a non-direct tensile application, such as metal rail attachment.

S-8 (1103) DEFINITIONS

The provisions of MnDOT 1103 are supplemented as follows:

S-8.1 The following definition is added to MnDOT 1103:

M Gallon. 1000 Gallons (MGal).

S-8.2 Replace the definitions for "Payment Bond" and "Performance Bond" with the following:

PAYMENT BOND. A bond furnished in accordance with Minnesota Statutes §574.26 and meeting the terms specified in Minnesota Statutes §574.26 subdivision 2 (2).

PERFORMANCE BOND. A bond furnished in accordance with Minnesota Statutes §574.26 and meeting the terms specified in Minnesota Statutes §574.26 subdivision 2 (1).

S-9 (1203) ACCESS TO PROPOSAL PACKAGE

MnDOT 1203 is hereby deleted from the MnDOT Standard Specifications. Bidding documents, including the Bid Form, Drawings, and Specifications, will be available to be downloaded from Onvia DemandStar at <http://www.demandstar.com/>.

S-10 (1205) EXAMINATION OF PLANS SPECIFICATIONS AND SITE OF WORK

All bidders are advised to carefully review the Plans, Specifications and site conditions prior to submitting their bid. Any and all costs of dewatering excavations shall be considered incidental and no direct

compensation will be made therefore. Dewatering plans shall be reviewed by Ramsey County's erosion control inspector prior to commencing operations. Dewatering activities shall comply with all applicable federal, state and local laws and regulations.

S-11 (1206) PREPARATION OF PROPOSAL

The provisions of MnDOT 1206 are supplemented and/or modified with the following:

MnDOT 1206.1 is hereby deleted from the MnDOT Standard Specifications.

S-11.1 MnDOT 1206.2 is hereby deleted from the MnDOT Standard Specifications and replaced with the following:

1206.2 ALLOWABLE SUBSTITUTIONS

For all Proposals the Bidder shall use the following method:

- (1) Submit a Proposal on the Bid Schedule forms provided by the Department. The Bidder shall:
 - (1.1) Submit a Unit Price in numeric figures for each Pay Item for which a quantity is shown. Assume a numeric quantity of "1" for each "Lump Sum" Pay Item, except as not required in the case of alternate Pay Items,
 - (1.2) Show the extensions resulting from Unit Prices multiplied by the shown quantities in the specified column, and
 - (1.3) Add the extended Pay Item amounts to show the total amount of the Proposal.

The Bidder shall write the figures in ink or provide typed or computer printed figures. In the case of a discrepancy between a Unit Price and extension in a Proposal, the Unit Price will govern.

If a Bidder fails to provide a Unit Price for any Pay Item on the Bid Schedule, except for "Lump Sum" Pay Items, the Department will reject the Proposal.

If a Pay Item in the Proposal requires the Bidder to choose an alternate Pay Item, the Bidder shall indicate its choice in accordance with the Specifications for that Pay Item.

An authorized representative of the Bidder must sign the Proposal.

S-12 (1209) DELIVERY OF PROPOSALS

The provisions of MnDOT 1209 are modified with the following:

When submitting a Proposal in accordance with 1206.2, "Allowable Substitutions," of these Special Provisions, the Bidder shall deliver the Proposal and the Proposal Guaranty in a sealed envelope. The Bidder shall mark the sealed envelope with the name of the Bidder, the Project number, and the letting date. The Bidder shall deliver the sealed envelope to the Department as specified in the Advertisement for Bids as follows:

1. To the address specified,
2. In care of the official receiving the Proposals, and
3. By the date and time for opening Proposals.

The Bidder shall return paper copies of the following with the submitted Proposal:

1. Proposal title sheet;
2. The complete "Schedule of Prices," with all changes made in ink and initialed;

3. Form 21126D, "Proposal Signature Page" attached to the back of the Proposal, with signatures and all Addenda acknowledged;
4. Form CM 32-34, "EEO Clause;"
5. Non-collusion affidavit; and
6. Any other forms included in the Proposal Package.

If the Department receives a Proposal after the date and time for opening Proposals, the Department will return the Proposal to the Bidder unopened.

S-13 (1210) REVISION OF PROPOSAL PACKAGE OR WITHDRAWAL OF PROPOSALS

The provisions of MnDOT 1210 are deleted and replaced with the following:

When submitting a Proposal in accordance with 1206.2, "Allowable Substitutions," of these Special Provisions, the Bidder may revise or withdraw its Proposal after delivery to the Department if the Department receives the Bidder's written request for withdrawal or revision before the date and time for opening Proposals.

The Department reserves the right to revise the Proposal Package at any time before the date and time for opening Proposals. The Department will issue a numbered and dated Addendum for any revision of the Proposal Package. The Department will post each Addendum as announced in an e-mail or other method of notification to each Bidder on the Department's list of Bidders.

The Department will include each Addendum with all Proposal Forms issued to the Bidder after the date of the Addendum.

If revisions made by an Addendum require change to Proposals or reconsideration by the Bidder, the Department may postpone opening Proposals. If the Department postpones opening Proposals, the Department will specify the new date and time for opening Proposals in the Addendum.

The Bidder shall acknowledge receipt of each Addendum in the proposal.

S-14 (1212) OPENING OF PROPOSALS

The provisions of MnDOT 1212 are modified with the following:

S-14.1 MnDOT 1212 is hereby deleted from the MnDOT Standard Specifications and replaced with the following:

1212 OPENING OF PROPOSALS

The Department will open Proposals at the time, date, and place defined in the Proposal Package and the Advertisement for Bids.

S-15 (1302) AWARD OF CONTRACT

Award of Contract shall be performed in accordance with the provisions of 1302 except as modified below:

S-15.1 Delete the first paragraph and add the following:

The award of Contract, if it is awarded, will be made within 60 calendar days after the opening of proposals to the lowest responsible bidder who complies with all prescribed requirements. The successful bidder will be notified by letter, mailed to the address shown on the proposal that the bid has been accepted subject to execution and approval of the Contract as required by law.

S-16 (1404) MAINTENANCE OF TRAFFIC, (1707) PUBLIC SAFETY, AND
(2563) TRAFFIC CONTROL

The provisions of 1404 are supplemented as follows:

All traffic control devices shall conform and be installed in accordance to the "Minnesota Manual on Uniform Traffic Control Devices" (MMUTCD) and part IV, "Field Manual for Temporary Traffic Control Zone Layouts," the "Guide to Establishing Speed Limits in Work Zones Guideline," the Minnesota Flagging Handbook, the provisions of Mn/DOT 1404 and 1710, the Minnesota Standard Signs Manual, the Traffic Engineering Manual and these Special Provisions.

The Contractor shall furnish, install, maintain, and remove all traffic control devices required to provide safe movement of vehicular and/or pedestrian traffic passing through the work zone during the life of the Contract from the start of Contract operations to the final completion thereof. The Engineer will have the right to modify the requirements for traffic control as deemed necessary due to existing field conditions. The highways shall be kept open to traffic at all times, except as modified below.

Traffic control devices include, but are not limited to, barricades, warning signs, trailers, flashers, cones, drums, pavement markings and flaggers as required and sufficient barricade weights to maintain barricade stability.

Traffic control plans are not included in the contract documents for the following:

- Noise wall construction along southbound TH 35W as a part of Phase 3 construction.
- All construction required that is not shown as being hatched on the phasing plan (Sheet TC 7). The areas not included generally consist of all construction located to the west of the southbound TH 35W / County Road H roundabout and all approaches to and from the intersection of CSAH 10 / TH 10 / County Road H.

For the required traffic control detailed in the plans, the work shall be paid for under the following items that are included in the statement of estimated quantities: portable precast conc barrier des 8337, relocate port precast conc barrier des 8337, impact attenuator, relocate impact attenuator, police officer, traffic control, portable changeable message sign, portable concrete barrier delineator, raised pavement marker temp, 4" solid line white – paint, 8" solid line white – paint, and removable preformed plastic mask (black).

For the required traffic control not detailed in the plans, the work shall be paid for under the following item that is included in the statement of estimated quantities: traffic control, temporary traffic control signal, and temporary bituminous. Any other items that are required to establish the traffic control to satisfy the requirements documented below will not be measured or paid for separately. These items may include but are not limited to the following: portable precast conc barrier des 8337, relocate port precast conc barrier des 8337, impact attenuator, relocate impact attenuator, flashing arrow panel, portable changeable message sign, portable concrete barrier delineator, flaggers, raised pavement marker temp, pavement marking removal or removable preformed plastic mask (black), tubular delineators, and temporary pavement markings (shall be paint or other material approved by the Engineer).

Barrels and or other weighted devices approved by the Engineer shall be used to delineate traffic except for the following: tubular delineators (epoxy type) shall be used between eastbound and westbound traffic on TH 10 when the crossovers are in use. The Contractor shall replace tubular delineators that are damaged by traffic as directed by the Engineer.

The contractor shall remove conflicting pavement markings and provide temporary pavement markings for all traffic control phases. The temporary pavement markings shall include the following:

- Turn arrows shall be used to identify turn lanes. Two arrows shall be used for turn lanes over 200 feet in length. One arrow shall be used if the turn lane is less than 200 feet in length.
- Where there is more than one thru traffic lane in each direction, a 4" white dashed line shall be used to separate the traffic lanes traveling in the same direction (10:40 skip pattern).
- 4" double yellow striping shall be used between traffic lanes where traffic travels in opposite directions.
- A 4" solid white line shall be installed at all turn lanes to delineate the turn lane from the through traffic lanes.
- Edge lines are required at tapers where lanes are dropped or where the thru lane(s) are shifted and along all segments of TH 10 and CSAH 10 construction to the west of TH 35W.

Temporary pavement markings shall be paint at all locations unless otherwise directed by the Engineer. See Section 2582 Permanent Pavement Markings for temporary paint pavement marking requirements.

The Contractor shall establish a truck route if turning trucks are not able to turn onto Highway 10 from County Road H or County Road H from Highway 10 due to restricted geometrics during construction. This condition shall be avoided if possible but if this restriction is necessary and if approved by the Engineer, the Contractor shall provide truck route signing to guide truck traffic to and from Highway 10 via an alternate route. The alternative route shall be subject to review and approval by the Engineer. The truck route sign layout shall be approved by the Engineer and one sign shall be installed at each turn location and one confirmatory sign shall be installed at the mid-point along each road on which the truck detour is established. All truck route signs shall be inclusive to the traffic control.

The Contractor shall furnish names, addresses, and phone numbers of at least three (3) individuals responsible for the placement and maintenance of traffic control devices. At least one of these individuals shall be "on call" 24 hours per day, seven days per week during the times any traffic control devices, furnished and installed by the Contractor, are in place. The required information shall be submitted to the Engineer at the Pre-construction Conference. The Contractor shall also furnish the names, addresses, and phone numbers of those individuals to the following:

- | | | |
|----|---------------------------------------|----------------|
| 1. | Mounds View Police Department | (763) 717-4070 |
| | Mounds View Public Works Department | (763) 717-4050 |
| 2. | Ramsey County Sheriff's Department | (651) 266-7300 |
| | Ramsey County Public Works Department | (651) 266-8500 |
| 3. | SBM Fire Department | (763) 786-4436 |
| 4. | Mounds View City Clerk | (763) 717-4000 |
| 5. | Mn/DOT Metro Maintenance Dispatch | (651) 582-1550 |
| 6. | State Patrol Dispatch | (651) 582-1500 |

The Contractor shall, at the pre-construction conference, designate a Work Zone Safety Coordinator who shall be responsible for safety and traffic control management in the Project work zone. The Work Zone Safety Coordinator shall be either an employee of the Contractor such as a superintendent or a foreman, or an employee of a firm which has a subcontract for overall work zone safety and traffic control management for the Project.

The Work Zone Safety Coordinator shall be certified as a worksite supervisor by MnDOT. A copy of the Traffic Control Supervisor's certification shall be provided to the Engineer at the Project pre-construction conference. This certification can be obtained by attending a 3 day MnDOT Traffic Control Supervisor Course

within the last 5 years. Additional information on MnDOT's certifications can be obtained by contacting Leigh Kreiwall at 651-366-4217. **The National ATSSA Traffic Control Supervisor Certification will not be accepted.**

The responsibilities of the Work Zone Safety Coordinator shall include, but not be limited to:

- Coordinating all work zone traffic control operations of the Project, including those of the Contractor, subcontractors and suppliers.
- Establishing contact with local school district, government, law enforcement, and emergency response agencies affected by construction before work begins.
- Maintaining a record of all known crashes within a work zone. This record should include all available information, such as: time of day, probable cause, location, pictures, sketches, weather conditions, interferences to traffic, etc. These records shall be made available to the Engineer upon request.

The Contractor shall inspect, on a daily basis, all traffic control devices, which the Contractor has furnished and installed, and verify that the devices are placed in accordance with the Traffic Control Layouts submitted by the Contractor and approved by the Engineer, these Special Provisions, and/or the MMUTCD. Any discrepancy between the placement and the required placement shall be immediately corrected. The person performing the inspection shall be required to make a daily log. This log shall also include the date and time any changes in the stages, phases, or portions thereof go into effect. The log shall identify the location and verify that the devices are placed as directed or corrected in accordance with the Plan. All entries in the log shall include the date and time of the entry and be signed by the person making the inspection. The Engineer reserves the right to request copies of the logs as he deems necessary.

S-16.1 SPECIAL PROJECT REQUIREMENTS

Project Phasing

- A. The project shall be constructed in 3 major phases.

Phase 1 Requirements

- B. Phase 1 includes all work on the local road system to the west of County Road H Station 48+00.00 and all areas included as Phase 1 on Sheet TC 7.
- C. The Contractor shall construct a temporary traffic control signal at the intersection of County Road H / CSAH 10 / TH 10 and remove the corresponding existing traffic signal after the temporary signal is operational and approved by the Engineer.
- D. During Phase 1C additional lane closures will only be allowed during periods that are permitted by the MnDOT Lane Closure Manual. The Engineer shall approve all lane closures 48 hours prior to the start of the desired closure period. The MnDOT Lane Closure Manual is available:

http://www.dot.state.mn.us/metro/trafficeng/lane_closure/index.html

- E. The existing traffic movements to be maintained east of County Road H Station 48+00.00 are included in these special provisions.

The Contractor at a minimum shall provide the following traffic lanes at the intersection of County Road H / CSAH 10 / TH 10:

West County Road H approach – one shared left-through-right lane.

CSAH 10 / TH 10 north and south approaches – one dedicated left-turn lane and one shared through-right turn lane. There will be periods when the northbound right and southbound left will be prohibited and applicable turn lanes closed (i.e. when County Road H to the east of CSAH 10/TH 10 is closed.)

The Contractor at a minimum shall provide the following traffic lanes at the intersection of County Road H / Old Highway 8:

Eastbound County Road H approach – one shared left-through-right lane.

Westbound County Road H approach – one shared left-through-right lane.

Old Highway 8 approach – one shared left-through-right lane.

- F. Turn lanes required above shall have storage lengths equal to or greater than the storage provided for the same exclusive turn lane provided under existing conditions or the maximum length allowed given the location of the temporary crossovers detailed in the plans unless otherwise approved by the Engineer on the CSAH 10/TH 10 approaches to County Road H.

Phase 2 Requirements

- G. Phase 2 includes work depicted as Phase 2 work in Sheet TC 7.
- H. The existing traffic movements to be maintained east of County Road H Station 48+00.00 are included in these special provisions.

Phase 3 Requirements

- I. Phase 3 includes work depicted as Phase 3 work on Sheet TC 7.

Traffic Control Plan

1. The Contractor shall be responsible for the design of a detailed traffic control plan for Phase 1, 2, and 3 construction for which detailed traffic control plans are not provided. The design of these traffic control plans shall be incidental to Traffic Control Lump Sum. No direct compensation will be made.
2. The Contractor shall furnish a detailed traffic control plan to the County for review. The Contractor shall submit the traffic control plans for the first phase of construction within 7 calendar days of Notice to Proceed to allow for County review and submittal of a request for a Temporary Speed Limit (Ramsey County will submit the Temporary Speed Limit request to Mn/DOT). Each plan for a major change in Traffic Control shall be submitted to the County a minimum of forty (40) working days before that phase begins to allow for resubmittal to Mn/DOT. Minor or routine adjustments to Traffic Control shall be submitted to the County a minimum of fourteen (14) working days before that phase begins. Changes and/or modifications to the approved Traffic Control Plan shall be approved by the Engineer.
3. These phases are subject to timing and coordination restrictions. Please refer to the Project Phasing section of these Special Provisions for details.

Additional Restrictions

- J. Pedestrian Paths
- a. The contractor shall provide pedestrian signing that identifies that a sidewalk is closed. The contractor shall provide signing that directs pedestrians to an alternative facility if

there is one available on the other side of the roadway. All signing shall be in accordance to the MMUTCD.

- b. The contractor shall protect the existing paths/sidewalks on CSAH 10 that are not under construction and these paths/sidewalks shall remain open unless under construction. The only existing paths/sidewalks that currently exists run adjacent to CSAH 10 to the northwest of County Road H. At least one of the two existing paths/sidewalks shall be open at all times. The duration that only one single sidewalk in these locations is provided shall be minimized.
- c. The Contractor shall install and maintain an orange plastic fence which shall separate the paths/sidewalks and the construction zone at all times unless otherwise approved by the Engineer.
- d. The Contractor shall keep paths/sidewalks open to pedestrians clear of objects at all times.
- e. Signalized pedestrian crossings that provide access to the west, north and south corners between the northwest and northeast corners of the shall be provided at all times at the intersection of CSAH 10 / TH 10 / County Road H.

These items will not be paid for separately and shall be inclusive to the traffic control.

- A. If "J" barriers, impact attenuator barrels, or impact attenuators are needed for protection due to contractor's excavation, storm sewer installation, etc., they shall be provided by the Contractor. For areas where they are required and detail traffic control plans are not provided, they shall be incidental to Traffic Control.

Table 6F-5a of the MMUTCD shall be used as the basis of determining whether temporary barrier is required for a particular construction activity. This table shall be applied regardless of posted speed prior unless otherwise directed by the Engineer.

Figure 9F-9 of the MMUTCD provides portable concrete barrier and end treatment details that shall be followed by the contractor. The clear zone distance from the edge of traveled way is 14 feet for all roadways. Impact attenuator barrels if used shall be installed in accordance with manufacturer's recommendations based on the design speed of the roadway. All impact attenuator barrels shall be of the same manufacture and same system for each installation. Any impact attenuator systems utilized shall be on Mn/DOT's approved/qualified product list available at: <http://www.dot.state.mn.us/products>.

- B. Existing, temporary, or new traffic control signals shall be in operation at all times and at all locations that are signalized under existing conditions.
- C. The Contractor shall provide special signs that will assist drivers in finding access points within the project limits during construction in addition to those required as a part of the traffic control as directed by the Engineer. The special signs shall have black on orange legends made of retroreflective sheeting meeting the requirements described elsewhere in these special provisions. Arrows shall be overlay panels to allow for the sign to be used for multiple phases of construction by modifying the orientation of the overlay panel. Special signs shall be incidental to the lump sum price for Traffic Control.

If a sign is required the Engineer will provide the Contractor of summary of the problem that special signing is being added to remedy. Using this information the Contractor shall submit a proposed sign layout to the Engineer for review and approval. The Contractor shall modify the legend as required by the Engineer. The contractor shall then fabricate and install the sign in

accordance to the requirements in the plans and specifications. These signs shall be fabricated and installed within two (2) calendar days of the request. The signs shall remain the property of the Contractor and the signs that are in place at the end of the project shall be removed by the Contractor. Up to a five (5) special signs that are smaller than 48" x 48" shall be provided by the Contractor. These signs shall be inclusive to the Traffic Control.

- D. Ramsey County will request from Mn/DOT a 24/7 Construction Speed Limit for the various construction traffic control phases of this project. If granted, the contractor shall provide a Construction Speed Limit in accordance with the "Speed Limits in Work Zones Guidelines" for all phases of the project. This document is available at:

<http://www.dot.state.mn.us/speed/pdf/WZSpeedLimitGuideline.pdf>

The requirements in Layout 3 in the "Workzone Speed Limit Guidelines" shall be satisfied except for the following:

- Temporary speed limit signs shall be installed on the right side of the roadway. All Temporary Speed Limit signs shall be ground mounted. Core drilling in the concrete median and concrete patching after sign removal shall be incidental at locations where required.
- Dynamic speed display signs are not required.
- A Temporary Speed Limit, if approved by MnDOT, shall be established for each direction of travel on TH 35W and TH 10 / CSAH 10.

The posted Construction Speed Limit for each traffic control phase of the project may be different than the posted Construction Speed Limit for other phases of the project. The Engineer will provide the speed limit to be posted for each phase. The Engineer may change the posted speed for the Construction Speed Limit for any future traffic control phase without an increase in the price of the traffic control, as long as notice is given to the Contractor at least 5 working days prior to the installation of the traffic control for the particular phase for which the posted Construction Speed Limit is being changed.

The contractor shall furnish and install the required reduced speed ahead (R2-5a) signs, furnish and install the speed limit signs (R2-1) with the posted temporary speed limit at the start of the temporary speed zone, furnish and install the confirmatory speed limit signs (R2-1) throughout the work zone, furnish and install speed limit signs (R2-1) stating the speed prior to the work starting downstream of the work zone, and remove or cover conflicting existing speed limit signs within the Temporary Speed Limit zone for the duration of the speed limit reduction for all phases of the project. Temporary Speed Limit signing and all associated work shall be incidental to the Traffic Control.

- E. Access to individual properties fronting or requiring access from a roadway under construction shall be maintained on in-place, temporary, permanent roadway, or by an alternate access except for access locations identified as being able to be closed in these special provisions. Closure of a drive during construction will only be permitted if an alternate drive is available and/or agreed to by property owner. Closure of a drive shall be limited to a maximum of seven (7) calendar days, except as otherwise noted.
- F. The Contractor shall meet with businesses affected by each restriction of access and coordinate work to allow for deliveries to be made to each affected business during construction.
- G. The Contractor shall make provisions to allow for garbage pick-up at properties whose access is impacted by construction activities.
- H. Temporary Access – Metro Transit Park & Ride

The Metro Transit Park & Ride located on the southwest corner of TH 35W / County Road H has two accesses. The Contractor shall maintain access from southbound TH 35W and to/from TH 10 at all times unless otherwise agreed to by Metro Transit and the Engineer in writing. It is acceptable to only provide this access by providing a two way crossing of County Road H for buses and patrons at Clifton Drive during periods when so required due to construction. When the permanent right-in access from County Road H is constructed across from Clifton Drive, full access shall be provided at the newly constructed roundabout at the TH 35W southbound ramps. Because access will no longer exist to southbound TH 35W at this time, access shall be provided to TH 10 / CSAH 10 via County Road H. The contractor shall provide temporary signing to direct patrons and from this Park & Ride.

- I. All City streets except for Clifton Drive (unless required to provide access to the Park & Ride) shall be kept open unless otherwise approved by the Engineer. All County roads except for County Road H to the east of CSAH 10 / TH 10 shall be kept open at all times unless otherwise approved by the Engineer. County Road H shall be open to traffic after Phase 1 is completed.
- J. No sanitary sewer, storm sewer, or water trenches shall be allowed to be left open at night without specific permission from the Engineer.
- K. Drainage shall be maintained during construction phases.
- L. The Contractor shall “restore” bituminous roadway surfaces that have traffic traveling over the disturbed areas within three (3) Calendar Days time after initial construction of culverts, storm sewer, sanitary sewer and water service trenches, signal components and other utilities in those areas left open to traffic. A roadway will be considered “restored” when all backfilling and compaction is complete and a bituminous surface suitable to handle vehicular traffic has been installed; except as otherwise permitted by the Engineer. The Contractor will be subject to a charge of \$500 per Calendar Day for failure to perform the work as specified.
- M. All bituminous wearing course pavement shall be placed after construction is substantially complete for each phase.
- N. Roadways which are open to traffic shall be kept free from earth materials and debris.
- O. Street identification and signage shall be maintained at all times. This will require temporary sign installations as directed by the Engineer. The Contractor shall furnish and install temporary ground mounted street name signs at all intersections where existing street name signs are removed as a part of construction operations. This is necessary to maintain the 911 emergency system and shall be included in the lump sum bid for traffic control.
- P. If the Contractor establishes a lane closure on a high-speed roadway, a vehicle equipped with a trunk mounted attenuator that meets the requirements of NCHRP 350 (or AASHTO’s Manual for Assessing Safety Hardware (MAASH)) shall be placed in the closed lane next to traffic prior to the active work site, as directed by the Engineer. The lane closure shall meet the requirements described in the appropriate Field Manual Layout.

- Q. Any person acting as a flagger on this Project shall have attended a training session taught by a Contractor's qualified trainer. The Contractor's qualified trainer shall have completed a "Mn/DOT Flagger Train the Trainer Session" in the five years previous to the start date of this Contract and shall be on file as a qualified flagger trainer with the Department. The Flagger Trainer's name and Qualification Number shall be furnished by the Contractor at the pre-construction meeting. The Contractor shall provide all flaggers with the Mn/DOT Flagger Handbook and shall observe the rules and regulations contained therein. This handbook shall be in the possession of all flaggers while flagging on the Project. The Contractor shall obtain handbooks from the Department. Flaggers shall not be assigned other duties while working as authorized flaggers. The "Checklist for Flagger training" form shall be furnished to the Engineer any time a new flagger reports to work on the Project. The "Checklist for Flagger Training" form can be found at:

<http://www.dot.state.mn.us/const/wzs/documents/flaggertrainingchecklist.pdf>

The Engineer will have the right to waive the above requirements.

Flaggers shall be incidental to the lump sum price for Traffic Control.

- R. The Contractor shall not interfere with the operation of any traffic signal system, except as required by the Contract. The Contractor shall notify the Engineer at least 24 hours prior to beginning any work that will interfere with any traffic signal system or its detectors.

The in place signal system shall remain in operation until the temporary signal system becomes operational. The temporary signal system shall remain in operation until the new signal system becomes operational.

The Contractor shall furnish off-duty police officers with cars for directing and controlling traffic during such times as the existing or temporary signal system at each location is out of operation. "Police officer" means every officer authorized to direct or regulate traffic or to make arrests for violations of traffic rules. Off-duty police officers shall be furnished in such numbers as deemed necessary by the Engineer to direct traffic. Payment for police officers will be considered incidental.

During the period when the existing signal system is de-energized and the new signal system is energized, the Contractor shall furnish, erect, and maintain "Stop Ahead" signs and "Stop" signs. The quantity and size of the temporary signs as well as their placement in the field shall be as directed by the Engineer. The Contractor shall furnish and install materials to keep these signs upright and stationary. The signs shall remain the property of the Contractor.

- S. All hauling that requires direct access to and from TH 35W shall be completed between 12:00 A.M. – 5:00 A.M., 9:00 A.M. – 3:00 P.M. and/or 7:00 P.M. – 12:00 A.M unless otherwise approved by MnDOT and the Engineer.
- T. If the shoulder pavement is damaged during Phase 2B, as determined by the Engineer, the Contractor shall repair the shoulder. This work shall be paid for under item Type SP 12.5 Wearing Course Mix (4,F). Traffic control that may be required shall be incidental to the work.

S-16.2 TEMPORARY LANE CLOSURE REQUIREMENTS

- A. The Contractor shall contact the Regional Transportation Management Center (RTMC) at 651-234-7093 at the time when a lane closure begins and again at the time when the lane closure ends. The Contractor shall also contact the RTMC at the beginning and end times of full roadway closures.

- B. Temporary lane closures or other restrictions by the Contractor, during work hours and consistent with time restrictions, will be permitted during those hours and at those locations approved by the Engineer. Requests for temporary lane closures shall be made at least 24 hours prior to such closures. The Contractor shall furnish, erect, and maintain all traffic control devices required for these closures; including, but not limited to, barricades, advance warning arrow boards, warning signs, flag persons with two-way radios, trailers, and delineation devices. Application of traffic control devices shall be in accordance with the MMUTCD. Sign panels shall be in accordance with the Mn/DOT Standard Signs Manual.
- U. Temporary lane restrictions on County Road H or CSAH 10/TH 10 will not be permitted between the hours of 6:00 A.M. and 9:00 A.M. and between the hours of 3:00 P.M. and 6:00 P.M. Work that will restrict or interfere with traffic shall not be performed between 12:00 noon on the day preceding and 9:00 A.M. on the day following any consecutive combination of a Saturday, Sunday and legal holiday. The Engineer will have the right to lengthen, shorten, or otherwise modify the foregoing periods of restrictions as actual traffic conditions may warrant. If the Contractor is negligent in adhering to the established time schedules, he shall be subject to an hourly charge assessed at a rate of \$500.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.
- V. All temporary lane restrictions on I-35W will only be allowed during periods that are permitted by the MnDOT Lane Closure Manual. The Engineer shall approve all lane closures 48 hours prior to the start of the desired closure period. The MnDOT Lane Closure Manual is available:
<http://www.dot.state.mn.us/metro/trafficeng/laneclosure/index.html>.
- W. The Contractor shall notify the Engineer in writing at least 72 hours prior to the start of any construction operation that will necessitate lane closure or internal traffic control signing. Requests for temporary lane closures that will occur on a Monday shall be made before the preceding Thursday. Requests for temporary lane closures that will occur on a Tuesday shall be made before the preceding Friday. When a temporary lane closure is used by the Contractor, the closure shall be incidental to the work.
- X. Any temporary lane closure extending beyond 1,000 feet shall have a minimum of one type III barricade placed in the closure lane for every 1,000 feet of extension.
- Y. All temporary lane closures used at night shall have plastic drum-like channelizers in the lane closure taper and also in any shifts in traffic alignment.
- Z. When a temporary lane closure is used by the Contractor, the closure shall be incidental work and no direct compensation will be made therefore.
- AA. Temporary lane closures will not be permitted during inclement weather, nor any other time when, in the opinion of the Engineer, the lane closure will be a greater than normal hazard to traffic.
- BB. When working on the shoulder or median the Contractor shall install traffic control according to Layout 2 (Work on Shoulder) of the Field Manual. Notes 1 and 2 are deleted on Layout 2.
- CC. During the time of lane restrictions, the Contractor's equipment shall "follow in line" and shall use the roadway in a manner similar to other traffic, unless otherwise authorized by the Engineer.
- DD. The Engineer will have the right to lengthen, shorten, or otherwise modify the foregoing periods of restrictions as actual traffic conditions may warrant.

- EE. Temporary lane restrictions and/or closures for removing and/or erecting overhead structures are permitted between the hours of 1:00 A.M. and 5:00 A.M. as approved by the Engineer. If the Contractor requests to close the road and the Engineer approves that it is necessary to temporarily detour traffic in order to remove or set the structures, the Contractor shall furnish the detour as directed by the Engineer. The temporary detour shall be incidental work. **If the Contractor is negligent in adhering to the established time schedules, he shall be subject to an hourly charge assessed at a rate of \$500.00 per hour for each hour or any portion thereof with which the Engineer determines that the Contractor has not complied.**

If necessary, the Contractor may stop all traffic on any road open to traffic to erect overhead structures for periods of time not to exceed fifteen minutes only from 1:30 A.M. to 5:00 A.M. The Contractor shall allow sufficient clearance time between stopped periods so as to cause as little delay to traffic as possible. The Contractor will be subject to a charge of \$500 for failure to perform the work as specified.

- FF. No center lane closures will be permitted. Only double lane closures as shown in the Field Manual will be allowed at the times as directed by the Engineer. This may require night lane closures if traffic volumes warrant.
- GG. The Contractor shall furnish flag persons as required to adequately control traffic. Flag persons shall conform to the requirements set forth in the MMUTCD. All costs incurred to provide such flag persons shall be incidental to the lump sum traffic control.

Qualified, certified flagpersons shall be provided by the Contractor in conformance with the provisions set forth in the flagging handbook which is a portion of the Field Manual. Flag persons shall wear high visibility retroreflective safety vests, pants and hats at all times while actively flagging on the Project. High visibility apparel shall also comply with current Minnesota OSHA Rules 5207.0100 and 5207.1000. The flag persons clothing shall be considered an incidental expense for which no direct compensation will be made.

The Contractor shall keep the separation distance between the last sign in the "flagger ahead" signing sequence and the actual flagger to the amount shown in the Field Manual, whenever it is practical. The maximum separation distance allowed from the signs to the flagger shall be ½ miles. The Contractor shall use multiple flagger signing set-ups or continuously move the signing for moving flagging operations to keep within the distance limit. The "flagger ahead" signing sequence shall not be in place when flagging operations are not in effect.

All signs associated with the flagging operation must be removed or covered when flagging operations are not present.

Flagpersons shall use an approved "Stop-Slow" paddle or standard when directing traffic.

Off-duty police or patrol officers may be utilized as flagpersons. They shall use a fluorescent yellow hard hat and vest and may use hand signs in lieu of "Stop-Slow" paddles, with approval of the Engineer.

The Contractor shall provide two-way radios for flag persons.

The Contractor shall coordinate the flagging operations in a manner which causes as little delay to the traveling public as possible, and at no time shall the delay exceed three (3) minutes. In the event that the Contractor is unable to meet the maximum delay requirements, operations shall shut down until such time a new traffic control plan is developed which does meet the maximum delay requirement.

The Contractor will be subject to a non-compliant charge for failure to adhere to the requirements listed in this Section S-16. These requirements include: providing two-way radios for flaggers, properly attired flaggers, flagging operation length requirements, and distance limit between the flagger and the last sign in the flagger sequence, and removing or covering flagger signs when flagging operations are not present. **Non-compliance charges, for each incident will be assessed at a rate of \$500 per incident that the Engineer determines that the Contractor has not complied.** The charges may be assessed equally, separately, and may be assessed concurrently.

- HH. If hauling operations create hazards for the traveling public, the Contractor will be required to provide additional flaggers, as directed by the Engineer. All costs incurred to provide the additional flaggers shall be incidental to the lump sum traffic control.
- II. The Contractor shall furnish off-duty police officers in uniform with cars and a reflectorized high-visibility safety vest to direct traffic if deemed necessary and so ordered by the Engineer. "Police Officer" means every officer authorized to direct or regulate traffic or to make arrests for violations of traffic rules. Payment for police officers will be made by the unit hour as provided elsewhere in these Special Provisions.
- JJ. The Contractor shall provide one vehicle or trailer mounted flashing arrow panel for each lane of each work area where traffic is restricted. The arrow panel shall meet the requirements of the MN MUTCD, and be on the Approved Products List for "Flashing Arrow Panels" found at: <http://www.dot.state.mn.us/products/temporarytrafficcontrol/tccelectronicquipment.html>, and shall be equipped with a light that is visible to personnel in the work area to indicate that the unit is in operation. The flashing arrow panel shall be incidental.

It is imperative that the Contractor continually operate each Flashing Arrow Panel at maximum legibility. Many factors, such as mechanical problems, insufficient charging, incorrect intensity settings, or other factors can degrade performance.

The Flashing Arrow Panel shall be stored off the shoulder when not in use, except if allowed by the Engineer. In the event the Engineer allows the arrow panel to remain on the shoulder, the arrow panel shall be delineated according to Layout 4 (Partial Shoulder Closure) in the Field Manual, as determined by the Engineer.

When not being actively used as a traffic control device, the Flashing Arrow Panel shall be stored beyond the clear zone distance. **Non-compliant charges, for each incident, will be assessed at a rate of \$500.00 per incident that the Engineer determines that the Contractor has not complied.**

- KK. A Portable Changeable Message sign will be provided in advance of each temporary lane closure or in advance of the work zone as directed by the Engineer to communicate real time information.

(PCMS) Type C Trailer Mounted Message Signs will be permitted and shall be on the Approved Products List for "Changeable Message Signs: Type C – Three Lines, Trailer Mounted" as found at:

<http://www.dot.state.mn.us/products/temporarytrafficcontrol/tccelectronicquipment.html>

It is imperative that the Contractor continually operate each PCMS at maximum legibility. Many factors, such as mechanical problems, insufficient charging, incorrect intensity settings, or other factors can degrade performance. If at any time the Contractor fails to operate a Portable Changeable Message Sign at maximum legibility, as determined by the Engineer, no payment will be made for each day that the Message Sign is deemed inadequate.

Except as approved by the Engineer, the message sign shall be stored off the shoulder when not in use. In the event the Engineer allows the message board to remain on the shoulder the message sign shall be delineated according to Layout 4 (Partial Shoulder Closure) in the field manual, as determined by the Engineer.

When not being actively used as a traffic control device, the Portable Changeable Message Sign shall be stored beyond the clear zone distance. **Non-compliant charges, for each incident, will be assessed at a rate of \$500.00 per incident that the Engineer determines that the Contractor has not complied.**

Payment for Portable Changeable Message Signs furnished and installed, as directed by the Engineer, will be made by the Unit Day as specified in Section S-2563 (PORTABLE CHANGEABLE MESSAGE SIGN) of these Special Provisions for locations where required as detailed in the traffic control plans.

In addition to those included in the traffic control plans, the Contractor shall provide a Portable Changeable Message Sign on all approaches to the CSAH 10 / TH 10 / County Road H intersection that are open to traffic to provide advance warning a minimum of seven (7) days prior to every major change in staging/phasing. These changeable message signs shall be inclusive to the Traffic Control.

S-16.3 GENERAL REQUIREMENTS

- C. The Contractor shall be responsible for the immediate repair or replacement of all traffic control devices that become damaged, moved or destroyed, of all lights that cease to function properly, and of all barricade weights that are damaged, destroyed or otherwise fail to stabilize barricades. The Contractor shall further provide sufficient surveillance of all traffic control devices 2 times daily, including once at the end of each working day to verify that the devices are placed in accordance with the approved and/or modified Traffic Control Layouts, these Special Provisions, and the MMUTCD. Any discrepancy between actual placement and required placement shall be immediately corrected.
- LL. The Contractor shall be required to respond immediately to any call from the Engineer or designated representative concerning any request for improving or correcting traffic control devices. If the Contractor is negligent in responding to this matter, they shall be subject to the daily charge as set forth in Mn/DOT 1807 (Failure to Complete the Work on Time) of these Special Provisions. In addition, the County may do the necessary work and the Contractor will be charged for the work at twice the County's cost. The amount will be deducted from the Contractor's monthly payment.
- MM. The Contractor is required to meet the traffic control device quality standards as determined in the Field Manual. The Contractor shall immediately replace traffic control devices that are deemed unacceptable. Signs that are dirty and result in a noticeable loss of reflectivity at night are also considered unacceptable and shall be cleaned or replaced. The Contractor shall be required to respond immediately to any call from the Engineer or his designated representative concerning the notification of unacceptable traffic control devices. **If the Contractor is negligent in correcting the deficiency within one day of notification the Contractor shall be subject to a daily charge assessed at a rate of \$500 for each day or any portion thereof with which the Engineer determines that the Contractor has not complied.**
- NN. The Contractor will not be permitted to park their vehicles as to obstruct a traffic control device, interfere with traffic flow, or conflict with resident or customer parking. The parking of workers' vehicles will not be allowed within the project limits unless so approved by the Engineer.

Note 1 of Layout 2 of the Field Manual is hereby deleted. The Contractor will not be allowed to load or unload material or equipment on the shoulders of the roadway without a full shoulder closure using appropriate signs, barricades, and channelizing devices as directed by the Engineer.

- OO. The Contractor will not be allowed to store materials or equipment within 30 feet of through traffic unless approved by the Engineer. If materials or equipment must be stored within 30 feet of through traffic, the Contractor shall provide Type B channelizers, barricades or barriers, placed near the object to warn and protect traffic.
- PP. Contractor shall furnish to the Engineer, for approval, the plan for switching traffic from one traffic control phase to another. The plan shall be furnished a minimum of fourteen (14) days prior to the switch and shall cover both the number of Contractor's personnel that will be available for the switch and the function of each person.
- QQ. Provide notice for all closures, detours and restrictions of access as follows:
- RR. Provide minimum three (3) working days notice for all closures, detours, and restrictions of access to the following as necessary:
- 1) The Engineer
 - 2) Ramsey County Sheriff's Department Dispatcher
 - 3) Local Police and Fire Departments
 - 4) Local Ambulance Dispatchers
 - 5) Mounds View Public Work Department
 - 6) Ramsey County Department of Public Works
 - 7) Local School District
 - 8) Postal and garbage services
 - 9) MTC (or other local transit)
- SS. Provide minimum 48 hours notice for all closures, detours and restrictions of access to all affected businesses identifying when closures or restrictions of access will occur and what their duration will be.
- TT. All portable sign assemblies shall be perpendicular to the ground. No roll-up signs will be allowed unless authorized by the Engineer. No traffic control device (signs, channelizing devices, arrowboards, etc.) shall be weighted so they become hazardous to motorists and workers. The approved ballast system for devices mounted on temporary portable supports is sandbags, unless it is designed, crash tested, and approved for the specific device. During freezing conditions, the sand for bags shall be mixed with a deicer to prevent the sand from freezing. The sandbags shall be placed and maintained at the base of the traffic control device to the satisfaction of the Engineer.

When signs will remain in the same location for more than 30 consecutive days the signs shall be post mounted. This would not include portable signs which are set up and taken down at the beginning and end of each work shift. The signs must be post mounted according to the Typical Temporary Sign Framing and Installation Detail Sheet found in the Plan or in these Special Provisions.

- UU. When signs are installed, they shall be mounted on posts driven into the ground at proper height and lateral offset as detailed in the MMUTCD. If this is not possible, they shall be mounted on portable supports or barricades as approved by the Engineer. When signs are removed, the signposts shall also be removed as soon as possible.
- VV. The Contractor shall be required to cover or remove all traffic control devices, which may be inconsistent with traffic patterns during all traffic switches.
- WW. All in place signs and delineators that interfere with the Contractor's normal operation shall be relocated outside of the work area or removed by the Contractor at the direction of the Engineer. **This includes any other sign that interfere with the Contractor's operation.** Signs that are removed and will be reused are to be stored in such a manner as to protect the sign from scratching, fading, or other harmful affects until said signs are reinstalled. Upon completion of work at each sign location, or at the direction of the Engineer, the signs shall be replaced as near to their original locations as possible or to a location designated by the Engineer. **Signs and structures damaged by the Contractor shall be replaced by him at his own expense.**

The reinstalled sign posts shall be plumb and the sign panels shall be level. The minimum mounting height shall be 7 feet above the elevation of the traveled roadway. The minimum embedment length of the stub posts shall be 3.5 feet. The splice between the stub post and the riser post shall be a minimum of 12 inches. **The Contractor will be assessed a \$100 charge for each sign that does not comply with the In Place Signing requirements. In addition the Contractor will be required to correct the deficiency at his own cost within 2 weeks of being notified by MnDOT. If the deficiency has not been corrected within 2 weeks, the Contractor will be charged \$50 per sign per day until the deficiency has been corrected.**

All costs incurred to relocate, salvage, and reinstall in place signing shall be incidental work.

- XX. Open excavations adjacent to existing pavement will not be permitted on opposite sides of the roadway at the same time.
- YY. The Contractor shall provide, at their own expense, protective devices necessary to protect the public from excavations, drop-offs, falling objects, splatter or other hazards that may exist during construction. The Contractor will not be allowed to suspend material, equipment, tools and personnel over traffic unless a lane closure is established below. All costs associated with the lane closure will be considered incidental.
- ZZ. All Contractors, subcontractors' and suppliers' mobile equipment, operating within the limits of the Project with potential exposure to passing traffic, shall be equipped with operable warning lights that meet the appropriate requirements of the SAE specifications. This would include closed roads that are open to local traffic only. This also includes any vehicle that enters the traveled roadway at any time. The SAE specification requirements are as follows:

360 Degree Rotating Lights - SAE Specification J845

Flashing Lights - SAE Specification J595

Flashing Strobe Lights - SAE Specification J1318

Lights shall be mounted so that at least one light is visible at all times from a height of 3.5 feet and from a 60 foot radius about the equipment. In order to meet the 360 degree at 60 foot [18 m] radius requirements supplemental lighting may be used in addition to the lights on the Approved

Products List. All supplemental lights must be SAE Class 1 certified. This specification is to be used for both day and night time operations. All costs incurred to provide warning lights shall be at no cost to the Department. These warning lights shall also be operating and visible when a vehicle decelerates to enter a construction work zone and again when a vehicle leaves the work zone and enters the traveled traffic lane.

Any warning lights shall be on the Approved Products List for Vehicle Lighting which is found at the following weblink:
<http://www.dot.state.mn.us/products/vehiclelighting/vehiclesafetylights.html>. The list may also be obtained by contacting:

Vehicle Warning Lights
Office of Construction MS722
Transportation Bldg. OR by calling: (651)366-3585
395 John Ireland Blvd.
St. Paul, MN 55155

This list is updated periodically. Warning light suppliers and manufacturers may contact the above for information on adding new products to the list.

A **\$100 penalty (per incident) will be assessed** against the Contractor each time failure to comply with the above requirements is observed on the Project site.

AAA. Sandbags will be the only acceptable weight to stabilize traffic control devices. During freezing conditions, sand for bags and impact barrels shall be mixed with a de-icer to prevent the sand from freezing. These sandbags shall be placed and maintained at the base of the traffic control devices to the satisfaction of the Engineer.

BBB. All workers within the road Right-of-Way who are exposed to either traffic or to construction equipment shall wear reflectorized high-visibility safety apparel.

High-visibility safety apparel means personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage, and meets the minimum performance Class 2 requirements of the ANSI/ISEA 107 – 2004 publication entitled “American National Standard for High-Visibility Safety Apparel and Headwear”.

Additional Requirements: ANSI/ISEA 107-2004 Class 3 Requirements (Class 2 Vest with Class E Long Pants)

- Flag Persons – In addition to an ANSI Class 2 hat, vest, shirt, or jacket, flaggers shall wear high visibility Class E long pants.
- Nighttime and Low Light Conditions – All workers working at night or in low light conditions shall wear high visibility Class E long pants in addition to an ANSI Class 2 vest, shirt, or jacket.

All high visibility apparel must be worn in the manner for which it was designed. All apparel worn on the torso must be closed in the front to provide contiguous 360 degree visibility. If a worker’s high-visibility apparel becomes faded, worn, torn, dirty, or defaced, reducing the conspicuity of the apparel, the apparel shall be removed from service and replaced with new apparel.

The Contractor will be subject to a non-compliant charge for failure to adhere to the clothing requirements as listed above. Non-compliance charges, for each incident, will be assessed at a rate of \$500.00 per incident that the Engineer determines that the Contractor has not complied.

CCC. When work will be performed between the official hours of sunset and sunrise, all appropriate practices for night work will apply.

The Contractor shall provide sufficient numbers of light plants to adequately illuminate the work area as determined by the Engineer. All costs incurred to provide such light plants shall be incidental to the lump sum traffic control.

All Contractor's personnel, except operators who will remain in their vehicles at all times, shall wear reflectively striped (approximately 10 m [33 feet] of striping), highly visible, short sleeved one or two piece coveralls (color and striping pattern to be determined by the Engineer), at all times while working on the Project. These coveralls shall be considered an incidental expense for which no direct compensation will be made. Any Contractor's employee found on the Project not wearing the prescribed reflective coveralls will be immediately ordered off the Project by the Engineer.

The Contractor shall provide a sufficient amount of 2 inch wide highly reflective vehicle marking tape to be applied to Contractor vehicles and equipment as directed by the Engineer, and as provided by the manufacturer's instructions. This tape shall be considered incidental and shall be on the Approved Products List <http://www.dot.state.mn.us/products/signing/sheeting.html>.

The State will **assess monetary deductions in the amount of \$1000.00 for each Calendar Day** or portion thereof, that the Contractor fails to provide sufficient numbers of light plants as described in this Section S-16. As light plants may be dedicated or otherwise made available to the Project, this assessment will be chargeable even if reasons beyond the control of the Contractor such as breakdowns, late delivery of materials, weather delays, or other unanticipated problems cause the work to be accomplished in non-daylight hours.

DDD. All in place signs and delineators mounted on less than three posts (not including back bracing) and which interfere with the Contractor's normal operation, shall be relocated outside of the work area by the Contractor at the direction of the Engineer. Any signs that are removed and may be reused are to be stored in such a manner as to protect the sign from scratching, fading, or other harmful affects until said signs are reinstalled or delivered to Ramsey County or the City of Mounds View. Signs and structures damaged by the Contractor shall be replaced by him at his own expense.

EEE. The Contractor shall conduct operations to allow continual fire and police access to all areas within the project.

FFF. All temporary rigid signs shall be fabricated with an approved retroreflective sheeting material of appropriate color, and be listed on the Qualified Product Listing (QPL) for either "Sheeting for Rigid Signs, Delineators, and Markers (Type IX and XI)" or "Sheeting for Rigid Permanent Signs, Delineators, and Markers (type IX and XI)". Signs remaining in place that still apply during temporary operations need no change in sign sheeting.

FFF. All temporary rigid signs shall be fabricated with an approved retroreflective sheeting material of appropriate color, and be listed on the Approved/Qualified Product List (APL/QPL) for either "Sheeting for Rigid Temporary Work Zone Signs, Delineators, and Markers (Type IX and XI)" or "Sheeting for Rigid Permanent Signs, Delineators, and Markers (Type IX and XI)". Signs remaining in place that still apply during temporary operations need no change in sign sheeting.

To visually identify approved retroreflective sign sheeting on temporary rigid signs in the field, signs shall have an easily identifiable marking on the face. This marking verifies that the sign sheeting is Approved for Rigid Sign use as found on the APL. Although still required to meet sheeting standards, temporary rigid signs 4 sq. feet and under in size and all barricades and route markers will be exempt from this marking. The appropriate marking shall be used for each type of the approved sheeting types. Refer to the instructions for marking of temporary signs that are on the APL or directly at the following link:

<http://www.dot.state.mn.us/products/signing/pdf/typelabel.pdf>

The retroreflective sheeting types and qualified products used for temporary signs and barricades can be found at: <http://www.dot.state.mn.us/products/signing/sheeting.html>.

S-16.4 MAINTENANCE AND STAGING OF TRAFFIC CONTROL

- A. The Contractor shall maintain, at all times, the existing traffic movements at the intersection of County Road H / Highway 10 except for allowed restrictions identified in the special provisions unless otherwise approved in writing by the Engineer.
- B. Pedestrian traffic shall be maintained and guided through the Project at all times and locations previously described in the special provisions.
- C. All signs installed on roads open to traffic that are not consistent with traffic operations shall be covered as directed by the Engineer. The cover should be a plate of solid material covering the entire legend or all of that part of the legend that is inappropriate. This cover shall be bolted to the sign and shall use a minimum of 1/8 inch plastic washers between the sign face and the cover. See Figures 8.2A, 8.2B and 8.3C of the Traffic Engineering Manual for details.
- D. As each phase of construction is completed, the Contractor shall install the signing and pavement markings required to safely open the road to traffic. This work shall be completed on or before the date of opening as approved by the Engineer.
- E. The Contractor shall keep the Right-of-Way fence closed up, except during work hours, by means of the in place fence, newly constructed fence, temporary fence (at the Contractor's expense), or a combination thereof.
- F. No access to or from any public road will be permitted for the Contractor's equipment, material deliveries, the hauling of excavated materials of any kind, or employees' private vehicles, except at in place public road intersections, or at locations and in such manner as approved by the Engineer.

S-16.5 LUMP SUM TRAFFIC CONTROL

No measurement will be made of the various items that constitute Traffic Control. All such work shall be construed to be included in a single lump sum payment under Item 2563.601 (Traffic Control), as listed on the Contract Proposal. The lump sum payment(s) shall be compensation in full for all costs of furnishing, installing, maintaining, and removing the individual traffic control devices, providing flagpersons, providing temporary street name signs, providing temporary speed limit signs and other items required as previously described.

If the Contractor requests changes in the Traffic Control Plan as the project progresses and these changes are implemented, there will be no increase or decrease in the lump sum payment of traffic control.

The County has the right to make minor modifications to the traffic control after it is established and set up in the field. These modifications will not result in an increase or decrease in the Lump Sum payment for Traffic Control.

Progress payment amounts for Item 2563.601 will be determined by the percentage of the total Contract completed based on the following schedule:

<u>% of Contract Completed</u>	<u>% of Item Paid</u>
5%	15%
25%	40%
50%	70%
75%	90%
100%	(Final 100%)

S-16.6 MISCELLANEOUS

- a. Store the following devices at a convenient location within the project limits for use in an emergency, as approved by Engineer:
 - 1) At least five (5) extra Type III barricades with flashers.
 - 2) At least ten (10) extra drums.
- b. No direct compensation will be made for furnishing, storing and erecting these traffic control devices.

S-17 (1506) SUPERVISION BY CONTRACTOR

Delete 1506.1 and add the following:

S-17.1 During the life of the Contract, the Contractor shall provide and have at all times a competent superintendent in charge of the overall project, who will personally be on call 24 hours a day and shall be available at the jobsite within four (4) hours notice. The superintendent may be either the Contractor himself/herself or a responsible employee authorized to act in the Contractor's behalf. This individual shall be fully authorized to conduct all business with the subcontractors; to negotiate and execute all supplemental agreements; to execute the orders and direction of the Engineer without delay; and to promptly supply the materials, equipment, tools, labor, and incidentals necessary for prosecution of the work.

S-17.2 At the Pre-construction Conference, the Contractor shall designate in writing whom the competent superintendent and competent individual (if different) will be for this project. These persons can only be changed throughout the duration of the project by submission of written authorization to the Engineer by the Contractor. The submittal of these persons shall be done before any work is performed on this project.

S-17.3 The Contractor shall furnish names, addresses, and phone numbers of at least three individuals responsible for all aspects of maintenance on the project. At least one of these individuals shall be "on call" 24 hours per day, seven days per week. The individual "on call" upon receiving notification of any deficiency shall dispatch people, materials, and equipment to correct the deficiency. The required information shall be submitted to the Engineer at the Pre-construction Conference.

S-18 **(1507) UTILITY PROPERTY AND SERVICE**

SP2016-21

Contractor shall perform construction operations near utility properties in accordance with the provisions of MnDOT 1507, except as modified below:

S-18.1 Add the following to MnDOT 1507.2:

- (3) The Contractor shall acquire a Positive Response confirmation from MnDOT for all proposed excavations when the Gopher State One Call has indicated that proposed excavations may affect MnDOT utilities. The Contractor may call MnDOT Electrical Services Section (ESS) Dispatch Locating to confirm the status of MnDOT owned Utility infrastructure. Contractor can contact MnDOT Electrical Services Section (ESS) Dispatch Locating at (651) 366 -5750 or (651) 366-5751. The Contractor shall be responsible for all damage to MnDOT owned Utility infrastructure if the Contractor did not acquire a Positive Response confirmation from MnDOT.

S-18.2 Any work performed by the Contractor that does not comply with MnDOT 1507.2 may be considered Unauthorized Work in accordance with MnDOT 1512.2.

S-18.3 All utilities related to this Project are classified as "Level D," unless the Plans specifically state otherwise. This utility quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data."

S-18.4 The bidder agrees that it shall use the Plan to identify the location of MnDOT storm water drainage facilities in order to meet the requirements of Minnesota Statutes Ch. 216D and Minnesota Rules 7560.0250 which apply to MnDOT storm water drainage facilities.

S-18.5 The following utility owners have existing facilities which the work under this Contract may affect. Where necessary, the utility owners intend to relocate or adjust the facilities in advance of or concurrently with the Contractor's operations.

City of Mounds View	St. Paul Regional Water Services
City of Arden Hills	Zayo Bandwidth
Xcel Energy Gas	Century Link
Xcel Energy Electric	Minnesota Department of Transportation

The [utility owner contact list](http://www.dot.state.mn.us/utility/contacts.html), provides current contacts for the utilities. See the utility owner contact link at <http://www.dot.state.mn.us/utility/contacts.html>.

S-18.6 The work under this Contract will affect The City of Mounds View utilities such as storm sewer, sanitary sewer, and water supply. Those affected utilities are included in the Plan for adjustment or relocation. The Contractor shall notify Brian Erickson City Engineer at telephone 763.717.4050, before the date the Contractor intends to start work. The Contractor shall give that office any information necessary for the responsible authorities to make suitable arrangements.

S-19 **(1514) MAINTENANCE DURING CONSTRUCTION**

SP2016-27

The provisions of MnDOT 1514 are supplemented with the following:

In addition to the requirements under MnDOT 2051 (Maintenance and Restoration of Haul Roads), the Engineer may require additional sweeping of roads adjacent to the construction site to ensure safety for the traveling public, protect the environment, uphold local requirements, or as otherwise directed by the Engineer.

Payment for additional sweeping ordered by the Engineer is specified below. (This price represents a shared cost.)

Pick Up Broom W/Operator.....	\$55.00 per hour
Self Propelled Pavement Broom W/Operator	\$30.00 per hour

S-20 (1601) SOURCE OF SUPPLY AND QUALITY

The provisions of MnDOT 1601 are supplemented as follows:

In conformance with the provisions of the U.S. Code of Federal Regulations 23CFR635.410 the Contractor will furnish and use only steel and iron materials that have been melted and manufactured in the United States,. Foreign source materials are any domestic products taken out of the United States for any process (e.g. change of chemical content, permanent shape or size, or final finish of product).

All bids must be based on furnishing domestic iron and steel, which includes the application of the coating, except where the cost of iron and steel materials incorporated in the work does not exceed one-tenth of one percent of the total Contract cost or \$2,500.00, whichever is greater. The state may approve the use of foreign iron and steel materials for particular Contract items, provided the bidder submits, a stipulation identifying the foreign source iron and/or steel product(s) and the estimated invoice cost of the product(s), for one or more of the Contract bid items. The Contractor shall submit a "Stipulation for Foreign Iron or Steel Materials" form for each stipulation with the Contractor's proposal. **If the Contractor chooses to use ANY non-domestic iron or steel, the Contractor must submit a stipulation with the proposal.**

Prior to performing work the Contractor shall submit to the Engineer a certification stating that all iron and steel items supplied are of domestic origin, except for non-domestic iron and steel specifically stipulated and permitted in accordance with the paragraph above.

Source of Supply and Quality: MnDOT 1604 is supplemented as follows: All costs of shop inspection at plants outside the United States shall be borne by the Contractor. Monies due or to become due the Contractor will be reduced according to these costs.

Partial Payment: All provisions for partial payments shall apply to domestic materials only. The Contractor will not receive payment for materials manufactured outside of the United States until such materials are delivered to the job site.

Alternate Bidding Process. Unless an alternate bidding process is specified, use of foreign steel and iron products in quantities in greater than provided above is not permitted. When the alternate bidding process is permitted the Contract may be awarded to the bidder who submits the lowest total bid based on furnishing domestic iron or steel unless such total bid exceeds the lowest total bid based on foreign materials by more than 25 percent.

S-21 (1602) NATURAL MATERIAL SOURCES
SP2016-29

The provisions of MnDOT 1602 are supplemented with the following:

S-21.1 The expansion of any existing natural material sources, or the creation of new Natural Material Sources, will be subject to the requirements of the Farmland Protection Act of 1981 (FPPA or the ACT). Coordination to

comply with FPPA shall be the responsibility of the Contractor. Contact the Natural Resources Conservation Service (NRCS) office for the county in which the source is located for further information.

S-22 (1603) MATERIALS: SPECIFICATIONS, SAMPLES, AND TESTS

The provisions of Mn/DOT 1603 are supplemented as follows:

S-22.1 SAMPLING AND TESTING

Quality assurance sampling and testing, as required by the "Schedule of Materials Control" will be performed by the County. The County at the Contractor's expense shall perform retests of those tests that fail.

S-22.2 ACCEPTANCE

A copy of the "Schedule of Materials Control" is in the Appendix.

S-23 (1701) LAWS TO BE OBSERVED (WET LANDS)

SP2016-31

The provisions of MnDOT 1701 are modified and/or supplemented with the following:

S-23.1 If the Contractor operations involve the excavation and/or disposal of material off MnDOT Right of Way, the Contractor is advised of the following:

 MN Statutes Sections 103G.2212 and 103G.241 stipulate that an agent or employee of another may not:

- 1) drain, excavate, or fill a wetland, wholly or partially; or
- 2) construct, reconstruct, remove, or make any change in any reservoir, dam, or the course, current, or cross-section of any public water

unless a signed statement from the property owner is obtained stating that any permit or wetland replacement plan required for the work is in place, or that a permit or replacement plan is not required; **AND** this statement is mailed to the appropriate office with jurisdiction over the wetland or public water prior to initiating the work.

 The "Landowner Statement and Contractor Responsibility For Work in Wetlands or Public Waters" can be found at http://www.bwsr.state.mn.us/wetlands/forms/Contractor_Responsibility.doc . The Contractor shall provide the Engineer with a copy of the completed "Landowner Statement and Contractor Responsibility for Work in Wetlands or Public Waters" for the excavation and/or disposal site prior to initiating the work.

S-24 (1701) LAWS TO BE OBSERVED (BRIDGE)

SP2016-33

The provisions of MnDOT 1701 are modified and supplemented with the following:

S-24.1 The Contractor shall use MnDOT-approved companies for testing, waste transport and disposal of asbestos and regulated wastes, as provided in MnDOT's manual "Asbestos and Regulated Waste Manual For Structure Demolition Or Relocations for Construction Projects". The manual is available on the following website: <http://www.dot.state.mn.us/environment/buildingbridge/index.html>. Contact Mark Vogel at 651.366.3630 or Jackie Klein at 651.366.3637, Office of Environmental Stewardship, with any questions regarding the manual.

 The Contractor shall only use MnDOT-approved contractors for the following work: building/bridge assessments, asbestos abatement and regulated waste oversight, asbestos removal, regulated waste

removal, and regulated waste disposal and recycling. Contact Mark Vogel at 651.366.3630 or Jackie Klein at 651.366.3637, Office of Environmental Stewardship, 651.366.3630, with any questions regarding the manual.

The Contractor shall use only MPCA-permitted Combined Solid Waste Disposal Facilities to dispose of all solid waste including demolition debris. Do NOT dispose of demolition debris in a permit-by-rule landfill.

S-24.2 The Contractor shall:

- (A) All work must comply with applicable federal and state regulations.
- (B) Provide the Minnesota Pollution Control Agency (MPCA) and the Engineer written notice of intent to demolish or move a structure - see form "Notification of Intent to Perform a Bridge Demolition for MnDOT Operations" at <http://www.dot.state.mn.us/environment/buildingbridge/index.html>. Provide such notice to the MPCA and the Engineer at least 10 working days before any move or demolition.
- (C) In addition to (A) and (B), if the bridge contains any asbestos, the Contractor shall:
 - (1) Use a MnDOT approved oversight contractor to oversee the work of the MnDOT-approved asbestos abatement contractor.
 - (2) If there is over 160 sq ft, 260 linear ft, or 35 cu ft of asbestos on the premises, submit "Notification of Asbestos Related Work", to the MPCA and the MN Department of Health. Submit notice at least 10 working days before commencing abatement activities. The Contractor shall submit a copy of the completed notification to the Engineer at the same time.
 - (3) Submit all required documentation to the MPCA and the MN Department of Health, and copy the Engineer on all submittals. Information on MPCA requirements can be found at http://www.pca.state.mn.us/programs/asbestos_p.html. Information on Department of Health requirements can be found at: <http://www.health.state.mn.us/divs/eh/asbestos/index.html>.
 - (4) Comply with all applicable USDOT packaging and transportation requirements when transporting asbestos-containing waste. The Contractor shall provide the Engineer with all Asbestos Containing Material Transportation shipping papers/manifests. Shipping paper guidance can be found at <http://www.dot.state.mn.us/environment/buildingbridge/disposal.html>.
 - (5) Dispose of all asbestos containing waste in a MPCA-permitted mixed municipal solid waste or Industrial landfill or a landfill permitted to accept asbestos-containing waste as listed under Landfills/Regulated Waste at <http://www.dot.state.mn.us/environment/buildingbridge/index.html> under Approved Contractors. Do not dispose of asbestos-containing waste in demolition debris landfills.
 - (6) Ensure that the oversight contractor provides the Engineer with a final report meeting the requirements contained in MnDOT's manual "Asbestos and Regulated Waste Manual for Structure Demolition or Relocations for Construction Projects" available on the following website: <http://www.dot.state.mn.us/environment/buildingbridge/index.html>.
 - (7) Notify the Engineer immediately if while removing or renovating a utility facility or bridge, the Contractor encounters additional asbestos materials or regulated wastes, other than that noted in the Assessment Summary. The Engineer may suspend work in accordance with MnDOT 1501. Abatement of the additional asbestos materials or regulated wastes will be paid for as Extra Work in accordance with MnDOT 1402.5.
- (D) Comply with the requirements specified in MnDOT's manual "Asbestos and Regulated Waste Manual for Structure Demolition or Relocations for Construction Projects" available on the following website: <http://www.dot.state.mn.us/environment/buildingbridge/index.html>.

S-24.3 The Contractor shall comply with all applicable MnDOT policies, and all applicable laws, rules, and regulations governing removing and recycling/disposing of any regulated wastes including, but not limited to: (see manual for procedures and approved contractors/end sites)

1. Treated Wood
2. Lead Paint
3. Lead Plates
4. Polychlorinatedbiphenols (PCB's)
5. Mercury

When shipping any of these wastes, the Contractor must comply with USDOT packaging and transportation requirements. The Contractor shall provide the Engineer with all shipping papers or manifests.

The Contractor shall provide the Engineer with copies of disposal or recycling records.

FAILURE TO COMPLY WITH THE NOTIFICATION PROVISIONS IN THIS SECTION WILL BE DEEMED A MATERIAL BREACH OF CONTRACT. IF A REGULATORY AGENCY IMPOSES MONETARY SANCTIONS ON MnDOT THAT ARE BASED, IN WHOLE OR IN PART, UPON THE ACTS OR OMISSIONS OF THE CONTRACTOR, THE CONTRACTOR AGREES TO INDEMNIFY MnDOT AND TO HOLD MnDOT HARMLESS FOR SAME, EXCEPT TO THE EXTENT THAT ANY SANCTIONS WERE CAUSED BY MnDOT'S OWN NEGLIGENCE

S-25 (1702) PERMITS, LICENSES AND TAXES

The provisions of Mn/DOT 1702 are supplemented as follows:

S-25.1 Ramsey County requires the Contractor and all of his/her subcontractors to submit the Annual Right of Way User Registration permit and the Excavation of Obstruction Permit application forms, (attached in Appendix). The permit fee will be waived. The bond and insurance requirements are met through the provisions of this Contract.

S-25.2 The Contractor is responsible for acquiring all required permits.

S-25.3 The permits included in the Proposal for this project, as issued, shall be construed to be a part of the Special Provisions in the Proposal. The conditions, requirements and restrictions of these permits shall be binding on the Contractor's operations under this Contract.

S-26 (1707) PUBLIC CONVENIENCE AND SAFETY

SP2016-37

Metro Transit has bus service in the Project area which will be affected by this construction. The Contractor shall notify the following Metro Transit representative prior to the start of the Project:

Lisa Johnson
Manager of Street Operations
Lisa.Johnson@metc.state.mn.us
612-349-7570

S-27 **(1714) RESPONSIBILITY FOR DAMAGE CLAIMS**

The provisions of 1714 are supplemented as follows:

The Contractor must have the State of Minnesota named as an additional insured on any insurance coverage the contractor is required to provide.

S-28 **(1716) CONTRACTOR'S RESPONSIBILITY FOR WORK**

The provisions of 1716 are supplemented as follows:

All warranties provided by Contractor, for the work performed on the trunk highway, will flow to, and be enforceable by, the State as the owner of such improvements.

S-29 **(1717) AIR, LAND, AND WATER POLLUTION (CONCRETE GRINDING)**

SP2016-39

The provisions of MnDOT 1717 are supplemented and/or modified with the following:

S-29.1 **CONCRETE DIAMOND GRINDING OPERATIONS AND SLURRY MANAGEMENT**

The Engineer will not permit residue and water to flow across adjacent traffic lanes, flow onto shoulder, flow off bridge decks, flow into gutters, or flow onto private property. The Contractor shall provide a plan for both the on-site and off-site slurry management. The Contractor shall choose, and the Engineer will approve, the methods for slurry management in accordance with the following provisions.

Slurry Management is prohibited within federally recognized tribal land boundaries. Identification of federally recognized tribal land boundaries are found on the following website: <http://mn.gov/indianaaffairs/tribes.html> and will be identified by the Engineer in the Plan.

S-29.2 On-site slurry management is prohibited within Areas of Environmental Sensitivity (AES). These areas will require off-Site slurry management. No slurry discharge is allowed in the AES or within the buffers (see table 1717-1) to an AES. Identification of the AES are as follows:

- (1) MnDNR Public Waters Inventory (PWI).
- (2) National Wetland Inventory (NWI).
- (3) Calcareous fens.
- (4) Permanent vegetation designated for preservation, such as areas adjacent to the right of way identified as a 'Site of Biodiversity Significance' or 'Native Plant Community' by the DNR Minnesota Biological Survey (MBS).
- (5) Prairie remnants, including but not limited to areas adjacent to Railroad Rights-of-way Prairies.
- (6) Wooded areas with specimen trees.
- (7) Locations with Federal or State listed Threatened or Endangered plant species.
- (8) Locations with Federal or State listed Threatened or Endangered aquatic species.
- (9) Historic properties.

Identification of items 1- 5 are found on the following web link:
http://deli.dnr.state.mn.us/data_search.html .

Identification of items 6-9 are provided by the Office of Environmental Stewardship (OES) staff through the project's Early Notification Memo (ENM) process.

The Engineer will identify all AES in the plans.

Other constraints within the project that must be addressed in the Slurry Management Plan (Section S-29.5) and require slurry collection are as follows:

- (1) Roadways that utilize curb and gutter to convey storm water to catch basin inlets into a closed drainage system (storm sewers).
- (2) Inlet structures that utilize a piping system to convey storm water directly into stormwater treatment facilities or AES.
- (3) Bridge deck grinding.
- (4) Stormwater treatment ponds.
- (5) Infiltration/filtration basins.

S-29.3 **OFF-SITE SLURRY MANAGEMENT (when slurry is collected and taken to a containment basin or treatment facility)**

Any areas identified in Section S-29.2, along with other areas identified by the Engineer will require slurry collection in accordance with the following:

- (1) Collect and transport slurry in water-tight haul units to prevent spills.
- (2) Provide a temporary or permanent lined containment basin outside the right-of-way to decant the collected slurry.
- (3) Areas outside of the right-of-way may require a separate NPDES Construction Stormwater Permit as per Minnesota Pollution Control Association (MPCA).
- (4) Follow additional requirements in Section S-29.5, Slurry Management Plan.

S-29.4 **ON- SITE SLURRY MANAGEMENT (when slurry is spread during the diamond grinding operation)**

The Engineer will allow the Contractor to spread the slurry within MnDOT right of way on the vegetated slope and median in accordance with the following requirements:

- (1) **Maximum Buildup of Slurry Sediment**
The Contractor shall spread the slurry at a rate to prevent sediment buildup of greater than ½ inch [13 mm] in any location by:
 - (a) Spreading the slurry either further up / down the slope with each subsequent pass of the grinder.
 - (b) Spread the material evenly on the adjacent slopes by using appropriate equipment (i.e., chain drags, tine harrows, plug aeration, dissipater plate, etc.) to break up the material.
 - (c) Remove and haul off site any sediment buildup of greater than ½ inch [13 mm].
 - (d) Other spreading methods, as approved by the Engineer.
- (2) **Vegetated Medians – The Engineer will allow slurry spreading within the entire roadway median in accordance with the following:**
 - (a) Maintain a vegetated buffer zone (as per Table 1717-1) from any identifiable point of concentrated storm water flow. The following are examples of points of concentrated storm water flow in medians:
 - i. A transverse ditch bottom width of < 5 feet.
 - ii. Longitudinal scouring is apparent within median.
 - iii. An identifiable low point (V ditch) that runs parallel to the roadway.
 - (b) Do not spread slurry in areas identified for protection in accordance with Section S-29.2.
 - (c) Maintain the vegetated buffer zones as per Table 1717-1.

- (3) Vegetated Outside Slopes – Deposit the slurry on either the in-slope or back-slope and maintain the vegetated buffer zones outlined in Table 1717-1.
- (4) In order to minimize sediment infiltration into drainage systems, the Contractor shall:
 - (a) Only place slurry in locations that flow away from the roadway.
 - (b) Begin the slurry spreading operation a minimum of 1-foot [0.3 m] from the paved shoulder.
 - (c) Provide compost filter log for inlet protection.
 - (d) Leave compost filter log in place after project is completed.

Table 1717-1	
Buffer Zone / Areas Slurry Spreading is <u>NOT</u> Allowed	
Location	Vegetated Buffer Distance, ft [m]
*Toe of in-slope or fill slope	5 [1.5]
*Toe of back-slope	5 [1.5]
Water level in roadside ditch or median ditch	5 [1.5]
Stormwater treatment ponds	100 [30]
Infiltration/filtration basins	100 [30]
Areas of Environmental Sensitivity	100[30]
Stormwater inlet <u>without</u> inlet protection	100 [30]
Stormwater inlet <u>with</u> inlet protection	50 [15]
* Does not apply to median areas with a transverse ditch bottom width > 5 feet [1.5 m] and standing water is not present.	

S-29.5 **SLURRY MANAGEMENT PLAN**

Prior to grinding operations, the Contractor shall submit to the Engineer in writing the proposed Slurry Management Plan for approval. Grinding operations shall not begin until the Plan is approved by the Engineer.

The Slurry Management Plan shall include the following:

- (1) When discharging on the slope, provide method to identify discharge start and stop locations for the equipment operator.
 Examples include:
 - (a) Lath and flagging tape
 - (b) Barrels
 - (c) The Engineer may approve other options as suggested by the Contractor.
- (2) When using a containment basin:
 - (a) Provide an estimate of the expected volume of slurry on the project and the volume of the containment basin.
 - (b) Ownership and location of the temporary containment basin.
 - (c) Method used to line the temporary containment basin. Examples include:
 - i. Clay (including thickness of clay layer)
 - ii. Impermeable membrane (including thickness of membrane).
 - (d) Describe management of water. Examples include:
 - i. Allowing the water to evaporate,
 - ii. Re-using the water in the grinding operation, slurry broadcast operation, in a commercially useful manor (include engineering need, i.e., dust control, grade compaction),
 - iii. Water sent via sanitary sewer (provide proper permits)

- iv. Hauling to a water treatment facility; (provide the name of the treating facility).
- (e) Describe management of the solids (fines). Examples include:
 - i. Using the solids as a fill material, a component in recycled aggregate or any other commercially useful application (include engineering need),
 - ii. Solids transported to a reuse storage facility, MPCA permitted lined mixed municipal solid waste or industrial landfill. Furnish the Engineer with a document that identifies the name and location of the reuse storage facility or a MPCA permitted lined mixed municipal solid waste or industrial landfill.
- (f) Describe restoration of the containment basin area. Include fill material, topsoil, seed mixtures and temporary covers.
- (3) pH control plan must include:
 - (a) Procedure used to maintain the pH of the slurry within the acceptable range,
 - (b) Example of pH test results log,

S-29.6

CONTROL OF pH

Monitor and control the pH of the slurry for all operations to maintain a pH between 6 and 12.

- (1) Calibrate the test equipment prior to start-up of daily operations.
- (2) At the start-up of operations, test the pH at least once per hour to ensure it is within the acceptable limits.
- (3) Once the pH control plan is operational and producing consistent results, the testing frequency may be reduced to 4 tests per day.
- (4) Keep a signed and dated log of all pH test results for each piece of equipment collecting slurry and have available to the Engineer upon request.

S-29.7

PRIOR TO CONCRETE GRINDING OPERATIONS

The Engineer will schedule a pre-grinding meeting at the project site. The Engineer and Contractor will review the Slurry Management Plan for approval, including identification of the AES, acceptable slurry management practices, and any other aspects of the Plan as determined by the Engineer.

S-29.8

STOP WORK

Stop operations and perform the necessary corrective actions before proceeding when any of the following conditions occur:

- (1) Raining during operations resulting in discharge of slurry into buffer areas,
- (2) Equipment failing to contain or remove slurry,
- (3) Defined quality control requirements are not followed,
- (4) The slurry is discharged into areas not approved in the Slurry Management Plan,
- (5) The pH is outside the designated range,
- (6) The slurry discharges into waters of the state, or
- (7) A spill.

Notify the State Duty Officer immediately if condition (6) or (7) occurs.

1-800-442-0798 for Out-State; 651-649-5451 for Metro area

S-30 (1717) NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

Pollution of natural resources of air, land and water by operations under this Contract shall be prevented, controlled, and abated in accordance with the rules, regulations, and standards adopted and

established by the Minnesota Pollution Control Agency (M.P.C.A.), and in accordance with the provisions of Mn/DOT 1717, 1803.5 and the following:

S- .1 Minnesota Pollution Control Agency General Permit, Authorization to Discharge Storm Water

- A. The Contractor shall furnish, install and maintain temporary and permanent erosion and sediment control devices in accordance with the provisions of 2105.5, 2573, 2575, as shown in the Plans, in accordance with the provisions of the Special Provisions Attachment "Minnesota Pollution Control Agency General Permit, Authorization to Discharge Storm Water", and the following:

Ramsey County has applied for and received coverage under the above mentioned permit by signing both the Owner's and Contractor's certification blanks on the permit application. The County shall retain a photocopy of the original permit application. Upon award of the Contract, the County and the Contractor shall execute the Storm Water Permit Transfer/Modification Application form (attached to these Special Provisions) and submit it along with a photocopy of the original application to the Minnesota Pollution Control Agency. The Minnesota Pollution Control Agency, upon receipt of the Storm Water Permit Transfer Modification Application, will amend it to the original permit application thereby making both the County and the Contractor co-permittees for the requirements of the General Permit, "Authorization to Discharge Storm Water."

- B. There is no fee for the transfer of the permit. Work may not begin until all transfer permit forms are signed and dated and the contractor identifies by name a person knowledgeable and experienced in the application and implementation of the Storm Water Pollution Prevention Plan, and has developed a chain of responsibility for all operators (subcontractors) on the site, in accordance to Part III.A.1 of the General Permit.
- C. The Contractor shall be solely responsible for complying with the requirements of General Permit where Contractor is referenced in Part II.B.2: Permittee(s) for Parts II.B, II.C and IV.

The Contractor shall be responsible for providing all inspections, documentation, record keeping, maintenance, remedial actions, repairs required by the permit. All inspections, maintenance, and records required in the General Permit Part IV.E, Inspections and Maintenance, shall be the sole responsibility of the Contractor. The word "Permittee" in these referenced paragraphs shall mean "Contractor". Standard forms for logging all required inspection and maintenance activities shall be used by the Contractor. All inspection and maintenance forms used on this Project shall be turned over to the Engineer every two weeks for retention in accordance with Part IV.E, Inspections and Maintenance of the permit.

The Contractor shall have all logs, documentation, inspection reports on site for Engineer's review and shall post the permit on site. The Contractor shall immediately rectify any shortcomings noted by the Engineer. All meetings with the MPCA, Watershed District, WMO, or any local authority shall be attended by both the Engineer and the Contractor or their representatives. No work required by said entities, and for which the Contractor would request additional compensation, shall be started without approval from the Engineer. No work required by said entities and for which the changes will impact the design or requirements of the Contract documents or impact traffic shall be started without approval from the Engineer.

The Contractor shall immediately notify the Engineer of any site visits by Local Permitting Authorities performed in accordance with Part V.H, Inspection and Entry.

- D. If the Contractor fails to perform the requirements as listed herein, the Engineer will issue a Work Order detailing the required action. The Contractor shall start the required action within twenty-four (24) hour of receipt of the Work Order and continue the required action until the Project is brought into compliance with the permit. Failure to perform the required action as specified, shall subject the Contractor to a \$1000/calendar day deduction.

The Contractor shall review and abide by the instructions contained in the permit package. The Contractor shall hold the County harmless for any fines or sanctions caused by the Contractor's actions or inactions regarding compliance with the permit or erosion control provisions of the Contract Documents.

S-31 (1718) FURNISHING RIGHT-OF-WAY

The provisions of 1718 are supplemented as follows:

The State of Minnesota, acting through its Commissioner of Transportation is an intended third party beneficiary of the contract with respect to the portion of the work performed on the State's right-of-way.

S-32 IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

SP2016-43

The bidder is agreeing that the following is true by signing this bid form:

(1) That any facility to be utilized in the performance of this Contract, unless such Contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub. L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub. L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 C.F.R. Part 15), is not listed on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 C.F.R. 15.20.

(2) That the state transportation department shall be promptly notified prior to Contract award of the receipt by the bidder of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility to be utilized for the Contract is under consideration to be listed on the EPA List of Violating Facilities.

S-33 (1801) SUBLETTING OF CONTRACT

REVISED 08/28/15

The provisions of MnDOT 1801 are modified as follows:

S-33.1 For Projects in excess of \$50,000, the Contractor may sublet work only to subcontractors that meet the definition of "responsible contractor" in Minnesota Statutes §16C.285, subdivision 3. The Contractor shall obtain verifications of compliance with §16C.285 from subcontractors using a form provided by the Department. The Contractor must provide such verifications to the Department upon the Department's request.

S-33.2 The third paragraph of MnDOT 1801 is modified to read:

On Contracts with Disadvantaged Business Enterprise (DBE), the Contractor's organization shall perform Work amounting to not less than 30 percent of the total original Contract Amount. The

Department will deduct specialty items from the total original Contract Amount before calculating the amount of Work that the Contractor shall perform.

S-34 **(1802) TRAINING FOR CONSTRUCTION TRUCK OPERATORS**
SP2016-46

Construction truck operators that haul construction materials such as borrow, aggregate base, asphalt mixtures and concrete paving mixtures are encouraged to become certified Level I Construction Truck Operators (CTO).

MnDOT District offices host a one-day CTO certification course. The CTO training covers the Federal and State construction truck and driver requirements and regulations. The course also covers safe driving techniques. The course includes presenters from the Minnesota State Patrol, Minnesota Department of Transportation, and the Minnesota Safety Center

The Minnesota State Patrol, the Minnesota Highway Safety Center, the Minnesota Trucking Association, the Minnesota Asphalt Pavement Association, and the Minnesota Department of Transportation co-sponsor this course.

For additional information, contact the following:

	PHONE #
Minnesota Department of Transportation: E-mail: motorcarrier.dot@state.mn.us Website: http://www.dot.state.mn.us/cvo/index.html	651-215-6330
Minnesota Highway Safety Center: E-mail: tjsakry@stcloudstate.edu Website: http://mnsafetycenter.org	Toll Free: 1-888-234-1294 320-255-4732 ex 109
Minnesota State Patrol: Email: cmvinfo@state.mn.us Website: https://dps.mn.gov/divisions/msp/commercial-vehicles/Pages/default.aspx	651-405-6196
Minnesota Trucking Association: E-mail: mta@mntruck.org Website: http://www.mntruck.org	651-646-7351

S-35 **(1803) PROSECUTION OF WORK (ADA)**
SP2016-47

The provisions of MnDOT 1803 are supplemented and/or modified with the following:

S-35.1 **SPECIAL PROJECT ADA REQUIREMENTS**

All pedestrian facilities and shared use paths on this Project must be constructed according to Public Rights-of-Way Accessibility Guidelines (PROWAG) which can be found at: <http://www.dot.state.mn.us/ada/pdf/PROWAG.pdf>. The appropriate pedestrian ramp details for each quadrant are included in the Plan. The Engineer may provide additional details to those provided in the Plan that meet the PROWAG guidelines as the need arises and field conditions dictate.

(A) The Contractor must designate a responsible person competent in all aspects PROWAG to assess proposed sidewalk layouts at each site before work begins. Any time work the Contractor is performing concerns pedestrian facilities, the Contractor's responsible person shall be on site.

(B) Pedestrian facilities must be constructed to meet the following criteria:

- (1) Pedestrian Access Routes (PAR) must be constructed to meet the following:
 - Minimum 4 feet width.
 - A maximum cross slope of 2.0%.
 - Vertical discontinuities must be less than 0.25 inches.
 - Must provide positive drainage without allowing any ponding and maintain existing drainage flow patterns unless indicated otherwise in the Plan.
 - All grade breaks shall be constructed perpendicular to the path of travel.
- (2) Landings are part of the PAR and must be constructed to meet the following:
 - 4 feet by 4 feet minimum width.
 - Maximum slope of 2.0% in all directions.
 - Required at all locations where the PAR changes directions or inverse grades.
 - Must be connected to the PAR.
- (3) Ramps are part of the PAR and must be constructed to meet either of the following criteria:
 - Longitudinal slopes less than 5% in the direction of travel requires no landing at the top of the ramp (unless the PAR changes direction).
 - Longitudinal slopes between 5 - 8.3% in the direction of travel require a landing at the top of the ramp.

If the Contractor constructs any pedestrian or shared-use trail facilities that are not per Plan, do not meet the above requirements, or do not follow the agreed upon resolution, the Contractor will be responsible for correcting the deficient facilities with no compensation paid for the corrective work. To ensure that the pedestrian facilities are constructed in compliance with PROWAG, the Contractor shall follow the following three steps:

- (1) The Contractor shall use the appropriate ramp details in the Plan and identify the removal limits for the sidewalk and curb and gutter. If Contractor determines the removal limits are not adequate to meet PROWAG, the Contractor shall stop work immediately and consult the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may finish the removals.
- (2) Prior to pouring each curb and gutter segment, the Contractor must verify the zero height curb and curb transitions will be located as shown in the Plans and will provide an adequate detectable edge as shown on Standard Plan Sheet No. 5-297.250 (sheet 4 of 5). The Contractor shall also verify the proposed curb flow lines will provide positive drainage as well as maintain existing drainage patterns including existing gutter inflows/outflows. The curb and gutter shall be constructed as detailed in the Plan with a defined flow line and no vertical discontinuities. The Contractor shall consult with the Engineer to determine a resolution if any of these conditions cannot be met. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with pouring the curb and gutter.
- (3) After the curb has been correctly poured, the Contractor has set the sidewalk forms, and prior to placing the concrete curb ramps/sidewalks, the Contractor shall verify the requirements in Section S-35.1B will be achieved.

In addition, the longitudinal slopes shown in the Construction Plans and the Standard Plans shall be utilized unless these conditions cannot be met. The starting point for setting the forms on the controlling ramp leg should be the following:

Steep (S) = 7%
Flat (F) = 4%
Landing = 1.5%
Sidewalk Cross Slope = 1.5%
Fan ramp = 5%

If any of these requirements cannot be met the Contractor shall meet with the Engineer to determine the best solution. Once the Engineer and the Contractor reach agreement on how to proceed, the Contractor may proceed with the curb ramp/sidewalk pour.

Landings – An initial landing is the first required landing of a pedestrian ramp. All initial landings required at the top of a ramped sloped surface (>2% longitudinal slope), shall be formed and placed separately in an independent concrete pour. This does not include initial landings placed at roadway grade such as depressed corners, parallel ramps, or rural flat landings. Secondary landings consist of all landings beyond the initial landing. These secondary landings do not require a separate landing pour. All landings adjacent to push buttons shall be formed and placed separately in an independent concrete pour, regardless of ramp type.

Wet casting or drill and grouting of dowel bars will be required in accordance with the details shown in Standard Plan 5-297.250 Sheet 5 of 5. These bars may be either smooth or deformed and shall be installed with 2 inch minimum concrete cover. When not accounted for in the Plan, payment for these bars will be made under Item 2301.602 (Drill & Grout Reinforcement Bar (Epoxy Coated)) by the Each at the Predetermined Price of \$10.00 per bar furnished and installed. All necessary subgrade preparation and aggregate base placement for the entire ramp construction limit shall be done before the initial landing is constructed at each location.

(C) It shall be the responsibility of the Contractor, or Contractor's Surveyor if applicable, to layout all proposed work at each intersection in accordance with the Plan and requirements listed in this Special Provision. The Contractor may confer with the Engineer for guidance in laying out the proposed work, but it will be the Contractor's responsibility to ensure the proposed work meets all the requirements of this Special Provision. This layout includes, but is not limited to placement of grade breaks, curb transitions, gutter flow lines, truncated dome placement, crosswalk marking placement, flares, landing limits, and ramp limits. It is important that the Contractor layout this work properly to achieve the construction of a compliant pedestrian facility. The owner's surveyor will only stake points and elevations provided in the Plan. For custom designs, other than specific dimensions provided in the Plan, the Contractor shall be expected to scale dimensions from the Plan as needed to construct the facility. If scaled dimensions do not allow for a facility to be constructed to meet the requirements of this Special Provision, the Contractor shall follow the process listed in Section S-35.1B. This layout work shall be incidental.

(D) The Contractor shall utilize measures and methods when working near existing buildings that will avoid damaging the building's face or structure. The contractor will be responsible for any damage to the building's face or structure, both below and above ground. Any damage resulting from Contractor operations will be repaired at the Contractor's expense to the satisfaction of the Engineer.

(E) This section applies when no sidewalk joint information is provided in the plan. The Contractor will round all sidewalk joints with a ¼ inch radius edging tool, contraction joints shall extend to at least 30 percent of walk thickness and shall be ¼ inch maximum width. The Contractor shall have the option of providing saw cuts to construct all sidewalk joints and the gutter joints within the PAR. When greater than 50 feet of continuous sidewalk runs are constructed the contractor shall saw cut all joints. The top grade break of walkable flares need a visual joint to indicate a change in grade. This visual joint shall have ¼ inch radius, ¼ inch maximum width and ¼ inch depth. All saw cut work associated with PAR construction shall be incidental.

(F) In areas where the sidewalk is to be constructed around fixed structures and the grade has been changed, the sidewalk shall be finished around these structures to the satisfaction of the Engineer at no additional cost.

(G) All pedestrian signal systems should be installed as shown in the Plan and must be constructed to meet the following criteria. The Contractor shall verify that the proposed push button locations will meet all of the following criteria before proceeding with the installation of the pedestrian push button system:

- Pedestrian push buttons shall be oriented with the button facing towards the intersection and the button face placed parallel to the outside edge of the crosswalk.
- Pedestrian push buttons shall be a minimum of 4 feet and a maximum of 10 feet from the back of curb/edge of roadway, but may be placed 1.5 feet to 4 feet from the back of curb/edge of roadway if mounted on a signal pole as indicated in the Plan or as approved by the Engineer.
- Pedestrian push buttons shall be located at the outside crosswalk edge and shall be no more than 5 feet offset from the projected outside edge of the crosswalk/outside edge of detectable warnings.
- Pedestrian push buttons shall be a minimum of 10 feet apart, except in islands and medians where only a 6' clear distance must be maintained
- Each pedestrian push button shall have a landing immediately adjacent to the push button face with minimum dimensions of 4 feet by 4 feet and a maximum slope of 2.0% in all directions. Center the push button on the landing if possible to do so without violating any of the requirements listed in this Special Provision. The landing must be connected to the Pedestrian Access Route.
- A 6-foot wide clear distance between obstructions in the same path as the PAR shall be maintained wherever it is possible to do so for snow removal purposes. This 6 foot obstruction free area is called a (MAR) Maintenance Access Route
- All new hand holes shall be placed outside of the PAR, inclusive of ramps and landings.
- The push buttons shall be mounted at a height of 42 inches as indicated in the Plan.
- Crosswalks shall be striped in a straight alignment between the outside edges of the detectable warnings with no kinks unless the crosswalks are shown as kinked in the Plan.
- The Contractor shall maintain all working points marked by the surveyor and use the working points to layout push button locations in accordance with the Plans and Special Provisions.

If any of these conditions cannot be met, the Contractor shall consult with the Engineer to determine a resolution. Once the Engineer and the Contractor reach an agreement on how to proceed, the Contractor may proceed. If the Contractor constructs any pedestrian push button systems or pedestrian facilities which do not meet the criteria or the agreed upon resolution, the Contractor will be responsible for correcting the deficiencies with no compensation paid for the corrective work.

To help ensure signal systems are properly constructed the Contractor must adhere to the following practices:

- All push button station bases shall be installed using a breakaway pedestal base, see Typical APS Pedestrian Push Button Location and MnDOT approved /qualified products list. The pedestal base shall be fastened to the station foundation using 4 5/8 inch (UNC) x 7 1/2 inch' stainless steel anchor rods. The push button station foundation shall be constructed as part of the sidewalk by increasing the sidewalk dimension to a 12 inch minimum thickness and an 18 inch minimum diameter to top of sidewalk surface. The push button station foundation shall be placed as part of the landing. All construction joints/grade breaks shall be located outside of foundation area and designated landing area.

- When not accounted for in the Plan, and determined necessary by the Engineer payment to furnish and install additional APS pedestrian push button station will be \$ 1,000.00 each and will be made under Item 2565.602 (Pedestrian Push Button Station). Payment shall include all components necessary to furnish and install APS push button station, including additional conduit, wiring, APS push button base installation, and shaft with reflective tape and cap.
- Signal pole foundations which are being constructed in or adjacent to sidewalk shall be constructed in accordance with the applicable MnDOT Standard Plate 8120 or 8126. If a push button is proposed to be mounted on a signal pole, the APS push button shall meet the vertical, horizontal, and crosswalk skew requirements. If these specifications cannot be met a MnDOT approved extension bracket must be used.

S-36 **(1803) PROGRESS SCHEDULES**

Prosecution of work shall be in accordance with the provisions of 1803 and the following:

S-36.1 The Progress Schedule as provided in 1803.1 shall be in the form of a bar chart. A bar chart approved by the Engineer may be required for the processing of estimates. All milestones must be denoted on the bar chart.

S-36.2 The contractor shall be aware that it is anticipated that there will be multiple “move-ins” required within the allotted contract time.

S-36.3 No concrete shall be poured past October 15th and winter suspension will not start until all roadway repairs have permanent pavement markings.

S-37 **(1803) LIMITATION OF OPERATIONS - NIGHT CONSTRUCTION**

SP2016-49

Modify MnDOT 1803.5, “Limitation of Operations”, with the following:

S-37.1 Night Construction means construction between the hours of 8 p.m. to 6 a.m. occurring within 500 feet of any sensitive areas such as:

- Hospitals;
- Nursing homes;
- Private residences including condos and apartments;
- Businesses;
- Hotels/motels.

The Contractor must not perform the following activities during Night Construction:

- Pile driving/removal;
- Concrete pavement demolition;
- Sawing for pavement removal;
- Crushing operations;
- Jack-hammering.

The Engineer must approve any deviation from these prohibitions.

The Contractor must have a supervisor on site during Night Construction. The supervisor must have satisfactorily completed the “MnDOT Noise Mitigation for Night Construction” training within the past five years, as

shown in the Department's records. This free 30 minute training is available online at <http://www.dot.state.mn.us/onlinelearning/construction/noisemitigation>. The Contractor must provide the Engineer with the nighttime supervisor's name and a copy of the current certification prior to beginning Night Construction.

In addition, the Contractor must:

- Notify owners or occupants of all buildings in sensitive areas (within 500 feet of the Night Construction). Notify owners or occupants of the type, location, and duration of the work. Provide notice in writing no later than five calendar days prior to beginning the work. Provide a copy of the notification to the Engineer and the City.
- Provide a contact person who is on site to ensure that any issues related to Night Construction are immediately addressed.
- Use only equipment having OSHA- approved ambient sound-sensing backup alarms or, as an alternative, use an observer may in accordance with OSHA standards.
- Allow for equipment to turn-around in lieu of backing-up (this includes equipment entering/exiting the project).
- Construct temporary noise mitigation enclosures or curtains around stationary equipment (e.g., generators, compressors) that are within 500 feet of sensitive areas.
- Ensure that tailgates on trucks are not slammed. Truck drivers unable to control the tailgates from slamming must be removed from the project.
- Ensure that all engines and engine driven equipment used for hauling or construction are equipped with an adequate muffler in constant operation and properly maintained to prevent excessive or unusual noise.

If the Engineer determines that the Contractor is not in compliance with the Night Construction requirements, the Engineer will suspend Night Construction. The suspension will remain in effect until the Contractor remedies the non-compliance or obtains the Engineer's acceptance of an action plan that satisfactorily addresses the non-compliance. The suspension will be considered an avoidable delay.

S-38 **(1806) DETERMINATION AND EXTENSION OF CONTRACT TIME**
SP2016-50

The County will determine Contract Time in accordance with the provisions of MnDOT 1806 and the following:

S-38.1 Contractor must start construction operations by April 15, 2016, or no later than eight Calendar days after the date of Notice Contract Approval, whichever is later. Contractor must not begin construction operations before contract approval.

S-38.2 Contractor must complete all work required under this Contract, except maintenance work and Final Clean Up, on or before August 31, 2017.

S-38.3 Contractor shall complete all work required under this Contract, including maintenance work and Final Clean Up, on or before September 30, 2017.

S-38.4 The Contractor shall not begin any Phase 2 work that includes construction of the off-ramp from TH 35W northbound to County Road H, and reconstruction of the on-ramp from westbound TH 10 to northbound TH 35W, until after January 1, 2017, unless approved by the Engineer in writing.

S-38.5 The Contractor shall not begin Phase 3 work that includes construction of the noise wall until after January 1, 2017, unless approved by the Engineer in writing.

S-38.6 In addition to the other Contract Time requirements, the Contractor must complete all work required in Phase 1 on or before November 30, 2016.

S-38.7 In addition to the other Contract Time requirements, the Contractor shall complete all work that requires a single northbound lane shift on TH 35W northbound during Phase 2B to construct the northbound on-ramp to TH 35W from westbound TH 10 in no more than 21 calendar days.

S-38.8 Unless authorized in writing by the Engineer, the Contractor must not begin construction operations that impact, restrict, or interfere with traffic, before receiving NTP2. The Engineer will determine whether operations impact, restrict, or interfere with traffic in the Engineer's sole discretion.

S-38.9 In addition to the other Contract Time requirements, the Contractor shall complete all work required in Phase 1 on the following three intersection approaches to the TH 10, CSAH 10, and County Road H intersection including the permanent signal by August 15, 2016:

- Westbound TH 10
- Eastbound TH 10
- Eastbound County Road H

All construction on TH 10 / CSAH 10 and County Road H to the west of TH 10 / CSAH 10 shall be completed by August 15, 2016.

County Road H to the east of TH 10 and CSAH 10 may remain closed throughout all of Phase 1.

S-38.10 The bridge removal shall be limited to one weekend closures on I-35W. The weekend schedule shall be approved by the Engineer in writing at least 14 calendar days in advance of the scheduled closure. The weekend closures shall occur between 10:00 PM Friday and 5:00 AM Monday

S-38.11 The TH 35W & TH 10 trunk fiber optic cables shall be spliced to the new location on the west side of TH 35W before removal or impacts. The TH 10 trunk fiber optic cable shall have a jumper cable to the TH 35W trunk fiber optic cable to keep it operational during construction.

Bridge work at the County Road H / TH 10 Ramp impacting the TH 10 / TH 35W trunk fiber optic cables shall not begin until the new trunk fiber optic cables have been relocated to the west side of TH 35W as described above.

Permanent installation of the TH 10 trunk fiber optic cable on the east side of TH 35W is to be placed after embankments and bridge work is completed.

S-39 (1807) FAILURE TO COMPLETE THE WORK ON TIME

The provisions of MnDOT 1807 are supplemented as follows:

S-39.1 In addition to the Liquidated Damages specified in 1807, for failure to complete the entire project within the specified time, Liquidated Damages in the amount identified in Table 1807-1, Schedule of Liquidated Damages, will be deducted from any monies due or coming due to the Contractor failure to complete any portion of this Project described in Section 1806 (DETERMINATION AND EXTENSION OF CONTRACT TIME) of these Special Provisions within the time specified herein.

S-39.2 The liquidated damages as set forth in these 1806 (DETERMINATION AND EXTENSION OF CONTRACT TIME) of these Special Provisions are separate and independent and may be assessed concurrently.

S-40 **(1906) PARTIAL PAYMENTS**

Payments shall be made in accordance with the provisions of 1906 and the following:

S-40.1 Partial payments of ninety-five (95) percent of the value of the completed work will be made under this Contract. Five (5) percent of the amount due will be retained until final completion and acceptance of all work covered by the Contract. Payments made pursuant to estimates and the final payment will be made after the work has been approved and accepted by the County Engineer and the County Board and then in the manner in which County claims are usually paid.

S-41 **(1910) COST ESCALATION**

SP2016-53

The provisions of MnDOT 1910 are hereby supplemented with the attached Fuel Escalation Clause.

S-42 **(2013) SURVEY MONUMENT**

The provisions of MnDOT 2013 shall be supplemented by the following:

S-42.1 Should the Contractor hit, disturb, or remove an existing Public Land survey, lot corner, block corner, or any other monument marking property boundaries that has been located, marked, or shown on the plans, an assessment of liquidated damages in the minimum amount of \$2,000.00 per monument or the actual cost of restoring the monument, shall be charged. If, during the course of construction a monument is discovered, the Contractor shall notify the County Surveyor at 651 266-7170. The Contractor shall cease all activities that could disturb the monument until the surveyors have perpetuated the monuments location. The County Surveyor must be contacted at 651-266-7170 prior to the removal of a survey monument. Compliance with this provision does not indemnify the Contractor from Minnesota Statutes Chapter 381.19, 505.33 or 609.605, Subdivision 1.

S-43 **(2031) FIELD OFFICE, TYPE D-MODIFIED**

The provisions of Mn/DOT shall be supplemented by the following:

S-43.1 The field office, Type D-Modified, shall be furnished in accordance with the conditions of 2031 and as follows:

The Contractor shall provide the following furnishings to a Contractor supplied mobile unit:

- 1) Electric service for the full life of the Contract, including periods of work suspension.
- 2) Portable toilet.
- 3) Hot and cold water source.
- 4) The Contractor shall furnish the field office with a multi-function, all-in-one printer, scanner, and copier, as approved by Engineer & County Informational Services. This machine will be considered to be an incidental expense to the field office and shall become property of the County upon machines delivery to the site.
- 5) The Contractor shall be responsible for repair and/or maintenance of this equipment for the duration of the Contract. Repair and/or maintenance shall be considered an incidental expense for which no direct compensation will be made.
- 6) Should the above equipment become damaged beyond repair or stolen, the Contractor shall provide an equivalent replacement within three working days of the loss of use of the equipment during the life of the Contract. Replacement shall be incidental to this item. All repairs needed to this equipment shall be made by the Contractor within the above specified time at no direct cost to the County during the life of this Contract.

- 7) Measurement will be made by each for a field office meeting, all the above requirements, and as approved by the Engineer.
- 8) Payment will be made under Item 2031.501 (Field Office Type D-Modified) at the Contract lump sum price, which price shall be compensation in full for all costs relative thereto.

S-44 (2031) FIELD OFFICE AND LABORATORY – BROADBAND SERVICES

In addition to the requirements set forth in MnDOT 2031.3, the Contractor shall provide the following for exclusive use by Ramsey County personnel for the entire length of the Contract including periods of work suspension:

S-44.1 **GENERAL REQUIREMENTS OF CONTRACTOR**
The Contractor shall provide Ramsey County with the information required by the Internet Service Provider (ISP) to authorize communication between the ISP and Ramsey County technical staff for purposes of problem resolution. This information shall include the name of the provider, a phone number for technical support and the account number as a minimum. The Contractor shall determine if additional information will be required from the ISP. This information shall be in writing and shall be provided to the Engineer at the Pre-Construction meeting.

S-44.2 **BROADBAND SERVICES TECHNICAL REQUIREMENTS**
The Contractor shall provide the following service:

- **Minimum bandwidth size shall be 768k**
- **Terminating in an Ethernet connection**
- **2 Static Public IP Address(es) – For Internet Use o (Minimum of two assignable host addresses, one for the remote VPN firewall, one for the ISP Gateway)**
- **Required IP addressing information provided to Ramsey County for remote VPN firewall Configuration:**
 - **IP address (Static Assignable Host Range)**
 - **ISP Gateway Address**
 - **Subnet Mask**
- **ISP Modem Hardware – Firewall configuration settings must be manageable, allowing for the firewall security level to be set to “off”.**

S-44.3 Contractor will provide the Hardware for Remote VPN Access/Wireless Access.

S-44.4 The above equipment will be returned to the Contractor ninety (90) days after final acceptance of all Contract work is made in accordance with MnDOT 1516.2.

S-44.5 The above equipment will be included for payment under Item 2031.501 (Field Office Type D-Modified)

S-45 (2041) ON-THE-JOB-TRAINING PROGRAM

Section II. 6.b of the "Required Contract Provisions-Federal-Aid Contracts" set forth elsewhere (Equal Employment Opportunity (EEO) Special Provisions) in this Proposal is deleted and the following substituted therefore:

As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training aimed at developing full journeyman in the type of trade involved. **THE NUMBER OF HOURS OF TRAINING TO BE FULFILLED UNDER THIS**

CONTRACT WILL BE 3000 ; UTILIZING AT LEAST 4 TRAINEES. In the event the Contractor subcontracts a portion of the Contract work, he/she shall determine how much of the training requirement will be fulfilled by the subcontractor, provided, however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. This Contractor shall insure that these provisions are made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on (1) the basis of the Contractor's needs and (2) the availability of journeymen in the various classifications within a reasonable area of recruitment. The contractor must complete all sections of the "On-the-Job Training (OJT) Program Approval Form" The form should be submitted to Mn/DOT's Office of Civil Rights within ten (10) days of Contract Award and must be received no later than at the time of the pre-construction conference to the Project Engineer. The Form can be found in the attached Equal Employment Opportunity (EEO) Special Provisions on EEO Page 25, and on the Mn/DOT Office of Civil Rights website - <http://www.dot.state.mn.us/civilrights/documents/OJTPre-ConstructionForm.pdf>. The Contractor will be credited for each trainee who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

THE COMPLETED FORM MUST BE SUBMITTED TO MN/DOT NO LATER THAN AT THE TIME OF THE PRE-CONSTRUCTION CONFERENCE. The Contractor may use one of the following means to submit their completed On-the-Job Training (OJT) Program Approval Form.

- a) Mail the form to Mn/DOT Office of Civil Rights 395 John Ireland Blvd. MS 170 Saint Paul, MN 55155
- b) The form may be faxed to Christian Guerrero at 651-366-3129.

A contractor who IS approved and accepted into Mn/DOT's On-the-Job Training (OJT) Alternative Program will submit their training plan within the timeframes specified by that program and therefore will not be required to submit the "On-the-Job Training (OJT) Program Approval Form" within ten (10) days of contract award or at the time of the pre-construction conference. The trainees that have been approved as part of their Contractor – based assignment of positions, must be utilized in accordance with the following provisions set forth here.

Training and upgrading of minorities and women toward journeyman status is a primary objective of these requirements. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he/she has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with these requirements. This training commitment is not intended and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employees shall be employed as a trainee in any classification in which he/she has successfully (1) completed a training course leading to journeyman status or (2) in which he/she has been employed as a journeyman. The Contractor shall satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used, the Contractor's records shall document the findings in each case.

The Contractor should also note the following in regards to qualification of candidates to meet the OJT requirements:

1. All apprentices that are officially registered in one of the approved training programs listed below are eligible to be accepted as a OJT candidates as long as they have not worked more hours than the stated number of hours of their crafts apprenticeship program.
2. Movement of approved trainees from project to project or from contractor to contractor is allowed for OJT credit, if that practice is not determined to constitute a practice of "bicycling" and/or result in a disproportionate adverse effect upon minority and women apprentice members or trainees. Bicycling – is the transfer of minority or female employees or trainees from contractor to

contractor and/or from project to project for the sole purpose of meeting the Contractor's goals. "Bicycling" shall be a violation of this Special Provision and the regulations in 41 CFR Part 60-4.

The minimum length and type of training for each classification will be as established on the "On-the-Job Training (OJT) Program Approval Form" submitted by the Contractor and approved by the State Transportation Department and the Federal Highway Administration. The State Transportation Department and the Federal Highway Administration will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and will qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts.

Examples of approved training programs are not limited to but include the following:

- MN Construction Laborers Apprenticeship Program
- Local 49 Operating Engineers Apprenticeship Training Program
- North Central States Regional Council of Carpenters Training Program
- Iron Workers Apprenticeship Program
- MN Teamsters Construction Apprenticeship Training Program
- MN Cement Masons Apprenticeship Training Program
- Painters and Allied Trades District Council 82 Finishing Trades Apprenticeship Program
- MN Electricians Union Apprenticeship Programs.

Any training program proposed by a contractor to meet the obligations set forth in this Provision which is not included in the list of approved programs cited above will be subject to approval by Mn/DOT's Office of Civil Rights, and must include a minimum of 500 training hours but shall not to exceed 2,000 hours. If a contractor proposes to utilize an approved apprenticeship program from one of the examples cited above, the contractor must provide the Apprenticeship Form or Indenture Number when submitting for approval. The Contractor shall also furnish to Mn/DOT's Office of Civil Rights a list of currently employed apprentices in each trade they wish to utilize. The list must include: Name, Gender, Ethnicity and current year of apprenticeship. The number of hours an approved trainee who is enrolled in a certified apprenticeship program can retain eligibility for trainee status will be consistent with the amount of hours that have been established as the minimum requirement necessary to be completed prior to achieving journey level status.

Approval or acceptance of a training program shall be obtained from Mn/DOT's Office of Civil Rights prior to any work by the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Any and all training provided by a contractor to meet the obligations in this Provision must provide a significant and meaningful training experience for the trainee candidate. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as noted below, the Contractor will be reimbursed at the appropriate Contract price per hour for each employee that is trained in accordance with, and for at least the minimum period specified in the approved training program. As approved by the Engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he/she does one or more of the following and the trainees are concurrently employed on a Federal-aid project; (1) contributes to the cost of the training, (2) provides the instruction to the trainee or (3) pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of this Special Provision. It is normally expected that a trainee will begin his/her training on the Project as soon as feasible after start of work utilizing the skill involved, and remain on the Project as long as training opportunities exist in his/her work classification or until he/she has completed his/her training program. It is not required that all trainees be on board for the entire length of the Contract. If a contractor lays off or terminates a trainee for any reason, that contractor must complete and submit the "Trainee Termination Form" which can be found in the EEO Special Provisions. A Contractor will have fulfilled his/her responsibilities under this special provision if he/she has provided a significant, meaningful training experience and/or acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the Contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the Contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this Project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Special Provision.

The Contractor shall furnish the trainee a copy of the program he/she will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The Contractor shall provide for the maintenance of records and furnish periodic reports documenting his/her performance under these Special Provisions. Any trainee that has been approved by the Office of Civil Rights and employed by the Contractor, and subsequently terminated must be documented on the "On-the-Job Training Trainee Termination Form" located in the EEO Special Provisions of this Contract on EEO Page 26. All required forms needed to satisfy the requirements of these Special Provisions can be found in the attached EEO Special Provisions, pages 23-26 or on the Mn/DOT Office of Civil Rights website - <http://www.dot.state.mn.us/civilrights/>.

Compliance with the foregoing requirements for timely filing of the reports may be a condition precedent to the processing and payment of partial and final payments. If it is determined that a contractor has not acted in "Good Faith" with efforts to comply with this provision or engages in willful violations, a contractor may be subject to sanctions including but not limited to: monetary deductions associated with the trainee line item in the contract, withholding of partial and/or final payment.

The trainee period will be measured by time in hours as specified hereinbefore, and payment will be made under Item 2041.610 (Trainees). This item will be shown on the Bid Schedule at the fixed rate amount of \$1.00 per hour.

With appropriate documentation, an additional \$4.00 per hour (maximum total of \$5.00 per hour) will be paid to the Contractor for hours worked on the project by employees recruited from Mn/DOT's OJT Supportive Services Programs. In conjunction with any employees recruited from Mn/DOT's OJT Supportive Services Programs, an additional \$5.00 per hour (maximum total of \$10.00 per hour) will be paid to the Contractor for hours worked on the project by employees recruited from Mn/DOT's OJT Supportive Services Programs, if the Contractor provides a mentor for the trainee(s) while the trainee(s) is working on the project. Approval for payments to be made under Item 2041.610 (Trainees) for any amount which exceeds the fixed rate amount of \$1.00 must be received in writing from the Mn/DOT Office of Civil Rights. The ratio of trainee to mentor may not exceed 3 to 1. A listing of Mn/DOT's OJT Supportive Services Programs can be found on the Office of Civil Rights website cited above.

S-46 (2101) CLEARING AND GRUBBING

Clearing and grubbing operations shall be performed in accordance with the provisions of MnDOT 2101 except as modified below:

S-46.1 The Engineer will mark each tree to be cleared and grubbed and will notify the property owners three days in advance of the removal.

S-47 (2102) PAVEMENT MARKING REMOVAL

REVISED 08/28/15

SP2016-67

The provisions of MnDOT 2102 are modified and/or supplemented with the following:

S-47.1 MnDOT 2102.3 is hereby deleted and replaced with the following:

Before making a change in traffic pattern, remove conflicting pavement markings as required by the contract and as directed by the Engineer without damaging the pavement structure or surface texture. If determined by the Engineer, repair damaged areas as directed by the Engineer at no additional cost to the Department.

Remove pavement markings on the basis of nominal widths and actual lengths as originally applied and still visible at the time of pavement marking removal. Remove irregularly shaped markings by enclosing them within rectangular boundaries of least dimension as determined by the Engineer.

Control or restrict operations to avoid exposing traffic to hazardous conditions in accordance with 1701, "Laws to be Observed," 1707, "Public Convenience and Safety," and 1717, "Air, Land, and Water Pollution." Remove expended materials or agents used in the pavement marking removal process from the pavement surface as the work progresses. Dispose of removed marking material in accordance with 1701, "Laws to be Observed," and 1717, "Air, Land, and Water Pollution."

Removed pavement marking material shall become the property of the Contractor.

All pavement marking removal shall be done utilizing either waterblasting or sandblasting equipment. GRINDER-TYPE CUTTING HEADS SHALL NOT BE USED for pavement marking removal.

S-48 (2104) REMOVE WALK AND PAVEMENT

Pavement shall be removed in accordance with the provisions of 2104 and the following:

S-48.1 All concrete and bituminous pavements removed on the project shall be hauled to an aggregate recycling plant for further processing into reusable material. The Contractor shall review the removal operations and disposal site with the Engineer prior to the pavement removal

**S-49 (2104) REMOVING PAVEMENT AND MISCELLANEOUS
STRUCTURES**

SP2016-70

Abandoned structures and other obstructions shall be removed from the Right of Way and disposed of in accordance with the provisions of MnDOT 2104, except as modified below:

S-49.1 Measurement and payment for the removal and disposal of materials will be made only for those Items of removal work specifically included for payment as such in the Proposal and as listed in the Plans. The removal of any unforeseen obstruction requiring in the opinion of the Engineer equipment or handling substantially different from that employed in excavation operations, will be paid for as Extra Work as provided in MnDOT 1402.5.

S-50 (2104) REMOVE AND HAUL TREATED WOOD

SP2016-71

If the Contractor is required to dispose of treated wood, the provisions of MnDOT 2104 are supplemented with the following:

S-50.1 The Contractor can elect to reuse the treated wood for its original intended purpose. The Contractor shall furnish a completed Transfer of Ownership form to the Engineer prior to removing any treated wood from the Project limits. The Transfer of Ownership form is available at the following website:

<http://www.dot.state.mn.us/environment/buildingbridge/index.html>.

S-50.2 If the Contractor cannot or elects not to re-use the treated wood for its original intended purpose, but must be disposed, the following shall apply:

(A) The Contractor shall dispose of all waste treated wood in a MPCA permitted Minnesota solid waste or industrial landfill or landfills listed under Landfills/Regulated Waste at <http://www.dot.state.mn.us/environment/buildingbridge/index.html>. The Contractor shall not dispose of waste treated wood in a demolition landfill. Within 30 days after the treated wood is transported to the landfill, the Contractor shall provide the Engineer with shipping manifests, scale tickets and invoices. Shipping manifests shall include, but are not limited to, the following information: specify treated wood as the type of waste, quantity of wood, date of hauling and disposal, and location of disposal.

(B) The Contractor has the option to chip creosote treated wood on site instead of hauling it to a landfill. After the wood is chipped on site, the Contractor shall transport the chipped wood off site to a MPCA permitted incinerator that is permitted to burn creosote treated wood. Call 651.366.3630 for list of incinerators permitted to burn creosoted treated wood. This applies to creosote treated wood only.

S-50.3 Measurement and payment for the removal and disposal of treated wood will be made only when specifically included for payment as such in the Proposal and as listed in the Plans. All other removal and disposal of treated wood operations shall be incidental.

S-51 (2104) ABATE ASBESTOS-CONTAINING PIPES OR CULVERTS

SP2016-73

All asbestos-containing pipes or culverts found on the Project shall be handled according to the following provision unless otherwise directed by the Engineer. The Contractor shall comply with all applicable safety regulations imposed by federal and state law for handling pollutants, contaminants, or hazardous substances, wastes, or materials, including but not limited to 29 CFR PART 1910 and all subsequent revisions thereof. The Contractor shall file a project **Health and Safety Plan** with the Engineer at the Preconstruction Conference. **Under this provision the disturbance or removal of the asbestos containing material (ACM) will be managed as regulated asbestos containing waste material. All wet soil from cutting operations will be considered ACM and must be removed immediately as asbestos containing waste material (ACWM).**

S-51.1 ACM MANAGEMENT

(A) The Contractor shall use a MnDOT-certified abatement company for all ACM abatement-related activities as provided and described in MnDOT's "Building & Bridge Demolition/Relocation" website <http://www.dot.state.mn.us/environment/buildingbridge/index.html>. Contact Mark Vogel (651-366-3630) or Jackie Klein (651-366-3637), Office of Environmental Stewardship with any questions.

(B) The Contractor shall provide a list of all Contractor personnel performing ACM abatement work and shall provide current proof of training (MDH Asbestos Hard Card) for each individual performing ACM abatement work to the Engineer and the State's Asbestos Abatement Oversight Consultant prior to commencing any abatement work at the site. The Contractor shall make sure all Contractor personnel performing ACM abatement work carry their MDH Asbestos Hard Cards at all times when actively performing abatement work.

(C) The Contractor shall complete and submit a MDH/MPCA asbestos abatement notification form in accordance with all MDH and MPCA requirements. The Contractor shall provide a copy of the completed form to the Engineer at the same time it is sent to the regulators. The Contractor shall provide proof to the Engineer that the MDH and MPCA have received notification of the asbestos abatement (either by facsimile receipt or certified mail) before commencing the ACM abatement.

(D) The pipe or culvert must be cut using either wet sawing, other wet operations, or a shearing technique. Torch cutting will not be allowed. Cutting debris must be maintained wet and transported in a leak tight container with proper labeling. The pipe shall be kept wet during removal operations and loading for transport. Saw-cut edges of the pipe shall be encapsulated immediately after cutting. Any pipe that is broken, or becomes broken during the handling of the material, must be wetted and kept wet until it is placed in the appropriate container for disposal. All wet soil from cutting operations or wetting of broken pipe must be removed immediately and managed as ACWM.

(E) The Contractor shall notify the Engineer a minimum of 48 hours prior to beginning ACM abatement to allow the Engineer time to arrange for the State's Asbestos Abatement Oversight Consultant to be at the site to observe and document the abatement and handling of the ACM.

(F) No removal of ACM shall take place without the approval of the Engineer, nor shall any ACM abatement work of any sort be done unless the State's Asbestos Abatement Oversight Consultant is present.

S-51.2 ACM DISPOSAL

All ACM abated from the Project Limits shall be hauled to a MPCA-permitted Municipal Solid Waste (MSW) landfill or a MPCA-permitted Industrial Landfill facility or landfills listed under Landfills/Regulated Waste at <http://www.dot.state.mn.us/environment/buildingbridge/index.html> at the MnDOT Approved List of Waste Contractors link for disposal or a MnDOT approved landfill. Contact Mark Vogel, 651-366-3630 or Jackie Klein, 651-366-3637, for a list of the MnDOT approved landfills. **ACM WILL NOT BE DISPOSED AT A DEMOLITION LANDFILL.**

(A) The Contractor shall be responsible for providing all required information to the landfill (typically waste profile forms) in order to obtain landfill acceptance of the material for disposal. If the ACM are in an area of soil contamination, the Contractor shall also provide soil analytical laboratory reports to the landfill in order to obtain acceptance of the material for disposal. The State's soil analytical data can be obtained from the Engineer.

(B) The Contractor shall provide the completed landfill-required waste profile form(s) to the Engineer for review a minimum of two weeks prior to beginning excavation or as approved by the Engineer.

(C) ACM shall not be hauled to the landfill facility until the Engineer has a written approval (e-mail is acceptable) from the landfill accepting the material for disposal at the landfill facility.

(D) The Contractor shall haul all ACM directly from the project site to the landfill. There shall be no co-mingling of ACM from this Project with waste from other sites outside the Project prior to hauling to the landfill.

(E) The Contractor shall provide clear and legible copies of shipping papers (manifests) and landfill scale tickets (tipping receipts) for each load to the State's Environmental Consultant and Engineer daily while material is being hauled to the landfill, or as approved by the Engineer. The Contractor shall provide copies of the completed manifests signed by the landfill (third signature copies) to the State's Environmental Consultant and Engineer within 10 days after all material has been hauled to the landfill.

When asbestos-containing pipes or culverts are encountered during excavation, the Contractor shall notify MnDOT Project Engineer who shall suspend work. The Contractor shall furnish a documented inspection and evaluation by a MnDOT approved certified MDH contractor prior to the resumption of work. All testing and, if necessary, removal of Asbestos Containing Pipes or Culverts will be paid for as Extra Work.

S-52 (2105) DEWATERING

Design, furnish, install, test, operate, monitor, and maintain dewatering system(s) of sufficient scope, size, and capacity to control surface waters, hydrostatic pressures and to lower, control, remove, and/or dispose of groundwater within the construction work area to allow for the construction of sanitary sewer, water-main, pipe and box culverts, bridge and wall foundations, ditches/channels, ponds, roadway grade and other areas to be constructed "in the dry" (as opposed to under wet conditions). Dewatering systems may include but are not limited to the following: multiple series of well points and pumps, sumps, additional backfill materials, ditches, trenches, French drains, detention basins, portable detention basin (upland sumps), and mechanical operations (i.e. discing, farming, etc.) to dry out material.

The Contractor is required to continuously monitor and maintain dewatering operations to ensure that erosion does not occur, stability of excavations and constructed slopes is maintained, the excavation does not flood, damage to adjacent subgrades and permanent structures is prevented, and the excavation does not uplift, heave, or develop seepage boils.

S-52.1 SUBMITTALS

The Contractor shall prepare and submit a Dewatering Plan to the Engineer for review no later than 7 days prior to mobilizing any dewatering or excavating equipment to the project site. The Dewatering Plan shall include:

1. A description of the dewatering system and associated system features, sufficient drawings to fully illustrate staging concepts involved and ultimate discharge locations. The plans shall describe all facilities and procedures required to dewater the work area as necessary, as well as any necessary coordination with excavation shoring and bracing systems.
2. The arrangement, locations, and details of the dewatering system; including locations of risers, headers, filters, pumps, power units, discharge lines, sumps, additional backfill materials, or other system components; as well as means of discharge, control of sediment, and disposal of water.
3. A schedule showing the proposed timing and sequencing of dewatering operations.
4. Listing and qualifications of any and all subcontractors to be retained to perform the dewatering work.

S-52.2 PERMITS

The Contractor is responsible for complying with all local and State installation requirements and sediment control regulations. Contractor shall obtain all necessary permits from governing agencies prior to commencing dewatering operations. Contractor shall be responsible for all associated fees with complying with necessary permits.

S-52.3 SUBSURFACE INVESTIGATION

The Contractor is responsible for conducting any additional subsurface investigations to determine specific dewatering needs for the proposed construction at the project site.

S-52.4 OTHER REQUIREMENTS

New or used materials, adequate in capacity for required usage, must not create unsafe conditions and must not violate requirements of applicable codes and standards. All materials, whether new or used, will be clean, dry and free of aquatic and terrestrial invasive species when delivered to the project site.

A. PROTECTION

1. Contain, treat, and discharge in accordance with the SWPPP.
2. Protect trees, shrubs, lawns, and construction area from damage due to installation and operation of dewatering devices.
3. Prevent sediment and turbid or silty water from entering surface waters.
4. Water from dewatering activities shall be treated to eliminate turbidity, as determined by visual inspection. Control sediment by one or more of the following treatment methods and as required by permitting agencies and local, State, and Federal regulations:
 - a) Construction of a detention basin.
 - b) Use of a portable detention basin or upland sumps.
 - c) Pump turbid waters away from surface waters.
 - d) Filters on discharge lines.
 - e) Treat with flocculants prior to discharge.
5. Dispose of treated water in a lawful manner that will not result in flooding the Project area or adjoining property, nor endanger either permanent work or temporary facilities nor rendering storm water best management practices ineffective.
6. Do not allow water discharge to run over roads, parking areas, or work areas where water or ice could cause a hazardous condition.
7. Do not allow water to pond in excavation area.
8. Protect existing or completed work from water or sedimentation damage.
9. Protect workers and public from temporary structures or basins.
10. Do not allow water to run over work in progress.

B. INSTALL

1. Do not install French drains, sumps, ditches, or trenches within 5 feet of a structure foundation or slab.
2. Install, operate, and ensure dewatering system is functional prior to excavating below the groundwater level, as directed by the Engineer.
3. Do not use crushed rock or granular soils beneath structure foundations unless shown on the Plans or directed by the Engineer.
4. Install dikes, riprap, culverts, and piping as necessary to prevent erosion of site or siltation of surface waters.
5. Install enclosures and noise reduction devices as necessary.
6. Maintain dewatering operations until utilities, structure or other work is backfilled and completed.
7. Remove unneeded equipment and pipe upon completion. Abandon wells and well points as required by controlling Agency.
8. Install temporary or permanent erosion control measures to restore or stabilize the area as necessary and as per construction staging and sequencing.

Monitoring and Restoration

The Contractor shall prepare a program for monitoring potential movement of adjacent structures and ground subsidence caused by dewatering operations. Descriptions and details of this program shall be included in the Dewatering Plan submittal.

The Contractor shall repair all damaged utilities, structures, or ground subsidence due to execution of the work at no additional cost to the State or Owner.

S-52.5 MEASUREMENT AND PAYMENT

Measurement shall be by the lump sum and shall include all permits, subsurface investigations, submittals, designs, labor, supplies, materials, backfills, tools and power to install and operate the dewatering systems necessary to construct the project to the lines and grades shown on the Plans. Measurement shall also include labor and materials required to properly treat dewatering water prior to discharge.

Payment for Dewatering shall be at the Contract Unit Price. All associated work items shall be considered incidental.

Progress payments for Dewatering will be determined by the percentage of the total contract completed based on the following schedule:

<u>Percent of Contract Completed</u>	<u>Percent of Item Paid</u>
5	10
25	35
50	60
75	80
100	100

If Percent of Contract Completed is less than 100 percent, yet all dewatering operations for the project have been completed, then payment up to 100 percent of the Dewatering item may be allowed per Engineer.

S-53 (2105) CONTAMINATED SOIL AND GROUNDWATER

All contaminated material found on the Project shall be handled according to the following provision unless otherwise directed by the Engineer. The Contractor shall comply with all applicable safety regulations imposed by federal and state law for handling pollutants, contaminants, or hazardous substances, wastes, or materials, including but not limited to 29 CFR PART 1910 and all subsequent revisions thereof. The Contractor shall file a site Health and Safety Plan with the Engineer at the preconstruction meeting for the project.

S-53.1 CONTAMINATED SOIL AND GROUNDWATER

An investigation of the Project area for contamination found two contaminated areas within Project limits. The areas are:

- (1) **County Road H Left of approximately STA. 40+00 to 45+00.** Petroleum releases have been reported at the gas station in this area. Soil was contaminated with Diesel Range Organics (DRO) at 13.9 milligrams per kilogram (mg/kg) and benzene at 0.097 mg/kg from 6 to 10 feet below ground surface (bgs). Groundwater was contaminated with Gasoline Range Organics (GRO) at 3500 micrograms/liter (ug/l), DRO at 1160 ug/l, benzene at 3170 ug/l and xylene at 61.5 ug/l. Groundwater was at approximately 4.5 feet bgs based on 2015 data.
- (2) **I35W NB approximately 200 feet Right of STA. 355+00.** Groundwater was contaminated with DRO at 116 ug/l. Groundwater was at approximately 8.5 feet bgs based on 2015 data.

The Contractor should assume that all excavation operations that take place within the areas identified in CONTAMINATED SOIL AND GROUNDWATER have the potential to encounter contaminated soil or groundwater.

- (1) For the purpose of these Special Provisions, the Contractor shall assume that up to 750 tons of contaminated soil and groundwater could be encountered during excavation activities.
- (2) Data from the environmental review that has been completed for this project is available by contacting Erin Borgschatz at 651.490.2044.

S-53.2 CONTAMINATED SOIL MANAGEMENT

Contractor shall notify the Engineer no less than three (3) working days prior to beginning the excavation and removal of soil in the areas described in CONTAMINATED SOIL AND GROUNDWATER, to allow the Engineer time to arrange for the County's Environmental Consultant to be at the site to observe and document the excavation for the presence of contaminated soil or groundwater.

Contractor will be allowed to start excavating soil after obtaining the Engineer's verbal approval to proceed, and after making sure the County's Environmental Consultant is present. The County's Environmental Consultant will determine which soils are to be considered contaminated. The Engineer must approve excavation of any soils beyond the limits shown on the cross sections in the Plan.

Contractor is required to manage open excavation areas to prevent to the extent possible, the flow and collection of rainwater runoff into excavation areas. Rainwater that comes into contact with contaminated soil must be considered to be contaminated and must be managed and disposed of in accordance with CONTAMINATED GROUNDWATER CONTINGENCY PLAN. The Contractor shall use, but not be limited to, the following runoff management methods: minimize the drainage area around the excavation, placing berms upgradient of the excavation to divert runoff, and/or covering the excavation, or as approved by the Engineer.

Any soil excavated from the areas described in CONTAMINATED SOIL AND GROUNDWATER, and in other Project areas as determined from CONTAMINATED SOIL CONTINGENCY PLAN, or as determined by the Engineer, to have levels of contamination that exceed MPCA standards, shall be hauled to a Minnesota permitted solid waste or industrial landfill facility for use by the landfill as daily cover if the soil contaminant levels meet the landfill's daily cover criteria, or for disposal by the landfill if the soil contaminant levels do not meet daily cover criteria.

- (1) Contractor shall be responsible for providing all required information to the landfill (typically waste profile forms and soil analytical laboratory reports) in order to obtain landfill acceptance of the contaminated soil and the stabilized hazardous contaminated soil.
 - (a) Contractor shall determine if the State's existing soil analytical data (obtained from the Engineer) are sufficient for the landfill to accept the contaminated soil. The Contractor shall immediately inform the Engineer if additional soil analytical data are required by the landfill. The Contractor shall dig test pits or as approved by the Engineer, in order for the County's Environmental Consultant to access contaminated soil to collect samples for additional analyses required by the landfill. The County will be responsible for any additional soil sample laboratory analyses required by the landfill. If the Contractor changes the landfill disposal location after additional samples were obtained/analyzed, all costs associated with collecting/analyzing those additional samples will be the responsibility of the Contractor.
 - (b) Contractor will manage the project schedule to allow for analytical laboratory sample analysis turn-around times. Standard laboratory sample analysis turn-around times are typically ten (10) days Monday through Friday. Shorter (rush) turn-around times may be available depending on laboratory availability, the chemical being analyzed,

and the particular laboratory method required. Rush laboratory turn-around times are typically five (5) working days Monday through Friday. The Engineer will determine when standard or rush turn-around times will be used for all laboratory analyses required in these provisions. If the Contractor elects to have laboratory analyses completed on a rush turn-around time, the difference in cost between the standard and the rush laboratory analysis turn-around time will be the responsibility of the Contractor.

