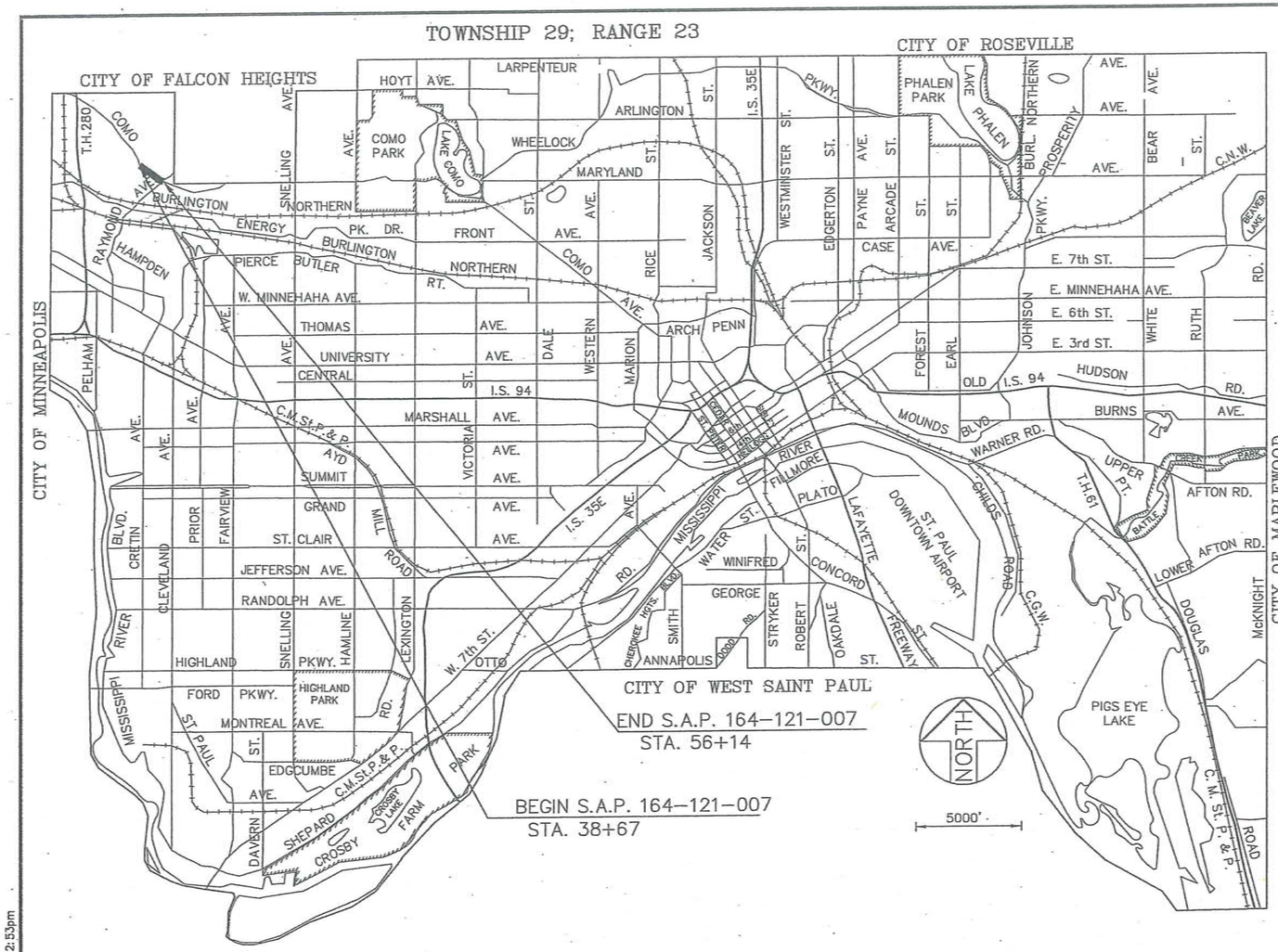

MINNESOTA DEPT. OF TRANSPORTATION
CITY OF ST. PAUL
Department of Public Works

AS BUILT
Mike Vanheuselcom
Inspector

CONSTRUCTION PLAN
for
GRADING, CURB AND GUTTER, BITUMINOUS PAVING,
STREET LIGHTING, STORM SEWER, STRIPING AND SIGNING
on

COMO AVENUE

from
RAYMOND/CLEVELAND AVE TO COMMONWEALTH AVENUE

S.A.P. NO. 164–121–007

CITY PROJECT NO. 17–P–8171

GROSS LENGTH	1747	FEET	0.331	MILES
BRIDGES LENGTH	0.00	FEET	0.000	MILES
EXCEPTIONS LENGTH	0.00	FEET	0.000	MILES
NET LENGTH	1747	FEET	0.331	MILES

COMO AVENUE
DESIGN DESIGNATION

PRESENT ADT (2017)	7140
PROJECTED ADT (2037)	7140
FUNCTIONAL CLASSIFICATION:	Arterial
NO. OF TRAFFIC LANES	2
NO. OF PARKING LANES	1
R VALUE	10
ΣN18 FACTOR	2,250,891
DESIGN LOAD (TON)	9
DESIGN SPEED (MPH)	30
STOPPING SIGHT DISTANCE BASED ON:	3.5' HEIGHT OF EYE & 2.0' HEIGHT OF OBJECT

PLAN SHEET INDEX

1. TITLE SHEET
2. LEGEND AND PLAN SHEET LOCATION MAP
3. STATEMENT OF ESTIMATED QUANTITIES
4. STAGING PLAN
5–6. EXISTING SEWER CHART/SEWER CONSTRUCT CHART
7. TYPICAL SECTIONS
8. EROSION AND SEDIMENT CONTROL PLAN
9–11. STANDARD DETAIL PLATES AND CONSTRUCTION DETAILS
12–18. PED RAMP DETAILS
19–21. PAVING PLANS
ST1–ST8. STRIPING PLANS
LT1–LT7. LIGHTING PLANS
SS1.–SS10. TRAFFIC SIGNAL PLANS
S1.–S3. RRFB AT COMO AND KNAPP

THIS PLAN CONTAINS 49 SHEETS

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY 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.

SPECIFICATIONS

THE 2016 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO THE LATEST EDITION OF THE MMUTCD, INCLUDING THE LATEST "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS"

APPROVED ..... DANIEL A. HAAK ..... DATE 3/8/17
City of St. Paul Manager Street Engineering/Construction Division

APPROVED ..... Paul Kurtz ..... DATE 3/8/17
Saint Paul City Engineer

APPROVED ..... DATE .....
Ramsey County Engineer

RECOMMENDED FOR APPROVAL ..... DATE .....
District State Aid Engineer: Reviewed for Compliance with State Aid Rules/Policy

RECOMMENDED FOR APPROVAL ..... DATE .....
Approved for State Aid funding ; State Aid Engineer

DESIGNED	CBH	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS
DRAWN	ASO	Signature: Barbara R. Mundahl Date: 3/8/17	COMO AVENUE
APPROVED	BRM	BARBARA R. MUNDAHL Lic. No. 43099	

PROJECT:	17–P–8171	STATE AID PROJECT NUMBER:	164–121–007
DRAWER:	12	CAD NAME:	PROJECTS/CURRENT/COMO/COMO–TITLE
DWG. NO.	1596	DATE: 3/8/2017	SHEET NO. 1 OF 21 SHEETS

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EXISTING & REMOVAL LEGEND

- EXISTING CURB & GUTTER
- EXISTING CURB
- EXISTING WALK
- WATER FITTING
- HYDRANT
- UTILITY POLE
- LIGHT STANDARD
- TRAFFIC SIGNAL
- PULLBOX
- UTILITY MANHOLE
- EXISTING MANHOLE (NO. REFERS TO EXISTING SEWER CHART)
- EXISTING CATCH BASIN (NO. REFERS TO EXISTING SEWER CHART)
- EXISTING SIDE INLET
- EXISTING SEWER
- EXISTING PIPE OR C.B. LEAD, CONSTR. 8" BRICK BULKHEAD
- EXISTING UTILITY GATE VALVE
- EXISTING WATER VALVE
- EXISTING WATER MAIN
- EXISTING GAS MAIN
- EXISTING CONDUIT (L=LIGHTING, T=TELEPHONE, E=ELECTRIC, T.S.=TRAFFIC SIGNAL, F.O.=FIBER OPTIC)
- EXISTING TREE (NO. REFERS TO SIZE)
- REMOVE CONCRETE CURB AND GUTTER
- REMOVE CONCRETE CURB OR SANDSTONE CURB
- SALVAGE GRANITE CURB
- REMOVE CONCRETE WALK
- REMOVE CONCRETE DRIVE
- REMOVE TREE (NO. REFERS TO SIZE)
- REMOVE STUMP
- REMOVE PAVEMENT OR TRENCH PAVEMENT
- REMOVE CONCRETE STEPS
- MILL BITUMINOUS SURFACE

- (A) ASPHALT DRIVE
- (C) CONCRETE DRIVE
- (D) DIRT DRIVE
- (G) GRAVEL DRIVE
- (B) BRICK DRIVE

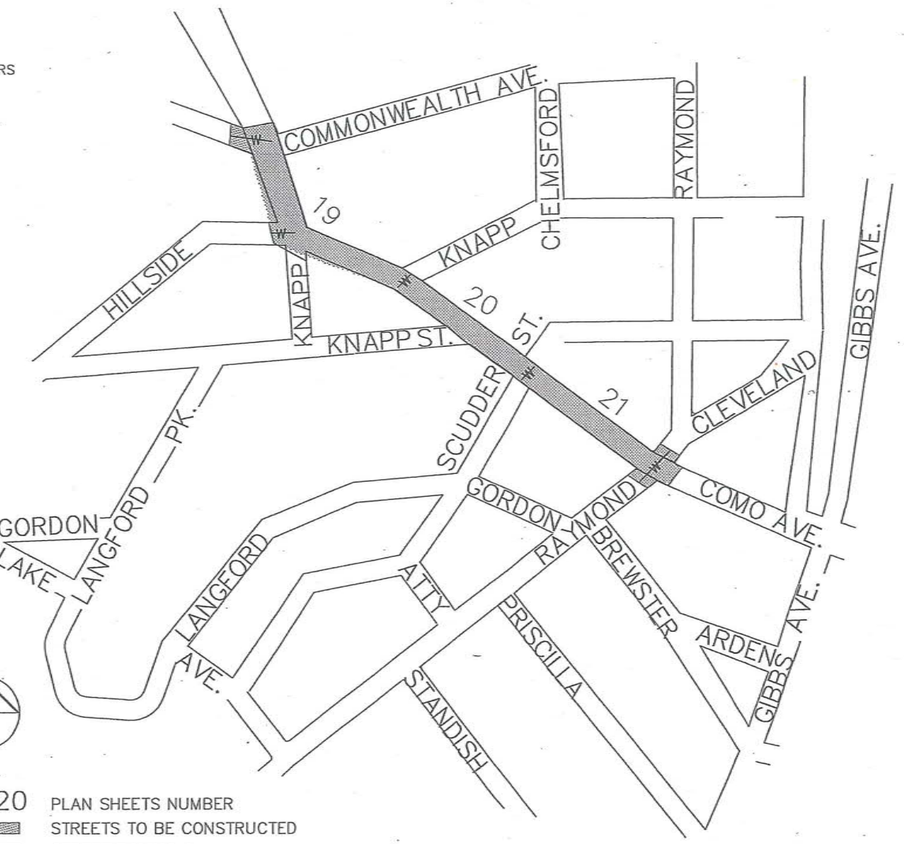
CONSTRUCTION LEGEND

- CONSTRUCT PAVEMENT (SEE TYPICAL SECTIONS)
- BITUMINOUS OVERLAY
- PAVEMENT OR TRENCH PAVEMENT RESTORATION
- CONSTRUCT CURB OR CURB & GUTTER (SEE TYPICAL SECTION FOR TYPE)
- CONSTRUCT CURB & GUTTER (SEE TYPICAL SECTION FOR TYPE)
- ADJUST MANHOLE (NO. REFERS TO EXISTING SEWER CHART)
- ADJUST UTILITY MANHOLE
- CONSTRUCT CONCRETE WALK (4" THICK MAINLINE WALK AND OUTWALKS) (6" THICK IN PEDESTRIAN RAMP AREAS)
- CONSTRUCT CONCRETE DRIVEWAY PAVEMENT (TYPE 6) 6" THICK UNLESS OTHERWISE NOTED.
- ADJUST WATER GATE VALVE HOUSING
- PEDESTRIAN CURB RAMP – "R" INDICATES LOCATION OF TRUNCATED DOMES
- CONSTRUCT CATCH BASIN (NO. REFERS TO SEWER CONST. CHART)
- CONSTRUCT CATCH BASIN LEAD (15" DIA. UNLESS OTHERWISE NOTED)
- NEW MANHOLE– TYPE AS NOTED (NO. REFERS TO SEWER CONST. CHART)
- NEW TYPE IV OR IV–A MANHOLE MANHOLE (NO. REFERS TO SEWER CONST. CHART)
- CONSTRUCT POSSIBLE SANITARY SERVICE RECONNECTION
- LEAD WATER SERVICE
- WATER MAIN REDUCER
- PROVIDE TREE PROTECTION

NOTES

1. WATER, GAS, ELECTRIC, TELEPHONE COMMUNICATION, SEWER AND T.V. CABLE LINES SHOWN ON THE DRAWINGS AND CROSS–SECTIONS ARE PLOTTED FROM THE BEST INFORMATION AVAILABLE AT THE TIME OF PLAN PREPARATION, BUT MAY NOT REFLECT ACTUAL LOCATIONS OR ELEVATIONS. THE CONTRACTOR SHALL VERIFY LOCATIONS OF ALL UTILITIES BEFORE BEGINNING CONSTRUCTION WHICH MAY BE AFFECTED BY A UTILITY CONFLICT. THE CONTRACTOR SHALL GIVE 48 HOURS NOTICE TO THE OWNERS OF ALL KNOWN UTILITIES BEFORE STARTING ANY OPERATIONS AFFECTING THOSE PROPERTIES, OR BEGINNING EXCAVATION IN THE VICINITY OF THOSE PROPERTIES. THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 1507 IN THE STANDARD SPECIFICATIONS.
2. ALL CURB RADII 20 FEET UNLESS OTHERWISE NOTED.
3. CONSTRUCT A 3 FOOT CONCRETE OUTWALK AT EACH RESIDENCE OR AS DIRECTED BY THE ENGINEER.
4. WHERE EXISTING UTILITIES ARE IN CONFLICT WITH SEWER CONSTRUCTION, THE UTILITY COMPANY WILL RELOCATE, OFFSET OR SUPPORT THE UTILITY UNLESS OTHERWISE INDICATED ON THE PLAN SHEET OR STATED IN THE SPECIAL PROVISIONS.
5. WHERE EXISTING FIRE HYDRANTS AND/OR LIGHT STANDARDS CONFLICT WITH SEWER CONSTRUCTION, THEY WILL BE RELOCATED BY OTHERS.
6. GAS MAINS SHOWN ON THE PLAN SHEETS ARE EXISTING MAINS. IN CONJUNCTION WITH THIS SEWER AND PAVING PROJECT, XCEL MAY ABANDON SOME OF THE GAS MAINS IN THE AREA AND CONSTRUCT NEW MAINS IN THE SIDEWALK AREA.
7. SOIL CLASSIFICATION SHOWN ON SOIL BORINGS IS ACCORDING TO A.S.T.M. DESIGNATION D2487 "STANDARD TEST METHOD FOR CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES".
8. ALL CONCRETE WALK IN QUADRANT AREAS AT THE CORNERS OF INTERSECTIONS SHALL BE 6" THICK.
9. RECORDS INDICATE THERE ARE PROPERTY IRONS AT THE BLOCK CORNERS IN THE PROJECT AREA. DO NOT DISTURB THESE IRONS WHEN REMOVING CONCRETE PANELS. IF REMOVED, REPLACEMENT BY A LICENSED SURVEYOR, AT THE CONTRACTOR'S EXPENSE.

