

PLANS SYMBOLS

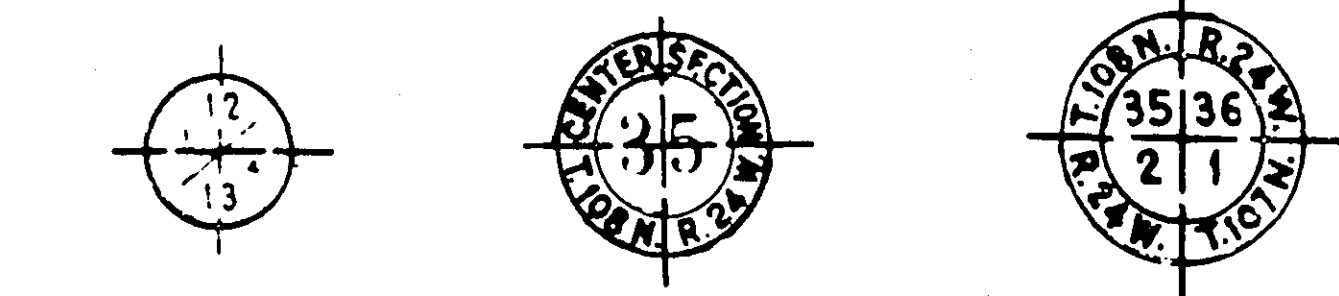
STATE LINE	----
COUNTY LINE	----
TOWNSHIP OR RANGE LINE	----
SECTION LINE	----
QUARTER LINE	----
SIXTEENTH LINE	----
RIGHT-OF-WAY LINE	----
PRESENT RIGHT-OF-WAY LINE	----
CONTROL OF ACCESS LINE	----
PROPERTY LINE (Except Land Lines)	----
VACATED PLATTED PROPERTY	----
CORPORATE OR CITY LIMITS	----
TRUNK HIGHWAY CENTER LINE	----
RETAINING WALL	----
RAILROAD	----
RAILROAD RIGHT-OF-WAY LINE	----
RIVER OR CREEK	----
DRY RUN	----
DRAINAGE DITCH	----
DRAIN TILE	----
CULVERT	----
DROP INLET	----
GUARD RAIL	----
BARBED WIRE FENCE	----
WOVEN WIRE FENCE	----
CHAIN LINK FENCE	----
RAILROAD SNOW FENCE	----
STONE WALL OR FENCE	----
HEDGE	----
RAILROAD CROSSING SIGN	----
RAILROAD CROSSING BELL	----
ELECTRIC WARNING SIGN	----
CROSSING GATE	----
MEANDER CORNER	----

SPRINGS	----
MARSH	----
TIMBER	----
ORCHARD	----
BRUSH	----
NURSERY	----
CATCH BASIN	----
FIRE HYDRANT	----
CATTLE GUARD	----
OVERPASS (Highway Over)	----
UNDERPASS (Highway Under)	----
BRIDGE	----
BUILDING (One Story Frame)	----
F-FRAME C-CONCRETE	----
S-STONE T-TILE	----
B-BRICK ST-STUCCO	----
IRON PIPE OR ROD	----
MONUMENT (STONE, CONCRETE, OR METAL)	----
WOODEN HUB	----
GRAVEL PIT	----
SAND PIT	----
BORROW PIT	----
ROCK QUARRY	----

UTILITIES SYMBOLS

POWER POLE LINE	----
TELEPHONE OR TELEGRAPH POLE LINE	----
JOINT TELEPHONE AND POWER ON POWER POLES	----
ON TELEPHONE POLES	----
ANCHOR	----
STEEL TOWER	----
STREET LIGHT	----
PEDESTAL (TELEPHONE BELL TERMINAL)	----
GAS MAIN	----
WATER MAIN	----

CONDUIT	----
TELEPHONE CABLE IN CONDUIT	----
ELECTRIC CABLE IN CONDUIT	----
TELEPHONE MANHOLE	----
ELECTRIC MANHOLE	----
BURIED TELEPHONE CABLE	----
BURIED ELECTRIC CABLE	----
AERIAL TELEPHONE CABLE	----
SEWER (SANITARY OR STORM)	----
SEWER MANHOLE	----



NOTE: SECTION NUMBERS READ FROM "THE SOUTH"

PIT DATA

PIT NO. _____	Located in _____
PIT NO. _____	Located in _____

THE "MINNESOTA HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION" DATED JANUARY 1, 1972 AS AMENDED BY "SUPPLEMENTAL SPECIFICATIONS" DATED APRIL 1, 1976 SHALL GOVERN.

OFFICE OF COUNTY ENGINEER RAMSEY COUNTY

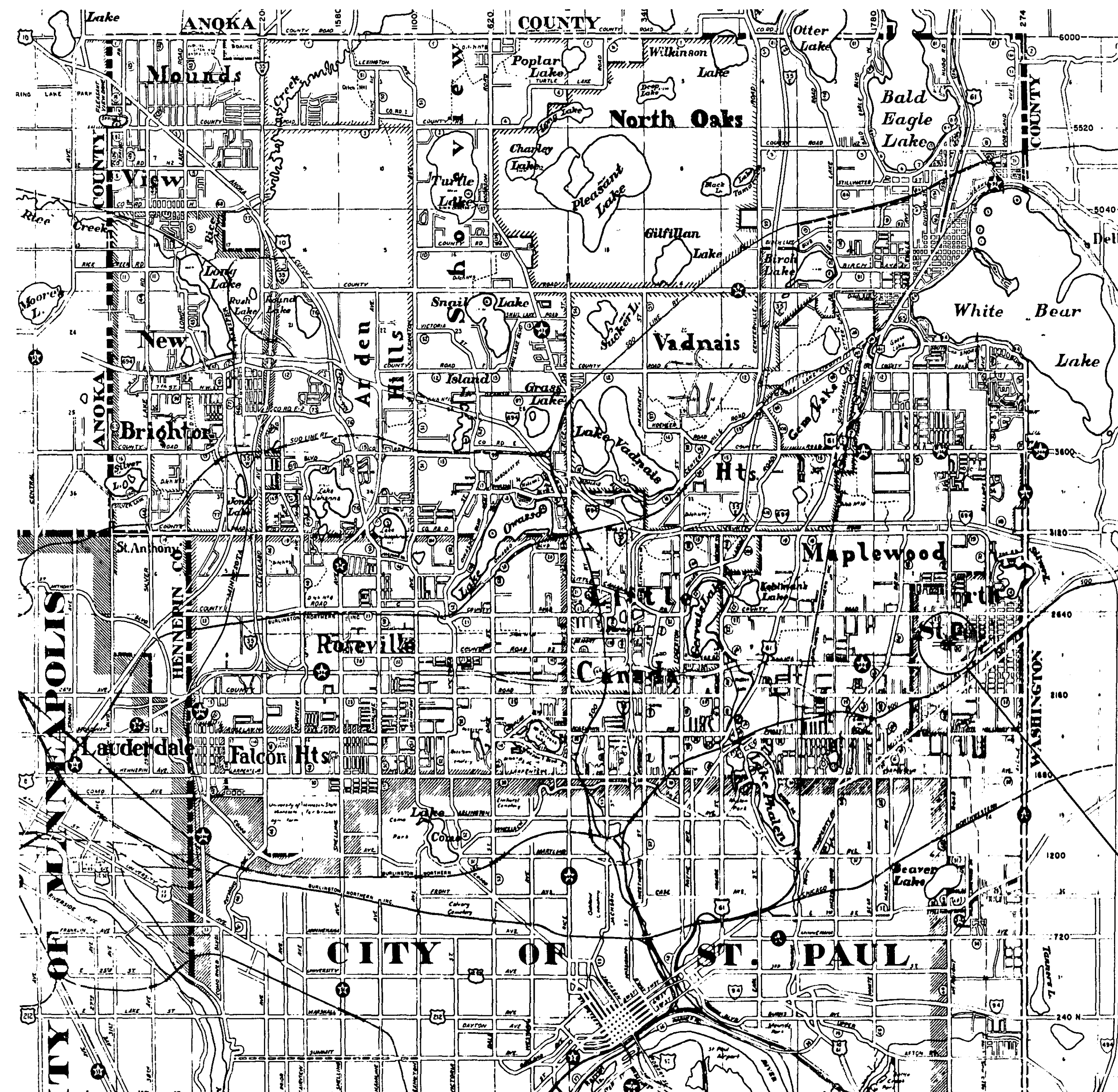
PLAN OF TRAFFIC CONTROL SYSTEM FOR THE INTERSECTION OF

McKNIGHT ROAD & 11th AVENUE

S.A.P. NO. 62-668-15

and

CO. PROJ. NO. TRF 543-31
OPTICOM



INDEX

SHEET NO.	DESCRIPTION
1	TITLE
2	DETAILS
3	INTERSECTION LAYOUT
4	FIELD WIRING DIAGRAM
5	INFORMATION
6	EVP SYSTEM (OPTICOM)

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

Date 12-8-76 Reg. No. 5031

McKNIGHT RD. & 11th AVE.
S.A.P. NO. 62-668-15

RECOMMENDED FOR APPROVAL	DATE 12/3/76
RECOMMENDED FOR APPROVAL	DATE 12/3/76
RECOMMENDED FOR APPROVAL	DATE 12-3-76
RECOMMENDED FOR APPROVAL	DATE 12/3/76
RECOMMENDED FOR APPROVAL	DATE 12-3-76
APPROVED	DATE

RECOMMENDED FOR APPROVAL	DATE 12-2-76
RECOMMENDED FOR APPROVAL	DATE 12-7-76
APPROVED	DATE
APPROVED	DATE 2-15-77
APPROVED	DATE