- (c) The Contractor will provide the completed landfill-required waste profile form(s) to the Engineer for review and signature. The Contractor will submit the profile form to the landfill.
- (2) Contaminated material shall not be hauled to the landfill facility until the Engineer has a written approval (e-mail is acceptable) from the landfill accepting the contaminated material for daily cover/disposal at the landfill facility.
- (3) The Engineer will require loads to be covered (tarped) while in transit at no cost to the County.
- (4) The Engineer will require all loads to be manifested. The Contractor shall make arrangements with the Engineer to have the County, or the County's Environmental Consultant, available to sign manifests as the Generator of the contaminated material.
- (5) Contractor shall provide copies of all shipping papers (manifests) and landfill scale tickets for each load to the County's Environmental Consultant daily while material is being hauled to the landfill, or as approved by the Engineer.

If the Engineer determines for any reason that any excavated contaminated material cannot be immediately hauled to the disposal facility, as directed by the Engineer, the contaminated material shall be temporarily stockpiled. Any additional costs for temporarily stockpiling the contaminated material as listed in TEMPORARY STOCKPILE OF CONTAMINATED MATERIAL will be considered Extra Work and will be paid for in accordance with MnDOT 1403.

If the Contractor elects to move a stockpile to a new location after it has been placed and secured, because the stockpile is in the way of construction, the cost of moving and re-stockpiling the soil as required by TEMPORARY STOCKPILE OF CONTAMINATED MATERIAL shall be incidental.

If the Contractor elects to temporarily stockpile soil described in CONTAMINATED SOIL AND GROUNDWATER before hauling it to the landfill, all costs incurred for temporarily stockpiling the contaminated soil as required by TEMPORARY STOCKPILE OF CONTAMINATED MATERIAL shall be incidental.

Measurement and Payment

Payment will be made under Haul and Dispose of Contaminated Material at the Contract bid price per ton, which shall be payment in full for all excavation, permits, disposal fees, loading and hauling of material, tarping loads (incidental) and all costs relative thereto. Measurement of contaminated material for disposal will be made by the tons of material disposed of as documented on the landfill scale tickets.

S-53.3 ENGINEERING CONTROLS

Contractor shall be prepared to place additional engineering controls, including, but not limited to, vapor barriers or trench dams within utility trenches to prevent the inadvertent flow of contaminants along the utility line as directed by the Engineer.

All costs associated with the placement of engineering controls directed by the Engineer shall be considered Extra Work and will be paid for in accordance with MnDOT 1403.

S-53.4 TEMPORARY STOCKPILE OF CONTAMINATED MATERIAL

The stockpile shall be placed at a location on the Project as approved by the Engineer. Contractor shall place contaminated soil from separate contaminated areas into separate stockpiles or as approved by the Engineer. The Contractor shall stockpile the contaminated soil on minimum 10 mil plastic, and cover the stockpile with minimum 10 mil reinforced plastic, or as approved by the Engineer. The stockpile shall be surrounded by fencing if the Engineer determines that additional security measures are necessary. The stockpile cover shall be securely anchored. The Contractor shall be responsible for the maintenance of the stockpile cover (and fencing if installed) for the duration of the Contract or as approved by the Engineer. The stockpile shall be inspected a minimum of once per week or as approved by the Engineer.

S-53.5 CONTAMINATED GROUNDWATER MANAGEMENT

Contractor shall minimize to the extent possible any groundwater dewatering within Project limits. The Contractor shall notify the Engineer no less than three (3) working days prior to beginning Project dewatering so that the Engineer can notify the County's Environmental Consultant to be on-site during dewatering operations.

All groundwater removed by the Contractor from within the Project limits shall be discharged to the sanitary sewer unless otherwise directed by the Engineer. Groundwater containing free (undissolved) petroleum products shall not be directly discharged to the sanitary sewer. Groundwater containing excess contaminant concentrations as determined by the sanitary sewer permitting authority shall not be directly discharged to the sanitary sewer.

Contractor shall be responsible for obtaining all necessary permits for discharge of contaminated groundwater into the sanitary sewer. If the sanitary sewer permitting authority requires the Contractor to obtain a permit, the Contractor shall complete and submit the permit application to the Engineer for review and approval. The Engineer will submit the application to the permitting authority. The Contractor shall provide any information needed for discharge monitoring reports as required by the Engineer, so that the Engineer can complete and submit discharge monitoring reports (if required) to the sanitary sewer permitting authority.

The Engineer shall be responsible for necessary sampling and testing of the dewatered groundwater as required by the sanitary sewer permitting authority for discharge into the sanitary sewer. Contractor shall measure the rate of groundwater discharge during dewatering. The Contractor shall record the rate of discharge daily, and shall submit a discharge report to the Engineer weekly, or as approved by the Engineer.

Measurement and Payment

All costs for discharge of groundwater to the sanitary sewer, including but not limited to permitting and discharge measuring, and all costs relative thereto shall be considered Extra Work and will be paid for in accordance with MnDOT 1403.

S-53.6 CONTAMINATED SOIL CONTINGENCY PLAN

Contractor shall follow the procedure outlined in MnDOT (1717) AIR, LAND AND WATER POLLUTION in the event on-site observations indicate that contaminated soil or regulated materials as listed in MnDOT 1717 are encountered in the Project area in any location other than the areas described in CONTAMINATED SOIL AND GROUNDWATER. The Engineer will be responsible for notifying the necessary regulatory agencies and other necessary parties. No further excavation will take place in the contaminated area without the approval of the Engineer, nor shall any contaminated soil be excavated unless the County's Environmental Consultant is present. No claims for idle time or delay shall be considered, unless work at the suspect contaminated site is stopped for more than seventy-two (72) hours as directed by the Engineer.

As directed by the Engineer, the Contractor shall be prepared to manage contaminated materials, soil or regulated waste in accordance with CONTAMINATED SOIL MANAGEMENT.

As directed by the Engineer, the Contractor shall be prepared to stockpile contaminated materials and soil within the Project limits in accordance with TEMPORARY STOCKPILE OF CONTAMINATED MATERIAL.

Disposal of contaminated soil, materials or regulated waste encountered in the Project area in any location other than the areas described in CONTAMINATED SOIL AND GROUNDWATER, including, but not limited to, excavation, permits, disposal fees, loading and hauling of material, tarping loads (incidental) and all costs relative thereto for regulated materials as listed in MnDOT 1717 or contaminated soil which does not conform with contamination described in CONTAMINATED SOIL AND GROUNDWATER shall be considered Extra Work and will be paid for in accordance with MnDOT 1403.

S-53.7 CONTAMINATED GROUNDWATER CONTINGENCY PLAN

Contractor shall follow the procedure outlined in MnDOT (1717) AIR, LAND AND WATER POLLUTION in the event the Contractor encounters contaminated groundwater that contains free (undissolved) petroleum products, or groundwater contaminant concentrations are found to be in excess of the limits established by the sanitary sewer permitting authority based on analytical testing.

All contaminated groundwater removed by the Contractor from within the Project limits shall be discharged to the sanitary sewer unless otherwise directed by the Engineer. Groundwater containing free (undissolved) petroleum products shall not be directly discharged to the sanitary sewer. Groundwater containing excess contaminant concentrations as determined by the sanitary sewer permitting authority shall not be directly discharged to the sanitary sewer.

In the event the Engineer determines that groundwater must be treated prior to discharge, the Contractor shall be prepared to immediately stop dewatering. Dewatering shall not be re-started until the discharge can be treated with a portable groundwater treatment system

Contractor shall supply a portable groundwater treatment system that includes but is not limited to the following components: flow equalizer, suspended solids removal, oil/water separator, activated carbon filtration, and/or aerator, or as approved by the Engineer. The portable groundwater treatment system shall have a treatment capacity equal to or greater than the rate of temporary construction dewatering. The portable groundwater treatment system shall be approved by the Engineer prior to mobilization of any groundwater treatment system components to the Project site.

Treatment of the contaminated groundwater with a portable groundwater treatment system including but not limited to groundwater treatment equipment, equipment mobilization and demobilization, equipment installation, equipment operation and maintenance, and all costs relative thereto, shall be considered Extra Work and will be paid for in accordance with MnDOT 1403.

S-53.8 IMPORTED MATERIALS

In addition to meeting the geotechnical requirements for the Project, the Contractor shall provide the Engineer with documentation that all Materials obtained by the Contractor from sources outside the roadway that are proposed for import to the Project (any Project borrow material) meet the following criteria:

- (1) Any one or more of the following:
 - (a) The Material is new and previously unused Material directly sourced from a natural, native, and/or in-situ location.
 - (b) The Material is from an import location with a current (less than 365 Days old) Phase I Environmental Site Assessment (Phase I ESA) acceptable to the Engineer, or other equivalent documentation acceptable to the Engineer, which clearly demonstrates that no Historic or Current Recognized Environmental Conditions associate the borrow source with any pollutants, contaminants, hazardous wastes or substances. A Recognized Environmental Condition is defined as: "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."
 - (c) The Material is from an import location with a current (less than 730 Days old) Phase II Environmental Site Assessment (Phase II ESA) acceptable to the County,

completed in accordance with Minnesota Pollution Control Agency (MPCA) Voluntary Investigation and Cleanup (VIC) program and/or Petroleum Brownfields Program (PBP)-compliant investigation work plans, or completed in an equivalent manner acceptable to the Engineer. The Phase II ESA report shall include soil analytical data documenting contaminant concentrations less than the MPCA's Residential Soil Reference Values (SRVs) and Tier 1 Soil Leaching Values (SLVs) for all potential non-petroleum contaminants of concern identified for the import source. Soil analytical data for petroleum-contaminated soils shall indicate concentrations contain less than 100 mg/kg for both diesel range organics (DRO) and gasoline range organics (GRO). Naturally-occurring metals, such as arsenic, selenium, and copper, can occur at concentrations that exceed the SRV or SLV. Such soils are not considered contaminated in the absence of a known contaminant source or other field or laboratory indication of contamination.

- (1) If the Contractor elects to import material from a location that has not been previously tested, the Contractor will obtain analytical data to characterize the proposed import material, and will complete the following requirements:

- (a) The Contractor will submit an investigation Work Plan for review and approval by the Engineer. The Work Plan will comply with the MPCA VIC program and/or PBP requirements or be completed in an equivalent manner acceptable to the County. The investigation Work Plan will include, but not be limited to the following information: sample collection method (such as drilling or test pits), sample locations and depths, sample frequency, and chemical parameters that will be analyzed. The purpose of the investigation Work Plan is to document that sufficient and representative samples of the proposed import Material are collected and analyzed.

- (b) After receiving the Engineer's approval of the Work Plan, the Contractor will complete the sampling and laboratory analysis. Samples shall be collected at the borrow area while the potential import material is still in place, and analyzed prior to removal from the borrow area, or as approved by Engineer.

- (2) Soil analytical data shall meet the same criteria listed above in A.1.c.

- (2) All of the following:

- (a) The Material is free from solid waste, debris, asbestos-containing material, visible staining, and chemical odor.
 - (b) The Material has no organic vapors above background concentration as measured with a photoionization detector (PID).

- (3) Imported Material intended for placement on a parcel within the Project limits which has a recorded environmental deed restriction (including, but not limited to: Environmental Covenant and/or Affidavit), must be free of all contamination. The Engineer will provide locations of parcels within the Project which have environmental deed restrictions (if any) to the Contractor. The Material must meet one or both of the following:

- (a) The Material has no detectable concentration of any chemical parameter above naturally occurring levels based on laboratory analysis.
 - (b) The Material is documented by the Contractor as new and previously unused Material directly sourced from a natural, native, and/or in-situ location.

- (4) Materials obtained from dredging waterways shall be managed in accordance with the MPCA guidance document "Management of Dredge Materials in the State of Minnesota," dated April, 2014.

- (5) Payment

This work shall consist of constructing concrete pavement terminal headers at the locations shown in the Plans and as directed by the Engineer in accordance with the detail shown on Standard Plate No. 1150, and the following:

Measurement will be made by the linear foot of terminal headers constructed as specified. Payment will be made under Item 2301.603 (Permanent Header) at the Contract bid price per linear foot, which shall be compensation in full for all costs incidental thereto.

S-58 (2301) CONCRETE PAVEMENT

SP2016-115

MnDOT 2301 is hereby modified as follows:

S-58.1 Table 2301-3 of MnDOT 2301.2.B.3 shall be deleted and replaced with the following:

Table 2301-3 Intermediate Aggregate for Use in Concrete			
If the gradation meets the following:	Classify material type as:	Gradation Test Procedures	Quality Test Requirements
100% passing the 1/2" and ≤90% passing #4	Intermediate Aggregate	Coarse Aggregate (+4 Portion)	Spec. 3137.2.D.3 except 3137.2.D.3(c) modified to maximum 40% carbonate
		Fine Aggregate (-4 Portion)	3126 Shale in Sand (-4 Portion)
100% passing the 1/2" and >90% passing #4	Intermediate Aggregate	Fine Aggregate * (Minimum 1000 g sample)	Shale Content Test by AASHTO T113 MnDOT Modified (+4 Portion)
			3126 Shale in Sand (-4 Portion)
100% passing the 3/8" and ≤90% passing #4	Coarse Sand	Fine Aggregate	Shale Content Test by AASHTO T113 MnDOT Modified (+4 Portion)
			3126 Shale in Sand (-4 Portion)
* Include a 1/2" sieve in the fine aggregate sieve stack. If a 1/2" sieve is not available, test the +4 portion as a coarse aggregate and the -4 portion as a fine aggregate.			

S-58.2 MnDOT 2301.2.C shall be modified to include the following:

C.5 Ternary Mixes

Ternary mixes are defined as portland cement and two other supplementary cementitious materials, or blended cement and one other supplementary cementitious material with a maximum replacement of 40% by weight.

S-58.3 Table 2301-5 of MnDOT 2301.2.L.1 shall be deleted and replaced with the following:

Table 2301-5 Concrete Mix Design Requirements												
Concrete Grade	Estimated Concrete Contract Quantity (yd ³)	Mix Number	Maximum w/c ratio		Minimum Cement Content (lbs/yd ³)	Cementitious Content (lbs/ yd ³)*	Air Content %	Gradation Requirements	Minimum Aggregate Size Required	Maximum %SCM (Fly Ash/ Slag/ Ternary)	Slump Range	3137 Spec.
			Fly Ash	Slag/ Ternary								
A	≥ 3,500	3A21	0.40	0.42	385	530 – 615	7.0	Job Mix Formula	1 1/2” nominal	33/35/40	½ - 3” †	2.D.3
		3A41	0.40	0.42							2 – 5”	
	< 3,500 and Minor work and fill-ins not provided by the primary paving plant	3A21	0.42	0.42	385	530 – 615	7.0	3126 and Table 3137-4 Or Job Mix Formula	3/4” nominal	33/35/40	½ - 3” †	2.D.3
		3A41	0.42	0.42							2 – 5”	
	Engineer Approved or Plan Allowed High-Early	3AHE ‡	0.40	0.42	385	> 615 – 750	7.0	3126 and Table 3137-4 Or Job Mix Formula	3/4” nominal	33/35/40	½ - 5”	2.D.3

* Provide additional cementitious material to meet requirements in accordance with this section at no additional cost to the Department.
|| Refer to Table 2301-2 and Table 2301-4 for ASR mitigation requirements.
† Adjust slump in accordance with 2461.3.G.7.a for slipform concrete placement.
‡ The Contractor may use 100% Portland cement for High Early Concrete, provided no mitigation is required for the fine aggregate in accordance with Table 2301-2 or the coarse aggregate in accordance with Table 2301-4. If mitigation is required, the Contractor is required to use a minimum of 15% of any supplementary cementitious material when designing High Early Concrete.

S-58.4 Table 2301-16 of MnDOT 2301.3.F.2.a shall be deleted and replaced with the following:

Table 2301-16 Paving Concrete	
Air Content Before Consolidation, %	Adjusted Contract Unit Price
> 9.0	The Engineer, in conjunction with the Concrete Engineer will determine the concrete suitability for the intended use in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work,"
6.0 – 9.0	The Department will pay 100 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer
> 5.0 – < 6.0	The Department will pay 75 percent of the Contract unit price for the concrete represented and placed as approved by the Engineer
> 4.0 – ≤ 5.0	The Engineer, in conjunction with the Concrete Engineer will determine the concrete suitability for the intended use in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work,"
≤ 4.0	Remove and replace concrete in accordance with 1503, "Conformity with Contract Documents" and 1512, "Unacceptable and Unauthorized Work" as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain place, the Engineer will not pay for the concrete and if the Engineer determines the surface is exposed to salt-brine freeze-thaw cycling, coat with an epoxy penetrant sealer from the Approved/Qualified Products List.

S-59 (2357) BITUMINOUS TACK COAT

SP2016-134

MnDOT 2357 is hereby modified as follows:

S-59.1 Delete MnDOT 2357.5 Basis of Payment and replace with:

2357.5 BASIS OF PAYMENT

All costs of furnishing and applying bituminous tack coat material will be incidental with no direct compensation being made therefore.

S-60 (2360) PLANT MIXED ASPHALT PAVEMENT – POLYMER MODIFIED

BINDER

SP2016-137

MnDOT 2360 is modified and/or supplemented with the following:

S-60.1 Mix Designation Numbers for the bituminous mixtures on this Project are as follows:

Type SP 12.5 Wearing Course	SPWEB440F (PMB)
Type SP 12.5 Wearing Course	SPWEB340C (PMB)
Type SP 12.5 Non-Wearing Course	SPNWB430B

(PMB) = Polymer Modified Binder

S-60.2 The sentence "In addition to the list the above the pavement surface must meet requirements of 2399 (Pavement Surface Smoothness) requirements." is deleted from MnDOT 2360.3.E Surface Requirements. The requirements of MnDOT 2360.3.E Surface Requirements **will** apply.

S-60.3 The first paragraph of MnDOT 2360.2.G.4.b Sampling and Testing is revised as shown below:

Take QC samples at random tonnage or locations, quartered from a larger sample of mixture. Sample randomly and in accordance with the Schedule of Materials Control. Determine random numbers and tonnage or locations using the Bituminous Manual; Section 5-693.7 Table A or ASTM D 3665, Section 5, or, an Engineer approved alternate method of random number generation. ~~Sample either behind the paver or from the truck box at the plant site. Other sampling locations can be approved by the Engineer. The Contractor must decide and notify the Engineer where samples will be taken before production begins. The Contractor and Engineer must both agree to a change of sampling location once production has begun.~~ **Sample mixture from behind the paver. Sampling from the truck box at the plant site is not allowed unless approved by the Engineer. In addition to the QC sample, the Contractor will also bring an additional split of the mixture sample to the plant site and store for the Department for 10 calendar days.** The procedure for truck box sampling is on the Bituminous Office website. The Contractor will obtain at least a 130 pound [60 kg] sample. Split the sample in the presence of the Inspector. The Inspector will retain possession of the Agency portion of each split sample and randomly submit a minimum of one sample, on a daily basis, to the District Laboratory for Verification testing (see 2360.2.G.3). Store compacted mixture specimens and loose mixture companion samples for 10 calendar days. Label these split companion samples with companion numbers.

S-61 **(2399) PAVEMENT SURFACE SMOOTHNESS**
SP2016-143

MnDOT 2399 is hereby modified as follows:

S-61.1 Delete MnDOT 2399.3.D.2 and substitute the following:

D.2 Areas of Localized Roughness

The Engineer will evaluate ALR in accordance with Table 2399-7, "ALR Monetary Deductions and Corrective Work Requirements."

Table 2399-7 ALR Monetary Deductions and Corrective Work Requirements		
Equation	25 ft [7.62 m] Continuous MRI, in/mi [m/km]	Corrective Work or Monetary Deduction, per linear 1.0 ft [0.30 m]
HMA-A or HMA-B, and a posted vehicle speed > 45 mph [73 km/hr]	< 175.0 [2.76]	Acceptable
	≥ 175.0 [2.76] to < 225.0 [3.55]	Corrective Work unless both the Engineer and the Contractor agree to a deduct of \$25.00
	≥ 225.0 [3.55]	Corrective Work unless both the Engineer and the Contractor agree to a deduct of \$125.00
PCC-A and a posted vehicle speed > 45 mph [73 km/hr]	< 175.0 [2.76]	Acceptable
	≥ 175.0 [2.76] to < 225.0 [3.55]	Corrective Work unless both the Engineer and the Contractor agree to a deduct of \$25.00
	≥ 225.0 [3.55]	Corrective Work
HMA-C, PI, ramps, loops, concrete intersections constructed under traffic, or any paving with a posted vehicle speed ≤ 45 mph [73 km/hr]	< 225.0 [3.55]	Acceptable
	≥ 225.0 [3.55]	\$25.00

The Engineer will consider areas of ALR acceptable if the retested segment contains no ALR. The Department will reduce payment for ALR remaining after retesting as determined by the Engineer and in accordance with Table 2399-7, "ALR Monetary Deductions and Corrective Work Requirements."

S-62 (2402) ORNAMENTAL METAL RAILING TYPE SPECIAL

This work consists of furnishing and installing an ornamental metal railing on the moment slab concrete barrier parapet as part of Retaining Wall D.

Furnish, coat, and install metal railing, including all anchorages and fittings, in accordance with the applicable provisions of 2402, "Steel Bridge Construction," 2433, "Structure Renovation," 2471, "Structural Metals," 2478, "Organic Zinc-Rich Paint System," the plans and the following. The Contractor is responsible for communicating all applicable specifications, special provisions, standards, and requirements to all subcontractors.

A. Engineer

Engineer, as used herein, when relating to shop fabrication and coatings, shall mean the Department's Bridge Engineer.

B. Materials

Ensure all materials conform to the plan details. If not specified, ensure all steel complies with 3306, "Low-Carbon Structural Steel," except pipe and pipe sleeves, which complies with 3362, "Structural Steel Pipe". Ensure threaded rods, bolts, nuts, and washers meet 3391, "Fasteners," and galvanize in accordance with 3392, "Galvanized Hardware," or electroplate in accordance with ASTM B 633, Type III, SC 4.

C. Anchorages

Except when part of a proprietary anchorage assembly, ensure threaded rods and bolts meet the requirements of 3385, "Anchor Rods," and 3391, "Fasteners," respectively.

Use cast-in-place type anchors unless otherwise specified in the contract.

Ensure bolt heads and/or nuts are in contact with the adjacent surface and torqued to

- 1/2 in [13 mm] diameter = 30 ft pounds [41 Nm]
- 5/8 in [16 mm] diameter = 60 ft pounds [81 Nm]
- 3/4 in [19 mm] diameter and larger = 80 ft pounds [108 Nm]

unless a different torque is recommended by the manufacturer.

C1. Drilled in Anchorages

Drilled in anchorages may be used in the following location(s) – Railing attachments of Parapet mounted ornamental metal railing.

There is no MnDOT approved product list for adhesive anchorages having an ultimate pull-out tension greater than 5000 lbs. [22 kN]. Every adhesive system will need to be accepted by the Engineer in conjunction with the Regional Bridge Construction Engineer. To accomplish this, furnish independent laboratory test data certifying that static load tests for ultimate pull-out strengths were performed and are acceptable, as specified. Provide independent lab test data in accordance with ASTM E 488.

If adhesive anchors are chosen, submit for approval by the Engineer the following chemical adhesive supplier's product literature or calculations to establish embedment depth. This information will demonstrate compliance with the specification:

- Name of supplier
- Full product name (as given in supplier's literature)
- Embedment depth as determined from supplier's literature

Ensure anchorages for fastening rail posts have an ultimate pull out strength, as specified in the plan, and install in sound concrete to a depth equal to a minimum depth of six times the rod or bolt diameter. Ensure adhesive anchorages consist of a continuously threaded rod secured by an adhesive or mortar.

Perform laboratory tests, which include static load tests for ultimate pullout strengths, on anchorage systems that are subject to tensile loads. Perform the tests in accordance with ASTM E 488, and have them certified by an independent testing laboratory. Furnish the Engineer with the test reports and the specification sheets that are prescribed by ASTM E 488.

Demonstrate the anchorage system for drilled-in anchorage systems at the first site of field installation prior to actual use in the project. Include in the demonstration installation and a static tension test in the presence of the Engineer, in accordance with test procedures prescribed in ASTM E 488. No portion of the testing device shall bear on the concrete surface within a distance equal to the anchorage

embedment depth. Test three anchorages to not less than ½ the required minimum ultimate pull out strength or the value given in Table 1, whichever is less. Failure of an anchorage test will require a modification of installation procedures or use of a different anchorage system.

In addition to the three tests stated above, the Engineer requires that each bridge have an additional 2% (not less than 1 test) of the remaining anchorages tested at a later date. The Engineer will determine the locations of the additional anchors. If a failure occurs while testing the additional 2%, more testing will be required at the rate of an additional 1% per each failure at the Contractor's expense. Compensation for costs of testing is included in the payment for the metal railing.

<u>Location</u>	<u>Bolt or Rod Diameter</u> <u>inches [mm]</u>	<u>Minimum Embedment Depth</u> <u>inches [mm]</u>	<u>Ultimate Pull-out Strength</u> <u>pounds [kN]</u>
Railing Base	5/8	5 inches	21,600

TABLE 1

ANCHOR ROD PROOF LOADS, kips [kN]
 TYPE OF ROD, FROM 3385, "Anchor Rods"

DIA., inches [mm]	TYPE A kips [kN]	TYPE B kips [kN]	TYPE C kips [kN]	TYPE D kips [kN]
1/2" [13]	4.75 [21.0]	5.7 [25.0]	10.1 [45.0]	4.9 [22.0]
5/8" [16]	7.4 [33.0]	8.9 [39.5]	15.8 [70.0]	7.6 [34.0]
3/4" [19]	10.6 [47.0]	12.6 [56.0]	22.8 [101.0]	11.0 [49.0]
7/8" [22]	14.5 [65.0]	17.4 [77.0]	31.0 [138.0]	15.0 [67.0]
1" [25]	19.0 [85.0]	22.6 [100.0]	40.5 [180.0]	19.5 [86.0]

Perform installation of anchorages in accordance with the manufacturer's recommendations and as specified in the plan.

Fill with caulk any voids occurring between the top of the anchorages and the concrete in which it is embedded, as approved by the Engineer.

D. Fabrication and Inspection Requirements

Fabricator shall supply QA/QC documentation verifying that all fabricated railing components are within the necessary tolerances for proper fit up and installation of the railing, including measurements between railing base plates that indicate that the as fabricated base plate hole locations are within 1/8 inch (3 mm) of the specified plan dimensions, based on the plan specified rail post spacing.

Fabricate all metal railing in accordance with 2471, "Structural Metals," the plan, and the welding code AWS D1.1-Structural Welding Code-Steel. Submit Welding Procedure Specifications (WPSs) to the Engineer for approval prior to the start of fabrication.

Prior to fabrication, submit a Quality Control Plan (QCP) and fabrication drawings that are acceptable to the Engineer. Any work started prior to receiving approved drawings WPSs, and a QCP, is subject to 1512, "Unacceptable and Unauthorized Work". Also give the Engineer at least 5 working days notice prior to beginning work so that Quality Assurance (QA) inspection may be provided.

The Engineer will inspect all metal railing. The purpose of the inspection(s) is to establish compliance with the Contract Documents. The shop inspection(s) is not intended to supplement or replace the Contractor's own Quality Control (QC). The Contractor is ultimately responsible for the correction of errors and faulty workmanship or for the replacement of nonconforming materials.

The Fabricator will visually inspect all parts of the fabrication and have the inspections documented by QC personnel. The Fabricator will ensure that the rail meets a straightness tolerance of 1/8 in in 10 ft [3 mm in 3000 mm]. The Fabricator will perform and document any Nondestructive Testing required by the Contract Documents using an ASNT-TC-1A Level II qualified inspector.

Document parts found to be in nonconformance by using a Nonconformance Report form (NCR), and describe in detail the fabrication error and the proposed repair procedure(s) in accordance with the QCP. Repair(s) performed are subject to the written approval of the Engineer.

E. Galvanizing Requirements

Galvanize all railing material in accordance with 3394, "Galvanized Structural Shapes," after fabrication and paint (Duplex Coat) using the applicable provisions of 2478, "Organic Zinc-Rich Paint System". Do not use the primer coat on galvanized surfaces.

Pre-Galvanized Procedure(s):

1. Calibrate dry film thickness gages in accordance with SSPC-PA 2-Measurement of Dry Coating Thickness with Magnetic Gauges.
2. Prepare all fabricated material surfaces by abrasive blast cleaning to a minimum of SSPC-SP 6/NACE No. 3-Commercial Blast Cleaning prior to galvanizing.
3. Purchase Order(s) shall identify which specific items are to be duplex coated and which materials to be galvanized are reactive (e.g. 3309, "High-Strength Low-Alloy Structural Steel," etc.).

Galvanizing Procedure(s):

Galvanize per 3394, "Galvanized Structural Shapes," ASTM D6386, and this specification. All products supplied using this specification have higher aesthetic expectations than standard galvanized products. Produce the final product to comply with its intended use as an "architectural" railing with heightened aesthetics and/or visual qualities.

1. Process all metal railing to be galvanized utilizing a "dry" kettle. Preflux the metal railing prior to the galvanizing bath using an aqueous tank of zinc chloride/ammonium chloride. Do not use a "top flux" blanket on the molten zinc bath.
2. Air cool the metal railing to ambient temperature before handling for shipment and/or storage. Do not quench the metal railing or apply any post-galvanizing treatments.
3. All lumps, projections, globules, high spots, drip lines, heavy deposits, black and bare areas, blisters, flux deposits, thin spots, dross inclusions, etc., are considered unacceptable. An unacceptable zinc coating shall be repaired with an Engineer approved QCP plan. Zinc, which will interfere with the "intended use of the product", will not be permitted.

4. Repair galvanized material that does not meet the requirements of this specification, ASTM D6386, and/or 3394, "Galvanized Structural Shapes," in accordance with an approved QCP procedures.
5. Store galvanized metal railing in a manner that will prevent the formation of "white-rust" or wet storage staining. "White rust" or staining of the galvanizing is not acceptable.
6. The Galvanizer shall provide the Engineer with all galvanizing process-related Quality Control documents which demonstrate compliance to this specification and referenced specifications prior to shipment of the galvanized product.
7. The Galvanizer will ensure the metal railings meet a straightness tolerance of 1/8 in in 10 ft [3 mm in 3000 mm] prior to any subsequent paint applications.
8. It is the Galvanizer's responsibility to provide the Engineer with advanced notification of at least 5 working days of intent to galvanize so that the Engineer can perform a Quality Assurance audit.

F. Coating Requirements

1. Perform preparation of galvanized surfaces for painting in accordance with SSPC SP16 "Brush-off Blast Cleaning of Non-Ferrous Metals," and ASTM D6386.

Inspect brush-off blasted surfaces for fins or tears, or any surface that shows that the galvanize coating has been damaged. Repair damaged areas using approved procedures in accordance with the suppliers QCP. Any surface of insufficient galvanize coating DFT readings shall be repaired using 2478, "Organic Zinc-Rich Primer".

Match the color of the finish coat to Federal Standard 595 C No. 14066 (Green) with a semi-gloss finish.

If a galvanize coating is not required, coat the rail in accordance with 2478, "Organic Zinc-Rich Paint System" (e.g. Mpls. Rail).

2. Coat all sweep blasted galvanized railing with the subsequent coat(s) within the time frame defined in ASTM D 6386, Sect. 5.4.1, or within the same 8-hour shift, maintaining manufacturer defined control and environmental conditions. The Contractor's QC personnel shall document that all parameters were followed.

3. Apply all coating material in accordance with the contract documents and the manufacturer's Product Data Sheet (PDS) and application guides for the material and system specified.

4. Ensure coating material(s) meet the requirements of 3520, "Zinc-Rich Paint Systems". Also ensure the color of the intermediate coat presents a distinct contrast from other applied coatings.

5. Accomplish all QC inspections of all coated products with an observer with normal color vision in a "well lighted" area during each coating phase and prior to final acceptance.

"Well-lighted" is defined as a minimum of 50 foot candles of artificial light or natural daylight. Use a light meter with readings in foot candles to verify the adequacy of the lighting.

Handling and Shipping of Coated Metal Railing:

Protect all completed, fabricated, and coated metal railing during handling and shipping to prevent any damage to the coating(s). Do not move or handle coated metal railing until the coating has cured, but in no case sooner than recommended by the coating manufacturer.

Metal railing may be padded to protect it from direct contact with wood, steel, or other packaging materials that could scratch, mar, stick to, or otherwise damage the final coated railing finish. Softeners may be used in conjunction with high-density foam or other acceptable packaging materials at all points of contact.

Storage of Coated Metal Railings:

Store all completed coated metal railing in accordance with MnDOT 1606 and the following:

1. The fabricator shall tag/piece mark all metal railing prior to final storage, and include the following identification markings, as a minimum: individual piece marks, bridge and/or project number(s), fabricator and applicator job numbers. All marking(s) shall not be visible to the public when the railing is in its installed position. Include the method of identification in the fabricators QCP.
2. Provide the Engineer with advance notification of at least 5 working days of intent to ship, so that the Engineer can perform a QA audit prior to shipping.

G. Construction Requirements

Provide the Engineer with a QA/QC plan that will be used to ensure that the cast-in-place anchorages are installed in the correct location using templates or other means ensuring that the exposed threads of the anchorages will not be damaged or contaminated and that the anchorages will not be displaced or allowed to move during concrete placement.

After the cast-in-place anchorages have been installed in the forms, but prior to placing the barrier concrete, the Contractor shall provide written documentation verifying that all of the anchorages are within the necessary tolerances to place the tubular railing without modifying the railing base plate configuration.

Adjust the steel posts to obtain the grade and alignment as shown in the plans by one of the following methods:

1. Shim the steel posts with steel shims or washers to the proper grade and alignment, not to exceed 1/4 in [6 mm] of shim height. Before attaching the nuts, **coat the entire surface between the base plate and concrete rail with an approved "Silicone Joint Sealant," as found on the Department's Approved Products website.** Tighten the anchor rod nuts (as per section "C"-Anchorages) and neatly smooth the caulk around the perimeter of the railpost base plate.
2. Thread the anchor rods with leveling nuts and turn down to the base of the anchor rods. Install the rails and set the steel posts to the proper grade and alignment by adjusting the leveling nuts. Install the top nuts and tighten them firmly to the base plate. Fill the space between the base plate and the concrete and neatly finish with grout that is approved by the Engineer.

Ground all metal railings. Install all electrical grounding in accordance with the applicable provisions of 2557, "Fencing," and the National Electrical Code. Clamp or braze the ground wires to the grounding device, then practicably route and attach to the nearest rail by clamping, brazing, or any other approved means that will provide a permanent positive connection. If rail has non-continuous sections, use a #6 AWG solid copper wire to connect adjacent railing panels.

If the bridge does not include exposed electrical equipment, then ground the rails at points directly below or adjacent to the railing at all abutment corners. Ensure the grounding system consists of a #6 AWG solid copper wire connected to the railing which in turn is connected to a copper coated steel rod having a nominal diameter of 5/8 in [16 mm] or more and a minimum length of 8 ft [2.4 m] installed to an elevation approximately flush with the ground surface.

If the bridge includes exposed electrical equipment, such as roadway lighting, traffic signals, variable message signs, surveillance cameras, or ramp metering, then bond the railing grounding system to the exposed electrical equipment grounding system. Refer to the electrical plans and electrical special provisions for details regarding bonding multiple electrical grounding systems.

H. Repairs of Coated Steel Railings:

Any damaged coated surfaces, identified through either Quality Control or Quality Assurance inspections as being unacceptable, either after the application of the paint or after shipping and handling, is subject to the provisions of 1512, "Unacceptable and Unauthorized Work".

S-63 (2406) BRIDGE APPROACH PANELS

SP2016-145

MnDOT 2406 is hereby modified as follows:

S-63.1 In MnDOT 2406.3.G paragraph 4 the phrase "...the contract does not contain a separate contact unit price..." is changed to read "...the contract does not contain a separate contract unit price..."

S-64 (2411) MINOR CONCRETE STRUCTURES

This work consists of constructing cast-in-place concrete Retaining Walls A, B, C, and D.

S-64.1 Architectural Concrete Texture (Ashlar Stone)

This work consists of constructing textured surfaces on specified areas of Retaining Walls A, B, C, and D as shown in the Plans. The work shall be performed in accordance with the applicable provisions of MnDOT 2401, the Plans and the following:

A. Definition of Architectural Concrete Texture (Ashlar Stone)

Architectural Concrete Texture (Ashlar Stone) shall have a texture created from Ashlar of random course height and random length placed in a random running bond pattern with a maximum relief of 1-3/4 inches. The pattern shall be similar to Pattern #12030 Milwaukee River Ashlar by Custom Rock. This pattern shall be used on the surfaces of the abutments, outside faces of rail post, and wing walls as shown in the Plans.

B. Formed Textured Surfaces

The textured concrete surfaces shall be formed using a form lining system made of high-strength urethane elastomer capable of withstanding anticipated concrete pour pressures without leakage or causing physical defects. Form liners shall attach easily to forms and be removable without causing concrete surface damage. The liners shall be designed to form surfaces conforming to the design intent including the shape, lines and dimensions described herein and in the Plans.

If applicable, match pattern features at form liner joints to minimize visible pattern repeats and make the formed concrete surface appear uniform and continuous without visible seams and form marks. When joints are unavoidable, make joints along main features of the pattern.

Subject to compliance with requirements, provide form liner materials from the following manufacturers:

1. Custom Rock, Inc.
2. Milestones, Inc.
3. ThemeScapes, Inc.
4. Fitzgerald Formliners, Inc.
5. Other approved manufacturers

Form ties shall be made of non-corrosive materials when the portion permanently embedded in the concrete is less than 1 1/2 inches from the finished surface.

Form release agents shall be fully compatible with the form liner material and the special surface finish to be applied to the textured surfaces.

C. Submittals

Within 60 calendar days of execution and approval of the Contract, the Contractor shall submit the following to the Engineer for approval:

1. Product data including manufacturer's technical information and use instructions for form liner placement and release.
2. Actual samples of form liner material (minimum of 1 foot x 1 foot).
3. Actual samples of form ties that will be permanently embedded in the concrete.
4. Qualification data for firms and persons specified below under Quality Assurance to demonstrate their capabilities and experience. Include a list of completed projects with project names, addresses, names of architects, engineers and owners, and any other pertinent information.
5. Shop drawings indicating form liner layout and termination details. Indicate backup, rustication, reveal, and chamfer strip locations. Include jointing, form tie location, pattern placement, and end, edge and other special conditions. Indicate tolerances and procedure of installation and separation.

D. Quality Assurance

1. Manufacturer's Qualifications: The form liner manufacturer must have five years minimum experience making liners used to create formed concrete surfaces matching natural stone shapes and textures.
2. Installer Qualifications: The form liner installer shall have had a minimum of five consecutive years of experience in textured formed concrete construction.
3. Test Panel Mock-ups: Construct test panel mock-ups of the textured formed surface for quality control comparison of surface texture and pattern characteristics between the approved sample mock-ups and the actual work as it is installed. Test panel mock-ups shall be constructed using urethane foam or other suitable lightweight material to produce a surface that simulates that produced when casting concrete. The test panel mock-ups shall be a minimum of 3-inches thick, 5-foot wide and 4-feet high. They must be lightweight and easily moved or transported by one person.
4. Concrete Test Panel: Upon approval of the test panel mock-up for the architectural concrete texture pattern, a concrete test panel for the texture shall also be constructed. At a minimum, the concrete test panel shall be the same size as the test panel mock-up. Materials used

in the construction of the concrete test panel shall comply with the applicable requirements of 2401 for formwork and concrete. Concrete mix for the concrete test panel shall be Mix No. 3B52. The form liner used for the concrete test panel shall produce the same pattern that is intended for use on the structure(s). Cast the unreinforced panel vertically simulating as many phases of the actual construction as possible. Additional concrete test panels will be required if results of the initial test panel do not meet the requirements of these special provisions, which shall be considered incidental to the Work.

The Engineer will represent the County in approving the form liner pattern and the color.

Following completion of construction of the bridges, remove and dispose of the test panels in accordance with 2104.3C3.

Test panels shall be considered incidental to the work and no direct compensation will be made therefore.

E. Construction Requirements

Surface Preparation: All conventionally formed concrete surfaces to receive ashlar stone texture shall be water blasted to break the surface film and to remove all laitance detrimental to the finish coating system performance. Sandblasting will not be allowed for cleaning concrete surfaces, as it will reduce the architectural concrete texture specified in this Special Provision. Pressure washing with water at a pressure of **3000 psi** at a rate of **3 to 4 gallons** per minute using a fan nozzle held perpendicular to the surface at a distance of **one to two feet** shall be used.

Match pattern features at form liner joints to make the formed concrete surface appear uniform and continuous without grout leakage at the joints. When concrete vertical construction joints are required, place form liner joints in the valley of the grooves, or as approved by the Engineer. Following removal of forms, finish minor defects to blend with the balance of the pattern surface texture. Filling of "bug holes" or other similar deformities in the texture surface that are 1/2 inch or less in diameter or depth is not required. No visible vertical and horizontal seams or conspicuous form marks created by butt-joining form liners will be allowed. Where it is not possible to locate a vertical groove at a construction joint, the concrete surface shall be finished to reduce visibility of the construction joints.

Strip formwork in accordance with the form liner manufacturer's recommendations to avoid concrete surface deterioration or weakness planes in the substrate. Finish form tie holes in accordance with 2401.3F2a using approved patching materials.

Clean and repair surfaces of form liners to be re-used. Split, frayed, delaminated or otherwise damaged form liner material will not be acceptable for exposed surfaces. Form liners shall be cleaned and free of concrete buildup prior to each pour. Do not use "patched" forms for exposed concrete surfaces unless acceptable to the Engineer.

F. Method of Measurement

Measurement for Architectural Concrete Texture (Ashlar Stone) will be made by the planimetric area in square feet of the textured surface based on the Plan dimensions.

G. Basis of Payment

Payment for Item 2411.618, "ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE)" will be made at the Contract price per square foot and shall be compensation in full for all costs of constructing the textured surfaces, as described above.

A. Description of Work

This work consists of applying an architectural surface finish of a multi-color application to all exposed concrete surfaces of Architectural Concrete Texture (Ashlar Stone) on specified areas of Retaining Walls A, B, C, and D as shown in the Plans. The work shall be performed in accordance with the applicable provisions of MnDOT 2401, the Plans, and the following:

B. Architectural Surface Finish (Multi Color) Application and Colors

Architectural Surface Finish (Multi Color) shall be applied to the abutment, pilasters and wing walls, so designated in the Plans to receive Architectural Concrete Texture (Ashlar Stone). Architectural Surface Finish (Multi Color) base color shall be a light buff matching Federal Standard 595C No. 33522, and highlight color shall be a dark brown matching Federal Standard 595C No. 37056, and meeting the approval of the Engineer in approving the form liner pattern and the color.

Cork joints shown in the Plans shall be finished to visually continue the stonework pattern across the joint uninterrupted. A sample of the colored cork for approval shall be included in the concrete test panel described in SB-6.8.

C. Stain Materials

Stain shall be a 100 percent acrylic; water-repellant, semi-opaque, tinted emulsion sealer designed for concrete and masonry surfaces. Acceptable products shall allow moisture and vapor transmission, be formulated for exterior application with resistance to freeze/thaw, moisture, alkali, acid and mildew, mold or fungus, discoloration or degradation and meet the following requirements:

1. Physical or performance properties:
 - Volume Solids.....29-31 percent (Calculated Lab Value)
 - Weight Solids.....44-46 percent (Calculated Lab Value)
 - Viscosity65-85 KU (Calculated Lab Value)
 - Accelerated Weathering.....1,000 Hours Minimum (ASTM G-26)
2. Color pigments for tinted products shall be derived from synthetic mineral oxides.
3. Subject to compliance with requirements, provide colored concrete finishing products from one of the following manufacturers:
 - Harris Specialty Chemicals, Inc.
 - The Sherwin-Williams Company
 - Tamms Industries
 - TK Products
 - United Coatings
 - Other approved sources

To the greatest practical extent, all concrete finishing products shall be obtained from a single source.

All materials shall be furnished, prepared, applied, cured and stored according to the product manufacturer's directions and as specified herein. Special attention shall be given to the recommended temperature range for application.

D. Submittals by Contractor

Within 60 calendar days of execution and approval of the Contract, the Contractor shall submit the following to the Engineer for approval:

1. Product data including manufacturer's technical information, label analysis, and application instructions for each material proposed for use.
2. Laboratory test reports showing that materials proposed for use meet physical or performance property requirements.
3. 12-inch x 12-inch square samples of the colors needed to complete the work. Final color selections will be based upon completion of the test panel specified above.
4. Proof that the concrete finisher has had five years of experience finishing simulated stone masonry textured concrete. Include list of completed projects with project name and location and architect/engineer/owner of record.

E. Quality Assurance

The Contractor shall demonstrate his workmanship by completely finishing the architectural surface treatment concrete test panel(s), described in S-64.1 using approved concrete stain products, materials, methods and workmanship and the specified surface preparation method. Test panel(s) shall be considered incidental to the work and no direct compensation will be made therefore.

F. Surface Preparation

Following removal of forms, all exposed textured concrete surfaces shall receive an ordinary surface finish in accordance with Mn/DOT 2401.3F2a prior to the surface preparation described below. Minor defects shall be finished to blend with the balance of the textured surfaces. The Contractor shall make every effort to match the surface texture of patched surfaces with the surrounding textured surface. Visible vertical or horizontal seams or conspicuous form marks shall be repaired to the satisfaction of the Engineer and at the Contractor's expense.

All formed concrete surfaces to receive Architectural Surface Finish (Multi Color) shall be water-blasted to break the surface film and to remove all laitance detrimental to the color system performance. Sandblasting will not be allowed for cleaning concrete surfaces, as it will reduce the architectural concrete texture. Pressure washing with water at a pressure of 3000 lbs. Per Square Inch at a rate of 3 to 4 gallons per minute using a fan nozzle held perpendicular to the surface at a distance of 12 inches to 24 inches shall be used.

G. Method of Measurement

Measurement for Architectural Surface Finish (Multi Color) applied to the Architectural Concrete Texture (Ashlar) will be by area in square feet based on the dimensions of the finished colored plane surface area as shown in the Plans.

H. Basis of Payment

Payment for Item No. 2411.618 "ARCHITECTURAL SURFACE FINISH (MULTI COLOR)" will be made at the Contract price per square foot and shall be compensation in full for all costs of furnishing, applying, and finishing stain materials to the areas of Architectural Concrete Texture (Ashlar Stone) as shown on the Plans.

Application of the Architectural Surface Finish to the concrete test panel(s) for quality assurance purposes shall be considered as incidental and no direct compensation will be made therefore.

S-64.3 Anti-graffiti Coating

A. Description of Work

This work consists of applying an anti-graffiti coating to all areas of Retaining Walls A, B, C, and D which receive Architectural Surface Finish (Multi Color). The work shall be performed in accordance with the Contract Documents and the following:

B. Materials

Anti-Graffiti Coatings

Anti-graffiti coatings shall be a clear, multi-component, multi-coat system designed as a permanent, non-destructive coating system for exterior architectural aesthetics. Product shall be compatible with any surface sealer and/or special surface finish that may have been previously applied to the concrete surfaces. It shall be non-yellowing, non-chalking, and UV-resistant, available in a flat, matte, or semi-gloss finish, and shall not require re-application after graffiti removal. Coating shall not contain paraffin (wax) or elastomeric silicones. Acceptable products shall demonstrate protection from graffiti defacement, chemical staining, ghosting, shadowing, and normal environmental effects without yellowing, color change, increased dirt pick-up, or damage to the coating or substrate for a minimum 10-year period.

Acceptable anti-graffiti coating products are as follows:

- Graffiti Solution System as manufactured by American Polymer Corporation
- Conformal Anti-graffiti Coating as manufactured by Chemprobe Technologies, Inc.
- Permaclean 1496 as manufactured by TK Products
- Other products Approved by Mn/DOT

Graffiti Removal Agents

Graffiti removal agents shall be non-toxic, non-flammable, biodegradable, and have a pH of 7-8.5. After graffiti removal, no evidence of graffiti shall be present. The product(s) shall not cause a change in the appearance to the treated surface, including shadowing, ghosting, or staining of the coating or substrate.

C. Submittals

Submittals shall be made prior to material being incorporated in the work. The Contractor shall allow sufficient time so that construction will not be delayed as a result of the time required to approve the submittals, including time for resubmittals as necessary. An extension of time will not be authorized because of failure to transmit submittals sufficiently in advance of the work.

The Contractor shall submit the following items to the Engineer and Mn/DOT:

- Manufacturer's product data sheets indicating technical information, label analysis, and application instructions for each material proposed.
- For the purpose of future maintenance, a list of manufacturer-approved products for cleaning of the surface of the anti-graffiti coating product(s) used on the Project.
- Certified test reports indicating compliance with requirements.
- A one-liter sample of each anti-graffiti coating product and a compatible graffiti removal agent for verification purposes.
- Test panel in accordance with the requirements of S-64.1.
- Applicator qualifications demonstrating experience in coating applications. Include a list of recently completed graffiti-resistant coating projects. Supply name and location of project, name and telephone number of owner, and a description of products used, substrates, applicable local environmental regulations, and application procedures.

D. Quality Assurance

All products applied under this Project shall be supplied by the same manufacturer. Coating and removal products shall demonstrate a history of successful use on transportation, commercial, or industrial projects.

The approved coating manufacturer shall conduct a training seminar for the purpose of training applicators on anti-graffiti product technology, substrates, and application methods. Applicator trainers shall be approved by, and shall be in good standing with, the manufacturer.

E. Application

Anti-graffiti coating shall be applied after all components of the Architectural Surface Finish have been applied to the areas of architectural concrete texture.

The substrate shall be prepared and the anti-graffiti coating product(s) shall be applied in accordance with the manufacturer's directions.

Prior to full application of the anti-graffiti coating to the designated surfaces, the applicator shall apply the anti-graffiti coating to the test panel containing Architectural Concrete Texture and Architectural Surface Finish (Multi-Color) as described in S-64.1 and S-64.2 to confirm compatibility, coverage, and possible color change. Any problems or damage to the color system as a direct result of the anti-graffiti products or face preparation methods shall be corrected to the satisfaction of the Engineer and at the Contractor's expense.

F. Method of Measurement

Measurement for Anti-Graffiti Coating applied to the Architectural Concrete Texture (Ashlar Stone) and the Architectural Surface Finish (Multi Color) will be by area in square feet based on the dimensions of the finished colored plane surface area as shown in the Plans.

G. Basis of Payment

Payment for Item No. 2411.618 "ANTI-GRAFITTI COATING" will be made at the Contract price per square foot and shall be compensation in full for all costs of surface preparation, furnishing and applying of the anti-graffiti coating as described above.

Application of the anti-graffiti coating to the test panels for quality assurance purposes shall be considered incidental and no direct compensation will be made therefore.

S-64.4 Finish of Concrete Surfaces

Cure concrete for a minimum of 28 days or as recommended by the manufacturer prior to applying special surface finish (SSF) or acrylic paint. Thoroughly flush all surfaces that are to receive SSF with clean water not more than 24 hours before commencing with the SSF finishing.

A. Special Surface Finish

The provisions of 2401.3.F.2.C, "Special Surface Finish," are supplemented as follows:

Apply SSF on the exposed concrete surfaces as designated below for Retaining Walls A, B, C, and D.

1. Barrier or Parapet (other than Type F)
2. Outside surfaces of F barrier
3. Coping at top of wall
4. Top of wall

Provide a finish color for all SSF matching Federal Standard 595 C No. 33522 (light buff). Provide paint free of toxic metals and toxic pigments.

Provide a test area, 3 foot x 3 foot [1 meter x 1 meter], for final color selection and have the Engineer approve the test area after the color has been added to it.

B. Finishing Roadway Faces and Tops of Barrier

1. Finish conventionally formed roadway faces, tops of barriers on retaining walls, as per 2401.3.F.2.d, "Curb, Sidewalk, and Median Finish," and the following:
 - a) Plan and execute concrete placement, form removal, and finishing operations so that the surface finishing can be started immediately after forms are removed. Remove the roadway face forms as soon as the concrete can retain its molded shape. In no case shall the elapsed time between concrete placement and initial surface finishing exceed 24 hours.
 - b) After completion of the curing period, paint the roadway faces and tops of the barriers (and median) with an approved acrylic paint conforming to 3584, "Exterior Masonry Acrylic Emulsion Paint". The color of the acrylic paint shall conform to Federal Standard 595 C No. 33522 (light buff). Apply the paint at a rate of 300 ft² per gallon [7.4 m² per L]. Commence or suspend the painting operation when the air and surface temperature meet or exceed the manufacturer's recommendations.

2. Finish slipformed roadway faces and tops of barriers, in accordance with the following:
 - a) Lightly broom the barrier surface immediately after passage of the slipformer.
 - b) Coat the roadway face and top of the barrier as described above for the conventionally formed barrier.

S-64.5 Joint Filler and Sealing

The provisions of 2401.3.I.1, "Joint Sealing," are supplemented as follows:

Complete concrete curing prior to installation of sealing materials. A minimum of 14 days drying is required prior to application of sealers. Sawcut joints, sandblast, blow clean, and ensure the concrete surfaces are dry at the time the sealer is installed. Perform work as per manufacturer's recommendations.

Construct preformed joint(s) as detailed in the plans and in conformance with the following requirements.

1. Use bituminous felt that complies with AASHTO M33, modified to the extent that the load required to compress the test specimen to 50 percent of its thickness before test be not more than 1200 psi (8274 kPa).
2. Supply cork complying with 3702, "Preformed Joint Fillers".
3. Supply polystyrene complying with the following:

Compressive Strength for Polystyrene Elements		
Type	Compressive Strength (min.) [5% deflection]	Characteristics
A (High Density)	30 psi [207 kPa]	Closed Cell Expanded Polystyrene
B (Low Density)	10 psi [69 kPa]	Molded Polystyrene

Test for compressive strength of polystyrene in accordance with ASTM D 1621. Furnish evidence that the material meets these requirements, if requested by the Engineer.

S-65 (2411) PREFABRICATED MODULAR BLOCK WALL (PMBW) WITH AND WITHOUT SOIL REINFORCEMENT

This work consists of furnishing certified design calculations, shop drawings, fabrication, furnishing and installing a non-structural leveling pad, prefabricated modular block wall, soil reinforcement elements (if applicable), wall construction, excavation and backfill (not included in MnDOT 2451 and 2105) and other services necessary for construction of the wall.

The work shall be performed in accordance with the applicable provisions of MnDOT Specifications 3126, 3137, 3149, these Special Provisions, and in close conformity with the lines, grades, standards, design, architectural details, and dimensions shown on the Plans or as otherwise established.

Prefabricated modular block wall systems shall be selected from the MnDOT pre-qualified wall system list at the following web site:

<http://www.dot.state.mn.us/products/index.html>

S-65.1 DEFINITIONS AND DESIGN REQUIREMENTS

I. DEFINITIONS

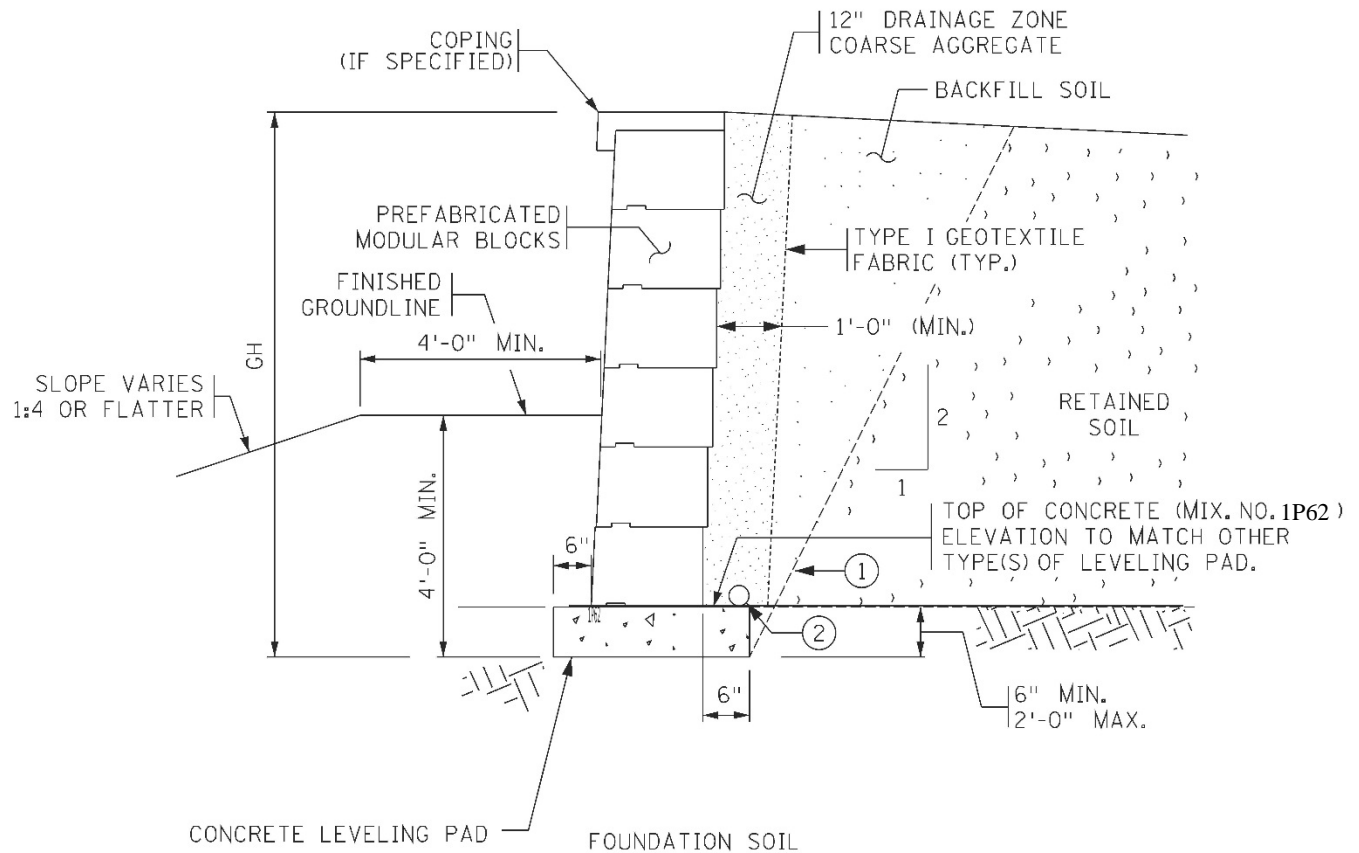
- A. Gravity PMBW: A retaining wall system consisting of wet cast concrete blocks that resists earth pressures and other loads solely by the weight of the blocks, and block infill (if applicable).
- B. PMBW with soil reinforcement: A retaining wall system that consists of reinforced soil, soil reinforcement, and wet cast concrete blocks that resists earth pressures and other loads by a reinforced soil mass.
- C. Soil Reinforcement: A material placed within a soil mass to increase the strength of the soil.
- D. Backfill Soil (for gravity walls only): Soil placed in the backfill zone meeting the requirements of MnDOT 3149 and the "Materials" section of this specification. See Figure 2411-1.
- E. Backfill Zone (for gravity walls only): Practical limit for placement of backfill soil. Limit begins at the bottom corner of the concrete portion of the leveling pad and extends at a slope determined by OSHA regulations and the in-situ soils. The pay limit quantity is a line extending at a 2 V:1 H slope from the bottom of the concrete portion of the leveling pad to the finished ground line at the top of the wall. Soil in this zone shall meet the requirements of MnDOT 3149 and the "Materials" section of this specification. See Figure 2411-1.
- F. Reinforced Soil (for reinforced walls only): Soil placed in the reinforced zone meeting the requirements of MnDOT 3149 and the "Materials" section of this specification. See Figure 2411-2.
- G. Reinforced Zone (for reinforced walls only): Practical limit for placement of reinforced soil. Limit begins near the termini of the bottom layer of soil reinforcement and extends at a slope determined by OSHA regulations and the in-situ soils. The pay limit is a line extending at a 2 V:1 H slope from the intersection of a horizontal line extending at the

top of the leveling pad and a vertical line extending at the back of the reinforcing elements. See Figure 2411-2.

- H. Retained Soil: Soil retained by the PMBW wall behind the reinforced zone for reinforced walls or backfill zone for gravity walls. See Figures 2411-1 and 2411-2.
- I. Foundation Soil: Soil below the leveling pad and beneath the reinforced soil zone. See Figures 2411-1 and 2411-2.
- J. Prefabricated Modular Blocks (PMB): Wet cast precast concrete modules used to contain the reinforced soil in position at the face of a reinforced wall. For gravity walls blocks are used to resist horizontal earth forces.
- K. Block Depth: The block “depth” is measured from the front face of the block to the back face of the block. The maximum block depth shall be 60”, exclusive of face relief.
- L. Connection Device: The item used to connect the soil reinforcement to the facing block of a reinforced wall. The connection could either be mechanical or friction.
- M. Coping: Attachment placed or cast on top of the wall to tie together the facing blocks and provide an aesthetic finish to the top of the wall.
- N. Geotextile Filter: Material placed behind blocks, which prevents migration of fines through the joints, yet still allows for drainage of water through joints.
- O. Temporary Shims: Temporary supports used to position the blocks during construction. For permanent shim requirements see Section S-1.4E.
- P. Impervious Layer (Geomembrane): A layer of puncture-free and flexible, roughened sheet HDPE, LLDPE or PVC at least 30 mils (0.75 mm) thick placed below the roadway surface to prevent surface water from entering into the wall system. The Impervious Layer (Geomembrane) shall meet the requirements of the materials section of this specification.
- Q. PMBW System Supplier: The vendor who’s name appears on the MnDOT pre-qualified wall system list and is responsible for supplying the PMBW system including the soil reinforcement, blocks and connections. The PMBW System Supplier designs the components of the PMBW system, designs the system for internal stability and prepares the shop drawings.
- R. Prequalified PMBW System: A PMBW wall system which has been prequalified by the MnDOT Structural Wall Committee. A list of prequalified PMBW systems can be found at <http://www.dot.state.mn.us/products/index.html>
- S. Gravity PMBW Design Height (GH): For walls with level fill, the wall design height is from the top of block or coping to the bottom of the concrete portion of the leveling pad. For walls containing a parapet with level fill, the wall design height is from the finished ground line at the top of the wall to the bottom of the concrete portion of the leveling pad. Parapets over 6” in height must always contain double sided architectural units. For walls with sloping fills or complex geometries see the AASHTO LRFD Bridge Design Specifications Chapter 11 for design height.
- T. PMBW with Soil Reinforcement Design Height (RH): For walls with level fill, the wall design height is from the top of block or coping to the top of the concrete portion of the leveling pad. For walls containing a parapet with level fill, the wall design height is from

the finished ground line at the top of the wall to the top of the concrete leveling pad. Parapets over 6" in height must always contain double sided architectural units. For walls with complex geometries see the AASHTO LRFD Bridge Design Specifications Chapter 11 for design height.

- U. Supporting Roadway: See Design Section Item G
- V. Exposed Height: The distance from the finished ground line at the top of the wall to the finished ground line at the base of the wall. See Design Section B.

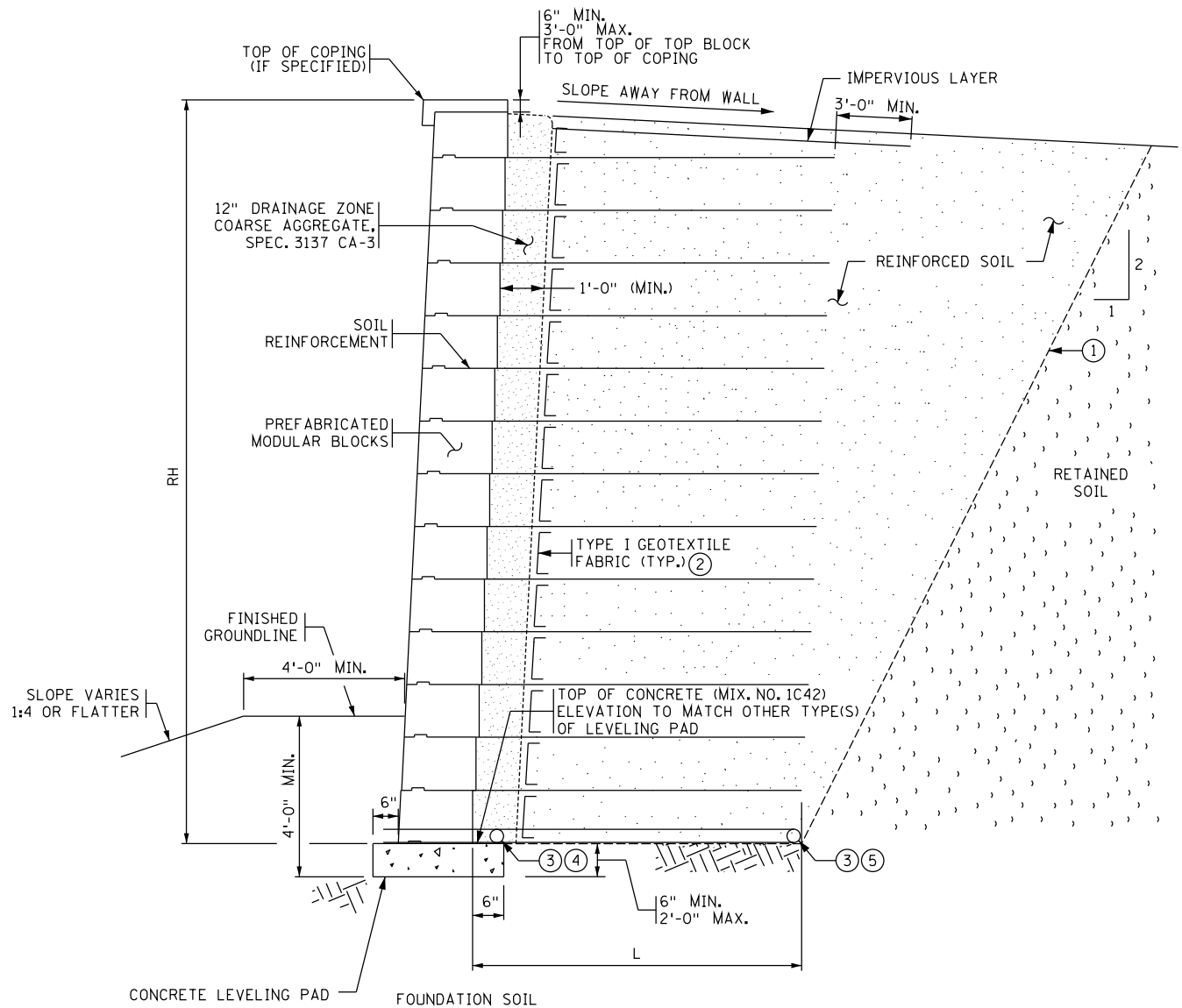


TYPICAL SECTION OF GRAVITY WALL

NOT TO SCALE
 LEVEL FILL

- ① PAY LIMIT (2:V TO 1:H) ACTUAL EXCAVATION SLOPE IS DETERMINED BY DESIGNER PREFERENCE OR OSHA REGULATIONS OF IN-SITU SOILS: EXCAVATION BEYOND THESE LIMITS AT CONTRACTORS EXPENSE.
- ② 4" THERMOPLASTIC PERFORATED PIPE, SPEC. 3245. WRAP WITH TYPE 1 GEOTEXTILE, SPEC. 3733, INSTALLATION AS PER SPEC. 2502. CONNECT TO DRAINAGE SYSTEM OR OUTLET THROUGH WALL USING 6" T.P. NON-PERFORATED PIPE WITH RODENT SCREEN. ALL WORK INCIDENTAL.

Figure 2411-1 Gravity PMBW Material Definitions/ Typical Cross Sections



TYPICAL SECTION OF PMBW WITH SOIL REINFORCEMENT

NOT TO SCALE
 LEVEL FILL

- ① PAY LIMITS (2V:1H). ACTUAL EXCAVATION SLOPE IS DETERMINED BY OSHA REGULATIONS AND IN-SITU SOILS: EXCAVATION BEYOND THESE LIMITS AT CONTRACTORS EXPENSE.
- ② THE WRAP LENGTH FOR GEOTEXTILE FABRIC SHALL NOT BE MORE THAN 6".
- ③ 4" THERMOPLASTIC PERFORATED PIPE, SPEC. 3245, WRAP WITH TYPE 1 GEOTEXTILE, SPEC. 3733, INSTALLATION AS PER SPEC. 2502. CONNECT TO DRAINAGE SYSTEM OR OUTLET THROUGH WALL USING 6" T.P. NON-PERFORATED PIPE WITH RODENT SCREEN. ALL WORK INCIDENTAL
- ④ FRONT DRAINTILE.
- ⑤ BACK DRAINTILE.

Figure 2411-2 PMBW with Soil Reinforcement Material Definitions/ Typical Cross Section

II. DESIGN REQUIREMENTS

The wall designer shall be an engineer licensed by the State of Minnesota and shall prepare, sign, and date the design calculations, shop drawings, and the "PMBW Design Certification Letter" provided herein for each PMBW in the contract. The wall designer shall have experience in the design and construction of a minimum of five PMBW projects of similar size and scope as the project currently under design. This experience shall include PMBWs of equivalent complexity and similar height to the walls being designed as part of this contract. A letter certifying the wall designer's previous design experience shall be submitted to the Engineer. A second engineer shall thoroughly check the design calculations and shop drawings to verify compliance with the specifications and shall also sign and date each "PMBW Design Certification Letter". Both the wall designer and the engineer checking the design shall have taken the NHI course titled "Design of Mechanically Stabilized Earth Wall and Reinforced Soil Slopes" (FHWA-NHI-132042) or equivalent, and shall provide proof of attendance to the Engineer.

The Contractor shall provide the PMBW designer with a complete set of project plans and specifications, geotechnical reports and all other necessary information to design the wall. The Contractor shall ensure that the wall design is compatible with all other project features that may impact the design and construction of the wall.

The design shall consider the internal and external stability of the wall mass including eccentricity (overturning), sliding, and bearing pressure including temporary construction slopes or stockpiles. The design shall be in accordance with any restrictions for the chosen PMBW system, the plans, specifications and the PMBW design and construction provisions of the AASHTO LRFD Bridge Design Specifications, latest with all interim revisions. The design shall also be in accordance with the Federal Highway Administration requirements as reported in publication Nos. FHWA-NHI-10-024 and FHWA-NHI-10-025, entitled "Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes - Volumes I and II" and the MnDOT LRFD Bridge Design Manual. If the provisions of the above documents conflict, the designer shall follow the most stringent requirement as determined by MnDOT. The internal stability design of PMBW's with Soil Reinforcement shall be performed using the Simplified Method as defined by the AASHTO LRFD Bridge Design Specifications.

The design shall meet the following requirements:

- A. Only PMBW systems listed on the MnDOT pre-qualified supplier list at the letting date will be allowed. The Contractor shall include in the shop drawing and calculation submittal a copy of the MnDOT pre-qualification letter for the PMBW system, and any deviations of details from the previously submitted pre-qualification shall also be specifically outlined in the letter, including MnDOT approval of the deviations.
- B. The exposed height is the distance from finished ground line at the top of the wall to the finished ground line at the base of the wall. The exposed wall height shall be less than 8' for gravity walls and less than 18' feet for walls with soil reinforcement. All walls shall have a minimum of 2' of block below the finished ground line at the base.
- C. For internal stability design of PMBW's with soil reinforcement the reinforced soil shall have a unit weight of 0.120 kcf and friction angle of 34 degrees.

For gravity PMBW's if backfill soil is placed behind the wall at a 1 V: 1 H from the bottom corner of the concrete portion of the leveling pad, a unit weight of 0.120 kcf and friction angle of 34 degrees may be used for design if adequate right of way (ROW) is available and there are no utility conflicts. If backfill soil is placed behind the wall at less

than a 1 V: 1 H from the bottom corner of the concrete of the leveling pad or for retained soil (outside of the backfill zone) properties are defined in the Geotechnical Report, but not to exceed a friction angle of 30 degrees. Shop drawings shall show backfill limits consistent with the design assumptions.

- D. The contribution from passive resistance in front of the wall shall not be allowed from the finished ground line to a distance of 2' below the finished ground line.
- E. The design life for the wall system other than soil reinforcement and connections shall be 75 years. The design life for geosynthetic soil reinforcement and connections used in the wall system, including long term creep, shall be 100 years.

For analysis of corrosion degradation life of metallic components, follow the requirements of "Corrosion/Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes" (FHWA-NHI-09-87)

- F. For PMBW's with soil reinforcement the minimum reinforcement length shall be $0.7 \times RH$ (see definitions section regarding PMBW's with Soil Reinforcement Design Height, RH) but not less than 8', measured from the back face of the block. If the length of soil reinforcement is governed by overall stability, the designer shall meet the requirement of overall stability. The depth and weight of the block can be used in external stability calculations, but shall not be used in internal stability calculations.
- G. Gravity PMBW's are not allowed to support traffic. A vehicular roadway or parking lot shall not be situated within a 1V: 1H horizontal distance measured from the front face bottom corner of the bottom block. (see Figure 2411-3). The horizontal distance shall be determined for each wall measured at the highest portion of the wall. Since no vehicular live load is applied, a surcharge must be applied to account for snow loads, future maintenance operations, or future regrading. The surcharge shall be 120 psf with a maximum load factor of 1.35 and a minimum load factor of 1.0.

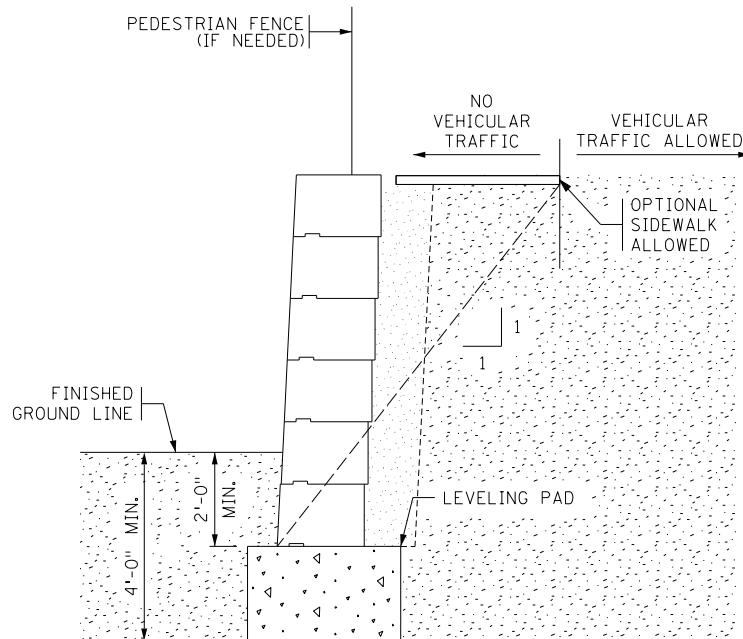


Figure 2411-3 Definition of Supporting Traffic for a Gravity PMBW

PMBW's with soil reinforcement are considered to support traffic if a vehicular roadway or parking lot is located within a horizontal distance measured from the front face of the bottom block equal to $(D_u + L + 0.5 RH)$ where:

D_u = Depth of the Unit (assume 3' min.)
 L = Length of Reinforcement (Minimum of $0.7 \times RH$ or 8')
 RH = Design Height of PMBW with Soil Reinforcement

The horizontal distance shall be determined for each wall measured at the highest portion of the wall.

Due to grading, design and visual quality issues between the edge of pavement or roadway and the back of a wall, traffic may not be placed within a horizontal distance of 11' (assumes 3' block depth + 8' behind back of wall) from the front face of the wall, regardless of height. See Figure 2411-4.

If a PMBW with soil reinforcement supports traffic, a live load surcharge of 240 psf with a maximum load factor of 1.35 for internal stability and maximum load factor of 1.75 for external stability shall be applied. The live load surcharge shall be placed directly behind the top block and patterned according to the AASHTO LRFD Bridge Design Specifications, Article 11.10.5.2. Since live load surcharge is applied, a surcharge load to account for snow loads, future maintenance operations, or future re-grading need not be applied.

If a PMBW with soil reinforcement supports traffic and if noise walls, overhead signs or other items are attached to the traffic barrier, then the wall shall be designed for the both (i) dead load of the barrier and attachments and (ii) dead load of barrier and no attachment loads; with the critical case controlling design. Distribute the dead load to the wall according to AASHTO LRFD Bridge Design Specifications, Article 3.11.6.3.

If a PMBW with soil reinforcement supports traffic and the roadway or parking lot is located directly over the soil reinforcement, the top two layers of soil reinforcement shall be designed for a TL-4 vehicular impact load.

If a PMBW with soil reinforcement does not support traffic, it does not need to be designed for vehicular live loads. For this case a surcharge load to account for snow loads, future maintenance operations, or future re-grading shall be applied. For PMBW's with soil reinforcement with exposed heights of 8' or less the surcharge shall be 120 psf and placed directly behind the top block with a maximum load factor of 1.35 and a minimum load factor of 1.0 for internal and external stability. For PMBW's with soil reinforcement with exposed heights between 8' and 18' the surcharge shall be 240 psf and placed directly behind the top block with a maximum load factor of 1.35 and a minimum load factor of 1.0 for internal and external stability.

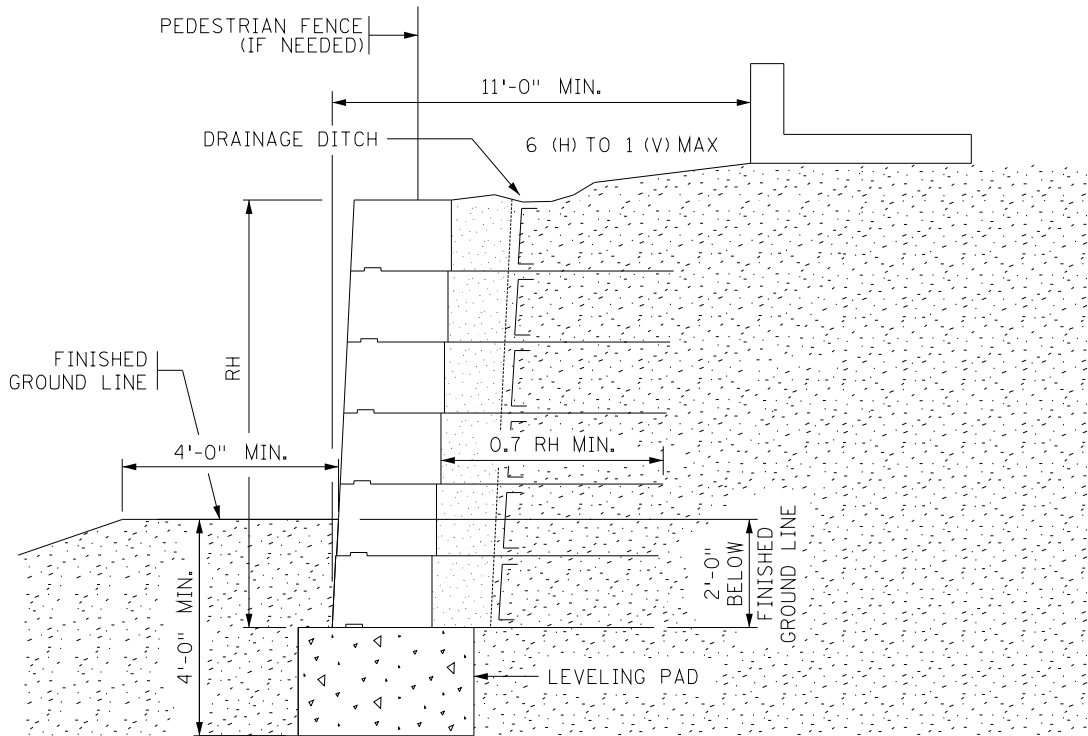


Figure 2411-4 Minimum Traffic Distance for a PMBW with Soil Reinforcement

- H. Differential settlement shall be less than 1/200 along the length of the wall and normal to the wall alignment. Adequate joint width/or slip joints shall be provided to accommodate movements without block cracking.

The wall shall be designed and detailed to accommodate differential movements and loads from adjacent structures or structures intercepting the blocks.

All PMBW's shall have 1 foot coarse aggregate per MnDOT Spec ASTM D 448-12, Size Number 5 behind the block and geotextile fabric per MnDOT Spec 3733 as shown in the Figure 2411-1 or 2411-2.

- I. For Gravity PMBW's and PMBW's with soil reinforcement do not place two facing blocks next to each other with interior or exterior angles of less than 90 degrees. Detailed corner block requirements can be found on the MnDOT Approved Products web site.
- J. Minimum radius requirements can be found on the MnDOT Approved Products web site.
- K. The length of soil reinforcement for the wall shall be constant for all layers unless otherwise approved in writing by the Bridge Office. The maximum vertical spacing of soil reinforcement layers shall be 2'-8".
- L. Lateral Earth Pressure for gravity PMBW's shall be calculated according to the Coloumb method in AASHTO LRFD Bridge Design Specifications, Article 3.11.5.3. The magnitude and resultant loads and resisting forces shall be calculated according to AASHTO LRFD Bridge Design Specifications, Article 3.11.5.9.

- M. If the placement of an obstruction in the soil reinforcement zone such as a catch basin, grate inlet, signal or sign foundation, guardrail post, or culvert cannot be avoided, the design of the wall near the obstruction shall be modified using one the of the following alternatives:
- a. Splay the reinforcement around the obstruction, however geogrid reinforcement may not be splayed unless the connection has been specifically fabricated to accommodate a splay and the connection detail has been approved by MnDOT. Horizontal deviation is referred to as splay. If used, the splay is limited to 15 degrees.
 - b. Assuming reinforcement layers must be partially or fully severed in the location of the obstruction, design the surrounding reinforcement layers to carry the additional load which had been carried by the severed reinforcements. The portion of the wall facing in front of the obstruction shall be made stable against a toppling or sliding failure.
 - c. Place a structural frame around the obstruction capable of carrying the load from the reinforcements in front of the obstruction to reinforcements connected to the structural frame behind the obstructions. The steel frame and connections shall be designed in accordance with Section 6 of the AASHTO Bridge Design Specifications. The steel frame and connections shall be galvanized, and long-term nominal strength shall consider corrosion losses. If a steel frame is used, an Impervious Layer (Geomembrane) is required above the steel frame regardless of the system or geogrid reinforcement manufacturer.
- N. All ends of the wall shall have corner or radius treatments when they do not abut up to a fixed feature on the project (bridge abutment, other wall, building, etc.). This is to prevent erosion around the end of wall, unsightly exposed ends of blocks and ease of matching in with the existing and fill slopes. The ends are then turned back inward and buried into the soil.
- O. All PMBW's with soil reinforcement shall be set on a concrete leveling pad. The minimum width of the pad shall be the depth of the bottom block plus 12 inches. The pad width may need to be increased to accommodate curved wall sections. The minimum height (thickness) of the leveling pad shall be 6 inches (maximum of 2 feet) and the bottom of the leveling pad must extend at least 4' below finished ground line. Vertical cracks in the leveling pad shall not be greater than 2.5 feet.

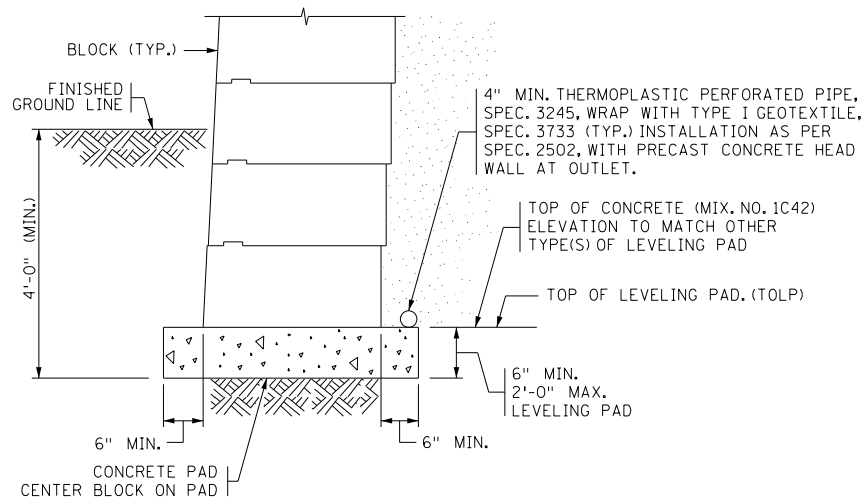


Figure 2411-5 – Full depth concrete leveling pad detail

Gravity PMBW's shall be set on either a concrete leveling pad (meeting the minimum requirements above) or a composite leveling pad. The composite leveling pad shall consist of a 6" min. thickness concrete slab over 6" min. thickness of compacted drainable coarse filter aggregate per MnDOT Spec 3149.2H. The coarse filter aggregate shall be completely wrapped with a Type 1 geotextile fabric per MnDOT Spec 3733. (see Figure 2411-6) The bottom of the leveling pad must extend at least 4' below grade. Drains shall be required at the bottom of the coarse filter aggregate and directly above the concrete.

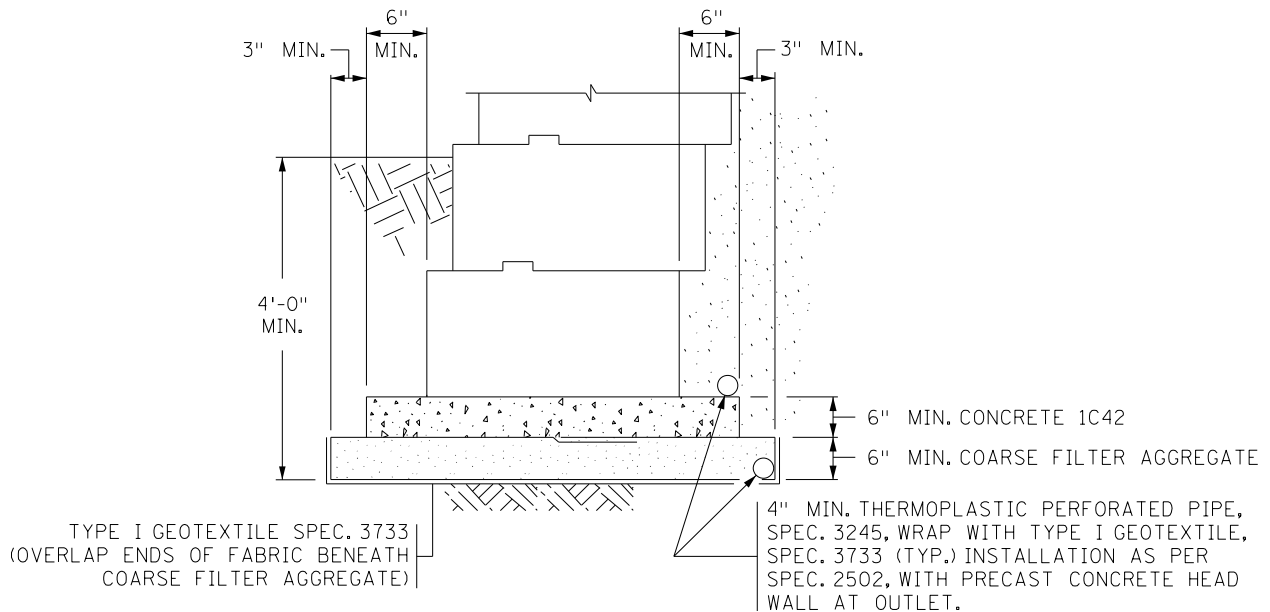


Figure 2411-6 - Composite leveling pad detail (gravity walls only)

- P. No drainage systems other than what is required for the wall and highway drainage shall be placed within the reinforced soil zone. The wall design shall include necessary details or design modifications to accommodate the drainage system. The placement of the drainage system shall occur only during construction backfilling of the wall.
- Q. PMBW's with soil reinforcement shall include a drainage system on top of the concrete leveling pad at the interface of the reinforced and the retained soil (see Figures 2411-2).

Gravity PMBW's with a concrete only leveling pad shall include a drainage system on top of the concrete leveling pad (see Figure 2411-5)

Gravity PMBW's with a composite leveling pad shall include a drainage system on top of the concrete portion of the leveling pad and at the bottom of the coarse filter aggregate (see Figure 2411-6).

The drainage system shall consist of perforated pipe per MnDOT 3245 wrapped with a type I geotextile per MnDOT 3733. The pipe shall be placed such that water drains freely from the pipe, typically a 1% grade and 3 foot minimum radius bends. Provide outlets as required due to expected flow rate with a maximum spacing of 150 feet. Outlet the drainage system through the slope in front of the wall with a concrete headwall per MnDOT Standard Plate 3131 or into a drainage structure (see Figure 2411-1 and 2411-2).

The designer shall take into account the location of wall drainage systems in the layout and step locations of wall leveling pads and to ensure the wall drainage system is compatible with the leveling pad step locations. The shop drawings for each wall shall denote the location of the drainage system components, including the station of each outlet penetration through the wall and whether the flow is outletted through the slope in front of the wall or into a drainage structure.

- R. The ground on the exposed side of the wall shall slope away from the wall per Figure 2411-1 or 2411-2. The surface water on the backfill side shall be drained away from the wall to prevent runoff next to the facing blocks and ponding above the reinforced zone or backfill zone. Surface run-off shall not be designed to pass over the top of the wall. A wall coping, drainage system, or a properly designed ditch shall be used to carry run-off water along the wall to be properly deposited.
- S. PMBW's with soil reinforcement that are considered to support traffic (see Item H for criteria for supporting traffic) shall have an impervious layer (geomembrane) placed below the roadway surface to prevent any surface water from entering into the wall system and degrading the soil reinforcement. The geomembrane requirement is applicable to all wall systems supporting a roadway unless the prequalified supplier list clearly and specifically states that the wall system is exempted from this requirement. The impervious layer shall be installed at the top of the reinforced zone and shall have a minimum coverage length measured perpendicular to the wall face of at least the length of soil reinforcement plus 3 feet. The impervious layer shall be drained properly to prevent ponding and shall be sloped at 20 (H) to 1 (V) away from the wall unless otherwise approved by the engineer. Contractor submitted shop drawings shall include specific details and dimensions addressing the placement of the geomembrane, soil reinforcement elements, drainage system details, pavement materials, and traffic barrier moment slab (as applicable) at the top of the wall. Notify the project engineer of any required perforations in the geomembrane (if required) for the installation of fence posts, etc., and provide details for sealing around said perforations.
- T. For gravity walls three zones have been identified when utilities are near walls. The zones are referenced in Figure 2411-7.

For purposes of this specification, utilities are defined as any utility requiring a permit as well as State owned utilities and stormwater structures. Dry utilities are defined as facilities that do not carry fluid, examples include power and telephone. Wet utilities are those facilities that carry fluid, but do not include roadway edge drains or subsurface drains associated with the bridge or wall structure.

All wet utilities in zones 1, 2, and 3 require gasketed pipe or joints designed to prevent leakage due to pressurized flow. Casing, where required, shall meet MnDOT requirements for casing. Refer to the *MnDOT Policy Statement on Accommodation of Utilities on Highway Right of Way* for casing requirements. The following constraints for utilities in any of the three zones describe requirements for parallel installations, skewed, and perpendicular crossings. The restrictions on utility placement are dependent on their position relative to the structure.

In zone 1, during the construction of a new PMBW, utilities are to be placed outside of zone 1 when possible. If relocation is impractical or impossible, new utilities to be installed and existing utilities to remain in place require Bridge Office approval. However, no new wet utilities may be placed longitudinally (i.e., parallel to the PMBW) in zone 1. New utilities may be placed transversely (i.e., perpendicular to the PMBW) to the structure in zone 1, with Bridge Office approval of proposed design and construction sequencing. All pipes and conduits must be designed for any surcharge loading due to structure bearing pressures and possible resulting deformations. All wet utilities must be cased in zone 1; if facilities are too large or cannot be cased effectively, a site specific design is required. Utility owners may choose to case dry utilities to allow for future maintenance or access; however, casing is not required for dry utilities. Future open trench excavation is prohibited in order to protect the wall from potential undermining. Other forms of excavation may be permitted in this zone with Bridge Office approval.

In zone 2, new utilities may be installed. Excavation for maintenance or replacement will be permitted with proper sheeting and shoring; no unbraced open cuts will be allowed. Any utilities installed in zone 2 must follow the same casing requirements as in zone 1, with the exception of stormwater facilities. Encasement is required for stormwater pipes with velocities greater than 10 fps, or pipe diameters 54 inches and larger, or pipe materials other than those shown in Standard Plate 3006. Other stormwater facilities need not be cased in zone 2 unless required by contract specifications or as recommended by the Bridge Office.

In zone 3, there are no restrictions for utility installations except for the requirement to use gasketed pipe as needed for wet utilities.

If these conditions cannot be met, options include relocation or replacement of the utility or placing the substructure on deep foundations. However, pressurized wet utilities placed in zone 1 must be cased due to the risk of significant soil loss. In lieu of casing, a risk analysis approved by the Regional Bridge Construction Engineer is acceptable for PMBW's on deep foundations.

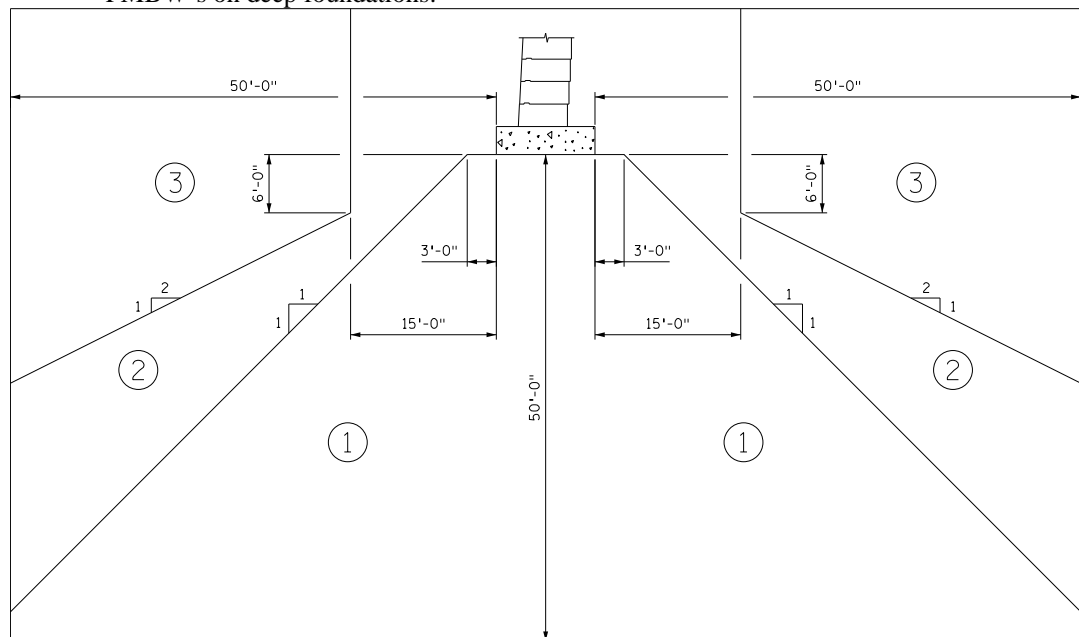


Figure 2411-7 Utilities Near Foundations for PMBW's with Soil Reinforcement

- U. For reinforced walls five zones have been identified when utilities are near walls. The zones are referenced in Figure 2411-8.

For purposes of this specification, utilities are defined as any utility requiring a permit as well as State owned utilities and stormwater structures. Dry utilities are defined as facilities that do not carry fluid, examples include power and telephone. Wet utilities are those facilities that carry fluid, but do not include roadway edge drains or subsurface drains associated with the bridge or wall structure.

In zone ①, during the construction of a new PMBW, utilities are to be placed outside of zone ① referenced in Figure 2411-8 when possible. If relocation is impractical or impossible, new utilities installed in zone ① and existing utilities in zone ① require MnDOT approval. However, no new wet utilities (except for utilities that are used for wall drainage) may be placed longitudinally (i.e., parallel to the wall) in zone ① of a new or existing wall. New utilities placed in Zone ① may be placed transversely (i.e., perpendicular to the wall) in zone ① of an existing wall, with Bridge Office approval of proposed design and construction sequencing. All pipes and conduits must be designed for any surcharge loading due to soil or structure bearing pressures and possible resulting deformations. All wet utilities (except for utilities that are used for wall drainage) must be cased in zone ①; if facilities are too large or cannot be cased effectively, a site specific design is required. Utility owners may choose to case dry utilities to allow for future maintenance or access; however, casing is not required for dry utilities. Future open trench excavation is prohibited in order to protect the wall from potential undermining. Other forms of excavation may be permitted in zone ① with Bridge Office approval.

In zone ②, new utilities may be installed. Excavation for utility maintenance or replacement is permitted with proper sheeting and shoring; however, unbraced cuts are not allowed. All utilities installed in zone ② must follow the same casing requirements as in zone ①, except that encasement is required for stormwater pipes with velocities greater than 10 fps, pipe diameters 54 inches and larger, or pipe materials other than design 3006 RCP.

In zone ③, future access through excavation areas is permissible and casing is not required for wet or dry utilities.

In zone ④, future access through the excavation is permissible and casing is not required for dry utilities. Use gasketed pipe as needed for wet utilities. When excavating within this zone, install shoring or sheet piling, without damaging the geomembrane, to protect the reinforced zone

In zone ⑤, utilities are to be placed outside of the zone when possible. Existing utilities cannot remain in place as they will be disturbed during construction. New utilities may be installed in zone ⑤ with Bridge Office approval provided that they are placed during the original construction of the wall and are not wet utilities placed longitudinally. All wet utilities placed transversely must be cased and if utilities are too large or cannot be cased effectively, a site specific design is required. Casing is not required for dry utilities; however utility owners may choose to case dry utilities to allow for future maintenance or access. Future excavation is prohibited.

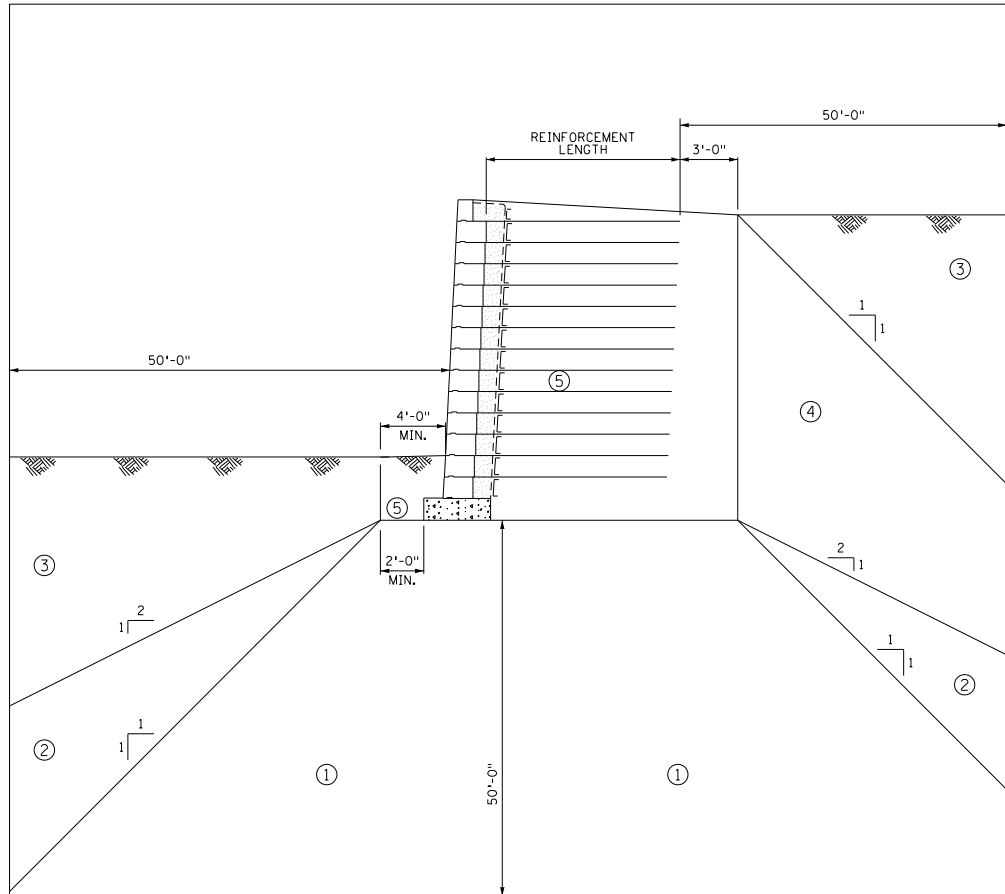


Figure 2411-8 Utilities Near Foundations for PMBW's with Soil Reinforcement

- V. No drilling or driving of posts (sign, guardrail, etc.) or other roadside hardware in the reinforced zone shall occur after placement of the reinforced soil. If such roadside hardware is required, the design and plans shall include details such as sleeves to accommodate it. Refer to section S-1.4F regarding penetration of the geomembrane for fence posts.
- W. Coping details shall include joints no more than every 20 feet along the length of the wall. Locate coping joints to align with the joints between the blocks.
- X. Stability Analysis shall be conducted. All appurtenances behind, in front of, under, mounted on, or passing through the wall such as drainage structures, utilities, noise wall, barrier and moment slab, footings, traffic, slope surcharge or other appurtenances shown on the plans shall be accounted for in the stability analysis. For more detailed stability analysis requirements see Section L.8
- Y. The wall parapet or freeboard height shall be a maximum of 2' measured from the finished ground line at the top of wall to the top of block or coping. Walls with parapets shall be designed to resist the appropriate pedestrian and/or railing loads specified in the AASHTO LRFD Bridge Design Specifications. Parapet units shall be rigidly connected together to prevent overturning and separation.

- Z. For walls that include pedestrian railings or barriers, the Contractor shall coordinate all design and detailing, including the connection between the railing and the wall, and all construction procedures, with the wall system supplier. All of the necessary details shall be included in the shop drawings. It is also the responsibility of the Contractor to ensure that all railings including connection details, are constructible and compatible with the specific PMBW system and meet the plans, design requirements and specifications for the project. No payment shall be made for additional rail quantities or work.

Pedestrian railings and connections attached to units shall be designed to resist loads per AASHTO LRFD Bridge Design Specifications, Article 13.8. The units shall be designed to fully resist the pedestrian live load with no contribution of the load carried by the earth reinforcement.

- AB. Gravity PMBW's with open core "bin" type units shall be designed according to AASHTO LRFD Bridge Design Specifications, Articles 11.11.4.3 and 11.11.4.4 with 100% of the soil-fill inside the units for applied bearing and a maximum of 80% of the soil-fill inside the units as effective in resisting overturning. The soil-fill inside the units shall meet the requirements of MnDOT Spec 3137 CA-3 with Class A aggregates (crushed quarry aggregates) and a friction angle of 36 degree's shall be assumed for design.
- AC. At a minimum, sliding and eccentricity shall be checked between all block interfaces below grade, at the top and bottom of the concrete portion of the leveling pad, and at all transitions in block sizes (depth) above grade. Bearing shall be checked at the top and bottom of the concrete portion of the leveling pad. The eccentricity limit at the interface between the bottom block and the concrete portion of the leveling pad and the interface between the concrete portion of the leveling pad and the base soil shall be $L/4$. If the concrete portion of the leveling pad is 18" or greater the eccentricity limit at the interface between the bottom block and the concrete portion of the leveling pad shall be $9L/20$. The eccentricity limit at the interface between blocks shall be $9L/20$.
- AD. PMBW walls with earth reinforcement may utilize the friction between the lowermost PMBW unit and the leveling pad to reduce the tributary lateral load area on the lowest geogrid layer. The lowest geogrid must be placed on the top of the first row of PMBW units, or lower, to utilize this base friction. The tributary load height for the lowermost geogrid may be measured from halfway between the geogrid above it to halfway to the base of the wall; if the facing element-to-leveling pad interface strength demonstrates sufficient lateral resistance. Sliding resistance at the bottom of the PMBW unit and the cast-in-place concrete leveling pad shall be calculated with a strength limit resistance factor, ϕ , of 0.9. The factored sliding resistance shall be greater than the factored lateral load computed on the tributary height from the base of the wall to one-half the distance to the lowest geogrid layer.
- AE. Stacking blocks front to back to achieve a greater wall depth is not permitted.
- AF. The Resistance Factors, Φ , for Tensile and Pullout Resistance for PMBWs shall be according to Table 2411-1:

Table 2411-1: Tensile and Pullout Resistance Factors

Reinforcement Type and Loading Condition		Resistance Factor Φ
Geogrid reinforcement and connector tensile resistance	Static loading	0.90
	Combined static/traffic barrier impact ^(A) - PET Geogrid	0.75
	Combined static/traffic barrier impact ^(A) - HDPE Geogrid	1.00
Geogrid reinforcement pullout resistance	Static loading	0.90
	Combined static/traffic barrier impact PET Geogrid ^(A)	1.00
	Combined static/traffic barrier impact HDPE Geogrid ^(A)	1.00
Notes: (A.) Combined static/traffic barrier impact resistance factors are not presented in the AASHTO LRFD Bridge Design Specifications.		

- AG. Traffic barriers and moment slabs shall meet the requirements of Test Level 4 (TL-4). There are three possible methods for approval of traffic barriers:
- a. Test Method: The barrier, connection, wall, backfill, and soil reinforcement shall be crash tested as a system per NCHRP Report 350 or MASH (08) requirements.
 - b. Analytical Method: The FHWA allows the use of bridge barrier designs that are similar to a crash tested design based on an analytic comparison using the methodology outlined in Section 13 of the AASHTO LRFD Bridge Design Specifications. The FHWA policy and an example comparison can be obtained at:

http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/ctrmeasures/bridge_railings/

For either method (a) or (b), FHWA acceptance is necessary and shall include a cross section detail of the barrier and slab, including all dimensions and reinforcement sizes and spacing requirements. Calculations validating the AASHTO LRFD Bridge Design Specifications Article 13 provisions must be included. No variation in the details will be allowed without written approval of the FHWA.

- c. Test and Analytical Method: The barrier shall be crash tested per NCHRP Report 350 or MASH (08) requirements and connection, moment slab, wall, reinforced soil and soil reinforcement shall be designed analytically per NCHRP Report 663 “Design of Roadside Barrier Systems Placed on MSE Retaining Walls” and this specification.

Regardless of what barrier approval method is used, traffic barriers and moment slabs shall be detailed to allow at least 2 inches of horizontal movement prior to making contact with PMBW block. The traffic barrier shall also meet the following requirements:

The barrier is cast integrally with a reinforced concrete slab that is placed on reinforced soil (does not sit overtop of the wall). The slab shall be at least 12 inches thick and have a minimum width (normal to the wall alignment) of 8 feet and shall meet the requirements of NCHRP report 663 “Design of Roadside Barrier Systems Placed on MSE

Retaining Walls". There shall be a minimum clearance of 2 inches from the back of slab to the back of the wall facing block or coping.

All joints in the moment slab must be doweled to maintain continuity. The minimum spacing between the dowel joints in a moment slab and the barrier shall be 35 feet for TL-4 and the moment slab shall be continuously reinforced between the joints.

**AH. Strength and Service Limit States for PMBW's with and without Traffic Barriers
 Loads and Load Factors for Strength and Service**

Table 2411-2: Maximum and Minimum PMBW Load Factors

Force Effect, Q_i	Load Factor γ_i	
	Max	Min
Vehicular Live Load (LL) for External Stability*	1.75	
Vehicular Live Load (LL) for Internal Stability*	1.35	
Dead Load of Structural Components and Nonstructural Attachments (DC)	1.25	0.90
Dead Load of Wearing Surfaces and Utilities (DW)	1.35	0.65
Horizontal Earth Pressure, Active (EH)	1.50	0.90
Vertical Pressure from Dead Load of Earth Fill (EV)	1.35	1.00
Earth Surcharge Load (ES)**	1.50	0.75

* There are no maximum or minimum values. Either apply or do not apply the transient live load with the single load factor.

**Earth Surcharge Loads such as stockpiles of fill shall have a load factor of 1.5. The minimum surcharge load to account for roadways, snow loads, future maintenance operations, or future re-grading shall use the maximum Earth Vertical (EV) load factor of 1.35 and minimum load factor of 1.0.

The vertical component of stress, σ_v used in the horizontal load calculation, for soil reinforced walls, consists of several loads including, Earth Vertical, Dead Load, Dead Load Surcharge, and Live Load Surcharge. An equation for the factored vertical component of stress,

σ_{vf} in ksf shall be taken as:

$$\sigma_{vf} = \gamma_p (\gamma H + \Delta\sigma_{vDL} + \Delta\sigma_{vLL}) \quad \text{(Equation 1)}$$

where:

γ = unit weight reinforced soil (0.120 kcf)

H = height of soil column behind wall (ft.)

$\Delta\sigma_{vDL}$ = Dead Load Surcharge (ksf)

$\Delta\sigma_{vLL}$ = Live Load Surcharge (ksf) where $\Delta\sigma_{vLL} = 2\gamma$

γ_p = the applicable load factor from Table 2411-2

The corresponding factored horizontal component of stress σ_{hf} in ksf, acting on the wall shall be taken as:

$$\sigma_{hf} = \gamma_p \Delta\sigma_h + k_r (\sigma_{vf}) \quad \text{(Equation 2)}$$

where:

- γ_p = the applicable load factor from Table 2411-2.
- $\Delta\sigma_h$ = horizontal stress at reinforcement level resulting from any applicable concentrated horizontal load as specified in AASHTO LRFD Bridge Design Specifications Article 11.10.10 (ksf), or loads from signs, noise wall, etc.
- k_r = horizontal pressure coefficient (dim.)
- σ_{vf} = factored vertical component of stress in (ksf) from Equation 1.

Pullout Resistance Load Combinations for Strength and Service Limit States

For pullout resistance, the loads Earth Vertical, EV, Dead Load Surcharge, $\Delta\sigma_{vDL}$ and Live Load Surcharge, $\Delta\sigma_{vLL}$ shall be defined and applied according to Table 2411-3.

Table 2411-3: Load Definitions and Applications Related to Pullout Resistance for Strength and Service Limit States

Load	Pullout Resistance
Earth Vertical, <i>EV</i>	May be included in the pullout resistance calculations.
Dead Load Surcharge, (Due to barrier and attachments) $\Delta\sigma_{vDL}$	Shall be excluded from the pullout resistance calculations.
Live Load Surcharge, (Traffic loading) $\Delta\sigma_{vLL}$	Shall be excluded from the pullout resistance calculations.

The PMBW strength loading and design shall include live load surcharge resulting from traffic loads. The live load surcharge for this case shall be equivalent to a 2 foot soil surcharge. (Use the load factors for Vehicular Live Load from Table 2411-2)

The vertical component of stress used in the pullout resistance calculations σ_v^* in ksf may be taken as:

$$\sigma_v^* = \gamma H \quad \text{(Equation 3)}$$

where:

- H = height of soil column behind wall, i.e., to the top of wall (ft.)
- γ = unit weight of reinforced soil (0.120 kcf)

AI. Extreme Event II Limit State for Walls Supporting Traffic

Walls supporting traffic shall include computations showing that the Extreme Event II limit state due to traffic impact has been met. The requirements for the Extreme Event II limit state consist of AASHTO LRFD Bridge Design Specifications, FHWA, NCHRP Report 663 and MnDOT requirements.

The total factored force effect, Q shall be taken as:

$$Q_i = \sum \gamma_i Q_i \leq \phi R_n \quad (\text{Equation 4})$$

where:

Q_i = force effects from loads specified herein

γ_i = load factors specified in Table 2411-5

R_n = nominal resistance

ϕ = resistance factor specified in Table 2411-1 applied to nominal resistance

1. Loads and Load Factors for Extreme Event II

The PMBW design for the Extreme Event II limit state shall include static loads due to horizontal earth pressure and dead load due to the barrier and attachments and a dynamic load due to the traffic impact. For the Extreme Event II case, the live load surcharge effects on the reinforcement are incorporated in the reinforcement loads presented in Table 2411-4. As a result for the Extreme Event II case the live load surcharge is not included again as an additional load. The loads for the Extreme Event II limit state are defined as:

a. Horizontal Earth Pressure

The static load due to horizontal earth pressure shall be obtained from the static earth pressure times the tributary area of the reinforcement unit.

b. Barrier and Attachments

The weight of the barrier and attachments above the top of the wall, such as noise walls, signs, etc., shall be included in the reinforcement tensile load calculations and treated as a dead load. For the vertical component of the stress due to dead load surcharge the load distribution width (normal to the wall alignment) shall be equal to the width of the bottom of the barrier denoted as "b_b" in Figure 2411-9.

The factored vertical component of stress, σ_{vf} consists of Earth Vertical and Dead Load due to the barrier and attachments. An equation for the factored vertical component of stress, σ_{vf} in ksf shall be taken as:

$$\sigma_{vf} = \gamma_p (\gamma H + \Delta\sigma_{vDL}) \quad (\text{Equation 5})$$

where:

γ = unit weight of reinforced soil (0.120 kcf)

H = height of reinforced soil column behind wall (ft.)

$\Delta\sigma_{vDL}$ = Dead Load Surcharge (ksf)

γ_p = the applicable load factor from Table 2411-5

The corresponding factored horizontal component of stress σ_{hf} in ksf, acting on the wall shall be taken as:

$$\sigma_{hf} = \gamma_p \Delta\sigma_h + k_r (\sigma_{vf}) \quad \text{(Equation 6)}$$

where:

- γ_p = the applicable load factor from Table 2411-5.
- $\Delta\sigma_h$ = horizontal stress at reinforcement level resulting from any applicable concentrated horizontal load as specified in AASHTO LRFD Bridge Design Specifications Article 11.10.10 (ksf), or loads from signs, noise wall etc.
- k_r = horizontal pressure coefficient
- σ_{vf} = factored vertical component of stress in (ksf) from Equation 5.

c. Horizontal Traffic Impact Load

The horizontal traffic impact load shall be distributed to the upper 2 layers of soil reinforcement, as specified in Table 2411-4.

Table 2411-4: Maximum Nominal Rupture and Pullout Impact Loads

Layer	Rupture impact load	Pullout impact load
1 st Top layer	2300 lb/ft	1300 lb/ft
2 nd Top layer	600 lb/ft	600 lb/ft

d. Extreme Event II Load Factors

For the loads included in Extreme Event II limit state the following load factors shall be used.

Table 2411-5: Maximum and Minimum PMBW Load Factors for Extreme Event II.

Force Effect, Q_i	Load Factor γ_i	
	Max	Min
Vehicular Collision Force (CT)	1.00	NA
Dead Load of Structural Components and Nonstructural Attachments (DC)	1.25	0.90
Dead Load of Wearing Surfaces and Utilities (DW)	1.35	0.65
Vertical Pressure from Dead Load of Earth Fill (EV)	1.35	1.00

NA= Not Applicable

2. Pullout Resistance for Extreme Event II

For pullout resistance, the loads Earth Vertical, EV and Dead Load Surcharge, $\Delta\sigma_{vDL}$ shall be defined and applied according to Table 2411-6. As described, permanent barrier and attachment loads shall be included in the pullout loading calculation.

Table 2411-6: Load Definitions and Applications Related to Pullout Resistance for Extreme Event II.

Load	Pullout Resistance
Earth Vertical, <i>EV</i>	Shall be included in the pullout resistance calculations.
Dead Load Surcharge, (Due to barrier and attachments) $\Delta\sigma_{vDL}$ (See “a” below)	Shall be excluded from the pullout resistance calculations.
Live Load Surcharge, (Traffic loading) $\Delta\sigma_{vLL}$	Shall be excluded from the pullout resistance calculations.

- a. The pullout resistance, the vertical component of stress used in the pullout calculations σ_v^* in ksf may be taken as:

$$\sigma_v^* = \gamma H \quad \text{(Equation 7)}$$

where:

- H = height of soil column behind wall, i.e., to the top of wall (ft.)
 γ = unit weight of reinforced soil (0.120 kcf)

- b. Resistance Factors for Extreme Event II

The resistance factors shall be taken from the resistance factor Table 2411-1

For geosynthetic reinforcements, the nominal strength used to structurally size the reinforcements to resist the impact load may be increased by eliminating the reduction factor for creep, as allowed for the internal stability in seismic design.

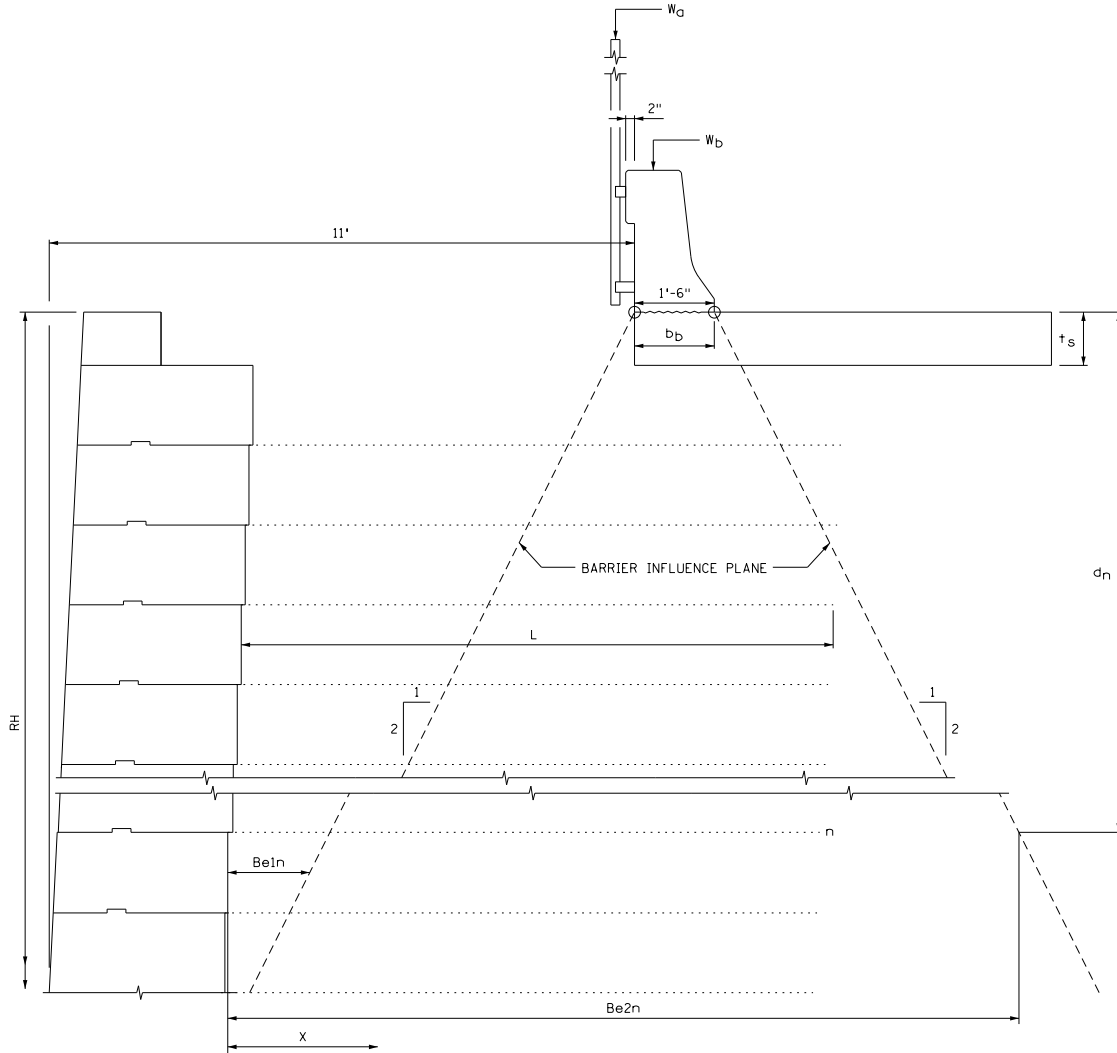


Figure 2411-9 Distribution of loading from barrier, moment slab and attachments used in reinforcement tensile load calculations for Extreme Event II.

S-65.2 **AESTHETIC REQUIREMENTS**

This work consists of constructing textured concrete and colors on all exposed areas of the modular block wall. The work shall be performed in accordance with the applicable provisions of MnDOT 2401, the Plans and the following:

- A. The architectural design texture will be selected by the Engineer/Owner based upon standard textures provided by the Contractor's retaining wall manufacturer. Texture shall be applied to the exposed wall faces, including the front face, back face, and end faces.
 1. Maximum pattern relief shall be 2 inches in depth.
 2. The block and cap block shall be textured as required by the design theme and based on the Owner's selection.
- B. Architectural Surface Finish (Multi Color) shall be a multi-colored stain application.
 1. The simulated stone formed concrete surfaces shall be stained with the same stain products and application requirements as other retaining walls within project.
 2. Architectural Surface Finish (Multi Color) shall also include an anti-graffiti coating applied to the stained surface. The contractor shall provide architectural details,

including surface pattern and texture, joint layout and details, and surface finish and color.

- C. Include segments of Architectural Concrete Texture on Elevation Views described in Section S-1.3C below.

S-65.3 **SUBMITTAL REQUIREMENTS AND MnDOT QUALITY ASSURANCE (QA) REVIEW**

Shop Drawing and Calculation Submittal:

The Contractor shall be responsible to review all available geotechnical investigation reports, and the Contractor's signature on the proposal shall certify that this review has been performed and that any relevant geotechnical information has been provided to the designer and PMBW System Supplier of the PMBW's.

For each wall the PMBW system supplier shall submit two sets of complete, certified and independently checked design computations, five sets of certified shop drawings, and one "PMBW Design Certification Letter" to the Engineer for quality assurance (QA) review allowing at least 30 calendar days for review before beginning the fabrication and construction of the wall system. The shop drawings shall comply with the design plans, and include all details, dimensions, quantities and any information required to lay out and construct the wall.

The submitted information shall include, but not be limited to, the following:

- A. Plan shop drawing for the full length of EACH wall containing the following:
1. Beginning and ending stations of wall relative to roadway centerline and any changes in wall alignment.
 2. Locations of bridges, piles, existing and other proposed retaining walls, slopes or other objects.
 3. Locations of all drainage structures, pipes, signs, light poles and other conflicting existing and planned structures or obstructions as provided in the contract documents. Additional typical sections shall be provided whenever changes happen to the wall such as the addition or change in moment slab or coping, transition to approach span of bridge, etc.
 4. Limits of soil reinforcement and location where changes in length and/or size of reinforcement occur.
 5. Location of existing and planned utilities as provided in the contract documents.
 6. Existing and proposed ground elevations.
 7. Limits for any construction constraints such as right-of-way, easements, staged construction, etc.
 8. Horizontal and vertical curve data for curved walls.
 9. Limits of bottom of wall and top of wall, for wall system submitted.
- B. Cross section drawing for EACH wall and design change identifying:
1. Location and batter of the wall face.
 2. Reinforcement type, dimensions, and vertical spacing.
 3. Wall treatment, including impervious geomembrane, traffic barrier(s), cast-in-place moment slab (including potential interference with soil reinforcement), runoff collection, subsurface and surface drainage pipes & structures.
 4. Elevation of leveling pad.
 5. Depth of wall embedment below finished grade.
 6. Limits of excavation and backfill.
 7. Block joint cover (geotextile filter fabric) location and generic material type.
- C. Elevation view in equal horizontal and vertical scale for the full length of EACH wall showing:

1. Top and bottom wall elevations, in-place ground line, and finished grade elevation at top and bottom of wall.
 2. Details and dimensions for foundation and leveling pad, including steps and setbacks in the leveling pad.
 3. Location of drainage structures and construction details around these structures. Locations and details of any penetrations in the facing blocks,
 4. Dimension, grade, and location of reinforcements.
 5. Maximum applied bearing pressure (Strength and Service) under the wall for each reinforcement length and owner specified Service and Strength nominal bearing resistance.
 6. Manufacturer name, block type and “depth” dimension for each block.
 7. Block configuration for standard and special cut blocks.
 8. Summary of quantities for each wall.
 9. Block dimensions.
- D. Horizontal and vertical curve data affecting the wall. Match lines or other details to relate wall stationing to centerline stationing.
- E. Connection details and dimensions between facing blocks, embedded devices and soil reinforcement.
- F. Details for construction, including but not limited to:
1. Termination at cast-in-place structures and any adjacent slope construction.
 2. Connection details and reinforcement placement requirements around all obstructions including light and sign supports.
 3. Details for constructing blocks lock and soil reinforcement at corners.
 4. ALL internal drainage pipes, systems, and facilities.
 5. Other details such as coping or barrier, guardrail, fencing, or noise wall.
 6. Impervious geomembrane to block connection detail, and construction sequencing notes.
 7. Location of ALL subdrains and outlets of the internal drainage system.
 8. Locations and details of any required penetrations in the blocks.
 9. Locations and placement details including minimum overlap(s) dimension(s), for geotextile filters.
- G. Architectural details including surface pattern and texture, joint layout and details, and surface finish and color. (See the Project Aesthetic Guidelines for requirements)
- H. Name of PMBW System Supplier and their QA/QC documents.
- I. Test wall construction and details, when specified.
- J. General notes required for constructing the wall:
1. Design properties and assumptions regarding material properties, material qualities and construction method.
 2. Wall layout information.
 3. Requirements for reinforced soil compaction.
 4. Materials used in construction.
 5. Geotextile filter fabric locations
 6. Reinforcement handling, storage, preparation, and placement information and requirements.
 7. Angle of internal friction used for the design.

- K. Copy of geotechnical report showing:
1. Plan view of sampling and field-testing locations across project site.
 2. Subsurface profile across project site.
 3. Boring logs.
 4. All laboratory test data and results.
 5. Engineering properties of the foundation soil, the reinforced soil, and the retained soil as appropriate to ensure the proper long-term performance of the PMBW structure.
 6. Required soil modification, if any
 7. Overall stability analysis.
 8. Service and Strength bearing pressure beneath the wall footing and the reinforced soil mass.
 9. Settlement analysis and anticipated differential settlement for the foundation soil beneath the wall and the reinforced soil mass.
 10. Groundwater, any free water conditions, anticipated high water conditions and any required drainage schemes.
 11. Recommendations concerning items that may be appropriate to ensure the proper long-term performance of the PMBW structure.
 12. Internal friction angle and unit weight of the retained soil.

- L. Copy of calculations showing:
1. Table of contents page for design computations.
 2. List of all assumptions used for all calculations and rationale for each assumption.
 3. Design notes page with explanation of symbols and details of any computer programs used. Summary table of design parameter inputs for computer program. Tabulate all calculated capacity to demand ratios to ensure internal, external and compound stability.
 4. Block design including the design of reinforcement connectors and internal reinforcement.
 5. Calculations and test results verifying the design life of the soil reinforcement.
 6. Computed applied bearing pressure and factored bearing resistance beneath the wall and the reinforced soil mass assuming an estimated total settlement of 1 inch. The computed applied bearing pressure shall be compared explicitly to the owner specified factored bearing resistance.
 7. Barrier/slab detail above wall, when applicable, including all reinforcement.
 8. Stability analysis shall include internal and external stability. External stability consists of evaluating sliding, limiting eccentricity (overturning), and bearing resistance. All appurtenances behind, in front of, under, mounted on, or passing through the wall such as drainage structures, utilities, noise wall, barrier and moment slab, footings, traffic, slope surcharge or other appurtenances shown on the plans shall be accounted for in the stability analysis.

Overall stability checks and calculations shall be conducted by the County's Geotechnical Engineer.

The wall system supplier is not required to perform a compound stability check.

9. Provide a copy of calculations showing magnitude, direction, and location of the forces from any external loads such as traffic surcharge, traffic barrier, moment slab and attachments including impact loading, lighting, signs, bridges, slope surcharge, etc. The design and detailing of the wall system shall take into account these external loads. Walls supporting traffic barriers shall provide complete details and calculations showing conformance with the requirements listed above for Extreme Event II traffic impacts.

Provide connection details for all reinforcements interfered with by obstructions. Provide design computations demonstrating that the details and wall system meets all design and construction requirements in the obstruction area.

10. A set of project-typical hand calculations verifying computer generated output.

11. Verification of the design properties/parameters including results from creep, durability, construction induced damage, junction strength tests, and any other applicable tests from MnDOT pre-approval documentation. Indicate the appropriate standardized test designation followed for each test.

12. Friction angles used in design for reinforced and retained soil.

13. Soil reinforcement length based on overall stability.

All design calculations shall be based on assumed conditions at the end of the design life.

M. Indicate the following performance requirements:

1. Anticipated and tolerable movement of the wall for both horizontal and vertical settlements or movements both along and perpendicular to wall.

2. Tolerable block movement.

3. Monitoring and measurement requirements, if any.

N. All other appropriate design computations.

O. As built drawings: As-built profiles and plans shall be submitted. Unless otherwise specified, the coordinates shall be in the 1996 adjustment to the UTM15N North American Datum (NAD83).

Shop Drawing and Calculation Submittal Review:

The above information shall be submitted to the Engineer for QA review. MnDOT's QA review of the computations and shop drawings shall not relieve the Contractor of sole responsibility for the wall design, details, computations, and the submission of complete shop drawings for the accurate construction and performance of the wall. The Contractor shall be solely responsible for ensuring that the information submitted by the wall designer and the PMBW System Supplier is in accordance with all contract plans and shall contain all material, fabrication and construction requirements for erecting the wall system complete in place. (For more information about routing and review of submittals see Technical Memorandum No.: 08-11-MRR-02)

S-65.4 MATERIALS

All Materials for the wall system shall conform to requirements of these Special Provisions.

A. Acceptance of Materials:

Unless stated otherwise, at least 3 weeks prior to construction of the PMBW the Contractor shall furnish the Engineer Certificates of Compliance for each material listed below, certifying that all materials comply with the applicable contract specifications, including a copy of all test results. All tests shall be performed by an independent testing laboratory. A Certificate of Compliance shall be provided by the Contractor for each material source. A new Certificate of Compliance shall be provided any time the Contractor changes the source of materials.

Acceptance will be based on the Certificate of Compliance, accompanying test reports, visual inspection, and/or tests ordered or performed independently by the Engineer. The Engineer retains the right to order or perform independent tests to verify information.

B. **Reinforced and Backfill Soil:** Soil used in the reinforced and backfill zones shall comply with MnDOT 3149 and shall meet the following additional requirements:

1. Contractor Certificate of Compliance: At least 3 weeks prior to construction of the PMBW the Contractor shall furnish the Engineer a Certificate of Compliance certifying that reinforced or backfill soil complies with the applicable contract specifications listed below, including a copy of all test results. A Certificate of Compliance shall be provided by the Contractor for each source at a rate of 1 per 50,000 yd³. A new Certificate of Compliance shall be provided any time the Contractor changes the source of the reinforced or backfill soil materials or the material within a given source changes.

a. Screened virgin aggregate material meeting the requirements of 3137.2B3, Class C.

b. Angle of Friction Requirements:
 Determine angle of friction with direct shear testing (MnDOT Lab Manual method 1309) assuming consolidated drained conditions. Tests to be performed on portion of sample passing the #10 sieve and compacted at optimum moisture content to 95% determined by MnDOT Lab Manual method 1305.

Table 2411-7: Friction Angle:

TEST	SPEC. RANGE	TEST METHOD	TESTING RATE
Angle of Friction	≥ 34 Degrees	MnDOT Lab Manual Method 1309	1/50,000 cu. yd. per source

c. Table 2411-8: Electrochemical Requirements of Reinforced or Backfill Soil:

Base Polymer	TEST	SPEC. RANGE	TEST METHOD	TESTING RATE
High Density Polyethylene (HDPE) and Polypropylene (PP)	pH	3 ≤ pH	AASHTO T 289	1/50,000 cu. yd. per source
Polyester (PET)	pH	3 ≤ pH ≤ 8	AASHTO T 289	1/50,000 cu. yd. per source

2. Contractor Certificate of Compliance for Sieve Analysis: At least 3 weeks prior to construction of the PMBW the Contractor shall furnish the Engineer a Certificate of Compliance certifying that reinforced or backfill soil complies with the applicable contract specifications listed below, including a copy of all test results. Certificate of Compliance for Sieve Analysis shall be provided by the Contractor for each source at a rate of 2 per 50,000 yd³. A new Certificate of Compliance shall be provided any time the Contractor changes the source of the reinforced or backfill soil materials or the material within a given source changes.

a. Sieve Analysis Requirements:

Sieve analysis tests shall be performed according to MnDOT lab manual methods 1202 and 1203 or in the field according to MnDOT Grading and Base Manual method 5-692.215 and meet the requirements in Table 2411-9 and Table 2411-10.

