

# WHITE BEAR LAKE SCHOOL DISTRICT

CONSTRUCTION PLAN FOR GRADING, BITUMINOUS SURFACE, ADA IMPROVEMENTS, TRAFFIC SIGNAL, AND LIGHTING

LOCATED ON T.H. 61 FROM 7TH STREET TO 8TH STREET

STATE PROJECT NO. 6222-197  
 GROSS LENGTH 435.17 FEET 0.082 MILES  
 BRIDGES-LENGTH FEET MILES  
 EXCEPTIONS-LENGTH FEET MILES  
 NET LENGTH 435.17 FEET 0.082 MILES  
 REF POINT 147+00.463 TO REF POINT 147+00.532



FED. PROJ. NO. LOCAL FUNDS

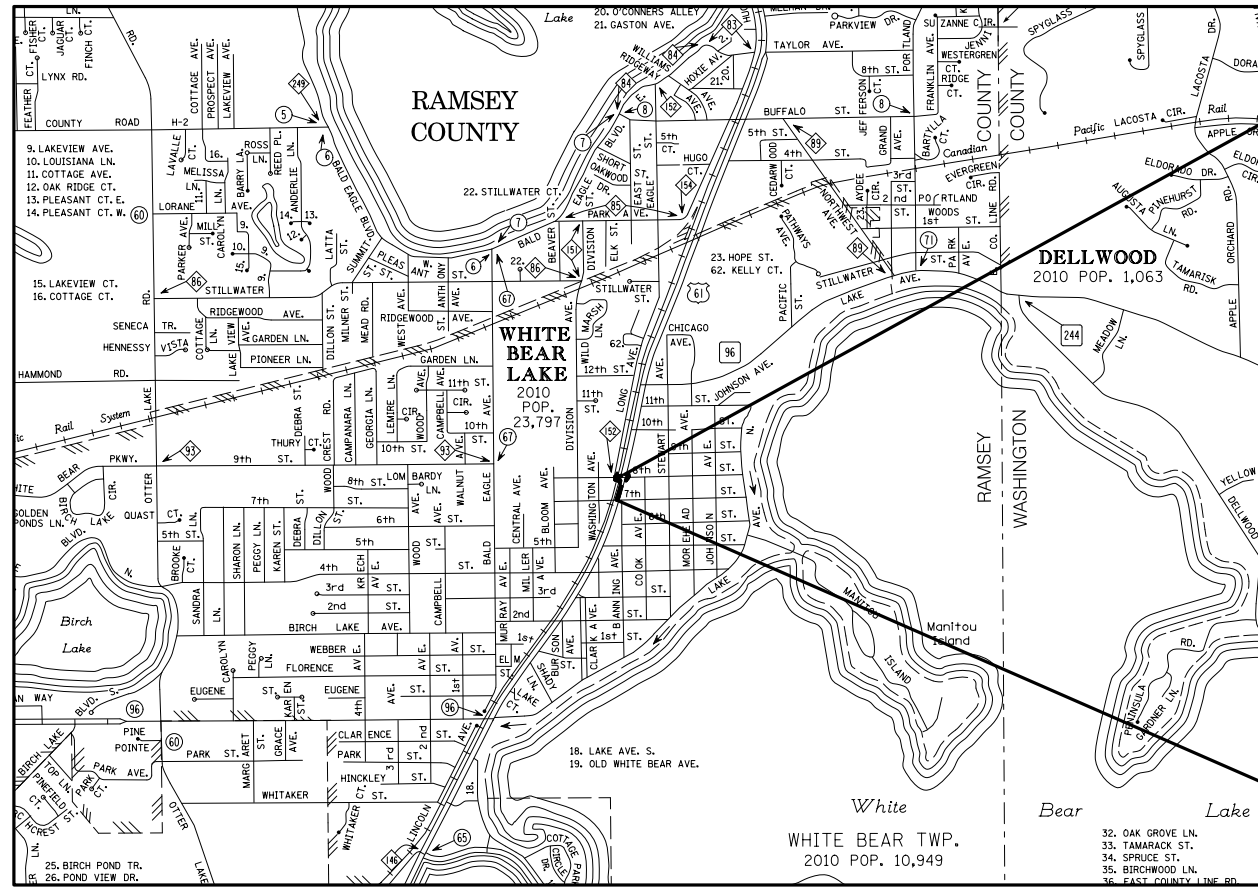
## GOVERNING SPECIFICATIONS

THE 2020 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM AND BE CONSTRUCTED IN ACCORDANCE TO THE "MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MN MUTCD) AND PART VI, "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS".

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XS1-XS2	CROSS SECTIONS



THIS PLAN CONTAINS 103 SHEETS

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

PRINT NAME: JOSHUA C. BREID LICENSE # 59756

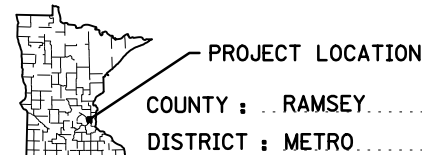
DATE: 12/22/2023 SIGNATURE: Joshua Breid

DESIGN SQUAD JOSH BREID, MY TRAN, BRYCE SCHMIDGALL, JOSH PALMATEER, COLE ARVIDSON, JOHN GRAY, MALLORY BEDNARZ, JON KRUSE, DAVID SAMPERS.

APPROVED \_\_\_\_\_ CITY ENGINEER

APPROVED \_\_\_\_\_ DISTRICT TRANSPORTATION ENGINEER

AGREEMENT NO. 1054975  
 WHITE BEAR LAKE AREA SCHOOL DISTRICT  
 SP 6222-197 (TH 61=001)  
 LOCAL FUNDS  
 METRO DISTRICT



PROJECT LOCATION  
 COUNTY : RAMSEY  
 DISTRICT : METRO

### SCALES

INDEX MAP	1500'
GENERAL LAYOUT	100'
PLAN	40'
CROSS SECTION	10' HORIZ. 10' VERT.

FOR PLANS AND UTILITIES SYMBOLS SEE TECHNICAL MANUAL

PLAN REVISIONS		
DATE	SHEET NO.	APPROVER

### DESIGN DESIGNATION

Design ESALS	=	
ADT (2019)	=	21,210
ADT (2024)	=	34,300
ADT (2044)	=	40,340
Design Speed		40 MPH
Based on		Sight Distance
Height of eye	3.5'	Height of object 2.0'
Design Speed not achieved at:		N/A

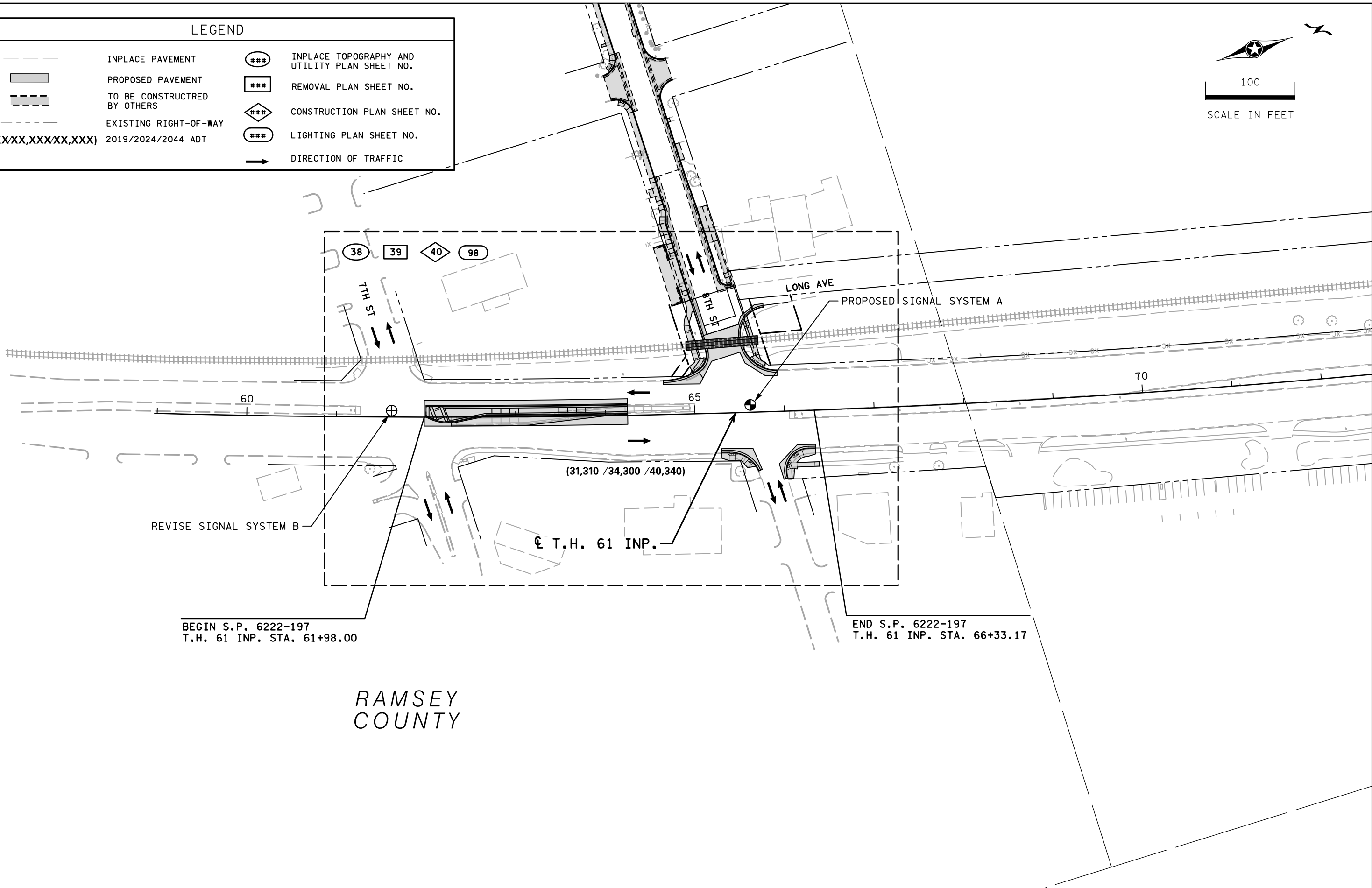
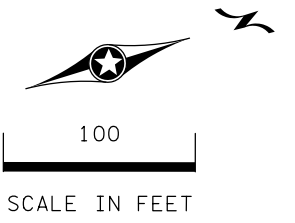
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### LEGEND

	INPLACE PAVEMENT		INPLACE TOPOGRAPHY AND UTILITY PLAN SHEET NO.
	PROPOSED PAVEMENT		REMOVAL PLAN SHEET NO.
	TO BE CONSTRUCTED BY OTHERS		CONSTRUCTION PLAN SHEET NO.
	EXISTING RIGHT-OF-WAY		LIGHTING PLAN SHEET NO.
<b>(XX,XXX/XX,XXX/XX,XXX)</b>	2019/2024/2044 ADT		DIRECTION OF TRAFFIC



## RAMSEY COUNTY

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

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

Certified By: Joshua Breid Lic. No. 59756  
 Licensed Professional Engineer

Printed Name: JOSHUA C. BREID Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**GENERAL LAYOUT**

SEH FILE NO. ISDWB170688	<b>2</b>
GL 1 OF GL 1	<b>101</b>

STATEMENT OF ESTIMATE QUANTITIES

Table with columns: ITEM NO., ITEM DESCRIPTION, NOTE, UNIT, 100% LOCAL FUNDS WHITE BEAR LAKE AREA SCHOOLS ISD 624 ESTIMATED QUANTITY. Rows include items like AS BUILT, CONSTRUCTION SURVEYING, MOBILIZATION, PAVEMENT MARKING REMOVAL, etc.

STATEMENT OF ESTIMATE QUANTITIES

Table with columns: ITEM NO., ITEM DESCRIPTION, NOTE, UNIT, 100% LOCAL FUNDS WHITE BEAR LAKE AREA SCHOOLS ISD 624 ESTIMATED QUANTITY. Rows include items like ALTERNATE PEDESTRAIN ROUTE, TRAFFIC CONTROL, INSTALL SIGN, etc.

QUANTITIES SHOWN ARE FOR INFORMATION ONLY. ALL WORK, AND ANY MATERIALS, LABOR OR OTHER COSTS AND EXPENSES TO COMPLETE THE PROJECT ARE INCLUDED AND PAID FOR IN THE PROJECT LUMP SUM.

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Certified By: Joshua Breid Lic. No. 59756 Printed Name: JOSHUA C. BREID Date: 01/23/2024



RAMSEY COUNTY, MINNESOTA T.H. 61 S.P. 6222-197

STATEMENT OF ESTIMATED QUANTITIES

### SOIL AND CONSTRUCTION NOTES

1. THE CONTRACTOR IS HEREBY REMINDED OF THEIR RESPONSIBILITY UNDER STATE LAW TO CONTACT ALL UTILITIES THAT MAY HAVE FACILITIES IN THE AREA. CONTACT MUST BE MADE THROUGH GOPHER STATE ONE CALL.
2. STRIP ALL SOD AND TOPSOIL FROM AREAS TO BE DISTURBED BY CONSTRUCTION AND REUSE AS TOPSOIL. TOPSOIL STRIPPING IS QUANTIFIED AS EXCAVATION - COMMON AND PLACEMENT OF TOPSOIL IS QUANTIFIED AS COMMON EMBANKMENT (CV).
3. PROVIDE FOR THE REMOVAL AND DISPOSAL OF ANY INPLACE SURFACING, OTHER STRUCTURES, OR DEBRIS THAT WOULD INTERFERE WITH CONSTRUCTION. ALL SUCH MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL EITHER BE RECYCLED OR DISPOSED OF OFF THE PROJECT LIMITS IN ACCORDANCE WITH SPEC. 2104.
4. CONTRACTOR SHALL FIELD VERIFY THE EXISTING PAVEMENT DEPTH AND SHALL NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO PAVING OPERATIONS IF THE EXISTING DEPTH IS MORE THAN 8.5"
5. ALL NEW EMBANKMENT AND EMBANKMENT WIDENING MATERIAL SHALL BE SELECT GRADING MATERIAL OR SELECT GRANULAR EMBANKMENT WHERE APPROPRIATE. IN EMBANKMENT WIDENING AREAS, THE MATERIAL SHOULD SUBSTANTIALLY MATCH THE INPLACE SUBGRADE SOILS RELATIVE TO THE TEXTURAL CLASSIFICATION, DENSITY, AND MOISTURE. THE EMBANKMENT MUST BE CONSTRUCTED IN ACCORDANCE WITH SPECIFICATION 2106.3C, "PREPARATION OF EMBANKMENT FOUNDATION".
6. THE "GRADING GRADE" IS DEFINED AS THE BOTTOM OF THE AGGREGATE BASE.
7. PROVIDE A FULL-DEPTH SAWCUT WHERE PLACING NEW PAVEMENT NEXT TO INPLACE PAVEMENT TO ENSURE A UNIFORM JOINT.
8. PROVIDE FOR UNIFORM BITUMINOUS TACK COAT BETWEEN ALL BITUMINOUS COURSES AND PRIOR TO PLACING ANY BITUMINOUS MIXTURES ON EXISTING PAVEMENT IN ACCORDANCE WITH SPEC. 2357 (INCIDENTAL).
9. DITCH BOTTOMS, TOE OF FILL, CUT RUNOUTS, AND THE TOP EDGE OF THE BACKSLOPES SHALL BE ROUNDED REGARDLESS OF THE SECTION USED ON THE CROSS SECTION SHEETS.
10. EARTHWORK QUANTITIES ARE BASED ON DIMENSIONS SHOWN, NO ADDITIONAL PAYMENTS WILL BE MADE IF THE CONTRACTOR CHOOSES TO INCREASE DIMENSIONS IN ORDER TO FACILITATE CONSTRUCTION OPERATIONS.
11. EROSION CONTROL SUPERVISOR IS REQUIRED FOR THIS PROJECT.
12. WHERE CONNECTING TO EXISTING ROADWAYS AT THE TERMINI OF PROPOSED CONSTRUCTION, CUT VERTICALLY TO THE BOTTOM OF THE EXISTING SURFACING OR TO THE BOTTOM OF THE NEW SURFACING DESIGN, WHICHEVER IS DEEPER, THEN AT A 1:20 (V:H) TAPER TO THE BOTTOM OF THE RECOMMENDED EXCAVATION.
13. WHERE MATCHING INTO IN-PLACE CROSSROADS, CUT VERTICALLY TO THE BOTTOM OF THE IN-PLACE SURFACING, THEN AT A 1V:4H SLOPE TO THE BOTTOM OF THE RECOMMENDED EXCAVATION.
14. AS A PRECAUTIONARY MEASURE FROM A SOILS STANDPOINT, TRAFFIC LANES TO BE USED DURING CONSTRUCTION MUST BE DELINEATED TO KEEP VEHICLES A SAFE DISTANCE AWAY FROM THE ADJACENT EXCAVATION. THE DELINEATION SHOULD COINCIDE WITH POINTS ESTABLISHED BY PROJECTING 1(V):2(H) OR GREATER (FLATTER) SLOPE BETWEEN THE EDGE OF THE TRAFFIC SURFACE AND THE BOTTOM OF THE EXCAVATION.
15. EXISTING PAVEMENT SECTIONS, BASED ON AS-BUILT DRAWINGS, ARE ASSUMED TO BE:
  - TH 61: 8" BITUMINOUS OVER 9" (NON-REINFORCED) CONCRETE
  - 8TH ST: 4" BITUMINOUS
 IF ACTUAL EXISTING PAVEMENT DEPTHS VARY FROM THE ABOVE, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO PLACING ANY NEW PAVEMENT.

MNDOT STANDARD PLATES	
THE FOLLOWING STANDARD PLATES, APPROVED BY THE DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, SHALL APPLY ON THIS PROJECT.	
PLATE NO.	PLATE TITLE
7038A	DETECTABLE WARNING SURFACE TRUNCATED DOMES
7100H	CONCRETE CURB AND GUTTER (DESIGN B AND DESIGN V)
7113A	CONCRETE APPROACH NOSE DETAIL
8000K	TEMPORARY CHANNELIZERS (3 SHEETS)
8106D	EQUIPMENT PAD B (2 SHEET)
8112I	PEDESTAL FOUNDATION (TRAFFIC CONTROL SIGNALS)
8118D	SERVICE EQUIPMENT & POLE TRAFFIC CONTROL SIGNALS
8121H	TRANSFORMER BASE AND POLE BASE PLATE (PA85, PA90 AND PA100) (2 SHEETS)
8122F	PEDESTAL AND PEDESTAL BASE (FOR TRAFFIC CONTROL SIGNALS SUPPORT) (2 SHEETS)
8123G	POLE AND MAST ARM - LUMINAIRES AND TRAFFIC LIGHTS ASSEMBLY (FOR ALL POLE TYPES) (2 SHEETS)
8126L	POLE FOUNDATION (PA90 AND PA100)
8129A	SHIM AND WASHER (TRAFFIC CONTROL SIGNALS AND ROADWAY LIGHTING)
8132B	PREFORMED RIGID PVC CONDUIT LOOP DETECTOR - LAYOUT DETAILS, LAYOUT NOTES, TYPICAL INSTALLATION (3 SHEETS)

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: <u>MTT</u>				
DESIGNER: <u>JCB</u>				
CHECKED BY: <u>JCB</u>				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: Joshua Breid Lic. No. 59756  
 Licensed Professional Engineer  
 Printed Name: JOSHUA C. BREID Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**STANDARD PLATES AND  
 SOIL AND CONSTRUCTION NOTES**

SEH FILE NO. ISDWB170688	<b>4</b>
SCN1 OF SCN1	<b>101</b>



LEGEND	UTILITY
— OHP —	OVERHEAD ELECTRIC LINE = POWER LINE-OVERHEAD
— P-BUR —	P-BUR = POWER LINE-UNDERGROUND
○	P POLE = POWER POLE
⊠	P PED = POWER PEDESTAL
┆	ANC = POWER POLE GUY WIRE ANCHOR
⊠ T	TEL PED = TELEPHONE/COMMUNICATION PEDESTAL
○	COM = COMMUNICATION LINE-UNDERGROUND
OM	TEL MH = TELEPHONE MANHOLE
— G —	GAS = GAS LINE-UNDERGROUND
⊗	GAS METER
⊠ OM	EXISTING CATCH BASIN/MANHOLE
— V —	EXISTING RC PIPE = RC STORM SEWER PIPE
— I —	WATER = WATERMAIN
⊗	WATER VLV = WATERMAIN GATE VALVE
⊠	FIRE HYD = FIRE HYDRANT
— S —	SAN = SANITARY SEWER PIPE
OM	SAN MH = SANITARY MANHOLE

UTILITY IMPACTS					
ITEM	STATION	OFFSET	OWNER	ACTION	NOTES
POLE	64+94.21	137.9' LT	XCEL ENERGY	UTILITY OWNER TO RELOCATE	RELOCATE PRIOR TO CONSTRUCTION
POLE	65+01.20	53.6' LT	XCEL ENERGY	UTILITY OWNER TO RELOCATE	RELOCATE PRIOR TO CONSTRUCTION
PEDESTAL	66+10.20	66.3' RT	COMCAST CABLE, LLC	UTILITY OWNER TO ADJUST	ADJUST DURING/AFTER CONSTRUCTION

UTILITY CONTACTS
THE FOLLOWING UTILITY OWNERS HAVE FACILITIES WITHIN THE LIMITS OF THIS PROJECT
CITY OF WHITE BEAR LAKE CENTURYLINK COMCAST CABLE, LLC CONSOLIDATED COMMUNICATIONS MCI COMMUNICATION SERVICES, LLC MINNESOTA COMMERCIAL RAILROAD MINNESOTA DEPARTMENT OF TRANSPORTATION RAMSEY COUNTY XCEL ENGERY

GENERAL NOTES:

1. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINE FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES."
2. SEE LIGHTING PLANS FOR LIGHTING RELOCATION AND ADJUSTMENT DETAILS.
2. SEE SIGNAL PLANS FOR SIGNAL RELOCATION AND ADJUSTMENT DETAILS.
3. SEE SHEET 38 FOR PRIVATE UTILITY IMPACT LOCATIONS.
4. ONLY IMPACTED FACILITIES HAVE BEEN TABULATED.

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

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RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**INPLACE UTILITY  
 TABULATIONS**

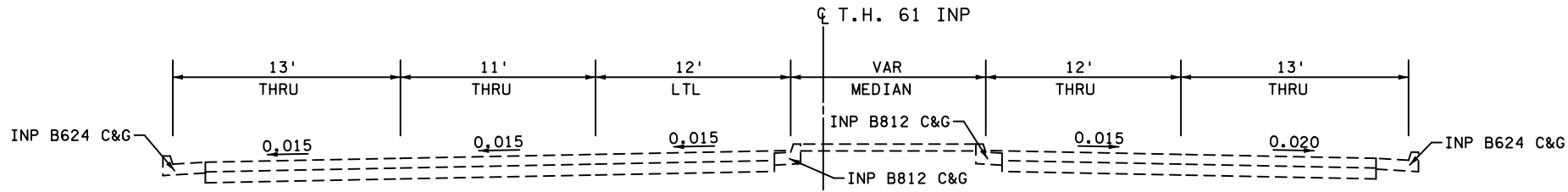
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UT1 OF UT1	<b>101</b>

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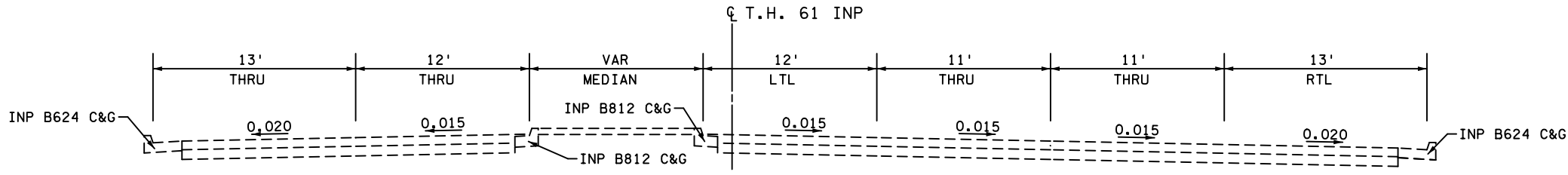
EXISTING TYPICAL SECTION

T.H. 61 INP STA 62+00 - 63+70



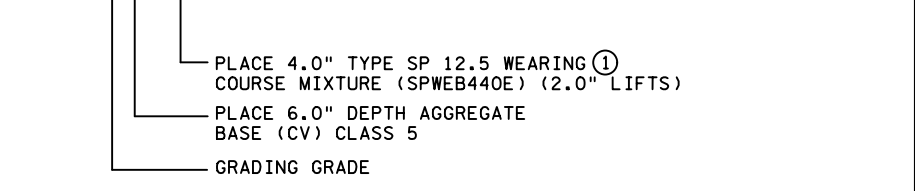
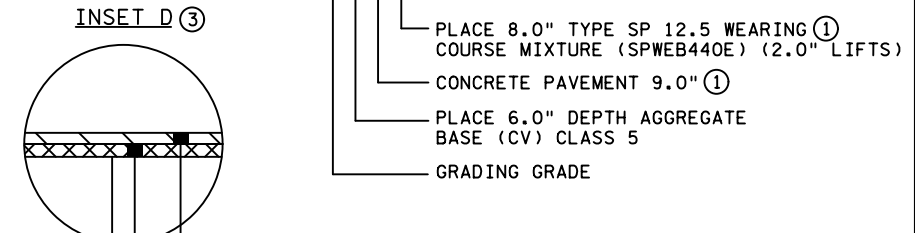
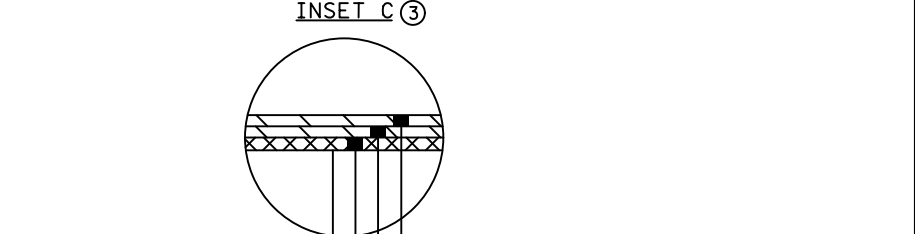
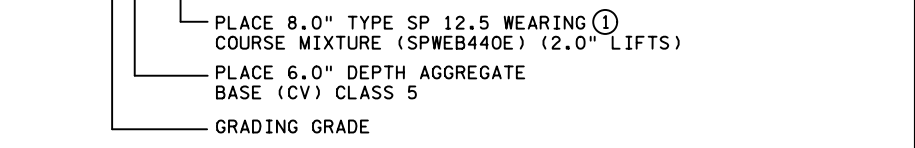
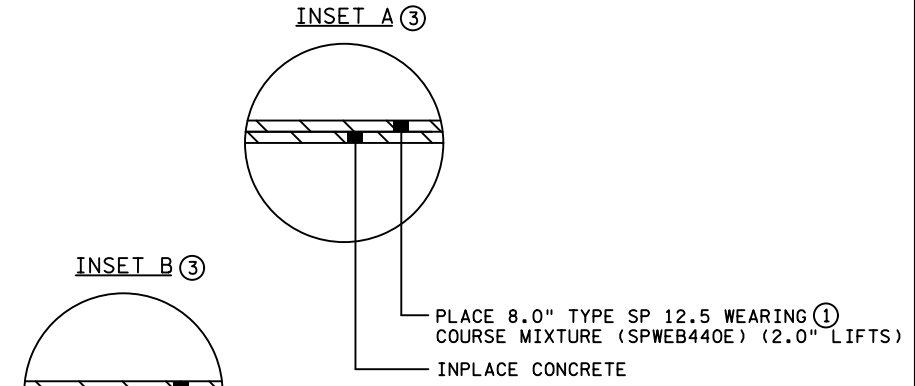
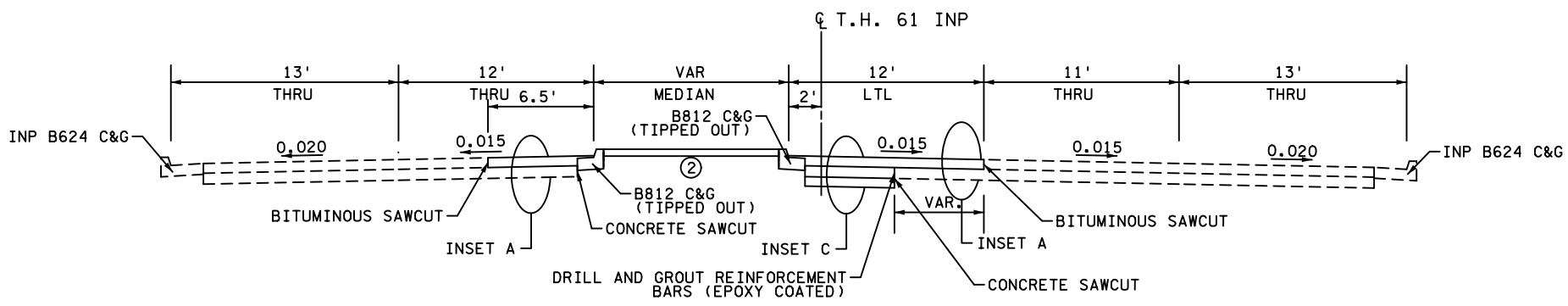
EXISTING TYPICAL SECTION

T.H. 61 INP STA 63+70 - 65+00



PROPOSED TYPICAL SECTION

T.H. 61 INP STA 62+00 - 64+25



GENERAL NOTES:

ALL CROSS SLOPES ARE FOOT PER FOOT.

INSLOPES, BACK SLOPES, AND DITCH GRADES MAY VARY FROM WHAT IS DEPICTED ON THE TYPICAL SECTIONS. SEE CROSS SECTIONS FOR FINAL SLOPES AND DITCH GRADES.

MAXIMUM ROLLOVER 0.07 FOOT PER FOOT.

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

- SPECIFIC NOTES:
- ① VERIFY AND MATCH EXISTING PAVEMENT DEPTH.
  - ② SEE SHEETS 41- 43 AND SHEET 47 FOR MEDIAN SURFACE TREATMENTS.
  - ③ SEE SHEETS 41- 43 FOR PAVEMENT LOCATIONS.

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MODEL: DeFault

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: MTT				
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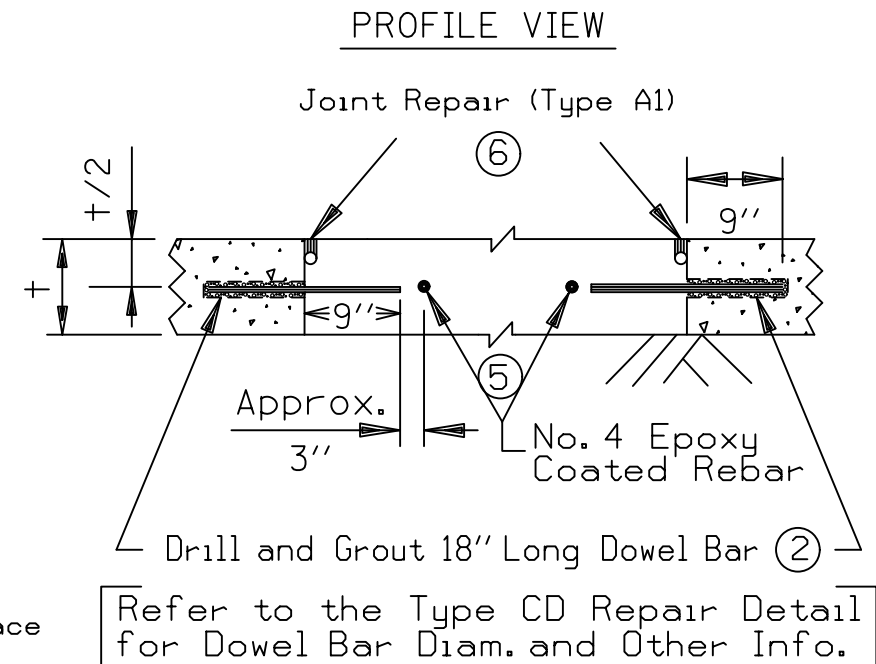
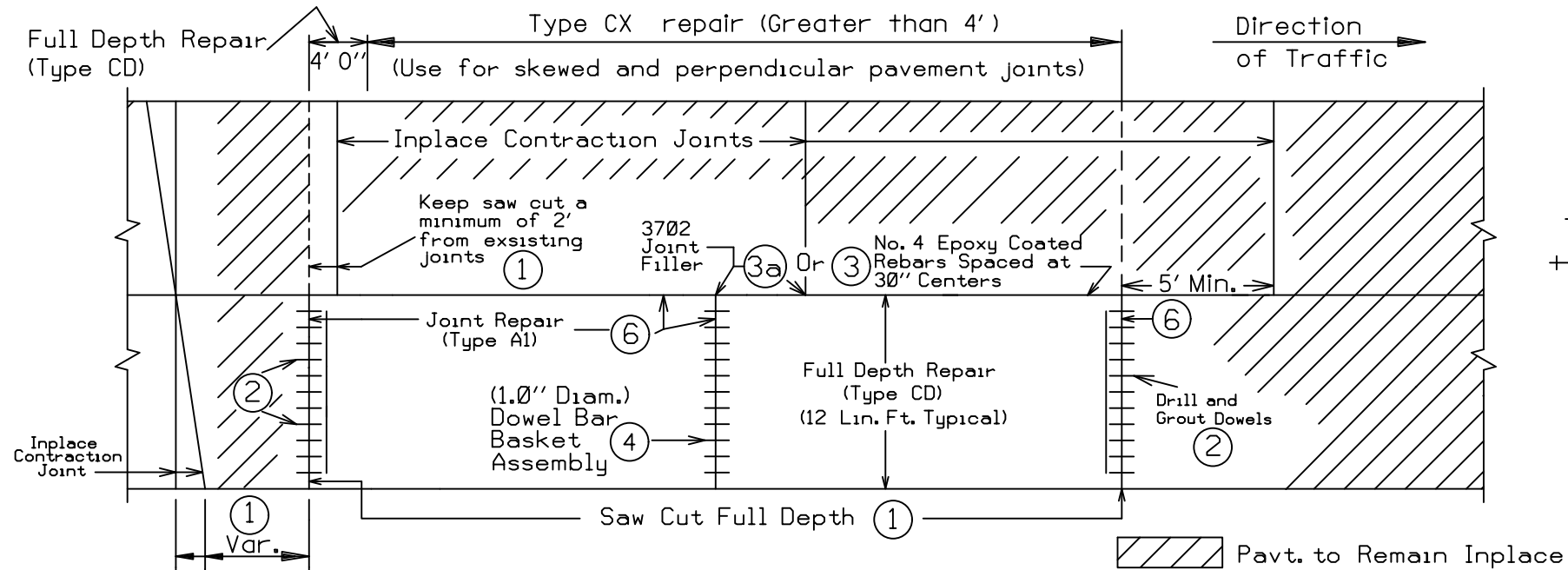


RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

TYPICAL SECTIONS

# PAVEMENT REPLACEMENT (TYPE CX)

DESCRIPTION: REMOVE CONCRETE, RESTORE AND COMPACT BASE, PLACE DOWELS AND REINFORCEMENT BARS, FURNISH AND PLACE CONCRETE, SAW AND SEAL JOINTS.



### Notes

- \* Place saw cut at least 2' up stream or 5' down stream from any transvers joints in the adjacent lane.
- \* Drill concrete pavement utilizing a drill bit diameter an > 1/8-inch larger than dowel/re-bar bar diameter. (2)
- \* Dowel bar basket required when longitudinal length of the repair is > 15'. Place dowel bar assemblies at 15' centers, when repair length exceeds 30'. (4)

### WORK TO BE DONE

1. See Full Depth Repair (Type CD) for additional information.
2. Saw full depth & remove in place concrete pavement. Restore and compact in place base. (1)
3. Drill in place concrete for dowel bars. Eliminate inside 5 dowels for (Type CD-LV) repairs (2)
4. Furnish and install dowels. Secure dowels to the in place concrete with a approved non shrink grout or epoxy adhesive. (2) Coat free end of dowels with a form coating material meeting Spec. 3902.
5. If matching in place transverse joints, drill and grout epoxy coated tie bars into the adjacent lane. Drill and grout reinforcement bars not require if repair length is under 75'. (3)
- OR
- 5a. Isolate all transverse pavement joints and cracks. Furnish and install joint filler 3702 between the adjacent in place lane and the (Type CX) repair. (3a) (Incidental)
6. As needed, furnish (1.0" Diam.) Dowel Bar Assemblies, in accordance with Standard Plate 1103. (4)
7. Clean vertical surfaces of in place concrete.
8. Place epoxy coated supplemental reinforcing bars over culverts as needed, See Standard Plate 1070.
9. Furnish and place Concrete Mix Number 3R52.
10. Furnish and install epoxy coated rebars in conc. repair, located 3" from end of dowel bar. (5)
11. Vibrate, finish to grade and slope, edge, texture, and apply cure.
12. Green saw joints over dowel bar baskets. (4)
13. Saw and seal joints in accordance with Joint Repair (Type A1) detail. (6) (Incidental)

### BASIS OF PAYMENT

- 2302 Full Depth Repair (Type CD) (Lin.Ft.)
- 2302 Drill and Grout Reinforcement Bars (Epoxy Coated) (Each)
- 2302 Dowel Bar (Each)
- 2302 Supplemental Reinforcement Bars (Epoxy Coated) (Pound)
- 2302 Pavement Replacement (Type CX) (Sq. Yd.)

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MODEL: DeFault

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

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RAMSEY COUNTY, MINNESOTA  
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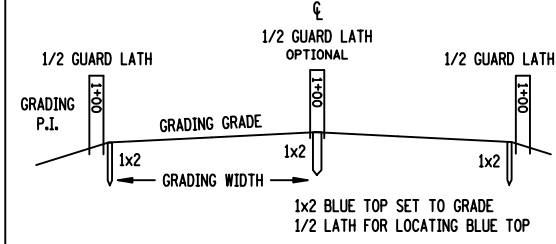
**MISCELLANEOUS DETAIL**  
PAVEMENT REPLACEMENT (TYPE CX)

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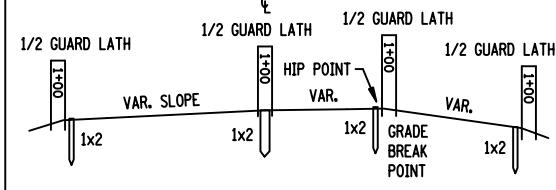
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101

BLUE TOPS

NORMAL SECTION

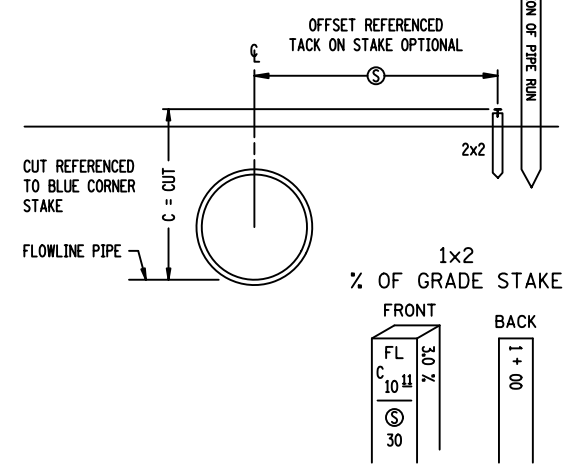


TRANSITION SECTION



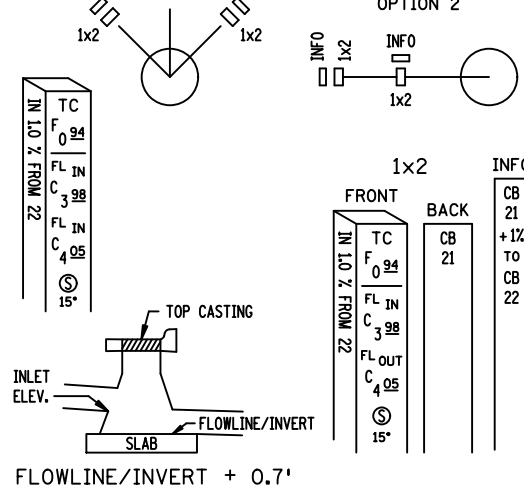
PIPE STAKING

PROFILE VIEW  
CENTERLINE PIPE

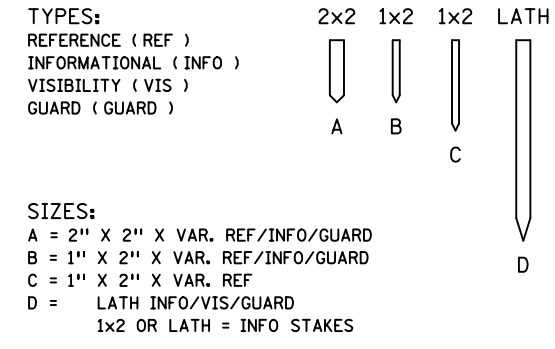


CATCH BASIN OR MANHOLE (CB/MH)

TOP VIEWS



STANDARD STAKES

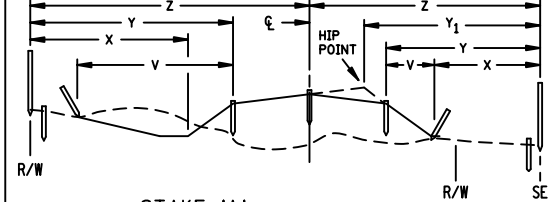


ABBREVIATIONS

- BBL = BARREL (PIPE)
- B.C. = BACK CURB
- C & G = CURB & GUTTER
- C = CUT
- CAP = CORR. ALUM. PIPE
- CB = CATCH BASIN
- COR = CORNER
- CR = CROWN
- CSP = CORR. STEEL PIPE
- D = DITCH CUT
- D.E. = DRAINAGE EASEMENT
- DI = DROP INLET
- EB = EASTBOUND
- E.M. = EDGE BITUMINOUS MAT
- E.S. = EDGE CONCRETE SLAB
- F = FILL
- FF = FRONT FACE
- FL = FLOW LINE
- FL IN = FLOWLINE INLET
- FL OUT = FLOWLINE OUTLET
- GR = GRADE
- GW = GRADING WIDTH
- HH = HANDHOLE
- HP = HIP POINT
- LT = LEFT
- MH = MANHOLE
- NB = NORTHBOUND
- ⊙ = OFFSET
- PAR = PARCEL
- % = PERCENT GRADE
- P.E. = PERM. EASEMENT
- RAD = RADIUS POINT
- RCP = REINF. CONC. PIPE
- RP = REFERENCE POINT
- RSC = REINF. SECT. CONC.
- RT = RIGHT
- R/W = RIGHT OF WAY
- SB = SOUTHBOUND
- SCP = SECT. CONC. PIPE
- SH = SHOULDER
- TC = TOP CASTING
- OR TOP CURB
- T.E. = TEMP. EASEMENT
- 3 : 1 = SLOPE (EXAMPLE)
- WB = WESTBOUND
- WP = WORKING POINTS

SLOPE STAKES

SINGLE ROADWAY - EXAMPLE 'A'



STAKE 'A'

FULL LATH AND HUB-STATION  
DIST. TO CL WITH CUT/FILL TO CL (Z)  
DIST. TO SHLD. WITH CUT/FILL TO SHLD. (Y) (Y1)  
DIST. TO TOE OF SLOPE, CUT/FILL FROM HUB (X)  
OFFSET TO SAFETY SLOPE  
OFFSET TO HIP POINT

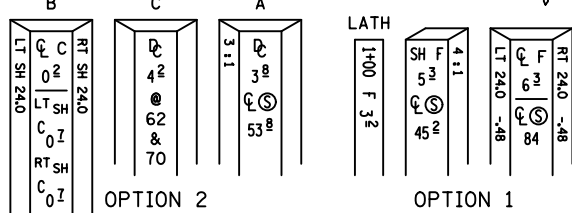
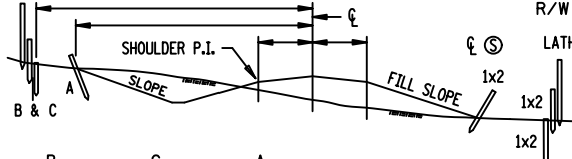
STAKE 'B'

FULL LATH  
DITCH CUT/SHLD. FILL  
SLOPE RATED  
DISTANCE TO INSLOPE  
TOE (V1) OR SHOULDER  
(AS APPLIES) (V)

NOTE:  
BLUE TOPS REQUIRED ON CL AND BOTH SHOULDERS AT MINIMUM  
ALL CULVERTS TO BE STAKED  
MINIMUM DATA TO BE PROVIDED  
STAKE TO BOTTOM OF TOPSOIL

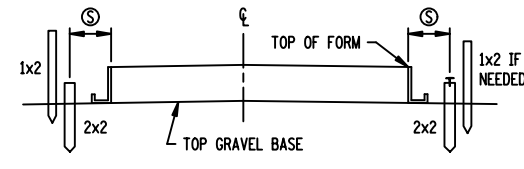
SLOPE STAKES

SINGLE ROADWAY - EXAMPLE 'B'

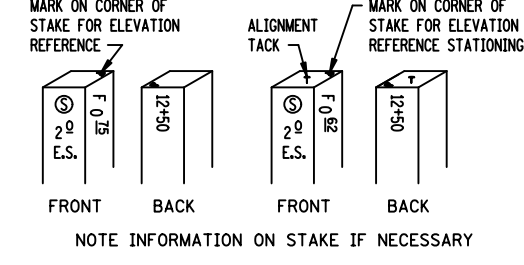


NOTES: ALL SLOPE STAKE REFERENCE DISTANCES GIVEN FROM CL.  
STAKE TO BOTTOM OF TOP SOIL.  
KEY STAKES: BLUE TOP SET AT R/W BOUNDARY LT. & RT.  
MAY BE EXCEPTIONS TO SETTING STAKE ON R/W.

CONCRETE PAVING STATIONARY FORM



OFFSET TO CONTRACTOR'S OPTION



RECOMMENDED STAKING INTERVALS

FIGURE A

	SLOPE STAKES	SUB GRADE B.T.	CLASS MATERIAL B.T.	CONC PAVT	C & G	CL & GR LIMITS	MUCK EXC.	R/W	TEMP. EASE.
TANGENT	100	100	100	50	50	ALL CORNERS	100	ALL CORNERS	ALL CORNERS
HORIZ. CURVE						ALL CORNERS		ALL CORNERS	ALL CORNERS
0 - 3'	100	100	100	50	50	ALL CORNERS	100	ALL CORNERS	ALL CORNERS
OVER 3' -	100	50	50	25	25	ALL CORNERS	100	ALL CORNERS	ALL CORNERS
VERT. CURVE									
'M' 100'	100	100	100	50	50				
CHORD 0 - .25									
'M' OVER .25	100	50	50	25	25				
TRAN.		50	50						

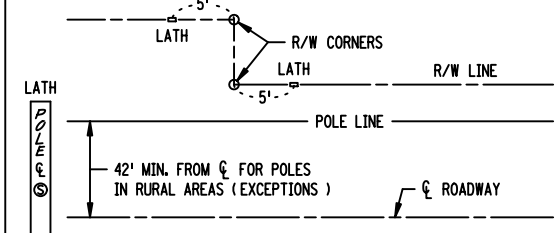
STAKING TOLERANCES ( FEET )

	HORIZONTAL	VERTICAL
CONSTRUCTION LIMITS	± 1.5	
CLEARING & GRUBBING	2.0	
SLOPES STAKES	2.0	± 0.2
KEY STAKES	0.2	0.03
DRAINAGE STAKES	0.05	0.05
CURB & GUTTER	0.07	0.03
PAVING	0.05	0.03
ALIGNMENT	0.07	
UTILITY	0.10	0.05
STRUCTURAL	0.02	0.02
GUARD RAIL	0.5	
BUILDINGS	0.04	
O.H. SIGNS	0.05	0.05
MUCK EXCAVATION LIMITS	2.0	
R/W B-POINTS	0.10	
NOISE WALLS	1.0	0.5

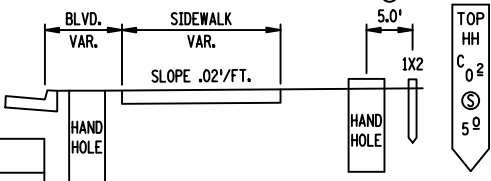
THE TOLERANCES ARE RELATIVE TO PROJECT DATUM

UTILITY ( UTIL )

STAKE POLES MINIMUM OF 5 FT. FROM ANY R/W CORNER  
EXAMPLE: POLE LINE = R/W LINE

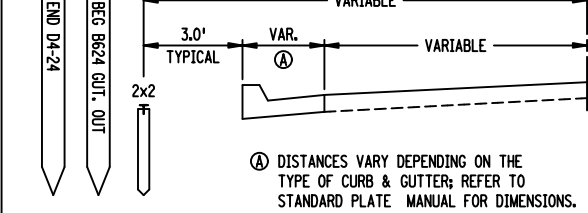


PULL BOX OR HAND HOLE



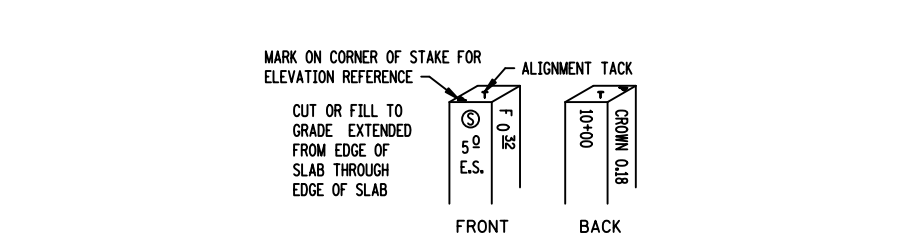
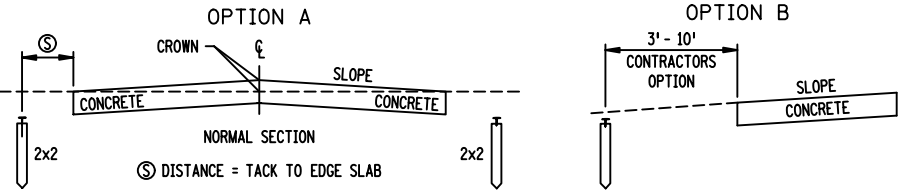
CURB & GUTTER ( CURB )

OPTIONAL LATH WHEN NEEDED TO MARK TYPE OF CURB & GUTTER IF THERE IS A CHANGE



MARK ON CORNER OF STAKE FOR ELEVATION REFERENCE STATIONING  
ALIGNMENT TACK  
CUT OR FILL TO TOP OF CURB  
⊙ = OFFSET DISTANCE FROM TACK TO BACK OF CURB

CONCRETE PAVING - SLIP FORM



REVISION:  
APPROVED: 8-6-2014  
*Ed. J. Dolfs*  
DIRECTOR, OFFICE OF LAND MANAGEMENT



STANDARD PLAN 5-297.115 1 OF 2  
APPROVED: 8-6-2014  
REVISED:  
*Christopher Ky*  
STATE DESIGN ENGINEER

STAKING INFORMATION SHEET



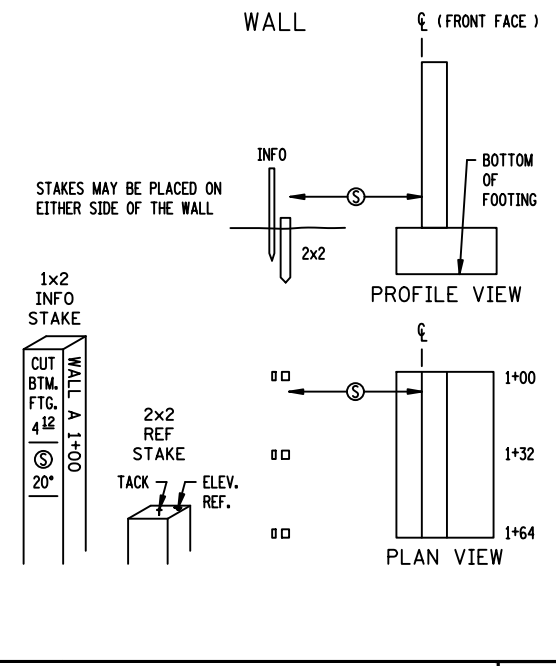
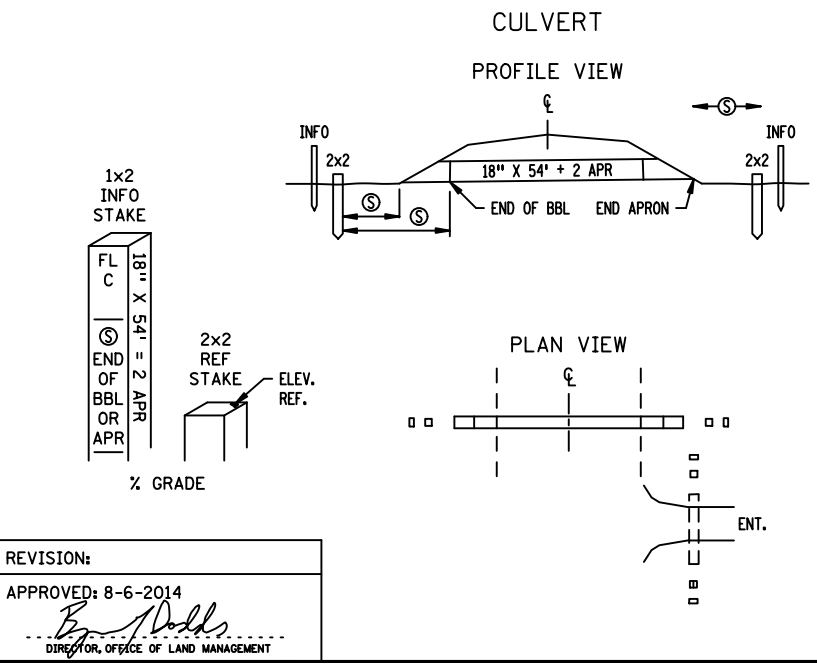
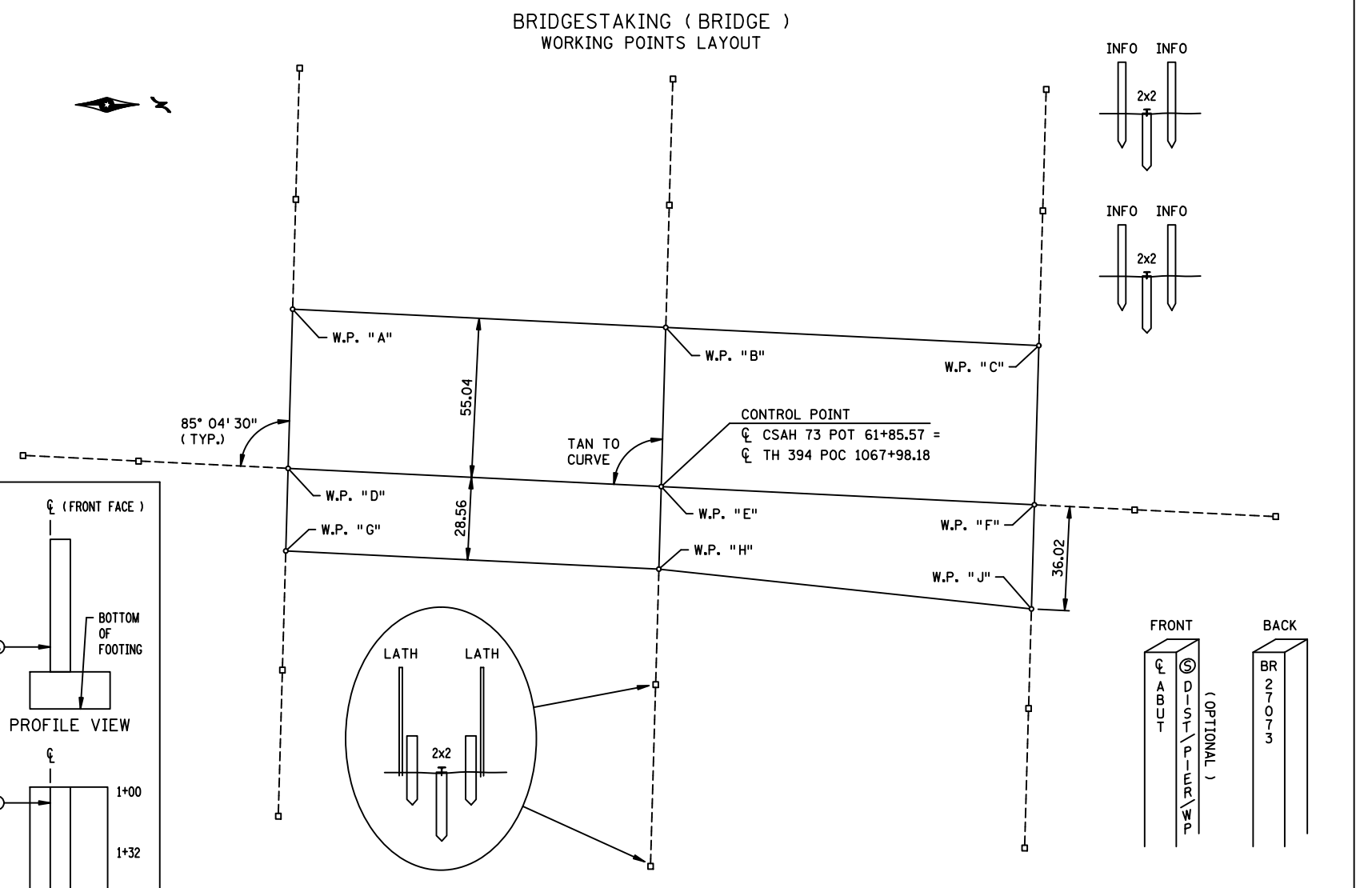
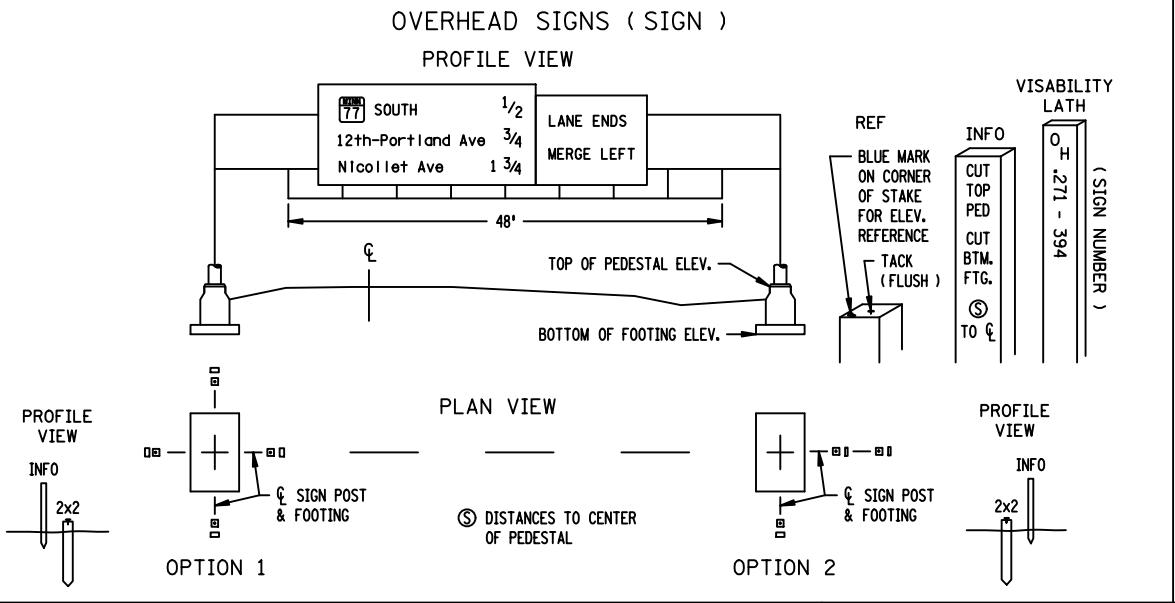
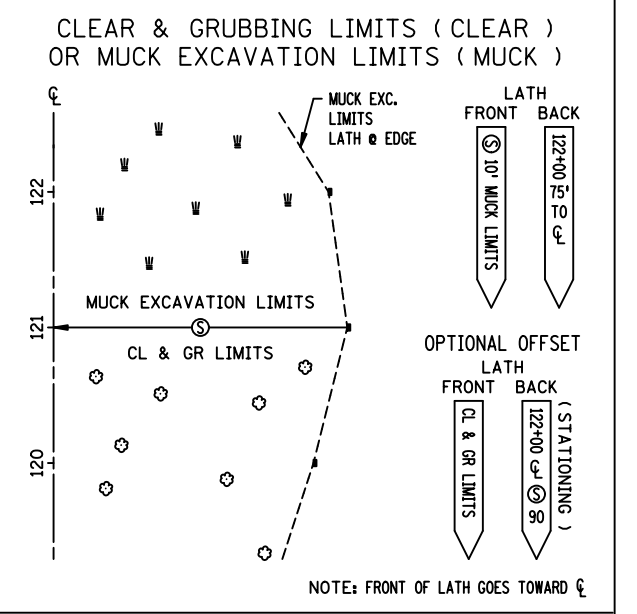
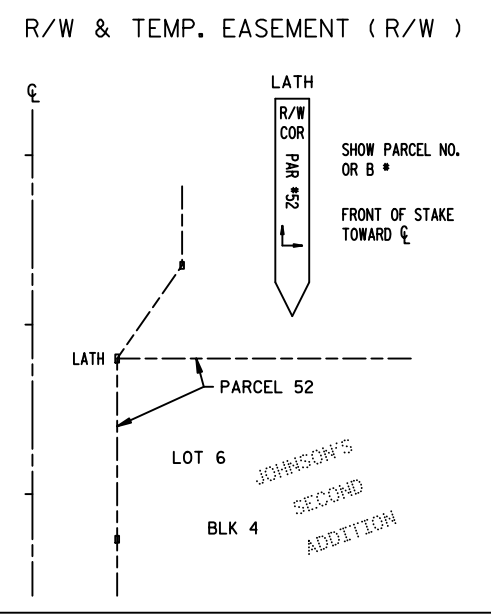
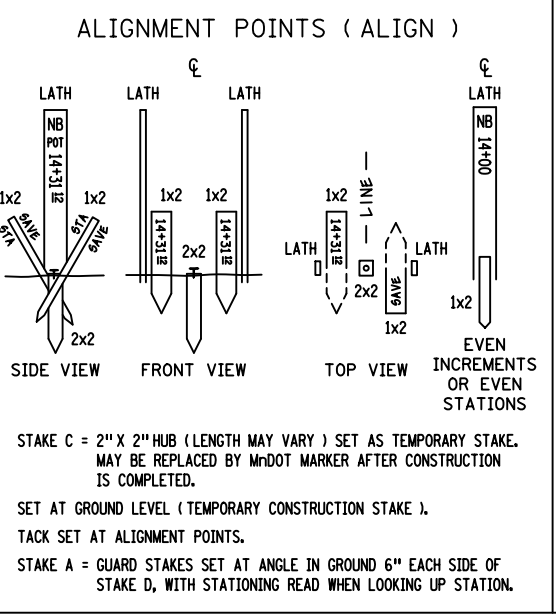
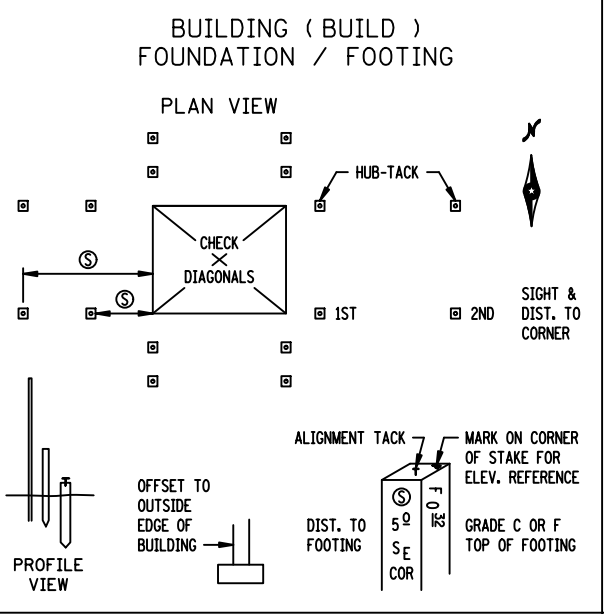
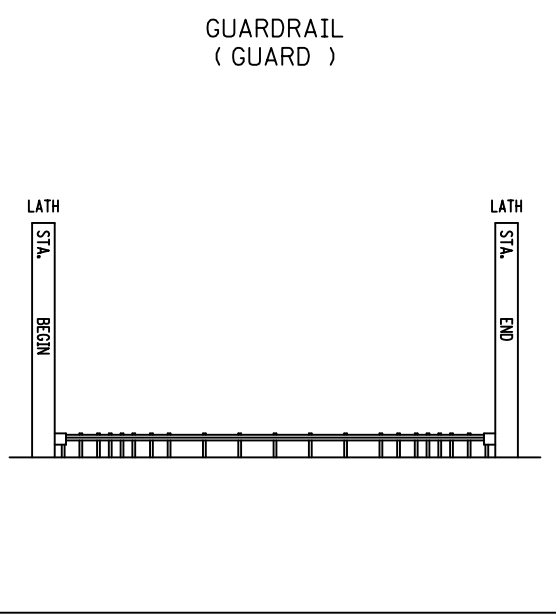
RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

STANDARD PLAN SHEET

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12/22/2023

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REVISION:

APPROVED: 8-6-2014

*By: [Signature]*

DIRECTOR, OFFICE OF LAND MANAGEMENT

**m** MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.115 2 OF 2

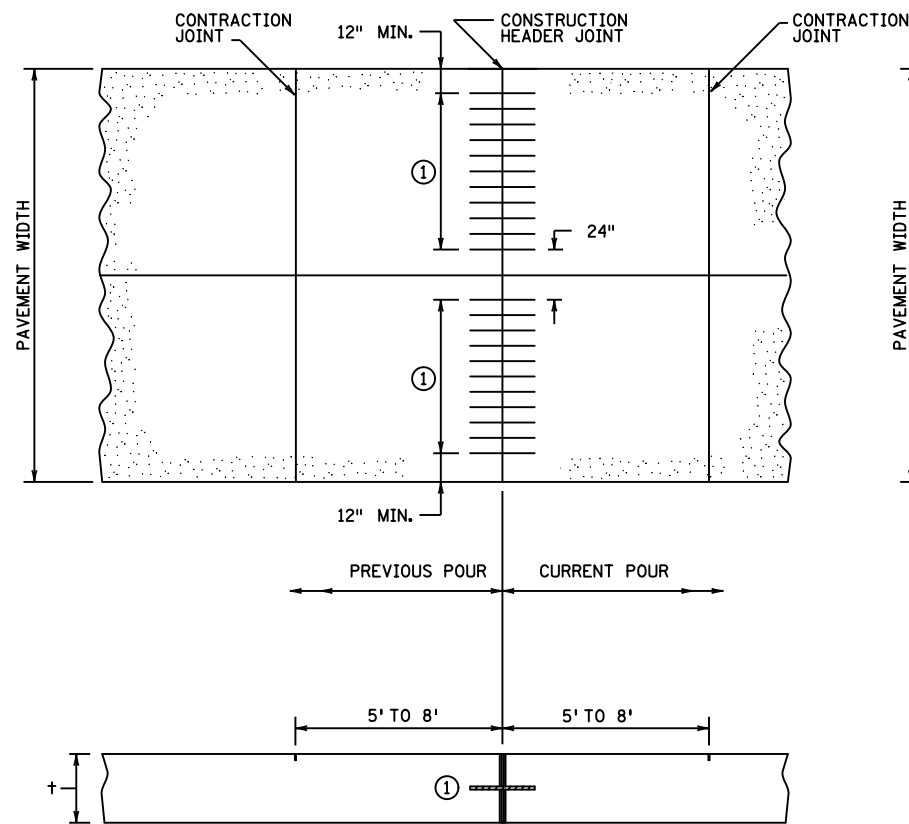
APPROVED: 8-6-2014

REVISOR:

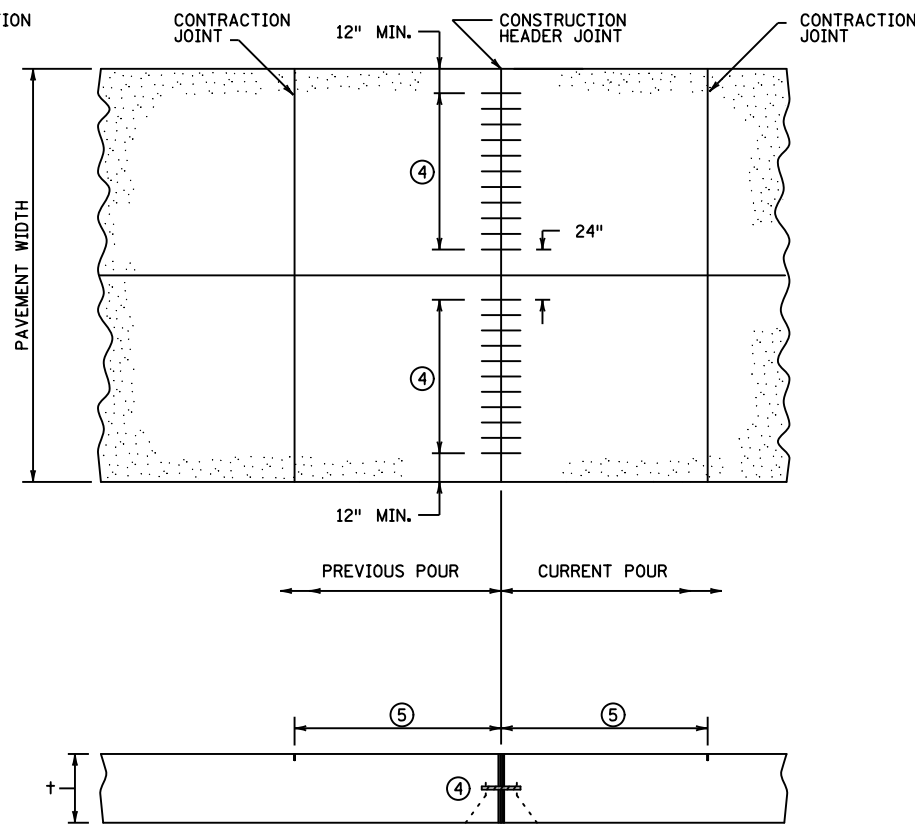
*Christy Ky*

STATE DESIGN ENGINEER

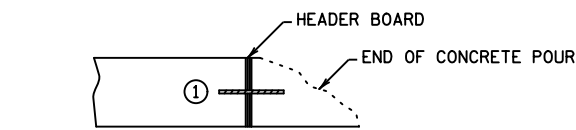
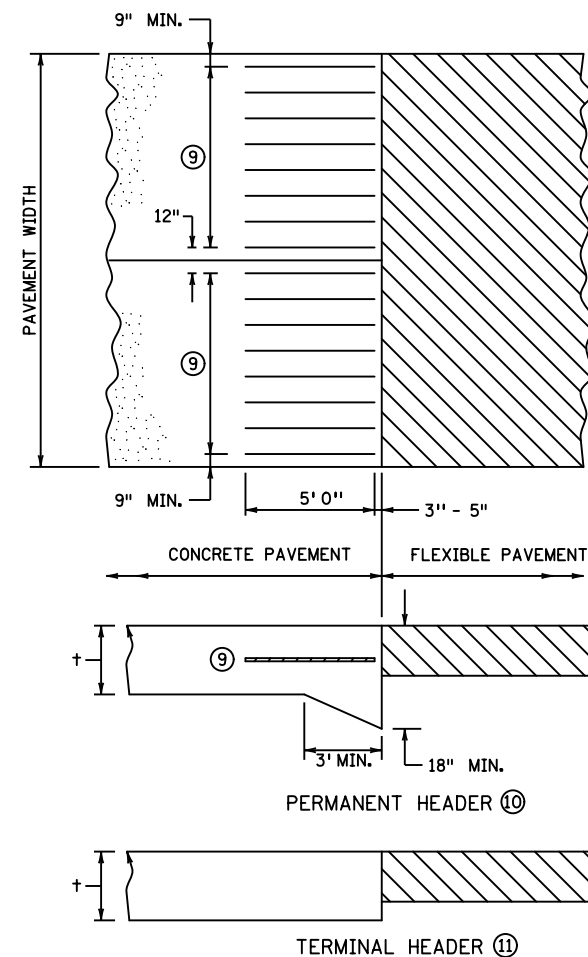
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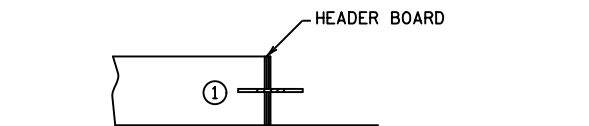
REINFORCEMENT BAR CONSTRUCTION HEADERS



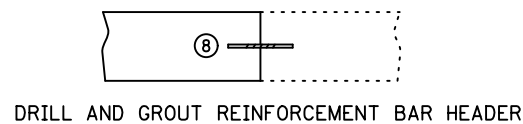
DOWEL BAR CONSTRUCTION HEADERS



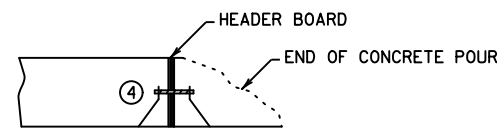
SLIPFORM PLACED REINFORCEMENT BAR HEADER ②



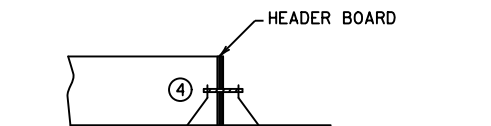
FIXED FORM PLACED REINFORCEMENT BAR HEADER ③



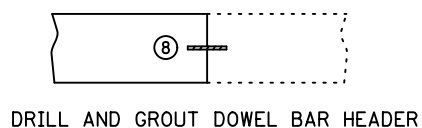
DRILL AND GROUT REINFORCEMENT BAR HEADER



SLIPFORM PLACED DOWEL BAR HEADER ⑥



FIXED FORM PLACED DOWEL BAR HEADER ⑦



DRILL AND GROUT DOWEL BAR HEADER

NOTES:

PROVIDE EPOXY-COATED REINFORCEMENT BARS IN ACCORDANCE WITH SPEC. 3301.

- ① PROVIDE NO. 4 REINFORCEMENT BARS, 30" LONG, SPREAD 12" ON CENTER AT DEPTH OF  $T/2 \pm 1"$ .
- ② PAVE PAST THE HEADER LOCATION. REMOVE END OF CONCRETE POUR. SET HEADER BOARD SHAPED TO PAVEMENT CROSS SECTION AND SLOTTED OR DRILLED FOR REINFORCEMENT BARS. INSERT THE REINFORCEMENT BARS AND FINISH THE CONCRETE BEHIND THE BOARD.
- ③ SET HEADER BOARD SHAPED TO PAVEMENT CROSS SECTION AND SLOTTED OR DRILLED FOR REINFORCEMENT BARS. PLACE THE CONCRETE BEHIND THE BOARD AND INSERT THE REINFORCEMENT BARS. CONSOLIDATE AND FINISH THE CONCRETE BEHIND THE HEADER BOARD.
- ④ PROVIDE DOWEL BARS IN ACCORDANCE WITH SPEC. 3302 AND THE CONTRACT.
- ⑤ DISTANCE EQUAL TO OR LESS THAN THE DESIGNED CONTRACTION JOINT SPACING IN ACCORDANCE WITH THE CONTRACT.
- ⑥ PLACE DOWEL BAR BASKET AT DESIRED HEADER LOCATION. SET HEADER BOARD SHAPED TO PAVEMENT CROSS SECTION ABOVE AND BELOW THE DOWELS. PAVE PAST THE HEADER LOCATION AND FINISH CONCRETE BEHIND THE HEADER BOARD. THOROUGHLY REMOVE ALL CONCRETE FROM THE EXPOSED DOWELS.
- ⑦ PLACE DOWEL BAR BASKET AT DESIRED HEADER LOCATION. SET HEADER BOARD SHAPED TO PAVEMENT CROSS SECTION ABOVE AND BELOW THE DOWELS. PLACE, CONSOLIDATE AND FINISH THE CONCRETE BEHIND THE HEADER BOARD.
- ⑧ DRILL AND GROUT 18" LONG DOWEL OR REINFORCEMENT BARS SPACED AT 12" ON CENTER AT A DEPTH OF  $T/2 \pm 1"$ . DRILL THE HOLE  $1/8"$  GREATER THAN THE NOMINAL OUTSIDE DIAMETER OF THE BAR BEING PLACED TO A DEPTH OF 9". INJECT A MNDOT-APPROVED EPOXY OR NON-SHRINK GROUT IN THE BACK OF THE DRILL HOLE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
  - FOR DOWEL BAR HEADERS, USE DOWEL BARS HAVING A DIAMETER IN ACCORDANCE WITH SPEC. 3302 AND THE CONTRACT.
  - FOR REINFORCEMENT BAR HEADERS, USE NO. 4 REINFORCEMENT BARS.
- ⑨ PROVIDE NO. 7 REINFORCEMENT BARS, 5' LONG, SPACED 18" ON CENTER AT DEPTH OF  $\pm 2 \pm 1"$ .
- ⑩ USE PERMANENT HEADER WHEN LONG SECTIONS OF CONCRETE (400' OR GREATER) ABUT BITUMINOUS. CONTACT THE CONCRETE UNIT WHEN FUTURE CONCRETE IS BEING CONSTRUCTED ADJACENT TO AN EXISTING PERMANENT HEADER.
- ⑪ USE TERMINAL HEADER WHEN SHORT SECTIONS OF CONCRETE (LESS THAN 400') ABUT BITUMINOUS (ON SIDE STREETS, FOR EXAMPLE).

**LEAD EXPERT OFFICE**

**GLENN ENGSTROM**  
DIRECTOR  
OFFICE OF MATERIALS  
AND ROAD RESEARCH



STANDARD PLAN 5-297.221 4 OF 4

APPROVED: 10-03-2022  
REVISED:

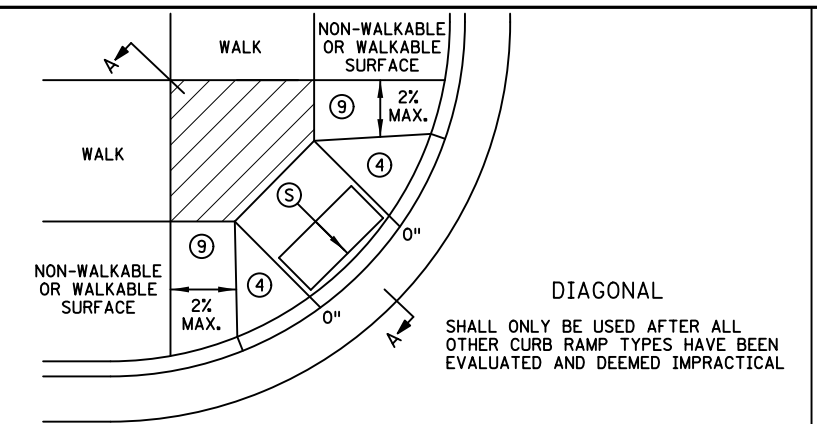
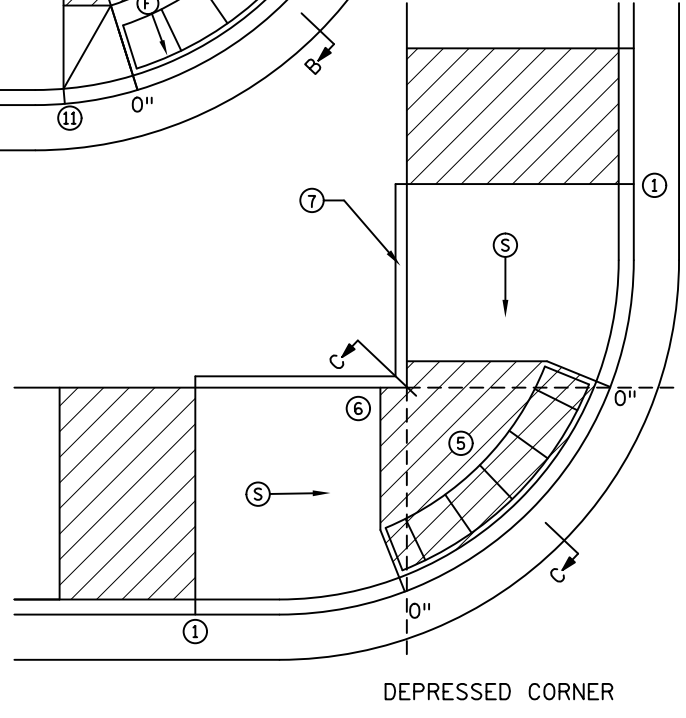
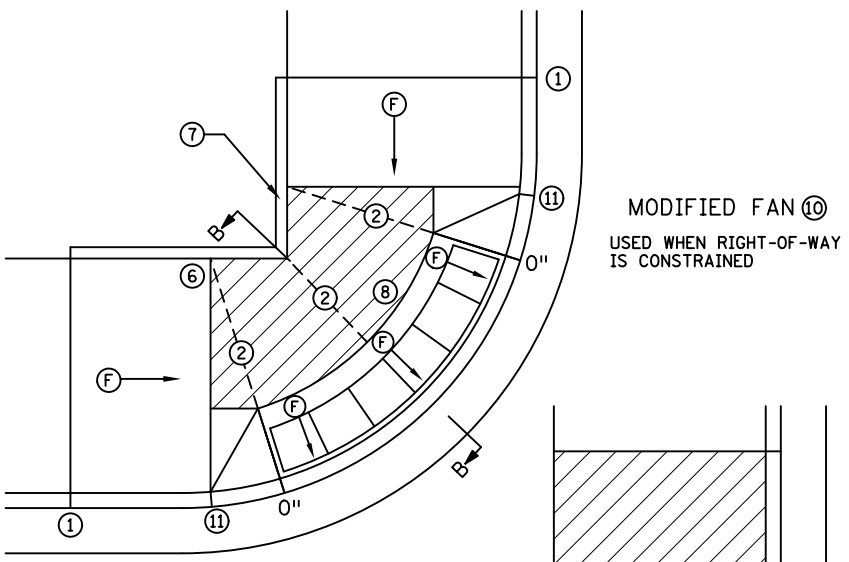
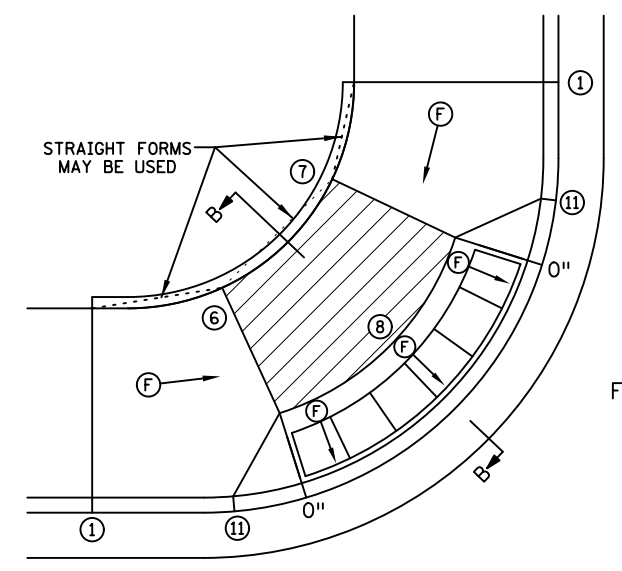
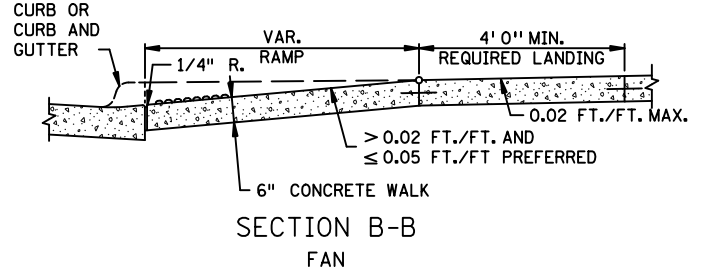
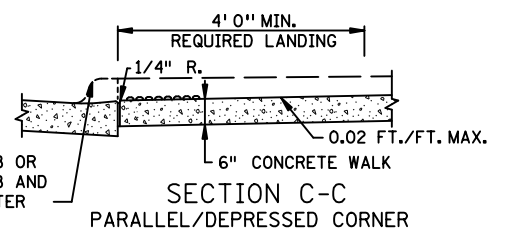
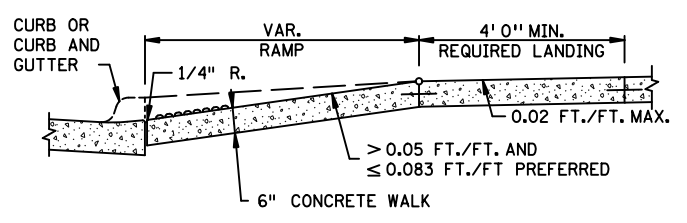
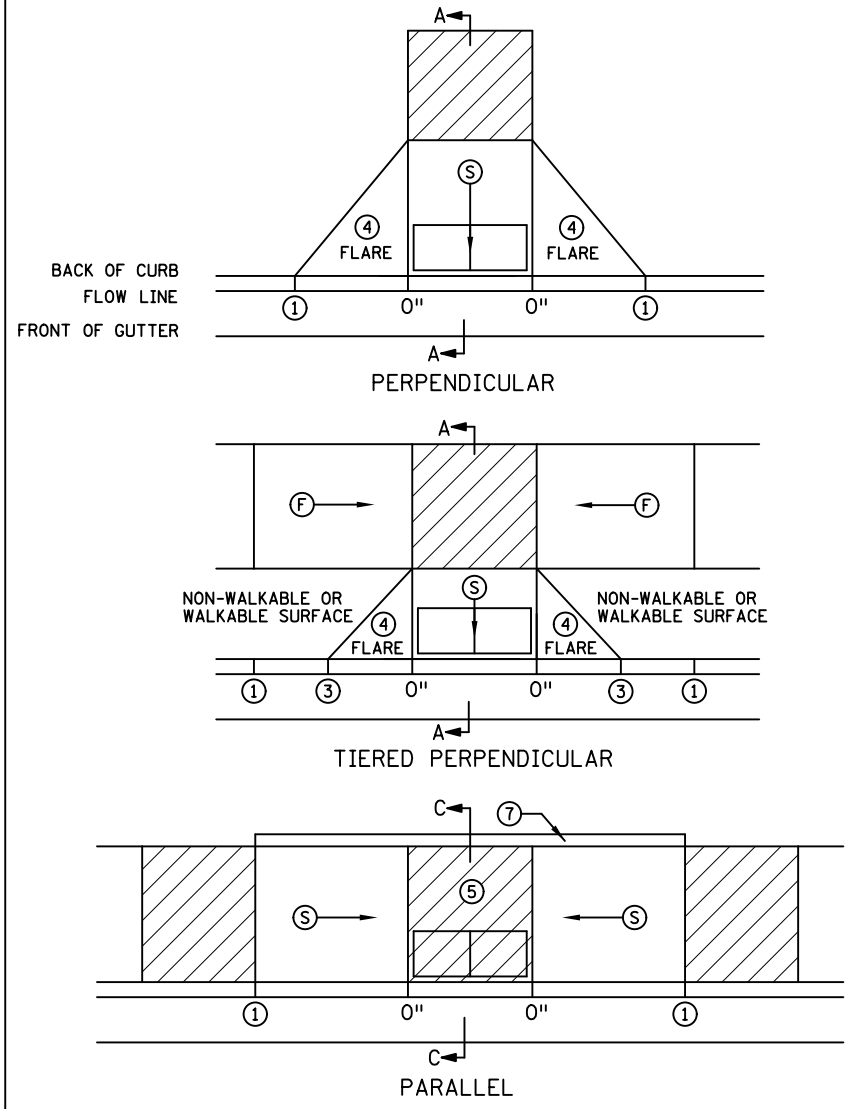
*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

**PAVEMENT JOINTS**  
**CONSTRUCTION AND TERMINAL HEADERS**

12/25/55 PM

12/22/2023

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- 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 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 SHEET 6 OF 6 FOR ALL SEPARATELY POURED INITIAL LANDINGS.
- WHEN SIDEWALK IS AT BACK OF CURB, TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE. MAINTAIN POSITIVE BOULEVARD DRAINAGE TO TOP OF CURB.
- 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 THE ENTIRE PAR WIDTH OF SHARED-USE PATHS AND THE ENTIRE PAR WIDTH OF THE WALK WITH THE EXCEPTION OF 3" MAXIMUM ON EACH OUTSIDE EDGE WHICH ENSURES THE DETECTABLE WARNINGS ARE ENCASED IN CONCRETE WHEN ADJACENT TO TURF. WHEN ADJACENT TO CONCRETE FLARES 0" - 3" OFFSET IS ALLOWED.
- WHEN DESIGNING OR ORDERING RECTANGULAR DETECTABLE WARNING SURFACES SHOULD BE 6" LESS THAN THE INCOMING PAR. ARC LENGTH OF THE 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.
  - 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 LESS THAN 5% RUNNING SLOPE SHOULD BE USED OVER V CURB TO REDUCE TRIPPING HAZARDS AND FACILITATE SNOW & ICE REMOVAL.
  - 8 A 7' MIN TOP RADIUS GRADE BREAK IS 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.
  - 11 INTERMEDIATE CURB HEIGHTS TAPER SHALL RISE AT 8-10% TO A MINIMUM 3" CURB HEIGHT. REDUCE INTERMEDIATE CURB HEIGHT TO 2+ INCHES IF NECESSARY TO MATCH ADJACENT BOULEVARD OR SIDEWALK GRADES.

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%.
[Hatched Box]	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 PAR.
X"	CURB HEIGHT

REVISIONS:

APPROVED: 11-04-2021

*Jeffrey Perkins*  
JEFFREY PERKINS  
OPERATIONS DIVISION

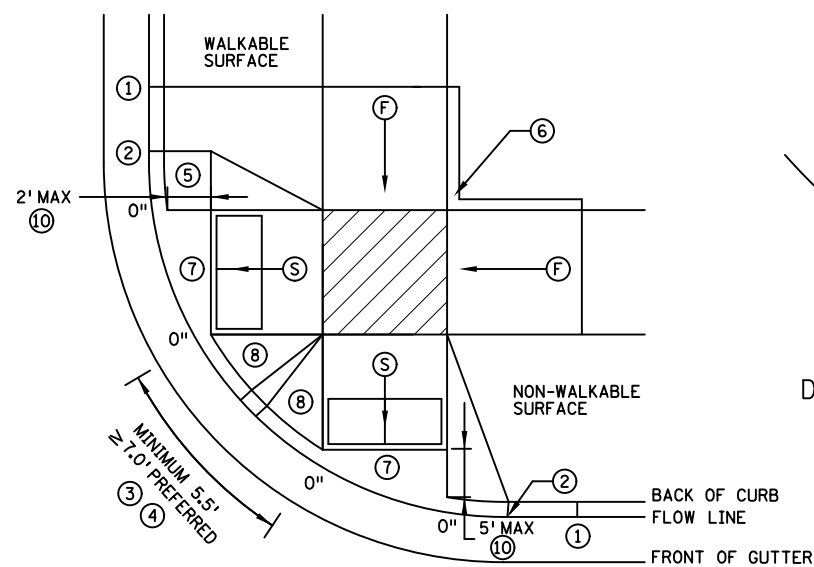
**m** MINNESOTA  
DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.250 1 OF 6

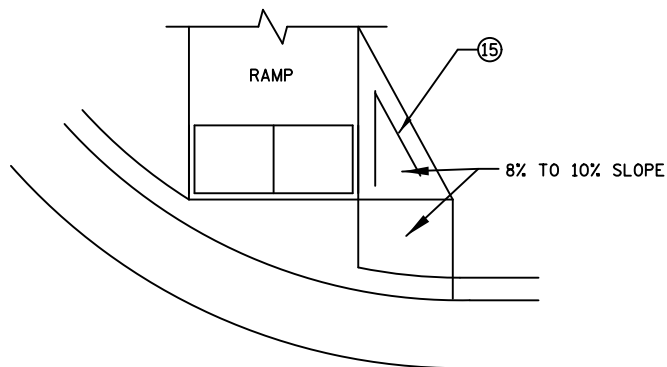
*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

APPROVED: 11-04-2021  
REVISED:

PEDESTRIAN CURB RAMP DETAILS

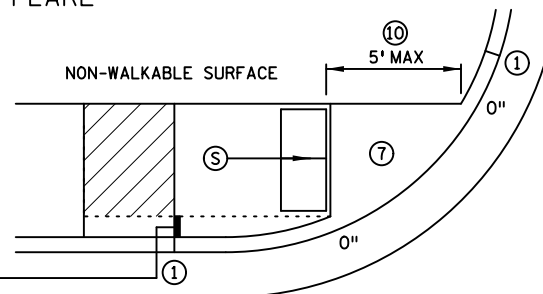


COMBINED DIRECTIONAL

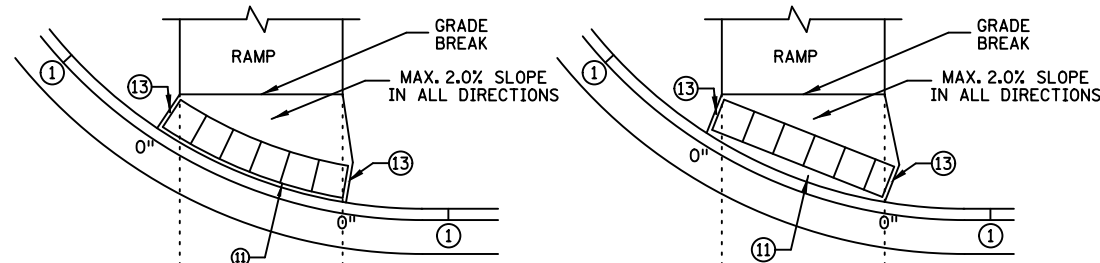


DIRECTIONAL RAMP WALKABLE FLARE

IF NON-CONCRETE BLVD. IS CONSTRUCTED AND IS LESS THAN 2' IN WIDTH AT TOP OF CURB TRANSITION, PAVE CONCRETE RAMP WIDTH TO ADJACENT BACK OF CURB.

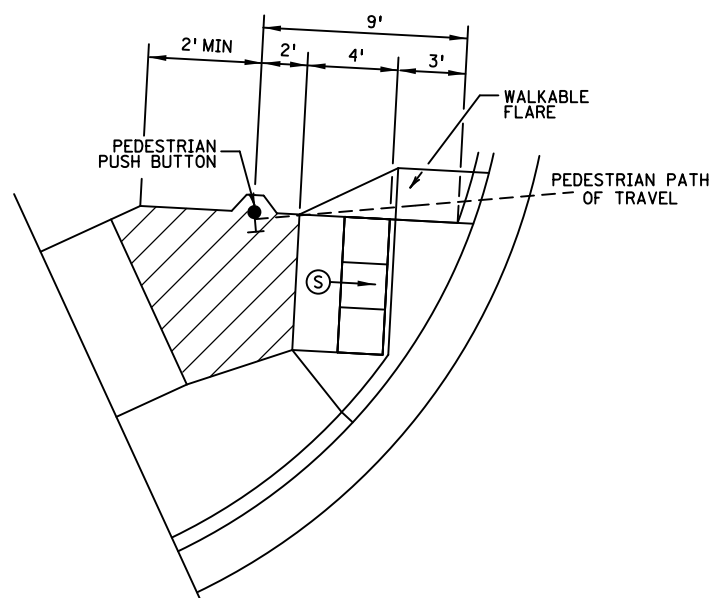


STANDARD ONE-WAY DIRECTIONAL ⑨



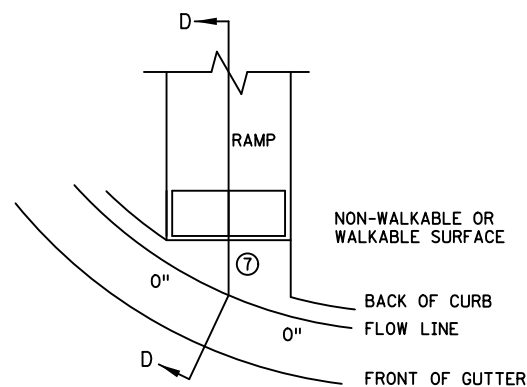
DETECTABLE WARNING PLACEMENT WHEN SETBACK CRITERIA IS EXCEEDED ⑫

ONE-WAY DIRECTIONAL WITH DETECTABLE WARNING AT BACK OF CURB

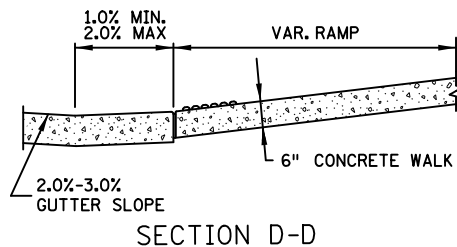


SEMI-DIRECTIONAL RAMP ③④⑨

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)



CURB FOR DIRECTIONAL RAMPS ⑭



SECTION D-D

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 THE ENTIRE PAR WIDTH OF SHARED-USE PATHS AND THE ENTIRE PAR WIDTH OF THE WALK WITH THE EXCEPTION OF 3" MAXIMUM ON EACH OUTSIDE EDGE WHICH ENSURES THE DETECTABLE WARNINGS ARE ENCASED IN CONCRETE WHEN ADJACENT TO TURF. WHEN ADJACENT TO CONCRETE FLARES 0" - 3" OFFSET IS ALLOWED.

WHEN DESIGNING OR ORDERING RECTANGULAR DETECTABLE WARNING SURFACES SHOULD BE 6" LESS THAN THE INCOMING PAR. ARC LENGTH OF THE 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 SHALL 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.
- ⑮ PLACE 2 NO. 4 BARS 4 INCHES FROM SIDE OF FORMS WITH A MINIMUM 2 INCHES OF CONCRETE COVER ALONG EACH SIDE OF FLARE (INCIDENTAL).