AS BUILT



18–20 PLAN SHEETS NUMBER
STREETS TO BE CONSTRUCTED
STREET PAVING & WATER MAIN REPLACEMENT

LEGEND
LOCATION AREA MAP

NOTE –
LOCATIONS FOR WATER DISTRIBUTION SYSTEM BID ITEMS UNDER 2504.602, 2504.603, AND 2504.604 ARE NOT COMPLETELY SHOWN ON PLANS – WORK SHALL BE DIRECTED IN THE FIELD BY SAINT PAUL REGIONAL WATER SERVICES WITH PAYMENT MADE AT THE CONTRACT BID PRICE FOR THE APPROPRIATE BID ITEM

SAINT PAUL	DESIGNED	ASO	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS	PROJECT: 17–P–8171	STATE AID PROJECT NUMBER: 164–121–007	
	DRAWN	ASO	Signature: Barbara R. Mundahl Date: 3/6/2017	COMO AVENUE	DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/LEGEND	
	APPROVED	BRM	BARBARA R. MUNDAHL Lic. No. 43099		DWG. NO. 1596	DATE: 3/6/2017	SHEET NO. 2 OF 21 SHEETS

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ITEM NO.	ITEM	UNIT	P-1419 PAVING QUANTITY	164-121-007 T. SIGNALS QUANTITY	SEWER QUANTITY	WATER QUANTITY	TOTAL QUANTITY
2013.602	COORDINATION OF SURVEY MONUMENT RESETTING	EACH	3				3
2021.501	MOBILIZATION	LUMP SUM	0.912	0.013	0.039	0.036	1.000
2101.502	CLEARING	TREE	6				6
2101.507	GRUBBING	TREE	11				11
2101.602	TREE ROOT REMOVAL	TREE	10				10
2101.602	WOOD CHIP DISPOSAL	TREE	11				11
2104.501	REMOVE CONCRETE CURB OR CURB & GUTTER	LIN. FT.	3848				3,848
2104.501	REMOVE GUIDE RAIL	LIN. FT.	125				125
2104.503	REMOVE CONCRETE WALK	SQ. FT.	19658			75	19,733
2104.505	REMOVE PAVEMENT	SQ. YD.	10200				10,200
2104.505	REMOVE CONCRETE DRIVEWAY PAVEMENT	SQ. YD.	144				144
2104.509	REMOVE CATCH BASIN OR MANHOLE	EACH	18				18
2104.509	REMOVE SERVICE CABINET	EACH	1				1
2104.509	REMOVE HANDHOLE	EACH	3				3
2104.509	REMOVE LIGHT UNIT	EACH	12				12
2104.509	REMOVE LIGHTING FOUNDATION	EACH	14				14
2104.509	REMOVE SIGNAL SYSTEM	EACH		1			1
2104.509	REMOVE SIGN TYPE C	EACH	9				9
2104.509	REMOVE SIGN PANEL TYPE C	EACH	20				20
2104.523	SALVAGE SIGN TYPE C	EACH	12				12
2104.523	SALVAGE SIGN PANEL TYPE C	EACH	10				10
2104.523	SALVAGE LIGHTING UNIT	EACH	2				2
2104.601	REMOVE LIGHTING CONDUCTOR	LUMP SUM	1				1
2104.603	SAWING PAVEMENT.	LIN. FT.	650				650
2105.501	COMMON EXCAVATION (P)	CU. YD.	4244				4,244
2105.507	SUBGRADE EXCAVATION	CU. YD.	3436				3,436
2104.618	REMOVE STREETCAR TRACKS	SQ.FT.	31446				31,446
2105.609	GRANULAR BORROW	TON	1495				1,495
2118.501	AGGREGATE SURFACING, CLASS 5	TON	146				146
2123.610	STREET SWEEPING	HOUR	400				400
2130.501	WATER	M GAL.	150				150
2211.503	AGGREGATE BASE PLACED (C.V.), CLASS 5 (P)	CU. YD.	6800				6,800
2301.602	DRILL AND GROUT REINFORCEMENT BAR (EPOXY COATED)	EACH	20				20
2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GALLON	1042				1,042
2360.501	TYPE SPWEA 340F WEARING COURSE MIXTURE	TON	2500				2,500
2360.502	TYPE SPNWB 330B NON-WEARING COURSE MIXTURE	TON	1875				1,875
2360.503	TYPE SPWEA 340F WEARING COURSE MIXTURE, 3" THICK	SQ.YD	100				100
2451.609	GRANULAR BACKFILL	TON				898	898
2503.511	12" C -900 SEWER PIPE	LIN. FT.	100				100
2503.541	15" R.C. PIPE SEWER, DESIGN 3006, CLASS V	LIN. FT.	515				515
2503.541	18" R.C. PIPE SEWER, DESIGN 3006, CLASS V	LIN. FT.	71				71
2503.602	CONNECT TO EXISTING STRUCTURE	EACH	13				13
2503.602	SANITARY SEWER SERVICE REPAIR EXCAVATION 14' OR LESS IN DEPTH AT	EACH			4		4
2503.602	SANITARY SEWER SERVICE REPAIR EXCAVATION GREATER THAN 14' IN	EACH			4		4
2503.603	SANITARY SEWER SERVICE REPAIR 14' OR LESS IN DEPTH AT MAIN	LIN. FT.			108		108
2503.603	SANITARY SEWER SERVICE REPAIR GREATER THAN 14' IN DEPTH AT MAIN	LIN. FT.			108		108
2503.603	SANITARY SEWER SERVICE RECONNECTION	LN.FT				30	30
2503.603	TELEVISE PROJECT SANITARY SEWER	LIN. FT.			1,747		1,747
2504.602	ADJUST VALVE BOX	EACH	21				21
2504.602	REPLACE VALAVE BOX	EACH				2	2
2504.602	WATER UTULTY HOLE	EACH				14	14
2504.602	EXCAVATION FOR WATER MAIN OFFSET TRENCH/REPLACEMENT TRENCH	EACH				1	1
2504.602	SERVICE STOP BOX	EACH				8	8
2504.602	ADJUST SERVICE RE STOP BOX	EACH				2	2
2504.602	REPAIR VALVE BOX	EACH				6	6
2504.603	WATER MAIN TRENCH	LN.FT				260	260
2504.603	WATER SERVICE EXCAVATION	LN.FT				30	30
2504.604	2" INSULATION	SQ. YD.				14	14
2506.502	RECONSTRUCT BRICK MANHOLE - 6 FT. DEPTH	EACH			16		16
2506.516	CASTING ASSEMBLY	EACH			16		16
2506.602	ADJUST MANHOLE CASTING ASSEMBLY, 0" TO 6"	EACH	8				8
2506.602	ADJUST MANHOLE CASTING ASSEMBLY, 7" TO 17"	EACH	8				8
2506.602	CONSTRUCT DIVERSION MANHOLE	EACH	1				1
2506.602	CONSTRUCT SAFL BAFFLE MANHOLE	EACH	1				1
2506.602	CONSTRUCT MANHOLE, DESIGN TYPE V	EACH	1				1
2506.602	CONSTRUCT CATCH BASIN, DESIGN TYPE 7B	EACH	18				18
2521.501	4" CONCRETE WALK	SQ. FT.	17659			75	17,734
2521.501	6" CONCRETE WALK	SQ. FT.	4681				4,681
2531.501	CONCRETE CURB & GUTTER, DESIGN B-624	LIN. FT.	3816				3,816
2531.501	CONCRETE CURB & GUTTER, DESIGN B-612	LIN. FT.	114				114
2531.507	6" CONCRETE DRIVEWAY PAVEMENT	SQ. YD.	113				113

ITEM NO.	ITEM	UNIT	P-1419 PAVING QUANTITY	164-121-007 T. SIGNALS QUANTITY	SEWER QUANTITY	WATER QUANTITY	TOTAL QUANTITY
2531.507	8" CONCRETE DRIVEWAY PAVEMENT	SQ. YD.	67				67
2531.603	HAND FORM CONCRETE CURB	LIN. FT.	400				400
2531.603	HAND FORM CONCRETE CURB, DESIGN V 1" TO 8"	LIN. FT.	200				200
2531.603	HAND FORM CONCRETE CURB, DESIGN V 8" TO 24"	LIN. FT.	100				100
2531.618	TRUNCATED DOMES	SQ.FT.	430				430
2540.602	BICYCLE RACK	EACH	3				3
2545.511	LIGHT POLE TYPE L14	EACH	18				18
2545.513	LUMINAIRE TYPE R150 EQ LED	EACH	18				18
2545.515	LIGHT POLE FOUNDATION	EACH	20				20
2545.521	2" RIGID STEEL CONDUIT	LIN. FT.	10				10
2545.523	1-1/2" NMC	LIN. FT.	2436				2,436
2545.523	1-1/2" NMC TRENCH & RESTORE/PUSH	LIN. FT.	543				543
2545.531	1C #6 AWG	LIN. FT.	10284				10,284
2545.531	1C #8 AWG INSULATED	LIN. FT.	3428				3,428
2545.541	METERED SERVICE CABINET	EACH	1				1
2545.553	HANDHOLE TYPE L	EACH	3				3
2545.602	INSTALL LIGHTING UNIT	EACH	2				2
2545.602	METERED ELECTRICAL SERVICE - POLE MOUNTED	EACH	1				1
2554.602	FLARED END TREATMENT	EACH	3				3
2554.603	GUARD RAIL	LIN. FT.	100				100
2563.601	TRAFFIC CONTROL	LUMP SUM	0.912	0.013	0.039	0.036	1.000
2563.601	TEMPORARY PEDESTRIAN ACCESS CONTROL	LUMP SUM	1.000				1.000
2564.531	SIGN PANEL TYPE D	SQ. FT.	83	83			166
2564.531	SIGN PANEL TYPE C	SQ. FT.	114	83			197
2564.536	INSTALL SIGN PANEL TYPE C	EACH	10				10
2564.537	INSTALL SIGN TYPE C	EACH	12				12
2564.602	INSTALL SIGN COLLAR	EACH	2				2
2564.602	F & I SIGN POST	EACH	7				7
2564.602	F.& I SIGN POST- SPECIAL (ROUND)	EACH	2				2
2564.618	F & I SIGN PANEL TYPE C	SQ.FT	65				65
2565.511	TRAFFIC CONTROL SIGNAL SYSTEM	SYS		1			1
2565.601	TRAFFIC CONTROL INTERCONNECT	LUMP SUM		1			1
2565.616	FLASHING BEACON SYSTEM	SYS.	1				1
2571.602	TREE PROTECTION	EACH	9				9
2573.530	STORM DRAIN INLET PROTECTION	EACH	29				29
2573.533	SEDIMENT CONTROL LOGS	LIN.FT.	300				300
2573.602	INTERIM SEDIMENT CONTROL FOR CATCH BASINS	EACH	18				18
2574.525	TOPSOIL BORROW (L.V.)	CU. YD.	421				421
2575.505	SODDING, TYPE LAWN	SQ. YD.	2912				2,912
2575.560	HYDRAULIC SOIL STABILIZER, TYPE 5	POUND	500				500
2582.501	PAVEMENT MESSAGE - PREF TAPE - INLAY	SQ.FT.	383				383
2582.502	4" SOLID LINE - PREF TAPE - INLAY	LIN.FT.	3850				3,850
2582.502	4" DOUBLE SOLID LINE - PREF TAPE - INLAY	LIN.FT.	1360				1,360
2582.502	4" DOTTED LINE PREF TAPE - INLAY	LIN.FT.	270				270
2582.502	4" BROKEN LINE - PREF TYPE - INLAY	LIN.FT.	15				15
2582.502	12" SOLID LINE - PREF TYPE - INLAY	LIN.FT.	30				30
2582.502	24" SOLID LINE - PREF TYPE - INLAY	LIN.FT.	120				120
2582.503	CROSSWALK - PREF TAPE - INLAY	SQ.FT.	1020				1,020
2582.618	PAVEMENT MARKING SPECIAL- SOLID GREEN PREF THERMOPLASTIC	SQ.FT.	467				467

AS BUILT

STATEMENT OF ESTIMATED QUANTITIES

DESIGNED	BRM	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
DRAWN	ASO	Signature: Barbara R. Mundahl — Date: 3/13/2017
APPROVED	BRM	BARBARA R. MUNDAHL — Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT:	17-P-8171	STATE AID PROJECT NUMBER:	164-121-007
DRAWER:	12	CAD NAME:	PROJECTS/CURRENT/COMO/COMO-ESTIMATE
DWG. NO.	1596	DATE: 3/13/2017	SHEET NO. 3 OF 21 SHEETS

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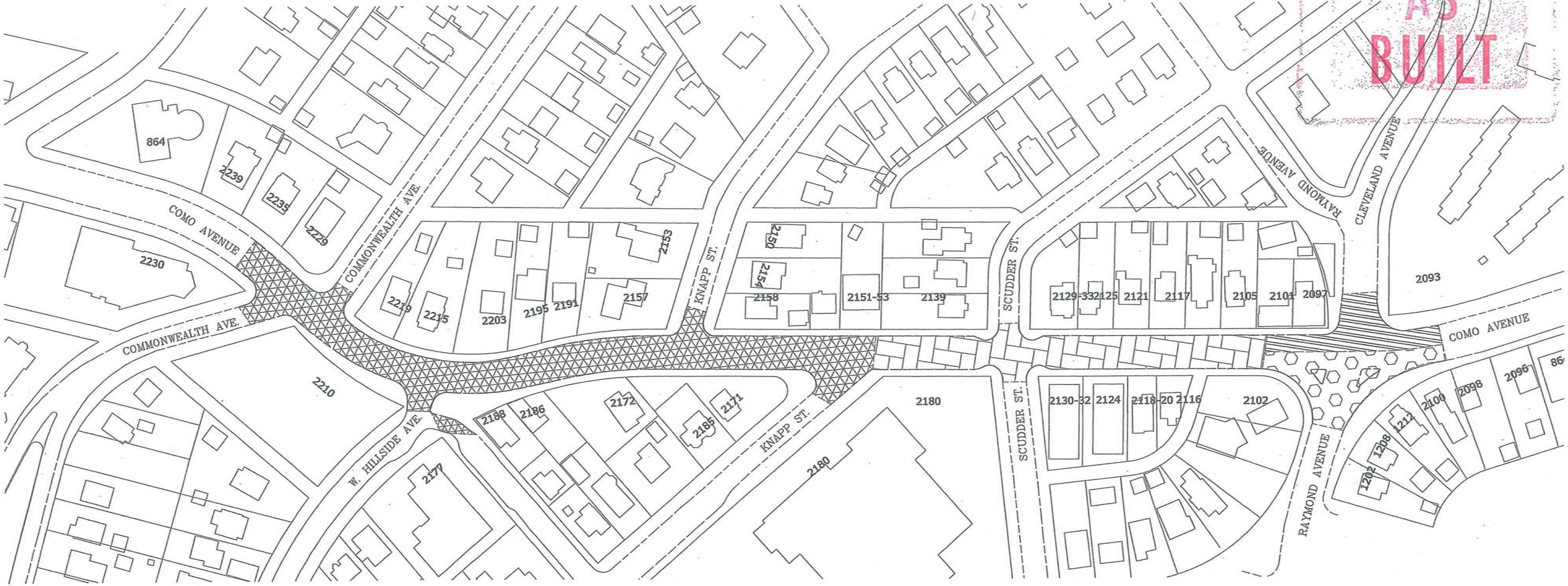
STAGING PLAN

AS BUILT



STAGE 1

STAGE 2

STAGE 3

STAGE 4

NOTES:
1. CONSECUTIVE STAGES SHALL NOT PROCEED UNTIL THE CURB AND GUTTER, FLATWORK AND BASE COURSE ARE INSTALLED ON THE PREVIOUS STAGE.
2. ALL BARRICADES, PAVEMENT MARKINGS AND SIGNS NECESSARY, INCLUDING SPECIALTY SIGNS, SHALL BE INCIDENTAL TO LUMP SUM BID ITEM 2563.601, "TRAFFIC CONTROL".
3. CONTRACTOR MAY ALTER ORDER OF STAGING AT ENGINEER'S DISCRETION.
4. WORK ON STAGE 4 SHALL NOT BEGIN UNTIL AFTER JULY 4, 2017.
5. COMO AVENUE SHALL REMAIN ACCESSIBLE TO PEDESTRIAN AND BICYCLE TRAFFIC THROUGHOUT THE CONSTRUCTION. THE CONTRACTOR MUST ACCOMMODATE PEDESTRIAN MOVING AROUND AND THROUGH THE PROJECT AREA DURING CONSTRUCTION. THE CONTRACTOR SHALL CLEARLY DELINEATE THE TRAVEL PATH FOR PEDESTRIANS TRAVELING THROUGH AND AROUND THE PROJECT AREA ACCORDING TO PART 6 OF THE MN MUTCD.
6- ONE LANE OF TRAFFIC IN EACH DIRECTION SHALL REMAIN OPEN DURING STAGE 1 AND STAGE 2

NORTH

COMO AVENUE
STAGING PLAN

DESIGNED	BRM
DRAWN	ASO
APPROVED	BRM

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

Signature: _____ ENGINEER Date: 3/6/2017 Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT:	17-P-8171	STATE AID PROJECT NUMBER:	164-121-007
DRAWER:	12	CAD NAME:	PROJECTS/CURRENT/COMO/STAGING
DWG. NO.	1596	DATE:	3/6/2017
		SHEET NO.	4 OF 21 SHEETS

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EXISTING SEWER STRUCTURES

AS BUILT

COMO AVENUE (SHEET 18)										
STR NO.	STATION	LT.	CENTER	RT.	AS IS	REM MH	REM CB	RECON	ADJ MH	NOTES
1	37+65.50			8	X					
2	38+43.34	17			X					
3	38+49.37	12			X					
4	38+90.11			24			X			
5	39+15.26			59			X			
6	39+32.88			40					X	
7	39+63.76			41			X			
8	39+57.69		X						X	
9	39+72.51	10						X		BRICK
10	40+13.00	9							X	
11	40+10.00	42						X		BRICK
12	39+91.86	49					X			
13	40+22.5	51					X			
14	40+25.57	40							X	
15	40+95.00			4					X	
16	41+24.26		X						X	
17	41+35.45			20			X			
18	41+73.00			7					X	
19	41+74.00	24					X			
20	41+92.00			43				X		BRICK
21	42+11.24			34					X	
22	42+57.70			84		X				

COMO AVENUE (SHEET 19)										
STR NO.	STATION	LT.	CENTER	RT.	AS IS	REM MH	REM CB	RECON	ADJ MH	NOTES
23	43+15.09		X					X		BRICK
24	45+8.81		X					X		BRICK
25	45+7.50			23			X			
26	45+38.00			22				X		BRICK
27	45+58.95	25							X	
28	45+36.12			43			X			
29	45+68.87	52					X			
30	45+12.24	24					X			
31	45+69.98		X					X		BRICK
32	46+97.00	23					X			
33	47+30.39			36					X	
34	46+45.94			174	X					
35	46+83.00			131	X					
36	47+81.47		X					X		BRICK
37	48+12.95		X					X		BRICK
38	48+50.00	24					X			
39	48+50.00			20					X	
40	48+30.00			23			X			

COMO AVENUE (SHEET 20)										
STR NO.	STATION	LT.	CENTER	RT.	AS IS	REM MH	REM CB	RECON	ADJ MH	NOTES
41	50+8.00		X					X		BRICK
42	51+8.00		X					X		BRICK
43	53+76.65		X					X		BRICK
44	53+70.00			22			X			
45	54+32.30	22					X			
46	54+37.75			23					X	
47	57+57.62	23							X	
48	57+63.17	43					X			
49	54+81.28	44						X		BRICK
50	54+53.00	153			X					
51	54+64.00	143			X					
52	54+83.50	163			X					
53	55+27.00	58							X	
54	54+77.38			21				X		BRICK
55	54+.72.20			45				X		BRICK
56	54+67.00			74					X	
57	54+52.21			202	X					
58	55+4.00			45					X	
59	55+41.00	33						X		BRICK
60	57+68.34			16	X					

NOTE: REPLACE ALL BRICK MANHOLES PER STANDARD PLATE 2322C, " RECONSTRUCT BRICK MH- 6 FT DEPTH."