Table 2411-9 Reinforced or Backfill Soil Sieve Analysis Requirement

Sieve Size	Percent Passing
¾ in	100

Table 2411-10 Reinforced Soil or Backfill Sieve Analysis Ratio

Percent Passing Ratio	Requirement
No. 40 / No. 10	0 – 0.65
No. 200 / No. 10	0 – 0.10

C. **Soil Reinforcement:** At least three weeks prior to the start of construction the Contractor shall furnish the Engineer a Certificate of Compliance certifying that all soil reinforcement complies with the applicable contract specifications listed below, including a copy of all test results. A Certificate of Compliance shall be provided with each additional shipment of reinforcement and any time the Contractor changes the source of reinforcement.

Geogrid reinforcement shall be oriented, drawn, long chain high-density polyethylene containing stabilizers and inhibitors added to the base plastic for resistance to ultraviolet and heat degradation. Geogrid reinforcements and their connection devices shall be the same connection devices and reinforcement as approved by MnDOT in the pre-qualification application of the MSE wall system. Geogrid reinforcement manufacturer’s certification shall include ultimate tensile strength ASTM D6637 quality assurance test results, at a minimum rate equal to, or greater than, the sampling rate defined in Table 2411-11 (ASTM D4354) for each type of geogrid used. Additionally, the Contractor shall provide ultimate tensile strength ASTM D6637 specification conformance test results, by an independent laboratory, at a minimum rate equal to, or greater than, the sampling defined in Table 2411-12 (ASTM D4354) for each type of geogrid used.

Table 2411-11 (ASTM D4354) Geosynthetic Manufacturer Quality Assurance Testing Rates

Number of Rolls in Lot*	Number of Tests
1 to 2	1
3 to 8	2
9 to 27	3
28 to 64	4
65 to 125	5
126 to 216	6
217 to 343	7

344 to 512	8
513 to 729	9
730 to 1000	10
1001 or more	11

Table 2411-12 (ASTM D4354) Geosynthetic Contractor Quality Assurance Testing Rates

Number of Rolls in Lot*	Number of Tests
1 to 200	1
201 to 500	2
501 to 1000	3
1001 or more	4

* A lot is defined as a group of rolls from an individual production run.

D. Lifting Devices, Connectors, and Joint Materials: At least 3 weeks prior to the start of construction the Contractor shall furnish the Engineer a Certificate of Compliance certifying that all connectors and joint materials comply with the applicable contract specifications listed below, including a copy of all test results. Flexible cable lifting devices shall be galvanized per MnDOT 3394, except for the finely stranded cable type which shall be stainless steel. Lifting devices cast into the back surface of the block and which do not extend into the block more than eight inches may be fine-stranded galvanized steel. The requirements of S-H.2 (below) shall also apply.

E. Geotextile: At least three weeks prior to the start of construction the Contractor shall furnish the Engineer a Certificate of Compliance certifying that all geotextiles comply with the applicable contract specifications listed below, including a copy of all test results. The Certificate of Compliance shall include a manufacturer's certificate stating the furnished geotextile meets the requirements of the specifications, as evaluated by the manufacturer's quality control program: (suitable for use on concrete surfaces in cold weather application) to ensure that it doesn't move out of place during backfilling operations. Geotextiles shall be tested at rate equal to, or greater than, the sampling rate defined in Table 2411-11 (ASTM D4354).

F. Impervious Layer: At least three weeks prior to the start of construction the Contractor shall furnish the Engineer a Certificate of Compliance certifying that all impervious geomembrane material complies with the applicable contract specifications listed below. A copy of all test results shall be provided by the Contractor to assure contract compliance. A new Certificate of Compliance shall be provided any time the Contractor changes the source of material or at a rate of 1 test per 50,000 yd² for each type of impervious layer.

The impervious layer material shall be a puncture-free and flexible, roughened sheet HDPE, LLDPE or PVC geomembrane. The geomembrane shall have both sides textured with a rough finish and have a minimum thickness of 30 mils (0.75 mm) in accordance with ASTM D5994 for Textured Geomembranes. The geomembrane manufacturer shall certify that the geomembrane properties have been tested by lot and meet the minimum specification property requirements for 30 mil (0.75 mm) material as specified in the following industry standards:

Table 2411-13: Geosynthetic Testing Standards:

Material Type	Organization	Standard
HDPE	Geosynthetic Institute	GRI Test Method GM13 Standard Specification for "Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes"
LLDPE	Geosynthetic Institute	GRI Test Method GM17 Standard Specification for "Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes"
PVC	American Society of Testing and Materials	ASTM D7176 - 06 Standard Specification for Non-Reinforced Polyvinyl Chloride (PVC) Geomembranes Used in Buried Applications, and <u>ASTM D7408 - 08 Standard Specification for Non Reinforced PVC (Polyvinyl Chloride) Geomembrane Seams</u>

In addition to the standard specification requirements, the following minimum properties shall be required regardless of the type of geomembrane. Samples of the geomembrane will be collected upon delivery to the site and, at the engineer's discretion, sent to an independent laboratory for verification testing.

- a. Minimum Thickness, 30 mils
Tested per ASTM D5199 or ASTM D5994 for Textured
- b. Minimum Tear (Die C), 10 lbs
Tested per ASTM D1004
- c. Minimum Puncture Resistance, 32 lbs
Tested per ASTM D4833

The geomembrane manufacturer's certification shall include quality assurance test results at a rate equal to, or greater than, the sampling rate defined in Table 2411-11 (ASTM D4354) for each type of geomembrane used.

G. Prefabricated Modular Blocks: The precast concrete blocks shall be wet cast and conform to the following requirements:

- 1. Concrete reinforcement (if any) shall conform to MnDOT 2472 and shall be galvanized per MnDOT 3394, or epoxy coated per MnDOT 3301. All reinforcing and attachment devices shall be carefully inspected by the Contractor to insure they are true to size and free from defects that may impair their strength and durability.
- 2. Steel connection elements, tie strip guides or other galvanized devices shall not contact or be attached to the facing block reinforcement steel, unless the block reinforcement is also galvanized.
- 3. The minimum rebar cover requirement is 1.5 inches.
- 4. The manufacturer's name, plant identification (if manufacturer has multiple plants) and date of manufacture shall be stenciled with waterproof ink or clearly scribed on the back face of

each block. If soil reinforcement is embedded into the block, the soil reinforcement type and strength shall be clearly scribed or stenciled with waterproof ink on the back face of each block.

5. Block colors shall be consistent and free of stains, and blocks should be free of defects, cracks or chips. Blocks that contain visible defects such as, but not limited to, vertical or horizontal seams, conspicuous stains, form marks or color streaks shall be repaired to the satisfaction of the Engineer or removed and replaced at the Contractor's expense.

6. Blocks may be stockpiled if the entire production is dedicated to MnDOT projects and all blocks are produced to meet the same MnDOT specification or if specific written permission from the State Materials Engineer has been obtained.

7. All units used shall be manufactured within the following tolerances:

- a. Height: +/- 3/16 inch
- b. Width: +/- 1/2 inch unless field cut for fitting purposes
- c. Depth: No less than the unit design depth (i.e. 24", 26", 48")
- d. Squareness shall be determined by measuring diagonally across the face; the difference between the two diagonals shall not exceed 1/2 inch.
- e. Formed patterns or textures designed to be oriented horizontally or vertically shall be aligned with both the horizontal and vertical edges of the block, and the pattern/texture shall cover the entire face of the block.
- f. If required, allowance shall be made for texture relief up to 2 inches in depth measured from the front face of the block.

8. The block shall be cast on a level surface and shall be fully supported until a compressive strength of 2500 psi or specific written permission from the State Materials Engineer has been attained. A random sample of the concrete shall be taken in accordance with AASHTO T141.

9. Concrete shall be mix number 3B52 or an air-entrained mix with a minimum compressive strength of 4300 psi, using an approved design meeting the requirements of 2461. Coarse aggregate shall meet the requirements of 3137.2D1. If the system requires a higher strength concrete, the mix design shall meet the requirements of MnDOT 2461 for that higher strength.

10. All units shall be handled, stored, and shipped in a manner to eliminate the risk of chipping, discoloration, cracks, fracture, and excessive bending stresses. Blocks shall be stored on firm blocking or on a paved or otherwise compacted surface so as to protect any block connection devices and the exterior finish. Blocks shall reach 100% of design strength before shipment, as demonstrated by control cylinders kept with the product.

11. The wall supplier shall provide a technical representative in the plant during the first three days of production or ensuing production period if needed or until the Materials Engineer determines that the plant has demonstrated the ability to fabricate the blocks without technical assistance or MnDOT oversight. When so directed by the Materials Engineer, the technical representative shall return to oversee manufacture of blocks, and shall remain until relieved of that responsibility by MnDOT.

H. **Block Rejection:** Blocks may be rejected because of failure to meet any of the requirements specified above. In addition, any or all of the following defects shall be sufficient cause for rejection:

1. Defects that indicate imperfect molding, including imperfections of the form liner, if there is one.

2. Bending or misalignment of connections.
3. Defects indicating honeycombing or open texture concrete.
4. Any defect on the visible face larger than 1 square inch, cracks on any face, severe chips or other defects caused by defective materials or workmanship.
5. Color variation on front face of block due to excess form oil or other reasons.
6. Tie strips, connecting pins, PVC pipe, or lifting devices set to improper dimensions or tolerances shown on the plans and specified above.
7. Any damage that would prevent making a satisfactory joint.

I. Gabion basket's used in gabion walls shall conform to MnDOT 3602 and shall be galvanized per MnDOT 3394 and epoxy coated per MnDOT 3301.

The Contractor shall furnish only durable, quarried carbonate rock from the Prairie du Chien Group, that is free from defects such as: silt or shale seams on which the rock will break or separate due to environmental weathering; excessive internal silt or clay content (exceeding 10% by mass); natural or production induced fractures; or any other visible defects that will cause rapid or excessive deterioration or degradation during service. Source rock for the project shall be approved by the MnDOT Geologist prior to the filling of any gabion baskets. Rock may only be supplied from specific layers or ledges that have been approved. The Contractor shall be required to verify that rock is being supplied only from the approved layers or ledges.

S-65.5 CONSTRUCTION REQUIREMENTS

A. **General Requirements:** An PMBW Preconstruction Meeting shall be held at least 15 days before wall construction begins and after the Department has completed the QA review of the shop drawings and design calculations. At a minimum this meeting shall be attended by the Engineer, Contractor, the Contractor who will erect the wall, and a technical representative from the PMBW system supplier. The Contractor shall provide a complete written sequence of PMBW construction at the meeting and review the sequence, any construction issues, the specifications and the PMBW system requirements and determine any issues that need to be resolved prior to construction.

The wall supplier shall provide a documented Field Construction Manual specific to MnDOT requirements and describing in complete details the sequence of construction steps. The PMBW system supplier shall also provide an experienced technical representative on the project site during the erection of the first full height section, and the following sections if needed until the Engineer determines that the Contractor has demonstrated the ability to construct the wall system on his own meeting all project construction requirements. The PMBW system supplier technical representative shall be available to provide instructions, guidance in pre-construction activities, and on-site technical assistance anytime during construction at no additional cost to MnDOT. Every step in the sequential construction of the PMBW system shall comply with the construction requirements and tolerances. All instructions from the PMBW system supplier that are not contrary to these special provisions shall be followed unless otherwise directed in writing by the Engineer.

The Contractor shall be solely responsible to coordinate construction of PMBWs with bridge, roadway, and other construction and ensure that resulting or existing obstructions shall not impact the construction or performance of the wall.

All PMBW system blocks shall be constructed in accordance with the QA reviewed shop drawings, including the architectural features specified.

B. Foundation Preparation: The following statements shall apply to MnDOT 2451: The foundation for the structure shall be graded level for a width equal to the length of the soil reinforcement element plus PMBW width or as shown on the plans. The entire graded area shall be compacted according to MnDOT 2451 before wall construction begins.

Prior to wall construction and subsequent to clearing and grubbing any unsuitable foundation material shall be excavated and replaced with granular fill per these specifications, and compacted with a smooth wheel steel vibratory drum roller. If the PMBW bears on a rocky foundation or on bedrock, place 6 inches of reinforced soil per the Materials section of these specifications, under the soil reinforcement. Compact as specified above.

The Contractor shall develop and implement a plan to protect the open excavation from surface drainage during construction and until the wall is placed. The Contractor shall protect the excavation against collapse.

C. Reinforced and Backfill Soil Placement: Soil placement shall closely follow erection of each row of blocks. Soil shall be placed in a way that does not cause damage or disturbance to the wall or soil reinforcement. Soil reinforcement shall be maintained in a horizontal position along its length and shall be placed perpendicular to the wall face, except as shown in the plans.

Compaction beyond 3 feet of the back face of the prefabricated modular blocks shall be compacted to a density of not less than 100 percent of maximum density using the specified density method in accordance to MnDOT 2105.3.F.1. or the granular penetration index method in accordance with MnDOT 2105.3.F.3. The maximum lift size shall be 12 inches loose.

Compaction within 3 feet of the back face of the concrete blocks shall be achieved by means of a minimum of 3 passes with a lightweight mechanical tamper, roller or vibratory system. The number of passes needed for the compaction within the 3 foot zone shall be determined using a test strip with the proposed compactor and lift height(s) for this zone. The maximum lift size within 3' shall be 8 inches loose and it shall be compacted to a density of not less than 95 percent of maximum density using the specific density method in accordance to MnDOT 2105.3.F.1.

Sieve analysis testing for quality control shall be performed according to section S-1.3B.2 of this specification. Sieve analysis testing for quality assurance shall be performed according the MnDOT Grading and Base Manual method 5-692.215.

The PMBW system supplier may require the Contractor to perform quality control density tests. The contractor shall perform the PMBW system suppliers required tests and submit the test results to the Engineer at no additional cost.

No drilling or driving of piles, posts (sign, guardrail, etc.) or other roadside hardware through the reinforced soil shall occur after placement of fill.

At the end of each day's operations, slope the last lift of reinforced soil to direct surface runoff away from the wall. Do not allow surface runoff from adjacent areas to enter the wall construction area.

The area in front of the wall and around the leveling pad should be backfilled as soon as practically possible. Tamping type (sheep's foot) rollers shall not be used for compaction of the reinforced soil.

At no time shall construction equipment come in direct contact with the soil reinforcement. A minimum reinforced soil thickness of 6 inches above geosynthetic soil reinforcement shall be required prior to operation of vehicles. Each course or layer shall be compacted up to or slightly above the location of the

next connection for the soil reinforcement prior to placing the next layer of reinforcement as designated in the erection sequence provided by the manufacturer of the wall system.

If the reinforced soil material changes or a new source or material is used, construction of the PMBW shall be halted until the Contractor provides a new Certificate of Compliance and accompanying test reports.

D. Leveling Pad: For PMBW's with soil reinforcement an unreinforced cast-in-place concrete leveling pad shall be provided at the foundation level for each base unit of the wall system and shall be continuous at all steps. The leveling pad shall be concrete Mix Number 1P62 and have minimum dimensions as shown in Figure's 2411-5 and 2411-6.

Gravity PMBW's shall be set on either a concrete leveling pad (meeting the minimum requirements above) or a composite leveling pad.

A wider leveling pad shall be used for walls with curves or corners to ensure blocks fully bear on the leveling pad. The bottom of pad elevation shall be a minimum of 4 feet below finished ground line. Construct the leveling pad so that the surface does not vary more than 1/4 inch in 10 feet along the length of the wall nor more than 1/8" across the width of the leveling pad from plan dimensions. The leveling pad shall have a compressive strength of at least 1500 psi and cured a minimum of 24 hours before blocks are placed. During erection blocks shall not extend more than 6 inches beyond the end of the leveling pad at steps. Fill the void with reinforced soil immediately after the first row of blocks are set.

E. Wall Erection: Storage, handling and transportation shall avoid damage or discoloration of the blocks. If water has ponded in front of the wall; pump the water out prior to constructing the wall and reinforced zone. All PMBW's shall be constructed in accordance with approved shop drawings and in conformance with this specification, including the architectural features specified. PMB's shall be placed so that their final position is vertical or battered as shown on the plans. Construction should always begin from existing structures toward the open end of the wall. For erection, blocks which are handled by means of lifting devices inset in the top surface of the block. After placing the blocks, the depressions for lifting devices in the top course of blocks shall be completely filled with MnDOT Spec 2506.2B mortar. Depressions do not need to be filled if the lifting device is stainless steel. Place the initial row of blocks on the centerline of the leveling pad and level the block. Permanent bearing pads to level the blocks (between the leveling pad and bottom course of blocks) are prohibited. Blocks should be placed in successive horizontal lifts in the sequence shown on the plans as reinforced soil placement proceeds.

Permanent shims may be used to level or position successive courses of blocks provided:

- a. The shim is made of a plastic material that will not rust, stain, rot or leach onto the concrete;
- b. The shim has a minimum compressive strength of 4300 psi;
- c. The shim shall not exceed 3/16" in thickness;
- d. No shim shall be used between the concrete leveling pad and the base course of the block wall, regardless if such wall is a Gravity PMBW or a PMBW with Soil Reinforcement;
- e. With respect to a PMBW with Soil Reinforcement, a shim shall not be used between blocks that are also being used for a frictional geogrid connection;
- f. Shims shall be limited to no more than 3 percent of the blocks in a wall.

If blocks overhang the leveling pad transversely reconstruct the leveling pad. After setting the batter of the blocks, horizontal and vertical alignments shall be checked by the Contractor with surveying methods, using suitable measuring points. The maximum vertical joint spacing between blocks of the constructed wall shall be 3/16 inch. Placement of a block on top of a block not completely backfilled shall not be permitted.

Concrete block vertical and horizontal alignment tolerances shall not exceed $\frac{3}{4}$ inch per 10 feet. Do not construct any block more than $\frac{1}{2}$ inch out of vertical or horizontal alignment from the adjacent blocks. The completed wall shall have (cap or top of wall) overall horizontal and vertical tolerance not to exceed $\frac{1}{2}$ inch per 10 feet of the planned location. Blocks out of alignment shall not be pulled or pushed into proper place, as that may cause damage to the soil reinforcement. If misalignment occurs, the reinforced soil and the soil reinforcement shall be removed and the facing blocks reset to the proper alignment.

F. Impervious Layer (Geomembrane): The installation of the impervious layer (geomembrane) shall be in accordance with manufacturer's recommendations and as approved by the Engineer. Before geomembrane installation, it shall be assured that the area that is to be lined shall be smooth and free of sharp objects or debris of any kind. Atmospheric exposure of the geomembrane to the elements following lay down shall be a maximum of fourteen (14) days. The Contractor shall install a geomembrane liner free of tears. Notify the project engineer of any perforations placed in the geomembrane for the installation fence posts, etc. The geomembrane shall be placed below the pavement, above the first row of reinforcement and under the parapet moment slab (where present) and over specified areas as shown on the plans. The geomembrane shall be sloped to drain away from the blocks as shown on the plans. HDPE shall not be installed during periods of precipitation or in conditions of excessive moisture such as fog or dew in accordance with the geomembrane manufacturer's recommendations and as approved by the Engineer.

All seams of the HDPE geomembrane liner system shall be welded or bonded, as per the manufacturer's specifications, such that a water tight seal is formed to prevent leakage. Seams shall be oriented parallel to the line of maximum slope. Seams shall have a minimum finished overlap of 4 in. unless a greater overlap is specified by the geomembrane manufacturer. Field testing of seams, according to the manufacturer's specifications, shall be conducted to verify satisfactory seaming conditions. When backfilling, care shall be taken to prevent damage to the geomembrane. Any tears, punctures or holes incurred during the installation process shall be assessed by the Engineer and the membrane shall either be repaired in accordance with recommendations of the membrane manufacturer or replaced at the Engineer's discretion at no additional cost.

Perforations through the liner shall be limited. Where penetrations are necessary, the Contractor shall provide details demonstrating the method(s) of sealing the penetration for approval by the Engineer.

G. Soil Reinforcement Installation: Soil reinforcement shall be placed in accordance with the shop drawings. Reinforcement shall generally be placed perpendicular to the back of wall unless shown otherwise on shop drawings. Pretension flexible reinforcement to remove any slack in the reinforcement. Bar mat soil reinforcement shall not be skewed. No alteration or cutting of reinforcement is permitted unless clearly detailed in the approved shop drawings. Connections must be made in accordance with the manufacturer's recommendations. Reinforcement placement elevations shall not vary more than 1 inch from a horizontal line through the block connection.

Any wall system material that becomes damaged or disturbed during the installation of the wall system shall be removed, replaced or corrected at the Contractor's expense, as directed by the Engineer. Walls may be rejected due to failure to meet any of the requirements of the above specifications that will require future maintenance or will impact aesthetics, function, performance or life of the wall.

H. Cap Block, Coping and Barrier Construction: This final construction sequence shall be undertaken after the final wall blocks have been placed, and the reinforced soil has been completed to its finished ground line.

I. Method of Measurement: PMBW's shall be measured by the square foot of face on a vertical plane between a line 2 feet below the finished ground line in front of the wall and the top of the wall or coping as shown on the plans. The Department will not adjust pay quantities for variations in concrete leveling pad elevations required to accommodate actual block placement.

J. **Payment Method:** Payment for PMBW's constructed at the Contract price per square foot of completed wall surface will be compensation in full for all costs of design and construction including excavation, backfill, coarse aggregate, geotextile fabric, blocks, coping, soil reinforcement, connection devices, joint materials, leveling pad, technical representatives, and other items which do not have separate pay items but are necessary to complete the PMBW. The pay item for PMBW's is 2411.618 PREFABRICATED MODULAR BLOCK WALL, SQ FT.

Drainage systems shall be paid for as specified in 2502.

PMBW Certification Letter

State Project No. (S.P. or S.A.P.)	
Wall No.	
Name of Pre-Qualified PMBW System	

Design Data	
The design life for the wall system other than soil reinforcement and connections.	75 years
The design life for geosynthetic reinforcement and connections used in the wall system, including long term creep.	100 years
Angle of Internal Friction - Reinforced Soil/Backfill	____ Degrees
Maximum Applied Bearing Pressure at Base	
Factored Bearing Resistance at base (located in Geotechnical or foundation report)	
Length of reinforcement to satisfy overall stability (located in Geotechnical or foundation report, Reinforced walls only)	
Compound stability check satisfied (if required by these special provisions)	

I hereby certify that the design calculations for the internal stability of the mechanically stabilized earth retaining structure and the detail drawings included in this construction submission are in complete conformance with the AASHTO LRFD Bridge Design Specifications, the project special provisions and meet the foundation report recommended overall stability soil reinforcement length. I further certify that the design data provided above and data assumed for the design calculation submitted herein is accurate for the above referenced wall.

<p>Engineer of Record</p> <p>I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the State of Minnesota.</p>
Signature:

<p>Engineer Performing Design Check</p> <p>I hereby certify that this plan was checked by me and that I am a duly licensed professional engineer under the laws of the State of Minnesota.</p>
Signature:

Date:
Registration Number:

Date:
Registration Number:

(Provide a PMBW Certification Letter for each wall in the project plans)

S-66 (2422) WOOD NOISE ATTENUATOR WALL

This work shall consist of furnishing all materials for and constructing wood noise barrier walls complete with appurtenant concrete posts, all in accordance with the Plan details, the applicable Mn/DOT Standard Specifications, and the following:

S-66.1 GENERAL

All thickness and width dimensions of solid sawn wood for timber facing material indicated in the Plans for wood wall construction shall be construed to be nominal dimensions unless otherwise indicated in the Plans or these Special Provisions.

S-66.2 MATERIALS

- (A) Concrete Posts
 As detailed in the Plan.

- (B) Mn/DOT 3426 (Structural Timber) and 3457 (Lumber); Planking and Battens
 - 1) Except as otherwise permitted elsewhere herein, dimensional timber for planks and battens shall be any species of southern pine conforming to the requirements of Mn/DOT 3426 and/or 3457, free of natural and manufacturing defects that would impair the strength or prevent use of the piece in its full size for purposes of strength and utility intended, such as checks, decay, loose knots, holes, edge wane and warp.
 - 2) Intermixing of wood species will not be permitted within any continuous section of wall.
 - 3) Planks, which are constructed above ground shall be No. 1 Structural Grade and better, dressed on two sides (S2S) or better, tongue and grooved worked. Planks, which are constructed partially above ground, such as those placed opposite the earth fill side of barriers, also shall meet these requirements. Planks, which are constructed below ground, such as those placed on the earth fill side (supporting) of barriers, and nailers shall be No. 2 Structural Grade and Better standard rough sawn. Battens and cap boards shall be No. 1 Structural Grade and better, dressed on one side and two edges (S1S2E) or better.
 - 4) Except as otherwise permitted elsewhere herein, all timber shall be treated with a Disodium Octaborate Tetrahydrate (DOT) and an exterior polymer based system that complies with ESR-1081 (ICC Evaluation Service Report) as described hereinafter in this specification.
 - 5) Moisture content shall meet the requirements of S-66.9 (MOISTURE CONTENT) of these Special Provisions.

- (C) Structural Steel Tubing
 Structural steel shall conform to the requirements of Mn/DOT 3306.

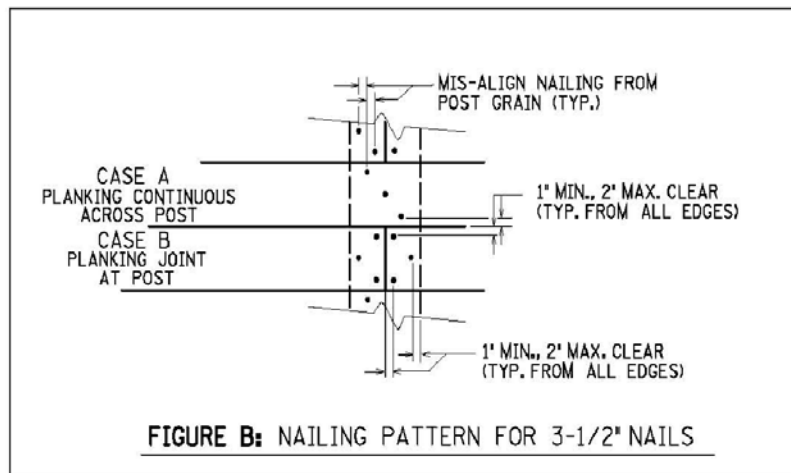
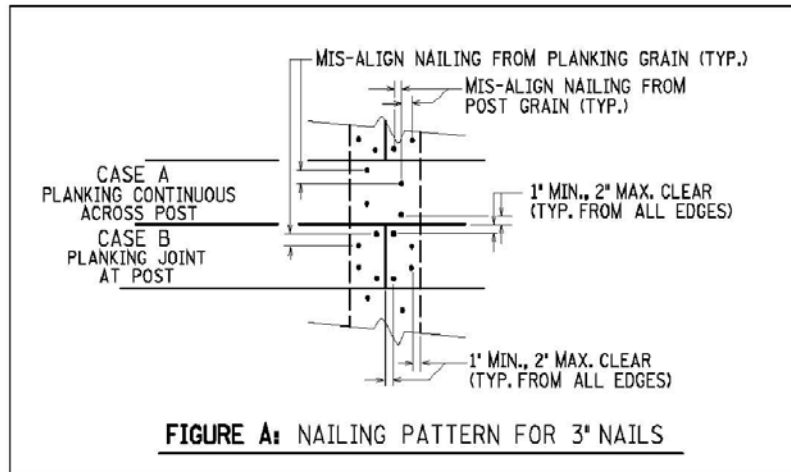
Threaded rods, bolts, nuts and washers shall be galvanized in accordance with Mn/DOT 3392 or be electroplated in accordance with ASTM B 633, Type III, SC 4.

(D) Hardware

All hardware for noise wall shall meet the following requirements:

- 1) All battens shall be secured to planks using a No. 8, or larger, hot-dipped galvanized (or as approved by the Engineer) screw with Square or Torx head that will penetrate completely through the batten board and through $\frac{3}{4}$ of the thickness of the facing board in all applications.
- 2) The requirements as shown on Mn/DOT Standard Plan Sheet 5-297.661 (Sheets 1 & 2) "Wood Planking Noise Barrier With Concrete Posts" shall be used as a reference except for the fastener pattern as detailed in S-66.2D3 and S-66.2D4 (MATERIALS; Hardware) below. Note: if employing hand-driven nails for nailing planks to nailing components, then Standard Plan Sheet 5-297.661 (Sheet 2 of 2) applies, except as detailed below in S-66.2D3; however, 8d ring shank nails (.120" minimum diameter) shall NOT be used for fastening battens (see S-66.2D4 below).
- 3) The fastener pattern used for nailing planks to nailer components shall at a minimum meet the following requirements:
 - a. Four (4) nails per board connection, as shown in Figure A for 3" long nails; or
 - b. Three (3) nails per board connection, as shown in Figure B for 3 ½" long nails.

The fasteners shall be placed a minimum of 1" (one inch) and a maximum of 2" (two inches) from the edges of the nailing plank.



- 4) The fastener pattern used for screwing battens, cap boards and other architectural features to planks shall utilize the following method:
 - a. Two fasteners shall be applied on 14" (fourteen inch) centers on the batten boards (thereby hitting every other facing plank).

The fasteners shall be placed a minimum of 1" (one inch) and a maximum of 2" (two inches) from the edges of the batten board.

- 5) When power tools and building equipment are used to drive ring shank nails into the planking, a minimum gauge diameter of 0.131" (one hundred thirty-one

thousands of an inch) hot-dipped galvanized full-head round ring shank nails shall be used. The number of nails required in each pattern shall be increased by an extra 50% (fifty percent) if using 3 ½" long full head nails to an increase of 100% (one hundred percent) if using 3" long full head nails. Clipped head nails shall not be allowed.

- 6) All hardware for wood noise barrier walls shall meet the requirements of Mn/DOT 3391 (Fasteners) and Mn/DOT 3392 (Galvanized Hardware).
- (E) **Stain and Paint**
Exposed concrete and wood surfaces shall be stained and finished on all exposed surfaces in accordance with the requirements described hereinafter in this specification. Steel surfaces shall be painted and finished on all exposed surfaces in accordance with the requirements described hereinafter in this specification.
- (F) **Caulk**
Caulk shall be a neutral-cure, one-component, high performance, medium modulus silicone joint sealant conforming to ASTM C920-86, Type S, Grade NS designed for general purpose caulking and glazing applications. Provide in a clear color. Apply after staining.

DEFINITIONS

- (A) **BORATE Treated Wood** – Non-arsenic, non-heavy metal, and non-chromium pressure treated wood produced in accordance with applicable procedures and specifications, and the appropriate International Code Council Evaluation Service (ICC-ES) Standards and/or applicable American Wood Preservers' Association (AWPA) Standards for exterior usage [UC3A (Use Category 3A for exterior construction, above ground, coated & rapid water runoff) and UC3B (Use Category 3B for exterior construction, above ground, uncoated and poor water runoff) approval]. The Disodium Octaborate Tetrahydrate (Na₂B₈O₁₃•4H₂O) solution is an inorganic borate. The exterior usage is permitted through the use of an additional polymer treatment that inhibits the leaching of the borate from the wood.
- (B) **Specialty Subcontractor** – Party responsible for BORATE handling, transporting, storing, installing, protecting, sampling, and patching (damaged BORATE). This may be the Contractor if Contractor is able to demonstrate to the Engineer its expertise in this area.
- (C) **Manufacturer** – The ICC Accredited party or parties (as listed in ESR-1081) responsible for producing the BORATE treated wood and/or the preservative.
- (D) **Retention** – amount of preservative level present in the BORATE wood measured in kg/m³ [lbs/ft³].
- (E) **Water resistant** – Quality of the wood to repel moisture, providing long-term protection against decay, rot, and weathering.
- (F) **Supplier** – If no Manufacturer (as defined above) exists for the Project, then the Supplier shall be defined as the facility responsible for furnishing the ICC Accredited borate-treated wood planks to the Specialty Subcontractor (as defined above).

S-66.3 REQUIREMENTS

- (A) **Materials Ordering**

BORATE treated wood materials shall not be ordered until the Engineer has approved the proposed materials. If the Contractor orders materials without the Engineer's written approval, the Contractor assumes all liability.

- (B) Preparation
Dewater the site, if noted in the Plan, such that the ground water is a minimum of 305 millimeters [1 foot] below the bottom of the excavation at all locations (See Special Provisions). Do not turn off the dewatering system until select granular borrow has been placed to the specified ground line, and approval has been obtained from the Engineer.
- (C) Excavation
Excavate and fill to lines and grades as shown in the Plans. Fill placed below the noise wall shall be placed in maximum 203 millimeters [8 inches] loose lifts and compacted to Mn/DOT standard dynamic cone penetrometer (DCP) Standards. Measure moisture and density of compacted fill at the rate of one test per 382 cubic meters [500 cubic yards] of fill or a minimum of one (1) test per day.
- (D) Branding
Each BORATE treated wood timber shall be individually permanently branded on the face of each timber, not the edges or ends with the following two (2) separate brands:

BRAND #1

- 1) Name of wood treating company;
- 2) Treatment plant city and state;
- 3) "Borate";
- 4) Preservative retention level;
- 5) "Approved for exterior use".

BRAND #2

- 1) Name of wood treating company;
- 2) ICC Accredited Facility;
- 3) ESR-1081 *.
* = ICC Evaluation Service Report 1081

- (E) BORATE preservative – A borate with a binding system used to minimize leaching of the borate. The preservative shall provide protection to the wood against decay, rot, and insect attack, and act as a fungicide.
- 1) The preservative shall be applied at a rate by the manufacturer which will ensure that the measured retention level at the construction jobsite will be a minimum of 0.50 pounds per cubic foot for all applications where the timber will be installed, and as noted in 2) below;
 - 2) Only Disodium Octaborate Tetrahydrate products approved for exposed conditions shall be allowed.
 - 3) The polymer shall be applied at a rate of thirty (30) gallons per one-thousand (1000) board feet as stated in the quality manual as approved by the ICC in accordance with ESR-1081. Verification of this rate of usage shall be monitored by an independent

third-party inspection agency and the resulting report will be presented to Mn/DOT upon request.

S-66.4 SUBMITTALS AND CERTIFICATION

All Borate Treated Wood must be sampled, tested and inspected by the Manufacturer and/or Supplier and approved by the Department prior to being incorporated permanently in the work. Unless otherwise specified, no direct compensation will be made for the costs of sampling and testing, it being understood that the costs are included in the Contract bid prices for treated wood products.

This inspection shall be performed in accordance with the following:

- (A) A Letter of Compliance from the Manufacturer and/or Supplier certifying that the material furnished meets the Specification requirements and identifying the Specification number or reference and the Project number to which the material is shipped shall be furnished to the Engineer. The report also shall include the sampling procedures and results of all quality control tests, including a description of test methods used.
- (B) A Letter of Compliance shall include Treatment and Inventory Audit Reports in accordance with the Quality Control Manual, Wood Treatment Products, Inc. (See Section S-66.6). This letter shall certify that all aspects of the Wood Treatment Products Quality Assurance Manual have been followed including both the retention of the borate in the wood and the appropriate amount of polymer as recorded by the treater upon treatment.
- (C) The Department reserves the right to request additional testing and/or verification by the Manufacturer and/or Supplier at the Contractor's expense.

The Contractor is advised that he/she needs to allow enough lead time so that a Letter of Compliance can be prepared and furnished to the Engineer so as to not to interfere with the construction schedule for the completion of the wood noise barrier walls.

S-66.5 WARRANTY

The Contractor shall warrant the installation of the BORATE treated wood against defects for a period of one hundred twenty (120) days from the date of the acceptance (See Section S-66.13) by the Engineer. (Note: This warranty is separate from any warranty (ties) that the manufacturer may provide to the Contractor on the treatment chemicals and/or the treated noise wall timbers supplied). The Contractor, or its designated representative, shall repair any defects due to improper installation that occur during the warranty period at no cost to the Department. The Contractor shall furnish the Engineer with a written warranty.

S-66.6 HANDLING AND STORAGE

BORATE Treated Wood materials shall be delivered in wrapped bundles and stored above ground, protected from weather and moisture until use. The Contractor is reminded that due diligence and care must be exercised when moving or handling any posts or wood material from their storage area(s) on the Project. Should any damage occur to any posts or wood material being installed on the Project by the result of mishandling, the Engineer may refuse to accept the placement of any such damaged material under Mn/DOT 1607 and at the approval of the Engineer. Such damaged and unaccepted material shall be replaced by the Contractor at his cost.

S-66.7 MOISTURE CONTENT

The Contractor is responsible for the following:

- (A) Samples shall be tested for moisture content at the rate of one (1) sample per 372 square meters [4000 square feet] of installed wood material. Testing and test equipment shall meet the requirements of ASTM D4444-92 (Reapproved 2003) [Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters], in particular Field Calibration (sections 5.2, 6.2, and 6.3) and Sampling Point (location) (section 6.6.1).
- (B) The specified sampling rate may be increased prior to installation at the discretion of the Engineer (i.e., to test samples after a precipitation event).
- (C) At the time of installation, the Contractor shall test and ensure the moisture content in the planking wood shall not exceed fifteen (15) percent maximum moisture content per volume tested. The moisture content for the battens shall not exceed thirty (30) percent maximum moisture content per volume tested. Wood planking and battens which do not meet these requirements will be rejected. However, the rejected portion will be allowed to sundry or be mechanically dried to meet moisture content requirements and then be placed with the approval of the Engineer in the noise wall installation. BORATE Treated Wood materials which fail to meet moisture content requirements shall be rejected by the Engineer and removed from the Project at no cost to Mn/DOT.

S-66.8 INSTALLER AND MATERIALS STANDARDS

- (A) Submittals and testing qualifications of the installer of the BORATE Treated Wood shall comply with S-66.4 (REQUIREMENTS), and S-66.9 (MOISTURE CONTENT) of these Special Provisions. These instructions must be provided to the Engineer, and approved by the Engineer prior to the Contractor ordering materials.
- (B) The Contractor shall dispose of BORATE treated wood scraps and cut-offs in a non-hazardous municipal solid waste landfill in accordance with Mn/DOT 2104 and local regulations. BORATE treated wood scraps shall not be burned.

S-66.9 CONSTRUCTION REQUIREMENTS

- (A) Construction of wood noise barrier walls together with appurtenant concrete posts shall be accomplished in accordance with the Plan details, the applicable Mn/DOT Standard Specifications, these Special Provisions, or as otherwise approved by the Engineer.

BORATE Treated Wood materials that must meet definite Specification requirements shall not be incorporated in the work until all preliminary inspections and tests necessary for moisture retention and preservative levels have been completed and the material is found to comply with requirements.

Structural Concrete shall be of Mix 1A43 placed as directed by the Plans, Specifications, these Special Provisions, and the Engineer.
- (B) Concrete posts and vertical wood components, such as battens, shall be plumb after installation. Horizontal wood components, such as planks and cap boards, shall be level after installation.
- (C) Excavated material for noise wall construction shall not be used for backfilling the post holes and shall be disposed of in accordance with Mn/DOT specifications.
- (D) Nailing and fastening shall be accomplished in a manner that will avoid splitting boards. When fill is retained by the wall, 6-mil polyethylene sheeting shall be placed between planks and earth. However, the placement of the sheeting shall be done in a manner which does NOT allow the infiltration or retention of water next to the planking (i.e., the

sheeting shall not be so tightly installed around the planking that a watertight area is formed next to the planking which could retain water).

- (E) Joints shall be constructed in a manner that will completely arrest the passage of light. No daylight shall be visible through the joints 120 days after completion of the wall; this shall be construed to be part of the Warranty as detailed in Section S-66.7 of these Special Provisions. The Contractor is advised to take whatever measures necessary to avoid excessive shrinkage or shifting which would cause the passage of light. Where passage of light does occur, the Contractor shall take corrective action, by applying caulking to the satisfaction of the Engineer, at his/her own expense.
- (F) Planking shall be installed "groove side down" in all installations. When battens are to be joined in the construction of the wall, they shall have a 45 degree down miter joint instead of the in-place 90 degree joint (to minimize water retention issues).
- (G) Storage of materials within the Right of Way will be permitted only as approved by the Engineer.
- (H) Debris shall be disposed of outside the Right of Way.

S-66.10 STAINING, PAINTING AND FINISHING REQUIREMENTS

This work shall consist of furnishing all materials and labor for staining exposed concrete and wood surfaces and painting of metal surfaces of Wood Noise Barrier in accordance with the applicable Mn/DOT Standard Specifications, the Plan details, and the following:

- (A) Scope
 - 1) Section includes thin-film wall coatings for concrete and wood substrates.
 - 2) Related sections include wall materials and construction as found elsewhere herein these Special Provisions.
- (B) Submittals
 - 1) Product Data: Submit manufacturer's complete technical data sheets for stains and paints for each substrate requiring finishing, including:
 - a. Product profile
 - b. Surface preparation
 - c. Technical data
 - d. Application
 - 2) Samples for Initial Color Selection: Submit manufacturer's color charts showing full range of colors available. When specified, match Federal color standards.
 - 3) Qualification Data: For product manufacturers and installers indicated in Quality Assurance section, indicating capabilities and list of projects completed. Provide complete contact information for each reference.
 - 4) Product Estimates: Submit calculations for the amount of stain material needed for a two-coat application for the Project using manufacturer's average recommended coverage rate for each substrate type.
- (C) Quality Assurance
 - 1) Manufacturer Qualifications: Manufacturer with 10 years of experience in stain system design, product manufacture and technical consultation services.
 - 2) Installer Qualifications: Installer with 5 years of experience in stain application and maintenance on projects of similar scope and quality.

- 3) Products for Concrete and Wood Surfaces: Provide a high quality water-based acrylic polymer stain designed to provide long-term protection in exterior exposures on concrete and wood surfaces, while adding design dimension in architectural applications. For a list of approved stains see the following web site:
<http://www.mrr.dot.state.mn.us/materials/apprprod.asp>
 - a. General Requirements:
 1. 100% straight acrylic polymer
 2. Free of toxic metals
 3. 100% organic pigments
 4. Meets latest Federal VOC regulations
 5. Color as specified
 - b. Specific Requirements:
 1. Solids by volume: 30% minimum
 2. Solids by weight: 44% minimum
 3. Viscosity: 65 KU minimum
 - c. Obtain each specified material from the same source and maintain high degree of consistency in workmanship throughout the Project.
 - d. Deliver, store and handle specified products according to manufacturer's instructions and application techniques.
- 5) Notification: Notify manufacturer's authorized representative at least 1-week before starting the work of the Project as directed by the Engineer.
- 6) Test Panels: At location selected by the Engineer, finish a 10-foot by 10-foot area of each substrate requiring stain application to obtain approval for the color, finish and coverage rates before proceeding with the Project.
 - a. Provide products, processes and techniques intended for use on permanent work. Adjust color shade of stain product as directed by the Engineer to achieve desired aesthetic appearance.
 - b. Retain and protect accepted test sample as the visual standard for the work of this section and quality standard for permanent work.
 - c. A one (1) pint sample of each lot number of stain to be used on the Project shall be submitted to Mn/DOT's Office of Materials for testing to verify: i) Percent Solids ; ii) Infrared Scan on vehicle; and iii) Viscosity.
 1. Stain failing these tests shall be rejected, and shall not be used on the Project.
- 7) Colors: Provide colors for stain specified in accordance with the following selection guide:
 - a. Concrete Surfaces – Includes concrete posts. Match Federal Standard 30372, Color No. Medium Tan/Gray.
 - b. Wood Surfaces – Includes wood planking, nailers, battens and cap boards. Match Federal Standard 30140, Color No. Medium Brown.
 - c. Metal Surfaces – Not Used
 - d. Architectural Features – Not Used.
 - e. Final color selections will be determined by the Engineer using test panels provided by the Contractor. The Contractor is advised that more than one color may be field tested and that the approved color may be a custom color.

(D) Construction Requirements

- 1) Verify that surfaces to be finished are sound, dry and free of dust, dirt, oils, efflorescence, biological and chemical residues, paint, stain, curing compounds and other contaminants which may affect performance of the stains(s) specified.

- 2) Pressure water blast (with or without abrasives in the water stream) to all surfaces which will be stained to ensure adhesion of stain specified. Unless the cleaning system proposed for use has been previously approved by the Department, the Contractor shall use a minimum pressure of 20.68 MPa [3,000 psi].
- 3) In addition to the moisture content test(s) performed under S-66.6 (MOISTURE CONTENT) of these Special Provisions, the Contractor shall test the moisture content of all wood surfaces before applying stain specified. This testing shall be performed at the rate of one (1) sample per 372 square meters [4000 square feet] of installed wood material. Except as otherwise approved by the Engineer, surfaces having a moisture content greater than 17% shall not be stained.
- 4) Apply stain specified according to manufacturer's instructions and application techniques to achieve average coverage rate shown on manufacturer's technical data sheets. This data must specifically provide surface preparation and application instructions for preservative treated timber and lumber products. Apply two coats minimum using airless spray equipment with appropriate tip/atomizing pressure for equipment, applicator technique and weather conditions to produce a wet application that provides color uniformity, but avoids buildups, lap marks and runs. Finished areas lacking a uniform appearance shall be repaired to the satisfaction of the Engineer without additional cost or expense to the State.
- 5) Protect and shield all surfaces that are not intended to be treated, including trees, shrubs and other plants. When multiple colors are specified, protect previously finished surfaces to avoid overspray.

(E) Payment

Staining, painting and finishing of concrete, wood and metal surfaces are considered an incidental expense to the respective items of Wood Noise Barrier construction, and no additional compensation will be made for this work.

S-66.11 "BORATE" TREATED WOOD ACCEPTANCE

The Contractor shall retain ownership and responsibility of the BORATE treated wood until the Engineer accepts it.

- (A) The Engineer will accept the BORATE installation after:
- 1) All required documentation from the Contractor has been received and accepted.
 - 2) Test reports verifying material properties have been received and accepted by the Engineer.
 - 3) Construction of the Borate-treated noise wall is complete, including any repairs needed due to material defects or construction requirements.

S-66.12 MEASUREMENT AND PAYMENT

- (A) Concrete posts of each size will be measured separately by the length of the posts furnished and installed complete in place as specified.
- (B) Wood noise wall construction will be measured by the square foot of BORATE treated timber and lumber furnished and installed complete in place as specified, including quality assurance sampling and testing, architectural treatments (battens and cap feature), fire hose access holes and staining. No increase in area will be allowed for measuring the opposite side of the wall or the architectural treatments required on this surface unless specified on drawings.

(C) Payment will be made according to the following schedule:

NOTE: Only those pay items which are applicable to this Project shall apply.

<u>Item</u>	<u>Description</u>	<u>Units</u>
2422.603	Concrete Posts 12" x 18"	Linear Foot
2422.618	Wood Noise Attenuator Wall	Square Foot

Payment shall be considered payment in full for all other costs incidental thereto.

* = Lean Mix Backfill will be paid for only if its use is recommended by Mn/DOT's Materials Office because of soils on site. If the Contractor chooses to use Lean Mix Backfill however, he/she shall only be paid what it would cost for (2411.523) Aggregate Backfill (CV) by the Cubic Yard.

S-67 **(2451) STRUCTURAL BACKFILL**

Wall Plans. This work is in accordance with the provisions of MnDOT 3149 and the details in the Retaining

S-68 **(2452) PILING**

The provisions of 2452, "Piling," are supplemented as follows:

S-68.1 The provisions of 2452.3.J, "Coating Steel H-Piles and Steel Pile Shells," are modified as follows:

Delete 2452.3.J.1, "Painted Piles."

Delete 2452.3.J.2, "Galvanized Piles."

S-69 **(2461) STRUCTURAL CONCRETE**

REVISED 09/25/15

SP2016-151

MnDOT 2461 is hereby modified as follows:

S-69.1 MnDOT 2461.2.A shall be modified to include the following:

A.5 Ternary Mixes

Ternary mixes are defined as portland cement and two other supplementary cementitious materials, or blended cement and one other supplementary cementitious material with a maximum replacement of 40% by weight.

S-69.2 MnDOT 2461.2.E shall be modified to include the following:

For all Concrete Grades shown in Table 2461-7, use any admixtures on the MnDOT Approved/Qualified Products list.

S-69.3 MnDOT 2461.2.F.1.d shall be deleted and replaced with the following:

F.1.d Coarse Aggregate Designation

Select the appropriate coarse aggregate gradation designation in accordance with Table 2461-3 based on the intended use and the gradation requirements in 3137, "Coarse Aggregate for Portland Cement Concrete."

Table 2461-3 Coarse Aggregate Designation for Concrete	
Designation	Coarse Aggregate Gradation
0	Job Mix Formula (JMF) combination of fine and coarse aggregate
Table 3137-4, "Coarse Aggregate Designation for Concrete"	
1	ASTM #467
2	ASTM #67
3	ASTM #7
4	ASTM #89
7	CA-70
8	CA-80

S-69.4 MnDOT 2461.2.F.1.e shall be deleted and replaced with the following:

F.1.e Additional Concrete Mix Designation Digits

The Contractor may add additional digits to the right of the required digits in the concrete mix number.

S-69.5 Table 2461-6 of MnDOT 2461.2.F.2.a shall be deleted and replaced with the following:

S.P. 6284-162, S.P. 062-609-006, S.A.P. 062-593-003

Table 2461-6 Concrete Mix Design Requirements (Not applicable to Mass Concrete)										
Concrete Grade	OLD Mix Number	NEW Mix Number	Intended Use 	Maximum w/c ratio †	Maximum Cementitious Content (lbs/yd ³)	Maximum %SCM (Fly Ash/Slag/Ternary)	Slump Range	Minimum 28-day Compressive Strength, f'c	3137 Spec.	
B Bridge Substructure	3Y43	3B52 *	Abutment, stems, wingwalls, paving brackets, pier columns and caps, CIP wall stems, pier struts	0.45	750	30/35/40	2 - 5"	4000 psi	2.D.1	
F Flatwork	3A22 3Y22	3F32 *	Slipform curb and gutter	0.42	750	30/35/0	½ - 3" ‡	4500 psi	2.D.1	
	3A32 3Y32 3A34	3F52 *	Sidewalk, curb and gutter, slope paving, median sidewalk, driveway entrances, ADA pedestrian sidewalk	0.45	750	25/30/0	2 - 5"	4500 psi	2.D.1	
	1A43	1G52 *	Footings and pilecap	0.55	750	30/35/40	2 - 5"	4500 psi	2.D.1	
G General Concrete	3A43 3B42 3Y43	3G52 *	Footings, pilecap, walls, cast-in-place manholes and catch basins, fence posts, signal bases, light pole foundations, erosion control structures, cast-in-place box culverts, culvert headwalls, open flumes	0.45	750	30/35/40	2 - 5"	4500 psi	2.D.1	
	3Y12	3M12	Slipform Median barrier, non-bridge	0.42	750	30/35/40	½ - 1" ‡	4500 psi	2.D.1	
M Median Barrier	3Y32	3M52	Median barrier, non-bridge	0.45	750	30/35/40	2 - 5"	4500 psi	2.D.1	
P Piling	1C62	1P62 *	Piling, leveling pads	0.60	750	30/35/40	3 - 6"	3000 psi	2.D.1	
R Pavement Rehabilitation	3A32 3B42	3R52 *	CPR - Full depth concrete repairs, concrete base	0.45	750	30/35/40	2 - 5"	4000 psi	2.D.3	
S Bridge Superstructure	3Y16	3S12	Slipform bridge barrier, parapets, end post	0.42	750	30/35/40	½ - 1" ‡	4000 psi	2.D.2	
	3A32 3A42 3Y43 3Y46 3Y46A	3S52	Median barrier, raised median, pilaster, curb, sidewalk, approach panel, formed bridge barrier, parapet, end post, collar	0.45	750	30/35/40	2 - 5"	4000 psi	2.D.2	
	1X62 1X46	1X62	Cofferdam seals, rock sockets, drilled shafts	0.45	750	30/35/40	3 - 6"	5000 psi	2.D.1	
X Miscellaneous Bridge	3X46	3X62	Drilled shafts above frost line	0.45	750	30/35/40	3 - 6"	5000 psi	2.D.1	
Y Bridge Deck #	3Y33 3Y33A 3Y36 3Y36A	3Y42-M 3Y42-S	Bridge decks, integral abutment diaphragms, pier continuity diaphragms, expansion joint replacement mix	0.45	750	30/35/40	2 - 4"	4000 psi	2.D.2	
		3YHPC-M 3YHPC-S 3YHPCCLC-M 3YHPCCLC-S	Bridge decks, integral abutment diaphragms, pier continuity diaphragms, expansion joint replacement mix	See Special Provisions of Contract						2.D.2
	3A37 3Y37	3Y47 *	Deck patching mix	0.45	750	30/35/40	2 - 4"	4000 psi	2.D.2	

* The Contractor may choose to use the Coarse Aggregate Designation "1" for the 4th digit in accordance with Table 2461-3. Mix 3Y47 requires the use of Coarse Aggregate Designation "7" or "3" for the 4th digit in accordance with Table 2461-3.

|| If the intended use is not included elsewhere in the Specification or Special Provisions, use mix 3G52, unless otherwise directed by the Engineer.

† The minimum water/cement (w/c) ratio is 0.30.

‡ Adjust slump in accordance with 2461.3.G.7.a for slipform concrete placement.

The "-S" indicates a bridge deck with a structural slab and "-M" indicates a monolithic bridge deck.

S-69.6 MnDOT 2461.2.F.2.b shall be deleted and replaced with the following:

F.2.b High-Early Concrete Mix Design Requirements

The Department defines High-Early (HE) concrete as concrete designed to achieve the minimum strength to opening at 48 hours. Unless otherwise included in the plans, all HE concrete requires approval of the Engineer prior to incorporation into the work.

Control cylinders are required for determining strength; in lieu of control cylinders the Contractor may use the maturity method in accordance with 2461.3.G.6, "Estimating Concrete Strength by the Maturity Method."

The Department defines the concrete mix design requirements for High-Early concrete in accordance with Table 2461-7.

Table 2461-7 High-Early (HE) Concrete Requirements (Not applicable to Mass Concrete)									
OLD Mix Number	NEW Mix Number	Concrete Grades Allowed	Minimum Time to Opening	Maximum w/c ratio	Maximum Cementitious Content (lbs/ yd³) *	Slump Range	Minimum Strength to Opening	Minimum 28-day Compressive Strength, f'c	3137 Spec.
3A22HE	3HE32	F	48 hrs	0.42	750	1 – 3" 	3000 psi	4500 psi	2.D.1
3A32HE 3Y43HE	3HE52	B, F, G	48 hrs	0.42	750	2 – 5"	3000 psi	4500 psi	2.D.1
3Y33HE 3Y46HE 3Y37HE	3YHE52	Y (Repairs Only)	48 hrs	0.42	750	2 – 5"	3000 psi	4000 psi	2.D.2
3A32HE	3RHE52	R (Repairs Only)	48 hrs	0.42	750	2 – 5"	3000 psi	4000 psi	2.D.3
* Supplementary Cementitious Materials allowed.									
Adjust slump in accordance with 2461.3.G.7.a for slipform concrete placement.									

S-69.7 The second paragraph of MnDOT 2461.2.F.3 shall be deleted and replaced with the following:
 Design the concrete mix to an absolute volume of 27.00 – 27.27 cu. ft [1.0 – 1.01 cu. m].

S-69.8 MnDOT 2461.2.F.3.a, 2461.2.F.3.a(1) and 2461.2.F.3.a(2) shall be deleted and replaced with the following:

F.3.a Preliminary Test Data Requirements for Level 2 Mixes

For Level 2 Mixes, submit the proposed Mix Design Proportions on the *Contractor Mix Design Submittal* based upon either a suitable experience record or conventional trial mixtures not to exceed the limits specified in Table 2461-6 or 2461-7.

F.3.a(1) Suitable Experience Record

A suitable experience record consists of at least 30 consecutive tests, or two groups of consecutive tests totaling at least 30 tests, within the previous 18 months. If the Contractor does not have 30 tests, the Concrete Engineer will consider a minimum of 10 test results representing a time period of at least 45 days.

The Concrete Engineer considers a suitable experience record to have the following characteristics as compared to the proposed mix:

- (a) Average compressive strength (f'cr) meeting the required 28-day compressive strength and no greater than 1000 psi above the required 28-day compressive strength,

- (b) Same type or grade of cementitious materials,
- (c) Same class of coarse aggregate,
- (d) Proportions of coarse and fine aggregate within 10% of the proposed,
- (e) Water/Cement ratio no greater than the maximum allowed,
- (f) Supplementary cementitious material contents within 5%, and
- (g) Batching conditions and testing procedures similar to those expected for the proposed work.

Submit all test results on the *Strength Test Data* sheet as part of the *Contractor Mix Design Submittal*.

The Concrete Engineer reserves the right to request batching data representing the suitable experience record submittal.

F.3.a(2) Conventional Trial Mixtures

If the Contractor does not have a suitable experience record as required in 2461.2.F.3.a(1) above, establish concrete proportions from trial mixtures, utilizing an AMRL accredited laboratory in accordance with the following:

- (a) Use proportions and consistencies required for proposed work at the w/c ratios or cementitious materials content that will produce a strength meeting or exceeding the required 28-day compressive strength ($f'c$) in accordance with Table 2461-6 or 2461-7;
- (b) Design trial mixtures to produce slump within ± 0.75 in. of maximum permitted;
- (c) For air-entrained concrete, design trial mixtures to produce air content within ± 0.5 percent of maximum allowable air content;
- (d) For each w/c ratio or cementitious materials content, make and cure at least three test cylinders for 28-day breaks in accordance with ASTM C 192. For HE concrete mixes, in addition to the 28-day cylinders, make a set of three test cylinders for 48-hour breaks in accordance with ASTM C 192.

Submit all test results for the trial mixtures, certified by the AMRL accredited laboratory, in addition to the *Contractor Mix Design Submittal*.

S-69.9 MnDOT 2461.2.G shall be deleted and replaced with the following:

G Department Designed Concrete Mixes

The Department will provide the mix proportions for the following concrete uses in accordance with Table 2461-10, "Department Designed Concrete Mixes":

Table 2461-10			
Department Designed Concrete Mixes			
Type of Concrete	Mix Number	Specification	Mix Design Location
Field Batched Patching Mix	3U18	2302	Table 2302-1
Low Slump Concrete	3U17A	2404	Weekly Report of Low Slump Concrete
Grout	1AGrout and 3AGrout	2461	Table 2461-11
Lean Mix Backfill	Lean-Mix	2520	Table 2520-1
Random Riprap (Matrix)	3AGrout	2511	Special Provisions
Bagged Patching Mix	3U18 and 3U18M	3105	Table 3105-1

Table 2461-11
Concrete Mix Design Requirements for Grout Mixes

Grout Mix Number*	Maximum w/c ratio	Water Content (pounds)	Cement Content (pounds)	Fine Aggregate Calculation (pounds)	%Air Content	Maximum Slump	Minimum 28-day Compressive Strength, f'c
1AGROUT	0.50	379	758	1031 x Specific Gravity	3.0%	As needed	4000 psi
3AGROUT	0.44	379	865	878 x Specific Gravity	10.0%	As needed	4000 psi

* Do not provide grout containing coarse aggregate or fly ash.

S-69.10 MnDOT 2461.3.F.1.a(3) shall be deleted and replaced with the following:

- (3) Include a site map showing stockpile locations identified with the MnDOT pit number.

S-69.11 MnDOT 2461.3.F.1.b shall be deleted and replaced with the following:

F.1.b Maintaining Plant Certification

The Producer will maintain plant certification by:

- (1) Notifying the Department of any upcoming cementitious or admixture changes;
- (2) Updating the Contact Report with any material or equipment changes and submitting to the Department;
- (3) Sampling and testing the materials in accordance with this section and the requirements of the Schedule of Materials Control;
- (4) Documenting the production and testing of the materials used in the certified ready-mix concrete.

Any procedural changes that cause non-compliance with this program may result in de-certification of the plant and cessation of further production of Department concrete as determined by the Concrete Engineer in accordance with 2461.3.F.4.h, "Decertification."

S-69.12 MnDOT 2461.3.F.4.g shall be deleted and replaced with the following:

F.4.g Signing the Certificate of Compliance

The Producer's MnDOT Certified Plant Level 1 or Level 2 technician will:

- (1) Review the first Certificate of Compliance for each mix type, each day, for accuracy; and
- (2) Legibly hand sign the Certificate of Compliance at a location designated for Producer signature signifying agreement to the terms of this program and to certify that the materials comply with the requirements of the Contract; and
- (3) Write their MnDOT Technical Certification Number next to their signature.

S-69.13 Delete the Title of Table 2461-17 of MnDOT 2461.3.G.5.e and replace with the following:

Table 2461-17
Acceptance Criteria for Standard 28-day Cylinders

S-69.14 Delete MnDOT 2461.3.G.5.e(4) and replace with the following:

G.5.e(4) Non-Conforming Material

If the Contractor inadvertently places concrete not meeting the strength requirements into the work, the Engineer will not accept nonconforming concrete at the contract unit price. For concrete not meeting the moving average of three (3) consecutive strength tests, the Engineer will adjust the contract unit price for the contract item of the concrete in accordance with Tables 2461-19 for Concrete Grades F, G, M, P and R.

For Concrete Grades B, S, X and Y strength failures the Engineer, in conjunction with the Concrete Engineer, will determine adjusted contract unit prices in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work."

When there is not a separate contract unit price for *Structural Concrete* for an item of work or the concrete is a minor component of the contract unit price, the Department will reduce payment based on a concrete price of \$100.00 per cu. yd [\$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.

Table 2461-19 Concrete Grades F, G, M, P, and R	
Moving average of 3 consecutive strength tests	Adjusted Contract Unit Price
> 93.0% of f'c	The Department will pay 87.5 percent of the relevant contract unit price for materials placed as approved by the Engineer.
≥ 87.5% and ≤ 93.0% of f'c	The Department will pay 75 percent of the relevant contract unit price for materials placed as approved by the Engineer.
< 87.5% of f'c	Remove and replace concrete in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer will not pay for the concrete.

S-69.15 MnDOT 2461.3.G.6.a and 2461.3.G.6.a(1) shall be deleted and replaced with the following:

G.6.a Development of Maturity-Strength Relationship

The Engineer will allow development of the maturity curve in either the laboratory or in the field, provided the precautions for field curing and testing are followed, as described in the MnDOT Concrete Manual. Test the concrete strength specimens for development of the maturity curve.

Determine the strength development criteria based on the type of concrete in accordance with the following:

- (1) For concrete pavement: 2301.3.O, "Opening Pavement to Traffic,"
- (2) For concrete pavement repairs: 2302.3.B.4, "Opening to Construction Equipment and Traffic,"
- (3) For concrete structures: 2401.3.G, "Concrete Curing and Protection"
- (4) For sidewalks, driveway entrances and curb and gutter, a minimum of 3000 psi [20.6 MPa] is required.

Until an acceptable strength-maturity relationship is established, verify strength using concrete beams or cylinders.

G.6.a(1) Procedure

Estimate the in-place concrete strength using the maturity method as described in ASTM C 1074, except as noted in this specification as follows:

- (a) Using 15 beams or 17 cylinders;
- (b) The Nurse-Saul method of computing maturity;
- (c) A datum temperature of -10°C (14°F);
- (d) Maintain specimens at temperatures greater than 50° F for the duration of the maturity curve development.

Test three (3) strength specimens at five different ages specified in Table 2461-20 for the type of concrete work.

Table 2461-20	
Chronological Testing Ages of Strength Specimens	
Type of Concrete	Testing Ages *
Concrete Pavement as defined in 2301	Determined by the Contractor
Normal Strength Concrete as defined in 2461	1, 2, 3, 7 and 28 days
High-Early (HE) Concrete as defined in 2461	12 hours, 1, 2, 7 and 28 days
Ultra High-Early (UHE) Concrete as defined in 2302	3, 4 and 8 hours, 1 and 14 days
* The Contractor may adjust the testing ages if approved by the Engineer, in conjunction with the Concrete Engineer.	
Test at least two (2) sets of strength specimens before the anticipated opening strength.	

S-69.16 The first paragraph of MnDOT 2461.3.G.6.c shall be deleted and replaced with the following:

Perform a verification strength test to ensure the in-place concrete strength correlates with the maturity-strength relationship as follows:

- (1) Notify the Engineer at least 24 hours in advance of the time and location of both the verification specimen's casting and strength testing.
- (2) When the maturity curve is developed prior to the start of construction or in a laboratory, perform a verification strength test on the first day of concrete placement.
- (3) Perform a verification strength test at least once every seven (7) calendar days during normal plant production.
- (4) If the plant has not supplied concrete to the project for a period of greater than thirty (30) calendar days, perform a verification strength test.
- (5) Cast 3 beams or 4 cylinders for each verification strength test.
- (6) The Engineer will test the concrete strength specimens for verification of the maturity curve as close to the maturity value determined to represent the opening, loading or form removal strength criteria in accordance with section 5-694.500 of the Concrete Manual.
- (7) Record the results of verification test on the *Concrete Maturity-Strength Verification* form and submit an updated copy with the newest test result to the Engineer the day that the verification test is completed.
- (8) The Engineer may direct additional verification testing as necessary.
- (9) Submit electronic data from the maturity meters or temperature loggers in a comma-delimited (.txt or .csv) file format to the Engineer, which includes at least the project number, date and location of the meters or loggers.

S-69.17 MnDOT 2461.3.G.6.d(2) shall be deleted and replaced with the following:

- (2) Increase in the water-cementitious materials ratio by more than 0.02,

S-69.18 Delete the Title of Table 2461-23 of MnDOT 2461.3.G.7.b and replace with the following:

Table 2461-23 All Concrete Grades (Excludes Grade Y)

S-69.19 Delete the Title of Table 2461-24 of MnDOT 2461.3.G.7.b and replace with the following:

Table 2461-24 Bridge Deck Concrete, Grade Y
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S-69.20 Delete the Title of Table 2461-27 of MnDOT 2461.3.G.8.a and replace with the following:

Table 2461-27 General Concrete (Target Air Content 6.5%)

S-70 **(2462) PRECAST CONCRETE**
SP2016-152

MnDOT 2462 is hereby modified as follows:

S-70.1 MnDOT 2462.2.A shall be modified to include the following:

A.5 Ternary Mixes

Ternary mixes are defined as portland cement and two other supplementary cementitious materials, or blended cement and one other supplementary cementitious material with a maximum replacement of 40% by weight.

S-70.2 MnDOT 2462.2.F.1 shall be deleted and replaced with the following:

F.1 Classification of Concrete

The Department will classify concrete by mix number to identify type, grade, consistency and aggregate size, if any, in accordance with Table 2462-1.

Table 2462-1 Mix Number Identification				
First Digit	Second Digit	Third Digit	Fourth Digit	Additional Digits
Type Designation	Grade Designation	Maximum Slump	Coarse Aggregate Gradation Designation	Additional Digits Allowed

S-70.3 MnDOT 2462.2.F.1.d shall be deleted and replaced with the following:

F.1.d Coarse Aggregate Designation

Select the appropriate coarse aggregate gradation designation in accordance with Table 2462-3 based on the intended use and the gradation requirements in 3137, "Coarse Aggregate for Portland Cement Concrete."

Table 2462-3	
Coarse Aggregate Designation for Concrete	
Designation	Coarse Aggregate Gradation
0	Job Mix Formula (JMF) combination of fine and coarse aggregate
	Table 3137-4, "Coarse Aggregate Designation for Concrete"
1	ASTM #467
2	ASTM #67
3	ASTM #7
4	ASTM #89
7	CA-70
8	CA-80

S-70.4 MnDOT 2462.2.F.1.e, 2462.2.F.1.f and 2462.2.F.1.g shall be deleted and replaced with the following:

F.1.e Additional Concrete Mix Designation Digits

The Contractor may add additional digits to the right of the required digits in the concrete mix number.

S-70.5 Table 2462-6 of MnDOT 2462.2.F.2.a shall be deleted and replaced with the following:

Table 2462-6 Precast Concrete Mix Design Requirements									
Concrete Grade	OLD Mix Number	NEW Mix Number	Intended Use *	Maximum w/c ratio	Cementitious Content (lbs/cy)	Maximum %SCM (Fly Ash/ Slag/ Ternary)	Slump Range 	Minimum 28-day Compressive Strength, f'c † ‡	3137 Spec.
M	3Y32	3M82	Precast concrete barrier	0.45	530 – 750	30/35/40	1 – 8”	4500 psi	2.D.1
W	1W36	1W82	Bridge girders ‡	0.42	660 – 850	30/35/40	1 – 8”	Design Strength Per Plan	2.D.1
	3W26 3W36 3W46	3W82	Noisewall posts, box culverts, bridge girders ‡	0.42	660 - 850	30/35/40	1 – 8”	Design Strength Per Plan	2.D.1
Y	3Y43	3Y82	Jumbo retaining wall blocks, MSE walls, noisewall panels	0.45	605 – 850	30/35/40	1 – 8”	4300 psi	2.D.1
	3Y43	3Y82	Thin panel retaining walls	0.45	605 – 850	30/35/40	1 – 8”	4300 psi	2.D.2
<p>* If the intended use is not included elsewhere in the Specification or Special Provisions, design concrete mix 3W82. Slumps exceeding the maximum allowed require approval of the MnDOT State Materials Engineer. † Requires control cylinders for determining shipping strength. ‡ Review the Plans to determine if the bridge girders require air entrainment.</p>									

S-71 (2471) STRUCTURAL METALS

REVISED 09/25/15

SP2016-153

S-71.1 The Contractor is hereby referred to Section SB (STRUCTURAL METALS) in Division SB which is attached to this Proposal. The provisions in SB- (STRUCTURAL METALS) shall be applicable to the entire Contract.

S-72 (2472) METAL REINFORCEMENT

The provisions of MnDOT 2472 are modified with the following:

S-72.1 Table 2472-2 is hereby deleted from MnDOT 2472.4A and replaced with the following sentence and table:

Reinforcement bars may be marked in either U.S. Customary or metric sizes. The conversion shall be made per the following table:

Table 2472-2 Reinforcement Bars Theoretical Weights Nominal Dimensions			
U.S. Customary Bar Size	Metric Bar Size*	Diameter, in [mm]	Weight, lb/ft [kg/m]
3	10	0.375 [9.5]	0.376 [0.560]
4	13	0.500 [12.7]	0.668 [0.994]
5	16	0.625 [15.9]	1.043 [1.552]
6	19	0.750 [19.1]	1.502 [2.235]
7	22	0.875 [22.2]	2.044 [3.042]
8	25	1.000 [25.4]	2.670 [3.973]
9	29	1.128 [28.7]	3.400 [5.060]
10	32	1.270 [32.3]	4.303 [6.404]
11	36	1.410 [35.8]	5.313 [7.907]
14	43	1.693 [43.0]	7.650 [11.380]
18	57	2.257 [57.3]	13.600 [20.240]

* Bar designation numbers approximate the nominal diameter of the bar in millimeters

S-73 (2501) BULKHEAD CULVERT

SP2016-155

This work shall consist of constructing a concrete bulkhead across part of an existing outlet apron as shown in the Plan, in accordance with the applicable MnDOT Standard Specifications and the following:

Measurement will be made by the number of bulkheads constructed complete in place as specified. Payment will be made under Item 2501.602 (Bulkhead Culvert) at the Contract bid price per each, which shall be payment in full for all costs involved.

S-74 **(2501) PLUG FILL AND ABANDON PIPE CULVERT**

SP2016-156

This work shall consist of plugging and abandoning in place centerline pipe culverts in accordance with the applicable MnDOT Standard Specifications and the following:

S-74.1 The pipes shown in the Plan to be plugged and abandoned shall be filled with sand and the ends plugged to the satisfaction of the Engineer.

S-74.2 Measurement will be made by the number of pipes plugged and abandoned as specified. Payment will be made under Item 2501.602 (Plug Fill and Abandon Pipe Culvert) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto.

S-75 **(2501) SAFETY GRATE**

SP2016-159

This work shall consist of furnishing and installing safety grates as shown in the Plans, in accordance with the applicable MnDOT Standard Specifications and the following:

Measurement will be made by the number of safety grates furnished and installed as specified. Payment will be made under Item 2501.602 (Safety Grate for ___" ___ Apron) at the Contract bid price per each, which shall be payment in full for all costs involved.

S-76 **(2502) SUBSURFACE DRAINS**

SP2016-162

MnDOT 2502 is hereby modified as follows:

S-76.1 MnDOT 2502.4D is changed to read:

The CS oversleeves with rodent guards shall be incidental.

S-76.2 The provisions of MnDOT 2502.5, "Basis of Payment," are supplemented as follows:

Regardless of option chosen, payment for Subcut Drain Type will be under Item 2502.541 (4 in Perforated PE Pipe Drain) at the Contract bid price per linear foot.

S-77 **(2502) DRAINAGE SYSTEM**

S-77.1 DESCRIPTION OF WORK

This work consists of constructing drainage systems and installing pipe and appurtenance materials for Retaining Walls A, B, C, D, and E and shall be in accordance with the provisions of MnDOT 2502, 3245, 3733 and details in the Retaining Wall Plans.

S-77.2 MATERIALS

Provide one of the following types of drain pipe as shown or allowed as an option on the plans. Provide fittings connecting multiple lengths of drain pipe made of the same material as the pipe. Provide nonperforated pipe except where the perforated type is shown on the plans. The Contractor may use pipe meeting the lowest strength class listed in the referenced materials specification, unless higher strength pipe is shown on the plans or specified in the special provisions. Provide nonperforated Thermoplastic (TP) pipe for discharge pipe, radial connecting pipe, and associated fittings. Provide special fabrication or jointing details if shown on the plans or as approved by the Engineer. Provide appurtenances, geotextiles, metal oversleeves with rodent screens, and precast

concrete headwalls with all subsurface drains for retaining walls, to intercept and carry off underground water in accordance with section 2502 "Subsurface Drains", 3245 "Thermoplastic Pipe", 3733 "Geotextiles", and as shown on the plans.

S-77.3 MEASUREMENT

No measurement will be made of the pipe, appurtenance material, or geotextile that is included in the drainage system pay item. All work performed as specified above will be considered to be included in a single lump sum for which payment is made under Item No. 2502.601, "DRAINAGE SYSTEM".

S-77.4 BASIS OF PAYMENT

Payment for Item No. 2502.601, "DRAINAGE SYSTEM" will be made at the Contract price per lump sum and shall be compensation in full for all costs of constructing drainage systems for Retaining Walls A, B, C, D, and E, as described above.

S-78 (2503) PIPE SEWERS

SP2016-165

This work shall consist of furnishing and installing pipe sewers and fittings in accordance with the Plans, the applicable MnDOT Standard Specifications, Section 12 of the AASHTO LRFD Bridge Design Specifications, the attached detail "PLASTIC PIPE INSTALLATION REQUIREMENTS", and the following:

S-78.1 If pipe options are allowed, measurement and payment will be made by the length and type of pipe indicated on the Plan, regardless of the type of material installed. No adjustments for any additional work required by the Contractor choice of material.

S-79 (2503) CONNECT TO EXISTING STORM SEWER

SP2016-166

This work consists of constructing connections into existing storm sewers in accordance with the applicable MnDOT Standard Specifications and the following:

Measurement will be made by the number of connections constructed as specified. Payment will be under Item 2503.602 (Connect to Existing Storm Sewer) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to, all materials and labor necessary to connect the proposed drainage structure to the existing storm sewer pipe. Any damage caused to the existing storm sewer pipe shall be repaired at no expense to the Department and to the satisfaction of the Engineer.

S-80 (2506) MANHOLES AND CATCH BASINS

SP2016-179

MnDOT 2506 is hereby modified and/or supplemented with the following:

S-80.1 Adjusting Rings manufactured from High Density Polyethylene (H.D.P.E.) are approved as an alternate to concrete adjusting rings. It is important that the H.D.P.E. adjusting ring be sealed with the product recommended by the manufacturer.

S-81 (2506) CONSTRUCT DRAINAGE DESIGN SPECIAL 2 AND 3

This work shall consist of constructing special drainage structures in accordance with the Plans, the applicable MnDOT Standard Specifications, and the following:

S-81.1 The grate in Des Special 2 and 3 is incidental to the structure, no additional payment will be made for the grate.

S-82 (2506) CONSTRUCT DRAINAGE DESIGN SPECIAL 1

S-82.1 This work shall consist of constructing a commercial type SPCD (SAFL Baffle) as manufactured by Upstream Technologies, 550 County Road D West Suite 3, New Brighton, MN 55112.

S-82.2 SUBMITTALS

- (A) An Operation and Maintenance manual from the manufacturer, specifically for the SPCD supplied. As a minimum, it shall list the maximum depth of sediment accumulation for which the SPCD achieves the specified TSS removal.

S-82.3 LIMITATIONS FOR SPACE AND PLACEMENT

The Contractor must ensure that the SPCD and external bypass structure (if required) can be constructed within the Right of Way with access covers located as close to edge of shoulder or back of curb as practicable as shown in the Plans, does not conflict with either existing or proposed utilities, and fits the designed pipe alignments unless otherwise approved by the Engineer. Flowline elevations at the outlet end of discharge pipes shall remain unchanged and any changes in pipe grades must be approved by the Engineer. Note- there is limited allowance for difference in elevation from pipe flowlines and SPCD and external bypass structure rim elevations. Check the construction drawings for these limitations.

S-82.4 MATERIALS OF CONSTRUCTION

- (A) All gaskets between precast sections shall be specifically designed to be watertight and resist hydrocarbons.
- (B) Inlet and outlet pipes shall be securely set into the structure using non-shrink grout or approved elastomeric pipe seals so that the SPCD is watertight. Sealing boots are acceptable. All lift holes shall be filled flush with mortar and sealed.
- (C) The structures, regardless of location in relation to the roadway, shall be rated for HS-25 loading. The SPCD and external bypass structure shall be precast concrete conforming to ASTM C-478 with attained compressive strength of 4000 psi prior to shipment to the project site.
- (D) All internal components (including fasteners) of the SPCD shall be stainless steel, reinforced concrete, fiberglass, or copolymer plastic. It is not necessary to dry-fit the SPCD components prior to delivery to the site if the following requirements are met.
 - i. The internal components are proprietary and are installed in a non-proprietary sump manhole structure. This includes new structures as well as existing structures to be retrofitted.
 - ii. The internal components can be installed through the casting after the manhole/catch basin structure is assembled and in place.
 - iii. The internal components are adjustable to fit the width of the structure without the need for cutting/drilling or other modification.

For all SPCD's not meeting all three of these requirements, the components shall be dry fitted in the manufacturer's yard prior to shipment to the project site. The SPCD when dry fitted shall have all component

connections pre-drilled and anchored. Section joints shall be clearly marked for the Contractor to properly install and align the SPCD in the field.

S-82.5 MAINTENANCE DURING CONSTRUCTION

The Contractor shall check the SPCD monthly during the construction of the project, after every rainfall event greater than 0.5", and within 24 hours of being directed by the Engineer. The SPCD must be cleaned when the depth of material reaches the manufacturer's guideline for maximum sediment depth. Prior to final acceptance of the project as a whole, the Contractor shall clean the SPCD of debris, sediment, and floatable materials and properly dispose. All costs of cleaning the SPCD, including but not limited to use of vacuum truck, shall be incidental expenses to the construction of the SPCD.

S-82.6 METHOD OF MEASUREMENT

SPCD will be measured per each, complete and installed. This includes the baffle (not including the manhole), all internal components, castings, interim and final cleanings, labor, and any other costs to provide the SPCD in-place as specified.

External bypass will be measured per each, complete and installed. This includes the the baffle (not including the manhole), all internal components, castings, interim and final cleanings, labor, and any other costs to provide the SPCD in-place as specified.

S-82.7 BASIS OF PAYMENT

Payment for SPCD and external bypass structure shall be in accordance with the schedule set forth below at the appropriate Contract bid price. Such payment shall be compensation in full for all costs associated with sizing, furnishing, and installing SPCD and external bypass structure, including all castings, non-proprietary manhole/catch basin sump structures, proprietary structures, internal components, interim and final cleanings, complete in-place as specified, and as approved and directed by the Engineer.

ITEM NO.	DESCRIPTION	UNIT
2506.603	Construct Drainage Des Special 1	Each

S-82.8 CONTACTS

The following table lists some of the devices that could meet this specification. Phone numbers and names of contacts are available on these websites.

<i>SPCD Name</i>	<i>Website Address</i>
SAFL Baffle	www.RevolutionaryBaffle.com

S-83 (2521) CONCRETE WALK (ADA)

SP2016-186

This work shall consist of constructing Concrete Walk, including necessary Subgrade Preparation, Aggregate Base, and Grading as indicated in the Plan, in accordance with the provisions of MnDOT 2112, 2211, 2521, other Contract provisions, and the following:

S-83.1 CONSTRUCTION REQUIREMENTS

(A) **Concrete Walk** – The walk shall be constructed as detailed in the Plan and conform to the requirements of MnDOT 2521, Walks.

To avoid corner breaks, all walk edges shall be formed and constructed perpendicular to the back of curb and gutter sections and concrete structures for a one foot minimum distance.

All existing signs shall be salvaged and reinstalled as directed by the Engineer or as indicated in the Plan.

(B) **Grading** – If not otherwise detailed in the Plan, all fill sections shall be graded flush with the top of walk for a minimum 18 inches from the edge of walk and then down at a maximum 1:3 slope to existing terrain. The Contractor shall blend in the toe of fill slope and adjacent areas so as not to adversely affect drainage.

(C) **Landings** – An initial landing is the first required landing of a pedestrian ramp. All initial landings required at the top of a ramped sloped surface (>2% longitudinal slope), shall be formed and placed separately in an independent concrete pour. This does not include initial landings placed at roadway grade such as depressed corners, parallel ramps, rural flat landings, or flat cut-throughs. Secondary landings consist of all landings beyond the initial landing. These secondary landings do not require a separate landing pour. All landings adjacent to push buttons shall be formed and placed separately in an independent concrete pour, regardless of ramp type.

Wet casting or drill and grouting of dowel bars will be required in accordance with the details shown in Standard Plan 5-297.250 Sheet 5 of 5. These bars may be either smooth or deformed and shall be installed with 2 inch minimum concrete cover.

When not accounted for in the Plan, payment for these bars will be made under Item 2301.602 (Drill & Grout Reinforcement Bar (Epoxy Coated)) by the Each at the Predetermined Price of \$10.00 per bar furnished and installed. All necessary subgrade preparation and aggregate base placement for the entire ramp construction limit shall be done before the initial landing is constructed at each location.

S-83.2 METHOD OF MEASUREMENT

Measurement of Concrete Walk will be made by top surface area.

S-83.3 BASIS OF PAYMENT

Payment will be made under Item 2521.618 (Concrete Walk) at the Contract bid price per square foot, including the area of walk under the truncated domes, which shall be compensation in full for all costs of furnishing, and installing the required material. In areas where Directional Curb is constructed, the triangular area that is behind the projected back of curb line will be paid for as Concrete Walk at the Contract bid price for Item 2521.618 (Concrete Walk). All excavation or borrow including hauling or disposal that is necessary to meet the walk grades in the Contract shall be incidental unless specifically provided for in the Plan. If common borrow requirements exceed 8 cubic yards (CV) at any individual site/quadrant, than the common borrow required at that location and not specifically accounted for in the Plan will be paid for at \$20 per cubic yard (CV).

If the Plan calls for payment of Aggregate Base and/or other Grading items for a pedestrian facility, then payment will only be made for the locations specifically provided for in the Plan. All salvaging and reinstalling of signs as a result of concrete walk construction shall be incidental unless specifically provided for in the Plan.

S-84 **(2531) CONCRETE CURB AND GUTTER (ADA)**

SP2016-187

This work shall consist of constructing Concrete Curb and Gutter and the necessary Aggregate Base in accordance with the provisions of MnDOT 2531, other Contract provisions, and the following:

S-84.1 CONSTRUCTION REQUIREMENTS

Concrete Curb and Gutter - The curb and gutter shall be constructed to meet the details in the Plan. The transition from the existing curb and gutter section to the new curb and gutter section should occur within 5-10 feet of the point where the curb and gutter construction begins. The gutter inslope shall be constructed as detailed in the Plans. The gutter inslope transitions shall occur outside of the zero height curb area. The proposed gutter width shall be modified as necessary so as not to protrude into the adjacent travel lane with approval from the Engineer.

At all locations where new curb and gutter meets existing curb and gutter, place saw cut to leave a minimum 3 feet of in place curb and gutter between an existing joint and the proposed saw cut. If the 3

foot minimum cannot be maintained, place the saw cut over the existing joint. At this saw cut location the Contractor shall drill and grout 2 No. 4 x 12 inch long reinforcement bars (Epoxy coated). Reinforcement bars shall be placed a minimum of 3 inches from face and back of gutter section. When not accounted for in the Plan, payment for these bars will be made under Item 2301.602 (Drill & Grout Reinforcement Bar (Epoxy Coated)) by the Each at the Predetermined Price of \$ 10.00 per bar furnished and installed.

The Contractor must form, at a minimum, the top 1.5 inches of the gutter face. The Contractor shall not use the existing roadway edge as a form for the top 1.5 inches of the gutter face unless approved by the Engineer.

If the gutter flow line in front of the proposed curb ramps exceeds 2.0% slope, the flow line should be adjusted to allow a flatter slope in front of the curb ramps, but still provide positive drainage. The bituminous patch in front of the truncated domes must not exceed 5% measured perpendicular to the flow line. In no case shall a newly constructed curb and gutter flow line exceed 8% unless the roadway profile exceeds 8%.

The Contractor shall not alter any existing drainage patterns unless called for in the plans or approved by the Engineer.

The Contractor shall construct a contraction joint through the curb and gutter section at the bottom of the curb height transitions where the curb height equals zero inches. If any curb and gutter joints fall within the PAR, they shall meet MnDOT 2521.3C.

When constructing directional curb where truncated domes are placed perpendicular to the path of travel, the concrete between the grade break/edge of truncated domes and the gutter toe shall be constructed integral.

S-84.2 METHOD OF MEASUREMENT

Measurement of Concrete Curb and Gutter will be by the linear foot measured at the face of the curb.

S-84.3 BASIS OF PAYMENT

Payment will be made under Item 2531.603 (Concrete Curb and Gutter) at the Contract bid price per linear foot, which shall be compensation in full for all costs of furnishing and installing the required material including Aggregate Base.

S-85 (2531) CONCRETE CURB DESIGN V (ADA)

SP2016-188

This work shall consist of constructing Concrete Curb Design V of varying heights up to 8 inches as detailed in the Plan and in accordance with the provisions of MnDOT 2531, other Contract provisions, and the following:

S-85.1 CONSTRUCTION REQUIREMENTS

The Concrete Curb Design V shall be constructed as detailed in the Plan. Concrete Curb Design V may be constructed independent of or integral to the adjacent sidewalk. The bottom elevation of the Concrete Curb Design V shall match the bottom elevation of the adjacent sidewalk slab. When the Concrete Curb Design V is constructed independent of the sidewalk, the portion of the Concrete Curb Design V that will have new concrete walk placed against it shall be clean so as to maximize bonding between the walk and Concrete Curb Design V. The joint locations in the curb shall align with the joint locations in the adjacent concrete walk.

The locations requiring the use of Concrete Curb Design V will solely be determined in the Plans or in the field by the Engineer. Any Concrete Curb Design V that is constructed without pre approval of the Engineer will be considered unauthorized work for which no compensation will be made and may be removed at the Engineer's discretion. The height and length of the Concrete Curb Design V to be constructed shall be recommended by the Contractor and approved by the Engineer before the Concrete Curb Design V is constructed.

S-85.2 METHOD OF MEASUREMENT

Measurement will be by the linear foot of Concrete Curb Design V constructed measured at the face of curb. Curb height shall be measured from the top of the adjacent concrete walk to the top of the curb.

S-85.3 BASIS OF PAYMENT

Payment will be made under Item 2531.603 (Concrete Curb Design V) at the Contract bid price per linear foot, which shall be compensation in full for all costs of performing the work as specified. All concrete approach noses will be paid as 2 feet of Concrete Curb Design V and 2 feet of roadway curb and gutter design adjacent to the approach nose. Any additional Concrete Curb Design V beyond the quantity provided in the Plan, will be paid for at \$20 per linear foot. Lengths of Concrete Curb Design V that never reach 3 inch height will be paid for as Concrete Walk.

S-86 (2531) TRUNCATED DOMES

SP2016-189

This work consists of furnishing and installing Truncated Dome Systems (detectable warning surfaces) at pedestrian curb ramps in compliance with the Public Rights-of-Way Accessibility Guidelines (PROWAG). This work shall be performed in accordance with the applicable MnDOT Standard Specifications, these Special Provisions, the details in the Plan, and the following:

S-86.1 CONSTRUCTION REQUIREMENTS

The Contractor shall select a truncated dome product from the approved products list at <http://www.dot.state.mn.us/products/miscmaterials/truncateddomes.html>. The truncated domes shall be placed in concrete and shall be pressed firmly into the concrete to the point that concrete fills the vent holes on the truncated dome plates. No cutting of truncated domes will be allowed unless approved by the Engineer. Any swelling of the concrete that occurs around the truncated domes must be screeded off and the surrounding concrete shall be finished flush with the truncated dome plate edge. To ensure that the truncated domes are well seated in concrete, the Contractor should provide a 3 inch minimum border around the edges of the truncated domes.

The Contractor will be allowed to interchange 9 foot 5 inch and 10 foot radial truncated domes when either is called for in the Plan. If the Contractor does make a substitution, the Contractor will be required to modify the curb line radius to match the truncated domes and meet the detectable edge requirements shown on Standard Plan Sheet No. 5-297.250 (Sheet 4 of 5). The Contractor will be allowed to adjust plan locations of zero inch height curb up to 6 inches laterally to make field fit adjustments for radial truncated domes placement.

S-86.2 METHOD OF MEASUREMENT

Square or rectangular truncated dome area will be measured by the square foot. Radial Truncated domes will be measured along the long cord and multiplied by 2 feet to compute S.F.

S-86.3 BASIS OF PAYMENT

Payment will be made under Item 2531.618 (Truncated Domes) at the Contract bid price per square foot, which shall be compensation in full for furnishing and installation of truncated domes. If additional radial domes are required and not called for in the plans they will be paid for at 4 square feet per each additional plate.

S-87 (2533) PORTABLE PRECAST CONCRETE BARRIER DESIGN 8337

SP2016-190

The Contractor shall furnish and install portable precast concrete median barriers in accordance with current MnDOT Standard Plate No. 8337, these provisions, the Plan details and the following:

S-87.1 All portable precast concrete median barrier shall be placed as shown in the Plans and as directed by the Engineer. The barrier shall not be removed until the Engineer approves the removal.

S-87.2 The portable precast concrete median barrier shall remain the property of the Contractor upon completion of the Project. The Contractor shall arrange for disposal of the barrier outside of the Right of Way at the completion of the Project.

S-87.3 The Contractor shall only place barrier that is deemed to be acceptable.

To be acceptable, the barrier section shall meet the following minimum requirements:

- Connecting loops shall be intact and undamaged.
- May have no more than hairline cracking present due to handling and wear.
- Barrier faces and/or ends may have areas where surface concrete has been lost, but no area that would affect impacting vehicle travel/direction or overall structural integrity.
- Rebar surface may be partially exposed but only if it is not likely to affect impacting vehicle travel/direction or overall structural integrity.
- Finished edges are reasonably square with no loss of concrete and may have minimal chipping due to wear.

The barrier is **unacceptable** in the following cases:

- Any connecting loops are cracked.
- Barrier section has major cracking that is likely to affect its structural integrity.
- Barrier faces have extensive loss of surface concrete which would affect vehicle travel/direction.
- Finished edges are so worn and rounded that the Type "F" face is no longer well-defined or true to its intended geometry.
- Barrier is delaminated to the point that reinforcing bars are completely exposed and are likely to affect impacting vehicle travel/direction or structural integrity.

Additional information regarding acceptable and unacceptable barrier can be found at the website for the Office of Traffic, Safety and Technology, which can be found at: <http://www.dot.state.mn.us/products>

S-87.4 The Contractor will be subject to a non-compliant charge for **unacceptable** Portable Concrete Barrier sections. Non-compliance charges for each incident will be **assessed at a rate of \$250.00 per hour**, for each or any portion thereof, which the Engineer determines that the Contractor has not complied.

S-87.5 Portable Concrete Barrier sections shall be connected using the connection pins as detailed on Standard Plate 8337. The Contractor will be subject to a non-compliant charge for failure to properly connect the barrier sections. Non-compliance charges for each incident will be **assessed at a rate of \$250.00 per hour**, for each or any portion thereof, which the Engineer determines that the Contractor has not complied.

S-87.6 Measurement will be made by the length of Portable Concrete Barrier installed. Payment will be made under Item 2533.507 (Portable Precast Concrete Barrier Design 8337) at the Contract bid price per linear foot [meter], which shall be compensation in full, but not limited to, loading, hauling and installing the concrete median barrier and subsequent removal, loading and hauling of the barrier.

S-88 (2533) RELOCATE PORTABLE PRECAST CONCRETE BARRIER DESIGN 8337

SP2016-193

This work shall consist of relocating portable concrete median barrier within the Project limits as directed by the Engineer and the following:

S-88.1 When portable median barrier has to be removed from the Project roadways, but will be needed again in a later phase of the work, the Engineer may direct that it be stockpiled on or near the Project site. When this is done for the required traffic control detailed in the plans, payment will be made under Item 2533.508 (Relocate Portable Precast Concrete Barrier Design 8337). For the required traffic control not detailed in the plans, this work shall be inclusive to the Traffic Control. Payment will be made once for removing the barrier from the roadway and placing it in the stockpile; and again for removing it from the stockpile and installing it in the roadway.

S-89 **(2554) TRAFFIC BARRIERS (METRO PROJECTS)**
SP2016-199

This work consists of furnishing and installing traffic barrier in accordance with MnDOT 2554, the details in the Plan, as recommended by the manufacturer, as directed by the Engineer, and the following:

S-89.1 **MATERIALS**

(A) **Guardrail Block-Outs**

Guardrail block-outs of composite or recycled material that meet the criteria of NCHRP 350 or MASH may be substituted for wood block-outs in the construction of Plate Beam Guardrail systems.

(B) **Delineation**

- (1) Provide I-beam post delineators with retro reflective sheeting meeting the specifications of ASTM Type IX or XI sign sheeting.
- (2) The contractor shall select I-beam post delineator from the Approved Products List.

S-89.2 **CONSTRUCTION REQUIREMENTS**

(A) **Guardrail Block-Outs**

Install guardrail block-outs as recommended by the manufacturer.

(B) **Delineation**

- (1) Install the I-beam delineators at the top of the I-beam post throughout the install at a maximum separation of 50 feet (50'). Attach the delineators as recommended by the manufacturer.
- (2) Apply the retro reflective sheeting to the delineators. The sheeting shall provide at least 7 sq. in. when viewed on a line parallel to the roadway centerline.
- (3) For median installations apply the sheeting to both sides of the post and for roadside installations apply the sheeting only to the side of the post facing traffic.
- (4) The sheeting shall be retro reflective yellow or white and shall be the same color as the adjacent edge line.

S-89.3 **METHOD OF MEASUREMENT**

The Traffic Barrier will be measured by the linear feet of traffic barrier installed. The guardrail block-outs, retro reflective sheeting and I-beam delineators are included in the pay item.

S-89.4 **BASIS OF PAYMENT**

Payment for the Traffic Barrier will be made under Item 2554.501 (Traffic Barrier Design B8338) by linear feet, which shall be payment in full for all costs involved to complete the work as specified.

S-90 **(2554) END TREATMENT - ENERGY ABSORBING TERMINAL**
SP2016-201

This work shall consist of constructing a commercial type energy absorbing terminal in accordance with the applicable provisions of MnDOT 2554, as recommended by the manufacturer, as directed by the Engineer, and the following:

S-90.1 The energy absorbing terminal shall be a flared terminal utilizing steel posts. The steel posts shall be steel breakaway posts as specified by the manufacturer.

S-90.2 The adhesive marker is sold separately from the terminal and shall be incidental. The object marker to use with the energy absorbing terminal is striped yellow and black.

S-90.3 The Contractor is responsible for obtaining the most current details from the manufacturer. The Contractor shall provide one copy for the Engineer.

S-91 **(2554) INSTALL ENERGY ABSORBING TERMINAL**

This work shall consist of installing salvaged Energy Absorbing Terminal in accordance with MnDOT 2554, as directed by the Engineer, as recommended by the manufacturer, and as noted in the Plan.

Install Energy Absorbing Terminal payment will be made under Item 2554.602 (Install Energy Absorbing Terminal) at the Contract bid price per each, which shall be payment in full for all costs involved and necessary to complete the work as specified.

S-92 **(2554) END TREATMENT - TANGENT TERMINAL (METRO**
PROJECTS)
SP2016-205

This work consists of constructing a commercial type energy absorbing terminal in accordance with MnDOT 2554, the details in the Plan, as recommended by the manufacturer, as directed by the Engineer, and the following:

S-92.1 MATERIALS:

A. Energy Absorbing Terminals

Install the Energy Absorbing Tangent Terminal option indicated in the Plan. For delineation of any energy absorbing terminal provide retro reflective sheeting meeting the specifications of ASTM Type IX or XI sign sheeting.

B. SKT-350 Sequential Kinking Terminal

- (1) Provide SKT-350 Sequential Kinking Terminals manufactured by Road Systems, Inc., Big Spring, Texas.
- (2) Provide steel hinged breakaway (HBA) posts for posts 1 through 8, as specified by the manufacturer.
- (3) Provide one 18 in x 18 in adhesive object marker striped black and retro reflective yellow.

C. Delineation

- (1) Provide I-beam post delineators with retro reflective sheeting.
- (2) The contractor shall select I-beam post delineator from the approved products list at <http://www.dot.state.mn.us/products/signing/delineationdevices.html>.

D. Snowplow Marker and Post

Provide a snow plow marker (X4-5) with retro reflective sheeting and a 2 lb./ft. delineator post (MnDOT 3401).

S-92.2 CONSTRUCTION REQUIREMENTS:

A. Energy Absorbing Terminals

The Contractor is responsible for obtaining the most current details from the manufacturer and providing the Engineer with a copy of the current details.

B. SKT-350 Sequential Kinking Terminal

- (1) Install the end treatment as specified by the manufacturer.
- (2) Install the adhesive object marker to the end treatment head. The alternating black and retro reflective yellow stripes shall be sloped down at an angle of 45 degrees toward the side on which traffic is to pass the obstruction. If traffic can pass to either side of the obstruction, the alternating black and retro reflective yellow stripes shall form chevrons that point upwards.

C. Delineation

- (1) Install the I-beam delineators at the top of the first five (5) I-beam posts of the upstream end treatment and the last five (5) I-beam posts of the downstream end treatment. Attach the delineators as recommended by the manufacturer.
- (2) Apply the retro reflective sheeting to the delineators. The sheeting shall provide at least 7 sq. in. when viewed on a line parallel to the roadway centerline.
- (3) For median installations apply the sheeting to both sides of the post and for roadside installations apply the sheeting only to the side of the post facing traffic.
- (4) The sheeting shall be retro reflective yellow or white and shall be the same color as the adjacent edge line.

D. Snowplow Marker and Post

- (1) Install the post with marker at the beginning and end of each guardrail run that was furnished and installed in this project.
- (2) Install the delineator post a minimum of 42 in into the ground.
- (3) The top of the post shall be 3 ft above the height of the guardrail. The post with marker shall be 6 in behind the end treatment and/or terminal end as shown on the end treatment detail(s) in the Construction Plan.

S-92.3 METHOD OF MEASUREMENT:

The Energy absorbing terminal will be measured by the number of tangent terminals installed. The retro reflective sheeting, I-beam delineators, and snowplow markers are included in the pay item.

S-92.4 BASIS OF PAYMENT:

Payment for the Energy absorbing terminal will be made under Item 2554.523 (End Treatment-Tangent Terminal) by the each, which shall be payment in full for all costs involved to complete the work as specified.

S-93 (2554) T-BARRIER BRIDGE CONNECTION DESIGN 8318
SP2016-214

This work shall consist of furnishing and installing T-Barrier Bridge Conn. Terminals in accordance with MnDOT 2554, and the following:

Measurement will be made by the number of terminals furnished and installed as specified. Payment will be made under Item 2554.602 (T-Barrier Bridge Connection Design 8318) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto.

S-94 **(2554) IMPACT ATTENUATOR**

SP2016-223

This work shall consist of furnishing, installing, maintaining, replacing if damaged or destroyed, and removing Impact Attenuators as shown in the Plan. This work shall be performed in accordance with the applicable MnDOT Standard Specifications and the following:

S-228.1 The Impact Attenuator shall be on the MnDOT Approved Product List for Temporary Crash Attenuators. The list is found on the MnDOT website at <http://www.dot.state.mn.us/products/temporarytrafficcontrol/temporarycrashcushions.html>. It shall be the responsibility of the Contractor to obtain all required details to install these systems.

S-228.2 The Contractor shall choose an Impact Attenuator that fits the site specific requirements for the Project.

S-228.3 Measurement will be made by the number of impact attenuators furnished, installed, and removed as specified for the required traffic control detailed in the plans. Payment will be made under Item 2554.615 (Impact Attenuator) at the Contract bid price per assembly, which shall be compensation in full for all costs relative thereto for the required traffic control detailed in the plans. For the required traffic control not detailed in the plans, this work shall be inclusive to the Traffic Control.

S-95 **(2554) RELOCATE IMPACT ATTENUATOR**

SP2016-226

This work shall consist of relocating impact attenuator assemblies within the Project site as directed by the Engineer and the following:

S-95.1 Payment will be made for relocating the impact attenuator assemblies under any of the following conditions:

- (A) Relocating the assemblies within the Project roadways.
- (B) Relocating the assemblies from Project roadway to stockpile for later use on Project roadways.
- (C) Relocating the assemblies from stockpile to Project roadways.

S-95.2 Measurement will be made on the basis of each separate impact attenuator assembly relocated for the required traffic control detailed in the plans. Payment will be made under Item 2554.615 (Relocate Impact Attenuator) at the Contract bid price per assembly, which shall be compensation in full for all costs incidental thereto for the required traffic control detailed in the plans. For the required traffic control not detailed in the plans, this work shall be inclusive to the Traffic Control.

S-96 **(2563) RAISED PAVEMENT MARKERS TEMPORARY (TRPMS)**

SP2016-233

This work shall consist of constructing temporary raised pavement markers and the selected mounting system, placing the marker on the roadway, and removing the marker in accordance with the specification TEMPORARY RAISED PAVEMENT MARKERS (TRPM) and the following:

S-96.1 The specification TEMPORARY RAISED PAVEMENT MARKERS (TRPM) can be accessed on the MnDOT Office of Traffic, Safety, and Technology website.

S-96.2 TRPMs will be measured by the number of markers installed for the required traffic control detailed in the plans. Payment will be made under Item 2563.602 (Raised Pavement Marker Temporary) at the Contract bid price per each for the required traffic control detailed in the plans. For the required traffic control not detailed in the plans, this work shall be inclusive to the Traffic Control.

S-97 (2563) PORTABLE CONCRETE BARRIER DELINEATOR

SP2016-234

This work shall consist of furnishing, installing and maintaining delineators on portable precast concrete barriers in accordance with the provisions of MnDOT 2564, the Plans, and the following:

S-97.1 The size and spacing of the barrier delineators shall be as specified in the Plans. The approved barrier delineators can be found at: <http://www.dot.state.mn.us/products/signing/delineationdevices.html>.

S-97.2 Measurement will be made by the number of barrier delineators furnished and installed as specified for the required traffic control detailed in the plans. Payment will be made under Item 2563.602 (Portable Concrete Barrier Delineator) at the Contract bid price per each, which shall be payment in full for all costs involved for the required traffic control detailed in the plans. For the required traffic control not detailed in the plans, this work shall be inclusive to the Traffic Control.

S-98 (2563) POLICE OFFICER

SP2016-238

The Contractor shall provide off-duty police officers in accordance with the applicable provisions of the MnDOT Standard Specifications, as determined by the Engineer, these Special Provisions, and the following:

S-98.1 To maintain safety for traffic, Off-Duty police officers shall be provided in such numbers and for such times as determined by the Engineer.

S-98.2 The police officers shall be properly uniformed and fully equipped including police car, and shall be paid for by the hour.

S-98.3 Payment for police officers at the Contract bid price shall be compensation in full for all costs for providing the police officers. Such payments will be measured and paid for in accordance with the following schedule:

<u>Item No.</u>	<u>Item</u>	<u>Unit</u>
2563.610	Police Officer	Hour

S-99 (2563) PORTABLE CHANGEABLE MESSAGE SIGN

SP2016-240

The Contractor shall furnish, install, maintain and remove Portable Changeable Message Signs in accordance with Contract provisions, as directed by the Engineer and the following:

S-99.1 The Portable Changeable Message Signs shall be trailer mounted three line, DOT signs with eight characters per line with a character height of 18 inches [450 mm] as approved by the Engineer.

S-99.2 (PCMS) Type C Trailer Mounted Message Signs will be permitted and shall be on the Approved Products List for "Changeable Message Signs: Type C - Three Lines, Trailer Mounted" as found at: <http://www.dot.state.mn.us/products/temporarytrafficcontrol/tccelectronicsequipment.html>. It is imperative that the Contractor continually operate each PCMS at maximum legibility. Many factors, such as mechanical problems, insufficient charging, incorrect intensity settings, or other factors can degrade performance. If at any time the

Contractor fails to operate a Portable Changeable Message Sign at maximum legibility, as determined by the Engineer, no payment will be made for each day that the Message Sign is deemed inadequate.

S-99.3 The changeable message signs shall be in operation within 24 hours of notification by the Engineer. Remove the changeable message signs within 24 hours after notification by the Engineer. Multiple mobilizations of the changeable message signs will be required and shall be incidental. The changeable message signs shall be subject to approval of the Engineer. All maintenance and repair as required will be incidental.

S-99.4 Except as approved by the Engineer, the message sign shall be stored off the shoulder when not in use. Delineate the changeable message sign according to Layout 4 (Partial Shoulder Closure) in the Field Manual if the Engineer permits the sign to remain on the shoulder.

S-99.5 When not being actively used as a traffic control device, the Portable Changeable Message Sign shall be stored beyond the clear zone distance. **Non-compliant charges, for each incident, will be assessed at a rate of \$500.00 per incident that the Engineer determines that the Contractor has not complied.**

S-99.6 Measurement will be made by the number of Portable Changeable Message Signs furnished and installed per day of service (Unit Day) as specified.

Payment for Portable Changeable Message Signs furnished and installed, as directed by the Engineer, will be made under Item 2563.613 (Portable Changeable Message Sign) at the Contract bid price per Unit Day for the required traffic control detailed in the plans. This payment shall be compensation in full for all costs incidental thereto, including but not limited to furnishing and installing the signs with appropriate message, maintaining the signs, revising the messages as directed by the Engineer, and removing the signs at the direction of the Engineer for the required traffic control detailed in the plans. The Portable Changeable Message Signs shall remain the property of the Contractor. For the required traffic control not detailed in the plans, this work shall be inclusive to the Traffic Control.

S-100 (2563) TRAFFIC CONTROL

This work shall be accomplished in accordance with the provisions of Mn/DOT 1404.

S-101 (2573) STORM WATER MANAGEMENT

SP2016-243

MnDOT 2573 is modified as follows:

S-101.1 The following is added to MnDOT 2573.5:

J Unit Prices

The Department will pay the following unit prices for temporary sediment control items in the absence of a Contract bid price:

Bale Barrier	\$4.10 /ln ft (\$13.45/meter)
Silt Fence, HI.....	\$3.00/ ln ft (\$10/meter)
Silt Fence, Type MS.....	\$2.00/ ln ft (\$6.50/meter)
Silt Fence, Type SD	\$20.00/ ln ft (\$6.50/meter)
Sandbag Barrier.....	\$6.00 square foot (\$64.68/ sq meter)
Flotation Silt Curtain, Type: Still Water, 1.2 m (4 foot) depth.....	\$12.50 / ln ft (\$41.00/meter)
Sediment Trap Excavation	\$5.50/cubic yard (\$7.20/cubic meter)
Bituminous Lined Flume.....	\$50.00/square yard (\$59.52/square meter)

Sediment Removal, Backhoe	\$175.00/ hour
Sediment Removal, Vacuum truck.....	\$250.00 /hour
Sediment Control Log, Type Wood Fiber	\$4.00/ In ft (\$13.00/meter)
Sediment Control Log, Type Rock.....	\$5.00/ In ft (\$16.50/meter)
Flocculant Sock.....	\$200 each

S-101.2 The following is added to MnDOT 2573.3:

In accordance with the Rice Creek Watershed District Permit Conditions, the Contractor shall submit the following documentation to the Rice Creek Watershed District on or before February 20, 2017:

- (1) Name, address, and phone number of party responsible for maintenance of all erosion and sediment control measures. This information shall be completed and submitted on the Storm Water Pollution Prevention Plan (Sheets SWP1 and SWP2).
- (2) RCWD Permit Application with original signature of the successful bidder (included in Attachments of Project Manual.)

S-102 (2573) EROSION CONTROL SUPERVISOR

Section 2573.5H is deleted and replaced by the following:

H Erosion Control Supervisor

No measurement will be made of the various duties that the Erosion Control Supervisor performs or of the number of hours required, but all such work will be construed to be included in the single Lump Sum Payment under Item 2573.550 (Erosion Control Supervisor). Upon satisfactory completion of at least half of the anticipated Project duration time, the Engineer may authorize partial payment not exceeding 50 percent of the Contract bid price. Project duration time is estimated as the time between the actual Project start date and the Project completion date. The remaining percentage will be paid upon completion of the Project.

S-103 (2574) SOIL PREPARATION

SP2016-244

MnDOT 2574 is modified as follows:

S-103.1 The following is added to MnDOT 2574.5:

C Unit Prices

The Department will pay the following unit prices for Soil preparation items in the absence of a Contract bid price:

Subsoiling.....	\$350.00 /acre (\$853.65/hectare)
Soil Bed Preparation.....	\$200.00/ acre (\$487.87/hectare)
Soil Tracking	\$134.00 /acre (\$326.83/hectare)

S-104 (2575) ESTABLISHING TURF AND CONTROLLING EROSION

SP2016-245

MnDOT 2575 is modified as follows:

S-104.1 The following is added to MnDOT 2575.5:

M Unit Prices

The Department will pay the following unit prices for temporary erosion control items in the absence of a Contract bid price:

Disc anchoring.....	\$45.00/ acre (\$110.00/ hectare)
Temporary Seed Mixtures	
21-111, 21-112 or 21-113	\$1.25/ pound (\$2.50 /kilogram)
22-111	\$2.00 /pound (\$4.44/ kilogram)
Erosion Control Blanket	
Category 3N	\$1.80/square yard (\$2.15/ square meter)
Category 4N	\$2.10/square yard (\$2.51/ square meter)
Rapid Stabilization	
Method 1	\$465.00/acre (\$1162.5/hectare)
Method 2	\$800.00/acre (\$1976.75/hectare)
Method 3	\$726.00/M gallon (\$149.5/cubic meter)
Method 4	\$1.84/sq yd (\$2.20/square meter)
Hydraulic mulch	\$1.86/lb (\$3.33/kilogram)
Hydraulic Stabilized Fiber Matrix.....	\$1.81/lb (\$4.4/kilogram)
Hydraulic Reinforced Fiber Matrix	\$1.77/lb (\$4.4/kilogram)
Water	\$17.00/M gallon (\$0.53/cubic meter)
Mowing	\$160.00/ acre (\$400.00/hectare)
Weed Spraying	\$60.00 /acre (\$150.00/hectare)

S-105 (2581) REMOVABLE PREFORMED PLASTIC MASK (BLACK)
SP2016-249

This work shall consist of furnishing, placing and removing temporary pavement marking material over in place pavement markings on bituminous pavement when traffic control must be temporarily changed. This work shall be in accordance with the provisions of MnDOT 2581, as modified below. The removable preformed plastic pavement marking material shall conform to the requirements of MnDOT 3355.

S-105.1 The 2nd paragraph of MnDOT 2581.4 is changed to read as follows:

The Engineer will base the measurement of removable preformed plastic mask (black) tape on equivalent lengths of 6 in [150 mm] wide marking tape. Broken line marking will be measured by the actual length of material used and will not include the gap between the broken lines.

S-105.2 Measurement will be made by the length in linear feet [meters].

Payment for pavement markings of each type will be made in accordance with the schedule set forth below at the appropriate Contract bid price for the specified unit of measure for the required traffic control detailed in the plans. For the required traffic control not detailed in the plans, the work shall be inclusive to the Traffic Control. Such payment, in each instance, shall be compensation for all costs of furnishing, placing, maintaining, replacing, and removing the Marking.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
2581.603	Removable Preformed Plastic Mask (Black)	linear foot [meter]

S-106 (2582) PERMANENT PAVEMENT MARKINGS

SP2016-250

The provisions of MnDOT 2582 are hereby modified and/or supplemented with the following:

S-106.1 The first paragraph of MnDOT 2582.3C.3 is supplemented with:

Initial pavement marking retroreflectivity is defined as the pavement marking retroreflectivity as measured between 14 days and 44 days after pavement marking installation.

S-106.2 Mobile Retroreflectometer Measurements (MRM)

Provide retroreflectivity measurements of longitudinal markings utilizing an independent Contractor using a vehicle-mounted mobile retroreflectometer utilizing 30 meter CEN geometry in accordance with ASTM E 1710-95 (Standard Test Method for Measurement of Retroreflective Pavement Markings Materials with CEN-Prescribed Geometry Reflectometers). The retroreflectometer shall be calibrated no less than twice a day in accordance with the operating manual and calibration guide for the particular machine and vehicle. Measurement shall consist of the average retroreflective readings and standard deviations over 0.1 mile intervals (or over the length of the line if shorter than 0.1 mile) for each type of pavement marking placed under this Contract.

Provide a measurement report that includes:

1. State Project Number,
2. Data collection software version,
3. Date and time of data collection,
4. The highway number with the beginning and ending reference points of data collection rounded to the nearest thousandths of a mile and the beginning and ending coordinates determined by a Global Positioning System receiver with 3 meter accuracy, including the direction of travel in terms of increasing or decreasing reference points,
5. Which line is being read (LEL – Left Edgeline, REL – Right Edgeline, CL, Centerline, LL – Lane Line Skip, 1LL – left most LL in multilane, 2LL – second to left most LL in multilane, etc),
6. The 0.1 mile station averages and standard deviations,
7. An explanation for any intervals that are marked invalid,
8. A summary of the average retroreflective readings in one mile increments,
9. A summary of average retroreflective readings based on 0.1 mile intervals. Base the summary on Table 2582-2.

Table 2582-2		
Summary of Average Retroreflective Readings		
Product	White	Yellow
PREF TAPE	Percent of Intervals < 300 :	Percent of Intervals < 250 :
	300 <= Percent of Intervals < 419 :	250 <= Percent of Intervals < 349 :
	420 <= Percent of Intervals <= 479 :	350 <= Percent of Intervals <= 399 :
	480 < Percent of Intervals <= 539 :	400 < Percent of Intervals <= 449 :
	540 < Percent of Intervals <= 600 :	450 < Percent of Intervals <= 500 :
	600 < Percent of Intervals :	500 < Percent of Intervals :
EPOXY	Percent of Intervals < 150 :	Percent of Intervals < 100 :
	150 <= Percent of Intervals < 209 :	100 <= Percent of Intervals < 139 :
	210 <= Percent of Intervals <= 239 :	140 <= Percent of Intervals <= 159 :
	240 < Percent of Intervals <= 269 :	160 < Percent of Intervals <= 179 :

	270 < Percent of Intervals <= 300 :	180 < Percent of Intervals <= 200 :
	300 < Percent of Intervals :	200 < Percent of Intervals :
PAINT	Percent of Intervals < 150 :	Percent of Intervals < 100 :
	150 <= Percent of Intervals < 191 :	100 <= Percent of Intervals < 125 :
	192 <= Percent of Intervals <= 219 :	126 <= Percent of Intervals <= 144 :
	220 < Percent of Intervals <= 246 :	145 < Percent of Intervals <= 162 :
	247 < Percent of Intervals <= 275 :	163 < Percent of Intervals <= 180 :
	275 < Percent of Intervals :	180 < Percent of Intervals :

Provide the measurement report in the form of an electronic database file, or delimited text file, containing all raw data collected. The electronic file must also contain a summary that is capable of being directly uploaded to the Department’s Pavement Marking Management Tool (PMMT) database. Submit the data to the email address: PMdata.dot@state.mn.us . The format of the required data file can be found at the following website: <http://www.dot.state.mn.us/trafficeng/pavement/manual.html> under the Heading Pavement Marking Management Tool. Provide a printed record of the summary to the Engineer at the Engineer’s discretion.

Conduct the evaluation of retroreflectivity between 14 days and 44 days after pavement marking installation. Excess beads or reflective elements must not be visible before the retroreflectivity testing is conducted.

Collect the data when pavement and markings are dry, clean and no visible moisture is on the road surface. Note in the report any areas where the pavement markings are obscured. Measure centerline markings in both directions. Measure other longitudinal markings in the direction of intended vehicular travel.

Evaluate any replaced or repaired markings at no additional cost per this Special Provision.

The Mobile Retroreflectometer Measurements, including but not limited to materials, equipment, labor and time, will be measured based on the Linear Foot. The Linear Foot will be measured for the distance travelled by the mobile retroreflectometer as it measures the retroreflectivity of the pavement marking. This assumes one laser instrument on one van that will read one line with each pass. For a one mile section of two-lane, two-way roadway this would need four (4) passes – First Direction: REL and CL, Second Direction: REL and CL - equating to 21120 linear feet.

No payment for pavement markings will be made until the evaluation of retroreflectivity is complete and the work accepted by the Engineer.

S-106.3 The provisions of MnDOT 2582.5 are hereby deleted and replaced with the following:

2582.5 BASIS OF PAYMENT

The contract unit price for permanent pavement markings includes the costs of materials, installation, traffic control, surface preparation, and primers as required by the contract.

The Contract unit price for the retroreflectivity evaluation includes all costs incurred in materials, equipment, labor, traffic control and time as required by the contract.

The Department will pay for pavement markings on the basis of the following schedule:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>UNIT</u>
2582.501	Pavement Message * † ‡ β	square foot (square meter)

2582.502	___ in [__ mm] * † ‡ β	linear foot (meter)
2582.503	Crosswalk * † ‡ β	square foot (square meter)
2582.603	Mobile Retroreflector Measurements	linear foot (meter)
	Specified type of line	
	* Specified material	
	† Specified if markings are Ground In	
	‡ Specified if markings are WR	
	β Specified if markings are Contrast	

S-107 (3105) BAGGED PORTLAND CEMENT CONCRETE PATCHING MIX
GRADE 3U18 AND 3U18M

SP2016-251

MnDOT 3105 is deleted and replaced with the following:

3105 BAGGED PORTLAND CEMENT CONCRETE PATCHING MIX GRADE 3U18 AND 3U18M

3105.1 SCOPE

Provide dry, bagged concrete patching mix Grade 3U18 and 3U18M for repairing portland cement concrete pavement.

3105.2 REQUIREMENTS

A Materials

Provide materials for patching mix meeting the following requirements:

A.1	Cement	3101
A.2	Fine Aggregate	3126
A.3	Coarse Aggregate	3137
A.4	Blank	
A.5	Admixtures	3113

B Quality Control (QC) Program

Maintain an approved Quality Control Program, including a Quality Plan, for the production of Bagged Portland Cement Concrete Patching Mix.

Prior to producing concrete patching mix each construction season, a Department Representative shall perform a thorough on-site inspection of the plant with a MnDOT Certified Plant Level 1 or Level 2 Technician representing the Producer.

B.1 Quality Plan Requirements

Submit a quality control plan to the Concrete Engineer for review and approval prior to producing Grade 3U18 and Grade 3U18M. The Quality Plan includes the following QC Procedures:

- (a) Moisture Content
- (b) Batch Weight Verification
- (c) Aggregate Gradation Testing
- (d) Documentation and Submittals

B.2 Personnel

Provide a MnDOT Aggregate Production Technician to perform moisture content and aggregate gradation testing. Provide a MnDOT Concrete Plant Level 1 or Plant Level 2 Technician to review batch tickets, test results, and oversee all quality control requirements of 3105 and the QC Program.

B.3 Daily Production Requirements

Each day Grade 3U18 or 3U18M is produced:

- (a) Perform moisture content and gradation testing on all aggregates each day Grade 3U18 or 3U18M is produced.
- (b) Complete MnDOT's *3U18 Quality Control Worksheet* and sign.
- (c) The Producer's Plant Level 1 or Plant Level 2 Technician will review and sign the *3U18 Quality Control Worksheet*.
- (d) Electronically submit all *3U18 Quality Control Worksheets* and batch tickets to MnDOT the day following production.

C Mix Proportioning

Proportion the mix in accordance with Table 3105-1. Use of any other size bag requires approval of the Concrete Engineer.

Table 3105-1 Mix Proportions			
Material	Gradation Requirements	Weight, lb [kg]	
		75 lb [34.1 kg] bag	3000 lb [1364 kg] bag
Type I Cement	-	17.8 [8.1]	712 [324]
Coarse Aggregate	ASTM #89 or CA-80	28.3 [12.9]	1132 [516]
Fine Aggregate	MnDOT 3126	28.9 [13.1]	1156 [524]

D Blending

Dry the coarse and fine aggregates as approved by the Engineer before blending with the cement. Blend the cement and aggregate before bagging the mix.

Provide a blending device meeting the following characteristics and requirements:

- (1) Capable of producing the required mix proportions within ± 2 percent,
- (2) Containing a proportioning device equipped with a warning device to indicate when the system is out-of-tolerance,
- (3) Capable of stopping the flow of cement to allow sampling of the blended coarse and fine aggregate, and
- (4) Designed to allow cement and aggregate to run out separately for checking material weights and ensuring that the blending proportions meet mix requirements.

E Bags and Batch Identification

Provide moisture-proof bags resistant to tearing.

Print the following on the bags:

- (1) The phrase, "MnDOT GRADE 3U18 CONCRETE PATCH MIX" or "MnDOT GRADE 3U18M CONCRETE PATCH MIX"
- (2) Weight of the bag in pounds [kilograms]
- (3) Mix date
- (4) The instructions for mixing into concrete

Sample individual materials and the aggregate blend in accordance with an approved Quality Control Plan before blending at the bagging site.

The Engineer will sample aggregates for gradation and aggregate quality testing in accordance with the Schedule of Materials Control for Certified Ready-Mix Concrete.

S-108 (3137) COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE

SP2016-252

MnDOT 3137 is hereby modified as follows:

S-108.1 The first paragraph of MnDOT 3137.2.D.2 shall be deleted and replaced with the following:

Provide coarse aggregate in accordance with 3137.2.D.1, “Coarse Aggregate for General Use,” except as modified by Table 3137-2.

S-108.2 Table 3137-2 (h) of MnDOT 3137.2.D.2 shall be deleted and replaced with the following:

h)	Absorption for Class B aggregate for all concrete bridge decks and bridge barrier	≤ 1.10
----	---	--------

S-108.3 Table 3137-4 of MnDOT 3137.2.E shall be deleted and replaced with the following:

Table 3137-4						
Coarse Aggregate Designation for Concrete,						
<i>percent by weight passing square opening sieves</i>						
	Coarse Aggregate Designation					
	1	2	3	4	7	8
Sieve Sizes	ASTM #467	ASTM #67*	ASTM #7*	ASTM #89	CA-70	CA-80
2 in [50 mm]	100	-	-	-	-	-
1½ in [37.5 mm]	95 – 100	-	-	-	-	-
1 in [25.0 mm]	-	100	-	-	-	-
¾ in [19.0 mm]	35 – 70	90 – 100	100	-	-	-
5/8 in [16.0 mm]	10 – 30	20 – 55	40 – 70	-	100	-
½ in [12.5 mm]	-	-	90 – 100	100	85 – 100	-
⅜ in [9.5 mm]	10 – 30	20 – 55	40 – 70	90 – 100	50 – 100	100
No.4 [4.75 mm]	0 – 5	0 – 10	0 – 15	40 – 70	0 – 25	55 – 95
No.8 [2.36 mm]	-	-	-	5 – 30	-	-
No.16 [1.18 mm]	-	-	-	0 – 10	-	-
No.50 [300 µm]	-	-	-	0 - 5	-	0-5

*ASTM #67 and ASTM #7 Gradations are MnDOT Modified.

S-109 (3151) BITUMINOUS MATERIAL – POLYMER MODIFIED BINDER

SP2016-253

MnDOT 3151 is hereby modified as follows:

S-109.1 MnDOT 3151.2 A shall be modified to include the following:

Asphalt binder grades shown below in Table 3151.2A shall have the minimum percent recovery as noted.

Table 3151.2A	
Percent Recovery (R_{3.2})	
Asphalt Binder Grade	Minimum Percent Recovery*
PG 58-34 (PMB)	30%
PG 64-28 (PMB)	30%
PG 64-34 (PMB)	55%
PG 70-28 (PMB)	55%

*At 3.2 kPa as measured by AASHTO T350 Multiple Stress Creep and Recovery at 58C test temperature.

S-110 **(3236) REINFORCED CONCRETE PIPE**
SP2016-254

The provisions of MnDOT 3236 are modified and/or supplemented with the following:

S-110.1 Manufacturers of reinforced concrete pipe may produce an alternate "offset joint" on the spigot end of the pipe. This type of offset joint is to be used with the profile or prelubricated pipe seal systems. See MnDOT Standard Plate 3006.

S-111 **(3356) PREFORMED THERMOPLASTIC PAVEMENT MARKING**
SP2016-255

The provisions of MnDOT 3356.2 are hereby modified with the following:

S-111.1 Delete MnDOT 3356.2.A, and replace with the following:

A General

Provide thermoplastic pavement marking product meeting the following requirements and characteristics:

- (1) Made of prefabricated retroreflective, resilient thermoplastic material,
- (2) Contains glass beads uniformly distributed through the entire cross sectional area,
- (3) Capable of being affixed to bituminous or concrete pavement by heating,
- (4) Does not require preheating of the pavement surface,
- (5) Resistant to deterioration due to exposure to sunlight, water, salt, and adverse weather conditions.
- (6) Under traffic wear, shows no appreciable fading in accordance with the color requirements in 3356.2.C, lifting, or shrinkage throughout the life of the marking,
- (7) Capable of conforming to pavement contours, breaks, and faults through the action of traffic at normal pavement temperatures
- (8) Possesses resealing characteristics, such that it is capable of fusing with itself and previous thermoplastic markings when heated,
- (9) Protected during shipment and in storage.

Apply the preformed thermoplastic pavement marking as recommended by the manufacturer to provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface remains stable. Use equipment and application methods specified by the manufacturer.

Provide precut messages and symbols meeting the requirements of the MN MUTCD and the MnDOT Standard Signs Manual in custom kits. Use separate pieces or segments to form individual letters

or symbols only to the extent supplied by the manufacturer. Provide shapes, sizes, and colors as required by the contract.

S-112 (3877) TOPSOIL MATERIAL

NEW WRITEUP 09/25/15

SP2016-256.1

MnDOT 3877 is modified as follows:

S-112.1 Delete MnDOT Table 3877-1 "Common Topsoil Borrow Requirements", and replace with the following:

Table 3877-1		
Common Topsoil Borrow Requirements		
Requirement	Range	Test Method
Material passing No. 4 in [4.75 mm]	≥ 85%	—
Clay	5% – 35%	ASTM D 422
Silt	5% - 70%	ASTM D 422
Sand & *Gravel	10% - 75%	ASTM D 422
Organic matter	3% – 15%	ASTM D 2974
pH	6.1 – 7.8	ASTM G 51
*Gravel shall be in the fine to medium range of particle sizes		

S-113 FINAL ESTIMATE AND FINAL PAYMENT

SP2016-257

The following provisions shall apply to preparation of the Final Estimate and execution of Final Payment under this Contract:

S-113.1 FINAL ESTIMATE

State Law provides that the final estimate will be made within 90 days after completion of all work required under this Contract. If, however, the total value of the Contract exceeds \$2,000,000.00, the 90 day requirement will not apply and the time allowed for making such final estimate shall be 180 days after the work under this Contract has been, in all things, completed to the satisfaction of the Commissioner.

S-113.2 FINAL PAYMENT

If this Contract contains a "Disadvantage Business Enterprise or Targeted Group Business" goal, the following requirement shall apply:

"Before final payment is made, the Contractor shall also complete an affidavit showing the total dollar amounts of work performed by disadvantaged business enterprise (DBE) and targeted group business (TGB) and/or veteran-owned small business."

DIVISION SB

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DIVISION SB

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BRIDGE PLANS

The plans for this project, consisting of the sheets tabulated below, were approved by the State Bridge Engineer.

<u>BRIDGE NO.</u>	<u>TOTAL SHEETS</u>	<u>SHEET NO.</u>	<u>DATE OF APPROVAL</u>
62732	58	B1-B58	
62937	66	D1-D66	

New or revised sheets were approved as listed below:

<u>BRIDGE NO.</u>	<u>SHEET NO.</u>	<u>DATE OF APPROVAL</u>

I hereby certify that the Special Provisions for bridge construction (Division SB) contained in this Proposal were prepared by me or under my direct supervision, and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.


(Mark Maves, PE)

Date: 12/8/15 Lic. No.20496

SB-1 **BRIDGE PLANS**

Plans of existing structures are available at the Minnesota Department of Transportation, Bridge Office, 3485 Hadley Ave N, Oakdale, MN, 55128-3307, for review and inspection by bidders; electronic copies are also available for viewing, printing and downloading on the MnDOT Consumer Access EDMS (Electronic Document Management System) at http://dotapp7.dot.state.mn.us/cyberdocs_guest/. However, the state neither warrants nor represents that existing structures conform exactly to the details shown in those plans.

SB-2 **(1706) EMPLOYEE HEALTH AND WELFARE**

The provisions of 1706, "Employee Health and Welfare," are supplemented as follows:

The Contractor shall submit a plan at the preconstruction conference providing all OSHA required safety equipment (safety nets, static lines, false decks, etc.) for all work areas whose working surface is 6 feet [1.8 meters] or more above the ground, water, or other surface. Submittal of this plan will in no way relieve the Contractor of his/her responsibility for providing a safe working area.

All safety equipment, in accordance with the Contractor's plan, must be in place and operable in adequate time to allow Department personnel to perform their required inspection duties at the appropriate time. Don't place concrete in any areas affected by such required inspection until the inspection has been completed.

The installation of safety lines, safety nets, or other systems whose purpose is to reduce the hazards of bridge work may require the attachment of anchorage devices to beams, girders, diaphragms, bracing or other components of the structure. Clamp type anchorage systems which do not require modification of structural members may be used, provided they do not interfere with proper execution of the work; if using an anchorage system which requires modification of structural members, request approval, in writing, for plan modifications as provided in MnDOT specifications. Requests to install systems which require field welding or drilling of primary stress carrying members of a bridge will not be approved. The Contractor shall indicate any portions of anchorage devices which will remain permanently in the structure.