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%.
- Ⓣ 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 PAR.
- X" CURB HEIGHT

REVISIONS:
APPROVED: 11-04-2021
<i>Jeffrey A. Perkins</i> JEFFREY PERKINS OPERATIONS DIVISION



STANDARD PLAN 5-297.250 2 OF 6

*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

APPROVED: 11-04-2021  
REVISED:

PEDESTRIAN CURB RAMP DETAILS



RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

STANDARD PLAN SHEET

SEH  
FILE NO.  
ISDWB170688  
SPN5  
OF SPN29

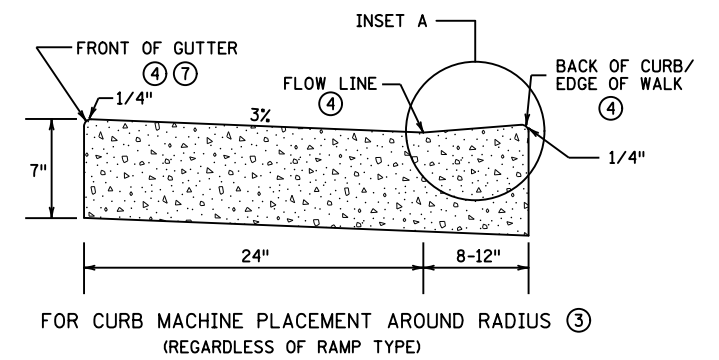
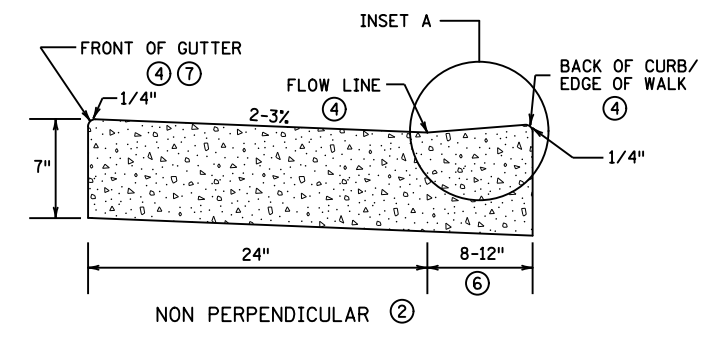
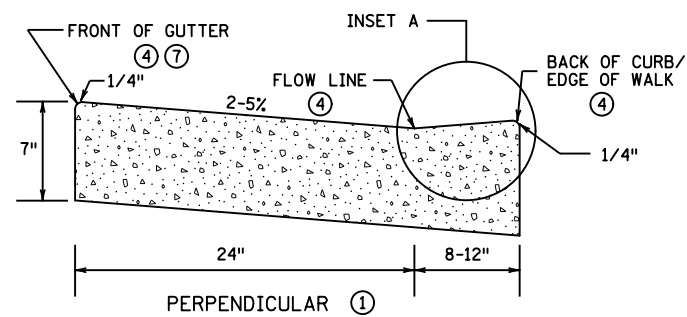
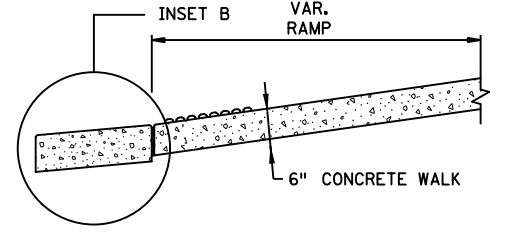
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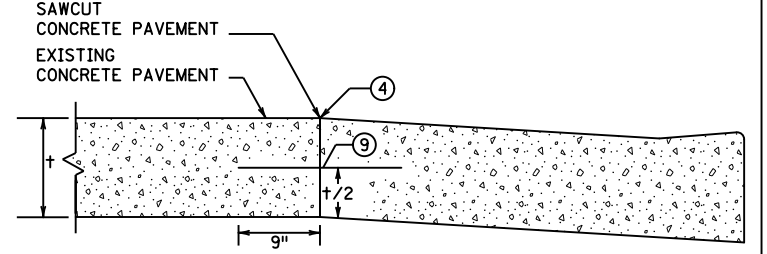
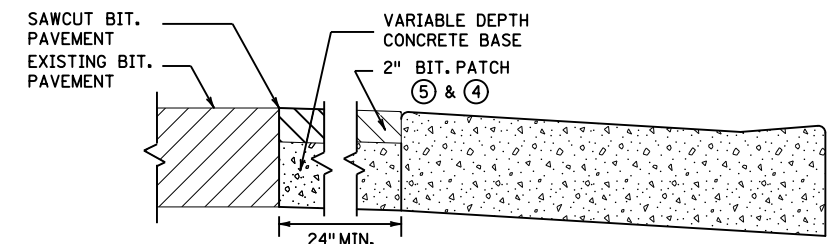
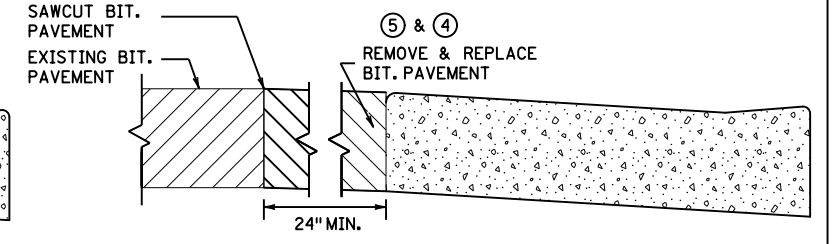
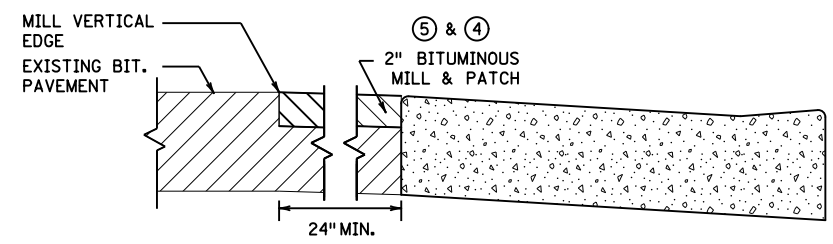
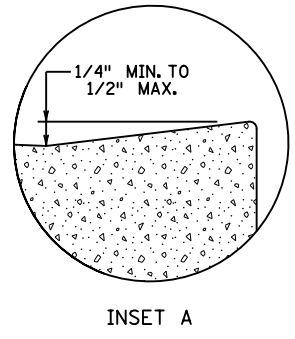
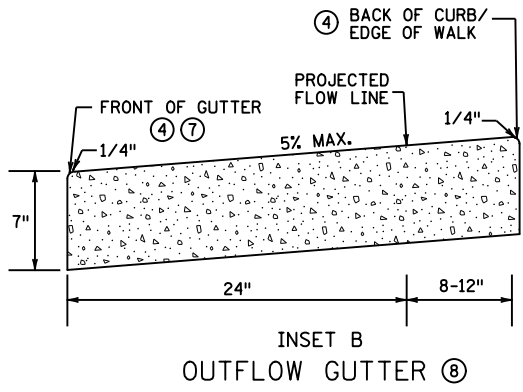
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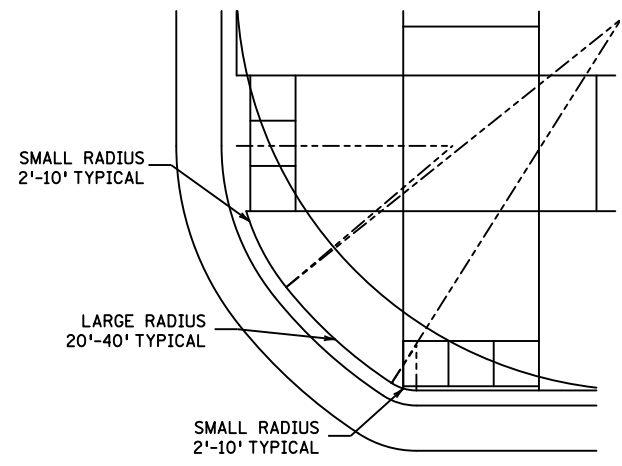
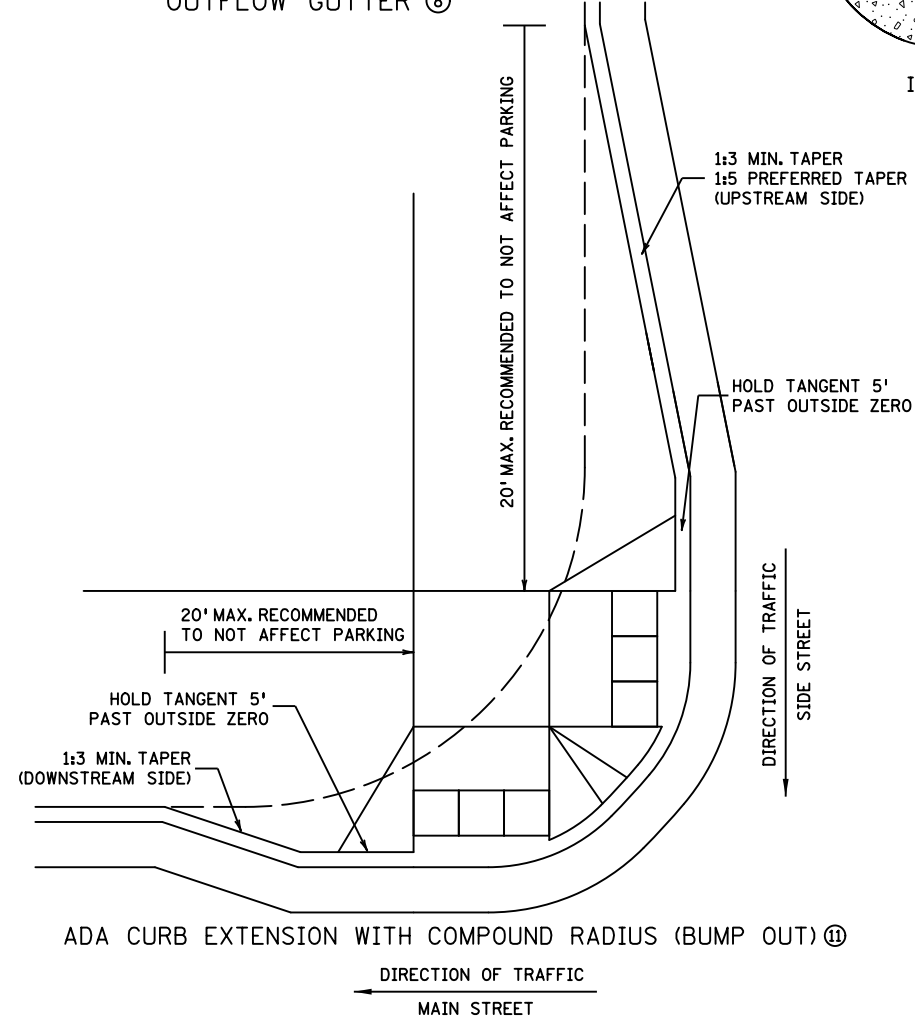


PEDESTRIAN ACCESS ROUTE CURB & GUTTER DETAIL



ONLY ALLOWED PER ENGINEER'S APPROVAL

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



COMBINED DIRECTIONAL (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.

REVISIONS:

APPROVED: 11-04-2021

*Jeffrey Perkins*  
JEFFREY PERKINS  
OPERATIONS DIVISION

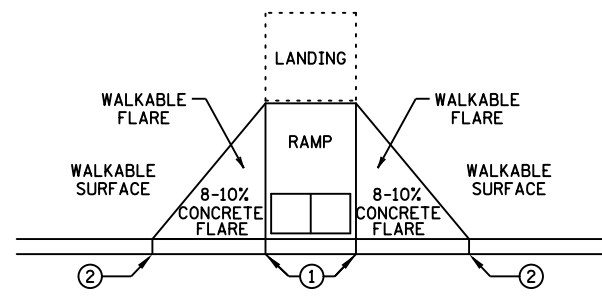
**m** MINNESOTA  
DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.250 3 OF 6

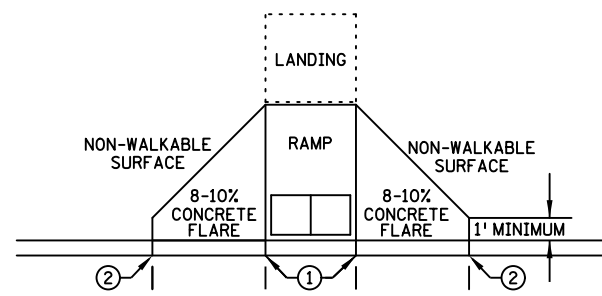
*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

APPROVED: 11-04-2021  
REVISED:

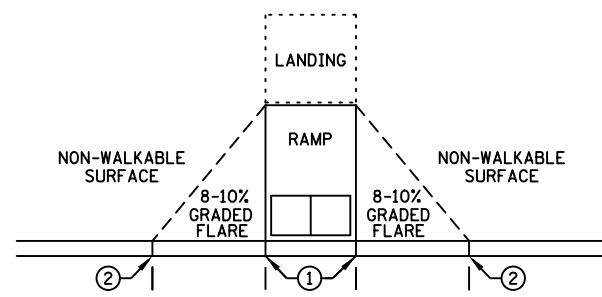
PEDESTRIAN CURB RAMP DETAILS



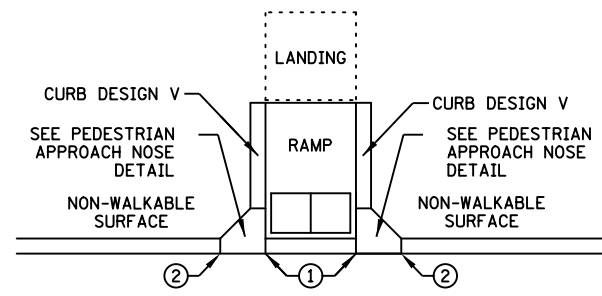
PAVED FLARES ADJACENT TO WALKABLE SURFACE



PAVED FLARES ADJACENT TO NON-WALKABLE SURFACE

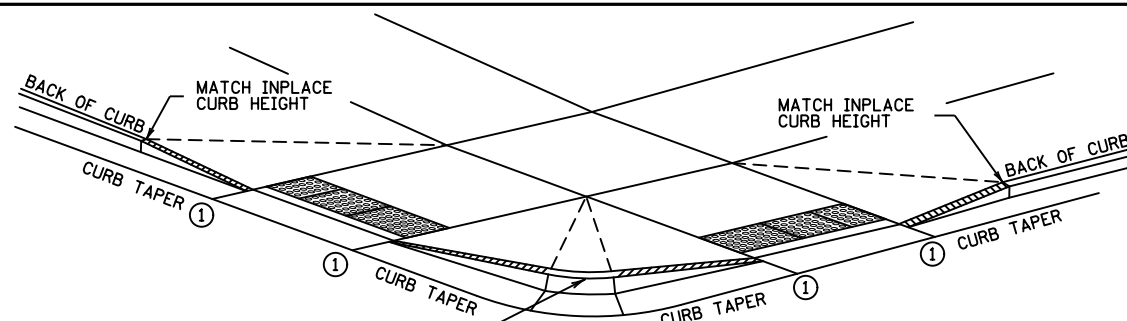


GRADED FLARES



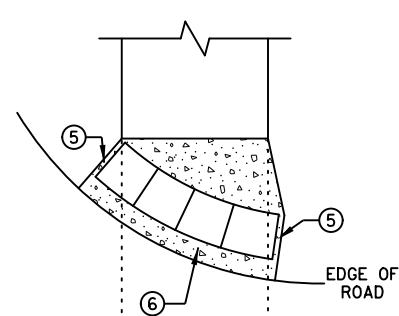
RETURNED CURB ④

TYPICAL SIDE TREATMENT OPTIONS ③ ⑩

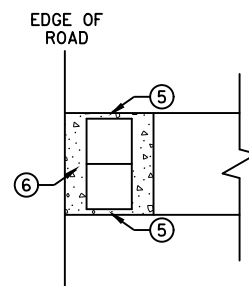


3" MINIMUM CURB HEIGHT, 4" PREFERRED (MEASURED AT FRONT FACE OF CURB) FOR A MIN. 6" LENGTH (MEASURED ALONG FLOW LINE)

DETECTABLE EDGE WITH CURB AND GUTTER ⑦

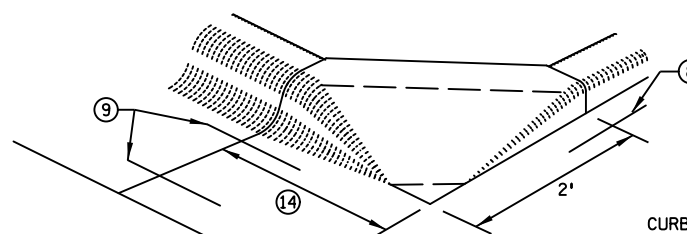


RADIAL DETECTABLE WARNING

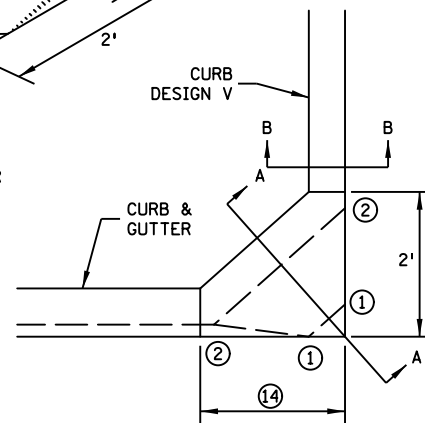


RECTANGULAR DETECTABLE WARNING

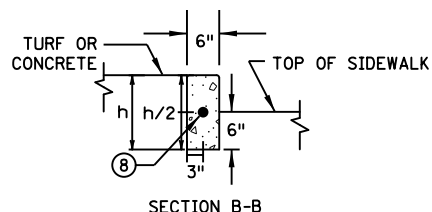
DETECTABLE EDGE WITHOUT CURB AND GUTTER



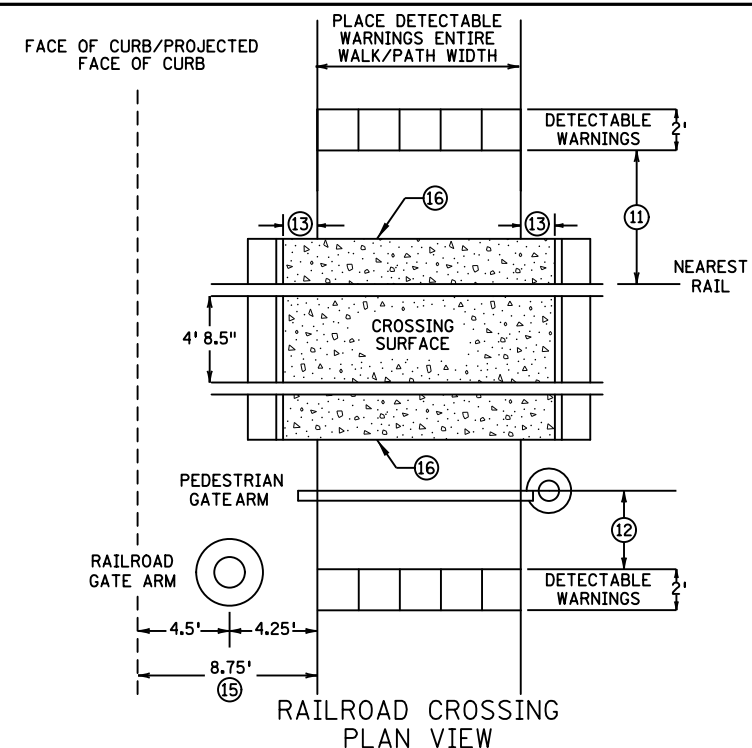
SECTION A-A



PEDESTRIAN APPROACH NOSE DETAIL (FOR RETURNED CURB SIDE TREATMENT)



SECTION B-B



NOTES:

INTERMEDIATE CURB HEIGHTS TAPER SHALL RISE AT 8-10% TO A MINIMUM 3 INCH CURB HEIGHT. INCREASE CURB TAPER LENGTH AT LESS THAN 8% OR REDUCE INTERMEDIATE CURB HEIGHT TO 2+ INCHES IF NECESSARY TO MATCH ADJACENT BOULEVARD OR SIDEWALK GRADES.

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 RAMP FROM THE BACK OF CURB.

- ① 0" CURB HEIGHT. SEE INSET A ON SHEET 3 OF 6.
- ② FULL CURB HEIGHT.
- ③ 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.
- ④ TYPICALLY USED FOR MEDIANS AND ISLANDS.
- ⑤ 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.
- ⑥ 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.
- ⑦ 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.
- ⑧ 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.
- ⑨ 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.
- ⑩ 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. CONSTRUCT THESE TAPERS AT 0"-3" AT 8-10%, THEN LESS THAN 5% FROM 3" CURB TO FULL CURB HEIGHT.
- ⑪ 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.
- ⑫ 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 ⑪.
- ⑬ CROSSING SURFACE SHALL EXTEND 2' MINIMUM PAST THE OUTSIDE EDGE OF WALK OR SHARED-USE PATH.
- ⑭ 3' FOR MEDIANS AND SPLITTER ISLANDS. NOSE CAN BE REDUCED TO 2' ON FREE RIGHT ISLANDS.
- ⑮ 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.
- ⑯ CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE.

REVISIONS:
APPROVED: 11-04-2021
<i>Jeffrey Perkins</i> JEFFREY PERKINS OPERATIONS DIVISION



STANDARD PLAN 5-297.250	4 OF 6
<i>Tom Styrbicki</i> THOMAS STYRBICKI STATE DESIGN ENGINEER	APPROVED: 11-04-2021 REVISED:

PEDESTRIAN CURB RAMP DETAILS

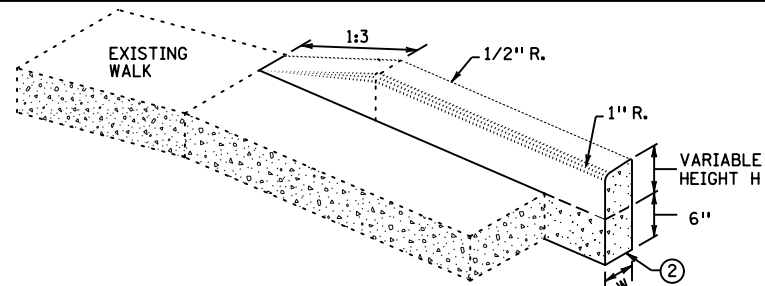


RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

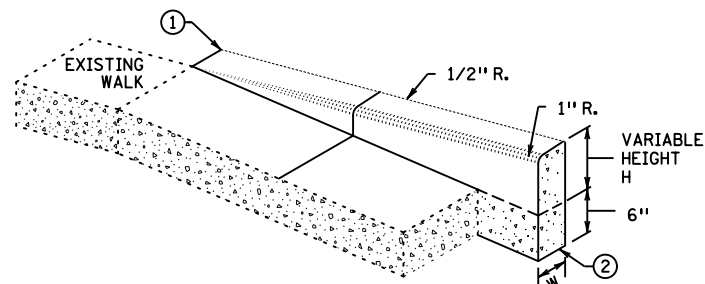
STANDARD PLAN SHEET

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SPN7  
OF SPN29

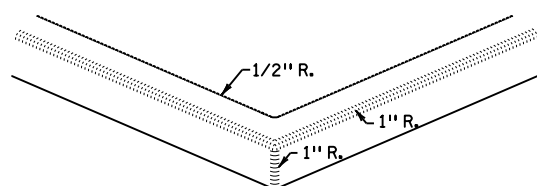
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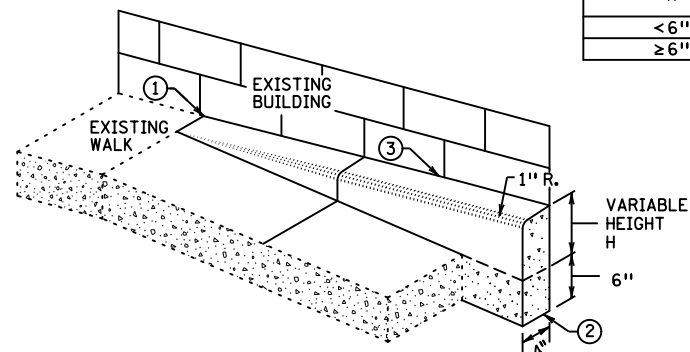
V CURB ADJACENT TO LANDSCAPE  
CURB WITHIN SIDEWALK LIMITS



V CURB ADJACENT TO LANDSCAPE  
CURB OUTSIDE SIDEWALK LIMITS

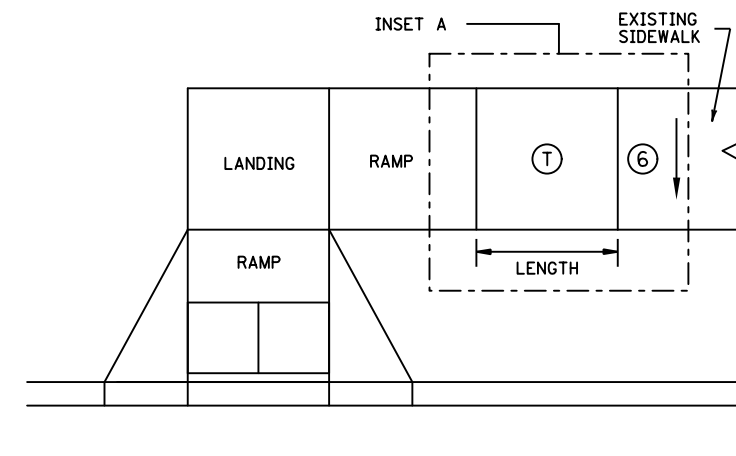


V CURB INTERSECTION

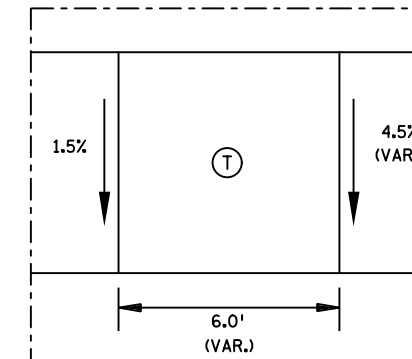


V CURB ADJACENT TO BUILDING  
OR BARRIER

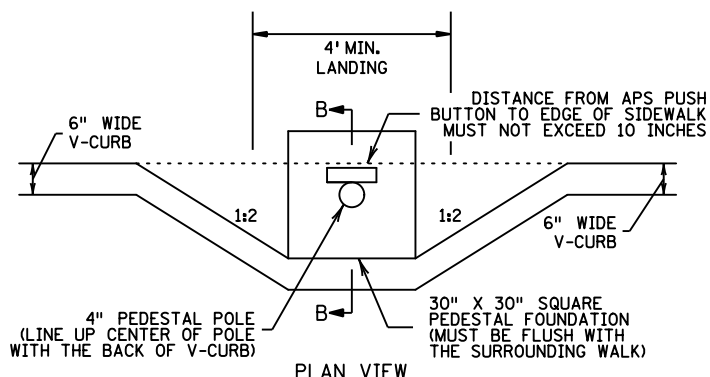
CONCRETE CURB DESIGN V	
CURB HEIGHT H	CURB WIDTH W
< 6"	4"
≥ 6"	6"



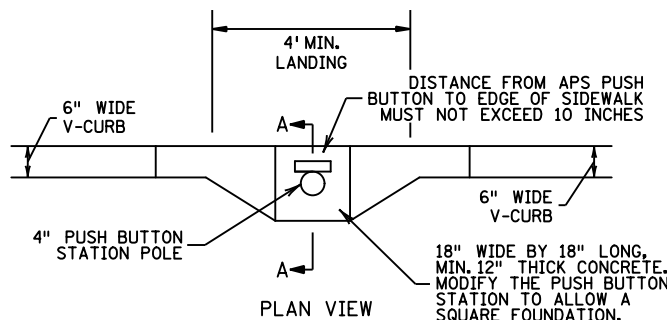
TRANSITION PANEL ④ ⑤



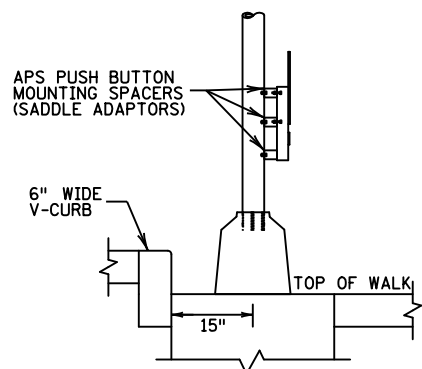
INSET A



PLAN VIEW

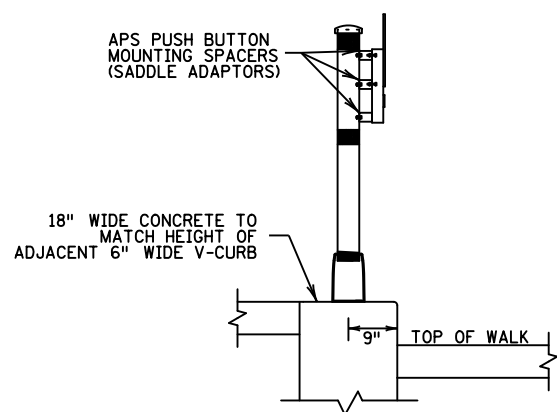


PLAN VIEW



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 CONSTRUCT USING APPROVED EXPANSION MATERIAL PER MNDOT TYPE A-E EXPANSION. LEAVE A MINIMUM 1/2" TOP GAP AND SEAL WITH MNDOT APPROVED SILICONE PER MNDOT SPEC 3722.
- 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.
- ⑤ 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.
- ① 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.

REVISIONS:
APPROVED: 11-04-2021
<i>Jeffrey Perkins</i> JEFFREY PERKINS OPERATIONS DIVISION



STANDARD PLAN 5-297.250 5 OF 6

*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

APPROVED: 11-04-2021  
REVISED:

PEDESTRIAN CURB RAMP DETAILS

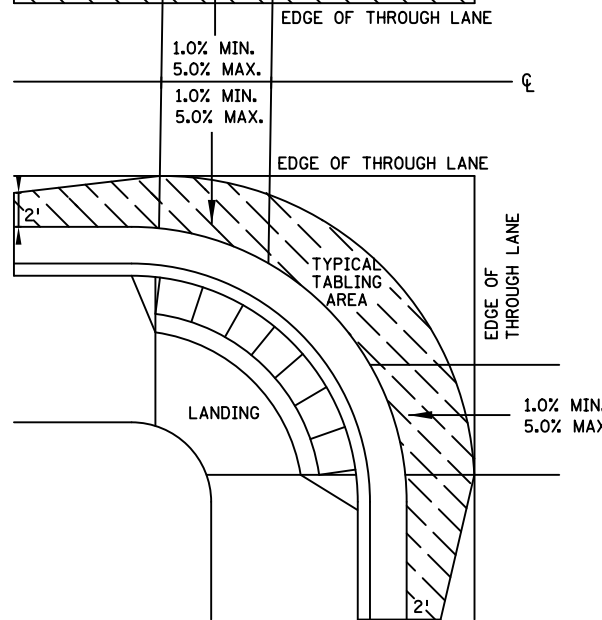
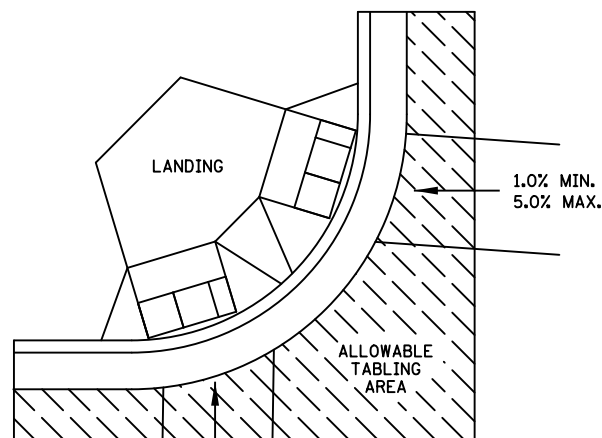


RAMSEY COUNTY, MINNESOTA  
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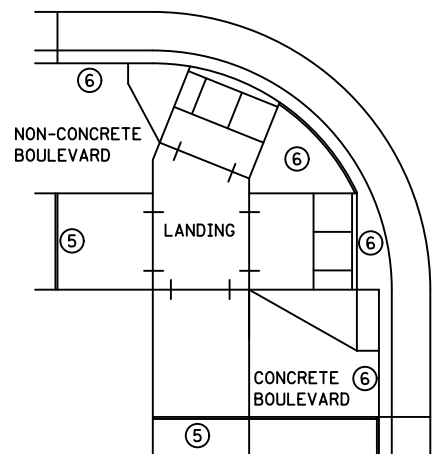
STANDARD PLAN SHEET

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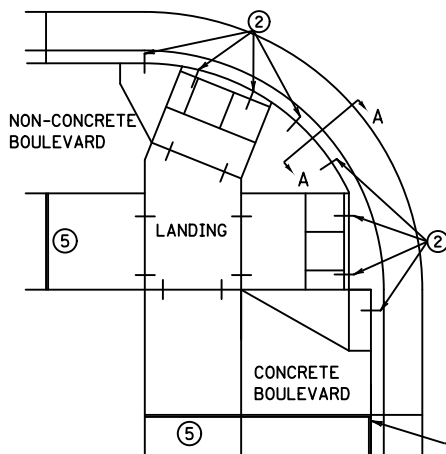
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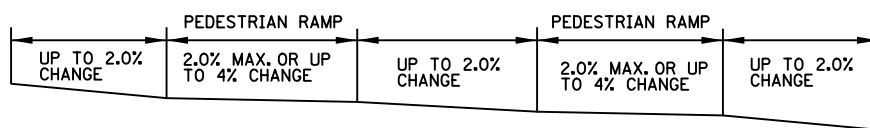
CURB LINE AND ROAD CROSSING ADJUSTMENTS



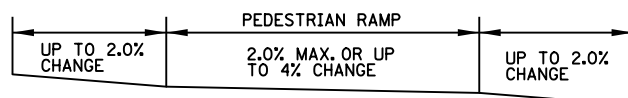
EXPANSION MATERIAL PLACEMENT FOR CONCRETE ROADWAYS



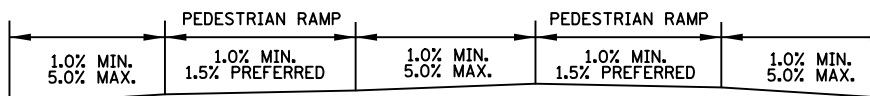
CURB LINE REINFORCEMENT PLACEMENT ON BITUMINOUS ROADWAYS



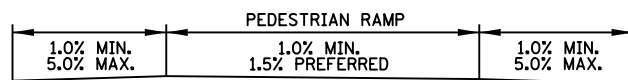
FLOW LINE PROFILE "TABLE" - TWIN PERPENDICULARS



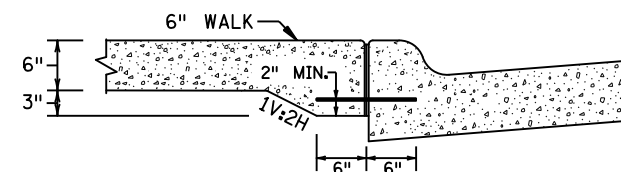
FLOW LINE PROFILE "TABLE" - FAN



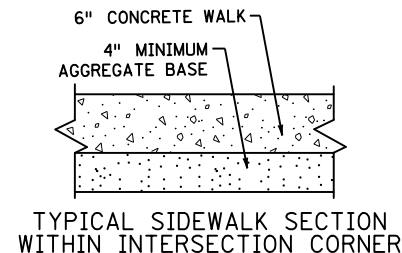
FLOW LINE PROFILE RAISE - TWIN PERPENDICULARS



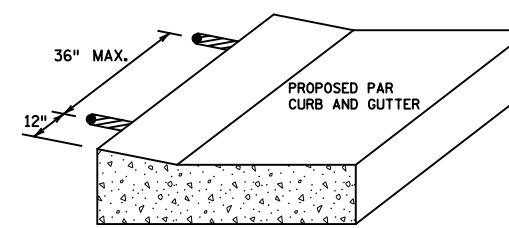
FLOW LINE PROFILE RAISE - FAN



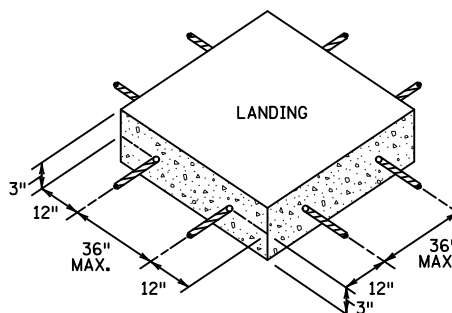
SECTION VIEW A-A THICKENED SECTION THROUGH CURB RAMP FLARES



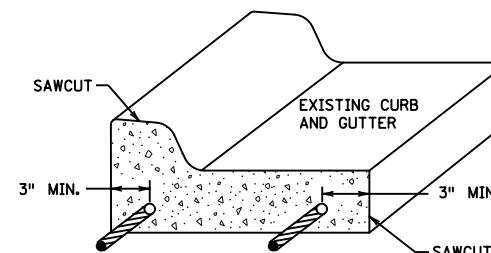
TYPICAL SIDEWALK SECTION WITHIN INTERSECTION CORNER



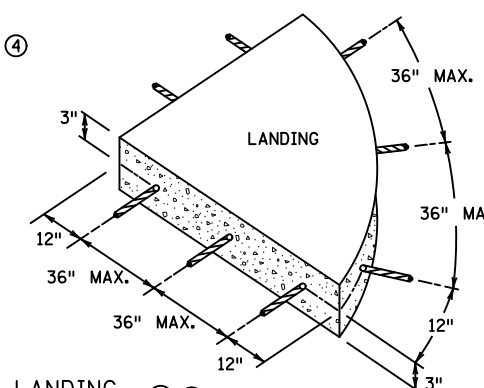
CURB RAMP REINFORCEMENT DETAILS



SEPARATE LANDING POUR REINFORCEMENT



CURB AND GUTTER REINFORCEMENT



GENERAL NOTES:

"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

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 (EPOXY COATED) AT 36" MAXIMUM CENTER TO CENTER MINIMUM 12" SPACING FROM CONSTRUCTION JOINTS. BARS TO BE ADJUSTED TO MATCH RAMP GRADE. BARS TO BE PAID BY EACH.
- ③ DRILL AND GROUT 2 - NO. 4 X 12" LONG (6" EMBEDDED) REINFORCEMENT BARS (EPOXY COATED). REINFORCEMENT REQUIRED FOR ALL CONSTRUCTION JOINTS. BARS TO BE PAID BY EACH.
- ④ THIS CURB LINE REINFORCEMENT DETAIL SHALL BE USED ON BITUMINOUS ROADWAYS. FOR CONCRETE ROADWAYS, SEE NOTE 6.
- ⑤ CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE.
- ⑥ USE AN APPROVED TYPE F (1/4 INCH THICK) SEPARATION MATERIAL. SEPARATION MATERIAL SHALL MATCH FULL HEIGHT DIMENSION OF ADJACENT CONCRETE.

REVISIONS:
APPROVED: 11-04-2021
<i>Jeffrey A. Perkins</i> JEFFREY PERKINS OPERATIONS DIVISION



STANDARD PLAN 5-297.250 6 OF 6

*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

APPROVED: 11-04-2021  
REVISED:

PEDESTRIAN CURB RAMP DETAILS

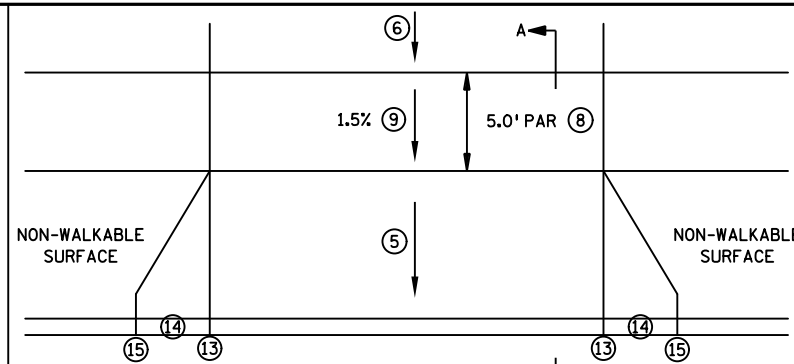


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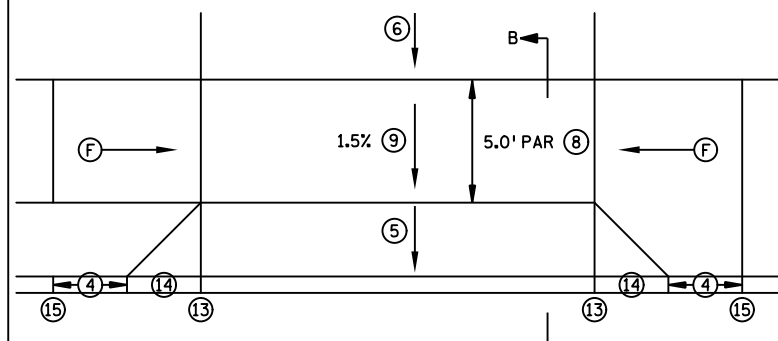
STANDARD PLAN SHEET

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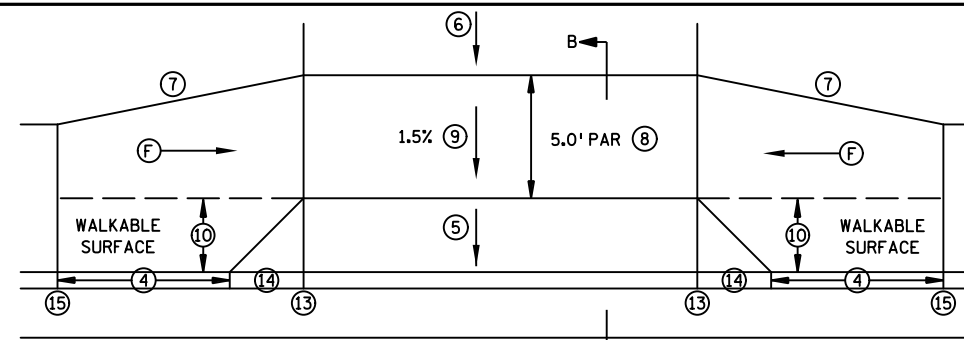
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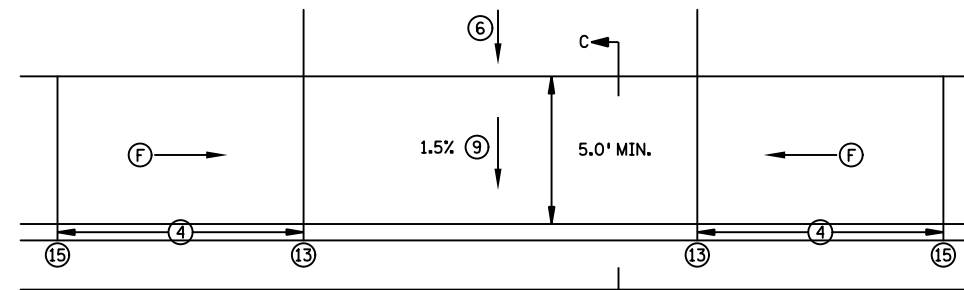
PERPENDICULAR DRIVEWAY ①



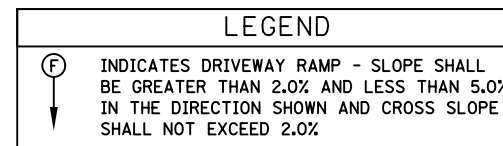
TIERED PERPENDICULAR DRIVEWAY ②



TIERED PERPENDICULAR OFFSET DRIVEWAY ②



PARALLEL DRIVEWAY ③



NOTES:

ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURED FROM BACK OF CURB.

IN URBAN ROADWAY SECTIONS, 6" CURB HEIGHT SHOULD BE USED WHEN 6' OR GREATER BOULEVARD WIDTH IS PROPOSED. WHEN BOULEVARD IS LESS THAN 6' WIDE, 4" CURB HEIGHT SHOULD BE USED.

MAINTAIN EXISTING DRAINAGE PATTERNS FLOWING TO PUBLIC RIGHT OF WAY.

ACQUIRE ADEQUATE L3 TO ALLOW FOR A CONTINUOUS PAR PROFILE (UNIFORM TYPICAL SIDEWALK SECTION) THROUGH THE DRIVEWAY APRON.

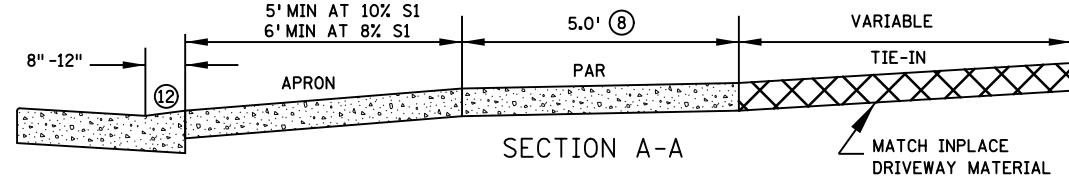
IN NO CASE SHALL SIDEWALK PROFILES EXCEED 5.0%, EXCEPT SIDEWALK PROFILES CAN MATCH ROADWAY GRADE IF ROADWAY GRADE IS GREATER THAN 5.0%. RAMPS FOR DRIVEWAYS ARE REQUIRED TO FOLLOW THE ABOVE SIDEWALK CRITERIA.

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

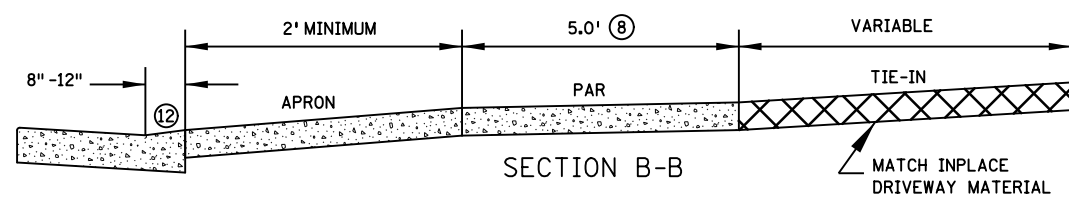
DRIVEWAY TYPES FROM MOST PREFERRED TO LEAST PREFERRED ARE AS FOLLOWS: PERPENDICULAR, TIERED PERPENDICULAR, TIERED PERPENDICULAR OFFSET & PARALLEL.

- ① PERPENDICULAR DRIVEWAYS ARE THE STANDARD AND STARTING POINT FOR ALL DRIVEWAY DESIGN AND CONSTRUCTION. SHOULD BE USED TO ACHIEVE CONTINUOUS PAR PROFILE THROUGH THE DRIVEWAY. OBTAINING A PERPENDICULAR DRIVEWAY DESIGN BECOMES MORE CRITICAL WITH STEEP ROADWAY PROFILES.
- ② TO BE USED WHEN PERPENDICULAR DRIVEWAY DESIGN CANNOT BE ACHIEVED, THE DRIVEWAY PAR IS BELOW ROADWAY CURB HEIGHT. THIS DRIVEWAY TYPE CAN BE USED FOR BOTH PAVED (AS SHOWN) AND GRASS BOULEVARDS.
- ③ TO BE USED WHEN PERPENDICULAR AND TIERED PERPENDICULAR DRIVEWAY DESIGN CANNOT BE ACHIEVED. CAN BE USED FOR STEEP NEGATIVE SLOPED DRIVEWAYS. DW CURB TYPE 2 SHOULD BE USED TO RAISE PAR ABOVE GUTTER AND REDUCE "ROLLER COASTER" EFFECT. 4" HIGH ROADWAY CURB SHOULD BE USED TO REDUCE "ROLLER COASTER" EFFECT ESPECIALLY WHEN MULTIPLE DRIVEWAYS ARE PRESENT.
- ④ TOP OF CURB SHALL MATCH PROPOSED ADJACENT WALK GRADE.
- ⑤ 8% STANDARD, 10% MAX. FOR COMMERCIAL AND 12% MAX. FOR RESIDENTIAL. SEE GENERAL NOTES ON SHEET 2 FOR MORE INFORMATION.
- ⑥ S3 8% MAXIMUM, IF THE SLOPE IS EXCEEDED OR CONTINUED FOR MORE THAN 5', ANALYZE VEHICLE TEMPLATES FOR VERTICAL CLEARANCE. IF EXISTING DRIVEWAY IS NEGATIVELY DRAINING, S3 CAN BECOME SLIGHTLY MORE NEGATIVE TO ACHIEVE PERPENDICULAR DRIVEWAY DESIGN IF THE VERTICAL CLEARANCE IS ACHIEVED IN VEHICLE TEMPLATES.
- ⑦ 1:3 MIN. 1:5 PREFERRED FOR DRIVEWAY RETROFIT PROJECTS. 1:10 PREFERRED FOR SIDEWALK REPLACEMENT PROJECTS.
- ⑧ 5.0' MIN. PAR WIDTH IS THE STANDARD THROUGH DRIVEWAYS. IF FEASIBLE WIDEN DRIVEWAY PAR WIDTH TO MATCH APPROACHING SIDEWALK PAR WIDTHS. IN VERTICALLY CONSTRAINED AREAS PAR WIDTHS CAN INCREMENTALLY BE REDUCED TO 4.5' OR 4' MIN AFTER ALL OTHER OPTIONS HAVE BEEN APPLIED.
- ⑨ THE PEDESTRIAN ACCESS ROUTE, MAY NOT EXCEED 0.02 FT./FT. AS CONSTRUCTED.
- ⑩ SIDEWALK OFFSET TO BE LESS THAN OR EQUAL TO HALF THE APPROACHING SIDEWALK WIDTH.
- ⑪ INTEGRAL DRIVEWAY APRON TO BE POURED MONOLITHICALLY/INTEGRAL WITH THE CURB AND GUTTER. SEE SHEET 2 FOR MORE INFORMATION.
- ⑫ SEE SHEET 2 FOR CURB TYPE INFORMATION.
- ⑬ 0" CURB IS AT FLOW LINE. SEE DRIVEWAY TABLE FOR BACK OF CURB HEIGHTS.
- ⑭ 3' LONG AT 8-10% PREFERRED FOR INITIAL CURB TAPER. REDUCE CURB TAPER SLOPE IF NECESSARY TO MATCH ADJACENT SIDEWALK GRADES.
- ⑮ MATCH FULL CURB HEIGHT.
- ⑯ 1:2 TAPER RATE ON INTEGRAL DRIVEWAY APRONS.
- ⑰ SEE SHEET 4 FOR WHEN 6" WALK IS REQUIRED.

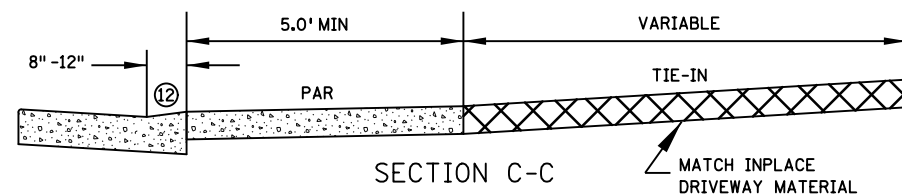
WITH 4" CURB HEIGHT;  
3' MIN AT 10% S1  
4' MIN AT 8% S1  
WITH 6" CURB HEIGHT;  
5' MIN AT 10% S1  
6' MIN AT 8% S1



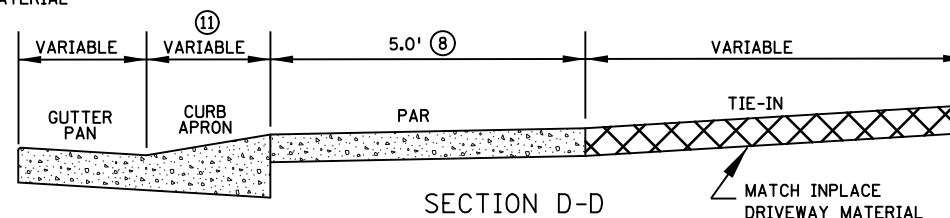
SECTION A-A



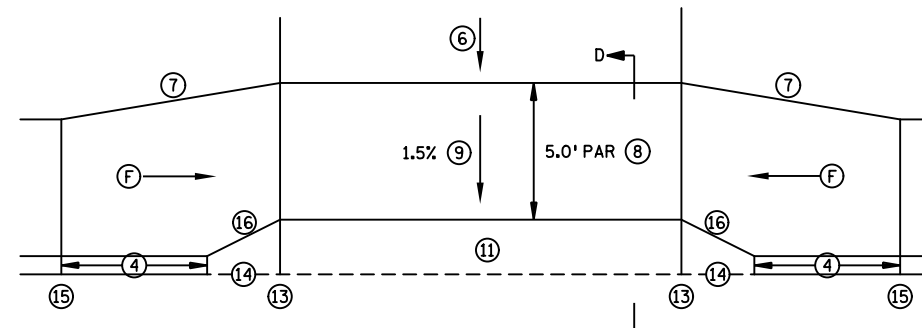
SECTION B-B



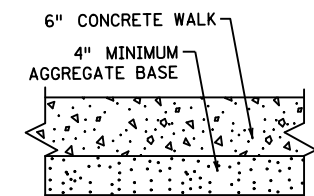
SECTION C-C



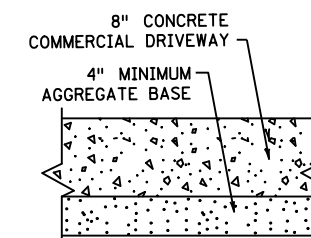
SECTION D-D



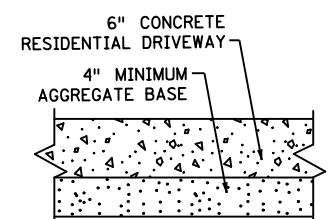
INTEGRAL DRIVEWAY APRON



TYPICAL SIDEWALK SECTION ⑰



8" CONCRETE COMMERCIAL DRIVEWAY  
4" MINIMUM AGGREGATE BASE



6" CONCRETE RESIDENTIAL DRIVEWAY  
4" MINIMUM AGGREGATE BASE

TYPICAL DRIVEWAY SECTIONS

REVISIONS:
APPROVED: 11-04-2021
<i>Jeffrey A. Perkins</i> JEFFREY PERKINS OPERATIONS DIVISION

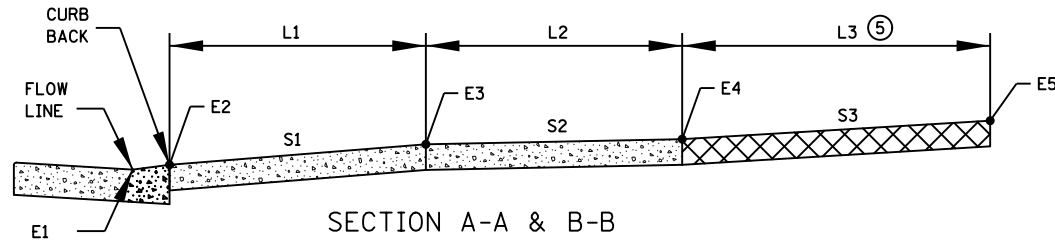


STANDARD PLAN 5-297.254	1 OF 4
<i>Tom Styrbicki</i> THOMAS STYRBICKI STATE DESIGN ENGINEER	APPROVED: 11-04-2021 REVISED:

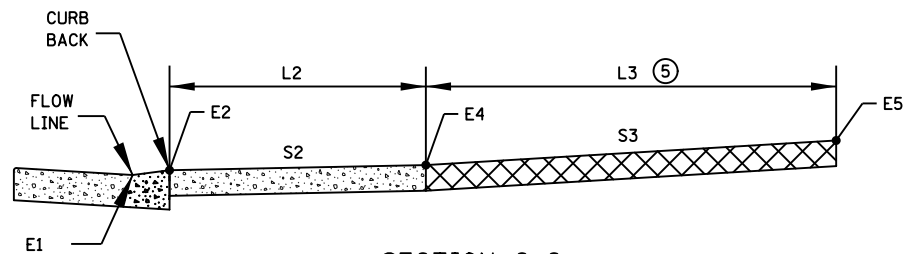
DRIVEWAY AND SIDEWALK DETAILS

DRIVEWAY TABLE ①

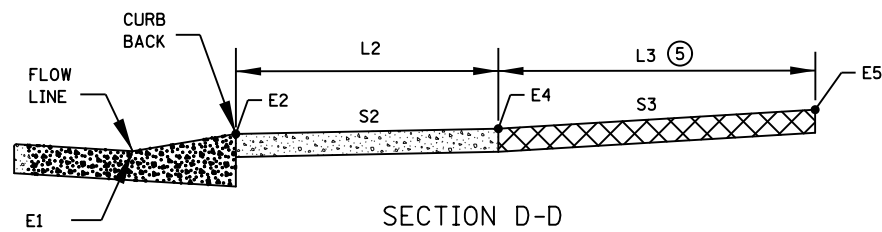
STATION	SIDE	DRIVEWAY TYPE ②	CURB TYPE ③	E1	E2	L1	S1	E3	L2	S2 ④	E4	L3 ⑤	S3	EXISTING ⑥	E5	COMMENTS
						FT	%		FT	%		FT	%			



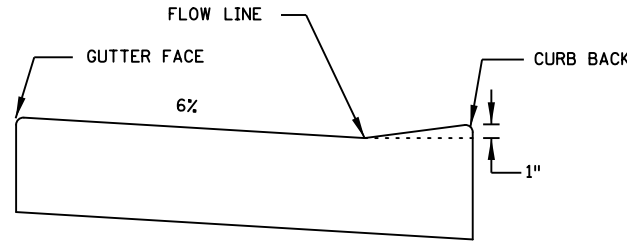
SECTION A-A & B-B  
(REFER TO PREVIOUS SHEET)



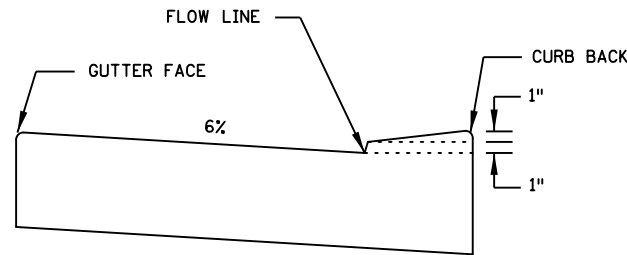
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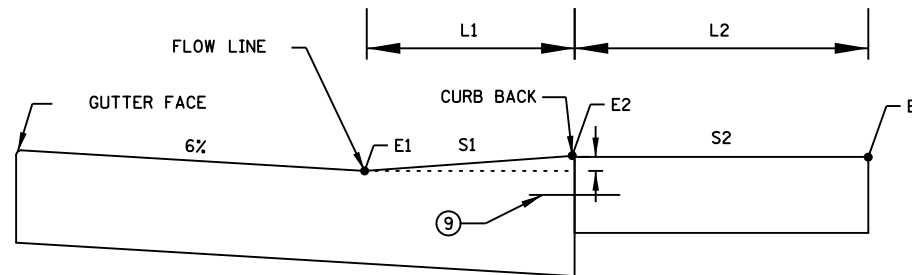
SECTION D-D  
(REFER TO PREVIOUS SHEET)



DW CURB TYPE 1  
STANDARD CURB AT DRIVEWAY



DW CURB TYPE 2  
VERTICALLY CONSTRAINED



INTEGRAL DRIVEWAY APRON (IDA)

NOTES:

- ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURED FROM BACK OF CURB.
- DW CURB TYPE 1 SHALL BE USED WHEN THE DRIVEWAY ACTS AS A PEDESTRIAN RAMP. THE MAX. APRON SLOPE MUST ADHERE TO ADA CRITERIA AS WELL. DW CURB TYPE 1 SHOULD BE USED IF THERE IS ON STREET PARKING.
- WHERE ROADWAY DRAINAGE IS A CONCERN (NEGATIVE SLOPED APRON) DW CURB TYPE 2 CAN BE USED TO HELP KEEP THE WATER ON PUBLIC RIGHT OF WAY.
- S1 8% STANDARD, 10% MAX. COMMERCIAL AND 12% MAX. RESIDENTIAL. IF EXISTING GRADES ARE STEEPER DO NOT MAKE GRADES APPRECIABLY WORSE BY USING BEST PRACTICES SUCH AS DRIVEWAY CURB HEIGHTS, EXTENDING L3 AND/OR STEEPEN S3.
- S3 8% MAXIMUM, IF THIS SLOPE IS EXCEEDED OR CONTINUED FOR MORE THAN 5', ANALYZE VEHICLE TEMPLATES FOR VERTICAL CLEARANCE. SEE FACILITY DESIGN GUIDE, CHAPTER 6, FOR GEOMETRIC DESIGNS OF DRIVEWAYS.
- ① EXAMPLE SHOWN TO BE INCLUDED IN PLAN FOR EACH DRIVEWAY THAT HAS PAR THROUGH IT.
- ② REFERS TO THE FOLLOWING TYPES; PERPENDICULAR DRIVEWAY, TIERED PERPENDICULAR OFFSET DRIVEWAY, TIERED PERPENDICULAR DRIVEWAY, PARALLEL DRIVEWAY, AND INTEGRAL DRIVEWAY APRON.
- ③ DW CURB TYPE 1 IS THE STANDARD AND SHALL BE THE STARTING POINT FOR ALL PERPENDICULAR AND TIERED DRIVEWAYS. DW CURB TYPE 2 SHALL ONLY BE USED AFTER UTILIZING BEST PRACTICES SUCH AS MAXIMIZING S1, S3, AND L3.
- ④ SHOULD BE DESIGNED AT 1.5%.
- ⑤ ACQUIRE ADEQUATE L3 TO ALLOW FOR CONTINUOUS PAR PROFILE (UNIFORM SIDEWALK SECTION) THROUGH THE DRIVEWAY APRON.
- ⑥ PROVIDE INPLACE TIE-IN SLOPE INFORMATION AT BACK OF PROPOSED WALK (S3 AREA).
- ⑦ INFORMATION TO BE INCORPORATED INTO DRIVEWAY TABLE WHEN INTEGRAL DRIVEWAY APRON IS USED. OTHER CURB HEIGHTS & CURB APRON LENGTHS CAN BE USED.
- ⑧ L1 & S1 FOR INTEGRAL DRIVEWAY APRON IS TO FLOWLINE. 12.5% IS MAXIMUM PREFERRED SLOPE.
- ⑨ TIE ADJACENT SECTIONS. CONCRETE DRIVEWAY APRON AND CONCRETE DRIVEWAY SIDEWALK SHALL BE CONSTRUCTED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. DRILL AND GROUT OR CAST IN-PLACE THROUGH HOLES IN THE FORMS NO. 4 X 12" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINT.

CURB TYPE	L1	E2	S1 ⑧
	FT		%
IDA 216	1.33	+0.16	12.5
IDA 220	1.67	+0.16	10
IDA 324	2	+0.24	12.5
IDA 432	2.67	+0.33	12.5

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*Jeffrey A. Perkins*  
JEFFREY PERKINS  
OPERATIONS DIVISION



STANDARD PLAN 5-297.254 2 OF 4

*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

APPROVED: 11-04-2021  
REVISED:

DRIVEWAY AND SIDEWALK DETAILS



RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

STANDARD PLAN SHEET

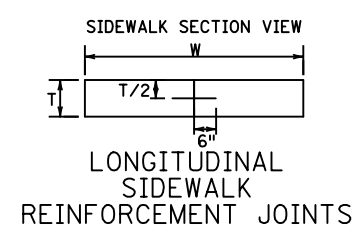
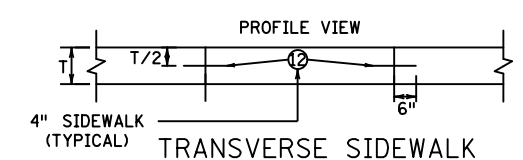
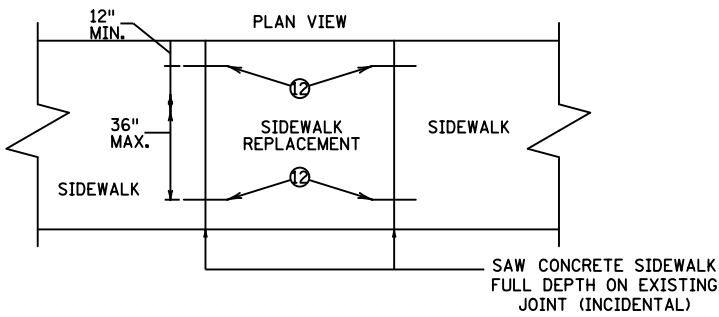
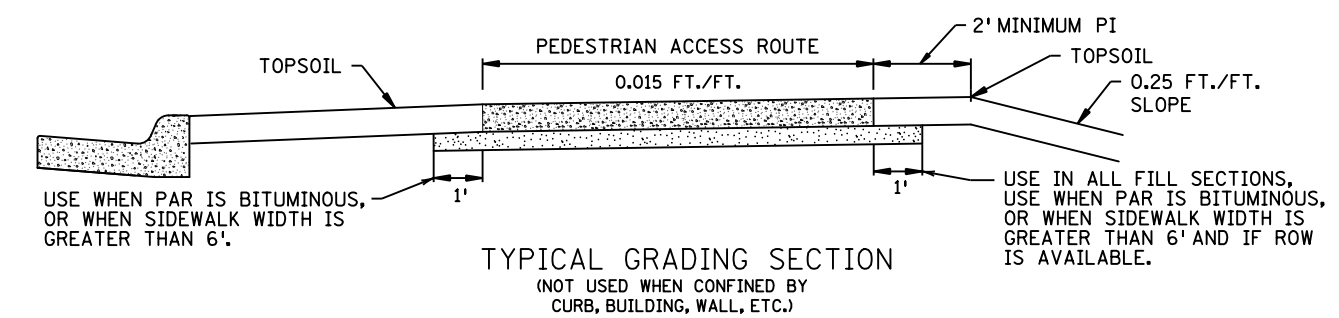
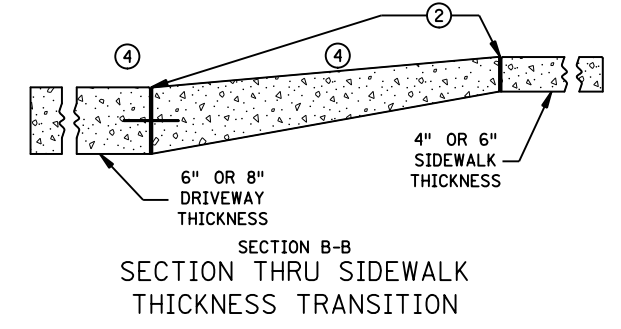
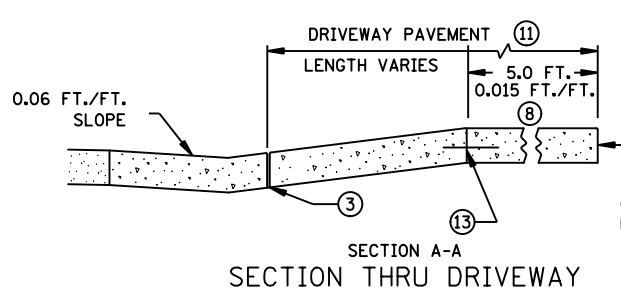
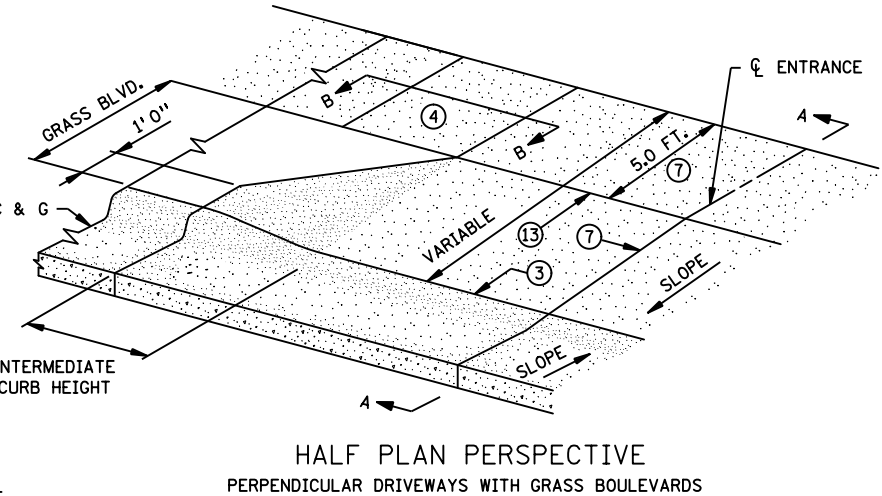
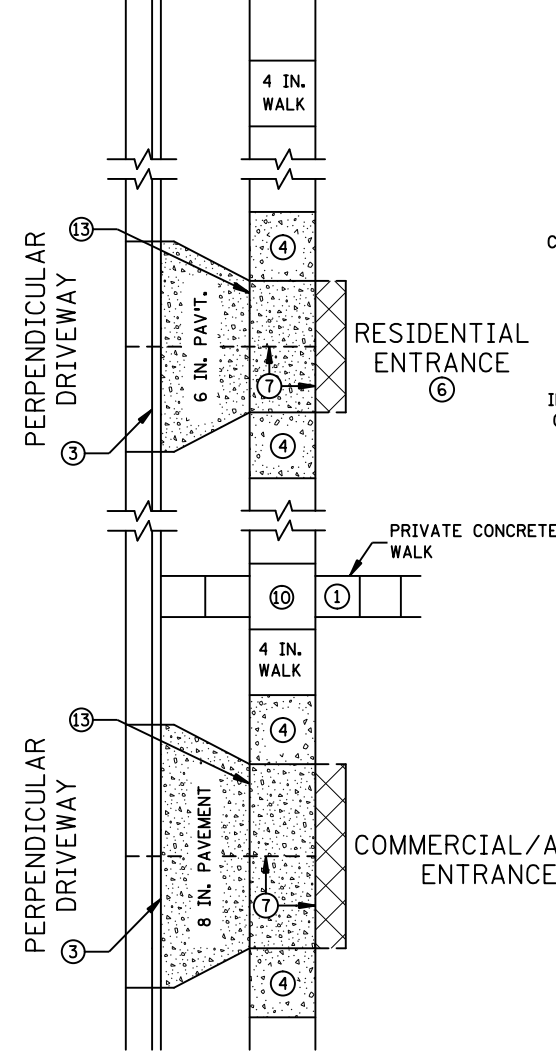
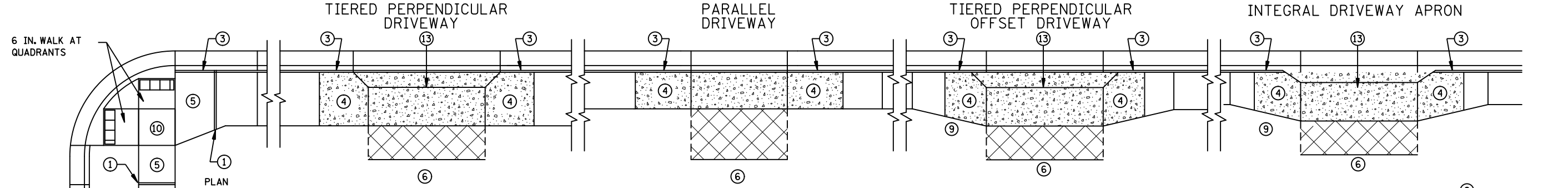
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MODEL: 254\_3



SIDEWALK WIDTH, W	SIDEWALK THICKNESS, T	TIE BAR SIZE	LENGTH	SPACING
> 7'	4"	No. 4	12"	24"
>10'	6"	No. 4	12"	36"

FOR 4" CONCRETE ONLY: CAST IN PLACE BARS MUST BE SUPPORTED WITH P-STAKES OR REINFORCEMENT BASKETS FOR FULL WIDTH CONCRETE PLACEMENTS.

FOR 6" CONCRETE ONLY: DRILL AND GROUT OR CAST IN PLACE THROUGH HOLES IN THE FORMS REQUIRED FOR STAGED ADJACENT CONCRETE PLACEMENTS.

- NOTES:**
- ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURED FROM BACK OF CURB.
  - TO MINIMIZE SIDEWALK "ROLLER COASTER" EFFECT IT IS DESIRABLE TO KEEP THE PAR ELEVATION CONTINUOUS OR AT LEAST IN THE UPPER HALF OF CURB HEIGHT. 4" HIGH CURB SHOULD BE USED INSTEAD OF 6" HIGH CURB TO HELP THIS PROBLEM WHEN APPLICABLE.
  - 4" HIGH ADJACENT CURB IS PREFERRED WHEN BOULEVARDS 4' OR LESS ARE PRESENT MEASURED FROM THE BACK OF CURB. WHEN THE DRIVEWAY IS SLOPING DOWN FROM THE ROADWAY (NEGATIVE) 4" HIGH ADJACENT CURB SHOULD ALSO BE USED.
  - SEE FACILITY DESIGN GUIDE, CHAPTER 6, FOR GEOMETRIC DESIGN OF DRIVEWAYS.
  - 1 CONSTRUCT WITH EXPANSION MATERIAL PER MNDOT SPECIFICATION 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE. DRIVEWAY EXPANSION SHALL BE PLACED AT TOP OR BOTTOM OF TRANSITION PANEL.
  - 2 CONSTRUCT WITH EXPANSION MATERIAL MNDOT PER SPEC. 3702 TYPES A-E. EXPANSION MATERIAL SHALL MATCH FULL HEIGHT OF ADJACENT CONCRETE. MAXIMUM ONE EXPANSION PER DRIVEWAY PLACED AT EITHER TOP OR BOTTOM OF CONCRETE THICKNESS TRANSITION. IF MULTIPLE DRIVEWAYS EXIST PLACE ONE EXPANSION BETWEEN EACH DRIVEWAY. IF NO DRIVEWAY EXIST PLACE A MAXIMUM OF ONE EXPANSION PER 150' OF SIDEWALK RUN.
  - 3 USE AN APPROVED TYPE F (1/4 INCH THICK) SEPARATION MATERIAL. SEPARATION MATERIAL SHALL MATCH FULL HEIGHT DIMENSION OF ADJACENT CONCRETE.
  - 4 TRANSITION DRIVEWAY THICKNESS TO WALK THICKNESS. IF THERE IS A CONSTRUCTION JOINT AND NO EXPANSION IS USED, INSTALL TIE BARS.
  - 5 TRANSITION CURB RAMP THICKNESS TO WALK THICKNESS.
  - 6 MATCH INPLACE DRIVEWAY WIDTH, MATERIAL TYPE AND THICKNESS.
  - 7 FORM CONTRACTION JOINT AS NEEDED TO PRODUCE APPROXIMATELY SQUARE PANELS. CONCRETE PANEL SIZE SHOULD NOT EXCEED 1 1/2 : 1 LENGTH X WIDTH. 81 SF FOR 6" CONCRETE DRIVEWAY WITH 9'X9' MAXIMUM PANEL SIZE. 144 SF FOR 8" CONCRETE DRIVEWAY WITH 12'X12' MAXIMUM PANEL SIZE. MATCH DRIVEWAY APRON AND SIDEWALK JOINTS.
  - 8 THE PEDESTRIAN ACCESS ROUTE CROSS-SLOPE, SHALL NOT EXCEED 0.02 FT./FT. AS CONSTRUCTED.
  - 9 1:10 MIN. SIDEWALK OFFSET TAPER REQUIRED FOR SIDEWALK REPLACEMENT PROJECTS. 1:3 MIN. AND 1:5 MIN. PREFERRED SIDEWALK OFFSET TAPER FOR DRIVEWAY REPLACEMENT.
  - 10 LANDING REQUIRED, SEE NEXT SHEET FOR MORE INFORMATION.
  - 11 CONCRETE DRIVEWAY APRON AND CONCRETE DRIVEWAY SIDEWALK SECTIONS SHALL BE CONSTRUCTED SEPARATELY IN AN INDEPENDENT CONCRETE POUR. ENGINEER'S APPROVAL REQUIRED FOR MONOLITHIC PLACEMENTS.
  - 12 DRILL AND GROUT NO. 4 X 12" LONG TIE BARS (EPOXY COATED), 36" MAXIMUM SPACING BETWEEN BARS COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINTS. 1' MINIMUM FROM ADJACENT CONCRETE JOINTS. BARS TO BE ADJUSTED TO MATCH SIDEWALK GRADES. TO BE PAID BY EACH.
  - 13 DRILL AND GROUT OR CAST IN-PLACE THROUGH HOLES IN THE FORMS NO. 4 X 12" LONG TIE BARS (EPOXY COATED), 36" MAXIMUM SPACING BETWEEN BARS WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINTS. 1' MINIMUM FROM ADJACENT CONCRETE JOINTS.

REVISION: 12-23-2021

APPROVED: 11-04-2021

*Jeffrey J. Perkins*  
JEFFREY PERKINS  
OPERATIONS DIVISION

**m** MINNESOTA  
DEPARTMENT OF TRANSPORTATION

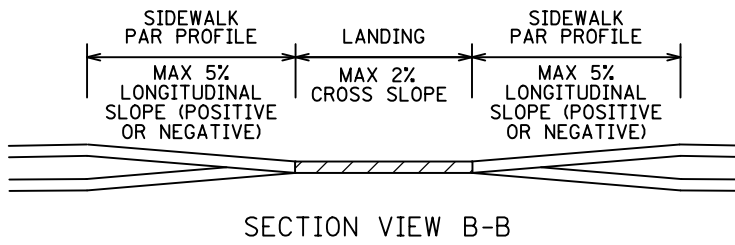
STANDARD PLAN 5-297.254 3 OF 4

APPROVED: 11-04-2021  
REVISED: 12-23-2021

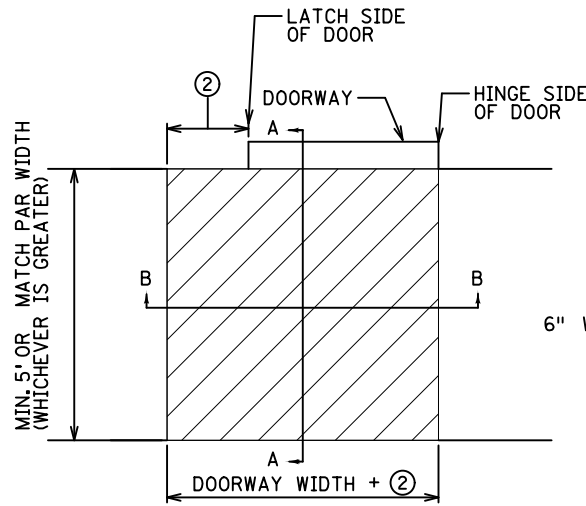
*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

**DRIVEWAY AND SIDEWALK DETAILS**

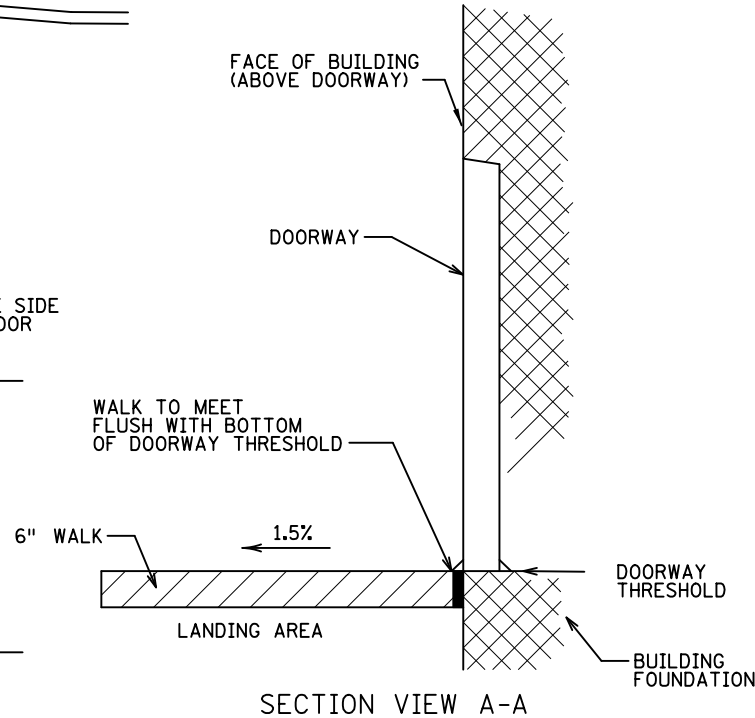




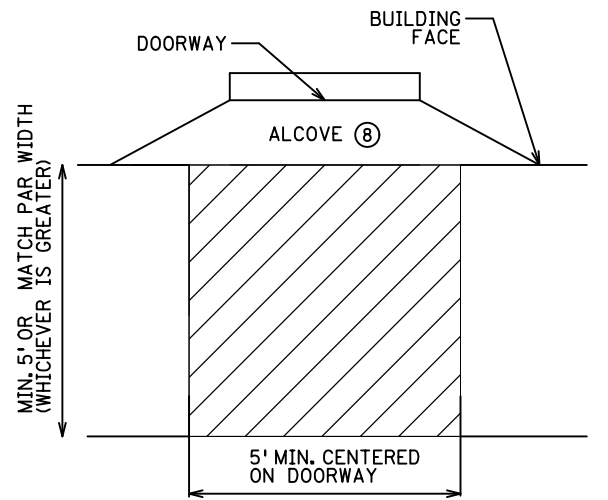
SECTION VIEW B-B



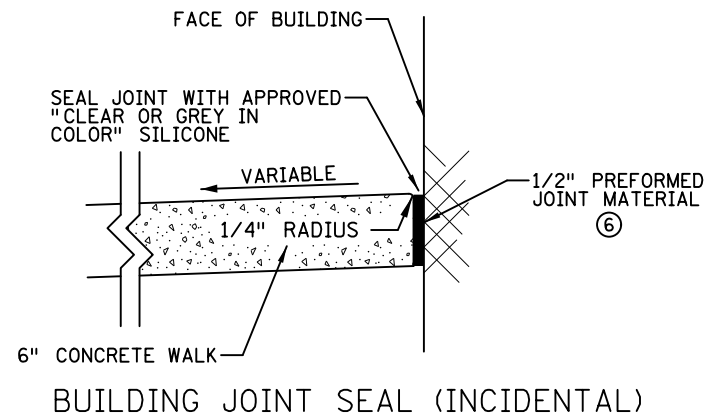
PLAN VIEW DOORWAY



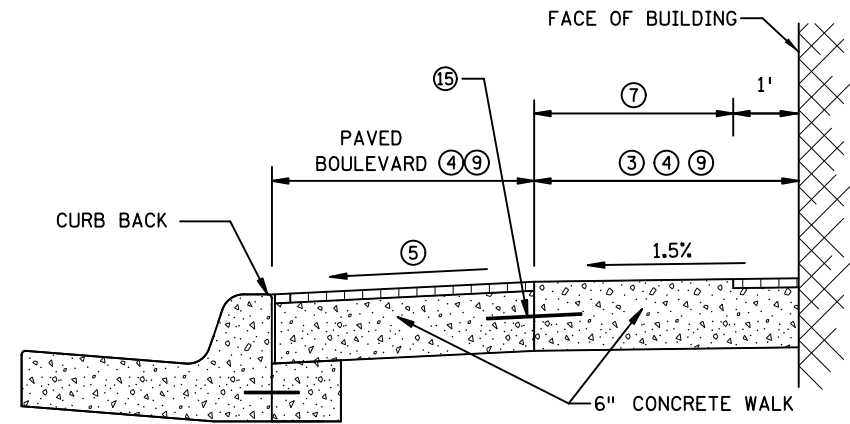
SECTION VIEW A-A



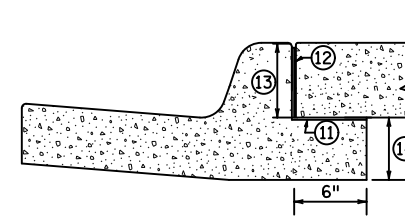
PLAN VIEW DOORWAY WITH ALCOVE  
SIDEWALK LANDING REQUIREMENTS ①



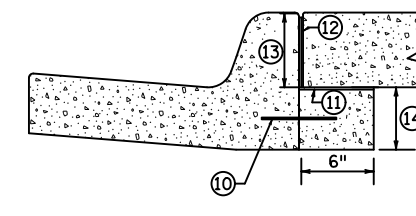
BUILDING JOINT SEAL (INCIDENTAL)



DOWNTOWN SIDEWALK TYPICAL SECTION



SLIP FORM SILL



FIXED FORM SILL

SILL CURB SHOULD BE USED AT ALL LOCATIONS WHEN CONCRETE WALK IS AT BACK OF CURB, INCLUDING PAVED BOULEVARD.  
SILL CURB SHALL NOT BE USED IN CURB RAMP AND DRIVEWAY AREAS, INCLUDING CONCRETE FLARES.  
SILL CURB WITH 4" WALK CAN USE FIXED OR SLIP FORM OPTIONS.

NOTES:

- 6" WALK IS REQUIRED:  
 1) IN ALL SIDEWALK LOCATIONS WHERE VARIABLE SLOPED CONCRETE BOULEVARDS ARE PAVED, SUCH AS COMMERCIAL (STORE FRONT, DOWNTOWN) AREAS.  
 2) ANYTIME DRILL AND REINFORCEMENT IS USED TO TIE LONGITUDINAL JOINTS TOGETHER.  
 3) TO ELIMINATE LONGITUDINAL JOINT WHEN INCREASING PANEL SIZE OVER 36SF.  
 4) AT LOCATIONS WHERE MAINTENANCE EQUIPMENT WILL SUBJECT CONCRETE TO HEAVY LOADS.
- ALL SIDEWALK AND BOULEVARD WIDTHS SHALL BE MEASURED FROM BACK OF CURB.  
 FIELD ADJUST SIDEWALK PROFILES TO MEET ALL DOORWAY THRESHOLDS.  
 SIDEWALK MUST MAINTAIN POSITIVE DRAINAGE AWAY FROM THE BUILDING TO THE ROADWAY.  
 SEE SPECIAL PROVISIONS FOR SILICONE SPECIFICATIONS.
- ① LANDING CRITERIA IS REQUIRED FOR ALL DOORS, STEPS, AND PRIVATE WALKS. FEASIBILITY DECREASES WITH NARROWER BOULEVARDS AND STEEPER SIDEWALK PROFILES.
  - ② 18" MIN. WHEN DOOR SWINGS OUTWARD FROM BUILDING. 12" MIN. WHEN DOOR SWINGS INWARD FROM BUILDING.
  - ③ 6' MIN. PAR REQUIRED WHEN ADJACENT TO BUILDINGS.
  - ④ 2/3 PAR TO 1/3 BOULEVARD SHOULD BE USED WHEN FEASIBLE. HOLD UNIFORM BOULEVARD WIDTH. 4' PREFERRED MINIMUM BOULEVARD.
  - ⑤ 1%-5% FOR THE MAJORITY OF THE BLOCK, WITH EXCEPTIONS UP TO 8% IN CONSTRAINED AREAS.
  - ⑥ CONSTRUCT USING APPROVED EXPANSION MATERIAL PER MNDOT TYPE A-E EXPANSION. LEAVE A MINIMUM 1/2" TOP GAP AND SEAL WITH MNDOT APPROVED SILICONE PER MNDOT SPEC 3722.
  - ⑦ TO MINIMIZE VIBRATION AND ROLLING RESISTANCE, AREA SHALL BE FREE OF PAVERS, STAMPED CONCRETE, AND/OR EXCESSIVE JOINTING.
  - ⑧ 2% MAX. PER BUILDING CODE. IF GREATER THAN 2%, FLATTEN AS FEASIBLE.
  - ⑨ FORM CONTRACTION JOINTS AS NEEDED TO PRODUCE APPROXIMATELY SQUARE PANEL SIZE. CONCRETE PANEL SIZE SHOULD NOT EXCEED 1/2 : 1 LENGTH X WIDTH.
  - ⑩ DRILL AND GROUT NO. 4 X 8" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING BETWEEN BARS WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONSTRUCTION JOINTS. 1' MINIMUM FROM ADJACENT CONCRETE JOINTS. TIE BARS SHALL BE EMBEDDED 4" WITH 2" MINIMUM CONCRETE COVER AND ARE INCIDENTAL TO SILL PLACEMENT.
  - ⑪ FURNISH AND INSTALL THE FULL WIDTH OF THE TOP OF SILL A MINIMUM 2ML THICK POLYTHENE SHEETING.
  - ⑫ USE AN APPROVED TYPE F (1/4 INCH THICK) SEPARATION MATERIAL. SEPARATION MATERIAL SHALL MATCH FULL HEIGHT DIMENSION OF ADJACENT CONCRETE.
  - ⑬ DIMENSION TO BE SAME AS SIDEWALK THICKNESS, 4" MIN.
  - ⑭ 6" WALK: 5" MIN. FOR B424; 7" MIN. FOR B624  
4" WALK: 7" MIN. FOR B424; 9" MIN. FOR B624
  - ⑮ DRILL AND GROUT NO. 4 X 12" LONG TIE BARS (EPOXY COATED). 36" MAXIMUM SPACING BETWEEN BARS WITH 2" MINIMUM CONCRETE COVER PLACED 1' MINIMUM FROM ADJACENT CONCRETE JOINTS.

REVISIONS:
APPROVED: 11-04-2021
<i>Jeffrey Perkins</i> JEFFREY PERKINS OPERATIONS DIVISION



STANDARD PLAN 5-297.254 4 OF 4

APPROVED: 11-04-2021  
 REVISION:  
*Tom Styrbicki*  
 THOMAS STYRBICKI  
 STATE DESIGN ENGINEER

DRIVEWAY AND SIDEWALK DETAILS



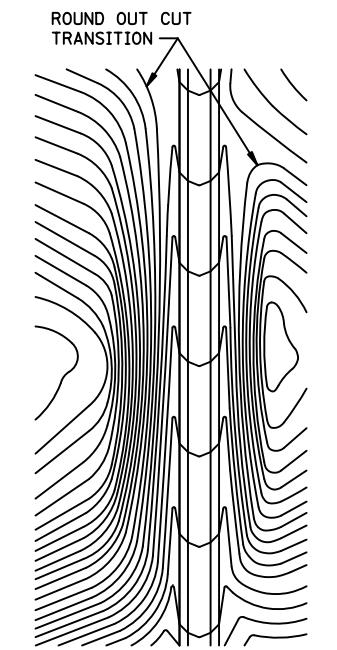
RAMSEY COUNTY, MINNESOTA  
 T.H. 61  
 S.P. 6222-197

STANDARD PLAN SHEET

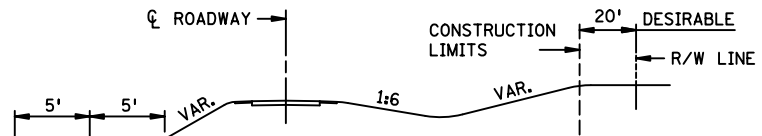
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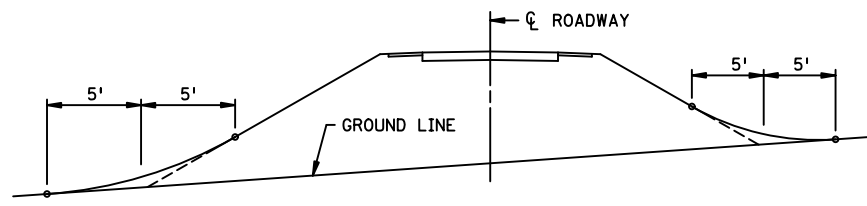




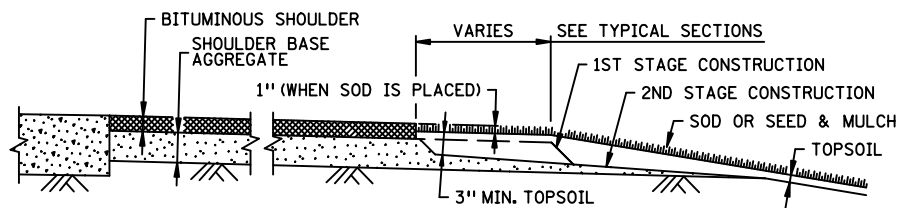
CONTOURING ROAD CUTS



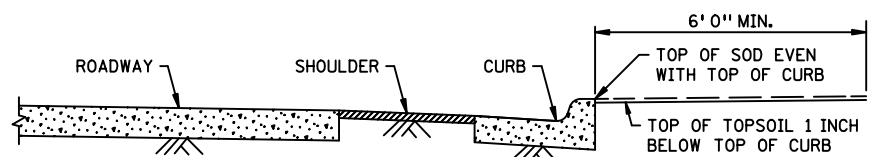
ROUNDING SHOULDERS AND BACKSLOPES



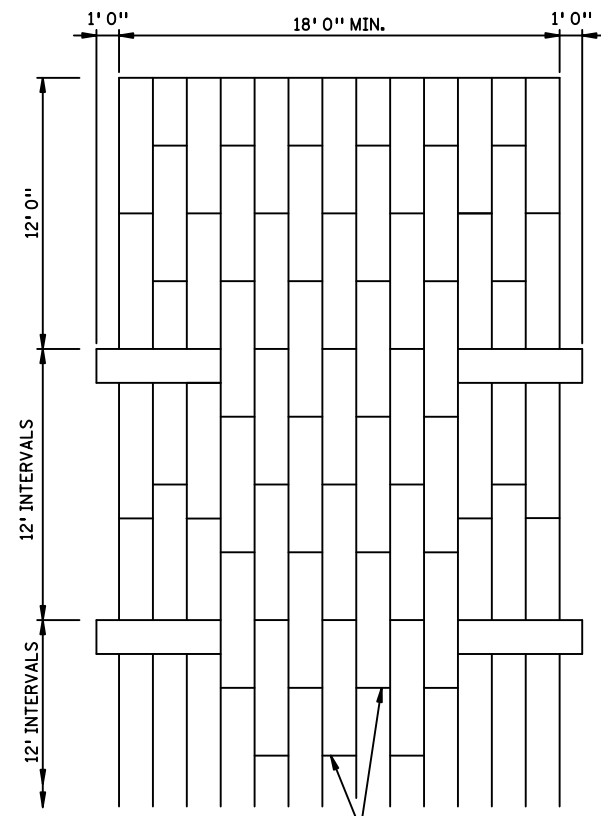
SHAPING FOR DRAINAGE ALONG THE TOE OF FILL SLOPES



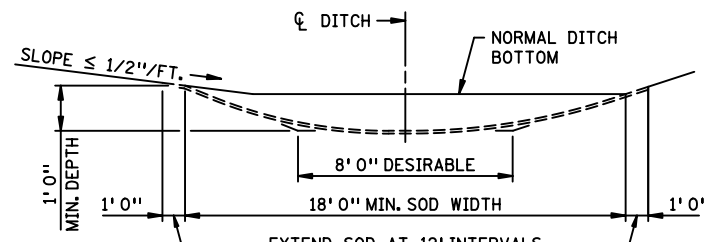
SHAPING AND TOPSOILING INSLOPES



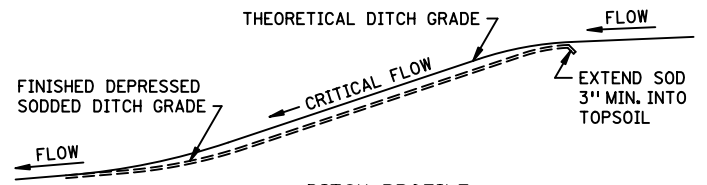
SHAPING ADJACENT TO CURBS WHEN SOD IS PLACED



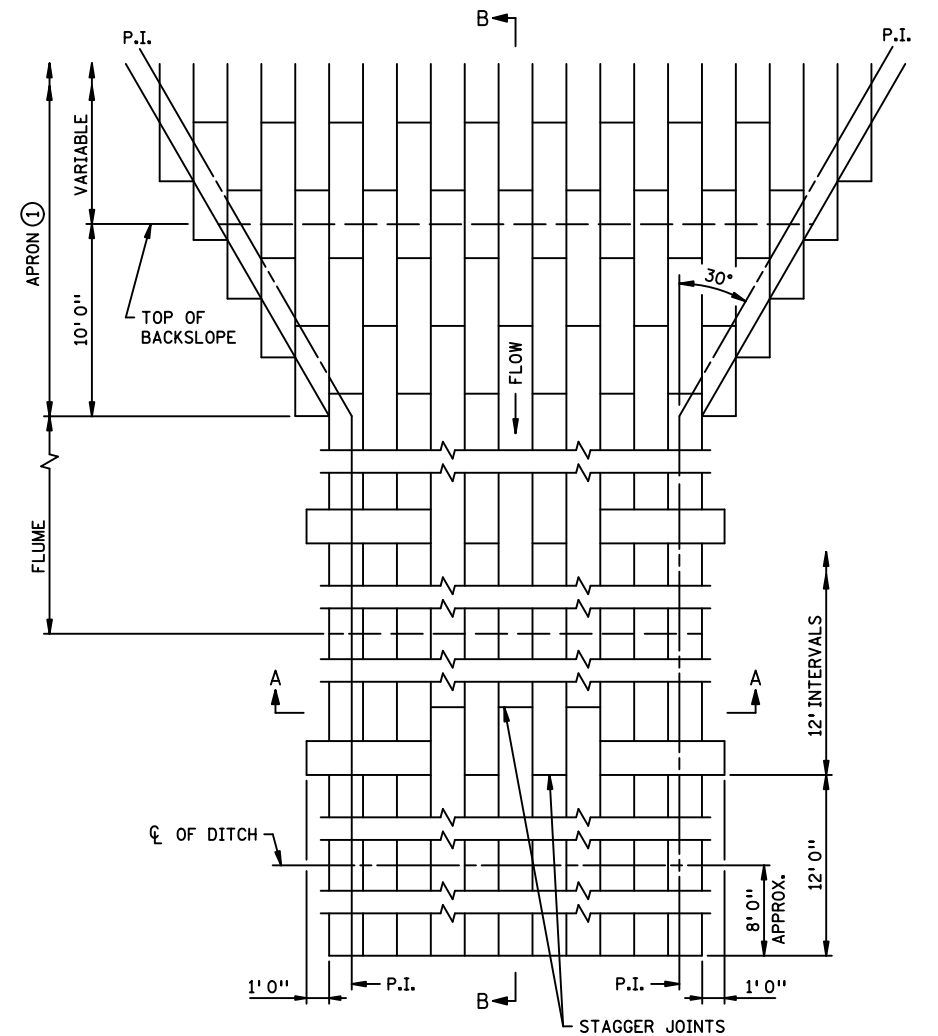
PLAN VIEW



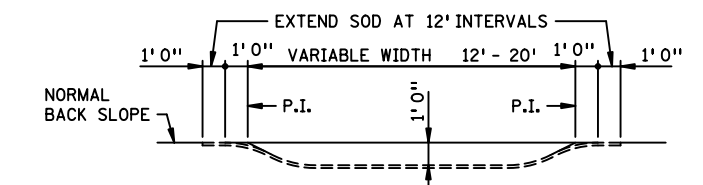
SODDED DITCH CROSS SECTION  
WHERE FRONT OR BACK SLOPE IS FLAT (LESS THAN 1/2"/FT.),  
FIRST NOTCH DITCH AND THEN PROVIDE ROUNDING.



