



THE ILLINOIS STATE TOLL HIGHWAY AUTHORITY

2700 OGDEN AVENUE • DOWNERS GROVE • ILLINOIS • 60515

# ***STANDARD DRAWINGS***

## ***VOLUME 1 of 2***

MARCH 2024

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DRAWING NUMBER	DESCRIPTION
L1-06	FIBER OPTIC SYSTEM TYPICALS AND DRAWINGS
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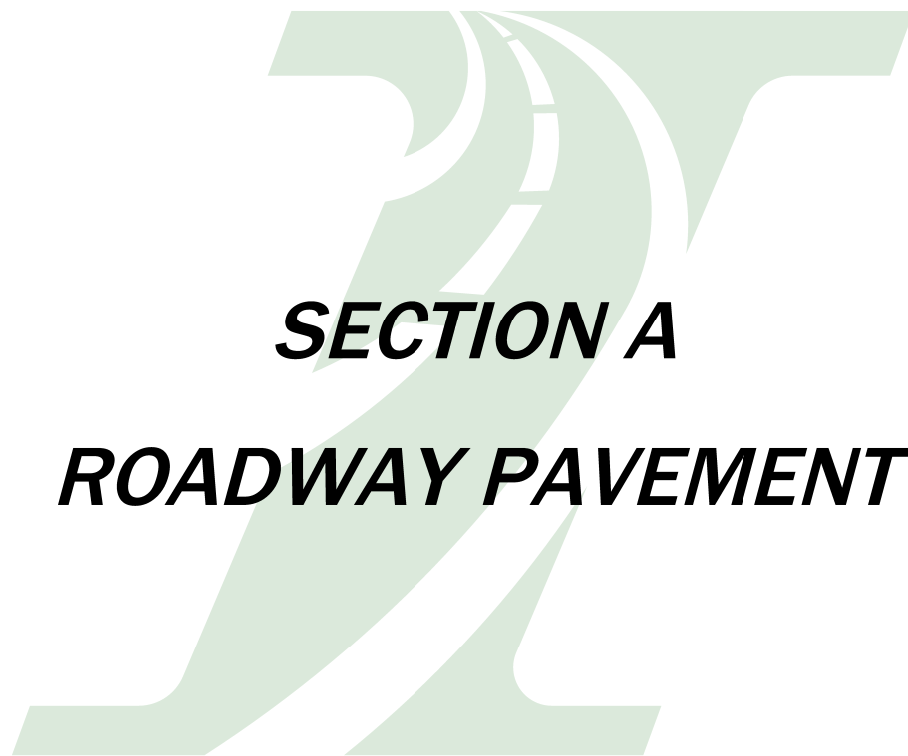


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# ***STANDARD DRAWINGS***



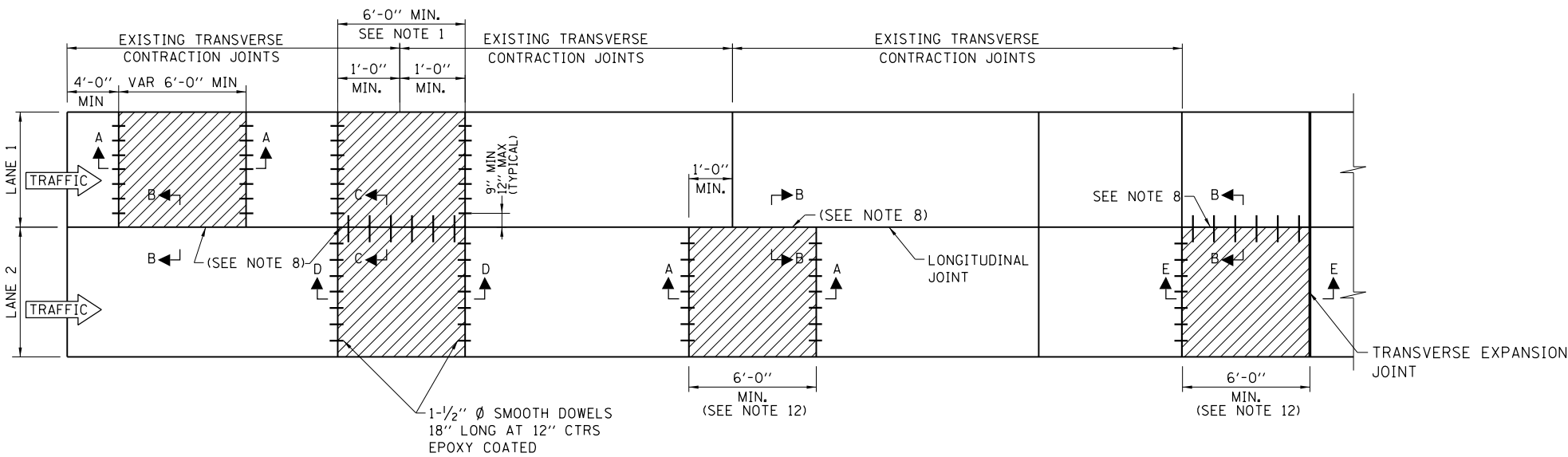
MARCH 2024

Illinois Tollway Standard Drawing Revisions
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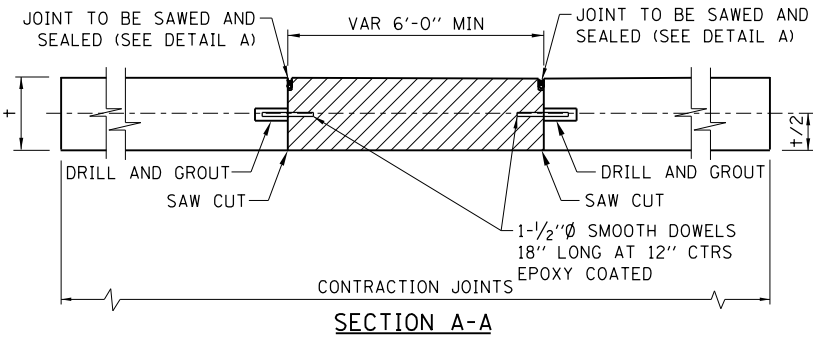
Section A	Roadway Pavement		
	Standard	Modification Summary	Effective: 03-01-2024
	A5-08	J.P.C Pavement	
	Sheet 1	Added a new Note 8.	
	Sheet 3	Sheet 3 of 3 added to standard with Pavement Cross-Section and Pavement Plan for J.P.C Pavement on 1- and 2- Lane Ramp	

New Sheet

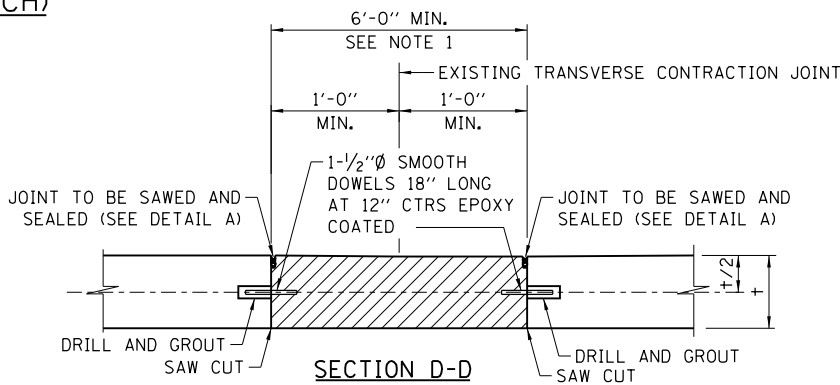
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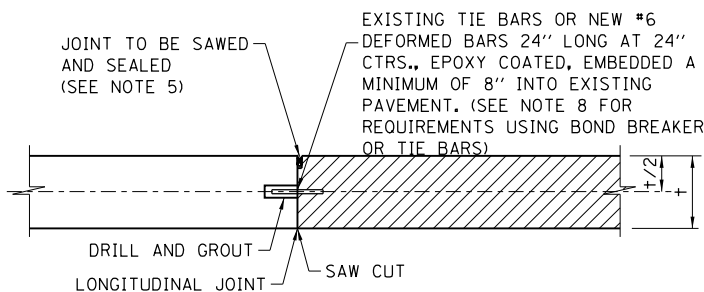
**PROPOSED CONCRETE PAVEMENT FULL DEPTH  
REPAIR TYPICAL ROADWAY PLAN  
(PAID AS CLASS B PATCH)**



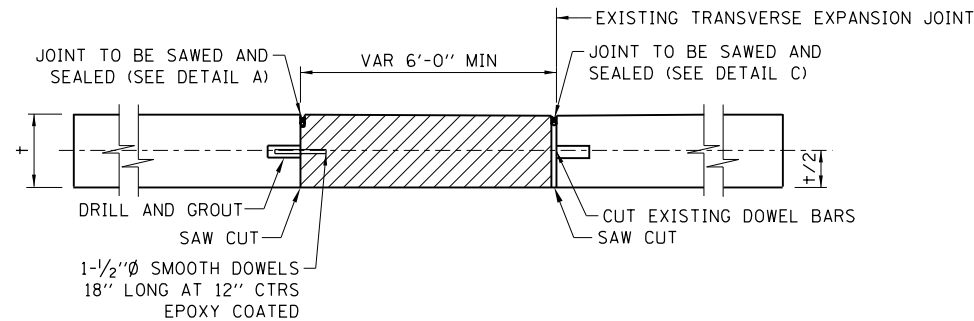
**REPAIR - FULL DEPTH, ONE LANE**



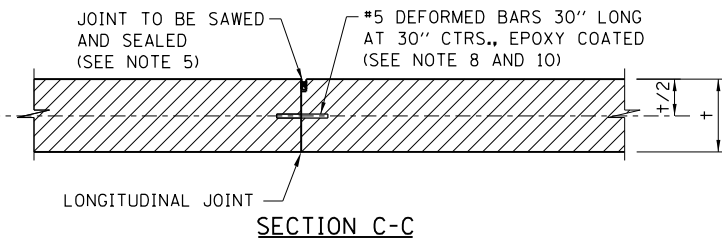
**REPAIR AT CONTRACTION JOINT**



**REPAIR ALONG LONGITUDINAL JOINT**



**REPAIR - FULL DEPTH, ONE LANE  
TRANSVERSE EXPANSION JOINT**



**REPAIR THROUGH LONGITUDINAL JOINT**

**GENERAL NOTES:**

1. THE MINIMUM OVERALL DIMENSIONS OF REPAIRS SHALL BE SIX (6) FEET BY THE LANE WIDTH EXCEPT FOR REPLACEMENT OF DETERIORATED PAVEMENT EDGES ADJACENT TO PROPOSED WIDENING (SEE SECTION F-F). REPAIRS TERMINATING AT TRANSVERSE CONTRACTION JOINTS SHALL BE EXTENDED ONE FOOT ACROSS THE JOINT. WHEN A REPAIR EXTENDS WITHIN FOUR FEET OF AN EXISTING TRANSVERSE CONTRACTION JOINT THE REPAIR SHALL BE EXTENDED ONE FOOT BEYOND THE JOINT.
2. WHENEVER A REPAIR IS CONSTRUCTED IN TWO OR MORE SEGMENTS BECAUSE OF MAINTENANCE OF TRAFFIC STAGING REQUIREMENTS, EACH SEGMENT SHALL BE CONSIDERED A SEPARATE PATCH WITH SIX (6) FEET MINIMUM DIMENSION.
3. UNLESS OTHERWISE NOTED, DRILLED AND GROUTED DOWELS SHALL BE EMBEDDED 1/2 THEIR LENGTH INTO THE EXISTING CONCRETE USING CHEMICAL ADHESIVE AS SPECIFIED.
4. UNLESS OTHERWISE NOTED, TIE BARS SHALL BE EMBEDDED 1/3 THEIR LENGTH INTO THE EXISTING CONCRETE USING CHEMICAL ADHESIVE AS SPECIFIED.
5. SAW CUTTING AND SEALING OF LONGITUDINAL JOINTS IN THE REPAIR AREAS SHALL FOLLOW IDOT HIGHWAY STANDARD 420001 (PAVEMENT JOINTS) WHERE TIE BARS ARE NEEDED OR DETAIL B WHERE BOND BREAKER IS USED. SEE NOTE 8 TO DETERMINE JOINT REQUIREMENTS. JOINT SEALING IS NOT REQUIRED FOR PAVEMENT BEING RESURFACED.
6. FOR REPAIR OF ASPHALT OVERLAY AND P.C.C. PAVEMENT, THE SAWCUT SHALL BE FULL DEPTH. THE PATCH SHALL MEET EXISTING CROSS SECTION MATERIALS THICKNESSES.
7. AT LOCATIONS OF PROPOSED PAVEMENT WIDENING, EDGE DETERIORATION REQUIRING FULL DEPTH REPAIR SHALL BE REPAIRED BY REMOVAL AND REPLACEMENT OF A MINIMUM OF 1'-6" WIDE STRIP. SAW CUTTING AND REMOVAL WILL BE PAID PER ARTICLE 109.04 OF THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS, UNLESS OTHERWISE PROVIDED IN THE CONTRACT. THE ADDITIONAL PAVEMENT WIDTH REPLACING THE EDGE DETERIORATION SHALL BE CONSTRUCTED MONOLITHICALLY WITH THE PAVEMENT WIDENING. THIS ADDITIONAL PAVEMENT SHALL BE PAID USING CONTRACT PAVEMENT WIDENING ITEMS IN ACCORDANCE WITH ARTICLE 109.03 OF THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS.
8. WHEN PROPOSED TRANSVERSE JOINTS ARE OFFSET FROM EXISTING JOINTS IN ADJACENT PAVEMENT TO REMAIN, BOND BREAKER SHALL BE USED AT THE LONGITUDINAL JOINT ADJACENT TO THE EXISTING PAVEMENT, WITH TIE BARS OMITTED. WHEN PROPOSED TRANSVERSE JOINTS LINE UP WITH ADJACENT JOINTS, TIE BARS SHALL BE USED WITH NO BOND BREAKER.
9. TYPICAL ROADWAY PLAN FOR FULL DEPTH REPAIR IS APPLICABLE TO ALL PAVEMENTS, LANE WIDTHS AND NUMBER OF EXISTING LANES.
10. THE TIE BAR FOR THE LONGITUDINAL SAWED JOINT SHALL BE 15" FROM THE TRANSVERSE CONTRACTION JOINT.
11. OMIT SEALING OF ALL JOINTS IN THE REPAIR AREA OF PAVEMENT TO BE RESURFACED.
12. THE MAXIMUM LENGTH BETWEEN TRANSVERSE CONTRACTION JOINTS IN ANY PATCH SHALL BE 15'.
13. CONTRACTOR WILL BE RESPONSIBLE TO ATTAIN A SMOOTHNESS REQUIREMENT OF PASSING A 3/16TH INCH BUMP TEST USING A 16' ROLLING STRAIGHT EDGE AFTER PATCHING IS COMPLETE. DIAMOND GRINDING MAY BE USED TO RESTORE RIDE QUALITY AND IS INCIDENTAL TO THE WORK UNLESS OTHERWISE SPECIFIED IN THE PLANS.

**LEGEND**

- EXISTING WELDED WIRE FABRIC (10" PAVEMENT ONLY)
- EXISTING PAVEMENT
- PROPOSED CONCRETE PAVEMENT REPAIR - FULL DEPTH
- PROPOSED CONCRETE PAVEMENT WIDENING
- + = CONCRETE PAVEMENT THICKNESS

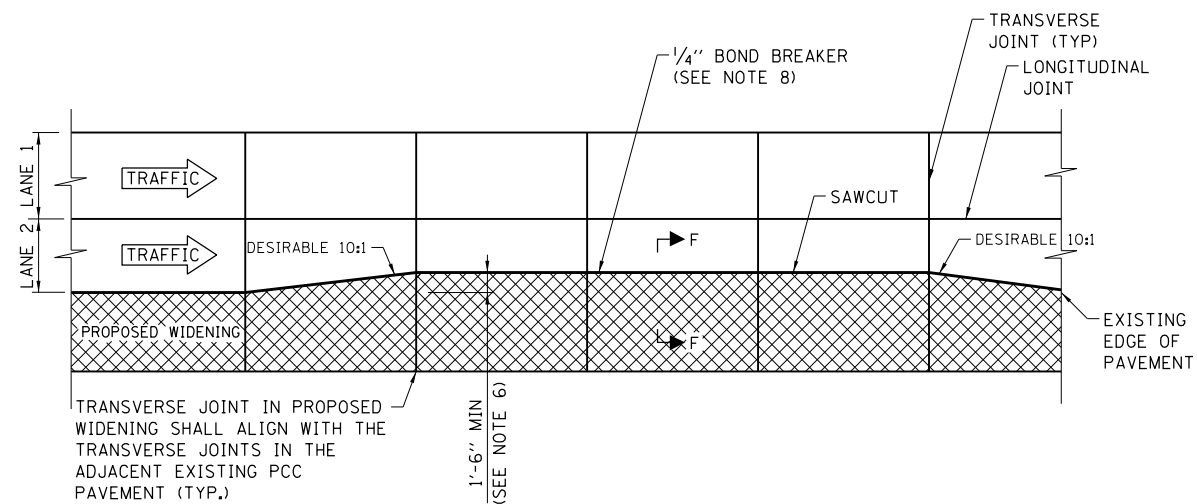


DATE	REVISIONS
3-01-2021	REVISED NOTES
3-01-2020	ADDED TRANSVERSE EXPANSION JOINT
3-01-2019	REVISED NOTES
3-01-2018	REMOVED TIE BARS & REVISED NOTES
	TAPER SAW CUT

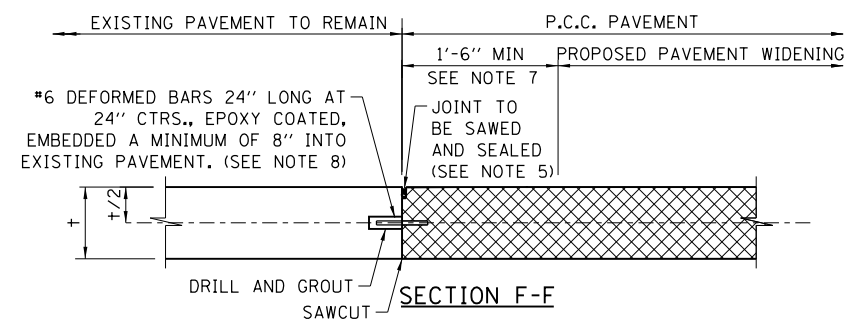
CONCRETE PAVEMENT REPAIR  
FULL DEPTH

STANDARD A1-09

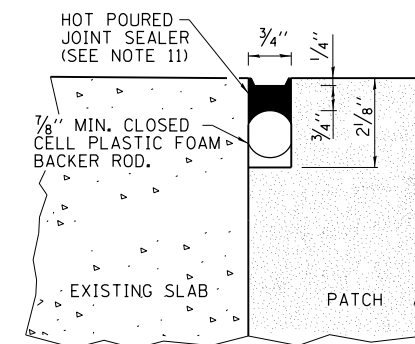
APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 05/01/2009



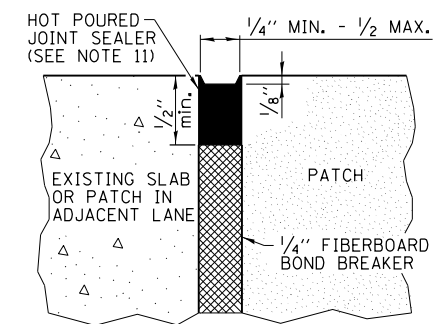
**REPLACEMENT OF DETERIORATED PAVEMENT  
EDGES ADJACENT TO PROPOSED WIDENING  
(PAID AS PART OF WIDENING)**



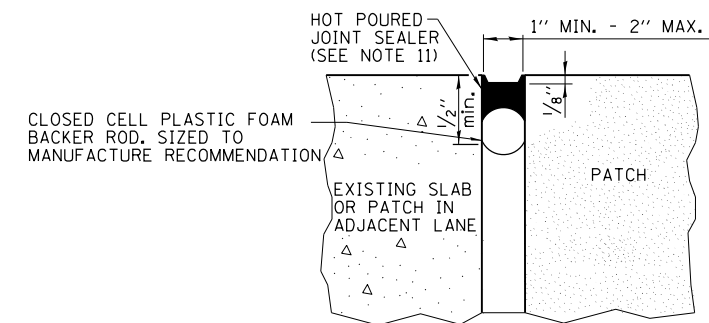
**REPLACEMENT OF DETERIORATED PAVEMENT  
EDGES ADJACENT TO PROPOSED WIDENING**



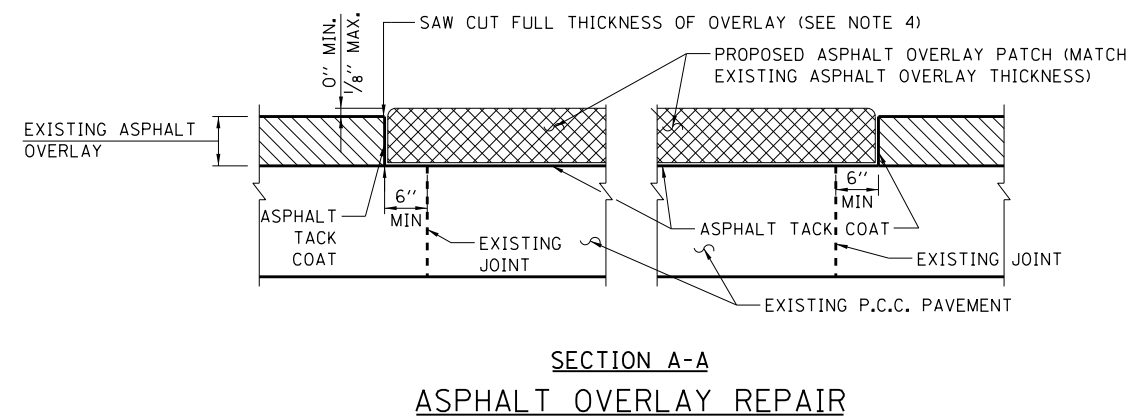
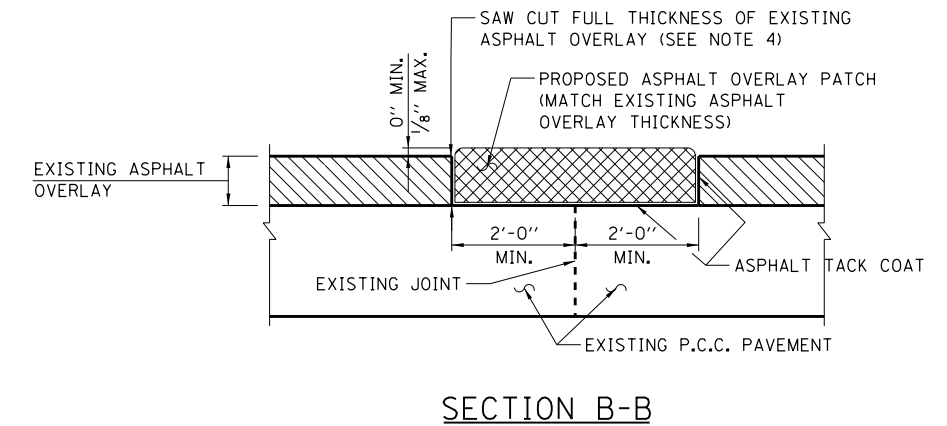
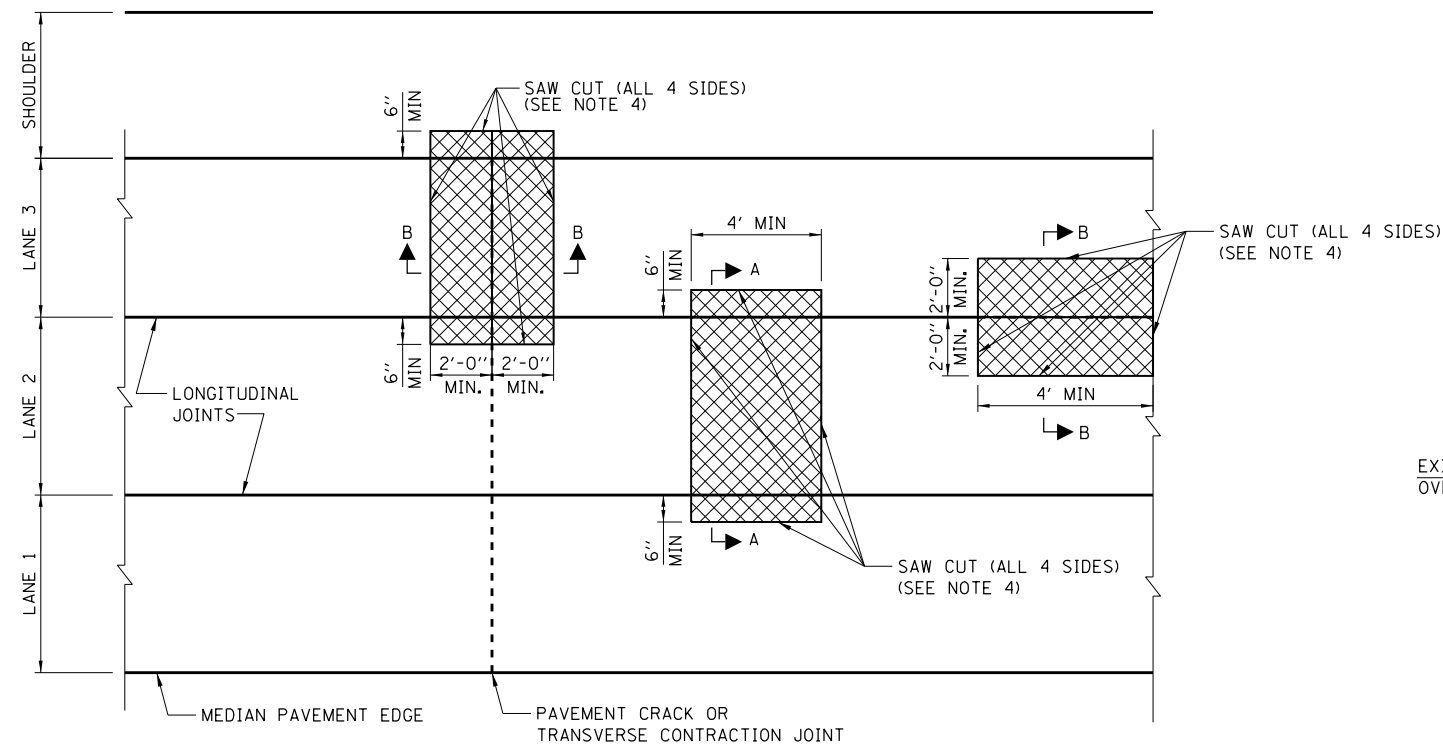
**DETAIL A  
(TRANSVERSE JOINT)**



**DETAIL B  
(LONGITUDINAL JOINT)**



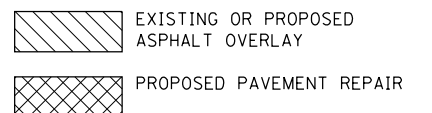
**DETAIL C  
(TRANSVERSE EXPANSION JOINT)**



- NOTES: TYPICAL ASPHALT OVERLAY REPAIR

1. LOCATION OF ALL OVERLAY REPAIR AREAS SHALL BE DETERMINED BY THE ENGINEER.
2. MINIMUM DIMENSIONS SHALL BE AS SHOWN IN TYPICAL ROADWAY PLAN.
3. ALL ASPHALT OVERLAY SHALL BE REMOVED TO THE TOP OF THE P.C.C. PAVEMENT.
4. SAWCUT MAY BE ELIMINATED IF MILLING EQUIPMENT IS USED AND VERTICAL AND STRAIGHT SIDES ARE OBTAINED. TRANSVERSE SAWCUTS ARE ALWAYS REQUIRED.

LEGEND



<i>DATE</i>	<i>REVISIONS</i>
3-01-2021	UPDATED MIN PAVEMENT DIMENSIONS
3-01-2020	REVISED NOTES
3-01-2019	REVISED NOTES
3-31-2017	REVISED SPECIAL PROVISION
	REFERENCE

## ASPHALT OVERLAY REPAIR

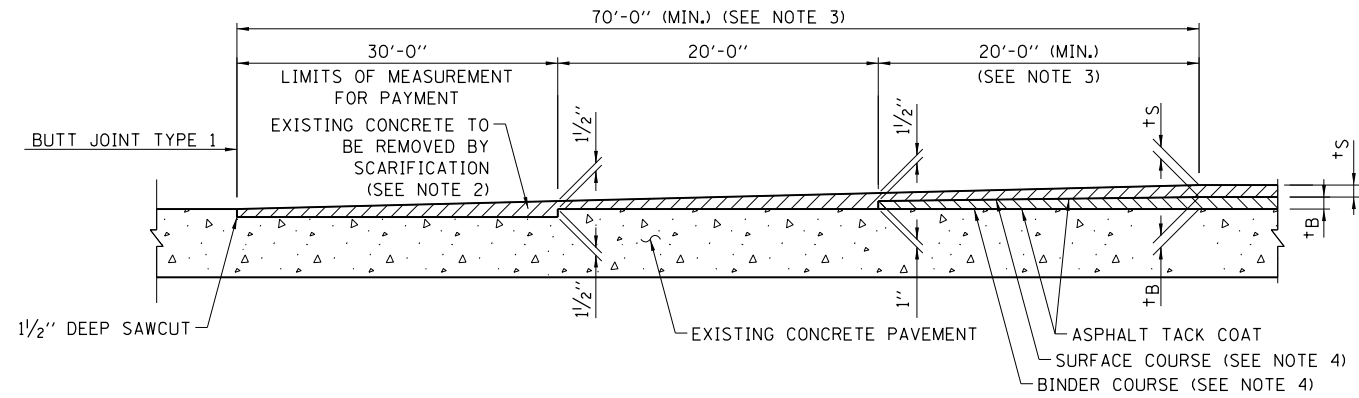
STANDARD A2-08

APPROVED BY:

DATE: \_\_\_\_\_

Paul Kovacs  
CHIEF ENGINEERING OFFICER

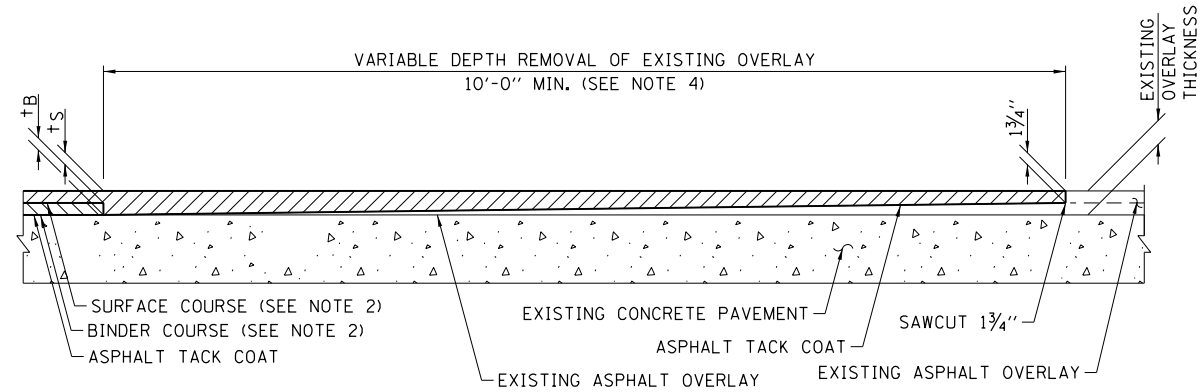
05/01/2009



**DETAIL OF BUTT JOINT, TYPE 1**

**NOTES FOR BUTT JOINT, TYPE 1**

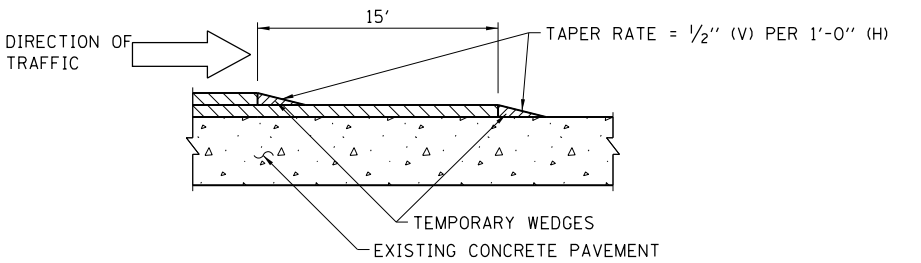
1. THE ABOVE WORK WILL BE PERFORMED AT THE ENDS OF ALL ASPHALT RESURFACING.
2. ONLY APPROVED SCARIFYING OR MILLING EQUIPMENT SHALL BE USED TO SCARIFY THE CONCRETE PAVEMENT.
3. REGARDLESS OF TYPE OF SURFACE MIX USED, NUMBER OR THICKNESS OF COURSES OR LAYERS, THE OVERLAY THICKNESS TRANSITION LENGTH SHALL BE BASED ON 1" IN 20' AND THE MINIMUM SURFACE LAYER THICKNESS SHALL BE 1 1/2".
4. REFER TO THE CONTRACT DOCUMENTS FOR THE REQUIRED BINDER AND SURFACE COURSE MATERIALS. "t<sub>s</sub>" IS THE THICKNESS OF THE SURFACE COURSE SPECIFIED IN THE CONTRACT. "t<sub>B</sub>" IS THE THICKNESS OF THE BINDER COURSE SPECIFIED IN THE CONTACT.



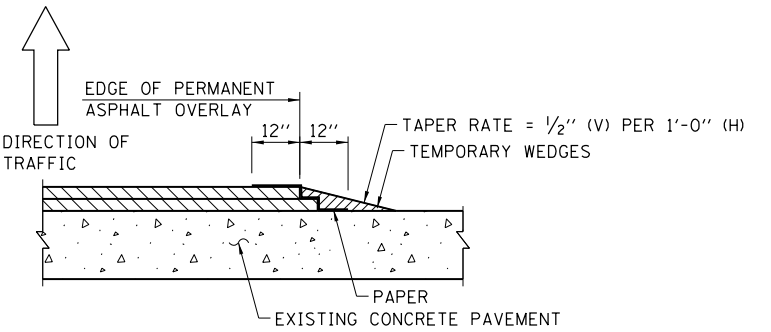
**DETAIL OF BUTT JOINT, TYPE 2  
AT EXISTING OVERLAY AREAS**

**NOTES FOR BUTT JOINT, TYPE 2**

1. THE ABOVE WORK WILL BE PERFORMED AT THE ENDS OF ALL ASPHALT RESURFACING WHERE BUTT JOINTS EXIST.
2. REFER TO THE CONTRACT DOCUMENTS FOR THE REQUIRED BINDER AND SURFACE COURSE MATERIALS. "t<sub>s</sub>" IS THE THICKNESS OF THE SURFACE COURSE SPECIFIED IN THE CONTRACT. "t<sub>B</sub>" IS THE THICKNESS OF THE BINDER COURSE SPECIFIED IN THE CONTACT.
3. SAWCUT MAY BE ELIMINATED IF MILLING EQUIPMENT IS USED AND VERTICAL AND STRAIGHT SIDES ARE OBTAINED.
4. REGARDLESS OF TYPE OF SURFACE MIX USED, NUMBER OR THICKNESS OF COURSES OR LAYERS, THE OVERLAY THICKNESS TRANSITION LENGTH SHALL BE BASED ON 1" IN 20' AND THE MINIMUM SURFACE LAYER THICKNESS SHALL BE 1 3/4".



**TEMPORARY ASPHALT WEDGE - TRANSVERSE**



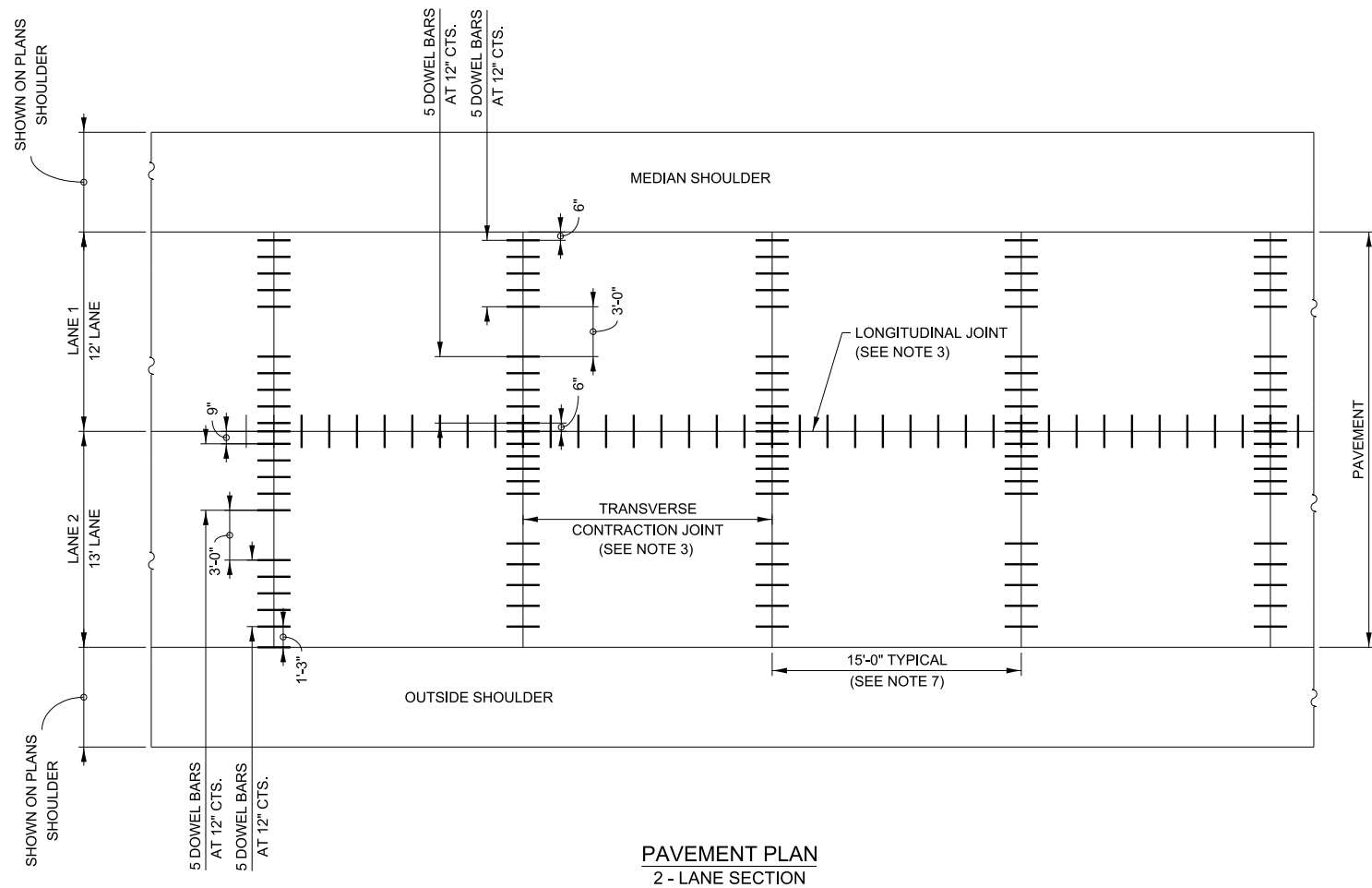
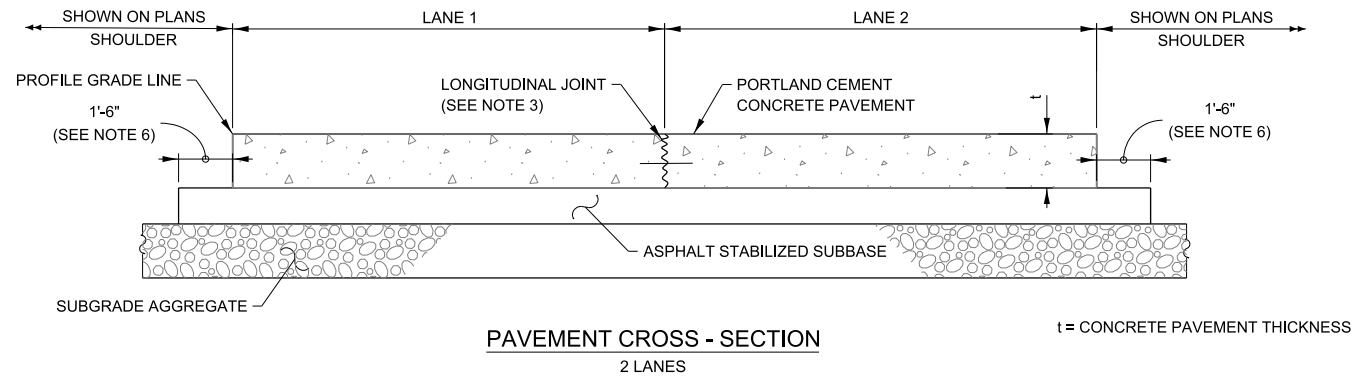
**TEMPORARY ASPHALT WEDGE - LONGITUDINAL**

**NOTES FOR TEMPORARY ASPHALT WEDGE - LONGITUDINAL**

1. UPON REMOVAL OF THE WEDGES, THE SURFACE COURSE SHALL BE SAWCUT PARALLEL TO THE JOINT TO PROVIDE A TRUE VERTICAL SURFACE.
2. REFER TO THE CONTRACT DOCUMENTS FOR THE REQUIRED BINDER AND SURFACE COURSE MATERIALS.

DATE	REVISIONS
3-01-2018	ADDED DIRECTION ARROWS
3-31-2017	REMOVED PAY ITEM DESIGNATION FROM NOTES REVISED MIN + THICKNESS
	UPDATED BUTT JOINT TYPE 2
	ADDED TRAFFIC ARROWS





GENERAL NOTES:

1. DOWEL BASKET ASSEMBLIES, WHERE USED, SHALL BE SUPPORTED AND ANCHORED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND SPECIAL PROVISIONS.
2. MATERIALS ARE PROJECT SPECIFIC. REFER TO PROJECT PLANS AND CONTRACT DOCUMENTS FOR DETAILS.
3. SEE ILLINOIS TOLLWAY STANDARD DRAWING A7 (PAVEMENT JOINTS) AND IDOT HIGHWAY STANDARD 420001 (PAVEMENT JOINTS) FOR DETAILS OF JOINTS AND TIE BARS NOT SHOWN.
4. PAVEMENT DESIGNS ARE PROJECT SPECIFIC, OTHER MATERIALS MAY BE SUBSTITUTED FOR ASPHALT STABILIZED SUBBASE AND SUBGRADE AGGREGATE. REFER TO PROJECT PLANS FOR DETAILS AND MATERIAL THICKNESS.
5. THE TIE BAR FOR THE LONGITUDINAL SAWED JOINT SHALL BE 18" FROM THE TRANSVERSE CONTRACTION JOINT.
6. THE 1'-6" WIDE ASPHALT STABILIZED SUBBASE MAY BE REDUCED TO 1'-0" WHEN PAVING EQUIPMENT UTILIZED FOR CONSTRUCTION OF THE PCC PAVEMENT WILL ALLOW.
7. THE 15'-0" TYPICAL TRANSVERSE JOINT SPACING DIMENSION SHALL BE ADJUSTED TO 12'-0" MIN. TO 18'-0" MAX. WHEN PLACED ADJACENT TO EXISTING PCC PAVEMENT STRUCTURE SO THAT THE JOINTS ARE IN PROLONGATION. ADJUST THE TIE BAR SPACING TO MAINTAIN A CLEARANCE OF 6" FROM DOWEL BARS.
8. SEE ILLINOIS TOLLWAY STANDARD DRAWINGS A12, A13, A14, A15, A16 AND A17 FOR CONCRETE SLAB WIDTH.

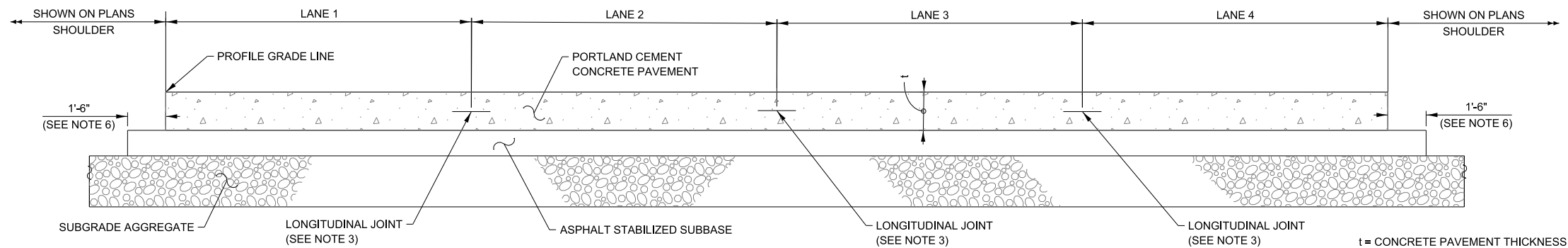
APPROVED BY: *Manar Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER

R E V I S I O N S	
DATE	DESCRIPTION
03-01-2024	ADDED NEW SHEET WITH RAMP PAVEMENT DETAIL. ADDED NOTE 8 IN GENERAL NOTES
03-01-2021	UPDATED NOTES
03-01-2020	UPDATED CROWN AND DOWELS
03-01-2019	UPDATED NOTES
03-01-2018	CORRECTED DIMENSION

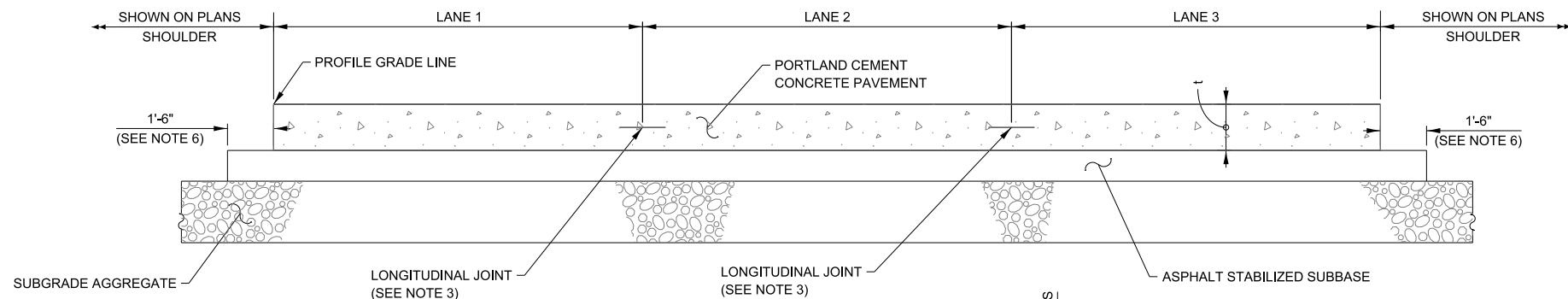


J.P.C. PAVEMENT

VERSION: 2024-03 STANDARD: A5-08 SHEET: 1 OF 3

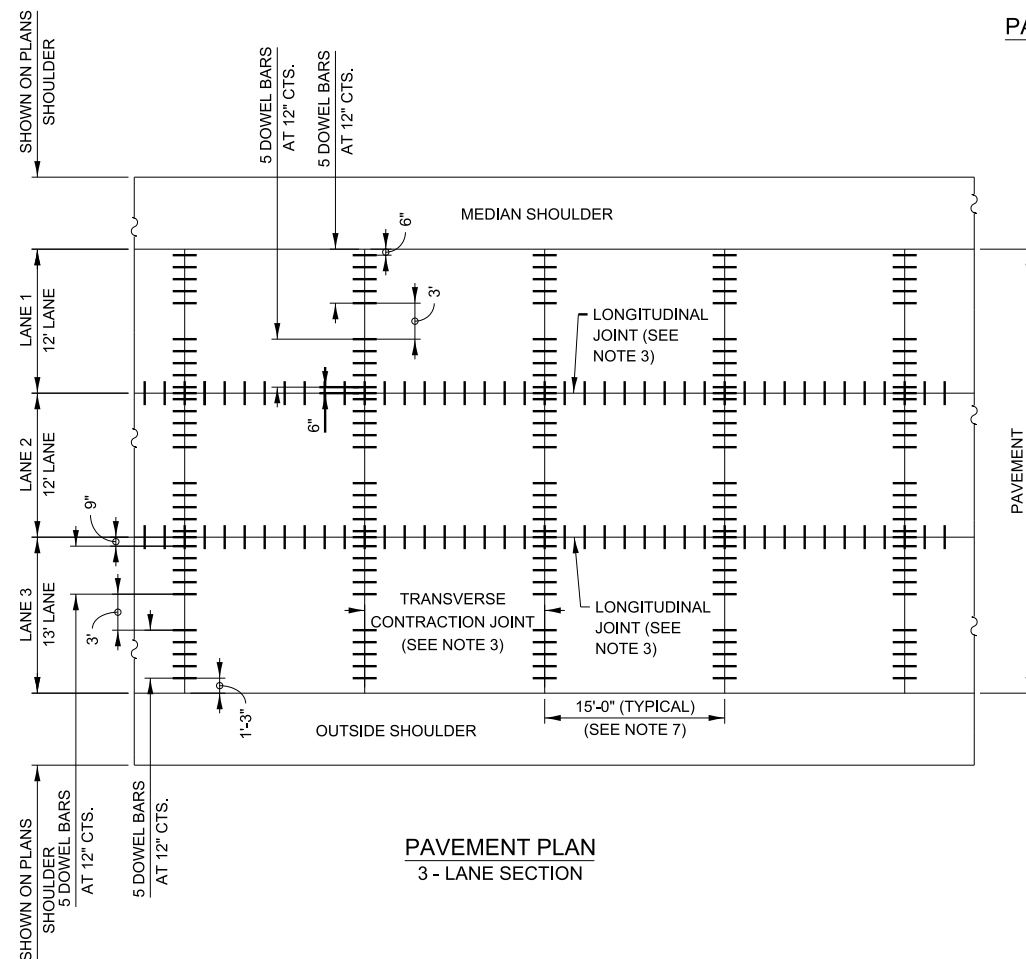


PAVEMENT CROSS - SECTION  
4 LANES

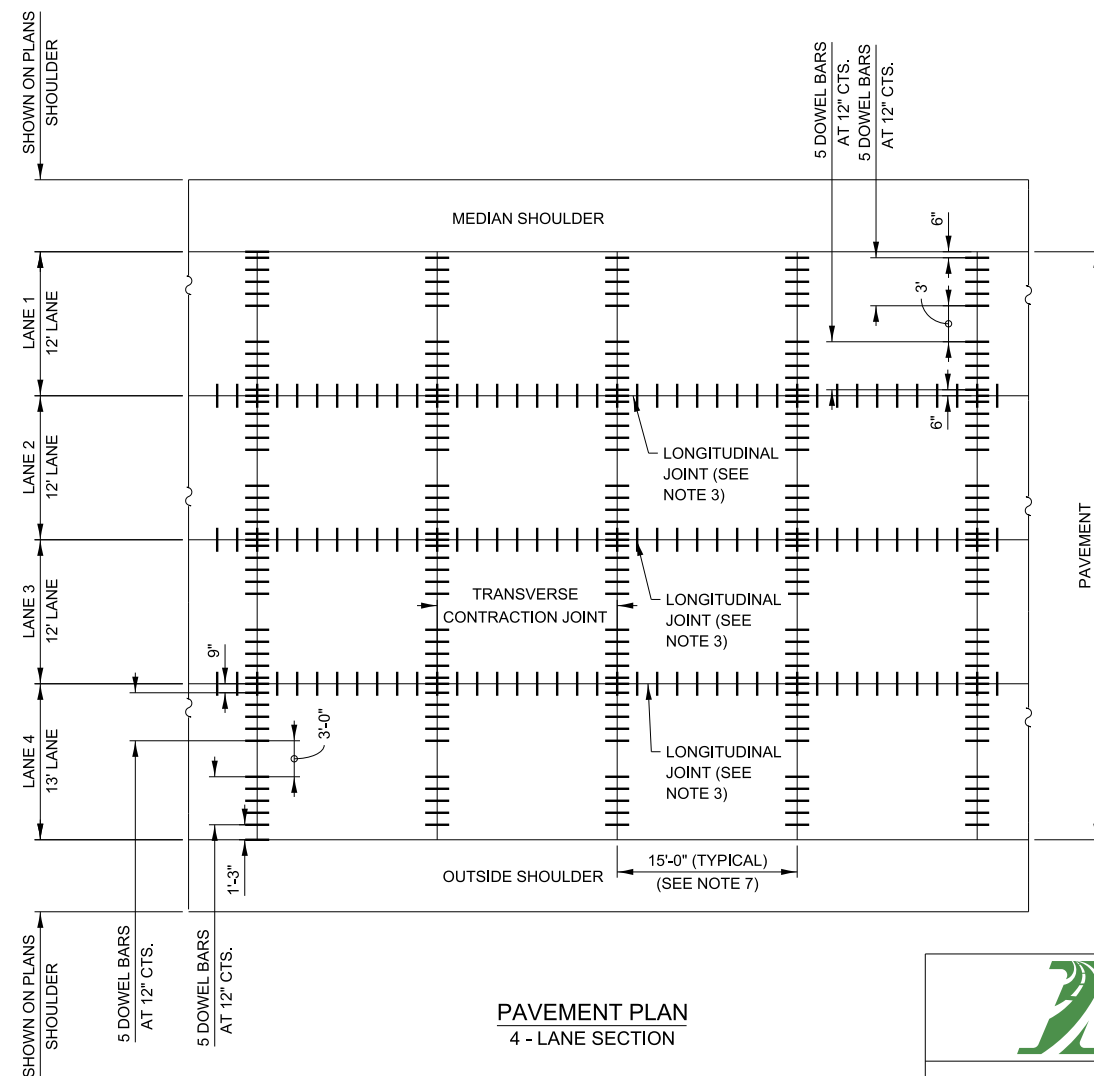


PAVEMENT CROSS - SECTION  
3 LANES

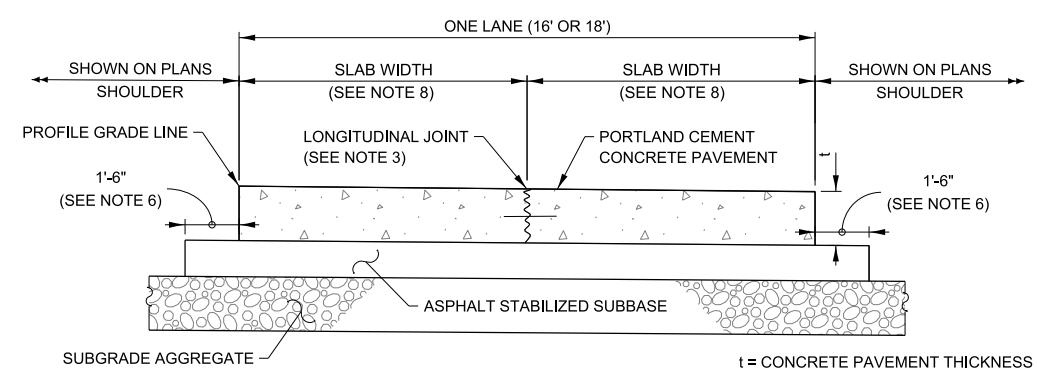
SEE SHEET 1 IN THIS SERIES  
FOR GENERAL NOTES.



PAVEMENT PLAN  
3 - LANE SECTION

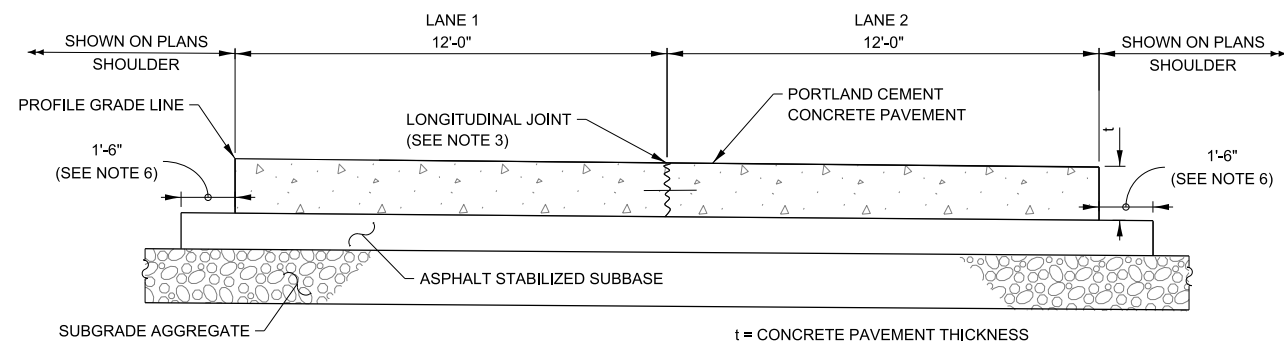


PAVEMENT PLAN  
4 - LANE SECTION

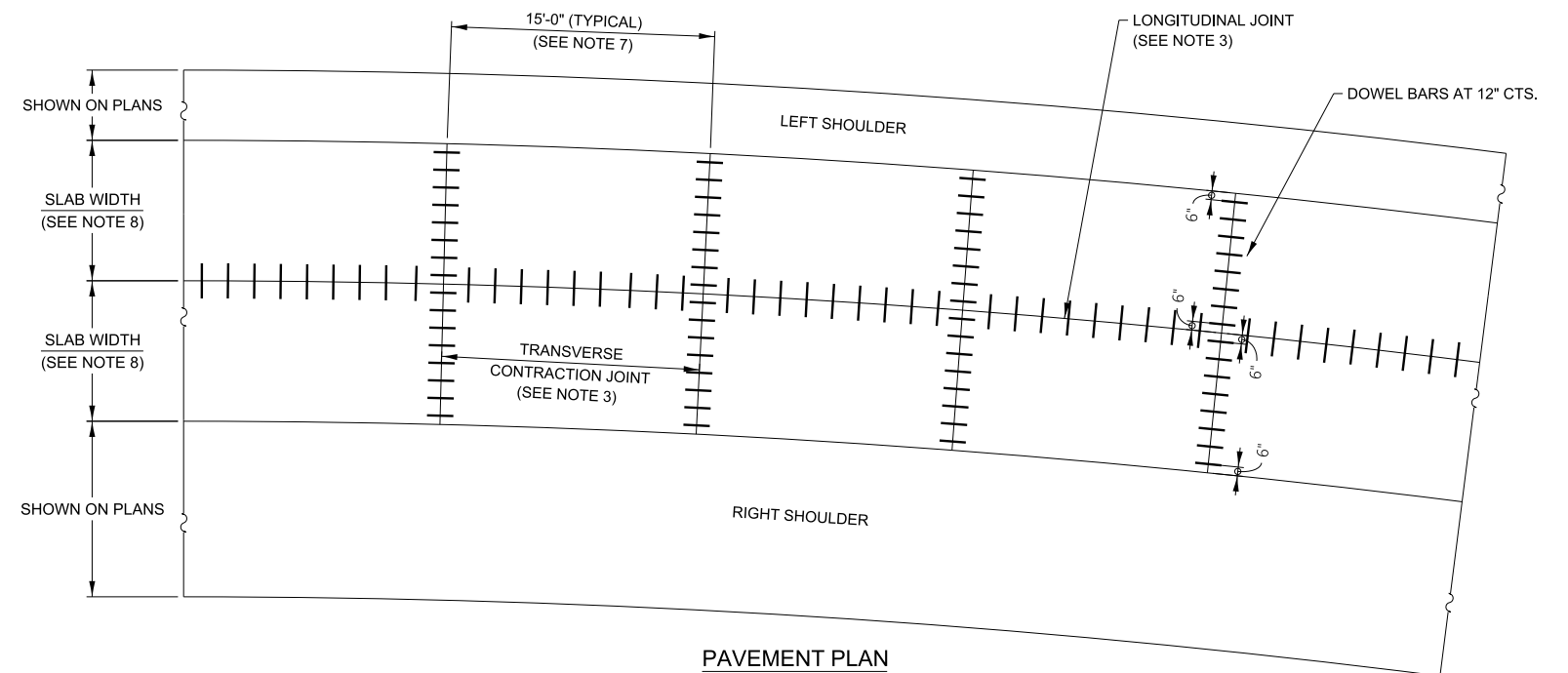


PAVEMENT CROSS - SECTION  
1-LANE RAMP

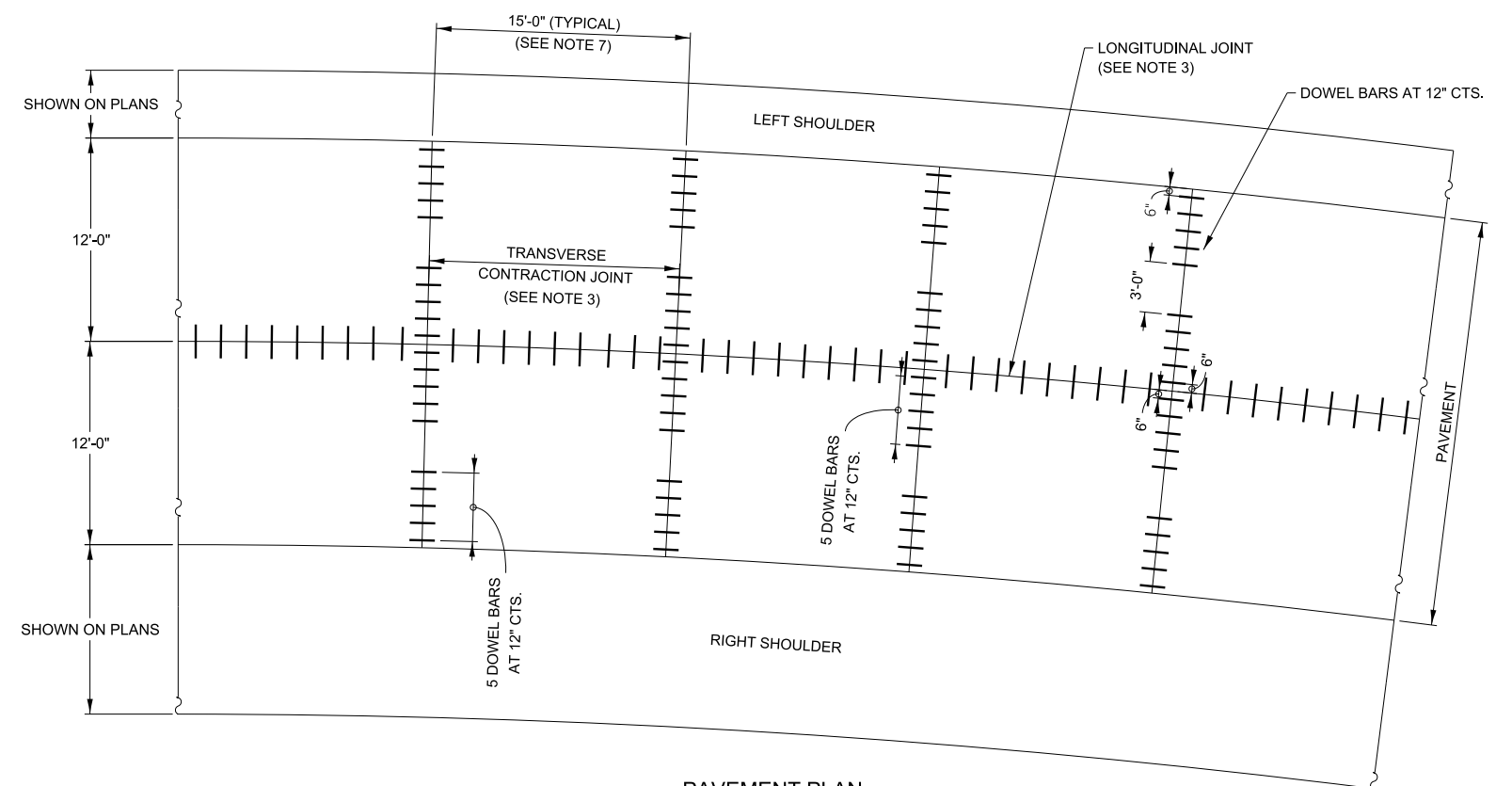
SEE SHEET 1 IN THIS SERIES  
FOR GENERAL NOTES.



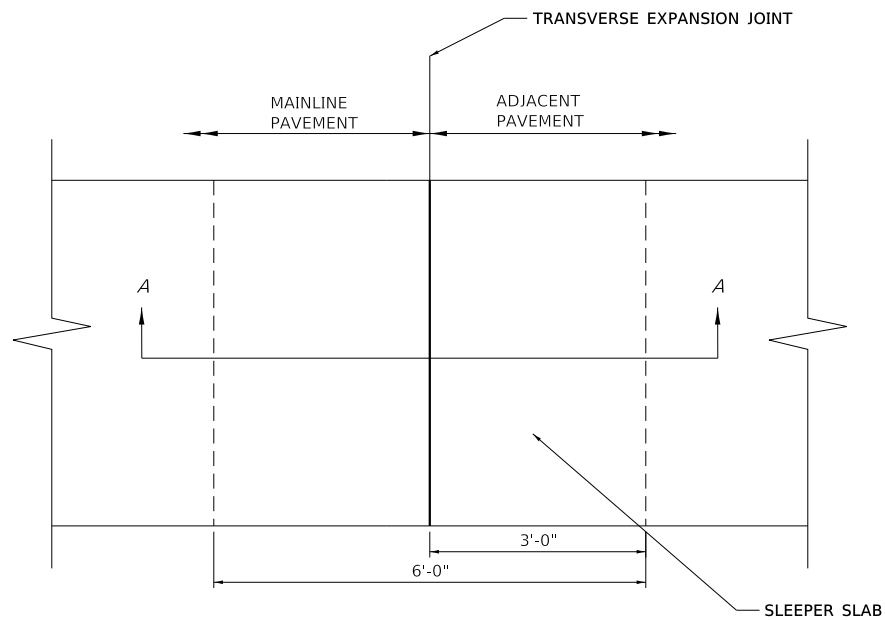
PAVEMENT CROSS - SECTION  
2-LANE RAMP



PAVEMENT PLAN  
1-LANE RAMP



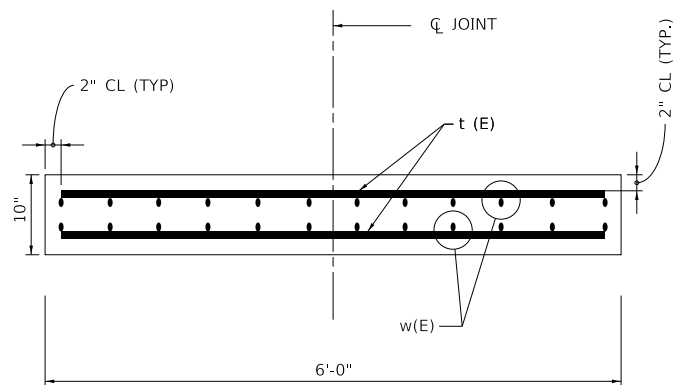
PAVEMENT PLAN  
2-LANE RAMP



### SLEEPER SLAB NOTES

#### PLAN

1. ADDITIONAL THICKNESS OF PAVEMENT SHALL BE INCLUDED IN THE COST OF THE PAY ITEM FOR THE PAVEMENT TYPE.
2. POLYETHYLENE SHEET AND AGGREGATE SUPPORTING THE SLEEPER SLAB SHALL BE INCLUDED IN THE COST OF SLEEPER SLAB.

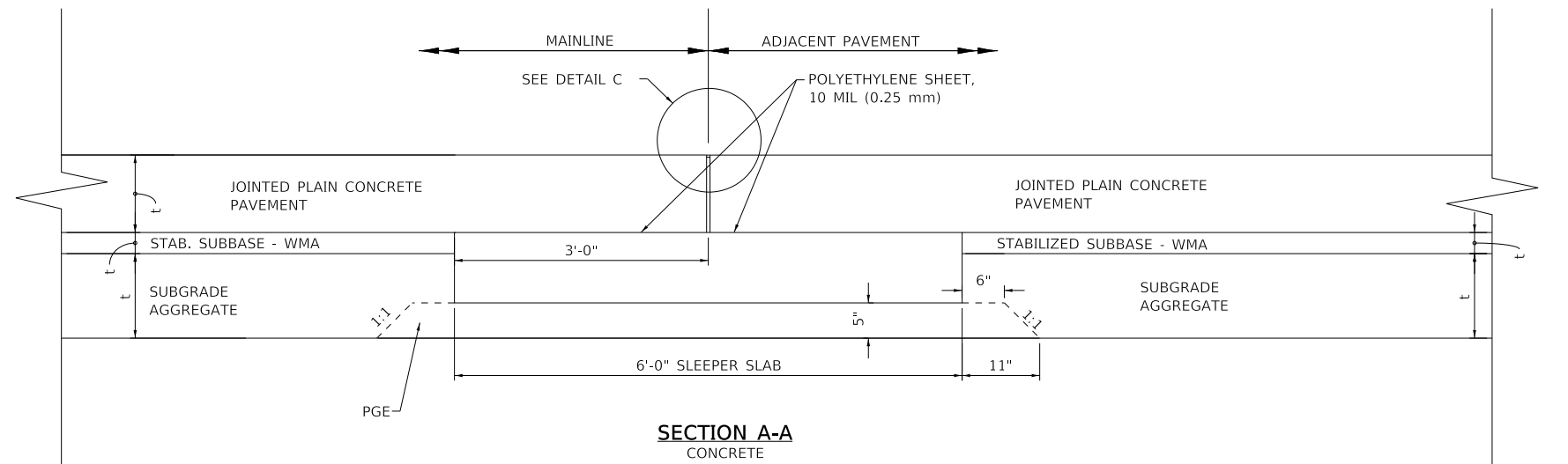
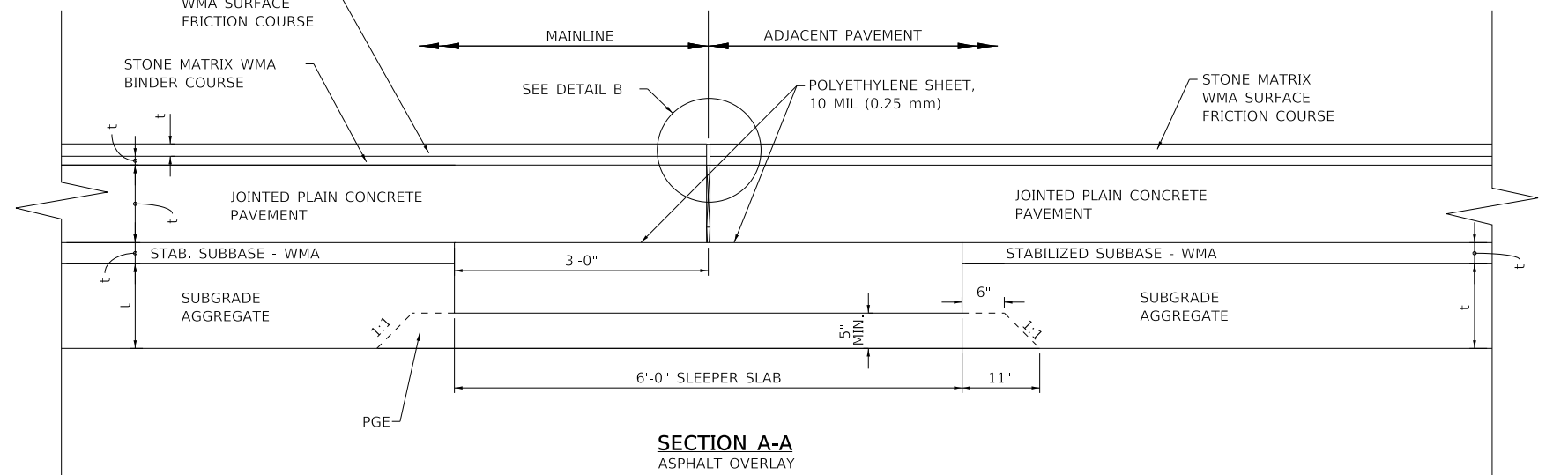
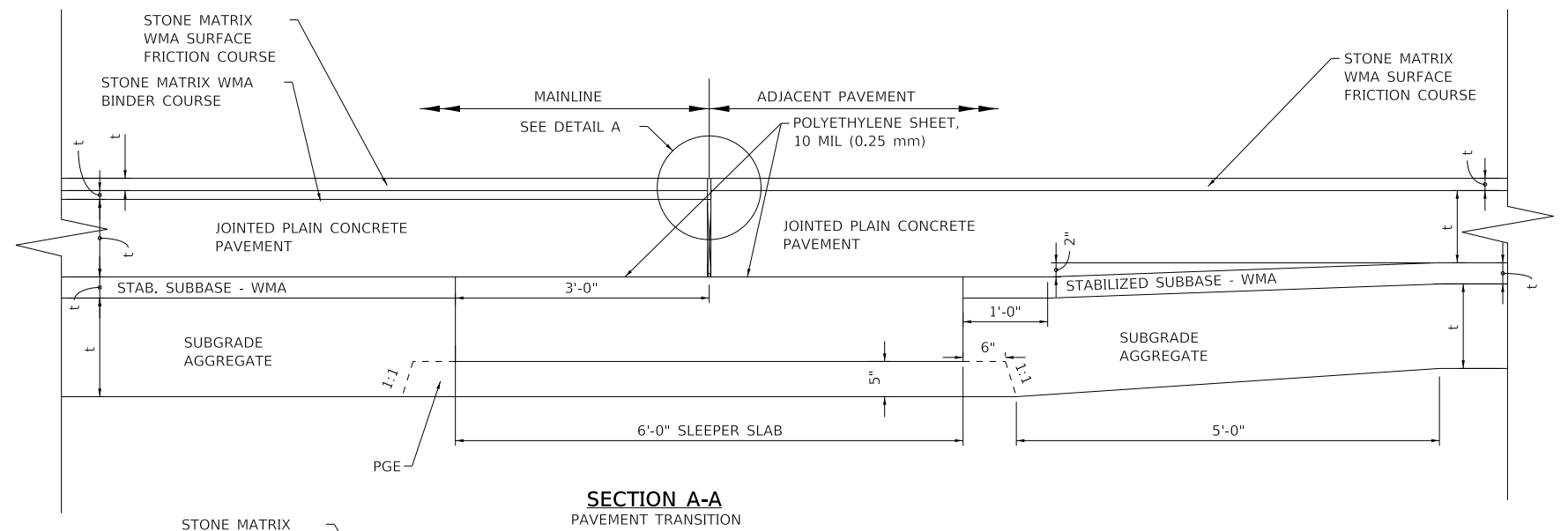


#### SLEEPER SLAB SECTION

Bar	No.	Size	Length
t(E)	XX	#4	5'-8"
w(E)	XX	#5	XX

#### SLEEPER SLAB SECTION NOTES

1. t(E) BARS SHALL BE PLACED AT 12" CTS.
2. w(E) NUMBER AND LENGTH DEPEND ON WIDTH OF ROADWAY.
3. USE 2'-8" MIN LAP FOR #4 BARS. USE 4'-0" MIN. LAP FOR #5 BARS.



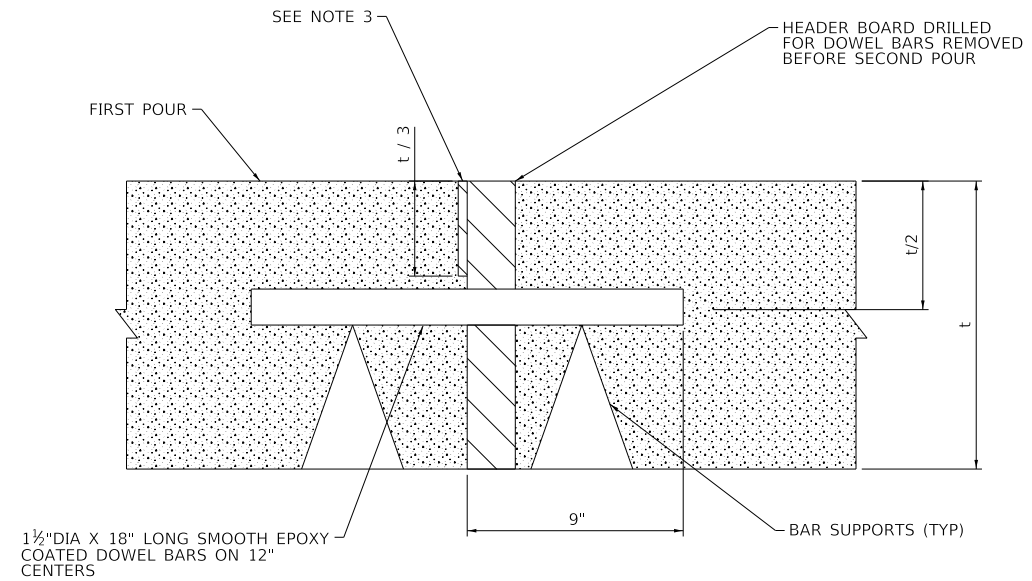
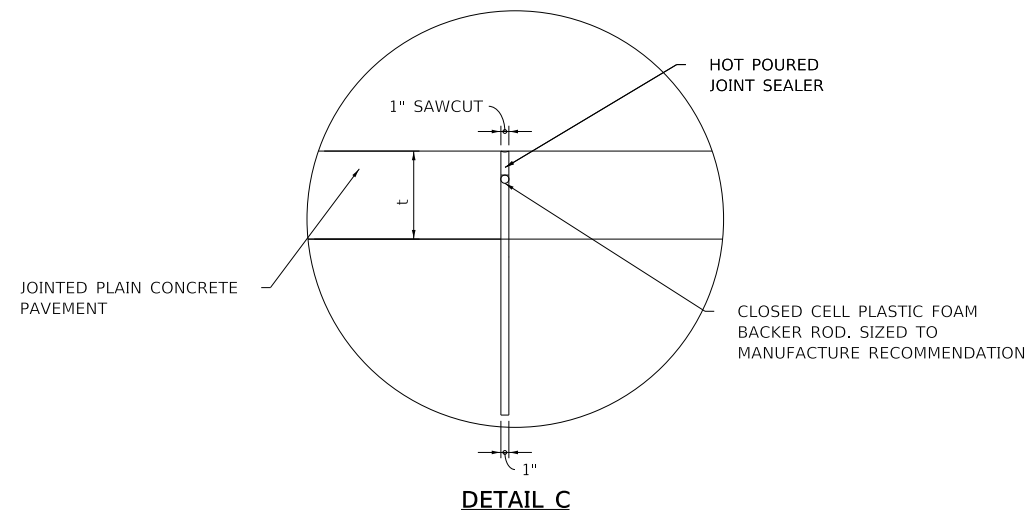
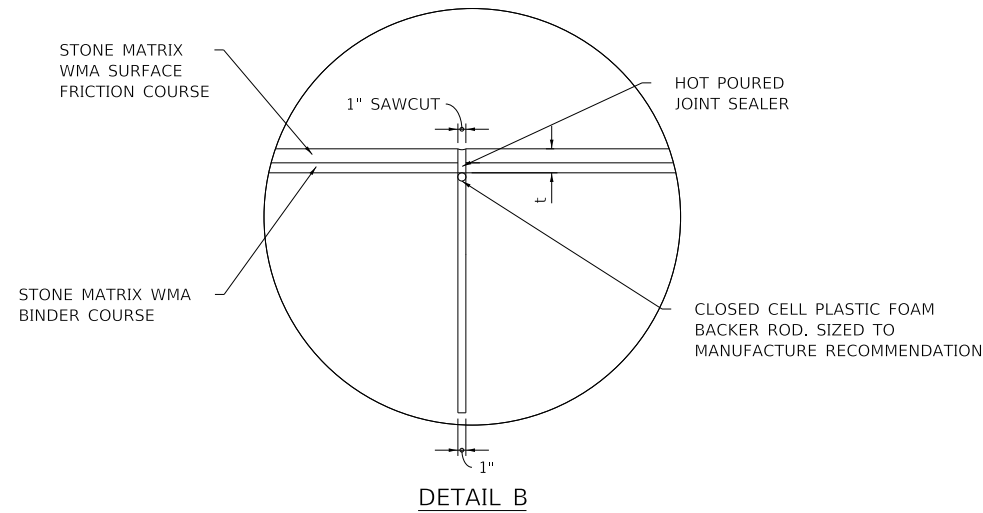
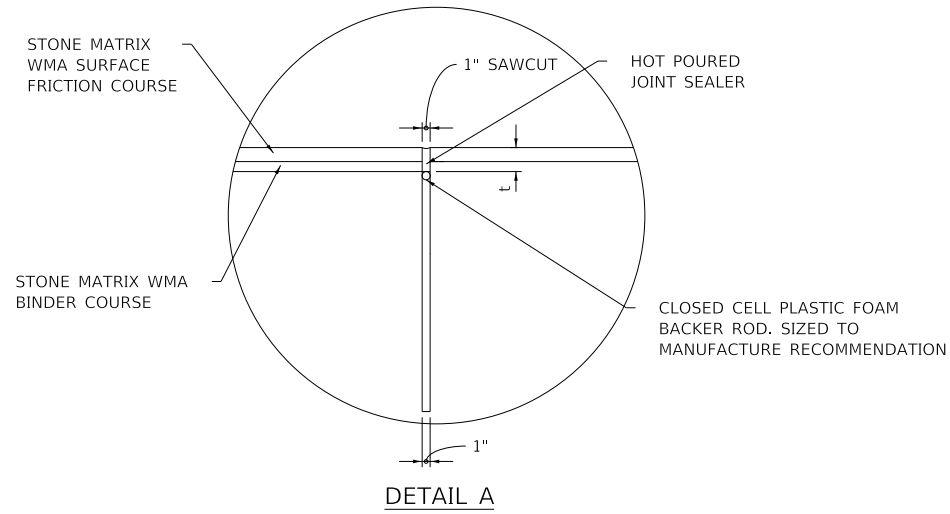
### PAVEMENT JOINTS

R E V I S I O N S	
DATE	DESCRIPTION
3-01-2022	REMOVED CAPPING AGG
3-01-2021	UPDATED NOTES
3-01-2020	REVISED TRANSVERSE EXPANSION JOINT
5-01-2017	MODIFIED JOINT DETAIL, REVISED NOTES
3-31-2017	ADDED TRANSVERSE EXPANSION JOINT
3-31-2016	REVISED 13" PAVE NOTE FOR DOWEL BAR

VERSION:	STANDARD:	SHEET:
2022-03	A7-06	1 OF 2

APPROVED BY: *Paul Kovacs* CHIEF ENGINEERING OFFICER

DATE: 02/17/2019



#### GENERAL NOTES:

1. ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SHOWN.
2.  $t$  = PAVEMENT THICKNESS.
3. A  $\frac{3}{8}$ " WIDE SAW CUT SHALL BE PROVIDED AFTER THE SECOND POUR FOR PAVEMENT CRACK CONTROL. MINIMUM DEPTH SHALL BE  $t/3$ .



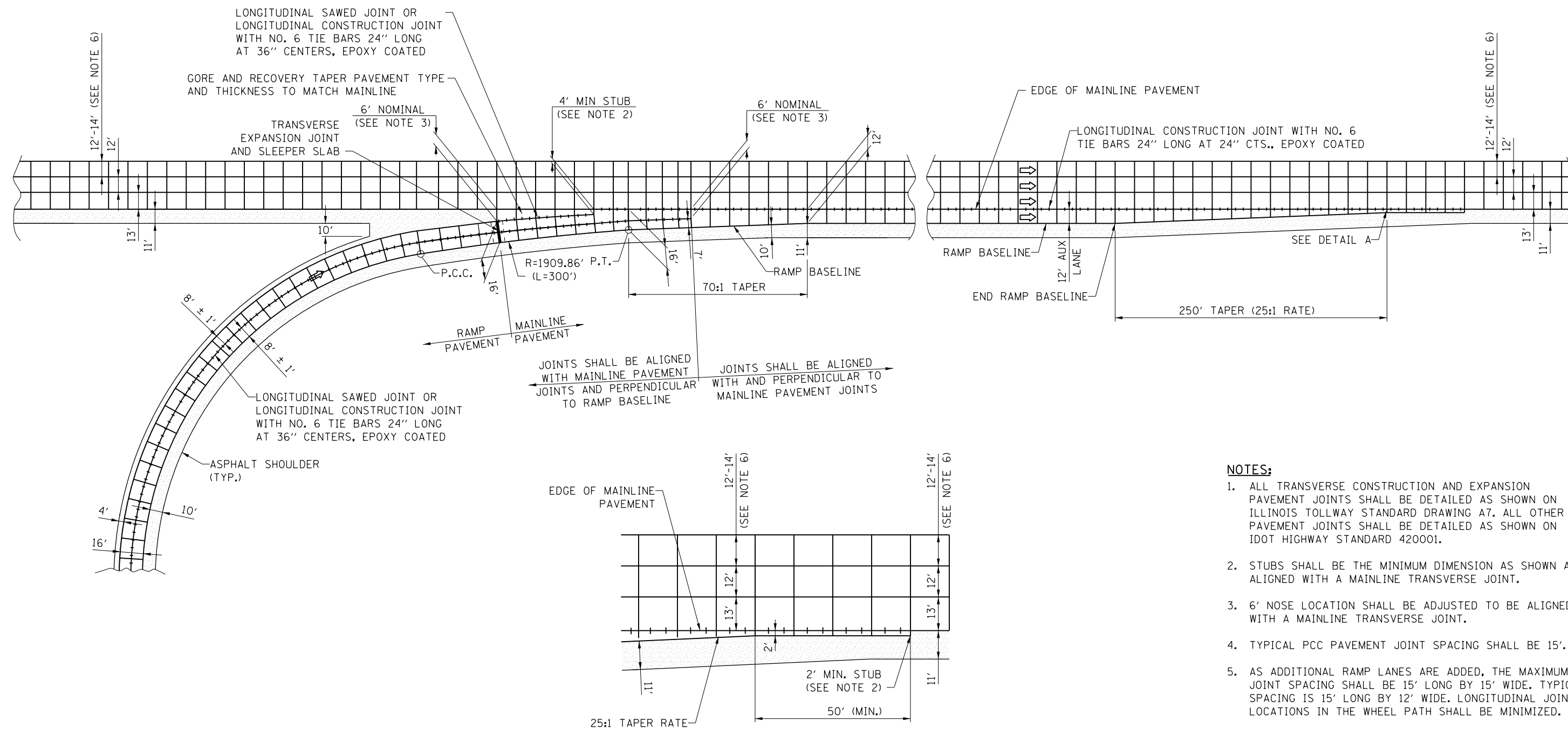
#### PAVEMENT JOINTS

APPROVED BY:

DATE:

*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

02/17/2019



# NOTES:

- ALL TRANSVERSE CONSTRUCTION AND EXPANSION PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7. ALL OTHER PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON IDOT HIGHWAY STANDARD 420001.
- STUBS SHALL BE THE MINIMUM DIMENSION AS SHOWN AND ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
- 6' NOSE LOCATION SHALL BE ADJUSTED TO BE ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
- TYPICAL PCC PAVEMENT JOINT SPACING SHALL BE 15'.
- AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
- DIMENSION OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.

SHEET 1 OF 2



JOINTING PLAN  
ENTRANCE RAMP TERMINAL  
WITH AUXILIARY LANE

STANDARD A12-02

DATE	REVISIONS
3-01-2021	TIE BARS AT 36" CENTERS
3-01-2020	UPDATED SHOULDER TO 11'
	UPDATED DIMENSIONS

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER

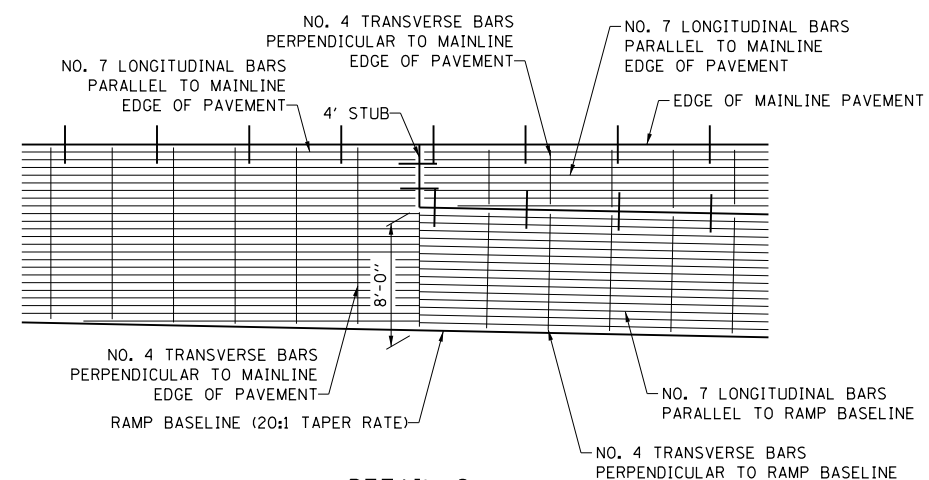
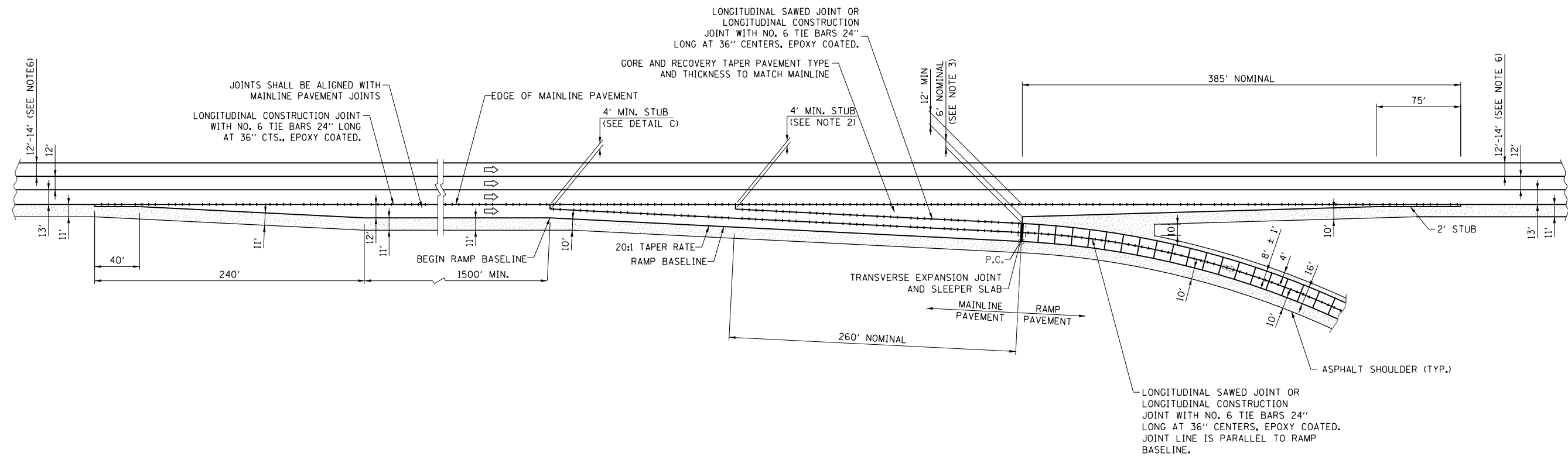
DATE: 03/01/2019

## JOINTED PCC RAMP ADJACENT TO JOINTED PCC MAINLINE PAVEMENT





DATE	REVISIONS
3-01-2022	UPDATED DIMENSIONS
3-01-2021	TIE BARS AT 36" CENTERS
3-01-2020	UPDATED 12" MIN AT GORE
3-01-2019	MODIFIED DETAILS
	ADDED PCC ADJ TO CRC
3-01-2018	MOVED RAMP PAYEMENT



DETAIL C

**NOTES:**

1. ALL PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7 AND IDOT HIGHWAY STANDARD 420001.
2. SEE PROJECT PLANS AND CONTRACT DOCUMENTS FOR DETAILS OF PAVEMENT REINFORCEMENT.
3. TYPICAL PCC PAVEMENT JOINT SPACING SHALL BE 15'.
4. AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL JOINT SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
5. DIMENSIONS OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.

JOINTED PCC RAMP ADJACENT TO C.R.C MAINLINE PAVEMENT

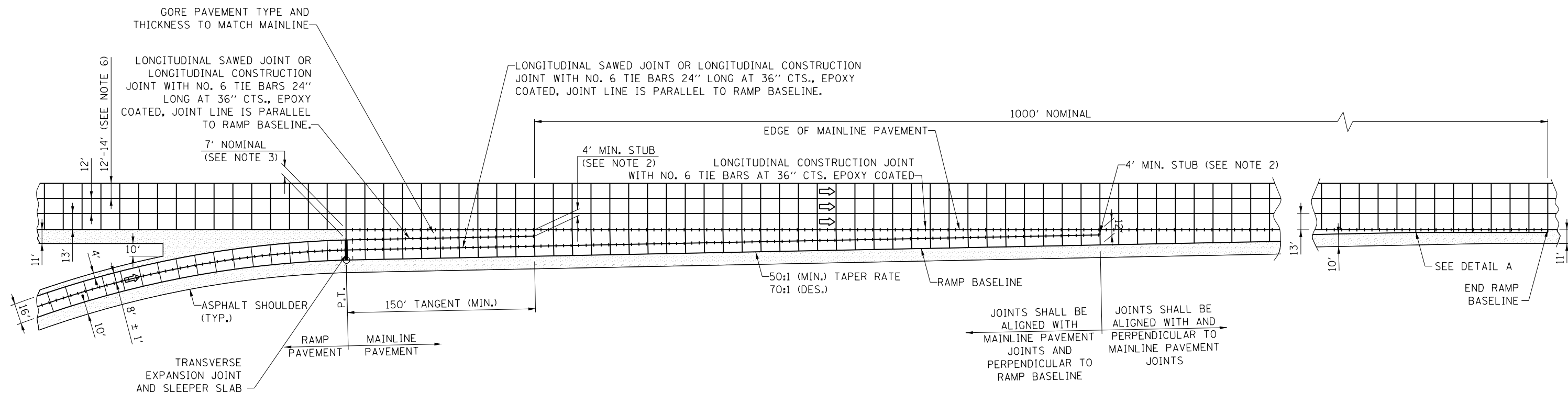
APPROVED BY:  
  
 CHIEF ENGINEERING OFFICER  
 DATE:  
 03/01/2019

SHEET 2 OF 2



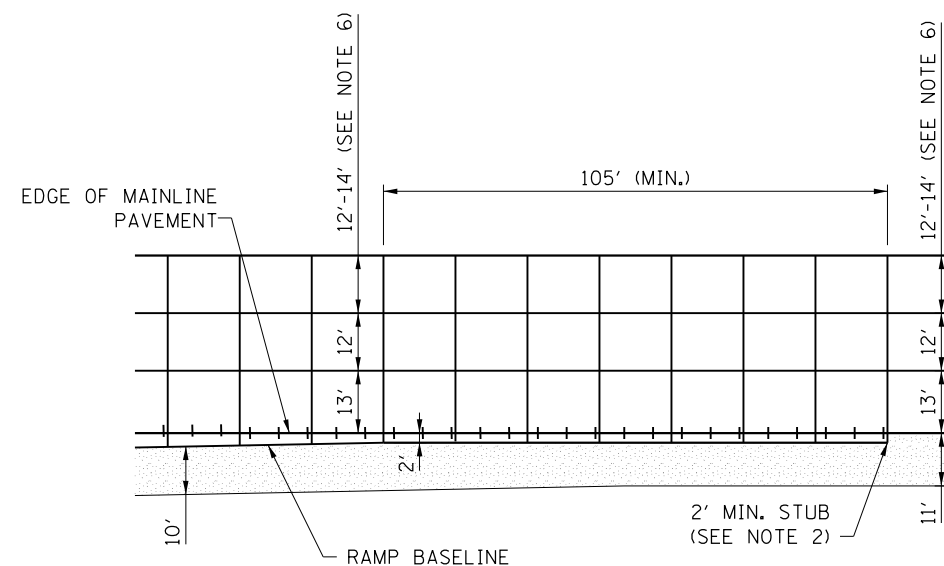
JOINTING PLAN  
 EXIT RAMP TERMINAL  
 WITH AUXILIARY LANE

STANDARD A13-05



# **NOTES:**

- ALL TRANSVERSE CONSTRUCTION AND EXPANSION PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7. ALL OTHER PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON IDOT HIGHWAY STANDARD 420001.
- STUBS SHALL BE THE MINIMUM DIMENSION AS SHOWN AND ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
- 7' NOSE LOCATION SHALL BE ADJUSTED TO BE ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
- TYPICAL PCC PAVEMENT JOINT SPACING SHALL BE 15'.
- AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATION IN THE WHEEL PATH SHALL BE MINIMIZED.
- DIMENSION OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.



**DETAIL A**

## **JOINTED PCC RAMP ADJACENT TO JOINTED PCC MAINLINE PAVEMENT**

SHEET 1 OF 2



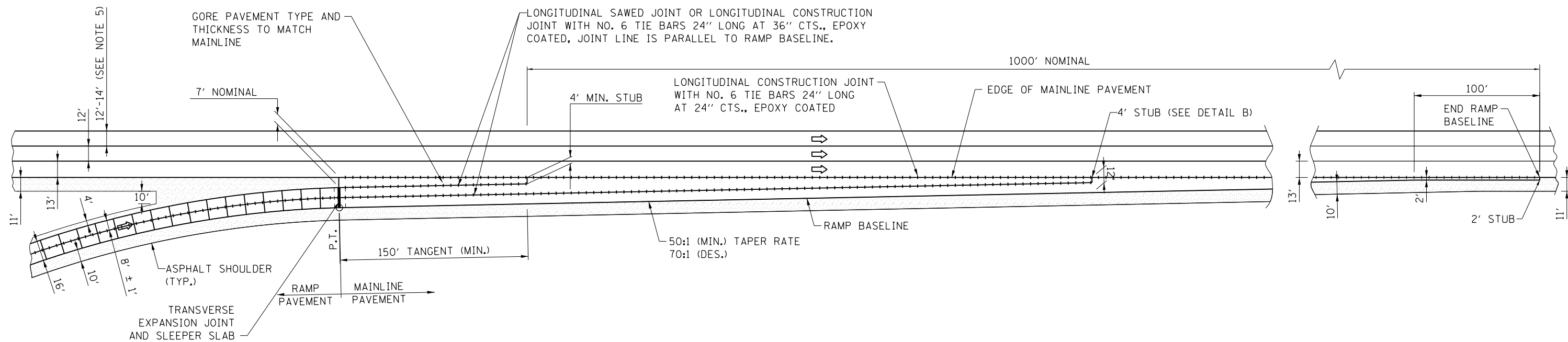
JOINTING PLAN  
ENTRANCE RAMP TERMINAL

STANDARD A14-07

DATE	REVISIONS
3-01-2021	UPDATE DETAIL B
	UPDATE 12' AT MAINLINE
	TIE BARS AT 36" CENTERS
3-01-2020	REVISED WITH EPOXY BARS
3-01-2019	UPDATED TAPER DESIRED
3-01-2018	MOVED RAMP PAVEMENT

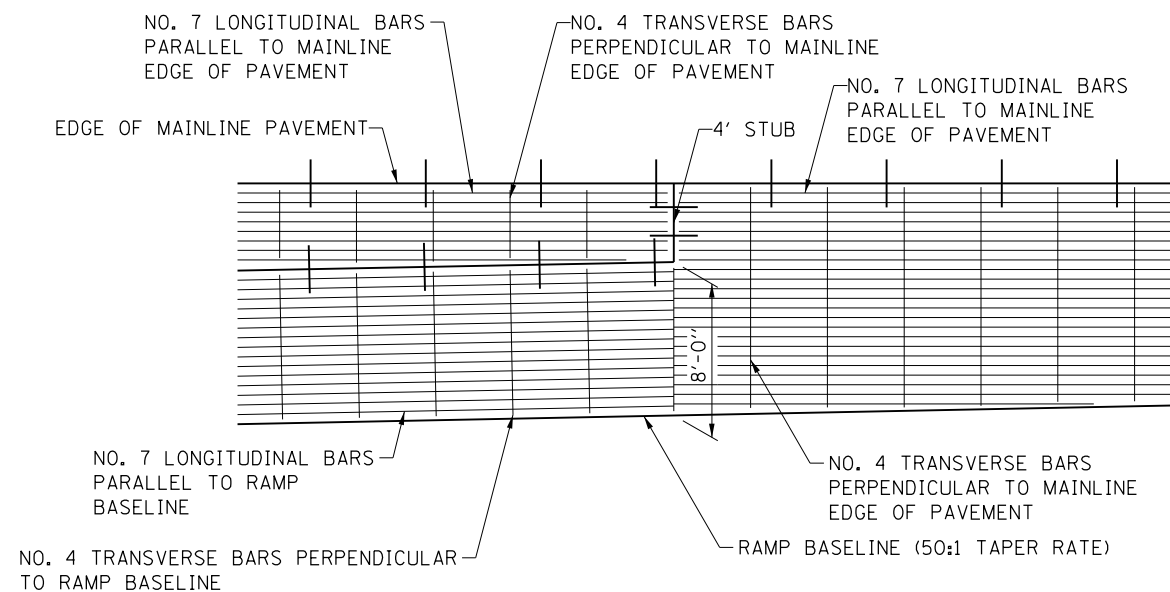
APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

DATE:  
01/31/2015



**NOTES:**

1. ALL PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7 AND IDOT HIGHWAY STANDARD 420001, EXCEPT EXPANSION JOINT SEALS SHALL BE AS DESCRIBED IN THE ILLINOIS TOLLWAY SPECIAL PROVISION, BONDED PREFORMED JOINT SEAL.
2. SEE PROJECT PLANS AND CONTRACT DOCUMENTS FOR DETAILS OF PAVEMENT REINFORCEMENT.
3. TYPICAL PCC PAVEMENT JOINT SPACING SHALL BE 15'.
4. AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL JOINT SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
5. DIMENSIONS OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.



DETAIL B

JOINTED PCC RAMP ADJACENT TO JOINTED C.R.C. MAINLINE PAVEMENT

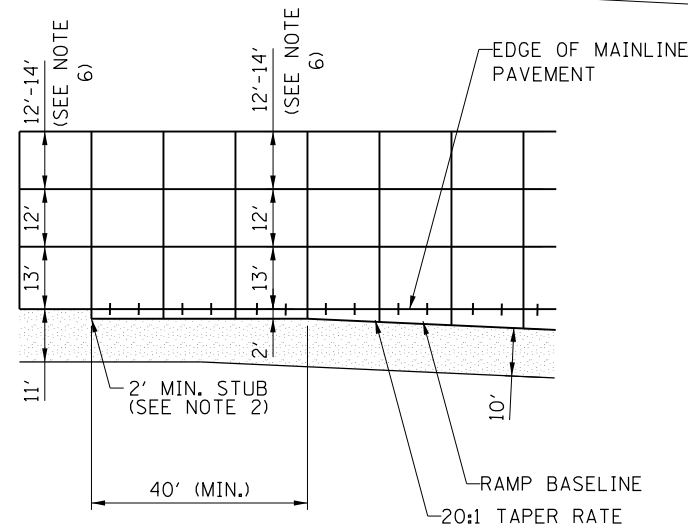
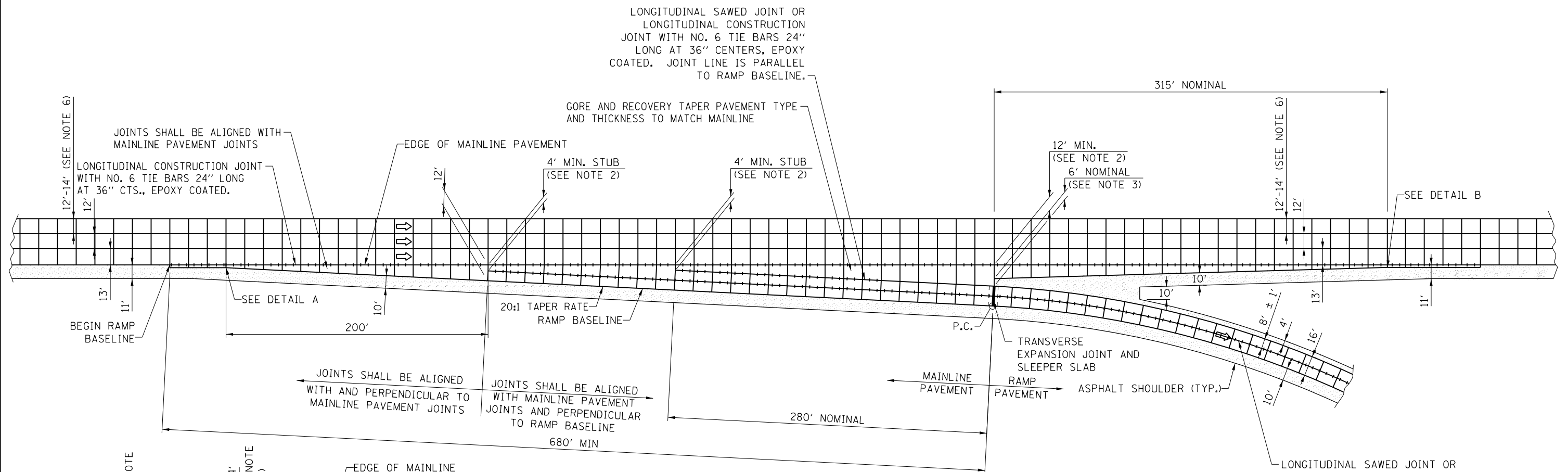
APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 01/31/2015

SHEET 2 OF 2

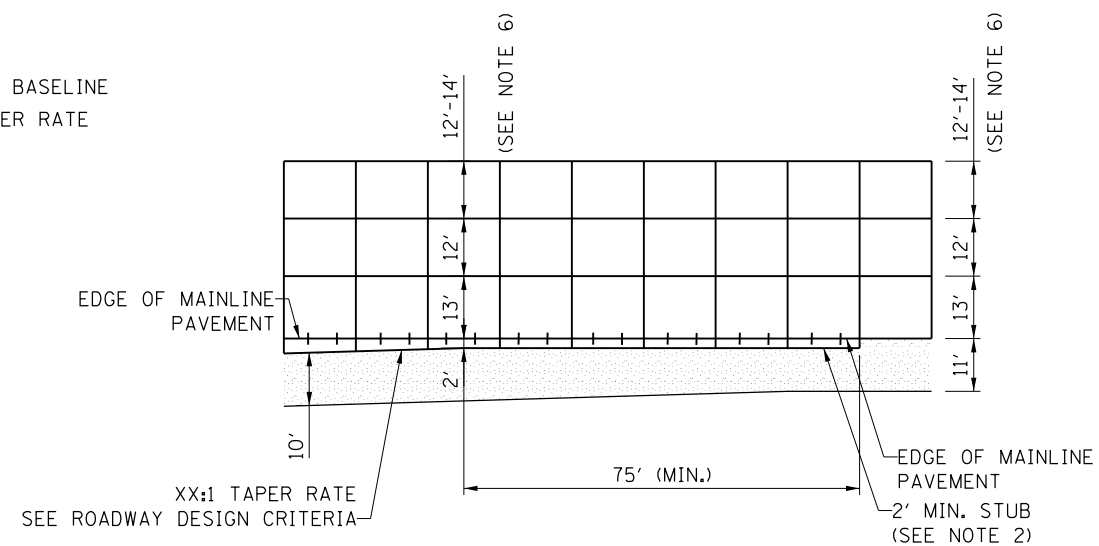


JOINTING PLAN  
ENTRANCE RAMP TERMINAL

STANDARD A14-07



DETAIL A



DETAIL B

JOINTED PCC RAMP ADJACENT TO JOINTED PCC MAINLINE PAVEMENT

- NOTES:

1. ALL TRANSVERSE CONSTRUCTION AND EXPANSION PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7. ALL OTHER PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON IDOT HIGHWAY STANDARD 420001.
2. STUBS SHALL BE THE MINIMUM DIMENSION AS SHOWN AND ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
3. 6' NOSE LOCATION SHALL BE ADJUSTED TO BE ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
4. TYPICAL P.C.C. PAVEMENT JOINT SPACING SHALL BE 15'.
5. AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
6. DIMENSIONS OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.

SHEET 1 OF 2



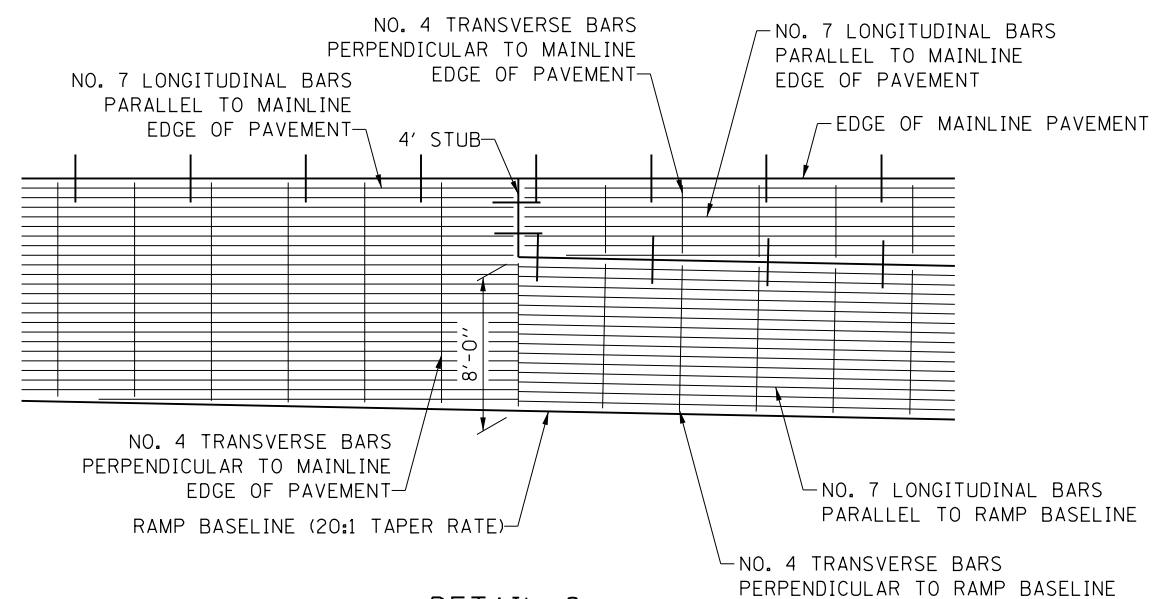
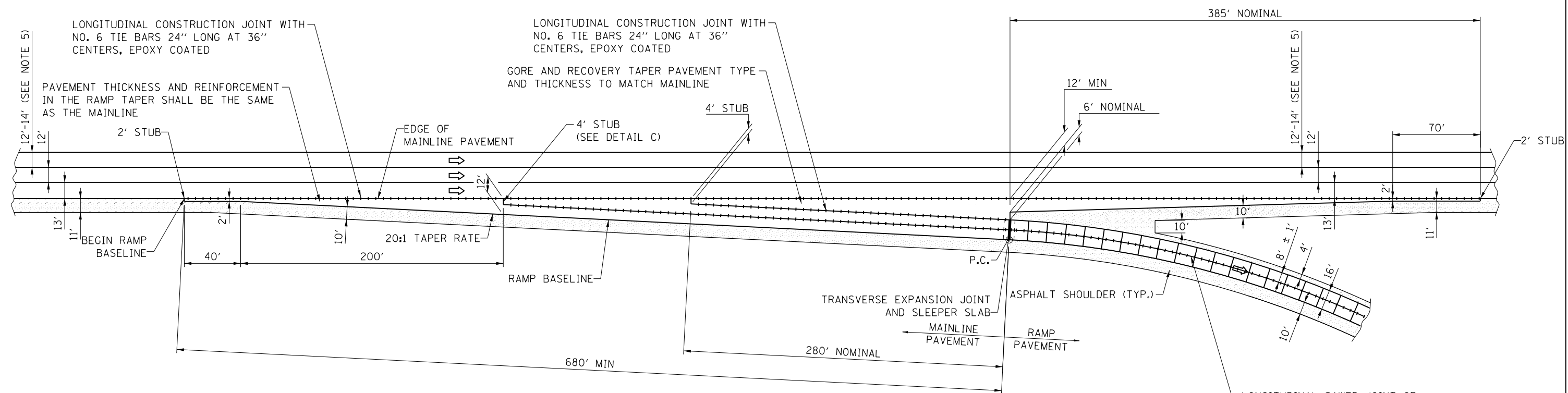
JOINTING PLAN  
EXIT RAMP TERMINAL

STANDARD A15-08

APPROVED BY: Paul Kovacs DATE: 01/31/2015  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2022	UPDATED DIMENSIONS
3-01-2021	UPDATE 12" AT MAINLINE TIE BARS AT 36" CENTERS
3-01-2020	UPDATE 12" MIN. AT GORE
3-01-2019	UPDATE DETAIL B UPDATE 11" MIN STUB





NOTES:

1. ALL PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7 AND IDOT HIGHWAY STANDARD 420001.
2. SEE PROJECT PLANS AND CONTRACT DOCUMENTS FOR DETAILS OF PAVEMENT REINFORCEMENT.
3. TYPICAL P.C.C. PAVEMENT JOINT SPACING SHALL BE 15'.
4. AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
5. DIMENSIONS OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.

SHEET 2 OF 2



JOINTING PLAN  
EXIT RAMP TERMINAL

STANDARD A15-08

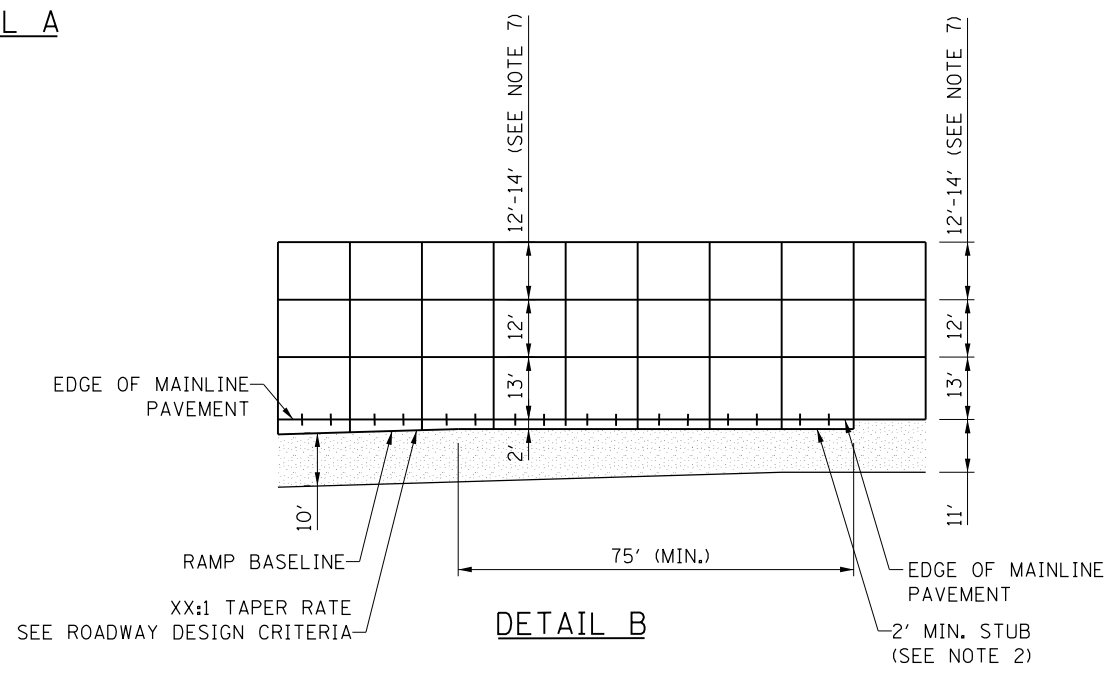
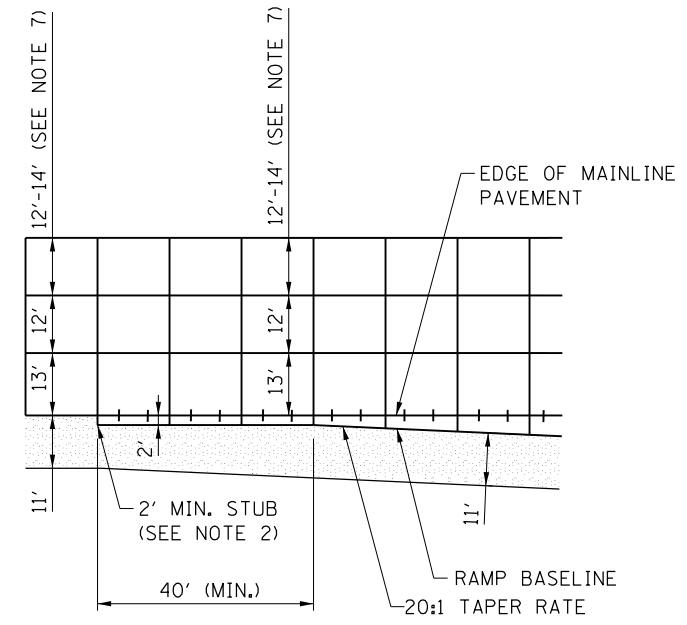
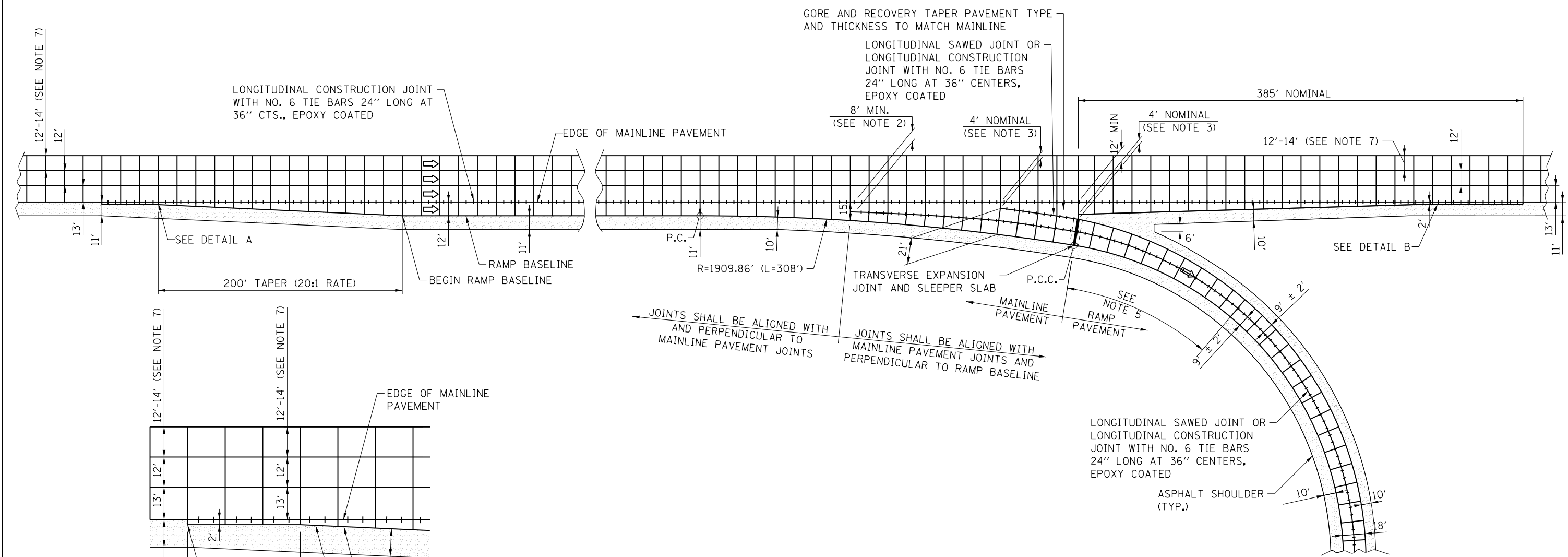
APPROVED BY:

DATE: \_\_\_\_\_

Paul Kovacs  
CHIEF ENGINEERING OFFICER

01/31/2015

JOINTED PCC RAMP ADJACENT TO C.R.C. MAINLINE PAVEMENT



- NOTES:**
- ALL TRANSVERSE CONSTRUCTION AND EXPANSION PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7. ALL OTHER PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON IDOT HIGHWAY STANDARD 420001.
  - STUBS SHALL BE THE MINIMUM DIMENSION AS SHOWN AND ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
  - 4' NOSE LOCATION SHALL BE ADJUSTED TO BE ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
  - TYPICAL P.C.C. PAVEMENT JOINT SPACING SHALL BE 15'.
  - RAMP NARROWS FROM 21' TO 18' IN 150'.
  - AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
  - DIMENSION OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 01/31/2015

JOINTED PCC RAMP ADJACENT TO JOINTED PCC MAINLINE PAVEMENT

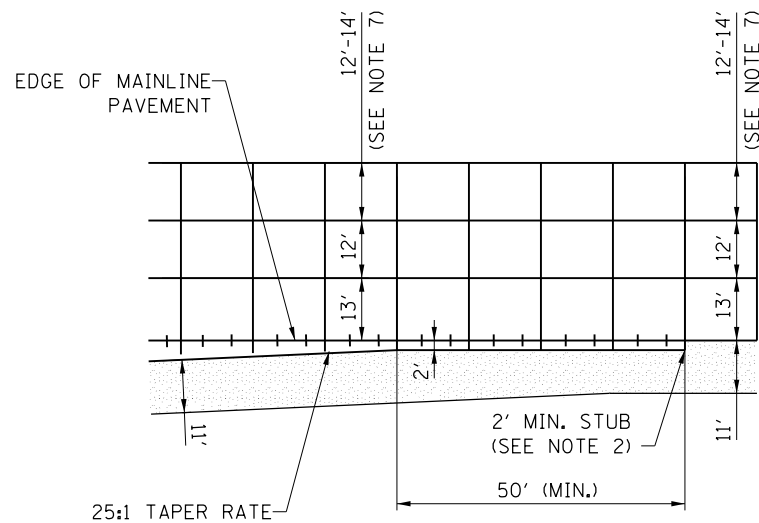
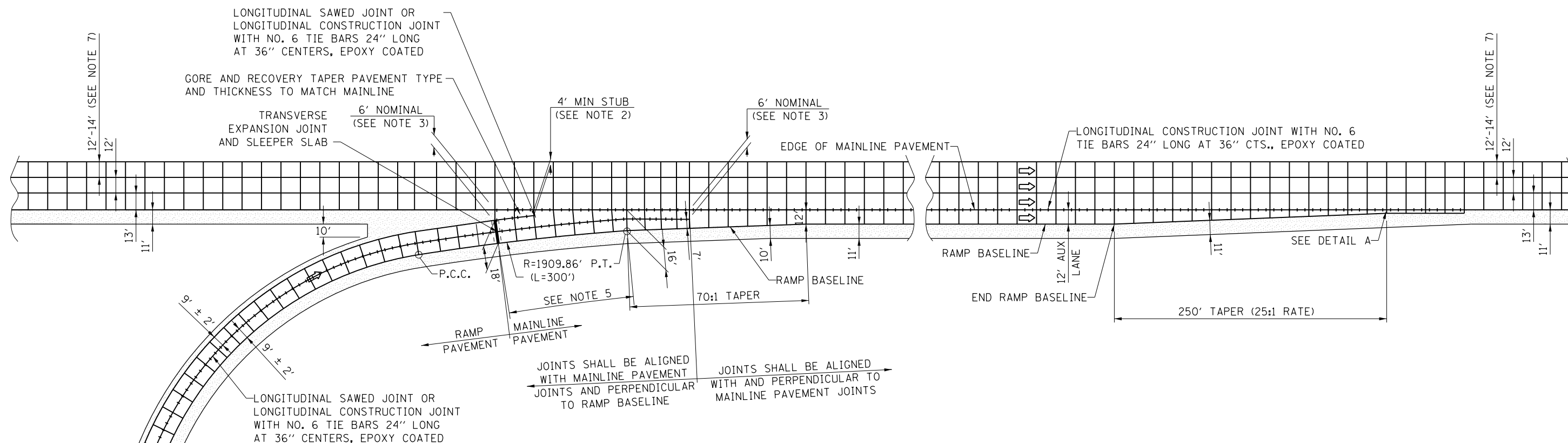
DATE	REVISIONS
3-01-2022	UPDATED DIMENSIONS
3-01-2021	TIE BARS AT 36" CENTERS
	UPDATED SHOULDER TO 11'
3-01-2020	UPDATED 12' MIN AT GORE
3-01-2019	UPDATED DETAIL A AND B
	ADDED 150' TAPER

SHEET 1 OF 2

JOINTING PLAN  
PARALLEL EXIT RAMP TERMINAL  
LOOP RAMP ONLY

STANDARD A16-08





DETAIL A

NOTES:

1. ALL TRANSVERSE CONSTRUCTION AND EXPANSION PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7. ALL OTHER PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON IDOT HIGHWAY STANDARD 420001.
2. STUBS SHALL BE THE MINIMUM DIMENSION AS SHOWN AND ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
3. 6' NOSE LOCATION SHALL BE ADJUSTED TO BE ALIGNED WITH A MAINLINE TRANSVERSE JOINT.
4. TYPICAL PCC PAVEMENT JOINT SPACING SHALL BE 15'.
5. RAMP NARROWS FROM 18' TO 16'.
6. AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
7. DIMENSION OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.



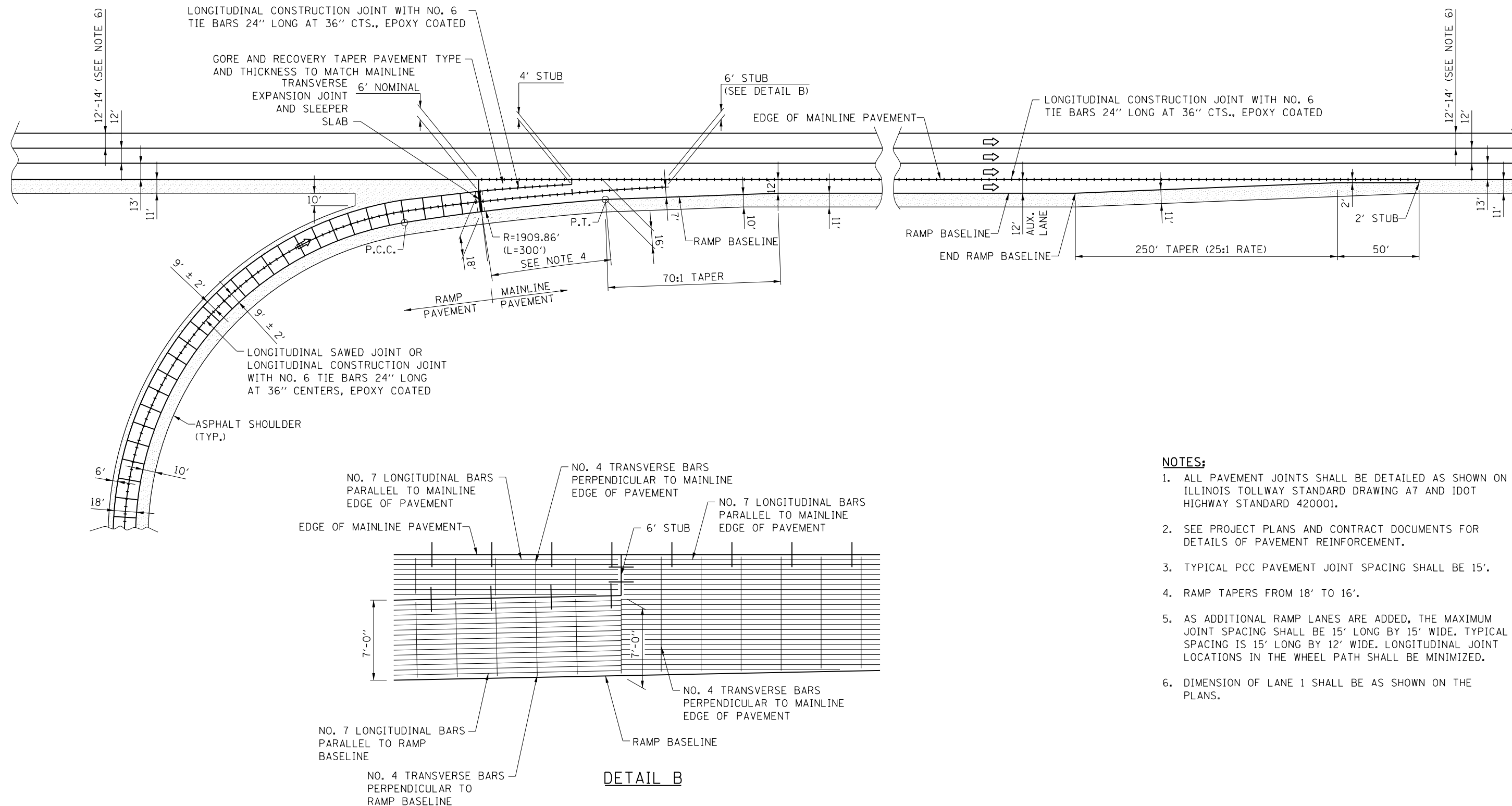
DATE	REVISIONS
3-01-2021	TIE BARS AT 36" CENTERS UPDATED SHOULDER TO 11'
3-01-2020	UPDATED DIMENSION
3-01-2019	ENTRANCE LAYOUT UPDATE
3-01-2018	MOVED RAMP PAVEMENT
3-31-2017	UPDATED NOTES.

JOINTING PLAN PARALLEL  
ENTRANCE RAMP TERMINAL  
LOOP RAMP ONLY

STANDARD A17-07

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
01/31/2015

JOINTED PCC RAMP ADJACENT TO JOINTED PCC MAINLINE PAVEMENT



#### NOTES:

1. ALL PAVEMENT JOINTS SHALL BE DETAILED AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING A7 AND IDOT HIGHWAY STANDARD 420001.
2. SEE PROJECT PLANS AND CONTRACT DOCUMENTS FOR DETAILS OF PAVEMENT REINFORCEMENT.
3. TYPICAL PCC PAVEMENT JOINT SPACING SHALL BE 15'.
4. RAMP TAPERS FROM 18' TO 16'.
5. AS ADDITIONAL RAMP LANES ARE ADDED, THE MAXIMUM JOINT SPACING SHALL BE 15' LONG BY 15' WIDE. TYPICAL SPACING IS 15' LONG BY 12' WIDE. LONGITUDINAL JOINT LOCATIONS IN THE WHEEL PATH SHALL BE MINIMIZED.
6. DIMENSION OF LANE 1 SHALL BE AS SHOWN ON THE PLANS.

SHEET 2 OF 2



JOINTING PLAN PARALLEL  
ENTRANCE RAMP TERMINAL  
LOOP RAMP ONLY

STANDARD A17-07

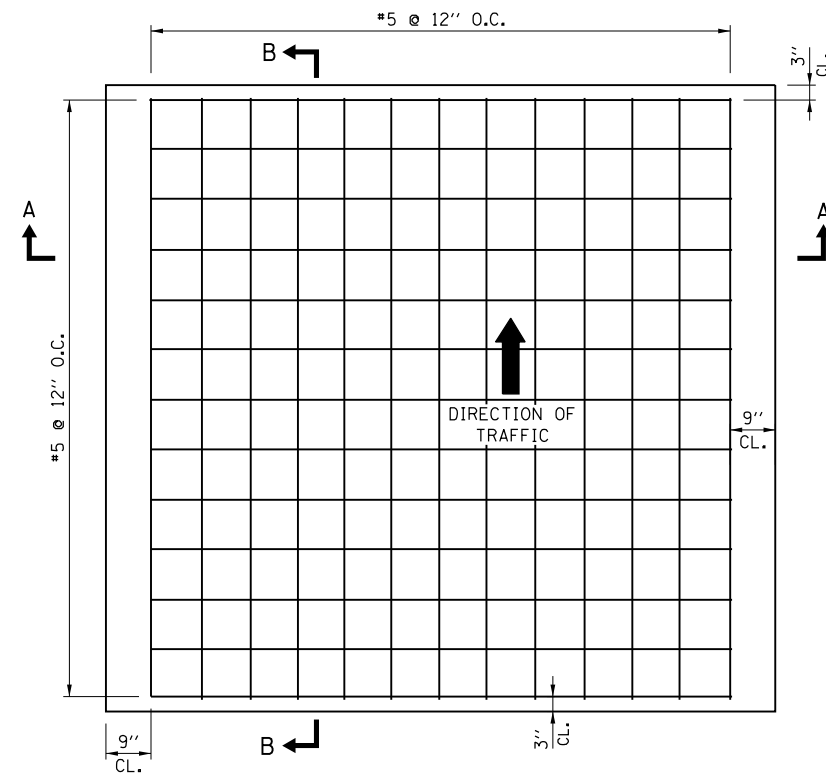
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DATE:

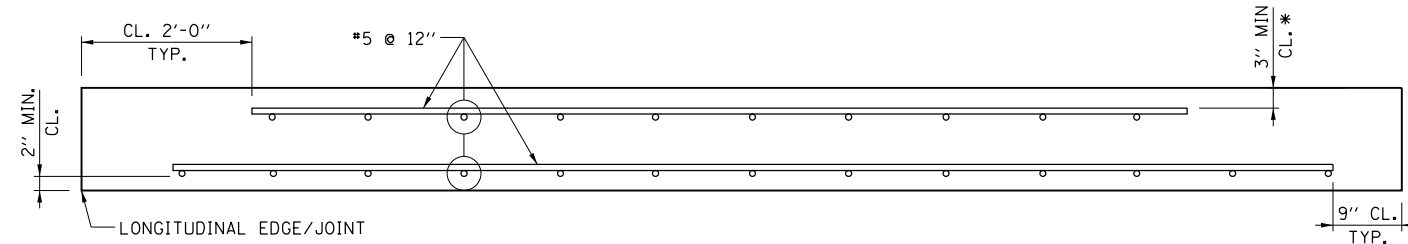
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

01/31/2015

JOINTED PCC RAMP ADJACENT TO C.R.C. MAINLINE PAVEMENT



TYPICAL REINFORCEMENT DETAIL FOR STANDARD SLABS

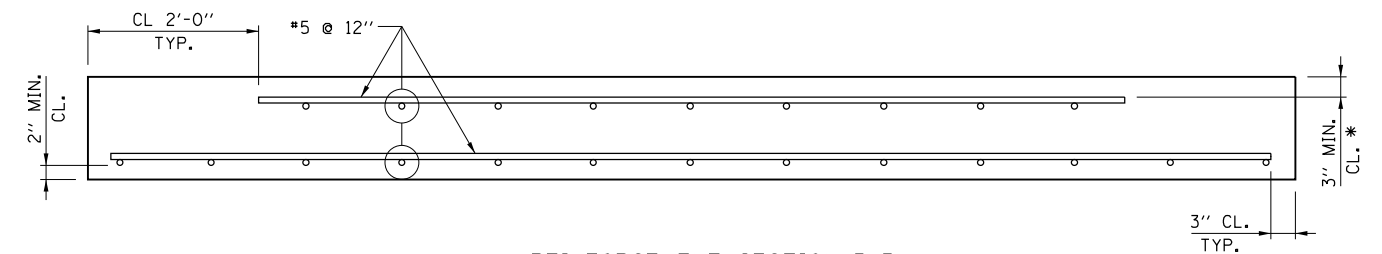


REINFORCEMENT SECTION A-A

TWO MATS OF REINFORCEMENT SHALL BE FOR APPLICATION TO ALL CUSTOM SLABS GREATER THAN 6 FT. LONGITUDINAL LENGTH TO BE OPENED TO TRAFFIC BEFORE GROUTING IS COMPLETED

ALL BARS ARE TRIMMED TO FIT #5 BAR

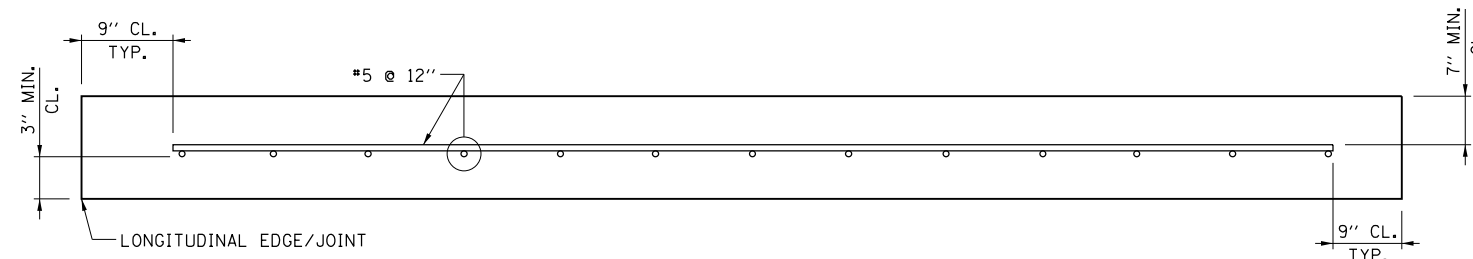
SAW CUTS OFF LONGITUDINAL EDGES SHALL BE NO MORE THAN 6" OFF THE EDGES



REINFORCEMENT SECTION B-B

TWO MATS OF REINFORCEMENT SHALL BE FOR APPLICATION TO ALL CUSTOM SLABS GREATER THAN 6 FT. LONGITUDINAL LENGTH TO BE OPENED TO TRAFFIC BEFORE GROUTING IS COMPLETED

ALL BARS ARE TRIMMED TO FIT #5 BAR

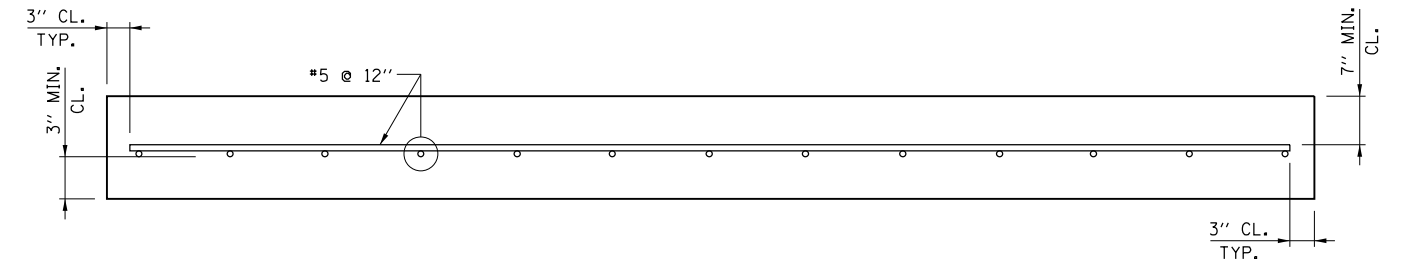


REINFORCEMENT SECTION A-A

ONE MAT OF REINFORCEMENT SHALL BE FOR APPLICATION TO ALL STANDARD SLABS AND FOR ANY CUSTOM SLABS GREATER THAN 6 FT. LONGITUDINAL LENGTH TO BE OPENED TO TRAFFIC ONLY AFTER GROUTING IS COMPLETED.

ALL BARS ARE TRIMMED TO FIT #5 BAR

SAW CUTS OFF LONGITUDINAL EDGES SHALL BE NO MORE THAN 6" OFF THE EDGES



REINFORCEMENT SECTION B-B

ONE MAT OF REINFORCEMENT SHALL BE FOR APPLICATION TO ALL STANDARD SLABS AND FOR ANY CUSTOM SLABS GREATER THAN 6 FT. LONGITUDINAL LENGTH TO BE OPENED TO TRAFFIC ONLY AFTER GROUTING IS COMPLETED.

ALL BARS ARE TRIMMED TO FIT #5 BAR

NOTE:

\* MIN. CLEARANCE FOR TOP REINFORCEMENT SHALL BE ADJUSTED FOR PLAZA SLAB TO FIT TREADLE FRAMES OR INSERTED HARDWARE.

APPROVED BY: *Paul Kovacs* DATE: 05/01/2009  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2019	REMOVED SHEETS 1,9,10,13,14,15,16
	UPDATED NOTES 4,5,6,8,11,12
3-01-2018	REVISED TEXT
3-31-2016	REVISED NOTES; UPDATED CALLOUTS
11-01-2012	REVISED NOTES

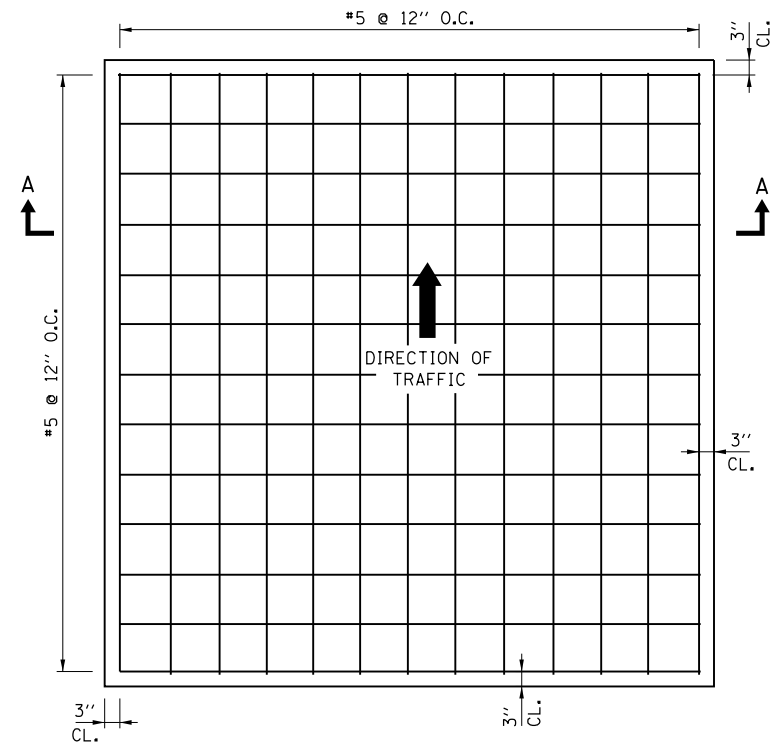
SHEET 1 OF 12



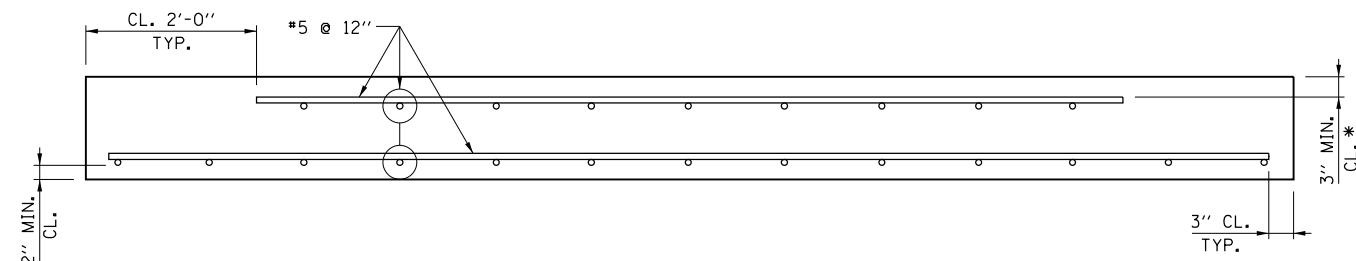
PRECAST PAVEMENT SLABS

STANDARD A18-05



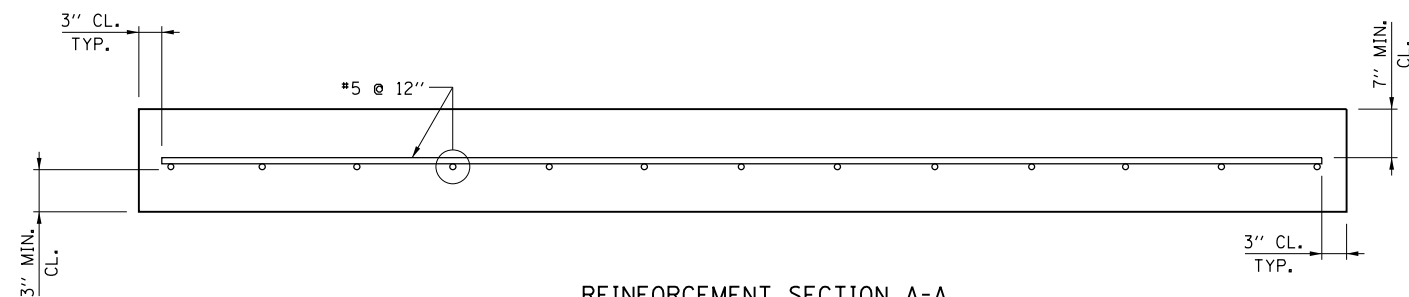


TYPICAL REINFORCEMENT DETAIL FOR CUSTOM SLABS



REINFORCEMENT SECTION A-A

TWO MATS OF REINFORCEMENT SHALL BE FOR APPLICATION TO ALL CUSTOM SLABS GREATER THAN 6 FT. LONGITUDINAL LENGTH TO BE OPENED TO TRAFFIC BEFORE GROUTING IS COMPLETED  
ALL BARS ARE TRIMMED TO FIT #5 BAR



REINFORCEMENT SECTION A-A

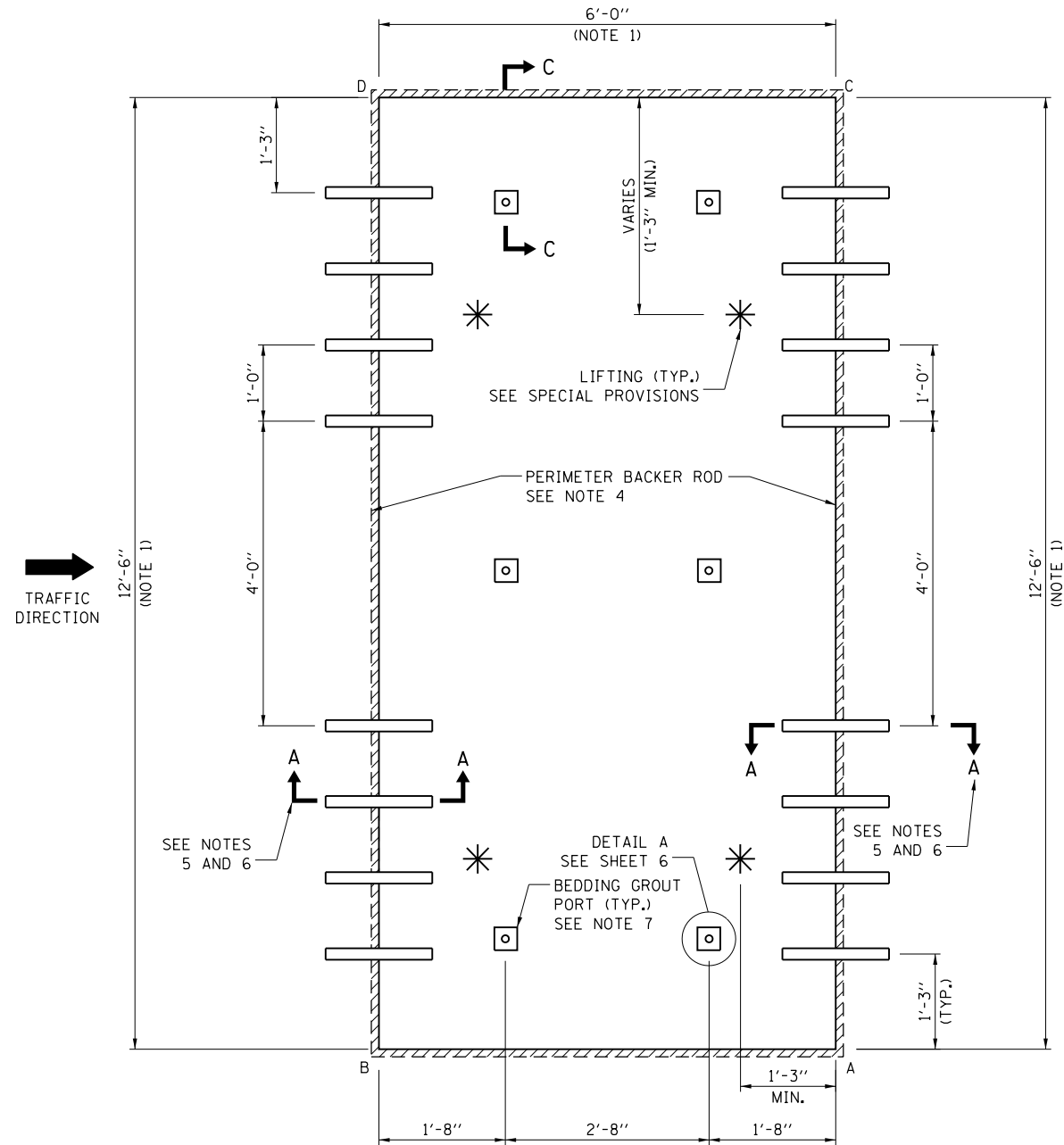
ONE MAT OF REINFORCEMENT SHALL BE FOR APPLICATION TO ALL STANDARD SLABS AND FOR ANY CUSTOM SLABS GREATER THAN 6 FT. LONGITUDINAL LENGTH TO BE OPENED TO TRAFFIC ONLY AFTER GROUTING IS COMPLETED.

ALL BARS ARE TRIMMED TO FIT #5 BAR

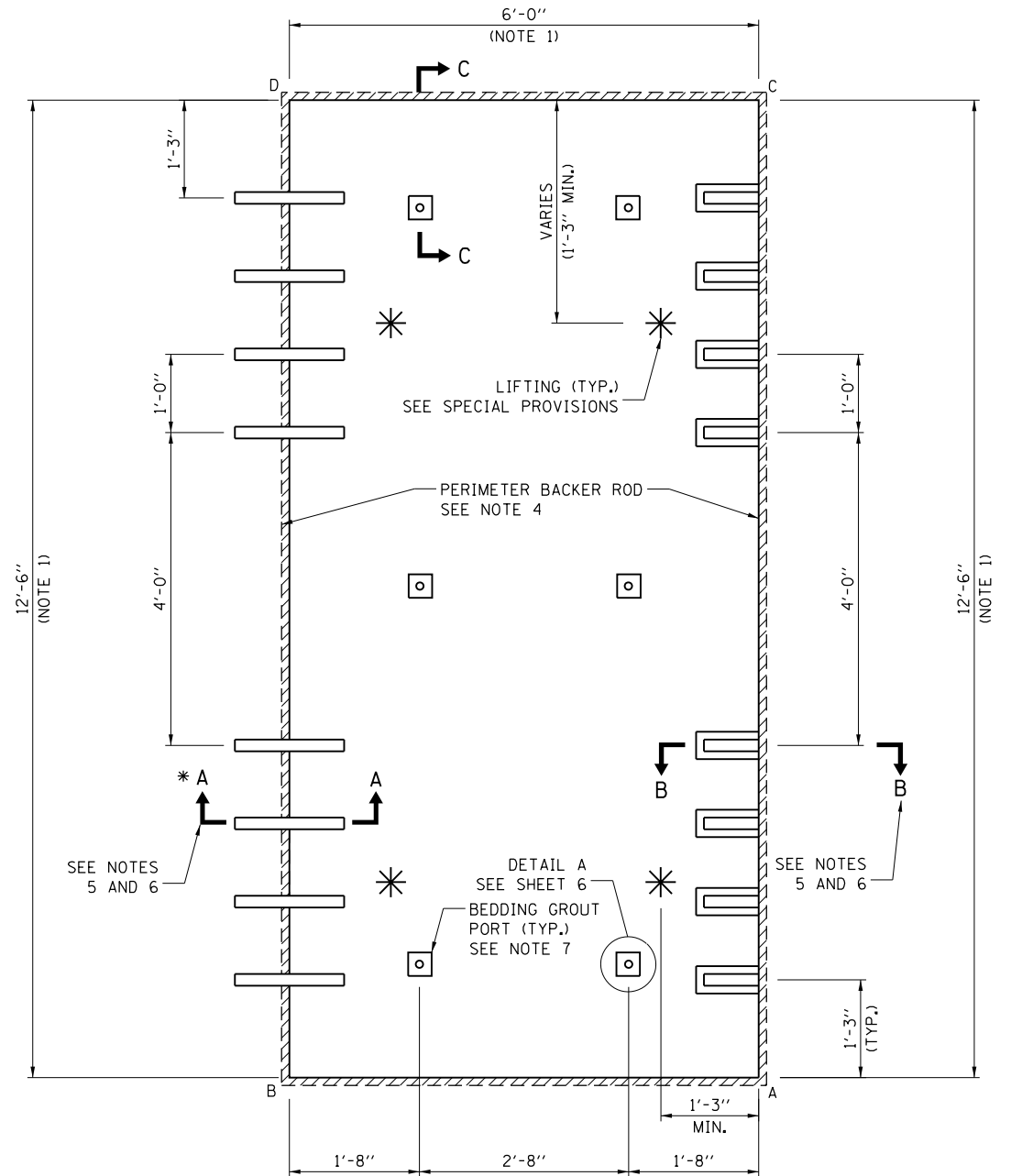
NOTE:

FOR ALL CUSTOM SLABS OF TRAPEZOID SHAPES, REINFORCEMENT SHALL BE LAID OUT IN A PERPENDICULAR GRID PATTERN, NOT SKEWED.

\* MIN. CLEARANCE FOR TOP REINFORCEMENT SHALL BE ADJUSTED FOR PLAZA SLAB TO FIT TREADLE FRAMES OR INSERTED HARDWARE.



**STANDARD 12'-6" WIDE PANEL LAYOUT FOR ISOLATED PLACEMENT  
WITH EMBEDDED DOWELS FOR PRECUT WIDE MOUTH  
SLOTS IN ADJACENT PAVEMENT**



**STANDARD 12'-6" WIDE PANEL LAYOUT FOR CONSECUTIVE PLACEMENT**

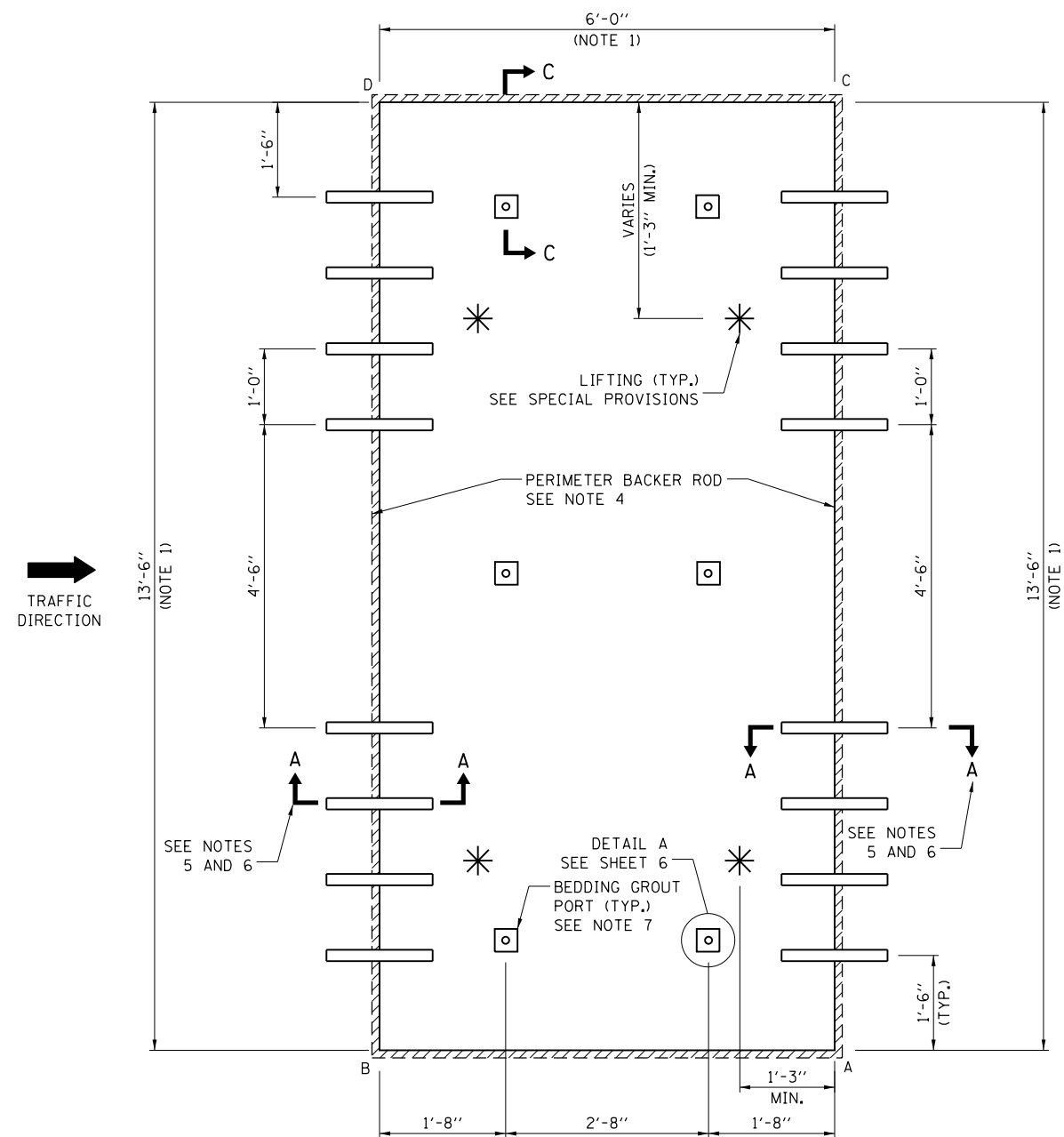
\* FOR INTERNAL CONSECUTIVE SLABS, PREFORMED SLOTS IN ACCORDANCE WITH SECTION B-B OF SHEET 4 MAY BE USED IN PLACE OF EMBEDDED DOWELS OR OF FIELD RETROFITTED DOWEL BARS WITH SAWCUT SLOTS. ALL PREFORMED SLOTS MUST BE FILLED BEFORE BEING OPENED TO TRAFFIC.

**NOTES:**

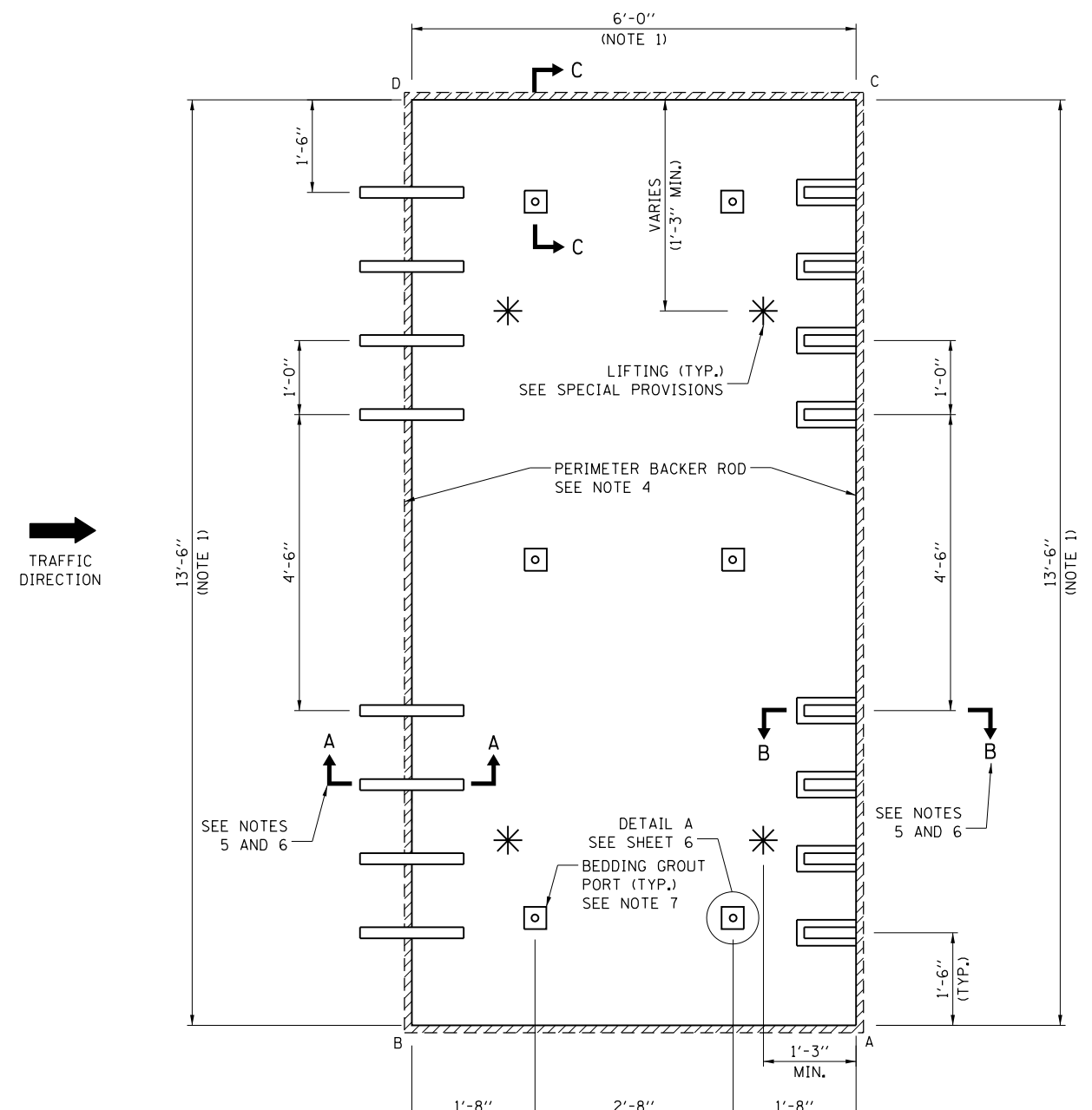
1. THE WIDTH AND LENGTH OF PRODUCED SLABS SHALL BE THE INDICATED DIMENSIONS  $\pm 1/8"$ .
2. FOR MIDDLE LANE SLAB OPENINGS/PATCHES LESS THAN 12'-6" IN WIDTH AND GREATER THAN 11'-6" IN WIDTH, THE STANDARD PRECAST SLAB CAN BE SAW CUT ON-SITE TO FIT THE OPENING AND TO MAINTAIN ALIGNMENT WITH EXISTING LONGITUDINAL JOINTS. OTHERWISE, THE SLAB PATCH LOCATION MUST BE PRESURVEYED BY THE CONTRACTOR AND THE SLAB FABRICATED AS A CUSTOM SLAB.
3. SLAB THICKNESS SHALL BE  $11\frac{1}{2}" \pm 1/8"$ .
4. A FOAM BACKER ROD SHALL BE PLACED AROUND THE OUTSIDE PERIMETER OF THE SLAB AT THE BOTTOM OF THE JOINTS BEFORE THE SLAB HAS BEEN SET AND BEFORE BEDDING GROUT OR POLYURETHANE LEVELING FILL IS APPLIED. THE BACKER ROD SHALL NOT BE REQUIRED WHEN ANY SLAB IS LEVELED WITH FLOWABLE FILL.
5. SEE SHEET 6 FOR SECTION DETAILS.
6. IT SHALL BE THE CONTRACTOR'S OPTION TO REPLACE ANY EMBEDDED DOWEL BARS OR PREFORMED SLOTS AS SHOWN ON THESE DRAWINGS WITH FULLY RETROFITTED DOWEL BARS FIELD INSTALLED IN ACCORDANCE WITH "DETAIL C" OF SHEET 13. THE CONTRACTOR SHALL USE AN APPROVED TEMPLATE TO LOCATE THE SAW CUTS REQUIRED FOR PROPER SPACING AND RETROFITTING OF THE DOWEL BARS IN ACCORDANCE WITH THESE DRAWINGS. DIAMOND BLADED GANG SAWS SHALL BE USED TO MAKE SAW CUTS PERPENDICULAR TO THE TRANSVERSE (NONSKEWED) JOINT LINE TO ALLOW FOR DOWEL BAR PLACEMENTS WITHIN THE SPECIFIED TOLERANCES.
7. SEE "PRECAST REPLACEMENT OF CONCRETE PAVEMENT SLABS" (ILLINOIS TOLLWAY) SPECIAL PROVISION FOR LOCATING BEDDING GROUT PORTS.

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 05/01/2009





STANDARD 13'-6" WIDE PANEL LAYOUT FOR ISOLATED PLACEMENT WITH EMBEDDED DOWELS FOR PRECUT WIDE MOUTH SLOTS IN ADJACENT PAVEMENT.