EXISTING SEWER CHART

SAINT PAUL	DESIGNED	BRM	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS	PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007	
	DRAWN	ASO	Signature: Barbara R. Mundahl Date: 3/6/2017	COMO AVENUE	DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/CHARTS	
	APPROVED	BRM	BARBARA R. MUNDAHL Lic. No. 43099		DWG. NO. 1596	DATE: 3/6/2017	SHEET NO. 5 OF 21 SHEETS

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AS BUILT

PROPOSED SEWER STRUCTURES

COMO AVE (SHEET 18-20)									
STR NO.	STATION	LT.	RT.	MH	CB	LENGTH	SIZE	TYPE	
101	39+17		55		7B	21	~~15"~~ 12"	~~R.C.P.~~	C900
102	39+63		~~34~~ 44		7B	~~32~~ 27	~~15"~~ 12"	~~R.C.P.~~	C900 (moved 10' west on Commonwealth)
103	39+96	45			7B	28	15"	R.C.P.	
104	40+24	47			7B	~~8~~ 10	15"	R.C.P.	
105	41+~~47~~ 75	~~22~~ 18			7B	~~44~~ 23	~~15"~~ 12"	~~R.C.P.~~	C900
106	41+47		21		7B	~~32~~ 33	15"	R.C.P.	
107	44+85		21		7B	~~74~~ 76	15"	R.C.P.	
108	44+85	21			7B	~~43~~ 42	15"	R.C.P.	
109	45+42	51			7B	~~28~~ 31	15"	R.C.P.	
110	45+72		43		7B	~~22~~ 30	15"	R.C.P.	
111	46+89	21			7B	48	~~15"~~ 12"	~~R.C.P.~~	C900
~~112~~	~~47+27~~	~~21~~			~~7B~~	~~46~~	~~15"~~	~~R.C.P.~~	Eliminated due to CenturyLink Duct/Vaults
113	47+10		22		7B	22	~~15"~~ 12"	R.C.P.	C900
114	48+23	21			7B	43	~~15"~~ 12"	R.C.P.	C900
115	48+23		22		7B	20	15"	R.C.P.	
116	54+20	22			7B	~~14~~ 25.5	15"	R.C.P.	
117	54+20		23		7B	~~18~~ 17	15"	R.C.P.	
118	54+68	48			7B	~~29~~ 22	15"	R.C.P.	
119	54+~~69~~ 74	43		DIVERSION MH		~~26~~ 27	18"	R.C.P.	MH 21 was in the way (moved 5' East)
120	42+41	38		SAFLE BAFFLE MH		~~45~~ 47	18"	R.C.P.	
121	42+50	83		TYPE V				R.C.P.	
CB at cleveland	55+22	58'			7B	23	15"	R.C.P.	
[Type IV MH at Cleveland]	55+02	57'		Type IV					

PROPOSED SEWER CHART

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SAINT PAUL	DESIGNED	BRM
	DRAWN	ASO
	APPROVED	BRM

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
Signature: Barbara R. Mundahl Date: 3/6/2017
BARBARA R. MUNDAHL Lic. No. 43099

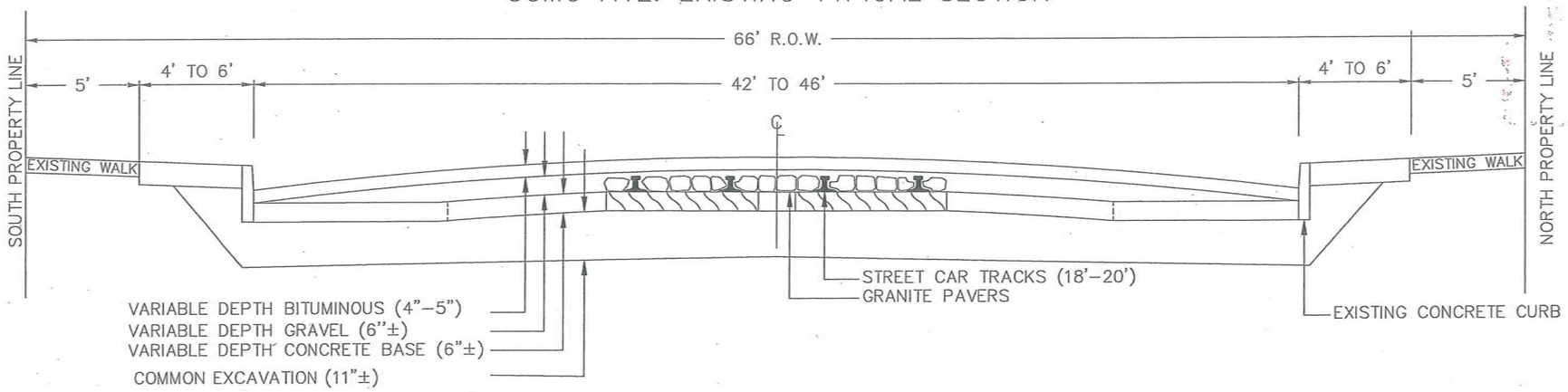
PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

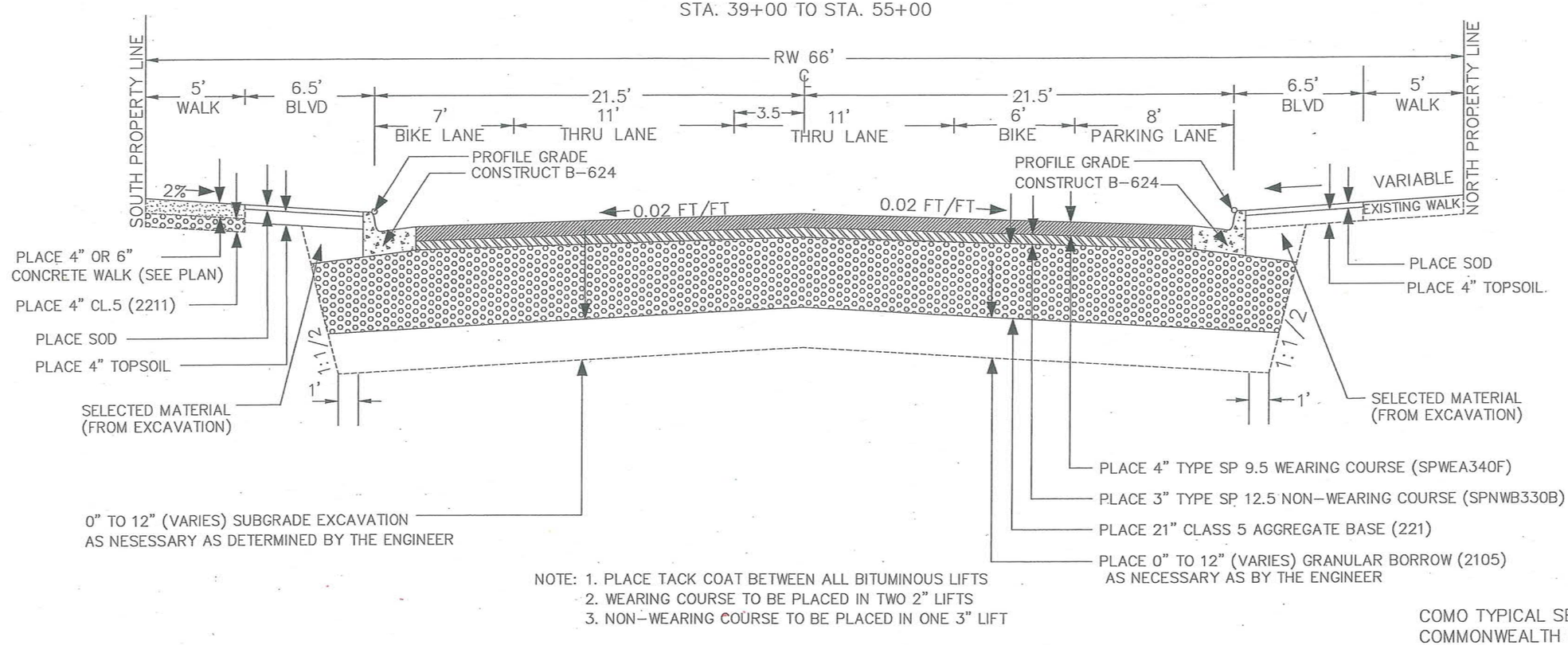
PROJECT: 17-P-8171		STATE AID PROJECT NUMBER: 164-121-007	
DRAWER: 12		CAD NAME: PROJECTS/CURRENT/COMO/CHARTS	
DWG. NO. 1596	DATE: 3/6/2017	SHEET NO. 6 OF 21 SHEETS	

AS BUILT

COMO AVE. EXISTING TYPICAL SECTION



PROPOSED TYPICAL SECTION
COMMONWEALTH AVENUE TO RAYMOND AVENUE
STA. 39+00 TO STA. 55+00



NOTE: 1. PLACE TACK COAT BETWEEN ALL BITUMINOUS LIFTS
2. WEARING COURSE TO BE PLACED IN TWO 2" LIFTS
3. NON–WEARING COURSE TO BE PLACED IN ONE 3" LIFT

COMO TYPICAL SECTION
COMMONWEALTH to RAYMOND

SAINT PAUL	DESIGNED	CBH	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS	PROJECT: 17–P–8171	STATE AID PROJECT NUMBER: 164–121–007
	DRAWN	ASO	Signature: Barbara R. Mundahl Date: 3/7/2017	COMO AVENUE	DRAWER: 12	CAD NAME: PROJECT/CURRENT/COMO/TYPICAL
	APPROVED	BRM	BARBARA R. MUNDAHL Lic. No. 43099		DWG. NO. 1596	DATE: 3/7/2017 SHEET NO. 7 OF 21 SHEETS

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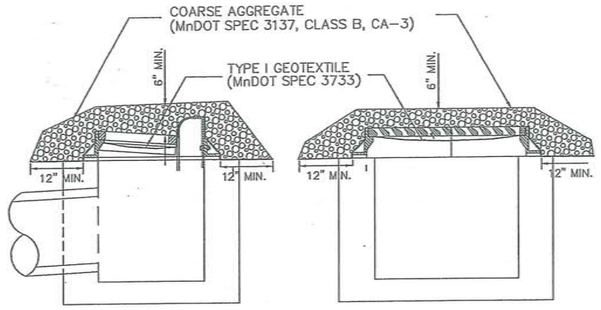
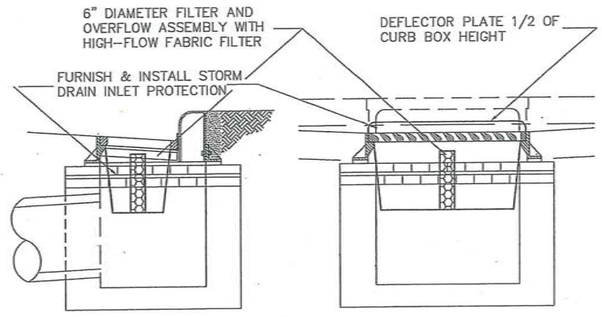
AS BUILT



INTERIM SEDIMENT CONTROL FOR CATCH BASINS

NOTES:

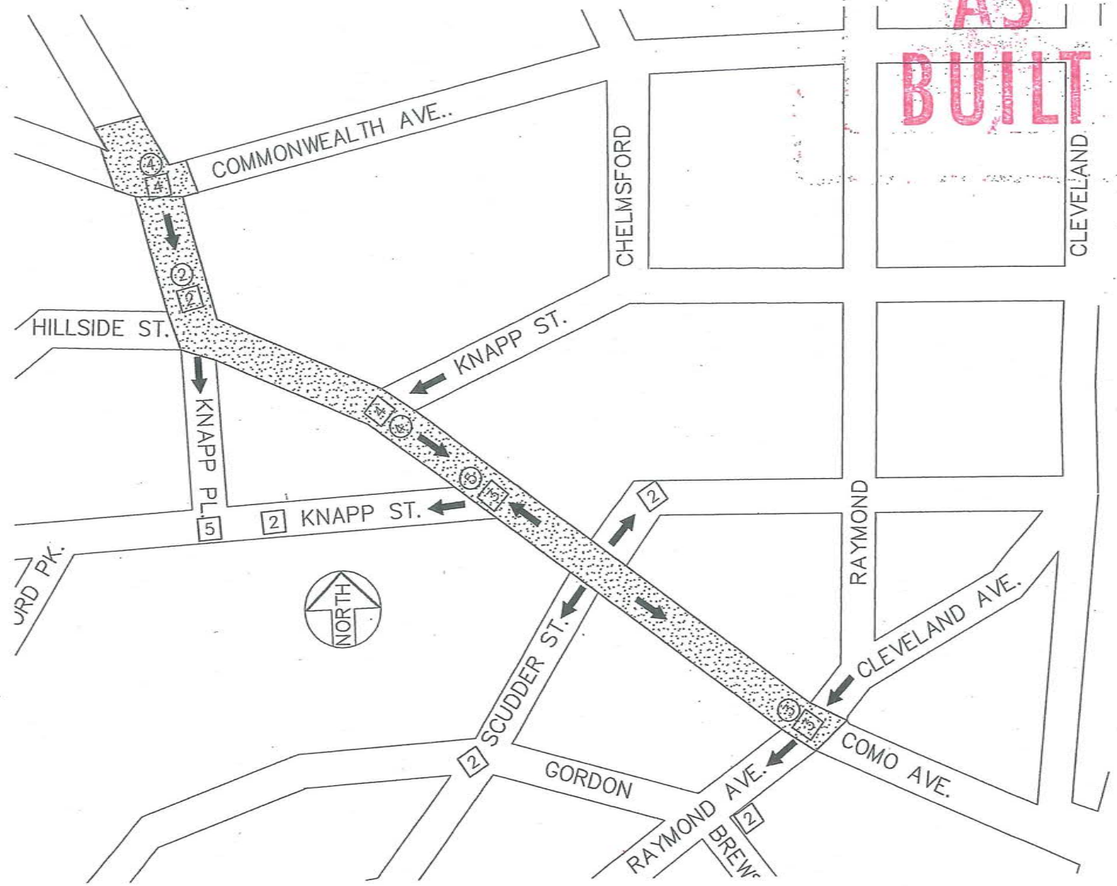
1. INTERIM SEDIMENT CONTROL REQUIRED FOR THE IDENTIFIED NEW CATCH BASINS PRIOR TO CURB AND GUTTER CONSTRUCTION. BID ITEM 2573.602. CONTRACTOR SHALL REMOVE INTERIM SEDIMENT CONTROL AND REPLACE WITH STORM DRAIN INLET PROTECTION AFTER CURB AND GUTTER CONSTRUCTION.
2. CONTRACTOR TO INSPECT "INTERIM SEDIMENT CONTROL FOR CATCH BASINS" EVERY 7 DAYS AND WITHIN 24 HOURS AFTER EVERY RAIN EVENT GREATER THAN 0.5 INCHES IN 24 HOURS. CONTRACTOR SHALL REPLACE COARSE AGGREGATE AND/OR GEOTEXTILE IF IT BECOMES NONFUNCTIONAL AS A SEDIMENT CONTROL.
3. CATCH BASIN SHALL BE KEPT FUNCTIONAL. CONTRACTOR SHALL CLEAN AS NECE NECESSARY.



STORM DRAIN INLET PROTECTION

NOTES:

1. STORM DRAIN INLET PROTECTION REQUIRED FOR NEW CATCH BASINS AFTER CURB AND GUTTER CONSTRUCTION. BID ITEM 2573.530.
2. CONTRACTOR TO INSPECT "STORM DRAIN INLET PROTECTION" EVERY 7 DAYS AND WITHIN 24 HOURS AFTER EVERY RAIN EVENT GREATER THAN 0.5 INCHES IN 24 HOURS.
3. CATCH BASIN SHALL BE KEPT FUNCTIONAL. CONTRACTOR SHALL CLEAN AS NECESSARY.
4. EXISTING CATCH BASINS AS IDENTIFIED SHALL ALSO RECEIVE STORM DRAIN INLET PROTECTION FROM THE TIME UPSTREAM CONSTRUCTION ACTIVITIES BEGIN UNTIL CLASS V IS PLACED ON THE ROADWAY AND THE BOULEVARDS HAVE BEEN RESTORED.



LEGEND:

- → DIRECTION OF FLOW
- ② INTERIM SEDIMENT CONTROL AND STORM DRAIN INLET PROTECTION FOR NEW CATCH BASINS SEE DETAIL (NO. INDICATES CB'S REQUIRING CONTROL)
- [4] EXISTING CATCH BASINS REQUIRING STORM DRAIN INLET PROTECTION SEE DETAIL (NO. INDICATES CB'S REQUIRING CONTROL.)

NOTES:

1) ALL PAVED SURFACES WITHIN AND ADJACENT TO THE PROJECT AREA SHALL BE SWEPT FREE OF SEDIMENT WITHIN 24 HOURS OF DISCOVERY.
2) CONTRACTOR SHALL PROVIDE CONSTRUCTION EXITS. SEE MnDOT 2573.3. AT ALL EXITS FROM ACTIVE CONSTRUCTION
3) SEE SPECIFICATIONS FOR STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

EROSION and SEDIMENT CONTROL

SAINT PAUL	DESIGNED	BRM	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS	PROJECT: 17–P–8171	STATE AID PROJECT NUMBER: 164–121–007	
	DRAWN	ASO	Signature: Barbara R. Mundahl Date: 3/6/2017	COMO AVENUE	DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/EROSION	
	APPROVED	BRM	BARBARA R. MUNDAHL Lic. No. 43099		DWG. NO. 1596	DATE: 3/6/2017	SHEET NO. 8 OF 21 SHEETS

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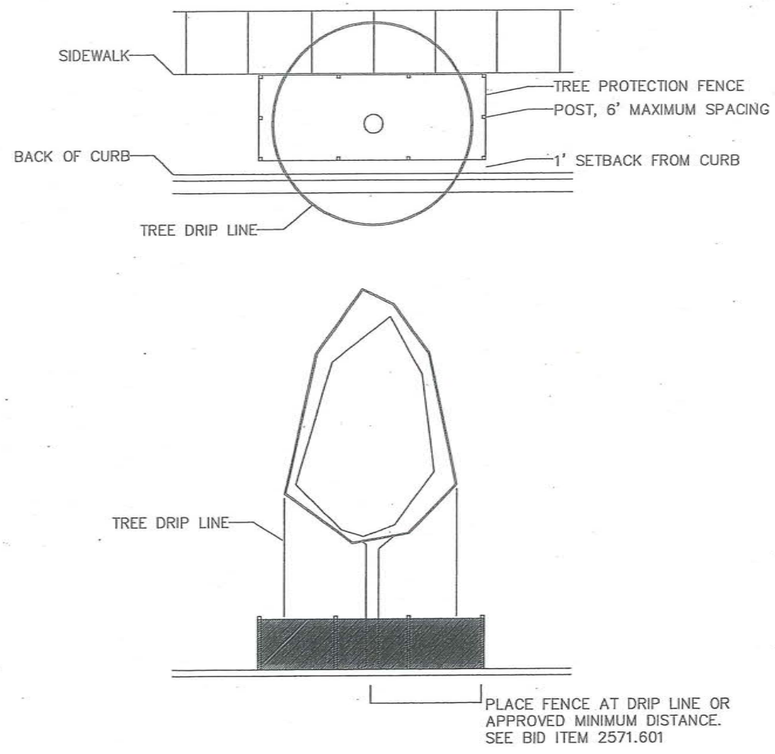
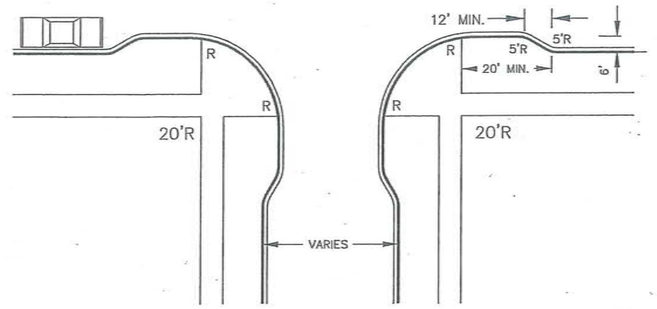


NOTES:

1. TREE PROTECTION FENCING SHALL BE INSTALLED ACCORDING TO PLAN PRIOR TO DEMOLITION OR OTHER SITE WORK. CONTACT CITY FORESTER (651.632.5129) PRIOR TO ANY RELOCATION OF THE TREE PROTECTION FENCING TO BE APPROVED BY CITY FORESTER.TREE PROTECTION FENCING SHALL BE MAINTAINED FOR THE DURATION OF THE CONSTRUCTION PROCESS.
2. CONSTRUCTION MATERIALS, STOCKPILES, EQUIPMENT, VEHICLES, AND TEMPORARY FACILITIES SHALL NOT BE STORED OR OPERATED WITHIN THE TREE PROTECTION ZONE.
3. ROOTS OUTSIDE OF THE TREE PROTECTION ZONE EXPOSED OR DAMAGED DURING EXCAVATION OR OTHER CONSTRUCTION ACTIVITY SHALL BE CLEANLY CUT AS DIRECTED BY THE CITY FORESTER.
4. ADDITIONAL TREE PROTECTION MEASURES MAY BE REQUIRED.
5. LIMIT GRADING WITHIN THE DRIP LINE OF EXISTING TREES, GRADING WITHIN 5' OF THE TRUNK OF TREE SHALL BE DONE BY HAND OR SMALL EQUIPMENT TO MINIMIZE DAMAGE TO TREE ROOTS.