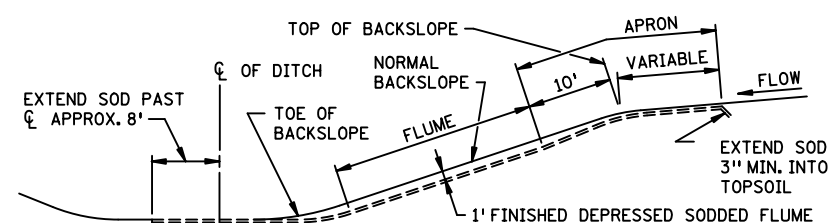
DITCH PROFILE  
SODDED DITCH DETAILS



PLAN VIEW



SECTION A-A



SECTION B-B

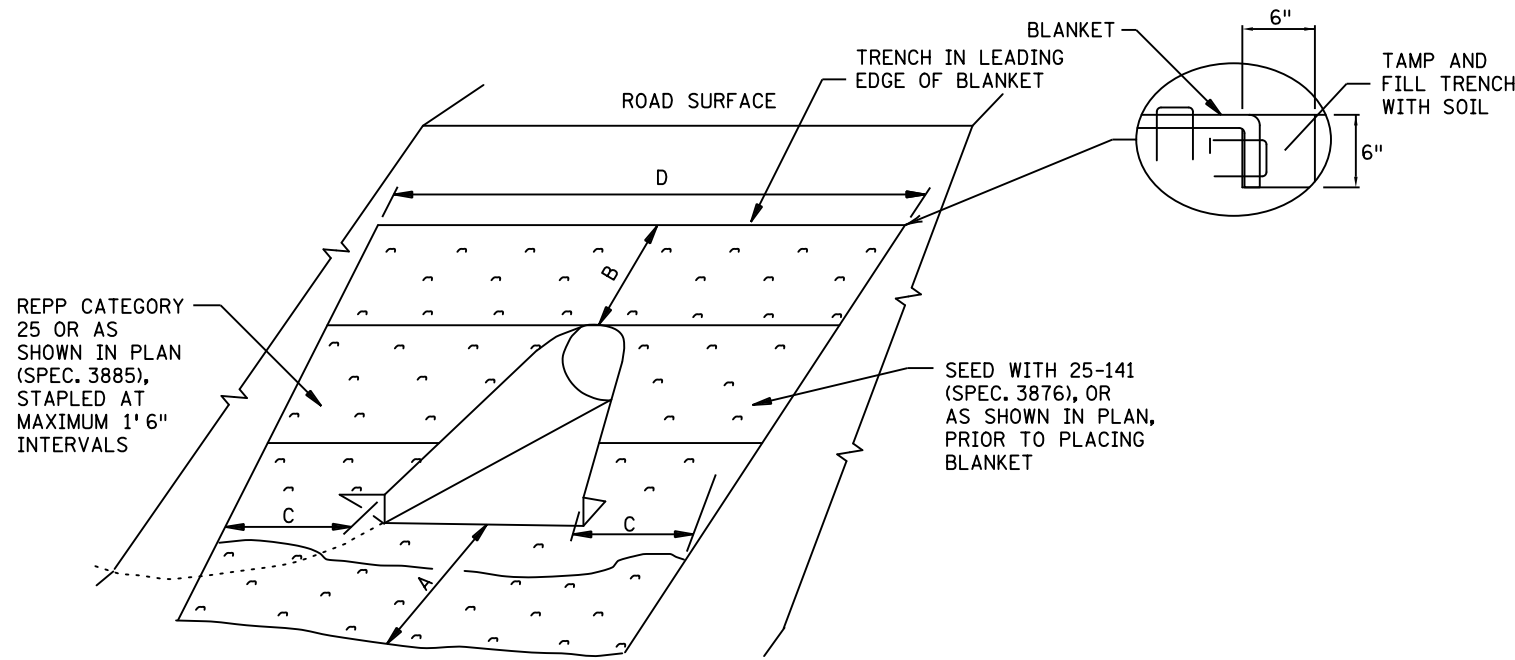
SODDED FLUME DETAILS

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

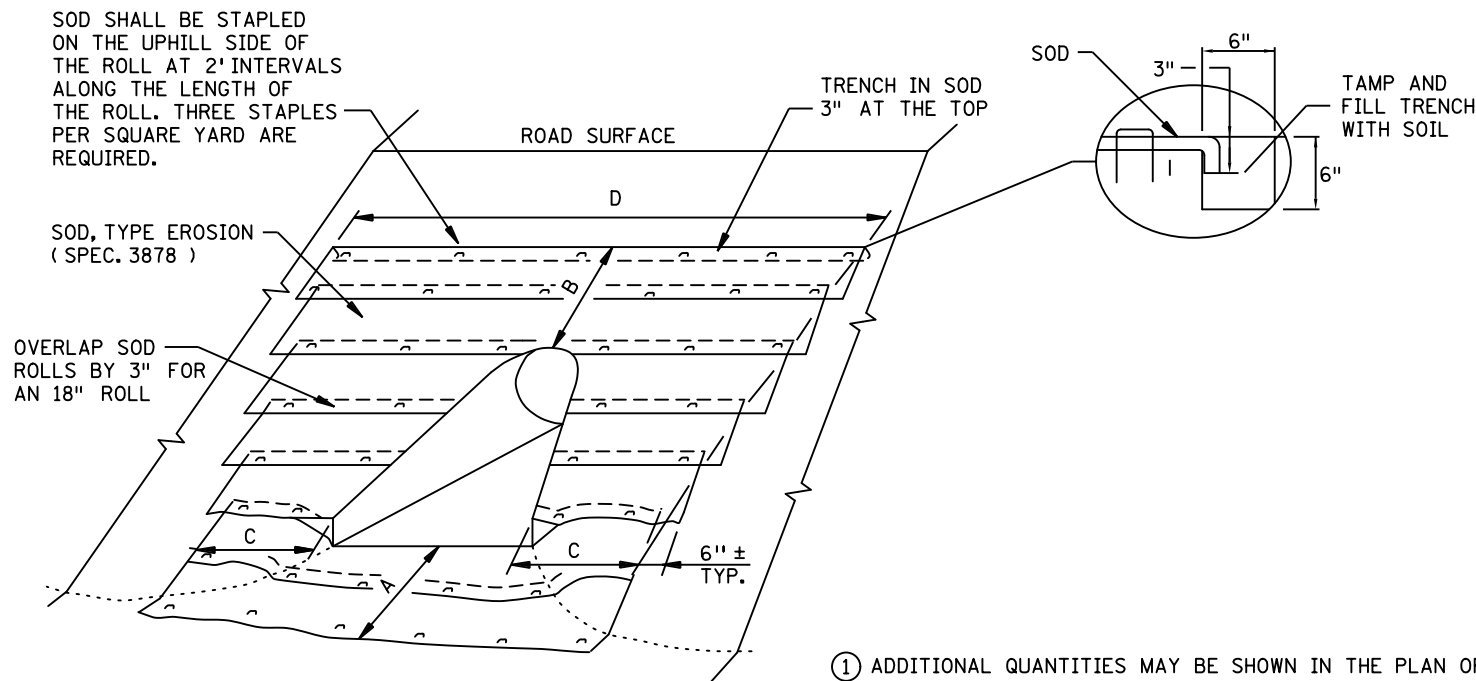
REVISION:  
APPROVED: 2-28-2017  
*[Signature]*  
CHIEF ENVIRONMENTAL OFFICER

**m** MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
STANDARD PLAN 5-297.404 1 OF 3  
*[Signature]* APPROVED: 2-28-2017  
STATE DESIGN ENGINEER REVISED:

**PERMANENT EROSION CONTROL  
ALONG ROADWAYS, DITCHES AND FLUMES**



ROLLED EROSION PREVENTION PRODUCT (BLANKET) & SEED DETAIL



SODDING DETAIL

- ① ADDITIONAL QUANTITIES MAY BE SHOWN IN THE PLAN OR REQUIRED BY THE ENGINEER.
- ② FOR ARCH PIPE USE CLOSEST CIRCULAR PIPE DIAMETER AND APRON SLOPE. DIAMETERS LARGER THAN 72" REQUIRE SPECIAL DESIGNS.

CULVERT DIAMETER ②	SOD OR REPP (SQ. YDS.)						"A"	"B"	"C"	"D"
	CIRCULAR AND ARCH PIPE METAL APRON (PLATE 3123, PLATE 3122)	CIRCULAR AND ARCH PIPE CONCRETE APRON (PLATE 3100, PLATE 3110)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:4 SLOPE (PLATE 3148)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:6 SLOPE (PLATE 3148)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:6 SLOPE (PLATE 3128)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:4 SLOPE (PLATE 3128)				
15"	9	9	8	8	N/A	N/A	3'	1.5'	3'	13'
18"	13	12	12	14	16	N/A	3'	3'	3'	16'
21"	14	14	14	16	18	14	3'	3'	3'	17'
24"	16	15	16	19	21	17	3'	3'	3'	18'
27"	N/A	20	N/A	N/A	N/A	N/A	3'	4.5'	3'	20'
30"	23	22	25	30	32	N/A	3'	4.5'	3'	22'
36"	34	34	39	48	51	37	4.5'	4.5'	4.5'	27'
42"	43	40	51	64	N/A	N/A	4.5'	6'	4.5'	30'
48"	54	50	66	82	N/A	N/A	4.5'	7.5'	4.5'	34'
54"	65	58	81	102	N/A	N/A	4.5'	9'	4.5'	37'
60"	69	59	91	115	N/A	N/A	4.5'	9'	4.5'	39'
66"	69	63	N/A	N/A	N/A	N/A	4.5'	9'	4.5'	39'
72"	78	72	99	122	N/A	N/A	4.5'	10.5'	4.5'	41'

CULVERT DIAMETER ②	SOD OR REPP (SQ. YDS.)						"A"	"B"	"C"	"D"
	CIRCULAR AND ARCH PIPE METAL APRON (PLATE 3123, PLATE 3122)	CIRCULAR AND ARCH PIPE CONCRETE APRON (PLATE 3100, PLATE 3110)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:4 SLOPE (PLATE 3148)	CIRCULAR AND ARCH PIPE METAL SAFETY APRON 1:6 SLOPE (PLATE 3148)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:6 SLOPE (PLATE 3128)	CIRCULAR CORRUGATED METAL PIPE SAFETY APRON 1:4 SLOPE (PLATE 3128)				
15"	10	10	9	10	N/A	N/A	4.5'	1.5'	3'	13'
18"	13	13	12	14	15	N/A	6'	1.5'	3'	14'
21"	16	14	16	18	19	15	6'	1.5'	3'	15'
24"	18	18	18	21	22	18	7.5'	1.5'	3'	16'
27"	N/A	19	N/A	N/A	N/A	N/A	7.5'	1.5'	3'	17'
30"	23	23	24	28	29	N/A	9'	1.5'	3'	18'
36"	36	35	38	47	48	37	10.5'	1.5'	4.5'	23'
42"	43	40	47	58	N/A	N/A	12'	1.5'	4.5'	25'
48"	50	46	57	70	N/A	N/A	13.5'	1.5'	4.5'	27'
54"	57	50	67	84	N/A	N/A	15'	1.5'	4.5'	29'
60"	74	63	90	113	N/A	N/A	16.5'	1.5'	6'	33'
66"	75	67	N/A	N/A	N/A	N/A	16.5'	1.5'	6'	33'
72"	77	70	92	114	N/A	N/A	16.5'	1.5'	6'	34'

NOTES:

REPP = ROLLED EROSION PREVENTION PRODUCT.

AREA SHOWN IN SQUARE YARDS IS FOR ONE CULVERT END.

QUANTITIES ARE CALCULATED TO INCLUDE SOD REQUIRED TO PROVIDE A 3" OVERLAP ON ALL 18" WIDE ROLLS. THIS ALLOWS FOR SHRINKAGE OF THE SOD.

FOR PIPE ARCHES USE EQUIVALENT PIPE DIAMETER TO APPROXIMATE AREA.

FOR CORRUGATED POLYETHYLENE PIPE METAL APRON (PLATE 3129), USE THE METAL APRON COLUMN (PLATE 3123).

AREAS AND DIMENSIONS ARE APPROXIMATE AND ARE BASED ON APRON SIDE SLOPES OF NO STEEPER THAN 1:2, UNLESS INDICATED AS FOR SAFETY APRONS.

CARE SHOULD BE TAKEN IN SELECTING SOD TO STABILIZE THE APRON. RIP-RAP SHOULD BE USED FOR FLOW VELOCITIES GREATER THAN 6 FPS.

REVISIONS:
APPROVED: JANUARY 8, 2020 <i>Marni Karnowski</i> MARNI KARNOWSKI CHIEF ENVIRONMENTAL OFFICER



STANDARD PLAN 5-297.404 2 OF 3

APPROVED: 1-8-2020  
REVISED:  
*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

PERMANENT EROSION CONTROL  
TURF ESTABLISHMENT DETAIL AT CULVERT ENDS

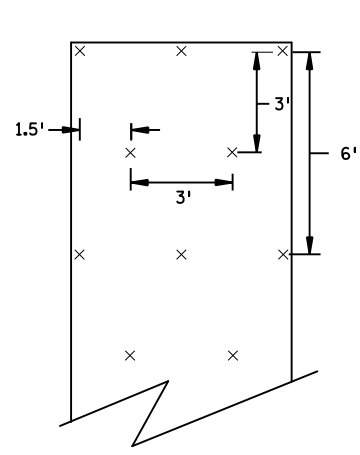


RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

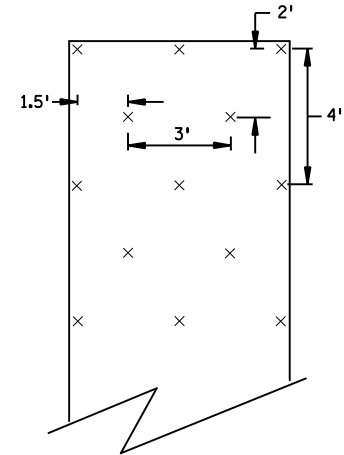
STANDARD PLAN SHEET

SEH  
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ISDWB170688  
SPN15  
OF SPN29

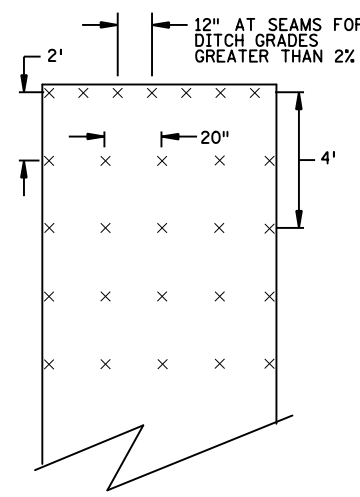
22  
101



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

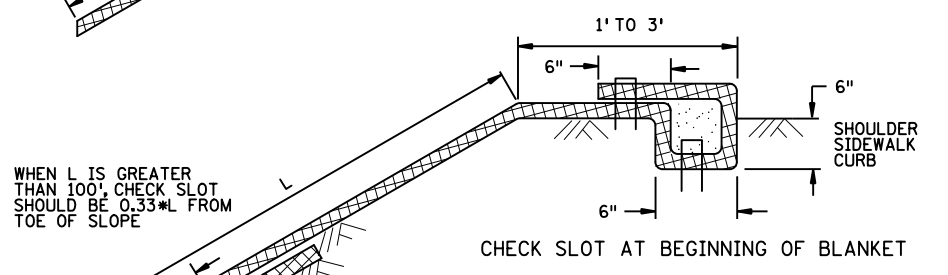
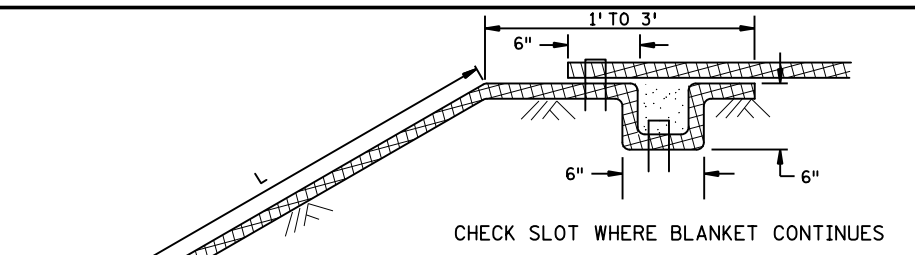


SLOPES 1:2 TO 1:1  
170 STAPLES PER 100 SQ YD

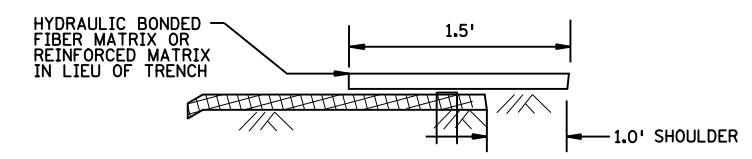


CHANNEL AND DITCH APPLICATIONS  
350 STAPLES PER 100 SQ YD

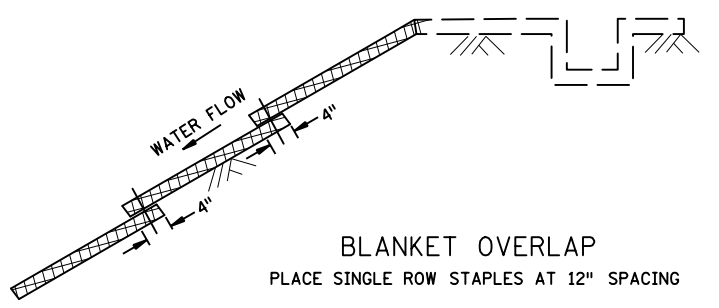
BLANKET STAPLE PATTERN



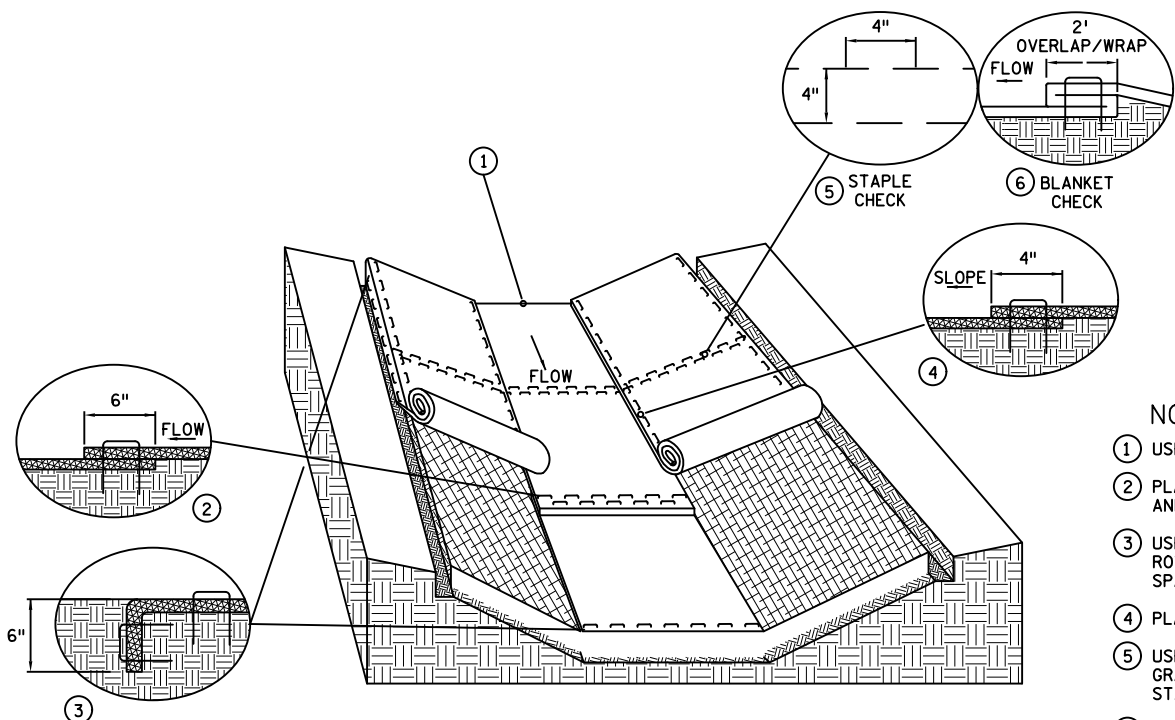
**CHECK SLOT REQUIREMENTS**  
 DIG 6" BY 6" TRENCH.  
 INSERT BLANKET INTO ENTIRE TRENCH PERIMETER.  
 PLACE SINGLE ROW STAPLES AT 3' SPACING ALONG THE BOTTOM OF THE TRENCH.  
 BACKFILL TRENCH WITH SOIL AND TAMP.  
 PLACE SINGLE ROW STAPLES AT 3' SPACING ON OVERLAP.



CHECK SLOT ALTERNATIVE  
PLACE SINGLE ROW STAPLES AT 12" SPACING  
CHECK SLOT DETAILS



**GENERAL BLANKET INSTALLATION REQUIREMENTS**  
 REPP = ROLLED EROSION PREVENTION PRODUCT.  
 PREPARE SOIL AS PER SPECIFICATION 2574.  
 LAY PARALLEL OR PERPENDICULAR TO THE DIRECTION OF WATER FLOW.  
 OVERLAP ADJACENT STRIP EDGES A MINIMUM OF 4".  
 OVERLAP BLANKET 6" (MINIMUM) AT EACH END. OVERLAP BOTTOM END OF UPPER BLANKET OVER TOP END OF LOWER BLANKET. STAPLE ALONG OVERLAP EVERY 1.5'.  
 THE UPPERMOST BLANKET OF ALL SLOPE APPLICATIONS MUST START IN A CHECK SLOT. IF SLOPE LENGTH (L) IS 100' OR GREATER, INSERT BLANKET INTO A CHECK SLOT 1/3 FROM THE BOTTOM OF THE SLOPE.



DITCH BLANKET STAPLE DETAIL

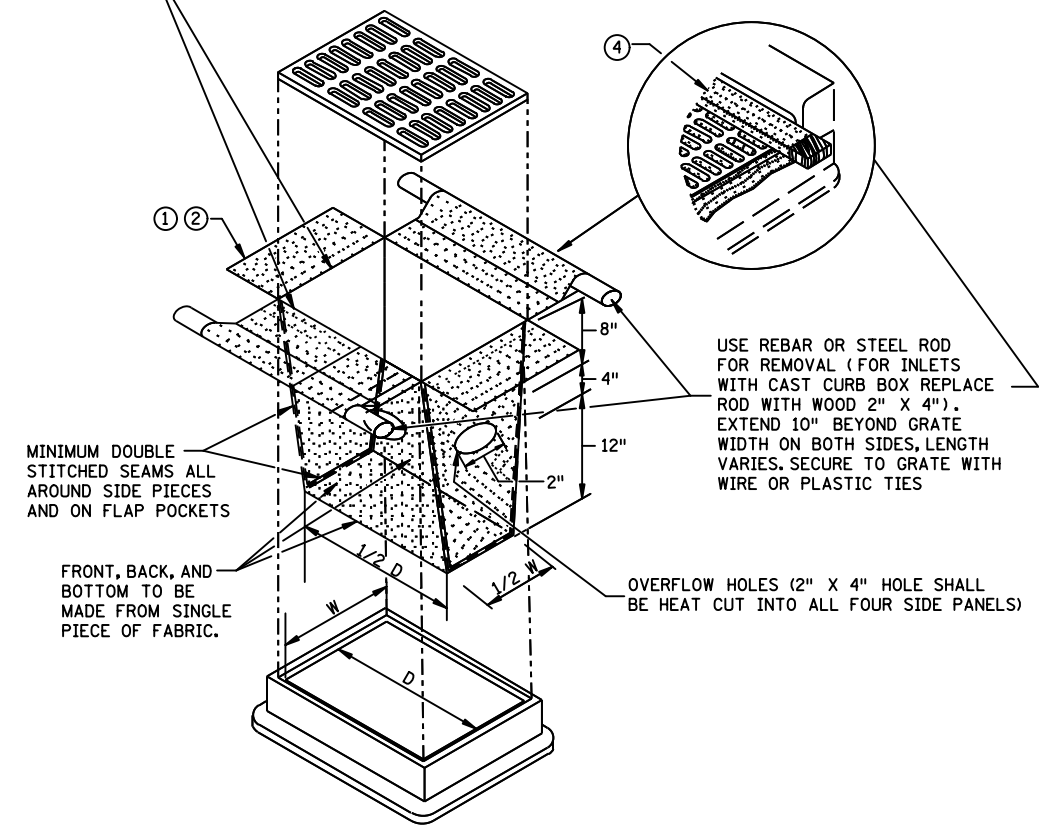
- NOTES:**
- USE CHECK SLOT DETAIL (NO ALTERNATES).
  - PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER.
  - USE 6" X 6" TRENCH TO PLACE BLANKET. PLACE SINGLE ROW OF STAPLES ON TOP AND TRENCH SIDES AT 12" SPACING. BACKFILL TRENCH WITH SOIL AND TAMP.
  - PLACE SINGLE ROW OF STAPLES AT 12" SPACING.
  - USE STAPLE CHECK FOR CHANNEL SLOPES LESS THAN 2.5% GRADE AT 100' INTERVALS. PLACE DOUBLE ROW OF STAPLES STAGGERED 4" APART AND AT 4" SPACING.
  - USE BLANKET CHECKS FOR THE FOLLOWING SLOPES:  
 2.5%-3% 100' INTERVALS  
 3%-5% 50' INTERVALS  
 5%-7% 25' INTERVALS
  - CRITICAL POINTS SHALL BE SECURED WITH PROPER STAPLE PATTERNS.

REVISION:  
 APPROVED: JANUARY 8, 2020  
*Marni Karnowski*  
 MARNI KARNOWSKI  
 CHIEF ENVIRONMENTAL OFFICER

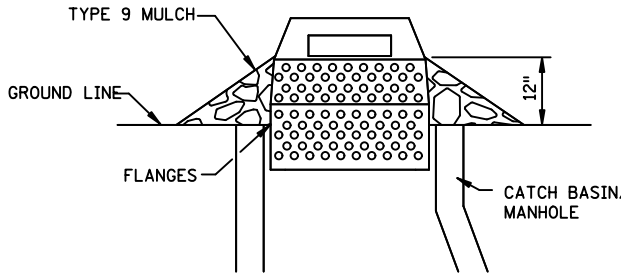
**m** MINNESOTA  
 DEPARTMENT OF TRANSPORTATION  
 STANDARD PLAN 5-297.404 3 OF 3  
 APPROVED: 1-8-2020  
 REVISED:  
*Tom Styrbicki*  
 THOMAS STYRBICKI  
 STATE DESIGN ENGINEER

**PERMANENT EROSION CONTROL**  
REPP (BLANKET) STAPLE PATTERN FOR SLOPES

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



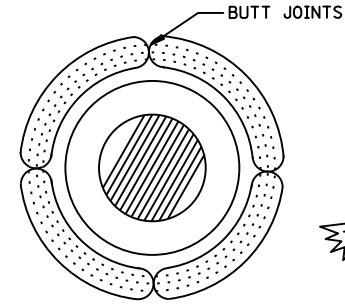
**FILTER BAG INSERT ③**  
(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)



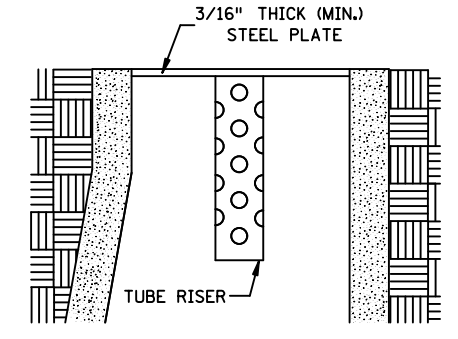
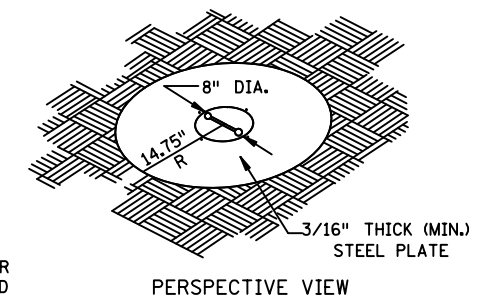
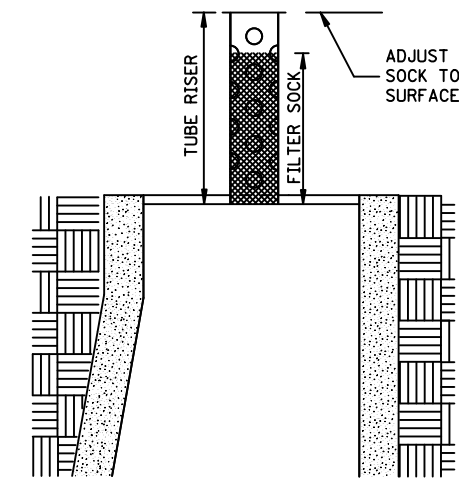
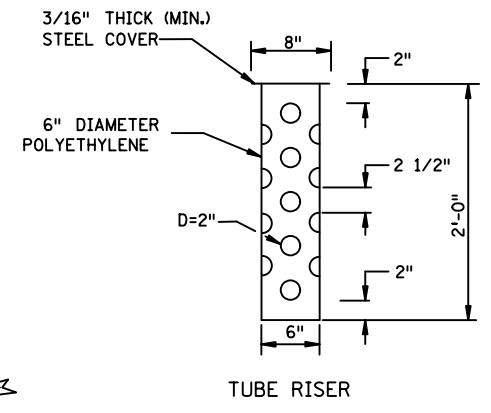
**SEDIMENT CONTROL INLET HAT**

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

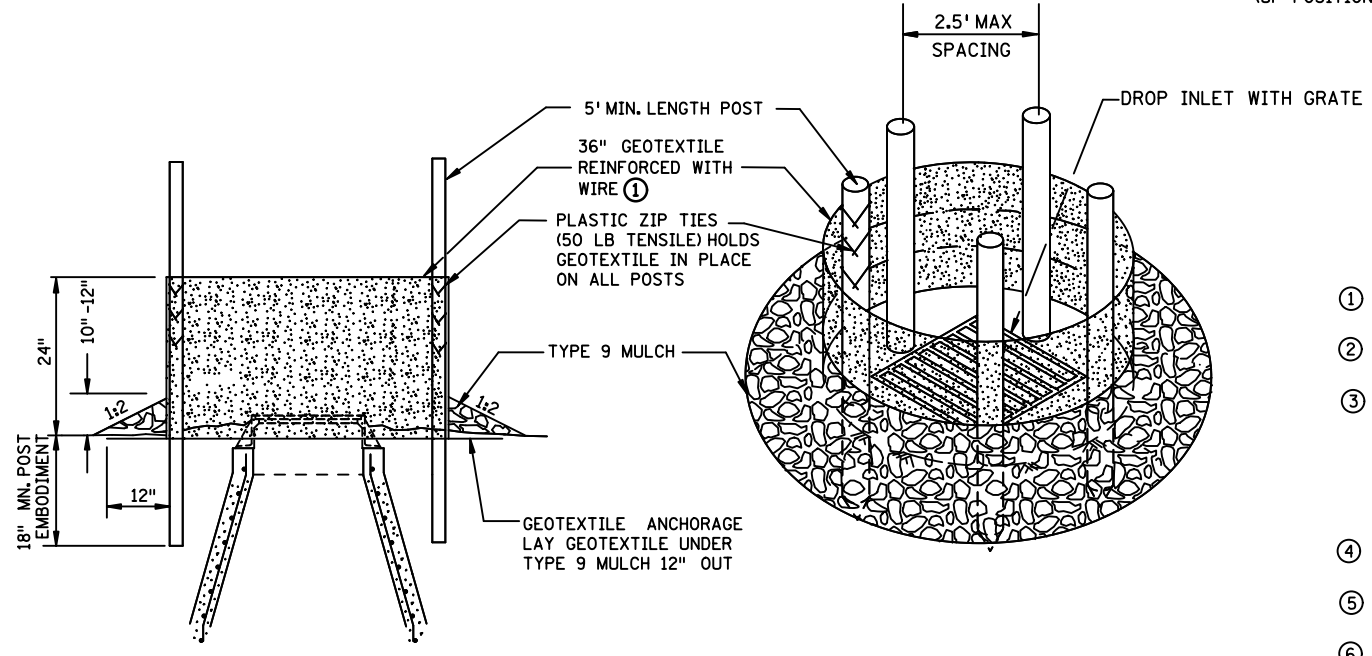
ENDS SECURELY CLOSED TO PREVENT LOSS OF OPEN GRADED AGGREGATE FILL. SECURED WITH 50 PSI. ZIP TIE.



**ROCK LOG/COMPOST LOG**



**POP-UP HEAD**



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

**NOTES:**

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

REVISION:

APPROVED: 2-28-2017

*[Signature]*  
CHIEF ENVIRONMENTAL OFFICER

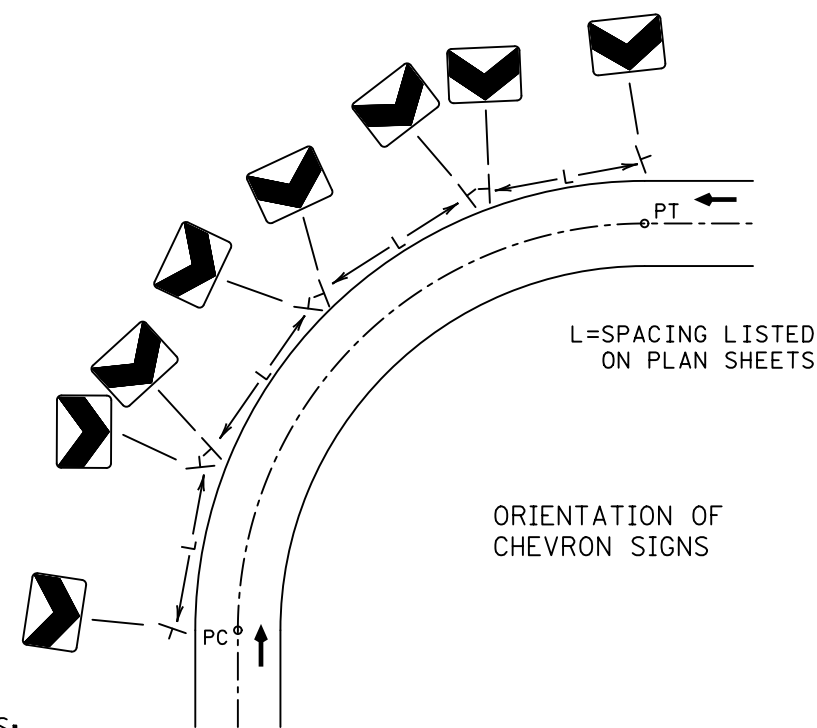
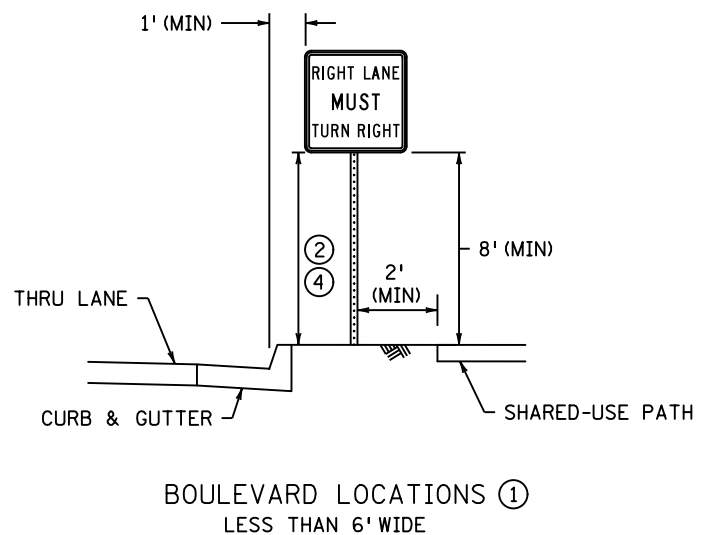
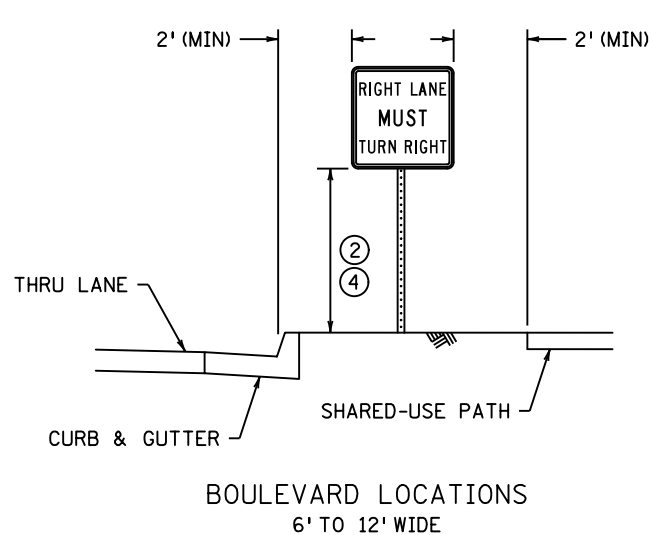
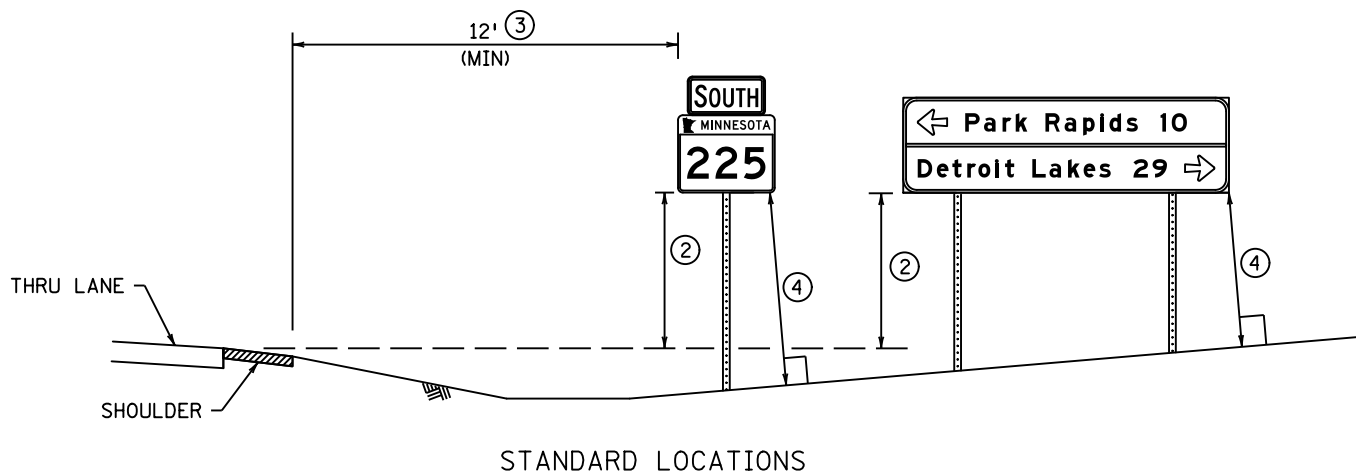
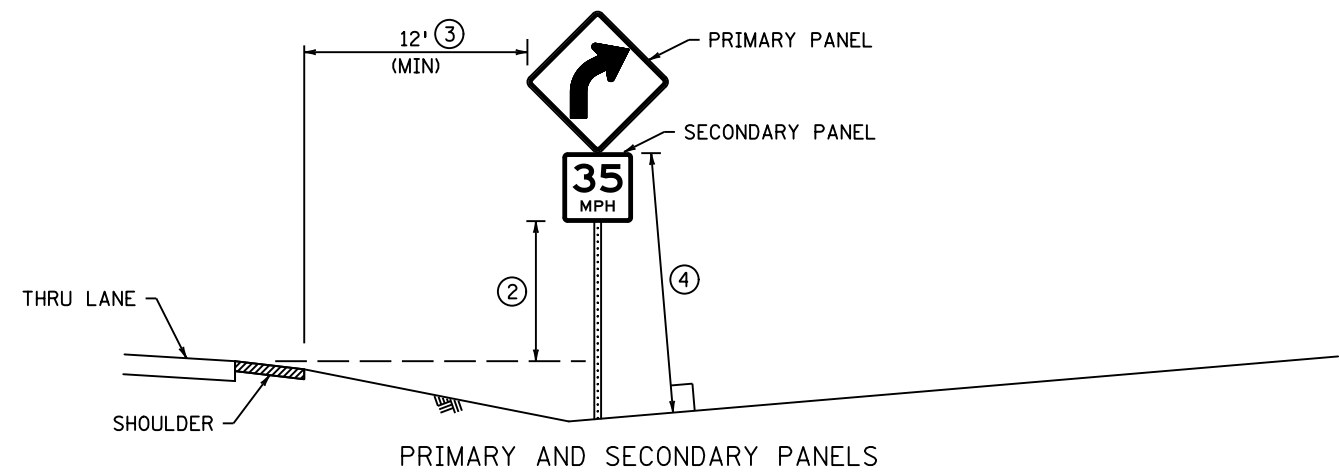
**m** MINNESOTA DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.405 4 OF 8

APPROVED: 2-28-2017  
REVISED:

*[Signature]*  
STATE DESIGN ENGINEER

**TEMPORARY SEDIMENT CONTROL  
STORM DRAIN INLET PROTECTION**



NOTES:

PLACE SIGNS AND ORIENT THEM APPROXIMATELY AS SHOWN IN THE PLAN, AT RIGHT ANGLES TO THE DIRECTION OF, AND FACING THE TRAFFIC THEY ARE INTENDED TO SERVE, UNLESS OTHERWISE SPECIFIED. TO AVOID SPECULAR GLARE, TURN SIGNS APPROXIMATELY THREE DEGREES AWAY FROM APPROACHING TRAFFIC.

IF A SIGN NEEDS TO BE REPOSITIONED FROM THE PROPOSED PLAN LOCATION IN ORDER TO AVOID CONFLICTS WITH UTILITIES OR OBSTACLES, CONTACT THE PROJECT ENGINEER.

MOUNT SIGN FACES PLUMB.

LATERAL CLEARANCES GIVEN APPLY TO RIGHT AND/OR LEFT SIDE INSTALLATION.

ERECT OR CONSTRUCT SIGN SUPPORT SO THAT NO PORTION OF THE SIGN PANEL IS WITHIN 15' OF THE RAIL OF A RAILROAD TRACK.

PLACE SIGNS SUCH THAT OBSTACLES DO NOT BLOCK THEM FROM BEING VIEWED BY THE APPROACHING TRAFFIC.

PLACE SIGNS A MINIMUM OF 10' FROM THE NEAREST OBSTACLE. OBSTACLES MAY INCLUDE, BUT ARE NOT LIMITED TO, LIGHT POLES, TREES, SIGNS, AND BUILDINGS. SIGNS MAY BE PLACED CLOSER TO SIGNS IN TIGHT AREAS, BUT NO MORE THAN TWO POSTS IN A 7' DIAMETER CIRCLE.

AVOID PLACING SIGNS IN DITCH BOTTOMS.

- ① ONLY USE WHEN BOULEVARD IS TOO NARROW TO OBTAIN ADEQUATE CURBED LOCATION SIGN OFFSETS.
- ② ALL SIGN MOUNTING HEIGHTS ARE MEASURED VERTICALLY FROM THE BOTTOM OF THE LOWEST SIGN PANEL TO THE TOP OF THE CURB, OR IN ABSENCE OF CURB, TO THE NEAR EDGE OF THE THRU-LANE PAVEMENT. SEE SIGN TABULATIONS.
- ③ MINIMUM OFFSET MAY BE REDUCED TO AT LEAST 6' FROM SHOULDER AND AT LEAST 12' FROM THRU LANE IF SITE CONDITIONS PROHIBIT A 12' OFFSET FROM SHOULDER.
- ④ CRASHWORTHY HEIGHT IS AT LEAST 7' FOR BREAKAWAY STRUCTURES AND AT LEAST 4' FOR BENDABLE STRUCTURES. SEE SPECIFIC SQUARE TUBE BASE STRUCTURE PLAN FOR CRASH RESPONSE TYPE. THE CRASHWORTHY HEIGHT IS MEASURED TO THE BOTTOM OF THE PRIMARY SIGN PANEL EXCLUDING ANY SECONDARY SIGN PANELS, MARKERS, DELINEATORS, AND REFERENCE LOCATION SIGN PANELS. ANY SECONDARY SIGN PANELS MOUNTED TO MORE THAN ONE POST ARE CONSIDERED PRIMARY SIGN PANELS FOR CRASHWORTHY PURPOSES.

**LEAD EXPERT OFFICE**

**BRIAN SORENSON**  
STATE TRAFFIC ENGINEER  
OFFICE OF TRAFFIC ENGINEERING

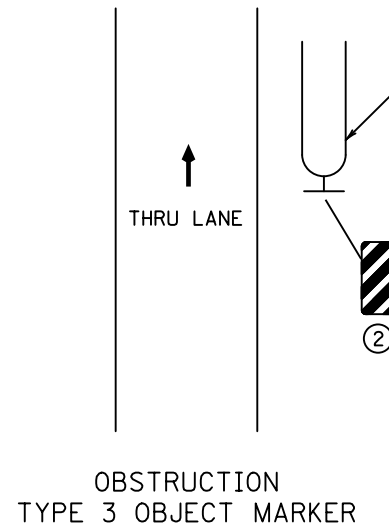
**m MINNESOTA**  
DEPARTMENT OF TRANSPORTATION

**STANDARD PLAN 5-297.701**    **1 OF 1**

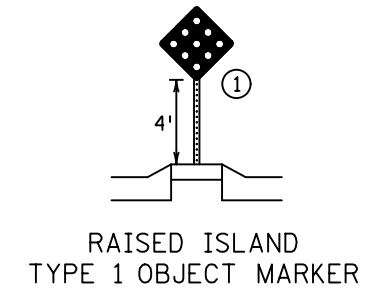
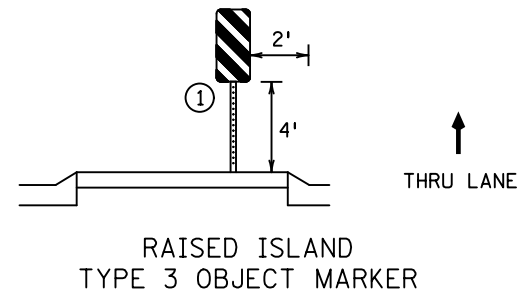
APPROVED: 08-09-2023  
REVISED:

*Tom Styrbicki*  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

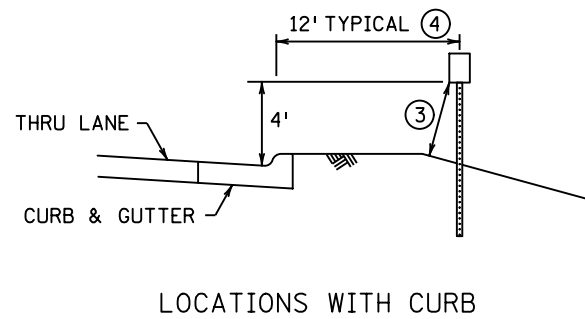
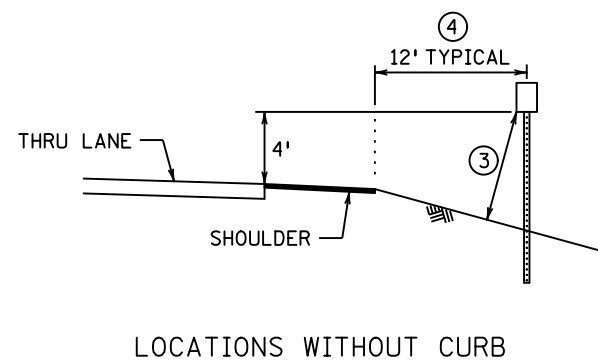
**STANDARD SIGN PLACEMENT**



BRIDGE PIER, BRIDGE ABUTMENT,  
HANDRAIL, UTILITY POLE, CULVERT  
HEADWALL, ETC, WHEN LESS THAN  
8' FROM THE PAVED SURFACE.



MARKER TYPICAL PLACEMENT



DELINEATOR TYPICAL PLACEMENT

NOTES:

FOR DELINEATOR OFFSETS AT RAMP GORES, SEE STANDARD PLAN 5-297.703.

- ① PLACE MARKER AS CLOSE TO THE BEGINNING OF MEDIAN AS POSSIBLE.
- ② PLACE THE EDGE OF THE OBJECT MARKER THAT IS CLOSEST TO THE ROAD USER IN LINE WITH THE CLOSEST EDGE OF THE OBSTRUCTION. ANGLE THE STRIPES DOWNWARD TOWARDS THE SIDE TRAFFIC IS TO PASS THE OBSTRUCTION.
- ③ THE CRASHWORTHY HEIGHT FROM THE GROUND TO ANY PORTION OF THE SIGN PANEL IS AT LEAST 7' FOR BREAKAWAY STRUCTURES AND AT LEAST 4' FOR BENDABLE STRUCTURES. SEE SPECIFIC SQUARE TUBE BASE STRUCTURE PLAN FOR CRASH RESPONSE TYPE.
- ④ ADJUST OFFSET TO MATCH OTHER SIGN OFFSETS ALONG ROADWAY CORRIDOR, BUT NOT MORE THAN 12' NOR LESS THAN 2'.

REVISION:
APPROVED: 02-28-2022
 BRIAN SOBENSON STATE TRAFFIC ENGINEER



STANDARD PLAN 5-297.702	1 OF 1
 THOMAS TYRBICKI STATE DESIGN ENGINEER	APPROVED: 02-28-2022 REVISED:

DELINEATOR AND MARKER PLACEMENT

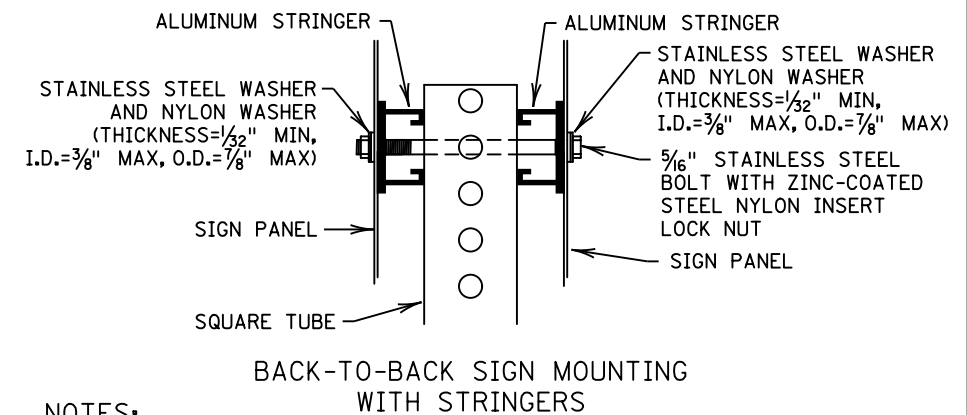
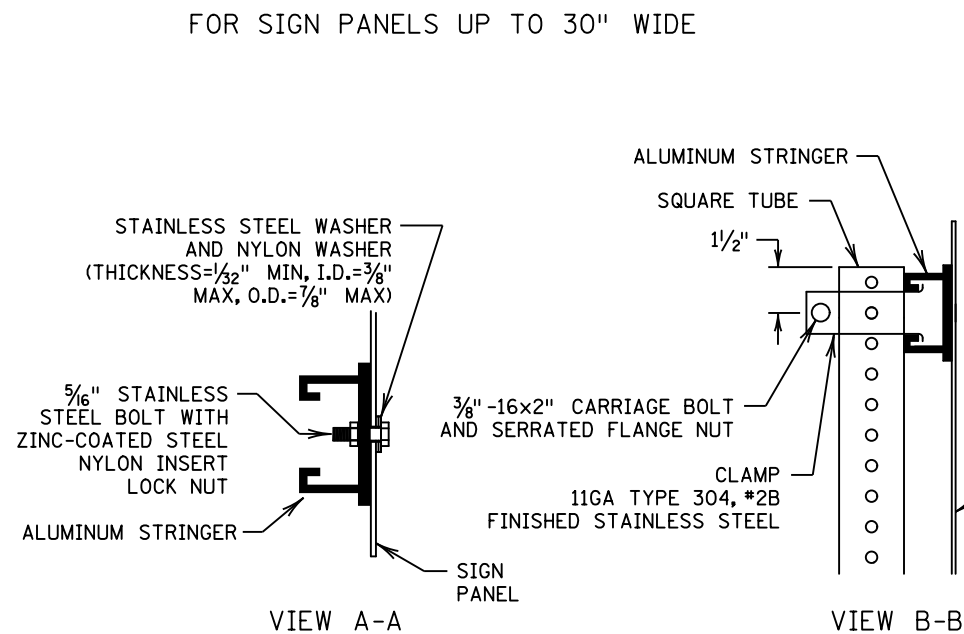
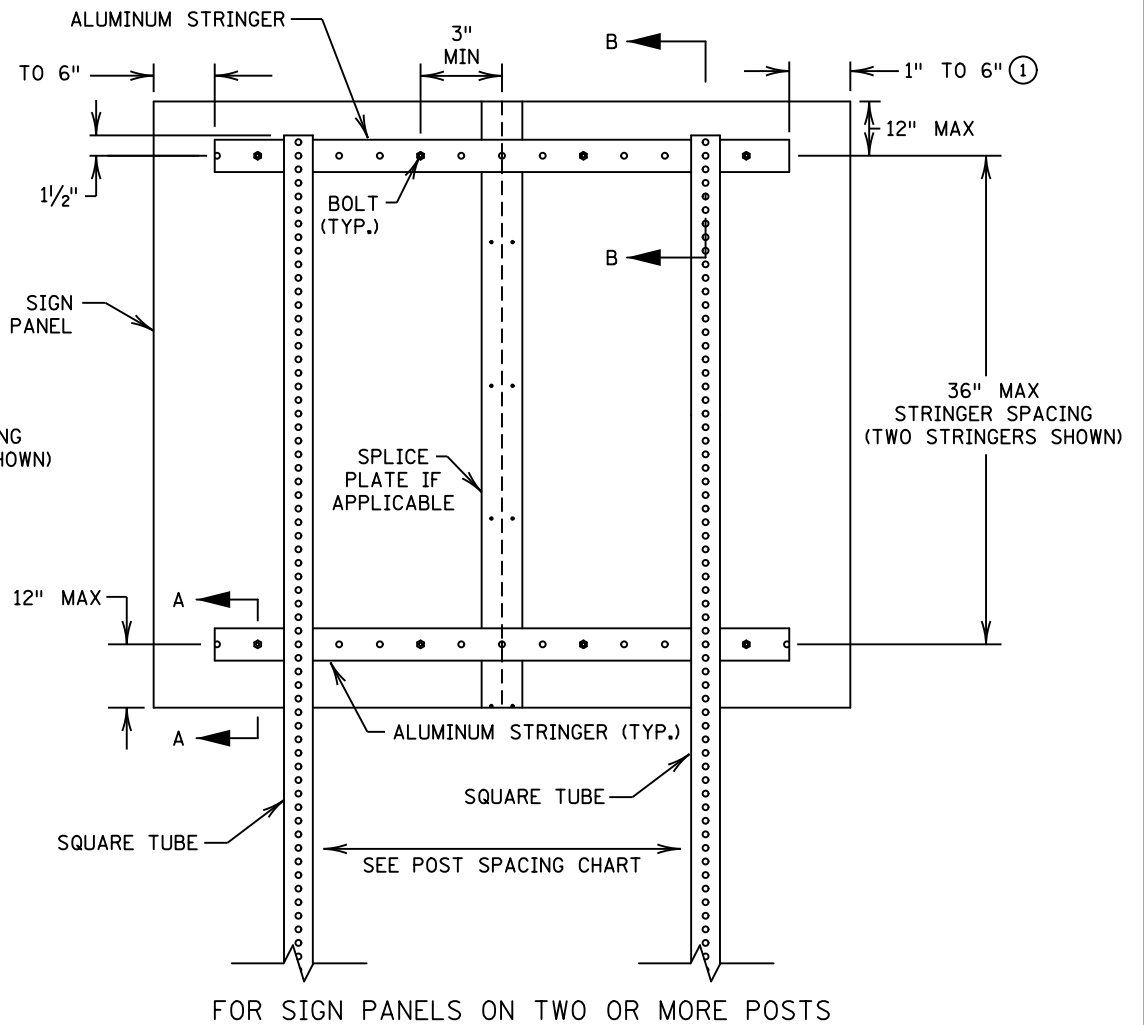
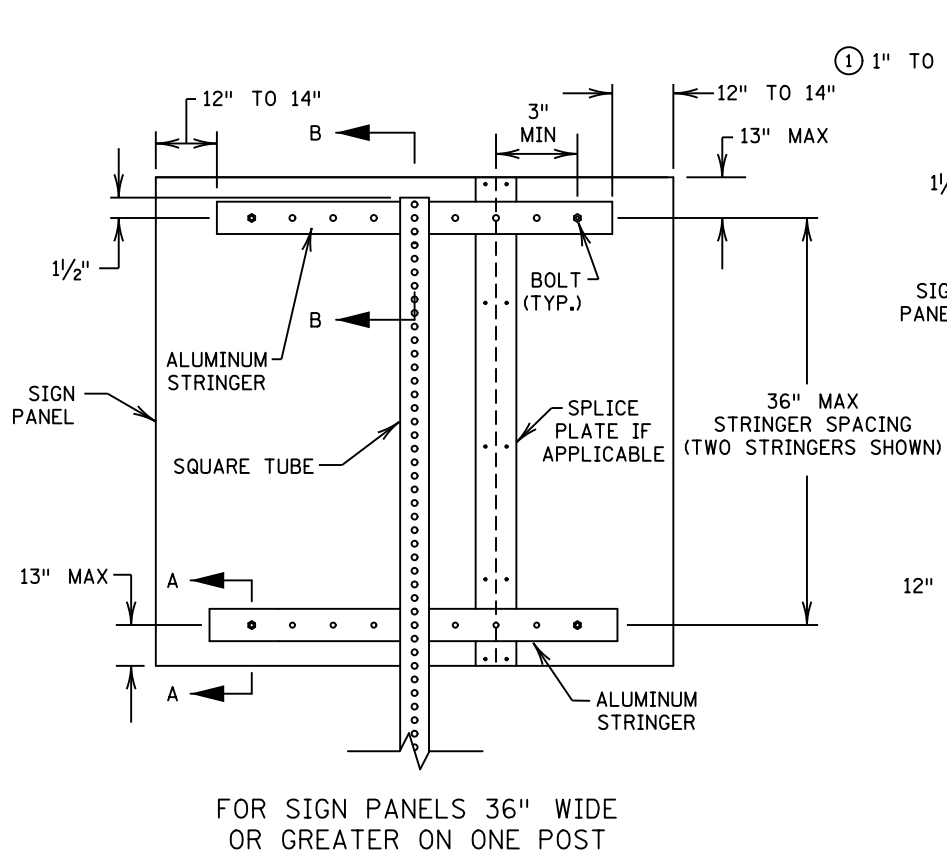
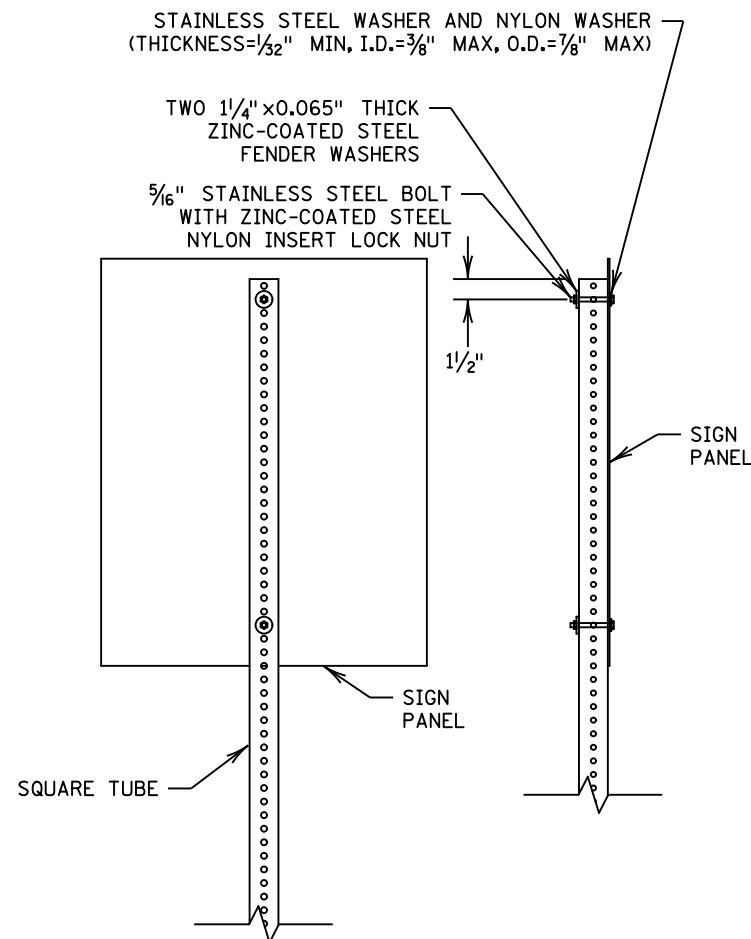


RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

STANDARD PLAN SHEET

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SPN19  
OF SPN29

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101



NOTES:  
BOLT SIGN PANELS TO STRINGERS OR RISER POSTS AT NO GREATER THAN 24" SPACING OR ACCORDING TO THE MNDOT STANDARD SIGNS AND MARKINGS MANUAL FOR MOUNTING HOLES (PUNCH CODES) INFORMATION.  
CENTER STRINGERS ON SIGN PANEL.  
① IF POST SPACING REQUIRES PLACEMENT OF A POST WITHIN THIS AREA, EXTEND STRINGERS AS NEEDED TO ACCOMMODATE THE STRINGER TO POST CLAMP.

LEAD EXPERT OFFICE

BRIAN SORENSON  
STATE TRAFFIC ENGINEER  
OFFICE OF TRAFFIC ENGINEERING

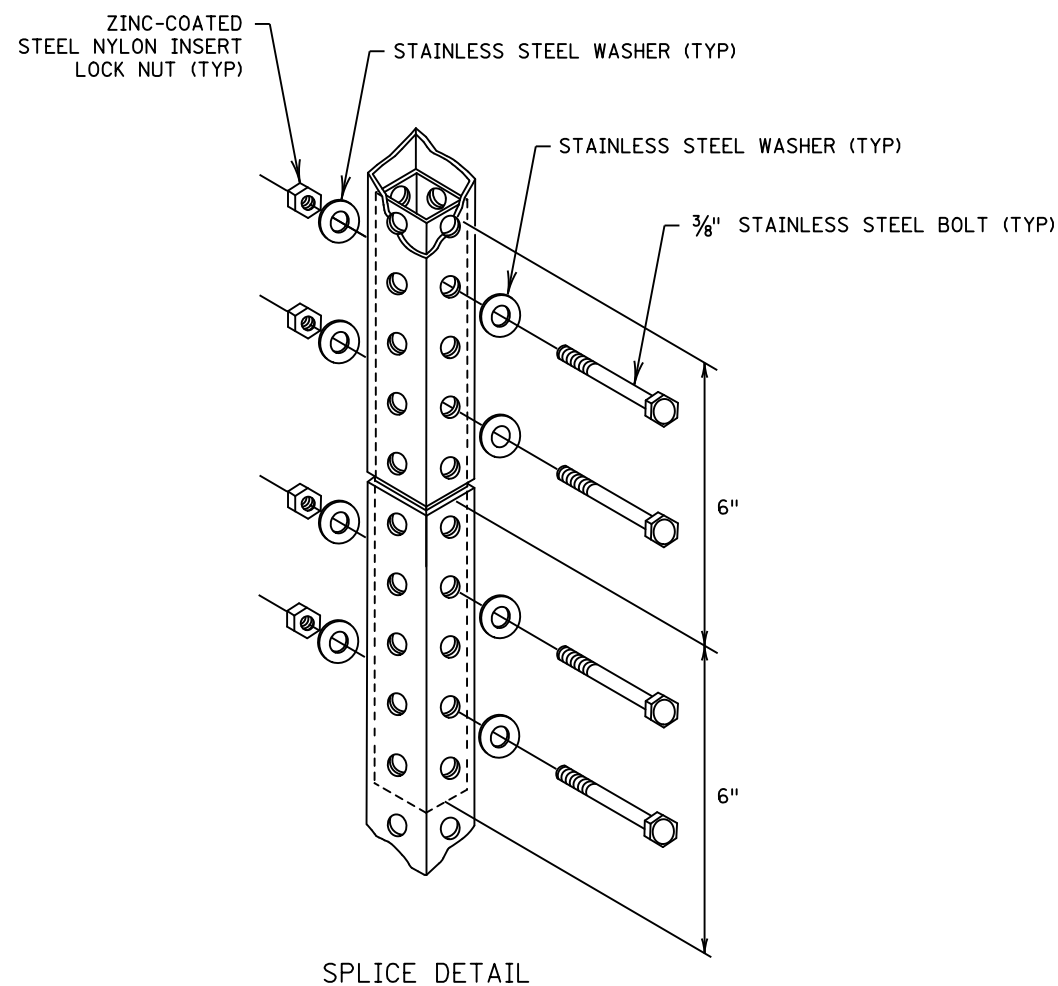
**m** MINNESOTA  
DEPARTMENT OF TRANSPORTATION

STANDARD PLAN 5-297.718 1 OF 3

APPROVED: 08-09-2023  
REVISED:

Tom Sorenson  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

SQUARE-TUBE SIGN MOUNTING DETAILS



PANEL WIDTH (IN)	SQUARE TUBE POST SPACING						
	2 POSTS (IN)	3 POSTS (IN)	4 POSTS (IN)	5 POSTS (IN)	6 POSTS (IN)	7 POSTS (IN)	8 POSTS (IN)
42	15						
48	21						
54	30						
60	36						
66	36						
72	42						
78	42						
84	48						
90	48	42					
96	48	42					
102	54	42					
108	54	42					
114	60	42					
120	60	48					
126	66	48					
132	66	48	42				
138	72	48	42				
144	72	48	42				
150	78	54	42				
156	78	54	42				
162	84	54	42				
168	84	60	48				
174	90	60	48	42			
180	90	60	48	42			
186	96	66	48	42			
192	96	66	48	42			
198	102	66	54	42			
204	102	72	54	42			
210	108	72	54	42			
216	108	72	54	48	42		
222	114	78	60	48	42		
228	114	78	60	48	42		
234	120	78	60	48	42		
240	120	84	60	48	42		
246		84	66	54	42		
252		84	66	54	42		
258		90	66	54	42	42	
264		90	66	54	48	42	
270		90	72	54	48	42	
276		96	72	60	48	42	
282		96	72	60	48	42	
288		96	72	60	48	42	
294		102	78	60	54	42	
300		102	78	60	54	42	42
306		102	78	66	54	42	42
312		108	78	66	54	48	42
318		108	84	66	54	48	42
324		108	84	66	54	48	42
330		114	84	66	60	48	42
336		114	84	72	60	48	42

DISTANCES ARE CENTER-TO-CENTER OF POSTS

NOTES:

NO MORE THAN ONE SPLICE PER POST.

WHEN USED, THE SPLICE MUST BE PLACED AT LEAST 8' ABOVE GROUND. THE PREFERRED PLACEMENT LOCATION IS BEHIND THE SIGN PANEL.

INTERIOR POST STUD SHALL BE ONE SIZE SMALLER FOR TIGHT FIT. IF RISER POST IS 2 1/2", INTERIOR POST IS 2 3/16". IF RISER POST IS 2", INTERIOR POST IS 1 3/4".

LEAD EXPERT OFFICE

BRIAN SORENSON  
STATE TRAFFIC ENGINEER  
OFFICE OF TRAFFIC ENGINEERING



STANDARD PLAN 5-297.718 2 OF 3

APPROVED: 08-09-2023  
REVISED:  
THOMAS STYRBICKI  
STATE DESIGN ENGINEER

SQUARE-TUBE SIGN MOUNTING DETAILS



RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

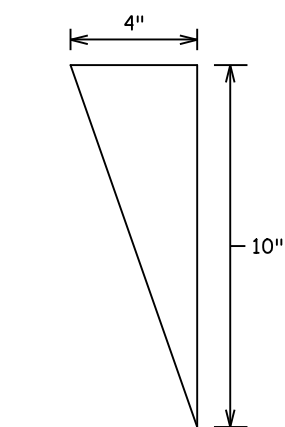
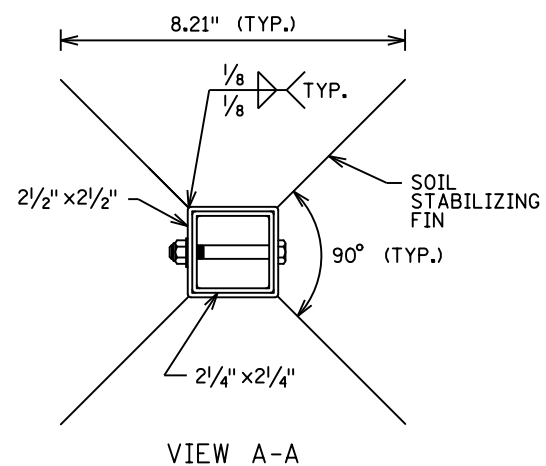
STANDARD PLAN SHEET

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OF SPN29

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101



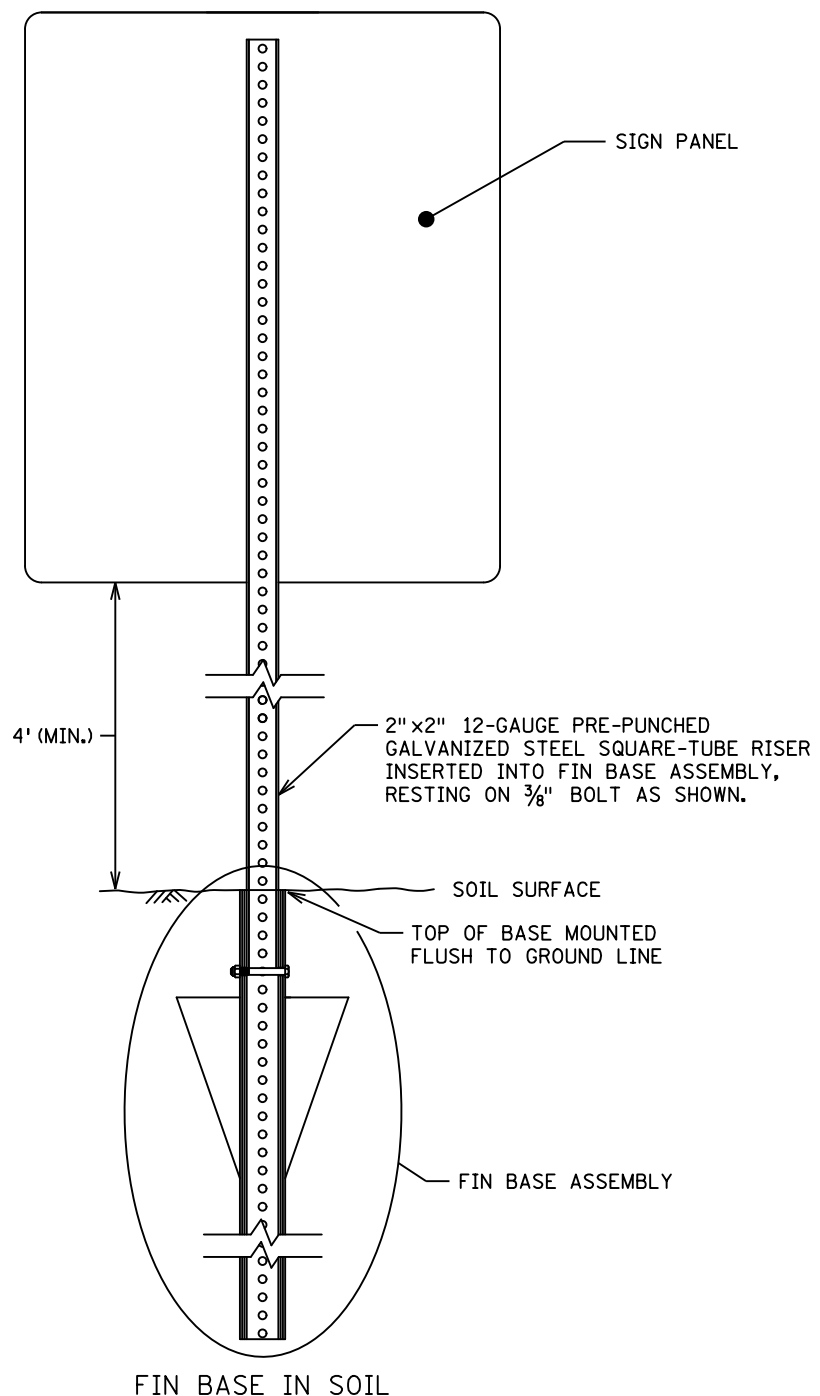
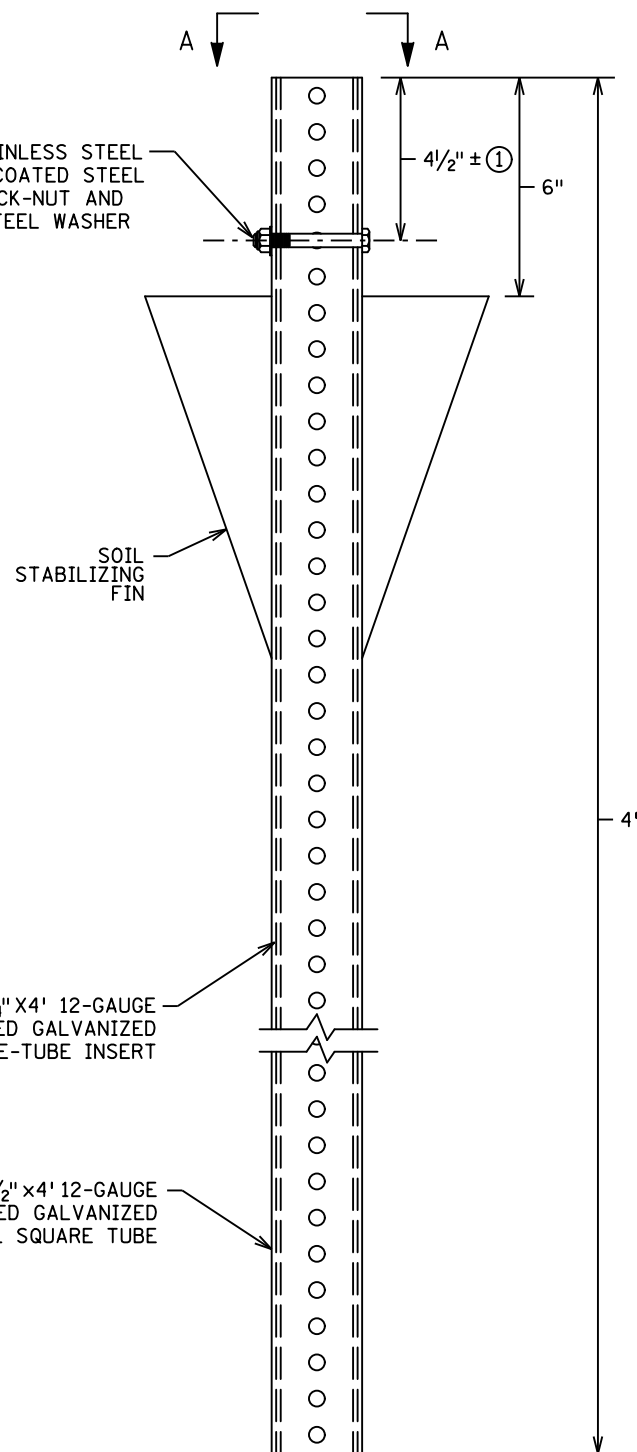




SOIL STABILIZING FIN  
FOUR REQUIRED

12-GAUGE PRE-GALVANIZED ASTM A569 STEEL.  
WELD THE 10" EDGE OF EACH FIN TO EACH  
CORNER OF THE 2 1/2" SQUARE TUBE. SEE VIEW  
A-A FOR WELDING DETAILS. WELDS MUST BE  
ZINC-COATED.

3/8" x 3" LONG STAINLESS STEEL  
BOLT WITH ZINC-COATED STEEL  
NYLON INSERT LOCK-NUT AND  
3/8" STAINLESS STEEL WASHER



NOTES:

THE CRASH RESPONSE TYPE FOR THIS STRUCTURE IS BENDABLE.

TO MEET CRASHWORTHY REQUIREMENTS, THE DISTANCE BETWEEN THE BOTTOM OF THE SIGN PANEL AND THE GROUND SURFACE BELOW ANY PORTION OF THE SIGN PANEL MUST BE A MINIMUM OF 4'. SEE TABULATIONS FOR MOUNTING HEIGHT.

SEE STANDARD PLAN 5-297.718 FOR ADDITIONAL MOUNTING DETAILS.

SQUARE-TUBE SIGN POSTS IN ACCORDANCE WITH SPEC. 3402.

① INSERT BOLT IN 5TH HOLE DOWN.

LEAD EXPERT OFFICE

BRIAN SORENSON  
STATE TRAFFIC ENGINEER  
OFFICE OF TRAFFIC ENGINEERING



STANDARD PLAN 5-297.722

1 OF 1

APPROVED: 08-09-2023  
REVISED:

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

FIN BASE  
FOR 2" SQUARE-TUBE RISER POST IN SOIL

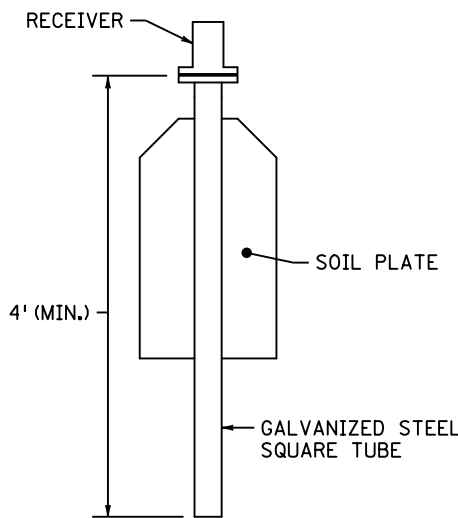


RAMSEY COUNTY, MINNESOTA  
T.H. 61  
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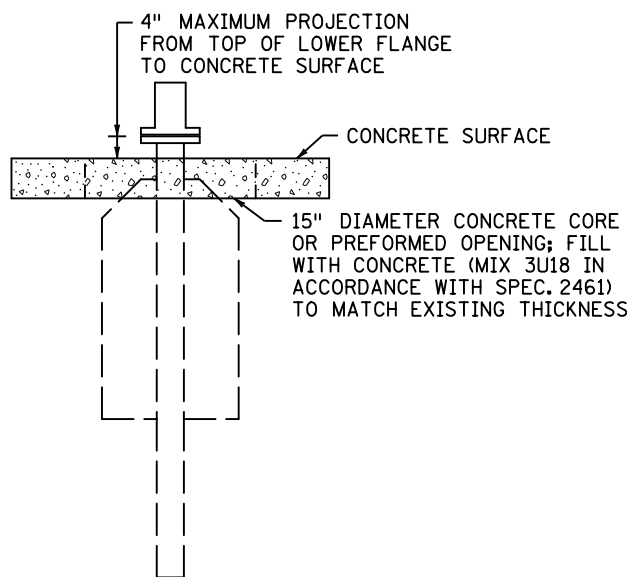
STANDARD PLAN SHEET

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FILE NO.  
ISDWB170688  
SPN23  
OF SPN29

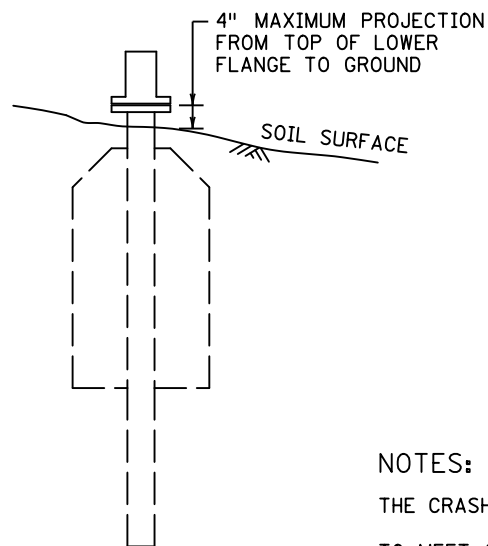
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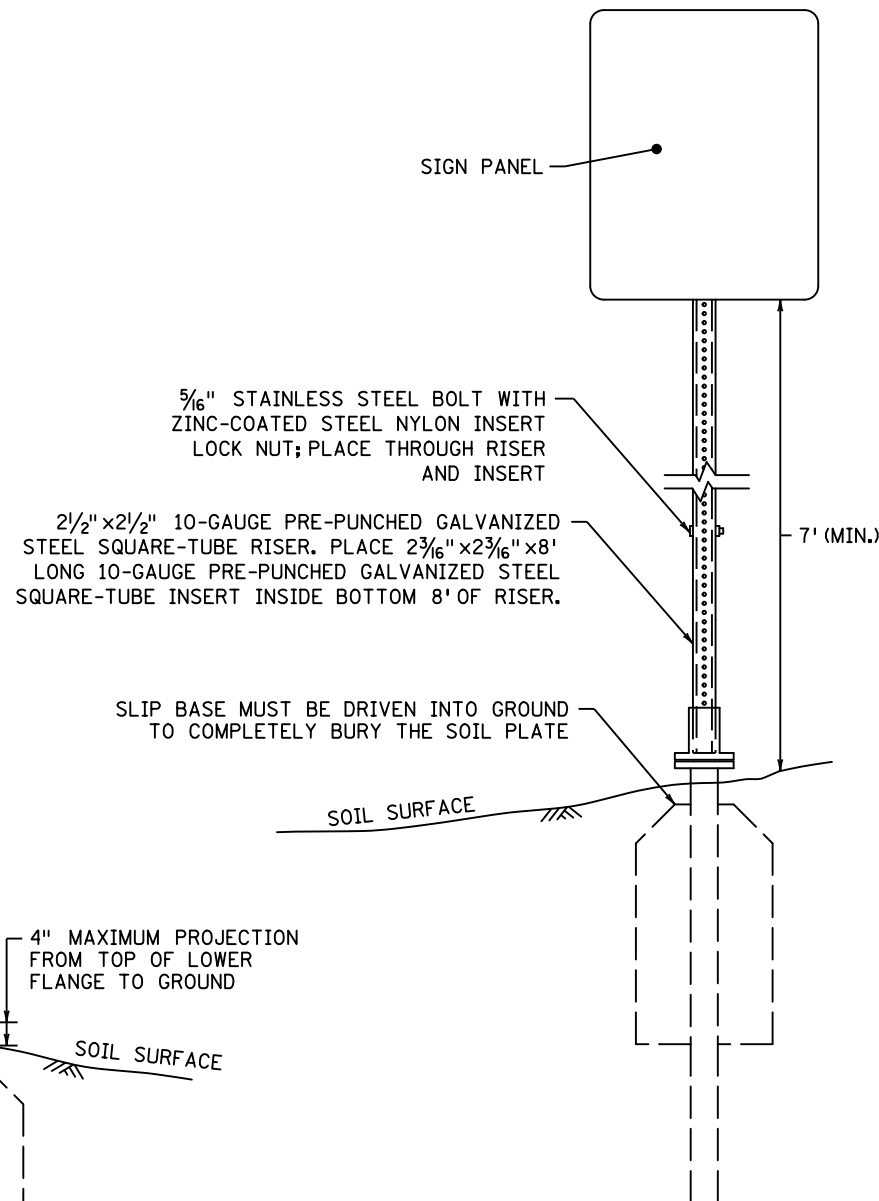
PROPRIETARY SLIP BASE ASSEMBLY ①



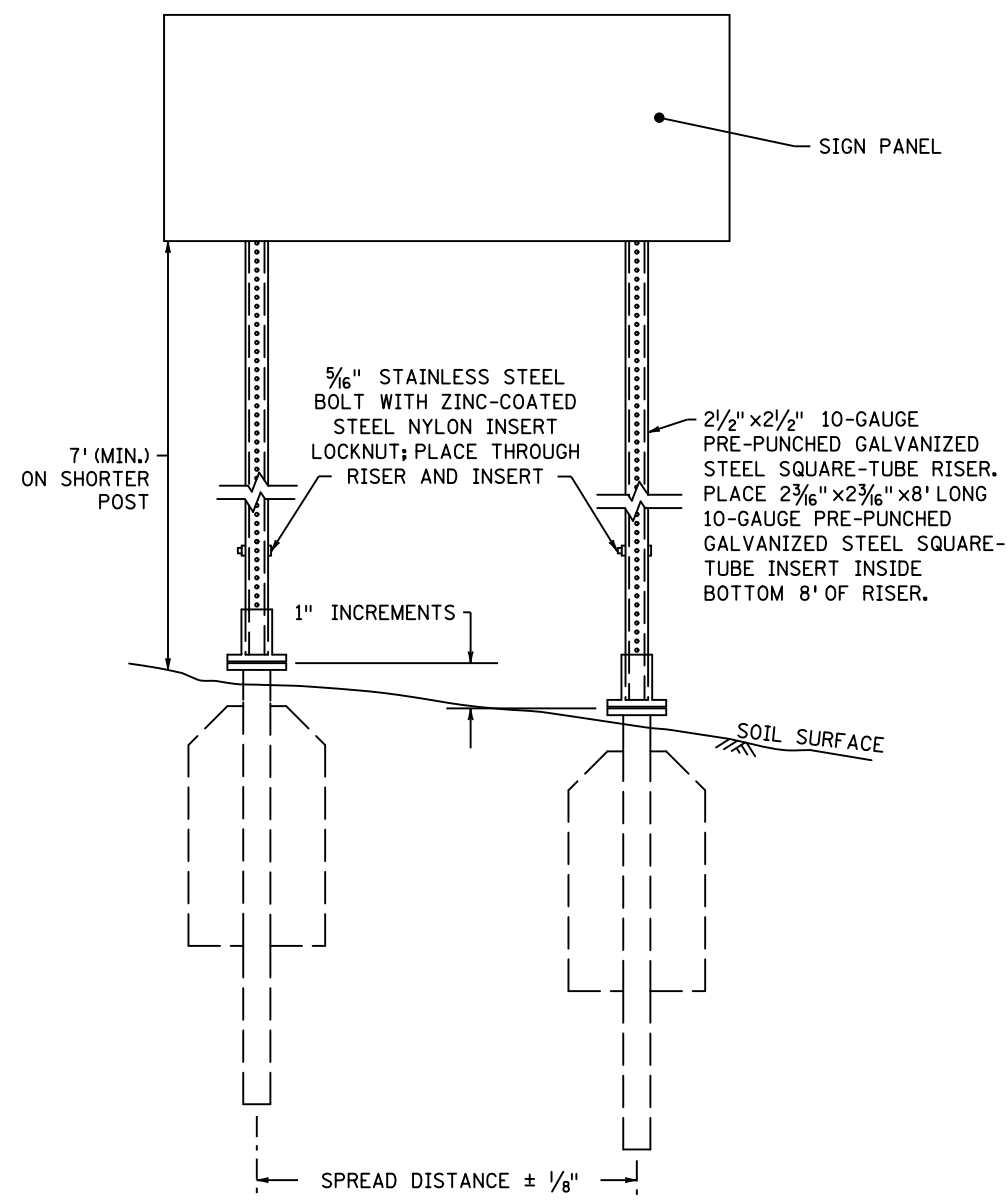
SLIP BASE ASSEMBLY IN CONCRETE



SLIP BASE ASSEMBLY IN SOIL



SLIP BASE ASSEMBLY WITH SINGLE-POST SIGN  
TYPICAL PLACEMENT IN SOIL



SLIP BASE ASSEMBLY WITH MULTIPLE-POST SIGN ②  
TYPICAL PLACEMENT IN SOIL

NOTES:

THE CRASH RESPONSE TYPE FOR THIS STRUCTURE IS BREAKAWAY.

TO MEET CRASHWORTHY REQUIREMENTS, THE DISTANCE BETWEEN THE BOTTOM OF THE PRIMARY SIGN PANEL AND THE GROUND SURFACE BELOW ANY PORTION OF THE PRIMARY SIGN PANEL MUST BE A MINIMUM OF 7'. SEE SIGNING PLAN TABULATIONS FOR MOUNTING HEIGHT.

1/16"-THICK LEVELING SHIMS MAY BE USED TO PLUMB TOP HALF. PLACE SHIMS UNDER TEFLON-COATED SLIP WASHER. MAXIMUM OF TWO SHIMS PER NOTCH POINT.

FOR SIGN PANEL MOUNTING DETAILS, SEE STANDARD PLAN 5-297.718.

SQUARE TUBE SIGN POST IN ACCORDANCE WITH MnDOT SPEC. 3402.

① USE APPROVED PRODUCT FROM THE SIGN STRUCTURES PAGE OF THE SIGNING SECTION OF THE APPROVED PRODUCTS LIST.

② FOR MULTIPLE-POST APPLICATIONS, ENSURE SOIL PLATES ARE COMPLETELY BURIED. IF SOIL SURFACE IS NOT LEVEL, DRIVE THE BASES UNTIL THEY ARE OFFSET IN 1" INCREMENTS. THE BASES MUST BE TRUE AND SQUARE WITH ONE ANOTHER TO ENSURE PROPER UNRESTRICTED INSERTION OF STEEL TUBE RISERS. MOUNT SIGN PANELS LEVEL.

LEAD EXPERT OFFICE

BRIAN SORENSON  
STATE TRAFFIC ENGINEER  
OFFICE OF TRAFFIC ENGINEERING



STANDARD PLAN 5-297.724 1 OF 1

APPROVED: 08-09-2023  
REVISED:  
THOMAS TYRBICKI  
STATE DESIGN ENGINEER

SLIP BASE ASSEMBLY  
FOR 2 1/2" SQUARE-TUBE RISER POST

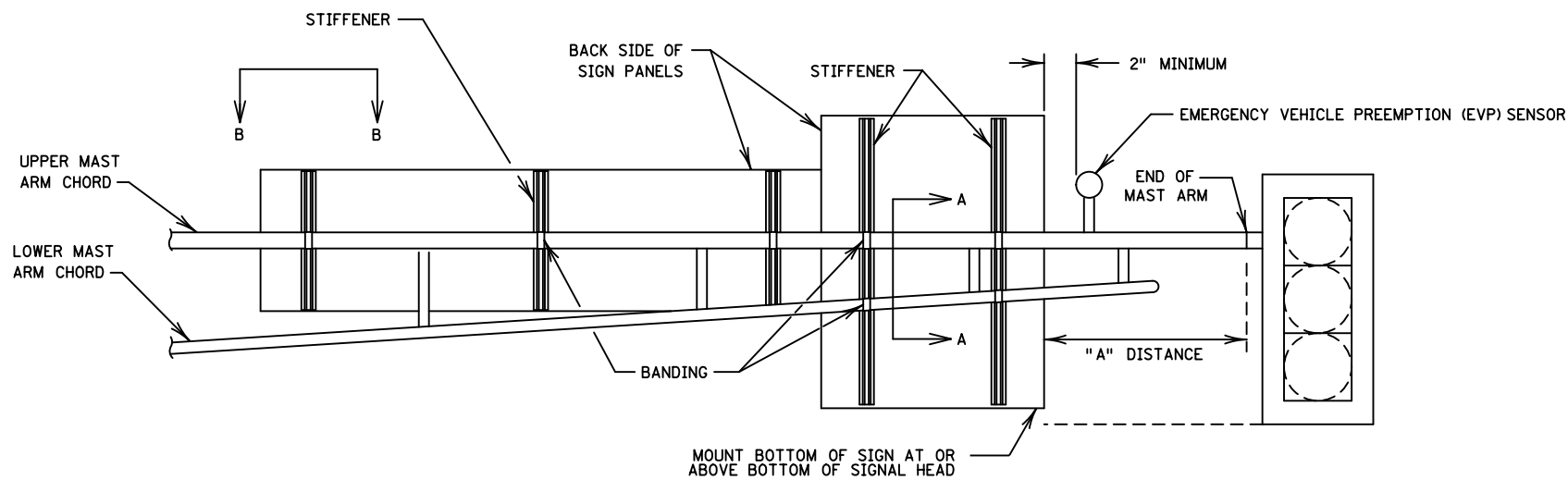


RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

STANDARD PLAN SHEET

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ISDWB170688  
SPN24  
OF SPN29

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101



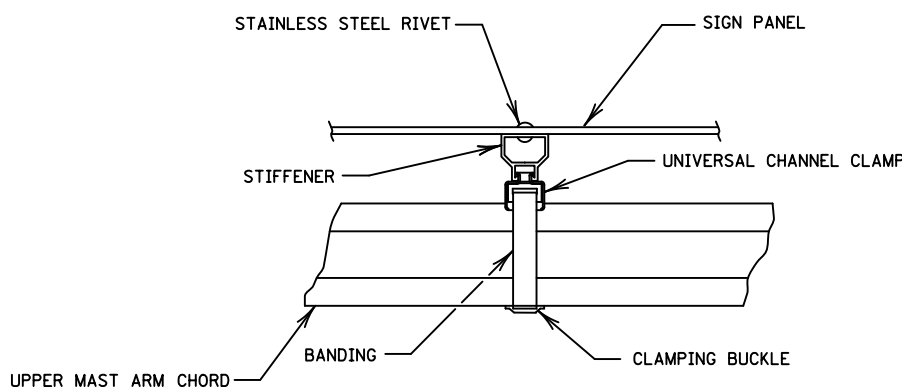
MAST ARM SIGN MOUNTING

		NUMBER OF EXTRUDED STIFFENERS REQUIRED*													
		PANEL WIDTH													
PANEL HEIGHT	2'	2	2	2	3	3	3	4	4	4	5	5	5	5	5
	3'	2	2	2	3	3	3	4	4	4	5	5	5	5	5
	4'	2	2	2	3	3	3	4	4	4	5	5	5	5	6
	5'	2	2	2	3	4	4	5	5	5	5	5	5	5	6
	6'		2	3	4	4	5	5	5	5	5	5	5	5	6
	7'			4	4	5	5	5	5	5	5	5	5	5	6

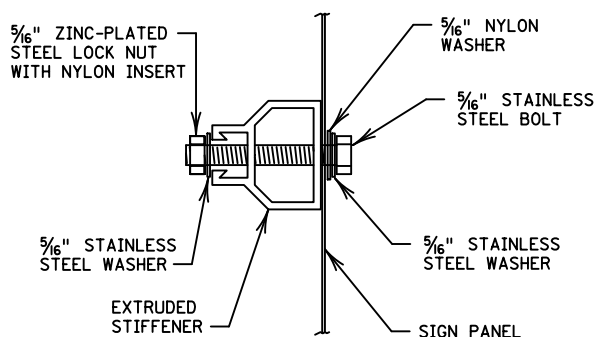
\* WHERE SIGN PANEL DIMENSIONS FALL BETWEEN 1' INCREMENTS, USE NEXT HIGHER WIDTH AND/OR HEIGHT DIMENSION.

NOTES:

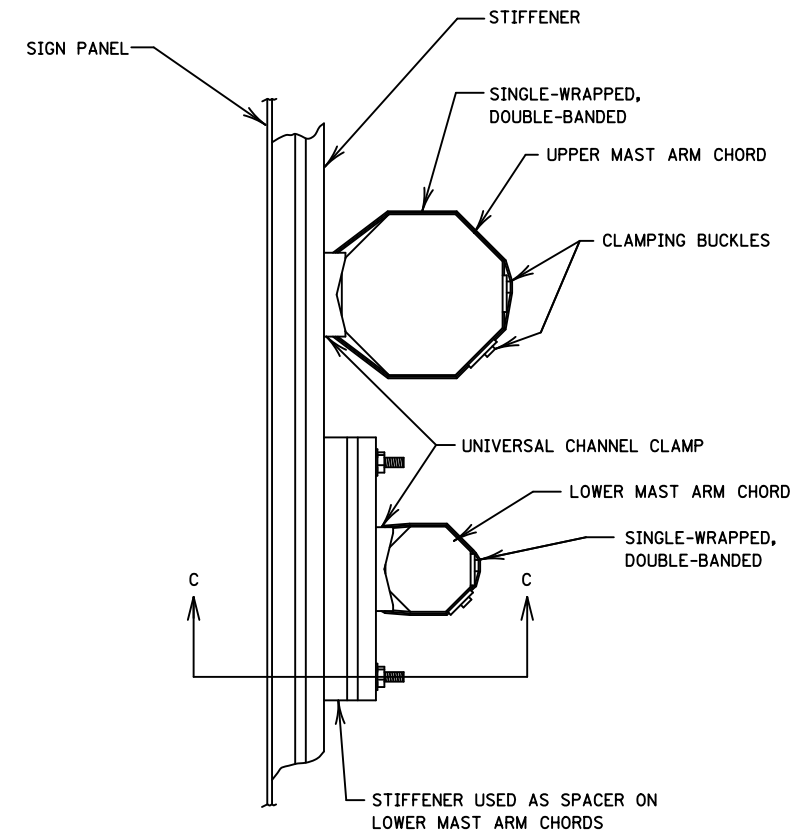
- FURNISH AND INSTALL AT LEAST ONE SPACER FOR EACH SIGN PANEL WHEN PANELS ARE ATTACHED TO THE LOWER MAST ARM CHORD.
- AFFIX SIGNS TO UPPER AND LOWER MAST ARM CHORDS WHEN POSSIBLE.
- POSITION BOTTOM OF SIGN PANEL AT LEAST 17' ABOVE ROADWAY.
- MOUNT SIGN PANELS PLUMB AND SHIM WITH REQUIRED SPACERS AS SHOWN.
- PROVIDE SPACING BETWEEN STIFFENERS OF NO MORE THAN 36".
- PROVIDE A HORIZONTAL DISTANCE OF NO MORE THAN 12" FROM PANEL EDGE TO STIFFENER.
- PROVIDE A VERTICAL DISTANCE OF NO MORE THAN 1" FROM PANEL EDGE TO STIFFENER.
- FURNISH AND INSTALL 1/4" STAINLESS STEEL RIVETS 3" FROM THE PANEL EDGE TO ATTACH THE STIFFENERS TO THE SIGN PANELS. FURNISH AND INSTALL 3/16" STAINLESS STEEL RIVETS AT 6" ON CENTER TO ATTACH THE REMAINDER OF THE STIFFENER TO THE SIGN PANEL.
- FURNISH TWO TYPE 201 STAINLESS STEEL 3/4" WIDE BY 1/32" THICK STRAPS, EACH WITH CLAMPING BUCKLES AND INSTALL SEPARATELY WITH A SINGLE WRAP AROUND THE MAST ARM CHORD. PLACE THE SECOND BANDING STRAP OVER THE FIRST STRAP AND STAGGER THE CLAMPING BUCKLES SO THE BUCKLES ARE NOT DIRECTLY OVER ONE ANOTHER.
- THE "A" DISTANCE IS SHOWN ON THE PLANS. IT IS THE DISTANCE FROM THE END OF THE MAST ARM TO THE EDGE OF EACH SIGN.



VIEW B-B

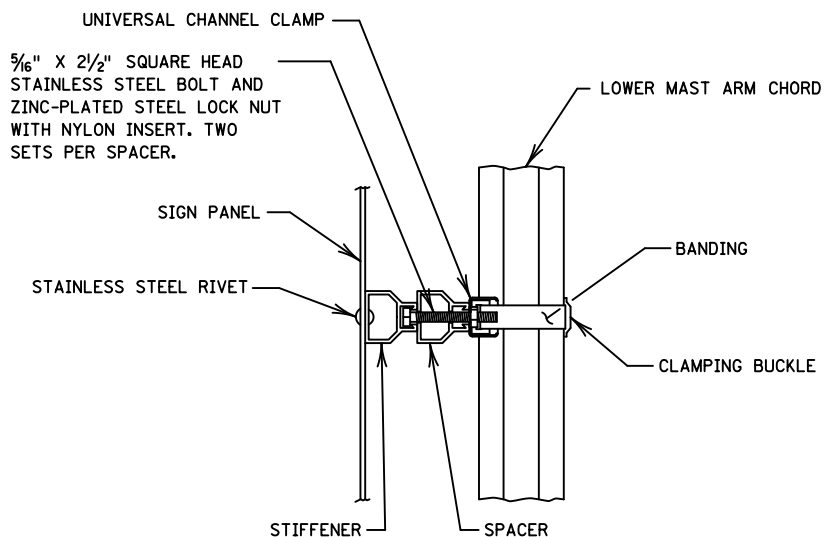


BOLT ATTACHMENT  
ATTACH AT STANDARD PUNCH CODE LOCATIONS



VIEW A-A ①

① SIGN PANELS TALLER THAN 36" MUST BE BANDED TO THE LOWER MAST ARM CHORD AT A MINIMUM OF ONE LOCATION. SIGN PANEL SHALL BE BANDED TO THE LOWER MAST ARM AT A LOCATION THAT WILL PROVIDE THE CLOSEST TO PLUMB ALIGNMENT FOR THE SIGN PANEL.



