

SIGNAL HEAD CHART				
FACE	R	Y	FYA	G
1-1,1-2	←	←	←	←
2-1,2-2,2-3	●	●	●	●
6-1,6-2	●	●	●	●
8-1,8-2,8-3	●	●	●	●

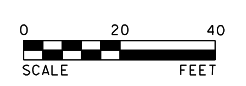
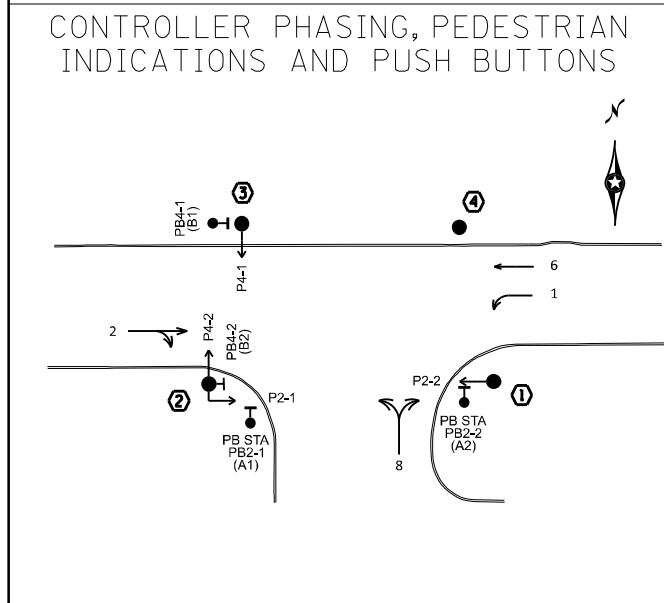
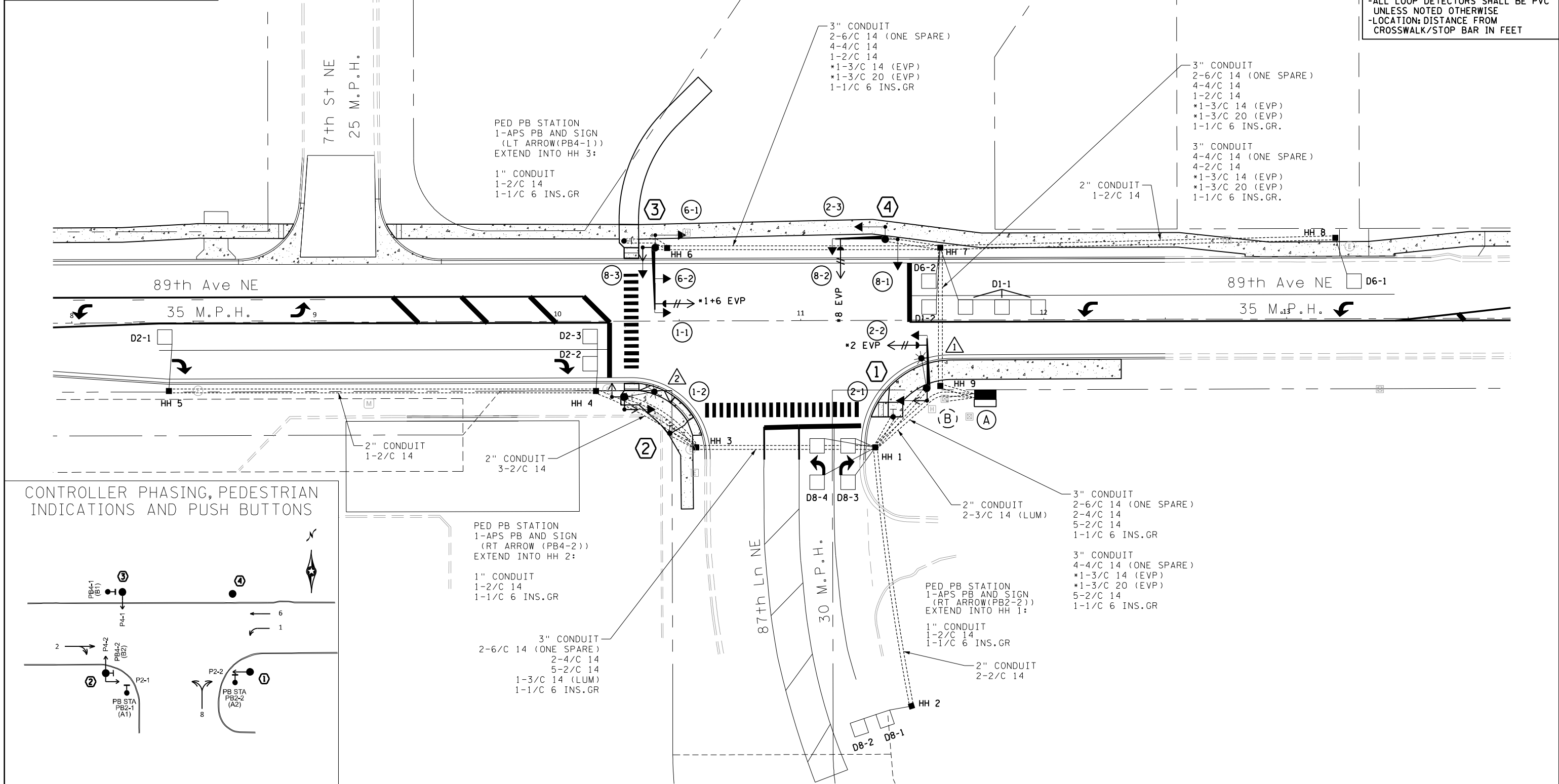
-ALL SIGNAL INDICATIONS SHALL BE 12" LED  
 -ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH REFLECTORIZED BACKGROUND SHIELDS  
 -FYA DENOTES FLASHING YELLOW ARROW