TREE PROTECTION.



CURB BUMPOUT DETAILS
NO SCALE

STANDARD DETAIL PLATES	
ST. PAUL DRG. NO.	STANDARD DETAIL
1206D	CONCRETE DRIVEWAY, TYPE 6
1304C	SIGN COLLAR PLACEMENT
2007F	CATCH BASIN, DESIGN TYPE 3C
2015I	CATCH BASIN, DESIGN TYPE 7A
2016B	CATCH BASIN, DESIGN TYPE 7B
2101E	MANHOLE, TYPE I
2102E	MANHOLE, TYPE II
2103F	MANHOLE, TYPE III & III-S
2104F	MANHOLE, TYPE IV
2107D	MANHOLE, TYPE VII
2201F	FRAME CASTING A
2202D	COVER CASTINGS B
2203	COVER CASTINGS D
2207D	MANHOLE ADAPTOR RINGS
2211	CATCH BASIN, DESIGN TYPE 7A CASTING DETAILS
2212A	MODIFIED TYPE 7A
2306F	RECONNECTION OF HOUSE SERVICES
2309D	CATCH BASIN CONNECTION
2311B	ANCHOR CLAMP DETAIL
2317C	TYPES OF TRENCH BEDDING
2318D	CONCRETE SADDLE FOR PIPE CROSSINGS
2319D	SADDLE CONNECTIONS FOR HOUSE SERVICES
2321B	MANHOLE ADJUST
2322F	MANHOLE RECONSTRUCT
3000B	CONCRETE CURB
3003C	PEDESTRIAN CURB RAMP FOR THE HANDICAPPED
3005E	PEDESTRIAN CURB RAMP FOR THE HANDICAPPED
3006E	PEDESTRIAN CURB RAMP FOR THE HANDICAPPED
3008A	SAWED / SEALED JOINTS
3100C	CONCRETE CURB AND GUTTER, DESIGN B
3102B	CONC. CURB & GUTTER OPENING FOR DRIVEWAYS
3107A	CONC. CURB & GUTTER DESIGN D-418
4031B	BARRICADE DESIGNS
4032A	BARRICADING FOR STREET CLOSURE
4035A	WARNING LIGHTS AND CHANNELIZING DEVICES
4036	BARRICADING FOR SIDEWALK REPLACEMENT
6200B	RESET MONUMENT
	MnDOT STANDARD DETAIL PLATES
THESE STANDARD PLATES AS APPROVED BY THE FHWA SHALL APPLY	
MnDOT DRG. NO.	STANDARD DETAIL
3000L	REINFORCED CONCRETE PIPE (5 SHEETS)
3006G	GASKET JOINT FOR R. C. PIPE (2 SHEETS)
3100G	CONCRETE APRON FOR REINFORCED CONCRETE PIPE
3145G	CONCRETE PIPE TIES
4010H	CONCRETE SHORT CONE & ADJUSTING RING
7038A	DETECTABLE WARNING SURFACE TRUNCATED DOMES
8000J	CHANNELIZER
8307S	TRAFFIC BARRIER

AS BUILT

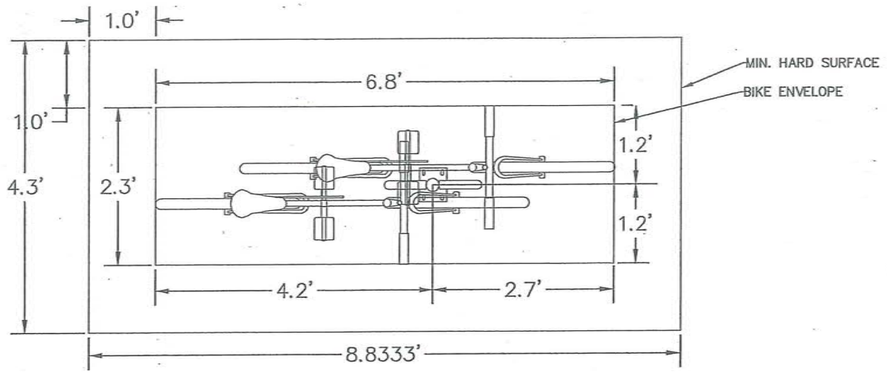
CONSTRUCTION DETAILS
STANDARD DETAIL PLATES

DESIGNED	BRM	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS
DRAWN	ASO	Signature: Barbara R. Mundahl Date: 3/6/2017	COMO AVENUE
APPROVED	BRM	BARBARA R. MUNDAHL Lic. No. 43099	

PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007		
DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/DETAILS		
DWG. NO. 1596	DATE: 3/6/2017	SHEET NO. 9 OF 21 SHEETS	

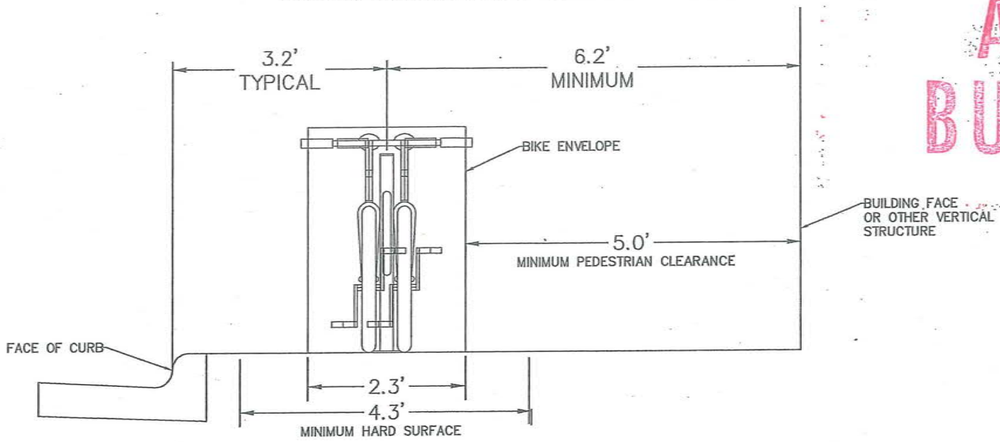
AS BUILT

BIKE ENVELOPE AND REQUIRED HARD SURFACE



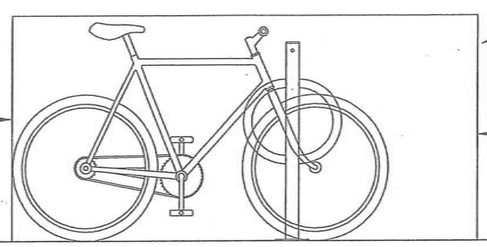
1. HARD SURFACE AREA MAY CONSIST OF VARIOUS MATERIALS, INCLUDING CONCRETE, PAVERS, ETC.
2. HARD SURFACE AREA MAY OVERLAP REQUIRED SIDEWALKS OR PEDESTRIAN CLEARANCE.

REQUIRED CLEARANCE FROM STREET AND BUILDINGS



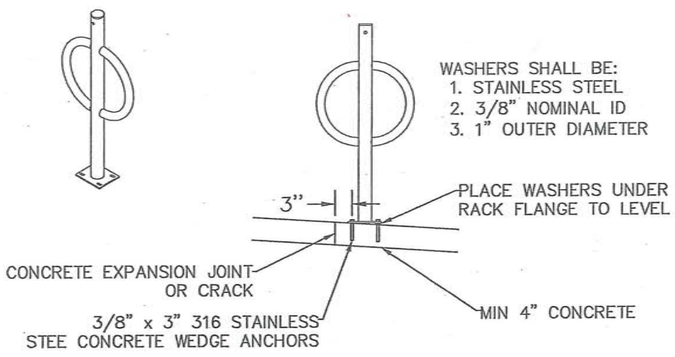
1. CENTER OF RACK SHOULD BE 38" FROM FACE OF CURB UNLESS OTHERWISE SPECIFIED.
2. MIN 5' PEDESTRIAN CLEARANCE SHOULD BE PROVIDED BETWEEN BIKE ENVELOPE AND BUILDING FACE.

MIN. 5' CLEARANCE FROM:
1. TREES
2. STREET LIGHTS
3. SIGN POSTS
4. PERMANENT STREET FURNITURE (BENCHES, TRASH CANS, MAILBOXES, ETC.)
5. UNDERGROUND UTILITY ACCESS POINTS (UTILITY VAULTS, MANHOLES, ETC.)
6. INACCESSIBLE SIDES OF ABOVE GROUND UTILITIES (SIGNAL CABINETS, ETC.)
7. BIKE ENVELOPE OF ADJACENT BIKE RACK



MIN. 10' CLEARANCE FROM:
1. FIRE HYDRANTS
2 ACCESSIBLE SIDES OF ABOVE GROUND UTILITIES (SIGNAL CABINETS, ETC.)

INSTALLATION REQUIREMENTS
1. DRILL PILOT HOLE 1/4" DEEPER THAN LENGTH OF ANCHOR TO ACCOMMODATE FOR EXPANSION AND DEBRIS
2. PILOT HOLES MUST BE MIN. 3" FROM ANY EXPANSION JOINT OR CRACK IN CONCRETE
3. WHEN WASHERS ARE USED, ANCHOR MUST HAVE MIN. 2" EMBEDMENT IN CONCRETE



GENERAL NOTES
1. THIS DETAIL ASSUMES RACKS WILL BE INSTALLED IN THE PUBLIC RIGHT OF WAY PARALLEL TO THE STREET. IN SOME LIMITED CIRCUMSTANCES, RACKS MAY ALSO BE ORIENTED AT A 45 OR 90 DEGREE ANGLE TO THE STREET AS DIRECTED BY THE ENGINEER TO INCREASE CAPACITY.
2. WHEN TWO BICYCLE RACKS ARE INSTALLED PARALLEL TO EACH OTHER, THE RACKS SHALL BE SPACED A MINIMUM OF 2 FT. APART WITH 3 FT. DESIRED.

BIKE RACK DETAILS

DESIGNED	??
DRAWN	??
APPROVED	RBM

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
Signature: Barbara R. Mundahl
BARBARA R. MUNDAHL
Date: 3/6/2017
Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007		
DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/CDETAILS		
DWG. NO. 1596	DATE: 3-6-2017	SHEET NO. 10	OF 21 SHEETS

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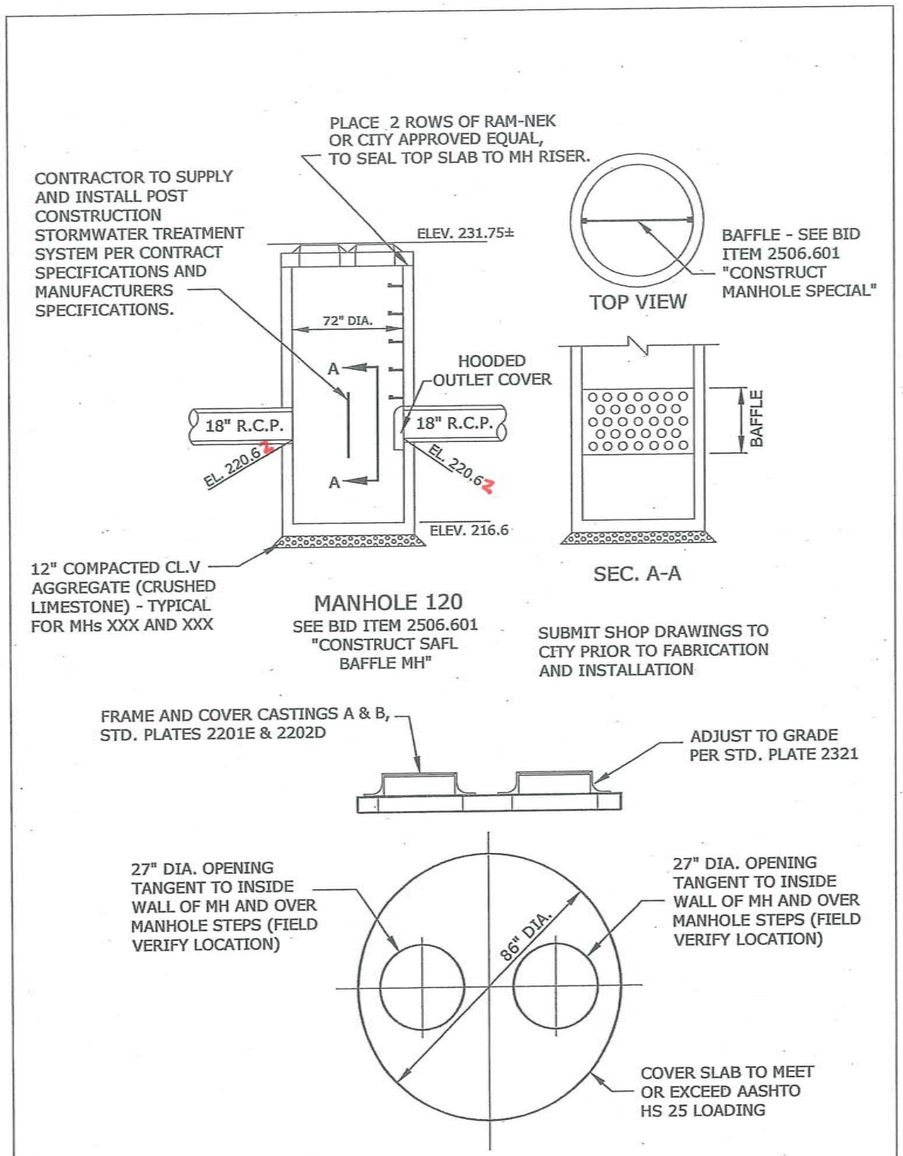
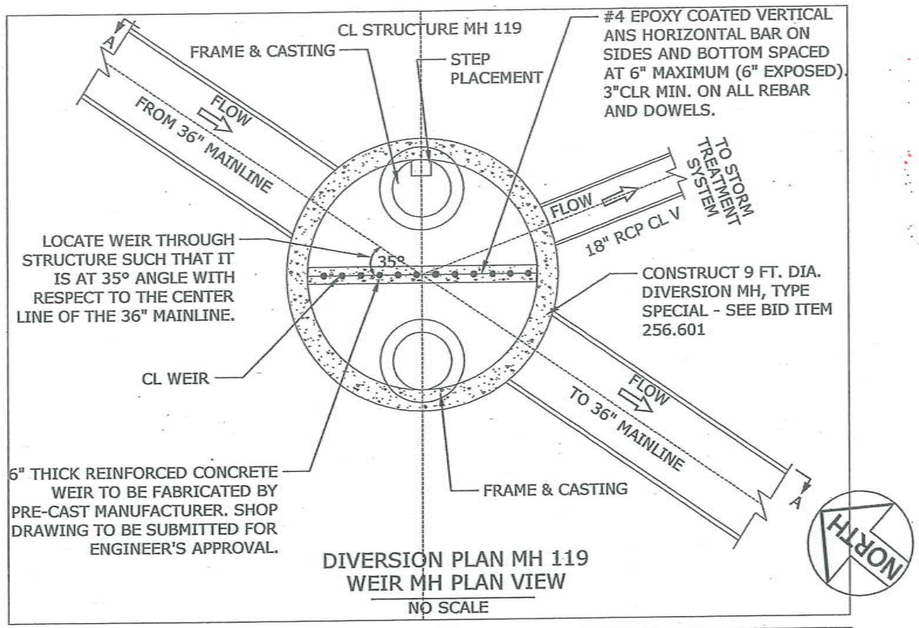
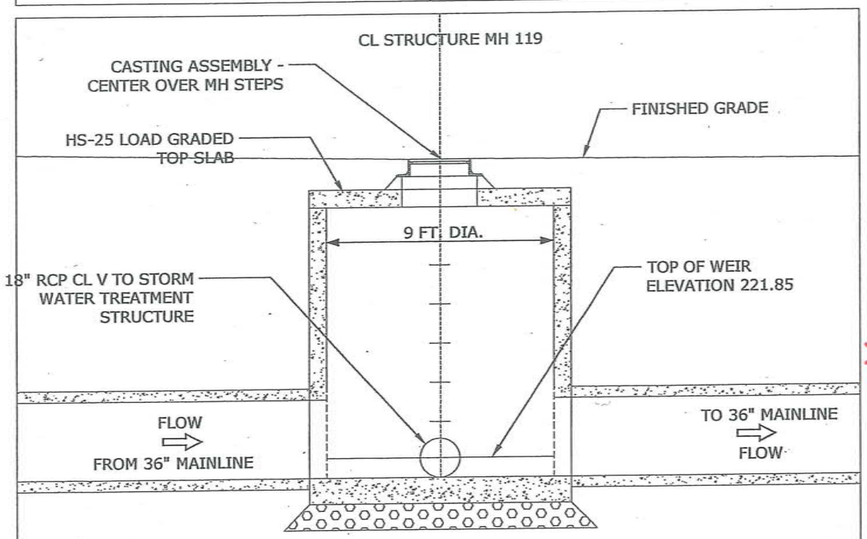