MINNESOTA STATE HIGHWAY DEPARTMENT

RECOMMENDED FOR APPROVAL	DATE 9-2-77
RECOMMENDED FOR APPROVAL	DATE 9/20/77
APPROVAL	DATE 9/2/77

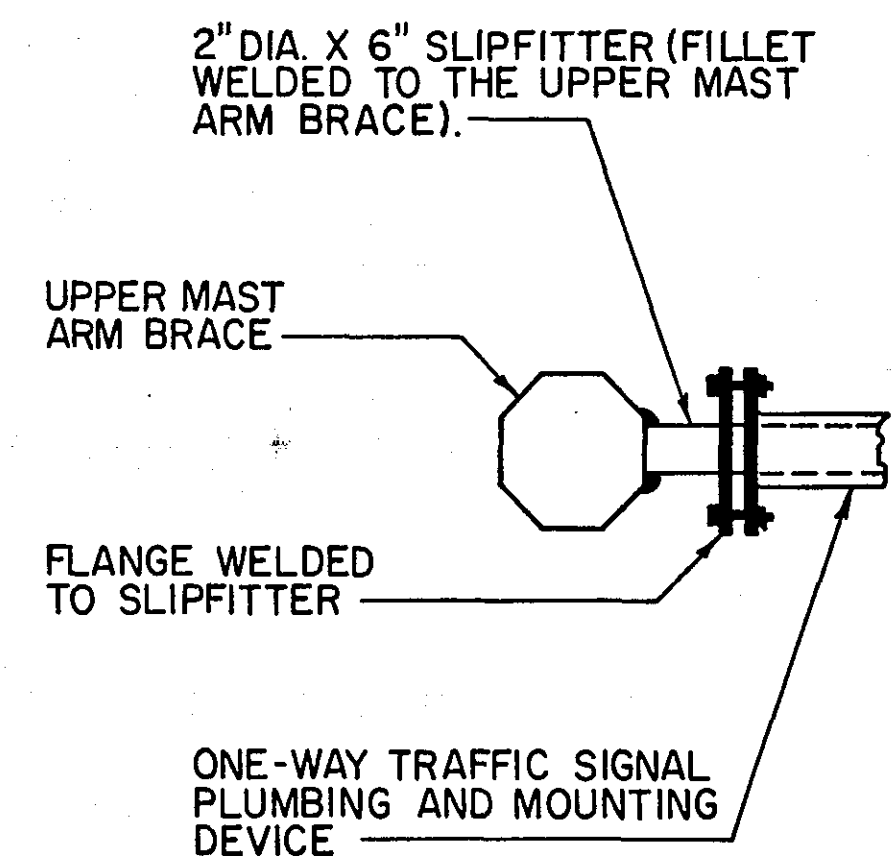
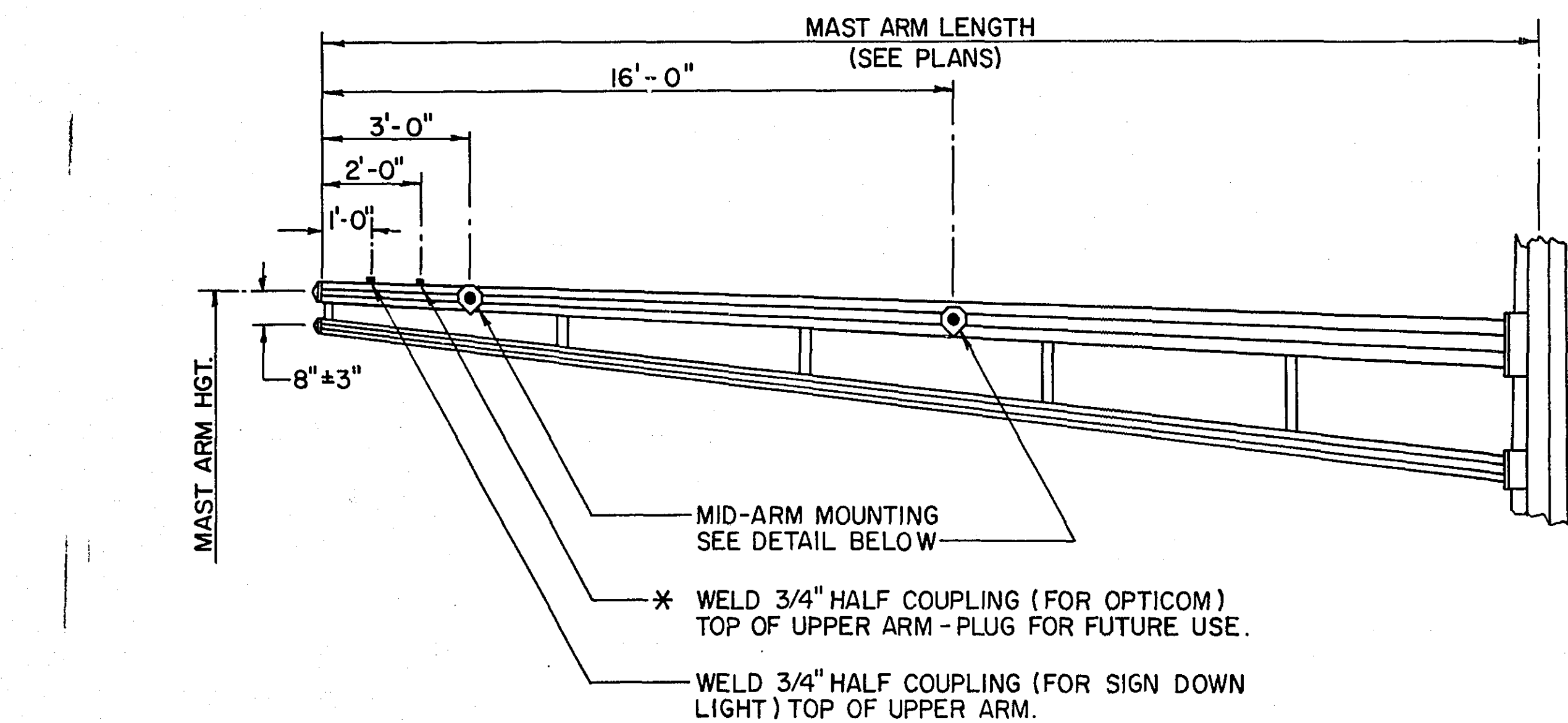
ACCOUNT NO. 50169

S.A.P. NO. 62-668-15 and CO. PROJ. NO. TRF 543-31

Sheet No. 1 of 6 Sheets

23-109

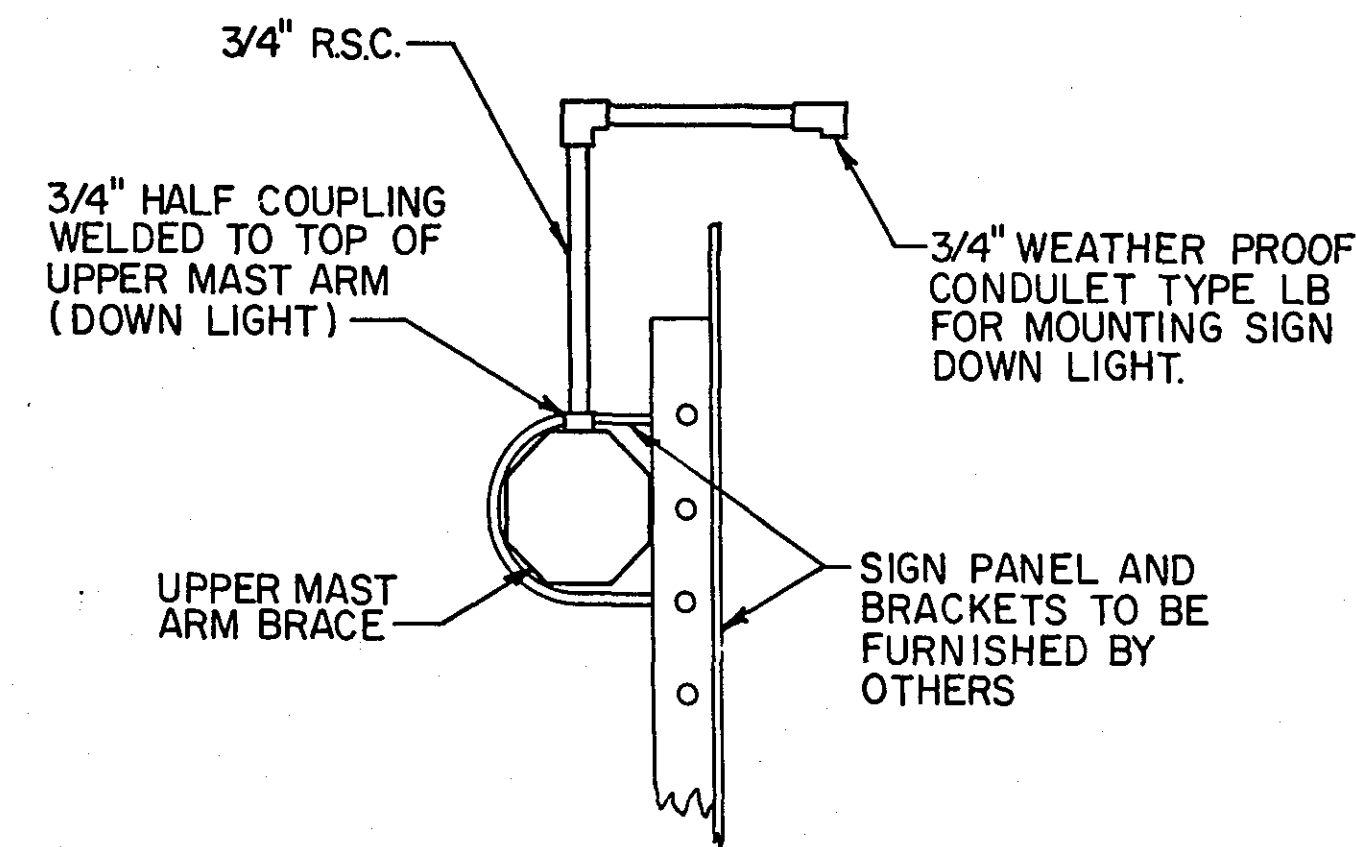
MAST ARM DETAILS
FOR MAST ARMS LISTED BELOW



MID-ARM MOUNTING DETAIL

MAST ARM DETAILS		
SYSTEM	INTERSECTION	MAST ARM No.
	McKNIGHT RD. & 11th AVE.	(1) (3)