On both ends of each pier cap extending 6 feet [1.8 meters] or more above the ground, the Contractor shall install an insert or other suitable anchorage to which safety lines can be attached. Remove any portion of said device extending outside the finished lines of the pier cap unless otherwise approved by the Engineer. The Contractor shall repair or seal any void or cavity resulting from the installation or removal of this device to prevent the ponding or entry of water as directed by the Engineer.

The Contractor shall furnish, install and remove approved anchorage systems at no increased cost to the state for materials, fabrication, erection, or removal of the bridge component or anchorage system.

SB-3 **(1707) CONSTRUCTION OPERATIONS ADJACENT TO ROADWAYS**

The Contractor shall perform in accordance with 1404, "Maintenance of Traffic," 1502, "Plans and Working Drawings," and 1707, "Public Convenience and Safety," provisions except as modified below:

When necessary to adequately prevent undermining of the existing roadbed and protect traffic, sheet and shore the roadway side and end of each footing excavation having a traveled roadway adjacent thereto. The Contractor shall leave sheeting and shoring in place until the excavated area has been properly backfilled.

SB-4 (1717) AIR, LAND, AND WATER POLLUTION

The provisions of 1717, "Air, Land, and Water Pollution," are supplemented as follows:

The Contractor's attention is hereby directed to MPCA Rule 7011.0150 (<http://www.pca.state.mn.us>) as it relates to sandblasting and/or concrete removal operations.

SB-5 BRIDGE ABUTMENT CONSTRUCTION

Do not start construction of each abutment until at least 72 hours after the approach fill at that abutment has been constructed to the full height and cross section. Extend the approach fill construction a distance of at least 50 feet [15 m] behind the abutment as measured along the centerline of the roadway.

SB-6 (2104) REMOVAL OF ASBESTOS AND REGULATED WASTE (BRIDGE) – BRIDGE NO. 62732

Remove and dispose of any regulated waste found on existing Bridge No. 9582 or from the utilities located on the bridge in accordance with the applicable MnDOT Standard Specifications and the following:

If, during the course of removal or renovation of utility or bridge, additional asbestos materials or regulated wastes other than that noted in the Assessment Summary are encountered, notify the MnDOT Project Engineer to suspend work and furnish a documented inspection and evaluation by a MnDOT approved certified MDH contractor prior to resuming work. The work, as outlined in this paragraph, will be paid for as Extra Work.

Dispose of all asbestos and/or regulated waste in accordance with MnDOT's manual. Only those listed in this manual as pre-approved for asbestos and/or regulated waste will be allowed to work on this project. Use MnDOT approved companies for testing, waste transport and disposal as provided and described in MnDOT's manual "*Asbestos and Regulated Waste Manual For Structure Demolition Or Relocations for Construction Projects*" available on the following website: <http://www.dot.state.mn.us/environment/buildingbridge/index.html>. Contact Mark Vogel at 651.366.3630 or Jackie Klein at 651.366.3637, Office of Environmental Stewardship, 651.366.3630, with any questions regarding the manual.

A pre-activity meeting will be conducted to outline the action items to the satisfaction of the Engineer prior to removing any regulated materials and any bridge renovation or demolition activities.

All material shall be removed, identified, and disposed of in accordance with Section S-1701 (LAWS TO BE OBSERVED (BRIDGE)) of these Special Provisions. Permission to begin the regulated waste removals, with the exception of material needed for hazardous and regulated waste assessment or testing, will not be granted until the Engineer has copies of all required notices.

Permission to proceed with the demolition or renovation of bridges will not be granted until the Engineer has received copies of all required notifications as indicated in Section S-1701 (LAWS TO BE OBSERVED (BRIDGE)) of these Special Provisions.

Notify any utility owners at least three (3) days prior to the removal of any regulated waste which may affect the utility, allowing the utility owner time to have a representative on site.

See the attached "Asbestos and Regulated Waste Inspection Report" for information on whether or not asbestos or regulated waste was detected in the bridge(s) to be removed or renovated.

The assessment summary along with the plan or Special Provisions is intended for informational purposes. Quantity, type and analysis of any asbestos or regulated waste containing material are estimates intended as a general guide.

No measurement will be made of any portion of the asbestos or regulated waste material removal, but the complete removal thereof as specified shall be construed to be included in the single lump sum for which payment is made under Item 2104.601 REMOVE REGULATED WASTE MATERIAL (BRIDGE).

SB-7 (2401) CONCRETE BRIDGE CONSTRUCTION

The provisions of 2401, "Concrete Bridge Construction," are supplemented as follows:

SB-7.1 Delete the second sentence of the second paragraph of 2401.3.B.8.

SB-7.2 Add the following to 2401.3.G:

The curing requirement for concrete bridge element barriers is 100 percent of the compressive strength prior to opening the bridge to traffic.

SB-7.3 Structural Concrete (Contractor Concrete Mix Design)

Delete the contents of 2401.2.A, "Concrete," and replace with the following:

For Bridge Numbers 62732 and 62937, design a **3YHPC-M** or **3YHPC-S** concrete mixture that will minimize cracking. Perform the work in accordance with the applicable requirements of MnDOT 2401, "Concrete Bridge Construction," 2461, "Structural Concrete," and the following:

2.A.1 Fine Aggregate Requirements

Provide fine aggregates complying with quality requirements of 3126.2.D, "Deleterious Material," 3126.2.E, "Organic Impurities," and 3126.2.F, "Structural Strength."

2.A.1.a Fine Aggregate Alkali Silica Reactivity (ASR) Requirements

The Department will routinely test fine aggregate sources for alkali silica reactivity (ASR) in accordance with the following:

- (1) Multiple sources of certified portland cement in accordance with ASTM C 1260 MnDOT Modified; and
- (2) Multiple combinations of certified portland cement and supplementary cementitious materials in accordance with ASTM C 1567 MnDOT Modified.

The Concrete Engineer, in conjunction with the Engineer, will review the 14-day fine aggregate expansion test results to determine the acceptability of the proposed fine aggregate and cement combination in accordance with the following:

- (1) For fine aggregate and cement combinations previously tested by the Department, the Concrete Engineer will use the average of all 14-day unmitigated test results for an individual source to determine necessary mitigation in accordance with Table HPC-1.
- (2) If the previously tested proposed fine aggregate and cement combination requires less mitigation than the average 14-day unmitigated test result, the Concrete Engineer will allow mitigation at the lesser rate in accordance with Table HPC-1.
- (3) Alkali silica reactivity (ASR) ASTM C1260 and ASTM C1567 test results are available on the MnDOT Concrete Engineering Unit website.

Table HPC-1 Fine Aggregate ASR Mitigation Requirements							
14-day Fine Aggregate Unmitigated Expansion Limits	Class F Fly Ash	Class C Fly Ash	Slag	Slag/Class F Fly Ash	Slag/Class C Fly Ash	IS(20)/Class F Fly Ash	IS(20)/Class C Fly Ash
≤ 0.150	No mitigation required						
>0.150 - 0.200	Minimum 20%	Minimum 20%	35%	20% Slag with a minimum of 15% Class F fly ash	20% Slag and 20% Class C fly ash	Type IS(20) with a minimum of 15% Class F	Type IS(20) with a minimum of 15% Class C
> 0.200 – 0.300	Minimum 20%	Minimum 30%	35%				
> 0.300	The Department will reject the fine aggregate						

The Contractor may use 100% Portland cement for High Early Concrete, provided no mitigation is required for the fine aggregate in accordance with Table HPC-1. If mitigation is required, the Contractor is required to use a minimum of 15% of any supplementary cementitious material when designing High Early Concrete.

The Concrete Engineer may reject the fine aggregate if mortar bar specimens exhibit an indication of external or internal distress not represented by the expansion results. The Concrete Engineer will make the final acceptance of the aggregate.

2.A.2 Intermediate Aggregate Requirements

Provide intermediate aggregates complying with the quality requirements of 3137.2.D.2, "Coarse Aggregate for Bridge Superstructure," except as modified in Table HPC-2. If the intermediate aggregate is from the same source as the ¾ in- fraction, the aggregate quality is determined based upon the composite of the ¾ in- and intermediate aggregate.

The Concrete Engineer classifies intermediate aggregate in accordance with Table HPC-2.

Table HPC-2 Intermediate Aggregate for Use in Concrete			
If the gradation meets the following:	Classify material type as:	Gradation Test Procedures	Quality Test Requirements
100% passing the 1/2" and ≤90% passing #4	Intermediate Aggregate	Coarse Aggregate (+4 Portion)	Spec. 3137.2.D.2 except 3137.2.D.2(i) modified to maximum 40% carbonate
		Fine Aggregate (-4 Portion)	Shale in Sand (-4 Portion)
100% passing the 1/2" and >90% passing #4	Intermediate Aggregate	Fine Aggregate (Minimum 1000 g sample)	Shale Content Test by AASHTO T113 MnDOT Modified (+4 Portion)
			Shale in Sand (-4 Portion)
100% passing the 3/8" and ≤90% passing #4	Coarse Sand	Fine Aggregate	Shale Content Test by AASHTO T113 MnDOT Modified (+4 Portion)
			Shale in Sand (-4 Portion)

For any intermediate aggregate size not previously tested by the Department, the Concrete Engineer reserves the right to test for alkali silica reactivity, in accordance with ASTM C1260, prior to allowing incorporation into the concrete mix design.

2.A.3 Coarse Aggregate Requirements

Provide Class A, B or C coarse aggregate meeting the quality requirements in accordance with 3137.2.D.2, "Coarse Aggregate for Bridge Superstructure."

When providing Class B aggregate, the maximum absorption percent by weight is 1.10%.

2.A.3.a Coarse Aggregate Alkali Silica Reactivity (ASR) Requirements

When using coarse aggregate identified as quartzite or gneiss, the Concrete Engineer will review ASTM C1293 testing to determine the necessary ASR mitigation requirements in accordance with Table HPC-3.

ASR ASTM C1293 test results are available on the MnDOT Concrete Engineering Unit website.

Table HPC-3 Coarse Aggregate ASR Mitigation Requirements*							
ASTM C1293 Expansion Results	Class F Fly Ash	Class C Fly Ash	Slag	Slag/Class F Fly Ash	Slag/Class C Fly Ash	IS(20)/Class F Fly Ash	IS(20)/Class C Fly Ash
≤ 0.040	No mitigation required						
>0.040	Minimum 30%	Not Allowed	35%	20% Slag with a minimum of 15% Class F fly ash	20% Slag and 20% Class C fly ash	Type IS(20) with a minimum of 15% Class F	Type IS(20) with a minimum of 15% Class C
* The Engineer will allow the Contractor to substitute a portion of the minimum required supplementary cementitious material with up to 5% silica fume by weight for mitigation purposes.							

2.A.4 Cementitious Materials

Provide only cementitious materials from the Approved/Qualified Products List.

2.A.4.a Cement

Use Type I or Type I/II cement complying with Specification 3101, "Portland Cement," or blended cement in accordance with Specification 3103, "Blended Hydraulic Cement."

- (1) Total alkalis (Na₂Oe) no greater than 0.60 percent in the portland cement, and
- (2) Total alkalis (Na₂Oe) no greater than 3.0 lb per yd³ of concrete resulting from the portland cement.

2.A.4.b Fly Ash

Use fly ash conforming with Specification 3115, "Fly Ash for use in Portland Cement." The Concrete Engineer defines Class F fly ash for the purposes of ASR mitigation as having a maximum CaO content of 18.0%.

2.A.4.c Ground Granulated Blast Furnace Slag

Use ground granulated blast furnace slag conforming to Specification 3102, "Ground Granulated Blast-Furnace Slag."

2.A.4.d Silica Fume

Use silica fume conforming to ASTM C 1240.

2.A.4.e Ternary Mixes

Ternary mixes are defined as portland cement and two other supplementary cementitious materials, or blended cement and one other supplementary cementitious material with a maximum replacement of 40% by weight.

2.A.5 Allowable Admixtures

Use any of the following admixtures on the MnDOT Approved/Qualified Products as listed under "Concrete Admixtures A-S":

- (A) Type A, Water Reducing Admixture,
- (B) Type B, Retarding Admixture,
- (C) Type C, Accelerating Admixture,
- (D) Type D, Water Reducing and Retarding Admixture,
- (E) Type F, High Range Water Reducing Admixture, and
- (F) Type S, Specific Performance Based Admixture

Obtain a written statement from the manufacturer of the admixtures verifying:

- (1) Compatibility of the combination of materials, and
- (2) Manufacturer recommended sequence of incorporating the admixtures into the concrete.

The manufacturer will further designate a technical representative to dispense the admixture products.

Utilize the technical representative in an advisory capacity and have them report to the Contractor any operations or procedures which are considered as detrimental to the integrity of the placement. Verify with the Engineer whether the Manufacturer's technical representative's presence is required during the concrete placement.

2.A.6 Concrete Mix Design Requirements

Submit the concrete mixes using the appropriate MnDOT Contractor Mix Design Submittal Workbook available on the Department's website at least 21 calendar days before the initial concrete placement. For mix design calculations, the Engineer, in conjunction with the Concrete Engineer, will provide specific gravity and absorption data.

The Concrete Engineer, in conjunction with the Engineer, will review the mix design submittal for compliance with the contract.

2.A.6.a Concrete Mix Design Requirements

Design and produce 3YHPC-M or 3YHPC-S concrete mixes based on an absolute volume of 27.0 ft³ [1.0 m³] in accordance with the Table HPC-4 and the following requirements:

Table HPC-4 High Performance Bridge Deck Concrete Mix Design Requirements								
Concrete Grade	Mix Number *	Intended Use	w/c ratio	Target Air Content	Maximum %SCM (Fly Ash/Slag/Silica Fume/Ternary) 	Slump Range †, inches	Minimum Compressive Strength, f'c (28-day)	3137 Spec.
HPC	3YHPC-M	Bridge Deck – Monolithic	0.35-0.45	6.5%	30/35/5/40	1 - 4	4000 psi	2.D.2
	3YHPC-S	Bridge – Structural Slab						
<p>* Provide a Job Mix Formula in accordance with 2401.2.A.7. Use any good standard practice to develop a job mix formula and gradation working range by using procedures such as but not limited to 8-18, 8-20 gradation control, Shilstone process, FHWA 0.45 power chart or any other performance related gradation control to produce a workable and pumpable concrete mixture meeting all the requirements of this contract.</p> <p> The individual limits of each SCM shall apply to ternary mixtures.</p> <p>† Keep the consistency of the concrete uniform during entire placement.</p>								

2.A.6.b Required Preliminary Testing

Prior to placement of any 3YHPC-M or 3YHPC-S Concrete, the Engineer will require preliminary batching and testing of the concrete mix design.

Submit the concrete mixes using the appropriate MnDOT Contractor Mix Design Submittal Workbook available on the Department's website at least 14 calendar days prior to the beginning of preliminary laboratory mixing and testing of the proposed mix designs. Any changes or adjustments to the material or mix design require a new Contractor mix design submittal. For mix design calculations, the Engineer, in conjunction with the Concrete Engineer, will provide specific gravity and absorption data.

The Concrete Engineer, in conjunction with the Engineer, will review the mix design submittal for compliance with the contract.

Test the concrete for the following hardened concrete properties in accordance with Table HPC-5:

Table HPC-5 Required Hardened Concrete Properties for Mixes 3YHPC-M and 3YHPC-S		
Test	Requirement	Test Method
Required Strength (Average of 3 cylinders)	4000 psi at 28 days	ASTM C31
Rapid Chloride Permeability	≤ 2500 coulombs at 28 days (For Preliminary Approval) ≤ 1500 coulombs at 56 days	ASTM C1202
Freeze-Thaw Durability	Greater than 90% at 300 cycles	ASTM C666 Procedure A
Shrinkage	No greater than 0.040 percent at 28 days	ASTM C157
Scaling	Visual rating not greater than 1 at 50 cycles	ASTM C672

The Engineer will allow the maturity method for subsequent strength determination. Perform all maturity testing in accordance with ASTM C1074 and the MnDOT Concrete Manual.

If a mix is approved, the Concrete Engineer will consider the mix design and testing as acceptable for a period of 5 years provided the actual concrete mixed and placed in the field meets the Contract Requirements. The Concrete Engineer will not require new testing within that 5-year period as long as all the constituents (including the aggregates) of the proposed mix design are the same as the original mix design.

The Engineer determines final acceptance of concrete for payment based on satisfactory field placement and performance.

2.A.7 Job Mix Formula

A Job Mix Formula (JMF) contains the following:

- (a) Proportions for each aggregate fraction,
- (b) Individual gradations for each aggregate fraction, and
- (c) Composite gradation of the combined aggregates including working ranges on each sieve in accordance with Table HPC-6.

Table HPC-6 Job Mix Formula Working Range	
Sieve Sizes	Working Range, %*
1 in [25 mm] and larger	±5
¾ in [19 mm]	±5
½ in [12.5 mm]	±5
⅜ in [9.5 mm]	±5
No.4 [4.75 mm]	±5
No.8 [2.36 mm]	±4
No.16 [1.18 mm]	±4
No.30 [600 µm]	±4
No.50 [300 µm]	±3
No.100 [150 µm]	±2
No.200 [75 µm]	≤ 1.6
* Working range limits of the composite gradation based on a moving average of 4 tests (N=4).	

2.A.7.a Verification of JMF

Prior to beginning placements of bridge deck concrete, perform gradation testing to ensure current materials comply with the approved JMF. Perform gradation testing in accordance with the Schedule of Materials Control.

- (1) Take samples at the belt leading to the weigh hopper or other locations close to the incorporation of the work as approved by the Engineer.
- (2) Add fill-in sieves as needed during the testing process to prevent overloading.

The Producer and Engineer will test and record the individual gradation results using the Concrete Aggregate Worksheet.

- (1) Using the JMF Moving Average Summary Worksheet, calculate the moving average of Producer aggregate gradation test results during production.
- (2) The Engineer will randomly verify Producer combined aggregate gradation results as defined in the Schedule of Materials Control.

If, during production, the approved JMF falls outside of the allowable working range immediately sample and test additional gradation and continue production.

2.A.7.b JMF Adjustment

If it is determined that the current aggregates do not meet the approved JMF, submit a new mix design including JMF to the Concrete Engineer in accordance with 2401.2.A.7.

2.A.7.c JMF Acceptance

The Engineer will make monetary adjustments for the quantity of bridge deck concrete represented by the JMF Working Range failure, from the failing test to the next passing test, at a minimum rate of \$500.00 or \$5.00 per cubic yard, whichever is greater.

2.A.8 Laboratory batching, testing requirements and submittals:

To determine the characteristics of the Contractor proposed mix design, the Concrete Engineer will require the Contractor to prepare test batches and do laboratory testing. Conduct all batching and testing of concrete at a **single** AMRL certified laboratory using the exact materials proposed in the mix design.

Lab testing requirements:

- (a) Slump and air content at <5 minutes, 15 minutes, and 30 minutes after the completion of mixing,
- (b) Compressive strength (Make cylinders in accordance with AASHTO T126 and tested in accordance with AASHTO T22) at 1, 3, 7, 28, 56 days (sets of 3),
- (c) Hardened air content (ASTM C457) at a minimum of 7 days,
- (d) Rapid chloride permeability (ASTM C1202) at 28 days and 56 days (2 specimens for 28 day test and 2 test specimens for 56 day test (Take 2 specimens from each batch of a 2 batch mix)),
- (e) Concrete Durability (ASTM C666, Procedure A) at 300 cycles, and
- (f) Concrete Shrinkage (ASTM C157) at 28 days.

The Contractor is required to contact the MnDOT Concrete Engineering Unit a minimum of 2-days prior to any mixing so that a MnDOT representative can observe the process. This same 2-day notification is required prior to any physical testing on hardened concrete samples. Additionally, retain any hardened concrete test specimens for a minimum of 90 days and make available for MnDOT to examine.

Perform all testing for plastic concrete after all admixtures additions to the concrete mixture.

After completion of the laboratory testing specified herein and, at least, 15 working days prior to the trial placement, submit the laboratory test data to the MnDOT for review and acceptance.

Include the following information in the laboratory reports of the design mixes:

- (a) Exact batch weights and properties of all ingredients used and all aggregate gradations

- (b) Slump and air content
- (c) Cylinder identification, including mix designation
- (d) Date and time of cylinder preparation
- (e) Date and time cylinder specimen was tested
- (f) Compressive strength of each cylinder specimen at 1, 3, 7, 28, and 56 day (sets of 3)
- (g) A graphic plot of age, from 0 to 56 days, vs. strength for each mix design
- (h) Hardened air content at a minimum of 7 days
- (i) Rapid chloride permeability at 28 days and 56 days
- (j) Concrete Durability at 300 cycles and
- (k) Concrete Shrinkage at 28 days.

2.A.9 Prior to Actual Bridge Deck Placement

2.A.9.a Trial Placement

A minimum of 14 calendar days prior to the actual placement of the bridge deck slab concrete, successfully complete a separate trial placement utilizing a minimum of two (2) - 10 yd³ loads.

The Engineer may allow the incorporation of the concrete for trial batches into the bridge footings, abutments or end diaphragms. The Contractor may also choose to incorporate the trial batches into residential /commercial construction in the immediate vicinity of the project. In any case, the Engineer will require mixing, transporting, and placing the concrete using the same methods as the actual placement of the bridge deck.

If the concrete is incorporated into the permanent work, the Engineer will test the plastic concrete in accordance with the Schedule of Materials Control. The Engineer may require additional trial batches if the concrete delivered to the project does not comply with the plastic concrete requirements of the Contract.

The Engineer will waive a trial placement, at the contractor's request, provided the contractor submits a history of at least three successful bridge deck placements in the last 5 years using the same mix design and similar pumping or placement configuration.

The concrete mix design, laboratory batching and mixing, and the trial placement is incidental to the concrete furnished and placed.

Use the same materials, same supplier, and same supplier's manufacturing plant, and proportions in the permanent work as in the trial placement. Strength requirements specified for each mix are applicable to the cylinder tests taken during the production work.

2.A.9.b Slab Placement and Curing Plan

At least 14 calendar days prior to slab placement, provide a slab placement and curing plan for each bridge to the Engineer for approval. Include the following information in the placement and curing plan:

- (1) Anticipated concrete delivery rates
- (2) Estimated start and finish time
- (3) Material, labor and equipment proposed for placing, finishing, and curing including placement of wet burlap, soaker hose, or other system to maintain the deck in a moist condition during the curing period
- (4) Number of work bridges proposed for use
- (5) Number of people responsible for the various tasks and
- (6) Bulkheading methods and materials proposed for use if the Contractor cannot maintain the proposed concrete placement rates.

For full depth monolithic decks, the finishing machine will consist of a cylindrical finisher mated with horizontal adjustable augers, both of which are mounted on a transversely moving carriage unless otherwise approved by the State Bridge Construction Engineer.

A 10 ft [3 m] bull float is required for full-depth decks prior to carpet dragging regardless of whether texture planing is specified for the final ride surface. Float slab in accordance with MnDOT Construction Manual 5-393.358 to ensure the final surface does not vary by greater than 1/8 in [3 mm] within a 10 ft [3 m]

straightedge laid longitudinally on the final surface. This surface tolerance includes areas near expansion devices and other breaks in the continuity of the bridge slab.

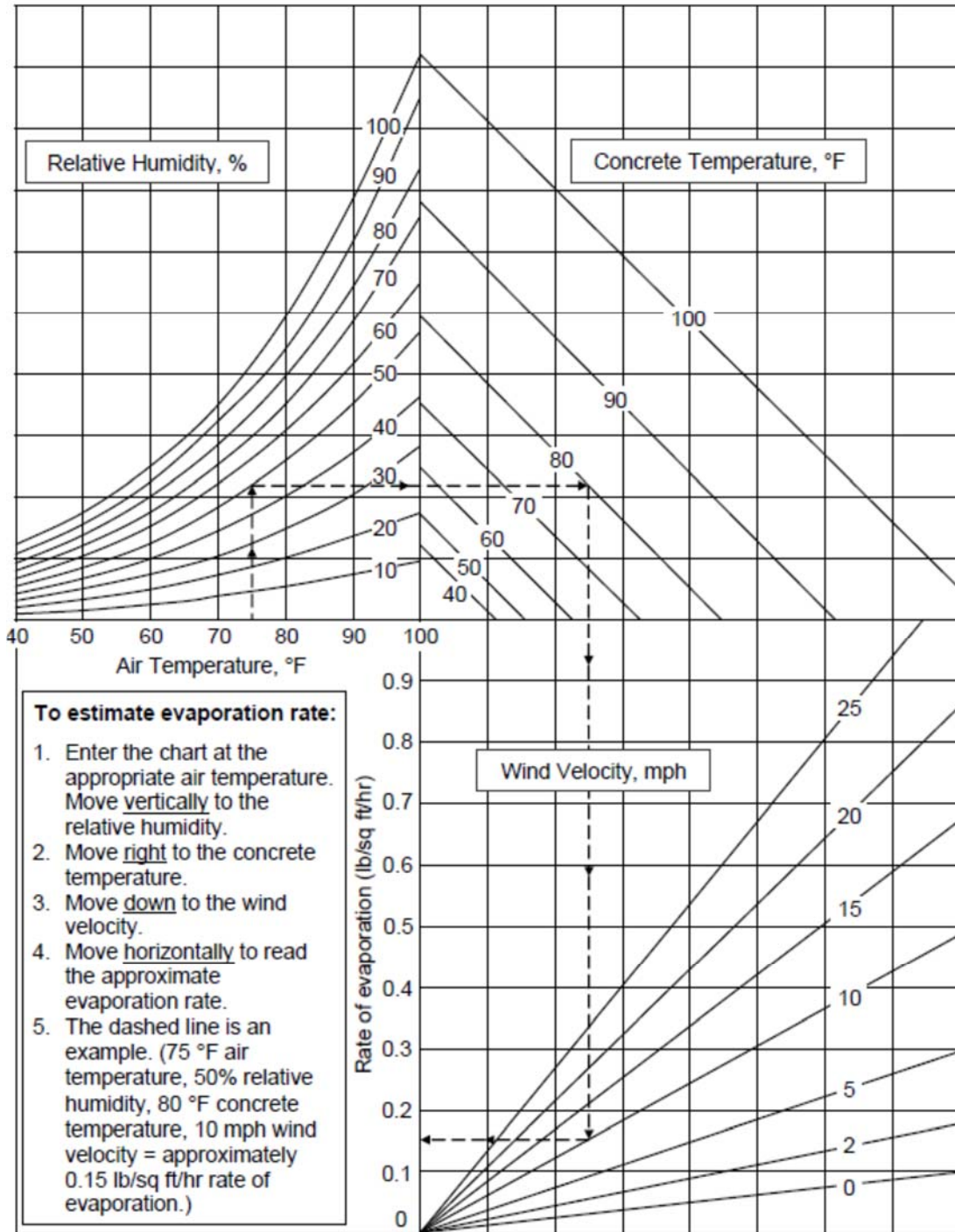
Attend a pre-placement meeting 2 days to 4 days before the slab placement to review the information and details provided in the placement and curing plan. The following project personnel are required to attend the pre-placement meeting:

- (1) Contractor
- (2) Engineer
- (3) Concrete supplier and
- (4) If required by the Engineer, the concrete pump supplier.

2.A.9.c Three (3) Hours Prior to Beginning Bridge Deck Concrete Placement

The Engineer requires the Contractor to comply with all of the following conditions prior to allowing the Contractor to begin the bridge deck concrete placement:

- (1) Provide a forecast to the Engineer three (3) hours before placement. The Engineer will review the forecast for the following:
 - (a) No forecasted precipitation two (2) hours prior to the scheduled placement duration, nor up to two (2) hours after the anticipated completion of the placement, and
 - (b) Less than 30% chance of precipitation for the entire placement window and
- (2) Only if the combination of air temperature, relative humidity, concrete temperature and wind velocity produces an evaporation rate of less than 0.20 pounds per square foot of surface area per hour, according Figure HPC-1:



¹ Based on ACI 305 R, "Hot Weathering Concreting"

FIGURE HPC-1

SB-7.4 Delete the 16th paragraph through 18th paragraphs of 2401.3.G, "Concrete Curing and Protection," and replace with the following:

2.A.9.d Actual Bridge Deck Placement and Curing Requirements

In addition to the requirements set forth in 2461.3.G.4, "Field Adjustments," if any adjustments are necessary on site, comply with the following:

- (1) The Engineer will only allow the addition of admixtures originally incorporated into the mix, except Viscosity Modifying Admixture (VMA) is allowed to adjust slump even if they were not used in the original testing
- (2) The Engineer will allow a maximum of 1 gal of water additions per yd³ of concrete on site provided additional water is available to add per the Certificate of Compliance, including any water necessary to dilute admixtures and
- (3) Mix the load a minimum of 5 minutes or 50 revolutions after any additions.

The Engineer will not allow finishing aids or evaporation retarders for use in finishing of the concrete.

The Contractor is fully responsible for curing methods. Comply with the following curing methods unless other methods are approved by the Engineer in writing.

Table HPC-7 Required Curing Method Based on Final Bridge Deck Surface		
Bridge Deck Type	Final Bridge Deck Surface	Required Curing Method
Bridge structural slab curing (3YHPC-S)	Low Slump Wearing Course	Conventional wet curing after carpet drag
Bridge deck slab curing for full-depth decks (3YHPC-M)	Epoxy Chip Seal Wearing Course or Premixed Polymer Wearing Course	Conventional wet curing after carpet drag
	Bridge Deck Planing	Conventional wet curing after carpet drag.
	Tined Texturing*	Conventional wet curing after tine texturing AMS curing Compound after wet cure period
	Finished Sidewalk or Trail Portion of Deck (without separate pour above)*	Conventional wet curing after applying transverse broom finish AMS curing Compound after wet cure period
Apply conventional wet curing to bridge slabs following the finishing machine or air screed. * Prevent marring of broomed finish or tined textured surface by careful placement of wet curing.		

Use conventional wet curing consisting of pre-wetted burlap covered with white plastic sheeting in accordance with the following:

- (1) Place the burlap to cover 100 percent of the deck area without visible openings
- (2) Place the wet curing within 30 min after the finishing machine completes the final strike-off of the concrete surface
- (3) If the Contractor fails to place the wet curing within 30 min, the Department will monetarily deduct \$500 for every 5 min period, or any portion thereof, after the initial time period until the Contractor places the wet curing as approved by the Engineer, the Department may assess the deduction more than once
- (4) Keep the slab surface continuously wet for an initial curing period of at least 7 calendar days
- (5) Use a work bridge to follow the finish machine and

- (6) Provide an additional center rail on wide bridges, if necessary.

Where marring of the broomed finish or tined texturing surface finish is a concern, the Engineer may authorize curing as follows:

- (1) Apply a membrane curing compound meeting the requirements of 3754, "Poly-Alpha Methylstyrene (AMS) Membrane Curing Compound"
- (2) Apply curing compound using approved power-operated spray equipment
- (3) Provide a uniform, solid white, opaque coverage of membrane cure material on exposed concrete surfaces (equal to a white sheet of paper)
- (4) Place the membrane cure within 30 min of concrete placement unless otherwise directed by the Engineer
- (5) Provide curing compound for moisture retention until the placement of a conventional wet curing
- (6) Apply conventional wet curing when walking on the concrete will not produce imprints deeper than $\frac{1}{16}$ in [1.6 mm]
- (7) Keep the deck slab surface continuously wet for an initial curing period of at least 7 calendar days including weekends, holidays, or both if these fall within the 7-calendar-day curing period
- (8) The Engineer will not allow placement of membrane curing compound on any concrete surface that expects future placement of additional concrete on that surface and
- (9) If the Contractor fails to meet these requirements, the Department may reduce the contract unit price for the concrete item in accordance with 1512, "Conformity with Contract Documents."

SB-7.5 Delete 2401.3.I.2, "Crack Sealing," and replace with the following:

The Contractor is fully responsible for crack sealing all cracks identified by the Engineer in accordance with Table HPC-8.

Table HPC-8 Required Crack Sealing Requirements Based on Final Bridge Deck Surface		
Bridge Deck Type	Final Bridge Deck Surface	Crack Sealing Requirements
Bridge structural slab (3YHPC-S) *	Low Slump Wearing Course	Seal cracks in accordance with 2401.3.I.2
Bridge deck slab for full-depth decks (3YHPC-M)	Epoxy Chip Seal Wearing Course or Premixed Polymer Wearing Course	See wearing course special provision
	Bridge Deck Texture Planing	Seal cracks in accordance with 2401.3.I.2 after texture planing
	Tined Texturing	Seal cracks in accordance with 2401.3.I.2
	Finished Sidewalk or Trail Portion of Deck (without separate pour above)	Seal cracks in accordance with 2401.3.I.2
<p>* Shotblast the surface in preparation for low slump wearing course. Prior to placing the low slump wearing course, the Engineer will visually inspect the bridge structural slab, and will mark cracks that require sealing appearing on the top surface. Control the application of the crack sealer such that the maximum width of crack sealant does not exceed 1 in [25 mm]. If exceeding the permitted width of 1 in [25 mm], remove excess by means of surface grinding to prevent debonding of concrete wearing course. The Engineer requires the sealer to cure completely prior to pre-wetting of the deck, as required for placement of a low slump concrete wearing course.</p>		

SB-7.6 Method of Measurement

If measuring bridge slab concrete by area, the Engineer will base the measurement on end-of-slab stationing and out-to-out transverse dimensions of the slab.

SB-7.7 Basis of Payment

Payment for Item No. 2401.618 "BRIDGE SLAB CONCRETE (3YHPC-S)" will be made at the Contract price per square foot and shall be compensation in full for all costs of forming, placing, finishing, curing, crack sealing, and all associated incidentals necessary to construct the bridge deck and diaphragms as detailed in the Plans in accordance with these specifications.

SB-7.8 Control Strength Cylinders

Delete 2461.3.G.5.b, "Control Strength Cylinders," and replace with the following:

3.G.5.b Curing and Transporting Standard (28-day) Strength Cylinders

Provide moist curing environments of adequate size and number for initial and final curing in accordance with ASTM C31 and in accordance with 2031.3.C, "Special Requirements."

The Concrete Engineer defines the **initial curing period** as immediately after molding and finishing for a period of up to 48 hours in a temperature range from 60° F to 80° F [16° C and 27° C].

After the initial curing period, the Engineer will both transport and further cure the test specimens in the provided curing tanks. The Engineer will deliver the test specimens to the laboratory for compressive strength testing.

Provide curing tanks of adequate size and number for curing all of the concrete test specimens in accordance with 2031.3.C, "Special Requirements." Maintain the water in the curing tanks to a water temperature of 60° F to 80° F [16° C and 27° C]. When cured in the testing laboratory, maintain the cylinders at a temperature of 73.5° F ± 3.5° F [23.0° C ± 2.0° C].

The Engineer will allow the Contractor to submit a strength-maturity relationship curve for use in lieu of control cylinders. Perform all maturity testing and validation of the strength-maturity relationship curve in accordance with ASTM C1074 and the MnDOT Concrete Manual.

3.G.5.b (1) Acceptance of Concrete Compressive Strength

The Concrete Engineer defines a **strength test** as the average (28-day) strength of three (3) cylinders fabricated from a single sample of concrete and cured in accordance with the MnDOT Concrete Manual.

The Engineer will consider concrete acceptable in accordance with Table HPC-9 provided **both** conditions are met for a required f'_c .

Table HPC-9		
Acceptance Criteria for Standard 28-day Cylinders		
Concrete Grades F, G, M, P, and S		
	All strength tests	Moving average of 3 consecutive strength tests *
$f'_c \leq 5000$ psi	$> (f'_c - 500 \text{ psi})$	$\geq f'_c$
$f'_c > 5000$ psi	$> 0.90 * f'_c$	$\geq f'_c$
* If a project does not establish a moving average of 3 consecutive strength tests, use either the single strength test or the average of 2 strength tests to determine acceptance.		

3.G.5.b (2) Strength Test Below Acceptance Criteria

If any single strength test (3 cylinders) falls below the criteria established in Table HPC-9, the Engineer, in conjunction with the Concrete Engineer, will determine the following:

- (A) If the concrete has attained critical load-carrying capacity;
- (B) If investigation is required; The investigation may consist of, but is not limited to reviewing the following:
 - (B.1) Sampling and testing plastic concrete,
 - (B.2) Handling of cylinders,
 - (B.3) Cylinder curing procedures,
 - (B.4) Compressive strength testing procedures,
 - (B.5) Certificate of Compliances
- (C) If dispute resolution coring is required in accordance with 2461.3.G.5.b(4).

3.G.5.b (3) Moving Average Below Acceptance Criteria

If the moving average of three (3) consecutive strength tests falls below f'_c , the Concrete Engineer will require a new mix design in accordance with Table HPC-4.

3.G.5.b (4) Dispute Resolution Coring

The Engineer and Contractor will mutually agree on an Independent Third Party to core and test the concrete in accordance with ASTM C42.

- (A) The Engineer will identify a minimum of three (3) locations for the Independent Third Party to core,
- (B) The Independent Third Party will take one (1) core at each location,
- (C) The Contractor will complete all coring within 14 days of notification of the low strength concrete, and
- (D) The Contractor is responsible for ensuring the core holes are repaired.

The Engineer, in conjunction with the Concrete Engineer, will review the core test results and evaluate in accordance with Table HPC -10, providing all other concrete tests meet requirements.

Table HPC-10 Evaluation of Core Test Results			
Core (average of 3 cores) Test Results:	Engineer considers concrete:	Cost of Coring and Testing:	Resolution:
$\geq 85\%$ of $f'c$	Acceptable to remain in place	Engineer Responsibility	No monetary adjustment for single strength test failure.
$< 85\%$ of $f'c$	Unacceptable	Contractor Responsibility	Remove and replace concrete in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer may not pay for the concrete or will pay at an adjusted Contract Unit Price and consider any additional actions in accordance with Table HPC-11.

3.G.5.b (5) Non-Conforming Material

If the Contractor inadvertently places concrete not meeting the strength requirements in accordance with Table HPC-10 into the work, the Engineer will not accept nonconforming concrete at the contract unit price.

For concrete not meeting the moving average of three (3) consecutive strength tests, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the contract unit price for the contract item of the concrete in accordance with Tables HPC-11 based upon cylinder strength test results.

Table HPC-11 3YHPC-M and 3YHPC-S	
Moving average of 3 consecutive strength tests	Adjusted Contract Unit Price
$< 100.00\%$ of $f'c$	Remove and replace concrete in accordance with 1512, "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer may apply a monetary adjustment to the Contract unit price or not pay for the concrete.*
* When there is not a separate contract unit price for <i>Structural Concrete</i> for an item of work or the concrete is a minor component of the contract unit price, the Department will reduce payment based on a concrete price of \$100.00 per yd ³ [\$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.	

SB-7.9 Joint Filler and Sealing

Add the following to the 3rd Paragraph of 2401.3.I.1:

4. Supply commercially available rigid polystyrene extrusion contraction joints such as "Zip Strips." Supply technical information to engineer regarding installation.

SB-7.10 Architectural Concrete Texture (Ashlar Stone)

This work consists of constructing textured surfaces on specified areas of the abutments and wingwalls for Bridge Nos. 62732 and 62937 as shown in the Plans. This work also consists of constructing textured surfaces on specified areas of the concrete pilasters along the concrete parapet railing for Bridge No. 62732 as shown in the Plans. The work shall be performed in accordance with the applicable provisions of Mn/DOT 2401, the Plans and the following:

A. Definition of Architectural Concrete Texture (Ashlar Stone)

Architectural Concrete Texture (Ashlar Stone) shall have a texture created from Ashlar of random course height and random length placed in a random running bond pattern with a maximum relief of 1-3/4 inches. The pattern shall be similar to Pattern #12030 Milwaukee River Ashlar by Custom Rock. This pattern shall be used on the surfaces of the abutments, outside faces of rail post, and wing walls as shown in the Plans.

B. Formed Textured Surfaces

The textured concrete surfaces shall be formed using a form lining system made of high-strength urethane elastomer capable of withstanding anticipated concrete pour pressures without leakage or causing physical defects. Form liners shall attach easily to forms and be removable without causing concrete surface damage. The liners shall be designed to form surfaces conforming to the design intent including the shape, lines and dimensions described herein and in the Plans.

If applicable, match pattern features at form liner joints to minimize visible pattern repeats and make the formed concrete surface appear uniform and continuous without visible seams and form marks. When joints are unavoidable, make joints along main features of the pattern.

Subject to compliance with requirements, provide form liner materials from the following manufacturers:

1. Custom Rock, Inc.
2. Milestones, Inc.
3. ThemeScapes, Inc.
4. Fitzgerald Formliners, Inc.
5. Other approved manufacturers

Form ties shall be made of non-corrosive materials when the portion permanently embedded in the concrete is less than 1 1/2 inches from the finished surface.

Form release agents shall be fully compatible with the form liner material and the special surface finish to be applied to the textured surfaces.

C. Submittals

Within 60 calendar days of execution and approval of the Contract, the Contractor shall submit the following to the Engineer for approval:

1. Product data including manufacturer's technical information and use instructions for formliner placement and release.

2. Actual samples of form liner material (minimum of 1 foot x 1 foot).
3. Actual samples of form ties that will be permanently embedded in the concrete.
4. Qualification data for firms and persons specified below under Quality Assurance to demonstrate their capabilities and experience. Include a list of completed projects with project names, addresses, names of architects, engineers and owners, and any other pertinent information.
5. Shop drawings indicating form liner layout and termination details. Indicate backup, rustication, reveal, and chamfer strip locations. Include jointing, form tie location, pattern placement, and end, edge and other special conditions. Indicate tolerances and procedure of installation and separation.

D. Quality Assurance

1. Manufacturer's Qualifications: The form liner manufacturer must have five years minimum experience making liners used to create formed concrete surfaces matching natural stone shapes and textures.
2. Installer Qualifications: The form liner installer shall have had a minimum of five consecutive years of experience in textured formed concrete construction.
3. Test Panel Mock-ups: Construct test panel mock-ups of the textured formed surface for quality control comparison of surface texture and pattern characteristics between the approved sample mock-ups and the actual work as it is installed. Test panel mock-ups shall be constructed using urethane foam or other suitable lightweight material to produce a surface that simulates that produced when casting concrete. The test panel mock-ups shall be a minimum of 3-inches thick, 5-feet wide and 4-feet high. They must be lightweight and easily moved or transported by one person.
4. Concrete Test Panel: Upon approval of the test panel mock-up for the architectural concrete texture pattern, a concrete test panel for the texture shall also be constructed. At a minimum, the concrete test panel shall be the same size as the test panel mock-up. Materials used in the construction of the concrete test panel shall comply with the applicable requirements of 2401 for formwork and concrete. Concrete mix for the concrete test panel shall be Mix No. 3B52. The form liner used for the concrete test panel shall produce the same pattern that is intended for use on the structure(s). Cast the unreinforced panel vertically simulating as many phases of the actual construction as possible. Additional concrete test panels will be required if results of the initial test panel do not meet the requirements of these special provisions, which shall be considered incidental to the Work.

The Engineer will represent the County in approving the formliner pattern and the color.

Following completion of construction of the bridges, remove and dispose of the test panels in accordance with 2104.3C3.

Test panels shall be considered incidental to the work and no direct compensation will be made therefore.

E. Construction Requirements

Surface Preparation: All conventionally formed concrete surfaces to receive Ashlar Stone texture shall be water blasted to break the surface film and to remove all laitance detrimental to the finish coating system performance. Sandblasting will not be allowed for cleaning concrete surfaces, as it will reduce the architectural concrete texture specified in this Special Provision. Pressure washing with water at a pressure of **3000 psi** at a rate of **3 to 4 gallons** per minute using a fan nozzle held perpendicular to the surface at a distance of **one to two feet** shall be used.

Match pattern features at form liner joints to make the formed concrete surface appear uniform and continuous without grout leakage at the joints. When concrete vertical construction joints are required, place form liner joints in the valley of the grooves, or as approved by the Engineer. Following removal of forms, finish minor defects to blend with the balance of the pattern surface texture. Filling of “bug holes” or other similar deformities in the texture surface that are 1/2 inch or less in diameter or depth is not required. No visible vertical and horizontal seams or conspicuous form marks created by butt-joining form liners will be allowed. Where it is not possible to locate a vertical groove at a construction joint, the concrete surface shall be finished to reduce visibility of the construction joints.

Strip formwork in accordance with the form liner manufacturer's recommendations to avoid concrete surface deterioration or weakness planes in the substrate. Finish form tie holes in accordance with 2401.3F2a using approved patching materials.

Clean and repair surfaces of form liners to be re-used. Split, frayed, delaminated or otherwise damaged form liner material will not be acceptable for exposed surfaces. Form liners shall be cleaned and free of concrete buildup prior to each pour. Do not use “patched” forms for exposed concrete surfaces unless acceptable to the Engineer.

F. Method of Measurement

Measurement for Architectural Concrete Texture (Ashlar Stone) will be made by the planimetric area in square feet of the textured surface based on the Plan dimensions.

G. Basis of Payment

Payment for Item 2411.618, “ARCHITECTURAL CONCRETE TEXTURE (ASHLAR STONE)” will be made at the Contract price per square foot and shall be compensation in full for all costs of constructing the textured surfaces, as described above.

SB-7.11 Architectural Surface Finish (Multi Color)

A. Description of Work

This work consists of applying an architectural surface finish of a multi-color application to all exposed concrete surfaces of Architectural Concrete Texture (Ashlar Stone) as applicable to Bridge Nos. 62732 and 62937 on this Project. The work shall be performed in accordance with the applicable provisions of MnDOT 2401, the Plans, and the following:

B. Architectural Surface Finish (Multi-Color) Application and Colors

Architectural Surface Finish (Multi-Color) shall be applied to the abutment, pilasters and wing walls, so designated in the Plans to receive Architectural Concrete Texture (Ashlar). Architectural Surface Finish (Multi-Color) base color shall be a light buff matching Federal Standard 595C No. 33522, and highlight color shall be a dark brown matching Federal Standard 595C No. 37056, and meeting the approval of the Engineer in approving the formliner pattern and the color.

Cork joints shown in the Plans shall be finished to visually continue the stonework pattern across the joint uninterrupted. A sample of the colored cork for approval shall be included in the concrete test panel described in SB-7.10

C. Stain Materials

Stain shall be a 100 percent acrylic; water-repellant, semi-opaque, tinted emulsion sealer designed for concrete and masonry surfaces. Acceptable products shall allow moisture and vapor transmission, be formulated for exterior application with resistance to freeze/thaw, moisture, alkali, acid and mildew, mold or fungus, discoloration or degradation and meet the following requirements:

1. Physical or performance properties:
 - Volume Solids.....29-31 percent (Calculated Lab Value)
 - Weight Solids.....44-46 percent (Calculated Lab Value)
 - Viscosity65-85 KU (Calculated Lab Value)
 - Accelerated Weathering 1,000 Hours Minimum (ASTM G-26)
2. Color pigments for tinted products shall be derived from synthetic mineral oxides.
3. Subject to compliance with requirements, provide colored concrete finishing products from one of the following manufacturers:
 - Harris Specialty Chemicals, Inc.
 - The Sherwin-Williams Company
 - Tamms Industries
 - TK Products
 - United Coatings
 - Other approved sources

To the greatest practical extent, all concrete finishing products shall be obtained from a single source.

All materials shall be furnished, prepared, applied, cured and stored according to the product manufacturer's directions and as specified herein. Special attention shall be given to the recommended temperature range for application.

D. Submittals by Contractor

Within 60 calendar days of execution and approval of the Contract, the Contractor shall submit the following to the Engineer for approval:

1. Product data including manufacturer's technical information, label analysis, and application instructions for each material proposed for use.
2. Laboratory test reports showing that materials proposed for use meet physical or performance property requirements.
3. 12-inch x 12-inch square samples of the colors needed to complete the work. Final color selections will be based upon completion of the test panel specified above.
4. Proof that the concrete finisher has had five years of experience finishing simulated stone masonry textured concrete. Include list of completed projects with project name and location and architect/engineer/owner of record.

E. Quality Assurance

The Contractor shall demonstrate his workmanship by completely finishing the architectural surface treatment concrete test panel(s), described in SB-7.10 using approved concrete stain products, materials, methods and workmanship and the specified surface preparation method. Test panel(s) shall be considered incidental to the work and no direct compensation will be made therefore.

F. Surface Preparation

Following removal of forms, all exposed textured concrete surfaces shall receive an ordinary surface finish in accordance with MnDOT 2401.3F2a prior to the surface preparation described below. Minor defects shall be finished to blend with the balance of the textured surfaces. The Contractor shall make every effort to match the surface texture of patched surfaces with the surrounding textured surface. Visible vertical or horizontal seams or conspicuous form marks shall be repaired to the satisfaction of the Engineer and at the Contractor's expense.

All formed concrete surfaces to receive Architectural Surface Finish (Multi-Color) shall be water-blasted to break the surface film and to remove all laitance detrimental to the color system performance. Sandblasting will not be allowed for cleaning concrete surfaces, as it will reduce the architectural concrete texture. Pressure washing with water at a pressure of 3000 lbs. Per Square Inch at a rate of 3 to 4 gallons per minute using a fan nozzle held perpendicular to the surface at a distance of 12 inches to 24 inches shall be used.

G. Method of Measurement

Measurement for Architectural Surface Finish (Multi-Color) applied to the Architectural Concrete Texture (Ashlar) will be by area in square feet based on the dimensions of the finished colored plane surface area as shown in the Plans.

H. Basis of Payment

Payment for Item No. 2411.618 "ARCHITECTURAL SURFACE FINISH (MULTI-COLOR)" will be made at the Contract price per square foot and shall be compensation in full for all costs of furnishing and applying finishing materials to the areas of Architectural Concrete Texture (Ashlar Stone).

Application of the Architectural Surface Finish to the concrete test panel(s) for quality assurance purposes shall be considered as incidental and no direct compensation will be made therefore.

SB-7.12 Anti-graffiti Coating

A. Description of Work

This work consists of applying an anti-graffiti coating to all areas of Bridge Nos. 62732 and 62937 which receive Architectural Surface Finish (Multi-Color). The work shall be performed in accordance with the Contract Documents and the following:

B. Materials

Anti-Graffiti Coatings

Anti-graffiti coatings shall be a clear, multi-component, multi-coat system designed as a permanent, non-destructive coating system for exterior architectural aesthetics. Product shall be compatible with any surface sealer and/or special surface finish that may have been previously applied to the concrete surfaces. It shall be non-yellowing, non-chalking, and UV-resistant, available in a flat, matte, or semi-gloss finish, and shall not require re-application after graffiti removal. Coating shall not contain paraffin (wax) or elastomeric silicones. Acceptable products shall demonstrate protection from graffiti defacement, chemical staining, ghosting, shadowing, and normal environmental effects without yellowing, color change, increased dirt pick-up, or damage to the coating or substrate for a minimum 10-year period.

Acceptable anti-graffiti coating products are as follows:

- Graffiti Solution System as manufactured by American Polymer Corporation
- Conformal Anti-graffiti Coating as manufactured by Chemprobe Technologies, Inc.
- Permaclean 1496 as manufactured by TK Products
- Other products Approved by Mn/DOT

Graffiti Removal Agents

Graffiti removal agents shall be non-toxic, non-flammable, biodegradable, and have a pH of 7-8.5. After graffiti removal, no evidence of graffiti shall be present. The product(s) shall not cause a change in the appearance to the treated surface, including shadowing, ghosting, or staining of the coating or substrate.

C. Submittals

Submittals shall be made prior to material being incorporated in the work. The Contractor shall allow sufficient time so that construction will not be delayed as a result of the time required to approve the

submittals, including time for resubmittals as necessary. An extension of time will not be authorized because of failure to transmit submittals sufficiently in advance of the work.

The Contractor shall submit the following items to the Engineer and Mn/DOT:

- Manufacturer's product data sheets indicating technical information, label analysis, and application instructions for each material proposed.
- For the purpose of future maintenance, a list of manufacturer-approved products for cleaning of the surface of the anti-graffiti coating product(s) used on the Project.
- Certified test reports indicating compliance with requirements.
- A one-liter sample of each anti-graffiti coating product and a compatible graffiti removal agent for verification purposes.
- Test panel in accordance with the requirements of SB-7.10.
- Applicator qualifications demonstrating experience in coating applications. Include a list of recently completed graffiti-resistant coating projects. Supply name and location of project, name and telephone number of owner, and a description of products used, substrates, applicable local environmental regulations, and application procedures.

D. Quality Assurance

All products applied under this Project shall be supplied by the same manufacturer. Coating and removal products shall demonstrate a history of successful use on transportation, commercial, or industrial projects.

The approved coating manufacturer shall conduct a training seminar for the purpose of training applicators on anti-graffiti product technology, substrates, and application methods. Applicator trainers shall be approved by, and shall be in good standing with, the manufacturer.

E. Application

Anti-graffiti coating shall be applied after all components of the Architectural Surface Finish have been applied to the areas of architectural concrete texture.

The substrate shall be prepared and the anti-graffiti coating product(s) shall be applied in accordance with the manufacturer's directions.

Prior to full application of the anti-graffiti coating to the designated surfaces, the applicator shall apply the anti-graffiti coating to the test panel containing Architectural Concrete Texture and Architectural Surface Finish (Multi-Color) as described in SB-7.10 and SB-7.11 to confirm compatibility, coverage, and possible color change. Any problems or damage to the color system as a direct result of the anti-graffiti products or face preparation methods shall be corrected to the satisfaction of the Engineer and at the Contractor's expense.

F. Method of Measurement

Measurement for Anti-Graffiti Coating applied to the Architectural Concrete Texture (Ashlar Stone) and the Architectural Surface Finish (Multi-Color) will be by area in square feet based on the dimensions of the finished colored plane surface area as shown in the Plans.

G. Basis of Payment

Payment for Item No. 2411.618 "ANTI-GRAFFITI COATING" will be made at the Contract price per square foot and shall be compensation in full for all costs of surface preparation, furnishing and applying of the anti-graffiti coating as described above.

Application of the anti-graffiti coating to the test panels for quality assurance purposes shall be considered incidental and no direct compensation will be made therefore.

SB-7.13 Finish of Concrete Surfaces

Cure concrete for a minimum of 28 days or as recommended by the manufacturer prior to applying special surface finish (SSF) or acrylic paint. Thoroughly flush all surfaces that are to receive SSF with clean water not more than 24 hours before commencing with the SSF finishing.

A. Special Surface Finish

The provisions of 2401.3.F.2.C, "Special Surface Finish," are supplemented as follows:

Apply SSF on the exposed concrete surfaces as designated below for Bridge No.(s). 62732 and 62937.

1. Inside faces of Railposts
2. Barrier or Parapet (other than Type F)
3. Outside surfaces of barriers
4. Underside and edge of deck
5. Wingwall Copings
6. Abutment Copings
7. Abutment corner pilasters
8. Piers/pier cap
9. Crash struts

Provide a finish color for all SSF matching Federal Standard 595 C No. 33522 (light buff). Provide paint free of toxic metals and toxic pigments.

Provide a test area, 3 foot x 3 foot [1 meter x 1 meter], for final color selection and have the Engineer approve the test area after the color has been added to it.

B. Finishing Roadway Faces and Tops of Barrier

1. Finish conventionally formed roadway faces, tops of barriers (and medians), as per 2401.3.F.2.d, "Curb, Sidewalk, and Median Finish," and the following:
 - a) Plan and execute concrete placement, form removal, and finishing operations so that the surface finishing can be started immediately after forms are removed. Remove the roadway face forms as soon as the concrete can retain its molded shape. In no case shall the elapsed time between concrete placement and initial surface finishing exceed 24 hours.
 - b) After completion of the curing period, paint the roadway faces and tops of the barriers (and median) with an approved acrylic paint conforming to 3584, "Exterior Masonry Acrylic Emulsion Paint". The color of the acrylic paint shall conform to Federal Standard 595 C No. 33522 (light buff). Apply the paint at a rate of 300 ft² per gallon [7.4 m² per L]. Commence or suspend the painting operation when the air and surface temperature meet or exceed the manufacturer's recommendations.
2. Finish slipformed roadway faces and tops of barriers (and median), in accordance with the following:
 - a) Lightly broom the barrier surface immediately after passage of the slipformer.
 - b) Coat the roadway face and top of the barrier as described above for the conventionally formed barrier.

C. Finishing Precast Concrete Girders

Apply two coats of 100% acrylic paint 3584, "Exterior Masonry Acrylic Emulsion Paint," on the exposed concrete surfaces as designated below for Bridge No.(s) 62732 and 62937.

1. Outside face of fascia girder
2. Bottom of bottom flange of fascia girder
3. Bottom of bottom flange of all girders

Provide a finish color for acrylic paint matching Federal Standard 595 C No. 33522 (light buff).

Apply the paint at a rate of 300 ft² per gallon [7.4 m² per L]. Commence or suspend the painting operation when the air and surface temperature meet or exceed the manufacturer's recommendations.

D. Basis of Payment

Finishing of concrete surfaces, except as otherwise provided in these special provisions, special surface finish, application of topcoat, and painting are considered an incidental expense to the respective concrete mixes for this construction, and no additional compensation will be made for this work.

SB-7.14 Precast Concrete Cap (Bridge No. 62732)

A. Description of Work

This work shall consist of furnishing and installing a pre-cast concrete cap, here-in-after known as "cast stone" cap assembly, on all areas so designated in the plans for Bridge No. 62732. An assembly consists of a single cast stone cap with anchorages required for attachment to the cast-in-place concrete. The work shall be performed in accordance with the following specifications:

B. Quality Assurance

The work under this section shall comply with the applicable provisions of MnDOT 2401, the Plan details and the following:

ACI 303 "Guide to Cast-in-Place Architectural Concrete Practice."

ACI 318 "Building Code Requirements for Reinforced Concrete"

C. Fabrication Qualifications

The cast stone caps shall be produced at plants engaged primarily in the manufacturing of architectural pre-cast products for the type required.

1. Pre-cast Fabricator: Fabrication firms shall have a minimum of 5 years successful experience in the fabrication of architectural pre-cast concrete, similar to the product required for this Project. The fabricator shall have sufficient production capacity to produce, transport and deliver the cast stone caps without causing delay in the work, and whose products have been previously used and exposed to the weather with satisfactory results.

2. Installation of Cast Stone Caps: The firm setting the cast stone caps shall have a minimum of 5 years successful experienced respectively on construction of architectural pre-cast units similar to those required for this Project.

D. Submittals

Cast stone caps shall not be manufactured until the required submittals, as described below, have been accepted and approved by the Engineer.

Product Data

Submit fabricator's specifications, data and instructions for manufactured materials and products. Include mix design(s), certifications and laboratory tests of materials and final products as required.

Submit shop detail drawings for the complete fabrication of the cast stone caps. Shop drawings shall show complete information for fabrication and installation of the caps. Show details and sizes of individual pieces, reinforcing, setting marking, openings for light standard anchorages, details of anchors, inserts, joints and connections to substrates. Include a complete field erection plan showing the location of each unit on the bridges, and the method of installation and anchoring. Each individual piece, when delivered, shall bear the same corresponding setting mark on an unexposed surface. Grouted and sealed joints shall be of the width shown in the Plans.

After the above submittals have been approved, a 6" x 12" x 1" sample of the finished cast stone cap material shall be submitted to the Engineer to illustrate quality, color and texture of the surface.

Samples of anchorages shall be submitted if so requested by the Engineer.

E. Materials

1. Reinforcement bars shall be deformed Grade 60 steel conforming to the requirements of MnDOT 3301 and shall be epoxy coated.

2. Materials used as ingredients in mortar shall conform to the requirements for the ASTM designations listed:

- a) Portland Cement (C-150 Type 1)
- b) Masonry Cement (C-91)
- c) Quicklime (C-5)
- d) Hydrated lime (C-207 Type S)
- e) Aggregates (C-144)
- f) Water (clean and potable)
- g) Color (lime-proof, color-fast mineral pigments)

Comply with ASTM C 270 proportion specification for type of mortar required. Type S mortar for stone masonry shall have a minimum compressive strength of 2500 psi at 28 days.

Mortar shall be mixed in a batch mixer for not less than five minutes, and shall be mixed long enough for thorough intimate mixing of all ingredients. If color is added, it shall be added in a consistent manner to provide final uniformity.

No mortar shall be re-tempered after initial set has taken place.

Grout, if used, may consist of mortar with sufficient water added to provide a pourable consistency or may consist of a 1:2:3 cement, sand and pea gravel mix.

3. Cleaner for stone shall be any commercial product formulated for the purpose intended approved by the cast stone fabricator and the Engineer.

4. Concrete surface sealer shall be clear penetrating silane water repellent containing a 40 percent solution of alkyl silane formulated for application to concrete and masonry surfaces.

F. Proportioning and Design of Concrete Mixes

1. Prepare a design mix for the cast stone caps. The concrete shall contain no reactive aggregate and no calcium chloride. The slump shall not exceed 4 inches.
2. The design mix may be prepared by an independent testing facility or by the qualified pre-cast manufacturing plant personnel, at the fabricator's option.
3. Proportion mix by either laboratory trial batch or field experience methods, using materials to be employed on the Project and in compliance with CI 318. The same design mix shall be used for all cast stone caps.
 - a) Compressive Strength: 5,000 psi minimum at 28 days.
 - b) Total Air Content: Not less than 4% nor more than 6%.
 - c) Water Absorption: Not to exceed 4% by weight for cast stone units.
4. Submit written reports to Engineer of the proposed mix for the cast stone at least 30 days prior to start of production.
5. Adjustment to Concrete Mixes: Mix design adjustments may be requested when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Laboratory test data for revised mix designs and strength results shall be submitted to and accepted by the Engineer before using in the work.
6. Admixtures: Use air-entraining admixtures in compliance with the manufacturer's directions. Admixtures to increase cement dispersion or to provide increased workability for low-slump concrete may be used subject to acceptance by the Engineer. Use amounts as recommended by admixture manufacturer for climatic conditions prevailing at time of placing. Adjust quantities as required to maintain quality control.
7. Concrete Color Admixture

The concrete color pigment shall be the closest equivalent to Federal Standard 595 C No. 33522 (light buff) by Prism Pigments or an approved equal. Color may be adjusted after final color selection of Architectural Surface Finish and Special Surface Finish.

The color-conditioning admixture shall be a single-component, pigmented, water reducing, concrete admixture, factory formulated and packaged in cubic foot dosage increments, not multiple additives and pigments to be dosed separately into the mix. All batching, placing, finishing, and curing, shall be in accordance with the manufacturer's instructions. Subject to requirements, all systems components shall be manufactured by one of the following firms:

1. Davis Colors
3700 East Olympic Boulevard
Los Angeles, CA 90025
(800) 356-4848
2. L M. Scofield Company
1652 E. Main St., Suite 200
St. Charles, IL 60174
(630) 377-5959
3. Prism Pigments
1251 Arundel Street
St. Paul, MN 55117
(651) 488-4250

4. Other approved equal

G. Fabrication

1. General

Fabricate cast stone caps in compliance with approved submittals, and dimensional tolerances given below. Caps shall be straight, rough faced, and true to size and shape, with exposed edges and corners precise and square unless otherwise indicated.

After removal from the forms, surfaces shall be finished uniformly and cured as specified. The concrete shall not be covered with plastic sheeting at any time during the curing process.

Caps that are warped, cracked, broken, spalled, stained or otherwise defective will be rejected. Any cap that does not conform to the Plan dimensions within the specified tolerances shall be subject to the provisions of MnDOT 1503.

2. Dimensional Tolerances of Cast Stone Caps

Overall dimensions, including openings for lighting unit anchorages and conduits, measured at the face adjacent to mold at time of casting: Height and width - plus 1/8 inch, minus 1/8 inch from Plan dimensions.

3. Position Tolerances:

For cast-in items measured from datum line locations as shown on approved shop drawings:

- a) Anchors and inserts shall be installed to provide proper alignment of the cast stone cap assembly. Face of cap stone shall line up with the alignment reference line and shall have an allowable tolerance of plus 1/8 inch, minus 1/8 inch. A minimum of four anchors are required per each pre-cast cap.
- b) Place reinforcement bars within plus or minus 1/2 inch of positions shown on the approved shop drawings.
- c) For exposed surfaces, cover on reinforcement bars shall be 2 inches minimum.

4. Formwork

Provide forms and form facing materials of metal, plastic, wood, or other acceptable material that is non-reactive with concrete and will produce the required finish of surfaces.

Forms shall be mortar-tight and of sufficient strength to withstand pressures due to concrete placing operations and pre-cast units of shapes, lines and dimensions indicated within specified fabrication tolerances.

Forms shall produce the textured effect of a natural stone surface having a fabricated (light sandblast) finish. Cap size shall be as shown in the Plans.

Wash surfaces of the cast stone caps with 7% to 10% muriatic acid solution at the fabricating plant in accordance with the manufacturer's recommendations. Rinse thoroughly with clean running water.

H. Construction Requirements

1. Delivery and Storage

Delivery anchorage items which are to be embedded in other construction before start of installation of the cast stone caps. Provide setting diagrams, templates, shims, spacers, instructions and directions as required.

All cast stone cap assemblies delivered to the Project shall be stored clear of the ground on non-staining planking in such a manner as to be protected from damage while in storage. Should units be stored for an extended period, cover with polyethylene or other non-staining waterproof material.

2. Setting of Cast Stone Caps

Setting of cast stone caps shall proceed only after completion and curing of the supporting concrete.

- a) Setting of Cast Stone Units: All caps shall be set by experienced workers, accurately and in accordance with shop and setting drawings. Unless otherwise noted, every cap shall be set in a full bed of mortar with all joints full. All anchors and dowels shall be firmly placed and all anchor and dowel holes, and similar holes completely filled with mortar.

When setting with mortar, all caps not thoroughly wet shall be drenched with clear water just prior to setting.

After each cap has been set, all joints shall be raked to a depth of 1/4 inch from the face of the Concrete/stone texture. The face of each cap and adjacent concrete/stone texture shall then be sponged off to remove any splashed mortar or mortar smears.

All caps shall be protected from splashing mortar or damage. Any foreign matter splashed on the caps shall be removed immediately

- b) Repair of chipped or damaged cast stone caps shall be done only by technicians skilled in this class of work, with materials furnished by the manufacturer and in accordance with supplied directions. Repaired caps must be reviewed and approved by the Engineer prior to acceptance. Caps that are not successfully repaired shall be replaced.
- c) Cleaning: After the setting mortar has cured, clean exposed faces of the cast stone caps to remove dirt, stains and joint sealer material after installation and completion of joint treatments. Wash and rinse in accordance with pre-cast manufacturer's recommendations. Protect other work from damage due to cleaning operations. Do not use cleaning materials or processes which could change the character of exposed concrete finishes.

The exposed faces of all cast stone caps shall be cleaned in accordance with the stone cleaner manufacturer's directions. After cleaning, thoroughly rinse the caps with clean running water. Any mortar on the face of the units shall be removed. No acids or prepared cleaners shall be used without the approval of the cast stone fabricator.

I. Method of Measurement

Measurement of the cast stone caps will be made by each cap assembly complete in place.

J. Basis of Payment

Payment for Item No. 2411.602, "PRECAST CONCRETE CAP", will be made at the Contract bid price per each, and shall be compensation in full for performing all of the work described above including reinforcement, setting grout, chemical anchors, cleaning and sealing materials, and all other costs incidental thereto.

SB-7.15 Bearing Seat Tolerances

Delete the contents of 2401.3.F.3.b(7), "Preparation of Bridge Seats," and substitute the following:

Construct the bearing seat forms, at time of form setting, within a 0.01ft [3 mm] accuracy tolerance.

After bearing seat curing and stripping of forms, grind the bearing areas of bridge seats to produce a level surface that does not vary by greater than $\frac{1}{16}$ in [1.6 mm] from the required plane for steel base plates or by greater than $\frac{1}{8}$ in [3.2 mm] from the required plane for elastomeric bearing pads. The required plane is defined as a level surface at Plan elevation, bounded by an area over the bearing contact dimensions plus 2 in [50 mm] outside the bearing surface.

After grinding to a horizontal surface, field-survey bearing seats at center of bearing and provide an electronic copy of the X and Y coordinates and elevations to the Engineer.

Adjust bearing seat elevations when the differential difference between adjacent bearing seats deviates by more than:

- $\frac{1}{8}$ in [3.2 mm] for steel framing fabricated by "full assembly" as specified in Spec 2471, "Structural Metals",
- $\frac{3}{8}$ in [9.6 mm] for all other bridges

The differential between adjacent bearings can be determined as follows:

$$\Delta = |(Plan\ Elevation\ Beam\ A - Survey\ Elevation\ Beam\ A) - (Plan\ Elevation\ Beam\ B - Survey\ Elevation\ Beam\ B)|$$

At a given line of bearing or within the same substructure, produce bearing seats within the following accuracy:

1. Seats may be no more than $\frac{3}{4}$ in [75 mm] low from plan elevation for the lowest seat at a given substructure, and
2. Seats may be no more than $\frac{3}{8}$ in [225 mm] high from plan elevation for the highest seat at a given substructure

Tolerances above are superseded by any plan notes.

Prior to adjusting any bearing seats, submit the proposed method, material specifications, and required adjustment for each bearing seat to the Engineer. The Engineer must accept the correction proposal in writing prior to proceeding with any modifications.

SB-7.16 Integral Concrete Diaphragms (Bridge No. 62732)

For Bridge No. 62732, use an approved chemical retarder from the "Approved/Qualified Product List for Concrete Products, Concrete Admixtures A-G" (<http://www.dot.state.mn.us/products>) in the concrete for the first poured integral concrete diaphragm. Adjust the retarder dosage so the integral diaphragm concrete remains in an unhardened state during placement of the entire bridge slab. Gradually reduce retarder dosage after the first end diaphragm

SB-7.17 Placement of Concrete in High Abutments

Delay adjacent concrete pours of abutments with vertical construction joints by 72 hours to reduce the effects of shrinkage.

SB-7.18 Mass Concrete (Bridge No. 62937)

Mass concrete requirements apply to concrete elements of Bridge No. 62937 only.

A. General

Assume the responsibility to produce a structure free of cracks, which result from unnecessary heat of hydration during the curing of the mass concrete.

This effort consists of temperature control of mass concrete for the purpose of minimizing potential cracking as a result of excessive temperature differentials due to the heat of hydration in concrete and for limiting the maximum temperature of concrete during the hydration process.

Unless otherwise noted in the plans, Mass Concrete, Concrete Temperature Control and Form Removal requirements for each concrete element must comply with Table MC-1:

Table MC-1 Mass Concrete, Concrete Temperature Control and Form Removal Requirements					
Concrete Element	Least Dimension	Mass Concrete Requirements Apply?	Concrete Temperature Control Requirements		Form Removal Requirements Apply? (Section B.3)
			Maximum Temperature Differential Apply? (Section B.1)	Maximum Temperature Apply? (Section B.2)	
Pier Tremie Seal Concrete	Any Dimension	No	No	No	No
Pre-cast Beams	Any Dimension	No	No	No	No
For all other concrete elements					
Concrete Design Strength $\geq 6,000$ psi [41,370 kPa]	≤ 48 in [1225 mm]	No	No	Yes	No
Post-Tensioned Elements		No	No	Yes	No
All Other Concrete Elements		No	No	No	No
All Concrete Elements*	> 48 in [1225 mm]	Yes	Yes	Yes	Yes
Drilled Shafts	> 48 in [1225 mm]	Yes	No	Yes	No
Buried Footings	≥ 60 in [1525 mm]	Yes	Yes	Yes	Yes
*Except as noted otherwise in table					

Provide temperature control of these elements in accordance with [ACI 207.1R-05](#), "Guide to Mass Concrete," [ACI 207.2R-07](#), "Report on Thermal and Volume Change Effects on Cracking of Mass Concrete," and [ACI 207.4R-05](#), "Cooling and Insulating Systems for Mass Concrete."

The Engineer will allow the Contractor to place successive lifts of concrete over other mass concrete elements if the requirements defined in this special provision are met. Do not alter the mass concrete curing and protection on top of the previous mass concrete elements until the concrete has reached the compressive strengths defined in 2401.3.G, "Concrete Curing and Protection."

A.1 Contractor Concrete Mix Designs

Design concrete mix designs for all concrete elements defined in Table MC-1 and in accordance with SB-7.19.

B. Temperature Limitations

Maintain temperature control as specified from the time of concrete placement until all interior concrete temperatures are decreasing and requirements in this special provision are met.

B.1 Maximum Temperature Differential

The temperature differential between the centroid of the placement and a point 2 in [50 mm] inside the surface along the shortest line from the centroid to the nearest surface of the element at any given time shall not exceed the limits of Table MC-:

Table MC-2 Maximum Temperature Differential	
Time	Maximum Temperature Differential
First 48 Hours	45° F [7° C]
Next 2 to 7 Calendar Days	50° F [10° C]
Greater than 8 Calendar Days	60° F [15° C]

Instead of the limits of Table MC-2, The Contractor may propose for consideration by the Engineer differential temperature vs. concrete strength curves based upon the following:

- (1) A finite element analysis revealing the calculated thermal stresses developed within the concrete will not exceed the tensile strength of the concrete,
- (2) Use test data from the actual concrete placed in the element to define any specific input properties of the concrete used in the model,
- (3) Apply a safety factor of at least two (2) to all stress calculations,
- (4) At least 60 calendar days prior to casting a mass concrete element that utilizes differential temperature vs. concrete strength curves, submit the finite element analysis as part of the Mass Concrete Placement and Temperature Plan,
- (5) The Engineer reserves the right to allow and discontinue use of the strength curves based on cracking observed on previous concrete elements, and
- (6) On concrete placements where differential temperature vs. concrete strength curves are allowed for use by the Engineer, the allowable differential temperature referenced in Table MC-5 will be determined from the curves.

B.2 Maximum Peak Temperature

Do not exceed a maximum peak concrete temperature of 160° F [71° C] for all mass/non-mass concrete elements, except for those elements excluded in table MC-1.

B.3 Form Removal

The Engineer will allow the Contractor to remove the forms from the mass concrete elements provided the following requirements are met:

- (1) Maximum peak temperature is reached and drops by more than 3° F [1.7° C],
- (2) Maximum temperature differential is reached and drops by more than 3° F [1.7° C],
- (3) The temperature difference between the ambient and the point 2 in [50 mm] from the surface has reached its maximum, drops by more than 3° F [1.7° C], and doesn't exceed 35° F [19° C],
- (4) A minimum of 72 hours for bridge substructures and 96 hours for bridge superstructures,
- (5) The requirements of 2401.3.G, "Concrete Curing and Protection," or a minimum compressive strength of 2000 psi [13800 kPa]; whichever is greater, based on control cylinders. The Contractor is responsible for making and testing control cylinders at a Qualified Laboratory. Produce sets of 3 cylinders to be used as part of the determination of removal of forms, and
- (6) Gradually discontinue heating or cooling protection in a manner such that the rate of temperature reduction adjacent to the concrete surface does not exceed 20° F [11° C] during any 12-hour period until the surface temperature reaches that of the ambient temperature outside any cold weather protection.

C. Temperature Control

Monitor and control the maximum interior and exterior temperature differentials as specified in this special provision.

C.1 Mass Concrete Placement and Temperature Plan

A registered Professional Engineer in the state of Minnesota is required to develop and complete the analysis for the mass concrete placement and temperature plan in accordance with the following:

- (1) At least 30 calendar days prior to casting a mass concrete element, submit a Preliminary Mass Concrete Placement and Temperature Plan to the Engineer, and
- (2) Within 48 hours of actual concrete placement, submit a Final Mass Concrete Placement and Temperature Plan to the Engineer using actual environmental conditions and current construction practices.

Provide the placement and temperature plan for each mass concrete element including, but not limited to the following items:

- (1) Specific element information, dimensions, and the location of temperature sensors within the element,
- (2) Mass concrete mix design reviewed and accepted by the Engineer,
- (3) Expected placement conditions including, but not limited to the following:
 - (a) Ambient temperatures,
 - (b) Concrete constituent temperatures for mixing,
 - (c) Ice or heating requirements,
 - (d) Concrete temperature at the point of placement, and
 - (e) Options for protection to satisfy temperature control.
- (4) Comprehensive heat generation and dissipation analysis in accordance with ACI 207.1R-05 "Guide to Mass Concrete," for each mass concrete element. The analysis determines the following:
 - (a) Predicted concrete temperature at the centroid,
 - (b) Location and temperature of maximum temperature if not at the centroid,
 - (c) Temperatures 2 in [50 mm] inside of the exterior surface exposed to air,
 - (d) Complete analyses until all temperatures are decreasing and the mass concrete element reaches maximum temperature differential and begins to decrease, or for the duration of the curing period, whichever is longer, and

- (e) Perform analyses for the anticipated mean weekly ambient air (or enclosure) temperatures for the period of the proposed placement and for temperatures plus and minus 20° F [7° C] of the mean weekly ambient air (or enclosure) temperature.
- (5) Anticipated concrete placement temperatures measured at discharge into the forms for the mean weekly ambient air temperatures,
- (6) The method(s) that are intended for ensuring that required temperature control (maximum temperature differential and maximum peak temperature) for the designated mass concrete elements are not exceeded considering the anticipated mean weekly ambient or enclosure air temperatures in which the element is cast.
 - (a) If cooling tubes are selected as a means for controlling the heat of hydration, submit the following:
 - i. Summary of design and details for cooling tube system,
 - ii. Submit the method of temperature control of cooling water effluent to the Engineer for review and acceptance, and
 - iii. Submit a heat transfer analysis, for the cooling tube system, prepared by a registered Professional Engineer licensed in Minnesota.
 - (b) If cooling tubes are used and circulating waterway water through the tube system is proposed for temperature control, monitor the spent cooling water temperature to assure that the temperature is in an appropriate range to be discharged back into the waterway water that it originated from.
- (7) Contractor planned field placement and protection methodologies for varying conditions along with planned mitigation measures should temperature control not follow the Mass Concrete Placement and Temperature Plan.

C.2 Temperature Monitoring

Cast temperature sensors 2 in [50 mm] below the concrete surfaces for measuring temperature differentials. The Engineer will not permit surface-mounted temperature sensors.

Provide temperature monitoring devices that meet the following requirements:

- (a) Automatic sensing and recording instruments that record information at a maximum interval of one hour,
- (b) Operate over a range of 0° F to 200° F [-17° C to 93° C] with an accuracy of plus or minus 2° F [1.1° C],
- (c) Use a minimum of two (2) sets of two (2) sensors (or 4 total sensors) for each placement,

Record temperature development at the following locations:

- (a) Unless indicated otherwise by the heat generation and dissipation analysis, place the monitoring points at the geometric center (centroid) of the element or placement (interior point) and a point located 2 in [50 mm] inside the exterior surface along the shortest line from the centroid to the nearest surface of the element (exterior point),
- (b) Monitor temperature at a minimum of two independent sets of interior and exterior points for each element to provide redundancy in the event of a monitoring device failure, and
- (c) Other locations as accepted by the Engineer.

Monitor temperatures in accordance with the following:

- (a) Review temperature readings at intervals not greater than 24 hours or as required by the Mass Concrete Placement and Temperature Plan to ensure that the automatic devices are working properly and that the temperatures are within allowable limits,
- (b) Ensure devices begin recording data immediately after casting is complete,
- (c) Continue monitoring temperatures for a minimum of 96 hours and until 24 hours after all of the form removal requirements from B.3 above are met, and all formwork, insulation, and other temporary items are removed from the mass concrete element and it is exposed to the environment,
- (d) Transmit readings to the Engineer immediately after they are recorded and at least every 24 hours or as required by the Mass Concrete Placement and Temperature Plan,

- (e) If monitoring indicates that the maximum temperature differential and/or the maximum peak temperature has or appears to have the potential to exceed specified limits, as determined by the Contractor or the Engineer, take immediate action to retard further growth in the differential or maximum peak temperatures to bring control back within specified limits by adjusting the protection plan in accordance with mitigation measures outlined in the Mass Concrete Placement and Temperature Plan,
- (f) Make any necessary revisions to the plan to avoid exceeding temperature limits on any remaining placements and submit to the Engineer for review, and
- (g) The Engineer must review and accept all revisions to the plan prior to implementation.

D. Crack Repair

The Engineer will make a visual inspection of the mass concrete elements and will identify all crack widths that are greater than 0.01 in [0.25 mm] wide appearing on the concrete surface. Provide lift equipment and other equipment as necessary to allow the Engineer full access to the surfaces of the mass concrete elements for the purpose of inspection.

Seal cracks in mass concrete that exceed 0.01 in [0.25 mm] in width as determined by the Engineer in accordance with Table MC-3. Do not repair cracks until at least 24 hours after all of the form removal requirements from B.3 above are met, and all formwork, insulation, and other temporary items are removed from the mass concrete element and it is exposed to the environment.

Table MC-3	
Crack Sealing Requirements for Mass Concrete	
Crack Width in [mm]	Crack Sealing Method
0.01 [0.25] to ≤ 0.03 [0.80]	Approved Epoxy Crack Sealant
0.03 [0.08] – 0.06 [1.50]	Approved Epoxy Injection Method and Materials #
> 0.06 [1.50]	As determined by the Engineer. The Engineer will evaluate whether these cracks compromise the integrity of the structure or the fitness for use.
#Perform epoxy injection operations in accordance with the material and equipment manufacturer's published recommendations, except where otherwise directed by the Engineer. Upon satisfactory completion and repair, remove all injection ports, excess epoxy and sealing epoxy from the concrete surface.	

E. Non-Compliance with Concrete Temperature Limitation

The remedies herein for the Contractor's failure to comply with the requirements of this Special Provision are in addition to, and not in limitation of, those provided elsewhere under the Contract.

The Engineer may deduct the whole, or part, of any payment for concrete identified as Mass Concrete as defined herein or elsewhere in the Contract Documents if, in the Engineer's evaluation and judgment, the Contractor fails to maintain the maximum peak temperature and/or the maximum differential temperature within the limits specified herein.

Tables MC-4 and MC-5 represent the materials that may be accepted by the Engineer even though such materials have received test results that would cause the materials to be considered of "borderline quality" as that term is used in MnDOT 1503, "Conformity with Contract Documents," and thus subject to the remedies specified in MnDOT 1512, "Unacceptable and Unauthorized Work". If the Engineer accepts such materials, the Engineer will make the adjustment authorized in the tables below, not as a penalty, but as a pre-agreed adjustment to the Contract Unit Prices approximating a reduction in value of the project due to use of materials of borderline quality.

If, in the judgment of the Engineer, the Contractor fails to maintain concrete temperatures below the maximum peak concrete temperature specified herein, the Engineer will make determinations regarding the disposition, payment or removal. The Engineer will require the following monetary reductions in payment for the subject concrete in accordance with Table MC-4:

Table MC-4 Monetary Reduction for Exceeding Maximum Peak Concrete Temperature	
Maximum Concrete Temperature	Monetary Reduction in Bid Price for Concrete
160° F [71° C] to 165° F [74° C]	\$ 2.00 per cubic yard
> 165° F [74° C] to 170° F [77° C]	\$ 35.00 per cubic yard
> 170° F [77° C] to 175° F [80° C]	\$150.00 per cubic yard
> 175° F [80° C]	Remove and Replace

If, in the judgment of the Engineer, the Contractor fails to maintain concrete temperatures within the maximum temperature differential specified herein, the Engineer will make determinations regarding the disposition, payment or removal. The Engineer will require the following monetary reductions in payment for the subject concrete in accordance with Table MC-5:

Table MC-5 Monetary Reduction for Exceeding Allowable Temperature Differential	
Temperature in Excess of Allowable Differential	Monetary Reduction in Bid Price for Concrete
0° F [71° C] to 5° F [2.8° C]	\$ 2.00 per cubic yard
5° F [2.8° C] to 10° F [5.6° C]	\$ 15.00 per cubic yard
10° F [5.6° C] to 15° F [8.3° C]	\$45.00 per cubic yard
Over 15° F [8.3° C]	Remove and Replace

F. Basis of Payment

The Engineer will not make separate payment for the analysis, plan, materials, protection, labor, equipment and all other incidentals associated with and required for the proper control of the heat generated by the Mass Concrete. No payment for crack measurement and repair or other repairs deemed necessary by the Engineer. The Engineer will consider all such costs incidental to the Structure Concrete of each Grade or Mix as designated in the Contract Documents.

SB-7.19 STRUCTURAL CONCRETE – MASS CONCRETE (CONTRACTOR CONCRETE MIX DESIGN) – BRIDGE NO. 62937

SB-7.19.1 2401.2.A shall be deleted and replaced with the following:

Mass concrete requirements apply to the following elements of Bridge No. 62937:

1. Abutment stems

Design all mass concrete mixtures used in the construction of the bridge. Perform the work in accordance with the applicable requirements of MnDOT 2401, 2461 and the following:

2.A.1 Fine Aggregate Requirements

Provide fine aggregates complying with quality requirements of 3126.2.D, 3126.2.E, and 3126.2.F, “Fine Aggregate for Portland Cement Concrete.”

2.A.1.a Fine Aggregate Alkali Silica Reactivity (ASR) Requirements

The Department will routinely test fine aggregate sources for alkali silica reactivity (ASR) in accordance with the following:

- (1) Multiple sources of certified portland cement in accordance with ASTM C 1260 MnDOT Modified; and
- (2) Multiple combinations of certified portland cement and supplementary cementitious materials in accordance with ASTM C 1567 MnDOT Modified.

The Concrete Engineer, in conjunction with the Engineer, will review the 14-day fine aggregate expansion test results to determine the acceptability of the proposed fine aggregate and cement combination in accordance with the following:

- (1) For fine aggregate and cement combinations previously tested by the Department, the Concrete Engineer will use the average of all 14-day unmitigated test results for an individual source to determine necessary mitigation in accordance with Table MC-6.
- (2) If the previously tested proposed fine aggregate and cement combination requires less mitigation than the average 14-day unmitigated test result, the Concrete Engineer will allow mitigation at the lesser rate in accordance with Table MC-6.
- (3) Alkali silica reactivity (ASR) ASTM C1260 and ASTM C1567 test results are available on the MnDOT Concrete Engineering Unit website.

Table MC-6 Fine Aggregate ASR Mitigation Requirements							
14-day Fine Aggregate Unmitigated Expansion Limits	Class F Fly Ash	Class C Fly Ash	Slag	Slag/Class F Fly Ash	Slag/Class C Fly Ash	IS(20)/Class F Fly Ash	IS(20)/Class C Fly Ash
≤ 0.150	No mitigation required						
>0.150 - 0.200	Minimum 20%	Minimum 20%	35%	20% Slag with a minimum of 15% Class F fly ash	20% Slag and 20% Class C fly ash	Type IS(20) with a minimum of 15% Class F	Type IS(20) with a minimum of 15% Class C
> 0.200 – 0.300	Minimum 20%	Minimum 30%	35%				
> 0.300	The Department will reject the fine aggregate						

High Early Concrete is not permitted for mass concrete elements.

The Concrete Engineer may reject the fine aggregate if mortar bar specimens exhibit an indication of external or internal distress not represented by the expansion results. The Concrete Engineer will make the final acceptance of the aggregate.

2.A.2 Intermediate Aggregate Requirements

Provide intermediate aggregates complying with the quality requirements of 3137.2.D.1, “Coarse Aggregate for Portland Cement Concrete,” except as modified in Table MC-7. If the intermediate aggregate is from

the same source as the 3/4" fraction, the aggregate quality is determined based upon the composite of the 3/4" and intermediate aggregate.

The Concrete Engineer classifies intermediate aggregate in accordance with Table MC-7.

Table MC-7 Intermediate Aggregate for Use in Concrete			
If the gradation meets the following:	Classify material type as:	Gradation Test Procedures	Quality Test Requirements
100% passing the 1/2" and ≤90% passing #4	Intermediate Aggregate	Coarse Aggregate (+4 Portion)	Spec. 3137.2.D.2 except 3137.2.D.2(i) modified to maximum 40% carbonate
		Fine Aggregate (-4 Portion)	Shale in Sand (-4 Portion)
100% passing the 1/2" and >90% passing #4	Intermediate Aggregate	Fine Aggregate (Minimum 1000 g sample)	Shale Content Test by AASHTO T113 Mn/DOT Modified (+4 Portion)
			Shale in Sand (-4 Portion)
100% passing the 3/8" and ≤90% passing #4	Coarse Sand	Fine Aggregate	Shale Content Test by AASHTO T113 Mn/DOT Modified (+4 Portion)
			Shale in Sand (-4 Portion)

For any intermediate aggregate size not previously tested by the Department, the Concrete Engineer reserves the right to test for alkali silica reactivity, in accordance with ASTM C1260, prior to allowing incorporation into the concrete mix design.

2.A.3 Coarse Aggregate Requirements

Provide coarse aggregate meeting the quality requirements in accordance with 3137.2.D.1.

When providing Class B aggregate, the maximum absorption is 1.10%.

2.A.3.a Coarse Aggregate Alkali Silica Reactivity (ASR) Requirements

When using coarse aggregate identified as quartzite or gneiss, the Concrete Engineer will review ASTM C1293 testing to determine the necessary ASR mitigation requirements in accordance with Table MC-8.

Alkali silica reactivity (ASR) ASTM C1293 test results are available on the MnDOT Concrete Engineering Unit website.

Table MC-8 Coarse Aggregate ASR Mitigation Requirements*							
ASTM C1293 Expansion Results	Class F Fly Ash	Class C Fly Ash	Slag	Slag/Class F Fly Ash	Slag/Class C Fly Ash	IS(20)/Class F Fly Ash	IS(20)/Class C Fly Ash
≤ 0.040	No mitigation required						
>0.040	Minimum 30%	Not Allowed	35%	20% Slag with a minimum of 15% Class F fly ash	20% Slag and 20% Class C fly ash	Type IS(20) with a minimum of 15% Class F	Type IS(20) with a minimum of 15% Class C
* The Engineer will allow the Contractor to substitute a portion of the minimum required supplementary cementitious material with up to 5% silica fume by weight for mitigation purposes.							

2.A.4 Cementitious Materials

Provide only cementitious materials from the Approved/Qualified Products List.

2.A.4.a Cement

Use Type I or Type I/II cement complying with Specification 3101 or blended cement in accordance with Specification 3103.

- (1) Total alkalis (Na₂O_e) no greater than 0.60 percent in the portland cement, and
- (2) Total alkalis (Na₂O_e) no greater than 3.0 lb per cu. yd of concrete resulting from the portland cement.

2.A.4.b Fly Ash

Use fly ash conforming with Specification 3115. The Concrete Engineer defines Class F fly ash for the purposes of ASR mitigation as having a maximum CaO content of 18.0%.

2.A.4.c Ground Granulated Blast Furnace Slag

Use ground granulated blast furnace slag conforming to Specification 3102.

2.A.4.d Silica Fume

Use silica fume conforming to ASTM C 1240.

2.A.4.e Ternary Mixes

Ternary mixes are defined as portland cement and two other supplementary cementitious materials, or blended cement and one other supplementary cementitious material with a maximum replacement of 40% by weight.

2.A.5 Allowable Admixtures

Use any of the following admixtures on the MnDOT Approved/Qualified Products list:

- (A) Type A, Water Reducing Admixture
- (B) Type B, Retarding Admixture
- (C) Type C, Accelerating Admixture
- (D) Type D, Water Reducing and Retarding Admixture
- (E) Type F, High Range Water Reducing Admixture
- (F) Type S, Specific Performance Based Admixture

Obtain a written statement from the manufacturer of the admixtures verifying:

- (1) Compatibility of the combination of materials, and
- (2) Manufacturer recommended sequence of incorporating the admixtures into the concrete.

The manufacturer will further designate a technical representative to dispense the admixture products.

The technical representative shall act in an advisory capacity and shall report to the Contractor any operations or procedures which are considered as detrimental to the integrity of the placement. Verify with the Engineer whether the Manufacturer's technical representative's presence is required during the concrete placement.

2.A.6 Concrete Mix Design Requirements

Submit the concrete mixes using the appropriate MnDOT Contractor Mix Design Submittal Workbook, available on the Department's website, at least 21 calendar days before the initial concrete placement. Identify the mix by the MnDOT mix designation (i.e. 3B52, 1A52, etc.). In addition, include "-MC" to the right of the mix designation to identify that the mix will be used on mass concrete elements. See Table MC-9 as an example. For mix design calculations, the Engineer, in conjunction with the Concrete Engineer, will provide specific gravity and absorption data.

The Concrete Engineer, in conjunction with the Engineer, will review the mix design submittal for compliance with the contract.

2.A.6.a Concrete Mix Design Requirements

Design and produce concrete mixes based on an absolute volume of 27.0 cu. ft [1.0 cu. m] in accordance with the Table MC-9 and the following requirements:

Table MC-9 Mass Concrete Bridge Concrete Mix Design Requirements									
Concrete Grade	Mix Number *	Intended Use	w/c ratio	Target Air Content	Conventional Concrete Maximum %SCM (FlyAsh/Slag/Silica Fume/Ternary)	Mass Concrete Maximum %SCM (FlyAsh/Slag/Silica Fume/Ternary)	Slump Range †	Minimum Compressive Strength, f'c (28-day) ‡	3137 Spec.
B	3B52-MC	Abutments/Piers	0.30-0.45	6.5%	30/35/5/40	30/70/5/70	2-5"	4,000 psi	2D1
G	1G52-MC	Footings	0.30-0.45	-	30/35/5/40	30/70/5/70	2-5"	4,500 psi	2D1

* Provide a Job Mix Formula in accordance with 2401.2.A.7. Use any good standard practice to develop a job mix formula and gradation working range by using procedures such as but not limited to 8-18, 8-20 gradation control, Shilstone process, FHWA 0.45 power chart or any other performance related gradation control to produce a workable and pumpable concrete mixture meeting all the requirements of this contract.
 || The individual limits of each SCM shall apply to ternary mixtures.
 † Keep the consistency of the concrete uniform during entire placement.
 ‡ Mass concrete may achieve the specified 28-day strength in 56 days for mix designs including cementitious replacement with the approval of the Engineer.

2.A.6.b Required Preliminary Testing

Prior to placement of any Concrete, the Engineer will require preliminary batching and testing of the concrete mix design.

Submit the concrete mixes using the appropriate MnDOT Contractor Mix Design Submittal Workbook, available on the Department's website, at least 14 calendar days prior to the beginning of preliminary laboratory mixing and testing of the proposed mix designs. Any changes or adjustments to the material or mix design require a new Contractor mix design submittal. For mix design calculations, the Engineer, in conjunction with the Concrete Engineer, will provide specific gravity and absorption data.

The Concrete Engineer, in conjunction with the Engineer, will review the mix design submittal for compliance with the contract.

Test substructure concrete for the following hardened concrete properties in accordance with Table MC-10:

Table MC-10 Required Hardened Concrete Properties		
Test	Requirement	Test Method
Required Strength (Average of 3 cylinders)	See Table MC-9	ASTM C31
Hardened air content	At a minimum of 7 days	ASTM C457
Shrinkage	No greater than 0.040 percent at 28 days	ASTM C157

The Engineer will allow the maturity method for subsequent strength determination. Perform all maturity testing in accordance with ASTM C1074 and the MnDOT Concrete Manual.

If a mix is approved, the Concrete Engineer will consider the mix design and testing as acceptable for a period of 5 years provided the actual concrete mixed and placed in the field meets the Contract Requirements. The Concrete Engineer will not require new testing within that 5-year period as long as all the constituents (including the aggregates) of the proposed mix design are the same as the original mix design.

The Engineer determines final acceptance of concrete for payment based on satisfactory field placement and performance.

2.A.7 Job Mix Formula

A Job Mix Formula (JMF) contains the following:

- (a) Proportions for each aggregate fraction,
- (b) Individual gradations for each aggregate fraction; and
- (c) Composite gradation of the combined aggregates including working ranges on each sieve in accordance with Table MC-11.

Table MC-11 Job Mix Formula Working Range	
Sieve Sizes	Working Range, %*
1 in [25 mm] and larger	±5
¾ in [19 mm]	±5
½ in [12.5 mm]	±5
⅜ in [9.5 mm]	±5
No.4 [4.75 mm]	±5
No.8 [2.36 mm]	±4
No.16 [1.18 mm]	±4
No.30 [600 µm]	±4
No.50 [300 µm]	±3
No.100 [150 µm]	±2
No.200 [75 µm]	≤ 1.6
* Working range limits of the composite gradation based on a moving average of 4 tests (N=4).	

2.A.7.a Verification of JMF

Prior to beginning placements of bridge concrete, perform gradation testing to ensure current materials comply with the approved JMF. Perform gradation testing in accordance with the Schedule of Materials Control.

- (1) Take samples at the belt leading to the weigh hopper or other locations close to the incorporation of the work as approved by the Engineer.
- (2) Add fill-in sieves as needed during the testing process to prevent overloading.

The Producer and Engineer will test and record the individual gradation results using the Concrete Aggregate Worksheet.

- (1) Using the JMF Moving Average Summary Worksheet, calculate the moving average of Producer aggregate gradation test results during production.
- (2) The Engineer will randomly verify Producer combined aggregate gradation results as defined in the Schedule of Materials Control.

If, during production, the approved JMF falls outside of the allowable working range immediately sample and test additional gradation and continue production.

2.A.7.b JMF Adjustment

If it is determined that the current aggregates do not meet the approved JMF, submit a new mix design including JMF to the Concrete Engineer in accordance with 2401.2.A.7.

2.A.7.c JMF Acceptance

The Engineer will make monetary adjustments for the quantity of structural concrete represented by the JMF Working Range failure, from the failing test to the next passing test, at a minimum rate of \$500.00 or \$5.00 per cubic yard, whichever is greater.

2.A.8 Laboratory batching, testing requirements and submittals:

To determine the characteristics of the Contractor proposed mix design, the Concrete Engineer will require the Contractor to prepare test batches and do laboratory testing. Conduct all batching and testing of concrete at a **single** AMRL certified laboratory using the exact materials proposed in the mix design.

Lab testing requirements:

- (a) Slump and air content at <5 minutes, 15 minutes, and 30 minutes after the completion of mixing
- (b) Compressive strength (Make cylinders in accordance with ASTM C43 and tested in accordance with ASTM C31) at 1, 3, 7, 28, 56 days (sets of 3).
- (c) Hardened air content (ASTM C457) at a minimum of 7 days.
- (d) Concrete Shrinkage (ASTM C 157) at 28 days.

The Contractor is required to contact the MnDOT Concrete Engineering Unit a minimum of 2-days prior to any mixing so that a MnDOT representative can observe the process. This same 2-day notification is required prior to any physical testing on hardened concrete samples. Additionally, retain any hardened concrete test specimens for a minimum of 90 days and make available for MnDOT to examine.

Perform all testing for plastic concrete after all admixtures additions to the concrete mixture.

After completion of the laboratory testing specified herein and, at least, 15 working days prior to the placement, submit the laboratory test data to the MnDOT for review and approval.

Include the following information in the laboratory reports of the design mixes:

- (a) Exact batch weights and properties of all ingredients used and all aggregate gradations;
- (b) Slump and air content;
- (c) Cylinder identification, including mix designation;
- (d) Date and time of cylinder preparation;
- (e) Date and time cylinder specimen was tested;
- (f) Compressive strength of each cylinder specimen at 1, 3, 7, 28, and 56 day (sets of 3);

- (g) A graphic plot of age, from 0 to 56 days, vs. strength for each mix design;
- (h) Hardened air content at a minimum of 7 days;
- (i) Concrete Shrinkage at 28 days.

SB-7.19.2 2401.5 shall be modified to include the following:

The Engineer will not make separate payment for the development and testing of mix designs to satisfy mass concrete requirements. The Engineer will consider all such costs incidental to **Structural Concrete (3B52)** or **Structural Concrete (1G52)** for elements designated as mass concrete in the Contract Documents.

SB-7.19.3 MnDOT Spec 2461.3.G.5.b shall be deleted and replaced with the following:

3.G.5.b Curing and Transporting Standard (28-day) Strength Cylinders

Provide moist curing environments of adequate size and number for initial and final curing in accordance with ASTM C31 and in accordance with 2031.3.C, "Special Requirements."

The Concrete Engineer defines the **initial curing period** as immediately after molding and finishing for a period of up to 48 hours in a temperature range from 60 °F to 80 °F [16 °C and 27 °C]."

After the initial curing period, the Engineer will both transport and further cure the test specimens in the provided curing tanks. The Engineer will deliver the test specimens to the laboratory for compressive strength testing.

Provide curing tanks of adequate size and number for curing all of the concrete test specimens in accordance with 2031.3.C, "Special Requirements." Maintain the water in the curing tanks to a water temperature of 60 °F to 80 °F [16 °C and 27 °C]. When cured in the testing laboratory, maintain the cylinders at a temperature of 73.5 °F ± 3.5 °F [23.0°C ± 2.0°C].

The Engineer will allow the Contractor to submit a strength-maturity relationship curve for use in lieu of control cylinders. Perform all maturity testing and validation of the strength-maturity relationship curve in accordance with ASTM C1074 and the MnDOT Concrete Manual.

3.G.5.b (1) Acceptance of Concrete Compressive Strength

The Concrete Engineer defines a **strength test** as the average (28-day) strength of three (3) cylinders fabricated from a single sample of concrete and cured in accordance with the MnDOT Concrete Manual.

The Engineer will consider concrete acceptable in accordance with Table MC-12 provided **both** conditions are met for a required $f'c$.

Table MC-12		
Acceptance Criteria for Standard 28-day Cylinders		
Concrete Grades B, F, G, M, P, and S		
	All strength tests	Moving average of 3 consecutive strength tests *
$f'c \leq 5000$ psi	$> (f'c - 500 \text{ psi})$	$\geq f'c$
$f'c > 5000$ psi	$> 0.90 * f'c$	$\geq f'c$
* If a project does not establish a moving average of 3 consecutive strength tests, use either the single strength test or the average of 2 strength tests to determine acceptance.		

3.G.5.b (2) Strength Test Below Acceptance Criteria

If any single strength test (3 cylinders) falls below the criteria established in Table MC-12, the Engineer, in conjunction with the Concrete Engineer, will determine the following:

- (A) If the concrete has attained critical load-carrying capacity;
- (B) If investigation is required; The investigation may consist of, but is not limited to reviewing the following:
 - (B.1) Sampling and testing plastic concrete,
 - (B.2) Handling of cylinders,
 - (B.3) Cylinder curing procedures,
 - (B.4) Compressive strength testing procedures,
 - (B.5) Certificate of Compliances
- (C) If dispute resolution coring is required in accordance with 2461.3.G.5.b(4).

3.G.5.b (3) Moving Average Below Acceptance Criteria

If the moving average of three (3) consecutive strength tests falls below $f'c$, the Concrete Engineer will require a new mix design in accordance with Table MC-9

3.G.5.b (4) Dispute Resolution Coring

The Engineer and Contractor will mutually agree on an Independent Third Party to core and test the concrete in accordance with ASTM C42.

- (A) The Engineer will identify a minimum of three (3) locations for the Independent Third Party to core.
- (B) The Independent Third Party will take one (1) core at each location.
- (C) The Contractor will complete all coring within 14 days of notification of the low strength concrete.
- (D) The Contractor is responsible for ensuring the core holes are repaired.

The Engineer, in conjunction with the Concrete Engineer, will review the core test results and evaluate in accordance with Table MC -13, providing all other concrete tests meet requirements.

Table MC-13 Evaluation of Core Test Results			
Core (average of 3 cores) Test Results:	Engineer considers concrete:	Cost of Coring and Testing:	Resolution:
$\geq 85\%$ of $f'c$	Acceptable to remain in place	Engineer Responsibility	No monetary adjustment for single strength test failure.
$< 85\%$ of $f'c$	Unacceptable	Contractor Responsibility	Remove and replace concrete in accordance with 1503, "Conformity with Contract Documents," and 1512, "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer may not pay for the concrete or will pay at an adjusted Contract Unit Price and consider any additional actions in accordance with Table MC-14.

3.G.5.b (5) Non-Conforming Material

If the Contractor inadvertently places concrete not meeting the strength requirements in accordance with Table MC-13 into the work, the Engineer will not accept nonconforming concrete at the contract unit price.

For concrete not meeting the moving average of three (3) consecutive strength tests, the Engineer will make determinations regarding the disposition, payment, or removal. The Department will adjust the contract unit price for the contract item of the concrete in accordance with Tables MC-14 based upon cylinder strength test results.

Table MC-14 All Mass Concrete Mixes	
Moving average of 3 consecutive strength tests	Adjusted Contract Unit Price
$< 100.00\%$ of $f'c$	Remove and replace concrete in accordance with 1512, "Unacceptable and Unauthorized Work," as directed by the Engineer. If the Engineer, in conjunction with the Concrete Engineer, determines the concrete can remain in place, the Engineer may apply a monetary adjustment to the Contract unit price or not pay for the concrete.*
* When there is not a separate contract unit price for <i>Structural Concrete</i> for an item of work or the concrete is a minor component of the contract unit price, the Department will reduce payment based on a concrete price of \$100.00 per cu. yd [\$130.00 per cu. m] or the Contractor-provided invoice amount for the concrete in question, whichever is less.	

SB-8 **(2402) STEEL BRIDGE CONSTRUCTION**

The provisions of 2402, "Steel Bridge Construction," are supplemented as follows:

SB-8.1 **Metal Railing (Bridge No. 62732)**

Furnish, coat, and install metal railing, including all anchorages and fittings, in accordance with the applicable provisions of 2402, "Steel Bridge Construction," 2433, "Structure Renovation," 2471, "Structural Metals," 2478, "Organic Zinc-Rich Paint System," the Bridge No. 62732 plans and the following. The Contractor is responsible for communicating all applicable specifications, special provisions, standards, and requirements to all subcontractors.

A. Engineer

Engineer, as used herein, when relating to shop fabrication and coatings, shall mean the Department's Bridge Engineer.

B. Materials

Ensure all materials conform to the plan details. If not specified, ensure all steel complies with 3306, "Low-Carbon Structural Steel," except pipe and pipe sleeves, which complies with 3362, "Structural Steel Pipe". Ensure threaded rods, bolts, nuts, and washers meet 3391, "Fasteners," and galvanize in accordance with 3392, "Galvanized Hardware," or electroplate in accordance with ASTM B 633, Type III, SC 4.

C. Anchorages

Except when part of a proprietary anchorage assembly, ensure threaded rods and bolts meet the requirements of 3385, "Anchor Rods," and 3391, "Fasteners," respectively.

Use cast-in-place type anchors unless otherwise specified in the contract.

Ensure bolt heads and/or nuts are in contact with the adjacent surface and torqued to

- 1/2 in [13 mm] diameter = 30 ft pounds [41 Nm]
- 5/8 in [16 mm] diameter = 60 ft pounds [81 Nm]
- 3/4 in [19 mm] diameter and larger = 80 ft pounds [108 Nm]

unless a different torque is recommended by the manufacturer.

C1. Drilled in Anchorages

Drilled in anchorages may be used in the following location(s) – Railing attachments of Parapet mounted ornamental metal railing.

There is no MnDOT approved product list for adhesive anchorages having an ultimate pull-out tension greater than 5000 lbs. [22 kN]. Every adhesive system will need to be accepted by the Engineer in conjunction with the Regional Bridge Construction Engineer. To accomplish this, furnish independent laboratory test data certifying that static load tests for ultimate pull-out strengths were performed and are acceptable, as specified. Provide independent lab test data in accordance with ASTM E 488.

If adhesive anchors are chosen, submit for approval by the Engineer the following chemical adhesive supplier's product literature or calculations to establish embedment depth. This information will demonstrate compliance with the specification:

- Name of supplier
- Full product name (as given in supplier's literature)

- Embedment depth as determined from supplier's literature

Ensure anchorages for fastening rail posts have an ultimate pull out strength, as specified in the plan, and install in sound concrete to a depth equal to a minimum depth of six times the rod or bolt diameter. Ensure adhesive anchorages consist of a continuously threaded rod secured by an adhesive or mortar.

Perform laboratory tests, which include static load tests for ultimate pullout strengths, on anchorage systems that are subject to tensile loads. Perform the tests in accordance with ASTM E 488, and have them certified by an independent testing laboratory. Furnish the Engineer with the test reports and the specification sheets that are prescribed by ASTM E 488.

Demonstrate the anchorage system for drilled-in anchorage systems at the first site of field installation prior to actual use in the project. Include in the demonstration installation and a static tension test in the presence of the Engineer, in accordance with test procedures prescribed in ASTM E 488. No portion of the testing device shall bear on the concrete surface within a distance equal to the anchorage embedment depth. Test three anchorages to not less than the required proof load. Failure of an anchorage test will require a modification of installation procedures or use of a different anchorage system.

In addition to the three tests stated above, the Engineer requires that each bridge have an additional 2% (not less than 1 test) of the remaining anchorages tested at a later date. The Engineer will determine the locations of the additional anchors. If a failure occurs while testing the additional 2%, more testing will be required at the rate of an additional 1% per each failure at the Contractor's expense. Compensation for costs of testing is included in the payment for the metal railing.

<u>Location</u>	<u>Bolt or Rod Diameter</u> <u>inches [mm]</u>	<u>Minimum Embedment Depth</u> <u>inches [mm]</u>	<u>Required Proof Load</u> <u>pounds [kN]</u>
Railing Base	5/8	5 inches	6,900

Perform installation of anchorages in accordance with the manufacturer's recommendations and as specified in the plan.

Fill with caulk any voids occurring between the top of the anchorages and the concrete in which it is embedded, as approved by the Engineer.

D. Fabrication and Inspection Requirements

Fabricator shall supply QA/QC documentation verifying that all fabricated railing components are within the necessary tolerances for proper fit up and installation of the railing, including measurements between railing base plates that indicate that the as fabricated base plate hole locations are within 1/8 inch (3 mm) of the specified plan dimensions, based on the plan specified rail post spacing.

Fabricate all metal railing in accordance with 2471, "Structural Metals," the plan, and the welding code AWS D1.1-Structural Welding Code-Steel. Submit Welding Procedure Specifications (WPSs) to the Engineer for approval prior to the start of fabrication.

Prior to fabrication, submit a Quality Control Plan (QCP) and fabrication drawings that are acceptable to the Engineer. Any work started prior to receiving approved drawings WPSs, and a QCP, is subject to 1512, "Unacceptable and Unauthorized Work". Also give the Engineer at least 5 working days notice prior to beginning work so that Quality Assurance (QA) inspection may be provided.

The Engineer will inspect all metal railing. The purpose of the inspection(s) is to establish compliance with the Contract Documents. The shop inspection(s) is not intended to supplement or replace

the Contractor's own Quality Control (QC). The Contractor is ultimately responsible for the correction of errors and faulty workmanship or for the replacement of nonconforming materials.

The Fabricator will visually inspect all parts of the fabrication and have the inspections documented by QC personnel. The Fabricator will ensure that the rail meets a straightness tolerance of 1/8 in in 10 ft [3 mm in 3000 mm]. The Fabricator will perform and document any Nondestructive Testing required by the Contract Documents using an ASNT-TC-1A Level II qualified inspector.

Document parts found to be in nonconformance by using a Nonconformance Report form (NCR), and describe in detail the fabrication error and the proposed repair procedure(s) in accordance with the QCP. Repair(s) performed are subject to the written approval of the Engineer.

E. Galvanizing Requirements

Galvanize all railing material in accordance with 3394, "Galvanized Structural Shapes," after fabrication and paint (Duplex Coat) using the applicable provisions of 2478, "Organic Zinc-Rich Paint System". Do not use the primer coat on galvanized surfaces.

Pre-Galvanized Procedure(s):

1. Calibrate dry film thickness gages in accordance with SSPC-PA 2-Measurement of Dry Coating Thickness with Magnetic Gauges.
2. Prepare all fabricated material surfaces by abrasive blast cleaning to a minimum of SSPC-SP 6/NACE No. 3-Commercial Blast Cleaning prior to galvanizing.
3. Purchase Order(s) shall identify which specific items are to be duplex coated and which materials to be galvanized are reactive (e.g. 3309, "High-Strength Low-Alloy Structural Steel," etc.).

Galvanizing Procedure(s):

Galvanize per 3394, "Galvanized Structural Shapes," ASTM D6386, and this specification. All products supplied using this specification have higher aesthetic expectations than standard galvanized products. Produce the final product to comply with its intended use as an "architectural" railing with heightened aesthetics and/or visual qualities.

1. Process all metal railing to be galvanized utilizing a "dry" kettle. Preflux the metal railing prior to the galvanizing bath using an aqueous tank of zinc chloride/ammonium chloride. Do not use a "top flux" blanket on the molten zinc bath.
2. Air cool the metal railing to ambient temperature before handling for shipment and/or storage. Do not quench the metal railing or apply any post-galvanizing treatments.
3. All lumps, projections, globules, high spots, drip lines, heavy deposits, black and bare areas, blisters, flux deposits, thin spots, dross inclusions, etc., are considered unacceptable. An unacceptable zinc coating shall be repaired with an Engineer approved QCP plan. Zinc, which will interfere with the "intended use of the product", will not be permitted.
4. Repair galvanized material that does not meet the requirements of this specification, ASTM D6386, and/or 3394, "Galvanized Structural Shapes," in accordance with an approved QCP procedures.
5. Store galvanized metal railing in a manner that will prevent the formation of "white-rust" or wet storage staining. "White rust" or staining of the galvanizing is not acceptable.

6. The Galvanizer shall provide the Engineer with all galvanizing process-related Quality Control documents which demonstrate compliance to this specification and referenced specifications prior to shipment of the galvanized product.

7. The Galvanizer will ensure the metal railings meet a straightness tolerance of 1/8 in in 10 ft [3 mm in 3000 mm] prior to any subsequent paint applications.

8. It is the Galvanizer's responsibility to provide the Engineer with advanced notification of at least 5 working days of intent to galvanize so that the Engineer can perform a Quality Assurance audit.

F. Coating Requirements

1. Perform preparation of galvanized surfaces for painting in accordance with SSPC SP16 "Brush-off Blast Cleaning of Non-Ferrous Metals," and ASTM D6386.

Inspect brush-off blasted surfaces for fins or tears, or any surface that shows that the galvanize coating has been damaged. Repair damaged areas using approved procedures in accordance with the suppliers QCP. Any surface of insufficient galvanize coating DFT readings shall be repaired using 2478, "Organic Zinc-Rich Primer".

Match the color of the finish coat to Federal Standard 595 C No. 14066 (Green) with a semi-gloss finish.

If a galvanize coating is not required, coat the rail in accordance with 2478, "Organic Zinc-Rich Paint System" (e.g. Mpls. Rail).

2. Coat all sweep blasted galvanized railing with the subsequent coat(s) within the time frame defined in ASTM D 6386, Sect. 5.4.1, or within the same 8-hour shift, maintaining manufacturer defined control and environmental conditions. The Contractor's QC personnel shall document that all parameters were followed.

3. Apply all coating material in accordance with the contract documents and the manufacturer's Product Data Sheet (PDS) and application guides for the material and system specified.

4. Ensure coating material(s) meet the requirements of 3520, "Zinc-Rich Paint Systems". Also ensure the color of the intermediate coat presents a distinct contrast from other applied coatings.

5. Accomplish all QC inspections of all coated products with an observer with normal color vision in a "well lighted" area during each coating phase and prior to final acceptance.

"Well-lighted" is defined as a minimum of 50 foot candles of artificial light or natural daylight. Use a light meter with readings in foot candles to verify the adequacy of the lighting.

Handling and Shipping of Coated Metal Railing:

Protect all completed, fabricated, and coated metal railing during handling and shipping to prevent any damage to the coating(s). Do not move or handle coated metal railing until the coating has cured, but in no case sooner than recommended by the coating manufacturer.

Metal railing may be padded to protect it from direct contact with wood, steel, or other packaging materials that could scratch, mar, stick to, or otherwise damage the final coated railing finish. Softeners may be used in conjunction with high-density foam or other acceptable packaging materials at all points of contact.

Storage of Coated Metal Railings:

Store all completed coated metal railing in accordance with MnDOT 1606 and the following:

1. The fabricator shall tag/piece mark all metal railing prior to final storage, and include the following identification markings, as a minimum: individual piece marks, bridge and/or project number(s), fabricator and applicator job numbers. All marking(s) shall not be visible to the public when the railing is in its installed position. Include the method of identification in the fabricators QCP.
2. Provide the Engineer with advance notification of at least 5 working days of intent to ship, so that the Engineer can perform a QA audit prior to shipping.

G. Construction Requirements

Provide the Engineer with a QA/QC plan that will be used to ensure that the cast-in-place anchorages are installed in the correct location using templates or other means ensuring that the exposed threads of the anchorages will not be damaged or contaminated and that the anchorages will not be displaced or allowed to move during concrete placement.

After the cast-in-place anchorages have been installed in the forms, but prior to placing the barrier concrete, the Contractor shall provide written documentation verifying that all of the anchorages are within the necessary tolerances to place the tubular railing without modifying the railing base plate configuration.

Adjust the steel posts to obtain the grade and alignment as shown in the plans by one of the following methods:

1. Shim the steel posts with steel shims or washers to the proper grade and alignment, not to exceed 1/4 in [6 mm] of shim height. Before attaching the nuts, **coat the entire surface between the base plate and concrete rail with an approved "Silicone Joint Sealant," as found on the Department's Approved Products website.** Tighten the anchor rod nuts (as per section "C"-Anchorages) and neatly smooth the caulk around the perimeter of the railpost base plate.
2. Thread the anchor rods with leveling nuts and turn down to the base of the anchor rods. Install the rails and set the steel posts to the proper grade and alignment by adjusting the leveling nuts. Install the top nuts and tighten them firmly to the base plate. Fill the space between the base plate and the concrete and neatly finish with grout that is approved by the Engineer.

Ground all metal railings. Install all electrical grounding in accordance with the applicable provisions of 2557, "Fencing," and the National Electrical Code. Clamp or braze the ground wires to the grounding device, then practicably route and attach to the nearest rail by clamping, brazing, or any other approved means that will provide a permanent positive connection. If rail has non-continuous sections, use a #6 AWG solid copper wire to connect adjacent railing panels.

If the bridge does not include exposed electrical equipment, then ground the rails at points directly below or adjacent to the railing at all abutment corners. Ensure the grounding system consists of a #6 AWG solid copper wire connected to the railing which in turn is connected to a copper coated steel rod having a nominal diameter of 5/8 in [16 mm] or more and a minimum length of 8 ft [2.4 m] installed to an elevation approximately flush with the ground surface.

If the bridge includes exposed electrical equipment, such as roadway lighting, traffic signals, variable message signs, surveillance cameras, or ramp metering, then bond the railing grounding system to the exposed electrical equipment grounding system. Refer to the electrical plans and electrical special provisions for details regarding bonding multiple electrical grounding systems.

H. Repairs of Coated Steel Railings:

Any damaged coated surfaces, identified through either Quality Control or Quality Assurance inspections as being unacceptable, either after the application of the paint or after shipping and handling, is subject to the provisions of 1512, "Unacceptable and Unauthorized Work".

SB-8.2 Expansion Joint Devices (Bridge No. 62937)

Fabricate waterproof expansion devices for Bridge No. 62937 in accordance with 2402, "Steel Bridge Construction," and supplemented as follows:

A. The Contractor shall:

1. Furnish a single diaphragm unreinforced neoprene gland whose physical and chemical properties conform to 3721, "Preformed Elastomeric Compression Joint Seals for Concrete," except:

(a) Substitute Durometer requirement of 60 plus or minus 5 for that which is shown in ASTM D 2628.

2. Make the gland $\frac{1}{4}$ in [6.4 mm] thick, subject to a minimum thickness of $\frac{7}{32}$ in [5.6 mm].

3. Submit 12 in [300 mm] of seal material from each lot of material for testing if required by the Project Engineer.

4. Furnish certified test results from the manufacturer attesting to the physical and chemical properties of the expansion joint devices in accordance with 1603, "Materials: Specifications, Samples, Tests, and Acceptance". Provide copies of the test results for the Project Engineer, the Materials Engineer, and the Structural Metals Engineer.

B. Provide only one of the devices shown on the Department's "Approved/Qualified Product Lists for Bridge Products, Expansion Joint System" (<http://www.dot.state.mn.us/products>). For products not on the Department's prequalified list, provide information as required on the web site so it can be evaluated and potentially qualified.

C. The Fabricator will be permitted to weld pre-galvanized sections of expansion device steel rail, complete with anchorages. If the steel rail is pre-galvanized, the Fabricator shall:

1. Provide roadway sections that are not less than 10 ft [3 M] long,

2. Provide an anchorage within 9 in [229 mm] of each end of the sections. This may require inclusion of additional anchorages,

3. Bevel abutting ends $\frac{1}{4}$ in [6 mm] on 3 edges and de-burr the edges,

4. Prepare the surfaces to be welded as per 2471.3.F.2, "Preparation of Base Metal",

5. Groove weld the sections on 3 sides preventing weld metal from entering the gland groove,

6. Grind the weld smooth on the top of the extrusion, and

7. Repair the welded surface as per 2471.3.L.1, "Galvanizing".

D. Unless the gland is shop installed, the Fabricator shall install filler material in the gland groove in the steel rail to protect against entry of dirt and debris. Install filler material at the fabrication shop prior to storage or transportation of completed expansion device.

E. The Contractor shall:

1. Remove filler material and clean all gland to steel contact areas of all dirt, oil, grease, or other contaminants before installing the neoprene gland.
2. Lightly sandblast the contact areas so as to roughen but not damage the galvanized surface just before applying the lubricant adhesive.
3. Apply lubricant adhesive on both gland and steel contact areas when installing the gland.
4. Install the gland only with tools recommended by the manufacturer.

F. Lubricant Adhesive

Ensure the lubricant adhesive conforms to the requirements of ASTM D 4070. Provide only one of the approved lubricant adhesives shown on the Department's "Approved/Qualified Product Lists for Bridge Products, Expansion Joint Lubricant Adhesive" (<http://www.dot.state.mn.us/products>). For lubricant adhesives not on the Department's prequalified list, provide information as required on the web site so it can be evaluated and potentially qualified.

G. Ensure all expansion joint cover plates on pedestrian bridges and sidewalk areas are raised pattern plate.

SB-9 (2404) CONCRETE WEARING COURSE FOR BRIDGES

The provisions of 2404, "Concrete Wearing Course for Bridges," are supplemented with the following:

SB-9.1 Concrete Wearing Course 3U17A

Unless otherwise authorized, ensure the concrete wearing course placement widths do not exceed 30 feet for Bridge No. 62732 and 24 feet for Bridge No. 62937.

SB-9.2 Crack Sealing Bridge Deck

Supplement 2404.3.C, "Deck Preparation," with the following:

After shotblasting the surface, the Engineer will perform a visual inspection of the bridge deck, and locate all cracks appearing on the top surface. Furnish only one of the materials listed on the Department's "Approved/Qualified Product List of Bridge Surface and Crack Sealers," (www.dot.state.mn.us/products/bridge). Fill all located cracks with an approved crack sealer following the manufacturer's recommendations, and as otherwise directed by the Engineer. Ensure the sealer is cured prior to preceding pre-wetting of the deck, as required for placement of a low slump concrete wearing course.

Control the application of the crack sealer such that the maximum width of crack sealant does not exceed $\frac{3}{4}$ in [20 mm]. If exceeding the permitted width of $\frac{3}{4}$ in [20 mm], remove excess by means of surface grinding to prevent debonding of concrete wearing course.

Furnishing and placing the sealer as specified above will be considered to be incidental work for which no direct compensation will be made.

SB-9.3 Modified Transverse Texturing (Tining) on Bridge Slab

Delete the 5th and 6th paragraphs of 2404.3.D, "Concrete Placement and Texturing," and replace with the following:

Immediately following the carpet drag, texture the concrete wearing course surface with a metal-tine pattern. Install the transverse texturing (tining) on a slight diagonal, at an angle of approximately 10 degrees to a line perpendicular to the roadway centerline, produced by using a device meeting the following characteristics and requirements:

- 1) Equipped with steel tines from 4 in to 6 in [100 mm to 150 mm] long and from $\frac{1}{12}$ in to $\frac{1}{8}$ in [2 mm to 3 mm] thick,
- 2) Steel tines arranged to obtain randomized grooves from $\frac{1}{8}$ in to $\frac{5}{16}$ in [3 mm to 8 mm] deep, and
- 3) Variable spacing between tines from $\frac{5}{8}$ in to 1 in [16 mm to 25 mm].

Do not texture or tine within 1 ft [300 mm] of gutterline.

SB-10 (2405) PRESTRESSED CONCRETE BEAMS

The provisions of 2405, "Prestressed Concrete Beams," are supplemented with the following:

SB-10.1 Prestressed Concrete Fabricator Certification

Ensure the Fabricator's quality control office maintains documentation containing the data required by the specifications and the State Materials Engineer. This documentation shall contain test data and measurements taken at times and locations approved by the Engineer, assuring that monitoring, by personnel not directly involved in production, is sufficient to ensure compliance with approved procedures.

If the Engineer's review of fabrication work discloses that approved procedures are not being followed, the Fabricator shall immediately correct the procedure.

The Engineer will determine what additional testing work must be done by the Fabricator or, if necessary, what part of the work must be repaired or replaced if fabrication work is not properly monitored and documented by the Fabricator.

Any and all costs of required additional monitoring and testing shall be at the expense of the Contractor with no additional compensation.

SB-10.2 Beam Camber and Deflection

Add the following 2405.3.J.1, "Beam Camber and Deflection," after the last paragraph of 2405.3.J, "Marking, Handling, Storage, and Transportation,":

J.1 Beam Camber and Deflection

The Erection Camber dimension shown in the Plans is the computed beam camber at midspan based on a time lapse of 30 to 180 calendar days after release of the prestressing strands. This camber may vary by + 1 in [25 mm] and is intended to advise the Contractor as to the expected camber at the time of deck forming. A positive (+) dimension indicates upward camber.

To help control camber, schedule fabrication of prestressed concrete beams between 30 and 180 calendar days prior to slab placement on the erected beams. For projects where the slab is placed; a) before the beams are 30 calendar days old, or b) after the beams are 180 calendar days old, the Contractor is responsible for controlling the beam camber and all associated costs, including but not limited to:

- bridge and roadway slab materials,
- form adjustments required to maintain specified steel reinforcing bar clearances and deck profiles,
- beam seat adjustments,
- application of load to the beams, and
- any additional expenses in connection with accommodating insufficient or excess beam camber.

Record the date and camber of each beam at the following times:

1. Initial – Just prior to removal of the beam from the casting bed; and
2. During Storage – At a frequency not to exceed 60 calendar days, and within a time frame of 7 to 21 calendar days prior to shipment.

In addition, record the date and camber of each beam if the support or bunking point (distance from point of support to end of beam) changes by more than 2 ft [600 mm] during storage (except during shipping to the job site).

Record the initial camber on the casting bed, just prior to lifting or removal of the beam from the bed.

Measure beam camber as the vertical dimension between the top of the beam at midspan and a theoretical line at the top of the beam between centerline of bearings.

Perform and record each check at a time when the camber and alignment of the beam is not influenced by temporary differences in surface temperature. Make these records available for the Engineer's inspection, and include in the "Record of Camber" (see attached sheet) document for each beam. Immediately notify the Materials Engineer and Bridge Construction Unit if any of the recorded cambers (other than initial) are outside a range of + 1 in [25 mm] of the Erection Camber dimension shown in the Plans. At the time of shipment, provide the "Record of Camber" document for each beam to the Materials Engineer and the Engineer.

To help control camber, place 27M, 36M, and MN45 beam shapes on storage bunks with at least 2 ft [600 mm] and no more than 4 ft [1200 mm] of beam end overhang. Place beams with a design height exceeding 45 inches [1150 mm] on storage bunks with at least 3 ft [900 mm] and no more than 6 ft [1800 mm] of beam end overhang. Place all beams within the same span and for each bridge, on storage bunks with beam end overhangs that differ by no more than 2 ft [600 mm] from one another. Include the location of the bunk or support point from the end of the beam on the "Record of Camber" for each end of each beam.

If it is anticipated that the beams will be older than 180 calendar days at time of slab placement, the Contractor shall submit calculations to the Engineer showing the estimated beam camber and the residual camber at midspan, at the beam age anticipated at time of slab forming and at time of deck placement (if more than 45 calendar days after slab forming). Include in the submittal the Contractor's proposal for accommodating or preventing any excess camber in the construction, including but not limited to; increased frequency of camber measurement, potential changes to beam seat elevations, etc.

Take elevations at top of beams after erection and allow for deflection shown to enable building deck forms to correct grade and specified slab thickness. Take elevations no more than 45 calendar days prior to slab placement.

Record of Camber (V3 -06/18/13)

Fabrication Company: _____
Bridge No.: _____
S.P. or S.A.P. No.: _____
Fabrication Date: _____

Beam Size: _____
Date Shipped: _____

Unique Beam ID (Per Fabricator)	Beam No. From Framing Plans	Erection Camber Shown in Plans	Beam Length (Feet-Inches) (i.e. 101'-7")	Camber Measurement Date	Beam Age (Days)	Camber at Midspan (Inches)*	Method Used**	Bunking Distance From "X" End (Feet-Inches)	Bunking Distance At Opposite End (Feet-Inches)	Measured By (Initials)
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*Beam camber shall be measured as the vertical dimension between the top of the beam at midspan and a theoretical line at the top of the beam between centerline of bearings. Immediately notify the Materials Engineer and Bridge Construction Unit if any of the recorded cambers (other than initial) are outside a range of ± 1 inch of the Erection Camber dimension shown in the Plan.

**Indicate the method used to measure the camber, i.e. Stringline, Survey instrument, etc.

Notes: _____

SB-10.3 Prestress Transfer of I Shaped Beams

The Fabricator of prestressed concrete beams must closely monitor the ends of the beams during the strand release process. The following sequence of releasing the individual prestressing strands is required if cracks occur in the ends of the beams during the Fabricator's releasing sequence.

Delete the first sentence of the second paragraph of 2405.3.G, "Prestress Transfer," and replace with the following:

Conduct prestress transfer in a sequential and alternating manner symmetrical to the vertical axis of the beam in order to minimize the lateral eccentricity of the prestress forces and diminish cracking of the concrete. Perform the sequence of individual prestressing strand release in accordance with the following criteria, unless different criteria are approved by the Engineer.

- 1) Beginning with the *straight* strands closest to the vertical axis of the beam and in the second row from the bottom of the beam, release the strands each side of center. Move two columns away from this column in the same row and release the strand on each side of the center. Then proceed to the outermost strands in this row and release the strand on each side of the center. Repeat the sequence for the third and subsequent rows from the bottom upward until approximately one-fourth of the straight strands have been released.
- 2) Release approximately one-half (+/- one strand) of the *draped* strands alternating about the vertical axis, starting from the bottom.
- 3) Release the hold-down anchors for the draped strands.
- 4) Release the remainder of the *draped* strands alternating about the vertical axis.
- 5) Release the remainder of the *straight* strands beginning with the strand in the bottom row nearest the vertical axis. The strands are released alternating each side of the center. Release all the strands in that column moving upward. Proceed two columns away from this column and release the strands bottom to top alternating each side of the center. Next, move to the outer most column and release strands bottom to top continuing to alternate each side of the center. Release the remainder of the strands bottom to top starting with the innermost column alternating each side of the center.

Once release has started, release all strands of that beam in the sequence described above even if cracking is noticed near the end of the beam. Notify the Engineer immediately of any cracking, and do not fabricate other beams with the same strand pattern until the Engineer has approved a revised release sequence.

SB-10.4 Prestressed Concrete Beam End Zone Crack Repair

Add the following as 2405.3.I.1, "**End of Beam Cracking and Repair**":

The Fabricator of the Prestressed Concrete Beam (PCB) is responsible for evaluating, supplying the products, and their application per the following:

Use feeler gauges to measure cracking in the beams. Report any cracks that appear to be perpendicular to the draped strands to the Department Precast Inspection Engineer, who will evaluate the cracks perpendicular to the draped strands and give further direction to the Fabricator.

- A. Reject PCB with cracks exceeding 0.050 inches [1.25 mm].
- B. Fill PCB cracks ranging in width from 0.025 inches [0.60 mm] to 0.050 inches [1.25 mm] using epoxy injection, approved by the Department Materials Engineer.