COVER SLAB DETAILS
NO SCALE

SAFL BAFFLE MH DETAILS

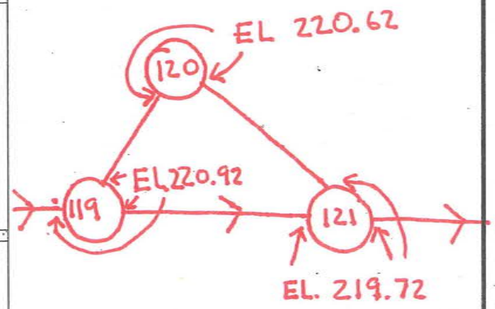


DIVERSION PLAN MH 119
WEIR MH PLAN VIEW
NO SCALE



SECTION A-A
NO SCALE

WEIR MH DETAIL



AS BUILT

CONSTRUCTION DETAILS
SAFL BAFFLE MH DETAILS
WEIR MH DETAILS
STANDARD DETAIL PLATES

SAINT PAUL	DESIGNED	HTH	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS	PROJECT: 17–P–18171	STATE AID PROJECT NUMBER: 164–121–007
	DRAWN	HTH		COMO AVENUE	DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/DWG
	APPROVED	BRM	Signature: ENGINEER Date: 3/6/2017 Lic. No. 43099		DWG. NO. 1596	DATE: 3/6/2017 SHEET NO. 11 OF 21 SHEETS

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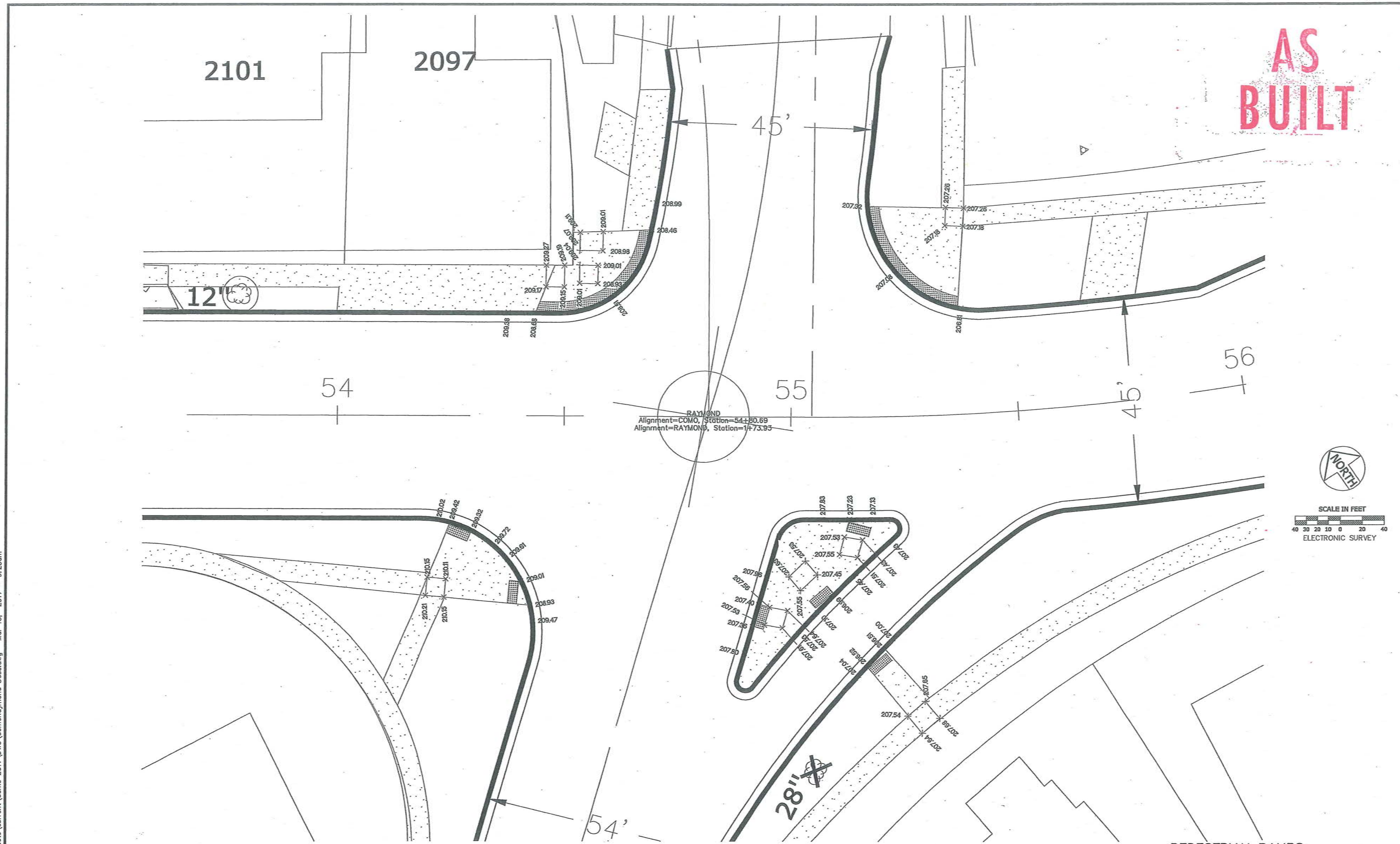

PEDESTRIAN RAMPS
COMO and RAYMOND

DESIGNED	CBH	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS
DRAWN	ASO	Signature: ______ ENGINEER Date: 3/13/2017 Lic. No. 43099	COMO AVENUE
APPROVED	BRM		

PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007		
DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/DWG		
DWG. NO. 1596	DATE: 3/13/2017	SHEET NO. 12 OF 21 SHEETS	

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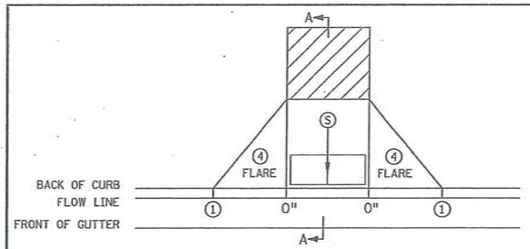
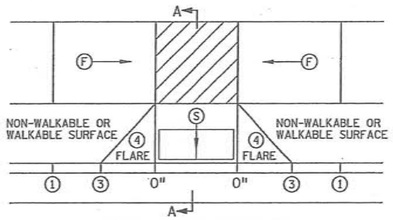
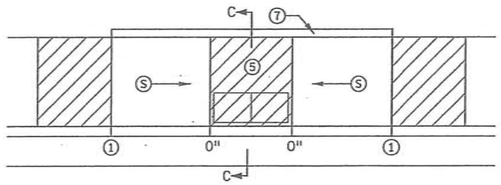


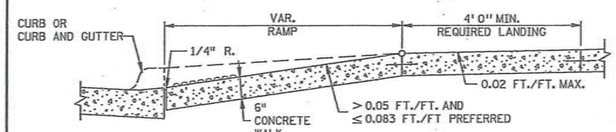
PERPENDICULAR



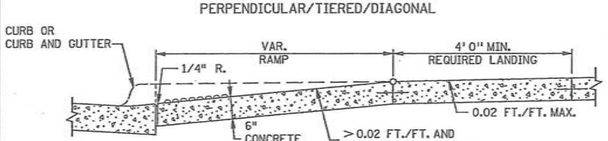
TIERED PERPENDICULAR



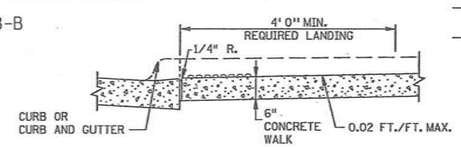
PARALLEL



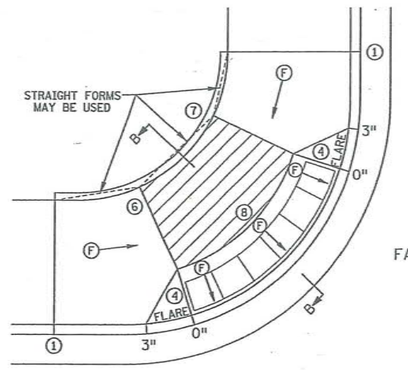
SECTION A-A
PERPENDICULAR/TIERED/DIAGONAL



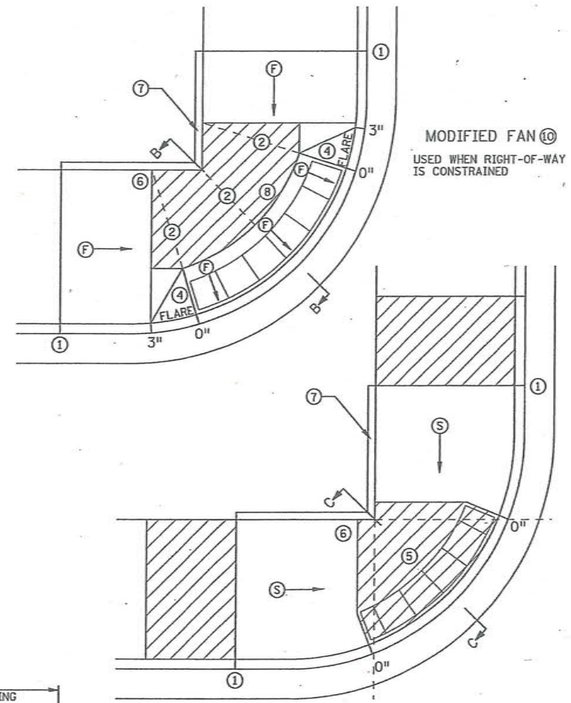
SECTION B-B
FAN



SECTION C-C
PARALLEL/DEPRESSED CORNER



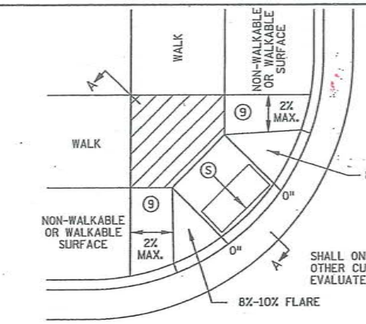
FAN⑩



MODIFIED FAN⑩

USED WHEN RIGHT-OF-WAY IS CONSTRAINED

DEPRESSED CORNER



DIAGONAL

SHALL ONLY BE USED AFTER ALL OTHER CURB RAMP TYPES HAVE BEEN EVALUATED AND DEEMED IMPRACTICAL

NOTES:

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) CHANGES DIRECTION, AT THE TOP OF RAMPS THAT HAVE RUNNING SLOPES GREATER THAN 5.0%, AND IF THE APPROACHING WALK IS INVERSE GRADE GREATER THAN 2%.

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, ONLY APPLICABLE WHEN THE INITIAL RAMP RUNNING SLOPE IS OVER 5.0%.

SECONDARY CURB RAMP LANDINGS ARE REQUIRED FOR EVERY 30" OF VERTICAL RISE WHEN THE LONGITUDINAL RUNNING SLOPE IS GREATER THAN 5.0%.

CONTRACTION JOINTS SHALL BE CONSTRUCTED ALONG ALL GRADE BREAKS WITHIN THE PAR. 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOPS OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.

ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL, THUS BOTH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH. (EXCEPT AS STATED IN ⑥ BELOW.

TO ENSURE INITIAL RAMPS AND INITIAL LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS SHALL BE CAST SEPARATELY. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 6 AND THE ADA SPECIAL PROVISIONS - PROSECUTION OF WORK (ADA).

TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

WHEN THE BOULEVARD IS 4' WIDE OR LESS, THE TOP OF CURB TAPER SHALL MATCH THE RAMP SLOPES TO REDUCE NEGATIVE BOULEVARD SLOPES FROM THE TOP BACK OF CURB TO THE PAR.

ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.

4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MIN. OF 24" IN THE PATH OF TRAVEL. DETECTABLE WARNING TO COVER ENTIRE WIDTH OF SHARED-USE PATHS AND THE ENTIRE PAR WIDTH OF THE WALK. DETECTABLE WARNING SHOULD BE 6" LESS THAN THE PAR/TRAIL WIDTH. ARC LENGTH OF RADIAL DETECTABLE WARNINGS SHOULD NOT BE GREATER THAN 20 FEET.

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.

① MATCH FULL HEIGHT CURB.
② 4' MINIMUM DEPTH LANDING REQUIRED ACROSS TOP OF RAMP.
③ 3" HIGH CURB WHEN USING A 3' LONG RAMP, 4" HIGH CURB WHEN USING A 4' LONG RAMP.
④ SEE SHEET 4 OF 6, TYPICAL SIDE TREATMENT OPTIONS, FOR DETAILS ON FLARES AND RETURNED CURBS, WHEN INITIAL LANDING IS AT FULL CURB HEIGHT.
⑤ DETECTABLE WARNINGS MAY BE PART OF THE 4' X 4' MIN. LANDING AREA IF IT IS NOT FEASIBLE TO CONSTRUCT THE LANDING OUTSIDE OF THE DETECTABLE WARNING AREA.
⑥ THE GRADE BREAK SHALL BE PERPENDICULAR TO THE BACK OF WALK. THIS WILL ENSURE THAT THE GRADE BREAK IS PERPENDICULAR TO THE DIRECTION OF TRAVEL. (TYPICAL FOR ALL)
⑦ WHEN ADJACENT TO GRASS, GRADING SHALL ALWAYS BE USED WHEN FEASIBLE. V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. WHEN ADJACENT TO PARKING LOTS, CONCRETE OR BITUMINOUS TAPERS SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.
⑧ A 7' MIN TOP RADIUS GRADE BREAK REQUIRED TO BE CONSTRUCTIBLE.
⑨ PAVE FULL WALK WIDTH.
⑩ "S" SLOPES ON FANS SHALL ONLY BE USED WHEN ALL OTHER FEASIBLE OPTIONS 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%.

LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

X" CURB HEIGHT

REVISION:

APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

REVISED:

APPROVED: 1-23-2017

STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250 | 1 OF 6

AS BUILT

DESIGNED	ASO	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
DRAWN	ASO	Signature: Barbara R. Mundal Date: 3/6/2017

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007
DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/CDETAILS

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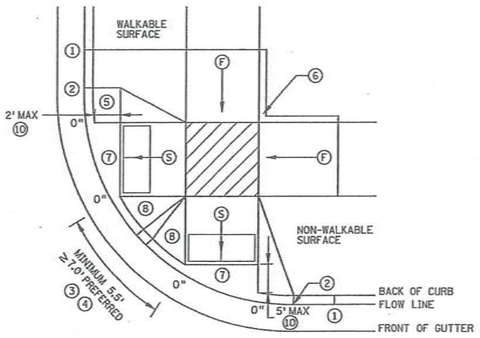
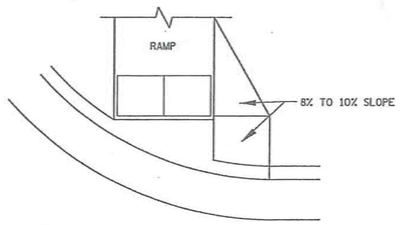
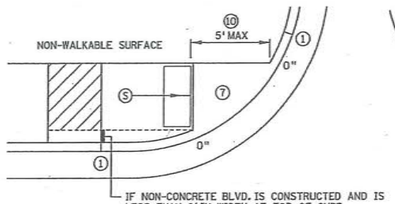


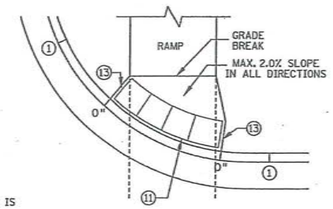
COMBINED DIRECTIONAL ⑨



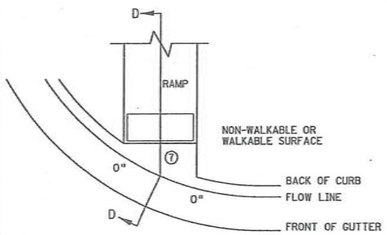
DIRECTIONAL RAMP WALKABLE FLARE



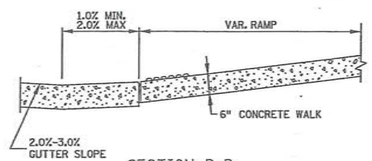
STANDARD ONE-WAY DIRECTIONAL ⑨



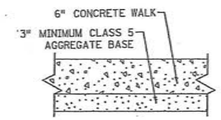
ONE-WAY DIRECTIONAL WITH DETECTABLE WARNING AT BACK OF CURB



CURB FOR DIRECTIONAL RAMPS ⑭



SECTION D-D



TYPICAL SIDEWALK SECTION WITHIN INTERSECTION CORNER

NOTES:

LANDINGS SHALL BE LOCATED ANYWHERE THE PEDESTRIAN ACCESS ROUTE (PAR) 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, ONLY APPLICABLE WHEN THE INITIAL RAMP RUNNING SLOPE IS OVER 5.0%.

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 WITHIN THE PAR. 1/4" DEEP VISUAL JOINTS SHALL BE USED AT THE TOP GRADE BREAK OF CONCRETE FLARES ADJACENT TO WALKABLE SURFACES.

ALL GRADE BREAKS WITHIN THE PAR SHALL BE PERPENDICULAR TO THE PATH OF TRAVEL. THUS BOTH SIDES OF A SLOPED WALKING SURFACE MUST BE EQUAL LENGTH.

TO ENSURE INITIAL RAMPS AND INITIAL LANDINGS ARE PROPERLY CONSTRUCTED, LANDINGS SHALL BE CAST SEPARATELY. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON SHEET 6 AND THE ADA SPECIAL PROVISION (PROSECUTION OF WORK).

TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.

WHEN THE BOULEVARD IS 4' WIDE OR LESS, THE TOP OF CURB TAPER SHALL MATCH THE RAMP SLOPES TO REDUCE NEGATIVE BOULEVARD SLOPES FROM THE TOP BACK OF CURB TO THE PAR.

ALL RAMP TYPES SHOULD HAVE A MINIMUM 3' LONG RAMP LENGTH.

4' MINIMUM WIDTH OF DETECTABLE WARNING IS REQUIRED FOR ALL RAMPS. DETECTABLE WARNINGS SHALL CONTINUOUSLY EXTEND FOR A MIN. OF 24" IN THE PATH OF TRAVEL. DETECTABLE WARNING TO COVER ENTIRE WIDTH OF SHARED-USE PATH AND THE ENTIRE PAR WIDTH OF THE WALK. DETECTABLE WARNING SHOULD BE 6" LESS THAN THE PAR/PATH WIDTH. ARC LENGTH OF RADIAL DETECTABLE WARNINGS SHOULD NOT BE GREATER THAN 20 FEET.