**SIGNAL SYSTEM OPERATION**

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 5 PHASE, WITH PHASE 1 BEING FLASHING YELLOW ARROW BY TIME OF DAY.
- PHASES 2 AND 6 SHALL BE ON VEHICLE RECALL.

LOOP DETECTOR CHART		
NUMBER	SIZE (FT)	LOCATION
D1-1	3-6X6	20, 35, 50
D1-2	6X6	5
D2-1	6X6	180
D2-2, D-3	6X6	5
D6-1	6X6	180
D6-2	6X6	5
D8-1, D8-2	6X6	120
D8-3, D8-4	2-6X6	5, 20

-ALL LOOP DETECTORS SHALL BE PVC UNLESS NOTED OTHERWISE  
 -LOCATION: DISTANCE FROM CROSSWALK/STOP BAR IN FEET



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REV.	BY	DATE
810	CON	04/01/2024
0	CON	05/06/2024

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

*Maury J. Hooper*  
 MAURY J. HOOPER  
 LIC. NO. 26435 DATE 04/01/2024

DESIGNED: DLR  
 DRAWN: JDR  
 CHECKED: MJH

TRAFFIC CONTROL SIGNAL SYSTEM

SAP 106-139-004

2024 SOUTHWEST AREA STREET RECONSTRUCTION

SIGNAL PLAN

SHEET C7.27

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①

- 1 - PA100 POLE FOUNDATION
- 1 - TYPE PA100-A-20-D30-9
- 1 - ANGLE MOUNT SIGNAL, OVERHEAD AT 0'
- 1 - ANGLE MOUNT WITH CD PED HEAD, POLE MOUNTED AT 180°
- 1 - LUMINAIRE-LED (D40-9), POLE MOUNTED AT 350°
- 1 - ONE WAY EVP DETECTOR AND CONFIRMATORY LIGHT, (OVERHEAD AT 4' (Phase 2))
- 1 - TYPE D SIGN AT 9' (D-2, SEE SIGN DETAILS)
- 3" CONDUIT TO HH 1:
  - 4-4/C 14 (ONE SPARE)
  - 1-3/C 14 (EVP)
  - 1-3/C 20 (EVP)
  - 1-3/C 14 (LUM)
  - 1-1/C 6 INS. GR.