Follow these directions for Epoxy injection:

1. Within 48 hours of application, clean the crack area of any loose debris such as dirt, dust, curing compounds, waxes, laitance, oil, grease, or other contaminants with an oil free 125 psi compressed air blast leaving only clean sound concrete. No water washing is allowed,
2. Ensure the epoxy injection is performed by a trained, approved, and certified applier of the manufacturer of the epoxy meeting these specifications. Training curriculum shall consist of the theory behind the causes of cracking, selection of materials, and injection technology including flow rates, operating pressures, and temperature effects,
3. The applier shall submit for review by the Department Materials Engineer, a written description of the proposed epoxy materials, their acceptable approvals, and the injection procedure, at least 7 calendar days prior to proceeding. Include in the list the repair work proposed for each item,
4. Utilize an epoxy injection system approved in writing by the Department Materials Engineer,
5. The certified applier is responsible for crack preparation. Determine the exact location and length of the crack to be injected. Clean the crack and the adjacent surfaces or other areas of application of paint, dirt, dust, grease, oil, efflorescence, or other foreign matter detrimental to bond of epoxy injection surface seal system using a grinding wheel, wire brush, and compressed air. Open crack walls slightly along its length with a small crack chaser blade if the crack walls remain contaminated. Acids and corrosives are not permitted for cleaning, and
6. Inject the approved system as recommended by the manufacturer.

Then apply Euclid Dural Prep AC or BASF MasterSeal 630 to the ends and the sides of the PCB (no coating applied to the top of the top flange or bottom of the bottom flange) for the greater of the following lengths, end four feet or from the end of the beam to the end of the furthest crack. Prepare and apply per the manufacturer's recommendations and as approved by Department Materials Engineer.

C. Fill girder cracks ranging in width from 0.012 inches [0.32 mm] up to 0.025 inches [0.60 mm] with Hilti RM 800.

Follow these directions for packing the Repair Mortar:

1. Within 48 hours prior to this application, clean the crack area of any loose debris such as dirt, dust, curing compounds, waxes, laitance, oil, grease or other contaminants with an oil free 125 psi compressed air blast leaving only clean sound concrete. No water washing is allowed and do not apply moisture to crack prior to mortar repair,
2. Pack Hilti RM 800, a Portland cement based repair mortar, along the entire length of each crack, filling the voids of the crack, and
3. Mix and apply the material per the manufacturer's recommendation, and as approved by Department Materials Engineer.

Then apply Euclid Dural Prep AC or BASF MasterSeal 630 to the ends and the sides of the PCB (no coating applied to the top of the top flange or bottom of the bottom flange) for the greater of the following lengths, end four feet or from the end of the beam to the end of the furthest crack. Prepare and apply per the manufacturer's recommendations and as approved by Department Materials Engineer.

D. Do not fill girder cracks less than 0.012 [0.32 mm] in width but apply either Euclid Dural Prep AC or BASF MasterSeal 630 to the PCB sides and end (no coating applied to the top of the top flange or bottom of the bottom flange) for the greater of the following lengths, end four feet or from the end of the beam to the end of the furthest crack. Prepare and apply per the manufacturer's recommendations and as approved by Department Materials Engineer.

E. If there are no visible cracks, apply either Euclid Dural Prep AC or BASF MasterSeal 630 to the PCB sides and end (no coating applied to the top of the top flange or bottom of the bottom flange) four feet of the beam. Prepare and apply per the manufacturer's recommendations and as approved by Department Materials Engineer.

Make repairs at least three days after prestress transfer has been made, but no sooner than 3 weeks before shipping to site, unless approved by the Department Precast Inspection Engineer.

Give the Department Materials Engineer the opportunity to monitor all end of beam repair work.

The contract unit price for *Prestressed Concrete Beams Type MN54 (Bridge No. 27632) and Type MN45 (Bridge No. 62937)* includes the cost for all the above mentioned.

SB-11 (2442) REMOVAL OF EXISTING BRIDGES – BRIDGE NO. 62732

For Bridge No. 62732, which includes the removal of existing Bridge No. 9582, apply the provisions of 2442, "Removal of Existing Bridges," except as supplemented below.

Remove all existing concrete footings and remove existing timber piles to a depth of four feet below finished grade.

Dispose of materials in accordance with 1506, "Supervision By Contractor," 2104.3.C, "Removal Operations," 2442, "Removal of Existing Bridges," MnDOT "Asbestos and Regulated Waste Manual for Structure Demolition or Relocations for Construction Projects" and the following:

Furnish written information to the Engineer as to disposal of steel bridge beams and other steel bridge components coated with lead paint. Include method of stabilization and disposal; name, address, and telephone number of disposal site; certification that Contractor has notified disposal site of presence of lead paint; acknowledgment by Contractor of OSHA requirements relating to lead; and certification that Contractor is familiar with proper handling and disposal of materials with lead-based paint systems. Stabilize all lead paint that has been identified as peeling by coating with an approved product, as listed on the MnDOT Approved Products website www.dot.state.mn.us/products under "Lead Paint Encasement Product". Prevent the peeling paint from flaking off during demolition, or scrape and contain the peeling paint. If the painting option is used apply 16 mils of the product. Applying more than 16 mils of the product on a bridge over any water will require that the bridge have a diaper apron be attached under the bridge to contain the drips. Complete all work as per the MnDOT Asbestos and Regulated Waste Manual for Structure Demolition or Relocations for Construction Projects. The form supplied in this special provision must include the signature of the authorized Superintendent verifying that the information is correct.

NOTIFICATION FORM ON DISPOSAL OF BRIDGE STEEL

The Contractor is required to provide certain information on disposal of bridge steel which has been painted with lead-based paint. By signing this document, the Contractor certifies that information supplied by the Contractor is correct and that the Contractor is familiar with proper handling and disposal of materials with lead-based paint. This information must be furnished to the Project Engineer a minimum of 30 days prior to removal of the bridge steel from the project site. Any change in method or location of disposal would require resubmittal and a 30 day notice.

MnDOT Project No. _____ Bridge No. _____

Description of Bridge Steel _____

Paint System is MnDOT Spec. _____
(Primer) (Top Coat)

Project Engineer: _____

Contractor/Subcontractor: _____
(Name, mailing address, telephone no.)

I _____ certify that the following information is correct:
(print name of authorized representative)

The above bridge steel will be disposed of by the following method(s): _____
(list name,

address and telephone no. of recipient, estimated delivery date, and intended use.)

I also certify that _____ is familiar with
(Contractor/Subcontractor name)
the requirements in OSHA 29 CFR 1926.62 relating to lead, precautions to be taken when working with lead, and proper handling and disposal of materials with lead-based paint systems and that _____
has been notified of the presence of lead-based paint. (name of recipient)

(signature)

(date)

Received by Project Engineer/Inspector: _____
(date) (signature)

cc: Project File
Office of Environmental Services

SB-12 (2451) STRUCTURE EXCAVATIONS AND BACKFILLS

The provisions of 2451, "Structure Excavations and Backfills," are supplemented as follows:

SB-12.1 Structure Excavation

Excavate, sheet, shore and/or protect, prepare foundation, and place backfill necessary for construction of Bridge Nos. 62732 and 62937, which are not specifically included in the grading portion of the Contract. Dispose of surplus material.

For both bridges, construct the footings in the dry. Control of water to be included in Structure Excavation pay item.

Do not measure the excavated or backfill material. All work performed as specified above will be considered to be included in a single lump sum for which payment is made under Item No. 2401.601, "STRUCTURE EXCAVATION".

For purposes of partial payments, the portion of the lump sum Structure Excavation at each substructure unit will be defined as follows:

Bridge No. 62732	Each Abutment 33%
	Each Pier 33%
Bridge No. 62937	Each Abutment 25%
	Each Pier 25%

SB-13 **(2452) PILING**

SB-13.1 The provisions of 2452.3.J, "Coating Steel H-Piles and Steel Pile Shells," are modified as follows:

Delete 2452.3.J.1, "Painted Piles."

Delete 2452.3.J.2, "Galvanized Piles."

SB-13.2 **Commercial Drive Fit Splices for CIP Piling**

Commercial drive fit splices will NOT be permitted on this project.

SB-14 **(2471) STRUCTURAL METALS**

REVISED 01/08/16

The provisions of MnDOT 2471 are modified with the following:

S-1.1 The entire section of MnDOT 2471.3.B.3, "Submittal for Engineer's Review and Approval," is deleted and replaced with the following:

Submit shop drawings from Fabricators directly to the MnDOT Bridge Office

at: MnDOT Bridge Office
Fabrication Methods Engineer
3485 Hadley Ave. North
Oakdale, MN 55128

Submit two sets of prints of required shop detail drawings, meeting 2471.3.B.2, "Format," from the fabricator to the Engineer for review and release for fabrication. Shop drawings must comply with the contract documents. Provide written authorization from the design EOR (Engineer of Record) for any deviation from the contract documents. Incorporate all contractor comments into shop drawings prior to submittal to reviewer. The reviewer will return one set of prints of the shop detail drawings to the Fabricator with comments.

Submit only checked drawings, in complete collated sets, from the fabricator for review. The Contractor may submit details such as ice-breakers, anchorages, bearing plates, and castings, separately to facilitate the work.

Fabricator may submit the shop drawings to the Contractor. Stamp these drawings with "For Contractor Use Only". Do not forward these stamped drawings to MnDOT.

Submit a schedule showing the submission dates of shop drawings and anticipated dates for shop fabrication from the fabricator, as directed by the Engineer. Arrange the schedule to avoid delay in completing the work. If constructing a structure composed of several units, consider submitting shop detail drawings of the separate units in proper order to expedite the review and release for fabrication of the details.

If the Engineer requests changes to the submitted drawings or if the fabricator makes additional changes not required by the Engineer, provide revised drawings, with revision control, from the fabricator with circles, underscores, or other marks to distinguish the changes from unchanged details or dimensions.

The Engineer will release shop detail drawings for fabrication after corrections are completed. Provide six sets of corrected drawings and additional copies as required by the contract or requested by the Engineer from the fabricator at no additional cost to the Department. Mark the corrected drawings as

Revision 0 and remove all comments and marks to make clean drawings for approval, stamping and distribution for use.

The shop drawings approved by the Engineer will become part of the Contract. Do not make changes on approved drawings unless otherwise approved by the Engineer in writing. Mark changes approved by the Engineer on the approved shop drawings with revision version in number sequence next to all changes and resubmit them for approval, stamping as revised sheet and distributing to replace the superseded version of drawings.

The Engineer's approval of shop drawings will not relieve the Contractor of full responsibility for submission of complete and accurate drawings and for the accurate assembly and fitting of all structural members.

S-1.2 The entire section of MnDOT 2471.3.M.1.d, "Radiographic Testing (RT)," is deleted and replaced with the following:

Provide Computed Radiography (CR) or Digital Radiography (DR) in lieu of conventional radiography. The Department will retain ownership of radiographic images provided by the Contractor. Name image files with bridge number and weld identification shot number.

Electronic Radiography method(s) consist of CR utilizing Storage Phosphor Imaging Plate (SPIP) or DR utilizing a Digital Detector Array (DDA).

Ensure CR complies with ASTM E2033, "Standard Practice for Computed Radiology (Photostimulable Luminescence Method)," and ASTM E2445, "Standard Practice for Performance Evaluation and Long-Term Stability of Computed Radiography Systems". Ensure DR complies with ASTM E2698, "Standard Practice for Radiological Examination Using Digital Detector Arrays," and ASTM E2737, "Standard Practice for Digital Detector Array Performance Evaluation and Long-Term Stability".

Ensure SPIP and DDA widths are sufficient to depict all portions of the weld joint, including the HAZs, and provide sufficient additional space for the required hole-type or wire-type IQIs and radiograph identification without infringing upon the area of interest.

Ensure all radiographs radiographic images are free from mechanical, chemical, or other blemishes to the extent that they cannot mask or be confused with the image of any discontinuity in the area of interest in the radiograph. Such blemishes include, but are not limited to the following:

- (1) False indications due to defective plates or internal faults; and
- (2) Artifacts due to non-functional pixels.

Ensure the contrast and brightness range that demonstrates the required sensitivity be considered valid contrast and brightness values for interpretation. When multiple IQIs are utilized to cover different thickness ranges the contrast and brightness range that demonstrates the required IQI image of each IQI is determined. Intervening thicknesses may be interpreted using the overlapping portions of the determined contrast and brightness ranges. When there is no overlap, additional IQI(s) are to be used.

When performing CR or DR, ensure a measuring scale is utilized to serve as a length reference. The scale is to be attached to the SPIP holder or DDA prior to exposure. As an alternative, when using SPIPs a transparent scale with opaque gradations may be placed on the SPIP prior to processing. In any case, the reference comparator cannot interfere with interpretation of the image.

Provide a work station monitor for evaluating images equipped with a display resolution with a pixel count which is at least equal to the pixel count of the direct imaging plate.

Archive images using a reproducible electronic medium. Provide data file format and storage that comply with ASTM E2339, "Standard Practice for Digital Imaging and Communication in Nondestructive

Evaluation (DICONDE)" format. Documented and prove the image archival method (at system installation). Include the image file nomenclature to enable the retrieval of images at a later date. Archived image files must maintain the bit depth and spatial resolution of the original image. Image data compression is not allowed. Preserve (store) the initial image presented by the CR or DR system without altering the original spatial resolution and pixel intensity. Preserve (store) the final image used for disposition when additional image processing is applied (excluding window/level and digital image zoom) to achieve the required image quality level. Store annotations made to the image in a manner which will not mask or hide diagnostic areas of the image.

SB-15 **(2472) METAL REINFORCEMENT**

The provisions of 2472, "Metal Reinforcement," are supplemented as follows:

SB-15.1 **Stainless Steel Reinforcement Bars (Bridge No. 62732)**

For Bridge No. 62732, furnish and place stainless steel reinforcement bars to connect the approach panel to the end diaphragm. Stainless steel reinforcement bars are marked with the suffix "S" in the Bridge No. 62732 plans. (Example: A504S.)

A. Materials

The requirements of 2472.2, "Materials," are modified to include the following:

Grade and Type: The material shall conform to ASTM A 955 and to one of the following Unified Numbering System (UNS) designations: S24000, S24100, S32205, S32304, S20910, S30400, S31603, S31803, or S31653.

Supply Grade 60 bars, all of the same UNS designation.

Evaluation of Corrosion Resistance: Prior to fabrication, supply test results from an independent testing agency certifying that stainless steel reinforcement from the selected UNS designation meets the requirements of Annex A1 of ASTM A955. Corrosion performance for the selected UNS designation shall be redemonstrated if the processing method is significantly altered. Removal of mill scale or pickling processes used for stainless steel reinforcement supplied under this contract shall be the same as those used to prepare the samples tested per Annex A1 of ASTM A955.

Chemical composition of the material shall conform to that specified in ASTM A 276, Table 1, Chemical Requirements, for the given UNS designation.

Heat Treatment: Bars may be furnished in one of the heat treatment conditions listed in ASTM A 955, and as needed to meet the requirements of this specification.

Finish: Supply bars that are free of dirt, mill scale, oil and debris by pickling to a bright or uniform light finish. Fabricate and bend bars using equipment that has been thoroughly cleaned or otherwise modified to prohibit contamination of the stainless steel from fragments of carbon steel or other contaminants.

Bending and Cutting: Bend bars in accordance with 2472, "Metal Reinforcement," and ASTM A 955. Use fabrication equipment and tools that will not contaminate the stainless steel with black iron particles. To prevent such contamination, equipment and tools used for fabrication, including bending and cutting, shall be solely used for working with stainless steel. Do not use carbon steel tools, chains, slings, etc. when fabricating or handling stainless steel reinforcement bars.

Stainless steel bars must not be "hot" bent or "hot" straightened.

Manufacturers/Suppliers: The following manufacturers/suppliers are capable of providing material meeting this specification. Other suitable manufacturers/suppliers may also exist. Ensure that all materials supplied meet the Contract requirements.

<u>SUPPLIERS:</u>	<u>CONTACT</u>	<u>PHONE NO.</u>
Altec Steel, Inc. 5515 Meadow Crest Drive Dallas, TX 75229	Ross Paulson	425-823-1913
American Arminox 1230 Avenue of the Americas 7 th Floor New York, NY 10020	Jean-Pierre Belmont	646-283-3837
Contractors Materials Co. 10320 S. Medallion Drive Cincinnati, OH 45241	David Friedman	513-719-0112
Dunkirk Specialty Steel 88 Howard Ave Dunkirk, NY 14048	Gary Zaffalon	800-916-9133 716-366-1000 Ext 323
North American Stainless 6870 Highway 42 East Ghent, KY 41045	Jason Sharp	800-499-7833 Ext 6360
Outokumpu Stainless Bar, LLc. 3043 Crenshaw Parkway Richburg, SC 29729-8225	Tom Holsing	630-651-3159
Salit Specialty Rebar 3235 Lockport Road Niagara Falls, NY 14305	Kevin Cornell	877-299-1700 716-299-1990
Talley Metals P.O. Box 2498 Hartsville, SC 29551	Melba Deese	800-334-8324 Ext 712-2356

Control of Material: All reinforcement bars or bar bundles delivered to the project site shall be clearly identified with tags bearing the identification symbols used in the Plans. The tags shall also include the UNS designation, heat treat condition, heat number, grade (corresponding to minimum yield strength level), and sufficient identification to track each bar bundle to the appropriate Mill Test Report.

In accordance with 1603.2, "Sampling and Testing," supply samples to the MnDOT Materials Laboratory for testing. Supply one three foot long sample per heat, per bar size. Each sample shall include one complete set of bar markings. Individually tag each sample with the same information listed above per "Control of Material" and include a copy of the associated Mill Test Report (MTR). Straighten the test specimen if sample comes from a coil.

Provide MTRs for the Project that:

1. Are from the supplying mill verifying that the stainless reinforcement provided has been sampled and tested and the test results meet ASTM A 955, ASTM A 276, Table 1 and the Contract requirements;

2. Include a copy of the chemical analysis of the steel provided, with the UNS designation, the heat lot identification, and the source of the metal if obtained as ingots from another mill;
3. Include a copy of tensile strength, yield strength and elongation tests per ASTM A 955 on each of the bar sizes of stainless steel reinforcement provided;
4. Permit positive determination that the reinforcement provided is that which the test results cover;
5. Include a statement certifying that the materials meet 1601, "Source of Supply and Quality," regarding material being melted and manufactured in the United States; and
6. Certify that the bars have been pickled to a bright or uniform light finish.

B. Construction

Conform to the construction methods in 2401, "Concrete Bridge Construction," and 2472, "Metal Reinforcement," except as modified below:

Ship, handle, store, and place the stainless steel reinforcement bars according to the applicable provisions with the following additions and exceptions:

1. Prior to shipping, ensure that all chains and steel bands will not come into direct contact with the stainless steel reinforcement bars. Place wood or other soft materials (i.e., thick cardboard) under the tie-downs. Alternatively, use nylon or polypropylene straps to secure the stainless steel reinforcement bars.
2. When bundles of reinforcement steel and stainless steel reinforcement bars must be shipped one on top of the other, load the stainless steel reinforcement bars on top. Use wooden spacers to separate the two materials.
3. Outside storage of stainless steel reinforcement bars is acceptable. Cover the stainless steel reinforcement bars with tarpaulins.
4. Store stainless steel reinforcement bars off the ground or shop floor on wooden supports.
5. Do not use carbon steel tools, chains, slings, etc. when fabricating or handling stainless steel reinforcement bars. Only use nylon or polypropylene slings. Protect stainless steel from contamination during construction operations including any cutting, grinding, or welding above or in the vicinity of stainless steel.
6. Bars displaying rust/oxidation, questionable blemishes, a dull or mottled finish or lack of a bright or uniform pickled surface as determined by the Engineer are subject to rejection.
7. Alternatively, epoxy coated bars may be substituted for stainless steel bars where the Plans indicate that the bars are immediately adjacent to (touching) galvanized expansion joint device anchorages, but only for the bars that run parallel to the length of the expansion device and that are completely within 12 inches [305 mm] of the device.
8. Place all stainless steel reinforcement on bar chairs that are solid plastic, stainless steel, or epoxy coated steel. Fabricate stainless steel metal chairs and continuous metal stainless steel supports from stainless steel conforming to the same requirements and UNS designations as stainless steel bar reinforcement as listed in section A, "Materials". Use stainless steel chairs with plastic-coated feet above steel beams as per 2472, "Metal Reinforcement".

Use one of the listed tie wires to tie stainless steel reinforcement:

- 16 gauge or heavier plastic or nylon coated soft iron wire; or

- Fabricated from stainless steel conforming to the same requirements as stainless steel bar reinforcement as listed in section A, "Materials", dead soft annealed, annealed at size. The tie wire does not need to be of the same UNS designation as the bar reinforcement.

Do not tie stainless steel reinforcing to, or allow contact with uncoated reinforcement, bare metal forming hardware, or to galvanized attachments or galvanized conduits. Direct contact with these materials is *not* acceptable. When stainless steel reinforcing or dowels must be near uncoated steel reinforcing, bare metal forming hardware or galvanized metals, maintain a minimum 1 in [25 mm] clearance between the two metals. Where insufficient space exists to maintain this minimum, sleeve the bars with a continuous $\frac{1}{8}$ in [3 mm] minimum thickness polyethylene or nylon tube extending at least 1 in [25 mm] in each direction past the point of closest contact between the two dissimilar bars and bind them with nylon or polypropylene cable ties. Stainless steel reinforcing bars are allowed to be in direct contact with undamaged epoxy coated reinforcing bars. Stainless steel reinforcing is permitted to contact or be tied to shear studs on steel girders.

Uncoated fasteners (such as used for static safety lines on beams), anchors, lifting loops, etc., that extend from the top flange of prestressed beams into the bridge deck shall be completely removed or cut off flush with the top flange of the beam prior to casting the deck.

Splices: Splices shall generally be of the lap type. Stainless steel mechanical splices may be used in certain situations, subject to the approval of the Engineer.

If it is necessary to increase the number of bar laps from those indicated in the Plans, provide copies of plan sheets to the Engineer showing the revised reinforcement layout with length and location of laps. The Engineer must approve the location of new lap splices prior to fabrication. New lap splices must be at least as long as those shown in the plans. No additional compensation or changes in the reinforcement bar quantities will be made for such splices.

Provide mechanical splices for stainless steel reinforcement made of stainless steel conforming to one of the UNS designations listed in section A, "Materials", above.

Approval: Stainless steel reinforcement placed in any member must be inspected and approved by the Engineer before placing concrete. Concrete placed in violation of this specification may be rejected and removal required, as directed by the Engineer.

C. Method of Measurement

Measurement of the stainless steel reinforcement will be by weight in pounds (kg) based on Table 5.2.2.1 of the MnDOT LRFD Bridge Design Manual, regardless of the actual unit weight of the material supplied.

D. Basis of Payment

Payment for Item No. 2401.541 "REINFORCEMENT BARS (STAINLESS-60KSI)" will be made at the Contract price per pound [kilogram] and shall be compensation in full for all costs of furnishing and installing the stainless steel reinforcement with all component materials as described above, including fabricating and shipping.

SB-16 **CONDUIT SYSTEMS**

Furnish and install each Conduit System in accordance with the plans, approved erection drawing, the applicable requirements of 2545, "Electrical Lighting Systems," 2550, "Traffic Management System," 2565, "Traffic Control Systems," and the following:

All conduit runs must be straight and true and all offsets and bends uniform and symmetrical. Adjust the elevations of the conduit assembly, for its full length, to approximately the same gradient as the finished roadway, and furnish and install in the approaches such suitable spacers and framing as may be necessary to maintain the correct grade and alignment.

Ferrous components of fittings must be hot dip galvanized as per 3394, "Galvanized Structural Shapes". Carefully install all fittings according to the manufacturer's recommendations and at the locations shown in the plans. At time of installation, adjacent conduit sections to be coupled by fittings must be in true alignment.

Ensure fabrication and inspection of structural metals used for each Conduit System are in accordance with the applicable requirements of 2471, "Structural Metals".

Identify the ends of conduits as lighting, signals, telephone, telegraph, power, etc. by the use of embossed metallic tags or other equally durable identification.

Conform non-metallic conduit and fittings to the requirements of the NEMA Standards Publication No. TC 14, titled "Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings."

Furnish three sets of erection drawings of each Conduit System to the Engineer for preliminary review. Two sets will be forwarded to the Bridge Construction and Maintenance Engineer for review and one set will be returned to the Contractor showing any necessary corrections.

The drawings must be to a scale of not less than 1/4" = 1'-0" [50:1] and show the locations of the diaphragms and inserts, a conduit placement scheme, and detailed views of the placement of the sleeves through the parapets, end webs, and diaphragms. Define the locations of the sleeves from established reference points or lines and elevations, such as working points or centerlines and bridge seat elevations. Show the locations and manufacturer of expansion fittings in the drawings.

Space concrete inserts for hanger assemblies in such a manner that the assemblies will not interfere with conduit couplings. Hanger spacing must not exceed 10 ft [3 m]. Conduit must be installed in 10 ft [3 m] lengths where practicable.

A combination expansion/deflection fitting must consist of an expansion fitting and an expansion/deflection fitting connected by a nipple. The expansion fitting must be in accordance with 3839, "Conduit Expansion Fittings," except that the fitting must provide for greater than 4 in [100 mm] linear movement when required by the plans. Each expansion/deflection fitting must be an approved watertight unit which can accommodate 3/4 inch [20 mm] of linear expansion or contraction of conduit, 3/4 in [20 mm] of parallel misalignment of adjacent conduit sections, and up to 30° of angular misalignment of the axes of adjacent conduit sections. To prevent damage to internal bonding jumper, do not twist fittings during installation.

Furnish and seal any remaining conduit opening at the back face of each abutment with one of the materials listed on the Department's "Approved/Qualified Product Lists of Bridge Silicone Joint Sealants" www.dot.state.mn.us/products/Bridge, after the conduit is in place.

All sidewalk or flush mounted junction boxes must be removable flange (NEMA 5) galvanized cast iron with checkered cast iron covers. Equip these junction boxes with 1/2 in [13 mm] diameter pipe drains. Each conduit entrance and the pipe drain entrance must be bossed and threaded to provide five full threads. Fasten the cover and flange with stainless steel screws. Equip the cover with pry bar slots and a neoprene gasket.

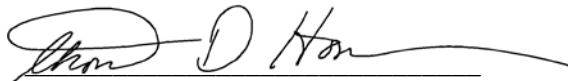
Include in each junction box conduit entrance an insulating bushing of the appropriate size.

DIVISION SL

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I hereby certify that the Special Provisions for lighting construction (Sections SL-1, SL-2, SL-3, SL-4, and SL-5) contained in this proposal were prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.



Thomas D. Honer, P.E.

Lic. No. 45519 Date: 11/25/15

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SPECIAL PROVISIONS

DIVISION SL

ELECTRICAL LIGHTING SYSTEM

SL - 1 COMPLIANCE WITH ELECTRICAL CODES AND STANDARDS

Bidders are advised that the NEC and the 2016 edition of MnDOT "Standard Specifications for Construction" shall govern. Compliance with provisions of MN/DOT 2545.2A, and the first paragraph of MN/DOT 2545.3a will be particularly enforced in conjunction with the construction of any kind or type of electrical system, conduit or conduit system for the conveyance of the electrical conductors, or the required portions thereof, as specified in the Contract. The Minnesota Electrical Act requires that a permit be obtained for the performance of all such work, including the installation of conduits. The Contractor shall obtain all necessary permits including, but not limited to, an electrical permit. Work shall be inspected and approved by the Engineer, Ramsey County, and MnDOT.

Required Signal and Lighting Certification for all Contractors, Supervisors or Foremen involved in the field installation of the Traffic Signal and/or Lighting portion of this Project. Signal and Lighting Certification is available through the MnDOT Office of Traffic, Safety, and Technology (OTST). Questions regarding certification or past certification may be directed to the MnDOT Office of Traffic, Safety, and Technology (OTST) at Telephone No. (651) 234-7055.

All material shall meet the requirements of the National Electrical Code (N.E.C.), National Electrical Manufacturers Association (NEMA) specifications, and local codes and ordinances, and shall be Underwriter's Laboratories listed, where U.L. standards for such products exist.

All work shall be under the direct supervision of a master electrician.

SL - 2 (2104) REMOVING MISCELLANEOUS STRUCTURES

SL-2.1 Description

This work consists of removing or salvaging miscellaneous structures in accordance with the provisions of MnDOT 2104 and the following:

Paint on existing lighting service cabinets and other painted items may include lead in the paint. If this is the case, the Contractor is responsible for the proper handling, transportation, and disposal of these materials as hazardous waste. The handling, transportation, and disposal of these items must be in accordance with Occupational Safety & Health Administration (OSHA) and the Minnesota Pollution Control Agency (MPCA) regulations.

The Contractor certifies being familiar with, and will comply with, the applicable requirements in OSHA 29 CFR 1926.62 and Minnesota Rules Chapter 5206, 7025, 7035, 7045 relating to disposal and the removal of these lead painted materials.

Provide to the Engineer a completed "Contractor Certification of Disposal" form that is included elsewhere in these Special Provisions.

SL-2.2 Materials

None

SL-2.3 Construction Requirements

A. Remove Light Foundation

1. Item 2104.509 (Remove Light Foundation) consists of removing the in-place light foundations as indicated in the Plan. Backfill all holes remaining from the removal of the light foundation in accordance with MnDOT 2545.3C

B. Remove Underground Wire

1. Item 2104.501 (Remove Underground Wire) consists of removing cables and conductors as directed by the Engineer. Removal of conduit is incidental to item 2104.501 (Remove Underground Wire). Removed cables, conductors, and conduit are the property of the Contractor.

C. Remove Equipment Pad

1. Item 2104.509 (Remove Equipment Pad) consists of removing the equipment pad as indicated in the Plan. Backfill all holes remaining from the removal of the equipment pad in accordance with MnDOT 2545.3C.

D. Remove Service Cabinet

1. Item 2104.509 (Remove Service Cabinet) consists of removing the in place service cabinet as indicated in the Plan. A removed service cabinet is the property of the Contractor.

E. Remove Lighting Unit

1. Item 2104.509 (Remove Lighting Unit) consists of removing the in place lighting units as shown in the Plan.
2. Disconnect all circuit wiring to removed lighting units from any lighting units remaining in place.
3. Disassemble removed materials as directed by the Engineer and, unless otherwise specified, deliver the removed MnDOT LED luminaires to the Department at the Electrical Services Section (ESS), 6000 Minnehaha Avenue, St. Paul, MN, 55111. Notify Mr. Mike Schroeder (651-366-5719) or Mr. Mark Harrington (Telephone 651-366-5720), of MnDOT Electrical Services Section at least three (3) normal working days in advance of the time the Contractor intends to deliver the removed materials.

Notify the Engineer in advance of contacting Mr. Schroeder or Mr. Harrington.

Obtain a removed material receipt from the MnDOT Central Electrical Inventory Center that indicates MnDOT has received the removed material. Provide the project Engineer a copy of this receipt for the permanent project records.

Removed Mounds View lighting units shall be delivered to Mounds View Public Works. Coordinate delivery schedule with Brian Erickson, Director of Public Works (763-717-4050).

Removed Metro Transit Lighting Units shall become the property of the Contractor and be disposed of in accordance with 2104.3.C.

4. Removed MnDOT light standards are the property of the Contractor. Dispose of in accordance with 2104.3.C.

SL - 3 **(2545) ELECTRICAL SYSTEM**

The provisions of MnDOT 2471, 2545, and 2565 shall apply in addition to the following:

SL-3.1 Scope of Work

A. Description:

1. The work included in the project shall include the furnishing of all required labor and materials for a complete and operable electrical system as indicated on the accompanying Plans and as required by the project manual inclusive of all appurtenances not specifically shown or covered by the specifications but required for complete operation of the electrical system as defined in the documents. The work shall also include the testing, adjustment, start-up and troubleshooting of the electrical equipment and the training of MnDOT, County, and Metro Transit operating personnel in its operation and maintenance.
2. It shall be the responsibility of the Contractor to furnish a complete and fully operating system. The Contractor shall be responsible for all details which may be necessary to properly install, adjust and place in operation the complete installation. The Contractor shall assume full responsibility for additional costs which may result from unauthorized deviations from the contract documents.
3. Light standards, luminaires and other electrical equipment is to be furnished and installed as shown in the Plans and including but not limited to the following items:
 - poles, luminaire arms, and luminaires
 - RSC and PVC conduits
 - handholes
 - bushings
 - caps
 - end bells
 - circuit wiring conductors
 - in-the-line fuse holders and fuses
 - splice blocks
 - underground cable
 - pole wiring conductors
 - service cabinets
 - foundations
 - ground rods

B. Verification of Drawings:

1. The contract drawings indicate the required size of conduit and cable for wiring. The locations of equipment shall be verified in the field by the Contractor. In the event it should become necessary to change the location of any work due to interference with other work, consult with the Engineer before making any changes. The Contractor shall determine and be responsible for the proper location and character of all anchor bolts, inserts, hangers, sleeves, etc. for the electrical equipment, unless specifically detailed otherwise. Rough-in location confirmation is required to be coordinated with equipment shop drawings prior to installation.

2. The drawings indicate the extent and general layout of the electrical systems. The drawings are drawn to the scale indicated, but the drawings shall not take precedence over field measurements. Make reasonable modifications to the layout to avoid conflict with other trades and underground utilities.

C. Quality:

1. All work shall be installed in a neat and workmanlike manner and shall be approved by the Engineer before final acceptance by MnDOT, the County, and Metro Transit.
2. If equipment is furnished having power and control requirements other than as specified, the Contractor shall make all necessary changes and furnish a complete set of drawings for installing the alternate equipment. The installation shall comply with the requirements of the 2014 edition of the National Electrical Code, local and state codes and ordinances. Where the contract documents call for workmanship or materials in excess of code requirements, the project manual shall take precedence. Electrical equipment and materials shall be Underwriter's Laboratory listed, where U.L. standards for such products exist.
3. All equipment to be installed on the project shall be new and unused except those items identified as relocated.
4. The Contractor shall keep the premises clean and orderly during installation of this work, remove rubbish periodically and as directed by the Engineer. Upon completion of this part of the project, remove all dirt, debris, tools, scaffolding, etc. used or resulting from this work.

D. Coordination:

1. Contractor shall coordinate his activities with the roadway contractor and all other parties occupying the site so as to not impede or delay construction progress. Contractor shall attend regularly scheduled construction progress meetings.
2. It shall be the sole responsibility of the Contractor to coordinate among suppliers and contractors providing equipment for the project. The coordination shall include, but not be limited to, operators, power requirements, etc.
3. Cooperate with other trades to avoid interferences in the installation of this work. Install all equipment and systems so as not to delay progress of construction, and correlate with other trades to avoid delay. Should differences of opinion develop; the Engineer's decision will be final.
4. Contract unit prices shall reflect all construction costs.

SL-3.2 Materials

MnDOT, the County, and Metro Transit reserve the right to sample, test, inspect, and accept or reject any of the materials used for the Lighting Systems based on its own tests. However, the County and Metro Transit may at their option, accept materials on the basis of listing by Underwriters Laboratories, Inc.

Fabrication and inspection of structural metals used for the Lighting Systems shall be in accordance with the applicable provisions of MnDOT 2471.

A. 3813.2E

The last paragraph is hereby deleted.

Provide R.S.C. from the Source of Power (SOP) to the lighting service cabinet.

B. Shop Drawings:

Provide shop detail drawings for all materials and electrical equipment as specified in the Contract Documents.

C. Conduit:

Provide the following types of conduits, Rigid Steel Conduit (R.S.C.), Rigid Polyvinyl Chloride Conduit (P.V.C.), or Continuous Length Conduit (HDPE) sized as indicated in the Plans. Provide conduit meeting the following requirements:

1. Rigid Steel Conduit (RSC) in accordance with 3801.
2. Rigid (PVC) and Continuous Length Conduit (HDPE) in accordance with MnDOT 3803 meeting the following requirements:
 - (2.1) Appropriate conduit fittings for use with HDPE continuous length conduit.
 - (2.2) Capable of being installed by stitching, plowing, trenching, or directional boring methods.
 - (2.3) Marked on the outside of conduit indicating the following:
 - a. Manufacturer's name
 - b. Size of conduit
 - c. Type of conduit (HDPE, etc.)
 - d. NRTL Certification Mark
 - e. Any other markings required by the N.E.C.
3. Continuous Length HDPE conduit for lighting circuits shall be red in color. PVC conduit and fittings shall be installed within concrete foundations. The Contractor shall use the appropriate conduit fittings when transitioning from HDPE to PVC or HDPE to HDPE. Glue or epoxy HDPE joints are not acceptable. End bells will be required at all conduit terminations in handholes, poles, and service cabinets.

Install non-metallic conduit end bells on HDPE or Rigid PVC conduit prior to installation of cables and conductors to prevent damage.

Install bushings with integral lugs, in accordance with 2545, on RSC conduit prior to installation of cables and conductors to prevent damage.

Provide either rigid steel conduit (R.S.C.) or rigid polyvinyl chloride conduit (P.V.C.) conduit from concrete foundations to the nearest handhole.

HDPE continuous length conduit is not allowed for use between concrete foundations and the nearest handhole.

D. Light Foundation, Design E

Provide and install a concrete Light Foundation, Design E in accordance with MnDOT 2545.3F and MnDOT Standard Plate 8127, at the locations indicated in the Plan.

E. Light Foundation, Design E Modified

Provide and install a concrete Light Foundation, Design E Modified in accordance with MnDOT 2545.3F, MnDOT Standard Plate 8127, and the details in the Plan, at the locations indicated in the Plan.

F. Light Foundation, Design H

Provide and install a concrete Light Foundation, Design H in accordance with MnDOT 2545.3F and MnDOT Standard Plate 8128, at the locations indicated in the Plan.

G. Light Foundation, Design Special

Provide and install a concrete Light Foundation, Design Special in accordance with the details in the Plan, at the locations indicated in the Plan.

H. Equipment Pad B

Provide and install a complete concrete pad in accordance with MnDOT Standard Plate No. 8106, at the locations indicated in the Plan. Construct the equipment pad in accordance with MnDOT 2545.3F, except the concrete must be Mix No. 3A32.

Use the equipment pad mentioned for mounting the MnDOT lighting service cabinet. Provide reinforcement bars that conform to the requirements of MnDOT 3301.

I. Equipment Pad B Modified

Provide and install a complete concrete pad in accordance with the details in the Plan, at the locations indicated in the Plan. Construct the equipment pad in accordance with MnDOT 2545.3F, except the concrete must be Mix No. 3A32.

Use the equipment pad mentioned for mounting the County lighting service cabinet. Provide reinforcement bars that conform to the requirements of MnDOT 3301.

J. Equipment Pad

Provide and install a complete concrete pad in accordance with the details in the Plan, at the locations indicated in the Plan. Construct the equipment pad in accordance with MnDOT 2545.3F, except the concrete must be Mix No. 3A32.

Use the equipment pad mentioned for mounting the Metro Transit lighting service cabinet. Provide reinforcement bars that conform to the requirements of MnDOT 3301.

K. Service Cabinet, Type L1 (240/480 VAC) (MnDOT Lighting System)

Provide and install a MnDOT approved Service Cabinet, Type L1 in accordance with 3850.2B which will include a Cold Sequence Disconnect before the meter socket, for supplying power to an electric lighting system, on an equipment pad concrete foundation at the location indicated in the Plans.

L. Service Cabinet, Type L1 Modified (120/240 VAC) (Ramsey County – County Road H Lighting System)

Provide and install a Service Cabinet, Type L1 Modified in accordance with the details in the Plan, on an equipment pad concrete foundation at the location indicated in the Plans.

M. Service Cabinet (120/240 VAC) (Metro Transit Lighting System)

Provide and install a Service Cabinet in accordance with the details in the Plan, on an equipment pad concrete foundation at the location indicated in the Plans.

N. Lighting Unit, Type 9-40 (Breakaway)

Provide and install Lighting Units Type 9-40.

Lighting Units Type 9-40 consists of the following:

1. Meet the applicable provisions of MnDOT 2545.2W.
2. AASHTO Breakaway Specifications.
3. Fabricated from stainless steel or aluminum.
4. Designed for one inch anchor bolts in a four bolt cluster as shown in MnDOT Standard Plate No. 8127.
5. As detailed in the Plan.
6. A 40 foot nominal luminaire mounting height.
7. A nine (9) foot davit type mast arm with 2 3/8 inch tenons.
8. High base or transformer base with access.

Additional requirements for lighting units fabricated from aluminum:

9. 8 inch diameter tapered pole shaft.
10. An aluminum wall thickness of 0.188 inches.
11. Factory installed vibration damper.

Provide a single mast arm unit base with a door at 180-degrees from the mast arm

O. Lighting Unit, Type 9-49 (Breakaway)

Provide and install Lighting Units Type 9-49.

Lighting Units Type 9-49 consists of the following:

1. Meet the applicable provisions of MnDOT 2545.2W.
2. AASHTO Breakaway Specifications.
3. Fabricated from stainless steel or aluminum.
4. Designed for one inch anchor bolts in a four bolt cluster as shown in MnDOT Standard Plate No. 8128.
5. As detailed in the Plan.
6. A 49 foot nominal luminaire mounting height.
7. A nine (9) foot davit type mast arm with 2 3/8 inch tenons.
8. High base or transformer base with access.

Additional requirements for lighting units fabricated from aluminum:

9. 10 inch diameter tapered pole shaft.
10. An aluminum wall thickness of 0.188 inches.
11. Factory installed vibration damper.

Provide a single mast arm unit base with a door at 180-degrees from the mast arm

P. Lighting Units (Ramsey County - County H Lighting System)

The Contractor shall furnish and install all lighting poles, pole collars, luminaires, mounting arms, and accessories as required by the contract documents and in accordance with the Equipment Schedule in the Plans. No substitutions allowed.

Light standard requirements:

- Pole shaft
 - Shall be constructed of seamless extruded tube of 6063 or 6061 aluminum alloy per the requirements of ASTM B221 of sufficient nominal thickness to meet the design requirements without the use of internal reinforcing sleeve.
 - No longitudinal shaft welds shall be allowed.
 - The shaft shall be full-length heat-treated after welding to produce a T6 temper. The heat-treating oven used shall be certified to meet the requirements of ASTM B597 and Mil-H-6088 specifications.
- Pole Base Flange
 - Shall be one piece cast socket of aluminum alloy 356 per ASTM B26 or B108.
 - Base flange shall be joined to the pole shaft by means of complete circumferential welds; externally at the top of flange and internally at the bottom of the shaft tube.
- Pole shall be equipped with an internal ground lug and handhole.

Lighting Units shall have a factory applied thermoset powder-coat having a minimum thickness of 2.0 mils. Powder-coat shall be electrostatically applied by a closed loop automated powder coating system.

The lighting units shall have a textured finish. The finish shall be a non-standard RAL color. Exact color will be determined during the shop drawing review process. Generally, the luminaires and arms will be silver in color, and the pole shaft will be oxide red in color.

All luminaires shall bear the U.L. label. The label shall be for the type of area the fixture is to be located in.

All luminaires shall be complete with guards, clips, retainers, etc. in accordance with the details, manufacturer's specifications governing the installation of the fixtures.

The Contractor shall follow manufacturer's instructions regarding luminaire installation.

Luminaires shall have a factory warranty that warrants the driver, LED array, housing, and finish to be free from defects for a period of five (5) years from the date of original purchase.

Light Standards shall have a factory lifetime warranty that covers the pole to be free of defects in material and workmanship, and to be free from corrosion, except those items normally consumed in service. The factory-applied powder coating shall be

covered against cracking, peeling, excessive color change, and fading due to normal climatic exposure for a period of five (5) years from the date of shipment.

The Contractor shall coat all threaded hardware with an approved zinc-based anti-seize compound prior to assembly.

The lighting units and luminaires shall be installed in a workable first class condition, and shall include all miscellaneous hardware required for a complete and operational installation.

Q. Electrical Cables and Conductors:

1. All electrical cables and conductors shall conform to the requirements of MnDOT 2545.2D except as modified within these specifications.

R. Single Conductor Wires (Ramsey County - County Road H & Metro Transit Lighting Systems):

The single conductor feeder wires, distribution wires, pole wires, ground wires, and control wires shall have Class B stranded annealed un-coated copper conductors and be listed by UL as Type XHHW-2. The insulation on each lighting distribution conductor shall be colored red, black, white or green. Single conductor pole wires connecting the luminaires to the distribution circuits shall be 1/c #12 stranded wire with XHHW-2 rated insulation.

S. Fuses:

1. Ramsey County - County Road H Lighting System

- a. Each luminaire in the 240-volt system shall be fused with two 6-amp fuses. The two-pole fuse holders for the 240-volt luminaires shall be a Bussman Catalog No. HEX-AW-DRLC-A, Littlefuse Catalog No. LEX-AA-S, or Ferraz Shawmut Catalog No. FEX-11-11-BA, or approved equal.

2. Metro Transit Lighting System

- a. Each luminaire in the 120-volt system shall be fused with one 6-amp fuse. The single-pole fuse holders for the 120-volt luminaires shall be a Bussman Catalog No. HEB-AW-RLC-A, Littlefuse Catalog No. LEB-AA-S, or Ferraz Shawmut Catalog No. FEB-11-11-BA, or approved equal.

3. MnDOT TH 35W Ramp Lighting System

- a. Each luminaire in the 240-volt system shall be fused with one 6-amp fuse. The single-pole fuse holders for the 240-volt luminaires are listed on the MnDOT Approved/Qualified Products Lists WEB site for Lighting:

<http://www.dot.state.mn.us/products/index.html>

4. The fuses shall be mounted in inline molded fuse connector/holders with the casing located at the level of the handhole or located in the junction box. Fuse holders shall be of the breakaway type, complete with watertight rubber boots. The Contractor shall provide sufficient excess conductor length to allow withdrawal of the connected fuse holder. Fuses and fuse holders shall be "UL" listed and shall be installed in such a manner that the fuse stays with the load side when holder is separated. In addition, the Contractor shall form loops in the leads on each side of the fuse holders and so position the fuse holders so that

they may be easily removed or inserted through the access hole. The grounding conductors shall not be fused.

T. Grounding:

1. The equipment grounding conductor shall be bonded to the foundation ground rod where shown on the Plans, and to the grounding lug of the light at every light standard. An insulated (green) copper conductor shall be used. The size of the ground conductor shall be as required by the National Electrical Code or No. 6 AWG, whichever is larger. The metal frame of the luminaires shall also be grounded to the pole.
2. Ground rods shall be copper plated steel.

SL-3.3 Construction Requirements

A. Sealing Open Ends of Conduit

Following installation of cables and conductors, seal the open ends of conduit entering cabinet's, handholes, and pole foundations using duct seal compound NRTL classified under general use tapes.

B. Light Foundations (Ramsey County – County Road H and Metro Transit Lighting Systems)

Install light foundations in accordance with MnDOT 2545 and as follows:

1. The Contractor shall furnish and install light foundations at the locations indicated in the Plan and in accordance with details in the Plan. The foundations shall accommodate the bolt circle specific to the light pole manufacturer as detailed in the shop drawings.
2. Maintain 2 inches of clearance from finished boulevard or sidewalk grade to top of concrete light foundations in accordance with the details in the Plan. The Contractor shall coordinate foundation installation with the Engineer, County and General Contractor to ensure proper foundation elevations are maintained. Maintain a minimum of 3-foot clearance from the back of the curb to the middle of the light foundations unless directed otherwise by the Engineer.
3. All light foundations shall be located in the field following the Plan. The Contractor is responsible for obtaining location of existing utilities and identifying any possible conflicts. Any such conflicts shall be reported immediately to the Engineer, County, and Metro Transit.
4. Rust Inhibitor: Threaded portions of all anchor rods above the concrete foundations shall be coated with an approved rust inhibitor before installation of the light standards.
5. The concrete for all foundations shall be mix number 3Y43 free of chloride additives conforming to MnDOT Specification 2461. Concrete shall be placed and consolidated using vibratory equipment and be finished smooth, flat and level in accordance with MnDOT 2565.F. Concrete shall be allowed to cure for a minimum of seven (7) days before being placed into use unless otherwise permitted by the Engineer.
6. An approved form shall be provided and placed for the foundation to ensure a good symmetrical top. Excavations for the concrete foundations shall be made to

the exact dimensions of the foundation so that no backfilling will be required. If the soil conditions are such that the above provisions cannot be met, the Engineer shall be contacted.

7. Where concrete for sidewalks is to be placed adjacent to new foundation, the foundation shall be wrapped with tar felt to prevent bonding of the sidewalk to the new foundation.
8. Factory bent PVC conduit shall be required to bring the wireways in the foundation down to the depth as shown in the details in the Plan. Conduits shall extend a minimum of 2 inches above the foundation. Care shall be taken to ensure that all extended conduits will fit into the opening in the base of the lighting unit.
9. Appropriate couplings shall be used to connect HDPE conduit to PVC conduit at the light foundations and underground runs. PVC cement or epoxy shall not be used to bond HDPE conduit to PVC conduit.

C. Equipment Pad

Install equipment pads in accordance with the details in the Plan, 2545.3 F.3, and as follows.

Install end bell bushings on all rigid PVC conduit ends.

D. Maintain Roadway Lighting

Maintain and keep in operation lighting systems in accordance with 2545.3 B and as follows:

The responsibility for locating all underground lighting facilities shall be transferred to the Contractor on the project start date as shown on the proposal. Locating of underground lighting facilities shall be in accordance with Minnesota State Statute 216D.

The MnDOT locating group will provide an initial locate of the underground lighting facilities within the project limits at the request of the Contractor at the start of the project. The request for the initial locate must be submitted to the MnDOT Locating Office a minimum of four (4) working days prior to the project start date.

Locate requests for MnDOT lighting systems that are within the construction project limits will continue to be received by the MnDOT locating office. These locate tickets will be forwarded to the Contractor's representative responsible for coordinating locate requests within the projects limits. The locate tickets will be forwarded via e mail or fax. Confirmation of receipt of the locate ticket must be sent by the Contractors representative back to the MnDOT Locating Office within two (2) hours of MnDOT's sending the Contractor's representative the locate request.

The Contractor responsible for locating all underground lighting facilities will repair any damage as the result of improperly located or unmarked underground lighting facilities within the project limits.

The repair of the damaged underground lighting facilities must be in accordance with 2545.3A, 2565.3B and in accordance with RTMC design and construction requirements all to the satisfaction of the Engineer. This work is considered incidental.

It is the Contractor's responsibility to notify the MnDOT Locating Office and the County to provide contact information and establish the contractor has assumed responsibility for locating underground lighting facilities within the project limits. The form below shall be filled out by the Contractor's representative at the pre-construction meeting and the completed form should be sent to the following:

Electrical Services Dispatch
Phone: (651)366-5750
Fax: (651)366-5742
E mail: ElectricalServicesDispatch@state.mn.us
6000 Minnehaha Ave. St. Paul, MN 55111-4014

And

Jesse Knox (Supervisor)
Phone: (651)755-9061
Fax: (651)366-5742
E mail: jesse.knox@state.mn.us
6000 Minnehaha Ave. St. Paul, MN 55111-4014

And

MnDOT District Lighting Operations
Name: Bruce Camitsch
Phone: 651-775-9495
Fax: 651-234-7850
E mail: bruce.camitsch@state.mn.us
Address:1500 West County Road B-2, Roseville, MN 55113

And

Ramsey County Public Works
Name:
Phone: 651-266-7100
Fax: 651-266-7110
E mail:
Address:1425 Paul Kirkwold Drive, Arden Hills, MN 55112

Locating Responsibility Form

Job S.P. Number _____

Job Type _____

Start Date _____

End Date _____

T.H. _____

Location _____

Lighting/ Signal Inspector _____

Contractor _____

Contractor (24 Hour Contact) _____

Project Manager _____

Phone Number _____

Fax Number _____

Email _____

Electrician _____

Phone Number _____

Locator Area _____

Project Engineer _____

Phone Number _____

Chief Inspector _____

Phone Number _____

Weekly Meeting _____

Until final written acceptance of the project by the Engineer (MnDOT 1716) this work is considered incidental.

Maintain and repair any damage that in the opinion of the Engineer has occurred by someone other than the Contractors operation. The Department will pay for this work in accordance with MnDOT 1403 (EXTRA WORK).

During any periods of authorized work suspension, the Department will provide and maintain all items of the existing, temporary, and newly constructed lighting systems.

In the event of an authorized work suspension the Contractor must Supply 3 copies of an up to date accurate As Built drawing of the existing, temporary and newly constructed lighting systems to the Engineer prior to the work suspension. The as built drawings shall be sent by the Engineer to the District Operations group, CESU/MESU and the MnDOT Locating Office.

PROVIDE TO THE DEPARTMENT, CONTACT INFORMATION WITH NAMES AND TELEPHONE NUMBERS FOR 24 HOURS A DAY, 7 DAYS A WEEK MAINTENANCE AS DEFINED ABOVE.

E. Conduit Installation (Ramsey County - County Road H Lighting System):

Conduit shall be installed in accordance with MnDOT 2565.3D, except as follows:

1. Conduit size shall be as specified in the Plans.
2. Contractor shall visit the site and make his own determination of the linear footage of conduit requiring boring in determining his bid on the project.
3. Conduits shall be installed underground in a direct line between light standards (unless trees or other obstructions require an alternate location) within the roadway right-of-way to a depth of 24 inches, as shown in the Plans or as directed by the Engineer or County. All conduits installed across surfaced streets shall be installed with a minimum cover of 24 inches. Cover material shall not contain rock or other debris that could damage the conduit. The cover material shall be firmly tamped into place to minimize uneven settlement above or below the conduit.
4. All conduits that are to be placed under driveways, streets, medians and sidewalks that are not scheduled for removal shall be pneuma-gophered, directional bored, or another method approved by Engineer or County, which will not damage or disturb the integrity of the driveway, street, or sidewalk.
5. Permanent surfaces such as sidewalks, medians, driveways and streets generally shall not be removed to install underground conduit. Contractor can remove these surfaces where it is necessary for boring on permission of the County. The Contractor is responsible to replace and compact the subgrade material and replace the permanent surface material in kind (exactly as the existing).
6. In general, all conduit runs shall be straight and true, and all offset and bends shall be uniform and symmetrical. Field bends of conduit shall only be accomplished through the use of approved conduit fittings. The Contractor shall adjust the elevations of the conduit assembly for its full length to approximately the same gradient as the finished roadway, and shall furnish and install in the trench, such suitable spacers and framing as may be necessary to maintain the correct grade and alignment.

7. Appropriate couplings shall be used to connect HDPE conduit to PVC conduit at the light bases and underground runs. PVC.
8. Each expansion fitting shall be in accordance with MnDOT 3839, except that the fitting shall provide for greater than 100 mm (4 inch) linear movement when required by the Plans.
9. Contractor shall avoid disturbing tree roots when installing conduit for the underground electric distribution conductors. Where underground conductors must cross tree roots Contractor shall follow the procedure listed below.
10. Trees less than 12 inches in diameter bore at a minimum of 24 inches below grade. For trees over 12 inches in diameter bore at a minimum of 36 inches below grade.
11. Trenching for boring shall stay out of drip line of trees. The following distances from the tree shall be considered a minimum.

Tree Diameter	Distance
6 to 9 inches	5 feet
10 to 14 inches	10 feet
15 to 19 inches	12 feet
Over 19 inches	15 feet

12. Contractor boring tunnel shall be 1 to 2 feet either side of tree center to avoid damage to tap root.

F. Concrete Light Foundation Rigid Template

Provide a rigid template of the pole base including anchor bolt holes and a slot to hold in proper position and height the anchor bolts, ground rod and conduits during the concrete pouring. The template shall not be removed until the concrete has cured.

G. LED Roadway Luminaires 40 Foot Mounting Height

1. Install the luminaire in accordance with the manufacturer's installation instructions. Tighten fitter bolts according to manufacturer's specification.
2. Label the luminaire with the installation date in accordance with 3810.2A. and as follows:
 - (2.1) Place an additional date of installation on the bottom of the luminaire so it can be read from the ground underneath the luminaire.
 - (2.2) Provide labels for the date of installation both inside and outside of the luminaire meeting the following requirements:
 - a. Record the installation date on self-adhering label.
 - b. Use machine printed numbers.
 - c. Text which is ½ inch tall.
 - d. Month/Year numeric format.
 - e. Suitable for placement in wet locations.
 - f. Paper based labels are not acceptable.
 - g. Place inside of the luminaire and on the bottom outside of the luminaire so the label showing the date can be viewed from the ground below.

3. Label the bottom outside of the luminaire with the number 40. Position this label so it is easily viewed from the ground directly underneath the luminaire.

MnDOT approved Labels are listed on the MnDOT Approved/Qualified Products Lists WEB site for Lighting:

<http://www.dot.state.mn.us/products/index.html>

Letters and numbers shall have a minimum stroke width of 0.35 inches.

H. LED Roadway Luminaires 49 Foot Mounting Height

1. Install the luminaire in accordance with the manufacturer's installation instructions. Tighten fitter bolts according to manufacturer's specification.
2. Label the luminaire with the installation date in accordance with 3810.2A. and as follows:
 - (2.1) Place an additional date of installation on the bottom of the luminaire so it can be read from the ground underneath the luminaire.
 - (2.2) Provide labels for the date of installation both inside and outside of the luminaire meeting the following requirements:
 - a. Record the installation date on self-adhering label.
 - b. Use machine printed numbers.
 - c. Text which is ½ inch tall.
 - d. Month/Year numeric format.
 - e. Suitable for placement in wet locations.
 - f. Paper based labels are not acceptable.
 - g. Place inside of the luminaire and on the bottom outside of the luminaire so the label showing the date can be viewed from the ground below.
3. Label the bottom outside of the luminaire with the number 49. Position this label so it is easily viewed from the ground directly underneath the luminaire.

MnDOT approved Labels are listed on the MnDOT Approved/Qualified Products Lists WEB site for Lighting:

<http://www.dot.state.mn.us/products/index.html>

Letters and numbers shall have a minimum stroke width of 0.35 inches.

I. Lighting Standard Installation

Light Standards shall be installed in accordance with 2545.3H, the details in the Plan, and manufacturer's recommendations.

J. Luminaire Installation

Luminaires shall be installed in accordance with 2545.3Q, the details in the Plan, and manufacturer's recommendations.

K. Electrical Service

Coordinate the installation of Electrical Service, provide power to the service cabinets, and verify the actual work to be done and all associated costs.

Proposed source of power addresses are identified in the Plan.

Fees for the "Application for Electrical Service" and payment to the Electric Utility for providing the electrical service connections is the responsibility of the Contractor.

Secure approval from the Engineer for any changes to the Electrical Service as reflected in the Plan.

No measurement is made of the various items that constitute Electrical Service, however this work is included as part of the project (the electrical service costs will not be paid for as part of the pay item). Provide the Engineer a copy of the invoice from the electric utility. Payment is the power company invoice cost plus 10%. The payment is compensation in full for all costs incidental thereto, including, but not limited to, providing power to service cabinets, electric utility fees, Electric Utility Coordination, notifying MnDOT of ownership details, and all materials and labor necessary to construct the Electrical Service.

L. Compliance with NEC Article 110. 24

1. Provide fault current calculations in accordance with 2565.3 CC.
2. Electric Service Information Form

Fill out the following electric service information form for lighting systems.

Provide to the Engineer, prior to final acceptance of the project, four (4) copies of the electric service information form for lighting systems. The Engineer will distribute copies as follows:

1. MnDOT Metro Electrical Services Unit.
2. MnDOT Traffic Electrical Systems Engineer.
3. MnDOT District Traffic Lighting Engineer.
4. Ramsey County

Provide an "electrical service information form for lighting systems". This form is considered incidental work.

Electric Service Information Form For Lighting Systems

Project Number: _____

Contractor: _____

Date: _____

System	MN/DOT Feed Point Number	Meter Address	Electric Utility Transformer Size In KVA	Transformer Primary Fuse Size and Type	Calculated Available Fault Current at the line Side of the Meter Socket	Length of conductors in feet from transformer connection to meter socket connection.		
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral
						L1 =	L2 =	Neutral

NEC Article 110.24

M. Anti-Seize Lubricant

Coat threaded portions of all anchor rods above concrete foundations with a brush-on anti-seize lubricant before installation of lighting units, lighting service cabinets, or other type cabinets on anchor rods.

All threaded handhole door and luminaire mounting hardware shall be coated with an approved zinc-based anti-seize lubricant by the Contractor prior to assembly.

N. Bonding and Grounding

Provide bonding and grounding that meets the provisions of MnDOT 2545.3R and as follows:

1. Use 5/8th inch by 15 foot NRTL listed ground rod electrodes.
2. Drill the shield for each cable assembly, in each pole base, with a 5/16 drill for stainless steel poles or 1/2 hole for aluminum poles for placement under the active clamping grounding lug.
3. Place a re-usable screw type active clamping ground lug with a tang on top of the shield.
4. A 5/16 inch or 1/2 inch stainless steel bolt shall be inserted thru the grounding lug and then thru the copper shielding. Non breakaway pole bases will have a 5/16" stud welded in place for terminating the ground lug.

(4.1) Securely fasten to the pole base.

5. Provide bonding of the #6 AWG solid bare grounding conductor to the pole base 5/16" grounding stud by using a UL listed Re-usable screw type active clamping ground lug with a tang that connects to the 5/16" or 1/2 " pole base grounding bolt.
6. Tighten the entire assembly (shield and the grounding lug) to form an electrically bonded and grounded connection.
7. Apply an oxide inhibiting agent to the connection after both final connection and assembly.

O. Conductor Installation:

1. No splices shall be made in underground distribution wiring except in pole bases. Conductors shall be continuous from pole to pole. Wiring shall be terminated as required in the contract documents.
2. All wire and cable shall be tested for grounds and continuity before the circuit is energized. The Contractor shall assume full responsibility for damage done to the equipment due to circuit grounds or open circuits.

P. Splicing:

1. Splices shall be made only in the service panel and light standard bases. Splices in light bases and service cabinets shall only be made using MnDOT approved insulated wire splice connector blocks.
2. Apply two layers of protective vinyl electrical tape over the insulated wire splice connector blocks in the area where the conductors enter the block including the

set screw access covers, and extend the wrap at least one (1) inch over the incoming conductor insulation.

3. No splicing shall be performed within handholes, except where noted.
4. Wire-nuts are not an acceptable method of splicing.

Q. Restoration:

1. Trenches shall be restored to grade as directed by the Engineer or County.
2. All sections of sidewalk damaged or removed by the Contractor shall be replaced in full panel increments. Where sections of sidewalk intersections are removed, the Contractor shall remove and replace the entire sidewalk intersection to a point where it connects to the curb radius.
3. The Contractor shall restore any damages resulting from construction activities to acceptable condition as directed by the Engineer or County. This includes but is not limited to restoration of sod, settling/heaving/cracking of pavement due to construction activities and any other damage associated with the installation of the electrical lighting system.
4. Where sidewalks, pavement, or streets are opened, the opening shall be restored to the original thickness using a material type equal to that removed.
5. Where areas of turf or planting beds are disturbed by construction, they shall be restored to the original condition using a material type equal to that removed.

R. Distribution Circuits:

1. The complete underground distribution circuits shall extend from the service cabinets in conduit to the lighting units and pass through the base of each lighting unit.

S. Wiring of Luminaires (Ramsey County - County H & Metro Transit Lighting Systems):

1. All conductors of the lighting distribution circuits shall pass through the base of each light standard. The conductors shall be fused as previously noted. All splices must take place in the base of the light standard.
2. The conductors to the pole mounted luminaires shall be stranded, No. 12 AWG Type XHHW-2 and be connected to the load and ground conductors of the distribution circuit.

SL-3.4 MEASUREMENTS AND PAYMENTS

A. Service Equipment

Providing, installing, and making operational service equipment as specified herein at the location indicated in the Plans is measured as an integral unit complete in place and operating and is paid for under pay Item No. 2545.544 (SERVICE EQUIPMENT) at the Contract price per EACH, which price is to be compensation in full.

THIS ITEM INCLUDES THE FOLLOWING:

1. Meter socket and mounting brackets.
2. All conduit and power conductors on wood pole.

3. Wiring connections.
4. Ground rod electrode.
5. Bonding and grounding materials and connections.
6. Other items incidental to a complete meter socket installation.

B. 2545.5 The itemized pay item list is hereby deleted and the following substituted therefore:

The Department will pay each pay item at the contract unit price per the specified pay unit as follows:

Item No:	Item:	Unit:
2104.501	Remove Underground Wire	linear foot
2104.509	Remove Lighting Unit	each
2104.509	Remove Light Foundation	each
2104.509	Remove Service Cabinet	each
2104.509	Remove Equipment Pad	each
2545.511	Lighting Unit, Type 9-40	each
2545.511	Lighting Unit, Type 9-49	each
2545.511	Lighting Unit, Type Special	each
2545.511	Lighting Unit, Type Special 1	each
2545.511	Lighting Unit, Type Special 2	each
2545.514	Underpass Luminaires Type LED	each
2545.515	Light Foundation, Design E	each
2545.515	Light Foundation, Design E Modified	each
2545.515	Light Foundation, Design H	each
2545.515	Light Foundation, Design Special	each
2545.523	2" Non-metallic Conduit	linear foot
2545.523	3" Non-metallic Conduit	linear foot
2545.523	3" Non-metallic Conduit (Directional Bore)	linear foot
2545.531	Underground Wire 1 Cond No 4	linear foot
2545.531	Underground Wire 1 Cond No 6	linear foot
2545.531	Underground Wire 1 Cond No 8	linear foot
2545.531	Underground Wire 1 Cond No 10	linear foot
2545.531	Underground Wire 1 Cond No 12	linear foot
2545.533	Direct Buried Lighting Cable, 4 Conductor No. 4	linear foot
2545.541	Service Cabinet, Type L1	each
2545.541	Service Cabinet, Type L1 (mod)	each
2545.541	Service Cabinet	each
2545.543	Underground Cable Splice	each
2545.544	Service Equipment	each
2545.545	Equipment Pad B	each
2545.545	Equipment Pad B (mod)	each
2545.545	Equipment Pad	each
2545.553	Handhole	each

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WARRANTY

The Contractor shall guarantee the operation of the installation and that the materials and workmanship of the equipment be free from defects for a period of one (1) year from the date of acceptance, providing the equipment has been operated and maintained in accordance with the manufacturer's recommendations. If a dispute exists regarding whether the equipment has been maintained according to the manufacturer's recommendations, the Engineer's decision will be final. The guarantee shall include all parts and labor necessary to return the system to normal operation. The guarantee on all equipment shall start after formal acceptance of equipment as defined by the General Conditions and after successful completion of start-up procedures.

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SYSTEM TESTING

The Contractor shall test the equipment installed under these specifications and shall demonstrate its proper operation to County staff.

No equipment shall be tested, or operated for any purpose until it has been fully prepared, connected and made ready for normal operation. Any damage to equipment occasioned by improper or ill-timed operation or testing shall be made good, at the Contractor's own expense, before final inspection and acceptance.

END OF SPECIAL PROVISIONS

Contractor Certification of Disposal

Project No.: _____ Location: _____

We, _____,
(Contractor Name)

hereby certify that the lighting service cabinets and other painted materials removed were removed, transported, and disposed of in accordance with all requirements of the Minnesota Pollution Control Agency (MPCA) and the Occupational Safety & Health Administration (OSHA) for the removal, transporting, and disposal of hazardous waste.

SIGNATURE

DATE

After signed and dated, the Contractor shall submit this form to the MnDOT project Engineer. The Contractor shall also submit to the Engineer a copy of the "Tipping Receipt" that the Contractor receives from the scrap yard or recycler.

DIVISION SS

DIVISION SS-SIGNALS SPECIAL PROVISIONS TABLE OF CONTENTS

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I hereby certify that this specification was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



BRANDON J. BOURDON, PE

Date: 12/08/2015 Lic. No.: 43709

DIVISION SS-Signals

SS-1 (2565) TRAFFIC CONTROL SIGNALS

This work shall consist of removing, salvaging, and hauling of materials of the existing signal system; furnishing and installing signs, materials, and electrical equipment as specified herein; all to provide a complete operating new hardwire interconnected coordinated full-traffic actuated Traffic Control Signal System at the intersection of

- County Road H and CSAH 10

in Mounds View; Ramsey County, in accordance with the Minnesota Department of Transportation “Standard Specifications for Construction: 2016 Edition;” with the applicable provisions of Mn/DOT 2545 and 2565; with the Plans; and as follows.

SS-1.1 GENERAL

- A. Location of poles, handholes, loop detectors, and other signal components are shown in the Plans in their approximate location and will be determined in the field by the Engineer prior to installation.
- B. All applicable provisions of the current edition of the National Electrical Code shall apply in constructing each traffic control signal system.
- C. Construction operations in the proximity of utility properties shall be performed in accordance with the provisions of Mn/DOT 1507, except the first paragraph is hereby deleted and the following substituted therefore:

The locations of any existing underground utilities shown on the Plans are approximate only. It shall be the Contractor’s own responsibility, prior to commencing work, to secure information and determine the exact location of any buried utility facilities as may exist, and to conduct operations in the vicinity of any such facilities in a manner that precludes damage thereto. The Contractor agrees to be fully responsible for any and all damages that might be occasioned by failure to exactly locate and preserve any and all underground utilities.

- D. Construction of all traffic signal related work shall be coordinated with the construction of all roadways. The Contractor shall schedule placement of conduit, handholes, loop detectors, bases, wood poles, etc., to be coordinated with operations involving the construction of the area roadways.
- E. Excavations, backfilling, removals and disposition thereof, and surface restoration shall be considered incidental work to each signal system, and no direct compensation will be made therefore.

- F. The Contractor shall ensure that each existing traffic control signal system is kept in operation at all times, until otherwise approved by the Engineer to be turned off. The Contractor shall not turn-off an existing traffic control signal system without the specific approval of, and only in the presence of, the Engineer. The Contractor shall notify the Engineer at least 48 hours in advance of scheduled turn-offs and before performing work on an existing traffic control signal system.

During any periods of authorized work suspension, County or State personnel will provide and maintain the existing traffic signal cabinets and control equipment and will maintain the existing traffic control signal systems.

- G. From start of construction and until time of turn over to the County, the Contractor shall be responsible for locating each in-place, temporary and new traffic signal system in accordance with the Minnesota State Statute 216D “Gopher State One Call”. All locating shall be incidental work and no direct compensation will be made therefore.
- H. The Contractor shall provide to the Engineer two (2) sets of manufacturer’s drawings for all items to be used from the Approved/Qualified Products List and as contained in these Special Provisions and in the Plans. The manufacturer’s drawings and any required warranty information shall be submitted at the project’s Preconstruction meeting or as requested by the Engineer. All manufacturers’ drawings shall be approved by the Engineer prior to procurement by the Contractor.
- I. Within fifteen (15) days of the awarding of the Contract, the Electrical Contractor shall provide evidence to the Engineer’s satisfaction that all arrangements have been made with the Power Utility (Xcel Energy) to secure power to the new signal service cabinet. In this regard, it shall be the Contractor’s responsibility to ensure that no delays occur to the signal construction or to the desired signal “turn-on” dates, as determined by the Engineer.
- J. PROVIDE SHOP DETAIL DRAWINGS FOR MATERIALS AND ELECTRICAL EQUIPMENT AS SPECIFIED IN THE CONTRACT DOCUMENTS.
- K. **The Contractor must adhere to all requirements of Gopher State One Call including the following:**

The Contractor is responsible for marking the proposed excavation area by utilizing white markings. The white markings must delineate the actual excavation area where the locating of underground facilities is required.

SS-1.2 MATERIALS

A. Material Ordering

Within 15 days after the Contract approval notice mailing date, the Contractor shall furnish evidence to the Engineer, in writing, that orders have been placed for all signal system components required on the project.

B. Pole Base Wiring

Terminal blocks in pole bases shall not be used. Each mast arm pole base shall have all conductors field connected in each base wire nut connectors or Engineer approved equal.

C. Electrical Cables and Conductors for Traffic Signal Systems

All electrical cables and conductors for traffic signal systems shall be in accordance with the applicable provisions of Mn/DOT 3815, and as specified herein.

1. Cable Markings:

All electrical cables, except Loop Detector Lead-in Cable - IMSA 50-2 and the 3/C #20 Emergency Vehicle Preemption (EVP) Detector Cable used in signal system construction shall have the jacket surface ink printed with the following information:

- a. Manufacturer Name
- b. Year of Manufacture (Date Code)
- c. Type of Wire or Cable (i.e. TC, XHHW-2, THWN)
- a. Size and Number of Conductors
- b. Voltage Rating
- c. Conductor Insulation Rating
- d. Nationally Recognized Testing Laboratory (NRTL) Certification Mark indicating the cable is listed. [i.e. UL, ITSNA (ETL), CSA]
- e. Labeled as sunlight resistant (Sun Res), direct burial (Dir Bur), Oil Resistant 1 (Oil Res 1)

Signal Control Cable shall have additional markings as follows.

- a. Traffic Signal Cable
- b. Foot Markers
- c. -35° C Cold Bend

Loop Detector Lead-in Cable - IMSA 50-2 shall meet the marking requirements set forth in the International Municipal Signal Association (IMSA) specification.

Emergency Vehicle Preemption (EVP) Detector Cable (3/C # 20) shall be surface marked in accordance with the National Electrical Code (NEC) and shall have additional markings as follows:

- a. Labeled as sunlight resistant, direct burial
- b. Year of Manufacture (Date Code)
- c. Conductor Insulation Rating
- d. Foot Markers

All cable markings shall be repeated at intervals not exceeding 24 inches on the jacket surface.

2. Signal Control Cable:

- a. All signal control cable shall be listed by a National Recognized Testing Laboratory (NRTL) as defined by the U.S. Department of Labor. The testing laboratory must be listed by OSHA in its scope of recognition for the applicable tests being conducted as required by this specification. A list of recognized testing labs for products sold in the United States may be found on the U.S. Department of Labor's web site:

<http://www.osha.gov/>

- b. The cables shall be tested by an NRTL and shall meet all of the following listed specifications and general requirements:

UL 44
UL 1277
UL 1685

- c. All signal control cable shall conform to the following :

ICEA T-29-520
ICEA T-30-520
ICEA S-73-532 (NEMA WC 57)

- d. Shall be suitable for use at 90°C in wet or dry locations
Note: This cable will be submersed in water for long periods of time
- e. Shall be suitable for direct burial
- f. Shall be sunlight resistant
- g. Shall be rated for 600 Volts
- h. Shall be rated as a Tray Cable
- i. Shall have a cable designation of XHHW-2
- j. Shall be #14 AWG

- k. Each conductor shall be a Class B (7 strand) soft drawn, bare or tinned copper per ASTM B3, ASTM B8 and ASTM B33
- l. Shall be constructed with circuit identification in accordance with method 1 of ICEA S-73-532 (NEMA WC-57) Table E-1 except as modified below.

3 Conductor:

- 1. Black
- 2. White
- 3. Green

4 Conductor:

- 1. Black
- 2. White
- 3. Red
- 4. Black/Red stripe

6 Conductor:

- 1. Black
- 2. White
- 3. Red
- 4. Black/Red stripe
- 5. Orange
- 6. Blue

12 Conductor:

- 1. Black
- 2. White
- 3. Red
- 4. Black/Red stripe
- 5. Orange
- 6. Blue
- 7. White/Black Stripe
- 8. Red/Black Stripe
- 9. White/Red Stripe
- 10. Orange/Black Stripe
- 11. Blue/Black Stripe
- 12. Black/White Stripe

- m. Shall have a minimum average insulation thickness of 30mils
- n. Shall be constructed using a tape binder

- o. Shall have a cable jacket that has a substantially circular cross-section. The outer cable jacket shall not be convoluted and shall not have a ropy appearance.
- p. Shall have non-hygroscopic fillers used in the interstices of the cables where necessary to give the completed cable assembly a circular cross-section.
- q. Fillers made of Jute or Paper are not acceptable.
- r. Shall have a rip cord between the outer jacket and the tape binder
- s. Bare copper or tinned wires are acceptable
- t. Outer jacket of the 4 conductor cable shall have **maximum** diameter of 0.480 inches.
- u. Outer jacket of the 6 conductor cable shall have **maximum** diameter of 0.560 inches.
- v. Shall carry an oil resistance level 1
- w. Shall meet a -35° C (-31° F) cold bend test
- x. For cables employing a PVC jacket a low migration grade of PVC is required
- y. The cable jacket shall pass the 7 day (168 hr) oven age test @ 121° C (249.8° F) per UL 1581
- z. This cable carries multiple ratings. Where requirements of different ratings are in conflict the more stringent specification shall be the parameter the cable is required to meet.
- aa. The manufacturer shall provide to Minnesota Department of Transportation (Mn/DOT) the test qualification report from the NRTL stating that the submitted cable meets all the requirements of this specification.
- bb. Once a cable has been accepted by MN/DOT as meeting the requirements of this specification no substitution of materials will be allowed unless the manufacturer has received written permission from Mn/DOT allowing the substitution.

All field wiring terminations shall be as indicated on the field wiring diagrams included in the Plans.

- 3. The following cables are not required to be listed by a Nationally Recognized Testing Laboratory (NRTL):

- 2/C #14 (Loop Detector Lead-in Cable)
 - 3/C #20 (EVP cable)

- 4. Loop Detector Lead In Cable shall be in accordance with Mn/DOT 3815.2C4(b).

D. Vehicle Signal Faces (Poly-Carbonate)

All new vehicle signal faces shall be in accordance with the applicable provisions of Mn/DOT 3834, except as follows:

All vehicle signal faces, visors, and background shields shall be fabricated with ultraviolet and heat stabilized black poly-carbonate materials, conforming to I.T.E. requirements.

Mn/DOT approved Poly-Carbonate Signal Heads are listed on the Mn/DOT Approved/Qualified

Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

The Contractor shall furnish and install a metal support plate (supplied by the signal head manufacturer) on the inside of the signal indication at the attachment point of the straight or angle mount plumbizer (one plate each for inside the upper and lower signal housing at the attachment point).

Vehicle signal faces shall utilize either straight or angled mounts. The mounts shall be in accordance with these special provisions and as detailed in the Plans.

The Contractor shall furnish and install signal head mounting spacers when mounting a four or five section signal face. See attached diagram located elsewhere in these Special Provisions.

Mn/DOT approved mounting spacers are listed on the Mn/DOT Approved/Qualified Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

The Contractor shall also furnish and install the required through-bolts for connecting the individual sections. See attached diagram located elsewhere in these Special Provisions.

In all cases, two sections of the vehicle signal head shall be mounted below the straight or angled mount with the remaining sections mounted above the straight or angled mount. The indications above or below the straight or angled mount shall be fastened together by means of a noncorrosive 3-bolt mounting assembly. The 3-bolt mounting assembly shall utilize locknuts to prevent the assembly from loosening.

The installation of the vehicle signal faces shall be to the satisfaction of the Engineer.

All "Red", "Yellow", and "Green" signal indications shall utilize light-emitting diode (LED) units. Mn/DOT approved LED Signal Indications are listed on the Mn/DOT Approved/Qualified Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

For each LED signal indication, the Contractor shall submit to the Engineer, for approval, four (4) copies of all warranty information indicating the required 5-year warranty period (**from date of installation**), product invoice, and documentation indicating name of manufacturer, model number, and serial number . The two (2) copies shall be distributed by the Engineer as follows:

1. Ramsey County Public Works Department.

The Contractor shall, to the satisfaction of the Engineer, affix to the back of each "LED" signal
8-SS

indication a permanent label, or permanently marked (utilizing a “oil based paint marker”) with the actual date of installation. The oil based paint marker shall be a contrasting color to ensure that the date can be easily read.

E. Pedestrian Signal Faces with Countdown Timers

The Contractor shall furnish and install poly-carbonate pedestrian signal faces with countdown timers. Mn/DOT approved Pedestrian Signal Faces with countdown timers are listed on the Mn/DOT Approved/Qualified Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

The pedestrian indications with countdown timer shall utilize Light-emitting Diode (LED) Units as listed on the Mn/DOT Approved/Qualified Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

The Contractor shall provide, to the Engineer, two (2) copies of product documentation as required by Mn/DOT 3835 and the copies shall be distributed, by the Engineer, as follows:

1. Ramsey County Public Works Department.

F. Modem

Communications between local controllers and the system master controller shall be facilitated by the use of fiber optic modems (multimode). The modems shall be capable of communications with NEMA traffic signal controllers in a coordinated closed loop system.

G. Accessible Pedestrian Signals (APS) Pushbutton Bases and Shafts

1. Provide APS pushbutton bases and shafts at locations indicated in the Plans and in accordance with the plans.

Use MnDOT approved APS Pushbutton Bases listed on the MnDOT Approved/Qualified Products List WEB site under Signals:

<http://www.dot.state.mn.us/products/index.html>

2. Provide a quantity of four (4) 5/8 inch (UNC) stainless steel threaded rods, nuts and washers in accordance with MnDOT 3385.2D for the anchors.

(2.1) Rod length = $7 \frac{1}{2} \pm \frac{1}{4}$ inches.

- a. The top and bottom of the rod must have chamfered (rounded) edges to allow easy installation of the required nut.

(2.2) Provide 1 nut and washer for each rod.

3. Provide APS pushbutton base adhesive anchoring systems to secure the stainless steel threaded rods into the concrete.

Use MnDOT approved APS Pushbutton Base Adhesive Anchoring Systems listed on the MnDOT Approved/Qualified Products List WEB site under Signals:

<http://www.dot.state.mn.us/products/index.html>

Installation of the pedestrian pushbutton bases are specified in the Plan and elsewhere in these Special Provisions.

H. Blank

I. Accessible Pedestrian Signal (APS) Pushbutton Mounting Spacer

Provide and install MnDOT approved Accessible Pedestrian Signal (APS) Pushbutton Mounting Spacers as specified herein and in the Plan.

MnDOT approved Accessible Pedestrian Signal (APS) Pushbutton Mounting Spacers are listed on the MnDOT Approved/Qualified Products Lists WEB site for Signals:

<http://www.dot.state.mn.us/products/index.html>

J. Traffic Signal Pedestals

Provide **aluminum** traffic signal pedestal shafts and pedestal bases at the locations indicated in the Plans in accordance with the applicable provisions of MnDOT Standard Plate No. 8112, 8122, 8129, MnDOT 3832, and the following requirements:

1. Pedestal Reinforcing Collar (Wind Collars):

Provide and install a pedestal reinforcing collar on each existing pedestal shaft without an extended collar.

Use MnDOT approved Pedestal Reinforcing Collars listed on the MnDOT Approved/Qualified Products List WEB site under Signals:

<http://www.dot.state.mn.us/products/index.html>

Installation requirements for the pedestal reinforcing collar are specified elsewhere in these Special Provisions.

2. Pedestal Cap:

Provide aluminum pedestal caps with an anodic coating as per MIL-A-8625C for Type II, Class I Coating atop each pedestal shaft when straight mount plumbizers are used for signal and pedestrian head mounting.

The pedestal caps must be MnDOT approved pedestal caps as listed on the MnDOT Approved/Qualified Products List WEB site for Signals:

<http://www.dot.state.mn.us/products/index.html>

K. Accessible Pedestrian Signals (APS) – (Audible Pedestrian Push Button Units and Associated Traffic Control Signal Cabinet Equipment)

The Contractor shall furnish and install “Accessible Pedestrian Signals (APS)”. Mn/DOT approved “Accessible Pedestrian Signals (APS)” are listed on the Mn/DOT Approved/Qualified Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

All Accessible Pedestrian Signals (APS) components, including controller cabinet components, shall be furnished, installed, and made operational by the Contractor.

The Contractor shall submit a completed Advanced Accessible Pedestrian System: Intersection Planning Sheet from the Accessible Pedestrian Signal (APS) manufacturer with the shop drawings.

In addition to the APS components listed below, the Contractor shall also furnish to the County (for future installation by the County at no expense to the Contractor) the following additional items:

- A. two (2) additional APS push buttons, each with sign and without Braille information.

The additional APS pedestrian push button units shall be new and shall be of the same make and model as is provided elsewhere in these Special Provisions and as part of this project.

The additional APS pedestrian push button units shall be delivered to the County by the Contractor in their original packaging material, for future County use.

The Contractor shall provide to the Engineer written confirmation (signed by County personnel) that these items have been delivered to the County by the Contractor prior to final acceptance of the project.

Furnishing these additional APS pedestrian push button units to Ramsey County shall be included as part of the pay item for each "Traffic Control Signal System" (Item No. 2565), with no direct compensation being made therefore.

Present the order form below to the Accessible Pedestrian Signal (APS) manufacturer so the appropriate Braille message is added to the pedestrian information sign and the correct voice messages are programmed in the pedestrian push buttons.

**Accessible Pedestrian Signal (APS)
ORDER FORM**
(Fill out one form per intersection)
Intersection: TH 10 & CSAH 10

System I.D. _____

T.E. No. _____

Total Qty of Pedestrian Push Buttons 10

Control Board: One needed for each intersection **Qty** 1

CCU: (Central Control Unit) One needed for each intersection **Qty** 1

CONFIG: (Configurator) One needed for each intersection when available **Qty** 1

Push Button and Sign Braille Information

Button	Arrow Direction R/L	Street Name (Street Being Crossed)
PB2-1	LEFT	PB2-1 COUNTY ROAD H
PB2-2	RIGHT	PB2-2 COUNTY ROAD H
PB2-3		PB2-3
PB2-4		PB2-4
PB4-1	LEFT	PB4-1 HIGHWAY 10
PB4-2	RIGHT	PB4-2 HIGHWAY 10
PB4-3	LEFT/RIGHT	PB4-3 HIGHWAY 10
PB4-4		PB4-4
PB6-1	LEFT	PB6-1 COUNTY ROAD H
PB6-2	RIGHT	PB6-2 COUNTY ROAD H
PB6-3		PB6-3
PB6-4		PB6-4
PB8-1	LEFT	PB8-1 HIGHWAY 10
PB8-2	RIGHT	PB8-2 HIGHWAY 10
PB8-3	LEFT/RIGHT	PB8-3 HIGHWAY 10
PB8-4		PB8-4

Custom Voice Message Details

Voice on Location and Walk Message(s) Please give phonetic pronunciation on difficult street names so that the message will be recorded correctly.

*Note that unless Street, Drive, Avenue etc...are absolutely necessary for intersection identification, it is recommended to not include them in the verbal message.

PB2-1

Wait Message:			
Wait to Cross	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">COUNTY ROAD H</div> <small>(Street Being Crossed)</small>	at	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">HIGHWAY 10</div> <small>(Intersecting Street)</small>
Walk Message:			
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">COUNTY ROAD H</div> <small>(Street Being Crossed)</small>	Walk sign is on to cross	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">COUNTY ROAD H</div> <small>(Street Being Crossed)</small>

PB2-2

Wait Message:			
Wait to Cross	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">COUNTY ROAD H</div> <small>(Street Being Crossed)</small>	at	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">HIGHWAY 10</div> <small>(Intersecting Street)</small>
Walk Message:			
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">COUNTY ROAD H</div> <small>(Street Being Crossed)</small>	Walk sign is on to cross	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">COUNTY ROAD H</div> <small>(Street Being Crossed)</small>

PB4-1

Wait Message:			
Wait to Cross	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">HIGHWAY 10</div> <small>(Street Being Crossed)</small>	at	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">COUNTY ROAD H</div> <small>(Intersecting Street)</small>
Walk Message:			
	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">HIGHWAY 10</div> <small>(Street Being Crossed)</small>	Walk sign is on to cross	<div style="border: 1px solid black; display: inline-block; padding: 2px 10px;">HIGHWAY 10</div> <small>(Street Being Crossed)</small>

PB4-2

Wait Message:			
Wait to Cross	HIGHWAY 10 (Street Being Crossed)	at	COUNTY ROAD H (Intersecting Street)
Walk Message:			
	HIGHWAY 10 (Street Being Crossed)	Walk sign is on to cross	HIGHWAY 10 (Street Being Crossed)

PB4-3

Wait Message:			
Wait to Cross	HIGHWAY 10 (Street Being Crossed)	at	COUNTY ROAD H (Intersecting Street)
Walk Message:			
	HIGHWAY 10 (Street Being Crossed)	Walk sign is on to cross	HIGHWAY 10 (Street Being Crossed)

PB6-1

Wait Message:			
Wait to Cross	COUNTY ROAD H (Street Being Crossed)	at	HIGHWAY 10 (Intersecting Street)
Walk Message:			
	COUNTY ROAD H (Street Being Crossed)	Walk sign is on to cross	COUNTY ROAD H (Street Being Crossed)

PB6-2

Wait Message:			
Wait to Cross	COUNTY ROAD H (Street Being Crossed)	at	HIGHWAY 10 (Intersecting Street)
Walk Message:			
	COUNTY ROAD H (Street Being Crossed)	Walk sign is on to cross	COUNTY ROAD H (Street Being Crossed)

PB8-1

Wait Message:			
Wait to Cross	HIGHWAY 10 (Street Being Crossed)	at	COUNTY ROAD H (Intersecting Street)
Walk Message:			
	HIGHWAY 10 (Street Being Crossed)	Walk sign is on to cross	HIGHWAY 10 (Street Being Crossed)

PB8-2

Wait Message:			
Wait to Cross	HIGHWAY 10 (Street Being Crossed)	at	COUNTY ROAD H (Intersecting Street)
Walk Message:			
	HIGHWAY 10 (Street Being Crossed)	Walk sign is on to cross	HIGHWAY 10 (Street Being Crossed)

PB8-3

Wait Message:			
Wait to Cross	HIGHWAY 10 (Street Being Crossed)	at	COUNTY ROAD H (Intersecting Street)
Walk Message:			
	HIGHWAY 10 (Street Being Crossed)	Walk sign is on to cross	HIGHWAY 10 (Street Being Crossed)

L. Equipment Pad

The Contractor shall furnish and install equipment pad, as detailed in the Plans and specified in these Special Provisions.

Each equipment pad shall contain the following:

1. Traffic control signal cabinet and control equipment.

Traffic control signal cabinet, anchor rods, nuts and washers and associated internal

control equipment to be provided by the County and installed by the Contractor.

2. Signal Service Cabinet.

Signal service cabinet Type UPS to be provided and installed by the Contractor. UPS cabinets will be supplied from the manufacturer with anchor rods, nuts and washers used for attaching the service cabinet to the equipment pad.

M. Signal Service Cabinet, Type UPS (without Battery Back-up Equipment)

The Contractor shall furnish and install new signal service cabinet, Type UPS, without battery back-up equipment. Mn/DOT approved Signal Service Cabinets (modified for future battery back-up operation and equipment by others) are listed on the Mn/DOT Approved/Qualified Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

Cabinet shall be complete with all circuit breakers, wiring, relays, etc., as required to perform the necessary functions.

All switches and circuit breakers shall be plainly marked in a manner that will not deteriorate with moisture or age.

All circuit breakers shall be fully magnetic and of a type stocked and readily available from local suppliers. The circuit breakers shall be such that only one type of breaker for each size need be stocked for replacement requirements in the cabinet.

All service wires from the power source entering the service cabinet shall be not less than the size specified in the Plans, Type THW, Type THWN or Type XHHW insulation and shall be installed in rigid steel conduit and fittings.

The Contractor shall submit to the Engineer for approval, two (2) sets of manufacturer's drawings and specifications for the service cabinet they propose to install.

Battery back-up systems are not required within the scope of this project.

The meter sockets shall be approved by the power company before installation and the meters will be furnished and installed by the power company at no expense to the Contractor.

The Contractor shall make all arrangements with the power company (Xcel Energy) for power connection at each signal system.

THE CONTRACTOR SHALL NOT FIELD PAINT THE SIGNAL SERVICE CABINETS.

N. Blank

O. Controller Cabinet Complete with Control Equipment

The Contractor shall furnish and install new traffic control signal cabinet, each complete with control equipment in accordance with Ramsey County's "Standard Specifications for Traffic Signal Cabinet with Control Equipment" version TRF 500.01 dated January 1, 1994 at the intersection of County Road H and Highway 10.

For information purposes, the following chart provides an overview of the cabinets and control equipment. Refer to specific item for additional information.

Cabinet and Equipment Overview

System	Cabinet	Load Switch (Quantity)	Controller Unit NEMA TS-2	Arterial Master Controller	Loop Detector (Quantity)	MMU	Telephone Modem	System Communications
A	Modified Type R	17	Type 1	no	15	yes	no	Fiber Optic

Cabinets:

System A – Type R. Ramsey County Standard Specifications TRF 500.02 dated January 1, 1997, Section B2.

Each cabinet shall be secured in an **upright position when transporting** to the job site to insure that the cabinets will not tip and be damaged.

Solid State Load Switches:

System A - Shall contain the following:

- Twenty-two (22) units total
- Thirteen (13) units for vehicle phases 1- 8
- Four (4) units for pedestrian Phases 2, 4, 6 and 8
- Four (4) units for EVP Phases 2, 4, 6 and 8
- One (1) spare

Controller Unit - NEMA TS2 - Type 1 with the following local intersection special operation and fiber optic communications (all systems): Fiber Optic communications, Ramsey County Standard Specifications TRF 500.02 dated 1/1/97 section D1b” Telemetry” shall apply except the modems shall be Contractor furnished Multi-mode full hand shaking RS 232 compatible, Econolite F.O. modems (with interface panels and cables).

Paragraphs 2-6 of Section D1b “Telemetry” of the Ramsey County Standard Specifications TRF 500.02 (dated 1/1/97) shall be deleted and replaced with the following paragraphs:

Fiber-optic communication shall utilize serial data transmission of at least 9600 baud over multimode fibers. Each multimode fiber shall be terminated in the controller cabinet with an ST type fiber optic connector. Each singlemode fiber shall be terminated in the controller cabinet with an LC type fiber optic connector. Display, Data Key, RS232 Telemetry, and 10/100 Ethernet Module with FSK Telemetry Module, in accordance with Ramsey County’s Standard Specifications TRF 500.02 dated 1/1/97.

There shall be two fibers between the master and the first local, two between the first and the second locals...etc.

Once of these fibers shall be dedicated to communication from the master and all the locals. The fiber shall be daisy-chained from the master to each local through the local fiber optic modems.

A second fiber shall be dedicated to communications from the locals and the master. The fiber shall be daisy-chained from each local controller to the master through the local fiber-optic modems.

There shall be two fiber-optic modems in each cabinet.

Loop Detector Modules:

System A

System A shall be furnished with FIFTEEN (15) two channel, Type A modules, installed in slots 1 and 2. BIU Compatible, Reno A & E model C. All remaining slots shall be open.

System A - shall contain the following:

	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8
Channel 1	D1-1	D2-1	D3-1	D3-3	D4-1	D4-3	D4-5	Future
Channel 2	D1-2	D2-2	D3-2	D3-4	D4-2	D4-4	Future	Future

	Slot 9	Slot 10	Slot 11	Slot 12	Slot 13	Slot 14	Slot 15	Slot 16
Channel 1	D5-1	D6-1	D7-1	D7-3	D8-1	D8-3	D8-5	Future
Channel 2	D5-2	D6-2	D7-2	D7-4	D8-2	D8-4	Future	Future

Malfunction Management Unit - Type 16

The Malfunction Management Units shall comply with Ramsey County's Standard Specifications TRF 500.02, dated 1/1/97, except a Type 16 shall be furnished conforming to the requirements of NEMA Standard Publication No. TS-1992 TRAFFIC CONTROLLER ASSEMBLIES, Part 4.

Fuse Panels

Each fuse panel shall be wired and the field leads terminated on the fuse panel in accordance with the following fuse charts: **System "A"** – County Road H and Highway 10

Fuse Holder No.	Load Switch Number	Phase	Signal Indication	Signal Face No(s).	Fuse Size (Amps)
Fuse Holder	Load Switch	Phase	Signal	Signal Face	Fuse Size
1	LS. 1	1	GLTA	1-1	2-1/2
2	LS. 1	1	GLTA	1-2	2-1/2
3	LS. 1	1	YLTA	1-1	2-1/2
4	LS. 1	1	YLTA	1-2	2-1/2
5	LS. 1	1	RLTA	1-1	2-1/2
6	LS. 1	1	RLTA	1-2	2-1/2
7	LS. 2	1	GLTA	1-3	2-1/2
8	LS. 2	1	YLTA	1-3	2-1/2
9	LS. 2	1	RLTA	1-3	2-1/2
10	LS. 2	1	FLTA	1-1	2-1/2
11	LS. 2	1	FLTA	1-2	2-1/2
12	LS. 2	1	FLTA	1-3	2-1/2
13	LS. 3	2	GRN	2-1	2-1/2
14	LS. 3	2	GRN	2-2	2-1/2
15	LS. 3	2	YEL	2-1	2-1/2
16	LS. 3	2	YEL	2-2	2-1/2
17	LS. 3	2	RED	2-1	2-1/2
18	LS. 3	2	RED	2-2	2-1/2
19	LS. 4	2	GRN	2-3	2-1/2
20	LS. 4	2	YEL	2-3	2-1/2
21	LS. 4	2	RED	2-3	2-1/2
22	LS. 4	3	FLTA	3-1	2-1/2
23	LS. 4	3	FLTA	3-2	2-1/2
24	LS. 4	3	FLTA	3-3	2-1/2
25	LS. 5	3	GLTA	3-1	2-1/2
26	LS. 5	3	GLTA	3-2	2-1/2
27	LS. 5	3	YLTA	3-1	2-1/2
28	LS. 5	3	YLTA	3-2	2-1/2
29	LS. 5	3	RLTA	3-1	2-1/2
30	LS. 5	3	RLTA	3-2	2-1/2
31	LS. 6	3	GLTA	3-3	2-1/2
32	LS. 6	3	YLTA	3-3	2-1/2
33	LS. 6	3	RLTA	3-3	2-1/2
34	LS. 6	4	GRN	4-1	2-1/2
35	LS. 6	4	YEL	4-1	2-1/2
36	LS. 6	4	RED	4-1	2-1/2
37	LS. 7	4	GRN	4-2	2-1/2

Each fuse panel shall be wired and the field leads terminated on the fuse panel in accordance with the following fuse charts: **System "A"** – County Road H and Highway 10

Fuse Holder No.	Load Switch Number	Phase	Signal Indication	Signal Face No(s).	Fuse Size (Amps)
38	LS. 7	4	GRN	4-3	2-1/2
39	LS. 7	4	YEL	4-2	2-1/2
40	LS. 7	4	YEL	4-3	2-1/2
41	LS. 7	4	RED	4-2	2-1/2
42	LS. 7	4	RED	4-3	2-1/2
43	LS. 8	5	GLTA	5-1	2-1/2
44	LS. 8	5	GLTA	5-2	2-1/2
45	LS. 8	5	YLTA	5-1	2-1/2
46	LS. 8	5	YLTA	5-2	2-1/2
47	LS. 8	5	RLTA	5-1	2-1/2
48	LS. 8	5	RLTA	5-2	2-1/2
49	LS. 9	6	GRN	6-1	2-1/2
50	LS. 9	6	GRN	6-2	2-1/2
51	LS. 9	6	YEL	6-1	2-1/2
52	LS. 9	6	YEL	6-2	2-1/2
53	LS. 9	6	RED	6-1	2-1/2
54	LS. 9	6	RED	6-2	2-1/2
55	LS. 10	6	GRN	6-3	2-1/2
56	LS. 10	6	YEL	6-3	2-1/2
57	LS. 10	6	RED	6-3	2-1/2
58	LS. 10	7	GLTA	7-1	2-1/2
59	LS. 10	7	GLTA	7-1	2-1/2
60	LS. 10	7	GLTA	7-1	2-1/2
61	LS. 11	7	GLTA	7-2	2-1/2
62	LS. 11	7	GLTA	7-3	2-1/2
63	LS. 11	7	YLTA	7-2	2-1/2
64	LS. 11	7	YLTA	7-3	2-1/2
65	LS. 11	7	RLTA	7-2	2-1/2
66	LS. 11	7	RLTA	7-3	2-1/2
67	LS. 12	8	GRN	8-1	2-1/2
68	LS. 12	8	GRN	8-2	2-1/2
69	LS. 12	8	YEL	8-1	2-1/2
70	LS. 12	8	YEL	8-2	2-1/2
71	LS. 12	8	RED	8-1	2-1/2
72	LS. 12	8	RED	8-2	2-1/2
73	LS. 13	8	GRN	8-3	2-1/2
74	LS. 13	8	YEL	8-3	2-1/2
75	LS. 13	8	RED	8-3	2-1/2

Each fuse panel shall be wired and the field leads terminated on the fuse panel in accordance with the following fuse charts: **System "A"** – County Road H and Highway 10

Fuse Holder No.	Load Switch Number	Phase	Signal Indication	Signal Face No(s).	Fuse Size (Amps)
76	LS. 13	7	FLTA	7-1	2-1/2
77	LS. 13	7	FLTA	7-2	2-1/2
78	LS. 13	7	FLTA	7-3	2-1/2
79	LS. 14	2	WLK	P2-1	2-1/2
80	LS. 14	2	WLK	P2-2	2-1/2
81	LS. 14	5	FLTA	5-1	2-1/2
82	LS. 14	5	FLTA	5-2	2-1/2
83	LS. 14	2	DWK	P2-1	2-1/2
84	LS. 14	2	DWK	P2-2	2-1/2
85	LS. 15	4	WLK	P4-1	2-1/2
86	LS. 15	4	WLK	P4-2	2-1/2
87	LS. 15	4	WLK	P4-3	2-1/2
88	LS. 15	4	DWK	P4-1	2-1/2
89	LS. 15	4	DWK	P4-2	2-1/2
90	LS. 15	4	DWK	P4-3	2-1/2
91	LS. 16	6	WLK	P6-1	2-1/2
92	LS. 16	6	WLK	P6-2	2-1/2
93	LS. 16	6	DWK	P6-1	2-1/2
94	LS. 16	6	DWK	P6-2	2-1/2
95	LS. 16	8	WLK	P8-1	2-1/2
96	LS. 16	8	DWK	P8-1	2-1/2
97	LS. 17	8	WLK	P8-2	2-1/2
98	LS. 17	8	WLK	P8-3	2-1/2
99	LS. 17	8	DWK	P8-2	2-1/2
100	LS. 17	8	DWK	P8-3	2-1/2
101	LS. 17	--	--	--	2-1/2
102	LS. 17	--	--	--	2-1/2
103	LS. 18	2 & 5	EVP	--	2-1/2
104	LS. 18	2 & 5	EVP	--	2-1/2
105	LS. 19	4 & 7	EVP	--	2-1/2
106	LS. 19	4 & 7	EVP	--	2-1/2
107	LS. 20	6 & 1	EVP	--	2-1/2
108	LS. 20	6 & 1	EVP	--	2-1/2
109	LS. 21	8 & 3	EVP	--	2-1/2
110	LS. 21	8 & 3	EVP	--	2-1/2

Shop Testing Equipment

The Contractor shall deliver the control equipment specified to Ramsey County Public Works, 1425 Paul Kirkwold Drive, Arden Hills, Minnesota 55112-3933.

The Contractor shall pick up the equipment after test running and install it in its permanent locations. Transporting this equipment shall be at the Contractor's expense and no direct compensation will be paid.

Cabinet-Wiring Diagrams and Service Manuals

Cabinet wiring diagrams and service manuals shall be furnished in accordance with Ramsey County's "Standard Specifications for Traffic Signal System Cabinet with Control Equipment" version TRF 500.02 dated January 1, 1997.

P. Loop Detector Sealant Material

For saw cut loop detectors, the Contractor shall furnish and install MnDOT approved loop detector sealant material. MnDOT approved Loop Detector Sealant is listed on the MnDOT Approved/Qualified Products Lists WEB site for Signals:

<http://www.dot.state.mn.us/products/index.html>

THE CONTRACTOR SHALL INSTALL SEALANT MATERIAL ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

Q. Loop Detector Splices

The Contractor shall furnish and install qualified loop detector splice encapsulation kits.

Mn/DOT approved Splice Encapsulation Kits are listed on the Mn/DOT Approved/Qualified Products Lists web site for Signals:

<http://www.dot.state.mn.us/products/index.html>

THE CONTRACTOR SHALL INSTALL LOOP DETECTOR SPLICES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AND AS SPECIFIED IN THE PLANS.

SS-1.3 CONSTRUCTION REQUIREMENTS

A. Conduit Installation

Conduit shall be installed in accordance with Mn/DOT 2565.3D, except as follows:

1. Continuous Type HDPE Non-Metallic Conduit:

Except for under existing pavements, underground Continuous Type HDPE Conduit shall be placed by trenching, stitching, plowing, or other method approved by the engineer. Under existing pavements, Continuous Type HDPE Non-Metallic Conduit shall be placed as specified in 2565.3D2b.

2. Rigid Non-Metallic Conduit Joints:

The Contractor shall install appropriate sized long line couplings when installed under existing roadway surfaces

The applied PVC joint cement shall be allowed to set-up for six **(6) hours** before pulling the conduit through a directional bored channel.

3. Miscellaneous Provisions:

Duct seal or other Engineer approved material shall be furnished and installed to seal all pole base, controller cabinet and service cabinet conduit entrances at the signal system in accordance with Mn/DOT 2565.3D2b.

All RSC terminating near the top of a wood pole shall utilize a metal weatherhead service entrance type fitting with knockouts (knockouts shall not be opened if not used).

Conduit shall be attached to a wood pole by galvanized RSC straps spaced 3 feet apart, or as directed by the Engineer.

Bell-ends shall be furnished and installed by the Contractor on all ends of non-metallic conduit entering a handhole (INCLUDING ON ALL LOOP DETECTOR CONDUITS CARRYING LOOP DETECTOR CONDUCTORS TO THE ROADWAY).

C. Anti-Seize Lubricant

The Contractor must apply Brush on Anti-Seize lubricant to all threaded portions of each signal system prior to assembly. The following is list of assemblies that require anti-seize lubricant:

Mast arm pole standard anchor rods above concrete foundations
Mast arm pole to transformer base bolts

Traffic signal cabinet anchor rods above concrete foundations
Signal service cabinet anchor rods above concrete foundations
Blind threaded inserts (rivet nuts)
Threaded hub and flange pole adaptor
Bolt on hub and flange
Straight and angle mount plumbizers
Signal bracketing (where used)

Application of the brush-on anti-seize lubricant to all threaded portions of each signal system shall be to the satisfaction of the Engineer.

D. Equipment Pad Concrete Foundation

Provide the equipment pad in accordance with 2565.3F.3 and as detailed in the Plans at the location staked by the the Engineer.

The cabinet concrete foundation for the Contractor furnished traffic signal cabinet and control equipment shall be installed as part of the equipment pad concrete foundation using Contractor furnished anchor rods, nuts, and washers to mount each cabinet. The anchor rod pattern for each Contractor furnished cabinet is 1035 mm (40-3/4 inches) by 470 mm (18-1/2 inches) rectangular, measured from the anchor rod centers. The anchor rods shall project above the concrete foundations to accommodate the 13 mm (1/2 inch) thick gaskets. The Contractor shall furnish and install the rubber gasket sections between the bottom of t cabinet base and the concrete foundation. The Contractor shall leave one 13 mm (1/2 inch) gap in the gasket to ensure proper water drainage.

The cabinet concrete foundation for the signal service cabinet shall be installed as part of the equipment pad concrete foundation using anchor rods, nuts, and washers supplied by the Contractor. Each anchor rod shall be in accordance with Mn/DOT 2565.2F3. The anchor rod pattern for the cabinet is 406 mm (16 inches) by 356 mm (14 inches) rectangular, measured from the anchor rod centers. The anchor rods shall project above the concrete foundation to accommodate the 13 mm (1/2 inch) thick gasket. The Contractor shall install the cabinet manufacturer supplied rubber gasket sections between the bottom of each cabinet base and the concrete foundation. The Contractor shall leave one 13 mm (1/2 inch) gap in the gasket to ensure proper water drainage.

E. Loop Detector Installation

The Contractor shall install loop preformed rigid PVC conduit loops in accordance with the Plans; as marked by the Engineer; and with the applicable provisions of Mn/DOT Standard Plate No. 8132 B and Mn/DOT 2565.3G.

Each loop detector type shall have 4 turns of wire unless otherwise indicated or directed by the Engineer.

Splice kits shall be installed in handholes in such a manner as to ensure that each splice kit is

suspended and/or secured near the top of the handhole to the satisfaction of the Engineer. Placing splice kits on top of the electrical cables and conductors is not acceptable.

All loop detector conduit ends shall have bell bushings and conduit runs shall be labeled in the handhole to the satisfaction of the Engineer.

Individual loop detector conduits in each handhole shall be labeled with permanent marker above each conduit and to which loop detector each conduit corresponds to.

Requirements of the “Loop Detector Test Report” specified in Mn/DOT 2565.3G3 shall apply except that testing will be performed by the County.

F. Compliance with NEC Article 110. 24

Provide fault current calculations in accordance with 2565.3 CC.

G. Pole Sealant

The Contractor shall place an adequate amount of 100% clear silicone sealant between the pole base plate and where it meets the transformer base to ensure a moisture proof seal between the pole and the transformer base. This seal shall be to the satisfaction of the Engineer.

H. Luminaires & Lamp Labeling

Luminaires and lamps shall be marked according to Mn/DOT 3810.2A. The term “permanent marker” shall be modified as follows: “black oil based paint marker.”

I. Blank

J. Signal Pole Installation to Concrete Foundation Anchor Rods

The Contractor shall install mast arm pole standards to concrete foundations anchor rods in accordance with the following installation procedure:

1. Clean exposed part of anchor rods with a wire brush or equivalent.
2. Assure clean anchor rods and that nuts will spin freely along entire length of all anchor rods.
3. Lubricate anchor rod threads with brush on anti-seize compound.
4. Install heavy hex leveling nuts and set them to level.
5. Install first set of washers, place base/pole on anchor rod cluster, install second set of washers.

6. Install heavy hex top nuts and hand tighten.
7. Using "full force" and a standard wrench, or a few impacts of an impact wrench, tighten all top nuts in any order.
8. **(Critical)** Using "full force" and a standard wrench, tighten all leveling nuts in any order.
9. Mark positions of all top nuts in relation to its adjacent bolt. Using appropriate equipment tighten all top nuts an additional 1/6 turn beyond tightening achieved in steps 6 and 7.
10. After 48 hours, with the entire mast arm pole standard [including mast arm(s), transformer base, and, if applicable, the luminaire extension] being completely assembled and installed, the nuts shall be checked to assure they have maintained tightness. If additional tightening is required, follow Steps 7 thru 9.

K. Activating Signals

Mn/DOT Specification 2565.3W is hereby deleted and replaced with the following:

When a traffic control signal system is to be placed in operation, all vehicle signal faces and pedestrian signal faces shall be aimed as directed by the Engineer. The Contractor shall notify the Engineer at least 48 hours in advance of the scheduled traffic signal turn-on.

Each traffic control signal system will be turned on by County personnel, unless otherwise authorized by the Engineer. The Contractor shall be present at time of turn-ons to provide assistance to ensure each traffic control signal system is operating correctly and in a safe manner. The Contractor shall provide all necessary parts and labor to rectify any malfunctioning components of the traffic control signal system installed by the Contractor. This requirement would not include County or State furnished material/components, except if the County or State furnished material/components were malfunctioning, or damaged, due to Contractors operations. All components of each signal system, including the emergency vehicle preemption (EVP) and the traffic control interconnection, must be completely operational to the satisfaction of the Engineer before an actual signal system turn on is performed.

The Contractor shall not turn a signal system ON or OFF, or place in flashing mode of operation, without the specific approval of, and in the presence of the Engineer.

L. Painting

All components of each new signal system shall not be painted.

1. **THE SIGNAL SERVICE CABINETS AND THE TRAFFIC SIGNAL CABINETS SHALL NOT BE FIELD PAINTED.**

2. Housings, housing doors, and background shields for vehicle and pedestrian signal faces shall not be painted and shall be left in their black manufactured condition.
3. Pedestrian push button housings shall not be painted and shall be left in their black manufactured condition.
4. New one-way mounts shall not be painted and shall be left in their manufactured condition.

M. Removals

When directed by the Engineer, the Contractor shall remove and salvage, or dispose of all items of each existing traffic control signal system, in accordance with the applicable provisions of Mn/DOT 2565.3U; the applicable provisions of Mn/DOT 2104; and the following:

1. All underground conduit, except under roadway surfaces, shall be removed and disposed of as specified herein. Conduit under roadway surfaces may be abandoned in place, unless otherwise directed by the Engineer to be removed.
2. The Contractor shall carefully remove, protect, and deliver the following salvaged items to the County: LED vehicle and pedestrian signal indication lenses, controllers, cameras and cabinets. The Contractor shall take care so as not to damage these items during removal and delivery to the County. If an item to be salvaged is damaged due to Contractor operations, then the Contractor shall furnish a new item to replace the existing damaged item, all to the satisfaction of the Engineer and the County (at no expense to the Owner).
3. After the traffic control signal cabinet and control equipment is de-energized and power conductors disconnected, the Contractor shall prevent damage to the cabinet and control equipment as follows:
 - a) Unplug and remove all removable control equipment (i.e., controller unit, detector amplifier units, conflict monitor, load switches, etc.) from the cabinet. The control equipment removed from the cabinet shall be suitably packed to prevent damage to the equipment during transportation.
 - b) Connecting harnesses for the equipment shall be coiled or grouped together and secured to a shelf in the cabinet. The harnesses can be taped, wired, or tie wrapped, but shall be done by a method that prevents the harnesses from being pinched in the door when the door is closed, or from dropping below the bottom of the cabinet when it is lifted off the foundation.
 - c) The cabinet shall be secured in an upright position at all times (removing from foundation, transporting, loading, and unloading) to insure that the cabinet will not tip and be damaged.

4. The salvaged traffic control signal cabinets and control equipment, LED vehicle and pedestrian signal indication lenses shall be disassembled as specified herein and shall be delivered to the Ramsey County Public Works Department (1425 Paul Kirkwold Drive, Arden Hills, MN 55112). The Contractor shall notify the County at least three (3) normal working days in advance of the time the Contractor intends to deliver the salvaged materials. **THE ENGINEER SHALL BE NOTIFIED IN ADVANCE OF NOTIFICATION TO THE COUNTY.**

The Contractor shall obtain a salvaged material receipt from the County indicating that the County has received the salvaged material. The Contractor shall give the project Engineer a copy of this receipt for the permanent project records.

5. All items, not salvaged, shall be removed entirely and disposed of outside the Right-of-Way in any manner that the Contractor may elect subject to the provisions of Mn/DOT 2104.3C3, and as follows:

The County no longer salvages mast arm pole standards or traffic signal pedestal shafts and bases. The Contractor shall remove and dispose of the mast arm pole standards and pedestal shafts as specified herein.

After removal, the mast arm pole standards (transformer base, pole shafts, mast arms, and luminaire extensions) shall be disassembled and cut-up (or other method that renders the mast arm pole standards unusable) to the satisfaction of Engineer. After the mast arm pole standards have been prepared for disposal, the Contractor shall dispose of the mast arm pole standards and traffic signal pedestals as follows:

The mast arm pole standards and the traffic signal pedestals (pedestal shafts and pedestal bases) may have been painted with lead-based paint. If this is the case, the Contractor shall be responsible for the proper handling, transportation, and disposal of the mast arm pole standards and traffic signal pedestals as hazardous waste and the handling, transportation, and disposal of these items shall be in accordance with Occupational Safety & Health Administration (OSHA) and Minnesota Pollution Control Agency (MPCA) regulations.

The Contractor certifies that he or she is familiar with, and will comply with, the applicable requirements in OSHA 29 CFR 1926.62 and Minnesota Rules Chapter 5206, 7025, 7035, 7045 relating to disposal and/or the removal of these lead painted mast arm pole standards and traffic signal pedestals.

The Contractor shall provide to the Engineer a completed "Contractor Certification of Disposal" form included elsewhere in these Special Provisions.

6. All resulting excavation shall be backfilled and the backfilling and compaction shall be like in kind to approximately the same density as the adjoining ground. Any roadway surfacing

(concrete pavement, bituminous surface, or gravel surface, including underlying base courses), sidewalks, curb and gutters, sod, etc., removed by the construction operations shall be replaced in kind by the Contractor, all at his own expense.

All removals of materials of the existing signal system and salvaging as required, the disposal of non-salvable materials, and backfilling, all in accordance with the foregoing, shall be included as part of the work to furnish and install each new traffic control signal system, with no direct compensation being made therefore.

SS-1.5 MEASUREMENT AND PAYMENT

Removing, salvaging, hauling of materials, and disposing of the existing traffic control signal system; furnishing and installing signs, materials emergency vehicle preemption system, and electrical equipment as specified herein, all to provide a complete operating new permanent interconnected coordinated full-traffic-actuated Traffic Control Signal System at the intersection of:

- System A – County Road H and Highway 10

Contractor Certification of Disposal

Project No.: _____ **Location:** _____

We, _____, hereby certify that the mast arm pole standards

(Name of Contractor)

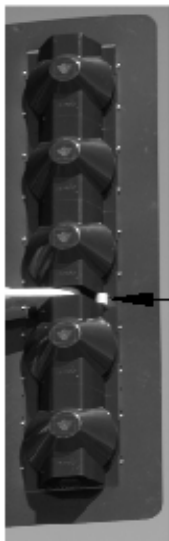
were rendered unusable, and the mast arm pole standards, and if applicable, pedestal shafts and bases were removed, transported, and disposed of in accordance with all requirements of the Minnesota Pollution Control Agency (MPCA) and the Occupational Safety & Health Administration (OSHA) for the removal, transporting, and disposal of hazardous waste.

SIGNATURE

DATE

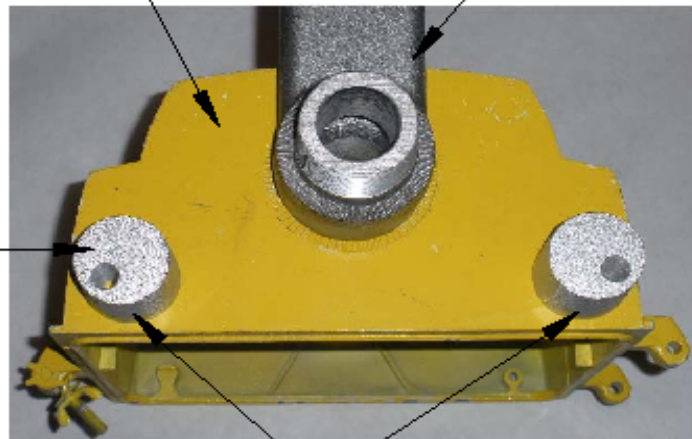
After signed and dated, the Contractor shall submit this form to the Project Engineer.

The Contractor shall also submit to the Engineer a copy of the "Tipping Receipt" that the Contractor receives from the scrap yard or recycler.



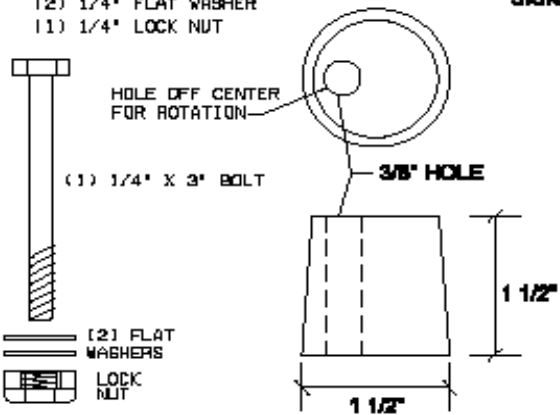
SIGNAL HEAD MOUNTING SPACER (2) REQUIRED

TOP VIEW **ANGLE OR STRAIGHT MOUNT**



ROTATE TO BEST POSITION BETWEEN SIGNALS. ATTACH USING SUPPLIED HARDWARE, TWO REQUIRED PER MOUNT. CASTING CAN BE INVERTED.

SUPPLIED HARDWARE
 SHM SPACER CASTING
 (1) 1/4" X 3" BOLT
 (2) 1/4" FLAT WASHER
 (1) 1/4" LOCK NUT



SHM Spacer



SHM Spacer Installed

SPACERS ALLOW THREE POINT STRESS RELIEF FOR MOUNTING SIGNALS HORIZONTALLY, OR FOR PLASTIC VEHICLE SIGNALS.

NOTES:

1. RECOMMENDED FOR 4 AND 5 SECTION PLASTIC SIGNAL ARRANGEMENTS.
2. TWO (2) SPACERS ARE REQUIRED PER MN/DOT SPECIFICATIONS FOR 4 AND 5 SECTION PLASTIC SIGNAL ARRANGEMENTS.
3. SOME SPECIFICATIONS REQUIRE THEM ON ALL PLASTIC SIGNAL VEHICLE ARRANGEMENTS.

SIGNAL HEAD MOUNTING SPACER

12-22-08
 NOT TO SCALE

SS-2 (2565) EMERGENCY VEHICLE PREEMPTION SYSTEM

This work shall consist of furnishing and installing emergency vehicle preemption (EVP) system, on the new permanent signal system at the intersection of County Road H and Highway 10 in Mounds View; Ramsey County, in accordance with the applicable provisions of Mn/DOT 2565; with the Plans; and as follows:

SS-2.1 GENERAL

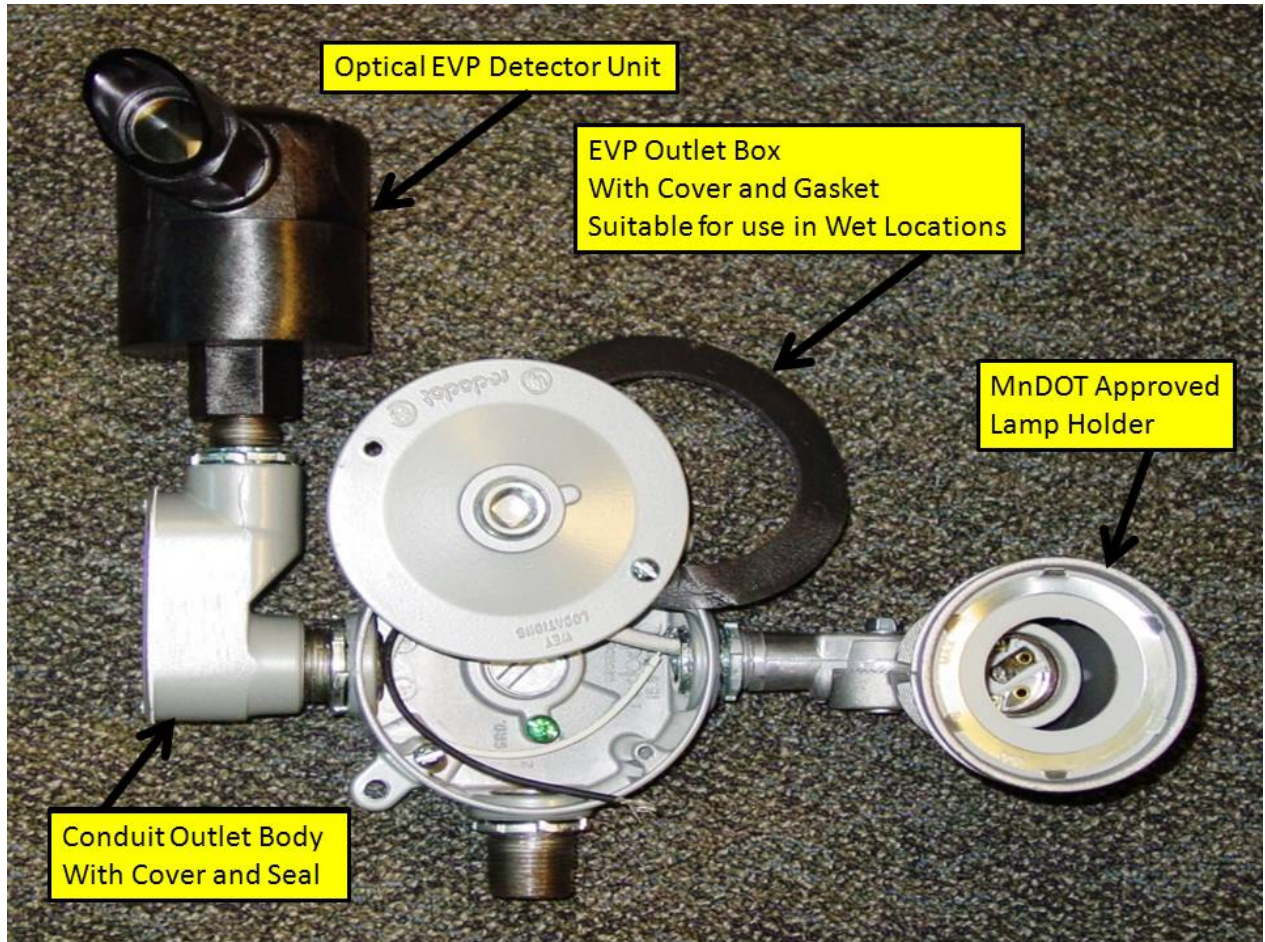
(None)

SS-2.2 MATERIALS

Provide Emergency Vehicle Preemption (EVP) equipment in accordance with MnDOT 2565 and 3814. Phase selectors (or other EVP equipment to be installed in the traffic control signal cabinet) will be installed in the County furnished cabinet by Ramsey County personnel. Deliver all EVP phase selectors or other required EVP equipment to be installed in the traffic signal cabinet to the County for installation into the County furnished traffic control signal cabinet. Provide the equipment at least thirty (30) normal working days in advance of when the County furnished traffic control signal cabinet is required on the job site.

SS-2.3 CONSTRUCTION REQUIREMENTS

Place in accordance with 2565.3.



SS-2.4 MEASUREMENT AND PAYMENT

Furnishing and installing an emergency vehicle preemption (EVP) system, on the new permanent signal system at the intersection of County Road H and Highway 10 in Mounds View; Ramsey County as specified herein, shall be included as part of the pay item for 2565.601 Emergency Vehicle Preemption System at Lump Sum.

SS 3 (2565) TRAFFIC CONTROL INTERCONNECT

This work consists of providing and installing conduit, pull vaults, and interconnect cable for traffic control interconnect on T.H. 10, at the locations indicated in the Plans, all in accordance with the applicable provisions of MnDOT 2565; with the current edition of the National Electrical Code; with the Plans; and as follows:

SS-3.1 GENERAL

1. As part of the traffic control interconnect, the Department will provide the master controller unit when required and all required master control equipment as part of the traffic control signal cabinet at _____ to operate the interconnected coordinated traffic control signal systems on T.H. ____ between ____ Street and ____ Street.

Or

The master controller unit and all required master control equipment to operate the interconnected coordinated traffic control signal systems on T.H. ____ is in place and located at the intersection of T.H. ____ and _____.

2. MnDOT personnel will make all interconnect cable connections in each intersection traffic control signal cabinet to make the interconnected coordinated portion of the traffic control signal system operational.

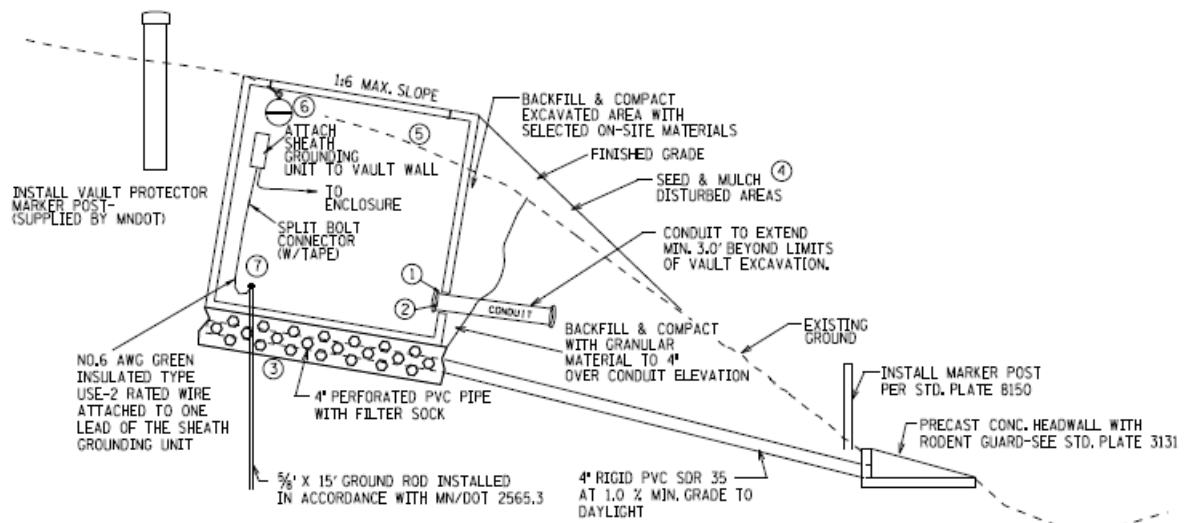
SS-3.2 MATERIALS

Interconnect Cable

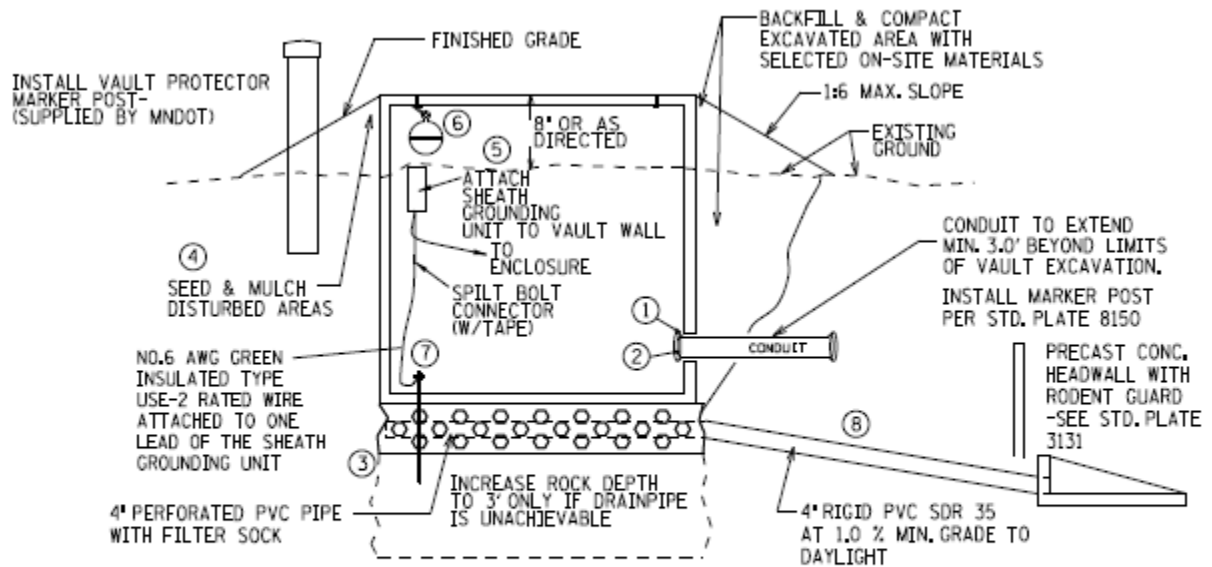
Provide interconnect cable (25 PAIR # 19 indicated in the Plans) in accordance with MnDOT 3815.2C.6b.