VIEW C-C

REVISION: APRIL 17, 2020  
 APPROVED: OCTOBER 16, 2019  
 Brian Sobenson  
 STATE TRAFFIC ENGINEER



STANDARD PLAN 5-297.731 1 OF 1  
 APPROVED: 10-16-2019  
 REVISION: 4-17-2020  
 Peter A. Harff  
 PETER A. HARFF  
 STATE DESIGN ENGINEER

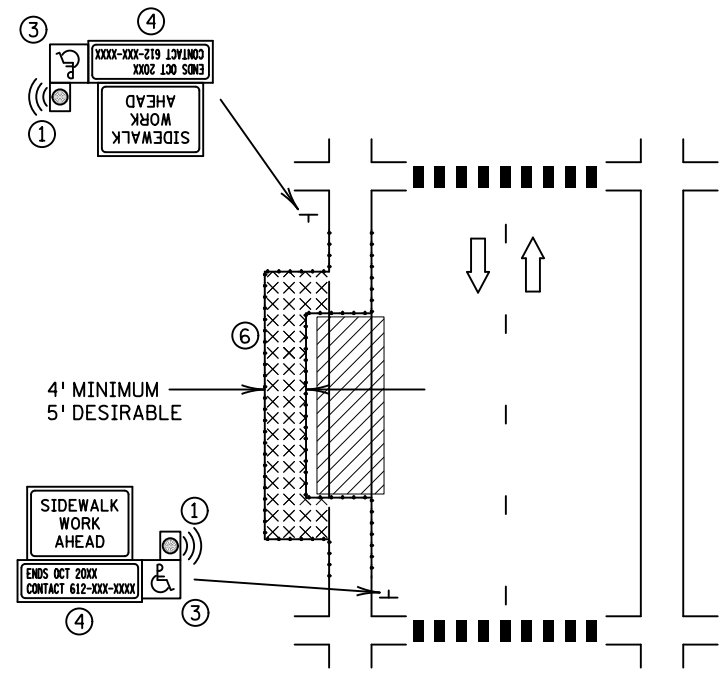
SIGN MOUNTING DETAILS FOR SIGNAL MAST ARMS



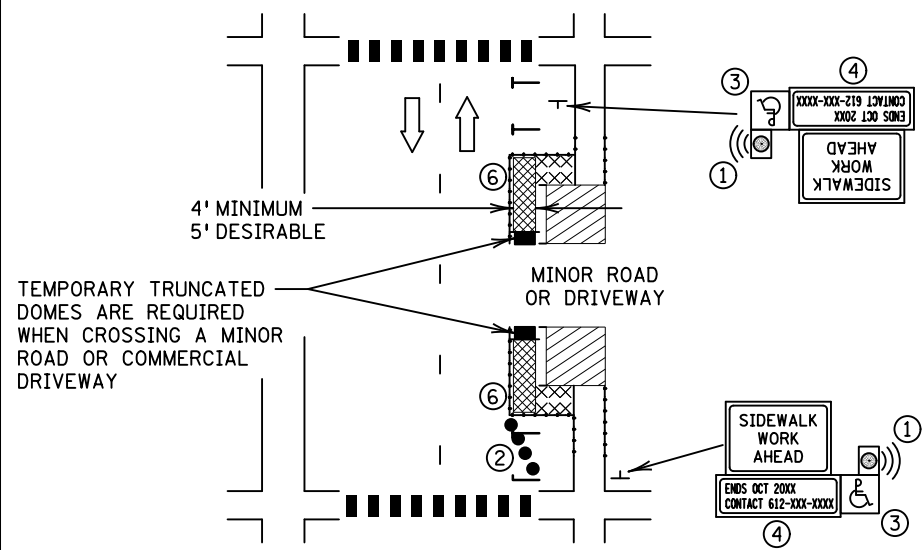
RAMSEY COUNTY, MINNESOTA  
 T.H. 61  
 S.P. 6222-197

STANDARD PLAN SHEET

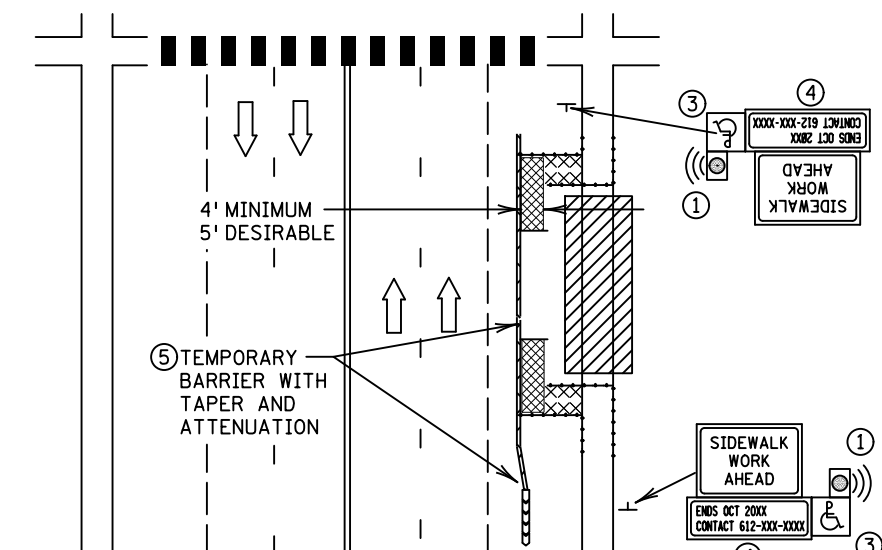
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 OF SPN29



**BYPASS TYPE A**  
BYPASS ON ADJACENT AVAILABLE  
RIGHT OF WAY



**BYPASS TYPE B**  
SIDEWALK BYPASS USING PARKING OR  
SHOULDER ON LOW-SPEED ROADWAY



**BYPASS TYPE C**  
SIDEWALK BYPASS USING SHOULDER  
OR PARKING LANE ON A MULTI-LANE  
OR HIGH-SPEED ROADWAY

**NOTES:**

WHEN CLOSING OR RELOCATING CROSSWALKS OR SIDEWALKS, PROVIDE DETECTABLE TEMPORARY FACILITIES AND INCLUDE ACCESSIBILITY FEATURES CONSISTENT WITH EXISTING PEDESTRIAN FACILITIES. THE ALTERNATE PEDESTRIAN ROUTE (APR) MUST REMAIN OPEN AT ALL TIMES.

TEMPORARY TRAFFIC CONTROL DEVICES FOR PEDESTRIANS ARE SHOWN. OTHER DEVICES MAY BE NECESSARY TO CONTROL VEHICULAR TRAFFIC. STAGE WORK AS NECESSARY TO PROVIDE AN APR AT ALL TIMES FOR ROADWAYS WITH NO AVAILABLE DETOURS. PROVIDE A SMOOTH, CONTINUOUS, HARD SURFACE THROUGH THE LENGTH OF THE APR.

PROVIDE A FIRM, STABLE, FREE-DRAINING, NON-SLIP, TEMPORARY WALKWAY SURFACE REGARDLESS OF WEATHER CONDITIONS. SUPPORT THE TEMPORARY WALKWAY SURFACE WITH A SOLID BASE TO COVER SHORT SEGMENTS OF ROUGH, SOFT, OR UNEVEN GROUND. THE TEMPORARY WALKWAY SURFACE WILL ALLOW NORMAL USAGE OF WHEELCHAIRS, WALKERS, STROLLERS, AND OTHER MOBILITY DEVICES. CONCRETE, BITUMINOUS, STEEL, RUBBER, WOOD (3/4" OR THICKER), AND PLASTIC ARE ACCEPTABLE SURFACE MATERIALS FOR THE TEMPORARY WALKWAY SURFACE. GRAVEL, MILLINGS, AND OTHER UNEVEN SURFACES ARE NOT ACCEPTABLE SURFACE MATERIALS. IF NEEDED, PROVIDE SOIL STABILIZATION TO PREVENT EROSION AROUND TEMPORARY SURFACES. IF NEEDED, PROVIDE SOIL STABILIZATION TO PREVENT EROSION AROUND TEMPORARY SURFACES.

IF A 60" PEDESTRIAN WALKWAY WIDTH ISN'T PROVIDED FOR THE ROUTE, THEN A 60" BY 60" PASSING SPACE IS REQUIRED EVERY 200'. THE MINIMUM WIDTH OF THE WALKWAY IS 48".

COVER OR DEACTIVATE ANY PEDESTRIAN TRAFFIC SIGNALS CONTROLLING CLOSED CROSSWALKS.

POST-MOUNTED SIGNS LOCATED ADJACENT TO A SIDEWALK SHALL HAVE A 7' MINIMUM CLEARANCE FROM THE BOTTOM OF THE LOWEST SIGN TO THE SIDEWALK SURFACE. SHARED-USE PATH SHALL HAVE 8' MINIMUM CLEARANCE FROM THE BOTTOM OF THE LOWEST SIGN TO THE SHARED USE PATH SURFACE.

APR SHOULD BE KEPT FREE OF TRASH, SEDIMENT, AND DEBRIS.

ANY PORTABLE SIGN OR BARRICADE PLACED OR STORED IN A PEDESTRIAN WALKWAY THAT COULD POSE A HAZARD TO A VISUALLY-IMPAIRED PEDESTRIAN SHALL HAVE A DETECTABLE EDGE TO GUIDE THE PEDESTRIAN AROUND THE HAZARD. FOR ADDITIONAL GUIDANCE, SEE THE "DETECTABLE EDGE FOR SIGN ON PORTABLE STAND" DETAIL ON STANDARD PLAN 5-297.813.

MINIMIZE DISRUPTION TO PEDESTRIANS TO THE MAXIMUM EXTENT FEASIBLE BY PROVIDING AN APR IN THE FOLLOWING ORDER OF PREFERENCE:

1. PROVIDE THE APR ON THE SAME SIDE OF THE ROADWAY AS THE DISRUPTED ROUTE UTILIZING 2. BYPASSES.

3. WHERE NOT FEASIBLE TO PROVIDE A SAME-SIDE APR, PROVIDE AN APR DETOUR ON THE OTHER SIDE OF THE ROADWAY.

4. WHERE NOT FEASIBLE TO PROVIDE AN APR ON EITHER SIDE OF THE ROADWAY, PROVIDE AN APR DETOUR WITH TRAILBLAZING SIGNS.

① CONSIDER PROVIDING AN APPROVED AUDIBLE MESSAGE DEVICE OR TACTILE MESSAGE FOR PEDESTRIANS WITH VISUAL DISABILITIES.

② RECOMMENDED TAPER WHEN THE CLOSED AREA WAS PREVIOUSLY USED AS AN INTERMITTENT TRAFFIC LANE OR BYPASS LANE IS 25' LONG USING FIVE EQUALLY-SPACED CHANNELIZING DEVICES.

③ FOR FULLY-ACCESSIBLE WALKWAYS THROUGH WORKZONES, CONSIDER DISPLAYING THE INTERNATIONAL SYMBOL OF ACCESSIBILITY.

④ INCLUDE INFORMATION SUCH AS THE DURATION OF THE WALKWAY RESTRICTIONS (BEGINNING AND/OR END DATES) AND A PROJECT CONTACT NUMBER FOR 24/7 QUESTIONS OR REPORTING HAZARDS ON SIGNS FOR TEMPORARY PEDESTRIAN DETOURS.

⑤ SEE THE MOST CURRENT EDITION OF THE MNDOT TEMPORARY BARRIER GUIDANCE MANUAL FOR GUIDANCE ON PLACEMENT AND USAGE OF TEMPORARY BARRIER.

⑥ PROVIDE SOIL STABILIZATION AROUND TEMPORARY SURFACES TO PREVENT EROSION, IF NEEDED.

**LEGEND**

- ⊕ SIGN
- ▨ WORK AREA
- PEDESTRIAN CHANNELIZATION DEVICE
- TEMPORARY BARRIER
- ➡ DIRECTION OF TRAFFIC
- CHANNELIZER
- Ⓜ AUDIBLE MESSAGE DEVICE (AMD)
- ▩ TEMPORARY CURB RAMP WITH DETECTABLE EDGES
- ▧ TEMPORARY WALKWAY SURFACE

REVISIONS:
APPROVED: 03-18-2021
BRIAN SOBENSON STATE TRAFFIC ENGINEER



STANDARD PLAN 5-297.811 1 OF 2

THOMAS STYRBICKI  
STATE DESIGN ENGINEER

APPROVED: 03-18-2021  
REVISED:

**ALTERNATE PEDESTRIAN ROUTE (APR) LAYOUTS**



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

STANDARD PLAN SHEET

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NOTES;

TPAR SHOULD BE KEPT FREE OF TRASH, SEDIMENT, AND DEBRIS.

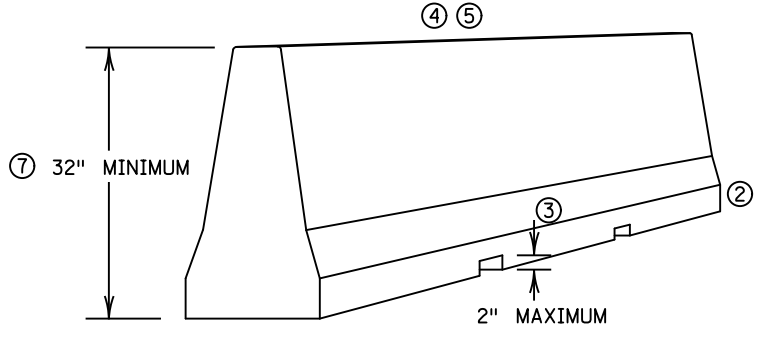
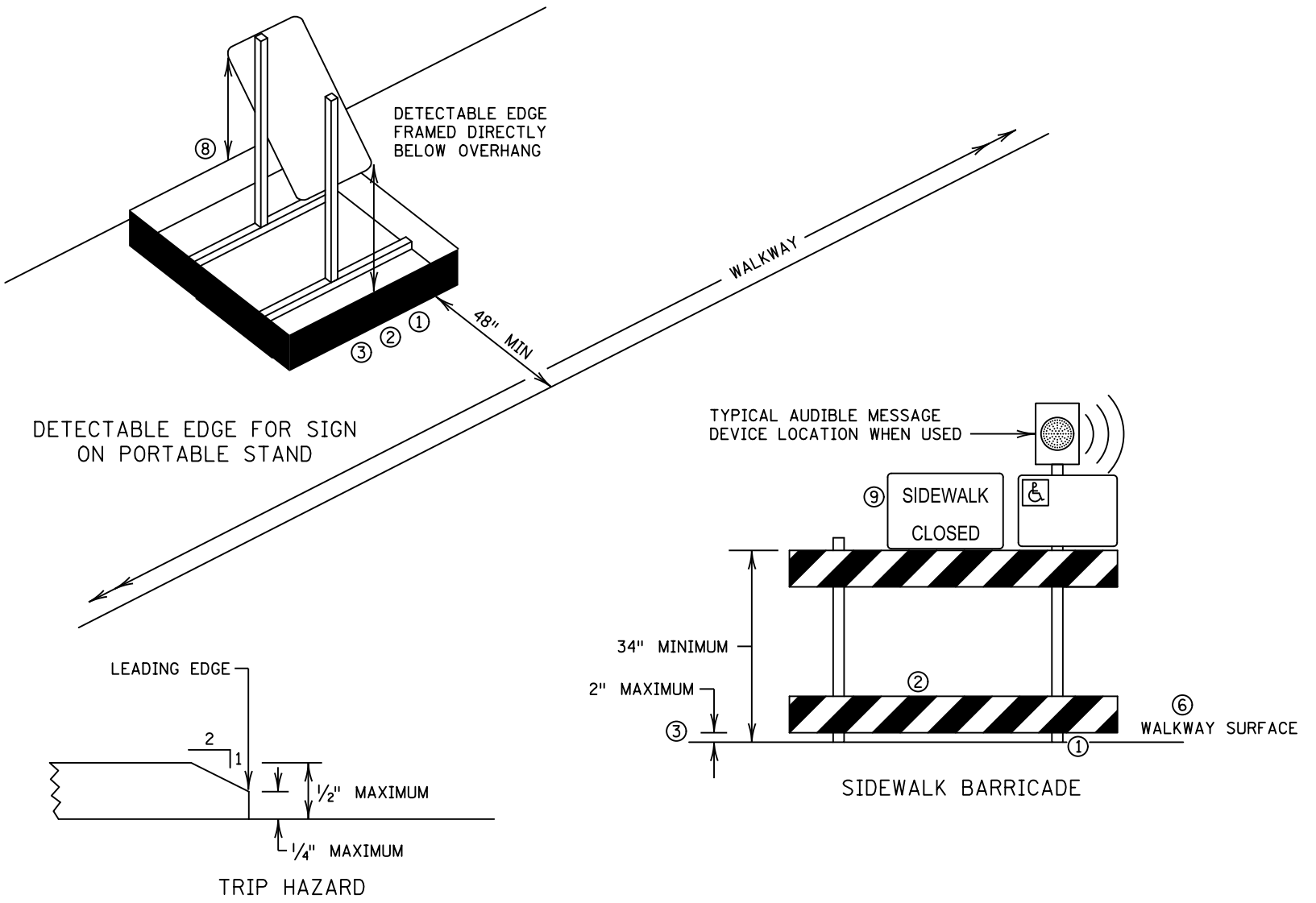
RAILINGS OR OTHER OBJECTS MAY PROTRUDE A MAXIMUM OF 4" INTO THE WALKWAY CLEAR SPACE WHEN LOCATED A MINIMUM OF 27" ABOVE THE WALKWAY SURFACE.

USE CRASHWORTHY TEMPORARY BARRIERS WHEN USED AS A PEDESTRIAN CHANNELIZERS.

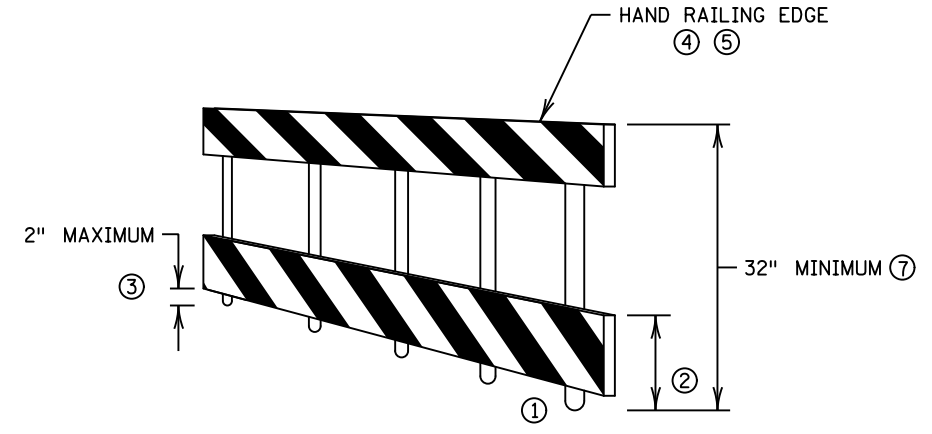
PLACE SIDEWALK BARRICADES ACROSS THE ENTIRE WIDTH OF THE WALKWAYSURFACE, WHEN USED.

USE INTERLOCKING DEVICES TO CHANNELIZE PEDESTRIAN FLOW TO PREVENT GAPS THAT COULD ALLOW PEDESTRIANS TO STRAY FROM THE CHANNELIZED PATH.

- ① PROVIDE DETECTABLE EDGE TO ANY TRIPPING HAZARD IN THE WALKWAY. LOCATE BALLAST BEHIND THE DETECTABLE EDGE OR INTEGRAL TO THE DEVICE. ANY SUPPORT ON THE FRONT OF THE DEVICE SHOULD NOT EXTEND INTO THE 48" MINIMUM WALKWAY CLEAR SPACE. ANY SUPPORT THAT EXTENDS INTO THE WALKWAY SHALL NOT EXCEED 1/2" HEIGHT ABOVE THE WALKWAY SURFACE; IF GREATER THAN 1/4", BEVEL AS SHOWN IN THE TRIP HAZARD DETAIL.
- ② PROVIDE CONTINUOUS DETECTABLE EDGES EXTENDING AT LEAST 6" ABOVE THE WALKWAY SURFACE. MARK DETECTABLE EDGES WITH A COLOR THAT CONTRASTS WITH THE WALKWAY SURFACE. PLACE THE DETECTABLE EDGE AROUND ANY PORTABLE SIGN STAND IN THE WALKWAY AREA WHERE THE SIGN POSES A HAZARD TO A VISUALLY-IMPAIRED PEDESTRIAN.
- ③ DEVICES AND DETECTABLE EDGES SHALL NOT BLOCK WATER DRAINAGE FROM THE WALKWAY. A GAP HEIGHT OR OPENING FROM THE WALKWAY SURFACE UP TO A MAXIMUM OF 2" IS ALLOWED FOR DRAINAGE PURPOSES.
- ④ USE HAND AND GUIDE RAILS WHEN REQUIRED. INSTALL TOP RAIL OR TOP SURFACE IN A VERTICAL PLANE PERPENDICULAR TO THE WALKWAY, ABOVE THE DETECTABLE EDGE. PROVIDE CONTINUOUS RAIL AT A HEIGHT OF 34" TO 38" ABOVE THE WALKWAY SURFACE. USE RAIL SUPPORTS THAT MINIMIZE CONTACT WITH PEDESTRIAN'S HANDS AND FINGERS. SEE "PUBLIC RIGHTS OF WAY ACCESSIBILITY GUIDELINES (PROWAG) 2005" FOR ADDITIONAL GUIDANCE ON USE OF HAND AND GUIDE RAILS.
- ⑤ USE DEVICES FREE OF SHARP OR ROUGH EDGES, AND USE ROUNDED FASTENERS (BOLTS) TO PREVENT HARM TO A PEDESTRIAN'S HANDS, ARMS, AND CLOTHING.
- ⑥ REGARDLESS OF WEATHER CONDITIONS PROVIDE FIRM, STABLE, FREE-DRAINING, AND NON-SLIP TEMPORARY WALKWAY SURFACES. TEMPORARY WALKWAY SURFACES SHALL ALLOW NORMAL USAGE OF WHEELCHAIRS, WALKERS, STROLLERS, OR OTHER MOBILITY DEVICES. CONCRETE, BITUMINOUS, STEEL, RUBBER, WOOD (3/4" OR THICKER), AND PLASTIC ARE ACCEPTABLE SURFACE MATERIALS FOR A TEMPORARY WALKWAY SURFACE. GRAVEL, MILLINGS, AND OTHER UNEVEN SURFACES ARE NOT ACCEPTABLE SURFACE MATERIALS.
- ⑦ PROVIDE 32" HIGH OR GREATER LONGITUDINAL CHANNELIZING DEVICES FOR PEDESTRIANS.
- ⑧ AN EDGE OF THE FRAMING MAY BE REMOVED IF IT IS NOT NEEDED FOR PEDESTRIAN GUIDANCE. STABILITY OF THE DETECTABLE EDGE SHOULD BE MAINTAINED.
- ⑨ TYPICAL. SEE SIGNING PLAN FOR DETAILS.



PEDESTRIAN CHANNELIZER DEVICE USING A PORTABLE CONCRETE BARRIER



PEDESTRIAN CHANNELIZER

REVISION:
APPROVED: 03-18-2021
<i>Brian Sobenson</i> BRIAN SOBENSON STATE TRAFFIC ENGINEER

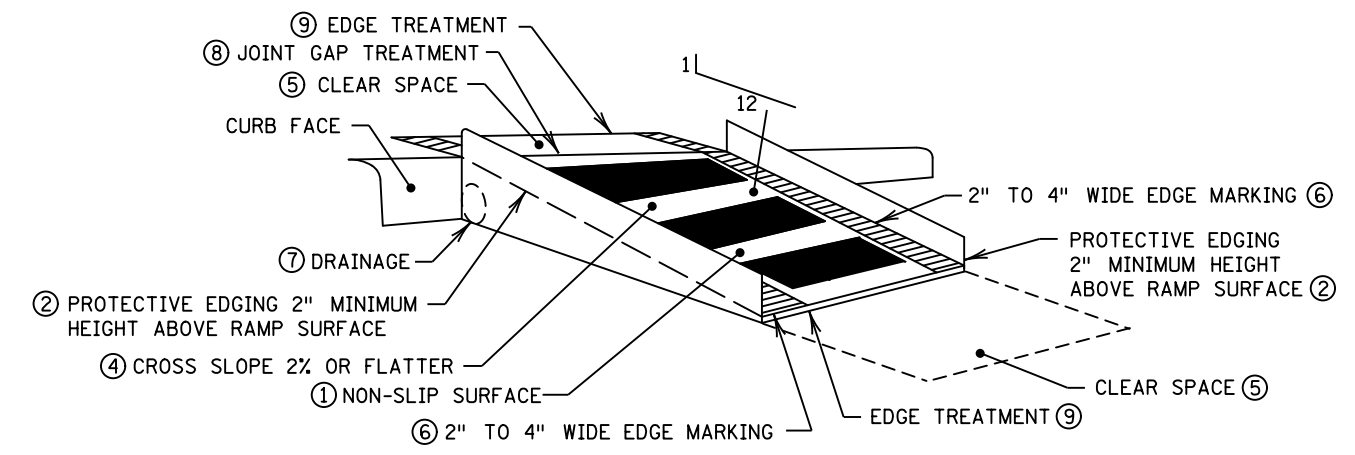
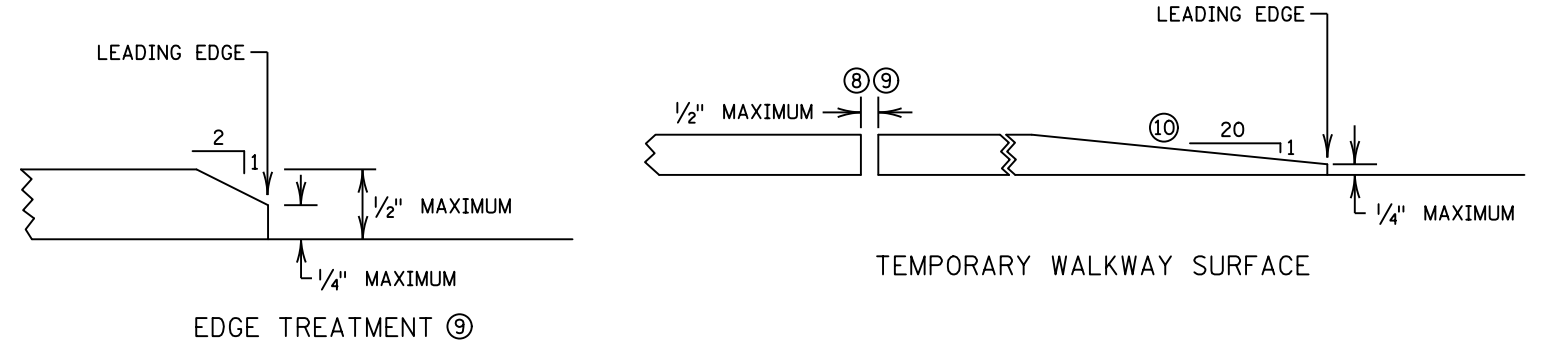
	STANDARD PLAN 5-297.813	1 OF 2
	 THOMAS STYRBICKI STATE DESIGN ENGINEER	
APPROVED: 03-18-2021 REVISED:		

**TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) DEVICES**  
CHANNELIZERS, SIDEWALK BARRICADES, AND PORTABLE STANDS

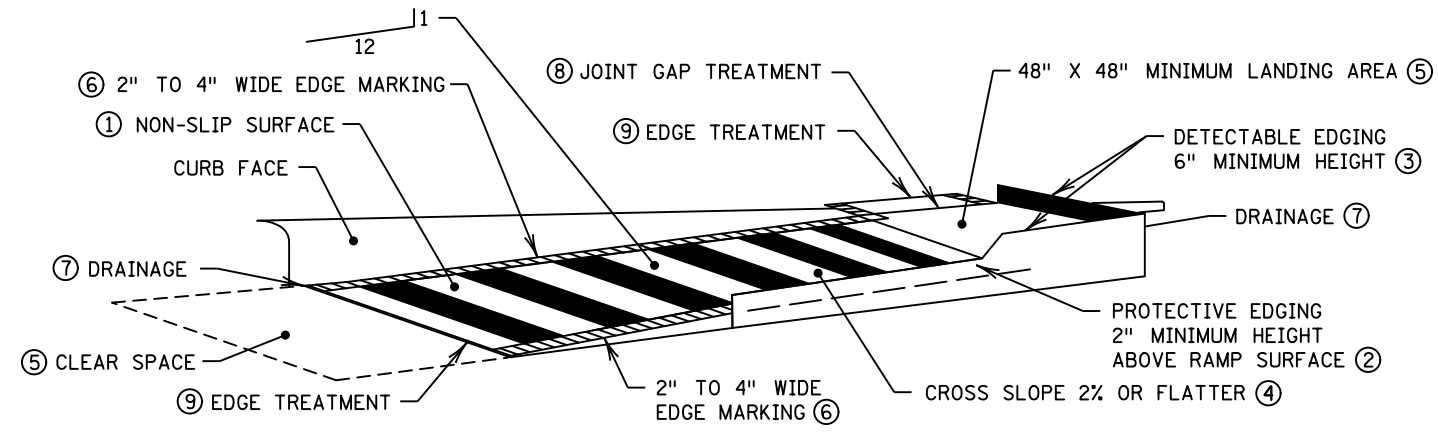
NOTES:

CONSTRUCT SLOPES AS INDICATED OR FLATTER, BUT NOT STEEPER.  
TPAR SHOULD BE KEPT FREE OF TRASH, SEDIMENT, AND DEBRIS.

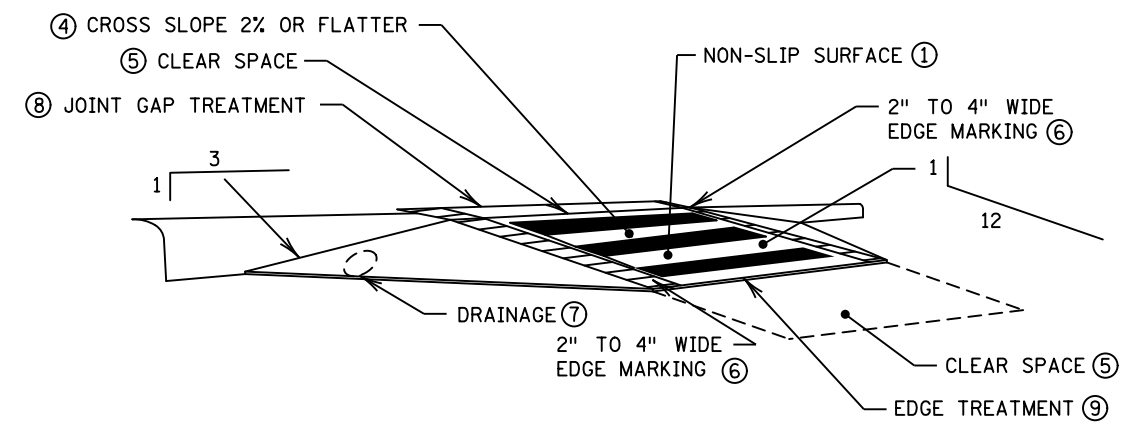
- ① CONSTRUCT CURB RAMPS AT LEAST 48" WIDE WITH A FIRM, STABLE, AND SLIP-RESISTANT SURFACE.
- ② PLACE PROTECTIVE EDGING WITH A 2" MINIMUM HEIGHT WHEN A CURB RAMP OR LANDING PLATFORM HAS A VERTICAL DROP OF 6" OR GREATER OR HAS A SIDE APRON SLOPE STEEPER THAN 1V:3H. CONSIDER PROTECTIVE EDGING WHEN CURB RAMPS OR LANDING PLATFORMS HAVE A VERTICAL DROP OF 3" OR MORE.
- ③ PLACE DETECTABLE EDGING WITH 6" MINIMUM HEIGHT AND CONTRASTING COLOR ON ALL CURB RAMP LANDINGS WHERE THE WALKWAY CHANGES DIRECTION.
- ④ CONSTRUCT CURB RAMPS AND LANDINGS WITH A 2% OR FLATTER CROSS SLOPE.
- ⑤ PROVIDE A CLEAR SPACE OF AT LEAST 48" X 48" ABOVE AND BELOW THE CURB RAMP.
- ⑥ MARK THE CURB RAMP WALKWAY EDGE WITH A 2" TO 4" WIDE MARKING OF CONTRASTING COLOR. THE MARKING IS OPTIONAL WHERE COLOR-CONTRASTING EDGING IS USED.
- ⑦ DO NOT IMPEDE WATER FLOW IN THE GUTTER SYSTEM.
- ⑧ NO LATERAL JOINTS OR GAPS BETWEEN SURFACES SHALL EXCEED 1/2" WIDTH.
- ⑨ CHANGES BETWEEN SURFACE HEIGHTS SHALL NOT EXCEED 1/2". USE VERTICAL LATERAL EDGES UP TO 1/4" HIGH, AND BEVELED AT 1V:2H FOR LATERAL EDGES BETWEEN 1/4" AND 1/2" HEIGHT.
- ⑩ BEVEL THE EDGE OF TEMPORARY WALKWAY SURFACES 1/2" OR THINNER AT 1V:2H. FOR THICKER WALKWAY SURFACE BEVEL EDGE 1V:20H OR FLATTER.



TEMPORARY CURB RAMP PERPENDICULAR TO CURB SHOWN WITH PROTECTIVE EDGE



TEMPORARY CURB RAMP PARALLEL TO CURB



TEMPORARY CURB RAMP PERPENDICULAR TO CURB SHOWN WITH SIDE APRON

REVISION:
APPROVED: 03-18-2021
<i>Brian Sobenson</i> BRIAN SOBENSON STATE TRAFFIC ENGINEER

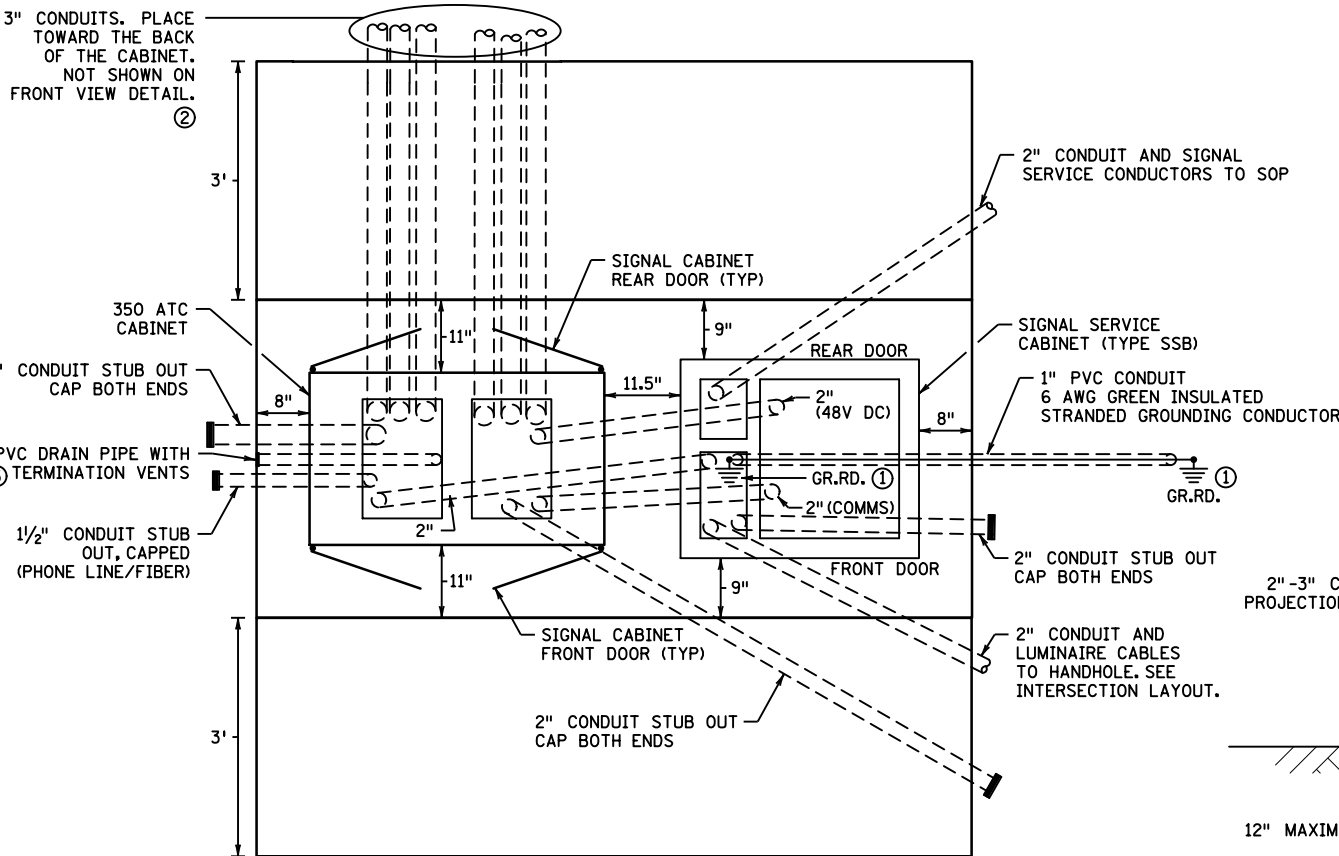
	STANDARD PLAN 5-297.813	2 OF 2
	 THOMAS STYRBICKI STATE DESIGN ENGINEER	
APPROVED: 03-18-2021 REVISED:		

**TEMPORARY PEDESTRIAN ACCESS ROUTE (TPAR) DEVICES**  
 TEMPORARY CURB RAMPS AND WALKWAY SURFACES

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PLAN VIEW 2

NOTES:

SEE INTERSECTION LAYOUT FOR CABLE INFORMATION.

FOR THE EQUIPMENT PAD, USE CONCRETE MIX 3G52 WITH APPROVED MACRO NON-METALLIC FIBERS FOR REINFORCEMENT. THESE ARE LISTED ON MnDOT'S APL UNDER CONCRETE "NONMETALLIC FIBERS (BRIDGE APPLICATIONS)." ADD FIBERS TO THE CONCRETE MIX IN ACCORDANCE WITH THE NON-METALLIC FIBERS MANUFACTURER'S INSTRUCTIONS AND CONTRACT DOCUMENTS.

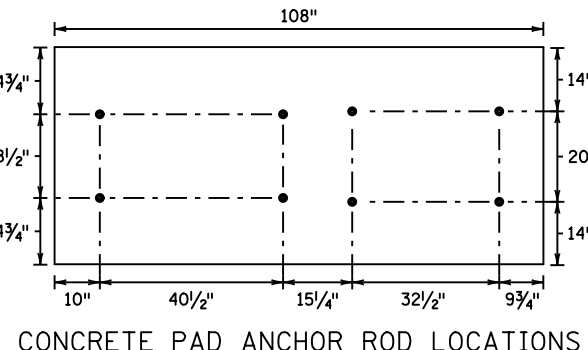
FOR CONCRETE WALK, USE CONCRETE MIX 3G52. 3G52 CONCRETE MIX WITH NON-METALLIC FIBERS MAY BE USED FOR THE CONCRETE WALK AND POLE FOUNDATIONS. DO NOT USE NON-METALLIC FIBERS AS A SUBSTITUTE FOR THE REQUIRED REINFORCEMENT IN ACCORDANCE WITH THE POLE FOUNDATION STANDARD PLATES.

IF THE SITE CONDITIONS REQUIRE THE PAD TO BE PLACED ON A SLOPE, INCREASE THE THICKNESS OF THE PAD BY 6". SHAPE THE TERRAIN AROUND THE PAD FOR PROPER DRAINAGE.

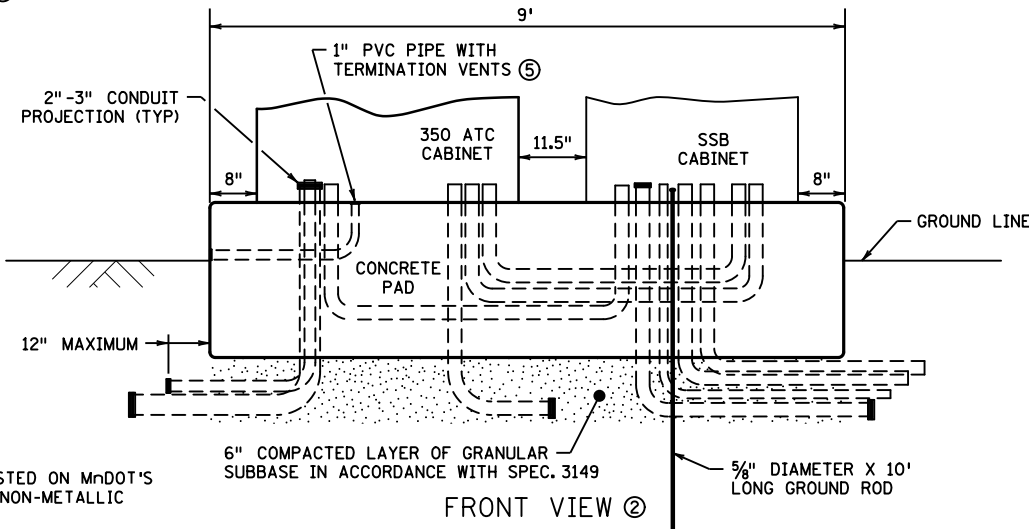
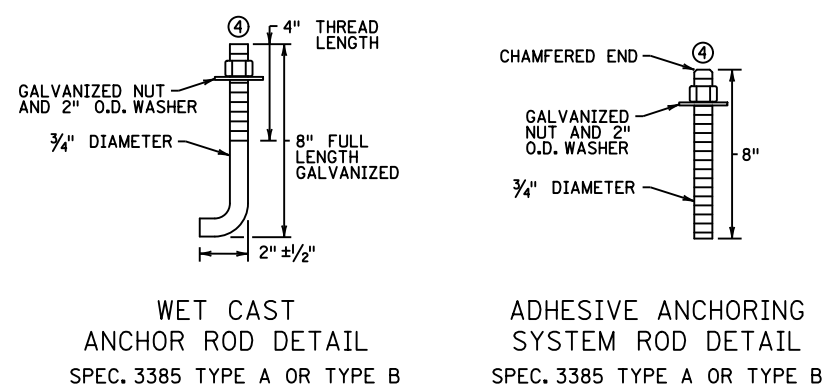
3" MINIMUM CLEAR REQUIRED BETWEEN THE TOP AND BOTTOM SURFACES OF THE PAD AND THE OUTSIDE OF THE CONDUIT.

ENSURE THE CONDUITS FULLY ENCASED IN CONCRETE FROM ONE CABINET TO THE OTHER ARE PLACED AT THE CORRECT DEPTH AND LOCATION TO AVOID INTERFERENCE WITH THE INSTALLATION OF THE ANCHOR RODS.

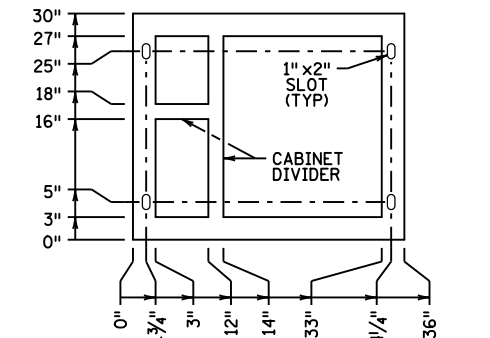
- 1 PLACE A GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH THE GROUNDING ELECTRODE SYSTEM DETAIL ON STANDARD PLATE 8106 SHEET 3 EXCEPT FURNISH AND INSTALL 10' GROUND ROD ELECTRODES, 6 AWG GREEN INSULATED COPPER CONDUCTOR, AND EXOTHERMIC WELDED CONNECTIONS. IF A MnDOT TRAFFIC SIGNAL SYSTEM HAND HOLE IS LOCATED AT LEAST 6' APART AND NO MORE THAN 10' APART FROM THE GROUND ROD LOCATED IN THE EQUIPMENT PAD, THE SUPPLEMENTAL GROUND ROD MAY BE PLACED IN THAT HANDHOLE. USE A 12' GROUND ROD IN THE HAND HOLE INSTEAD OF A 10' GROUND ROD AND PULL A GREEN INSULATED 6 AWG CONDUCTOR IN THE CONDUIT GOING TO THAT HAND HOLE. IF THE REQUIRED TRAFFIC SIGNAL POLE HANDHOLE GROUND ROD IS LOCATED WITHIN THE SPECIFIED DISTANCE MENTIONED, BOND THE GREEN INSULATED 6 AWG CONDUCTOR TO THAT GROUND ROD.
- 2 CONDUIT SIZE, QUANTITY, AND DIRECTION MAY VARY. FURNISH AND INSTALL CONDUITS AS SPECIFIED ON THE INTERSECTION LAYOUT PLAN SHEET. ENSURE CONDUITS ARE NOT PLACED DIRECTLY UNDER ANCHOR ROD LOCATIONS.
- 3 USE TEMPLATES WITH THE DIMENSIONS SHOWN INCLUDING OPENINGS, DIVIDERS, AND ANCHOR ROD HOLES AS A GUIDE TO ENSURE PROPER PLACEMENT OF THE CABINETS, CONDUITS, AND ANCHOR RODS. 350 BASE OPENINGS FOR TEMPLATE ARE SMALLER THAN THE ACTUAL BASE OPENINGS.
- 4 SET ANCHOR RODS IN THE CONCRETE PAD WITH A 2" TO 2 1/4" PROJECTION ABOVE THE PAD. FURNISH AND INSTALL ANCHOR RODS SHOWN ON THE ANCHOR ROD DETAIL IF WET-CASTING ANCHORS IN CONCRETE. FURNISH AND INSTALL ANCHOR RODS SHOWN ON THE ANCHOR ROD DETAIL IF USING AN ADHESIVE ANCHORING SYSTEM. WHEN USING THE ADHESIVE, FULLY INSERT THE 3/4" DIA X 8" LONG ANCHOR RODS INTO 6" DEEP DRILLED HOLES IN THE PAD AT THE LOCATIONS SHOWN ON THE ANCHOR ROD LOCATION DETAIL. DRILL THE HOLES TO THE DIAMETER SIZE SHOWN IN THE ADHESIVE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS FOR 3/4" DIA RODS. FOLLOW THE ADHESIVE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS INCLUDING CURE TIME AND GEL TIME BASED ON CONCRETE TEMPERATURE. USE AN APPROVED ADHESIVE ANCHORING SYSTEM LISTED ON MnDOT'S APL UNDER SIGNALS/PEDESTRIAN PUSHBUTTONS AND MOUNTING HARDWARE.
- 5 FURNISH AND INSTALL A DRAIN IN THE PAD USING 1" SCHEDULE 40 PVC PIPE. PLACE PVC TERMINATION VENT SCREEN DESIGNED FOR PVC PIPE AT EACH END OF THE PIPE. PROVIDE PVC TERMINATION VENTS WITH A STAINLESS STEEL SCREEN. ENSURE THE TERMINATION VENT SCREEN AND PIPE ARE FLUSH WITH THE TOP AND SIDE OF THE PAD AND PROTECT FROM CONCRETE INTRUSION BEFORE CONCRETE PLACEMENT OPERATIONS.



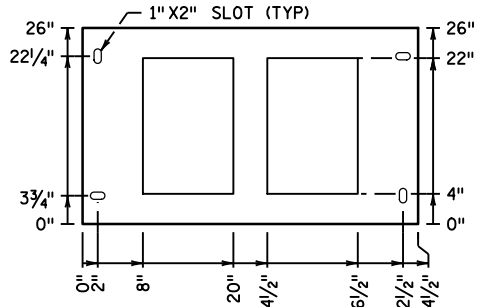
CONCRETE PAD ANCHOR ROD LOCATIONS



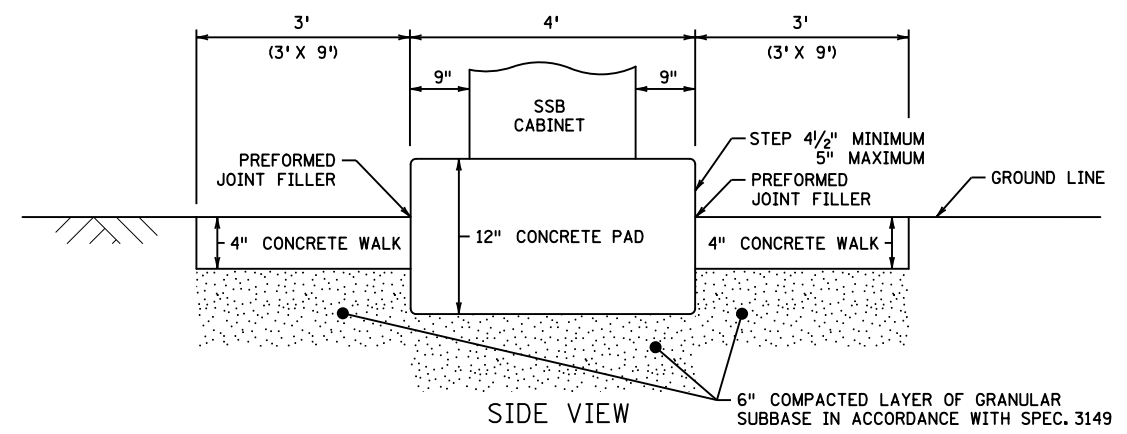
FRONT VIEW 2




SSB CABINET BASE TEMPLATE 3




350 ATC CABINET BASE TEMPLATE 3



SIDE VIEW

REVISION:
APPROVED: 02-22-2022
 BRIAN SOBENSON STATE TRAFFIC ENGINEER

	STANDARD PLAN 5-297.869	1 OF 1
THOMAS STYRBICKI STATE DESIGN ENGINEER	APPROVED: 02-22-2022	REVISED:

350 ATCC AND SSB CABINET EQUIPMENT PAD CAST IN PLACE
---



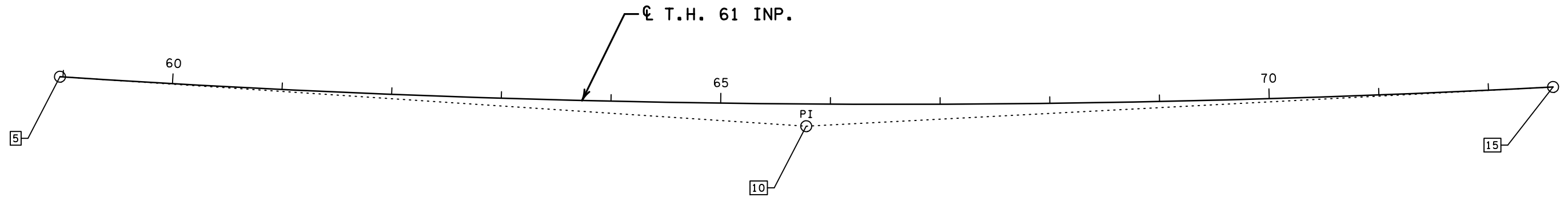
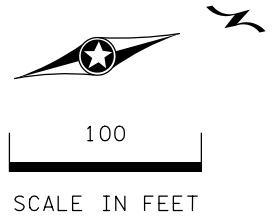
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12/22/2023

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**HORIZONTAL CONTROL DATUM**

THE HORIZONTAL DATUM OF THIS MAP IS BASED ON THE RAMSEY COUNTY COORDINATE SYSTEM WHICH IS RELATED TO THE MINNESOTA STATE PLANE COORDINATE SYSTEM, NAD 1983 (HARN 1996) ADJUSTMENT NORTH ZONE.



ALIGNMENT TABULATION										
POINT NUMBER	POINT	STATION	CIRCULAR CURVE DATA					COORDINATES		AZIMUTH
			DELTA	DEGREE	RADIUS	TANGENT	LENGTH	X	Y	
			SPIRAL CURVE DATA							
ANGLE ( Os )	DEGREE	ST	LT	LS						
<b>☉ T.H. 61 INP. (CHAIN: US61INP)</b>										
5	PC	58+97.260						596,878.1316	208,364.5754	18° 43' 22.68"
10	PI	65+78.898	6° 48' 30.00" LT	0° 29' 59.99"	11,459.192'	681.638'	1,361.671'	597,096.9322	209,010.1420	PI
	CC							586,025.3403	212,042.8917	
15	PT	72+58.931						597,237.6591	209,677.0948	11° 54' 52.68"

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: Joshua Breid Lic. No. 59756  
 Licensed Professional Engineer  
 Printed Name: JOSHUA C. BREID Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

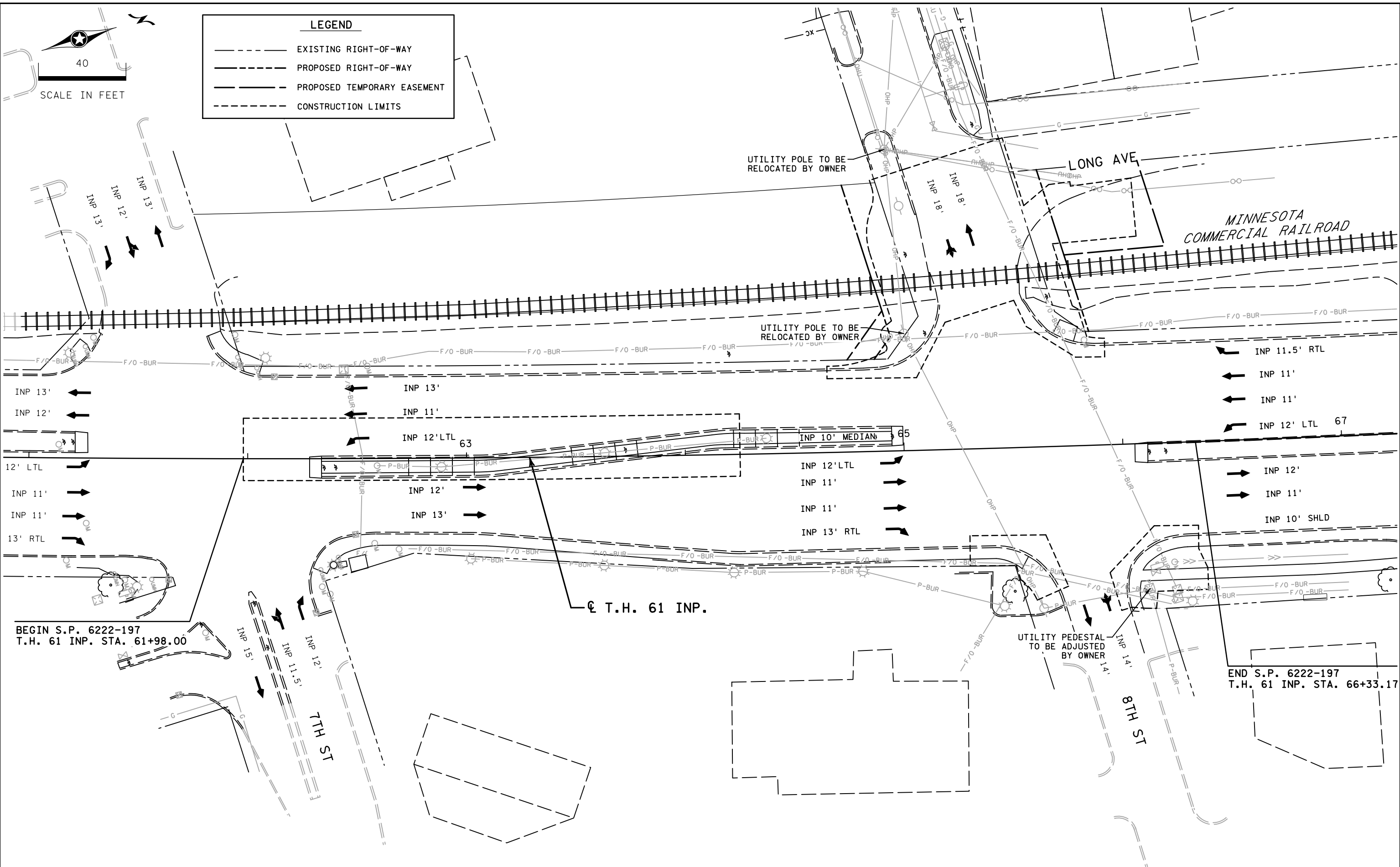
**ALIGNMENT PLAN AND TABULATION**  
 T.H. 61

SEH  
 FILE NO.  
 ISDWB170688  
**37**  
 AL 1  
 OF AL 1  
**101**

12/26/08 PM

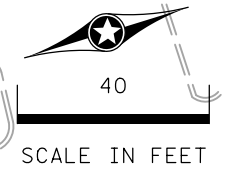
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**LEGEND**

- EXISTING RIGHT-OF-WAY
- - - PROPOSED RIGHT-OF-WAY
- - - PROPOSED TEMPORARY EASEMENT
- - - CONSTRUCTION LIMITS



INP 13' ←  
INP 12' ←  
12' LTL ←  
INP 11' →  
INP 11' →  
13' RTL →

INP 13' ←  
INP 11' ←  
INP 12' LTL 63 ←  
INP 12' →  
INP 13' →

INP 12' LTL →  
INP 11' →  
INP 11' →  
INP 13' RTL →

INP 11.5' RTL →  
INP 11' →  
INP 11' →  
INP 12' LTL 67 →

INP 12' →  
INP 11' →  
INP 10' SHLD →

BEGIN S.P. 6222-197  
T.H. 61 INP. STA. 61+98.00

END S.P. 6222-197  
T.H. 61 INP. STA. 66+33.17

☉ T.H. 61 INP.

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

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Certified By: Joshua Breid Lic. No. 59756  
Printed Name: JOSHUA C. BREID Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

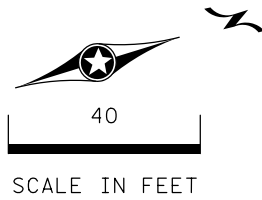
**INPLACE UTILITY AND TOPOGRAPHY PLAN**  
T.H. 61 INP. STA. 61+98.00 - 66+25.31

SEH FILE NO. ISDWB170688  
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**38**  
**101**

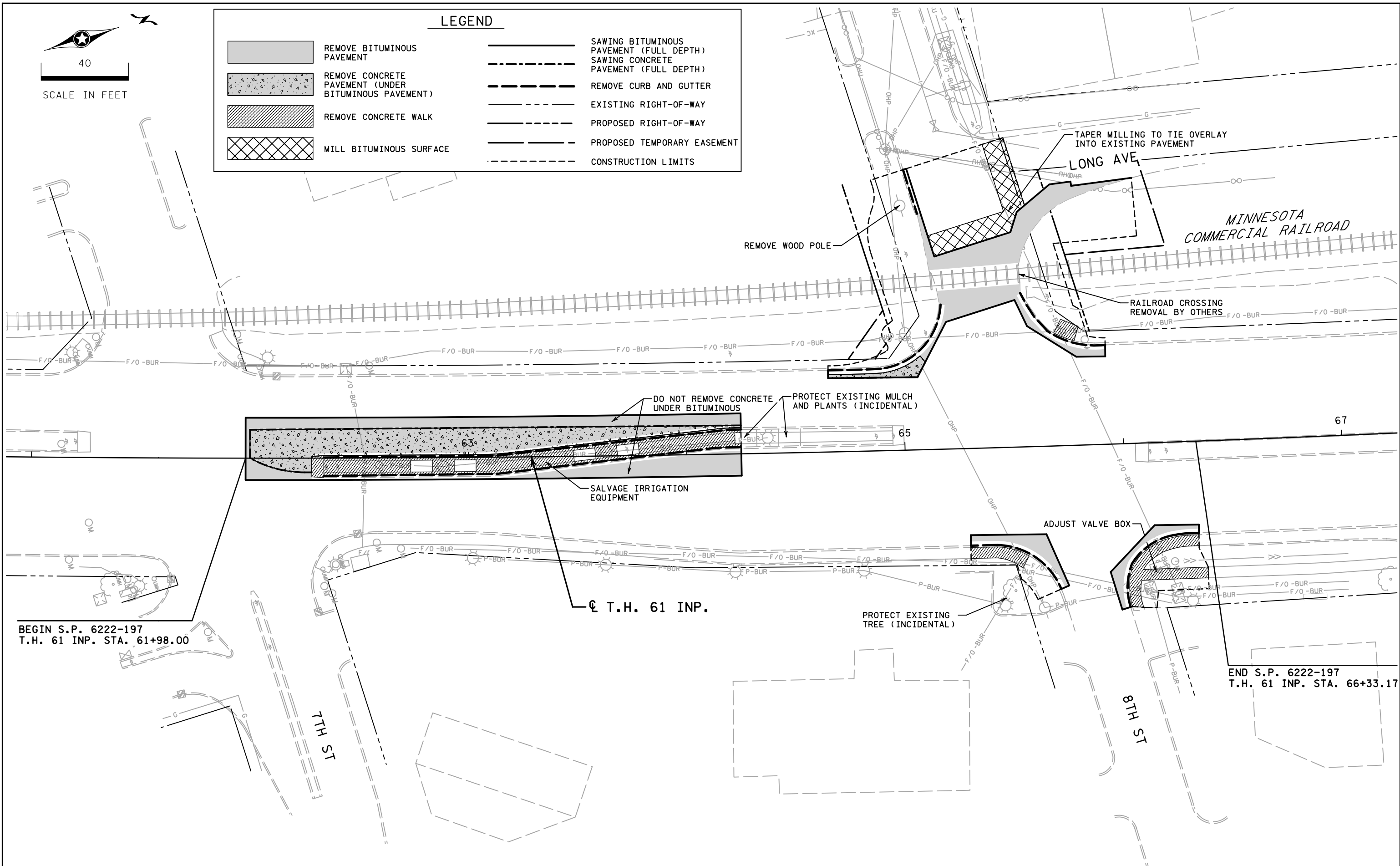
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LEGEND			
	REMOVE BITUMINOUS PAVEMENT		SAWING BITUMINOUS PAVEMENT (FULL DEPTH)
	REMOVE CONCRETE PAVEMENT (UNDER BITUMINOUS PAVEMENT)		SAWING CONCRETE PAVEMENT (FULL DEPTH)
	REMOVE CONCRETE WALK		REMOVE CURB AND GUTTER
	MILL BITUMINOUS SURFACE		EXISTING RIGHT-OF-WAY
			PROPOSED RIGHT-OF-WAY
			PROPOSED TEMPORARY EASEMENT
			CONSTRUCTION LIMITS



BEGIN S.P. 6222-197  
T.H. 61 INP. STA. 61+98.00

END S.P. 6222-197  
T.H. 61 INP. STA. 66+33.17

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

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Certified By: Joshua Breid Lic. No. 59756  
Licensed Professional Engineer  
Printed Name: JOSHUA C. BREID Date: 12/22/2023

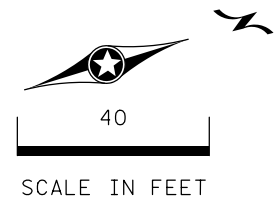


RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**REMOVAL PLAN**  
T.H. 61 INP. STA. 61+98.00 - 66+25.31

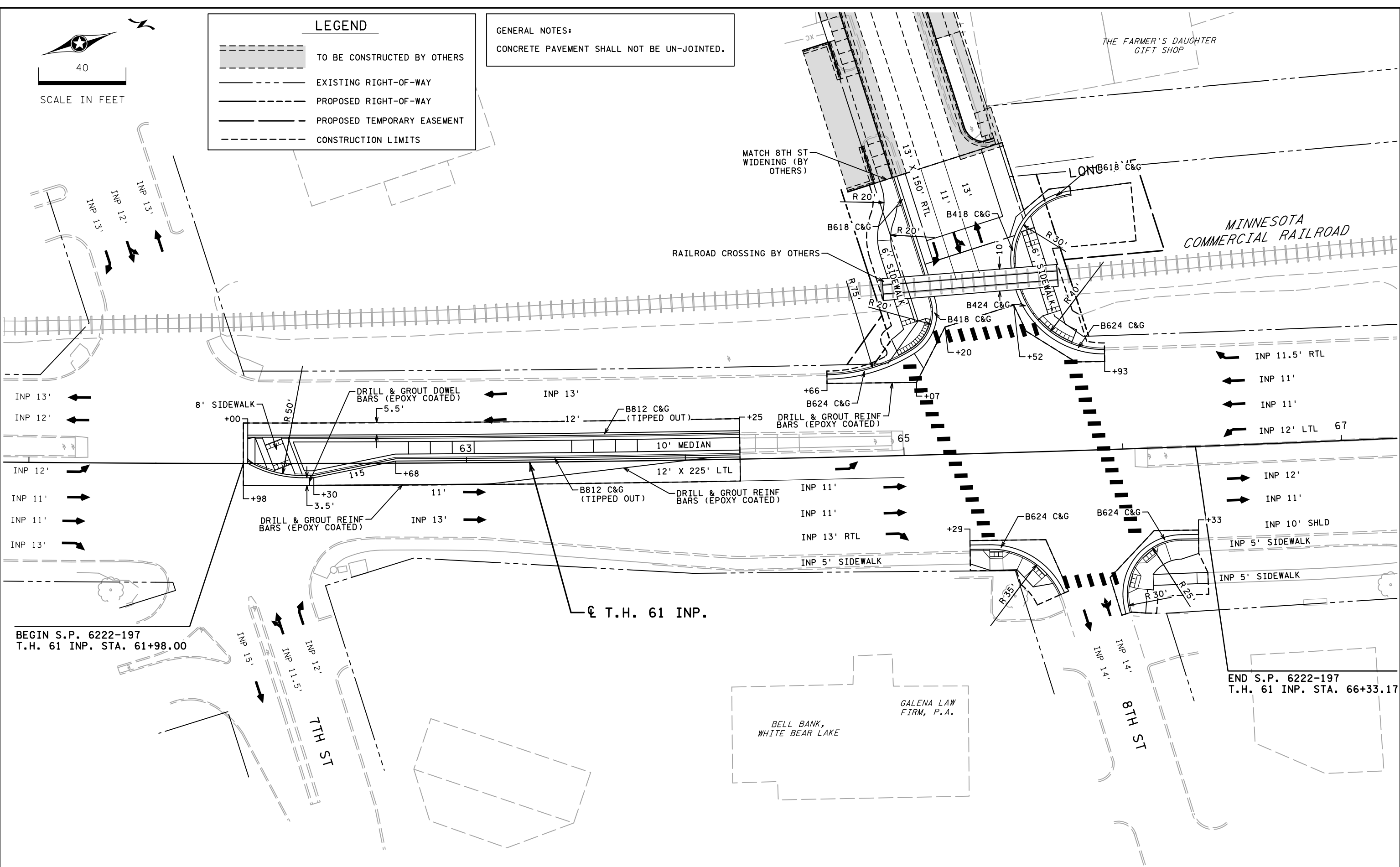
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 MODEL: cp1



LEGEND	
	TO BE CONSTRUCTED BY OTHERS
	EXISTING RIGHT-OF-WAY
	PROPOSED RIGHT-OF-WAY
	PROPOSED TEMPORARY EASEMENT
	CONSTRUCTION LIMITS

GENERAL NOTES:  
 CONCRETE PAVEMENT SHALL NOT BE UN-JOINTED.



BEGIN S.P. 6222-197  
 T.H. 61 INP. STA. 61+98.00

END S.P. 6222-197  
 T.H. 61 INP. STA. 66+33.17

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: Joshua Breid Lic. No. 59756  
 Licensed Professional Engineer  
 Printed Name: JOSHUA C. BREID Date: 01/23/2024



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**CONSTRUCTION PLAN**  
 T.H. 61 INP. STA. 61+98.00 - 66+25.31

SEH  
 FILE NO.  
 ISDWB170688  
**40**  
 CP1  
 OF CP1  
**101**

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12/22/2023

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### LEGEND

- XXX CONTROL POINTS AT GUTTER FLOW LINE
- TRUNCATED DOMES (SEE STANDARD PLATE 7038)
- CONSTRUCT CONCRETE CURB & GUTTER
- X" CURB HEIGHT
- LANDING AREA - 4'X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
- DRAINAGE FLOW ARROW
- PROPOSED CATCH BASIN
- PEDESTRIAN PUSH BUTTON STATION

### LEGEND

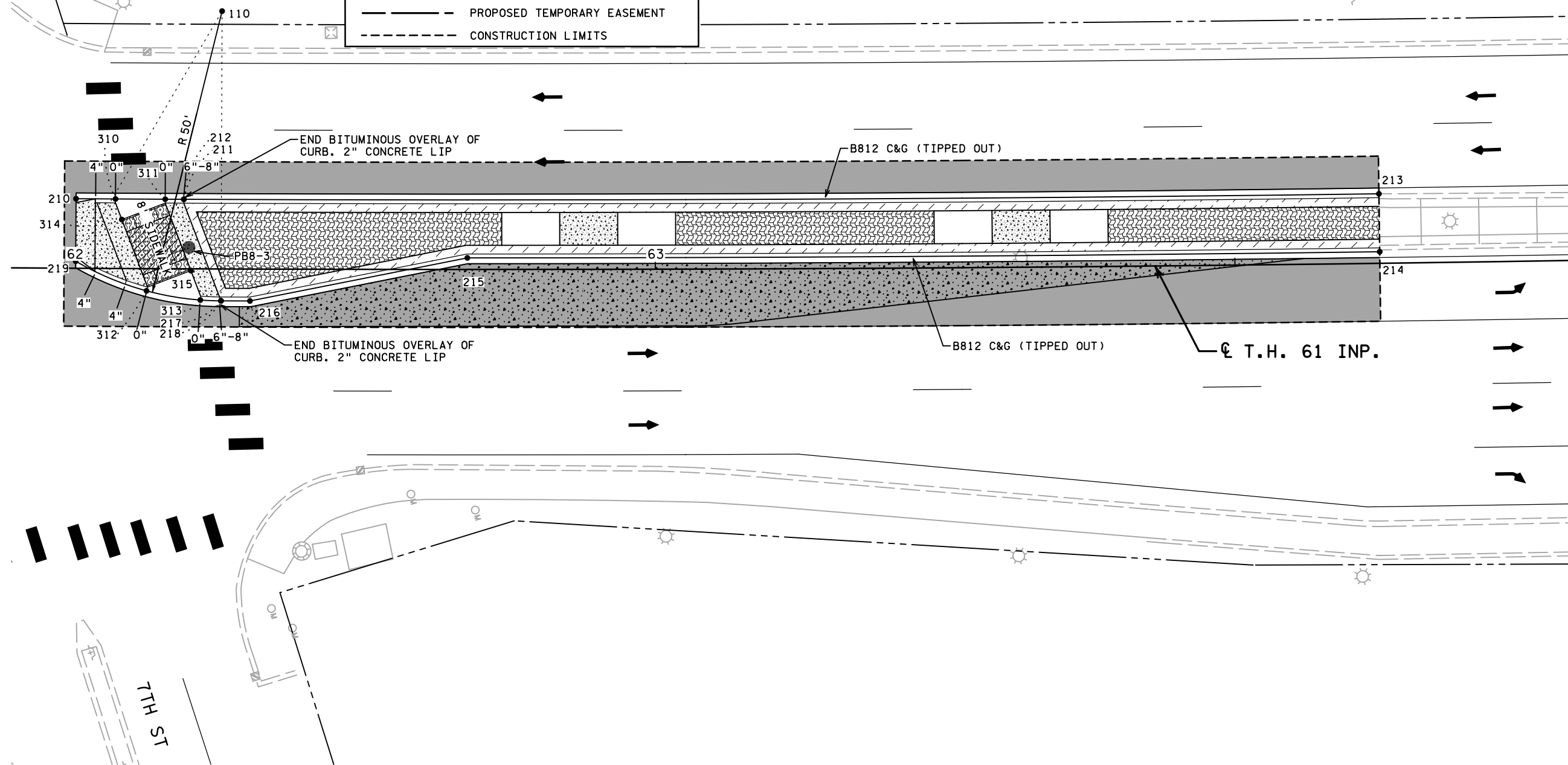
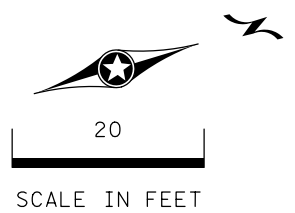
- 6" CONCRETE WALK
- 4" CONCRETE WALK
- 6" COLORED CONCRETE WALK
- 6" CONCRETE WALK SPECIAL
- CONCRETE CURB RAMP WALK
- 8" BITUMINOUS  
SEE INSET A ON SHEET \$TS1\$
- 8" BITUMINOUS OVER 6" AGGREGATE  
SEE INSET B ON SHEET \$TS1\$
- 8" BITUMINOUS OVER 9" CONCRETE  
SEE INSET C ON SHEET \$TS1\$
- 4" BITUMINOUS OVER 6" AGGREGATE  
SEE INSET D ON SHEET \$TS1\$
- 3" BITUMINOUS  
SEE INSET E ON SHEET \$TS1\$
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- PROPOSED TEMPORARY EASEMENT
- CONSTRUCTION LIMITS

RADIUS POINTS			
POINT	X	Y	RADIUS
110	596936.37	208689.60	50'

DETAIL POINTS			
POINT	X	Y	ELEV
210	596960.05	208656.10	938.67
211	596965.54	208673.86	938.85
212	596965.54	208673.86	938.67
213	597024.43	208871.44	938.18
214	597034.04	208868.67	939.83
215	596989.40	208717.74	939.41
216	596985.63	208679.69	939.15
217	596984.17	208674.91	939.04
218	596984.17	208674.91	939.21
219	596970.34	208652.91	938.69
310	596962.06	208662.60	938.82
311	596964.59	208670.79	938.88
312	596978.79	208663.12	939.08
313	596983.00	208671.54	939.15
314	596965.78	208662.61	938.89
315	596977.67	208671.45	939.07

SIGNAL POINTS			DISTANCE TO FRONT OF LANDING (FT)	DISTANCE TO BACK OF LANDING (FT)
POINT	X	Y		
PB8-3	596973.79	208671.56	8.6	3.9

GENERAL NOTE:  
CONCRETE PAVEMENT SHALL BE UN-JOINTED.



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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *Joshua Breid* Lic. No. 59756  
Printed Name: JOSHUA C. BREID Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**INTERSECTION AND PED RAMP DETAIL PLAN**  
T.H. 61 BETWEEN 7TH ST AND 8TH ST










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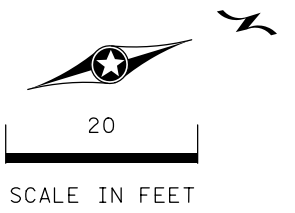
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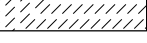
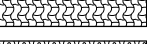


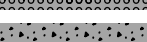

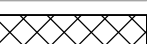
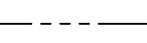
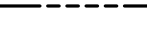

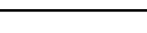

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### LEGEND

- XXX ● CONTROL POINTS AT GUTTER FLOW LINE
-  TRUNCATED DOMES (SEE STANDARD PLATE 7038)
-  CONSTRUCT CONCRETE CURB & GUTTER
- X" CURB HEIGHT
-  LANDING AREA - 4' X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
-  INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
-  INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
-  DRAINAGE FLOW ARROW
-  PROPOSED CATCH BASIN
-  PEDESTRIAN PUSH BUTTON STATION
-  SIGNAL POLE

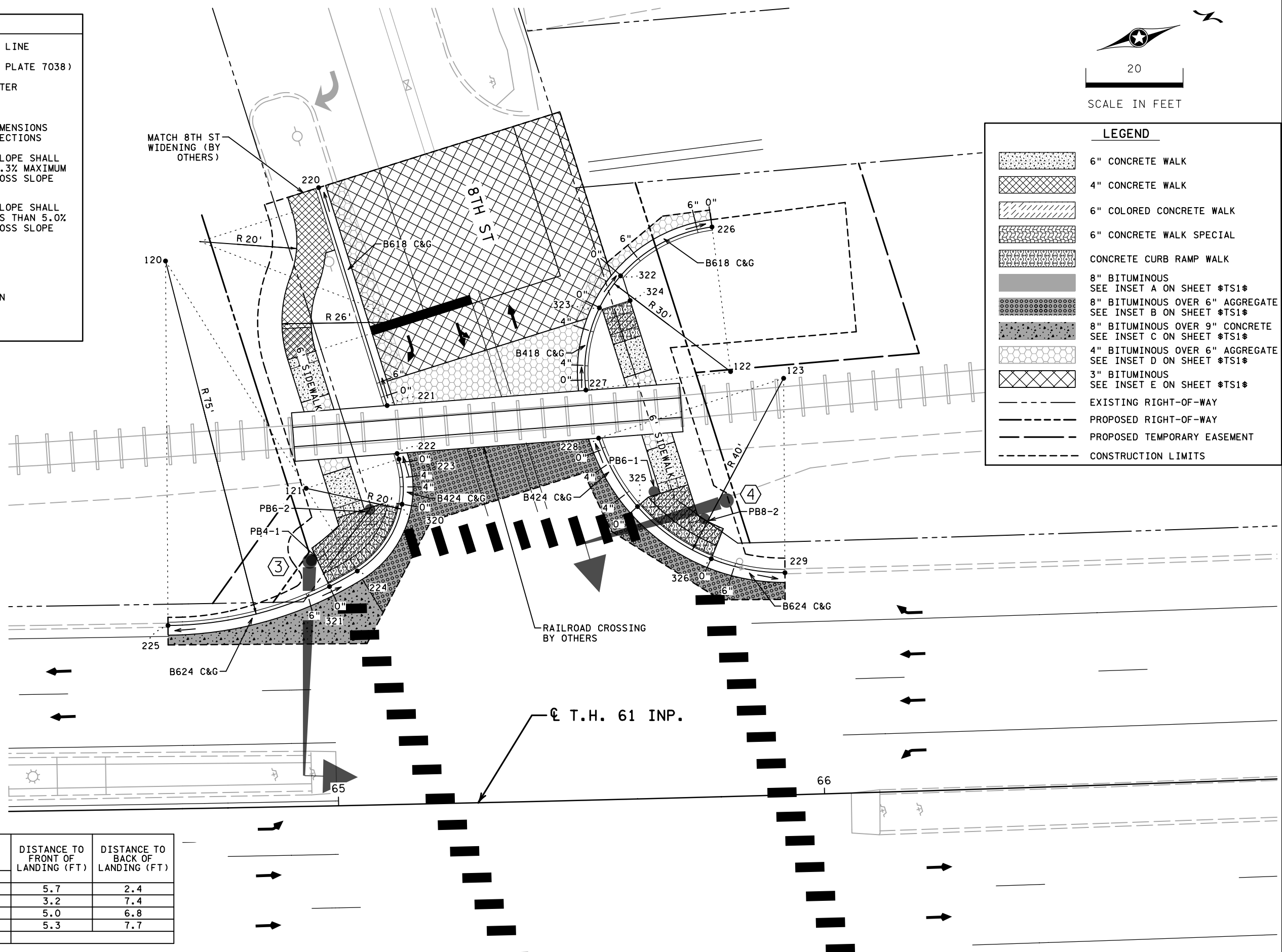


### LEGEND

-  6" CONCRETE WALK
-  4" CONCRETE WALK
-  6" COLORED CONCRETE WALK
-  6" CONCRETE WALK SPECIAL
-  CONCRETE CURB RAMP WALK
-  8" BITUMINOUS  
SEE INSET A ON SHEET \$TS1\$
-  8" BITUMINOUS OVER 6" AGGREGATE  
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-  3" BITUMINOUS  
SEE INSET E ON SHEET \$TS1\$
-  EXISTING RIGHT-OF-WAY
-  PROPOSED RIGHT-OF-WAY
-  PROPOSED TEMPORARY EASEMENT
-  CONSTRUCTION LIMITS

RADIUS POINTS			
POINT	X	Y	RADIUS
120	596938.90	208938.69	75'
121	596992.06	208952.79	20'
122	596994.39	209043.32	30'
123	596998.89	209053.37	40'

DETAIL POINTS			
POINT	X	Y	ELEV
220	596933.60	208973.20	937.91
221	596980.59	208973.68	938.67
222	596990.63	208972.78	938.84
223	596991.86	208972.79	938.85
224	597011.39	208957.93	938.98
225	597010.82	208917.42	938.98
226	596964.81	209048.30	938.88
227	596989.39	209013.74	938.56
228	596999.63	209013.38	938.72
229	597037.24	209042.03	938.70
320	597000.92	208970.73	938.90
321	597012.79	208951.54	939.01
322	596968.98	209027.38	937.90
323	596974.02	209021.30	937.94
324	596974.42	209027.79	938.00
325	597015.43	209016.95	938.88
326	597030.10	209028.35	938.78



GENERAL NOTE:  
CONCRETE PAVEMENT SHALL BE UN-JOINTED.

SIGNAL POINTS			DISTANCE TO FRONT OF LANDING (FT)	DISTANCE TO BACK OF LANDING (FT)
POINT	X	Y		
POLE3 (PB4-1)	597006.65	208949.12	5.7	2.4
PB6-1	597014.19	209020.92	3.2	7.4
PB6-2	597000.92	208963.91	5.0	6.8
PB8-2	597021.81	209028.64	5.3	7.7
POLE4	597019.54	209034.83		

DESIGN TEAM					REVISIONS				
NO.	BY	DATE	DESCRIPTION	DATE	NO.	BY	DATE	DESCRIPTION	DATE
1	MTT								
2	JCB								
3	JCB								

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: Joshua Breid Lic. No. 59756  
Printed Name: JOSHUA C. BREID Date: 01/23/2024



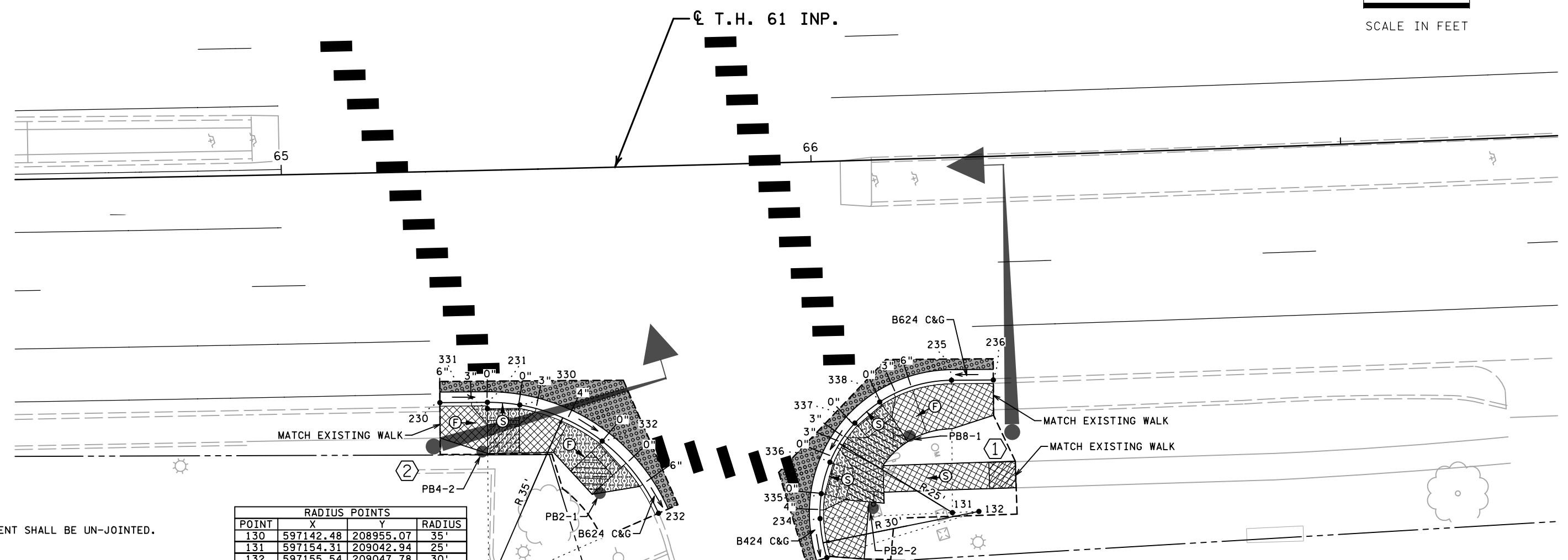
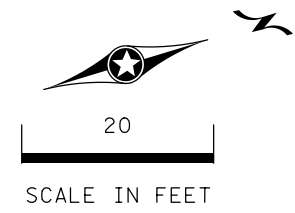
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**INTERSECTION AND PED RAMP DETAIL PLAN**  
T.H. 61 AT 8TH ST

SEH FILE NO. ISDWB170688  
42  
PD2 OF PD3  
101

1:19:17 PM

12/22/2023



GENERAL NOTE:  
CONCRETE PAVEMENT SHALL BE UN-JOINTED.

RADIUS POINTS			
POINT	X	Y	RADIUS
130	597142.48	208955.07	35'
131	597154.31	209042.94	25'
132	597155.54	209047.78	30'

DETAIL POINTS			
POINT	X	Y	ELEV
230	597106.37	208956.39	939.50
231	597108.91	208964.99	939.45
232	597138.33	208989.82	939.19
233	597155.57	209017.78	939.11
234	597148.14	209018.71	939.17
235	597130.33	209050.03	939.49
236	597132.57	209057.59	939.52
330	597111.17	208970.70	939.41
331	597110.06	208964.65	939.47
332	597122.21	208983.60	939.30
335	597143.71	209020.30	939.21
336	597138.49	209023.58	939.27
337	597132.78	209030.22	939.33
338	597130.33	209035.88	939.39

SIGNAL POINTS				DISTANCE TO FRONT OF LANDING (FT)	DISTANCE TO BACK OF LANDING (FT)
POINT	X	Y			
PB2-1	597130.76	208980.56		5.5	2.0
PB2-2	597148.46	209029.12		5.3	2.0
PB4-2	597117.45	208962.11		4.7	0.8
PB8-1	597137.88	209038.74		4.2	1.3
POLE1	597143.02	209058.15			
POLE2	597113.96	208952.87			

LEGEND	
	6" CONCRETE WALK
	4" CONCRETE WALK
	6" COLORED CONCRETE WALK
	6" CONCRETE WALK SPECIAL
	CONCRETE CURB RAMP WALK
	8" BITUMINOUS SEE INSET A ON SHEET #TS1#
	8" BITUMINOUS OVER 6" AGGREGATE SEE INSET B ON SHEET #TS1#
	8" BITUMINOUS OVER 9" CONCRETE SEE INSET C ON SHEET #TS1#
	4" BITUMINOUS OVER 6" AGGREGATE SEE INSET D ON SHEET #TS1#
	3" BITUMINOUS SEE INSET E ON SHEET #TS1#
	EXISTING RIGHT-OF-WAY
	PROPOSED RIGHT-OF-WAY
	PROPOSED TEMPORARY EASEMENT
	CONSTRUCTION LIMITS

LEGEND	
	XXX CONTROL POINTS AT GUTTER FLOW LINE
	TRUNCATED DOMES (SEE STANDARD PLATE 7038)
	CONSTRUCT CONCRETE CURB & GUTTER
	X" CURB HEIGHT
	LANDING AREA - 4'X 4' MIN. DIMENSIONS AND MAX 2.0% SLOPE IN ALL DIRECTIONS
	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
	INDICATES PEDESTRIAN RAMP - SLOPE SHALL BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%
	DRAINAGE FLOW ARROW
	PROPOSED CATCH BASIN
	PEDESTRIAN PUSH BUTTON STATION
	SIGNAL POLE

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MODEL: pd3

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: Joshua Breid Lic. No. 59756  
Printed Name: JOSHUA C. BREID Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**INTERSECTION AND PED RAMP DETAIL PLAN**  
T.H. 61 AT 8TH ST

SEH FILE NO. ISDWB170688  
PD3 OF PD3  
43  
101

**STORM WATER POLLUTION PREVENTION PLAN (SWPPP) NARRATIVE**

**PROJECT DESCRIPTION/LOCATION**

THE PROJECT IS LOCATED ON US 61 IN THE CITY OF WHITE BEAR LAKE IN RAMSEY COUNTY. THE PLANNED SCOPE OF THE PROJECT INCLUDES: GRADING, BITUMINOUS SURFACE, ADA IMPROVEMENTS, TRAFFIC SIGNAL, AND LIGHTING

THE SWPPP MUST BE AMENDED TO DOCUMENT ANY CHANGES TO EROSION AND SEDIMENT CONTROLS, METHODS OR PRACTICES. THESE AMENDMENTS MUST BE TIMELY TO KEEP THE SWPPP UPDATED AND NEED TO BE KEPT ON SITE.

**RESPONSIBILITIES**

THIS SWPPP WAS PREPARED BY PERSONNEL THAT ARE CERTIFIED IN THE DESIGN OF CONSTRUCTION SWPPPS. COPIES OF THE CERTIFICATIONS ARE ON FILE WITH SEH AND ARE AVAILABLE UPON REQUEST.

PROVIDE A CERTIFIED EROSION CONTROL SUPERVISOR PER MNDOT SPECIFICATION 2573.3.A.1. EROSION CONTROL SUPERVISOR WILL WORK WITH PROJECT ENGINEER TO OVERSEE THE IMPLEMENTATION OF THE SWPPP AND THE INSTALLATION, INSPECTION, AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMPs BEFORE, DURING AND AFTER CONSTRUCTION UNTIL FINAL STABILIZATION HAS BEEN ESTABLISHED.

PROVIDE AT LEAST ONE CERTIFIED INSTALLER PER MNDOT SPECIFICATION 2573.3.A.2. FOR EACH CONTRACTOR OR SUBCONTRACTOR THAT PLACES PRODUCTS LISTED IN MNDOT SPECIFICATIONS SECTION 2573.3.A.2.

**CHAIN OF RESPONSIBILITY**

WHITE BEAR LAKE AREA SCHOOLS AND THE CONTRACTOR ARE COPERMITTEES FOR THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) CONSTRUCTION PERMIT. THE CONTRACTOR IS RESPONSIBLE TO COMPLY WITH ALL ASPECTS OF THE NPDES CONSTRUCTION PERMIT AT ALL TIMES UNTIL THE NOTICE OF TERMINATION (NOT) HAS BEEN FILED WITH THE MPCA. WHITE BEAR LAKE AREA SCHOOLS' CONSTRUCTION PROJECT ENGINEER WILL ENSURE THAT THE CONTRACTOR'S EROSION AND SEDIMENT CONTROL SUPERVISOR FULFILLS THEIR DUTIES.

**LAND FEATURE CHANGES**

TOTAL DISTURBED AREA 0.31 ACRES  
 TOTAL EXISTING IMPERVIOUS SURFACE AREA 0.20 ACRES  
 TOTAL PROPOSED IMPERVIOUS SURFACE AREA 0.24 ACRES  
 TOTAL PROPOSED NET CHANGE IN IMPERVIOUS SURFACE AREA 0.04 ACRES

**LOCATION OF SWPPP REQUIREMENTS**

THE REQUIRED SWPPP ELEMENTS MAY BE LOCATED IN MANY PLACES WITHIN THE PLAN SET AS WELL AS IN THE SPECIAL PROVISIONS, MNDOT SPEC BOOK (2020 EDITION), OR ON FILE WITH SEH. THE NOTES AND TABLE BELOW ARE INTENDED TO BE A QUICK REFERENCE FOR THE CONTRACTOR AND PROJECT ENGINEER TO USE IN THE FIELD. THERE MAY BE ADDITIONAL REQUIRED SWPPP ELEMENTS INCLUDED ON THE PROJECT THAT ARE NOT LISTED ON THIS SHEET.

DESCRIPTION	LOCATION
TEMPORARY EROSION CONTROL MEASURES	SHEETS NO. 47
PERMANENT EROSION CONTROL MEASURES	SHEETS NO. 47
DIRECTION OF FLOW	SHEETS NO. 47
FINAL STABILIZATION	SHEETS NO. 47
SOILS AND CONSTRUCTION NOTES	SHEETS NO. 4
EROSION AND SEDIMENT CONTROL DETAILS	SHEETS NO. 26- 30
ESTIMATED QUANTITIES	SHEETS NO. 3
SITE MAP	SHEETS NO. 2
STORMWATER CALCULATIONS	SEH PROJECT FOLDER

STORMWATER CALCULATIONS AND ADDITIONAL HYDRAULIC DESIGN INFORMATION IS STORED IN SEH'S PROJECT HYDRAULICS FOLDER. SEH WILL MAKE THIS INFORMATION AVAILABLE UPON REQUEST.

**SOIL TYPES**

SOIL TYPES TYPICALLY FOUND ON THIS PROJECT ARE LINO LOAMY FINE SANDS (HSG A/D) AND URBAN LAND-ZIMMERMAN COMPLEX, 1 TO 8 PERCENT SLOPES (HSG NONE).

**ENVIRONMENTAL REVIEW**

THERE ARE NO STORMWATER MITIGATION MEASURES REQUIRED AS A RESULT OF AN ENVIRONMENTAL, ARCHEOLOGICAL OR AGENCY REVIEW. ALL MITIGATION MEASURES HAVE BEEN ADDRESSED IN THIS PLAN SET OR THE SPECIAL PROVISIONS.

THIS PROJECT IS NOT LOCATED IN A WELL HEAD PROTECTION AREA.

THIS PROJECT IS NOT LOCATED IN A DRINKING WATER SUPPLY MANAGEMENT AREA (DWSMA).

THIS PROJECT IS NOT LOCATED IN A KARST AREA.

THIS PROJECT IS NOT LOCATED IN AN EMERGENCY RESPONSE AREA (ERA) PER DEPARTMENT OF HEALTH.

**WATER RELATED PERMITS**

NONE

IF IT BECOMES NECESSARY TO DISTURB AREAS OUTSIDE OF THE CONSTRUCTION LIMITS, OPERATIONS SHOULD CEASE AND DETERMINATION MADE IF ADDITIONAL PERMITS ARE NEEDED OR EXISTING PERMITS NEED TO BE MODIFIED.

TEMPORARY DEWATERING ACTIVITIES MAY BE REQUIRED FOR ROADWAY CONSTRUCTION AND UTILITY WORK. CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE PERMIT. SUBMIT A SITE MANAGEMENT PLAN TO THE ENGINEER FOR APPROVAL PRIOR TO COMMENCING WORK.

WATERBODY	NO WORK DURING
LAKES	APRIL 1 - JUNE 30
NON-TROUT STREAMS	MARCH 15 - JUNE 15
TROUT STREAMS	SEPTEMBER 1 - APRIL 1

**SPECIAL AND IMPAIRED WATERS**

THE PROJECT AREA DISCHARGES TO TWO SPECIAL OR IMPAIRED WATERS LOCATED WITHIN ONE MILE (AERIAL RADIUS) OF THE PROJECT LIMITS.

WATERBODY WITHIN 1 AERIAL MILE	DRAINS TO	SPECIAL OR IMPAIRED
UNNAMED WETLAND COMPLEX	YES	NO
BALD EAGLE LAKE	YES (VIA UNNAMED WETLAND COMPLEX)	YES - IMPAIRED FOR NUTRIENTS
WHITE BEAR LAKE	YES	YES

**AREAS OF ENVIRONMENTAL SENSITIVITY (AES)**

WETLANDS AND EXISTING STORMWATER FACILITIES WITHIN AND NEAR THE PROJECT BOUNDARY ARE SHOWN ON DRAINAGE PLANS.

**PROJECT CONTACTS**

THE PROJECT ENGINEER AND CONTRACTOR ARE RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP AND INSTALLATION, INSPECTION, AND MAINTENANCE OF THE EROSION PREVENTION AND SEDIMENT CONTROL BMPs BEFORE, DURING AND AFTER CONSTRUCTION UNTIL THE NOTICE OF TERMINATION HAS BEEN FILED. SEH STAFF ARE ALSO AVAILABLE FOR TECHNICAL ASSISTANCE.

ORGANIZATION	CONTACT NAME	PHONE
SWPPP DESIGNER (SEH)	NOAH ODALEN	651-271-1565
WHITE BEAR LAKE AREA SCHOOLS' PROJECT MANAGER	AJ LILLESVE	480-369-2079
MINNESOTA POLLUTION CONTROL AGENCY (MPCA)	TBD	651-296-6300
MNDOT METRO DISTRICT MS4	JASON SWENSON	651-234-7539
MNDOT METRO DISTRICT MS4	TARA CARSON	651-366-3638
WHITE BEAR LAKE AREA SCHOOLS' CONSTRUCTION ENGINEER	TBD	
US ARMY CORPS OF ENGINEERS (USACE)	TOM HINGSBERGER	651-290-5367
WETLAND CONSERVATION ACT LGU (MNDOT)	TBD	TBD
<b>MPCA DUTY OFFICER 24 HOUR EMERGENCY NOTIFICATION: 651-649-5451 OR 800-422-0798</b>		

**INSPECTION TIMEFRAMES**

INSPECT THE ENTIRE CONSTRUCTION SITE A MINIMUM OF ONCE EVERY SEVEN DAYS DURING ACTIVE CONSTRUCTION AND WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS. INSPECT ALL TEMPORARY AND PERMANENT WATER QUALITY MANAGEMENT, EROSION PREVENTION AND SEDIMENT CONTROL BMPs, SURFACE WATERS AND CONSTRUCTION SITE EXITS UNTIL ALL CONSTRUCTION IS COMPLETE AND THE SITE HAS UNDERGONE FINAL STABILIZATION. RECORD ALL INSPECTIONS AND MAINTENANCE ACTIVITIES IN WRITING WITHIN 24 HOURS. SUBMIT INSPECTION REPORTS IN A FORMAT THAT IS ACCEPTABLE TO THE PROJECT ENGINEER.