RADIAL DETECTABLE WARNINGS SHALL BE SETBACK 3" MINIMUM TO 6" MAXIMUM FROM THE BACK OF CURB. SEE NOTES ⑩ & ⑪ FOR INFORMATION REGARDING RECTANGULAR DETECTABLE WARNING PLACEMENT.

① MATCH FULL CURB HEIGHT.

② 3" HIGH CURB WHEN USING A 3' LONG RAMP
4" HIGH CURB WHEN USING A 4' LONG RAMP.

③ 3" MINIMUM CURB HEIGHT (5.5' MIN. DISTANCE REQUIRED BETWEEN DOMES)
4" PREFERRED (7' MIN. DISTANCE REQUIRED BETWEEN DOMES).

④ THE "BUMP" IN BETWEEN THE RAMPS SHOULD NOT BE IN THE PATH OF TRAVEL FOR COMBINED DIRECTIONAL RAMPS. IF THIS OCCURS MODIFY THE RAMP LOCATION OR SWITCH RAMP TO A FAN/DEPRESSED CORNER.

⑤ WHEN USING CONCRETE PAVED FLARES ON THE OUTSIDE OF DIRECTIONAL RAMPS, AND ADJACENT TO A WALKABLE SURFACE, DIRECTIONAL RAMP FLARES SHOULD BE USED. SEE THE DETAIL ON THIS SHEET.

⑥ GRADING SHALL ALWAYS BE USED WHEN FEASIBLE. V CURB, IF USED, SHALL BE PLACED OUTSIDE THE SIDEWALK LIMITS WHEN RIGHT OF WAY ALLOWS. WHEN ADJACENT TO PARKING LOTS, CONCRETE OR BITUMINOUS TAPERS SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.

⑦ 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.

⑧ 8% TO 10% WALKABLE FLARE.

⑨ PLACE DOMES AT THE BACK OF CURB WHEN ALLOWABLE SETBACK CRITERIA IS EXCEEDED.

⑩ 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. A WALKABLE SURFACE IS DEFINED AS A PAVED SURFACE ADJACENT TO A CURB RAMP WITHOUT RAISED OBSTACLES THAT COULD MISTAKENLY BE TRAVERSED BY A USER WHO IS VISUALLY IMPAIRED.

⑪ RECTANGULAR DETECTABLE WARNINGS MAY BE SETBACK UP TO 9" FROM THE BACK OF CURB WITH CORNERS SET 3" FROM BACK OF CURB. IF 9" SETBACK IS EXCEEDED USE RADIAL DETECTABLE WARNINGS.

⑫ FOR DIRECTIONAL RAMPS WITH THE DETECTABLE WARNINGS PLACED AT THE BACK OF CURB, THE DETECTABLE WARNINGS SHALL COVER THE ENTIRE WIDTH OF THE WALK/PATH. THIS ENSURES A DETECTABLE EDGE AND HELPS ELIMINATE THE CURB TAPER OBSTRUCTING THE PATH OF PEDESTRIAN TRAVEL.

⑬ THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE BACK OF CURB. MAINTAIN 3" BETWEEN EDGE OF DOMES AND EDGE OF CONCRETE.

⑭ TO BE USED FOR ALL DIRECTIONAL RAMPS, EXCEPT WHERE DOMES ARE PLACED ALONG THE BACK OF CURB.

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%.
LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PARS.
X" CURB HEIGHT

REVISION:
APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

REVISED:
APPROVED: 1-23-2017
STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250 | 2 OF 6

AS BUILT

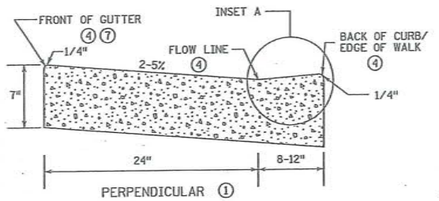
DESIGNED	ASO	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
DRAWN	ASO	Signature: Barbara R. Mundahl — Date: 3-6-2017
APPROVED	BRM	BARBARA R. MUNDAHL — Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

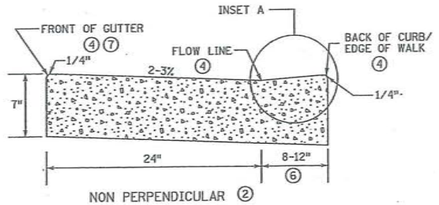
COMO AVENUE

PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007
DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/CDETAILS
DWG NO. 1596	DATE: 3-6-2017 SHEET NO. 14 OF 21 SHEETS

AS BUILT

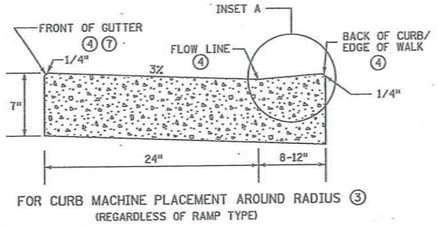


PERPENDICULAR ①

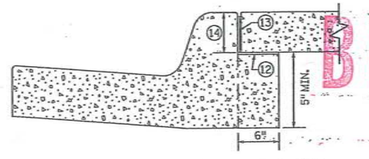


NON PERPENDICULAR ②

PEDESTRIAN ACCESS ROUTE CURB & GUTTER DETAIL

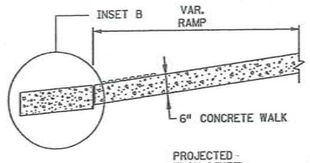


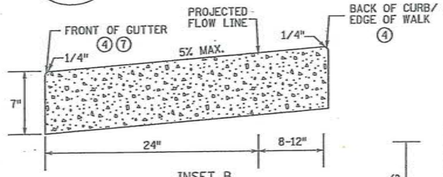
FOR CURB MACHINE PLACEMENT AROUND RADIUS ③
(REGARDLESS OF RAMP TYPE)



OPTIONAL SILL CURB WHEN SIDEWALK
IS AT BACK OF CURB

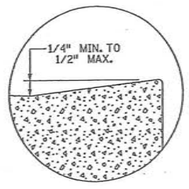
CONCRETE SILL TO BE USED ONLY WHEN
SPECIFIED IN THE PLAN.



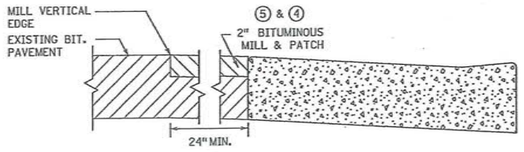


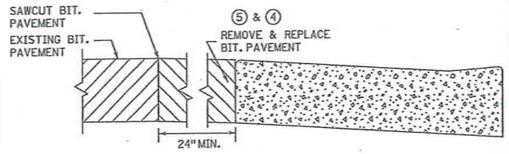
INSET B

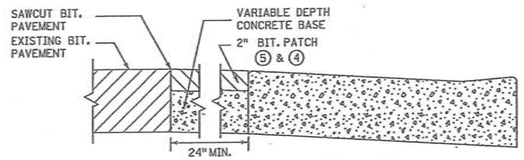
OUTFLOW GUTTER ⑧



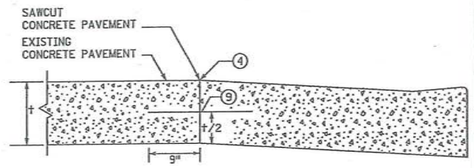
INSET A



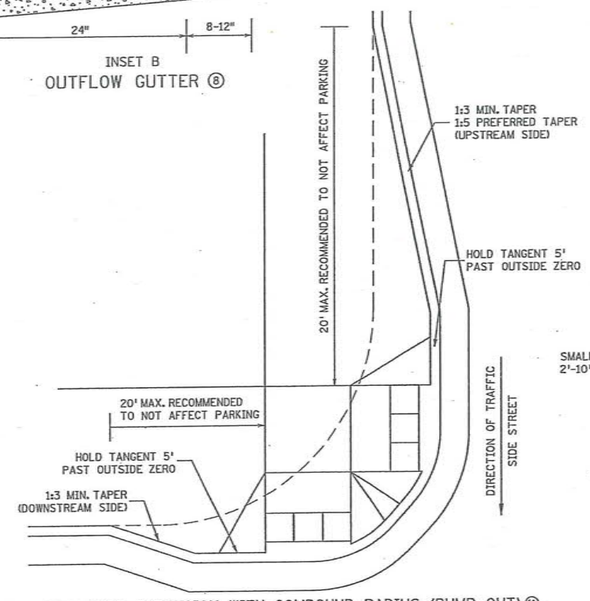




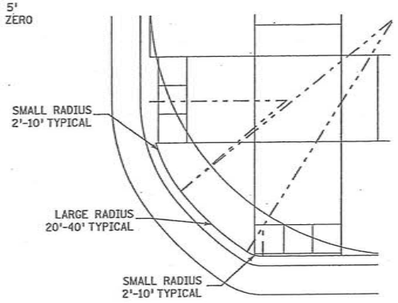
ONLY ALLOWED PER ENGINEER'S APPROVAL



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



ADA CURB EXTENSION WITH COMPOUND RADIUS (BUMP OUT) ⑪



COMBINED DIRECTIONAL ⑩
(COMPOUND RADIUS)

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 PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: PERPENDICULAR, TIERED PERPENDICULAR, PARALLEL, AND DIAGONAL RAMPS.

② FOR USE AT CURB RAMPS WHERE THE PEDESTRIAN'S PATH OF TRAVEL IS ASSUMED NON PERPENDICULAR TO THE GUTTER FLOW LINE. RAMP TYPES INCLUDE: FANS & DEPRESSED CORNERS.

③ BEGIN GUTTER SLOPE TRANSITION 10' OUTSIDE OF ALL CURB RAMPS.

④ THERE SHALL BE NO VERTICAL DISCONTINUITIES GREATER THAN 1/4".

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. SEE SHEET 2 FOR DIRECTIONAL CURB SLOPE REQUIREMENTS.

⑦ TOP FRONT OF GUTTER SHALL BE CONSTRUCTED FLUSH WITH PROPOSED ADJACENT PAVEMENT ELEVATION. TOP 1.5" OF THE GUTTER FACE MUST BE A FORMED EDGE. PAR GUTTER SHALL NOT BE OVERLAID.

⑧ SHOULD BE USED AT VERTICALLY CONSTRAINED AREAS WHEN AT A DRAINAGE HIGH POINT OR SUPER ELEVATED ROADWAY SEGMENTS.

⑨ DRILL AND GROUT NO. 4 EPOXY-COATED 18" LONG TIE BARS AT 30" CENTER TO CENTER INTO EXISTING CONCRETE PAVEMENT 1' MINIMUM FROM ALL JOINTS.

⑩ HELPS PROVIDE TWO SEPARATE RAMPS, REDUCES THE DOME SETBACK LENGTH AND MINIMIZES DIRECTIONAL CURB. THIS RADIUS DESIGN CLOSELY FOLLOWS THE TURNING VEHICLE PATH WHILE OPTIMIZING CURB RAMP LENGTH.

⑪ CURB EXTENSIONS SHOULD BE USED IN VERTICALLY CONSTRAINED AREAS, USUALLY IN DOWNTOWN ROADWAY SEGMENTS WHERE ON-STREET PARKING IS AVAILABLE. CURB EXTENSIONS SHOULD BE CONSIDERED FOR APS INTERSECTIONS WHERE SPACE IS LIMITED. PUSH BUTTONS MUST MEET APS CRITERIA AS DESCRIBED IN THE PUSH BUTTON LOCATION DETAIL SHEET.

⑫ PLACE BOND BREAKER BETWEEN WALK AND TOP OF SILL.

⑬ 1/2" PREFORMED JOINT FILLER PER MNDOT SPEC. 3702.

⑭ DIMENSION TO BE SAME AS SIDEWALK THICKNESS, 4" MIN.

REVISION:

APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

REVISED:

APPROVED: 1-23-2017
STATE DESIGN ENGINEER

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250 | 3 OF 6

DESIGNED	ASO	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
DRAWN	ASO	Signature: Barbara R. Mundahl — Date: 3-6-2017
APPROVED	BRM	BARBARA R. MUNDAHL — Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007		
DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/CDETAILS		
DWG. NO. 1596	DATE: 3-6-2017	SHEET NO. 15 OF 21 SHEETS	

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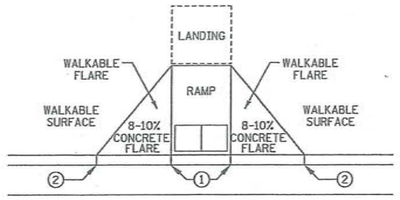
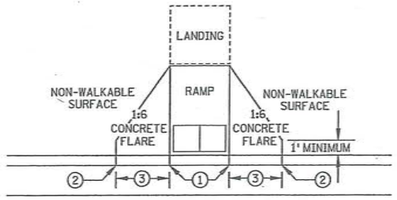
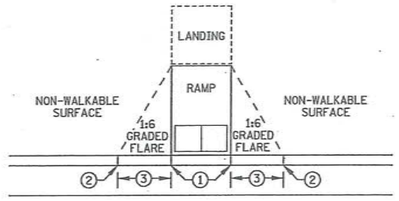


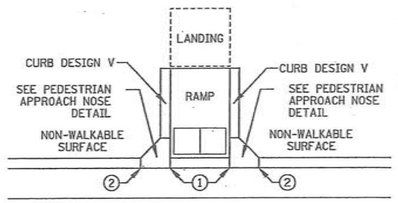
PAVED FLARES
ADJACENT TO WALKABLE SURFACE



PAVED FLARES
ADJACENT TO NON-WALKABLE SURFACE

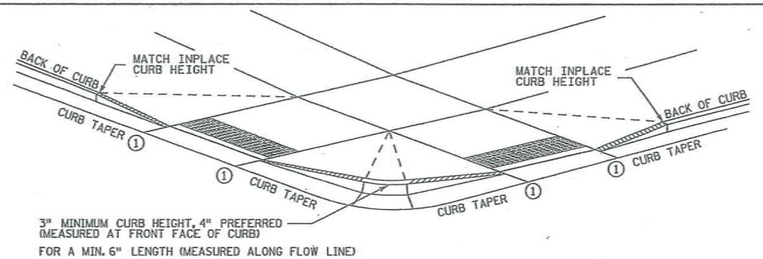


GRADED FLARES

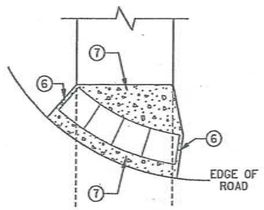


RETURNED CURB ⑤

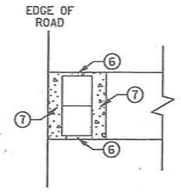
TYPICAL SIDE TREATMENT OPTIONS ④ ⑪



DETECTABLE EDGE WITH ⑧
CURB AND GUTTER

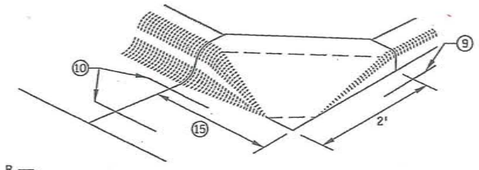


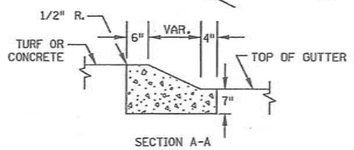
RADIAL DETECTABLE WARNING



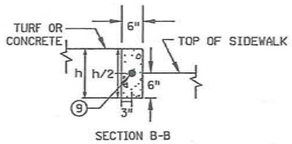
RECTANGULAR DETECTABLE WARNING

DETECTABLE EDGE WITHOUT CURB AND GUTTER

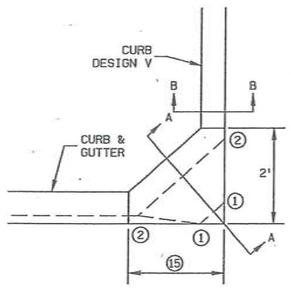




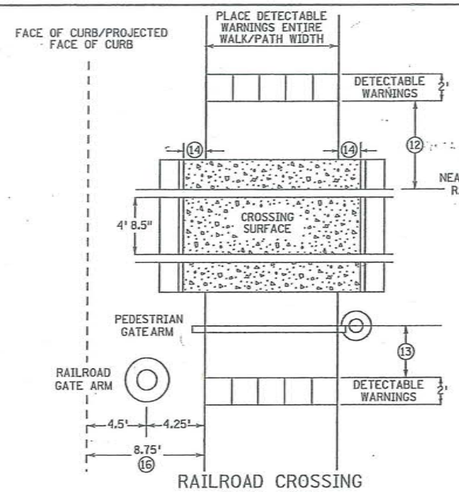
SECTION A-A



SECTION B-B



PEDESTRIAN APPROACH
NOSE DETAIL
(FOR RETURNED CURB
SIDE TREATMENT)



RAILROAD CROSSING
PLAN VIEW

NOTES:

SEE STANDARD PLATE 7038 AND THIS SHEET FOR ADDITIONAL DETAILS ON DETECTABLE WARNING.

A WALKABLE SURFACE IS DEFINED AS A PAVED SURFACE ADJACENT TO A CURB RAMP WITHOUT RAISED OBSTACLES THAT COULD MISTAKENLY BE TRAVERSED BY A USER WHO IS VISUALLY IMPAIRED.

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' FOR 4" HIGH CURB AND 3' FOR 6" HIGH CURB.

④ SIDE TREATMENTS ARE APPLICABLE TO ALL RAMP TYPES AND SHOULD BE IMPLEMENTED AS NEEDED 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.

⑤ TYPICALLY USED FOR MEDIANS AND ISLANDS.

⑥ WHEN NO CONCRETE FLARES ARE PROPOSED, THE CONCRETE WALK SHALL BE FORMED AND CONSTRUCTED PERPENDICULAR TO THE EDGE OF ROADWAY. MAINTAIN 3" MAX. 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 BITUMINOUS ROADWAY AND/OR BITUMINOUS SHARED-USE PATH 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.

⑨ DRILL AND GROUT 1 - NO. 4 12" LONG REINFORCEMENT BAR (EPOXY COATED) WITH 3" MIN. COVER. REINFORCEMENT BARS ARE NOT NEEDED IF THE APPROACH NOSE IS POURED INTEGRAL WITH THE V CURB.

⑩ DRILL AND GROUT 2 - NO. 4 12" LONG REINFORCEMENT BARS (EPOXY COATED) WITH 3" MIN. COVER. REINFORCEMENT BARS ARE NOT NEEDED IF THE APPROACH NOSE IS POURED INTEGRAL WITH THE CURB AND GUTTER.