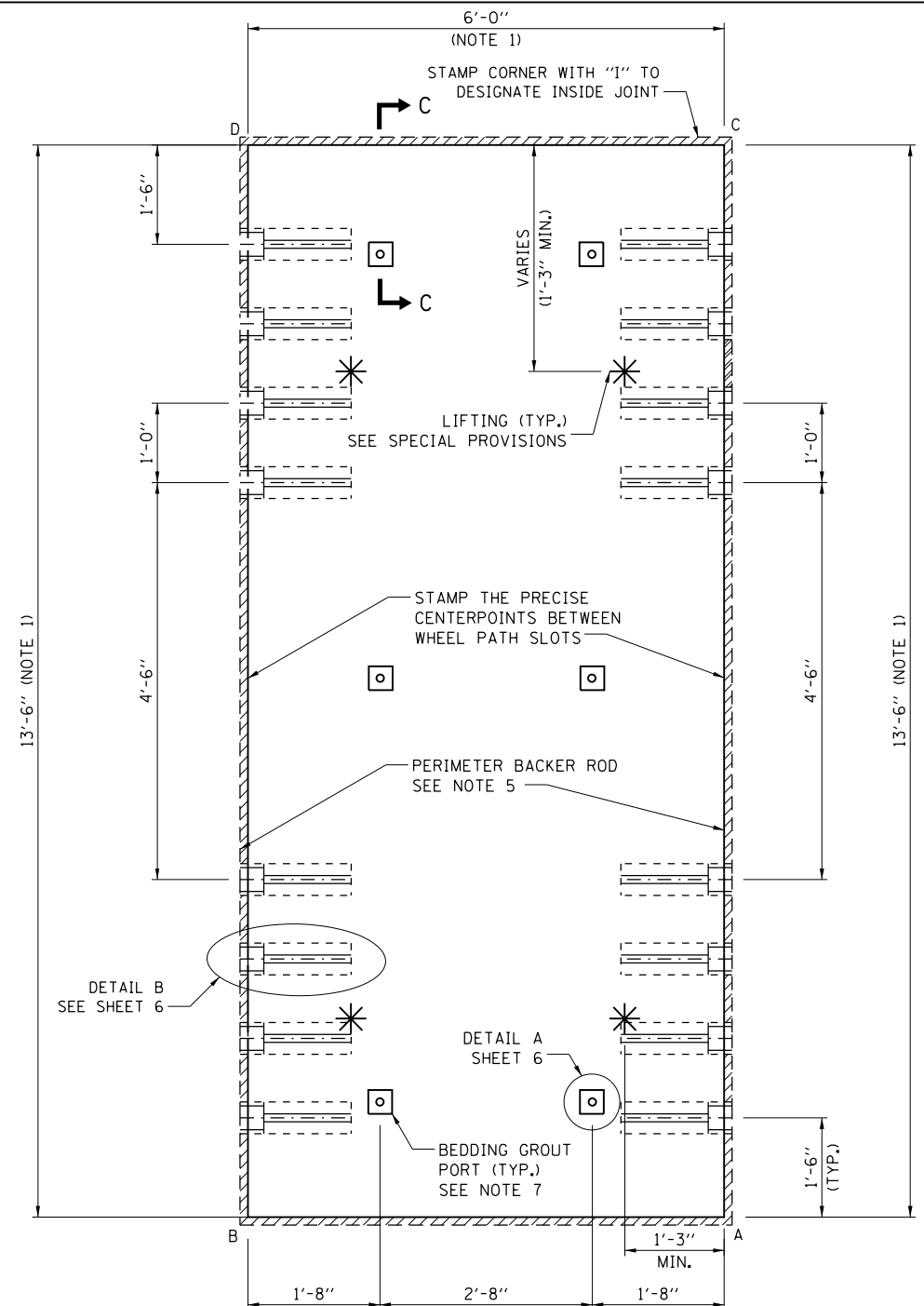
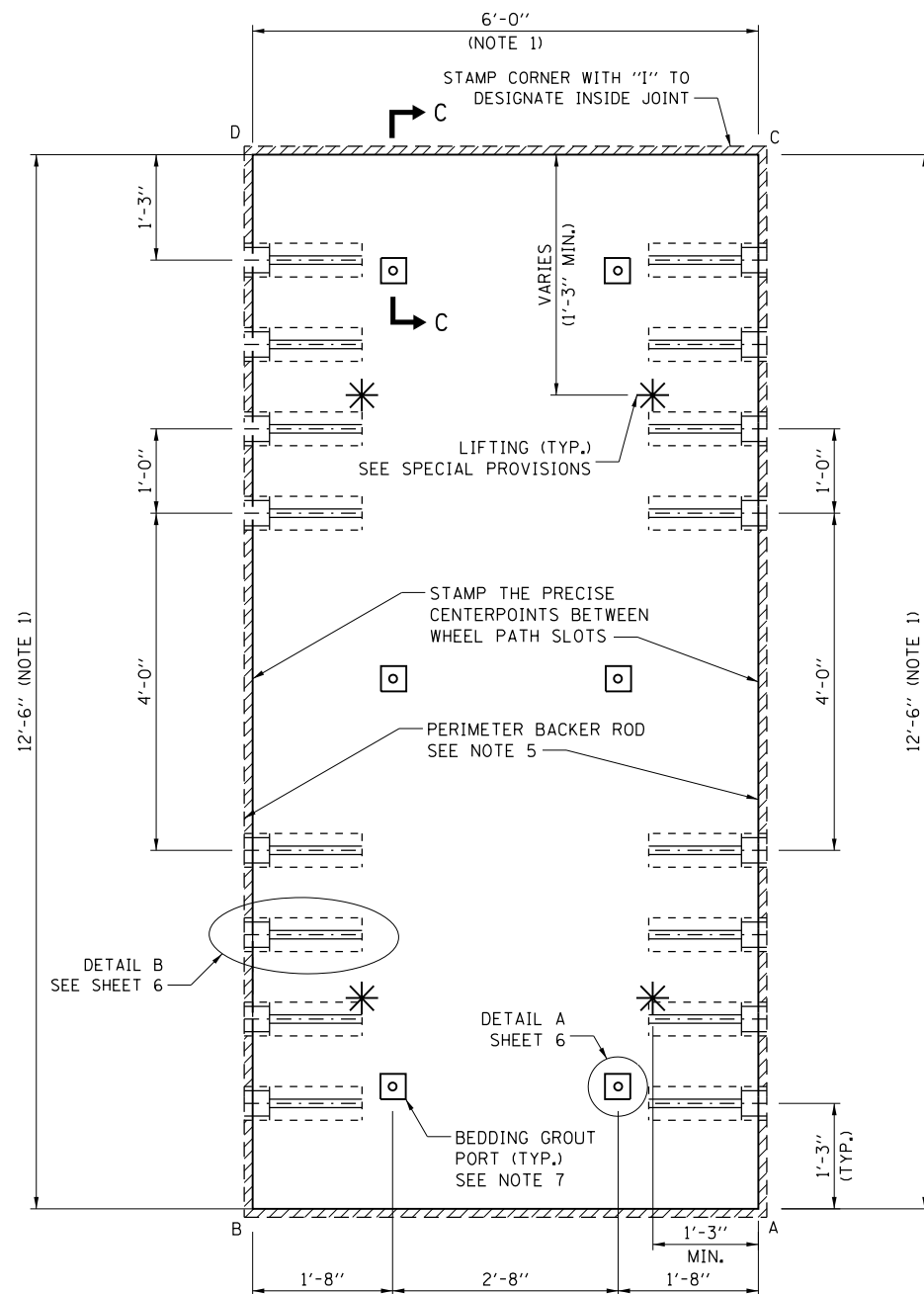
STANDARD 13'-6" WIDE PANEL LAYOUT FOR CONSECUTIVE PLACEMENT

\* FOR INTERNAL CONSECUTIVE SLABS, PREFORMED SLOTS IN ACCORDANCE WITH SECTION B-B OF SHEET 4 MAY BE USED IN PLACE OF EMBEDDED DOWELS OR OF FIELD RETROFITTED DOWEL BARS WITH SAWCUT SLOTS. ALL PREFORMED SLOTS MUST BE FILLED BEFORE BEING OPENED TO TRAFFIC.

**NOTES:**

1. THE WIDTH AND LENGTH OF PRODUCED SLABS SHALL BE THE INDICATED DIMENSIONS  $\pm 1/8"$ .
2. FOR MIDDLE LANE SLAB OPENINGS/PATCHES LESS THAN 13'-6" IN WIDTH AND GREATER THAN 12'-6" IN WIDTH, THE STANDARD PRECAST SLAB CAN BE SAW CUT ON-SITE TO FIT THE OPENING AND TO MAINTAIN ALIGNMENT WITH EXISTING LONGITUDINAL JOINTS. OTHERWISE, THE SLAB PATCH LOCATION MUST BE PRESURVEYED BY THE CONTRACTOR AND THE SLAB FABRICATED AS A CUSTOM SLAB.
3. SLAB THICKNESS SHALL BE  $11\frac{1}{2}" \pm 1/8"$ .
4. A FOAM BACKER ROD SHALL BE PLACED AROUND THE OUTSIDE PERIMETER OF THE SLAB AT THE BOTTOM OF THE JOINTS BEFORE THE SLAB HAS BEEN SET AND BEFORE BEDDING GROUT OR POLYURETHANE LEVELING FILL IS APPLIED. THE BACKER ROD SHALL NOT BE REQUIRED WHEN ANY SLAB IS LEVELED WITH FLOWABLE FILL.
5. SEE SHEET 6 FOR SECTION DETAILS.
6. IT SHALL BE THE CONTRACTOR'S OPTION TO REPLACE ANY EMBEDDED DOWEL BARS OR PREFORMED SLOTS AS SHOWN ON THESE DRAWINGS WITH FULLY RETROFITTED DOWEL BARS FIELD INSTALLED IN ACCORDANCE WITH "DETAIL C" OF SHEET 13. THE CONTRACTOR SHALL USE AN APPROVED TEMPLATE TO LOCATE THE SAW CUTS REQUIRED FOR PROPER SPACING AND RETROFITTING OF THE DOWEL BARS IN ACCORDANCE WITH THESE DRAWINGS. DIAMOND BLADED GANG SAWS SHALL BE USED TO MAKE SAW CUTS PERPENDICULAR TO THE TRANSVERSE (NONSEKED) JOINT LINE TO ALLOW FOR DOWEL BAR PLACEMENTS WITHIN THE SPECIFIED TOLERANCES.
7. SEE "PRECAST REPLACEMENT OF CONCRETE PAVEMENT SLABS" (ILLINOIS TOLLWAY) SPECIAL PROVISION FOR LOCATING BEDDING GROUT PORTS.

APPROVED BY: *Paul Kovacs* DATE: 05/01/2009  
CHIEF ENGINEERING OFFICER



STANDARD 12'-6" WIDE PANEL LAYOUT FOR ISOLATED PLACEMENT WITH NARROW MOUTH PREFORMED DOWEL SLOTS TO ALIGN WITH PRE-DRILLED HOLES IN ADJACENT PAVEMENT.

STANDARD 13'-6" WIDE PANEL LAYOUT FOR ISOLATED PLACEMENT WITH NARROW MOUTH PREFORMED DOWEL SLOTS TO ALIGN WITH PRE-DRILLED HOLES IN ADJACENT PAVEMENT.

#### NOTES:

1. THE WIDTH AND LENGTH OF PRODUCED SLABS SHALL BE THE INDICATED DIMENSIONS  $\pm \frac{1}{8}"$ .
2. FOR MIDDLE LANE SLAB OPENINGS/PATCHES LESS THAN 12'-6" IN WIDTH AND GREATER THAN 11'-6" IN WIDTH, THE 12'-6" WIDE STANDARD PRECAST SLAB CAN BE SAW CUT ON-SITE TO FIT THE OPENING AND TO MAINTAIN ALIGNMENT WITH EXISTING LONGITUDINAL JOINTS. OTHERWISE, THE SLAB PATCH LOCATION MUST BE PRESURVEYED BY THE CONTRACTOR AND THE SLAB FABRICATED AS A CUSTOM SLAB.
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4. SLAB THICKNESS SHALL BE  $11\frac{1}{2}" \pm \frac{1}{8}"$ .
5. A FOAM BACKER ROD SHALL BE PLACED AROUND THE OUTSIDE PERIMETER OF THE SLAB AT THE BOTTOM OF THE JOINTS BEFORE THE SLAB HAS BEEN SET AND BEFORE BEDDING GROUT OR POLYURETHANE LEVELING FILL IS APPLIED. THE BACKER ROD SHALL NOT BE REQUIRED WHEN ANY SLAB IS LEVELED WITH FLOWABLE FILL.
6. SEE SHEET 6 FOR SECTION DETAILS.
7. SEE "PRECAST REPLACEMENT OF CONCRETE PAVEMENT SLABS" (ILLINOIS TOLLWAY) SPECIAL PROVISION FOR LOCATING BEDDING GROUT PORTS.

APPROVED BY:

DATE:

*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

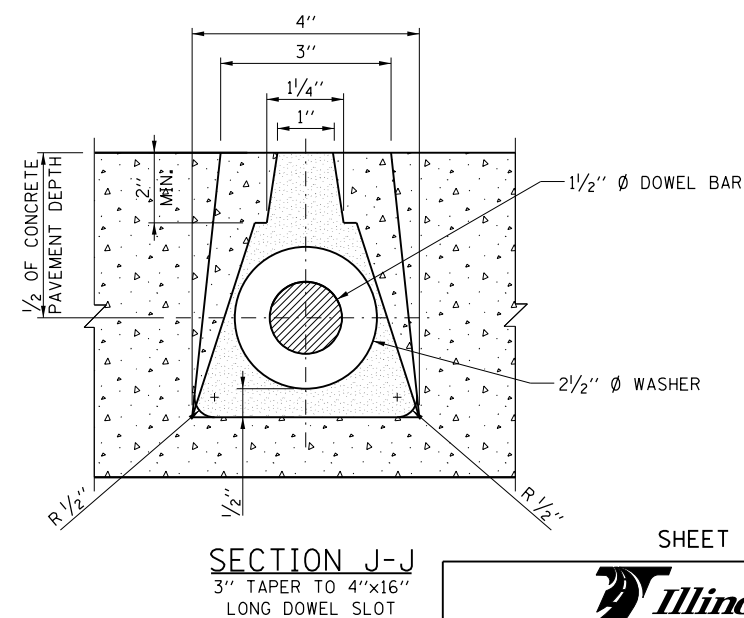
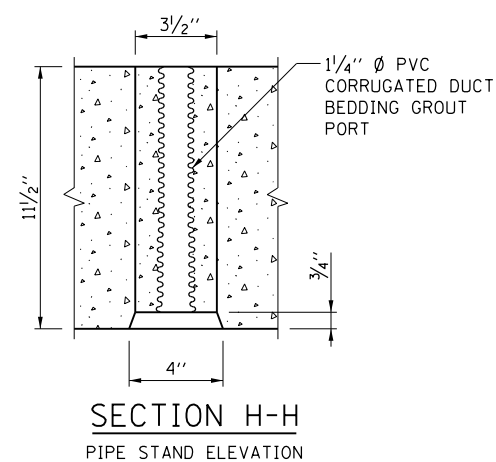
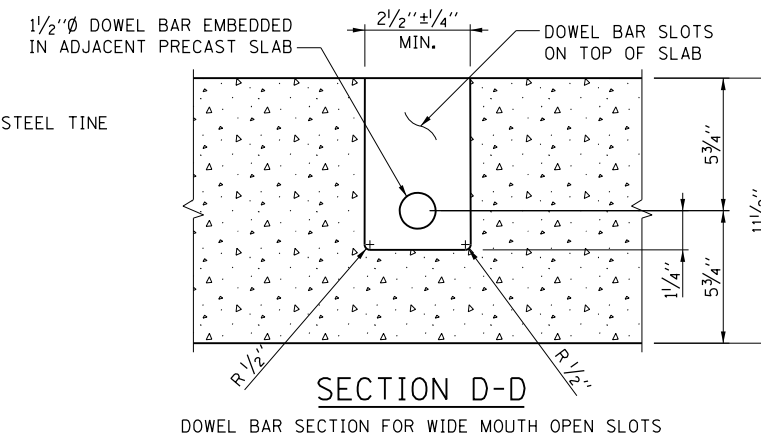
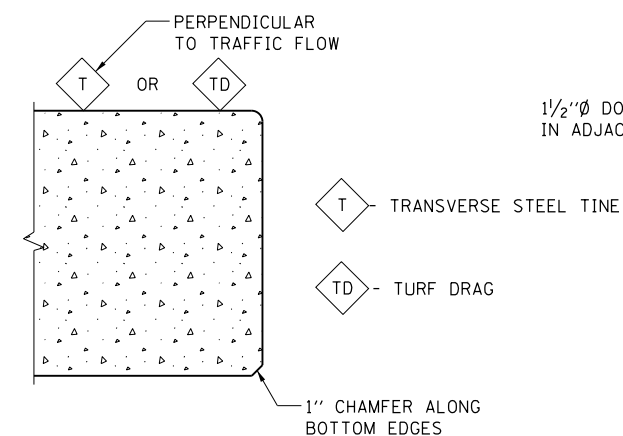
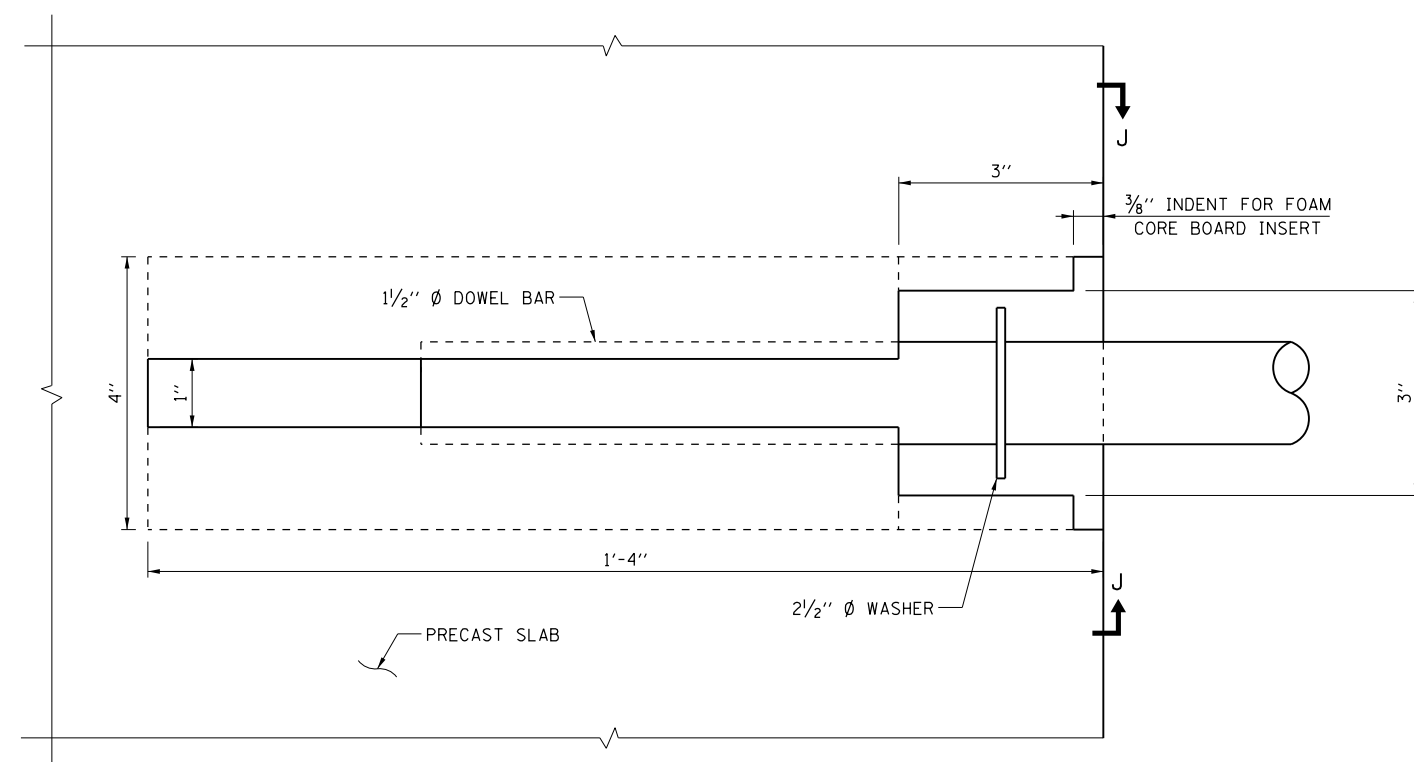
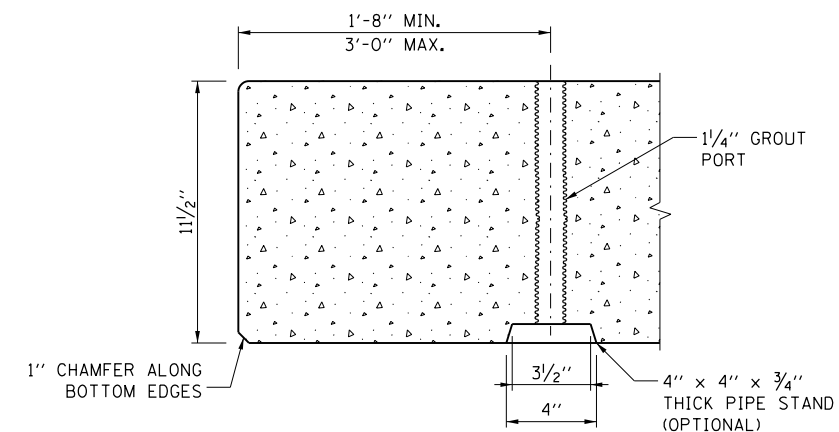
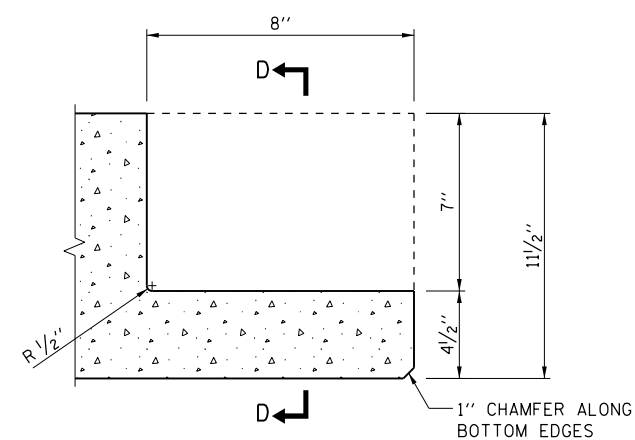
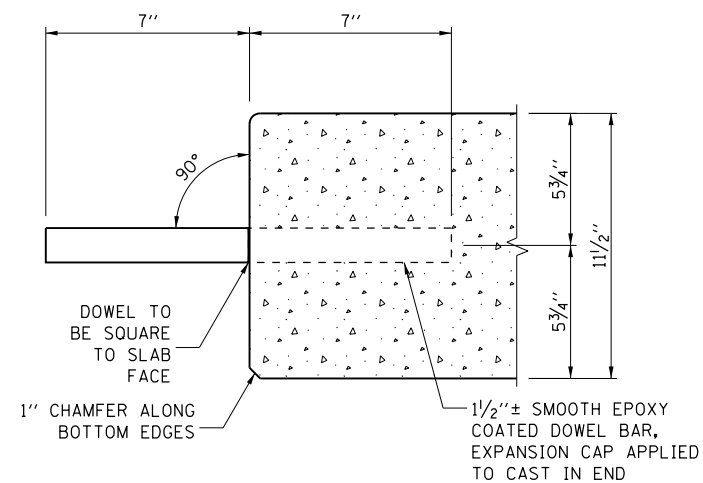
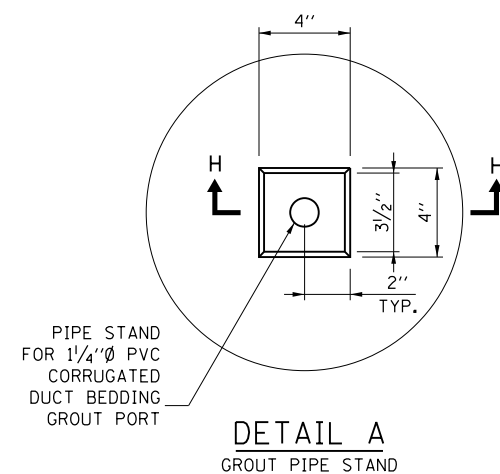
05/01/2009

SHEET 5 OF 12



PRECAST PAVEMENT SLABS

STANDARD A18-05



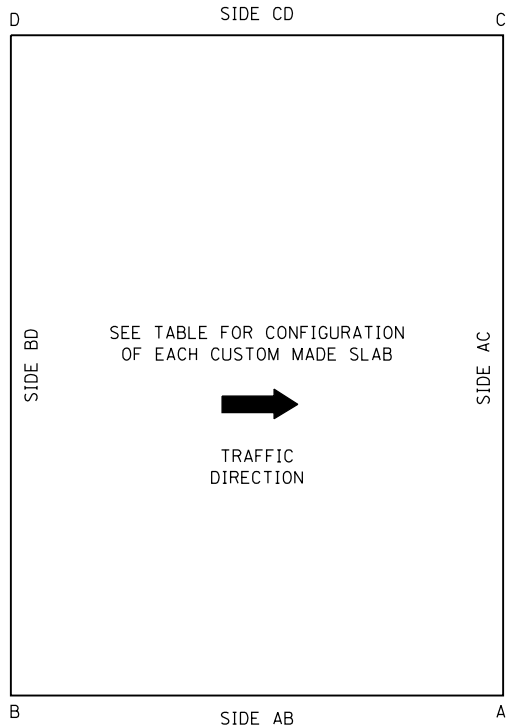
FOR NON-STANDARD SLABS, UPON COMPLETION BY THE CONTRACTOR A SLAB LAYOUT WILL BE ADDED  
WITH SLAB DIMENSIONS TO INCLUDE BUT NOT BE LIMITED TO THE TABLE SHOWN BELOW.

EXAMPLE	CORRIDOR	STATION NUMBER	MAINLINE LANE NO.	RAMP ID.	RAMP LANE NO.	PLAZA NO.	PLAZA LANE NO.	MARK NO.	LANE TYP.	VARIABLES (FT.)				AB* SIDE	BD* SIDE	CD* SIDE	AC* SIDE	AREA (SQ.FT.)	VOLUME (CU. FT.)	WEIGHT (TONS)	DIAGONALS (FT.)	
										AB (FT.)	AC (FT.)	BD (FT.)	CD (FT.)								AD	BC

MAINLINE LANE NO.: LANE NO 1 IS ADJACENT TO MEDIAN SHOULDER.  
RAMP LANE NO.: LANE NO 1 IS ADJACENT TO THE BUILDING  
PLAZA LANE NO.: LANE NO 1 IS ADJACENT TO THE BUILDING  
MARK NO.: EACH PANEL SHALL BE INDIVIDUALLY MARKED FOR CORRECT PLACEMENT.  
LANE TYP.: "OUT" IN THIS COLUMN INDICATES OUTSIDE LANE.  
"MID" IN THIS COLUMN INDICATES MIDDLE LANE.  
"IN" IN THIS COLUMN INDICATES INSIDE LANE  
"PLAZA" IN THIS COLUMN INDICATES PLAZA LANE.

LEGEND

DB= DOWEL BAR EMBEDDED  
DS= DOWEL SLOT  
ST= SLOT OR HOLE FOR STITCHED TIE BAR  
RD= FIELD RETROFITTED DOWEL BARS

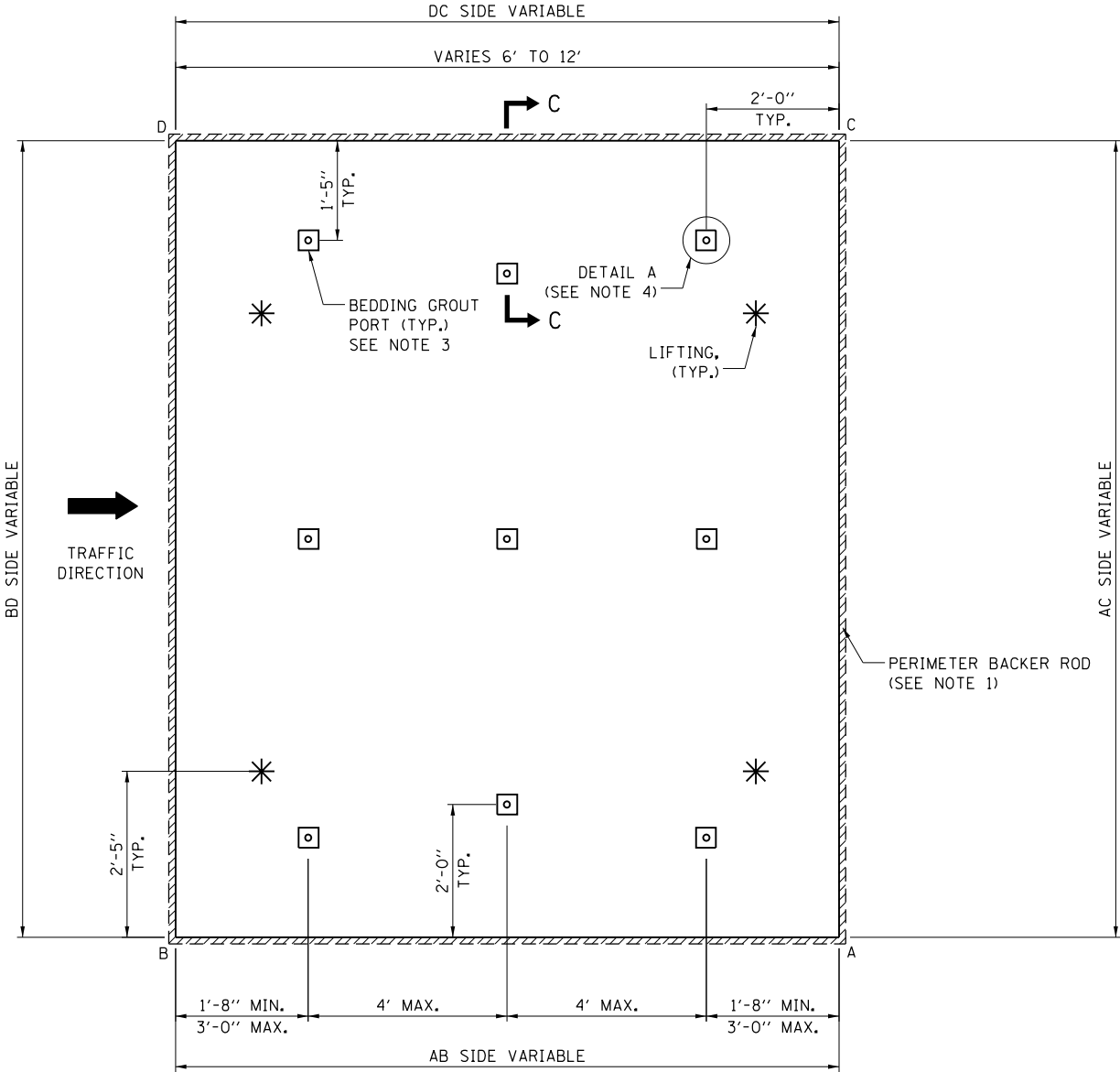


LAYOUT FOR CUSTOM SLABS

LAYOUT KEY

NOTES:

- A FOAM BACKER ROD SHALL BE PLACED AROUND THE OUTSIDE PERIMETER OF THE SLAB AT THE BOTTOM OF THE JOINTS BEFORE THE SLAB HAS BEEN SET AND BEFORE BEDDING GROUT OR POLYURETHANE LEVELING FILL IS APPLIED. THE BACKER ROD SHALL NOT BE REQUIRED WHEN ANY SLAB IS LEVELED WITH A FLOWABLE FILL.
- EITHER SINGLE DIAMOND BLADED SAWS OR DIAMOND BLADED GANG SAWS SHALL BE USED TO MAKE THE SAW CUTS PERPENDICULAR TO THE TRANSVERSE (NONSEKUED) JOINT LINE TO ALLOW FOR DOWEL BAR PLACEMENTS WITHIN THE SPECIFIED TOLERANCES.
- SEE "PRECAST REPLACEMENT OF CONCRETE PAVEMENT SLABS" (ILLINOIS TOLLWAY) SPECIAL PROVISION FOR LOCATING BEDDING GROUT PORTS.
- SEE SHEET 6 FOR SECTION DETAILS.

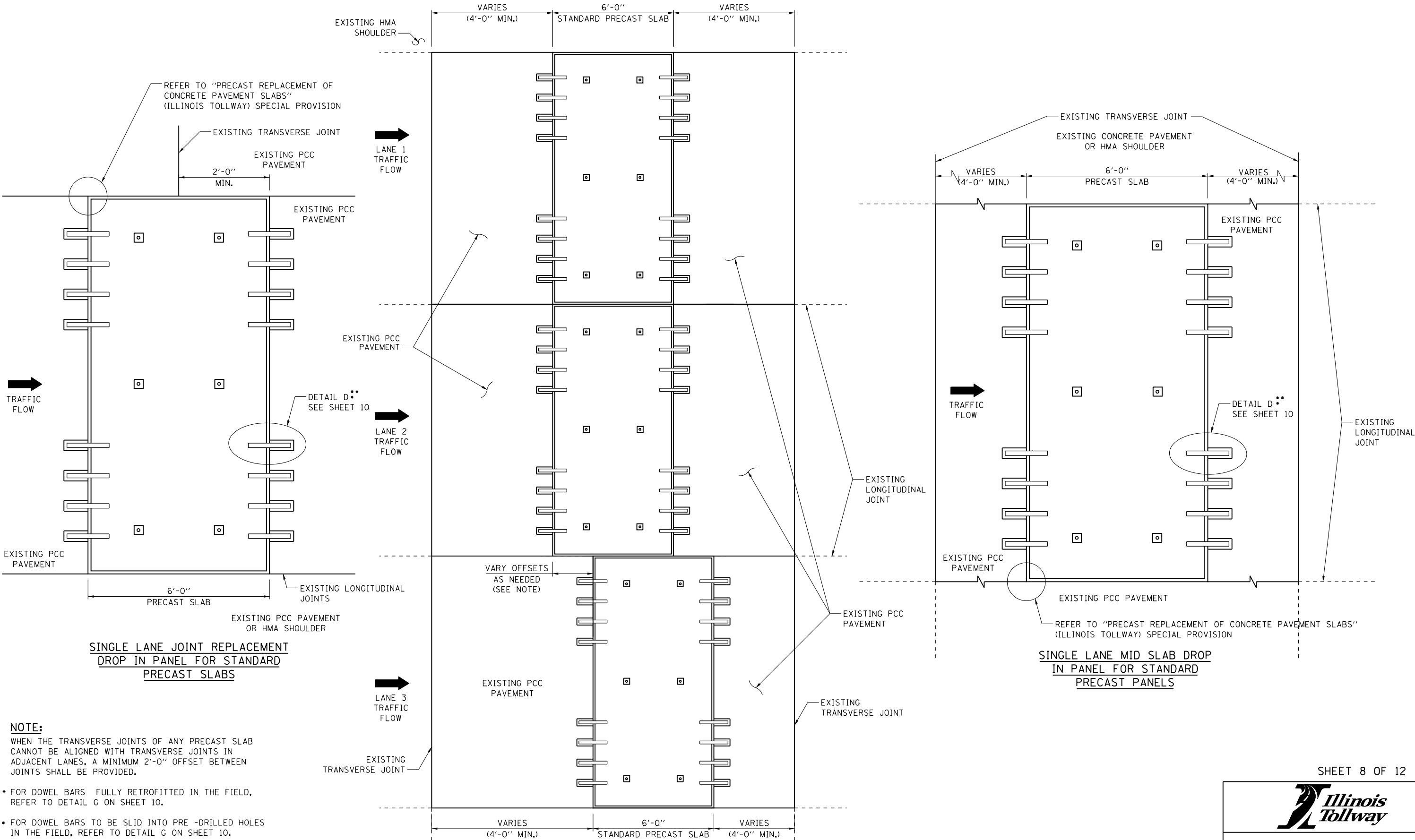


LAYOUT DETAIL FOR CUSTOM  
SLABS 6'-12' IN LENGTH  
(VARIED WIDTH\*\*)

\*\*FOR TRAPEZOID SLABS MINIMUM WIDTH IS  
2 FT. WITH MAXIMUM WIDTH OF 16 FT.

APPROVED BY: *Paul Kovacs* DATE: 05/01/2009  
CHIEF ENGINEERING OFFICER

INSTALLATION OF ISOLATED STANDARD PRECAST SLABS



**NOTE:**  
WHEN THE TRANSVERSE JOINTS OF ANY PRECAST SLAB CANNOT BE ALIGNED WITH TRANSVERSE JOINTS IN ADJACENT LANES, A MINIMUM 2'-0" OFFSET BETWEEN JOINTS SHALL BE PROVIDED.

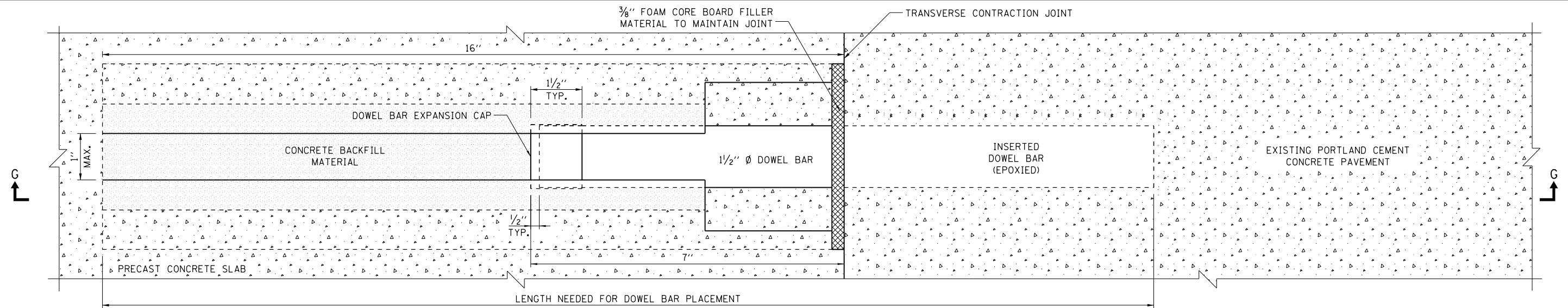
- FOR DOWEL BARS FULLY RETROFITTED IN THE FIELD, REFER TO DETAIL G ON SHEET 10.
- FOR DOWEL BARS TO BE SLID INTO PRE -DRILLED HOLES IN THE FIELD, REFER TO DETAIL G ON SHEET 10.

APPROVED BY: *Paul Kovacs* DATE: 05/01/2009  
CHIEF ENGINEERING OFFICER

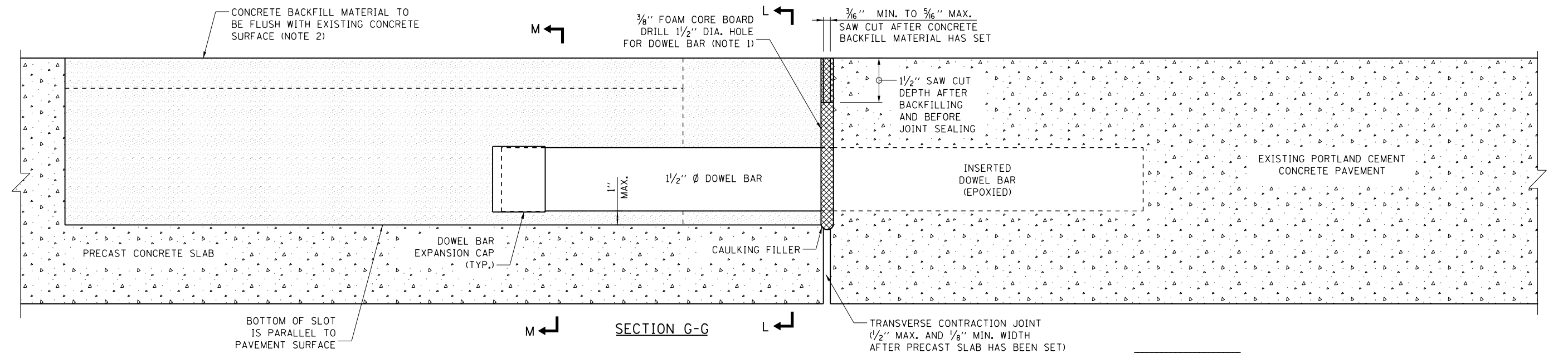
MULTIPLE LANE MID SLAB DROP IN PANEL FOR STANDARD PRECAST PANELS







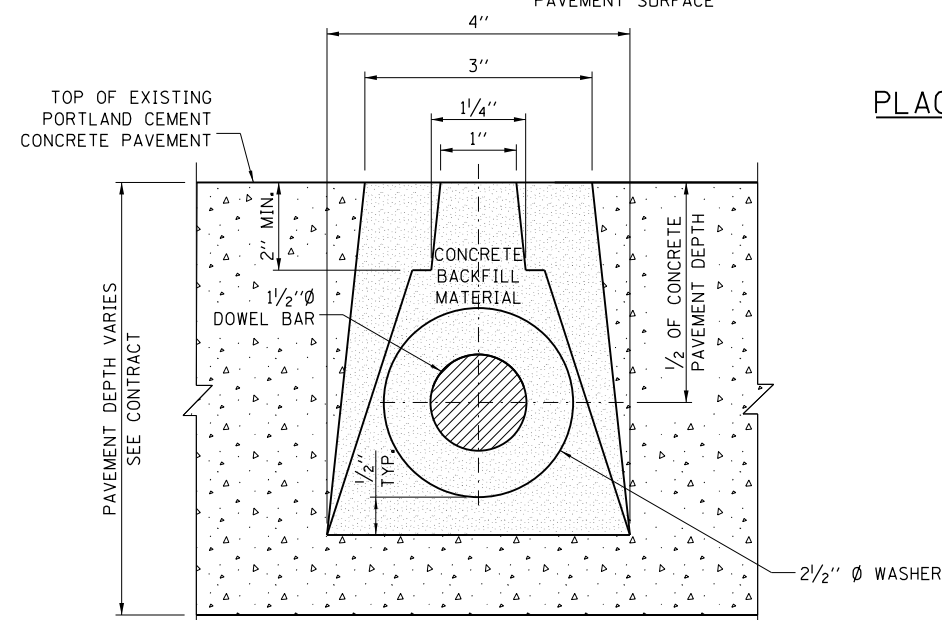
PLAN VIEW



SECTION G-G

### DETAIL G - NARROW MOUTH DOWEL BAR PLACEMENT DETAIL FOR ISOLATED PRECAST PANELS

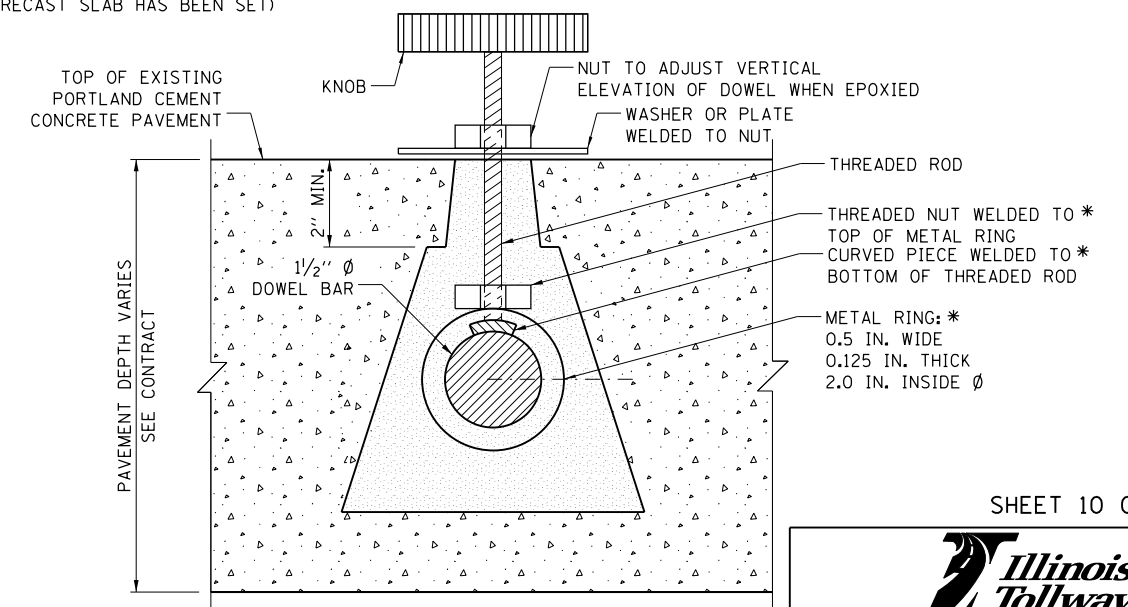
(FOR OPTIONAL APPLICATION WITH ALL ISOLATED  
SLABS IN PLACE OF FULL RETROFITS)



SECTION L-L

#### NOTES:

1. PLACE FOAM CORE BOARDS TO THE TOP OF PATCH.
2. UPON COMPLETION, THE FINISHED SURFACE OF THE CONCRETE BACKFILL MATERIAL SHALL NOT BE BELOW EXISTING CONCRETE SURFACE.



SECTION M-M  
CLAMP DETAIL FOR SLIDING DOWEL BAR SLOTS

\* METAL RING MAY BE REPLACED WITH A STRONG MAGNET WELDED TO THE THREADED ROD. AT LEAST ONE CLAMP WILL BE NEEDED FOR EACH INSERTED DOWEL BAR TO MAINTAIN ALIGNMENT.

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

DATE:  
05/01/2009

SHEET 10 OF 12



PRECAST PAVEMENT SLABS

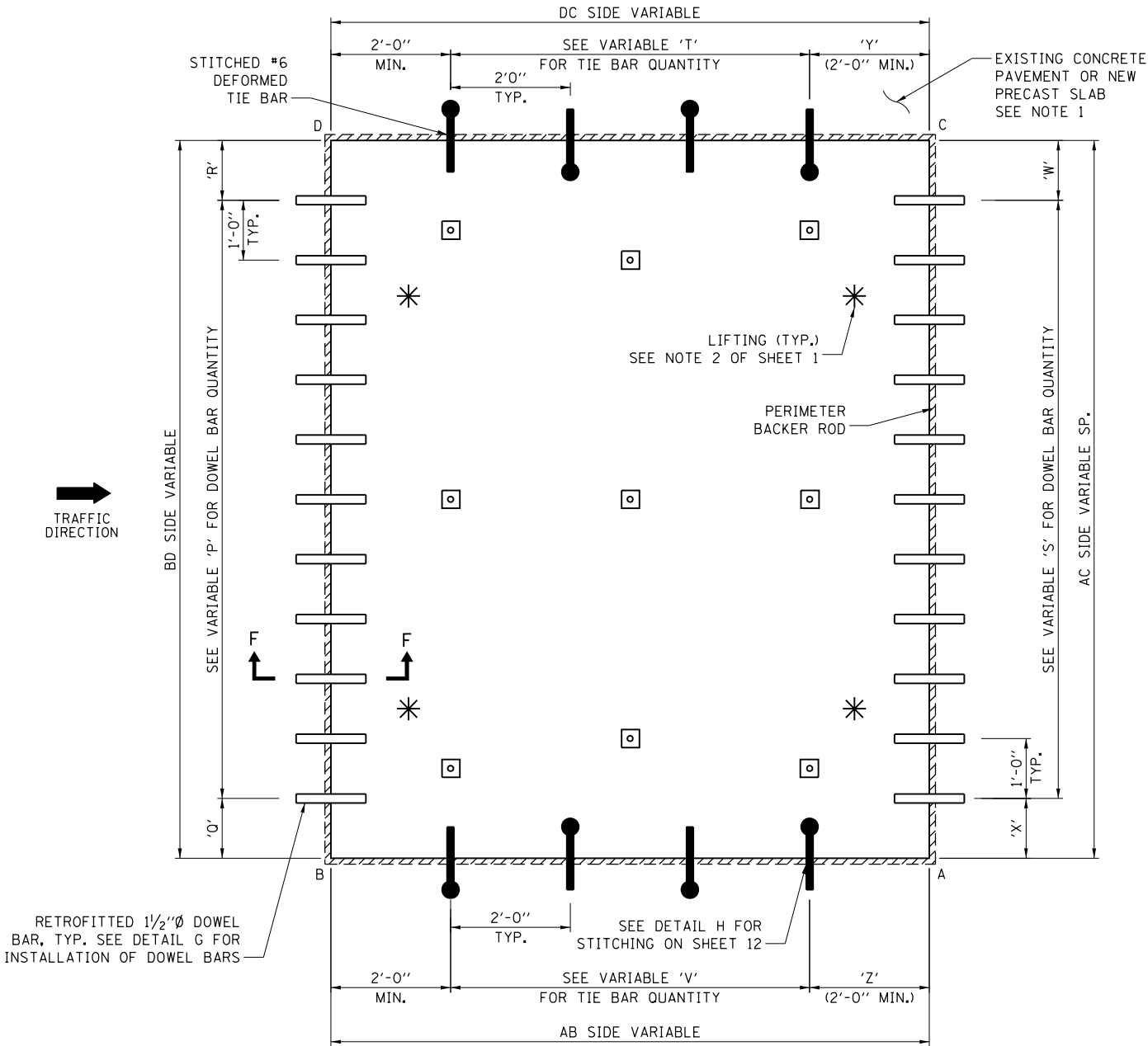
STANDARD A18-05

FOR NON-STANDARD SLABS, UPON COMPLETION BY THE CONTRACTOR A SLAB LAYOUT WILL BE ADDED  
WITH SLAB DIMENSIONS TO INCLUDE BUT NOT BE LIMITED TO THE TABLE SHOWN BELOW.

EXAMPLE	CORRIDOR	STATION NUMBER	MAINLINE LANE NO.	RAMP ID.	RAMP LANE NO.	PLAZA NO.	PLAZA LANE NO.	MARK NO.	LANE TYP.	VARIABLES											AB * SIDE	BD * SIDE	CD * SIDE	AC * SIDE	AREA (SQ.FT.)	VOLUME (CU. FT.)	WEIGHT (TONS)	DIAGONALS (FT.)				
										AB (FT.)	AC (FT.)	BD (FT.)	CD (FT.)	P (NO.)	Q (FT.)	R (FT.)	S (NO.)	T (NO.)	V (NO.)	W (FT.)								X (FT.)	Y (FT.)	Z (FT.)	AD	BC

MAINLINE LANE NO.: LANE NO. 1 IS ADJACENT TO MEDIAN SHOULDER.  
RAMP LANE NO.: LANE NO. 1 IS ADJACENT TO THE BUILDING  
PLAZA LANE NO.: LANE NO. 1 IS ADJACENT TO THE BUILDING  
MARK NO.: EACH PANEL SHALL BE INDIVIDUALLY MARKED FOR CORRECT PLACEMENT.  
LANE TYP.: "OUT" IN THIS COLUMN INDICATES OUTSIDE LANE.  
"MID" IN THIS COLUMN INDICATES MIDDLE LANE.  
"IN" IN THIS COLUMN INDICATES INSIDE LANE.  
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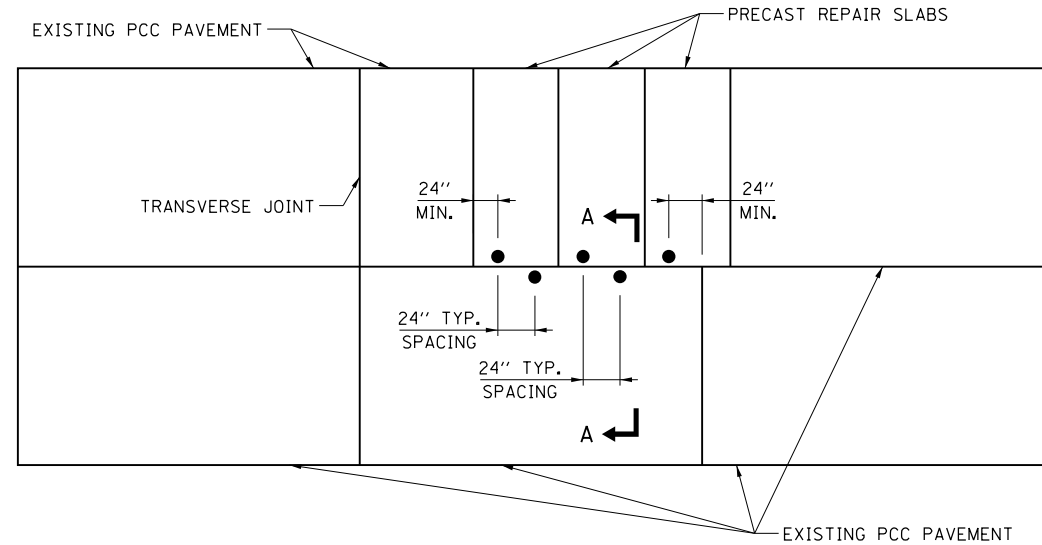
\* **LEGEND**  
DB= DOWEL BAR EMBEDDED  
DS= DOWEL SLOT  
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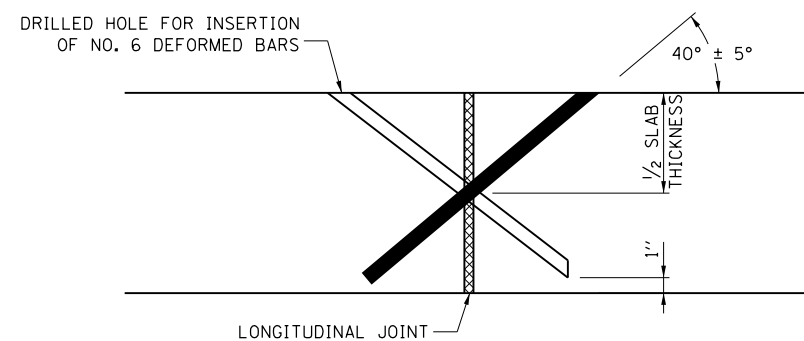
- NOTES:**
1. NO STITCHING OF DEFORMED TIE BARS IS REQUIRED WHEN PRECAST SLAB IS PLACED ADJACENT TO HMA SHOULDER OR PLAZA ISLAND.
  2. TIE BAR STITCHING SHALL BE REQUIRED WHEN THE REPAIR AREA LENGTH EXCEEDS 20 FT. OR WHEN MORE THAN 3 PRECAST SLABS ARE PLACED IN SEQUENCE.
  3. SHOP DRAWINGS SHALL BE REQUIRED FOR ALL CUSTOM PLAZA SLABS.

INSTALLATION DETAIL FOR CUSTOM SLABS

APPROVED BY: *Paul Kovacs* DATE: 05/01/2009  
CHIEF ENGINEERING OFFICER



DETAIL H - LONGITUDINAL TIE BAR  
STITCHING FOR PRECAST PANELS



SECTION A-A

NOTES FOR TIE BAR STITCHING:

1. DRILL HOLES THAT ARE ORIENTED AT 40° ± 5° ANGLE TO THE PAVEMENT SURFACE SO THAT THEY INTERSECT THE LONGITUDINAL CRACK OR JOINT AT ABOUT MID-DEPTH. (IT IS IMPORTANT TO START DRILLING THE HOLE AT A CONSISTENT DISTANCE FROM THE JOINT, IN ORDER TO CONSISTENTLY CROSS AT THE MID-DEPTH OF THE SLAB.)
2. HOLE CENTERLINES ARE PERPENDICULAR TO THE JOINT (IN PLAN VIEW) AT EACH LOCATION BEING DRILLED.
3. SELECT A DRILL THAT MINIMIZES DAMAGE TO THE CONCRETE SURFACE, SUCH AS A HYDRAULIC POWERED DRILL. SELECT A DRILL DIAMETER NO MORE THAN 0.375 IN. LARGER THAN THE TIE BAR DIAMETER. CHOOSE A GANG-MOUNTED DRILL IF A HIGHER PRODUCTIVITY IS NEEDED.
4. DRILL HOLES WITH NO LESS THAN A 24 INCH BAR SPACING. ADJACENT HOLES ARE DRILLED IN OPPOSITE DIRECTIONS ACROSS THE JOINT. THE HOLES AND INSERTED TIE BAR SHALL BE NO LESS THAN 24 INCHES FROM ANY EXISTING TRANSVERSE JOINT OR ANY PRECAST OR REPAIR TRANSFER JOINT.
5. HOLE BOTTOMS ARE NO MORE THAN 1 INCH FROM THE SLAB BOTTOM.
6. AIR BLOW THE HOLES TO REMOVE DUST AND DEBRIS AFTER DRILLING.
7. INJECT ADHESIVE INTO THE HOLE, LEAVING SOME VOLUME FOR THE BAR TO OCCUPY THE HOLE. (POURING THE ADHESIVE IS ACCEPTABLE FOR SMALL QUANTITIES.)
8. INSERT THE NO. 6 EPOXY COATED DEFORMED TIE BAR INTO THE HOLE, LEAVING ABOUT 1 IN. FROM THE TOP OF BAR TO THE PAVEMENT SURFACE. DEFORMED TIE BARS SHALL BE EPOXY COATED.
9. REMOVE EXCESS ADHESIVE AND FINISH FLUSH WITH THE PAVEMENT SURFACE.

SHEET 12 OF 12

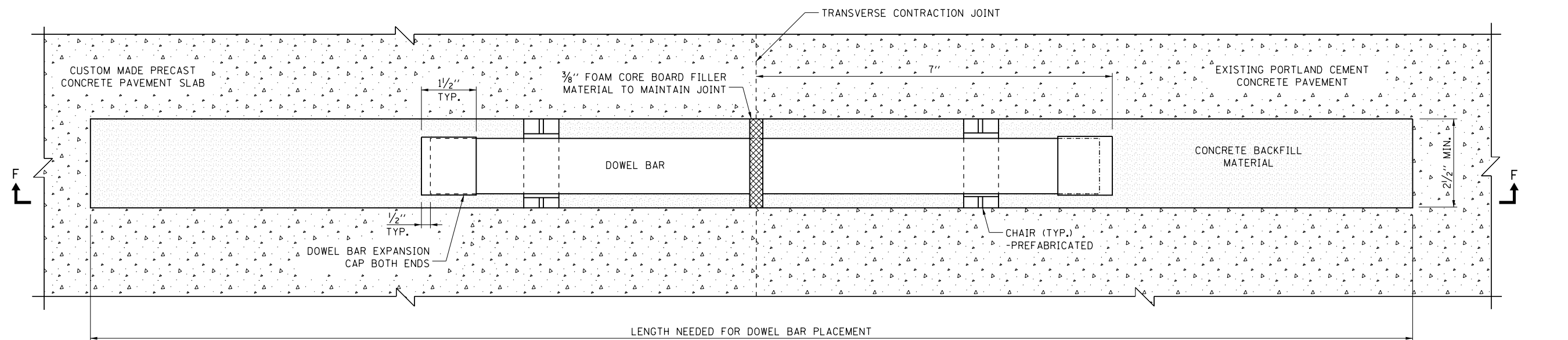


PRECAST PAVEMENT SLABS

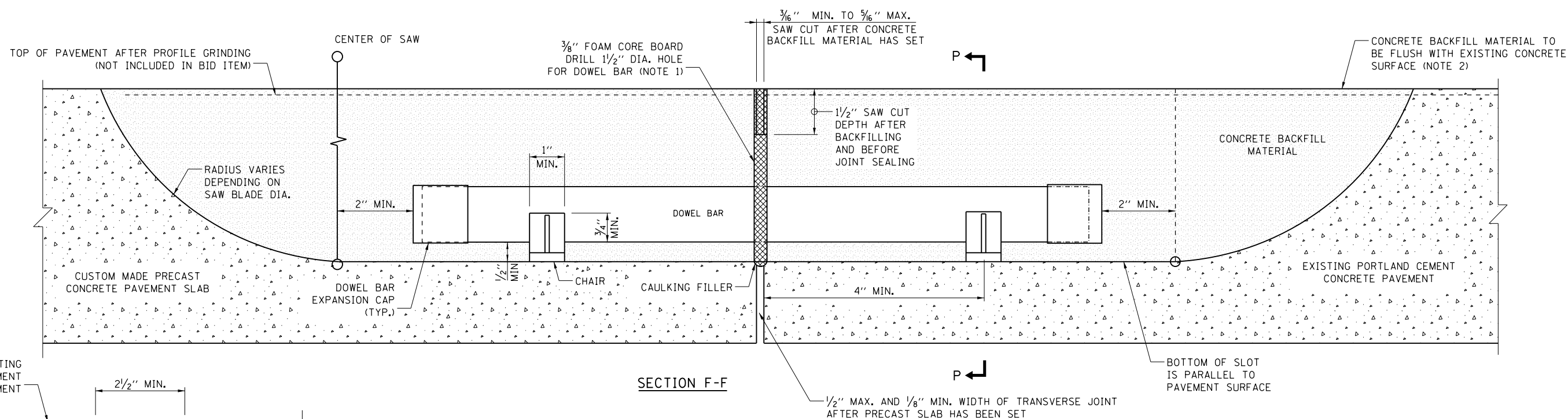
STANDARD A18-05

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER

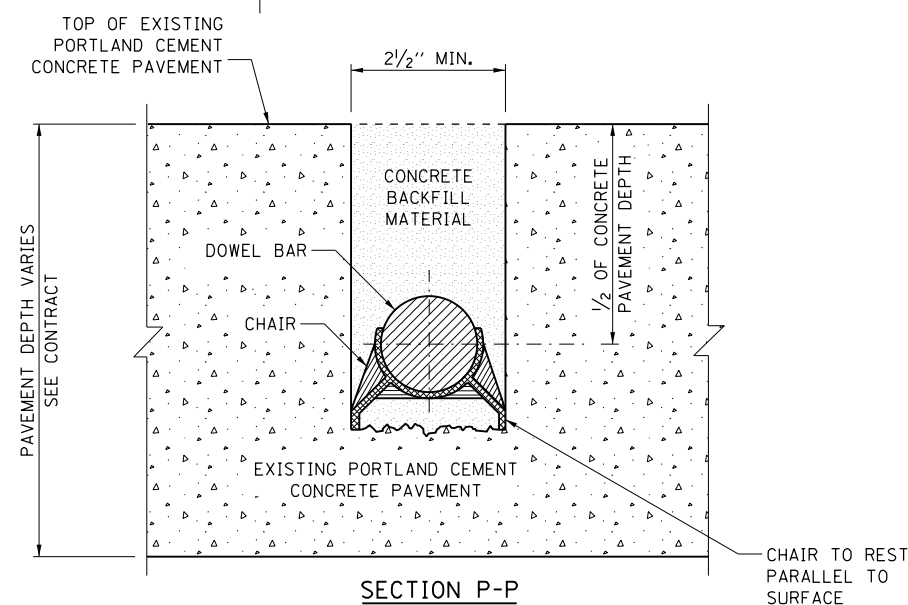
DATE: 05/01/2009



PLAN VIEW

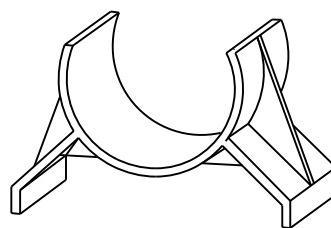


SECTION F-F

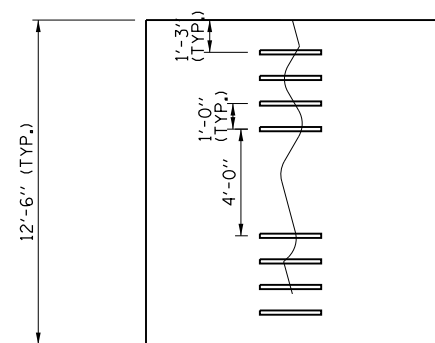


SECTION P-P

DETAIL C - WIDE MOUTH DOWEL BAR PLACEMENT DETAIL FOR  
ALL CUSTOM MADE PRECAST PANELS AND OPTIONAL  
FOR STANDARD SLABS



CHAIR DETAIL



DOWEL BAR RETROFIT  
(PLAN VIEW)

NOTES:

1. PLACE FOAM CORE BOARDS TO THE TOP OF PATCH.
2. UPON COMPLETION, THE FINISHED SURFACE OF THE CONCRETE BACKFILL MATERIAL SHALL NOT BE BELOW EXISTING CONCRETE SURFACE.

SHEET 1 OF 1

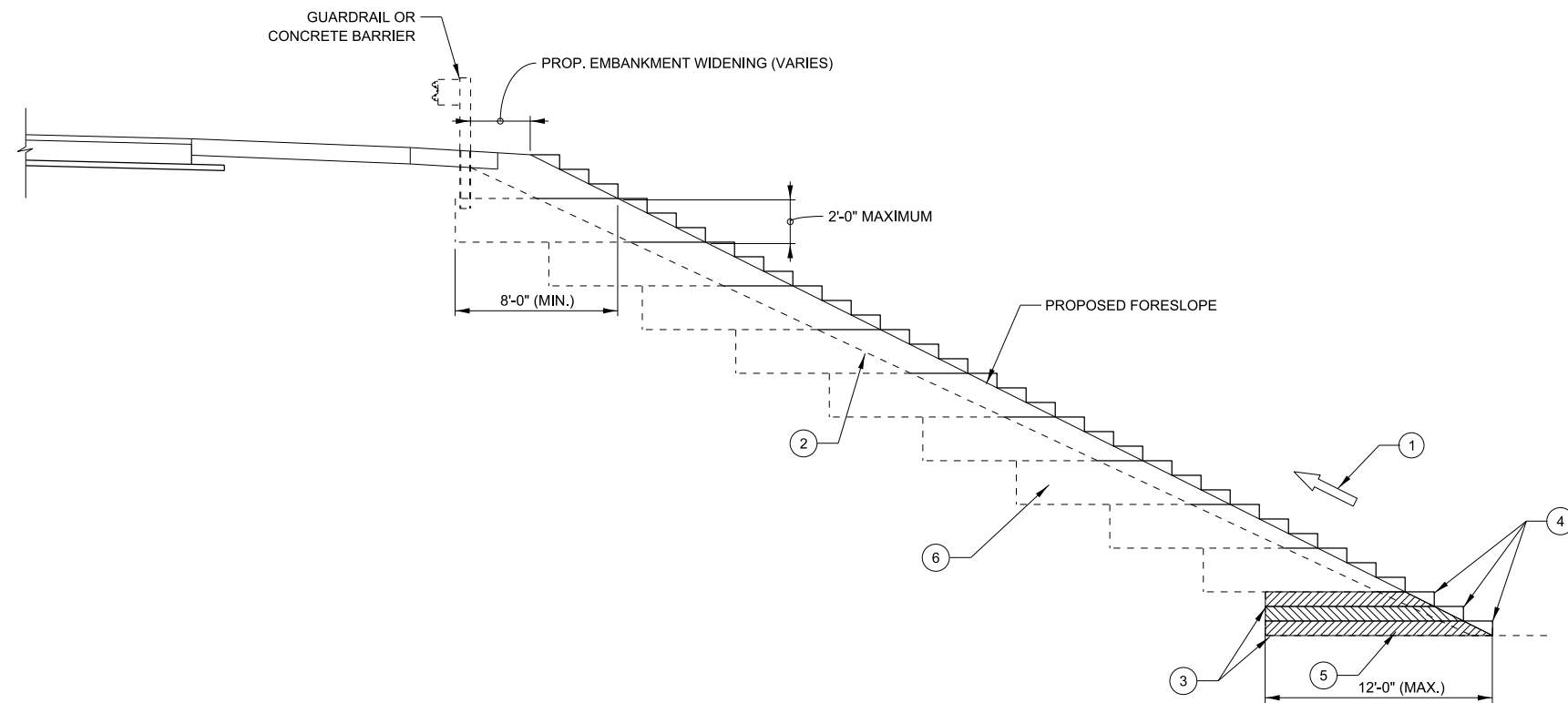


DOWEL BAR RETROFIT

STANDARD A19-00

DATE	REVISIONS


APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2019



TYPICAL BENCHING DETAIL FOR EMBANKMENT

NOTES:

1. CONSTRUCT SUCCEEDING BENCH CUTS AND EMBANKMENT PLACEMENT AND COMPACTION FROM BOTTOM TO TOP IN STAIR STEP FASHION.
2. EXISTING FORESLOPE PREPARED IN ACCORDANCE WITH ARTICLE 205.03 OF THE STANDARD SPECIFICATIONS.
3. BENCH CUT EXISTING SLOPE TYPICAL FOR EACH STEP.
4. TRIM TO FINAL SLOPE.
5. EQUAL 8-INCH LIFTS OF EMBANKMENT COMPACTED IN ACCORDANCE WITH ARTICLE 205.05 OF THE STANDARD SPECIFICATIONS.
6. EXCAVATION OF BENCH CUTS FOR EMBANKMENT WIDENING WITHIN EXISTING EMBANKMENT WILL BE INCIDENTAL TO THE CONTRACTS EARTH EXCAVATION.
7. SLOPES SHALL BE BENCHED ACCORDING TO THIS DETAIL WHEN THE SLOPE IS STEEPER THAN 1:4(V:H) AND THE HEIGHT IS GREATER THAN 5'.
8. SOILS EXCAVATED FOR BENCHING THAT ARE TYPE 1 AND ARE TO BE DISPOSED OFF-SITE, SHALL BE PAID FOR AS NON-SPECIAL WASTE DISPOSAL, TYPE 1.

APPROVED BY:   
CHIEF ENGINEERING OFFICER  
DATE: 03/17/2022

REVISIONS	
DATE	DESCRIPTION



BENCHING DETAIL FOR EMBANKMENT WIDENING

VERSION: 2022-03 STANDARD: A20-00 SHEET: 1 OF 1

# ***STANDARD DRAWINGS***



## ***SECTION B***

### ***DRAINAGE STRUCTURES, CURBS AND GUTTER***

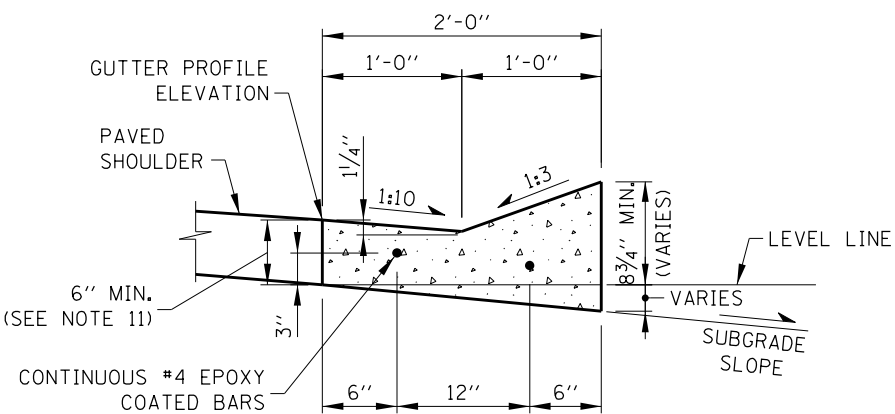
MARCH 2024

Illinois Tollway Standard Drawing Revisions

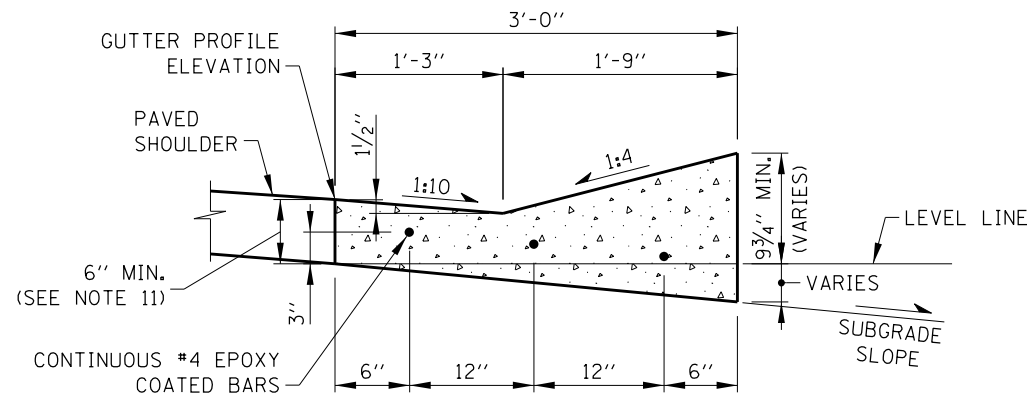
Section B	Drainage Structures, Curbs & Gutter		
	Standard	Modification Summary	Effective: 03-01-2024
	B1-12	GUTTER AND CURB DETAILS	
	Sheet 2	Removed Concrete Gutter Overlay Detail.	
		Removed Notes 1,2 and 3. Notes 4 and 5 are now Notes 1 and 2.	
	Sheet 3	Revised Crack Control Joint depth from 1" to t/3.	
		Added Crack Control Joints and 1/2" Preformed Joint Filler to Gutter, Type G-3N Plan.	
	B3-10	TYPE G-2/G-3 GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6	
	Sheet 4	Added new detail for Gutter, Type G-2 Transition at Traffic Barrier Terminal, Type T6, to Constant-Slope Concrete Barrier, Single Face. Sheets 4, 5 and 6 are now Sheets 5, 6 and 7.	
	B8-09	CATCH BASINS TYPE G AND TYPE G-3 MODIFIED, FRAMES AND GRATES	
	Sheet 1	Noted the maximum pipe sizes on Sections A-A and B-B.	
		Revised Note 16.	
	Sheet 2	Revised Note 11.	
		Revised Note 11 callout in Section B-B.	
	Sheet 3	Revised Note 11.	
		Revised Note 11 callout in Section B-B.	
	B32-02	FLAT SLAB TOP FOR TYPE G-3 FRAME AND GRATE 4'-5'-6'-7'-8'-9' DIAMETER	
	Sheet 1	Renamed the standard from "Flat Slab Top 4'-5'-6'-7'-8'-9' Diameter" to "Flat Slab Top for Type G-3 Frame and Grate 4'-5'-6'-7'-8'-9' Diameter."	
	Sheet 2	Renamed the standard from "Flat Slab Top 4'-5'-6'-7'-8'-9' Diameter" to "Flat Slab Top for Type G-3 Frame and Grate 4'-5'-6'-7'-8'-9' Diameter."	
	Sheet 3	Renamed the standard from "Flat Slab Top 4'-5'-6'-7'-8'-9' Diameter" to "Flat Slab Top for Type G-3 Frame and Grate 4'-5'-6'-7'-8'-9' Diameter."	

New Sheet

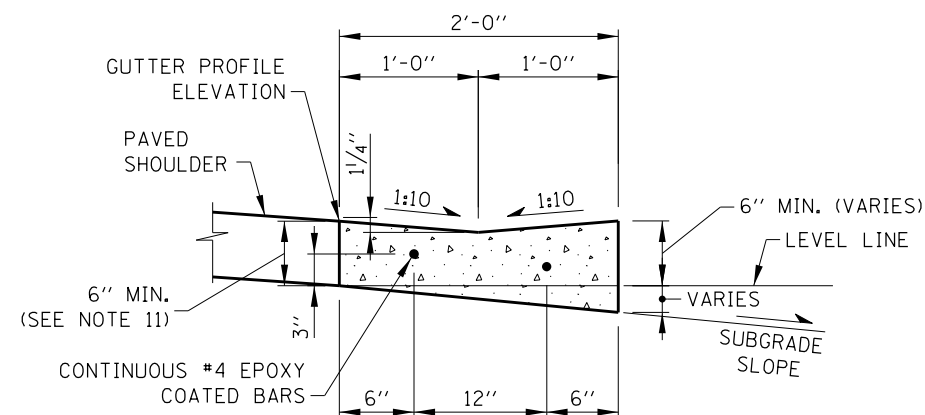
Retired Standard



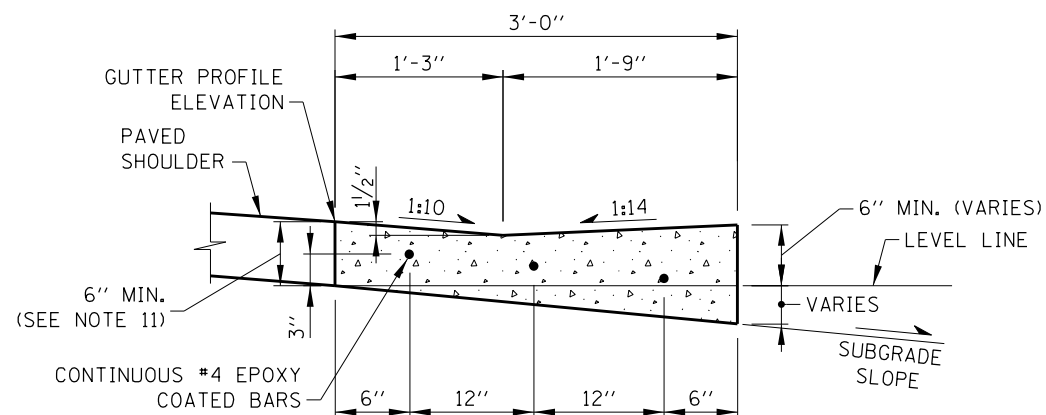
GUTTER, TYPE G-2



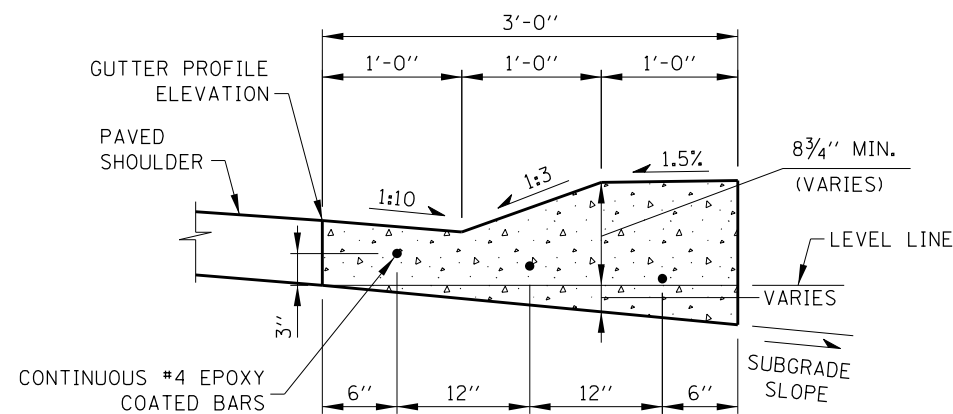
GUTTER, TYPE G-3



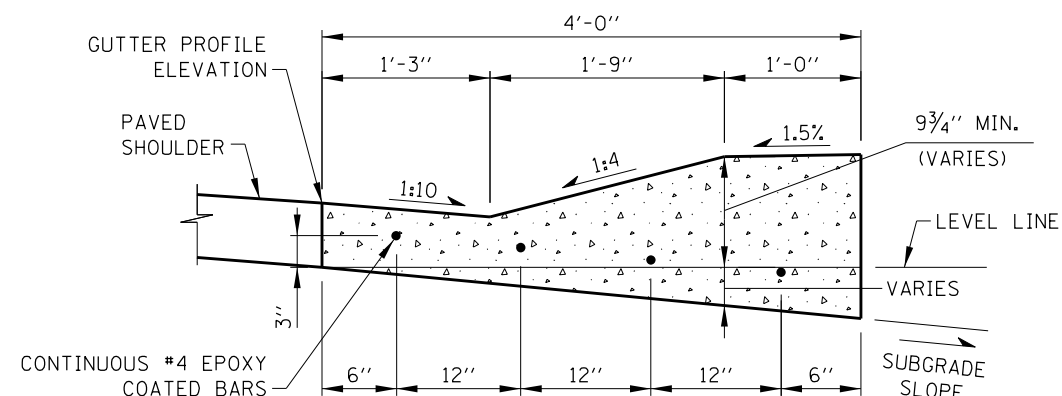
GUTTER, TYPE G-2, MODIFIED



GUTTER, TYPE G-3, MODIFIED



GUTTER, TYPE G-2N



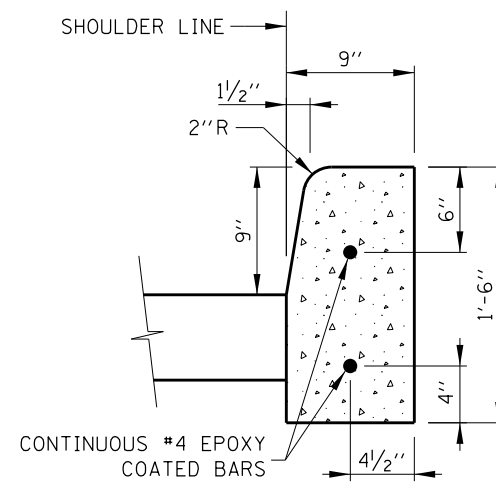
GUTTER, TYPE G-3N

## NOTES:

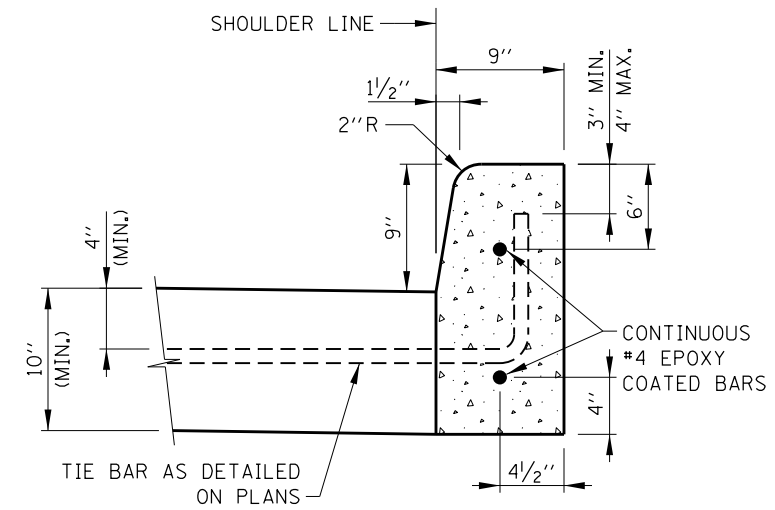
- FOR CONCRETE CURB, TYPE C TRANSITIONS, THE LEADING ENDS OF CURB IN THE DIRECTION OF TRAFFIC SHALL BEGIN FLUSH WITH ADJACENT PAVEMENT OR SHOULDER SURFACE AND TRANSITION TO FULL HEIGHT AT THE RATE OF ONE INCH VERTICAL TO ONE FOOT HORIZONTAL.
- | GUTTER TRANSITION DETAILS                    | STANDARD DRAWING |
|--|------------------|
| TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)   | B-28             |
| TRAFFIC BARRIER TERMINAL TYPE T1-A (SPECIAL) | B-29             |
| TRAFFIC BARRIER TERMINAL TYPE T10            | B-2              |
| TRAFFIC BARRIER TERMINAL TYPE T6             | B-3              |
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- REINFORCEMENT STEEL SHALL BE ACCURATELY PLACED AND FIRMLY HELD IN THE POSITION SPECIFIED USING EPOXY COATED STEEL CHAIRS. CHAIR SPACING SHALL NOT EXCEED 4'-0".
- GUTTER REINFORCEMENT SHALL BE PLACED 3" ABOVE BOTTOM OF GUTTER FOLLOWING THE SUBGRADE SLOPE.
- OTHER GUTTER AND CURB TRANSITION DETAILS WILL BE SHOWN ON THE PLANS.
- CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-1".
- FOR CONCRETE GUTTER OVERLAYS, CRACK CONTROL JOINTS SHALL BE PLACED AT LOCATIONS OF UNDERLYING JOINTS AND WORKING CRACKS.
- GUTTER CRACK CONTROL JOINTS TO ALIGN IN PROLONGATION WITH PCC SHOULDER JOINTS WHERE EXISTING. CRACK CONTROL JOINTS SHALL BE SEALED FULL DEPTH AND WIDTH IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- EXPANSION JOINTS SHALL BE CONSTRUCTED IN GUTTER AT MAXIMUM JOINT SPACING OF 60'-0", SEE EXPANSION JOINT DETAIL ON SHEET 3 OF THIS STANDARD.
- GUTTER DEPTH SHALL MATCH PAVED SHOULDER DEPTH.
- THIS WORK WILL BE MEASURED FOR PAYMENT IN FEET ALONG THE FLOW LINE OF THE GUTTER, WHICH MEASUREMENT WILL INCLUDE DRAINAGE CASTINGS INCORPORATED WITHIN GUTTER.

DATE	REVISIONS
03-01-2024	REMOVED CONCRETE GUTTER OVERLAY DETAIL.
03-01-2023	REVISED NOTE 10 AND USAGE OF CONCRETE CURB, TYPE C
03-01-2022	ADDED NEW G-2N & G-3N DETAILS REVISED CONC. GUTTER OVERLAY





ADJACENT TO FLEXIBLE PAVEMENT

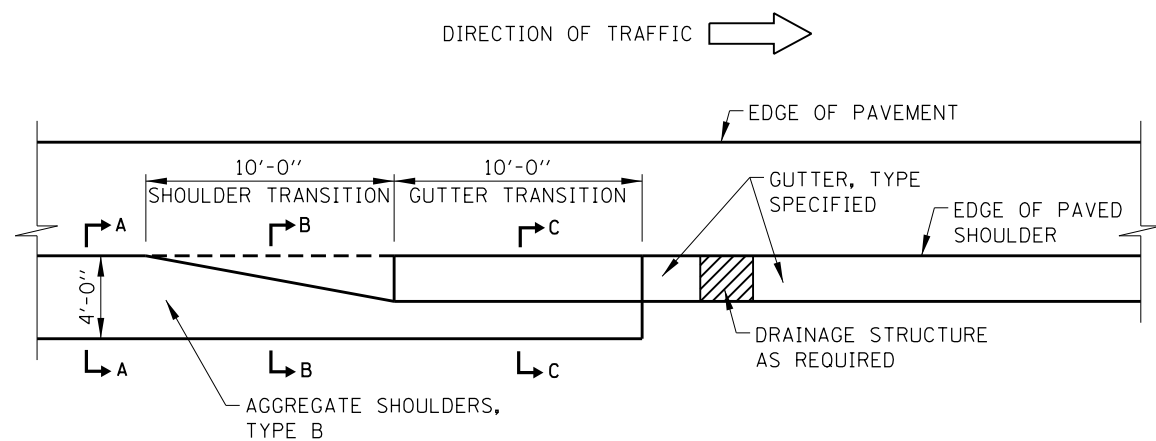


ADJACENT TO PCC PAVEMENT

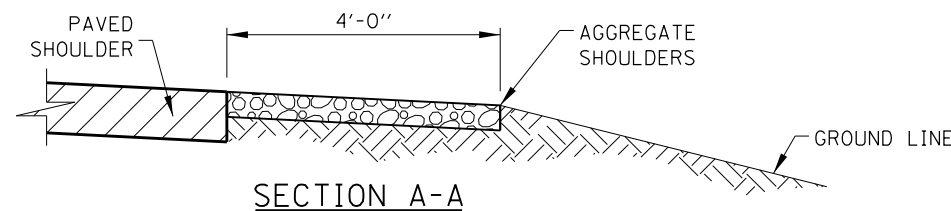
CONCRETE CURB, TYPE C  
(SEE NOTE 1)

**NOTES:**

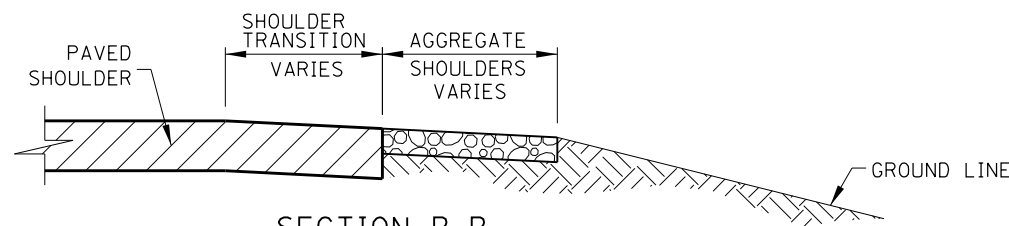
1. CONCRETE CURB, TYPE C SHALL ONLY BE USED ALONG PLAZA PARKING AREAS, AT MAINTENANCE FACILITIES, OR IN CONJUNCTION WITH GUARDRAIL ON THE TAPERING APPROACH TO A NON-AET PLAZA.
2. SEE SHEET 1 OF THIS SERIES FOR ADDITIONAL NOTES.



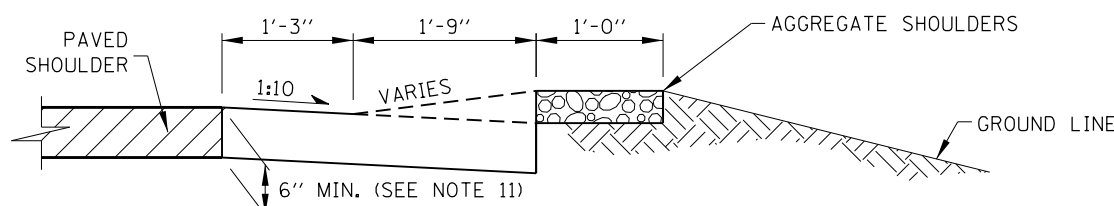
**GUTTER TRANSITION TERMINATION**



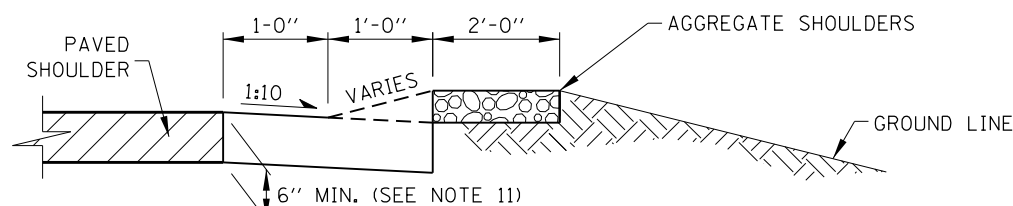
**SECTION A-A**



**SECTION B-B  
ASPHALT SHOULDER TRANSITION**

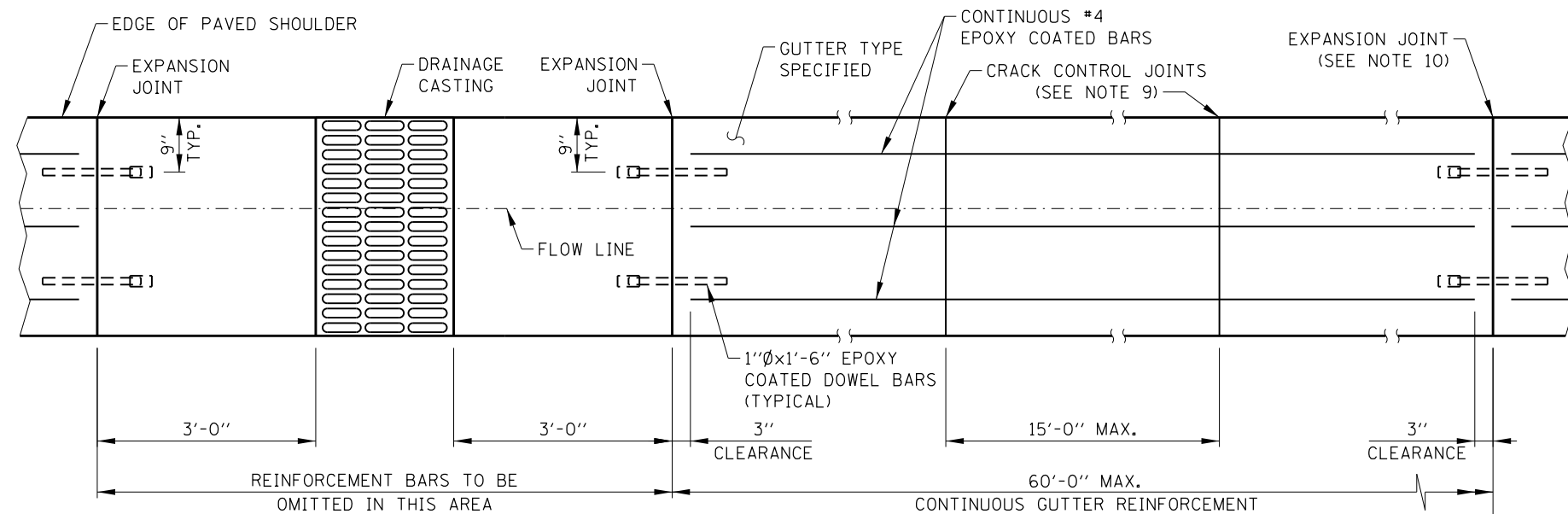


**GUTTER, TYPE G-3 TRANSITION**

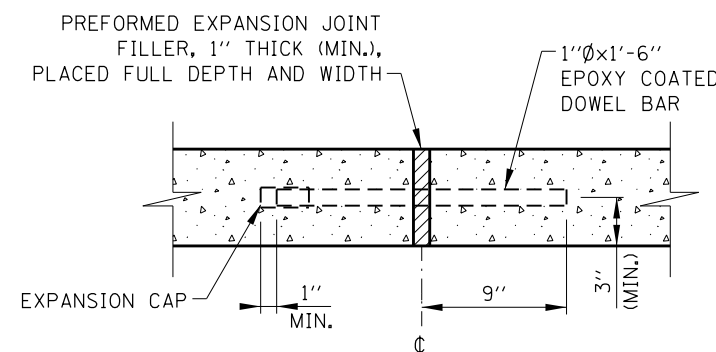


**GUTTER, TYPE G-2 TRANSITION**

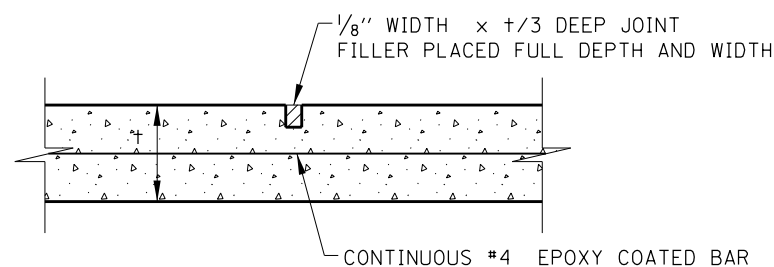
**SECTION C-C**



**PLAN  
GUTTER, TYPE G-2 OR GUTTER, TYPE G-3  
(GUTTER, TYPE G-3 SHOWN)**

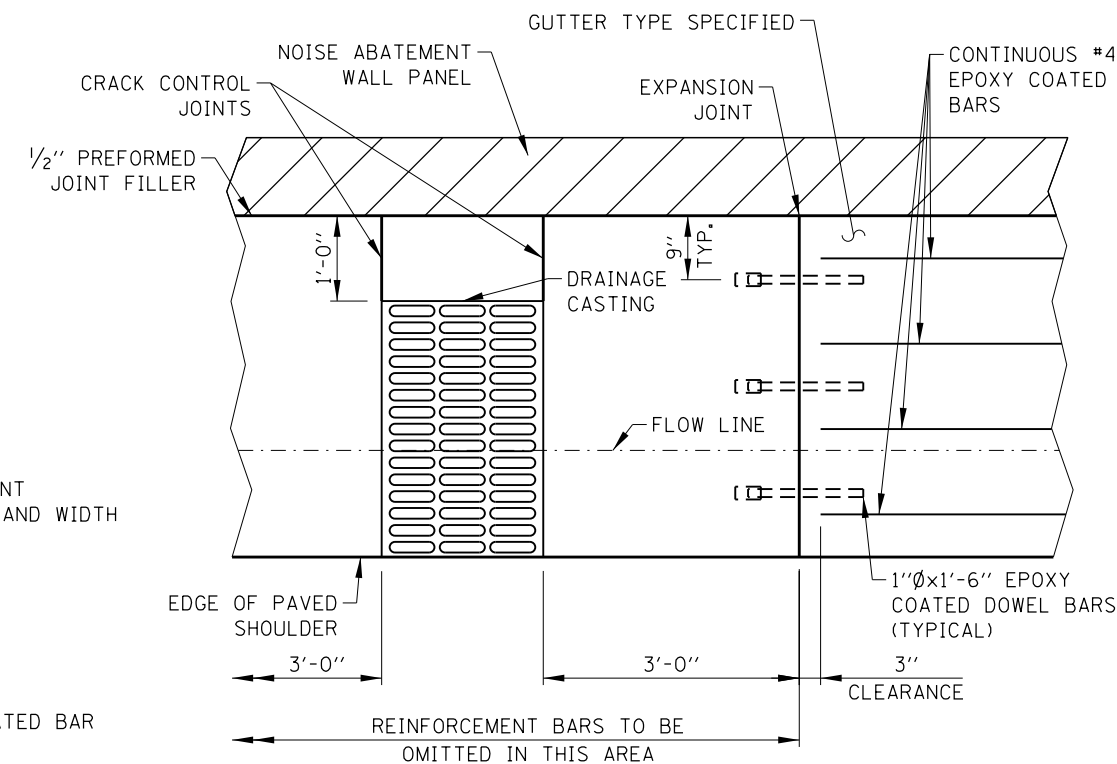


**EXPANSION JOINT**



**CRACK CONTROL JOINT**

**CONTRACTION-CRACK CONTROL JOINTS  
GUTTER, TYPE SPECIFIED**



**PLAN  
GUTTER, TYPE G-2N OR GUTTER, TYPE G-3N  
(GUTTER, TYPE G-3N SHOWN)**

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

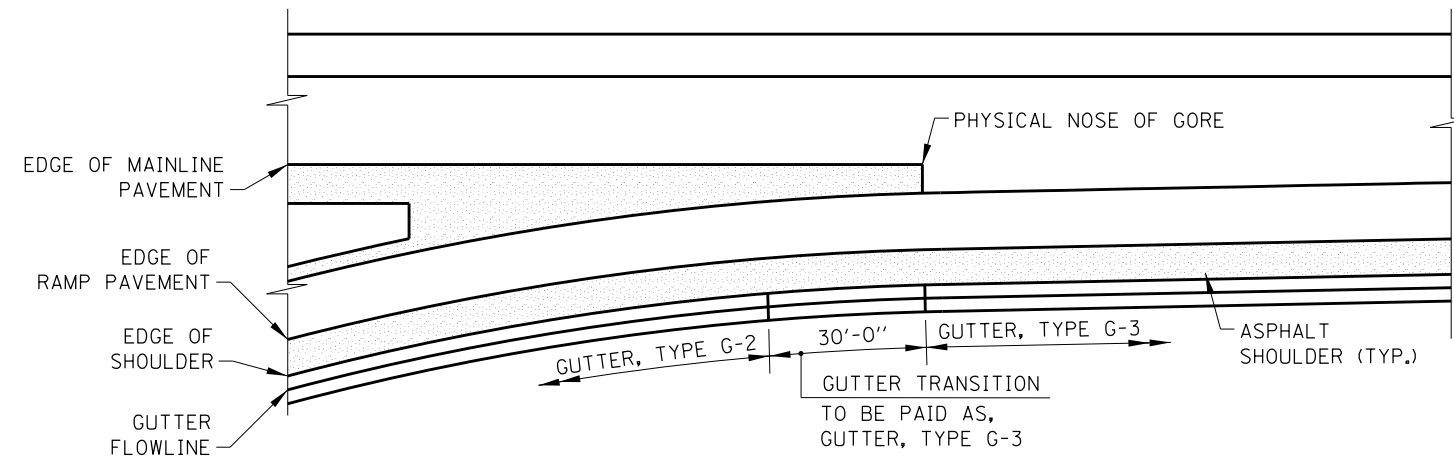
**NOTE:**  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 3 OF 3

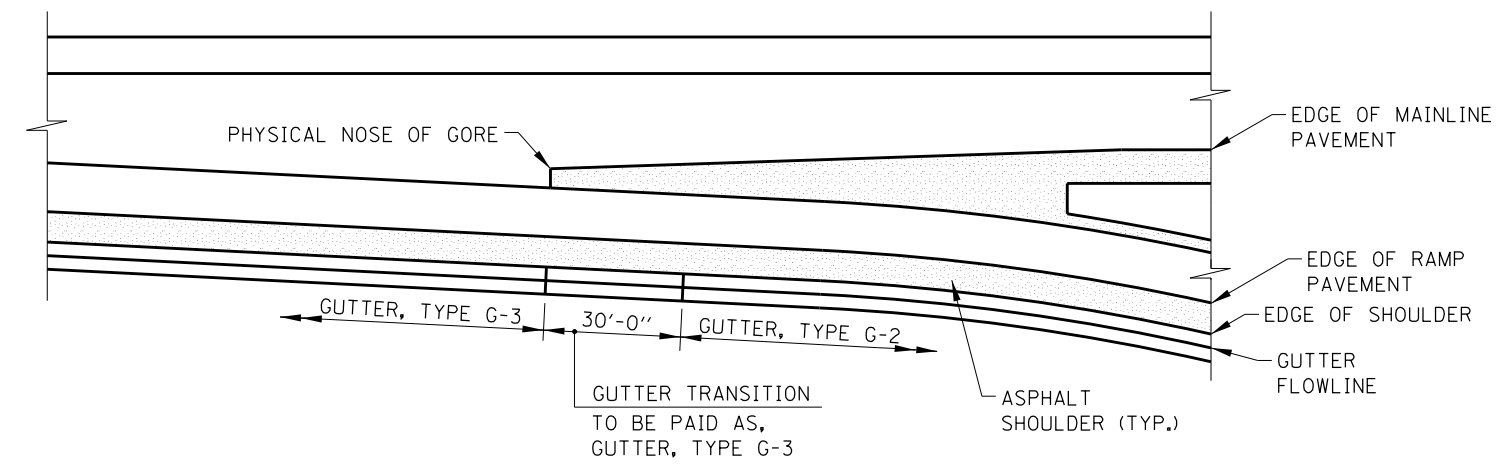


GUTTER AND CURB  
DETAILS

STANDARD B1-12



GUTTER TRANSITION AT ENTRANCE RAMP TERMINALS



GUTTER TRANSITION AT EXIT RAMP TERMINALS

**GUTTER TRANSITION NOTES:**

1. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL, BARRIER, PARAPET OR NOISE ABATEMENT WALL.
2. SEE STANDARD B3 FOR GUTTER TRANSITIONS AT BRIDGE APPROACH.
3. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
4. REINFORCEMENT BARS SHALL BE ACCURATELY PLACED AND FIRMLY HELD AT THE POSITION USING EPOXY COATED CHAIRS. CHAIR SPACING SHALL NOT EXCEED 4'-0".
5. GUTTER REINFORCEMENT BARS SHALL BE PLACED 3" ABOVE BOTTOM OF GUTTER FOLLOWING SUBGRADE SLOPE.
6. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-1".
7. GUTTER DEPTH SHALL MATCH PAVED SHOULDER DEPTH.

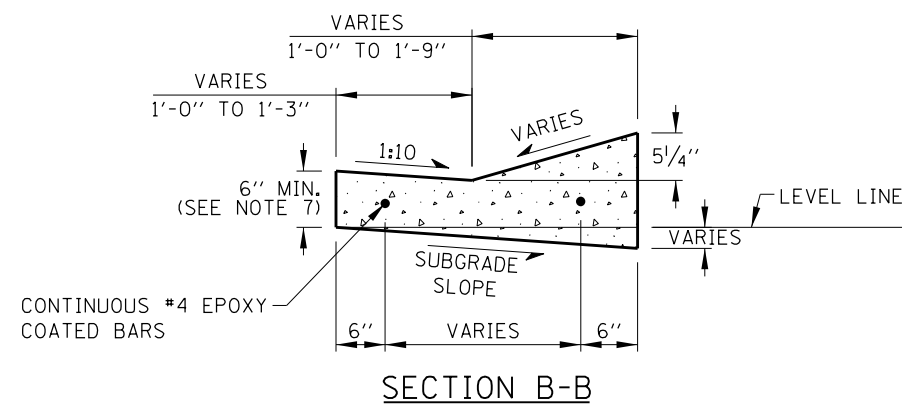
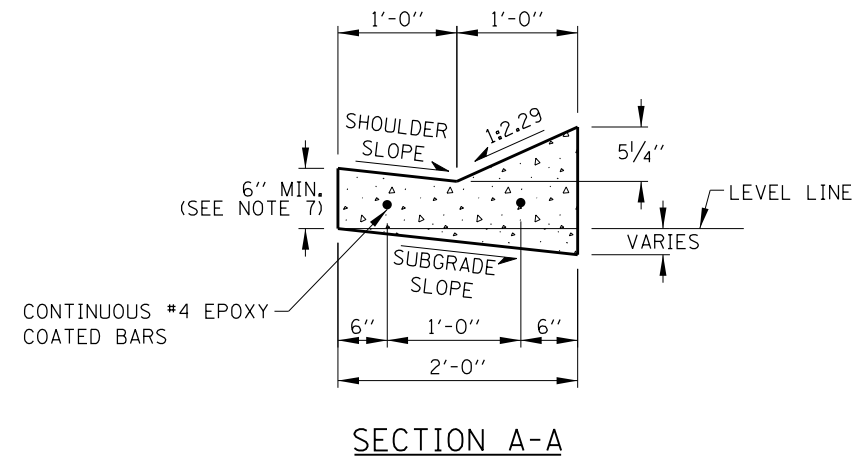
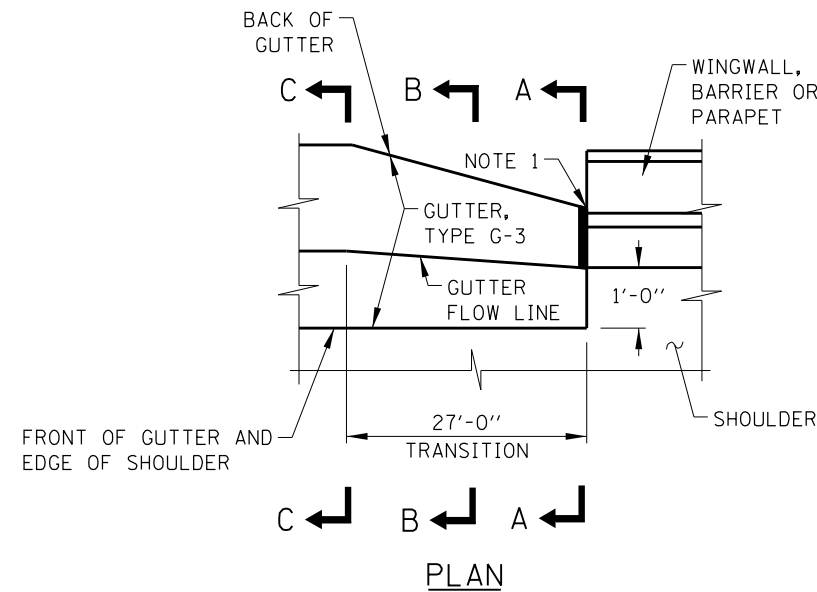
APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2023

DATE	REVISIONS
03-01-2023	ADDED G-3N & G-2N GUTTER TRANSITIONS, REMOVED GORE DIMENSIONS, RENAMED STANDARD
03-01-2019	TRANSITION SHT NOTED GUTTER DEPTH SHALL MATCH PAVED SHOULDER DEPTH
03-01-2018	REVISED NOTE

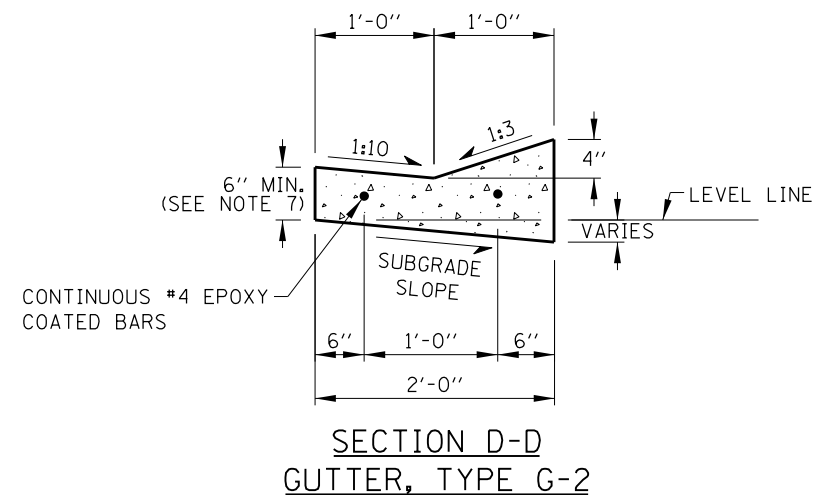
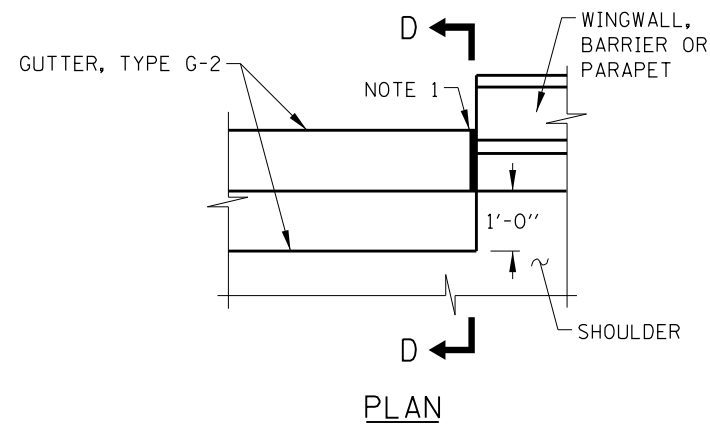
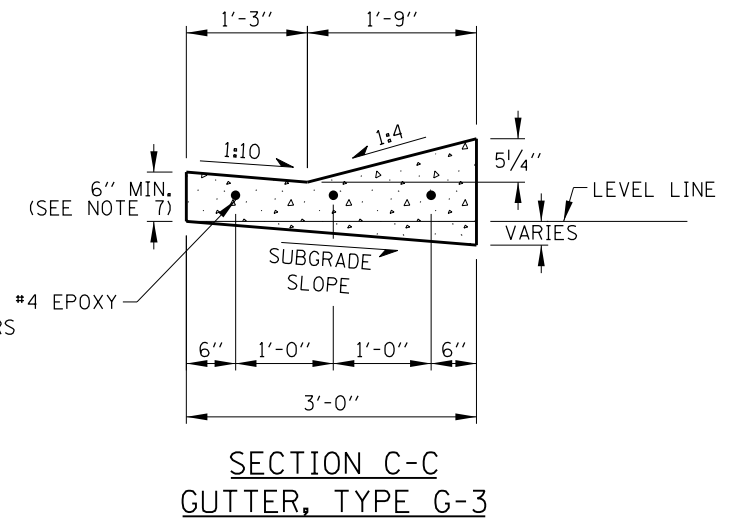


**GUTTER TRANSITION DETAILS**

**STANDARD B2-09**



GUTTER, TYPE G-3 TRANSITION AT BRIDGE DEPARTURE



GUTTER, TYPE G-2 AT BRIDGE DEPARTURE

NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 2 OF 4

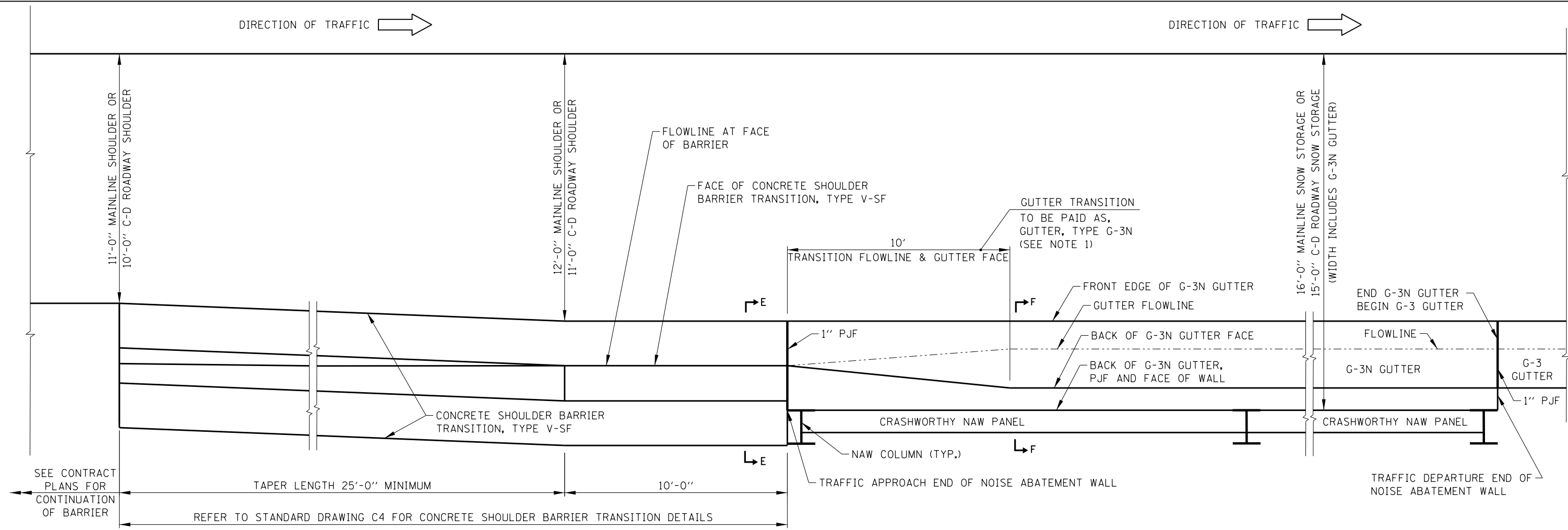


GUTTER TRANSITION  
DETAILS

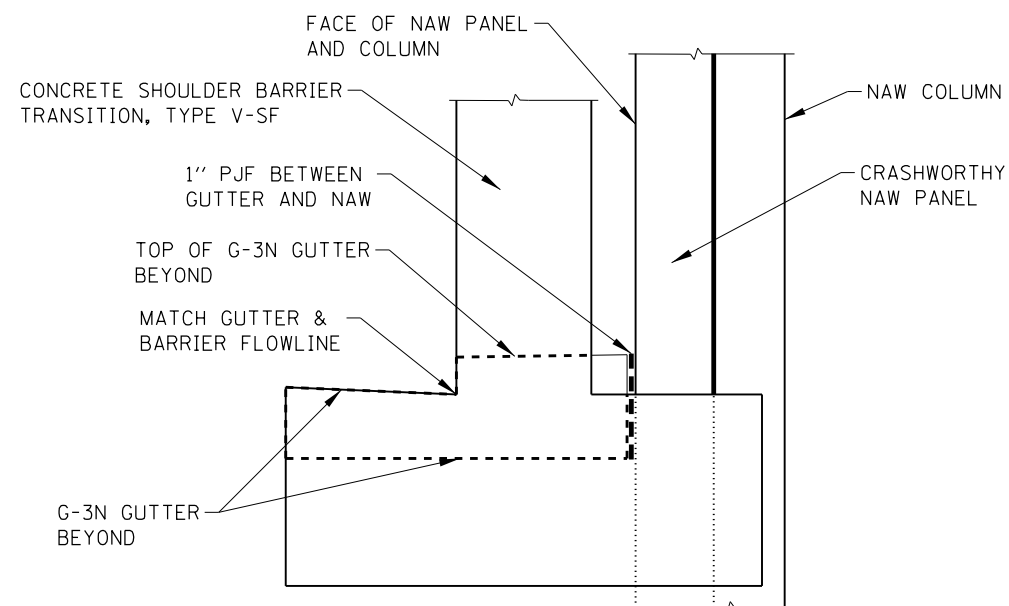
STANDARD B2-09

APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

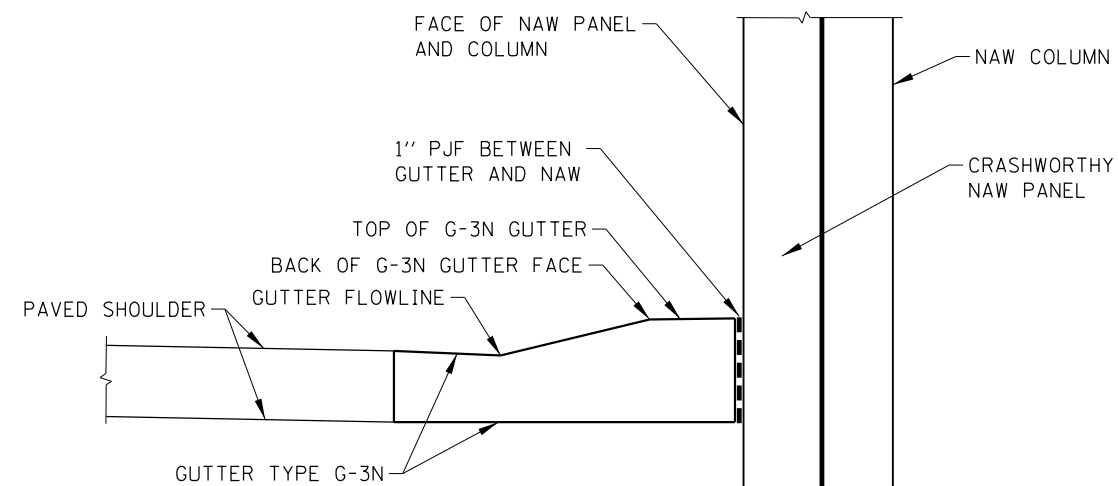
DATE:  
03/01/2023



**G-3N GUTTER TRANSITION AT END OF CRASHWORTHY NOISE ABATEMENT WALL  
(USE ALONG MAINLINE AND C-D ROADWAYS)**



**SECTION E-E**



**SECTION F-F**

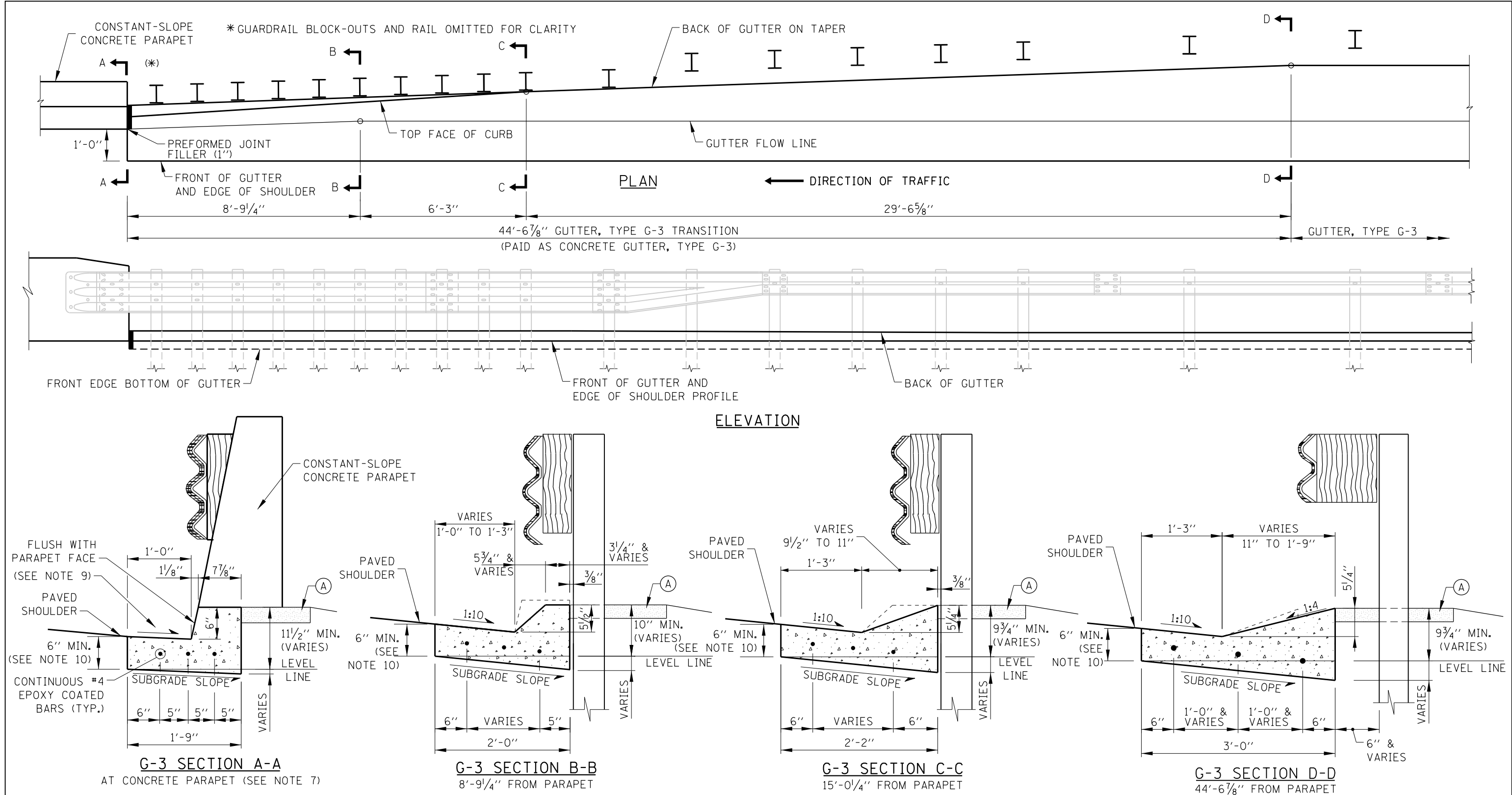
- NOTES:**
1. NO DRAINAGE STRUCTURES SHALL BE PLACED WITHIN THE GUTTER TRANSITION.
  2. SEE SHEET 1 OF THIS SERIES FOR ADDITIONAL NOTES.

SHEET 3 OF 4

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2023

GUTTER TRANSITION DETAILS
STANDARD B2-09





#### GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.

#### GUTTER, TYPE G-3 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6 TO CONSTANT-SLOPE CONCRETE PARAPET

3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF TRAFFIC BARRIER TERMINAL, TYPE T6, SEE ILLINOIS TOLLWAY STANDARD C9.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL SHALL MATCH PROFILE AND VERTICAL FACE OF BARRIER. MODIFY GUTTER FACE TO MATCH OTHER BARRIER/PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-1".
9. MATCH SHOULDER SLOPE IN FRONT OF PARAPET OR BARRIER.
10. GUTTER DEPTH SHALL MATCH PAVED SHOULDER DEPTH.

#### LEGEND

- (A) AGGREGATE SHOULDERS SPECIAL, TYPE C

SHEET 1 OF 7



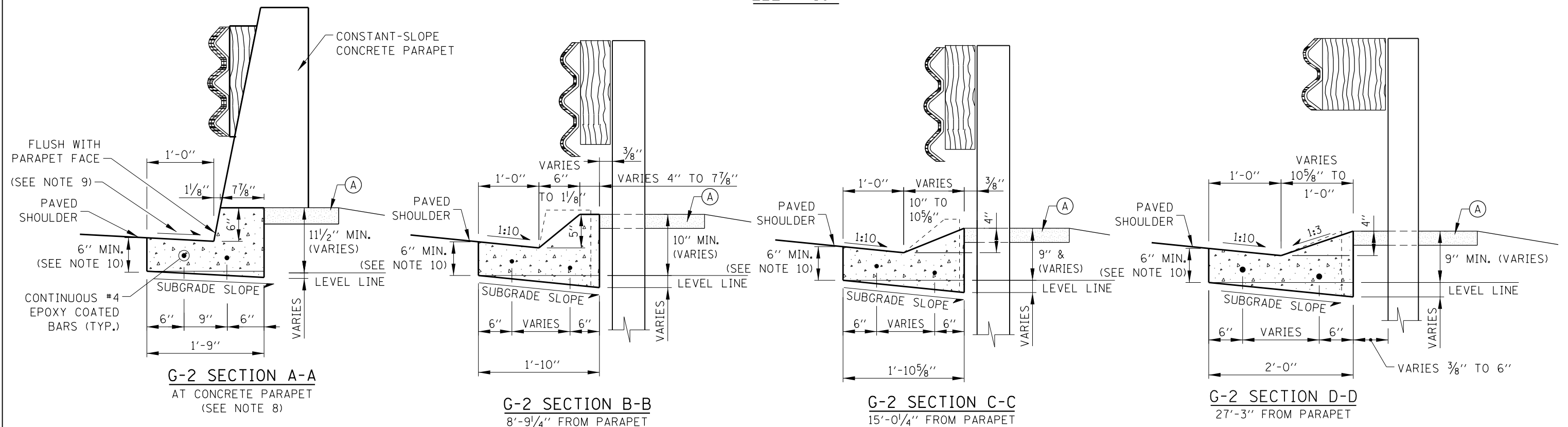
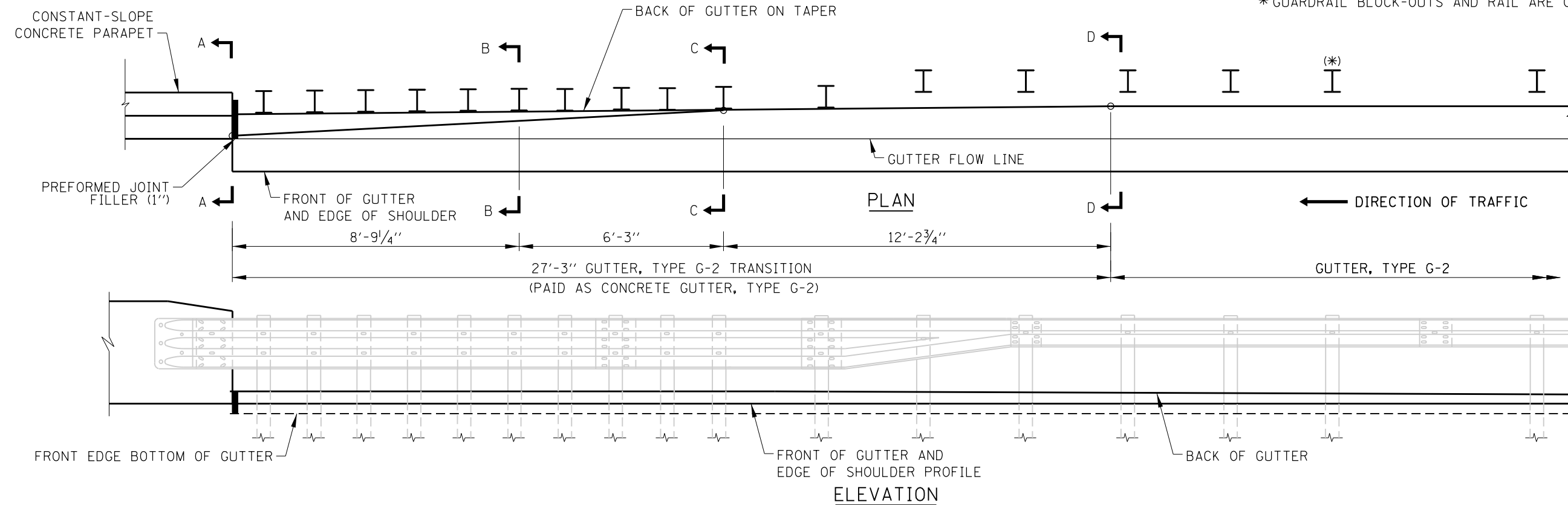
TYPE G-2/G-3 GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6

STANDARD B3-10

DATE	REVISIONS
03-01-2024	ADDED NEW SHEET (4 OF 7)
03-01-2020	REVISED GUTTER TRANSITION LENGTH AND TAPER
03-01-2019	ADDED PG 1, 2 & 3 CONSTANT-SLOPE BARRIER & NOTE 10 (GUTTER DEPTH)
03-01-2019	REVISED G-2 GUTTER SHAPE

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

\* GUARDRAIL BLOCK-OUTS AND RAIL ARE OMITTED FOR CLARITY



GUTTER, TYPE G-2 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6  
TO CONSTANT-SLOPE CONCRETE PARAPET

LEGEND

(A) AGGREGATE SHOULDERS SPECIAL, TYPE C

NOTE:

SEE SHEET 1 OF THIS SERIES FOR  
GUTTER TRANSITION NOTES.

SHEET 2 OF 7



TYPE G-2/G-3 GUTTER  
TRANSITION AT TRAFFIC  
BARRIER TERMINAL,  
TYPE T6

STANDARD B3-10

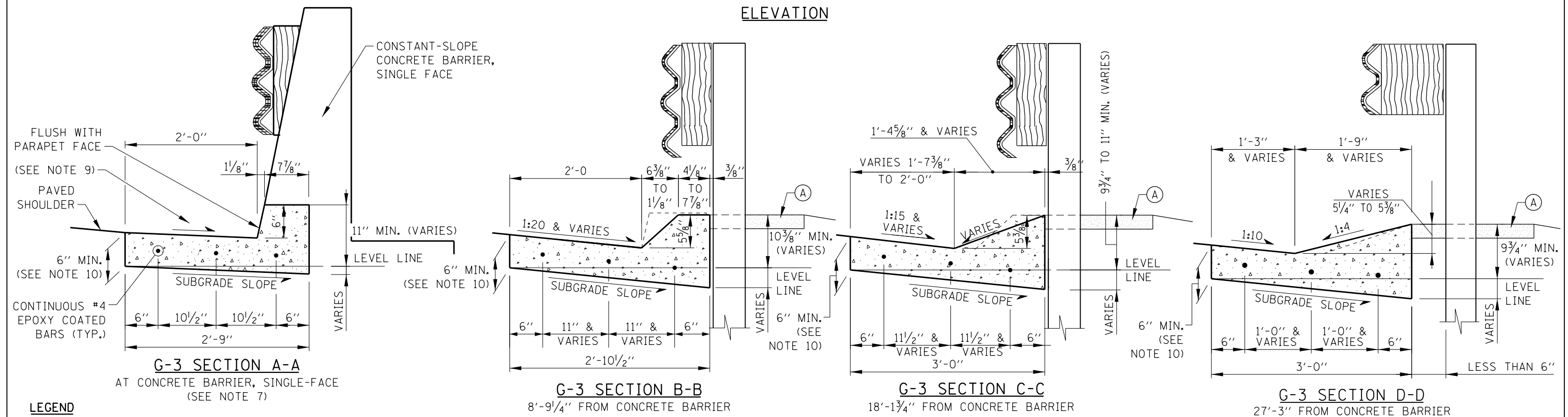
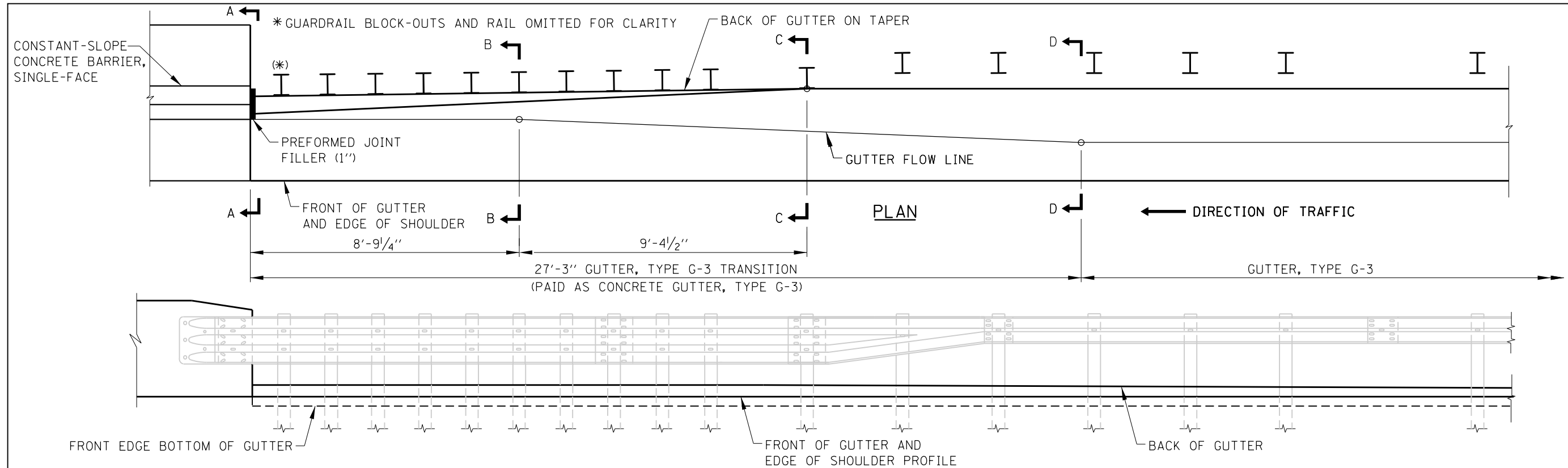
APPROVED BY:

Manar Nashif  
CHIEF ENGINEERING OFFICER

DATE:

03/01/2024





GUTTER, TYPE G-3 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6,  
TO CONSTANT-SLOPE CONCRETE BARRIER, SINGLE FACE

NOTE:  
SEE SHEET 1 OF THIS SERIES FOR GUTTER  
TRANSITION NOTES.

SHEET 3 OF 7

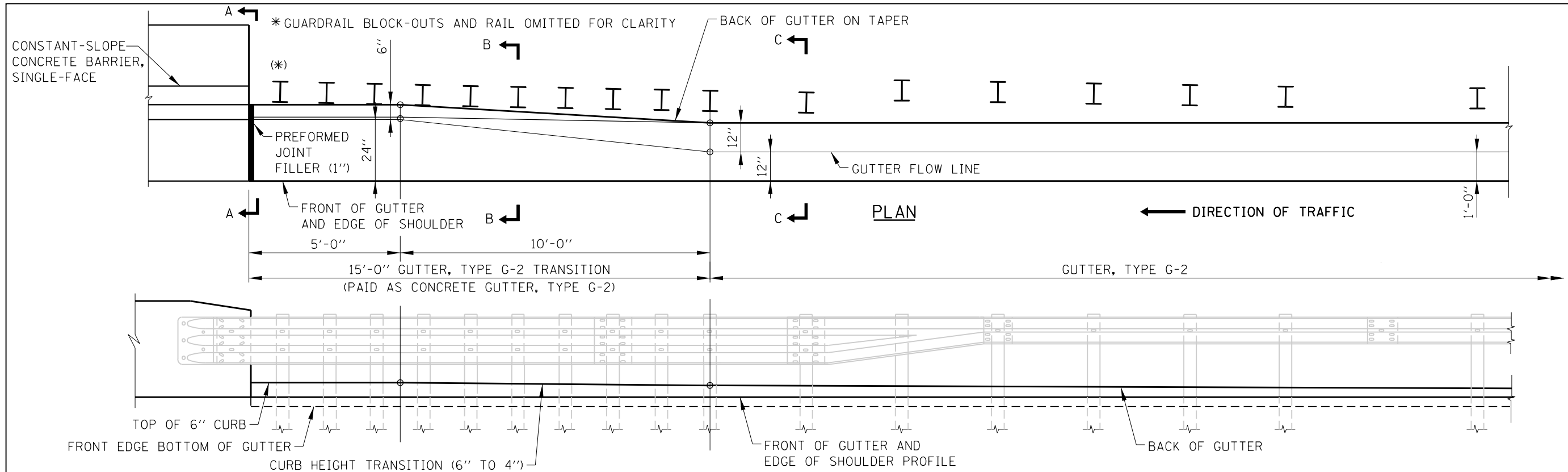


TYPE G-2/G-3 GUTTER  
TRANSITION AT TRAFFIC  
BARRIER TERMINAL,  
TYPE T6

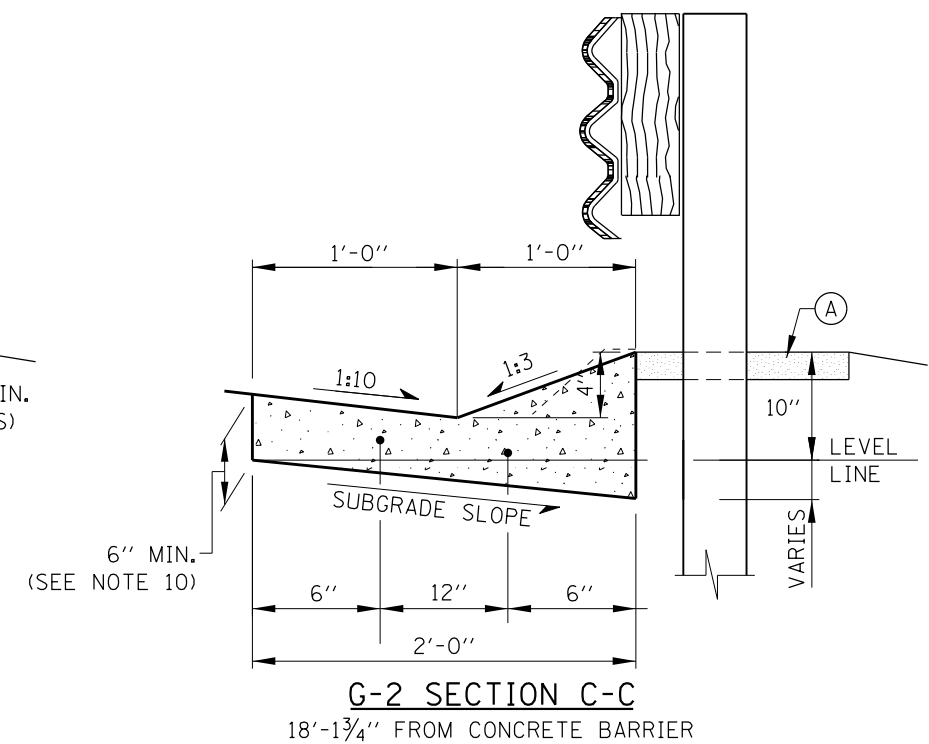
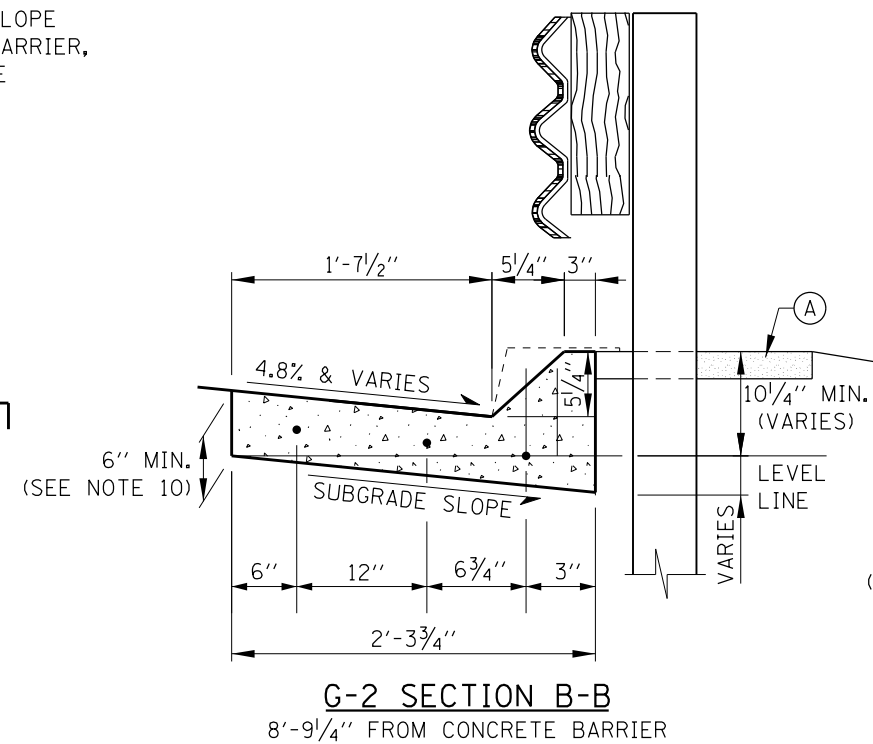
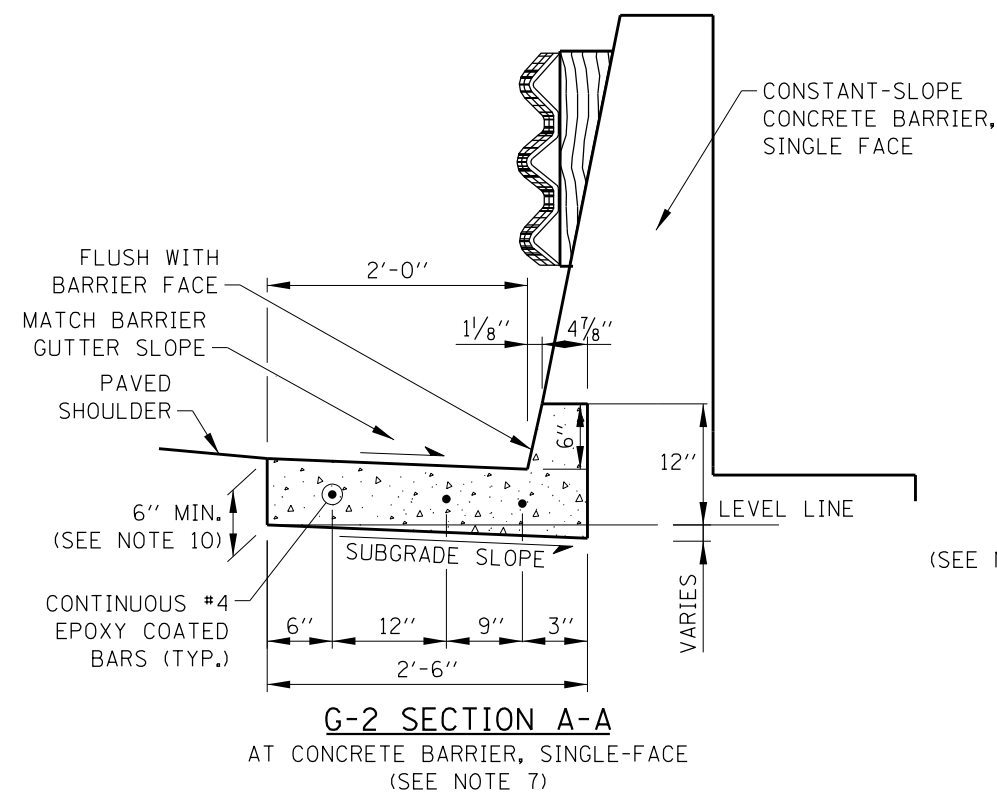
STANDARD B3-10

APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024



### ELEVATION



### LEGEND

(A) AGGREGATE SHOULDERS SPECIAL, TYPE C

### GUTTER, TYPE G-2 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6, TO CONSTANT-SLOPE CONCRETE BARRIER, SINGLE FACE

### NOTE:

SEE SHEET 1 OF THIS SERIES FOR GUTTER TRANSITION NOTES.

SHEET 4 OF 7



TYPE G-2/G-3 GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6

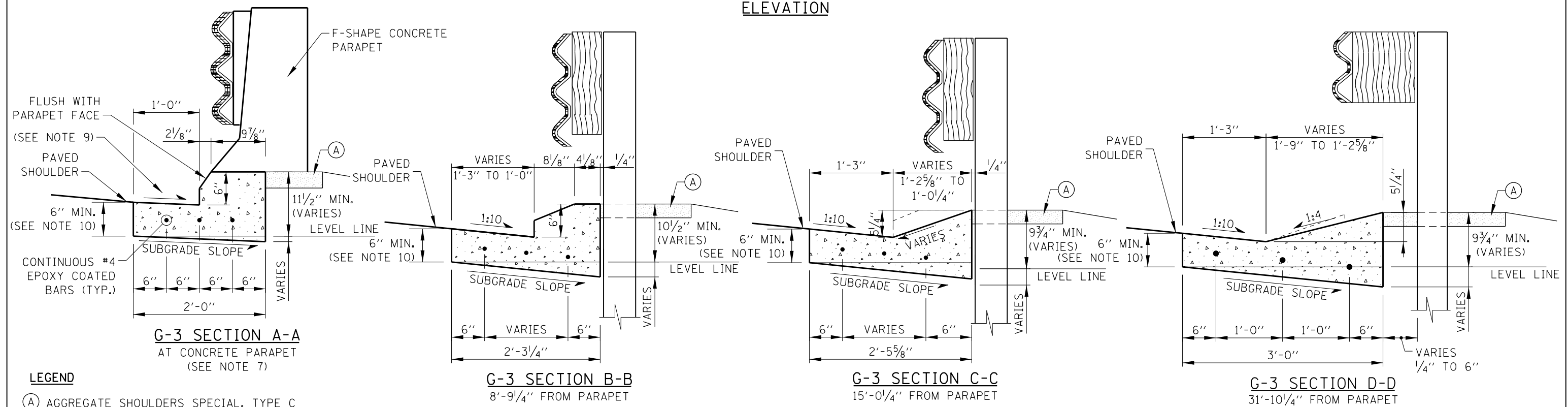
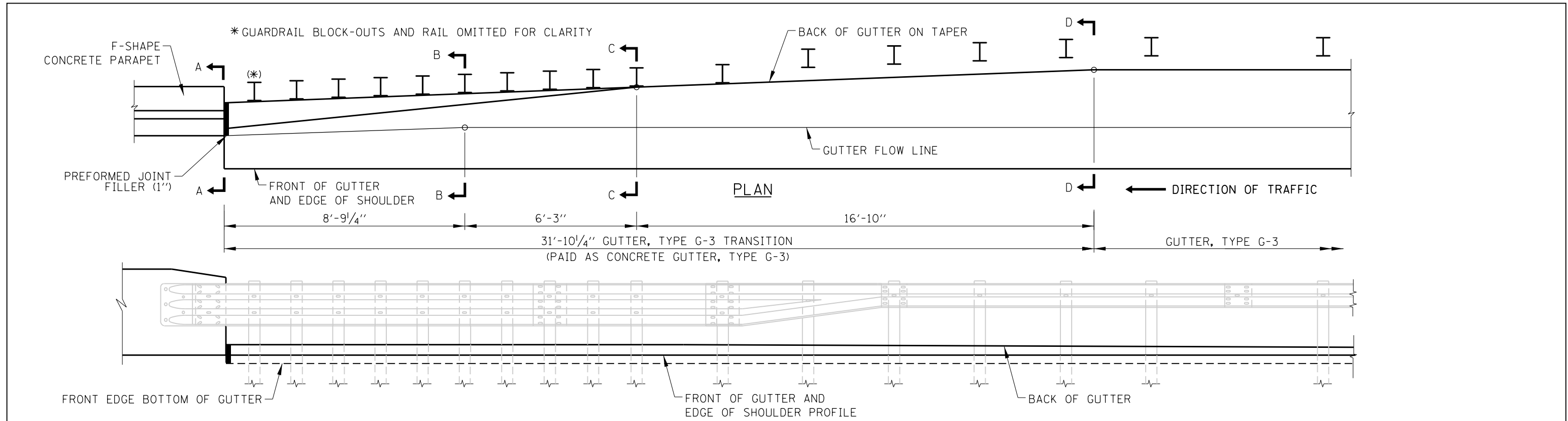
STANDARD B3-10

APPROVED BY:

*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:

03/01/2024



**GUTTER, TYPE G-3 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6 TO F-SHAPE CONCRETE PARAPET**

SHEET 5 OF 7

**NOTE:**  
SEE SHEET 1 OF THIS SERIES FOR GUTTER TRANSITION NOTES.

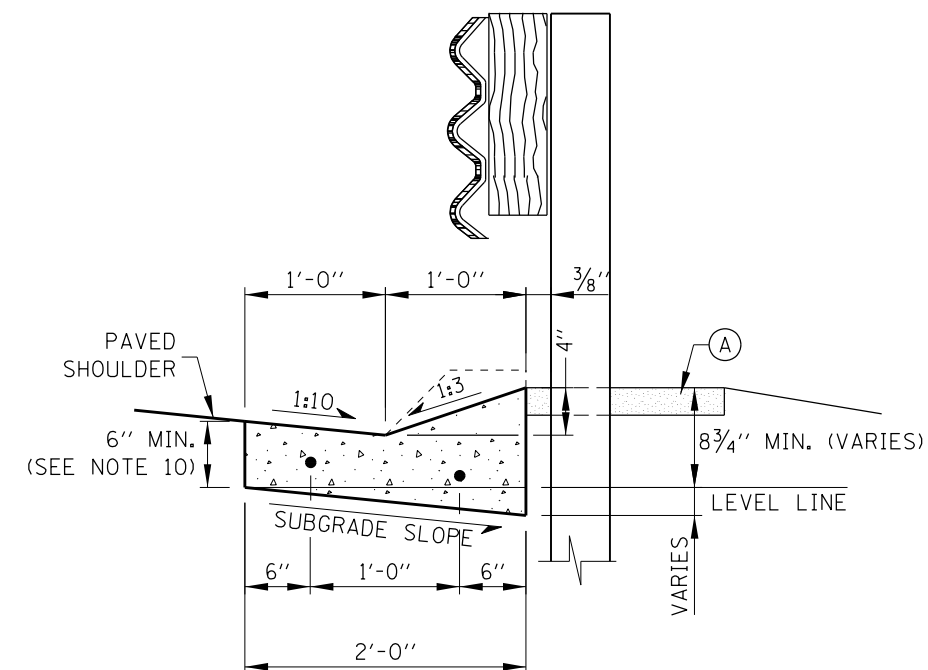
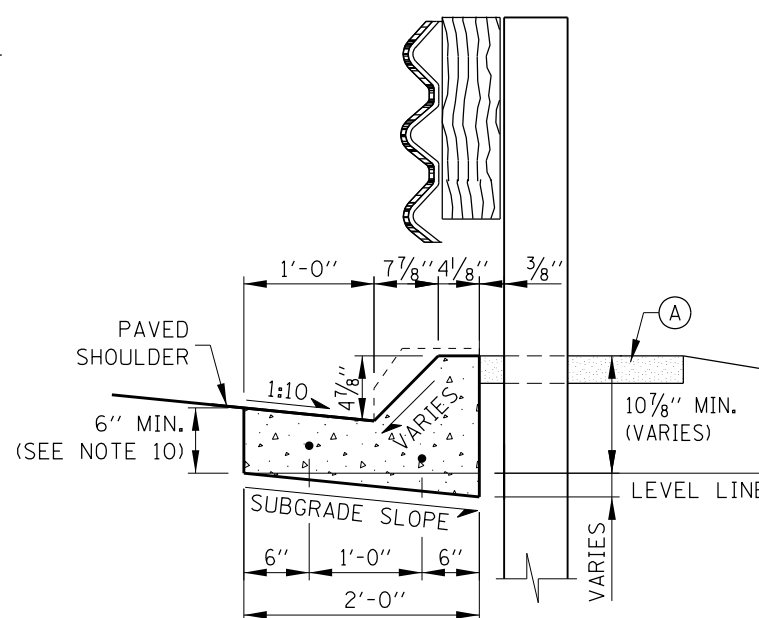
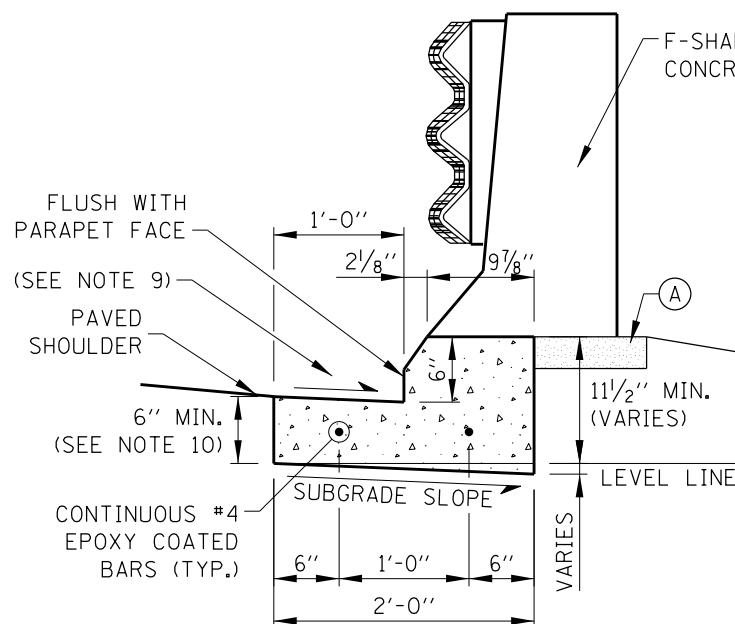
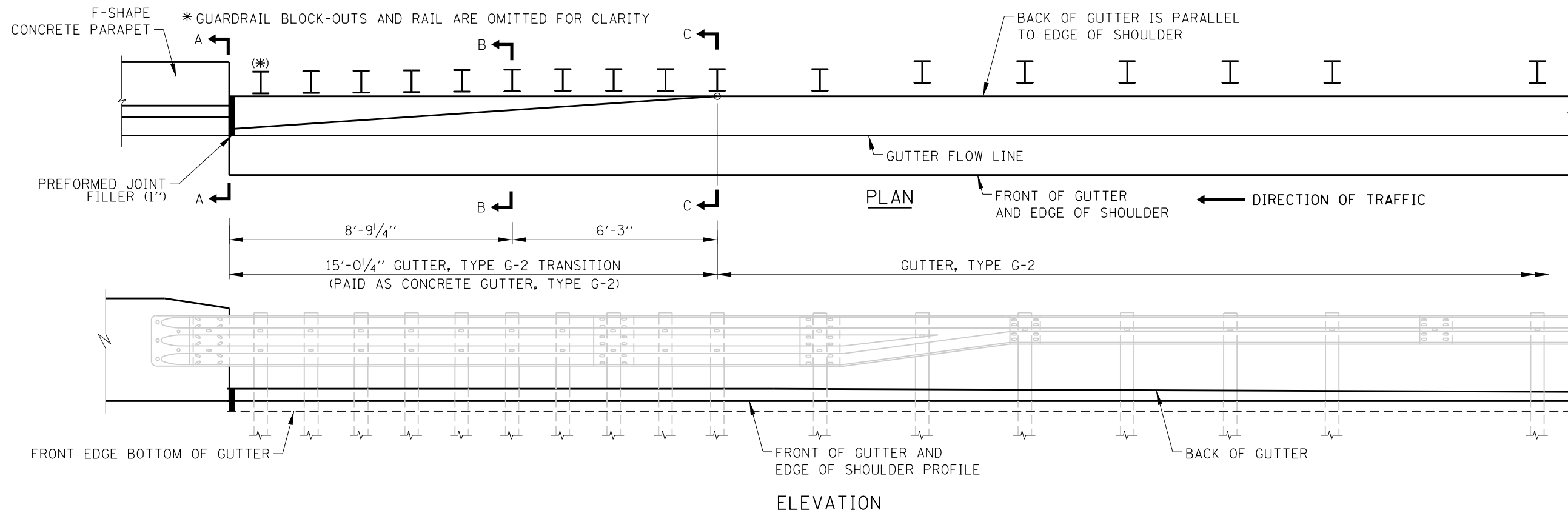
TYPE G-2/G-3 GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6

STANDARD B3-10

APPROVED BY:

DATE:

03/01/2024



**GUTTER, TYPE G-2 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6  
TO F-SHAPE CONCRETE PARAPET**

**LEGEND**

- (A) AGGREGATE SHOULDERS SPECIAL, TYPE C

**NOTE:**

SEE SHEET 1 OF THIS SERIES FOR  
GUTTER TRANSITION NOTES.

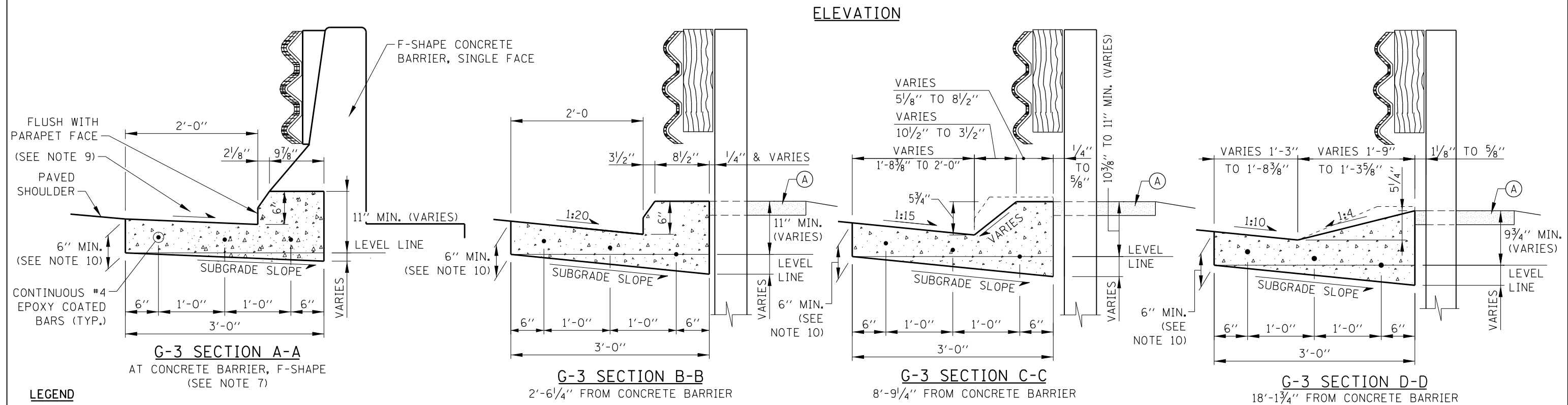
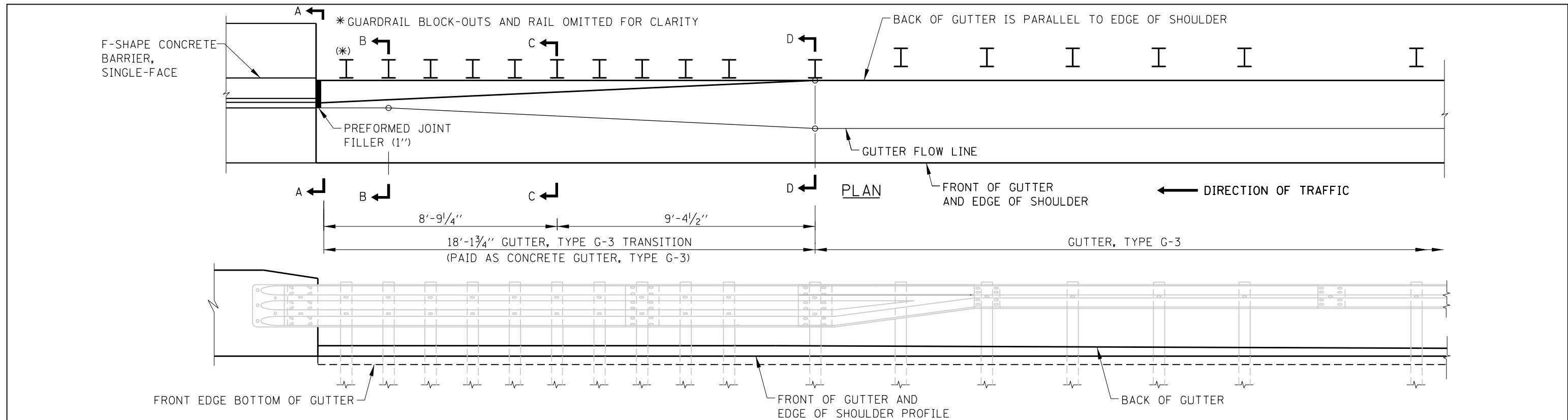
APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

SHEET 6 OF 7



TYPE G-2/G-3 GUTTER  
TRANSITION AT TRAFFIC  
BARRIER TERMINAL,  
TYPE T6

STANDARD B3-10



# LEGEND

- (A) AGGREGATE SHOULDERS SPECIAL, TYPE C

## GUTTER, TYPE G-3 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6, TO F-SHAPE CONCRETE BARRIER, SINGLE-FACE

### NOTE:

SEE SHEET 1 OF THIS SERIES FOR GUTTER TRANSITION NOTES.

SHEET 7 OF 7



TYPE G-2/G-3 GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6

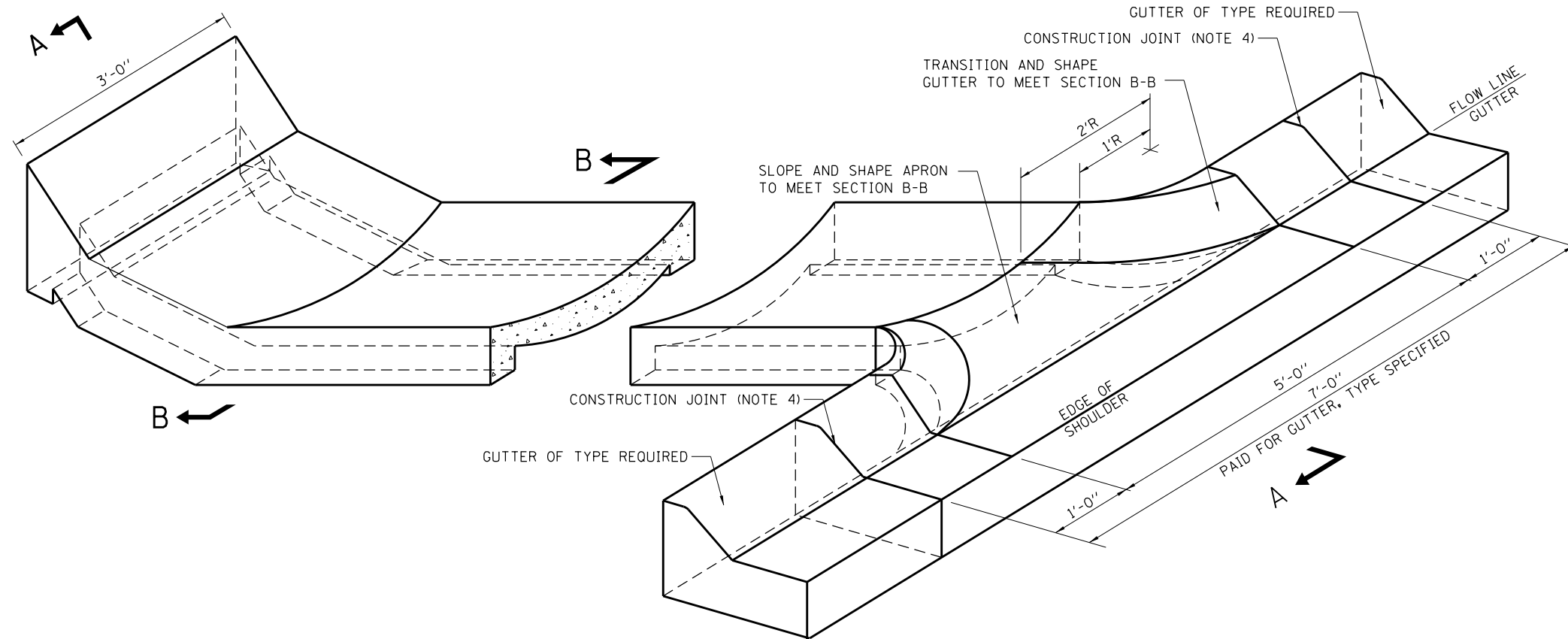
STANDARD B3-10

APPROVED BY:

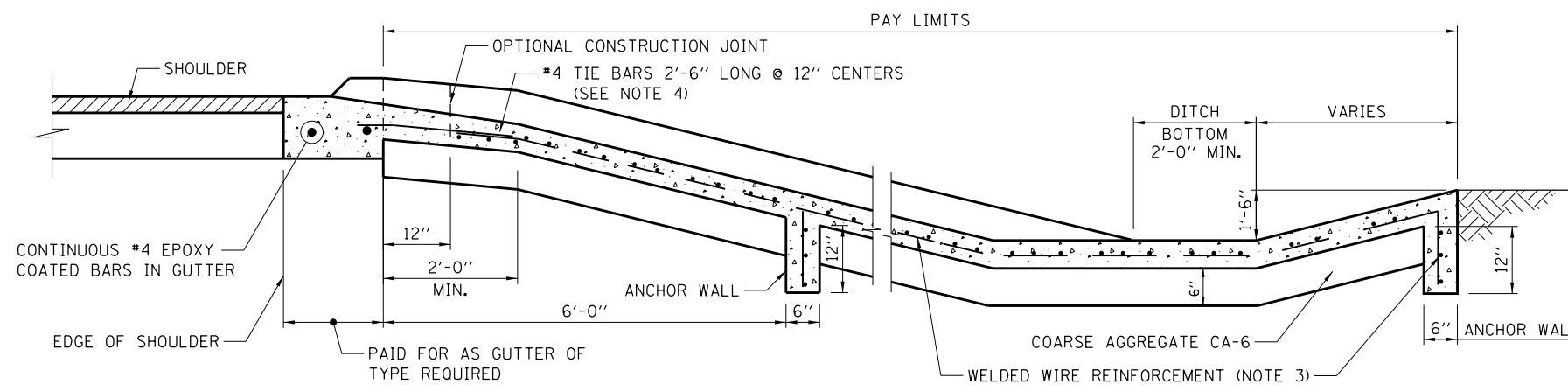
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:

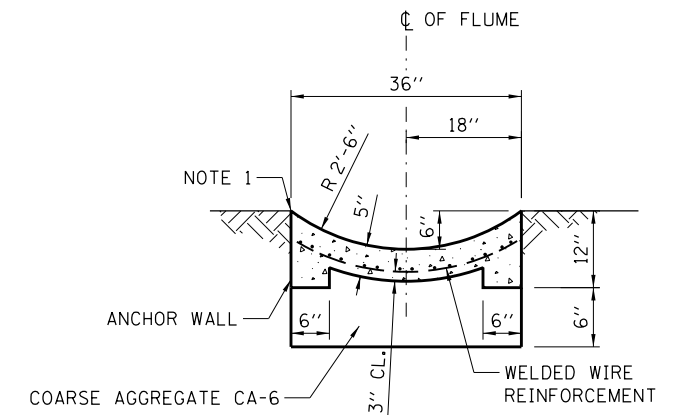
03/01/2024



PLAN



SECTION A-A  
ADJACENT TO GUTTER



NOTE:  
0.62 C.Y. CONCRETE / L.F.