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 MODEL: swpp

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: <u>MTT</u>				
DESIGNER: <u>JCB</u>				
CHECKED BY: <u>JCB</u>				

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 Certified By: Joshua Breid Lic. No. 59756  
 Licensed Professional Engineer  
 Printed Name: JOSHUA C. BREID Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**STORMWATER POLLUTION PREVENTION PLAN**

SEH FILE NO. ISDWB170688	<b>44</b>
SWP1 OF SWP3	<b>101</b>



**STORM WATER POLLUTION PREVENTION PLAN (SWPPP) NARRATIVE (CONTINUED)**

**EROSION AND SEDIMENT CONTROL MEASURES**

AREA	TIME FRAME
ESTABLISH SEDIMENT CONTROL DEVICES ON ALL DOWN GRADIENT PERIMETERS AND UPGRADIENT OF ANY BUFFER ZONES	BEFORE ANY UP GRADIENT LAND DISTURBING ACTIVITIES BEGIN
REPAIR, REPLACE OR SUPPLEMENT PERIMETER CONTROL BMPS	WHEN BMP BECOMES NONFUNCTIONAL OR SEDIMENT REACHES 1/2 THE HEIGHT OF THE BMP BY THE END OF THE NEXT BUSINESS DAY AFTER DISCOVERY.
REPLACE, REPAIR OR SUPPLEMENT ALL NONFUNCTIONAL BMPS	BY THE END OF THE NEXT BUSINESS DAY AFTER DISCOVERY.
REPAIR, REPLACE, OR SUPPLEMENT INLET PROTECTION BMPS	WHEN THEY BECOME NONFUNCTIONAL OR SEDIMENT REACHES 1/2 THE HEIGHT AND/OR DEPTH OF THE BMP BY THE END OF THE NEXT BUSINESS DAY AFTER DISCOVERY.
REMOVE TRACKED SEDIMENT FROM PAVED SURFACES BOTH ON AND OFF SITE (LIGHTLY WET PRIOR TO SWEEPING)	WITHIN 24 HOURS OF DISCOVERY
REMOVE ALL DELTAS AND SEDIMENT DEPOSITED IN SURFACE WATERS AND RESTABILIZE	WITHIN 7 DAYS OF DISCOVERY

1. PROVIDE PERIMETER CONTROL AROUND ALL STOCKPILES AND DO NOT PLACE THEM IN NATURAL BUFFER AREAS, SURFACE WATERS OR STORMWATER CONVEYANCES. TOPSOIL BERMS MUST BE STABILIZED IN ORDER TO BE CONSIDERED PERIMETER CONTROL BMPS.
2. PROTECT STORM SEWER INLETS AT ALL TIMES WITH THE APPROPRIATE INLET PROTECTION BMP AND PROVIDE EMERGENCY OVERFLOW CAPABILITIES. SILT FENCE PLACED IN THE INLET GRATE IS NOT AN ACCEPTABLE INLET PROTECTION BMP FOR GRADING OPERATIONS.
3. PLACE AND MAINTAIN CONSTRUCTION EXITS OF SUFFICIENT SIZE TO PREVENT TRACKING OF SEDIMENT ONTO PAVED SURFACES BOTH ON AND OFF THE PROJECT SITE. REGULAR STREET SWEEPING IS NOT AN ACCEPTABLE ALTERNATIVE TO PROPER CONSTRUCTION EXIT INSTALLATION AND MAINTENANCE.
4. PROVIDE SCOUR PROTECTION AT OUTFALL OF DEWATERING ACTIVITIES. PROVIDE STABILIZATION IN TRENCHES CUT FOR DEWATERING OR SITE DRAINING PURPOSES.
5. PREPARE AND SUBMIT A SITE MANAGEMENT PLAN AND CONTACT ALL APPROPRIATE AUTHORITIES PRIOR TO WORKING IN SURFACE WATERS.
6. MAINTAIN ALL BMPS UNTIL WORK HAS BEEN COMPLETED, SITE HAS GONE UNDER FINAL STABILIZATION FOR PERMIT TERMINATION, AND THE NOTICE OF TERMINATION (NOT) HAS BEEN SUBMITTED TO THE MPCA.

**STABILIZATION**

AREA	TIME FRAME	NOTES
LAST 200 LINEAL FEET OF DRAINAGE DITCH OR SWALE	WITHIN 24 HOURS OF CONNECTION TO SURFACE WATER OR PROPERTY EDGE	2A, 3A
REMAINING PORTIONS OF DRAINAGE DITCH OR SWALE	7 DAYS	3A
PIPE AND CULVERT OUTLETS	24 HOURS	
EXPOSED SOILS AND STOCKPILES	7 DAYS	1A
WHEN CONSTRUCTION HAS TEMP. OR PERM. CEASED	IMMEDIATELY	

- 1A. TEMPORARY SOIL STOCKPILES WITHOUT SIGNIFICANT CLAY OR SILT AND STOCKPILED AND CONSTRUCTED ROAD BASE ARE EXEMPT FROM THE STABILIZATION REQUIREMENT.
- 2A. STABILIZE WETTED PERIMETER OF DITCH (I.E. WHERE THE DITCH GETS WET).
- 3A. APPLICATION OF MULCH, HYDROMULCH (SLOPE>2%), DISANCHORED MULCH (SLOPE>2%), TACKIFIER AND POLYACRYLAMIDE ARE NOT ACCEPTABLE STABILIZATION METHODS IN DITCHES AND SWALES.

**MATERIAL STORAGE, WASTE MANAGEMENT, FUELING AND DUST CONTROL**

1. PROVIDE A SPILL KIT AT EACH WORK LOCATION ON THE SITE. ENSURE ALL SPILLS ARE CLEANED UP IMMEDIATELY.
2. STORE ALL LIQUID CHEMICALS UNDER COVER WITH SECONDARY CONTAINMENT. CREATE AND FOLLOW A WRITTEN DISPOSAL PLAN FOR ALL WASTE MATERIALS. STORE, COLLECT AND DISPOSE OF ALL SOLID WASTE.
3. FUEL AND MAINTAIN VEHICLES IN A DESIGNATED CONTAINED AREA WHENEVER FEASIBLE. USE DRIP PANS OR ABSORBENT MATERIALS TO PREVENT SPILLS OR LEAKED CHEMICALS FROM DISCHARGING TO SURFACE WATER OR STORMWATER CONVEYANCES.
4. PROVIDE EFFECTIVE CONTAINMENT FOR ALL LIQUID AND SOLID WASTES GENERATED BY WASHOUT OF CONCRETE, STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS AND OTHER CONSTRUCTION MATERIALS. LIQUID AND SOLID WASHOUT WASTES MUST NOT CONTACT THE GROUND. DESIGN THE CONTAINMENT SO THAT IT DOES NOT RESULT IN RUNOFF FROM THE WASHOUT OPERATIONS OR CONTAINMENT AREA.
5. USE METHODS AND OPERATIONAL PROCEDURES THAT PREVENT DISCHARGE OR PLACEMENT OF BITUMINOUS GRINDINGS, CUTTINGS, MILLINGS, AND OTHER BITUMINOUS WASTES FROM AREAS OF EXISTING OR FUTURE VEGETATED SOILS AND FROM ALL WATER CONVEYANCE SYSTEMS, INCLUDING INLETS, DITCHES AND CURB FLOW LINES.
6. USE METHODS AND OPERATIONAL PROCEDURES THAT PREVENT CONCRETE DUST, STREET SWEEPING DUST, SAWCUT SLURRY, PLANING WASTE, CONCRETE WASH OUT, AND OTHER CONCRETE WASTES FROM LEAVING MNDOT RIGHT OF WAY, DEPOSITING IN EXISTING OR FUTURE VEGETATED AREAS, AND FROM ENTERING STORMWATER CONVEYANCE SYSTEMS, INCLUDING INLETS, DITCHES AND CURB FLOW LINES.

**IMPORTANT SWPPP NOTES FOR CONSTRUCTION ACTIVITY**

1. PREPARE AND SUBMIT A SITE MANAGEMENT PLAN FOR THE ENGINEER'S ACCEPTANCE FOR CONCRETE MANAGEMENT, CONCRETE SLURRY APPLICATION AREAS, WORK IN AND NEAR AREAS OF ENVIRONMENTAL SENSITIVITY, AREAS IDENTIFIED IN THE PLANS AS "SITE MANAGEMENT PLAN AREA", ANY WORK THAT WILL REQUIRE DEWATERING, AND AS REQUESTED BY THE ENGINEER. SUBMIT ALL SITE MANAGEMENT PLANS TO THE ENGINEER IN WRITING. ALLOW A MINIMUM OF 7 DAYS FOR MNDOT TO REVIEW AND ACCEPT SITE MANAGEMENT PLAN SUBMITTALS. WORK WILL NOT BE ALLOWED TO COMMENCE IF A SITE MANAGEMENT PLAN IS REQUIRED UNTIL ACCEPTANCE HAS BEEN GRANTED BY THE ENGINEER. THERE WILL BE NO EXTRA TIME ADDED TO THE CONTRACT DUE TO THE UNTIMELY SUBMITTAL.
2. DO NOT BUILD INFILTRATION AREAS OR PLACE FINAL FILTRATION MEDIA UNTIL THE PROJECT IS NEARLY COMPLETE. PROTECT THESE AREAS FROM COMPACTION AND FROM CONSTRUCTION STORMWATER RUNOFF.
3. ROUTE STORMWATER AROUND UNSTABILIZED AREAS OF THE SITE WHENEVER FEASIBLE.
4. CONSTRUCTION PROJECT SHOULD BE PHASED TO MINIMIZE THE DURATION OF EXPOSED SOILS.
5. MINIMIZE COMPACTION OF SOILS AND PRESERVE TOPSOIL IN AREAS WHERE VEGETATION WILL BE ESTABLISHED.
6. DIRECT DISCHARGES FROM BMPS TO VEGETATED AREAS WHENEVER FEASIBLE. PROVIDE VELOCITY DISSIPATION DEVICES AS NEEDED TO PREVENT EROSION.
7. FLOATING SILT CURTAIN IS ALLOWED AS PERIMETER CONTROL FOR IN WATER WORK ONLY. PLACE THE FLOATING SILT CURTAIN AS CLOSE TO SHORE AS POSSIBLE. PLACE PERIMETER CONTROL BMP ON LAND IMMEDIATELY AFTER THE IN WATER WORK IS COMPLETED.
8. DISCHARGE TURBID OR SEDIMENT LADEN WATER TO TEMPORARY SEDIMENT BASINS WHENEVER FEASIBLE. (REQUIRED IF DRAINAGE AREA IS 10 ACRES OR LARGER OR 5 ACRES OR LARGER AND WITHIN 1 MILE OF IMPAIRED WATER) THE EVENT THAT IT IS NOT FEASIBLE TO DISCHARGE THE SEDIMENT LADEN WATER TO A TEMPORARY SEDIMENT BASIN, THE WATER MUST BE TREATED SO THAT IT DOES NOT CAUSE A NUISANCE CONDITION IN THE RECEIVING WATERS OR TO DOWNSTREAM LANDOWNERS. MUST DOCUMENT WHY SEDIMENT BASIN IS NOT
9. PROVIDE STABILIZATION IN ANY TRENCHES CUT FOR DEWATERING OR SITE DRAINING PURPOSES.
10. REMOVE SEDIMENT FROM STORMWATER SYSTEM AND BMPS AT THE END OF PROJECT.
11. PRESERVE A 50 FOOT NATURAL BUFFER OR (IF BUFFER IS INFEASIBLE) PROVIDE A DOUBLE ROW OF SEDIMENT CONTROLS WHEN A SURFACE WATER IS LOCATED WITHIN 50 FEET OF LAND DISTURBANCE AND STORMWATER FLOWS TO THE SURFACE WATER.
12. SUBSOIL ALL DISTURBED GREEN SPACES EXCEPT AS LISTED IN 2574.3A.5.

**PIPE AND STRUCTURE NOTES**

1. SIZE AND ELEVATION OF CULVERTS, STORM SEWER PIPES, AND CATCH BASINS HAVE BEEN SPECIFICALLY DESIGNED TO CONFORM TO MNDOT DESIGN STANDARDS AND PERMIT REQUIREMENTS. THE DESIGN COMPUTATIONS ARE ON FILE WITH MNDOT METRO WATER RESOURCES. CHANGING THESE ITEMS OR THE DIRECTION OF FLOW FROM WHAT IS SHOWN ON THE PLANS MAY CAUSE PROBLEMS OFF THE PROJECT AND COULD MEAN THE PROJECT IS OUT OF COMPLIANCE WITH APPROVED DRAINAGE PERMITS. ANY CHANGES OF THE DRAINAGE SYSTEM MUST BE APPROVED BY THE PROJECT ENGINEER.
2. SUBSURFACE DRAINAGE TILES DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED, REPLACED OR REROUTED, AND CONNECTED TO THE EXISTING TILE OR DRAINAGE SYSTEM TO ENSURE THAT EXISTING UPLAND DRAINAGE IS PERPETUATED. THIS SHALL BE DONE TO THE APPROVAL AND SATISFACTION OF THE ENGINEER.

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DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: <u>MTT</u>				
DESIGNER: <u>JCB</u>				
CHECKED BY: <u>JCB</u>				

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 Licensed Professional Engineer  
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RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
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**STORMWATER POLLUTION PREVENTION PLAN**

SEH FILE NO. ISDWB170688	<b>45</b>
SWP2 OF SWP3	<b>101</b>

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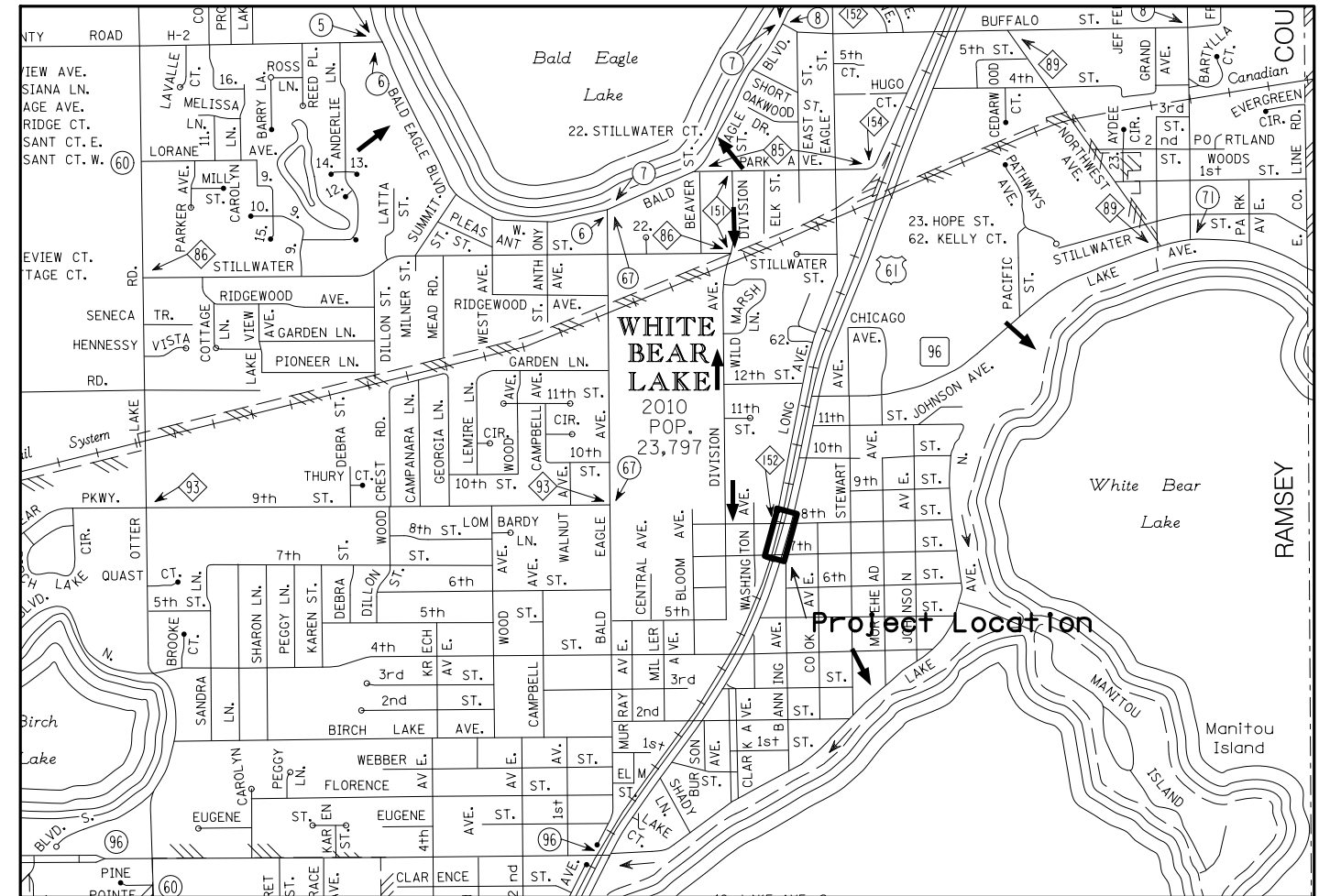


STORM WATER POLLUTION PREVENTION PLAN (SWPPP) NARRATIVE (CONTINUED)

1500

SCALE IN FEET

OFFSITE FLOW INFORMATION DRAWING



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

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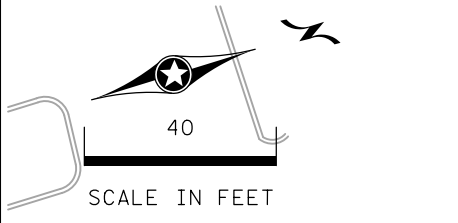
RAMSEY COUNTY, MINNESOTA  
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STORMWATER POLLUTION PREVENTION PLAN

SEH  
 FILE NO.  
 ISDWB170688  
 SWP3  
 OF SWP3

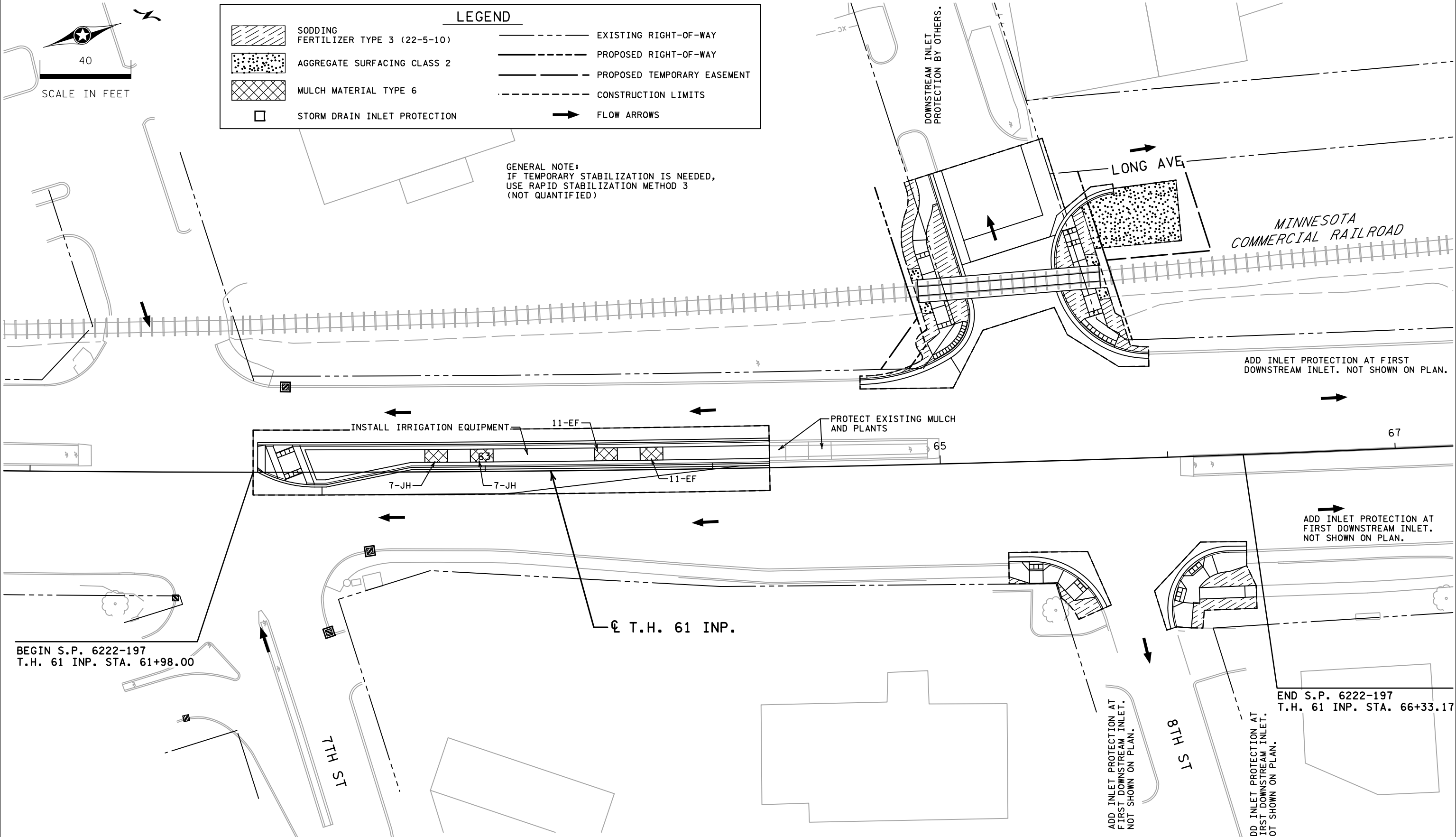
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 MODEL: tel



LEGEND	
	SODDING FERTILIZER TYPE 3 (22-5-10)
	AGGREGATE SURFACING CLASS 2
	MULCH MATERIAL TYPE 6
	STORM DRAIN INLET PROTECTION
	EXISTING RIGHT-OF-WAY
	PROPOSED RIGHT-OF-WAY
	PROPOSED TEMPORARY EASEMENT
	CONSTRUCTION LIMITS
	FLOW ARROWS

GENERAL NOTE:  
 IF TEMPORARY STABILIZATION IS NEEDED,  
 USE RAPID STABILIZATION METHOD 3  
 (NOT QUANTIFIED)



ABBREVIATION	SCIENTIFIC NAME	COMMON NAME	SIZE	CHARACTERISTICS
JH	JUNIPERUS HORIZONTALIS 'BAR HARBOR'	BAR HARBOR CREEPING JUNIPER	2' SPREAD CONT.	8" HT, SALT TOLERANT
EF	EUONYMUS FORTUNEL 'COLORATUS'	PURPLELEAF WINTERCREEPER	NO. 1 CONT.	15" HT, SALT TOLERANT

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: Joshua Breid Lic. No. 59756  
 Licensed Professional Engineer  
 Printed Name: JOSHUA C. BREID Date: 01/23/2024



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**EROSION CONTROL AND TURF ESTABLISHMENT PLAN**  
 T.H. 61 INP. STA. 61+98.00 - 66+25.31

SEH FILE NO. ISDWB170688	47
TE1 OF TE1	101

**NOTES & GUIDELINES**

**GENERAL INFORMATION:**

1. ALL DISTANCES ARE APPROXIMATE.

**SIGNING:**

1. ALL TEMPORARY SIGNS ARE REQUIRED TO BE CRASHWORTHY PER THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE 2016 (MASH-2016). TEMPORARY SIGN STRUCTURES THAT ARE CRASHWORTHY UNDER THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP-350) MAY BE USED PROVIDED THE DEVICES WERE ACQUIRED BY THE CONTRACTOR PRIOR TO DECEMBER 31ST, 2019. THE MINNESOTA TYPE "C" AND "D" BRACED LEG U-CHANNEL (KNEE BRACE) SIGN SUPPORT IS NOT ALLOWED.
2. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF THE FINAL SIGNS TO ASSURE THAT THE FINAL SIGNS ARE PLACED AS NEEDED, OR PROVIDE TEMPORARY SIGNING UNTIL THE FINAL SIGNING IS PLACED.
3. WHEN MULTIPLE GROUND MOUNTED SIGN STRUCTURES ARE PLACED ADJACENT TO EACH OTHER THERE SHOULD BE NO MORE THAN 2 POSTS WITHIN 84" OF EACH OTHER. WHEN THIS SPACING CAN NOT BE MAINTAINED, THEN SIGN STRUCTURES SHALL BE OFFSET, AND STAGGERED WITH A MINIMUM OF 4' BETWEEN SIGN STRUCTURES BOTH LATERALLY AND LONGITUDINALLY. EXAMPLE SHOWS DETOUR SIGNAGE, BUT THIS REQUIREMENT APPLIES TO ALL SIGNAGE.
4. WHEN A SIGN OR BARRICADE IS ORIENTED SUCH THAT VISIBILITY TO ROAD USERS INCLUDING BIKES AND PEDESTRIANS IS REDUCED ENOUGH TO CAUSE A HAZARD, DELINEATE THE SIGN/BARRICADE WITH APPROPRIATE DEVICES.
5. TEMPORARY SIGNS SHALL BE PLACED SUCH THAT OBSTACLES DO NOT BLOCK THEM FROM BEING VIEWED BY APPROACHING ROAD USERS. OBSTACLES MAY INCLUDE, BUT ARE NOT LIMITED TO, LIGHT POLES, TREES, SIGNS, AND BUILDINGS.
6. TEMPORARY SIGNS SHALL BE PLACED AND ORIENTED APPROXIMATELY AS SHOWN IN THE PLAN, AT RIGHT ANGLES TO DIRECTION OF AND FACING THE TRAFFIC THEY ARE INTENDED TO SERVE, UNLESS OTHERWISE SPECIFIED.
7. LONGITUDINAL DROPOFFS SHALL BE SIGNED AS SHOWN IN THE "MINNESOTA TEMPORARY TRAFFIC CONTROL FIELD MANUAL" PAGES (6K-qj) THRU (6K-dl) UNLESS OTHERWISE SPECIFIED IN THESE PLANS.
8. AFTER REMOVAL OF SIGN AND/OR SIGN BASE, BACK FILL, COMPACT, AND LEVEL SOIL TO MATCH SURROUNDING SOIL.

**PAVEMENT MARKING:**

1. MASK OR REMOVE ANY CONFLICTING PAVEMENT MARKINGS AS DIRECTED BY THE ENGINEER.
2. ALL TEMPORARY PAVEMENT MARKINGS SHALL BE WET REFLECTIVE. ALL PAVEMENT MARKINGS IN TAPERS AND TRANSITIONS SHALL BE 6" IN WIDTH.
3. SEE 2582 IN THE SPECIAL PROVISIONS FOR PAVEMENT MARKING SPOTTING RESPONSIBILITIES.

**CONSTRUCTION INFORMATION SIGNING:**








1. THE CONTRACTOR SHALL USE CONSTRUCTION INFORMATION SIGNING AS SHOWN IN THE PLAN WHICH ARE TO BE USED AS FOLLOWS:

PLACE G20-X2 ADVANCE NOTICE SIGNS 7 DAYS PRIOR TO THE WORK STARTING DATE. ONCE WORK BEGINS, COVER THE START DATE LEGEND WITH SUGGESTED PLAQUE CONTAINED IN THIS PLAN. IF NO ALTERNATE MESSAGE IS SUGGESTED OR IF DIRECTED BY THE ENGINEER, DISPLAY THE CORRECT ESTIMATED FINISH DATE, MONTH, OR SEASON

IF CONSTRUCTION INFORMATION SIGNING IS NO LONGER VISIBLE TO THE MOTORING PUBLIC ONCE WORK BEGINS, MOVE SAID SIGNING TO A SITE IN ADVANCE OF THE WORK ZONE OR CLOSURE AS DIRECTED BY THE PLAN OR ENGINEER.

**TRAFFIC CONTROL DEVICES & SYMBOLS LEGEND**

**SYMBOL DESCRIPTION**

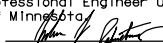
-  WORK AREA
-  TRAFFIC CONTROL SIGN
-  TYPE II BARRICADE = 
-  TYPE III BARRICADE = 
-  CHANNELIZING DEVICE (25' SPACING)

**INDEX**

TRAFFIC CONTROL SHEET NO.	DESCRIPTIONS
48	TITLE SHEET
49	TABULATION
50	GROUND MOUNTED SIGN DETAILS
51	SIGN COVERING DETAILS
52 - 57	STAGE 1 LAYOUT
58 - 62	STAGE 2 LAYOUT

UPDATED 04/24/2020

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: <u>MRO</u>				
DESIGNER: <u>MRO</u>				
CHECKED BY: <u>JJP</u>				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By:  Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023





RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197


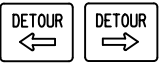
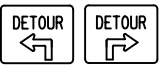
**TRAFFIC CONTROL PLAN**  
 TITLE SHEET

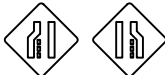






SEH FILE NO. ISDWB170688	<b>48</b>
TC1 OF TC15	<b>101</b>


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
"R" SERIES			
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)
	R3-2	BLACK AND RED ON WHITE	36" X 36"

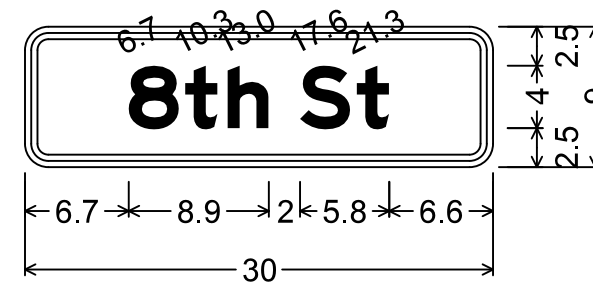
"G" SERIES			
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)
	G20-X9 (L)	BLACK ON ORANGE	30" X 36"

"M" SERIES			
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)
	M4-8A	BLACK ON ORANGE	24" X 18"
	M4-9M (L, R)	BLACK ON ORANGE	30" X 24"
	M4-9M (L90, R90)	BLACK ON ORANGE	30" X 24"

"W" SERIES			
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)
	W4-2 (L, R)	BLACK ON ORANGE	36" X 36"
	W16-2P	BLACK ON ORANGE	30" X 24"
	W20-1	BLACK ON ORANGE	18" X 18"
	W20-2	BLACK ON ORANGE	36" X 36"
	W20-3	BLACK ON ORANGE	36" X 36"
	W20-X3 (L, R)	BLACK ON ORANGE	36" X 36"
	W20-X3 (L, R)	BLACK ON ORANGE	36" X 36"

"W" SERIES			
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)
	WZ-1	BLACK ON ORANGE	30" X 9"

BARRICADE MOUNTED SIGNS			
SIGN	SIGN NO.	COLOR	SIZE (IN. X IN.) (WxH)
	R3-1	BLACK AND RED ON WHITE	36" X 36"
	R3-2	BLACK AND RED ON WHITE	36" X 36"
	R11-2M	BLACK ON WHITE	48" X 30"
	R11-4	BLACK ON WHITE	60" X 30"



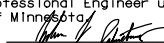
WZ-1;  
1.5" Radius, 0.4" Border, 0.4" Indent, Black on, Orange;  
"8th St", E Mod 2K 50% spacing;

GENERAL NOTES:

- SIGN STRUCTURE TABULATIONS INDICATE SQUARE TUBE GROUND MOUNTED SIGN STRUCTURES THAT ARE MASH-16 COMPLIANT.
- USE PRODUCTS FROM THE BASES FOR SQUARE TUBE SIGN STRUCTURES APPROVED/QUALIFIED PRODUCTS LIST FOR THE INDICATED SQUARE TUBE RISER POST SIZE. PLACE PER THE MANUFACTURER'S SPECIFICATIONS.
- ALUMINUM STRINGERS SHALL BE USED FOR SIGNS 36 INCHES AND WIDER. SEE MANUFACTURER'S SPECIFICATIONS FOR SQUARE TUBE MOUNTING DETAILS. STRINGERS ON SINGLE POST ASSEMBLIES ARE REQUIRED TO BE AT LEAST 9 INCHES IN FROM THE EDGE OF THE SIGN.
- UNLESS OTHERWISE INDICATED, USE 2-1/2 INCH RISER POSTS FOR GROUND MOUNTED SIGN STRUCTURES.

UPDATED 04/24/2020

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By:  Lic. No. 56671  
Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

TRAFFIC CONTROL PLAN  
TABULATIONS

SEH FILE NO. ISDWB170688	49
TC2 OF TC15	101

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12/22/2023

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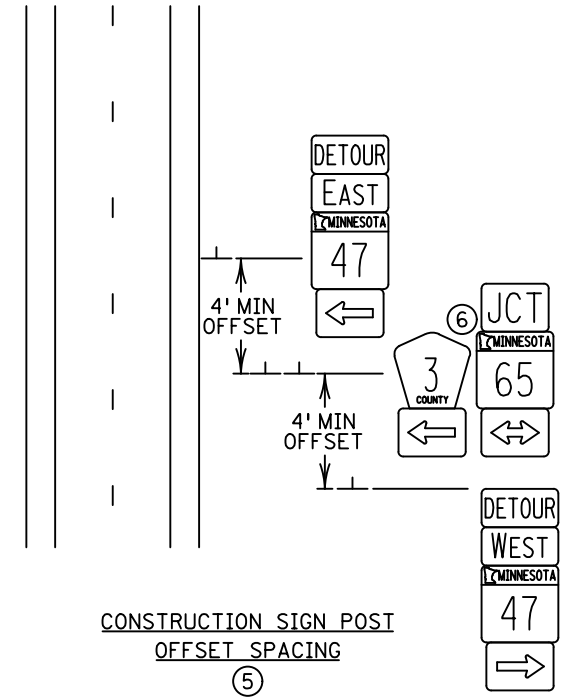
**GENERAL NOTES:**

1. GROUND MOUNTED SQUARE TUBE SIGN STRUCTURES PLACED WITHIN 50' OF THE RADIUS END OF AN INTERSECTION SHALL BE PLACED ON ONE 2" OR 2-1/2" POST.
2. FOR 2" SQUARE TUBE RISER POST IN SOIL, USE FIN BASE PLACED PER MANUFACTURER'S SPECIFICATIONS. USE A 2" X 2" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE RISER POST. PLACE 3/8" STAINLESS STEEL BOLT THROUGH THE 5TH HOLE DOWN FROM THE TOP OF THE BASE. RISER POST SHALL REST ON THE BOLT.
3. FOR 2-1/2" SQUARE TUBE RISER POST IN SOIL, USE SLIP BASE PLACED PER MANUFACTURER'S SPECIFICATIONS USING A 10 GAUGE, 2-1/2" X 2-1/2" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE RISER POST WITH A 10 GAUGE 2-3/16" X 2-3/16" PRE-PUNCHED, GALVANIZED STEEL, SQUARE TUBE INTERNAL INSERT.

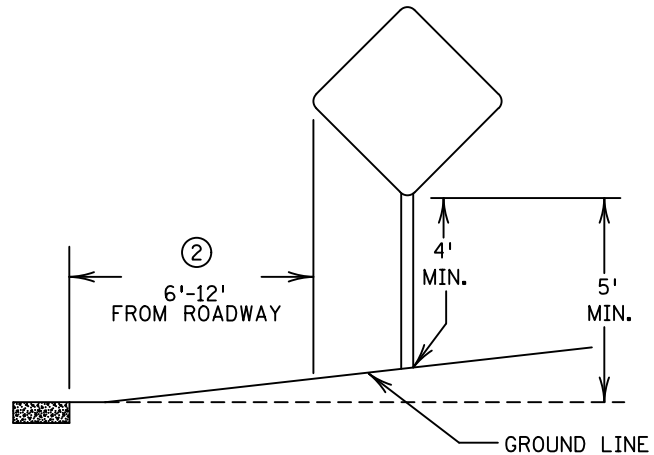
**SPECIFIC NOTES:**

- ① IF ANY PART OF A SIGN OR SIGN ASSEMBLY EXTENDS MORE THAN 4" INTO THE PEDESTRIAN FACILITY, THE MINIMUM HEIGHT TO BOTTOM OF THE SIGN OR SIGN ASSEMBLY SHALL BE 7'.
- ② 6' - 12' FROM EDGE OF ROADWAY, MUST BE A MINIMUM OF 6' FROM EDGE OF PAVED SHOULDER (WHEN PRESENT).
- ③ IF GROUND MOUNTED TEMPORARY SIGN OR SIGN ASSEMBLY IS PLACED ON 2-1/2" SQUARE TUBE RISER POST(S), THE MINIMUM CLEARANCE FROM THE GROUND LINE TO THE BOTTOM OF THE LOWEST SIGN ON THE ASSEMBLY SHALL BE 7', OR AS SHOWN IN DETAIL, WHICHEVER IS GREATER.
- ④ 5' MINIMUM IN RURAL. 7' MINIMUM IN BUSINESS, COMMERCIAL, OR RESIDENTIAL AREAS.
- ⑤ WHEN MULTIPLE GROUND MOUNTED SIGN STRUCTURES ARE PLACED ADJACENT TO EACH OTHER THERE SHOULD BE NO MORE THAN 2 POSTS WITHIN 84" OF EACH OTHER. WHEN THIS SPACING CAN NOT BE MAINTAINED, THEN SIGN STRUCTURES SHALL BE OFFSET, AND STAGGERED WITH A MINIMUM OF 4' BETWEEN SIGN STRUCTURES BOTH Laterally AND LONGITUDINALLY. EXAMPLE SHOWS DETOUR SIGNAGE, BUT THIS REQUIREMENT APPLIES TO ALL SIGNAGE.
- ⑥ INPLACE AND/OR OTHER CONSTRUCTION SIGNING.

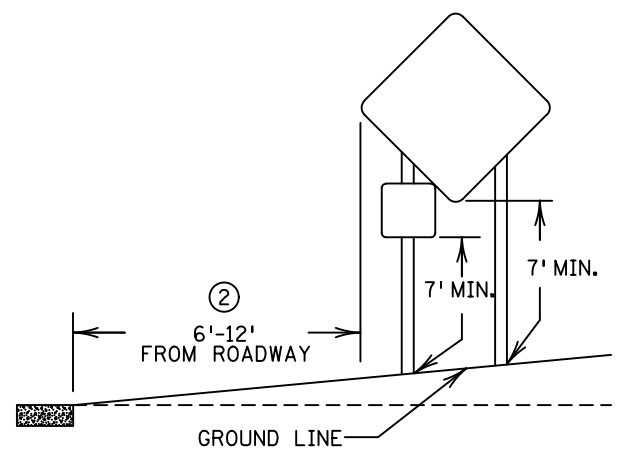
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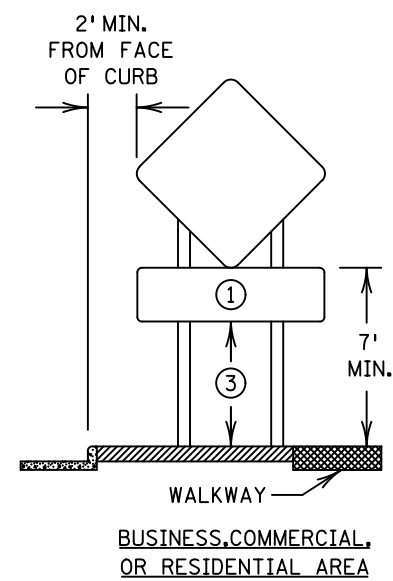
CONSTRUCTION SIGN POST  
OFFSET SPACING  
⑤



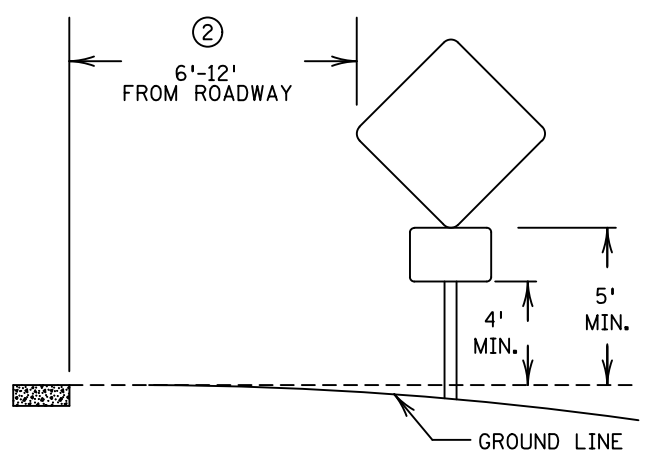
TYPICAL RURAL DESIGN  
AND 2" RISER POST



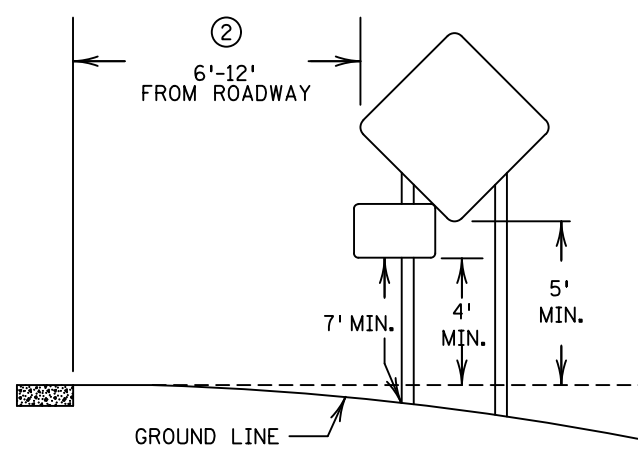
TYPICAL RURAL DESIGN WITH SUPPLEMENTAL  
PLAQUE AND 2-1/2" RISER POST



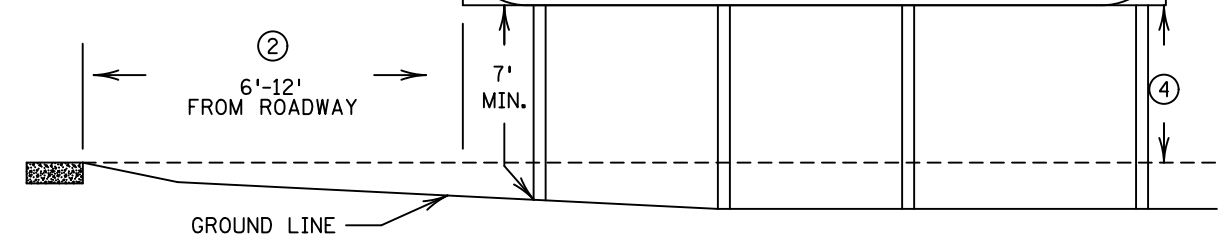
BUSINESS, COMMERCIAL,  
OR RESIDENTIAL AREA



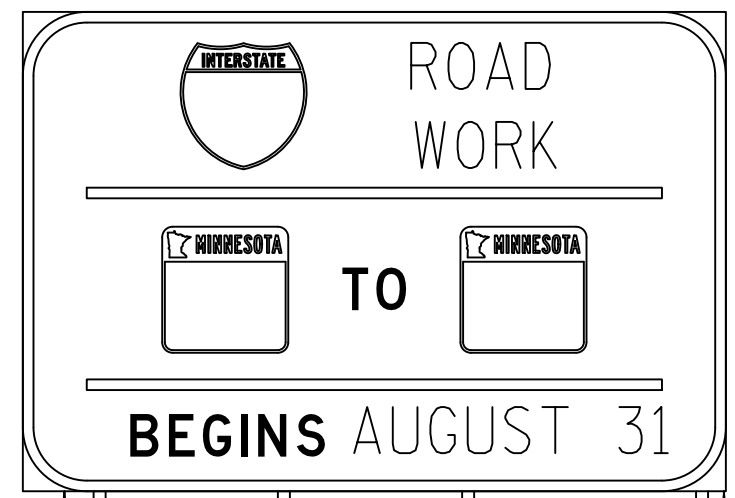
TYPICAL RURAL DESIGN WITH SUPPLEMENTAL  
PLAQUE AND 2" RISER POST



TYPICAL RURAL DESIGN  
2-1/2" RISER POST



TYPICAL G20-X2 DESIGN



PUBLISHED BY OTE 03/15/2021

MODIFIED BY

TEMPORARY SQUARE TUBE GROUND MOUNTED SIGN PLACEMENT

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

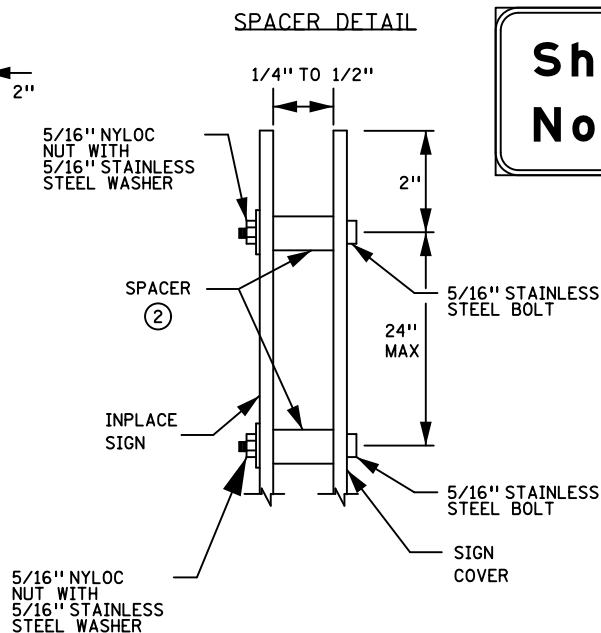
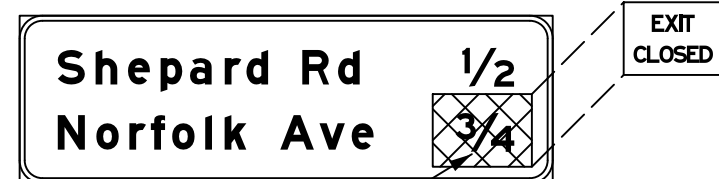
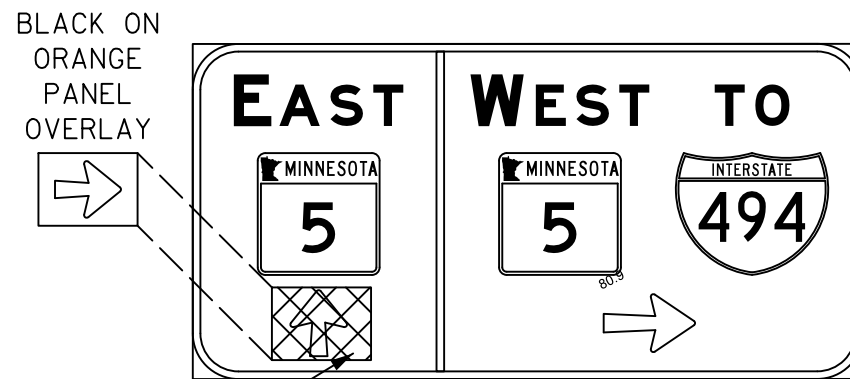
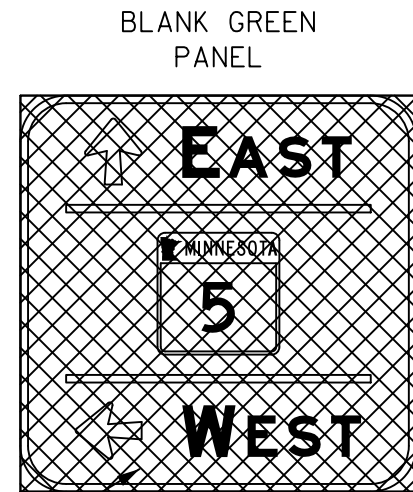
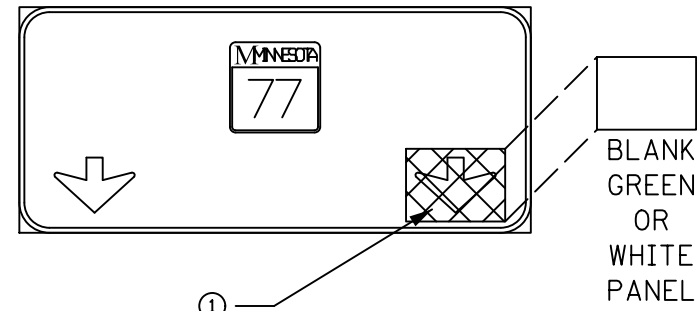
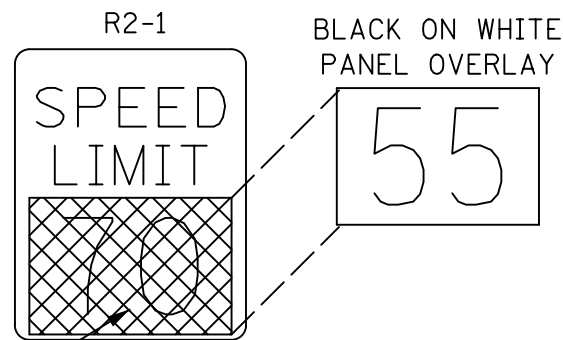
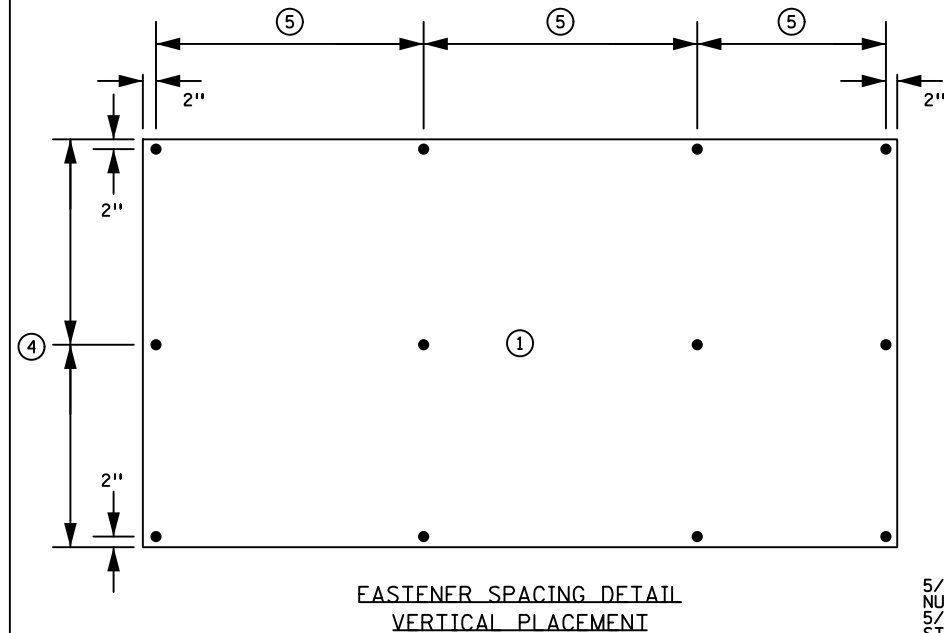
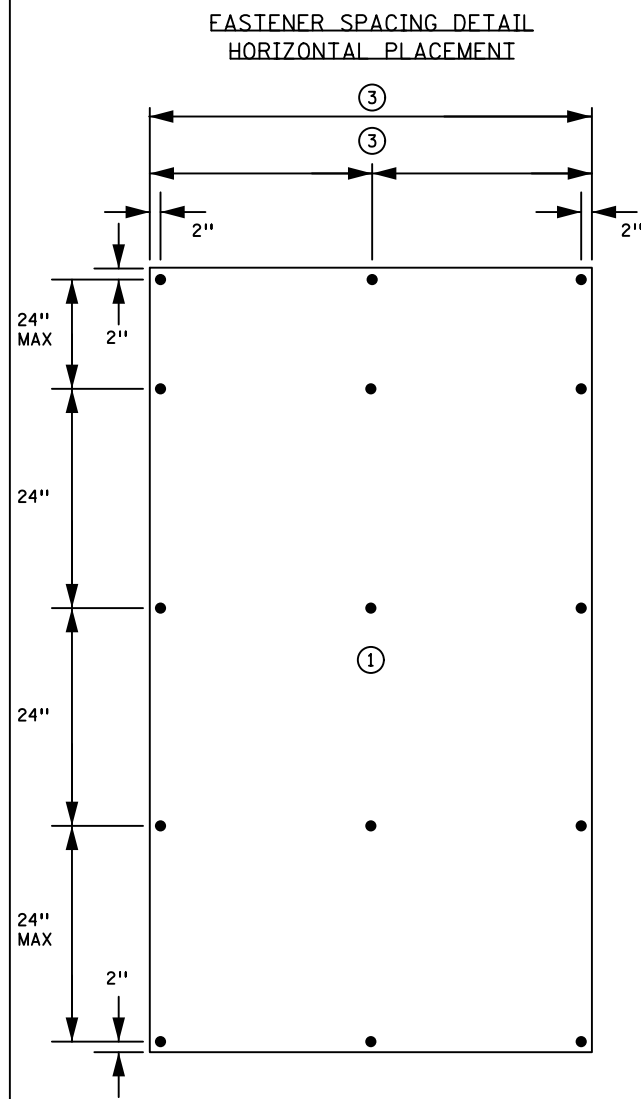
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

TRAFFIC CONTROL PLAN

SEH  
 FILE NO.  
 ISDWB170688  
 TC3  
 OF TC15  
**50**  
**101**



GENERAL NOTES:

- SIGN COVER PANELS ARE USED TO COVER AN ENTIRE INPLACE SIGN PANEL OR A PORTION THEREOF TO REMOVE OR MODIFY THE SIGN MESSAGE. THEY HAVE NO ADDITIONAL MESSAGE PRINTED ON THEM. SIGN COVER PANELS SHALL BE MADE OF A RIGID MATERIAL (SHEET ALUMINUM, PLYWOOD, CORRUGATED PLASTIC, OR OTHER MATERIAL AS APPROVED BY THE ENGINEER). SIGN COVER PANELS SHALL BE THE SAME COLOR AS THE BACKGROUND COLOR OF THE INPLACE SIGN PANEL AND SHALL COVER THE ENTIRE SIGN PANEL OR MESSAGE ELEMENT.
- SIGN PANEL OVERLAYS ARE USED TO MODIFY THE MESSAGE OF AN INPLACE SIGN PANEL. THEY INCLUDE A SIGN MESSAGE. SIGN PANEL OVERLAYS SHALL BE MADE OF SHEET ALUMINUM WITH THE APPROPRIATE SHEETING MATERIAL AS SPECIFIED ON THE MNDOT SHEETING FOR RIGID PERMANENT SIGNS, DELINEATORS, AND MARKERS APL OR THE MNDOT SHEETING FOR RIGID TEMPORARY WORK ZONE SIGNS APL. SIGN PANEL OVERLAY MESSAGES SHALL BE BLACK ON FLUORESCENT ORANGE, EXCEPT ON REGULATORY SIGNS WHICH SHALL BE THE PROPER COLOR ON A WHITE BACKGROUND. THE MESSAGE SHALL FOLLOW THE REQUIREMENTS OF THE MNDOT STANDARD SIGNS AND MARKINGS MANUAL OR THE FHWA STANDARD HIGHWAY SIGNS MANUAL (AND SUPPLEMENTS). THE SIGN PANEL OVERLAY SHALL FULLY COVER THE MESSAGE ELEMENT(S) BEING MODIFIED.
- MINIMIZE DAMAGE TO THE INPLACE SIGN PANEL. DO NOT APPLY TAPE TO THE INPLACE SIGN SHEETING.
- SPACERS SHALL BE A MATERIAL THAT WILL NOT HARM THE INPLACE SIGN SHEETING FACE (SUCH AS PLASTIC OR RUBBER).
- ATTACH SIGN COVER PANEL OR PANEL OVERLAY USING HARDWARE SHOWN IN THE SPACER DETAIL.
- IF SHEET METAL SCREWS ARE USED TO PLACE CORRUGATED PLASTIC AS A SIGN COVER PANEL, PLACE FENDER WASHERS BETWEEN THE SCREW HEADS AND THE CORRUGATED PLASTIC. REMOVE ALL COVERING MATERIAL, MOUNTING HARDWARE, AND FASTENERS WHEN SIGN COVER PANEL OR PANEL OVERLAY IS REMOVED.
- NO HANDLE OR OTHER LIFTING DEVICE SHALL BE LEFT ATTACHED TO ANY SIGN COVER PANEL AFTER PLACEMENT.

SPECIFIC NOTES:

- THE SIGN COVER PANEL OR PANEL OVERLAY SHALL FULLY COVER THE MESSAGE BEING COVERED OR MODIFIED.
- PLACE SIGN COVER PANELS AND PANEL OVERLAYS WITH SPACERS THAT PROVIDE A SPACING OF 1/4 IN TO 1/2 IN BETWEEN THE COVER MATERIAL AND THE INPLACE SIGN. THE SPACERS SHALL HAVE AN OUTSIDE DIAMETER BETWEEN 3/8 IN TO 7/8 IN. EACH FASTENER REQUIRES A SPACER.
- IF THE SIGN COVER PANEL OR PANEL OVERLAY IS GREATER THAN 48 IN WIDE, THE FASTENER SPACING SHALL BE NO GREATER THAN 24 IN. IF THE SIGN COVER PANEL OR PANEL OVERLAY IS LESS THAN 24 IN WIDE, DO NOT PLACE A CENTER FASTENER (UNLESS REQUIRED BY SPECIFIC NOTE 4).
- VERTICAL SPACING FOR FASTENERS IS 50% OF THE SIGN COVER PANEL OR PANEL OVERLAY. IF THE SIGN COVER PANEL OR PANEL OVERLAY IS LESS THAN 24 IN HIGH, DO NOT PLACE A CENTER FASTENER (UNLESS REQUIRED PER SPECIFIC NOTE 5).
- HORIZONTAL SPACING FOR FASTENERS SHALL NOT BE LESS THAN 15 IN NOR MORE THAN 24 IN.

ASSEMBLY STEPS

- DRILL 11/32 IN HOLES ON THE SIGN COVER PANEL OR PANEL OVERLAY IN ACCORDANCE WITH THE FASTENER SPACING DETAILS.
- ATTACH PLASTIC SPACERS TO SIGN COVER PANEL OR PANEL OVERLAY WITH DOUBLE FACED TAPE, CENTERED BEHIND EACH DRILLED HOLE.
- POSITION THE COVER OR OVERLAY MATERIAL OVER THE SIGN OR MESSAGE TO BE MODIFIED.
- DRILL ALL THE OUTSIDE HOLES THROUGH THE INPLACE SIGN PANEL AND ATTACH THE COVER OR OVERLAY MATERIAL WITH APPROPRIATE FASTENERS.
- DRILL ALL THE INNER HOLES THROUGH THE INPLACE SIGN PANEL AND ATTACH WITH APPROPRIATE FASTENERS.

PUBLISHED BY OTE 01/22/2021

MODIFIED BY

TEMPORARY SIGN COVERING AND MODIFICATION

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

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

Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023

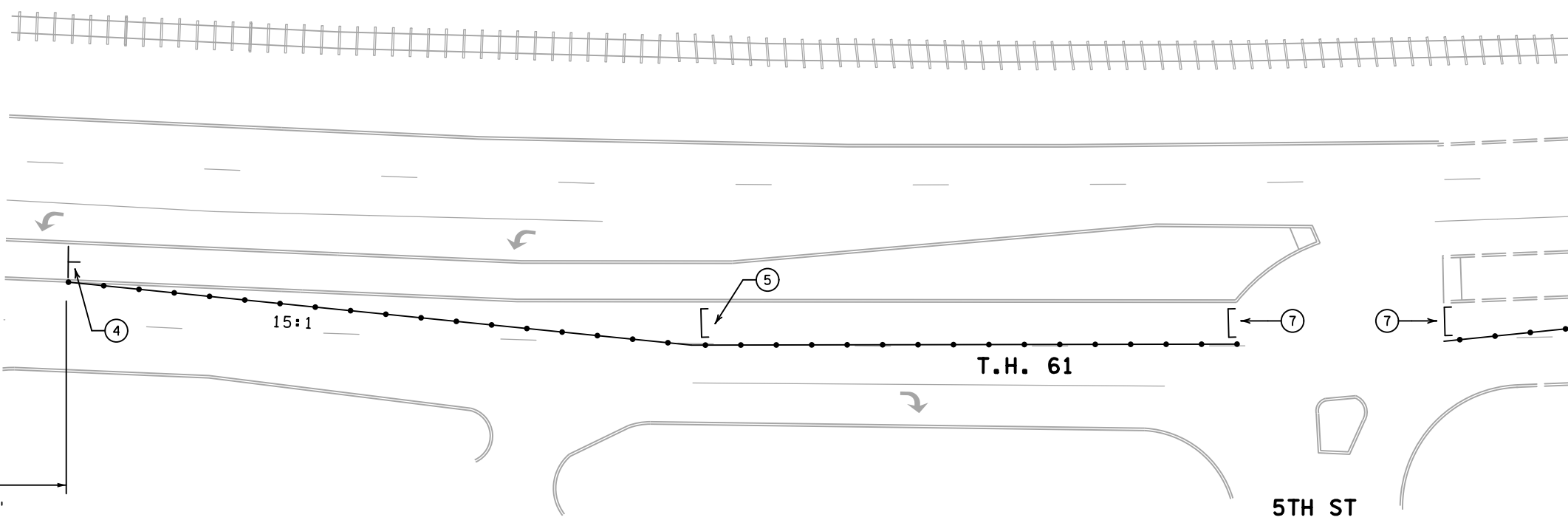
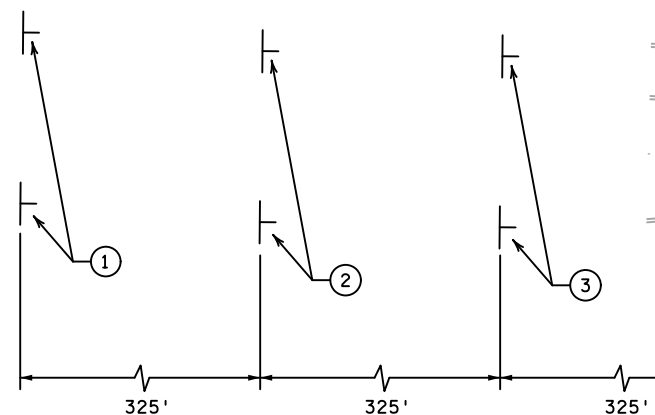
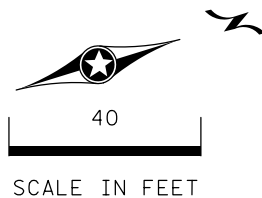


RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

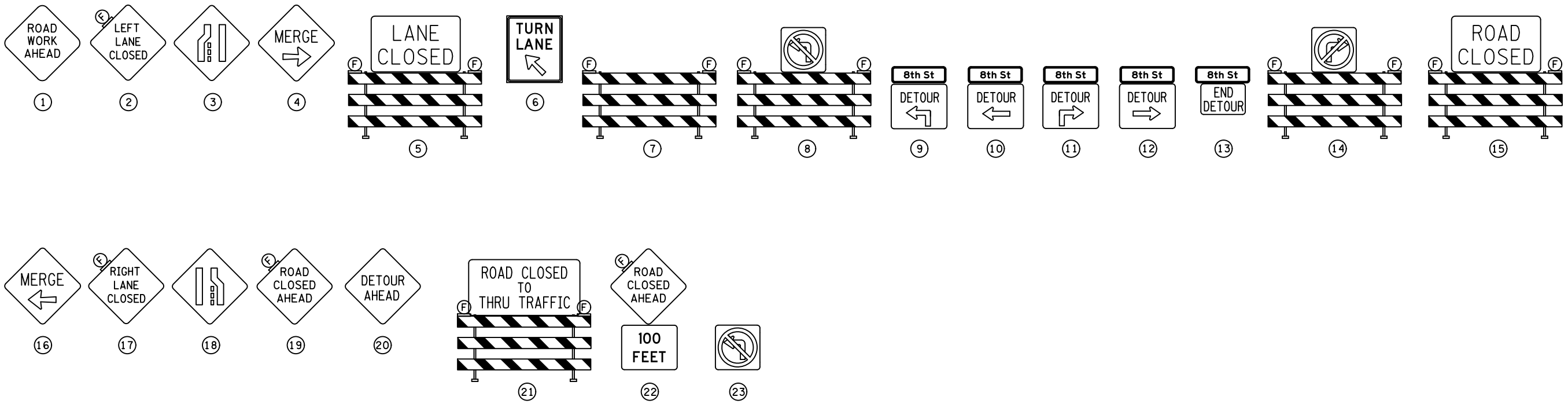
TRAFFIC CONTROL PLAN

SEH  
 FILE NO.  
 ISDWB170688  
 TC4  
 OF TC15

51  
 101



MATCHLINE T.H. 61 INP. SEE SHEET 53



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MODEL: tc5

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

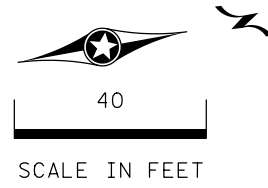
**TRAFFIC CONTROL PLAN**  
 STAGE 1

SEH FILE NO. ISDWB170688	<b>52</b>
TC5 OF TC15	<b>101</b>

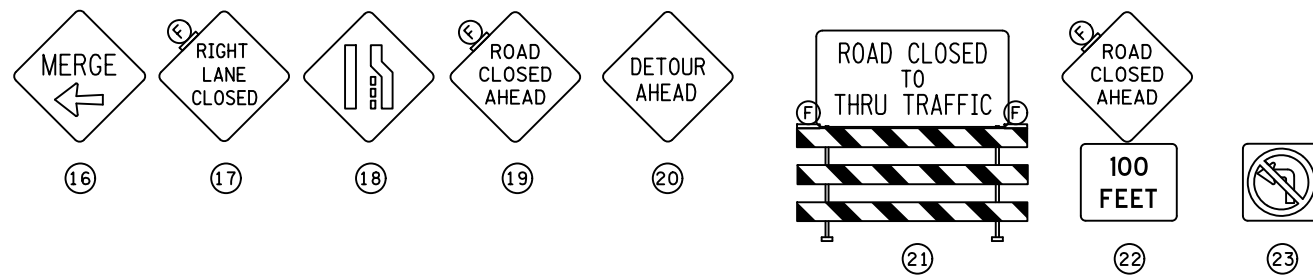
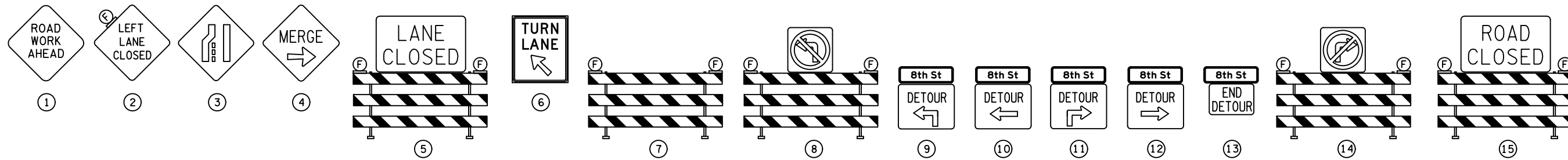
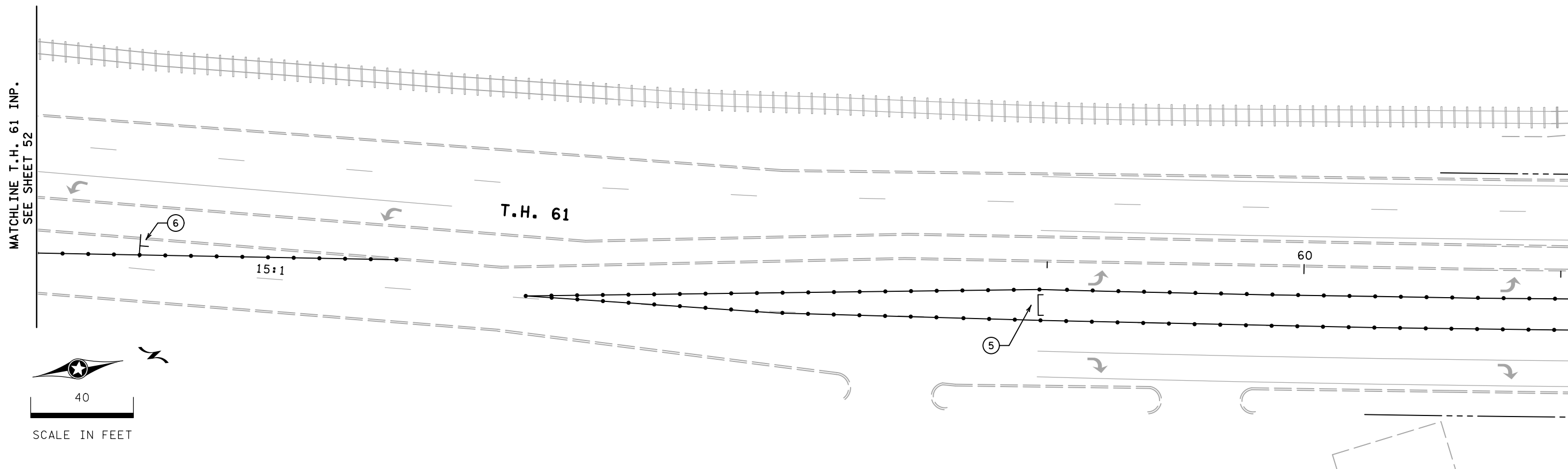


MATCHLINE T.H. 61 INP.  
SEE SHEET 52

MATCHLINE T.H. 61 INP.  
SEE SHEET 54



SCALE IN FEET



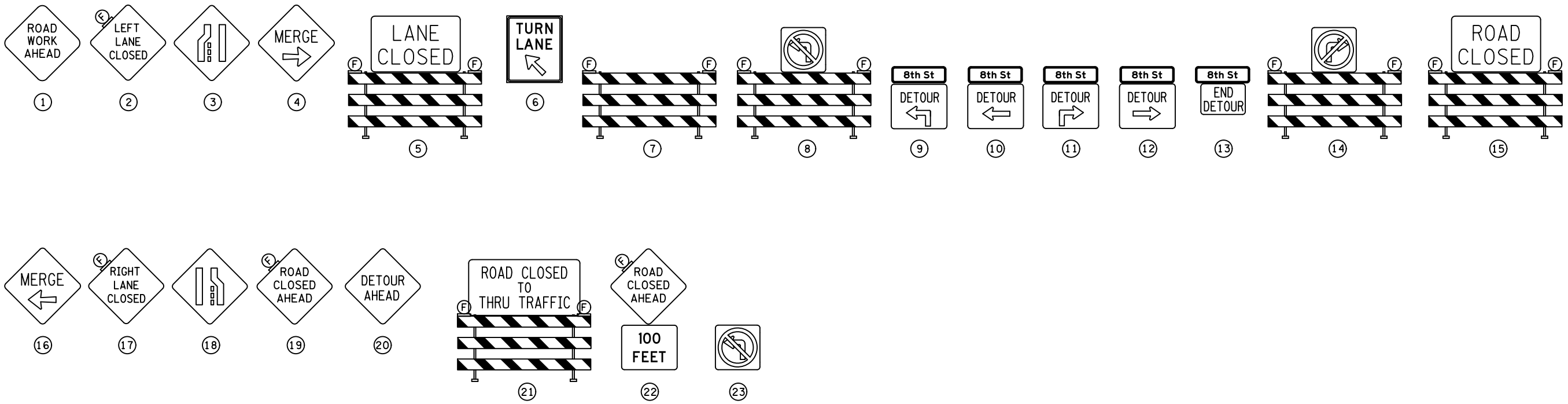
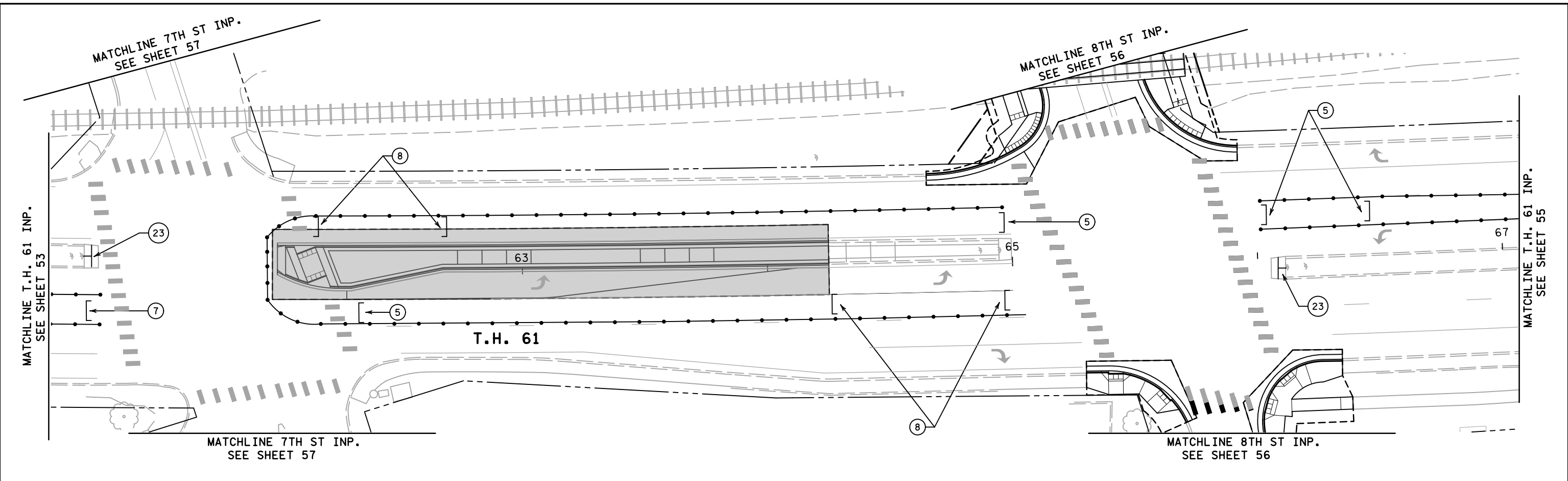
DESIGN TEAM				
DRAWN BY:	MRO			
DESIGNER:	MRO			
CHECKED BY:	JJP			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
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 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 1



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

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 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023

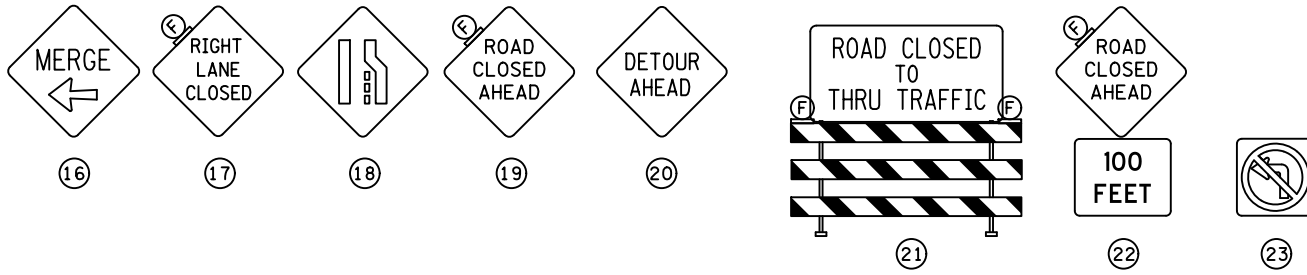
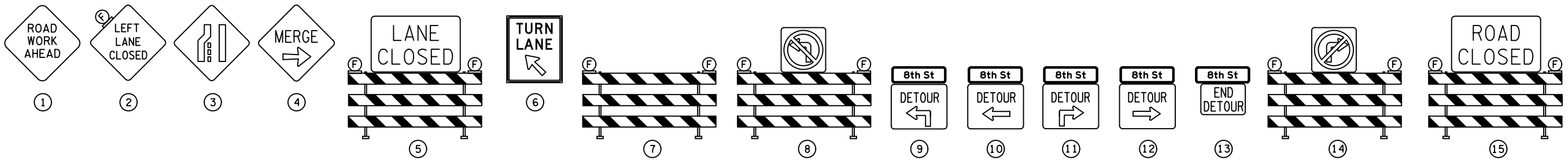
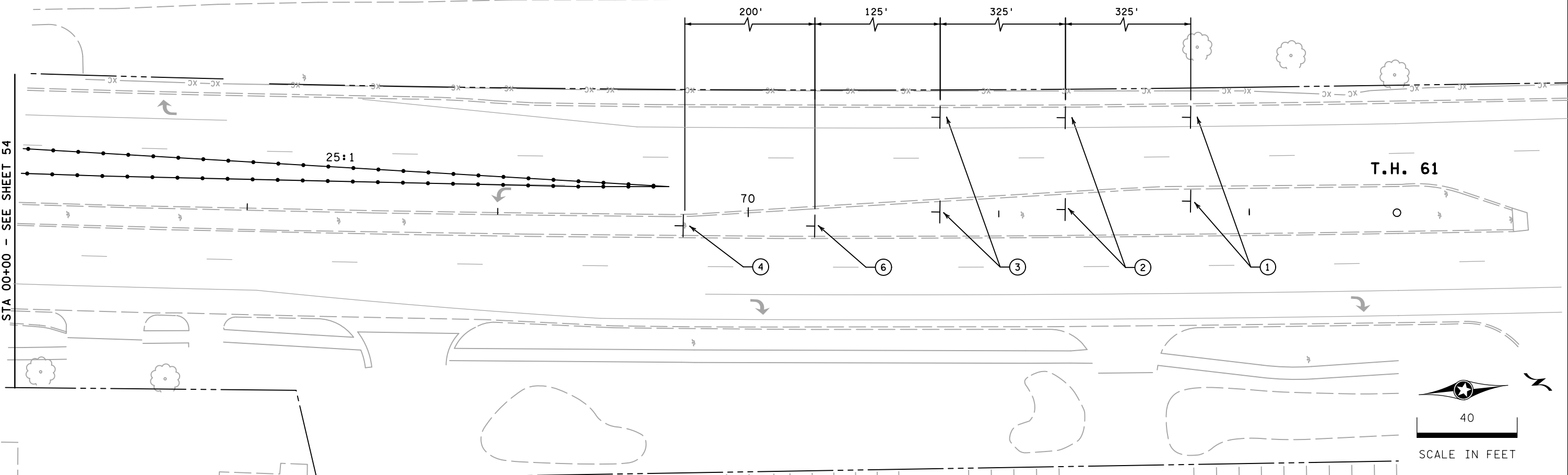


RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 1

SEH FILE NO. ISDWB170688	<b>54</b>
TC7 OF TC15	<b>101</b>

MATCHLINE T.H. 61 INP.  
STA 00+00 - SEE SHEET 54



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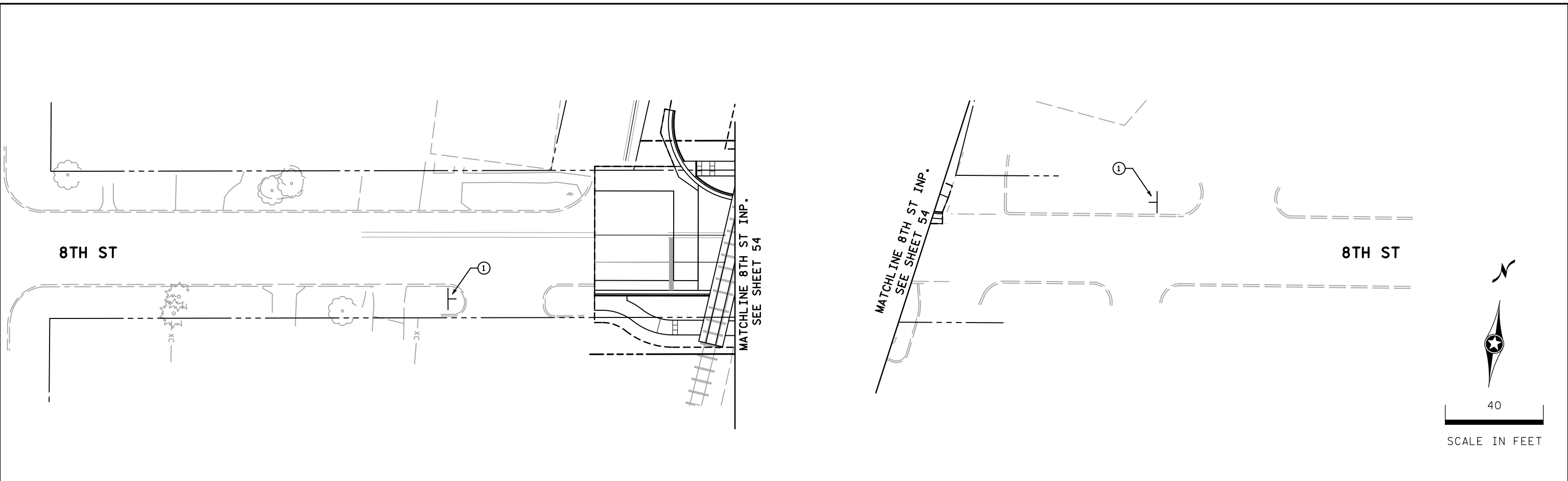
DESIGN TEAM				
DRAWN BY:	MRO			
DESIGNER:	MRO			
CHECKED BY:	JJP			
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 1



- ①
- ②
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MODEL: tc9

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

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

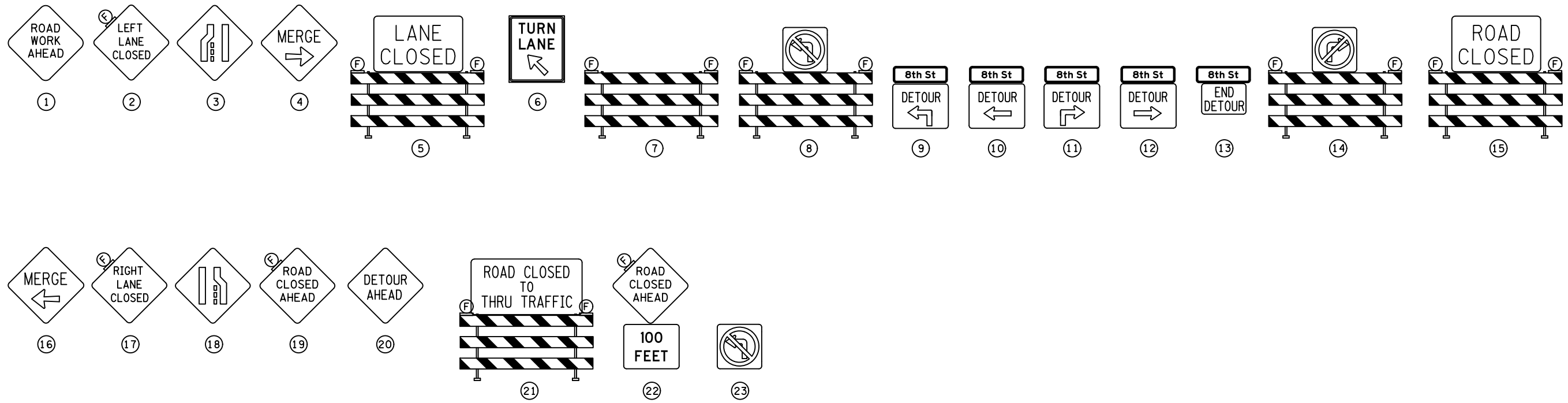
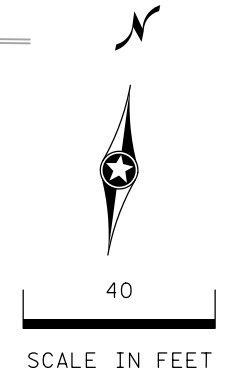
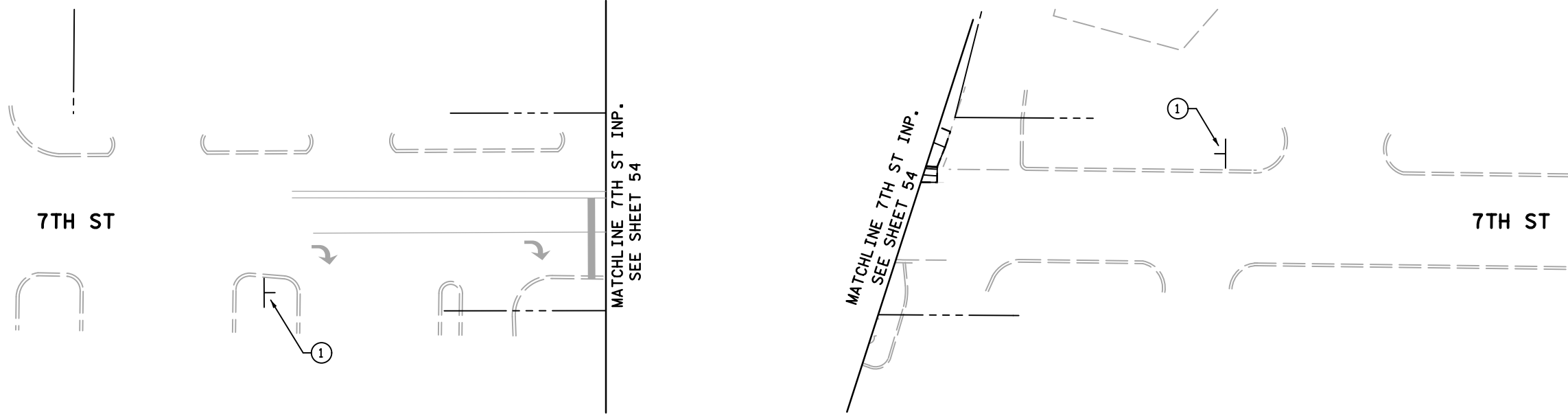
Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 1

SEH FILE NO. ISDWB170688	<b>56</b>
TC9 OF TC15	<b>101</b>



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MODEL: TC10

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *[Signature]* Lic. No. 56671  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



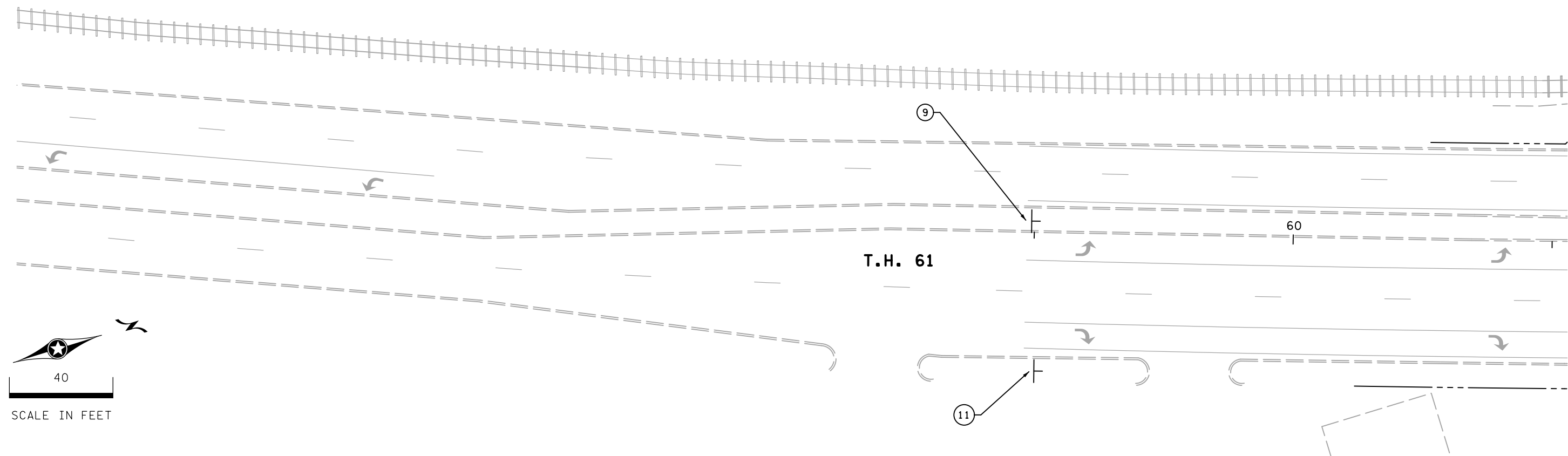
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 1

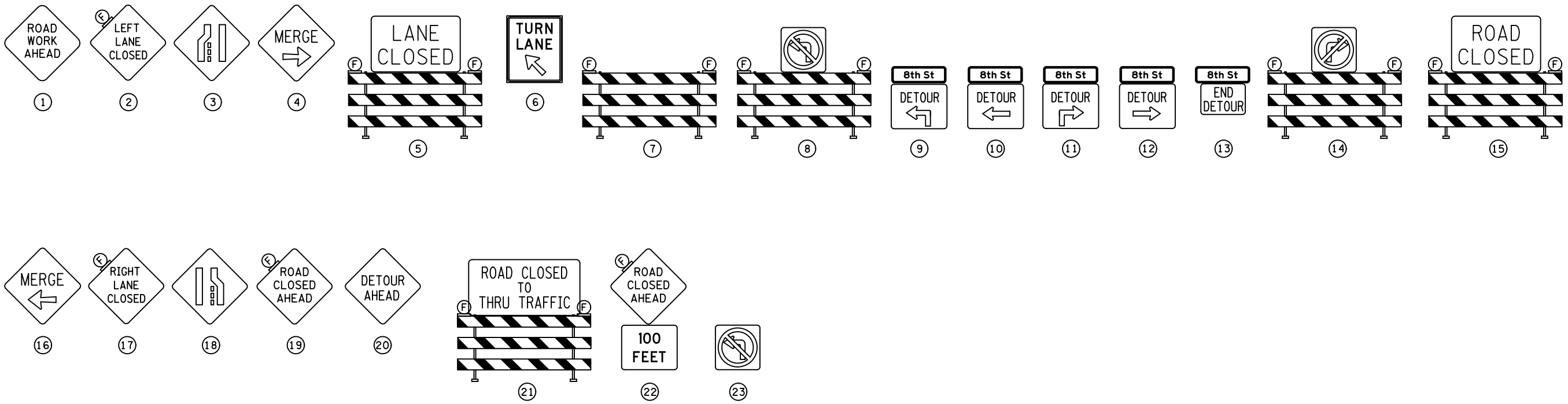
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TC10 OF TC15	<b>101</b>

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2/15/2024



MATCHLINE T.H. 61 INP.  
SEE SHEET 59



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MODEL: tc11

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

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 Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 02/15/2024



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 2

SEH FILE NO. ISDWB170688	<b>58</b>
TC11 OF TC15	<b>101</b>

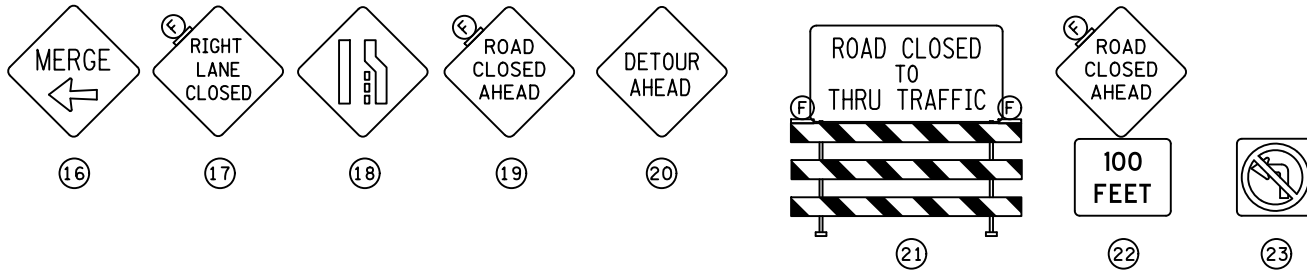
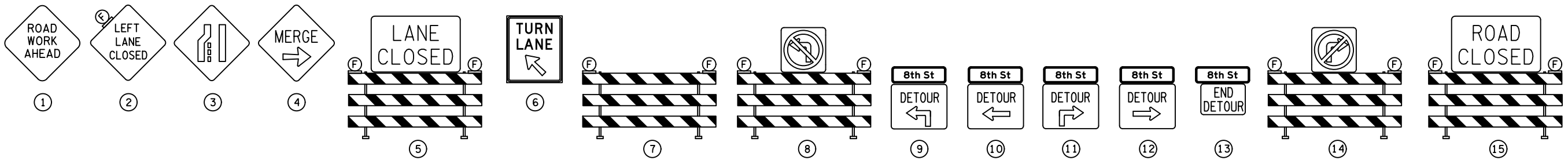
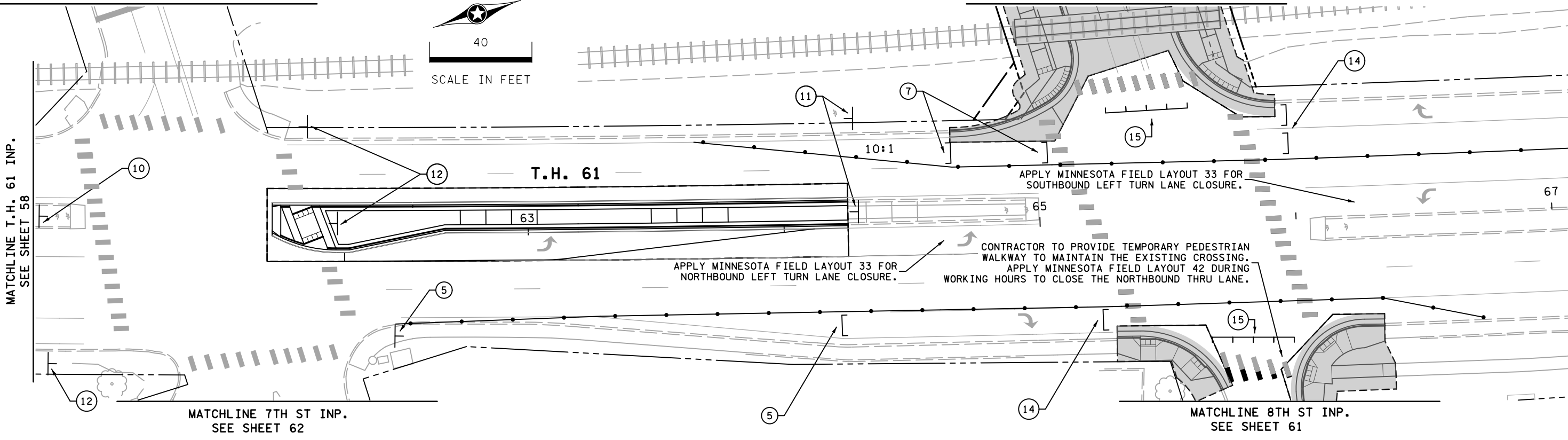
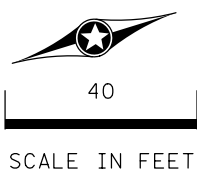
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MATCHLINE 7TH ST INP.  
SEE SHEET 62

MATCHLINE 8TH ST INP.  
SEE SHEET 61



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

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 Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 02/15/2024



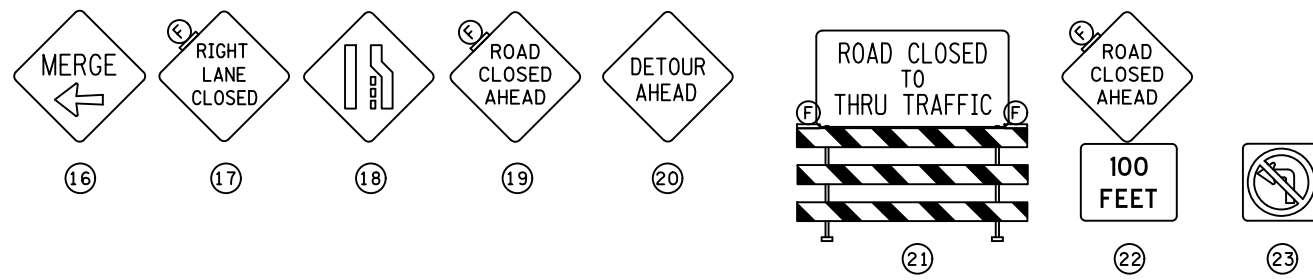
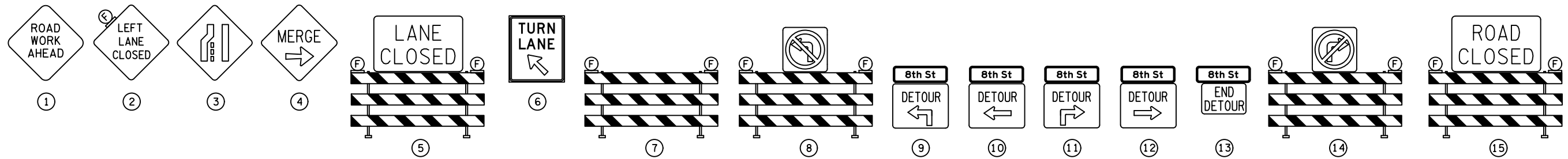
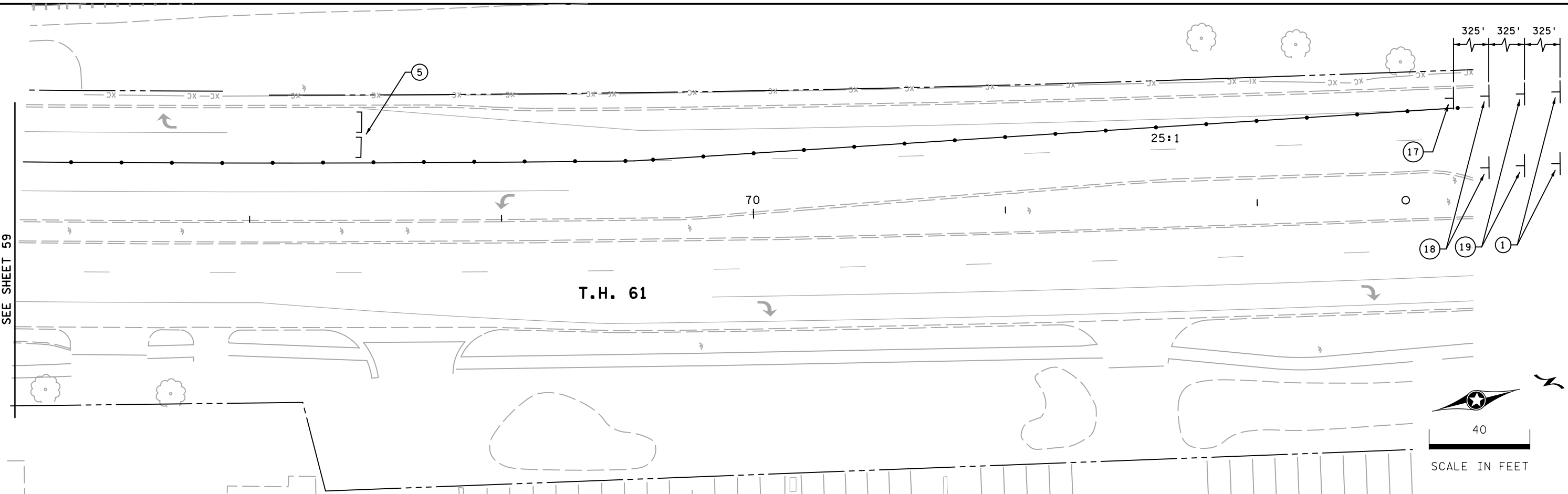
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 2

SEH  
 FILE NO.  
 ISDWB170688  
 TC12  
 OF TC15

59  
 101

MATCHLINE T.H. 61 INP.  
SEE SHEET 59



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

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 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023

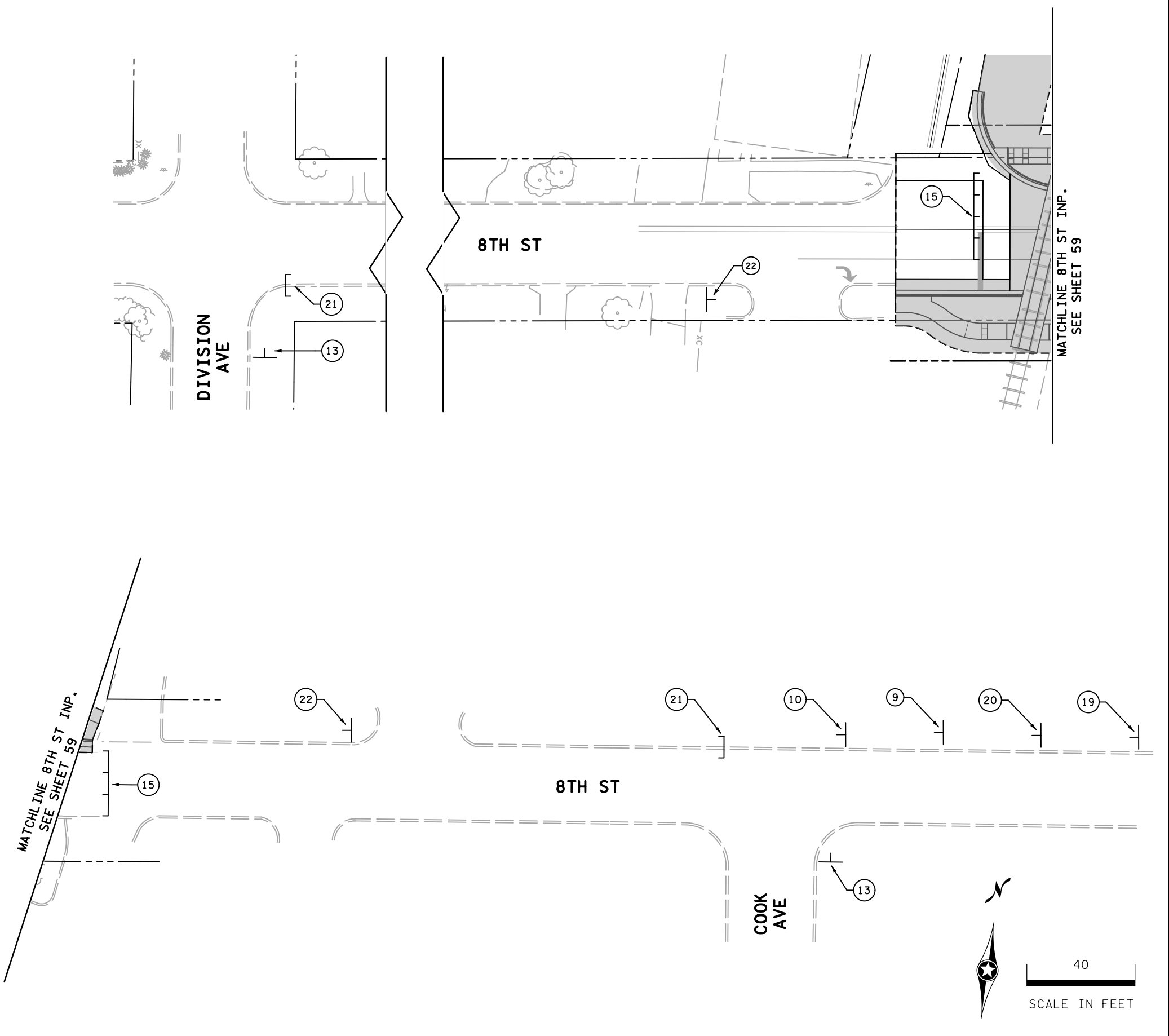
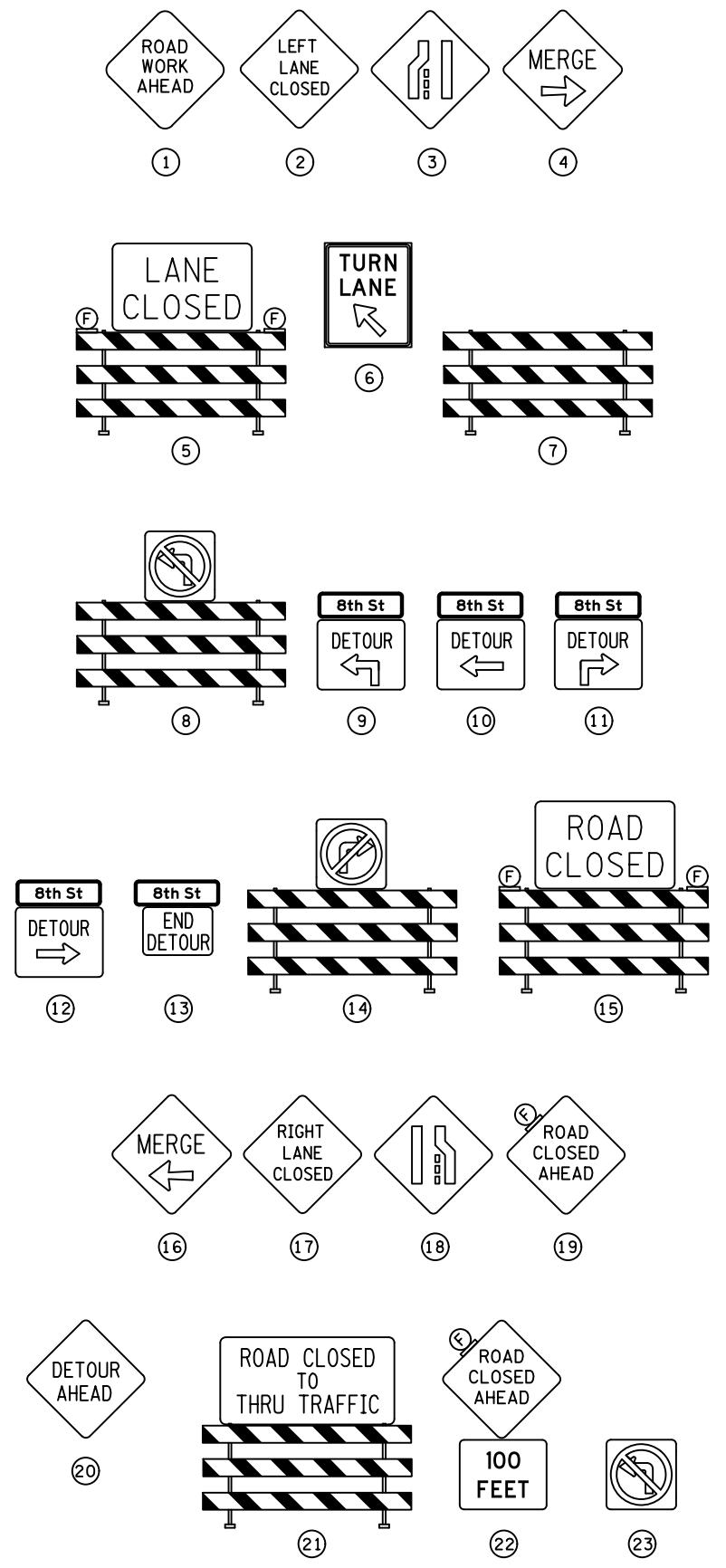


RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 2

SEH FILE NO. ISDWB170688	<b>60</b>
TC13 OF TC15	<b>101</b>





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

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 Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 02/15/2024



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

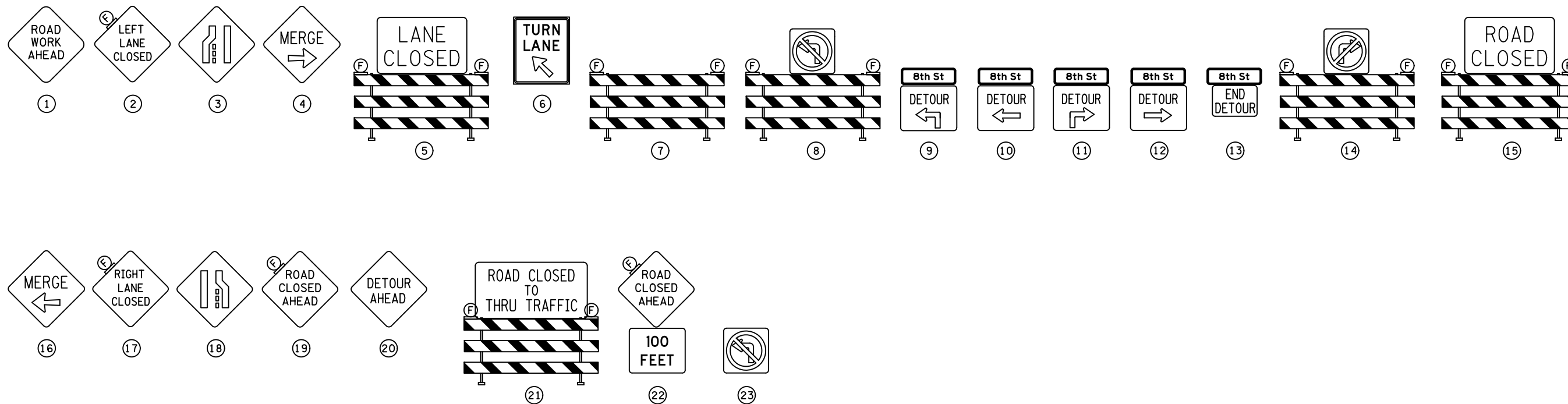
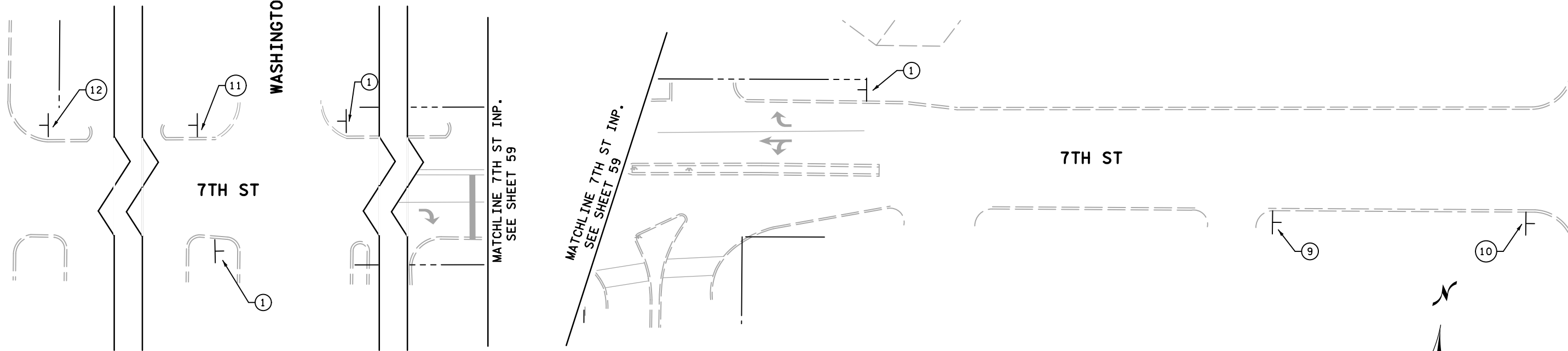
**TRAFFIC CONTROL PLAN**  
 STAGE 2

SEH FILE NO. ISDWB170688	<b>61</b>
TC14 OF TC15	<b>101</b>

DIVISION AVE

WASHINGTON AVE

COOK AVE



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

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RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**TRAFFIC CONTROL PLAN**  
 STAGE 2

# SIGNING AND PERMANENT PAVEMENT MARKING PLAN

## NOTES & GUIDELINES

### GENERAL PAVEMENT MARKING INFORMATION:

1. SEE 2582 IN THE SPECIAL PROVISIONS FOR PAVEMENT MARKING SPOTTING RESPONSIBILITIES.
2. EDGE LINES AND LANE LINES ARE TO BE BROKEN ONLY AT INTERSECTIONS WITH PUBLIC ROADS, AND AT PRIVATE ENTRANCES IF THEY ARE CONTROLLED BY AN AGENCY PLACED YIELD SIGN, STOP SIGN OR TRAFFIC SIGNAL. THE BREAK POINT IS TO BE AT THE START OF THE MAINLINE RADIUS.
3. DO NOT APPLY THE PAVEMENT MARKINGS WHEN WEATHER AND OTHER CONDITIONS CAUSE A FILM OF DUST OR DEBRIS TO BE DEPOSITED ON THE PAVEMENT SURFACE AFTER CLEANING AND BEFORE THE MARKING MATERIAL IS APPLIED.
4. THE FILLING OF TANKS, POURING OF MATERIALS OR CLEANING OF EQUIPMENT SHALL NOT BE PERFORMED ON UNPROTECTED PAVEMENT SURFACES UNLESS ADEQUATE PROVISIONS ARE MADE TO PREVENT SPILLAGE OF MATERIAL.