⑪ SIDE TREATMENT EXAMPLES SHOWN ARE WHEN THE INITIAL LANDING IS APPROXIMATELY LEVEL WITH THE FULL HEIGHT CURB (I.E. 6' LONG RAMP FOR 6" HIGH CURB). WHEN THE INITIAL LANDING IS MORE THAN 1" BELOW FULL HEIGHT CURB REFER TO SHEETS 1 & 2 TO MODIFY THE CURB HEIGHT TAPERS AND MAINTAIN POSITIVE BOULEVARD DRAINAGE.

⑫ 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.

⑬ 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. THIS CRITERIA GOVERNS OVER NOTE ⑫.

⑭ CROSSING SURFACE SHALL EXTEND 2' MINIMUM PAST THE OUTSIDE EDGE OF WALK OR SHARED-USE PATH.

⑮ 3' FOR MEDIANS AND SPLITTER ISLANDS. NOSE CAN BE REDUCED TO 2' ON FREE RIGHT ISLANDS.

⑯ SIDEWALK TO BE PLACED 8.75' MIN. FROM THE FACE OF CURB/PROJECTED FACE OF CURB. THIS ENSURES MIN. CLEARANCE BETWEEN THE SIDEWALK AND GATE ARM COUNTERWEIGHT SUPPORTS.

REVISION:	REVISED:	PEDESTRIAN CURB RAMP DETAILS	
APPROVED: JANUARY 23, 2017 OPERATIONS ENGINEER	APPROVED: 1-23-2017 STATE DESIGN ENGINEER	STANDARD PLAN 5-297.250	4 OF 6

DESIGNED	ASO	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	PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS	PROJECT: 17-P-8171	STATE AID PROJECT NUMBER: 164-121-007
DRAWN	ASO	Signature: BARBARA R. MUNDAHL Date: 3-2-2017 Lic. No. 43099	COMO AVENUE	DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/CDETAILS
APPROVED	BRM			DWG. NO. 1596	DATE: 3-2-2017 SHEET NO. 16 OF 21 SHEETS

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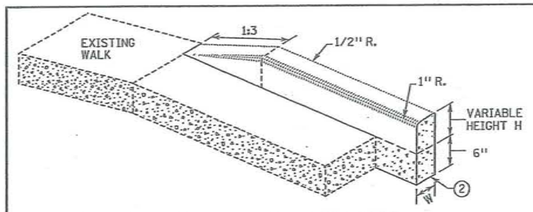
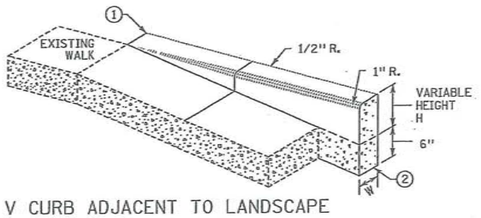
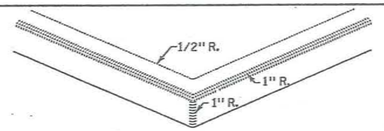


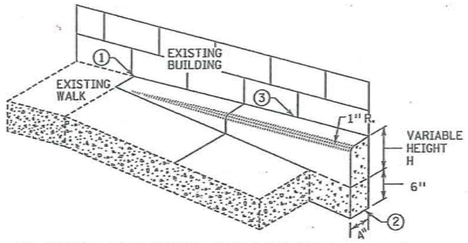
V CURB ADJACENT TO LANDSCAPE
CURB WITHIN SIDEWALK LIMITS



V CURB ADJACENT TO LANDSCAPE
CURB OUTSIDE SIDEWALK LIMITS

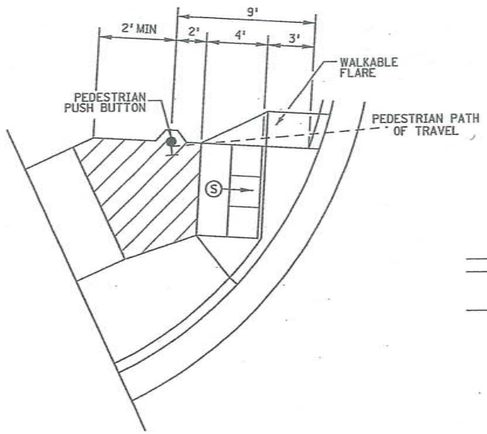


V CURB INTERSECTION



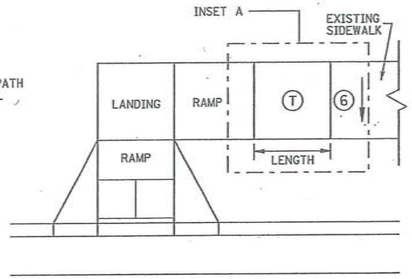
V CURB ADJACENT TO BUILDING OR BARRIER

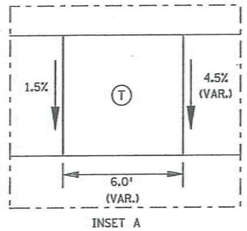
CONCRETE CURB DESIGN V	
CURB HEIGHT H	CURB WIDTH W
<6"	4"
≥6"	6"



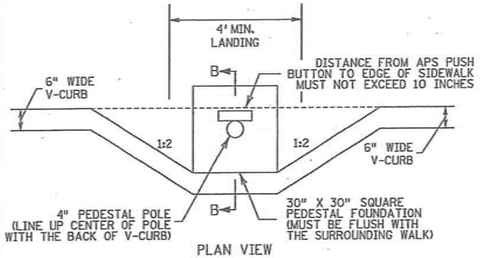
SEMI-DIRECTIONAL RAMP (3,4,9)
3' DOME SETBACK, 4' LONG RAMP AND PUSH BUTTON 9' FROM THE BACK OF CURB

PRIMARILY USED FOR APS APPLICATIONS WHERE THE PAR DOES NOT CONTINUE PAST THE PUSH BUTTON (DEAD-END SIDEWALK)

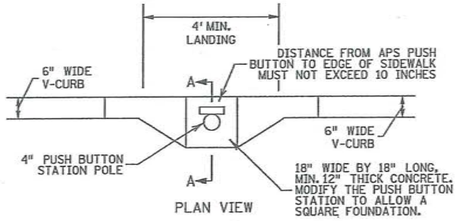




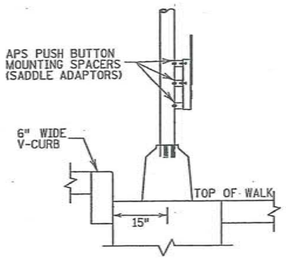
TRANSITION PANEL ④⑤



PLAN VIEW

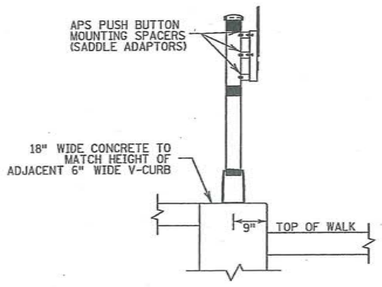


PLAN VIEW



SECTION B-B

SIGNAL PEDESTAL & PUSH BUTTON (V-CURB)



SECTION A-A

PUSH BUTTON STATION (V-CURB)

NOTES:

A WALKABLE FLARE IS AN 8-10% CONCRETE FLARE THAT IS REQUIRED WHEN THE FLARE IS ADJACENT TO A WALKABLE SURFACE, OR WHEN THE PEDESTRIAN PATH OF TRAVEL OF A PUSH BUTTON TRAVERSES THE FLARE.

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 THE MAX. RATE OF CROSS SLOPE TRANSITIONING IS 1' LINEAR FOOT OF SIDEWALK PER HALF PERCENT CROSS SLOPE. WHEN PAR WIDTH IS GREATER THAN 6' OR THE RUNNING SLOPE IS GREATER THAN 5%, DOUBLE THE CALCULATED TRANSITION LENGTH.
⑤ TRANSITION PANELS ARE TO ONLY BE USED AFTER THE RAMP, OR IF NEEDED, LANDING ARE AT THE FULL CURB HEIGHT (TYPICAL SECTION).
⑥ EXISTING CROSS SLOPE GREATER THAN 2.0%.

LEGEND

THESE LONGITUDINAL SLOPE RANGES SHALL BE THE STARTING POINT. IF SITE CONDITIONS WARRANT, LONGITUDINAL SLOPES UP TO 8.3% OR FLATTER ARE ALLOWED.

Ⓢ 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%.

LANDING AREA - 4' X 4' MIN. (5' X 5' MIN. PREFERRED) DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS. LANDING SHALL BE FULL WIDTH OF INCOMING PARS.

Ⓣ TRANSITION PANEL(S) - TO BE USED FOR TRANSITIONING THE CROSS-SLOPE OF A RAMP TO THE EXISTING WALK CROSS-SLOPE. RATE OF TRANSITION SHOULD BE 0.5% PER 1 LINEAR FOOT OF WALK. SEE THIS SHEET FOR ADDITIONAL INFORMATION.

REVISION:
APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION
STATE DESIGN ENGINEER
REVISED:
APPROVED: 1-23-2017

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250 | 5 OF 6

AS BUILT

SAINT PAUL

DESIGNED	ASO
DRAWN	ASO
APPROVED	BRM

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
Signature: Barbara R. Mundahl
BARBARA R. MUNDAHL
Date: 3-6-2017
Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

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PROJECT: 17-P-8171		STATE AID PROJECT NUMBER:	164-121-007
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DWG. NO. 1596	DATE: 3-6-2017	SHEET NO. 17	OF 21 SHEETS

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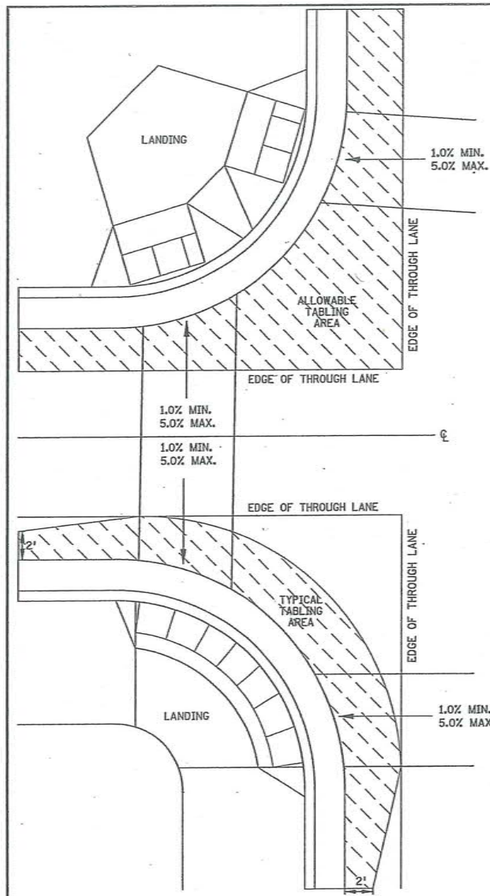
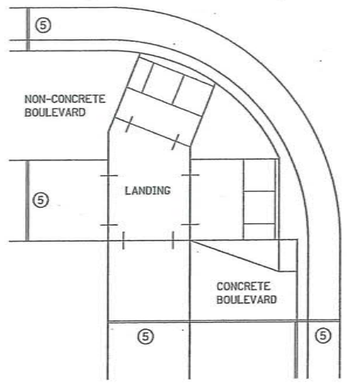
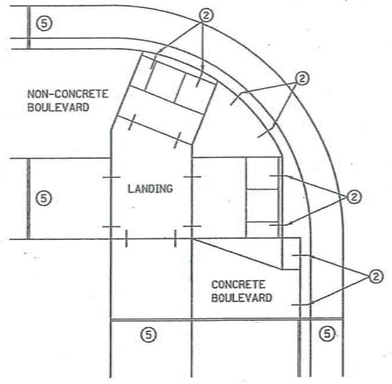


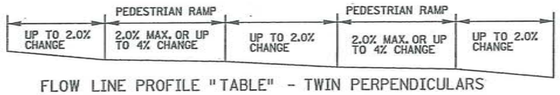
CURB LINE AND ROAD CROSSING ADJUSTMENTS



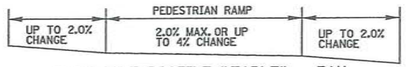
EXPANSION MATERIAL PLACEMENT FOR CONCRETE AND BITUMINOUS ROADWAYS



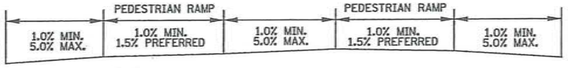
OPTIONAL CURB LINE REINFORCEMENT ④ PLACEMENT ON BITUMINOUS ROADWAYS



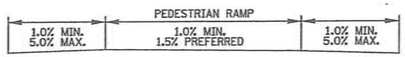
FLOW LINE PROFILE "TABLE" - TWIN PERPENDICULARS



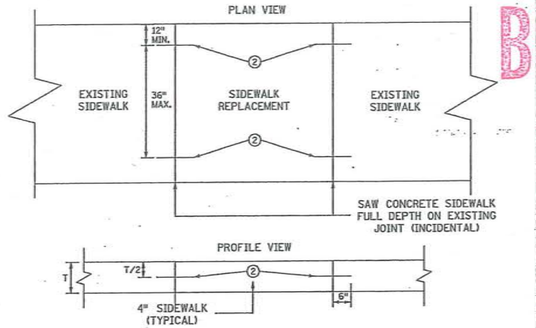
FLOW LINE PROFILE "TABLE" - FAN



FLOW LINE PROFILE RAISE - TWIN PERPENDICULARS

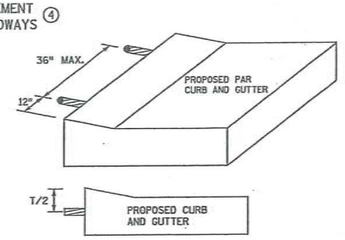


FLOW LINE PROFILE RAISE - FAN

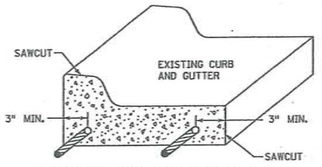


OPTIONAL SIDEWALK REINFORCEMENT

SIDEWALK REINFORCEMENT TO BE USED ONLY WHEN SPECIFIED IN THE PLAN.

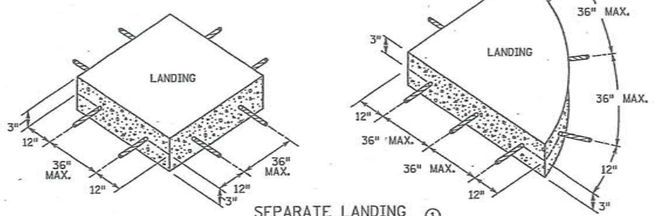


OPTIONAL CURB LINE REINFORCEMENT DETAILS ②④



FOR USE ON CURB RAMP RETROFITS

CURB AND GUTTER REINFORCEMENT ③



SEPARATE LANDING POUR REINFORCEMENT ①

NOTES:

① TO ENSURE RAMPS AND LANDINGS ARE PROPERLY CONSTRUCTED, ALL INITIAL LANDINGS AT A TOP OF A RAMPED SURFACE (RUNNING SLOPE GREATER THAN 2%) SHALL BE FORMED AND PLACED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. FOLLOW SIDEWALK REINFORCEMENT DETAILS ON THIS SHEET FOR ALL SEPARATELY POURED INITIAL LANDINGS.

② DRILL AND GROUT NO. 4 12" LONG REINFORCEMENT BARS AT 36" MAXIMUM CENTER TO CENTER (EPOXY COATED). BARS TO BE ADJUSTED TO MATCH RAMP GRADE.

③ DRILL AND GROUT 2 - NO. 4 X 12" LONG REINFORCEMENT BARS (EPOXY COATED). REINFORCEMENT REQUIRED FOR ALL CONSTRUCTION JOINTS WITHIN RADIUS.

④ THIS OPTIONAL CURB LINE REINFORCEMENT DETAIL SHOULD ONLY BE USED ON BITUMINOUS ROADWAYS WHEN SPECIFIED IN THE PLAN.

⑤ 1/2 IN. PREFORMED JOINT FILLER MATERIAL PER MNDOT SPEC. 3702.

"TABLING" OF CROSSWALKS MEANS MAINTAINING LESS THAN 2% CROSS SLOPE WITHIN A CROSSWALK, IS REQUIRED WHEN A ROADWAY IS IN A STOP OR YIELD CONDITION AND THE PROJECT SCOPE ALLOWS.

RECONSTRUCTION PROJECTS: ON FULL PAVEMENT REPLACEMENT PROJECTS "TABLING" OF ENTIRE CROSSWALK SHALL OCCUR WHEN FEASIBLE.

MILL & OVERLAY PROJECTS: "TABLING" OF FLOW LINES, IN FRONT OF THE PEDESTRIAN RAMP, IS REQUIRED WHEN THE EXISTING FLOW LINE IS GREATER THAN 2% WARPING OF THE BITUMINOUS PAVEMENT CAN NOT EXTEND INTO THE THROUGH LANE. TABLE THE FLOW LINE TO 2% OR AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA;
1) 1.0% MIN. CROSS-SLOPE OF THE ROAD
2) 5.0% MAX. CROSS-SLOPE OF THE ROAD
3) "TABLE" FLOW LINE UP TO 4% CHANGE FROM EXISTING SLOPE IN FRONT OF PEDESTRIAN RAMP
4) UP TO 2% CHANGE IN FLOW LINE FROM EXISTING SLOPE BEYOND THE PEDESTRIAN CURB RAMP

STAND-ALONE ADA RETROFITS: FOLLOW MILL & OVERLAY CRITERIA ABOVE HOWEVER ALL PAVEMENT WARPING IS DONE WITH BITUMINOUS PATCHING ON BITUMINOUS ROADWAYS AND FULL-DEPTH APRON REPLACEMENT ON CONCRETE ROADWAYS.