SECTION B-B

## CONCRETE FLUME

### NOTES:

1. CONCRETE FLUMES SHALL BE CONSTRUCTED FLUSH WITH THE ADJACENT EXISTING OR PROPOSED SURFACES.
2. CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
3. WELDED WIRE REINFORCEMENT SHALL BE EPOXY COATED 6x6 W4xW4, 58 LBS. PER 100 SQ. FT.
4. #4 EPOXY COATED TIE BARS 2'-6" LONG AT 12" O/C SHALL BE PROVIDED AT ALL CONSTRUCTION JOINTS.
5. EPOXY COATED EXPANDED METAL FABRIC OF EQUIVALENT STRENGTH MAY BE USED IN LIEU OF WELDED WIRE REINFORCEMENT SUBJECT TO ENGINEER'S APPROVAL.
6. THE LOCATION OF THE ANCHOR WALL MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER.
7. THE MATERIALS AND CONSTRUCTION OF THE CONCRETE FLUME SHALL CONFORM TO THE APPLICABLE PORTIONS OF THE STANDARD SPECIFICATIONS.

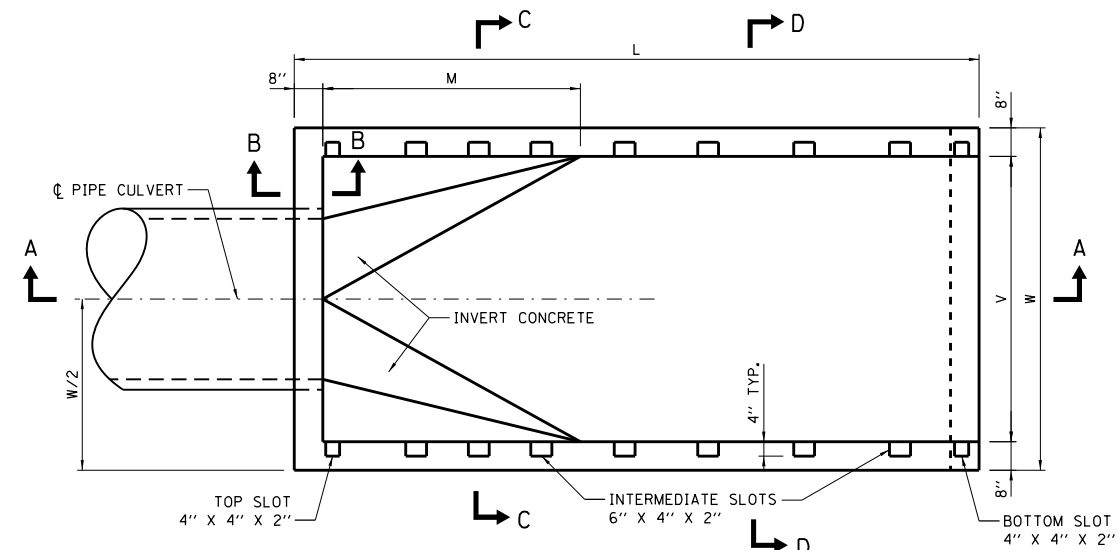
APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
02/07/2012

DATE	REVISIONS
03-01-2018	REVISED SECTION A-A TO INCLUDE COARSE AGGREGATE. NOTE 8 WAS REMOVED
03-31-2016	CHANGED TERMINOLOGY TO WELDED WIRE REINFORCEMENT
03-11-2015	DELETED CURB SECTION

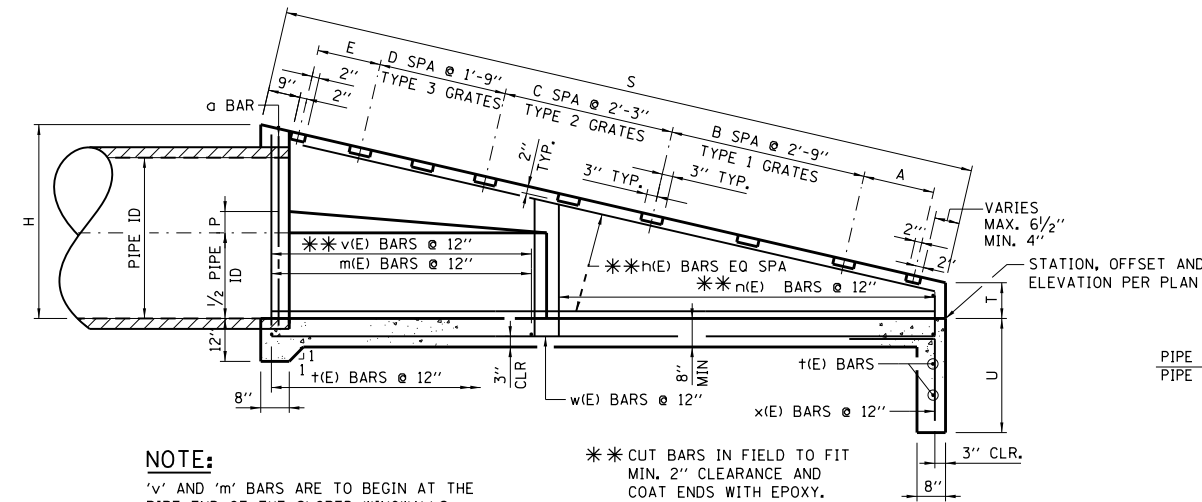


CONCRETE FLUME DETAILS

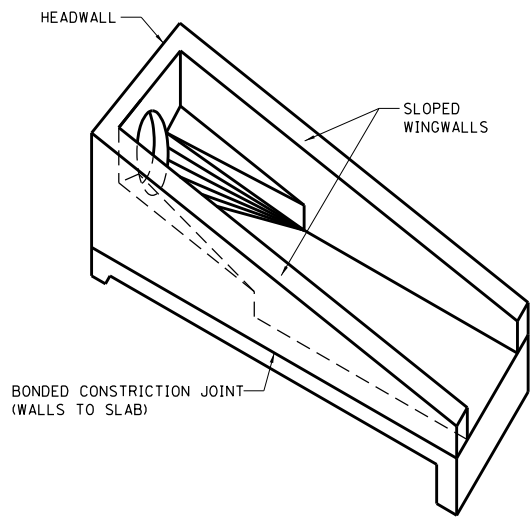
STANDARD B5-04



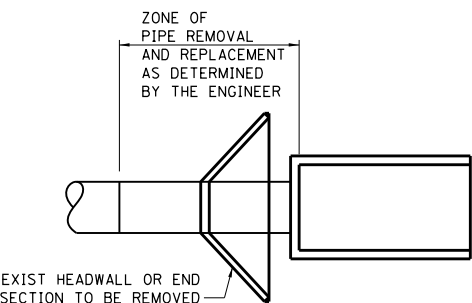
PLAN



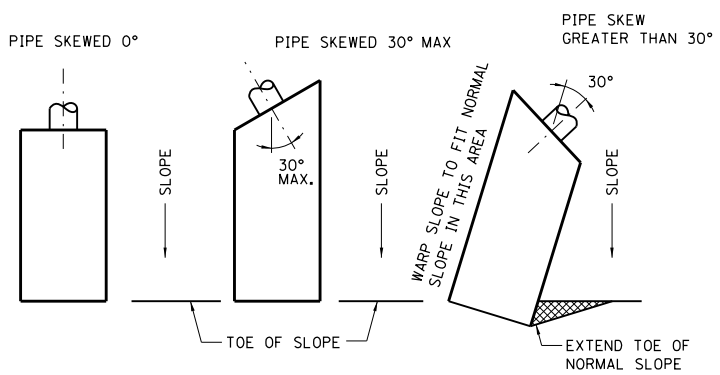
SECTION A-A



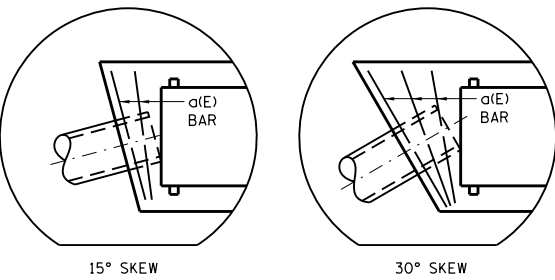
ISOMETRIC VIEW



INSTALLATION DETAIL

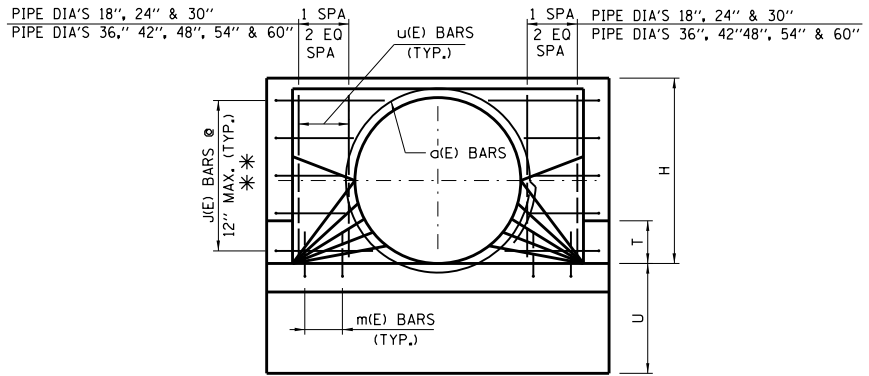


PLAN VIEW OF STRUCTURE LOCATIONS



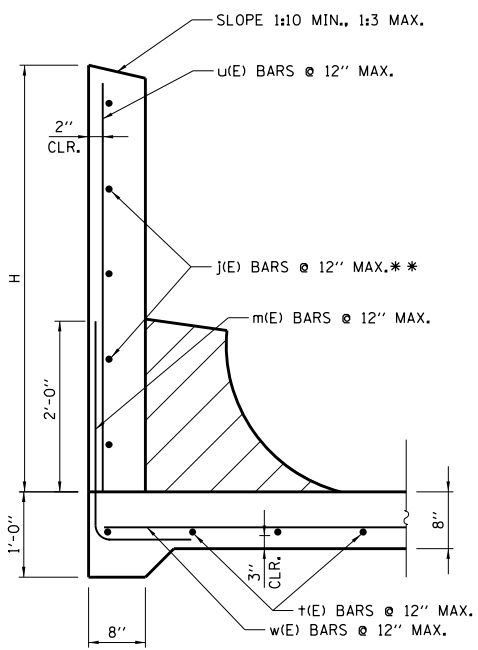
FLARED BAR DETAILS

**NOTES:**  
 ADDITIONAL "a" BARS SHALL BE FURNISHED AND PLACED BY THE CONTRACTOR. THE ADDITIONAL BARS ARE NOT INCLUDED IN THE LISTED QUANTITIES, BUT WILL BE PAID FOR AS REINFORCEMENT BARS (EPOXY COATED).  
 1 ADDITIONAL BAR REQUIRED FOR EACH 15° SKEW OR FRACTION THEREOF.

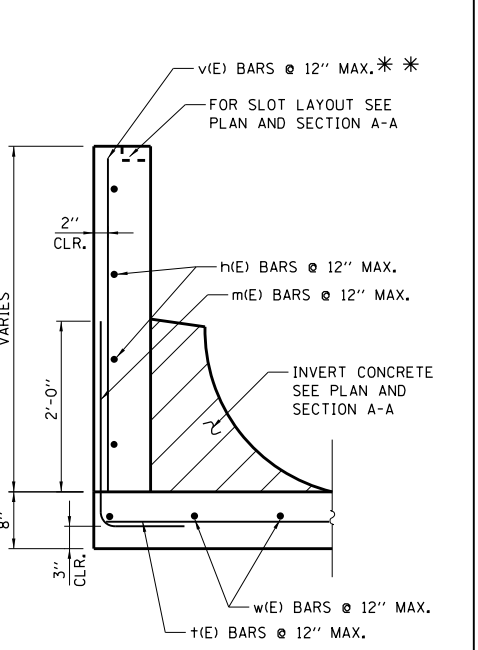


FRONT ELEVATION

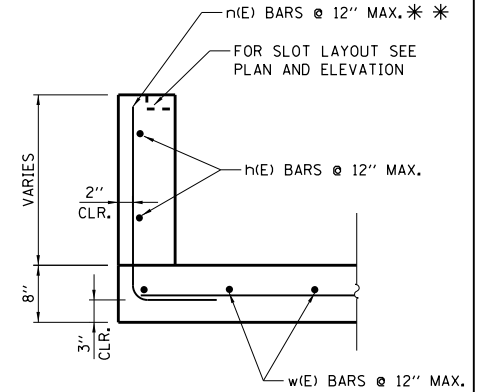
- NOTES:**
- HEADWALL TYPE III SHALL BE CONSTRUCTED FLUSH WITH EXISTING OR PROPOSED SLOPE.
  - CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
  - ALL REINFORCEMENT BARS SHOWN SHALL BE EPOXY COATED (E).
  - BAR BENDING DETAILS ARE DIMENSIONED OUT TO OUT OF BARS.
  - ALL EXPOSED EDGES SHALL HAVE A  $\frac{3}{4}$ " - 45° CHAMFER. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW THE FINISHED GROUND LINE.
  - COVER FROM THE FACE OF CONCRETE TO FACE OF REINFORCEMENT BAR SHALL BE 3" FOR SURFACES FORMED AGAINST EARTH AND 2" FOR ALL OTHER SURFACES UNLESS OTHERWISE SHOWN.
  - CARE SHALL BE EXERCISED IN REMOVING ANY LENGTH OF EXISTING PIPE SO THE REMAINING PIPE IS UNDAMAGED AND FULLY FUNCTIONING.
  - FOR DIMENSIONS AND QUANTITIES FOR ONE HEADWALL, SEE SHEET 2 IN THIS SERIES.
  - FOR STEEL GRATING DETAILS, SEE SHEET 3 IN THIS SERIES.
  - FOR ALTERNATE PRECAST CONCRETE DETAILS AND NOTES, SEE SHEET 4 IN THIS SERIES.
  - ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).



SECTION B-B



SECTION C-C



SECTION D-D

APPROVED BY: *Paul Kovacs* DATE: 05/01/2009  
 CHIEF ENGINEERING OFFICER

DATE	REVISIONS
03-01-2022	REVISED BAR NO. 1 THICKNESS AND WEIGHT OF HEADWALL GRATES
03-01-2021	ADJUSTED LENGTH OF 'h' BARS FOR THE 1:3 SLOPE HEADWALL
03-01-2019	MINOR EDIT

SHEET 1 OF 4

**Illinois Tollway**

HEADWALL TYPE III  
 18"-24"-30"-36"-42"-48"-54"-60"  
 FOR 1:3, 1:4, 1:6, AND  
 1:10 SLOPES

STANDARD B6-09

### DIMENSIONS AND QUANTITIES IN ONE HEADWALL TYPE III 1:3 SLOPE

PIPE DIA	DIMENSIONS											NO. OF SPACES			CONCRETE CLASS SI CU. YD.	REINF. BARS LB.
	H	L	M	P	S	T	U	V	W	A	E	B	C	D		
36"	3'-10"	11'-0"	3'-3"	4"	11'-7"	2"	2'-8"	6'-0"	7'-4"	2'-2"	1'-8"	0	2	1	3.8	347
42"	4'-5"	12'-9"	3'-10"	6"	13'-5"	2"	3'-2"	6'-6"	7'-10"	2'-2"	1'-8"	0	2	2	4.6	444
48"	5'-0"	14'-6"	4'-4"	6"	15'-3"	2"	3'-2"	7'-0"	8'-4"	1'-8"	1'-8"	0	0	6	5.5	502
54"	5'-6"	16'-0"	4'-10"	8"	16'-10"	2"	3'-6"	7'-6"	8'-10"	2'-2"	1'-8"	0	2	4	6.4	613
60"	6'-0"	17'-6"	5'-3"	8"	18'-5"	2"	3'-6"	8'-0"	9'-4"	2'-8"	1'-8"	2	0	4	7.3	668

### DIMENSIONS AND QUANTITIES IN ONE HEADWALL TYPE III 1:4 SLOPE

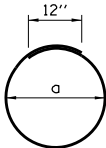
PIPE DIA	DIMENSIONS											NO. OF SPACES			CONCRETE CLASS SI CU. YD.	REINF. BARS LB.
	H	L	M	P	S	T	U	V	W	A	E	B	C	D		
36"	3'-10"	14'-8"	4'-5"	4"	15'-2"	2"	2'-8"	6'-0"	7'-4"	2'-8"	2'-8"	3	0	0	4.7	415
42"	4'-5"	17'-0"	5'-1"	6"	17'-6"	2"	3'-2"	6'-6"	7'-10"	2'-8"	2'-2"	0	5	0	5.8	546
48"	5'-0"	19'-4"	5'-10"	6"	19'-11"	2"	3'-2"	7'-0"	8'-4"	2'-8"	2'-2"	0	6	0	6.9	625
54"	5'-6"	21'-4"	6'-5"	8"	22'-0"	2"	3'-6"	7'-6"	8'-10"	2'-8"	2'-2"	0	7	0	8.0	788
60"	6'-0"	23'-4"	7'-0"	8"	24'-1"	2"	3'-6"	8'-0"	9'-4"	1'-8"	1'-8"	0	0	11	9.1	837

### DIMENSIONS AND QUANTITIES IN ONE HEADWALL TYPE III 1:6 SLOPE

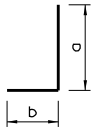
PIPE DIA	DIMENSIONS											NO OF SPACES			CONCRETE CLASS SI CU. YD.	REINF. BARS LB.
	H	L	M	P	S	T	U	V	W	A	E	B	C	D		
36"	3'-10"	22'-0"	6'-8"	4"	22'-4"	2"	2'-8"	6'-0"	7'-4"	1'-8"	1'-8"	0	0	10	7.5	573
42"	4'-5"	25'-6"	7'-8"	6"	25'-10"	2"	3'-2"	6'-6"	7'-10"	1'-8"	1'-8"	0	0	12	9.5	746
48"	5'-0"	29'-0"	8'-9"	6"	29'-5"	2"	3'-2"	7'-0"	8'-4"	1'-8"	1'-8"	0	0	14	11.7	863
54"	5'-6"	32'-0"	9'-8"	8"	32'-5"	2"	3'-6"	7'-6"	8'-10"	2'-2"	1'-8"	0	5	9	13.9	1047
60"	6'-0"	35'-0"	10'-6"	8"	35'-6"	2"	3'-6"	8'-0"	9'-4"	2'-2"	1'-8"	0	1	16	16.3	1177

### DIMENSIONS AND QUANTITIES IN ONE HEADWALL TYPE III 1:10 SLOPE

PIPE DIA	DIMENSIONS											NO OF SPACES			CONCRETE CLASS SI CU. YD.	REINF. BARS LBS.
	H	L	M	P	S	T	U	V	W	A	E	B	C	D		
18"	2'-3"	20'-10"	6'-3"	2"	20'-11½"	2"	2'-8"	3'-0"	4'-4"	2'-8"	2'-2"	2	4	0	4.1	368
24"	2'-9"	25'-10"	7'-9"	3"	25'-11½"	2"	2'-8"	4'-0"	5'-4"	1'-8"	1'-8"	0	0	12	6.1	490
30"	3'-4"	31'-8"	9'-6"	4"	31'-10"	2"	2'-8"	5'-0"	6'-4"	2'-8"	2'-2"	6	4	0	8.8	705
36"	3'-10"	36'-8"	11'-0"	4"	36'-10½"	2"	2'-8"	6'-0"	7'-4"	2'-8"	2'-2"	7	5	0	11.9	944
42"	4'-5"	42'-6"	12'-9"	6"	42'-8½"	2"	3'-2"	6'-6"	7'-10"	2'-8"	2'-8"	13	0	0	15.2	1178
48"	5'-0"	48'-4"	14'-6"	6"	48'-7"	2"	3'-2"	7'-0"	8'-4"	2'-2"	2'-2"	0	19	0	18.8	1457
54"	5'-6"	53'-4"	16'-0"	8"	53'-7½"	2"	3'-6"	7'-6"	8'-10"	2'-8"	2'-8"	17	0	0	22.4	1687
60"	6'-0"	58'-4"	17'-6"	8"	58'-7½"	2"	3'-6"	8'-0"	9'-4"	2'-8"	2'-2"	19	0	0	26.2	1964



TYPE 1



TYPE 2

### REINFORCEMENT BARS SCHEDULE

#### FOR ONE HEADWALL

##### TYPE III 1:10 SLOPE

PIPE DIA	NO 4 REINFORCEMENT BARS					
	MARK(E)	TYPE	NO REQ'D	LENGTH	a	b
18"	a18	1	1	8'-7"	2'-5"	-
	n18	2	32	2'-7"	1'-10"	9"
	m18	2	18	3'-2"	2'-5"	9"
	j18	2	6	4'-0"	2'-0"	2'-0"
	h18	STR.	6	20'-8"	-	-
	x18	2	5	4'-3"	2'-3"	2'-0"
	t18	STR.	23	4'-0"	-	-
	u18	STR.	4	2'-1"	-	-
	v18	STR.	14	2'-1"	-	-
	w18	STR.	5	20'-6"	-	-
24"	a24	1	1	10'-5"	3'-0"	-
	n24	2	38	2'-11"	2'-2"	9"
	m24	2	20	3'-2"	2'-5"	9"
	j24	2	6	4'-0"	2'-0"	2'-0"
	h24	STR.	6	25'-8"	-	-
	x24	2	6	4'-3"	2'-3"	2'-0"
	t24	STR.	28	5'-0"	-	-
	u24	STR.	4	2'-7"	-	-
	v24	STR.	16	2'-7"	-	-
	w24	STR.	6	25'-6"	-	-
30"	a30	1	1	12'-3"	3'-7"	-
	n30	2	46	3'-4"	2'-7"	9"
	m30	2	24	3'-2"	2'-5"	9"
	j30	2	8	4'-0"	2'-0"	2'-0"
	h30	STR.	8	31'-6"	-	-
	x30	2	7	4'-3"	2'-3"	2'-0"
	t30	STR.	34	6'-0"	-	-
	u30	STR.	4	3'-2"	-	-
	v30	STR.	20	3'-2"	-	-
	w30	STR.	7	31'-4"	-	-
36"	a36	1	1	13'-10"	4'-1"	-
	n36	2	52	3'-8"	2'-11"	9"
	m36	2	30	3'-2"	2'-5"	9"
	j36	2	10	4'-0"	2'-0"	2'-0"
	h36	STR.	10	36'-6"	-	-
	x36	2	8	4'-3"	2'-3"	2'-0"
	t36	STR.	39	7'-0"	-	-
	u36	STR.	6	3'-8"	-	-
	v36	STR.	24	3'-8"	-	-
	w36	STR.	8	36'-4"	-	-
42"	a42	1	1	15'-11"	4'-9"	-
	n42	2	62	3'-8"	2'-11"	9"
	m42	2	34	3'-2"	2'-5"	9"
	j42	2	10	4'-0"	2'-0"	2'-0"
	h42	STR.	20	22'-2"	-	-
	x42	2	9	4'-7"	2'-7"	2'-0"
	t42	STR.	46	7'-6"	-	-
	u42	STR.	6	4'-3"	-	-
	v42	STR.	28	4'-3"	-	-
	w42	STR.	18	22'-1"	-	-
48"	a48	1	1	17'-9"	5'-4"	-
	n48	2	70	4'-6"	3'-9"	9"
	m48	2	36	3'-2"	2'-5"	9"
	j48	2	12	4'-0"	2'-0"	2'-0"
	h48	STR.	24	25'-2"	-	-
	x48	2	9	4'-7"	2'-7"	2'-0"
	t48	STR.	52	8'-0"	-	-
	u48	STR.	6	4'-10"	-	-
	v48	STR.	30	4'-10"	-	-
	w48	STR.	18	25'-0"	-	-
54"	a54	1	1	19'-7"	5'-11"	-
	n54	2	76	4'-10"	4'-1"	9"
	m54	2	40	3'-2"	2'-5"	9"
	j54	2	12	4'-0"	2'-0"	2'-0"
	h54	STR.	24	27'-8"	-	-
	x54	2	10	5'-1"	3'-1"	2'-0"
	t54	STR.	57	8'-6"	-	-
	u54	STR.	6	5'-4"	-	-
	v54	STR.	34	5'-4"	-	-
	w54	STR.	20	27'-6"	-	-
60"	a60	1	1	21'-2"	6'-5"	-
	n60	2	82	5'-3"	4'-6"	9"
	m60	2	42	3'-2"	2'-5"	9"
	j60	2	14	4'-0"	2'-0"	2'-0"
	h60	STR.	28	30'-2"	-	-
	x60	2	10	5'-1"	3'-1"	2'-0"
	t60	STR.	62	9'-0"	-	-
	u60	STR.	6	5'-10"	-	-
	v60	STR.	36	5'-10"	-	-
	w60	STR.	20	30'-0"	-	-

### REINFORCEMENT BARS SCHEDULE

#### FOR ONE HEADWALL

##### TYPE III 1:6 SLOPE

PIPE DIA	NO 4 REINFORCEMENT BARS					
	MARK(E)	TYPE	NO REQ'D	LENGTH	a	b
36"	a36	1	1	13'-10"	4'-1"	-
	n36	2	32	3'-8"	2'-11"	9"
	m36	2	20	3'-2"	2'-5"	9"
	j36	2	8	4'-0"	2'-0"	2'-0"
	h36	STR.	8	22'-0"	-	-
	x36	2	8	4'-3"	2'-0"	2'-0"
	t36	STR.	25	7'-0"	-	-
	u36	STR.	6	3'-7"	-	-
	v36	STR.	14	3'-7"	-	-
	w36	STR.	8	21'-8"	-	-
42"	a42	1	1	15'-11"	4'-9"	-
	n42	2	38	4'-2"	3'-5"	9"
	m42	2	22	3'-2"	2'-5"	9"
	j42	2	10	4'-0"	2'-0"	2'-0"
	h42	STR.	10	25'-6"	-	-
	x42	2	9	4'-7"	2'-7"	2'-0"
	t42	STR.	29	7'-6"	-	-
	u42	STR.	6	4'-2"	-	-
	v42	STR.	16	4'-2"	-	-
	w42	STR.	9	25'-2"	-	-
48"	a48	1	1	17'-9"	5'-4"	-
	n48	2	42	4'-6"	3'-9"	9"
	m48	2	24	3'-2"	2'-5"	9"
	j48	2	10	4'-0"	2'-0"	2'-0"
	h48	STR.	10	29'-1"	-	-
	x48	2	9	4'-7"	2'-7"	2'-0"
	t48	STR.	33	8'-0"	-	-
	u48	STR.	6	4'-9"	-	-
	v48	STR.	18	4'-9"	-	-
	w48	STR.	9	28'-8"	-	-
54"	a54	1	1	19'-7"	5'-11"	-
	n54	2	46	4'-10"	4'-1"	9"
	m54	2	26	3'-2"	2'-5"	9"
	j54	2	12	4'-0"	2'-0"	2'-0"
	h54	STR.	12	32'-1"	-	-
	x54	2	10	5'-1"	3'-1"	2'-0"
	t54	STR.	36	8'-6"	-	-
	u54	STR.	6	5'-3"	-	-
	v54	STR.	20	5'-3"	-	-
	w54	STR.	10	31'-8"	-	-
60"	a60	1	1	21'-2"	6'-5"	-
	n60	2	50	5'-3"	4'-6"	9"
	m60	2	28	3'-2"	2'-5"	9"
	j60	2	12	4'-0"	2'-0"	2'-0"
	h60	STR.	12	35'-2"	-	-
	x60	2	10	5'-1"	3'-1"	2'-0"
	t60	STR.	40	9'-0"	-	-
	u60	STR.	6	5'-9"	-	-
v60	STR.	22	5'-9"	-	-	
w60	STR.	10	34'-8"	-	-	



GRATE DIMENSIONS AND QUANTITIES IN ONE  
HEADWALL TYPE III END ENTRANCE 1:3 SLOPE

INSIDE PIPE DIAMETER	GRATES		BARS FOR ONE GRATE				HEADWALL GRATES (POUND)	
	NUMBER REQUIRED	TYPE REQ'D	BAR NO 1		BAR NO 2		EACH GRATE	TOTAL
			BARS REQ'D	LENGTH	BARS REQ'D	LENGTH		
36"	0	1	2	6'-7"	11	2'-4"	133	601
	3	2	2	6'-7"	11	1'-10"	124	
	2	3	2	6'-7"	11	1'-4"	115	
42"	0	1	2	7'-1"	12	2'-4"	144	772
	3	2	2	7'-1"	12	1'-10"	134	
	3	3	2	7'-1"	12	1'-4"	124	
48"	0	1	2	7'-7"	13	2'-4"	155	1062
	0	2	2	7'-7"	13	1'-10"	144	
	8	3	2	7'-7"	13	1'-4"	133	
54"	0	1	2	8'-1"	14	2'-4"	166	1170
	3	2	2	8'-1"	14	1'-10"	154	
	5	3	2	8'-1"	14	1'-4"	142	
60"	3	1	2	8'-7"	15	2'-4"	176	1283
	0	2	2	8'-7"	15	1'-10"	164	
	5	3	2	8'-7"	15	1'-4"	151	

GRATE DIMENSIONS AND QUANTITIES IN ONE  
HEADWALL TYPE III END ENTRANCE 1:4 SLOPE

INSIDE PIPE DIAMETER	GRATES		BARS FOR ONE GRATE				HEADWALL GRATES (POUND)	
	NUMBER REQUIRED	TYPE REQ'D	BAR NO 1		BAR NO 2		EACH GRATE	TOTAL
			BARS REQ'D	LENGTH	BARS REQ'D	LENGTH		
36"	5	1	2	6'-7"	11	2'-4"	133	666
	0	2	2	6'-7"	11	1'-10"	124	
	0	3	2	6'-7"	11	1'-4"	115	
42"	1	1	2	7'-1"	12	2'-4"	144	947
	6	2	2	7'-1"	12	1'-10"	134	
	0	3	2	7'-1"	12	1'-4"	124	
48"	1	1	2	7'-7"	13	2'-4"	155	1161
	7	2	2	7'-7"	13	1'-10"	144	
	0	3	2	7'-7"	13	1'-4"	133	
54"	1	1	2	8'-1"	14	2'-4"	166	1395
	8	2	2	8'-1"	14	1'-10"	154	
	0	3	2	8'-1"	14	1'-4"	142	
60"	0	1	2	8'-7"	15	2'-4"	176	1961
	0	2	2	8'-7"	15	1'-10"	164	
	13	3	2	8'-7"	15	1'-4"	151	

GRATE DIMENSIONS AND QUANTITIES IN  
ONE HEADWALL TYPE III END ENTRANCE 1:6 SLOPE

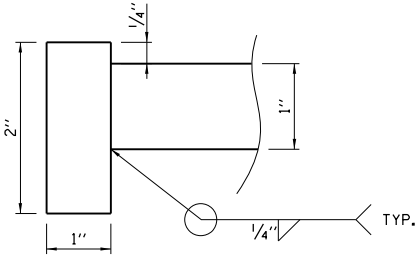
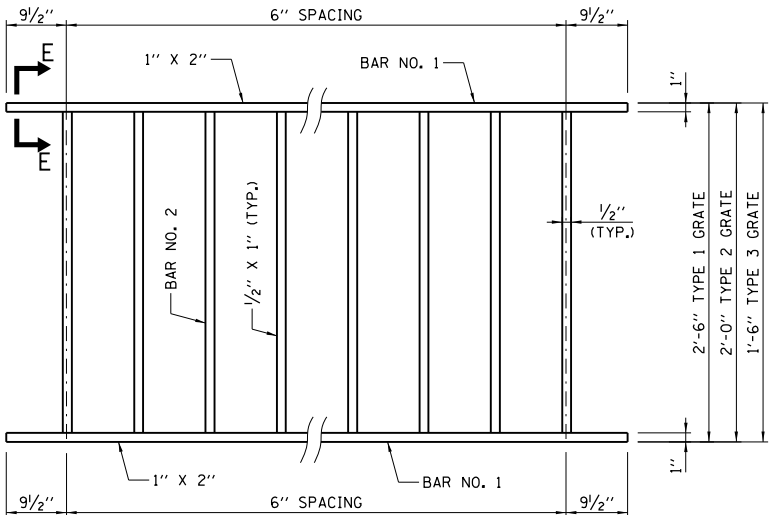
INSIDE PIPE DIAMETER	GRATES		BARS FOR ONE GRATE				HEADWALL GRATES (POUND)	
	NUMBER REQUIRED	TYPE REQ'D	BAR NO 1		BAR NO 2		EACH GRATE	TOTAL
			BARS REQ'D	LENGTH	BARS REQ'D	LENGTH		
36"	0	1	2	6'-7"	11	2'-4"	133	1375
	0	2	2	6'-7"	11	1'-10"	124	
	12	3	2	6'-7"	11	1'-4"	115	
42"	0	1	2	7'-1"	12	2'-4"	144	1731
	0	2	2	7'-1"	12	1'-10"	134	
	14	3	2	7'-1"	12	1'-4"	124	
48"	0	1	2	7'-7"	13	2'-4"	155	2123
	0	2	2	7'-7"	13	1'-10"	144	
	16	3	2	7'-7"	13	1'-4"	133	
54"	0	1	2	8'-1"	14	2'-4"	166	2340
	6	2	2	8'-1"	14	1'-10"	154	
	10	3	2	8'-1"	14	1'-4"	142	
60"	0	1	2	8'-7"	15	2'-4"	176	2892
	2	2	2	8'-7"	15	1'-10"	164	
	17	3	2	8'-7"	15	1'-4"	151	

GRATE DIMENSIONS AND QUANTITIES IN ONE HEADWALL  
TYPE III END ENTRANCE 1:10 SLOPE

INSIDE PIPE DIAMETER	GRATES		BARS FOR ONE GRATE				HEADWALL GRATES (POUND)	
	NUMBER REQUIRED	TYPE REQ'D	BAR NO 1		BAR NO 2		EACH GRATE	TOTAL
			BARS REQ'D	LENGTH	BARS REQ'D	LENGTH		
18"	3	1	2	3'-7"	5	2'-4"	69	528
	5	2	2	3'-7"	5	1'-10"	64	
	0	3	2	3'-7"	5	1'-4"	60	
24"	0	1	2	4'-7"	7	2'-4"	90	1096
	0	2	2	4'-7"	7	1'-10"	84	
	14	3	2	4'-7"	7	1'-4"	78	
30"	7	1	2	5'-7"	9	2'-4"	112	1302
	5	2	2	5'-7"	9	1'-10"	104	
	0	3	2	5'-7"	9	1'-4"	96	
36"	8	1	2	6'-7"	11	2'-4"	133	1810
	6	2	2	6'-7"	11	1'-10"	124	
	0	3	2	6'-7"	11	1'-4"	115	
42"	15	1	2	7'-1"	12	2'-4"	144	2161
	0	2	2	7'-1"	12	1'-10"	134	
	0	3	2	7'-1"	12	1'-4"	124	
48"	0	1	2	7'-7"	13	2'-4"	155	3019
	21	2	2	7'-7"	13	1'-10"	144	
	0	3	2	7'-7"	13	1'-4"	133	
54"	19	1	2	8'-1"	14	2'-4"	166	3146
	0	2	2	8'-1"	14	1'-10"	154	
	0	3	2	8'-1"	14	1'-4"	142	
60"	20	1	2	8'-7"	15	2'-4"	176	3691
	1	2	2	8'-7"	15	1'-10"	164	
	0	3	2	8'-7"	15	1'-4"	151	

NOTES:

- ALL STRUCTURAL STEEL SHALL BE AASHTO M270, GRADE 36 OR 50.
- GALVANIZING SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- FOR PLACEMENT OF GRATES, SEE SHEET 1 IN THIS SERIES.
- ALL TABLE DIMENSIONS AND QUANTITIES ARE FOR SINGLE HEADWALL, TYPE III.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- GRATING IS DESIGNED FOR A TRANSVERSING LOAD OF 1,800 POUNDS AT YIELD.

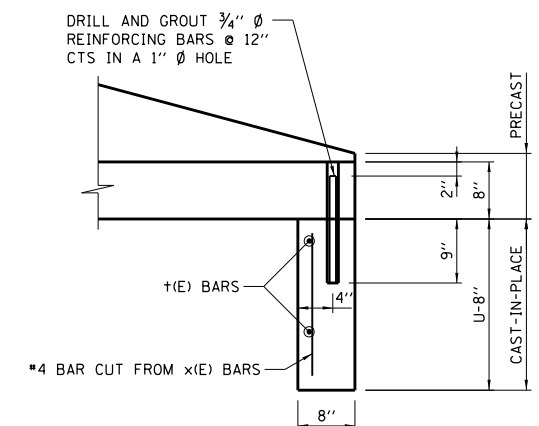
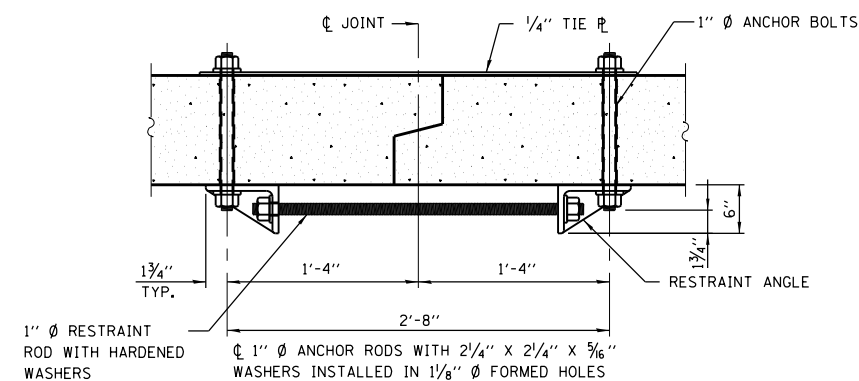
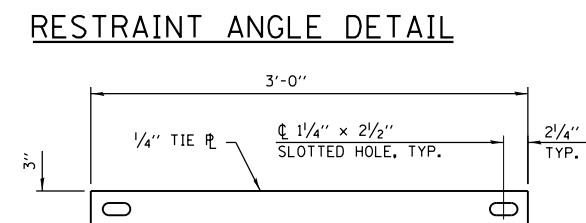
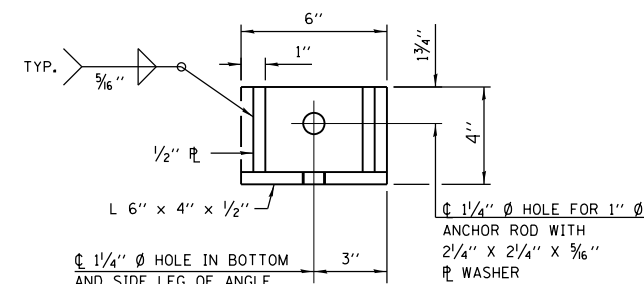
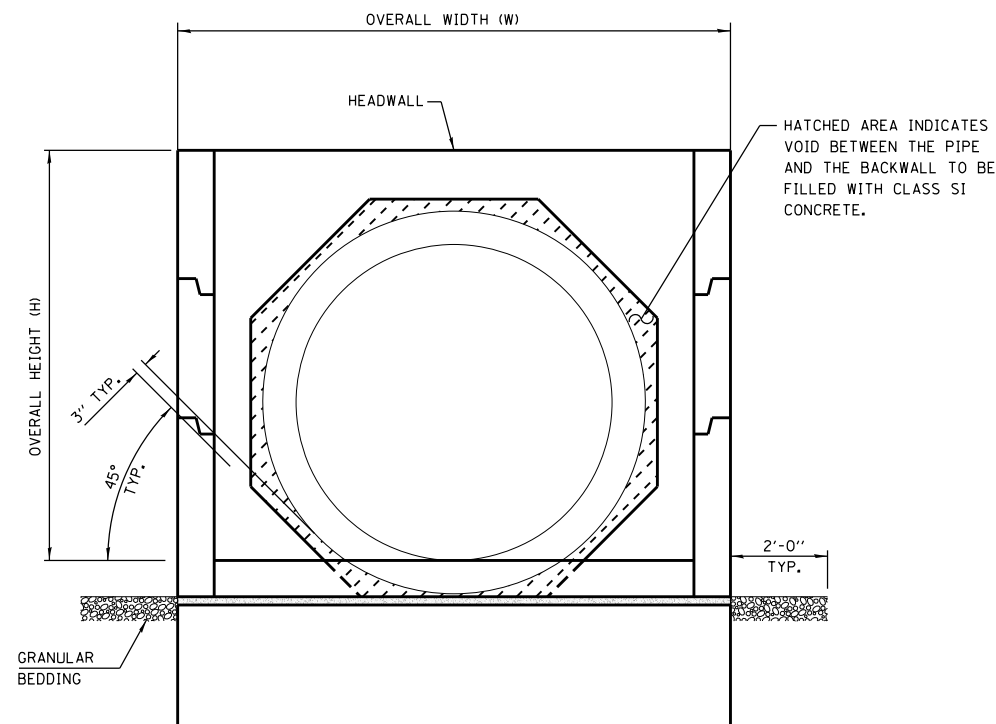
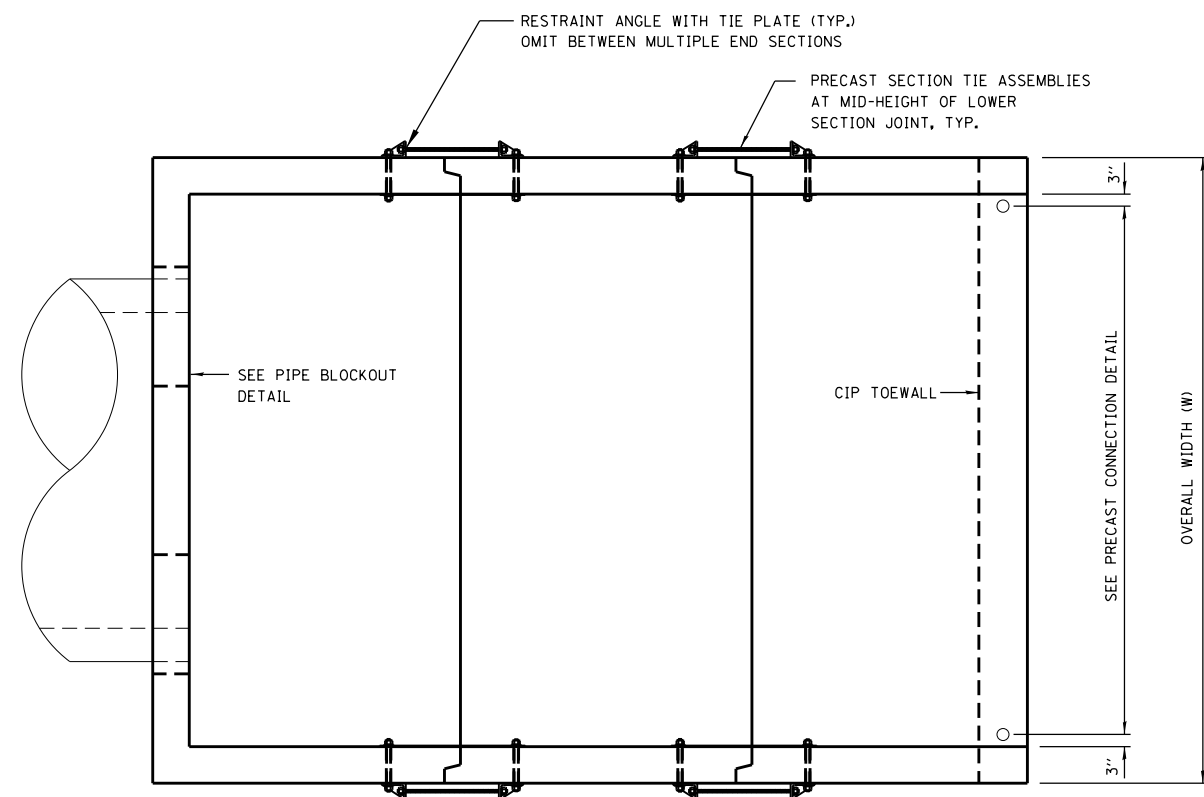
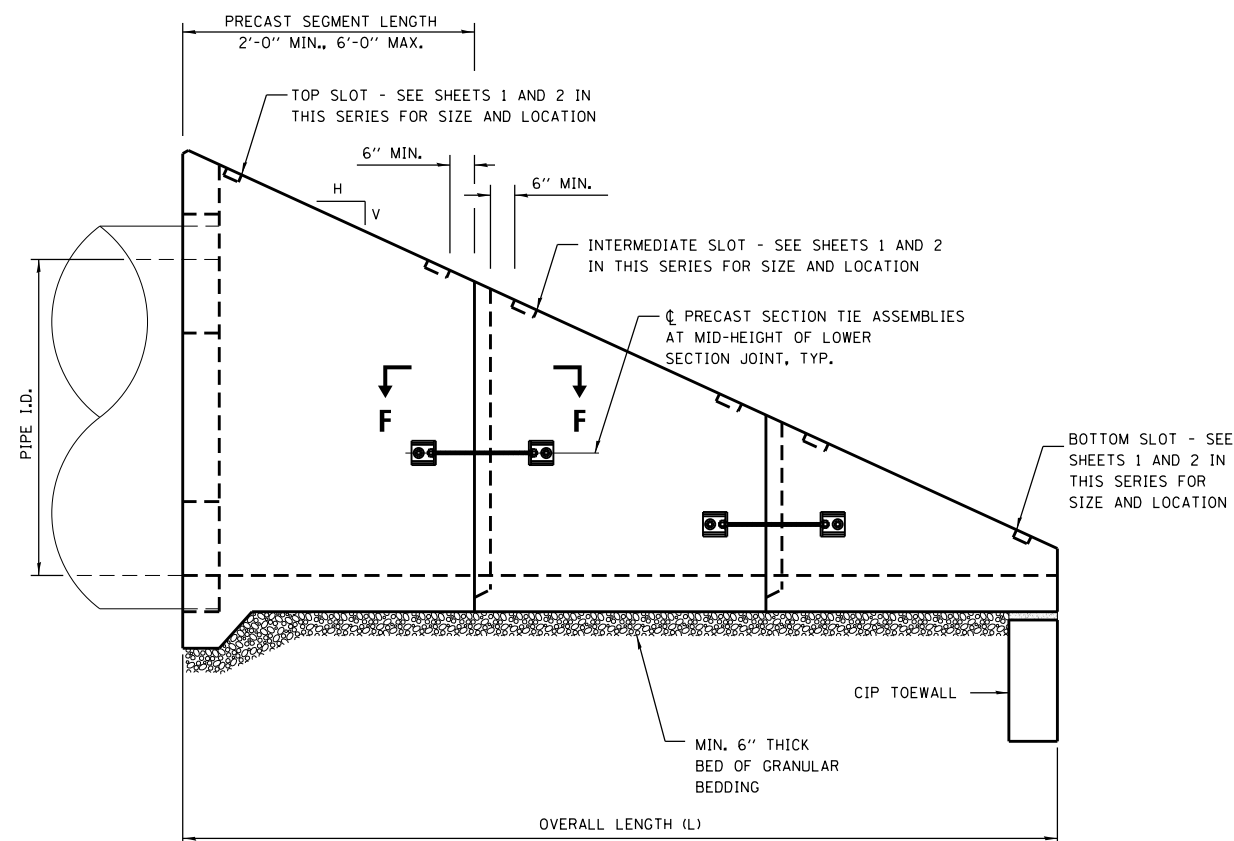


SECTION E-E

TYPICAL GRATE

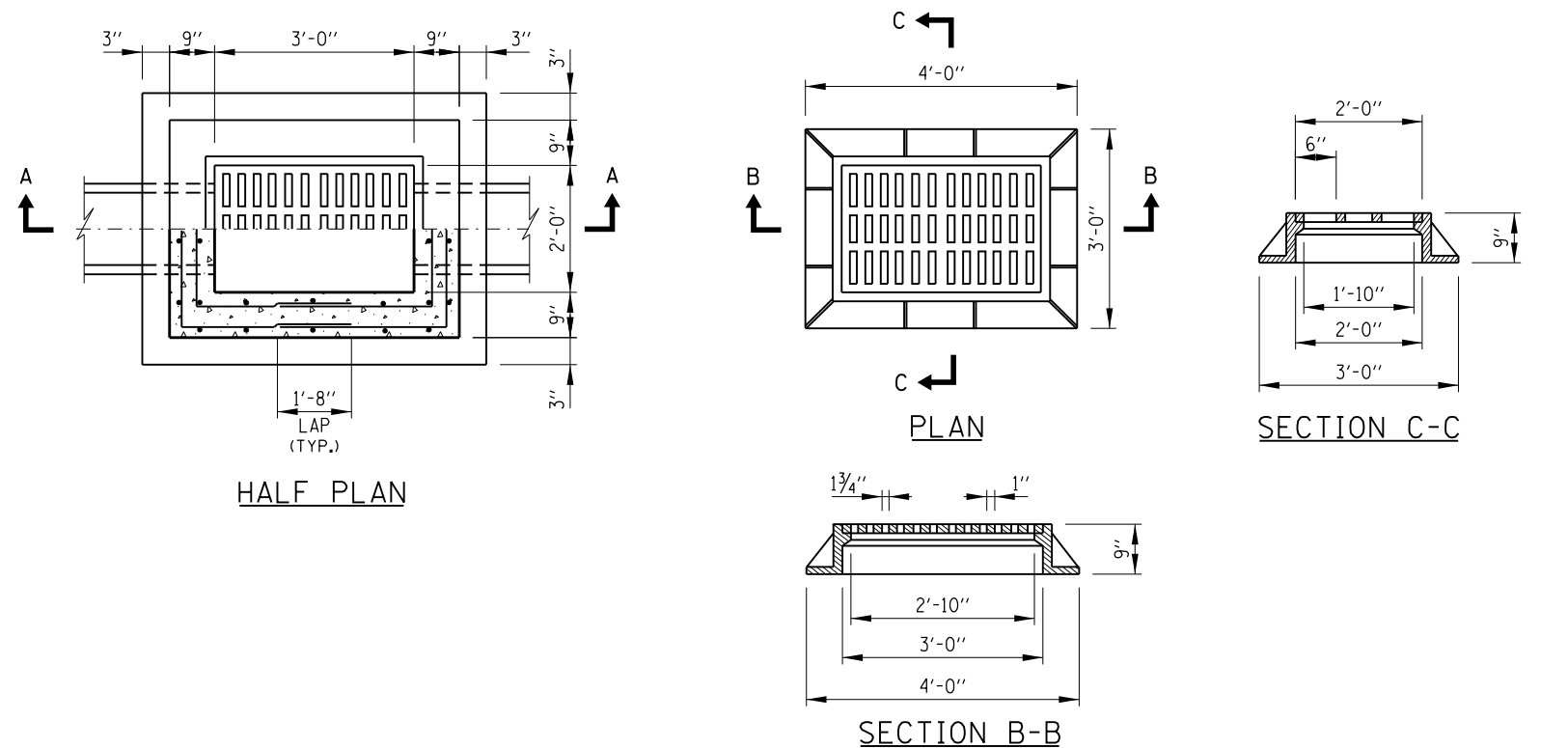


HEADWALL TYPE III  
18"-24"-30"-36"-42"-48"-54"-60"  
FOR 1:3, 1:4, 1:6, AND  
1:10 SLOPES

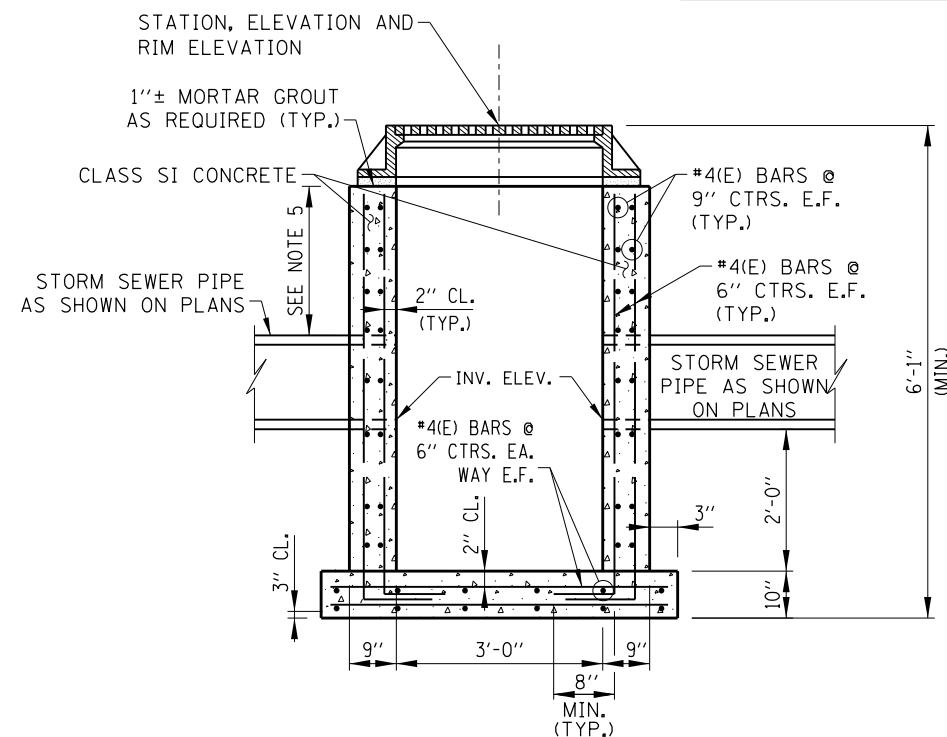


GENERAL NOTES:

1. THE NUMBER OF SEGMENTS SHOWN IN ELEVATION IS FOR EXAMPLE ONLY. THE LENGTH AND NUMBER OF PRECAST SECTIONS REQUIRED TO CONSTRUCT THE END SECTION SHALL BE DETERMINED BY THE CONTRACTOR.
2. CONTRACTOR SHALL RETAIN THE SERVICES OF AN ILLINOIS LICENSED STRUCTURAL ENGINEER TO PROPORTION, DESIGN AND DETAIL PRECAST SECTIONS FOR INSTALLATION AND FOR SERVICE. SEE CAST-IN-PLACE DIMENSIONS AND REINFORCING DETAILS FOR MINIMUM REQUIREMENTS. INCREASE MEMBER SIZES AND REINFORCING AS NECESSARY TO SATISFY HANDLING AND INSTALLATION STRESSES IN PRECAST SECTIONS.
3. CLASS "SI" CONCRETE SHALL BE USED THROUGHOUT.
4. REINFORCEMENT BARS (GRADE 60) SHALL BE EPOXY COATED. SEE CAST-IN-PLACE DETAILS FOR BENDING DIAGRAM. SEE NOTES ON SHEET 1 IN THIS SERIES FOR REINFORCING COVER REQUIREMENTS.
5. ALL EXPOSED EDGES SHALL BE CHAMFERED. SEE NOTES ON SHEET 1 IN THIS SERIES.
6. SEE ROADWAY PLANS FOR SLOPE (V:H) AND PIPE INSIDE DIAMETER.
7. HOLES IN THE WALLS FOR THE PRECAST TIE ASSEMBLY MAY BE DRILLED USING CORE BITS IN LIEU OF FORMED HOLES. AVOID DAMAGE TO REINFORCING FROM DRILLING HOLES.
8. FOR STEEL GRATING DETAILS, SEE SHEET 3 IN THIS SERIES.
9. ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
10. TIE ASSEMBLIES, CONSISTING OF ANCHOR RODS, TIE PLATES, RESTRAINT ANGLES, RESTRAINT RODS AND ALL NUTS AND WASHERS SHALL CONFORM WITH AASHTO M270 GR36, OR GR50 AND SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH AASHTO M 111 AFTER FABRICATION.

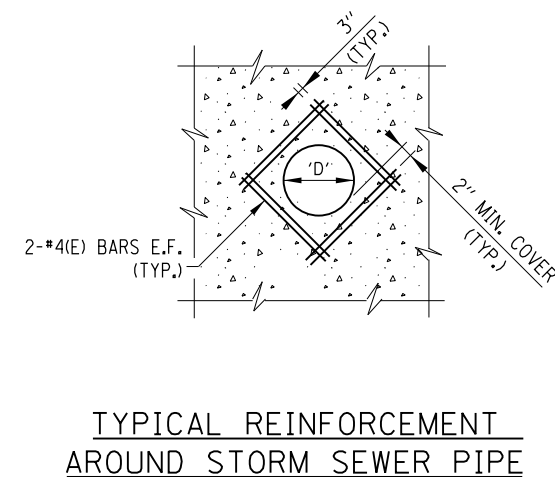


FRAME AND GRATE DETAIL



SECTION A-A

CATCH BASIN TYPE B



**NOTES:**

1. FOR MATERIALS AND CONSTRUCTION REQUIREMENTS OF THE CATCH BASIN, REFER TO THE STANDARD SPECIFICATIONS.
2. FRAME AND GRATE FOR CATCH BASIN TYPE B SHALL BE NEENAH FOUNDRY COMPANY TYPE R-3455C, EAST JORDAN IRON WORKS V5360-1 OR APPROVED EQUAL.
3. REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED.
4. THE CONTRACTOR SHALL CLEARLY MARK EACH CATCH BASIN WITH "ILLINOIS TOLLWAY", CONTRACT NUMBER, STRUCTURE NUMBER, PRODUCER NAME AND DATE OF MANUFACTURE. THIS INFORMATION SHALL BE MARKED ON THE OUTSIDE FACE OF THE STRUCTURE IN A VISIBLE SURFACE AS DESIGNATED BY THE ENGINEER. THE MARKING SHALL BE PAINTED/STAMPED IN THE STRUCTURE WITH WATERPROOF PAINT/INK OR RECESSED IN THE STRUCTURE BY 1/2". THE LETTERS SHALL BE CAPITALS, NOT LESS THAN 2 IN. AND NOT MORE THAN 3 IN. IN HEIGHT.
5. A MINIMUM OF 9" OF MONOLITHIC REINFORCED CONCRETE SHALL BE MAINTAINED ABOVE PIPE PENETRATION HOLES >15".

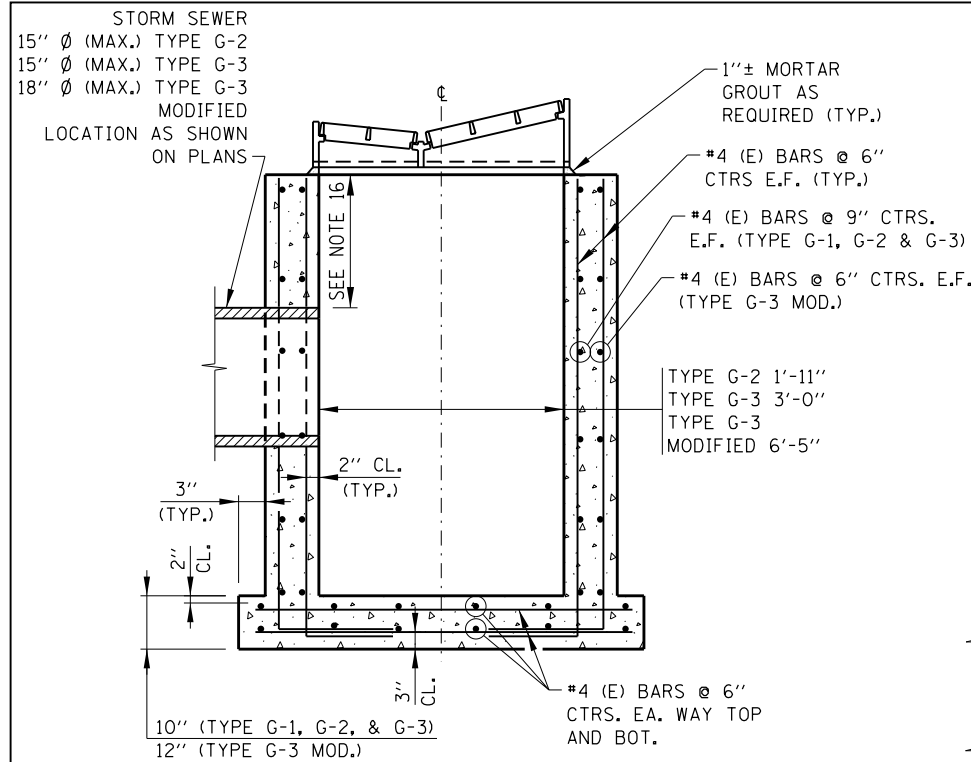
APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
03-01-2022	ADDED NOTES FOR MARKINGS AND MINIMUM 9" ABOVE PIPE PENETRATION HOLES
03-01-2020	REVISED TYPICAL REINFORCEMENT AROUND PIPE
03-11-2015	SLOPE DRAIN CHANGE TO BASE SHEET

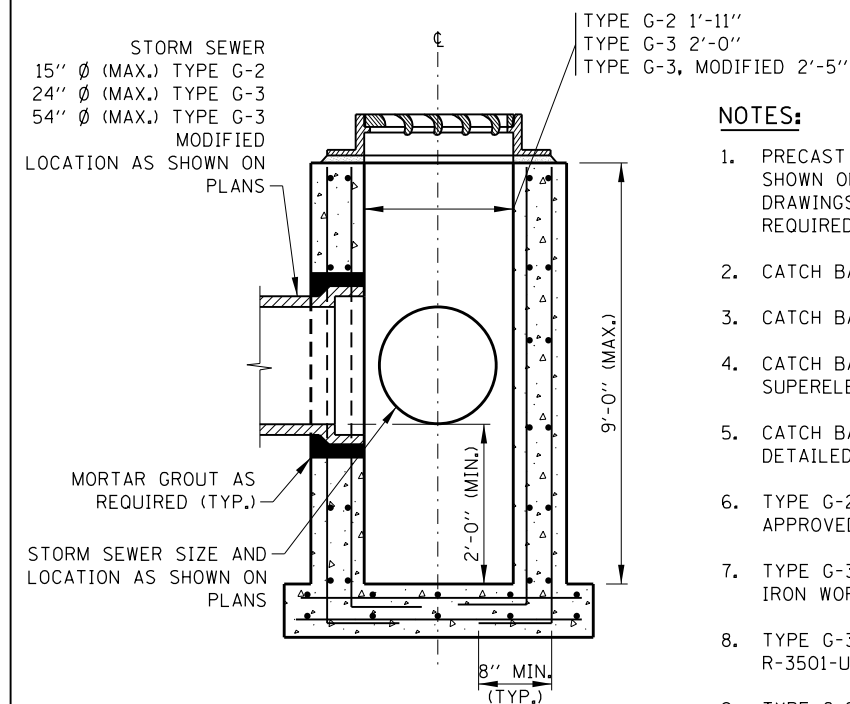


CATCH BASIN, TYPE B

STANDARD B7-05



SECTION A-A

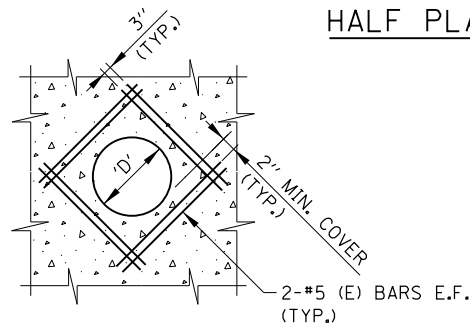
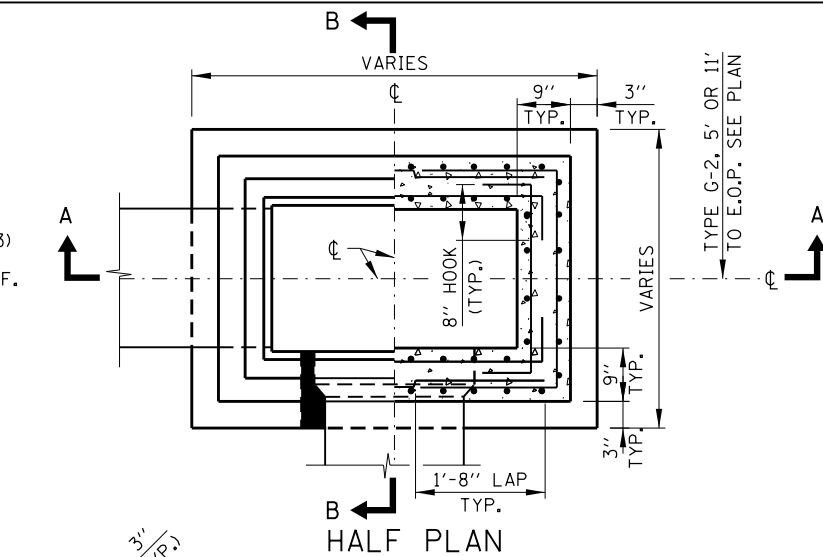


SECTION B-B

CATCH BASIN TYPE "G" SERIES

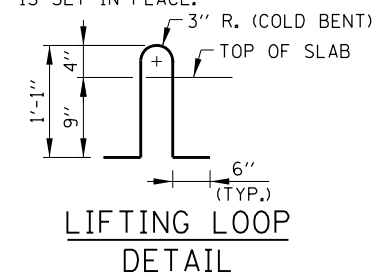
NOTE:

POSITION OF OPENING VARIES FROM 3'-2" TO 5'-4" MEASURED FROM BACK OF GUTTER LINE.



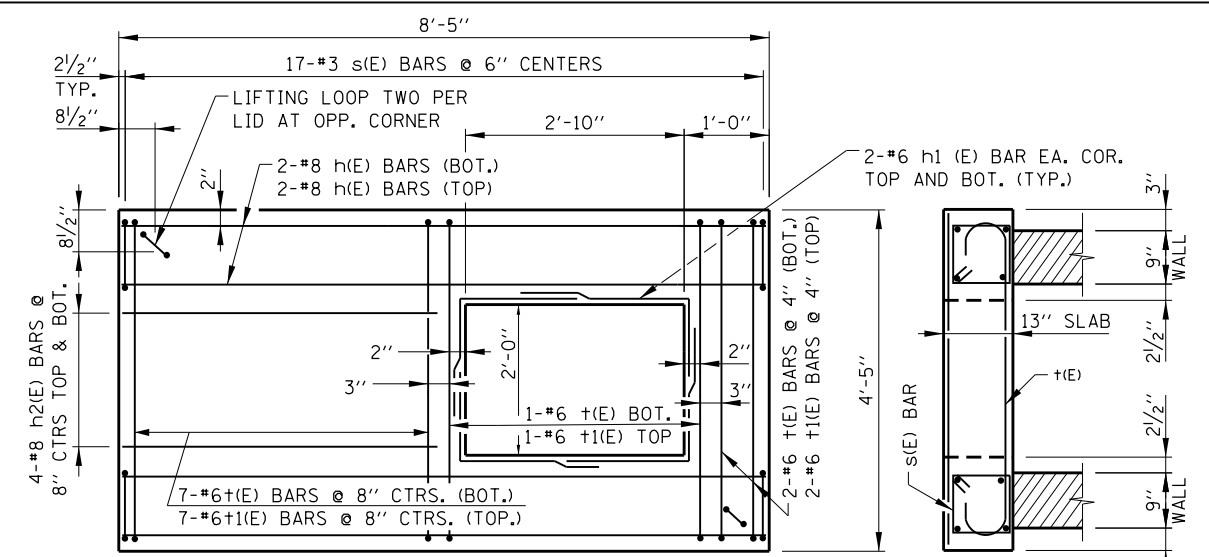
TYPICAL REINFORCEMENT AROUND STORM SEWER PIPE

LIFTING LOOP TO BE 1/2"Ø x 270 KSI STRANDS TO BE BURNED AFTER PRECAST CONCRETE LID IS SET IN PLACE.

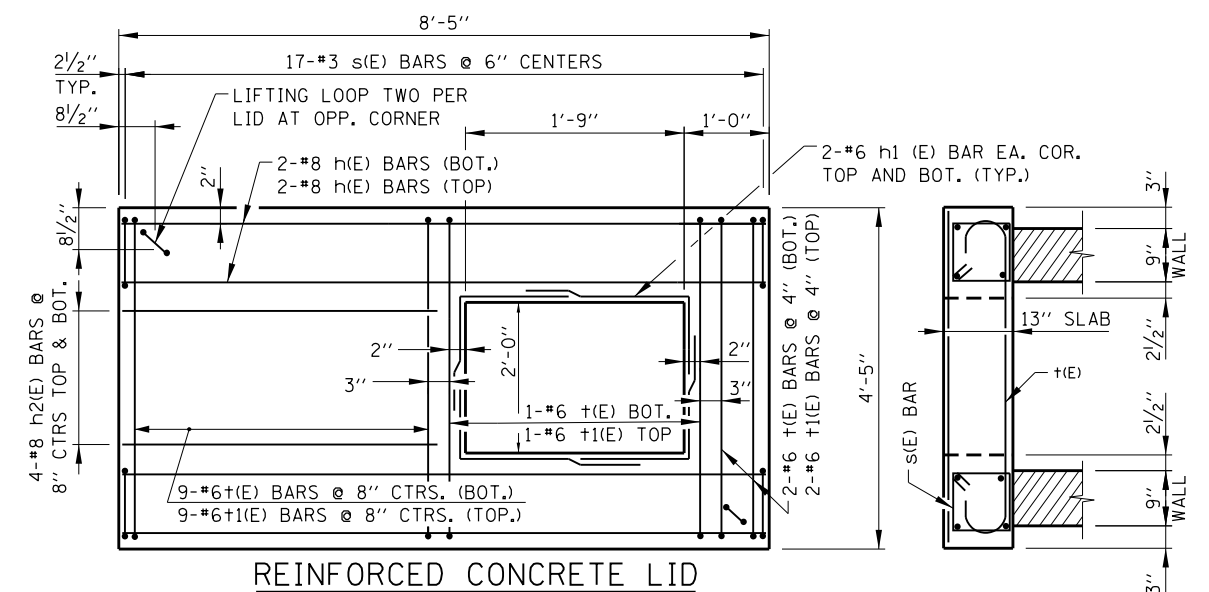


NOTES:

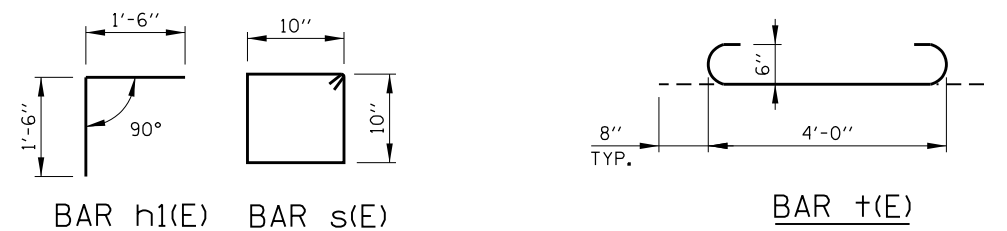
1. PRECAST CONCRETE UNITS WILL BE ACCEPTABLE PROVIDED THEY MEET ALL THE REQUIREMENTS AS SHOWN ON THIS DRAWING. BASE EXTENSION OF 3" NOT REQUIRED FOR PRECAST UNITS. FABRICATION DRAWINGS SHOWING PIPE OPENINGS, REINFORCEMENT AND OTHER PERTINENT DIMENSIONS WILL BE REQUIRED FOR EACH UNIT, FOR APPROVAL BY THE ENGINEER PRIOR TO FABRICATION.
2. CATCH BASIN, TYPE G-2 SHALL BE USED ALONG RAMPS WHERE GUTTER TYPE G-2 IS PROVIDED.
3. CATCH BASIN, TYPE G-3 SHALL BE USED WHERE GUTTER TYPE G-3 IS PROVIDED.
4. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE USED IN PAVEMENT SECTIONS AND ON THE LOW SIDE OF SUPERELEVATED PAVEMENT.
5. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE PROVIDED WITH A REINFORCED CONCRETE SLAB TOP AS DETAILED ON THIS DRAWING.
6. TYPE G-2 FRAME AND GRATE SHALL BE NEENAH R-3508-A2, EAST JORDAN IRON WORKS 7300 OR APPROVED EQUAL.
7. TYPE G-3 FRAME AND GRATE SHALL BE NEENAH INLET FOR ROLL TYPE CURB R-3501-U OR EAST JORDAN IRON WORKS 7545 OR APPROVED EQUAL.
8. TYPE G-3, MODIFIED FRAME AND GRATE SHALL BE NEENAH INLET FOR ROLL TYPE CURB SPECIAL R-3501-U1, EAST JORDAN IRON WORKS 7546 OR APPROVED EQUAL.
9. TYPE G-2, MODIFIED FRAME AND GRATE FOR ROLL TYPE CURB R-3508-B2 OR APPROVED EQUAL.
10. MORTAR OR SEALER SHALL BE USED WHEN A PRECAST REINFORCED CONCRETE LID IS USED.
11. REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED.
12. E.O.P. = EDGE OF PAVEMENT.
13. ALL CONCRETE SHALL BE CLASS SI CONCRETE.
14. FRAME AND GRATE RIM ELEVATION AND OFFSET MEASURED AT THE EDGE OF SHOULDER.
15. THE CONTRACTOR SHALL CLEARLY MARK EACH CATCH BASIN WITH "ILLINOIS TOLLWAY", CONTRACT NUMBER, STRUCTURE NUMBER, PRODUCER NAME AND DATE OF MANUFACTURE. THIS INFORMATION SHALL BE MARKED ON THE OUTSIDE FACE OF THE STRUCTURE IN A VISIBLE SURFACE AS DESIGNATED BY THE ENGINEER. THE MARKING SHALL BE PAINTED/STAMPED IN THE STRUCTURE WITH WATERPROOF PAINT/INK OR RECESSED IN THE STRUCTURE BY 1/2". THE LETTERS SHALL BE CAPITALS, NOT LESS THAN 2 IN. AND NOT MORE THAN 3 IN. IN HEIGHT.
16. A MINIMUM OF 9" OF MONOLITHIC REINFORCED CONCRETE SHALL BE MAINTAINED ABOVE PIPE PENETRATION HOLES.



REINFORCED CONCRETE LID  
TYPE G-3 FRAME AND GRATE  
CATCH BASIN, TYPE G-3, MODIFIED

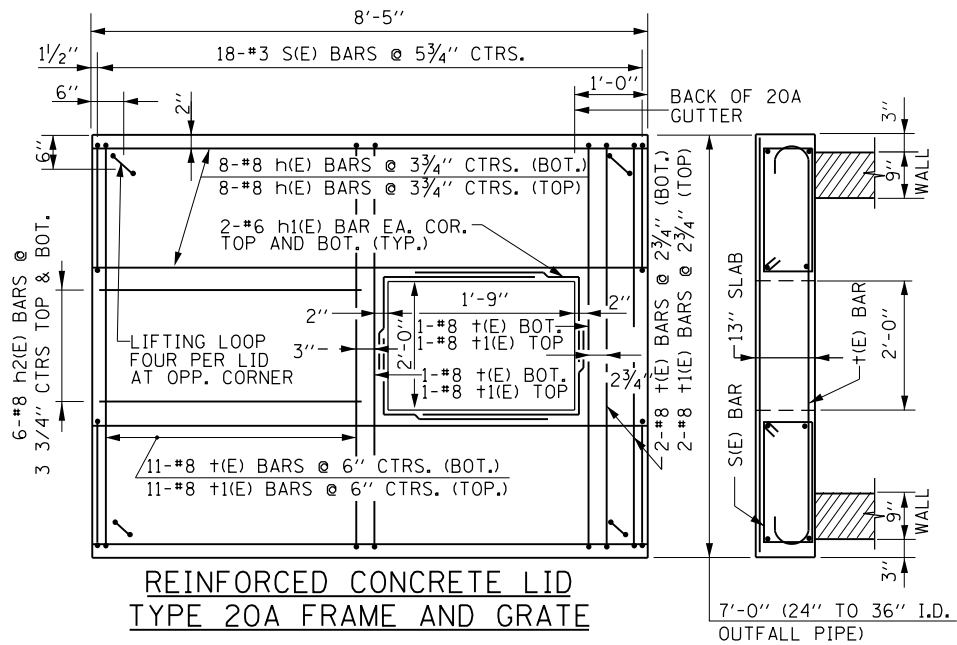
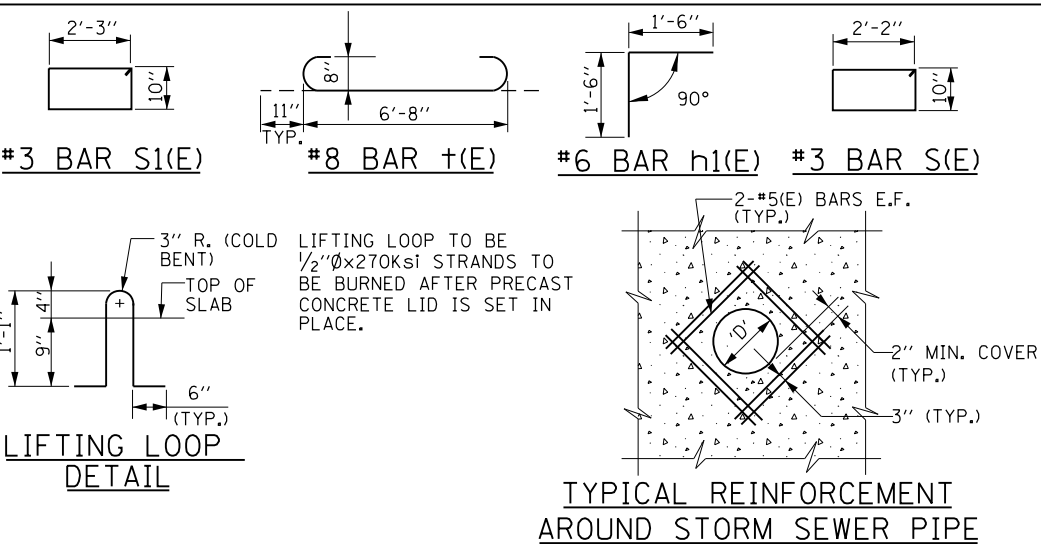
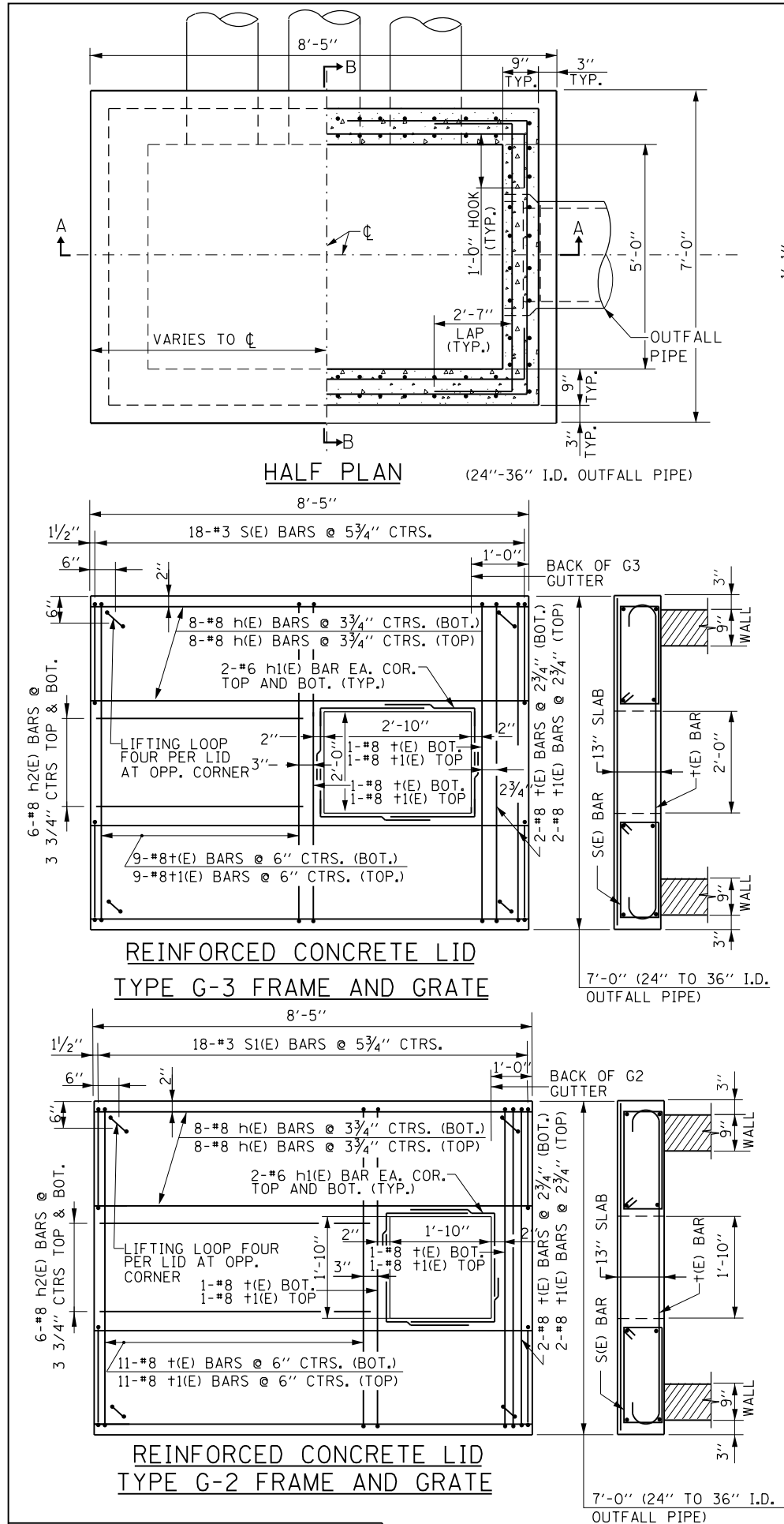


REINFORCED CONCRETE LID  
TYPE 20A FRAME AND GRATE  
CATCH BASIN, TYPE G-3, MODIFIED



DATE	REVISIONS
03-01-2024	NOTED MAXIMUM PIPE SIZES ON SECTIONS A-A AND B-B (SHEET 1), REVISED NOTE 16 (SHEET 1), REVISED NOTE 11 (SHEETS 2 AND 3)

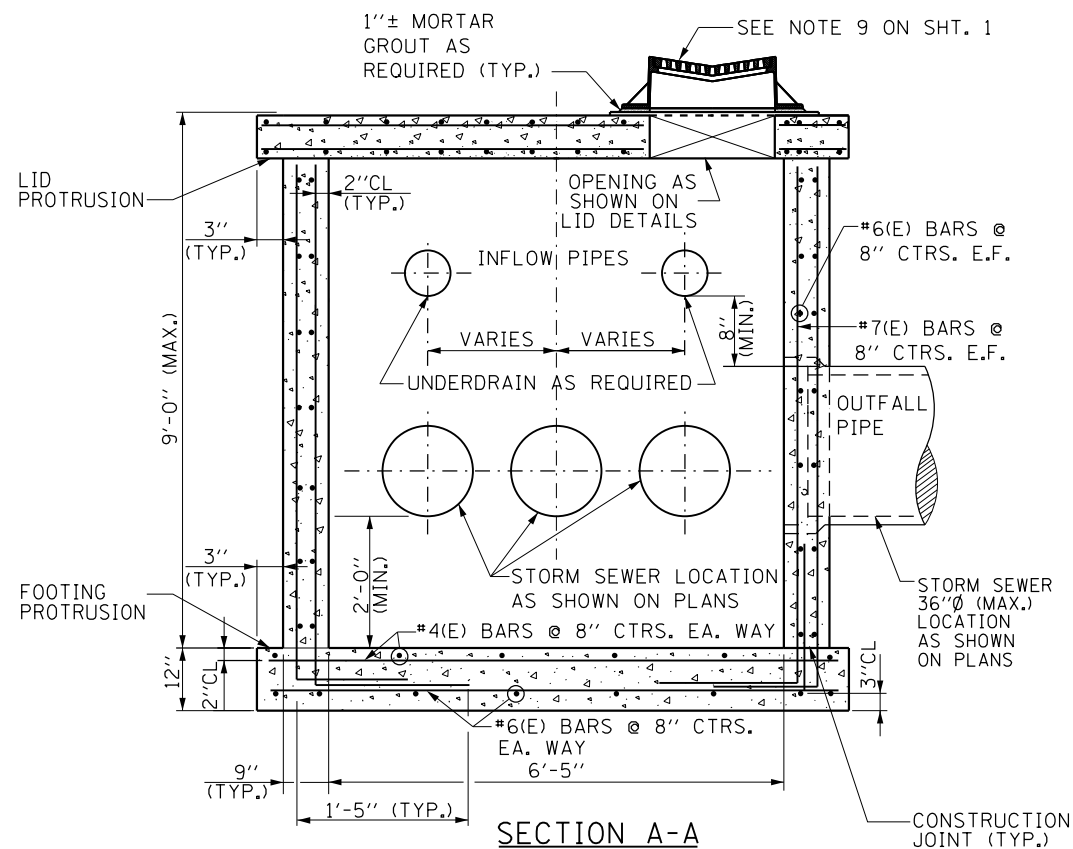
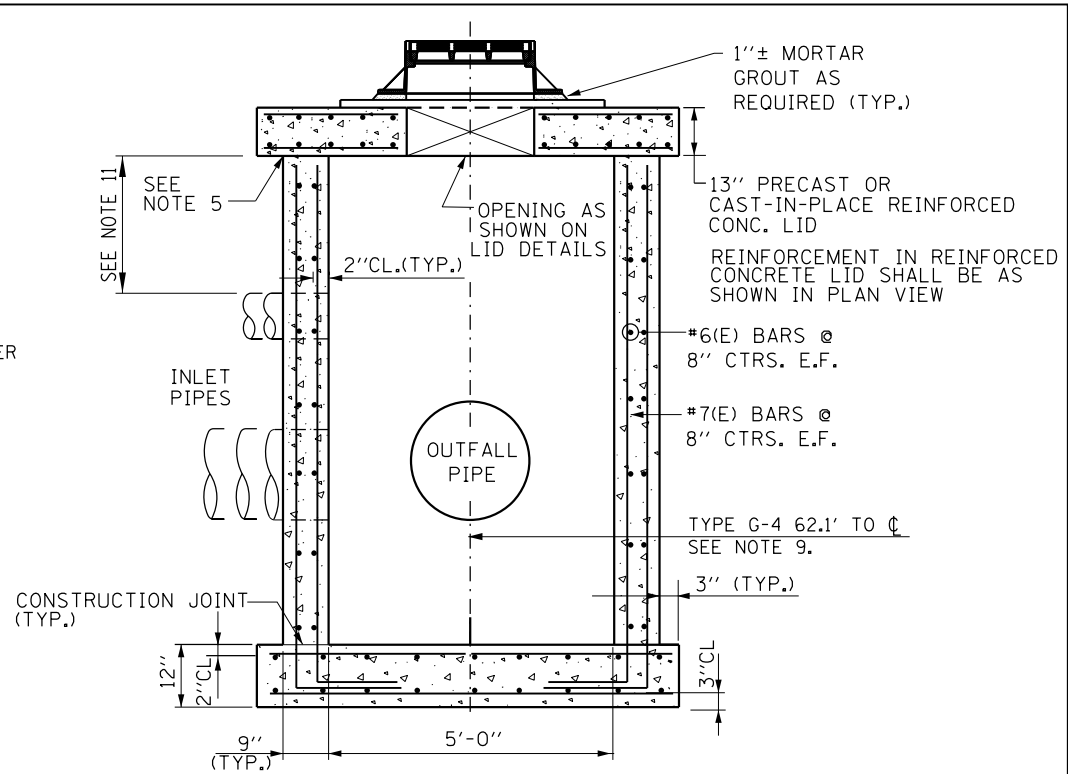
CATCH BASINS TYPE G AND TYPE G-3 MODIFIED, FRAMES AND GRATES



### CATCH BASIN TYPE G-4

#### NOTES:

- SEE SHEET 1 OF THIS SERIES FOR ADDITIONAL NOTES.
- CATCH BASINS TYPE G-4 SHALL BE USED IN TANGENT SECTIONS AND ON THE LOW SIDE OF SUPERELEVATED PAVEMENT.
- CATCH BASINS TYPE G-4 SHALL BE PROVIDED WITH A REINFORCED CONCRETE SLAB TOP AS DETAILED ON THIS DRAWING.
- CATCH BASINS TYPE G-4 SHALL BE USED WHEN GUTTER, TYPE G-3 IS PROVIDED.
- MORTAR OR SEALER SHALL BE USED WHEN A PRECAST REINFORCED CONCRETE LID IS USED.
- FRAME AND GRATE RIM ELEVATION AND OFFSET MEASURED AT THE EDGE OF SHOULDER.
- 36"Ø MAX. OUTFALL PIPE FOR TYPE G-4 CATCH BASIN.
- ALL CONCRETE SHALL BE CLASS SI CONCRETE.
- DISTANCE FROM CL OUTFALL PIPE TO CL ROADWAY TO BE VERIFIED BY ENGINEER.
- THE CONTRACTOR SHALL CLEARLY MARK EACH CATCH BASIN WITH "ILLINOIS TOLLWAY", CONTRACT NUMBER, STRUCTURE NUMBER, PRODUCER NAME AND DATE OF MANUFACTURE. THIS INFORMATION SHALL BE MARKED ON THE OUTSIDE FACE OF THE STRUCTURE IN A VISIBLE SURFACE AS DESIGNATED BY THE ENGINEER. THE MARKING SHALL BE PAINTED/STAMPED IN THE STRUCTURE WITH WATERPROOF PAINT/INK OR RECESSED IN THE STRUCTURE BY 1/2". THE LETTERS SHALL BE CAPITALS, NOT LESS THAN 2 IN. AND NOT MORE THAN 3 IN. IN HEIGHT.
- A MINIMUM OF 9" OF MONOLITHIC REINFORCED CONCRETE SHALL BE MAINTAINED ABOVE PIPE PENETRATION HOLES.



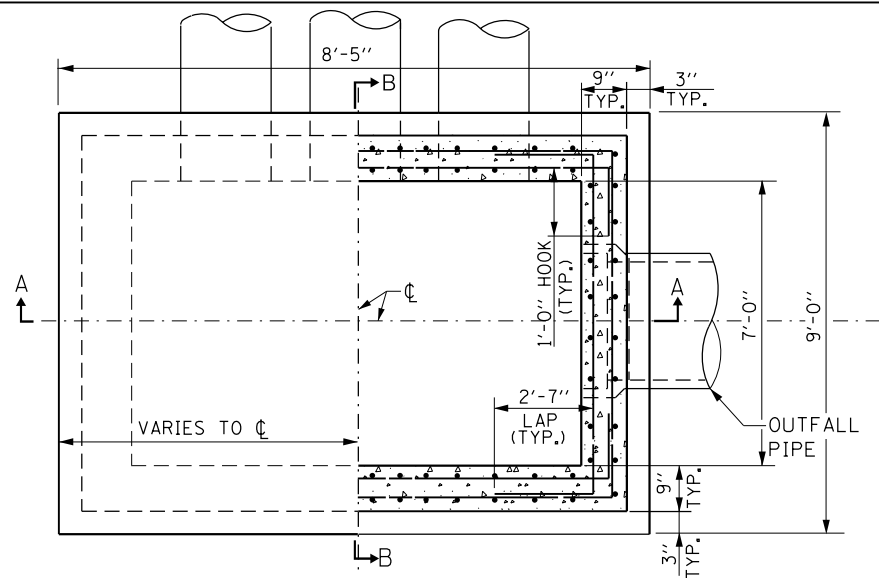
SHEET 2 OF 4



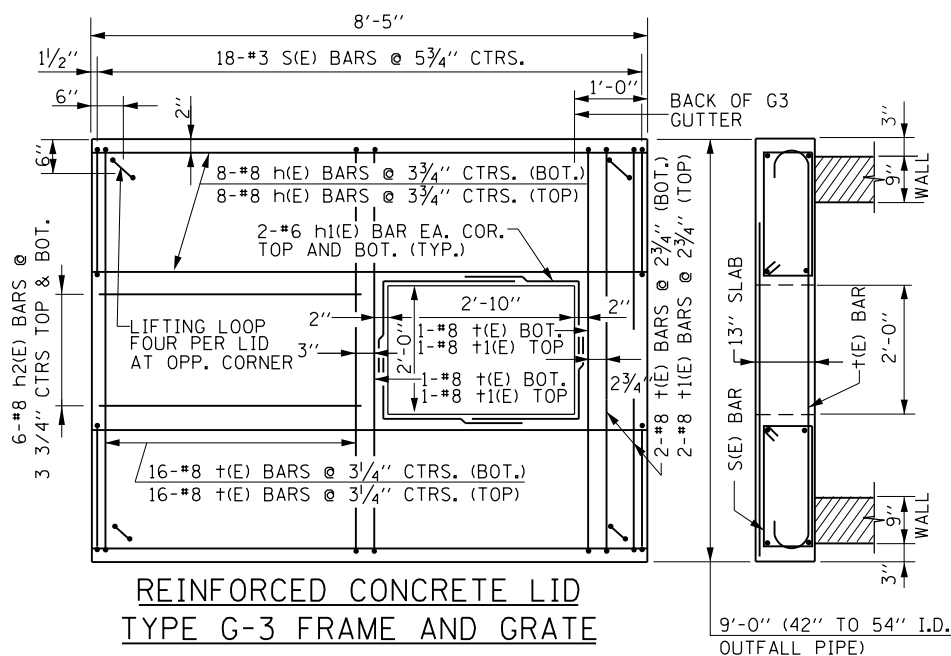
CATCH BASINS TYPE G AND TYPE G-3 MODIFIED, FRAMES AND GRATES

STANDARD B8-09

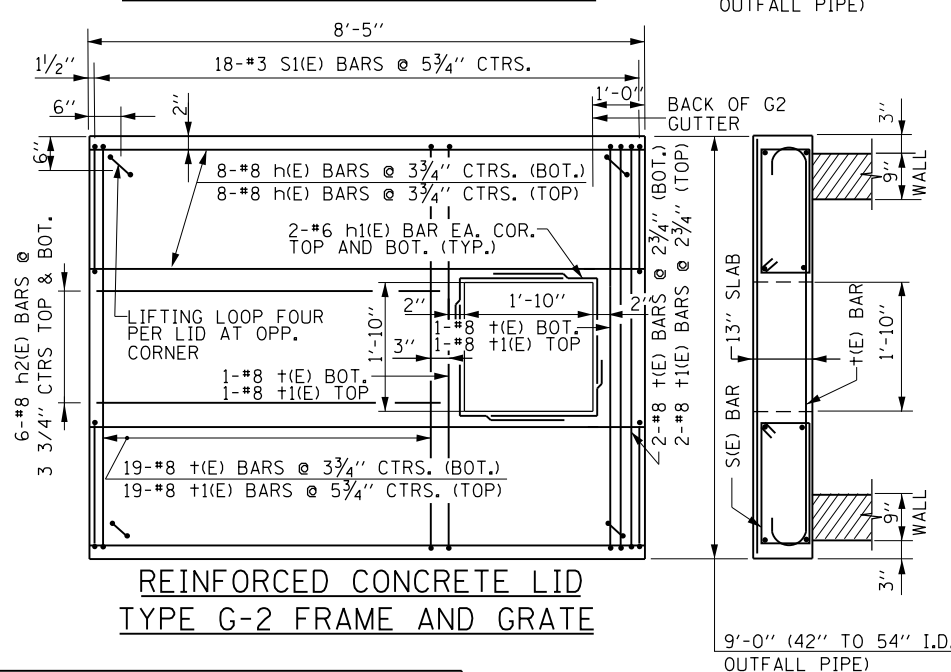
APPROVED BY: *Mamir Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER



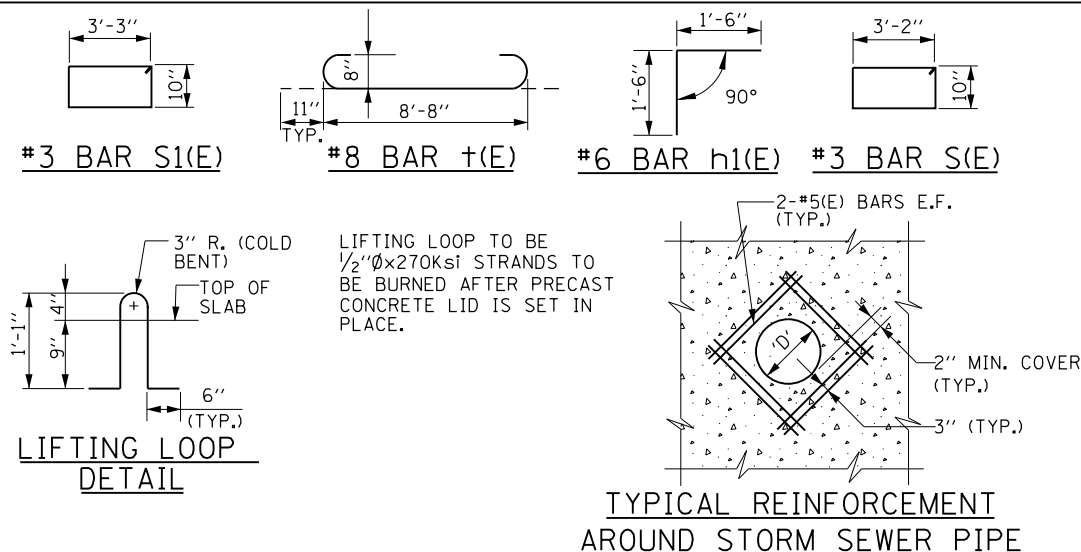
HALF PLAN (42"-54" I.D. OUTFALL PIPE)



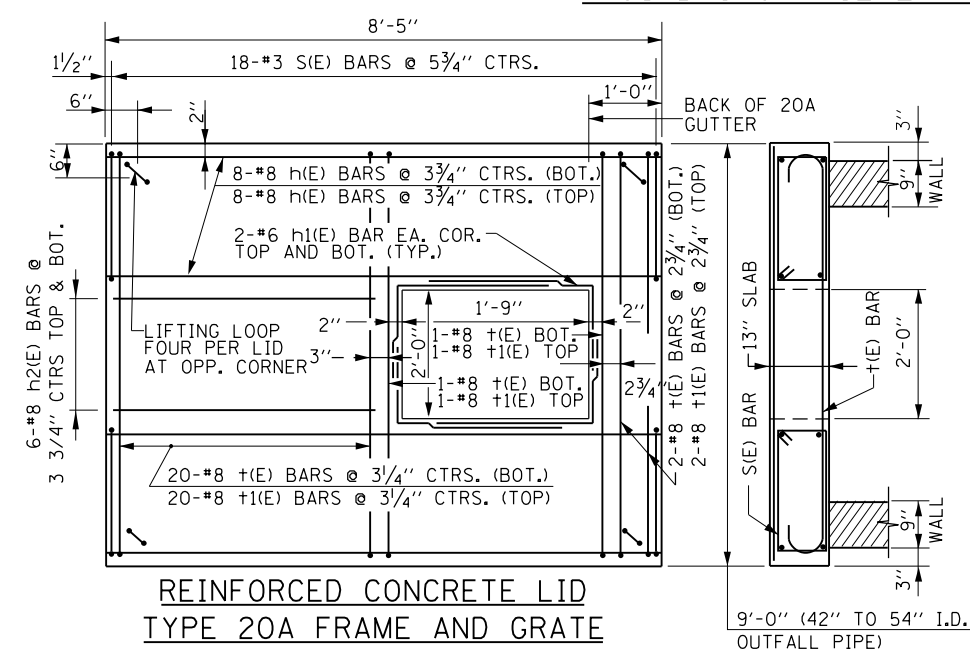
REINFORCED CONCRETE LID  
TYPE G-3 FRAME AND GRATE



REINFORCED CONCRETE LID  
TYPE G-2 FRAME AND GRATE



TYPICAL REINFORCEMENT  
AROUND STORM SEWER PIPE

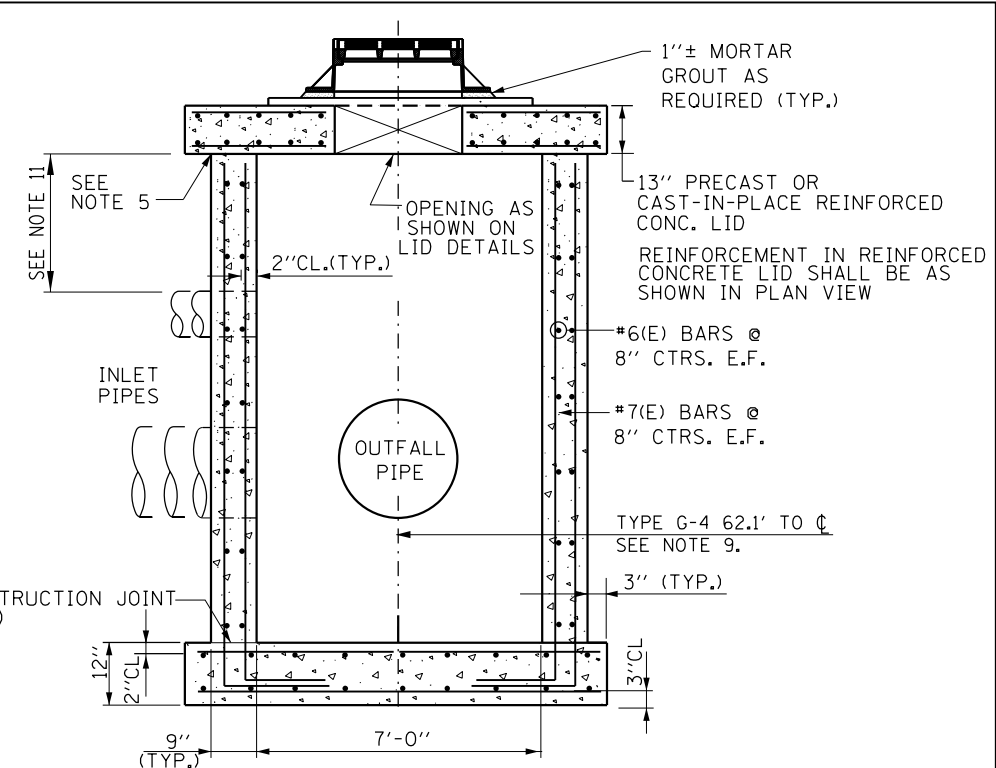


REINFORCED CONCRETE LID  
TYPE 20A FRAME AND GRATE

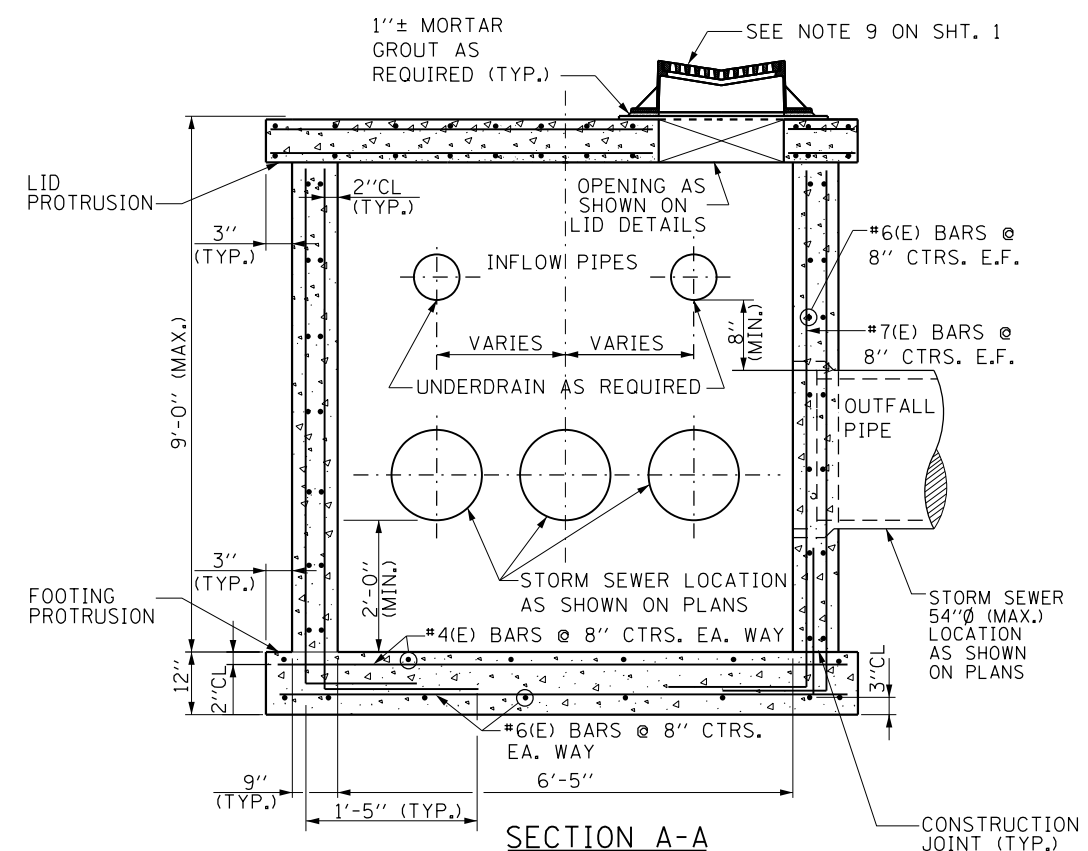
CATCH BASIN TYPE G-5

#### NOTES:

- SEE SHEET 1 OF THIS SERIES FOR ADDITIONAL NOTES.
- CATCH BASINS TYPE G-5 SHALL BE USED IN TANGENT SECTIONS AND ON THE LOW SIDE OF SUPERELEVATED PAVEMENT.
- CATCH BASINS TYPE G-5 SHALL BE PROVIDED WITH A REINFORCED CONCRETE SLAB TOP AS DETAILED ON THIS DRAWING.
- CATCH BASINS TYPE G-5 SHALL BE USED WHEN GUTTER, TYPE G-3 IS PROVIDED.
- MORTAR OR SEALER SHALL BE USED WHEN A PRECAST REINFORCED CONCRETE LID IS USED.
- FRAME AND GRATE RIM ELEVATION AND OFFSET MEASURED AT THE EDGE OF SHOULDER.
- 54"Ø MAX. OUTFALL PIPE FOR TYPE G-5 CATCH BASIN.
- ALL CONCRETE SHALL BE CLASS SI CONCRETE.
- DISTANCE FROM CL OUTFALL PIPE TO CL ROADWAY TO BE VERIFIED BY ENGINEER.
- THE CONTRACTOR SHALL CLEARLY MARK EACH CATCH BASIN WITH "ILLINOIS TOLLWAY", CONTRACT NUMBER, STRUCTURE NUMBER, PRODUCER NAME AND DATE OF MANUFACTURE. THIS INFORMATION SHALL BE MARKED ON THE OUTSIDE FACE OF THE STRUCTURE IN A VISIBLE SURFACE AS DESIGNATED BY THE ENGINEER. THE MARKING SHALL BE PAINTED/STAMPED IN THE STRUCTURE WITH WATERPROOF PAINT/INK OR RECESSED IN THE STRUCTURE BY 1/2". THE LETTERS SHALL BE CAPITALS, NOT LESS THAN 2 IN. AND NOT MORE THAN 3 IN. IN HEIGHT.
- A MINIMUM OF 9" OF MONOLITHIC REINFORCED CONCRETE SHALL BE MAINTAINED ABOVE PIPE PENETRATION HOLES.

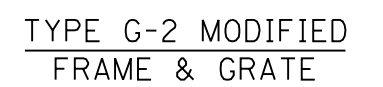
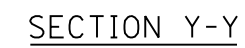
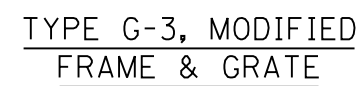
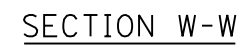
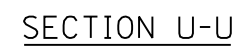
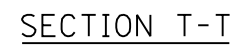


SECTION B-B



SECTION A-A





SHEET 4 OF 4



### CATCH BASINS TYPE G AND TYPE G-3 MODIFIED, FRAMES AND GRATES

STANDARD B8-09

NOTE:

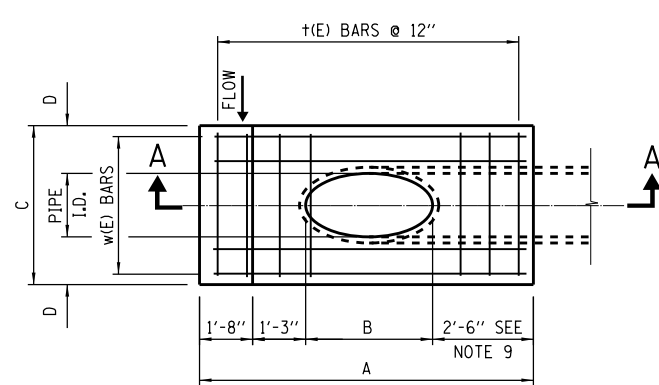
SEE SHEET 1 OF THIS SERIES FOR NOTES.

APPROVED BY:

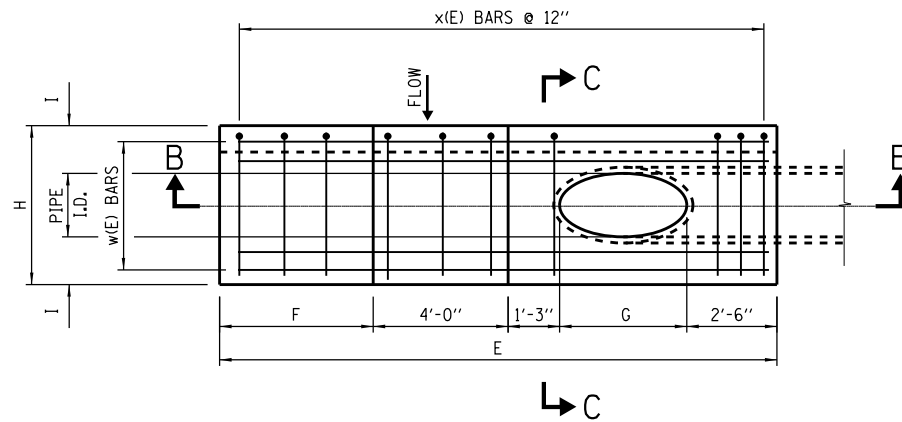
DATE: \_\_\_\_\_

APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

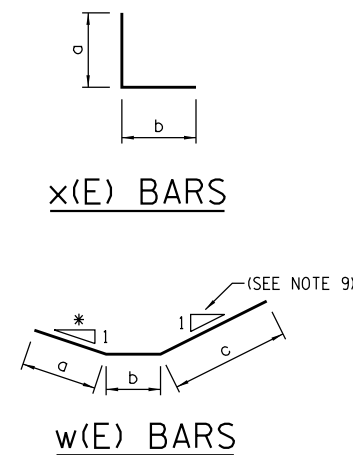
03/01/2024



PLAN I

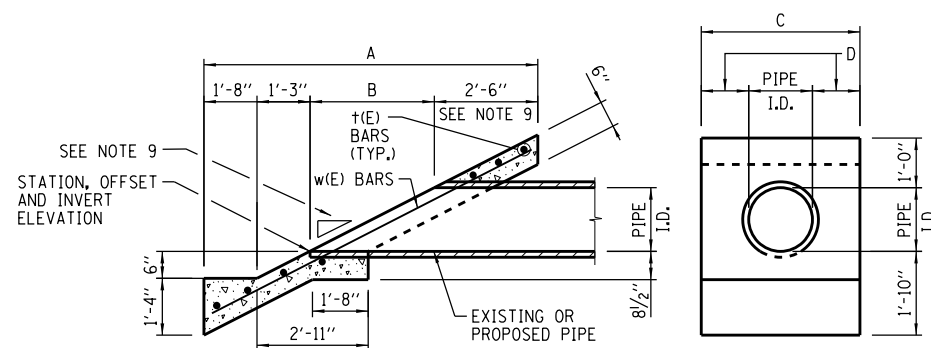


PLAN II

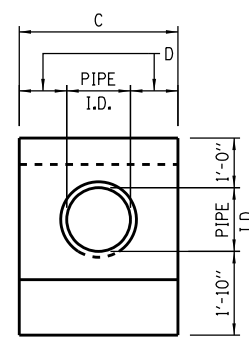


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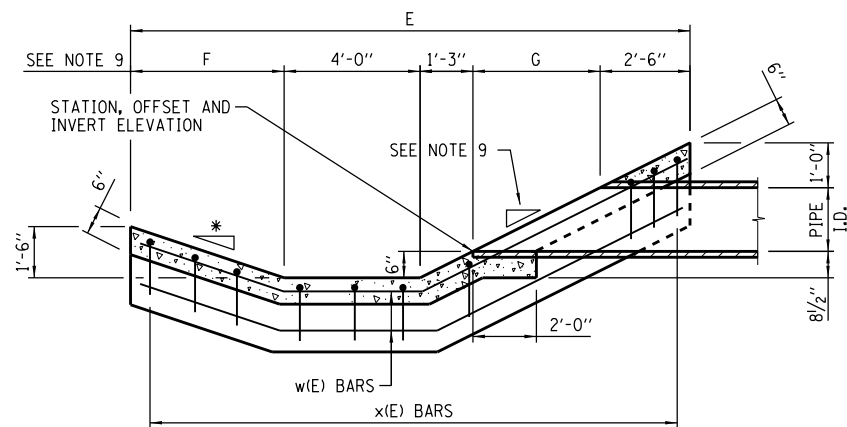
1. SLOPED HEADWALL TYPES I AND II SHALL BE CONSTRUCTED FLUSH WITH EXISTING OR PROPOSED SLOPE.
2. CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
3. ALL REINFORCEMENT BARS SHOWN SHALL BE EPOXY COATED (E).
4. BAR BENDING DETAILS ARE DIMENSIONED OUT TO OUT OF BARS.
5. ALL EXPOSED EDGES SHALL HAVE A  $\frac{3}{4}$ " CHAMFER. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW THE FINISHED GROUND LINE.
6. COVER FROM THE FACE OF CONCRETE TO FACE OF REINFORCEMENT BARS SHALL BE 3" FOR SURFACES FORMED AGAINST EARTH AND 2" FOR ALL OTHER SURFACES UNLESS OTHERWISE SHOWN.
7. CARE SHALL BE EXERCISED IN REMOVING ANY LENGTH OF EXISTING PIPE SO THE REMAINING PIPE IS UNDAMAGED AND FULLY FUNCTIONING.
8. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
9. SLOPED HEADWALLS, TYPES I AND II TO BE USED ONLY FOR SLOPES STEEPER THAN 1:3. DIMENSIONS AND QUANTITIES SHOWN ARE BASED ON A 1:2.5 SLOPE (EXISTING AND PROPOSED).
10. I.D. DENOTES INSIDE DIAMETER OF PIPE.  
O.D. DENOTES OUTSIDE DIAMETER OF PIPE.



SECTION A-A

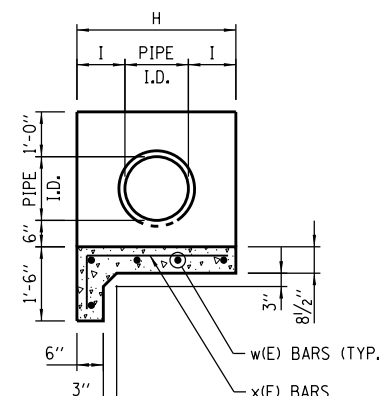


ELEVATION



SECTION B-B

\* MATCH EXISTING OR PROPOSED SLOPE, SEE NOTE 9



SECTION C-C

TABLES FOR DIMENSIONS, REINFORCEMENT AND QUANTITIES FOR ONE SLOPED HEADWALL TYPE I

SLOPED HEADWALL DIMENSION TABLE - TYPE I					
PIPE I.D.	A	B	C	D	
6"	6'-8"	1'-3"	2'-6"	1'-0"	
12"	7'-11"	2'-6"	3'-0"	1'-0"	
15"	8'-7"	3'-2"	3'-9"	1'-3"	
18"	9'-2"	3'-9"	4'-6"	1'-6"	

PIPE I.D.	REINFORCEMENT BARS		
	MARK(E)	NO. & SIZE	LENGTH
6"	+6	7-#4	2'-2"
	w6	4-#4	6'-8"
12"	+12	7-#4	2'-8"
	w12	4-#4	8'-2"
15"	+15	7-#4	3'-5"
	w15	4-#4	8'-11"
18"	+18	7-#4	4'-2"
	w18	4-#4	9'-6"

DESIGN NO.	INSIDE DIA. OF PIPE	CONC. 1 HDWL. (CU. YD.)	REINF. BARS. 1 HDWL. (POUND)
F-6-2	6"	0.5	29
F-12-2	12"	0.6	35
F-15-2	15"	0.8	40
F-18-2	18"	1.0	45

SLOPED HEADWALL TYPE I

TABLES FOR DIMENSIONS, REINFORCEMENT AND QUANTITIES FOR ONE SLOPED HEADWALL TYPE II

SLOPED HEADWALL DIMENSION TABLE - TYPE II					
PIPE I.D.	E	F	G	H	I
12"	14'-0"	3'-9"	2'-6"	3'-0"	1'-0"
15"	14'-8"	3'-9"	3'-2"	3'-9"	1'-3"
18"	15'-3"	3'-9"	3'-9"	4'-6"	1'-6"

PIPE I.D.	REINFORCEMENT BARS					
	MARK(E)	NO. & SIZE	LENGTH	a	b	c
12"	x12	10-#4	3'-6"	2'-6"	1'-0"	---
	w12	5-#4	14'-4"	3'-10"	4'-0"	6'-6"
15"	x15	10-#4	4'-3"	3'-3"	1'-0"	---
	w15	5-#4	15'-1"	3'-10"	4'-0"	7'-3"
18"	x18	10-#4	5'-0"	4'-0"	1'-0"	---
	w18	5-#4	15'-8"	3'-10"	4'-0"	7'-10"

DESIGN NO.	INSIDE DIA. OF PIPE	CONC. 1 HDWL. (CU. YD.)	REINF. BARS. 1 HDWL. (POUND)
E-12-2	12"	1.2	75
E-15-2	15"	1.6	82
E-18-2	18"	1.7	89

SLOPED HEADWALL TYPE II

APPROVED BY: *Paul Kovacs* CHIEF ENGINEERING OFFICER  
DATE: 02/07/2012

DATE	REVISIONS
03-31-2017	REVISED REINFORCEMENT BARS, TABLES
03-11-2015	REVISED REINFORCEMENT BARS, TABLES
03-31-2014	REVISED CONCRETE QUANTITIES, REINFORCEMENT STEEL



SLOPED HEADWALLS TYPE I AND TYPE II

STANDARD B9-04



DIMENSIONS AND QUANTITIES FOR ONE SLOPED HEADWALL TYPE III

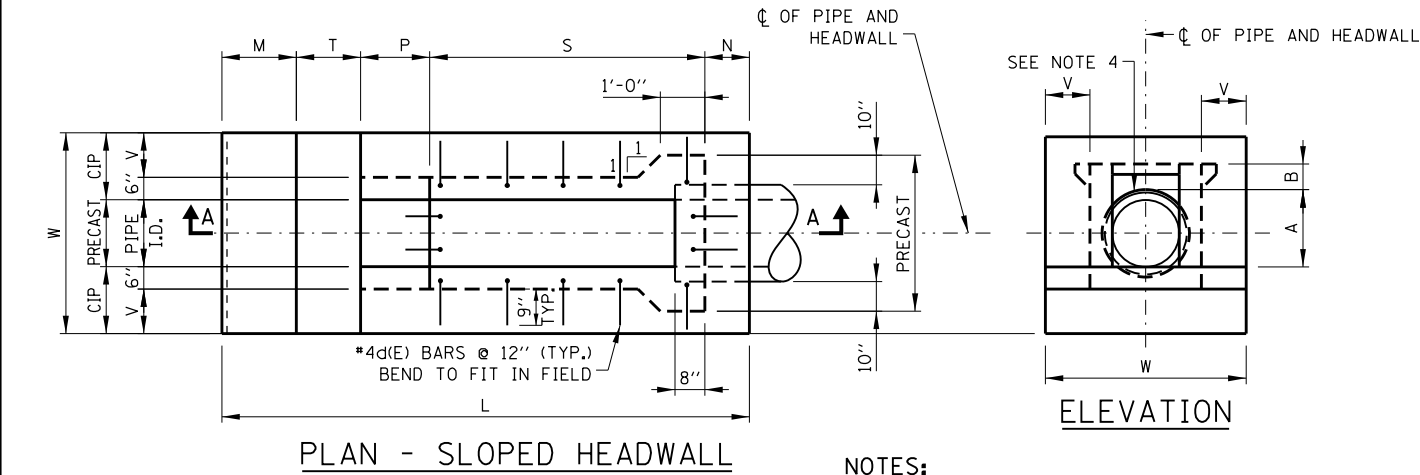
1 TO 3 SLOPE	PIPE I.D.	DIMENSIONS										PRE CAST CONC. CU. YD.	CAST-IN-PLACE CU. YD.	WELDED WIRE REINFORCEMENT SQ. YD.	REINFORCEMENT BARS					
		A	B	C	N	M	T	P	S	L	V				W	MARK(E)	SIZE	NO.	LENGTH	LB.
	6"	9"	2¾"	1'-9¾"	1'-0"	1'-8"	1'-6"	1'-6¾"	2'-11¼"	8'-8"	1'-0"	3'-6"	0.15	0.72	3.28	d6	#4	12	2'-0"	16
	8"	11"	2¾"	1'-11¾"	1'-0"	1'-8"	1'-6"	1'-6¾"	3'-5¼"	9'-2"	1'-0"	3'-8"	0.22	0.75	3.89	d8	#4	12	2'-0"	16
	12"	1'-3½"	2¾"	2'-4¼"	1'-0"	1'-8"	1'-6"	1'-6¾"	4'-6¾"	10'-3½"	1'-0"	4'-0"	0.34	0.92	4.50	d12	#4	14	2'-0"	19
	15"	1'-6½"	2¾"	2'-7¼"	1'-0"	1'-8"	1'-6"	1'-6¾"	5'-3¾"	11'-½"	1'-0"	4'-3"	0.45	1.01	5.88	d15	#4	16	2'-0"	21
	18"	1'-10"	2¾"	2'-10¾"	1'-0"	1'-8"	1'-6"	1'-6¾"	6'-2¼"	11'-11"	1'-0"	4'-6"	0.61	1.13	6.44	d18	#4	18	2'-0"	24
	21"	2'-1"	2¾"	3'-1¾"	1'-0"	1'-9"	1'-6"	1'-6¾"	6'-11¼"	12'-9"	1'-3"	5'-3"	0.76	1.39	8.34	d21	#4	22	2'-0"	29
	24"	2'-4½"	2¾"	3'-5¼"	1'-0"	2'-0"	1'-6"	1'-6¾"	7'-9¾"	13'-10½"	1'-6"	6'-0"	0.95	1.72	9.85	d24	#4	24	2'-0"	32
	27"	2'-7½"	2¾"	3'-8¼"	1'-1½"	2'-3"	1'-6"	1'-6¾"	8'-6¾"	15'-0"	1'-9"	6'-9"	1.14	2.07	13.54	d27	#4	24	2'-0"	32
30"	2'-11"	2¾"	3'-11¾"	1'-3"	2'-6"	1'-6"	1'-6¾"	9'-5¼"	16'-3"	2'-0"	7'-6"	1.38	2.46	16.40	d30	#4	26	2'-0"	35	

1 TO 4 SLOPE	PIPE I.D.	DIMENSIONS										PRE CAST CONC. CU. YD.	CAST-IN-PLACE CU. YD.	WELDED WIRE REINFORCEMENT SQ. YD.	REINFORCEMENT BARS					
		A	B	C	N	M	T	P	S	L	V				W	MARK(E)	SIZE	NO.	LENGTH	LB.
	6"	9"	2"	1'-9"	1'-0"	1'-8"	2'-0"	2'-1"	3'-8"	10'-5"	1'-0"	3'-6"	0.17	0.83	4.07	d6	#4	12	2'-0"	16
	8"	11"	2"	1'-11"	1'-0"	1'-8"	2'-0"	2'-1"	4'-4"	11'-1"	1'-0"	3'-8"	0.28	0.87	4.97	d8	#4	14	2'-0"	19
	12"	1'-3½"	2"	2'-3½"	1'-0"	1'-8"	2'-0"	2'-1"	5'-10"	12'-7"	1'-0"	4'-0"	0.41	1.07	5.50	d12	#4	16	2'-0"	21
	15"	1'-6½"	2"	2'-6½"	1'-0"	1'-8"	2'-0"	2'-1"	6'-10"	13'-7"	1'-0"	4'-3"	0.55	1.18	6.63	d15	#4	18	2'-0"	24
	18"	1'-10"	2"	2'-10"	1'-0"	1'-8"	2'-0"	2'-1"	8'-0"	14'-9"	1'-0"	4'-6"	0.74	1.32	8.60	d18	#4	22	2'-0"	29
	21"	2'-1"	2"	3'-1"	1'-0"	1'-9"	2'-0"	2'-1"	9'-0"	15'-10"	1'-3"	5'-3"	0.93	1.63	11.03	d21	#4	24	2'-0"	32
	24"	2'-4½"	2"	3'-4½"	1'-0"	2'-0"	2'-0"	2'-1"	10'-2"	17'-3"	1'-6"	6'-0"	1.18	2.00	13.88	d24	#4	28	2'-0"	37
	27"	2'-7½"	2"	3'-7½"	1'-1½"	2'-3"	2'-0"	2'-1"	11'-2"	18'-7½"	1'-9"	6'-9"	1.42	2.41	14.83	d27	#4	30	2'-0"	40
30"	2'-11"	2"	3'-11"	1'-3"	2'-6"	2'-0"	2'-1"	12'-4"	20'-2"	2'-0"	7'-6"	1.71	2.87	20.49	d30	#4	32	2'-0"	43	

1 TO 6 SLOPE	PIPE I.D.	DIMENSIONS										PRE CAST CONC. CU. YD.	CAST-IN-PLACE CU. YD.	WELDED WIRE REINFORCEMENT SQ. YD.	REINFORCEMENT BARS					
		A	B	C	N	M	T	P	S	L	V				W	MARK(E)	SIZE	NO.	LENGTH	LB.
	6"	9"	1½"	1'-8½"	1'-0"	1'-8"	3'-0"	3'-0"	5'-3"	13'-11"	1'-0"	3'-6"	0.23	1.07	5.29	d6	#4	16	2'-0"	21
	8"	11"	1½"	1'-10½"	1'-0"	1'-8"	3'-0"	3'-0"	6'-3"	14'-11"	1'-0"	3'-8"	0.43	1.13	7.13	d8	#4	18	2'-0"	24
	12"	1'-3½"	1½"	2'-3"	1'-0"	1'-8"	3'-0"	3'-0"	8'-6"	17'-2"	1'-0"	4'-0"	0.57	1.38	8.62	d12	#4	22	2'-0"	29
	15"	1'-6½"	1½"	2'-6"	1'-0"	1'-8"	3'-0"	3'-0"	10'-0"	18'-8"	1'-0"	4'-3"	0.77	1.53	10.35	d15	#4	26	2'-0"	35
	18"	1'-10"	1½"	2'-9½"	1'-0"	1'-8"	3'-0"	3'-0"	11'-9"	20'-5"	1'-0"	4'-6"	1.04	1.70	12.47	d18	#4	28	2'-0"	37
	21"	2'-1"	1½"	3'-0½"	1'-0"	1'-9"	3'-0"	3'-0"	13'-3"	22'-0"	1'-3"	5'-3"	1.31	2.11	15.77	d21	#4	34	2'-0"	45
	24"	2'-4½"	1½"	3'-4"	1'-0"	2'-0"	3'-0"	3'-0"	15'-0"	24'-0"	1'-6"	6'-0"	1.66	2.59	17.62	d24	#4	38	2'-0"	51
	27"	2'-7½"	1½"	3'-7"	1'-1½"	2'-3"	3'-0"	3'-0"	16'-6"	25'-10½"	1'-9"	6'-9"	1.99	3.11	24.10	d27	#4	40	2'-0"	53
30"	2'-11"	1½"	3'-10½"	1'-3"	2'-6"	3'-0"	3'-0"	18'-3"	28'-0"	2'-0"	7'-6"	2.41	3.70	29.13	d30	#4	44	2'-0"	59	

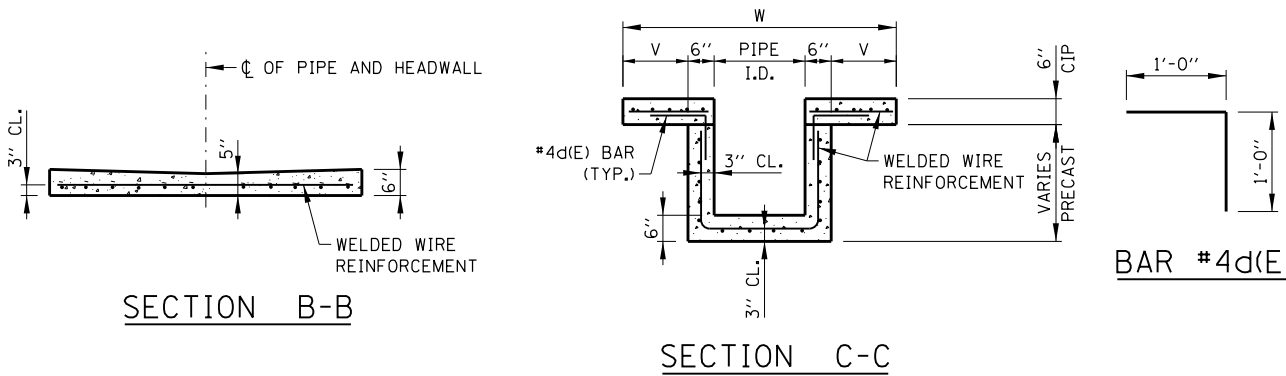
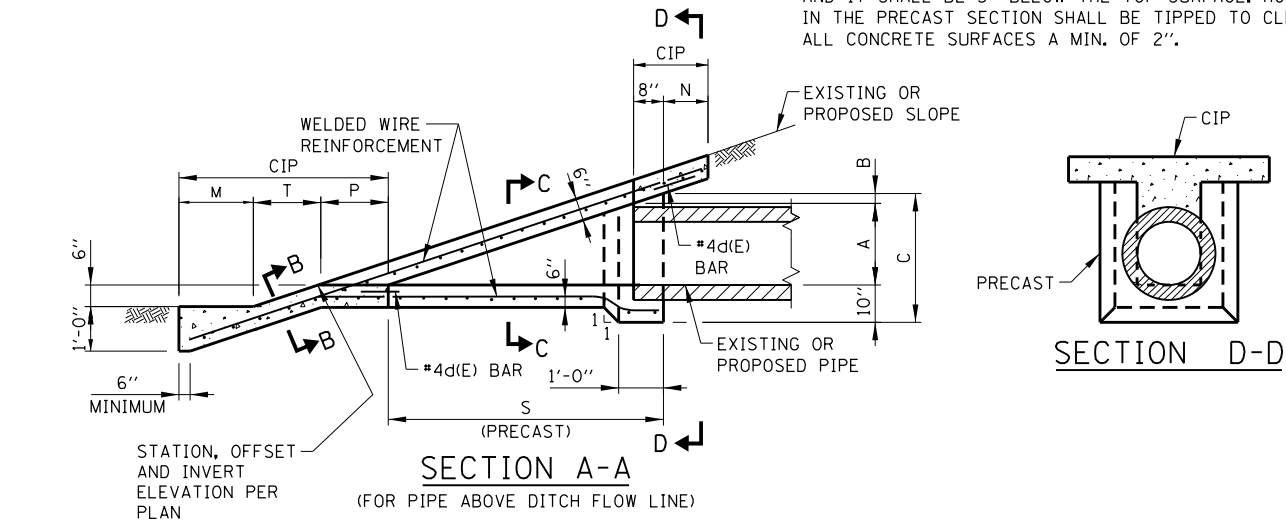
NOTES:

- THE CAST IN PLACE (CIP) SLOPED HEADWALL SHALL BE CONSTRUCTED FLUSH WITH EXISTING OR PROPOSED SLOPE.
- CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
- WELDED WIRE REINFORCEMENT SHALL BE EPOXY COATED 4x4-W4xW4, 58 LBS. PER 100 SQ.FT.
- ALL REINFORCEMENT BARS SHOWN SHALL BE EPOXY COATED (E).
- BAR BENDING DETAILS ARE DIMENSIONED OUT TO OUT OF BARS.
- COVER FROM FACE OF CONCRETE TO FACE OF REINFORCEMENT BAR SHALL BE 3" FOR SURFACES FORMED AGAINST EARTH AND 2" FOR ALL OTHER SURFACES UNLESS OTHERWISE SHOWN.
- PRECAST UNIT USE IS OPTIONAL. THE ENTIRE STRUCTURE MAY BE CAST IN PLACE.
- AFTER THE PRECAST SLOPED HEADWALL HAS BEEN PLACED, THE SPACE BETWEEN THE HEADWALL AND PIPE SHALL BE COMPLETELY FILLED WITH AN APPROVED NON-SHRINK GROUT WITH A MINIMUM COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- THE SLOPED HEADWALL DETAILS SHOWN ON THIS DRAWING ARE FOR USE ONLY WITH PIPES HAVING DIAMETER OR SPAN OF 30" OR LESS.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- I.D. DENOTES INSIDE DIAMETER OF PIPE. O.D. DENOTES OUTSIDE DIAMETER OF PIPE.
- REBAR REINFORCEMENT MAY BE USED AS AN OPTION TO WELDED WIRE REINFORCEMENT, DRAWINGS SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER.



NOTES:

EACH #4d(E) BAR SHALL BE PLACED SUCH THAT IT WILL PROJECT 9" INTO THE CAST IN PLACE (CIP) CONCRETE AND IT SHALL BE 3" BELOW THE TOP SURFACE. HOOKS IN THE PRECAST SECTION SHALL BE TIPPED TO CLEAR ALL CONCRETE SURFACES A MIN. OF 2".



APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

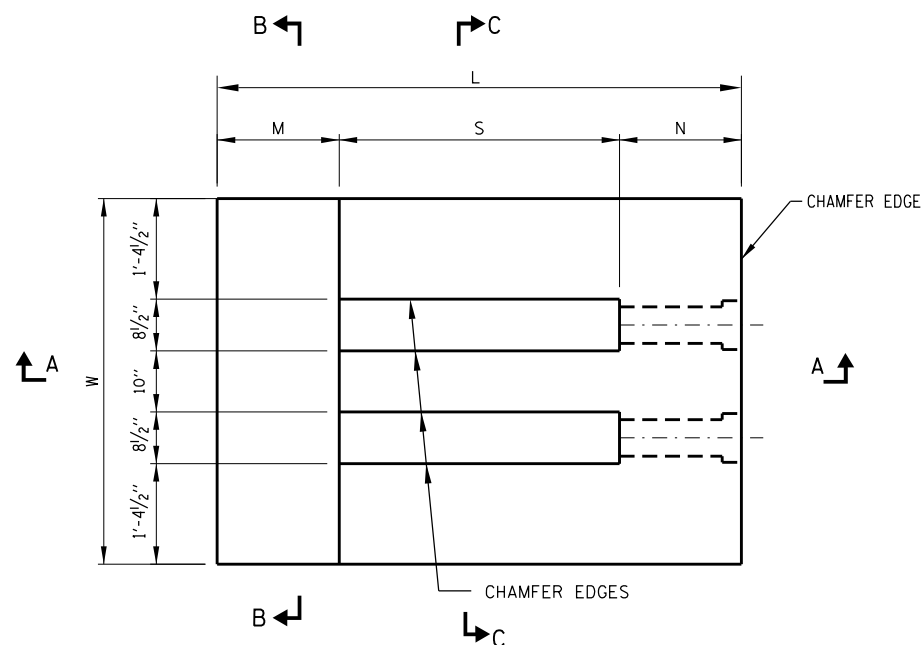
DATE	REVISIONS
03-01-2022	REVISED WELDED WIRE NOTE
03-01-2021	ADDED 8" SLOPED HEADWALL TYPE III
03-01-2020	REVISED NOTES
03-01-2019	ADDED DOUBLE SLOPED HEADWALL TYPE III
03-31-2017	REVISED TABLE (L)

SHEET 1 OF 3

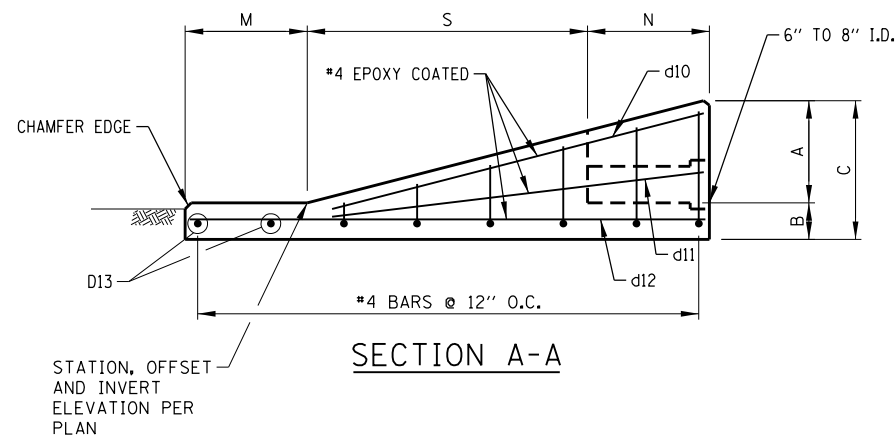
**Illinois Tollway**

SLOPED HEADWALLS  
TYPE III DETAILS

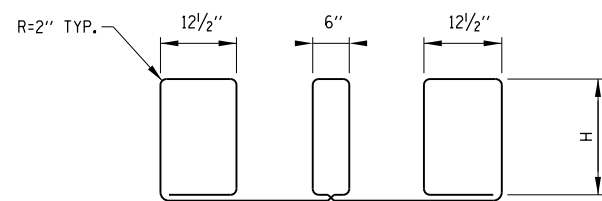
STANDARD B10-13



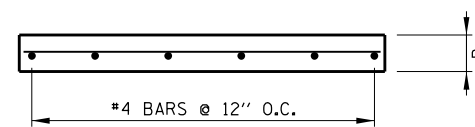
PLAN - DOUBLE SLOPED HEADWALL



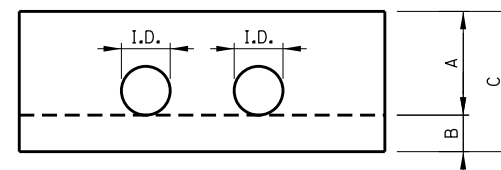
SECTION A-A



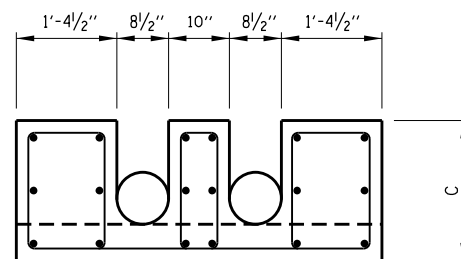
d1 THROUGH d9 BAR  
BENT



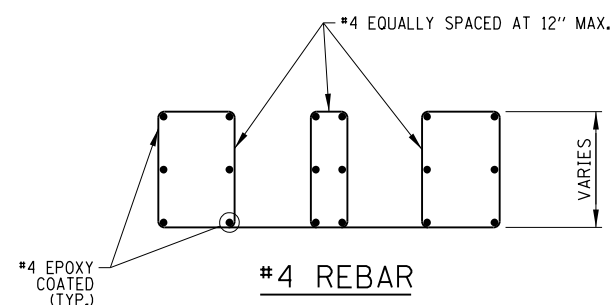
SECTION B-B



ELEVATION



SECTION C-C



#4 REBAR

STIRRUP HEIGHT TABLE  
FOR DOUBLE SLOPED HEADWALL TYPE III

1 TO 3 SLOPE AND C=1'-11"		1 TO 4 SLOPE AND C=1'-11"		1 TO 6 SLOPE AND C=1'-11"	
	STIRRUP HEIGHT, H		STIRRUP HEIGHT, H		STIRRUP HEIGHT, H
d1 E	17'-6"	d1 E	17'-7"	d1 E	17'-8 1/4"
d2 E	14'-4 3/4"	d2 E	15'-3 3/4"	d2 E	15'-10 1/2"
d3 E	11'-3 3/4"	d3 E	12'-6 3/4"	d3 E	14'-1 1/4"
d4 E	8'-2 3/4"	d4 E	10'-1 1/2"	d4 E	12'-2 1/4"
d5 E	5'-1 1/2"	d5 E	7'-6"	d5 E	10'-4 1/4"
		d6 E	5'-0"	d6 E	8'-6"
				d7 E	6'-8 1/4"
				d8 E	4'-10"

1 TO 3 SLOPE AND C=2'-1"		1 TO 4 SLOPE AND C=2'-1"		1 TO 6 SLOPE AND C=2'-1"	
	STIRRUP HEIGHT, H		STIRRUP HEIGHT, H		STIRRUP HEIGHT, H
d1 E	19'-6"	d1 E	19'-7"	d1 E	19'-8 1/4"
d2 E	16'-4 3/4"	d2 E	17'-3 3/4"	d2 E	17'-10 1/2"
d3 E	13'-3 3/4"	d3 E	14'-6 3/4"	d3 E	16'-1 1/4"
d4 E	10'-2 3/4"	d4 E	12'-1 1/2"	d4 E	14'-2 1/4"
d5 E	7'-1 1/2"	d5 E	9'-6"	d5 E	12'-4 1/4"
d6 E	4'-1 1/2"	d6 E	7'-0"	d6 E	10'-6"
		d7 E	4'-5 3/4"	d7 E	8'-8 1/4"
				d8 E	6'-10"
				d9 E	5'-0"

NOTES:

- THE DOUBLE SLOPED HEADWALL SHALL BE CONSTRUCTED FLUSH WITH EXISTING OR PROPOSED SLOPE.
- CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
- ALL REINFORCEMENT BARS SHOWN SHALL BE EPOXY COATED (E).
- BAR BENDING DETAILS ARE DIMENSIONED OUT TO OUT OF BARS.
- COVER FROM FACE OF CONCRETE TO FACE OF REINFORCEMENT BAR SHALL BE 3" FOR SURFACES FORMED AGAINST EARTH AND 2" FOR ALL OTHER SURFACES UNLESS OTHERWISE SHOWN.
- PRECAST UNIT USE IS OPTIONAL. THE ENTIRE STRUCTURE MAY BE CAST IN PLACE.
- AFTER THE PRECAST SLOPED HEADWALL HAS BEEN PLACED, THE SPACE BETWEEN THE HEADWALL AND PIPE SHALL BE COMPLETELY FILLED WITH AN APPROVED NON-SHRINK GROUT WITH A MINIMUM COMPRESSIVE STRENGTH IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- THE DOUBLE SLOPED HEADWALL DETAILS SHOWN ON THIS DRAWING ARE FOR USE ONLY WITH PIPES HAVING DIAMETER OR SPAN OF 8" OR LESS.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- I.D. DENOTES INSIDE DIAMETER OF PIPE.
- WELDED WIRE REINFORCEMENT MAY BE USED AS AN OPTION TO REBAR REINFORCEMENT, DRAWINGS SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SHEET 2 OF 3



SLOPED HEADWALLS  
TYPE III DETAILS

STANDARD B10-13

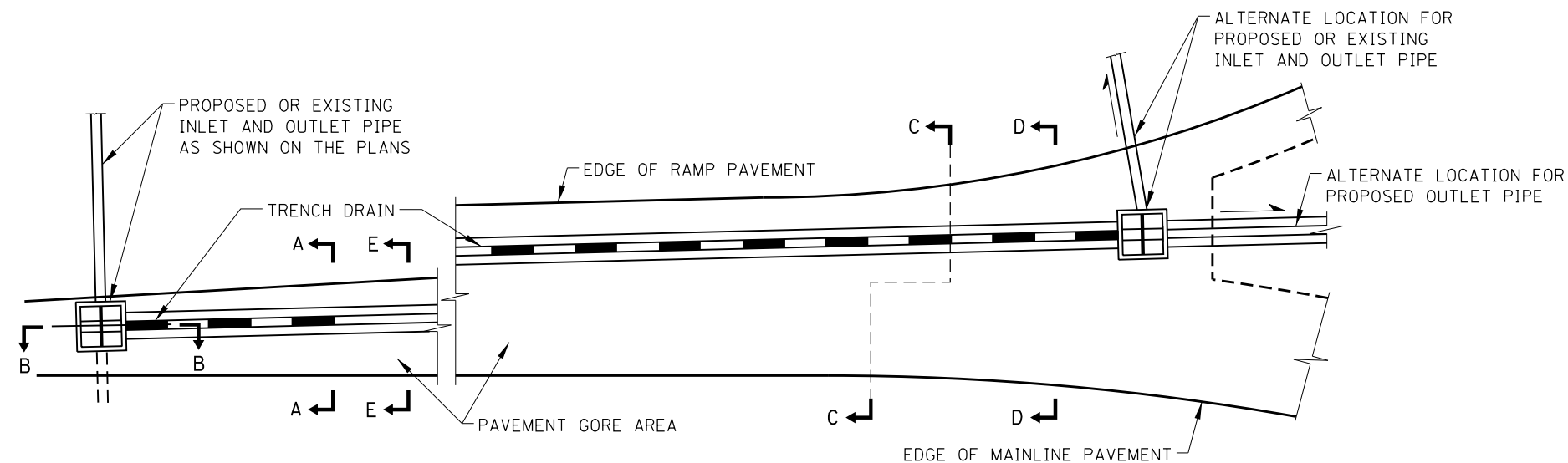
APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

	PIPE I.D.	DIMENSIONS								PRECAST CONCRETE CU YD	MARK	SIZE	NO	LENGTH	LB
		A	B	C	N	S	M	L	W						
1 TO 3 SLOPE	(2) - 6'' PIPE	1'-5''	6''	1'-11''	1'-8''	3'-10''	1'-8''	7'-2''	5'-0''	1.29	d1 E	#4	1	17'-4 3/4''	12
											d2 E	#4	1	15'-10 1/4''	11
											d3 E	#4	1	14'-3 1/2''	10
											d4 E	#4	1	12'-9 1/4''	9
											d5 E	#4	1	11'-2 1/2''	7
											d10 E	#4	6	4'-8''	19
											d11 E	#4	6	3'-10 3/4''	16
											d12 E	#4	6	6'-10''	27
											d13 E	#4	2	4'-8''	6
	(2) - 8'' PIPE OR (1) - 6'' PIPE & (1) - 8'' PIPE	1'-5''	8''	2'-1''	1'-8''	3'-10''	1'-8''	7'-2''	5'-0''	1.51	d1 E	#4	1	18'-4 3/4''	12
											d2 E	#4	1	16'-10 1/4''	11
											d3 E	#4	1	15'-3 1/2''	10
											d4 E	#4	1	13'-9 1/4''	9
											d5 E	#4	1	12'-2 1/2''	8
											d6 E	#4	1	10'-8''	7
											d10 E	#4	6	5'-4''	21
											d11 E	#4	6	4'-6 1/2''	18
											d12 E	#4	6	6'-10''	27
											d13 E	#4	2	4'-8''	6

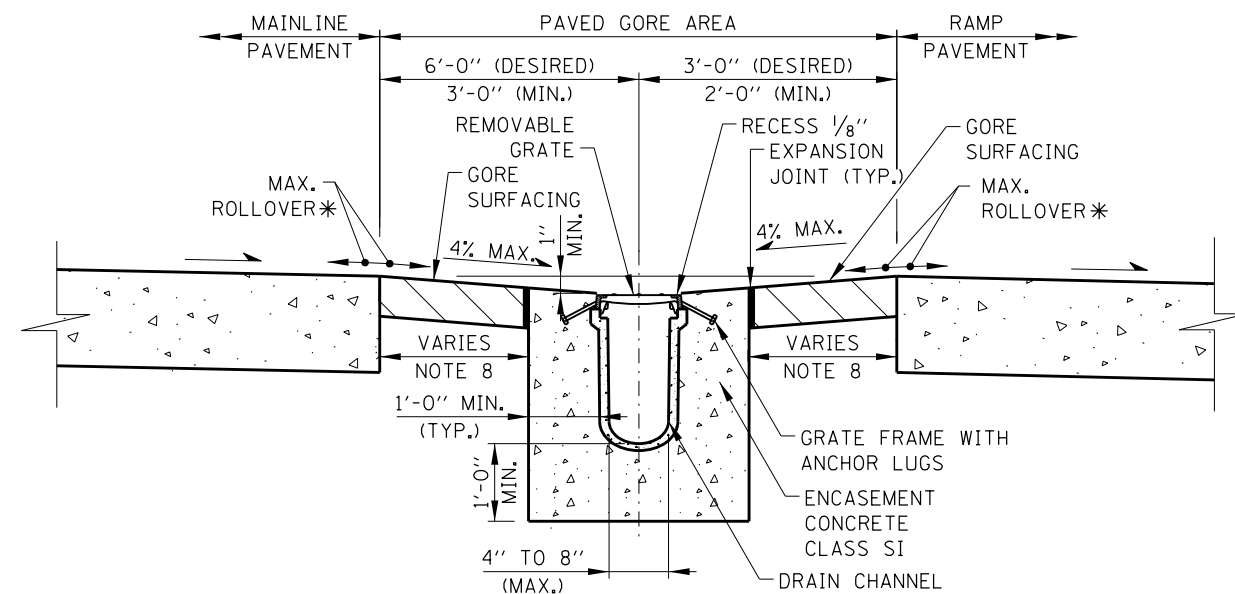
	PIPE I.D.	DIMENSIONS								PRECAST CONCRETE CU YD	MARK	SIZE	NO	LENGTH	LB
		A	B	C	N	S	M	L	W						
1 TO 6 SLOPE	(2) - 6'' PIPE	1'-5''	6''	1'-11''	1'-8''	7'-7''	1'-8''	10'-11''	5'-0''	2.00	d1 E	#4	1	17'-6''	12
											d2 E	#4	1	16'-7''	11
											d3 E	#4	1	15'-8''	10
											d4 E	#4	1	14'-9''	10
											d5 E	#4	1	13'-10''	9
											d6 E	#4	1	12'-10 3/4''	9
											d7 E	#4	1	12'-0''	8
											d8 E	#4	1	11'-3/4''	7
											d10 E	#4	6	7'-9 3/4''	31
											d11 E	#4	6	6'-7 3/4''	27
											d12 E	#4	6	10'-7 1/4''	42
											d13 E	#4	2	4'-8''	6
	(2) - 8'' PIPE OR (1) - 6'' PIPE & (1) - 8'' PIPE	1'-5''	8''	2'-1''	1'-8''	7'-7''	1'-8''	10'-11''	5'-0''	2.33	d1 E	#4	1	18'-6''	12
											d2 E	#4	1	17'-7''	12
											d3 E	#4	1	16'-8''	11
											d4 E	#4	1	15'-9''	11
											d5 E	#4	1	14'-10''	10
											d6 E	#4	1	13'-10 3/4''	9
											d7 E	#4	1	13'-0''	9
											d8 E	#4	1	12'-3/4''	8
											d9 E	#4	1	11'-1 3/4''	7
											d10 E	#4	6	8'-11''	36
											d11 E	#4	6	7'-9''	31
											d12 E	#4	6	10'-7 1/4''	42
											d13 E	#4	2	4'-8''	6

DIMENSIONS AND QUANTITIES  
FOR DOUBLE SLOPED HEADWALL TYPE III

	PIPE I.D.	DIMENSIONS								PRECAST CONCRETE CU YD	MARK	SIZE	NO	LENGTH	LB
		A	B	C	N	S	M	L	W						
1 TO 4 SLOPE	(2) - 6'' PIPE	1'-5''	6''	1'-11''	1'-8''	5'-1''	1'-8''	8'-5''	5'-0''	1.53	d1 E	#4	1	17'-5 1/4''	12
											d2 E	#4	1	16'-2 1/4''	11
											d3 E	#4	1	14'-11''	10
											d4 E	#4	1	13'-8''	9
											d5 E	#4	1	12'-4 3/4''	8
											d6 E	#4	1	11'-1 3/4''	7
											d10 E	#4	6	5'-8 1/2''	23
											d11 E	#4	6	4'-9 3/4''	19
											d12 E	#4	6	8'-1 1/4''	32
											d13 E	#4	2	4'-8''	6
	(2) - 8'' PIPE OR (1) - 6'' PIPE & (1) - 8'' PIPE	1'-5''	8''	2'-1''	1'-8''	5'-1''	1'-8''	8'-5''	5'-0''	1.79	d1 E	#4	1	18'-5 1/4''	12
											d2 E	#4	1	17'-2 1/4''	11
											d3 E	#4	1	15'-11''	11
											d4 E	#4	1	14'-8''	10
											d5 E	#4	1	13'-4 3/4''	9
											d6 E	#4	1	12'-1 3/4''	8
											d7 E	#4	1	10'-10 3/4''	7
											d10 E	#4	6	6'-6 1/4''	26
											d11 E	#4	6	5'-7 1/4''	22
											d12 E	#4	6	8'-1 1/4''	32
											d13 E	#4	2	4'-8''	6



PLAN



SECTION A-A  
TRENCH DRAIN INSTALLATION

NOTES:

1. OUTLET PIPES AND PREFORMED CHANNEL INVERTS SHALL BE SLOPED AT 0.6% OR STEEPER TOWARD OUTLET REGARDLESS OF THE SURFACE SLOPE.
2. TRENCH DRAIN MAY BE STUBBED DIRECTLY INTO DRAINAGE STRUCTURES OR OUTLET PIPES MAY BE USED TO CONNECT TRENCH DRAIN TO DRAINAGE STRUCTURES.
3. TRENCH EXCAVATION MUST ALLOW FOR A MINIMUM OF 12 INCHES OF CONCRETE TO BE PLACED UNDER AND ALONGSIDE THE TRENCH DRAIN CHANNEL SYSTEM.
4. THE FINISHED LEVEL OF CONCRETE MUST BE APPROXIMATELY 1/8" ABOVE THE TOP OF THE DRAIN CHANNEL.
5. TRENCH DRAINS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS DETAILS AND SPECIFICATIONS.
6. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN PAVED SHOULDER AND TRENCH DRAIN ENCASEMENT.
7. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL PLACEMENT (V:H).
8. WHEN THE CONCRETE ENCASEMENT FOR TRENCH DRAIN IS WITHIN 6' OF THE PAVEMENT, REPLACE THE GORE SURFACING WITH CLASS SI CONCRETE 9" DEPTH; PAY ITEM: PORTLAND CEMENT CONCRETE SHOULDERS (JOINTED) 9".

\* MAXIMUM ROLLOVER AND \*\* MAXIMUM SLOPE FROM EDGE OF SHOULDER VARIES FROM THE PHYSICAL NOSE TO THE GORE NOSE ACCORDING TO THE FOLLOWING:

- FOR EXIT RAMPS:
- \* 5% MAX. ROLLOVER AND
  - \*\* 9% MAX. SLOPE FROM EDGE OF SHOULDER
- FOR ENTRANCE RAMPS:
- \* 7% MAX. ROLLOVER AND
  - \*\* 10% MAX. SLOPE FROM EDGE OF SHOULDER

SHEET 1 OF 2



TRENCH DRAIN DETAIL

STANDARD B12-07

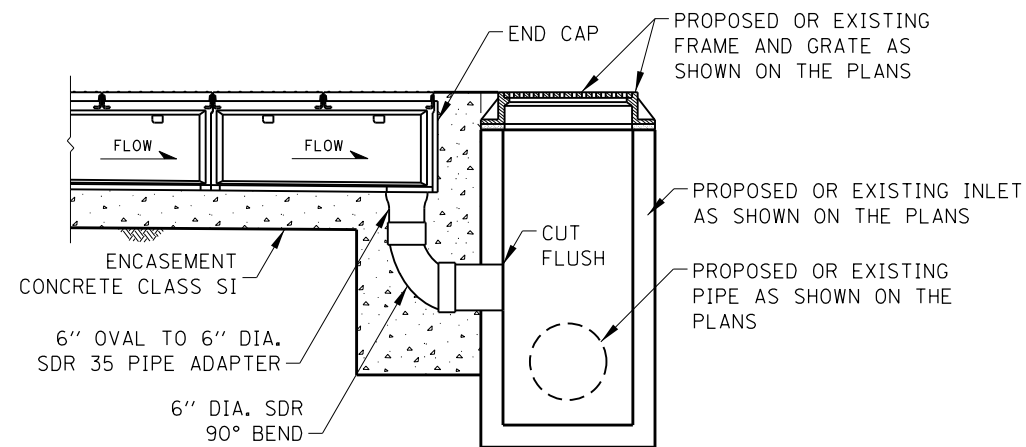
DATE	REVISIONS
03-01-2018	UPDATED MAX. ROLLOVER REQ
03-31-2016	REVISED SECTION E-E HATCHING
03-11-2015	REVISED PIPING BEND
03-31-2014	REVISED ROLLOVER, ADDED CATCH BASIN, TYPE B
	REVISED NOTES

APPROVED BY:

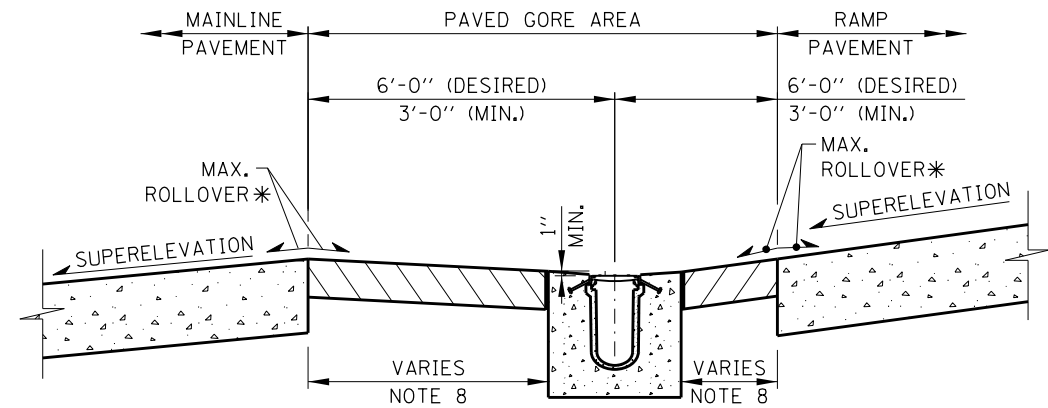
DATE:

*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

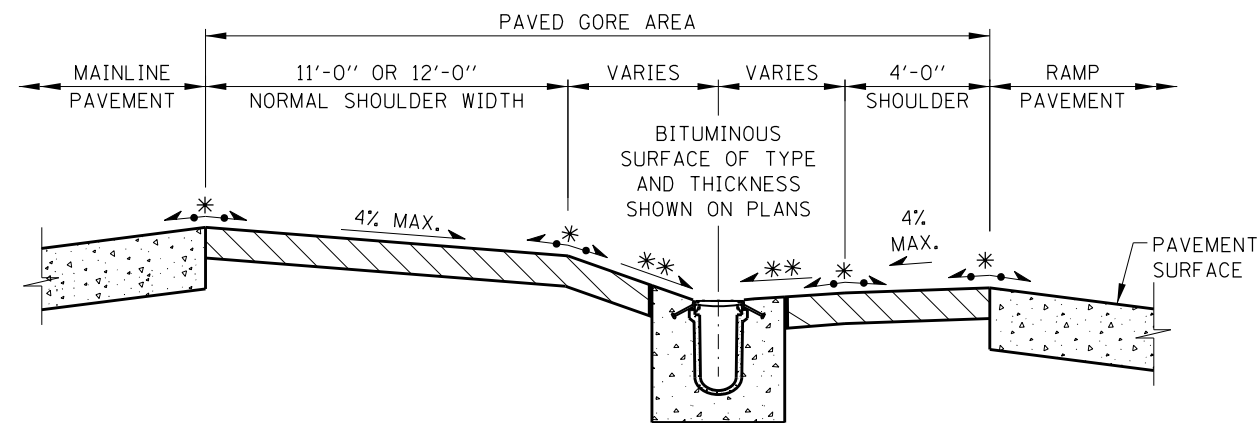
01/01/2011



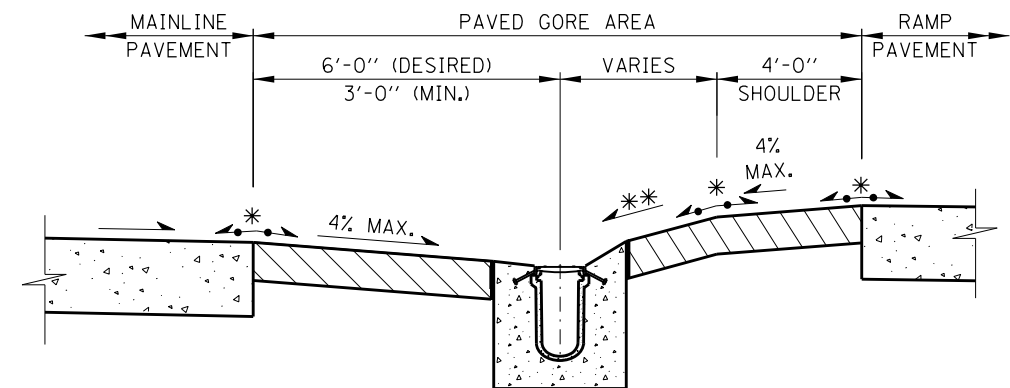
SECTION B-B  
PIPE OUTLET TO DRAINAGE STRUCTURE



SECTION E-E  
RAMP ON OUTSIDE OF  
SUPERELEVATED MAINLINE SECTION



SECTION D-D



SECTION C-C

NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

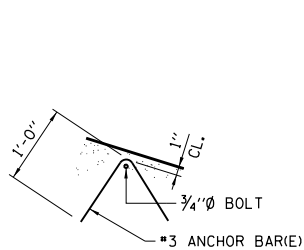
APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
01/01/2011

SHEET 2 OF 2



TRENCH DRAIN DETAIL

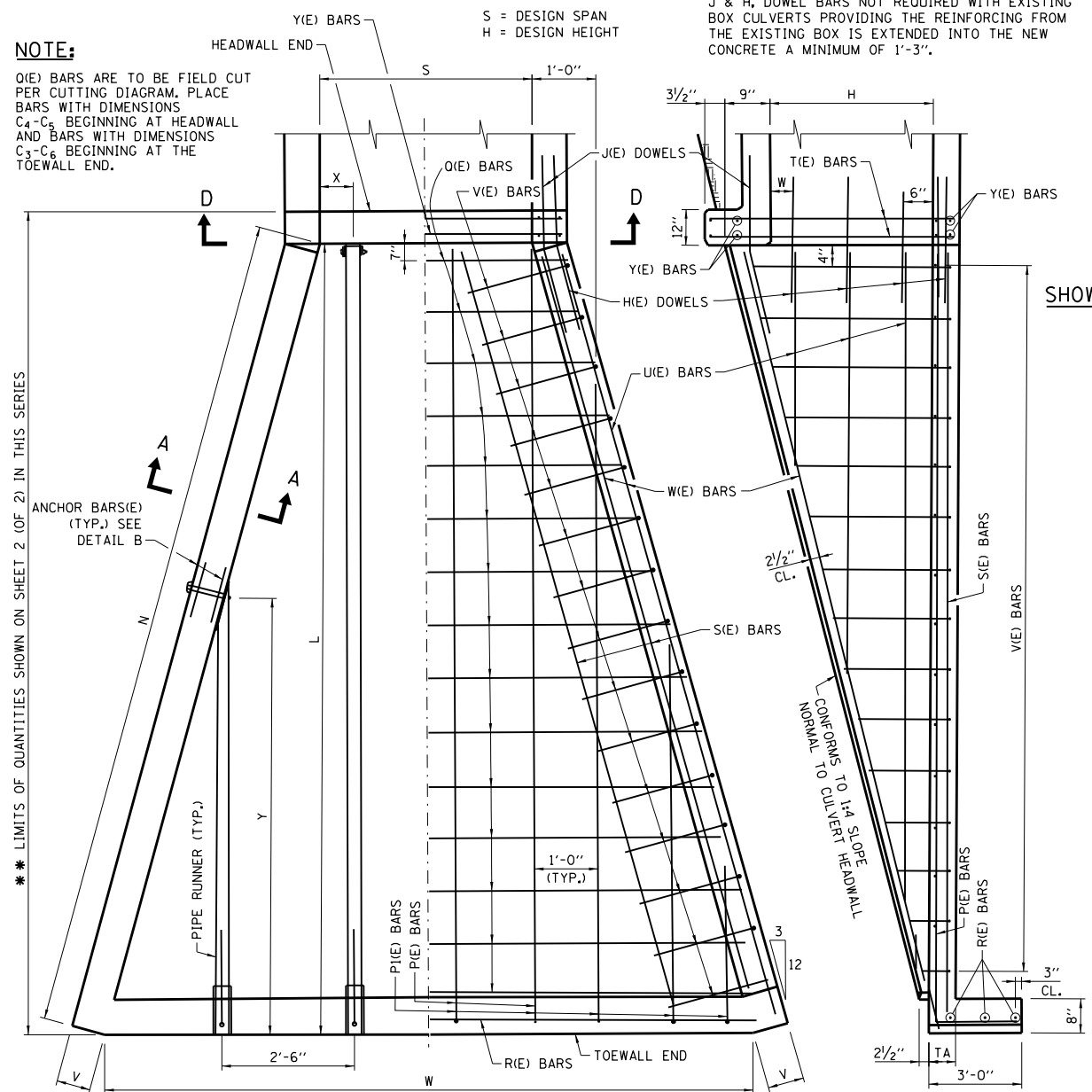
STANDARD B12-07



**ANCHOR BARS**  
CONTRACTOR SHALL PROVIDE 2-#3 ANCHOR BARS(E) PER SIDEWALL BOLT.

**DETAIL B**

**NOTE:**  
O(E) BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE BARS WITH DIMENSIONS C<sub>4</sub>-C<sub>5</sub> BEGINNING AT HEADWALL AND BARS WITH DIMENSIONS C<sub>3</sub>-C<sub>6</sub> BEGINNING AT THE TOEWALL END.