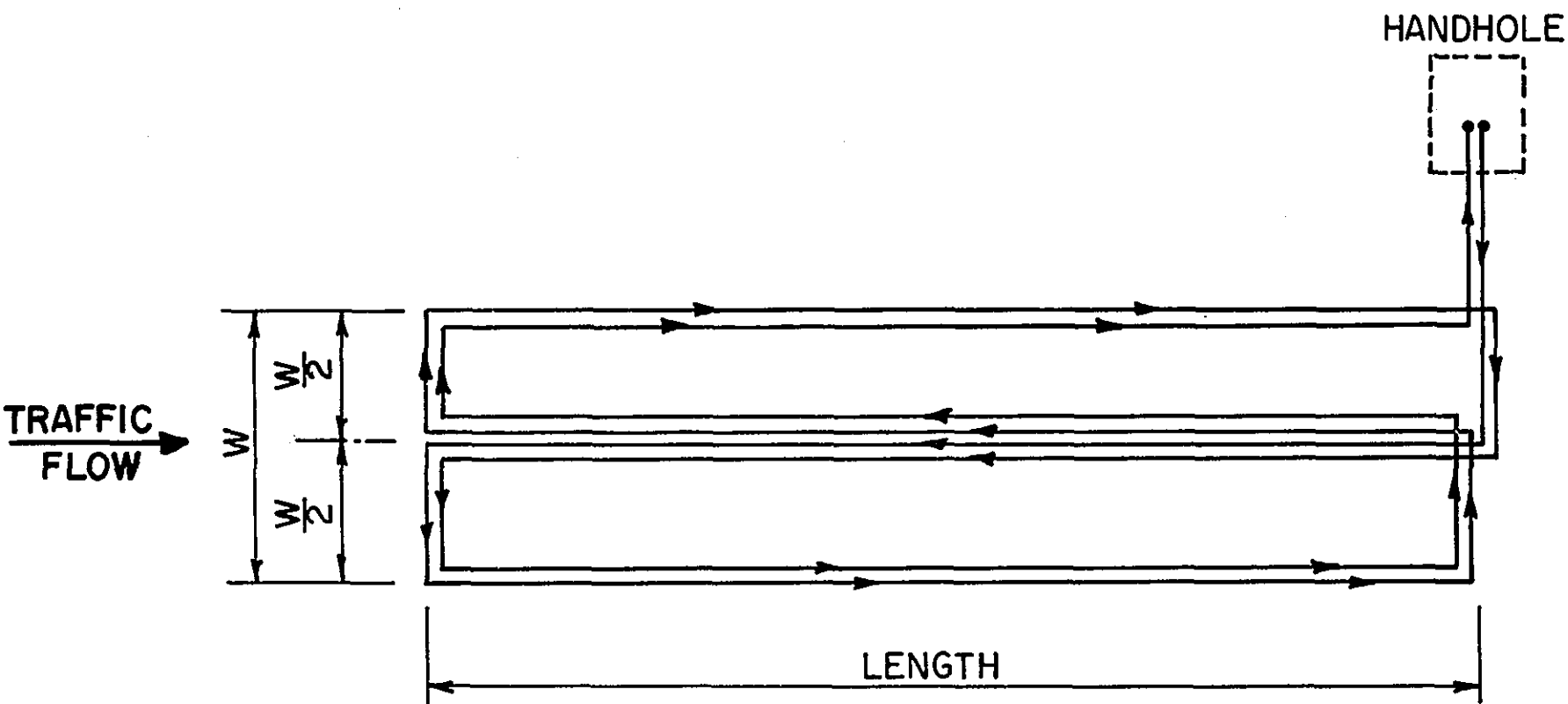
* NOTE: PROVIDE 3/4" HALF COUPLING & PLUG ON ALL MAST ARMS FOR OPTICOM.



SIGN DOWN LIGHT
MOUNTING DETAIL

STANDARD PLATES	
PLATE NO.	TITLE
* 8110 B	TRAFFIC SIGNAL BRACKETING (POLE MOUNTED)
* 8111 A	TRAFFIC SIGNAL BRACKETING (PEDESTAL MOUNTED)
* 8112 B	PEDESTAL FOUNDATION
8113 B	MAGNETIC VEHICLE DETECTOR INSTALLATION
* 8115 B	PEDESTRIAN PUSH BUTTON INSTALLATION
* 8116 C	STEEL GUARD POST
* 8117 E	PRECAST CONCRETE HANDHOLE
* 8118 B	SERVICE EQUIPMENT & POLE, TRAFFIC CONTROL SIGNALS
* 8119 B	GROUND MOUNTED CABINET FOUNDATION
8120 D	MAST ARM POLE FOUNDATION
* 8122 B	PEDESTAL AND PEDESTAL BASE
* 8123 A	POLE AND MAST ARM (LUMINAIRES AND TRAFFIC LIGHTS)
* 8124 B	SIGNAL HEAD MOUNTS
8125 A	SWING-AWAY HINGE (FOR TRAFFIC SIGNAL ARM MAST)
* 8130 B	SAW CUT LOOP DETECTORS

* STANDARD PLATES APPLICABLE TO THIS PROJECT



DB2-1 and DB1-1
LOOP CONFIGURATION

STATEMENT OF ESTIMATED QUANTITIES				
PROJECT NO.	ITEM NO.	ITEM	UNIT	QUANT.
62-668-15	2565.501	FULL TRAFFIC ACTUATED TRAFFIC CONTROL SYSTEM	SIGNAL SYSTEM	1
* CO. PROJ. NO. TRF 543-31	565.613	EMERGENCY VEHICLE PRE-EMPTION SYSTEM	SYSTEM	1

* ADD ALTERNATE "A"
SEE SHEET NO. 6

ABBREVIATIONS

EQUIPMENT & INDICATIONS

RED - RED
YEL - YELLOW
GRN - GREEN
LTA - LEFT TURN ARROW
THA - THRU ARROW
RTA - RIGHT TURN ARROW
TRA - THRU AND RIGHT ARROW
WLK - WALK
NEU - NEUTRAL
DWK - DON'T WALK
SW - SWITCH
SWD - SWITCHED
LUM - LUMINAIRE
PA1 (eg) - PEDESTRIAN INDICATION-"A" PHASE
PBB2 (eg) - PUSH BUTTON-"B" PHASE
C3 (eg) - SIGNAL HEAD-"C" PHASE
DA4 (eg) - DETECTOR-"A" PHASE
H.H. - HANDHOLE
GR.R. - GROUND ROD
SERV. - SERVICE
EVP - EMERGENCY VEHICLE PRE-EMPTION

DNL - DOWNLIGHT
P.E.C. - PHOTOELECTRIC CELL
ST. LHT. - STREET LIGHT
CH. - CHECK
S.O.P. - SOURCE OF POWER
EQ.G. - EQUIPMENT GROUND
SPR - SPARE CONDUCTOR

COLOR CODING OF CONDUCTOR

R - RED
O - ORANGE
BL - BLUE
WH - WHITE
R/BLK - RED WITH BLACK TRACER
O/BLK - ORANGE WITH BLACK TRACER
BL/BLK - BLUE WITH BLACK TRACER
WH/BLK - WHITE WITH BLACK TRACER
BLK - BLACK
BLK/WH - BLACK WITH WHITE TRACER
G/BLK - GREEN WITH BLACK TRACER
G - GREEN

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.
Dean R. Amble
Date 12-7-76 Reg. No. 5031