Fiber Optic Pull Vault

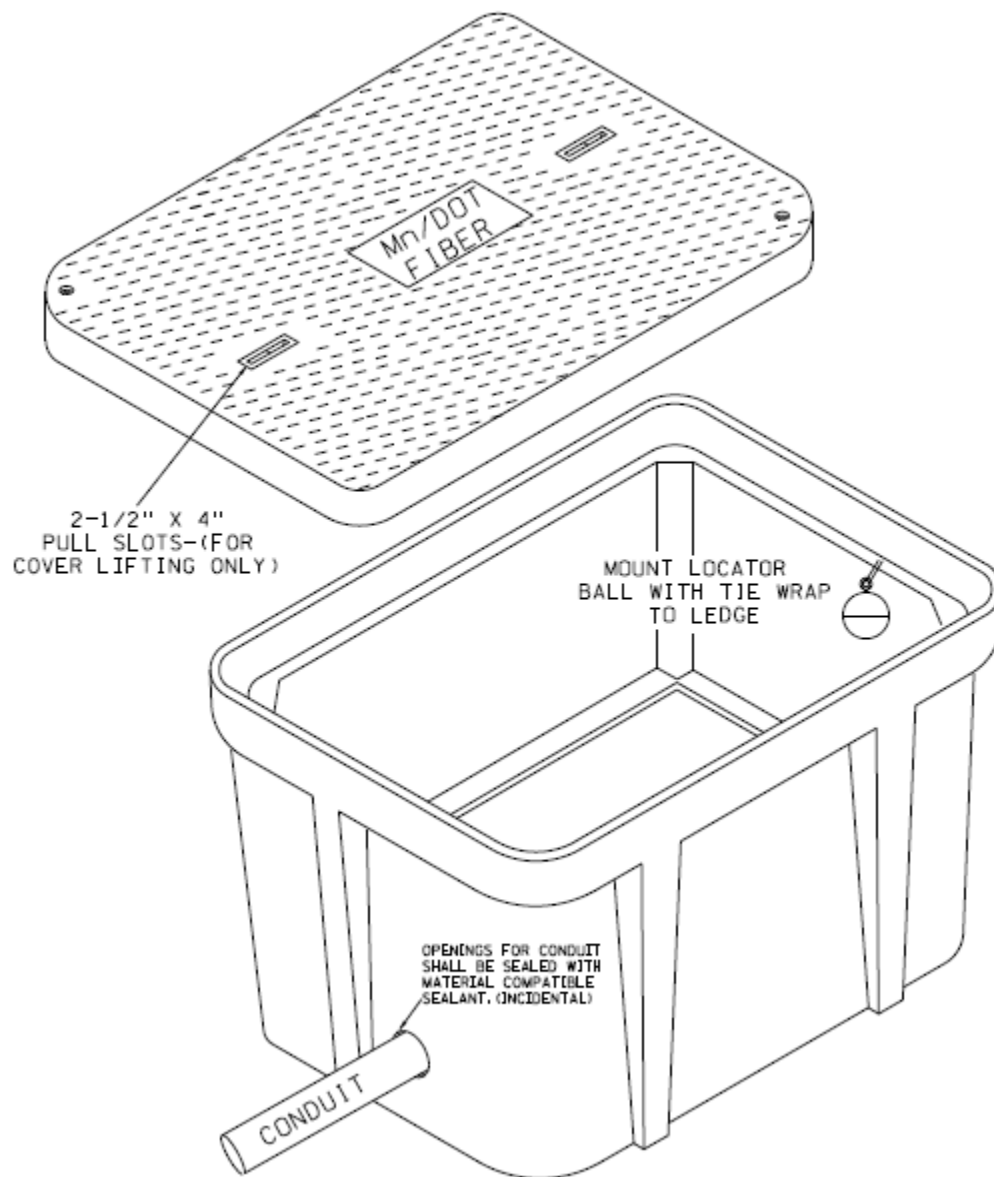
The Contractor shall install the fiber optic pull vault in accordance with the information included below:



VAULT INSTALLATION & DRAINAGE SYSTEM (SLOPED AREAS)



VAULT INSTALLATION & DRAINAGE SYSTEM (LEVEL GROUND & ACHIEVABLE DRAINAGE AREAS)



SPECIFIC NOTES

- ① OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT. (INCIDENTAL)
- ② PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND (INCIDENTAL)
- ③ F&I 1.0' COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MN/DOT 3149.2H. F&I 4" PERFERATED PVC PIPE WITH FILTER SOCK TO PROVIDE DRAINAGE. (INCIDENTAL)
- ④ RESTORE DISTURBED AREAS FOR TMS INSTALLATION WITH SEED AND TYPE I MULCH PER MNDOT 2575.3 (INCIDENTAL)
- ⑤ STRIP TOPSOIL FROM VAULT AND SLOPE AREAS PRIOR TO VAULT INSTALLATION (INCIDENTAL)
- ⑥ MOUNT LOCATOR BALL WITH TIE WRAP TO COVER LEDGE
- ⑦ SHEATH GROUNDING DEVICE AND GROUND ROD ARE NOT PLACED IN VAULTS WHERE SPLICING DOES NOT TAKE PLACE.
- ⑧ DRAIN PIPE MAY BE PLACED IN SIDEWALL OF PULL VAULT TO ACHIEVE DRAINAGE IN AREAS WHERE MINIMUM PIPE OUTFALL IS AVAILABLE

SPECIFIC NOTES

- ① OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT. (INCIDENTAL)
- ② PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND (INCIDENTAL)
- ③ F&I 1.0' COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MN/DOT 3149.2H. F&I 4" PERFERATED PVC PIPE WITH FILTER SOCK TO PROVIDE DRAINAGE. (INCIDENTAL)
- ④ RESTORE DISTURBED AREAS FOR TMS INSTALLATION WITH SEED AND TYPE I MULCH PER MNDOT 2575.3 (INCIDENTAL)
- ⑤ STRIP TOPSOIL FROM VAULT AND SLOPE AREAS PRIOR TO VAULT INSTALLATION (INCIDENTAL)
- ⑥ MOUNT LOCATOR BALL WITH TIE WRAP TO COVER LEDGE
- ⑦ SHEATH GROUNDING DEVICE AND GROUND ROD ARE NOT PLACED IN VAULTS WHERE SPLICING DOES NOT TAKE PLACE.
- ⑧ DRAIN PIPE MAY BE PLACED IN SIDEWALL OF PULL VAULT TO ACHIEVE DRAINAGE IN AREAS WHERE MINIMUM PIPE OUTFALL IS AVAILABLE

SS-5.3 CONSTRUCTION REQUIREMENTS

Place interconnect cable in accordance with MnDOT 2565.3J2.

SS-3.4 MEASUREMENT AND PAYMENT

Providing and installing conduit, pull vaults, and interconnect cable for traffic control interconnection on TH 10, at the locations indicated in the Plans, as contained in these Special Provisions and in the Plans will be measured as an integral unit complete in place and operating and will be paid for under Item No. 2565.514 (TRAFFIC CONTROL INTERCONNECT) at the Contract price per LUMP SUM, which price will be compensation in full for all costs incidental thereto.

SS-4 (2565) TEMPORARY SIGNAL SYSTEMS

This work shall consist of the following:

- Furnishing and installing materials and electrical equipment, as specified herein;
- Removing and salvaging temporary signal system materials and electrical equipment after the new permanent signal systems are placed into operation; and
- Providing all labor and materials necessary to revise the temporary signal systems during each stage of construction; all to provide temporary signal system operation during roadway reconstruction at the intersection of County Road H and Highway 10; all in accordance with the applicable provisions of Mn/DOT 2565; with the Plans; with the current edition of the National Electric Code; and as follows:

SS-4.1 GENERAL

A All materials and electrical equipment furnished by the Contractor for the temporary traffic signal systems (wood poles, video detection system, hardware and bracketing, etc.) shall be approved by the Engineer prior to installation. No installation work shall begin until signal materials are approved for installation by the Engineer.

The Contractor shall ensure that a traffic control signal system is kept in operation at each intersection at all times. The Contractor shall not turn-off any of the traffic control signal systems without the specific approval of, and only in the presence of, the Engineer. The Contractor shall notify the Engineer at least 48 hours in advance of scheduled turn-offs and before performing work on the traffic control signal systems.

The Contractor shall be responsible for maintaining operation of the temporary traffic signal systems during all stages of construction including any authorized work suspension.

Any change initiated by the Contractor resulting in an increase in materials, quantities, or in work shall be considered incidental to the work and no direct compensation will be made therefore.

The Contractor shall be responsible for all maintenance of every signal system item of the temporary traffic control signal systems, except for the traffic signal cabinet and signal control equipment which will be maintained by the County (includes timing and complete maintenance of the cabinet and control equipment) until final written acceptance of the project by the Engineer (Mn/DOT 1716) including periods of authorized work suspension.

The Contractor shall furnish to the County the names and phone numbers of contact personnel for both day and night operation for each temporary signal system.

The temporary traffic control signals shall consist of separate temporary signal systems utilized during the various stages of roadway construction.

The transition from one stage of a temporary signal system to another stage of a temporary signal system shall occur only when directed by the Engineer.

The County by its own forces will make all necessary revisions in the intersection traffic signal cabinets and control equipment when the transition from one stage of a temporary signal system to another stage of a temporary signal system occurs. For each stage of a temporary signal system, the Contractor shall make all necessary field lead connections in the intersection traffic signal cabinet as directed by the Engineer and shall make the temporary signal system operational.

- B A performance specification for temporary traffic control shall be satisfied by the Contractor (See (1404) MAINTENANCE OF TRAFFIC, (1707) PUBLIC SAFETY, AND (2563) TRAFFIC CONTROL), therefore detailed traffic control plans are not included in the plans. Since the temporary traffic control plans for the various stages of construction is the responsibility of the Contractor, detailed temporary signal plans are not included for each stage of construction. The temporary signal plans included show the temporary signal requirements that shall be satisfied under the existing geometric conditions.

The Contractor shall submit revised temporary traffic signal plans for each stage of traffic control for review and approval by the Engineer. A marked-up version of the temporary signal plans provided in the plan set is acceptable as long as the drawings are neat and legible as determined by the Engineer. Each revised temporary signal plan for each stage of traffic control shall be submitted to the County for review and approval a minimum of 14 working days before installation or modifications to the temporary signal systems are required.

The items shown in the temporary signal plans provided satisfy the requirements of operating the temporary traffic signal under existing geometric conditions. Additional signal heads, signal cable, and modifications to the left-turn signal heads provided shall be included as required for each revision to the temporary signal system. Wood pole mounted signal head that control left turn phases shall have the same indications as used in the overhead signal head(s) that controls the same left turn phase. All signal heads shall have their own signal cable from the controller cabinet to the signal head. The following minimum requirements shall be satisfied to for every temporary signal system during any stage of traffic control:

Vehicular Signal Faces

The type and number of signal heads as well as the placement of the signal heads shall be in accordance with the signal head placement charts documented in Chapter 3 of Mn/DOT's "Signal Design Manual" dated June 2008. The low speed charts shall be utilized and the layout that applies will be dependent on the approved intersection approach geometrics for each stage of traffic control. The Signal Design Manual is currently available at:

<http://www.dot.state.mn.us/trafficeng/publ/signaldesign/2008%20Signal%20Design%20Manu>

[al.pdf](#)

At least one signal face for the major movement on each approach shall be located within 180 ft of the stop bar. If this condition is not satisfied a supplemental near side signal face shall be provided as required by the MMUTCD.

Left-turn phases shown in the temporary signal plans as being protected-permissive shall not be modified to permissive-only operation.

If two left-turn lanes are provided, the five-section head shall be replaced with a three-section protected-only signal head for both the approach with two left-turn lanes and the opposing left turn lane(s) regardless of whether one or two opposing left-turn lanes are provided.

Pedestrian Signal Faces

The contractor shall provide for pedestrian movements across a minimum of three approaches at each temporary traffic signal during all phases of construction, so that access is provided to each corner of every intersection. The contractor can prohibit pedestrians from crossing on one approach. No pedestrian crossing signs shall be installed to identify any crossings where pedestrian movements are prohibited, the pedestrian signal heads and pedestrian push buttons for the prohibited phase shall be bagged, and the wiring for the pedestrian signal heads and pedestrian push buttons disconnected at the controller cabinet. All signing shall be inclusive to the temporary traffic signal.

The contractor shall provide access to operational pedestrian detectors at all times and operational pedestrian signal indications shall be visible across the entire roadway crossing. The contractor shall install pedestal poles and push button stations as required to satisfy this requirement.

- C Cast aluminum pipe fittings are **NOT** permitted for mounting vehicle and pedestrian signal faces. All locknuts, nipples, locknipples, gaskets, washers, and all other hardware, used to fasten vehicle and pedestrian signal faces to signal bracketing and pipe fittings and to signal head mounts shall **NOT** be fabricated of aluminum and shall be traffic signal industry standard signal hardware.

Non-metallic (plastic) caps shall not be used to plug unused openings in signal bracket pipe fittings, and signal indication housings.

- D **The Contractor must adhere to all requirements of Gopher State One Call including the following:**

The Contractor is responsible for marking the proposed excavation area by utilizing white markings. The white markings must delineate the **actual excavation area** where the locating of underground facilities is required.

SS-4.2

MATERIALS

All equipment furnished by the Contractor as part of the Temporary Signal Systems unless noted otherwise in this section shall become the property of the Contractor when the temporary signal systems are removed. All temporary signal system equipment except for items being salvaged to the County upon removal may be used, as long as the requirements of the plans and special provision are satisfied and the equipment is in good condition as determined by the Engineer. Existing traffic signal equipment that is part of the existing traffic signals that are being salvaged / removed may not be used to construct the Temporary Signal Systems.

A Conduit

A section of liquidtight flexible metal conduit and conduit fittings shall be furnished and installed from each metal junction box to each signal bracket.

All conduits terminating near the top of wood poles shall utilize a weatherhead service entrance type fitting with knockouts (knockouts shall not be opened if not used).

1. **Rigid Steel Conduit (R.S.C.):**

Shall be in accordance with Mn/DOT 3801.

2. **Rigid Non-Metallic Conduit (NMC) and Continuous Length Conduit (HDPE):**

Shall be in accordance with Mn/DOT 3803, except as follows:

1. Shall be Schedule 80 conduit and fittings for all installations.
2. Conduit fittings shall be appropriate for use with HDPE continuous length conduit.
3. Shall be capable of being installed by plowing, trenching, or directional boring methods.
4. Shall be either "GREY" or "RED" in color.
5. Shall be marked on the outside of conduit indicating manufacturer's name, size of conduit, HDPE, ASTM F 2160, UL Listing, and any other markings required by the N.E.C.
6. Before the cables and conductors are installed, non-metallic conduit bell ends (**appropriately sized for the HDPE type conduit**) shall be installed to prevent

damage to the cables and conductors

The Contractor shall, prior to procurement, furnish to County for approval, two 4 foot samples (sample shall include all required conduit markings) of the HDPE continuous type conduit that the Contractor proposes to install. Contractor must also submit description of proposed installation process.

All conduit from concrete foundations to the nearest handhole shall be either rigid steel conduit (R.S.C.) or rigid non-metallic conduit (N.M.C.). **HDPE continuous length conduit is not allowed for use between concrete foundations and the nearest handhole.**

B Handholes

New Handholes shall be Mn/DOT approved Handholes and Handhole Covers listed on the Mn/DOT WEB site under the Mn/DOT Approved Products List for Signals:

<http://www.dot.state.mn.us/products/index.html>

C Electrical Cables and Conductors for Traffic Signal Systems

All electrical cables and conductors for traffic signal systems shall be in accordance with the applicable provisions of Mn/DOT 3815, and as specified herein.

1. Cable Markings:

All electrical cables, except Loop Detector Lead-in Cable - IMSA 50-2 and the 3/C #20 Emergency Vehicle Preemption (EVP) Detector Cable used in signal system construction shall have the jacket surface ink printed with the following information:

- a. Manufacturer Name
- b. Year of Manufacture (Date Code)
- c. Type of Wire or Cable (i.e. TC, XHHW-2, THWN)
- d. Size and Number of Conductors
- e. Voltage Rating
- f. Conductor Insulation Rating
- g. Nationally Recognized Testing Laboratory (NRTL) Certification Mark indicating the cable is listed. [i.e. UL, ITSNA (ETL), CSA]
- h. Labeled as sunlight resistant (Sun Res), direct burial (Dir Bur), Oil Resistant 1 (Oil Res 1)

Signal Control Cable shall have additional markings as follows.

- a. Traffic Signal Cable
- b. Foot Markers
- c. -35° C Cold Bend

Loop Detector Lead-in Cable - IMSA 50-2 shall meet the marking requirements set forth in the International Municipal Signal Association (IMSA) specification.

Emergency Vehicle Preemption (EVP) Detector Cable (3C # 20) shall be surface marked in accordance with the National Electrical Code (NEC) and shall have additional markings as follows:

- a. Labeled as sunlight resistant, direct burial
- b. Year of Manufacture (Date Code)
- c. Conductor Insulation Rating
- d. Foot Markers

All cable markings shall be repeated at intervals not exceeding 24 inches on the jacket surface.

2. Signal Control Cable:

- a. All signal control cable shall be listed by a National Recognized Testing Laboratory (NRTL) as defined by the U.S. Department of Labor. The testing laboratory must be listed by OSHA in its scope of recognition for the applicable tests being conducted as required by this specification. A list of recognized testing labs for products sold in the United States may be found on the U.S. Department of Labor's web site:

<http://www.osha.gov/>

- b. The cables shall be tested by an NRTL and shall meet all of the following listed specifications and general requirements:

UL 44
UL 1277
UL 1685

- c. All signal control cable shall conform to the following :

ICEA T-29-520
ICEA T-30-520
ICEA S-73-532 (NEMA WC 57)

- d. Shall be suitable for use at 90°C in wet or dry locations
Note: This cable will be submersed in water for long periods of time
- e. Shall be suitable for direct burial
- f. Shall be sunlight resistant
- g. Shall be rated for 600 Volts
- h. Shall be rated as a Tray Cable
- i. Shall have a cable designation of XHHW-2
- j. Shall be #14 AWG
- k. Each conductor shall be a Class B (7 strand) soft drawn, bare or tinned copper per ASTM B3, ASTM B8 and ASTM B33

- l. Shall be constructed with circuit identification in accordance with method 1 of ICEA S-73-532 (NEMA WC-57) Table E-1 except as modified below.

3 Conductor:

1. Black
2. White
3. Green

4 Conductor:

1. Black
2. White
3. Red
4. Black/Red stripe

6 Conductor:

1. Black
2. White
3. Red
4. Black/Red stripe
5. Orange
6. Blue

12 Conductor:

1. Black
2. White
3. Red
4. Black/Red stripe
5. Orange
6. Blue
7. White/Black Stripe
8. Red/Black Stripe
9. White/Red Stripe
10. Orange/Black Stripe
11. Blue/Black Stripe
12. Black/White Stripe

- m. Shall have a minimum average insulation thickness of 30mils
- n. Shall be constructed using a tape binder

- o. Shall have a cable jacket that has a substantially circular cross-section. The outer cable jacket shall not be convoluted and shall not have a ropy appearance.
- p. Shall have non-hygroscopic fillers used in the interstices of the cables where necessary to give the completed cable assembly a circular cross-section.
- q. Fillers made of Jute or Paper are not acceptable.
- r. Shall have a rip cord between the outer jacket and the tape binder
- s. Bare copper or tinned wires are acceptable
- t. Outer jacket of the 4 conductor cable shall have **maximum** diameter of 0.450 inches.
- u. Outer jacket of the 6 conductor cable shall have **maximum** diameter of 0.530 inches.
- v. Shall carry an oil resistance level 1
- w. Shall meet a -35° C (-31° F) cold bend test
- x. For cables employing a PVC jacket a low migration grade of PVC is required
- y. The cable jacket shall pass the 7 day (168 hr) oven age test @ 121° C (249.8° F) per UL 1581
- z. This cable carries multiple ratings. Where the requirements of different ratings are in conflict the more stringent specification shall be the parameter the cable is required to meet.
- aa. The manufacturer shall provide to Minnesota Department of Transportation (Mn/DOT) the test qualification report from the NRTL stating that the submitted cable meets all the requirements of this specification.
- bb. Once a cable has been accepted by MN/DOT as meeting the requirements of this specification no substitution of materials will be allowed unless the manufacturer has received written permission from Mn/DOT allowing the substitution.

All field wiring terminations shall be as indicated on the field wiring diagram included in the Plan set or the revised field wiring diagram submitted by the Contractor and approved by the Engineer based on approach geometry modifications required as part of an approved traffic control plan.

- 3. The following cables are not required to be listed by a Nationally Recognized Testing Laboratory (NRTL):

- 2/c #14 (Loop Detector Lead-in Cable)
 - 3/C #20 (EVP cable)

- 4. Loop Detector Lead In Cable

- Shall be in accordance with 3815.2C4(b)

- 5. Non-metallic Straps for Above Ground Wiring

- Non-metallic straps shall be in accordance with the provisions of Mn/DOT 2565.3J6, and, in addition, all non-metallic straps shall be weather resistant black nylon with a minimum loop tensile strength of 250 pounds.

D Temporary Cabinet Base

The temporary cabinet bases must be Mn/DOT approved temporary cabinet bases listed on the Mn/DOT WEB site under the Mn/DOT Approved Products List for Signals:

<http://www.dot.state.mn.us/products/index.html>

E Vehicle Signal Faces (Poly-Carbonate)

All vehicle and pedestrian signal faces shall be in accordance with the provisions of Mn/DOT 3834, except as modified as follows:

All vehicle signal faces, visors, and background shields shall be fabricated with ultraviolet and heat stabilized black polycarbonate materials, conforming to ITE requirements.

All signal faces shall have background shields.

All new vehicle signal indications shall be illuminated with a light-emitting diode (LED) unit in accordance with the latest issue of the ITE standards for color and intensity, and as follows:

Signal Indications:

All "Red", "Yellow", and "Green" signal indications shall utilize light-emitting diode (LED) units. Mn/DOT approved LED Signal Indications are listed on the Mn/DOT Approved Products List for Signals:

<http://www.dot.state.mn.us/products/index.html>

F Pedestrian Signal Faces

Pedestrian signal faces shall be Mn/DOT approved as listed on the Mn/DOT approved products list on the Office of Traffic, Security, and Operations (OTSO) WEB site:

www.dot.state.mn.us/products/index.html

The Contractor shall furnish and install poly-carbonate pedestrian signal faces with LED pedestrian indications. Either LED pedestrian indications or pedestrian indications with countdown timers from the Mn/DOT approved Product Lists are permissible. All signal indications used for all temporary signal installations shall be of the same type (i.e. countdown timers or non-countdown type). Mn/DOT approved Pedestrian Signal Faces and indications are listed on the Mn/DOT Approved

Products List for Signals:

<http://www.dot.state.mn.us/products/index.html>

G Pedestrian Push Buttons

The Contractor shall furnish and install solid state pedestrian pushbuttons. The pedestrian push buttons shall be large red 2-inch push buttons, Campbell Company DCC 700P, Mn/DOT approved Solid State Pedestrian Pushbuttons, or preapproved equal. Mn/DOT approved Solid State Pedestrian Pushbuttons are listed on the Mn/DOT Approved Products List for Signals:

<http://www.dot.state.mn.us/products/index.html>

H Service Equipment

Service equipment shall be furnished and installed on the wood pole where indicated in the Plans and shall be in accordance with the provisions of Mn/DOT 3837 utilizing a circuit breaker load center. The Contractor shall furnish and install circuit breakers in the new load center as follows:

- one (1) 2-pole 100 amp main circuit breaker.
- one (1) 1-pole, 60 amp circuit breaker for signal system.
- two (2) 1-pole, 15 amp circuit breakers for street lighting.

I Blank

J Metal Junction Boxes on Wood Poles

A metal junction box with terminal blocks shall be furnished and installed on each wood pole with vehicle signal faces in accordance with the provisions of Mn/DOT 3838.2B.

Terminal blocks shall be in accordance with the provisions of Mn/DOT 2565.3J5.

All terminal blocks shall be coated with an electrical insulating coating. Mn/DOT approved Electrical Insulating Coatings are listed on the Mn/DOT Approved Products List for Signals:

<http://www.dot.state.mn.us/products/index.html>

The coating of the terminal block shall include spraying the terminal connections and the exposed wire ends where crimped to the spade connector.

The Contractor shall remove the “white plastic marking strip” before application of the electrical insulating coating and reinstall the white plastic marking strip after the coating of the terminal block is

completed. **The coating of the terminal block shall include spraying the terminal connections and the exposed wire ends where crimped to the spade connector.** The coating of each terminal block shall be to the satisfaction of the Engineer.

K Controller Cabinet Complete with Control Equipment

Controller Cabinet Complete with Control Equipment furnished shall be new for each temporary traffic signal system. The Controller Cabinet Complete with Control Equipment shall be salvaged to the County after removal of the temporary signal systems.

The Contractor shall furnish and install a traffic signal cabinet complete with control equipment in accordance with Ramsey County's "Standard Specifications for Traffic Signal Cabinet with Control Equipment" version TRF 500.01 dated January 1, 1994 at the intersection of County Road H and Highway 10.

The controller cabinet shall NOT be painted.

For information purposes the following chart provides an overview of the cabinet(s) and control equipment. Refer to specific item for additional information.

Cabinet and Equipment Overview

System	Cabinet	Load Switch (Quantity)	Controller Unit NEMA TS-2	Arterial Master Controller	Loop Detector (Quantity)	MMU	Multimode Modem	System Communications
A	65" Mod. P	22	Type 1	no	N/A	yes	No	None

1. Cabinets:

Type P Modified. Ramsey County Standard Specifications TRF 500.01 dated 1/1/94 section shall apply.

Relays for removing power to the load switches during flash shall be solid state rated for 125 amperes minimum, shall be AC controlled, shall be normally open and shall have zero voltage switching. The solid-state relay shall be Gentron Type SSR1200-480-A125.

2. Solid State Load Switches:

The System shall contain the following:

12 units total

Eight units for vehicle phases 1, 2, 3, 4, 5, 6, 7, and 8
 Three units for pedestrian phases 2, 4, 6, and 8 and EVP phases 2, 4, 6, and 8
 One Spare

3. Controller Unit: NEMA TS2 - Type 1
4. Malfunction Management Unit - Type 16

The Malfunction Management Units shall comply to Ramsey County's Standard Specifications TRF 500.01, dated 1/1/94, except a Type 16 shall be furnished conforming to the requirements of NEMA Standard Publication No. TS-1992 TRAFFIC CONTROLLER ASSEMBLIES, Part 4.

5. Fuse Panel

Each fuse panel shall be wired and the field leads terminated on the fuse panel in accordance with the following fuse charts:

County Road H and Highway 10

FUSE HOLDER No.	LOAD SWITCH (VEH or PED) and No.	PHASE	SIGNAL INDICATION	SIGNAL FACE No.	FUSE SIZE (AMPS)
1	VEH 1	1	GLTA	1-1	2-1/2
2	VEH 1	1	GLTA	1-2	2-1/2
3	VEH 1	1	YLTA	1-1	2-1/2
4	VEH 1	1	YLTA	1-2	2-1/2
5	VEH 1	1	RLTA	1-1	2-1/2
6	VEH 1	1	RLTA	1-2	2-1/2
7	VEH 2	2	GRN	2-1, 2-3	2-1/2
8	VEH 2	2	GRN	2-2	2-1/2
9	VEH 2	2	YEL	2-1, 2-3	2-1/2
10	VEH 2	2	YEL	2-2	2-1/2
11	VEH 2	2	RED	2-1, 2-3	2-1/2
12	VEH 2	2	RED	2-2	2-1/2
13	VEH 3	3	GLTA	8-2	2-1/2
14	VEH 3	3	GLTA	8-3	2-1/2
15	VEH 3	3	YLTA	8-2	2-1/2
16	VEH 3	3	YLTA	8-3	2-1/2
17	VEH 3	3	FUTURE	--	2-1/2
18	VEH 3	3	FUTURE	--	2-1/2
19	VEH 4	4	GRN	4-1	2-1/2
20	VEH 4	4	GRN	4-2	2-1/2
21	VEH 4	4	YEL	4-1	2-1/2
22	VEH 4	4	YEL	4-2	2-1/2
23	VEH 4	4	RED	4-1	2-1/2
24	VEH 4	4	RED	4-2	2-1/2

25	VEH 5	5	GLTA	5-1	2-1/2
26	VEH 5	5	GLTA	5-2	2-1/2
27	VEH 5	5	YLTA	5-1	2-1/2
28	VEH 5	5	YLTA	5-2	2-1/2
29	VEH 5	5	RLTA	5-1	2-1/2
30	VEH 5	5	RLTA	5-2	2-1/2
31	VEH 6	6	GRN	6-1, 6-3	2-1/2
32	VEH 6	6	GRN	6-2	2-1/2
33	VEH 6	6	YEL	6-1, 6-3	2-1/2
34	VEH 6	6	YEL	6-2	2-1/2
35	VEH 6	6	RED	6-1, 6-3	2-1/2
36	VEH 6	6	RED	6-2	2-1/2

County Road H and Highway 10

FUSE HOLDER No.	LOAD SWITCH (VEH or PED) and No.	PHASE	SIGNAL INDICATION	SIGNAL FACE No.	FUSE SIZE (AMPS)
37	VEH 7	7	GLTA	7-1	2-1/2
38	VEH 7	7	GLTA	7-2	2-1/2
39	VEH 7	7	YLTA	7-1	2-1/2
40	VEH 7	7	YLTA	7-2	2-1/2
41	VEH 7	7	RLTA	7-1	2-1/2
42	VEH 7	7	RLTA	7-2	2-1/2
43	VEH 8	8	GRN	8-1, 8-3	2-1/2
44	VEH 8	8	GRN	8-2	2-1/2
45	VEH 8	8	YEL	8-1, 8-3	2-1/2
46	VEH 8	8	YEL	8-2	2-1/2
47	VEH 8	8	RED	8-1, 8-3	2-1/2
48	VEH 8	8	RED	8-2	2-1/2
49	EVP	2&5	--	--	2-1/2
50	EVP	2&5	--	--	2-1/2
51	EVP	4&7	--	--	2-1/2
52	EVP	4&7	--	--	2-1/2
53	--	--	--	--	2-1/2
54	--	--	--	--	2-1/2
55	PED 6	6	WLK	P6-1	2-1/2
56	PED 6	6	WLK	P6-2	2-1/2
57	EVP	1&6	--	--	2-1/2
58	EVP	1&6	--	--	2-1/2
59	PED 6	6	DWK	P6-1	2-1/2
60	PED 6	6	DWK	P6-2	2-1/2
61	PED 8	8	WLK	P8-1	2-1/2
62	PED 8	8	WLK	P8-2	2-1/2
63	EVP	3&8	--	--	2-1/2
64	EVP	3&8	--	--	2-1/2
65	PED 8	8	DWK	P8-1	2-1/2
66	PED 8	8	DWK	P8-2	2-1/2

K1 Shop Testing Equipment

The Contractor shall deliver the control equipment specified to Ramsey County Public Works, 1425 Paul Kirkwold Drive, Arden Hills, Minnesota 55112-3933.

The Contractor shall pick up the equipment after test running and install it in its permanent location. Transporting this equipment shall be at the Contractor's expense and no direct compensation will be paid.

K2 Cabinet-Wiring Diagrams and Service Manuals

Cabinet wiring diagrams and service manuals shall be furnished in accordance with Ramsey County's "Standard Specifications for Traffic Signal System Cabinet with Control Equipment" version TRF 500.01 dated January 1, 1994.

L Video Detection

This traffic signal video detection equipment will be installed in a fully compliant NEMA TS2 Type 1 traffic signal cabinet. All components shall operate over a temperature range of -29° F (-34° C) to 140° F (60°C). All video detection equipment shall have a 2 year warranty.

Video detection equipment furnished shall be new for each temporary traffic signal system. The video detection equipment shall be salvaged to the County after removal of the temporary signal systems.

The machine vision sensor shall be equipped with the following:

1. An integrated imaging CCD array with optics, high-speed, color, image processing hardware and a dual core CPU bundled into a sealed, weather proof, dust tight NEMA-4 housing (IP 66).
2. An adjustable weather and sun shield with drip guard to reflect solar heat and to shield the CCD array and faceplate from direct exposure to the sun. The under part of the sunshield shall be coated with a non-reflective material to reduce glare into the camera.
3. A faceplate heater to melt accumulated ice, snow, or fog from the view of the camera. It shall be a low power thermostatically-controlled ITO faceplate heater.
4. The faceplate shall have a Hydrophilic coating on the glass to reduce dirt from building up.
5. The machine vision sensor shall process a minimum of 99 detector zones placed anywhere in the field of view of the sensor. The video output shall have the ability to show overlaid graphics indicating the current real-time detection state of each detector zone in the output video.
6. The detection of vehicles passing through the field of view of an image sensor shall be made available to a large variety of end user applications either as (a) simple contact closure outputs that reflect the current real time detector or alarm state (on/off), or as (b) NEMA TS-2 compliant SDLC serial bus I/O. In addition the summary traffic statistics shall be available to

be reported locally or remotely. The contact closure outputs or SDLC I/O shall be provided to a traffic signal controller and comply with NEMA and 170/2070 standards and be able to be provided simultaneously.

7. No Coax Connections shall be utilized beyond the cabinet in the system. Only 3 wires shall be required between the Machine Vision Processor and the traffic cabinet. These wires shall provide both power and communications. Ethernet cables from the cabinet to the Machine Vision Processor are not acceptable.
8. This equipment shall meet the NEMA environmental, power, and surge ratings as set forth in NEMA TS2 specifications.

The optics and camera electronics shall be directly controlled by the on-board dual core CPU for optimal illumination for traffic detection.

The lens shall be pre-focused at the factory, as required for operation.

The machine vision sensor shall operate at a maximum rate of 30 frames per second when configured for the NTSC video standard.

The machine vision sensor shall use medium resolution, color 1/4 inch CCD as the video source for real-time vehicle detection using NTSC format. Each image sensor shall produce images with a CCD sensing element with horizontal resolution of 470 TVL.

The machine vision sensor shall provide the following:

1. Sensitivity at the lens with full video, AGC off, 1/60 second - 2.0 lux (color)
2. Video signal-to-noise ratio of 50 dB, and provide direct real-time iris and shutter speed control to the MVP sensor on-board dual core processor.

The sensor shall be equipped with an integrated zoom lens that can be adjusted using configuration computer software. Zoom shall be able to be controlled from the ground or a remote location and utilize the same 3-wire system cabling. Additional cabling shall not be necessary. It shall not be necessary to adjust the camera zoom directly at the camera.

The Zoom lens shall have a 22X optical zoom and the field of view shall be adjustable over the range of 2.3 to 48 degrees horizontal, 1.8 to 37 degrees vertical, and a focal length of 4mm to 88mm. With an optional Wide angle configuration range of 4 to 74 degrees horizontal, 3 to 59 degrees vertical, and a focal length of 2.4mm to 52.8mm.

Detector Types

The machine vision sensor shall be capable to use a variety of detector types that perform specific functions. The general functions performed by the detectors shall include:

- 1) Presence/passage detection of moving and stopped vehicles.
- 2) Enable detection based on the direction of travel.

- 3) Measure speed.
- 4) Generate a variety of alarms based on measured traffic conditions
- 5) Combine the output of several detectors with logical operators and modify the resulting state based on delay or extend timers, which can be referenced to the state of any associated signal phase state.
- 6) Each of the detector types shall have the option to be shown in the live video output of the sensor at the user's request. The allocation of these functional detection capabilities to programmable detector types is described below:

Different detector types shall be selectable via software.

Detector types shall include:

- 1) *Count detectors* output traffic volume statistics. Generate traffic counts and occupancy.
- 2) *Presence detectors* indicate presence of a vehicle, stopped vehicle, or vehicles traveling in the wrong direction.
- 3) *Speed detectors* provide vehicle counts, speed, length, and classification.
- 4) *Detector functions* combine outputs of multiple detectors via Boolean logic functions. Minimum available logic functions shall be OR, AND, NAND, NOR, & M of N
- 5) *Labels* display information on the machine vision sensor video output an optionally pass input information to other detectors.
- 6) *Detector stations* accumulate traffic data over specified time intervals.
- 7) *Incident detectors* monitor free flowing traffic speed, occupancy, and flow for conditions that suggest a shock wave from an incident has occurred.
- 8) *Schedulers* define plans that can be used by other detectors to specify different parameters for each time of the day plan.
- 9) *Global Video Contrast Loss detectors* monitor the quality of the whole video image that the machine vision sensor is processing.
- 10) *Speed alarms* generate tri-state alarm outputs on user defined algorithms.

Detection Operation & Performance

Detection Zone Placement

- 1) The video detection system shall provide flexible detection zone placement anywhere and at any orientation within the field of view of the machine vision sensor.
- 2) A single detection zone shall be able to replace one or more conventional detector loops connected in series.
- 3) Detection zones shall be able to be overlapped for optimal road coverage.
- 4) Groups of detector zones shall be able to be logically combined into a single output.

Detection Zone Programming

- 1) Placement of detection zones shall be by means of a portable or desktop computer using the Windows XP/Vista operating systems, a keyboard, and a mouse.
- 2) The VGA monitor shall be able to show the detection zones superimposed on images of traffic scenes.

Optimal Detection

The machine vision sensor, when placed at a mounting height that minimizes vehicle image occlusion and equipped with a lens to match the width of the road, shall be able to monitor a maximum of 6 to 8 traffic lanes simultaneously.

Count Detection Performance

Using a machine vision sensor installed within the optimal viewing specifications described above or count station traffic applications, the system shall be able to accurately count vehicles with at least 96% accuracy under normal operating conditions (day and night), and at least 93% accuracy under adverse conditions. Adverse conditions are combinations of weather and lighting conditions that result from shadows, fog, rain, snow, etc.

Demand Presence Detection Performance

Using a machine vision sensor installed within the optimal viewing specifications described above for intersection control traffic applications, the system shall be able to accurately provide demand presence detection. The demand presence accuracy shall be based on the ability to enable a protected turning movement on an intersection stop line, when a demand exists. The probability of not detecting a vehicle for demand presence shall be less than 1 percent error under all operating conditions. In the presence of adverse conditions, the machine vision sensor shall minimize extraneous (false) protected movement calls to less than 7%.

Speed Detection Performance

The machine vision sensor shall accurately measure average (arithmetic mean) speed of multiple vehicles with more than 98% accuracy under all operating conditions for approaching and receding traffic. The machine vision sensor shall accurately measure individual vehicle speeds with more than 95% accuracy under all operating conditions for vehicles approaching the sensor, and 90% accuracy for vehicles receding from the sensor. These specifications shall apply to vehicles that travel through both the count and speed detector pair and shall not include partial detection situations created by lane changing maneuvers.

All power cables used for connecting the camera to the traffic signal cabinet shall meet the following

requirements:

- i. Shall be approved by the video detection manufacturer.
- ii. Shall be listed by a Nationally Recognized Testing Laboratory (NRTL) As meeting the requirements of UL44, UI277, UL1685
- iii. Shall be rated for 600 volts
- iv. Shall be suitable for use at 90 degrees C in wet or dry locations
- v. Shall be listed as Tray Cable

The camera shall be mounted as shown in the plan. It shall be a band mount type camera bracket. Band mount mast arm bracket shall be aluminum and all other hardware including the banding shall be stainless steel.

Monitor

A 9” or larger color monitor shall be furnished and installed in the traffic signal controller cabinet to view video detection output at each intersection where video detection is utilized.

SS-4.3 CONSTRUCTION REQUIREMENTS

A Conduit Installation

Conduit shall be installed in accordance with Mn/DOT 2565.3D, except as follows:

Non-Metallic Conduit Attached to Wood Poles:

--- Non-metallic conduit shall be securely fastened to wood poles by appropriate type conduit straps that meet the current edition of the National Electrical Code (NEC). The conduit straps shall be spaced 3 - 4 feet apart or as directed by the Engineer.

Continuous Type HDPE Non-Metallic Conduit:

--- except for under existing pavements, underground Continuous Type HDPE Conduit shall be placed by trenching, stitching, plowing, or other method approved by the Engineer. Under existing pavements, Continuous Type HDPE Non-Metallic Conduit shall be placed as specified in 2565.3D2b.

Rigid Non-Metallic Conduit Joints:

--- the Contractor shall install appropriate sized long line couplings when installed under existing roadway surfaces

--- the applied PVC joint cement shall be allowed to set-up for **six (6) hours** before pulling the conduit through a directional bored channel.

B Handhole Installation

The Contractor shall install handholes in accordance with the provisions of Mn/DOT 2565.3E and as follows:

The required aggregate drain bed below the handhole shall be **compacted** before installation of the handhole.

Conduit holes located in handhole barrel section shall be sized no more than 1 inch larger than the size of the conduit being used.

All handholes shall be backfilled **after** the frame casting and cover have been installed onto the handhole.

C Temporary Cabinet Base

The Contractor shall install the temporary traffic signal cabinet base at the location staked by the Engineer. The temporary traffic signal cabinet base shall be installed per the Manufacturer's instructions to the satisfaction of the Engineer.

D Span Wire Mounted Vehicle Signal Faces

The Contractor shall install each one-way span wire mounted vehicle signal face as detailed on the "TYPICAL WOOD POLE/SPAN WIRE SIGNAL SYSTEM DETAILS" in the Plan, all to the satisfaction of the Engineer.

E Wood Pole Anchors for Down Guys

Wood pole anchors for down guys shall be approved by the Engineer before installation and shall be installed where indicated in the Plans at an elevation at least 5 feet below the ground line. The wood pole anchors shall be embedded in a compacted granular material in a manner approved by the Engineer.

F Street Lights on Wood Poles

Each mast arm and luminaire for street lights shall be in accordance with the following specifications.

1. Mast Arm

Mast arm for the luminaire shall be suitable for wood pole mounting; shall be 15 foot in length; and shall be galvanized. The slipfitter for the luminaire shall be nominal 2 inch diameter.

2. Luminaire

All luminaires shall be cobrahead, 250 watt, High Pressure Sodium (HPS) with Photoelectric control for 120 Volt. Mn/DOT approved Luminaires are listed on the Mn/DOT Approved Product List for Lighting:

<http://www.dot.state.mn.us/products/index.html>

3. Photoelectric Control

New Photoelectric Controls shall be Mn/DOT approved Photocells listed on the Mn/DOT WEB site under the Mn/DOT Approved Products List for Lighting:

<http://www.dot.state.mn.us/products/index.html>

4. Wiring

A 1-3/C #14 (LUM) cable shall be provided from the service equipment circuit breaker load center to the luminaire as required by the Plans with a 6 amp cartridge type fuse mounted in a watertight inline fuse connector in the ungrounded conductor and located inside each luminaire housing. It is not required that the inline fuse connector be made of rubber.

Street light check switches are not required.

5. Wire Labeling

All wiring shall be in accordance with the Plan or revised field wiring diagram(s) included submitted by the Contractor and approved by the Engineer based on approach geometry modifications required as part of an approved traffic control plan, and Mn/DOT 2565.3J, except as follows:

Labels to identify cables and conductors, except the individual conductors terminated at the cabinet fuse panels, shall consist of white vinyl adhesive tape wrapped around the cable. The labeling shall be hand written on the vinyl adhesive tape or produced with a label maker. If label marking is handwritten, the labeling shall be accomplished by utilizing a black permanent marker, in such a manner, that the markings are legible to the satisfaction of the Engineer. Labels produced with a label maker shall be suitable for use in wet locations, and this label must wrap around the cable one complete revolution with some overlap.

Labels to identify the individual conductors terminated at the cabinet fuse panels, shall utilize either machine printed labels, embossed plastic labels, vinyl adhesive pre-printed labels, or sleeve type labels placed around each conductor.

G Video Detection

Each Camera must be properly aimed for optimal field of view for the specific approach. Camera must be zoomed and focused to allow optimal imaging of the approach.

Detection zones must be placed as indicated on the plan sheets or as indicated on the revised plan sheet submitted by the Contractor and approved by the Engineer based on approach geometry modifications required as part of an approved traffic control plan.

All video detection equipment and cameras shall be installed by qualified personnel approved by the video detection equipment manufacturer. Ramsey County personnel will not be responsible for aiming the cameras or programming detector zones at or before initial signal turn on or as part of modified approach geometry required as part of an approved traffic control plan that is implemented. This task will be the sole responsibility of the contractor.

The contractor is responsible for arranging with Ramsey County personnel a field review to verify that each detection zone for each approach is working correctly. This review will include a view of the live video image showing the detection zones overlaid and operating on the video image.

H Bonding and Grounding

All bonding and grounding shall be in accordance with the National Electrical Code; with the Plans; and with the applicable provisions of Mn/DOT 2565.3H, except as follows:

1. The last paragraph on Page 650 shall read as follows:

Where a bonded and grounded continuous rigid steel conduit system is not installed, metal poles, pedestals, cabinets, and other structures requiring a ground rod electrode shall be bonded to the ground rod electrode by a No. 6 grounding electrode conductor enclosed in a 25 mm (1inch) diameter conduit stubbed out of the concrete foundation. One end of the bonding jumper shall be attached to the lower part of the pole, pedestal, cabinet, or structure shaft or base and the other end attached to the ground rod electrode by a grounding connection.

2. The first paragraph on Page 651 shall read as follows:

For bonding and grounding in all conduit systems, a No. 6 green stranded equipment grounding conductor shall be installed with all electrical circuits. Where non-metallic conduit is to be installed for future use, the equipment grounding conductor may be omitted.

Metal conduits, luminaire mast arm, metal junction boxes, span wire, down guys, service equipment, video detector units, and the traffic signal cabinet shall be made mechanically and electrically secure to form a continuous bonded grounded system. The bonding and grounding jumper shall be copper wire not less than No. 6 AWG. Attachment of the bonding and grounding jumper to span wires, down guys, conduits, and the ground rod electrode shall be made by material compatible grounding

clamps and connectors.

I Blank

J Oxide Inhibitor

The Contractor shall apply an oxide inhibiting agent to all No. 6 grounding connections after assembly and final connection.

SS-4.3 TRAFFIC SIGNAL STAGING

Construction of the temporary and permanent signal systems shall be accomplished according to the suggested staging detailed below and in the Plans unless an alternate plan, provided by the Contractor at no additional cost, is approved by the Engineer as part of the planned sequence of construction. However the Contractor shall make sure that a traffic control signal is operational at the intersection at all times, except as approved by the Engineer.

The Contractor shall utilize the temporary signals to provide temporary operation of the traffic signal at the intersections, all to the satisfaction of the Engineer. The Contractor shall provide any necessary wires and cables and shall make all required connections to keep temporary signals, in operation at the intersections, all to the satisfaction of the Engineer.

Prior to beginning the road construction, the Contractor shall install the temporary signal systems.

When ready for temporary operation of a signal system, the Contractor shall bag and turn-off all in-place vehicle and pedestrian signal faces, and make the temporary signal operational.

During each stage of construction, the Contractor shall be responsible for reaiming the video detectors toward the appropriate traffic lanes and making the required detection zones operational during all phases of road construction, as directed by the Engineer. Relocating or reaiming video detectors and reconfiguring video detection zones for each stage of construction will be considered incidental.

The transition from one stage of temporary signal system to another stage of temporary signal system shall occur only when directed by the Engineer.

The County by its own forces will make all necessary revisions in the intersection traffic signal cabinet and control equipment when the transition from one stage of temporary signal system to another stage of temporary signal system occurs. For each stage of a temporary signal system, the Contractor shall make all the necessary field lead connections in the intersection traffic signal cabinet as directed by the Engineer and shall make the temporary signal system operational.

Upon completion of all road construction, the Contractor shall remove and salvage all items of the temporary signal system, complete all work on the permanent signal system, and place the complete new permanent signal system into operation as shown in the Plans and as directed by the Engineer.

Removal of Temporary Signal System

When directed by the Engineer, the Contractor shall remove and salvage all materials and electrical equipment of the temporary traffic control signal system, as required by these Special Provisions, in accordance with the applicable provisions of Mn/DOT 2104, and as follows:

All Contractor furnished materials shall be removed and salvaged by the Contractor and shall become the property of the Contractor except for items that are specified as being salvaged to the County.

Underground conduit not being reused in-place as part of the new permanent signal system shall be removed and disposed of by the Contractor.

Damaged items that are to be salvaged to the County shall be brought to the attention of the Engineer prior to removal from the temporary signal system that replacement by the Contractor will not have to be made.

If an item that is to be salvaged to the County is damaged during salvaging and removal, these items shall be replaced by the Contractor at no expense to the County. Replacement items shall be approved by the Engineer prior to delivery.

Electrical cables and conductors, wood poles, and all other items supplied by the Contractor for the temporary traffic control signal system not designated as being salvaged to the County shall be removed entirely by the Contractor and disposed of outside the right-of-way in any manner that the Contractor may elect subject to the provisions of Mn/DOT 2104.3C3.

The following items shall be disassembled and salvaged to Ramsey County as specified below:

1. After the cabinet and control equipment is de-energized and power conductors disconnected, the Contractor shall prevent damage to the cabinet and control equipment as follows:
 - a) Unplug and remove all removable control equipment (i.e., controller unit, video detection equipment, conflict monitor, load switches, etc.) from the cabinet. The control equipment removed from the cabinet shall be suitably packed to prevent damage to the equipment during transportation.
 - b) Connecting harnesses for the equipment shall be coiled or grouped together and secured to a shelf in the cabinet. The harnesses can be taped, wired, or tie wrapped, but shall be done by a method that prevents the harnesses from being pinched in the door when the door is closed, or from dropping below the bottom of the cabinet when it is lifted off the foundation.

- c) The cabinet shall be secured in an upright position at all times (removing from foundation, transporting, loading, and unloading) to insure that the cabinet will not tip and be damaged.
2. Video detection cameras shall be delivered to the County along with the mounting assemblies provided as part of the temporary signal systems after being disconnect from the luminaire mast arms or wood poles to which they are attached. The wiring from the traffic cabinet to the cameras shall become property of the Contractor.

The salvaged traffic signal cabinet, control equipment, and video detection cameras shall be disassembled as specified herein and shall be delivered to the Ramsey County Public Works Facility at 1425 Paul Kirkwold Drive in Arden Hills, MN 55112. The Contractor shall notify Mr. Joe Hugo (651) 266-7141 of Ramsey County Public Works at least three (3) normal working days in advance of the time the Contractor intends to deliver the salvaged materials. **THE ENGINEER SHALL BE NOTIFIED IN ADVANCE OF NOTIFICATION TO MR. HUGO.** Salvaging and delivery of specified salvaged equipment to Ramsey County is inclusive to the work.

All resulting excavation shall be backfilled, and the backfilling and compaction shall be like in kind to approximately the same density as the adjoining ground. Any roadway surfacing (concrete pavement bituminous surface, or gravel surface, including underlying base courses), sidewalk, curbs and gutter, sod, etc., removed by the construction operations shall be replaced in kind by the Contractor, all at his own expense.

All removals of material of the temporary signal system, the disposal of Contractor-owned materials, and backfilling, all in accordance with the foregoing, shall be considered incidental.

SS-4.4 MEASUREMENT AND PAYMENT

Furnishing and installing materials and electrical equipment as specified herein, all to provide a complete operating temporary full-traffic-actuated traffic control signal system at the intersections of -

T.H. 10 / CSAH 10 / COUNTY ROAD H

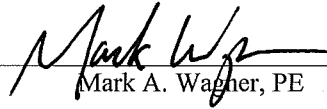
--- will be measured as an integral unit complete in place and operating and will be paid for under Item No. 2565.616 (TEMPORARY SIGNAL SYSTEM) at the Contract price per SYSTEM, which price shall be compensation in full for all costs incidental thereto (including all modifications of the temporary signal system to accommodate changes in traffic control, removal and salvaging of the temporary signal system materials and electrical equipment, and delivery of salvaged materials upon completion of all road construction and operation of the new permanent traffic control signal system).

DIVISION ST

DIVISION ST

Section		Page
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ST-3	(3352) SIGNS, DELINEATORS AND MARKERS.....	7-ST

I hereby certify that the Special Provisions for traffic sign construction (Division ST) contained in this proposal were prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.


Mark A. Wagner, PE

Lic. No. 51660

Date 12/8/15

DIVISION ST**ST-1 (2104) REMOVING MISCELLANEOUS STRUCTURES****ST-1.1 DESCRIPTION**

The Contractor shall remove and salvage miscellaneous structures according to 2104, "Removing Pavement and Miscellaneous Structures" and these Special Provisions.

ST-1.2 MATERIALS

The Contractor shall use materials according to 2104, "Removing Miscellaneous Structures" and the 2104, "Removing Miscellaneous Structures: Construction Requirements" section of these Special Provisions.

ST-1.3 CONSTRUCTION REQUIREMENTS**A Remove Sign Panel Type A**

Remove the sign panel and post clips.

B Remove Sign Panel Type OH

For Sign(s) OH 35W-061:

Remove the left sign panel and panel mounting posts.

Remove the sign panel and sign bracket assembly(ies) which attach each sign panel to the sign support.

For Sign(s) OH 35W-065:

Remove the right sign panel and panel mounting posts.

C Remove Sign Type A

Remove the concrete footings or H-pile footings completely.

D Remove Sign Type OH

Disconnect the power conductors at the source of power (SOP) and the sign base. Resplice and waterproof any SOP power cable connections required to maintain roadway lighting according to 2545, "Electric Lighting Systems." Shut off the circuit breaker(s) in service cabinets.

Contact the Department for final acceptance of the source of power disconnection:

John Pedersen
Metro Traffic Lighting Operations
651-234-7849

Remove the concrete footing(s). Bury the end of the power cable and abandon it in place as directed by the Engineer.

E Remove Sign Type OH (Bridge Mounted)

Disconnect the power conductors at the source of power (SOP) and at the switch. Resplice and waterproof any SOP power cable connections required to maintain roadway lighting according to 2545, "Electric Lighting Systems."

Contact the Department for final acceptance of the source of power disconnection:

John Pedersen
Metro Traffic Lighting Operations
651-234-7849

F Salvage Sign Type EA and EO

Inform the Engineer of any damaged in-place EA/EO sign panels prior to salvaging.

Remove and dispose of the post clips and flanged channel posts.

Prevent damage to the bracket assemblies, aluminum sign panels, and the sign sheeting materials at all times, including during storage.

Methods to prevent damage during storage include but are not limited to:

Store sign panels so that they are NOT lying on the ground.

Store sign panels so that reflective surfaces do NOT come in contact with dirt, water, or grass.

Store sign panels so that they are NOT covered with plastic or a tarp.

Salvaged Type EA signs will be reinstalled under Item No. 2564.537 - Install Sign Type EA.

Salvaged Type EO signs will be reinstalled under Item No. 2564.537 - Install Sign Type EO.

G Salvage Sign Type OH

Pull the power cable out of the conduit in the footing prior to removal of the concrete footing. Tape the ends of the conductors.

Salvage the sign truss (including sign panels and panel mounting posts) and sign post from the concrete footing and deliver to MnDOT. Give 14 days advance notice to the Department prior to delivering the salvaged sign materials:

Jeff Streeter
651-366-5191

Remove the concrete footing. Bury the end of the power cable and abandon in place as directed by the Engineer.

ST-1.4 METHOD OF MEASUREMENT & BASIS OF PAYMENT

The Engineer will measure each item according to the Contract and the 2104, "Removing Miscellaneous Structures: Construction Requirements" section of these Special Provisions.

The Department will include all work described in the Contract and the 2104, "Removing Miscellaneous Structures: Construction Requirements" section of these Special Provisions as part of the contract unit price per unit of measure.

The Department will pay for traffic signs and devices on the basis of the following schedule:

Item No.:	Item:	Unit:
2104.509	Remove Sign Panel Type _	Each
2104.509	Remove Sign Type _	Each
2104.523	Salvage Sign Type _	Each

The Department's payment for each item shall be compensation in full for all work, material, and costs involved in performing the work specified on the Plans and these Special Provisions.

ST-2 (2564) TRAFFIC SIGNS AND DEVICES**ST-2.1 DESCRIPTION**

The Contractor shall furnish and install traffic signs in accordance with 2564, "Traffic Signs and Devices," except as modified in these Special Provisions.

ST-2.2 MATERIALS

Fabricate all signs, markers, and delineators with material in accordance with 3352, “Signs, Delineators, and Markers” except as modified in these Special Provisions.

Fabricate all rigid permanent signs, markers, and delineators with materials from the [MnDOT Approved/Qualified Products List](#).

Provide sign face material meeting the performance requirements of 3352.2.A.2.b, “Sign Sheeting Type IV” for rigid permanent signs, markers, and delineators described in Table 2564.2-ST1 and on the Plans:

Table 2564.2-ST1: MnDOT Metro District Sign Sheeting Type IV Requirements		
Category	Item	Condition(s)
(1)	Sign Panels Type C	All Sign Panels Type C with the exception of: <ul style="list-style-type: none"> • R1-1 STOP, R1-2 YIELD, R1-3P ALL WAY, R5-1 DO NOT ENTER signs, • W-Series (warning) signs, • S-Series (school) signs, • Mast arm-mounted signs, and • Bridge-mounted signs. Provide sign face material meeting the requirements of 3352.2.A.2.f, “Sign Sheeting Type XI for the exceptions listed in Category (1).”
(2)	Sign Panels Type D	Ground-mounted signs
(3)	Sign Panels Type Overlay	Type Overlays which are attached to signs described in Categories (1) and (2)
(4)	Delineator Type X3-1	All
(5)	Delineator Type X4-6	White background color
(6)	Delineator Type X4-8	All
(7)	Infiltration Area Marker X3-6a	All

Provide non-fluorescent reflective sheeting for the yellow background color portions for:

- Overhead-mounted Type D sign panels,
- Sign Panel Type Overlays attached to overhead-mounted Type C and Type D sign panels, and
- X3-6A Infiltration Area Markers.

ST-2.3 CONSTRUCTION REQUIREMENTS

The provisions of 2564.3, “Construction Requirements, General” are modified and supplemented as follows:

The following replaces the fourth paragraph of 2564.3A:

Sign locations and sign structure posts lengths indicated on the Plans are approximate. Locate and stake final sign and delineator locations and obtain approval of locations by the Engineer. Determine the final post lengths for Type C signs, Type D signs and delineators in accordance with offsets, mounting heights and clearances detailed on the Plans and field verification of the proposed or in-place slopes. Determine the

final post lengths for Type OH sign in accordance with the offsets, mounting heights and clearances detailed on the Plans and by field verification of the proposed or in-place slopes. Provide shop drawings for Type OH signs in accordance with 2564.3, "Construction Requirements, Structural Steel."

A As-Built Signing Data

Submit to the Department an electronic data table containing GPS coordinates and sign attribute data for all new signs, as well as signs that change location.

Contact the Department 15 working days prior to field collection to obtain tables containing the attribute and plan spreadsheet data to be collected.

Eric Peterson
North Metro Signing Engineer
651-234-7830
eric.peterson@state.mn.us

Provide the electronic data table in standard geospatial vector data format. The format must be accepted by MnDOT prior to commencement of field work.

Collect the data in the 1996 adjustment to the UTM15N North American Datum (NAD83), unless otherwise specified.

Ensure that the GPS receiver uses a minimum of 5 satellites during data collection.

Ensure that the geospatial data collected is accurate to less than 1 meter.

Collect 1 GPS coordinate per sign support structure.

Sign support structures include but are not limited to the following types: flanged channel sign post, square tube sign post, I-beam, signal mast arm, signal post, guardrail end treatment, wall mounting, cantilever, sign bridge.

If the support consists of a guardrail end treatment or multiple sign posts or I-beams,

Collect the GPS coordinate at the center of the support.

If the sign is located on a signal mast arm or signal post,

Collect the GPS coordinate at the signal post.

If the sign is located on a cantilever or sign bridge,

Collect the GPS coordinate at the support pole located exterior to the roadway.

Use the following support structure data definitions:

Route – MnDOT route where the sign is located.

Travel Direction – Cardinal direction of the roadway

Type – Support Type

Material – The physical properties/description of which the support is made.

Mounting Kit - Means of attaching or mounting a sign panel or support.

Assign each sign panel to a support structure and use the following attribute definitions:

Code – Specify the MN MUTCD code of standard signs. If the panel is a uniquely designed sign, use the panel number as specified on plan sheet (i.e. D-101 or OH100-001).

Size – width x height for rectangular and octagonal panels, diameter for circular panels, length of a side for triangular panels, and length of the bottom side for pentagonal panels (inches).

Facing Direction – Direction the sign panel is facing.

Sheeting Material – Manufacturer’s brand name (DG3, OmniCube)

If the submitted data does not meet the criteria of this specification,

The Department may reject the data and require the Contractor to repeat the data collection. No direct payment will be made for this work.

B Fabrication & Warning Stickers

Install Department-provided warning stickers on new Type C and D sign panels according to 2564.3H.2, “Traffic Signs and Devices: Construction Requirements: Sign Panels: Fabrication and Warning Stickers.”

Give 30 days advance notice to the Department prior to picking up the Department-provided warning stickers:

Jeff Streeter
651-366-5191

C Field Spotting of Signs

Give the Engineer 14 calendar days advance notice prior to installing signs inside or within 50 feet of roundabouts.

The Engineer will contact the District Traffic Office, which will provide personnel to field spot the installation location and orientation of the signs:

Michael Kamnikar
Metro District Traffic Engineer
651-234-7835
michael.kamnikar@state.mn.us

For Type A signs and sign panel overlays on Type A signs,

Affix the warning sticker to each Type A sign panel in the lower right corner of the back of the sign panel, directly above the fabrication sticker.

D Install Sign Type EA and EO

For each salvaged Sign Type EA and Sign Type EO being installed,

Furnish and install new extruded panel sections as detailed on the Plans; they will be furnished and installed under Item No. 2564.531 – Sign Panels Type EA and Item No. 2564.531 – Sign Panels Type EO.

Install by attaching Type EA panels to Type A sign panels and Type EO panels to Type OH sign panels with new flanged channel or S4x7.7 panel mounting posts and new post clips. Install the panels under Item No. 2564.537– Install Sign Type EA and Item No. 2564.537 – Install Sign Type EO.

Torque the post clips according to Item (3) in 2564.3L, “Traffic Signs and Devices: Construction Requirements: Install Sign Panel Type.”

Overlay the Type EA and Type EO panels under Item No. 2564.535 – Sign Panel Overlay Type EA and Item No. 2564.535 – Sign Panel Overlay Type EO.

E Post-Award Data

SignCAD Millennium (Program Version 8.61) panel layout files for panel layouts shown on the Plans are available electronically upon project award. To request these files, please contact:

Rick Sunstrom
MnDOT Central Office Signing
Office of Traffic, Safety and Technology
651 234-7381
rick.sundstrom@state.mn.us

MnDOT believes the electronic data it will provide is accurate, but MnDOT provides no guarantee or warranty, express or implied, concerning the accuracy of the data and the Contractor shall not act in reliance on the data without verifying the data against the contract documents. The documents originally provided with the Contract remain the basis of the Contract, and the electronic data that will be provided at the Request of the Contractor is provided only for the convenience of the Contractor. Therefore, if use of this data causes an error, omission, unacceptable work, or work not in conformance with the contract documents, then any costs to the Contractor to make corrections as a result of this error will not be considered "extra work", and the Contractor will not be entitled to an adjustment of contract time.

F Sign Panel Overlay Type A

The provisions of 2564.3K, "Construction Requirements: Sign Panel Overlay Type A" are modified as follows:

Use retroreflective sheeting sign face material in accordance with 3352.2.A.2.f, "Sign Sheeting Type XI," except for the following:

- (1) For a yellow background on sign panel overlays, use retroreflective sheeting as specified by 3352.2.A.2.f, "Sign Sheeting Type XI," non-fluorescent yellow, and
- (2) For a brown background, use white retroreflective sheeting as specified by 3352.2.A.2.f, "Sign Sheeting Type XI."

Use sign legend material as specified by 3352.2.A.2.f, "Sign Sheeting Type XI" for the sign face material on each sign panel, except for the following:

- (1) Use brown (1179), electronic Cuttable (EC) film produced by the same manufacturer that fabricates the retroreflective sheeting specified by 3352.2.A.2.f, "Sign Sheeting Type XI," for sign legend material on sign panel overlays with brown sheeting; and
- (2) If brown EC film for sign panel overlays requires splicing, make splices vertical and butt spliced and spaced so splices do not occur through letters or arrows.

In addition to the work described in 2564.3K, "Traffic Signs and Devices: Construction Requirements: Sign Panel Overlay Type A,"

Remove in-place sign panel overlays before attaching the new overlays to the panel.

For Sign Panel Overlays Type OH indicated in Chart S of the Plan and for Sign Panels Type Overlay to be attached to these panels,

Apply the graffiti film to the panels in the shop and according to the manufacturer's specifications.

Apply graffiti film to the entire Sign Panel Overlay Type OH panel.

Apply graffiti film to the Sign Panels Type Overlay.

Rivet the Sign Panels Type Overlay to the Sign Panel Overlay Type OH panel according to 2564.3H, "Traffic Signs and Devices: Construction Requirements: Sign Panels", paragraph 1.

G Sign Panels Type OH
For Sign Panel(s) OH 35W-061,

Furnish and attach new sign bracket assemblies to the sign support.

Attach each new panel to the new sign bracket assemblies with new mounting hardware as detailed on the Plans.

ST-2.4 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

The Engineer will measure each item according to the Contract and the 2564, "Traffic Signs and Devices: Construction Requirements" section of these Special Provisions.

The Department will include all work described in the Contract and the 2564, "Traffic Signs and Devices: Construction Requirements" section of these Special Provisions as part of the contract unit price per unit of measure.

The Department will pay for traffic signs and devices on the basis of the following schedule:

Item No.:	Item:	Unit:
2564.531	Sign Panels Type _	Square foot
2564.535	Sign Panel Overlay Type _	Square foot
2564.537	Install Sign Type _	Each

The Department's payment for each item shall be compensation in full for all work, material, and costs involved in performing the work specified on the Plans and these Special Provisions.

ST-3 (3352) SIGNS, DELINEATORS AND MARKERS

ST-3.1 SCOPE

The Contractor shall fabricate traffic signs, delineators, and markers consisting of sign panels 3352, "Signs, Delineators and Markers" and these Special Provisions.

ST-3.2 REQUIREMENTS

The Contractor shall use materials according to 3352, "Signs, Delineators and Markers" and these Special Provisions.

A Sign Sheeting Type IV

The provisions of 3352.2.A.2.b, "Signs, Delineators, and Markers: Requirements: Sign Sheeting Type IV" are modified as follows:

Provide Sign Sheeting Type IV for highway signing, markers, and delineators. Provide white and fluorescent orange Sign Sheeting Type IV for reboundable plastic drums and weighted channelizers. Additionally, test to ensure the impact resistance of the material at 32 °F [0 °C].

The provisions of 3352.2.A.3, "Signs, Delineators, and Markers: Requirements: Warranty Requirements" are supplemented as follows:

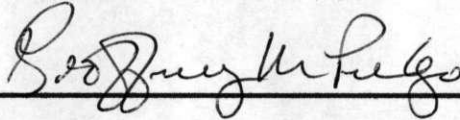
Table 3352-3 Minimum Retroreflectivity Values			
Sign Sheeting Type	Warranty Period, <i>years</i>	Minimum Allowable Retroreflection	Total Daytime Luminance Factor Minimum
Type IV Signs, Delineators, and Markers	1 - 7	80%	---
Type IV Signs, Delineators, and Markers	8 - 12	70%	---

ST-3.3 SAMPLING AND TESTING — (BLANK)

DIVISION SZ

Office of Traffic and Maintenance Operations

I hereby certify that Special Provisions for the Traffic Management System (Division SZ), contained in this proposal were prepared by me or under my direct supervision and that I am a duly licensed professional engineer under the laws of the State of Minnesota.



Geoffrey M. Prelgo

License # 26530

Date: 11/20/15

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DIVISION SZ

SZ-1 **(1102) ABBREVIATIONS**

The provisions of Mn/DOT 1102 are hereby supplemented with the following:

SZ-1.1 The following is added to Mn/DOT 1102:

APL	Approved Product List
ABS	Acrylonitrile Butadiene Styrene
CPVC	Chlorinated Polyvinyl Chloride
DC	Direct Current
EIA	Electronic Industries Alliance
FDF	Fiber Distribution Frame
FNMC	Flexible Non-Metallic Conduit
FO	Fiber Optic
FOTP	Fiber Optic Test Procedure
HDPE	High Density Polyethylene
HOV	High Occupancy Vehicle
JB	Junction Box
KA	Kilo Amperes
LCS	Lane Control Signal
LLDPE	Linear Low Density Polyethylene
LED	Light Emitting Diode
MDPE	Medium Density Polyethylene
MIL	Military
MM	Multimode
NRTL	Nationally Recognized Testing Laboratory
OTDR	Optical Time Domain Reflectometer
OFSTP	Optical Fiber System Test Procedure
PE	Polyethylene
PTZ	Pan, Tilt, Zoom
RCS	Ramp Control Signal
SGU	Sheath Grounding Unit
SM	Single Mode
SNR	Signal to Noise Ratio
SS	Stainless Steel
STP	Shielded Twisted Pair
TIA	Telecommunications Industries Association
TWP	Twisted Wire Pair
XLP	Crosslinked Polyethylene
V	Volt
ZDW	Zero Dispersion Wavelength

SZ-1.2 UNITS

°F	Degree Fahrenheit
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SZ-1.3 SYMBOLS

π	pi (3.1416)
<	less than
>	greater than

SZ-1.4 CONVERSIONS

1 inch	25.4 millimeters (mm)
1 inch ²	645 mm ²
1 inch ³	16,400 mm ³
1 yd ³	0.76 m ³
1 liter	61 in ³
1gallon	3.785 liters
1 pound mass	0.4536 kg

SZ-2

(1103) DEFINITIONS

The provisions of Mn/DOT 1103 are hereby supplemented with the following:

AS BUILT PLANS

Copies of the original Plan and Plan Detail sheets with changes and additions to the Contract marked in the color red.

SPECIFICATIONS

Detailed descriptions of a device or devices including physical and operating characteristics.

SUBMITTAL

Documentation of proposed, materials, products, equipment or processes. Additionally, it shall include shop drawings, wiring diagrams, and test reports

SCHEMATICS

Diagrams using standard symbols to show the function.

HAS MET

A Manufacturer's product that is in conformance with the specifications required in these Special Provisions. The Contractor may submit any other Manufacturer's product of equal quality for approval.

APL

Mn/DOT's Approved Product List which contains Manufacturer's products that are in conformance with the specifications required by Mn/DOT. The Contractor shall only use products contained within the Traffic Management Systems/ ITS section of the APL unless otherwise directed within these Special Provisions. The Contractor may submit any other Manufacturer's product of equal quality for approval. See the following website for the APL:

<http://www.dot.state.mn.us/products/index.html>

SZ-3

(1903) COMPENSATION FOR INCREASED OR DECREASED QUANTITIES

Quantities shown in the Plan are estimates only. Increases or decreases in final quantities shall not be grounds for unit bid price adjustment requests. Quantities requested for work not covered by unit bid prices shall be paid for as Extra Work in accordance with Mn/DOT 1904.

SZ-3.1 Mn/DOT1903 is modified to the extent that any references to 75 percent shall be construed to read 60 percent and any references to 125 percent shall be construed to read 150 percent for the following items:

2550.516	BURIED CABLE SIGN
2550.532	LEAD-IN CABLE 2 CONDUCTOR NO 14

2550.603 _____ “ BORED CONDUIT

SZ-4 **(2104) REMOVE FIBER OPTIC VAULT**

This work shall consist of Remove Fiber Optic Vault and removal or salvaging of internal and external components which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-4.1 Notify the TMS Integrator by TMS construction phone number (651) 331-8370, a minimum of two Working days before removing the Fiber Optic Vault and removing or salvaging internal and external components.

(A) Internal and external components shall include but not be limited to the following:

- a. Outdoor Fiber Splice Enclosure.
- b. Concrete Drain Headwall.

SZ-4.2 Internal and external components shall be salvaged according to Plan. Salvaged items shall be given to the TMS Integrator.

SZ-4.3 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2104.509 (REMOVE FIBER OPTIC VAULT) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited removing internal and external components, salvaging internal and external components, and all materials and labor necessary to construct the Remove Fiber Optic Vault.

SZ-5 **(2104) REMOVE CABINET**

This work shall consist of Remove Cabinet and removal or salvaging of internal and external components which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-5.1 Notify the TMS Integrator by TMS construction phone number (651) 331-8370, a minimum of two Working days before removing the Cabinet. The TMS Integrator will salvage some components prior to removal.

SZ-5.2 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2104.509 (REMOVE CABINET) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited removing internal and external components, notifying the TMS Integrator, and all materials and labor necessary to construct the Remove Cabinet.

SZ-6 **(2104) SALVAGE RAMP CONTROL SIGNAL**

This work shall consist of removing, salvaging and delivering the Ramp Control Signal as directed by the Engineer. The salvaged ramp control signal shall be delivered to the storage location as specified below, or as directed by the Engineer. Any damage to the salvaged materials resulting from the removing, salvaging, and delivering operation shall be repaired or replaced at the Contractor's expense.

SZ-6.1 The signs attached to the Salvaged Ramp Control Signal shall be included in the salvage operation.

SZ-6.2 Notify the TMS Integrator by TMS construction phone number (651) 331-8370, a minimum of two Working days before transporting the salvaged ramp control signal, or components, from the job site to the storage site. The storage site is on Mn/DOT property in the Metro area.

SZ-6.3 Materials deemed non-salvageable by the Engineer shall be removed completely and disposed of outside of Mn/DOT right-of-way in any manner that the Contractor may elect subject to the provisions of Mn/DOT 2104.3C3.

SZ-6.4 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2104.523 (SALVAGE RAMP CONTROL SIGNAL) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to all materials and labor necessary to construct the Salvage Ramp Control Signal.

SZ-7 (2104) REMOVE CABLES

This work shall consist of Removing Cables, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-7.1 Remove Cables from termination or splice location to termination or splice location by extracting designated cables from existing conduit and end equipment in a manner that is harmless to the cables that shall remain intact.

SZ-7.2 **MEASUREMENT AND PAYMENT**

No measurement will be made of the various Items that constitute Remove Cables but all such work will be construed to be included in the single Lump Sum payment under Item 2104.601 (Remove Cables).

SZ-8 (2104) HAUL SALVAGED MATERIAL

This work shall consist of loading and hauling salvaged materials, not required for installation elsewhere under this Contract, to the designated storage area(s) and depositing said materials thereat in a manner satisfactory to the Engineer.

SZ-8.1 The Storage area will be within the Metro area.

SZ-8.2 Notify the TMS Integrator by TMS construction phone number (651) 331-8370, a minimum of two Working days before transporting the salvaged items, from the job site to the storage site.

SZ-8.3 The Contractor shall carefully clean and bundle, if appropriate, the salvaged materials to the satisfaction of the Engineer prior to loading.

SZ-8.4 It shall be the Contractor's responsibility to neatly stockpile the material at the storage site with their forces as directed by the Engineer.

SZ-8.5 Salvaged material shall arrive at the storage area in carefully segregated lots so that it can be easily and quickly placed in its proper storage location. The Contractor shall unload the salvaged material and place it at designated locations within the yard.

SZ-8.6 **MEASUREMENT AND PAYMENT**

No measurement will be made of the various Items that constitute Haul salvaged Material but all such work will be construed to be included in the single Lump Sum payment under Item 2104.601 (Haul Salvaged Material). Payment will be made under Item 2104.601 (HAUL SALVAGED MATERIAL), which shall be compensation in full for all costs incidental thereto, including but not limited to hauling the materials, protecting the salvaged materials, depositing the salvaged materials, and all materials and labor necessary to construct the Haul Salvaged Material.

SZ-9 (2550) MATERIALS

The following provisions shall supplement Mn/DOT 2550.2A:

- SZ-9.1 All Materials, work methods, and equipment shall comply with the standards of the National Electrical Manufacturers Association, Electronic Industries Association, Underwriters Laboratory, Inc., National Electrical Code; Telecommunications Industries Association, local codes and ordinances, the requirements of the Contract, these Special Provisions, and the Plan.
- SZ-9.2 The Contractor warrants all F&I materials and workmanship as well as workmanship on materials that were paid for as an Install item for a minimum of six months after completion and acceptance of the work. Specific items within these Special Provisions may require longer warranty periods. The warranty period begins when the Contractor completes all construction obligations, documented as the Final Completion Date on the Change in Construction Status report.
- SZ-9.3 Use stainless steel hardware (e.g. mounting bolts, nuts, washers, and external hinges, etc.) on all outdoor TMS components (vaults, cabinets, TMS Shelter Cabinets, handholes, electrical services, etc.).
- SZ-9.4 The Contractor is responsible for rounding and smoothing sharp corners and edges of all F&I TMS components.

SZ-10 Mn/DOT FURNISHED MATERIALS

The following provisions shall apply to State Provided Materials:

- SZ-10.1 State provided materials are procured and stored by Mn/DOT, unless otherwise stated and are provided to the Contractor with proper notice. The Contractor is responsible for any damage to the equipment once Mn/DOT has provided the materials to the Contractor.

SZ-10.2 LOCATOR BALLS

Mn/DOT provides the 3M 1401 four inch Orange Ball Marker. The Contractor shall be responsible for the following:

- (A) Contacting the TMS Integrator by TMS construction phone number (651) 331-8370 and arrange to have the Ball Markers delivered. Seven Working days notice is necessary prior to ball marker delivery.
- (B) Providing the TMS Integrator with an exact count of Locator Balls needed for the Project.
- (C) Mounting the hardware.

SZ-10.3 Mn/DOT FURNISHED FIBER OPTIC SPLICE VAULT MARKER

The Contractor shall notify the TMS Integrator by TMS construction phone number (651) 331-8370, a minimum of two Working days before delivery.

SZ-11 TMS INTEGRATION

The Regional Traffic Management Center (RTMC) will assign a Traffic Management System (TMS) Integrator to each project involving construction of the Traffic Management System. The TMS Integrator shall serve as a technical resource to Mn/DOT Construction Administration. Contact information will be provided at the Pre-construction meeting. If the TMS Integrator is not reachable, contact TMS Integrator by TMS construction phone number (651) 331-8370.

SZ-11.1 TMS INTEGRATOR RESPONSIBILITIES

The TMS Integrator will be responsible for performing the following tasks:

- (A) Recommend approval/disapproval of TMS components and/or TMS construction methods to the project engineer.
- (B) Help to resolve Plan and Special Provision discrepancies.
- (C) Provide technical guidance to Contractors as directed by the Engineer.
- (D) **Staking**
 - a. The Contractor shall stake or flag proposed FO cable and conduit with trace wire which will be used for future FO cable installation. The stakes or flags shall be every 100 feet and at each change in direction. The Contractor shall acquire Integrator approval of these locations prior to installation.
 - b. An Integrator shall be present when locations are staked or flagged for, Vaults.
 - c. The Contractor shall be responsible for locating all existing utilities prior to installation of any proposed Integrator staked TMS infrastructure locations. Staking done by Mn/DOT Integrator is not a substitute for existing utility location.
- (E) Respond to requests for Mn/DOT Furnished Materials.
- (F) Assist with TMS construction inspection.
- (G) Perform the following actions after loop detector installation:
 - a. Testing.
 - b. Terminate lead-in conductors.
 - c. Configure loop detector modules within cabinets.

SZ-11.2 **TMS PROJECT SUBMITTAL AND FO TEST DOCUMENTATION**

TMS Project Submittal and FO Test Documentation shall be reviewed by a TMS Integration representative assigned to the project. The representative will evaluate and make recommendations to the Engineer regarding acceptance of the required documentation. Contact information will be provided at the Pre-construction meeting.

SZ-12 GROUNDING

The following provisions shall apply to Grounding:

SZ-12.1 **SINGLE POINT GROUNDING**

All grounded devices shall connect to one single piece ground rod, via the shortest and straightest route. Connect the devices' chassis and electrical grounds at a ground buss before connecting them to the earth ground rod. Connect the ground busses via conductors that meet the requirements of SINGLE POINT GROUNDING.

SZ-12.2 **GROUND RODS AND GROUND ROD CONNECTIONS**

The following provisions shall apply to ground rods and ground rod connections:

- (A) The ground rod shall be 4.6 m (15 feet) long, one piece, and comply with Mn/DOT 2545.3R.
- (B) The ground rod shall be in the center of cabinet foundations unless otherwise specified in the Plan details.
- (C) An oxide inhibitor shall be applied over bonded connections to ground rods. The Oxide Inhibitor must be U.L. listed and applied to the bonded area between the temperatures of -22 °C (-30 °F) and 149 °C (300 °F).

- (D) The Contractor shall clean each grounding component with 300-grit emery cloth before bonding and apply a mineral oil based oxide inhibitor to the bond area.
- (E) Bonding the ground conductor to the ground rod shall be accomplished by one of the following bonding methods:
 - a. Mechanical. The Mechanical Grounding connector shall have the following characteristics:
 - i. Shall be sized ½ inch diameter for Lightning rods and 0.625 inch diameter for Ground rods.
 - ii. Shall include two stainless steel cap screws to secure the cable to the ground electrode for a positive electrical connection.
 - b. Exothermic Welding.
- (F) **APL**
Mn/Dot approved Mechanical Grounding connectors for Lightning rods and Ground rods are listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtsystems/index.html>

SZ-12.3 CABLES

The following provisions shall apply to the grounding of Cables:

- (A) Ground all Cable shields entering cabinets and splice enclosures.
- (B) Maintain the electrical continuity of the Cable shields.
- (C) Shield bonding shall comply with RUS splicing Standard PC-2, Section 3.3.
- (D) Bonding connectors shall comply with RUS standard PE-33 (Cable Shield Connectors).

SZ-12.4 OUTDOOR FIBER SPLICE ENCLOSURE

The following provisions shall apply to the grounding of Outdoor Fiber Splice Enclosure:

- (A) All FO cable shields shall be bonded to the internal ground lug within the Outdoor Fiber Splice Enclosure. Bond one SGU conductor to the ground lug of the splice enclosure and the other conductor to the outside ground rod.
- (B) A ground strap shall connect the two grounding post to electrically tie them together.

SZ-12.5 FO CABLE

The following provisions shall apply to the grounding of Fiber Optic Cable:

- (A) The Contractor furnishes and installs the appropriate SGU for all fiber optic cable ground locations including but not limited to Control cabinets, Signal Control Cabinets, Shelter Cabinets, and vaults. See Mn/DOT FURNISHED MATERIALS on page 5 for locations where Mn/DOT will furnish and install a SGU. See Has Met to determine the type of SGU required.
- (B) A SGU shall be required in the following locations:
 - a. Control cabinets require a SGU to ground the outer shield and armor of the fiber optic cables to the equipment ground buss.
 - b. Shelters require one SGU on each FO cable entering/exiting the Shelter.

- c. Vaults require one SGU between the splice enclosure and the ground rod.
- (C) Utilize a SGU to ground the outer shield and armor of the fiber optic cables in control cabinets to the equipment ground buss.
- (D) An oxide inhibitor shall be applied over bonded connections. The Oxide Inhibitor must be U.L. listed and applied to the bonded area between the temperatures of -22 °C (-30 °F) and 149 °C (300 °F).
- (E) The Contractor shall clean each grounding component with 300-grit emery cloth before bonding and apply a mineral oil based oxide inhibitor to the bond area.
- (F) In vaults mount the SGU to the inner wall of the vault along the upper half. The SGU shall have the following features:
 - a. Low impedance ground path for high voltage transients while allowing location and monitoring signals to pass.
 - b. Automatic reset.
 - c. Failsafe circuitry design.
 - d. Hybrid surge suppression circuitry designed for below grade use.
 - e. No. 6 AWG solid copper lead wires.

(G) Grounding of fiber optic cables must be within the first five feet after the conduit entrance.

(H) **SGU-APL**

Mn/Dot Sheath Grounding Units are listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtsystems/index.html>

- a. SGU-1 shall be used in the following locations:
 - i. Armored FO Pigtail Cable ends contained within a Control Cabinet.
 - ii. Trunk FO Cable ends when the Trunk FO cable end is located in a vault and is the end of the Trunk FO cable run:
- b. SGU-2 shall be used in the following locations:
 - i. Armored FO Pigtail Cable ends contained within a vault
 - ii. Trunk FO Cable ends except when the Trunk FO cable end is located in a vault and is the end of the Trunk FO cable run:

SZ-12.6 **MEASUREMENT AND PAYMENT**

GROUNDING includes but shall not be limited to Single Point Grounding, Ground Rods and Ground Rod Connections, Cables, Outdoor Fiber Splice Enclosure, FO Cable, and all materials and labor necessary to complete Grounding. GROUNDING shall be considered incidental for which no direct compensation will be made.

SZ-13 LABELING

The following provisions shall apply to Labeling:

- SZ-13.1 Secure identifying labels to each fiber, cable, component, cabinet in the manner described in the Plan and these Special Provisions.
- SZ-13.2 Contractor shall not use wire ties for labeling cables.

SZ-13.3 **FIBER OPTIC CABLES**

The following provisions shall apply to labeling Fiber Optic Cables:

- (A) See “Fiber Optic Cable Labeling Detail” in the Plans for additional information.
- (B) Colored electrical tape shall be applied both ends of Trunk FO and pigtail cables to indicate either a pigtail or the direction the majority of the FO Cable travels from a structure. The direction of the cable will not always coincide with the initial direction the cable leaves a structure. The color of the tape shall represent the following:
 - a. Northbound-NB (blue)
 - b. Southbound-SB (green)
 - c. Eastbound-EB (yellow)
 - d. Westbound-WB (orange)
 - e. Pigtails-(White)
- (C) Descriptive identifiers shall be written on the colored tape with a laundry marking pen. Descriptive identifiers shall include a combination of the following:
 - a. Identify the nearest meter mark.
 - b. Identify the FO Cable number.
 - c. Identify the item that the fiber is traveling to by name. (e.g. Cab. 94-212.64, Cam 808, DMS 94-206.70, ect...)
 - d. Identify the fiber count and mode.
 - e. Identify the direction the majority of the FO Cable travels from a structure. The direction of the cable will not always coincide with the initial direction the cable leaves a structure.
- (D) Labeling shall include the following identifiers and be applied to the outer jacket of the FO Cable at the following structures and locations:
 - a. Vaults and Handholes
 - i. The Trunk FO Cable, within 18 inches from the end of the conduits with the following identifiers: FO Cable number, direction, fiber count and mode, and nearest meter mark.
 - ii. The FO pigtail, within 18 inches from the end of the conduit (White tape) with the following identifiers: name, fiber count and mode, and nearest meter mark.
 - b. Outdoor FO Splice Enclosure
 - i. The Trunk FO Cable, within 18 inches from the end with the following identifiers: FO Cable number, direction, fiber count and mode, and nearest meter mark.
 - ii. The FO pigtail, within 18 inches from the end (White tape) with the following identifiers: name, fiber count and mode, and nearest meter mark.
 - iii. Splice trays with the FO Cable ID number and each fiber number on the Manufacturer provided cover label.

SZ-13.4 **ELECTRICAL COMPONENTS**

The following provisions shall apply to labeling Electrical Components:

- (A) Label the function of each circuit breaker in each circuit breaker enclosure on the front panel below the breaker.

SZ-13.5 **LOOP DETECTORS AND LOOP DETECTOR SPLICES**

The following provisions shall apply to Labeling Loop Detectors and Loop Detector Splices (see TMS Loop Detector Typical in the plans):

- (A) Label the following components utilizing white electrical tape with black permanent marker as described in the Plan Detail:
 - a. Loop detector conductor tail cable
 - b. Lead-in conductor cable in the handhole that contains the splice to the loop conductor
 - c. Lead-in conductor cable in the cabinet.

- (B) The factory test information shall be recorded on the following items:
 - a. Loop Tail by utilizing a yellow label. Yellow tags may be removed from the loop tail, on installation, and temporarily attached to the loop wire ends in the handhole for information retrieval at the time of splicing.

SZ-13.6 **MEASUREMENT AND PAYMENT**

LABELING includes but shall not be limited to FO Cables, Electrical Components, Loop Detectors and Loop Detector Splices, and all materials and labor necessary to complete Labeling. LABELING shall be considered incidental for which no direct compensation will be made.

SZ-14 ELECTRICAL SERVICE

This work shall consist of coordinating the installation of Electrical Service, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-14.1 The Contractor shall provide power to the service panel(s) and verify the actual work to be done and all the associated costs.

- SZ-14.2 Power shall be fully operational Monday-Friday from 5:00 am to 9:00 am and 3:00 pm to 7:00 pm unless approved by the Engineer. Power transfers from existing to proposed shall occur outside of these hours.

- SZ-14.3 Proposed source of power addresses are identified in the Plan.

SZ-14.4 **POWER UTILITY COMPANY COORDINATION**

The following provisions shall apply to the Power Utility Company Coordination requirements for Electrical Service:

- (A) Proposed power sources shall be required as denoted in the Plan. The Contractor shall be responsible for the following:
 - a. Process the **existing** "Application for Electrical Service" for each location.
 - b. Coordinate with the Utility Company to ensure the proper location of electrical services provided by the Utility.
 - c. Coordinate the Utility Company construction with the Project construction schedule to ensure power is available when needed.
 - d. Coordinate with the Utility Company for installation of the power meter and power supply infrastructure.

- (B) Power sources shall be removed or salvaged as denoted in the Plan. The Contractor shall be responsible for the following:
 - a. Coordinate with the Utility Company to ensure the proper location of electrical services by the Utility.

- b. Coordinate the Utility Company construction with the Project construction schedule to ensure power is removed as needed.
- c. Coordinate with the Utility Company for removal of the power meter and power supply infrastructure.
- (C) Fees for the “Application for Electrical Service” and payment to the Utility Company for providing the electrical service connections shall be the responsibility of the Contractor. Mn/DOT has negotiated estimated costs for providing electrical service connections with the Power Utility Company. This information will be provided to the Contractor upon award of the Contract.
- (D) The Contractor shall secure approval from the Engineer for any changes to the Electrical Service shown in the Plan.
- (E) The Power Utility Company names are Xcel Energy. The name, phone number, location, premise number, and account number, responsibilities for each of the Project Power Utility Company Designers can be acquired by contacting the following MnDOT personnel:

MnDOT Regional Traffic Management Center (RTMC)
John Korth
Work: (651) 234-7984
Cell: (651) 245-2250

- SZ-14.5 Notify Mn/DOT Business Services Section when Mn/DOT is to assume ownership of the proposed source of power. Following is the contact information:

Paula Erickson (651) 234-7441
Metro Accounts Payable-Mn/DOT Mailstop 050
Waters Edge Building
1500 County Road B2
Roseville MN 55113

SZ-14.6 **MEASUREMENT AND PAYMENT**

No measurement will be made of the various Items that constitute Electrical Service but all such work will be construed to be included. The Contractor shall provide the Engineer a copy of the invoice from the power company. Payment will be made for the invoice cost paid to the power company plus 10%. This payment shall be compensation in full for all costs incidental thereto, including but not limited to providing power to service panels, power company fees, Power Utility Company Coordination, notifying Mn/DOT of ownership details, and all materials and labor necessary to construct the Electrical Service.

SZ-15 JOB SPECIFIC SPECIFICATION CONSIDERATIONS

- SZ-15.1 The Traffic Management System shall be fully operational Monday-Friday from 5:00 am to 9:00 am and 3:00 pm to 7:00 pm unless approved by the Engineer.

- SZ-15.2 All Trunk FO Cables located outside the project limits and impacted by the project construction shall be fully operational and connected to the RTMC network Monday-Friday from 5:00 am to 9:00 am and 3:00 pm to 7:00 pm unless approved by the Engineer. The Contractor shall install temporary connections if Trunk FO Cables will be non-operational during the above required hours of full operation. The temporary system shall require MN/DOT TMS Integrator approval and shall be considered incidental. **The Contractor shall be subject to a daily charge assessed at a rate of \$1000.00 per day for each day or portion thereof with which the Engineer determines that the Contractor has not complied.**

- (A) See staging notes on Bridge plans and Traffic Management System Plans

SZ-16 **PROJECT TESTING AND DOCUMENTATION SUBMITTALS**

This work shall consist of Project Documentation Submittals for Components, FO Cable Testing, and As-builts which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-16.1 Project Testing and Documentation Submittals shall be presented directly to the Engineer. Project Testing and Documentation Submittals shall be presented as three complete packages unless prior authorization is made with the Engineer. The complete packages shall be defined as one submittal for Components, one submittal for Testing, and one submittal for As-builts. Each submittal shall include all required documentation. No payment shall be made until a submittal package is received and approved by the Engineer.

SZ-16.2 Project Testing and Documentation Submittals are required for the following items:

- (A) Components
- (B) FO Cable Testing.
- (C) As-builts

SZ-16.3 **COMPONENTS**

The following provisions shall apply to project component testing and documentation submittals for Components:

- (A) Component Documentation Submittals shall be submitted to the Engineer within two weeks subsequent to contract approval. **The Contractor shall be subject to a daily charge assessed at a rate of \$200.00 per day for each day or portion thereof with which the Engineer determines that the Contractor has not complied.** The Engineer reserves the right to allow the Contractor greater than two weeks after contract approval to make submittals.
- (B) The Contractor shall submit two sets of component specifications and/or shop drawings for each project component, assembled or whole, to the Engineer. The Contractor shall forward any Mn/DOT recommended revisions to the Manufacturer.
- (C) Two separate copies of project Component documentation shall be submitted as a complete and organized package unless otherwise directed by the Engineer.
- (D) The Engineer will approve or reject submittals within two weeks of receipt. The TMS Component Documentation Submittal package shall be approved by the Engineer prior to installation or payment for the component.
- (E) Project Component documentation submittals shall include the manufacturer's name, manufacturer's specification, and/or detailed drawings for all items listed on the **COMPONENT CHECK-OFF LIST** on page 15.
- (F) It is not necessary to submit manufacturer's information for components already identified as meeting the specification as a "has met" or is listed on the Traffic Management System/ITS APL. This includes components listed on the TMS/ITS APL when the Contract is advertised and at the time the Testing and Documentation Submittal is submitted.
- (G) The Contractor shall complete the check-off list for "Has Met" items and include this list as part of the Project Documentation Component Submittal package. See **COMPONENT CHECK-OFF LIST** on page 15.

(H) **Loop Detectors and Loop Detector Splices**

The following provisions shall apply to Project Testing and Documentation Submittals for Loop Detectors and Loop Detector Splices:

- a. The Contractor shall submit Loop Detector Splice component specifications for Engineer approval prior to installation or payment for the following Loop Detector Splice components:
 - i. Loop lead-in.
 - ii. Splice encapsulator.
- b. The Contractor shall submit Loop Detector Design Preformed component specifications for Engineer approval prior to installation or payment for the following Loop Detector Design Preformed components:
 - i. Loop assembly.
 - ii. Loop lead-in.
 - iii. Splice encapsulator.
- c. The Contractor shall be responsible for notifying the Engineer and TMS Integrator when the Loop Detector tail conductor and lead-in cable have been spliced and are ready for testing and termination.
- d. Identify the location on the Plan Detail.

SZ-16.4 **FO CABLE TESTING**

The following provisions shall apply to FO Cable Testing Submittals:

- (A) Fiber Optic Testing Documentation Submittals shall be submitted to the Engineer within 30 Working days subsequent to the last test. **The Contractor shall be subject to a daily charge assessed at a rate of \$200.00 per day for each day or portion thereof with which the Engineer determines that the Contractor has not complied.** The Engineer reserves the right to allow the Contractor greater than 30 Working days after contract approval to make submittals.
- (B) Documentation of test equipment calibration and certification (See (2550) FIBER OPTIC CABLE TESTING on page 26) shall be submitted as part of the Project Documentation Submittal for FO Cable Testing along with the test results. The calibration certificate shall be dated no more than one year prior to the last date of FO Cable Testing. FO cable testing shall be rejected if calibration certificates are out of date.
- (C) The Contractor shall use the “Fiber Optic Schematic” sheets in the Plan as a template for recording power meter and OTDR test data as well as the physical characteristics of the FO cable and FO cable run.
- (D) FO Cable test parameters are identified in a later section of this document. See (2550) FIBER OPTIC CABLE TESTING on page 26.
- (E) The Contractor shall utilize a Manufacturer-recommended “OTDR Trace Analysis” and a “Power Meter Report” software program or a single software program that is a combination of “ODTR Trace Analysis” and “Power Meter Report”. The software shall conform to SZ-30.8 (A) (See page 26). The Contractor shall identify the software to Mn/DOT as part of the FO Cable Testing Project Documentation Submittal. If Mn/DOT does not already own a copy of the software, the Contractor shall provide Mn/DOT with a “OTDR Trace Analysis” and a “Power Meter Report” Viewer application.

- (F) The Contractor shall notify the Engineer prior to beginning the FO system testing. The Contractor shall provide all test documentation electronically on a CD. The Contractor shall use Mn/DOT's file naming convention for OTDR electronic test files. The Engineer may observe each test.
- (G) OTDR electronic files shall be stored under a directory folder named by the Launch Point cable identification (ID) description found on the test schematics. These files must include the following items:
 - a. Date of each test completed.
 - b. The "Index of refraction" for the FO cable as recorded on the cable spool by the manufacturer or for existing FO cable, the Index of Refraction that was utilized.
 - c. File names and notes as described by the Mn/DOT file naming convention. See **FO CABLE TEST DOCUMENTATION** on page 28 for file naming convention example.
- (H) The Contractor shall provide a test summary describing the following items:
 - a. Final measurements that are out of range.
 - b. Engineer and TMS Integrator approved changes in specified methods.
 - c. OTDR manufacturer, equipment model number, and last date calibrated.
 - d. Dates of tests performed by both Power Meter & OTDR.
 - e. The method used to set a launch power reference regarding the additional launching cables used for Power Meter testing.
 - f. Special circumstances.
- (I) The Contractor shall provide the Engineer with the Manufacturer's reel (spool) test documentation. This is required for all Contractor furnished FO cable.

SZ-16.5 **AS-BUILTS**

The Contractor shall submit As-built drawings with deviations from the Plan shown in red on the Plan. These sheets do not satisfy the Contractor's responsibilities with regard to Gopher State One Call.

- (A) As-Built Documentation Submittals shall be submitted to the Engineer subsequent to construction completion. As-Built Documentation Submittals shall reflect the final location of all items constructed for the project, not just the Components and FO Cable. It shall also include any roadway or other construction included in the project.

SZ-16.6 **MEASUREMENT AND PAYMENT**

PROJECT TESTING AND DOCUMENTATION SUBMITTALS includes but shall not be limited to Testing and Documentation Submittals, Components, FO Cable Testing, As-BUILTS, and all materials and labor necessary to prepare and submit the Project Testing and Documentation Submittals. PROJECT TESTING AND DOCUMENTATION SUBMITTALS shall be considered incidental for which no direct compensation will be made.

SZ-16.7 **COMPONENT CHECK-OFF LIST**

The Contractor shall complete the following Component check-off list for “Has Met” and “APL” items and include this list as part of the submittal package. For “Has Met” components the Contractor may choose to submit components of equal quality to the Engineer for TMS Integrator approval. For “APL” components the Contractor may choose to submit components through the process for listing products on the APL. The Contractor shall provide submittals for items that do not have a Has Met or are not on the APL.

<i>Product Manufacturer</i>	Material Description	Special Provisions Section	“Has Met” or “APL” Part Number <i>(No Submittal required if “has met” or “APL” listed here)</i>	<i>Submittal Provided</i> (✓)
	SGU-1	SZ-12.5 (H)		
	SGU-2	SZ-12.5 (H)		
	Ground Rod Connector	SZ-12.2		
	Fiberoptic Splice Vault	SZ-22.9		
	Outdoor Fiber Splice Enclosure	SZ-23.6		
	Outdoor Fiber Splice Enclosure Splice Tray	SZ-23.6 SZ-31.9		
	Outdoor Fiber Splice Enclosure Cable Addition Kit	SZ-23.6 SZ-31.9		
	Outdoor Fiber splice Enclosure Double Butt Adapter Bolt Kit	SZ-23.6 SZ-31.9		
	Outdoor Fiber splice Enclosure Triple Butt Adapter Bolt Kit	SZ-23.6 SZ-31.9		
	Buried Cable Sign Plastic-Resin Sheath	SZ-24.8		
	Splice Encapsulator	SZ-28.7 SZ-33.16		
	Pull Vault	SZ-32.7		
	Loop Preformed	SZ-33.16		
	Fiber Optic Trunk Cable	SZ-36.3		

SZ-17 INDUSTRY ACCEPTED LUBRICANTS FOR ALL CABLES

The following provisions shall apply to Industry Accepted Lubricants for all Cables:

- SZ-17.1 The “Industry Accepted Lubricants” referenced in 2550.3, used during cable pulling operations shall be UL Listed and be compatible with cable insulation materials. They shall not deteriorate the cable insulation or performance.
- SZ-17.2 Lubricants shall not contain wax or grease.
- SZ-17.3 The appropriate lubricant shall be applied as specified by the manufacturer for its intended use.

SZ-18 **INSPECTION AND CLEANING EXISTING CONDUIT SYSTEMS**

The following provisions shall apply to Existing Conduit Systems:

- SZ-18.1 Existing TMS conduit systems may consist of stick PVC, stick PE, continuous PE, IMC or RSC.
- SZ-18.2 When installing copper cable or FO cable in existing conduits through existing hand holes, the Contractor shall visually check the cable route to ensure that there is a smooth transition between exit and entrance elevations and that the horizontal and vertical angle is not so sharp as to cause damage to the cable as it is being pulled through the existing conduit. Should the Contractor encounter sharp bends in existing conduit, the Contractor shall bring the situation to the Engineer's attention. Reinstalling existing conduit through a handhole to provide smooth transitions is a potential solution.
- SZ-18.3 Clean the existing conduit of any debris that could impede pulling FO or copper cable through it or that could damage the cable if the debris remained, as directed by the Engineer.
- SZ-18.4 Inspection And Cleaning Existing Conduit Systems includes but shall not be limited to inspecting the cable route, notifying the Engineer of sharp bends, cleaning, and all materials and labor necessary to Inspect and Clean Existing Conduit Systems. **INSPECTION AND CLEANING EXISTING CONDUIT SYSTEMS** shall be considered incidental for which no direct compensation will be made.

SZ-19 **FO CABLE REPAIR OR REPLACEMENT**

FO Cable Repair or Replacement shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-19.1 **EXISTING FO CABLE**
The following provisions shall apply to Existing FO Cable:
 - (A) Exercise caution and excavate by hand or by utilizing a vacuum excavator when exposing an existing FO cable.
 - (B) All nicks or abrasions shall be reported to the TMS Integrator prior to making repairs.
 - (C) The FO Cable bending radius shall not be exceeded while handling the FO Cable.
- SZ-19.2 **DAMAGED FO CABLE**
The following provisions shall apply to Damaged FO Cable:
 - (A) Active FO Cable that is severed or otherwise rendered not useable by Contract activities shall be repaired. The cost of the Contract shall reduce at the rate of \$1,000 per hour until the repair is complete. The penalty shall begin when the Contractor severs the cable or otherwise renders the FO Cable unusable. The penalty shall continue until the permanent repair is complete or until an approved temporary splice is installed. A part of an hour shall count as a full hour. Notify the TMS Integrator by TMS construction phone number (651) 331-8370 as soon as the cable damage is discovered.
 - (B) The Contractor shall stock approved splice kits to repair any Mn/DOT cable damaged by construction activities
 - (C) Spliced repairs to Damaged FO Cable shall comply with the following:

- a. Initial emergency repairs to FO Cable shall utilize mechanical splices unless all fibers (severed and not severed) are fusion spliced within 24 hours.
 - b. Splices shall be located within existing splice vaults.
 - c. Splices shall comply with the requirements for FO Cable Splicing. See the Engineer for FO Cable splicing requirements.
 - d. Mn/DOT shall withhold payment until approved FO Cables with fusion splices have been installed.
- (D) New cable shall be furnished and installed for cable that has suffered damage caused by contract activities if the damage affects performance or longevity.
- (E) Nicks or abrasions caused by exposing any cable by hand digging or vacuum excavation shall be sealed with rubber splicing tape. Seal nicks that penetrate through the cable jacket to the armor with a cast epoxy kit.
- SZ-19.3 **HAS MET**
The following items have met the above specifications:

- (A) Sealing nicks and abrasions: 3M Scotchcast kits and 3M Scotch #23 rubberized splicing tape.

SZ-19.4 **MEASUREMENT AND PAYMENT**
FO CABLE REPAIR OR REPLACEMENT includes but shall not be limited to devices, enclosures, and all materials and labor necessary to construct the FO Cable Repair or Replacement. FO CABLE REPAIR OR REPLACEMENT shall be considered incidental for which no direct compensation will be made.

SZ-20 ELECTRIC AND ELECTRONIC CABLE REPAIR OR REPLACEMENT

Electric and Electronic Cable Repair or Replacement shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-20.1 The Contractor shall stock approved splice kits to repair any Mn/DOT cable damaged by construction activities.
- SZ-20.2 Notify the Engineer and TMS Integrator of any damaged cable or damaged conduit that contains cables before starting repair.
- SZ-20.3 Electric, electronic, video and telephone cables are found within the project limits and may be impacted or are replaced by construction activities. The Contractor shall exercise caution when working near existing cables. Exercise caution and dig by hand or use vacuum excavator when within two feet of exposing the existing cables.
- SZ-20.4 Nicks or abrasions caused by exposing any cable by hand digging or vacuum excavation shall be sealed with rubber splicing tape. Seal nicks that penetrate through the cable jacket to the armor with a cast epoxy kit.
- SZ-20.5 Above ground, temporary, twisted pair, control cable splices shall be repaired with button style, gel filled, crimp-on butt splices enclosed in zippered poly bags. Splices shall be protected in a manner approved by the Engineer and TMS Integrator until the permanent splices are installed.
- SZ-20.6 Permanent repairs to twisted pair cables shall utilize button style crimp-on Butt splices within an enclosure that is rigid-body, non-re-enterable, made of translucent polypropylene, and packed with a urethane compound. Rubber tape shall be used to seal the ends of the enclosure. The enclosure is available in 4-pr, 18-pr, and 50 pr sizes.

SZ-20.7 Cables severely damaged and not replaced in a timely manner, shall be repaired and maintained until cable replacement is made.

SZ-20.8 New cable shall be furnished and installed for cable that has suffered damage caused by contract activities if the damage affects performance or longevity.

SZ-20.9 Engineer and TMS Integrator approved materials shall be used to replace cable.

SZ-20.10 **HAS MET**

The following items have met the above specifications:

- (A) Butt Connector: 3M UY2 or UR2 as appropriate
- (B) Enclosure for permanent repairs to twisted pair cables: 3M Better Buried Closure with 3M Scotchlok Shield Connector and 3M High Gel Encapsulating Compound.
- (C) Sealing nicks and abrasions: 3M Scotchcast kits and 3M Scotch #23 rubberized splicing tape.

SZ-20.11 **MEASUREMENT AND PAYMENT**

ELECTRIC AND ELECTRONIC CABLE REPAIR OR REPLACEMENT includes but shall not be limited to devices, enclosures, and all materials and labor necessary to construct the Electric and Electronic Cable Repair or Replacement. ELECTRIC AND ELECTRONIC CABLE REPAIR OR REPLACEMENT shall be considered incidental for which no direct compensation will be made.

SZ-21 ELECTRIC AND ELECTRONIC CABLE

Electric and Electronic Cable shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-21.1 The Contractor shall provide slack cable within all handholes and Pull Vaults. Provide three feet for each cable entering or exiting a handhole or Pull Vault.

SZ-21.2 Splices are not allowed in electric or electronic cable without Engineer and TMS Integrator approval.

SZ-21.3 Power, Control, and RF cable shall be one-piece between termination points.

SZ-21.4 When using crimp-on connectors, the Contractor shall execute the following operations:

- (A) Install the insulation of cables deep enough into lugs to ensure that the insulation acts as a strain relief.
- (B) Crimp both the conductor and the insulation to the lug.
- (C) Form the crimps with an appropriate ratchet style crimp tool.

SZ-21.5 Protect non-terminated Electric and Electronic Cable, located in handholes from moisture intrusion by providing epoxy encapsulation for cable ends. It is not necessary to provide epoxy protection for non-terminated cable ends in control/splice cabinets.

SZ-21.6 **MEASUREMENT AND PAYMENT**

ELECTRIC AND ELECTRONIC CABLE includes but shall not be limited to crimping connectors, grounding, maintaining electrical continuity, protecting non-terminated cables, and all materials and labor necessary for the construction of Electric and Electronic Cable. ELECTRIC AND ELECTRONIC CABLES shall be considered incidental for which no direct compensation will be made.

SZ-22 **(2550) FIBEROPTIC SPLICE VAULT**

This work shall consist of constructing a Fiberoptic Splice Vault, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-22.1 See GROUNDING on page 6 for grounding specifications.
- SZ-22.2 Install a Mn/DOT furnished fiber optic splice vault marker per the Plan detail. See **Mn/DOT FURNISHED FIBER OPTIC SPLICE VAULT MARKER** on page 5.
- SZ-22.3 **COVER**
The following provisions shall apply to the Cover part of the FO Splice Vault:
 - (A) Provide one ferrous device to lift the Cover from the body of the FO Splice Vault for every three FO Splice Vaults. The ferrous device must be >28 inches in length.
- SZ-22.4 The FO Splice Vault contains a Mn/DOT furnished locator ball installed by the Contractor. See **LOCATOR BALLS** on page 5.
- SZ-22.5 Near the FO Splice Vault, the FO cables sweep up to meet the conduit entrance to the FO Splice Vault Take care not to exceed minimum bend radius.
- SZ-22.6 Provide a drainage system for the FO Splice Vault (see the FO Splice Vault detail in the Plans). The Engineer must approve deviation from the drainage system shown on the FO Splice Vault detail in the Plans.
- SZ-22.7 Clean FO Splice Vaults after installation and splicing of cable. All areas shall be cleaned including the flange that the Cover rests on and the bolt holes for the Cover.
- SZ-22.8 FO Cables shall be coiled onto the FO coiling brackets within vaults.
- SZ-22.9 **APL**
Mn/Dot approved Fiberoptic Splice Vault is listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtsystems/index.html>

SZ-22.10 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2550.514 (FIBEROPTIC SPLICE VAULT) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to grounding, installing the marker, Cover, the drainage system, restoration, cleaning, and all materials and labor necessary to construct the Fiberoptic Splice Vault.

SZ-23 **(2550) OUTDOOR FIBER SPLICE ENCLOSURE**

This work shall consist of furnishing and installing an Outdoor Fiber Splice Enclosure, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-23.1 **ENCLOSURE**
The following provisions shall apply to the Enclosure part of the Outdoor Fiber Optic Splice Enclosure:
 - (A) The enclosure shall have the following characteristics:

- a. A temperature rating of -30 to +60 C (-22 to 140 °F).
- b. Sufficient desiccant (packaged silica) inside to reduce possible damage from moisture.
- c. FO Cables enter and exit from the same end of the Outdoor Fiber Splice Enclosure.
- d. Expands to allow for up to 8 FO cables and/or FO pigtailed to enter through one end.
- e. Pressurized to 20 kPa (3 psi).
- f. Permits selective fiber splicing (FO cable can loop in and out with only the selected fibers cut).
- g. Is compatible with the splice trays and FO cables.
- h. Protects splices from damage.
- i. Composed of salt corrosion resistant, compatible materials not supporting galvanic cell action.
- j. Splicing can be completed without circuit disruption.
- k. Provides for FO cable (trunk and pigtail) strain relief.
- l. FO Cables may be inserted without exceeding the minimum bending radius.
- m. Includes a grounding lug.
- n. Includes two grounding posts.
- o. Provides for termination of up to two trunk FO cables and armored FO pigtailed.
- p. Includes a cable clamp for bonding to the armor of the FO cable.
- q. Provides for re-entry of future FO cable.
- r. Able to accommodate the following combinations of FO cables, FO cable addition kits, and bolt adapter kits:
 - i. Two FO cables without a FO cable addition kit.
 - ii. Four FO cables with one FO cable addition kit and butt adapter bolt kit.
 - iii. Six FO cables with two FO cable addition kits and double butt adapter bolt kit.
 - iv. Eight FO cables with three FO cable addition kits and triple butt adapter bolt kit.

(B) Non-oxidizing coating shall be applied to all connections.

SZ-23.2 Tape the FO Cables together as necessary near the Outdoor FO Splice Enclosure and throughout the slack length.

SZ-23.3 See GROUNDING on page 6 for grounding specifications.

SZ-23.4 **SPLICE TRAY**

The following provisions shall apply to the Splice Tray part of the Outdoor Fiber Optic Splice

Enclosure:

(A) The splice tray shall have the following characteristics:

- a. Provides for entry of individual fibers.
- b. Is stackable.
- c. Capable of holding 24 splices and 48 fibers.
- d. FO Cables may be inserted without exceeding the minimum bending radius.
- e. Accommodates splice identification on the cover.
- f. Includes Polyethylene tubes to protect the fibers and ethylene vinyl acetate sleeves with stainless steel rods to protect the splices.
- g. Has a manufacturer provided label on the cover for fiber identification.

(B) Splices shall be mounted on the splice chip.

(C) See LABELING on page 8 for more details.

SZ-23.5 **MOUNTING**

The following provisions shall apply to Mounting of the Outdoor Fiber Optic Splice Enclosure:

- (A) Mounting the Outdoor Fiber Splice Enclosure in the splice vault requires a bracket to be constructed to fit the opening to the splice vault per plan detail. The objective of this bracket is to keep the splice enclosure off the floor of the vault. The bracket is constructed as follows:
- a. The main support member is one inch x 1.5 inches variable "C" channel and may be perforated with web-centered holes. The length dimension varies with the diameter of the access cover.
 - b. The ends of the main support member have "Z" brackets constructed of 0.1875 inch stainless steel 1.5 inches wide. The "Z" brackets rest on the vault lip for the round access cover.
 - c. The outdoor fiber splice enclosure is hung from the bracket assembly with 0.125 inch stainless steel cable.

SZ-23.6 **HAS MET**

The following items have met the above specifications:

- (A) Splice Case Enclosure: 3M 2178-LS.
- (B) Cable Addition Kit: 3M 2181-LS.
- (C) Double Butt Adapter Bolt Kit: 3M 2181-B.
- (D) Triple Butt Adapter Bolt Kit: 3M 2181-C.
- (E) Splice Tray: 3M 2524-FT.

SZ-23.7 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2550.515 (OUTDOOR FIBER SPLICE ENCLOSURE) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to, the enclosure, grounding, FO cable addition kits, butt adapter bolt kits, hanger hardware, splice tray, mounting, pressure testing, and all materials and labor necessary to construct the Outdoor Fiber Splice Enclosure.

SZ-24 **(2550) BURIED CABLE SIGN**

This work shall consist of constructing a Buried Cable Sign, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-24.1 Mn/DOT 3973 shall be modified by substituting the word orange for the word yellow.
- SZ-24.2 The Contractor shall mark all fiber-route changes in direction (see Plan Detail) within seven days of FO cable installation.
- SZ-24.3 Install the sign bottoms at 1.2 m (4 ft) above ground.
- SZ-24.4 Install the signpost three feet offset from the cable trench between the cable and the Right-of-way.
- SZ-24.5 Install an orange-colored plastic resin sheath to enhance the visibility of buried cable signposts. The plastic resin sheath is: Triangular in shape, having a wall thickness of 0.08 ± 0.01 inch with a 3.31 ± 0.02 inch width of each side; Temperature stable from -40 °C (-40 ° F) to 65 °C (150 °F), UV resistant; Made of Polypropylene; Installed on the above ground portion of each post below the bottom of the sign.
- SZ-24.6 The Contractor shall remove any existing buried cable signs currently marking in place FO Cable proposed for removal or abandonment. This shall be done according to Mn/DOT 2104.

SZ-24.7 **BURIED CABLE WARNING SIGNS**

The buried cable signs comply with 3973 and the following modifications/supplements:

- (A) The telephone number for the sign legend is 811.

SZ-24.8 **HAS MET**

The following items have met the above specifications:

- (A) Resin Sheath: REPNET Rhino TVF48-O by REPNET Inc.

SZ-24.9 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2550.516 (BURIED CABLE SIGN) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to installation, the resin sheath, the post, mounting, removing existing signs over abandoned cable, and all materials and labor necessary to construct the Buried Cable Sign.

SZ-25 **(2550) NON-METALLIC CONDUIT**

This work shall consist of furnishing and installing Non-Metallic Conduit, which shall be UL listed and in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-25.1 The requirement for Red-colored conduit in Mn/DOT 3803 does not apply.
- SZ-25.2 Industry standard couplings shall be used.
- SZ-25.3 If adhesives and solvents are used they shall be compatible with the materials to be adhered.
- SZ-25.4 The Contractor shall connect to existing conduit utilizing standard couplings. Prepare existing conduit for coupling as indicated in the Plans.
- SZ-25.5 All NMC designated to contain FO cable shall be continuous. Stick conduit shall not be allowed.
- SZ-25.6 All conduit under roads shall be placed a minimum of 60 inches below finished grade and shall be continuous without joints.
- SZ-25.7 All conduit used for FO cable shall be placed a minimum of 0.9 m (36 inches) below the finished grade.
- SZ-25.8 Non-metallic conduit shall be PVC or HDPE and shall be Schedule 40, with the exception of conduit above ground or under roadway surfaces. Conduit above ground or under roadway surfaces shall be heavy-wall rigid PVC or HDPE and shall be Schedule 80.
- SZ-25.9 Standard bell ends shall be installed on all NMC ends to prevent damage to cables during installation.
- SZ-25.10 3.15 inches wide, stretchable, orange warning tape shall be installed between 18 inches and 12 inches below the surface over all NMC bearing communication cable (including FO cable). The tape shall bare the following permanent legend: **CAUTION: Mn/DOT CABLE BELOW.**
- SZ-25.11 **NMC FOR BLOWN FO CABLE**
The following provisions shall apply to Non-Metallic conduit for Blown FO Cable:

- (A) The NMC shall have the following material characteristics:
 - a. The NMC shall be 1.5 inches diameter or as called out in Plan.
 - b. The minimum pressure rating for the 1.5 inches NMC and couplings shall be 130-psi.
- (B) The conduit shall be continuous flexible duct and direct buried. Plowed duct is preferred over trenched duct.
- (C) Open trench installations of NMC for Blown FO Cable shall be are backfilled with granular material to six inches over the top of conduit elevation.

SZ-25.12 MEASUREMENT AND PAYMENT

Measurement will be made by the length of NMC furnished and installed as specified. Payment for NON-METALLIC CONDUIT will be made in accordance with the schedule set forth below at the appropriate Contract unit bid price for each separate item of work, which shall, in each instance, be compensation in full for the costs of all materials, equipment, and labor required to complete the work as specified, to the satisfaction of the Engineer.

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
2550.523	(__") Non-Metallic Conduit	(linear foot)

SZ-26 (2550) POWER AND CONTROL CABLES

This work shall consist of furnishing and installing Power and Control Cables, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-26.1 All Power and Control Cables shall be UL listed.
- SZ-26.2 Terminate Power and Control cables unless otherwise directed by the Plans.
- SZ-26.3 See GROUNDING on page 6 for grounding details.
- SZ-26.4 Some power cables may require protection within handholes as denoted in the Plan. The Contractor shall protect these power cables by enclosing them in two inch diameter split conduit within the handhole. The split conduit shall be colored red.

SZ-26.5 MEASUREMENT AND PAYMENT

Measurement will be made by the length of Power and Control Cables furnished and installed as specified. Payment for POWER AND CONTROL CABLES will be made in accordance with the schedule set forth below at the appropriate Contract unit bid price for each separate item of work, which shall, in each instance, be compensation in full for the costs incidental thereto including but not limited to Termination, Grounding, and all materials, equipment, and labor required to complete the work as specified, to the satisfaction of the Engineer.

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
2550.532	Power Cable ___ Conductor No. ___	(linear foot)

SZ-27 (2550) LEAD-IN CABLE 2 CONDUCTOR NO 14

This work shall consist of furnishing and installing Lead-in Cable 2 Conductor No. 14, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-27.1 The Loop Detector Lead-in Cable shall comply with Mn/DOT 3815.2C4(b).

SZ-27.2 Use a flat strap to pull cable through conduit to alleviate damage to the NMC bushings in the handhole. Pulling cable with round rope is permitted in conduit that has an RSC bushing.

SZ-27.3 The Lead-in Cable 2 Conductor No. 14 ends shall be protected at the handhole if the cable is not spliced immediately.

SZ-27.4 **MEASUREMENT AND PAYMENT**

Measurement will be made by the length of Lead-in Cable 2 Conductor No. 14 furnished and installed complete in place as specified. Payment will be made under Item 2550.532 (LEAD-IN CABLE 2 CONDUCTOR NO 14) at the Contract bid price per linear foot, which shall be compensation in full for all costs incidental thereto, including but not limited to pulling cable, protecting conductor ends, and all materials and labor necessary to construct the Lead-in Cable 2 Conductor No. 14.

SZ-28 (2550) LOOP DETECTOR SPLICE

This work shall consist of furnishing and installing Loop Detector Splice, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-28.1 See PROJECT TESTING AND DOCUMENTATION SUBMITTALS on page 12 for project testing and documentation details.

SZ-28.2 Prior to utilization of existing handholes they shall be cleaned to the satisfaction of the Engineer and TMS Integrator.

SZ-28.3 **SPLICING LEAD-IN CONDUCTOR CABLE TO LOOP DETECTOR WIRE**

The following provisions shall apply to Splicing Lead-in Conductor Cable to Loop Detector Wire for Loop Detector Splice:

- (A) Utilize a rosin core solder or rosin flux and solder to splice the loop conductor and the loop lead-in conductor.
- (B) Separation shall be created between soldered splices by staggering the splices. Contact between soldered splice shall not be allowed.
- (C) To ensure the splice is sealed by the epoxy, install the splice through the cap into the tube of the splice kit so that the outer jacket of each conductor enters the encapsulator tube. Install both loop conductor and lead-in conductor splices into the same end of the encapsulator tube.
- (D) The 2/C No. 14 Lead-in cable outer jacket and the sawcut loop detector tubing shall have one half inch roughed surface contained within the epoxy. A minimum of one inch sand paper roughened surface shall protrude outside the epoxy. The sand paper roughed surface protruding outside the epoxy shall be visually verifiable. The exposed drain wire and the foil shield of the 2/C No. 14 Lead-in cable shall be cut off prior to inserting the outer jacket into the epoxy.
- (E) The 2/C No. 14 Lead-in cable outer jacket and the sawcut loop detector tubing shall have one half inch roughed surface contained within the epoxy. A minimum of one inch sand paper roughened surface shall protrude outside the epoxy. The sand paper roughed surface protruding outside the epoxy shall be visually verifiable. The exposed drain wire and the foil shield of the 2/C No. 14 Lead-in cable shall be cut off prior to inserting the outer jacket into the epoxy.
- (F) Attach the splice to the eyebolt near the top of the handhole (install an eyebolt if it is missing).
- (G) Verify that loop conductor cable identification markings (lane and cabinet ID) are correct and consistent with the Plan Detail prior to cutting the existing splices to Lead-in conductor Cable.

- (H) Notify the Engineer following the installation of the splice. A Mn/DOT representative will test the loop and lead-in system and terminate the lead-in within seven days.

SZ-28.4 **LEAD-IN SPLICE ENCAPSULATOR**

The following provisions shall apply to the Lead-in Splice Encapsulator for Loop Detector Splice:

- (A) Detector loop and lead-in conductor wires shall be spliced as directed in the Plan Detail "TMS Loop Detector Typical – Part Two". The Splice protection device shall have the following features
- a. Designed for use in weather exposed or direct burial locations,
 - b. For making splices on unshielded synthetic insulated cables,
 - c. UL listed for direct burial and submerged applications up to 600 volts,
 - d. Capable of withstanding temperatures up to 90 °C,
 - e. Capable of accommodating conductor cable and connector outside diameters of up to 0.625 inch.

SZ-28.5 **PROTECT CONDUCTOR ENDS**

The following provisions shall apply to Protect Lead Ends for the Loop Detector Splice:

- (A) The Contractor shall protect Loop Tail and Lead conductor ends whenever they are not immediately spliced to the 2/C No.14 in the handhole by performing the following:
- a. Wire ends shall be encapsulated with an epoxy type encapsulator.
 - b. The Contractor shall attach the encapsulated wires to the eyebolt near the top of the HH (install an eye bolt if it is missing from an existing handhole).

- SZ-28.6 Loops and loop circuits including the lead-in cable must have insulation resistance greater than 100 megohm to qualify as a good circuit. If the insulation test is under 100 megohm it is the responsibility of the contractor to troubleshoot and repair the problem.

SZ-28.7 **APL**

The following items have met the above specifications:

- (A) Mn/Dot approved Splice Encapsulator is listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtsystems/index.html>

SZ-28.8 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2550.542 (LOOP DETECTOR SPLICE) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to Project Testing and Documentation Submittals, Conductor, Lead-in Splice Encapsulator, Protecting Conductor Cable Ends, Splicing Lead-in Conductor Cable, and all materials and labor necessary to construct the Loop Detector Splice.

SZ-29 **(2550) SERVICE INSTALLATION**

This work shall consist of furnishing and installing a Service Installation, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-29.1 See Plan for proposed power source locations, addresses, and Service Installation details.
- SZ-29.2 See GROUNDING on page 6 for grounding specifications.

SZ-29.3 MEASUREMENT AND PAYMENT

Measurement will be made by the each constructed as specified. Payment for SERVICE INSTALLATION will be made in accordance with the schedule set forth below at the appropriate Contract unit bid price for each separate item of work, which shall, in each instance, be compensation in full for the costs of all Grounding, materials, equipment, and labor required to complete the work as specified, to the satisfaction of the Engineer.

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
2550.572	Service Installation Type ____	each

SZ-30 (2550) FIBER OPTIC CABLE TESTING

This work shall consist of Fiber Optic Cable Testing, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-30.1 A FO Link shall be defined as “any fiber with a connector at one end originating in a cabinet, TMS shelter cabinet, or building; and the other end with a connector in another location within a cabinet, TMS shelter cabinet, or building”.
- SZ-30.2 The Contractor shall arrange a meeting with the Project Engineer and the TMS Integrator to discuss the plan for proposed FO cable splicing, testing, and documentation. This meeting shall occur prior to any splicing. All splicing, testing, and documentation personnel shall be required to attend the meeting.
The meeting will be waived if approved by the Engineer. The meeting may be waived if the splicing, testing, and documentation personnel have historically demonstrated their ability to conform to Mn/DOT FO cable splicing , testing and documentation requirements.
- SZ-30.3 The Contractor shall notify the Engineer and TMS System Integrator prior to FO system splicing and testing. The Engineer, or a representative, may observe splicing or testing. All test documentation shall be provided electronically.
- SZ-30.4 The Contractor shall use an OTDR and Power Meter with current calibration certificates to perform the FO Cable testing required. Test equipment calibration information and certification documentation shall be submitted as part of the Project Documentation Package (with test results).
- SZ-30.5 The calibration certificate shall be dated no more than two years prior to the last dates of FO cable testing.
- SZ-30.6 Problems encountered with existing cable plant or hardware shall be brought to the attention of the TMS System Integrator before testing is completed. The Contractor shall notify the TMS Integrator by email within two Working days of noticing the problem.
- SZ-30.7 FO Cable Testing shall be rejected if calibration certificates are out of date.
- SZ-30.8 **OPTICAL TIME DOMAIN REFLECTOMETER “OTDR” TESTING**
The following provisions shall apply to OTDR Testing:

- (A) The OTDR shall comply with the latest issue of Telcordia Document GR-196. In addition, the OTDR performance shall comply with the following minimum requirements:
- The event dead zone shall be less than or equal to three meters.
 - The attenuation dead zone is less than or equal to 5 meters.
 - Has a dynamic range of 25 dB or greater.
 - Test pulse width shall be set to the shortest value allowed by the OTDR.

(B) **OTDR Test files**

- a. The Contractor uses Mn/DOT's file naming convention for test files. See **FO CABLE TEST DOCUMENTATION** on page 28 for file naming convention and example.
 - b. The test files must include the actual date of testing and the "Index of refraction" for the FO cable as recorded on the cable spool by the manufacturer or for existing FO cable, the Index of Refraction that was utilized.
- (C) Test FO Links bi-directionally per EIA/TIA 455-59, FOTP-59, except as otherwise noted. Use a 500 m (1650 foot) patch cord as a launch cable when testing.
- (D) Measure and record each FO Signature for the completed SM FO Link at 1550 nm or 1300 nm for MM. (See FO Schematics Plan Sheets).
- (E) Test each FO Link. Each fusion splice shall be tested in the forward and backward directions, recorded, and denoted by FO Splice Vault location. All events which indicate a loss greater than or equal to 0.01 dB, within the FO Signature shall be recorded as "Event Notes" describing the corresponding vault location. Event Notes are not required for splices indicating loss less than 0.01 dB. The Contractor shall provide an explanation for all events that do not align with a vault.
- (F) The average loss through a fusion splice, when measured at wavelengths of 1550 nm for SM and 1300 nm for MM, is no more than 0.15 dB. The average shall be calculated by adding the bi-directional testing values and dividing by 2.
- (G) Each FO Link shall be tested after splices are sealed within their enclosure or panel. Should any FO Link fail, re-splice that FO Link and retest all FO Links within the enclosure or panel. The Contractor will be allowed a maximum of three splice attempts to achieve passing results.

SZ-30.9 **POWER METER TESTING**

The following provisions shall apply to Power Meter Testing of FO Links:

- (A) The Contractor shall use a light source and power meter conforming to EIA/TIA 455-171, FOTP-171, and OFSTP-14, except as otherwise noted, to bi-directionally test the cable plant.
- (B) Measure and record each directional value for the completed SM optical link at 1550 nm or 1300 nm for MM. (See FO Schematics Plan Sheets).
- (C) Power meter measurements shall be in dB.

- a. Measurements for SM links shall not exceed the result of the following formula:

$$0.4 * [\text{Link length of FO Cable in kilometers}] + 1$$

- b. Measurements for MM links shall not exceed the result of the following formula:

$$[\text{Link length of FO Cable in kilometers}] + 1$$

- (D) The Contractor shall correct out of range measurements on the constructed FO Links. If after performing corrective action an acceptable measurement has not been achieved, the Contractor shall notify the TMS Integrator.

SZ-30.10 **FO CABLE TEST DOCUMENTATION**

The objective of FO Cable Test Documentation is to document OTDR and Power Meter test results to verify that these results meet specifications, as well as to document the FO Link loss, FO cable distance between splices and terminations, and the fusion splice losses. A TMS System Integrator representative will review this documentation for approval and the following provisions shall apply to FO Cable Test Documentation:

- (A) The Contractor shall provide post installation documentation on a CD.
 - a. The Contractor shall use the “Fiber Optic Schematic” Plan sheets as a template for recording power meter and OTDR test data, fiber count, and fiber routing of the cable and cable run.
 - b. Measurements recorded on copies of FO schematics shall be stored as PDF formatted files. The Engineer will supply the Contractor with a PDF if the Contractor requests one. The text font shall be typed and legible as determined by the Mn/DOT representative reviewing the measurements. If measurements are not determined legible then the measurements shall be repeated and recorded again.
 - c. If resplicing is required to achieve passing test results, those OTDR files shall be stored in a separate folder on the CD.

- (B) Measure and record the following values for all FO cables:
 - a. FO cable length markings at all splice and termination locations on the FO schematics.
 - b. Fiber distances derived from OTDR testing and the FO Index of Refraction (usually included on FO cable spool documentation) shall be shown on the FIBER OPTIC SCHEMATICS in the Plan. For existing FO cable, provide the Index of Refraction utilized.
 - c. Attenuation of each FO Link in each direction measured.
 - d. Event notes for each splice indicating loss greater than or equal to 0.01dB. These notes shall identify each splice location and shall be consistent with each FO schematic vault location. The Contractor shall provide an explanation for all events that do not align with a vault.
 - e. Signatures of the FO cable span and events using Mn/DOT file naming convention. See below in this section for file naming convention example.
 - f. Attenuation of each FO link, in both directions, as measured with a light source and power meter at 1550 nm wavelength for SM and 1300 nm wavelength for MM.
 - g. The Contractor shall provide Fiber Optic Schematics indicating power meter and splice loss results, power meter test reports, and OTDR trace files on the Mn/DOT provided FO Schematics on the Contractor provided CD.