RAISING OF CURB LINES SHOULD OCCUR IN VERTICALLY CONSTRAINED AREAS. RAISE THE CURB LINES ENOUGH TO ALLOW COMPLIANT RAMPS OR AS MUCH AS POSSIBLE WHILE ADHERING TO THE FOLLOWING CRITERIA;
1) 1.0% MIN. AND 5.0% MAXIMUM CROSS-SLOPE OF THE ROAD
2) 1.0% MIN. FLOW LINE (ON EITHER SIDE OF PEDESTRIAN RAMP) TO MAINTAIN POSITIVE DRAINAGE
3) 5.0% RECOMMENDED MAX. FLOW LINE
4) LONGITUDINAL THROUGH LANE ROADWAY TAPERS SHOULD BE 1" VERTICAL PER 15' HORIZONTAL

REVISION:

APPROVED: JANUARY 23, 2017
OPERATIONS ENGINEER

MINNESOTA DEPARTMENT OF TRANSPORTATION
STATE DESIGN ENGINEER

REVISED:

APPROVED: 1-23-2017

PEDESTRIAN CURB RAMP DETAILS

STANDARD PLAN 5-297.250 | 6 OF 6

SAINT PAUL	DESIGNED	ASO
	DRAWN	ASO
	APPROVED	BRM

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

Signature: Barbara R. Mundahl
BARBARA R. MUNDAHL
Date: 3/6/2017
Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT: 17-P-8171		STATE AID PROJECT NUMBER:	164-121-007
DRAWER: 12		CAD NAME:	PROJECTS/CURRENT/COMO/CDETAILS
DWG. NO. 1596	DATE: 3/6/2017	SHEET NO. 18	OF 21 SHEETS

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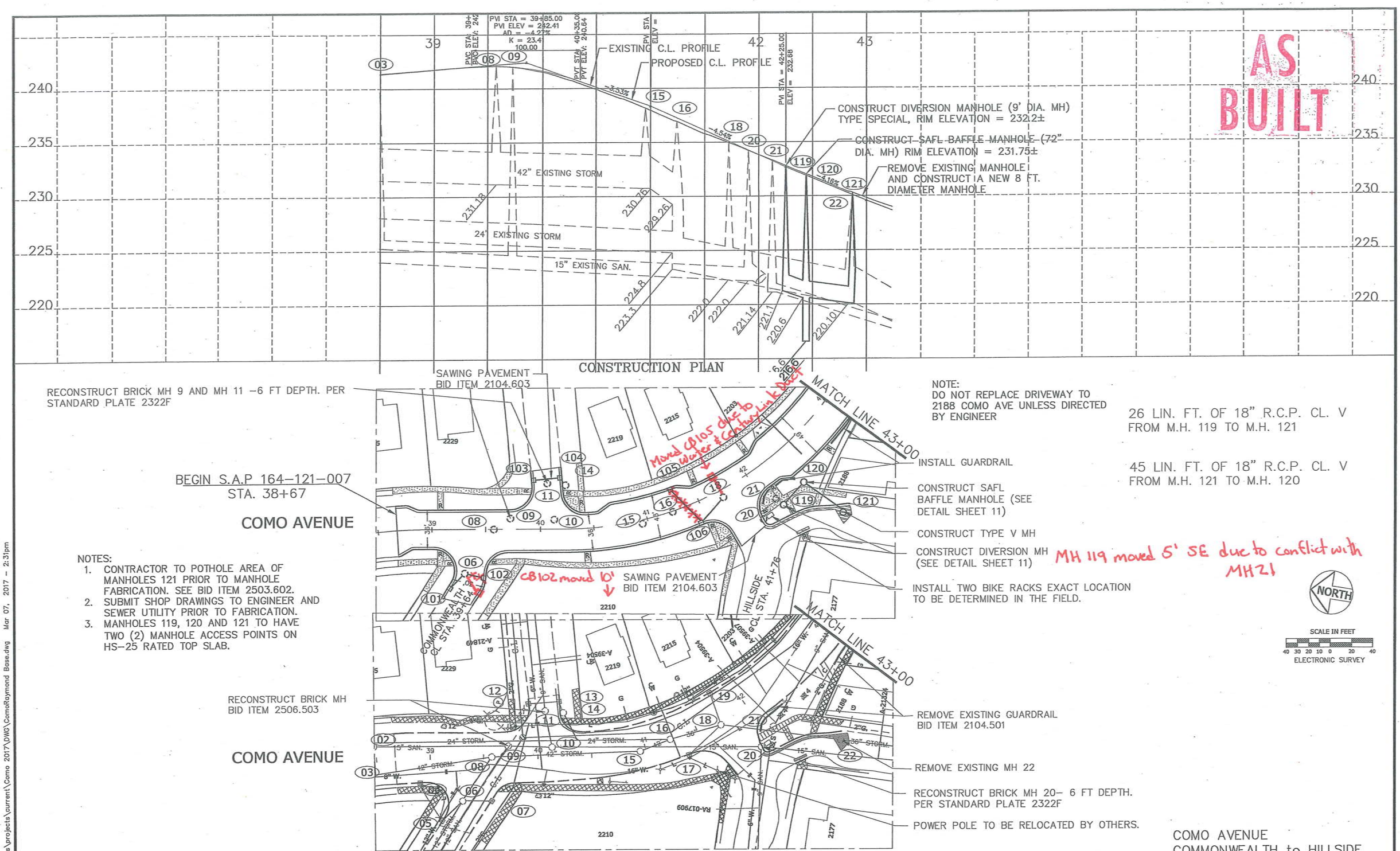

SAINT PAUL	DESIGNED	ASO	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
	DRAWN	ASO	Signature: Date: 3/6/2017

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

17–P–8171	STATE AID PROJECT NUMBER: 164–121–007		
DRAWER: 12	CAD NAME: PROJECTS/CURRENT/COMO/DWG		
DWG. NO. 1596	DATE: 3/6/2017	SHEET NO. 19 OF 21 SHEETS	

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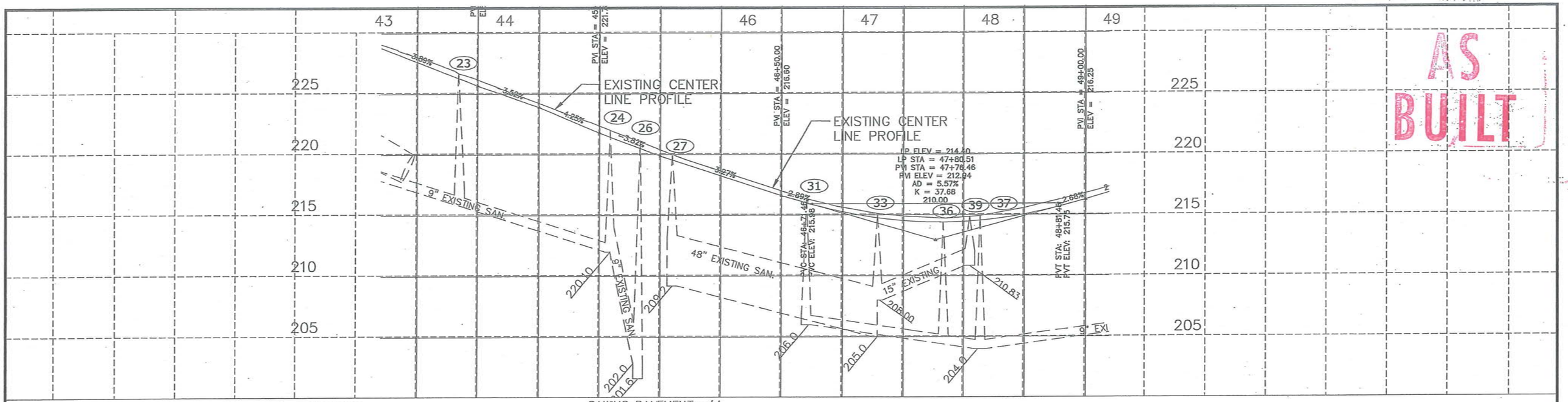
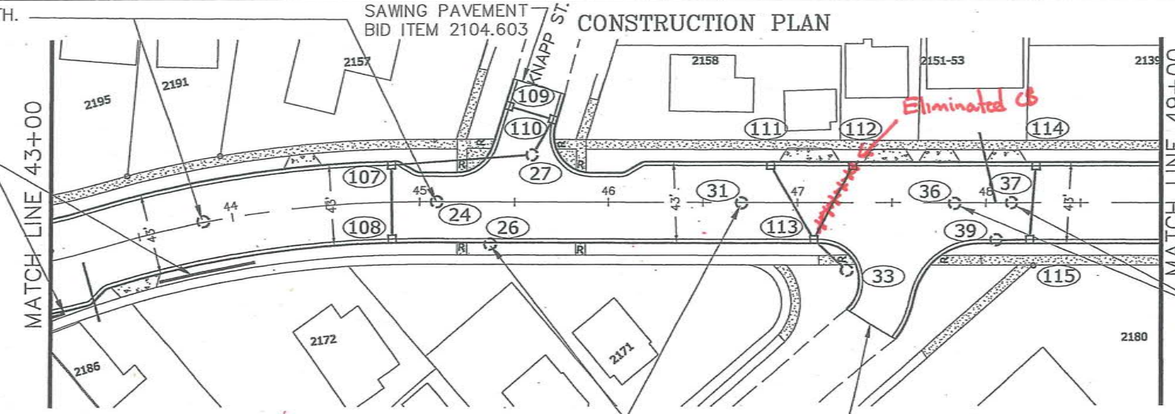


RECONSTRUCT BRICK MH 36 AND MH 37– 6 FT DEPTH.
PER STANDARD PLATE 2322F

SAWING PAVEMENT
BID ITEM 2104.603

CONSTRUCTION PLAN



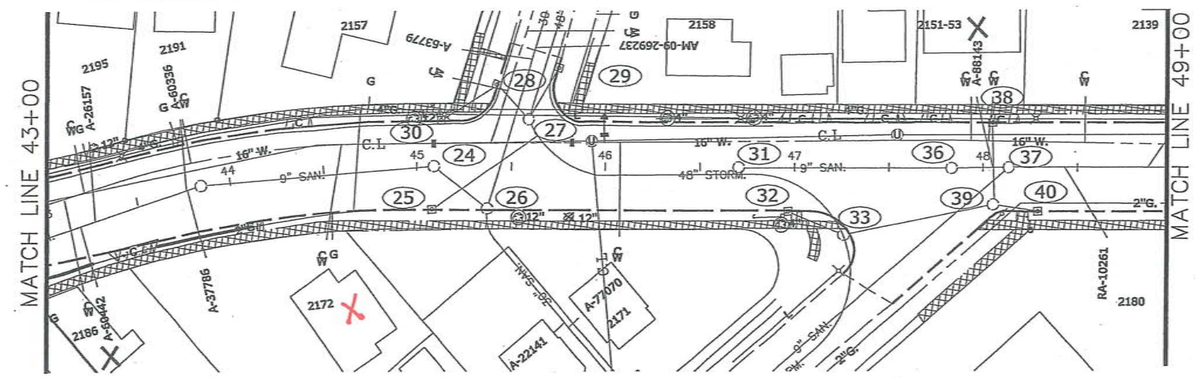
INSTALL GUARDRAIL
EXACT LOCATION TO BE
DETERMINED IN THE FIELD.

COMO AVENUE

RECONSTRUCT BRICK MH 36 AND MH 37– 6 FT DEPTH.
PER STANDARD PLATE 2322F

RECONSTRUCT BRICK MH 26 AND MH 31 – 6 FT DEPTH.
PER STANDARD PLATE 2322F

SAWING PAVEMENT
BID ITEM 2104.603



COMO AVENUE

REMOVE 1 TREEE

NORTH

SCALE IN FEET
40 30 20 10 0 20 40
ELECTRONIC SURVEY

COMO AVENUE
HILLSIDE to SCUDDER

EXISTING AND REMOVAL PLAN

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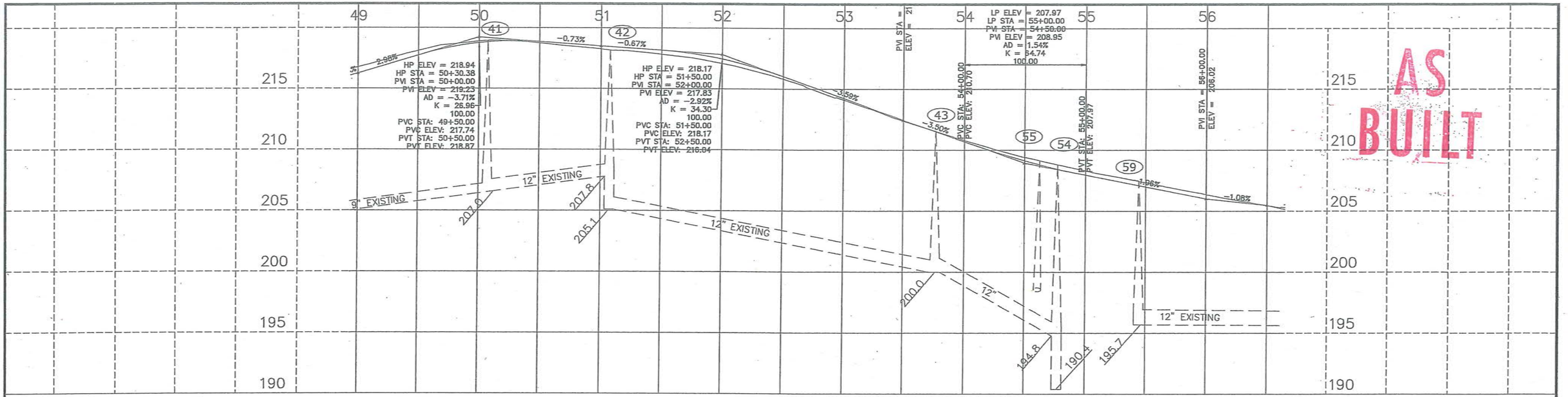
SAINT PAUL	DESIGNED	ASO	I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
	DRAWN	ASO	Signature: Date: 3/6/2017
	APPROVED	BRM	Lic. No. 43099

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT:	17–P–8171	STATE AID PROJECT NUMBER:	164–121–007
DRAWER:	12	CAD NAME:	PROJECTS/CURRENT/COMO/DWG
DWG. NO.	1596	DATE: 3/6/2017	SHEET NO. 20 OF 21 SHEETS



AS BUILT

RECONSTRUCT BRICK MH 41, MH 42 AND MH 43 -6 FT DEPTH. PER STANDARD PLATE 2322F

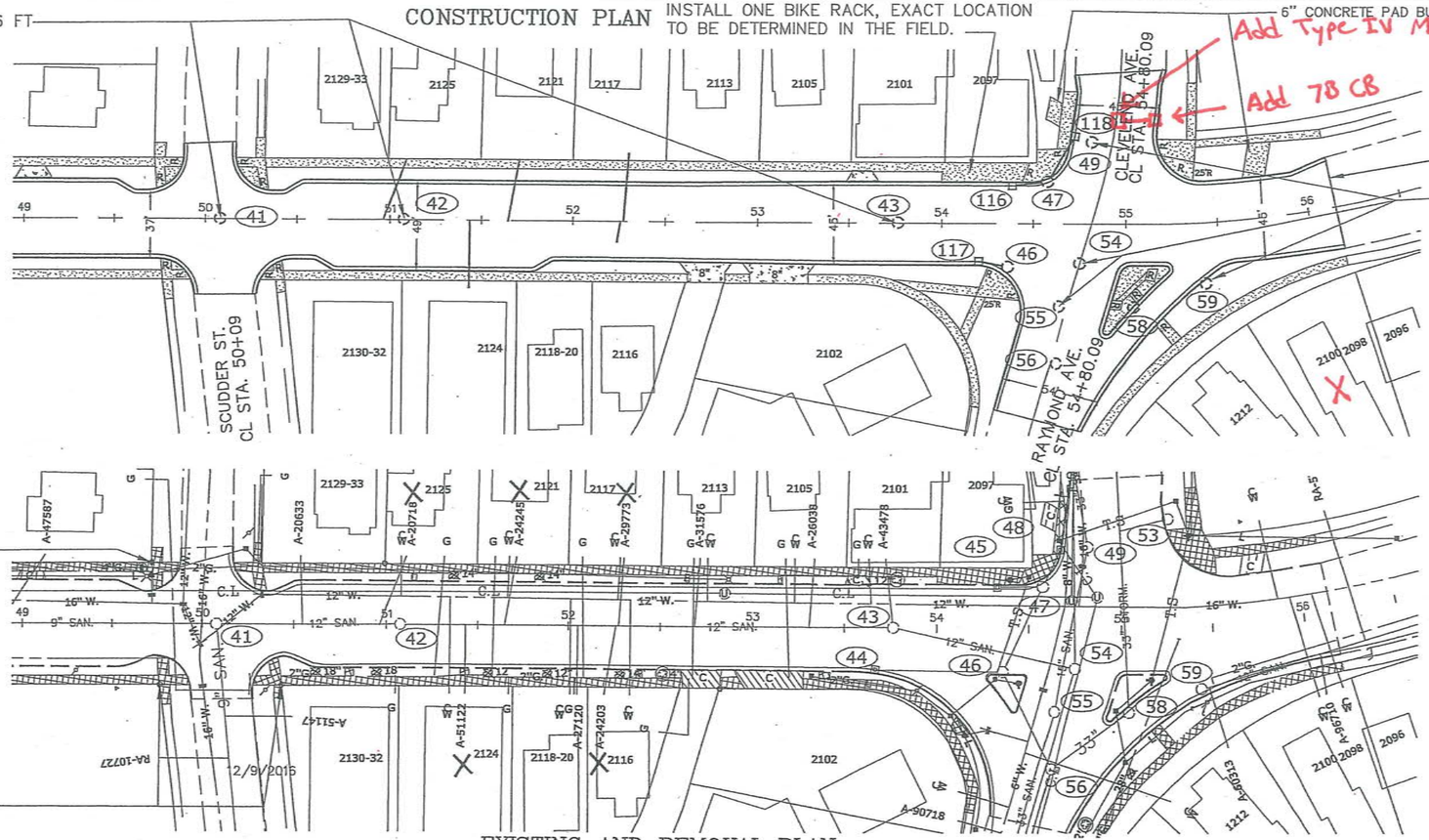
CONSTRUCTION PLAN

INSTALL ONE BIKE RACK, EXACT LOCATION TO BE DETERMINED IN THE FIELD.

6" CONCRETE PAD BUS STOP

Add Type IV MH

Add 78 CB



END S.A.P. 164-121-007
STA.56+14
RECONSTRUCT BRICK MH 49, MH 54 MH 55 AND MH 59 -6 FT DEPTH. PER STANDARD PLATE 2322F

NORTH

SCALE IN FEET
40 30 20 10 0 20 40
ELECTRONIC SURVEY

POSSIBLE MONUMENT RESETTING
BID ITEM 2013.602

POSSIBLE MONUMENT RESETTING
BID ITEM 2013.602

COMO AVENUE
SCUDDER to RAYMOND

EXISTING AND REMOVAL PLAN

SAINT PAUL	DESIGNED	ASO	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
	DRAWN	ASO	Signature: _____ ENGINEER Date: 3/10/2017 Lic. No. 43099
	APPROVED	BRM	

PREPARED BY STREET ENGINEERING DIVISION FOR THE CITY OF ST. PAUL, DEPARTMENT OF PUBLIC WORKS

COMO AVENUE

PROJECT:	17-P-8171	STATE AID PROJECT NUMBER:	164-121-007
DRAWER:	12	CAD NAME:	PROJECTS/CURRENT/COMO/DWG
DWG. NO.	1596	DATE:	3/10/2017
SHEET NO.	21 OF 21 SHEETS		

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