DETAILS

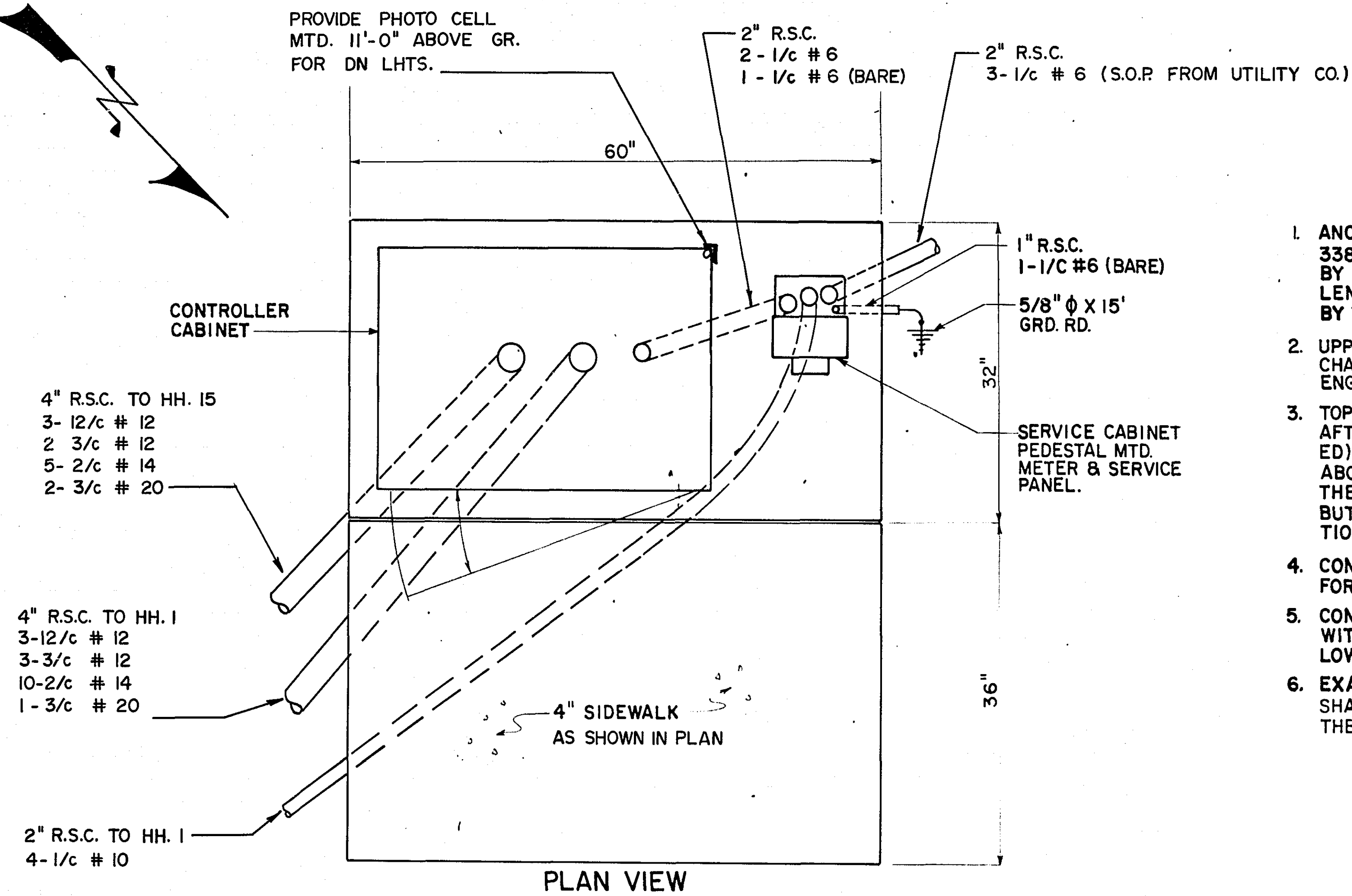
ACCOUNT NO. 50169

S.A.P. NO. 62-668-15

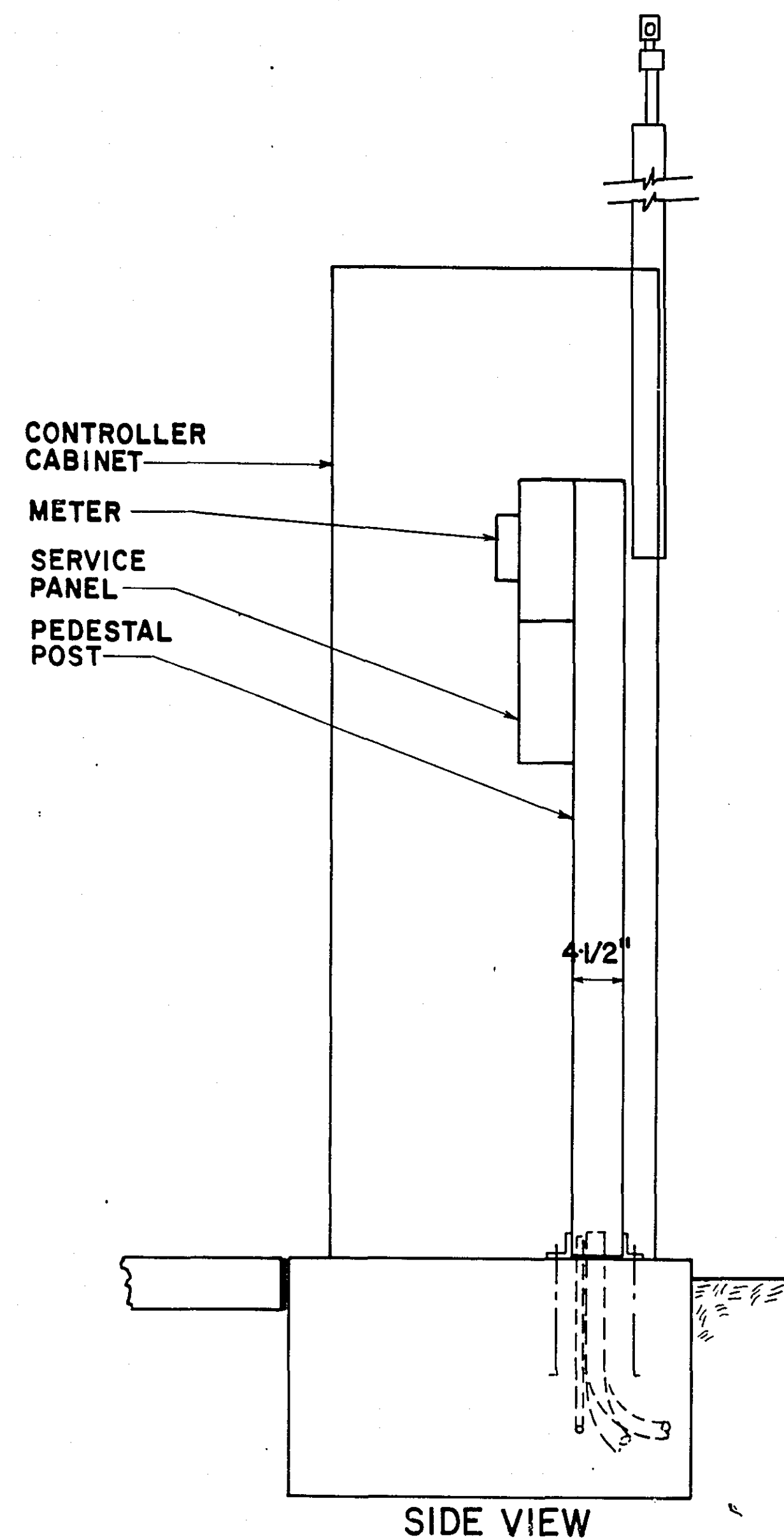
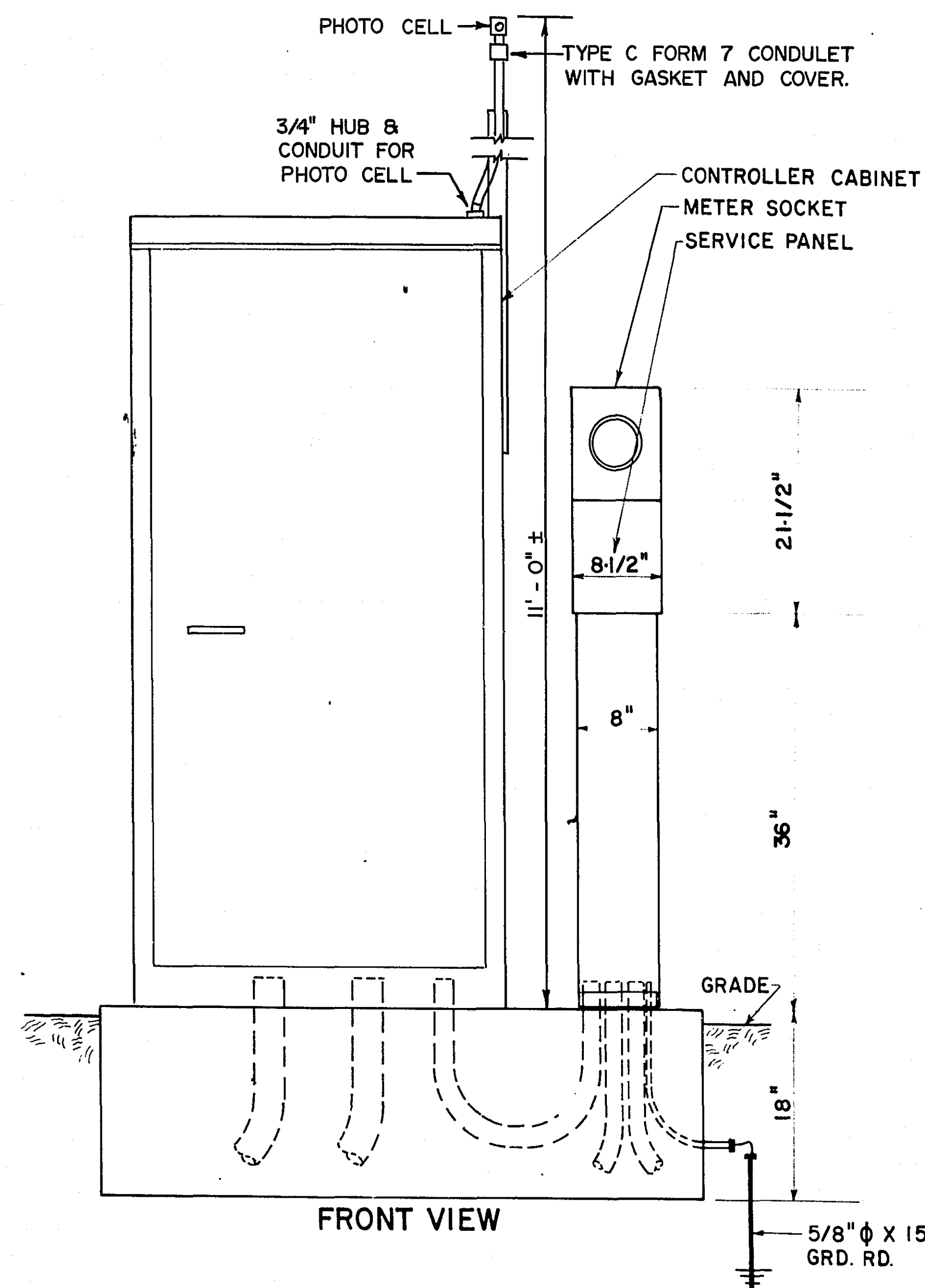
SHEET NO. 2 OF 6 SHEETS

23-109

EQUIPMENT PAD DETAILS



1. ANCHOR RODS, NUTS AND WASHERS PER MN/DOT 3385 OR APPROVED EQUAL SET AS RECOMMENDED BY CABINET MANUFACTURER (NUMBER, SIZE AND LENGTH OF ANCHOR RODS SHALL BE AS REQUIRED BY THE CABINET (MANUFACTURER).
2. UPPER PART OF FOUNDATION SHALL BE BEVELED OR CHAMFERED IN A NEAT MANNER AS DIRECTED BY THE ENGINEER IN THE FIELD.
3. TOP OF CONDUITS SHALL BE THREADED AND CAPPED AFTER INSTALLATION (UNTIL CABLES ARE INSTALLED) CONDUIT SHALL PROJECT A MINIMUM OF 2" ABOVE CONCRETE AND SHALL BE LOCATED INSIDE THE CABINET WHERE DIRECTED BY THE ENGINEER BUT SHALL NOT INTERFERE WITH CABINET FUNCTIONS. (SUPPORTING MEMBERS, ETC.)
4. CONCRETE MIX 3A32 OR EQUAL SHALL BE USED FOR FOUNDATION AND CONCRETE WALK.
5. CONDUITS WHICH HAVE BOTH ENDS TERMINATING WITHIN THE PAD SHALL NOT BE INSTALLED BELOW THE CONCRETE.
6. EXACT LOCATIONS OF CONDUIT WITHIN THE PAD SHALL BE AS DETERMINED BY THE ENGINEER IN THE FIELD.