- (C) Naming OTDR files is done as follows:
 - a. The FO trunk cable ID and FO Pigtail cable ID numbers are derived from the FO Schematic plan sheets.
 - b. The OTDR file name is developed from left to right in the following order:
 - i. FO cable launch point (trunk or pigtail FO cables).
 - ii. North, South, East, or West (N, S, E, or W) designation shall be added after the FO Trunk ID or FO Pigtail ID; this is the direction of the optical test pulse traveling from the OTDR launch point along the majority of cable under test. This will not always be the direction the cable leaves the OTDR launch point.
 - iii. FO cable type (S=Single Mode, M=Multimode) and strand count.
 - iv. Filename extension (data format) preceded by a period.

Fiber Optic OTDR File Naming Convention

LAUNCH DIRECTION
┌ ----- CABLE ID ----- ┌ | ┌ FIBER ┌ ┌ EXT ┌
C A B 6 9 4 - 5 0 . 4 7 W S 0 4 . XXX

CABLE I.D. = Trunk or pigtail FO cable I.D. number as shown on the plan schematics. Number of characters may vary.

LAUNCH DIRECTION = Direction in which the OTDR is launching (N, S, E or W). This is the direction of the optical test pulse traveling from the OTDR launch point along the majority of cable under test. This will not always be the direction the cable leaves the OTDR launch point.

FIBER = Fiber Type, (S= Single mode), (M= Multimode) and Fiber Number (example: 01...04...08...48...76...100...144). Number of characters may vary.

EXT = Data file format

The OTDR file "**Fiber Notes**" field includes the State Project Number and the origin of the test launch (i.e. the complete name of the building, TMS Shelter Cabinet, cabinet, camera, or temporary termination point).

SZ-30.11 **MEASUREMENT AND PAYMENT**

No measurement will be made of the various Items that constitute Fiber Optic Cable Testing but all such work will be construed to be included in the single Lump Sum payment under Item 2550.601 (FIBER OPTIC CABLE TESTING).

SZ-31 **(2550) FIBER OPTIC CABLE SPLICING**

This work shall consist of Fiber Optic Cable Splicing, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-31.1 Fusion type splices shall be utilized. Mechanical splices shall be prohibited.
- SZ-31.2 FO Cable Splicing shall be allowed in locations denoted in the Plan. Additional locations shall require the approval of the Engineer and TMS Integrator.
- SZ-31.3 FO Cable Splicing locations shall be within cabinets and splice vaults.
- SZ-31.4 The Contractor shall adhere to the FO cable manufacturer's methods, recommendations, materials, and techniques for splicing. All splicing equipment shall be in good working order, properly calibrated, and meet all industry standards and safety regulations.
- SZ-31.5 The FO cable preparation, splice enclosure installation, and splicing shall be accomplished in accordance with industry standards. Mechanical stress and splicing locations shall be minimized by training the FO cable into final position, concurrently observing the minimum bending radii of the FO cable. The minimum bending radii of the FO cable shall be 20 times the diameter of the cable or as per the manufacturer's requirements, whichever is greater.
- SZ-31.6 Cleanliness and freedom from contamination shall be strictly observed with respect to splicing materials and joint construction. Upon completion of the splicing operation, all waste material shall be deposited in suitable containers, removed from the job site, and disposed of in an environmentally acceptable manner.

SZ-31.7 **EXISTING OR INSTALLED OUTDOOR FIBER SPLICE ENCLOSURE**

The following provisions shall apply when the Contractor is required to enter an Existing Outdoor Fiber Splice Enclosure for FO Cable Splicing:

(A) **Cables**

- a. FO Cables enter and exit from the same end of the Outdoor Fiber Splice Enclosure.

(B) **Testing**

- a. The Contractor shall be responsible for all existing and proposed splices within an Existing Outdoor Fiber Splice Enclosure.

(C) **Adjustments**

- a. The Contractor shall make adjustments to the size of Existing Outdoor Fiber Splice Enclosures to accommodate additional cables. The contractor shall utilize cable addition kits, butt adapter bolt kits, and splice trays as required to complete the installation.

(D) **Grounding**

- a. See GROUNDING on page 6 for grounding specifications.

SZ-31.8 **PRESSURE TEST**

To ensure that the outdoor fiber splice enclosure is properly sealed, the Contractor shall utilize the following test procedure:

- (A) Testing shall be performed in the presence of the TMS Integrator when the Outdoor Fiber Splice Enclosure is in its final hanging position.
- (B) Pressurize the enclosure to between 8 to 10 psi and wait 45 seconds. During the 45 second wait, spray soapy water around the seal to check for leaks.
- (C) Recheck the pressure. The enclosure should not have lost more than 2.5 psi.
- (D) If the pressure loss is not greater than 2.5 psi and no leaks were detected when soapy water was sprayed around the seal, the enclosure requires no further testing.
- (E) If the pressure loss is greater than 2.5 psi or leaks were detected when soapy water was sprayed around the seal, the Contractor shall repair any leaks and retest the enclosure.

SZ-31.9 **HAS MET**

The following items have met the above specifications:

- (A) FC Fiber Bulkhead Adapters: ADC/FL2-6PSMFC-Z.
- (B) 6 Fiber FC SM Indoor Pigtails with FC Fiber Bulkhead Adapters: ADC/FL2-6PLSC605R.
- (C) Cable Addition Kit: 3M 2181-LS.
- (D) Double Butt Adapter Bolt Kit: 3M 2181-B.
- (E) Triple Butt Adapter Bolt Kit: 3M 2181-C.
- (F) Splice Tray: 3M 2524-FT.

SZ-31.10 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified per location. Payment will be made under Item 2550.602 (FIBER OPTIC CABLE SPLICING) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to Existing or Installed Outdoor FO Splice Enclosure, Pressure Test, and all materials and labor necessary to construct the Fiber Optic Cable Splicing.

SZ-32 **(2550) PULL VAULT**

This work shall consist of furnishing and installing a Pull Vault, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-32.1 **SPLICING REQUIREMENTS**

The following provisions shall apply when FO cable splicing is required within the Pull Vault:

- (A) See GROUNDING on page 6 for grounding specifications.
- (B) Install a Mn/DOT furnished fiber optic splice vault marker per the Plan detail. See Mn/DOT FURNISHED FIBER OPTIC SPLICE VAULT MARKER on page 5.
- (C) Provide a drainage system for the Pull Vault (see the Vault detail in the Plans). The Engineer must approve deviation from the drainage system shown on the Vault detail in the Plans.
- (D) Clean Pull Vaults after installation and splicing of cable. All areas shall be cleaned including the flange that the Cover rests on and the bolt holes for the Cover.
- (E) FO Cables shall be coiled onto the FO coiling brackets within vaults.

SZ-32.2 Shall be placed on a 12 inches thick layer of coarse filter aggregate per Mn/DOT 3149.2H.

SZ-32.3 **COVER**

The following provisions shall apply to the Cover part of the Pull Vault:

- (A) Provide one ferrous device to lift the cover from the body of the Pull Vault for every three Pull Vaults. The ferrous device must be >28 inches in length.

SZ-32.4 The Pull Vault contains a Mn/DOT furnished locator ball installed by the Contractor. See **LOCATOR BALLS** on page 5.

SZ-32.5 Near the Pull Vault, the FO cables sweep up to meet the conduit entrance to the Pull Vault Take care not to exceed minimum bend radius.

SZ-32.6 Clean Pull Vaults after installation. All areas shall be cleaned including the flange that the cover rests on and the bolt holes for the cover.

SZ-32.7 **APL**

Mn/Dot approved Pull Vault is listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtsystems/index.html>

SZ-32.8 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2550.602 (PULL VAULT) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including Splicing Requirements, Cover, and all materials and labor necessary to construct the Pull Vault.

SZ-33 **(2550) LOOP DETECTOR DESIGN PREFORMED**

This work shall consist of furnishing and installing a Loop Detector Design Preformed, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-33.1 See PROJECT TESTING AND DOCUMENTATION SUBMITTALS on page 12 for project testing and documentation details.
- SZ-33.2 See LABELING on page 8 for Labeling details.
- SZ-33.3 The Loop Detector, Design Preformed, consists of three parts: the head, the tail, and the conductor. The conductor is continuous throughout all parts. See the Plan for detailed drawing of the parts.
- SZ-33.4 The Contractor shall be responsible for ordering loops with the proper dimensions and grades of materials. The Contractor shall note that the preformed loop detector, installed in the grade (below the pavement), has four turns of No. 16 XHHW insulated wire.
- SZ-33.5 Locate Loop Detector Design Preformed loops in the center of the lane and approximately one meter from transverse pavement panel joints.
- SZ-33.6 Coordinate the installation of detector loops with the Roadway Contractor.
- SZ-33.7 Loops and loop circuits including the lead-in cable must have insulation resistance greater than 100 megohm to qualify as a good circuit. If the insulation test is under 100 megohm it is the responsibility of the contractor to troubleshoot and repair the problem.
- SZ-33.8 **LOOP CONDUCTOR**
The following provisions shall apply to the Loop Conductor for the Loop Detector Design Preformed:
- (A) The Conductor shall be continuous through the loop head, tail, and entrance conduit to the handhole.
 - (B) Unencased tail wire shall be twisted three (3) turns per foot.
- SZ-33.9 **LOOP DETECTOR HEAD CONDUIT**
The following provisions shall apply to the Loop Detector Head Conduit for the Loop Detector Design Preformed:
- (A) The Loop Detector Head Conduit shall require the following properties:
 - a. Flexibility.
 - b. Protection from moisture.
 - c. Protection from pavement expansion/contraction,
 - d. Binds the loop conductor firmly in place.
 - e. 0.375 inch I.D. and 0.625 inch O.D. polypropylene.
 - f. Two five inch expansion/contraction joints with each joint protected by a nine inch, schedule 80, polypropylene slide cover.
 - (B) The Loop Detector Head Conduit and the PVC Loop Tail Encasement shall be filled with hot rubberized asphalt.
- SZ-33.10 **TEE CONNECTOR**
Loop Detector Head Conduit shall be attached to the PVC Loop Tail Encasement with a schedule 80 CPVC tee (shown as the “TEE CONNECTOR” in the Plan detail).
- SZ-33.11 **LOOP TAIL**
The Loop Tail is the part of the Loop Detector Design Preformed that runs from the “Tee Connector” to the handhole. The following provisions shall apply the Loop Tail for the Loop Detector Design Preformed:

- (A) The following description of the Loop Tail differentiates between which parts are encased and which parts not non-encased:
 - a. The encased portion shall be the first five feet from the Tee Connector.
 - b. The non-encased portion shall be from the encased portion to the splice encapsulator in the handhole. The length of the non-encased portion shall be 90 feet.
- (B) The encased portion of the Loop Tail shall have a minimum of one foot inserted into the NMC that runs to the handhole.
- (C) The encased Loop tail wire shall have the following properties:
 - a. Seamless.
 - b. Urethane.
 - c. Non-perforated jacket reinforced with extruded polyester fiber braid.
 - d. Nonconductive
 - e. Completely filled with hot rubberized asphalt. The length of the flex hose tail encasement is the distance from the loop head tee connector and the handhole entrance conduit plus one foot (length varies, see Plan).
- (D) The loop tail shall vary in length depending on lane location (see Plans).

SZ-33.12 LOOP INSTALLATION

The Loop Installation for Loop Detector Design Preformed shall conform to Mn/DOT 2550.3, Plan details and the following provisions:

- (A) Furnish and install NMC conduit as shown in the plan detail.
- (B) Loop tails shall enter an appropriately sized $\frac{3}{4}$ inch handhole entrance conduit (see Plan Detail).

SZ-33.13 LEAD-IN SPLICE ENCAPSULATOR

The following provisions shall apply to the Lead-in Splice Encapsulator for Loop Detector Design Preformed:

- (A) Detector loop and lead-in conductor wires shall be spliced as directed in the Plan Detail "TMS Loop Detector Typical – Part Two". The Splice protection device shall have the following features
 - a. Designed for use in weather exposed or direct burial locations,
 - b. For making splices on unshielded synthetic insulated cables,
 - c. UL listed for direct burial and submerged applications up to 600 volts,
 - d. Capable of withstanding temperatures up to 90 °C,
 - e. Capable of accommodating conductor cable and connector outside diameters of up to 0.625 inch.

SZ-33.14 PROTECT CONDUCTOR ENDS

The following provisions shall apply to Protect Lead Ends for the Loop Detector Design Preformed:

- (A) The Contractor shall protect Loop Tail and Lead conductor ends whenever they are not immediately spliced to the 2/C No.14 in the handhole by performing the following:
 - a. Wire ends shall be encapsulated with an epoxy type encapsulator.
 - b. The Contractor shall attach the encapsulated wires to the eyebolt near the top of the HH (install an eye bolt if it is missing from an existing handhole).

SZ-33.15 **SPLICING LEAD-IN CONDUCTOR CABLE TO LOOP DETECTOR WIRE**

The following provisions shall apply to Splicing Lead-in Conductor Cable to Loop Detector Wire for Loop Detector Design Preformed:

- (A) Utilize a rosin core solder or rosin flux and solder to splice the loop conductor and the loop lead-in conductor.
- (B) Separation shall be created between soldered splices by staggering the splices. Contact between soldered splice shall not be allowed.
- (C) To ensure the splice is sealed by the epoxy, install the splice through the cap into the tube of the splice kit so that the outer jacket of each conductor enters the encapsulator tube. Install both loop conductor and lead-in conductor splices into the same end of the encapsulator tube.
- (D) The 2/C No. 14 Lead-in cable outer jacket and the sawcut loop detector tubing shall have one half inch roughed surface contained within the epoxy. A minimum of one inch sand paper roughened surface shall protrude outside the epoxy. The sand paper roughed surface protruding outside the epoxy shall be visually verifiable. The exposed drain wire and the foil shield of the 2/C No. 14 Lead-in cable shall be cut off prior to inserting the outer jacket into the epoxy.
- (E) Attach the splice to the eyebolt near the top of the handhole (install an eyebolt if it is missing).
- (F) Verify that loop conductor cable identification markings (lane and cabinet ID) are correct and consistent with the Plan Detail prior to cutting any existing splices to Lead-in conductor Cable.
- (G) Notify the Engineer following the installation of the splice. A Mn/DOT representative will test the loop and lead-in system and terminate the lead-in within seven days.

SZ-33.16 **APL**

The following items have met the above specifications:

- (A) Mn/Dot approved Splice Encapsulator is listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtsystems/index.html>

- (B) Mn/Dot approved Preformed Loop Detector is listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtsystems/index.html>

SZ-33.17 **MEASUREMENT AND PAYMENT**

Measurement will be made by the each constructed as specified. Payment will be made under Item 2550.602 (LOOP DETECTOR DESIGN PREFORMED) at the Contract bid price per each, which shall be compensation in full for all costs incidental thereto, including but not limited to Project Testing and documentation Submittals, Labeling, Loop Conductor, Loop Detector Head Conduit, Tee Connector, Loop Tail, Loop Installation, Splice Encapsulator, Protect Conductor Ends, Splicing Requirements, and all materials and labor necessary to construct the Loop Detector Design Preformed.

SZ-34 **(2550) REROUTE CABLE**

This work shall consist of Reroute Cable, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-34.1 The Contractor shall utilize a vacuum excavator for exposing all cables and conduit that require excavation for rerouting. Hand digging will only be allowed as specified in the plan.

- SZ-34.2 Disconnect and terminate cables unless otherwise directed by the Plans.
- SZ-34.3 Pull back cables prior to rerouting as directed by the Plan.
- SZ-34.4 Existing conduit and cables shall be removed to adjust to the proposed design.
- SZ-34.5 Protect cable to ensure it is not damaged when exposed. The Contractor shall be responsible for any damage incurred during the Reroute Cable operation.
- SZ-34.6 See GROUNDING on page 6 for Grounding requirements.
- SZ-34.7 See LABELING on page 8 for Labeling requirements.

SZ-34.8 **FO CABLE INSTALLATION REQUIREMENTS**

The FO Cable Installation Requirements shall comply with Mn/DOT 2550.3 and the following provisions:

- (A) Additional lengths FO Cable shall be stored in end-equipment Control cabinets, FO Patching Shelters, and TMS Shelter Cabinets.
- (B) The following lengths of outer jacket and armor shall be removed from field terminated FO Cable for fiber management:
 - a. Remove eight to 15 feet of the outer jacket of cable terminating an Outdoor FO Splice Enclosure.
- (C) FO Cable shall be placed a minimum of 36 inches below finished grade.
- (D) FO cable shall be placed a minimum of 60 inches below finished grade when it is placed under a road.
- (E) For lengths of FO Cable over 600 feet the Contractor shall employ the Air Assisted method for installation.
- (F) See **GROUNDING** on page 6 for grounding requirements.
- (G) Expected tension on the FO Cable and pulling tape shall be calculated prior to installing the FO Cable in conduit runs. The pulling force shall be distributed between the inner strength member and the aramid fibers by securing both to the main pulling device.
- (H) A “break-away” type pulling attachment shall be utilized to protect against over stressing the FO Cable. A cable grip that pulls only on the outer jacket to pull FO Cable shall not be allowed.
- (I) Damage to the FO Cable from any source or exceeding the manufacturer’s recommended tensile strength limits or cable-bending radius is cause for the cables to be rejected. The Contractor shall ensure a minimum bend radius of ten inches during installation (loaded cable) and minimum bend radius of eight inches after installation (static cable).
- (J) Often, FO Cable is pulled through conduit/handhole networks. Using the 24 inches diameter handholes as a fiber pull box, is likely to exceed the minimum loaded bend radius and cause damage to the cable fibers. The Contractor shall not use the handhole as a fiber pull box.
- (K) Slack FO cable shall be provided for FO cables spliced within vaults. Provide 70 feet of slack FO Cable coiled in these vaults per each vault entrance/exit. Provide other lengths of Slack FO Cable if called for in the Plan.

- (L) Backfill open trench installations with granular material six inches over the FO Cable conduit elevation.
- (M) **Air Assisted FO Cable**
 - a. Long radius bends shall be utilized in equipment foundations and other situations requiring the negotiation of sharp angles.
 - b. The duct system shall be properly installed utilizing pressure tight splices.
 - i. Seal one end of the duct and pressurize the duct utilizing a sealed blowing machine.
 - ii. The duct shall maintain 130 psi without realizing significant pressure loss
 - iii. Use care near pressurized ducts.
 - c. High air speed blowing shall require the front end of the FO Cable to be endcapped to prevent the cable from getting hung up in the duct.
 - d. Utilize proper air seals to fit the OD of the FO Cable.
 - e. Provide proof that the duct is properly spliced and not crushed by blowing a hard mandrel through the duct.
 - f. Clean and dry the duct utilizing the following procedures
 - i. Blow a tight fitting foam carrier through the duct at high pressure. The foam shall travel at approximately 100 fps.
 - ii. If excess water and/or dirt is expelled from the duct, repeat the process until minimal water and/or dirt is observed.
 - iii. Dry the duct with airflow.
 - g. For high speed air machines (no missile), inject the recommended amount of approved lubricant and spread it with a foam carrier. For piston type machines, inject the majority of the lubricant in front of the missile with some placed behind the missile.
 - h. For push/pull machines, attach the piston to the FO Cable and insert the piston into the duct.
 - i. For high air speed machines, hand push approximately 100 feet of FO Cable into the duct prior to activating the machine.
 - j. Use caution in bringing up the air and hydraulic pressure.

SZ-34.9 MEASUREMENT AND PAYMENT

Measurement will be made by the affected length of Cable Rerouted as specified. If groups of cable pulled to the same location are designated for rerouting within the Plan, measurement shall apply to an average length for the group of cables not individual cable lengths. Installation of the rerouted cable shall be considered incidental. Payment will be made under Item 2550.603 (REROUTE CABLE) at the Contract bid price per linear foot, which shall be compensation in full for all costs incidental thereto, including but not limited to Disconnecting and Terminating cables, FO Cable Installation Requirements, rerouting the cable, removing and relocating existing conduit as necessary, protecting the cable, Grounding, Labeling, and all materials and labor necessary to construct the Reroute Cable.

SZ-35 (2550) BORED CONDUIT

This work shall consist of furnishing and installing Bored Conduit, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

- SZ-35.1 Bored Conduit shall conform to but not be limited to the following Mn/DOT Specifications except as modified by these provisions:

- (A) Installation: Mn/DOT 2565.3.
- (B) NMC: Mn/DOT 3803.
- (C) RSC: 3801.
- (D) Expansion Fittings: 3839.

SZ-35.2 For installation under an existing roadway or paved surface, Bored Conduit shall be Heavy-wall rigid PVC or HDPE and shall be Schedule 80.

SZ-35.3 All conduit under roadways shall be continuous without joints.

SZ-35.4 Bored Conduit installed under slope paving shall be accomplished without damage to the slope paving.

SZ-35.5 Bored Conduit shall be installed 1.5 m (60 inches) below the bottom of the finished driving surface. Bored Conduit under roadway surfaces shall extend 10 feet beyond the pavement edge or curb line. The transition from the routine 0.9 m (36 inches) depth of direct-buried cable to the 1.5 m (60 inches) depth under a roadway or paved shoulder shall not exceed one foot vertical per five feet horizontal.

SZ-35.6 Bored conduit shall be installed at depths according to the Plan if the Plan calls out for deviations from these specifications.

SZ-35.7 Standard bell ends shall be installed on all conduit ends to prevent damage to cables during installation.

SZ-35.8 **MEASUREMENT AND PAYMENT**

Measurement will be made by the length of Bored Conduit furnished and installed as specified.

Payment for BORED CONDUIT of each size will be made in accordance with the schedule set forth below at the appropriate Contract unit bid price for each separate item of work, which shall, in each instance, be compensation in full for the costs of all materials, equipment, and labor required to complete the work as specified, to the satisfaction of the Engineer.

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
2550.603	___ Bored Conduit	linear foot

SZ-36 **(2550) FIBER OPTIC CABLE**

This work shall consist of furnishing and installing Fiber Optic Cable, which shall be in accordance with the Mn/DOT Standard Specifications, Mn/DOT Standard Plans/Plates, the Plans, and the following:

SZ-36.1 **INSTALLATION REQUIREMENTS**

The Installation Requirements for FO Cable shall comply with Mn/DOT 2550.3 and the following provisions:

- (A) Additional lengths FO Cable shall be stored in end-equipment Control cabinets, FO Patching Shelters, and TMS Shelter Cabinets.
- (B) The following lengths of outer jacket and armor shall be removed from field terminated FO Cable for fiber management:
 - a. Remove eight to 15 feet of the outer jacket of cable terminating an Outdoor FO Splice Enclosure.

- (C) FO Cable shall be placed a minimum of 36 inches below finished grade.
- (D) FO cable shall be placed a minimum of 60 inches below finished grade when it is placed under a road.
- (E) For lengths of FO Cable over 600 feet the Contractor shall employ the Air Assisted method for installation.
- (F) See **GROUNDING** on page 6 for grounding requirements.
- (G) Expected tension on the FO Cable and pulling tape shall be calculated prior to installing the FO Cable in conduit runs. The pulling force shall be distributed between the inner strength member and the aramid fibers by securing both to the main pulling device.
- (H) A “break-away” type pulling attachment shall be utilized to protect against over stressing the FO Cable. A cable grip that pulls only on the outer jacket to pull FO Cable shall not be allowed.
- (I) Damage to the FO Cable from any source or exceeding the manufacturer’s recommended tensile strength limits or cable-bending radius is cause for the cables to be rejected. The Contractor shall ensure a minimum bend radius of ten inches during installation (loaded cable) and minimum bend radius of eight inches after installation (static cable).
- (J) Often, FO Cable is pulled through conduit/handhole networks. Using the 24 inches diameter handholes as a fiber pull box, is likely to exceed the minimum loaded bend radius and cause damage to the cable fibers. The Contractor shall not use the handhole as a fiber pull box.
- (K) Slack FO cable shall be provided for FO cables spliced within vaults. Provide 70 feet of slack FO Cable coiled in these vaults per each vault entrance/exit. Provide other lengths of Slack FO Cable if called for in the Plan.
- (L) Backfill open trench installations with granular material six inches over the FO Cable conduit elevation.
- (M) **Air Assisted FO Cable**
 - a. Long radius bends shall be utilized in equipment foundations and other situations requiring the negotiation of sharp angles.
 - b. The duct system shall be properly installed utilizing pressure tight splices.
 - i. Seal one end of the duct and pressurize the duct utilizing a sealed blowing machine.
 - ii. The duct shall maintain 130 psi without realizing significant pressure loss
 - iii. Use care near pressurized ducts.
 - c. High air speed blowing shall require the front end of the FO Cable to be endcapped to prevent the cable from getting hung up in the duct.
 - d. Utilize proper air seals to fit the OD of the FO Cable.
 - e. Provide proof that the duct is properly spliced and not crushed by blowing a hard mandrel through the duct.
 - f. Clean and dry the duct utilizing the following procedures
 - i. Blow a tight fitting foam carrier through the duct at high pressure. The foam shall travel at approximately 100 fps.
 - ii. If excess water and/or dirt is expelled from the duct, repeat the process until minimal water and/or dirt is observed.

- iii. Dry the duct with airflow.
- g. For high speed air machines (no missile), inject the recommended amount of approved lubricant and spread it with a foam carrier. For piston type machines, inject the majority of the lubricant in front of the missile with some placed behind the missile.
- h. For push/pull machines, attach the piston to the FO Cable and insert the piston into the duct.
- i. For high air speed machines, hand push approximately 100 feet of FO Cable into the duct prior to activating the machine.
- j. Use caution in bringing up the air and hydraulic pressure.

SZ-36.2 **HAS MET**

The following items have met the above specifications:

SZ-36.3 **APL**

Mn/Dot approved FO Trunk Cable is listed on the following Website:

<http://www.dot.state.mn.us/products/trafficmgtssystem/index.html>

SZ-36.4 **MEASUREMENT AND PAYMENT**

Measurement will be made by the length of Fiber Optic Cable furnished and installed as specified. Payment for FIBER OPTIC CABLE of each size and type will be made in accordance with the schedule set forth below at the appropriate Contract unit bid price for each separate item of work, which shall, in each instance, be compensation in full for all costs incidental thereto, including but not limited to FO Cables, Installation Requirements, and all materials, equipment, and labor required to complete the work as specified, to the satisfaction of the Engineer.

<u>Item No.</u>	<u>Description</u>	<u>Unit</u>
2550.603	Fiber Optic Trunk Cable ____ ____	linear foot

**WATERMAIN
SPECIAL PROVISIONS**

WATERMAIN
GENERAL REQUIREMENTS

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3400
WATERMAIN
GENERAL REQUIREMENTS

3400.1 DESCRIPTION

This work shall consist of the construction of the watermains, hydrants, services and other appurtenances in accordance with the Plans and these General Requirements, except as modified by the Specific Requirements or the Special Provisions. All work shall comply with the requirements of the Minnesota Department of Health, the Minnesota Plumbing Code and all applicable codes and ordinances.

3400.2 MATERIALS

The materials used in this work shall be new, conforming to the requirements of the referenced specifications for class, kind, type, size and grade of material as specified below and other details indicated in the contract.

The Contractor shall submit in writing a list of materials and suppliers for approval.

A. Watermain

1. Ductile Iron Pipe: Ductile iron pipe for watermains shall be Special Class 52 for pipe less than 12 inches in diameter, Special Class 52 for pipe 12 inches or larger in diameter, and shall conform to the requirements of AWWA C151 (ANSI A21.51). Ductile iron pipe shall be used unless otherwise noted.

- a. Fittings: Fittings shall be Gray Iron or Ductile Iron, having a minimum working pressure rating of 150 psi, and shall conform to the requirements of AWWA C153 (ANSI 21.53), Ductile-Iron Compact Fittings.

Couplings shall be Gray Iron or Ductile Iron in accordance with fitting requirements above. Carbon steel couplings and sleeves shall not be used.

- b. Lining and Coating: All pipe and fittings shall be furnished with cement mortar lining meeting the requirements of AWWA C104 (ANSI A21.4) for standard thickness lining. All interior and exterior surfaces of the pipe and fittings shall have a tar or bituminous seal coating at least one mil thick. Spotty or thin seal coating, or poor coating adhesion, shall be cause for rejection.

- c. Joints: Pipe three inches and larger in diameter shall have push-on joints. Fittings shall have mechanical joints. The rubber gasket shall conform to AWWA C111 (ANSI A21.11).

Restrained push-on joints shall be as applies to each pipe manufacture. U.S. Pipe's TR Flex, Clow's Push-On Restrained Joint, American's Lok-Fast, or approved equal.

Restrained mechanical joints shall be Series 1100 Megalug retainer glands by EBAA Iron.

When using threaded rods as restraints they shall be sized as listed below.

<u>Pipe Size</u>	<u>Number of Rods</u>	<u>Rod Size</u>
4"	2	3/4"
6"	2	3/4"
8"	4	3/4"
10"	4	3/4"
12"	6	3/4"
16"	8	3/4"
20"	10	3/4"
24"	12	3/4"

- d. Electrical Conductivity: Copper straps shall be welded or otherwise permanently affixed to each pipe or appurtenance to provide a positive means of conveying electricity from pipe or fitting, to pipe or fitting. Conductive pipe gaskets may be used on pipe to pipe connections if approved by the Engineer. Size and method of affixing strap shall be subject to the approval of the Engineer and shall be sufficient to meet or exceed the criteria for conductivity testing set forth in this specification.
2. Polyvinyl Chloride Pipe: Polyvinyl chloride pipe (PVC) for watermain shall conform to AWWA C900 for pipe 4 inches through 12 inches in diameter and shall conform to AWWA C905 for pipe 14 inches and larger in diameter. All 4 inch through 12-inch pipe shall have a minimum dimension ratio (DR) of 18, corresponding to a working pressure of 150 psi for PVC type 1120 pipe. All 14 inch and larger pipe shall have a minimum dimension ratio (DR) of 25, corresponding to a working pressure of 165 psi for PVC type 1120 pipe.
- a. Fittings: Fittings shall be Gray Iron or Ductile Iron, having a minimum working pressure rating of 150 psi, and shall conform to the requirements of AWWA C110 (ANSI A21.10), or AWWA C153 (ANSI 21.53) Ductile-Iron Compact Fittings.
- b. Joints: Joints in plastic pipe shall be bell-end elastomeric-gasket type.
- c. Restraints: Restraints for PVC pipe shall be Series 1100HD split restraint harness for push-on pipe bells, Series 1100 Megalug retainer gland for mechanical joint fittings, by EBBA Iron.

Restraints for PVC pipe shall be Series 1600 restraint harness for C900 pipe bells, Series 2000PV Megalug retainer gland for C900/C905 mechanical joint fittings.

When using threaded rods as restraints they shall be sized as listed below:

<u>Pipe Size</u>	<u>Number of Rods</u>	<u>Rod Size</u>
4"	4	3/4"
6"	4	3/4"
8"	4	3/4"
10"	4	3/4"
12"	4	3/4"
16"	8	3/4"
20"	10	3/4"
24"	12	3/4"

- d. Tracer Wire: Tracer wire shall be 8 gauge single strand wire with plastic jacket, type TW or THW. It is required that the tracer wire carry a radio signal to aid in locating buried

watermain. Tracer wire shall be copper conductor insulated with medium density polyethylene (HDPE) and shall be in accordance with ASTM B 1, and B 3 for copper wire and ASTM D 1248 for polyethylene. The wire shall be identified by surface marking indicating manufacturer's identification, conductor size, and other appropriate information.

In-line splices shall be compression butt splices with 3M cast kit. Wire nut splices shall not be allowed.

3. High Density Polyethylene Pipe: High Density Polyethylene pipe (HDPE) pipe and fittings for watermain shall conform to the requirements of AWWA C 906. PE pipe shall be DR11 and be rated for 160 psig at 73.4° F. The polyethylene material of the pipe shall be listed by the Plastic Pipe Institute as PE3408 with a Hydrostatic Design stress rating of 800 psi at 73.4° F.

The profile of the PE installed by directional boring shall be as shown on the plans and as staked in the field. All watermain shall maintain a minimum cover of 7½ feet.

Any fittings or adapters to connect the PE to the DIP pipe or manholes shall be considered incidental to the installation of the pipe.

- a. Polyethylene Pipe Fusing Procedure: Contractor shall provide the equipment and qualified personnel to fuse the PE 3408 pipe. Contractor shall use pipe manufacturer's recommendations on temperature, time and pressure criteria for joint procedure and submit joint procedure and pre-qualification to the Owner for their approval.

Personnel performing the fusing of PE pipe shall be pre-qualified to fuse PE pipe. PE fusing certification shall be per above paragraph.

- b. Tracer Wire: Tracer wire shall be minimum 8 gauge single strand as specified above. For pipe that is directional bored the tracer wire may be of a heavier gauge or structure to allow it to be pulled along with the pipe provided that it meets the functional requirements of the tracer wire test and operation.
- c. Tracer Wire Access Box: The maximum spacing between tracer wire connection points shall be 500 feet. Tracer wires on lengths of pipe without hydrants or valves or that cannot meet the 500' spacing requirement shall have wire terminal connection points through the use of a terminal box. The top lid shall be cast iron, suitable for flush burial, with integral stainless steel terminals and a locking lid opened with a standard pentagon key. The bottom section shall be a minimum 12" ABS tube. The tracer wire access box shall be Valvco Pipe Tracer Wire Terminal Box.

B. Fire Hydrants

Fire hydrants shall be Pacer Model WB-67 as manufactured by Waterous Company, and shall conform to AWWA C502. Hydrant shall be yellow in color.

Hydrants shall be furnished in conformance with the following supplementary requirements:

1. Five-inch (nominal diameter) main valve opening of the type that opens against water pressure with a pentagonal operating nut with one-inch sides (nominal 1½" from point of pentagon to opposite side), and opening counterclockwise (left). All fasteners to be 316 stainless steel.

2. Barrels shall be two piece, non-jacket type, with bottom of traffic flange set 2 inches above finish grade, 24 inch nozzle height above finish grade (16 inch break off extension, center of nozzle 22 inches above bottom of traffic flange), and with mechanical joint connection at the base for connecting to a 6 inch ductile iron pipe hydrant lead.
3. Hydrant bury depth, measured from the top of the branch pipe connection to the finished ground line at the hydrant, shall be 8'-0" (According to Waterous definition of "bury", hydrants with a bury of 8'-6" shall be furnished).
4. Hydrants shall have two outlet nozzles for 2½ inch (I.D.) hose connection and one outlet nozzle for 4½ inch (I.D.) pumper connection. Threads shall conform to NFPA No. 194 (ANSI B26) and shall be: hose connection – 7½ threads per inch, 3.062 inch nominal outside diameter (National Standard Thread); pumper connection - 4 threads per inch, 5¾" nominal outside diameter (National Standard Thread). Nozzle caps shall be nut type with chain.
5. Hydrant operating mechanisms shall be provided with "O" ring seals preventing entrance of moisture and shall be lubricated through an opening in the operating nut or bonnet.
6. Drain holes shall be left open unless indicated otherwise on the plans. If so indicated, the hydrant shall be tagged "Pump After Use".
7. The Contractor shall provide the Owner with one hydrant wrench for every ten (10) hydrants supplied or portion thereof. Cost of the wrenches shall be incidental to the project.
8. All hydrants shall be equipped with a flexstake mounted to the hydrant with flexible mount.

C. Valves

Six inch to twelve inch valves shall be resilient seated gate valves. Valves larger than twelve inches shall be butterfly valves, unless noted on the plans. All valves shall be for buried service.

1. Butterfly Valves: Butterfly valves shall conform to the requirements of AWWA C504 and the following requirements:
 - a. Working pressure rating of 150 psi minimum.
 - b. Two inch square operating nut opening counterclockwise (left).
 - c. Double "O" ring or split V type stem seal.
 - d. Traveling nut type operator permanently sealed and lubricated.
 - e. Manufacturers: Dezurik or Pratt.
 - f. all fasteners to be 316 stainless steel
2. Gate Valves: Gate valves shall conform to AWWA C509 for Resilient Seated Valves, and shall comply with the following supplementary requirements:
 - a. Working pressure rating of 200 psi for all sizes.
 - b. Two inch square operating nut opening counterclockwise (left).
 - c. Double "O" ring stem seal, one above and below the stem seal.
 - d. Weather seal on bonnet cover.

- e. Non-rising stem.
- f. Mechanical joints for typical installation. Tapping sleeve assemblies require flange by mechanical joint.
- g. Manufacturers: American, Mueller, Kennedy, or an approved equal.
- h. all fasteners to be 316 stainless steel

3. Valve Boxes:

- a. Valve boxes shall be 5¼ inch diameter shaft suitable for 7½ feet of cover over the top of the watermain. Boxes shall be cast iron screw type three piece boxes with the word "WATER" on the lid. Valve boxes shall be Tyler 6860 with 5¼ inch drop lid.
- b. All valve boxes shall be installed upon the valve with the use of a Gate Valve Adaptor as manufactured by Adaptor Inc. of Oak Creek, WI. The adaptor shall be considered incidental to the valve box installation.
- c. Valves shall be fitted with an Extension Stem, part number A-26441 as manufactured by Mueller Company. The extension shall bring the top nut fitting to within 6" – 12" of the finished grade. The extension shall be considered incidental to the valve box installation.
- d. Valve boxes shall have a 1/8" diameter (minimum) hole drilled in the upper section just below the lid housing. This is to allow tracer wire to be threaded from the outside to the inside of the valve so an end of the wire can be left in the valve for connection when necessary.

D. Water Service Pipe and Appurtenances

1. Pipe: Water service pipe with inside diameter larger than 2½ inches shall conform to the requirements of Ductile Iron Pipe or Polyvinyl Chloride Pipe.

Water service pipe ¾" to 2" inside diameter shall be Type K, seamless copper water tubing, soft annealed temper and conform to the requirements of ASTM B88.

2. Appurtenances:

- a. Corporation Stop: For use with flared copper service pipe, and the inlet threaded with the standard AWWA taper thread.
- b. Curb Stop: For use with flared copper service pipe both ends, inverted key, and Minneapolis pattern.
- c. Curb Box: Minneapolis pattern base, 78"– 81" stationary rod, 12 inch box adjustment from 7 to 8 feet, lid with pentagon plug, and 1½" I.D. upper section.
- d. Service Saddle: Double strap bronze or brass type.
- e. Wrenches and Keys: The Contractor shall provide the Owner with one 3-foot curb box shutoff rod and pentagon key for every 20 curb boxes supplied or portion thereof, minimum of 3. Cost of keys shall be incidental to the project.
- f. Manufacturers (or an approved equal):

<u>Appurtenance</u>	<u>Service Diameter*</u>	<u>Manufacturer's Number</u>		
		<u>Mueller</u>	<u>McDonald</u>	<u>Ford</u>
Corporation Stop	¾" – 2"	B-25000	4701B	FB600

Curb Stop	¾"– 2"	Mark II Oriseal H-15154	6104	B22 series
Curb Box	¾"	H-10302	5622	EM2-80-67
	1½"– 2"	H-10304	5623	EM2-80-67
Stationary Rod		88139	5700R	ROD-78
Shut-off Rod		H-10321	305 3	SROD-3
Pentagon Key		H-10323	304K	KEY-1
Saddle				
DIP		BR 2 B series	3825 series	202B series
HDPE	Poly-Cam Series 415 Butt Fusion Tapping Saddle			

* 1" service lines on DIP may use ¾" corporation stops with flared connection for 1" copper service.

E. Polyethylene Encasement Material

Polyethylene encasement material shall conform to AWWA C105 Type A for tube type installation and 8 mil nominal film thickness.

F. Steel Casing Pipe

Steel casing pipe for jack-boring shall have a wall thickness of 0.375 inches for casing pipe up to 24 inch diameter, and a wall thickness of 0.500 inches for casing pipe 26 to 32 inches in diameter.

G. Piling

Piling shall be constructed in accordance with the provisions of Mn/DOT Specification 2452. Piles for pipelines shall be Treated Timber, in accordance with Mn/DOT 3471.

H. Granular Materials

Granular materials furnished for foundation, bedding, encasement, backfill or other purposes as may be specified shall consist of any natural or synthetic mineral aggregate such as sand, gravel, crushed rock, crushed stone, or slag, that shall be so graded as to meet the gradation requirements specified herein for each particular use.

1. Granular Material Gradation Classifications: Granular materials furnished for use in Foundation, Bedding, Encasement, and Backfill construction shall be in accordance with Mn/DOT 3149 as listed below:

Material Use Designation and Percent Passing Sieve

<u>Sieve Size</u>	<u>Foundation*</u>	<u>Bedding</u>	<u>Encasement</u>	<u>Backfill</u>
	Coarse Filter	Aggregate	Aggregate	Aggregate

	Aggregate 3149.H	Bedding 3149.G	Bedding 3149.G	Backfill 3149.E
2 inch				100
1 inch	100	100	100	
¾ inch	85-100	90-100	90-100	
⅜ inch	30-60	50-90	50-90	
No.4	0-10	35-80	35-80	35-100
No. 10		20-65	20-65	20-70
No. 40		10-35	10-35	10-35
No.200		3-10	3-10	3-10

* ¾ inch to 1½ inch material may be used in lieu of Foundation specified.

2. Granular Material Use Designation: Granular materials provided for Foundation, Bedding, Encasement, or Backfill use as required by the Contract, either as part of the pipe item work unit or as a BID item, shall be classified as to use in accordance with the following:

Material Use Designation Zone Designation

Granular Foundation	Placed below the bottom of pipe grade as replacement for unsuitable or unstable soils, to achieve better foundation support.
Granular Bedding	Placed below the pipe midpoint, prior to pipe installation, to facilitate proper shaping and achieve uniform pipe support.
Granular Encasement	Placed from pipe midpoint to one foot above the top of pipe, after pipe installation, for protection of the pipe and to assure proper filling of voids and thorough consolidation of backfill.
Granular Backfill	Placed below subgrade, if any, as the second stage of backfill, to minimize trench settlement and provide support for surface improvements.

In each case above, unless otherwise indicated, the lower limits of any particular zone shall be the top surface of the next lower course as constructed. The upper limits of each zone are established to define variable needs for material gradation and compaction or void content, taking into consideration the sequence of construction and other conditions. The material use and zone designations described above shall not be construed to restrict the use of any particular material in other zones where the gradation requirements are met.

I. Insulation

Main insulation shall be extruded rigid board material having a maximum thermal conductivity of 0.23 BTU/hour/square foot/° Fahrenheit/per inch thickness, at 40° F mean, a compressive strength of 35 psi minimum, and water absorption of 0.25 percent by volume maximum. Insulation shall be DOW Styrofoam HI-40, Minnesota Diversified Products (DiversiFoam) CertiFoam brand insulation.

Unless otherwise specified in the Plans, Specifications, and Specific Requirements, board dimensions shall measure 8 foot long, 4 foot wide, and 1½ inches thick or greater.

3400.3 CONSTRUCTION REQUIREMENTS

A. Maintenance

Maintenance of the project site, and any other area affected by construction, shall be in accordance with Mn/DOT specifications including Sections:

1404	Maintenance of Traffic
1514	Maintenance During Construction
1515	Control of Haul Roads
1701	Public Convenience and Safety
Chapter 6	Minnesota Manual on Uniform Traffic Control Devices

Maintenance of streets and any detours, by-passes, equipment, stockpile, or storage areas provided in conjunction with the project shall be required and shall be the responsibility of the Contractor. Said maintenance shall include but not be limited to: keeping the streets free of obstacles, parked equipment and unused barricades; blading the traveled ways; controlling the dust in the construction area and on detours; and maintenance of all barricades and flashers.

The Contractor shall keep the portions of the project being used by public traffic, whether it be through or local traffic, in such condition that the traffic will be adequately accommodated at all times.

B. Service Disruptions

The Contractor shall maintain water service to existing customers during installation of new watermain and service connections. Service to residential properties can be disrupted for a maximum of 6 hours in one day. If it is necessary to disrupt water service to residential properties for a longer period than 6 hours the contractor shall provide temporary water service while the service is disconnected. Water service to business customers shall not be disrupted for more than 2 hours and cannot be disrupted during a peak business period to business that relies on water service. If it is necessary to disrupt business service outside these restrictions temporary water service must be provided at the contractor's expense.

C. Establishing Line and Grade

The primary line and grade will be established by the Engineer. Line and grade stakes will be set parallel to the proposed pipeline at an appropriate offset and interval as will serve the Contractor's operations wherever practical; at each change in line or grade; and as needed for pipeline appurtenances and service lines.

The Contractor shall arrange his operations to avoid unnecessary interference with the establishment of the primary line and grade stakes; and shall render whatever assistance may be required by the Engineer to accomplish the staking. The Contractor shall be responsible for preservation of the primary stakes and shall bear the full cost of any restaking necessitated by his negligence.

The Contractor shall be solely responsible for the correct transfer of the primary line and grade from the stakes to all working points and for construction of the work to the prescribed lines and grades.

Unless otherwise specified in the Plans, Specifications, and Specific Requirements, all watermain shall generally be placed with 7½ feet of cover. However, a greater depth may be required to clear storm and sanitary sewers and sewer services, and no additional compensation shall be provided for such adjustments.

In certain locations where watermain is in direct conflict with storm or sanitary sewer, the watermain shall be constructed above the sewer. Where it is necessary to use vertical bends to avoid sewer mains, no extra compensation will be made for this construction with the exception of payment for fittings used.

No deviation shall be made from the required line or grade except with the consent of the Engineer.

In areas of conflict between watermains, house sewers, storm sewers, or sanitary sewers, a separation of at least 18 inches between the watermain and the sewer shall be provided. When local conditions prevent a vertical separation as described, the following construction shall be used:

1. Sewers passing over or under watermains shall be constructed of material equal to watermain standards of construction for a distance of at least 9 feet on either side of the watermain.
2. Watermain passing under sewers shall, in addition, be protected by providing:
 - a. Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking of the watermains; and
 - b. That the length of water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.

Watermains shall be laid at least 10 feet horizontally from any sanitary sewer, storm sewer or sewer manhole, whenever possible. When local conditions prevent a horizontal separation of 10 feet a watermain may be laid closer to a storm or sanitary sewer provided that:

1. The bottom of the watermain is at least 18 inches above the top of the sewer;
2. Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to watermain standards of construction and shall be pressure tested to assure water-tightness prior to backfilling.

D. Protection of Surface Structures

All surface structures and features located outside the excavation limits for underground installations, together with those within the construction areas which are indicated in the Plans as being saved, shall be properly protected against damage and shall not be disturbed or removed without approval of the Engineer. Within the construction limits, as required, the removal of improvements such as paving, curbing, walks, turf, etc., shall be subject to acceptable replacement after completion of underground work, with all expense of removal and replacement being borne by the Contractor unless separate compensation is specifically provided for in the Contract.

Obstructions such as street signs, mailboxes, guard posts, culverts, and other items of prefabricated construction may be temporarily removed during construction provided essential service is maintained in a relocated setting as approved by the Engineer and nonessential items are properly stored for the

duration of construction. Upon completion of the underground work, all such items shall be replaced in their proper setting by and at the sole expense of the Contractor.

In the event of damage to any surface improvements, either privately or publicly owned, the Contractor will be required to replace or repair the damaged property to the satisfaction of the Engineer and by the Contractor at his expense.

E. Interference of Underground Structures

When any underground structure interferes with the planned placement of pipe or appurtenances and requires alterations in the work to eliminate the conflict or avoid endangering effects on either the existing or proposed facilities, the Contractor shall immediately notify the Engineer and the Owner of the affected structures. When any existing facilities are endangered by the Contractor's operations, he shall cease his operations at the site and take such precautions as may be necessary to protect the in-place structures until a decision is made as to how the conflict will be resolved.

Without specific authorization from the utility owner, no essential utility service shall be disrupted, nor shall any change be made in either the existing structures or the planned installations to overcome the interference. Alterations to existing facilities will be allowed only when that service will not be curtailed unavoidably and then only when the encroachment or relocation will satisfy all applicable regulations and conditions.

Wherever alterations are required as a result of unforeseen underground interference not due to any fault or negligence of the Contractor, the Engineer will issue a written change order covering any additional or extra work involved and specifying the revised basis of payment, if any. Any alterations made strictly for the convenience of the Contractor shall be subject to prior approval and shall be at the Contractor's expense.

No extra compensation will be allowed for delays caused by the interference of underground structures or utilities unless approved by the Engineer and included in a change order.

F. Removal of Surface Improvements

Removal of surface improvements in connection with trench excavation shall be limited to actual needs for installation of the pipeline and appurtenances. Removal operations shall be coordinated effectively with the excavation and installation operations as will cause the least practical disruption of traffic or inconvenience to the public. Removed debris shall not be deposited at locations that will restrict access to fire hydrants, private driveways, or other essential service areas. Removal and final disposal of debris shall be accomplished as a single operation wherever possible and the debris shall be removed from the site before starting the excavating operations.

Removal of concrete or bituminous structures shall be by methods producing clean-cut breakage that will preserve the remaining structure without damage. Concrete or bituminous paving shall be removed so when the trench is excavated there will be a six inch wide minimum undisturbed subgrade and aggregate base course lip. Removal equipment shall not be operated in a manner that will cause damage to the remaining or adjoining property. Where not removed to an existing joint, concrete structures shall be sawed along the break lines to a minimum depth of one-third of the structure depth.

Any reusable materials or materials for recycling, such as asphalt, concrete, aggregate, sod or topsoil, shall be segregated from other waste materials and be stockpiled so as to maintain suitability and permit proper reuse.

G. Excavation and Trench Preparation

Excavating operations shall proceed only so far in advance of pipe laying as will satisfy the needs for construction of work and permit advance verification of unobstructed line and grade as planned. Where interference with existing structures is possible or in any way indicated, and where necessary to establish elevation or direction for connections to in-place structures, the excavating shall be done at those locations in advance of the main operation so actual conditions will be exposed in sufficient time to make adjustments without resorting to extra work or unnecessary delay.

All installations shall be accomplished by open trench construction except where boring and jacking or tunnel construction methods shall be employed as specifically required by the Plans or approved by the Engineer. Surface structures must be properly supported and the backfill restored to the satisfaction of the Engineer.

The excavation operations shall be conducted to carefully expose all in-place underground structures without damage. Wherever the excavation extends under or approaches close to an existing structure as to endanger it in any way, precautions and protective measures shall be taken as necessary to preserve the structure and provide temporary support. Hand methods of excavating shall be utilized to probe for and expose such critical or hazardous installations as gas pipe and power or telephone cables.

1. Classification and Disposition of Materials: All materials encountered in the excavations, with the exception of items classified for payment as structure removals, will be considered as Unclassified Excavation. Unclassified materials shall include muck, rubble, wood debris, boulder stone, masonry or concrete fragments less than 1 cubic yard in volume, together with other miscellaneous matter that can be removed effectively with power operated excavators.

Excavated materials will be classified for reuse as being either Suitable or Unsuitable for backfill or other specified use, subject to selective controls. All suitable materials shall be reserved for backfill to the extent needed, and any surplus remaining shall be utilized for other construction on the project as may be specified or ordered by the Engineer. To the extent practical, granular materials and topsoil shall be segregated from other materials during the excavating and stockpiling operations so as to permit best use of the available materials at the time of backfilling.

All excavated materials reserved for backfill or other use on the project shall be stored at locations approved by the Engineer that will cause a minimum of nuisance or inconvenience to public travel, adjacent properties, and other special interests. The material shall not be deposited so close to the edges of the excavations as would create hazardous conditions, nor shall any material be placed so as to block the access to emergency services. All materials considered unsuitable by the Engineer, for any use on the project, shall be immediately removed from the project and be disposed of as arranged for by the Contractor.

If contaminated soils are encountered during the excavation process the Contractor shall notify the Engineer and the MPCA to determine what actions are necessary to properly handle the removal of the contaminated soils and replace them with suitable materials.

2. Excavation Limitations and Requirements: Trench excavating shall be to a depth that will permit preparation of the foundation, as specified, and installation of the pipeline and appurtenances at the prescribed line and grade except where alterations are specifically authorized. Trench widths shall be sufficient to permit the pipe to be laid and joined properly and the backfill to be placed and compacted as specified. Extra width shall be provided as necessary to permit convenient placement of sheeting and shoring and to accommodate placement of appurtenances.

Excavations shall be extended below the bottom of structure grade as necessary to accommodate any required Granular Bedding material. When unstable foundation materials are encountered at the established grade, additional materials shall be removed as specified or ordered by the Engineer to produce an acceptable foundation. All excavations below grade shall be to a minimum width equal to the outside pipe diameter plus 2 feet.

Where no other grade controls are indicated or established for the pipeline, the excavating and foundation preparations shall provide a minimum cover over the top of the pipe of 7.5 feet to the proposed final grade as indicated on the plans.

Trench widths shall allow for at least six inches of clearance on each side of the joint hubs. The maximum allowable width of the trench at the top of pipe level shall be the outside diameter of the pipe plus 2 feet, subject to the considerations for alternate pipe loading set forth below. The width of the trench at the ground surface shall be held to a minimum to prevent unnecessary destruction of the surface structures while maintaining safe working conditions.

The maximum allowable trench width at the level of the top of pipe may be exceeded only by approval of the Engineer, after consideration of pipe strength and loading relationships. Any alternate proposals made by the Contractor shall be in writing, giving the pertinent soil weight data and proposed pipe strength alternate, and shall be made in a timely manner so as not to delay the project. Approval of alternate pipe designs shall be with the understanding that there will be no extra compensation will be allowed for any increase in material or construction costs.

3. Sheeting and Bracing Excavations: All excavations shall be sheeted, shored, and braced as will meet all requirements of the applicable safety codes and regulations; comply with any specific requirements of the Contract; and prevent disturbance or settlement of adjacent surfaces, foundations, structures, utilities, and other properties. Any damages to the work under contract or to adjacent structures or property caused by settlement, water or earth pressures, slides, cave-ins, or other causes due to failure or lack of sheeting, shoring, or bracing or through negligence or fault of the Contractor in any manner shall be repaired by the Contractor at his expense and without delay.

Where conditions warrant extreme care, the Contractor shall exercise special precautions to protect life or property. This may include the installation of sheet piling of the interlocking type or shall include other safety measures be taken as the Contractor deems necessary. The Contractor shall at all times be responsible for protection of life, property, and the work on the project.

The Contractor shall assume full responsibility for proper and adequate placement of sheeting, shoring, and bracing, wherever and to such depths that soil stability may dictate the need for support to prevent displacement. Bracing shall be so arranged as to provide ample working space and so as not to place stress or strain on the in-place structures to any extent that may cause damage.

Sheeting, shoring and bracing materials shall be removed only when and in such manner as will assure adequate protection of the in-place structures and prevent displacement of supported grounds. Sheeting and bracing shall be left in place only as required by the Contract. Otherwise, sheeting and bracing may be removed as the backfilling reaches the level of respective support. Wherever sheeting and bracing is left in place, the upper portions shall be cut and removed to an elevation of 3 feet or more below the established surface grade or as the Engineer may direct.

All costs of furnishing, placing and removing sheeting, shoring and bracing materials, including the value of materials left in place as required by the Contract, shall be included in the prices bid for pipe installation and will not be compensated for separately. When any sheeting, shoring, or bracing materials are left in place by written order of the Engineer, payment may be made for those materials as an extra work item, including waste material resulting from upper cut-off requirements.

4. Preparation and Maintenance of Foundations: Foundation preparations shall be conducted to produce a stable foundation and provide continuous and uniform pipe bearing between bell holes. Where Class C bedding is specified, the initial excavating or backfilling operations shall produce a subgrade level slightly above finished grade to permit hand shaping to finished grade by trimming of high spots and without the need for filling of low spots to grade.

In excavations made below grade to remove unstable materials, the backfilling to grade shall be made with Granular Foundation material. Placement of the backfill shall be in relatively uniform layers not exceeding 8 inches in loose thickness. Each layer of backfill shall be compacted thoroughly, by means of approved mechanical compaction equipment, to produce uniform pipe support throughout the full pipe length and facilitate proper shaping of the pipe bed.

Where the foundation soil is found to consist of materials that the Engineer considers to be so unstable as to preclude removal and replacement to a reasonable depth to achieve solid support, a suitable foundation shall be constructed as the Engineer directs in the absence of special requirements therefore in the Contract. The Contractor shall be required to furnish and drive piling and construct concrete or timber bearing supports or other work as provided for in an extra work order.

Care shall be taken during final subgrade shaping to prevent any over-excavation. Should any low spots develop, they shall only be filled with Granular Foundation material, which shall be compacted thoroughly, without additional compensation provided to the Contractor. The finished subgrade shall be maintained free of water and shall not be disturbed during pipe lowering operations except as necessary to remove pipe slings. The discharge of trench dewatering pumps shall be directed to natural drainage channels or storm water drains in a manner which does not cause damage to private or public property. Any debris left by dewatering operations shall be cleaned up immediately by the Contractor. Draining trench water into sanitary sewers or combined sewers will not be permitted.

The Contractor shall install and operate a dewatering system of wells or points to maintain pipe trenches free of water wherever necessary or as directed by the Engineer to meet the intent of these specifications. Unless otherwise specified in the Plans, Specifications, or Specific Requirements, such work shall be considered incidental with no additional compensation provided therefore.

The Contractor shall be responsible for evaluating any existing well situations and the impact his dewatering operation may have on them. Any damage or corrective action needed as a result of the dewatering operation shall be the Contractor's responsibility. If as a result of the dewatering operation anyone is without potable water the Contractor shall make provisions for a temporary water supply to those properties.

Dewatering wells must be installed in accordance with the Minnesota Department of Health regulations and Minnesota Rules, Chapter 4725. Construction may only be completed by a licensed dewatering well or well contractor and a Minnesota Department of Health Notification Form and fee is required. All fees are the full responsibility of the Contractor.

All costs of excavating below grade and placing foundation or bedding aggregates as required shall be included in the bid prices for pipe items to the extent that the need for such work is indicated in the Contract provisions and the BID does not provide for payment therefore under separate BID items.

If examination by the Engineer reveals the need for placement of foundation aggregates was caused by the Contractor's manipulation of the soils in the presence of excessive moisture or lack of proper dewatering, the cost of the corrective measures shall be borne by the Contractor.

H. Installation of Pipe and Fittings

Inspection, handling, and all aspects of the installation of pipe, services, and appurtenances shall be in accordance with the applicable sections of the AWWA specifications, the manufacturer's recommendations, and as supplemented as follows.

1. Inspection and Handling: Proper and adequate implements, tools, and facilities shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Unloading, distribution, and storage of pipe and appurtenant materials on the job site shall be at a location approved by the Engineer. All materials shall be handled carefully, as will prevent damage to protective coatings, linings, and joint fittings; preclude contamination of interior areas; and to avoid jolting contact, dropping or dumping.

Before being lowered into laying position, the Contractor shall make a thorough visual inspection of each pipe section and appurtenant units to detect damage or unsound conditions that may need corrective action or be cause for rejection. Inspection procedure shall be as approved by the Engineer, with special methods being required as he deems necessary to check out suspected defects more definitely. The Contractor shall inform the Engineer of any defects discovered and the Engineer will prescribe the required corrective action or order rejection.

Immediately before placement, the joint surfaces of each pipe section and fitting shall be inspected for the presence of foreign matter, coating blisters, rough edges or projections, and any imperfections so detected shall be corrected by cleaning, trimming, or repairs as needed.

2. Pipe Laying Operations: Trench excavation and bedding preparations shall proceed ahead of pipe placement as will permit proper laying and joining of the units at the prescribed grade and alignment without unnecessary deviation or hindrance.

All foreign matter or dirt shall be removed from the inside of the pipe and fittings before they are lowered into position in the trench and they shall be kept clean by approved means during and

after laying. The watermain materials shall be carefully lowered into laying position by the use of suitable restraining devices. Under no circumstances shall the pipe be dropped into the trench.

At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate to support the pipe throughout its length. No pipe material shall be laid in water nor when the trench or bedding conditions are otherwise unsuitable or improper.

When placement or handling precautions prove inadequate, in the Engineer's opinion, the Contractor shall provide and install suitable plugs or caps effectively closing the open ends of each pipe section before it is lowered into laying position, and they shall remain so covered until removal is necessary for connection of an adjoining unit. It shall be the sole responsibility of the Contractor for the removal of any debris found in the watermain at any time during the project.

As each length of bell and spigot pipe is placed in laying position, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with approved backfill material, which shall be thoroughly compacted by tamping around the pipe.

Connect to existing watermain shall be as accomplished as noted on the plans or as otherwise approved by the Engineer. This work shall be considered incidental unless there is a separate bid item provided.

At all times when pipe laying is not in progress, including noon hour and overnight periods, all open ends of the pipe line shall be closed by watertight plugs or other means approved by the Engineer. If water is present in the trench, the seals shall remain in place until the trench is pumped completely dry.

Pipe bedding for ductile iron watermain shall be Class C, shaping the trench bottom to conform to the pipe, and pipe bedding for PVC watermain shall be Class B, 4 inches of granular bedding, unless noted otherwise. Pipe bedding shall be considered incidental unless there is a separate bid item provided.

3. Ductile Iron Pipe Joints

- a. Push-On Joints: The circular rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. A thin film of approved gasket lubricant shall be applied to either the inside surface of the gasket or the outside surface of the spigot end. Care shall be taken to prevent introduction of contaminants. The joint shall be completed by forcing the spigot end to the bottom of the socket by the use of suitable prybar or jack type equipment. Spigot ends which do not have depth marks shall be marked before assembly to insure full insertion. Field cut pipe shall be filled or ground at the spigot edge to resemble the manufacturer's fabricated detailing. The use of the bucket on the excavation equipment shall not be used to force pipe into socket.
- b. Mechanical Joints: The last eight inches of the outside spigot surface and the inside bell surface of each pipe and appurtenance joint shall be painted with a soap solution, after being thoroughly cleaned. The cast iron gland shall then be slipped on the spigot end with the lip extension toward the socket or bell end. The rubber gasket shall be painted with soap solution

and be placed on the spigot end with the thick edge toward the gland. An approved lubricant provided by the pipe manufacturer may be used in lieu of the soap solution.

After the spigot end is inserted into the socket to full depth and centered, the gasket shall be pressed into place within the bell evenly around the entire joint. After the gland is positioned behind the gasket, all bolts shall be installed and the nuts tightened alternately to the specified torque, such as to produce equal pressure on all parts of the gland.

Unless otherwise specified, the bolts shall be tightened in accordance with AWWA C-600 by means of a suitable torque-limiting wrench within a foot-pound range of:

Pipe Size <u>Inch</u>	Bolt Size <u>Inch</u>	Torque <u>ft-lb</u>
3	5/8	45-60
4-24	3/4	75-90
30-36	1	100-120

After tightening, all exposed parts of the bolts and nuts shall be completely coated with an approved bituminous rust preventive coal tar material such as Koppers Bitumastic Super Service Black or Tnemec 46-457 Tnemecol.

4. Polyvinyl Chloride Pipe Joints: Jointing shall be in accordance with AWWA Manual No. M23.
5. Aligning and Fitting of Pipe: The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe and shall leave a smooth square-cut end. Pipe shall be cut with approved mechanical cutters.

Wherever it is necessary to deflect the pipe from a straight line either in the vertical or horizontal plane, to avoid obstructions, plumb stems, or produce a long radius curve when permitted, the amount of deflection allowed at each joint shall not exceed the allowable limits for maintaining satisfactory joint seal as given in AWWA C600 for mechanical joints and push-on joints, or as otherwise allowed by the pipe manufacturer.

MECHANICAL JOINT

<u>Pipe Size</u>	<u>Deflection Angle</u>	<u>Offset</u>		<u>Radius</u>	
		<u>18'</u>	<u>20'</u>	<u>18'</u>	<u>20'</u>
3" – 4"	8° 18'	31"	35"	125'	140'
6"	7° 07'	27"	30"	145'	160'
8" – 12"	5° 21'	20"	22"	195'	220'
14" – 16"	3° 35'	13½"	15"	285'	320'
18" – 20"	3° 00'	11"	12"	340'	380'
24" – 30"	2° 23'	9"	10"	450'	500'

PUSH-ON JOINT

<u>Pipe Size</u>	<u>Deflection Angle</u>	<u>Offset</u>		<u>Radius</u>	
		<u>18'</u>	<u>20'</u>	<u>18'</u>	<u>20'</u>
3" – 12"	5°	19"	21"	205'	230'
14" – 36"	3°	11"	12"	340'	380'

6. Pipe Restraints: All plugs, caps, tees, bends, and other thrust points shall be provided with suitable restraining devices to prevent movement. Restraining devices shall be as follows unless indicated otherwise on the plans or details:

Mechanical restraining devices shall be used unless other suitable reaction blocking is indicated or is approved by the Engineer.

- a. Retainer glands shall be used for joint restraint on all horizontal and vertical bends 22½° and greater, caps, tees, crosses, valves at the end of a line, four inch and larger service line valves, hydrant valves, and hydrants.

Restrained joints as provided by the pipe manufacture as a part of the pipe joint such as Lok-Fast by American, TR Flex by U.S. Pipe, and Push-On Restrained Joint by Clow shall be considered equivalent to the use of an independent restraining device.

Tees and crosses in the run of the main do not require restraint. The plugs of tees and crosses and the branch of tees shall be restrained.

Service lines and valves, four inch and larger, shall be restrained from the main to the end of the service or a minimum of 20 feet to allow future excavation and connection to the service stub without shutting down the main line water.

Hydrants and leads shall be restrained from the main to the hydrant or a minimum of 20 feet.

Joint restraint on four inch and larger service lines shall be provided from the main to the end of the service.

The following table indicates the required linear feet of pipe to be restrained on each side of a bend. The minimum length value is based on:

Test pressure of 150 psi
 Bury depth of 7 feet from ground surface to top of pipe
 A safety factor of 1.5:1
 Pipe bedded in native soil

PIPE RESTRAINING REQUIREMENTS

Ductile Iron Pipe													
Pipe Size Inch	Sand				Valve Tee End	Clay			Valve Tee End	Silt			Valve Tee End
	Elbow			90°		Elbow				90°	Elbow		
	22½°	45°	90°		22½°	45°	90°	22½°	45°		90°		
	Minimum Length to be Restrained on Each Side of Fitting - Feet												
4	1	2	5	9	1	3	7	11	1	3	7	13	
6	1	3	7	13	2	4	10	16	2	4	10	18	
8	2	4	9	17	3	6	14	21	3	6	13	24	
12	3	5	13	24	4	8	20	30	4	8	19	34	
16	3	7	17	31	5	11	26	39	5	10	25	44	
20	4	9	21	38	6	13	32	48	6	12	30	54	
24	5	10	24	45	7	15	37	57	7	15	35	64	

Ductile Iron Pipe with Polyethylene Wrap													
Pipe Size Inch	Sand				Valve Tee End	Clay			Valve Tee End	Silt			Valve Tee End
	Elbow			90°		Elbow				90°	Elbow		
	22½°	45°	90°		22½°	45°	90°	22½°	45°		90°		
	Minimum Length to be Restrained on Each Side of Fitting - Feet												
4	2	3	8	26	2	4	10	28	2	4	10	28	
6	2	5	11	37	3	6	14	40	3	6	15	40	
8	3	6	14	48	4	8	19	53	4	8	19	53	
12	4	8	21	69	5	11	27	76	5	11	27	76	
16	5	11	26	90	7	14	35	98	7	15	35	98	
20	6	13	32	110	8	18	42	120	9	18	43	120	
24	8	16	38	130	10	21	50	142	10	21	50	142	

PVC Pipe													
Pipe Size Inch	Sand				Valve Tee End	Clay			Valve Tee End	Silt			Valve Tee End
	Elbow			90°		Elbow				90°	Elbow		
	22½°	45°	90°		22½°	45°	90°	22½°	45°		90°		
	Minimum Length to be Restrained on Each Side of Fitting - Feet												
4	1	3	14	14	2	4	10	21	2	4	10	23	
6	2	4	20	20	3	6	14	30	3	6	13	32	
8	2	5	26	26	4	8	19	39	4	7	18	43	
12	3	7	37	37	5	11	27	57	5	10	25	61	
16	4	9	49	49	7	14	35	74	6	14	33	80	
20	5	11	60	60	8	18	42	92	8	16	40	98	
24	6	13	70	70	10	21	50	109	9	19	47	116	

- b. Offset bends made with standard offset fittings need not be strapped or buttressed.
- c. Tie rods and tie harnesses shall be of the same size as the required bolt, torqued to the requirements of Section H.3.b. After installing the tie rods and harnesses and prior to the backfill operations, they shall be coated with a brush applied tar coating. This coating shall be Koppers Bitumastic Super Services Black or Tnemec 46-457 Tnemecol, and shall be applied to the manufacturer's specifications. Hot dipped galvanized parts need not be tar coated.

All necessary fittings, bands, tie rods, nuts, and washers, and all labor and excavation required for installation of reaction restraints shall be furnished by the Contractor at his expense and without direct compensation.

- d. Hardwood blocking shall only be used as temporary reaction backing until acceptable permanent reaction blocking or restraining devices have been installed. Blocking shall be nominal 2-inch timber having an area equivalent to at least four times the area of the surface of the cap or plug it restrains.
- e. Concrete buttresses shall be poured against firm, undisturbed ground and shall be formed in such a way that the joints will be kept free of concrete and remain accessible for repairs. The concrete mix used in buttress construction shall meet the requirements for Grade B (3400 psi) of Mn/DOT 2461.

Buttress dimensions shall be as indicated on the Plans or as approved by the Engineer.

Contractors are instructed to size concrete buttress blocking on fittings and dead ends where the blocking must withstand the pressure of larger main line fittings equipped with reducers, for the larger sized main line thrust and not for smaller fitting size only. This is of particular importance on tees and crosses where the main size is reduced on the run from large to small size by use of reducers.

- 7. Wet Tap with Valve: The tapping sleeve and resilient seated gate valve assembly shall be installed on the watermain pipe after thoroughly cleaning the pipe to be tapped. The sleeve shall be assembled on the pipe and the bolts tightened per the manufacturer's specifications. Joint restraints shall be provided in accordance with these specifications.

Shell cutters shall be the maximum size allowed for the tap being made. Size on size taps shall utilize a ½ inch undersized shell cutter.

Electrical conductivity straps shall be provided to bypass the tapping sleeve assembly.

Upon completing the installation all exposed bolts and nuts shall be completely coated with an approved bituminous rust preventative coal tar material. The entire tapping sleeve and valve assembly shall be polyethylene encased in accordance with section 3400.3.I of the specifications.

8. HDPE Pipe

a. Polyethylene Pipe Fusing Procedure

Contractor shall provide the equipment and qualified personnel to fuse the PE 3408 pipe. Contractor shall use pipe manufacturer's recommendations on temperature, time and pressure

criteria for joint procedure and submit joint procedure and pre-qualification to the Owner for their approval.

Personnel performing the fusing of PE pipe shall be pre-qualified to fuse PE pipe. PE fusing certification shall be per above paragraph.

b. Installation of Pipe by Directional Boring

Contractor shall design, furnish, install, maintain and remove after their portion of the project appropriate sediment barriers. The Contractor shall be responsible for the preservation of all existing trees, plants and other vegetation that are to remain within or adjacent to the Construction site and shall also be responsible for protecting existing concrete curb, fence, utilities and other structures that are located within or adjacent to the construction site.

After interfering vegetation has been removed, all topsoil shall be stripped from areas to be excavated and stockpiled for future use. The topsoil shall be stockpiled within the limits of the project as designated by the Owner. The polyethylene pipe and fittings shall be installed in accordance with ASTM D-2774, Underground Installation of Thermoplastic Pressure Piping, and with the guidelines and recommendations of the manufacturer. The pipe shall be installed in the location to the line and grade designated on the Drawings with the pipe joints neatly fused together.

All materials delivered to the project for work on the project shall be neatly piled. Excavated material which is not removed from the immediate site of the work shall be kept neatly piled and protected so as to cause as little inconvenience to the owners of neighboring property and to the public, as possible. Gutters, driveway and street crossings must be kept clear except when the latter are unavoidably obstructed by open trench. Excavated material, including but not limited to, pipe, pavement, concrete, and concrete rubble, and masonry units, which is unsuitable for backfill and all excavated material which has not been used for backfill, upon completion of the project, be removed from the site of the work by the Contractor at his own cost and expense.

The drill staging area shall be kept neat and orderly and disturb as little area as possible. The pipe staging area shall disturb as little area as needed to accommodate workers, equipment, and to string, fuse and inspect the pipe. Steering equipment shall be housed in a non-magnetic bottom-hole assembly of the lead section of the non-magnetic drill pipe to allow for in-hole deviation at the front during the drilling of the pilot hole. Lead section shall be positioned along the same alignment as the proposed crossing from entry to exit. Additional (two or more) non-magnetic drill collars shall be included and drilled behind the non-magnetic bottom-hole assembly to serve as a buffer between the magnetized pilot work-string and the steering guidance probe. The pilot hole shall be enlarged to a size slightly larger than the outside diameter of the proposed polyethylene pipe by a drilling-auger. Initial auguring or reaming of the hole shall start in the opposite direction taken by the pilot drill, that is, in the direction from pilot exit-point to pilot entry-point. The drilling auger shall be pulled back along the pilot hole toward the entry side (pilot hole exit-point) and enlarging or reaming process repeated, if necessary until hole is enlarged to the proper size.

Bentonite shall be injected through the drill pipe attached to the drilling auger to suspend the cuttings, keeping the hole filled with a slurry of Bentonite and cuttings. When the drilling-auger reaches the pilot drill entry-point on its final reaming pass, the drilling-auger shall be pushed back through the pre-reamed hole to the exit side while at the same time injecting

Bentonite.

After the final pass of enlarging the pilot hole, the drilling-auger shall be disconnected at the pilot hole exit-point side and the pulling tractor, consisting of a swivel and a circulating sub shall be attached to the pilot working string assembly or drill pipe. The proposed HDPE pipe and tracer wires shall be attached to the pulling tractor to be led back through the enlarged hole in the direction towards the pilot entry-point.

A Bentonite slurry shall be used in connection with the installation of the proposed pipe into the hole. Prior to installation of the pipe into the hole, the Contractor shall notify the Owner and inform them of the conditions encountered during the auguring to determine whether a cement slurring shall be used as a supplement. If sub-surface conditions contain predominantly clayey soil as indicated in the soil logs, then the Bentonite slurry shall be used. If on the other hand, substantial pockets of sandy or granular material are encountered, then a cement slurry shall be chosen as a supplement for added strength to the hole.

Mud and slurry material displaced by the pipe during installation and during drilling operations are to be deposited in watertight containers and hauled off by a vacuum truck to a certified receiving site.

The leading three feet \pm of polyethylene pipe shall be inspected for excessive bruises or gouges. If gouges exceed 1/16" deep, entire pipe shall be replaced at Contractor's expense. Continuity check of the tracer wires shall also be made.

9. Tracer Wire: Tracer wire shall be installed along all PVC and HDPE pipe unless noted otherwise. The tracer wire shall be considered incidental to the watermain construction.
 - a. The 8 gauge tracer wire shall be installed no more than 6" above and centered along the top of the pipe during the initial backfilling operations. Care shall be taken to not damage the wire. Splices shall be made using 3M cast kits. Splices shall not occur more frequently than one per 250 feet of pipe.
 - b. At each hydrant and main line valve and valve box, the tracer wire shall be securely fastened to the appurtenance in an approved manner so as to be readily visible. On hydrants the wire can be secured to a bottom flange bolt of the hydrant head, at the traffic flange, just above the ground. At mainline valves the wire shall be routed up along the outside of the valve box and threaded through a 1/8" hole drilled in the upper portion of the valve box for that purpose. A minimum of 2' of wire shall extend to the inside of the valve box. The Contractor shall wind the wire into a loop and place it in the top of the valve box where it can be accessed when necessary. The purpose of the wire shall be to allow a low voltage circuit locator to be attached without excavation. It is recommended that during construction, the Contractor periodically test the tracer wire being installed, to ensure continuity. Upon completion of the project the Contractor shall test the tracer wire in accordance with Section 3400.4 Testing.
 - c. Tracer Wire Access Box: The maximum spacing between tracer wire connection points shall be 500 feet. Tracer wires on lengths of pipe without hydrants or valves or that cannot meet the 500' spacing requirement shall have wire terminal connection points through the use of a terminal box. The access box shall be placed on the pipe in accordance with the manufacturer's recommendations. The tracer wire shall be routed up through the access box and securely fastened to the terminal connectors on the bottom side of the lid.

I. Polyethylene Encasement of Pipeline

Wherever so required by the Plans or Specific Requirements, the pipeline, including valves, fittings, and appurtenances, shall be fully encased in polyethylene film of 8 mil nominal thickness. The film shall be furnished in tube form for installation on pipe and all pipe shaped appurtenances such as bends, reducers, offsets, etc. Sheet film shall be provided and used for encasing all odd-shaped appurtenances such as valves, tees, crosses, etc.

Installation shall be in accordance with AWWA C105, Type A.

J. Jack-Bore Steel Casing Pipe

The Contractor shall jack-bore steel casing pipe in place as specified and as shown on the plans. Steel casing pipe for use with a carrier pipe is indicated on the plans as the minimum size required. The Contractor may at his own expense use a larger size pipe if so desired for ease of construction and when approved by the Engineer.

Traffic control shall be in accordance with the Minnesota Manual on Uniform Traffic Control Devices and any permit requirements.

Soil borings provided with this specification are for general information purposes only. The contractor shall evaluate the site to his own satisfaction, by taking additional borings, before commencing work. No horizontal boring shall take place in ground water situations without first dewatering to a level at least two feet below the proposed casing pipe. When ground water is present, piezometers shall be installed, at the Contractor's expense, to monitor the ground water level before and during construction. Piezometers shall be installed far enough ahead of the construction to permit stabilization with natural ground water levels.

The boring pit shall be well sheeted, braced, and of sufficient strength, as determined by established soils engineering practices, to withstand the loads and pressures imposed by boring and to resist the horizontal earth pressures that could develop for the type of material encountered.

Fencing shall be placed around all pits and secured at the end of each work day.

The boring and jacking machine shall be of the fixed rail type, have the capability of controlling the flow of material at the face, have the capability of conforming to line and grade, and shall conform to the size and shape of the casing or liner.

A 1½ inch pipe shall be forced along the top of the pipe being jacked. The end of this 1½ inch pipe shall be 18 inches back from the lead edge of the jacking pipe. Bentonite grout shall be forced under pressure through this pipe at all times during the jacking operation to lubricate the pipe and fill any voids that develop above the pipe.

In the event that cobbles or boulders are encountered which can not be removed through the auger, the auger shall be pulled and the rocks removed by hand, mechanical methods, or blasting. When provided for as a bid item, this removed rock material shall be field measured to determine the volume for payment. Payment shall be made only when the auger is required to be pulled and there is a bid item provided, otherwise rock removal shall be considered incidental to the boring.

The auger shall at all times be held back of the cutting head adequately to prevent over excavation at the cutting head and voids in the surrounding soils. Any voids which may occur or surface settlement shall be corrected by augering from the surface and injection grouting to correct the settlement. The Contractor shall also be responsible for any associated damage.

In non-granular soils back grouting shall be required on the outside of the casing once the casing is installed. A grouting tube and grout pump that maintains positive piston pressure on the grout shall be used. Grout mixture shall contain one, 94 pound bag of Type II portland cement with 5 to 6 gallons of water.

The carrier pipe shall be installed using joint restraints to facilitate removal if ever needed. The carrier pipe shall be supported to provide the specified alignment and prevent undue stress on the bells of the pipe. Supports shall be of pressure treated wood with stainless steel bands.

After the carrier pipe has been inserted, the annular space inside the casing pipe shall be filled with sand utilizing equipment and procedures adequate to completely fill the void space throughout the full length of the casing. Concrete bulkheads of one foot minimum thickness shall be constructed at both ends of the casing pipe.

The rate of filling the annular space with sand shall be carefully controlled to avoid floating the pipe. The Contractor shall take all necessary precautions and be fully responsible for maintaining the grade and straight alignment of the carrier pipe.

Particular care shall be exercised to provide full and uniform support of the carrier pipe at the transition from direct bury to encasement in the casing pipe.

The Contractor shall be responsible for obtaining and paying for any special permit fees, insurance, or bonds which may be required to accomplish the work.

K. Placement of Insulation

Rigid insulation board shall be placed within the pipe encasement zone, 6 inches above the pipe. Prior to placement of the insulation, encasement material shall be compacted until there is no further visual evidence of increased consolidation or the density of the compacted layer conforms to the density requirements specified in the Specific Requirements, then leveled and lightly scarified to a depth of 1/2 inch. Encasement zone material placed below the insulation shall be free of rock or stone fragments measuring 1½ inches or greater.

Insulation boards shall be placed on the scarified material with the long dimension parallel to the centerline of the pipe. Boards placed in a single layer shall be overlapped at least 6 inches on all sides to eliminate continuous joints for the full depth of the insulation. If two or more layers of insulation boards are used, each layer shall be placed to cover the joints of the layer immediately below with an overlap of at least 6 inches.

The Contractor shall exercise caution to insure that all joints between boards are tight during placement and backfilling with only extruded ends placed end to end or edge to edge. Broken or damaged material shall be removed and replaced.

The first layer of material placed over the insulation shall be 12 inches in depth, free of rock or stone fragments measuring 1½ inches or greater. The material shall be placed in such a manner that

construction equipment does not operate directly on the insulation and shall be compacted with equipment which exerts a contact pressure of less than 80 psi. The first layer shall be compacted until there is no further visual evidence of increased consolidation or the density of the compacted layer conforms to the density requirements specified.

L. Water Service Installations

Water service lines complete with all required appurtenances shall be installed in accordance with all pertinent requirements for main line installations and as supplemented as follows.

It shall be the responsibility of the Contractor to keep an accurate record of the location, depth and size of each service connection and other pertinent data such as the location of curb stops and pipe endings. Tap locations shall be recorded in reference to survey line stationing. Curb boxes shall be tied to definable land marks such as building corners, fire hydrants, manholes and telephone pedestals. Pipe terminals at the property line shall be marked on the ground surface with a 2" x 2" x 8' wood marker extending 3 feet above grade with a steel fence post attached to the wood marker. The top 2 feet of the fence post shall be painted blue.

Water service lines shall be installed in accordance with Minnesota Department of Health standards. Where water service lines are installed alongside of sanitary or storm sewer service lines, installation shall maintain the minimum specified clearances between pipelines and provide proper and adequate bearing for all pipes and appurtenances. For separate installation, the trench width shall be not less than two feet. Subject to minimum clearances, the water lines may be laid in a common trench excavated principally for sewer installation, either by widening the trench as necessary or by providing a shelf in the trench wall where ground stability will permit.

Unless otherwise specified, installation of water service lines shall provide for not less than 7½ feet of cover over the top of the pipe and for not less than 18 inches of clearance between pipelines. Also, at least 6 inches of clearance shall be maintained in crossing over or under other structures. Where the service pipe may be exposed to freezing due to insufficient cover or exposure from other underground structures, the water pipe shall be insulated as directed by the Engineer.

Service trenches shall be restored and compacted as specified for pipelines.

1. Tap Service Lines: Tap service piping shall be Seamless Copper Water Tube of the size and type specified. Pipe size for tap service installations shall be from ¾ inch to 2½ inch nominal inside diameter.

Unless otherwise indicated, tap service piping may be laid directly on any solid foundation soil that is relatively free of stones and hard lumps.

Tap service piping shall be installed in one piece without intermediate joint couplings between the corporation stop at the watermain tap and the curb stop. All pipe and appurtenances shall be joined by means of approved flared type threaded couplings.

Connection of tap service lines to the watermain shall be made with an approved corporation stop, with the watermain tap being made from horizontal to an angle of not more than 15 degrees from the horizontal. (2:30 and 9:30). Expansion loops shall be directed horizontally, not vertically from the tap. A minimum of 3 full threads of the corporation stop must engage in ductile iron watermain or a saddle must be used for the connection as noted in the table below.

DUCTILE IRON PIPE SADDLE REQUIREMENT										
	Special Class 52				Special Class 50					
Pipe Size Wall Thickness	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
	0.29"	0.31"	0.33"	0.35"	0.31"	0.33"	0.34"	0.35"	0.36"	0.38"
Corporation Stop	Pipe Thickness Required for 3 Corporation Stop Threads									
	Above Line - Without Saddle									
¾"	0.31"	0.28"	0.27"	0.26"	0.25"	0.25"	0.25"	0.24"	0.24"	0.24"
1"	0.38"	0.34"	0.32"	0.31"	0.30"	0.29"	0.29"	0.28"	0.28"	0.27"
1¼"	0.45"	0.39"	0.36"	0.34"	0.33"	0.32"	0.31"	0.30"	0.30"	0.30"
1½"	---	0.44"	0.40"	0.37"	0.35"	0.34"	0.33"	0.32"	0.32"	0.31"
2"	---	---	0.48"	0.44"	0.41"	0.39"	0.37"	0.36"	0.35"	0.33"
	Below Line - With Saddle									

All tap service lines to PVC watermain require the use of a saddle.

The flaring of copper tubing ends shall be accomplished only with the use of the proper size and type of tools as designated for the purpose, and will provide accurate sizing and rounding of the ends. Tubing shall be cut squarely and all edge roughness shall be removed prior to flaring. All couplings shall be tightened securely, so the flared end fits snugly against the bevel of the fitting without leakage. The flared joint couplings shall be made up without the use of jointing compounds.

Unless otherwise indicated, tap service lines shall be installed on a straight line at right angles to the watermain or property line. The service line shall be terminated with a curb stop and box at the property line. When the service lines are to be terminated beyond the curb stop and box at the property line, then the service line extension shall be terminated with a compression fitting and cap, suitable to pressure test against. This longer service line may be required to avoid future sidewalk disruption or conflicts with utility lines within the utility easement along the front of the lot line.

The service pipe and curb stop coupling depth shall be such as to maintain not less than 7½ foot minimum cover, or in locations where conflict may occur with storm sewer, service pipe shall be placed at least 3 feet below the storm sewer invert or shall be insulated in accordance with the Plans, Specifications, and Special Provisions to prevent freezing. In any case the Contractor shall make every effort to provide for a standard depth service box installation where practicable.

The service box shall be screwed onto the curb stop coupling and be firmly supported on a concrete block. Service boxes shall be installed plumb and be braced effectively to remain vertical during and after completion of backfilling. The service boxes shall be brought to final surface grade when the final ground surface has been established.

2. HDPE Pipe Service Taps: Service taps on HDPE pipe shall be accomplished with butt fusion tapping saddle installed in accordance with the manufacturer's recommendations.

M. Setting Valves, Hydrants, Fittings and Specials

1. Valves, hydrants, fittings and specials shall be provided and installed as required by the plans and detail plates, and with each installation accomplished in accordance with the requirements for installation of mainline pipe to the extent applicable. Support blocking, thrust blocking, and anchorage devices shall be provided as required by the plans and detail plates.
2. Hydrants shall be installed plumb, with the height and orientation of nozzles as shown on the plans and details. The large pumper nozzle shall be oriented squarely facing the street. If the hydrant installation results in the pumper nozzle not facing the street, the hydrant head shall be rotated accordingly. The traffic flange of the hydrant shall be set with the bottom of the flange 2 inches above finish grade. When a hydrant barrel extension is installed the traffic flange shall be adjusted to remain at 2 inches above the finish grade.
3. Valve boxes shall be installed upon the valve with the use of a Gate Valve Adaptor as manufactured by Adaptor Inc.
4. Valves shall be fitted with an Adjustable Valve Extension Stem as manufactured by Mueller Company. The extension shall be securely mounted on the valve nut and the extension adjusted so as to bring the upper nut fitting to within 6" – 12" of the top of the valve box lid.
5. A drainage pit of a minimum volume of one cubic yard shall be constructed around the hydrant base and filled with ¾" to 1½" clear drain rock firmly compacted under and around the hydrant base and to 6 inches above the hydrant drain hole. The drain rock shall be covered with geotextile fabric, 6 mil polyethylene, or two layers of tar paper prior to backfilling. Hydrant drain holes shall normally be left open. Hydrants located where the groundwater is above the drain hole shall have the outlet factory plugged to ensure proper plug installation. The hydrant shall have a permanent tag attached stating "Pump After Use". The pumper nozzle shall be factory painted in accordance with the City standard to identify the hydrant as having a plugged drain hole and needing to be pumped out after use.
6. Valve boxes shall have a ⅛" diameter (minimum) hole drilled in the upper section just below the lid housing. This is to allow tracer wire to be threaded from the outside to the inside of the valve so an end of the wire can be left in the valve for connection when necessary.
7. New hydrants shall have a city standard flag locating device mounted on the upper flange of the hydrant
8. Valves shall have a piece of geotextile fabric, 4 feet by 4 feet, placed centered over the valve body, prior to installing the bottom section of the valve box, to prevent soil migration into the valve box assembly. The valve box shall be centered over the operating nut of the valve, installed plumb, and the box cover set to finish grade in accordance with the pavement requirements. Valve boxes shall be installed so as to not transmit shock or stress to the valve. The Contractor shall take extra care in backfilling and compacting around the valve box assembly to ensure plumbness and ease of keying the valve upon final installation.

9. Valve boxes installed independent of a hydrant outside the paved roadway shall be marked with a 4 foot high sign post with a 4 x 8 inch reflectorized marker with a GV labeling on it. The marker post shall be installed two feet back of and facing the valve box, to allow operation of the valve wrench without hitting the marker post.
10. All dead end lines shall be terminated with a plug or cap and restrained, rodded or thrust blocked. If the pipe size is reduced near the end of the line, restraints shall be sized for the pipe size prior to the reduction. A 4 inch x 4 inch x 6 foot wood post marker shall be installed at the end of the line.. The marker shall be installed with 4 feet buried in the ground and 2 feet exposed above the ground.
11. Special appurtenances shall be installed as shown on the plans and specified.

N. Pipeline Backfilling Operations

All pipeline excavations shall be backfilled to restore pre-existing conditions as the minimum requirement, and fulfill all supplementary requirements indicated in the Plans and Specifications. The backfilling operations shall be started as soon as conditions will permit on each section of pipeline, so as to provide continuity in subsequent operations and restore normal public service as soon as practicable on a section-by-section basis. All operations shall be pursued diligently, with proper and adequate equipment, as will assure acceptable results.

Backfilling shall be accomplished with the use of Suitable Materials selected from the excavated materials to the extent available and practical.

Suitable Material shall be defined as a mineral soil reasonably free of foreign materials (rubbish, debris, etc.), frozen clumps, organic matter, stone, rock, concrete, or bituminous chunks larger than 4 inches, and other unsuitable materials that may damage the pipe installation or prevent thorough compaction, taking into consideration particular needs of different backfill zones. Unsuitable material shall only be utilized where and to the extent there will be no detrimental effects and with the approval of the Engineer.

Backfill materials shall be carefully placed in relatively uniform depth layers spread over the full width and length of the trench section to provide simultaneous support on both sides of the pipeline. Each layer shall be compacted effectively, by approved mechanical methods before placing material for a succeeding layer thereon. Within the pipe bedding zone compaction shall be in a minimum of three lifts: invert to spring line, spring line to top of pipe, and top of pipe to 1.0 foot over top of pipe. Maximum thickness of any lift shall be 8 inches compacted thickness. Compaction requirements are: 95% Standard Proctor maximum dry density from the pipe zone to within 3 feet of the ground surface, and 100% Standard Proctor maximum dry density in the final 3 feet.

All surplus or waste materials remaining after completion of the backfilling operations shall be disposed of in an acceptable manner after completing the backfill work. Disposal at any location within the project limits shall be as specified, or as approved in writing by the Engineer; otherwise, disposal shall be accomplished outside the project limits at the Contractor's own dump site.

O. Restoration of Surface Improvements

Wherever any surface improvements such as pavement, curbing, pedestrian walks, fencing or turf have been removed, damaged or otherwise disturbed by the Contractor's operations, they shall be repaired

or replaced in kind and structure to the pre-existing condition or better. Each item of restoration work shall be done as soon as practical after completion of installation and backfilling operations on each section of pipeline.

In the absence of specific payment provisions, as separate bid items, the restoration work shall be compensated for as part of the work required under those bid items which necessitated the destruction and replacement or repair, and there shall be no additional compensation. If separate bid items are provided for restoration work, only that portion of the replacement or repair which was necessitated by the contract work will be measured for payment. Any improvements removed or damaged unnecessarily shall be replaced or repaired at the Contractor's expense.

A proper foundation shall be prepared before reconstructing concrete or bituminous improvements. Unless otherwise directed, granular material shall be placed to a depth of at least 4 inches under all concrete and bituminous items. No direct compensation will be made for furnishing and placing this material even though such course was not part of the original construction.

Existing concrete and bituminous surfaces at the trench wall shall be sawed or cut with a cutting wheel to form a neat edge in a straight line before surfaces are to be restored. Sawing or cutting may be accomplished as a part of the removal or prior to restoration at the option of the Contractor. However, all surface edges shall be inspected prior to restoration.

P. Operational Inspection

At the completion of the construction, as part of the punch list preparation, there shall be an operational inspection conducted by the Contractor, in the presence of the Engineer and Owner, to ascertain that the entire facility is in good working order. Specific items to be inspected are that services are marked, off street valves are marked, valve boxes are centered on the valve with the use of a spider, valves can be keyed, valves operate smoothly, valves are in the open position, hydrants operate and drain properly, curb stops operate easily, curb boxes are set plumb, and valves boxes and curb boxes are set to proper grade.

Q. Maintenance and Final Cleanup

All subgrade surfaces shall be maintained acceptably until the start of surface construction or restoration work. Additional materials shall be provided and placed as needed to compensate for trench settlement and to serve until completion of the final surface improvements.

Final disposal of debris, waste materials, and other remains or consequences of construction, shall be accomplished prior to final acceptance of all work. Final acceptance of each BID item can only be made when the cleanup associated with each item is completed. The Engineer may withhold partial payments until such work is satisfactorily pursued or he may deduct the estimated cost of its performance from the partial estimate value.

3400.4 TESTING

A. Construction Testing

Testing for work done in this contract shall be done to assure quality of materials and/or workmanship. Testing shall be at the expense of the Contractor with direct compensation only for items specified as a bid item and all other testing shall be incidental to the construction.

Testing, which includes obtaining the samples, shall be performed and certified by an independent testing laboratory.

The Contractor shall coordinate and order the tests to be performed. The contractor shall notify the Inspector as to the testing time schedule, so that the Inspector can be present to indicate test locations and observe the testing.

The testing shall be done on a daily basis in a timely manner with the progress of the work to insure acceptable construction workmanship. Subsequent work shall not proceed without acceptable test results of the previous work. Testing of embankment or backfill shall occur at the time of placement and compaction. Coming back later to perform testing is unacceptable.

Copies of all test results, either passing or failing, shall be provided to the Engineer. Two copies of test reports shall be sent to the Engineer, one copy for the file and one copy to be forwarded to the Inspector for payment approval of associated items. Lack of acceptable test results and documentation is justification to delay payment. Non-compliant tests results require corrective action, whether directed by the Engineer or not. Failing test results shall receive no payment for the testing, if so itemized on the bid, and may result in no payment or reduced payment for the associated item.

Test reports shall include the following:

- Project name
- project number
- Location/Client
- Street name
- Street location per plan stationing
- Offset distance left or right of centerline
- Depth below finish grade and/or elevation
- Results of tests performed.
- Comparison of the test results to the project specifications.
- Conclusion as to meeting or failing to meet the project specifications.
- If failing, retest results to confirm compliance with the project specifications.
- If failing, recommendations for corrective action.
- Certification by a Mn/DOT certified tester or registered professional engineer.

The following minimum testing shall be performed:

Trench Backfill (main line and services)

Standard Proctor	One minimum
In-place Density and Moisture	Upper 3 feet, 1 per 6 inch lift per 1000 LF

Below 3 feet, 1 per 12 inch lift per 1000 LF

Granular Material

Gradation	1/2000 TN
Standard Proctor	One minimum
In-place Density and Moisture	1/500 LF

B. Disinfection of Watermains

Before being placed in service, the completed watermain installation shall be disinfected and flushed, and after the final flushing the water shall be tested for bacteriologic quality and found to meet the standards prescribed by the Minnesota Department of Health. The disinfection materials and procedures and the collection and testing of water samples shall at a minimum be in accordance with the provisions of AWWA C651, Disinfecting Watermains, and as will meet the requirements of the Minnesota Department of Health.

Where an existing watermain is cut for the installation of a hydrant, for lowering the watermain, or for reasons determined by the Engineer, the pipe and fittings proposed to be installed shall be disinfected prior to installation as follows:

- (1) The interior of the pipe and fittings shall be cleaned of all dirt and foreign material.
- (2) The interior of the pipe and fittings shall be thoroughly swabbed or sprayed with a 1 percent minimum hypochlorite solution.

Unless otherwise indicated in the Plans, Specifications, and Specific Requirements, the Contractor shall furnish all materials and perform the disinfecting, flushing, and testing as necessary for meeting the water quality requirements. The AWWA C651 provisions for disinfection of watermains are reproduced for informational purposes as follows:

1. Tablet Method

Tablet Method may be used only when scrupulous cleanliness has been practiced to exclude all foreign materials and ground water during pipe installation. If ground water has entered pipe during pipe installation, the watermain shall be flushed and the Chlorine-Water solution method shall be used.

Placing Calcium Hypochlorite Granules

During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500 foot intervals along the main. The quantity of granules shall be in accordance with the following table:

Ounces of Calcium Hypochlorite Granules to be placed at beginning of main and at each 500 foot interval:

<u>Pipe Diameter</u>	<u>Calcium Hypochlorite Granules (oz.)</u>
4"	0.5
6"	1.0
8"	2.0
10"	3.0
12"	4.0
16" and larger	8.0

Placing Calcium Hypochlorite Tablets

Attach tablets on the top of the main using an adhesive such as Permatex No. 1, product of Loctite Corp, or equal. If tablets are not attached to the top and water contacts them they will react prior to the disinfection period. The table below gives tablets required per pipe size and length to achieve 25 mg/liter.

Number of 5-g Hypochlorite Tablets
Required for Dose of 25 mg/liter

<u>Pipe Diameter</u>	<u>Length of Pipe</u>				
	<u>13' or less</u>	<u>18'</u>	<u>20'</u>	<u>30'</u>	<u>40'</u>
4"	1	1	1	1	1
6"	1	1	1	2	2
8"	1	2	2	3	4
10"	2	3	3	4	5
12"	3	4	4	6	7
16"	4	6	7	10	13

$$\text{Number of 5-g tablets} = 0.0012 d^2 L$$

d = pipe diameter, inches L = pipe length, feet
Based on 3.25 grams (65%) available chlorine per tablet

The main shall be filled with water at a rate no greater than 1 fps. Precautions shall be taken to assure that air pockets are eliminated. The use of additional curb stops to bleed air through at high points may be necessary.

Chlorination Residual of 25 mg/liter chlorinated water shall be retained in the pipe for a minimum of 24 hours, 48 hours when the water temperature is below 41° F. Valves and hydrants shall be operated to ensure disinfection.

2. Continuous Feed Method

Continuous feed method consists of completely filling the main, removing all air pockets, flushing to remove particulates, then filling the main with potable water chlorinated so that after a 24 hour holding period in the main there will be a free chlorine residual of not less than 10 mg/liter. Flushing velocity shall not be less than 2.5 fps, see table below.

Required Flow and Openings to Flush Pipelines *
(40 psi residual pressure in watermain)

<u>Pipe Diameter</u>	<u>GPM flow for 2½ fps velocity in watermain</u>	<u>Size of tap on watermain**</u>	<u>Number of taps on watermain</u>	<u>Number of 2½” Hydrant Outlets</u>
4”	100	1”	1	1
6”	200	1½”	1	1
8”	400	1½”/ 2”	2/ 1	1
10”	600	1½”/ 2”	3/ 2	1
12”	900	2”	2	2
16”	1600	2”	4	2

* With a 40 psi pressure in the watermain with the hydrant flowing to atmosphere, a 2½” hydrant outlet will discharge approximately 1000 gpm and a 4½” hydrant nozzle will discharge approximately 2500 gpm.

** Size of tap on watermain with no significant length of discharge pipe.

Water from the existing system or other approved source shall be made to flow at a constant measured rate in the new main. At a point not much more than 10 feet downstream from beginning the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 25 mg/liter free chlorine. Measure the chlorine concentration at regular intervals in accordance with Standard Methods, AWWA M12, or using appropriate chlorine test kits. The following Table gives the amount of chlorine required for various pipes:

Chlorine Required to Produce 25 mg/liter
Concentration in 100 ft of Pipe - by Diameter

<u>Pipe Diameter</u>	<u>100 percent Chlorine pounds</u>	<u>1 percent Chlorine Solutions gallons</u>
4”	0.013	0.16
6”	0.030	0.36
8”	0.054	0.65
10”	0.085	1.02
12”	0.120	1.44
16”	0.217	2.60

1% chlorine solution requires 1 lb. of calcium hypochlorite in 8 gallons of water.

Strong chlorine solution in the main being treated shall not flow into mains in service. The chlorinated water shall be retained in the main for at least 24 hours, during which time all valves and hydrants shall be operated in order to disinfect the appurtenances. At the end of the 24 hour period the treated water in all portions of the main shall have a residual of not less than 10 mg/liter free chlorine.

Preferred equipment for applying liquid chlorine is a solution feed vacuum operated chlorinator in combination with a booster pump for injecting the chlorine gas solution water into the main to be disinfected.

3. Flushing

After the applicable retention period, heavily chlorinated water shall not remain in prolonged contact with the pipe. Chlorinated water shall be flushed from the main until chlorine concentration is no higher than generally in the system for domestic use.

The environment to which the chlorinated water is to be discharged shall be inspected. The Contractor shall be responsible to ensure that the receiving area is not damaged by the chlorinated water and shall use a reducing agent for neutralization when necessary.

4. Bacteriological Tests

After final flushing and before the watermain is placed in service, two consecutive sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main. At least one set of samples shall be collected from every 1,200 feet of pipe, one set shall be collected from the end of the main and one set from each branch line. All samples shall be tested for bacteriological quality in accordance with 'Standard Methods for the Examination of Water and Wastewater' and shall show the absence of coliform organisms. If water in the pipe does not meet the Minnesota Department of Health requirements, disinfection procedure shall be repeated until meeting the requirements. Acceptance forms from the governing agency shall be furnished to the Engineer.

C. Hydrostatic Testing of Watermains

Each valved section shall be subjected to a separate two hour pressure test and, if required, the leakage test prescribed herein. Testing for the two hour duration shall be with hydrants closed, and valves on hydrant leads and dead end lines open. When service lines have stubs extending beyond the curb stops, the curb stops shall be in the open position and the pressure test conducted against the capped extension. Once this portion of the test is completed, the valve on the hydrant leads and dead end water lines shall be closed and hydrants opened. The specified test pressure shall be applied, and the test repeated for 15 minutes to establish the condition of the hydrant lead valves.

This shall apply to both the pressure and leakage test. The Engineer or Owner may require the Contractor to test the first section of pipe installed to demonstrate the Contractor's ability to install the pipe in an acceptable manner. When the connection to the existing system is not made with a valve, the Contractor shall test the existing section to the first available valve(s) to determine the condition of the existing system, or the Contractor may make provisions to test his work separately, prior to connection to the existing system, in a manner acceptable to the Engineer. Isolation of the Contractor's work shall be considered incidental.

When watermain is constructed, separated from the active system, the Contractor shall still be required to chlorinate, pressure test, and flush the new work in accordance with these specifications. This may require additional work operation to fill and flush the system. All costs associated with any additional work or materials shall be considered incidental to the watermain construction.

The Contractor shall furnish the pump, pipe connections, gauges, and measuring equipment, and shall perform the testing in the presence of the Engineer. The pressure gauge for the test shall be an Ashcroft Model 1082 with 4½” dial face at 1 psi increments. Where permanent air vents are not provided, the Contractor shall provide and install corporation cocks at the high points as needed for release of air as the line is filled with water.

Where concrete reaction blocking is placed, the watermain shall not be subjected to hydrostatic pressure until at least 5 days have elapsed after the concrete placement, with the exception that this period may be reduced to 2 days where high early strength concrete is used.

At the option of the Engineer, the pressure and leakage tests may be conducted simultaneously. Any defective joints, pipe, fittings, valves, or hydrants, revealed during the testing or before final acceptance of the work shall be satisfactorily corrected and the tests shall be repeated until the specified requirements have been met.

1. Pressure Test: The section being tested shall be slowly filled with water and the specified test pressure shall be applied after all air has been expelled from the pipe. A hydrostatic pressure of 150 pounds per square inch, gauge pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner.

The gauge pressure shall be checked after a minimum of two hours. A pressure drop of 1 psi or less over a 2 hour period shall be considered acceptance for the test section. If the pressure drop is greater than 1 psi the Contractor shall investigate the cause and take corrective action. The Contractor must make every effort to expel all air in the test section which may be causing a test failure. This may require the Contractor to tap a corporation at a high point of the main on the top of the pipe to release trapped air. Only if several consecutive tests indicate a consistent pressure drop and only after the Contractor has made numerous attempts to resolve the problem, acceptable to the Engineer, may the Contractor request in writing and the Engineer consider the use of the leakage test. The leakage test may be performed by the Contractor to determine the magnitude of the leak, however, meeting the leakage allowance shall not automatically be considered acceptance, in lieu of the pressure test, for the section being tested.

Service pipe shall typically be tested in conjunction with the main line testing. However, services may be tested separately at 100 psi, with the corporation stops open.

The Contractor may have to perform additional pressure testing if during the flushing operation there is evidence of debris being flushed out of the system. This may be due to poor construction practices and result in valves not closing tight after having done the original pressure test. Retesting shall be at the discretion of the Engineer.

2. Leakage Test: After an unsatisfactory pressure test, and if authorized in writing by the Engineer a leakage test shall be performed on each valved section of watermain to determine the quantity of water that must be supplied into the section to maintain a test pressure of 150 pounds per square inch, after the air in the pipeline has been expelled and the pipe has been filled with water. The water added shall be recorded to the nearest fluid ounce.

After filling the pipe with water and expelling all air in the line, a pressure of 150 psi shall be applied in the same manner as prescribed for the pressure test, and sufficient water shall be measured and supplied into the pipe section to maintain the pressure for a test duration of 2 hours.

Each pipe section tested will be accepted if the leakage does not exceed the quantity determined by the formula as shown in the table below, based on an allowable leakage of 11.65 gpd/mile/nominal diameter inch at 150 psi.

$$L = \frac{SD\sqrt{P}}{133,200}$$

- L = Maximum permissible leakage in gallons per hour
- S = Length of pipe tested
- D = Nominal diameter of pipe in inches
- P = Average test pressure during the test, in pounds per square inch, gauge pressure

ALLOWABLE LEAKAGE PER 1000 FEET OF PIPE

Gallons Per Hour

Avg. Test Pressure (psi)	Nominal Pipe Diameter									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
200	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55
175	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38
150	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21
125	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01
100	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80
70	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	1.26	1.51

If the pipe section under test contains pipe of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

When requested, the Contractor shall furnish a written report of the results of leakage tests, which shall identify the specific test section, the average pressure, the duration of test, and the amount of leakage.

D. Electrical Conductivity Test

The Contractor shall perform a conductivity test within one week after completion of pressure testing of the watermain on all ductile iron pipe watermain. This shall be performed in a timely manner to ensure acceptable conductivity prior to further construction.

On watermain reconstruction projects, the Contractor shall perform the conductivity test prior to service line reconnections to ensure main line isolation from house services.

The Engineer or Owner may require the Contractor to test the first section of pipe installed to demonstrate the Contractors ability to install the pipe in an acceptable manner. When the connection to the existing system is not made with a valve, the Contractor shall test the existing section to the first available valve(s) to determine the condition of the existing system, or the Contractor may make provisions to test his work separately, prior to connection to the existing system, in a manner acceptable to the Engineer.

The system (pipeline, valves, fittings and hydrants) shall be tested for electrical continuity and current capacity. The electrical test shall be made after the hydrostatic pressure test and while the line is at normal operating pressure. Backfilling shall have been completed. The line may be tested in sections of convenient length as approved by the Engineer.

Direct current of 350 amperes plus or minus 10%, shall be passed through the pipeline for 5 minutes. Current flow through the pipe shall be measured continuously on a suitable ammeter and shall remain steady without interruption or fluctuation throughout the 5-minute test period.

Insufficient current or intermittent current or arcing, indicated by large fluctuation of the ammeter needle, shall be evidence of defective contact in the pipeline. The cause shall be isolated and corrected. Thereafter, the section in which the defective test occurred shall be retested as a unit and shall meet the requirements.

Sources of D.C. for these tests may be motor generators, arc welding machines, or other approved sources. All such equipment shall be furnished by the Contractor.

Cables from the power source to the section of system under test should be of sufficient size to carry the test current without overheating or excessive voltage drop.

After the test, the hydrant shall be shut off and a cap loosened to allow hydrant drainage. Tighten cap after drainage.

E. Tracer Wire

Upon completion of the project the Contractor shall furnish a locator and using a low voltage circuit, test the entire tracer wire system in the presence of the Engineer. The test shall consist of a continuous above ground trace of the piping and appurtenances installed. All areas failing the location test shall be corrected at the Contractor's expense. The wire shall be tested in accordance with the requirements of ASTM B-1, B-3, B-8 and D-1248. All wire will be spark tested at 7500 VAC.

3400.5 METHOD OF MEASUREMENT

A. Connect to Existing Watermain

Connect to existing watermain shall be measured separately on a per each basis for each type of connection.

B. Wet Tap With Valve

Wet tap with valve shall be measured on a per unit basis for each size. The unit includes the tapping sleeve, the valve, and valve box.

C. Watermain

Watermain of each type and size shall be measured separately in linear feet. Measurements shall be made along the pipe centerline without deductions in length for fittings, valves and other specials. Lengths of branches shall be measured from the centers of connecting pipes to centers of valves or fittings. In the case of hydrant leads, the compensation length shall be from the center of the

connecting main to the center of the valve. All length shall be measured in a horizontal plane unless the grade of the pipe exceeds fifteen percent.

D. Valves

Valves of each type and size shall be measured on a unit basis which shall include the valve assembly, valve box, valve box adaptor, valve extension stem and cover.

E. Hydrant With Valve

Hydrant with valve shall be measured on a per unit basis. The unit includes hydrant, 6-inch valve and valve box, 6-inch pipe between valve and hydrant, Hydrafinder crushed rock, and blocking or restraining devices.

F. Fittings

Fittings shall be measured on a pound basis of standard weight of fittings as published in AWWA C153 excluding the weight of glands, gaskets, bolts or other accessories. The fitting weights for payment purposes are provided in the following table:

DUCTILE-IRON COMPACT MECHANICAL-JOINT FITTINGS
Weight in Pounds per AWWA C153/A21.53

<u>Bends</u> <u>(MJ-MJ)</u>	<u>90°</u>	<u>45°</u>	<u>22½°</u>	<u>11¼°</u>	<u>Sleeves</u>	<u>Caps</u>	<u>Plugs</u>
4 Inch	23	19	17	16	25	12	12
6 Inch	44	37	33	31	39	19	19
8 Inch	61	49	44	40	53	30	36
10 Inch	94	74	64	57	64	41	50
12 Inch	124	101	85	73	82	53	67
14 Inch	220	164	148	129	141	79	85
16 Inch	264	202	179	162	172	100	93
18 Inch	410	289	292	196	225	125	130
20 Inch	505	348	364	227	270	148	153
24 Inch	586	475	385	345	370	214	202

<u>Reducers</u> <u>(MJ-MJ)</u>	<u>x4</u>	<u>x6</u>	<u>x8</u>	<u>x10</u>	<u>x12</u>	<u>x14</u>	<u>x16</u>	<u>x18</u>	<u>x20</u>
6 Inch	32	-	-	-	-	-	-	-	-
8 Inch	43	54	-	-	-	-	-	-	-
10 Inch	61	64	62	-	-	-	-	-	-
12 Inch	82	85	82	82	-	-	-	-	-
14 Inch	-	108	104	100	100	-	-	-	-
16 Inch	-	136	132	128	125	140	-	-	-
18 Inch	-	-	194	196	185	190	196	-	-
20 Inch	-	-	-	225	210	208	225	233	-
24 Inch	-	-	-	-	310	315	324	312	315

Tees										
<u>(all MJ)</u>	<u>x4</u>	<u>x6</u>	<u>x8</u>	<u>x10</u>	<u>x12</u>	<u>x14</u>	<u>x16</u>	<u>x18</u>	<u>x20</u>	<u>x24</u>
6 Inch	51	63	-	-	-	-	-	-	-	-
8 Inch	61	75	87	-	-	-	-	-	-	-
10 Inch	80	93	102	117	-	-	-	-	-	-
12 Inch	98	113	123	137	156	-	-	-	-	-
14 Inch	172	183	206	229	235	281	-	-	-	-
16 Inch	-	229	248	265	281	317	323	-	-	-
18 Inch	-	275	280	286	370	415	445	490	-	-
20 Inch	-	335	383	410	432	475	530	560	605	-
24 Inch	-	615	621	628	634	650	663	788	804	841
Crosses										
<u>(all MJ)</u>	<u>x4</u>	<u>x6</u>	<u>x8</u>	<u>x10</u>	<u>x12</u>	<u>x14</u>	<u>x16</u>	<u>x18</u>	<u>x20</u>	<u>x24</u>
6 Inch	62	72	-	-	-	-	-	-	-	-
8 Inch	84	108	108	-	-	-	-	-	-	-
10 Inch	98	118	138	144	-	-	-	-	-	-
12 Inch	123	140	155	187	214	-	-	-	-	-
14 Inch	-	210	231	255	269	344	-	-	-	-
16 Inch	-	250	264	286	310	-	410	-	-	-

G. Granular Material

Granular material used as specified shall be measured in tons based on weight tickets collected at the project site by the Inspector on the date of delivery. Weight tickets shall contain the following information:

Project name	Leave time
Project location	Gross weight
Truck number	Tare weight
Date	Net weight

Failure to comply with weight ticket requirements may be considered unacceptable and unauthorized work and subject to the Engineer's determination by the calculated section constructed and/or the material hauled as to the method of measurement and quantity of material used.

H. Boring

Boring shall be measured in linear feet as specified on the plans or approved by the Engineer. Measurement shall include the steel casing pipe and the watermain carrier pipe as an assembly.

I. Water Service Connection

Water service connections shall be measured on a unit basis for each size and type. The connection shall include the corporation stop, tapping saddle where required, curb stop, and curb box.

J. Service Line

Service lines shall be measured in linear feet for each type and size from the center of the watermain to the end of the service line.

K. Insulation

Insulation shall be measured in square feet for the specified thickness.

L. Testing

Testing shall be measured on a unit basis for each type of test as provided for on the bid schedule. Testing which is not itemized on the bid schedule shall be considered incidental. Only tests which indicate that the materials and workmanship meet or exceed the specified requirements shall be considered for payment.

3400.6 BASIS OF PAYMENT

A. Connect to Existing Watermain

Connect to existing watermain shall be paid for at the contract unit price on a per each basis. Payment shall include all material, labor, and equipment to connect to the existing watermain as indicated on the plans.

B. Wet Tap with Valve

Wet tap with valve shall be paid for at the contract unit price per each size including the tapping sleeve, the valve, and valve box.

C. Watermain

Watermain shall be paid for at the contract unit price per linear foot for each which includes size. Payment for the excavation and backfilling of the trench shall be included in the payment for the watermain and testing, as well as any required restraining devices, dewatering, sheeting or shoring for which separate payment is not provided. For HDPE watermain pipe the linear price per foot shall include the PE pipe, fittings, fusion welds, tracer wires, tracer wire access boxes and all other materials required for the installation.

D. Directional Bore Watermain

Watermain that is directional bored shall include all labor, equipment and materials to install the pipe in accordance with the plans. The linear price per foot shall include the PE pipe, fittings, fusion welds, tracer wires, tracer wire access boxes and all other materials required for the installation.

E. Valves

Valves of each type and size shall be paid for at the contract unit price per each, including valve box, installation of all components and adjustment of the valve box.

F. Hydrant with Valve

Hydrant with valve shall be paid for at the contract unit price per each including installing hydrant, connecting piece of pipe between valve and hydrant, valve, valve box, Hydrafinder, concrete base, drain rock, polyethylene or tar paper as required, and restraining devices.

G. Fittings

Fittings shall be paid for at the contract unit price per pound including installation and restraint.

H. Granular Material

Granular material used as specified shall be paid for at the contract unit price per ton. Payment shall include all material, labor, and equipment to haul, place, compact, shape it, and any necessary water for compaction.

I. Boring

Boring shall be paid for at the contract unit price per linear foot for each type and size of casing and carrier pipe assembly. Payment shall include all material, labor, and equipment to excavate the boring pit, install the casing, install the carrier pipe, fill the casing pipe with sand, and backfill the excavation.

J. Water Service Connection

Water service connection shall be paid for at the contract unit price per each type and size including corporation stop, curb stop, curb box and tapping saddle where required.

K. Service Lines

Service lines shall be paid for at the contract unit price per linear foot for each type and size of service line installed.

L. Insulation

Insulation shall be paid for at the contract unit price per square foot. Payment shall include all material, labor, and equipment to prepare the trench, install the insulation, and to backfill the insulation without damaging it.

M. Testing

Testing shall be paid for at the contract unit price per each type of test as provided for on the bid schedule. Payment shall include all material, labor, and equipment to sample the material, perform the test, analyze and report the results to be in compliance with the contract requirements.

END OF SECTION 3400

**SANITARY SEWER
SPECIAL PROVISIONS**

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4000
SANITARY SEWER
GENERAL REQUIREMENTS

4000.1 DESCRIPTION

This work shall consist of the construction of sanitary sewers utilizing plant fabricated pipe and other appurtenant materials, installed for conveyance of sewage. The work includes construction of manholes, service lines, forcemains and other related items in accordance with the Plans and these General Requirements, except as modified by the Specific Requirements or the Special Provisions. All work shall comply with the requirements of the Minnesota Pollution Control Agency, the Minnesota Department of Health, the Minnesota Plumbing Code and all applicable codes and ordinances.

4000.2 MATERIALS

The materials used in this work shall be new, conforming to the requirements of the referenced specifications for the class, kind, type, size and grade of material as specified below, and other details indicated in the Contract.

The Contractor shall submit in writing a list of materials and supplies for approval.

Sanitary sewer gravity pipe, fittings and services shall be Polyvinyl Chloride (PVC), forcemains shall be Polyvinyl Chloride (PVC) or Ductile Iron Pipe (DIP) and manholes shall be precast reinforced concrete unless otherwise required or allowed.

A. Pipe

1. Polyvinyl Chloride Pipe (Non-Pressure): Pipe and fittings for non-pressure gravity sewers and services shall conform to the requirements of ASTM D 1784 and D 3034, with SDR of 35, or ASTM F 789 and D 3034, and shall have push-on joints with elastomeric gaskets.
2. Polyvinyl Chloride Pipe (Pressure): Pipe and fittings for pressure forcemains shall conform to the requirements of ASTM D 1784 and D 2241 with SDR of 26 corresponding to a working pressure of 160 psi, and have push-on joints with elastomeric gaskets.

Forcemain pipe shall be placed with a tracer wire to assist with location in the absence of manhole structures. Specifications of the tracer wire is defined below.

3. Ductile Iron Pipe: All ductile iron pipe shall be Class 50 and conform to the requirements of AWWA C 151 (ANSI A21.51).
 - a. Fittings: Fittings shall be Gray Iron or Ductile Iron, having a minimum working pressure rating of 150 psi, and shall conform to the requirements of AWWA C110 (ANSI A21.10) Ductile-Iron and Gray-Iron Fittings, or AWWA C153 (ANSI 21.53) Ductile-Iron Compact Fittings.
 - b. Lining and Coating: All pipe and fittings shall be furnished with cement mortar lining meeting the requirements of AWWA C103 (ANSI A21.4) for standard thickness lining. All interior and exterior surfaces of the pipe and fittings shall have a tar or bituminous

seal coating at least one mil thick. Spotty or thin seal coating, or poor coating adhesion, shall be cause for rejection.

- c. Joints: Pipe three inches and larger in diameter shall have push-on joints. Fittings shall have mechanical joints. The rubber gasket for both type joints shall conform to AWWA C111 (ANSI A21.11).
- d. Tracer Wire: Tracer wire shall be 8 gauge single strand wire with plastic jacket, type TW or THW. It is required that the tracer wire carry a radio signal to aid in locating buried watermain. Tracer wire shall be copper conductor insulated with medium density polyethylene (HDPE) and shall be in accordance with ASTM B 1, and B 3 for copper wire and ASTM D 1248 for polyethylene. The wire shall be identified by surface marking indicating manufacturer's identification, conductor size, and other appropriate information.

In-line splices shall be compression butt slices with 3M cast kit. Wire nut splices shall not be allowed.

- e. Tracer Wire Access Box: The maximum spacing between tracer wire connection points shall be 500 feet. Tracer wires on lengths of pipe without hydrants or valves or that cannot meet the 500' spacing requirement shall have wire terminal connection points through the use of a terminal box. The top lid shall be cast iron, suitable for flush burial, with integral stainless steel terminals and a locking lid opened with a standard pentagon key. The bottom section shall be a minimum 12" ABS tube. The tracer wire access box shall be Valvco Pipe Tracer Wire Terminal Box.

B. Valves

1. Gate Valves: Gate valves shall conform to AWWA C509 for Resilient Seated Valves, and shall comply with the following supplementary requirements:
 - a. Working pressure rating of 200 psig for all sizes.
 - b. Two inch square operating nut opening counterclockwise (left).
 - c. Double "O" ring stem seal, one above and one below the stem seal.
 - d. Weather seal on bonnet cover.
 - e. Non-rising stem.
 - f. Mechanical joints.
 - g. Manufacturers: American, Mueller, Kennedy, or equal.
2. Valve Boxes:
 - a. Valve boxes shall be 5¼ inch diameter shaft suitable for 7½ feet of cover over the top of the forcemain. Boxes shall be screw type three piece boxes with the word "SEWER" on the lid. Valve boxes shall be Tyler 6860 with 5¼ inch drop lid.
 - b. All valve boxes shall be installed upon the valve with the use of a Gate Valve Adaptor as manufactured by Adaptor Inc. of Oak Creek, WI, or approved equal. The adaptor shall be considered incidental to the valve box installation.
 - c. Valve boxes shall have a 1/8" diameter (minimum) hole drilled in the upper section just below the lid housing. This is to allow tracer wire to be threaded from the outside to the

inside of the valve so an end of the wire can be left in the valve for connection when necessary.

3. Air Release Valves: Air release valves shall be Apco 400 Sewage Air Release Valve.

C. Steel Casing Pipe

Steel casing pipe for jack-boring shall have a wall thickness of 0.375 inches for casing pipe up to 24 inch diameter, and a wall thickness of 0.500 inches for casing pipe 26 to 36 inches in diameter.

D. Precast Concrete Manholes

Precast concrete manholes shall conform to Mn/DOT 3622, Mn/DOT Standard Plate 4007C, the standard detail plates, and the following requirements.

1. Concrete Sections: Manhole barrel, base, slab top, cone, rings, and special precast sections shall conform to ASTM C 478. Base sections shall be cast integral with the bottom manhole section, unless the manhole is constructed over an existing line or other constraints require block or separate slab/barrel construction. Concrete shall be air entrained, 5 to 7 percent.
2. Joints: Joints between concrete sections shall be confined "O" ring conforming to ASTM C 361 and C 443, and shall be Cretex CX-2.

Joints between the manhole structure and inlet and outlet pipes with an outside diameter of 21 inches or less shall be KorNSeal, with bands of 300 series nonmagnetic corrosion resistant steel. For pipes with an outside diameter larger than 21 inches, the bell and spigot inlet and outlet shall be cast integral with the bottom section of the manhole

When conditions require the placement of a pipe through an existing manhole wall, the connection shall be made by core drilling a hole, inserting a rubber boot gasket, and making a water tight seal to the proposed pipe. When core drilling is not possible due to an existing opening or the location of the hole, a rubber waterstop is required on the pipe prior to grouting the space between the pipe and the manhole. Waterstops shall be Fernco, Concrete Manhole Adapters (CMA).

3. Iron Castings: Iron castings for manhole frame and cover shall conform to ASTM A 48 and the following requirements:
 - a. Casting dimensions, details, weights, and class shall be as indicated in the detailed drawings for the design designation specified. Unless otherwise specified, the castings shall be Class 30 or better.
 - b. Lid-to-frame surfaces on round casting assemblies shall be machine milled to provide true bearing around the entire circumference.
 - c. Casting weight shall be not less than 95 percent of theoretical weight for a unit cast to exact dimensions, based on 442 pounds per cubic foot.
 - d. The words "SANITARY SEWER" shall be cast on the top of each manhole casting in two-inch letters.

4. Steps: Steps shall be 1/2 inch diameter grade 60 steel reinforcing rod encapsulated in copolymer polypropylene, PS-1 or PS-1-PF as manufactured by M.A. Industries.

5. Concrete Adjusting Rings

Concrete rings for adjusting the bottom of the casting shall be reinforced concrete in accordance with Mn/DOT Standard Plate 4010H. Rings shall be 0.2, 0.3, or 0.5 feet in height.

6. Metal Adjusting Rings

Cast iron adjusting rings for manholes shall be in accordance with Mn/DOT Standard Plate 4108F or Neenah R-1979.

E. Cleanouts

Cleanouts shall be constructed of ductile iron pipe, mechanical joint, Class 50 as shown on the standard detail plate.

F. Mortar

Mortar for use in masonry construction shall be an air-entrained mixture of one part portland cement and three parts mortar sand, with sufficient water added to produce proper consistency, and with sufficient air-entraining agent added to maintain an air content within range of 7 to 10 percent.

Mortar shall meet the requirements of ASTM C 270.

Plaster shall be portland cement grout.

G. Concrete

Concrete for cast-in-place masonry construction shall be produced and furnished in accordance with the provisions of Mn/DOT 2461 for Type 3, air-entrained, Grade A, 3900 psi concrete.

H. Granular Materials

Granular materials furnished for foundation, bedding, encasement, backfill or other purposes as may be specified shall consist of any natural or synthetic mineral aggregate such as sand, gravel, crushed rock, crushed stone, or slag, that shall be so graded as to meet the gradation requirements specified herein for each particular use.

1. Granular Material Gradation Classifications:

Granular materials furnished for use in Foundation, Bedding, Encasement, and Backfill construction shall be in accordance with Mn/DOT 3149 as listed below:

Material Use Designation and Percent Passing Sieve

<u>Sieve Size</u>	<u>Foundation*</u> Coarse Filter Aggregate 3149.H	<u>Bedding</u> Aggregate Bedding 3149.G	<u>Encasement</u> Aggregate Bedding 3149.G	<u>Backfill</u> Aggregate Backfill 3149.E
2 inch				100
1 inch	100	100	100	
¾ inch	85-100	90-100	90-100	
⅜ inch	30-60	50-90	50-90	
No.4	0-10	35-80	35-80	35-100
No. 10		20-65	20-65	20-70
No. 40		10-35	10-35	10-35
No.200		3-10	3-10	3-10

* ¾ inch to 1½ inch material may be used in lieu of Foundation specified.

2. Granular Material Use Designation: Granular materials provided for Foundation, Bedding, Encasement, or Backfill use as required by the Contract, either as part of the pipe item work unit or as a BID item, shall be classified as to use in accordance with the following:

Material Use Designation Zone Designation

Granular Foundation	Placed below the bottom of pipe grade as replacement for unsuitable or unstable soils, to achieve better foundation support.
Granular Bedding	Placed below the pipe midpoint, prior to pipe installation, to facilitate proper shaping and achieve uniform pipe support.
Granular Encasement	Placed from pipe midpoint to one foot above the top of pipe, after pipe installation, for protection of the pipe and to assure proper filling of voids and thorough consolidation of backfill.
Granular Backfill	Placed below subgrade, if any, as the second stage of backfill, to minimize trench settlement and provide support for surface improvements.

In each case above, unless otherwise indicated, the lower limits of any particular zone shall be the top surface of the next lower course as constructed. The upper limits of each zone are established to define variable needs for material gradation and compaction or void content, taking into consideration the sequence of construction and other conditions. The material use and zone designations described above shall not be construed to restrict the use of any particular material in other zones where the gradation requirements are met.

I. Piling

Piling shall be constructed in accordance with the provisions of Mn/DOT Specification 2452. Piles for pipelines shall be Treated Timber, in accordance with Mn/DOT Specification 3471.

J. Insulation

Main insulation shall be extruded rigid board material having a maximum thermal conductivity of 0.23 BTU/hour/square foot/° Fahrenheit/per inch thickness, at 40° F mean, a compressive strength of 35 psi minimum, and water absorption of 0.25 percent by volume maximum. Insulation shall be DOW Styrofoam HI-40, Minnesota Diversified Products (DiversiFoam) CertiFoam brand insulation.

Unless otherwise specified in the Plans, Specifications, and Specific Requirements, board dimensions shall measure 8 feet long, 2 or 4 feet wide, and 1½ inches thick or greater.

4000.3 CONSTRUCTION REQUIREMENTS

A. Maintenance

Maintenance of the project site, and any other area affected by construction, shall be in accordance with Mn/DOT specifications including Sections:

1404	Maintenance of Traffic
1514	Maintenance During Construction
1515	Control of Haul Roads
1701	Public Convenience and Safety
Chapter 6	Minnesota Manual on Uniform Traffic Control Devices

Maintenance of streets and any detours, by-passes, equipment, stockpile, or storage areas provided in conjunction with the project shall be required and shall be the responsibility of the Contractor. Said maintenance shall include, but not be limited to: keeping the streets free of obstacles, parked equipment and unused barricades; blading the traveled ways; controlling the dust in the construction area and on detours; and maintenance of all barricades and flashers.

The Contractor shall keep the portions of the Project being used by public traffic, whether it be through or local traffic, in such condition that the traffic will be adequately accommodated at all times. The Contractor shall provide and maintain temporary approaches, crossings, and intersections with trails, roads, streets, businesses, parking lots, residences, garages, farms, and other abutting property in acceptable condition.

The Contractor shall maintain essential services during the course of the project. Essential services shall include emergency vehicles, buses, mail delivery, garbage, collection, drainage and public utility services. The Contractor shall coordinate his work with all appropriate agencies and utility companies during construction. The Contractor shall maintain access to all required intersecting streets throughout the project.

During construction it shall be the Contractor's responsibility to see that all existing drainage structures, ditches, gutters and utilities in the working area are kept clean. Gutters shall be cleaned and free of dirt and other materials at the end of each working day to ensure proper drainage. Bales, silt fence, or other erosion control measures acceptable to the Engineer shall be used to prevent materials from washing into drainage ways or storm sewers.

There shall be an inspection of the existing sanitary sewer, storm sewer and water main utilities prior to the start of construction. The Contractor shall notify the Engineer 24 hours in advance to

aid in accomplishing this inspection. All deficiencies in these existing systems prior to beginning construction must be immediately brought to the attention of the Engineer.

During construction, the Contractor shall maintain the streets and control dust as directed by the Engineer. Dust control shall be provided in the same manner to stockpiles of topsoil, dirt, or other materials throughout the period of construction. Payment for maintaining streets and controlling dust shall be incidental to this project and no separate payment made unless provided for on the bid.

B. Work Limits

The Owner has obtained permanent and temporary easements for all construction on private property, as shown on the plan sheets.

The remaining construction is within the right-of-way of dedicated streets. The Contractor shall limit his operations to the street right-of-way or easement unless he makes a separate arrangement with the landowner for the use of additional land.

1. Work on Existing Right-of-Ways: In the case of construction on a railroad, state or county highway right-of-way, a permit for such construction shall be obtained by the Owner. The Contractor shall comply with all requirements specified by the permit with respect to limits, safety precautions, method of construction, etc., and shall furnish to the state or county highway department or the railroad the required supplemental bonds or insurance coverages as stipulated in the permits without additional cost to the Owner.