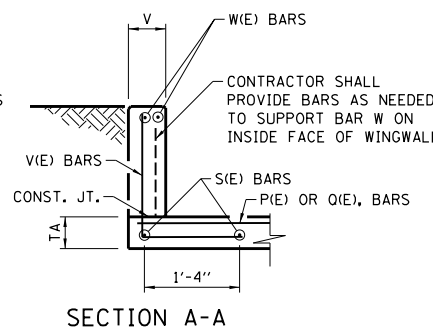


**HALF PLAN SHOWING DIMENSIONS**      **HALF PLAN SHOWING REINFORCEMENT BARS**      **ELEVATION PARALLEL TO BARREL**

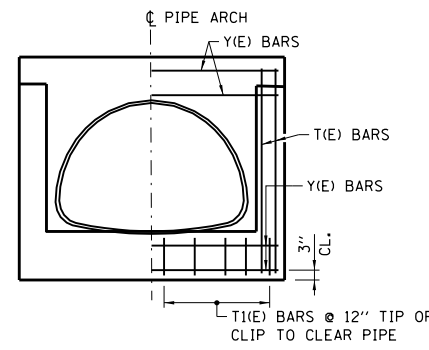
**\*\* DOWEL BARS EXTENDING INTO THE CONCRETE BOX CULVERT ARE INCLUDED IN THE QUANTITIES**

**NOTE:**

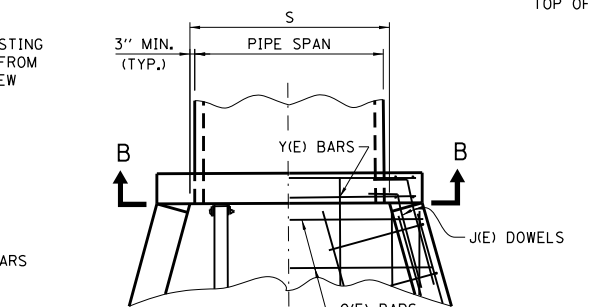
J & H, DOWEL BARS NOT REQUIRED WITH EXISTING BOX CULVERTS PROVIDING THE REINFORCING FROM THE EXISTING BOX IS EXTENDED INTO THE NEW CONCRETE A MINIMUM OF 1'-3".



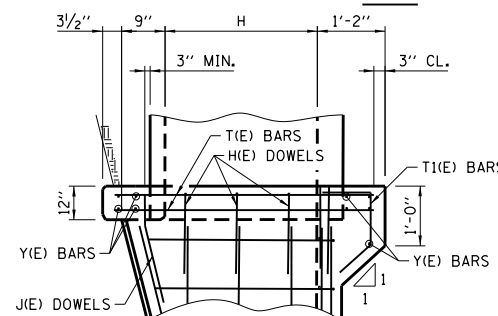
**SECTION A-A**



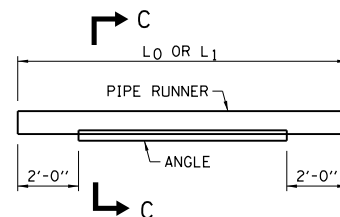
**SECTION B-B**



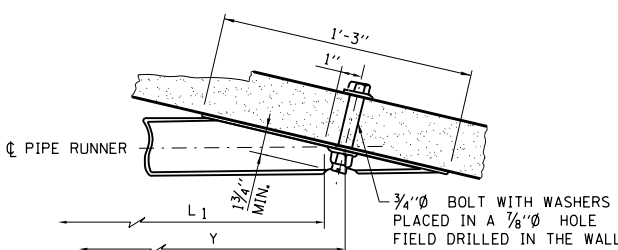
**HALF PLAN SHOWING DIMENSIONS**      **HALF PLAN SHOWING REINFORCEMENT BARS**



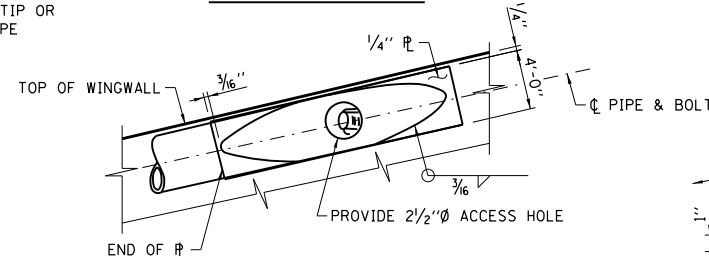
**ELEVATION PIPE ARCH DETAILS**



**DETAIL A PIPE RUNNER DETAILS**

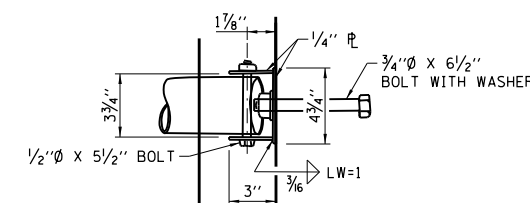


**SECTION AT WING**



**ELEVATION AT WING**

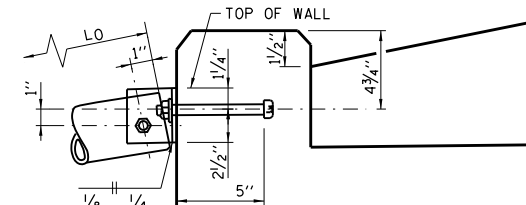
**NOTE:**  
PIPE O.D. IS THE PIPE RUNNER OUTSIDE DIAMETER.



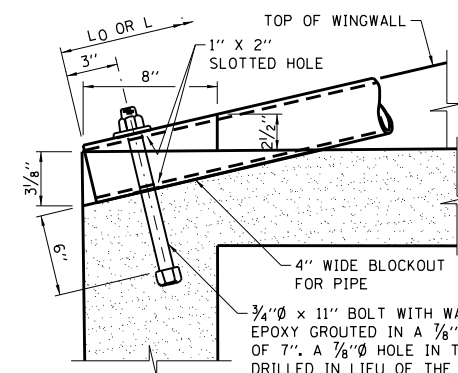
**PLAN AT HEADWALL**

**NOTE:**

A 3/4 inch x 9/2 inch BOLT WITH ADDITIONAL 1/4 inch WASHER PLACED IN A 7/8 inch HOLE DRILLED THROUGH THE HEADWALL OR A 3/4 inch x 8 inch THREADED ROD EPOXY GROUTED IN A 7/8 inch HOLE WITH A MINIMUM EMBEDMENT OF 6 3/4 inch MAY BE USED IN LIEU OF CAST-IN-PLACE BOLT SHOWN.



**ELEVATION AT HEADWALL**



**SECTION THRU TOEWALL**

**NOTE:**

V, P1 AND U BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE ONE-HALF THE BARS IN OR NEAR EACH WINGWALL BEGINNING WITH THE SHORTEST V BARS AND P1 BARS AT THE TOEWALL END AND LONGEST U BARS AT THE BOTTOM OF THE WALL.

**GENERAL NOTES:**

- ALL CONCRETE SHALL BE CLASS SI.
- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4 inch x 45° CHAMFER. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW FINISHED GROUND LEVEL. COVER FROM THE FACE OF CONCRETE TO THE FACE OF REINFORCEMENT BARS SHALL BE 2 inch, UNLESS OTHERWISE SHOWN.
- CONCRETE QUANTITIES SHOWN ON SHEET 2 (OF 2) IN THIS SERIES ARE FOR REINFORCED CONCRETE BOX CULVERT SECTIONS AND ADDITIONAL CONCRETE REQUIRED IN HEADWALLS FOR PIPE OR ARCH CULVERT SECTIONS SHALL BE ADDED TO THESE QUANTITIES.
- THIS STANDARD MAY BE USED FOR CULVERTS WITH SKEW OF 0° ± 7.5° AS SHOWN PER CULVERT SKEW ORIENTATION ON THIS SHEET.
- DESIGN: SAFETY PIPE RUNNERS ARE DESIGNED FOR A TRANSVERSING LOAD OF 1,800 POUNDS AT YIELD AS RECOMMENDED BY RESEARCH REPORT 280-1, SAFETY TREATMENT OF ROADSIDE CROSS DRAINAGE STRUCTURES, TEXAS TRANSPORTATION INSTITUTE, MARCH 1981.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- FOR EROSION PROTECTION SEE STANDARD B19.
- ALL REINFORCEMENT BARS SHOWN SHALL BE EPOXY COATED (E).

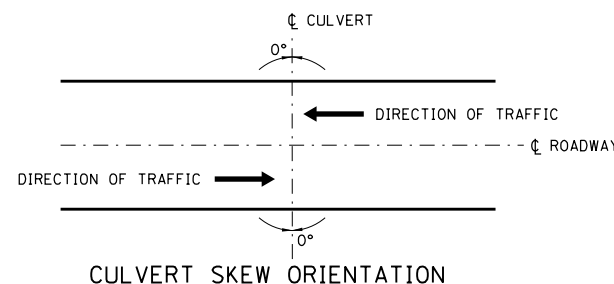
SHEET 1 OF 2



DATE	REVISIONS
03-01-2022	REVISED HEADWALL THICKNESS AND REBAR TABLE
03-11-2015	REVISED NOTES
03-31-2014	TABLE QUANTITIES REVISED
02-07-2012	TABLE QUANTITIES REVISED

END TREATMENT WITH PIPE RUNNERS, FOR SINGLE CULVERTS 0° SKEW, 1:4 SLOPE, H ≤ 4'

STANDARD B13-06



**CULVERT SKEW ORIENTATION**

APPROVED BY:

*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

DATE:

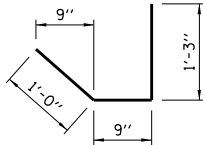
06/01/2009

CULVERT SIZE	TABLE OF DIMENSIONS							TOTAL QUANTITIES ONE END			PIPE RUNNERS FOR ONE END - SIZE 3" O.D.			
								CONC.	REINF. BARS	PIPE RUNNER	HEADWALL PIPE		WINGWALL PIPE	
S x H	L	N	V	W	TA	X	Y	CU. YD.	POUND	FT.	NO.	L <sub>0</sub>	NO.	L <sub>1</sub>
3 x 2	10'-10"	11'-2"	7"	8'-5"	6"	0'-3"	--	3.2	346	22.16	2	11'-1"	0	--
3 x 3	14'-10"	15'-3½"	7"	10'-5"	6"	1'-6"	10'-10"	5.2	489	37.50	1	15'-2"	2	11'-2"
4 x 2	10'-10"	11'-2"	7"	9'-5"	6"	0'-9"	--	3.4	372	22.16	2	11'-1"	0	--
4 x 3	14'-10"	15'-3½"	7"	11'-5"	6"	2'-0"	12'-10"	6.5	521	41.50	1	15'-2"	2	13'-2"
4 x 4	18'-10"	19'-5"	7"	13'-5"	6"	0'-9"	11'-10"	8.1	727	63.00	2	19'-4"	2	12'-2"
5 x 2	10'-10"	11'-2"	7"	10'-5"	6"	1'-3"	5'-10"	3.7	397	34.16	2	11'-1"	2	6'-0"
5 x 3	14'-10"	15'-3½"	7"	12'-5"	6"	1'-3"	9'-10"	5.9	554	50.50	2	15'-2"	2	10'-1"
5 x 4	18'-10"	19'-5"	7"	14'-5"	6"	1'-3"	13'-10"	8.5	765	67.17	2	19'-4"	2	14'-3"
6 x 3	14'-10"	15'-3½"	7"	13'-5"	6"	1'-9"	11'-10"	6.2	583	54.67	2	15'-2"	2	12'-2"
6 x 4	18'-10"	19'-5"	7"	15'-5"	6"	0'-6"	10'-10"	8.9	800	80.33	3	19'-4"	2	11'-2"
7 x 3	14'-10"	15'-3½"	7"	14'-5"	6½"	2'-3"	13'-10"	6.5	614	58.83	2	15'-2"	2	14'-3"
7 x 4	18'-10"	19'-5"	7"	16'-5"	6½"	1'-0"	12'-10"	9.3	835	84.33	3	19'-4"	2	13'-2"
8 x 4	18'-10"	19'-5"	7"	17'-5"	7"	0'-3"	9'-10"	9.7	871	97.50	4	19'-4"	2	10'-1"

## PIPE ARCH AND ELLIPTICAL PIPE CULVERTS

FOR PIPE ARCH OR ELLIPTICAL PIPE CULVERTS SELECT APPROPRIATE "S" & "H" FROM SIZES SHOWN. ADD THE FOLLOWING ADDITIONAL BARS:

- (a) 1 ADDITIONAL Y(E) BAR  
(b) #4 - T1(E) BARS @ APPROX. 12" CTS. (NO. = S + 2)



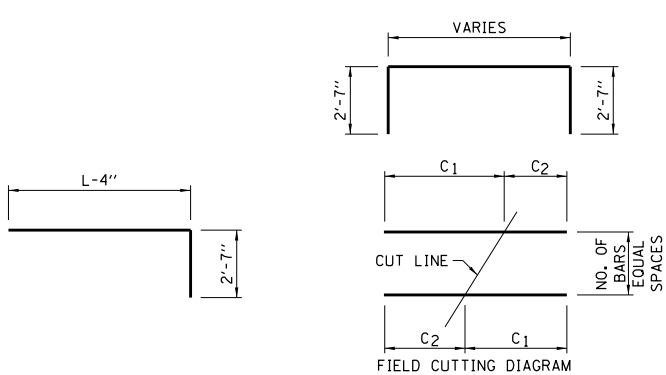
### T1(E) BARS

THE WEIGHT OF THE ADDITIONAL BARS AND THE ADDITIONAL QUANTITY OF CONCRETE IN THE HEADWALL SHALL BE ADDED TO THE QUANTITIES SHOWN.

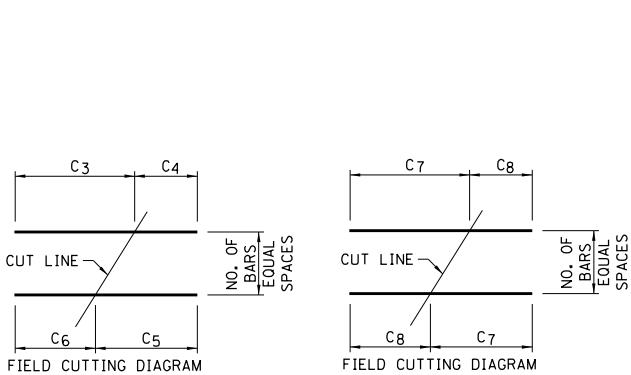
CULVERT SIZE	TABLE OF REINFORCING STEEL FOR ONE END																														
	H(E) DOWEL #4 @ 12"		J(E) DOWEL #6		P(E) BARS #4 @ 12"		P1(E) BARS #4 @ 12"			Q(E) BARS #4 @ 12"						R(E) BARS 3-#4	S(E) BARS 4-#4	U(E) BARS #4 @ 12"			V(E) BARS #4 @ 10.5"				4 W(E) BARS		Y(E) BARS 8-#5	T(E) BARS 8-#5 BOX CULVERT	T(E) BARS 8-#5 PIPE ARCH		
S x H	NO.	LENGTH.	NO.	LENGTH.	NO.	LENGTH.	NO.	C <sub>1</sub>	C <sub>2</sub>	LENGTH.	NO.	C <sub>3</sub>	C <sub>4</sub>	C <sub>5</sub>	C <sub>6</sub>	LENGTH.	LENGTH.	LENGTH.	NO.	C <sub>7</sub>	C <sub>8</sub>	LENGTH.	NO.	C <sub>9</sub>	C <sub>10</sub>	LENGTH.	SIZE	LENGTH.	LENGTH.	LENGTH.	LENGTH.
3 x 2	6	2'-6"	4	4'-0"	4	13'-1"	2	8'-4"	4'-4"	17'-10"	5	8'-8"	4'-2"	6'-2"	6'-8"	12'-10"	8'-9"	10'-10"	2	8'-7"	4'-5"	13'-0"	11	2'-9"	6"	6'-3"	#5	10'-4"	3'-8"	3'-2"	3'-8"
3 x 3	8	2'-6"	4	4'-0"	4	17'-1"	3	12'-4"	4'-4"	21'-10"	7	10'-8"	4'-2"	7'-2"	7'-8"	14'-10"	10'-9"	15'-0"	3	12'-8"	4'-5"	17'-1"	16	3'-9"	6"	7'-3"	#5	14'-6"	3'-8"	4'-2"	4'-8"
4 x 2	6	2'-6"	4	4'-0"	5	13'-1"	2	8'-4"	4'-4"	17'-10"	5	9'-8"	5'-2"	7'-2"	7'-8"	14'-10"	9'-9"	10'-10"	2	8'-7"	4'-5"	13'-0"	11	2'-9"	6"	6'-3"	#5	10'-4"	4'-8"	3'-2"	3'-8"
4 x 3	8	2'-6"	4	4'-0"	5	17'-1"	3	12'-4"	4'-4"	21'-10"	7	11'-8"	5'-2"	8'-2"	8'-8"	16'-10"	11'-9"	15'-0"	3	12'-8"	4'-5"	17'-1"	16	3'-9"	6"	7'-3"	#5	14'-6"	4'-8"	4'-2"	4'-8"
4 x 4	10	2'-6"	4	4'-0"	5	21'-1"	4	16'-4"	4'-4"	25'-10"	9	13'-8"	5'-2"	9'-2"	9'-8"	18'-10"	13'-9"	19'-1"	4	16'-9"	4'-5"	21'-2"	21	4'-9"	6"	8'-3"	#6	18'-7"	4'-8"	5'-2"	5'-8"
5 x 2	6	2'-6"	4	4'-0"	6	13'-1"	2	8'-4"	4'-4"	17'-10"	5	10'-8"	6'-2"	8'-2"	8'-8"	16'-10"	10'-9"	10'-10"	2	8'-7"	4'-5"	13'-0"	11	2'-9"	6"	6'-3"	#5	10'-4"	5'-8"	3'-2"	3'-8"
5 x 3	8	2'-6"	4	4'-0"	6	17'-1"	3	12'-4"	4'-4"	21'-10"	7	12'-8"	6'-2"	9'-2"	9'-8"	18'-10"	12'-9"	15'-0"	3	12'-8"	4'-5"	17'-1"	16	3'-9"	6"	7'-3"	#5	14'-6"	5'-8"	4'-2"	4'-8"
5 x 4	10	2'-6"	4	4'-0"	6	21'-1"	4	16'-4"	4'-4"	25'-10"	9	14'-8"	6'-2"	10'-2"	10'-8"	20'-10"	14'-9"	19'-1"	4	16'-9"	4'-5"	21'-2"	21	4'-9"	6"	8'-3"	#6	18'-7"	5'-8"	5'-2"	5'-8"
6 x 3	8	2'-6"	4	4'-0"	7	17'-1"	3	12'-4"	4'-4"	21'-10"	7	13'-8"	7'-2"	10'-2"	10'-8"	20'-10"	13'-9"	15'-0"	3	12'-8"	4'-5"	17'-1"	16	3'-9"	6"	7'-3"	#5	14'-6"	6'-8"	4'-2"	4'-8"
6 x 4	10	2'-6"	4	4'-0"	7	21'-1"	4	16'-4"	4'-4"	25'-10"	9	15'-8"	7'-2"	11'-2"	11'-8"	22'-10"	15'-9"	19'-1"	4	16'-9"	4'-5"	21'-2"	21	4'-9"	6"	8'-3"	#6	18'-7"	6'-8"	5'-2"	5'-8"
7 x 3	8	2'-6"	4	4'-0"	8	17'-1"	3	12'-4"	4'-4"	21'-10"	7	14'-8"	8'-2"	11'-2"	11'-8"	22'-10"	14'-9"	15'-0"	3	12'-8"	4'-5"	17'-1"	16	3'-9"	6"	7'-3"	#5	14'-6"	7'-8"	4'-2"	4'-8"
7 x 4	10	2'-6"	4	4'-0"	8	21'-1"	4	16'-4"	4'-4"	25'-10"	9	16'-8"	8'-2"	12'-2"	12'-8"	24'-10"	16'-9"	19'-1"	4	16'-9"	4'-5"	21'-2"	21	4'-9"	6"	8'-3"	#6	18'-7"	7'-8"	5'-2"	5'-8"
8 x 4	10	2'-6"	4	4'-0"	9	21'-1"	4	16'-4"	4'-4"	25'-10"	9	17'-8"	9'-2"	13'-2"	13'-8"	26'-10"	17'-9"	19'-1"	4	16'-9"	4'-5"	21'-2"	21	4'-9"	6"	8'-3"	#6	18'-7"	8'-8"	5'-3"	5'-8"

#### NOTE:

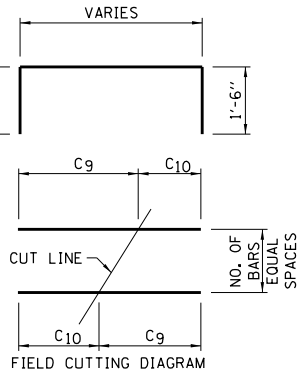
REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.



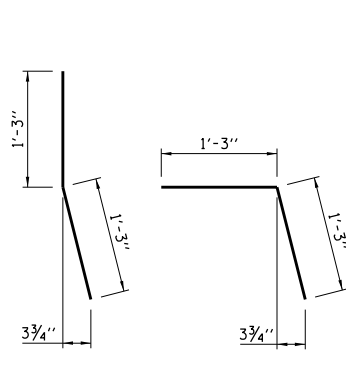
P(E) BARS



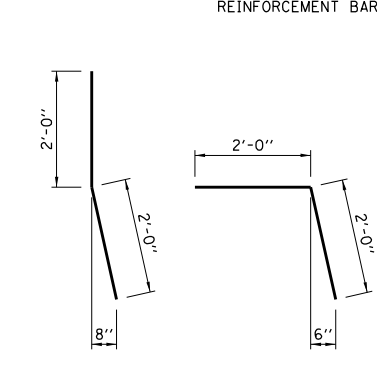
P1(E) BARS



Q(E) BARS



U(E) BARS



V(E) BARS

FOR BOX CULVERTS FOR PIPE ARCHES

H(E) DOWELS

FOR BOX CULVERTS FOR PIPE ARCHES

J(E) DOWELS

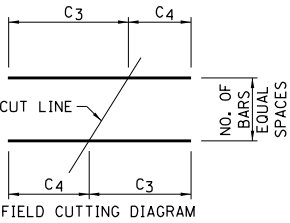


END TREATMENT WITH PIPE RUNNERS, FOR SINGLE CULVERTS  
0° SKEW, 1:4 SLOPE, H ≤ 4'



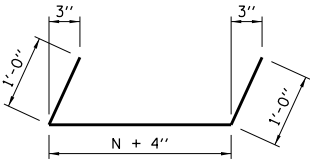


TABLE OF DIMENSIONS							TABLE OF REINFORCEMENT BARS FOR ONE END																									
							C(E) BARS 2 REQ'D.		D(E) BARS 8-#4	E(E) BARS #4 ⑤		F(E) BARS				H(E) DOWEL #5 @ 12"		J(E) DOWEL 4-#6	K(E) DOWEL 2-#5	U(E) BARS #4 @ 12"			V(E) BARS #5 @ 6" CTS.				W(E) BARS 4 REQ'D.					
S	H	L	WF	WW	TF	N	SIZE	LENGTH	LENGTH	NO.	LENGTH	SIZE	NO.	C <sub>1</sub>	C <sub>2</sub>	LENGTH	NO.	LENGTH	LENGTH	LENGTH	NO.	C <sub>3</sub>	C <sub>4</sub>	LENGTH	NO.	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	LENGTH	SIZE	LENGTH	
9'	3'	14'-4"	3"	7"	7"	14'-10 <sup>1</sup> / <sub>8</sub> "	#4	15'-2"	17'-2"	4	16'-8"	#4	15	2'-0"	2'-2"	9'-4"	6	3'-0"	4'-6"	4'-0"	3	12'-8"	4'-5"	17'-1"	28	9"	3'-10"	1'-0"	6'-7"	#5	14'-11"	
9'	4'	18'-4"	9"	7"	8"	18'-11 <sup>3</sup> / <sub>4</sub> "	#4	19'-4"	21'-4"	4	20'-10"	#4	19	2'-0"	2'-8"	9'-10"	8	3'-0"	4'-6"	4'-6"	4	16'-10"	4'-5"	21'-3"	36	10"	4'-11"	1'-0"	7'-9"	#6	19'-2"	
5'	5'	22'-4"	1'-3"	7"	8"	23'-1 <sup>1</sup> / <sub>2</sub> "	#4	23'-6"	25'-6"	4	25'-0"	#4	23	2'-0"	3'-2"	10'-4"	10	3'-0"	4'-6"	5'-0"	5	20'-11"	4'-5"	25'-4"	44	10"	5'-11"	1'-0"	8'-9"	#6	23'-5"	
6'	6'	26'-4"	1'-9"	7"	8 <sup>1</sup> / <sub>2</sub> "	27'-3 <sup>1</sup> / <sub>8</sub> "	#4	27'-7"	29'-7"	6	29'-1"	#5	27	2'-0"	3'-8"	10'-10"	12	3'-0"	4'-6"	5'-6"	6	25'-1"	4'-5"	29'-6"	52	10"	6'-11"	1'-0"	9'-9"	#6	27'-8"	
7'	7'	30'-4"	2'-3"	7"	9"	31'-4 <sup>1</sup> / <sub>8</sub> "	#5	31'-9"	33'-9"	6	33'-3"	#5	31	2'-1"	4'-3"	11'-6"	14	3'-0"	4'-6"	6'-0"	7	29'-2"	4'-5"	33'-7"	60	11"	8'-0"	1'-0"	10'-11"	#6	31'-11"	
8'	8'	34'-4"	2'-9"	8 <sup>1</sup> / <sub>2</sub> "	9 <sup>1</sup> / <sub>2</sub> "	35'-6 <sup>1</sup> / <sub>2</sub> "	#5	35'-10"	37'-10"	6	37'-4"	#6	35	2'-2"	4'-10"	12'-2"	16	3'-0"	4'-6"	6'-6"	8	33'-4"	4'-5"	37'-9"	68	11"	9'-0"	1'-1"	12'-1"	#6	36'-2"	

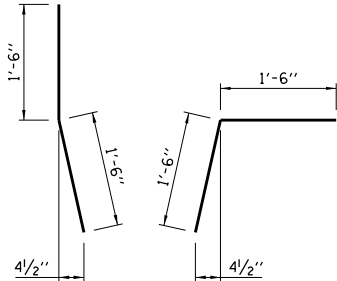


U(E) BARS

PIPE RUNNERS FOR ONE END								
S	H	SIZE (DIA.)	SCHEDULE	NO. WINGWALL PIPES	L1	L2	L3	LENGTH (FT.)
9'	3'	3"	40	2	9'-11"	--	--	19.84
9'	4'	3"	40	2	14'-0"	--	--	28.00
5'	5'	3 <sup>1</sup> / <sub>2</sub> "	40	4	18'-1"	8'-6"	--	53.16
6'	6'	3 <sup>1</sup> / <sub>2</sub> "	80	4	22'-3"	12'-7"	--	69.66
7'	7'	4"	40	6	26'-4"	16'-9"	7'-2"	100.50
8'	8'	4"	80	6	30'-6"	20'-10"	11'-7"	125.83

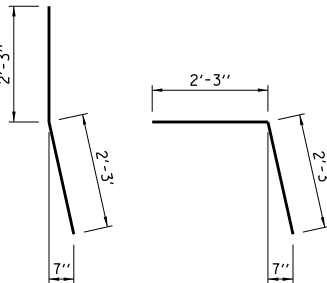


D(E) BARS



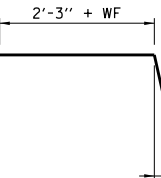
FOR BOX CULVERTS FOR PIPE CULVERTS

H(E) DOWELS



FOR BOX CULVERTS FOR PIPE CULVERTS

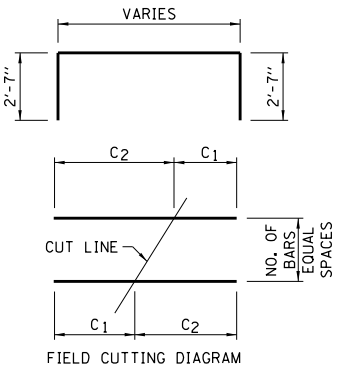
J(E) DOWELS



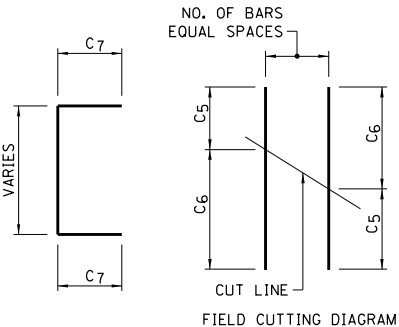
K(E) DOWEL

NUMBER OF HDWL PIPE RUNNERS FOR ONE END			
S	No	S	No
10'	4	23'	10
11'	5	24'	10
12'	5	25'	10
13'	6	26'	11
14'	6	27'	11
15'	6	28'	12
16'	7	29'	12
17'	7	30'	12
18'	8	31'	13
19'	8	32'	13
20'	8	33'	14
21'	9	34'	14
22'	9	35'	14

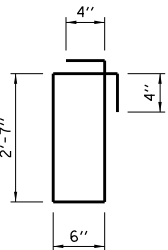
TABLE OF DIMENSIONS			TABLE OF REINFORCEMENT BARS FOR MINIMUM "S"									HEADWALL PIPE RUNNERS FOR MINIMUM "S"					QUANTITIES FOR MIN. "S" (SINGLE PIPE OR CONC. BOX CULVERT)		INCREASE IN QUANTITIES FOR 1' INCREASE IN "S"	
			② Y(E) BARS 12-#5		① Z(E) BARS #4 @ 12"		② R(E) BARS 6-#5		① S(E) BARS #4 @ 12"		① T(E) BARS #4 @ 12"									
			S	H	W ④	LENGTH	NO.	LENGTH	LENGTH	NO.	LENGTH	NO.	LENGTH	LENGTH	SIZE (DIA.)	SCHEDULE	NO.	L <sub>0</sub>	LENGTH (FT.)	CONCRETE CU. YD.
≧ 9'	3'	16'-8"	9'-10"	9	5'-4"	15'-10"	16	6'-10"	9	3'-0"	6'-8"	3"	40	4	14'-9"	59.00	7.24	863	0.35	13
≧ 9'	4'	18'-9"	9'-10"	9	5'-4"	17'-11"	18	6'-10"	9	3'-0"	7'-8"	3"	40	4	18'-10"	75.33	10.44	1078	0.35	13
≧ 5'	5'	16'-11"	5'-10"	5	5'-4"	16'-1"	16	6'-10"	5	3'-0"	8'-8"	3½"	40	2	23'-0"	46.00	10.87	1162	0.35	13
≧ 6'	6'	20'-1"	6'-10"	6	5'-4"	19'-3"	19	6'-10"	6	3'-0"	9'-8"	3½"	80	3	27'-2"	81.51	14.77	1553	0.35	13
≧ 7'	7'	23'-3"	7'-10"	7	5'-4"	22'-5"	22	6'-10"	7	3'-0"	10'-8"	4"	40	3	31'-3"	93.75	19.47	1869	0.35	13
≧ 8'	8'	26'-4"	9'-0"	8	5'-4"	25'-6"	25	6'-10"	8	3'-0"	11'-8"	4"	80	4	35'-4"	141.33	25.01	2379	0.35	13



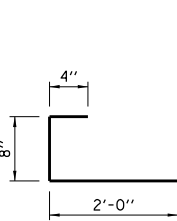
F(E) BARS



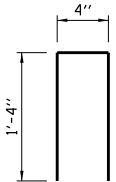
V(E) BARS



S(E) BARS

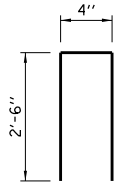


FOR BOX CULVERTS



FOR PIPE CULVERTS

T(E) BARS



Z(E) BARS

NOTE:

REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.

NOTES FOR TABLE OF DIMENSIONS:

- ① THE NUMBER OF S, T AND Z BARS SHALL BE INCREASED BY 1 FOR EACH 1 FOOT OF INCREASE IN DIMENSION "S".
- ② THE LENGTH OF R AND Y BARS SHALL BE INCREASED BY 1 FOOT FOR EACH 1 FOOT OF INCREASE IN DIMENSION "S".
- ③ THE NUMBER OF P BARS SHOWN ARE FOR SINGLE SPAN PIPES OR BOX CULVERTS. THIS NUMBER SHALL BE INCREASED BY 4 FOR EACH MULTIPLE OF PIPE OR BOX ADDED.
- ④ THIS DIMENSION SHALL BE INCREASED BY 1 FOOT FOR EACH 1 FOOT INCREASE IN DIMENSION "S".
- ⑤ THE LENGTH OF THIS BAR INCLUDES ONE 1'-6" MINIMUM LAP.

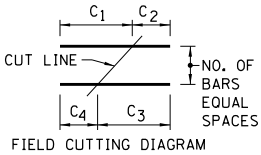


CULVERT SIZE (FEET)	TABLE OF DIMENSIONS							PIPE RUNNERS FOR ONE END SIZE 3" DIA.							TABLE OF REINFORCEMENT BARS FOR ONE END															
								HEADWALL PIPE			WINGWALL PIPE - ONE PER EACH LENGTH SHOWN				H(E) DOWELS #4 @ 12"				J(E) DOWELS 2-#6 EACH WALL				P(E) BARS #4 - EQUALLY SPACED		P1(E) BARS #4 @ 12"					
															30° WALL		0° WALL		30° WALL		0° WALL									
S X H	L	NR	V	W1	W2	WR	TA	SCH.	NO.	L0	L1	L2	L3	L4	NO.	LENGTH	NO.	LENGTH	LENGTH	LENGTH	NO.	LENGTH	NO.	C5	C6	C7	C8	LENGTH		
3 x 2	10'-10"	12'-6 <sup>1</sup> / <sub>8</sub> "	7"	3'-1 <sup>1</sup> / <sub>4</sub> "	9'-4 <sup>1</sup> / <sub>4</sub> "	6'-3"	6"	40	2	11'-5"	6'-3"	-	7'-0"	-	3	2'-6"	3	2'-6"	4'-0"	4'-0"	4	13'-1"	3	10'-2"	1'-6"	5'-0"	6'-8"	16'-10"		
3 x 3	14'-10"	17'-1 <sup>1</sup> / <sub>2</sub> "	7"	3'-1 <sup>1</sup> / <sub>4</sub> "	11'-8"	8'-6 <sup>3</sup> / <sub>4</sub> "	6"	40	2	15'-8"	10'-6"	-	11'-3"	-	4	2'-6"	4	2'-6"	4'-0"	4'-0"	4	17'-1"	4	14'-2"	2'-0"	7'-3"	8'-11"	21'-4"		
4 x 2	10'-10"	12'-6 <sup>1</sup> / <sub>8</sub> "	7"	4'-1 <sup>3</sup> / <sub>4</sub> "	10'-4 <sup>3</sup> / <sub>4</sub> "	6'-3"	6"	40	2	11'-5"	6'-3"	-	7'-0"	-	3	2'-6"	3	2'-6"	4'-0"	4'-0"	5	13'-1"	3	10'-2"	1'-6"	5'-0"	6'-8"	16'-10"		
4 x 3	14'-10"	17'-1 <sup>1</sup> / <sub>2</sub> "	7"	4'-1 <sup>3</sup> / <sub>4</sub> "	12'-8 <sup>1</sup> / <sub>2</sub> "	8'-6 <sup>3</sup> / <sub>4</sub> "	6"	40	2	15'-8"	10'-6"	-	11'-3"	-	4	2'-6"	4	2'-6"	4'-0"	4'-0"	5	17'-1"	4	14'-2"	2'-0"	7'-3"	8'-11"	21'-4"		
4 x 4	18'-10"	21'-9"	7"	4'-1 <sup>3</sup> / <sub>4</sub> "	15'-0 <sup>1</sup> / <sub>4</sub> "	10'-10 <sup>1</sup> / <sub>2</sub> "	6"	80	2	19'-11"	14'-9"	4'-6"	15'-6"	6'-7"	5	2'-6"	5	2'-6"	4'-0"	4'-0"	5	21'-1"	5	18'-2"	2'-5"	9'-5"	11'-2"	25'-9"		
5 x 2	10'-10"	12'-6 <sup>1</sup> / <sub>8</sub> "	7"	5'-2 <sup>1</sup> / <sub>8</sub> "	11'-5 <sup>1</sup> / <sub>8</sub> "	6'-3"	6"	40	2	11'-5"	6'-3"	-	7'-0"	-	3	2'-6"	3	2'-6"	4'-0"	4'-0"	6	13'-1"	3	10'-2"	1'-6"	5'-0"	6'-8"	16'-10"		
5 x 3	14'-10"	17'-1 <sup>1</sup> / <sub>2</sub> "	7"	5'-2 <sup>1</sup> / <sub>8</sub> "	13'-8 <sup>3</sup> / <sub>8</sub> "	8'-6 <sup>3</sup> / <sub>4</sub> "	6"	40	2	15'-8"	10'-6"	-	11'-3"	-	4	2'-6"	4	2'-6"	4'-0"	4'-0"	6	17'-1"	4	14'-2"	2'-0"	7'-3"	8'-11"	21'-4"		
5 x 4	18'-10"	21'-9"	7"	5'-2 <sup>1</sup> / <sub>8</sub> "	16'-0 <sup>5</sup> / <sub>8</sub> "	10'-10 <sup>1</sup> / <sub>2</sub> "	6"	80	2	19'-11"	14'-9"	4'-6"	15'-6"	6'-7"	5	2'-6"	5	2'-6"	4'-0"	4'-0"	6	21'-1"	5	18'-2"	2'-5"	9'-5"	11'-2"	25'-9"		
6 x 3	14'-10"	17'-1 <sup>1</sup> / <sub>2</sub> "	7"	6'-2 <sup>1</sup> / <sub>2</sub> "	14'-9 <sup>1</sup> / <sub>4</sub> "	8'-6 <sup>3</sup> / <sub>4</sub> "	6"	40	3	15'-8"	10'-6"	-	11'-3"	-	4	2'-6"	4	2'-6"	4'-0"	4'-0"	7	17'-1"	4	14'-2"	2'-0"	7'-3"	8'-11"	21'-4"		
6 x 4	18'-10"	21'-9"	7"	6'-2 <sup>1</sup> / <sub>2</sub> "	17'-1"	10'-10 <sup>1</sup> / <sub>2</sub> "	6"	80	3	19'-11"	14'-9"	4'-6"	15'-6"	6'-7"	5	2'-6"	5	2'-6"	4'-0"	4'-0"	7	21'-1"	5	18'-2"	2'-5"	9'-5"	11'-2"	25'-9"		
7 x 3	14'-10"	17'-1 <sup>1</sup> / <sub>2</sub> "	7"	7'-3"	15'-9 <sup>3</sup> / <sub>4</sub> "	8'-6 <sup>3</sup> / <sub>4</sub> "	6 <sup>1</sup> / <sub>2</sub> "	40	3	15'-8"	10'-6"	-	11'-3"	-	4	2'-6"	4	2'-6"	4'-0"	4'-0"	8	17'-1"	4	14'-2"	2'-0"	7'-3"	8'-11"	21'-4"		
7 x 4	18'-10"	21'-9"	7"	7'-3"	18'-1 <sup>1</sup> / <sub>2</sub> "	10'-10 <sup>1</sup> / <sub>2</sub> "	6 <sup>1</sup> / <sub>2</sub> "	80	3	19'-11"	14'-9"	4'-6"	15'-6"	6'-7"	5	2'-6"	5	2'-6"	4'-0"	4'-0"	8	21'-1"	5	18'-2"	2'-5"	9'-5"	11'-2"	25'-9"		
8 x 4	18'-10"	21'-9"	7"	8'-3 <sup>3</sup> / <sub>8</sub> "	19'-1 <sup>7</sup> / <sub>8</sub> "	10'-10 <sup>1</sup> / <sub>2</sub> "	7"	80	4	19'-11"	14'-9"	4'-6"	15'-6"	6'-7"	5	2'-6"	5	2'-6"	4'-0"	4'-0"	9	21'-1"	5	18'-2"	2'-5"	9'-5"	11'-2"	25'-9"		

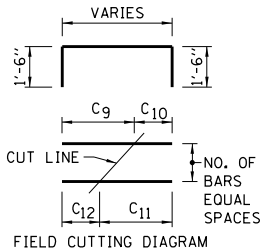
CULVERT SIZE (FEET)	TABLE OF REINFORCEMENT BARS FOR ONE END																								V1(E) BARS #4 - EQUALLY SPACED						
	O(E) BARS #4 @ 12"						R(E) BARS 3-#4	S(E) BARS 30° WALL 2-#4	S1(E) BARS 0° WALL 2-#4	T(E) BARS 8-#5 BOX CULVERT	T(E) BARS 8-#5 PIPE ARCH	U(E) BARS-ONE PER EACH LENGTH SHOWN #4 @ 12"				U1(E) BARS ONE PER EACH LENGTH SHOWN #4 @ 12"				V(E) BARS #4 - EQUALLY SPACED											
												30° WALL				0° WALL				30° WALL						0° WALL					
S X H	NO.	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	LENGTH	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	C <sub>8</sub>	C <sub>5</sub>	C <sub>6</sub>	C <sub>7</sub>	C <sub>8</sub>	NO.	C <sub>9</sub>	C <sub>10</sub>	C <sub>11</sub>	C <sub>12</sub>	LENGTH	NO.	C <sub>9</sub>	C <sub>10</sub>	C <sub>11</sub>	C <sub>12</sub>	LENGTH
3 x 2	5	9'-7"	4'-4"	6'-8"	7'-3"	13'-11"	9'-10"	12'-2"	10'-6"	3'-2"	3'-8"	5'-0"	9'-8"	-	-	4'-4"	8'-4"	-	-	6	2'-9"	6"	1'-6"	1'-9"	6'-3"	5	2'-9"	6"	1'-6"	1'-9"	6'-3"
3 x 3	7	11'-10"	4'-4"	7'-9"	8'-5"	16'-2"	12'-2"	16'-9"	14'-6"	4'-2"	4'-8"	5'-0"	9'-8"	14'-3"	-	4'-4"	8'-4"	12'-4"	-	8	3'-9"	6"	2'-0"	2'-3"	7'-3"	7	3'-9"	6"	2'-0"	2'-3"	7'-3"
4 x 2	5	10'-7"	5'-5"	7'-8"	8'-4"	16'-0"	10'-10"	12'-2"	10'-6"	3'-2"	3'-8"	5'-0"	9'-8"	14'-3"	-	4'-4"	8'-4"	-	-	6	2'-9"	6"	1'-6"	1'-9"	6'-3"	5	2'-9"	6"	1'-6"	1'-9"	6'-3"
4 x 3	7	12'-11"	5'-5"	8'-10"	9'-6"	18'-4"	13'-2"	16'-9"	14'-6"	4'-2"	4'-8"	5'-0"	9'-8"	-	-	4'-4"	8'-4"	12'-4"	-	8	3'-9"	6"	2'-0"	2'-3"	7'-3"	7	3'-9"	6"	2'-0"	2'-3"	7'-3"
4 x 4	9	15'-2"	5'-5"	10'-0"	10'-7"	20'-7"	15'-6"	21'-4"	18'-6"	5'-2"	5'-8"	5'-0"	9'-8"	14'-3"	18'-10"	4'-4"	8'-4"	12'-4"	16'-4"	10	4'-9"	6"	2'-6"	2'-9"	8'-3"	9	4'-9"	6"	2'-6"	2'-9"	8'-3"
5 x 2	5	11'-8"	6'-5"	8'-7"	9'-3"	18'-1"	11'-11"	12'-2"	10'-6"	3'-2"	3'-8"	5'-0"	9'-8"	-	-	4'-4"	8'-4"	-	-	6	2'-9"	6"	1'-6"	1'-9"	6'-3"	5	2'-9"	6"	1'-6"	1'-9"	6'-3"
5 x 3	7	13'-11"	6'-5"	9'-10"	10'-6"	20'-4"	14'-2"	16'-9"	14'-6"	4'-2"	4'-8"	5'-0"	9'-8"	14'-3"	-	4'-4"	8'-4"	12'-4"	-	8	3'-9"	6"	2'-0"	2'-3"	7'-3"	7	3'-9"	6"	2'-0"	2'-3"	7'-3"
5 x 4	9	16'-3"	6'-5"	11'-0"	11'-8"	22'-8"	16'-6"	21'-4"	18'-6"	5'-2"	5'-8"	5'-0"	9'-8"	14'-3"	18'-10"	4'-4"	8'-4"	12'-4"	16'-4"	10	4'-9"	6"	2'-6"	2'-9"	8'-3"	9	4'-9"	6"	2'-6"	2'-9"	8'-3"
6 x 3	7	14'-11"	7'-5"	10'-10"	11'-6"	22'-4"	15'-3"	16'-9"	14'-6"	4'-2"	4'-8"	5'-0"	9'-8"	14'-3"	-	4'-4"	8'-4"	12'-4"	-	8	3'-9"	6"	2'-0"	2'-3"	7'-3"	7	3'-9"	6"	2'-0"	2'-3"	7'-3"
6 x 4	9	17'-3"	7'-5"	12'-0"	12'-8"	24'-8"	17'-6"	21'-4"	18'-6"	5'-2"	5'-8"	5'-0"	9'-8"	14'-3"	18'-10"	4'-4"	8'-4"	12'-4"	16'-4"	10	4'-9"	6"	2'-6"	2'-9"	8'-3"	9	4'-9"	6"	2'-6"	2'-9"	8'-3"
7 x 3	7	16'-0"	8'-6"	11'-11"	12'-7"	24'-6"	16'-3"	16'-9"	14'-6"	4'-2"	4'-8"	5'-0"	9'-8"	14'-3"	-	4'-4"	8'-4"	12'-4"	-	8	3'-9"	6"	2'-0"	2'-3"	7'-3"	7	3'-9"	6"	2'-0"	2'-3"	7'-3"
7 x 4	9	18'-4"	8'-6"	13'-1"	13'-9"	26'-10"	18'-7"	21'-4"	18'-6"	5'-2"	5'-8"	5'-0"	9'-8"	14'-3"	18'-10"	4'-4"	8'-4"	12'-4"	16'-4"	10	4'-9"	6"	2'-6"	2'-9"	8'-3"	9	4'-9"	6"	2'-6"	2'-9"	8'-3"
8 x 4	9	19'-4"	9'-6"	14'-1"	14'-9"	28'-10"	19'-7"	21'-4"	18'-6"	5'-2"	5'-8"	5'-0"	9'-8"	14'-3"	18'-10"	4'-4"	8'-4"	12'-4"	16'-4"	10	4'-9"	6"	2'-6"	2'-9"	8'-3"	9	4'-9"	6"	2'-6"	2'-9"	8'-3"

CULVERT SIZE (FEET)	TABLE OF REINFORCING STEEL FOR ONE END				
	2 W(E) BARS		2 W <sub>1</sub> (E) BARS		Y(E) BARS 8-#5
	30° WALL		0° WALL		
S X H	SIZE	LENGTH	SIZE	LENGTH	LENGTH
3 x 2	#5	11'-6"	#5	10'-4"	3'-11"
3 x 3	#5	16'-2"	#5	14'-5"	3'-11"
4 x 2	#5	11'-6"	#5	10'-4"	4'-11"
4 x 3	#5	16'-2"	#5	14'-5"	4'-11"
4 x 4	#6	20'-11"	#6	18'-7"	4'-11"
5 x 2	#5	11'-6"	#5	10'-4"	6'-0"
5 x 3	#5	16'-2"	#5	14'-5"	6'-0"
5 x 4	#6	20'-11"	#6	18'-7"	6'-0"
6 x 3	#5	16'-2"	#5	14'-5"	7'-0"
6 x 4	#6	20'-11"	#6	18'-7"	7'-0"
7 x 3	#5	16'-2"	#5	14'-5"	8'-1"
7 x 4	#6	20'-11"	#6	18'-7"	8'-1"
8 x 4	#6	20'-11"	#6	18'-7"	9'-1"

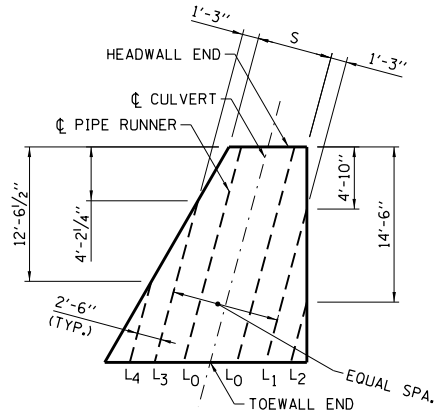
TOTAL QUANTITIES ONE END		
CONC.	REINF. BARS	PIPE RUNNERS
CU. YD.	LB.	FT.
3.2	395	36.09
4.9	537	53.08
3.6	426	36.09
5.3	573	53.08
7.4	781	81.17
3.9	446	36.09
5.7	610	53.08
7.9	823	81.17
6.2	635	68.75
8.4	854	101.08
6.8	676	68.75
9.3	903	101.08
10.2	950	121.00



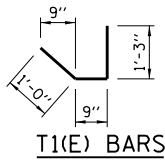
Q(E) BARS



V(E) AND V1(E) BARS



PIPE RUNNER LAYOUT



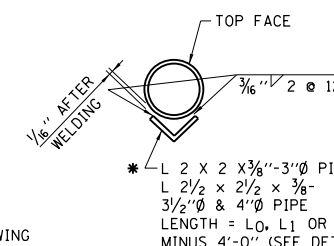
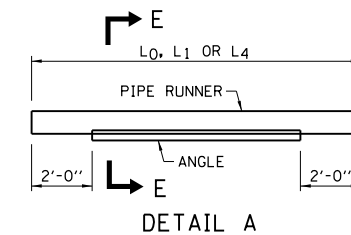
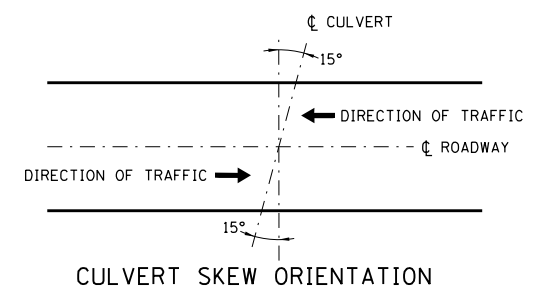
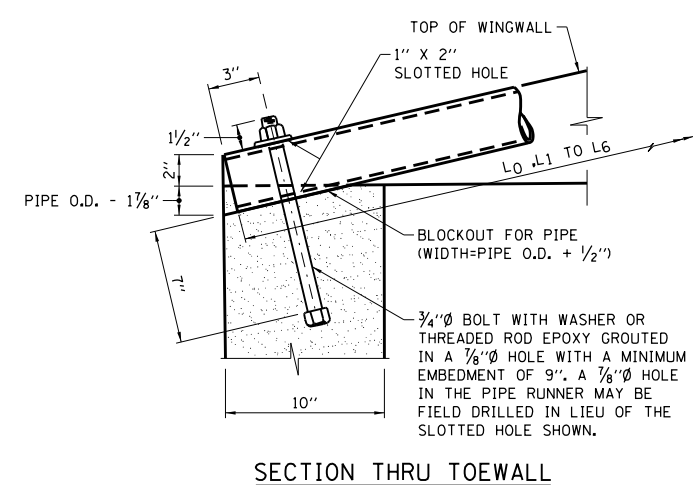
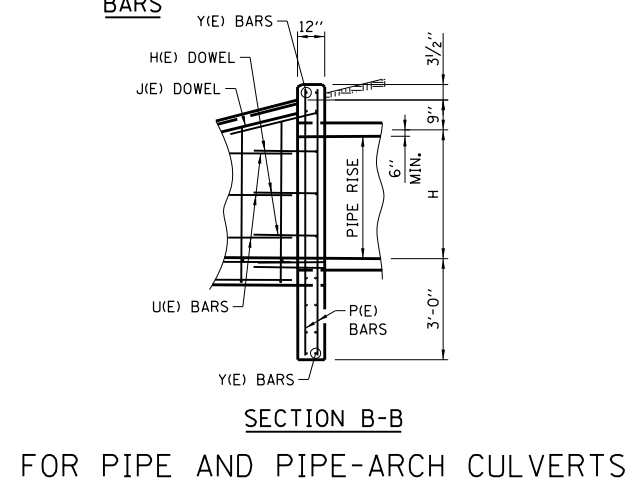
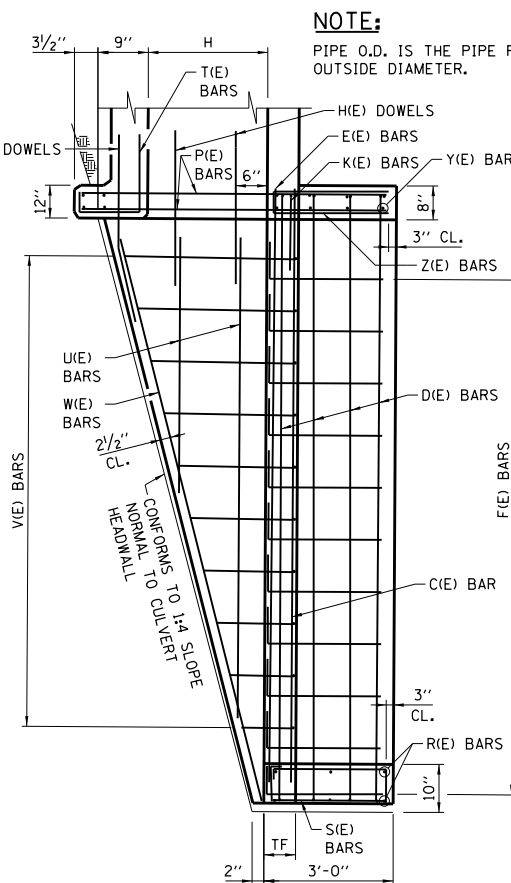
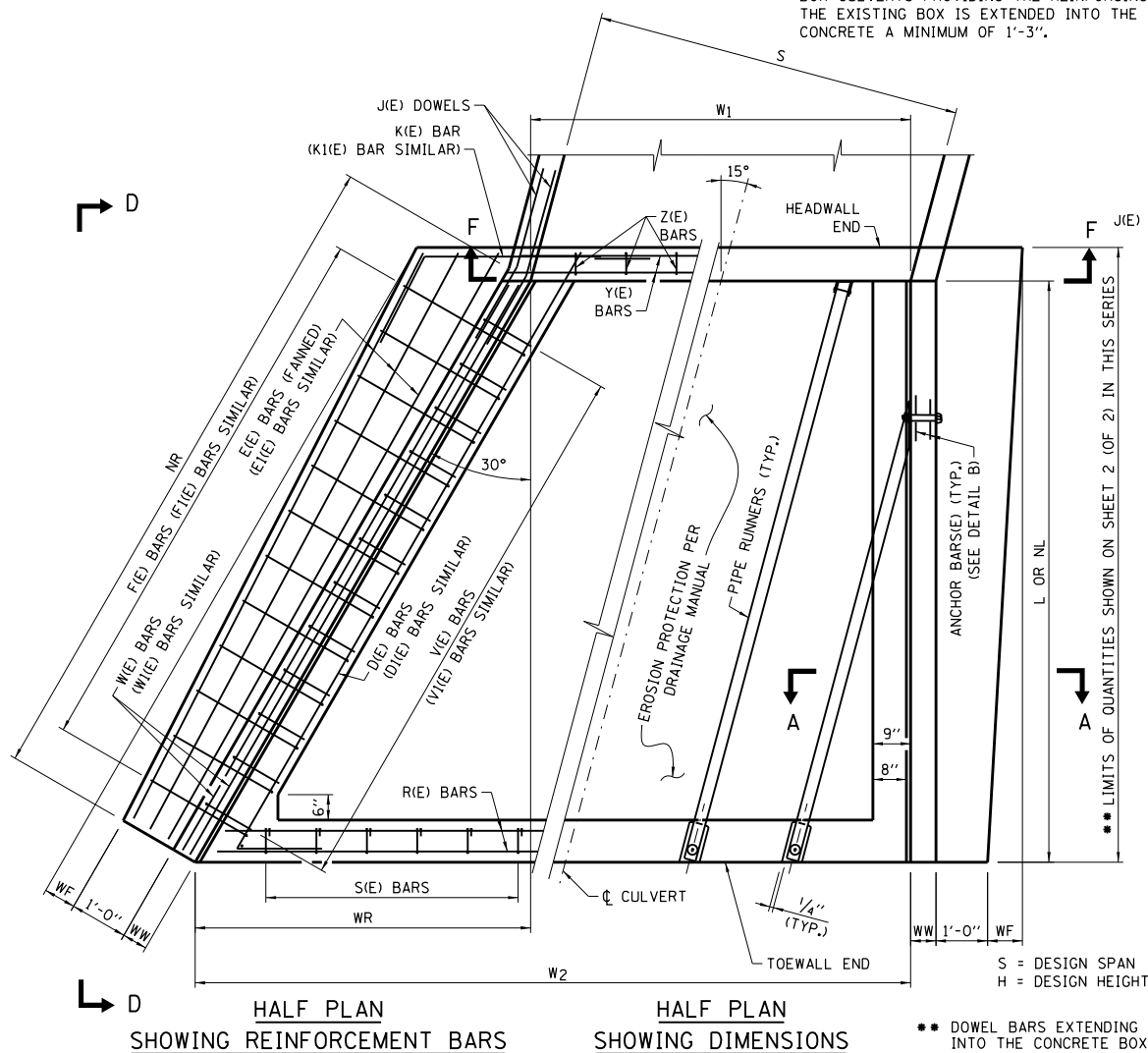
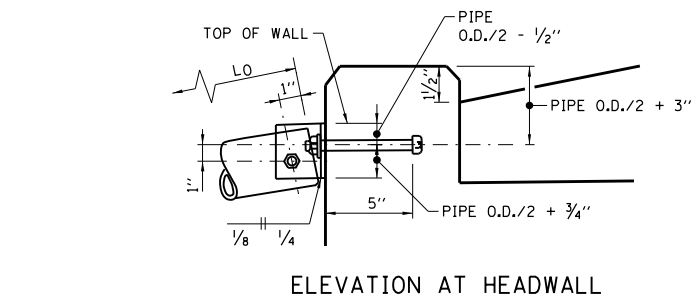
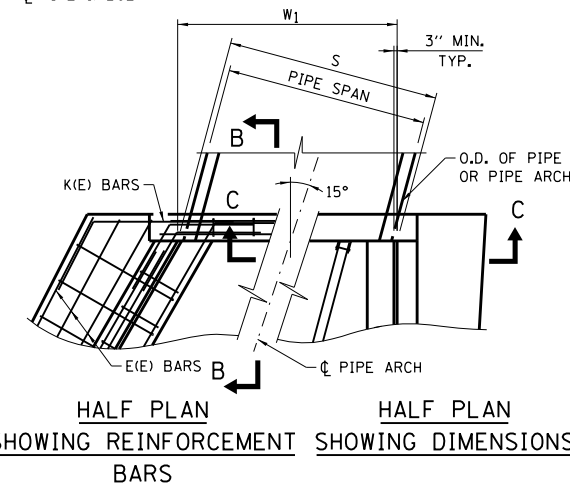
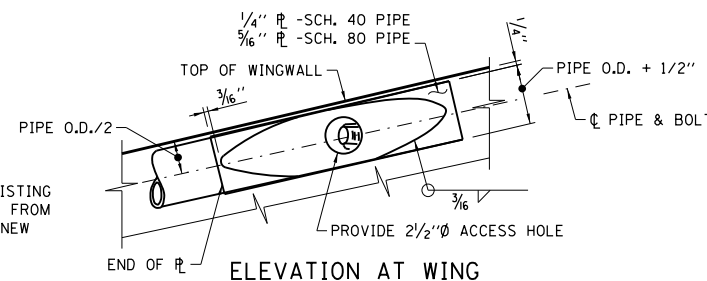
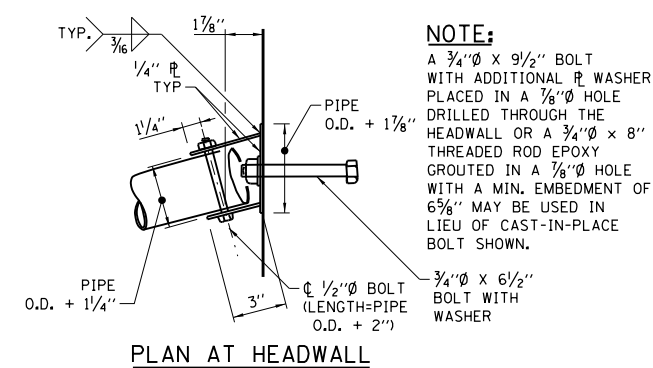
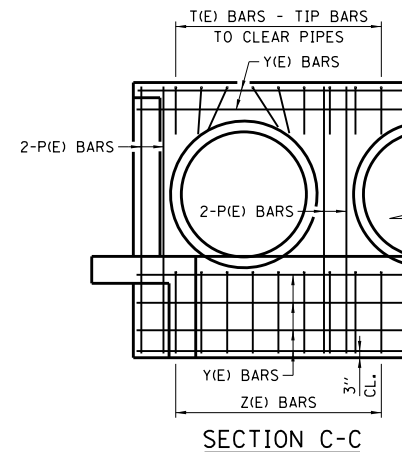
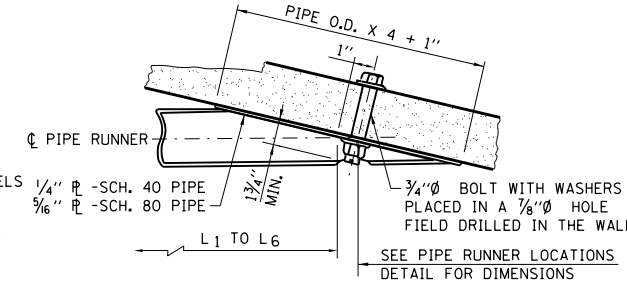
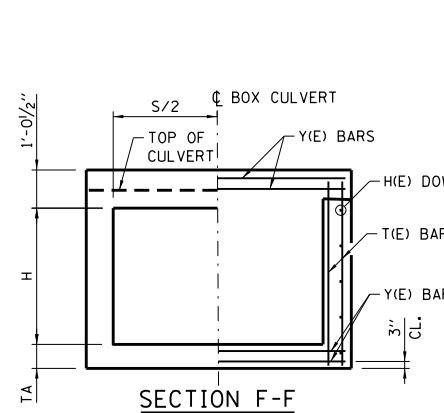
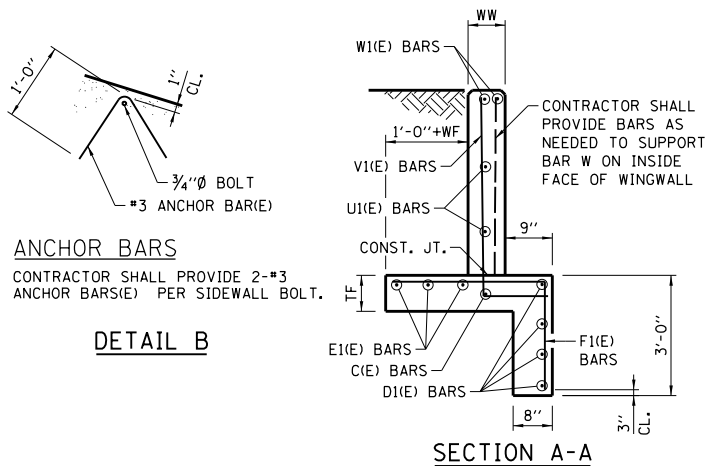
FOR PIPE OR ELLIPTICAL PIPE  
CULVERTS SELECT APPROPRIATE  
"S" & "H" FROM SIZES SHOWN.  
ADD THE FOLLOWING ADDITIONAL  
BARS:  
(a) 1 ADDITIONAL Y(E) BAR  
(b) #4-T1 BARS @ APPROX.  
12" CTS. (NO. = S + 2)

THE WEIGHT OF THE ADDITIONAL BARS AND THE  
ADDITIONAL QUANTITY OF CONCRETE IN THE HEADWALL  
SHALL BE ADDED TO THE QUANTITIES SHOWN.

**NOTE:**  
REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
06/01/2009





## FOR BOX CULVERTS

### GENERAL NOTES:

- ALL CONCRETE SHALL BE CLASS SI.
- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" x 45° CHAMFER. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW FINISHED GROUND LEVEL. COVER FROM THE FACE OF CONCRETE TO THE FACE OF REINFORCEMENT BARS SHALL BE 2", UNLESS OTHERWISE SHOWN.
- CONCRETE QUANTITIES SHOWN ON SHEET 2 (OF 2) IN THIS SERIES ARE FOR REINFORCED CONCRETE BOX CULVERT SECTIONS AND ADDITIONAL CONCRETE REQUIRED IN HEADWALLS FOR PIPE OR ARCH CULVERT SECTIONS SHALL BE ADDED TO THESE QUANTITIES.
- THIS STANDARD MAY BE USED FOR CULVERTS WITH SKEW OF 15° ± 7.5° AS SHOWN PER CULVERT SKEW ORIENTATION ON THIS SHEET.

- DESIGN: SAFETY PIPE RUNNERS ARE DESIGNED FOR A TRANSVERSING LOAD OF 1,800 POUNDS AT YIELD AS RECOMMENDED BY RESEARCH REPORT 280-1, SAFETY TREATMENT OF ROADSIDE CROSS DRAINAGE STRUCTURES, TEXAS TRANSPORTATION INSTITUTE, MARCH 1981.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V/H).
- FOR EROSION PROTECTION SEE STANDARD B19.
- ALL REINFORCEMENT BARS SHALL BE EPOXY COATED (E).

### \*NOTE:

WHERE L0, L1 OR L4 EXCEEDS THE FOLLOWING LENGTH, THE PIPE RUNNER SHALL BE STRENGTHENED OVER THE MIDSPAN AS SHOWN.

PIPE	LENGTH
3"Ø, SCH. 40	12'-8"
3 1/2"Ø, SCH. 40	17'-3"
3 1/2"Ø, SCH. 80	22'-1"
4"Ø, SCH. 40	22'-6"
4"Ø, SCH. 80	29'-4"

## PIPE RUNNER DETAILS

### SECTION E-E

DATE	REVISIONS
03-01-2022	REVISED HEADWALL THICKNESS AND REBAR TABLE
03-31-2014	TABLE QUANTITIES REVISED
02-07-2012	TABLE QUANTITIES REVISED

SHEET 1 OF 2



END TREATMENT WITH PIPE RUNNERS, FOR SINGLE AND MULTIPLE CULVERTS  
15° SKEW, 1:4 SLOPE, H ≤ 8'  
STANDARD B16-06

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 06/01/2009

TABLE OF DIMENSIONS										
S	H	L	NL	NR	WW	W1 ④	W2 ④	WR	WF	TF
9'	3'	14'-4"	14'-4"	16'-6½"	7"	9'-3¾"	17'-7"	8'-3¼"	3"	7"
9'	4'	18'-4"	18'-4"	21'-2"	7"	9'-3¾"	19'-10¾"	10'-7"	9"	8"
5'	5'	22'-4"	22'-4"	25'-9½"	7"	5'-2"	18'-0¾"	12'-10¾"	1'-3"	8"
6'	6'	26'-4"	26'-4"	30'-4⅞"	7"	6'-2½"	21'-5"	15'-2½"	1'-9"	8½"
7'	7'	30'-4"	30'-4"	35'-0¼"	7½"	7'-3"	24'-9"	17'-6"	2'-3"	9"
8'	8'	34'-4"	34'-4"	39'-7¾"	9½"	8'-3½"	28'-1¼"	19'-9¾"	2'-9"	9½"

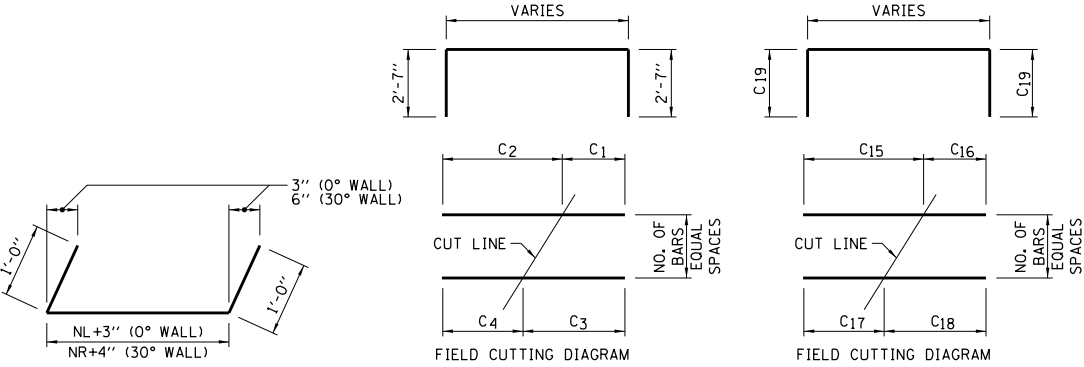
TABLE OF REINFORCEMENT BARS FOR ONE END									
		1-C(E) BAR 30° WALL	1-C1(E) BAR 0° WALL		D(E) BAR 4-#4 30° WALL	D1(E) BAR 4-#4 0° WALL	#4-E(E) BARS 30° WALL ⑥	#4-E1(E) BARS 0° WALL ⑥	
H	SIZE	LENGTH	SIZE	LENGTH	LENGTH	LENGTH	NO.	LENGTH	NO.
3'	#4	16'-11"	#4	14'-8"	18'-10"	16'-7"	2	18'-4"	2
4'	#4	21'-7"	#4	18'-8"	23'-6"	20'-7"	2	23'-0"	2
5'	#4	22'-2"	#4	22'-8"	24'-1"	24'-7"	2	27'-7"	2
6'	#4	30'-9"	#4	26'-8"	32'-8"	28'-7"	3	32'-3"	3
7'	#5	35'-5"	#5	30'-8"	37'-4"	32'-7"	3	36'-10"	3
8'	#5	40'-0"	#5	34'-8"	41'-11"	36'-7"	3	41'-6"	3

TOTAL QUANTITIES ONE END MINIMUM "S"				INCREASE IN QUANTITIES FOR 1' INCREASE IN "S"	
S	H	CONC. CU. YD.	REINF. BARS POUND	CONC. CU. YD.	REINF. BARS POUND
9'	3'	8.4	890	0.20	30
9'	4'	12.7	1120	0.20	30
5'	5'	14.4	1200	0.20	30
6'	6'	20.1	1610	0.20	30
7'	7'	27.0	1930	0.20	30
8'	8'	36.0	2460	0.20	30

TABLE OF REINFORCEMENT BARS FOR ONE END																													
H	F(E) BARS EQUALLY SPACED 30° WALL							F1(E) BARS EQUALLY SPACED 0° WALL							H(E) DOWELS #5 @ 12" 30° WALL		H1(E) DOWELS #5 @ 12" 0° WALL		J(E) DOWELS 4-#6 ⑤	1-K(E) BAR 30° WALL			1-K1(E) BAR 0° WALL			2-W(E) BARS 30° WALL		2-W1(E) BARS 0° WALL	
	SIZE	NO.	C1	C2	C3	C4	LENGTH	SIZE	NO.	C1	C2	C3	C4	LENGTH	NO.	LENGTH	NO.	LENGTH	LENGTH	SIZE	C5	LENGTH	SIZE	C6	LENGTH	SIZE	LENGTH	SIZE	LENGTH
3'	#4	7	1'-11"	2'-1"	2'-0"	2'-0"	9'-2"	#4	7	1'-11"	2'-1"	2'-0"	2'-0"	9'-2"	3	3'-0"	3	3'-0"	4'-6"	#5	3'-11"	5'-5"	#5	3'-9"	5'-3"	#5	16'-9"	#5	14'-6"
4'	#4	9	1'-11"	2'-7"	2'-3"	2'-3"	9'-8"	#4	9	1'-11"	2'-7"	2'-3"	2'-3"	9'-8"	4	3'-0"	4	3'-0"	4'-6"	#5	4'-6"	6'-0"	#5	4'-3"	5'-9"	#6	21'-6"	#6	18'-7"
5'	#4	11	1'-11"	3'-1"	2'-6"	2'-6"	10'-2"	#4	11	1'-11"	3'-1"	2'-6"	2'-6"	10'-2"	5	3'-0"	5	3'-0"	4'-6"	#5	5'-1"	6'-7"	#5	4'-9"	6'-3"	#6	26'-3"	#6	22'-9"
6'	#5	13	1'-11"	3'-8"	2'-9"	2'-10"	10'-9"	#5	13	1'-11"	3'-6"	2'-8"	2'-9"	10'-7"	6	3'-0"	6	3'-0"	4'-6"	#5	5'-8"	7'-2"	#5	5'-3"	6'-9"	#6	31'-10"	#6	26'-11"
7'	#5	15	2'-0"	4'-3"	3'-1"	3'-2"	11'-5"	#5	15	2'-0"	4'-1"	3'-0"	3'-1"	11'-3"	7	3'-0"	7	3'-0"	4'-6"	#5	6'-3"	7'-9"	#5	5'-9"	7'-3"	#6	35'-9"	#6	31'-0"
8'	#6	18	2'-1"	4'-10"	3'-5"	3'-6"	12'-1"	#6	17	2'-1"	4'-8"	3'-4"	3'-5"	11'-11"	8	3'-0"	8	3'-0"	4'-6"	#5	6'-10"	8'-4"	#5	6'-3"	7'-9"	#6	40'-6"	#6	35'-2"

TABLE OF REINFORCEMENT BARS FOR ONE END																														
U(E) BARS - ONE PER EACH LENGTH SHOWN #4 @ 12" 30° WALL									U1(E) BARS - ONE PER EACH LENGTH SHOWN #4 @ 12" 0° WALL								V(E) BARS #5-EQUALLY SPACED 30° WALL							V1(E) BARS #5-EQUALLY SPACED 0° WALL						
H	C7	C8	C9	C10	C11	C12	C13	C14	C7	C8	C9	C10	C11	C12	C13	C14	NO.	C15	C16	C17	C18	C19	LENGTH	NO.	C15	C16	C17	C18	C19	LENGTH
3'	5'-1"	9'-8"	14'-3"	-	-	-	-	-	4'-4"	8'-4"	12'-4"	-	-	-	-	-	30	3'-10"	9"	9"	3'-10"	1'-0"	6'-7"	27	3'-10"	9"	7"	4'-0"	1'-0"	6'-7"
4'	5'-1"	9'-8"	14'-3"	18'-11"	-	-	-	-	4'-4"	8'-4"	12'-4"	16'-4"	-	-	-	-	39	4'-11"	10"	10"	4'-11"	1'-0"	7'-9"	35	4'-11"	10"	8"	5'-1"	1'-0"	7'-9"
5'	5'-1"	9'-8"	14'-3"	18'-11"	23'-6"	-	-	-	4'-4"	8'-4"	12'-4"	16'-4"	20'-4"	-	-	-	48	5'-11"	10"	10"	5'-11"	1'-0"	8'-9"	43	5'-11"	10"	8"	6'-1"	1'-0"	8'-9"
6'	5'-1"	9'-8"	14'-3"	18'-11"	23'-6"	28'-1"	-	-	4'-4"	8'-4"	12'-4"	16'-4"	20'-4"	24'-4"	-	-	57	6'-11"	10"	11"	6'-10"	1'-0"	9'-9"	51	6'-11"	10"	8"	7'-1"	1'-0"	9'-9"
7'	5'-1"	9'-8"	14'-3"	18'-11"	23'-6"	28'-1"	32'-9"	-	4'-4"	8'-4"	12'-4"	16'-4"	20'-4"	24'-4"	28'-4"	-	67	8'-0"	11"	11"	8'-0"	1'-0"	10'-11"	59	8'-0"	11"	9"	8'-2"	1'-0"	10'-11"
8'	5'-1"	9'-8"	14'-3"	18'-11"	23'-6"	28'-1"	32'-9"	37'-4"	4'-4"	8'-4"	12'-4"	16'-4"	20'-4"	24'-4"	28'-4"	32'-4"	76	9'-0"	11"	11"	9'-0"	1'-1"	12'-1"	67	9'-0"	11"	9"	9'-2"	1'-1"	12'-1"

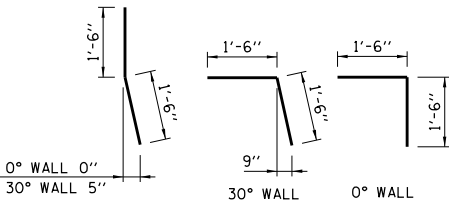
TABLE OF REINFORCEMENT BARS FOR MINIMUM "S" - ONE END									
		Y(E) BARS 12-#5 ②	R(E) BARS 6-#5 ②	Z(E) BARS #4 @ 12" ①	S(E) BARS #4 @ 12" ①	T(E) BARS #4 @ 12" ①	P(E) BARS 8-#5 ③		
S	H	LENGTH	LENGTH	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH
≧9'	3'	10'-3"	17'-1"	10	5'-4"	16	6'-10"	10	3'-0"
≧9'	4'	10'-3"	19'-5"	10	5'-4"	18	6'-10"	10	3'-0"
≧5'	5'	6'-1"	17'-7"	6	5'-4"	16	6'-10"	6	3'-0"
≧6'	6'	7'-2"	20'-11"	7	5'-4"	20	6'-10"	7	3'-0"
≧7'	7'	8'-2"	24'-3"	8	5'-4"	23	6'-10"	8	3'-0"
≧8'	8'	9'-4"	27'-8"	9	5'-4"	26	6'-10"	9	3'-0"



D(E) BARS

F(E) AND F1(E) BARS

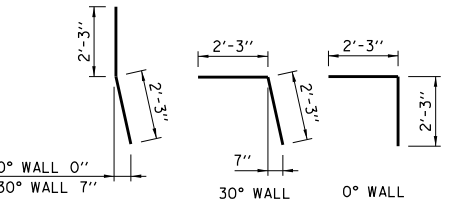
V(E) AND V1(E) BARS



H(E) AND H1(E) DOWELS

K(E) BARS

K1(E) BARS



J(E) DOWELS

S(E) BARS

T(E) BARS

Z(E) BARS

NUMBER OF HEADWALL PIPE RUNNERS FOR 1 END			
S	NO.	S	NO.
10'	4	23'	10
11'	5	24'	10
12'	5	25'	10
13'	6	26'	11
14'	6	27'	11
15'	6	28'	12
16'	7	29'	12
17'	7	30'	12
18'	8	31'	13
19'	8	32'	13
20'	8	33'	14
21'	9	34'	14
22'	9	35'	14

NOTES FOR TABLES:

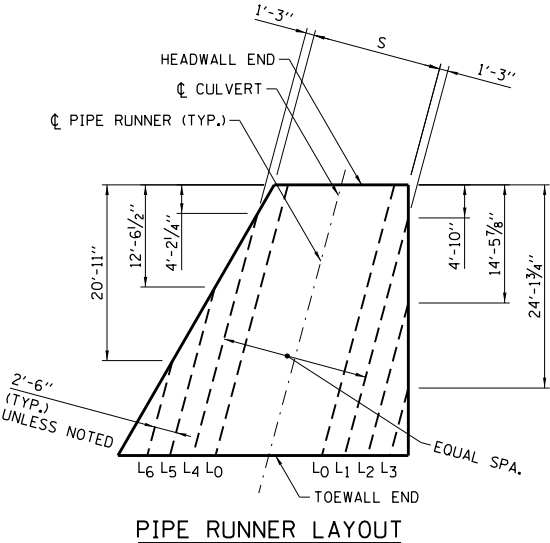
- ① THE NUMBER OF S, T AND Z BARS SHALL BE INCREASED BY 1 FOR EACH 1 FOOT OF INCREASE IN DIMENSION "W1".
- ② THE LENGTH OF R AND Y BARS SHALL BE INCREASED BY 1'-1½" FOR EACH 1 FOOT OF INCREASE IN DIMENSION "S".
- ③ THE NUMBER OF P BARS SHOWN ARE FOR SINGLE SPAN PIPES OR BOX CULVERTS. THIS NUMBER SHALL BE INCREASED BY 4 FOR EACH MULTIPLE OF PIPE OR BOX ADDED.
- ④ THIS DIMENSION SHALL BE INCREASED BY 1'-1½" INCHES FOR EACH 1 FOOT INCREASE IN DIMENSION "S".
- ⑤ 2 BARS FOR 30° WALL, 2 BARS FOR 0° WALL.
- ⑥ THE LENGTH OF THIS BAR INCLUDES ONE 1'-6" MINIMUM LAP.

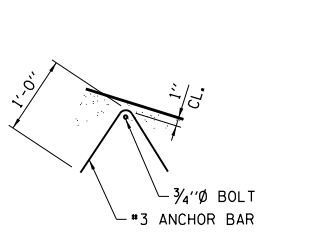


END TREATMENT WITH PIPE  
RUNNERS, FOR SINGLE AND  
MULTIPLE CULVERTS  
15° SKEW, 1:4 SLOPE, H ≤ 8'  
STANDARD B16-06

NOTE:

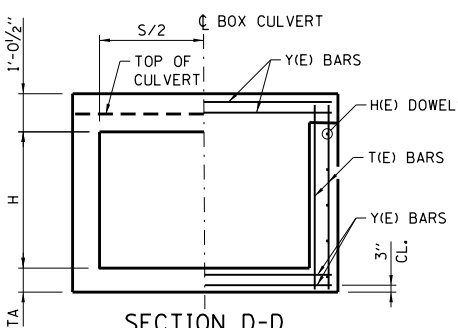
REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.



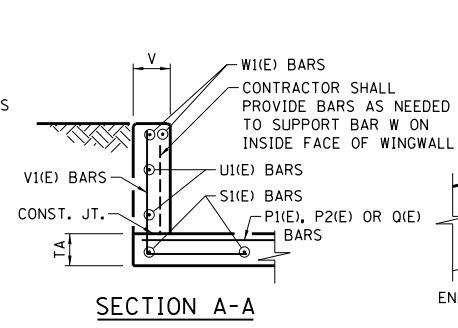


ANCHOR BARS(E)  
CONTRACTOR SHALL PROVIDE 2-#3 ANCHOR BARS(E) PER SIDEWALL BOLT.

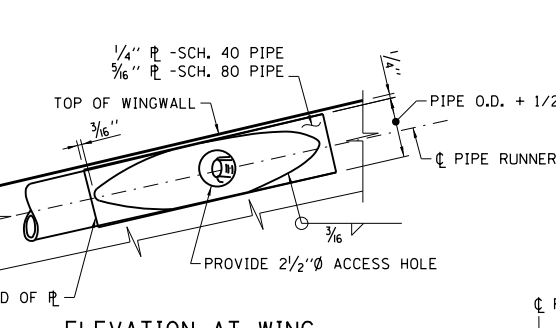
DETAIL B



SECTION D-D

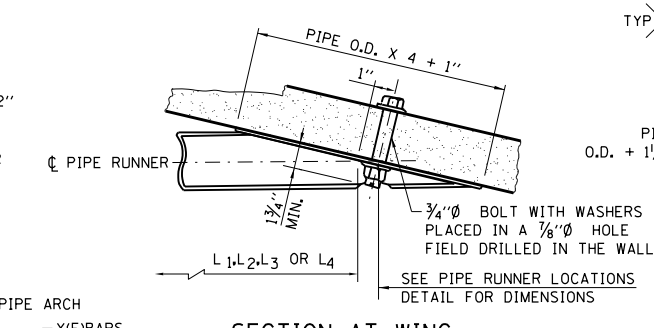


SECTION A-A

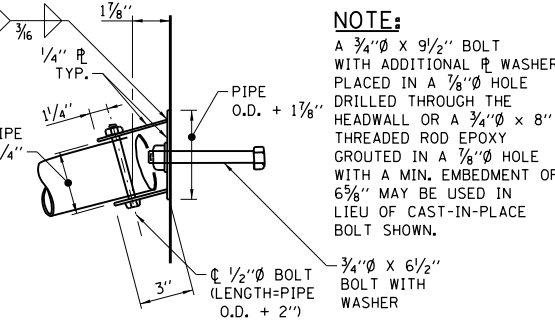


ELEVATION AT WING

NOTE:  
PIPE O.D. IS THE PIPE RUNNER OUTSIDE DIAMETER.



SECTION AT WING

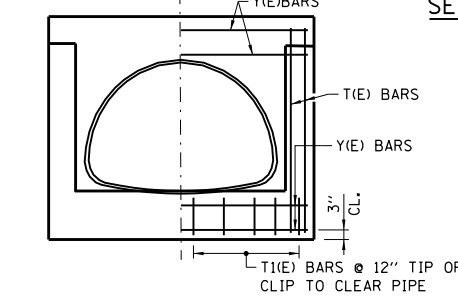


PLAN AT HEADWALL

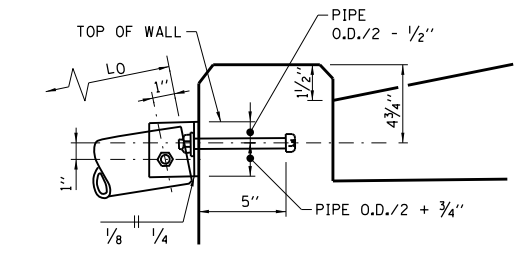
NOTE:  
Q(E), V(E), AND V1(E) BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE BARS WITH DIMENSIONS C2-C3, C9-C12 BEGINNING AT HEADWALL AND BARS WITH DIMENSIONS C1-C4, C10-C11 BEGINNING AT THE TOEWALL END.

NOTE:  
P1(E) BARS ARE TO BE FIELD CUT PER CUTTING DIAGRAM. PLACE BARS WITH DIMENSIONS C6-C7 BEGINNING AT THE TOEWALL END OF 45° WINGWALL AND BARS WITH DIMENSIONS C5 -C8 BEGINNING PARALLEL TO THE P1(E) BARS. PLACE P2(E) BARS PARALLEL TO THE P1(E) BARS BEGINNING WITH THE SHORTEST BARS AT THE HEADWALL END OF THE 15° WINGWALL.

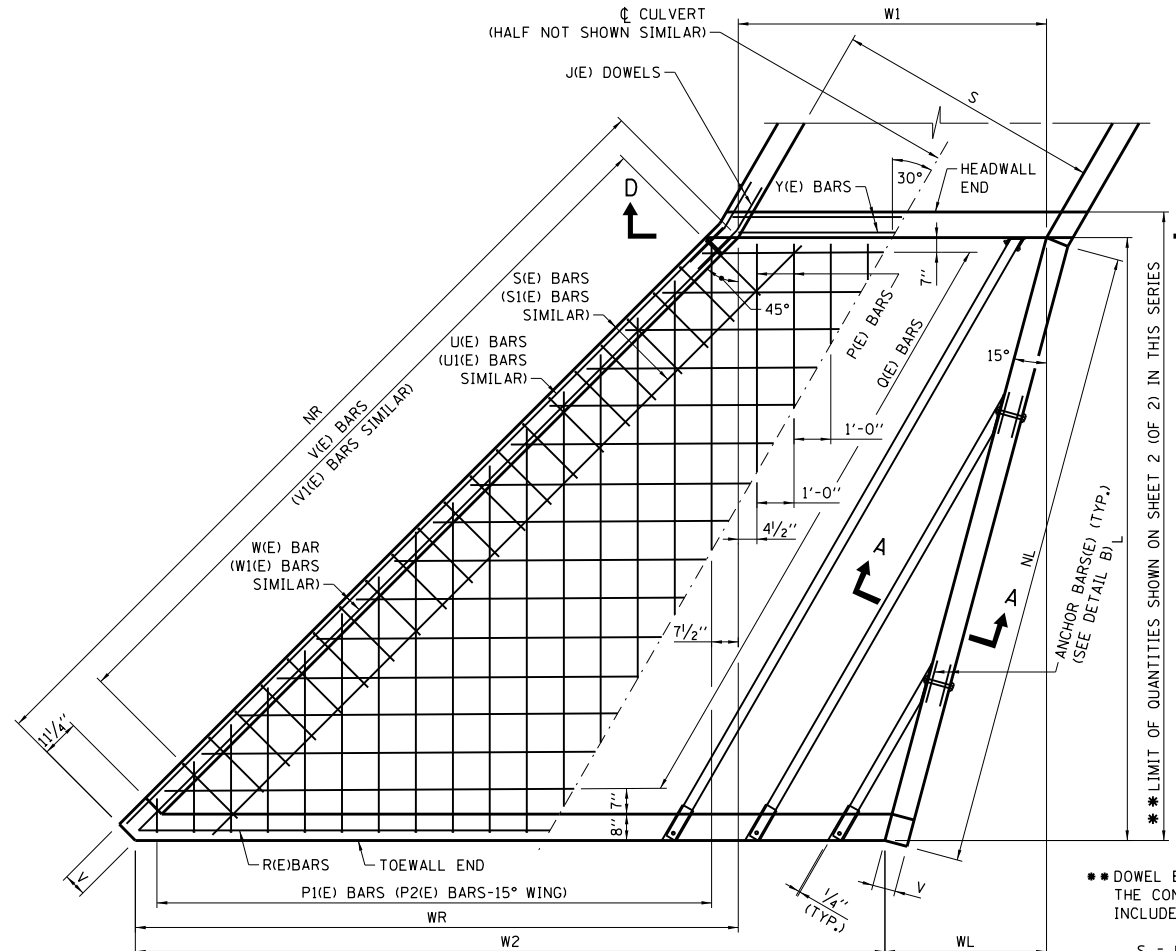
NOTE:  
J(E) & H(E) DOWEL BARS NOT REQUIRED WITH EXISTING BOX CULVERTS PROVIDING THE REINFORCING FROM THE EXIST. BOX IS EXTENDED INTO THE NEW CONCRETE A MIN. OF 1'-3".



SECTION B-B



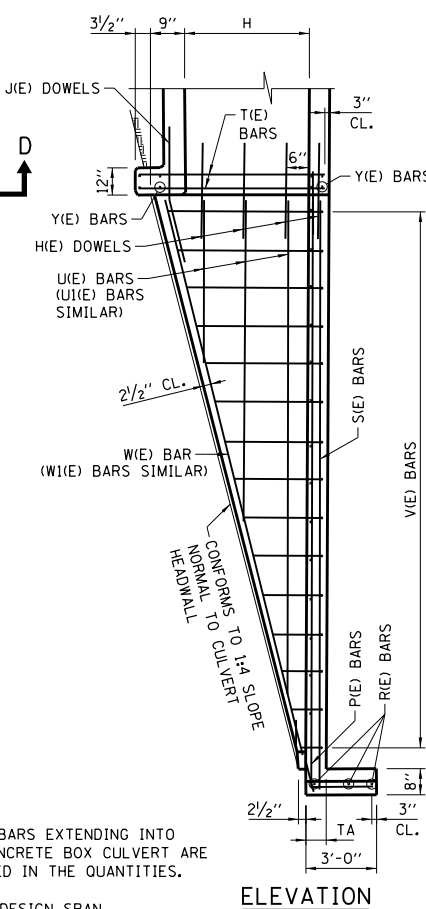
ELEVATION AT HEADWALL



HALF PLAN  
SHOWING REINFORCEMENT BARS

HALF PLAN  
SHOWING DIMENSIONS

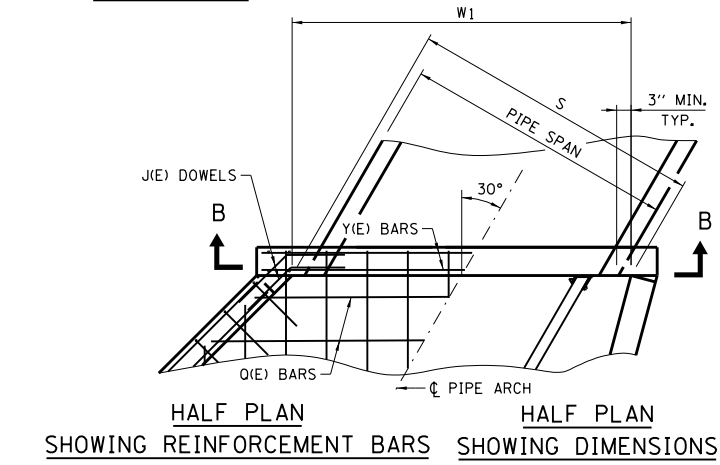
BOX CULVERT DETAILS



ELEVATION

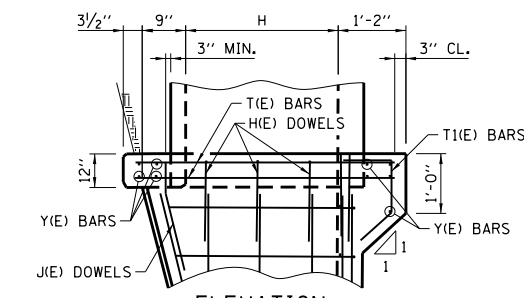
• DOWEL BARS EXTENDING INTO THE CONCRETE BOX CULVERT ARE INCLUDED IN THE QUANTITIES.

S = DESIGN SPAN  
H = DESIGN HEIGHT

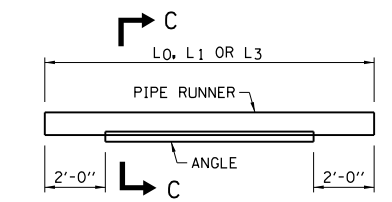


HALF PLAN  
SHOWING REINFORCEMENT BARS

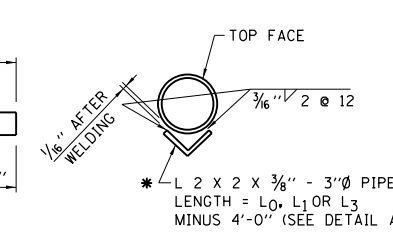
HALF PLAN  
SHOWING DIMENSIONS



ELEVATION  
PIPE ARCH DETAILS



DETAIL A

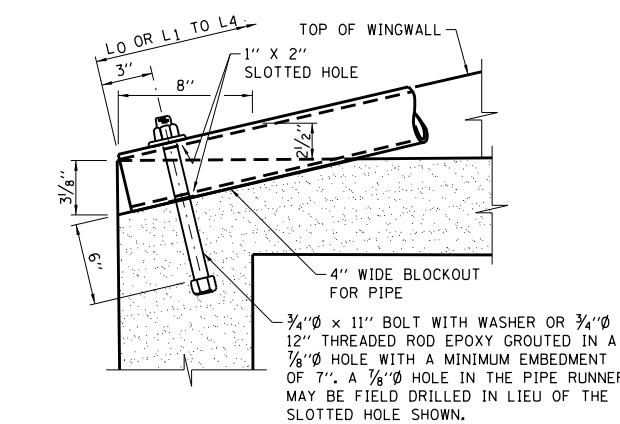


SECTION C-C

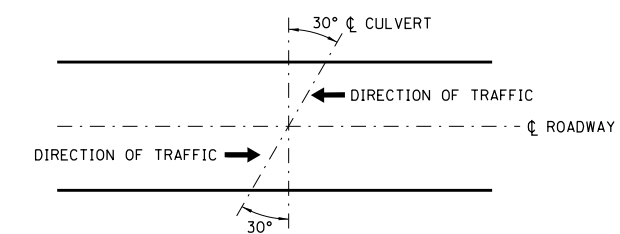
NOTE:  
WHERE L0, L1 OR L3 EXCEEDS THE FOLLOWING LENGTH, THE PIPE RUNNER SHALL BE STRENGTHENED OVER THE MIDSPAN AS SHOWN.

PIPE	LENGTH
3"Ø, SCH. 40	12'-8"
3"Ø, SCH. 80	15'-4"

PIPE RUNNER DETAILS



SECTION THRU TOEWALL



CULVERT SKEW ORIENTATION

GENERAL NOTES:

- ALL CONCRETE SHALL BE CLASS S1.
- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" x 45° CHAMFER. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW FINISHED GROUND LEVEL. COVER FROM THE FACE OF CONCRETE TO THE FACE OF REINFORCEMENT BARS SHALL BE 2", UNLESS OTHERWISE SHOWN.
- CONCRETE QUANTITIES SHOWN ON SHEET 2 (OF 2) IN THIS SERIES ARE FOR REINFORCED CONCRETE BOX CULVERT SECTIONS AND ADDITIONAL CONCRETE REQUIRED IN HEADWALLS FOR PIPE OR ARCH CULVERT SECTIONS SHALL BE ADDED TO THESE QUANTITIES.
- THIS STANDARD MAY BE USED FOR CULVERTS WITH SKEW OF 30° ± 7.5°, AS SHOWN PER CULVERT SKEW ORIENTATION ON THIS SHEET.
- DESIGN: SAFETY PIPE RUNNERS ARE DESIGNED FOR A TRANSVERSING LOAD OF 1,800 POUNDS AT YIELD AS RECOMMENDED BY RESEARCH REPORT 280-1, SAFETY TREATMENT OF ROADSIDE CROSS DRAINAGE STRUCTURES, TEXAS TRANSPORTATION INSTITUTE, MARCH 1981.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- FOR EROSION PROTECTION SEE STANDARD B19.
- ALL REINFORCEMENT BARS SHALL BE EPOXY COATED (E).

APPROVED BY: *Paul Kovacs* DATE: 06/01/2009  
CHIEF ENGINEERING OFFICER

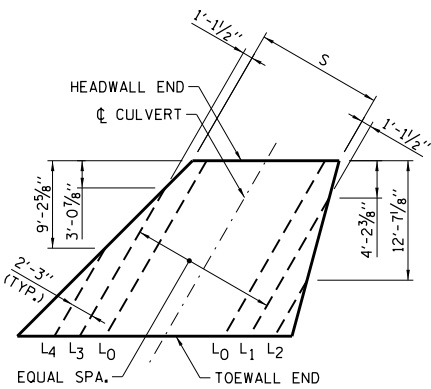


END TREATMENT WITH PIPE RUNNERS, FOR SINGLE CULVERTS 30° SKEW, 1:4 SLOPE, H ≤ 4'

STANDARD B17-05

CULVERT SIZE (FEET)	TABLE OF DIMENSIONS								
	L	NL	NR	V	W <sub>1</sub>	W <sub>2</sub>	WL	WR	TA
3 x 2	10'-10"	11'-2 <sup>5</sup> / <sub>8</sub> "	15'-3 <sup>7</sup> / <sub>8</sub> "	7"	3'-5 <sup>5</sup> / <sub>8</sub> "	11'-4 <sup>3</sup> / <sub>4</sub> "	2'-10 <sup>1</sup> / <sub>8</sub> "	10'-10"	6"
3 x 3	14'-10"	15'-4 <sup>1</sup> / <sub>4</sub> "	20'-11 <sup>3</sup> / <sub>4</sub> "	7"	3'-5 <sup>5</sup> / <sub>8</sub> "	14'-3 <sup>7</sup> / <sub>8</sub> "	3'-11 <sup>3</sup> / <sub>4</sub> "	14'-10"	6"
4 x 2	10'-10"	11'-2 <sup>5</sup> / <sub>8</sub> "	15'-3 <sup>7</sup> / <sub>8</sub> "	7"	4'-7 <sup>3</sup> / <sub>8</sub> "	12'-6 <sup>1</sup> / <sub>2</sub> "	2'-10 <sup>1</sup> / <sub>8</sub> "	10'-10"	6"
4 x 3	14'-10"	15'-4 <sup>1</sup> / <sub>4</sub> "	20'-11 <sup>3</sup> / <sub>4</sub> "	7"	4'-7 <sup>3</sup> / <sub>8</sub> "	15'-5 <sup>5</sup> / <sub>8</sub> "	3'-11 <sup>3</sup> / <sub>4</sub> "	14'-10"	6"
4 x 4	18'-10"	19'-6"	26'-7 <sup>5</sup> / <sub>8</sub> "	7"	4'-7 <sup>3</sup> / <sub>8</sub> "	18'-4 <sup>1</sup> / <sub>8</sub> "	5'-0 <sup>1</sup> / <sub>2</sub> "	18'-10"	6"
5 x 2	10'-10"	11'-2 <sup>5</sup> / <sub>8</sub> "	15'-3 <sup>7</sup> / <sub>8</sub> "	7"	5'-9 <sup>1</sup> / <sub>4</sub> "	13'-8 <sup>3</sup> / <sub>8</sub> "	2'-10 <sup>1</sup> / <sub>8</sub> "	10'-10"	6"
5 x 3	14'-10"	15'-4 <sup>1</sup> / <sub>4</sub> "	20'-11 <sup>3</sup> / <sub>4</sub> "	7"	5'-9 <sup>1</sup> / <sub>4</sub> "	16'-7 <sup>1</sup> / <sub>2</sub> "	3'-11 <sup>3</sup> / <sub>4</sub> "	14'-10"	6"
5 x 4	18'-10"	19'-6"	26'-7 <sup>5</sup> / <sub>8</sub> "	7"	5'-9 <sup>1</sup> / <sub>4</sub> "	19'-6 <sup>3</sup> / <sub>4</sub> "	5'-0 <sup>1</sup> / <sub>2</sub> "	18'-10"	6"
6 x 3	14'-10"	15'-4 <sup>1</sup> / <sub>4</sub> "	20'-11 <sup>3</sup> / <sub>4</sub> "	7"	6'-11 <sup>1</sup> / <sub>8</sub> "	17'-9 <sup>3</sup> / <sub>8</sub> "	3'-11 <sup>3</sup> / <sub>4</sub> "	14'-10"	6"
6 x 4	18'-10"	19'-6"	26'-7 <sup>5</sup> / <sub>8</sub> "	7"	6'-11 <sup>1</sup> / <sub>8</sub> "	20'-8 <sup>3</sup> / <sub>8</sub> "	5'-0 <sup>1</sup> / <sub>2</sub> "	18'-10"	6"
7 x 3	14'-10"	15'-4 <sup>1</sup> / <sub>4</sub> "	20'-11 <sup>3</sup> / <sub>4</sub> "	7"	8'-1"	18'-11 <sup>1</sup> / <sub>4</sub> "	3'-11 <sup>3</sup> / <sub>4</sub> "	14'-10"	6 <sup>1</sup> / <sub>2</sub> "
7 x 4	18'-10"	19'-6"	26'-7 <sup>5</sup> / <sub>8</sub> "	7"	8'-1"	21'-10 <sup>1</sup> / <sub>2</sub> "	5'-0 <sup>1</sup> / <sub>2</sub> "	18'-10"	6 <sup>1</sup> / <sub>2</sub> "
8 x 4	18'-10"	19'-6"	26'-7 <sup>5</sup> / <sub>8</sub> "	7"	9'-2 <sup>1</sup> / <sub>8</sub> "	23'-0 <sup>3</sup> / <sub>8</sub> "	5'-0 <sup>1</sup> / <sub>2</sub> "	18'-10"	7"

PIPE RUNNERS FOR ONE END SIZE 3" DIA.						
SCHEDULE	HEADWALL PIPE		WINGWALL PIPE-ONE PER EACH LENGTH SHOWN			
	NO.	L <sub>0</sub>	15° WALL		45° WALL	
			L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>
40	2	12'-10"	7'-10"	-	9'-2"	-
40	2	17'-8"	12'-6"	-	13'-11"	6'-7"
40	2	12'-10"	7'-10"	-	9'-2"	-
40	2	17'-8"	12'-6"	-	13'-11"	6'-7"
80	2	22'-4"	17'-3"	7'-4"	18'-7"	11'-4"
40	3	12'-10"	7'-10"	-	9'-2"	-
40	3	17'-8"	12'-6"	-	13'-11"	6'-7"
80	3	22'-4"	17'-3"	7'-4"	18'-7"	11'-4"
40	3	17'-8"	12'-6"	-	13'-11"	6'-7"
80	3	22'-4"	17'-3"	7'-4"	18'-7"	11'-4"
40	4	17'-8"	12'-6"	-	13'-11"	6'-7"
80	4	22'-4"	17'-3"	7'-4"	18'-7"	11'-4"
80	4	22'-4"	17'-3"	7'-4"	18'-7"	11'-4"



PIPE RUNNER LAYOUT

CULVERT SIZE (FEET)	TABLE OF REINFORCEMENT BARS FOR ONE END																													
	H(E) DOWELS #4 @ 12" 2'-6" LG.		J(E) DOWELS #4 @ 12" 4'-0" LG.		P(E) BARS #4 @ 12"		P1(E) BARS #4 @ 12"					P2(E) BARS - ONE PER EACH LENGTH SHOWN #4 @ 12"					Q(E) BARS #4 @ 12"					R(E) BARS 3-#4	S(E) BARS 45° WALL 2-#4	S1(E) BARS 15° WALL 2-#4	U(E) BARS- ONE PER EACH LENGTH SHOWN #4 @ 12"					
							LENGTH					LENGTH										LENGTH	LENGTH	LENGTH	LENGTH	45° WALL				
	S X H	NO.*	NO.**	NO.*	NO.**	NO.	LENGTH	NO.	C5	C6	C7	C8	LENGTH	α1	α2	α3	α4	α5	NO.	C1	C2	C3	C4	LENGTH	LENGTH	LENGTH	LENGTH	α6	α7	α8
3 x 2	3	3	2	2	1	13'-1"	5	10'-6"	1'-6"	5'-6"	6'-6"	17'-2"	5'-4"	9'-1"	-	-	-	5	11'-6"	4'-11"	7'-10"	8'-7"	16'-5"	11'-10"	14'-10"	11'-0"	6'-2"	11'-10"	-	-
3 x 3	4	4	2	2	0	-	7	14'-6"	1'-6"	7'-6"	8'-6"	21'-2"	5'-4"	9'-1"	12'-10"	-	-	7	14'-5"	4'-11"	9'-4"	10'-0"	19'-4"	14'-9"	20'-6"	15'-2"	6'-2"	11'-10"	17'-6"	-
4 x 2	3	3	2	2	2	13'-1"	5	10'-6"	1'-6"	5'-6"	6'-6"	17'-2"	2'-3"	6'-0"	9'-9"	-	-	5	12'-8"	6'-1"	9'-0"	9'-9"	18'-9"	13'-0"	14'-10"	11'-0"	6'-2"	11'-10"	-	-
4 x 3	4	4	2	2	1	17'-1"	7	14'-6"	1'-6"	7'-6"	8'-6"	21'-2"	2'-3"	6'-0"	9'-9"	13'-6"	-	7	15'-7"	6'-1"	10'-6"	11'-2"	21'-8"	15'-11"	20'-6"	15'-2"	6'-2"	11'-10"	17'-6"	-
4 x 4	5	5	2	2	0	-	9	18'-6"	1'-6"	9'-6"	10'-6"	25'-2"	2'-3"	6'-0"	9'-9"	13'-6"	17'-3"	9	18'-6"	6'-1"	11'-11"	12'-8"	24'-7"	18'-10"	26'-2"	19'-4"	6'-2"	11'-10"	17'-6"	23'-1"
5 x 2	3	3	2	2	3	13'-1"	5	10'-6"	1'-6"	5'-6"	6'-6"	17'-2"	2'-10"	6'-7"	10'-4"	-	-	5	13'-10"	7'-3"	10'-2"	10'-11"	21'-1"	14'-2"	14'-10"	11'-0"	6'-2"	11'-10"	-	-
5 x 3	4	4	2	2	2	17'-1"	7	14'-6"	1'-6"	7'-6"	8'-6"	21'-2"	2'-10"	6'-7"	10'-4"	14'-0"	-	7	16'-9"	7'-3"	11'-8"	12'-4"	24'-0"	17'-1"	20'-6"	15'-2"	6'-2"	11'-10"	17'-6"	-
5 x 4	5	5	2	2	1	21'-1"	9	18'-6"	1'-6"	9'-6"	10'-6"	25'-2"	2'-10"	6'-7"	10'-4"	14'-0"	17'-9"	9	19'-8"	7'-3"	13'-1"	13'-10"	26'-11"	20'-0"	26'-2"	19'-4"	6'-2"	11'-10"	17'-6"	23'-1"
6 x 3	4	4	2	2	3	17'-1"	7	14'-6"	1'-6"	7'-6"	8'-6"	21'-2"	3'-4"	7'-1"	10'-10"	14'-7"	-	7	17'-11"	8'-4"	12'-9"	13'-6"	26'-3"	18'-3"	20'-6"	15'-2"	6'-2"	11'-10"	17'-6"	-
6 x 4	5	5	2	2	2	21'-1"	9	18'-6"	1'-6"	9'-6"	10'-6"	25'-2"	3'-4"	7'-1"	10'-10"	14'-7"	18'-3"	9	20'-10"	8'-4"	14'-3"	14'-11"	29'-2"	21'-2"	26'-2"	19'-4"	6'-2"	11'-10"	17'-6"	23'-1"
7 x 3	4	4	2	2	4	17'-1"	7	14'-6"	1'-6"	7'-6"	8'-6"	21'-2"	4'-0"	7'-9"	11'-5"	15'-2"	-	7	19'-1"	9'-6"	13'-11"	14'-8"	28'-7"	19'-5"	20'-6"	15'-2"	6'-2"	11'-10"	17'-6"	-
7 x 4	5	5	2	2	3	21'-1"	9	18'-6"	1'-6"	9'-6"	10'-6"	25'-2"	4'-0"	7'-9"	11'-5"	15'-2"	18'-6"	9	22'-0"	9'-6"	15'-5"	16'-1"	31'-6"	22'-4"	26'-2"	19'-4"	6'-2"	11'-10"	17'-6"	23'-1"
8 x 4	5	5	2	2	5	21'-1"	9	18'-6"	1'-6"	9'-6"	10'-6"	25'-2"	4'-6"	8'-3"	12'-0"	15'-9"	-	9	23'-1"	10'-8"	16'-6"	17'-3"	33'-9"	23'-6"	26'-2"	19'-4"	6'-2"	11'-10"	17'-6"	23'-1"

CULVERT SIZE (FEET)	TABLE OF REINFORCEMENT BARS FOR ONE END																						
	U(E) BARS - ONE PER EACH LENGTH SHOWN #4 @ 12"				V(E) BARS #4 @ 10.5"						V(E) BARS #4 @ 10.5"						2 W(E) BARS 45° WALL		2 W(E) BARS 15° WALL		Y(E) BARS 8-#5	T(E) BARS 8-#5 BOX CULVERT	T(E) BARS 8-#5 PIPE ARCH
	15° WALL				45° WALL						15° WALL												
S X H	Q10	Q11	Q12	Q13	No.	C9	C10	C11	C12	LENGTH	No.	C9	C10	C11	C12	LENGTH	SIZE	LENGTH	SIZE	LENGTH	LENGTH	LENGTH	LENGTH
3 x 2	4'-6"	8'-7"	-	-	16	2'-9"	6"	7"	2'-8"	6'-3"	12	2'-9"	6"	7"	2'-8"	6'-3"	#5	14'-5"	#5	10'-8"	4'-4"	3'-2"	3'-8"
3 x 3	4'-6"	8'-7"	12'-9"	-	23	3'-9"	6"	6"	3'-9"	7'-3"	16	3'-9"	6"	9"	3'-6"	7'-3"	#5	20'-2"	#5	14'-11"	4'-4"	4'-2"	4'-8"
4 x 2	4'-6"	8'-7"	-	-	16	2'-9"	6"	7"	2'-8"	6'-3"	12	2'-9"	6"	7"	2'-8"	6'-3"	#5	14'-5"	#5	10'-8"	5'-6"	3'-2"	3'-8"
4 x 3	4'-6"	8'-7"	12'-9"	-	23	3'-9"	6"	6"	3'-9"	7'-3"	16	3'-9"	6"	9"	3'-6"	7'-3"	#5	20'-2"	#5	14'-11"	5'-6"	4'-2"	4'-8"
4 x 4	4'-6"	8'-7"	12'-9"	16'-11"	29	4'-9"	6"	7"	4'-8"	8'-3"	21	4'-9"	6"	8"	4'-7"	8'-3"	#6	25'-11"	#6	19'-1"	5'-6"	5'-2"	5'-8"
5 x 2	4'-6"	8'-7"	-	-	16	2'-9"	6"	7"	2'-8"	6'-3"	12	2'-9"	6"	7"	2'-8"	6'-3"	#5	14'-5"	#5	10'-8"	6'-8"	3'-2"	3'-8"
5 x 3	4'-6"	8'-7"	12'-9"	-	23	3'-9"	6"	6"	3'-9"	7'-3"	16	3'-9"	6"	9"	3'-6"	7'-3"	#5	20'-2"	#5	14'-11"	6'-8"	4'-2"	4'-8"
5 x 4	4'-6"	8'-7"	12'-9"	16'-11"	29	4'-9"	6"	7"	4'-8"	8'-3"	21	4'-9"	6"	8"	4'-7"	8'-3"	#6	25'-11"	#6	19'-1"	6'-8"	5'-2"	5'-8"
6 x 3	4'-6"	8'-7"	12'-9"	-	23	3'-9"	6"	6"	3'-9"	7'-3"	16	3'-9"	6"	9"	3'-6"	7'-3"	#5	20'-2"	#5	14'-11"	7'-10"	4'-2"	4'-8"
6 x 4	4'-6"	8'-7"	12'-9"	16'-11"	29	4'-9"	6"	7"	4'-8"	8'-3"	21	4'-9"	6"	8"	4'-7"	8'-3"	#6	25'-11"	#6	19'-1"	7'-10"	5'-2"	5'-8"
7 x 3	4'-6"	8'-7"	12'-9"	-	23	3'-9"	6"	6"	3'-9"	7'-3"	16	3'-9"	6"	9"	3'-6"	7'-3"	#5	20'-2"	#5	14'-11"	9'-0"	4'-2"	4'-8"
7 x 4	4'-6"	8'-7"	12'-9"	16'-11"	29	4'-9"	6"	7"	4'-8"	8'-3"	21	4'-9"	6"	8"	4'-7"	8'-3"	#6	25'-11"	#6	19'-1"	9'-0"	5'-2"	5'-8"
8 x 4	4'-6"	8'-7"	12'-9"	16'-11"	29	4'-9"	6"	7"	4'-8"	8'-3"	21	4'-9"	6"	8"	4'-7"	8'-3"	#6	25'-11"	#6	19'-1"	10'-2"	5'-2"	5'-8"

TOTAL QUANTITIES ONE END		
CONC.	REINF. BARS	PIPE RUNNERS
CU, YD.	LB.	FT.
3.8	396	41.67
5.8	580	67.17
4.2	430	41.67
6.3	617	67.17
8.8	874	97.83
4.6	460	54.17
6.8	653	84.42
9.4	915	119.83
7.3	688	84.42
9.9	957	119.83
8.0	724	101.67
10.9	999	141.84
12.0	1042	141.84

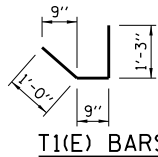
NOTE:

REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.

• 45° WALL

• 15° WALL

PIPE ARCH AND ELLIPTICAL PIPE CULVERTS



FOR PIPE OR ELLIPTICAL PIPE CULVERTS SELECT APPROPRIATE "S" & "H" FROM SIZES SHOWN. ADD THE FOLLOWING ADDITIONAL BARS:  
(a) 1 ADDITIONAL Y(E) BAR  
(b) #4-T1 BARS @ APPROX. 12" CTS. (NO. = S + 2)

THE WEIGHT OF THE ADD







TABLE OF DIMENSIONS											
S	H	L	NL	NR	WW	W <sub>1</sub> ④	W <sub>2</sub> ④	WL	WR	WF	TF
9'	3'	14'-4"	14'-10 <sup>3</sup> / <sub>8</sub> "	20'-3 <sup>1</sup> / <sub>4</sub> "	7"	10'-4 <sup>3</sup> / <sub>4</sub> "	20'-10 <sup>5</sup> / <sub>8</sub> "	3'-10 <sup>3</sup> / <sub>8</sub> "	14'-4"	3"	7"
9'	4'	18'-4"	18'-11 <sup>3</sup> / <sub>4</sub> "	25'-11 <sup>3</sup> / <sub>8</sub> "	7"	10'-4 <sup>3</sup> / <sub>4</sub> "	23'-9 <sup>3</sup> / <sub>4</sub> "	4'-11"	18'-4"	9"	8"
5'	5'	22'-4"	23'-1 <sup>1</sup> / <sub>2</sub> "	31'-7"	7"	5'-9 <sup>1</sup> / <sub>4</sub> "	22'-1 <sup>1</sup> / <sub>2</sub> "	5'-11 <sup>3</sup> / <sub>4</sub> "	22'-4"	1'-3"	8"
6'	6'	26'-4"	27'-3 <sup>3</sup> / <sub>8</sub> "	37'-2 <sup>1</sup> / <sub>8</sub> "	7"	6'-11 <sup>1</sup> / <sub>8</sub> "	26'-2 <sup>1</sup> / <sub>2</sub> "	7'- <sup>5</sup> / <sub>8</sub> "	26'-4"	1'-9"	8 <sup>1</sup> / <sub>2</sub> "
7'	7'	30'-4"	31'-4 <sup>1</sup> / <sub>8</sub> "	42'-10 <sup>3</sup> / <sub>4</sub> "	8"	8'-1"	30'-3 <sup>1</sup> / <sub>2</sub> "	8'-1 <sup>1</sup> / <sub>2</sub> "	30'-4"	2'-3"	9"
8'	8'	34'-4"	35'-6 <sup>1</sup> / <sub>2</sub> "	48'-6 <sup>5</sup> / <sub>8</sub> "	9 <sup>1</sup> / <sub>2</sub> "	9'-2 <sup>1</sup> / <sub>8</sub> "	34'-4 <sup>1</sup> / <sub>2</sub> "	9'-2 <sup>3</sup> / <sub>8</sub> "	34'-4"	2'-9"	9 <sup>1</sup> / <sub>2</sub> "

TOTAL QUANTITIES ONE END MINIMUM "S"		INCREASE IN QUANTITIES FOR 1' INCREASE IN "S"	
CONC. CU. YD.	REINF. BARS POUND	CONC. CU. YD.	REINF. BARS POUND
9.8	1010	0.22	33
14.8	1270	0.22	33
16.8	1380	0.22	33
23.5	1860	0.22	33
31.5	2330	0.22	33
42.2	2960	0.22	33

NOTE:  
REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.

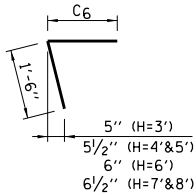
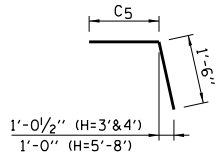
PIPE RUNNERS FOR ONE END														TABLE OF REINFORCEMENT BARS FOR ONE END												
H	SIZE (DIA.)	SCHEDULE	WINGWALL PIPES - ONE PER EACH LENGTH SHOWN								HEADWALL PIPES			TOTAL LENGTH	1-C(E) BAR 45° WALL		1-C1(E) BAR 15° WALL		D(E) BAR 4-#4 45° WALL		D1(E) BAR 4-#4 15° WALL		#4-E(E) BARS 45° WALL ⑥		#4-E1(E) BARS 15° WALL ⑥	
			15° WALL				45° WALL				S	No.	L <sub>0</sub>		SIZE	LENGTH	SIZE	LENGTH	LENGTH	LENGTH	NO.	LENGTH	NO.	LENGTH		
			L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>5</sub>	L <sub>6</sub>	L <sub>7</sub>	L <sub>8</sub>																
3'	3"	40	11'-11"	-	-	13'-3"	6'-0"	-	-	9'	4	16'-10"	98.50	#4	20'-8"	#4	15'-3"	22'-9"	17'-2"	2	21'-4"	2	17'-0"			
4'	3"	80	16'-8"	-	-	18'-0"	10'-9"	-	-	9'	4	21'-7"	131.75	#4	26'-4"	#4	19'-5"	28'-5"	21'-4"	2	27'-0"	2	21'-1"			
5'	3½"	80	21'-4"	11'-6"	-	22'-8"	15'-5"	8'-2"	-	5'	3	26'-4"	158.08	#4	32'-0"	#4	23'-7"	34'-1"	25'-6"	2	32'-8"	2	25'-3"			
6'	3½"	80	26'-1"	16'-2"	-	27'-9"	20'-2"	12'-11"	5'-8"	6'	3	31'-0"	201.75	#4	37'-8"	#4	27'-8"	39'-9"	29'-7"	3	38'-4"	3	29'-4"			
7'	4"	80	30'-10"	20'-11"	11'-0"	32'-2"	24'-9"	17'-8"	10'-9"	7'	4	35'-9"	291.08	#5	44'-10"	⑥	#5	31'-10"	46'-11"	⑥	33'-9"	3	44'-0"	3	33'-6"	
8'	4"	80	35'-9"	25'-8"	15'-9"	36'-10"	29'-7"	22'-4"	15'-1"	8'	4	40'-6"	350.83	#5	50'-6"	⑥	#5	36'-0"	52'-6"	⑥	37'-10"	3	49'-8"	3	37'-7"	

TABLE OF REINFORCEMENT BARS FOR ONE END																																		
F(E) BARS EQUALLY SPACED 45° WALL								L(E) BARS 45° WALL				F1(E) BARS EQUALLY SPACED 15° WALL						H(E) DOWELS #5 @ 12" 45° WALL		H(E) DOWELS #5 @ 12" 15° WALL		J(E) DOWELS 4 - #6 ⑤		1-K(E) BAR 45° WALL			1-K1(E) BAR 15° WALL			2-W(E) BARS 45° WALL		2-W1(E) BARS 15° WALL		
H	SIZE	NO.	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	LENGTH	SIZE	NO.	C <sub>0</sub>	LENGTH	SIZE	NO.	C <sub>1</sub>	C <sub>2</sub>	C <sub>3</sub>	C <sub>4</sub>	LENGTH	NO.	LENGTH	NO.	LENGTH	LENGTH	SIZE	C <sub>5</sub>	LENGTH	SIZE	C <sub>6</sub>	LENGTH	SIZE	LENGTH	SIZE	LENGTH	
3'	#4	10	1'-11"	2'-2"	2'-0"	2'-1"	9'-3"	#4	-	--	--	#4	8	1'-11"	2'-2"	2'-0"	2'-1"	9'-3"	3	3'-0"	3	3'-0"	4'-6"	#5	4'-3"	5'-9"	#5	3'-10"	5'-4"	#5	20'-6"	#5	14'-11"	
4'	#4	12	1'-11"	2'-8"	2'-3"	2'-4"	9'-9"	#4	1	3'-10"	6'-5"	#4	10	1'-11"	2'-8"	2'-3"	2'-4"	9'-9"	4	3'-0"	4	3'-0"	4'-6"	#5	5'-0"	6'-6"	#5	4'-4"	5'-10"	#6	26'-4"	#6	19'-2"	
5'	#4	15	1'-11"	3'-2"	2'-6"	2'-7"	10'-3"	#4	2	4'-6"	7'-1"	#4	12	1'-11"	3'-2"	2'-6"	2'-7"	10'-3"	5	3'-0"	5	3'-0"	4'-6"	#5	5'-8"	7'-2"	#5	4'-10"	6'-4"	#6	32'-2"	#6	23'-5"	
6'	#5	18	1'-11"	3'-8"	2'-9"	2'-10"	10'-9"	#5	2	5'-3"	7'-10"	#5	14	1'-11"	3'-8"	2'-9"	2'-10"	10'-9"	6	3'-0"	6	3'-0"	4'-6"	#5	6'-5"	7'-11"	#5	5'-4"	6'-10"	#6	38'-0"	#6	27'-8"	
7'	#5	20	2'-0"	4'-3"	3'-1"	3'-2"	11'-5"	#5	3	6'-0"	8'-7"	#5	16	2'-0"	4'-2"	3'-1"	3'-1"	11'-4"	7	3'-0"	7	3'-0"	4'-6"	#5	7'-1"	8'-7"	#5	5'-10"	7'-4"	#7	45'-4"	⑥	#7	31'-11"
8'	#6	23	2'-1"	4'-10"	3'-5"	3'-6"	12'-1"	#6	3	6'-9"	9'-4"	#6	18	2'-1"	4'-8"	3'-4"	3'-5"	11'-11"	8	3'-0"	8	3'-0"	4'-6"	#5	7'-10"	9'-4"	#5	6'-5"	7'-11"	#7	51'-2"	⑥	#7	36'-2"

NUMBER OF HEADWALL PIPE RUNNERS FOR 1 END			
S	NO.	S	NO.
10'	5	23'	11
11'	5	24'	11
12'	6	25'	12
13'	6	26'	12
14'	7	27'	12
15'	7	28'	13
16'	8	29'	13
17'	8	30'	14
18'	8	31'	14
19'	9	32'	15
20'	9	33'	15
21'	10	34'	16
22'	10	35'	16

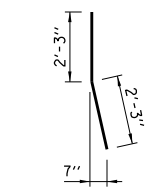
TABLE OF REINFORCEMENT BARS FOR ONE END																														
U(E) BARS - ONE PER EACH LENGTH SHOWN #4 @ 12" 45° WALL									U1(E) BARS - ONE PER EACH LENGTH SHOWN #4 @ 12" 15° WALL								V(E) BARS #5-EQUALLY SPACED 45° WALL						V1(E) BARS #5-EQUALLY SPACED 15° WALL							
H	C <sub>7</sub>	C <sub>8</sub>	C <sub>9</sub>	C <sub>10</sub>	C <sub>11</sub>	C <sub>12</sub>	C <sub>13</sub>	C <sub>14</sub> ⑥	C <sub>7</sub>	C <sub>8</sub>	C <sub>9</sub>	C <sub>10</sub>	C <sub>11</sub>	C <sub>12</sub>	C <sub>13</sub>	C <sub>14</sub>	NO.	C <sub>15</sub>	C <sub>16</sub>	C <sub>17</sub>	C <sub>18</sub>	C <sub>19</sub>	LENGTH	NO.	C <sub>15</sub>	C <sub>16</sub>	C <sub>17</sub>	C <sub>18</sub>	C <sub>19</sub>	LENGTH
3'	6'-2"	11'-9"	17'-5"	--	--	--	--	--	4'-6"	8'-7"	12'-9"	--	--	--	--	--	38	3'-10"	9"	7"	4'-0"	1'-0"	6'-7"	27	3'-10"	9"	9"	3'-10"	1'-0"	6'-7"
4'	6'-2"	11'-9"	17'-5"	23'-1"	--	--	--	--	4'-6"	8'-7"	12'-9"	16'-11"	--	--	--	--	49	4'-11"	10"	9"	5'-0"	1'-0"	7'-9"	35	4'-11"	10"	10"	4'-11"	1'-0"	7'-9"
5'	6'-2"	11'-9"	17'-5"	23'-1"	28'-9"	--	--	--	4'-6"	8'-7"	12'-9"	16'-11"	21'-0"	--	--	--	60	5'-11"	10"	9"	6'-0"	1'-0"	8'-9"	43	5'-11"	10"	11"	5'-10"	1'-0"	8'-9"
6'	6'-2"	11'-9"	17'-5"	23'-1"	28'-9"	34'-5"	--	--	4'-6"	8'-7"	12'-9"	16'-11"	21'-0"	25'-2"	--	--	72	6'-11"	10"	8"	7'-1"	1'-0"	9'-9"	52	6'-11"	10"	10"	6'-11"	1'-0"	9'-9"
7'	6'-2"	11'-9"	17'-5"	23'-1"	28'-9"	34'-5"	40'-0"	--	4'-6"	8'-7"	12'-9"	16'-11"	21'-0"	25'-2"	29'-4"	--	83	8'-0"	11"	9"	8'-2"	1'-0"	10'-11"	60	8'-0"	11"	11"	8'-0"	1'-0"	10'-11"
8'	6'-2"	11'-9"	17'-5"	23'-1"	28'-9"	34'-5"	40'-0"	47'-3"	4'-6"	8'-7"	12'-9"	16'-11"	21'-0"	25'-2"	29'-4"	33'-5"	94	9'-0"	11"	10"	9'-1"	1'-1"	12'-1"	68	9'-0"	11"	11"	9'-0"	1'-1"	12'-1"

TABLE OF REINFORCEMENT BARS FOR MINIMUM "S" - ONE END										
		Y(E) BARS 12-#5 ②	R(E) BARS 6-#5 ②	Z(E) BARS #4@12" ①		S(E) BARS #4@12" ①		T(E) BARS #4@12" ①		P(E) BARS 8-#5 ③
S	H	LENGTH	LENGTH	No.	LENGTH	No.	LENGTH	No.	LENGTH	LENGTH
≧ 9'	3'	11'-4"	19'-10"	10	5'-4"	20	6'-10"	10	3'-0"	6'-8"
≧ 9'	4'	11'-4"	22'-10"	10	5'-4"	23	6'-10"	10	3'-0"	7'-8"
≧ 5'	5'	6'-9"	21'-1"	6	5'-4"	21	6'-10"	6	3'-0"	8'-8"
≧ 6'	6'	7'-10"	25'-2"	7	5'-4"	25	6'-10"	7	3'-0"	9'-8"
≧ 7'	7'	9'-1"	29'-3"	8	5'-4"	30	6'-10"	8	3'-0"	10'-8"
≧ 8'	8'	10'-4"	33'-4"	9	5'-4"	34	6'-10"	9	3'-0"	11'-8"

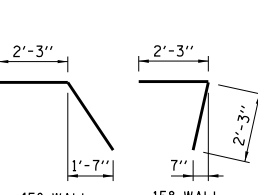


K(E) BARS

K1 BARS

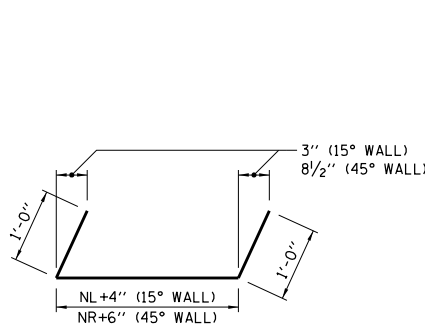


FOR BOX CULVERTS

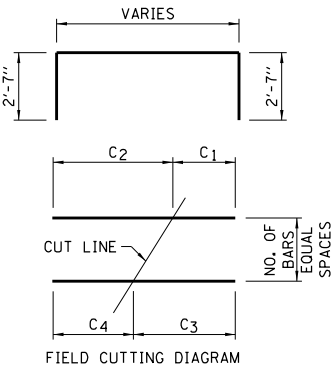


FOR PIPE CULVERTS

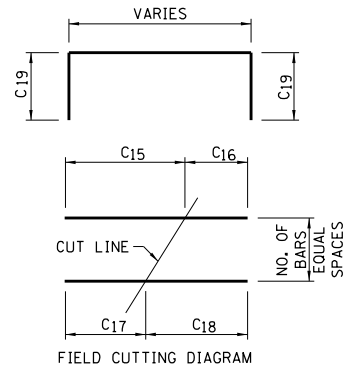
J(E) DOWELS



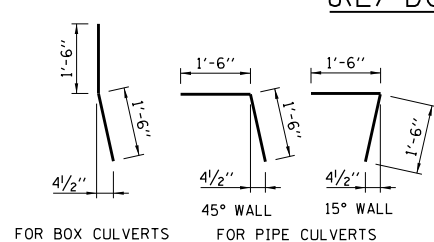
D(E) AND D1(E) BARS



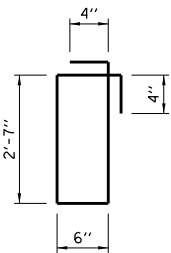
F(E) AND F1(E) BARS



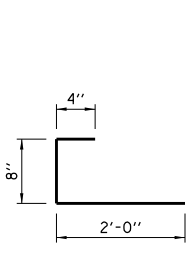
V(E) AND V1(E) BARS



H(E) DOWELS

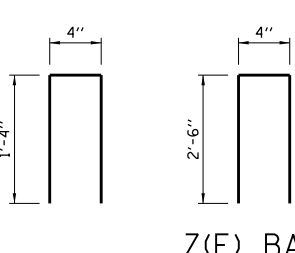


S(E) BARS

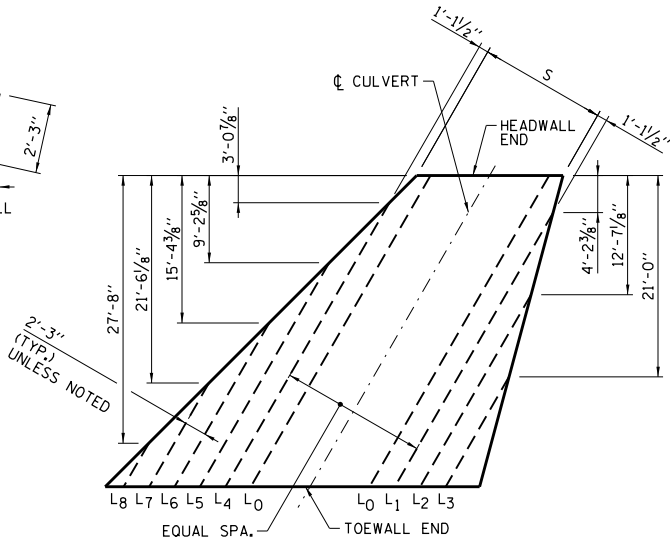


T(E) BARS

FOR BOX CULVERTS FOR PIPE CULVERTS



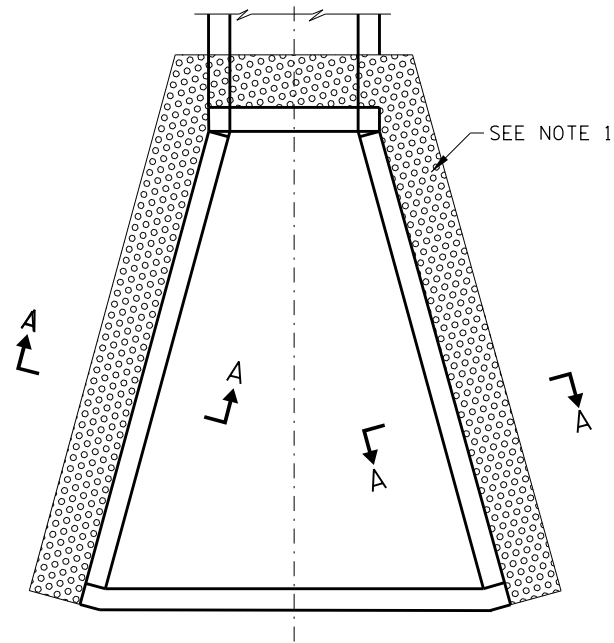
Z(E) BARS



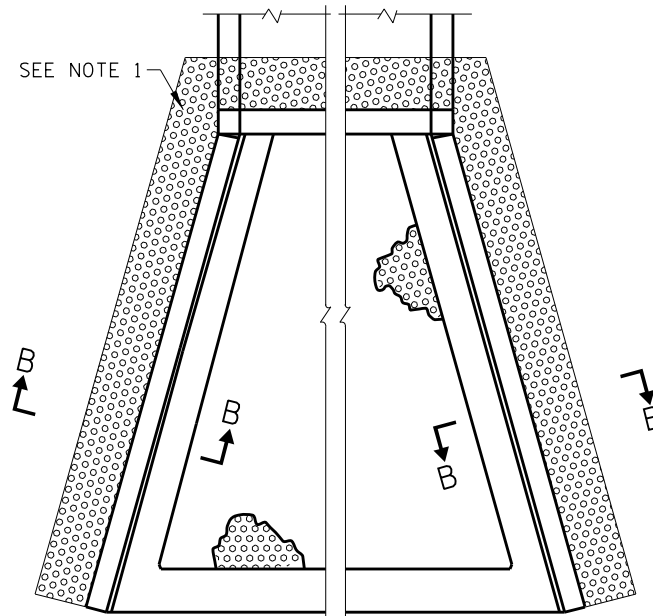
PIPE RUNNER LAYOUT

NOTES FOR TABLES:

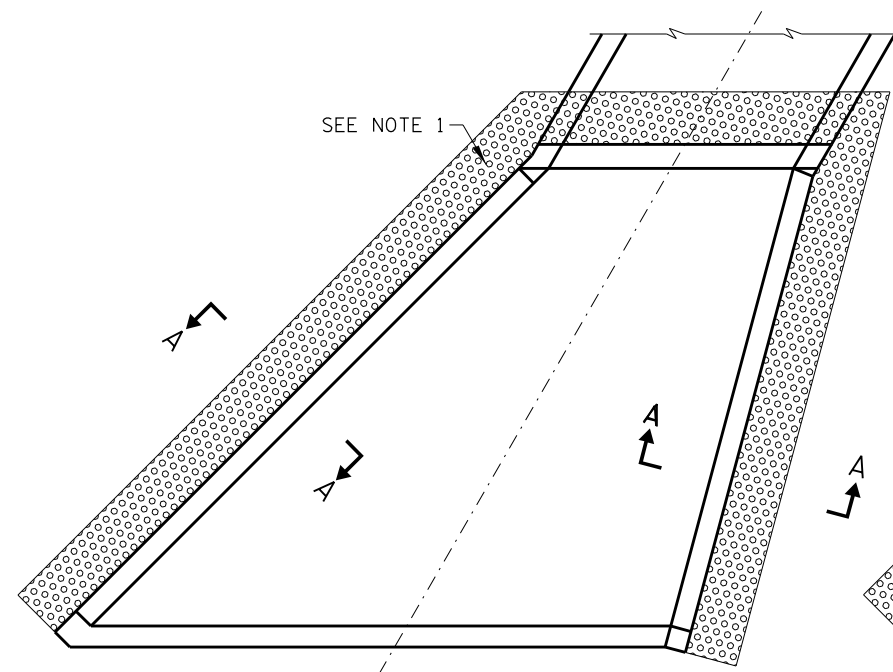
- ① THE NUMBER OF S(E), T(E) AND Z(E) BARS SHALL BE INCREASED BY 1 FOR EACH 1 FOOT OF INCREASE IN DIMENSION "W<sub>1</sub>".
- ② THE



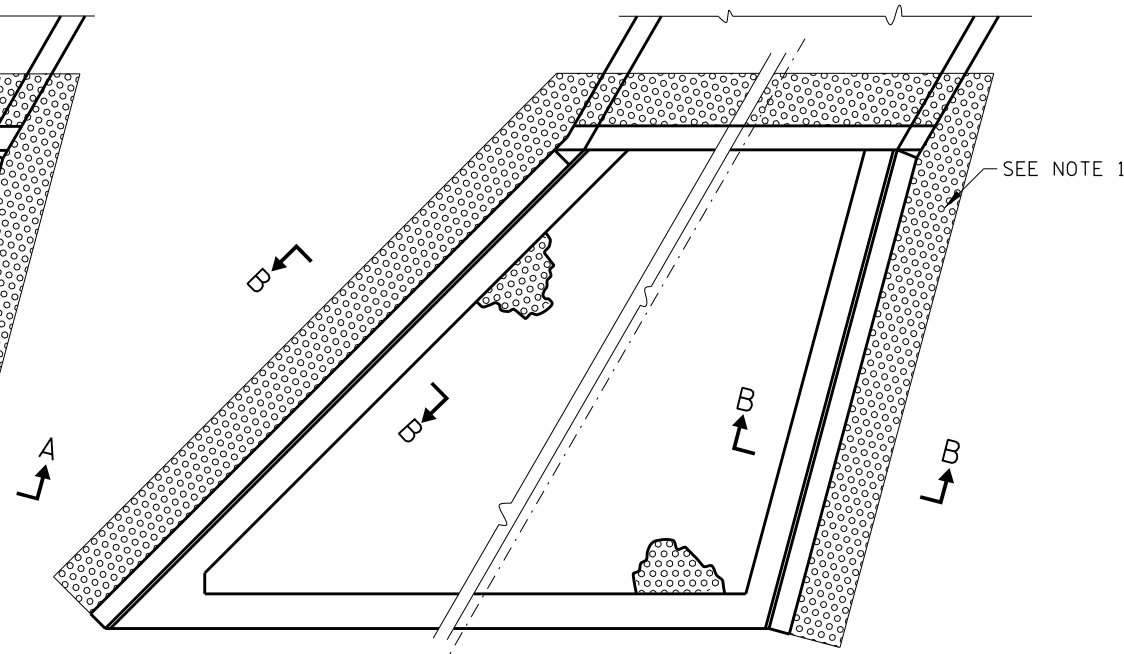
PLAN-0° SKEW,  $H \leq 4'$



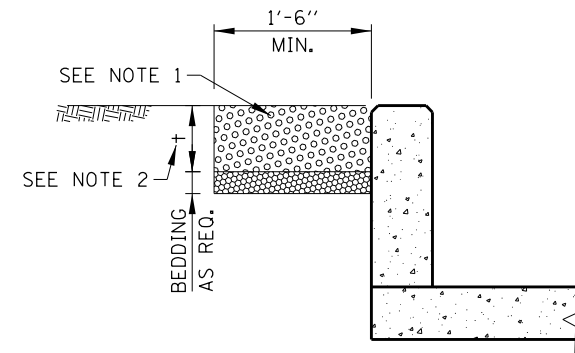
PLAN-0° SKEW,  $H \leq 8'$



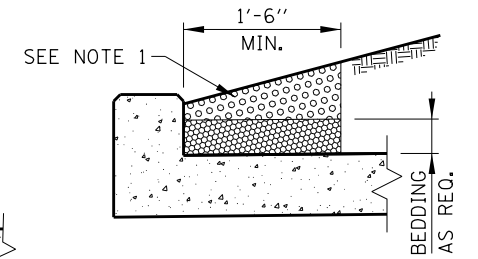
PLAN-SKEW,  $H \leq 4'$



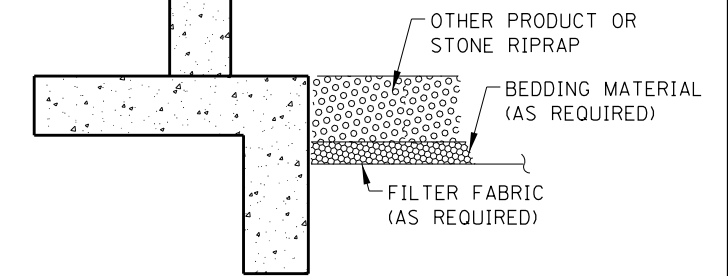
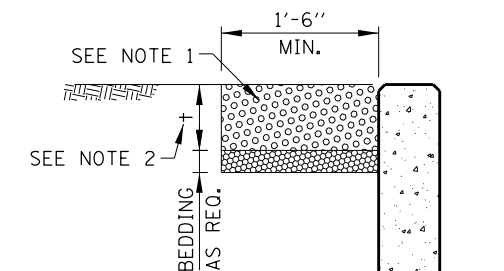
PLAN-SKEW,  $H \leq 8'$



SECTION A-A



SECTION AT HEADWALL



SECTION B-B

**NOTES:**

1. THE PREFERRED METHOD FOR ACHIEVING EROSION PROTECTION AT END SECTIONS SHOULD BE THROUGH THE USE OF PRODUCTS THAT PROMOTE REVEGETATION WITHIN THE AREA OF CONCERN.
2. THICKNESS "+" WILL BE DETERMINED BY THE MANUFACTURER'S RECOMMENDATION FOR THE PRODUCT USED.
3. EROSION PROTECTION PLACEMENT SHALL BE INSTALLED FLUSH WITH ADJACENT GRADE.
4. FOR USE WITH STANDARDS B10 TO B18.
5. STONE RIPRAP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND DRAINAGE DESIGN MANUAL.

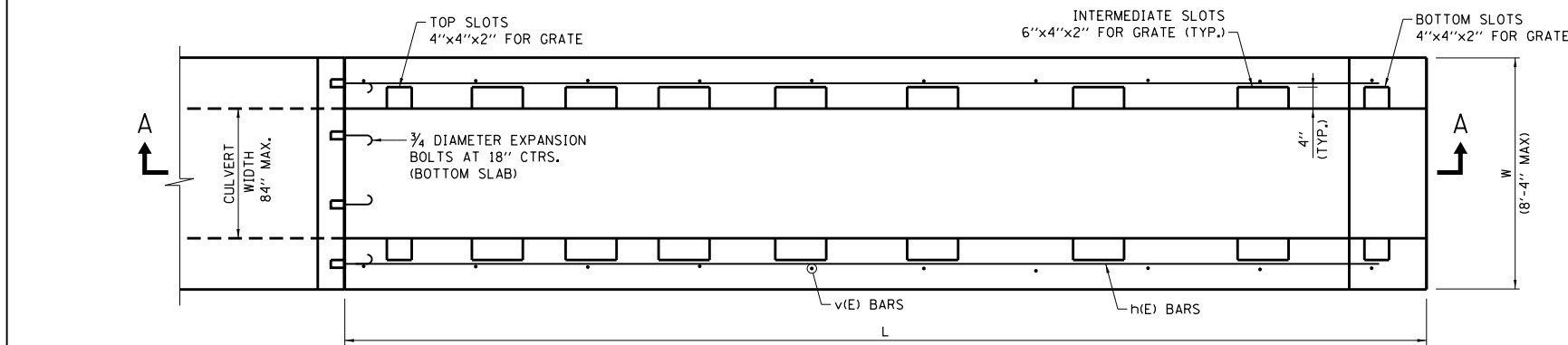
APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2010

DATE	REVISIONS
03-11-2015	REVISED NOTES
03-01-2010	REVISED EROSION PROTECTION AND NOTES

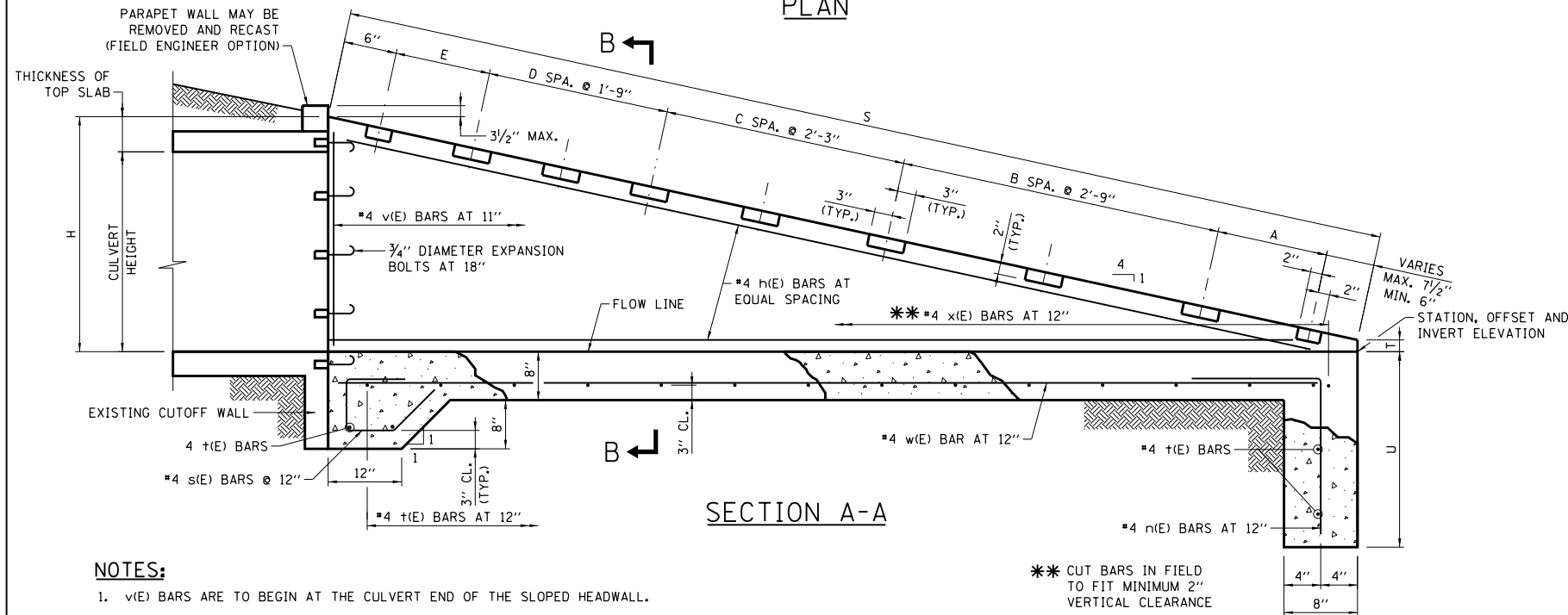


EROSION PROTECTION

STANDARD B19-02



PLAN



SECTION A-A

NOTES:

1. v(E) BARS ARE TO BEGIN AT THE CULVERT END OF THE SLOPED HEADWALL.
2. 3/4" DIAMETER EXPANSION BOLTS SHALL CONSIST OF SELF DRILLING EXPANSION SHIELDS AND 3/4" DIAMETER HOOKED BOLTS. HOOKED BOLTS SHALL EXTEND A MINIMUM OF 9" INTO NEW CONCRETE WITH ANCHORAGE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. MINIMUM CERTIFIED PROOF LOAD = 4,080 LBS.

\*\* CUT BARS IN FIELD TO FIT MINIMUM 2" VERTICAL CLEARANCE

DIMENSIONS AND QUANTITIES IN TWO WINGWALLS 1:4 SLOPE

CULVERT HEIGHT	DIMENSIONS							NO. OF SPACES			CONCRETE CLASS SI C.Y.	* REINF. BARS (POUND)
	H	L	S	T	U	A	E	B	C	D		
36"	3'-8"	14'-0"	14'-5 1/8"	2"	2'-8"	2'-2"	2'-2"	-	4	-	1.33	188
42"	4'-3"	16'-4"	16'-10"	2"	3'-2"	2'-8"	2'-2"	4	-	-	1.78	259
48"	4'-9"	18'-4"	18'-10 3/4"	2"	3'-2"	2'-2"	2'-2"	-	6	-	2.23	304
54"	5'-3"	20'-4"	20'-11 1/2"	2"	3'-6"	2'-2"	2'-2"	4	2	-	2.72	379
60"	5'-10"	22'-8"	23'-4 5/8"	2"	3'-6"	2'-2"	2'-2"	-	8	-	3.36	468

TABLE OF BARS IN ONE WINGWALL 1:4 SLOPE

NO. 4 REINFORCEMENT BARS						
CULVERT HEIGHT	MARK(E)	TYPE	NO. REQ'D	LENGTH	a	b
36"	h 36 3/4" EXP BLT v 36 x 36	STR.	4	13'-8"	2'-0"	3'-6"
		---	3	---		
		---	7	5'-6"		
		---	15	3'-2"		
42"	h 42 3/4" EXP BLT v 42 x 42	STR.	5	16'-0"	1'-11"	4'-1"
		---	4	---		
		---	10	6'-0"		
		---	17	3'-2"		
48"	h 48 3/4" EXP BLT v 48 x 48	STR.	5	18'-0"	1'-10"	4'-7"
		---	4	---		
		---	13	6'-5"		
		---	19	3'-2"		
54"	h 54 3/4" EXP BLT v 54 x 54	STR.	6	20'-0"	1'-10"	5'-1"
		---	4	---		
		---	15	6'-11"		
		---	21	3'-2"		
60"	h 60 3/4" EXP BLT v 60 x 60	STR.	7	22'-4"	1'-11"	5'-8"
		---	5	---		
		---	17	7'-7"		
		---	23	3'-2"		

SECTION B-B  
SINGLE BOX ≤ 84" WIDTH

TABLE OF BARS IN SLAB 1:4 SLOPE  
(PER FT. OF FLOOR SLAB WIDTH)

NO. 4 REINFORCEMENT BARS								
CULVERT HEIGHT	MARK(E)	TYPE	NO. REQ'D	LENGTH	a	b	REINF. BAR LB. *	CONCRETE CLASS SI (C.Y.) *
36"	n 36 w 36 t 36 3/4" EXP BLT s 36	1	1	4'-1"	2'-1"	2'-0"	27	.45
		STR.	18	13'-5"				
		---	0.67	W-(0'-4")				
		---	3	---				
42"	n 42 w 42 t 42 3/4" EXP BLT s 42	1	1	4'-7"	2'-7"	2'-0"	32	.53
		STR.	18	15'-9"				
		---	0.67	W-(0'-4")				
		---	3	---				
48"	n 48 w 48 t 48 3/4" EXP BLT s 48	1	1	4'-7"	2'-7"	2'-0"	33	.58
		STR.	18	17'-9"				
		---	0.67	W-(0'-4")				
		---	3	---				
54"	n 54 w 54 t 54 3/4" EXP BLT s 54	1	1	4'-11"	2'-11"	2'-0"	37	.64
		STR.	18	19'-9"				
		---	0.67	W-(0'-4")				
		---	3	---				
60"	n 60 w 60 t 60 3/4" EXP BLT s 60	1	1	4'-11"	2'-11"	2'-0"	39	.70
		STR.	18	22'-1"				
		---	0.67	W-(0'-4")				
		---	3	---				

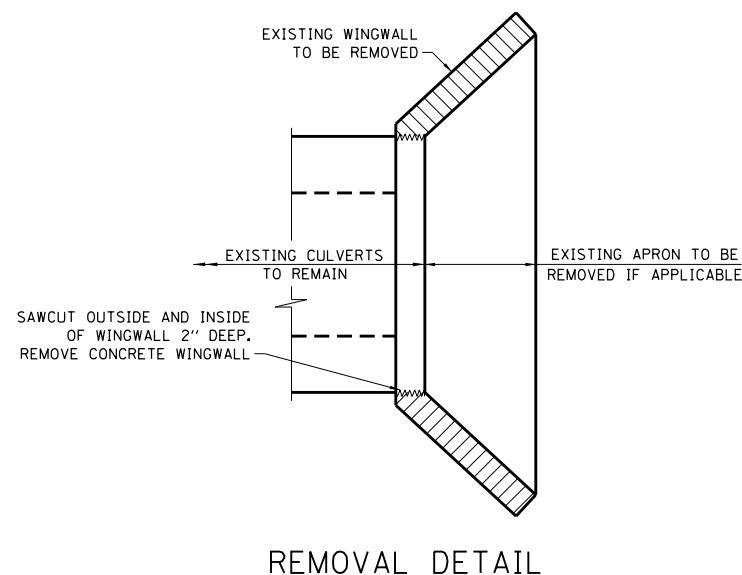
NOTES:

1. TYPE 2 "v(E)" BARS SHALL BE ORDERED FULL LENGTH AND CUT IN THE FIELD. THE REMAINING PORTION OF THE "v(E)" BARS SHALL BE USED IN THE OTHER WALL.
2. THE LONG LEG OF THE "n(E)" BAR SHALL BE VERTICAL.
3. SEE STANDARD B23 FOR GRATING DETAILS.

DATE	REVISIONS
03-01-2022	REVISED HEADWALL TO WINGWALL IN REMOVAL DETAIL AND REVISED REBAR TABLE
03-31-2016	STATION, OFFSET & INVERT ELEVATION MOVED

GENERAL NOTES:

1. ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" X 45° CHAMFER. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW FINISHED GROUND LEVEL.
2. COVER FROM THE FACE OF CONCRETE TO FACE OF REINFORCEMENT BARS SHALL BE 2" UNLESS OTHERWISE SHOWN.
3. CONCRETE QUANTITIES SHOWN ARE FOR REINFORCED CONCRETE BOX CULVERT HEADWALLS.
4. PAY ITEMS ARE IDENTIFIED BY AN ASTERISK (\*).
5. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
6. ALL REINFORCEMENT BARS SHALL BE EPOXY COATED (E).



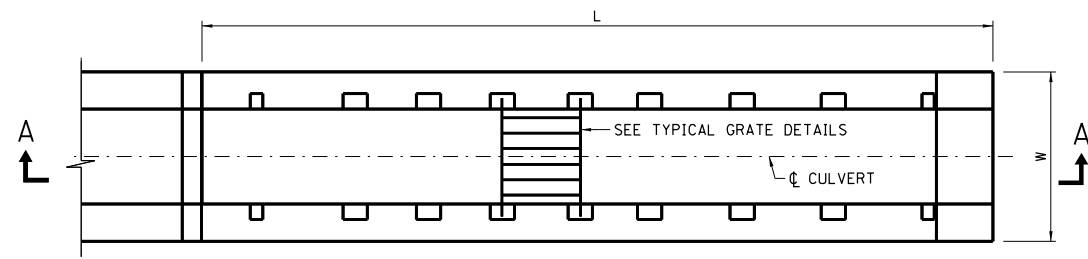
REMOVAL DETAIL

APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

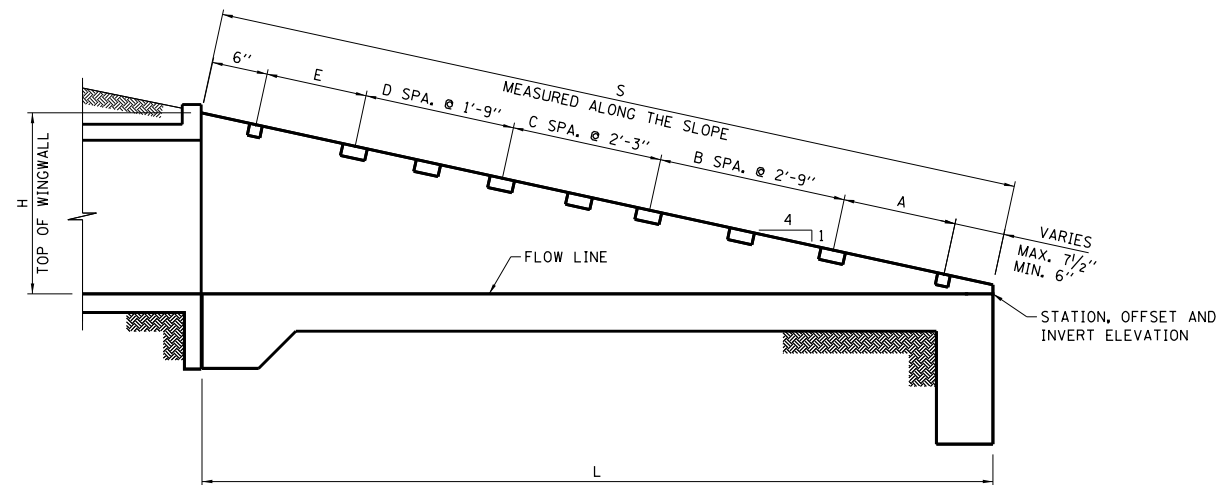


HEADWALL TYPE IV  
CONCRETE BOX CULVERT  
≤ 84" WIDTH

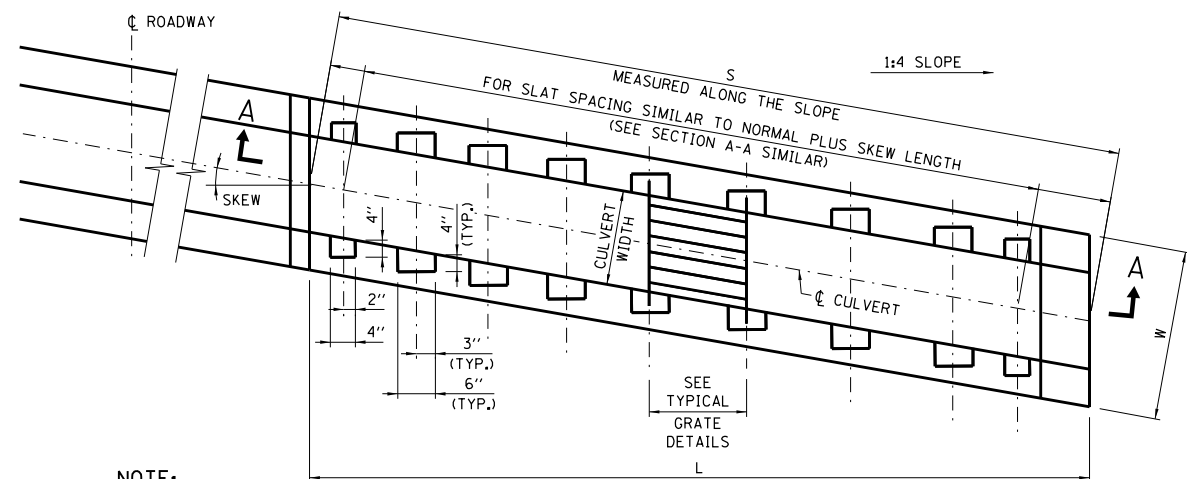
STANDARD B20-06



PLAN VIEW (NO SKEW)  
SINGLE BOX CULVERT  $\leq 84''$  WIDE



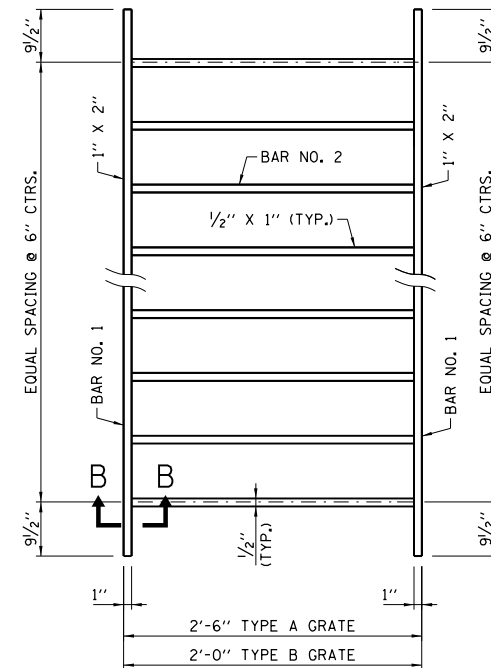
SECTION A-A  
END TREATMENT - MULTIPLE OR SINGLE CELL  
BOX CULVERT



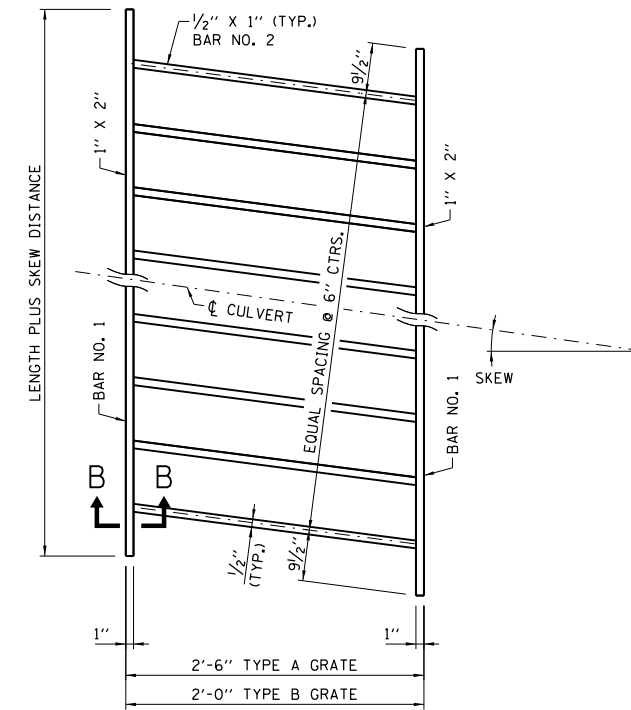
**NOTE:**

REINFORCEMENT BARS AND GRATE SPACING ARE  
SIMILAR TO BOX CULVERT AT NORMAL (NO SKEW).