②

- 1 - PA100 POLE FOUNDATION
- 1 - TYPE PA100-A-D30-9
- 1 - ANGLE MOUNT SIGNAL, POLE MOUNTED AT 90°
- 2 - ANGLE MOUNT WITH CD PED HEADS, POLE MOUNTED AT 90° AND 180°
- 1 - LUMINAIRE-LED (D40-9), POLE MOUNTED AT 350°
- 1 - APS PB AND SIGN (RT ARROW (PB4-2))
- 3" CONDUIT TO HH 3:
  - 2-6/C 14 (ONE SPARE)
  - 2-4/C 14
  - 1-2/C 14
  - 1-3/C 14 (LUM)
  - 1-1/C 6 INS. GR.

③

- 1 - PA100 POLE FOUNDATION
- 1 - TYPE PA100-A-25
- 1 - ANGLE MOUNT SIGNAL, OVERHEAD AT 0'
- 1 - STRAIGHT MOUNT SIGNAL, OVERHEAD AT 9'
- 2 - ANGLE MOUNT SIGNALS, POLE MOUNTED AT 90° AND 180°
- 1 - ANGLE MOUNT WITH CD PED HEAD, POLE MOUNTED AT 90°
- 1 - ONE WAY EVP DETECTOR AND CONFIRMATORY LIGHT, (OVERHEAD AT 6' (Phase 1, 6))
- 1 - R10-X12 AT 0.5'
- 1 - TYPE D SIGN AT 16.0' (D-2, SEE SIGN DETAILS)
- 3" CONDUIT TO HH 6:
  - 2-6/C 14 (ONE SPARE)
  - 4-4/C 14
  - 1-3/C 14 (EVP)
  - 1-3/C 20 (EVP)
  - 1-1/C 6 INS. GR.

④

- 1 - PA100 POLE FOUNDATION
- 1 - TYPE PA100-A-20
- 1 - ANGLE MOUNT SIGNAL, OVERHEAD AT 0'
- 2 - ANGLE MOUNT SIGNALS, POLE MOUNTED AT 90° AND 180°
- 1 - ONE WAY EVP DETECTOR AND CONFIRMATORY LIGHT, (OVERHEAD AT 5' (Phase 8))
- 1 - TYPE D SIGN AT 9' (D-1, SEE SIGN DETAILS)
- 3" CONDUIT TO HH 7:
  - 4-4/C 14 (ONE SPARE)
  - 1-3/C 14 (EVP)
  - 1-3/C 20 (EVP)
  - 1-1/C 6 INS. GR.

NOTES:

1. LOCATIONS OF FOUNDATIONS, APS PUSH BUTTON STATIONS, HANDHOLES, VAULTS, AND LOOP DETECTORS SHALL BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER.
2. THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD. CONDUITS UNDER ROADWAYS AND HARD SURFACES SHALL REQUIRE BORING OPERATIONS.
3. SEE SPECIAL PROVISIONS FOR INFORMATION REGARDING CITY OF BLAINE FURNISHED SIGNAL EQUIPMENT.
4. CONTRACTOR SHALL LOCATE AND VERIFY INPLACE UTILITIES PRIOR TO COMMENCING WORK.
5. ALL CABLES AND CONDUCTORS REQUIRED FOR THIS PROJECT SHALL BE NEW AND FURNISHED AND INSTALLED BY CONTRACTOR (EXCEPT FOR VIDEO DETECTION CABLE).
6. UNLESS OTHERWISE NOTED, ALL ITEMS RELATED TO THE PERMANENT SIGNAL SYSTEM CONSTRUCTION, TO WHICH INCLUDE FURNISHING AND INSTALLING OR INSTALLING CITY OF BLAINE PROVIDED MATERIALS SHALL BE PAID FOR UNDER LUMP SUM PAY ITEM, 2565.516 TRAFFIC CONTROL SIGNAL SYSTEM.
7. SPLICING ON ANY CABLE OR CONDUCTOR BETWEEN THE CONTROLLER / SERVICE CABINET AND EACH POLE OR MAST ARM MOUNTED SIGNAL COMPONENT IS PROHIBITED, EXCEPT FOR LOOP DETECTOR SPLICES PERMITTED ONLY IN ADJACENT HANDHOLES.
8. ITEMS NOTED WITH AN "\*" ARE INCLUDED IN PAYMENT FOR EVP SYSTEM PAY ITEM.