EQUIPMENT PAD DETAILS

McKNIGHT ROAD & 11TH AVENUE

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

Paul L. Kohn

Date: 9-25-78 Reg. No. 12703

SUPPLEMENT AGREEMENT DATED 9-20-78

S.A.P. No. 62-668-15

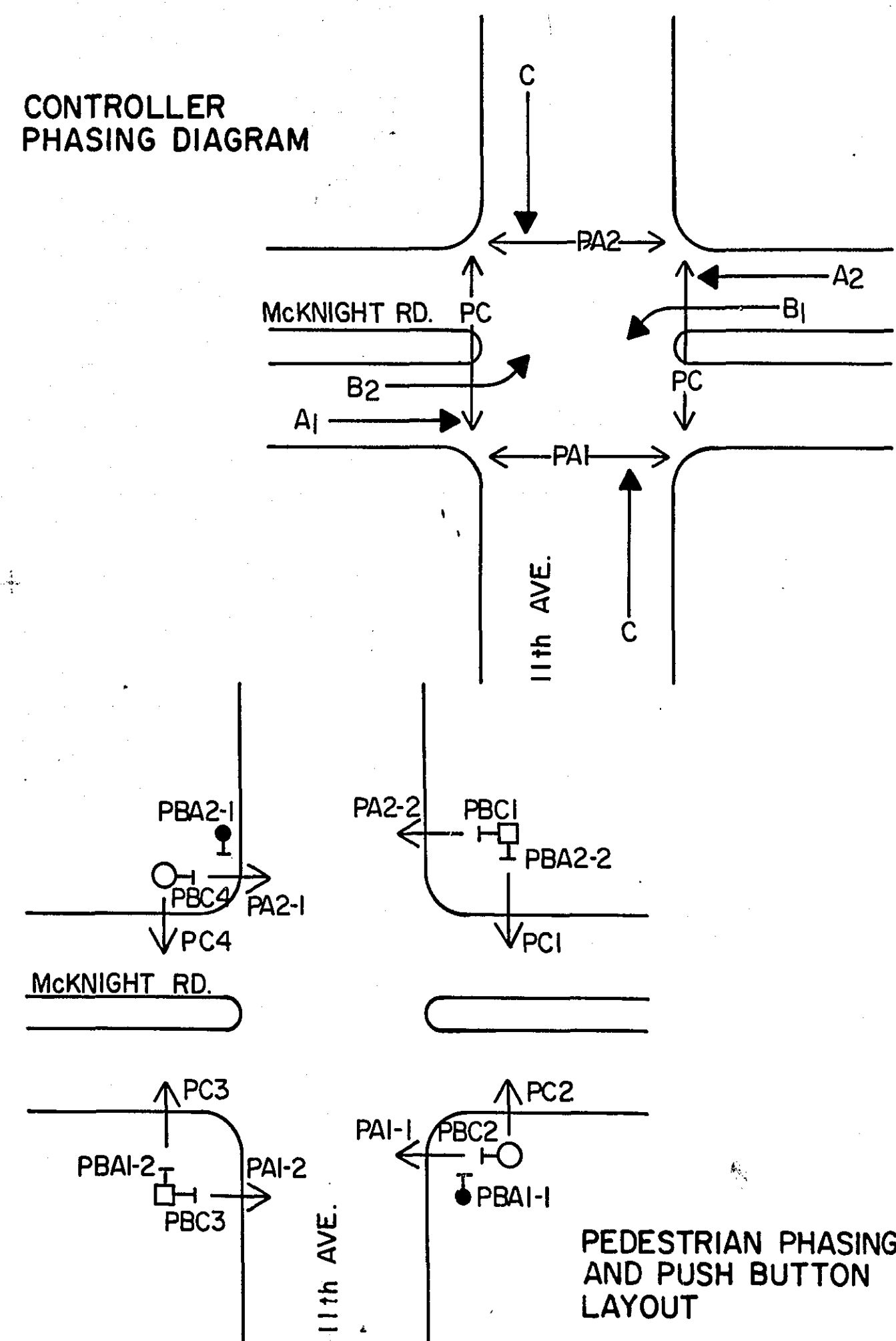
Sheet No. 2A of 7 Sheets

LEGEND OF SYMBOLS	
SIGNAL BASE No. _____	(5)
SIGNAL FACE No. _____	(A2)
CONTROLLER AND CABINET _____	
CONTROLLER AND CABINET-INPLACE _____	
HANDHOLE _____	
HANDHOLE-INPLACE _____	
RIGID STEEL CONDUIT (R.S.C.) _____	
RIGID STEEL CONDUIT (R.S.C.)-INPLACE _____	
SIGNAL FACE _____	
SIGNAL FACE WITH BACKGROUND SHIELD _____	
SIGNAL FACE - INPLACE _____	
PEDESTRIAN INDICATIONS _____	
PEDESTRIAN INDICATIONS - INPLACE _____	
PEDESTRIAN PUSH BUTTON ON PEDESTAL OR POLE _____	
PEDESTRIAN PUSH BUTTON STATION _____	
TRAFFIC SIGNAL PEDESTAL _____	
TRAFFIC SIGNAL PEDESTAL - INPLACE _____	
TRAFFIC SIGNAL POLE AND MAST ARM _____	
TRAFFIC SIGNAL POLE AND MAST ARM - INPLACE _____	
MAST ARM AND LUMINAIRE _____	
MAST ARM AND LUMINAIRE - INPLACE _____	
WOOD POLE _____	
WOOD POLE - INPLACE _____	
SOURCE OF POWER _____	
EMERGENCY VEHICLE PRE-EMPTION DETECTOR LOCATION _____	

VEHICLE DETECTION		
NUMBER	SIZE	REMARKS
DAI-1	6' X 6'	CALL & EXTEND
DAI-2	6' X 6'	CALL & EXTEND
DAI-3	6' X 18'	CALL ONLY
DA2-1	6' X 6'	CALL & EXTEND
DA2-2	6' X 6'	CALL & EXTEND
DA2-3	6' X 18'	CALL ONLY
* DB2-1	6' X 20'	CALL & EXTEND
DB2-2	2-6' X 20'	CALL & EXTEND
* DBI-1	6' X 20'	CALL & EXTEND
DBI-2	2-6' X 20'	CALL & EXTEND
DC1	2-6' X 15'	EXTEND ONLY
DC2	2-6' X 15'	CALL & EXTEND
DC3	2-6' X 15'	EXTEND ONLY
DC4	2-6' X 15'	CALL & EXTEND

* SEE DETAIL - SHEET NO. 2

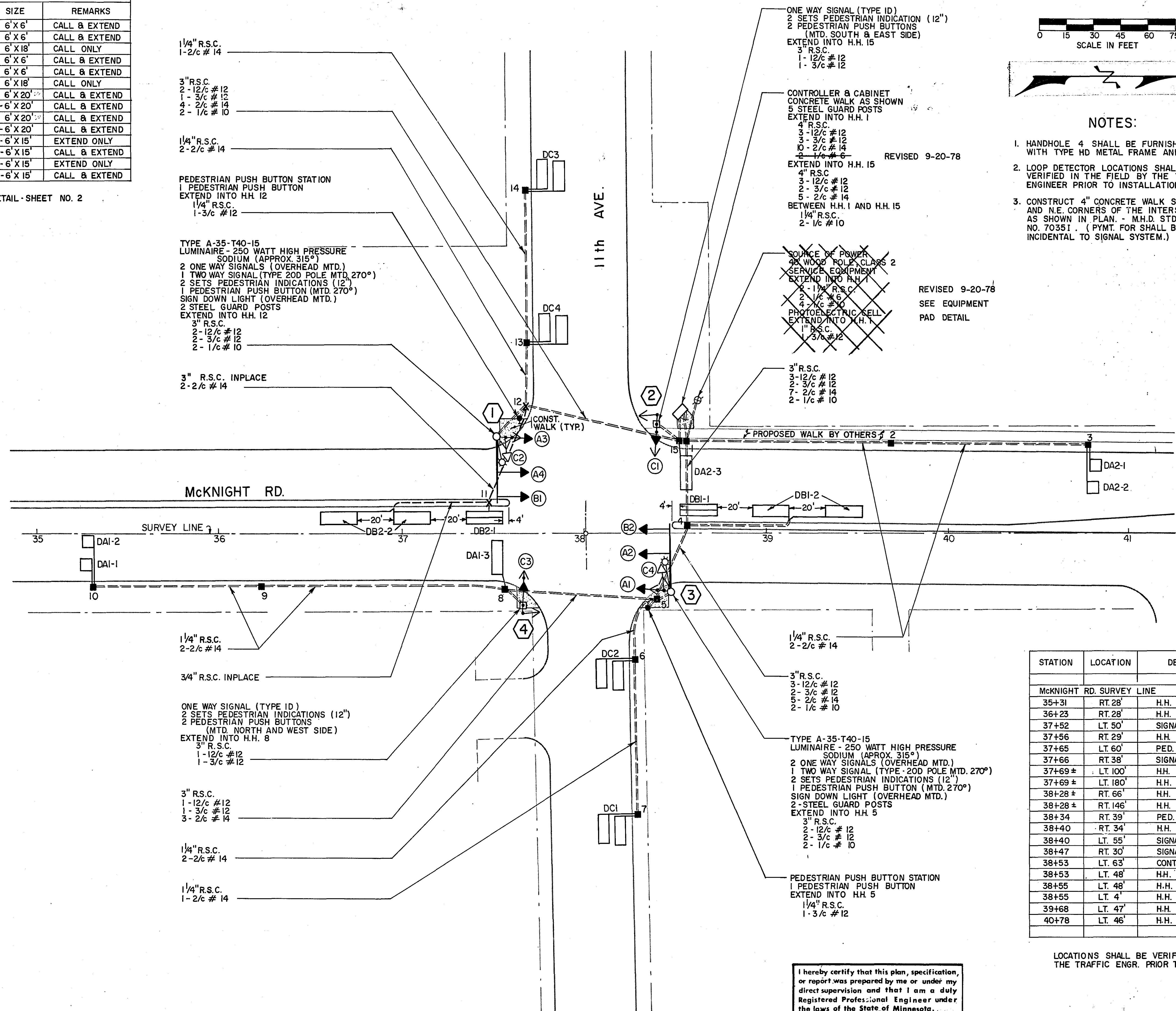
CONTROLLER PHASING DIAGRAM



PEDESTRIAN PHASING AND PUSH BUTTON LAYOUT

SIGNAL INDICATION CHART							
FACE	PHASE	FLASH	INDICATION SIZE				
			R	Y	G	←	→
A1	A1	R	12"	12"	12"	-	-
* A2	A1	R	12"	12"	12"	-	-
A3	A2	R	12"	12"	12"	-	-
* A4	A2	R	12"	12"	12"	-	-
* B1	B1	R	12"	12"	-	12"	-
* B2	B2	R	12"	12"	-	12"	-
C1	C	R	12"	12"	12"	-	-
C2	C	R	12"	12"	12"	-	-
C3	C	R	12"	12"	12"	-	-
C4	C	R	12"	12"	12"	-	-

* SPECIAL SIGNAL FACES
(SEE SPECIAL PROVISIONS)



LOCATIONS SHALL BE VERIFIED BY
THE TRAFFIC ENGR. PRIOR TO INSTALLATION

INTERSECTION LAYOUT
McKNIGHT RD. & 11th AVE.

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or report was prepared by me or under my
direct supervision and that I am a duly
Registered Professional Engineer under
the laws of the State of Minnesota.
Dean K. Amble
Date 12-7-76 Reg. No. 5031