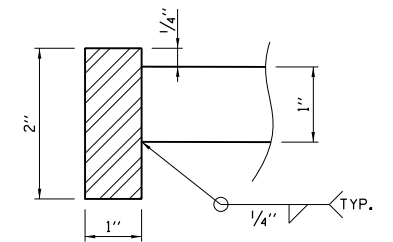
PLAN VIEW (WITH SKEW)  
SINGLE BOX CULVERT  $\leq 84''$  WIDE



TYPICAL GRATE  
(NO SKEW)



GRATE  
(WITH SKEW)



SECTION B-B

GRATING DIMENSIONS AND QUANTITIES  
IN ONE HEADWALL TYPE IV  
BASED ON A 1 FOOT WIDTH, 1:4 SLOPE, AND NO SKEW

CULVERT HEIGHT	GRATES		BARS FOR ONE GRATE				GRATING (LBS.)
	NUMBER REQUIRED	TYPE REQ'D.	BAR NO. 1		BAR NO. 2		
			BARS REQ'D.	LENGTH	BARS REQ'D.	LENGTH	EACH GRATE
36"	6	B	2	W-0.75	$\frac{W-1.33}{0.5}-1$	1'-10"	19.9W - 21.6
42"	5	A	2	W-0.75	$\frac{W-1.33}{0.5}-1$	2'-4"	21.5W - 24.7
	1	B	2	W-0.75	$\frac{W-1.33}{0.5}-1$	1'-10"	19.9W - 21.6
48"	8	B	2	W-0.75	$\frac{W-1.33}{0.5}-1$	1'-10"	19.9W - 21.6
54"	4	A	2	W-0.75	$\frac{W-1.33}{0.5}-1$	2'-4"	21.5W - 24.7
	4	B	2	W-0.75	$\frac{W-1.33}{0.5}-1$	1'-10"	19.9W - 21.6
60"	10	B	2	W-0.75	$\frac{W-1.33}{0.5}-1$	1'-10"	19.9W - 21.6

DIMENSIONS "S" FOR SLOPE 1:4  
FOR VARIOUS CULVERT SIZES AND SKEWS

CULVERT HEIGHT	NO SKEW	$\leq 10^\circ$	$10^\circ \leq 20^\circ$	$20^\circ \leq 30^\circ$
36"	14'-5 7/8"	14'-7 3/4"	15'-4 1/4"	16'-8"
42"	16'-10"	17'-1"	17'-11"	19'-5 1/4"
48"	18'-10 3/4"	19'-2 1/4"	20'-1 1/4"	21'-10"
54"	20'-11 1/2"	21'-3 3/8"	22'-3 3/8"	24'-2 3/8"
60"	23'-4 3/8"	23'-8 3/4"	24'-10 3/8"	26'-11 3/4"

**GENERAL NOTES:**

- ALL TABLE DIMENSIONS AND QUANTITIES ARE FOR SINGLE BOX CULVERT HEADWALLS. TO ADAPT ANY OF THESE TABLES FOR DOUBLE BOX CULVERTS, DOUBLE THE NUMBER OF GRATES REQUIRED AND ADD AN ADDITIONAL WALL. (WALL THICKNESS SHALL BE SAME AS THE CENTER WALL THICKNESS OF THE BOX CULVERT).
- FOR QUANTITY CALCULATIONS DIMENSION "W" SHALL BE MEASURED IN FEET.
- QUANTITIES FOR SKEWED HEADWALLS NOT SHOWN.
- PAY ITEMS ARE IDENTIFIED BY AN ASTERISK (\*).
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- GRATING IS DESIGNED FOR A TRANSVERSING LOAD OF 1,800 POUNDS AT YIELD.

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

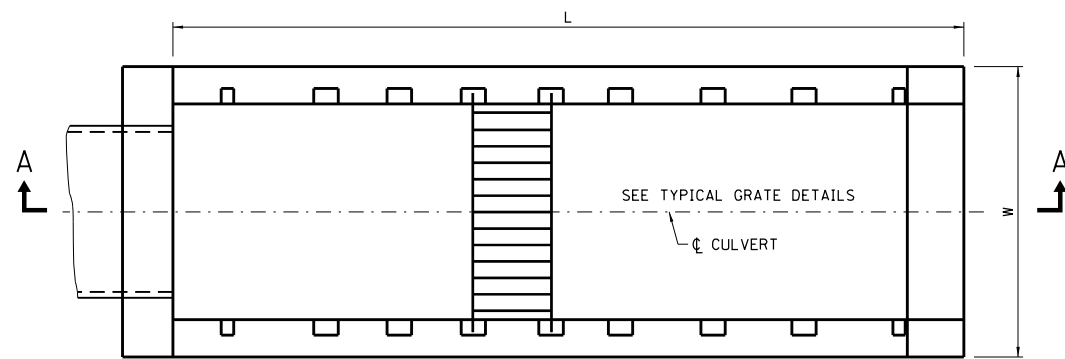
DATE:  
02/07/2012

DATE	REVISIONS
03-01-2022	REVISED BAR NO. 1 THICKNESS AND WEIGHT OF HEADWALL GRATES
03-31-2016	STATION, OFFSET AND INVERT ELEVATION MOVED
02-07-2012	DELETED SECTION FROM PLAN VIEW

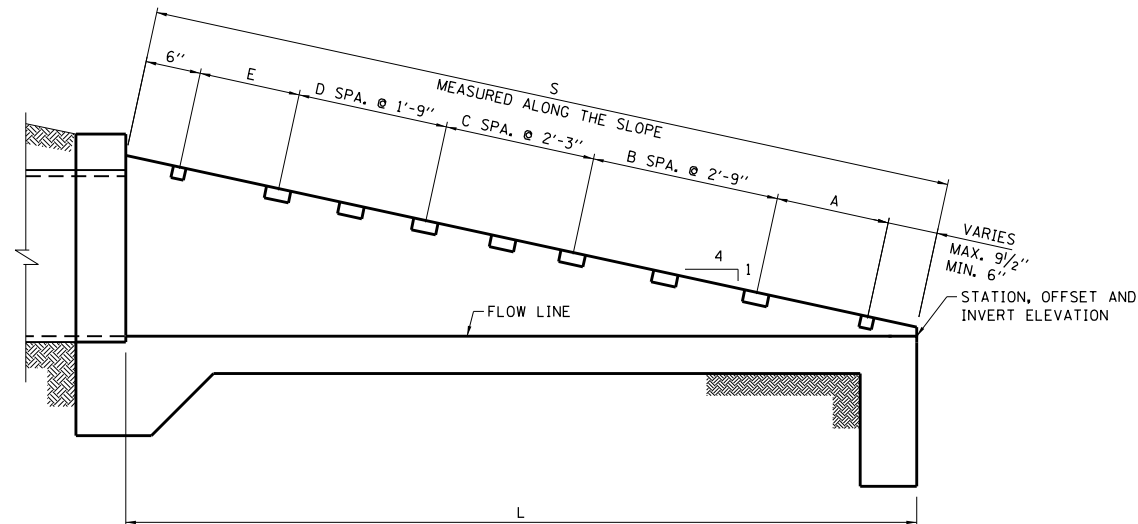


GRATING FOR  
HEADWALL TYPE IV  
BOX CULVERT  $\leq 84''$  WIDTH  
STANDARD B21-04

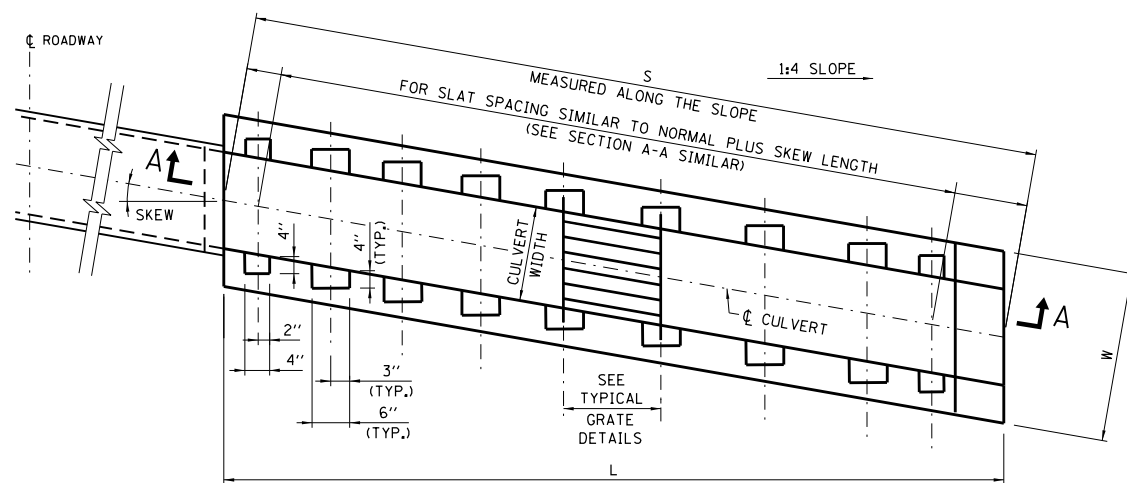




PLAN VIEW (NO SKEW)  
SINGLE BOX CULVERT ≤ 84" WIDE

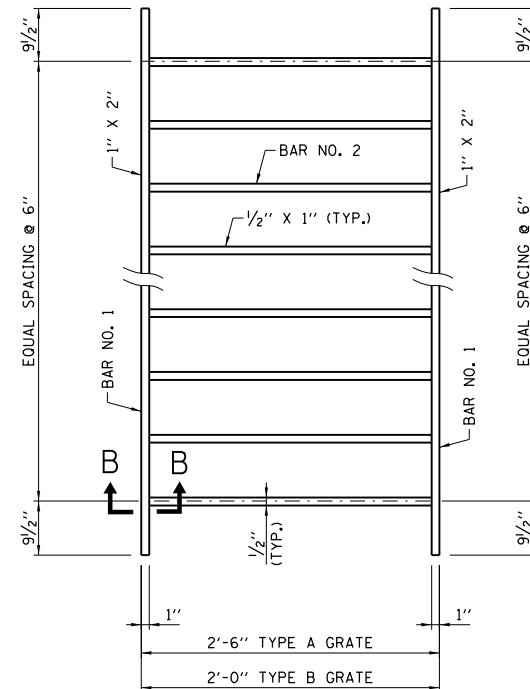


SECTION A-A  
END TREATMENT - MULTIPLE OR SINGLE CELL  
BOX CULVERT

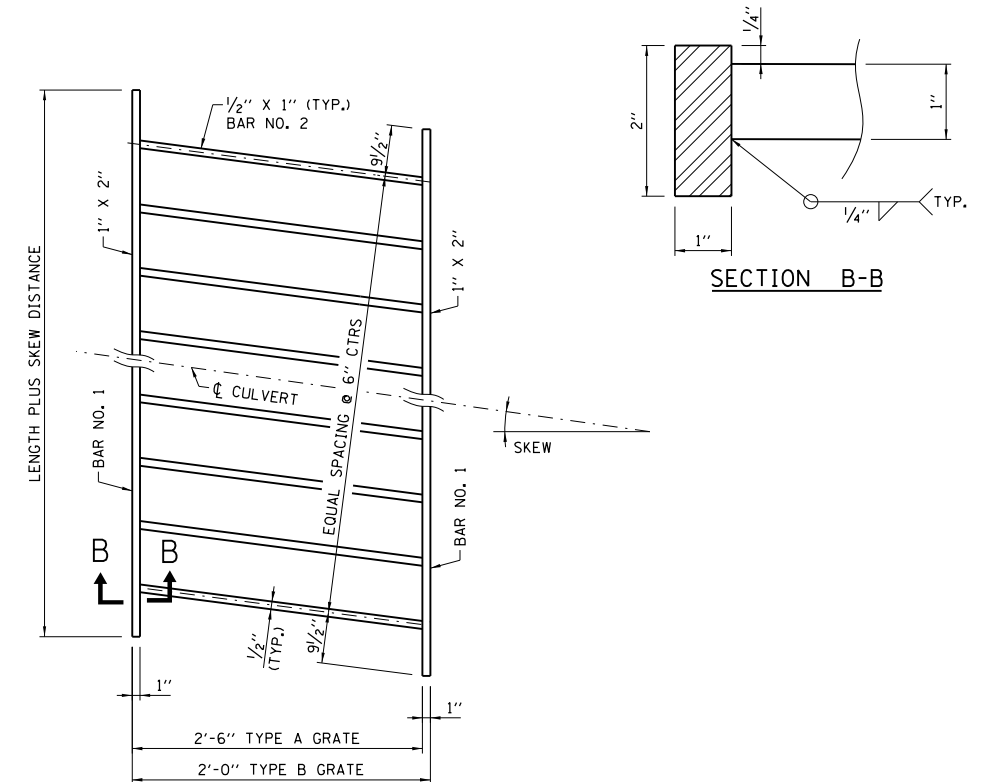


NOTE:  
REINFORCEMENT BARS AND GRATE SPACING ARE  
SIMILAR TO BOX CULVERT AT NORMAL (NO SKEW).

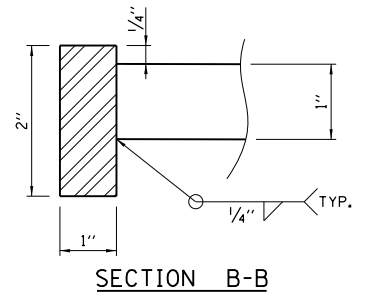
PLAN VIEW (WITH SKEW)



GRATE DETAILS  
(WITH NO SKEW)



GRATE DETAILS  
(WITH SKEW)



SECTION B-B

GRATING DIMENSIONS AND QUANTITIES IN ONE HEADWALL TYPE IV  
BASED ON A 1 FOOT WIDTH, 1:4 SLOPE AND SKEW

H	GRATES		BARS FOR ONE GRATE				GRATING (POUND)*
	NUMBER REQUIRED	TYPE REQ'D.	BAR NO. 1 BARS REQ'D.	LENGTH	BAR NO. 2 BARS REQ'D.	LENGTH	
3'-2"	5	B	2	W-.75	W-1.33 0.5	1'-10"	19.9W - 21.6
3'-8"	6	B	2	W-.75	W-1.33 0.5	1'-10"	19.9W - 21.6
4'-3"	5	A	2	W-.75	W-1.33 0.5	2'-4"	21.5W - 24.7
	1	B	2	W-.75	W-1.33 0.5	1'-10"	19.9W - 21.6
4'-9"	8	B	2	W-.75	W-1.33 0.5	1'-10"	19.9W - 21.6
5'-3"	4	A	2	W-.75	W-1.33 0.5	2'-4"	21.5W - 24.7
	4	B	2	W-.75	W-1.33 0.5	1'-10"	19.9W - 21.6
5'-10"	10	B	2	W-.75	W-1.33 0.5	1'-10"	19.9W - 21.6
6'-4"	4	A	2	W-.75	W-1.33 0.5	2'-4"	21.5W - 24.7
	6	B	2	W-.75	W-1.33 0.5	1'-10"	19.9W - 21.6

DIMENSIONS "S" FOR SLOPE 1:4  
FOR VARIOUS CULVERT SIZES AND SKEWS

H	NO SKEW	≤ 10°	10° ≤ 20°	20° ≤ 30°
3'-2"	12'-4 1/2"	12'-6 3/4"	13'-2"	14'-3 3/8"
3'-8"	14'-5 1/4"	14'-7 3/4"	15'-4 1/4"	16'-8"
4'-3"	16'-10"	17'-1"	17'-11"	19'-5 1/4"
4'-9"	18'-10 3/4"	19'-2 1/4"	20'-1 1/4"	21'-10"
5'-3"	20'-11 1/2"	21'-3 3/8"	22'-3 5/8"	24'-2 3/4"
5'-10"	23'-4 3/8"	23'-8 3/4"	24'-10 3/8"	26'-11 3/4"
6'-4"	25'-5 1/8"	25'-9 3/4"	27'-0 5/8"	29'-4 1/4"

#### GENERAL NOTES:

- ALL TABLE DIMENSIONS AND QUANTITIES ARE FOR SINGLE CULVERT HEADWALLS. TO ADAPT ANY OF THESE TABLES FOR DOUBLE CULVERTS, DOUBLE THE NUMBER OF GRATES REQUIRED AND ADD AN ADDITIONAL WALL. (WALL THICKNESS SHALL BE SAME AS THE CENTER WALL THICKNESS OF THE CULVERT.)
- FOR QUANTITY CALCULATIONS DIMENSION "W" SHALL BE MEASURED IN FEET.
- QUANTITIES FOR SKEWED HEADWALLS NOT SHOWN.
- PAY ITEMS ARE IDENTIFIED BY AN ASTERISK (\*).
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- GRATING IS DESIGNED FOR A TRANSVERSING LOAD OF 1,800 POUNDS AT YIELD.

DATE	REVISIONS
03-01-2022	REVISED BAR NO. 1 THICKNESS AND WEIGHT OF HEADWALL GRATES
03-31-2016	STATION, OFFSET AND INVERT ELEVATION MOVED
02-07-2012	DELETED SECTION VIEW FROM SKEW PLAN



GRATING FOR  
HEADWALL TYPE IV PIPE  
AND PIPE-ARCH CULVERTS

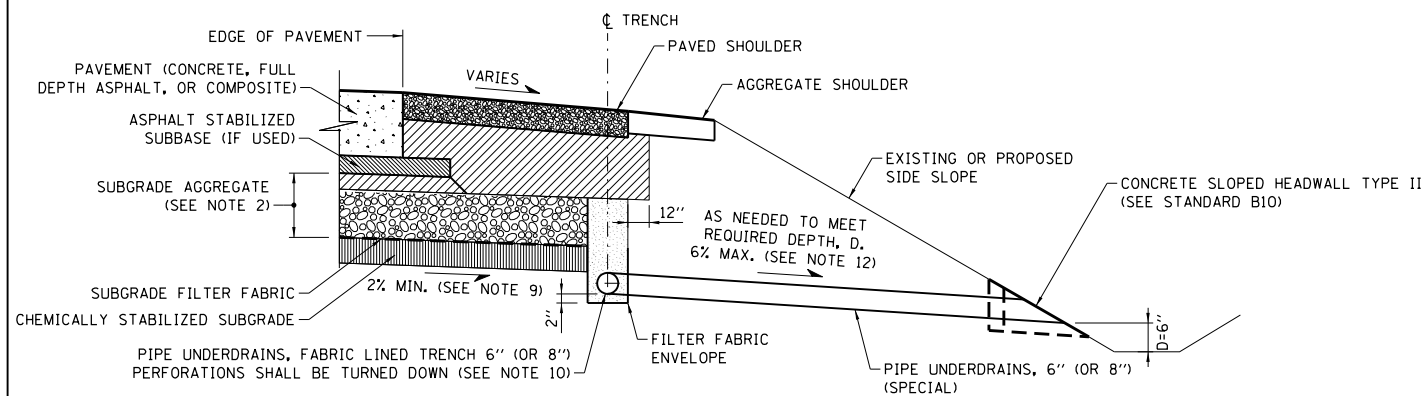
STANDARD B23-04

APPROVED BY:

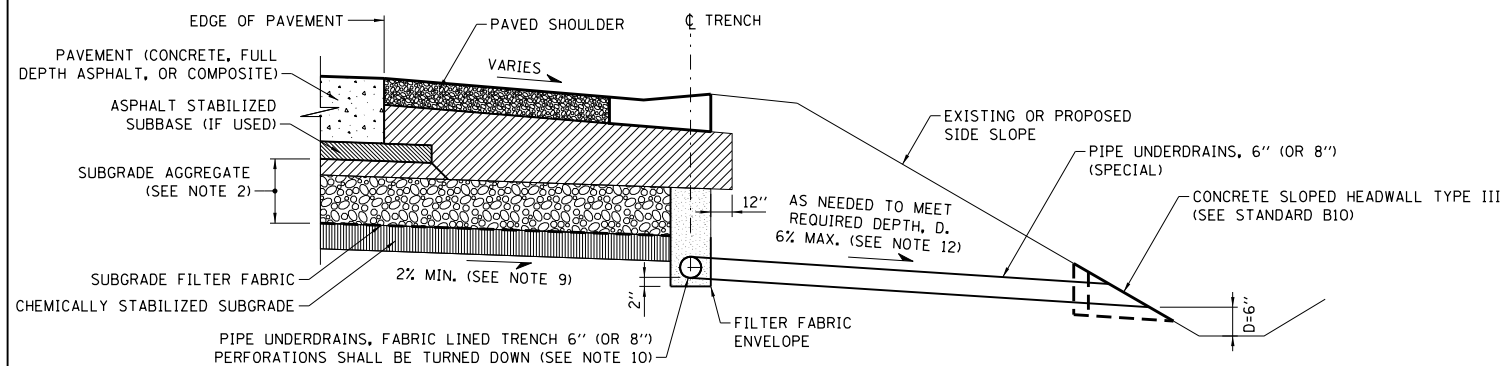
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

DATE:

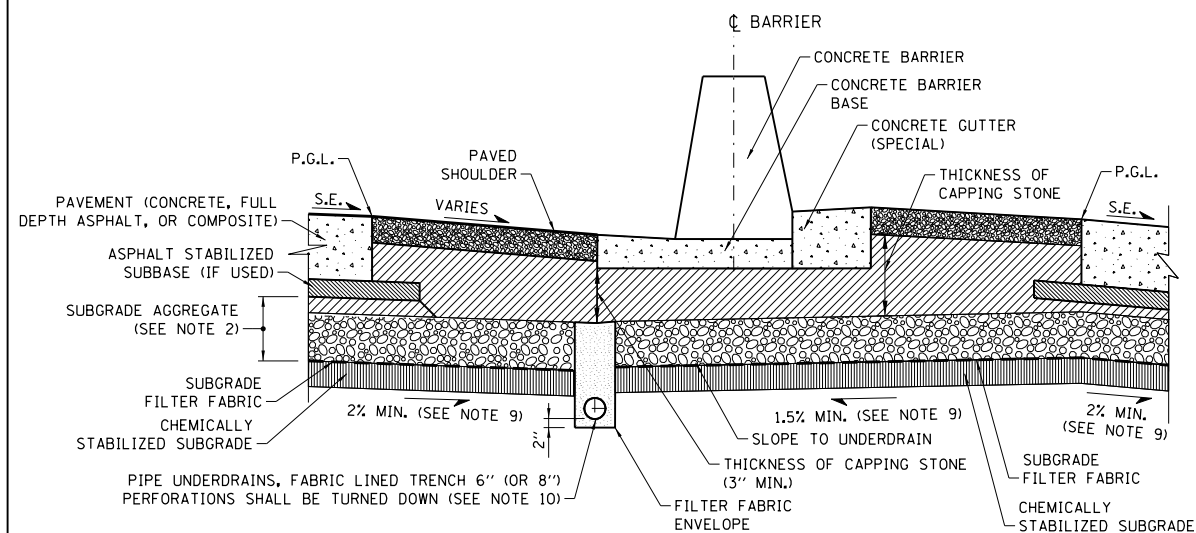
02/07/2012



LOCATIONS WITHOUT GUTTER

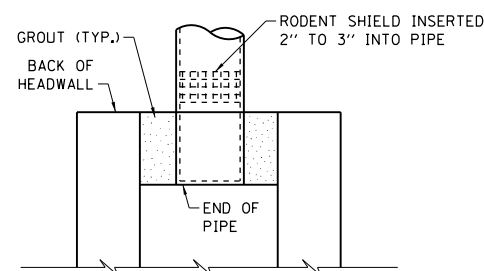


LOCATIONS WITH GUTTER

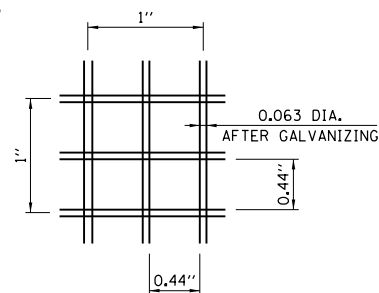


LOCATIONS WITH VARIABLE HEIGHT DOUBLE FACE BARRIER

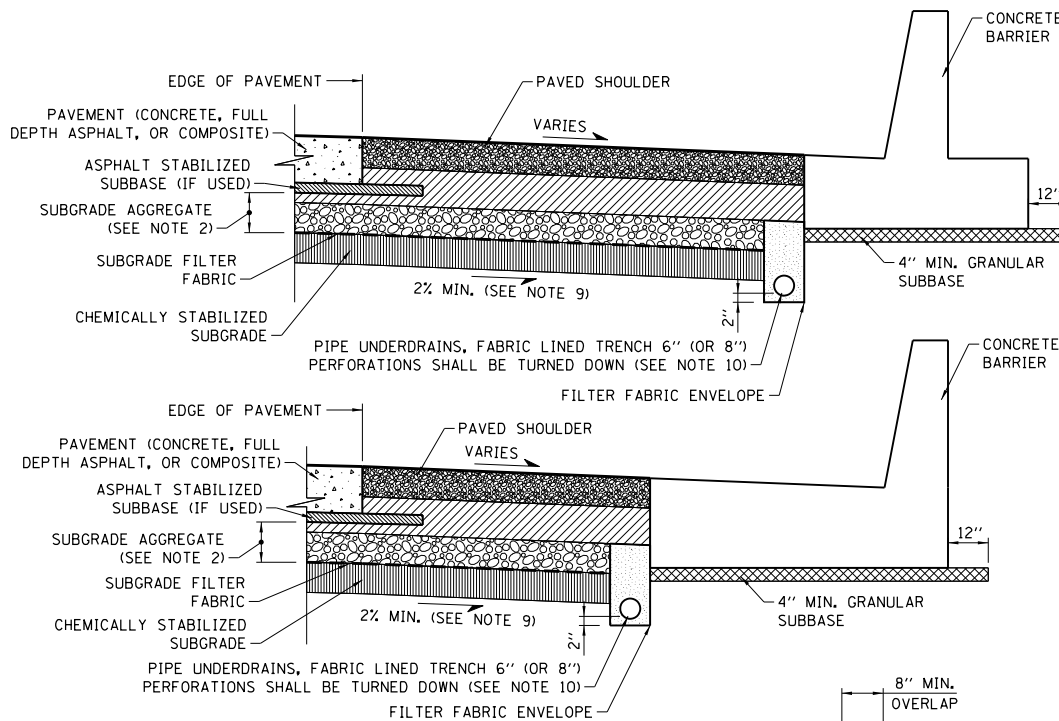
MAXIMUM ALLOWABLE DRAINAGE DISTANCE TO OUTLET OR SEPARATION DISTANCE BETWEEN OUTLETS	
ROADWAY PROFILE GRADE (%)	DISTANCE
≤ 1	250 FT.
BETWEEN 1 AND 2	375 FT.
≥ 2	500 FT. (NOTE 5)



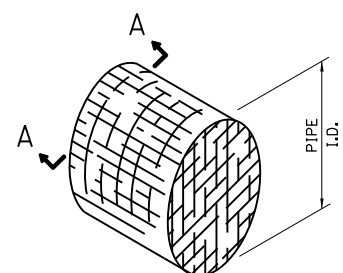
RODENT SHIELD PLACEMENT



SECTION A-A

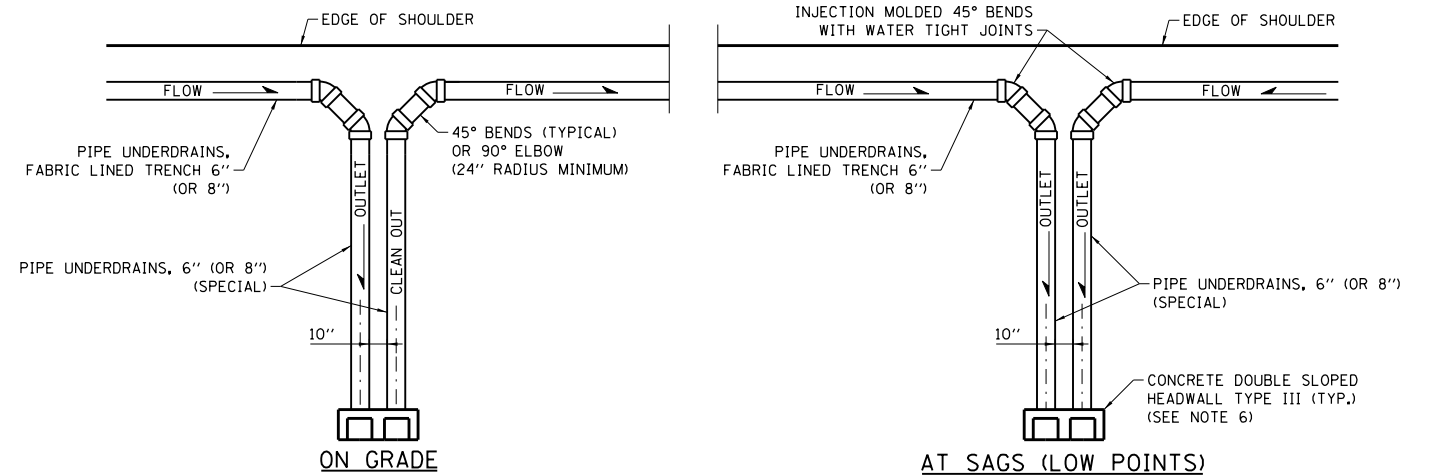


LOCATIONS WITH BARRIER

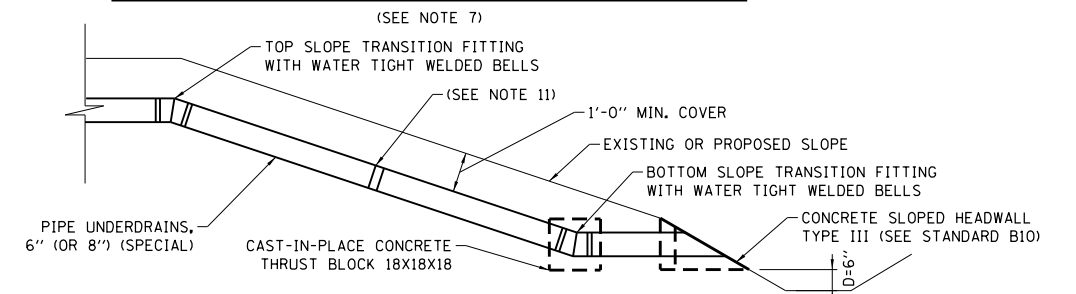


DETAIL OF RODENT SHIELD

FILTER FABRIC ENVELOPE



DETAIL OF PIPE UNDERDRAIN OUTLETS



DETAIL OF PIPE UNDERDRAIN OUTLET ON HIGH FILL SLOPE

#### NOTES FOR PIPE UNDERDRAIN

- FOR NEW CONSTRUCTION OR WIDENING PROJECTS, THE PIPE UNDERDRAIN INSTALLATION SHALL OCCUR AFTER SUBGRADE HAS BEEN PREPARED AND AFTER LIFT OF PGE BASE IS PLACED AND BEFORE 3" AND VARIES CA-6 CAPPING STONE IS PLACED, FOR PAVEMENT RUBBLIZATION PROJECTS, THE PIPE UNDERDRAIN SHALL BE INSTALLED PRIOR TO RUBBLIZATION.
- SUBGRADE AGGREGATE SHALL CONSIST OF A 3" AND VARIES CA-6 CAP ABOVE A PGE BASE, THICKNESS AS NOTED IN THE PLANS.
- ON SUPERELEVATED CURVES PLACE LONGITUDINAL UNDERDRAIN ON LOW SIDE ONLY.
- IN AREAS WHERE ROADWAY LONGITUDINAL GRADE IS LESS THAN 0.5%, DIMENSION WILL INCREASE AS NECESSARY TO MAINTAIN MINIMUM 0.5% SLOPE IN PIPE UNDERDRAIN.
- IF 500' MAXIMUM DISTANCE IS EXCEEDED, PIPE UNDERDRAIN SHALL BE INCREASED TO 8" DIAMETER AND TRENCH WIDTH INCREASED TO 16".
- AT OUTLET LOCATIONS, PIPE UNDERDRAINS SHALL SEPARATE SUFFICIENTLY TO PROVIDE SPACE FOR TWO CONCRETE SLOPED HEADWALLS, OR TWO PIPES CAN RUN PARALLEL INTO A DOUBLE SLOPED HEADWALL.
- IN AREAS WHERE A CLOSED DRAINAGE SYSTEM EXISTS, THE PIPE UNDERDRAIN, 6" (OR 8") (SPECIAL) SHALL DRAIN TO THE NEAREST CATCH BASIN. THE UPPER END OF A RUN ON GRADE SHALL ALSO BE CONNECTED TO A CATCH BASIN TO BE USED AS A CLEANOUT.
- THE OUTLET END OF THE SUBDRAIN SHALL BE PROTECTED BY A PERMANENT RODENT SHIELD. THE RODENT SHIELD SHALL HAVE THE CONFIGURATION SHOWN AND BE CONSTRUCTED FROM HOT DIP GALVANIZED STEEL INDUSTRIAL WIRE CLOTH 3x3 MESH, 0.063"x0.063" WIRE SIZE IN ACCORDANCE WITH AASHTO M232 (ASTM A153).
- BOTTOM OF SUBGRADE AGGREGATE SLOPE FROM ROADWAY PROFILE GRADE SHALL NOT BE LESS THAN 1.5% TOWARD THE PIPE UNDERDRAIN IN SUPERELEVATED SECTIONS.
- A CA 16 BACKFILLED TRENCH SHALL BE USED WITH THE INSTALLATION OF A PIPE UNDERDRAIN SYSTEM, EXCEPT THE PERCENT PASSING THE NO. 16 (1.18 mm) SIEVE SHALL BE 4 ± 4 PERCENT.
- ALL JOINTS IN SLOPE DRAIN SYSTEM SHALL BE WATERTIGHT WITH A WELDED INTERNAL CYLINDER ON THE SPIGOT END OF THE PIPE. FIELD JOINTS SHALL BE WRAPPED WITH A DOUBLE WIDE MARMAC COUPLER, OR EQUIVALENT.
- IF REQUIRED PIPE UNDERDRAIN SLOPE EXCEEDS 6%, PIPE UNDERDRAIN OUTLET ON HIGH FILL SLOPE DETAIL SHALL APPLY.

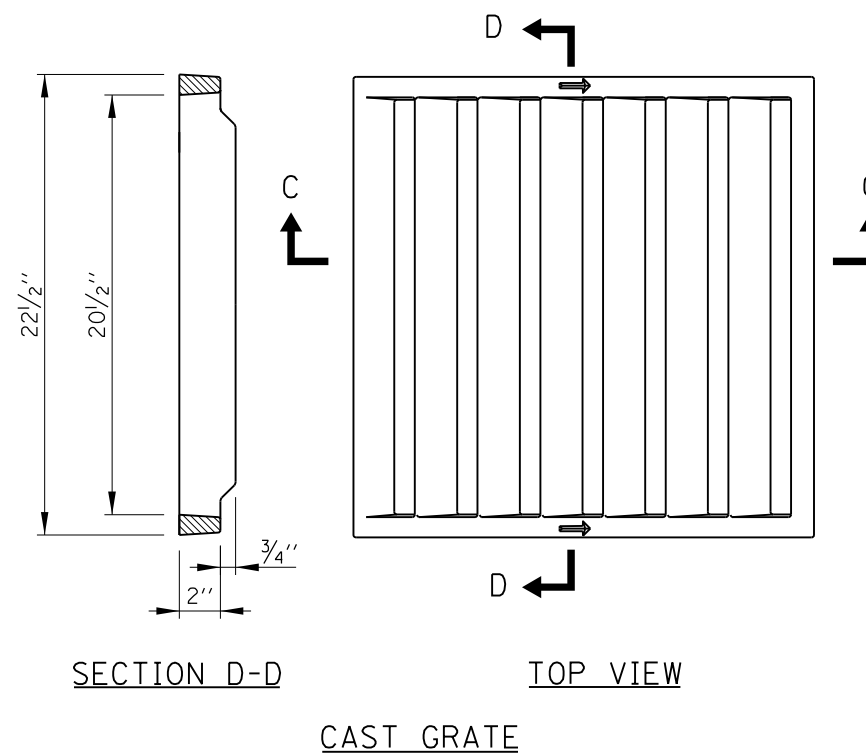
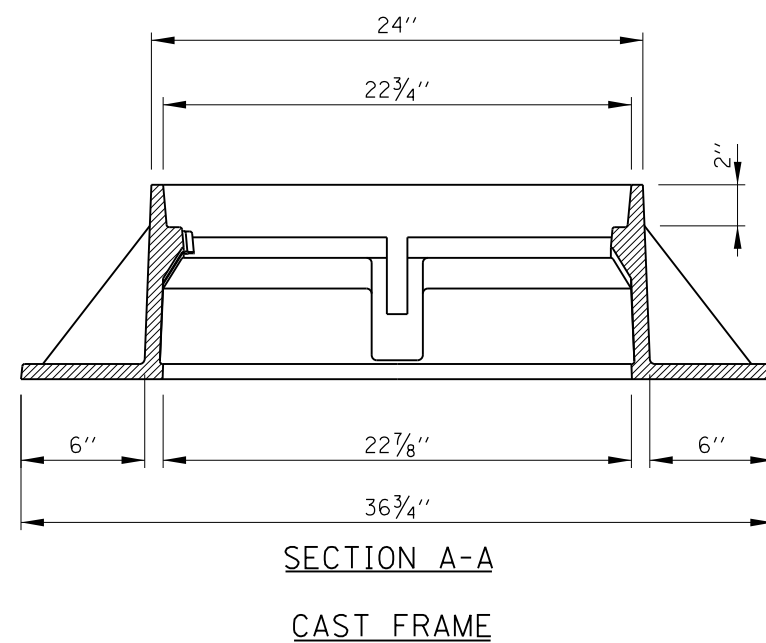
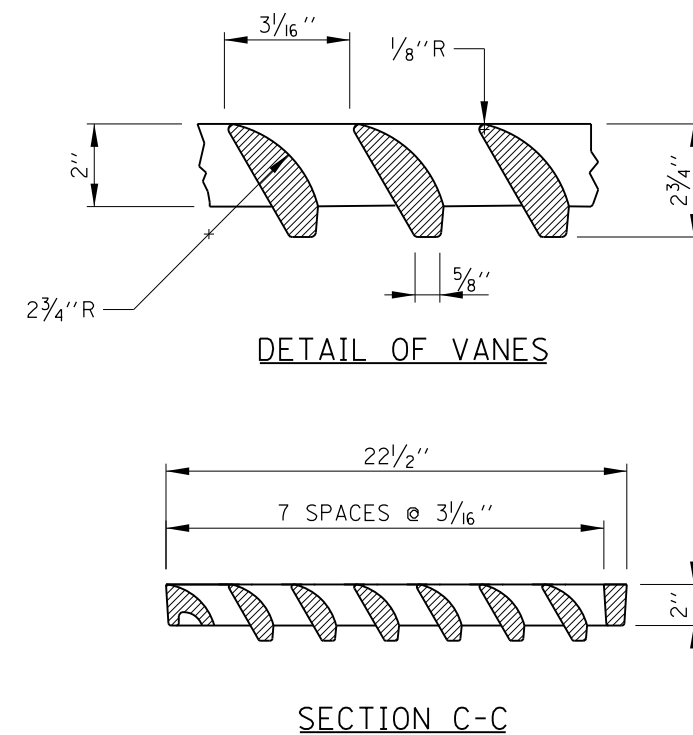
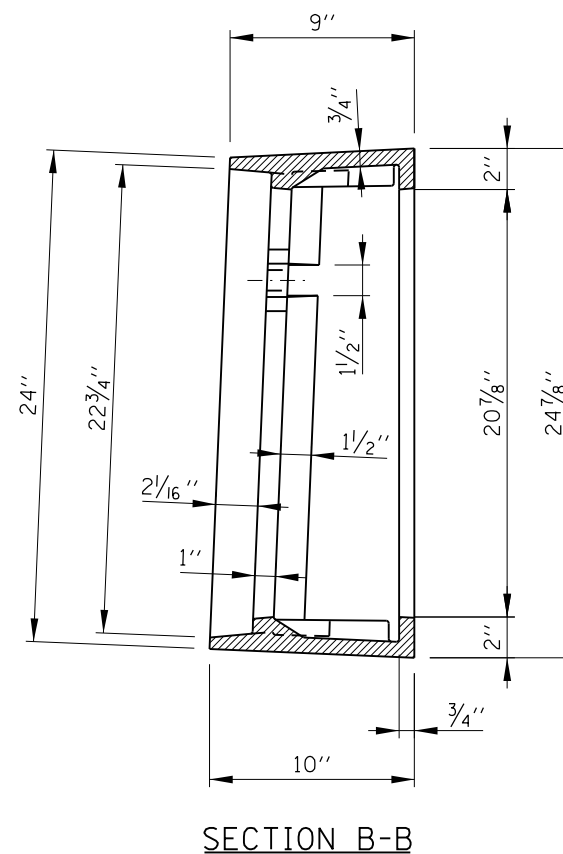
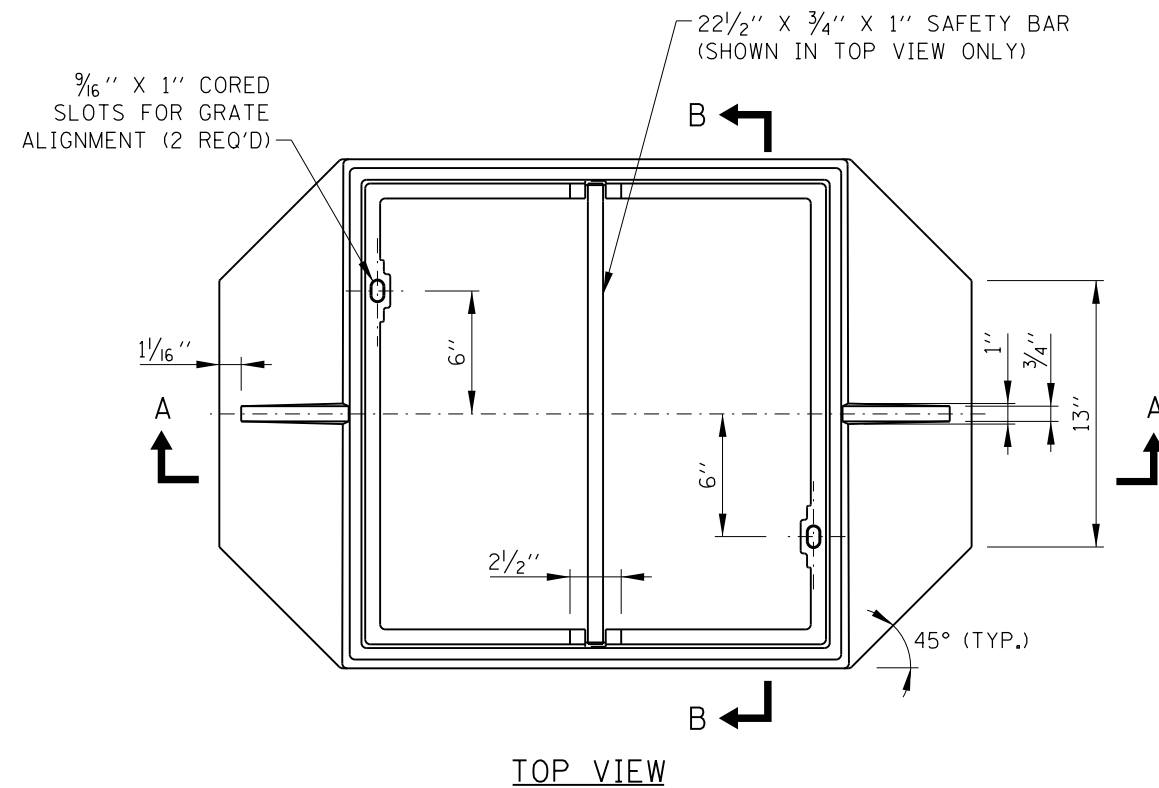


PIPE UNDERDRAINS

STANDARD B24-09

DATE	REVISIONS
03-01-2021	ADDED DETAIL FOR BARRIER
03-01-2020	ADDED COMPOSITE PAVEMENT AS OPTION
03-01-2019	REVISED PIPE UNDERDRAIN OUTLETS
	ADDED DETAIL FOR HIGH FILL SLOPE

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
06/01/2009



#### NOTES:

1. ALL FRAMES AND GRATES SHALL CONFORM TO THE REQUIREMENTS OF ART. 1006.14 FOR GRAY IRON CASTINGS AND TO ART. 1006.15 FOR DUCTILE IRON CASTINGS.
2. FRAME AND GRATE TO BE NEENAH FOUNDRY COMPANY, NEENAH NO. R-3528-V, EAST JORDAN IRON WORKS 7535 OR APPROVED EQUAL.
3. GRATE SHALL NOT BE BOLTED TO FRAME.

APPROVED BY: *Paul Kovacs* DATE: 06/30/2008  
CHIEF ENGINEERING OFFICER

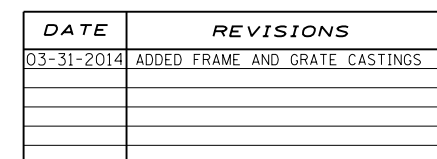
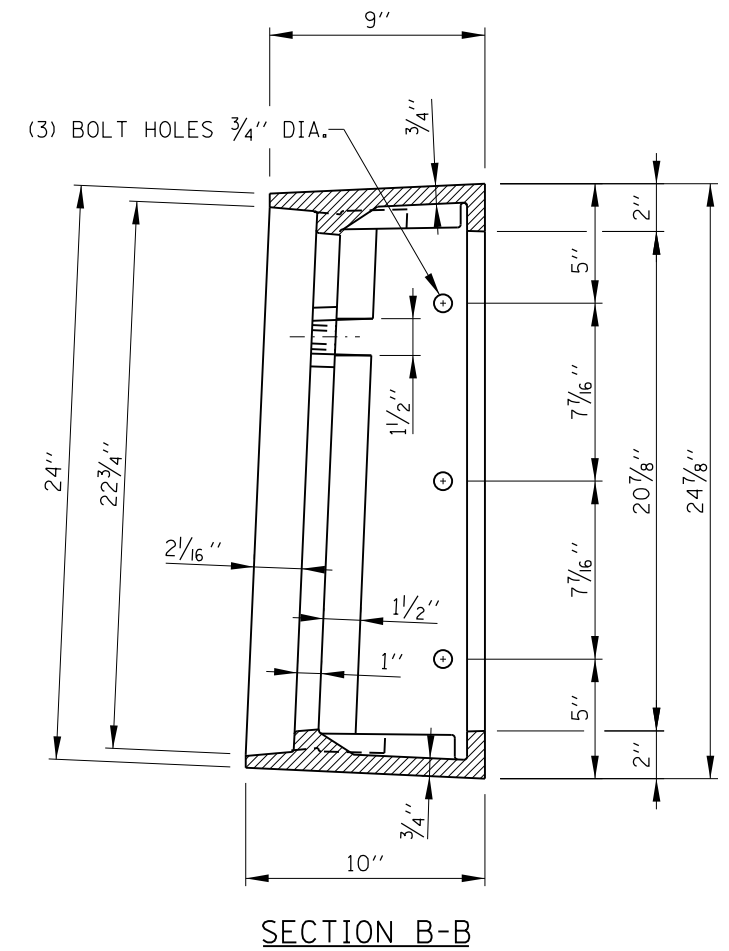
DATE	REVISIONS
03-31-2014	ADDED FRAME AND GRATE CASTINGS



FRAME AND GRATE  
TYPE 20A

STANDARD B25-01





FRAME AND GRATE  
TYPE 22A

STANDARD B27-01

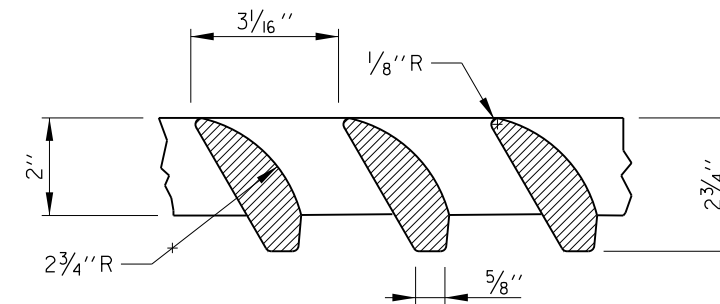
SHEET 1 OF 2

APPROVED BY:

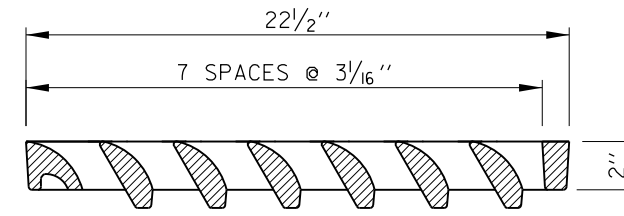
DATE: \_\_\_\_\_

Paul Kovacs  
CHIEF ENGINEERING OFFICER

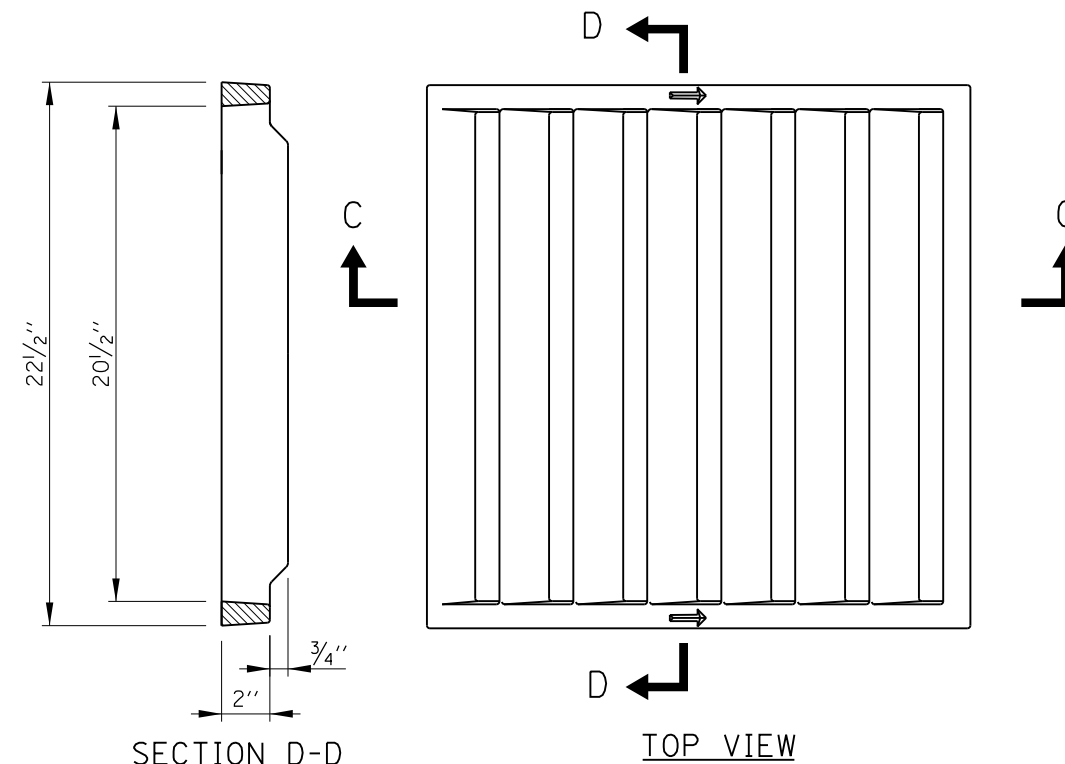
06/30/2008



DETAIL OF VANES



SECTION C-C



SECTION D-D

TOP VIEW

CAST GRATE  
(2 REQ'D)

NOTES:

1. ALL FRAMES AND GRATES SHALL CONFORM TO THE REQUIREMENTS OF ART. 1006.14 FOR GRAY IRON CASTINGS AND TO ART. 1006.15 FOR DUCTILE IRON CASTINGS.
2. FRAME AND GRATE TO BE NEENAH FOUNDRY COMPANY, NEENAH NO. R-3529-V, EAST JORDAN IRON WORKS 7536 OR APPROVED EQUAL.
3. GRATE SHALL NOT BE BOLTED TO FRAME.

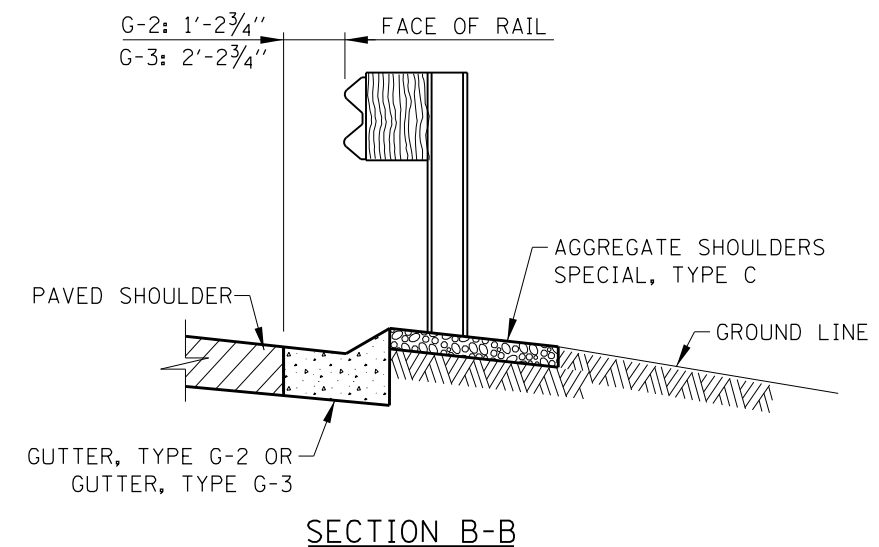
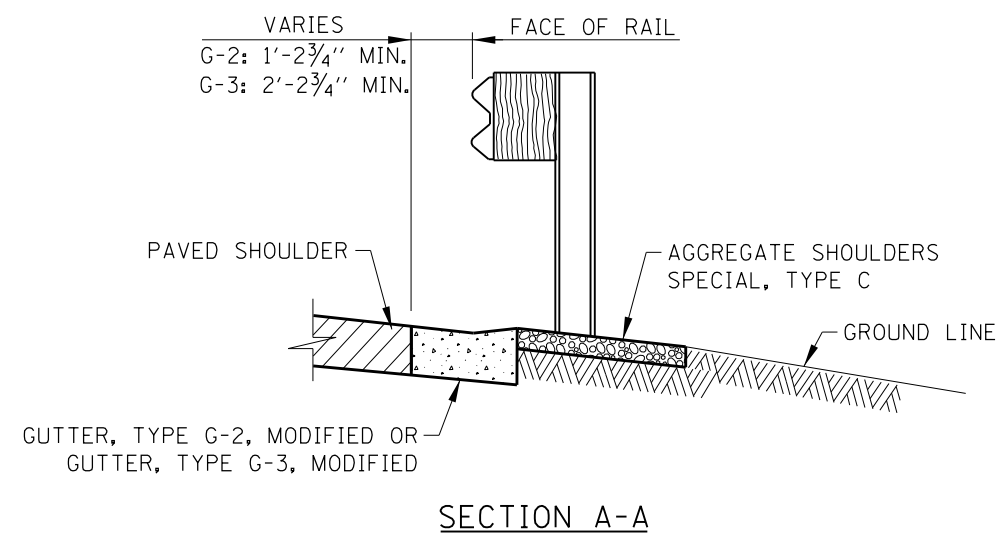
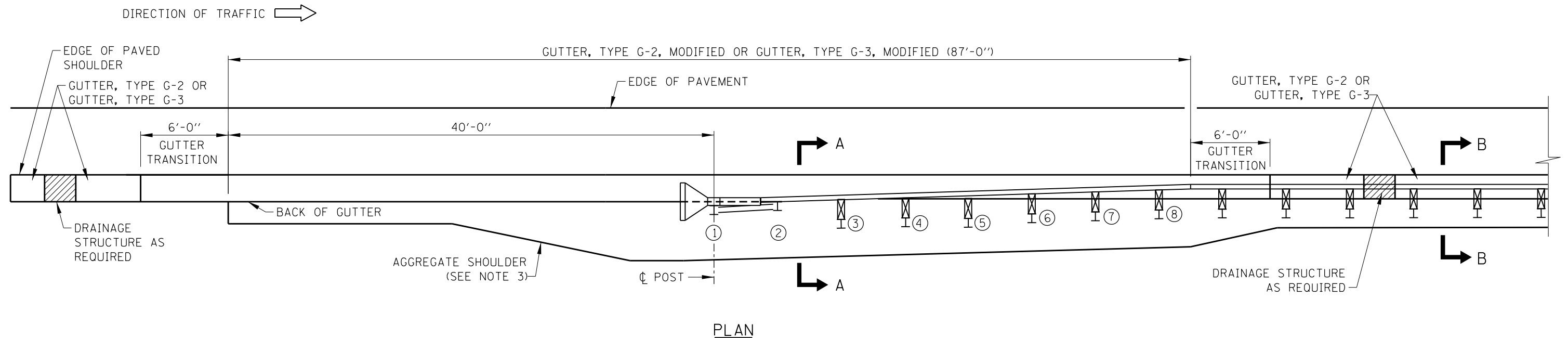
APPROVED BY: *Paul Kovacs* DATE: 06/30/2008  
CHIEF ENGINEERING OFFICER

SHEET 2 OF 2



FRAME AND GRATE  
TYPE 22A

STANDARD B27-01



GUTTER, TYPE G-2 TRANSITION AND GUTTER, TYPE G-3 TRANSITION  
AT TRAFFIC BARRIER TERMINAL, TYPE T1 (SPECIAL)

GENERAL NOTES:

1. GUTTER TRANSITIONS SHALL BE PAID FOR PER FOOT AS GUTTER, TYPE G-2 OR GUTTER, TYPE G-3, AS SPECIFIED IN THE PLANS.
2. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR ADDITIONAL GUARDRAIL INFORMATION.
3. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C6 FOR SHOULDER WIDENING INFORMATION.

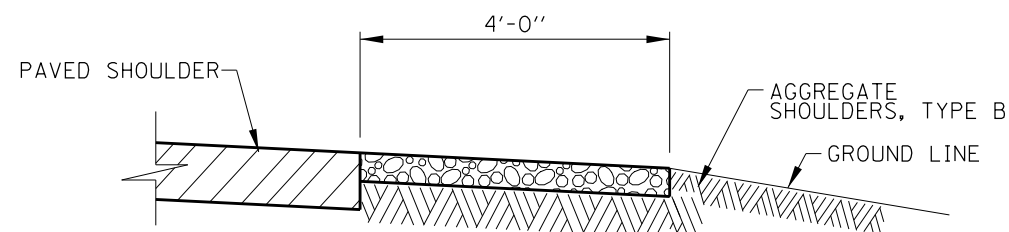
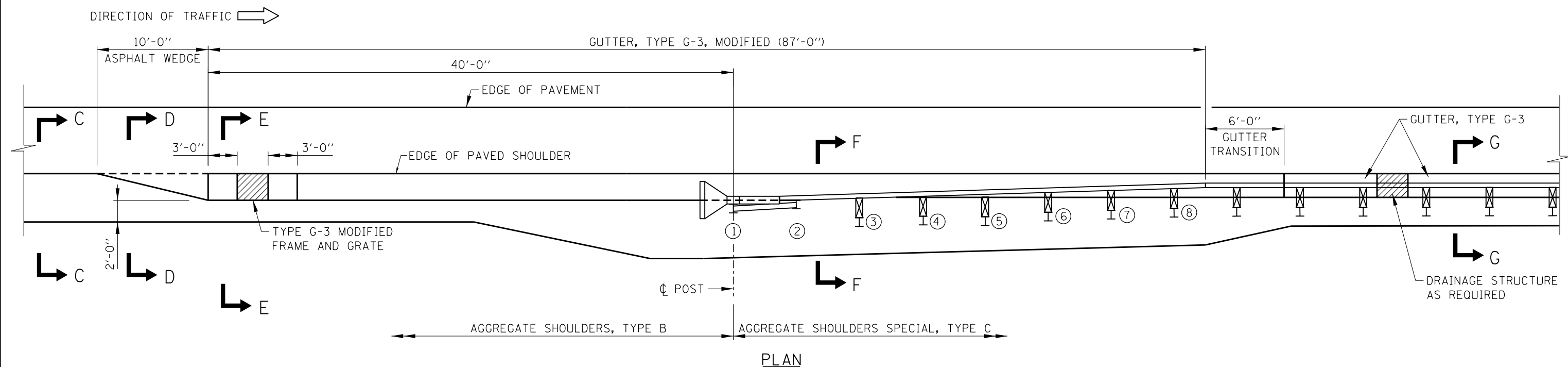
APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2010

DATE	REVISIONS
03-01-2018	CHANGED LINSTYLE AT WEDGE TO DASHED
03-31-2017	DELETED SHEET 2
03-11-2015	REVISED NOTES
03-01-2013	REVISED GUTTER
01-01-2011	REVISED GUTTER TRANSITION TERM

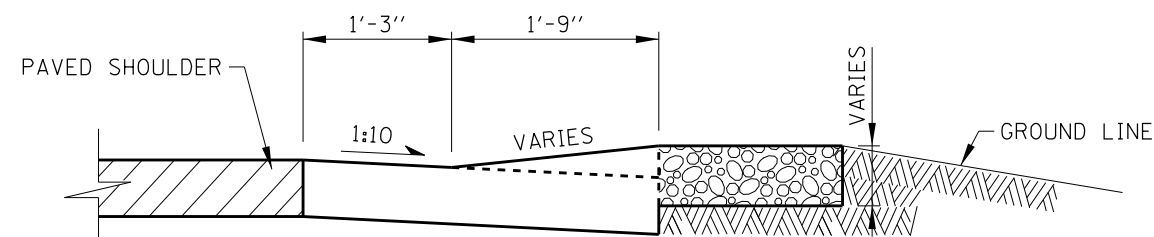


GUTTER TRANSITION AT  
TRAFFIC BARRIER TERMINAL  
TYPE T1 (SPECIAL)

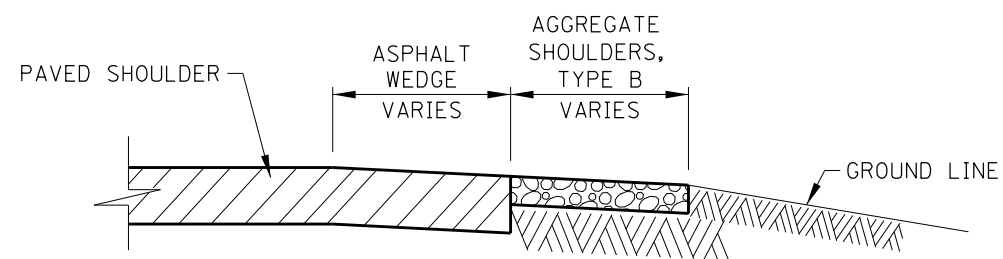
STANDARD B28-05



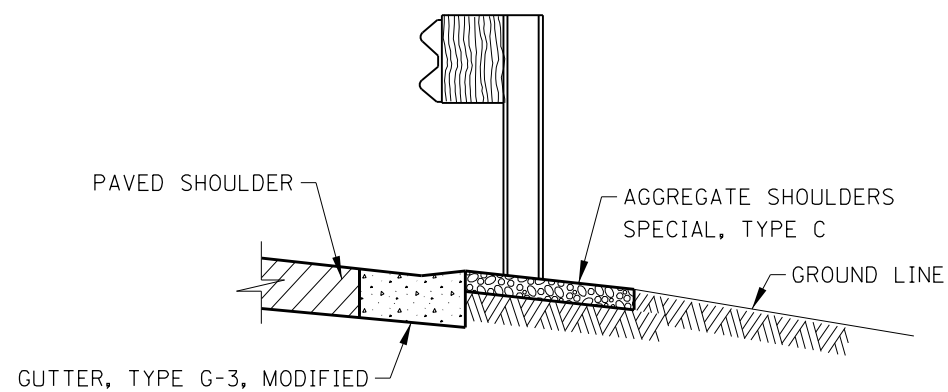
SECTION C-C



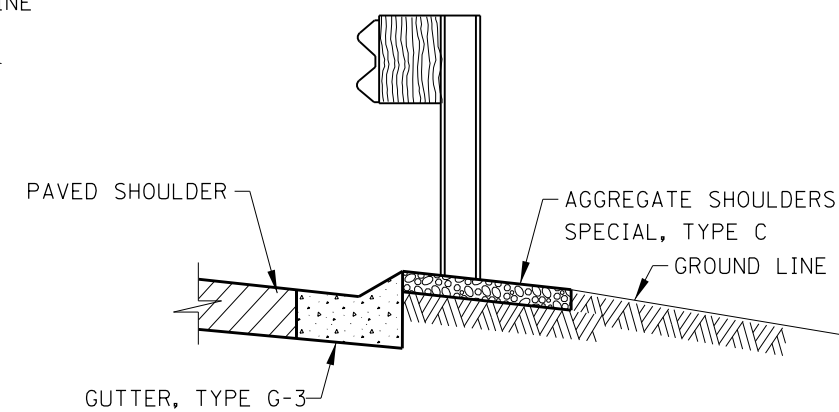
SECTION E-E  
GUTTER, TYPE G-3, MODIFIED TRANSITION



SECTION D-D  
ASPHALT SHOULDER TRANSITION



SECTION F-F



SECTION G-G

**NOTE:**

SEE SHEET 1 OF THIS SERIES FOR NOTES

GUTTER, TYPE G-3 TRANSITION TERMINATION AT TRAFFIC BARRIER TERMINAL,  
TYPE T1 (SPECIAL)

SHEET 2 OF 2

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

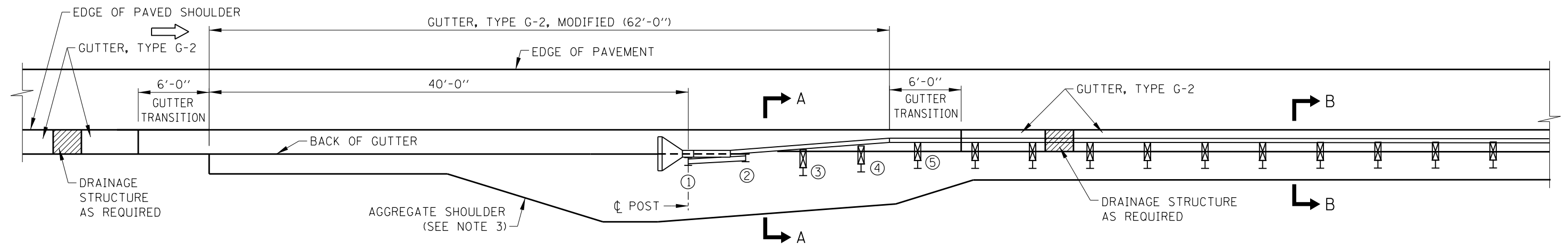
DATE:  
03/01/2010

**Illinois Tollway**

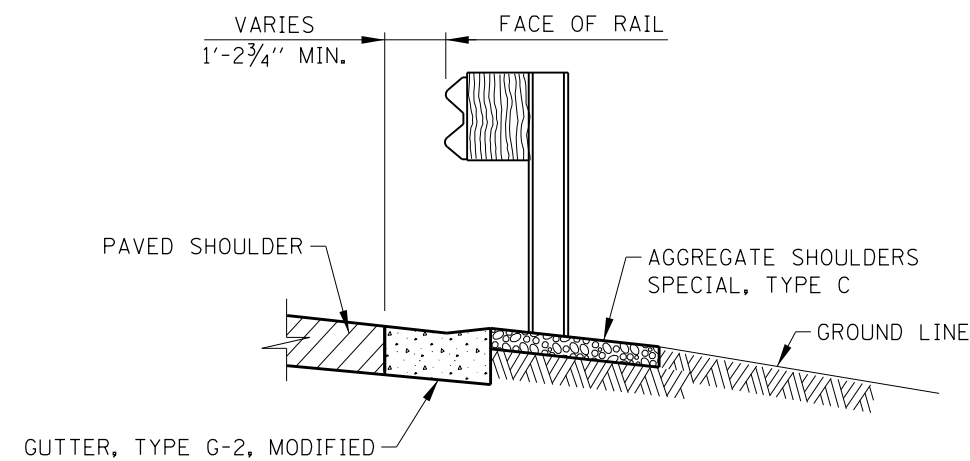
GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL TYPE T1 (SPECIAL)

STANDARD B28-05

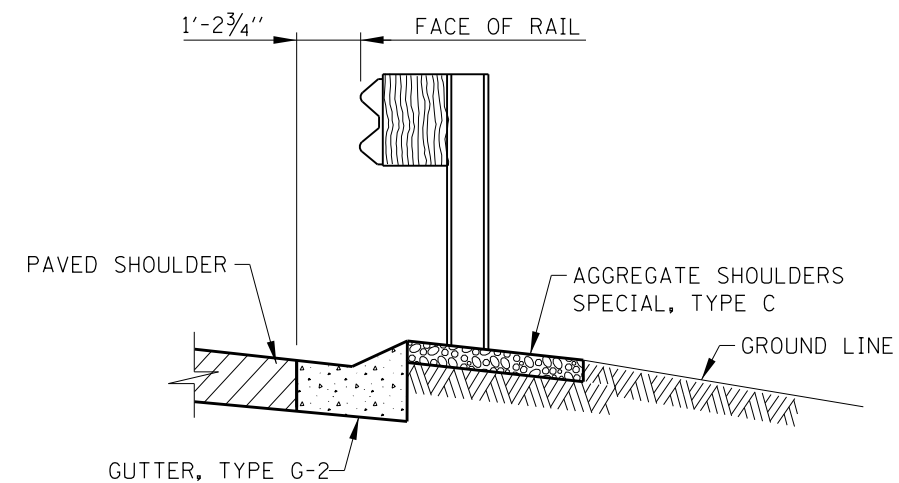
DIRECTION OF TRAFFIC →



PLAN



SECTION A-A



SECTION B-B

GUTTER, TYPE G-2 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL)

GENERAL NOTES:

1. GUTTER TRANSITIONS SHALL BE PAID FOR PER FOOT AS GUTTER, TYPE G-2 OR AS SPECIFIED IN THE PLANS.
2. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR ADDITIONAL GUARDRAIL INFORMATION.
3. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C12 FOR SHOULDER WIDENING INFORMATION.

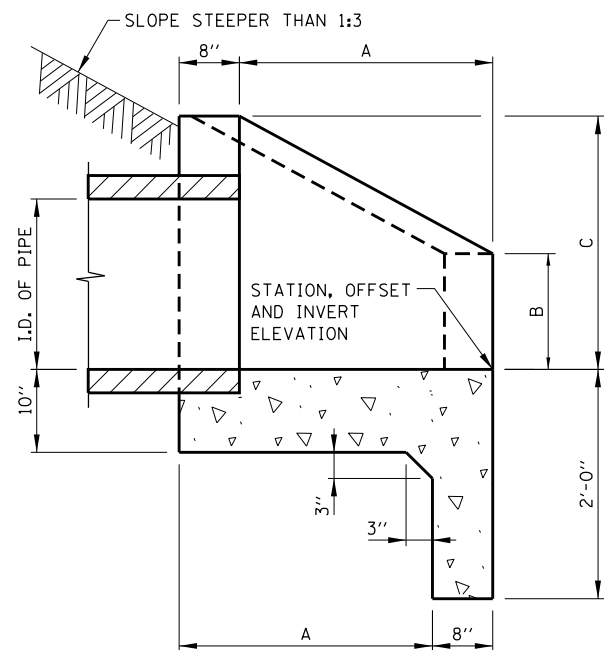
APPROVED BY:   
CHIEF ENGINEERING OFFICER  
DATE: 01/01/2011

DATE	REVISIONS
03-31-2017	REMOVED SHLDR DIMS
03-11-2015	REVISED NOTES
03-01-2013	REVISED GUTTER

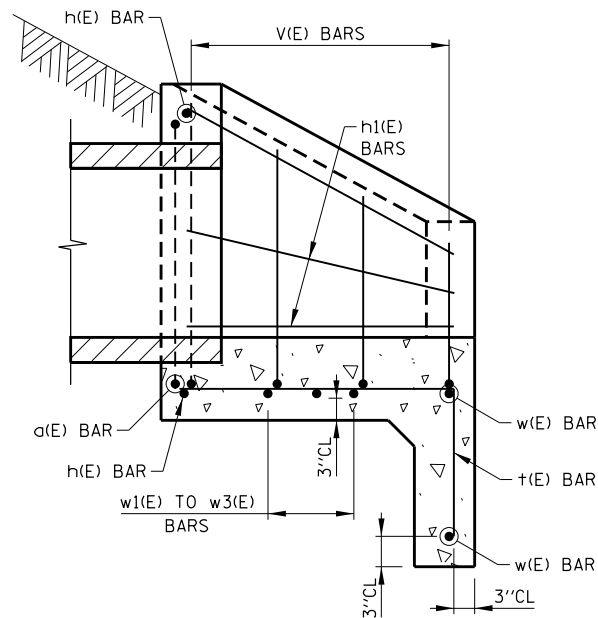


GUTTER TRANSITION AT  
TRAFFIC BARRIER TERMINAL  
TYPE T1-A (SPECIAL)

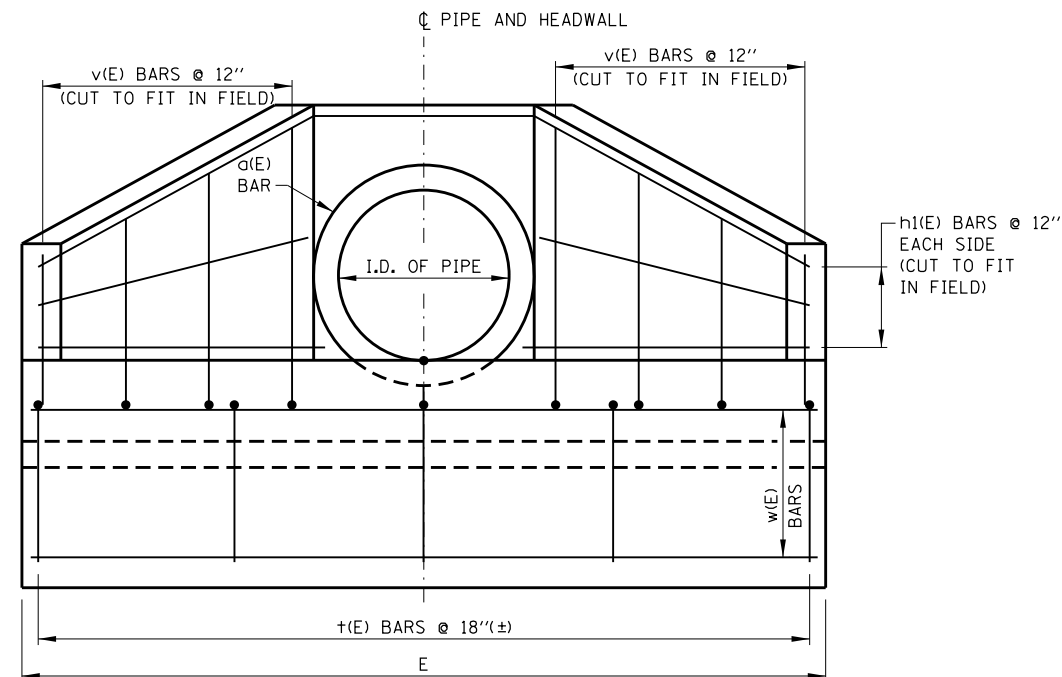
STANDARD B29-03



SECTION A-A  
(DIMENSIONS)



SECTION A-A  
(REINFORCEMENT)



FRONT ELEVATION

NOTES:

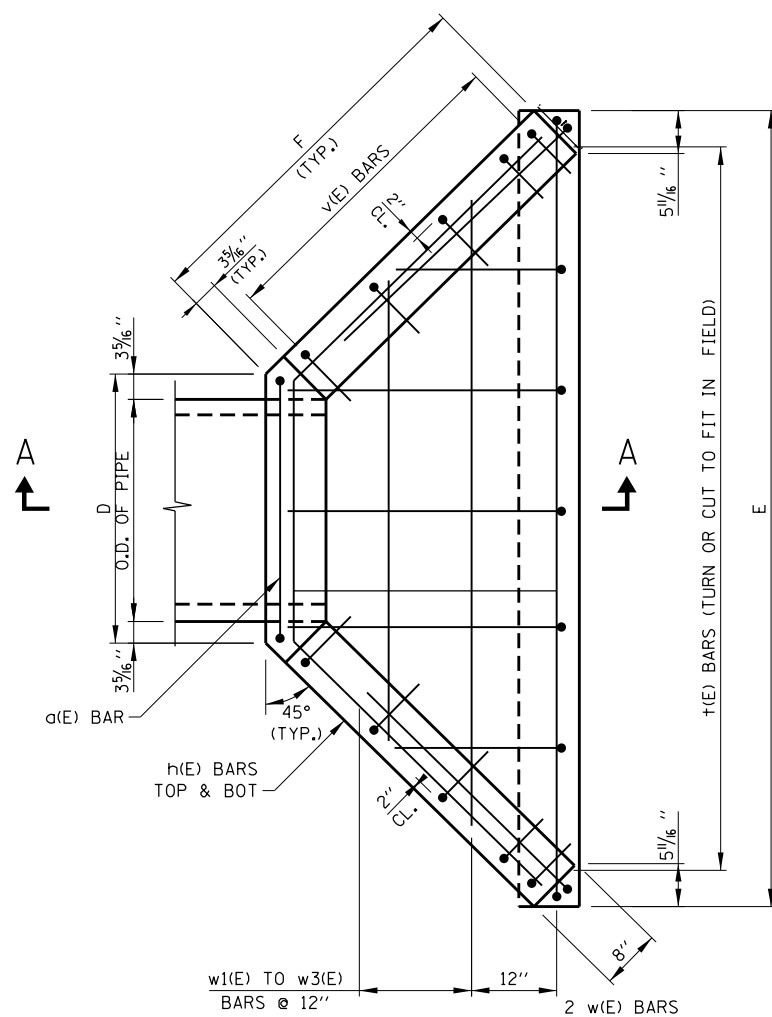
1. SLOPED HEADWALLS TYPES I AND II SHALL BE CONSTRUCTED FLUSH WITH EXISTING OR PROPOSED SLOPE.
2. CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
3. ALL REINFORCEMENT BARS SHOWN SHALL BE EPOXY COATED (E).
4. BAR BENDING DETAILS ARE DIMENSIONED OUT TO OUT OF BARS.
5. ALL EXPOSED EDGES SHALL HAVE A  $\frac{3}{4}$ "-45° CHAMFER. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW THE FINISHED GROUND LINE.
6. COVER FROM THE FACE OF CONCRETE TO FACE OF REINFORCEMENT BAR SHALL BE 3" FOR SURFACES FORMED AGAINST EARTH AND 2" FOR ALL OTHER SURFACES UNLESS OTHERWISE SHOWN.
7. CARE SHALL BE EXERCISED IN REMOVING ANY LENGTH OF EXISTING PIPE SO THE REMAINING PIPE IS UNDAMAGED AND FULLY FUNCTIONING.
8. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT.
9. TYPES I AND II HEADWALLS TO BE USED ONLY FOR SLOPES STEEPER THAN 1:3. DIMENSIONS AND QUANTITIES ARE BASES ON A SLOPE 1:2.
10. I.D. DENOTES INSIDE DIAMETER OF PIPE.  
O.D. DENOTES OUTSIDE DIAMETER OF PIPE.
11. FOR EROSION PROTECTION SEE STANDARD B19.

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE HEADWALL

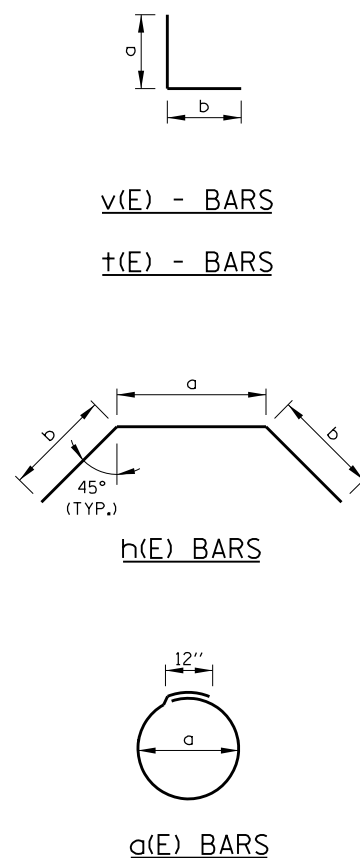
INSIDE DIA. OF PIPE	SLOPE OF FILL	DIMENSIONS						CONCRETE CLASS SI	REINF. BARS (POUND)
		A	B	C	D	E	F		
21"	1:3	4'-0"	1'-2"	2'-6"	2'-9 $\frac{1}{8}$ "	11'-1 $\frac{7}{8}$ "	5'-11 $\frac{3}{16}$ "	1.6 C.Y.	75
24"	1:3	4'-3"	1'-4"	2'-9"	3'-0 $\frac{5}{8}$ "	11'-11 $\frac{3}{8}$ "	6'-3 $\frac{3}{16}$ "	2.1 C.Y.	80
27"	1:3	4'-0"	1'-8"	3'-0"	3'-4 $\frac{1}{8}$ "	11'-8 $\frac{7}{8}$ "	5'-11 $\frac{3}{16}$ "	2.0 C.Y.	100
30"	1:3	5'-0"	1'-7"	3'-3"	3'-7 $\frac{5}{8}$ "	14'-0 $\frac{3}{8}$ "	7'-4 $\frac{3}{16}$ "	2.7 C.Y.	120
36"	1:3	6'-0"	1'-10"	3'-10"	4'-2 $\frac{5}{8}$ "	16'-7 $\frac{3}{8}$ "	8'-9 $\frac{1}{8}$ "	3.6 C.Y.	145

TABLE OF REINFORCING STEEL FOR ONE HEADWALL

BAR		21" I.D. PIPE				24" I.D. PIPE				27" I.D. PIPE				30" I.D. PIPE				36" I.D. PIPE			
MARK (E)	SIZE	NO.	LENGTH	a	b	NO.	LENGTH	a	b	NO.	LENGTH	a	b	NO.	LENGTH	a	b	NO.	LENGTH	a	b
a	#4	1	9'-3"	31 $\frac{1}{2}$ "	-	1	10'-2"	2'-11"	-	1	11'-1"	3'-2 $\frac{1}{2}$ "	-	1	12'-0"	3'-6"	-	1	13'-10"	4'-1"	-
h	#4	2	8'-7"	2'-3"	3'-2"	2	10'-2"	2'-6"	3'-10"	2	11'-0"	2'-10"	4'-1"	2	9'-5"	3'-1"	3'-2"	2	11'-0"	3'-8"	4'-1"
h1	#4	4	3'-2"	-	-	4	3'-10"	-	-	4	4'-2"	-	-	5	4'-7"	-	-	6	5'-6"	-	-
v	#4	6	4'-0"	1'-0"	3'-0"	8	4'-3"	1'-0"	3'-3"	8	4'-6"	1'-0"	3'-6"	10	4'-9"	1'-0"	3'-9"	10	5'-4"	1'-0"	4'-4"
t	#4	6	4'-0"	1'-6"	2'-6"	6	4'-3"	1'-6"	2'-9"	6	4'-8"	1'-6"	3'-1"	7	4'-10"	1'-6"	3'-4"	8	5'-4"	1'-6"	3'-10"
w	#4	2	7'-7"	-	-	2	8'-6"	-	-	2	10'-1"	-	-	2	10'-0"	-	-	2	12'-0"	-	-
w1	#4	1	6'-0"	-	-	1	6'-11"	-	-	1	7'-11"	-	-	1	8'-7"	-	-	1	10'-6"	-	-
w2	#4	1	-	-	-	1	4'-11"	-	-	1	5'-11"	-	-	1	6'-7"	-	-	1	8'-6"	-	-
w3	#4	-	-	-	-	-	-	-	-	-	-	-	-	1	4'-7"	-	-	1	7'-6"	-	-



PLAN



HEADWALL - TYPE I  
(PIPE DIAMETER ≤ 36")

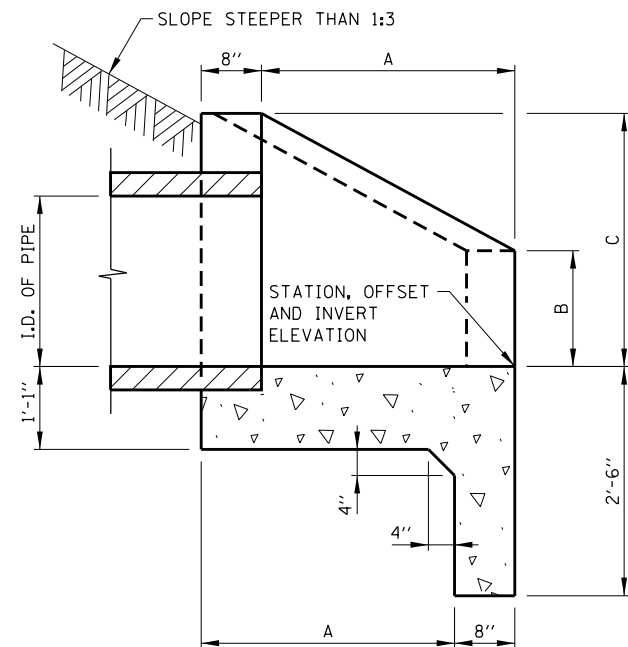
APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
02/07/2012

DATE	REVISIONS
03-01-2022	REVISED HEADWALL DIMENSIONS
03-11-2015	REVISED NOTES
02-07-2012	ADDED 21" AND 27" DIA PIPE AND REVISED TABLE QUANTITIES

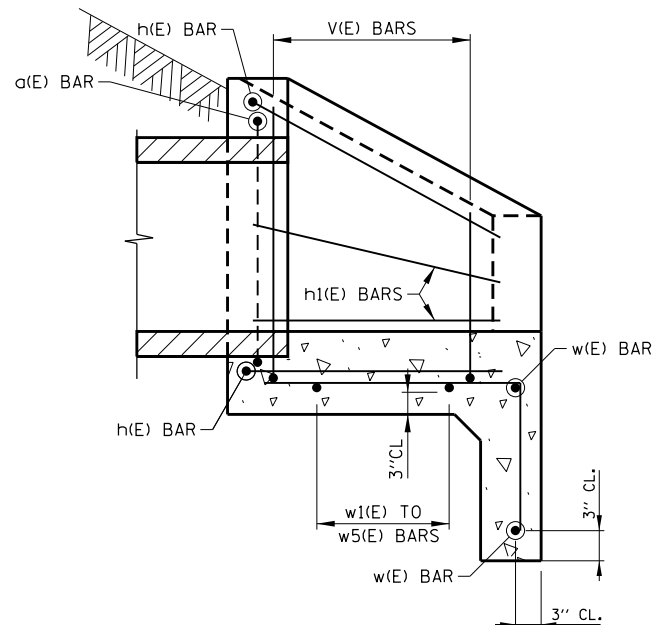


HEADWALLS  
TYPE I AND II

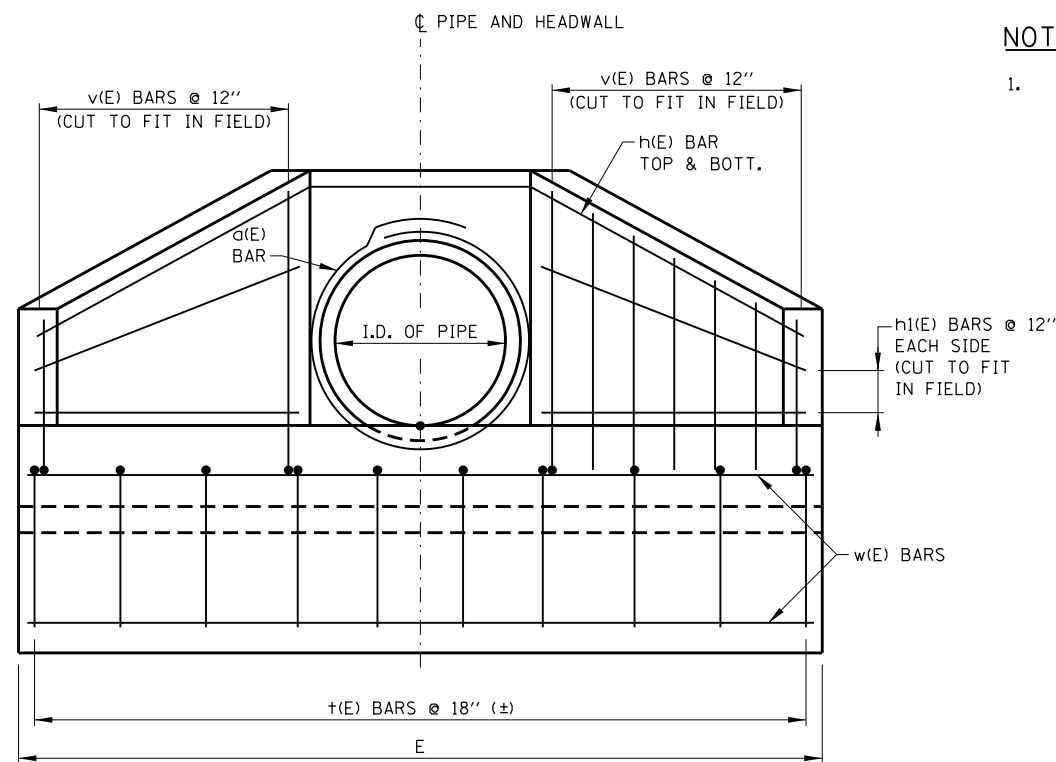
STANDARD B30-03



SECTION A-A  
(DIMENSIONS)



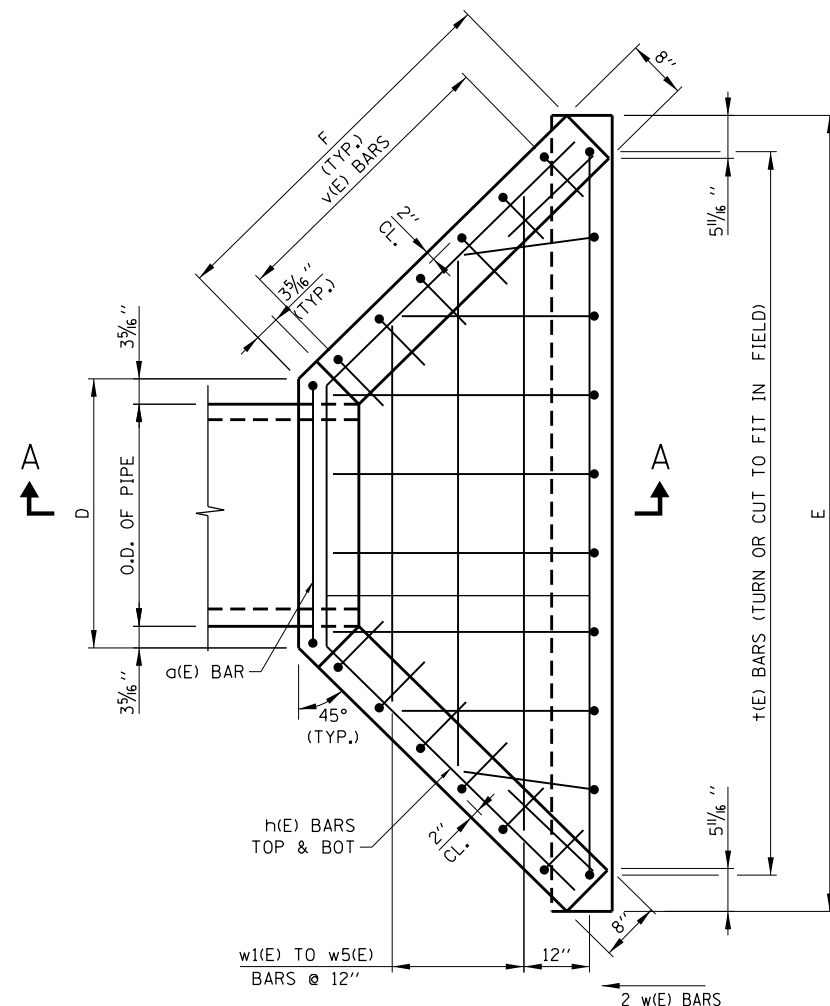
SECTION A-A  
(REINFORCEMENT)



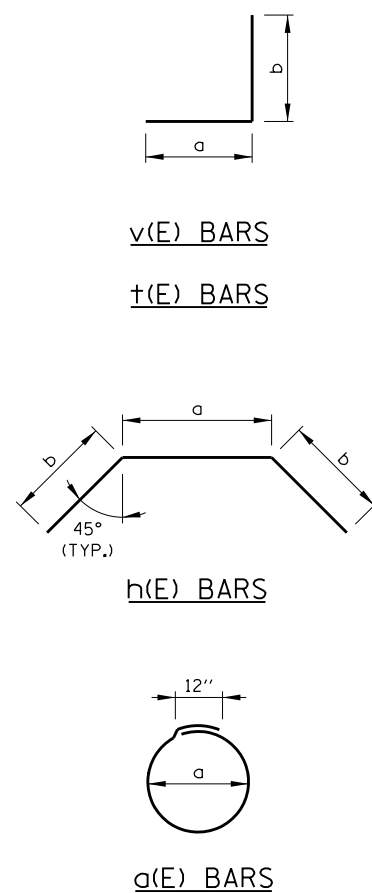
FRONT ELEVATION

**NOTE:**

1. FOR ADDITIONAL NOTES SEE SHEET 1 IN THIS SERIES.



PLAN



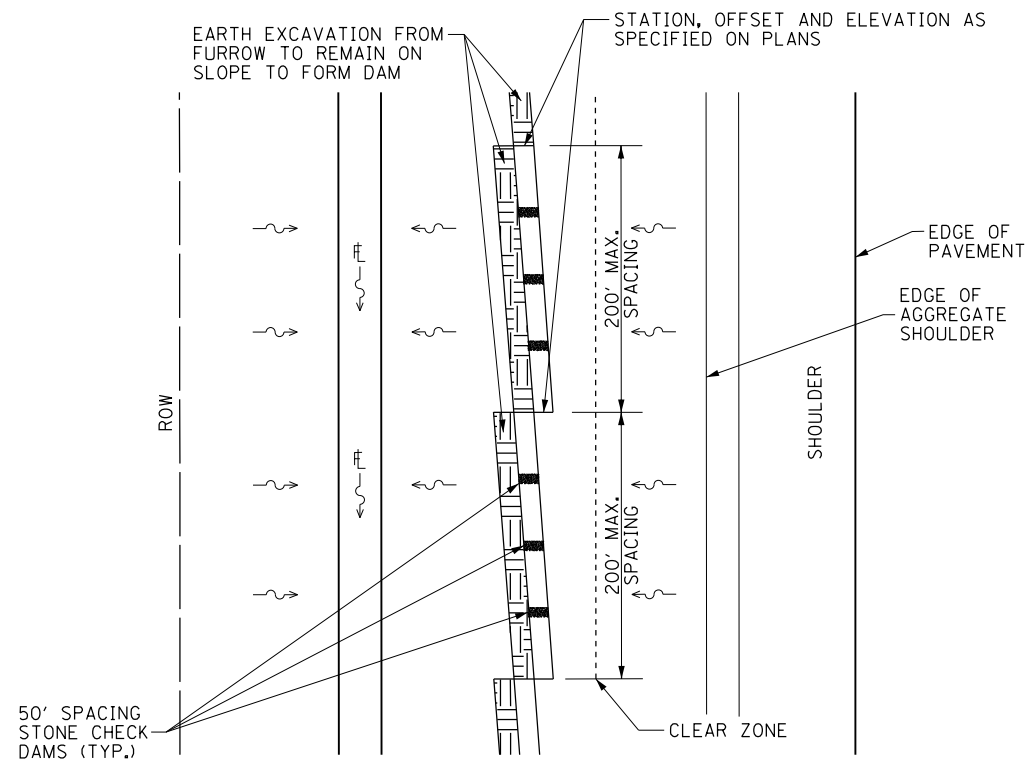
HEADWALL - TYPE II  
(PIPE DIAMETER ≥ 36")

TABLE OF BARS FOR ONE HEADWALL

BAR	MARK (E)	SIZE	42" PIPE				48" PIPE				54" I.D. PIPE				60" I.D. PIPE			
			NO.	LENGTH	a	b	NO.	LENGTH	a	b	NO.	LENGTH	a	b	NO.	LENGTH	a	b
a	#5	2	15'-11"	4'-9"	-	-	2	17'-9"	5'-4"	-	2	19'-7"	5'-11"	-	2	21'-5"	6'-6"	-
h	#5	2	17'-7"	5'-3"	6'-2"	-	2	19'-9"	5'-9"	7'-0"	2	22'-0"	6'-4"	7'-10"	2	24'-1"	6'-9"	8'-8"
h1	#5	8	6'-6"	-	-	-	10	7'-4"	-	-	10	8'-2"	-	-	12	9'-0"	-	-
t	#5	10	6'-1"	1'-6"	4'-7"	-	11	6'-8"	1'-6"	5'-2"	13	7'-3"	1'-6"	5'-9"	15	7'-10"	1'-6"	6'-4"
v	#5	14	5'-10"	1'-0"	4'-10"	-	16	6'-6"	1'-0"	5'-6"	16	7'-1"	1'-0"	6'-1"	18	7'-8"	1'-0"	6'-8"
w	#5	2	14'-3"	-	-	-	2	15'-10"	-	-	2	17'-8"	-	-	2	18'-10"	-	-
w1	#5	1	12'-0"	-	-	-	1	13'-8"	-	-	1	15'-2"	-	-	1	16'-10"	-	-
w2	#5	1	10'-0"	-	-	-	1	11'-8"	-	-	1	13'-4"	-	-	1	15'-0"	-	-
w3	#5	1	8'-0"	-	-	-	1	9'-8"	-	-	1	11'-6"	-	-	1	13'-2"	-	-
w4	#5	-	-	-	-	-	1	8'-0"	-	-	1	9'-8"	-	-	1	11'-4"	-	-
w5	#5	-	-	-	-	-	-	-	-	-	-	7'-8"	-	-	1	9'-6"	-	-

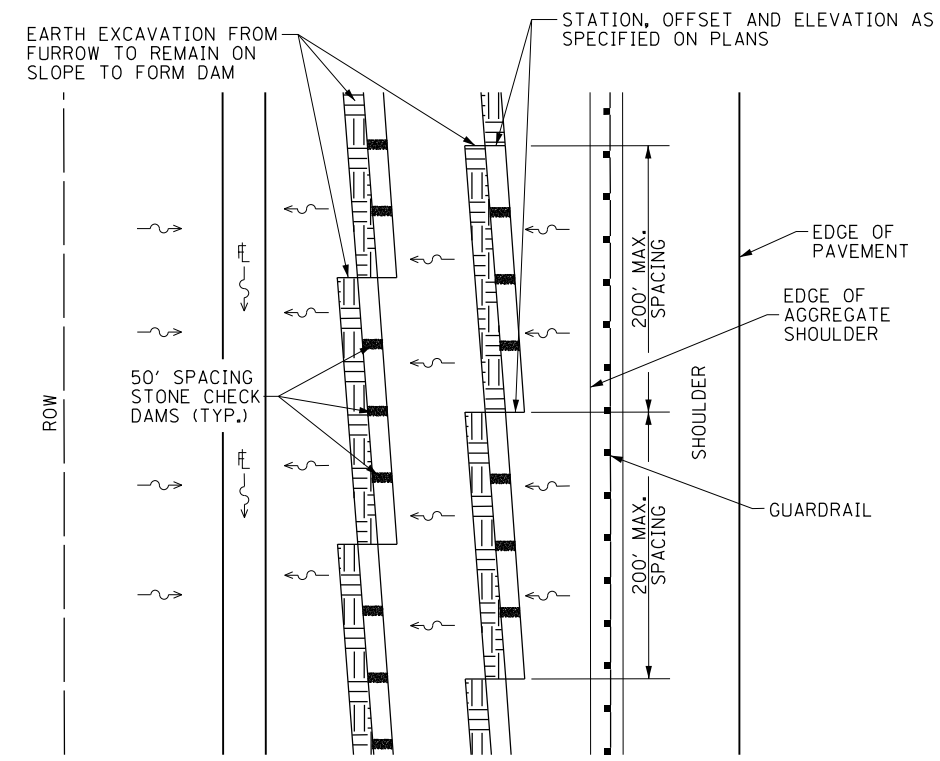
TABLE OF DIMENSIONS AND QUANTITIES FOR ONE HEADWALL

INSIDE DIA. OF PIPE	SLOPE OF FILL	DIMENSIONS						CONCRETE CLASS SI	REINF. BARS (POUND)
		A	B	C	D	E	F		
42"	1:3	6'-7 1/2"	2'-2"	4'-4 1/2"	4'-9 5/8"	18'-5 3/8"	9'-7 3/4"	3.8 C.Y.	400
48"	1:3	7'-6"	2'-5"	4'-11"	5'-4 5/8"	20'-9 3/8"	10'-10 3/16"	4.1 C.Y.	450
54"	1:3	8'-4 1/2"	2'-8"	5'-5 1/2"	5'-11 5/8"	23'-1 3/8"	12'-1 1/16"	5.6 C.Y.	500
60"	1:3	9'-3"	2'-11"	6'-0"	6'-6 5/8"	25'-5 3/8"	13'-4 5/16"	6.5 C.Y.	600



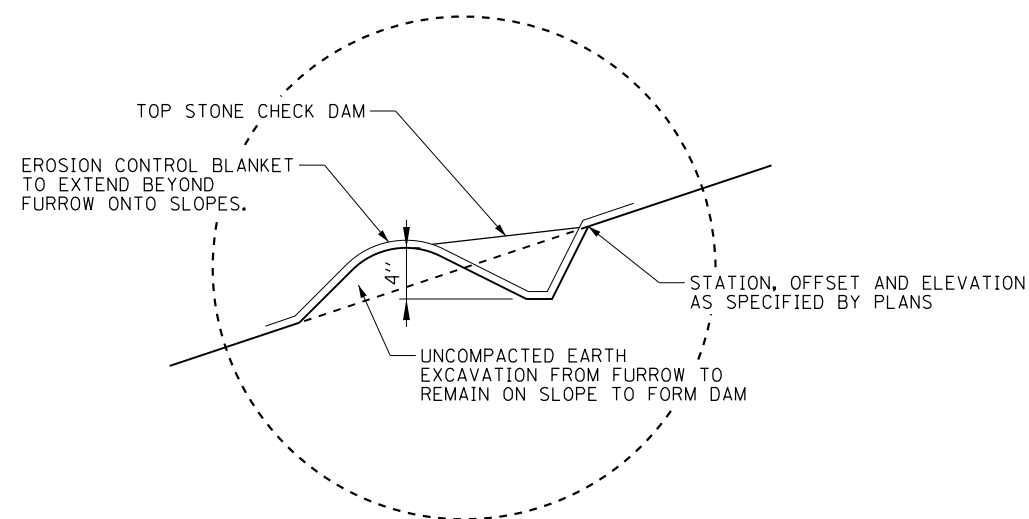
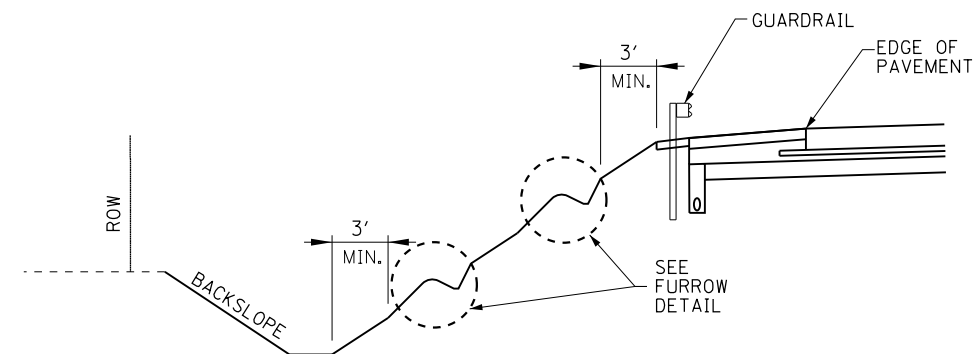
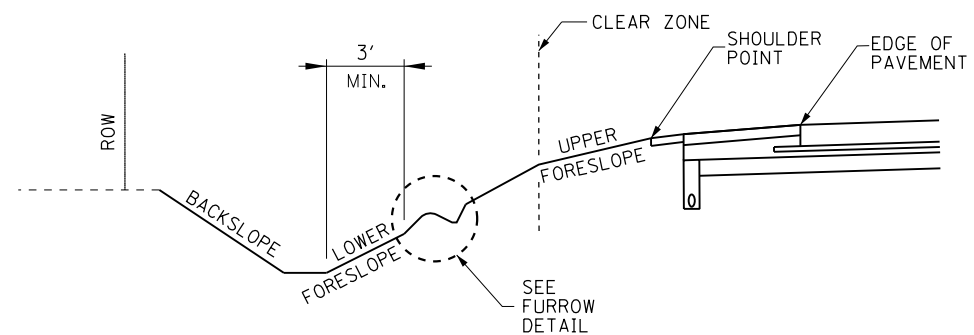
### DEFINED CLEAR ZONE LOCATIONS

PLAN VIEW: NOT TO SCALE



### SHIELDED LOCATIONS

PLAN VIEW: NOT TO SCALE



### FURROW DETAIL

SECTION VIEW: NOT TO SCALE

### NOTES:

1. INSTALL STONE CHECK DAMS AT 50' SPACING ALONG FURROW. STONE CHECK DAMS TO CONSIST OF CA-7 STONE, 2' LONG, FILLED TO FULL DEPTH OF FURROW
2. FURROW TO BE SLICED/TILLED ALONG LEVEL CONTOUR BEGINNING.
3. FURROWS SHALL NOT BE INSTALLED IN UNSHIELDED, UNDEFINED CLEAR ZONE LOCATIONS.

APPROVED BY: *Paul Kovacs* DATE: 03/31/2016  
CHIEF ENGINEERING OFFICER

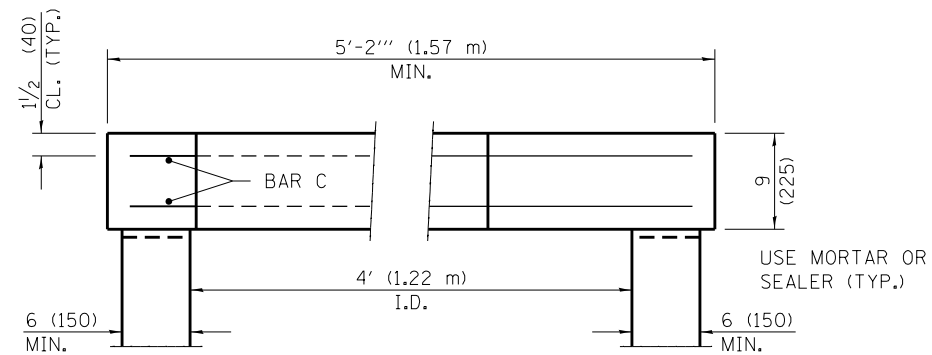
DATE	REVISIONS



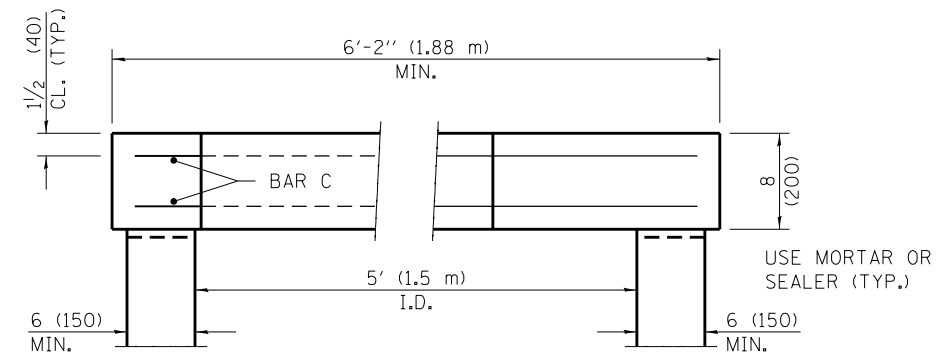
FURROW DETAIL

STANDARD B31-00

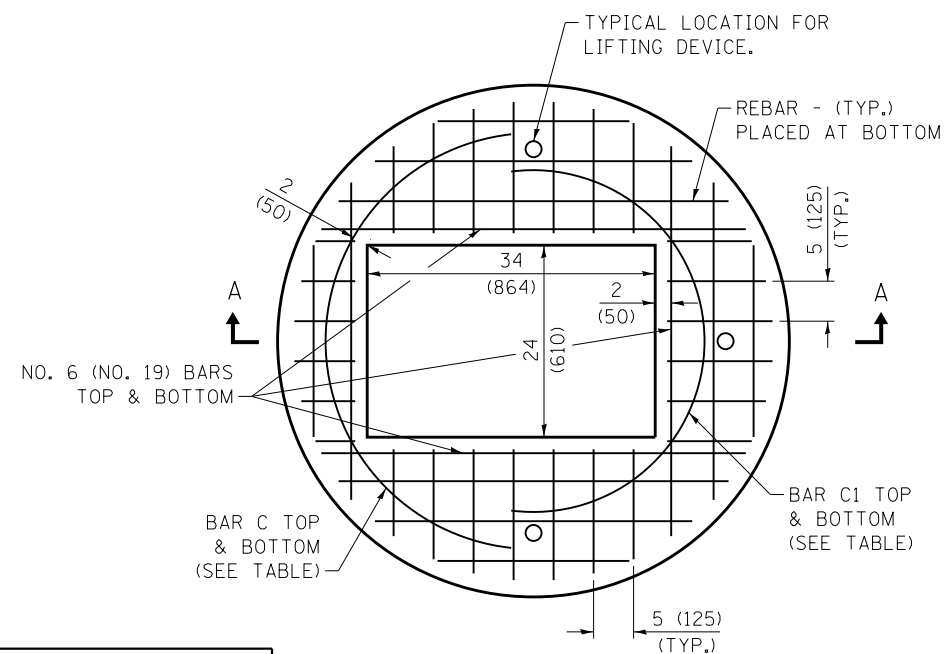




SECTION A-A

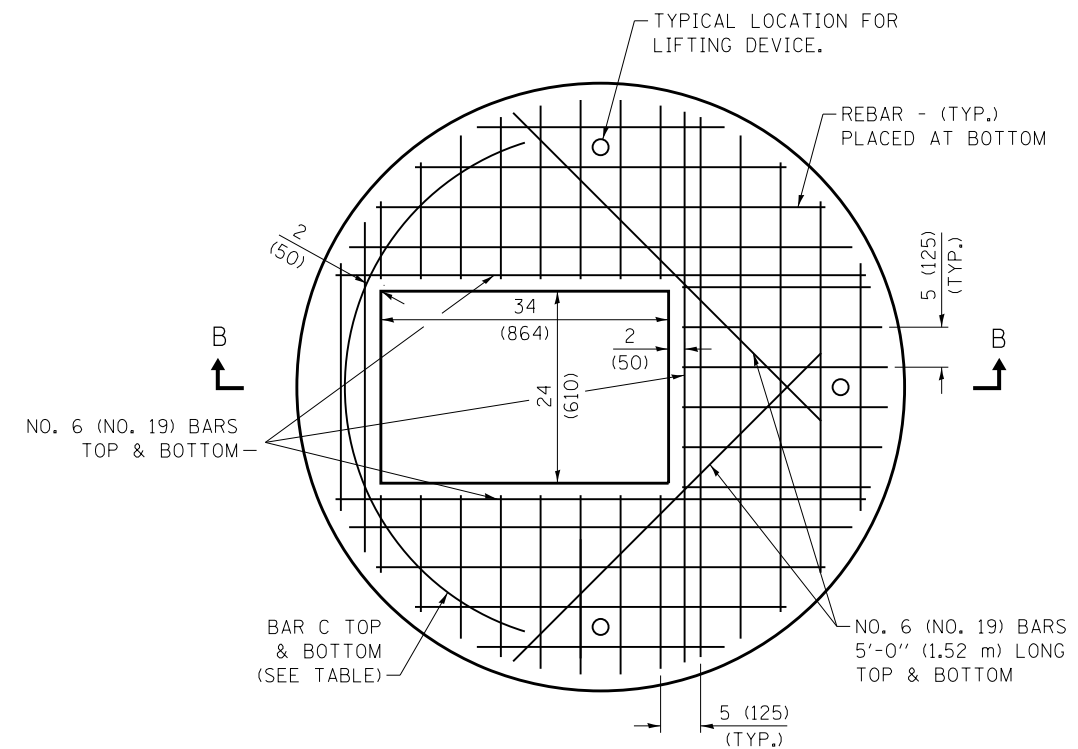


SECTION B-B



NO. 4 (NO. 13)		
BAR	LENGTH	RADIUS
C	6'-6" (1.98 m)	26 (660)
C1	6'-6" (1.98 m)	22 (59)

4' MANHOLE PLAN  
SHOWING REBAR REINFORCEMENT  
NO. 6 (NO. 19) UNLESS OTHERWISE SHOWN



NO. 4 (NO. 13) BAR C	
LENGTH	RADIUS
7'-0" (2.13 m)	32 (813)

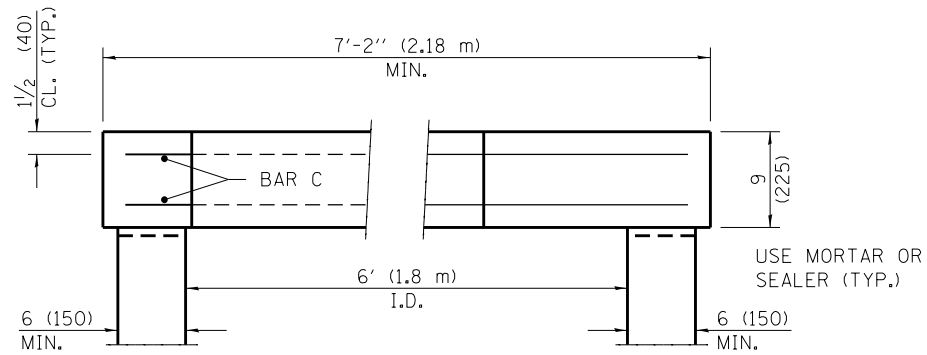
5' MANHOLE PLAN  
SHOWING REBAR REINFORCEMENT  
NO. 6 (NO. 19) UNLESS OTHERWISE SHOWN



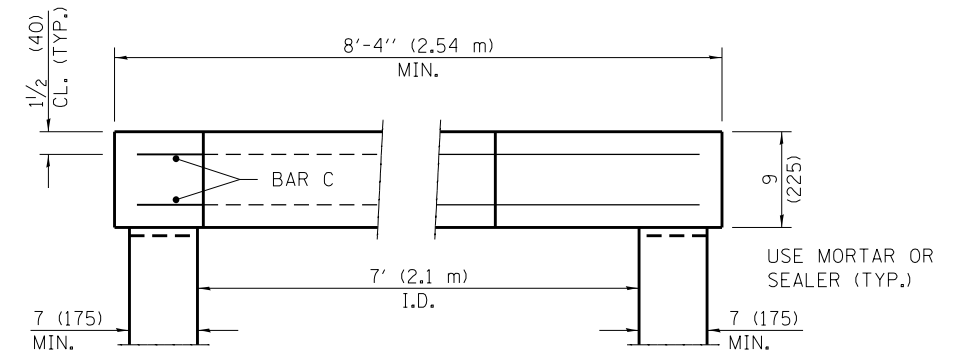
DATE	REVISIONS
03-01-2024	RENAMED STANDARD
03-01-2022	REVISED SLAB THICKNESS AND REBAR SPACING

FLAT SLAB TOP FOR TYPE G-3  
FRAME AND GRATE  
4'-5'-6'-7'-8'-9' DIAMETER

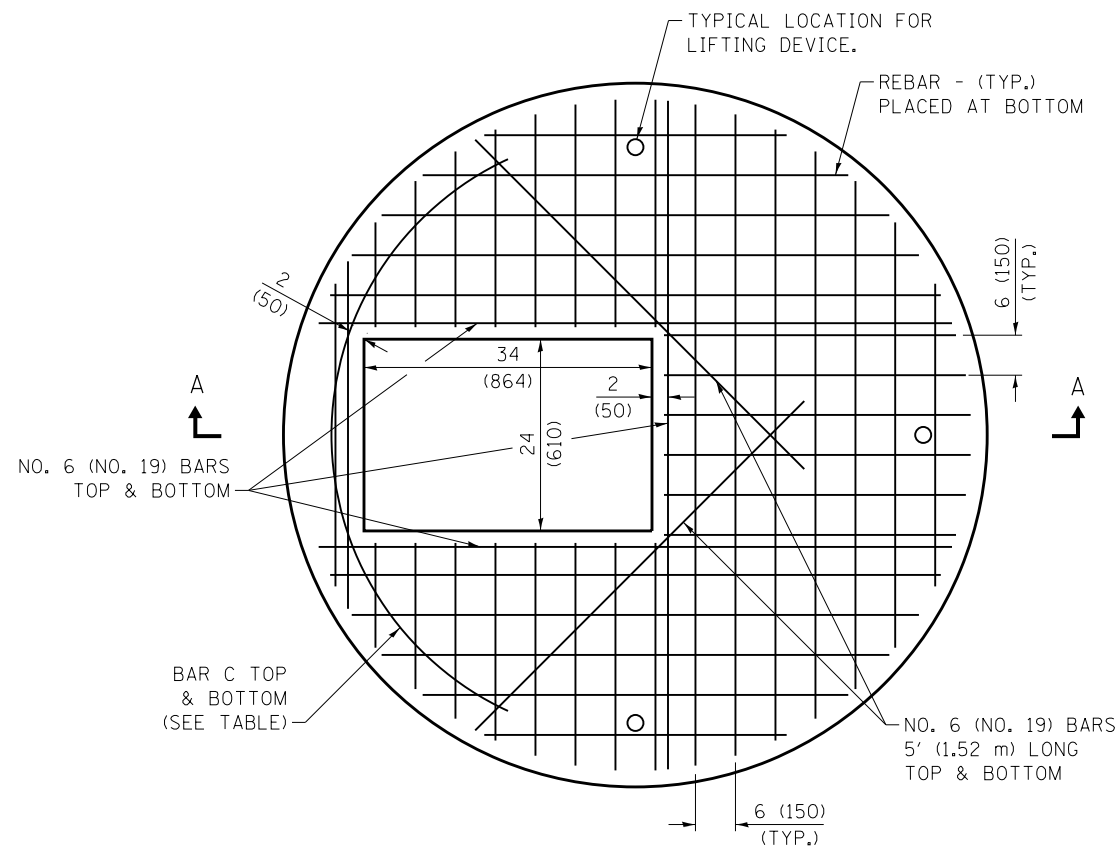
STANDARD B32-02



SECTION A-A

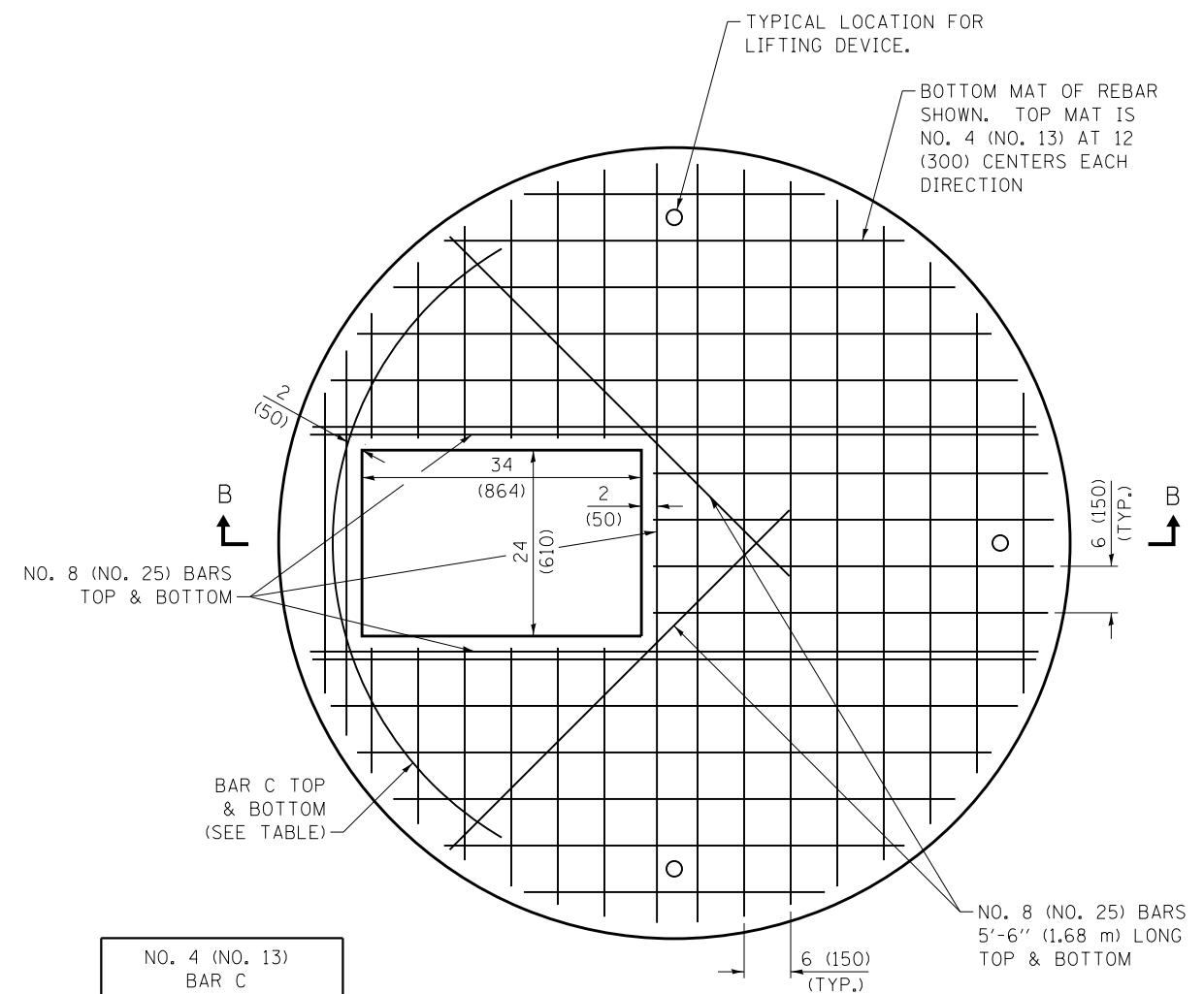


SECTION B-B



NO. 4 (NO. 13) BAR C	
LENGTH	RADIUS
7'-6" (2.29 m)	38 (965)

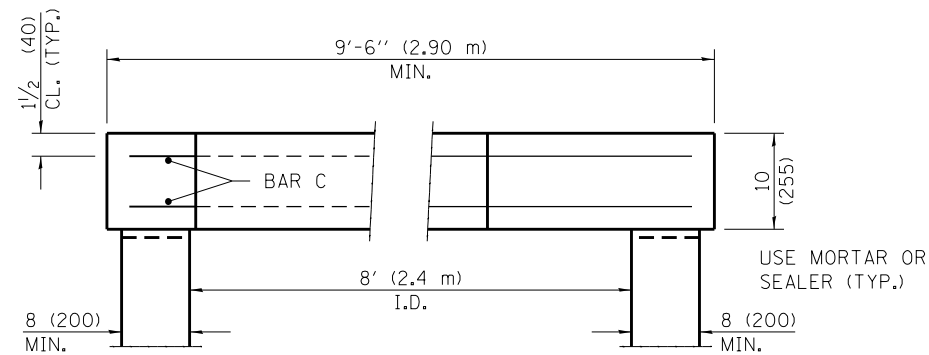
6' MANHOLE PLAN  
SHOWING REBAR REINFORCEMENT  
NO. 6 (NO. 19) UNLESS OTHERWISE SHOWN



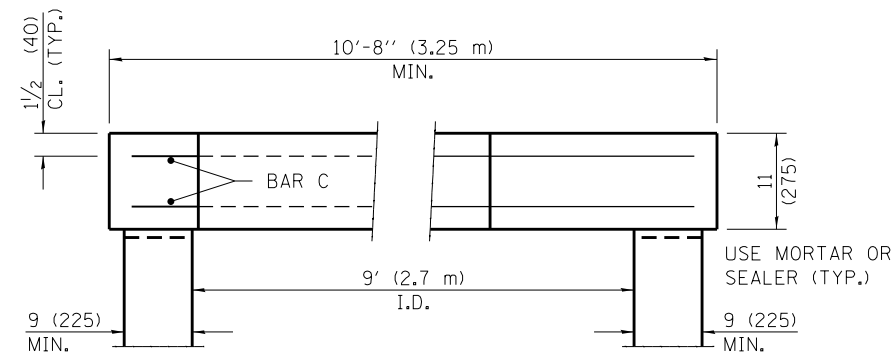
NO. 4 (NO. 13) BAR C	
LENGTH	RADIUS
8'-0" (2.44 m)	3'-8" (1.12 m)

7' MANHOLE PLAN  
SHOWING REBAR REINFORCEMENT  
NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN

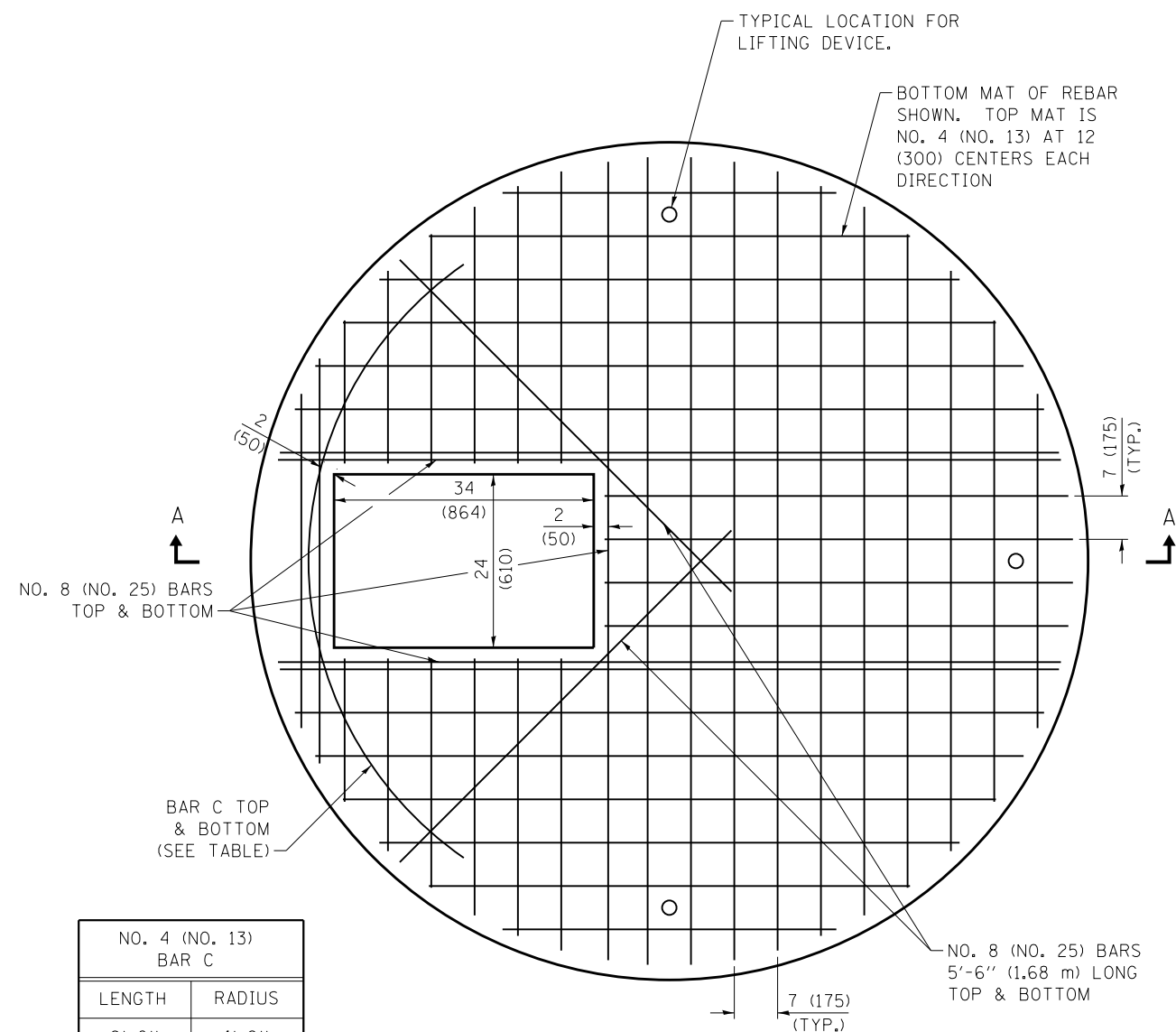




SECTION A-A

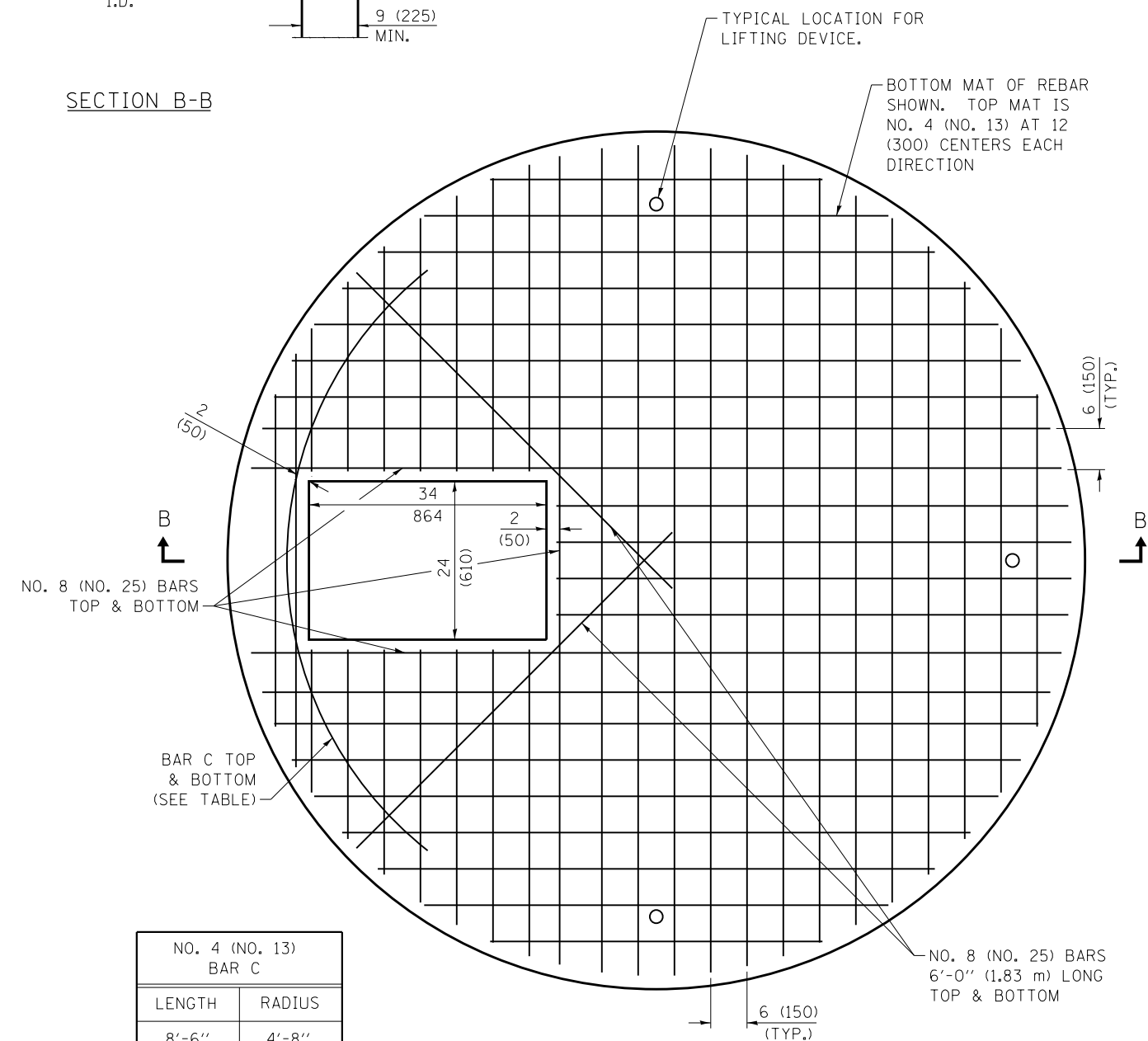


SECTION B-B



8' MANHOLE PLAN  
SHOWING REBAR REINFORCEMENT  
NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN

NO. 4 (NO. 13) BAR C	
LENGTH	RADIUS
8'-6" (2.59 m)	4'-2" (1.27 m)



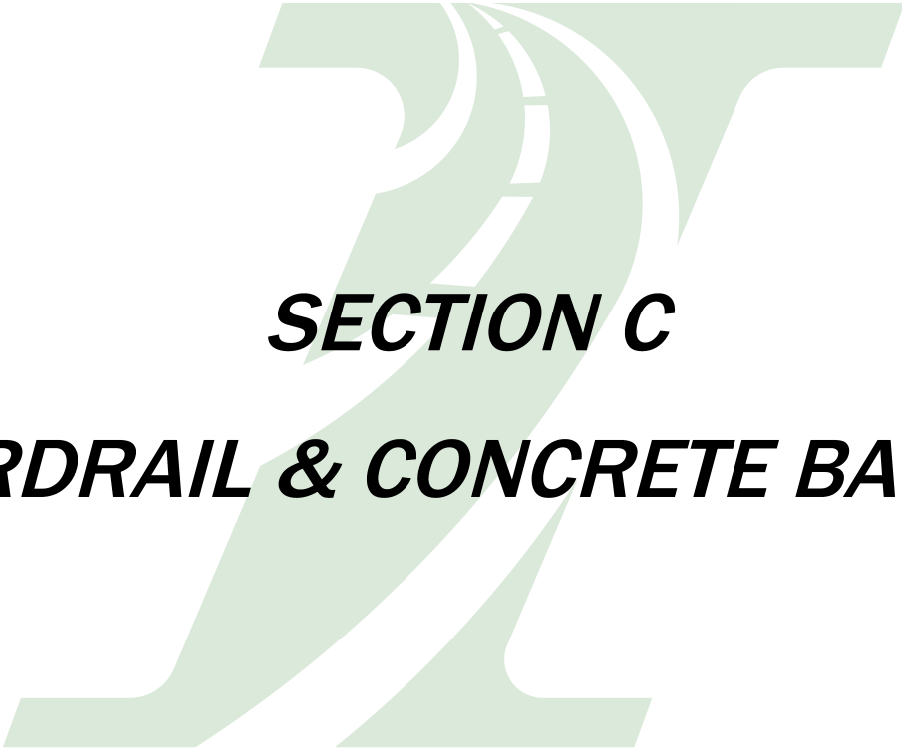
9' MANHOLE PLAN  
SHOWING REBAR REINFORCEMENT  
NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN

NO. 4 (NO. 13) BAR C	
LENGTH	RADIUS
8'-6" (2.59 m)	4'-8" (1.42 m)

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024



# ***STANDARD DRAWINGS***



## ***SECTION C*** ***GUARDRAIL & CONCRETE BARRIER***

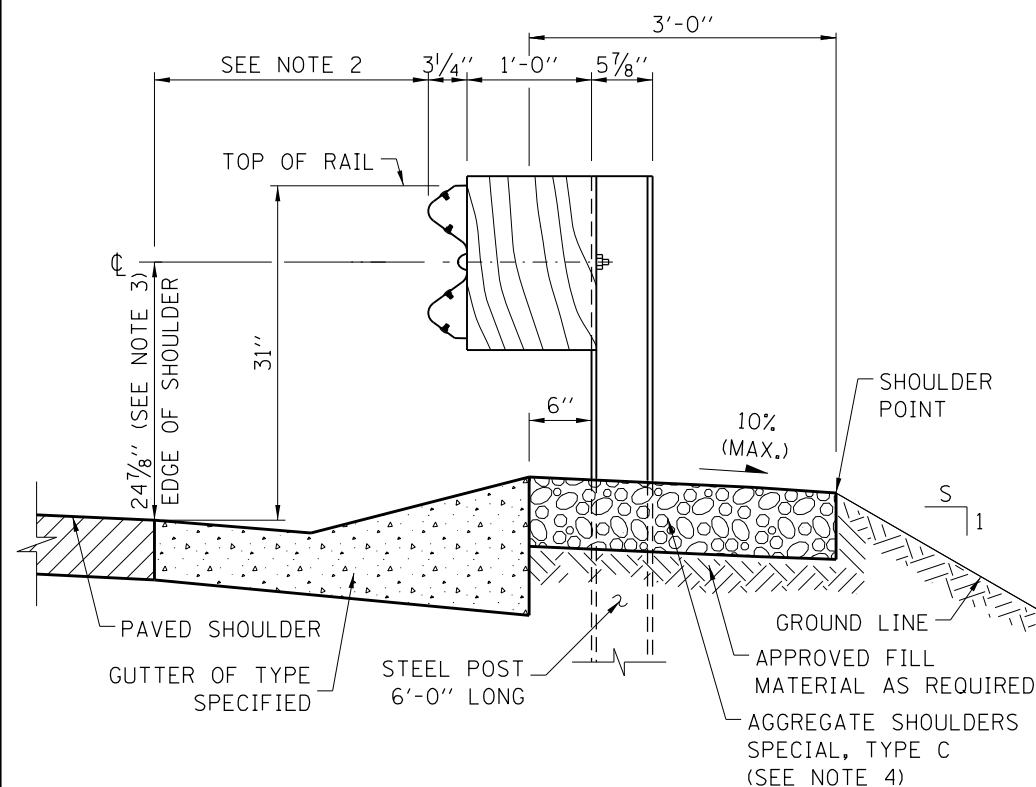
MARCH 2024

Illinois Tollway Standard Drawing Revisions
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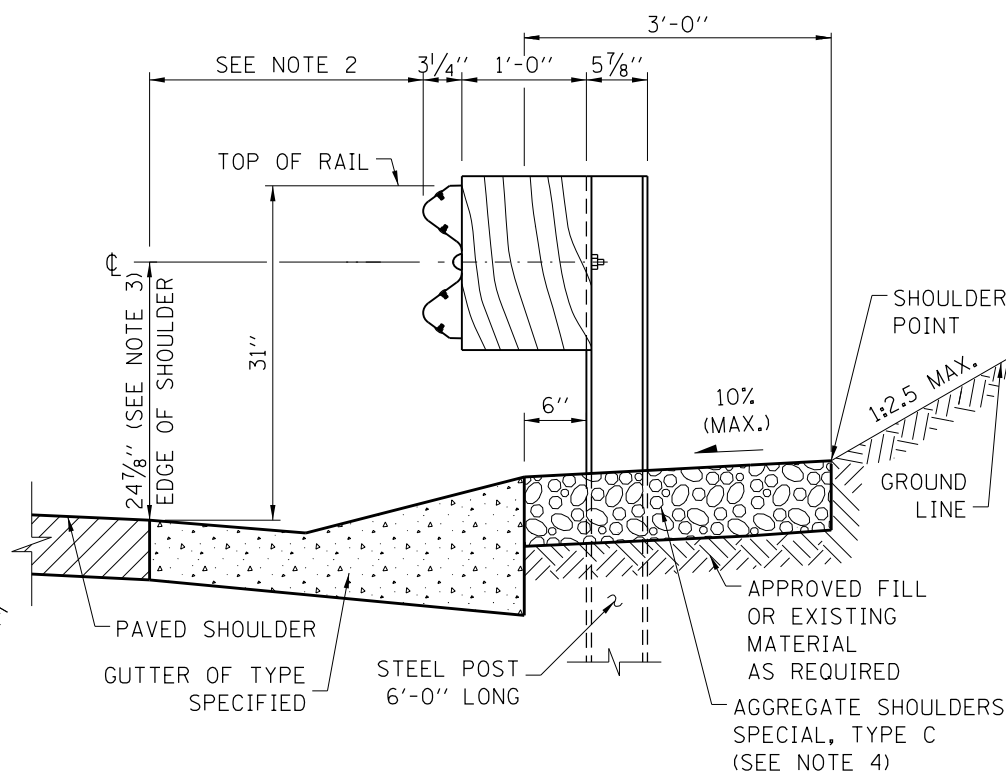
Section C	Guardrail & Concrete Barrier	
	Standard	Modification Summary Effective: 03-01-2024
	C1-13	GALVANIZED STEEL PLATE BEAM GUARDRAIL
	Sheet 1	Removed notes 7 and 10 and their references. Removed requirements for 9' posts.
	Sheet 3	Removed notes relating to 9' post identification.
	C2-01	CONCRETE BARRIER SINGLE FACE, REINFORCED TL-4, L-SHAPE 44 INCH
		Added note that 1" PJF is to be placed below the barrier base when on top of a drainage structure to note 8.
	C3-11	CONCRETE BARRIER SINGLE FACE, REINFORCED TL-4, 44 INCH
		Added note that 1" PJF is to be placed below the barrier base when on top of a drainage structure to note 7.
	C4-12	CONCRETE SHOULDER BARRIER TRANSITION, TYPE V-SF
		Added note citing alignment of NAW with G-2N/3N gutter, on Concrete Shoulder Barrier Transition, V-SF Plan detail, to see Standard B2. Added hot pour joint sealer to Section D-D.
	C15-04	CONCRETE BARRIER SINGLE FACE, REINFORCED TL-5, T-SHAPE 44 INCH
		Added note that 1" PJF is to be placed below the barrier base when on top of a drainage structure to note 7.
	C16-04	CONCRETE BARRIER SINGLE FACE, REINFORCED TL-5, L-SHAPE 44 INCH
		Added note that 1" PJF is to be placed below the barrier base when on top of a drainage structure to note 7.
	C17-05	CONCRETE BARRIER SINGLE FACE, REINFORCED TL-5, 54 INCH
		Added note that 1" PJF is to be placed below the barrier base when on top of a drainage structure to note 7.

New Sheet

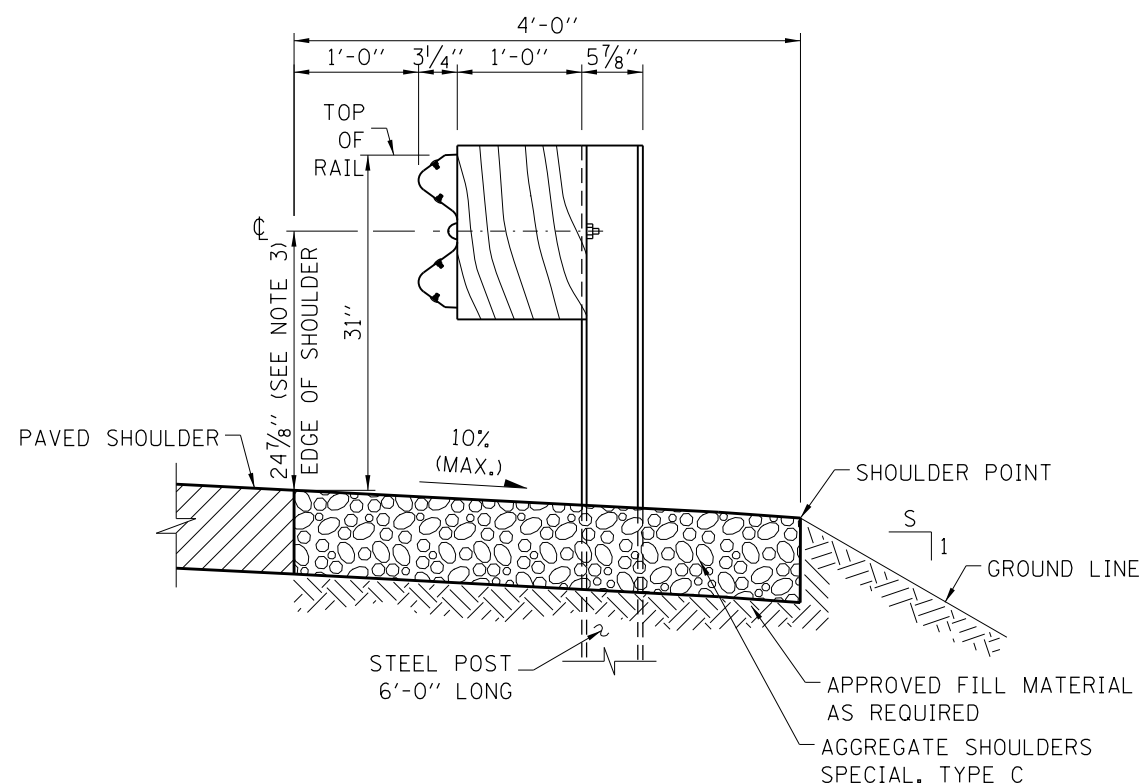
Retired Standard



FILL SECTION WITH GUTTER



CUT SECTION WITH GUTTER



SECTION WITHOUT GUTTER

# GUARDRAIL INSTALLATION DETAILS

## NOTES:

- 1'-0" OFFSET FROM EDGE OF PAVED SHOULDER TO FACE OF RAIL IS TYPICAL FOR ALL INSTALLATIONS WITHOUT GUTTER EXCEPT AS OTHERWISE DETAILED IN THE PLAN DRAWINGS.
- WHERE GUTTERS SUCH AS TYPE G-2, G-3 ARE REQUIRED IN FRONT OF THE GUARDRAIL, THE POSTS SHALL BE LOCATED 6" BEHIND THE GUTTER, OR AS OTHERWISE DETAILED IN THE PLANS. THE OFFSET FROM THE EDGE OF SHOULDER TO THE FACE OF THE GUARDRAIL SHALL BE AS SHOWN ON STANDARD B28.
- THE 24 7/8" TYPICAL RAIL HEIGHT IS MEASURED FROM EXISTING SURFACE 1'-0" IN FRONT OF RAIL, OR FROM EDGE OF SHOULDER/EDGE OF GUTTER WHEN EDGE IS MORE THAN 1'-0" IN FRONT OF RAIL TO CENTER OF RAIL.
- WHERE GUTTER IS PROPOSED WITH GUARDRAIL, A 6" MINIMUM THICKNESS OF AGGREGATE SHOULDERS SPECIAL, TYPE C SHALL BE PLACED BEHIND GUTTER. FOR GUARDRAIL WITHOUT GUTTER, AGGREGATE SHOULDER, TYPE C, OF THE SAME THICKNESS AS PAVED SHOULDER SLOPING AWAY TO A 6" MIN. THICKNESS.
- GUARDRAIL POSTS SHALL NOT BE ATTACHED TO ANY STRUCTURE.
- PLASTIC BLOCK-OUTS SHALL NOT BE ALLOWED AS A SUBSTITUTE FOR WOOD BLOCK-OUTS ON NEW INSTALLATIONS.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENTS (V:H).
- UNDER NO CIRCUMSTANCES SHALL AN EXISTING GUARDRAIL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE EXTENDED, ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
- THE MGS GUARDRAIL SYSTEM WITH STANDARD POST SPACING HAS BEEN PERFORMANCE-TESTED FOR TL-3 CRASH WORTHINESS UNDER PROCEDURES DEFINED IN THE AASHTO MANUAL FOR ASSESSING SAFETY HARDWARE (MASH). OTHER VARIATIONS OF THE MGS GUARDRAIL SYSTEM HAVE BEEN PERFORMANCE-TESTED FOR TL-3 CRASH WORTHINESS UNDER PROCEDURES OUTLINED IN THE NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.
- GUARDRAIL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENT. WHEN NECESSARY USE LEAVE-OUT DETAIL ON SHEET 3 OF 4 OF THIS SERIES.

SHEET 1 OF 4

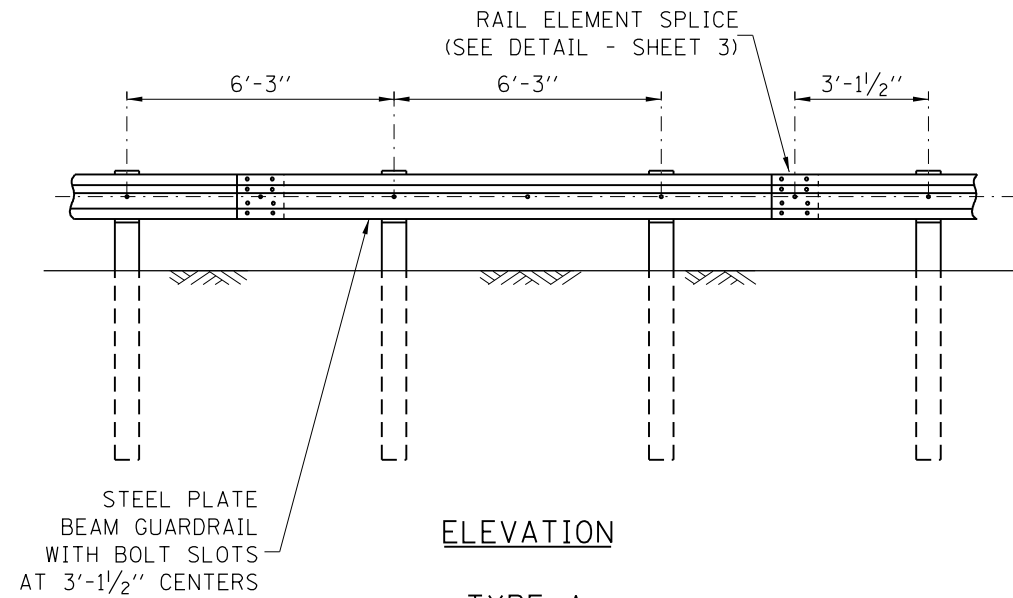


DATE	REVISIONS
3-01-2024	REMOVE 9' POSTS AND REQUIRE FULL WIDTH AGGREGATE SHOULDER
3-01-2021	CHANGED DRAINAGE CONFLICTS TO OMITTED POST, SHEET 4
3-01-2020	MODIFIED NOTE 11 AND HEADING OF TABLE 2B

GALVANIZED STEEL PLATE BEAM GUARDRAIL

STANDARD C1-13

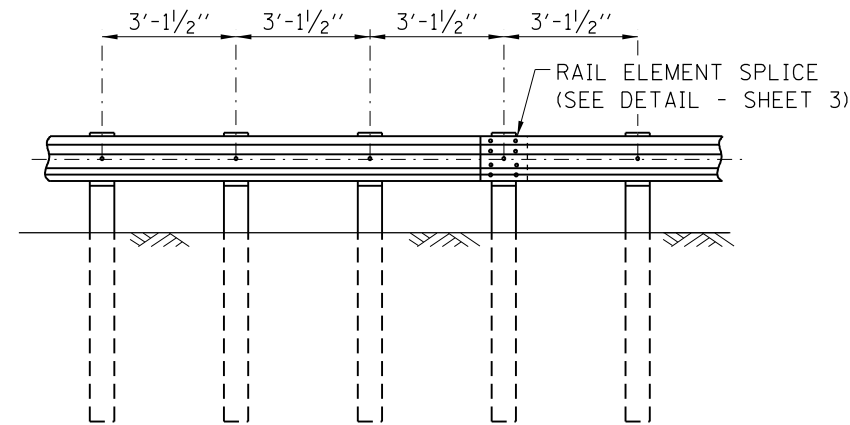
APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024



ELEVATION

TYPE A

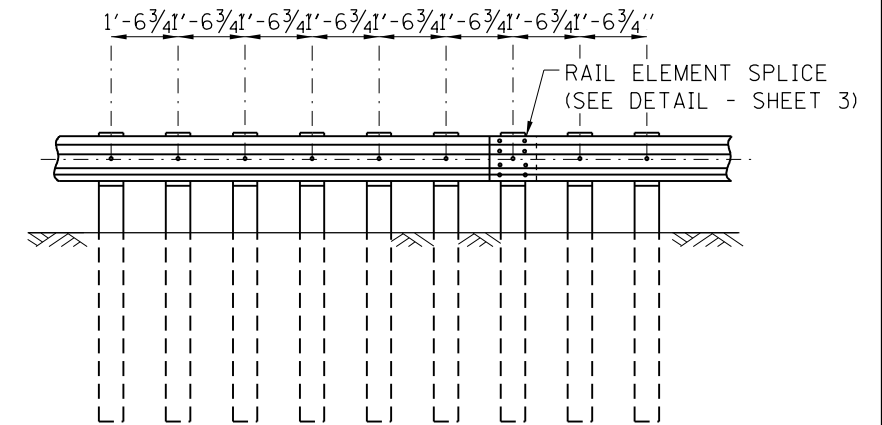
6'-3" TYPICAL POST SPACING



ELEVATION

TYPE B

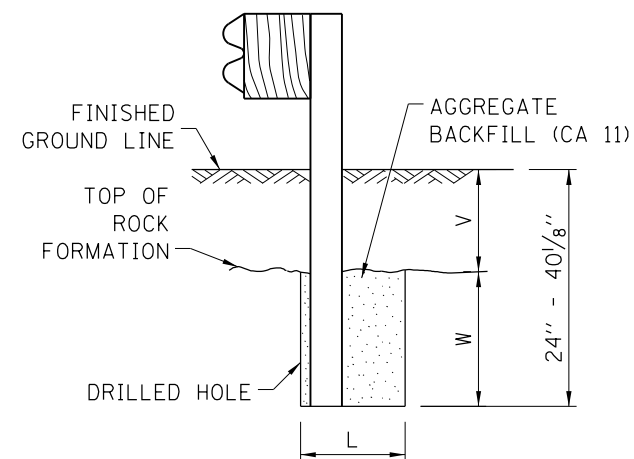
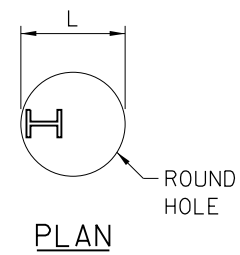
3'-1 1/2" 1/2 POST SPACING



ELEVATION

TYPE C

1'-6 3/4" 1/4 POST SPACING

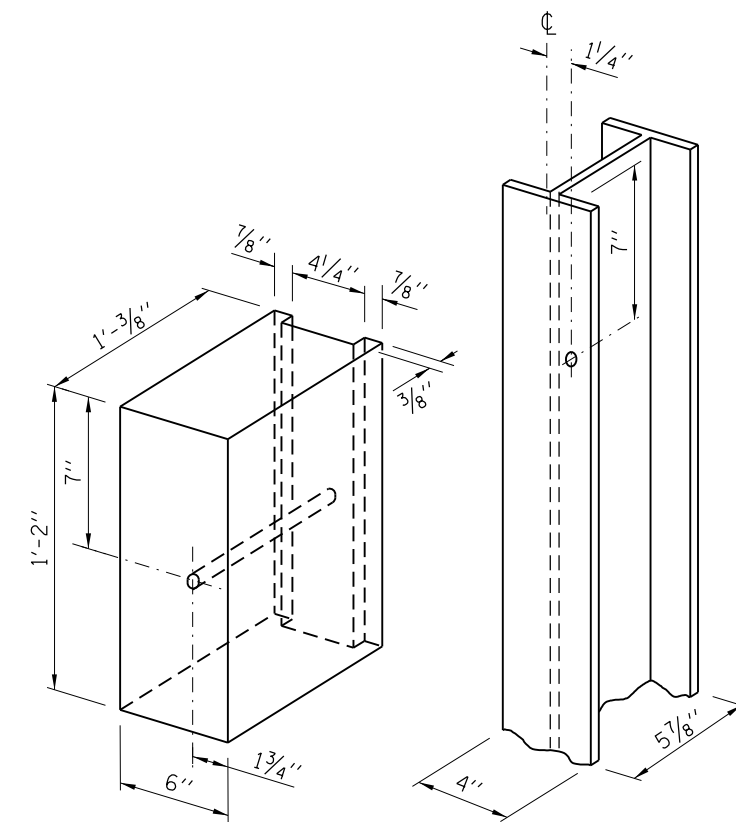


ELEVATION

FOOTING FOR POST WHEN ROCK FORMATION IS ENCOUNTERED

TABLE 1		
V	W	L
0 - 16 1/8"	24"	21"
> 16 1/8" - 28 1/8"	12"	8"
> 28 1/8" - 40 1/8"	12" - 0 (*)	8"

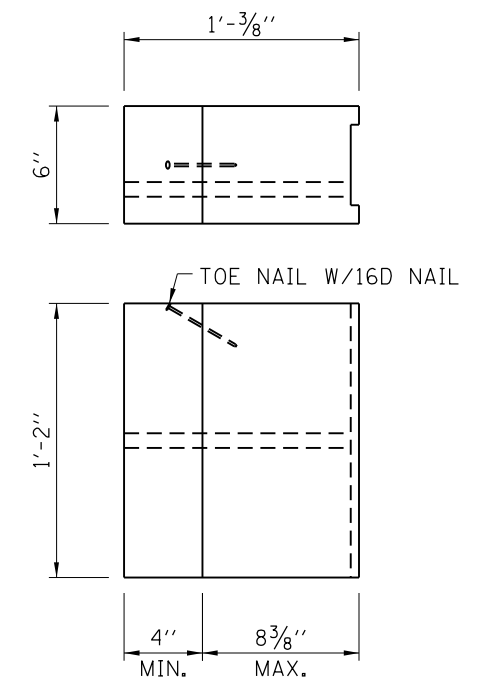
\* V + W = 40 1/8"



NOTES:

ALL HOLES 3/4" DIA.

WOOD BLOCK-OUT AND  
STEEL POST DETAILS



TWO-PIECE WOOD  
BLOCK-OUT OPTION

SHEET 2 OF 4

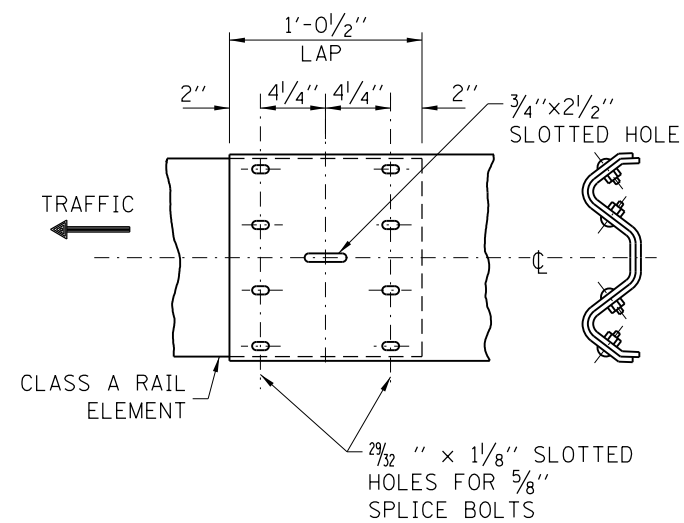


GALVANIZED STEEL PLATE  
BEAM GUARDRAIL

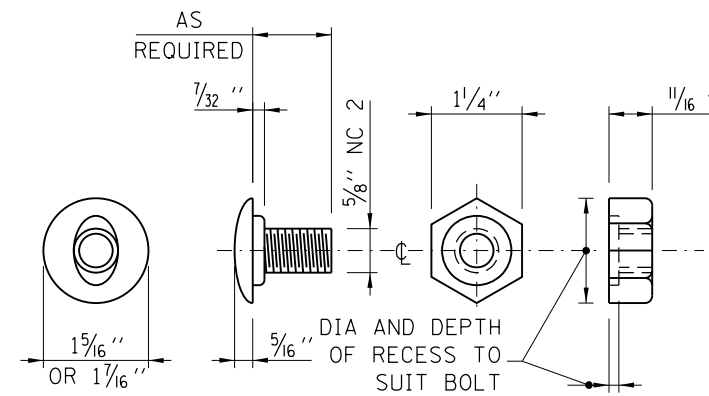
STANDARD C1-13

APPROVED BY:  
*Mamun Nashid*  
CHIEF ENGINEERING OFFICER

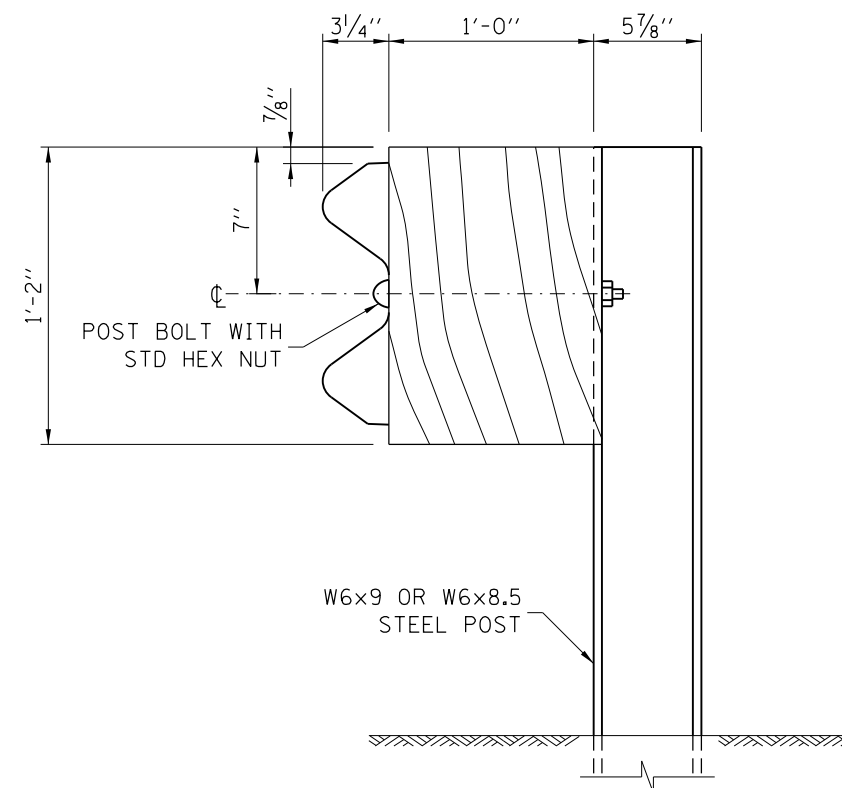
DATE:  
03/01/2024



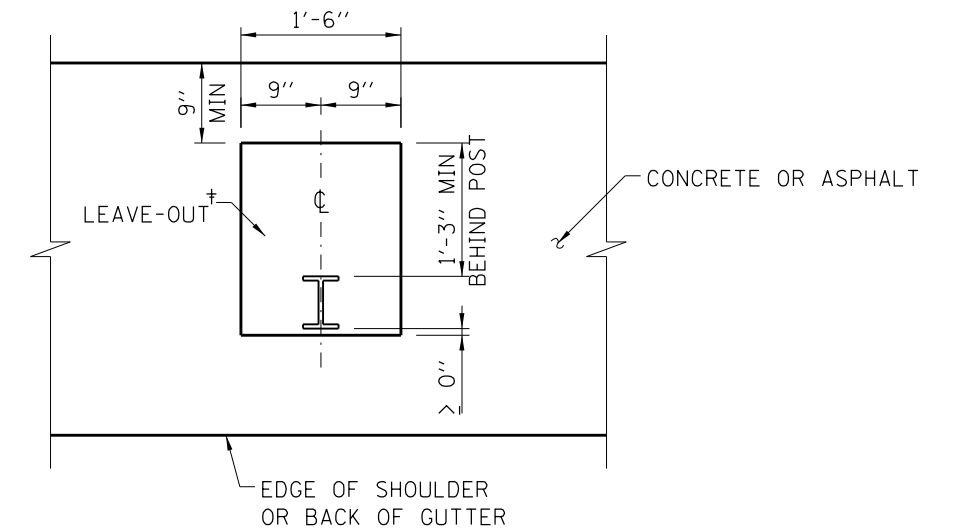
RAIL ELEMENT SPLICE



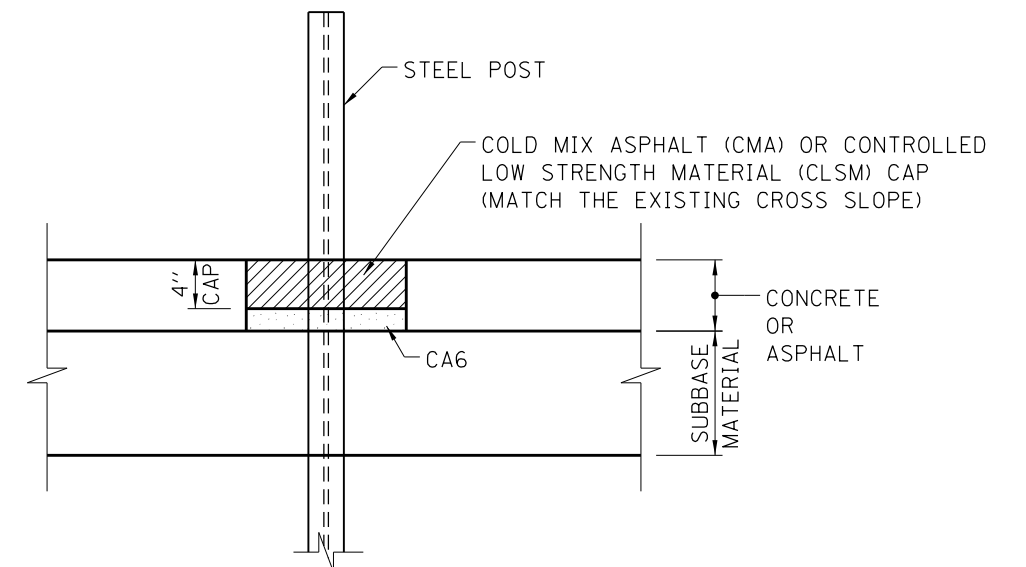
POST OR SPLICE BOLT & NUT



STEEL POST CONSTRUCTION



PLAN



ELEVATION

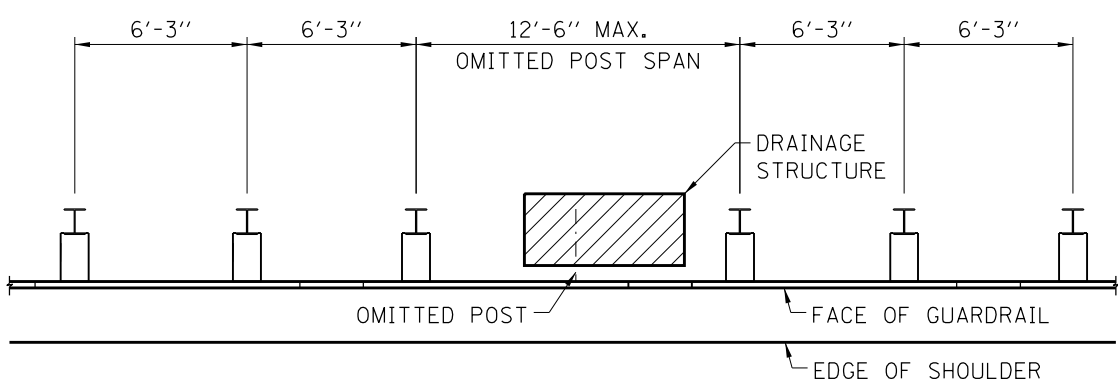
LEAVE-OUTS

† THE AREA AROUND THE POST THAT IS EITHER OMITTED FROM THE NEW CONSTRUCTION OR REMOVED FROM THE EXISTING CONCRETE OR ASPHALT.