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EQUIPMENT PAD (SEE DETAIL)  
 SERVICE CABINET  
 (SSB WITH BATTERY BACKUP AND BATTERIES)  
 CONTROLLER AND CABINET (TS2 TYPE 1)  
 WITH GPS TIME CLOCK

3" CONDUIT FROM SIGNAL CONTROLLER TO:

HH1:	HH1:	HH9:	HH9:
4-4/C 14 (ONE SPARE)	2-6/C 14 (ONE SPARE)	2-6/C 14 (ONE SPARE)	4-4/C 14 (ONE SPARE)
• 1-3/C 14 (EVP)	2-4/C 14	4-4/C 14	4-2/C 14
• 1-3/C 20 (EVP)	5-2/C 14	1-2/C 14	• 1-3/C 14 (EVP)
5-2/C 14	1-1/C 6 INS.GR.	• 1-3/C 14 (EVP)	• 1-3/C 20 (EVP)
1-1/C 6 INS.GR.		• 1-3/C 20 (EVP)	1-1/C 6 INS.GR.
		1-1/C 6 INS.GR.	

GROUND WIRE AND GROUND ROD PER EQUIPMENT PAD DETAIL

CONTROLLER CABINET TO SERVICE CABINET:

1-2" CONDUIT	2-2" CONDUIT
3-1/C 6	PER EQUIPMENT PAD DETAIL

SERVICE CABINET TO HH1:

2" CONDUIT  
 2-3/C 14 (LUM)

SERVICE CABINET TO EXTERNAL GR. RD.:

1-1/C 6 INS. GR.  
 (SEE EQUIPMENT PAD DETAIL)

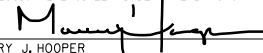
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EXISTING SOP-GROUND MOUNTED TRANSFORMER (XCEL)  
 2" CONDUIT FROM SERVICE CABINET TO SOP:  
 3-1/C 2