C. Establishing Line and Grade

The primary line and grade will be established by the Engineer. Line and grade stakes will be set parallel to the proposed pipeline at an appropriate offset and interval as will serve the Contractor's operations wherever practical; at each change in line or grade; and as needed for pipeline appurtenances and service lines.

The Contractor shall arrange his operations to avoid unnecessary interference with the establishment of the primary line and grade stakes; and shall render whatever assistance may be required by the Engineer to accomplish the staking. The Contractor shall be responsible for preservation of the primary stakes and shall bear the full cost of any restaking necessitated by his negligence.

The Contractor shall be solely responsible for the correct transfer of the primary line and grade from the stakes to all working points and for construction of the work to the prescribed lines and grades.

Unless otherwise specified in the Plans, Specifications, and Specific Requirements, all water main shall generally be placed with 7-1/2 feet of cover. However, a greater depth may be required to clear storm and sanitary sewers and sewer services, and no additional compensation shall be provided for such adjustments.

In certain locations where water main is in direct conflict with storm or sanitary sewer, the water main shall be constructed under the sewer. Where it is necessary to use vertical bends to avoid sewer mains, no extra compensation will be made for this construction.

No deviation shall be made from the required line or grade except with the consent of the Engineer.

In areas of conflict between water mains, house sewers, storm sewers, or sanitary sewers, a separation of at least 18 inches between the water main and the sewer shall be provided. When local conditions prevent a vertical separation as described, the following construction shall be used:

1. Sewers passing over or under water mains shall be constructed of materials equal to water main standards of construction for a distance of at least 9 feet on either side of the water main.
2. Water main passing under sewers shall, in addition, be protected by providing:
 - a. Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking of the water mains; and
 - b. That the length of water pipe be centered at the point of crossing so that the joints will be equidistant and as far as possible from the sewer.
3. Water mains shall be laid at least 10 feet horizontally from any sanitary sewer, storm sewer or sewer manhole, whenever possible. When local conditions prevent a horizontal separation of 10 feet a water main may be laid closer to a storm or sanitary sewer provided that:
 - a. The bottom of the water main is at least 18 inches above the top of the sewer;
 - b. Where this vertical separation cannot be obtained, the sewer shall be constructed of materials and with joints that are equivalent to water main standards of construction and shall be pressure tested to assure water tightness prior to backfilling.

D. Protection of Surface Structures

All surface structures and features located outside the excavation limits for underground installations, together with those within the construction areas which are indicated in the Plans as being saved, shall be properly protected against damage and shall not be disturbed or removed without approval of the Engineer. Within the construction limits, as required, the removal of improvements such as paving, curbing, walks, turf, etc., shall be subject to acceptable replacement after completion of underground work, with all expense of removal and replacement being borne by the Contractor unless separate compensation is specifically provided for in the Contract.

Obstructions such as street signs, mailboxes, guard posts, culverts, and other items of prefabricated construction may be temporarily removed during construction provided essential service is maintained in a relocated setting as approved by the Engineer and nonessential items are properly stored for the duration of construction. Upon completion of the underground work, all such items shall be replaced in their proper setting by and at the sole expense of the Contractor.

In the event of damage to any surface improvements, either privately or publicly owned, the Contractor will be required to replace or repair the damaged property to the satisfaction of the Engineer and by the Contractor at his expense.

E. Interference of Underground Structures

When any underground structure interferes with the planned placement of pipe or appurtenances and requires alterations in the work to eliminate the conflict or avoid endangering effects on either the existing or proposed facilities, the Contractor shall immediately notify the Engineer and the Owner of the affected structure. When any existing facilities are endangered by the Contractor's operations, he shall cease his operations at the site and take such precautions as may be necessary to protect the in-place structures until a decision is made as to how the conflict will be resolved.

Without specific authorization from the utility owner, no essential utility service shall be disrupted, nor shall any change be made in either the existing structures or the planned installations to overcome the interferences. Alterations to existing facilities will be allowed only when that service will not be curtailed unavoidably and then only when the encroachment or relocation will satisfy all applicable regulations and conditions.

Wherever alterations are required as a result of unforeseen underground interferences not due to any fault or negligence of the Contractor, the Engineer will issue a written change order covering any additional or extra work involved and specifying the revised basis of payment, if any. Any alterations made strictly for the convenience of the Contractor shall be subject to prior approval and shall be at the Contractor's expense.

No extra compensation will be allowed for delays caused by the interference of underground structures or utilities unless approved by the Engineer and included in a change order.

F. Removal of Surface Improvements

Removal of surface improvements in connection with trench excavation shall be limited to actual needs for installation of the pipeline and appurtenances. Removal operations shall be coordinated effectively with the excavation and installation operations as will cause the least practical disruption of traffic or inconvenience to the public. Removed debris shall not be deposited at locations that will restrict access to fire hydrants, private driveways, or other essential service areas. Removal and final disposal of debris shall be accomplished as a single operation wherever possible and the debris shall be removed from the site before starting the excavating operations.

Removal of concrete or bituminous structures shall be by methods producing clean-cut breakage that will preserve the remaining structure without damage. Concrete or bituminous paving shall be removed so when the trench is excavated there will be a six inch wide minimum undisturbed subgrade and aggregate base course lip.

Removal equipment shall not be operated in a manner that will cause damage to the remaining or adjoining property. Where not removed to an existing joint, concrete structures shall be sawed along the break lines to a minimum depth of one-third of the structure depth.

Any reusable materials or materials for recycling, such as asphalt, concrete, aggregate, sod or topsoil, shall be segregated from other waste materials and be stockpiled so as to maintain suitability and permit proper reuse.

G. Excavation and Trench Preparation

Excavating operations shall proceed only so far in advance of pipe laying as will satisfy the needs for coordination of work and permit advance verification of unobstructed line and grade as planned. Where interference with existing structures is possible or in any way indicated, and where necessary to establish elevation or direction for connections to in-place structures, the excavating shall be done at those locations in advance of the main operation so actual conditions will be exposed in sufficient time to make adjustments without resorting to extra work or unnecessary delay.

All installations shall be accomplished by open trench construction except where boring and jacking or tunnel construction methods shall be employed as specifically required by the Plans or approved by the Engineer. Surface structures must be properly supported and the backfill restored to the satisfaction of the Engineer.

The excavation operations shall be conducted to carefully expose all in-place underground structures without damage. Wherever the excavation extends under or approaches close to an existing structure as to endanger it in any way, precautions and protective measures shall be taken as necessary to preserve the structure and provide temporary support. Hand methods of excavating shall be utilized to probe for and expose such critical or hazardous installations as gas pipe and power or telephone cables.

1. Classification and Disposition of Materials: All materials encountered in the excavations, with the exception of items classified for payment as structure removals, will be considered as Unclassified Excavation. Unclassified materials shall include muck, rubble, wood debris, boulder stone, masonry or concrete fragments less than one cubic yard in volume, together with other miscellaneous matter that can be removed effectively with power operated excavators.

Excavated materials will be classified for reuse as being either Suitable or Unsuitable for backfill or other specified use, subject to selective controls. All suitable materials shall be reserved for backfill to the extent needed, and any surplus remaining shall be utilized for other construction on the project as may be specified or ordered by the Engineer. To the extent practical, granular materials and topsoil shall be segregated from other materials during the excavating and stockpiling operations so as to permit best use of the available materials at the time of backfilling.

All excavated materials reserved for backfill or other use on the project shall be stored at locations approved by the Engineer that will cause a minimum nuisance or of inconvenience to public travel, adjacent properties, and other special interests.

The material shall not be deposited so close to the edges of the excavations as would create hazardous conditions, nor shall any material be placed so as to block the access to emergency services. All materials considered unsuitable by the Engineer, for any use on the project, shall be immediately removed from the project and be disposed of as arranged for by the Contractor.

If contaminated soils are encountered during the excavation process the Contractor shall notify the Engineer and the MPCA to determine what actions are necessary to properly handle the removal of the contaminated soils and replace them with suitable materials.

2. Excavation Limitations and Requirements: Trench excavating shall be to a depth that will permit preparation of the foundation, as specified, and installation of the pipeline and

appurtenances at the prescribed line and grade except where alterations are specifically authorized. Trench widths shall be sufficient to permit the pipe to be laid and joined properly and the backfill to be placed and compacted as specified. Extra width shall be provided as necessary to permit convenient placement of sheeting and shoring and to accommodate placement of appurtenances.

Excavations shall be extended below the bottom of structure grade as necessary to accommodate any required Granular Bedding material. When unstable foundation materials are encountered at the established grade, additional materials shall be removed as specified or ordered by the Engineer to produce an acceptable foundation. All excavations below grade shall be to a minimum width equal to the outside pipe diameter plus 2 feet.

Trench widths shall allow for at least six inches of clearance on each side of the joint hubs. The maximum allowable width of the trench at the top of pipe level shall be the outside diameter of the pipe plus two feet. The width of the trench at the ground surface shall be held to a minimum to prevent unnecessary destruction of the surface structures while maintaining safe working conditions.

The maximum allowable trench width at the level of the top of pipe may be exceeded only by approval of the Engineer, after his consideration of pipe strength and loading relationships. Any alternate proposals made by the Contractor shall be in writing, giving the pertinent soil weight data and proposed pipe strength alternate, and shall be made in a timely manner so as not to delay the project. Approval of alternate pipe designs shall be with the understanding that no extra compensation will be allowed for any increase in material or construction costs.

3. Sheeting and Bracing Excavations: All excavations shall be sheeted, shored, and braced as will meet all requirements of the applicable safety codes and regulations; comply with any specific requirements of the Contract; and prevent disturbance or settlement of adjacent surfaces, foundations, structures, utilities, and other properties. Any damages to the work under contract or to adjacent structures or property caused by settlement, water or earth pressures, slides, cave-ins, or other causes due to failure or lack of sheeting, shoring, or bracing or through negligence or fault of the Contractor in any manner shall be repaired by the Contractor at his expense and without delay.

Where conditions warrant extreme care, the Contractor shall exercise special precautions to protect life or property. This may include the installation of sheet piling of the interlocking type or shall include other safety measures be taken as the Contractor deems necessary. The Contractor shall at all times be responsible for protection of life, property, and the work on the project.

The Contractor shall assume full responsibility for proper and adequate placement of sheeting, shoring, and bracing, wherever and to such depths that soil stability may dictate the need for support to prevent displacement. Bracing shall be so arranged as to provide ample working space and so as not to place stress or strain on the in-place structures to any extent that may cause damage.

Sheeting, shoring and bracing materials shall be removed only when and in such manner as will assure adequate protection of the in-place structures and prevent displacement of supported grounds. Sheeting and bracing shall be left in place only as required by the Contract. Otherwise, sheeting and bracing may be removed as the backfilling reaches the level of respective support. Wherever sheeting and bracing is left in place, the upper portions

shall be cut and removed to an elevation of 3 feet or more below the established surface grade or as the Engineer may direct.

All costs of furnishing, placing and removing sheeting, shoring and bracing materials, including the value of materials left in place as required by the Contract, shall be included in the prices bid for pipe installation and will not be compensated for separately. When any sheeting, shoring, or bracing materials are left in place by written order of the Engineer, payment may be made for those materials as an extra work item, including waste material resulting from upper cut-off requirements.

4. Preparation and Maintenance of Foundations: Foundation preparations shall be conducted to produce a stable foundation and provide continuous and uniform pipe bearing between bell holes. Where Class C bedding is specified the initial excavating or backfilling operations shall produce a subgrade level slightly above finished grade to permit hand shaping to finished grade by trimming of high spots and without the need for filling of low spots to grade.

In excavations made below grade to remove unstable materials, the backfilling to grade shall be made with Granular Foundation material. Placement of the backfill shall be in relatively uniform layers not exceeding 8 inches in loose thickness. Each layer of backfill shall be compacted thoroughly, by means of approved mechanical compaction equipment, to produce uniform pipe support throughout the full pipe length and facilitate proper shaping of the pipe bed.

Where the foundation soil is found to consist of materials that the Engineer considers to be so unstable as to preclude removal and replacement to a reasonable depth to achieve solid support, a suitable foundation shall be constructed as the Engineer directs in the absence of special requirements therefore in the Contract. The Contractor shall be required to furnish and drive piling and construct concrete or timber bearing supports or other work as provided for in an extra work order.

Care shall be taken during final subgrade shaping to prevent any over-excavation. Should any low spots develop, they shall only be filled with Granular Foundation material, which shall be compacted thoroughly, without additional compensation provided to the Contractor. The finished subgrade shall be maintained free of water and shall not be disturbed during pipe lowering operations except as necessary to remove pipe slings. The discharge of trench dewatering pumps shall be directed to natural drainage channels or storm water drains in a manner which does not cause damage to private or public property. Any debris left by dewatering operations shall be cleaned up immediately by the Contractor. Draining trench water into sanitary sewers or combined sewers will not be permitted.

The Contractor shall install and operate a dewatering system of wells or points to maintain pipe trenches free of water whenever necessary or as directed by the Engineer to meet the intent of these specifications. Unless otherwise specified in the Plans, Specifications, or Specific Requirements, such work shall be considered incidental with no additional compensation provided therefore.

The Contractor shall be responsible for evaluating any existing well situations and the impact his dewatering operation may have on them. Any damage or corrective action needed as a result of the dewatering operation shall be the Contractor's responsibility. If as a result of the

dewatering operation anyone is without potable water the Contractor shall make provisions for a temporary water supply to those properties.

Dewatering wells must be installed in accordance with the Minnesota Department of Health regulations and Minnesota Rules, Chapter 4725. Construction may only be completed by a licensed dewatering well or well contractor and a Minnesota Department of Health Notification Form and fee is required. All fees are the full responsibility of the Contractor.

All costs of excavating below grade and placing foundation or bedding aggregates as required shall be included in the bid prices for pipe items to the extent that the need for such work is indicated in the Contract provisions and the BID does not provide for payment therefore under separate BID items.

If examination by the engineer reveals the need for placement of foundation aggregates was caused by the Contractor's manipulation of the soils in the presence of excessive moisture or lack of proper dewatering, the cost of the corrective measures shall be borne by the Contractor.

H. Installation of Pipe and Fittings

Inspection, handling, and all aspects of the installation of the pipe, services, and appurtenances shall be in accordance with the manufacturer's recommendations, and as supplemented as follows:

1. Inspection and Handling: Proper and adequate implements, tools, and facilities shall be provided and used by the Contractor for the safe and convenient prosecution of the work. Unloading, distribution, and storage of pipe and appurtenant materials on the job site shall be at a location approved by the Engineer.

All materials shall be handled carefully, as will prevent damage to protective coatings, linings, and joint fittings; preclude contamination of interior areas; and to avoid jolting contact, dropping or dumping.

Before being lowered into laying position, the Contractor shall make a thorough visual inspection of each pipe section and appurtenant units to detect damage or unsound conditions that may need corrective action or be cause for rejection. Inspection procedure shall be as approved by the Engineer, with special methods being required as he deems necessary to check out suspected defects more definitely. The Contractor shall inform the Engineer of any defects discovered and the Engineer will prescribe the required corrective action or order rejection.

Immediately before placement, the joint surfaces of each pipe section and fitting shall be inspected for the presence of foreign matter, coating blisters, rough edges or projections, and any imperfections so detected shall be corrected by cleaning, trimming, or repairs as needed.

2. Pipe Laying Operations: Trench excavation and bedding preparations shall proceed ahead of pipe placement as will permit proper laying and joining of the units at the prescribed grade and alignment without unnecessary deviation or hindrance.

All foreign matter or dirt shall be removed from the inside of the pipe and fittings before they are lowered into position in the trench and they shall be kept clean by approved means during

and after laying. The sewer materials shall be carefully lowered into laying position by the use of suitable restraining devices. Under no circumstances shall the pipe be dropped into the trench.

At the time of pipe placement, the bedding conditions shall be such as to provide uniform and continuous support for the pipe between bell holes. Bell holes shall be excavated as necessary to make the joint connections, but they shall be no larger than would be adequate to support the pipe throughout its length. No pipe material shall be laid in water nor when the trench or bedding conditions are otherwise unsuitable or improper.

When placement or handling precautions prove inadequate, in the Engineer's opinion, the Contractor shall provide and install suitable plugs or caps effectively closing the open ends of each pipe section before it is lowered into laying position, and they shall remain so covered until removal is necessary for connection of an adjoining unit.

Unless otherwise permitted by the Engineer, bell and spigot pipe shall be laid with the bell ends facing upgrade and the laying shall start on the downgrade end and proceed upgrade. As each length of bell and spigot pipe is placed in laying position, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade. The pipe shall be secured in place with approved backfill material, which shall be thoroughly compacted by tamping around the pipe out to the trench wall.

Connection of pipe to existing lines or previously constructed manholes shall be accomplished as shown in the Plans or as otherwise approved by the Engineer. All structure penetrations shall be made with the use of waterstop seals.

At all times when pipe laying is not in progress, including noon hour and overnight periods, all open ends of the pipe line shall be closed by watertight plugs or other means approved by the Engineer. If water is present in the trench, the seals shall remain in place until the trench is pumped completely dry.

Installation of PVC shall conform to ASTM D 2321.

Unless otherwise noted in the Specific Requirements, pipe bedding shall be Class B.

I. Forcemain Installation

The following sections apply to construction of Ductile Iron Pipe and Polyvinyl Chloride Pipe forcemains only.

1. Ductile Iron Pipe Joints

- a. Push-On Joints: The circular rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. A thin film of approved gasket lubricant shall be applied to either the inside surface of the gasket or the outside surface of the spigot end, or to both. Care shall be taken while inserting the spigot end to prevent introduction of contaminants. The joint shall be completed by forcing the spigot end to the bottom of the socket by the use of suitable pry-bar or jack type equipment. Spigot ends which do not have depth marks shall be marked before assembly to insure full insertion. Field cut pipe shall be filed or ground at the spigot edge to resemble the manufacturer's fabricated

detailing. The bucket on the excavation equipment shall not be used to force pipe into socket.

- b. Mechanical Joints: The last eight inches of the outside spigot surface and the inside bell surface of each pipe and appurtenant joint shall be painted with a soap solution, after being thoroughly cleaned. The cast iron gland shall then be slipped on the spigot end with the lip extension toward the socket or bell end. The rubber gasket shall be painted with soap solution and be placed on the spigot end with the thick edge toward the gland. An approved lubricant provided by the pipe manufacturer may be used in lieu of the soap solution.

After the spigot end is inserted into the socket to full depth and centered, the gasket shall be pressed into place within the bell evenly around the entire joint. After the gland is positioned behind the gasket, all bolts shall be installed and the nuts tightened alternately to the specified torque, such as to produce equal pressure on all parts of the gland.

Unless otherwise specified, the bolts shall be tightened in accordance with AWWA C-600 by means of a suitable torque-limiting wrench within a foot-pound range of;

<u>Pipe Size</u>	<u>Bolt Size</u>	<u>Torque ft-lb</u>
3"	5/8"	45 - 60
4" - 24"	3/4"	75 - 90
30" - 36"	1"	100 - 120

After tightening, all exposed parts of the bolts and nuts shall be completely coated with an approved bituminous rust preventive coal tar material such as Koppers, Bitumastic Super Service Black or Tnemec 46-457 Tnemecol.

- 2. Tracer Wire: Tracer wire shall be installed along all PVC pipe forcemain unless noted otherwise. The tracer wire shall be considered incidental to the forcemain construction.
 - a. The 8-gauge tracer wire shall be installed no more than 6" above and centered along the top of the pipe during the initial backfilling operations. Care shall be taken to not damage the wire. Splices shall be made using 3M cast kits. Splices shall not occur more frequently than one per 250 feet of pipe.
 - b. At the lift station, valve manhole, air release manhole, the trace wire shall be securely fastened to the appurtenance in an approved manner so as to be readily visible. At valves the wire shall be routed up along the outside of the valve box and threaded through a 1/8" hole drilled in the upper portion of the valve box for that purpose. A minimum of 2' of wire shall extend to the inside of the valve box. The Contractor shall wind the wire into a loop and place it in the top of the valve box where it can be accessed when necessary. The purpose of the wire shall be to allow a low voltage circuit locator to be attached without excavation. It is recommended that during construction, the Contractor periodically test the trace wire being installed, to insure continuity. Upon completion of the project the Contractor shall test the trace wire in accordance with Section 4000.4 Testing.

- c. Tracer Wire Access Box: The maximum spacing between tracer wire connection points shall be 500 feet. Tracer wires on lengths of pipe without hydrants or valves or that cannot meet the 500' spacing requirement shall have wire terminal connection points through the use of a terminal box. The access box shall be placed on the pipe in accordance with the manufacturer's recommendations. The tracer wire shall be routed up through the access box and securely fastened to the terminal connectors on the bottom side of the lid.
3. Aligning and Fitting and Pipe: The cutting of pipe for inserting valves, fittings, or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe and shall leave a smooth square-cut end. Pipe shall be cut with approved mechanical cutters.

Wherever it is necessary to deflect the pipe from a straight line either in the vertical or horizontal plane, to avoid obstructions, plumb stems, or produce a long radius curve when permitted, the amount of deflection allowed at each joint shall not exceed the allowable limits for maintaining satisfactory joint seal as given in AWWA C600 for mechanical joints and push-on joints, or as otherwise allowed by the pipe manufacturer.

MECHANICAL JOINT

<u>Pipe Size</u>	<u>Deflection Angle</u>	<u>Offset</u>		<u>Radius</u>	
		<u>18'</u>	<u>20'</u>	<u>18'</u>	<u>20'</u>
3" – 4"	8° 18'	31"	35"	125'	140'
6"	7° 07'	27"	30"	145'	160'
8" – 12"	5° 21'	20"	22"	195'	220'
14" – 16"	3° 35'	13½"	15"	285'	320'
18" – 20"	3° 00'	11"	12"	340'	380'
24" – 30"	2° 23'	9"	10"	450'	500'

PUSH-ON JOINT

<u>Pipe Size</u>	<u>Deflection Angle</u>	<u>Offset</u>		<u>Radius</u>	
		<u>18'</u>	<u>20'</u>	<u>18'</u>	<u>20'</u>
3" – 12"	5°	19"	21"	205'	230'
14" – 36"	3°	11"	12"	340'	380'

4. Blocking and Anchoring of Pipe: All plugs, caps, tees, bends, and other thrust points shall be provided with reaction backing, or movement shall be prevented by attachment of suitable restraining devices, in accordance with the requirements of the Plans, Specific Requirements and typical details.

In the absence of other specified requirements for reaction blocking or restraining devices, the following provisions shall apply:

- a. All horizontal bends exceeding 20° deflection, and all caps, plugs, and branch tees shall be provided with concrete buttress block.
- b. All vertical bends exceeding 20° deflection shall be provided with concrete buttress blocking at the low points and with metal tie rod or strapping restraints at the high points.
- c. Offset bends made with standard offset fittings need not be strapped or buttressed.

- d. Tie rods and tie harnesses shall be of the same size as the required bolt, torqued to the requirements of Section I.1.b. After installing the tie rods and harnesses and prior to the backfill operations, they shall be coated with a brush-applied tar coating. This coating shall be Koppers Bitumastic Super Service Black or Tnemec 46-457 Tnemecol, and shall be applied to the manufacturer's specifications. Hot dipped galvanized parts need not be tar coated.

All necessary fittings, bands, tie rods, nuts and washers, and all labor and excavation required for installation of reaction restraints shall be furnished by the Contractor at his expense and without direct compensation.

Hardwood blocking shall only be used as temporary reaction backing until acceptable permanent reaction blocking or restraining devices have been installed. Blocking shall be nominal 2-inch timber having an area equivalent to at least four times the area of the surface of the cap or plug it restrains.

Concrete buttresses shall be poured against firm, undisturbed ground and shall be formed in such a way that the joints will be kept free of concrete and remain accessible for repairs. The concrete mix used in buttress construction shall meet the requirements for Grade B (3400 psi) of Mn/DOT 2461.

Buttress dimensions shall be as indicated on the Plans or as approved by the Engineer.

5. Polyethylene Encasement of Pipeline: Wherever so required by the Plans or Specific Requirements, the pipeline, including valves, fittings, and appurtenances, shall be fully encased in polyethylene film of 8 mil nominal thickness. The film shall be furnished in tube form for installation on pipe and all pipe-shaped appurtenances such as bends, reducer, off-sets, etc. Sheet film shall be provided and used for encasing all odd-shaped appurtenances such as valves, tees, crosses, etc.

Installation shall be in accordance with AWWA C105.

J. Gravity Sewer Installation

1. Connection and Assembly of Joints: All pipe and fitting joints shall fit tightly and be fully closed. Spigot ends shall be marked as necessary to indicate the point of complete closure on PVC pipe. All joints shall be watertight.

All pipe and fitting ends left open for future connection shall be closed off with prefabricated plugs or caps.

Prefabricated plugs and caps shall be of the same material as the pipe material, or an approved alternate material, and shall be watertight.

Sanitary sewer lines connecting into an existing manhole, unless specified otherwise, shall be made by installing the pipe at or slightly above the elevation of the bench. A concrete invert one half the depth of the sewer pipe shall be formed on the bench from the sewer pipe to the edge of the existing invert through the manhole.

Concrete Manhole Adapters, waterstop seals, shall be used to provide a watertight seal when penetrating a structure wall with a pipe.

If specified, sanitary sewer line connection into an existing manhole shall be made by removing a portion of the existing manhole invert and reconstructing to provide smooth flow of all pipelines through the manhole.

Inside or outside drop manholes shall be constructed in accordance with the detail plates. Straps and anchors for inside drops shall be non-corrosive, stainless steel or fiberglass.

K. Sewer Service Installations

Forcemain and gravity sewer service connections and service sewer pipe shall be installed where indicated on the plans, and/or where staked in the field. The sewer service connections and pipe lines shall be installed in conformance with all applicable requirements of the forcemain or gravity sewer installation and as more specifically provided for herein.

The Contractor shall keep accurate records of all service installations as to type, size, location, elevation, point of connection and termination, etc. This service record shall be maintained jointly by the Contractor and Inspector. The service installations shall not be backfilled until visually inspected and all required information has been obtained and recorded.

The main sewer service connection shall consist of installing a built-in wye fitting in the gravity sewer line or Tee in the forcemain at designated locations or of providing an insert type Wye Saddle with gasketed skirt with 2 stainless steel straps in a pipe cut-out where the gravity main is existing. Orientation of service connection fitting is shown in the detail plates.

Where the depth of the gravity sewer invert is 15 feet or greater, the service connection shall be extended upward by means of a Service Riser pipe in accordance with the detail plate. Separate compensation shall not be made for Service Riser pipe unless provided for in the bid.

Unless otherwise specified, service pipe shall be installed at right angles to the main sewer and at a straight line grade to the property line. Typical pipe grade is 2.00% (1/4 inch per foot) for gravity services, however, 1.00% (1/8 inch per foot) may be allowed in restrictive elevation differences when approved by the Engineer. When a pressure line discharges into a gravity service, a minimum cover of 7½ feet shall be maintained to prevent freezing.

Service trenches shall be restored and compacted as specified for pipelines.

Unless otherwise indicated, service pipe installation shall terminate at the property line, at which point the Contractor shall install a prefabricated plug or cap, secured to pass the air test, set a 2 x 2 inch wooden stake from the plug up to grade to mark the exact end of pipe, and a surface marker of a metal fence post with the top 2 feet painted green shall also be provided.

Sewer service lines shall not be connected into manholes without the approval of the Engineer; rather, wyes shall be placed in the main line prior to the manhole. When sewer services must be run into a manhole the connection shall be through the manhole wall with a watertight sealing boot or approved waterstop gasket. A concrete channel, 1/2 the depth of the service pipe diameter, shall be formed on the manhole bench to direct the flow. This channel shall extend from the end of the service pipe to the edge of the invert channel running through the manhole base.

All pipe and fitting stubs shall be sealed with prefabricated plugs or caps and secured to pass the air test. Their locations shall be marked in the same manner as noted above for service terminations.

L. Manhole Structures

Manholes and other special access structures shall be constructed at designated locations as required by the Plans and in accordance with the detail plates.

Unless otherwise specified or approved, manholes and catch basins shall be constructed of precast concrete sections, integral base and the barrel, riser sections, eccentric cone or flat top, and adjusting rings. All units shall be properly fitted and sealed to form a completely watertight structure. Barrel and cone height shall be such as to permit placement of at least two and not more than five standard 0.2 foot precast concrete adjusting rings, for a maximum height of 1.0 foot, immediately below the casting assembly set in a full mortar bed, 1/4 inch to 1/2 inch thick without the use of shims or blocking. Rings shall be plastered on the exterior to form a watertight seal.

When placing the precast base, the bedding shall be solid and compacted to the grade necessary prior to setting the base. Manipulation of the base to achieve the proper grade will not be allowed. If the base is low and needs fill to level it or is high and material must be removed, the base shall be removed, bedding corrected, and the base reset to proper grade.

Unless otherwise specified or approved, manholes shall have an inside barrel diameter of 48 inches minimum, and the inside diameter at the top of the cone section and of adjusting rings shall be 27 inches.

Concrete cast-in-place bases shall be poured on undisturbed or firmly compacted foundation material which shall be trimmed to proper elevation. The bottom riser section shall be set in fresh concrete or mortar and all other riser section joints of the tongue and groove design shall be sealed with rubber O-ring gaskets.

Wherever special designs so require or permit, the structure may be constructed with solid concrete sewer brick or block units or cast-in-place concrete. Any combination of cast-in-place concrete and concrete brick or solid concrete block mortar construction will be allowed and may be required where it is impossible to complete the construction with standard precast manhole sections. When concrete brick or solid concrete block are used, the exterior must be completely plastered to form a water tight seal. The exterior plaster must cure at least 24 hours, to prevent damage during backfilling.

All annular wall space surrounding the in-place pipes shall be completely filled with mortar or concrete, and the inside bottom of each structure shall be shaped with concrete to provide free flow through invert channels. Invert channels shall extend to the pipe centerline and side floors slope upward to the structure.

Steps shall be spaced 16 inches on center, the top step shall be no greater than 27 inches from the top of casting, the bottom step shall be no greater than 16 inches from the structure floor, offsetting the bottom step from the step row may be necessary due to the outlet pipe location.

Manholes installed outside the paved roadway shall be marked with a four foot high sign post with a 4 x 8 inch reflectorized marker with an MH labeling on it. The marker post shall be installed adjacent to and facing the manhole casting.

Connections to existing sanitary sewer pipe stubs shall be made after verifying that the existing pipe grade and alignment conform to the proposed pipe extension.

Connections to existing sanitary manholes when a gasketed plugged opening exists shall be made by removing the plug, inserting the proposed pipe, and making a water tight seal with the existing gasket.

Connections to existing sanitary manholes when no plugged opening exists shall be made by core drilling a hole, inserting a rubber boot gasket, and making a water tight seal to the proposed pipe. If the proposed core drilling occurs in the area of a manhole joint the proposed hole shall be lowered and the pipe slope adjusted whenever possible in order to obtain a watertight seal.

M. Jack-Bore Steel Casing Pipe or Reinforced Concrete Pipe

The Contractor shall jack-bore steel casing pipe or reinforced concrete pipe in place as specified and as shown on the plans. Steel casing pipe for use with a carrier pipe is indicated on the plans as the minimum size required. The Contractor may at his own expense use a larger size pipe if so desired for ease of construction and when approved by the Engineer.

Traffic control shall be in accordance with the Minnesota Manual on Uniform Traffic Control Devices and any permit requirements.

Soil borings provided with this specification are for general information purposes only. The contractor shall evaluate the site to his own satisfaction, by taking additional borings, before commencing work. No horizontal boring shall take place in ground water situations without first dewatering to a level at least two feet below the proposed casing pipe. When ground water is present, piezometers shall be installed, at the Contractor's expense, to monitor the ground water level before and during construction. Piezometers shall be installed far enough ahead of the construction to permit stabilization with natural ground water levels.

The boring pit shall be well sheeted, braced, and of sufficient strength, as determined by established soils engineering practices, to withstand the loads and pressures imposed by boring and to resist the horizontal earth pressures that could develop for the type of material encountered.

Fencing shall be placed around all pits and secured at the end of each work day.

The boring and jacking machine shall be of the fixed rail type, have the capability of controlling the flow of material at the face, have the capability of conforming to line and grade, and shall conform to the size and shape of the casing or liner.

A 1½ inch pipe shall be forced along the top of the pipe being jacked. The end of this 1½ inch pipe shall be 18 inches back from the lead edge of the jacking pipe. Bentonite grout shall be forced under pressure through this pipe at all times during the jacking operation to lubricate the pipe and fill any voids that develop above the pipe.

In the event that cobbles or boulders are encountered which can not be removed through the auger, the auger shall be pulled and the rocks removed by hand, mechanical methods, or blasting. When provided for as a bid item, this removed rock material shall be field measured to determine the volume for payment. Payment shall be made only when the auger is required to be pulled and there is a bid item provided, otherwise rock removal shall be considered incidental to the boring.

The auger shall at all times be held back of the cutting head adequately to prevent over excavation at the cutting head and voids in the surrounding soils. Any voids which may occur or surface settlement shall be corrected by augering from the surface and injection grouting to correct the settlement. The Contractor shall also be responsible for any associated damage.

In non-granular soils back grouting shall be required on the outside of the casing once the casing is installed. A grouting tube and grout pump that maintains positive piston pressure on the grout shall be used. Grout mixture shall contain one, 94 pound bag of Type II portland cement with 5 to 6 gallons of water.

The carrier pipe shall be installed using joint restraints to facilitate removal if ever needed. The carrier pipe shall be supported to provide the specified alignment and prevent undo stress on the bells of the pipe. Supports shall be of pressure treated wood with stainless steel bands.

After the carrier pipe has been inserted, the annular space inside the casing pipe shall be filled with sand utilizing equipment and procedures adequate to completely fill the void space throughout the full length of the casing. Concrete bulkheads of one foot minimum thickness shall be constructed at both ends of the casing pipe.

The rate of filling the annular space with sand shall be carefully controlled to avoid floating the pipe. The Contractor shall take all necessary precautions and be fully responsible for maintaining the grade and straight alignment of the carrier pipe.

Particular care shall be exercised to provide full and uniform support of the carrier pipe at the transition from direct bury to encasement in the casing pipe.

The Contractor shall be responsible for obtaining and paying for any special permit fees, insurance, or bonds which may be required to accomplish the work.

N. Placement of Insulation

Rigid insulation board shall be placed within the pipe encasement zone, 6 inches above the pipe. Prior to placement of the insulation, encasement material shall be compacted until there is no further visual evidence of increased consolidation or the density of the compacted layer conforms to the density requirements specified in the Specific Requirements, then leveled and lightly scarified to a depth of ½ inch. Encasement zone material placed below the insulation shall be free of rock or stone fragments measuring 1½ inches or greater.

Insulation boards shall be placed on the scarified material with the long dimension parallel to the centerline of the pipe. Boards placed in a single layer shall be overlapped at least 6 inches on all sides to eliminate continuous joints for the full depth of the insulation. If two or more layers of insulation boards are used, each layer shall be placed to cover the joints of the layer immediately below with an overlap of at least 6 inches.

The Contractor shall exercise caution to insure that all joints between boards are tight during placement and backfilling with only extruded ends placed end to end or edge to edge. Broken or damaged material shall be removed and replaced.

The first layer of material placed over the insulation shall be 12 inches in depth, free of rock or stone fragments measuring 1½ inches or greater. The material shall be placed in such a manner that construction equipment does not operate directly on the insulation and shall be compacted with equipment which exerts a contact pressure of less than 80 psi. The first layer shall be compacted until there is no further visual evidence of increased consolidation or the density of the compacted layer conforms to the density requirements specified.

O. Pipeline Backfilling Operations

All pipeline excavations shall be backfilled to restore pre-existing conditions as the minimum requirement, and fulfill all supplementary requirements indicated in the Plans and Specifications. The backfilling operations shall be started as soon as conditions will permit on each section of pipeline, so as to provide continuity in subsequent operations and restore normal public service as soon as practicable on a section-by-section basis. All operations shall be pursued diligently, with proper and adequate equipment, as will assure acceptable results.

Backfilling shall be accomplished with the use of Suitable Materials selected from the excavated materials to the extent available and practical.

Suitable Material shall be defined as a mineral soil reasonable free of foreign materials (rubbish, debris, etc.), frozen clumps, organic matter, stone, rock, concrete, or bituminous chunks larger than 4", and other unsuitable materials that may damage the pipe installation or prevent thorough compaction, taking into consideration particular needs of different backfill zones. Unsuitable material shall only be utilized where and to the extent there will be no detrimental effects and with the approval of the Engineer.

Backfill materials shall be carefully placed in relatively uniform depth layers spread over the full width and length of the trench section to provide simultaneous support on both sides of the pipeline. Each layer shall be compacted effectively, by approved mechanical methods before placing material for a succeeding layer thereon. Within the pipe bedding/encasement zone compaction shall be in a minimum of three lifts: invert to spring line, spring line to top of pipe, and top of pipe to 1.0 foot over top of pipe. Maximum thickness of any compaction lift shall be 8 inches compacted thickness. Compaction Requirements are: 95% Standard Proctor maximum dry density from the pipe zone to within 3 feet of the ground surface, and 100% Standard Proctor maximum dry density in the final 3 feet.

All surplus or waste materials remaining after completion of the backfilling operations shall be disposed of in an acceptable manner after completing the backfill work. Disposal at any location within the project limits shall be as specified, or as approved in writing by the Engineer; otherwise, disposal shall be accomplished outside the project limits at the Contractor's own dump site.

P. Restoration of Surface Improvements

Wherever any surface improvements such as pavement, curbing, pedestrian walks, fencing or turf have been removed, damaged or otherwise disturbed by the Contractor's operations, they shall be repaired or replaced in kind and structure to the pre-existing condition or better. Each item of

restoration work shall be done as soon as practical after completion of installation and backfilling operations on each section of pipeline.

In the absence of specific payment provisions, as separate bid items, the restoration work shall be compensated for as part of the work required under those bid items which necessitated the destruction and replacement or repair, and there shall be no additional compensation. If separate bid items are provided for restoration work, only that portion of the replacement or repair which was necessitated by the contract work will be measured for payment. Any improvements removed or damaged unnecessarily shall be replaced or repaired at the Contractor's expense.

A proper foundation shall be prepared before reconstructing concrete or bituminous improvements. Unless otherwise directed, granular material shall be placed to a depth of at least four (4) inches under all concrete and bituminous items. No direct compensation will be made for furnishing and placing this material even though such course was not part of the original construction.

Existing concrete and bituminous surfaces at the trench wall shall be sawed or cut with a cutting wheel to form a neat edge in a straight line before surfaces are to be restored. Sawing or cutting may be accomplished as a part of the removal or prior to restoration at the option of the Contractor. However, all surface edges shall be inspected prior to restoration.

Q. Operational Inspection

At the completion of the construction, as part of the punch list preparation, there shall be an operational inspection conducted by the Contractor, in the presence of the Engineer and Owner, to ascertain that the entire facility is in good working order. Specific items to be inspected are that services are marked, off street manholes are marked, castings are centered properly, and when a forcemain is constructed that valve boxes are centered on the valve, valves can be keyed, valves operate smoothly, valves are in the open position, and valves boxes are set to proper grade.

R. Maintenance and Final Cleanup

All subgrade surfaces shall be maintained acceptably until the start of surface construction or restoration work. Additional materials shall be provided and replaced as needed to compensate for trench settlement and to serve until completion of the final surface improvements.

Final disposal of debris, waste materials, and other remains or consequences of construction, shall be accomplished prior to final acceptance of all work. Final acceptance of each bid item can only be made when the cleanup associated with each item is completed. The Engineer may withhold partial payments until such work is satisfactorily pursued or he may deduct the estimated cost of its performance from the partial estimate value.

4000.4 TESTING

A. Construction Testing

Testing for work done in this contract shall be done to assure quality of materials and/or workmanship. Testing shall be at the expense of the Contractor with direct compensation only for items specified as a bid item and all other testing shall be incidental to the construction.

Testing, which includes obtaining the samples, shall be performed and certified by an independent testing laboratory.

The Contractor shall coordinate and order the tests to be performed. The contractor shall notify the Inspector as to the testing time schedule, so that the Inspector can be present to indicate test locations and observe the testing.

The testing shall be done on a daily basis in a timely manner with the progress of the work to insure acceptable construction workmanship. Subsequent work shall not proceed without acceptable test results of the previous work. Testing of embankment or backfill shall occur at the time of placement and compaction. Coming back later to perform testing is unacceptable.

Copies of all test results, either passing or failing, shall be provided to the Engineer. Two copies of test reports shall be sent to the Engineer one copy for the file and one copy to be forwarded to the Inspector for payment approval of associated items. Lack of acceptable test results and documentation is justification to delay payment. Non-compliant test results require corrective action, whether directed by the Engineer or not. Failing test results shall receive no payment for the testing, if so itemized on the bid, and may result in no payment or reduced payment for the associated item.

Test reports shall include the following:

- Project name
- Project number
- Location/Client
- Street name
- Street location per plan stationing
- Offset distance left or right of centerline
- Depth below finish grade and/or elevation
- Results of tests performed.
- Comparison of the test results to the project specifications.
- Conclusion as to meeting or failing to meet the project specifications.
- If failing, retest results to confirm compliance with the project specifications.
- If failing, recommendations for corrective action.
- Certification by a Mn/DOT certified tester or registered professional engineer.

The following minimum testing shall be performed:

Trench Backfill (main line and services)

Standard Proctor	One minimum
In-place Density and Moisture	Upper 3 feet, 1 per 6 inch lift per 1000 LF Below 3 feet, 1 per 12 inch lift per 1000 LF

Granular Material

Gradation	1/2000 TN
Standard Proctor	One minimum
In-place Density and Moisture	1/500 LF

B. Deflection Test

Deflection testing shall be performed on all flexible pipe (PVC) installed for gravity sewer. The test shall be conducted after the final backfill has been in place for at least 30 days. If dewatering was necessary for construction it shall be removed prior to the deflection testing. The Contractor may perform a deflection test prior to removing the dewatering to check his work. However, the final acceptance deflection test must be made without dewatering occurring and after the 30 day waiting period.

The Contractor shall prepare the pipe for deflection testing, cleaning and stringing the lines, prior to requesting the presence of the Engineer to observe the tests.

The deflection test shall be performed using a rigid mandrel with a diameter equal to 95% of the inside diameter of the pipe considering manufacturing allowances. The mandrel diameter, as listed in the table below, must be clearly stamped on it or the mandrel shall be considered unacceptable. The test shall be performed without any mechanical devices. Any pipe exceeding 5% deflection shall be corrected or removed and replaced.

Nominal Pipe Diameter	ASTM 3034		ASTM F 789	
	Base Inside Diameter	Mandrel Diameter	Base Inside Diameter	Mandrel Diameter
6"	5.742"	5.45"		
8"	7.665"	7.28"	7.73"	7.34"
10"	9.563"	9.08"	9.64"	9.15"
12"	11.361"	10.79"	11.46"	10.88"
15"	13.898"	13.20"	14.01"	13.30"

* From Unibell Handbook, Table 69 (1982).

C. Television Inspection

After completion of all gravity sanitary sewer construction, the Contractor shall televise sanitary sewer sections.

The televising camera shall be mounted on a skid so that it is centered in the pipe. The camera shall be equipped with sufficient lights to completely illuminate the interior of the pipe within the range of the camera.

A monitor shall be provided with seating facilities to allow three or more persons to view the picture continuously. The television camera, transmitting equipment, and monitoring equipment shall combine to provide a picture on the monitor screen which is free from distortion and clean enough to distinguish between hairline cracks, "pipe marks", etc.

Within 30 days of the deflection test a recording shall be made of the entire footage of pipe televised, copied onto a DVD and given to the Engineer. The linear footage of pipe televised shall be integrated into the recording for ease of identification of pipe being viewed. A diagram of the project with all televising indexed on it shall be provided in triplicate within five working days following the last day of televising on the project. If televising is interrupted for more than

five days, an interim index diagram shall be furnished. DVD(s) of the entire footage together with a written log of start, stop, wyes, left/right, etc., shall be provided to the Engineer, after televising is completed, of the same quality as the original recording.

D. Sanitary Sewer Leakage Testing

All sanitary sewer lines shall be substantially watertight and shall be tested for excessive leakage upon completion and before service connections are made. Each test section of the sewer shall be subjected to exfiltration testing, by air test method or when approved by the Engineer by hydrostatic method as described below. The requirements set forth for maximum leakage shall be met as a condition for acceptance of the sewer section represented by the test.

All testing shall be performed by the Contractor at his expense without any direct compensation being made therefore, and he shall furnish all necessary equipment and materials, including plugs and standpipes as required.

In the event of test failure on any test section, testing shall be continued until all leakage has been detected and corrected to meet the requirements. All repair work shall be subject to approval of the Engineer. Introduction of sealant substances by means of the test water will not be permitted. Unsatisfactory repairs or test results may result in an order to remove and replace pipe as the Engineer considers necessary for test conformance. All repair and replacement work shall be at the Contractor's expense.

1. Air Test Method: The section of sewer pipe shall be clean, and the pipe may be wetted. Pneumatic balls shall be used to plug each end of the test section at a manhole. The testing gauge shall be located at ground level, out of the manhole, and have dial increments of 0.1 psi or less.

Low pressure air shall be introduced into the line until the gauge pressure reaches 4.0 psi plus the incremental back pressure due to the average height of ground water above the pipe.

The incremental back pressure on the pipe to be added due to the average height of ground water above the pipe shall be determined by dividing the average height by 2.31. The following table summarizes these values for heights of 1-10 feet.

<u>Average Height of Ground Water Table Above Pipe</u>	<u>Incremental Back Pressure to be added to 4.0 psig</u>
1 foot	0.43 psig
2 feet	0.86 psig
3 feet	1.29 psig
4 feet	1.72 psig
5 feet	2.16 psig
6 feet	2.59 psig
7 feet	3.01 psig
8 feet	3.44 psig
9 feet	3.87 psig
10 feet	4.30 psig

The sewer section under test will be accepted as having passed the air leakage test if it does not lose air at a rate to cause the pressure to drop more than 0.4 psi in a time less than or equal to 30 seconds for each inch of pipe diameter (e.g. 30 sec. x 8" dia. = 240 seconds or 4

minutes). Testing must be done in the presence of the Engineer. If the test fails, necessary repairs shall be made and the test performed again until acceptable.

2. Hydrostatic Test Method: After bulkheading the test section, the pipe shall be subjected to a hydrostatic pressure produced by head of water at a depth of three feet above the invert elevation of the sewer at the manhole of the test section. In areas where ground water exists, this head of water shall be three feet above the existing water table. Where permanent air vents are not provided, the Contractor shall furnish and install corporation cocks at the high points as needed for release of air as the line is filled with water. Water for testing is required to be pumped in from a truck and shall be incidental to the testing.

The water head shall be maintained for a period of one hour during which time it will be presumed that full absorption of the pipe body has taken place, and thereafter for an extended period of one hour the water head shall be maintained as the test period. During the one hour test period, the measured water loss within the test section, including service stubs, shall not exceed the Maximum Allowable Volumes given below for the applicable Main Sewer Diameter.

<u>Main Sewer Diameter</u>	<u>Maximum Allowable Loss *</u> <u>(In Gallons Per Hour Per 100 Feet)</u>
6"	0.5
8"	0.6
10"	0.8
12"	1.0
15"	1.2
18"	1.4
21"	1.7
24" & Larger	1.9

* Based on 100 Gallons Per Day Per Inch Per Mile.

If measurement indicates exfiltration within a test section is not greater than the allowable maximum, the section will be accepted as passing the test. Testing must be done in the presence of the Engineer. If the test fails, necessary repairs shall be made and the test performed again until acceptable.

E. Hydrostatic Testing of Forcemains

Forcemains shall be subjected to a pressure test, trace wire test, and if required, a leakage test prior to acceptance. Testing shall be for a 2 hour duration with valves closed.

The Contractor shall furnish the pump, pipe connections, temporary plugs, gauges, water and measuring equipment, and shall perform the testing in the presence of the Engineer. The pressure gauge for the test shall be an Ashcroft Model 1082 with a 4-1/2 inch dial face and 1 psi increments. Where permanent air vents are not provided, the Contractor shall furnish and install corporation cocks at the high points as needed for release of air as the line is filled with water.

Where concrete reaction blocking is placed, the forcemain shall not be subjected to hydrostatic pressure until at least 5 days have elapsed after the concrete placement, with the exception that this period may be reduced to 2 days where high early strength concrete is used.

Any defective joints, pipe fittings, or valves revealed during the testing or before final acceptance of the work shall be satisfactorily corrected and the test repeated until the specified requirements have been met.

1. Pressure Test: The section being tested shall be slowly filled with water and the specified test pressure shall be applied after all air has been expelled from the pipe. A hydrostatic pressure of two times the maximum design pressure, or a minimum of 70 pounds per square inch gauge pressure, measured at the lowest point of elevation, shall be applied by means of a pump connected to the pipe in a satisfactory manner.

The gauge pressure shall be checked after a minimum of two hours. A pressure drop of 1 psi or less over a 2 hour period shall be considered acceptance for the test section. If the pressure drop is greater than 1 psi the Contractor shall investigate the cause and take corrective action. The Contractor must make every effort to expel all air in the test section which may be causing a test failure. This may require the Contractor to tap a corporation at a high point of the main on the top of the pipe to release trapped air. Only if several consecutive tests indicate a consistent pressure drop and only after the Contractor has made numerous attempts to resolve the problem, acceptable to the Engineer, may the Engineer consider the use of the leakage test as acceptance. The leakage test may be performed by the Contractor to determine the magnitude of the leak, however, meeting the leakage allowance shall not automatically be considered acceptance, in lieu of the pressure test, for the section being tested.

2. Leakage Test: After an unsatisfactory pressure test, and if authorized in writing by the Engineer, a leakage test shall be performed on each valved section of forcemain to determine the quantity of water that must be supplied into the section to maintain a test pressure of 150 pounds per square inch, after the air in the pipeline has been expelled and the pipe has been filled with water. The water added shall be recorded to the nearest fluid ounce.

After filling the pipe with water and expelling all air in the line, a pressure of 2 times the maximum design pressure or a minimum of 70 psig measured at the lowest point of elevation shall be applied in the same manner as prescribed for the pressure test, and sufficient water shall be measured and supplied into the pipe section to maintain the pressure for a test duration of 2 hours.

Each pipe section tested will be accepted if the leakage does not exceed the quantity determined by the formula as shown in the table.

$$L = \frac{SD\sqrt{P}}{133,200}$$

L = Maximum permissible leakage in gallons per hour

S = Length of pipe tested

D = Nominal diameter of pipe in inches

P = Average test pressure during the test, in pounds per square inch, gauge pressure

ALLOWABLE LEAKAGE PER 1000 FEET OF PIPE

Gallons Per Hour

Avg. Test Pressure (psi)	Nominal Pipe Diameter									
	<u>4"</u>	<u>6"</u>	<u>8"</u>	<u>10"</u>	<u>12"</u>	<u>14"</u>	<u>16"</u>	<u>18"</u>	<u>20"</u>	<u>24"</u>
200	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55
175	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38
150	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21
125	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01
100	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80
70	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	1.26	1.51

If the pipe section under test contains pipe of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

When requested, the Contractor shall furnish a written report of the results of leakage tests, which shall identify the specific test section, the average pressure, the duration of test, and the amount of leakage.

F. Tracer Wire

Upon completion of the project the Contractor shall furnish a locator and using a low voltage circuit, test the entire tracer wire system in the presence of the Engineer. The test shall consist of a continuous above ground trace of the piping and appurtenances installed. All areas failing the location test shall be corrected at the Contractor's expense. The wire shall be tested in accordance with the requirements of ASTM B-1, B-3, B-8 and D-1248. All wire will be spark tested at 7500 VAC.

4000.5 METHOD OF MEASUREMENT

A. Connect to Existing Sanitary Sewer

Connect to existing sanitary sewer shall be measured separately on a per each basis for each type of connection.

B. Gravity Sewer

Gravity sewer pipe of each type, diameter, and depth category shall be measured separately in linear feet. Measurements shall be made in the horizontal plane along the pipe centerline from center to center of manholes. The depth of pay cut shall be measured from the pipe invert to the proposed finish grade.

C. Forcemain

Forcemain of each size and type shall be measured along the pipe centerline separately in linear feet. No deductions shall be made in length through fittings, clean-outs, and gate valves. Fittings, tracer wire and tracer wire access boxes shall be considered as incidental to the forcemain installation.

D. Manhole

Manholes shall be measured on a unit basis. Each unit shall include the manhole base, invert, barrel sections, cone or flat slab, adjusting rings, frame and cover casting required to construct a total manhole depth from the lowest invert to the top of the casting.

E. Drop Connection

Outside drop and inside drop connections to manholes shall be measured on a unit basis per each assembly for the initial 0 to 2 foot drop from the upper invert to the lower invert.

F. Drop Extra Depth

Drop extra depth shall be measured in linear feet for the additional vertical drop in excess of the initial 2 foot drop.

G. Cleanout

Cleanouts shall be measured on a unit basis including the wye branch, bend, riser and cap assembly.

H. Boring

Boring shall be measured in linear feet as specified on the plans or approved by the Engineer. Measurement shall include the steel casing pipe and the sanitary sewer or forcemain carrier pipe as an assembly.

I. Service Wyes

Service wyes shall be measured on a unit basis for each size.

J. Service Lines

Service lines of each size shall be measured in linear feet which shall include any service riser from the main line upward and from the end of the service at the property line upward.

K. Valves

Valves of each type and size shall be measured on a unit basis which shall include the valve assembly, valve box, valve box adaptor and cover.

L. Air Release Manhole

Air release manholes shall be measured on a unit basis, including the manhole structure, the air release or air/vacuum release valve, gate valve, all piping and the installation.

M. Granular Material

Granular material used as specified shall be measured in tons based on weight tickets collected at the project site by the Inspector on the date of delivery. Weight tickets shall contain the following information:

Project name	Leave time
Project location	Gross weight
Truck number	Tare weight
Date	Net weight

Failure to comply with weight ticket requirements may be considered unacceptable and unauthorized work and subject to the Engineer's determination by the calculated section constructed and/or the material hauled as to the method of measurement and quantity of material used.

N. Insulation

Insulation shall be measured in square feet for the specified thickness.

O. Testing

Testing shall be measured on a unit basis for each type of test as provided for on the bid schedule. Testing which is not itemized on the bid schedule shall be considered incidental. Only tests which indicate that the materials and workmanship meet or exceed the specified requirements shall be considered for payment.

4000.6 BASIS OF PAYMENT

A. Connect to Existing Sanitary Sewer

Connect to existing sanitary sewer shall be paid for at the contract unit price on a per each basis. Payment shall include all material, labor, and equipment to connect to the existing sanitary sewer as indicated on the plans.

B. Gravity Sewer

Gravity sewer pipe shall be paid for at the contract unit price per linear foot for each type, diameter, and depth category. Payment for the excavation and backfilling of the trench and pipe testing shall be included in the payment for the sewer pipe as well as any dewatering, sheeting, or shoring for which separate payment is not provided.

C. Forcemain

Forcemain shall be paid for at the contract unit price per linear foot for each type and size. Payment for trench excavation and backfilling and pipe fittings shall be included in the payment for forcemains as well as any dewatering, sheeting, or shoring for which separate payment is not provided.

D. Manhole

Manholes shall be paid for at the contract unit price per each. Payment shall include all material, labor, and equipment to construct the manhole.

E. Drop Connection

Outside drop and inside drop connections shall be paid for at the contract unit price per each. Payment shall include all material, labor, and equipment to assemble the pipe and fittings, and to construct the drop connection.

F. Drop Extra Depth

Drop extra depth shall be paid for at the contract unit price per linear foot. Payment shall include all material, labor, and equipment to construct the extra depth of the drop connection.

G. Cleanout

Cleanout shall be paid for at the contract unit price per each. Payment shall include all material, labor, and equipment to assemble the pipe and fittings to construct the cleanout.

H. Boring

Boring shall be paid for at the contract unit price per linear foot for each type and size of casing and carrier pipe assembly. Payment shall include all material, labor, and equipment to excavate the boring pit, install the casing, install the carrier pipe, fill the casing pipe with sand, and backfill the excavation.

I. Service Wyes

Service wyes shall be paid for at the contract unit price for each size of service wye required.

J. Service Lines

Service lines shall be paid for at the contract unit price per linear foot for each size and type of service line. Payment shall include all material, labor, and equipment to excavate, install, and backfill the service line and any service riser.

K. Valves

Valves shall be paid for at the contract unit price per each. Payment shall include all material, labor, and equipment to install the valve.

L. Air Release Manhole

Air release manhole shall be paid for at the contract unit price per each.. Payment shall include all material, labor, and equipment to install the air release manhole.

M. Granular Material

Granular material used as specified shall be paid for at the contract unit price per ton. Payment shall include all material, labor, and equipment to haul, place, compact and shape it, and any necessary water for compaction.

N. Insulation

Insulation shall be paid for at the contract unit price per square foot for the specified thickness. Payment shall include all material, labor, and equipment to prepare the trench and install the insulation, and to backfill the insulation without damaging it.

O. Testing

Testing shall be paid for at the contract unit price per each type of test as provided for on the bid schedule. Payment shall include all material, labor, and equipment to sample the material, perform the test, analyze and report the results to be in compliance with the contract requirements.

END OF SECTION 4000

ATTACHMENTS

ASBESTOS AND REGULATED WASTE INSPECTION REPORT

Bridge No. 9582
Interstate 35W
Ramsey County Road H
Former West TCAAP Entrance
Arden Hills, Minnesota
S.P. 6284-162



Prepared For:

Mr. Mark Vogel
Minnesota Department of Transportation
395 John Ireland Boulevard, Mail Stop 620
St. Paul, Minnesota 55155

Prepared By:

Wenck Associates, Inc.
1802 Wooddale Drive, Suite 100
Woodbury, Minnesota 55125

March 2013

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SECTION 1
Site Specifics and Certification
Bridge No. 9582 Ramsey County Rd H (T.C. Arsenal Entrance)
Arden Hills, Minnesota

SP: 6284-162

Bridge #: 9582

Location: Former west entrance to TCAAP, Arden Hills, MN (see copies of site map Appendix II).

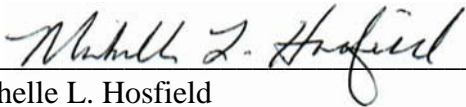
Number and type of Structure/s: One pre-stressed concrete deck with steel girder roadway bridge

Current Owner: State of Minnesota

Expected Disposition of the Structure: Demolition and Replacement

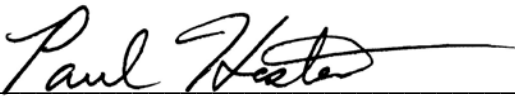
Licensure: MDH certified asbestos inspectors conducted the inspection (Appendix III).

Certification: The undersigned certifies that this asbestos inspection was performed in compliance with MN Rules 4620.3460.

Signature: 
Michelle L. Hosfield
Certified Asbestos Inspector No. AI9036

Date: 3/27/13

Certification: The undersigned certifies that this asbestos and regulated waste inspection and report was performed under my direct supervision and I have reviewed its contents and find it to meet or exceed Mn/DOT's contract requirements.

Signature: 
Paul B. Hester
Certified Hazardous Materials Manager License No. 14429

Date: 3/27/13

SECTION 2
Summary of Actions Required For This Bridge Demolition
Bridge No. 9582 County Road H (T.C. Arsenal Entrance)
Arden Hills, Minnesota

Review Bridge Drawings: As-built drawings were reviewed to identify suspect asbestos containing materials and other regulated materials. These plans include:

- 1963 General Bridge Plan and Elevation for Bridge No. 9582

Suspected asbestos-containing materials (ACM) that were identified on the bridge plans included expansion joints, spacer felt and water proofing.

Asbestos Summary: The roadway of the bridge was inspected for asbestos-containing materials. Suspect ACM expansion joint and caulking material was found on top of the bridge deck and sampled. Suspect ACM electrical insulation and expansion joint felt were found on the bridge abutments and sampled.

The bridge was inspected for the following suspect ACM:

- Caulking and patching on exterior joints
- Electrical conduit Transite piping
- Expansion joints
- Waterproofing

Regulated Waste Summary: See Section 3 for detailed list of regulated materials found on the bridge. **This waste is required to be removed before demolition, if these items are to be disturbed.** These materials should be managed and disposed in accordance with Mn/DOT specifications.

Lead: No lead containing painted surfaces were present on the structure or railings of the bridge. Lead plates were noted between the south railing and the concrete and at the bridge bearings.

Mercury: No mercury containing devices were noted on the bridge.

PCBs: No PCB containing caulking was found on the bridge.

Treated Wood: Treated wood was present in the guardrail approaches of the bridge.

SECTION 3
Summary of all Asbestos and Regulated Wastes at
Bridge No. 9582 Ramsey County Rd H (T.C. Arsenal Entrance)
Arden Hills, Minnesota

If the structure becomes scheduled for demolition rather than a move the following asbestos and regulated materials/wastes must be removed prior to demolition.

Parcel Number	N/A
Structure Name	Bridge No. 9582
Address of Structure	County Road H over Interstate 35W (Former T.C. Arsenal entrance), Arden Hills, MN
Inspection Date	February 14, 2013

Category I and II

Location	Sample Description	% Asbestos	Quantity (ft2)	Item	Condition	Sample #'s	Lab Analysis/COC
<i>None</i>							

Friable

Location	Sample Description	% Asbestos	Quantity (ft2)	Item	Condition	Sample #'s	Lab Analysis/COC
<i>None</i>							

Definitions

Sample Description Type of Homogeneous material i.e. sheetrock, siding,
Condition Excellent
 Good
 Poor
Quantity Only if contains >1% asbestos otherwise NA

**Mn/DOT Building Regulated Waste Inspection
Form**

One Form Per Structure

Company Performing the Inspection	Wenck Associates, Inc.
Company's State Work Order Number	01647
Company Address	1802 Wooddale Drive, Ste. 100, Woodbury, Minnesota 55125
Company Telephone	651-294-4580
Inspectors Name	Michelle Hosfield

Mn/DOT District	Metro District
State Project Number	6284-162
Bridge Number	9582
Bridge Name	Former T.C. Armory Entrance
Address of Structure	County H over Interstate 35, Arden Hills, MN
Inspection Date	February 14, 2013

Inspected Items	Item	Quantity	Location
		(If none found, state "none")	
PCB			
<i>Ballasts</i>	N/A	None	N/A
<i>Transformers</i>	N/A	None	N/A
<i>Caulk</i>	N/A	None	N/A
<i>Caulk</i>	N/A	None	N/A
<i>Other (name)</i>	N/A	None	N/A
Mercury			
<i>Fluorescent Bulbs</i>	N/A	None	N/A
<i>HID Lamps</i>	N/A	None	N/A
<i>Other (name)</i>	N/A	None	N/A
Lead			
<i>Lead Plates</i>	Railing base	30	South Bridge Railing
<i>Lead Plates</i>	Bearing Plates	9	Bridge Piers
<i>Lead paint peeling (Sq Ft)</i>	N/A	None	N/A
<i>Other (name)</i>	N/A	None	N/A
Treated Wood			
<i>Creosote</i>	N/A	None	N/A
<i>Creosote</i>	N/A	None	N/A
<i>CCA (green treat)</i>	Guardrail posts and blocks	50	East and west guardrail approaches
Other	N/A	None	N/A

Appendix I

**Chain of Custody Forms, Analytical Results, and XRF Results
Bridge No. 9582
Arden Hills, Minnesota**

CHAIN OF CUSTODY

EMC Laboratories
 9830 S. 51ST St., Ste B-109
 Phoenix, AZ 85044
 (800) 362-3373 Fax (480) 893-1726

LAB#: 123121
 TAT: 3 days
 Rec'd: FEB 19 P.M.
 EMC USE ONLY

COMPANY NAME: Wenck Associates
1802 Wooddale Drive, Suite 100
Waukegan, MN 55125
 CONTACT: Michelle Hosfield E-MAILED FEB 22 2013
 Phone/Fax: 651-395-5224 / 651-228-1969
 Email: mhosfield@wenck.com

BILL TO: (If Different Location)
Melissa Winterhalter
Wenck
800 Pioneer Creek Ctr.
Maple Plain, MN 55359
mwinterhalter@wenck.com

Now Accepting: **VISA - MASTERCARD** Price Quoted: \$ 6.00 / Sample \$ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. **TURNAROUND TIME:** [4hr rush] [8hr rush] [1-Day] [2-Day] (3-Day) [5-Day] [6-10 Day]

****Prior confirmation of turnaround time is required

****Additional charges for rush analysis (please call marketing department for pricing details)

****Laboratory analysis may be subject to delay if credit terms are not met

2. **TYPE OF ANALYSIS:** (Bulk-PLM) [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]

3. **DISPOSAL INSTRUCTIONS:** (Dispose of samples at EMC) [Return samples to me at my expense]

(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

4. **Project Name:** Bridge 9582, Arden Hills, MN

P.O. Number: _____ Project Number: 0791-30

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No	AIR SAMPLE INFO / COMMENTS		
					ON	OFF	FLOW RATE
<u>1</u>	<u>WIREINS-1</u>	<u>2-14-13</u>	<u>Wire insulation</u>	<u>N</u>			
<u>2</u>	<u>BITFELT-1</u>		<u>Bituminous felt below beams</u>	<u>Y N</u>			
<u>3</u>	<u>BITFELT-2</u>		<u>Bituminous felt between conc. gaps</u>	<u>N</u>			
<u>4</u>	<u>MEM-1</u>		<u>Expansion joint membrane</u>	<u>Y N</u>			
<u>5</u>	<u>MEMBAD-1</u>		<u>Rubber membrane adhesive</u>	<u>Y N</u>			
<u>6</u>	<u>EXPAC-1</u>		<u>Expansion joint caulk compound</u>	<u>Y N</u>			
<u>7</u>	<u>WECAULK-1</u>	<u>✓</u>	<u>White caulk on concrete</u>	<u>N</u>			
				<u>Y N</u>			
				<u>Y N</u>			
				<u>Y N</u>			
				<u>Y N</u>			
				<u>Y N</u>			
				<u>Y N</u>			
				<u>Y N</u>			
				<u>Y N</u>			

SPECIAL INSTRUCTIONS:

Sample Collector: (Print) Michelle Hosfield (Signature) [Signature]
 Relinquished by: [Signature] Date/Time: 2-15-13 Received by: Diana Federsco Date/Time: 2/19/13
 Relinquished by: Diana Federsco Date/Time: 2/19/13 Received by: [Signature] Date/Time: 2-19-13
 Relinquished by: _____ Date/Time: _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0123121

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	WENCK ASSOCIATES, INC.	Job# / P.O. #:	0791-30
Address:	1802 WOODDALE DR, STE 100	Date Received:	02/19/2013
	WOODBURY MN 55125	Date Analyzed:	02/22/2013
Collected:	02/14/2013	Date Reported:	02/22/2013
Project Name:	BRIDGE 9582, ARDEN HILLS, MN	EPA Method:	EPA 600/M4-82-020
Address:		Submitted By:	MICHELLE HOSFIELD
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0123121-001 WIREINS-1		Wire Insulation, Black	No	None Detected	Carbonates Binder/Filler	100%
0123121-002 BITFELT-1		LAYER 1 Bituminous Felt, Lt. Green/ Black	No	None Detected	Cellulose Fiber Carbonates Quartz Binder/Filler	25% 75%
		LAYER 2 Bituminous Felt, Black	No	None Detected	Cellulose Fiber Carbonates Binder/Filler	30% 70%
		LAYER 3 Bituminous Felt, Black	No	None Detected	Cellulose Fiber Carbonates Binder/Filler	30% 70%
0123121-003 BITFELT-2		Bituminous Felt, Lt. Brown/ Black	No	None Detected	Cellulose Fiber Quartz Binder/Filler	30% 70%
0123121-004 MEM-1		Expansion Joint Membrane, Black	No	None Detected	Carbonates Gypsum Binder/Filler	100%
0123121-005 MEMBAD-1		LAYER 1 Rubber Membrane Adhesive, Yellow	No	None Detected	Cellulose Fiber Carbonates Binder/Filler	<1% 99%
		LAYER 2 Rubber Membrane Adhesive, Black	No	None Detected	Cellulose Fiber Carbonates Quartz Binder/Filler	1% 99%
0123121-006 EXP-C-1		Expansion Joint Caulk Compound, Brown	No	None Detected	Cellulose Fiber Quartz Binder/Filler	<1% 99%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0123121

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP#101926-0

Client:	WENCK ASSOCIATES, INC.	Job# / P.O. #:	0791-30
Address:	1802 WOODDALE DR, STE 100	Date Received:	02/19/2013
	WOODBURY MN 55125	Date Analyzed:	02/22/2013
Collected:	02/14/2013	Date Reported:	02/22/2013
Project Name:	BRIDGE 9582, ARDEN HILLS, MN	EPA Method:	EPA 600/M4-82-020
Address:		Submitted By:	MICHELLE HOSFIELD
		Collected By:	

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0123121-007 WCAULK-1		Caulk, White/ Gray	No	None Detected	Cellulose Fiber Carbonates Binder/Filler	1% 99%



Analyst - Johann Hofer



Signatory - Lab Director - Kurt Kettler

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernible layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicated or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. These reports are for the exclusive use of the addressed client and that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of thirty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method for asbestos. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. Polarized Light Microscopy may not be consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials.

February 25, 2013

Mr. Paul Hester
Wenck Associates, Inc.
1802 Wooddale Drive
Suite 100
Woodbury, MN 55125

RE: Project: 0791-30 MnDOT Bridge 9582
Pace Project No.: 10220147

Dear Mr. Hester:

Enclosed are the analytical results for sample(s) received by the laboratory on February 14, 2013. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Diane J. Anderson

diane.anderson@pacelabs.com
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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Page 1 of 9

CERTIFICATIONS

Project: 0791-30 MnDOT Bridge 9582

Pace Project No.: 10220147

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414

A2LA Certification #: 2926.01

Alaska Certification #: UST-078

Alaska Certification #MN00064

Arizona Certification #: AZ-0014

Arkansas Certification #: 88-0680

California Certification #: 01155CA

Colorado Certification #Pace

Connecticut Certification #: PH-0256

EPA Region 8 Certification #: Pace

Florida/NELAP Certification #: E87605

Georgia Certification #: 959

Hawaii Certification #Pace

Idaho Certification #: MN00064

Illinois Certification #: 200011

Kansas Certification #: E-10167

Louisiana Certification #: 03086

Louisiana Certification #: LA080009

Maine Certification #: 2007029

Maryland Certification #: 322

Michigan DEQ Certification #: 9909

Minnesota Certification #: 027-053-137

Mississippi Certification #: Pace

Montana Certification #: MT CERT0092

Nevada Certification #: MN_00064

Nebraska Certification #: Pace

New Jersey Certification #: MN-002

New York Certification #: 11647

North Carolina Certification #: 530

North Dakota Certification #: R-036

North Dakota Certification #: R-036A

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507

Oregon Certification #: MN200001

Oregon Certification #: MN300001

Pennsylvania Certification #: 68-00563

Puerto Rico Certification

Tennessee Certification #: 02818

Texas Certification #: T104704192

Utah Certification #: MN00064

Virginia/DCLS Certification #: 002521

Virginia/VELAP Certification #: 460163

Washington Certification #: C754

West Virginia Certification #: 382

Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

Page 2 of 9

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SAMPLE SUMMARY

Project: 0791-30 MnDOT Bridge 9582

Pace Project No.: 10220147

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10220147001	WCaulk-1	Solid	02/14/13 12:50	02/14/13 13:00
10220147002	EXTC-1	Solid	02/14/13 12:55	02/14/13 13:00

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: 0791-30 MnDOT Bridge 9582

Pace Project No.: 10220147

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10220147001	WCaulk-1	EPA 8082	KL1	11
10220147002	EXTC-1	EPA 8082	KL1	11

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: 0791-30 MnDOT Bridge 9582

Pace Project No.: 10220147

Sample: WCaulk-1 **Lab ID:** 10220147001 Collected: 02/14/13 12:50 Received: 02/14/13 13:00 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB Soxtherm		Analytical Method: EPA 8082 Preparation Method: EPA 3541						
PCB-1016 (Aroclor 1016)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	12674-11-2	
PCB-1221 (Aroclor 1221)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	11104-28-2	
PCB-1232 (Aroclor 1232)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	11141-16-5	
PCB-1242 (Aroclor 1242)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	53469-21-9	
PCB-1248 (Aroclor 1248)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	12672-29-6	
PCB-1254 (Aroclor 1254)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	11097-69-1	
PCB-1260 (Aroclor 1260)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	11096-82-5	
PCB-1262 (Aroclor 1262)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	37324-23-5	
PCB-1268 (Aroclor 1268)	ND ug/kg		198	1	02/15/13 12:47	02/20/13 21:20	11100-14-4	
Surrogates								
Tetrachloro-m-xylene (S)	90 %		36-150	1	02/15/13 12:47	02/20/13 21:20	877-09-8	
Decachlorobiphenyl (S)	72 %		30-150	1	02/15/13 12:47	02/20/13 21:20	2051-24-3	

ANALYTICAL RESULTS

Project: 0791-30 MnDOT Bridge 9582

Pace Project No.: 10220147

Sample: EXTC-1 **Lab ID: 10220147002** Collected: 02/14/13 12:55 Received: 02/14/13 13:00 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8082 GCS PCB Soxtherm		Analytical Method: EPA 8082 Preparation Method: EPA 3541						
PCB-1016 (Aroclor 1016)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	12674-11-2	
PCB-1221 (Aroclor 1221)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	11104-28-2	
PCB-1232 (Aroclor 1232)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	11141-16-5	
PCB-1242 (Aroclor 1242)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	53469-21-9	
PCB-1248 (Aroclor 1248)	87.9	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	12672-29-6	
PCB-1254 (Aroclor 1254)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	11097-69-1	
PCB-1260 (Aroclor 1260)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	11096-82-5	
PCB-1262 (Aroclor 1262)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	37324-23-5	
PCB-1268 (Aroclor 1268)	ND	ug/kg	63.9	1	02/15/13 12:47	02/20/13 21:36	11100-14-4	
Surrogates								
Tetrachloro-m-xylene (S)	80 %		36-150	1	02/15/13 12:47	02/20/13 21:36	877-09-8	
Decachlorobiphenyl (S)	65 %		30-150	1	02/15/13 12:47	02/20/13 21:36	2051-24-3	

QUALITY CONTROL DATA

Project: 0791-30 MnDOT Bridge 9582
Pace Project No.: 10220147

QC Batch: OEXT/20946 Analysis Method: EPA 8082
QC Batch Method: EPA 3541 Analysis Description: 8082 GCS PCB
Associated Lab Samples: 10220147001, 10220147002

METHOD BLANK: 1378787 Matrix: Solid

Associated Lab Samples: 10220147001, 10220147002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1221 (Aroclor 1221)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1232 (Aroclor 1232)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1242 (Aroclor 1242)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1248 (Aroclor 1248)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1254 (Aroclor 1254)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1260 (Aroclor 1260)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1262 (Aroclor 1262)	ug/kg	ND	33.0	02/20/13 20:32	
PCB-1268 (Aroclor 1268)	ug/kg	ND	33.0	02/20/13 20:32	
Decachlorobiphenyl (S)	%	84	30-150	02/20/13 20:32	CL
Tetrachloro-m-xylene (S)	%	84	36-150	02/20/13 20:32	

LABORATORY CONTROL SAMPLE & LCSD: 1378788 1378789

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
PCB-1016 (Aroclor 1016)	ug/kg	667	444	513	67	77	66-125	15	20	
PCB-1260 (Aroclor 1260)	ug/kg	667	530	605	79	91	61-125	13	20	
Decachlorobiphenyl (S)	%				82	70	30-150			CL
Tetrachloro-m-xylene (S)	%				79	90	36-150			

QUALIFIERS

Project: 0791-30 MnDOT Bridge 9582

Pace Project No.: 10220147

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

BATCH QUALIFIERS

Batch: GCSV/10880

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

CL The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased low.

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 0791-30 MnDOT Bridge 9582

Pace Project No.: 10220147

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10220147001	WCaulk-1	EPA 3541	OEXT/20946	EPA 8082	GCSV/10880
10220147002	EXTC-1	EPA 3541	OEXT/20946	EPA 8082	GCSV/10880

10220147

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:	Page: 1 of 1
Company: Wenck Associates	Report To: Paul Hester	Attention: Wenck A/R	1577853
Address: 1802 Wooddale Dr.	Copy To: _____	Company Name: Wenck	REGULATORY AGENCY
Ste. 100, Woodbury, MN		Address: Po Box 249, Maple Plain	
Email To: phester@wenck.com	Purchase Order No.: _____	Pace Quote Reference: _____	<input type="checkbox"/> NPDES <input type="checkbox"/> GROUND WATER <input type="checkbox"/> DRINKING WATER
Phone: 651-294-4520 Fax: 651-228-1969	Project Name: MnDOT Bridge 9582	Pace Project Manager: Diane Anderson	<input type="checkbox"/> UST <input checked="" type="checkbox"/> RCRA <input type="checkbox"/> OTHER _____
Requested Due Date/TAT: Normal	Project Number: 0791-30	Pace Profile #: _____	Site Location STATE: MN

ITEM #	Section D Required Client Information	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED				SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives								Analysis Test ↓	PCBs in caulk	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.						
					COMPOSITE START		COMPOSITE END/GRAB				Unpreserved	H ₂ SO ₄	HNO ₃	HCl	NaOH	Na ₂ S ₂ O ₃	Methanol	Other										
					DATE	TIME	DATE	TIME																				
1	WCAULK-1		GT	G			2-14-13	1250		1	X																	
2	EXTC-1		GT	G			2-14-13	1255		1	X																	
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS		
	<i>Michelle Hester</i>	2-14-13	1300	<i>John Z...</i>	2-14-13	1300	22	N	Y

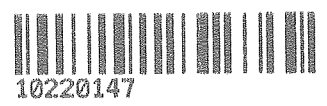
ORIGINAL	SAMPLER NAME AND SIGNATURE				Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	PRINT Name of SAMPLER: <i>Michelle Hester</i>							
	SIGNATURE of SAMPLER: <i>Michelle Hester</i>							

10 of 11

Sample Condition Upon Receipt

Client Name: Wrench

Project #: WO#: 10220147



Courier: Fed Ex UPS USPS Client
 Commercial Pace Other: _____

Tracking Number: _____

Custody Seal on Cooler/Box Present? Yes No **Seals Intact?** Yes No **Optional:** Proj. Due Date: _____ Proj. Name: _____

Packing Material: Bubble Wrap Bubble Bags None Other: _____ **Temp Blank?** Yes No

Thermom. Used: B88A912167504 80512447 72337080 **Type of Ice:** Wet Blue None Samples on Ice, cooling process has begun

Cooler Temp Read (°C): 21.7 **Cooler Temp Corrected (°C):** 22.2 **Biological Tissue Frozen?** Yes No
Temp should be above freezing to 6°C **Correction Factor:** +0.5 **Date and Initials of Person Examining Contents:** 2/14/13

Comments: _____

Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Chain of Custody Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	8.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11.	
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	12.	
-Includes Date/Time/ID/Analysis Matrix: <u>SL</u>			
All containers needing acid/base preservation have been checked? Noncompliances are noted in 13. All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , HCl<2; NaOH>12) Exceptions: VOA, Coliform, TOC, Oil and Grease, WI-DRO (water)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13.	<input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> NaOH <input type="checkbox"/> HCl
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		Sample #
	<input type="checkbox"/> Yes <input type="checkbox"/> No		Initial when completed: _____ Lot # of added preservative: _____
Headspace in VOA Vials (>6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	15.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A		
Pace Trip Blank Lot # (if purchased):			

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ **Date/Time:** _____

Comments/Resolution: Temp OK

Project Manager Review: _____

DW

Date: 2/14/13

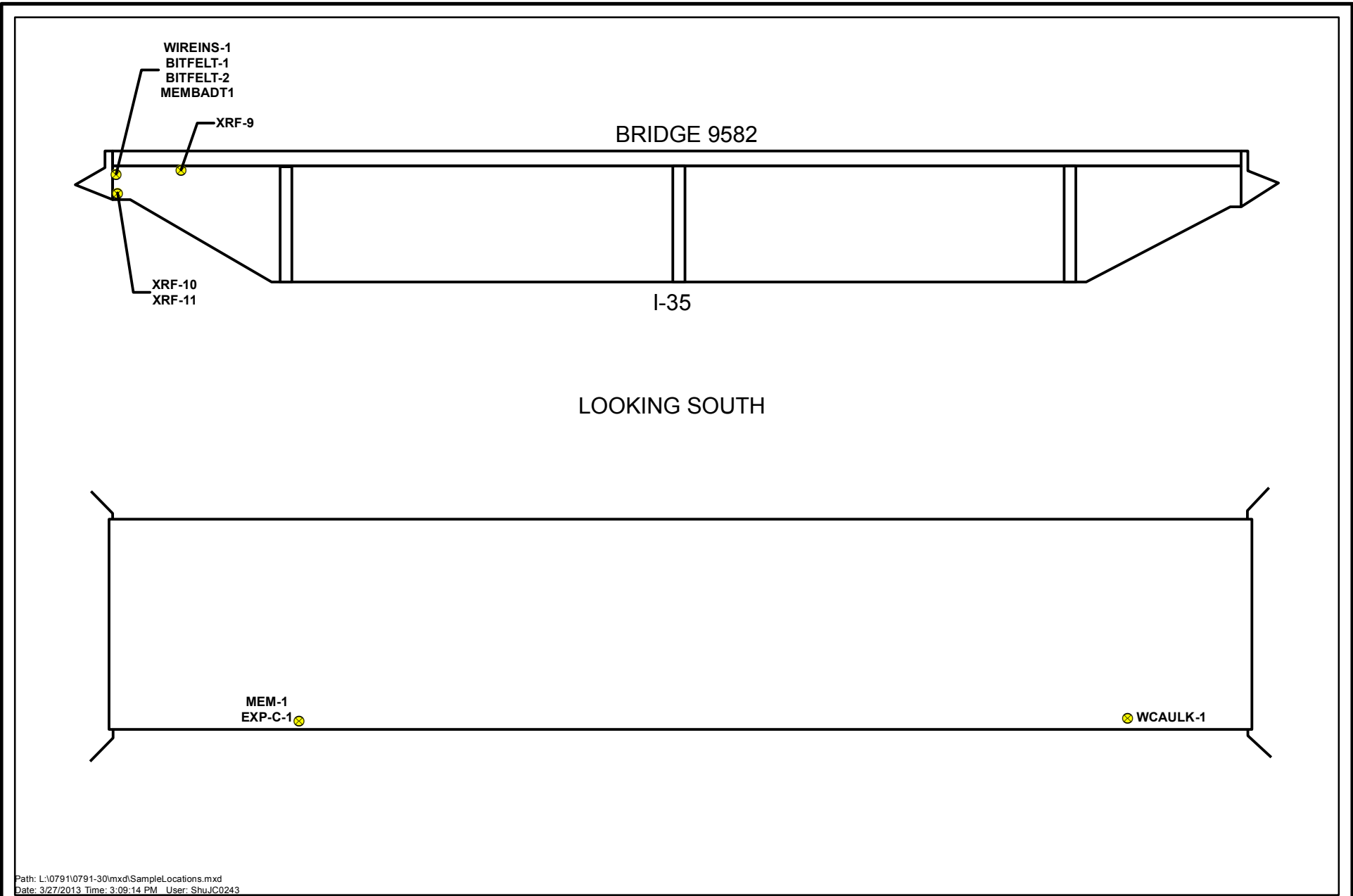
Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

XRF Readings
 Bridge 9582
 Arden Hills, MN
 MNDOT
 Wenck Project #0791-30

Reading No	Time	Type	Duration	Units	Sequence	Site	Inspector	Floor	Room	Res	EScale1	EScleCT	Results	Depth	Index	Action Level	PbC	PbC Error	PbL	PbL Error	PbK	PbK Error	
1	2/14/2013 9:50	SHUTTER_CAL	52.28	cps	Final		MLH			391.02	4.4	2.47					5.85	0	1.16	0	0	0	0
2	2/14/2013 9:52	PAINT	7.36	mg / cm ^2	Final		Calibration						Positive		1.13	1	1.1	0.1	1.1	0.1	< LOD	0.75	
3	2/14/2013 9:53	PAINT	9.29	mg / cm ^2	Final								Positive		1.08	1	1.1	0.1	1.1	0.1	< LOD	0.6	
4	2/14/2013 9:53	PAINT	4.25	mg / cm ^2	Final								Positive		1.15	1	1.2	0.1	1.2	0.1	< LOD	0.9	
5	2/14/2013 9:53	PAINT	1.16	mg / cm ^2	Final								Negative		1	1	< LOD	0.03	< LOD	0.03	< LOD	2.32	
6	2/14/2013 9:54	PAINT	1.16	mg / cm ^2	Final								Negative		1	1	< LOD	0.03	< LOD	0.03	< LOD	2.36	
7	2/14/2013 9:54	PAINT	5.02	mg / cm ^2	Final								Null		1.03	1	1	0.1	1	0.1	< LOD	0.9	
8	2/14/2013 9:54	PAINT	1.17	mg / cm ^2	Final								Negative		1	1	< LOD	0.03	< LOD	0.03	< LOD	2.04	
9	2/14/2013 10:04	PAINT	1.16	mg / cm ^2	Final		Green paint on steel						Negative		1.45	1	< LOD	0.1	< LOD	0.1	< LOD	3.23	
10	2/14/2013 10:04	PAINT	1.16	mg / cm ^2	Final		Green paint on conduit						Negative		1.9	1	< LOD	0.2	< LOD	0.2	< LOD	3	
11	2/14/2013 10:05	PAINT	1.16	mg / cm ^2	Final		Green paint on concrete						Negative		1.87	1	< LOD	0.11	< LOD	0.11	< LOD	3.29	
12	2/14/2013 11:32	PAINT	7.75	mg / cm ^2	Final		Calibration						Positive		1.1	1	1.1	0.1	1.1	0.1	0.8	0.4	
13	2/14/2013 11:33	PAINT	7.76	mg / cm ^2	Final								Positive		1.09	1	1.1	0.1	1.1	0.1	0.9	0.4	
14	2/14/2013 11:33	PAINT	10.84	mg / cm ^2	Final								Positive		1.1	1	1.1	0.1	1.1	0.1	1	0.3	

Appendix II

**Structure Location & Bridge Drawing with Sampling Points
Pictures of Sampling Points
Bridge No. 9582
Arden Hills, Minnesota**



Path: L:\0791\0791-30\mxd\SampleLocations.mxd
Date: 3/27/2013 Time: 3:09:14 PM User: ShuJC0243

MNDOT - BRIDGE 9582 ARDEN HILLS, MN

Sample Locations



Wenck
Engineers - Scientists
Business Professionals
www.wenck.com

1800 Pioneer Creek Center
Maple Plain, MN 55359-0429
1-800-472-2232

MAR 2013

Figure 1



Photo 001: Bridge 9582 Name Plate



Photo 002: Bridge from East



Photo 003: Supports from East



Photo 004: Abandoned cable



Photo 005: Bituminous felt 1 sample

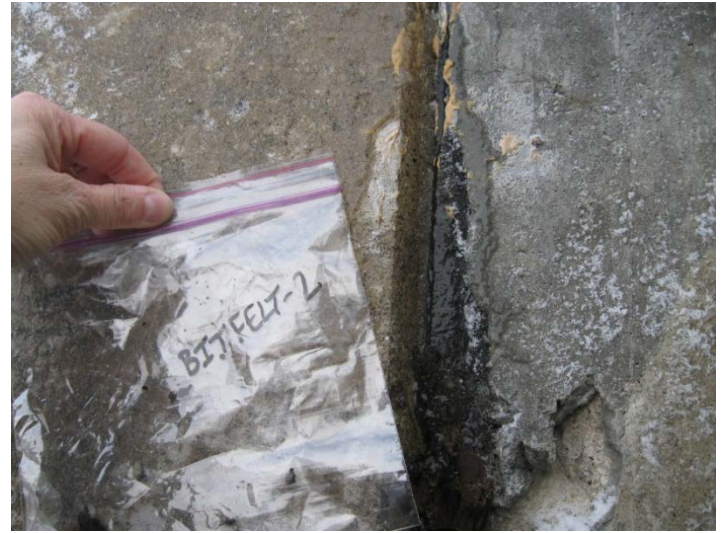


Photo 006: Bituminous felt 2 sample



Photo 007: Bituminous felt sample



Photo 008: Rubber flashing



Photo 009: Abutment membrane



Photo 010: Probing for water proofing



Photo 011: Deck Expansion Joint



Photo 012: Expansion joint membrane



Photo 013: Lead shim under railing



Photo 014: South curb line



Photo 015: South railing base



Photo 016: Northwest caulk

Appendix III

Licenses and Laboratory Accreditation

MDH Inspector(s) License(s)

Copies of Analytical Laboratory Accreditation(s)

Bridge No. 9582

Arden Hills, Minnesota

Certificate No: 5LM09051210IR

Expiration Date: September 5, 2013

This is to certify that

Paul Hester

has attended and successfully completed an

**ASBESTOS INSPECTOR
REFRESHER TRAINING COURSE**

permitted by

the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722

and meets the requirements of

Section 206 of Title II of the Toxic Substances Control Act (TSCA)

conducted by

Lake States Environmental, Ltd.

White Bear Lake, MN on September 5, 2012

Examination Date: September 5, 2012

Lake States Environmental, Ltd
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Paul W. Hester
Training Instructor



MINNESOTA MDH ASBESTOS INSPECTOR
DEPARTMENT OF HEALTH

Certified by:
State of Minnesota
Department of Health
Expires: 09/05/2013

Paul B Hester
3295 147th Street W
Rosemount, MN 55068

Frank B. Bremer
Director, Env. Health Div.

No AI10531 Issued: 09/07/2012



**ASBESTOS
INSPECTOR**

Certified by:

State of Minnesota
Department of Health

Expires: 07/09/2013

Michelle L. Hosfield
11886 Narcissus St NW
Coon Rapids, MN 55433

Judith S. Baumer
Director, Env. Health Div.

No AI9036

Issued: 07/24/2012

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 101926-0

EMC Labs, Inc.
Phoenix, AZ

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

BULK ASBESTOS FIBER ANALYSIS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).*

2010-07-01 through 2011-06-30

Effective dates



Sally S. Bruce
For the National Institute of Standards and Technology



4325 Pheasant Ridge Drive #611 | Blaine, MN 55449
 Phone (763) 398-3070 | Fax (763) 398-3088

For Office Use Only

Permit App. #: _____

Date Received: _____

Amount/Payer: _____

Check Number: _____

Permit Application Form

Project Information

Project Name: _____

Project Location: _____

City or Township: _____ County: _____

Quarter: _____ Section: _____ Township: _____ N Range: _____ W

Project Purpose: _____

Area of Land Disturbance: _____ acres Area of New and/or Reconstructed Impervious Surface: _____ acres

Contact Information

(All contacts will receive permit status updates)

Applicant (must sign application on reverse):

Name: _____

Address: _____ Company: _____

City: _____ Phone: _____

State: _____ Zip: _____ Email: _____

Permitting Contact (engineer, architect, etc.):

Name: _____

Address: _____ Company: _____

City: _____ Phone: _____

State: _____ Zip: _____ Email: _____

Other Permitting Contact:

Name: _____

Address: _____ Company: _____

City: _____ Phone: _____

State: _____ Zip: _____ Email: _____

Permit Fee

(Check all that apply)

- Rule C (Stormwater Management Plans):**
- Single Lot, Single Family Residential Development**
- Home, accessory structure, driveway \$150
- All Other Development**
- < 1 acre impervious surface \$1000
 - 1 to 2.5 acres impervious surface \$2,000
 - >2.5 to 5 acres impervious surface \$3,500
 - > 5 acres impervious surface \$5,000 + \$1,000/ac >5*
- * Capped at \$10,000, round down to the nearest whole acre
- Rule D (Erosion Control Plans):**
- < 2.5 acres of land disturbance \$100
 - 2.5 to 10 acres of land disturbance \$250
 - > 10 acres of land disturbance \$500
- Rule E (Floodplain Alteration):**
- No mitigation required \$0
 - Mitigation required \$100

- Rule F (Wetland Alteration):**
- Exemption \$250
 - < 1 acre of mitigation required \$875
 - 1 to 5 acres of mitigation required \$1,750
 - > 5 to 10 acres of mitigation required \$3,500
 - > 10 acres of mitigation required \$5,250
 - Banking Plan \$1,750
- Rule G (Bridge, Culvert & Utility Crossings):**
- All projects \$500
- Rule I (Drainage Systems):**
- Public Ditch Alteration Plan \$2250
- Rule J (Appropriation of Public Waters):**
- All RCWD regulated appropriations \$0
- Rule L (Variances):**
- See District Permit Variance Guidance Policy

*NOTE: Permit fee is the cumulative total of all individual aspects of a project checked above. **Government entities are exempt from permit fees.***

Total Permit Fee: \$ _____

Submittal Requirements

Complete applications (all materials for each applicable District Rule) must be submitted 50 calendar days prior to the regular Board of Managers meeting for applications involving wetlands/Wetland Conservation Act or 40 calendar days prior to the regular Board of Managers meeting for those not involving wetlands/Wetland Conservation Act. Permits are generally considered at the regular Board of Managers meeting on the fourth Wednesday of each month (check District website for exact meeting dates and permit application schedules). Applicants must submit one (1) full size copy and either one (1) reduced size copy or an electronic copy of all required information. See District website for complete rules or contact the office for a printed copy. Projects involving a Wetland Replacement Plan have special noticing requirements and require the submittal of seven (7) copies of all wetland-related submittal materials.

Applicant Signature

"I understand that, as the permittee, I am legally accountable to ensure compliance with terms and conditions of the permit. I understand that I am not authorized to begin the project until I receive the permit and the permit sign is posted on site. If the project is modified, I will obtain approval by the Rice Creek Watershed District before I continue with the project. I authorize the District, and its agents, employees, officers and contractors, to enter the project to perform any inspections, compliance work, or other work authorized by the permit or any applicable law."

"I certify that I have thoroughly read and understand the above information."

Beth Engum
Signature of permittee or designated agent
(No agents without a letter of authority)

12/21/15
Date

Beth Engum
Print signer's name

Successful Bidder *(For public projects only)*

Successful Bidder Signature

"I understand that, as the successful bidder, I am legally accountable to ensure compliance with terms and conditions of the permit. I understand that I am not authorized to begin the project until I receive the permit and the permit sign is posted on site. If the project is modified, I will obtain approval by the Rice Creek Watershed District before I continue with the project. I authorize the District, and its agents, employees, officers and contractors, to enter the project to perform any inspections, compliance work, or other work authorized by the permit or any applicable law."

"I certify that I have thoroughly read and understand the above information."

Signature of successful bidder or designated agent
(No agents without a letter of authority)

Date

Print signer's name

Company: _____

Address: _____

City: _____

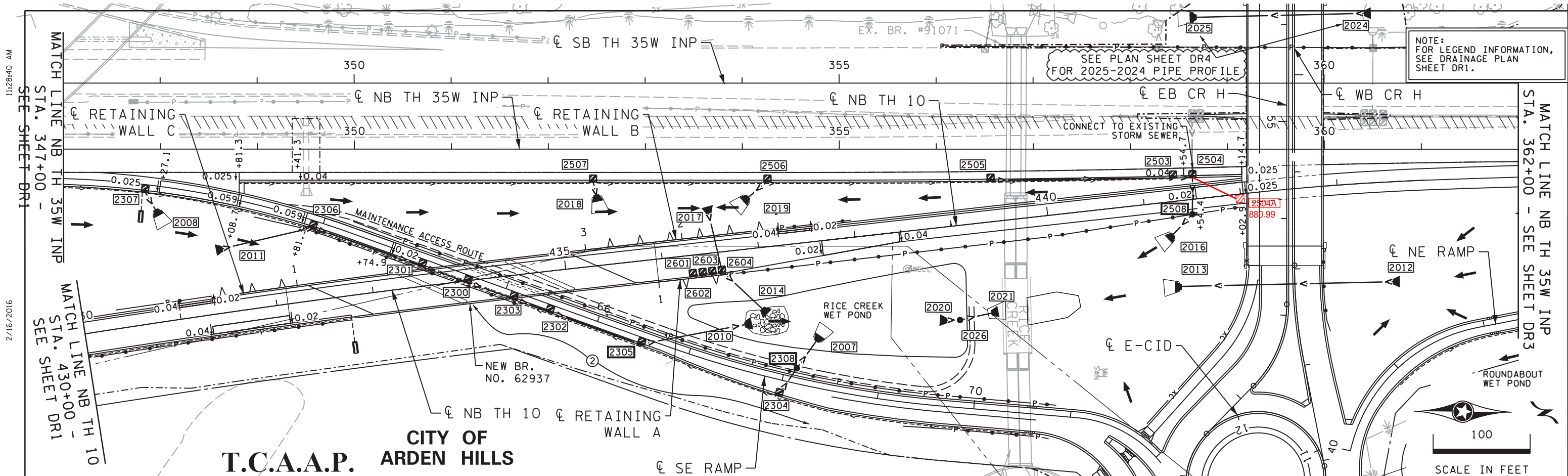
State: _____ Zip: _____

Phone: _____

Fax: _____

Email: _____

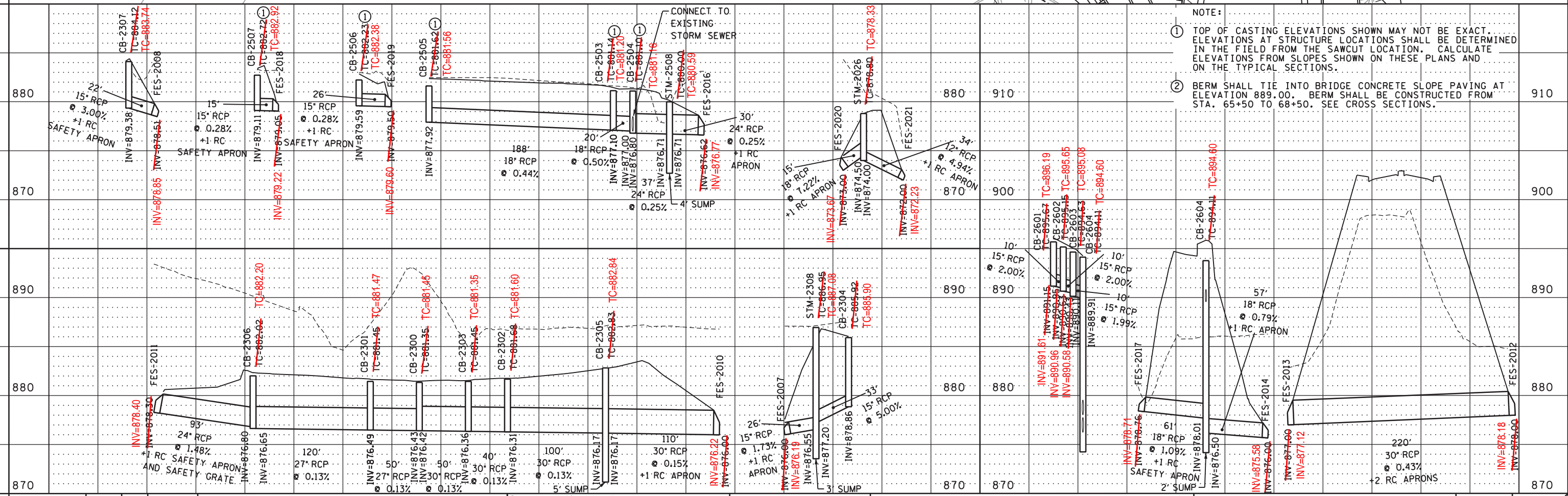
Anticipated Bid Date:
February 26 2016



T.C.A.A.P. CITY OF ARDEN HILLS

NOTE: FOR LEGEND INFORMATION, SEE DRAINAGE PLAN SHEET DR1.

SEE PLAN SHEET DR4 FOR 2025-2024 PIPE PROFILE



NOTE:
 ① TOP OF CASTING ELEVATIONS SHOWN MAY NOT BE EXACT. ELEVATIONS AT STRUCTURE LOCATIONS SHALL BE DETERMINED IN THE FIELD FROM THE SAWCUT LOCATION. CALCULATE ELEVATIONS FROM SLOPES SHOWN ON THESE PLANS AND ON THE TYPICAL SECTIONS.
 ② BERM SHALL TIE INTO BRIDGE CONCRETE SLOPE PAVING AT ELEVATION 889.00. BERM SHALL BE CONSTRUCTED FROM STA. 65+50 TO 68+50. SEE CROSS SECTIONS.

S:\PT\Ramsey\129594_5-final-dsgn\51-const-dwgs-CAD\40-TransHwy\plnshts\CH6284162_dr01.dgn
 DR2

NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: **RACHEL E. PICHELMANN** Lic. No. 51315
 Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016

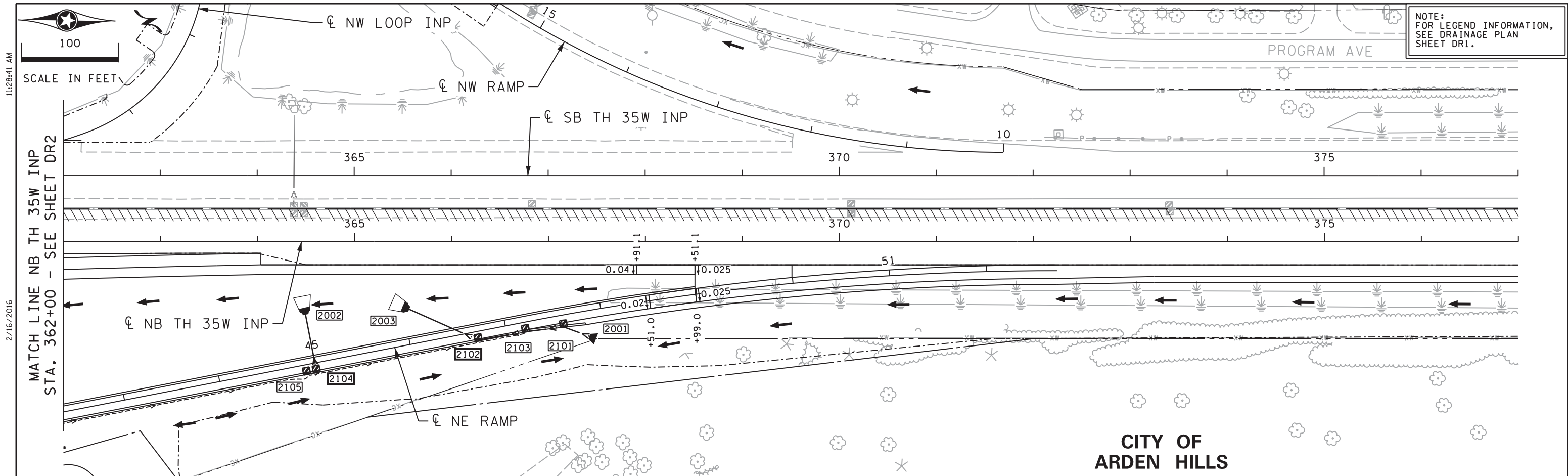


RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

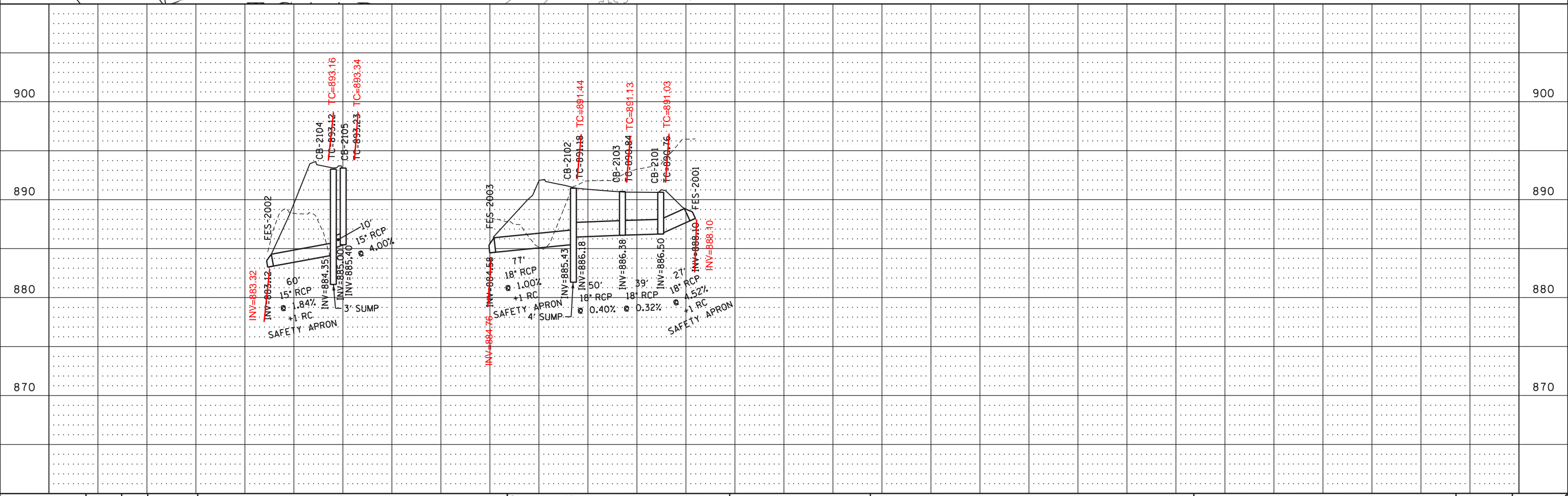
SUPERELEVATION & DRAINAGE
PLAN AND PROFILE
 NB TH 35W INP STA. 347+00 - 362+00
 NB TH 10 STA. 430+00 - 442+01

FILE NO. **RAMSEI29594**
DR2
 OF DR9

245
367



CITY OF
ARDEN HILLS



DESIGN TEAM			
DRAWN BY:	CIF		
DESIGNER:	REP		
CHECKED BY:	REP		

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: RACHEL E. PICHELMANN Lic. No. 51315
 Printed Name: RACHEL E. PICHELMANN Date: 2/16/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

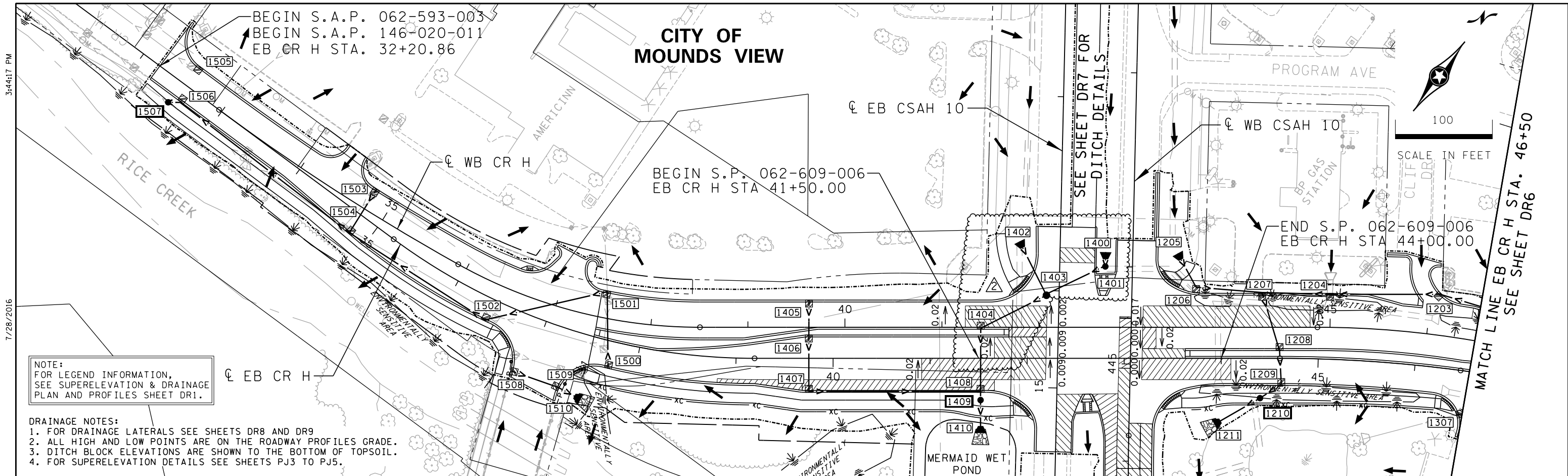
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 PLAN AND PROFILE**
 NB TH 35W INP STA. 362+00 - 392+00

FILE NO. RAMSEI29594	246
DR3 OF DR9	367

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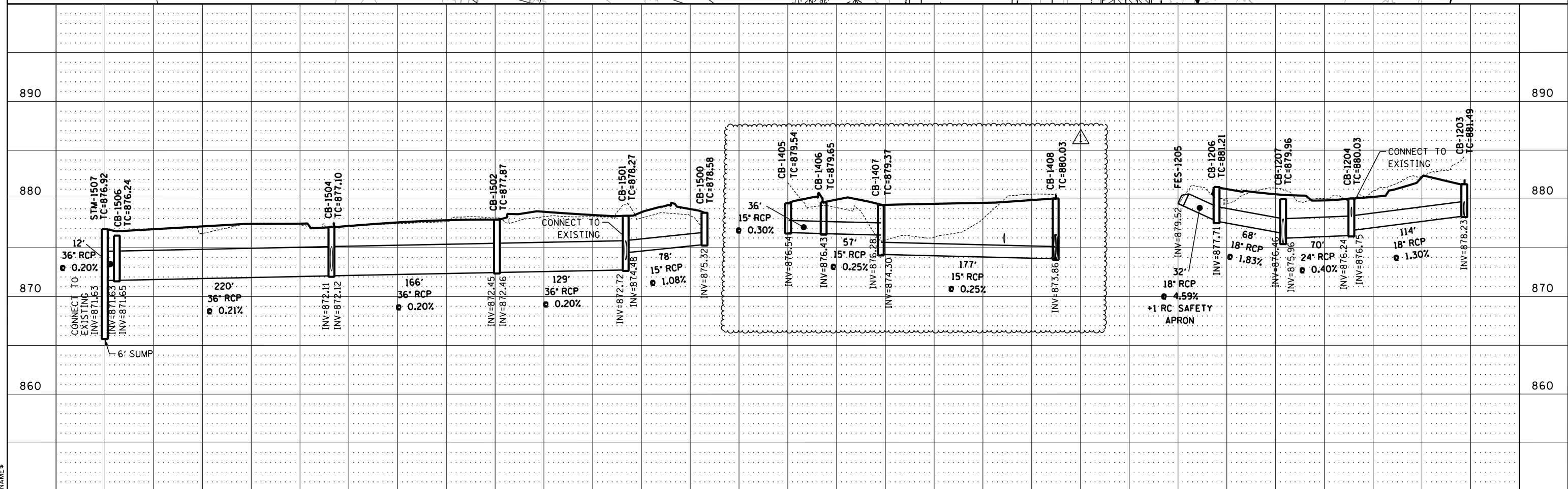
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2/16/2016



NOTE:
FOR LEGEND INFORMATION,
SEE SUPERELEVATION & DRAINAGE
PLAN AND PROFILES SHEET DR1.

- DRAINAGE NOTES:
1. FOR DRAINAGE LATERALS SEE SHEETS DR8 AND DR9
 2. ALL HIGH AND LOW POINTS ARE ON THE ROADWAY PROFILES GRADE.
 3. DITCH BLOCK ELEVATIONS ARE SHOWN TO THE BOTTOM OF TOPSOIL.
 4. FOR SUPERELEVATION DETAILS SEE SHEETS PJ3 TO PJ5.



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\$MODELNAME\$

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DRAWN BY:	GDK	GDK	07/28/16	REVISED PIPE RUN FES-1400 TO CB-1408 DUE TO UTILITY CONFLICT
DESIGNER:	NMG			
CHECKED BY:	WCK			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
Printed Name: NICOLE GULICK, P.E. Date: 7/28/2016



RAMSEY COUNTY, MINNESOTA
TH 35W / COUNTY ROAD H
S.P. NO. 6284-162 (TH35W),
S.P. 062-609-006, S.A.P. 062-593-003

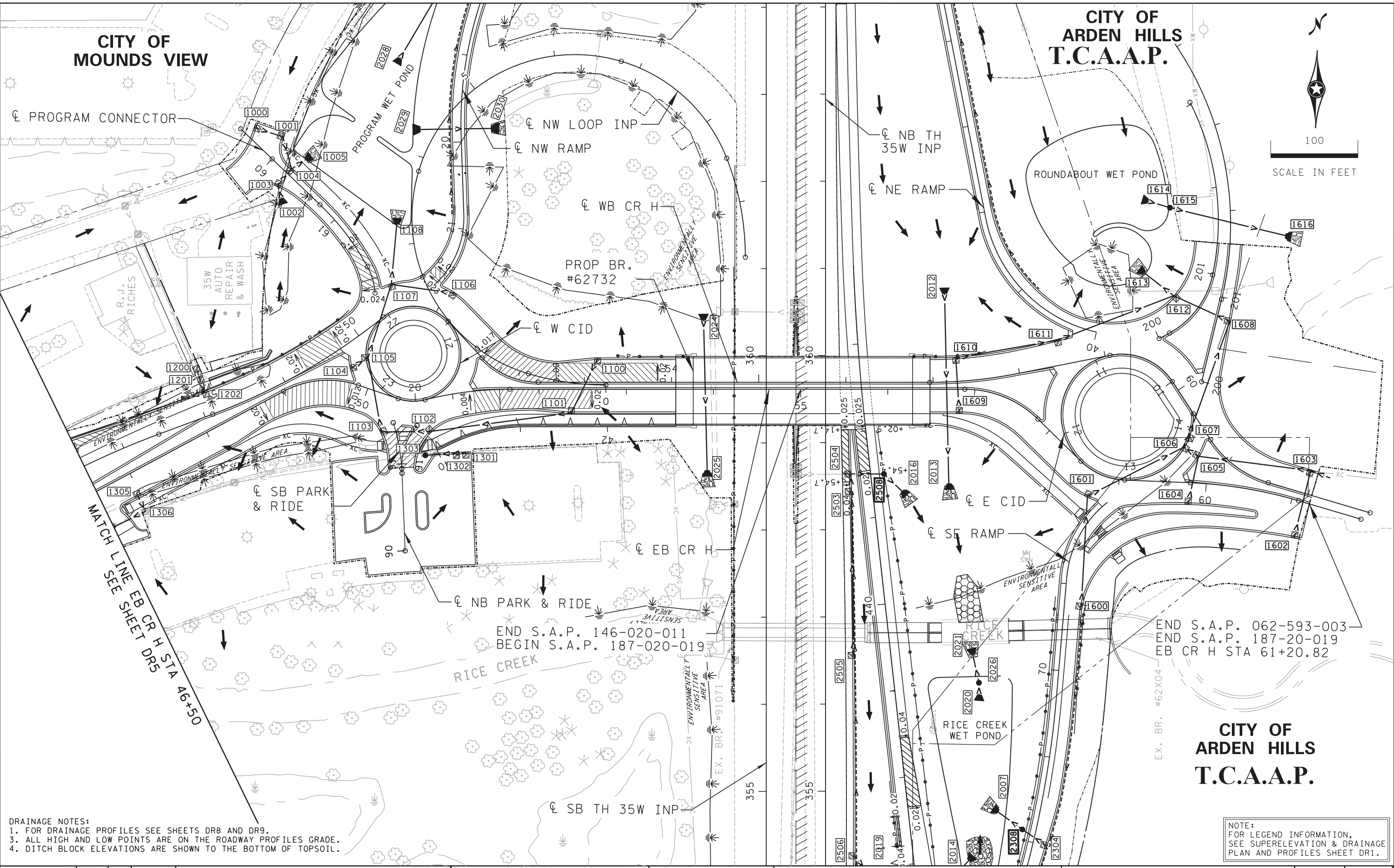
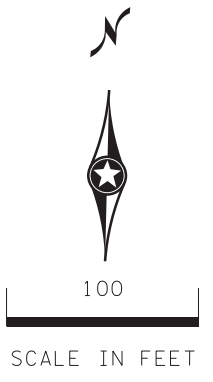
**SUPERELEVATION & DRAINAGE
PLAN AND PROFILES**
EB CR H STA. 32+20 - 46+50

FILE NO. RAMSEI29594	248
DR5 OF DR9	367

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 \$MODELNAME\$

CITY OF MOUNDS VIEW

**CITY OF ARDEN HILLS
T.C.A.A.P.**



DRAINAGE NOTES:
 1. FOR DRAINAGE PROFILES SEE SHEETS DR8 AND DR9.
 2. ALL HIGH AND LOW POINTS ARE ON THE ROADWAY PROFILES GRADE.
 3. ALL HIGH AND LOW POINTS ARE ON THE ROADWAY PROFILES GRADE.
 4. DITCH BLOCK ELEVATIONS ARE SHOWN TO THE BOTTOM OF TOPSOIL.

END S.A.P. 062-593-003
 END S.A.P. 187-20-019
 EB CR H STA 61+20.82

**CITY OF ARDEN HILLS
T.C.A.A.P.**

NOTE:
 FOR LEGEND INFORMATION,
 SEE SUPERELEVATION & DRAINAGE
 PLAN AND PROFILES SHEET DR1.

DESIGN TEAM				
DRAWN BY:	GDK			
DESIGNER:	NMG			
CHECKED BY:	WCK			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 2/15/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

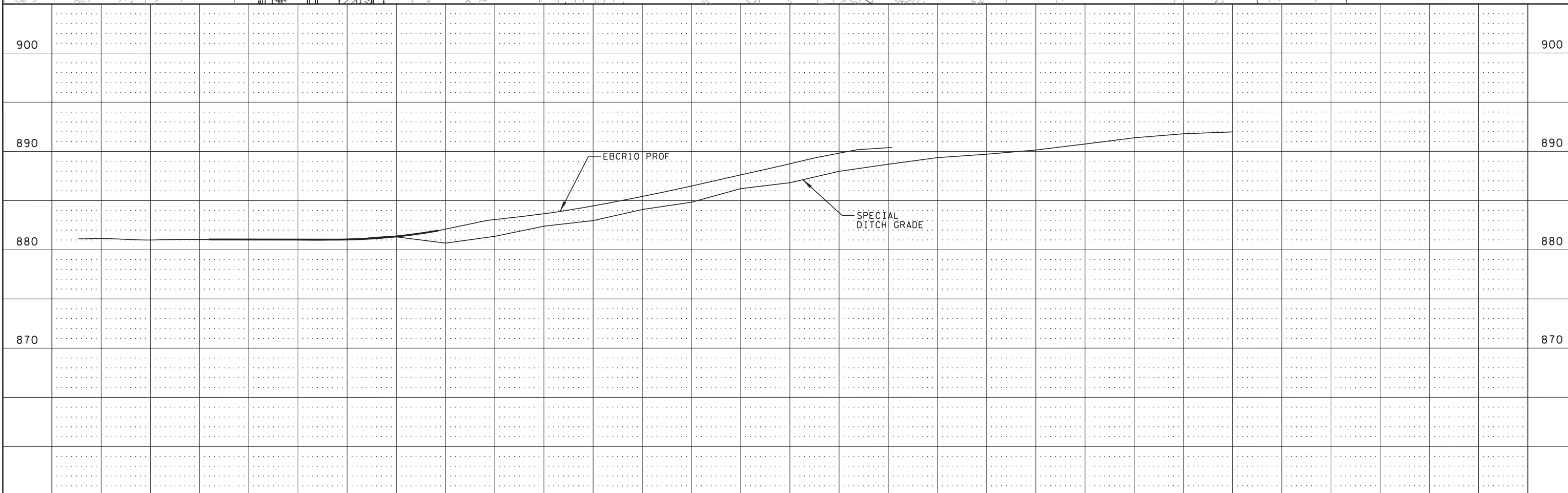
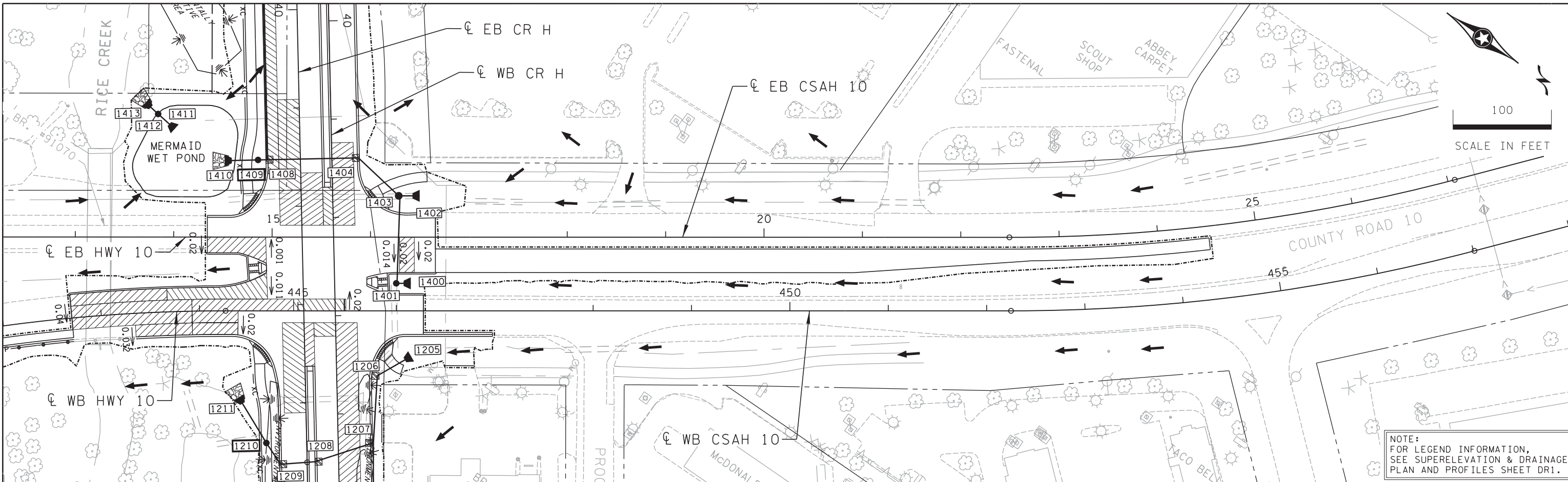
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 PLAN AND PROFILES**
 EB CR H STA. 46+50 - 61+21

FILE NO. RAMSEI29594	249
DR6 OF DR9	367

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12/29/2015

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DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

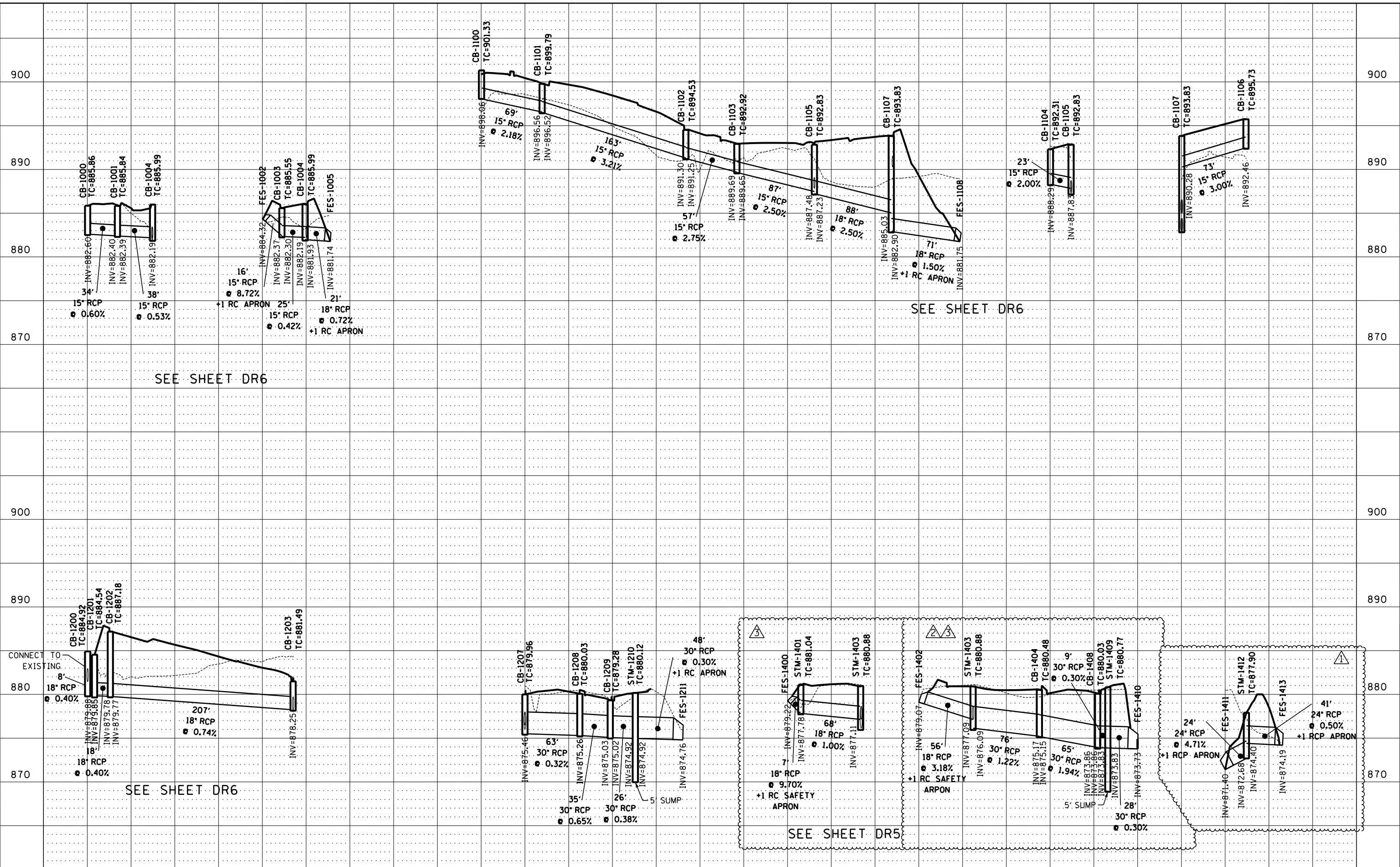
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 12/29/2015



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SUPERELEVATION & DRAINAGE PLAN AND PROFILES		FILE NO. RAMSEI29594	250
WB CSAH 10 STA. 441+00 - 455+00		DR7 OF DR9	367



SEE SHEET DR6

SEE SHEET DR6

SEE SHEET DR6

SEE SHEET DR5

DESIGN TEAM	1	GDK	6/21/16	REVISED PIPE RUN FES 1411 THROUGH FES 1413 DUE TO POND GRADING	
DRAWN BY:	GDK	2	GDK	7/13/16	REVISED PIPE RUN CB-1404 THROUGH FES-1410 DUE TO UTILITY CONFLICT
DESIGNER:	NMG	3	GDK	7/28/16	REVISED PIPE RUN FES-1400 THRU FES-1410 DUE TO UTILITY CONFLICT
CHECKED BY:	WCK				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

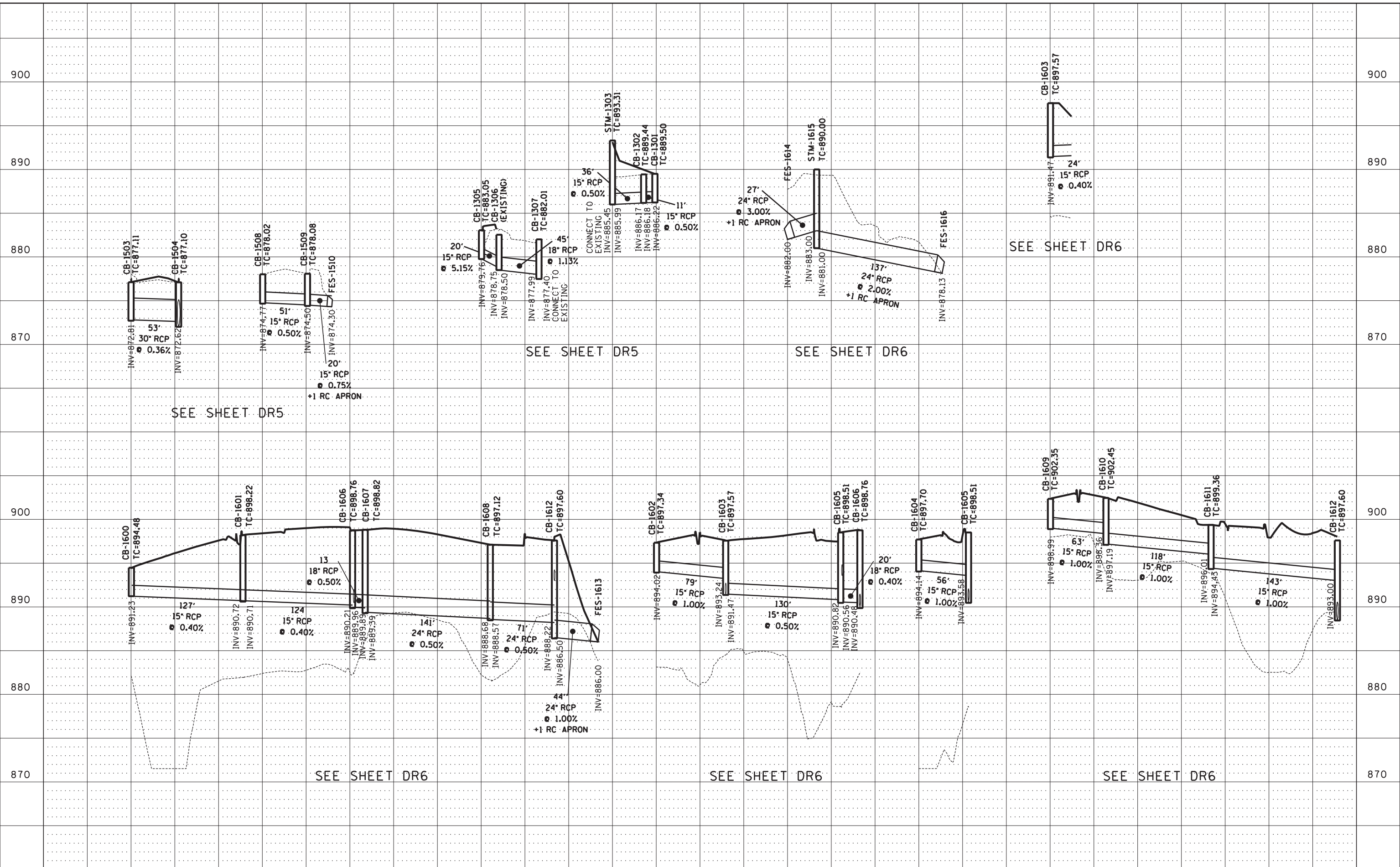
Certified By: *Nicole Gulick* Lic. No. 45642
 Licensed Professional Engineer
 Printed Name: NICOLE GULICK, P.E. Date: 7/28/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

**SUPERELEVATION & DRAINAGE
 PLAN AND PROFILES**
 DRAINAGE PROFILES

FILE NO. RAMSEI29594	251
DR8 OF DR9	367



DESIGN TEAM			
DRAWN BY:	GDK		
DESIGNER:	NMG		
CHECKED BY:	WCK		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
 Certified By: *Nicole Gulick* Lic. No. 45642
 Printed Name: NICOLE GULICK, P.E. Date: 1/26/2016



RAMSEY COUNTY, MINNESOTA
 TH 35W / COUNTY ROAD H
 S.P. NO. 6284-162 (TH35W),
 S.P. 062-609-006, S.A.P. 062-593-003

SUPERELEVATION & DRAINAGE
 PLAN AND PROFILES
 DRAINAGE PROFILES

FILE NO. RAMSEI29594	252
DR9 OF DR9	367