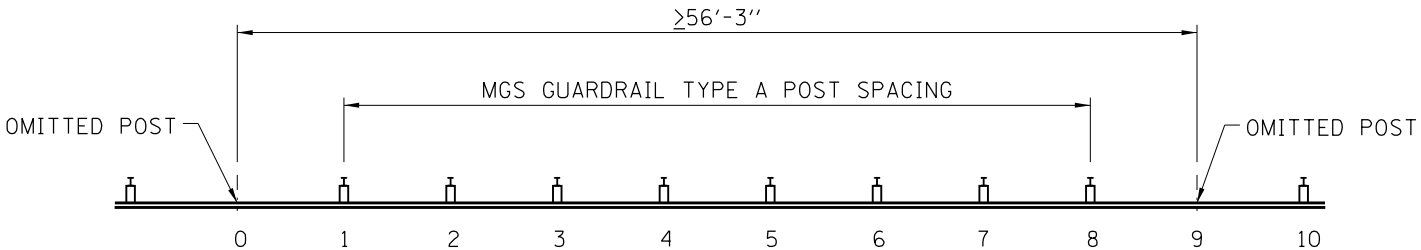


TABLE 2A BARRIER CLEARANCE DISTANCE (MGS) NEW CONSTRUCTION/RECONSTRUCTION		
GUARDRAIL SYSTEM	POST SPACING	MINIMUM DISTANCE
TYPE A	6'-3"	39"
TYPE B 1/2 POST SPACING	3'-1 1/2"	34"
TYPE C 1/4 POST SPACING	1'-6 3/4"	26"

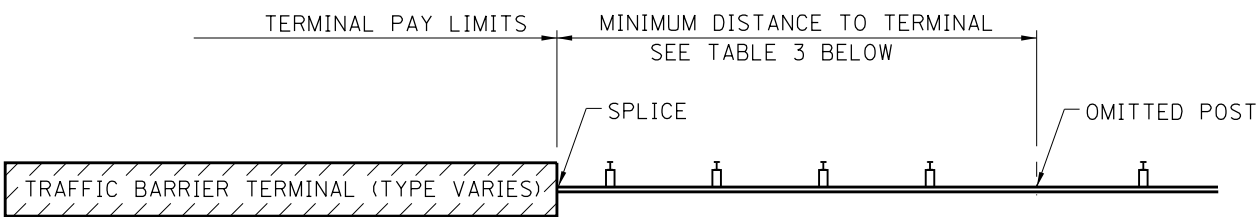
TABLE 2B BARRIER CLEARANCE DISTANCE (MGS) REHABILITATION				
GUARDRAIL SYSTEM	POST SPACING	MINIMUM DISTANCE		
		EXISTING BREAKAWAY LIGHT POLES	ALL OTHER OBSTACLES EXISTING GUARDRAIL	ALL NEW GUARDRAIL
TYPE A	6'-3"	20"	28"	39"
TYPE B 1/2 POST SPACING	3'-1 1/2"	N/A	23"	34"
TYPE C 1/4 POST SPACING	1'-6 3/4"	N/A	14"	26"



TYPE A GUARDRAIL-DRAINAGE STRUCTURE CONFLICT  
ONE POST OMITTED



MINIMUM ALLOWED DISTANCE BETWEEN OMITTED POSTS

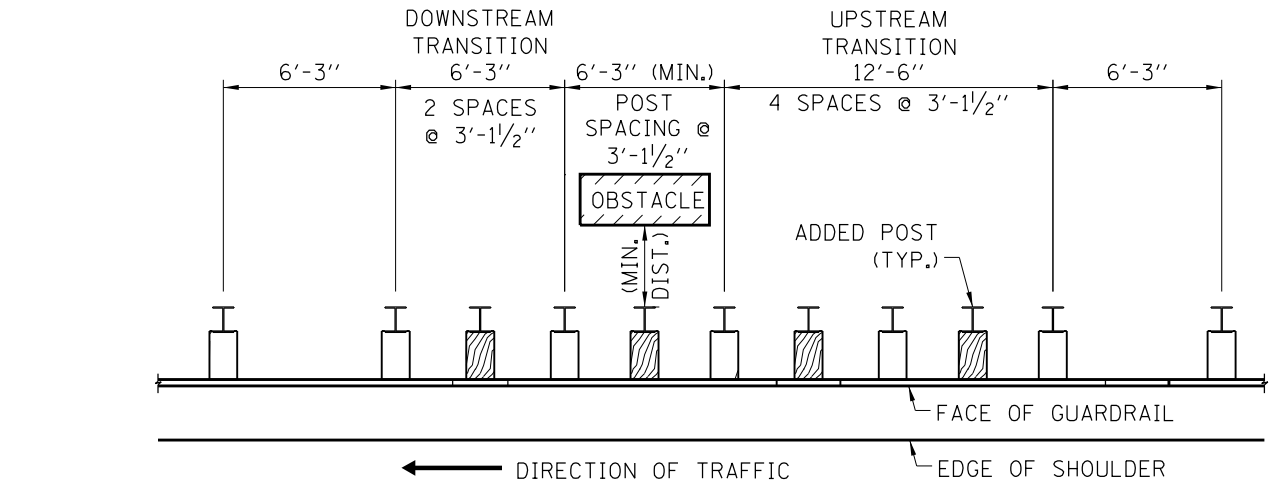


MINIMUM DISTANCE TO TERMINAL FROM OMITTED POST

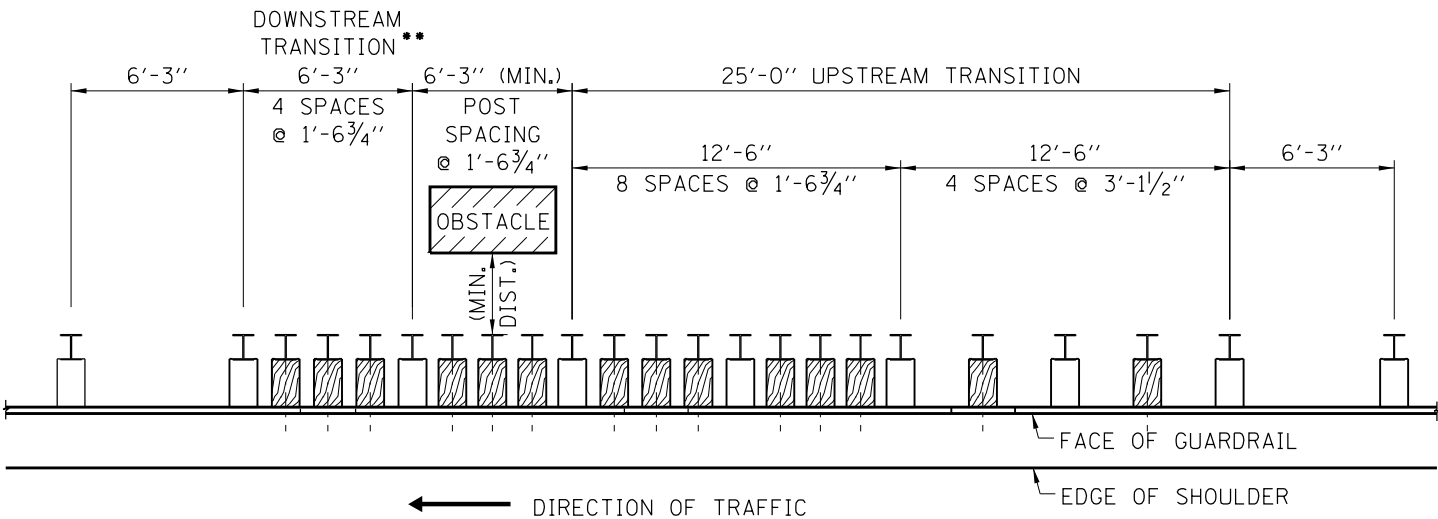
NOTES:

- A. THE OMISSION OF A SINGLE SUPPORT POST WITHIN THE GUARDRAIL SPAN IS PERMITTED WHEN A CONFLICT EXISTS. THE MINIMUM DISTANCE BETWEEN TWO OMITTED POSTS IS 56'-3".
- B. GUARDRAIL POSTS SHALL NOT BE SET BACK TO AVOID CONFLICTS WITH A DRAINAGE SUBSURFACE UTILITY.
- C. THIS DETAIL ALSO APPLIES TO OTHER UNDERGROUND CONFLICTS.
- D. THE OMISSION OF A SUPPORT POST IS NOT PERMITTED WITHIN A GUARDRAIL INSTALLATION WITH GUTTER.

TABLE 3 MINIMUM DISTANCE FROM OMITTED POST TO TERMINAL LIMIT	
TRAFFIC BARRIER TERMINAL	MIN. DISTANCE
TBT TYPE T1 (SP) OR TBT TYPE T1-A (SP)	15'-7 1/2"
TBT TYPE T6 OR TBT TYPE T6B	28'-1 1/2"
TBT TYPE T2	53'-1 1/2"



TRANSITION TO 1/2-POST SPACING



TRANSITION TO 1/4-POST SPACING

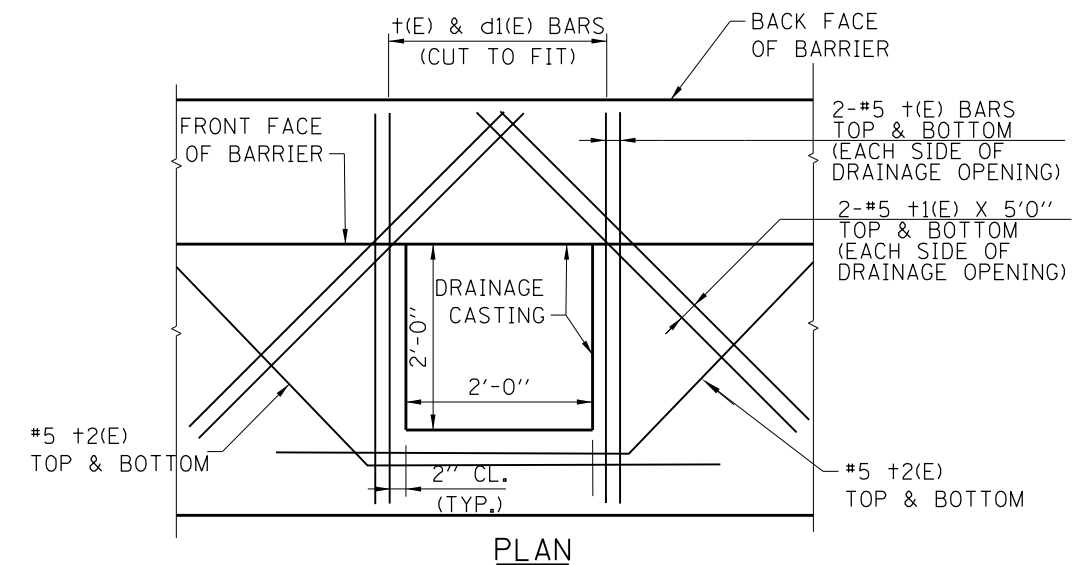
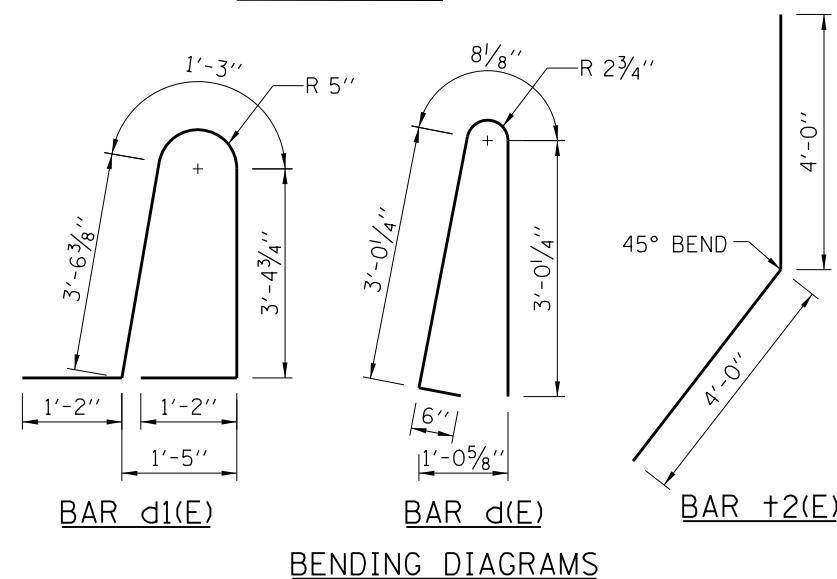
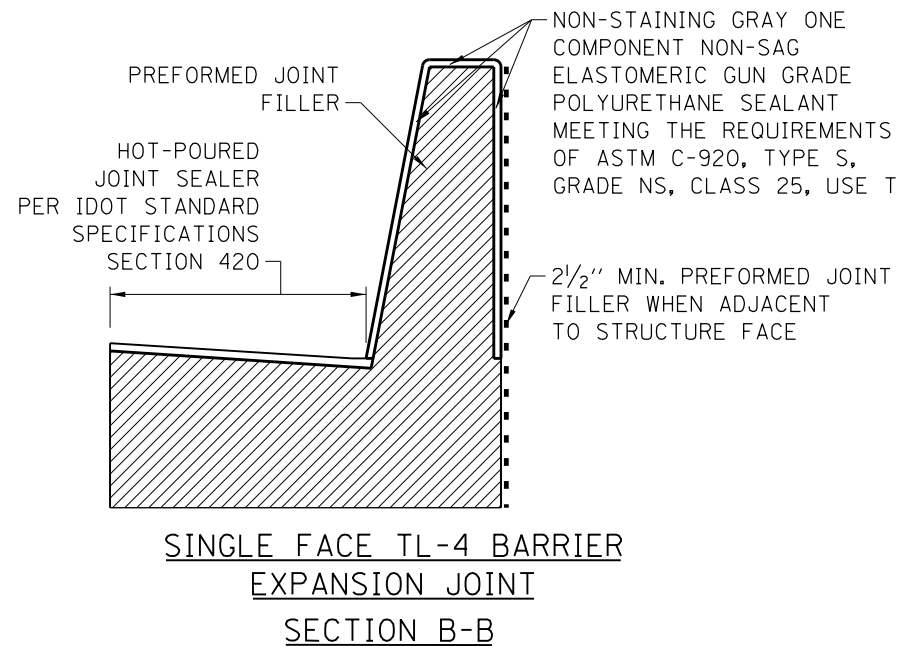
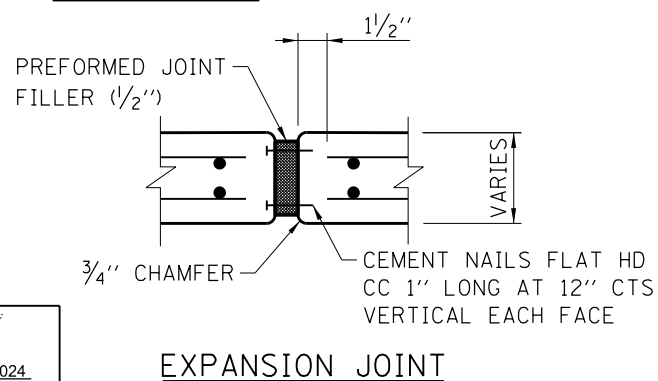
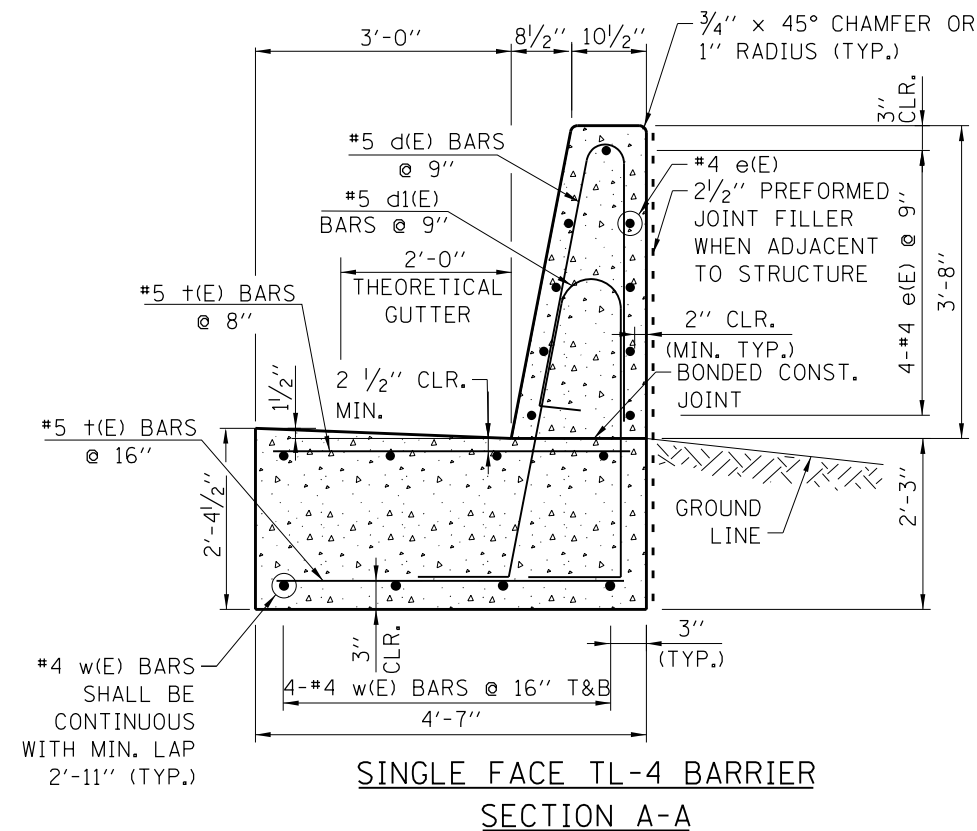
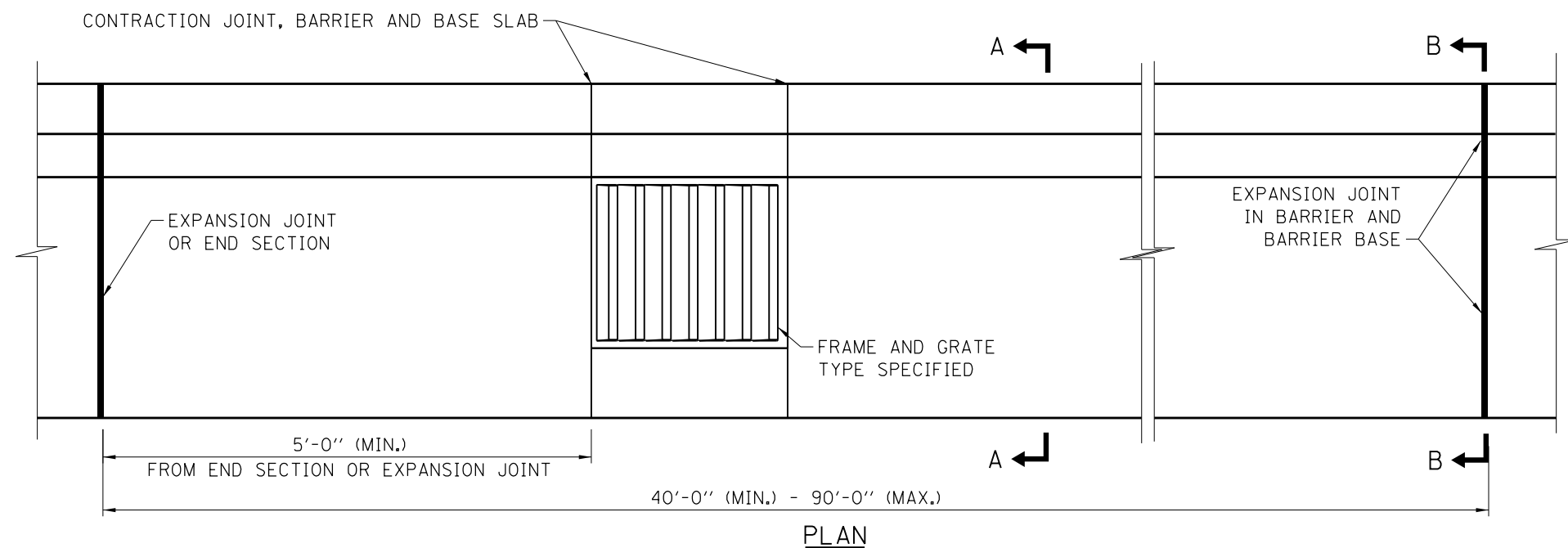
•• WHEN LENGTH OF OBSTACLES IS 1'-3" OR LESS, THE DOWNSTREAM TRANSITION SHALL BE OMITTED.

POST SPACING TRANSITIONS

NOTE: NO MODIFICATIONS OF ANY KIND TO THE  
TRANSITION POST SPACING ARE ALLOWED.

APPROVED BY: *Mamun Nashid*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024





## REINFORCEMENT AROUND DRAINAGE STRUCTURE

### NOTES:

- THIS REINFORCED CONCRETE TL-4 ROADSIDE BARRIER IS USED TO SHIELD NON-CRASHWORTHY SOIL-BACKED WALLS AND OTHER ROADWAY APPURTENANCES WHEN SPACE BEHIND DOES NOT ALLOW THE FOOTING EXTENSION OF THE T-SHAPED BARRIER (STD C3). THE MINIMUM LENGTH OF INSTALLATION SHALL BE 40'-0". BASIS OF DESIGN: IL TOLLWAY STRUCTURE DESIGN MANUAL.
- TOP SHOULDER EDGE OF BARRIER BASE SHALL MATCH THE TOP OF SHOULDER ELEVATION. BACKSIDE OF BARRIER SHALL BE FILLED TO THE TOP OF THE BASE.
- WHEN USED ADJACENT TO A STRUCTURE, A 2 1/2" PREFORMED JOINT FILLER SHALL BE INSTALLED BETWEEN THE BARRIER AND THE STRUCTURE FACE.
- 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0".
- CONTRACTION JOINTS SHALL BE FORMED BY A 1/8" WIDE, GROOVE EITHER FORMED IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS SET.
- REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
- REINFORCEMENT BARS BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
- AT DRAINAGE STRUCTURES, CUT FOOTING BARS TO FIT. ADD ADDITIONAL +, +1, AND +2 BARS ON EACH SIDE OF THE DRAINAGE STRUCTURE. A 1" P/JF SHALL BE PLACED BELOW THE BARRIER BASE WHEN IT SITS UPON A FLAT SLAB DRAINAGE STRUCTURE.
- EXPANSION JOINTS SHALL BE CONSTRUCTED IN BARRIER AND BASE AT A MAXIMUM JOINT SPACING OF 90'-0" AND A MINIMUM JOINT SPACING OF 40'-0". SEE SECTION B-B FOR DETAILS.

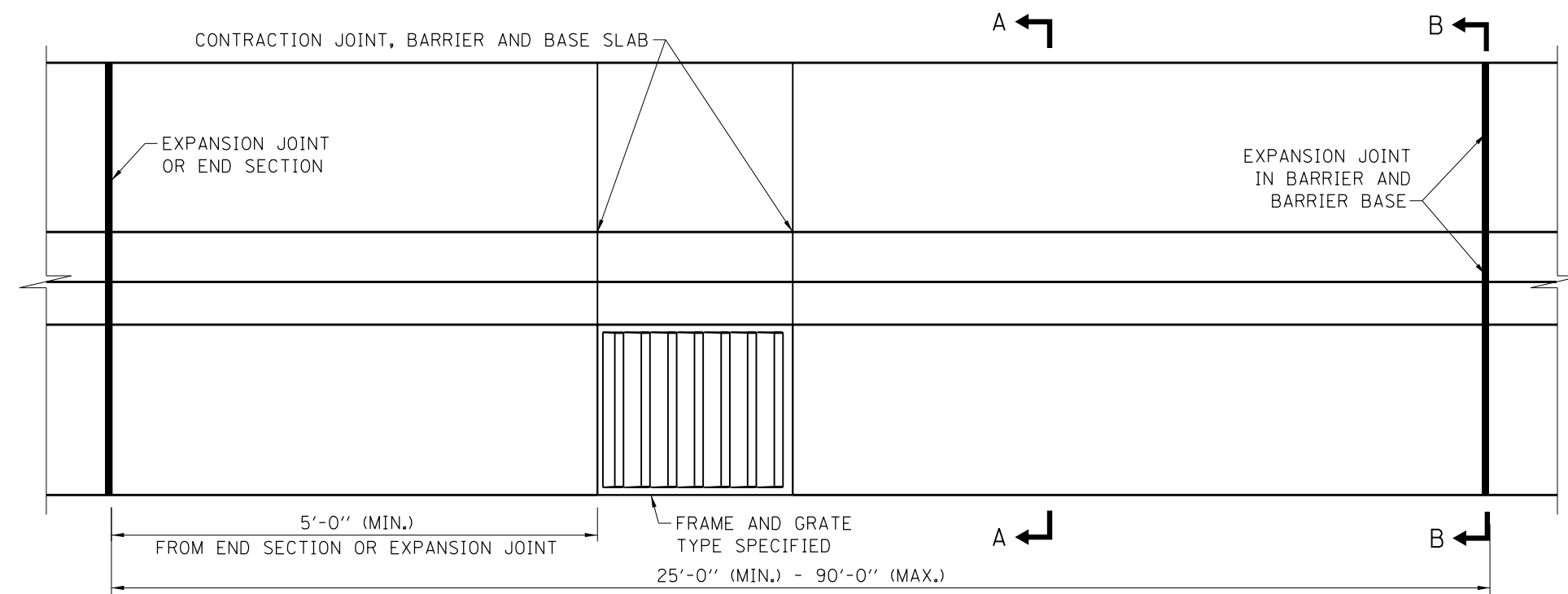
DATE	REVISIONS
3-01-2024	ADDED P/JF BETWEEN BASE AND DRAINAGE STRUCTURE



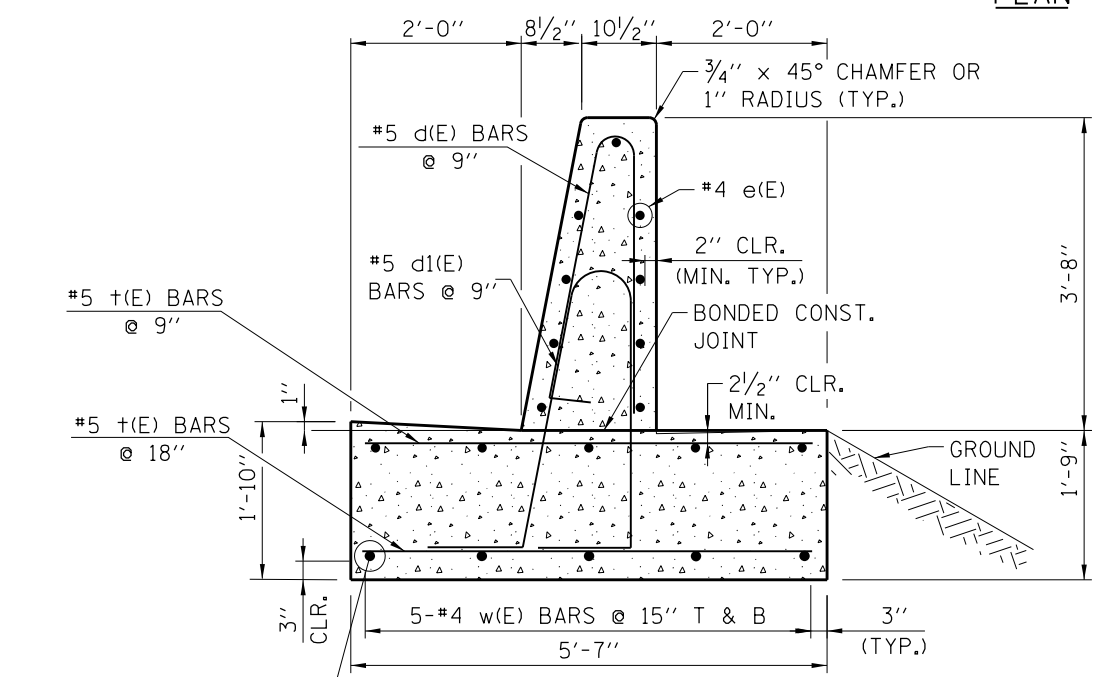
CONCRETE BARRIER SINGLE FACE, REINFORCED TL-4, L-SHAPE 44 INCH

STANDARD C2-01

APPROVED BY: *Mamun Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER

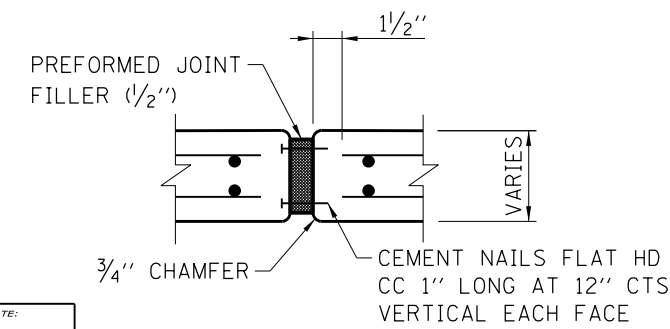


PLAN

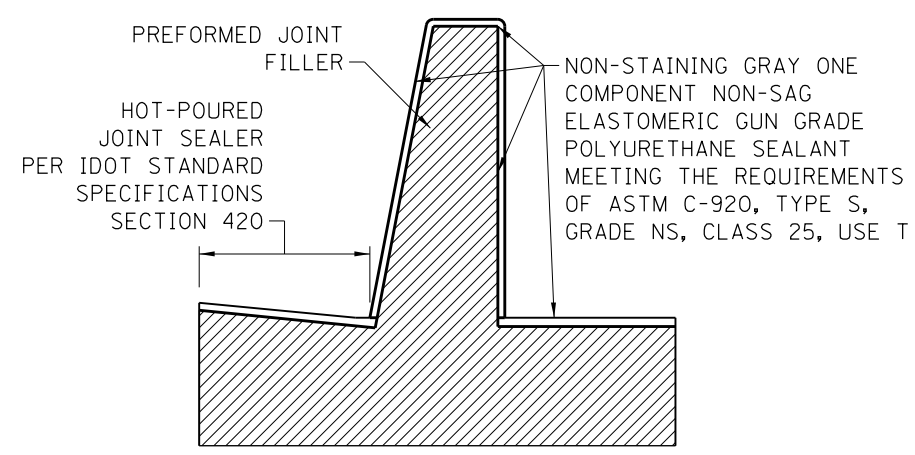


SINGLE FACE TL-4 BARRIER  
SECTION A-A

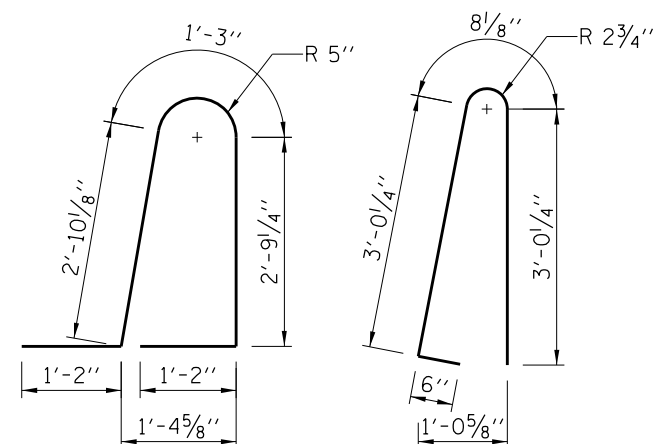
#4 w(E) BARS SHALL BE CONTINUOUS WITH MIN. LAP 2'-11" (TYP.)



EXPANSION JOINT



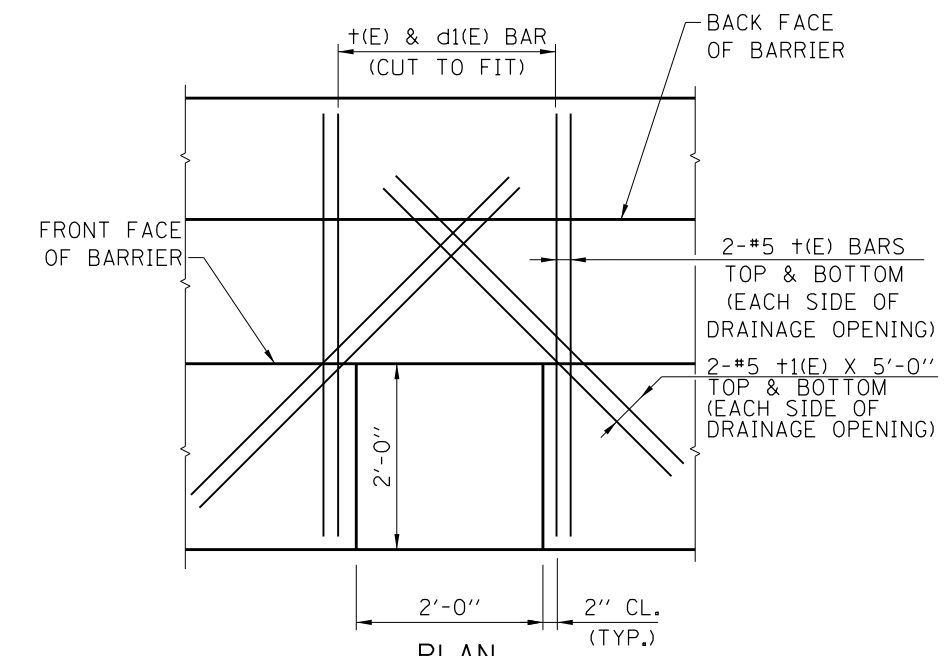
SINGLE FACE TL-4 BARRIER  
EXPANSION JOINT  
SECTION B-B



BAR d1(E)

BAR d(E)

BENDING DIAGRAMS



PLAN  
REINFORCEMENT AROUND DRAINAGE STRUCTURE

NOTES:

- THIS IS A REINFORCED CONCRETE TL-4 ROADSIDE BARRIER USED TO SHIELD ROADWAY APPURTENANCES. THE MINIMUM LENGTH OF INSTALLATION SHALL BE 25'-0". BASIS OF DESIGN: IL TOLLWAY STRUCTURE DESIGN MANUAL.
- TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
- 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0".
- CONTRACTION JOINTS SHALL BE FORMED BY A GROOVE 1/8", EITHER FORMED IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS SET.
- REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
- REINFORCEMENT BARS BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
- AT DRAINAGE STRUCTURES, CUT FOOTING BARS TO FIT. ADD ADDITIONAL + AND +1 BARS ON EACH SIDE OF THE DRAINAGE STRUCTURE. A 1" PJF SHALL BE PLACED BELOW THE BARRIER BASE WHEN IT SITS UPON A FLAT SLAB DRAINAGE STRUCTURE.
- EXPANSION JOINTS SHALL BE CONSTRUCTED IN BARRIER WALL AT A MAXIMUM JOINT SPACING OF 90'-0" AND A MINIMUM JOINT SPACING OF 25'-0". SEE SECTION B-B FOR DETAILS.
- WHEN SPECIFIED IN THE PLANS, THE BACKSIDE OF THE BARRIER BASE MAY BE LEFT EXPOSED A MAXIMUM OF 1', MEASURED FROM THE TOP OF THE BARRIER BASE.

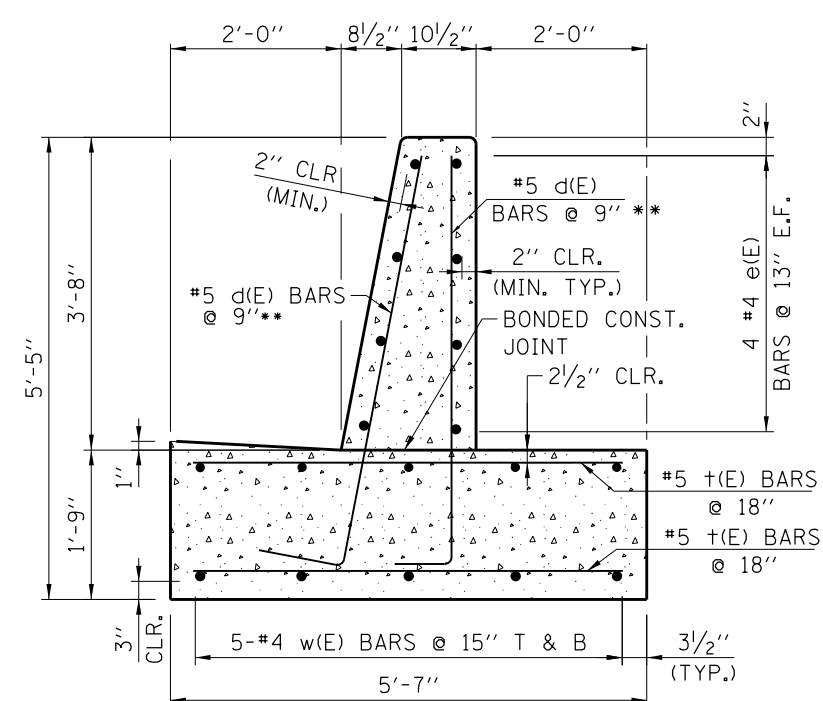
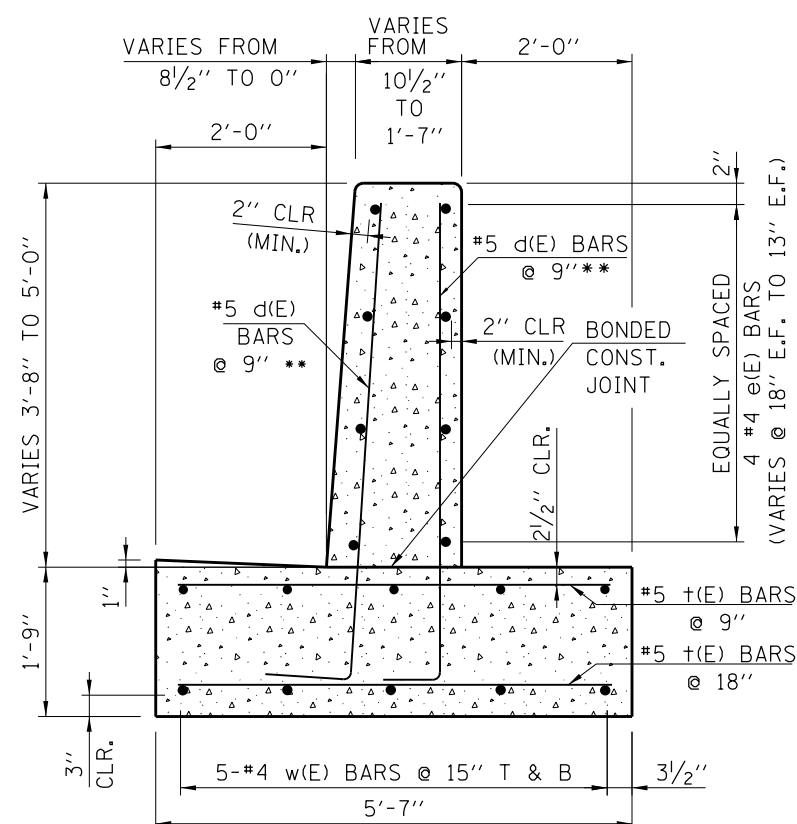
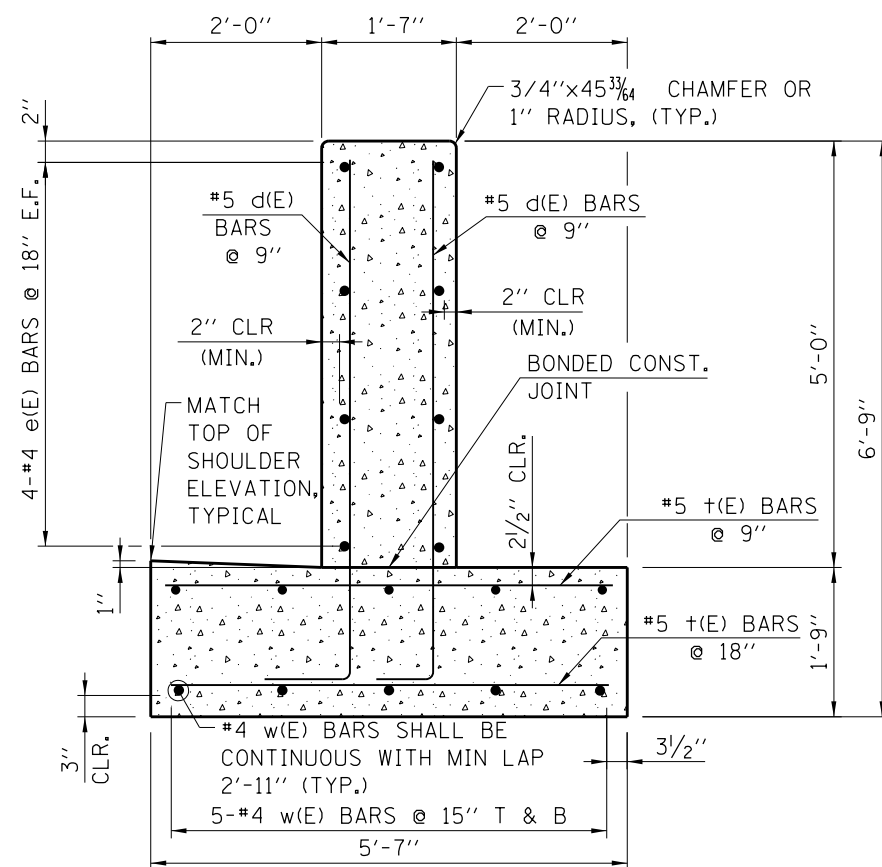
APPROVED BY: *Mamun Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2024	ADDED PJF BETWEEN BASE AND DRAINAGE STRUCTURE
3-01-2023	REVISED REINF. AT DRAINAGE STR.
3-01-2022	REVISED CALLOUTS AND NOTES
3-01-2020	REVISED TO 44" HEIGHT & RENAMED
3-01-2019	REVISED TO CONSTANT SLOPE

**Illinois Tollway**

CONCRETE BARRIER SINGLE FACE, REINFORCED TL-4, 44 INCH

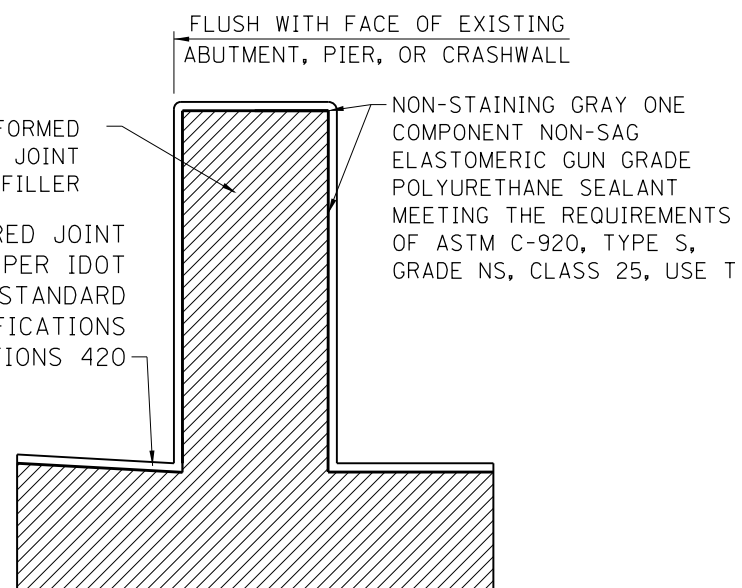
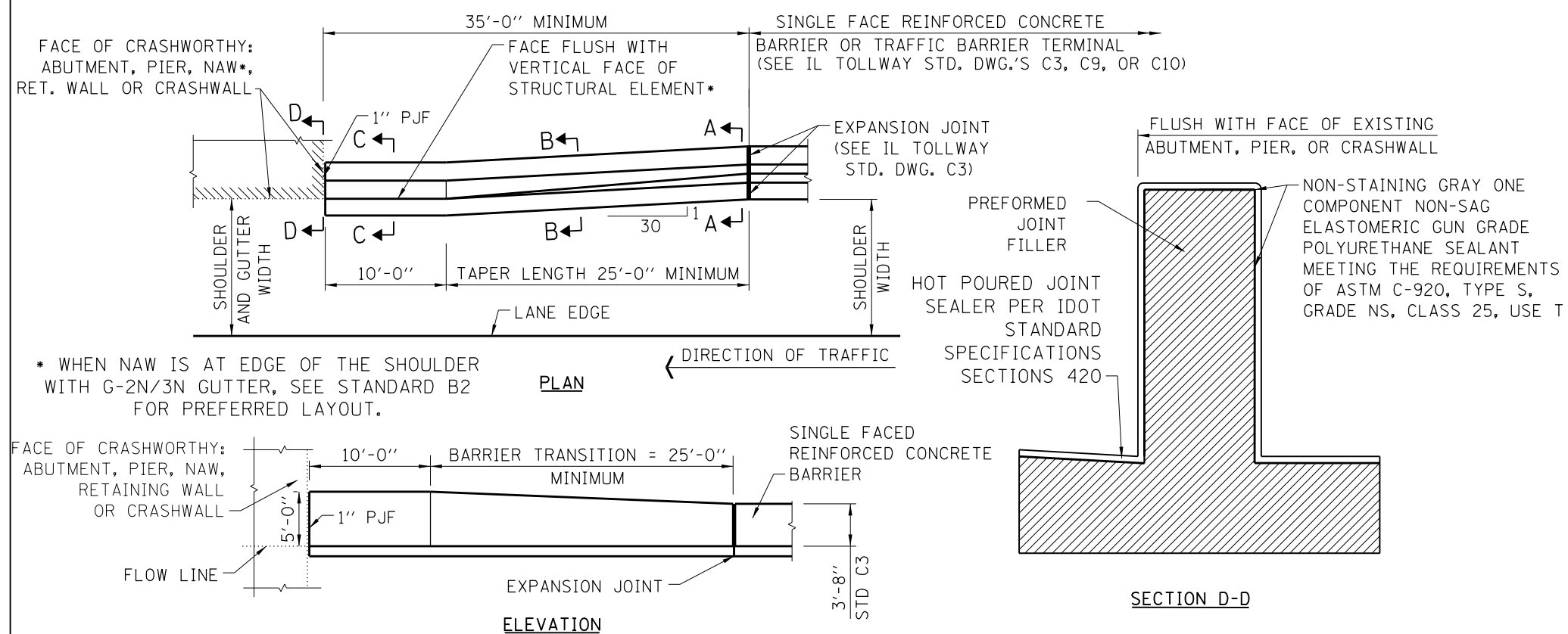
STANDARD C3-11



SECTION A-A  
\*\* CUT TO FIT IN FIELD  
2" MIN. VERTICAL CLR.

NOTES:

1. TAPER LENGTH REQUIRED FOR THE SHOULDER WIDTH TRANSITION SHALL BE 25'-0" MINIMUM. INCREASE TAPER RATE AS REQUIRED TO OBTAIN THE LENGTH OF 25'-0".
2. TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
3. 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0".
4. CONTRACTION JOINTS SHALL BE FORMED BY A GROOVE 1/8", EITHER IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS SET.
5. REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
6. REINFORCEMENT BARS BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICES FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION.
7. REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.
8. CONSTANT-SLOPE BARRIER SHALL BE USED WITH ALL NEW CONSTRUCTION, OR RECONSTRUCTION OF EXISTING BARRIERS.
9. E.F. DENOTES EACH FACE
10. MINIMUM EXPANSION JOINT SPACING SHALL BE 25'-0".



SECTION D-D

BENDING DIAGRAM

#5 d(E) BAR

APPROVED BY:

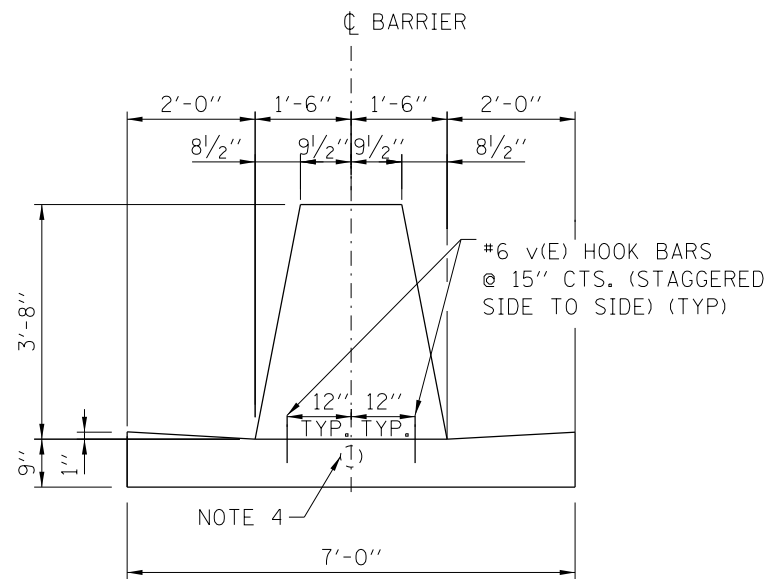
DATE: \_\_\_\_\_

03/01/2024

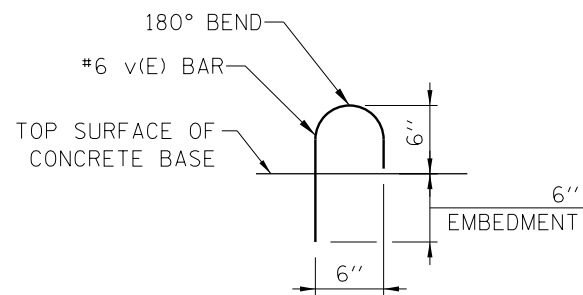
DATE	REVISIONS
3-01-2024	ADDED NOTE, NAW WITH G-2N/3N SEE STD B2.ADDED HOT POUR AT SECT D-D
3-01-2022	REVISED NOTE 4
3-01-2021	CLARIFIED SHLD. WIDTH AND REVISED NOTES IN PLAN VIEW

CONCRETE SHOULDER  
BARRIER TRANSITION  
TYPE V-SF

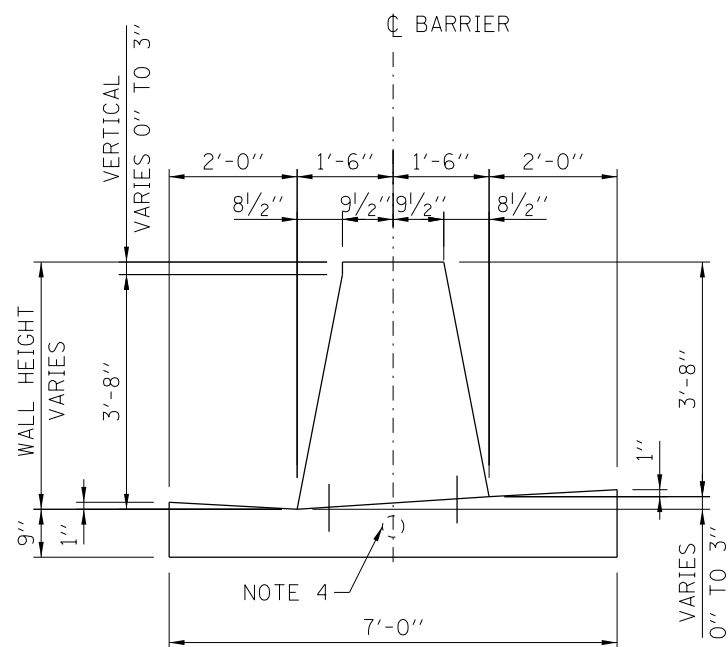
STANDARD C4-12



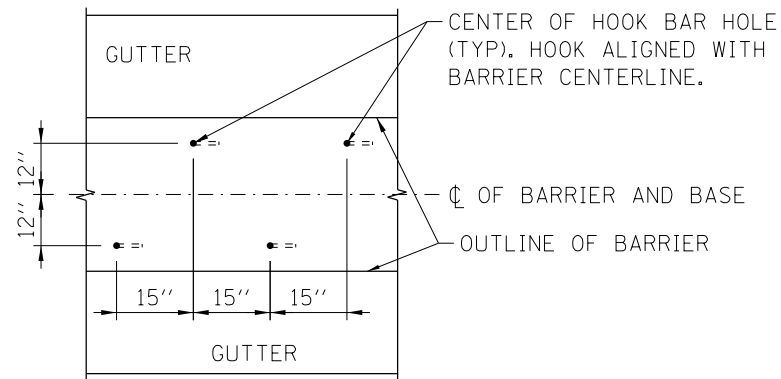
CONCRETE BARRIER, DOUBLE FACE, 44"  
CONCRETE BARRIER BASE, 7'-0"



HOOK BAR  
(Side View)

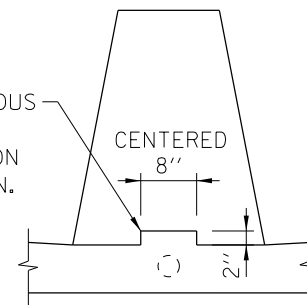


CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT  
CONCRETE BARRIER BASE, VARIABLE HEIGHT, 7'-0"  
(BARRIER HEIGHT VERTICAL DIFFERENTIAL VARIES 0" TO 3")

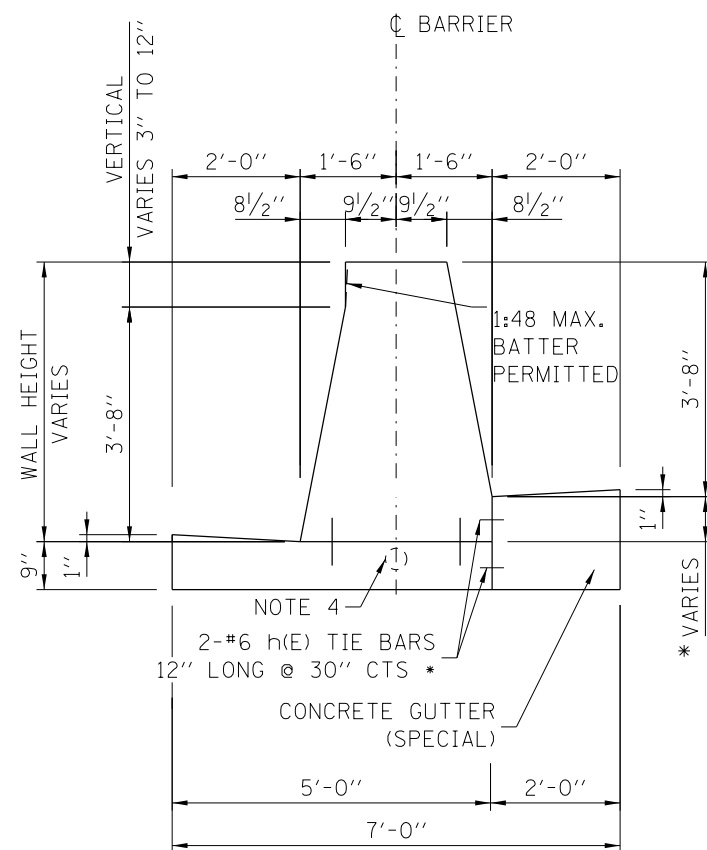


HOOK BAR PLACEMENT  
(Plan View)

REQUIRES CONTINUOUS  
BARRIER SECTION  
(BETWEEN EXPANSION  
JOINTS) OF 70' MIN.  
SEE NOTE 5



CONCRETE BARRIER BASE  
WITH KEYWAY OPTION



CONCRETE BARRIER, DOUBLE FACE, VARIABLE HEIGHT  
CONCRETE BARRIER BASE, 5'-0"

(BARRIER HEIGHT VERTICAL DIFFERENTIAL VARIES 3" TO 12")  
\* WHEN 6" OR GREATER ADD TOP TIE BAR.

#### NOTES:

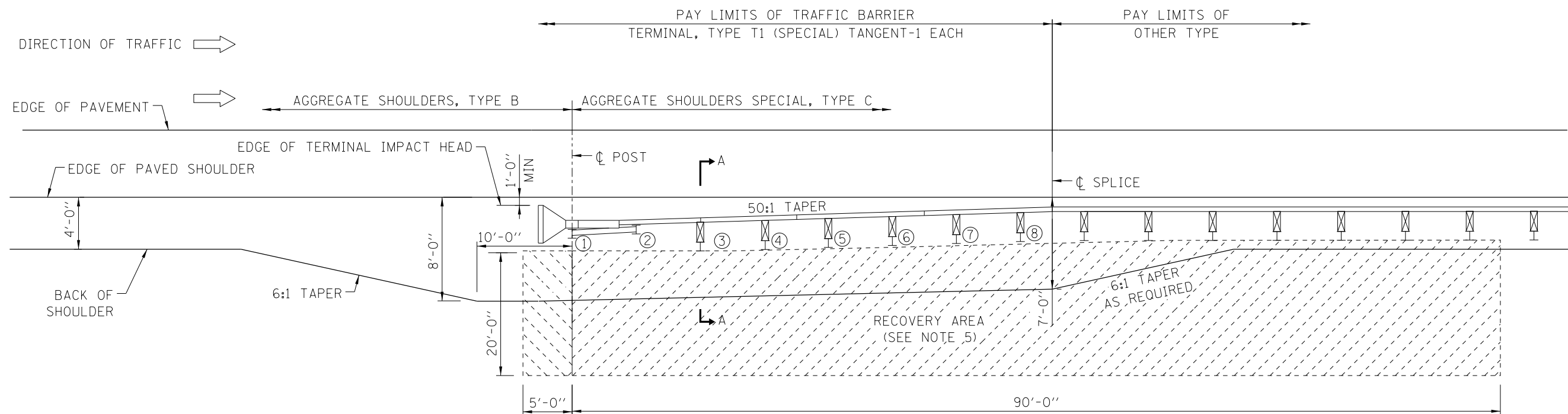
- 2" DEEP CONTRACTION JOINTS SHALL BE DONE BY SAWING AND SHALL BE CONSTRUCTED IN THE CONCRETE BARRIER WALL, CONCRETE BARRIER BASE, AND CONCRETE GUTTER (SPECIAL). CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0". THE MINIMUM DISTANCE BETWEEN CONTRACTION JOINTS IN THE MEDIAN BARRIER WALL SHALL BE 2'-0". WHEN A DRAINAGE STRUCTURE FALLS WITHIN 2'-0" FROM AN EXPANSION JOINT (OR) CONTRACTION JOINT, THE NEAREST CONTRACTION JOINT SHALL BE OMITTED.
- GUTTER PROFILE IN THE VICINITY OF SAG VERTICAL CURVES, ALONG FLAT GRADES AND AT THE MEETING OF PROPOSED AND EXISTING GUTTER, SHALL BE CAREFULLY CONTROLLED AND FIELD ADJUSTED IF NECESSARY TO ENSURE POSITIVE DRAINAGE AND AVOID PONDING.
- IN AREAS OF RELATIVELY FLAT LONGITUDINAL PROFILE GRADES, THE VERTICAL DIMENSION TO THE TOP OF THE BARRIER CAN VARY (BY VARYING THE GUTTER SLOPE) FROM 43" TO 44.5" TO CREATE AN ACCEPTABLE LONGITUDINAL GRADE IN THE GUTTER.
- REFERENCE PLAN SHEET FOR TYPE, SIZE AND NUMBER OF CONDUITS. PROVIDE 1 1/2" (MIN.) CLEARANCE TO THE TOP OF CONDUIT AND 2" (MIN.) CLEARANCE TO THE BOTTOM OF THE CONDUIT.
- THE CONTRACTOR HAS THE OPTION OF USING EITHER THE KEYWAY OR THE #6 HOOK BAR v(E) BETWEEN THE BARRIER AND THE BASE. WHEN THE KEYWAY IS USED, THE RAISED KEYWAY SHALL BE POURED MONOLITHIC WITH THE BARRIER BASE AND THE BARRIER SHALL HAVE A MINIMUM UNINTERRUPTED SECTION LENGTH OF 70'. IF THE KEYWAY OR ITS EDGES BECOME DAMAGED, THEN HOOK BARS SHALL BE INSTALLED WITHIN THE DAMAGED SECTION.
- ALL BARS SHALL BE INCLUDED IN THE COST OF THE VARIOUS BARRIER AND GUTTER ITEMS. REINFORCEMENT BARS DESIGNATED '(E)' SHALL BE EPOXY COATED. TIE BARS BETWEEN THE BARRIER AND BASE SHALL BE v(E) HOOK BARS ON 15" CENTERS AND ALTERNATE LEFT AND RIGHT OF THE BARRIER CENTERLINE. TIE BARS BETWEEN EITHER THE VARIABLE HEIGHT BARRIER OR THE BASE AND THE GUTTER (SPECIAL) SHALL BE h(E) STRAIGHT BAR PAIRS ON 30" CENTERS.
- WHEN VARIABLE HEIGHT VERTICAL DIFFERENTIAL EXCEEDS 12" SEE STRUCTURAL PLANS FOR DETAILS.
- GUTTER SLOPE SHALL BE 4.17% SLOPED TOWARD THE MEDIAN UNLESS OTHERWISE NOTED. GUTTER SLOPE IS REVERSE PITCHED WHEN THE SHOULDER/FLEX LANE DRAINS AWAY FROM THE GUTTER. TRANSITION GUTTER SLOPE OVER 30'-0". GUTTER SLOPE TRANSITIONS ARE INCLUDED IN THE COST OF CONCRETE BASE AND/OR CONCRETE GUTTER (SPECIAL). SEE ROADWAY PLANS FOR LIMITS OF REVERSE PITCHED GUTTER AND TRANSITIONS.

APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

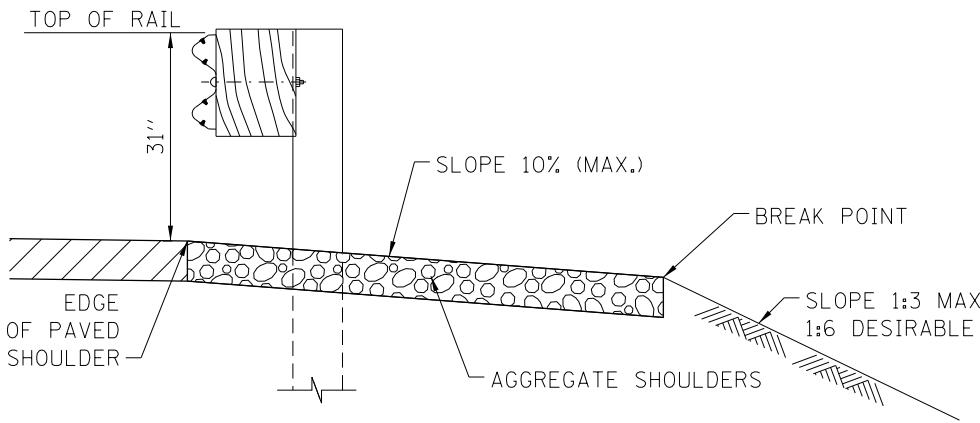
DATE	REVISIONS
8-28-2020	CHANGED TIE BAR DETAILS
3-01-2020	CHANGED MAX. VERTICAL DIFFERENTIAL TO 12"
3-01-2019	REVISED TO CONSTANT SLOPE ADDED TIE BARS
3-31-2016	REVISED NOTES



CONCRETE BARRIER BASE,  
AND CONCRETE BARRIER,  
DOUBLE FACE, 44 INCH AND  
VARIABLE HEIGHT  
STANDARD C5-08



SHOULDER WIDENING TRANSITION - WITHOUT GUTTER FOR  
TRAFFIC BARRIER TERMINAL, TYPE T1 (SPECIAL) TANGENT



SECTION A-A

GENERAL NOTES:

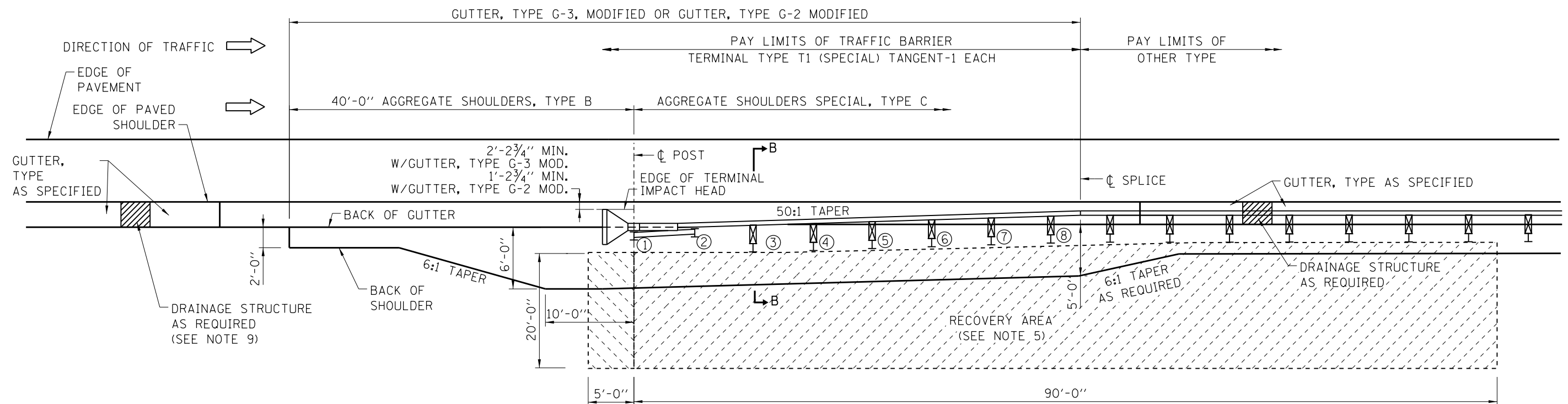
- ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING B28 FOR GUTTER TRANSITION, AND MINIMUM DISTANCE FROM EDGE OF PAVED SHOULDER TO FACE OF RAIL.
- UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANY WAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
- TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.
- NO ABOVE-GROUND ROADSIDE OBSTACLE OF ANY TYPE-FIXED OR BREAKAWAY, EITHER TEMPORARY OR PERMANENT SHALL BE ALLOWED WITHIN THIS RECOVERY AREA.
- ON TANGENT ROADWAY: TRAFFIC BARRIER TERMINAL SHALL BE INSTALLED AT A 50:1 TAPER MEASURED FROM EDGE OF TRAVELED WAY. ON CURVED ROADWAY: THE EDGE OF THE TERMINAL IMPACT HEAD SHALL BE OFFSET A DISTANCE FROM A POINT ON THE BACK OF THE CURVED EDGE OF PAVED SHOULDER AS SHOWN IN TABLE 1. NO CURVED W-BEAM SECTIONS ARE PERMITTED WITHIN THE TERMINAL PAY LIMITS. THE TERMINAL SHALL BE LAID OUT IN A STRAIGHT LINE.
- TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT. WHEN NECESSARY USE LEAVE-OUT DETAIL SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING C1.
- THE TERMINAL SYSTEM HAS BEEN PERFORMANCE-TESTED FOR CRASHWORTHINESS UNDER PROCEDURES DEFINED IN AASHTO MASH. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.
- WHEN GUTTER IS PRESENT, DRAINAGE STRUCTURES SHALL NOT BE INSTALLED WITHIN THE TERMINAL LIMITS, BUT SHALL BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE TERMINAL AS REQUIRED.

APPROVED BY: *Paul Kovacs* DATE: 07/01/2009  
CHIEF ENGINEERING OFFICER

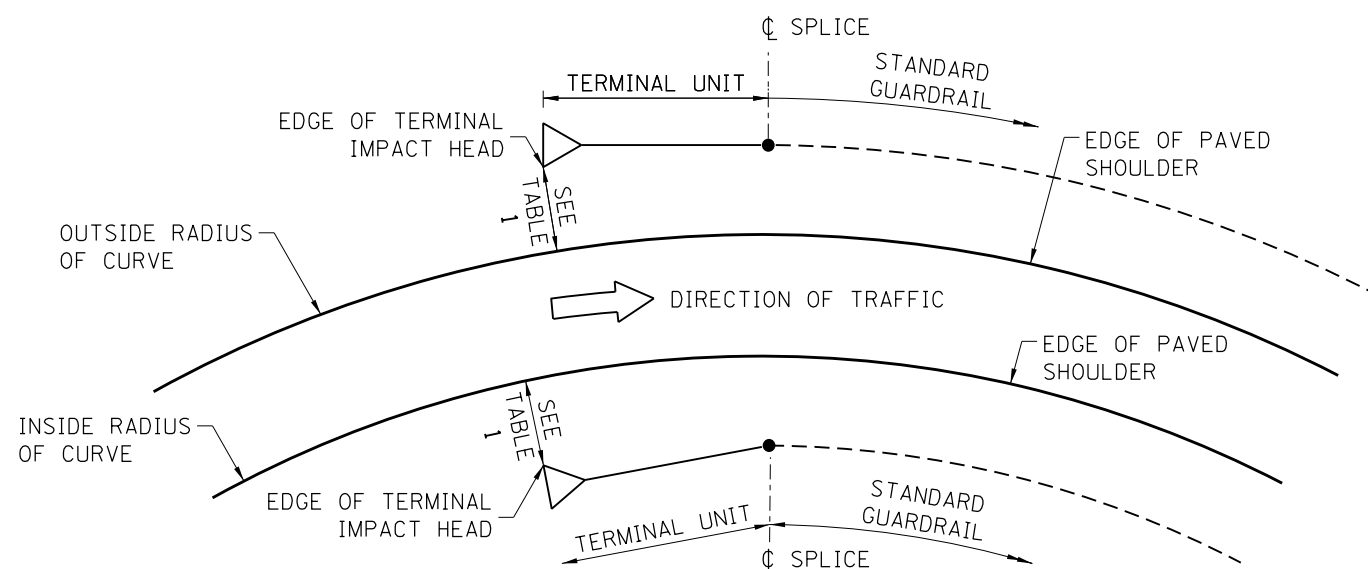
DATE	REVISIONS
3-01-2020	ADDED MOD. TO TABLE 1 & PLAN NOTE
3-01-2019	REVISED NOTES FOR MASH
3-31-2017	REVISED NOTES
3-31-2016	COMBINED G-3 & G-2
3-11-2015	REVISED NOTES

SHOULDER WIDENING FOR  
TRAFFIC BARRIER TERMINAL,  
TYPE T1 (SPECIAL) TANGENT

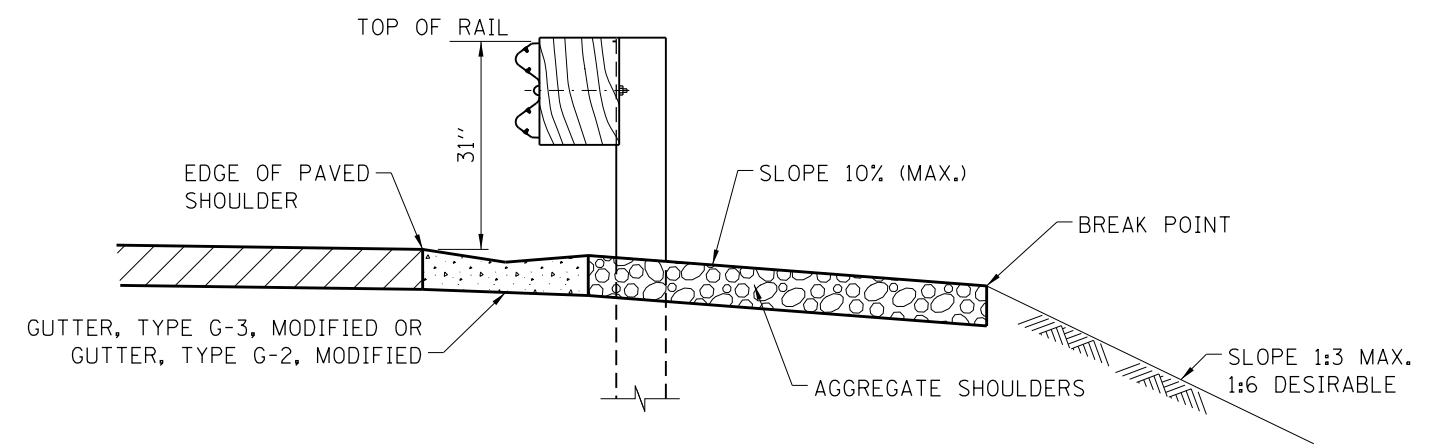
STANDARD C6-11



SHOULDER WIDENING TRANSITION - WITH GUTTER, TYPE G-3 OR TYPE G-2 FOR  
TRAFFIC BARRIER TERMINAL, TYPE T1 (SPECIAL) TANGENT



CURVED ROADWAY  
TRAFFIC BARRIER TERMINAL PLACEMENT



SECTION B-B

TABLE 1		
LATERAL OFFSET DIMENSION TO EDGE OF TERMINAL IMPACT HEAD		
	INSIDE RADIUS OF CURVE	OUTSIDE RADIUS OF CURVE
NO GUTTER	1'-0"	1'-0" *
GUTTER, TYPE G-2, MOD.	1'-2 3/4"	1'-2 3/4" MIN. *
GUTTER, TYPE G-3, MOD.	2'-2 3/4"	2'-2 3/4" MIN. *

(\*) OFFSET DISTANCE WILL VARY BASED ON RADIUS OF HORIZONTAL CURVE AND THE TERMINAL BEING INSTALLED IN A STRAIGHT LINE.

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 07/01/2009

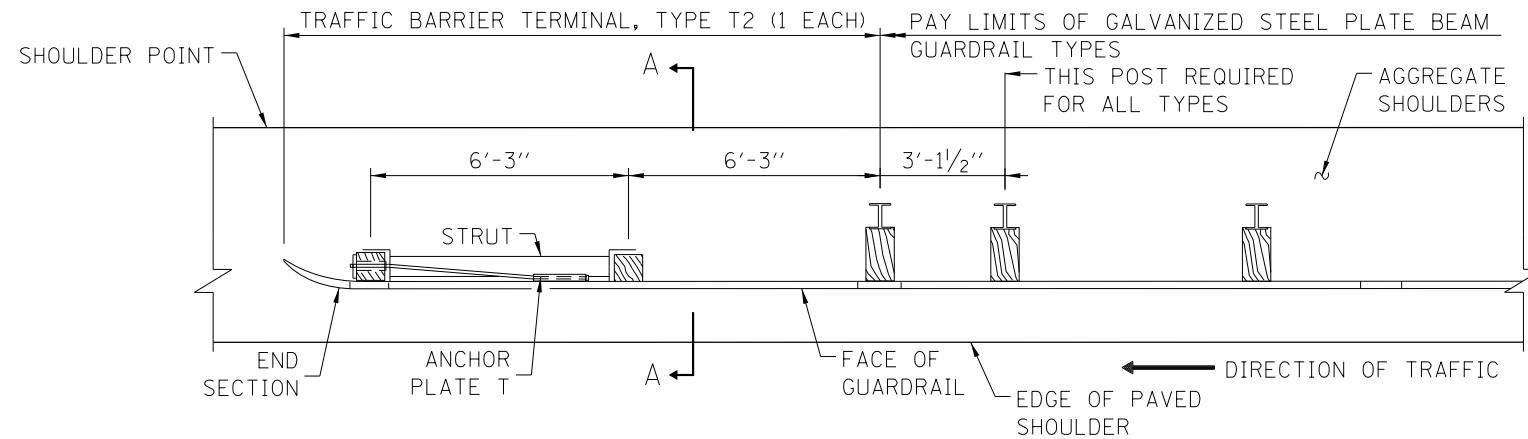
NOTES:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 2 OF 2

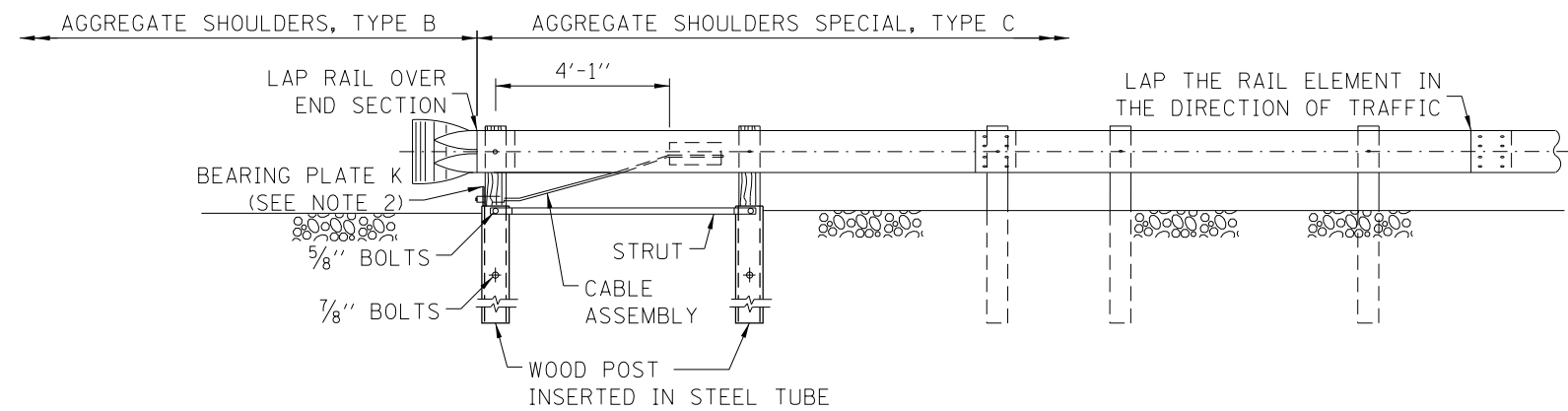


SHOULDER WIDENING FOR  
TRAFFIC BARRIER TERMINAL,  
TYPE T1 (SPECIAL) TANGENT

STANDARD C6-11

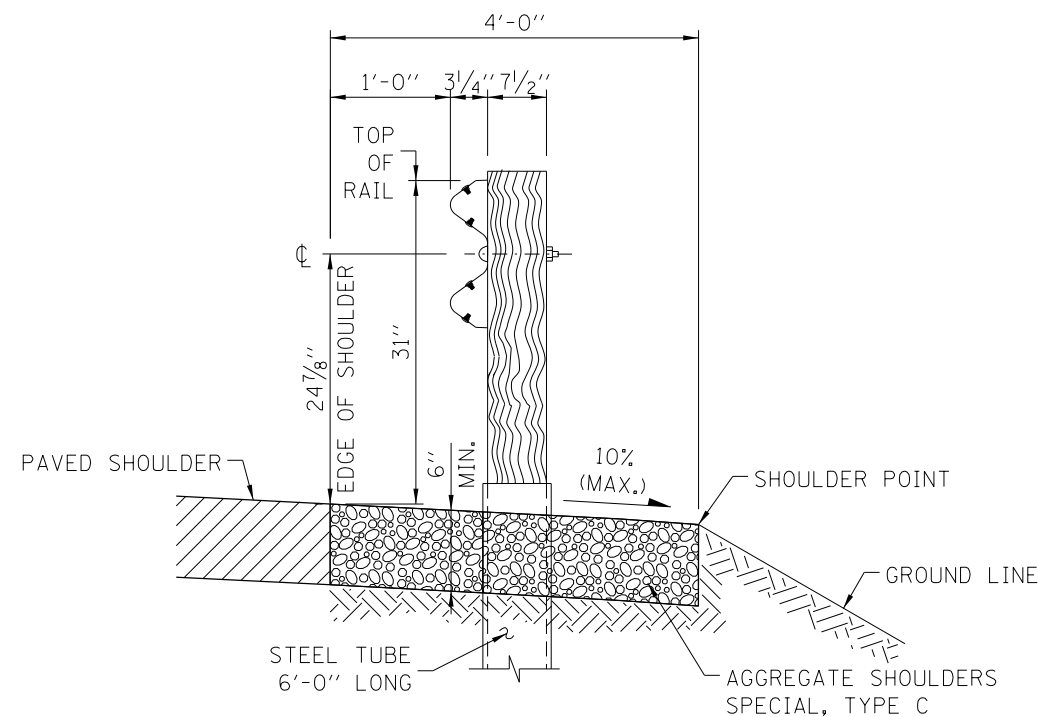


PLAN



ELEVATION

# TRAFFIC BARRIER TERMINAL, TYPE T2-WITHOUT GUTTER



SECTION A-A

## NOTES:

- SEE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
- THE BEARING PLATE K SHALL BE HELD IN POSITION BY TWO 8D NAILS DRIVEN INTO THE POST AND BENT OVER THE TOP OF THE PLATE.
- THE TRAFFIC BARRIER TERMINAL, TYPE T2 IS TYPICALLY UTILIZED FOR THE DEPARTING END SECTION OF A GALVANIZED STEEL PLATE BEAM GUARDRAIL BARRIER SYSTEM.
- UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
- TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE ILLINOIS TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
- TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENT. WHEN NECESSARY USE LEAVE-OUT DETAIL PER ILLINOIS TOLLWAY STANDARD DRAWING C1.
- WHERE GUTTER, TYPE G-2 OR GUTTER, TYPE G-3 ARE REQUIRED IN FRONT OF THE GUARDRAIL, THE POSTS SHALL BE LOCATED 6" BEHIND THE GUTTER, OR AS OTHERWISE DETAILED IN THE PLANS. THE OFFSET FROM THE EDGE OF SHOULDER TO THE FACE OF THE GUARDRAIL SHALL BE AS SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING B28.

SHEET 1 OF 3



TRAFFIC BARRIER TERMINAL, TYPE T2

STANDARD C7-08

DATE	REVISIONS
3-31-2017	REVISED SECT A-A SHOULDER SLOPE TO 10%
3-31-2016	REVISED SECTION A-A SHOULDER
3-11-2015	REVISED NOTES
3-31-2014	REVISED NOTES

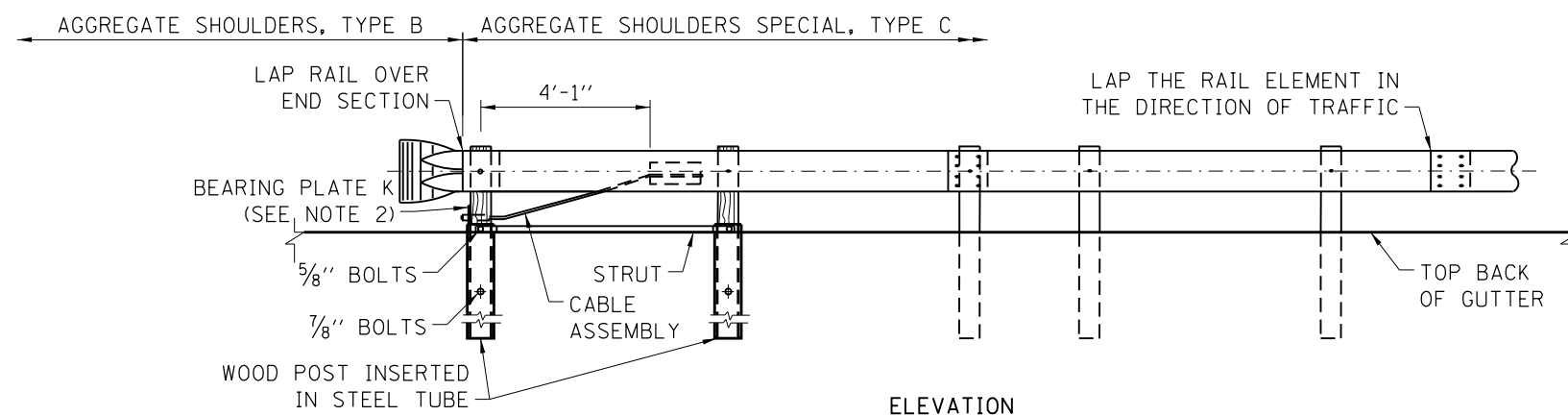
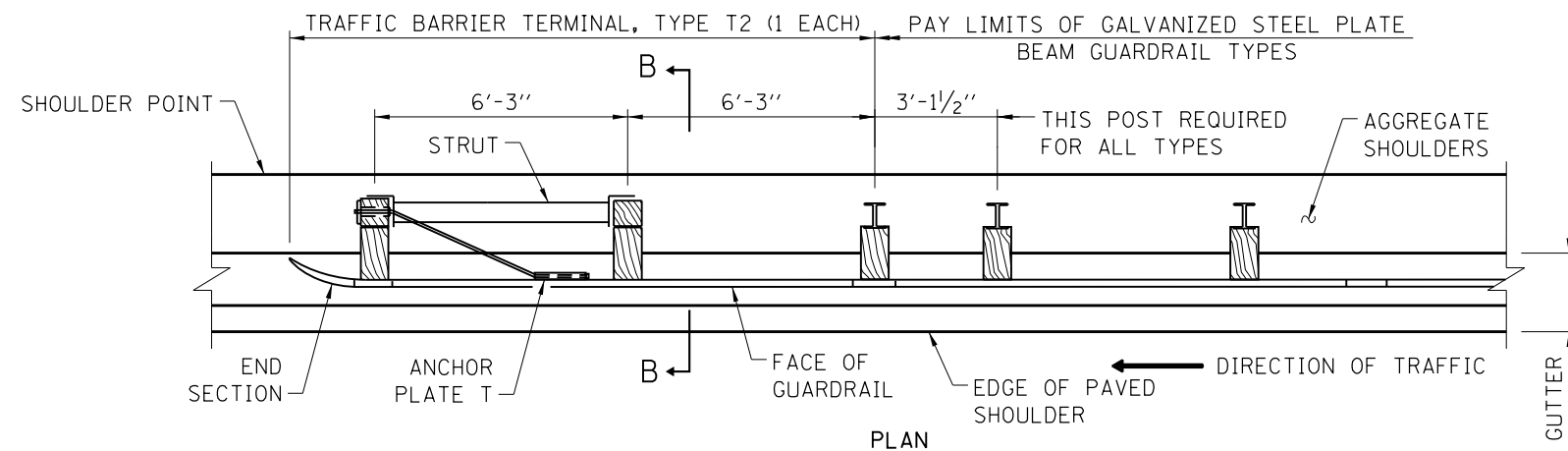
APPROVED BY:

*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

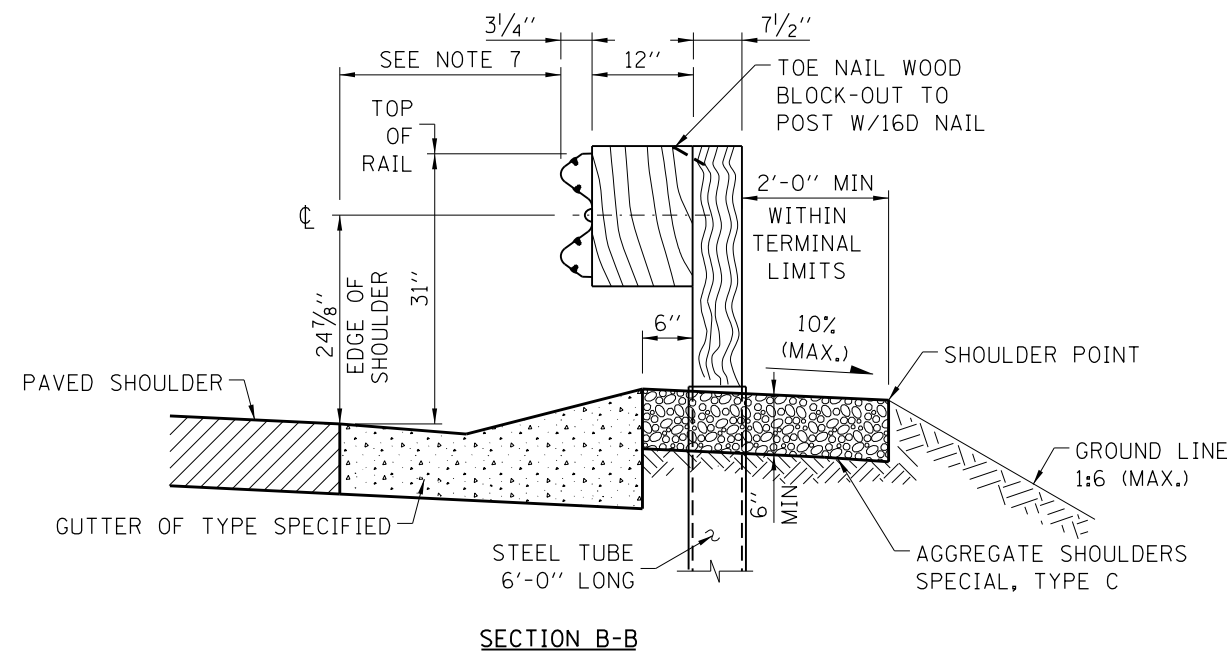
DATE:

07/01/2009





TRAFFIC BARRIER TERMINAL, TYPE T2-WITH GUTTER



SECTION B-B

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 07/01/2009

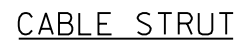
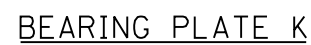
NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 2 OF 3

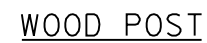


TRAFFIC BARRIER TERMINAL,  
TYPE T2

STANDARD C7-08



## ANCHOR PLATE T DETAILS



FRONT

SIDE

STEEL TUBE



NOTE:

SHEET 3 OF 3



TRAFFIC BARRIER TERMINAL,  
TYPE T2

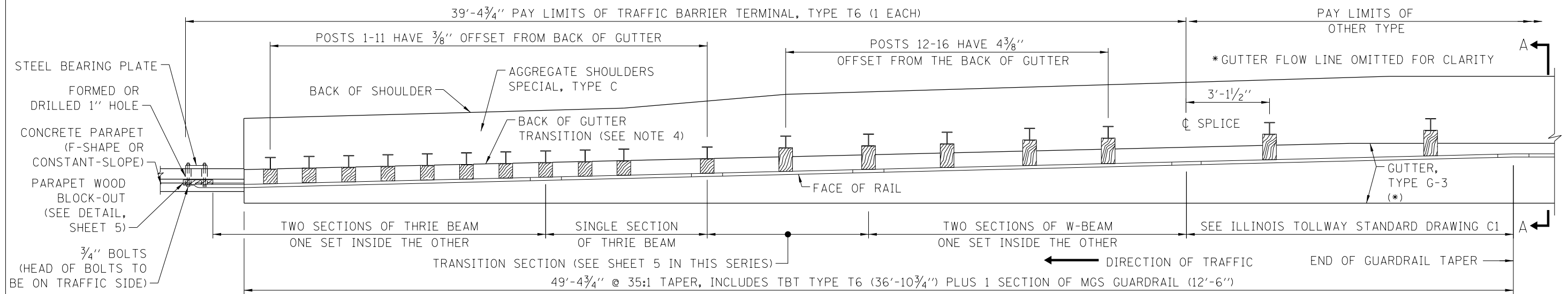
STANDARD C7-08

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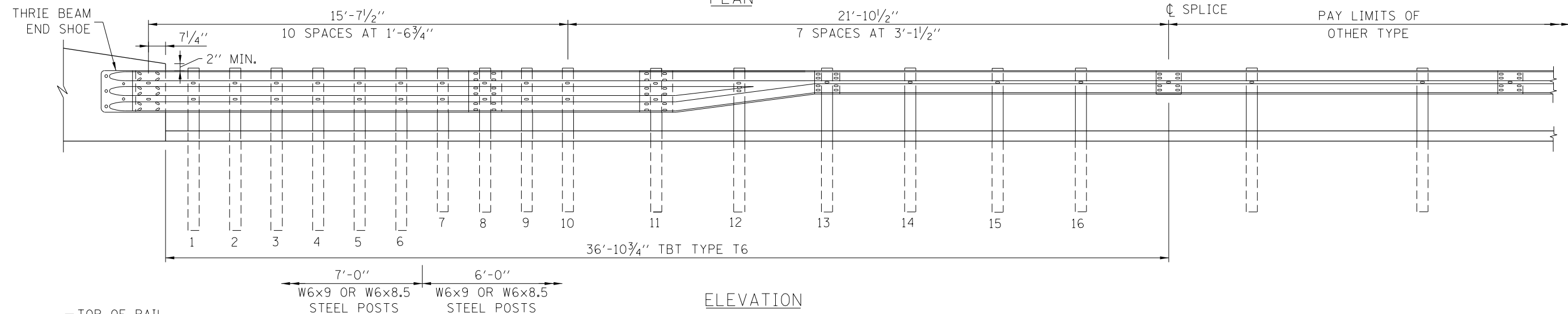
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Paul Kovacs  
CHIEF ENGINEERING OFFICER

07/01/2009



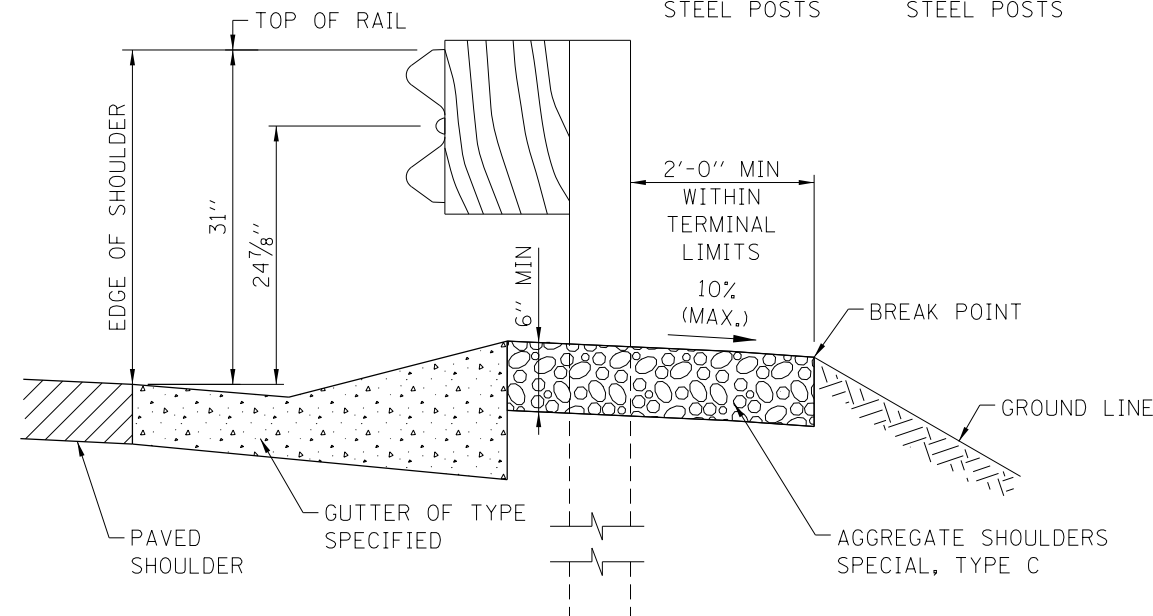
PLAN



ELEVATION

NOTES:

- SEE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
- THRIE BEAM RAIL SHALL BE BOLTED TO BLOCK-OUT AT ALL POSTS.
- THE TRAFFIC BARRIER TERMINAL, TYPE T6 IS TYPICALLY UTILIZED TO ATTACH GALVANIZED STEEL PLATE BEAM GUARDRAIL AT THE UPSTREAM END OF THE BRIDGES CONCRETE PARAPET, WHERE A ROADSIDE GUTTER IS TO BE INSTALLED.
- SEE ILLINOIS TOLLWAY STANDARD DRAWING B3 FOR GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T6.
- UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
- TRAFFIC BARRIER TERMINAL, TYPE T6 SHALL BE IN ACCORDANCE WITH THE ILLINOIS TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
- TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENTS. WHEN NECESSARY USE LEAVE-OUT DETAIL PER ILLINOIS TOLLWAY STANDARD DRAWING C1.
- TERMINAL POSTS TO BE INSTALLED PERPENDICULAR TO BACK OF GUTTER.
- THE TERMINAL SYSTEM HAS BEEN PERFORMANCE-TESTED FOR CRASHWORTHINESS UNDER PROCEDURES DEFINED IN AASHTO MASH. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.
- TERMINAL BARRIER CLEARANCE DISTANCE SHALL CONFORM WITH TABLE 2 ON ILLINOIS TOLLWAY STANDARD DRAWING C1.
- LEAVE-OUT DIMENSION BEHIND POSTS 1-6, SHALL BE A MINIMUM OF 4".
- WHEN GUTTER IS PRESENT, DRAINAGE STRUCTURES SHALL NOT BE INSTALLED WITHIN THE TERMINAL LIMITS, BUT SHALL BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE TERMINAL AS REQUIRED.



WITH GUTTER, TYPE G-3

SECTION A-A

APPROVED BY:

DATE:

Paul Kovacs

CHIEF ENGINEERING OFFICER

07/01/2009

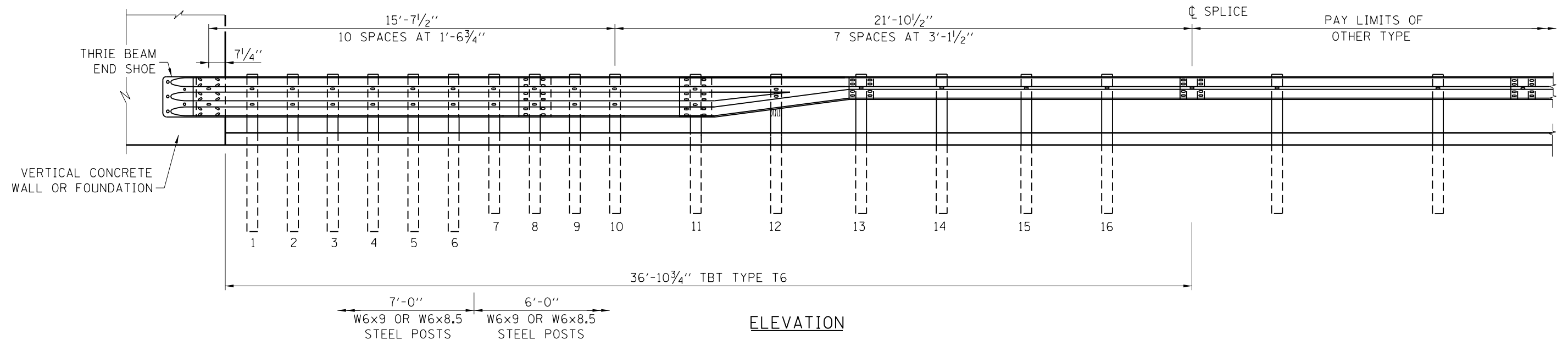
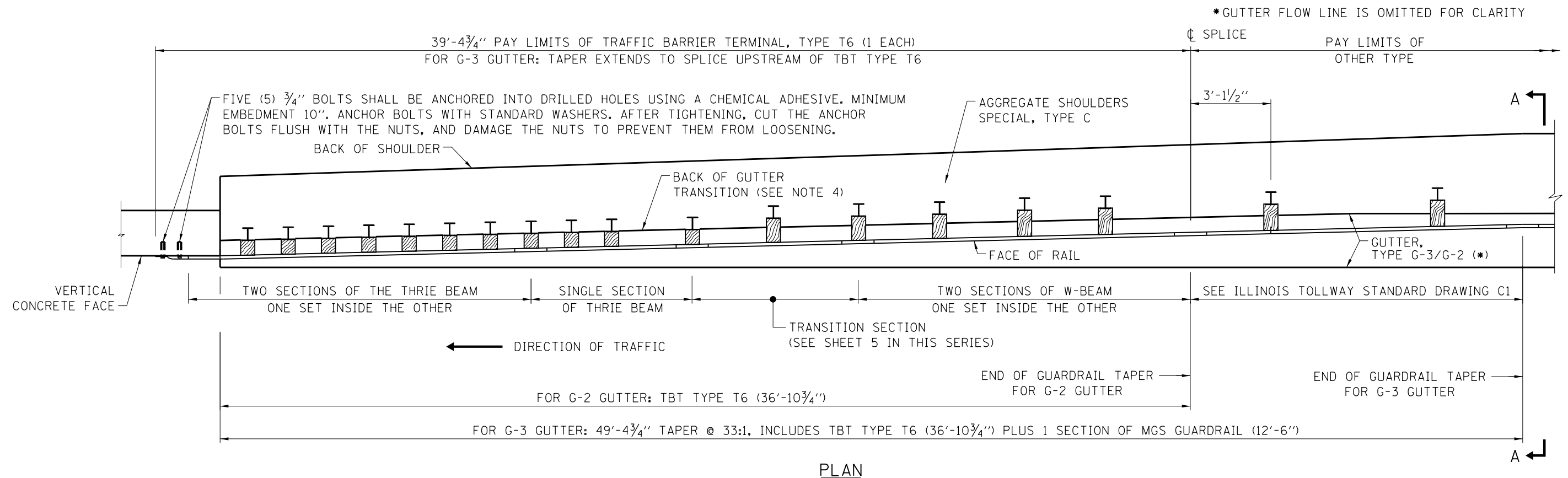
FOR PARAPET (SAFETY SHAPE)

WITH GUTTER, TYPE G-3

DATE	REVISIONS
3-01-2020	REVISED LENGTH OF THRIE BEAM
3-01-2019	REVISED LENGTH OF POSTS
3-01-2019	UPDATED NOTES FOR
3-31-2017	CONSTANT-SLOPE CONCRETE BARRIER
3-31-2016	ADDED DRAINAGE STRUCTURE NOTE
3-31-2016	REVISED SHOULDER SECTION

TRAFFIC BARRIER TERMINAL, TYPE T6

STANDARD C9-10



FOR OTHER VERTICAL CONCRETE WALL/FOUNDATION  
WITH GUTTER

SHEET 2 OF 5



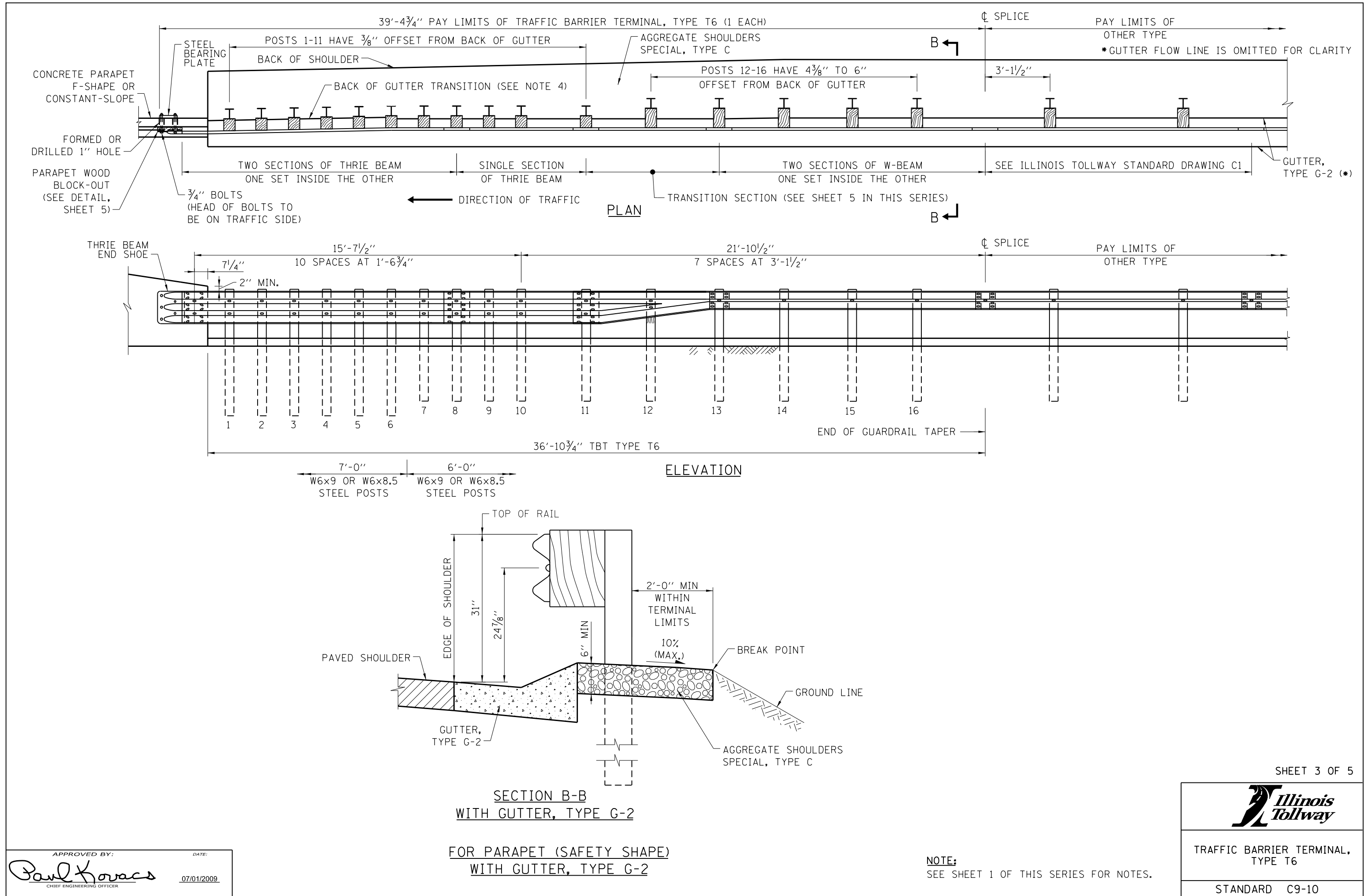
TRAFFIC BARRIER TERMINAL,  
TYPE T6

STANDARD C9-10

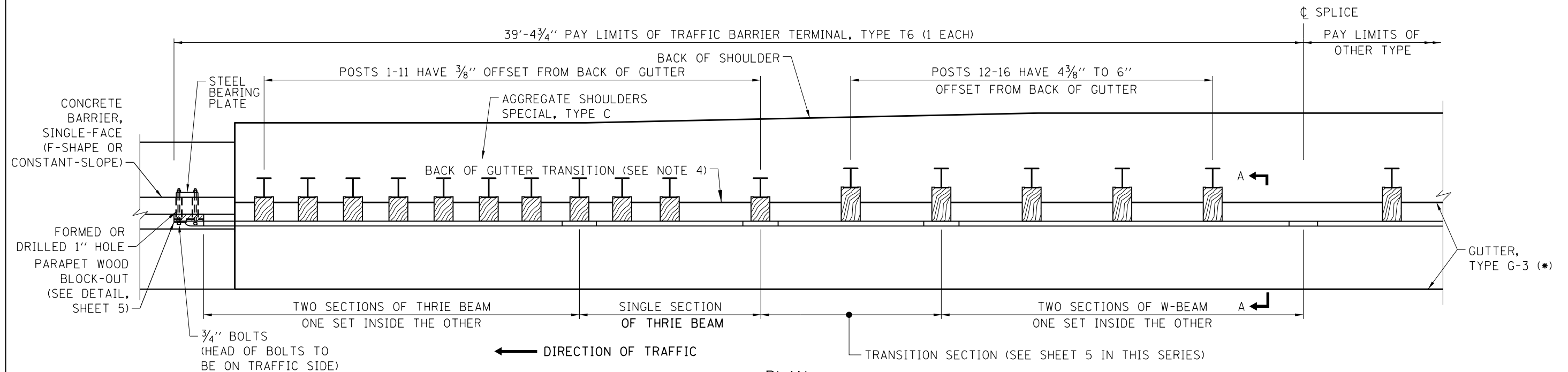
APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

DATE:  
07/01/2009

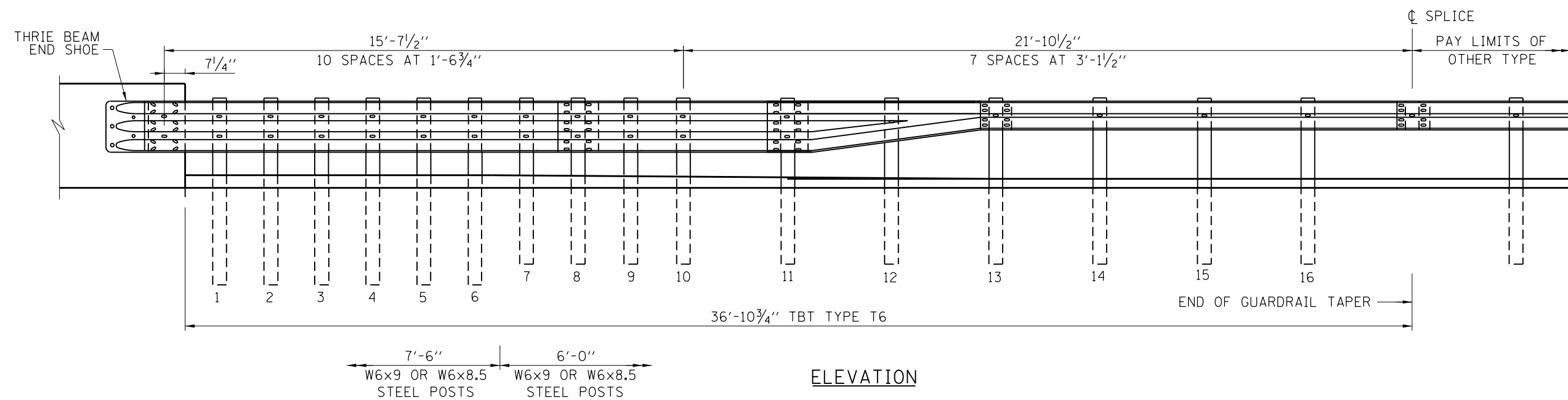
NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES  
AND SECTION A-A.



\*GUTTER FLOW LINE IS OMITTED FOR CLARITY



PLAN



ELEVATION

FOR CONCRETE BARRIER, SINGLE-FACE W/ GUTTER, TYPE G-3

SHEET 4 OF 5



TRAFFIC BARRIER TERMINAL, TYPE T6

STANDARD C9-10

NOTE:

SEE SHEET 1 OF THIS SERIES FOR GUTTER TRANSITION NOTES AND SECTION A-A.

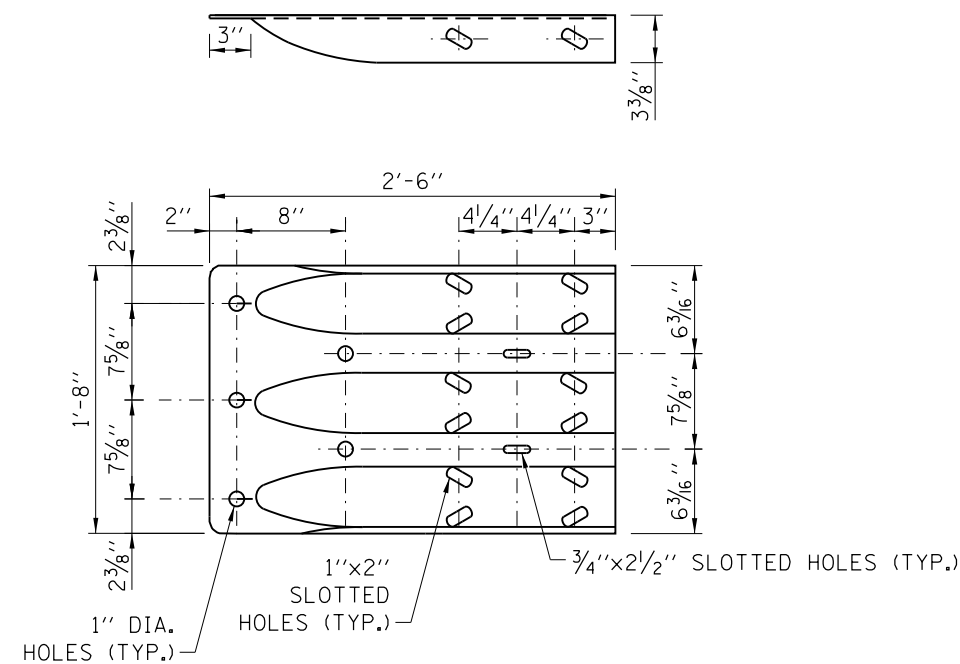
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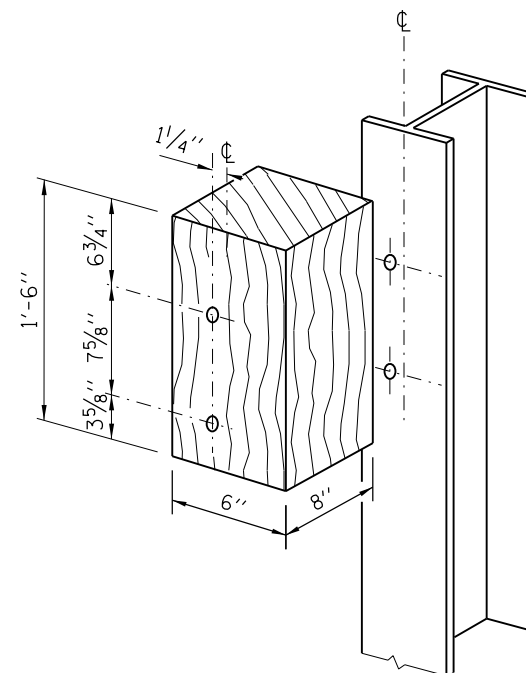
Paul Kovacs

02/07/2012

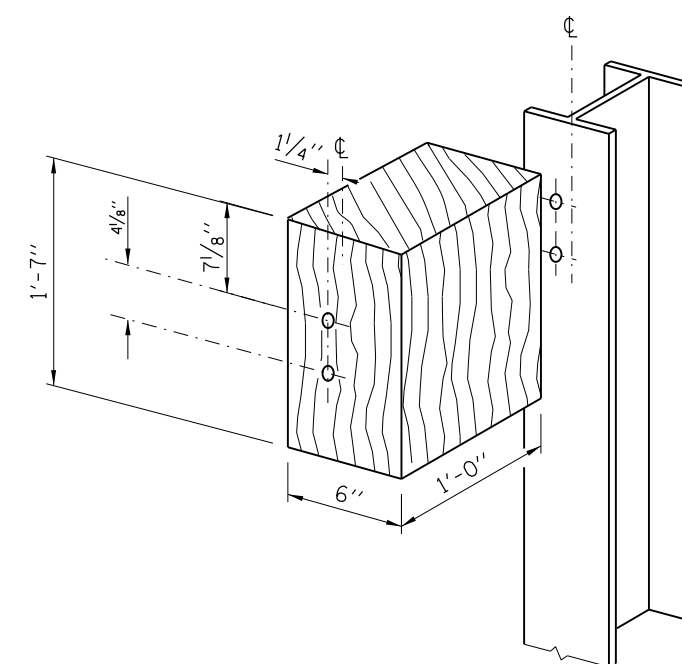
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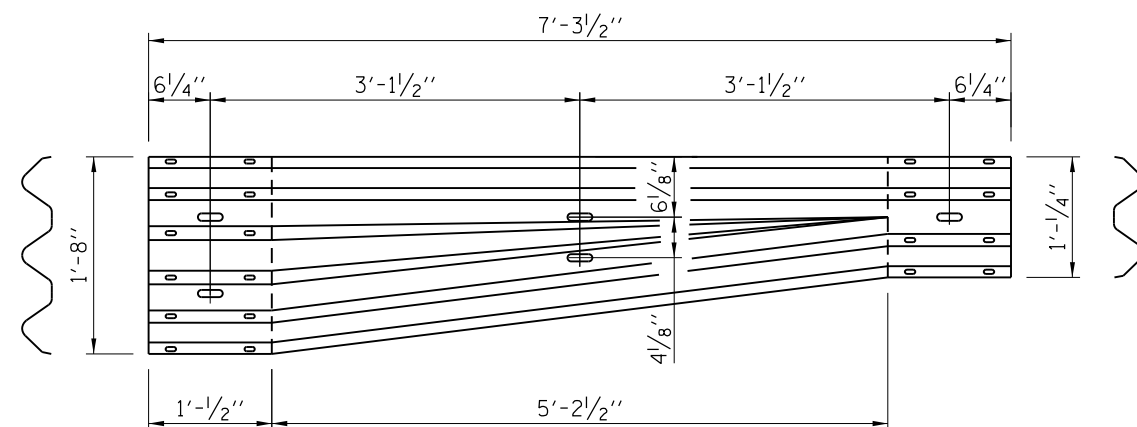
THRIE BEAM END SHOE DETAIL



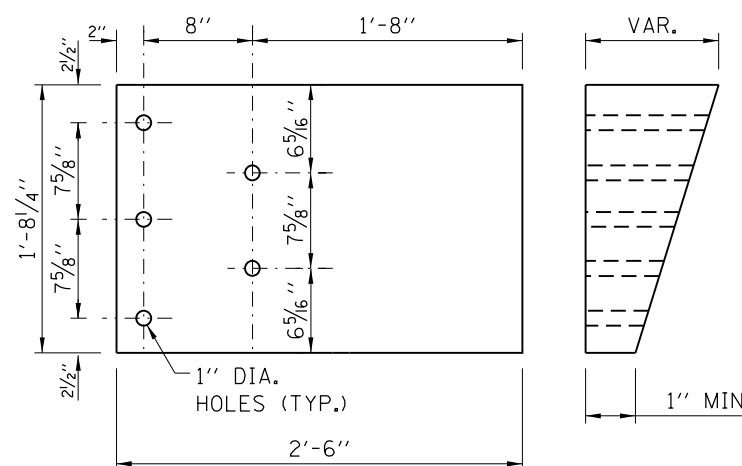
POSTS 1-11 WOOD BLOCK-OUT DETAIL



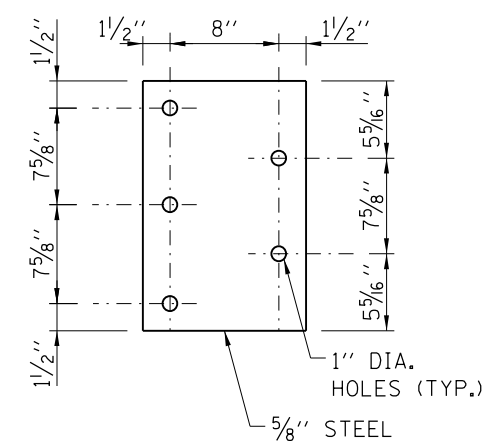
POST 12 WOOD BLOCK-OUT DETAIL  
(SEE ILLINOIS TOLLWAY STANDARD DRAWING C1  
FOR POST 13-16 BLOCKOUTS)



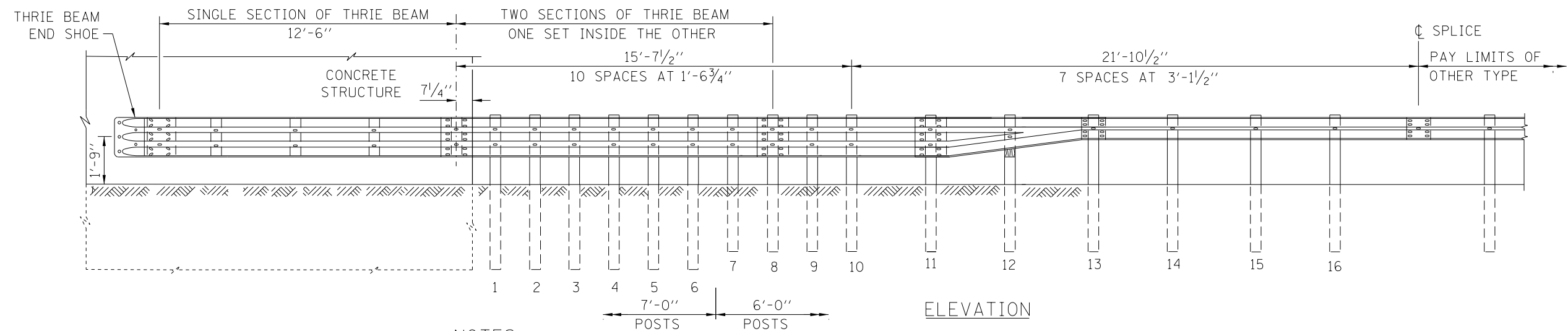
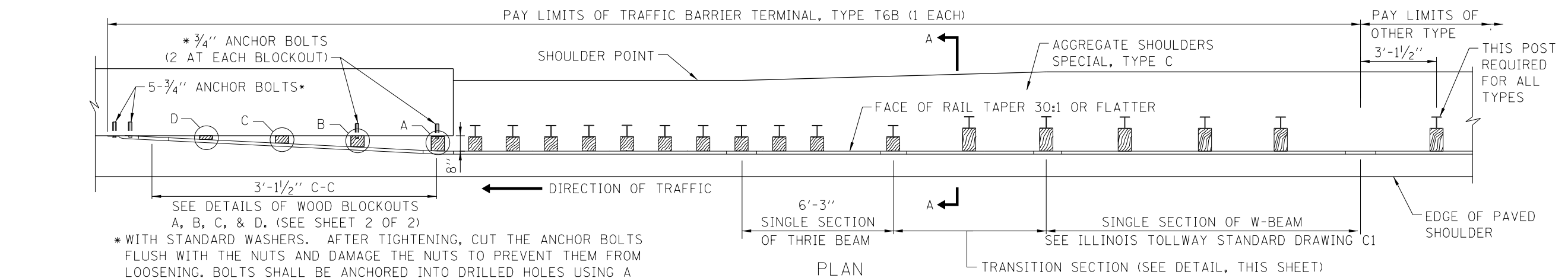
TRANSITION SECTION  
(10 GAUGE RAIL ELEMENT)



PARAPET WOOD BLOCK-OUT DETAIL

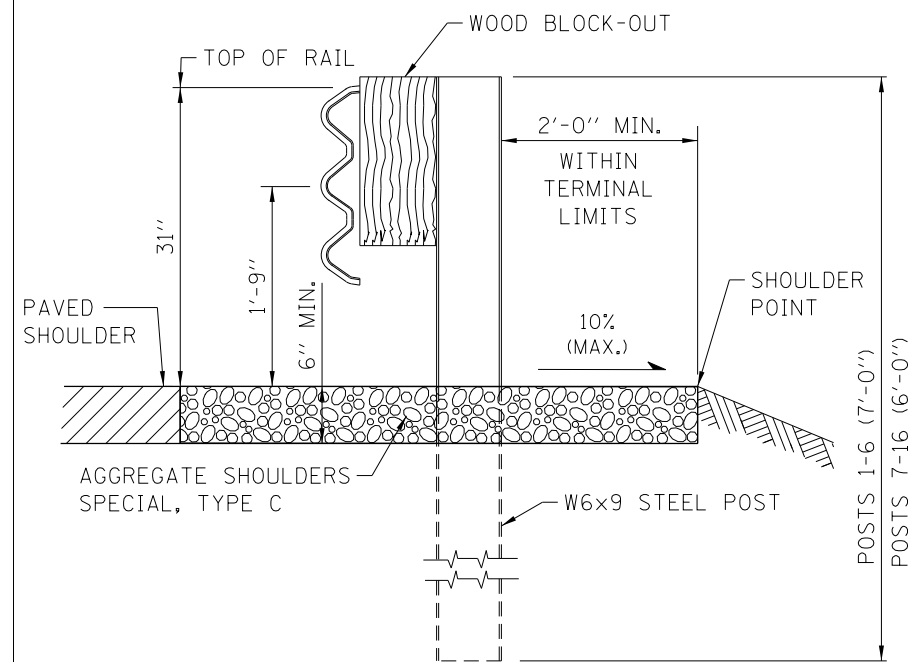


PARAPET STEEL BEARING PLATE DETAIL  
(5 EACH INDIVIDUAL 5"x5"x5/8" STEEL  
PLATES WITH CENTERED 1" HOLES MAY BE  
SUBSTITUTED FOR THE PLATE SHOWN.)

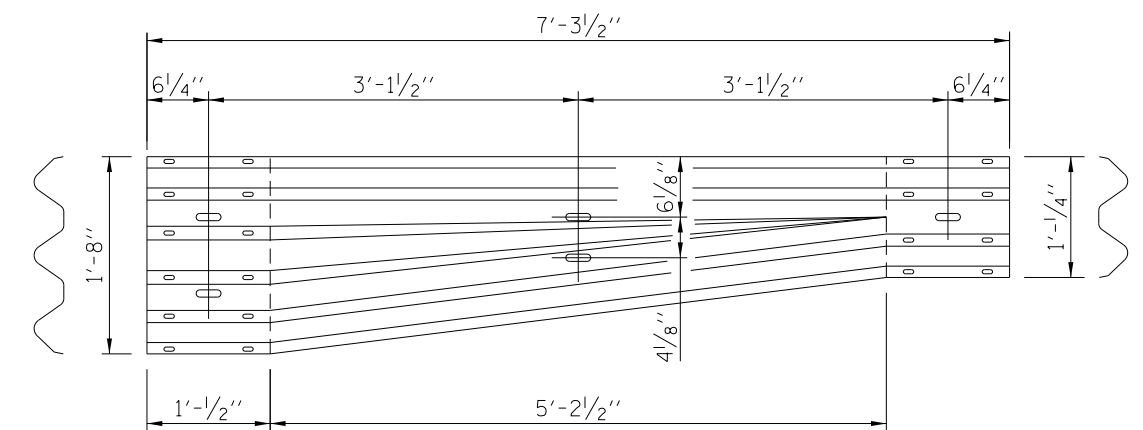


#### NOTES:

1. SEE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
2. THRIE BEAM RAIL SHALL BE BOLTED TO BLOCK-OUT AT ALL POSTS.
3. THE TRAFFIC BARRIER TERMINAL, TYPE T6B IS TYPICALLY UTILIZED TO ATTACH GALVANIZED STEEL PLATE BEAM GUARDRAIL AT THE UPSTREAM END OF THE BRIDGE CONCRETE PARAPET, WHERE A ROADSIDE GUTTER IS NOT TO BE INSTALLED.
4. UNDER NO CIRCUMSTANCES SHALL EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
5. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE ILLINOIS TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
6. TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT PAVEMENTS. WHEN NECESSARY USE LEAVE-OUT DETAIL PER ILLINOIS TOLLWAY STANDARD DRAWING C1, SHEET 3 OF 4.
7. TERMINAL BARRIER CLEARANCE DISTANCE SHALL CONFORM WITH TABLE 2 ON ILLINOIS TOLLWAY STANDARD DRAWING C1.
8. LEAVE-OUT DIMENSION BEHIND POSTS 1-6, SHALL BE A MINIMUM OF 4\".



SECTION A-A



TRANSITION SECTION  
(10 GAUGE RAIL ELEMENT)

SHEET 1 OF 2



TRAFFIC BARRIER  
TERMINAL, TYPE T6B

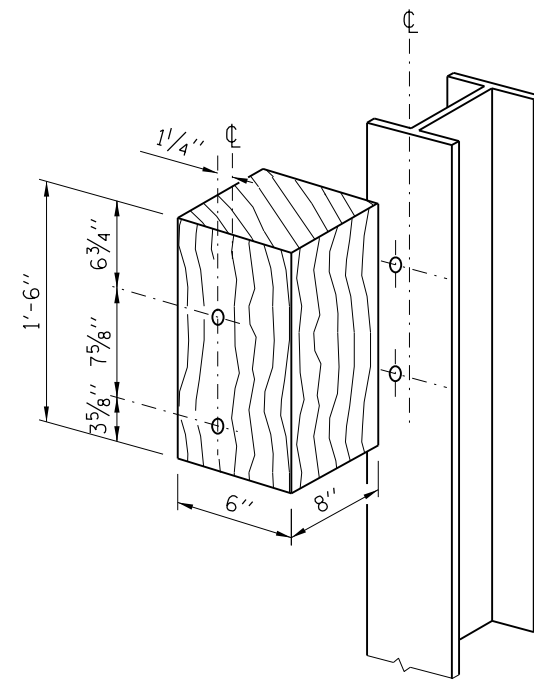
STANDARD C10-09

DATE	REVISIONS
3-01-2020	REVISED LENGTH OF THRIE BEAM
	REVISED LENGTH OF POSTS
3-31-2017	REVISED SHOULDER SLOPE LABEL
3-31-2016	REVISED SECTION A-A SHOULDER
3-11-2015	REVISED NOTES
3-31-2014	REVISED WOOD BLOCKS AND NOTES

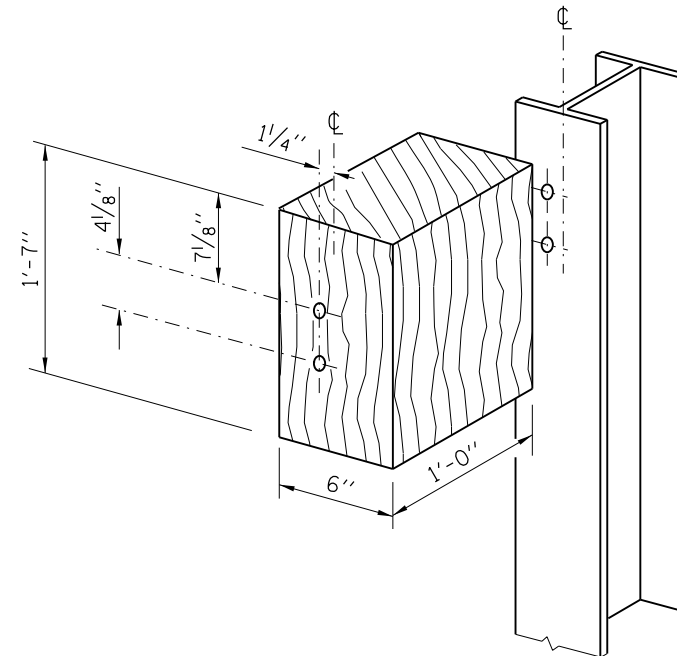
APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

DATE:  
07/01/2009

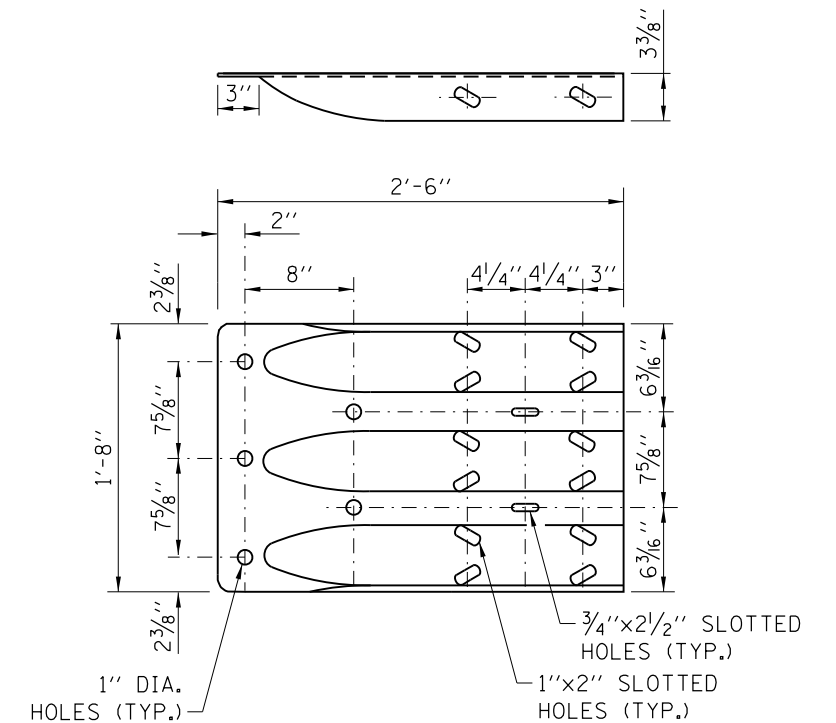




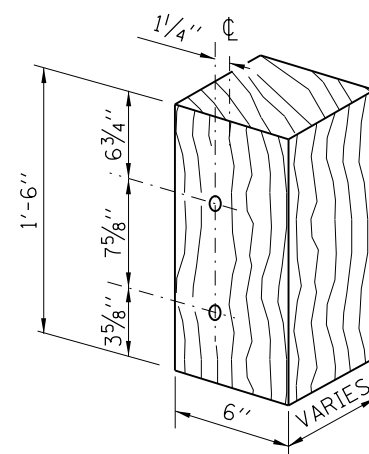
POSTS 1-11 WOOD BLOCK-OUT DETAIL



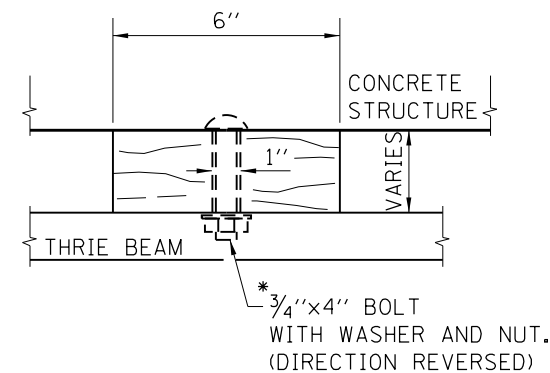
POST 12 WOOD BLOCK-OUT DETAIL  
(SEE ILLINOIS TOLLWAY STANDARD DRAWING C1  
FOR POST 13-16 BLOCKOUTS)



THRIE BEAM END SHOE DETAIL

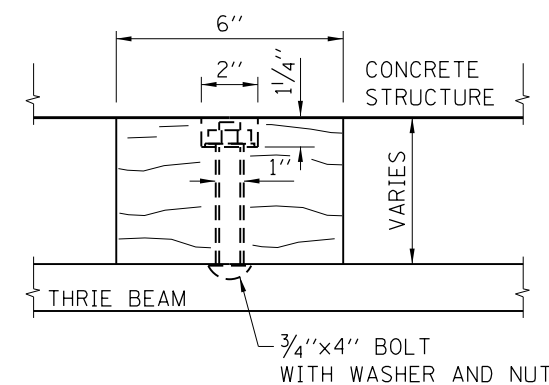


MODIFIED THICKNESS DETAIL  
WOOD BLOCK-OUTS A, B, C, & D

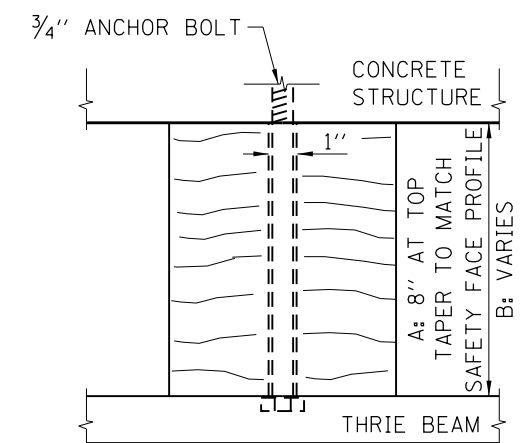


WOOD BLOCK-OUT D

\* AFTER TIGHTENING, CUT THE BOLTS FLUSH WITH THE NUTS AND DAMAGE THE NUTS TO PREVENT THEM FROM LOOSENING.



WOOD BLOCK-OUT C



WOOD BLOCK-OUT A & B

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
07/01/2009

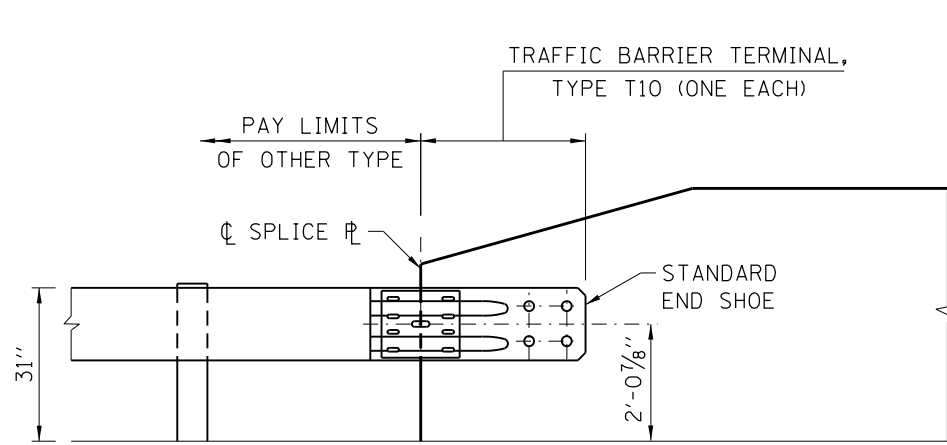
NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 2 OF 2

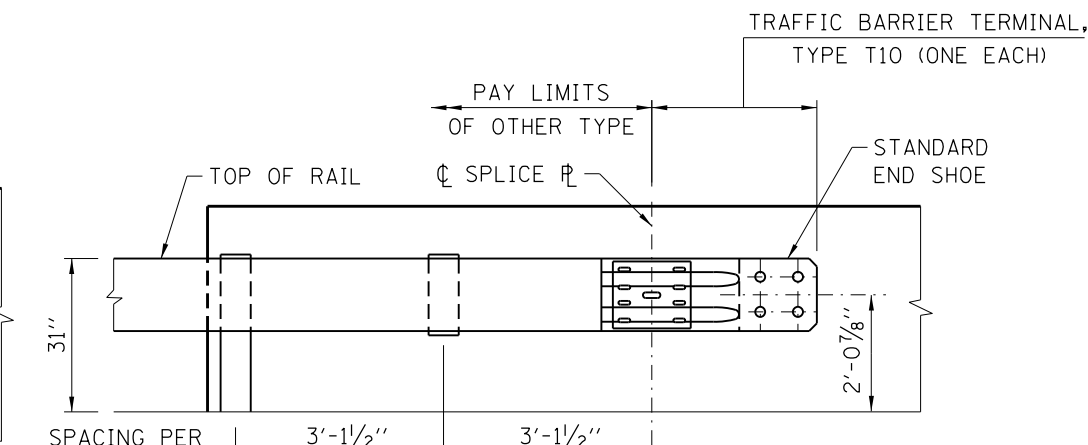


TRAFFIC BARRIER  
TERMINAL, TYPE T6B

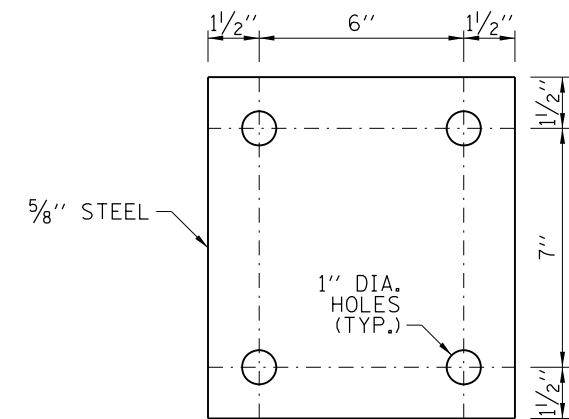
STANDARD C10-09



ELEVATION

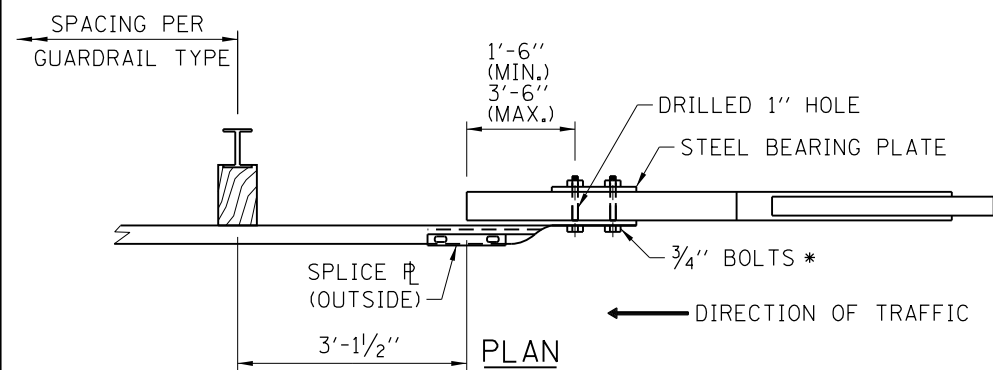


ELEVATION

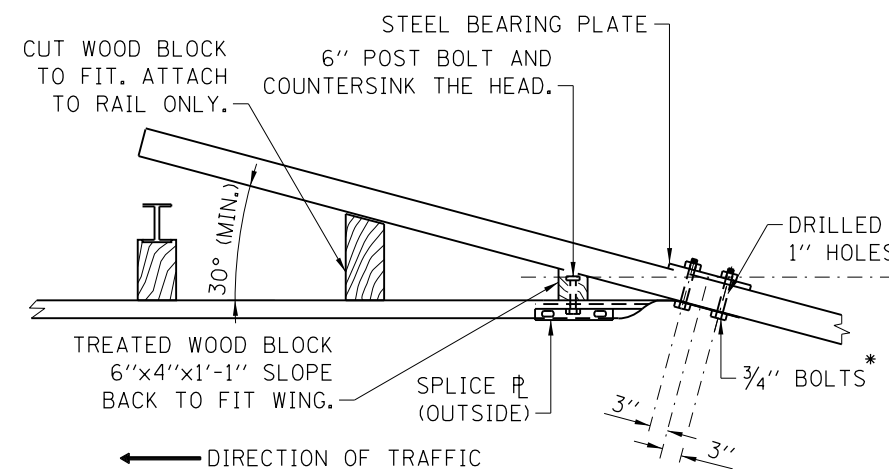


PARAPET STEEL BEARING  
PLATE DETAIL

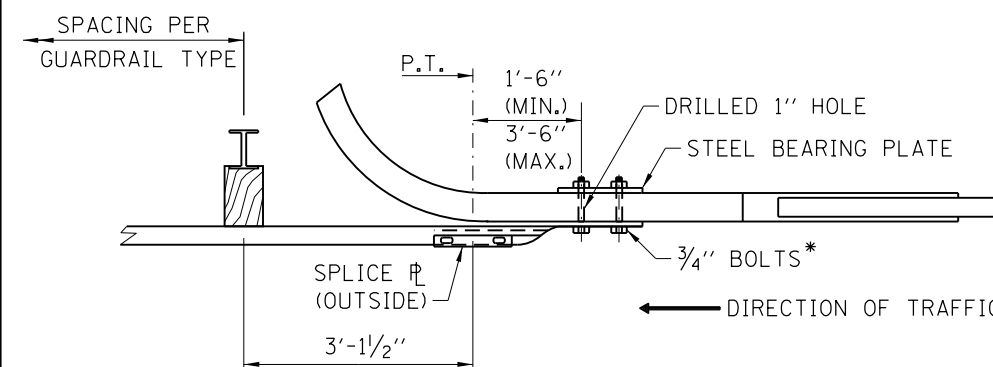
(4 EACH INDIVIDUAL 5"x5"x5/8" STEEL PLATES WITH CENTERED HOLES MAY BE SUBSTITUTED FOR THE PLATE SHOWN)



TANGENT WING



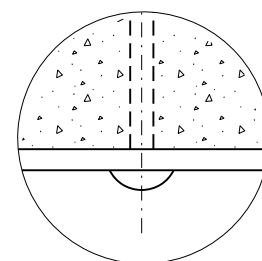
PLAN  
FLARED WING



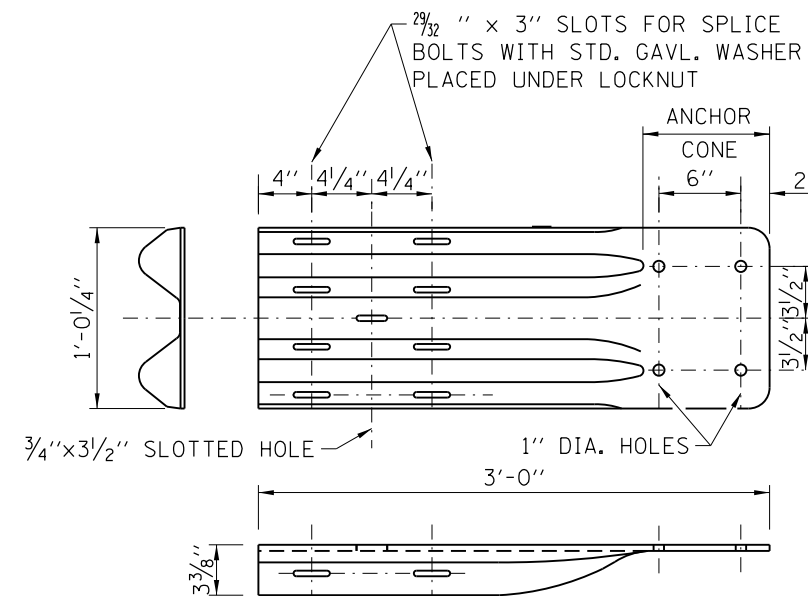
PLAN  
CURVED WING

**GENERAL NOTE:**

\* HEAD OF BOLT TO BE ON TRAFFIC SIDE. SEE DETAIL "A"



DETAIL "A"



END SHOE

**NOTES:**

- SEE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR DETAILS OF GUARDRAIL NOT SHOWN.
- THE 24 7/8" TYPICAL RAIL HEIGHT IS MEASURED FROM EXISTING SURFACE 1'-0" IN FRONT OF RAIL, OR FROM EDGE OF SHOULDER/EDGE OF GUTTER WHEN EDGE IS MORE THAN 1'-0" IN FRONT OF RAIL TO CENTER OF RAIL.
- THE TRAFFIC BARRIER TERMINAL, TYPE T10 IS TYPICALLY UTILIZED TO CONNECT GALVANIZED STEEL PLATE BEAM GUARDRAIL TO THE DEPARTING END OF AN EXISTING BRIDGE CONCRETE WING WALL OR PARAPET.
- UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
- TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE ILLINOIS TOLLWAY'S DETAILS AND SPECIFICATIONS. NO MODIFICATIONS SHALL BE PERMITTED.
- WHEN END SHOE IS ATTACHED TO A BRIDGE PARAPET WHICH HAS AN EXPANSION JOINT, THE BOLTS SHALL BE PROVIDED WITH A LOCKNUT OR DOUBLE NUT AND SHALL BE TIGHTENED ONLY TO A POINT THAT WILL ALLOW GUARDRAIL MOVEMENT.
- THE ANCHOR CONE SHALL BE SET FLUSH WITH THE SURFACE OF THE CONCRETE.
- EXTERNALLY THREADED STUDS PROTRUDING FROM THE SURFACE OF THE CONCRETE SHALL NOT BE PERMITTED.
- WHEN WING WALL THICKNESS IS GREATER THAN 18" OR NOT ACCESSIBLE TO THE BACK SIDE, 4-3/4" BOLTS SHALL BE ANCHORED INTO DRILLED HOLES, USING A CHEMICAL ADHESIVE. MINIMUM EMBEDMENT SHALL BE 10". ANCHOR BOLTS WITH STANDARD WASHER SHALL BE USED. AFTER TIGHTENING, CUT THE ANCHOR BOLTS FLUSH WITH THE NUTS, AND DAMAGE THE NUTS TO PREVENT THEM FROM LOOSENING.

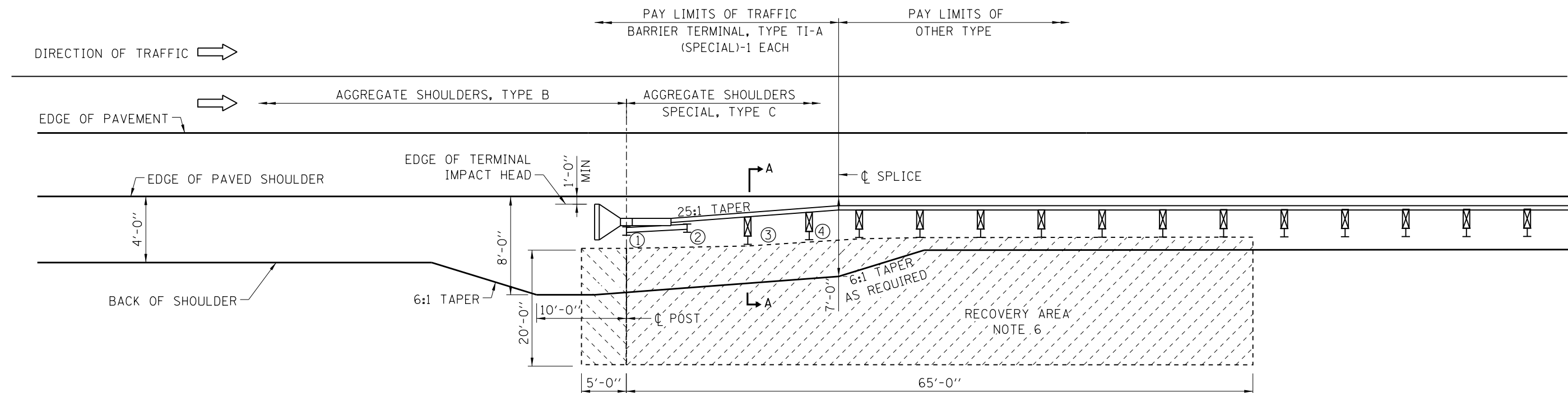
DATE	REVISIONS
3-31-2017	REV'D EL PARAPET & FL WING ANGLE
3-31-2016	REVISED FLARED WING ANGLE.
3-11-2015	REVISED NOTES.
3-31-2014	REVISED NOTES.
2-07-2012	REVISED BOLT NOTE, ADDED DETAIL "A" AND REVISED NOTES.



TRAFFIC BARRIER  
TERMINAL, TYPE T10

STANDARD C11-07

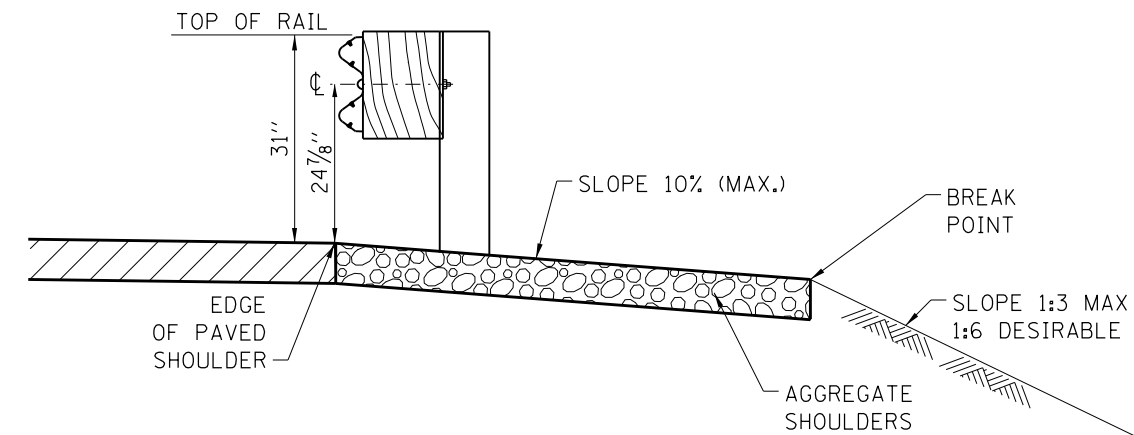
APPROVED BY: *Paul Kovacs* CHIEF ENGINEERING OFFICER  
DATE: 07/01/2009



**SHOULDER WIDENING TRANSITION - WITHOUT GUTTER  
FOR TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL)**

**GENERAL NOTES:**

1. ALL SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
2. THE TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL) IS THE UPSTREAM END SECTION OF A GALVANIZED STEEL PLATE BEAM GUARDRAIL BARRIER SYSTEM, FOR RAMP INSTALLATION WITH DESIGN SPEED LIMIT OF 40 MPH OR LESS, AASHTO MASH, TEST LEVEL (TL-2).
3. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING B29 FOR GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL), AND MINIMUM DISTANCE FROM EDGE OF PAVED SHOULDER TO FACE OF RAIL.
4. UNDER NO CIRCUMSTANCES SHALL AN EXISTING TERMINAL, THAT WAS DESIGNED USING A PREVIOUS STANDARD, BE ATTACHED TO OR MODIFIED IN ANYWAY FROM ITS ORIGINAL DESIGN. IF ANY MODIFICATION IS REQUIRED AND A PROPER BARRIER WARRANT HAS BEEN COMPLETED, THE ENTIRE BARRIER INSTALLATION SHALL BE COMPLETELY REMOVED AND REPLACED WITH A NEW SYSTEM THAT CONFORMS TO THE CURRENT STANDARD.
5. TRAFFIC BARRIER TERMINAL SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.
6. NO ABOVE-GROUND ROADSIDE OBSTACLE OF ANY TYPE-FIXED OR BREAKAWAY, EITHER TEMPORARY OR PERMANENT SHALL BE ALLOWED WITHIN THIS RECOVERY AREA.
7. ON TANGENT ROADWAY: TRAFFIC BARRIER TERMINAL SHALL BE INSTALLED AT A 25:1 TAPER MEASURED FROM EDGE OF TRAVELED WAY.  
ON CURVED ROADWAY: THE EDGE OF THE TERMINAL IMPACT HEAD SHALL BE OFFSET A DISTANCE FROM A POINT ON THE BACK OF THE CURVED EDGE OF PAVED SHOULDER AS SHOWN IN TABLE 1. NO CURVED W-BEAM SECTIONS ARE PERMITTED WITHIN THE TERMINAL PAY LIMITS. THE TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL) SHALL BE LAID OUT IN A STRAIGHT LINE.
8. TERMINAL POSTS SHALL NOT BE INSTALLED IN CONCRETE OR ASPHALT. WHEN NECESSARY USE LEAVE-OUT DETAIL SHOWN ON ILLINOIS TOLLWAY STANDARD DRAWING C1.
9. THE TERMINAL SYSTEM HAS BEEN PERFORMANCE-TESTED FOR CRASHWORTHINESS UNDER PROCEDURES DEFINED IN AASHTO MASH. NO MODIFICATION TO THIS STANDARD DRAWING SHALL BE PERMITTED.
10. WHEN GUTTER IS PRESENT, DRAINAGE STRUCTURES SHALL NOT BE INSTALLED WITHIN THE TERMINAL LIMITS, BUT SHALL BE INSTALLED UPSTREAM AND DOWNSTREAM OF THE TERMINAL AS REQUIRED.



**SECTION A-A**

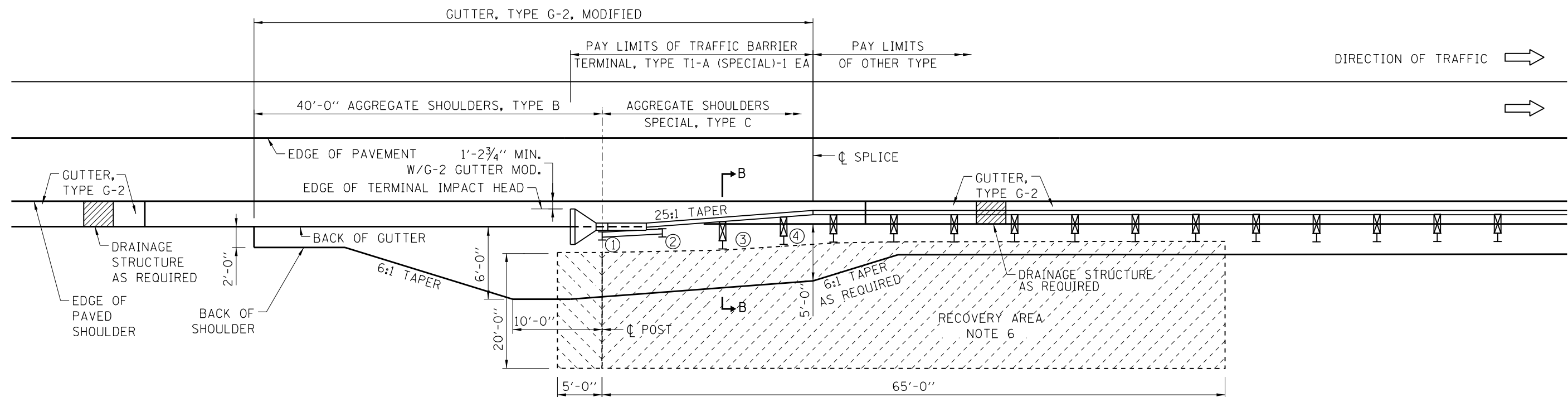


**SHOULDER WIDENING FOR  
TRAFFIC BARRIER TERMINAL,  
TYPE T1-A (SPECIAL)**

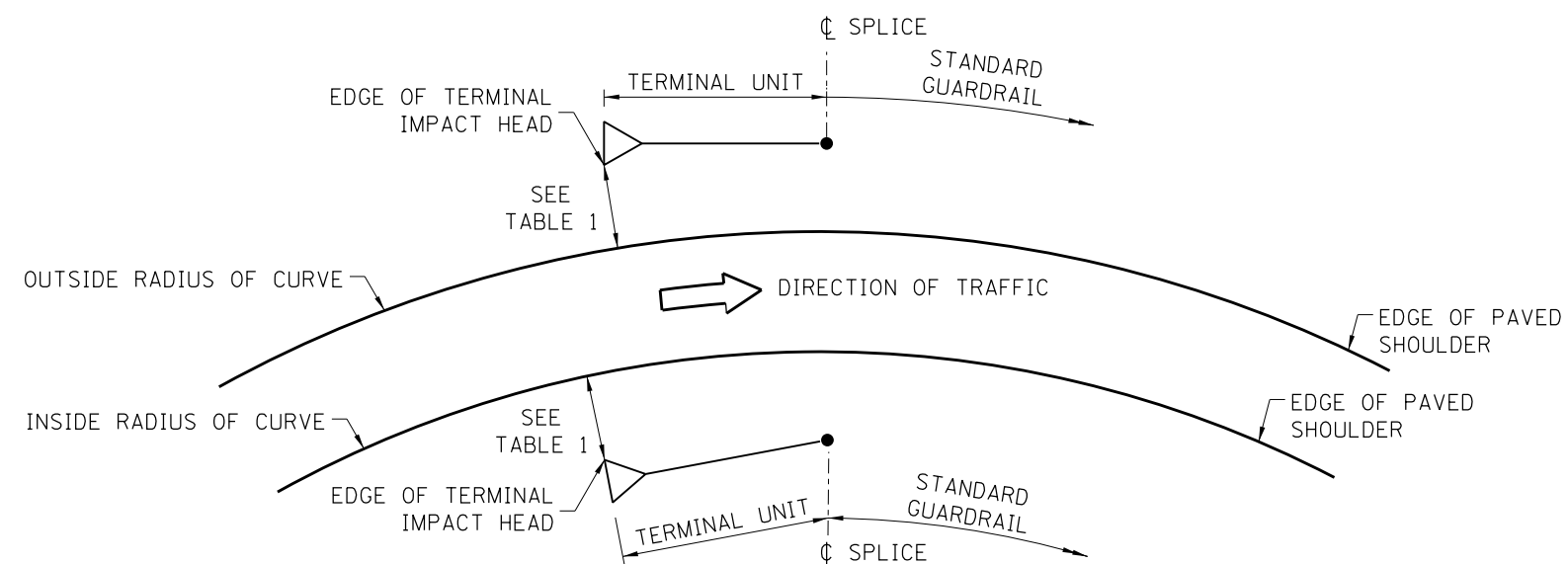
**STANDARD C12-10**

DATE	REVISIONS
3-01-2020	ADD MOD. TO TABLE 1 & PLAN NOTE
3-01-2019	ADDED MOD. TO TABLE 1 & PL
3-01-2018	CORRECTED G-2 GUTTER REFERENCE
3-01-2017	REV SHOULDER WIDTH AT TERMINAL
3-01-2016	ADD INSTALL NOTES IN NOTE 7 AND REVISED SECTION A-A SHLDR

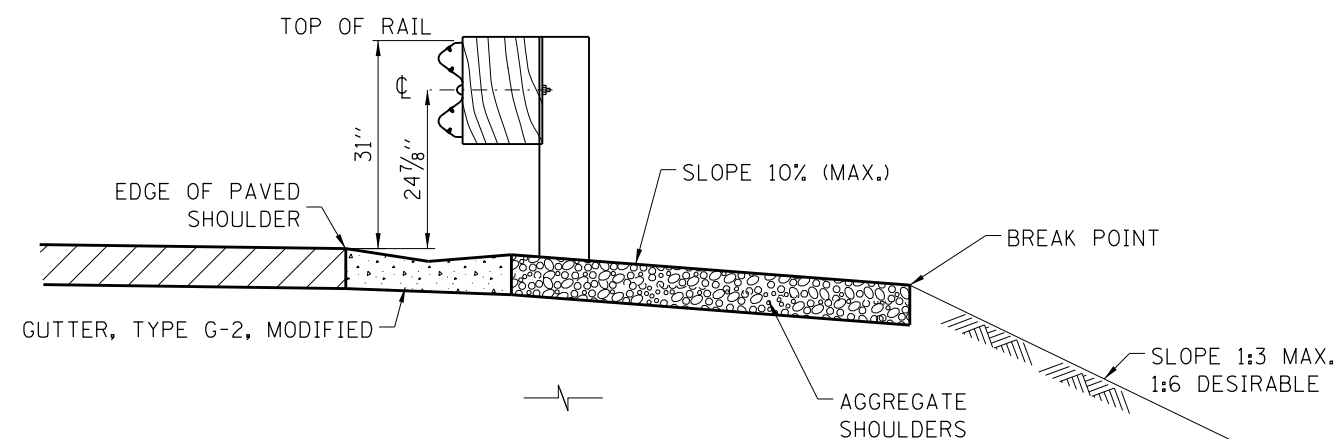
APPROVED BY: *Paul Kovacs* DATE: 01/01/2011  
CHIEF ENGINEERING OFFICER



SHOULDER WIDENING TRANSITION - WITH GUTTER, TYPE G-2  
FOR TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL)



CURVED ROADWAY  
TRAFFIC BARRIER TERMINAL PLACEMENT  
(SEE NOTE 7)



SECTION B-B

NOTES:

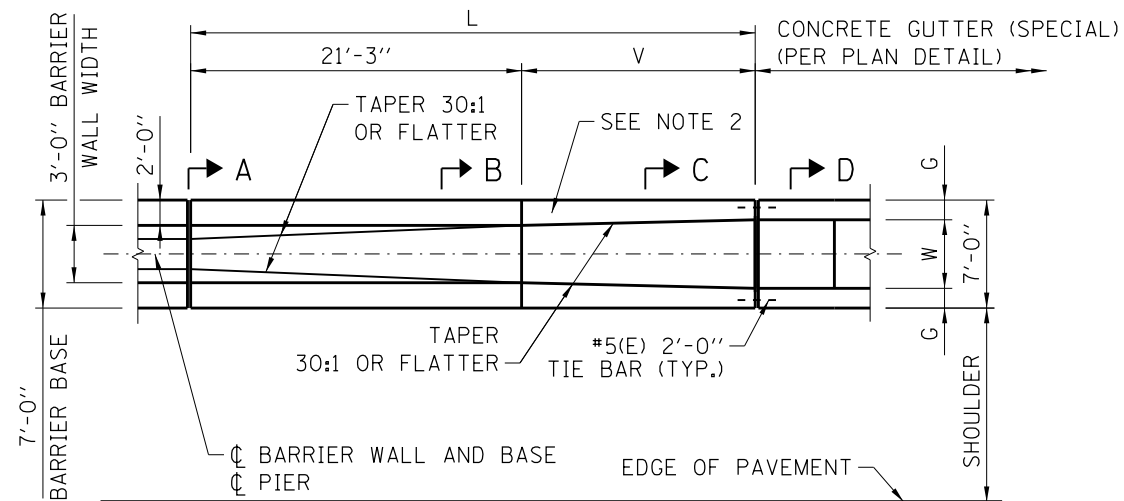
SEE SHEET 1 OF THIS SERIES FOR NOTES.