### GENERAL SIGNING INFORMATION:

1. MOUNTING HEIGHT IS MINIMUM (WITH A + 6 INCH TOLERANCE)
2. SEE CURRENT MNDOT STANDARD SIGNS AND MARKINGS MANUAL FOR STANDARD SIGN DESIGNS, SPLICE PLATES, STRINGERS AND PUNCHING CODES.
3. SEE PANEL LAYOUTS FOR SIGNS WITH THE CODE "DESIGN."
4. SEE STANDARD PLANS AND DETAILS FOR SIGN STRUCTURE INSTALLATION AND PLACEMENT.
5. STANDARD SIGN PANELS ARE LISTED IN THE TABULATIONS WITH TWO DIMENSIONS THAT MAY NOT BE THEIR ACTUAL WIDTH OR HEIGHT, BUT INSTEAD ARE LENGTHS OF THEIR SIDES OR DIAMETER. SEE THE MNDOT STANDARD SIGNS AND MARKINGS MANUAL FOR ACTUAL DIMENSIONS OF THESE PANELS BASED UPON THE CORRESPONDING DIMENSIONS FROM THE TABULATIONS.
6. SIGNS AND DELINEATOR/MARKER TABULATIONS DISPLAY SIGN PANEL AND SUPPORT INFORMATION FOR NEW SIGNS. SIGNS BEING REMOVED OR SALVAGED MAY NOT INCLUDE PANEL OR SUPPORT INFORMATION IN THE TABULATION.
7. INSTALL SIGNS AFTER FINAL GRADING IS COMPLETE.

STANDARD PLANS	
NUMBER	DESCRIPTION
5-297.701	STANDARD SIGN PLACEMENT
5-297.702	DELINEATOR AND MARKER PLACEMENT
5-297.718	SQUARE TUBE SIGN MOUNTING DETAILS
5-297.722	FIN BASE FOR 2" SQUARE-TUBE RISER POST IN SOIL
5-297.724	SLIP BASE FOR 2-1/2" SQUARE-TUBE RISER POST
5-297.731	SIGN MOUNTING DETAILS FOR SIGNAL MAST ARMS

### SIGNING AND PERMANENT PAVEMENT MARKING PLAN INDEX

63	TITLE SHEET AND TABULATIONS
64 - 65	PAVEMENT MARKING DETAILS
66	SIGNING TABULATIONS
67	SIGNING DETAILS
68	LAYOUT

### ABBREVIATIONS

MA	MAST ARM
SQ-CONC	SQUARE TUBE ON CONCRETE
SQ-SOIL	SQUARE TUBE IN SOIL

### SIGNING LEGEND

+	SIGN
=	SIGN BACK TO BACK
↙	MAST ARM

### SYMBOLS & MATERIALS LEGEND

■	CROSSWALK BLOCK
↙	PAVEMENT MESSAGE (LEFT ARROW)

### STRIPING KEY

---	CIRCLE-MULTI COMP					
1ST DIGIT WIDTH 4", 8", ETC.	2ND DIGIT PATTERN S - SOLID B - BROKEN T - DOTTED D - DOUBLE SOLID K - DOUBLE BROKEN H - DOUBLE DOTTED	3RD DIGIT COLOR W - WHITE Y - YELLOW B - BLACK				
<table style="width: 100%; border: 1px solid black;"> <tr> <td style="padding: 2px;">G=GROUND IN</td> <td style="padding: 2px;">W=WET REFLECTIVE</td> </tr> <tr> <td style="padding: 2px;">C=CONTRAST</td> <td style="padding: 2px;">E=ENHANCED SKID RESISTANCE</td> </tr> </table>			G=GROUND IN	W=WET REFLECTIVE	C=CONTRAST	E=ENHANCED SKID RESISTANCE
G=GROUND IN	W=WET REFLECTIVE					
C=CONTRAST	E=ENHANCED SKID RESISTANCE					
EXAMPLE:  = 4" SOLID LINE WHITE PREF THERMO GROUND IN, CONTRAST, WET REFLECTIVE						

FILE: X:\F\J\1\SDWB\170688\5-Final-dsgn\51-drawings\40-Trans Hwy\Plansheets\CT170688\_sgn1.dgn  
MODEL: 1

12/26/31 PM

12/22/2023

DESIGN TEAM	NO.	BY	DATE	REVISIONS
DRAWN BY: <u>MRO</u>				
DESIGNER: <u>MRO</u>				
CHECKED BY: <u>JJP</u>				

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: Lic. No. 56671  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



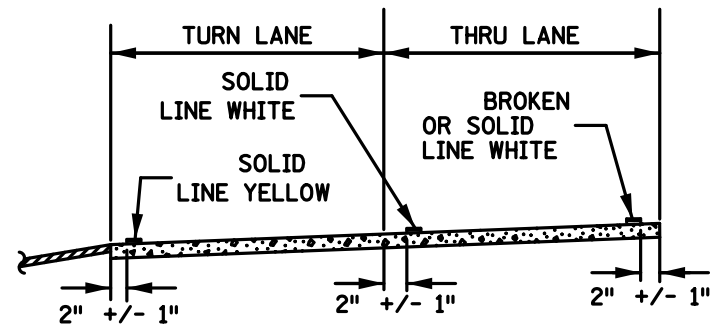
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNING AND PAVEMENT MARKING PLAN**  
 TITLE SHEET AND TABULATIONS

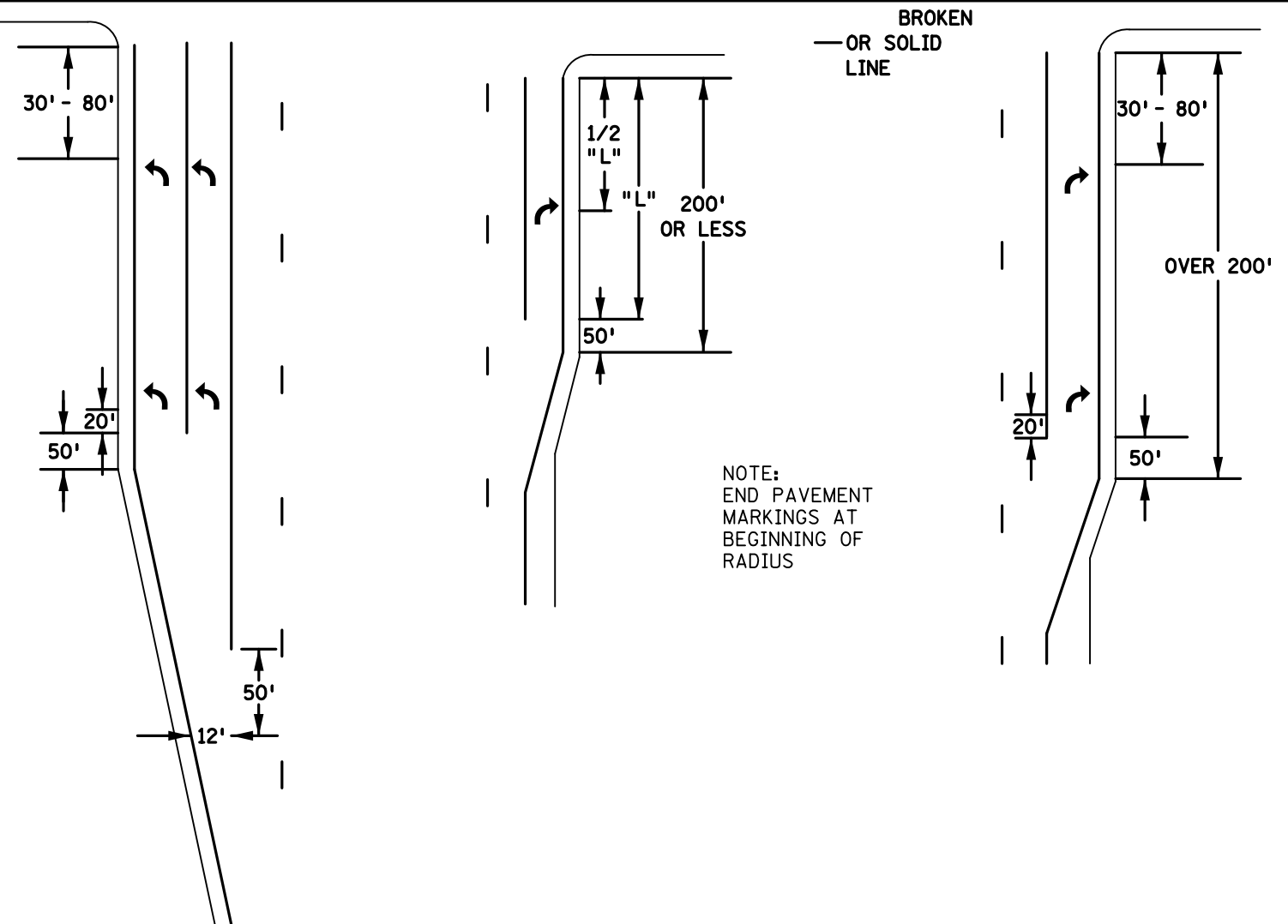
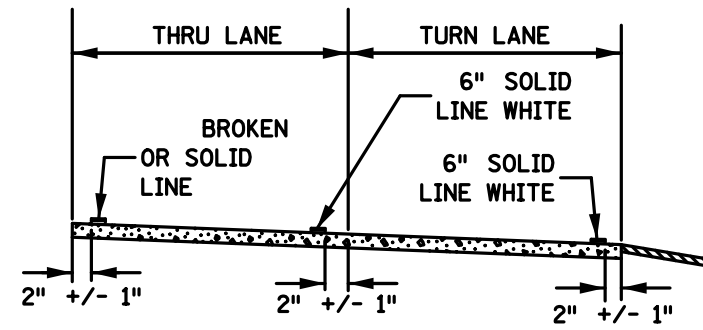
SEH FILE NO. ISDWB170688	<b>63</b>
SGN1 OF SGN14	<b>101</b>

# TURN LANE WITH ARROW MESSAGE

## LEFT TURN LANE



## RIGHT TURN LANE



NOTE:  
END PAVEMENT  
MARKINGS AT  
BEGINNING OF  
RADIUS

PUBLISHED BY OTE: 16 NOV 2021      MODIFIED:

12:26:32 PM  
 12/22/2023  
 FILE: X:\F\J\1\SDWB\170688\5-final-dsgn\51-drawings\40-Transhwy\Plansheets\CT170688\_sgn1.dgn  
 MODEL: 2

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

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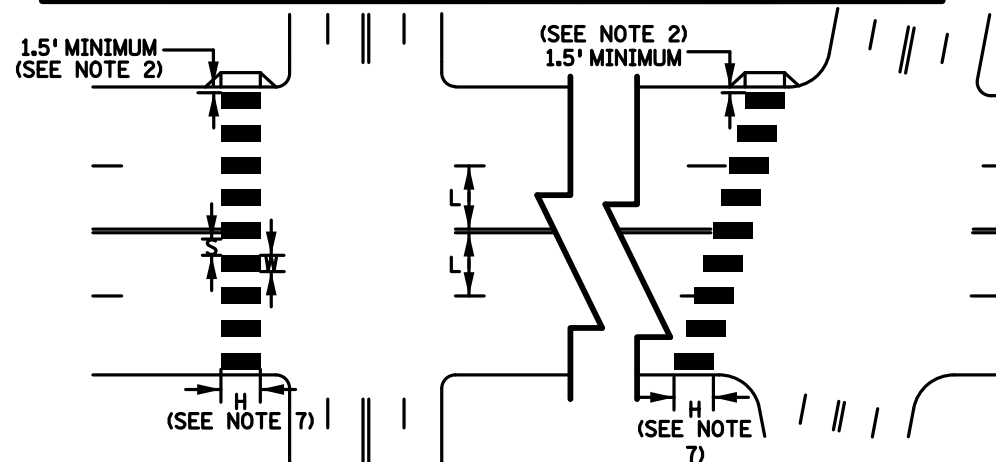


RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNING AND PERMANENT  
 PAVEMENT MARKING PLAN**  
 PAVEMENT MARKING DETAILS

# PEDESTRIAN CROSSWALK MARKINGS

(L) WIDTH OF INSIDE LANE	(W) WIDTH OF PAINTED AREA	(S) WIDTH OF SPACE	ALTERNATE (W) WIDTH OF PAINTED AREA	ALTERNATE (S) WIDTH OF SPACE
9'	2.0'	2.5'	—	—
10'	2.5'	2.5'	2.0'	3.0'
11'	2.5'	3.0'	2.0'	3.5'
12'	3.0'	3.0'	2.5'	3.5'
13'	3.0'	3.5'	—	—



## NOTES:

1. PAINTED AREAS TO BE CENTERED ON CENTERLINE AND LANE LINES.
2. A MINIMUM OF 1.5 FT. CLEAR DISTANCE SHALL BE LEFT ADJACENT TO THE CURB FACE. IF LAST PAINTED AREA FALLS INTO THIS DISTANCE IT MUST BE OMITTED.
3. ON TWO LANE TWO WAY STREETS, USE SPACING SHOWN FOR AN 11 FT. INSIDE LANE.
4. FOR DIVIDED ROADWAYS, ADJUSTMENTS IN SPACING OF THE BLOCKS SHOULD BE MADE IN THE MEDIAN SO THAT THE BLOCKS ARE MAINTAINED IN THEIR PROPER LOCATION ACROSS THE TRAVELED PORTION OF THE ROADWAY.
5. AT SKEWED CROSSWALKS, THE BLOCKS ARE TO REMAIN PARALLEL TO THE LANE LINES AS SHOWN.
6. THE BLOCKS SHALL BE PLACED SO THAT THEY ARE NOT LOCATED IN THE WHEEL PATH OF THE VEHICLES.
7. THE BLOCKS SHALL BE A MINIMUM OF 6' LONG AND AT LEAST AS LONG AS THE TRUNCATED DOMES, FOR FANNED TRUNCATED DOMES THE BLOCKS SHALL BE AT LEAST AS LONG AS THE APPROACHING SIDEWALK OR SHARED USE PATH.
8. THE ALTERNATE (W) AND (S) MAY BE USED WHEN BLOCKS LONGER THAN 6' (H) ARE USED.

PUBLISHED BY OTE: 20 NOV 2015

MODIFIED:

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

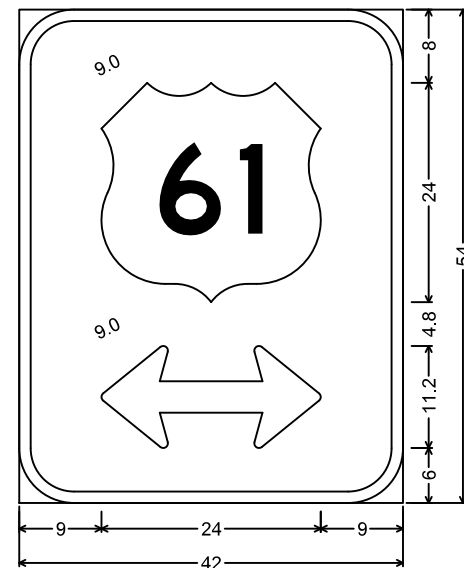
**SIGNING AND PERMANENT  
 PAVEMENT MARKING PLAN**  
 PAVEMENT MARKING DETAILS

SEH  
 FILE NO.  
 ISDWB170688  
 SGN3  
 OF SGN14

65  
 101

**SIGN AND DELINEATOR / MARKER**

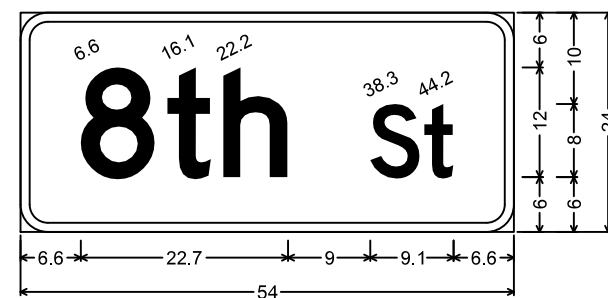
SIGN NUMBER	PANEL					SUPPORT		
	PANEL CODE	LEGEND	SIZE (W x H)	MOUNTING HEIGHT	A DISTANCE	TYPE	RISER POST SIZE	NUMBER OF POSTS
			INCHES	FEET	FEET		INCHES	
S-1	R3-2	NO LEFT TURN	36 x 36		2	MA		
S-2	R5-1	DO NOT ENTER	36 x 36	7		SQ-CONC	2	1
S-3	R4-7	KEEP RIGHT	24 x 30	7		SQ-CONC	2	1
	X4-3	CYLINDER STYLE DELINEATOR (WHITE)	9 x 6	4				
S-4	R3-2	NO LEFT TURN	36 x 36	7		SQ-CONC	2	1
S-5	OM3-L	TYPE 3 OBJECT MARKER LEFT	12 x 36	4		SQ-CONC	1-3/4	1
S-6	R3-7L	LEFT LANE MUST TURN LEFT	36 x 36	7		SQ-CONC	2	1
S-7	R1-1	STOP	36 x 36			SOIL		
	R6-3	DIVIDED HIGHWAY	36 x 30					
	X4-3	CYLINDER STYLE DELINEATOR (WHITE)	9 x 6					
S-8	R1-2	YIELD	36 X 36 X 36			SOIL		
	-	RAILROAD CROSSBUCK	x					
	-	RAILROAD CROSSBUCK	x					
S-8.1	W10-4L	TEE INTERSECTION RR PARALLEL TRACKS LEFT	36 x 36	7		SQ-SOIL	2	1
S-9	-	8TH ST	x			SOIL		
	-	HWY 61	x					
	R1-1	STOP	36 x 36					
	R6-3	DIVIDED HIGHWAY	36 x 30					
	X4-3	CYLINDER STYLE DELINEATOR (WHITE)	9 x 6					
S-10	R1-2	YIELD	36 X 36 X 36			SOIL		
	-	RAILROAD CROSSBUCK	x					
	-	RAILROAD CROSSBUCK	x					
S-11	DESIGN	TH61 DOUBLE ARROW	42 x 54		8	MA		
S-12	DESIGN	8TH ST	54 x 24		28	MA		
S-13	DESIGN	TH61 DOUBLE ARROW	42 x 54		8	MA		
S-14	DESIGN	8TH ST	54 x 24		28	MA		
S-15	-	SEVENTH ST	84 x 24		18	MA		
S-16	R10-X12	LEFT TURN YIELD ON FLASHING YELLOW ARROW	36 x 42		1	MA		
S-17	R10-X12	LEFT TURN YIELD ON FLASHING YELLOW ARROW	36 x 42		1	MA		
S-18	R10-X12	LEFT TURN YIELD ON FLASHING YELLOW ARROW	36 x 42		1	MA		
S-19	W10-2L	RR PARALLEL TRACKS LEFT INTERSECTION	36 x 36	7		SQ-CONC	2	1
S-20	R10-X12	LEFT TURN YIELD ON FLASHING YELLOW ARROW	36 x 42		2	MA		
S-21	R10-X12	LEFT TURN YIELD ON FLASHING YELLOW ARROW	36 x 42		2	MA		
S-22	R8-8	DO NOT STOP ON TRACKS	24 x 30	7		SQ-SOIL	2	1



S-11 & S-13: 6.0" Radius, 1.3" Border, White on, Green;  
US 61 M1-4a;  
Double Headed Arrow 5 - 24.0" 0';

**GENERAL INFORMATION:**

1. MOUNTING HEIGHT IS MINIMUM (WITH A + 6 INCH TOLERANCE)
2. SEE CURRENT MNDOT STANDARD SIGNS AND MARKINGS MANUAL FOR STANDARD SIGN DESIGNS, SPLICE PLATES, STRINGERS AND PUNCHING CODES.
3. SEE PANEL LAYOUTS FOR DESIGNS OF PANEL OVERLAYS OR PANEL CODES THAT BEGIN WITH THE LETTER "P" (P1, P2 ETC.).
4. SEE STANDARD PLANS AND DETAILS FOR SIGN STRUCTURE INSTALLATION AND PLACEMENT.
5. ALL SIGN PANEL DIMENSIONS ARE IN INCHES.



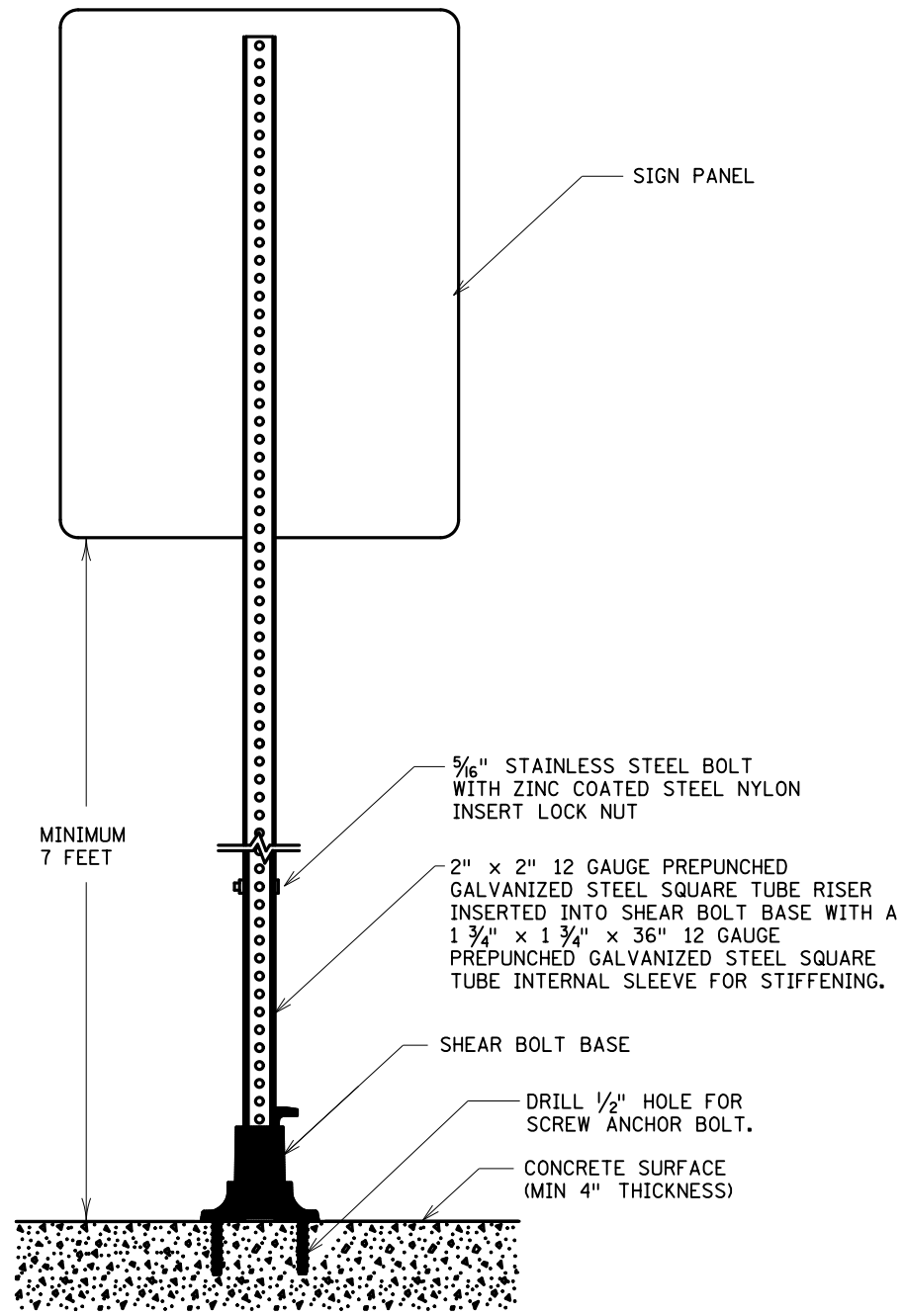
S-12 & S-14: 3.0" Radius, 1.0" Border, White on, Green;  
"8th", D 2K; "St", D 2K;

DESIGN TEAM				I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Certified By: <i>[Signature]</i> Lic. No. 56671 Printed Name: JOSHUA J. PALMATEER Date: 01/23/2024	SEH	RAMSEY COUNTY, MINNESOTA <b>T.H. 61</b> S.P. 6222-197	SIGNING AND PERMANENT PAVEMENT MARKING PLAN SIGNING TABULATIONS	SEH FILE NO. ISDWB170688 SGN4 OF SGN14	66 101
DRAWN BY: <u>MRO</u>									
DESIGNER: <u>MRO</u>									
CHECKED BY: <u>JJP</u>									
NO.	BY	DATE	REVISIONS						

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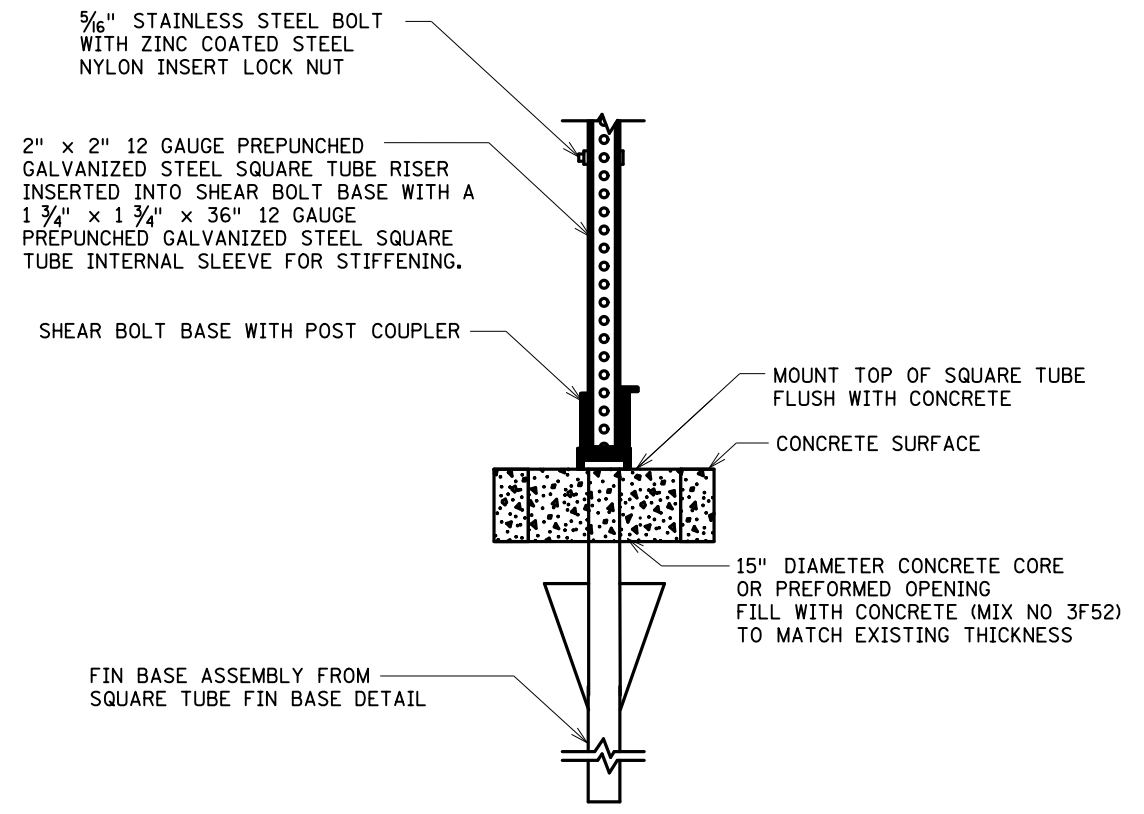
12/22/2023

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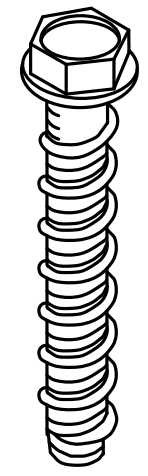


**SHEAR BOLT BASE MOUNTED TO CONCRETE SURFACE**

RISER POSTS TO BE MOUNTED CLOSE TO PLUMB. UP TO A MAXIMUM OF 1/2" OF SHIM WASHERS MAY BE USED BETWEEN SHEAR BOLT BASE AND CONCRETE FOR LEVELING. IF MORE THAN 1/2" OF SHIMS ARE REQUIRED, THEN CORE THROUGH THE CONCRETE.



**SHEAR BOLT BASE CORED THROUGH CONCRETE**



**SCREW ANCHOR BOLT**  
5" LONG CARBON STEEL THAT MUST MEET A MINIMUM ALLOWABLE TENSION LOAD OF 2270 PSI.

**NOTES:**

1. THE CRASH RESPONSE TYPE FOR THIS STRUCTURE IS BREAKAWAY.
2. TO MEET CRASHWORTHY REQUIREMENTS THE DISTANCE BETWEEN THE BOTTOM OF THE SIGN PANEL AND THE GROUND SURFACE BELOW ANY PORTION OF THE PRIMARY SIGN PANEL MUST BE A MINIMUM OF 7 FEET. SEE TABULATIONS FOR MOUNTING HEIGHT.
3. INSTALLATION OF SHEAR BOLT BASE MUST BE NO EARLIER THAN 3 DAYS AFTER CONCRETE IS PLACED.
4. FOR SHEAR BOLT BASE USE APPROVED PRODUCT FROM MnDOT APPROVED PRODUCTS LIST, PRODUCT MUST BE MODIFIED AS SHOWN.
5. USE ANTI SEIZE ON THE SHEAR BOLT CONNECTIONS.
6. FOR SIGN PANEL MOUNTING DETAILS SEE SQUARE TUBE SIGN MOUNTING DETAILS.
7. SQUARE TUBE SIGN POSTS PER MnDOT SPEC. 3402.

REV 4/20/21

**SHEAR BOLT BASE**  
FOR 2 INCH SQUARE TUBE RISER POST ON CONCRETE

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *[Signature]* Lic. No. 56671  
 Printed Name: JOSHUA J. PALMATEER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

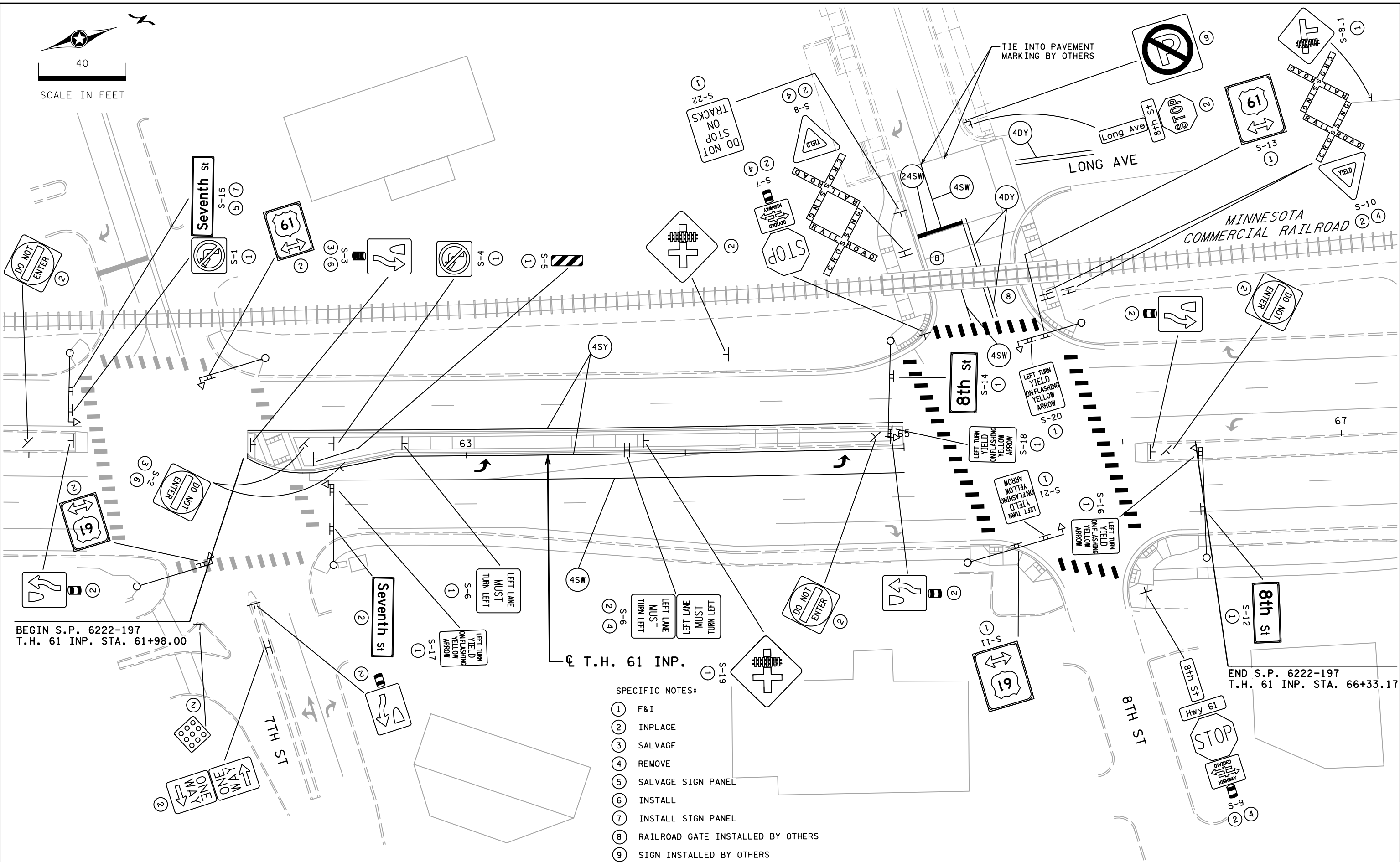
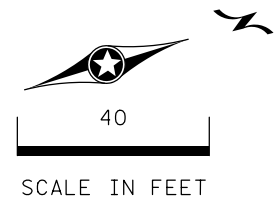
**SIGNING AND PERMANENT PAVEMENT MARKING PLAN**  
 SIGNING DETAILS

SEH FILE NO. ISDWB170688	<b>67</b>
SGN5 OF SGN14	<b>101</b>

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1/23/2024

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BEGIN S.P. 6222-197  
T.H. 61 INP. STA. 61+98.00

T.H. 61 INP.

END S.P. 6222-197  
T.H. 61 INP. STA. 66+33.17

SPECIFIC NOTES:

- ① F&I
- ② INPLACE
- ③ SALVAGE
- ④ REMOVE
- ⑤ SALVAGE SIGN PANEL
- ⑥ INSTALL
- ⑦ INSTALL SIGN PANEL
- ⑧ RAILROAD GATE INSTALLED BY OTHERS
- ⑨ SIGN INSTALLED BY OTHERS

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

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

Certified By: *[Signature]* Lic. No. 56671  
 Licensed Professional Engineer  
 Printed Name: JOSHUA J. PALMATEER Date: 01/23/2024



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNING AND PAVEMENT MARKING PLAN**  
 T.H. 61 INP. STA. 61+98.00 - 66+25.31

SEH FILE NO. 170688  
 SGN6 OF SGN14  
**68**  
**101**



### ABBREVIATIONS

APS	ACCESSIBLE PEDESTRIAN SIGNAL
AWF	ADVANCED WARNING FLASHER
BL	BLUE
BL/BLK	BLUE WITH BLACK TRACER
BLK	BLACK
BLK/R	BLACK WITH RED TRACER
BLK/WH	BLACK WITH WHITE TRACER
C.D.	COUNT DOWN
CH. SW.	CHECK SWITCH
CLR	CLEAR
D2-1 (e.g.)	DETECTOR (PHASE 2, NO. 1)
DEG	DEGREES
DWK	DON'T WALK
EQ.G	EQUIPMENT GROUND
EVP	EMERGENCY VEHICLE PRE-EMPTION
F&I	FURNISH AND INSTALL
FL	FLASH/FLASHING
FYA	FLASHING YELLOW ARROW
FYLA	FLASHING YELLOW LEFT ARROW
G	GREEN
G/BLK	GREEN WITH BLACK TRACER
GLA	GREEN LEFT ARROW
GRN	GREEN INDICATION
GR. RD.	GROUND ROD
GRA	GREEN RIGHT ARROW
GTA	GREEN THRU ARROW
HH	HANDHOLE
HPS	HIGH PRESSURE SODIUM
IMC	INTERMEDIATE METAL CONDUIT
IND	INDICATION
INP	INPLACE
INS. GR.	INSULATED GROUND
JB	JUNCTION BOX
LED	LIGHT EMITTING DIODE
LHT	LIGHT
LUM	LUMINAIRE
NEU	NEUTRAL
NMC	NONMETALLIC CONDUIT
O	ORANGE
O/BLK	ORANGE WITH BLACK TRACER
P1-1 (e.g.)	PEDESTRIAN INDICATION (PHASE 1, NO. 1)
PB	PUSH BUTTON
PB2-1 (e.g.)	PUSH BUTTON (PHASE 2, NO. 1)
PEC	PHOTOELECTRIC CELL
PED	PEDESTRIAN
PVC	POLYVINYL CHLORIDE (CONDUIT)
RED	RED INDICATION
R&S	REMOVE AND SALVAGE
R/BLK	RED WITH BLACK TRACER
RLA	RED LEFT ARROW
RSC	RIGID STEEL CONDUIT
S & I	SALVAGE AND INSTALL
SOP	SOURCE OF POWER
SPR	SPARE
ST LHT	STREET LIGHT
STA	STATION
SW	SWITCH
SWD	SWITCHED
TDW	TELEPHONE DROP WIRE
WH	WHITE
WH/BLK	WHITE WITH BLACK TRACER
WH/R	WHITE WITH RED TRACER
WLK	WALK
YEL	YELLOW INDICATION
YLA	YELLOW LEFT ARROW
YRA	YELLOW RIGHT ARROW

### SYMBOLS

	HANDHOLE
	EQ. G CONNECTION
	EVP CONFIRMATORY LIGHT
	EVP DETECTOR
	EVP DETECTOR & CONFIRMATORY LIGHT
	FIBER OPTIC VAULT
	LUMINAIRE NO.
	SIGNAL BASE NO.
	SIGNAL FACE NO./FLASHER FACE NO.
	SPLICE
	VIDEO DETECTION (ONE DIRECTION)
	360 DEGREE VIDEO DETECTION (FISHEYE/BELL CAMERA)
	MICROWAVE DETECTION
	SONIC DETECTION

FOR PLANS AND UTILITIES SYMBOLS  
SEE TECHNICAL MANUAL

### STANDARD PLATES - SIGNAL SYSTEMS

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

PLATE NO.	DESCRIPTION
8106 D	EQUIPMENT PAD B (3 SHEETS)
8112 I	PEDESTAL FOUNDATION (TRAFFIC CONTROL SIGNALS)
8118 D	SERVICE EQUIPMENT & POLE TRAFFIC CONTROL SIGNALS
8121 H	TRANSFORMER BASE & POLE BASE PLATE (2 SHEETS)
8122 F	PEDESTAL & BASE (FOR TRAFFIC CONTROL SIGNALS SUPPORT) (2 SHEETS)
8123 G	POLE & MAST ARM - LUMINAIRES & TRAFFIC LIGHTS ASSEMBLY (2 SHEETS)
8126 L	POLE FOUNDATION (PA90 & PA100)
8129 A	SHIM AND WASHER (TRAFFIC CONTROL SIGNALS AND ROADWAY LIGHTING)
8132 B	PREFORMED RIGID PVC CONDUIT LOOP DETECTOR (3 SHEETS)

### STANDARD PLANS

NUMBER	DESCRIPTION
5-297.731	SIGN MOUNTING FOR SIGNAL MAST ARMS
5-297.869	350 ATCC AND SSB CABINET EQUIPMENT PAD - CAST IN PLACE

### WIRE COLOR CODE KEY

R	Red
O	Orange
BL	Blue
WH	White
BLK	Black
BRN	Brown
CL	Clear
G	Green
R/BLK	Red with Black Stripe
O/BLK	Orange with Black Stripe
BL/BLK	Blue with Black Stripe
WH/BLK	White with Black Stripe
WH/R	White with Red Stripe
BLK/WH	Black with White Stripe
BLK/R	Black with Red Stripe

### CONDUCTOR AND CABLE SPECIFICATION CHART

Type	Name	Specification Number
1/C 2	Power Conductors	3815.2B.1
1/C 6	Power Conductors	3815.2B.1
1/C 6 INS.GR.	Grounding Conductors	3815.2B.5
2/C 14	Loop Detector Lead-In Cable	3815.2C.4
3/C 14	Signal Control Cable	3815.2C.3
4/C 14	Signal Control Cable	3815.2C.3
6/C 14	Signal Control Cable	3815.2C.3
12/C 14	Signal Control Cable	3815.2C.3
6PR 19	Telephone Cables Outdoor	3815.2C.6.b
3/C 20	EVP Detector Cable	3815.2C.5

### CONDUCTOR COLOR CODE

FROM	TO DEVICE
SIGNAL SERVICE	1/C 6 EGC AS SHOWN ON PLAN
SOP	3-1/C 2 R WH BLK SIGNAL SERVICE
SIGNAL SERVICE	3-1/C 6 BLK WH G SIGNAL CABINET
SIGNAL CABINET	(6SM) CABLE SIGNAL CABINET
SIGNAL CABINET TO DEVICE	
6PR 19	AS SHOWN ON PLAN
COAXIAL CABLE	AS SHOWN ON PLAN
4/C 18 CABLE	R BLK WH AS SHOWN ON PLAN
2/C 14 CABLE	BLK WH OR CLR AS SHOWN ON PLAN
3/C 20 CABLE	R OR O WH OR YEL BLK OR BL AS SHOWN ON PLAN
CAT 5	AS SHOWN ON PLAN

SIGNAL CABINET TO DEVICE	
6/C 14 CABLE	R RED/RLA O YEL/YLA BL GRN/GLA WH NEU BLK/R YLA/FYA BLK GLA

4/C 14 CABLE	R RED/DWK BLK/R YEL/WLK BLK GRN/SPR WH NEU
--------------	---

4/C 14 CABLE	R RED BLK/R YEL BLK GRN WH NEU
4/C 14 CABLE	R FYA BLK/R YLA BLK GLA WH NEU

3/C 14 CABLE	BLK EVP LIGHT/AWF G LUMINAIRE WH VIDEO CAMERA ENFORCEMENT LIGHT
--------------	---

NOTES:  
ARRANGE AND TERMINATE CONDUCTORS AND CABLES AS SHOWN WITHOUT SPLICE.  
NUMBER ONLY MEANS AWG CONDUCTOR SIZE (e.g. 14=14AWG)  
1/C MEANS AN INDIVIDUAL CONDUCTOR NOT PART OF A CABLE ASSEMBLY

### CABLE LABELING ABBREVIATIONS

ABBREVIATION	LABEL REFERENCE DESCRIPTION & EXAMPLE	COMPONENT
X-Y	INDICATION NUMBER 2-1	SIGNAL HEAD
X-Y	LOOP NUMBER D2-1	DETECTOR
X-Y	PUSH BUTTON NUMBER PB2-1	PUSH BUTTON
X-Y	PED INDICATION NUMBER P2-1	PED INDICATION
X-Y	LUMINAIRE NUMBER L1	LUMINAIRE
X-Y	EVP PHASE NUMBER EVP 2+5	EVP DETECTOR
X-Y	EVP LIGHT PHASE NUMBER EVPL 2+5	EVP CON. LIGHT
X-Y	VIDEO DETECTION PHASE V2-1	VIDEO DETECTION
X-Y	RADAR DETECTION PHASE RD2-1	RADAR DETECTION
SS	SIGNAL SERVICE	SERVICE WIRE
CC	CABINET COMMS	COMMS CABLE
FO	FIBER OPTIC	FIBER CABLE
SPARE Y	SPARE WIRE TO POLE NUMB. SPARE1	SPARE WIRE
ELYZ *	ENFORC. LIGHT POLE & DIRECTION	ENFORCEMENT LIGHT
PTZ1	PTZ CAMERA POLE NUMBER PTZ1	PTZ CAMERA
IC	INTERCONNECT CABLE	INTERCONNECT
EGC	EQUIPMENT GROUNDING CONDUCTOR	GROUND

X = SIGNAL SYSTEM PHASE NUMBER; REFER TO THE PLAN  
Y = SIGNAL SYSTEM ASSIGNED COMPONENT NUMBER; REFER TO THE PLAN  
Z \* = DIRECTION  
FURNISH AND INSTALL LABELS ON CABLES WITH ABBREVIATIONS SHOWN ON THIS TABLE AND IN ACCORDANCE WITH THE WIRING DIAGRAM.

TRUNK HIGHWAY 61 AT 7TH STREET / 8TH STREET

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

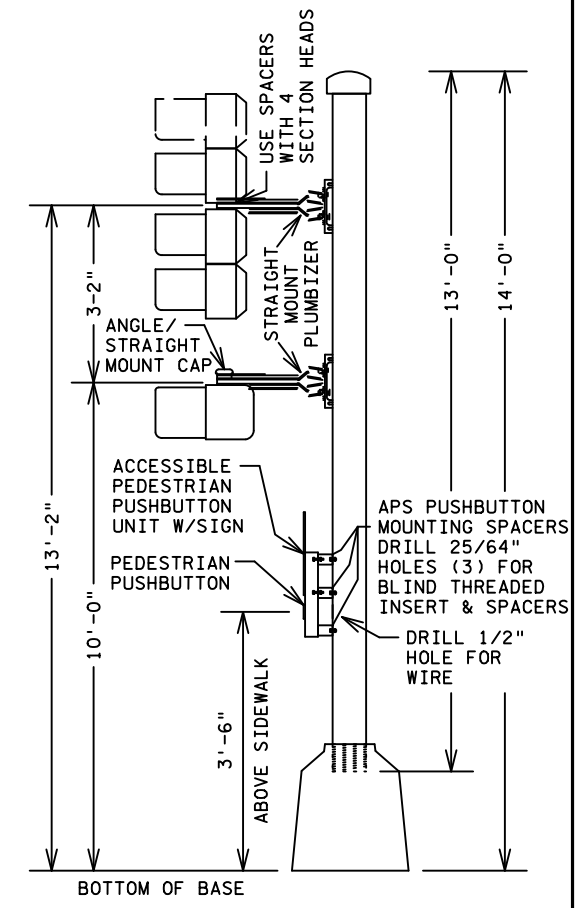
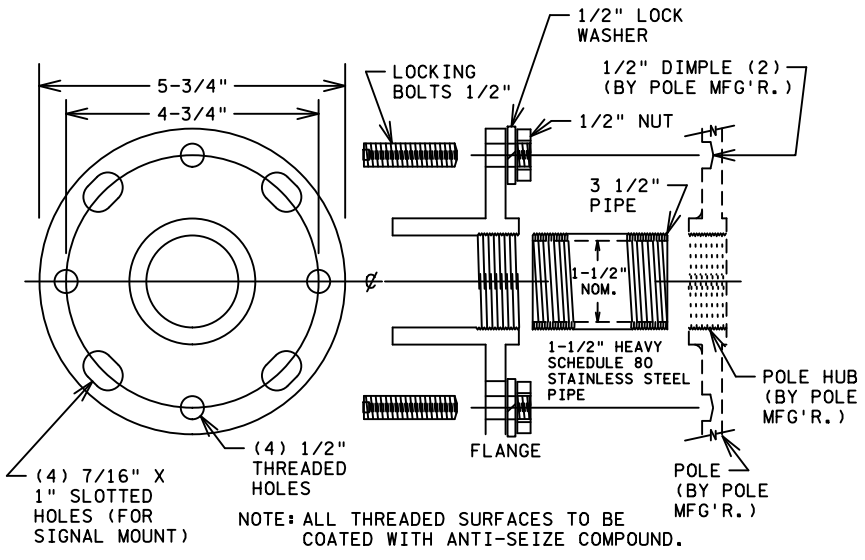
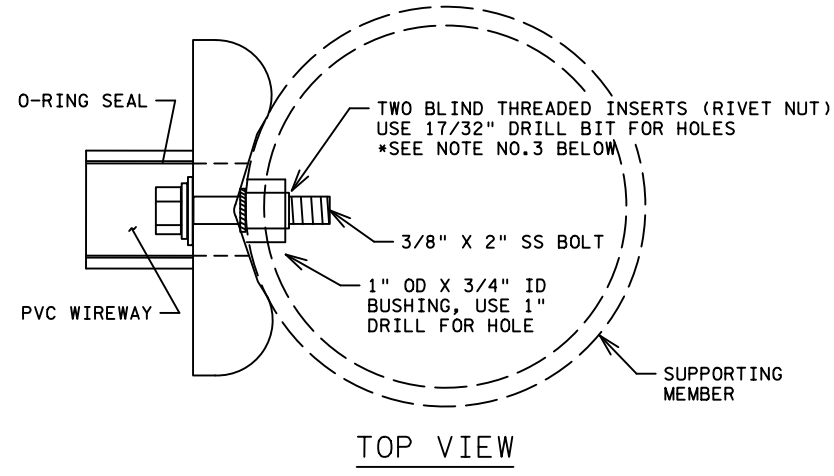
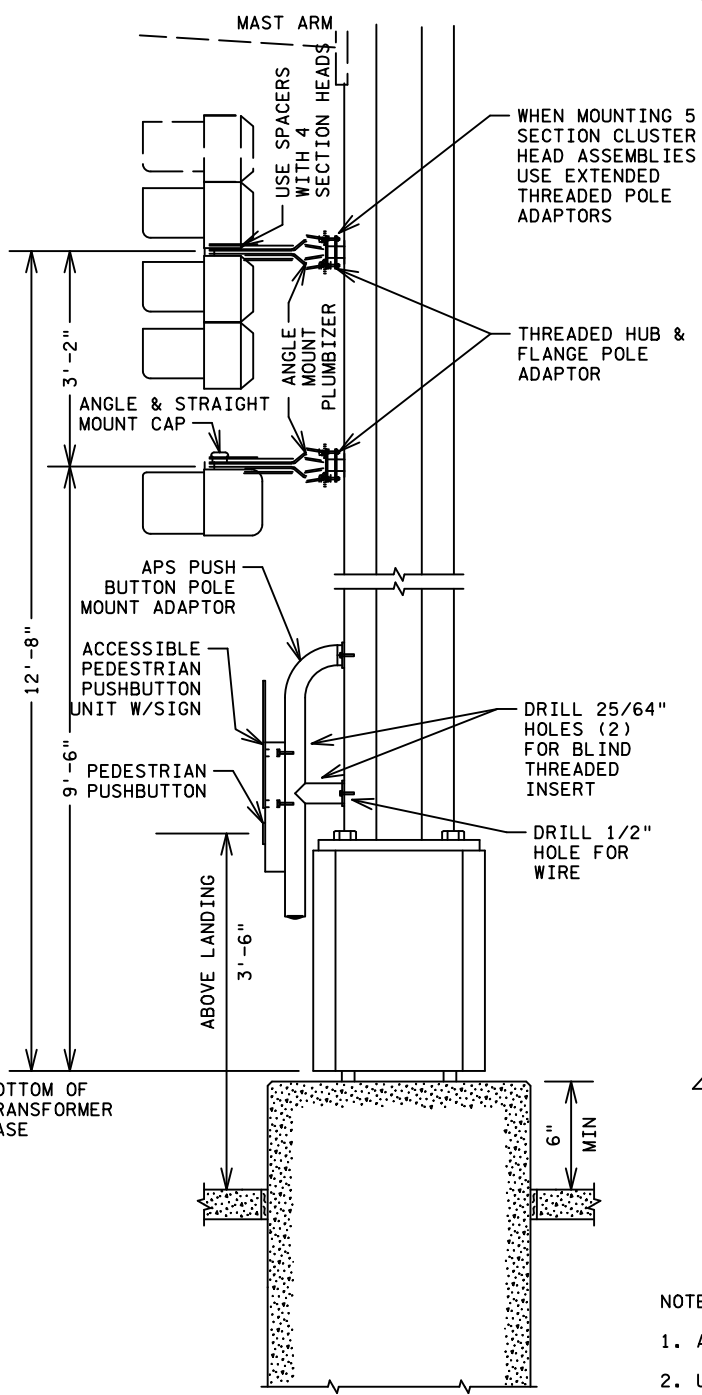
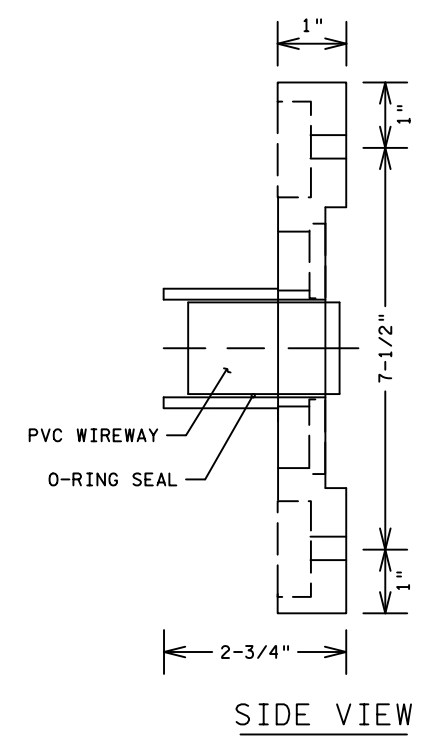
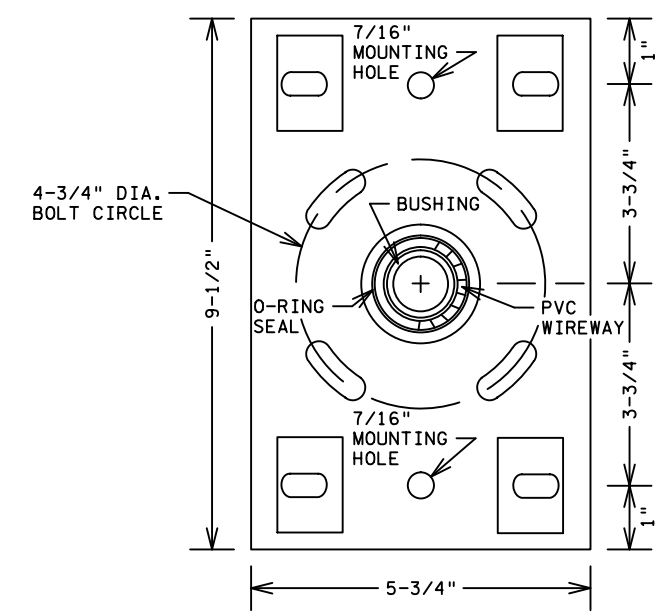
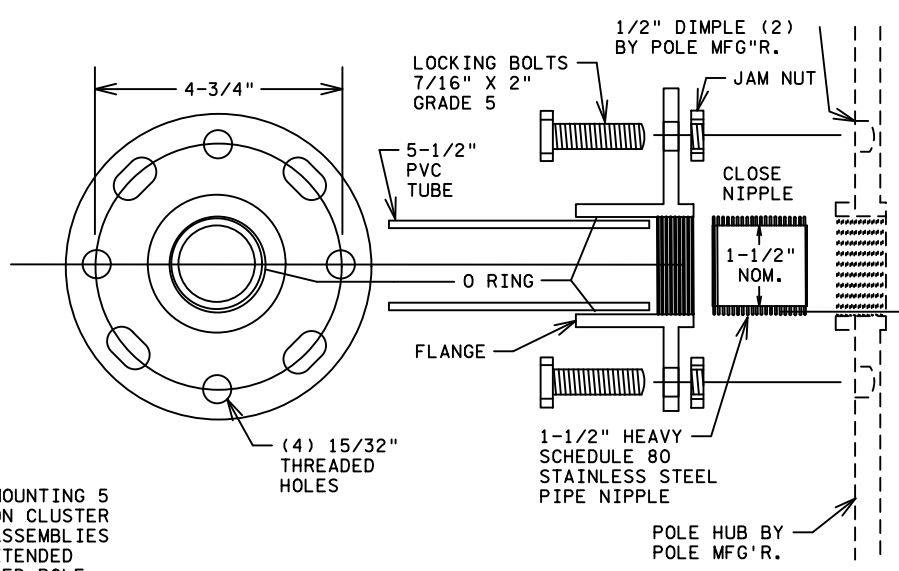
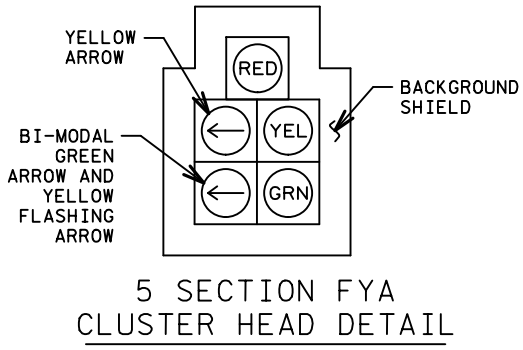
**SIGNAL PLAN**  
DETAILS & STANDARD PLATES

SEH FILE NO. ISDWB170688	<b>69</b>
SG1 OF 5627	<b>101</b>

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12/22/2023

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MODEL: sgl2



- NOTES:**
1. ALL THREADED SURFACES TO BE COATED WITH ANTI-SEIZE COMPOUND.
  2. USE SIGNAL HEAD MOUNTED SPACERS FOR 4 SECTION POLY HEADS.
  3. SEE STANDARD PLATE NUMBER 8123 FOR ADDITIONAL SIGNAL POLE DETAILS.
  4. EXTENDED THREADED POLE ADAPTOR ONLY USED WITH 5 SECTION CLUSTER HEADS.

- NOTES:**
1. ALL THREADED SURFACES TO BE COATED WITH ANTI-SEIZE COMPOUND.
  2. USE SIGNAL HEAD MOUNTED SPACERS FOR 4 SECTION POLY HEADS.
  3. BLIND THREADED INSERTS (RIVET NUT) MUST BE INSERTED USING MANUFACTURERS SPECIFIC INSERTION TOOL. NO OTHER METHOD IS ACCEPTABLE.
  4. SEE STANDARD PLATE NUMBER 8122 FOR ADDITIONAL PEDESTAL POLE DETAILS.

TRUNK HIGHWAY 61 AT 7TH STREET / 8TH STREET

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

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

Certified By: *John M. Gray* Lic. No. 22457  
 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
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**SIGNAL PLAN**  
 ONE-WAY MOUNT DETAILS

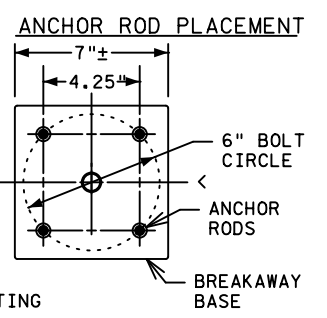
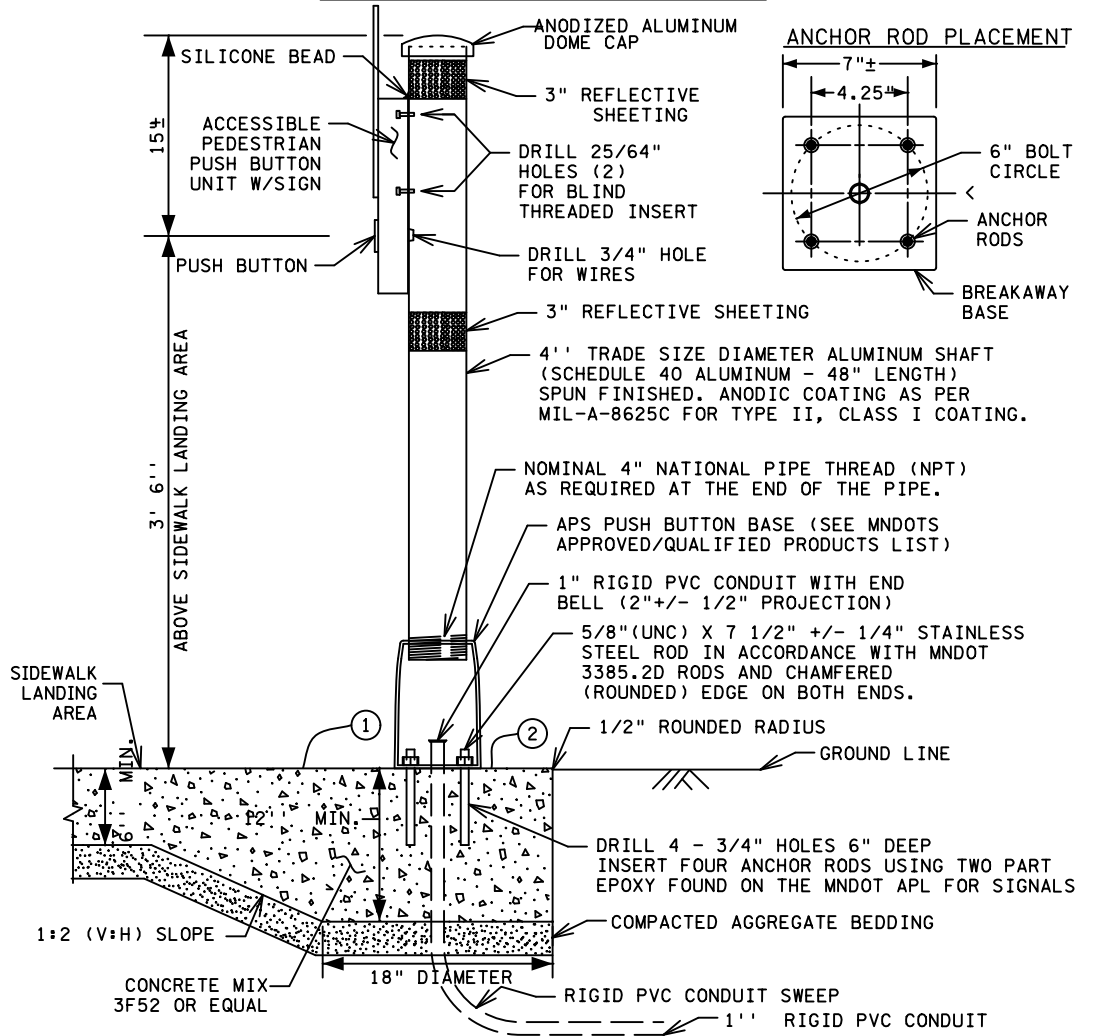
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**70**  
 SG2 OF SG27  
**101**

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12/22/2023

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MODEL: sqj3

### APS PUSH BUTTON STATION



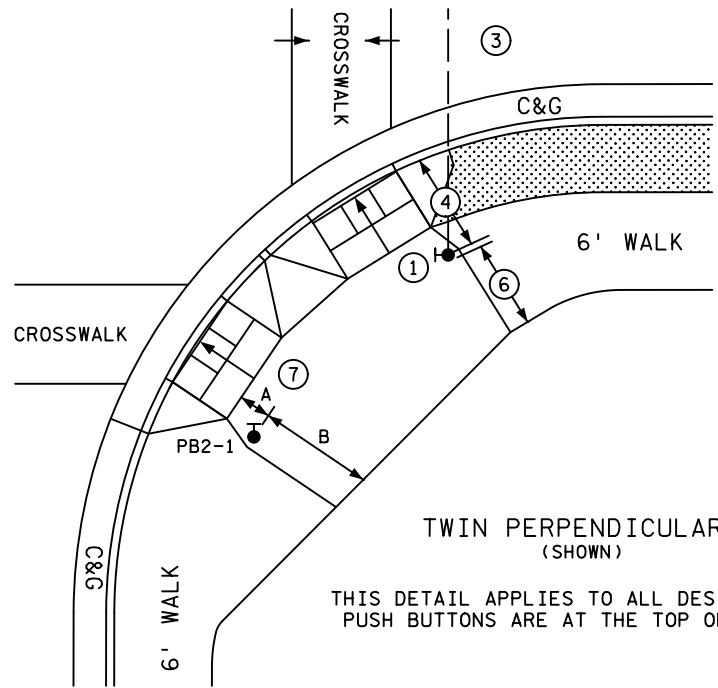
- NOTES:**
- PLACEMENT AND ORIENTATION OF THE PUSH BUTTON STATION IS CRITICAL. MOUNT THE BUTTON SO THAT THE FACE IS PARALLEL WITH THE ASSOCIATED CROSSWALK. SCREW IN SHAFT TO A TIGHTENED POSITION BEFORE MOUNTING ACCESSIBLE PEDESTRIAN PUSH BUTTON UNIT TO THE SHAFT.
  - ORIENT ACCESS OPENING ON THE BREAKAWAY PEDESTAL DIRECTLY BELOW THE APS BUTTON.
  - PLUMB THE PUSH BUTTON STATION WITH LEVELING SHIMS IN ACCORDANCE WITH STANDARD PLATE 8129.
  - INSTALL BLIND THREADED INSERTS USING MANUFACTURER'S SPECIFIC INSERTION TOOL.
  - USE ZINC PLATED STEEL 1/4 - 20 UNC BLIND THREADED INSERTS SUITABLE FOR MOUNTING ON SURFACE WALL THICKNESS OF .337. APPROVED BLIND INSERTS ARE LISTED ON MNDOT'S APPROVED/QUALITY PRODUCTS LIST WEBSITE FOR TRAFFIC SIGNALS.
  - USE APS 1/4 - 20 STAINLESS STEEL MOUNTING BOLTS. APPLY BRUSH ON ANTI SEIZE COMPOUND TO BOLTS PRIOR TO ASSEMBLY.
  - APPLY A BEAD OF 100% SILICONE SEALANT ALONG THE TOP OF THE PUSH BUTTON UNIT WHERE IT COMES IN CONTACT WITH THE 4" SHAFT.
  - USE WHITE REFLECTIVE SHEETING AT INTERSECTION CORNERS AND YELLOW REFLECTIVE SHEETING IN CENTER MEDIANS. APPROVED TUBE DELINEATOR SHEETING IS LISTED ON MNDOT'S APPROVED/QUALIFIED PRODUCTS LIST WEBSITE FOR SIGNING.
  - AN 18" X 6" FIBER FORMING TUBE MAY BE USED FOR THE LOWER HALF OF THE FOUNDATION WHEN CONDITIONS DO NOT ALLOW FOR THE 18" X 6" HOLE TO STAND OPEN.
- THE PUSH BUTTON STATION FOUNDATION IS MONOLITHIC (POURED AT ONE TIME) WITH THE SIDEWALK. PROVIDE A 1:2 (V:H) SLOPE GRADE WHERE THE 6" MIN SIDEWALK DEPTH TRANSITIONS TO THE 12" MIN FOUNDATION DEPTH. MAINTAIN THE COMPACTED AGGREGATE BEDDING AND THICKNESS USED FOR THE SIDEWALK THROUGHOUT THE SLOPE AND FOUNDATION GRADING. PROVIDE 1:2 (V:H) SLOPE GRADING 360 DEGREES FOR THE TRANSITION FROM THE SIDEWALK TO THE FOUNDATION WHEN THE FOUNDATION IS NOT LOCATED NEAR EDGE OF SIDEWALK AND IS SURROUNDED BY CONCRETE WALK.
  - ENSURE CONCRETE CONTROL JOINTS AND EDGE OF CONCRETE WALK ARE A MINIMUM 9" FROM THE CENTER OF THE PUSH BUTTON FOUNDATION.

### TYPICAL APS PEDESTRIAN PUSH BUTTON LOCATION

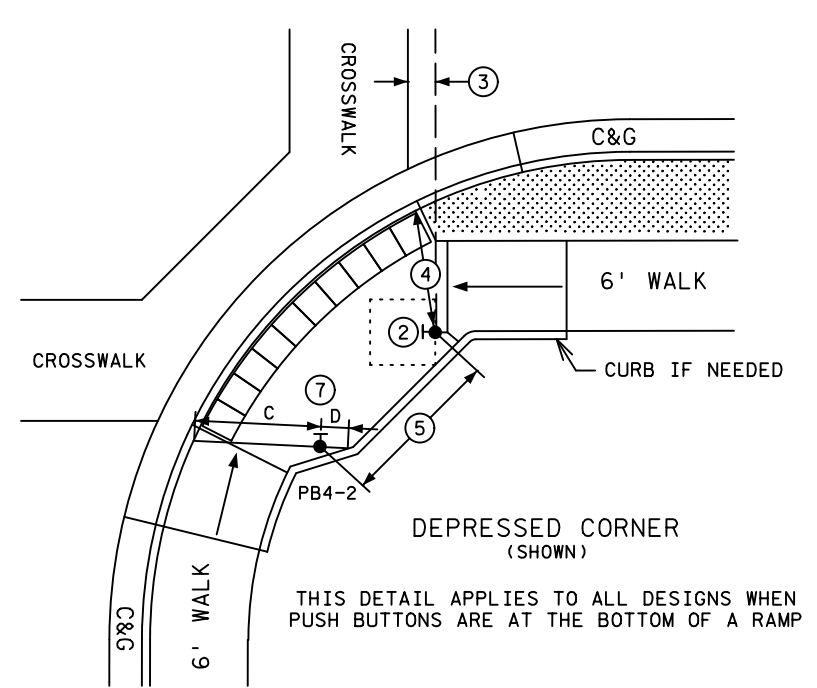
THIS IS A GENERAL DETAIL INTENDED TO SHOW THE REQUIREMENTS OF APS PUSH BUTTON LOCATION. FOR PROJECT SPECIFIC INFORMATION REGARDING PEDESTRIAN RAMP LAYOUT AND PUSH BUTTON LOCATIONS, SEE THE PLAN.

#### SUPPLEMENTAL GUIDANCE FOR CONSTRUCTING COMPLIANT APS PUSH BUTTONS:

- THE FACE OF THE BUTTON SHALL BE PARALLEL WITH THE OUTSIDE EDGE OF CROSSWALK.
- A MINIMUM 4 FT X 4 FT LANDING AREA SHALL BE PROVIDED ADJACENT TO EACH BUTTON, WITH A 2 PERCENT MAXIMUM SLOPE IN ALL DIRECTIONS.
- BUTTONS SHALL BE WITHIN 5 FT OF THE OUTSIDE EDGE OF THE CROSSWALK.
- BUTTONS SHALL BE BETWEEN 1.5 FT AND 10 FT FROM THE BACK OF CURB OR EDGE OF ROADWAY, MEASURED IN THE DIRECTION OF TRAVEL. STANDALONE PUSH BUTTON STATIONS SHOULD BE 4' MINIMUM FROM THE BACK OF CURB TO AVOID KNOCKDOWNS.
- BUTTONS MINIMUM 10 FT APART.
- PROVIDE A MAINTENANCE ACCESS ROUTE (MAR) WHEREVER POSSIBLE FOR SNOW REMOVAL PURPOSES. A MAR REQUIRES A 6 FT MINIMUM CLEAR DISTANCE BETWEEN A PUSH BUTTON AND ANY OBSTRUCTIONS, INCLUDING BUILDINGS, V-CURB, ELECTRICAL FOUNDATIONS, SIGNAL CABINETS, OR ANOTHER PUSH BUTTON.
- BUTTON SHOULD BE 2 FT MINIMUM FROM RAMP GRADE BREAK AND BACK OF WALK.

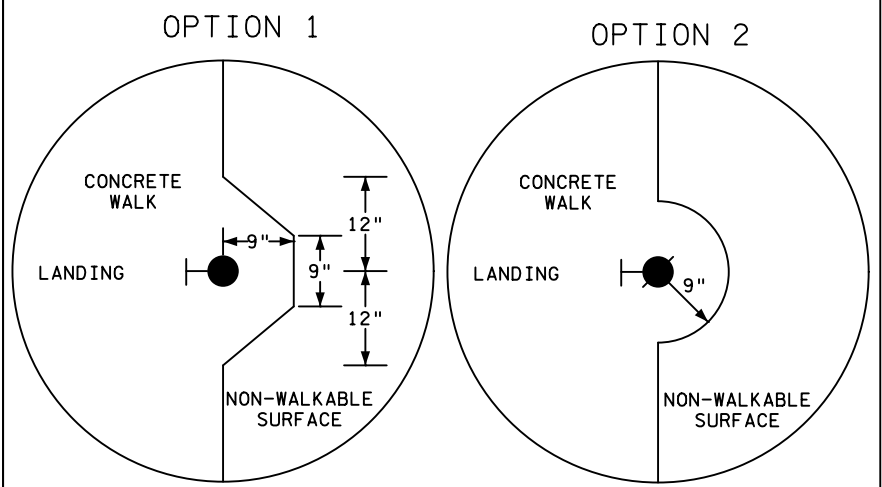


THIS DETAIL APPLIES TO ALL DESIGNS WHEN PUSH BUTTONS ARE AT THE TOP OF A RAMP



THIS DETAIL APPLIES TO ALL DESIGNS WHEN PUSH BUTTONS ARE AT THE BOTTOM OF A RAMP

CONTRACTOR MUST USE OPTION 1 OR 2 WHEN THE APS PUSH BUTTON IS SHOWN AT THE EDGE OF WALK. OPTION USED (OR SELECTED) MUST BE THE SAME THROUGHOUT THE ENTIRE PROJECT.



SIGNAL CONTROL POINTS			DISTANCE TO FRONT OF LANDING (FT)	DISTANCE TO BACK OF LANDING (FT)
SIGNAL NO.	X	Y		
PB2-1	-	-	A	B
PB4-2	-	-	C	D

- A - DISTANCE MEASURED FROM THE PUSH BUTTON TO THE FRONT OF LANDING/TOP OF RAMP
- B - CLEAR DISTANCE MEASURED FROM THE PUSH BUTTON TO THE BACK OF LANDING/EDGE OF WALK
- C - CLEAR DISTANCE MEASURED FROM THE PUSH BUTTON TO THE OUTSIDE EDGE OF DOMES IN THE DIRECTION OF TRAVEL
- D - CLEAR DISTANCE FROM THE PUSH BUTTON TO THE BACK OF LANDING MEASURED IN THE OPPOSITE DIRECTION OF TRAVEL

TRUNK HIGHWAY 61 AT 7TH STREET / 8TH STREET

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

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

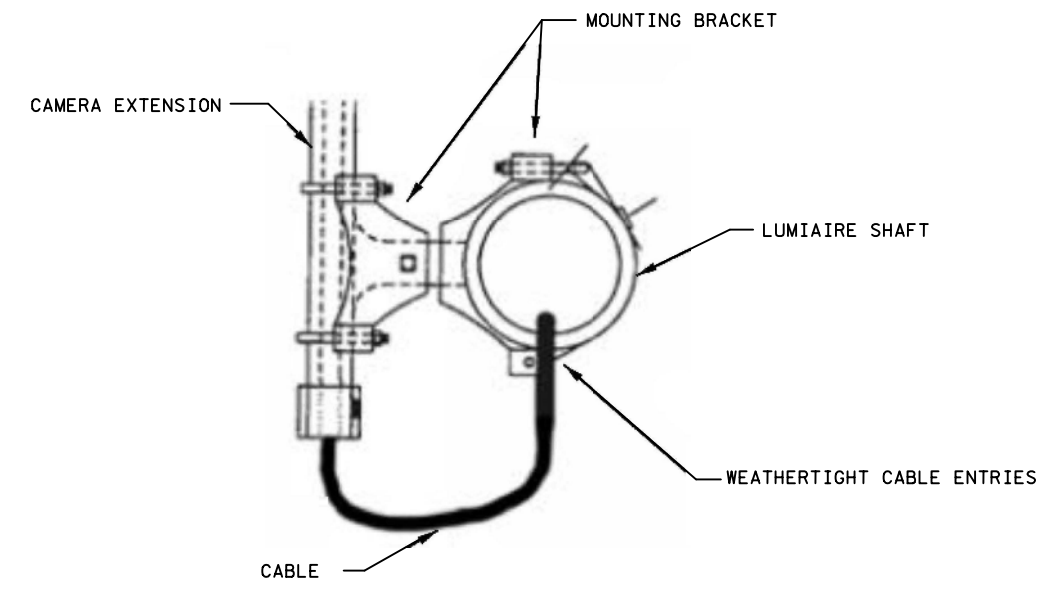
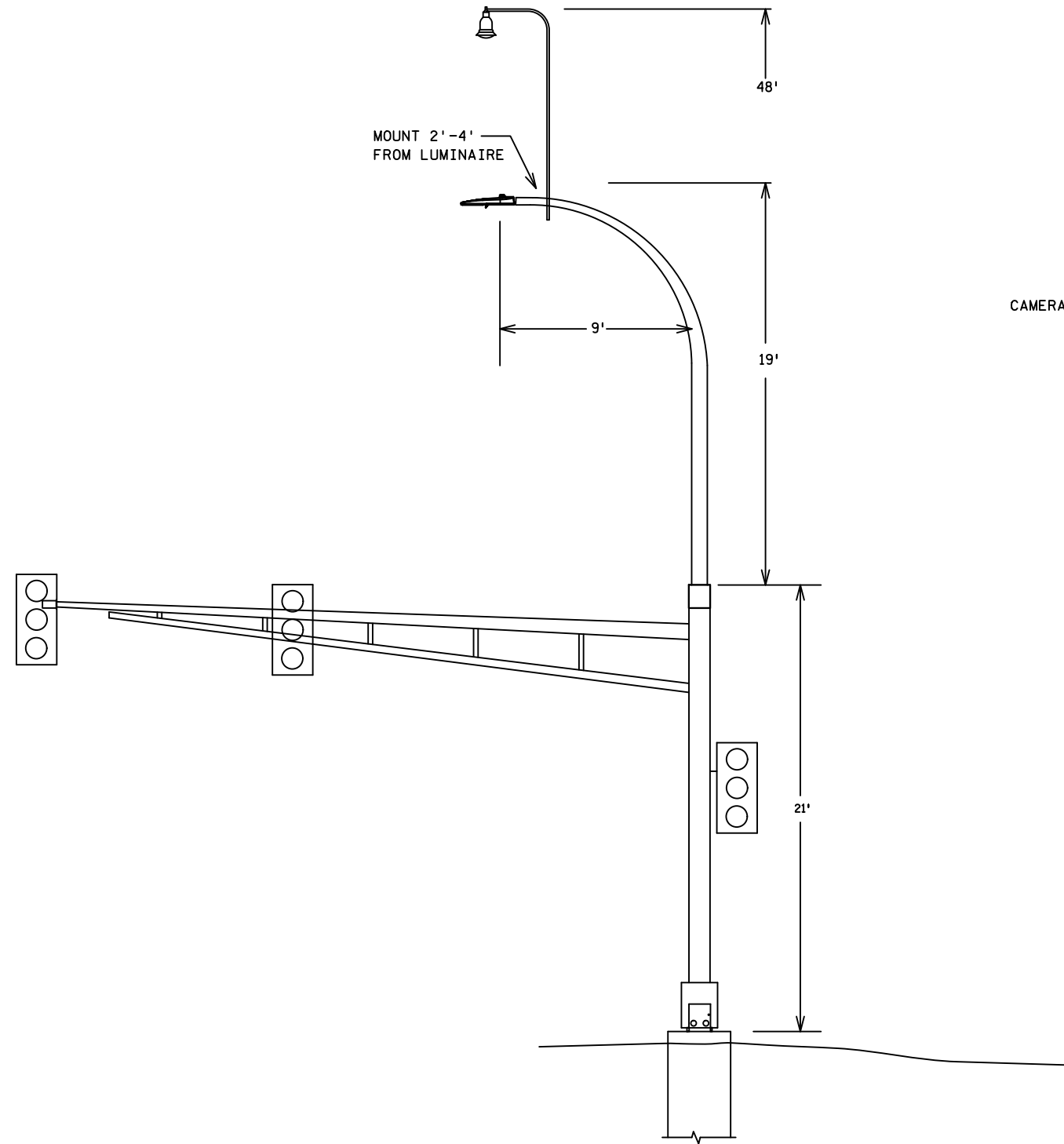
Certified By: *John M. Gray* Lic. No. 22457  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 APS PUSH BUTTON STATION DETAILS

TYPICAL LUMINAIRE FISHEYE/BELL CAMERA MOUNTING DETAIL



TYPICAL WIRING OF LUMINAIRE SHAFT MOUNTED FISHEYE/BELL CAMERA AND MOUNTING BRACKET

NOTES:

1. CAMERA DETECTION EQUIPMENT (INCLUDING CAMERA, CAMERA EXTENSION, AND MOUNTING BRACKET) WILL BE FURNISHED BY THE STATE TO BE INSTALLED BY THE CONTRACTOR.
2. THE CABLE (CAT 5E) BETWEEN THE CAMERA AND THE TRAFFIC SIGNAL CONTROL CABINET SHALL BE CONTINUOUS. THE CAT 5E CABLE SHALL BE TERMINATED BY THE CONTRACTOR.
3. THE CONTRACTOR SHALL INSTALL THE CAMERA PER MANUFACTURER INSTRUCTIONS. THE CAMERA SHALL BE ADJUSTED AND LEVELED TO THE SATISFACTION OF MNDOT TRAFFIC OFFICE PERSONNEL.
4. THE VIDEO DETECTION CAMERA AND BRACKETING MUST BE GROUNDED.

TRUNK HIGHWAY 61 AT 8TH STREET

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 MODEL: sgl4

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *John M. Gray* Lic. No. 22457  
 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



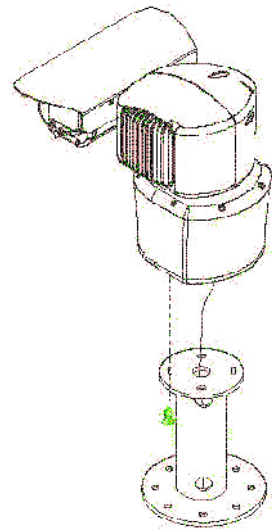
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 LUMINAIRE FISHEYE/BELL VIDEO DETECTION CAMERA MOUNTING DETAIL

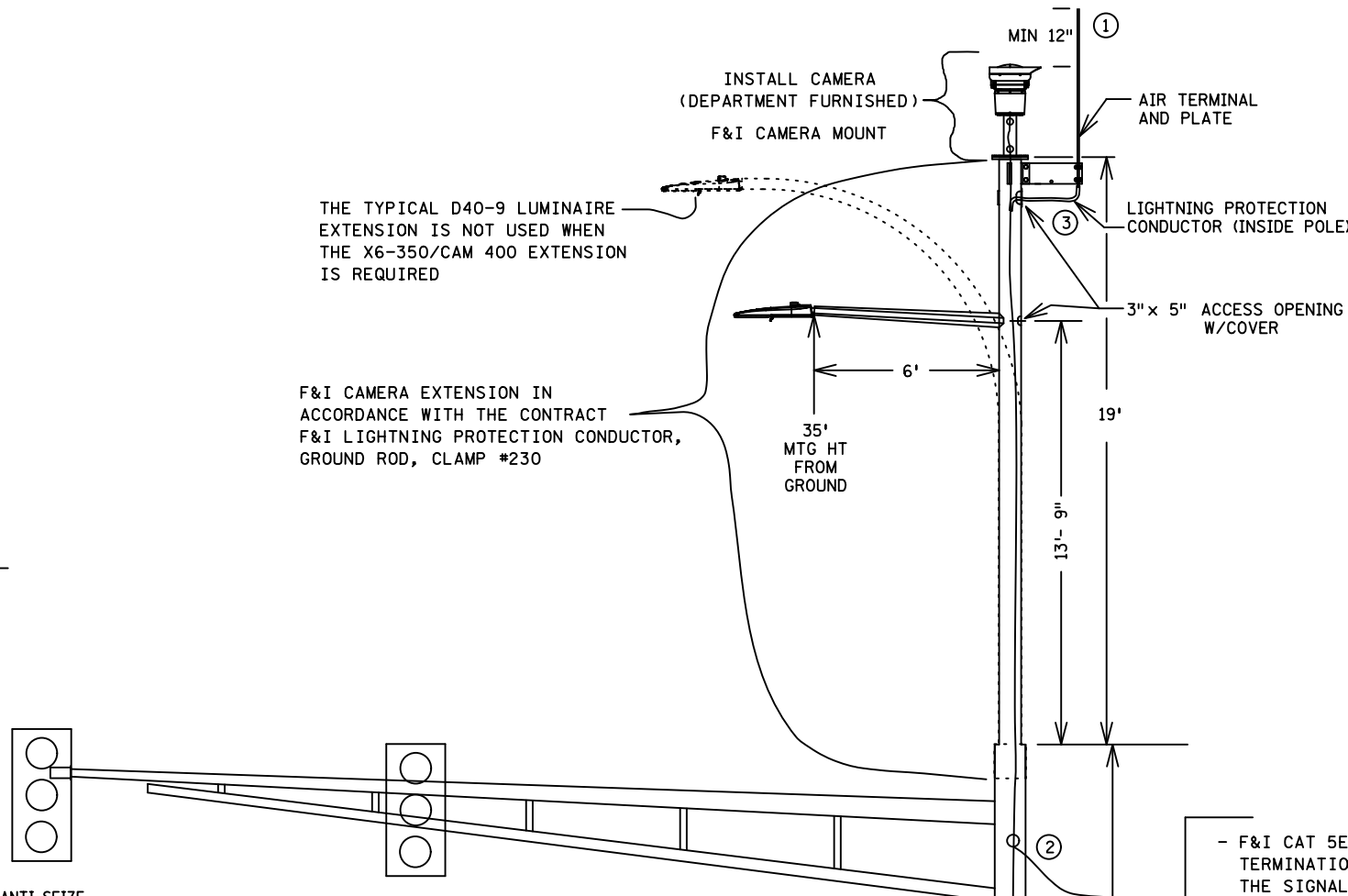
SEH FILE NO. ISDWB170688	<b>72</b>
SG4 OF SG27	<b>101</b>

ISOMETRIC VIEW- CAMERA & MOUNT

(DEPARTMENT FURNISHED)



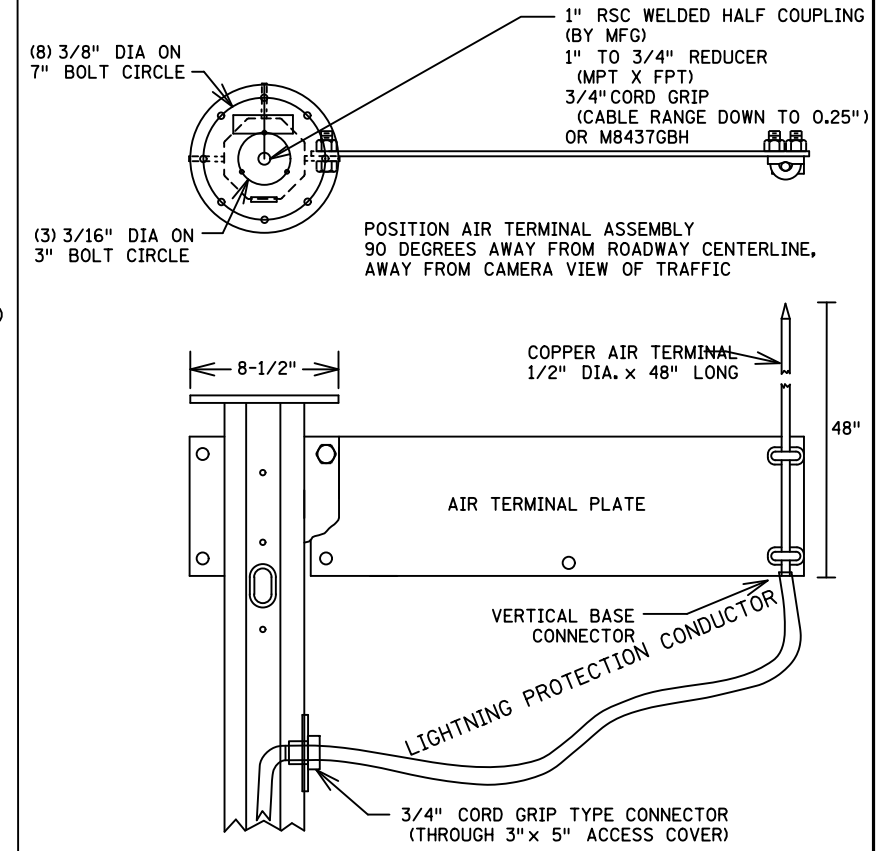
X6-350/CAM 400



THE TYPICAL D40-9 LUMINAIRE EXTENSION IS NOT USED WHEN THE X6-350/CAM 400 EXTENSION IS REQUIRED

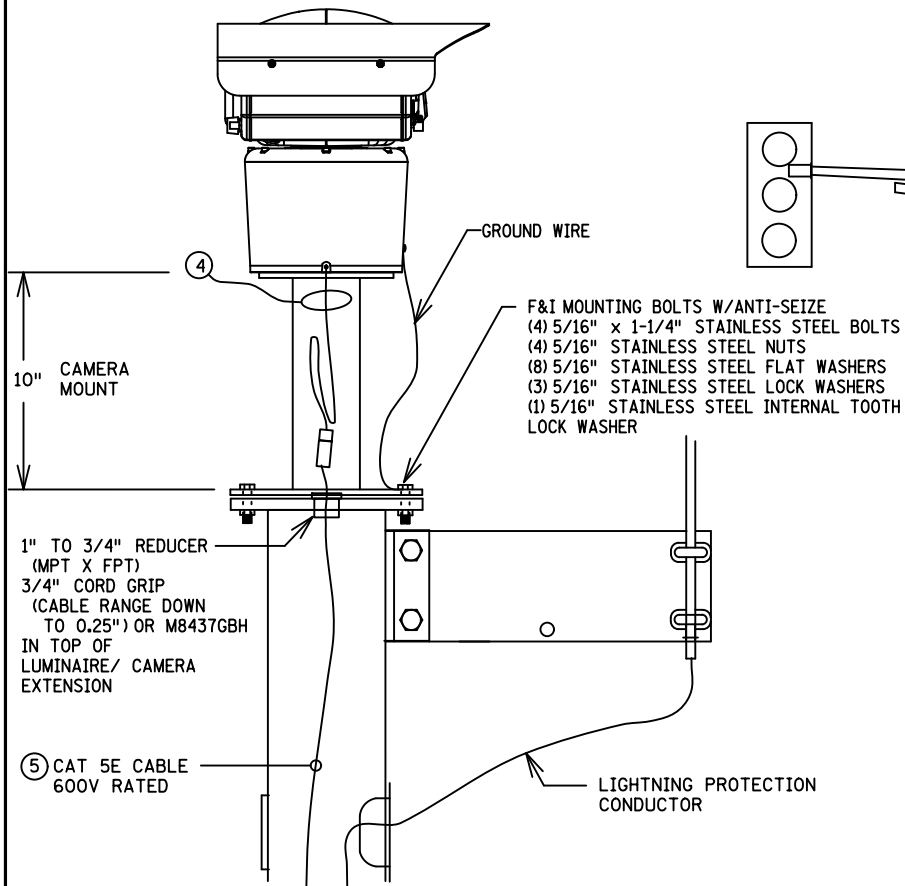
F&I CAMERA EXTENSION IN ACCORDANCE WITH THE CONTRACT F&I LIGHTNING PROTECTION CONDUCTOR, GROUND ROD, CLAMP #230

EXTENSION TOP & LIGHTNING PROTECTION DETAIL



CAMERA & MOUNT AT TOP OF EXTENSION

IP CAMERA (DEPARTMENT FURNISHED)



NOTES:

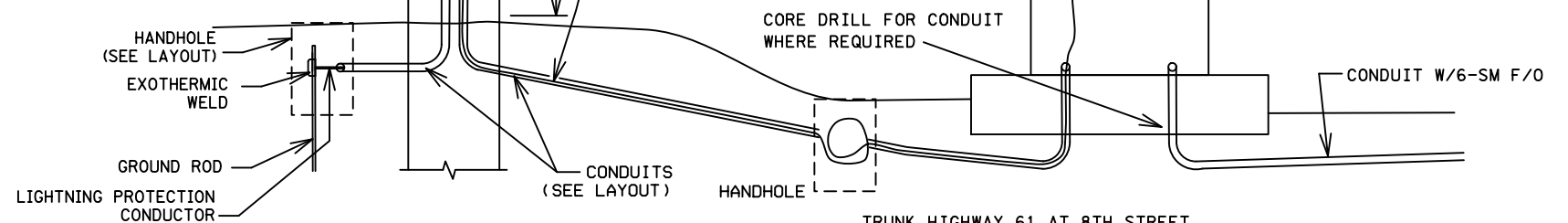
- ① F & I AN NRTL LISTED BRASS, TINNED BRASS OR BRONZE HEX STRAIGHT VERTICAL BASE CONNECTOR INTENDED FOR "LESS ADAPTER" TYPE AIR TERMINALS. AIR TERMINAL THREADS INTO THE TOP OF THE CONDUCTOR AND BOLTS OR SET SCREWS HOLD THE LIGHTNING PROTECTION CONDUCTOR IN PLACE.
- ② F AND I 7/16 INCH DIA. LIGHTING PROTECTION CONDUCTOR MEETING THE FOLLOWING: 32 STRANDS OF 17 AWG COPPER WIRE, BRAIDED SMOOTH TWIST, 65,500 CIRCULAR MILS, NET WEIGHT 215 LBS PER 1000 FEET. CONNECT THE LIGHTNING PROTECTION CONDUCTOR WITHOUT SPLICES FROM THE AIR TERMINAL TO THE 5/8 INCH DIA. GROUND IN THE HAND HOLE AS SHOWN.
- ③ CUT A 3/4 INCH DIA. HOLE IN THE ACCESS COVER CLOSEST TO THE CAMERA. F & I A 3/4 INCH CORD GRIP TYPE FITTING INTO THE HOLE TO TRANSITION THE LIGHTNING PROTECTION CONDUCTOR INSIDE THE POLE.
- ④ USE THE 20 INCH CABLE PIGTAIL SUPPLIED WITH THE CAMERA TO TERMINATE A RJ45 PLUG AS SHOWN ON THE IP CAMERA CONNECTOR STANDARD PLAN.
- ⑤ F&I ETHERNET CABLE IN ACCORDANCE WITH 3815.2C.6.d (CAT 5E), BETWEEN THE SIGNAL CONTROL CABINET AND THE TOP OF THE POLE. TERMINATE THE END OF THE CABLE WITH UNSHIELDED RJ-45 (T-568B) CONNECTORS.