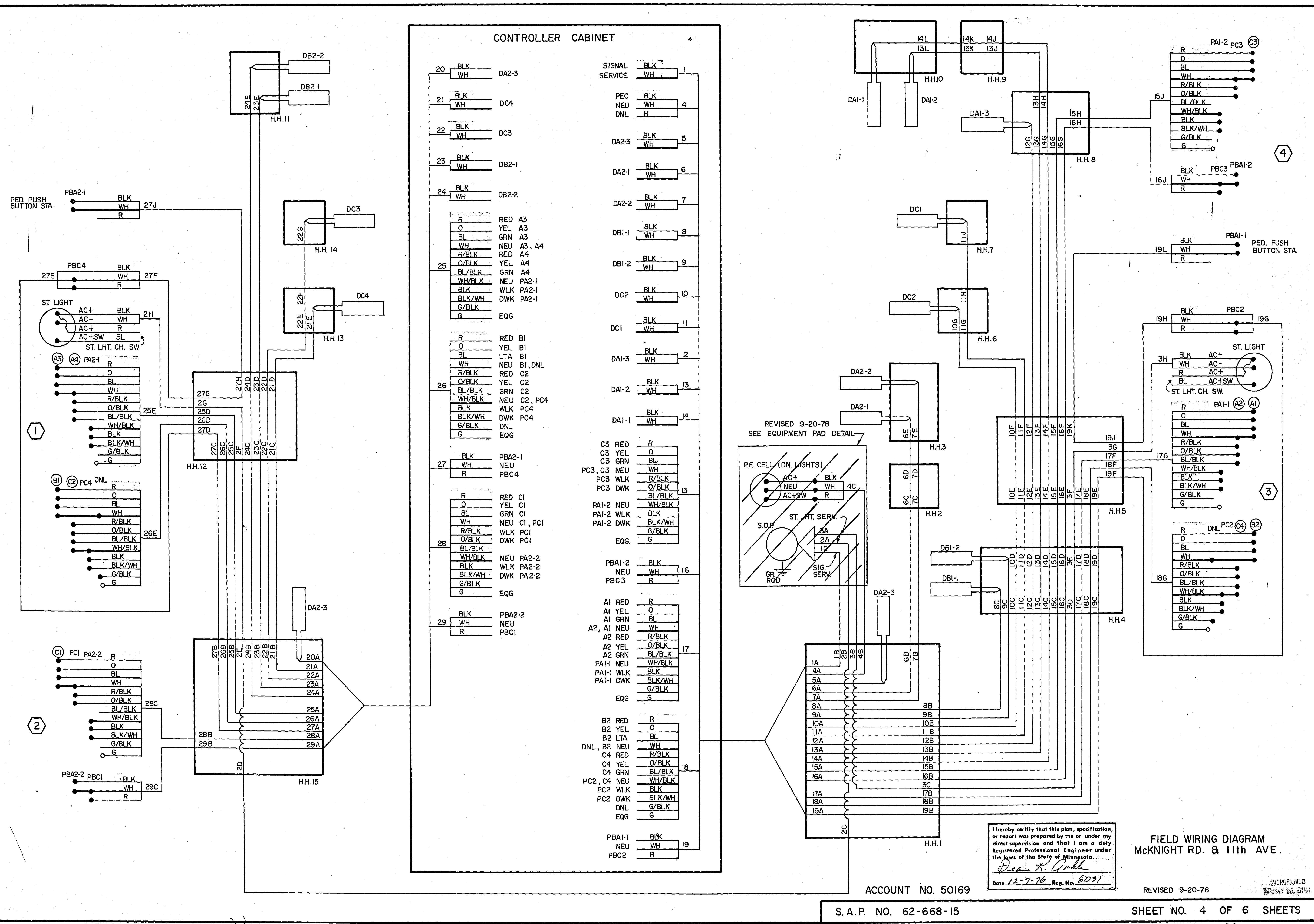
ACCOUNT NO. 50169

REVISED 9-20-78

S.A.P. NO. 62-668-15

SHEET NO. 3 OF 6 SHEETS

23-109



CONTROLLER CABINET

20	BLK	DA2-3	SIGNAL	BLK	1
	WH		SERVICE	WH	
21	BLK	DC4	PEC	BLK	4
	WH		NEU	WH	
22	BLK	DC3	DNL	R	
	WH				
23	BLK	DB2-1	DA2-3	BLK	5
	WH			WH	
24	BLK	DB2-2	DA2-1	BLK	6
	WH			WH	
25	R	RED A3	DA2-2	BLK	7
	O	YEL A3		WH	
	BL	GRN A3	DBI-1	BLK	8
	WH	NEU A3, A4		WH	
	R/BLK	RED A4	DBI-2	BLK	9
	O/BLK	YEL A4		WH	
	BL/BLK	GRN A4	DC2	BLK	10
	WH/BLK	NEU PA2-1		WH	
	BLK	WLK PA2-1	DC1	BLK	11
	BLK/WH	DWK PA2-1		WH	
	G/BLK		DAI-3	BLK	12
	G	EQG		WH	
26	R	RED B1	DAI-2	BLK	13
	O	YEL B1		WH	
	BL	LTA B1	DAI-1	BLK	14
	WH	NEU B1, DNL		WH	
	R/BLK	RED C2			
	O/BLK	YEL C2			
	BL/BLK	GRN C2			
	WH/BLK	NEU C2, PC4			
	BLK	WLK PC4			
	BLK/WH	DWK PC4			
	G/BLK	DNL PC4			
	G	EQG			
27	BLK	PBA2-1	C3 RED	R	
	WH	NEU	C3 YEL	O	
	R	PBC4	C3 GRN	BL	
			PC3, C3 NEU	WH	
			PC3 WLK	R/BLK	
			PC3 DWK	O/BLK	
			PAI-2 NEU	BL/BLK	
			PAI-2 WLK	WH/BLK	
			PAI-2 DWK	BLK	
			EQG	BLK/WH	
				G/BLK	
				G	
28	R	RED C1	PBAI-2	BLK	16
	O	YEL C1	NEU	WH	
	BL	GRN C1	PBC3	R	
	WH	NEU C1, PC1			
	R/BLK	WLK PC1			
	O/BLK	DWK PC1			
	BL/BLK				
	WH/BLK	NEU PA2-2			
	BLK	WLK PA2-2			
	BLK/WH	DWK PA2-2			
	G/BLK				
	G	EQG			
29	BLK	PBA2-2	A1 RED	R	
	WH	NEU	A1 YEL	O	
	R	PBC1	A1 GRN	BL	
			A2 RED	R/BLK	
			A2 YEL	O/BLK	
			A2 GRN	BL/BLK	
			PAI-1 NEU	WH/BLK	
			PAI-1 WLK	BLK	
			PAI-1 DWK	BLK/WH	
				G/BLK	
				G	
			EQG		
			B2 RED	R	
			B2 YEL	O	
			B2 LTA	BL	
			DNL, B2 NEU	WH	
			C4 RED	R/BLK	
			C4 YEL	O/BLK	
			C4 GRN	BL/BLK	
			PC2, C4 NEU	WH/BLK	
			PC2 WLK	BLK	
			PC2 DWK	BLK/WH	
				G/BLK	
				G	
			PBAI-1	BLK	19
			NEU	WH	
			PBC2	R	

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James K. Gable
Date 12-7-76 Reg. No. 5031

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S.A.P. NO. 62-668-15

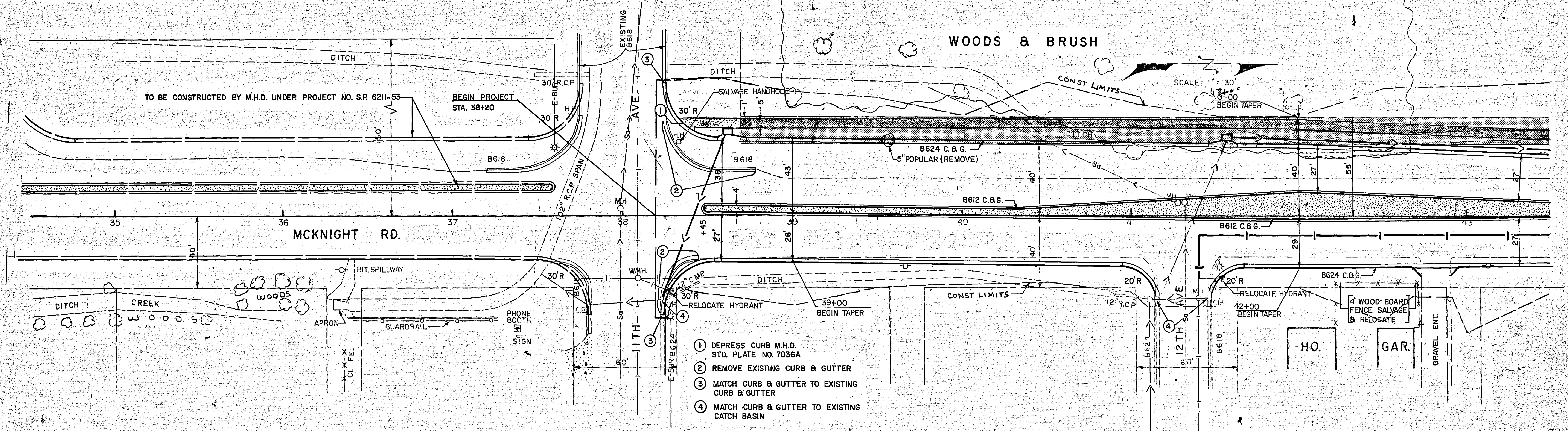
FIELD WIRING DIAGRAM
McKNIGHT RD. & 11th AVE.

REVISED 9-20-78

SHEET NO. 4 OF 6 SHEETS

23-109

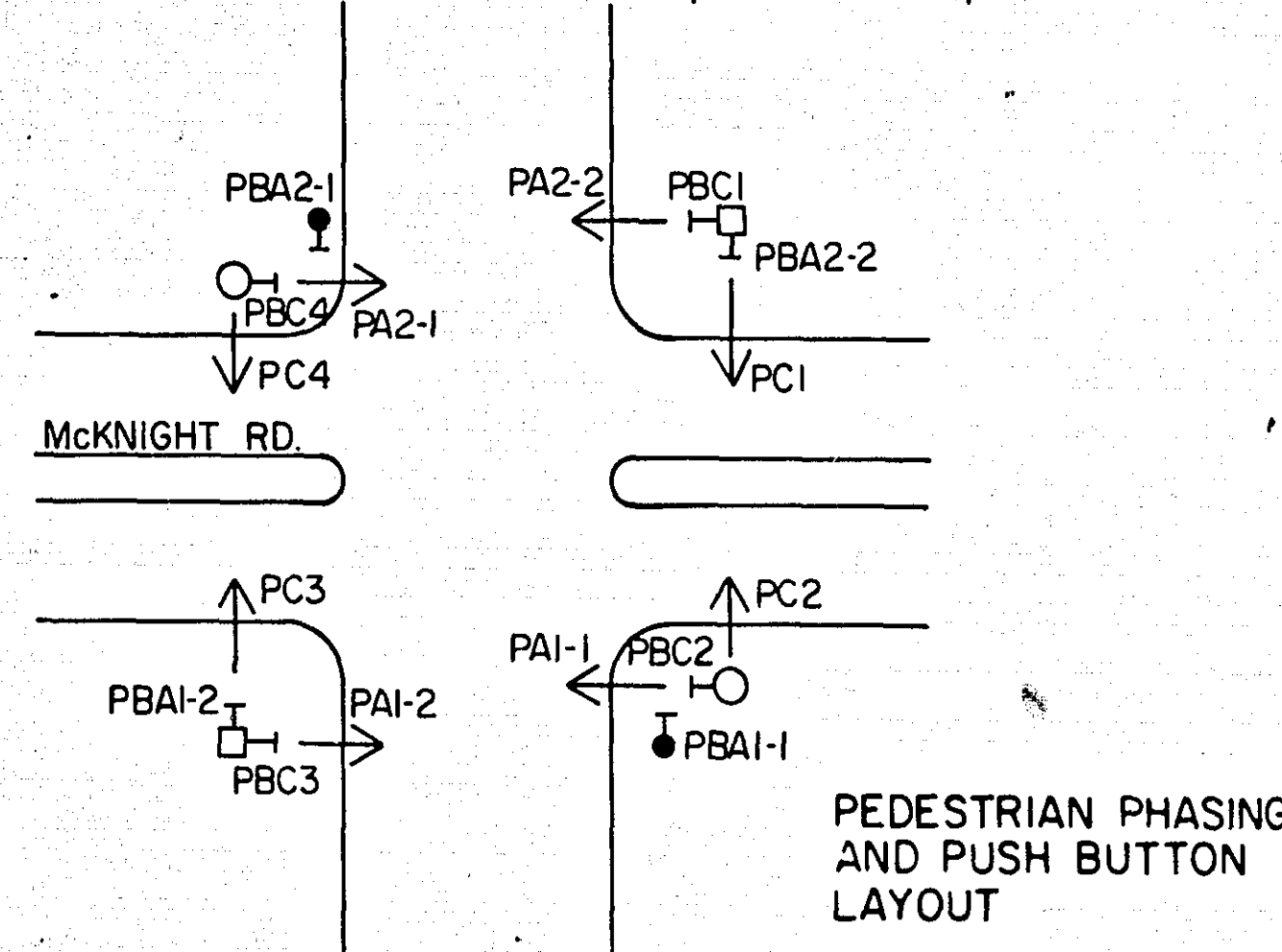
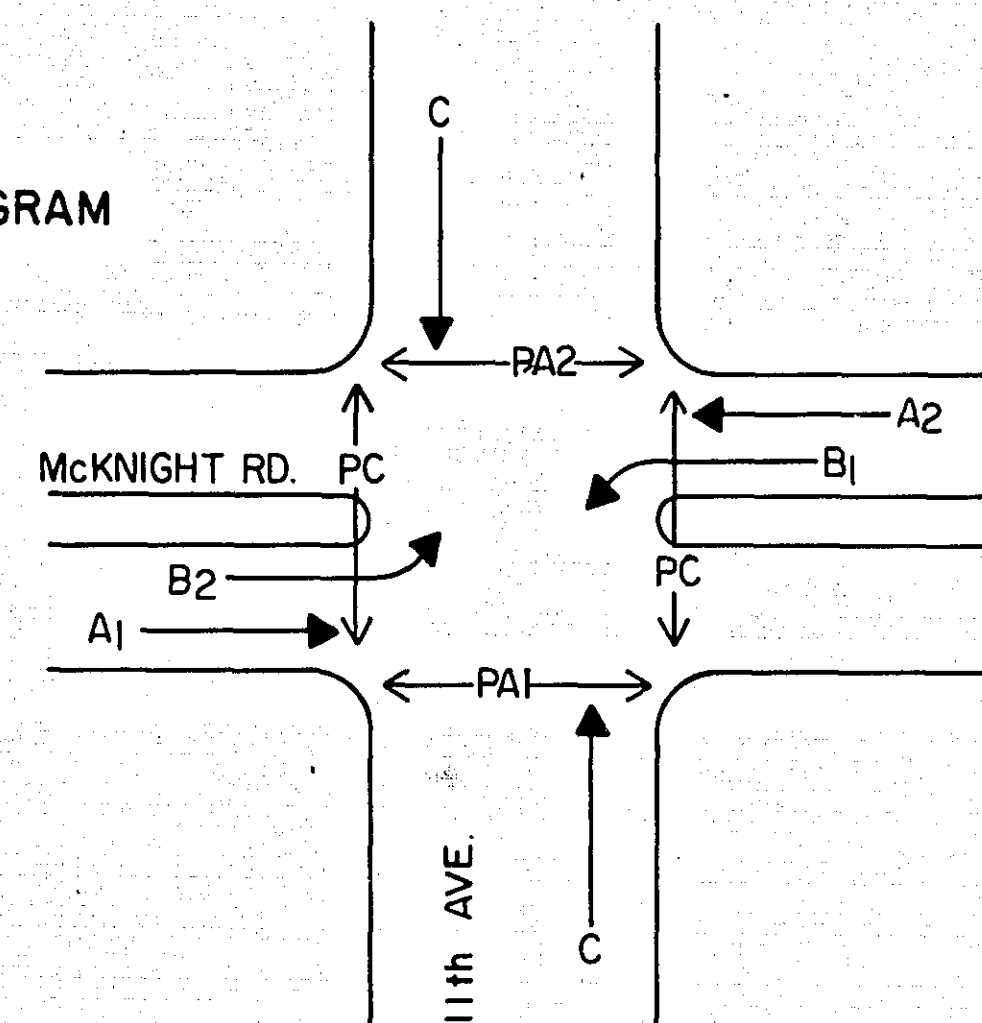
TOPOGRAPHY	PLOTTED BY	DATE	CHECKED BY	DATE
UTILITIES	PLOTTED BY	DATE	CHECKED BY	DATE
PROFILE	PLOTTED BY	DATE	CHECKED BY	DATE