TABLE 1		
LATERAL OFFSET DIMENSION TO EDGE OF TERMINAL IMPACT HEAD		
	INSIDE RADIUS OF CURVE	OUTSIDE RADIUS OF CURVE
NO GUTTER	1'-0"	1'-0" *
GUTTER, TYPE G-2, MOD.	1'-2 3/4"	1'-2 3/4" MIN. *

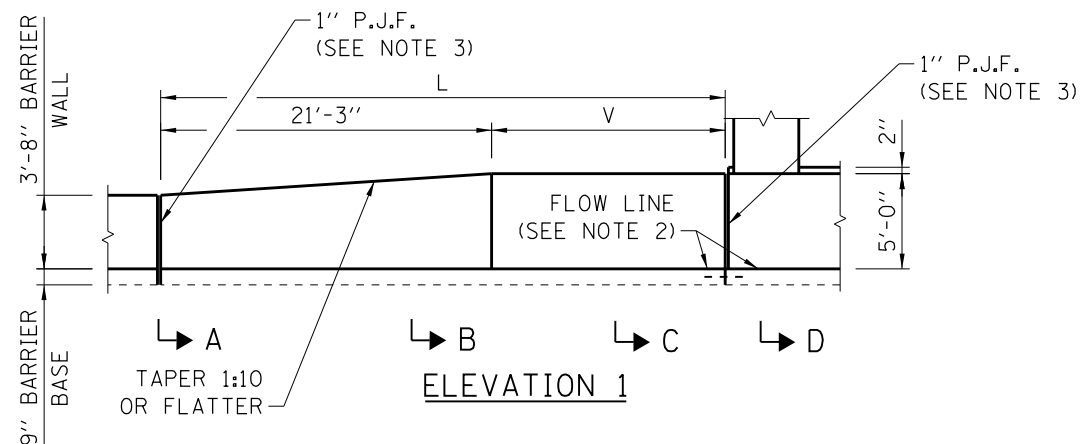
(\*) OFFSET DISTANCE WILL VARY BASED ON RADIUS OF HORIZONTAL CURVE AND THE TERMINAL BEING INSTALLED IN A STRAIGHT LINE.

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
01/01/2011

SHEET 2 OF 2

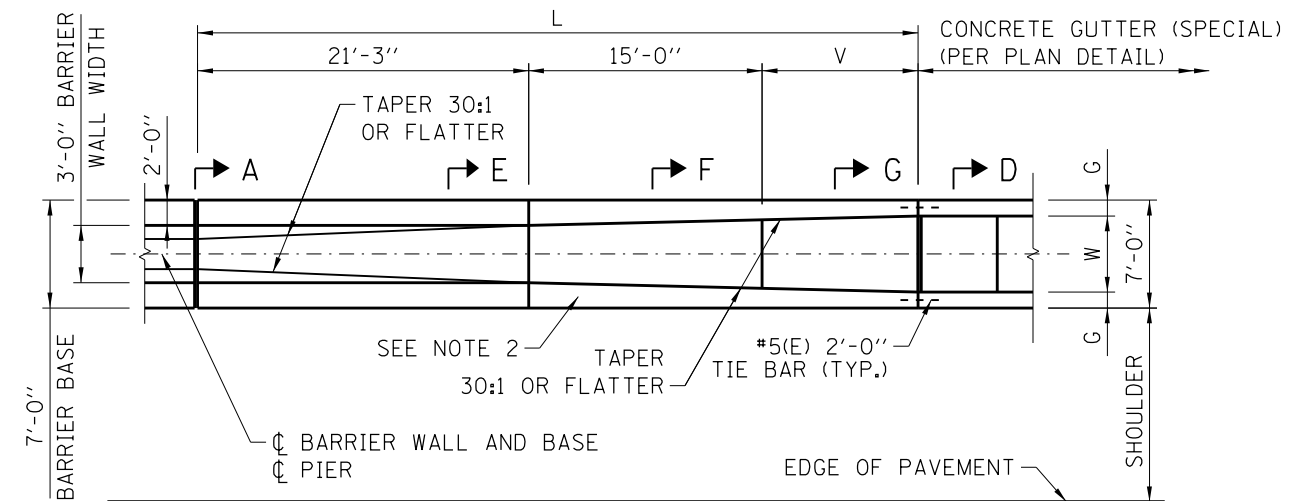


PLAN 1

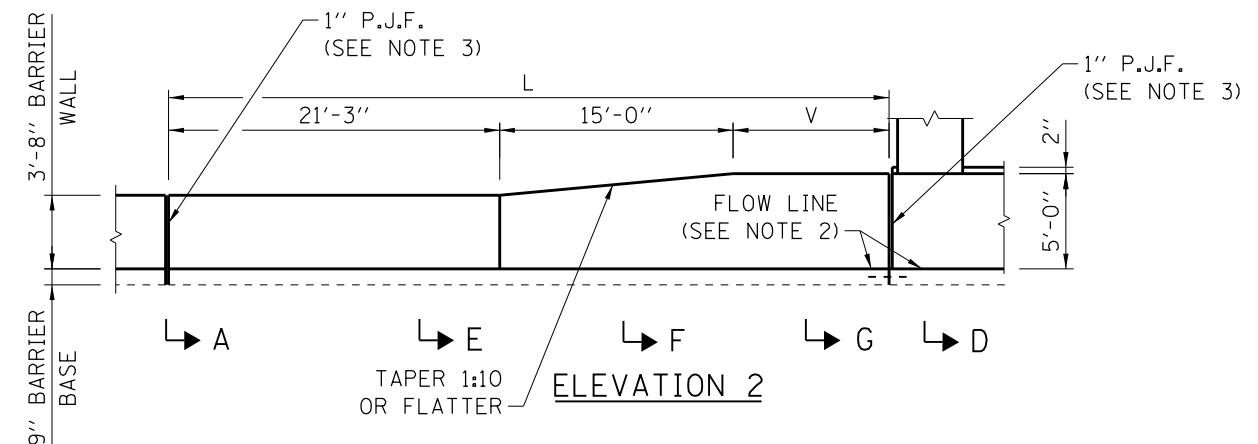


ELEVATION 1

CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-DF  
AT BRIDGE PIERS (FOR  $W \leq 4'-0''$ )



PLAN 2



ELEVATION 2

CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-DF  
AT BRIDGE PIERS (FOR  $W > 4'-0''$ )

NOTES:

- 2" DEEP CONTRACTION JOINTS SHALL BE DONE BY SAWING AND SHALL BE CONSTRUCTED IN THE CONCRETE BARRIER WALL, CONCRETE BARRIER BASE, AND CONCRETE GUTTER (SPECIAL). CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0". THE MINIMUM DISTANCE BETWEEN CONTRACTION JOINTS IN THE MEDIAN BARRIER WALL SHALL BE 2'-0". WHEN A DRAINAGE STRUCTURE FALLS WITHIN 2'-0" FROM AN EXPANSION JOINT (OR) CONTRACTION JOINT, THE NEAREST CONTRACTION JOINT SHALL BE OMITTED.
- GUTTER PROFILE IN THE VICINITY OF SAG VERTICAL CURVES, ALONG FLAT GRADES AND AT THE MEETING OF PROPOSED AND EXISTING GUTTER, SHALL BE CAREFULLY CONTROLLED AND FIELD ADJUSTED IF NECESSARY TO ENSURE POSITIVE DRAINAGE AND AVOID PONDING.
- NON-STAINING GRAY ONE COMPONENT NON-SAG ELASTOMERIC GUN GRADE POLYURETHANE SEALANT MEETING THE REQUIREMENTS OF ASTM C-920, TYPE S, GRADE NS, CLASS 25, USE T.
- HOOK BARS SHALL BE INCLUDED IN THE COST OF THE VARIOUS BARRIER AND GUTTER ITEMS AND SHALL BE EPOXY COATED. HOOK BARS BETWEEN THE BARRIER AND BASE SHALL BE ON 15" CENTERS AND ALTERNATE LEFT AND RIGHT OF THE BARRIER CENTERLINE. SEE STANDARD C5 FOR "HOOK BAR" DETAIL.

TABLE OF VARIABLES				
	W	L	V	G
PLAN 1	3'-0"	31'-3"	10'-0"	2'-0"
	3'-6"	31'-3"	10'-0"	1'-9"
	4'-0"	36'-3"	15'-0"	1'-6"
PLAN 2	4'-6"	46'-3"	10'-0"	1'-3"
	5'-0"	51'-3"	15'-0"	1'-0"
	5'-6"	58'-9"	22'-6"	9"
	6'-0"	66'-3"	30'-0"	6"

APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

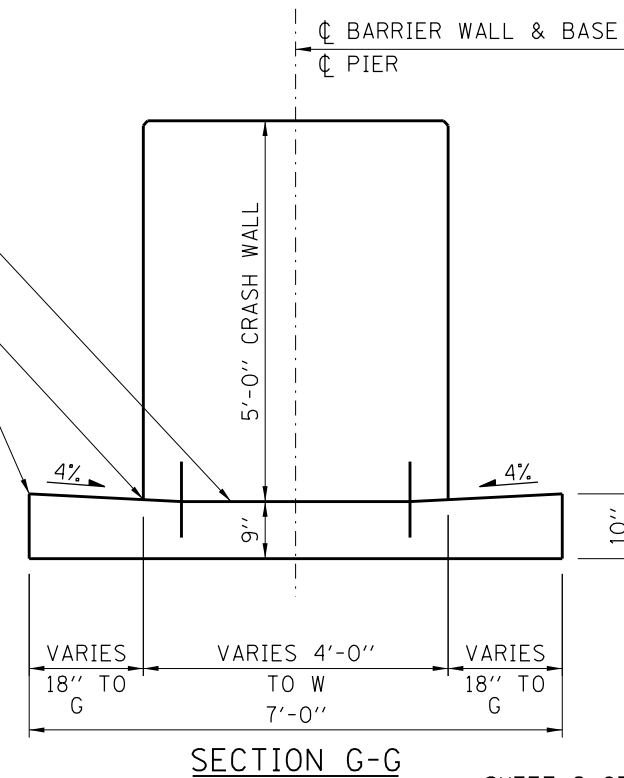
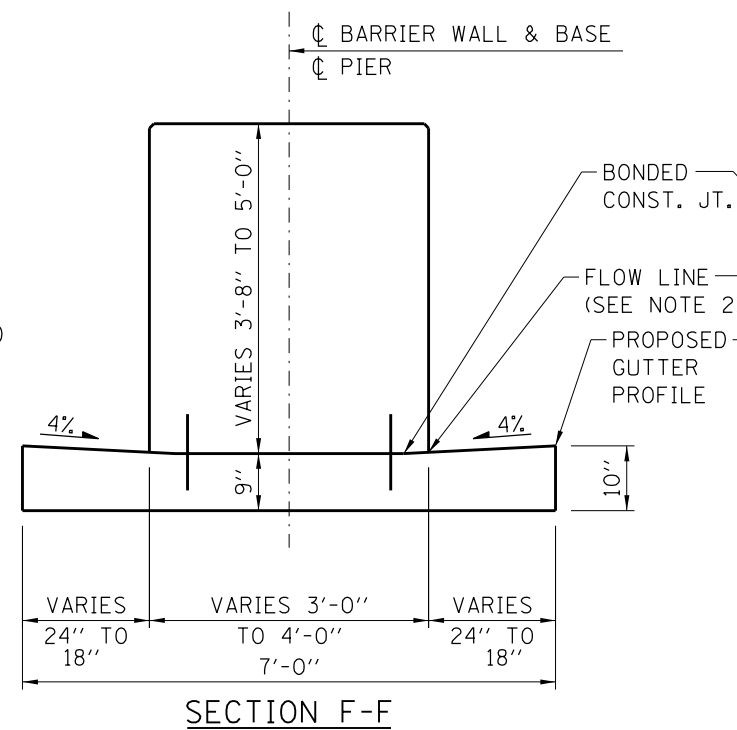
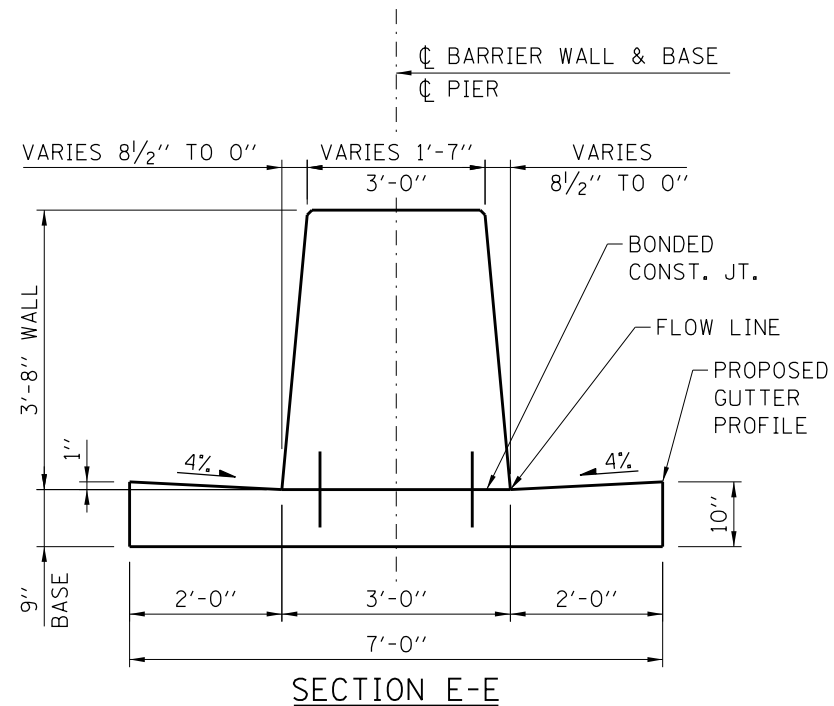
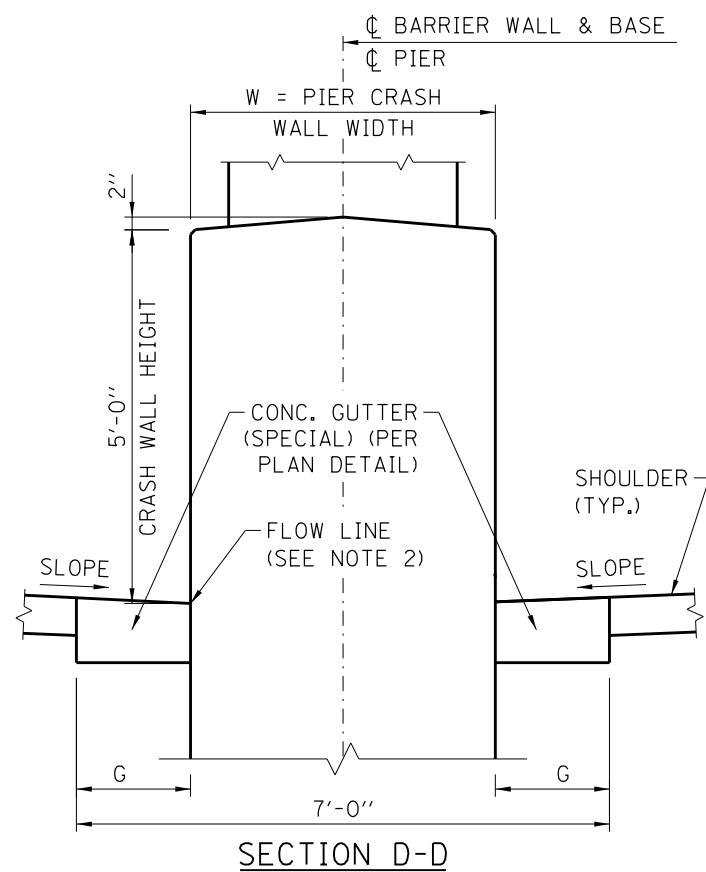
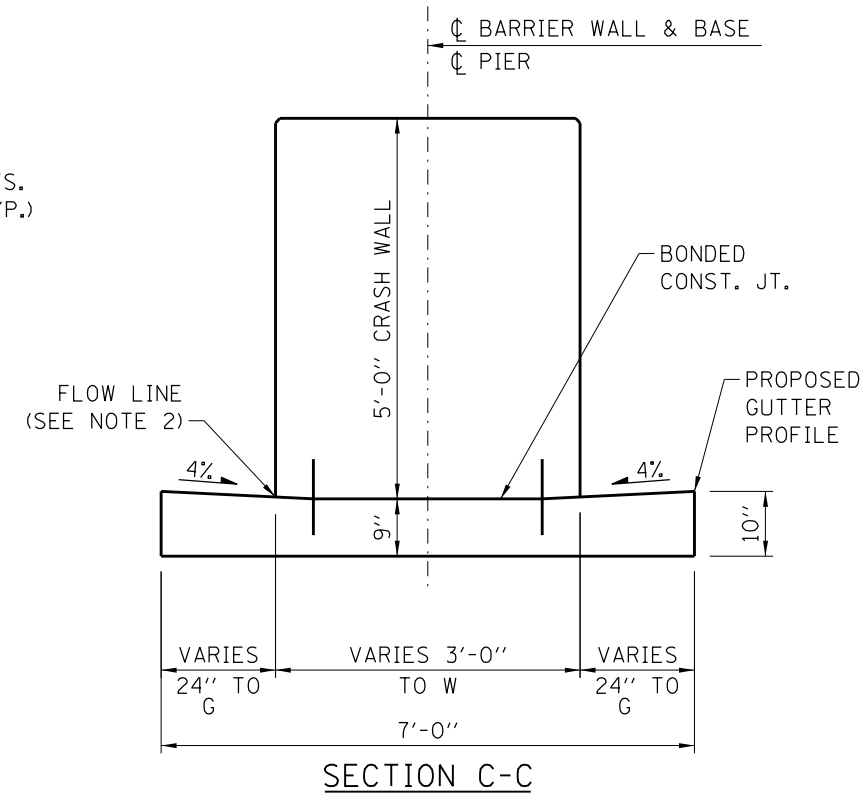
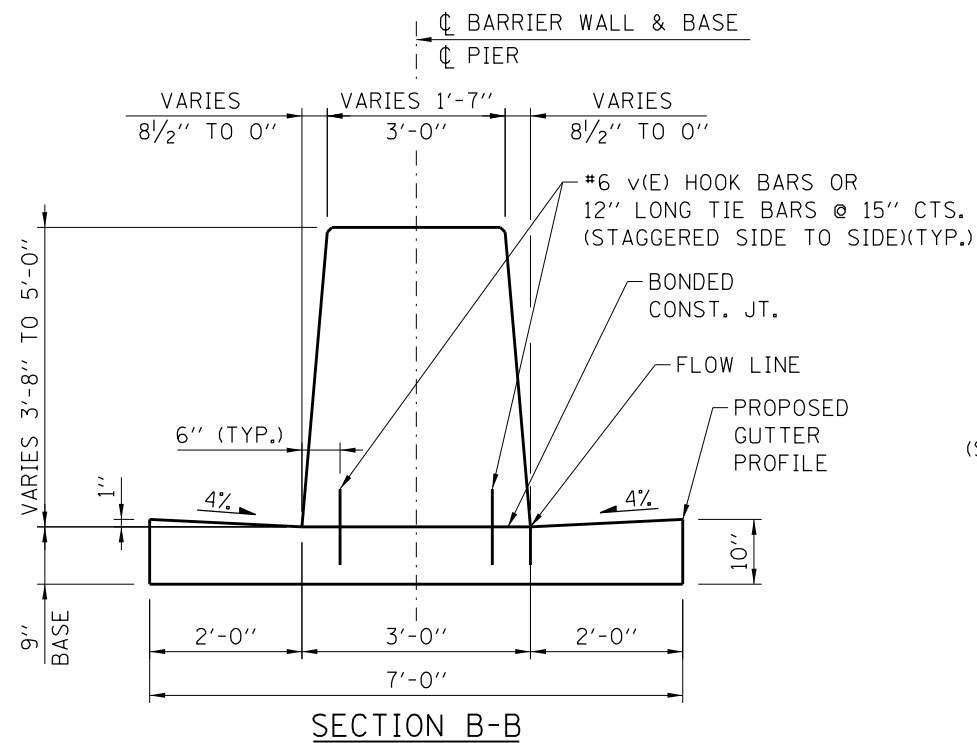
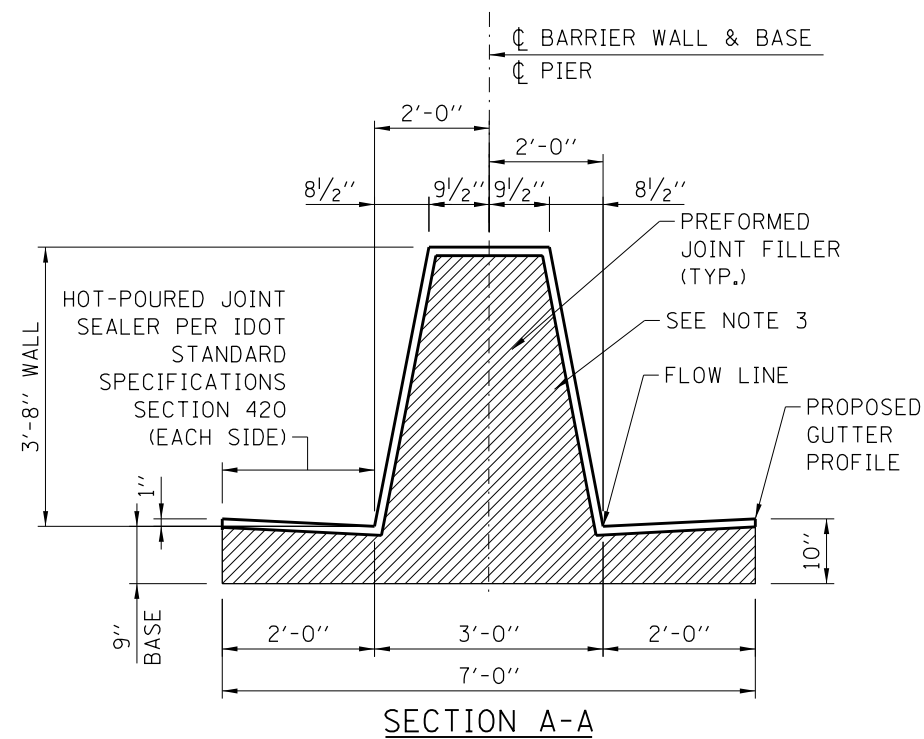
SHEET 1 OF 2



CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-DF  
AT BRIDGE PIERS

STANDARD C13-07

DATE	REVISIONS
3-01-2022	REVISED SECTION A-A DIMENSIONS
3-01-2021	REVISED TO HOOK BARS
3-01-2019	REVISED TO CONSTANT SLOPE AT 44"
3-31-2016	MODIFIED NOTES
3-11-2015	MODIFIED MEDIAN BARRIER TRANSITION
3-31-2014	MODIFIED BARRIER BASE.



SHEET 2 OF 2

APPROVED BY:

DATE:

Paul Kovacs  
CHIEF ENGINEERING OFFICER

02/07/2012

CHIEF ENGINEERING OFFICER

NOTES:

SEE SHEET 1 OF THIS SERIES FOR NOTES.



# CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-DF AT BRIDGE PIERS

STANDARD C13-07

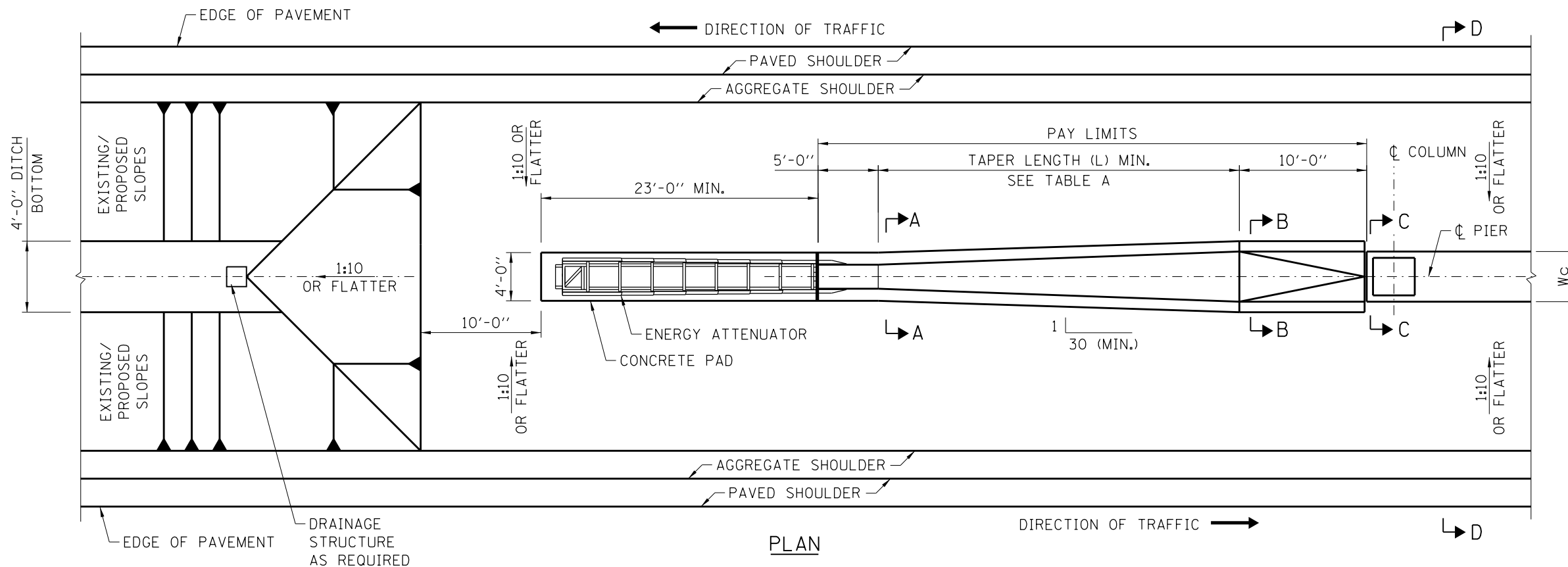
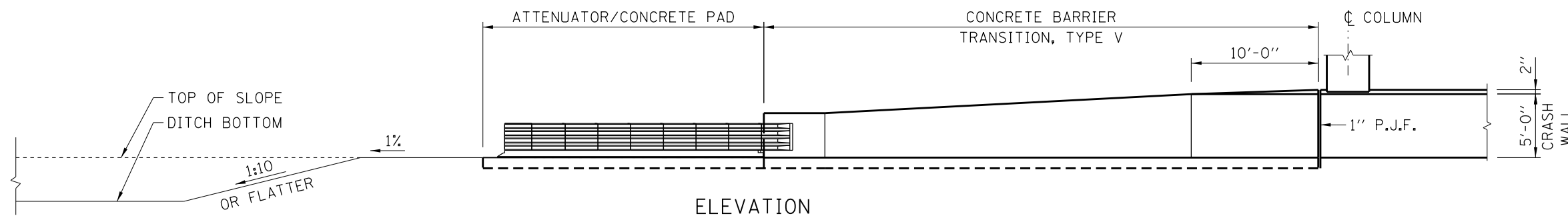


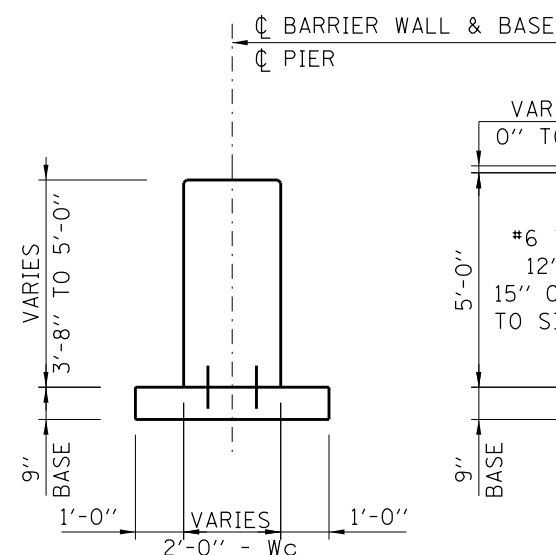
TABLE A	
W <sub>c</sub>	L (MIN.)
24"	20'-0"
24" < W <sub>c</sub> < 35"	25'-0"
35" < W <sub>c</sub> < 43"	35'-0"
43" < W <sub>c</sub> < 51"	45'-0"
51" < W <sub>c</sub> < 59"	55'-0"
59" < W <sub>c</sub> < 67"	65'-0"
67" < W <sub>c</sub> < 72"	75'-0"

W<sub>c</sub>=PIER CRASH WALL WIDTH

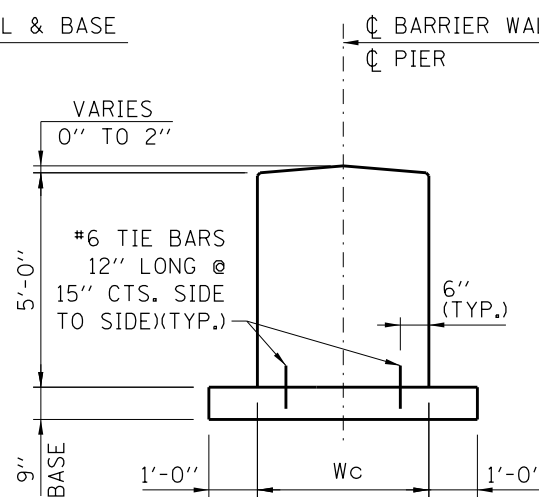


#### NOTES:

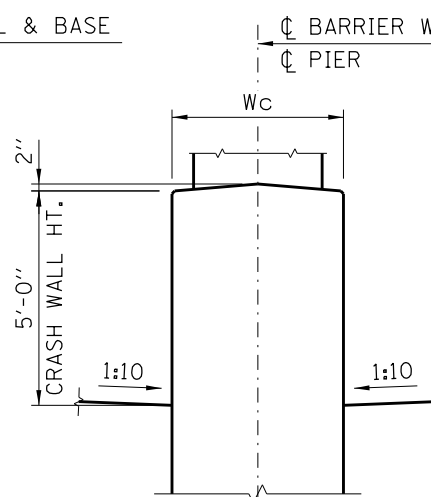
1. SLOPE RATIOS ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
2. ENERGY ATTENUATOR AND PAD SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.
3. 2" DEEP CONTRACTION JOINTS SHALL BE DONE BY SAWING AND SHALL BE CONSTRUCTED IN THE CONCRETE BARRIER WALL, AND CONCRETE BARRIER BASE. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0". THE MINIMUM DISTANCE BETWEEN CONTRACTION JOINTS IN THE MEDIAN BARRIER WALL SHALL BE 2'-0".



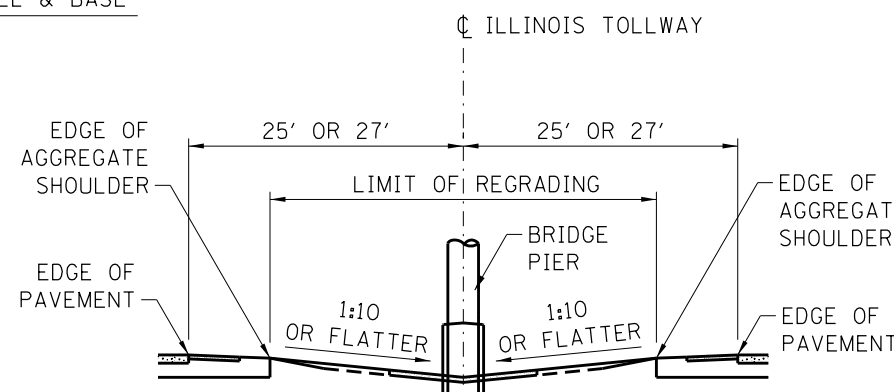
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

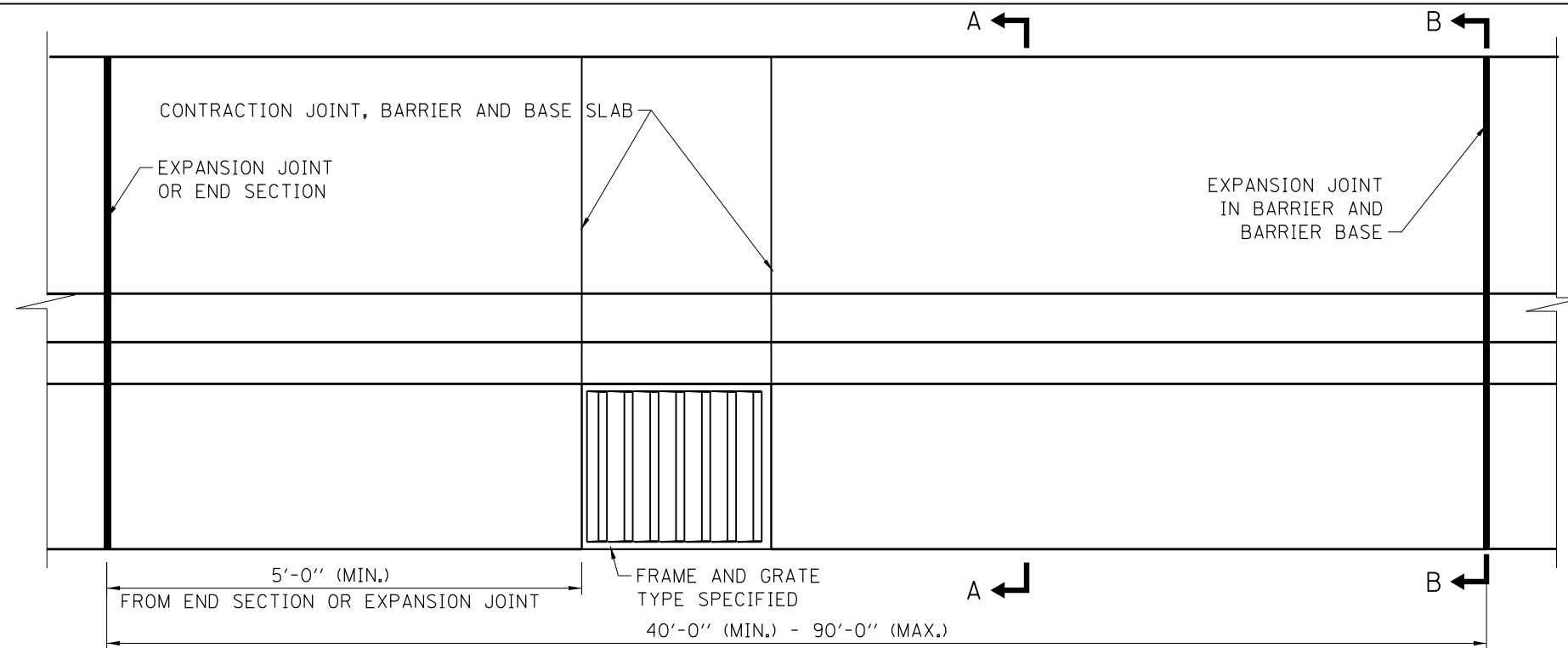
APPROVED BY: *Paul Kovacs* DATE: 03/31/2014  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2021	ADDED TIE BARS
3-01-2020	CORRECTED HEIGHT IN SECTION A-A
3-01-2019	REVISED ATTENUATOR
3-31-2016	ADDED SEC. B-B TOP, DITCH ELEV.
3-11-2015	VIEW AND REVISED NOTE 3
3-11-2015	REVISED NOTES

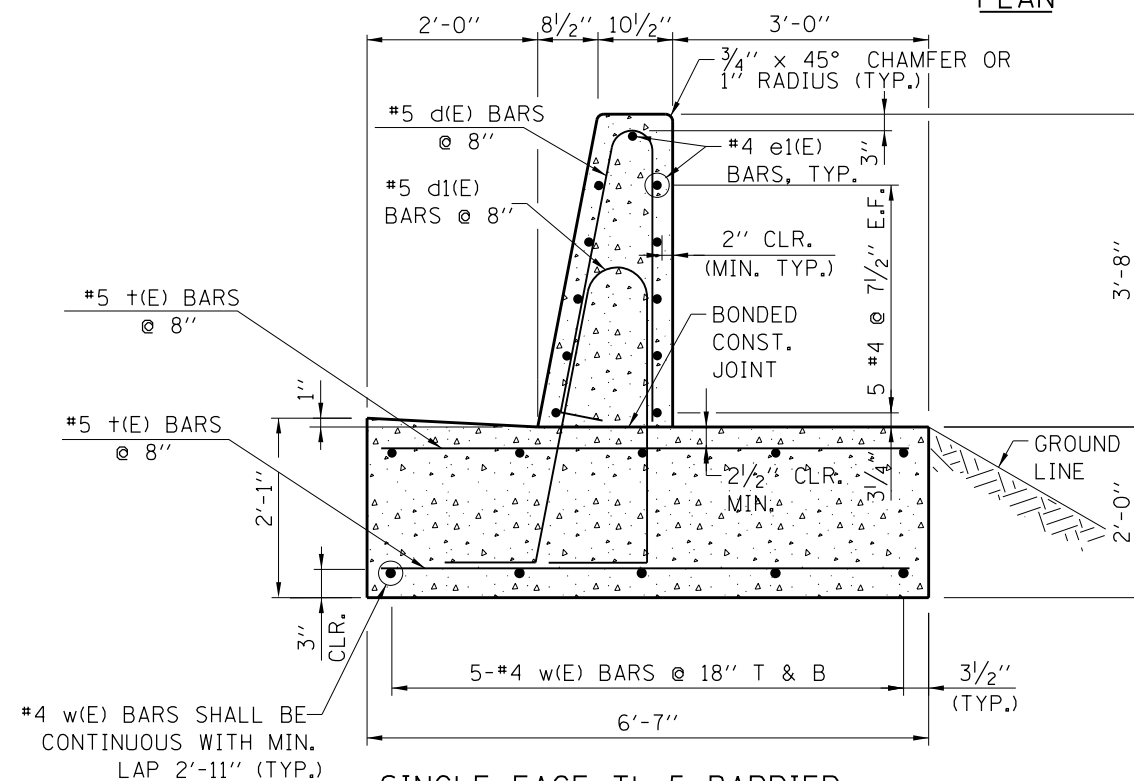


CONCRETE MEDIAN BARRIER  
TRANSITION, TYPE V  
AT BRIDGE PIERS

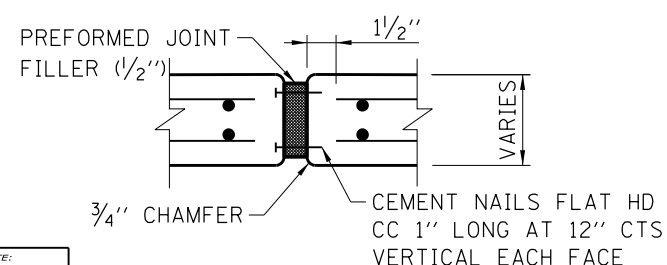
STANDARD C14-05



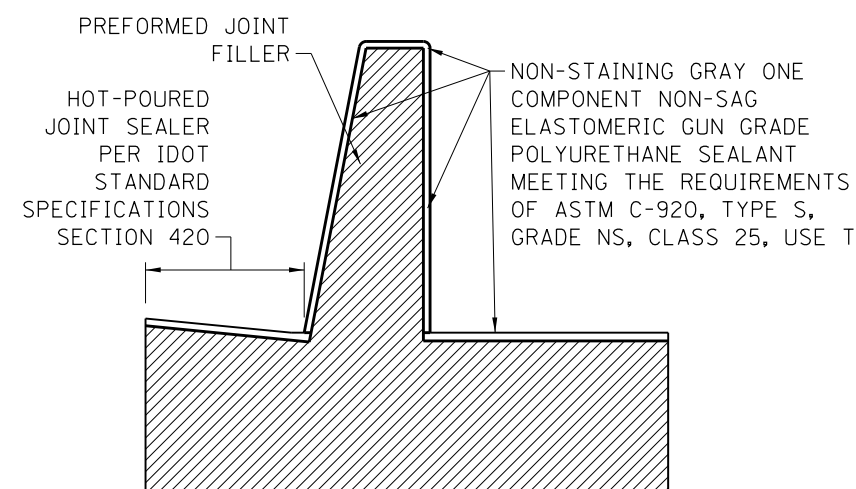
PLAN



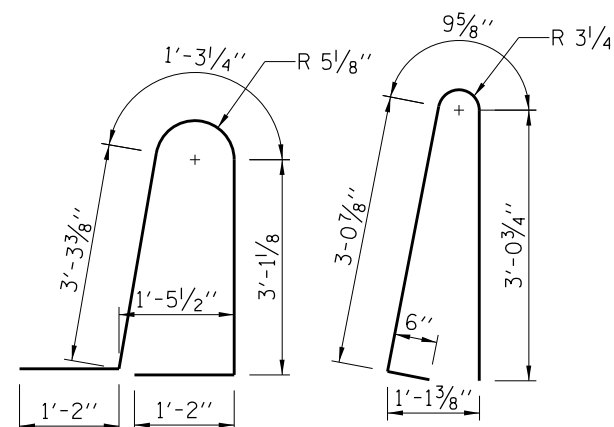
SINGLE FACE TL-5 BARRIER  
SECTION A-A



EXPANSION JOINT



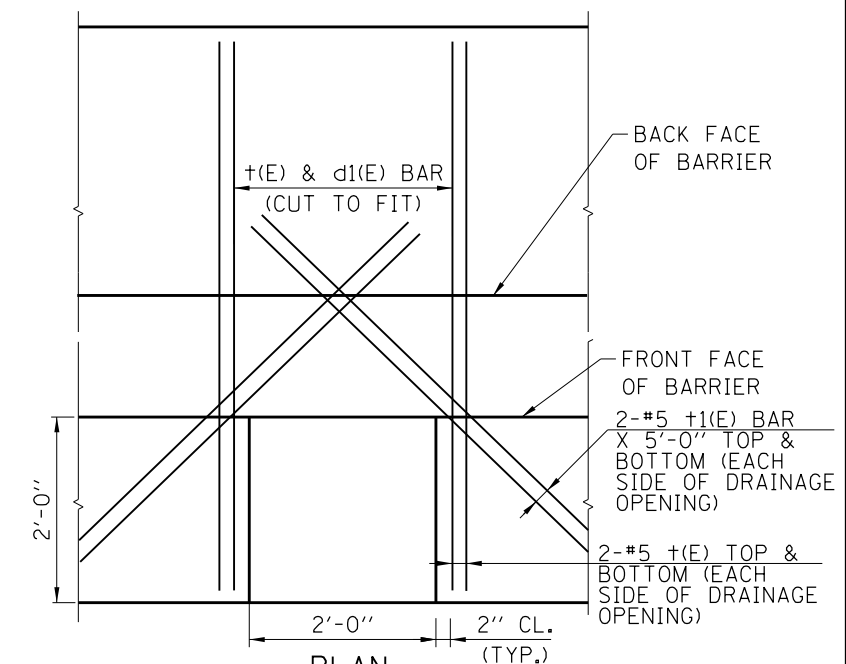
SINGLE FACE 44" BARRIER  
EXPANSION JOINT  
SECTION B-B



BAR d1(E)

BAR d(E)

BENDING DIAGRAM



PLAN  
REINFORCEMENT AROUND  
DRAINAGE STRUCTURE

NOTES:

- THIS IS A REINFORCED CONCRETE TL-5 ROADSIDE BARRIER USED TO SHIELD DROP-OFFS AND FOR PROTECTION OF STRUCTURES WHEN THE BARRIER IS AWAY FROM THE FACE OF THE STRUCTURE. THE MINIMUM LENGTH OF INSTALLATION SHALL BE 40'-0". BASIS OF DESIGN: IL TOLLWAY STRUCTURE DESIGN MANUAL.
- TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
- 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0".
- CONTRACTION JOINTS SHALL BE FORMED BY A GROOVE 1/8", EITHER IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS SET.
- REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
- REINFORCEMENT BARS BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT. E.F. DENOTES EACH FACE.
- AT DRAINAGE STRUCTURES, CUT FOOTING BARS TO FIT. ADD ADDITIONAL + AND +1 BARS ON EACH SIDE OF THE DRAINAGE STRUCTURE. A 1" PJF SHALL BE PLACED BELOW THE BARRIER BASE WHEN IT SITS UPON A FLAT SLAB DRAINAGE STRUCTURE.
- EXPANSION JOINTS SHALL BE CONSTRUCTED IN BARRIER WALL AT A MAXIMUM JOINT SPACING OF 90'-0" AND A MINIMUM JOINT SPACING OF 40'-0". SEE SECTION B-B FOR DETAILS.
- WHEN SPECIFIED IN THE PLANS, THE BACKSIDE OF THE BARRIER BASE MAY BE LEFT EXPOSED A MAXIMUM OF 1', MEASURED FROM THE TOP OF THE BARRIER BASE.

DATE	REVISIONS
3-01-2024	ADDED PJF BETWEEN BASE AND DRAINAGE STRUCTURES
3-01-2023	REVISED NOTE #1 AND REINF. DETAIL AT DRAINAGE STRUCTURES
3-01-2022	REVISED NOTES & CALLOUTS
3-01-2020	REVISED NAME & REINFORCING



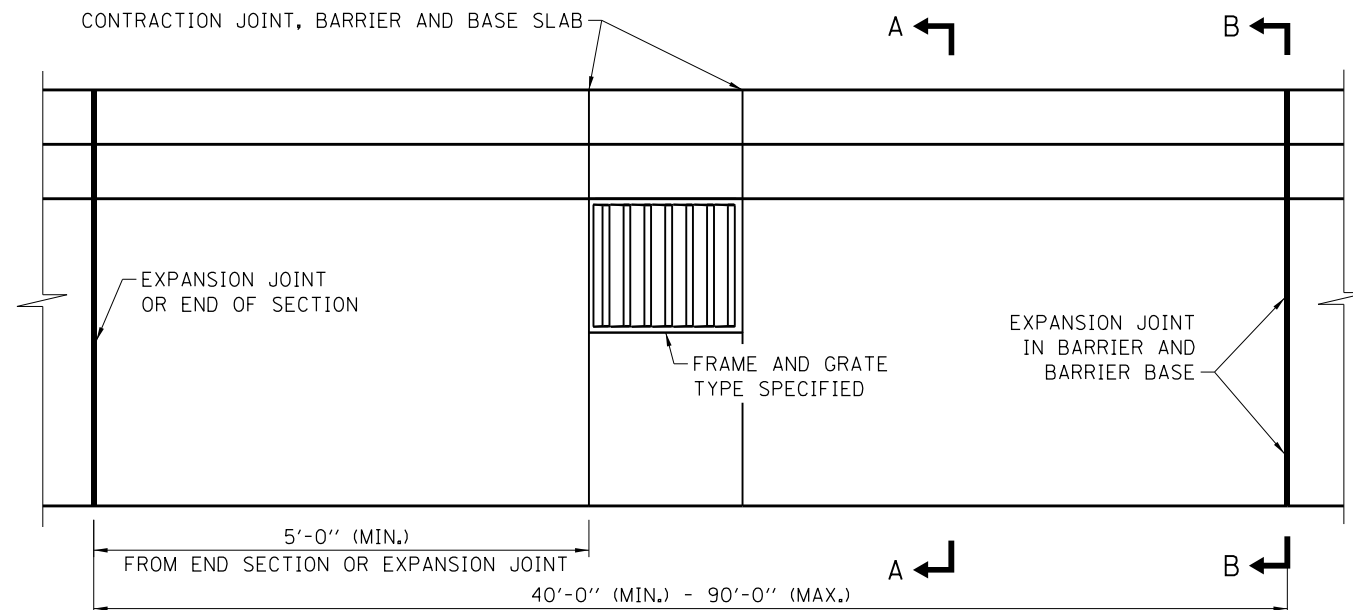
CONCRETE BARRIER SINGLE  
FACE, REINFORCED TL-5,  
T-SHAPE 44 INCH

STANDARD C15-04

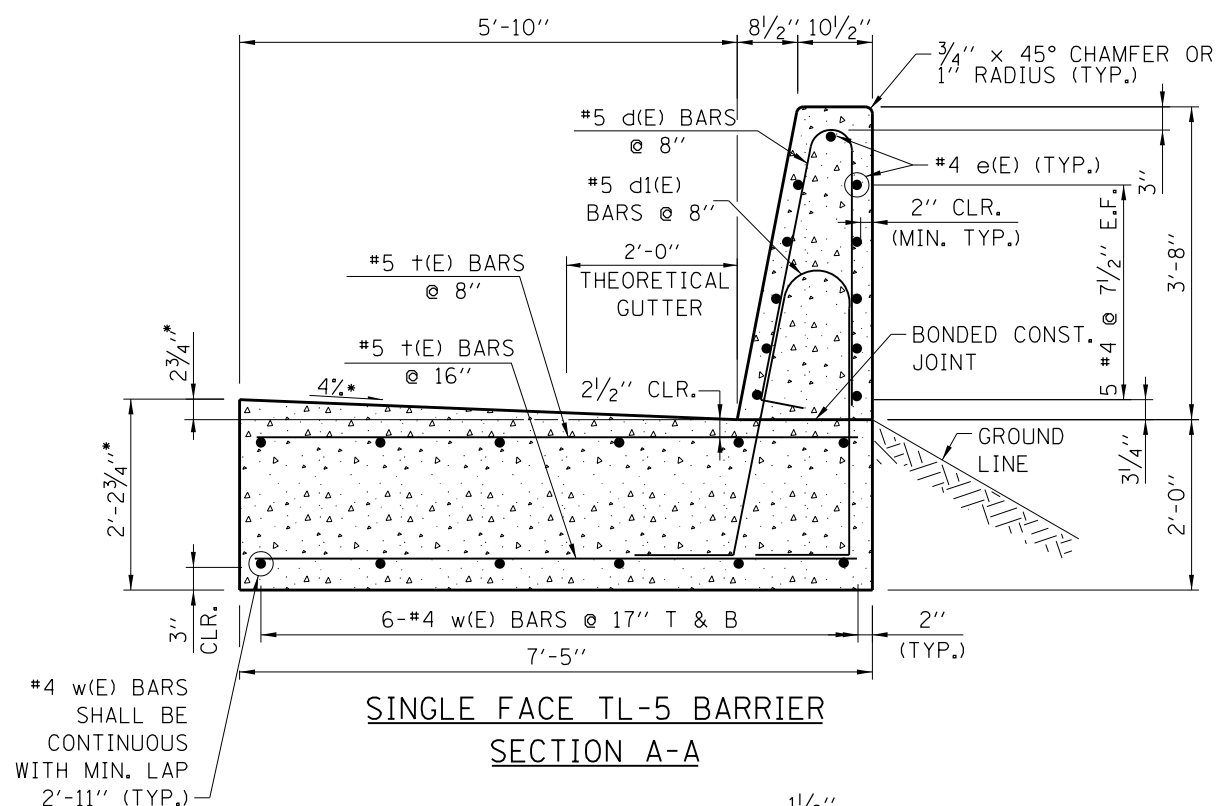
APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024





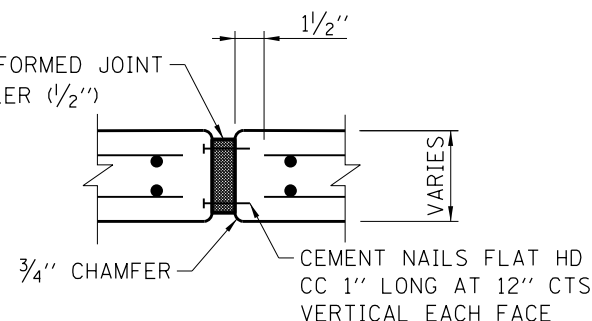
PLAN



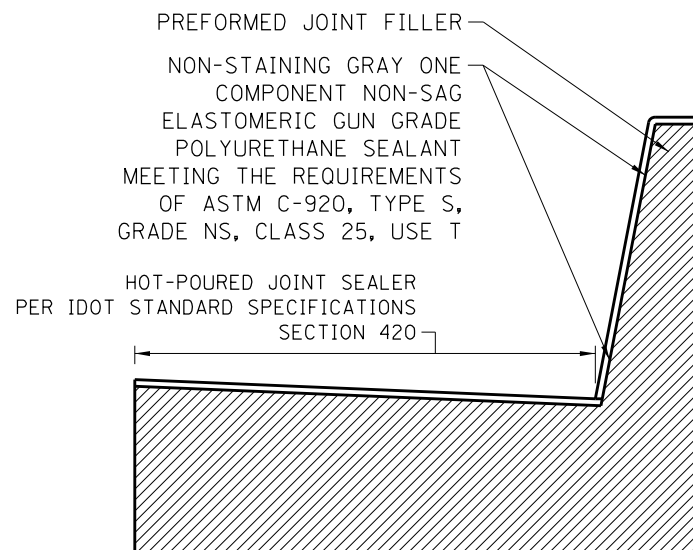
SINGLE FACE TL-5 BARRIER  
SECTION A-A

\* OR AS REQUIRED TO MATCH SHOULDER CROSS SLOPE

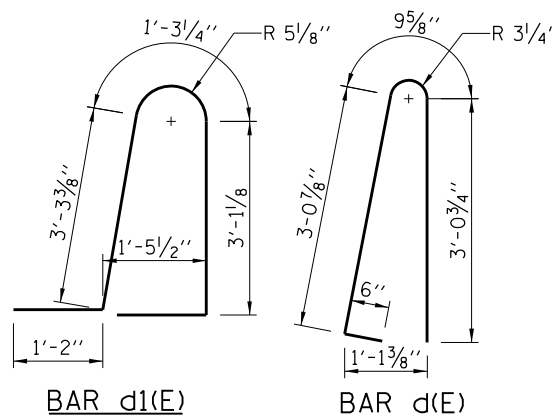
PREFORMED JOINT FILLER (1/2")



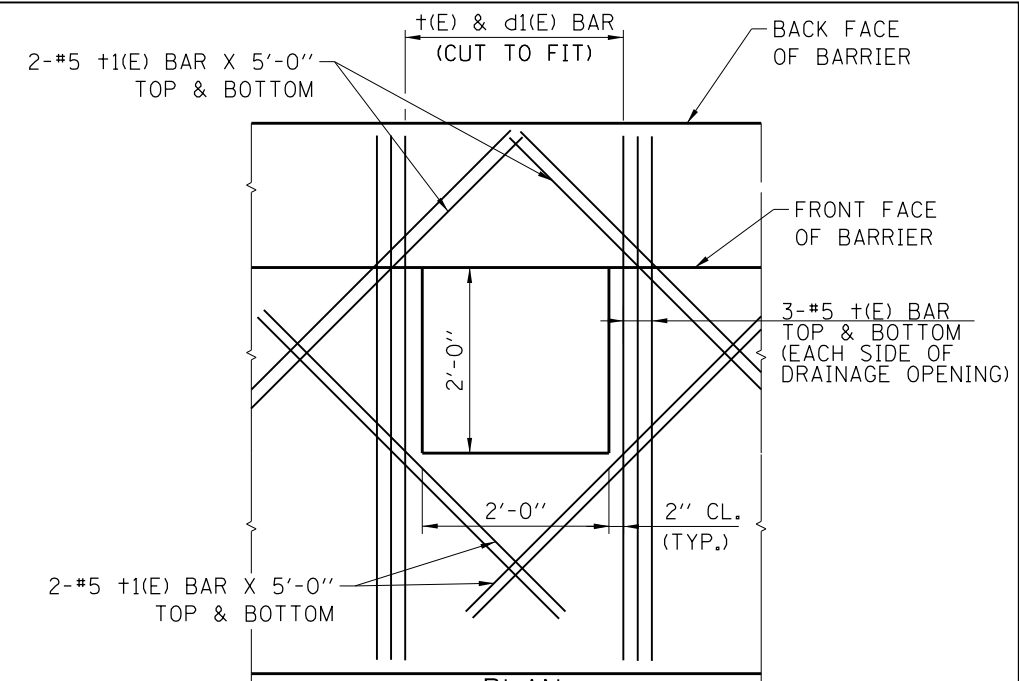
EXPANSION JOINT



SINGLE FACE 44" BARRIER  
EXPANSION JOINT  
SECTION B-B



BENDING DIAGRAMS



PLAN  
REINFORCEMENT AROUND  
DRAINAGE STRUCTURE

NOTES:

- THIS IS A REINFORCED CONCRETE TL-5 ROADSIDE BARRIER USED TO SHIELD DROP-OFFS AND FOR PROTECTION OF STRUCTURES WHEN THE BARRIER IS AWAY FROM THE FACE OF THE STRUCTURE. THE MINIMUM LENGTH OF INSTALLATION SHALL BE 40'-0". BASIS OF DESIGN: IL TOLLWAY STRUCTURE DESIGN MANUAL.
- TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
- 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0".
- CONTRACTION JOINTS SHALL BE FORMED BY A GROOVE 1/8", EITHER IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS SET.
- REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
- REINFORCEMENT BARS BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT. E. F. DENOTES EACH FACE.
- AT DRAINAGE STRUCTURES, CUT FOOTING BARS TO FIT. ADD ADDITIONAL + AND +1 BARS ON EACH SIDE OF THE DRAINAGE STRUCTURE. A 1" PJF SHALL BE PLACED BELOW THE BARRIER BASE WHEN IT SITS UPON A FLAT SLAB DRAINAGE STRUCTURE.
- EXPANSION JOINTS SHALL BE CONSTRUCTED IN BARRIER WALL AT A MAXIMUM JOINT SPACING OF 90'-0" AND A MINIMUM JOINT SPACING OF 40'-0". SEE SECTION B-B FOR DETAILS.
- WHEN SPECIFIED IN THE PLANS, THE BACKSIDE OF THE BARRIER BASE MAY BE LEFT EXPOSED A MAXIMUM OF 1', MEASURED FROM THE TOP OF THE BARRIER BASE.

DATE	REVISIONS
3-01-2024	ADDED PJF BETWEEN BASE AND DRAINAGE STRUCTURES
3-01-2023	REVISED NOTE #1 AND REINF. DETAIL AT DRAINAGE STRUCTURES
3-01-2022	REVISED NOTES & CALLOUTS

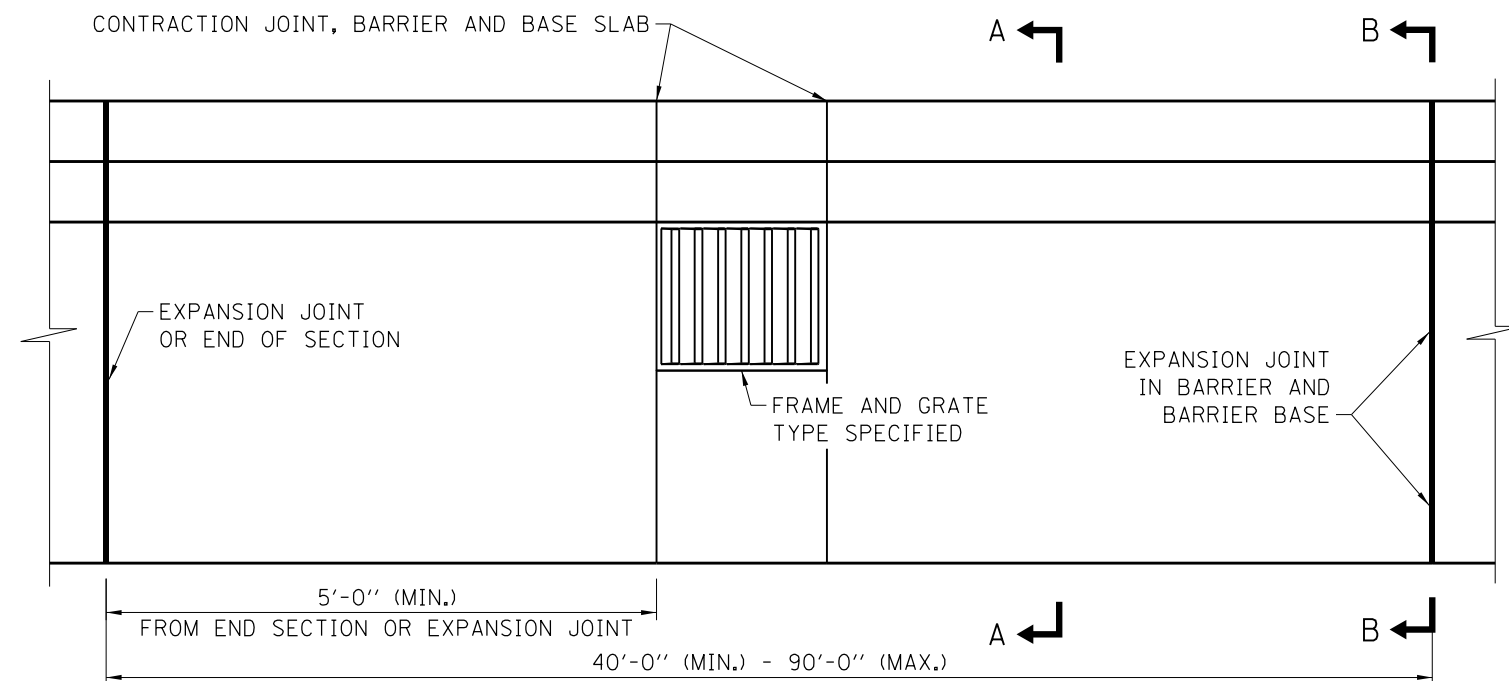


CONCRETE BARRIER SINGLE  
FACE, REINFORCED TL-5,  
L-SHAPE 44 INCH

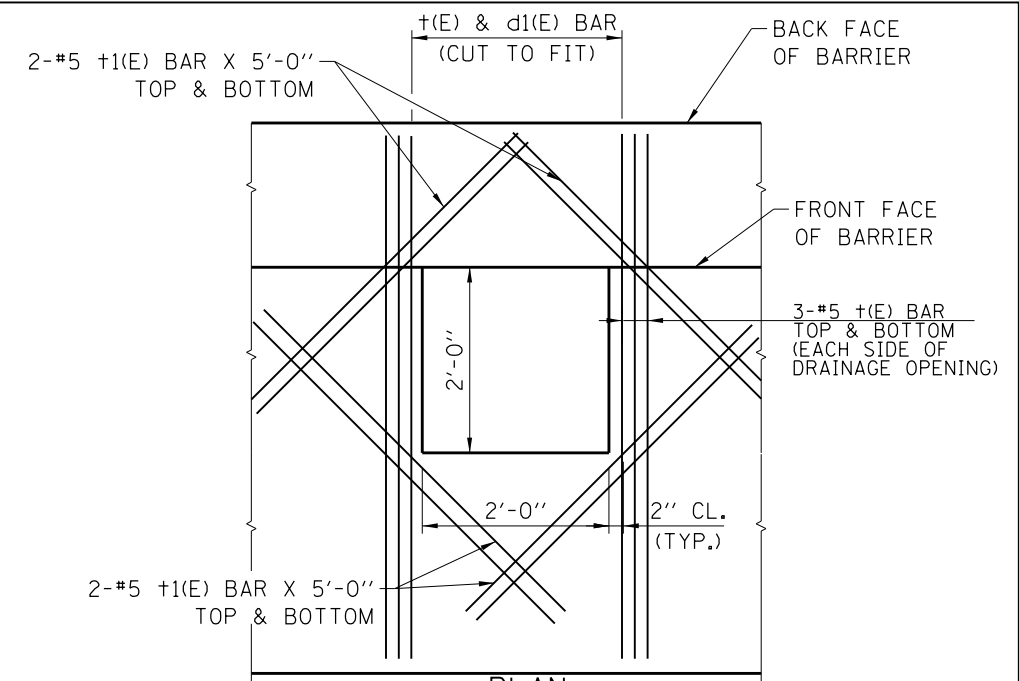
STANDARD C16-04

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER

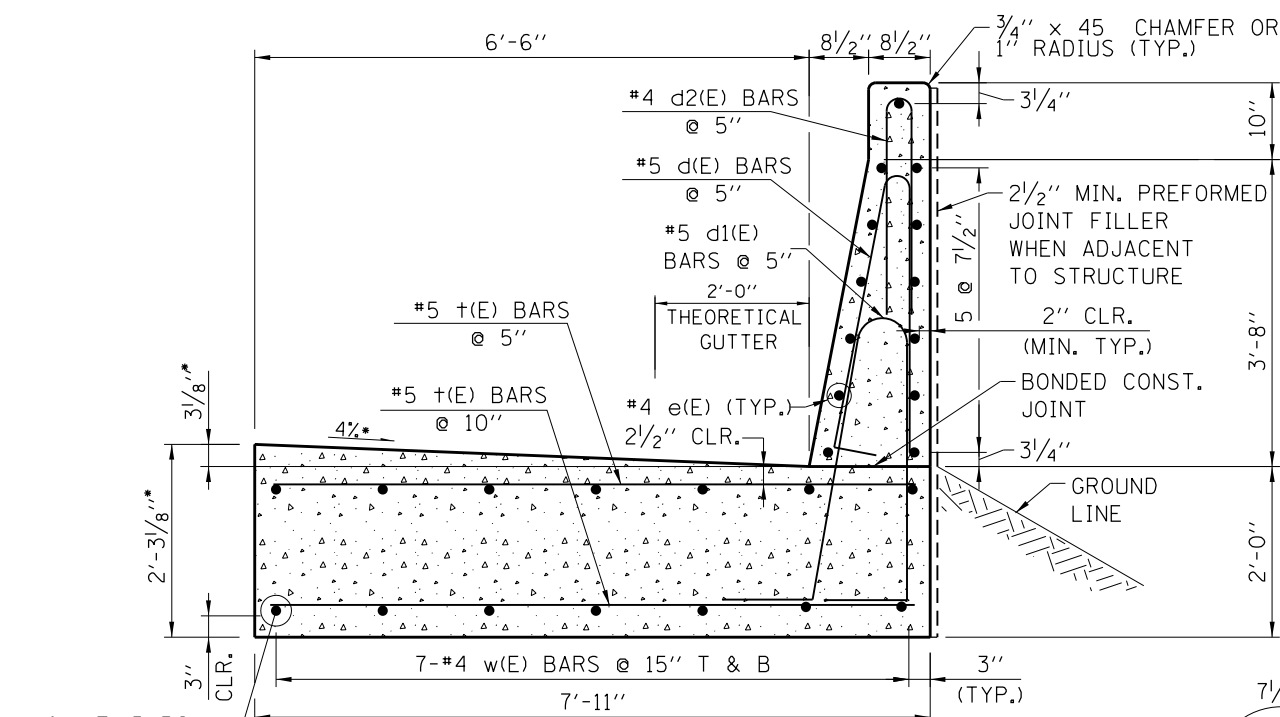
DATE: 03/01/2024



PLAN



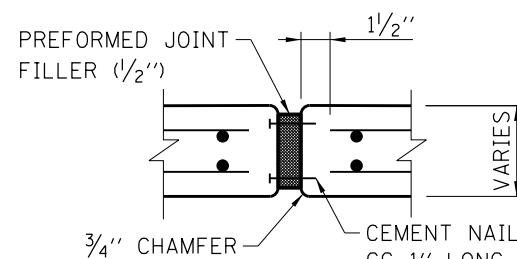
PLAN  
REINFORCEMENT AROUND  
DRAINAGE STRUCTURE



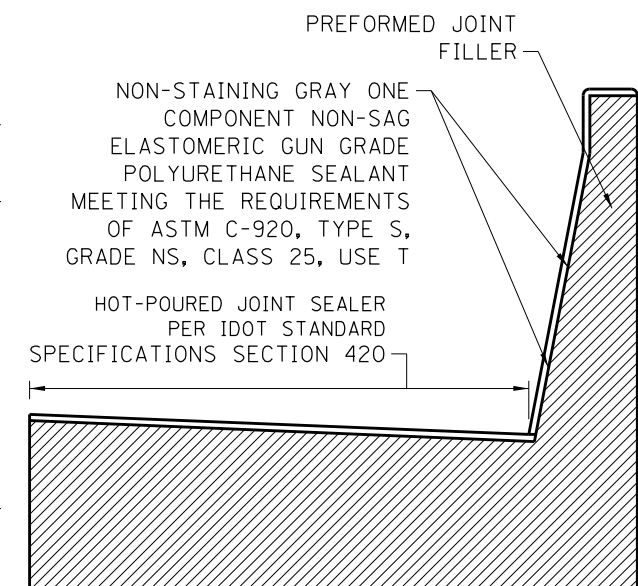
SINGLE FACE TL-5 BARRIER  
SECTION A-A

#4 w(E) BARS SHALL BE CONTINUOUS WITH MIN. LAP 2'-11" (TYP.)

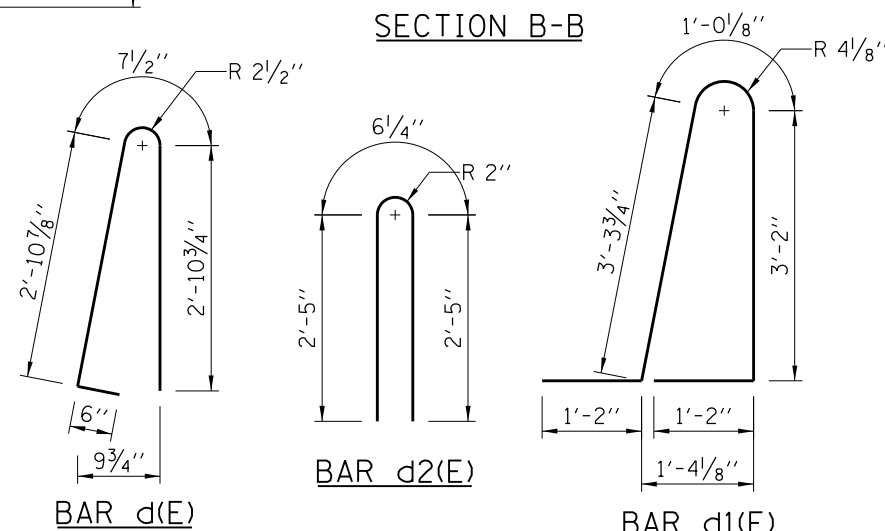
\* OR AS REQUIRED TO MATCH SHOULDER CROSS SLOPE



EXPANSION JOINT



SINGLE FACE 54" BARRIER  
EXPANSION JOINT  
SECTION B-B



BENDING DIAGRAMS

NOTES:

- THIS IS A REINFORCED CONCRETE TL-5 ROADSIDE BARRIER USED TO SHIELD BRIDGE PIERS AND ABUTMENTS WHEN THE BARRIER IS ADJACENT TO THE FACE OF THE STRUCTURE. THE MINIMUM LENGTH OF INSTALLATION SHALL BE 40'-0". BASIS OF DESIGN: IL TOLLWAY STRUCTURE DESIGN MANUAL.
- TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
- 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0".
- CONTRACTION JOINTS SHALL BE FORMED BY A GROOVE 1/8", EITHER IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS SET.
- REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
- REINFORCEMENT BARS BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION. REINFORCEMENT BAR BENDING DIMENSIONS ARE SHOWN OUT TO OUT.
- AT DRAINAGE STRUCTURES, CUT FOOTING BARS TO FIT. ADD ADDITIONAL +, AND +1 BARS ON EACH SIDE OF THE DRAINAGE STRUCTURE. A 1" PJF SHALL BE PLACED BELOW THE BARRIER BASE WHEN IT SITS UPON A FLAT SLAB DRAINAGE STRUCTURE.
- EXPANSION JOINTS SHALL BE CONSTRUCTED IN BARRIER WALL AT A MAXIMUM JOINT SPACING OF 90'-0" AND A MINIMUM JOINT SPACING OF 40'-0". SEE SECTION B-B FOR DETAILS.

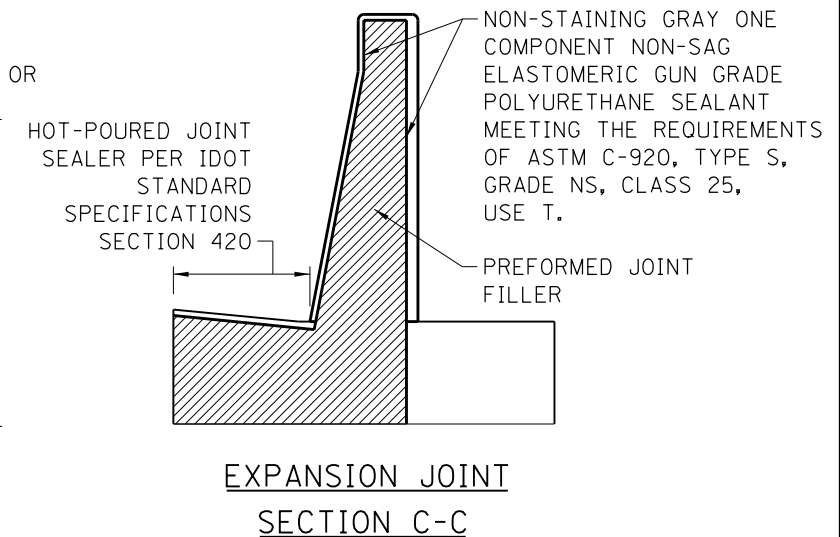
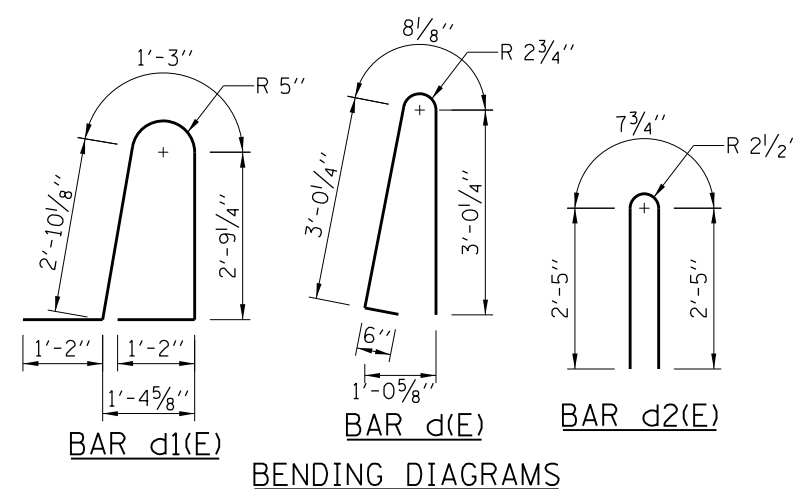
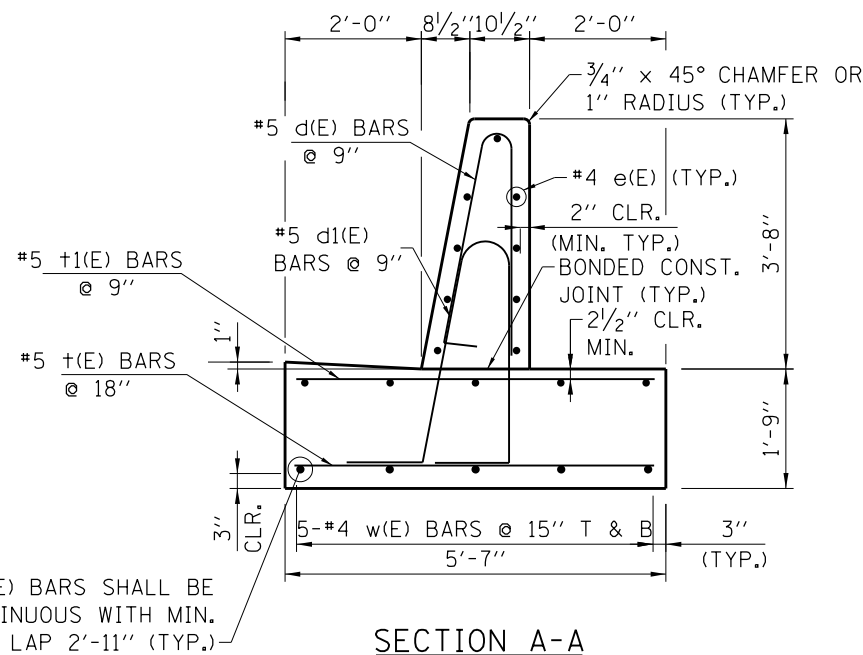
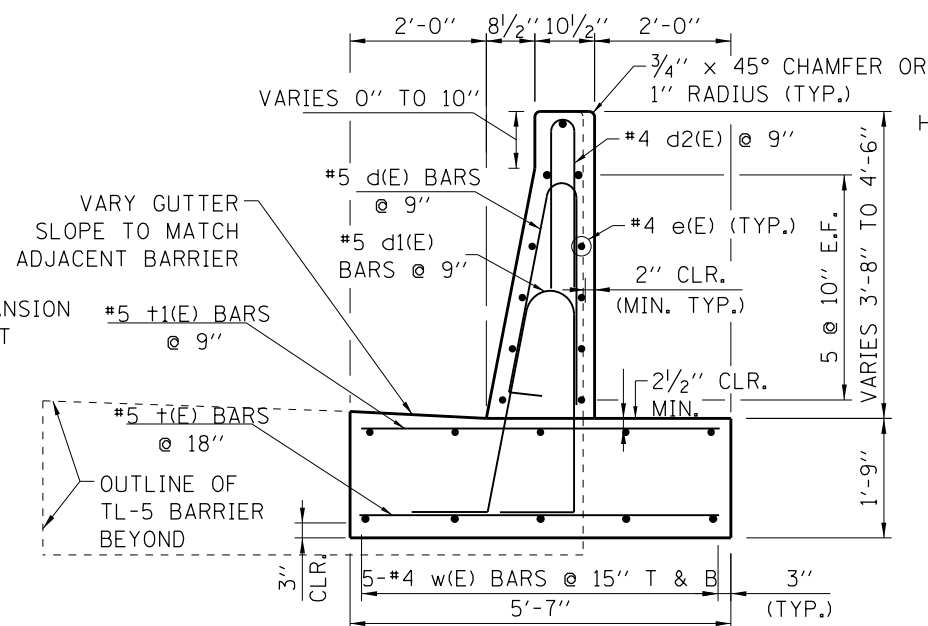
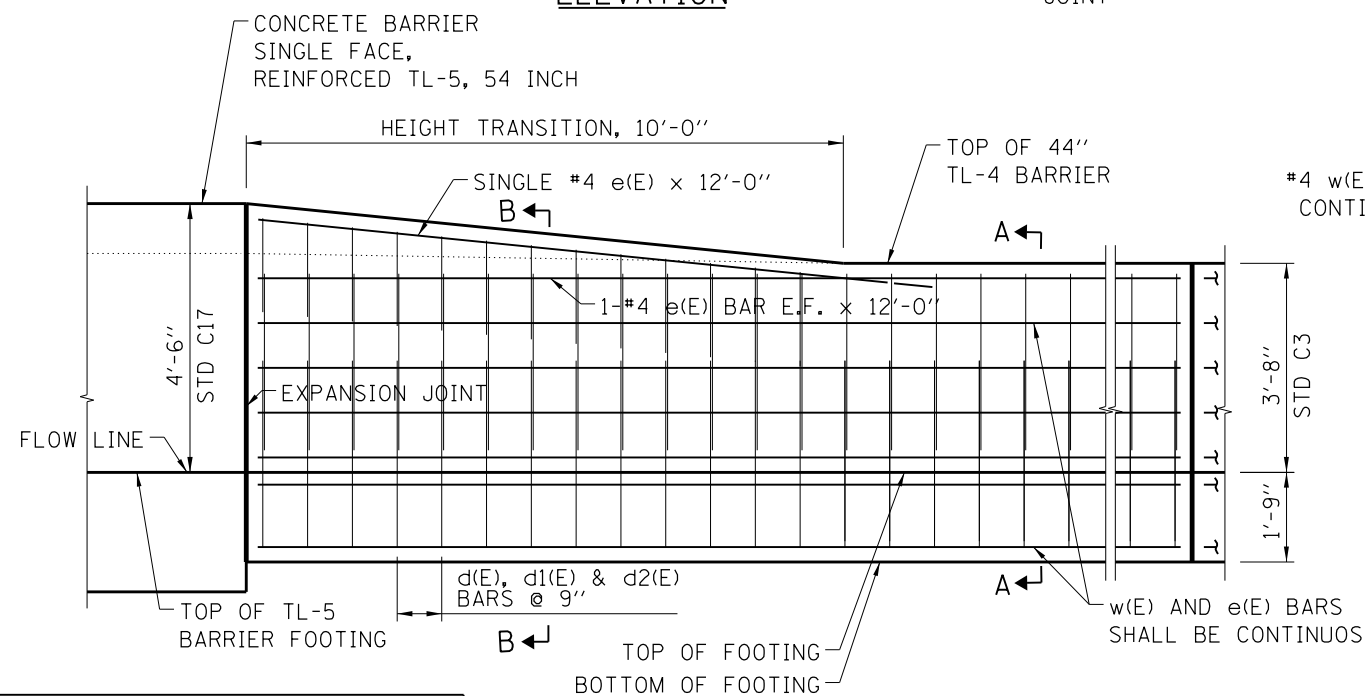
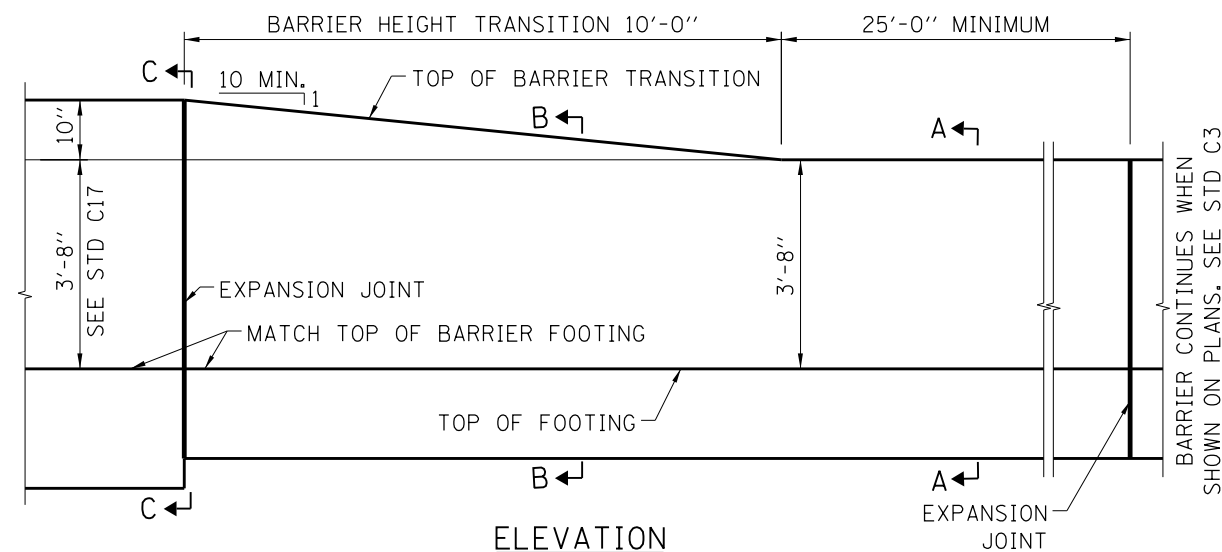
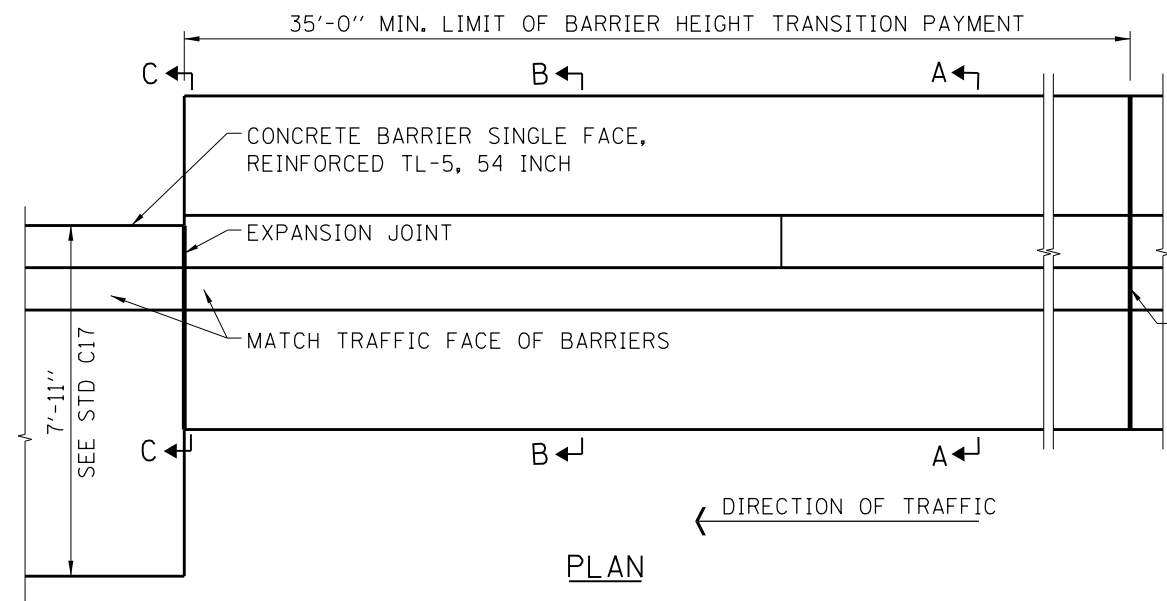
DATE	REVISIONS
3-01-2024	ADDED PJF BETWEEN BASE AND DRAINAGE STRUCTURE
3-01-2023	REVISED REINF. DETAIL AT DRN. STRUCTURE, REMOVED NOTE 9
3-01-2022	REVISED NOTE 4.
3-01-2021	REVISED REBAR LENGTH, ADDED NOTE



CONCRETE BARRIER  
SINGLE FACE, REINFORCED  
TL-5, 54 INCH

STANDARD C17-05

APPROVED BY: *Mamun Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER



#### NOTES:

1. THIS REINFORCED CONCRETE TL-4 BARRIER HEIGHT TRANSITION IS USED TO VARY THE BARRIER HEIGHT FROM 44" TO 54". THE MINIMUM LENGTH OF INSTALLATION BETWEEN EXPANSION JOINTS SHALL BE 35'-0". BASIS OF DESIGN: IL TOLLWAY STRUCTURE DESIGN MANUAL.
2. TOP SHOULDER EDGE OF BARRIER BASE GUTTER SHALL MATCH THE TOP OF SHOULDER ELEVATION.
3. 1" DEEP CONTRACTION JOINTS SHALL BE CONSTRUCTED IN BOTH THE REINFORCED CONCRETE BARRIER WALL AND BASE. CONTRACTION JOINTS SHALL ALSO BE CONSTRUCTED AT BOTH SIDES OF ALL DRAINAGE STRUCTURES. SEE STANDARD C3 FOR REINFORCEMENT AROUND DRAINAGE STRUCTURES. MAXIMUM CONTRACTION JOINT SPACING SHALL BE 30'-0".
4. CONTRACTION JOINTS SHALL BE FORMED BY A GROOVE 1/8", EITHER IN THE PLASTIC CONCRETE OR SAWED AFTER THE CONCRETE HAS SET.
5. REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED. ALL w(E) AND e(E) BARS SHALL BE CONTINUOUS WITH 2'-11" LAPS MIN. "E.F." DENOTES EACH FACE.
6. REINFORCEMENT BARS BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE "MANUAL OF STANDARD PRACTICES FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315, LATEST EDITION. REINFORCEMENT BARS BENDING DIMENSIONS ARE OUT TO OUT.

APPROVED BY: *Paul Kovacs* CHIEF ENGINEERING OFFICER

DATE: 08/28/2020

DATE	REVISIONS
3-01-2022	REVISED NOTES
3-01-2021	REVISED REBAR LENGTH

<b>Illinois Tollway</b>
CONCRETE SHOULDER BARRIER HEIGHT TRANSITION, SINGLE FACE, TYPE SF-54
STANDARD C18-02

# ***STANDARD DRAWINGS***

## ***SECTION D***

### ***ROADWAY APPURTENANCES (FENCE, SYMBOLS, MARKERS AND DELINEATORS)***

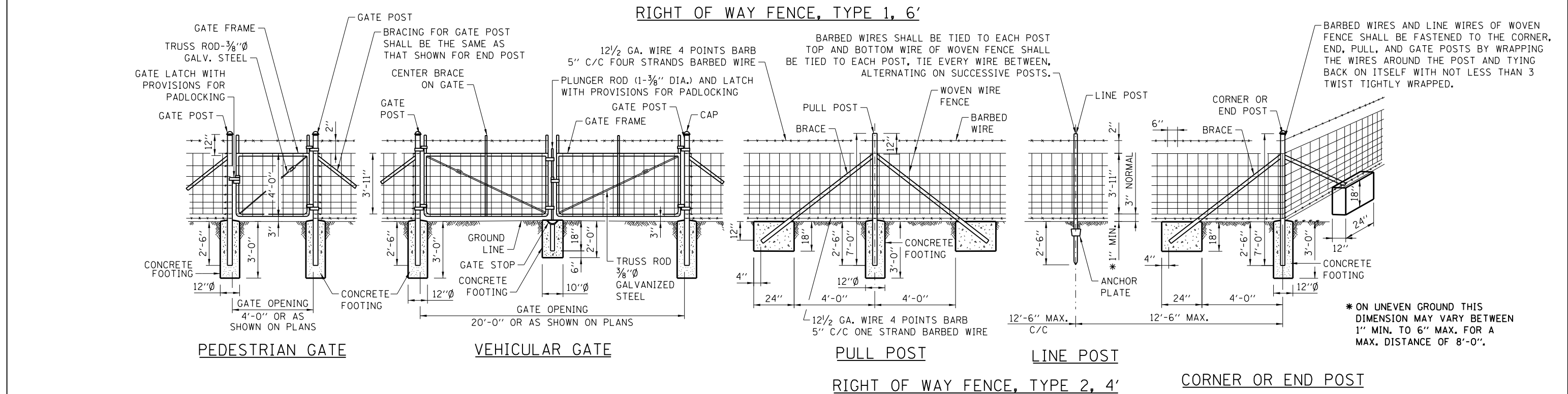
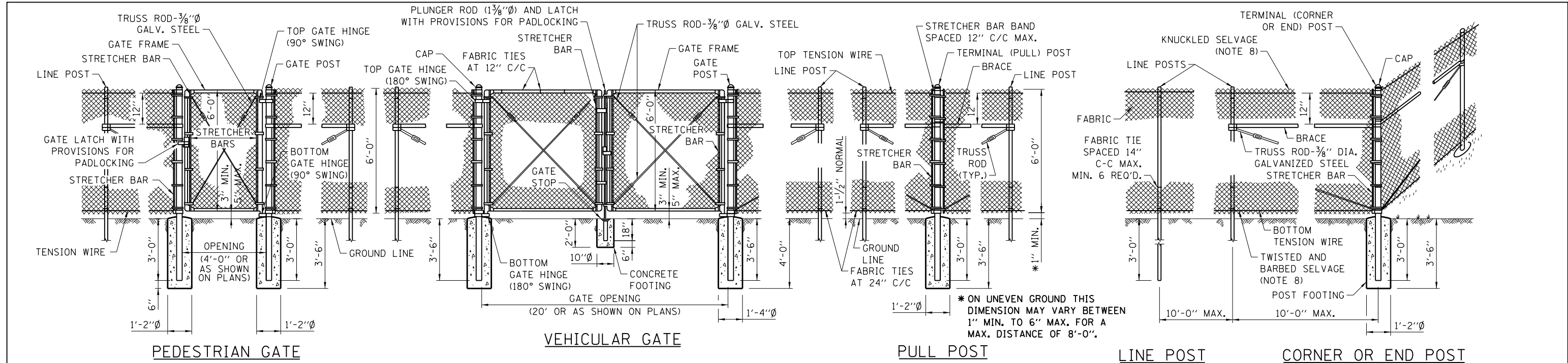
MARCH 2024

Illinois Tollway Standard Drawing Revisions
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Section D	Roadway Appurtenances		
	Standard	Modification Summary	Effective: 03-01-2024
	D4-09	ROADWAY DELINEATORS AND REFLECTORS	
	Sheet 1	Added retaining walls to crashworthy NAW and bridge parapet notes, in Permanent Delineation Spacing table.	
	Sheet 3	Added detail for reflector at crashworthy NAW or crashworthy retaining walls.	

 New Sheet

 Retired Standard



### GENERAL NOTES

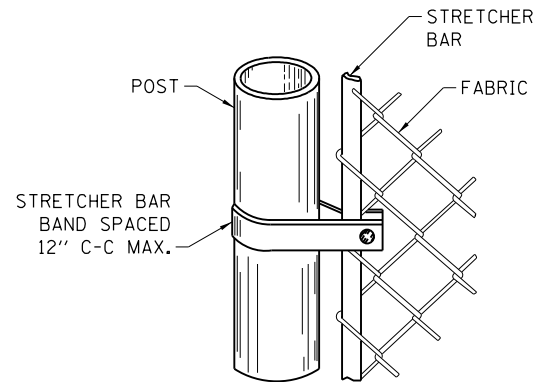
- ON STRAIGHT RUNS OF FENCE, PULL POSTS SHALL BE USED AT 500' CENTERS FOR TYPE 1 AND 330' CENTERS FOR TYPE 2.
- WHERE R.O.W. FENCE FOLLOWS R.O.W. LINE IT SHALL BE INSTALLED PARALLEL TO AND 6" INSIDE THE R.O.W. LINE ON ILLINOIS TOLLWAY PROPERTY.
- LINE POSTS AND BRACES SHALL BE ON ILLINOIS TOLLWAY SIDE OF FENCE FABRIC.
- WHEN THE TENSION OF THE FENCE TENDS TO PULL THE POSTS FROM THE GROUND, THE LINE POSTS SHALL BE ANCHORED WITH ANCHORAGE SPECIFIED FOR CORNER POSTS.
- WHEN THE FENCE LINE HAS A CHANGE IN DIRECTION OF 10° OR MORE, A CORNER POST SHALL BE PLACED AT THE POINT OF CHANGE. WHERE THE ANGLE OF CHANGE IS LESS THAN 10° A PULL POST SHALL BE USED.
- WHERE GRADE LINE HAS A CHANGE IN SLOPE OF 10° OR MORE, A CORNER POST WITH BRACING AS REQUIRED SHALL BE PLACED. WHERE ANGLE IS LESS THAN 10° LINE POST MAY BE USED.
- WHERE RIGHT-OF-WAY FENCE, TYPE 1 IS USED, THE FABRIC SHALL BE KNUCKLED SELVAGE ON TOP AND TWISTED AND BARBED SELVAGE ON BOTTOM.
- PLACEMENT OF BRACED END POSTS OR CORNER POSTS WITHIN THE CLEAR ZONE SHALL BE AVOIDED.

APPROVED BY: *Paul Kovacs* DATE: 07/01/2009  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2020	ADDED GATE TO HEADWALL DETAIL
3-31-2017	REVISED NOTES
3-11-2015	REVISED NOTES
3-31-2014	REVISED ROLLED FORM SECTIONS
11-01-2012	REVISED NOTES

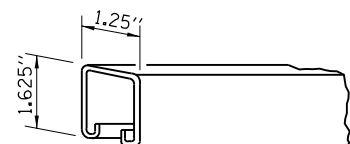
RIGHT OF WAY FENCE

STANDARD D1-06

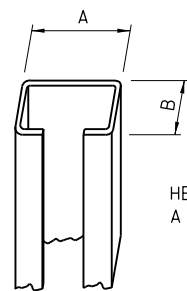


STRETCHER BARS SHALL BE GALVANIZED FLAT STEEL BAR NOT LESS THAN  $\frac{1}{4}'' \times \frac{3}{4}''$  AND THE STRETCHER BAR BANDS SHALL BE GALVANIZED FLAT STEEL BAR NOT LESS THAN  $\frac{1}{8}'' \times 1''$  WITH A  $\frac{3}{8}''$  GALVANIZED CARRIAGE BOLT.

### METHOD OF FASTENING STRETCHER BAR TO POST

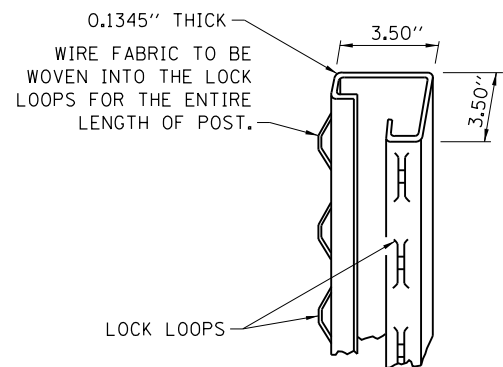


**BRACE SECTION**  
1.25 LBS/LF



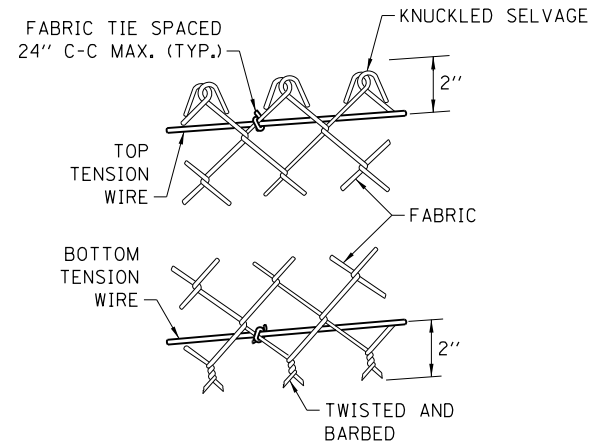
HEAVY "C" - 2.70 LBS/LF  
A x B = 2.250" x 1.625"

### LINE POST "C" SECTION

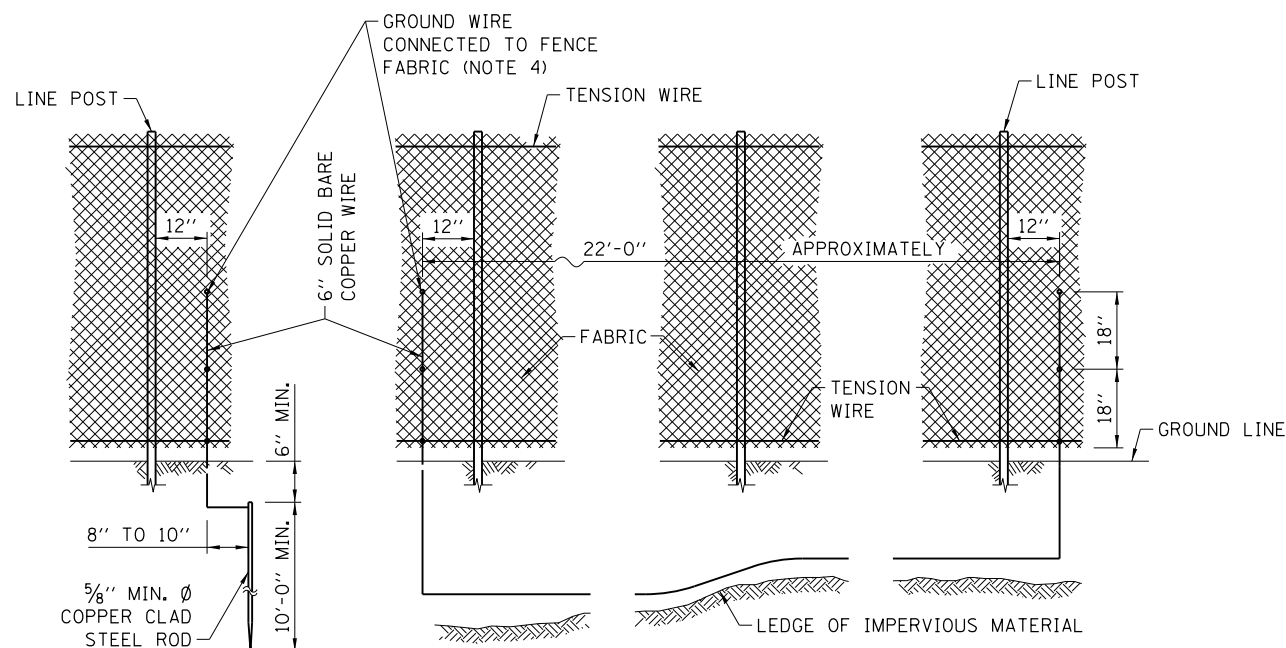


**TERMINAL POST SECTION**  
5.10 LBS/LF

### DETAILS OF ROLL FORMED SECTIONS



### METHOD OF TYING FABRIC TO TENSION WIRES



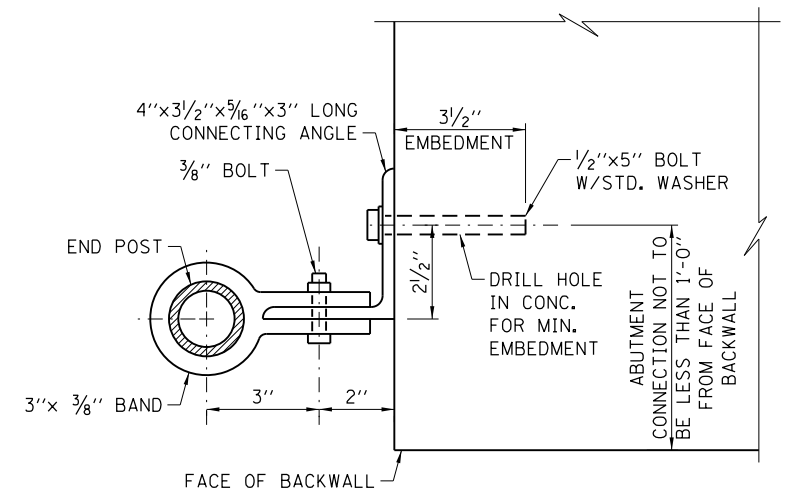
### STANDARD GROUND

### COUNTERPOISE GROUND (ALTERNATE)

### NOTES FOR STANDARD AND COUNTERPOISE GROUND:

1. THE INTERVALS FOR GROUNDING CONTINUOUS FENCING SHALL NOT EXCEED 500 FEET IN URBAN AREAS AND 1000 FEET IN RURAL AREAS. FENCE ADJACENT TO A GATE SHALL BE GROUNDED A MAXIMUM DISTANCE 100 FEET EACH SIDE OF THE GATE.
2. FENCE CROSSING UNDER A POWER LINE SHALL BE GROUNDED, ONCE DIRECTLY UNDER THE CROSSING AND ONE ON EACH SIDE AT 25 TO 50 FEET AWAY. FENCE LOCATED DIRECTLY UNDER A TELEPHONE WIRE OR CABLE CROSSING SHALL HAVE A SINGLE GROUND.
3. COUNTERPOISE GROUNDS SHALL BE USED AT LOCATIONS WHERE GROUND RODS CAN NOT BE DRIVEN DUE TO IMPERVIOUS EARTH MATERIALS.
4. THE GROUND WIRES SHALL BE CONNECTED TO FENCE FABRIC AND GROUND ROD BY STAINLESS STEEL BOLTS AND WASHERS. THE LOWER CONNECTION OF THE GROUND WIRE SHALL BE MADE TO THE BOTTOM TENSION WIRE.

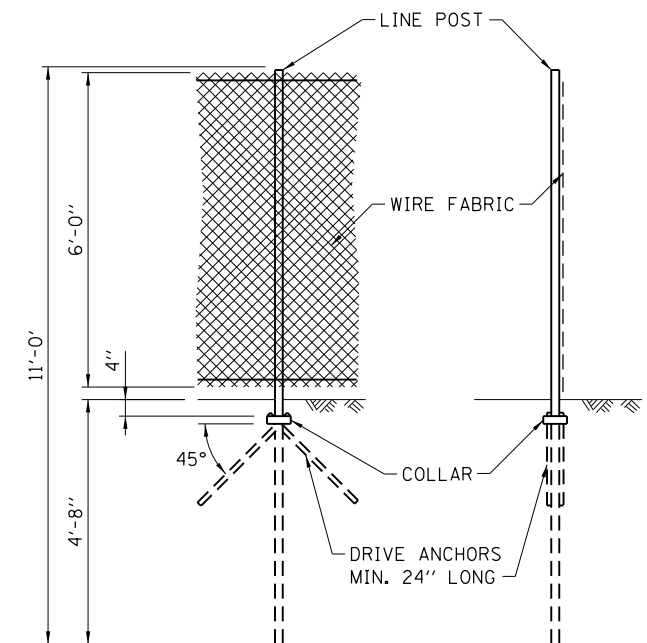
### ELECTRICAL GROUNDING DETAILS



### ABUTMENT CONNECTION DETAIL

### NOTES FOR ABUTMENT CONNECTION:

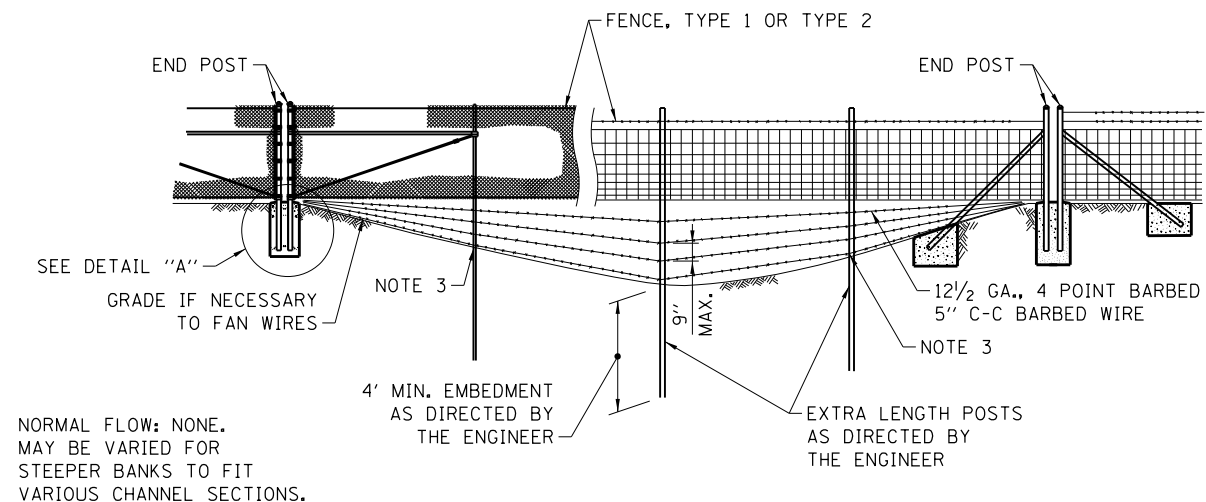
1. WHEN ROLL FORMED SECTION IS USED IN LIEU OF PIPE AS END POST, THE POST SHALL BE BOLTED DIRECTLY TO THE ABUTMENT WALL WITH  $\frac{1}{2}'' \times 5''$  BOLTS WITH STANDARD WASHERS MEETING THE APPROVAL OF THE ENGINEER.



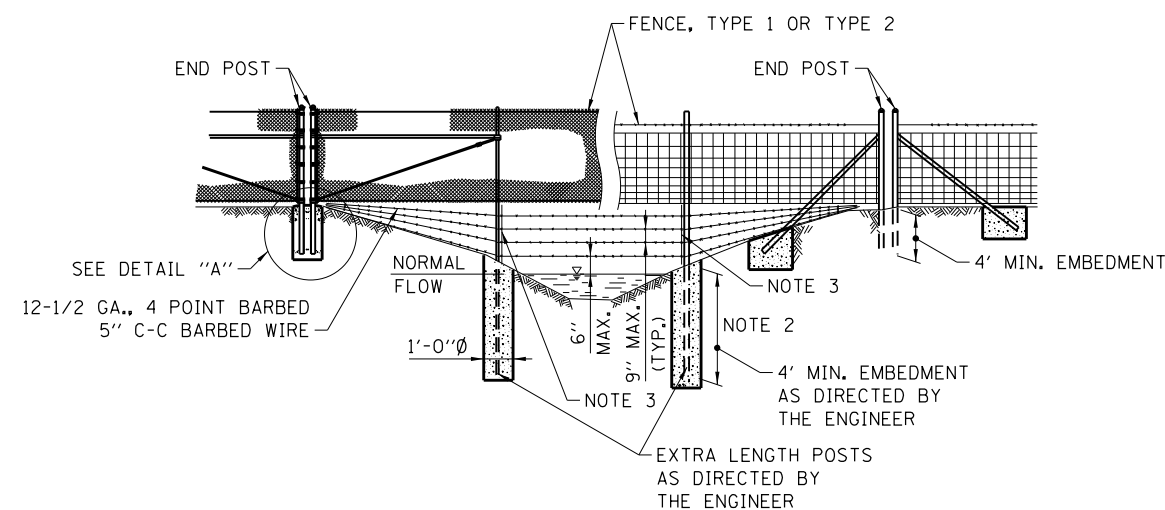
### ALTERNATE DRIVEN LINE POST ANCHORAGE WITH OR WITHOUT DRIVE ANCHORS

### NOTE FOR FENCE POST:

ALTERNATE DRIVEN LINE POST ANCHORAGE IS OPTIONAL. DRIVEN LINE POST ANCHORAGE WITHOUT DRIVE ANCHORS MAY BE USED IN AVERAGE TO GOOD SOIL CONDITIONS. WHEN SOIL IS WEAKER ( $Q_u < 1.25$  TONS/ SQ. FT.) AND STABILITY OF THE POST IS QUESTIONABLE, DRIVE ANCHORS SHALL BE USED. TYPES, SHAPES, DIMENSIONS AND COATING REQUIREMENTS OF DRIVE ANCHORS (ANCHOR BLADES AND COLLARS) FOR DIFFERENT TYPE OF POSTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.



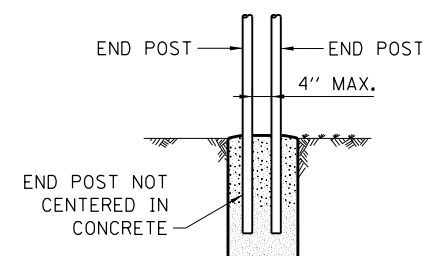
STREAM CROSSING, TYPE 1



STREAM CROSSING, TYPE 2

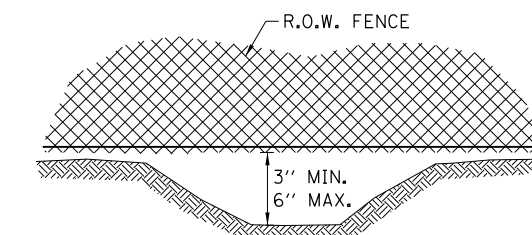
NOTES FOR STREAM CROSSING TYPE 1 AND TYPE 2:

1. THESE INSTALLATION CONDITIONS ARE TYPICAL AND ARE NOT TO BE CONSTRUED AS REPRESENTATIVE OF ALL CONDITIONS WHICH WILL BE ENCOUNTERED. CONSTRUCTION WILL BE VARIED AS REQUIRED OR DIRECTED TO MEET FIELD CONDITIONS.
2. FOR STREAM CROSSING OF THE TYPE REQUIRED THE BOTTOM BARBED WIRE SHALL BE ANCHORED TO CONCRETE FOOTING OR TO HOLES DRILLED IN POSTS, AND INTERMEDIATE WIRES SHALL BE TIED TO THE BOTTOM WIRE AND TO POSTS IN AN EVENLY SPACED FASHION TO PREVENT SLIPPAGE.
3. CONCRETE AND FITTINGS FOR ALL TYPES OF FENCE SHALL BE AS DETAILED FOR SIMILAR CONDITIONS PER STANDARD DRAWING.

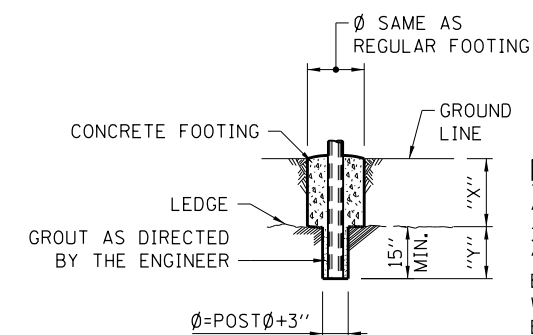


THE FENCE FABRIC SHALL BE REPLACED BY BARBED WIRE STRANDS AT 12\"/>

DETAIL A



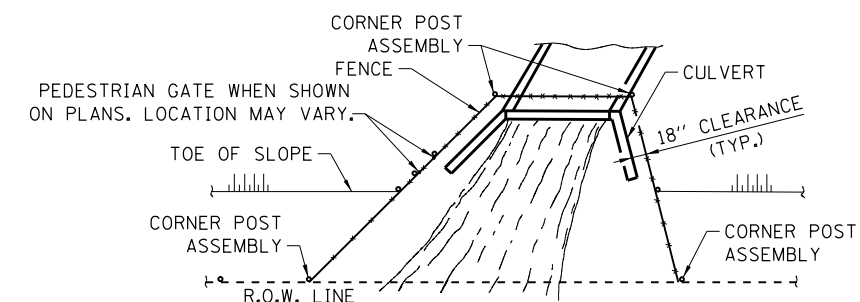
FENCE INSTALLATION OVER DITCH



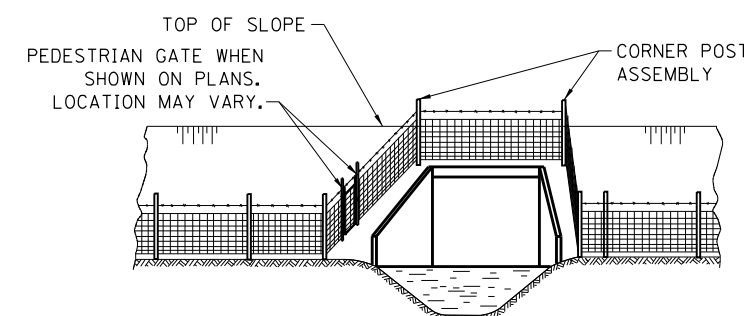
NOTE:

"X" + "Y" SHALL NOT EXCEED 30" WHEN "X" IS 0" TO 15" "Y" =15", AND THE POST SHALL BE SHORTENED AS REQUIRED. WHEN "X" EXCEEDS 15" "Y" SHALL BE DECREASED ACCORDINGLY.

FOOTING FOR POST WHEN  
ROCK LEDGE IS ENCOUNTERED



PLAN AT HEADWALL



ELEVATION


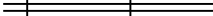










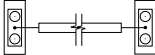
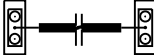




NOTES FOR INSTALLATION AROUND HEADWALL:

1. THIS TYPE OF INSTALLATION IS TO BE USED ONLY WHEN SPECIFICALLY CALLED FOR IN THE CONTRACT PLANS.
2. WHEN THE WIDTH OF THE CULVERT MAKES IT NECESSARY TO ANCHOR A POST TO THE TOP OF THE CULVERT, A CAST IRON SHOE OR OTHER DEVICE APPROVED BY THE ENGINEER SHALL BE USED.

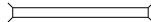
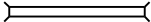

















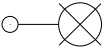














INSTALLATION AROUND HEADWALL



SURVEY AND ROADWAY ITEMS

EXISTING	PROPOSED	
		CONSTRUCTION JOINT W/DOWEL BARS
		BENCHMARK
		CANTILEVER SIGN STRUCTURE
		BUTTERFLY SIGN STRUCTURE
		DOUBLE COLUMN GROUND MOUNTED SIGN
		SINGLE COLUMN GROUND MOUNTED SIGN
		SPAN TYPE SIGN STRUCTURE
		TRIPLE COLUMN GROUND MOUNTED SIGN
		RUMBLE STRIP

DRAINAGE AND UTILITY ITEMS; ROADWAY LIGHTING AND SIGNS

EXISTING	PROPOSED	
		BOX CULVERT WITH HEADWALL
		CABLE IN DUCT W/O GROUND
		LOW POINT
		OVERHEAD ELECTRICAL
		OVERHEAD TELEPHONE
		PIPE CULVERT
		LAKE OR POND
		QUARRY
		STREAM
		SWAMP
		CABLE OR CONDUIT TAG
		ELECTRICAL MANHOLE
		LIGHT-DUTY BOX
		ROADWAY LUMINAIRE
		STEEL TOWER
		TELEPHONE MANHOLE
		UNDERPASS LUMINAIRE
		WATER POINT
		WATERMAIN VALVE VAULT
		WATER WELL
		WOOD POLE

SHEET 1 OF 4

















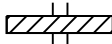
SYMBOLS AND PATTERNS

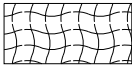

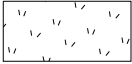

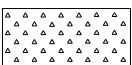
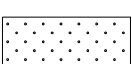

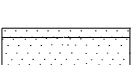
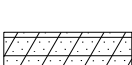

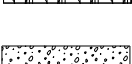


STANDARD D2-04

DATE	REVISIONS
3-31-2016	UPDATED DITCH CHECK SYMBOL
3-11-2015	ADDED NEW SYMBOL
11-01-2012	ADDED NEW SYMBOLS
7-01-2009	REVISED SYMBOL & PATTERNS

APPROVED BY:   
CHIEF ENGINEERING OFFICER  
DATE: 07/01/2009

EROSION & SEDIMENT CONTROL, LANDSCAPING ITEMS

EXISTING	PROPOSED	
	---.---.---.---	CLEARING & GRADING LIMITS (LIMITS OF CONSTRUCTION)
	==>=>	DIVERSION DIKE
	==/==	DRAINAGE DIVIDE
- - - - -	==>=>	DRAINAGE PATH
		SEDIMENT BASIN
		AGGREGATE BERM
	CIP	CULVERT INLET PROTECTION-STONE
		CULVERT INLET PROTECTION-FENCE
	DB	DEWATERING BASIN
	FIPB	FILTER FABRIC INLET PROTECTION, BASKET TYPE
	FIPC	FILTER FABRIC INLET PROTECTION, COVER TYPE
- FB - FB -		FLOTATION BOOM
	IC	INITIAL CONSTRUCTION ITEM
	RIP	RECTANGULAR INLET PROTECTION
		TEMPORARY ROCK CHECK DAM
		TEMPORARY DITCH CHECK
		SEDIMENT BASIN
		SILT FENCE
	SSF	SUPER SILT FENCE
		STABILIZED CONSTRUCTION ENTRANCE
		STONE OUTLET STRUCTURE
		SEDIMENT TRAP
		STREAM DIVERSION
		TEMPORARY PIPE SLOPE DRAIN
		TEMPORARY RIPRAP
	TS	TEMPORARY SWALE
		TREES AND STUMP
	TP	TREE PROTECTION
		TEMPORARY STREAM CROSSING

PROPOSED	
	EROSION CONTROL BLANKET
	OVER SEEDING CLASS B1
	OVER SEEDING CLASS B2
	SEEDING CLASS A1
	SEEDING CLASS A2
	SEEDING CLASS A3
	SEEDING CLASS A4
	SEEDING CLASS A5
	SEEDING CLASS A6
	SEEDING CLASS D1
	SODDING (SALT TOLERANT)
	TEMPORARY GROUND COVER
	TURF REINFORCEMENT MAT

ELECTRICAL AND MECHANICAL ITEMS

	HOME RUN TO PANEL AS NOTED
	INDICATES CIRCUIT TURNING DOWN
	INDICATES CIRCUIT TURNING UP
	GROUND ROD
	GROUNDING TRIAD
	TRANSFORMER
	MOTOR
	AUTOMATIC TRANSFER SWITCH (ATS)
	JUNCTION BOX
	DISCONNECT SWITCH
	CIRCUIT BREAKER
	MANUAL TRANSFER SWITCH
	SELF CONTAINED UTILITY METERING

	STANDBY GENERATOR
	PANEL CIRCUIT BREAKER
	MECHANICALLY HELD LIGHTING COIL
	CONTROL RELAY COIL
	SINGLE-POLE SWITCH
	DUPLEX RECEPTACLE
	4P, 4W, WEATHERPROOF RECEPTACLE WITH SPRING DOOR, BACK BOX, & ANGLE ADAPTER
	4P, 4W, WEATHERPROOF RECEPTACLE WITH SPRING DOOR & BACK BOX
	DUPLEX RECEPTACLE WITH GROUND FAULT PROTECTION
	CONTROL BUILDING LIGHTING 1' X 4' INDUSTRIAL FLUORESCENT FIXTURE, PORCELAIN REFLECTOR, ELECTRONIC BALLAST.
	COMPACT WALL-MOUNTED LOW WATTAGE HPS FIXTURE WITH WIRE GUARD & SINGLE FACTORY INSTALLED FUSE
	EMERGENCY LIGHT UNIT WITH 2-6 VOLT, 12 WATT SEALED BEAM HALOGEN LAMPS WITH WALL MOUNTING BRACKET
	LANE LIGHTING - HEAVY DUTY ALUMINUM HOUSING WITH ENCLOSED REFLECTOR & TEMPERED GLASS LENS W/AUTO REGULATOR BALLAST. ASYMMETRIC PATTERN
	WIRE
	CONDUIT

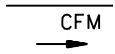
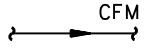
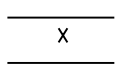
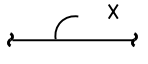
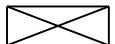
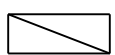
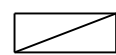
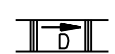
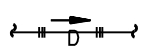

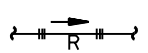
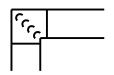
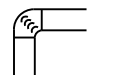
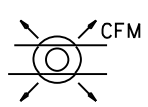
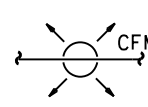
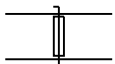
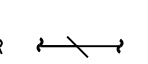
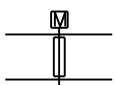
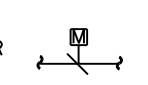

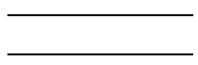
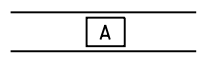
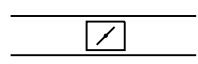
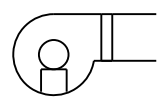
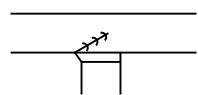
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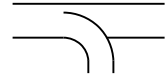
























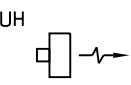

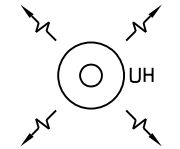

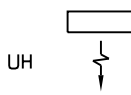







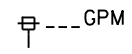











PROPOSED

		COMPRESSED AIR (A)
		ACID RESISTANT WASTE OR DRAIN
		ACID RESISTANT VENT
		STORM SEWER (DOWNSPOUT)
		GAS LINE
		HOT GAS BYPASS LINE (HG)
		HEATING HOT WATER RETURN (HHWR)
		HEATING HOT WATER SUPPLY (HHWS)
		DRY COMPRESSED AIR (IA-INSTRUMENT AIR)
		PROCESS WATER ("P" WATER) LINE
		PROTECTED WATER OR PLANT WATER (PW)
		REFRIGERANT DISCHARGE LINE (RD)
		REFRIGERANT SUCTION LINE (RS)
		VENT LINE (V)

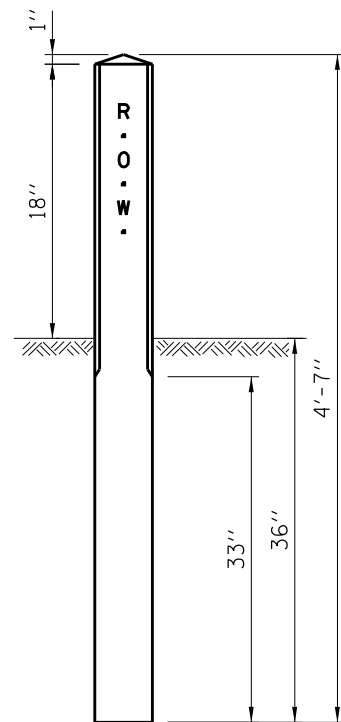
NOTE:  
ALL SYMBOLS AND PATTERNS ON THIS DRAWING  
ARE PROPOSED UNLESS OTHERWISE NOTED.

ELECTRICAL AND MECHANICAL ITEMS

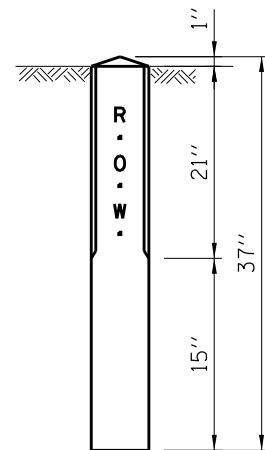
	OR		QUANTITY AND DIRECTION OF THE AIR FLOW
	OR		DUCT SIZE (FIRST FIGURE SIZE OF SHOWN, SECOND FIGURE SIZE OF SIDE NOT SHOWN.)
			SUPPLY DUCT SECTION
	OR		RETURN OR EXHAUST DUCT SECTION
	OR		DUCT DROPS IN THE DIRECTION OF FLOW
	OR		DUCT RISES IN THE DIRECTION OF FLOW
	OR		TURNING VANES
	OR		8" THROAT DIAMETER CEILING DIFFUSER; AIR FLOW -- 100 CFM
	OR		BALANCING OR VOLUME DAMPER
	OR		MOTOR OPERATED DAMPER
			FLEXIBLE DUCT
			FIRE DAMPER
			SOUND ATTENUATOR
			ZONE DAMPER
			FLEXIBLE CONNECTION AT FAN OR EQUIPMENT
			EXTRACTOR

	OR		SPLITTER DAMPER		GLOBE VALVE
			PLUG VALVE WITH MEMORY STOP (BALANCING)		BUTTERFLY VALVE
			PLUG VALVE		CHECK VALVE
			SOLENOID VALVE		ANGLE GATE VALVE
			TEMPERATURE CONTROL VALVE		CONCENTRIC REDUCER
			THREE-WAY TEMPERATURE CONTROL VALVE DIAPHRAGM		ECCENTRIC REDUCER
			THREE-WAY TEMPERATURE CONTROL VALVE TOP VIEW		ORIFICE FLANGE
			PRESSURE REDUCING VALVE (NOS = INITIAL AND FINAL PRESSURE - PSIG)		CROSSOVER
			AIR PRESSURE REDUCING STATION (NO. CORRESPONDS WITH AIR PRESSURE REDUCER SCHEDULE)		PIPE GUIDE
			SAFETY VALVE (NOS. = PRESSURE SETTING - PSIG)		EXPANSION JOINT (SLIP TYPE)
			FLOAT OPERATED VALVE		EXPANSION JOINT (BELLOWS TYPE)
			QUICK COUPLING (QC)		AIR ELIMINATOR (AIR VENT)
			HORIZONTAL UNIT HEATER (NO. CORRESPONDS WITH UNIT HEATER SCHEDULE)		PIPE CAP
			VERTICAL UNIT HEATER (NO. CORRESPONDS WITH UNIT HEATER SCHEDULE)		STRAIGHT CROSS
			CABINET TYPE UNIT HEATER (NO. CORRESPONDS WITH UNIT HEATER SCHEDULE)		90° ELBOW
			THERMOSTAT OR ROOM TEMPERATURE SENSOR		90° ELBOW TURNED DOWN
			GATE VALVE		90° ELBOW TURNED UP
			FLOW SWITCH		SIDE OUTLET ELBOW TURNED DOWN
			VENTURI FLOW METER AND FLOW TO BE INDICATED		SIDE OUTLET ELBOW TURNED UP
			CONNECTION BETWEEN NEW AND EXISTING		LATERAL
					TEE
					TEE OUTLET UP
					TEE OUTLET DOWN
					UNION
					STRAINER
					PIPE ANCHOR
					THERMOMETER (NOS. = RANGE IN DEGREES FAHRENHEIT)
					PRESSURE, VACUUM OR COMPOUND GAUGE

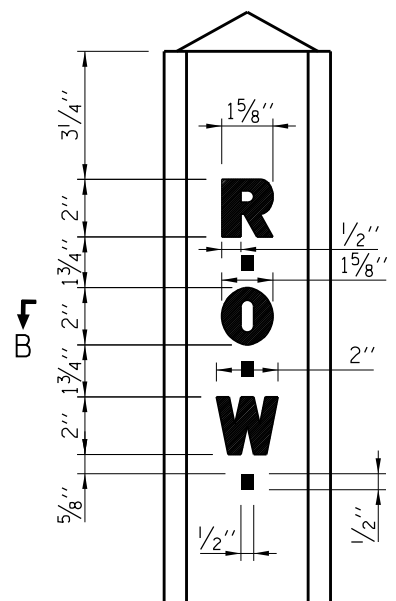
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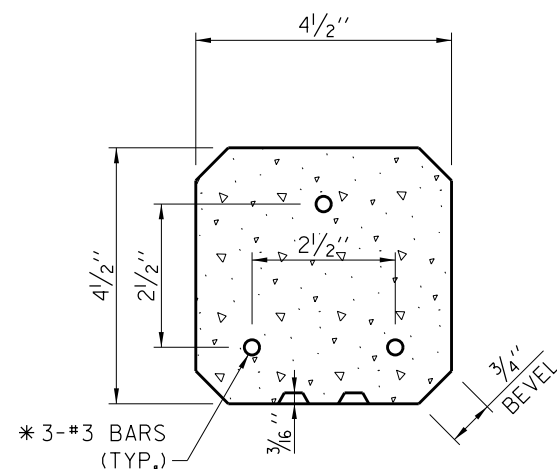
RIGHT OF WAY  
MARKER



RIGHT OF WAY  
MARKER (SPECIAL)

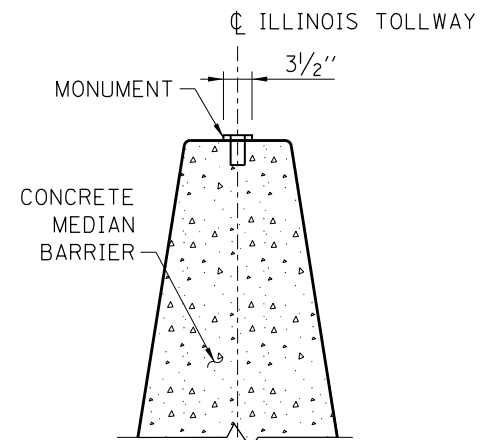


LETTERING DETAIL



- \* METHOD A- 4'-2" LONG BARS
  - \* METHOD B- 2'-6" LONG BARS
- SECTION B-B

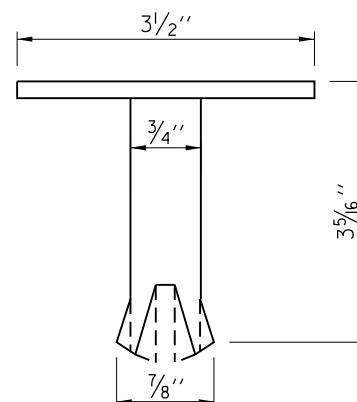
RIGHT OF WAY MARKER



TYPICAL CENTERLINE MONUMENT  
AT MEDIAN BARRIER

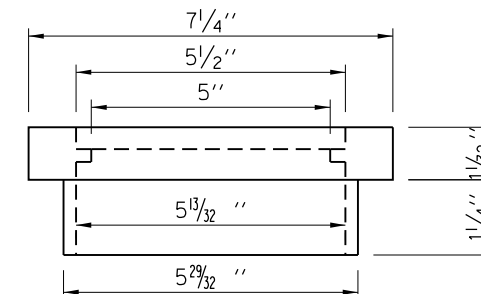


TOP VIEW

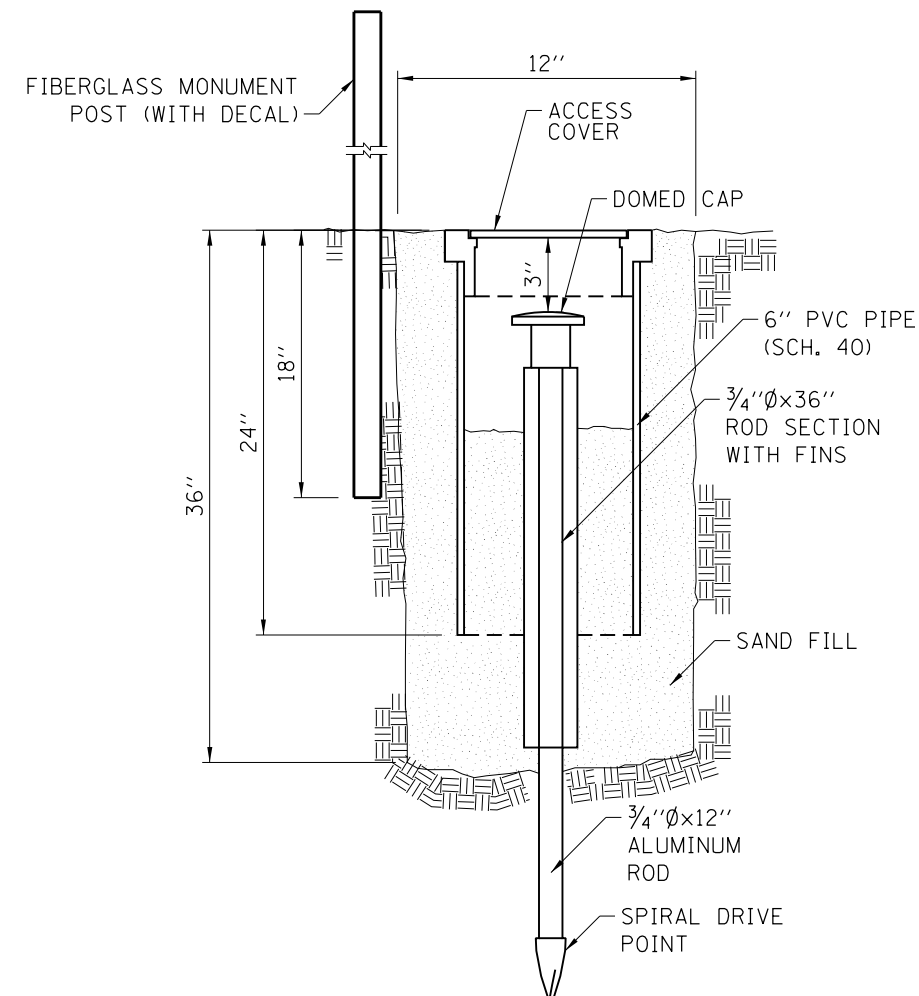


BRONZE DOMED CAP

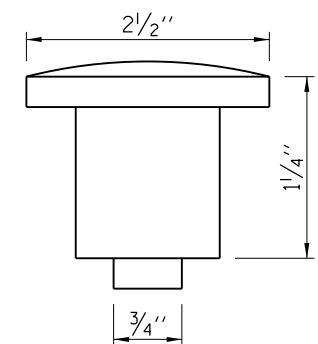
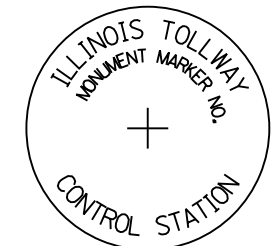
PERMANENT SURVEY MONUMENT



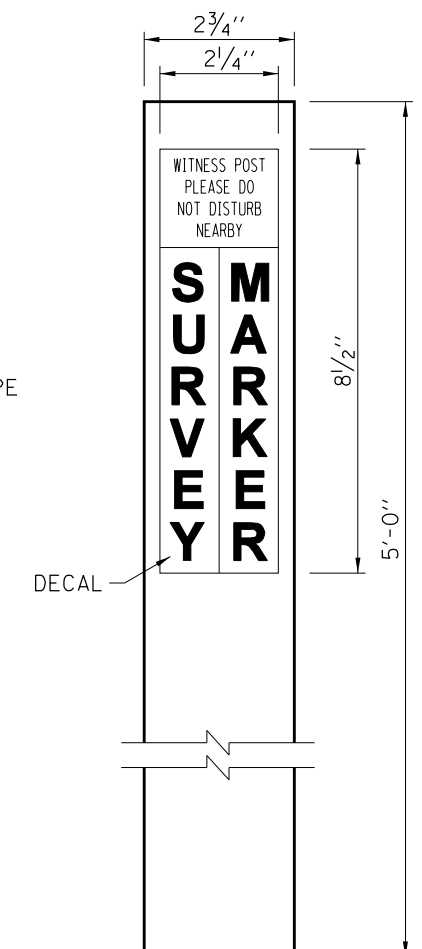
ACCESS COVER  
(RECESSED HINGE)



PERMANENT SURVEY MONUMENT (SPECIAL)



ALUMINUM DOMED CAP



MONUMENT POST



DATE	REVISIONS
3-01-2019	CHANGED TO CONSTANT-SLOPE MEDIAN BARRIER
7-01-2010	NEW MONUMENT AND BARRIER MARKERS

PERMANENT SURVEY  
MONUMENTS AND  
RIGHT-OF-WAY MARKERS  
STANDARD D3-02

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 01/01/2007

PERMANENT DELINEATION SPACING					
		MAINLINE		RAMP	
	REFLECTORS	TANGENT	CURVE	TANGENT	CURVE
*	GUARDRAIL	100'	100'	100'	100' (R >= 1,050') 50' (R < 1,050')
*	BARRIER WALL (DOUBLE FACE)	100'	100'	100'	100' (R >= 1,050') 50' (R < 1,050')
*	BARRIER WALL (SINGLE FACE)	100'	100'	100'	100' (R >= 1,050') 50' (R < 1,050')
	SHOULDER NARROWING	3 @ 15'	3 @ 15'	3 @ 15'	3 @ 15'
	BRIDGE APPROACHES	3 @ 15'	3 @ 15'	3 @ 15'	3 @ 15'
*	BRIDGE OR RETAINING WALL PARAPET	50'	50'	50'	50'
*	CRASHWORTHY NOISE ABATEMENT WALL OR RETAINING WALL AT EDGE OF SHOULDER	100'	100'	100'	100' (R >= 1,050') 50' (R < 1,050')
	ROADWAY DELINEATORS	MAINLINE		RAMP	
		TANGENT	CURVE	TANGENT	CURVE
	POST MOUNTED DELINEATOR	200'	200'	200' **	TABLE A **
	POST MOUNTED DELINEATOR (RAMP TAPERS AND TANGENTS)	100' **	100' **	NA	NA
TEMPORARY DELINEATION SPACING					
		TANGENT	REVERSE CURVE	SHIFT	TAPER
	TEMPORARY CONCRETE BARRIER	50'	25'	25'	25'
* WHEN ADJACENT SHOULDER IS USED AS A TRAVELED LANE, USE SPACING REQUIREMENTS AS SHOWN FOR TEMPORARY DELINEATION.					
* * RED REFLECTORS SHALL BE INSTALLED (FACING OPPOSITE TRAFFIC FLOW) ALONG EXIT RAMPS AND ADJACENT TO THE RIGHT SIDE OF TANGENTS AND TAPERS OF DECELERATION LANES AS INDICATED ON THE INTERCHANGE RAMP PLACEMENT PLAN (SEE SHEET 2).					

TABLE A	
REFLECTOR SPACING ON RAMP - CURVES	
RADIUS OF CURVE (FT.)	SPACING ALONG CURVE (FT.)
LESS THAN 1050	50
1050-1299	100
1300-1999	125
2000-2999	150
3000-3999	175
MORE THAN 3999	200

GENERAL NOTES:

1. EMERGENCY TURNAROUNDS DELINEATION - THE FOLLOWING DELINEATION SHOULD BE INSTALLED ON THE LEFT SIDE OF THE PAVEMENT APPROACHING EMERGENCY TURNAROUNDS.
- A. ONE-HALF OF A MILE IN ADVANCE OF THE EMERGENCY TURNAROUNDS ONE WHITE REFLECTOR UNIT OVER THREE AMBER REFLECTOR UNITS.

B. ONE-FOURTH OF A MILE IN ADVANCE OF THE EMERGENCY TURNAROUNDS ONE WHITE REFLECTOR UNIT OVER TWO AMBER REFLECTOR UNITS.

C. AT A POINT NEAR THE INTERSECTION OF THE EDGE OF THE LEFT SHOULDER AND NEAR EDGE OF THE EMERGENCY TURNAROUNDS ONE WHITE REFLECTOR UNIT OVER ONE AMBER REFLECTOR UNIT.
2. ALL REFLECTORS FACING OPPOSITE TRAFFIC FLOW SHALL BE RED.

NOTES FOR ROADWAY DELINEATORS, POST MOUNTED INSTALLATION:

1. 

A. MAINLINE-SINGLE WHITE REFLECTOR UNITS SHALL BE PLACED CONTINUOUSLY ON THE RIGHT AND SINGLE AMBER REFLECTOR UNITS SHALL BE PLACED ON THE LEFT ON MAIN LINE SECTIONS WITHOUT BARRIER WALL.

B. RAMPS-SINGLE REFLECTOR UNITS SHALL BE PLACED ON THE OUTSIDE OF ALL CURVED SECTIONS OF RAMPS, SINGLE WHITE SHALL BE PLACED ON THE RIGHT SIDE AND AMBER ON THE LEFT SIDE. THE DELINEATORS SHALL BE OVERLAPPED FOR A SHORT DISTANCE TO CLEARLY INDICATE WHERE DELINEATION ON ONE SIDE OF THE RAMP ENDS AND DELINEATION ON THE OTHER SIDE APPEARS.

C. DOUBLE WHITE REFLECTOR UNITS SHALL BE PLACED ON THE RIGHT AT ALL ACCELERATION AND DECELERATION LANES.

D. TWO RED REFLECTORS SHALL BE INSTALLED ON THE BACK SIDE (FACING OPPOSITE TRAFFIC FLOW) OF ALL DELINEATOR POSTS ALONG EXIT RAMPS AND ALONG THE RIGHT SIDE OF TANGENTS AND TAPERS OF DECELERATION LANES.
2. REFLECTORS SHALL BE MOUNTED ON SUPPORTS SUCH THAT THE TOP OF REFLECTORS IS FOUR FEET ABOVE THE ROADWAY EDGE AND TWO FEET OUTSIDE THE OUTER EDGE OF THE PAVED SHOULDER OR TWO FEET MINIMUM AND SIX FEET MAXIMUM OUTSIDE THE BACKS OF CURBS OR GUTTERS.
3. IN ALL CASES, THE COLOR OF THE REFLECTORS SHALL BE THE SAME AS THE ADJACENT EDGE LINE EXCEPT AS SPECIFIED IN GENERAL NOTES.
4. POST MOUNTED REFLECTORS SHALL BE PLACED CONTINUOUSLY AS NOTED ABOVE IN CONJUNCTION WITH GUARDRAIL INSTALLED.
5. THE PLACEMENT OF ROADWAY DELINEATOR "CIRCULAR REFLECTORS" SHALL BE USED FOR ALL MINOR PROJECTS WHICH HAVE A LENGTH OF LESS THAN 5 MILES. THE PLACEMENT OF ROADWAY DELINEATOR "RECTANGULAR REFLECTORS" SHALL BE USED FOR ALL MAJOR PROJECTS WHICH HAVE A LENGTH GREATER THAN 5 MILES. ALL ROADWAY DELINEATORS WITHIN A ROADWAY SEGMENT SHALL BE OF THE SAME TYPE.

NOTES FOR GUARDRAIL AND BARRIER WALL REFLECTOR:

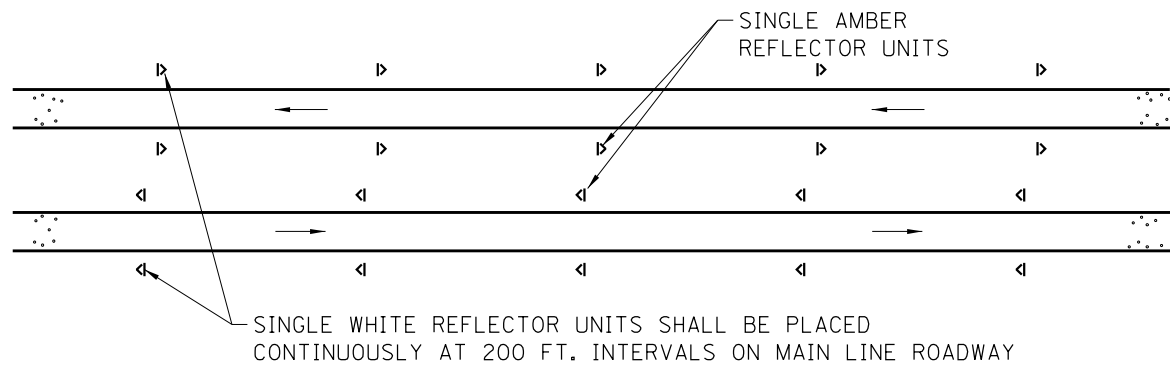
1. REFLECTORS TYPE B AND TYPE C SHALL HAVE REFLECTIVE SURFACE ON ONE SIDE ONLY. WHERE DOUBLE BACK REFLECTOR IS INDICATED, A SECOND RED REFLECTOR SHALL BE INSTALLED.

DATE	REVISIONS
3-01-2024	ADDED DETAIL FOR REFLECTOR AT NAW & RETAINING WALL
3-01-2023	ADDED WRONG-WAY REFLECTORS TO EXIT RAMPS AND RELATED NOTES
3-01-2019	CHANGED BARRIER TO CONSTANT-SLOPE SHAPE

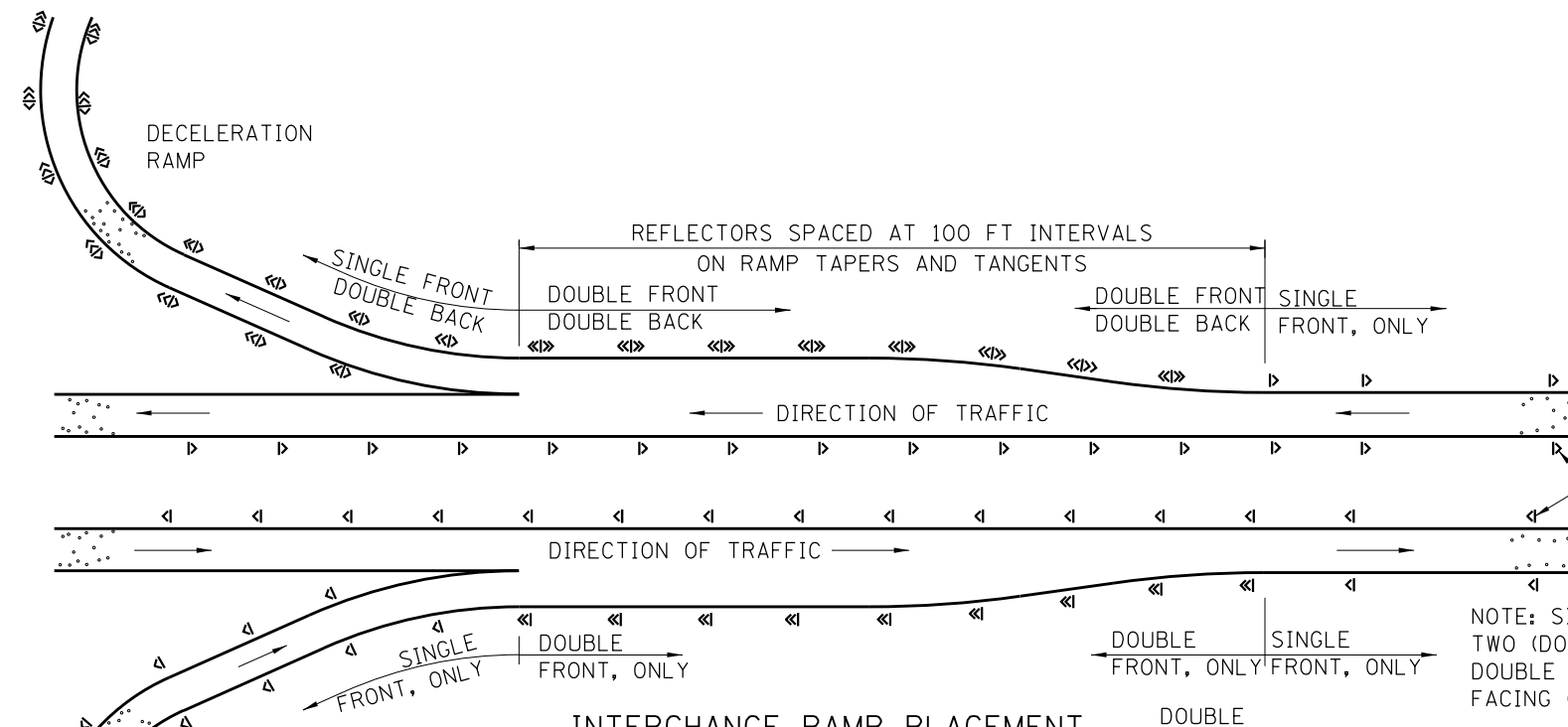


ROADWAY DELINEATORS  
AND REFLECTORS

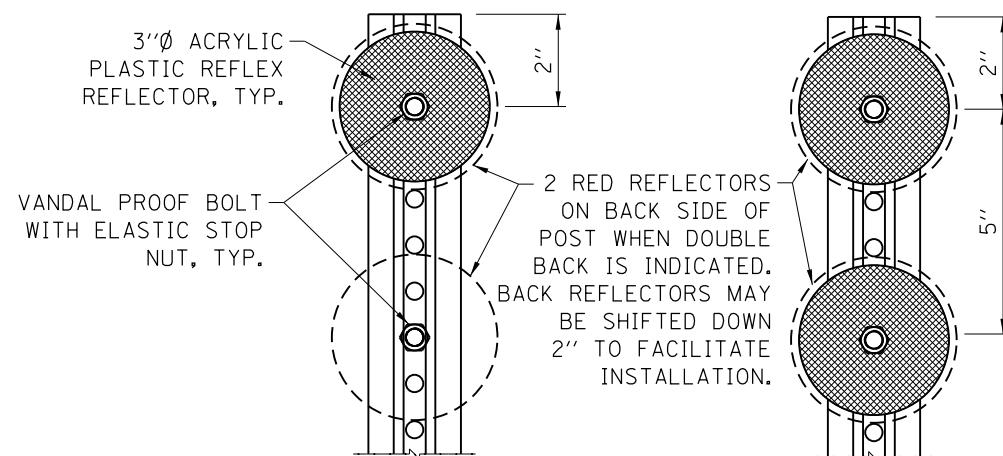
STANDARD D4-09



TANGENT PLACEMENT



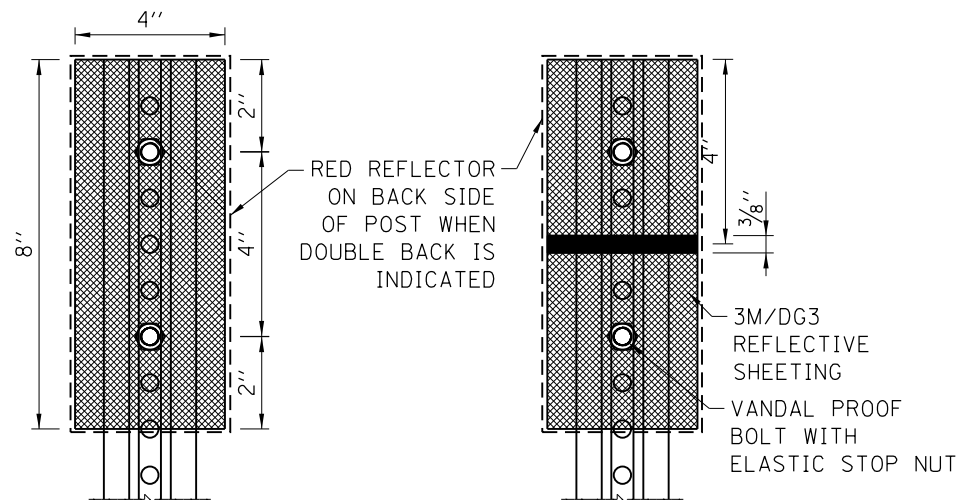
INTERCHANGE RAMP PLACEMENT



SINGLE FRONT

DOUBLE FRONT

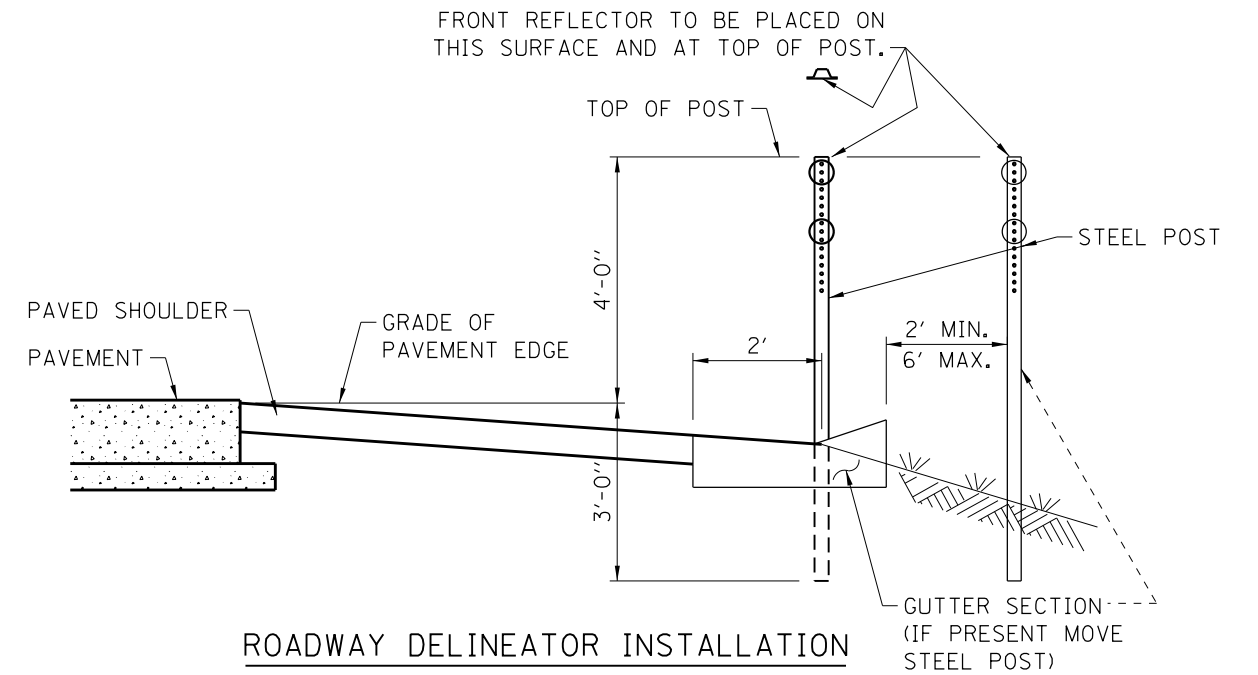
CIRCULAR REFLECTORS



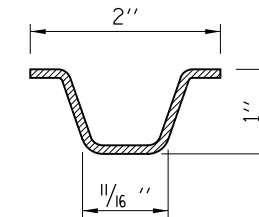
SINGLE FRONT

DOUBLE FRONT

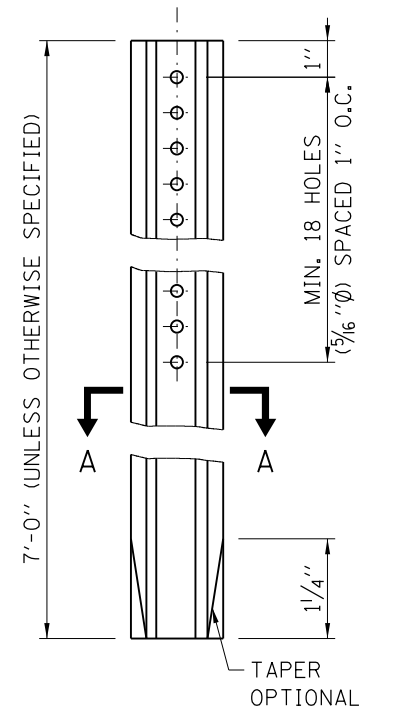
RECTANGULAR REFLECTORS



ROADWAY DELINEATOR INSTALLATION



SECTION A-A  
STEEL- 1.12 LBS/FT.



STEEL POST

NOTE:  
SEE SHEET 1 OF THIS  
SERIES FOR NOTES.