- F&I CAT 5E (600V RATED) (WITH THE PROPER TERMINATIONS) FROM THE TOP OF THE POLE TO THE SIGNAL CABINET. (NOT TO EXCEED 250' LENGTH)
- F&I LIGHTNING PROTECTION CONDUCTOR FROM AIR TERMINAL TO THE GROUND ROD IN HANDHOLE

REQUIRED CABLE TERMINATION:  
COM CABLE- CAT 5E  
SHIELDED -RJ-45 (T-568B)

PROPOSED SIGNAL CONTROL CABINET (DEPARTMENT FURNISHED OR INPLACE)

DEPARTMENT FURNISHED/INSTALLED:  
CAMERA POWER OVER  
ETHERNET (POE) INJECTOR  
PATCH CORDS  
SIGNAL CONTROLLER  
MMU  
ETHERNET SWITCH



TRUNK HIGHWAY 61 AT 8TH STREET

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**SIGNAL PLAN**  
LUMINAIRE/CAMERA EXTENSION DETAIL

SEH FILE NO. 15DWB170688  
SG5 OF 5627  
**73**  
**101**



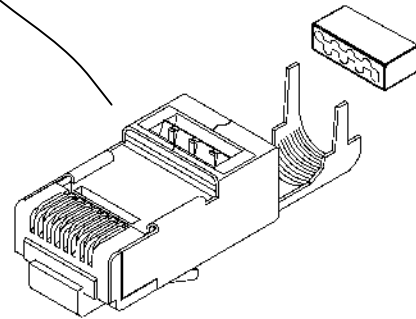
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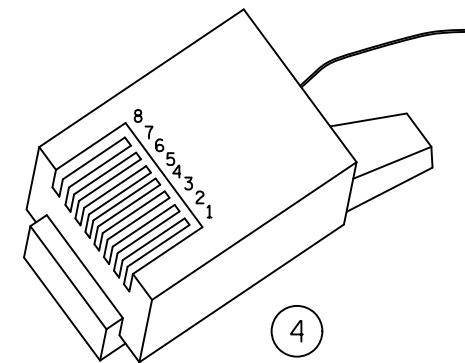
② CAT 5E (600V RATED) CABLE TERMINATION

F&I RJ45 CABLE TERMINATION - FOR HIGH SPEED APPLICATION. CAT 6 UNSHIELDED MODULAR PLUG, RJ45 (8 CONDUCTOR), GOLD PLATED CONTACTS, ACCEPTS CABLES WITH DIAMETERS UP TO 0.310 INCHES. MEETS CATERGORY 6 ANSI/EIA 568-C.2



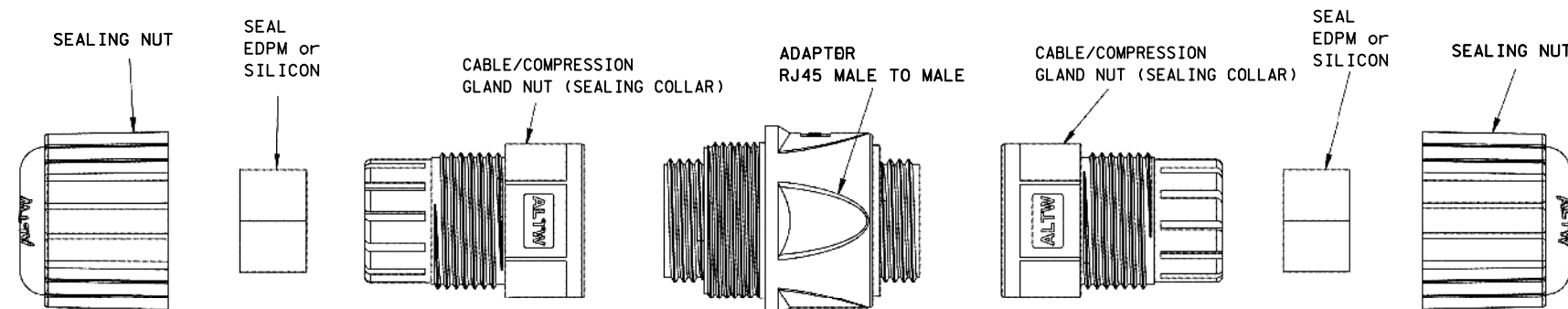
③ CAT 5E (600V RATED)

F&I ETHERNET CABLE CAT 5E IN ACCORDANCE WITH 3815.2C.6d. "ETHERNET CABLE (OUTSIDE PLANT)" L-COM PART NO. TFDL5089 MEETS THE REQUIREMENTS. QUABBIN PART NO. 5089 MEETS THE REQUIREMENTS.

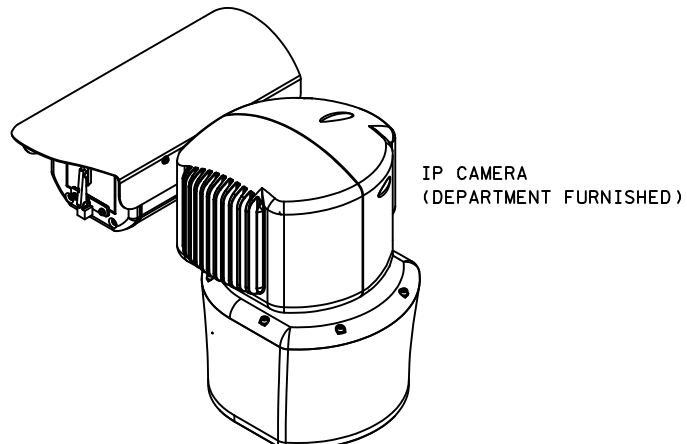


① WATERPROOF SHIELDED RJ-45 (MALE TO MALE) INLINE COUPLER/ADAPTER

IP67  
COPPER ALLOY CONTACT MATERIAL  
GOLD CONTACT PLATING  
NYLON HOUSING  
AMPHENOL PART NO. RDP-00BFFA-SLM7001 &  
VPI PART NO. CAT5E-WTP-FF MEETS REQUIREMENTS



1	2	3	4	5	6	7	8
WHITE/ORANGE	ORANGE	WHITE/GREEN	BLUE	WHITE/BLUE	GREEN	WHITE/BROWN	BROWN
CAT 6 RJ-45 PLUG							
T-568B							



IP CAMERA (DEPARTMENT FURNISHED)

FACTORY INSTALLED 20" PIGTAIL WITH CONNECTOR (RJ-45 PLUG)

ETHERNET CABLE 4/PR

RJ-45 PLUG (T-568B) (SUPPLIED WITH CAMERA)

CONNECTORS LOCATED AT THE TOP OF THE SIGNAL POLE (IN CAMERA MOUNT)



③ INSTALL BETWEEN THE SIGNAL CONTROL CABINET AND THE TOP OF THE SIGNAL POLE. TERMINATE THE ENDS OF THE CABLE WITH RJ-45 (T-568B) CONNECTORS. INSTALL FIELD TERMINATIONS/CONNECTORS AS RECOMMENDED BY THE MANUFACTURER, AND USE THE SPECIFIED INSTALLATION TOOL(S).

④ F&I SHIELDED RJ45 CABLE TERMINATION (CONNECTOR)

CONNECTOR LOCATED IN THE SIGNAL CABINET

TRUNK HIGHWAY 61 AT 8TH STREET

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

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RAMSEY COUNTY, MINNESOTA  
T.H. 61  
S.P. 6222-197

SIGNAL PLAN  
IP CAMERA CONNECTORS DETAIL

SEH FILE NO. ISDWB170688	74
SG6 OF SG27	101

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12/22/2023

INDEX OF REFRACTION

PROVIDE CABLE MANUFACTURERS INDEX OF REFRACTION USED FOR TESTING ON PROJECT.

U = FURNISHED SPLICE, NO SPLICE OTDR READING REQUIRED AT THIS LOCATION

X.X POWER METER/OTDR LAUNCH TEST POINT
INSERT OPTICAL LINK LOSS IN dB (TEST MULTI MODE FIBER AT 1300) (TEST SINGLE MODE FIBER AT 1550)



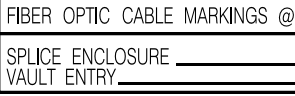
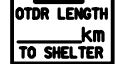
INSERT OTDR SPLICE LOSS SHOT FROM THIS DIRECTION

FO CABLE SPLICE POINT & OTDR TEST SPLICE READING

OTDR TEST SPLICE READING ON INPLACE CABLE



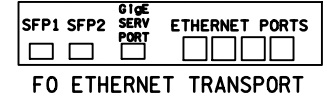
PROVIDE TRUNK AND PIGTAIL OTDR FIBER LENGTH MEASUREMENTS USING OTDR READINGS FROM CONNECTORS AT SHELTER OR CABINETS TO SPLICE POINTS IN VAULTS



PROVIDE TRUNK CABLE OUTER JACKET LENGTH MARKINGS AT ENTRY TO VAULT AND AT ENTRY TO OUTDOOR FIBER SPLICE ENCLOSURE



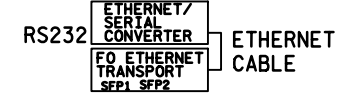
FACTORY PRE-TERMINATED/ARMORED FIBER OPTIC PIGTAIL



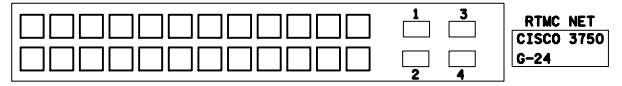
FO ETHERNET TRANSPORT



ETHERNET/SERIAL CONVERTER

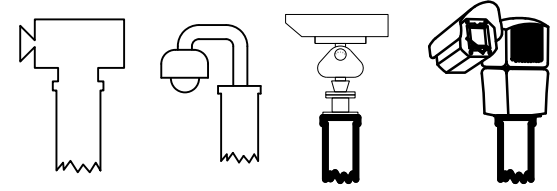


ETHERNET/SERIAL CONVERTER RS232

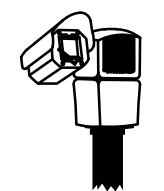


ETHERNET SWITCH

COMMON ETHERNET EQUIPMENT

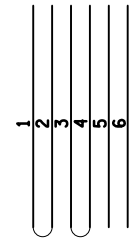
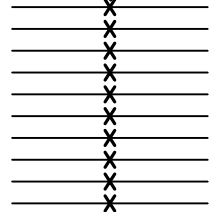


EXISTING CAMERA WITH PAN AND TILT UNIT



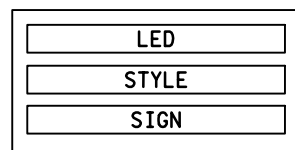
PROPOSED CAMERA WITH PAN AND TILT UNIT (BY OTHERS)

EXISTING FO CABLE SPLICE POINT



FIBER OPTIC PIGTAIL SPLICE DIAGRAM

(SPLICE UNUSED FIBERS TOGETHER IN THE SPLICE VAULT SO THAT THE FIBERS CAN BE TESTED)



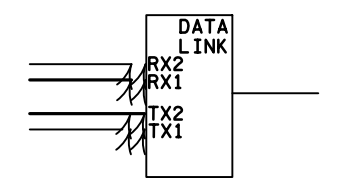
DYNAMIC MESSAGE SIGN



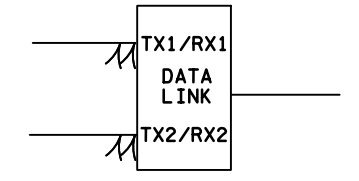
FIBER OPTIC PATCHCORD



TWISTED PAIR INTERCONNECT



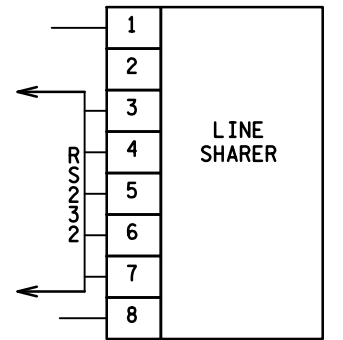
FORCE TRANS. MODEL 2869 DATA LINK



OPTELECOM MODEM DATA LINK



VIDEO & DATA TRANSCEIVER TRANSMITTER



RS 232 LINE SHARER

170 170 CONTROLLER

DMS CHANGEABLE MESSAGE SIGN

FLS FLASHER

RCS RAMP CONTROL SIGNAL

LDS LOOP DETECTOR STATION

LD LOOP DETECTOR(S)

ILCS INTELLIGENT LANE CONTROL SIGN

LEGEND FOR COMMUNICATION SCHEMATICS

TRUNK HIGHWAY 61 AT 8TH STREET

NOTE: CABINET TO CABINET PIGTAILS REQUIRE BOTH POWERMETER AND OTDR TESTING OF CABLE

REVISED 6/27/18

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota. Certified By: JOHN M. GRAY Lic. No. 22457 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA T.H. 61 S.P. 6222-197

SIGNAL PLAN FIBER OPTIC SCHEMATIC LEGEND

SEH FILE NO. ISDWB170688 75 SG7 OF 5627 101

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**GENERAL NOTES**

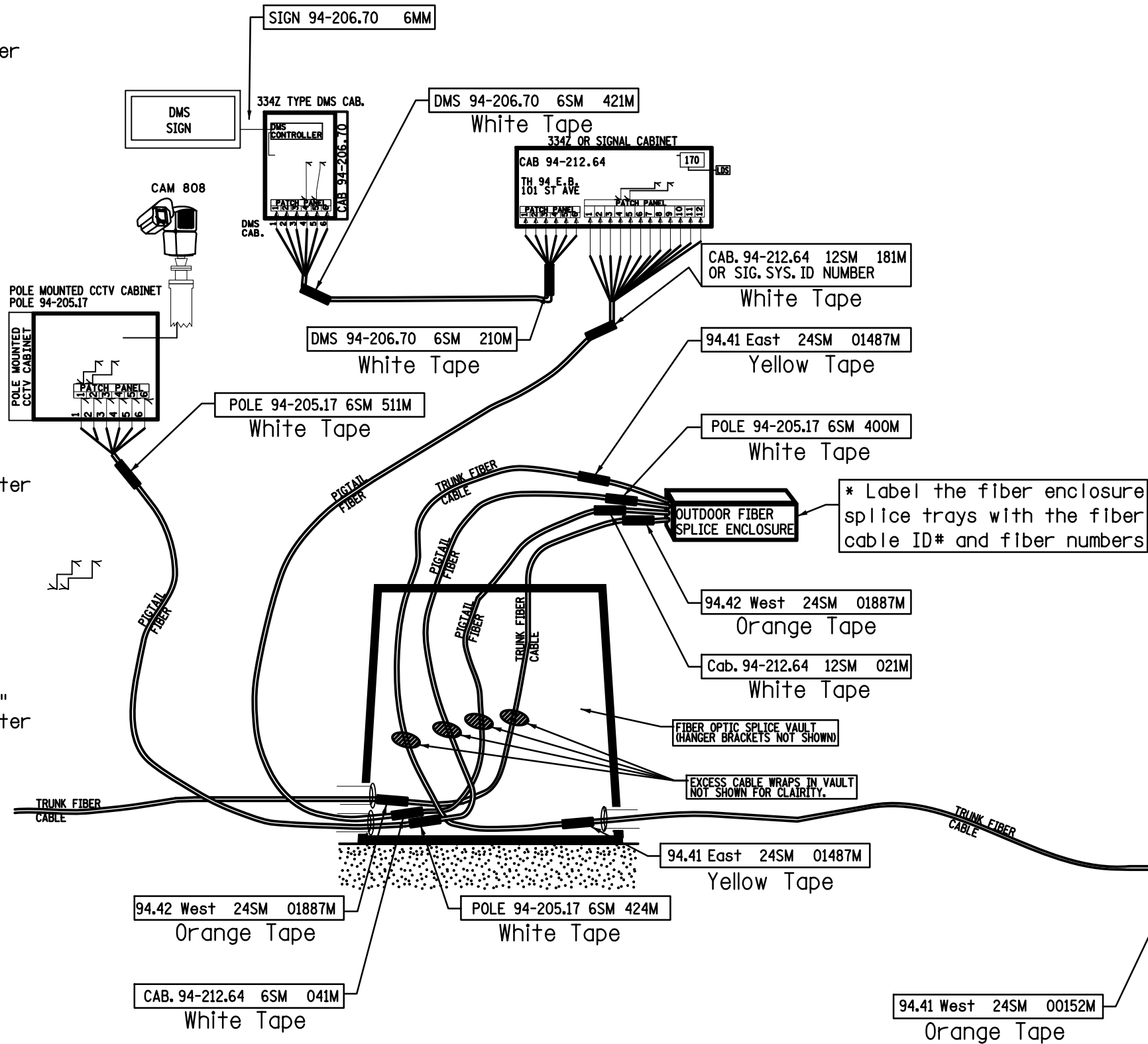
\* Add cable identifiers to color coded electrical tape with a permanent marker as shown on this detail.

e.g.: 94.41 East 24SM 01467M.  
 94.41 = Cable ID#  
 East = Direction  
 24SM = Cable fiber count  
 01467 = Nearest cable length marking to where the tape is applied.

\* Electrical tape colors:  
 NB (Blue)  
 SB (Green)  
 EB (Yellow)  
 WB (Orange)  
 Pigtails (White)

- \* The electrical tape with the identifiers is added to:
- 334Z-Type Cabinets to within 18" of the entrance conduit on the outer jacket of the fiber optic cable.
  - Pole Mounted CCTV Cabinet between the entrance point and the fiber termination panel.
  - FO Splice Vaults to within 18" of the splice enclosure and the entrance conduit.
  - TMS Shelter Cabinets to within 18" of the entrance conduit on the outer jacket of the fiber optic cable and again to within 18" of the splice panel on the inner jacket of the fiber optic cable.

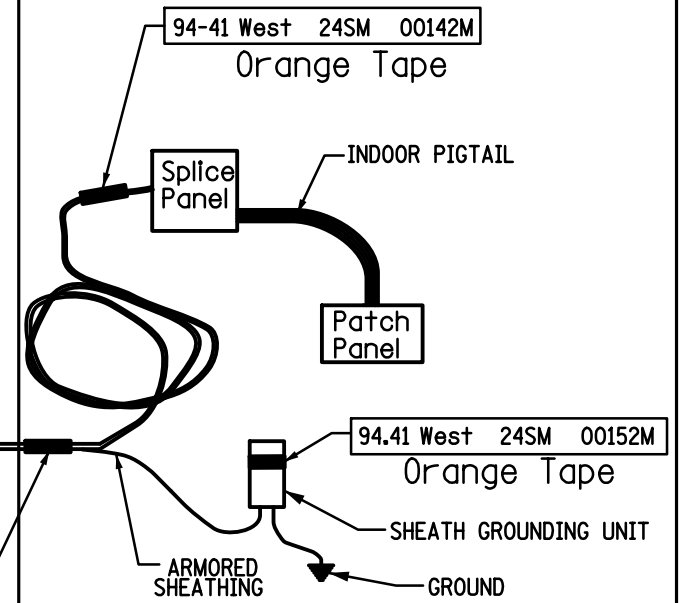
- \* Neatly tape the fiber optic cables together as needed near the fiber enclosure then throughout the length of slack.
- \* Neatly coil the fiber optic cables into the fiber optic hanger brackets inside the vault.



**TMS SHELTER CABINET**

**SHELTER NOTES**

- \* Label the indoor pigtail six-paks on the outer jacket at both the splice tray/wheel and inside the patch panel to indicate the fiber cable ID # and which six fibers the six-paks are spliced to: (e.g. 94-12 SM7-12)
- \* Label the front of the splice panels with the fiber cable ID#, direction, and fiber count.
- \* Label splice trays/wheels with the fiber cable ID# and the fiber count.
- \* Label the front of patch panels with the fiber cable ID#, direction and fiber count.
- \* Label the sheath grounding unit with the fiber cable ID#, direction and fiber count.



REVISED 4/5/22

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *John M. Gray* Lic. No. 22457  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

TRUNK HIGHWAY 61 AT 8TH STREET

**SIGNAL PLAN**  
 FIBER OPTIC CABLE LABELING DETAIL

SEH FILE NO. ISDWB170688	76
SG8 OF 5627	101

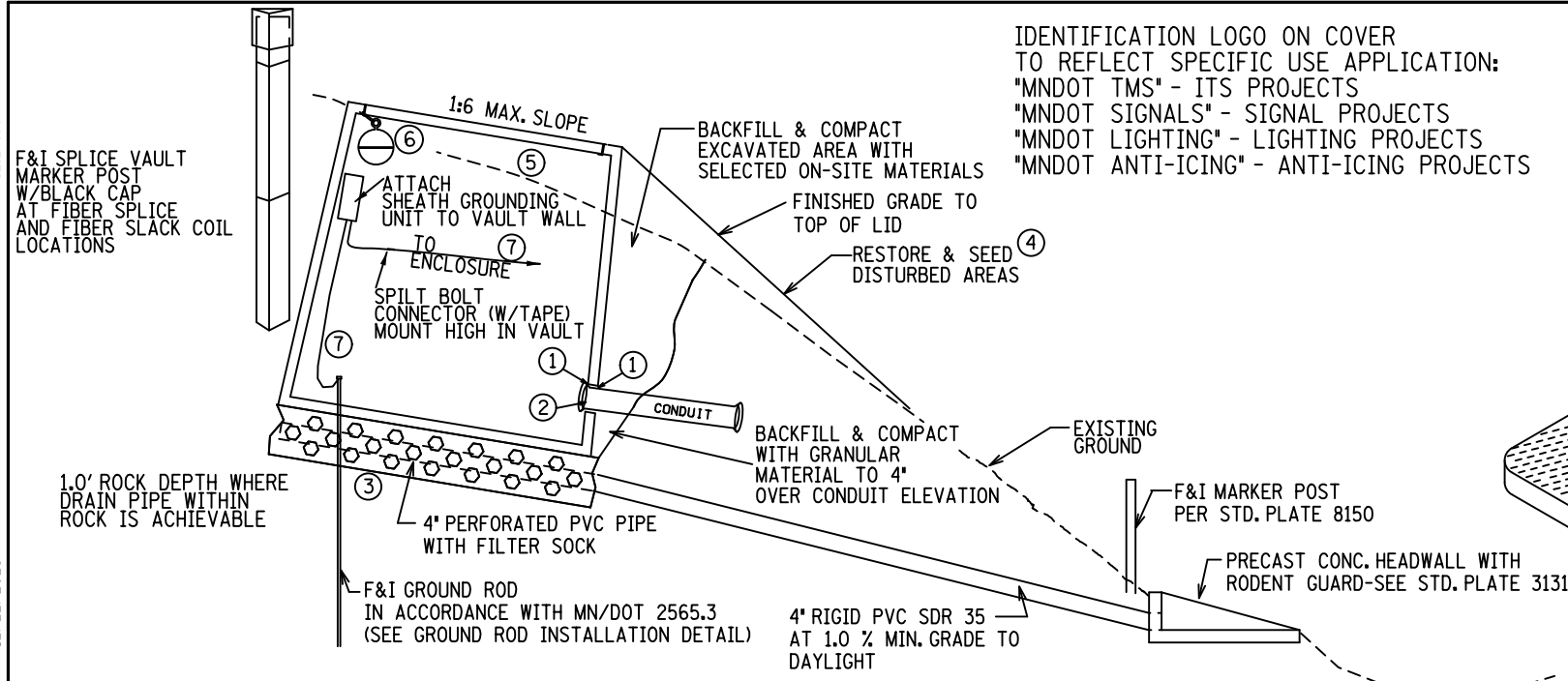
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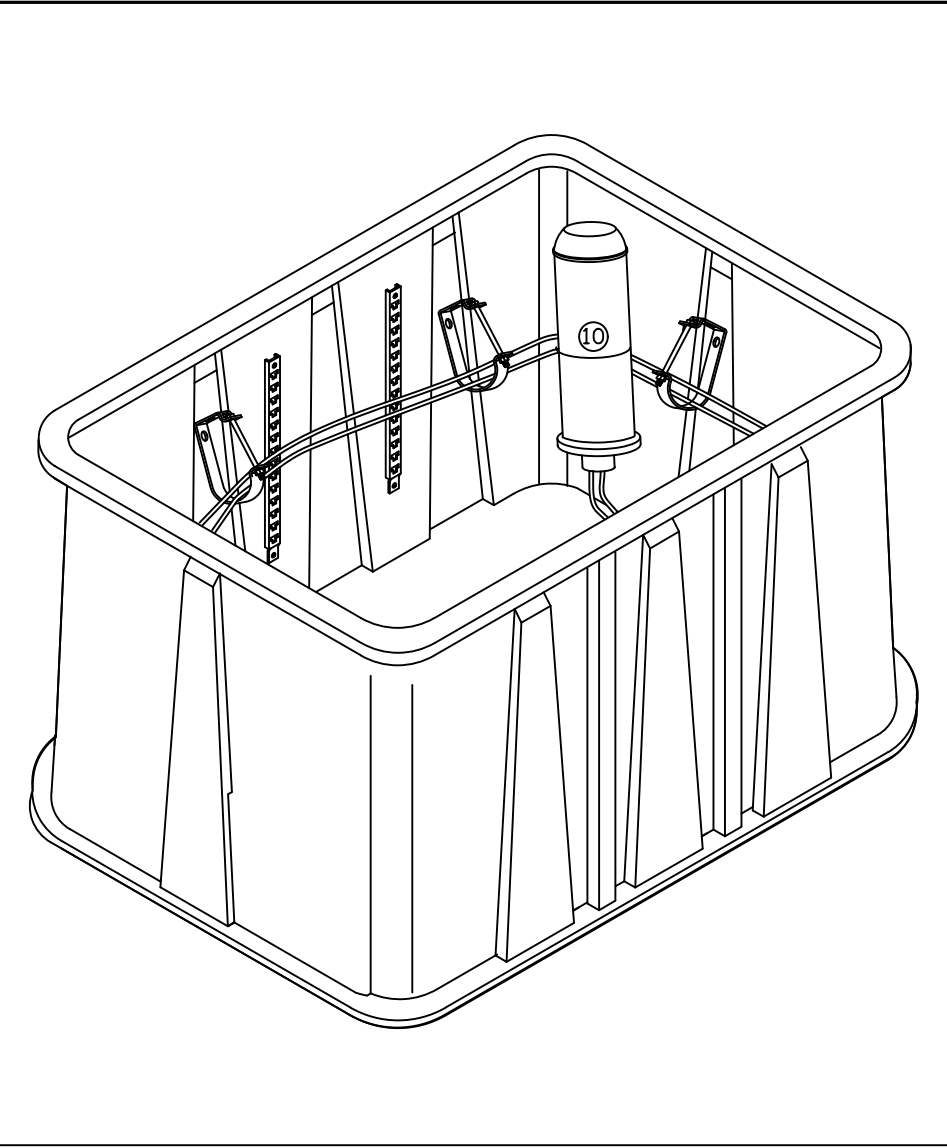
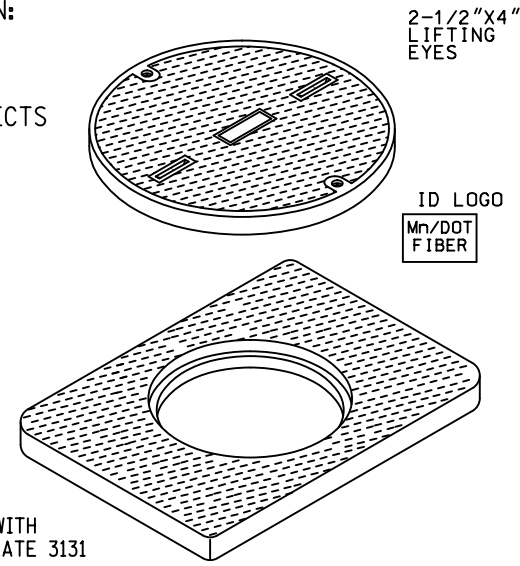
12/22/2023

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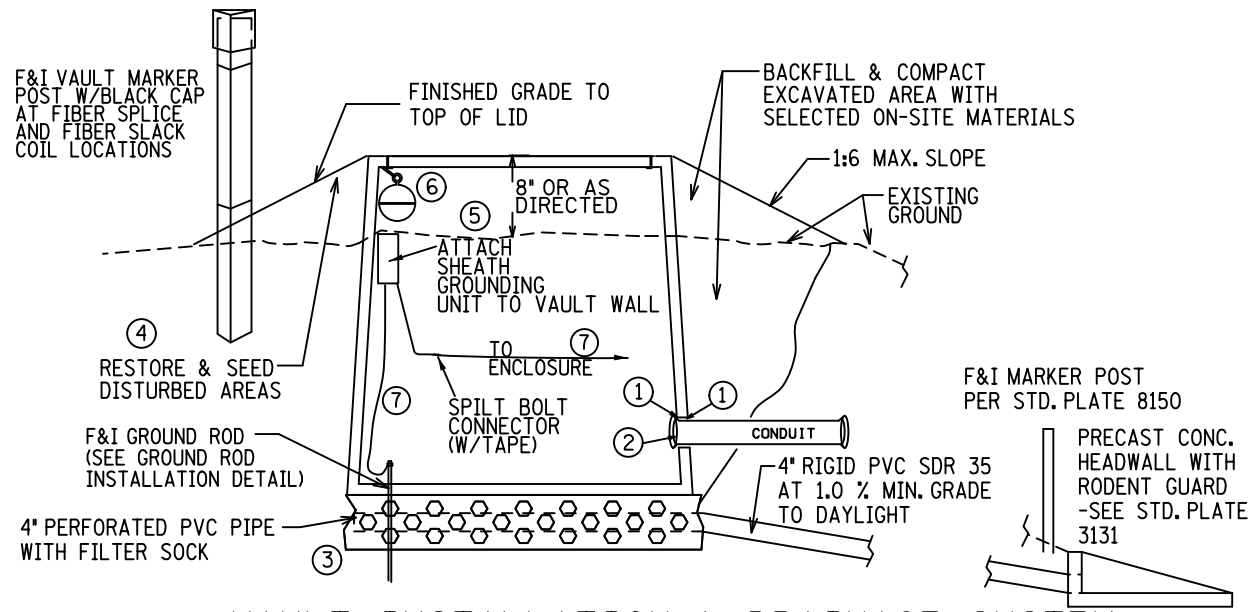
VAULT INSTALLATION & DRAINAGE SYSTEM (SLOPED AREAS)

IDENTIFICATION LOGO ON COVER  
TO REFLECT SPECIFIC USE APPLICATION:  
"MNDOT TMS" - ITS PROJECTS  
"MNDOT SIGNALS" - SIGNAL PROJECTS  
"MNDOT LIGHTING" - LIGHTING PROJECTS  
"MNDOT ANTI-ICING" - ANTI-ICING PROJECTS



GENERAL NOTES

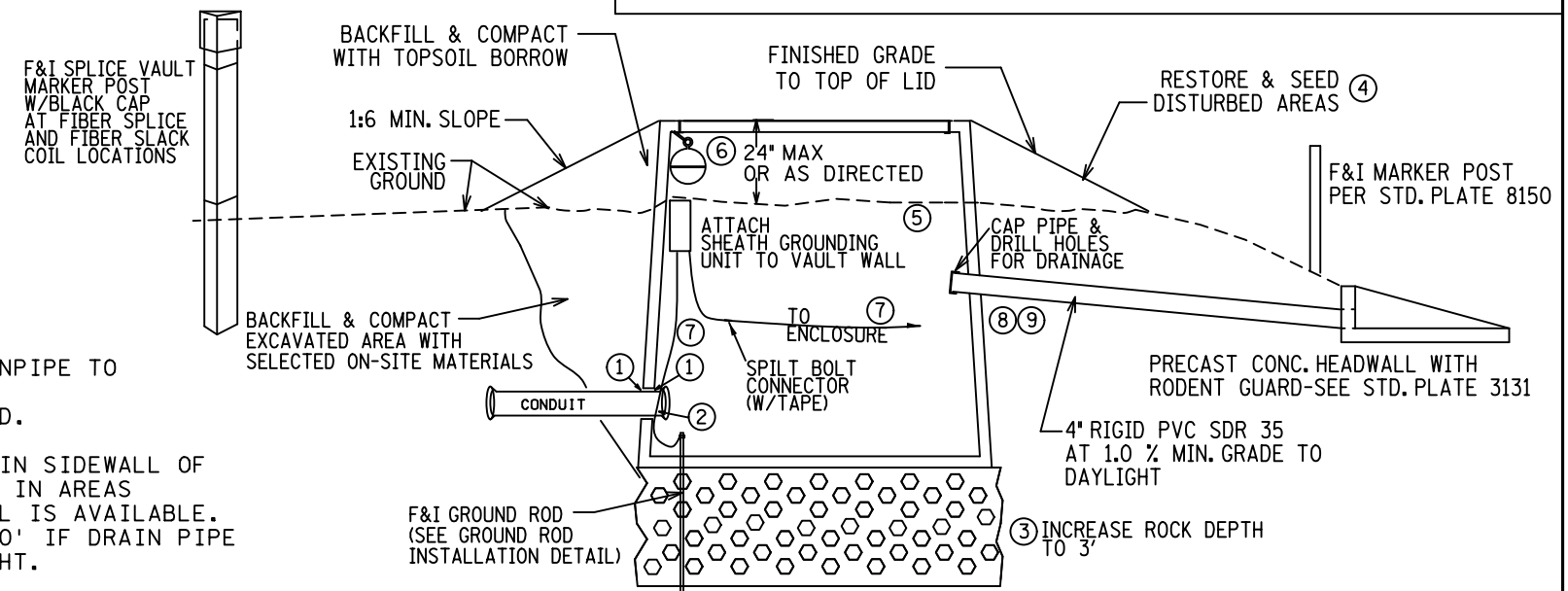
1. GROUND CONNECTIONS SHALL BE COATED WITH OXIDATION PROHIBITING COMPOUND.
2. CABLE SHALL ENTER BELOW THE SUPPORT BRACKETS WITH MIN. 70' OF SLACK OUTSIDE OF THE ENCLOSURE FOR EACH CABLE. CABLE SHALL BE COILED AROUND INSIDE OF SUPPORT BRACKETS. CABLES SHALL BE CUT TO THE SAME LENGTH AT THE ENCLOSURE.
3. ALL HARDWARE SHALL BE STAINLESS STEEL WITH EXCEPTION OF THE "C" CHANNEL MOUNTING BAR.



VAULT INSTALLATION & DRAINAGE SYSTEM (LEVEL GROUND & ACHIEVABLE DRAINAGE AREAS)

SPECIFIC NOTES

1. OPENINGS FOR CONDUIT SHALL BE SEALED WITH MATERIAL COMPATIBLE SEALANT. (INCIDENTAL)
2. PLUG CONDUIT OPENING WITH A DRAINABLE COMPOUND (INCIDENTAL)
3. F&I COARSE FILTER AGGREGATE UNDER BASE COMPLYING WITH MN/DOT 3149.2H. F&I 4" PERFORATED PVC PIPE WITHIN ROCK AREA WITH FILTER SOCK TO PROVIDE DRAINAGE WHERE ACHIEVABLE. (INCIDENTAL)
4. RESTORE DISTURBED AREAS FOR TMS INSTALLATION WITH SEED AND ROLLED EROSION PREVENTION CATEGORY 20 PER MNDOT 2575.3 (INCIDENTAL)
5. STRIP TOPSOIL FROM VAULT AND SLOPE AREAS PRIOR TO VAULT INSTALLATION (INCIDENTAL)
6. MOUNT LOCATOR BALL WITH TIE WRAP TO COVER LEDGE
7. 6' OF NO.6 AWG GREEN INSULATED STRANDED WIRE
8. NO DRAIN REQUIRED IF DRAINPIPE TO DAYLIGHT IS UNACHIEVABLE. ENGINEER APPROVAL REQUIRED.
9. DRAIN PIPE MAY BE PLACED IN SIDEWALL OF VAULT TO ACHIEVE DRAINAGE IN AREAS WHERE MINIMUM PIPE OUTFALL IS AVAILABLE. INCREASE ROCK DEPTH TO 3.0' IF DRAIN PIPE IS PLACE ABOVE FLOOR HEIGHT.
10. DOME STYLE SPLICE ENCLOSURE. TIE WRAP ENCLOSURE TO CABLES



VAULT INSTALLATION & DRAINAGE SYSTEM (LEVEL GROUND & MINIMUM ACHIEVABLE DRAINAGE AREAS)

TRUNK HIGHWAY 61 AT 8TH STREET

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**SIGNAL PLAN**  
FIBER OPTIC SPLICE VAULT INSTALLATION

SEH FILE NO. ISDWB170688	77
SG9 OF 5627	101

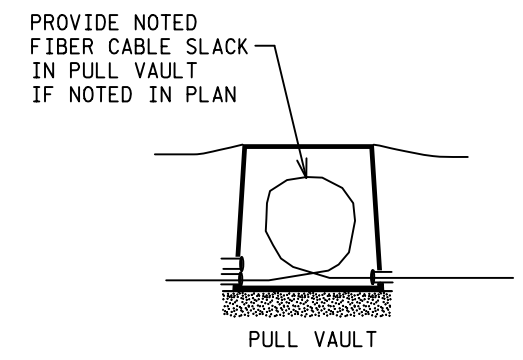
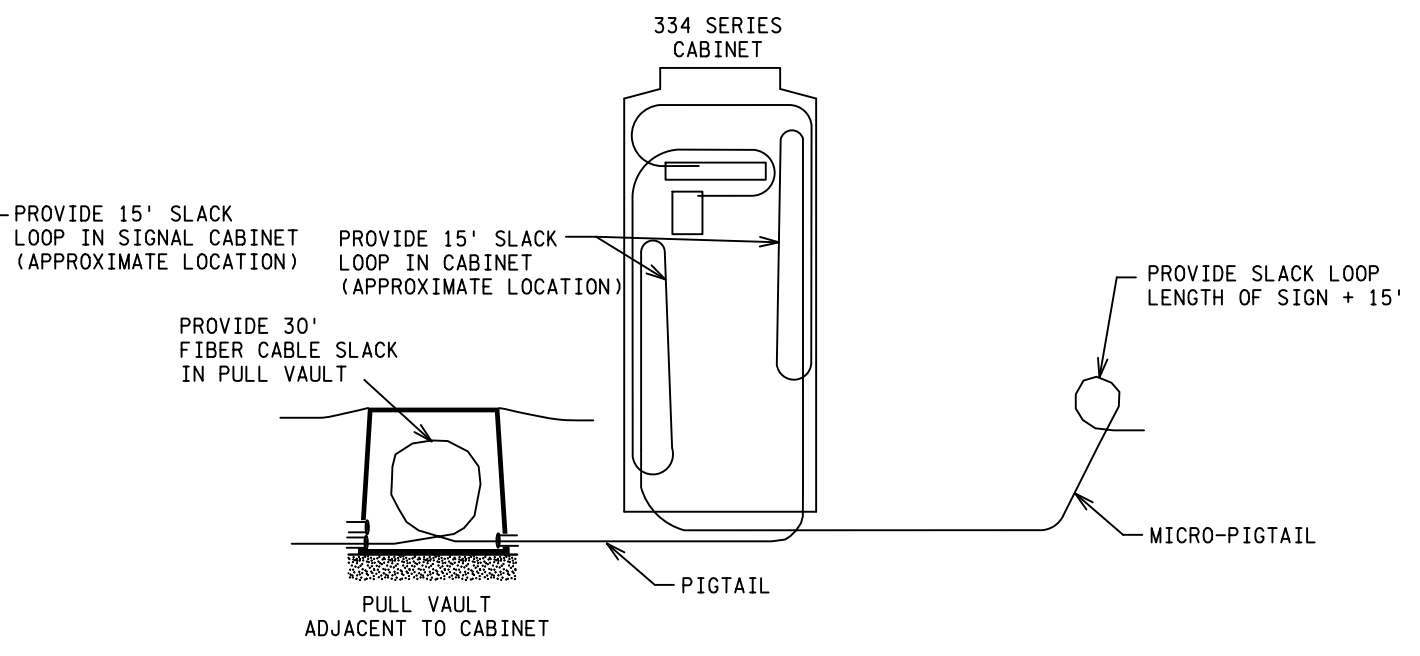
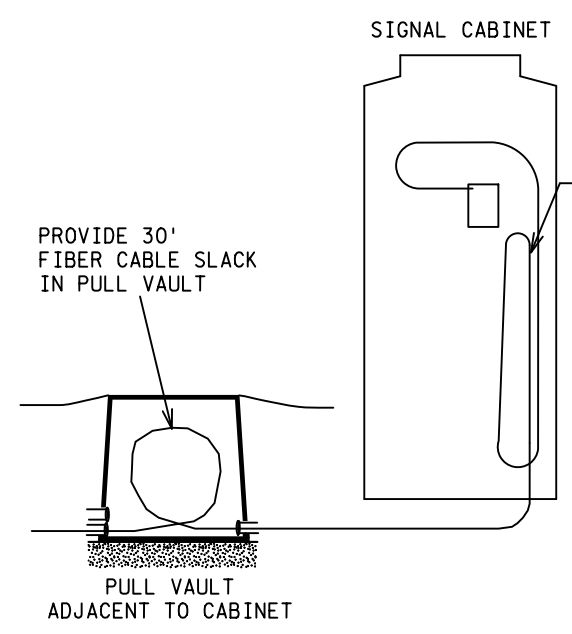
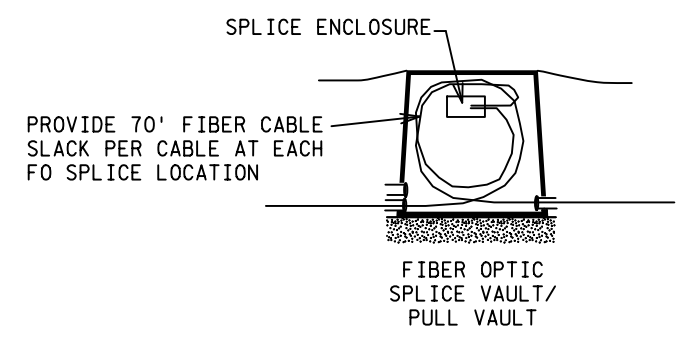
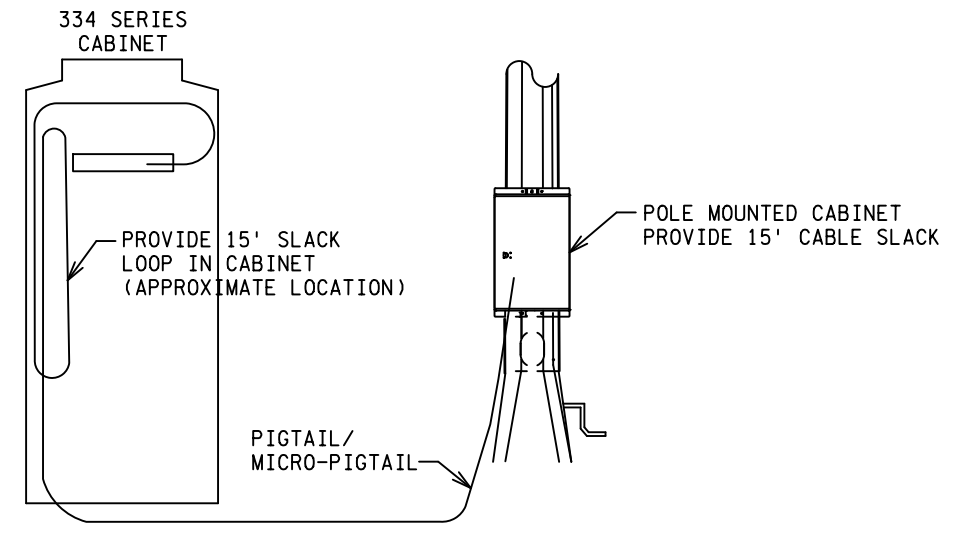
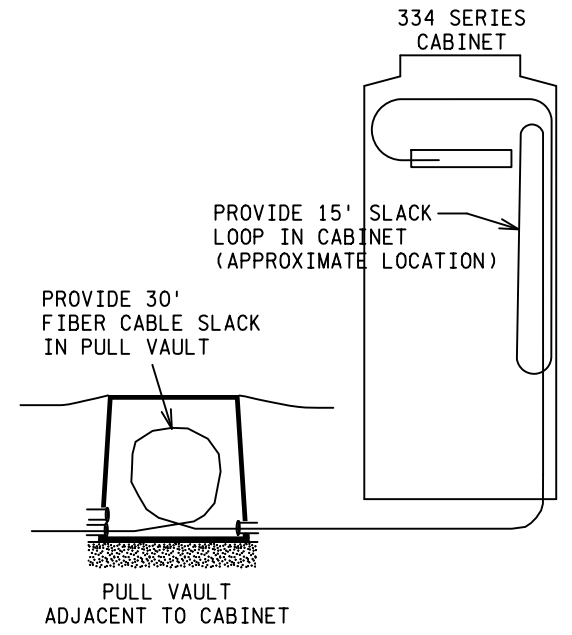
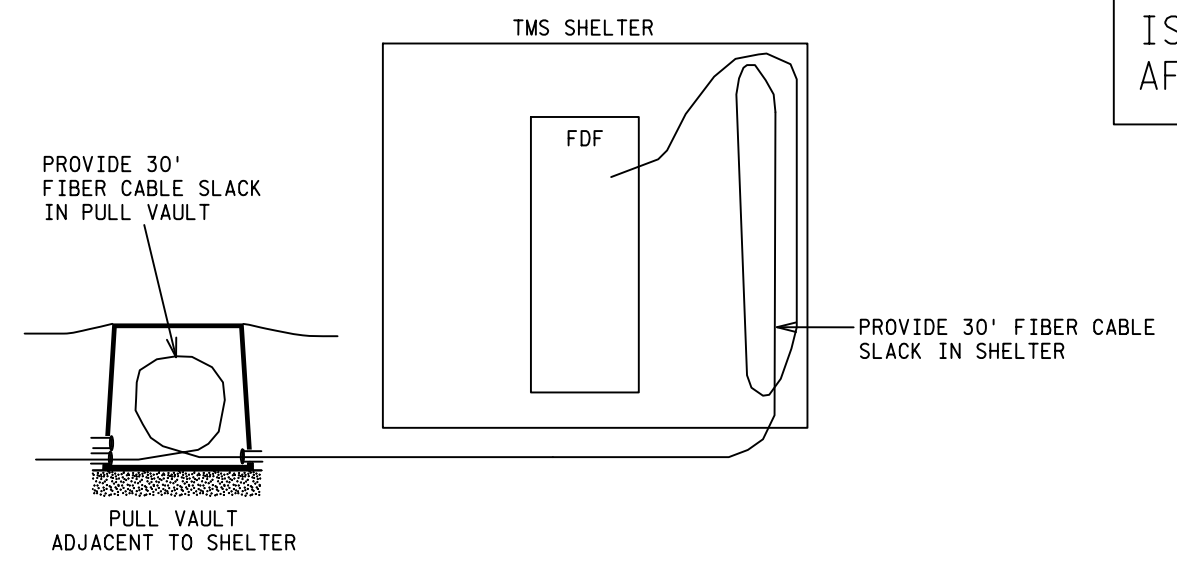
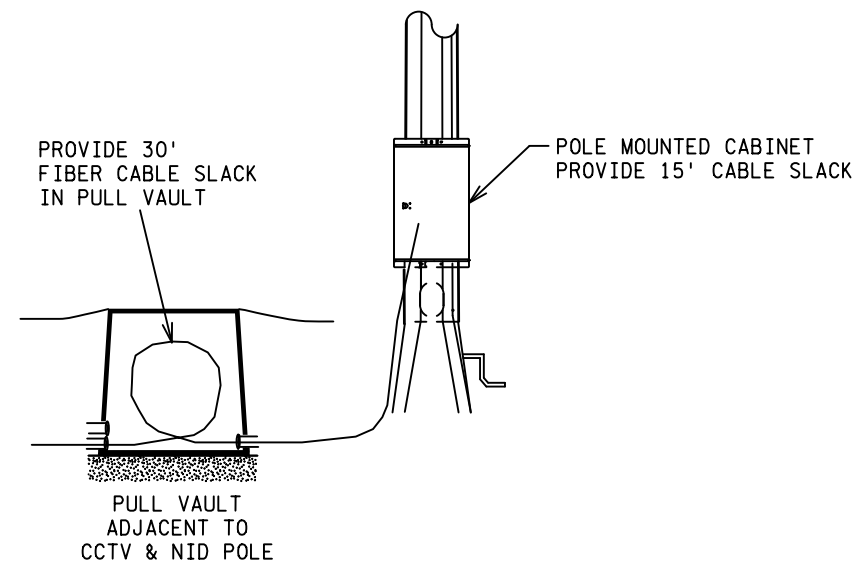
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12/22/2023

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MODEL: sgl10

SLACK LENGTH NOTED IN EACH SCENERIO IS THE FINAL SLACK LENGTH REQUIRED AFTER DEVICES ARE CONNECTED

TMS CABLE FIBER SLACK INSTALLATION DETAIL



TRUNK HIGHWAY 61 AT 8TH STREET

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

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

Certified By: *John M. Gray* Lic. No. 22457  
 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

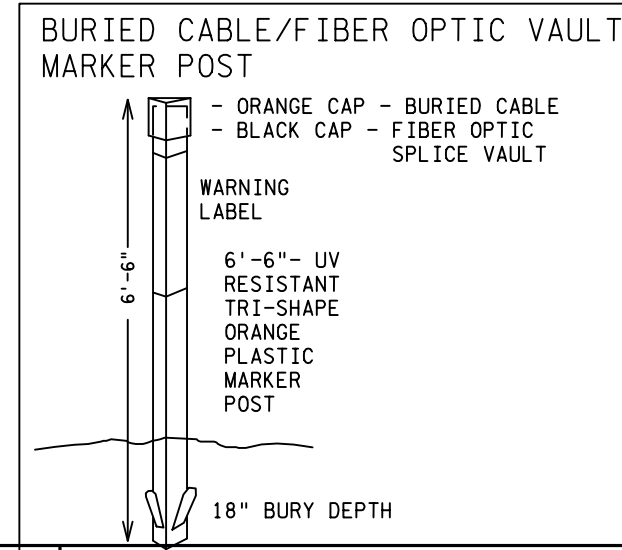
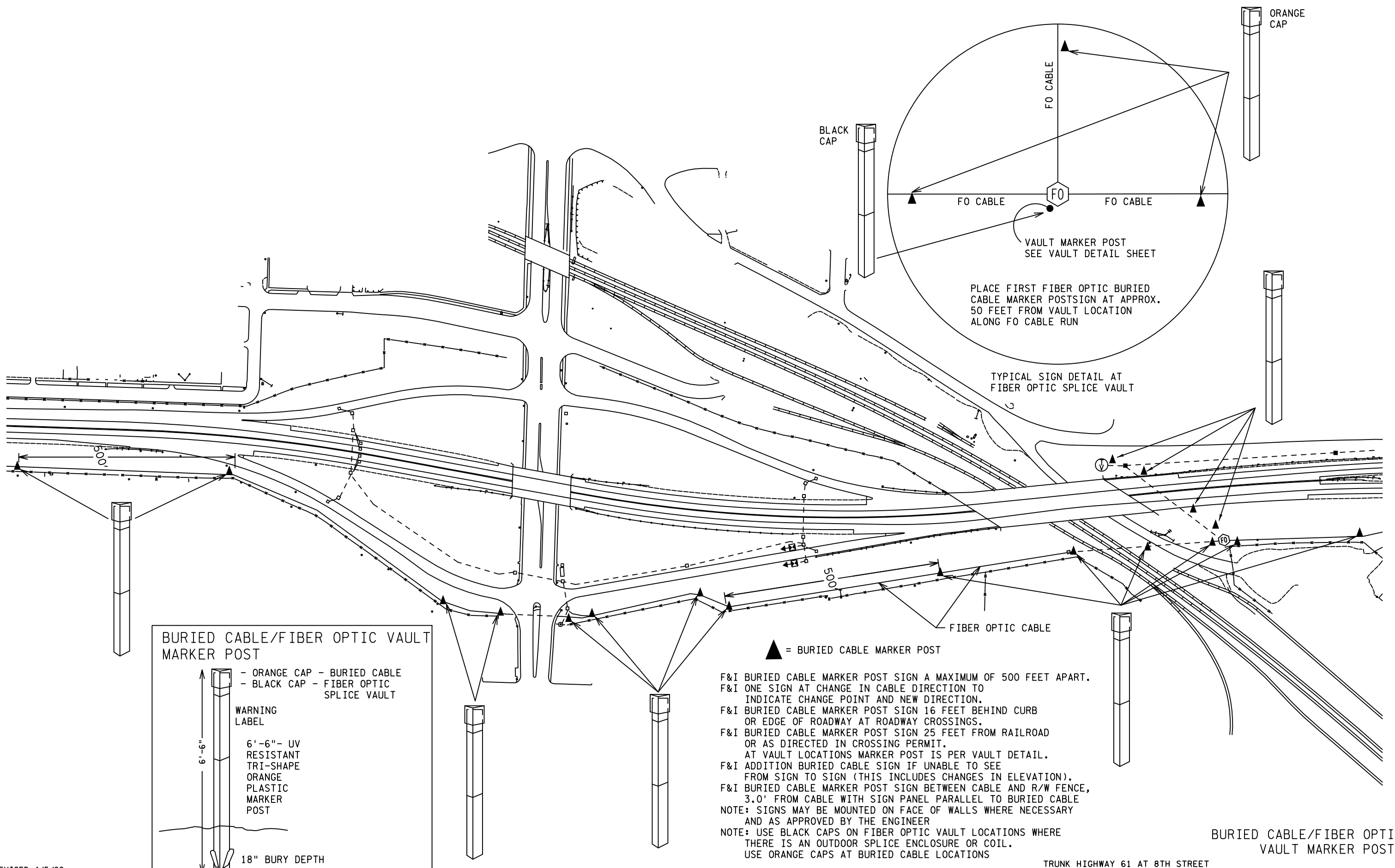
**SIGNAL PLAN**  
 TMS CABLE FIBER SLACK INSTALLATION DETAIL

SEH FILE NO. ISDWB170688	<b>78</b>
SG10 OF 5627	<b>101</b>

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12/22/2023

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REVISED 4/5/22

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

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RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 FIBER OPTIC BURIED CABLE SIGNING

SEH  
 FILE NO.  
 ISDWB170688  
**79**  
 SG11  
 OF 5627  
**101**

TRUNK HIGHWAY 61 AT 8TH STREET

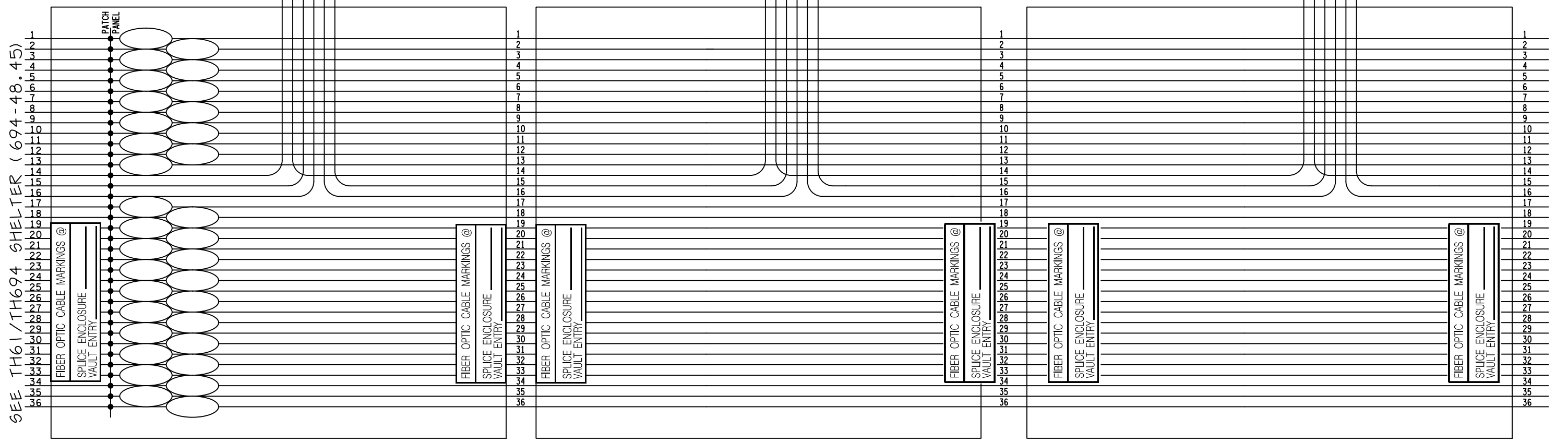
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TRUNK ID# 61-188

TRUNK ID# 61-188A

TRUNK ID# 61-189

TRUNK ID# 61-190



NOTE: THIS PLAN SHEET IS BEING PROVIDED FOR INFORMATIONAL PURPOSES. ALL FIBER INTERCONNECT CABLES, CAMERAS, AND VAULTS SHOWN ON THIS PAGE ARE INPLACE AND SHALL BE REUSED AND MAINTAINED INPLACE (EXCEPT FOR FIBER-OPTIC CABLE TESTING AT ALL SPLICE LOCATION TO BE COMPLETED BY THE CONTRACTOR AND PAID FOR UNDER THE "TRAFFIC CONTROL INTERCONNECT" PAY ITEM (ITEM NO. 2565). SEE SPECIAL PROVISIONS.

INPLACE PULL/SPLICE VAULT TH61 AT TH 694 NW QUAD

INPLACE PULL/SPLICE VAULT TH61 AT BUERKLE RD NE QUAD

INPLACE PULL/SPLICE VAULT TH61 AT WILLOW LK. RD NE QUAD

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

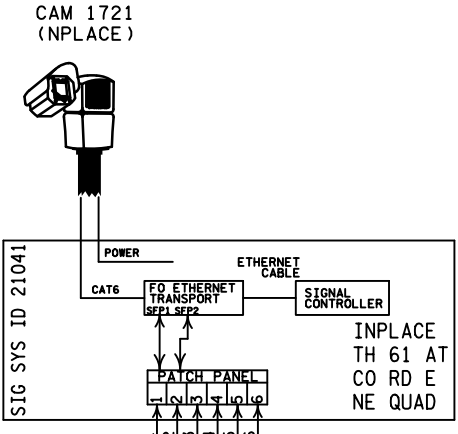
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 Certified By: *John M. Gray* Lic. No. 22457  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



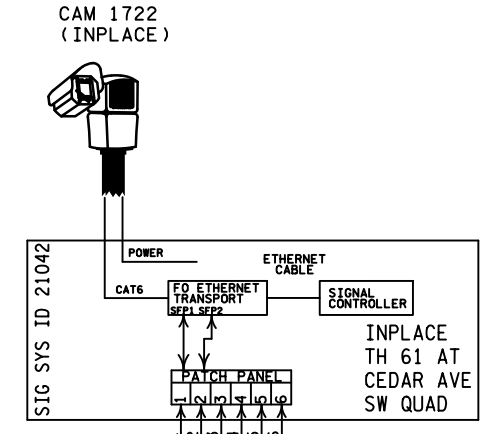
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 FIBER OPTIC SCHEMATIC  
 TRUCK HIGHWAY 61 (TH 694 TO WILLOW LAKE RD)

SEH FILE NO. ISDWB170688	<b>80</b>
SG12 OF 5627	<b>101</b>



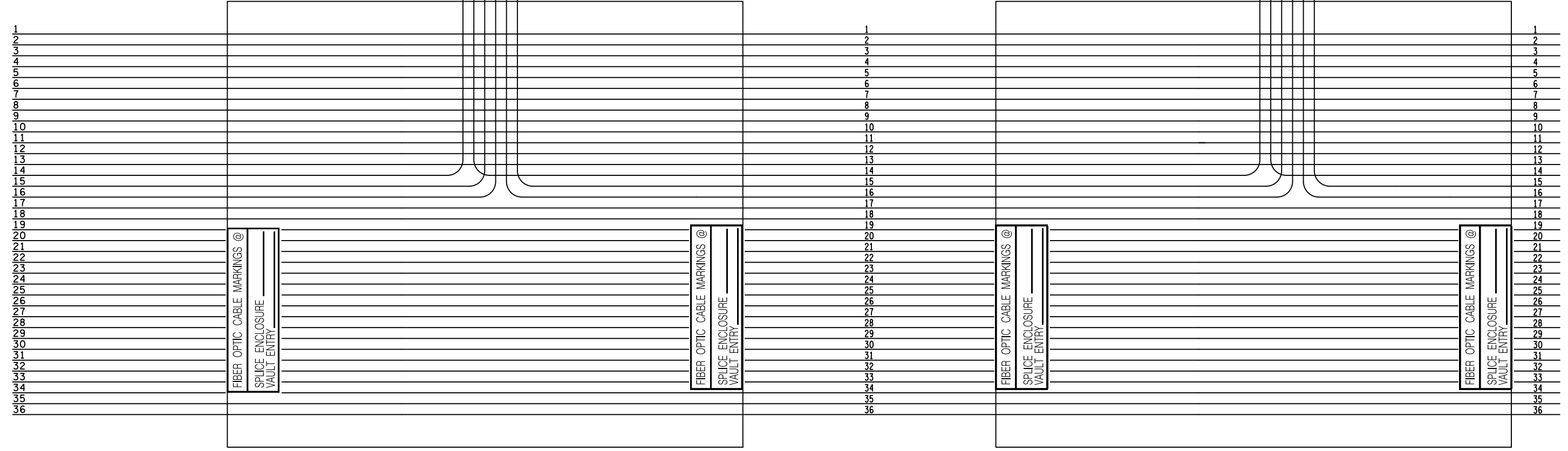
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TRUNK ID# 61-190

TRUNK ID# 61-191

TRUNK ID# 61-192



INPLACE  
PULL/SPLICE VAULT TH61 AT  
CO RD E (CSAH 15) NE QUAD

INPLACE  
PULL/SPLICE VAULT TH61 AT  
CEDAR AVE SW QUAD

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

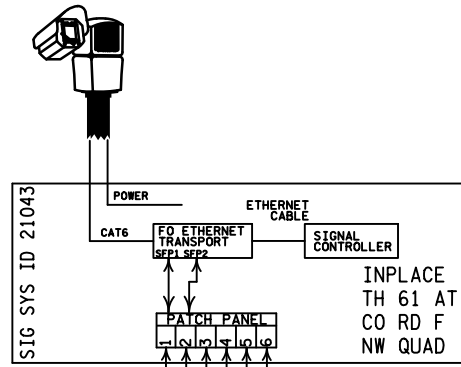
I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *John M. Gray* Lic. No. 22457  
 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

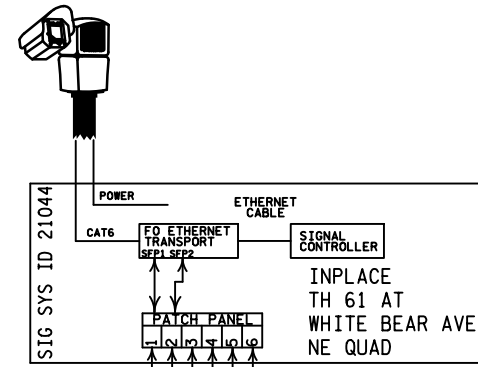
**SIGNAL PLAN**  
 FIBER OPTIC SCHEMATIC  
 TRUCK HIGHWAY 61 (WILLOW LAKE RD TO CEDAR AVE)

CAM 1723  
(INPLACE)



NOTE: THIS PLAN SHEET IS BEING PROVIDED FOR INFORMATIONAL PURPOSES. ALL FIBER INTERCONNECT CABLES, CAMERAS, AND VAULTS SHOWN ON THIS PAGE ARE INPLACE AND SHALL BE REUSED AND MAINTAINED INPLACE (EXCEPT FOR FIBER-OPTIC CABLE TESTING AT ALL SPLICE LOCATION TO BE COMPLETED BY THE CONTRACTOR AND PAID FOR UNDER THE "TRAFFIC CONTROL INTERCONNECT" PAY ITEM (ITEM NO. 2565). SEE SPECIAL PROVISIONS.

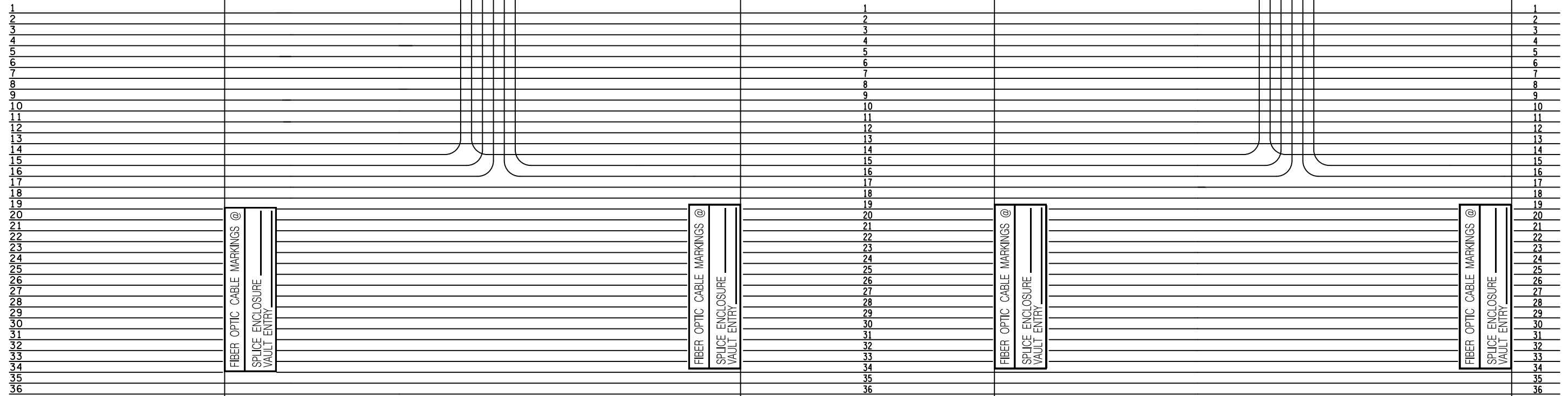
CAM 1724  
(INPLACE)



TRUNK ID# 61-192

TRUNK ID# 61-193

TRUNK ID# 61-194



INPLACE  
PULL/SPLICE VAULT TH61 AT  
CO RD F (CSAH 12) NW QUAD

INPLACE  
PULL/SPLICE VAULT TH61 AT  
WHITE BEAR AVE (CSAH 65) NE QUAD

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

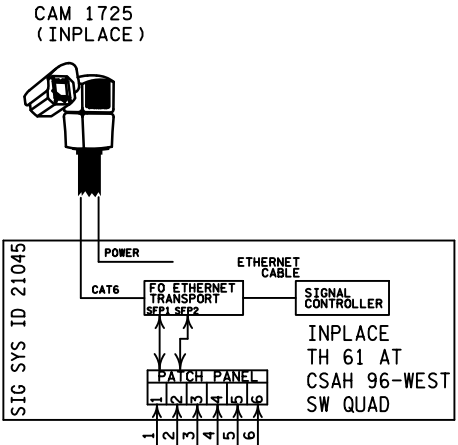
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 Certified By: *John M. Gray* Lic. No. 22457  
 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 FIBER OPTIC SCHEMATIC  
 TRUCK HIGHWAY 61 (CSAH 12 TO WHITE BEAR AVE)

SEH  
 FILE NO.  
 ISDWB170688  
**82**  
 SG14  
 OF 5627  
**101**



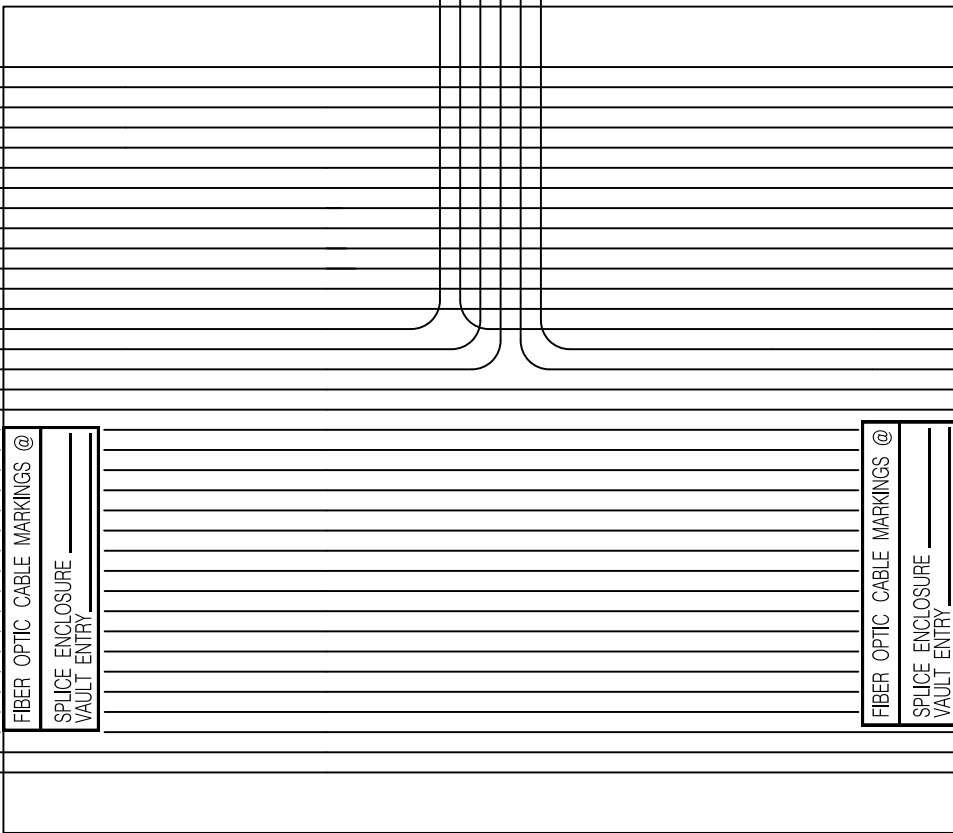
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TRUNK ID# 61-194

TRUNK ID# 61-195

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

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 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 FIBER OPTIC SCHEMATIC  
 TRUCK HIGHWAY 61 AT CSAH 96

TRUNK ID# 61-195

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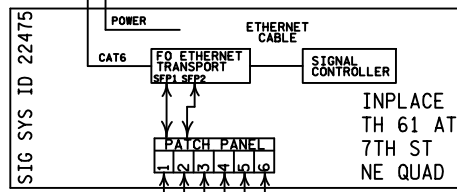
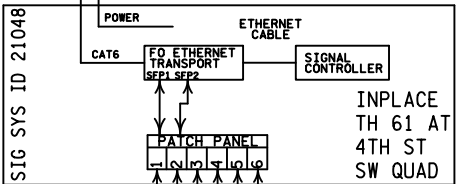
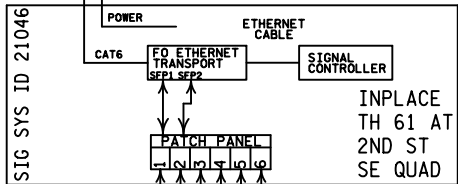
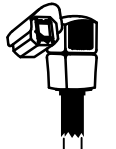
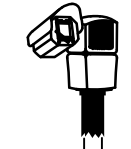
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TRUNK ID# 61-197B (NEW)

CAM 1726 (INPLACE)

CAM 1727 (INPLACE)

CAM 1728 (INPLACE)



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FIBER OPTIC CABLE MARKINGS @  
SPICE ENCLOSURE  
VAULT ENTRY

FIBER OPTIC CABLE MARKINGS @  
SPICE ENCLOSURE  
VAULT ENTRY

FIBER OPTIC CABLE MARKINGS @  
SPICE ENCLOSURE  
VAULT ENTRY

FIBER OPTIC CABLE MARKINGS @  
SPICE ENCLOSURE  
VAULT ENTRY

INPLACE  
PULL/SPLICE VAULT TH61 BETWEEN  
2ND ST & 4TH ST W SIDE

INPLACE  
PULL/SPLICE VAULT TH61 AT  
7TH ST NE QUAD

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

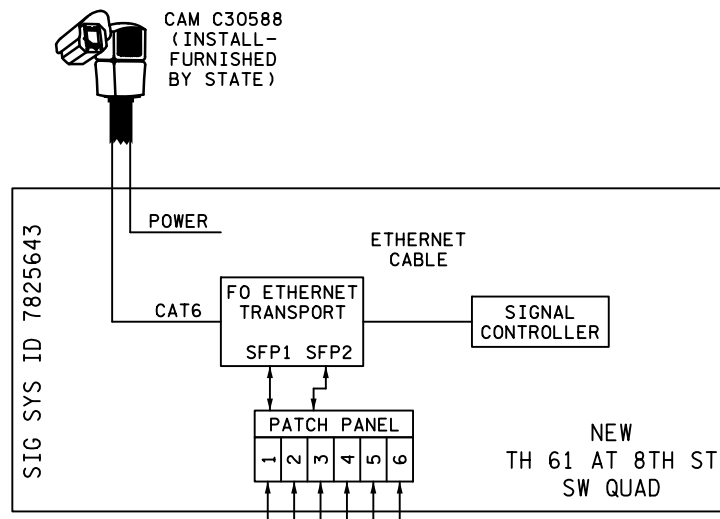
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Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**SIGNAL PLAN**  
FIBER OPTIC SCHEMATIC  
TRUCK HIGHWAY 61 (2ND STREET TO 7TH STREET)

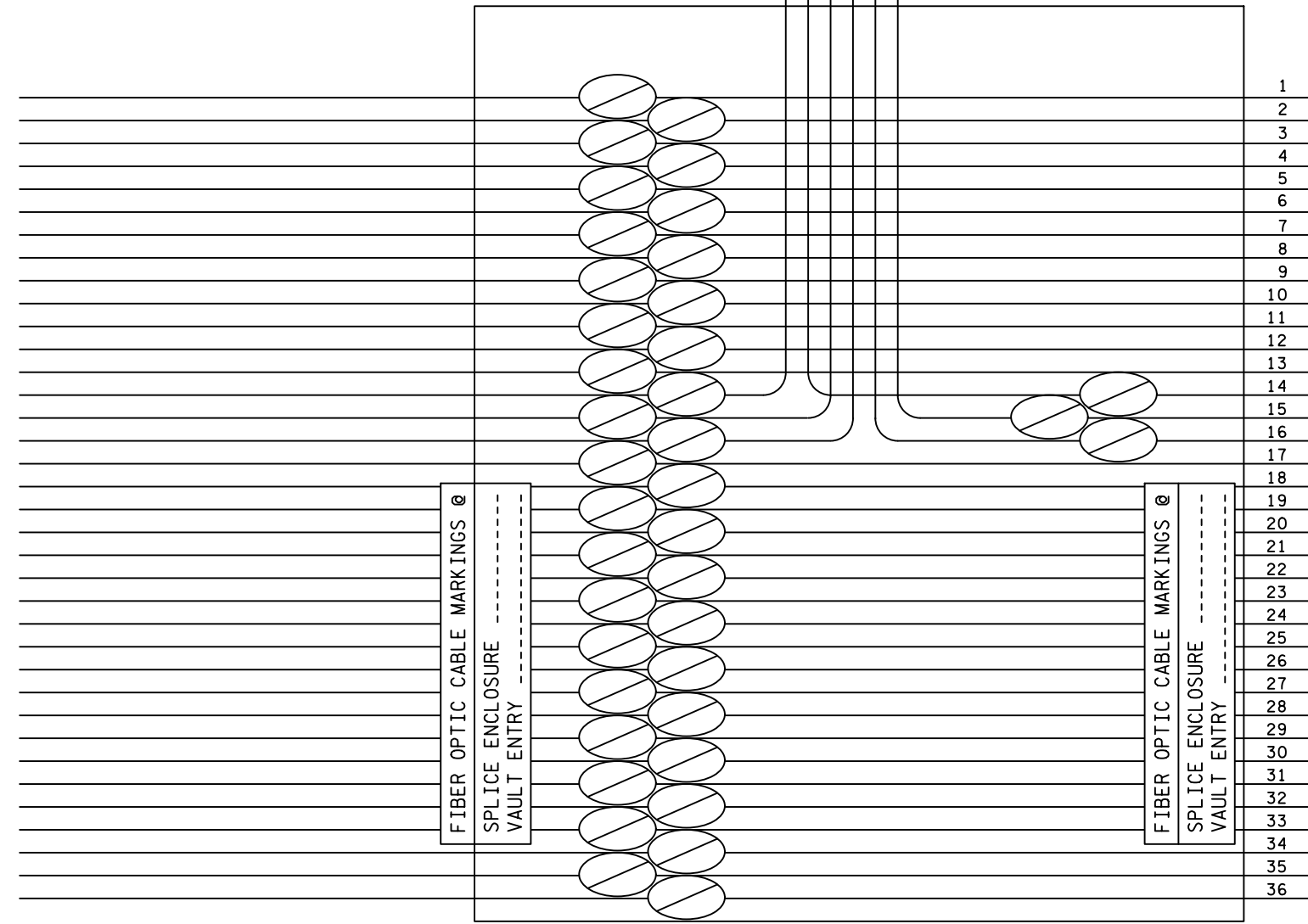




TRUNK ID# 61-197B (NEW)

PIGTAIL ID#: 7825643

TRUNK ID# 61-197 (INPLACE)



F&I PULL VAULT TH 61 AT 8TH ST SW QUAD

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

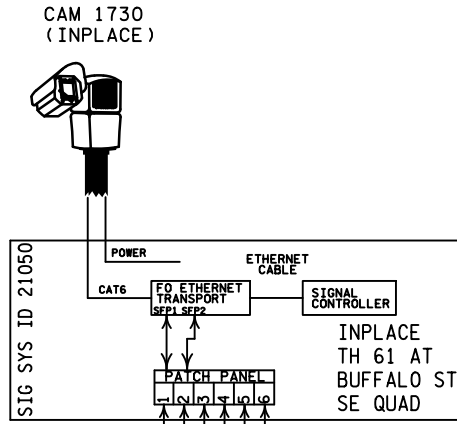
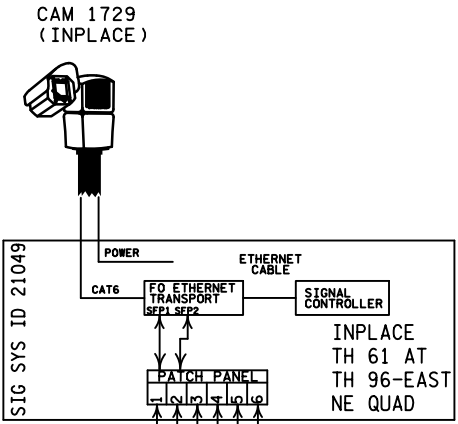
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Certified By: *John M. Gray* Lic. No. 22457  
 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 FIBER OPTIC SCHEMATIC  
 TRUNK HIGHWAY 61 AT 8TH STREET

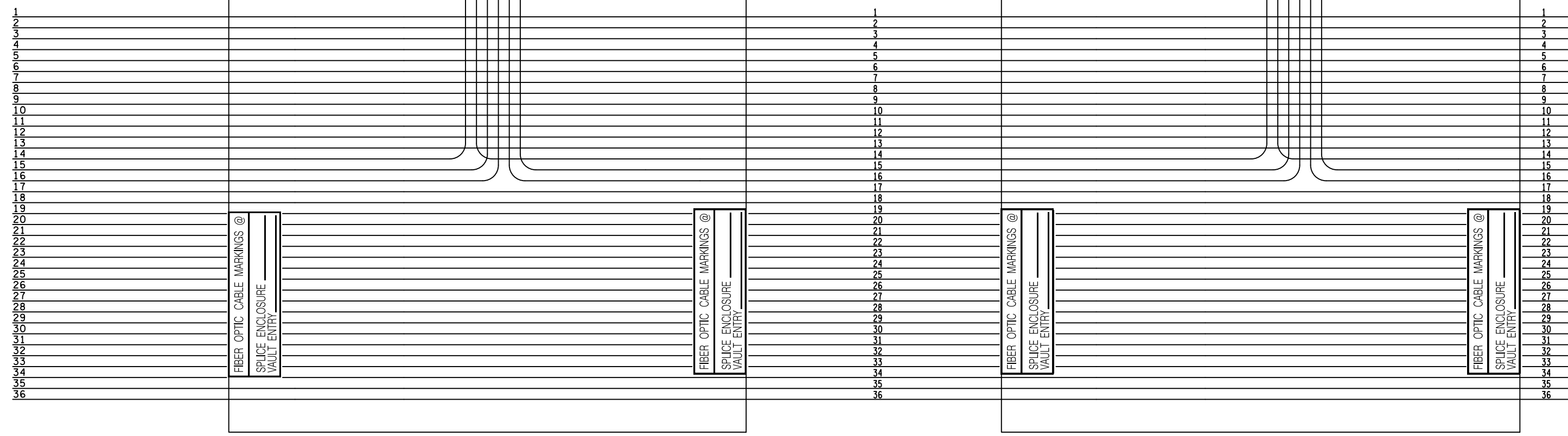


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TRUNK ID# 61-197

TRUNK ID# 61-198

TRUNK ID# 61-199



INPLACE  
PULL/SPLICE VAULT TH61 AT  
TH 96 (12TH ST) NE QUAD

INPLACE  
PULL/SPLICE VAULT TH61 AT  
BUFFALO ST (CSAH 8) SE QUAD

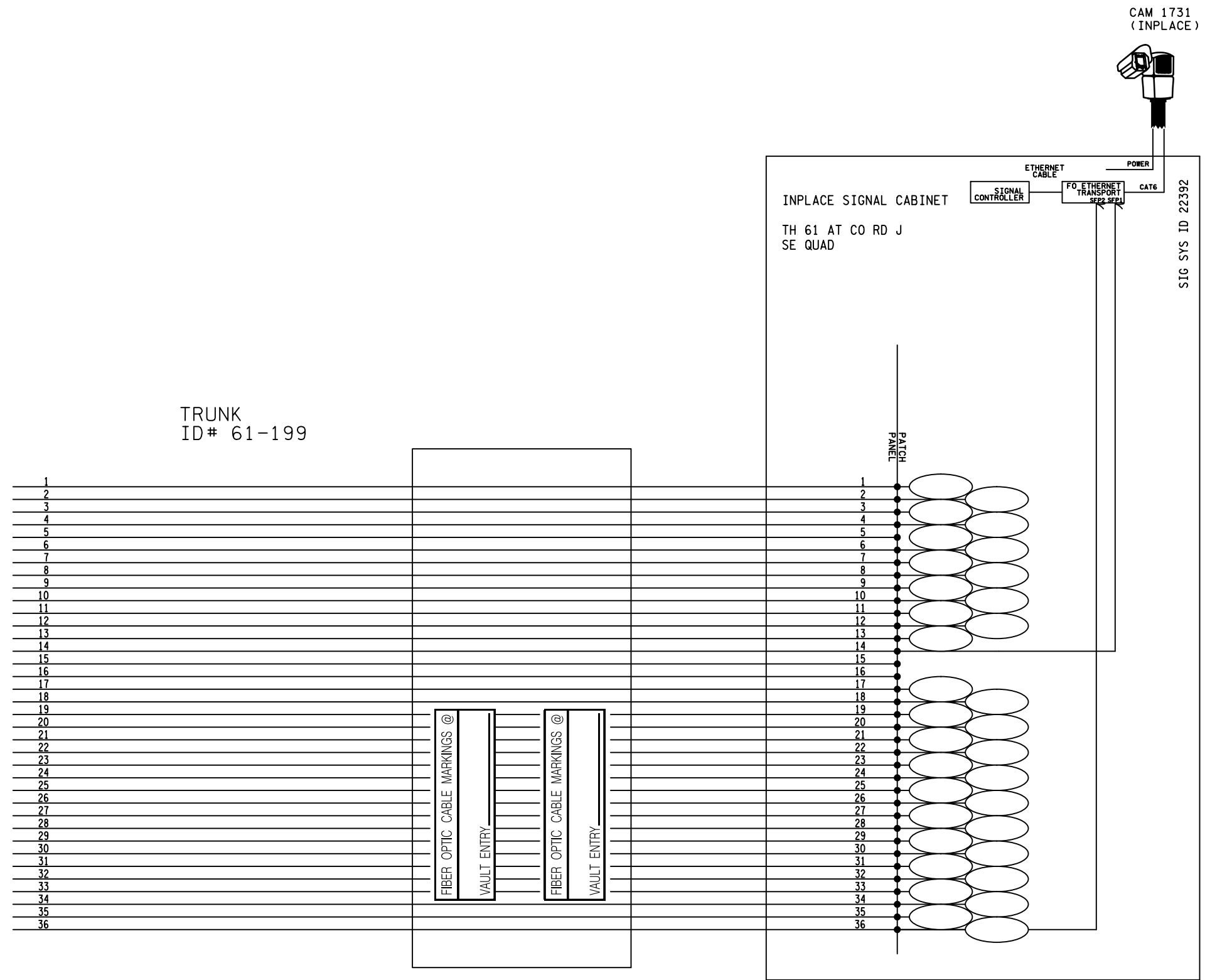
DESIGN TEAM				REVISIONS			
NO.	BY	DATE	DESCRIPTION	NO.	BY	DATE	DESCRIPTION

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *John M. Gray* Lic. No. 22457  
 Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 FIBER OPTIC SCHEMATIC  
 TRUNK HIGHWAY 61 (TH 96 TO BUFFALO STREET)



INPLACE  
PULL VAULT TH61 AT  
CO RD J (CO RD 81) SE QUAD

NOTE: THIS PLAN SHEET IS BEING PROVIDED FOR INFORMATIONAL PURPOSES. ALL FIBER INTERCONNECT CABLES, CAMERAS, AND VAULTS SHOWN ON THIS PAGE ARE INPLACE AND SHALL BE REUSED AND MAINTAINED INPLACE (EXCEPT FOR FIBER-OPTIC CABLE TESTING AT ALL SPLICE LOCATION TO BE COMPLETED BY THE CONTRACTOR AND PAID FOR UNDER THE "TRAFFIC CONTROL INTERCONNECT" PAY ITEM (ITEM NO. 2565). SEE SPECIAL PROVISIONS.

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
 Certified By: *John M. Gray* Lic. No. 22457  
 Licensed Professional Engineer  
 Printed Name: JOHN M. GRAY Date: 12/22/2023

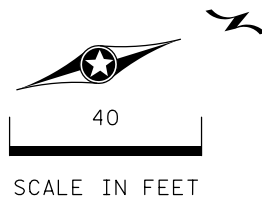
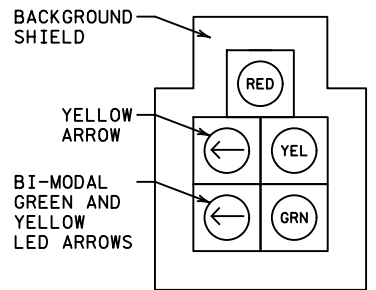


RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**SIGNAL PLAN**  
 FIBER OPTIC SCHEMATIC  
 TRUNK HIGHWAY 61 AT COUNTY ROAD J

SEH FILE NO. ISDWB170688	<b>87</b>
SG19 OF 5627	<b>101</b>

5 SECTION FYA CLUSTER HEAD DETAIL



SYSTEM ID = 7825643  
TE # = 103620  
METER ADDRESS = NE 8TH STREET

VIDEO DETECTION					LOOP DETECTOR CHART			
NO.	TYPE	POLE	LOCATION	PHASE	NUMBER	SIZE (FT)	LOCATION	TYPE
V-1	360 DEG	2	LUM EXT.	ALL	D4-1	6x6	50'	PVC
V-2	360 DEG	4	LUM EXT.	ALL	D4-2	6x6	50'	PVC
					D4-3	6x6	0'	PVC
					D4-4	6x6	0'	PVC

- VIDEO DETECTION CAMERAS AND MOUNTING HARDWARE ARE STATE FURNISHED.

- NEW LOOP DETECTORS SHALL BE IN ACCORDANCE WITH MNDOT STANDARD PLATE 8132.  
LOCATION = DISTANCE FROM CROSSWALK TO FRONT OF LOOP DETECTOR

2/15/2024

FO VAULT (7TH) TO FO VAULT (8TH)  
INPLACE (\*\*\*) 1.5" CONDUIT - CUT AND EXTEND INTO NEW 8TH STREET VAULT  
INPLACE (\*\*\*) 1-36 SM FO CABLE - PULL BACK FROM 7TH VAULT TO NEW 8TH VAULT AND SPLICE TO NEW 6 SM FO PIGTAIL (FOR 8TH) IN 8TH VAULT (COIL AND STORE EXCESS CABLE)  
F&I - (\*\*\*) 1-36 SM FO CABLE-SPLICE TO INPLACE 36 SM AND NEW 6 SM PIGTAIL CABLES IN 8TH VAULT, AND F&I NEW 36 SM FO CABLE TO 7TH VAULT

FO VAULT (TH 96) TO FO VAULT (8TH)  
INPLACE (\*\*\*) 1.5" CONDUIT - CUT AND EXTEND INTO NEW 8TH STREET VAULT  
INPLACE (\*\*\*) 1-36 SM FO CABLE - PULL BACK FROM 7TH VAULT TO NEW 8TH VAULT AND SPLICE TO NEW 6 SM FO PIGTAIL (FOR 8TH) IN 8TH VAULT (COIL AND STORE EXCESS CABLE)

F&I APS PUSH BUTTON STATION (SEE DETAILS)  
1-APS PUSH BUTTON & SIGN (RT ARROW) (PB8-2)  
EXTEND INTO HH 7:  
1" CONDUIT  
1-2/C 14  
1-1/C 6 (INS.GR.)

- (C) RAILROAD CONTROL CABINET (TO BE F & I BY OTHERS)
- F&I EXTEND INTO HH 6:  
3" CONDUIT  
2-12/C 14 (RR PREEMPT)
- F&I APS PUSH BUTTON STATION (SEE DETAILS)  
1-APS PUSH BUTTON & SIGN (RT ARROW) (PB6-2)  
EXTEND INTO HH 4:  
1" CONDUIT  
1-2/C 14  
1-1/C 6 (INS.GR.)
- F&I APS PUSH BUTTON STATION (SEE DETAILS)  
1-APS PUSH BUTTON & SIGN (RT ARROW) (PB4-2)  
EXTEND INTO HH 3:  
1" CONDUIT  
1-2/C 14  
1-1/C 6 (INS.GR.)
- F&I APS PUSH BUTTON STATION (SEE DETAILS)  
1-APS PUSH BUTTON & SIGN (LT ARROW) (PB2-1)  
EXTEND INTO HH 2:  
1" CONDUIT  
1-2/C 14  
1-1/C 6 (INS.GR.)

MATCHLINE T.H. 61 INP.  
STA 64+50 - SEE SHEET 91

3" CONDUIT  
2-6/C 14  
7-4/C 14  
(\*1-3/C 14  
(\*1-3/C 20  
1-3/C 14 (LUM)  
1-1/C 6 (INS GR)

3" CONDUIT  
4-2/C 14  
3" CONDUIT  
2-6/C 14  
7-4/C 14  
(\*1-3/C 14  
(\*1-3/C 20  
1-3/C 14 (LUM)

3" CONDUIT  
2-6/C 14  
5-4/C 14  
(\*1-3/C 14  
(\*1-3/C 20  
1-CAT 5E CABLE (V-1)  
1-3/C 14 (LUM)  
1-1/C 6 (INS GR)

3" CONDUIT  
5-2/C 14

3" CONDUIT  
2-6/C 14  
7-4/C 14  
(\*1-3/C 14  
(\*1-3/C 20  
1-3/C 14 (LUM)

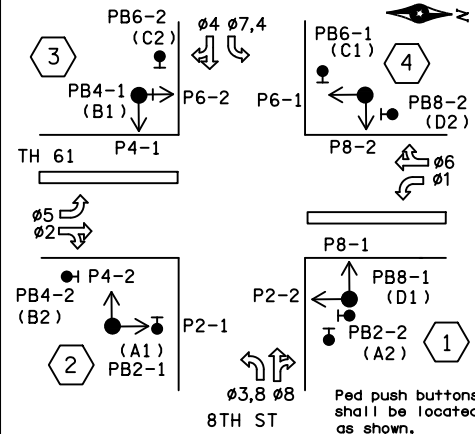
3" CONDUIT  
6-2/C 14

3" CONDUIT  
2-6/C 14  
5-4/C 14  
1-3/C 14  
4-2/C 14  
(\*2-3/C 20  
1-CAT 5E CABLE (V-2)  
(\*1-3/C 14 (LUM)  
1-1/C 6 (INS GR)

3" CONDUIT  
2-12/C 14 (RR)

PV F&I (\*\*\*) FIBER OPTIC PULL VAULT  
EXTEND INTO CONTROLLER CABINET:  
(\*\*\*) 1.5" CONDUIT  
(\*\*\*) 1-6 SM FO PIGTAIL  
(COIL EXCESS CABLE IN VAULT)

CONTROLLER PHASING, PEDESTRIAN INDICATIONS, AND PUSH BUTTONS



(B) INPLACE GRD MTD TRANSFORMER (SOP - XCEL ENERGY)  
F&I EXTEND TO SERVICE CABINET:  
2" CONDUIT  
3-1/C 2

SIGNAL SYSTEM OPERATIONS:  
- SIGNAL SYSTEM FLASH MODE SHALL BE ALL RED.  
- NORMAL OPERATION SHALL BE 8 PHASE, WITH PHASES 1,3,5,7 BEING FLASHING YELLOW ARROW SEQUENCING SELECTABLE BY TOD PROGRAMS.  
- VEHICLE SIGNAL PHASES 2 AND 6 SHALL OPERATE ON RECALL.