LEGEND OF SYMBOLS

SIGNAL BASE No.	5
SIGNAL FACE No.	A2
CONTROLLER AND CABINET	
CONTROLLER AND CABINET-INPLACE	
HANDHOLE	
HANDHOLE-INPLACE	
RIGID STEEL CONDUIT (R.S.C.)	
RIGID STEEL CONDUIT (R.S.C.)-INPLACE	
SIGNAL FACE	
SIGNAL FACE WITH BACKGROUND SHIELD	
SIGNAL FACE - INPLACE	
PEDESTRIAN INDICATIONS	
PEDESTRIAN INDICATIONS-INPLACE	
PEDESTRIAN PUSH BUTTON ON PEDESTAL OR POLE	
PEDESTRIAN PUSH BUTTON STATION	
TRAFFIC SIGNAL PEDESTAL	
TRAFFIC SIGNAL PEDESTAL-INPLACE	
TRAFFIC SIGNAL POLE AND MAST ARM	
TRAFFIC SIGNAL POLE AND MAST ARM-INPLACE	
MAST ARM AND LUMINAIRE	
MAST ARM AND LUMINAIRE-INPLACE	
WOOD POLE	
WOOD POLE-INPLACE	
SOURCE OF POWER	
EMERGENCY VEHICLE PRE-EMPTION DETECTOR LOCATION	

CONTROLLER PHASING DIAGRAM



PEDESTRIAN PHASING AND PUSH BUTTON LAYOUT

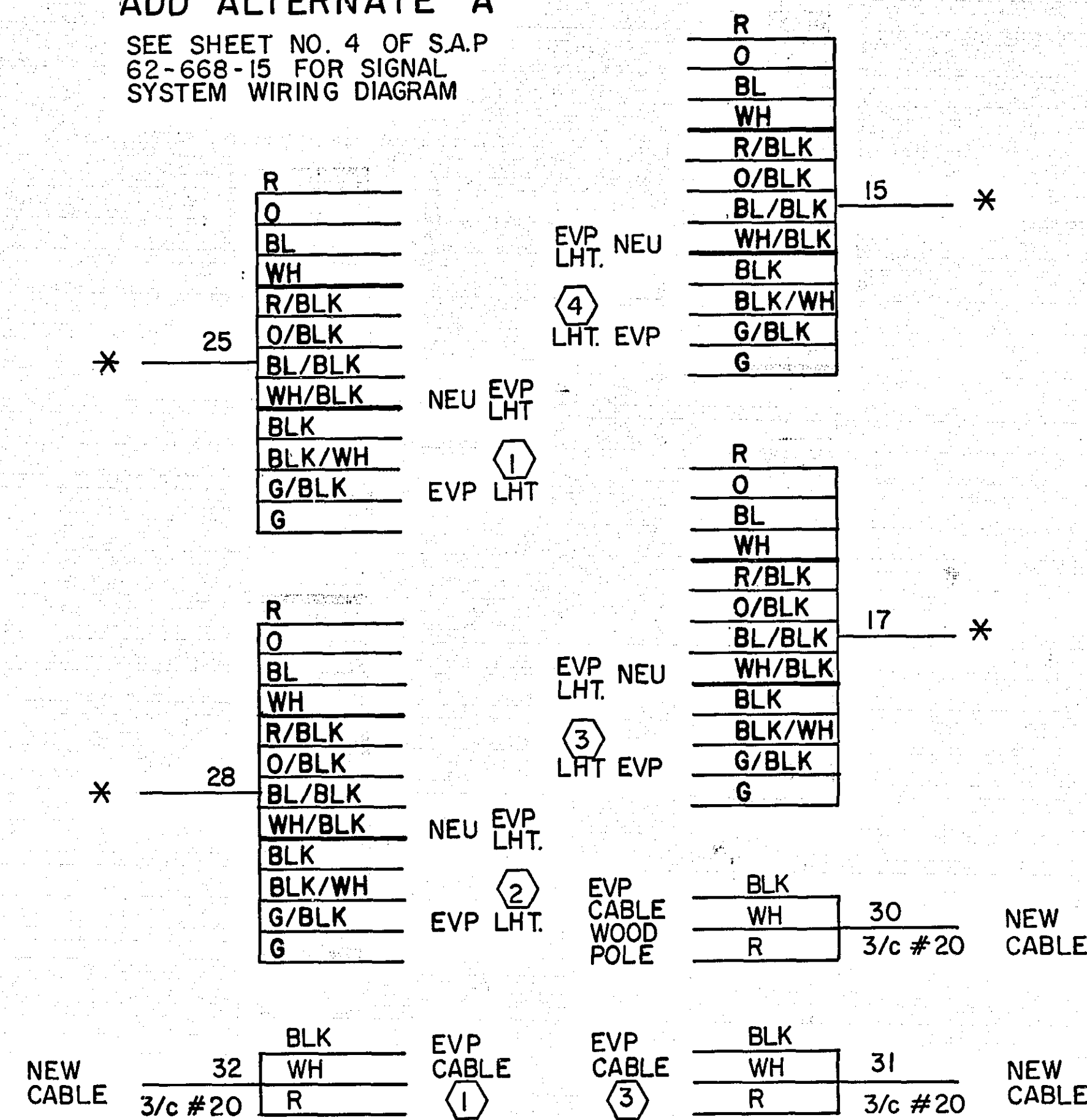
SIGNAL INDICATION CHART

FACE	PHASE	FLASH	INDICATION SIZE					
			R	Y	G	←	↑	→
A1	A1	R	12"	12"	12"	-	-	-
* A2	A1	R	12"	12"	12"	-	-	-
A3	A2	R	12"	12"	12"	-	-	-
* A4	A2	R	12"	12"	12"	-	-	-
* B1	B1	R	12"	12"	-	12"	-	-
* B2	B2	R	12"	12"	-	12"	-	-
C1	C	R	12"	12"	12"	-	-	-
C2	C	R	12"	12"	12"	-	-	-
C3	C	R	12"	12"	12"	-	-	-
C4	C	R	12"	12"	12"	-	-	-

* SPECIAL SIGNAL FACES
(SEE SPECIAL PROVISIONS)