TRAFFIC CONTROL SIGNAL SYSTEM



**BOLTON & MENK**  
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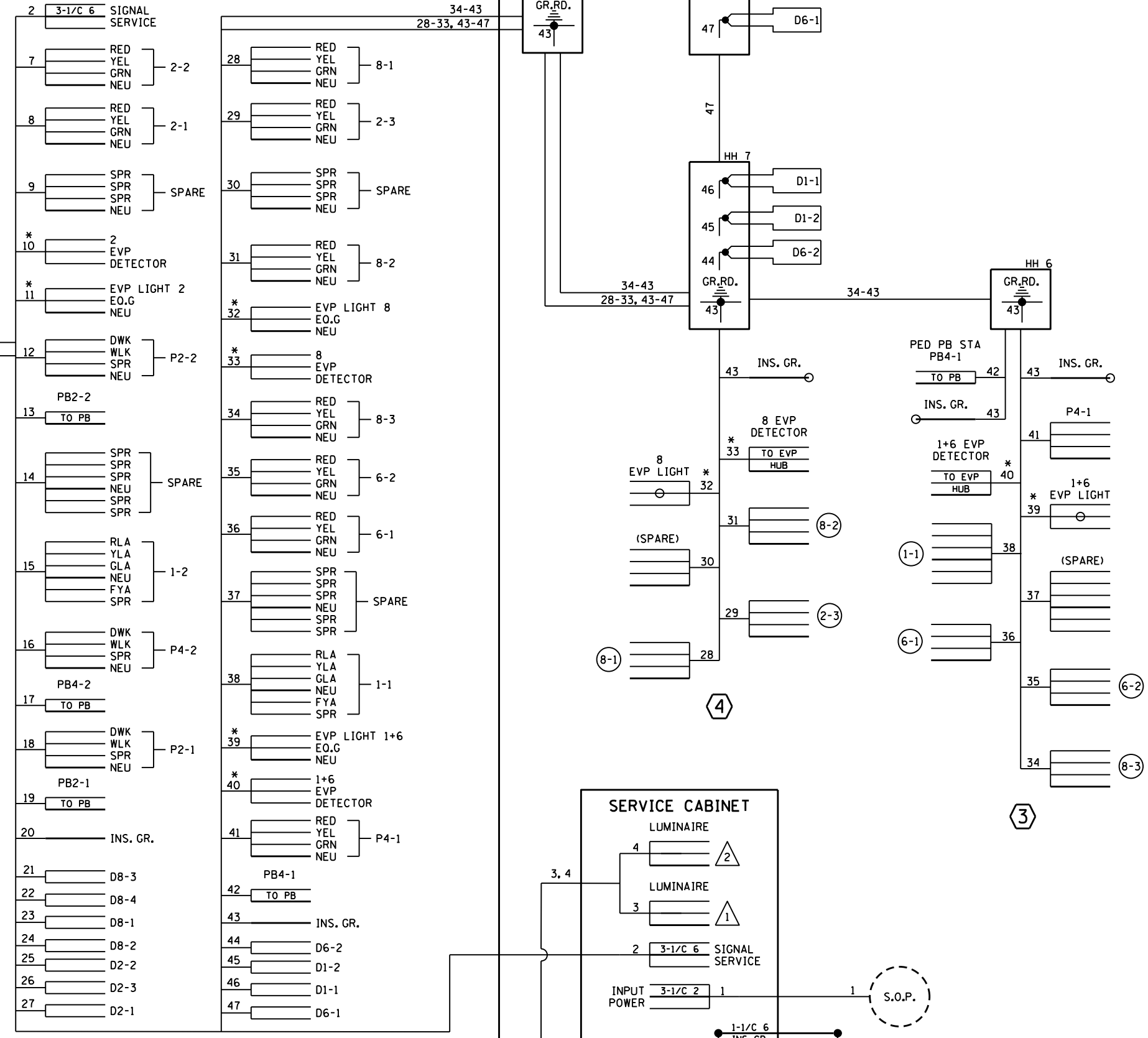
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DESIGNED	DLR	SAP 106-139-004 2024 SOUTHWEST AREA STREET RECONSTRUCTION SIGNAL PLAN
DRAWN	JDR	
CHECKED	MJH	

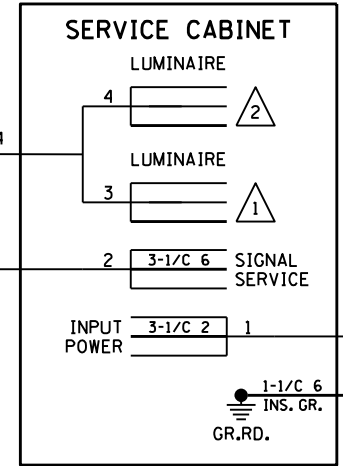
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SERVICE CABINET



89TH AVE / 87TH LN  
 WIRING DIAGRAM



TRAFFIC CONTROL SIGNAL SYSTEM

- NOTES:
1. ALL CABLES SHALL BE CONTINUOUS FROM CABINET TO SIGNAL COMPONENTS.
  2. SIGNAL SYSTEM INCLUDES BATTERY BACKUP SERVICE CABINET WITHOUT BATTERIES.
  3. ITEMS DENOTED WITH \* ARE INCLUDED IN PAYMENT FOR THE EVP SYSTEM PAY ITEM.
  4. FOR EACH "SPARE WIRE, COIL ENOUGH WIRE TO REACH THE END OF THE MAST ARM IN THE HOLE NEAREST TO EACH POLE.
  5. LEAVE ONE LOOP OF SLACK FOR EACH CABLE IN THE POLE BASE



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 2024 SOUTHWEST AREA STREET RECONSTRUCTION  
 SIGNAL PLAN

SHEET  
 C7.29