F&I APS PUSH BUTTON STATION (SEE DETAILS)  
1-APS PUSH BUTTON & SIGN (LT ARROW) (PB6-1)  
EXTEND INTO HH 7:  
1" CONDUIT  
1-2/C 14  
1-1/C 6 (INS.GR.)

F&I APS PUSH BUTTON STATION (SEE DETAILS)  
1-APS PUSH BUTTON & SIGN (RT ARROW) (PB2-2)  
EXTEND INTO HH 1:  
1" CONDUIT  
1-2/C 14  
1-1/C 6 (INS.GR.)

F&I APS PUSH BUTTON STATION (SEE DETAILS)  
1-APS PUSH BUTTON & SIGN (LT ARROW) (PB8-1)  
EXTEND INTO HH 1:  
1" CONDUIT  
1-2/C 14  
1-1/C 6 (INS.GR.)

SIGNAL HEAD CHART

SIGNAL HEAD	R	Y	FYA	G	Y	G
1-1, 1-2	←	←	←	←		
2-1, 2-2, 2-3	●	●		●		
4-1	●	●		●	←	←
4-2, 4-3	●	●	←	●	←	←
5-1, 5-2	←	←	←	←		
6-1, 6-2, 6-3	●	●		●		
8-1	●	●		●		
8-2, 8-3	●	●	←	●	←	←

-ALL SIGNAL INDICATIONS SHALL BE 12" LED.  
-FYA DENOTES FLASHING YELLOW ARROW.  
-ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BACKGROUND SHIELD.  
-ALL BACKGROUND SHIELDS SHALL HAVE YELLOW RETROREFLECTIVE BORDER.

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 02/15/2024



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**SIGNAL PLAN**  
INTERSECTION LAYOUT

SEH FILE NO. ISDWB170688	<b>88</b>
SG20 OF 5627	<b>101</b>

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1/23/2024  
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MODEL: sqj21

NOTES:

- 1) THE EXACT LOCATION OF HANDHOLES, POLES, LOOP DETECTORS, FIBER-OPTIC VAULTS, AND EQUIPMENT PAD WILL BE VERIFIED IN THE FIELD BY THE ENGINEER AND VIA STATE TRAFFIC PERSONNEL.
- 2) SEE SPECIAL PROVISIONS FOR STATE & OWNER FURNISHED MATERIALS.
- 3) THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE SERVICE CONNECTION FOR THE TRAFFIC SIGNAL SYSTEM WITH XCEL ENERGY. THE CITY OF WHITE BEAR LAKE IS RESPONSIBLE FOR COSTS ASSOCIATED WITH THE SERVICE CONNECTION AND MONTHLY ELECTRICAL SERVICE.
- 4) A 3/4 INCH HALF COUPLING, 3/4 INCH PIPE NIPPLE AND CONDUIT OUTLET BODY WILL BE LOCATED 6' FROM END OF EACH MAST ARM.
- 5) THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER EXISTING ROADWAYS/SIDEWALKS WILL REQUIRE BORING.
- 6) SEE SHEET 66 FOR MAST ARM MOUNTED SIGNS AND SIGN MOUNTING DETAILS.
- 7) FOR CONSTRUCTION OF PEDESTRIAN CURB RAMPS, TRAILS, AND CONCRETE WALK, SEE DETAIL SHEETS.
- 8) USE PVC OR HDPE FOR ALL NEW CONDUIT. CONDUIT SIZES ARE NOMINAL DIAMETER.
- 9) ALL WIRES LISTED ARE AWG (AMERICAN WIRE GAUGE).
- 10) FOR PAVEMENT MARKINGS, SEE DETAIL SHEETS.
- 11) ALL POLE MOUNTED VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED USING ONE-WAY SIGNAL HEAD MOUNTS.
- 12) NEW FIBER OPTIC VAULTS SHALL BE IN ACCORDANCE WITH THE DETAILS INCLUDED ELSEWHERE IN THESE PLANS AND AS PER MNDOT APPROVED/QUALIFIED PRODUCTS LIST & SPECIAL PROVISIONS.
- 13) (\*) DENOTES ITEMS TO BE INCLUDED AS PART OF EMERGENCY VEHICLE PREEMPTION SYSTEM A. SEE SPECIAL PROVISIONS.
- 14) (\*\*) DENOTES ITEMS TO BE INCLUDED AS PART OF TRAFFIC CONTROL INTERCONNECT. SEE SPECIAL PROVISIONS.
- 15) HANDHOLES 6 AND 7 SHALL BE SPECIAL HANDHOLES. SEE SPECIAL PROVISIONS.
- 16) 36 SM FIBER OPTIC CABLE REMOVAL AND REPLACEMENT MUST BE STAGED SO THAT COMMUNICATION TO THE NORTH IS IN-OPERATIONAL FOR ONLY A NORMAL 1-DAYTIME CUTOVER TIME PERIOD. ALL FIBER MUST BE TERMINATED AND FUNCTIONAL BEFORE NEW SIGNAL SYSTEM IS MADE OPERATIONAL.

**A** F&I  
EQUIPMENT PAD (SEE DETAILS)  
INSTALL CONTROLLER CABINET (FURNISHED BY STATE)  
BBU SERVICE CABINET (SSB) (WITH BATTERIES)  
CONTROLLER CABINET TO HH 1:  
3" CONDUIT  
6-2/C 14

3" CONDUIT  
2-6/C 14  
7-4/C 14  
(\*) 1-3/C 14  
(\*) 1-3/C 20  
1-1/C 6 INS. GR.

3" CONDUIT  
2-6/C 14  
5-4/C 14  
(\*) 1-3/C 14  
(\*) 1-3/C 20  
1-CAT 5E CABLE (V-1)

CONTROLLER CABINET TO HH 8:  
3" CONDUIT  
2-12/C 14 (RR)

3" CONDUIT  
2-6/C 14  
7-4/C 14  
(\*) 1-3/C 14  
(\*) 1-3/C 20  
1-CAT 5E CABLE (PTZ)

3" CONDUIT  
2-6/C 14  
5-4/C 14  
(\*) 1-3/C 14  
(\*) 2-3/C 20  
1-CAT 5E CABLE (V-2)  
1-1/C 6 INS. GR.

F&I  
GROUND WIRE AND GROUND ROD - MIN 8' FROM PAD  
2-2" AND 1-3" CONDUITS STUBBED OUT (CAP BOTH ENDS)  
CONTROLLER CABINET TO FO PULL VAULT:  
(\*\*) 1.5" CONDUIT  
(\*\*) 1-6 SM FO PIGTAIL  
CONTROLLER CABINET TO SERVICE CABINET:  
2" CONDUIT  
3-1/C 6  
2" CONDUIT  
1-6 Pr. 19 (COMMS)  
SERVICE CABINET TO SOP TRANSFORMER:  
2" CONDUIT  
3-1/C 2  
SERVICE CABINET TO HH 1:  
2" CONDUIT  
2-3/C 14 (LUM)  
SERVICE CABINET TO HH 8:  
2" CONDUIT  
2-3/C 14 (LUM)  
SERVICE CABINET TO EXTERNAL GROUND ROD:  
1" CONDUIT  
1-1/C 6 INS. GR. (SEE EQUIPMENT PAD LAYOUT)

**1** F&I  
X: 597091.6167  
Y: 208904.8406  
PA100 POLE FOUNDATION  
LIGHTNING ROD PLATE, LIGHTNING ROD, AND 7/16"  
GROUND ROD FOR PTZ CAMERA (SEE DETAILS)  
LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)  
1-ANGLE MOUNT SIGNAL-OVERHEAD AT 0'  
2-STRAIGHT MOUNT SIGNALS-OVERHEAD AT 11', 23'  
1-SPECIAL MOUNT SIGNAL-POLE MOUNTED 90 DEG  
1-ANGLE MOUNT SIGNAL-POLE MOUNTED 180 DEG  
2-ANGLE MOUNT C.D. PED HEADS-POLE MOUNTED  
90 DEG AND 180 DEG  
R10-X12 SIGN PANEL-ADJACENT TO 5-1 (SEE SIGNING PLANS)  
STREET NAME SIGN PANEL (54" X 24")-OVERHEAD AT 28'  
(SEE SIGNING PLANS)  
(\*) ONE WAY EVP DETECTOR AND CONFIRMATION LIGHT AT 6' (#2,5)  
EXTEND INTO HH 8:  
3" CONDUIT  
2-6/C 14 (INCLUDING 1 SPARE)  
7-4/C 14  
(\*) 1-3/C 14  
(\*) 1-3/C 20  
1-CAT 5E CABLE (PTZ)  
1-3/C 14 (LUM)  
1-1/C 6 INS. GR.

INSTALL (FURNISHED BY STATE) — 1-PTZ CAMERA, MOUNT, AND POWER SUPPLY (CAMERA C30588)

INSTALL (FURNISHED BY OWNER) — TYPE PA100-A-50-X6-350 CAM 400 (DAVIT 350 DEG)  
PA100 SWING-AWAY HINGES

**3** F&I  
X: 596955.2393  
Y: 208795.8231  
PA100 POLE FOUNDATION  
LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)  
1-ANGLE MOUNT SIGNAL-OVERHEAD AT 0'  
2-STRAIGHT MOUNT SIGNALS-OVERHEAD AT 11', 23'  
1-SPECIAL MOUNT SIGNAL-POLE MOUNTED 90 DEG  
1-ANGLE MOUNT SIGNAL-POLE MOUNTED 180 DEG  
2-ANGLE MOUNT C.D. PED HEADS-POLE MOUNTED  
90 DEG AND 180 DEG  
1-APS PUSH BUTTON & SIGN (LT ARROW) (PB4-1)  
APS MAST ARM POLE ADAPTOR FOR PUSH BUTTON  
R10-X12 SIGN PANEL-ADJACENT TO 1-1 (SEE SIGNING PLANS)  
STREET NAME SIGN PANEL (54" X 24")-OVERHEAD AT 28'  
(SEE SIGNING PLANS)  
(\*) ONE WAY EVP DETECTOR AND CONFIRMATION LIGHT AT 6' (#6,1)  
EXTEND INTO HH 4:  
3" CONDUIT  
2-6/C 14 (INCLUDING 1 SPARE)  
7-4/C 14  
(\*) 1-3/C 14  
1-2/C 14 (PB)  
(\*) 1-3/C 20  
1-3/C 14 (LUM)  
1-1/C 6 INS. GR.

INSTALL (FURNISHED BY OWNER) — TYPE PA100-A-45-D40-9 (DAVIT 350 DEG)  
PA100 SWING-AWAY HINGES

**2** F&I  
X: 597062.5492  
Y: 208799.5510  
PA100 POLE FOUNDATION  
LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)  
1-SPECIAL MOUNT SIGNAL-OVERHEAD AT 0'  
2-ANGLE MOUNT SIGNALS-POLE MOUNTED AT 90/180 DEG  
2-ANGLE MOUNT C.D. PED HEADS-POLE MOUNTED  
90 DEG AND 180 DEG  
R10-X12 SIGN PANEL-ADJACENT TO 4-2 (SEE SIGNING PLANS)  
STREET NAME SIGN PANEL (42" X 54")-OVERHEAD AT 8'  
(SEE SIGNING PLANS)  
(\*) ONE WAY EVP DETECTOR AND CONFIRMATION LIGHT AT 6' (#4,7)  
EXTEND INTO HH 3:  
3" CONDUIT  
2-6/C 14 (INCLUDING 1 SPARE)  
5-4/C 14  
(\*) 1-3/C 14  
(\*) 1-3/C 20  
1-CAT 5E CABLE (V-1)  
1-3/C 14 (LUM)  
1-1/C 6 INS. GR.

INSTALL (FURNISHED BY STATE) — 1-FISHEYE CAMERA, MOUNT, AND POWER SUPPLY (V-1)

INSTALL (FURNISHED BY OWNER) — TYPE PA100-A-45-D40-9 (DAVIT AT 350 DEG)

**4** F&I  
X: 596968.1004  
Y: 208881.5146  
PA100 POLE FOUNDATION  
LUMINAIRE-LED (FOR 40' MOUNTING HEIGHT)  
1-SPECIAL MOUNT SIGNAL-OVERHEAD AT 0'  
2-ANGLE MOUNT SIGNALS-POLE MOUNTED AT 90/180 DEG  
2-ANGLE MOUNT C.D. PED HEADS-POLE MOUNTED  
90 DEG AND 180 DEG  
R10-X12 SIGN PANEL-OVERHEAD TO 8-2 (SEE SIGNING PLANS)  
STREET NAME SIGN PANEL (42" X 54")-OVERHEAD AT 8'  
(SEE SIGNING PLANS)  
(\*) ONE WAY EVP DETECTOR AND CONFIRMATION LIGHT AT 6' (#8,3)  
EXTEND INTO HH 7:  
3" CONDUIT  
2-6/C 14 (INCLUDING 1 SPARE)  
5-4/C 14  
(\*) 1-3/C 14  
(\*) 1-3/C 20  
1-CAT 5E CABLE (V-2)  
1-3/C 14 (LUM)  
1-1/C 6 INS. GR.

INSTALL (FURNISHED BY STATE) — 1-FISHEYE CAMERA, MOUNT, AND POWER SUPPLY (V-2)

INSTALL (FURNISHED BY OWNER) — TYPE PA100-A-30-D40-9 (DAVIT AT 350 DEG)

**5** F&I  
X: 596884.3110  
Y: 208811.4181  
(\*) PEDESTAL FOUNDATION  
(\*) 12' (MIN) PEDESTAL POLE, BASE, WIND COLLAR  
(\*) ONE WAY EVP DETECTOR - MOUNT ATOP  
PEDESTAL POLE SLIPFITTER COLLAR (#4,7)  
EXTEND INTO HH 5:  
(\*) 2" CONDUIT  
(\*) 1-3/C 20  
(\*) 1-1/C 6 INS. GR.

SYSTEM ID = 7825643  
TE \* = 103620  
METER ADDRESS = NE 8TH STREET

TRAFFIC SIGNAL SYSTEM A - TRUNK HIGHWAY 61 AT 8TH STREET

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 01/23/2024



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

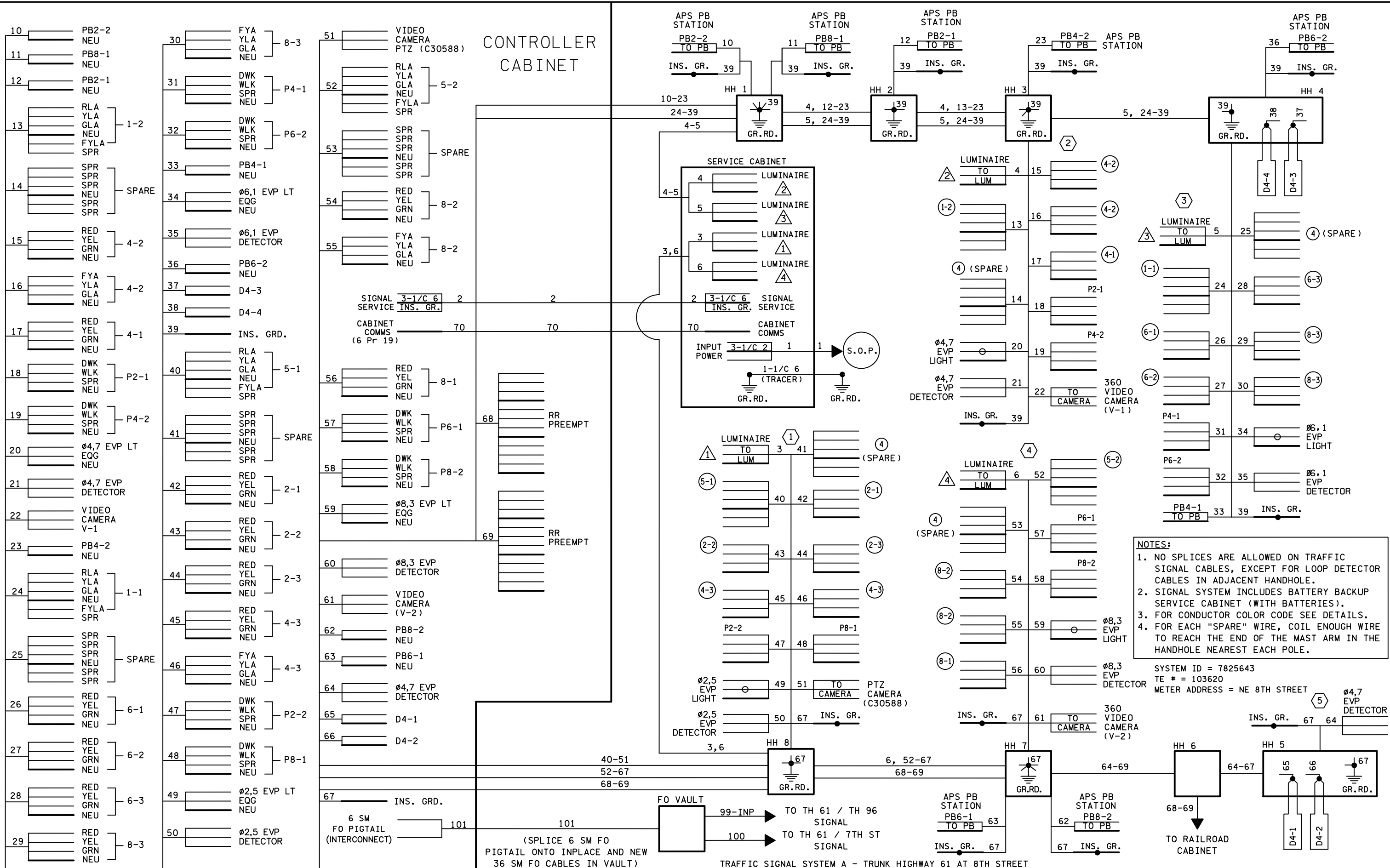
**SIGNAL PLAN**  
POLE & CABINET NOTES

SEH FILE NO. ISDWB170688	<b>89</b>
SG21 OF SG27	<b>101</b>

12/26/23 PM

12/22/2023

FILE: X:\F\J\1\SDWB\170688\5-final-dsgn\51-drawings\40-Drawings\CT170688\_sgl1.dgn  
MODEL: sgl2



- NOTES:**
1. NO SPLICES ARE ALLOWED ON TRAFFIC SIGNAL CABLES, EXCEPT FOR LOOP DETECTOR CABLES IN ADJACENT HANDHOLE.
  2. SIGNAL SYSTEM INCLUDES BATTERY BACKUP SERVICE CABINET (WITH BATTERIES).
  3. FOR CONDUCTOR COLOR CODE SEE DETAILS.
  4. FOR EACH "SPARE" WIRE, COIL ENOUGH WIRE TO REACH THE END OF THE MAST ARM IN THE HANDHOLE NEAREST EACH POLE.

SYSTEM ID = 7825643  
TE # = 103620  
METER ADDRESS = NE 8TH STREET

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023

RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**SIGNAL PLAN**  
FIELD WIRING DIAGRAM

SEH FILE NO. ISDWB170688  
SG22 OF SG27

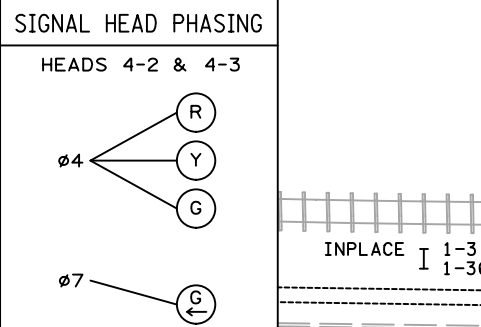
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**101**

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MODEL: sqj23

LED SIGNAL HEADS

SIGNAL HEAD	ALL 12"					STATUS
	R	Y	FYA	G	G	
1-1, 1-2	←	←	←			5
2-1, 2-2, 2-3	○	○		○		1
4-1	○	○		○		1
4-2, 4-3	○	○		○	←	1
5-1	←	←	←	←		3
5-2	←	←	←	←		2
6-1	○	○		○		1
6-2	○	○		○		4
6-3	○	○		○		4
8-1, 8-2, 8-3	○	○		○		1

ALL SIGNAL INDICATIONS SHALL BE 12" LED.  
ALL SIGNAL HEADS SHALL BE BLACK POLY-CARBONATE WITH BACKGROUND SHIELDS.  
FYA DENOTES FLASHING YELLOW ARROW.



**STATUS:**

- 1) = INPLACE, REUSE AND MAINTAIN INPLACE.
- 2) = REMOVE 3-SECTION RL-YL-GL, F & I NEW 4-SECTION HEAD ON MAST ARM POLE.
- 3) = REMOVE 3-SECTION RL-YL-GL, F & I NEW 4-SECTION HEAD ON MAST ARM (NEW MOUNT).
- 4) = INPLACE, SALVAGE AND INSTALL ON NEW MAST ARM (NEW MOUNT).
- 5) = INPLACE (REMOVE HEAD AND MOUNT).

○ ← = INPLACE LED INDICATION (REUSE INPLACE).  
⬆ ← = NEW LED INDICATION TO BE FURNISHED & INSTALLED BY CONTRACTOR.

INPLACE (MAINTAIN INPLACE) APS PUSH BUTTON STATION EXTENDED INTO HH 8: 1" CONDUIT 1-2/C 14 1-1/C 6 (INS.GR.)  
INPLACE (REMOVE) - 1-APS PB & SIGN  
F&I 1-APS PUSH BUTTON & SIGN (RT ARROW) (PB6-2)

INPLACE 1-3" PVC 1-36 SM FO CABLE

INPLACE - 2" PVC

INPLACE (MAINTAIN INPLACE) APS PUSH BUTTON STATION EXTENDED INTO HH 4: 1" CONDUIT 1-2/C 14 1-1/C 6 (INS.GR.)  
INPLACE (REMOVE) - 1-APS PB & SIGN  
F&I 1-APS PUSH BUTTON & SIGN (RT ARROW) (PB4-2)

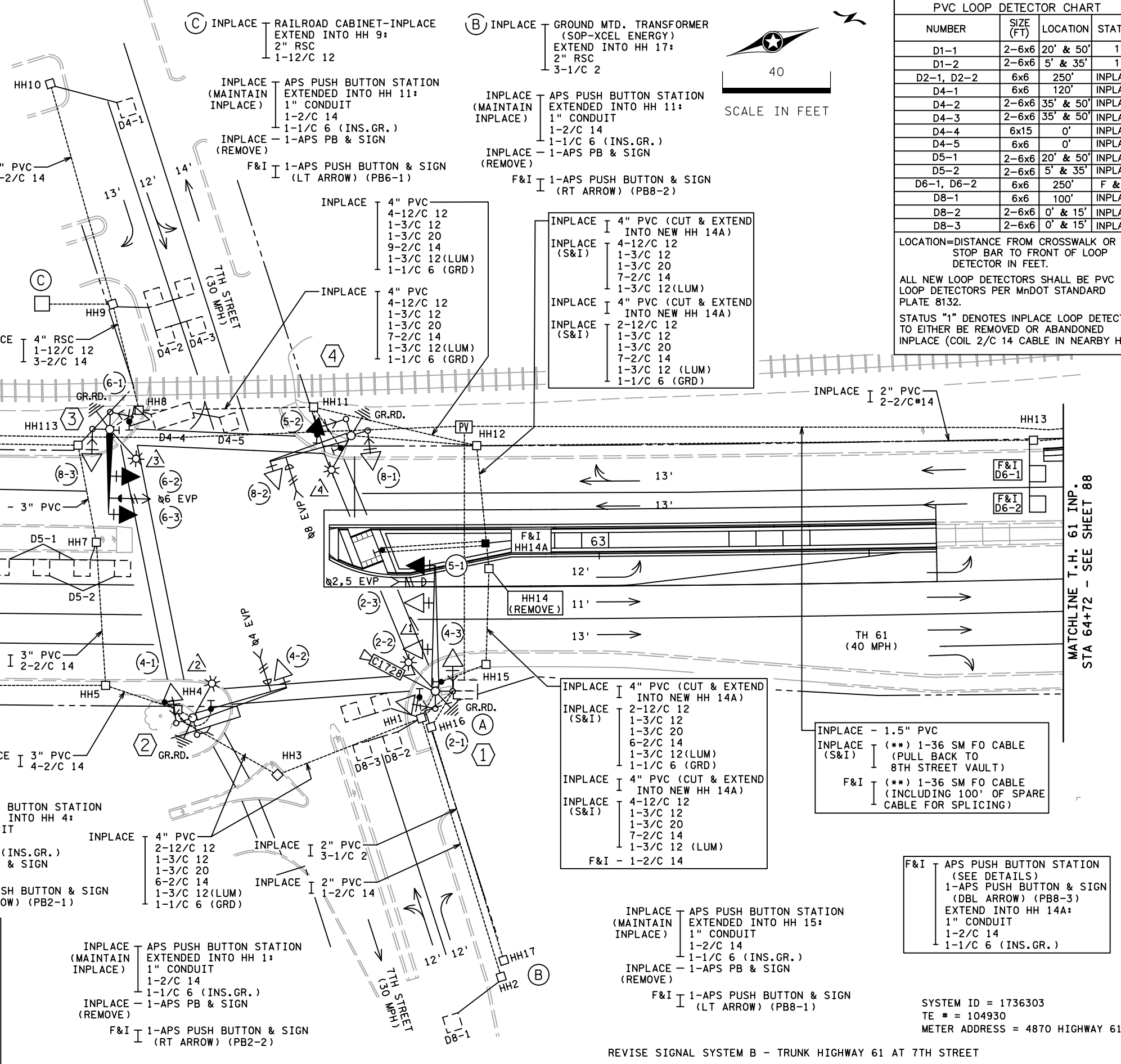
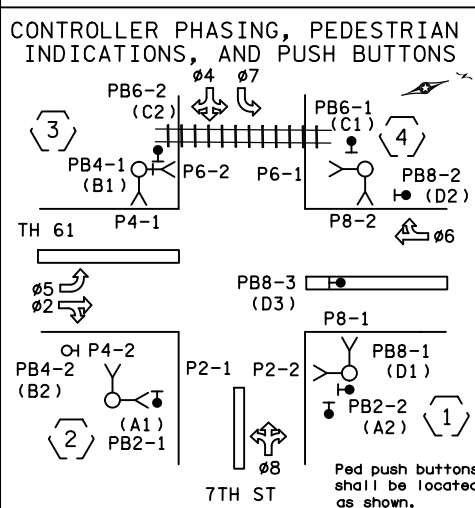
INPLACE (MAINTAIN INPLACE) APS PUSH BUTTON STATION EXTENDED INTO HH 4: 1" CONDUIT 1-2/C 14 1-1/C 6 (INS.GR.)  
INPLACE (REMOVE) - 1-APS PB & SIGN  
F&I 1-APS PUSH BUTTON & SIGN (RT ARROW) (PB4-2)

INPLACE (MAINTAIN INPLACE) APS PUSH BUTTON STATION EXTENDED INTO HH 4: 1" CONDUIT 1-2/C 14 1-1/C 6 (INS.GR.)  
INPLACE (REMOVE) - 1-APS PB & SIGN  
F&I 1-APS PUSH BUTTON & SIGN (RT ARROW) (PB4-2)

INPLACE (MAINTAIN INPLACE) APS PUSH BUTTON STATION EXTENDED INTO HH 4: 1" CONDUIT 1-2/C 14 1-1/C 6 (INS.GR.)  
INPLACE (REMOVE) - 1-APS PB & SIGN  
F&I 1-APS PUSH BUTTON & SIGN (RT ARROW) (PB4-2)

**SIGNAL SYSTEM OPERATIONS:**

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION SHALL BE REVISED FROM 7 PHASE TO 6 PHASE, WITH PHASE 1 BEING REVISED FROM PROTECTED LEFT TURNS TO FYA SEQUENCING SELECTABLE BY TOD PROGRAMS, AND PHASE 7 OPERATING ONLY DURING RAILROAD PREEMPTION.
- PHASES 2 AND 6 SHALL BE ON VEHICLE RECALL.



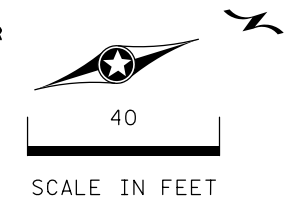
PVC LOOP DETECTOR CHART

NUMBER	SIZE (FT)	LOCATION	STATUS
D1-1	2-6x6	20' & 50'	1
D1-2	2-6x6	5' & 35'	1
D2-1, D2-2	6x6	250'	INPLACE
D4-1	6x6	120'	INPLACE
D4-2	2-6x6	35' & 50'	INPLACE
D4-3	2-6x6	35' & 50'	INPLACE
D4-4	6x15	0'	INPLACE
D4-5	6x6	0'	INPLACE
D5-1	2-6x6	20' & 50'	INPLACE
D5-2	2-6x6	5' & 35'	INPLACE
D6-1, D6-2	6x6	250'	F & I
D8-1	6x6	100'	INPLACE
D8-2	2-6x6	0' & 15'	INPLACE
D8-3	2-6x6	0' & 15'	INPLACE

LOCATION=DISTANCE FROM CROSSWALK OR STOP BAR TO FRONT OF LOOP DETECTOR IN FEET.

ALL NEW LOOP DETECTORS SHALL BE PVC LOOP DETECTORS PER MnDOT STANDARD PLATE 8132.

STATUS "1" DENOTES INPLACE LOOP DETECTOR TO EITHER BE REMOVED OR ABANDONED INPLACE (COIL 2/C 14 CABLE IN NEARBY HH).



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

NO.	BY	DATE	REVISIONS

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

Certified By: *[Signature]* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023

RAMSEY COUNTY, MINNESOTA

**T.H. 61**

S.P. 6222-197

REVISION SIGNAL SYSTEM B - TRUNK HIGHWAY 61 AT 7TH STREET

SYSTEM ID = 1736303  
TE # = 104930  
METER ADDRESS = 4870 HIGHWAY 61

**SIGNAL PLAN**  
INTERSECTION LAYOUT

SEH FILE NO. ISDWB170688	<b>91</b>
SG23 OF 5627	<b>101</b>

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12/22/2023

(A) INPLACE EQUIPMENT PAD FOUNDATION  
CONTROLLER AND CABINET  
SERVICE CABINET

INPLACE CONTROLLER CABINET TO HH 1:  
4" PVC  
2-12/C 12  
1-3/C 12  
1-3/C 20  
6-2/C 14  
1-3/C 14 (CAMERA POWER)  
1-COM CABLE  
1-COAXIAL CABLE

INPLACE CONTROLLER CABINET TO HH 15:  
4" PVC

S&I 2-12/C 12  
1-3/C 12  
1-3/C 20  
7-2/C 14  
1-1/C 6 (GRD)

S&I 4-12/C 12  
1-3/C 12  
1-3/C 20  
7-2/C 14

F&I 1-2/C 14  
NEW PEDESTRIAN CCU IN  
CONTROLLER CABINET  
(FOR NEW APS SYSTEM)

INPLACE STUB OUT 2-3" PVC FROM  
CONTROLLER CABINET TO WEST  
(CAP BOTH ENDS-FOR FUTURE USE)

SERVICE CABINET TO HH 1:  
2" PVC  
2-3/C 12 (LUM)

SERVICE CABINET TO HH 15:  
2" PVC

SERVICE CABINET TO HH 16:  
2" PVC  
3-1/C 2

SERVICE CABINET TO CONTROLLER CABINET:  
2" PVC  
2-1/C 6  
1-1/C 6 (GRD)

INPLACE - 2-3/C 12 (LUM)  
(S&I)

INPLACE CONTROLLER CABINET TO TMS PULL VAULT (NW CORNER)  
1.5" CONDUIT INSIDE EXISTING 3" PVC:  
1-6SM FO CABLE (PIGTAIL)

(1) INPLACE PA100 POLE FOUNDATION  
TYPE PA100-A-45-X6-350/CAM 400 EXTENSION  
(MOUNTED AT 350 DEG)  
LUMINAIRE-LED  
1-VIDEO CAMERA WITH MOUNT (C1728)  
PA100 SWING-AWAY HINGES  
2-ONE WAY SIGNALS-OVERHEAD (11', 23'  
FROM END OF MAST ARM)  
2-ONE WAY SIGNALS-POLE MOUNTED 45 AND 225 DEG  
2-SETS PEDESTRIAN INDICATIONS-POLE MOUNTED 45 AND 225 DEG  
ONE WAY EVP DETECTOR AND LIGHT (#2,5) AT 6'  
STREET NAME SIGN PANEL (84" X 24")-OVERHEAD AT 28'  
(SEE SIGNING PLANS)  
EXTEND INTO HH 1:  
3" PVC  
3-12/C 12  
1-3/C 12  
1-3/C 20  
1-3/C 14 (LUM)  
2-1/C 6 (GRD)  
1-7/16" GROUNDING BRAID TO GROUND ROD IN HH 1:  
1-3/C 14 (CAMERA POWER)  
1-COM CABLE  
1-COAXIAL CABLE

INPLACE - 1-ONE WAY SIGNAL-OVERHEAD AT 0' (OLD 5-1)  
(REMOVE)

F&I 1-ONE WAY SIGNAL AND ANGLE MOUNT-  
OVERHEAD AT 0' (NEW 5-1)  
R10-X12 SIGN PANEL (ADJACENT TO 5-1)  
(SEE SIGNING PLANS)

(3) INPLACE PA100 POLE FOUNDATION  
(WITH 1" PVC STUB OUT AND 5/8" X 15' GROUND ROD)  
TYPE PA100-A-D40-9 MAST ARM POLE (DAVIT AT 350 DEG)  
PA100 SWING-AWAY HINGES  
LUMINAIRE-LED  
2-ONE WAY SIGNALS-POLE MOUNTED 45 AND 225 DEG  
2-SETS PEDESTRIAN INDICATIONS-POLE MOUNTED 45 AND 225 DEG  
MAST ARM POLE ADAPTOR FOR APS PUSH BUTTON (PB4-1)  
EXTEND INTO HH 8:  
3" PVC  
3-12/C 12  
1-3/C 12  
1-2/C 14  
1-3/C 20  
1-3/C 14 (LUM)  
1-1/C 6 (GRD)

INPLACE (REMOVE) 40' MAST ARM  
1-ONE WAY SIGNAL-OVERHEAD AT 0' (1-1)  
1-APS PUSH BUTTON & SIGN

INPLACE (S&I) 2-ONE WAY SIGNALS-OVERHEAD AT 0', 12' (6-3, 6-2)  
ONE WAY EVP DETECTOR AND LIGHT (#6) AT 6'  
STREET NAME SIGN PANEL (84" X 24")-OVERHEAD AT 18'  
(SEE SIGNING PLANS)

F&I 30' MAST ARM (WITH MID-MOUNT AT 12')  
1-ANGLE MOUNT AND 1-STRAIGHT MOUNT-  
OVERHEAD (FOR 6-3, 6-2)  
R3-2 (NO LEFT TURN) SIGN PANEL (36" X 36")-OVERHEAD AT 2'  
(SEE SIGNING PLANS)  
GREEN UP LED ARROW (FOR 6-3)  
1-APS PUSH BUTTON & SIGN (LT ARROW) (PB4-1)

(2) INPLACE PA90 POLE FOUNDATION  
(WITH 1" PVC STUB OUT AND 5/8" X 15' GROUND ROD)  
TYPE PA90-A-35-D40-9 (DAVIT AT 350 DEG)  
LUMINAIRE-LED  
1-ONE WAY SIGNAL-OVERHEAD AT 0'  
1-ONE WAY SIGNAL-POLE MOUNTED 225 DEG (4-1)  
2-SETS PEDESTRIAN INDICATIONS-POLE MOUNTED 45 AND 225 DEG  
ONE WAY EVP DETECTOR AND LIGHT (#4) AT 6'  
STREET NAME SIGN PANEL (42" X 54")-OVERHEAD AT 2'  
(SEE SIGNING PLANS)  
EXTEND INTO HH 4:  
3" PVC  
2-12/C 12  
1-3/C 12  
1-3/C 20  
1-3/C 14 (LUM)  
1-1/C 6 (GRD)

INPLACE - 1-ONE WAY SIGNAL AND ANGLE MOUNT AT 45 DEG (1-2)  
(REMOVE)

F&I - CAP HUB AT 45 DEG (WHERE 1-2 USED TO BE)

(4) INPLACE PA90 POLE FOUNDATION  
(WITH 1" PVC STUB OUT AND 5/8" X 15' GROUND ROD)  
TYPE PA90-A-30-D40-9 (DAVIT AT 350 DEG)  
LUMINAIRE-LED  
1-ONE WAY SIGNAL-OVERHEAD  
1-ONE WAY SIGNALS-POLE MOUNTED 225 DEG (8-1)  
2-SETS PEDESTRIAN INDICATIONS-POLE MOUNTED 45 AND 225 DEG  
ONE WAY EVP DETECTOR AND LIGHT (#8) AT 6'  
STREET NAME SIGN PANEL (42" X 54")-OVERHEAD AT 2'  
(SEE SIGNING PLANS)  
EXTEND INTO HH 12:  
3" PVC  
2-12/C 12  
1-3/C 12  
1-3/C 20  
1-3/C 14 (LUM)  
2-1/C 6 (GRD)

INPLACE - 1-ONE WAY SIGNAL AND ANGLE MOUNT AT 45 DEG (OLD 5-2)  
(REMOVE)

F&I - 1-ONE WAY SIGNAL AND ANGLE MOUNT AT 45 DEG (NEW 5-2)

(FO) INPLACE - FIBER OPTIC PULL VAULT

INPLACE (\*\*) 1-36 SM FO CABLE  
(UNSPlice AND PULL BACK TO VAULT AT 61/8TH STREET)

INPLACE (\*\*) 1-36 SM FO CABLE TO SOUTH (TO 4TH STREET)  
AND 1-6 SM FO PIGTAIL (TO 7TH CABINET)  
SPlice TO NEW 1-36 SM FO CABLE IN VAULT

F&I (\*\*) 1-36 SM FO CABLE  
(7TH STREET TO 8TH STREET)  
(COIL & STORE AN EXTRA 100' OF CABLE IN VAULT FOR  
SPlicing PURPOSES)

**REVISE SIGNAL SYSTEM "B" NOTES:**

- LOCATION OF NEW LOOP DETECTORS AND PUSH BUTTON STATIONS SHALL BE DETERMINED IN THE FIELD BY ENGINEER AND MnDOT METRO TRAFFIC PERSONNEL.
- ALL NEW VEHICLE SIGNAL HEADS SHALL HAVE BLACK POLYCARBONATE BACKGROUND SHIELDS (WITHOUT YELLOW BORDERS), HOUSINGS, AND VISORS AND ALSO HAVE LED INDICATIONS.
- NEW LOOP DETECTORS SHALL BE PVC LOOP DETECTORS PER MnDOT STANDARD PLATE 8132 AND SHALL BE INCLUDED AS PART OF PAY ITEM FOR REVISE SIGNAL SYSTEM "B".  
REMOVE AND DISPOSE OF ALL EXISTING LOOP DETECTOR SPLICE KITS (FOR D1-1, D1-2, D6-1, AND D6-2), AND FURNISH AND INSTALL NEW SPLICE KITS FOR NEW LOOP DETECTOR INSTALLATIONS (FOR D6-1 AND D6-2).
- ALL HANDHOLES ARE INPLACE AND SHALL BE REUSED AND MAINTAINED INPLACE, EXCEPT AS FOLLOWS: CONTRACTOR SHALL ADJUST HANDHOLE 13 TO FINISHED SURROUNDING GRADE (PVC HANDHOLE WITH METAL FRAME AND COVER); SHALL REMOVE INPLACE HANDHOLE 14; AND SHALL FURNISH AND INSTALL NEW HANDHOLE 14A PER LATEST MnDOT SPECIFICATIONS AND MnDOT APPROVED PRODUCTS LIST.  
ALL WORK TO ADJUST, REMOVE, FURNISH AND INSTALL HANDHOLES AS NOTED ABOVE WILL BE CONSIDERED AS INCIDENTAL TO THE REVISE SIGNAL SYSTEM "B" PAY ITEM.
- ALL POLE AND MAST ARM MOUNTS SHALL UTILIZE ONE-WAY MOUNTS PER THE DETAILS INCLUDED ELSEWHERE IN THE PLANS.
- INPLACE ITEMS TO BE REUSED INPLACE AS PART OF REVISE SIGNAL SYSTEM SHALL BE PROTECTED AND MAINTAINED INPLACE. SEE SPECIAL PROVISIONS.
- CONTRACTOR SHALL MAINTAIN OPERATION OF THE INPLACE SIGNAL SYSTEM AT ALL TIMES, UNLESS OTHERWISE APPROVED BY ENGINEER FOR THIS SIGNAL SYSTEM TO BE TURNED OFF TO ACCOMMODATE SIGNAL CONSTRUCTION.
- F & I = MATERIALS TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR AS PART OF THIS PROJECT.  
S & I = MATERIALS TO BE SALVAGED AND INSTALLED BY THE CONTRACTOR AS PART OF THIS PROJECT.
- ALL CONDUIT, HANDHOLES, CABLES AND CONDUCTORS ARE INPLACE AND SHALL BE REUSED, PROTECTED AND MAINTAINED INPLACE, EXCEPT WHERE BOXED IN AND DENOTED OTHERWISE ON THE PLANS.
- USE PVC OR HDPE FOR ALL NEW CONDUIT. CONDUIT SIZES ARE NOMINAL DIAMETER.
- ALL WIRES LISTED ARE AWG (AMERICAN WIRE GAUGE).
- (\*\*) DENOTES ITEMS TO BE INCLUDED AS PART OF TRAFFIC CONTROL INTERCONNECT WORK.
- 36 SM FIBER OPTIC CABLE REMOVAL AND REPLACEMENT MUST BE STAGED SO THAT COMMUNICATION TO THE NORTH IS IN-OPERATIONAL FOR ONLY A NORMAL 1-DAYTIME CUTOVER TIME PERIOD. ALL FIBER MUST BE TERMINATED AND FUNCTIONAL BEFORE NEW SIGNAL SYSTEM IS MADE OPERATIONAL.
- SEE SHEET 66 FOR MAST ARM MOUNTED SIGNS AND SIGN MOUNTING DETAILS.

SYSTEM ID = 1736303  
TE \* = 104930  
METER ADDRESS = 4870 HIGHWAY 61

REVISE SIGNAL SYSTEM B - TRUNK HIGHWAY 61 AT 7TH STREET

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023



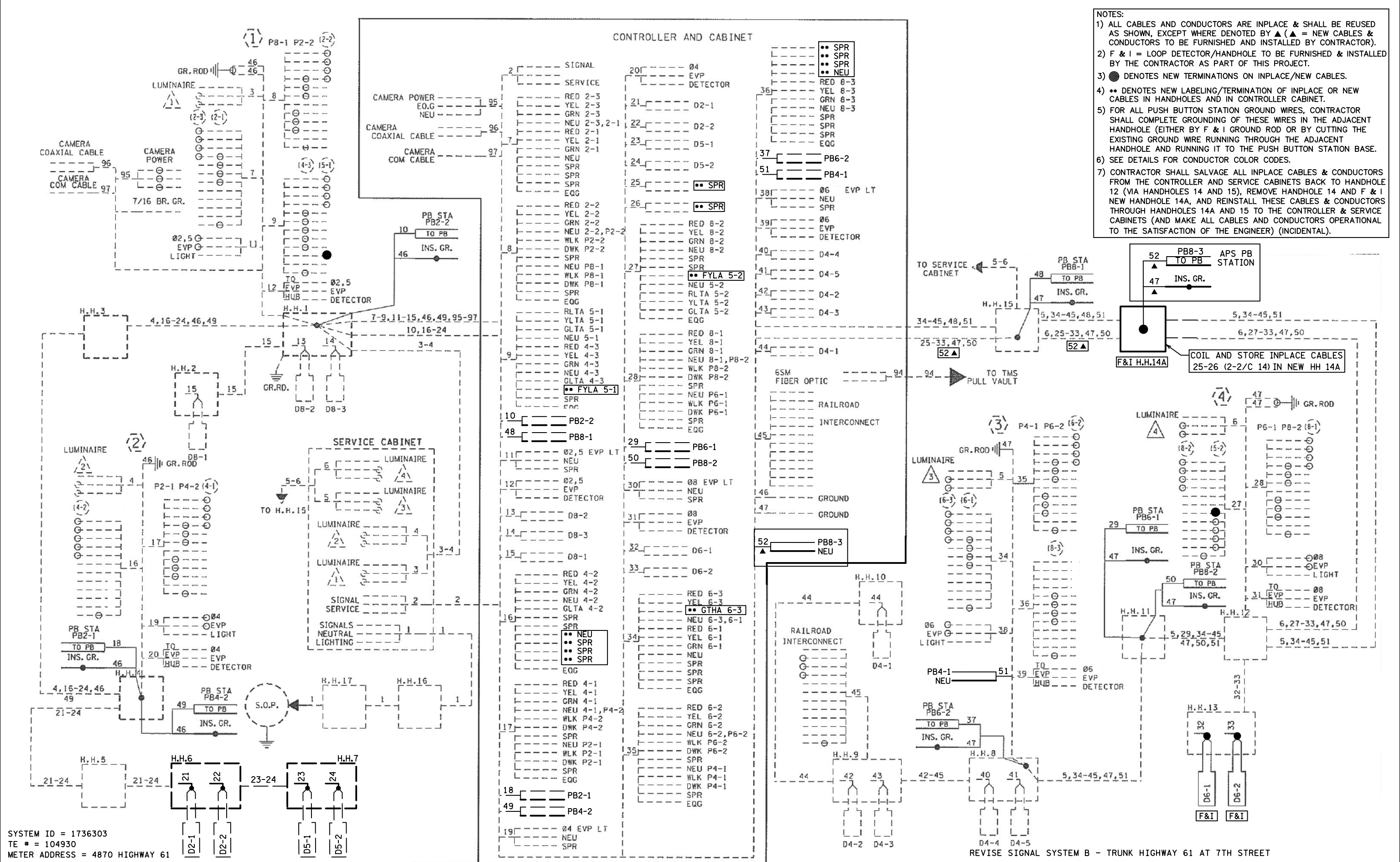
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**SIGNAL PLAN**  
POLE & CABINET NOTES

SEH  
FILE NO.  
ISDWB170688  
92  
SG24  
OF SG27  
101

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MODEL: sqj24





- NOTES:
- 1) ALL CABLES AND CONDUCTORS ARE INPLACE & SHALL BE REUSED AS SHOWN, EXCEPT WHERE DENOTED BY ▲ (▲ = NEW CABLES & CONDUCTORS TO BE FURNISHED AND INSTALLED BY CONTRACTOR).
  - 2) F & I = LOOP DETECTOR/HANDHOLE TO BE FURNISHED & INSTALLED BY THE CONTRACTOR AS PART OF THIS PROJECT.
  - 3) ● DENOTES NEW TERMINATIONS ON INPLACE/NEW CABLES.
  - 4) \*\* DENOTES NEW LABELING/TERMINATION OF INPLACE OR NEW CABLES IN HANDHOLES AND IN CONTROLLER CABINET.
  - 5) FOR ALL PUSH BUTTON STATION GROUND WIRES, CONTRACTOR SHALL COMPLETE GROUNDING OF THESE WIRES IN THE ADJACENT HANDHOLE (EITHER BY F & I GROUND ROD OR BY CUTTING THE EXISTING GROUND WIRE RUNNING THROUGH THE ADJACENT HANDHOLE AND RUNNING IT TO THE PUSH BUTTON STATION BASE).
  - 6) SEE DETAILS FOR CONDUCTOR COLOR CODES.
  - 7) CONTRACTOR SHALL SALVAGE ALL INPLACE CABLES & CONDUCTORS FROM THE CONTROLLER AND SERVICE CABINETS BACK TO HANDHOLE 12 (VIA HANDHOLES 14 AND 15), REMOVE HANDHOLE 14 AND F & I NEW HANDHOLE 14A, AND REINSTALL THESE CABLES & CONDUCTORS THROUGH HANDHOLES 14A AND 15 TO THE CONTROLLER & SERVICE CABINETS (AND MAKE ALL CABLES AND CONDUCTORS OPERATIONAL TO THE SATISFACTION OF THE ENGINEER) (INCIDENTAL).

SYSTEM ID = 1736303  
TE # = 104930  
METER ADDRESS = 4870 HIGHWAY 61

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

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John M. Gray* Lic. No. 22457  
Printed Name: JOHN M. GRAY Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

REVISION SIGNAL SYSTEM B - TRUNK HIGHWAY 61 AT 7TH STREET

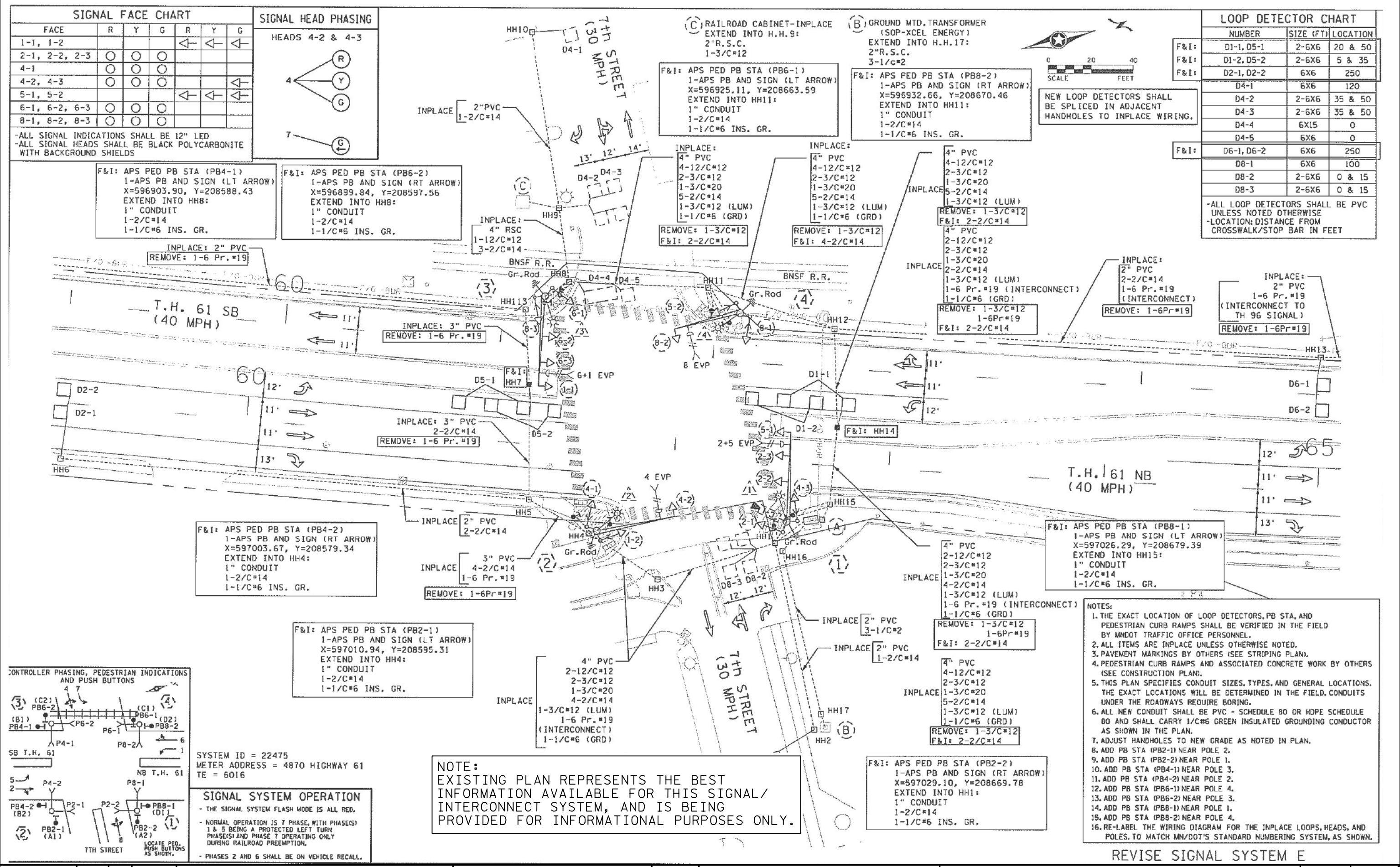
SEH FILE NO. ISDWB170688	93
SG25 OF SG27	101



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12/22/2023

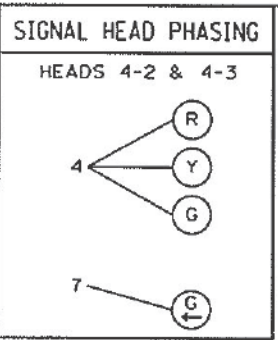
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MODEL: sqj26



**SIGNAL FACE CHART**

FACE	R	Y	G	R	Y	G
1-1, 1-2				←	←	←
2-1, 2-2, 2-3	○	○	○			
4-1	○	○	○			
4-2, 4-3	○	○	○			
5-1, 5-2				←	←	←
6-1, 6-2, 6-3	○	○	○			
8-1, 8-2, 8-3	○	○	○			

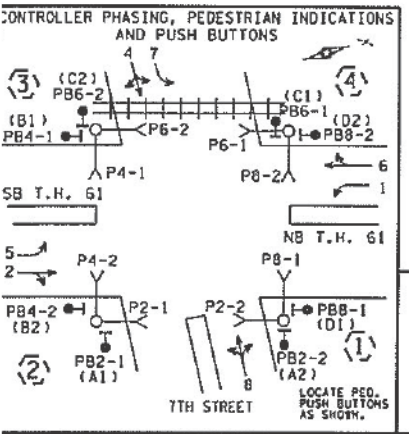
- ALL SIGNAL INDICATIONS SHALL BE 12" LED  
- ALL SIGNAL HEADS SHALL BE BLACK POLYCARBONITE WITH BACKGROUND SHIELDS



**LOOP DETECTOR CHART**

NUMBER	SIZE (FT)	LOCATION
F&I: D1-1, D5-1	2-6X6	20 & 50
F&I: D1-2, D5-2	2-6X6	5 & 35
F&I: D2-1, D2-2	6X6	250
D4-1	6X6	120
D4-2	2-6X6	35 & 50
D4-3	2-6X6	35 & 50
D4-4	6X15	0
D4-5	6X6	0
F&I: D6-1, D6-2	6X6	250
D8-1	6X6	100
D8-2	2-6X6	0 & 15
D8-3	2-6X6	0 & 15

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



SYSTEM ID = 22475  
METER ADDRESS = 4870 HIGHWAY 61  
TE = 6016

**SIGNAL SYSTEM OPERATION**

- THE SIGNAL SYSTEM FLASH MODE IS ALL RED.
- NORMAL OPERATION IS 7 PHASE, WITH PHASE(S) 1 & 5 BEING A PROTECTED LEFT TURN PHASE(S) AND PHASE 7 OPERATING ONLY DURING RAILROAD PREEMPTION.
- PHASES 2 AND 6 SHALL BE ON VEHICLE RECALL.

**NOTE:**  
EXISTING PLAN REPRESENTS THE BEST INFORMATION AVAILABLE FOR THIS SIGNAL/ INTERCONNECT SYSTEM, AND IS BEING PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

- NOTES:**
1. THE EXACT LOCATION OF LOOP DETECTORS, PB STA, AND PEDESTRIAN CURB RAMPS SHALL BE VERIFIED IN THE FIELD BY MNDOT TRAFFIC OFFICE PERSONNEL.
  2. ALL ITEMS ARE INPLACE UNLESS OTHERWISE NOTED.
  3. PAVEMENT MARKINGS BY OTHERS (SEE STRIPING PLAN).
  4. PEDESTRIAN CURB RAMPS AND ASSOCIATED CONCRETE WORK BY OTHERS (SEE CONSTRUCTION PLAN).
  5. THIS PLAN SPECIFIES CONDUIT SIZES, TYPES, AND GENERAL LOCATIONS. THE EXACT LOCATIONS WILL BE DETERMINED IN THE FIELD. CONDUITS UNDER THE ROADWAYS REQUIRE BORING.
  6. ALL NEW CONDUIT SHALL BE PVC - SCHEDULE 80 OR HDPE SCHEDULE 80 AND SHALL CARRY 1/2" INSULATED GROUNDING CONDUCTOR AS SHOWN IN THE PLAN.
  7. ADJUST HANDHOLES TO NEW GRADE AS NOTED IN PLAN.
  8. ADD PB STA (PB2-1) NEAR POLE 2.
  9. ADD PB STA (PB2-2) NEAR POLE 1.
  10. ADD PB STA (PB4-1) NEAR POLE 3.
  11. ADD PB STA (PB4-2) NEAR POLE 2.
  12. ADD PB STA (PB6-1) NEAR POLE 4.
  13. ADD PB STA (PB6-2) NEAR POLE 3.
  14. ADD PB STA (PB8-1) NEAR POLE 1.
  15. ADD PB STA (PB8-2) NEAR POLE 4.
  16. RE-LABEL THE WIRING DIAGRAM FOR THE INPLACE LOOPS, HEADS, AND POLES, TO MATCH MN/DOT'S STANDARD NUMBERING SYSTEM, AS SHOWN.

**DESIGN TEAM**

DRAWN BY:	MRB
DESIGNER:	MRB
CHECKED BY:	JMG

**REVISIONS**

NO.	BY	DATE



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**SIGNAL PLAN**  
FOR INFORMATION ONLY

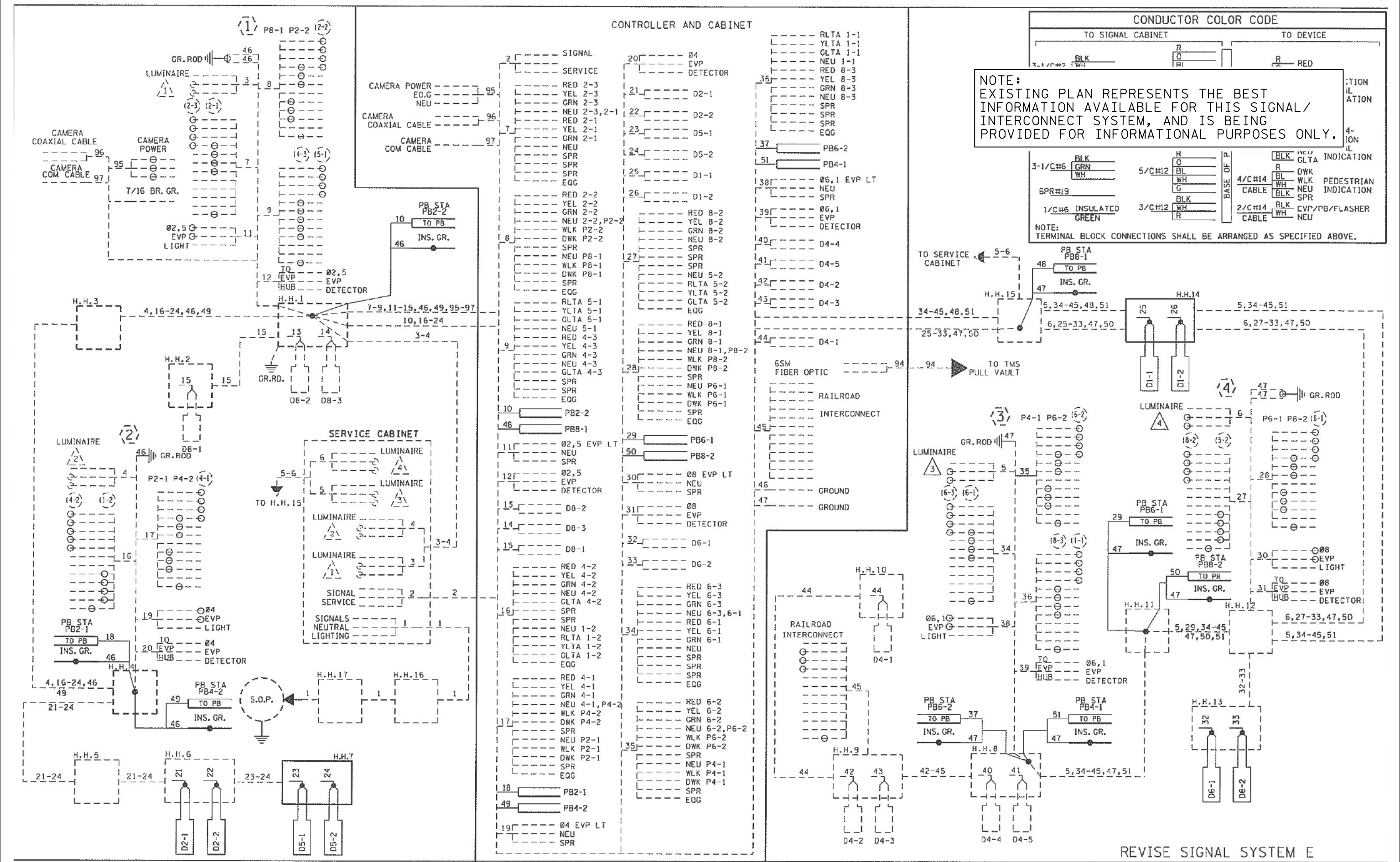
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SG26 OF 527	<b>101</b>



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MODEL: sqj27



DESIGN TEAM

DRAWN BY: MRB			
DESIGNER: MRB			
CHECKED BY: JMG			

RAMSEY COUNTY, MINNESOTA

**T.H. 61**

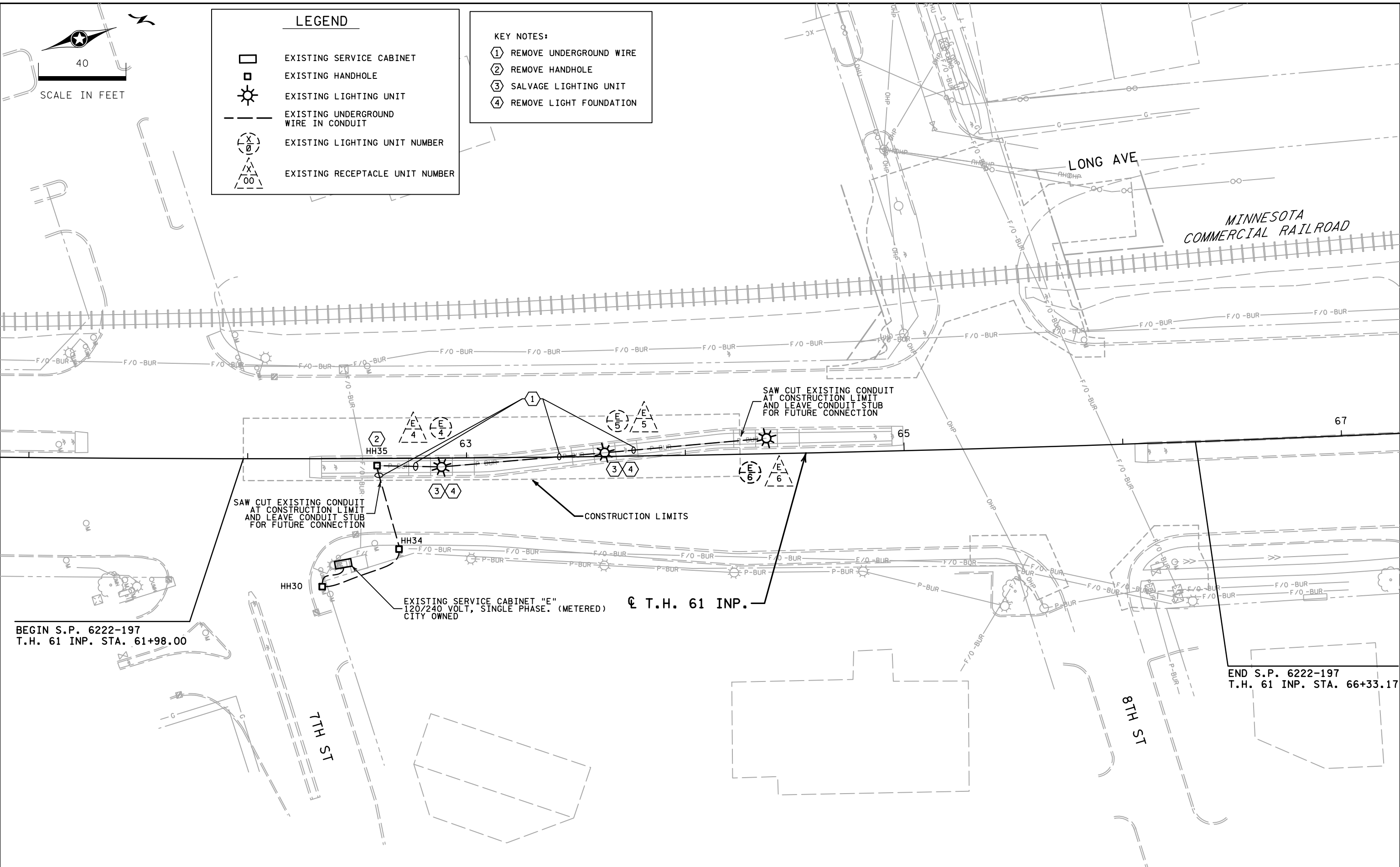
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**SIGNAL PLAN**

FOR INFORMATION ONLY

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SG27 OF SG27	<b>101</b>

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**LEGEND**

- EXISTING SERVICE CABINET
- EXISTING HANDHOLE
- EXISTING LIGHTING UNIT
- EXISTING UNDERGROUND WIRE IN CONDUIT
- EXISTING LIGHTING UNIT NUMBER
- EXISTING RECEPTACLE UNIT NUMBER

- KEY NOTES:**
- ① REMOVE UNDERGROUND WIRE
  - ② REMOVE HANDHOLE
  - ③ SALVAGE LIGHTING UNIT
  - ④ REMOVE LIGHT FOUNDATION



BEGIN S.P. 6222-197  
T.H. 61 INP. STA. 61+98.00

END S.P. 6222-197  
T.H. 61 INP. STA. 66+33.17

DESIGN TEAM			
DRAWN BY:	DWS		
DESIGNER:	JEK		
CHECKED BY:	JCP		
NO.	BY	DATE	REVISIONS

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John P. Calver* Lic. No. 24001  
Printed Name: JOHN P. CALVER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

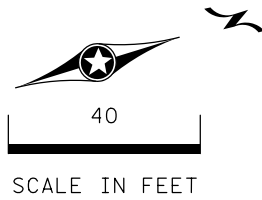
**LIGHTING PLAN**  
REMOVALS  
T.H. 61 INP. STA. 61+98.00 - 66+25.31

SEH FILE NO. ISDWB170688	<b>96</b>
LL1 OF LL6	<b>101</b>

12/26/25 PM

12/22/2023

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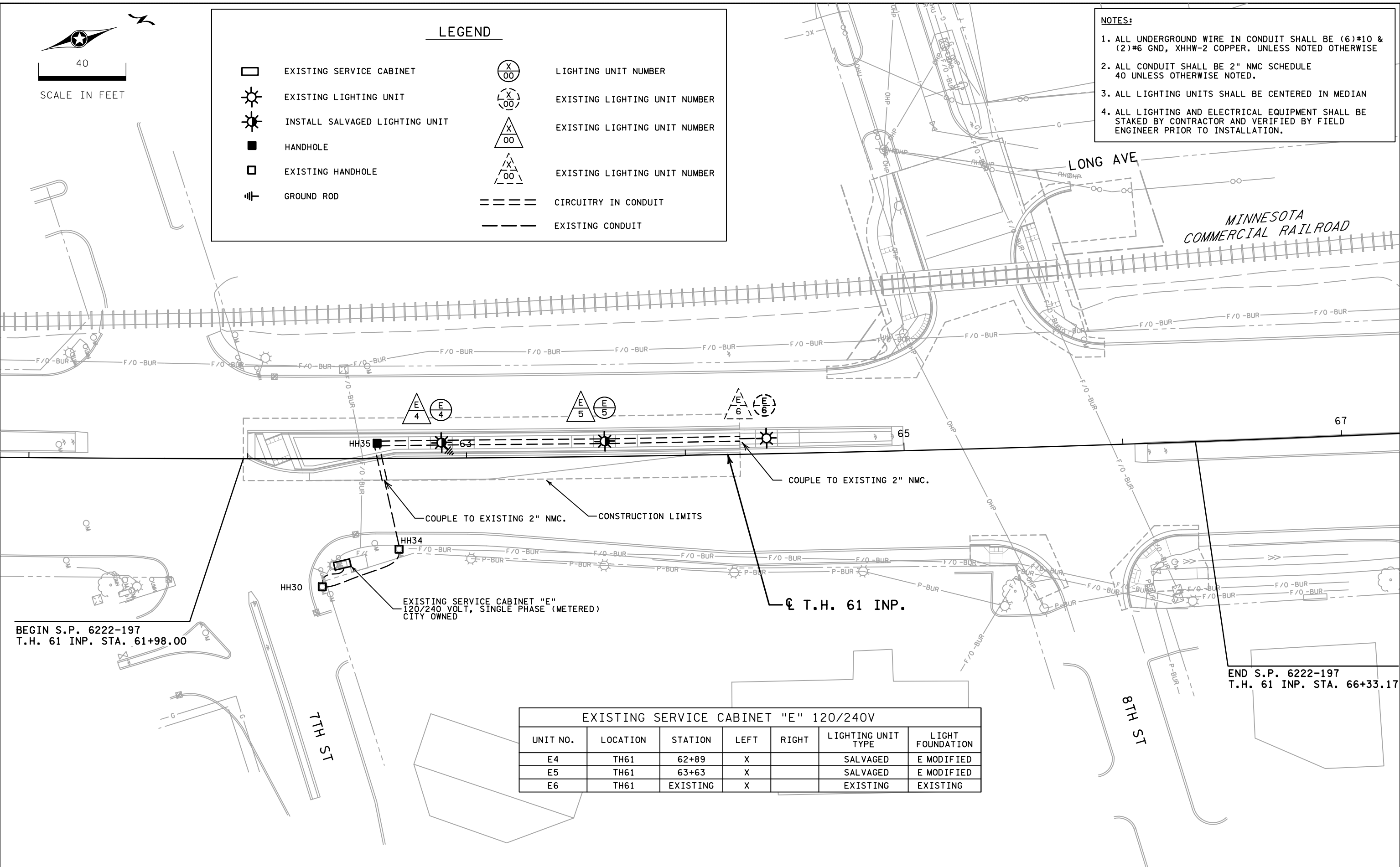


### LEGEND

<ul style="list-style-type: none"> <li> EXISTING SERVICE CABINET</li> <li> EXISTING LIGHTING UNIT</li> <li> INSTALL SALVAGED LIGHTING UNIT</li> <li> HANDHOLE</li> <li> EXISTING HANDHOLE</li> <li> GROUND ROD</li> </ul>	<ul style="list-style-type: none"> <li> LIGHTING UNIT NUMBER</li> <li> EXISTING LIGHTING UNIT NUMBER</li> <li> EXISTING LIGHTING UNIT NUMBER</li> <li> EXISTING LIGHTING UNIT NUMBER</li> <li> CIRCUITRY IN CONDUIT</li> <li> EXISTING CONDUIT</li> </ul>
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**NOTES:**

1. ALL UNDERGROUND WIRE IN CONDUIT SHALL BE (6)\*#10 & (2)\*#6 GND, XHHW-2 COPPER. UNLESS NOTED OTHERWISE
2. ALL CONDUIT SHALL BE 2" NMC SCHEDULE 40 UNLESS OTHERWISE NOTED.
3. ALL LIGHTING UNITS SHALL BE CENTERED IN MEDIAN
4. ALL LIGHTING AND ELECTRICAL EQUIPMENT SHALL BE STAKED BY CONTRACTOR AND VERIFIED BY FIELD ENGINEER PRIOR TO INSTALLATION.



EXISTING SERVICE CABINET "E" 120/240V						
UNIT NO.	LOCATION	STATION	LEFT	RIGHT	LIGHTING UNIT TYPE	LIGHT FOUNDATION
E4	TH61	62+89	X		SALVAGED	E MODIFIED
E5	TH61	63+63	X		SALVAGED	E MODIFIED
E6	TH61	EXISTING	X		EXISTING	EXISTING

DESIGN TEAM			
DRAWN BY:	DWS		
DESIGNER:	JEK		
CHECKED BY:	JCP		
NO.	BY	DATE	REVISIONS

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Certified By: Lic. No. 24001

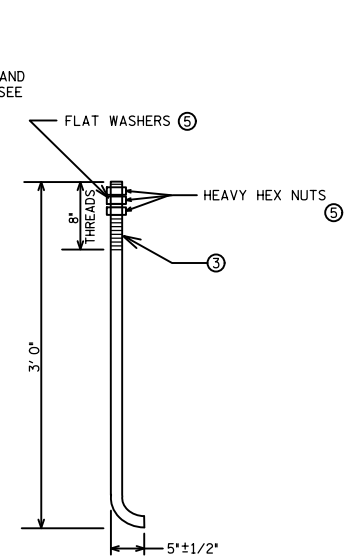
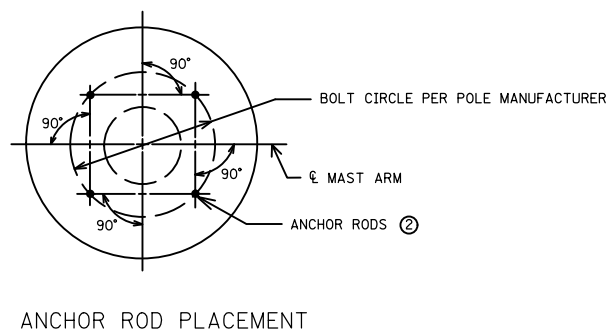
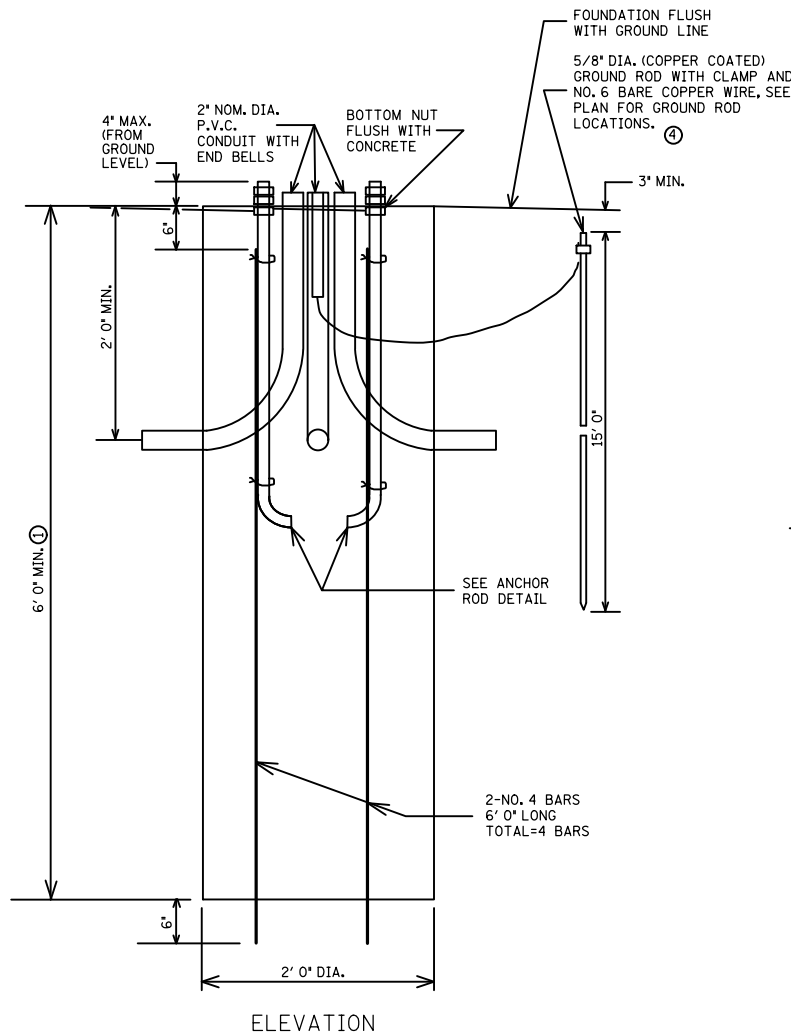
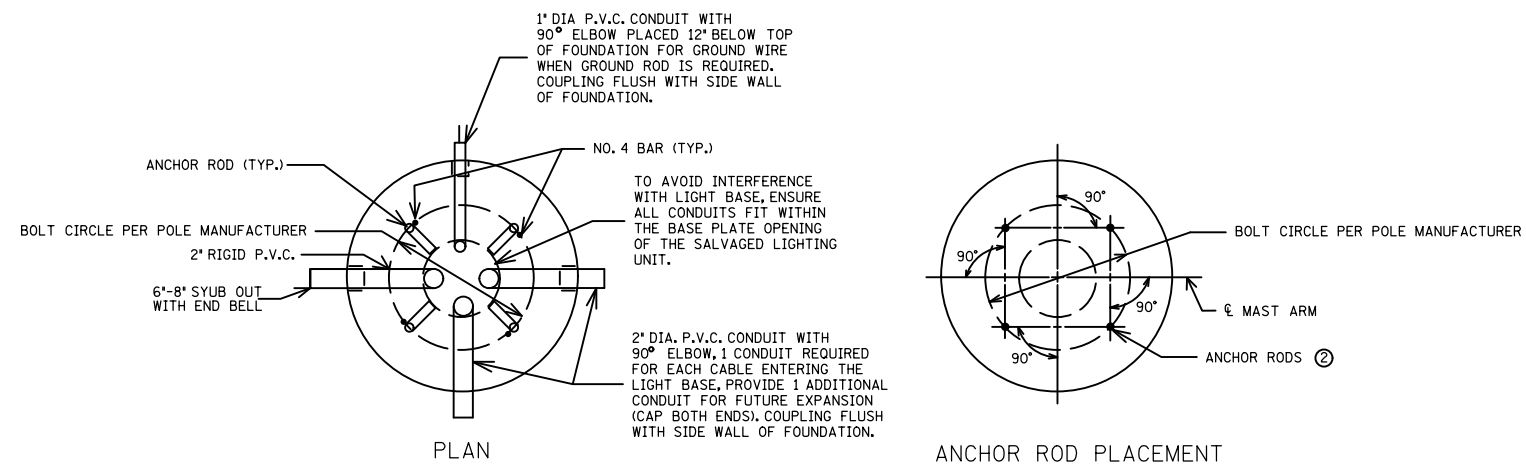
Printed Name: JOHN P. CALVER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**LIGHTING PLAN**  
PROPOSED  
T.H. 61 INP. STA. 61+98.00 - 66+25.31

SEH FILE NO. ISDWB170688	<b>97</b>
LL2 OF LL6	<b>101</b>



ANCHOR ROD DETAIL  
ANCHOR ROD DETAIL ABOVE IS SHOWN AS EXAMPLE.  
ANCHOR ROD SHALL BE PER POLE MANUFACTURER SPECIFICATIONS. ②

- NOTES:
- CONCRETE SHALL BE MIX NO. 3052.
  - RIGID P.V.C. CONDUIT PER SPEC. 3803 WITH END BELLS SHALL BE PROJECTED A MINIMUM 1/4" TO MAXIMUM 1" ABOVE THE FOUNDATION BEFORE MORTAR IS PLACED AND SHALL BE THE SIZE AND NUMBER SHOWN IN THE PLAN.
  - A RIGID TEMPLATE SHALL BE PROVIDED FOR ANCHOR ROD AND CONDUIT PLACEMENT AND SHALL BE LEFT IN PLACE UNTIL THE CONCRETE HAS SET.
  - OPEN ENDS OF CONDUITS SHALL BE SEALED WITH AN APPROVED SEALING COMPOUND.
  - ANTI-SEIZE COMPOUND THAT MEETS MIL-PRF-907E SPEC. SHALL BE APPLIED WITH A BRUSH TO ALL THREADS.
  - WHEN ROCK IS ENCOUNTERED, SEE PLAN DETAILS.
  - ALL BACKFILLING AND EXCAVATION AROUND FOUNDATION MUST BE IN ACCORDANCE WITH 2451 AND 2545.3.
  - ALL EXCAVATIONS MUST BE PROPERLY COMPACTED IN ACCORDANCE WITH 2451.

- ① THE DEPTH OF THE FOUNDATION MAY VARY IN THE PLANS OR SPECIAL PROVISIONS.
- ② ANCHOR RODS, NUTS, AND WASHERS PER SPEC. 3385, TYPE B, SHALL BE PLACED AT RIGHT ANGLES TO THE DIRECTION OF THE MAST ARM. GALVANIZE THE TOP 1 FT. OF THE ANCHOR ROD AND NUTS PER SPEC. 3392.
- ③ WRAP THREADS OF ANCHOR RODS ABOVE THE BOTTOM NUT WITH VINYL ELECTRICAL TAPE TO AVOID CONTAMINATION DURING CONCRETE POURING. WRAP THREADS OF ANCHOR RODS WITH 3 LAYERS OF VINYL ELECTRICAL TAPE 2" BELOW THE BOTTOM NUTS.
- ④ GROUND ROD MUST BE ADDED 3" TO 6" DEEP BELOW GROUND LINE AND WITHIN 1' OF FOUNDATION.
- ⑤ USE 1 HOLDDOWN WASHER AND 2 HEAVY HEX NUTS PER ROD FOR ALUMINUM POLE INSTALLATION.

**CAST IN PLACE LIGHT BASE DESIGN E MODIFIED**  
USE STANDARD PLATE 8127 EXCEPT FOR FOUNDATION DEPTH AND BOLT CIRCLE AS MODIFIED BY THE DETAIL

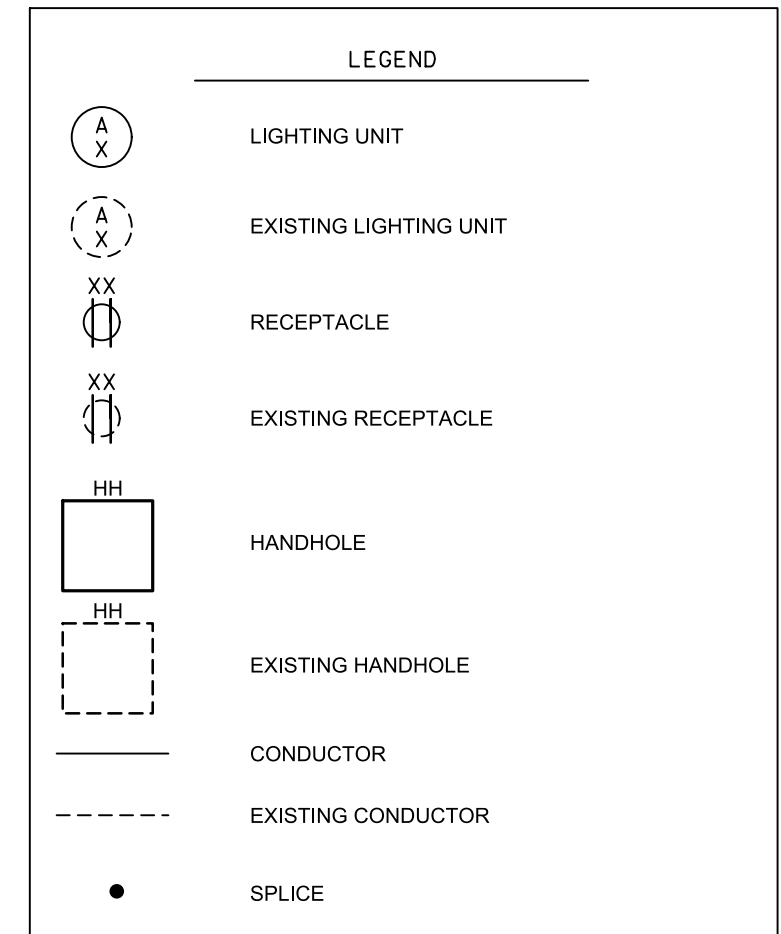
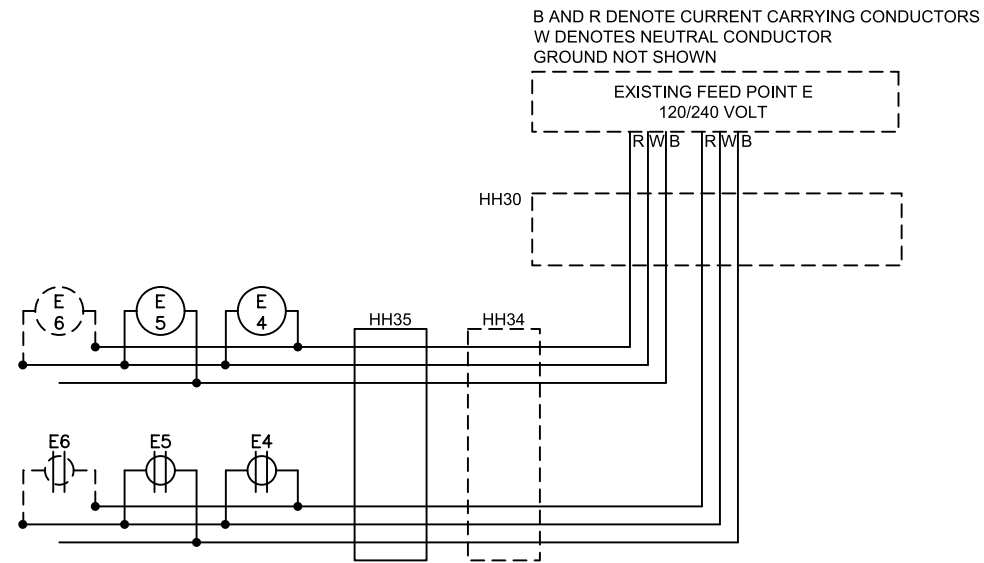
DESIGN TEAM				
DRAWN BY: DWS				
DESIGNER: JEK				
CHECKED BY: JCP				
NO.	BY	DATE	REVISIONS	

I hereby certify that this plan was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.  
Certified By: *John P. Calver* Lic. No. 24001  
Printed Name: \_\_\_\_\_ Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**LIGHTING PLAN**  
DETAILS



DESIGN TEAM				
DRAWN BY:	DWS			
DESIGNER:	JEK			
CHECKED BY:	JCP			
NO.	BY	DATE	REVISIONS	

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

Certified By: *John P. Calver* Lic. No. 24001

Printed Name: JOHN P. CALVER Date: 12/22/2023



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

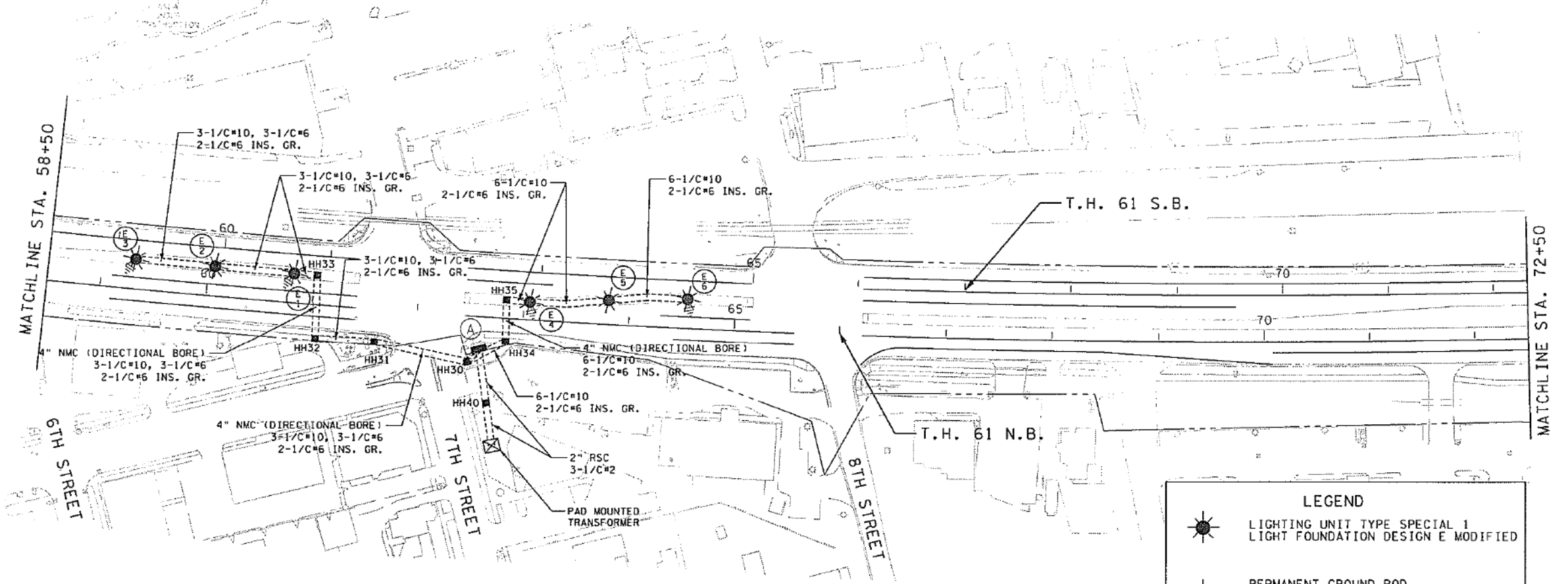
**LIGHTING PLAN**  
WIRING DIAGRAM



### FEED POINT E LIGHTING STANDARDS AND BASES

NO.	STATION	LT. (ft)	RT. (ft)	LOCATION	MEDIAN	TYPE	POLE BASE	FIXTURE
E1	60+81	26		NB TH 61	x	SPECIAL 1	BREAKAWAY	80-96W LED
E2	60+06	26		NB TH 61	x	SPECIAL 1	BREAKAWAY	80-96W LED
E3	59+31	26		NB TH 61	x	SPECIAL 1	BREAKAWAY	80-96W LED
E4	63+06	15		NB TH 61	x	SPECIAL 1	BREAKAWAY	80-96W LED
E5	63+80	21		NB TH 61	x	SPECIAL 1	BREAKAWAY	80-96W LED
E6	64+55	26		NB TH 61	x	SPECIAL 1	BREAKAWAY	80-96W LED

(A) LIGHT SYSTEM E  
EQUIPMENT PAD B  
SERVICE CABINET, SECONDARY TYPE L2  
2" NMC TO HH 30  
9-1/C#10, 3-1/C#6  
4-1/C#6 INS. GR.



- NOTES:
1. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE CONNECTION OF THE POWER FOR THE LIGHTING SYSTEM WITH XCEL ENERGY.
  2. THIS PLAN SPECIFIES CONDUIT SIZE, TYPE AND GENERAL LOCATIONS, THE EXACT LOCATION WILL BE DETERMINED IN THE FIELD.
  3. ALL CONDUIT SHALL BE PVC - SCHEDULE 80 OR HDPE SCHEDULE 80 AND SHALL CARRY 1/C#6 GREEN INSULATED GROUNDING CONDUCTOR, UNLESS OTHERWISE NOTED, AS SHOWN IN THE PLAN.
  4. ALL CONDUIT SHALL BE TRENCHED UNLESS OTHERWISE NOTED.
  5. SEE SPECIAL PROVISIONS FOR DETAILS OF THE LIGHTING UNITS TO BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
  6. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO UTILIZE THE GOPHER ONE CALL EXCAVATION NOTICE SYSTEM FOR ALL UTILITY LOCATIONS.

**LEGEND**

- LIGHTING UNIT TYPE SPECIAL 1  
LIGHT FOUNDATION DESIGN E MODIFIED
- PERMANENT GROUND ROD  
(25 OHMS OR LESS)
- 2" NON-METALLIC CONDUIT  
(UNLESS OTHERWISE NOTED)
- FURNISH AND INSTALL HANDHOLE
- PAD MOUNTED SERVICE CABINET
- PAD MOUNTED TRANSFORMER  
(BY OTHERS)

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1/15/2014



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

*Bryan J. Nemeth*  
BRYAN J. NEMETH  
LIC. NO. 43354 DATE 01/16/2014

DESIGNED: BIN  
DRAWN: JMM  
CHECKED: [Signature]  
DTN

**BOLTON & MENK, INC.**  
CONSULTING ENGINEERS & SURVEYORS  
MANKATO, MN FARGO, MN SLEEPY EYE, MN BURNSVILLE, MN WELMAR, MN  
CHASKA, MN RAMSEY, MN MAPLEWOOD, MN BAXTER, MN ROOSTER, MN  
AMES, IA SPENCER, IA DES MOINES, IA FARGO, ND

REV.	BY	DATE

S.P. 6222-162, S.A.P. 174-010-006  
T.H. 61 PAVEMENT REHABILITATION  
LIGHTING PLAN

SHEET  
175  
OF  
312

### EXISTING LIGHTING PLAN (FOR INFORMATION ONLY)

NO.	BY	DATE	REVISIONS



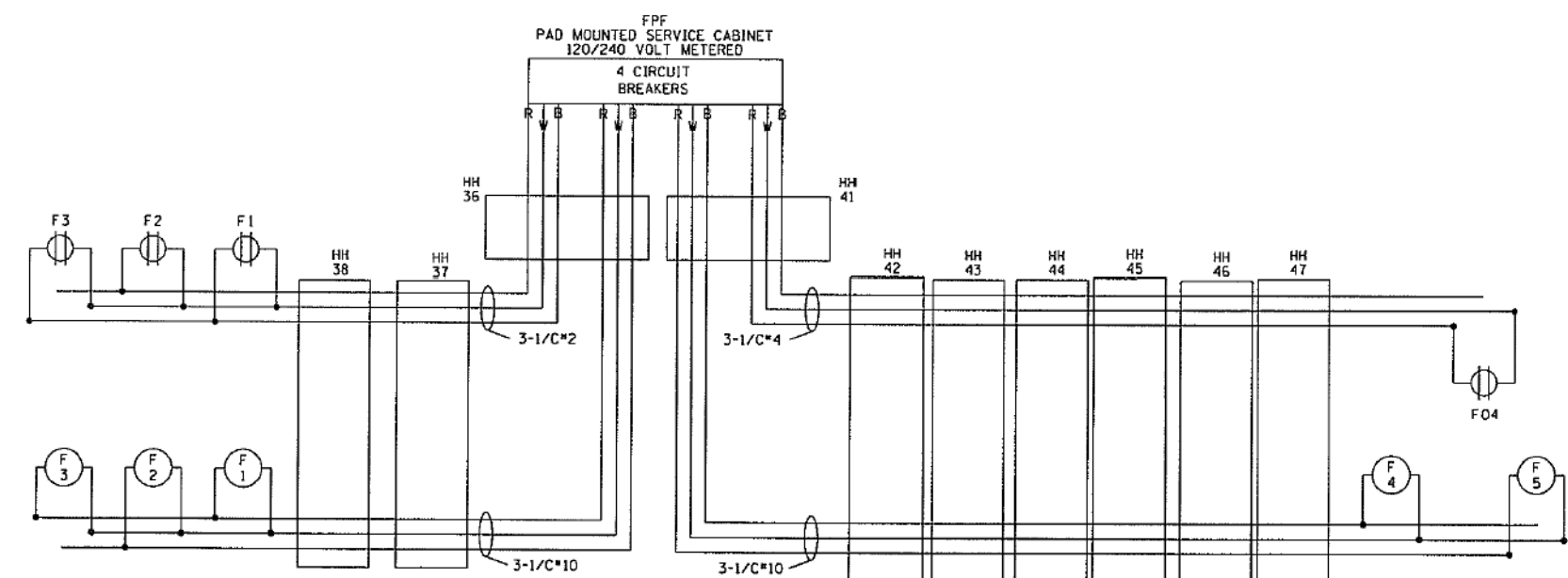
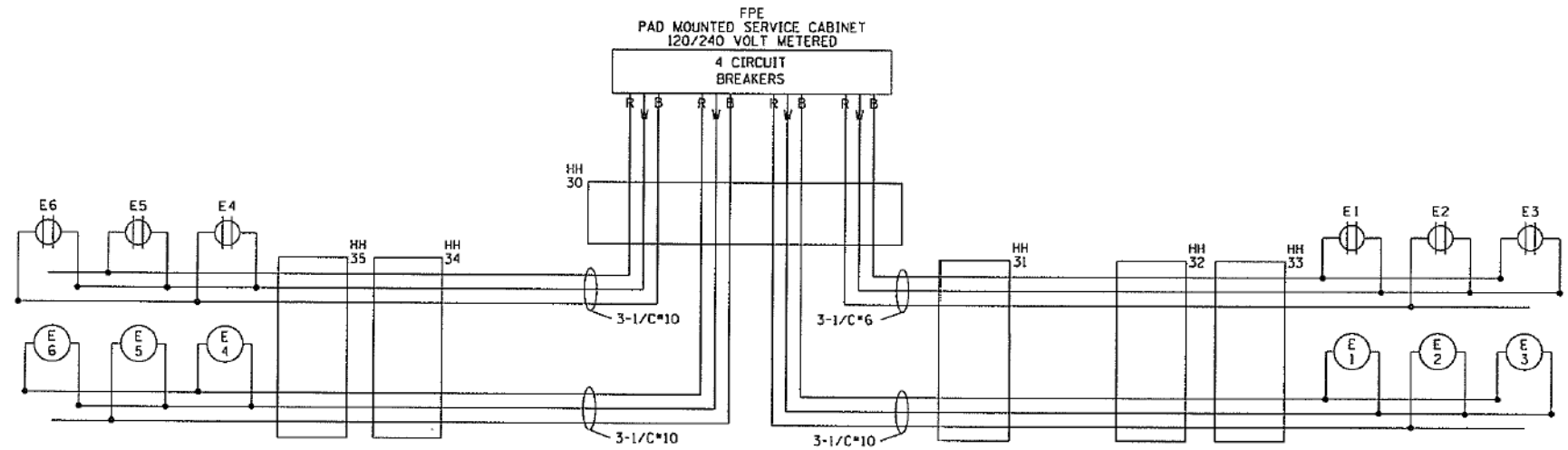
RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
S.P. 6222-197

**LIGHTING PLAN**  
LIGHTING AS-BUILT

SEH  
FILE NO.  
ISDWB170688  
100  
LL5  
OF LL6  
101



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**LEGEND**  
 A1 = GFCI RECEPTACLE (ON POLE)  
 A01 = GFCI RECEPTACLE (SEPARATE)

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. BRYAN T. HENLTH LIC. NO. 43354 DATE 01/15/2014		DESIGNED BTN DRAWN JMM CHECKED BTN	<b>BOLTON &amp; MENK, INC.</b> CONSULTING ENGINEERS & SURVEYORS MANKATO, MN FARMINGTON, MN SLEEPY EYE, MN BURDICKVILLE, MN WILLMAR, MN CHASKA, MN RAMSEY, MN MAPLEWOOD, MN BAXTER, MN ROCHESTER, MN AMES, IA SPENCER, IA DES MOINES, IA FARGO, ND	REV. BY DATE _____ _____ _____	S.P. 6222-162, S.A.P. 174-010-006 T.H. 61 PAVEMENT REHABILITATION LIGHTING PLAN	SHEET 180 OF 312
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EXISTING LIGHTING PLAN  
 (FOR INFORMATION ONLY)

NO.	BY	DATE	REVISIONS



RAMSEY COUNTY, MINNESOTA  
**T.H. 61**  
 S.P. 6222-197

**LIGHTING PLAN**  
 WIRING DIAGRAM AS-BUILT