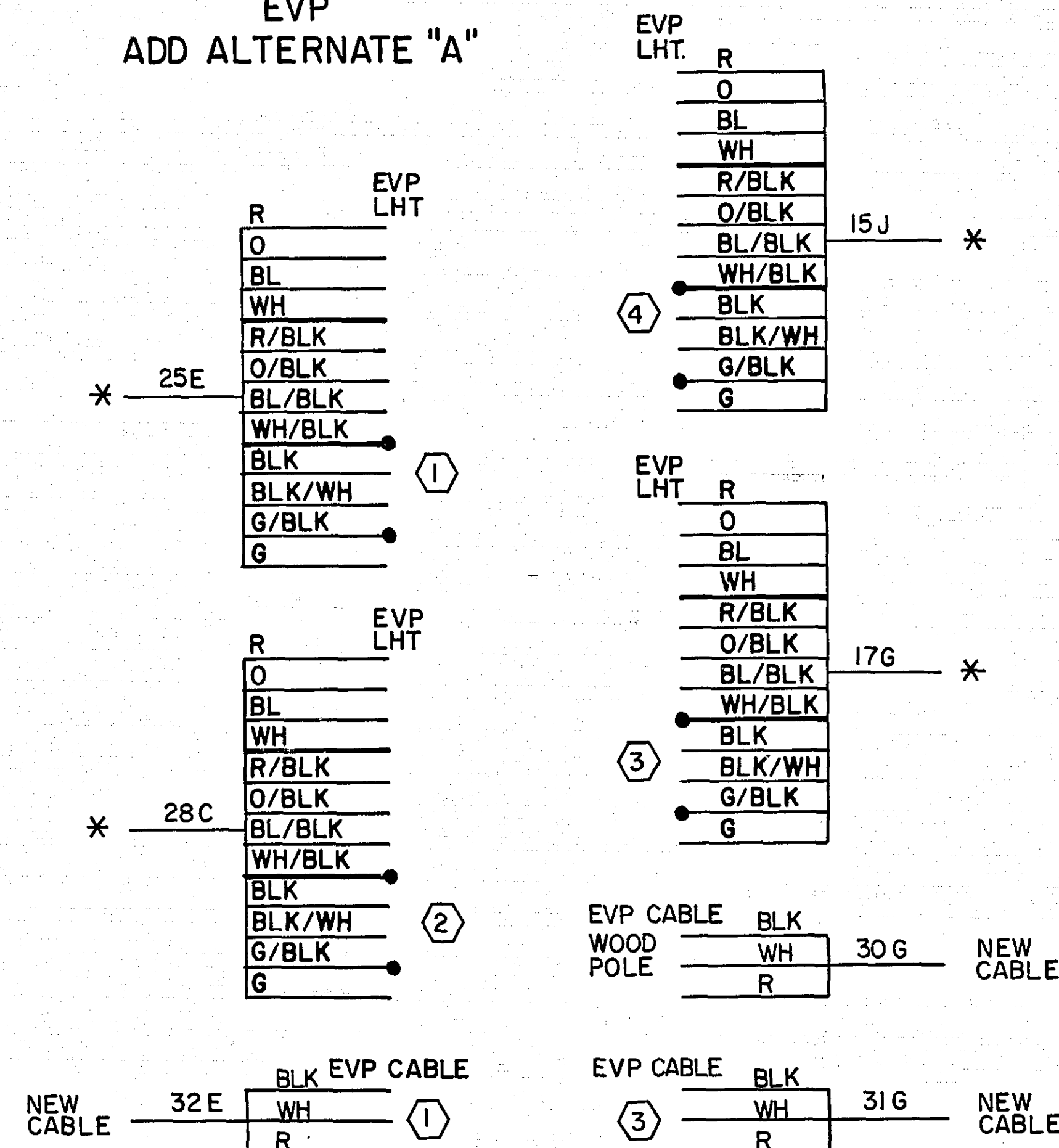
CONTROLLER CABINET EVP

ADD ALTERNATE "A"
SEE SHEET NO. 4 OF S.A.P.
62-668-15 FOR SIGNAL
SYSTEM WIRING DIAGRAM

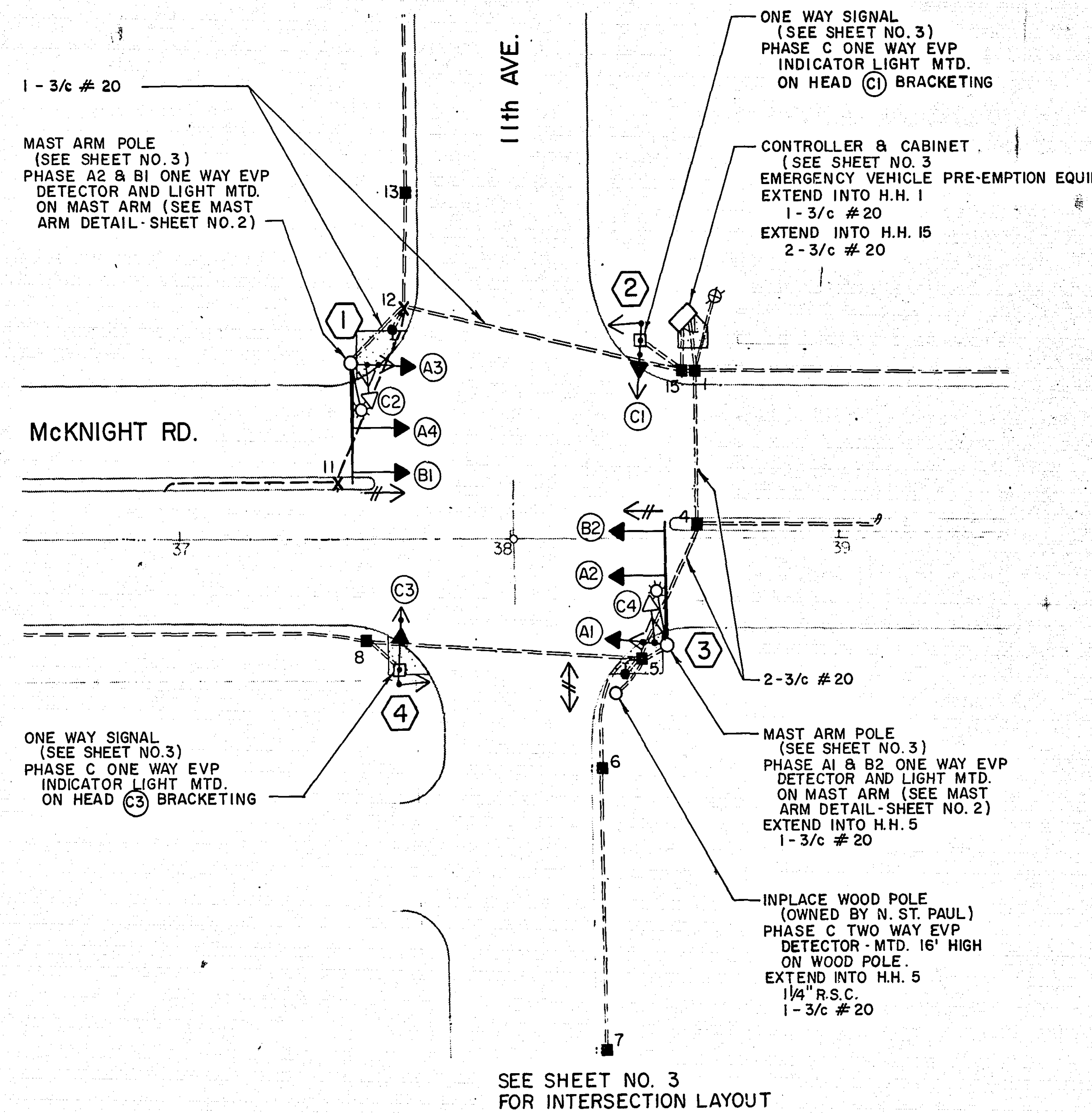


* CABLES 15, 17, 25 & 28 TO BE INSTALLED
UNDER PROJ. S.A.P. 62-668-15 (SEE SHEET NO. 4)

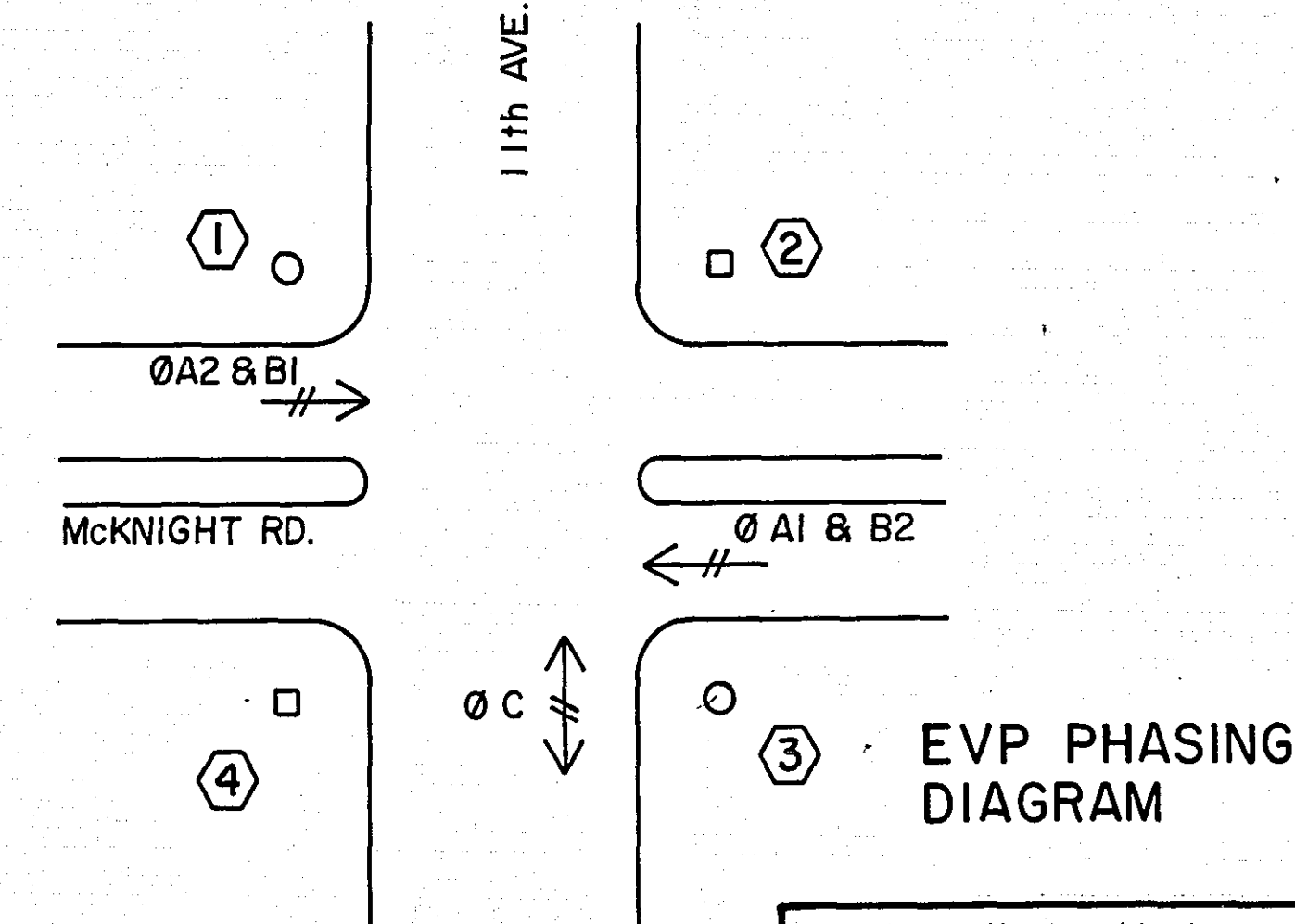
FIELD WIRING EVP ADD ALTERNATE "A"



0 15 30 45 60 75
SCALE IN FEET



SEE SHEET NO. 3
FOR INTERSECTION LAYOUT



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or report was prepared by me or under my
direct supervision and that I am a duly
Registered Professional Engineer under
the laws of the State of Minnesota.
Paul R. Smith
Date 10-18-77 Reg. No. 12703

EMERGENCY VEHICLE PRE-EMPTION
SYSTEM

ADD ALTERNATE "A"