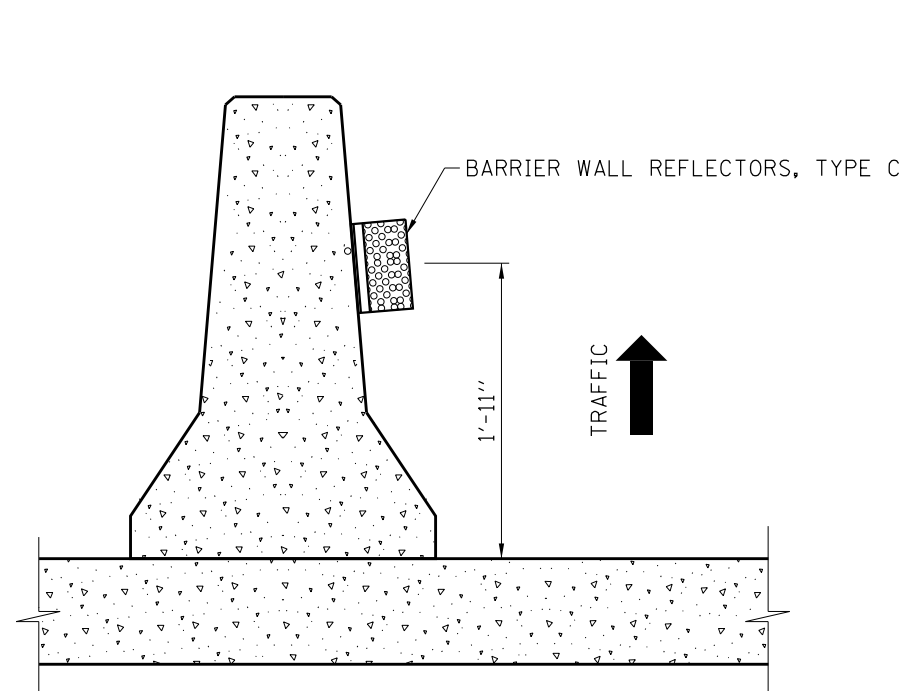
APPROVED BY:  
*Mamam Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/01/2024

SHEET 2 OF 3

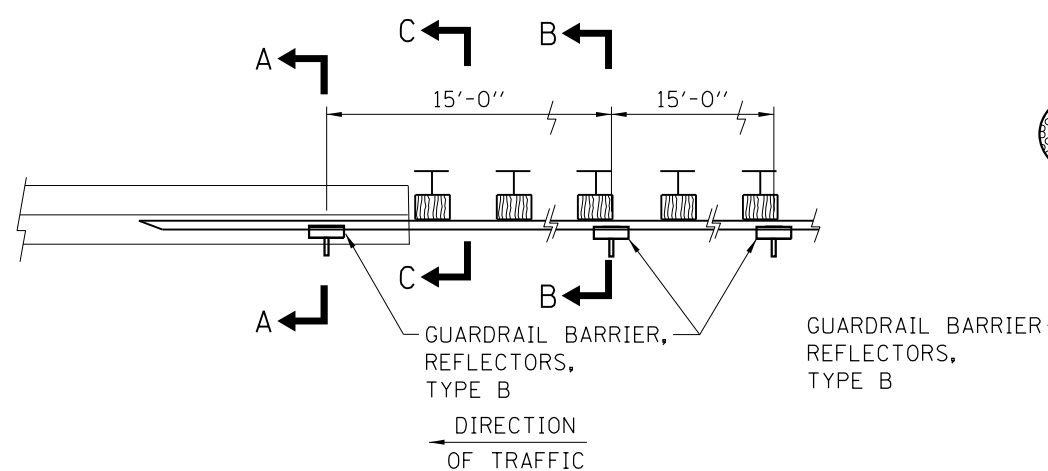


ROADWAY DELINEATORS  
AND REFLECTORS

STANDARD D4-09



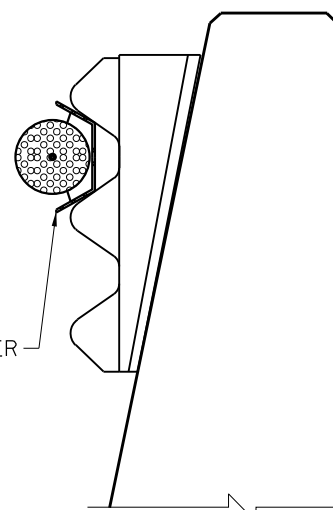
CROSS-SECTION  
TEMPORARY CONCRETE BARRIER



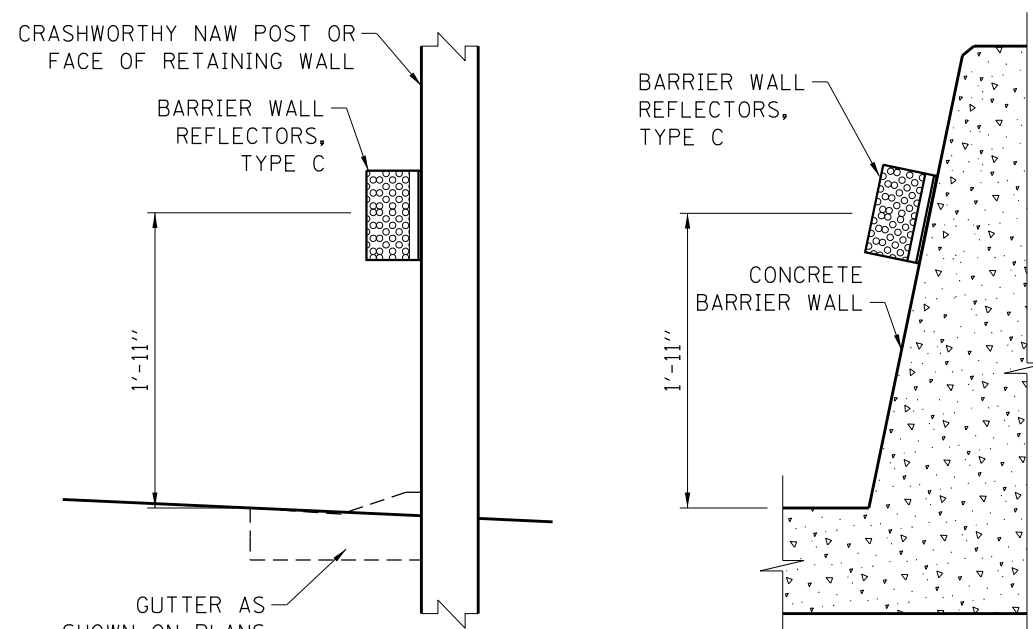
PLAN

REFLECTOR INSTALLATION ON GUARDRAIL  
AT BRIDGE APPROACHES

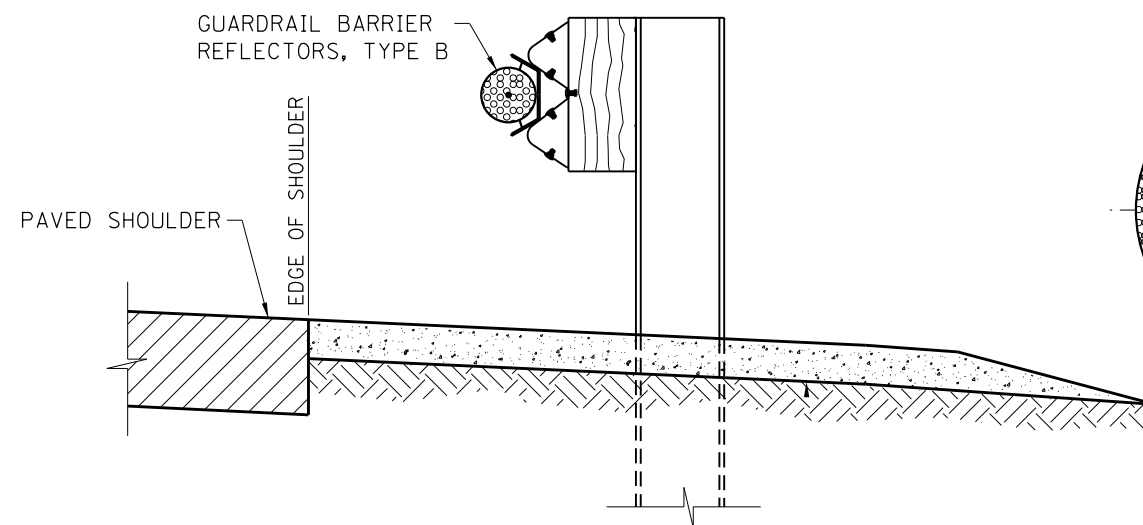
ALSO SEE SHEET 1 IN THIS SERIES  
FOR ADDITIONAL INFORMATION



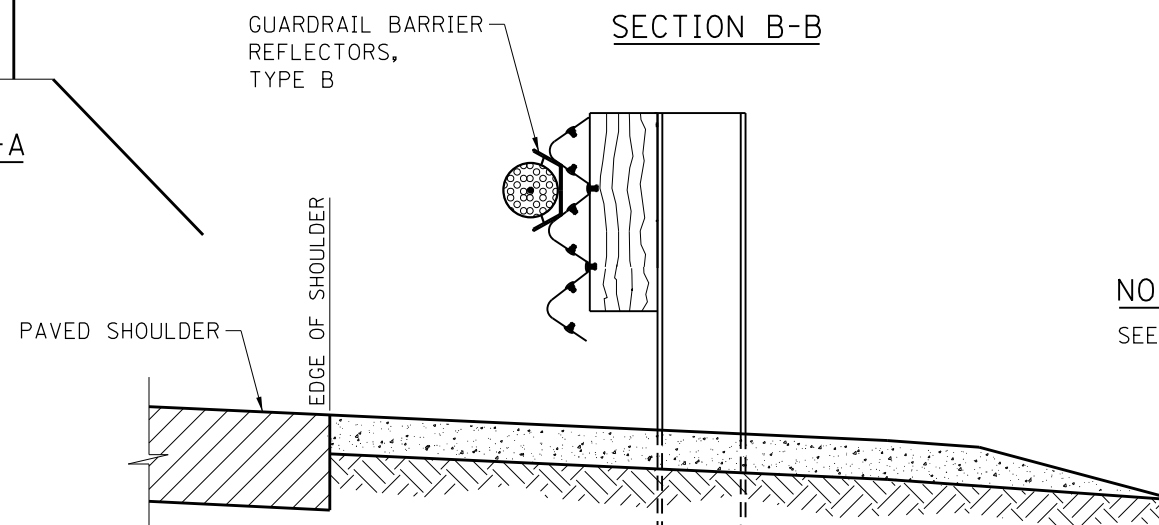
SECTION A-A



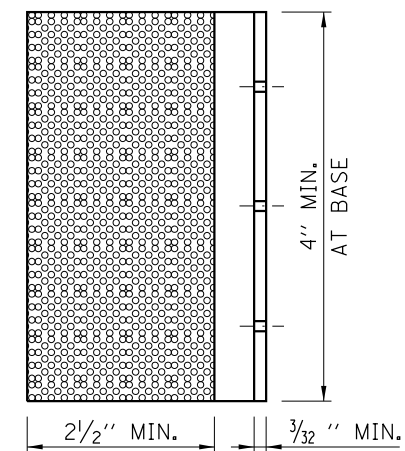
VERTICAL WALL, BARRIER OR PARAPET  
REFLECTOR INSTALLATION



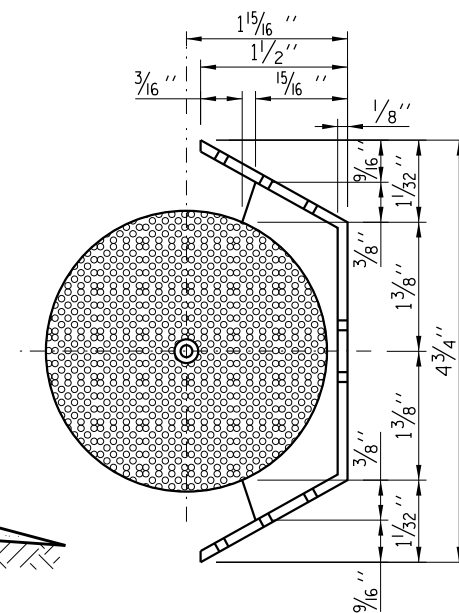
SECTION B-B



SECTION C-C



REFLECTOR, TYPE C



REFLECTOR, TYPE B

NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

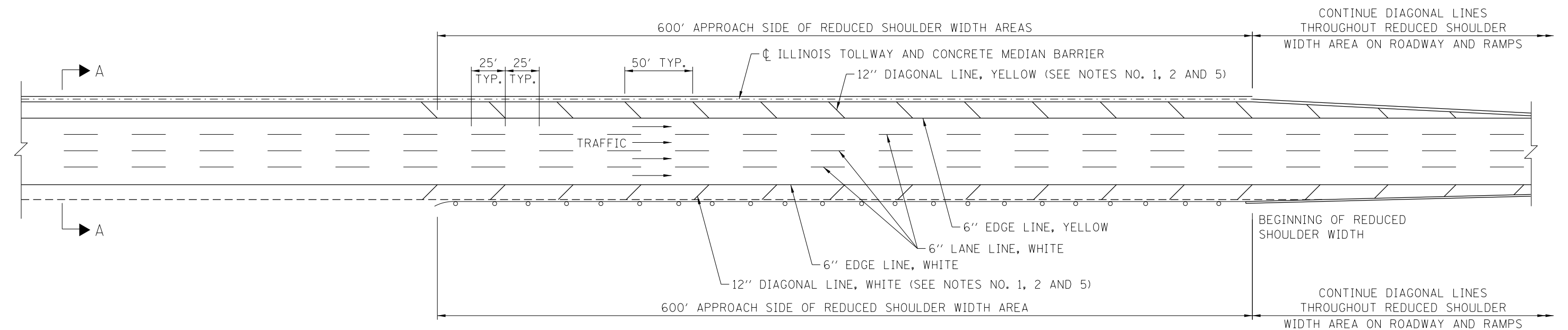
SHEET 3 OF 3



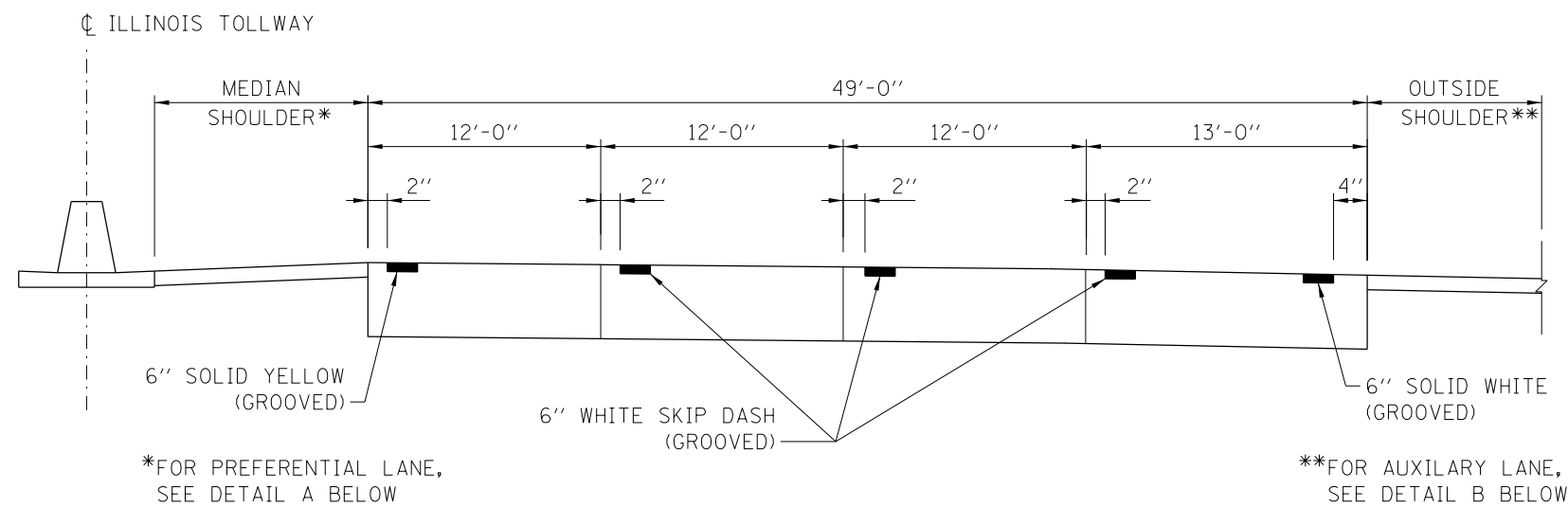
ROADWAY DELINEATORS  
AND REFLECTORS

STANDARD D4-09





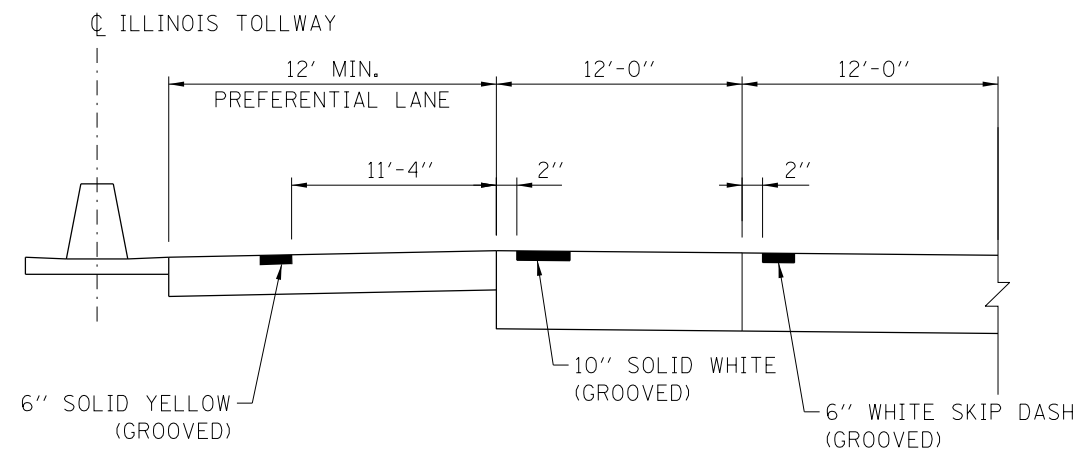
PLAN



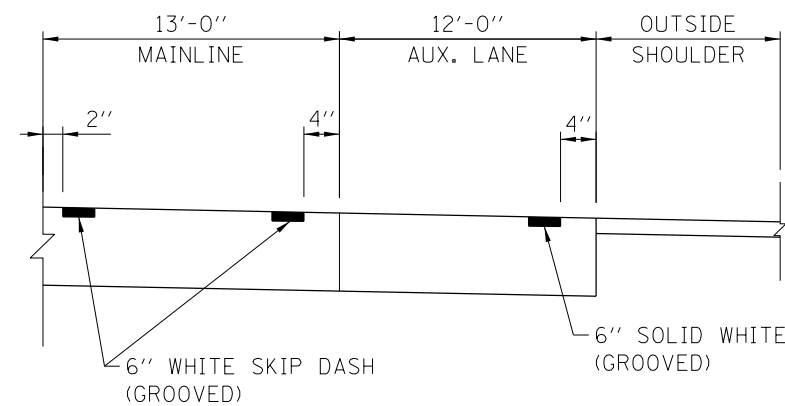
SECTION A-A

ROADWAY AND SHOULDER STRIPING - NEW CONSTRUCTION

FOR RUMBLE STRIP DETAILS  
SEE STANDARD DRAWING D7



DETAIL A - PREFERENTIAL LANE STRIPING



DETAIL B - AUXILIARY LANE STRIPING

### GENERAL NOTES:

1. DIAGONAL SHOULDER STRIPING REQUIRED WHERE THE SHOULDER WIDTH IS LESS THAN STANDARD.
2. ROADWAY MARKING MATERIALS TO BE USED ON FINISHED CONCRETE SURFACE AND ASPHALT SURFACE SHALL BE AS SHOWN ON THE PLANS.
3. WHERE THE GUARDRAIL ENCROACHES ON THE SHOULDER THE DIAGONAL MARKINGS SHALL EXTEND AS CLOSE TO THE FACE OF THE RAIL AS POSSIBLE.
4. ALL PERMANENT LANE LINES AND EDGE LINES SHALL BE GROOVED, ON ROADWAY SURFACES, UNLESS OTHERWISE NOTED.
5. DIAGONAL STRIPING SHALL BE SURFACE APPLIED.
6. GORE STRIPING (CHEVRON) SHALL BE SURFACE APPLIED.
7. ALL LANE LINES AND EDGE LINES SHALL BE SURFACE APPLIED ON BRIDGES.
8. ALL LANE LINES AND EDGE LINES SHALL BE SURFACE APPLIED ON CONTINUOUSLY REINFORCED CONCRETE (CRC) PAVEMENT AT TOLL PLAZAS.

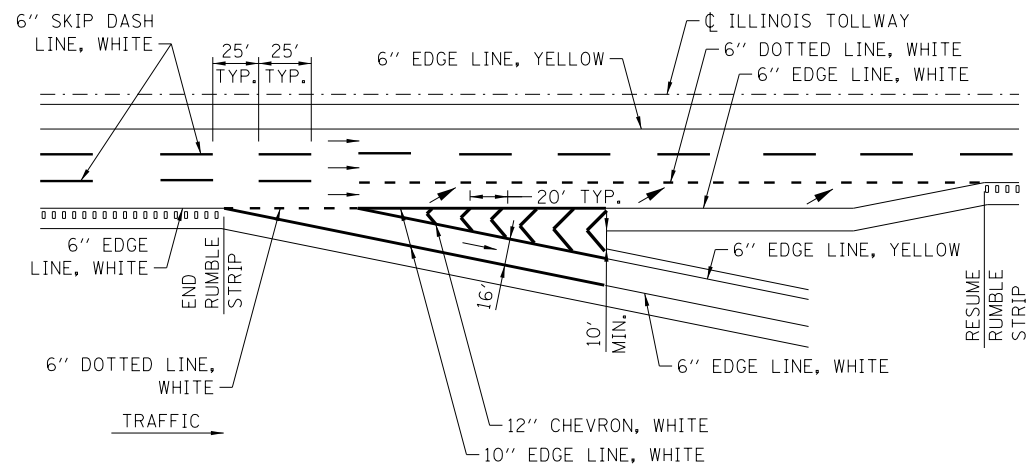
APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
02/23/2023

DATE	REVISIONS
3-01-2023	ADDED AUX. LANE STRIPING DETAIL
3-01-2022	REVISED EDGE LINES TO 6"
3-01-2021	ADDED PREF. LANE STRIPING
3-01-2020	REVISED EDGE LINE TO BE 4" MIN.
3-31-2016	REVISED NOTES
3-31-2014	REVISED NOTES

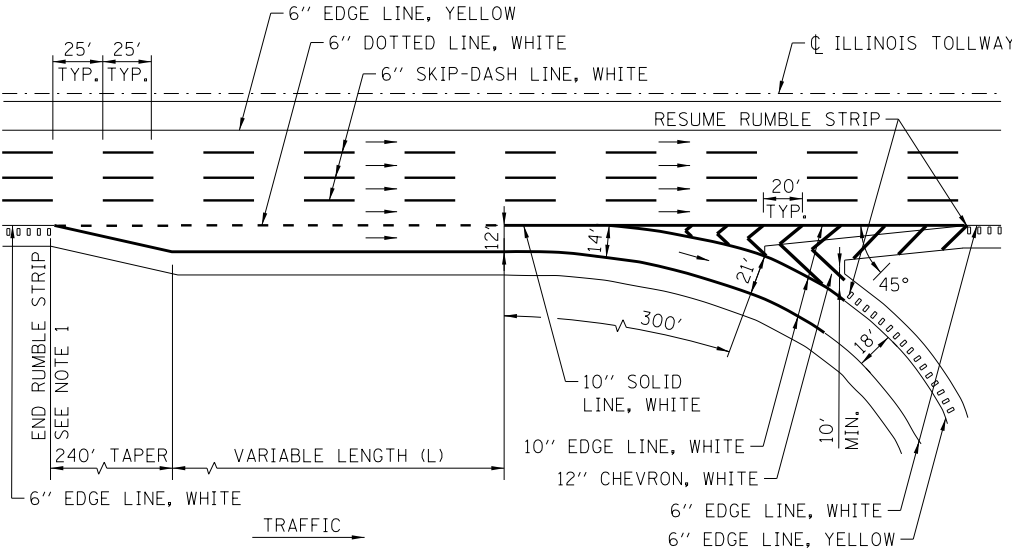


PERMANENT PAVEMENT MARKINGS  
MAINLINE

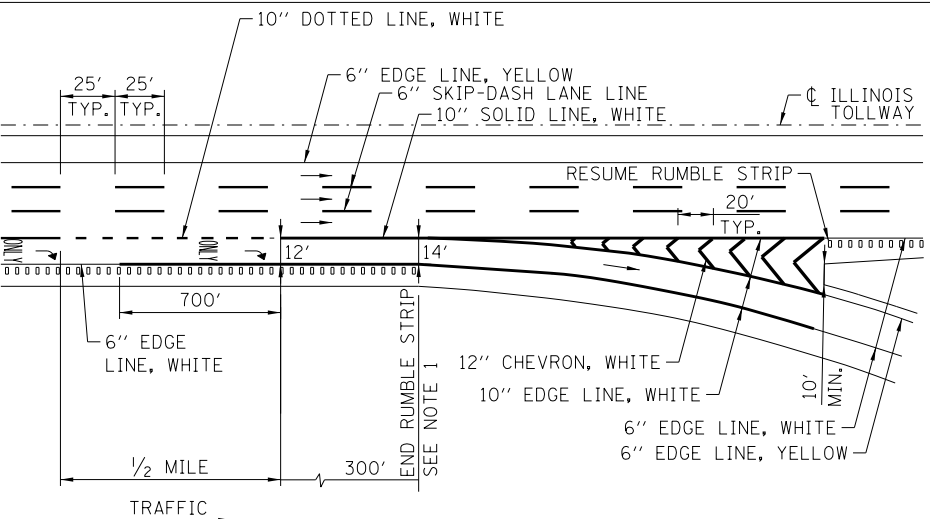
STANDARD D5-10



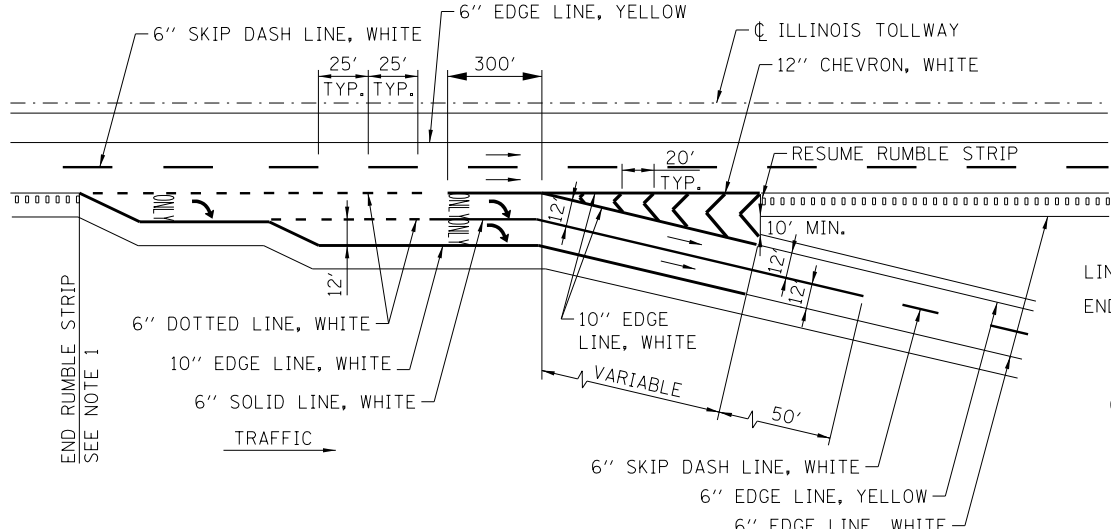
EXIT - SINGLE LANE RAMP  
LANE THREE TERMINATION



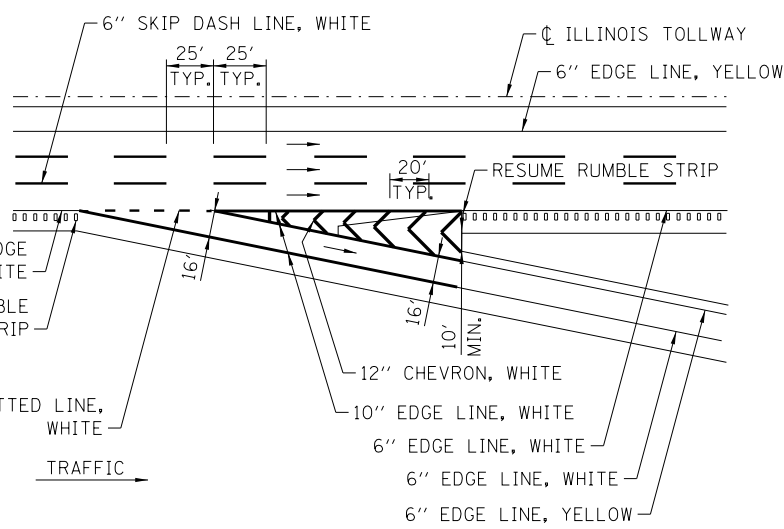
EXIT - SINGLE LANE LOOP RAMP - PARALLEL TYPE  
SEE SHEET 4 FOR SPEED REDUCTION MARKINGS



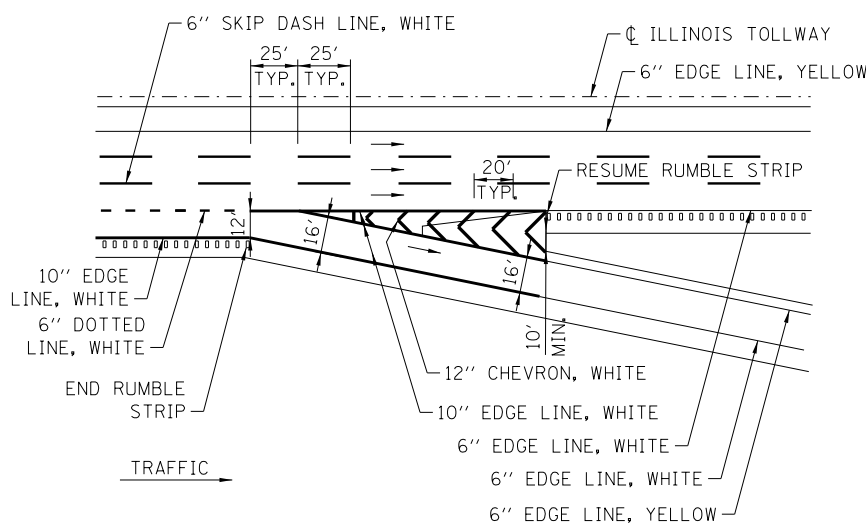
EXIT - SINGLE LANE RAMP - LANE DROP



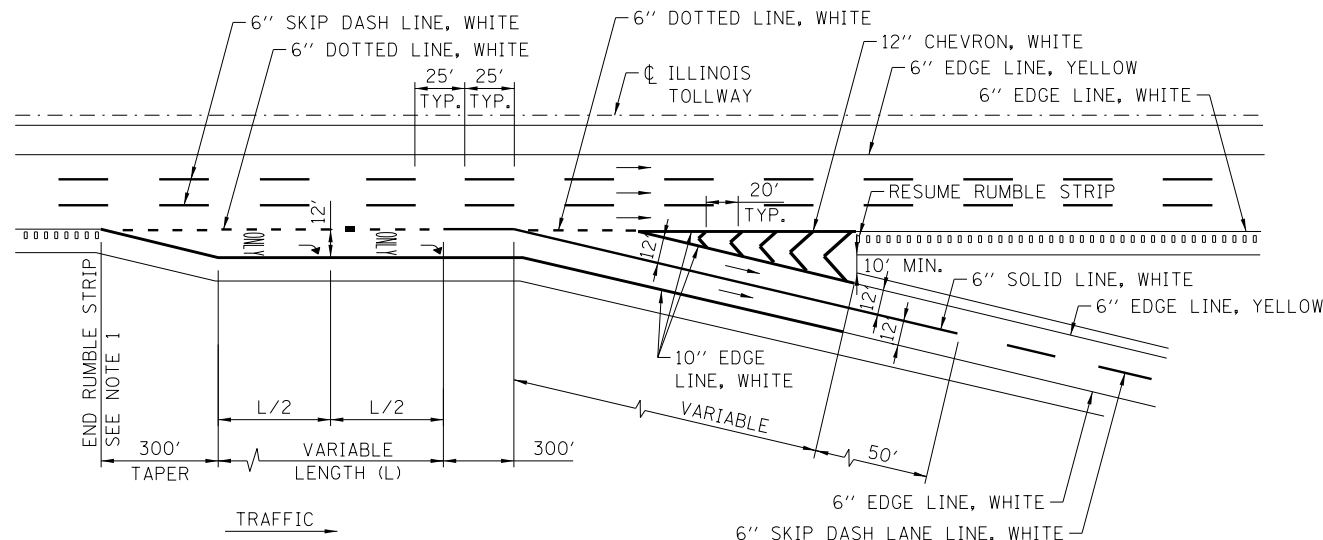
EXIT - TWO LANE PARALLEL RAMP



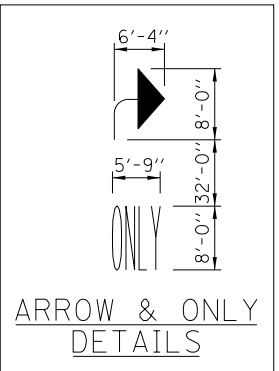
EXIT - SINGLE LANE RAMP - TAPER TYPE



EXIT - SINGLE LANE RAMP WITH AUX LANE - TAPER TYPE



EXIT - TWO LANE RAMP



NOTE:  
PAVEMENT MARKING LETTERS AND SYMBOLS-ONLY AND ARROW ARE TO BE TYPICALLY PLACED AT 1/2 MILE EXIT ONLY GUIDE SIGN, AT GORE EXIT GUIDE SIGN AND APPROXIMATELY HALFWAY BETWEEN THE TWO.

GENERAL NOTES:

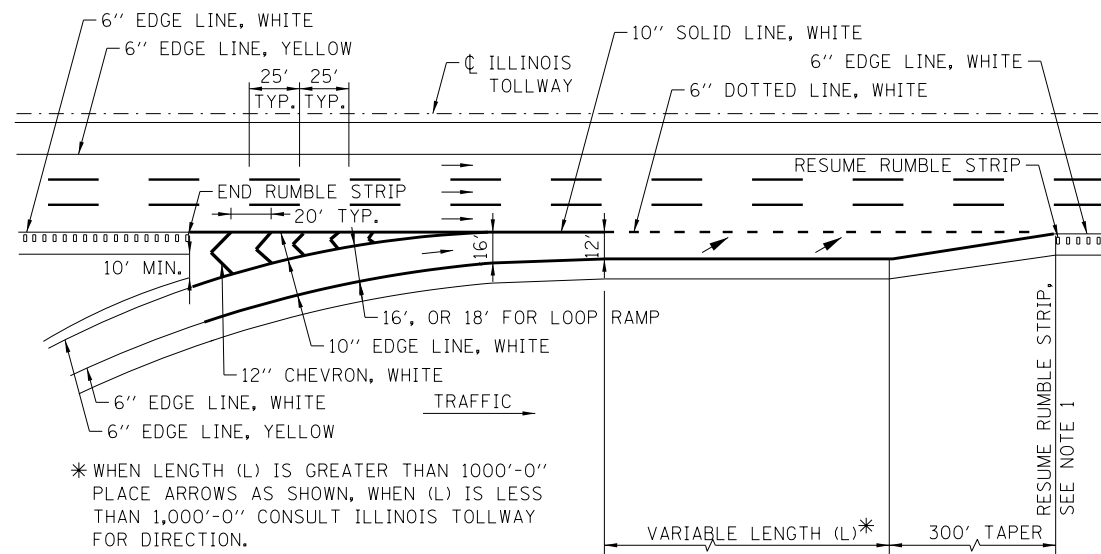
1. RUMBLE STRIPS SHALL BE INSTALLED BETWEEN THE THEORETICAL GORE AND TAPER WHEN LENGTHS (L) OF AUXILIARY LANES, ACCELERATION LANES OR DECELERATION LANES, ARE GREATER THAN 1000'.
2. ROADWAY MARKING MATERIALS TO BE USED ON FINISHED CONCRETE SURFACE AND ASPHALT SURFACE SHALL BE AS SHOWN ON THE PLANS.
3. ALL LANE LINES AND EDGE LINES SHALL BE GROOVED.
4. GORE STRIPING (CHEVRON) SHALL BE SURFACE APPLIED.
5. LETTERS AND SYMBOL MARKING SHALL BE SURFACE APPLIED.
6. DOTTED LINES SHALL CONSIST OF 3' LINE AND 9' GAPS.
7. PAVEMENT MARKINGS SHALL NOT BE GROOVED ON THE CONTINUOUSLY REINFORCED CONCRETE (CRC) PAVEMENT SECTION AT TOLL PLAZAS.

APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/01/2023

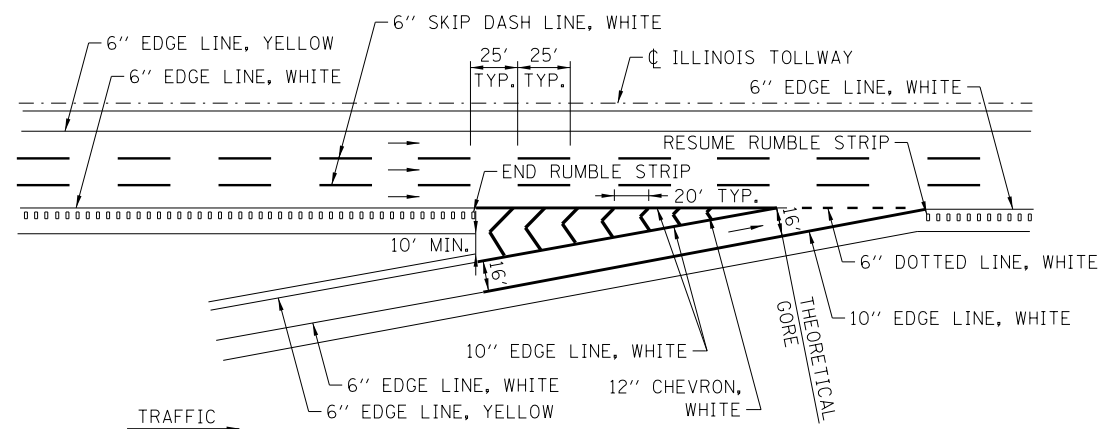
DATE	REVISIONS
3-31-2023	ADD 6" DOTTED LINE ACROSS EXIT & ENTRANCE RAMP TAPERS. ADDED NOTE 7.
3-01-2022	REVISED EDGE LINES TO 6"

SHEET 1 OF 4

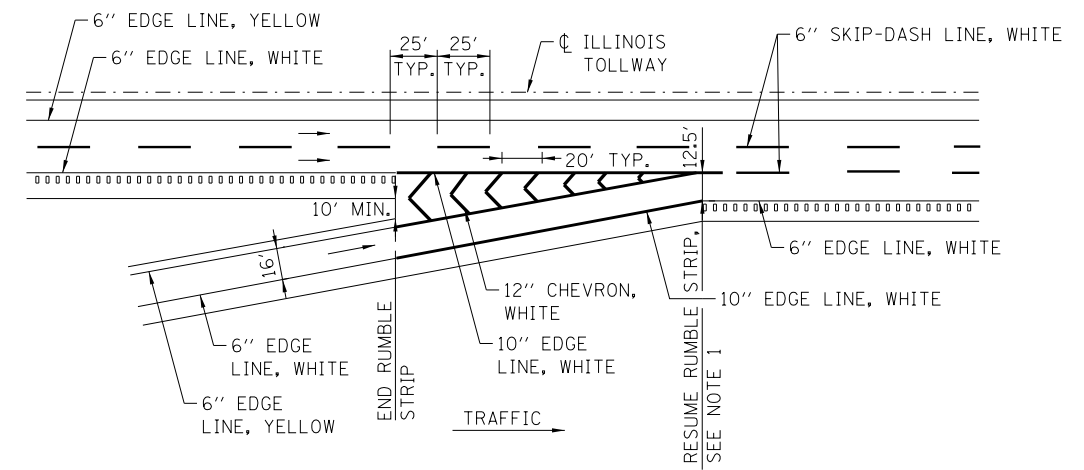
PERMANENT PAVEMENT MARKINGS  
RAMPS  
STANDARD D6-11



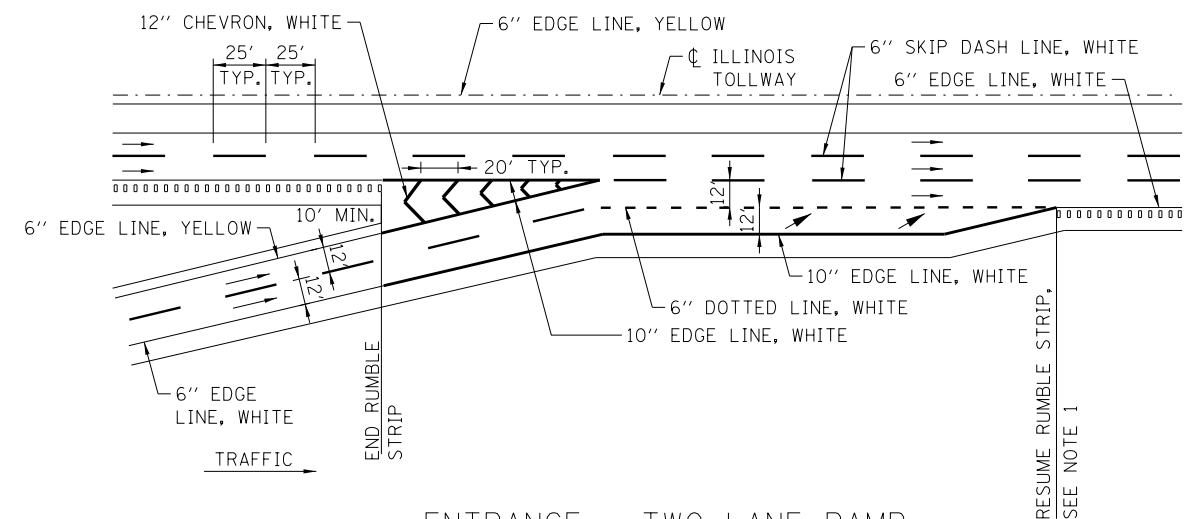
ENTRANCE - SINGLE LANE RAMP - PARALLEL TYPE



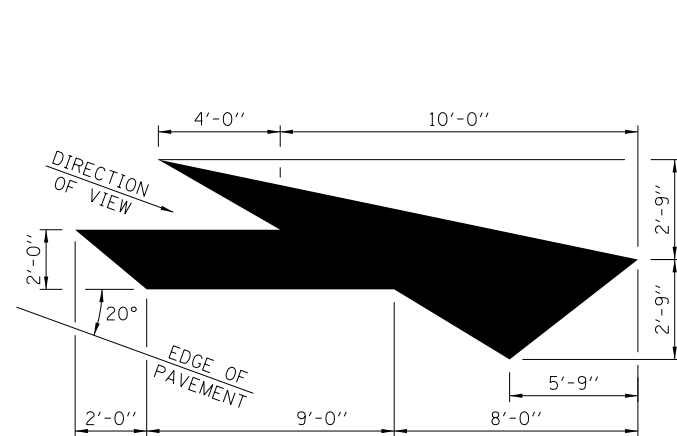
ENTRANCE - SINGLE LANE RAMP - TAPER TYPE



ENTRANCE - SINGLE LANE RAMP  
WITH ADDED MAINLINE LANE

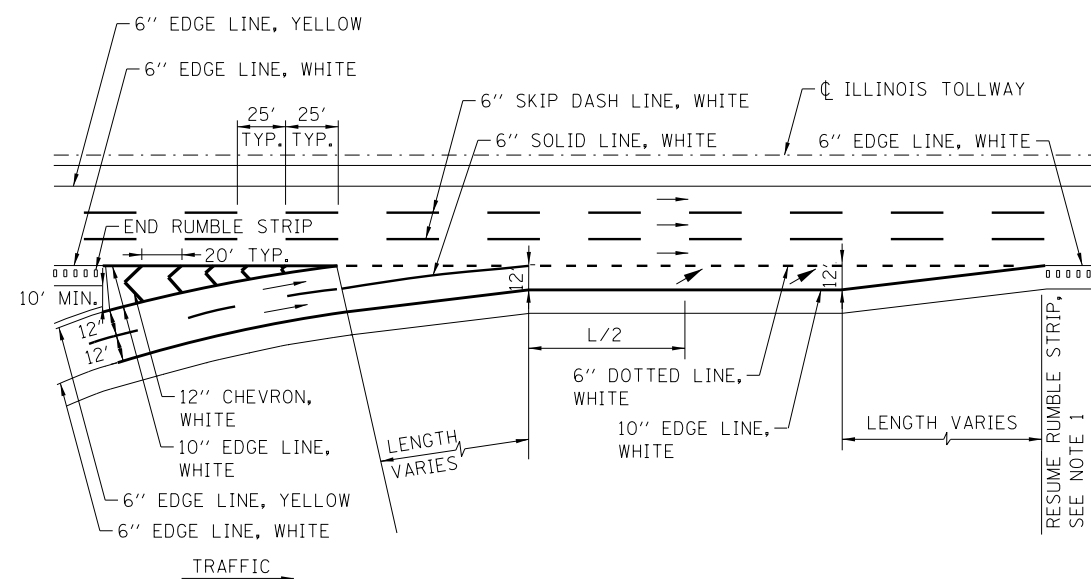


ENTRANCE - TWO LANE RAMP  
WITH ADDED MAINLINE LANE

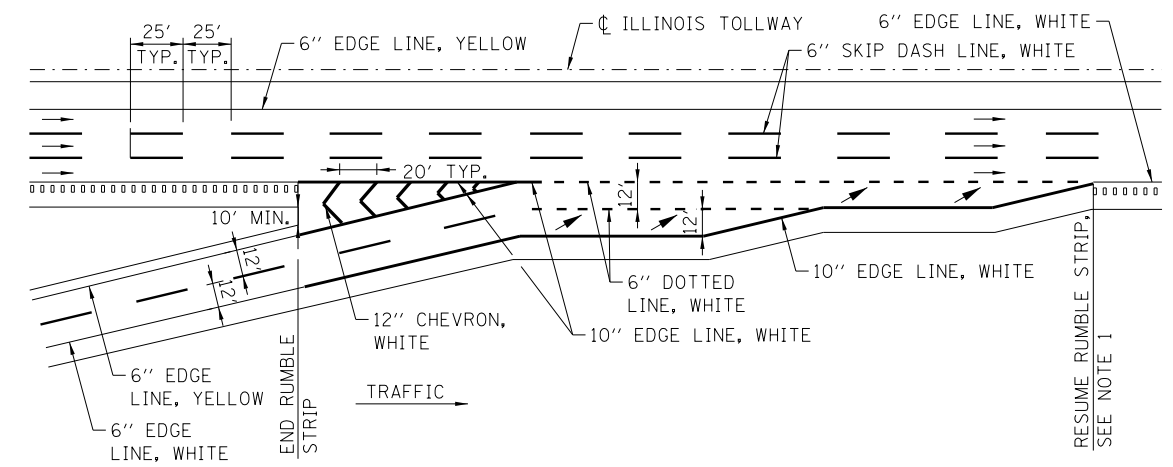


LANE-REDUCTION ARROW

RIGHT LANE-REDUCTION ARROW SHOWN.  
USE MIRROR IMAGE FOR LEFT LANE.

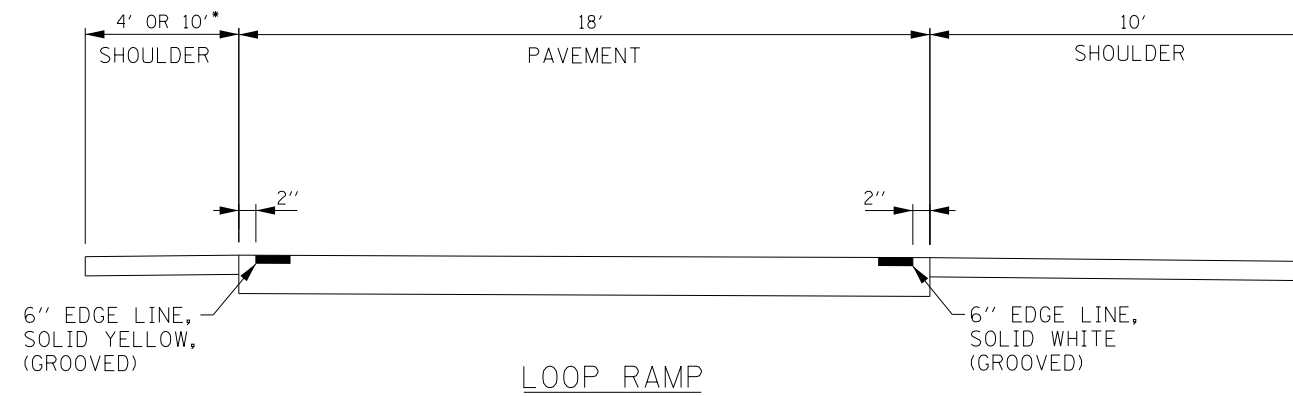
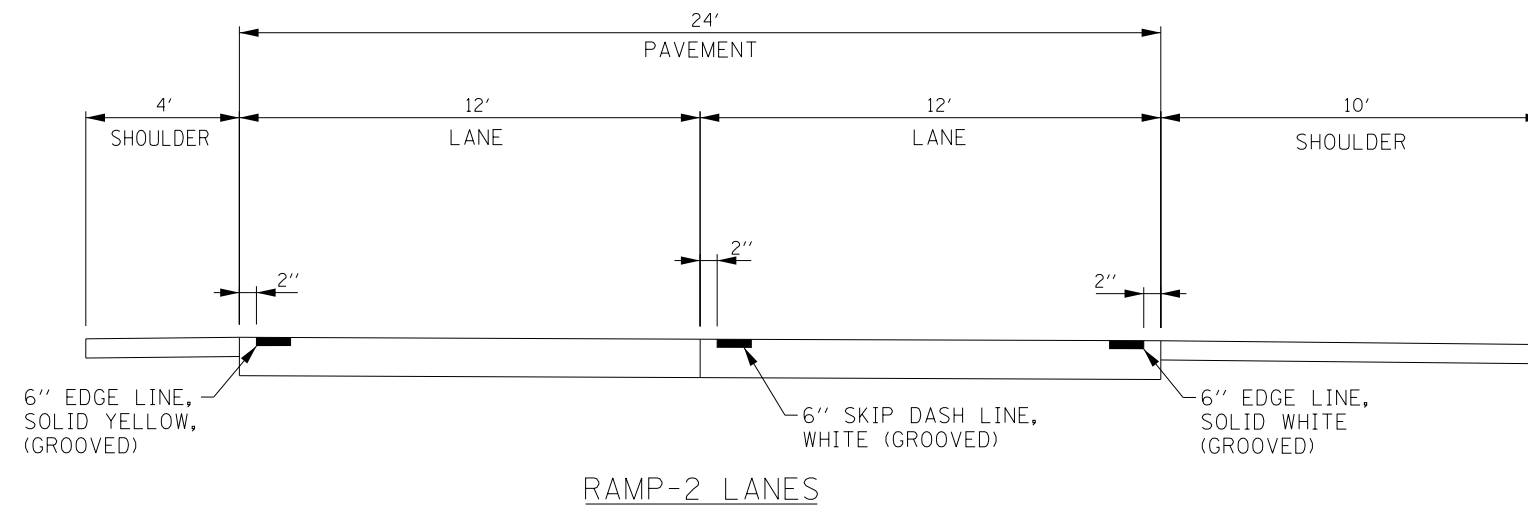
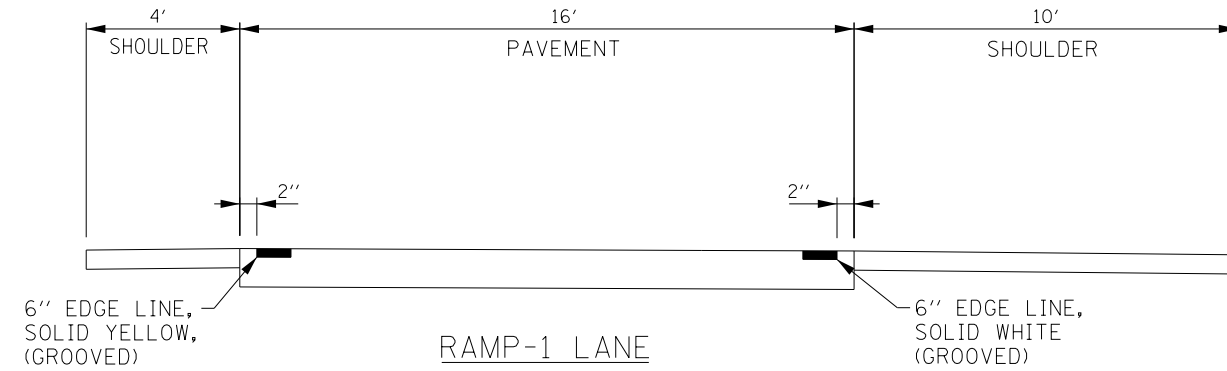


ENTRANCE - TWO LANE RAMP

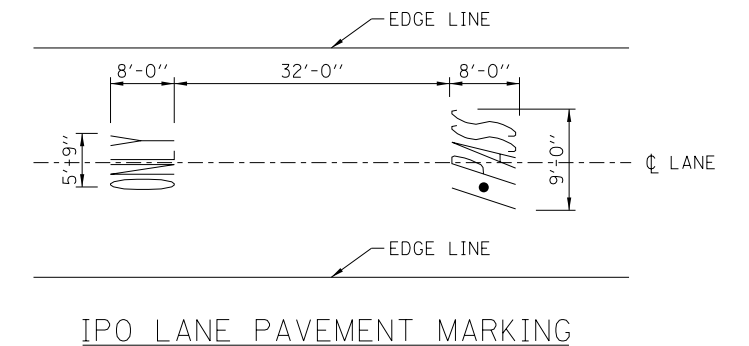


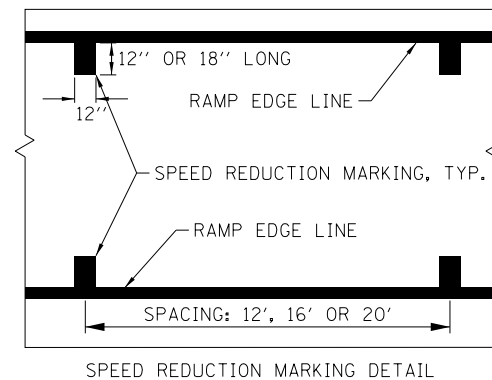
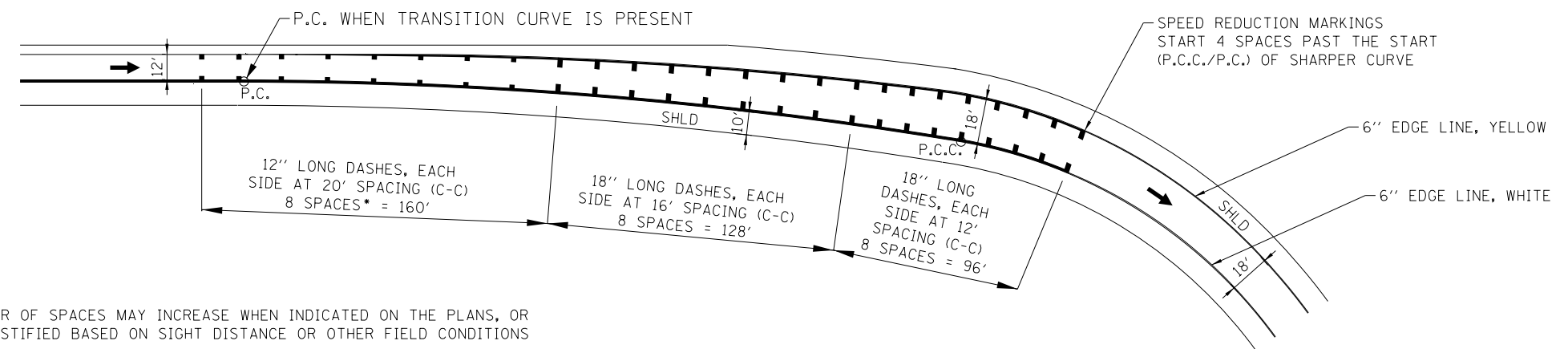
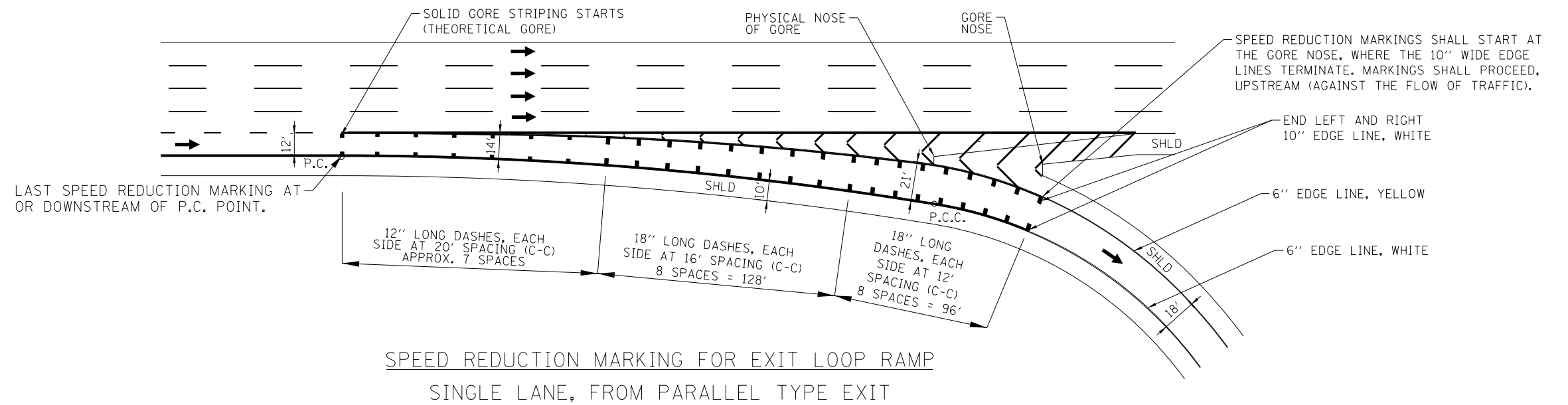
ENTRANCE - TWO LANE PARALLEL RAMP

SHEET 2 OF 4



- RUMBLE STRIP SHALL BE ADDED WHEN ALONG EXIT LOOP RAMP AND LEFT SHOULDER IS 10' WIDE





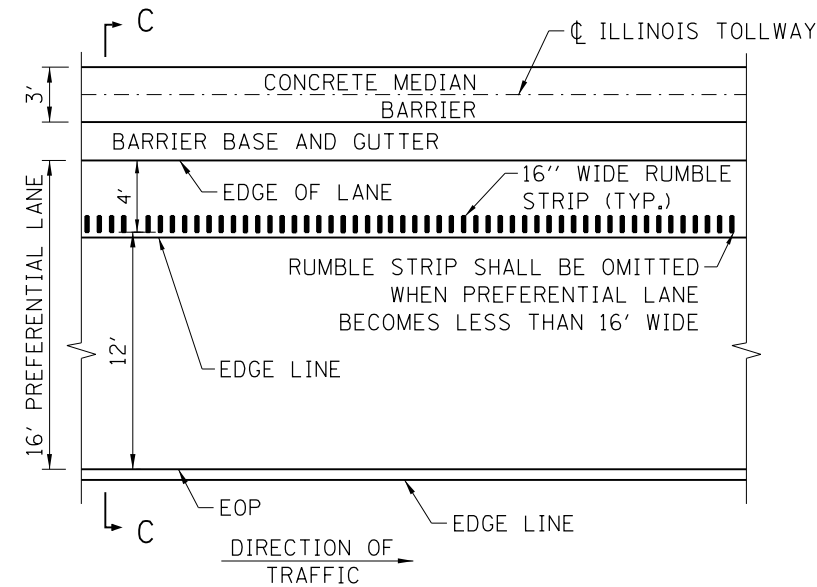
SPEED REDUCTION MARKING NOTES:

SR-1. SPEED REDUCTION MARKINGS SHALL BE WHITE IN COLOR, BE 12" WIDE AND BE PLACED PERPENDICULAR TO THE EDGE LINE. THE MARKINGS SHALL TOUCH THE EDGE LINE AND EXTEND INTO THE LANE BY THE LENGTH INDICATED. THE MARKINGS ARE NOT GROOVED INTO THE PAVEMENT.

SR-2. SPACINGS SHALL VARY FROM LONGER SPACES TO SHORTER SPACES IN THE DIRECTION OF TRAFFIC. THE SPACES SHALL BE MEASURED ALONG THE RAMP BASELINE AND SHALL BE AS INDICATED ON THE DETAIL.

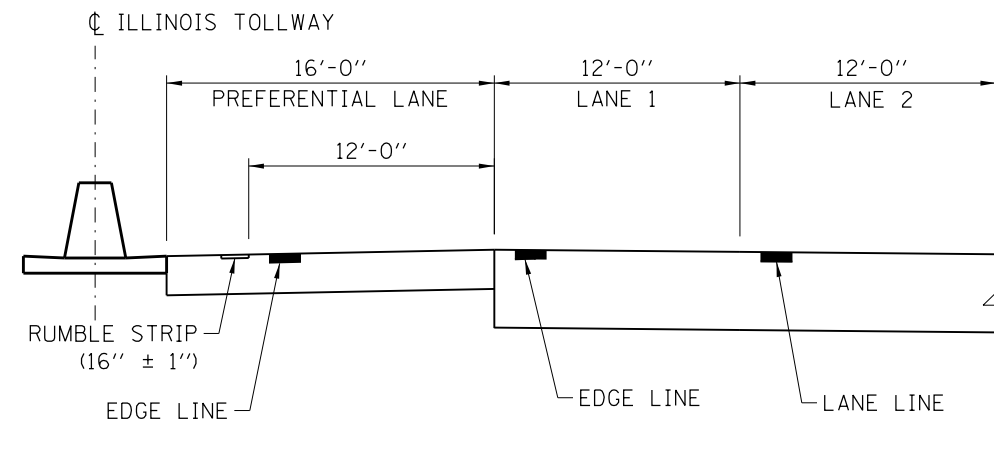
SR-3. SPEED REDUCTION MARKINGS SHALL ONLY BE USED ON EXIT LOOP RAMPS. PAYMENT FOR SPEED REDUCTION MARKINGS WILL BE FOR PAVEMENT MARKING LINE, 12" OF THE PERMANENT PAVEMENT MARKING TYPE USED ON THE RAMP.

SR-4. THIS DETAIL SHOWS PLACEMENT OF SPEED REDUCTION MARKINGS. FOR PLACEMENT AND TYPE OF EDGE LINES AND OTHER RAMP PAVEMENT MARKINGS, REFER TO OTHER DETAILS ON THE STANDARD DRAWINGS AND PLANS.



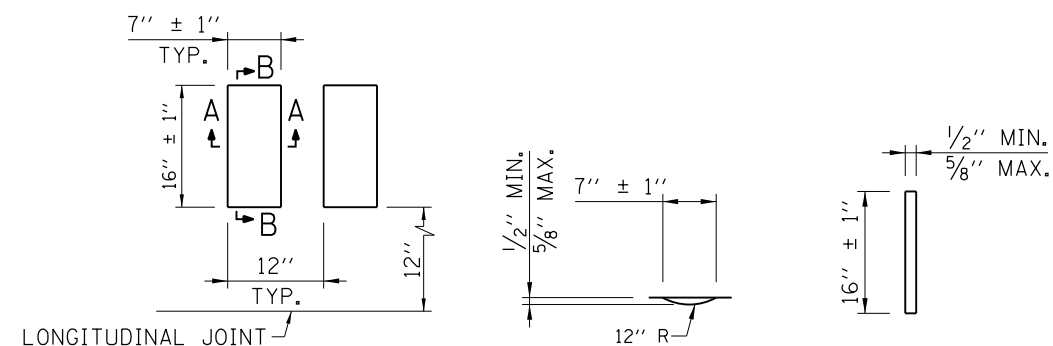
**PREFERENTIAL LANE RUMBLE STRIP PLACEMENT - PLAN VIEW**

USE WHEN SHOWN ON PLANS, MAINLINE MEDIAN SHOULDER IS AT LEAST 16' WIDE AND USED AS PREFERENTIAL LANE



**SECTION C-C**

**PREFERENTIAL LANE RUMBLE STRIP PLACEMENT - SECTION VIEW**

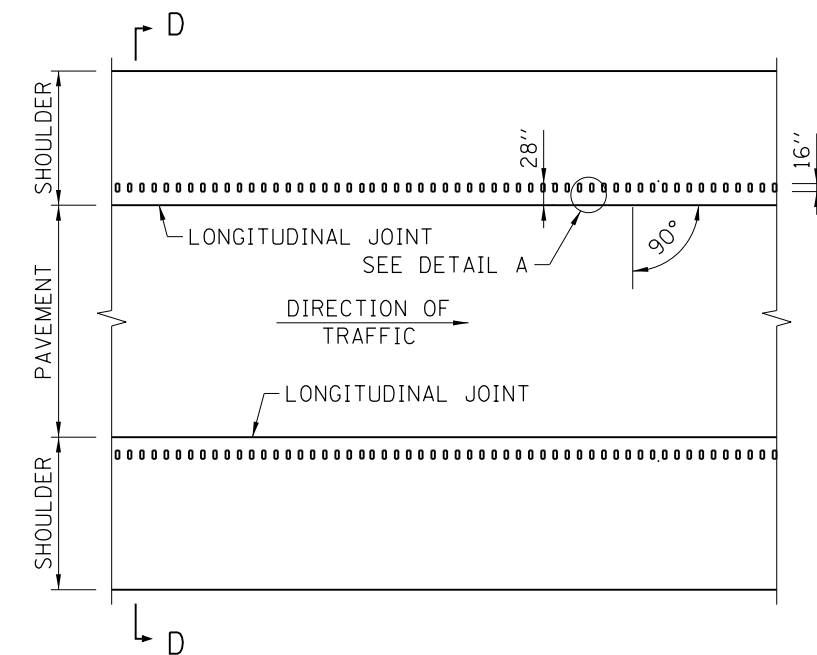


**PLAN DETAIL A**

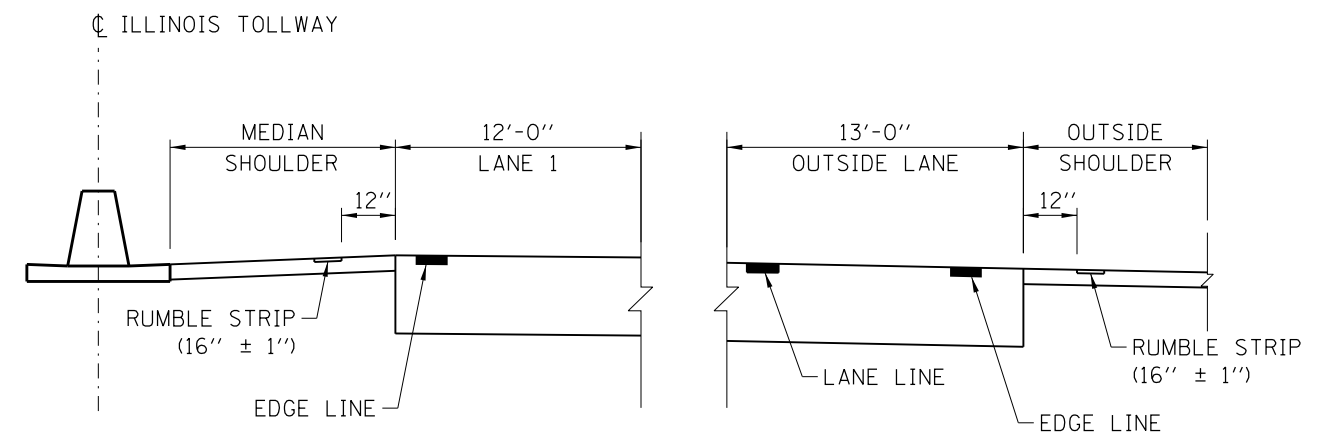
**SECTION A-A**

**SECTION B-B**

**ASPHALT SHOULDER RUMBLE STRIP DETAILS**

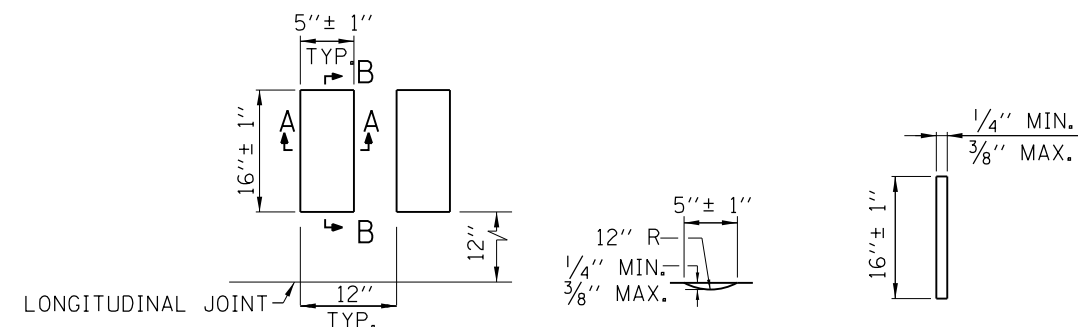


**TYPICAL MAINLINE RUMBLE STRIP PLACEMENT - PLAN VIEW**



**SECTION D-D**

**TYPICAL MAINLINE RUMBLE STRIP PLACEMENT - SECTION VIEW**



**PLAN DETAIL A**

**SECTION A-A**

**SECTION B-B**

**CONCRETE SHOULDER RUMBLE STRIP DETAILS**

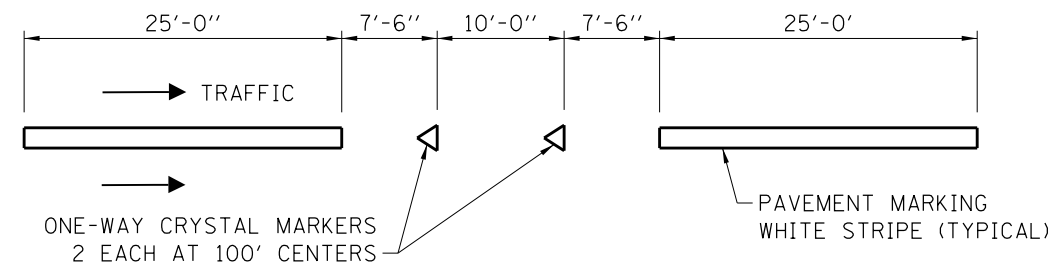
APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2021

DATE	REVISIONS
3-01-2022	REVISED EDGE LINES ON SECTIONS C-C & D-D

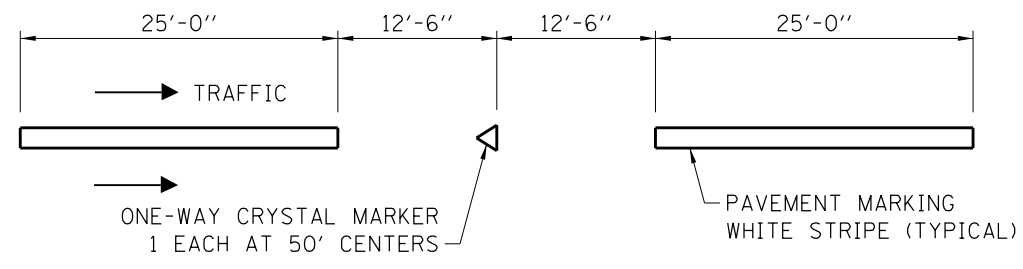


SHOULDER RUMBLE STRIP  
DETAILS

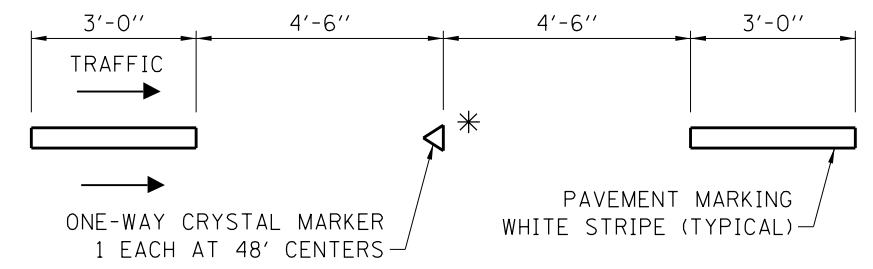
STANDARD D7-01



DETAIL A

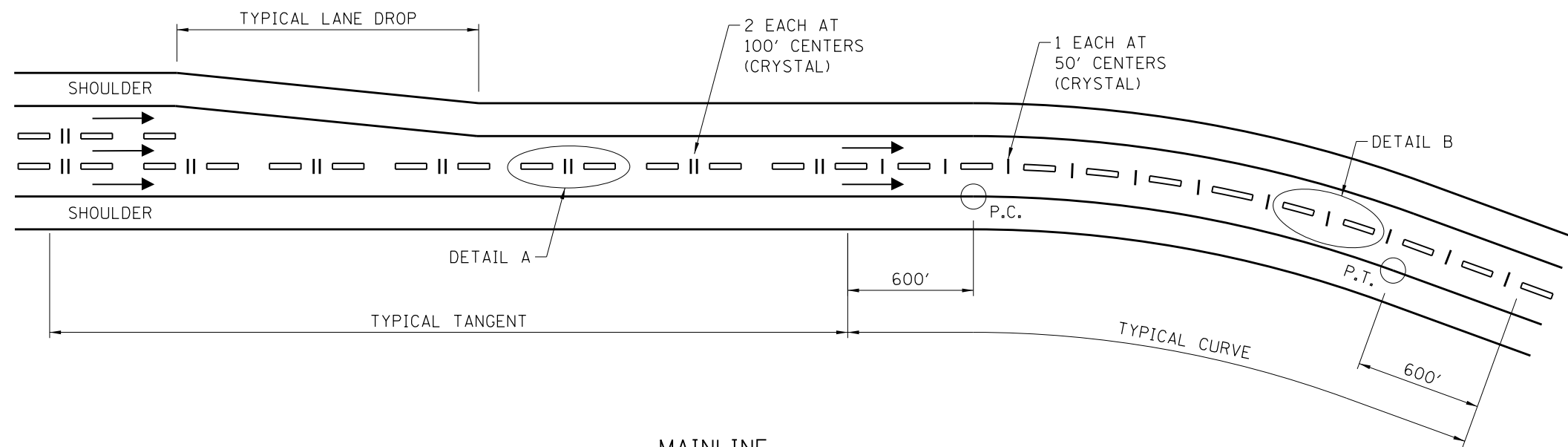


DETAIL B



\* MARKER TO BE INSTALLED WHEN LENGTHS OF AUXILIARY LANES ARE GREATER THAN 1000'.

DETAIL C



MAINLINE

### RAISED PAVEMENT LANE MARKER DETAILS

#### NOTES:

1. USE OF RAISED PAVEMENT LANE MARKERS SHALL BE IN ACCORDANCE WITH THE IL TOLLWAY, ROADWAY SIGNING AND PAVEMENT MARKING GUIDELINES.
2. FOR COLLECTOR-DISTRIBUTOR (C-D) ROADWAYS, PLACE ONE-WAY CRYSTAL MARKER, 2 EACH AT 100' CENTERS. USE DETAIL A.
3. FOR MULTI LANE DIRECTIONAL RAMPS, PLACE ONE-WAY CRYSTAL MARKER, 1 EACH AT 50' CENTERS. USE DETAIL B.
4. FOR AUXILIARY LANES, PLACE ONE-WAY CRYSTAL MARKER, 1 EACH AT 48' CENTERS. USE DETAIL C.

APPROVED BY: *Paul Kovacs* DATE: 07/01/2009  
CHIEF ENGINEERING OFFICER

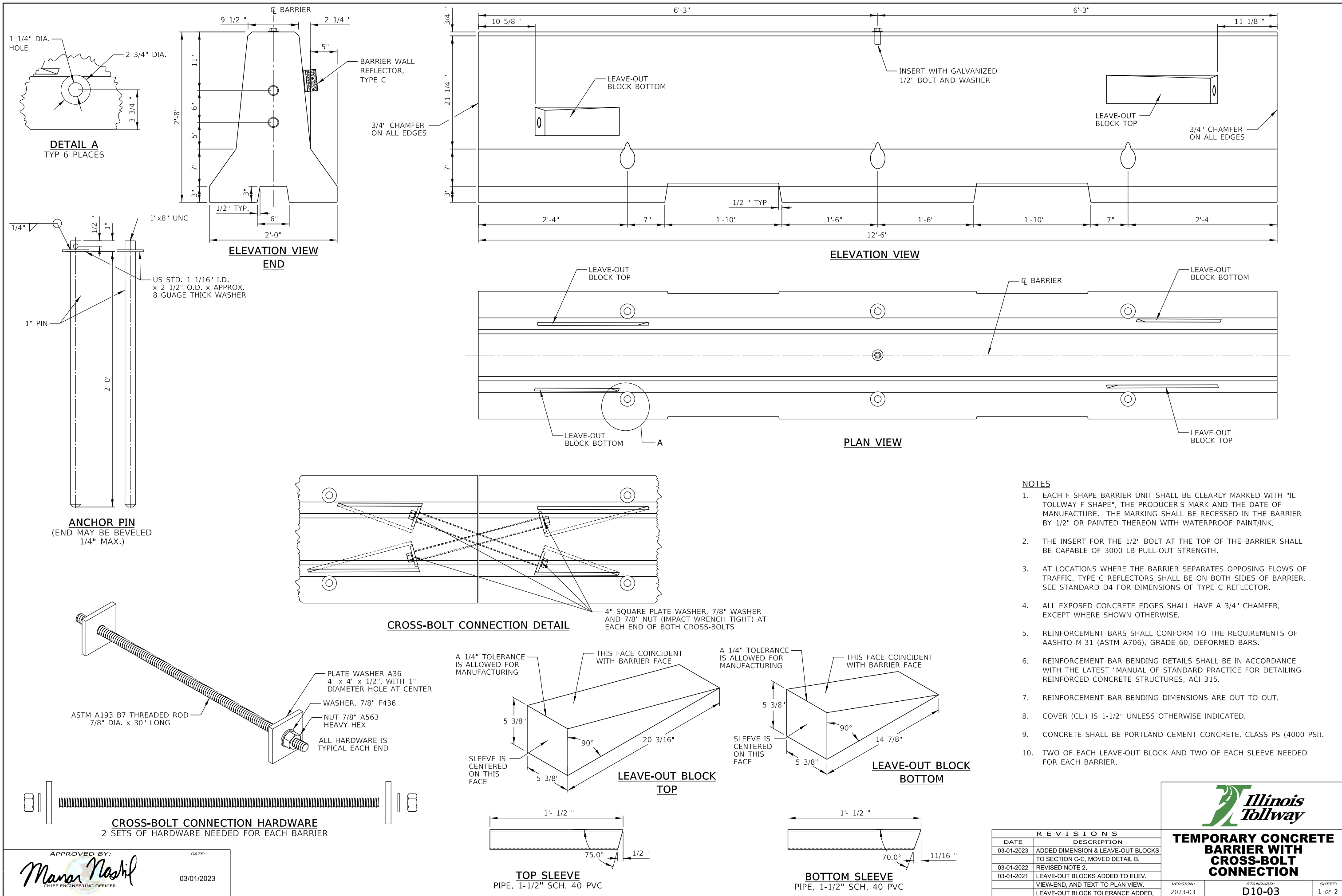
DATE	REVISIONS
3-01-2019	ADDED NEW NOTE 1
3-31-2016	REVISED NOTES 1.
11-01-2012	REVISED DETAIL C.



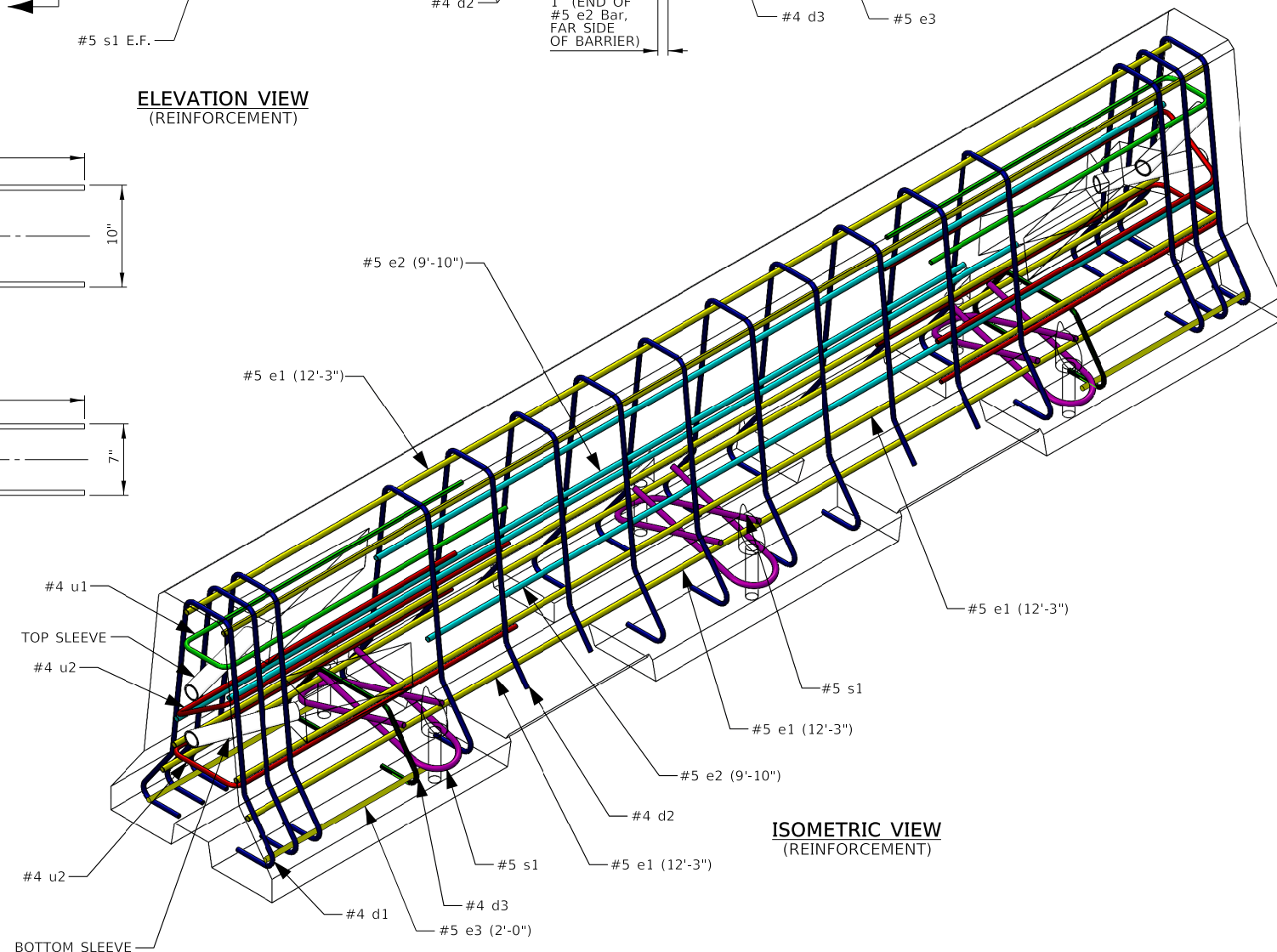
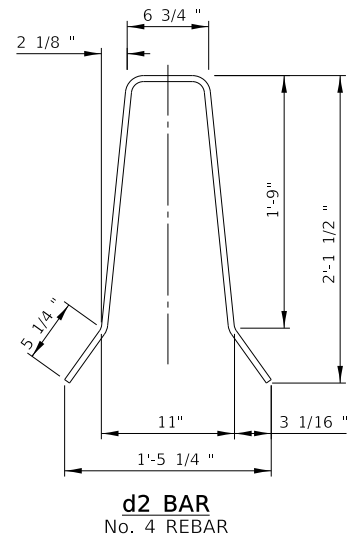
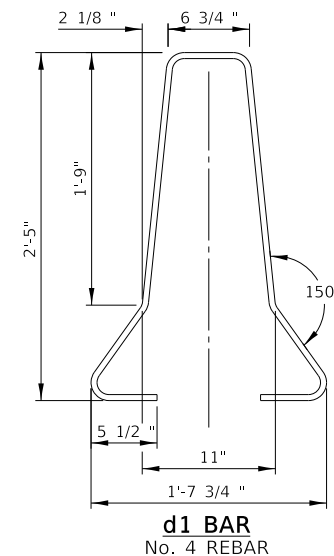
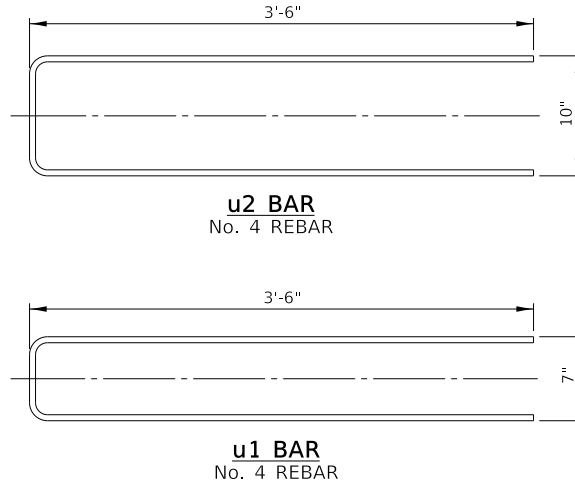
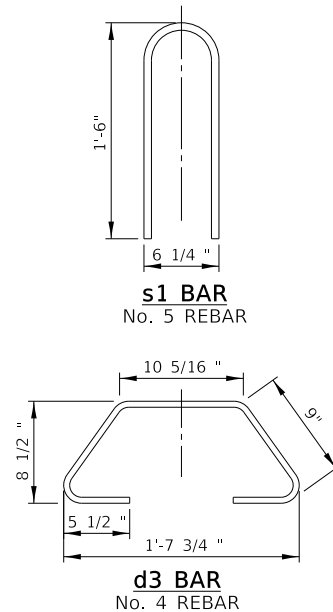
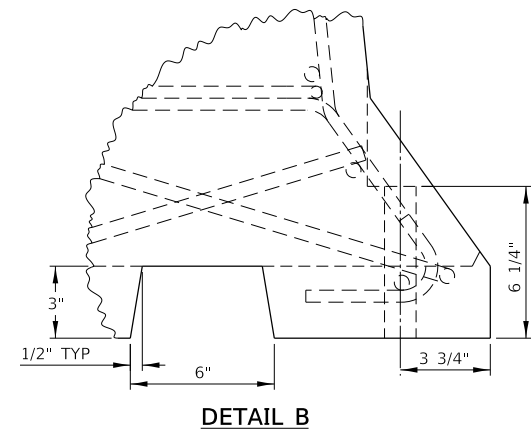
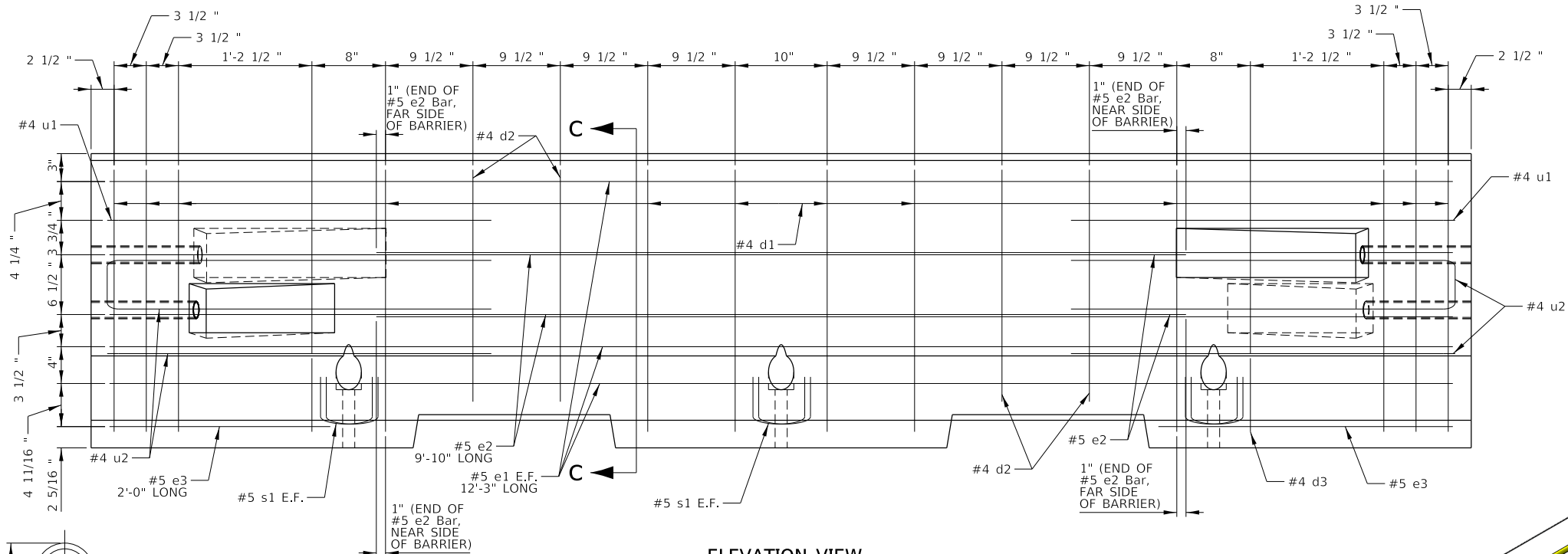
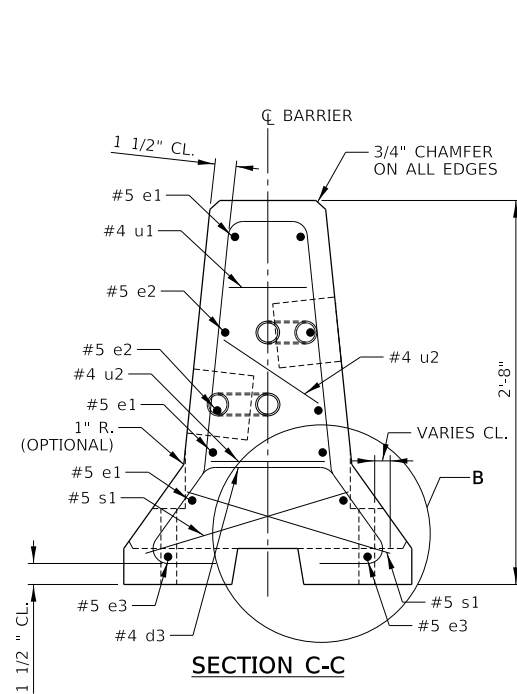
RAISED PAVEMENT  
LANE MARKER

STANDARD D8-03









APPROVED BY: *Manar Nashif*  
 CHIEF ENGINEERING OFFICER  
 DATE: 03/01/2023

# ***STANDARD DRAWINGS***



## ***SECTION E*** ***MAINTENANCE OF TRAFFIC***

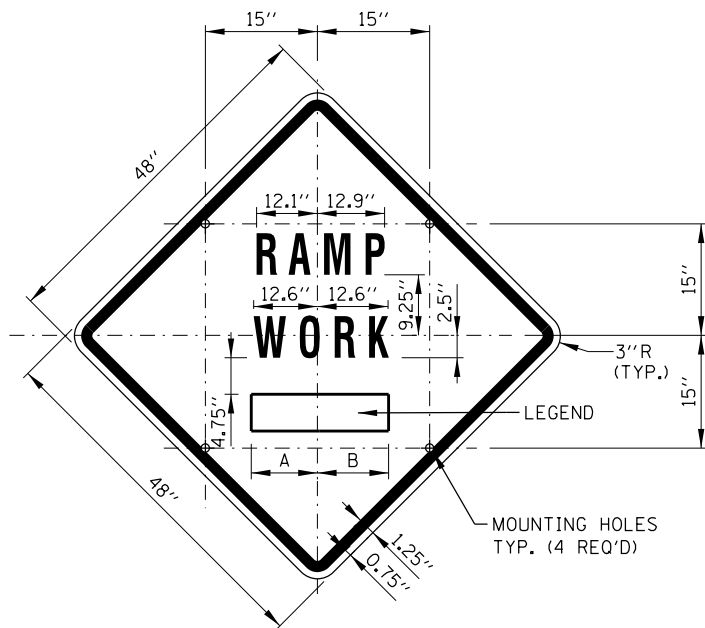
MARCH 2024

Illinois Tollway Standard Drawing Revisions

Section E	Maintenance of Traffic		
	Standard	Modification Summary	Effective: 03-01-2024
	E2-11	Lane Closure Details	
	Sheet 1	Revised matchline callout	
	Sheet 2	Revised matchline callouts	
		Deleted sign designation for arrow boards	
		Reduced Work Zone Area width for One-Lane Vlosure with Barrier & One-Lane Closure with Barricade	
		Revised Note 18 and added callout for Note 18 for Lane Closures with Barricades	
		Added Trailer Mounted Radar Speed Display Units	
		Added callout for work restrictions for free-standing TCB for One - Lane Closure with Barrier	
	Sheet 3	Reduced Work Zone Area width for Two- and Three- Lane Closures with Barricade	
		Added callout for Note 18 for Lane Closures with Barricades	
		Added Trailer Mounted Radar Speed Display Units	
	E3-10	Shoulder Closure Details	
		Revised Notes 1 and 2. Replaced edge of pavement with edge of traveled way	
		Reduced Work Zone Area width for Work Zone with Barricades and Work Zone with Barriers	
		Added callout for Note 2 to Work Zone with Barricades	
		Added callout for work restrictions for free-standing TCB for Work Zone with Barriers	
	E6-08	Contractor Access to Work Area	
	Sheet 2	Added Note 15 callout for Contractor Access to Work Area Without Barrier Wall	

New Sheet

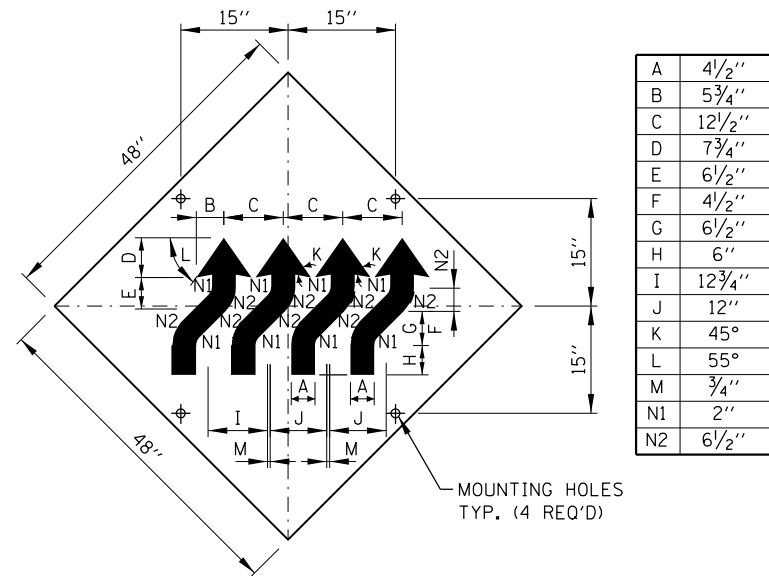
Retired Standard



SIGN TS-2 (O)

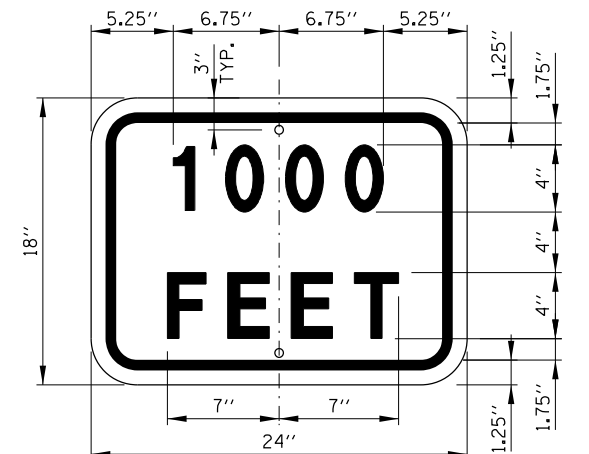
COLOR: BACKGROUND - FLUORESCENT ORANGE (O)  
BORDER AND SYMBOL - BLACK  
SIZE: 48"x48"  
LETTERING: 7" FEDERAL SERIES D  
MOUNTING HOLES: 1/16" DIA., 4 HOLES SPACED AS SHOWN

SIGN NO.	LEGEND	A	B
TS-2A	AHEAD	15.50"	15.50"
TS-2B	500 FT	14.25"	15.13"
TS-2C	1000 FT	14.88" L2	15.75" L2
TS-2D	1500 FT	14.88" L2	15.75" L2
TS-2E	1/2 MILE	15.75" L3	15.75" L3
TS-2F	1 MILE	13.06"	13.06"

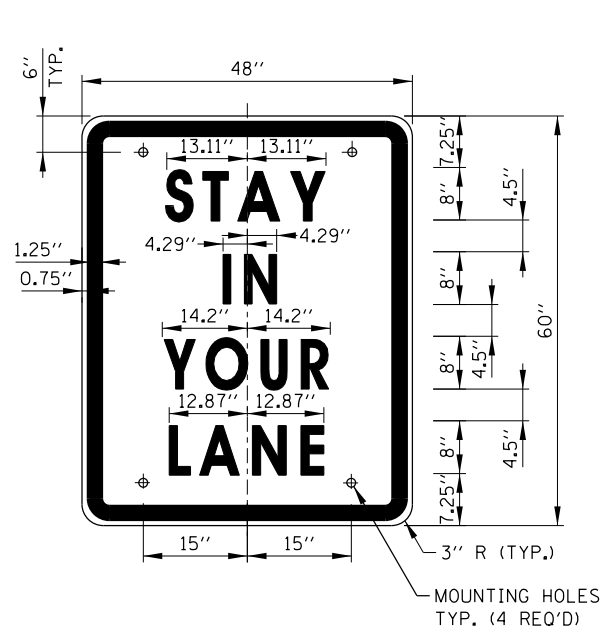


SIGN W1-4dR (O)

COLOR: BACKGROUND-FLUORESCENT ORANGE (O)  
TYPE A REFLECTIVE  
SHEETING PER STANDARD  
SPECIFICATIONS (\*A)  
BORDER AND LETTERS-BLACK  
SIZE: 48"x48"  
MOUNTING HOLES: 1/16" DIA., 4 HOLES SPACED AS SHOWN.

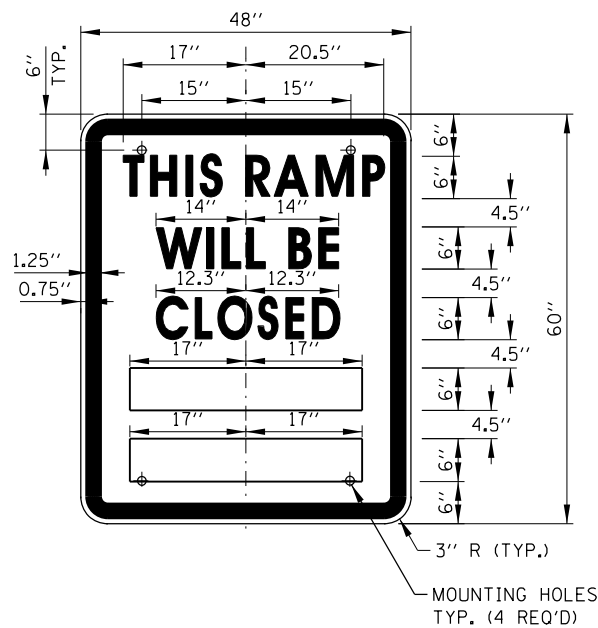


COLOR: BACKGROUND - FLUORESCENT ORANGE (O)  
BORDER AND LETTERS - BLACK  
SIZE: 24"x18"  
LETTERING: 4" FEDERAL SERIES D  
MOUNTING HOLES: 1/16" DIA., 2 HOLES SPACED AS SHOWN



SIGN TS-3

COLOR: BACKGROUND - WHITE (REFLECTORIZED) (\*A)  
BORDER AND LETTERS - BLACK  
SIZE: 48"x60"  
LETTERING: LEGEND - 8" FEDERAL SERIES D  
MOUNTING HOLES: 1/16" DIA., 4 HOLES, SPACED AS SHOWN

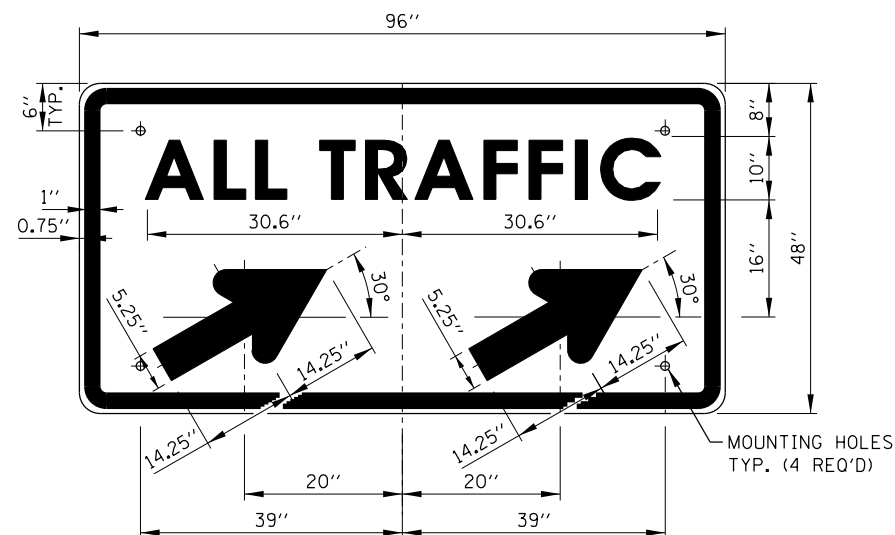


SIGN TS-4

COLOR: BACKGROUND - WHITE (REFLECTORIZED) (\*A)  
BORDER AND LETTERS - BLACK  
SIZE: 48"x60"  
LETTERING: LEGEND - 6" FEDERAL SERIES C  
MOUNTING HOLES: 1/16" DIA., 4 HOLES, SPACED AS SHOWN

### RAMP CLOSURE ADVANCE INFORMATION SIGN

THE VARIABLE MESSAGE WITH DATES FOR THE BOTTOM TWO LINES SHALL BE DETERMINED BY THE ENGINEER AND GIVEN TO THE CONTRACTOR BEFORE THE REQUIRED FIELD ERECTION DATE.



SIGN TS-5a & TS-5b

COLOR: BACKGROUND - WHITE (REFLECTORIZED) (\*A)  
BORDER AND LETTERS - BLACK  
ARROW - BLACK  
SIZE: 96"x48"  
LETTERING: 10" FEDERAL SERIES D  
MOUNTING HOLES: 1/16" DIA., 4 HOLES, SPACED AS SHOWN  
NOTE: SIGN TS-5a IS SHOWN, SUBSTITUTE LEGEND " " FOR " " FOR SIGN TS-5b

### NOTES:

- ALL LETTERING IS DESIGNATED BY SIZE AND SERIES IN ACCORDANCE WITH THE LATEST EDITION OF "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS" AS PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION. LETTERING SPACING SHALL BE IN ACCORDANCE WITH THIS GUIDE EXCEPT WHERE NOTED.
- SYMBOLS AND ARROWS SHALL CONFORM TO THE DETAILS SHOWN IN THE LATEST EDITION OF "STANDARD HIGHWAY SIGNS" AS PUBLISHED BY THE U.S. DEPARTMENT OF TRANSPORTATION.
- SEE THE CONTRACT REQUIREMENTS FOR ADDITIONAL NOTES AND SPECIFICATIONS.  
(O) FLUORESCENT ORANGE REFLECTIVE SHEETING PER THE STANDARD SPECIFICATIONS.  
(\*A) - REFLECTIVE SHEETING PER THE STANDARD SPECIFICATIONS.
- DIMENSIONS INDICATED THUS L ARE BASED ON A REDUCTION IN STANDARD LETTERING SPACING AS SHOWN BELOW:  
L1 SPACING REDUCED BY 25%  
L2 SPACING REDUCED BY 40%  
L3 SPACING REDUCED BY 50%

SHEET 1 OF 2

APPROVED BY: *Paul Kovacs* DATE: 05/01/2009  
CHIEF ENGINEERING OFFICER

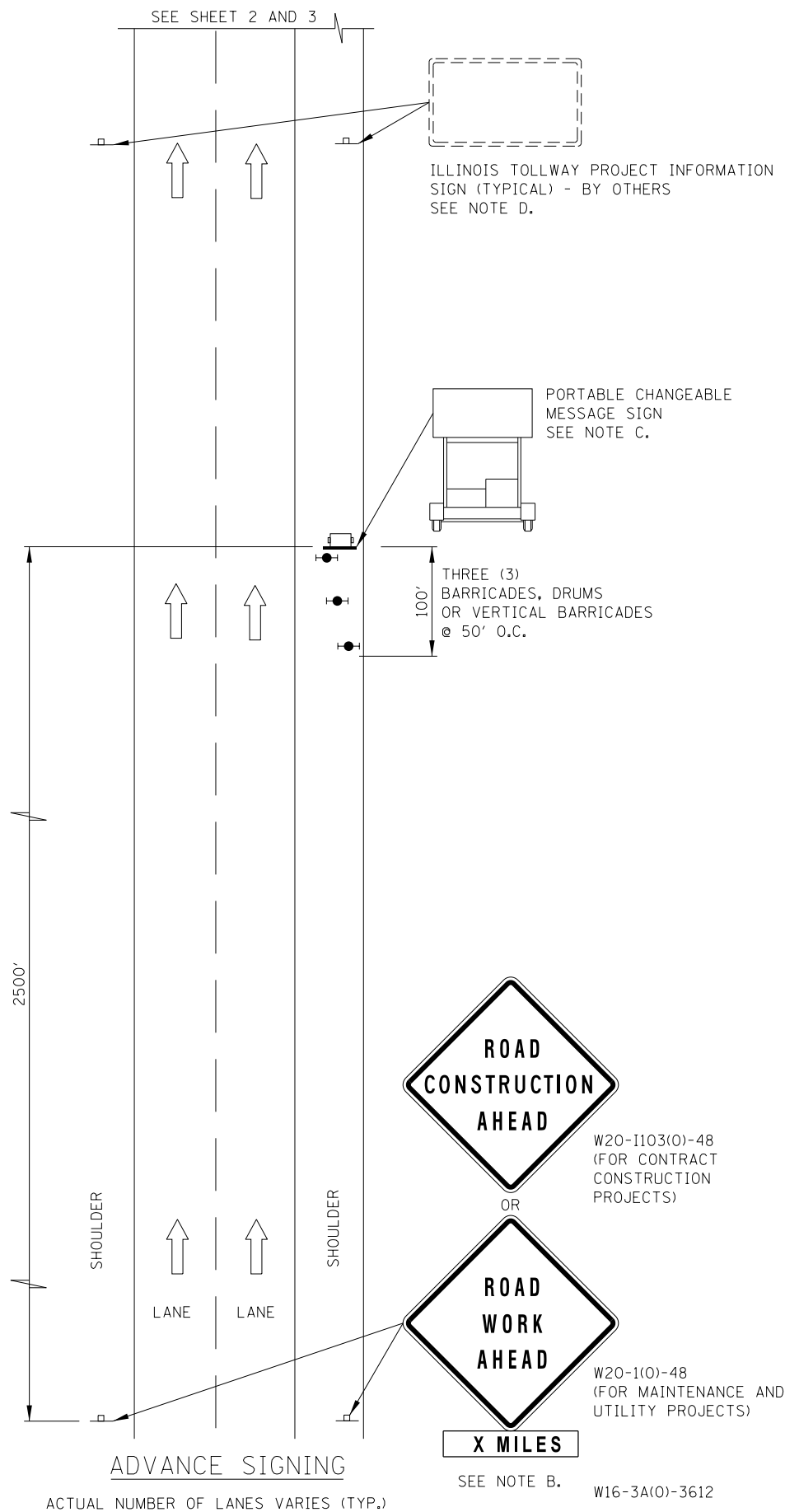
DATE	REVISIONS
3-01-2019	REMOVED STANDARD IDOT SIGNS, REVISED WZSL ASSEMBLY, ADDED WZSL TRANSITION
3-31-2017	REVISED END WZSL SIGN COLOR
3-11-2015	REVISED NOTES



CONSTRUCTION SIGNS

STANDARD E1-07





ADVANCE SIGNING NOTES:

- A. THE ADVANCE SIGNING SHOWN ON THIS STANDARD SHALL APPLY ANY TIME THE CONTRACTOR CLOSES ONE OR MORE LANES, OR IS REQUIRED TO SHIFT THE LANE ALIGNMENT. THE "ROAD WORK AHEAD" OR "ROAD CONSTRUCTION AHEAD" SIGNS, WORK ZONE PUBLIC INFORMATION SIGNS AND PORTABLE CHANGEABLE MESSAGE ARE STATIONARY.
- B. THE ROAD CONSTRUCTION AHEAD SIGN (W20-1A, WITH W16-3a SUPPLEMENTAL PLATE) OR ROAD WORK AHEAD SIGN (W20-1, WITH W16-3A SUPPLEMENTAL PLATE) SHALL BE LOCATED UP TO 5 MILES IN ADVANCE OF THE PROJECT LIMITS, WITH THE LOCATION BEING DETERMINED BY THE ENGINEER.
- C. THE PORTABLE CHANGEABLE MESSAGE SIGN SHALL BE USED TO DISPLAY THE STATUS OF LANE WITHIN THE CONTRACT LIMITS. THE PRIMARY MESSAGES SHALL BE: "RIGHT LANE(S) CLOSED" / "x MILES AHEAD", "LEFT LANE(S) CLOSED" / "x MILES AHEAD", "LANE(S) SHIFT" / "x MILES AHEAD", "ALL LANES OPEN". THE PORTABLE CHANGEABLE MESSAGE SIGN MAY BE MOVED TO THE MEDIAN SHOULDER WHEN THE LANE CLOSURES ARE ON THE LEFT, PROVIDED THE EXISTING SHOULDER WIDTH IS ADEQUATE.
- D. THE ILLINOIS TOLLWAY WILL FURNISH AND INSTALL STATIC PROJECT INFORMATION SIGNS IN ADVANCE, THROUGH AND AT THE END OF THE WORK ZONE. THESE SIGNS WILL BE INSTALLED ALONG THE OUTSIDE SHOULDER WITH THE ADVANCE SIGNS LOCATED BEYOND THE PORTABLE CHANGEABLE MESSAGE SIGN. THE ENGINEER AND CONTRACTOR SHALL COORDINATE WITH THE ILLINOIS TOLLWAY REGARDING THE LOCATION OF THESE SIGNS AND NOTIFY THE ILLINOIS TOLLWAY OF ANY DAMAGE TO THE SIGNS OR SUPPORTS.

LEGEND

- ARROW BOARD
- ▨ WORK AREA
- ┆ SIGN
- ↑ DIRECTION INDICATOR BARRICADE WITH SEQUENTIAL FLASHING WARNING LIGHT
- TYPE II BARRICADE, DRUM, OR VERTICAL BARRICADE WITH LIGHT IF REQUIRED. SEE ARTICLE 701.05(a)(5)
- FLAGGER WITH TRAFFIC CONTROL SIGN
- ⋈ WORKER
- × LANE CLOSED
- ⊥ CHECK BARRICADE
- 🚚 TRUCK MOUNTED ATTENUATOR

SHEET 1 OF 3



LANE CLOSURE DETAILS

STANDARD E2-11

DATE	REVISIONS
3-01-2024	REVISED MATCHLINE DETAIL & NOTE 18
	ADDED NOTE 18 CALLOUT, RSDU SIGN & LEGEND, CALLOUT FOR FREE-STANDING
	TCB WITH BARRIER
3-01-2021	DELETED WORK ZONE PUBLIC INFORMATION SIGN.

APPROVED BY:  DATE: 03/01/2024

CHIEF ENGINEERING OFFICER

LANE CLOSURE NOTES:

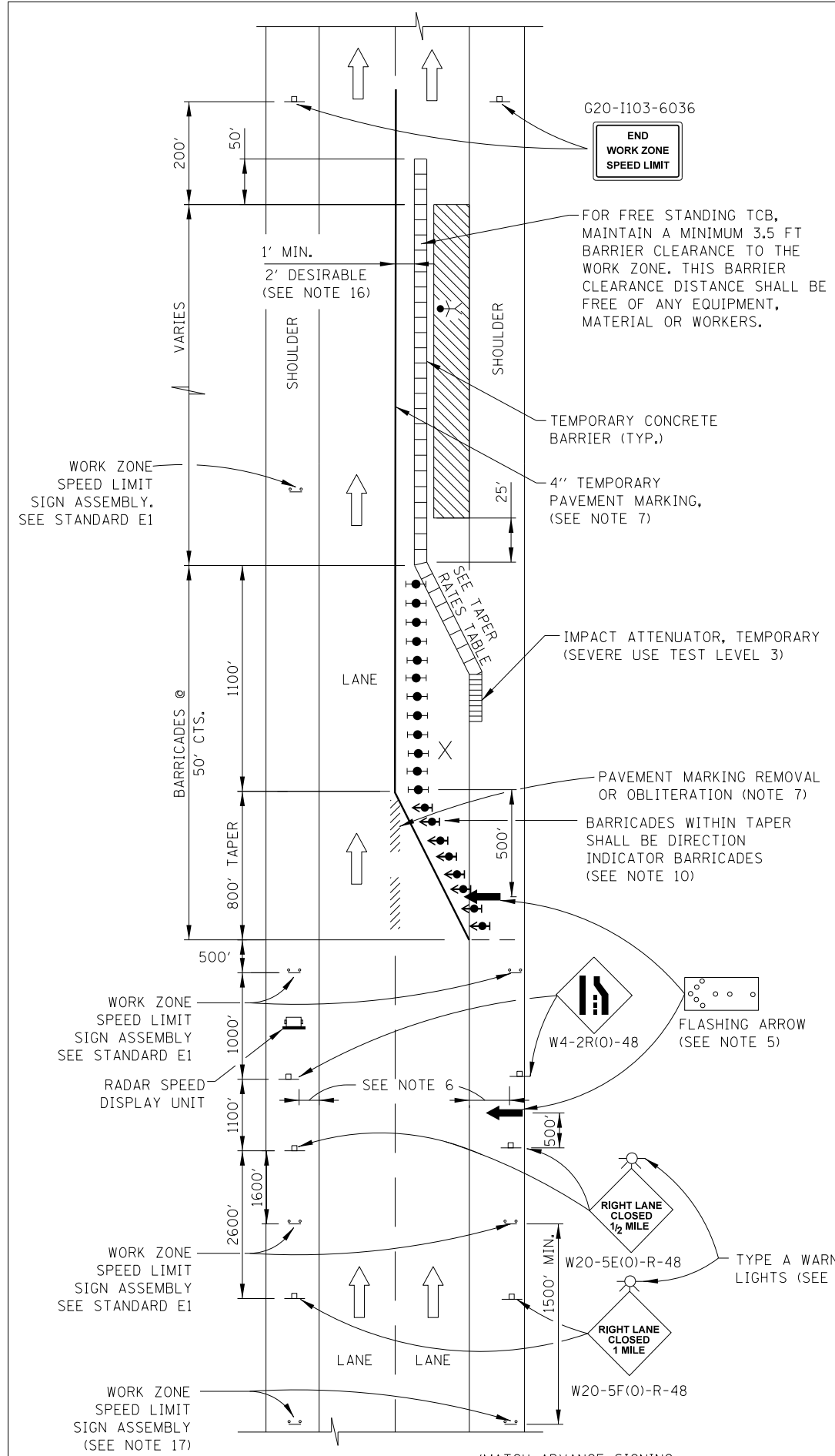
- IF CLOSURES ARE EXPECTED TO PRODUCE TRAFFIC BACKUPS EXTENDING BEYOND THE FIRST WARNING SIGN SHOWN ON THE DETAILS, ADDITIONAL UPSTREAM SIGNS SHALL BE PLACED SO THAT THE TRAFFIC CONTROL ZONE ENCOMPASSES THE ANTICIPATED BACKUP ZONE.
- LONGITUDINAL DIMENSIONS MAY BE ADJUSTED SLIGHTLY TO FIT FIELD CONDITIONS.
- THESE DETAILS ALSO APPLY TO OPPOSITE HAND LANE CLOSURES BY CHANGING SIGN LEGENDS AND ARROW DIRECTIONS TO INDICATE THE APPROPRIATE CLOSURE.
- FOR NIGHT TIME CLOSURES, ONE TYPE A WARNING LIGHT SHALL BE INSTALLED ABOVE EACH OF THE 1 MILE AND 1/2 MILE ADVANCE WARNING SIGNS. FOR DAYLIGHT - ONLY CLOSURES, THE LIGHTS MAY BE OMITTED.
- FOR ANY LANE CLOSURE, FLASHING ARROW BOARDS SHALL BE REQUIRED AND IN OPERATION AT ALL TIMES. THE FLASHING ARROW BOARD IN ADVANCE OF THE TAPER SHALL BE PROTECTED WITH THREE TYPE II BARRICADES AT 50' O.C.
- CONSTRUCTION SIGNS SHALL GENERALLY BE POST - MOUNTED OR ATTACHED TO PORTABLE SUPPORTS AND SHALL BE INSTALLED 8' TO 12' FROM ADJACENT TRAVEL LANE WHEREVER POSSIBLE. IN NO CASE SHALL SIGNS BE LOCATED TO PROVIDE LESS THAN 2' CLEARANCE BETWEEN EDGE OF SIGN AND ADJACENT TRAVEL LANE.
- PAVEMENT MARKING TAPE AND REMOVAL OR OBLITERATION OF EXISTING MARKINGS SHALL BE REQUIRED WHEN THE CLOSURE TIME EXCEEDS FOUR DAYS. THIS WORK SHALL BE MEASURED AND PAID FOR SEPARATELY.
- WHEN A FLAGGER IS NOT ON STATION, THE FLAGGER SIGN SHALL BE PROMPTLY REMOVED, COVERED OR TURNED TO FACE AWAY FROM TRAFFIC. FLAGGER SIGNS SHALL BE MOVED AS NECESSARY TO MAINTAIN THE REQUIRED SPACING BETWEEN THE SIGNS AND THE WORKERS IN EACH SEPARATE WORK ACTIVITY, PER THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS.
- WORK ZONE SPEED LIMIT SIGN ASSEMBLIES, SHALL BE PLACED ADJACENT TO THE OPEN TRAFFIC LANE(S). WORK ZONE SPEED SIGNS SHALL BE MOVED AS NECESSARY TO MAINTAIN THE REQUIRED SPACING BETWEEN SIGNS AND THE WORKERS IN EACH SEPARATE WORK ACTIVITY PER THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS.
- DIRECTION INDICATOR BARRICADES SHALL BE USED IN LANE TAPERS.
- FOR CLOSURES OTHER THAN SHORT TERM (SUNRISE TO ONE HOUR BEFORE SUNSET), THE MINIMUM HEIGHT OF THE SIGN FROM SHOULDER ELEVATION SHALL BE 7'-0".
- CONES MAY BE USED IN LIEU OF BARRICADES IN THE BUFFER AND WORK AREAS, WHEN THE CLOSURE IS FOR MAINTENANCE OPERATIONS.
- BARRICADES ARE TO BE LOCATED AT JOINT LINE WHEN WORK AREA EXTENDS UP TO JOINT UNLESS OTHERWISE SHOWN ON THE PLANS.
- SEE MAINTENANCE OF TRAFFIC DRAWINGS FOR ADDITIONAL SIGNING IN THIS AREA.
- CHECK BARRICADES SHALL BE PLACED IN EACH CLOSED LANE AND SHOULDER AT 1000 FOOT CENTERS.
- A 1'-0" MINIMUM/2'-0" DESIRABLE SHY DISTANCE SHALL BE PROVIDED, MEASURED BETWEEN EDGE OF PAVEMENT LANE MARKING TO THE EDGE OF THE TRAFFIC CONTROL DEVICE.
- SEE STANDARD E1 FOR ADDITIONAL SIGNAGE REQUIRED WHEN WORK ZONE SPEED LIMIT IS REDUCED BY MORE THAN 10 MPH. THE SPEED LIMIT SHALL BE TRANSITIONED TO THE SPECIFIED WORK ZONE SPEED LIMIT 2600 FEET BEFORE THE FIRST W4-2 SIGN.
- WHEN WORKERS OR EQUIPMENT ENCROACH WITHIN 2'-0" OR LESS FROM THE EDGE OF TRAVELED WAY, THE LANE OPEN TO TRAFFIC SHALL BE TEMPORARILY CLOSED OR SHIFTED DURING WORK ACTIVITIES.
- IN WORK ZONES WITH NO POSITIVE PROTECTION, A TRUCK MOUNTED ATTENUATOR (TMA) SHALL BE PROVIDED WITH A BUFFER AREA BETWEEN THE FRONT OF THE TMA AND WORKERS OR EQUIPMENT. THE BUFFER AREA SHALL BE 200' UNLESS OTHERWISE DETERMINED. WHERE WORKERS OR EQUIPMENT ARE PRESENT BEYOND THE WORK AREA, AN ADDITIONAL TMA SHALL BE PROVIDED TO EACH WORK AREA. A WORK AREA IS DEFINED AS STARTING AT THE END OF THE BUFFER AREA, EXTENDING 1000 FEET BEYOND THIS POINT.

SHEET 2 OF 3

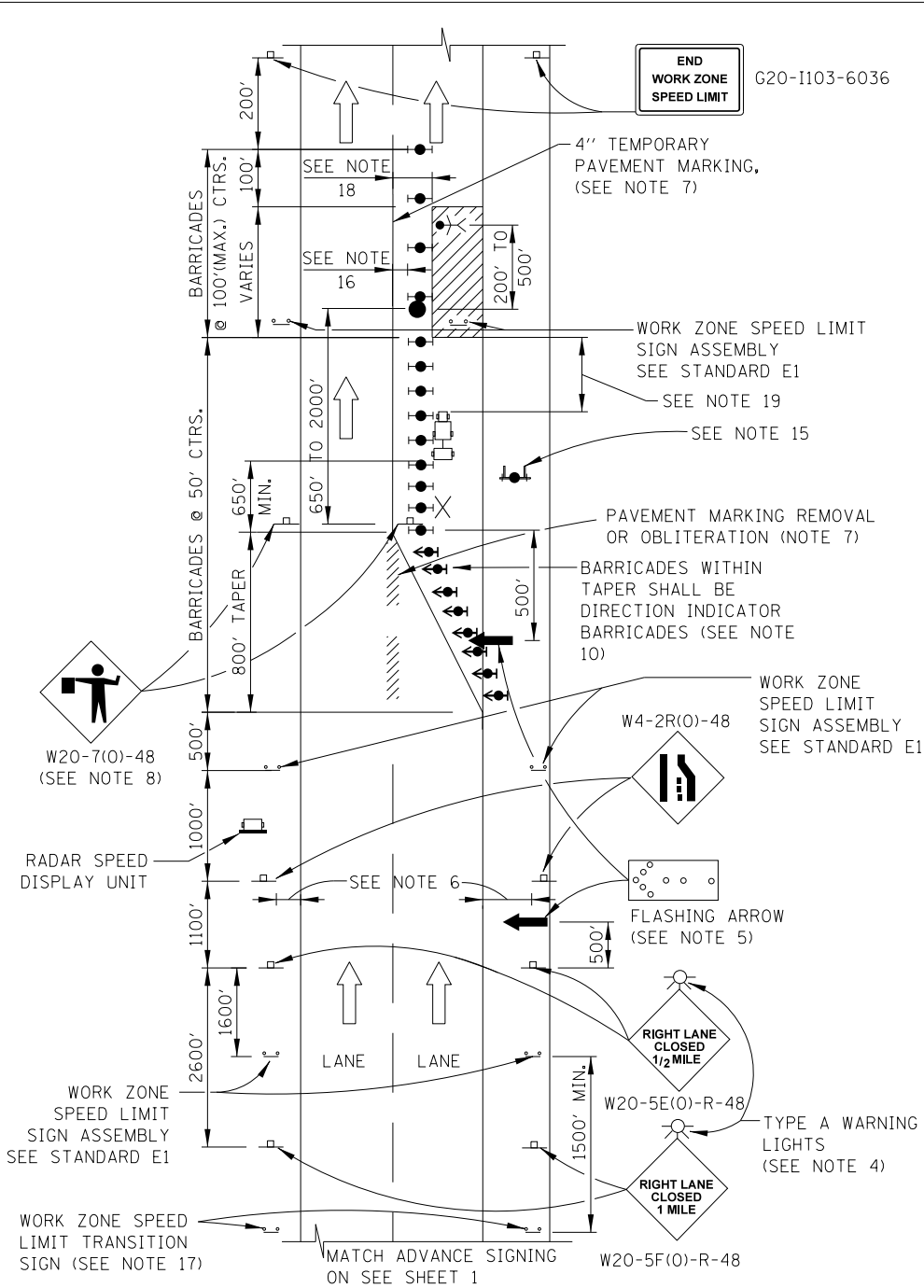


LANE CLOSURE DETAILS

STANDARD E2-11



ONE - LANE CLOSURE WITH BARRIER



ONE - LANE CLOSURE WITH BARRICADE

TAPER RATES

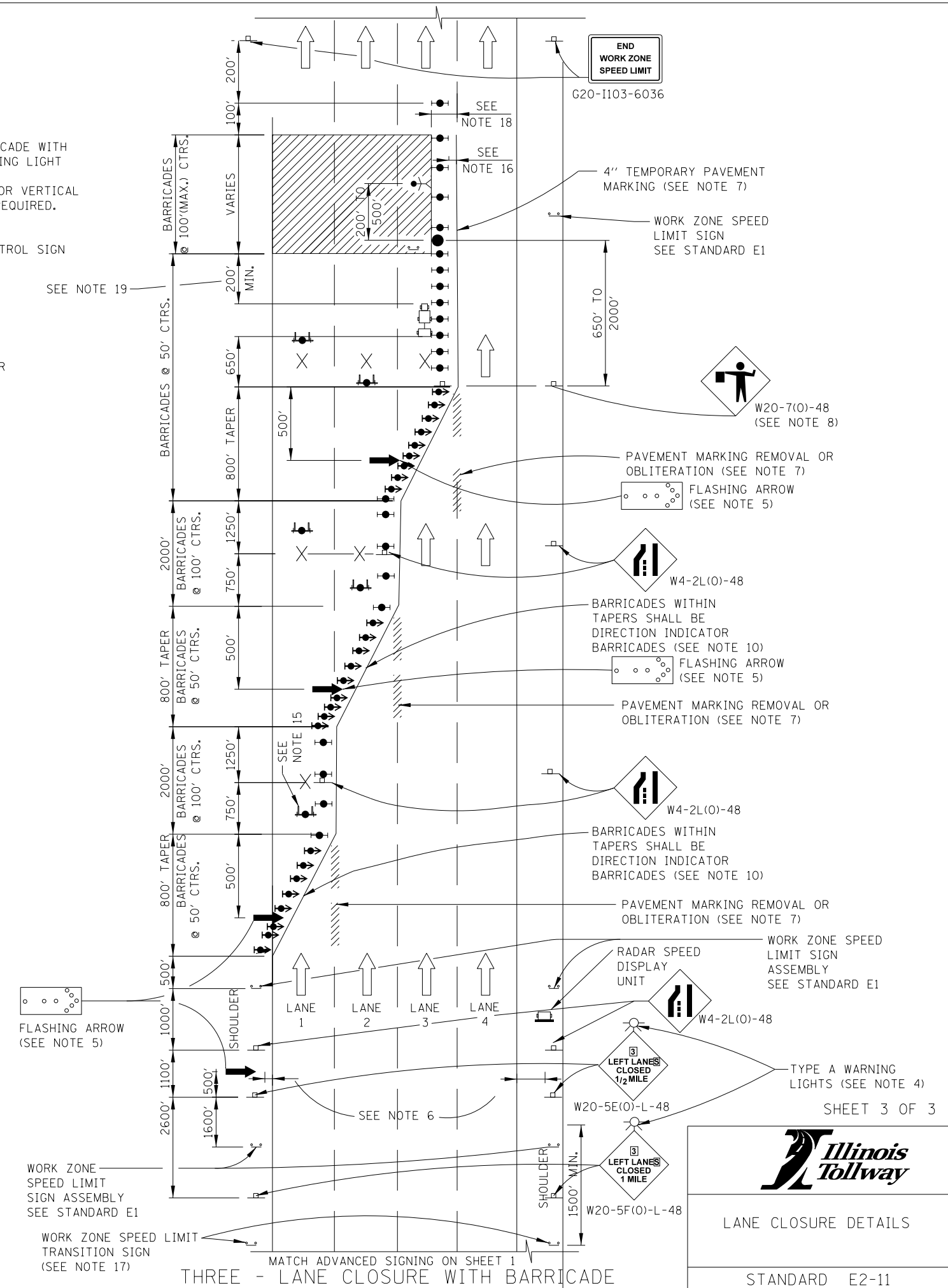
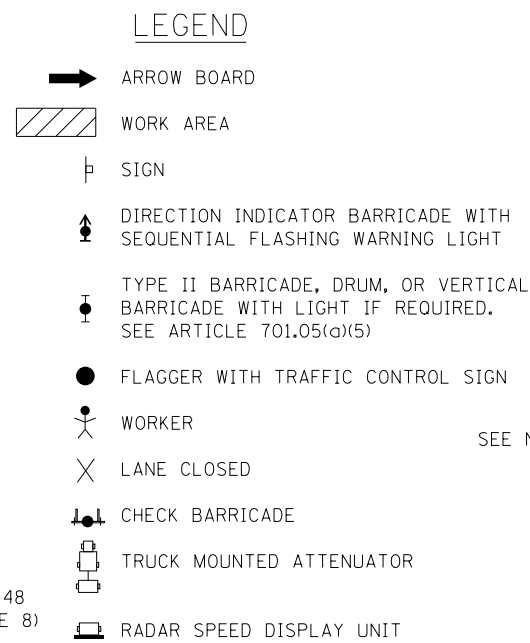
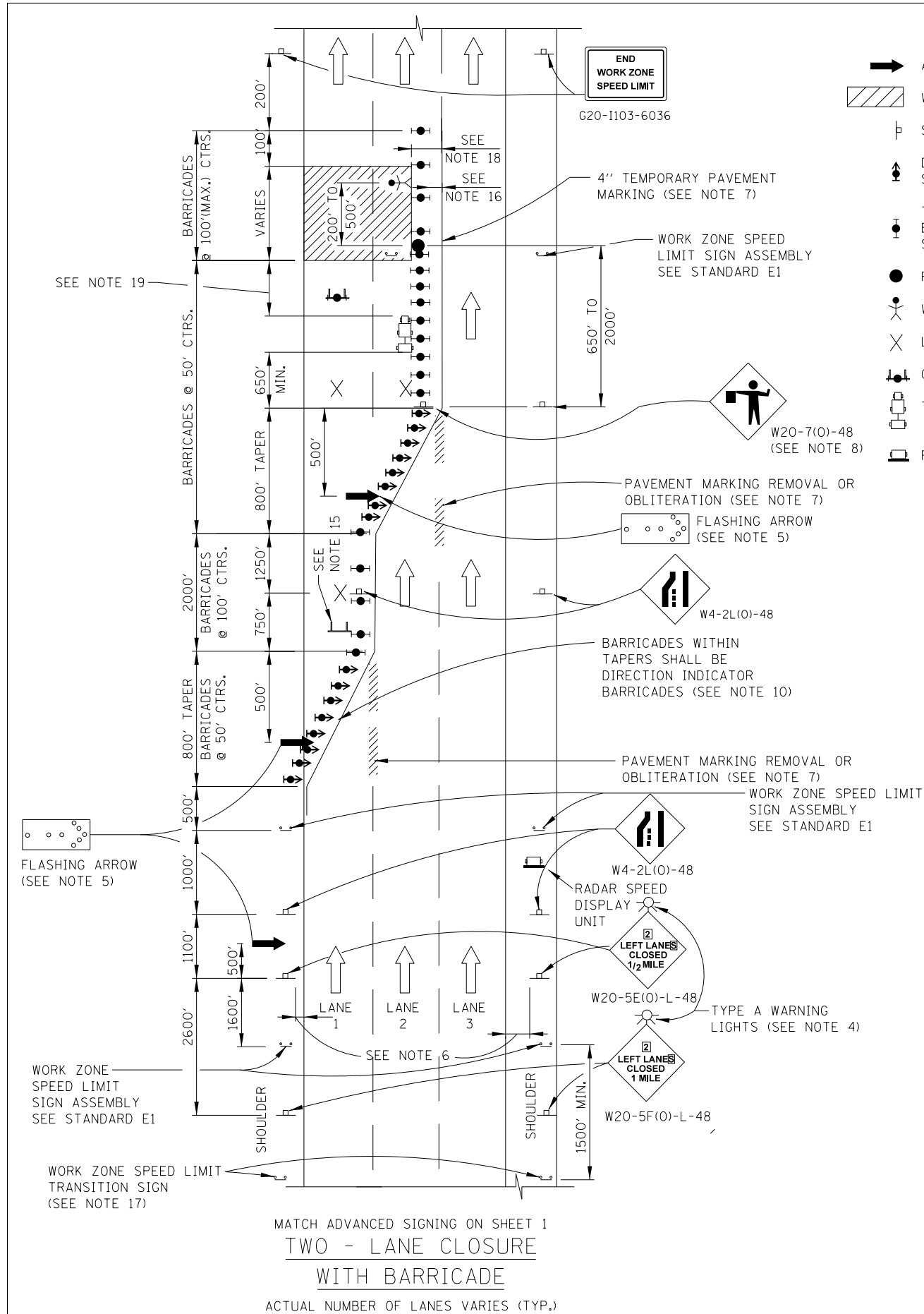
WORK ZONE SPEED (mph)	SHY LINE (ft.)	BARRIER INSIDE SHY LINE	BARRIER AT OR BEYOND SHY LINE
65	8.5	28:1	19:1
60	8	26:1	18:1
55	7	24:1	16:1
50	6.5	21:1	14:1
45	6	18:1	12:1
40	5	16:1	10:1
35	4.5	15:1	9:1
30	4	13:1	8:1

LEGEND

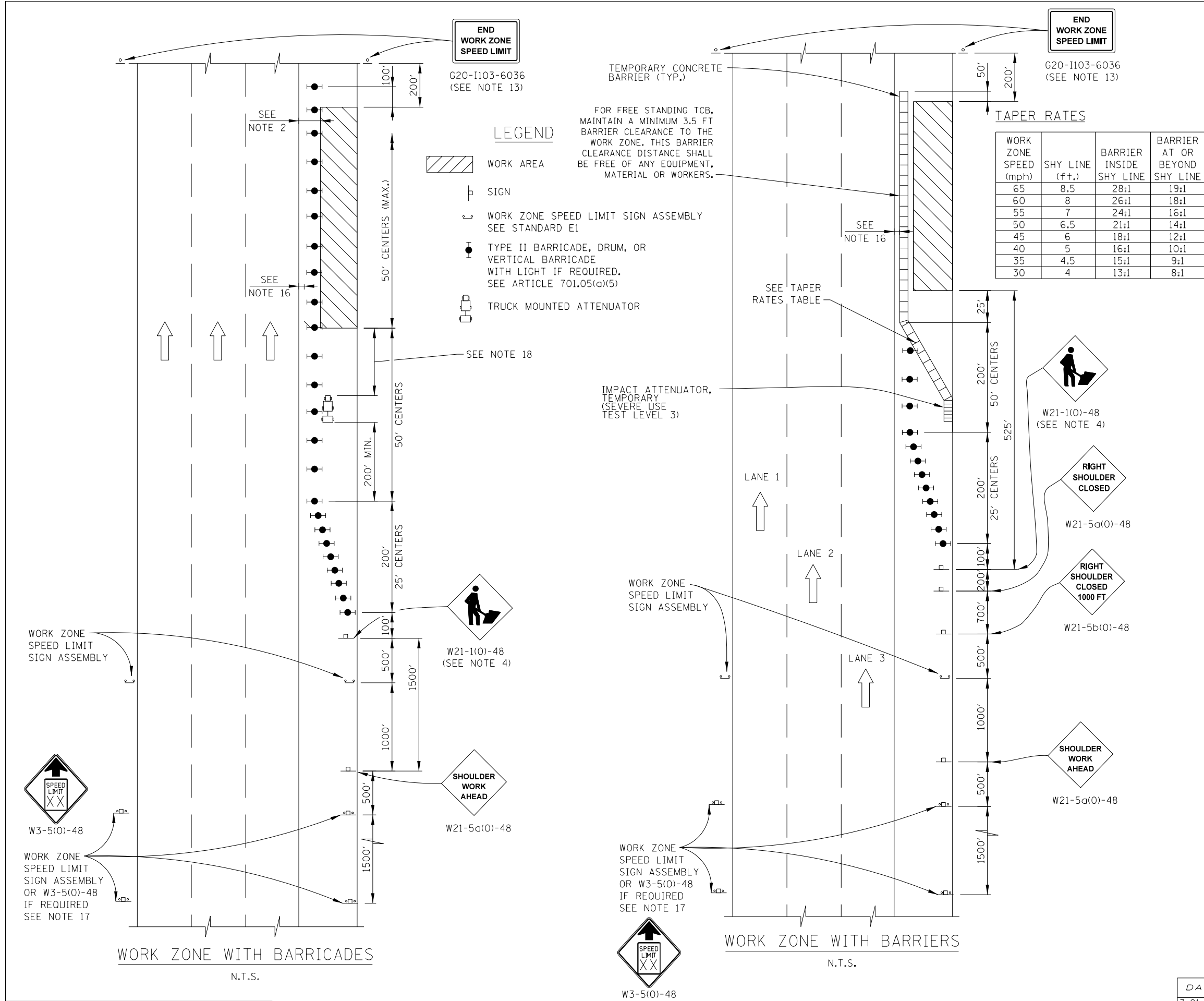
- ARROW BOARD
- WORK AREA
- SIGN
- DIRECTION INDICATOR BARRICADE WITH SEQUENTIAL FLASHING WARNING LIGHT
- TYPE II BARRICADE, DRUM, OR VERTICAL BARRICADE WITH LIGHT IF REQUIRED. SEE ARTICLE 701.05(d)(5)

- FLAGGER WITH TRAFFIC CONTROL SIGN
- WORKER
- LANE CLOSED
- CHECK BARRICADE
- TRUCK MOUNTED ATTENUATOR
- RADAR SPEED DISPLAY UNIT

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

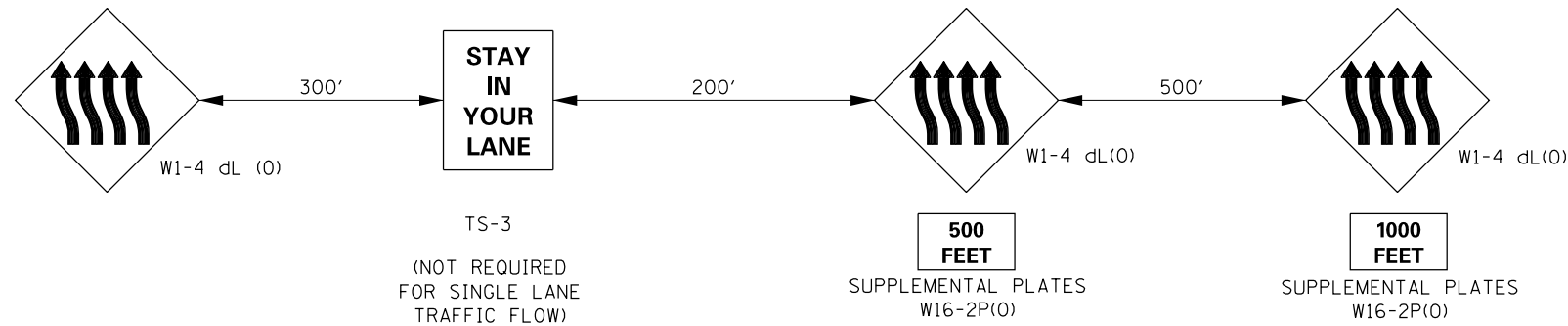




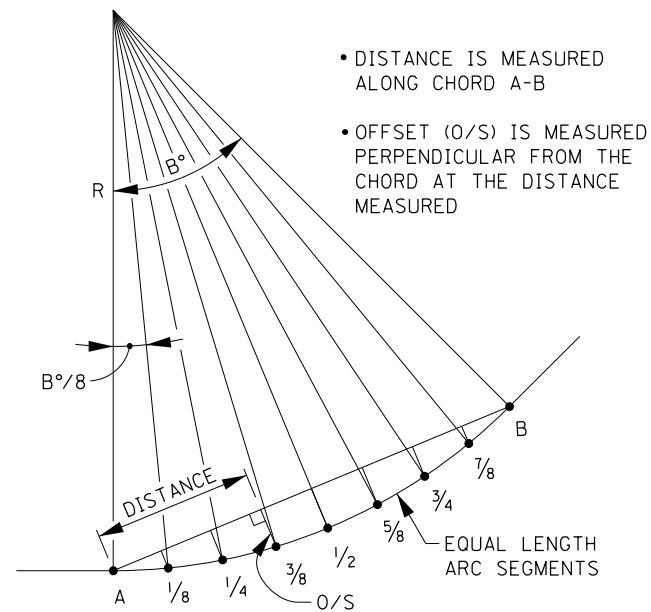
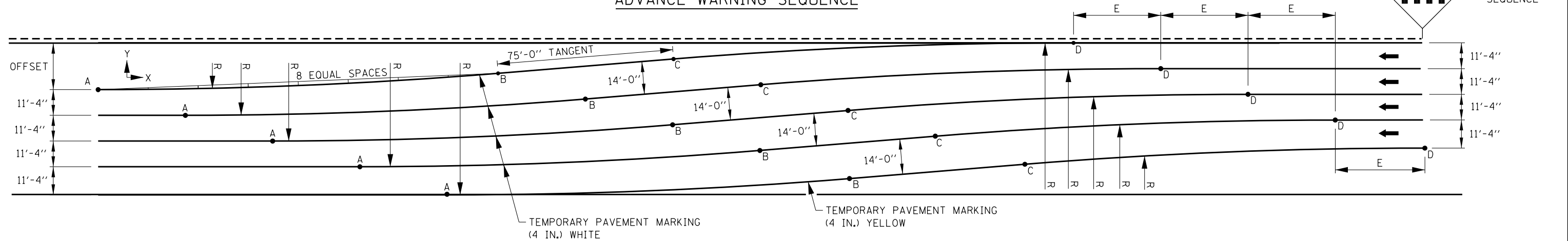


- GENERAL NOTES:
1. THE SHOULDER SHALL BE CLOSED WHEN A WORK ACTIVITY REQUIRING 15 OR MORE MINUTES IS PERFORMED AT A DISTANCE WHICH IS LESS THAN 15 FEET BUT NO CLOSER THAN 2 FEET FROM THE EDGE OF TRAVELED WAY.
  2. THE ADJACENT EXTERIOR LANE SHALL BE CLOSED WHEN WORK IS PERFORMED WITHIN 2 FEET FROM THE EDGE OF TRAVELED WAY.
  3. THE CHANNELIZING DEVICES WHICH SEPARATE THE WORK SPACE FROM THE ADJACENT TRAVEL LANE SHALL BE SPACED AT 25' FOR (200 FEET) AND AT A MAXIMUM OF 50' FOR ALL ADDITIONAL DEVICES.
  4. WHEN THE WORK SITE IS UNATTENDED, SUBSTITUTE - "SHOULDER WORK AHEAD" SIGN.
  5. WORKER SIGNS OR SHOULDER WORK SIGNS AND CHANNELIZATION DEVICES ARE PLACED ONLY ON THE SIDE OF THE ROADWAY ON WHICH THE ACTIVITY IS PERFORMED.
  6. FOR SHOULDER CLOSURE EXTENDING OVERNIGHT, BARRICADE TYPE II SHALL BE USED. SEE ARTICLE 701.05(a)(5) FOR BARRICADE LIGHT REQUIREMENTS
  7. FOR SHORT TERM CLOSURE (SUNRISE TO ONE HOUR BEFORE SUNSET) NOT EXTENDING INTO DARKNESS, CONES MAY BE USED.
  8. ONE WORK ZONE SPEED LIMIT SIGN ASSEMBLY SHALL BE PLACED AT A DISTANCE OF 500' TO 2,500' MAXIMUM IN ADVANCE OF WORKERS THROUGHOUT THE SHOULDER CLOSURE. MOVING OPERATIONS MAY REQUIRE CONTINUOUS ADJUSTMENT OF THE SIGN ASSEMBLY LOCATION TO MAINTAIN THE ABOVE INTERVAL.
  9. AN ADDITIONAL SIGN ASSEMBLY SHALL BE PLACED 500' BEYOND THE LAST ENTRANCE RAMP FOR EACH INTERCHANGE THAT FALLS WITHIN THE 2,500'.
  10. THE SIGN ASSEMBLY SHALL BE PLACED NO CLOSER THAN 500' TO ANY OTHER SIGN.
  11. THE WORK ZONE SPEED LIMIT SIGNS AND SIGN ASSEMBLY SHALL BE PROMPTLY REMOVED OR COVERED WHEN SHOULDER CLOSURE IS REMOVED.
  12. ALL CONFLICTING SPEED LIMIT SIGNS SHALL BE COVERED OR REMOVED.
  13. "END WORK ZONE SPEED LIMIT" SIGNS SHALL BE IN PLACE ONLY WHEN THE EXISTING POSTED SPEED > 55MPH.
  14. FOR SHOULDER REPAIRS OR REPLACEMENT THE CHANNELIZING DEVICES SHALL BE PLACED AT THE EDGE OF PAVEMENT WHENEVER THE WORK ACTIVITIES RESULT IN A DROP OFF AT THE EDGE OF PAVEMENT.
  15. ANY UNATTENDED OBSTACLE OR EXCAVATION LEFT ON THE SHOULDER OVERNIGHT SHALL BE IN COMPLIANCE WITH THE ROADWAY TRAFFIC CONTROL AND COMMUNICATIONS MANUAL.
  16. A 1'-0" MINIMUM/2'-0" DESIRABLE SHY DISTANCE SHALL BE PROVIDED, MEASURED BETWEEN EDGE OF PAVEMENT LANE MARKING TO THE EDGE OF THE TRAFFIC CONTROL DEVICE.
  17. SEE STANDARD E1 FOR ADDITIONAL SIGNAGE REQUIRED WHEN WORK ZONE SPEED LIMIT IS REDUCED BY MORE THAN 10 MPH.
  18. IN WORK ZONES WITH NO POSITIVE PROTECTION, A TRUCK MOUNTED ATTENUATOR SHALL BE PROVIDED WITH A BUFFER AREA BETWEEN THE FRONT OF THE TMA AND WORKERS OR EQUIPMENT. THE BUFFER AREA SHALL BE 200' UNLESS OTHERWISE DETERMINED. WHERE WORKERS OR EQUIPMENT ARE PRESENT BEYOND THE WORK AREA, AN ADDITIONAL TMA SHALL BE PROVIDED FOR EACH WORK AREA IS DEFINED AS STARTING AT THE END OF THE BUFFER AREA, EXTENDING 1000 FEET BEYOND THIS POINT.

DATE	REVISIONS
3-01-2024	REVISED NOTE 1, 2 AND 6, ADDED CALLOUT FOR NOTE 2, REDUCED WORK ZONE HATCH
3-01-2021	DELETED WORK ZONE PUBLIC INFORMATION SIGN



### ADVANCE WARNING SEQUENCE



### CHORD OFFSET SKETCH

### GENERAL NOTES:

1. REVERSE CURVE INFORMATION CAN BE USED FOR SINGLE LANE OR MULTILANE TRAFFIC FLOWS, SHIFTING RIGHT TO LEFT (AS SHOWN) OR LEFT TO RIGHT BY CHANGING TO THE APPROPRIATE ADVANCE WARNING SEQUENCE.
2. THE REVERSE CURVE SHALL NOT BE USED OUTSIDE THE ACTIVITY AREA. LANE SHIFTS IN ADVANCE OF OR ON THE APPROACH TO THE ACTIVITY AREA SHALL BE IMPLEMENTED WITH A SHIFT RATE OF 65:1.
3. LANE SHIFTS FOR DEPARTURES OUT OF THE ACTIVITY AREA SHALL BE IMPLEMENTED WITH A SHIFT RATE OF 65:1.

APPROVED BY:

*Paul Kovacs*

CHIEF ENGINEERING OFFICER

DATE:

02/07/2012

DATE	REVISIONS
3-31-2017	REVISED TABLE DATA ON SHEET 2.
3-31-2016	REVISED TABLE DATA ON SHEET 2.
3-11-2015	REVISED NOTES AND ADDED RADIUS DIMENSIONS TO TABLES.
3-31-2014	REVISED CURVE DATA PER MPH AND REVISED NOTES.



MAINTENANCE OF TRAFFIC  
REVERSE CURVE

STANDARD E4-07

TYPE I (45 MPH) (RADIUS: 2100')

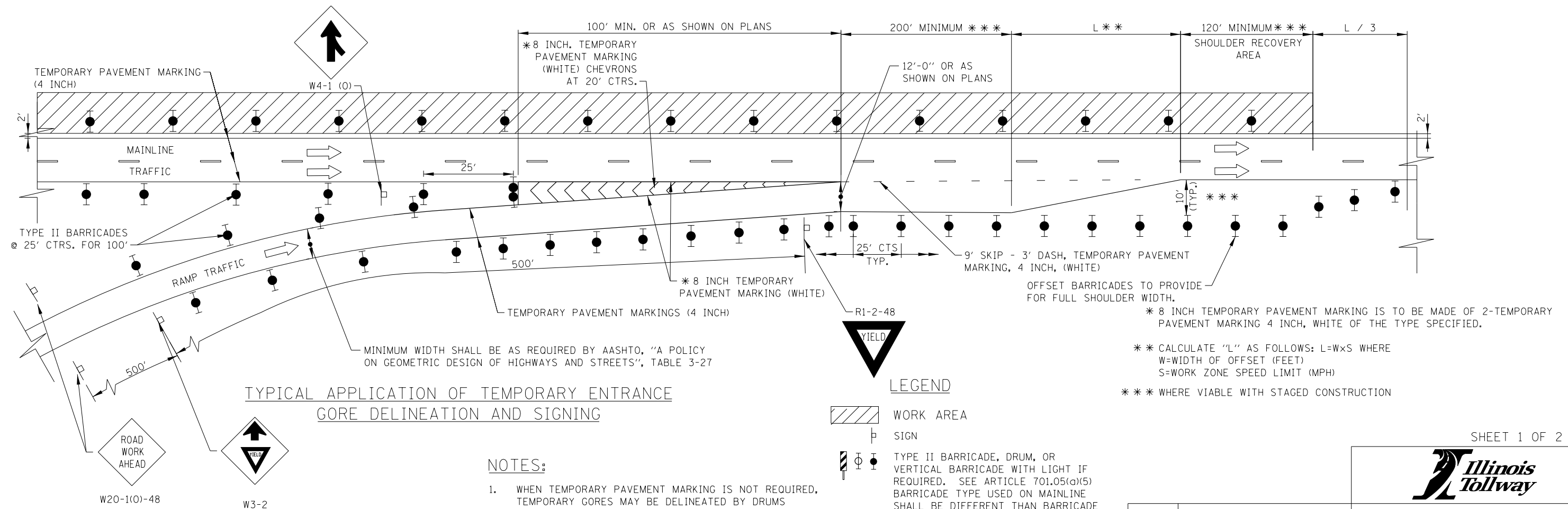
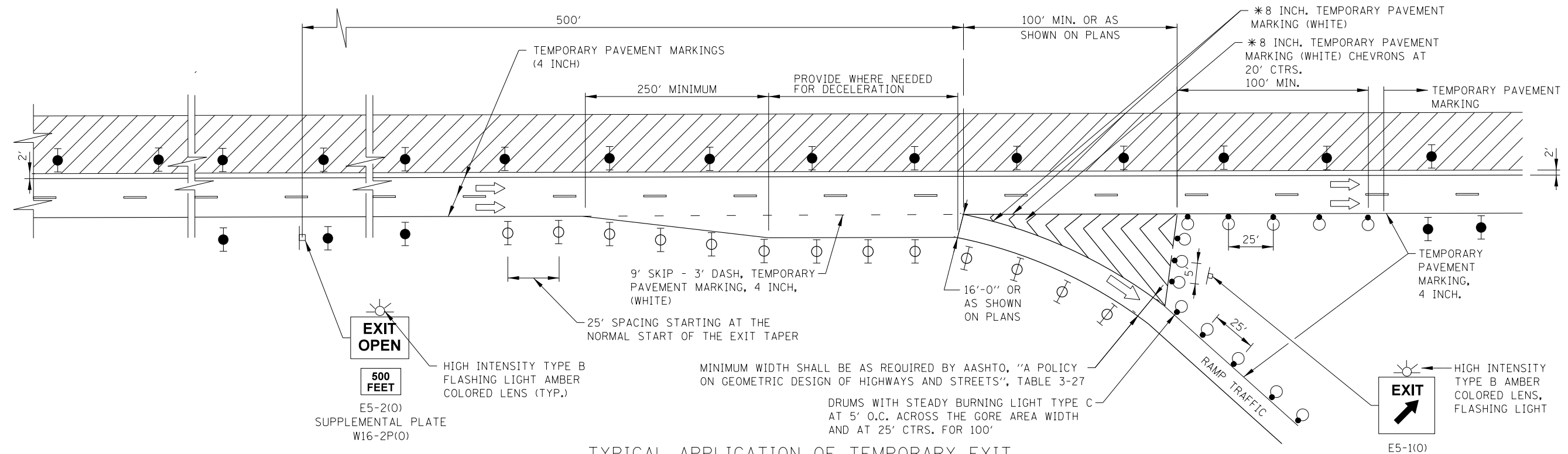
			POINT LAY-OUT								CHORD OFFSET DATA							
OFFSET	E	B	A		B		C		D		1/8 & 7/8		1/4 & 3/4		3/8 & 5/8		1/2	
			X	Y	X	Y	X	Y	X	Y	O/S	DIST	O/S	DIST	O/S	DIST	O/S	DIST
10	50.23	3.06	0	0	112.2	3.0	187.1	7.0	299.2	10.0	0.3	14.0	0.6	28.0	0.7	42.1	0.7	56.1
12	44.94	3.43	0	0	125.6	3.8	200.4	8.2	326.0	12.0	0.4	15.7	0.7	31.4	0.9	47.1	0.9	62.8
14	40.96	3.77	0	0	138.0	4.5	212.8	9.5	350.8	14.0	0.5	17.3	0.9	34.5	1.1	51.8	1.1	69.0
16	37.86	4.08	0	0	149.5	5.3	224.3	10.7	373.9	16.0	0.6	18.7	1.0	37.4	1.2	56.1	1.3	74.8
18	35.34	4.38	0	0	160.4	6.1	235.2	11.9	395.6	18.0	0.7	20.1	1.2	40.1	1.4	60.2	1.5	80.3
20	33.26	4.66	0	0	170.7	7.0	245.5	13.0	416.2	20.0	0.8	21.4	1.3	42.7	1.6	64.1	1.7	85.4
22	31.50	4.93	0	0	180.5	7.8	255.3	14.2	435.8	22.0	0.9	22.6	1.5	45.2	1.8	67.8	1.9	90.4
24	30.00	5.19	0	0	189.9	8.6	264.6	15.4	454.6	24.0	0.9	23.8	1.6	47.5	2.0	71.3	2.2	95.1
26	28.68	5.44	0	0	199.0	9.4	273.6	16.6	472.6	26.0	1.0	24.9	1.8	49.8	2.2	74.7	2.4	99.6
28	27.53	5.67	0	0	207.7	10.3	282.3	17.7	489.9	28.0	1.1	26.0	1.9	52.0	2.4	78.0	2.6	104.0
30	26.51	5.90	0	0	216.0	11.1	290.6	18.9	506.7	30.0	1.2	27.0	2.1	54.1	2.6	81.1	2.8	108.2
32	25.59	6.13	0	0	224.2	12.0	298.7	20.0	522.9	32.0	1.3	28.0	2.3	56.1	2.8	84.2	3.0	112.2
34	24.76	6.34	0	0	232.0	12.9	306.6	21.1	538.6	34.0	1.4	29.0	2.4	58.1	3.0	87.1	3.2	116.2
36	24.02	6.55	0	0	239.7	13.7	314.2	22.3	553.8	36.0	1.5	30.0	2.6	60.0	3.2	90.0	3.4	120.0
38	23.33	6.76	0	0	247.1	14.6	321.6	23.4	568.7	38.0	1.6	30.9	2.7	61.9	3.4	92.8	3.7	123.8
40	22.71	6.96	0	0	254.3	15.5	328.8	24.5	583.1	40.0	1.7	31.8	2.9	63.7	3.6	95.5	3.9	127.4
42	22.13	7.15	0	0	261.4	16.3	335.8	25.7	597.2	42.0	1.8	32.7	3.1	65.4	3.8	98.2	4.1	131.0
44	21.60	7.34	0	0	268.3	17.2	342.7	26.8	611.0	44.0	1.9	33.6	3.2	67.2	4.0	100.8	4.3	134.4
46	21.11	7.53	0	0	275.0	18.1	349.4	27.9	624.4	46.0	2.0	34.4	3.4	68.9	4.2	103.3	4.5	137.8
48	20.65	7.71	0	0	281.6	19.0	356.0	29.0	637.6	48.0	2.1	35.2	3.6	70.5	4.5	105.8	4.7	141.1
50	20.22	7.89	0	0	288.1	19.9	362.4	30.1	650.5	50.0	2.2	36.1	3.7	72.2	4.7	108.3	5.0	144.4
52	19.82	8.06	0	0	294.4	20.7	368.7	31.3	663.1	52.0	2.3	36.9	3.9	73.7	4.9	110.7	5.2	147.6
54	19.44	8.23	0	0	300.6	21.6	374.9	32.4	675.5	54.0	2.4	37.6	4.1	75.3	5.1	113.0	5.4	150.7
56	19.09	8.40	0	0	306.7	22.5	380.9	33.5	687.7	56.0	2.5	38.4	4.2	76.8	5.3	115.3	5.6	153.8
58	18.76	8.56	0	0	312.7	23.4	386.9	34.6	699.6	58.0	2.6	39.2	4.4	78.3	5.5	117.6	5.9	156.8
60	18.44	8.73	0	0	318.6	24.3	392.7	35.7	711.4	60.0	2.7	39.9	4.6	79.8	5.7	119.8	6.1	159.8

TYPE II (50-55 MPH) (RADIUS: 3100')

			POINT LAY-OUT								CHORD OFFSET DATA							
OFFSET	E	B	A		B		C		D		1/8 & 7/8		1/4 & 3/4		3/8 & 5/8		1/2	
			X	Y	X	Y	X	Y	X	Y	O/S	DIST	O/S	DIST	O/S	DIST	O/S	DIST
10	58.28	2.63	0	0	142.5	3.3	217.4	6.7	359.9	10.0	0.4	17.8	0.6	35.6	0.8	53.4	0.8	71.3
12	52.30	2.94	0	0	158.9	4.1	233.8	7.9	392.8	12.0	0.4	19.9	0.8	39.7	1.0	59.6	1.0	79.5
14	47.80	3.22	0	0	174.1	4.9	249.0	9.1	423.1	14.0	0.5	21.8	0.9	43.5	1.1	65.3	1.2	87.1
16	44.25	3.48	0	0	188.3	5.7	263.1	10.3	451.4	16.0	0.6	23.5	1.1	47.1	1.3	70.6	1.4	94.2
18	41.38	3.73	0	0	201.6	6.6	276.4	11.4	478.0	18.0	0.7	25.2	1.2	50.4	1.5	75.6	1.6	100.8
20	38.99	3.96	0	0	214.2	7.4	289.0	12.6	503.2	20.0	0.8	26.8	1.4	53.6	1.7	80.4	1.9	107.2
22	36.96	4.18	0	0	226.2	8.3	301.0	13.7	527.2	22.0	0.9	28.3	1.5	56.6	1.9	84.9	2.1	113.2
24	35.22	4.40	0	0	237.7	9.1	312.5	14.9	550.1	24.0	1.0	29.7	1.7	59.5	2.1	89.2	2.3	118.9
26	33.70	4.60	0	0	248.7	10.0	323.5	16.0	572.1	26.0	1.1	31.1	1.9	62.2	2.3	93.3	2.5	124.4
28	32.36	4.80	0	0	259.3	10.9	334.0	17.1	593.3	28.0	1.2	32.4	2.0	64.9	2.5	97.3	2.7	129.8
30	31.16	4.99	0	0	269.5	11.7	344.2	18.3	613.8	30.0	1.3	33.7	2.2	67.4	2.8	101.2	2.9	134.9
32	30.10	5.17	0	0	279.4	12.6	354.1	19.4	633.6	32.0	1.4	34.9	2.4	69.9	3.0	104.9	3.2	139.9
34	29.13	5.35	0	0	289.0	13.5	363.7	20.5	652.7	34.0	1.5	36.2	2.5	72.3	3.2	108.5	3.4	144.7
36	28.25	5.52	0	0	298.4	14.4	373.0	21.6	671.4	36.0	1.6	37.3	2.7	74.7	3.4	112.0	3.6	149.4
38	27.45	5.69	0	0	307.4	15.3	382.1	22.7	689.5	38.0	1.7	38.5	2.9	76.9	3.6	115.4	3.8	153.9
40	26.72	5.86	0	0	316.3	16.2	390.9	23.8	707.1	40.0	1.8	39.6	3.0	79.1	3.8	118.7	4.0	158.3
42	26.04	6.02	0	0	324.9	17.1	399.5	24.9	724.3	42.0	1.9	40.6	3.2	81.3	4.0	122.0	4.3	162.7
44	25.41	6.17	0	0	333.3	18.0	407.9	26.0	741.1	44.0	2.0	41.7	3.4	83.4	4.2	125.1	4.5	166.9
46	24.83	6.32	0	0	341.5	18.9	416.1	27.1	757.6	46.0	2.1	42.7	3.5	85.5	4.4	128.2	4.7	171.0
48	24.29	6.47	0	0	349.6	19.8	424.1	28.2	773.6	48.0	2.2	43.7	3.7	87.5	4.6	131.3	4.9	175.1
50	23.78	6.62	0	0	357.4	20.7	431.9	29.3	789.4	50.0	2.3	44.7	3.9	89.5	4.8	134.2	5.2	179.0
52	23.31	6.76	0	0	365.2	21.6	439.6	30.4	804.8	52.0	2.4	45.7	4.0	91.4	5.1	137.2	5.4	182.9
54	22.86	6.91	0	0	372.7	22.5	447.2	31.5	819.9	54.0	2.5	46.6	4.2	93.3	5.3	140.0	5.6	186.7
56	22.44	7.04	0	0	380.2	23.4	454.6	32.6	834.8	56.0	2.6	47.6	4.4	95.2	5.5	142.8	5.9	190.5
58	22.05	7.18	0	0	387.5	24.3	461.9	33.7	849.4	58.0	2.7	48.5	4.6	97.0	5.7	145.6	6.1	194.1
60	21.67	7.31	0	0	394.7	25.2	469.1	34.8	863.7	60.0	2.8	49.4	4.7	98.8	5.9	148.3	6.3	197.7

TYPE III (60-65 MPH) (RADIUS: 4400')

			POINT LAY-OUT								CHORD OFFSET DATA							
OFFSET	E	B	A		B		C		D		1/8 & 7/8		1/4 & 3/4		3/8 & 5/8		1/2	
			X	Y	X	Y	X	Y	X	Y	O/S	DIST	O/S	DIST	O/S	DIST	O/S	DIST
10	67.06	2.29	0	0	175.6	3.5	250.5	6.5	426.1	10.0	0.4	21.9	0.7	43.9	0.8	65.8	0.9	87.8
12	60.34	2.54	0	0	195.3	4.3	270.2	7.7	465.5	12.0	0.5	24.4	0.8	48.8	1.0	73.2	1.1	97.7
14	55.24	2.78	0	0	213.5	5.2	288.4	8.8	501.8	14.0	0.6	26.7	1.0	53.4	1.2	80.1	1.3	106.8
16	51.22	3.00	0	0	230.4	6.0	305.3	10.0	535.7	16.0	0.7	28.8	1.1	57.6	1.4	86.4	1.5	115.2
18	47.95	3.21	0	0	246.3	6.9	321.2	11.1	567.5	18.0	0.8	30.8	1.3	61.6	1.6	92.4	1.7	123.2
20	45.22	3.41	0	0	261.4	7.8	336.3	12.2	597.7	20.0	0.9	32.7	1.5	65.4	1.8	98.1	1.9	130.8
22	42.90	3.59	0	0	275.8	8.6	350.6	13.4	626.4	22.0	0.9	34.5	1.6	69.0	2.0	103.5	2.2	137.9
24	40.91	3.77	0	0	289.5	9.5	364.3	14.5	653.8	24.0	1.0	36.2	1.8	72.4	2.2	108.6	2.4	144.8
26	39.16	3.94	0	0	302.6	10.4	377.5	15.6	680.1	26.0	1.1	37.8	2.0	75.7	2.4	113.6	2.6	151.4
28	37.62	4.11	0	0	315.3	11.3	390.1	16.7	705.4	28.0	1.2	39.4	2.1	78.9	2.7	118.3	2.8	157.8
30	36.24	4.27	0	0	327.5	12.2	402.3	17.8	729.9	30.0	1.3	41.0	2.3	81.9	2.9	122.9	3.1	163.9
32	35.01	4.42	0	0	339.4	13.1	414.2	18.9	753.5	32.0	1.4	42.4	2.5	84.9	3.1	127.4	3.3	169.8
34	33.90	4.57	0	0	350.8	14.0	425.6	20.0	776.4	34.0	1.5	43.9	2.6	87.8	3.3	131.7	3.5	175.6
36	32.88	4.72	0	0	362.0	14.9	436.7	21.1	798.7	36.0	1.6	45.3	2.8	90.6	3.5	135.8	3.7	181.1
38	31.95	4.86	0	0	372.8	15.8	447.5	22.2	820.4	38.0	1.7	46.6	3.0	93.3	3.7	139.9	4.0	186.6
40	31.10	5.00	0	0	383.4	16.7	458.1	23.3	841.4	40.0	1.8	47.9	3.1	95.9	3.9	143.9	4.2	191.9
42	30.31	5.13	0	0	393.7	17.6	468.4	24.4	862.0	42.0	1.9	49.2	3.3	98.5	4.1	147.8	4.4	197.0
44	29.59	5.26	0	0	403.7	18.6	478.4	25.4	882.1	44.0	2.0	50.5	3.5	101.0	4.4	151.5	4.6	202.1
46	28.91	5.39	0	0	413.5	19.5	488.2	26.5	901.7	46.0	2.1	51.7	3.7	103.5	4.6	155.2	4.9	207.0
48	28.28	5.52	0	0	423.1	20.4	497.8	27.6	920.9	48.0	2.2	52.9	3.8	105.9	4.8	158.8	5.1	211.8
50	27.68	5.64	0	0	432.6	21.3	507.2	28.7	939.7	50.0	2.3	54.1	4.0	108.2	5.0	162.4	5.3	216.5
52	27.13	5.76	0	0	441.8	22.2	516.4	29.8	958.2	52.0	2.4	55.3	4.2	110.6	5.2	165.9	5.6	221.2
54	26.61	5.88	0	0	450.8	23.2	525.4	30.8	976.3	54.0	2.5	56.4	4.3	112.8	5.4	169.3	5.8	225.7
56	26.12	6.00	0	0	459.7	24.1	534.3	31.9	994.0	56.0	2.6	57.5	4.5	115.0	5.6	172.6	6.0	230.2
58	25.65	6.11	0	0	468.4	25.0	543.0	33.0	1011.5	58.0	2.7	58.6	4.7	117.2	5.9	175.9	6.3	234.6
60	25.21	6.22	0	0	477.0	25.9	551.6	34.1	1028.6	60.0	2.8	59.7	4.9	119.4	6.1	179.1	6.5	238.9






- NOTES:

1. WHEN TEMPORARY PAVEMENT MARKING IS NOT REQUIRED, TEMPORARY GORES MAY BE DELINEATED BY DRUMS WITH STEADY BURN LIGHTS AT 25' C-C ACCORDING TO THE CONFIGURATIONS SHOWN.
2. THE TAPER LENGTHS ARE MINIMUMS. EXISTING ACCELERATION, DECELERATION, AND TAPER LENGTHS SHOULD BE PRESERVED TO THE EXTENT POSSIBLE.

LEGEND

 WORK AREA

☐ SIGN

   TYPE II BARRICADE, DRUM, OR VERTICAL BARRICADE WITH LIGHT IF REQUIRED. SEE ARTICLE 701.05(a)(5) BARRICADE TYPE USED ON MAINLINE SHALL BE DIFFERENT THAN BARRICADE TYPE USED ON TAPER.

● DRUM WITH LIGHT IF REQUIRED  
SEE ARTICLE 701.05(d)(5)

TYPE III BARRICADE

\* 8 INCH TEMPORARY PAVEMENT MARKING IS TO BE MADE OF 2-TEMPORARY PAVEMENT MARKING 4 INCH, WHITE OF THE TYPE SPECIFIED.

\*\* CALCULATE "L" AS FOLLOWS:  $L=W \times S$  WHERE  
 W=WIDTH OF OFFSET (FEET)  
 S=WORK ZONE SPEED LIMIT (MPH)

\*\*\* WHERE VIABLE WITH STAGED CONSTRUCTION

SHEET 1 OF 2



## TEMPORARY GORE DETAILS

STANDARD E5-10

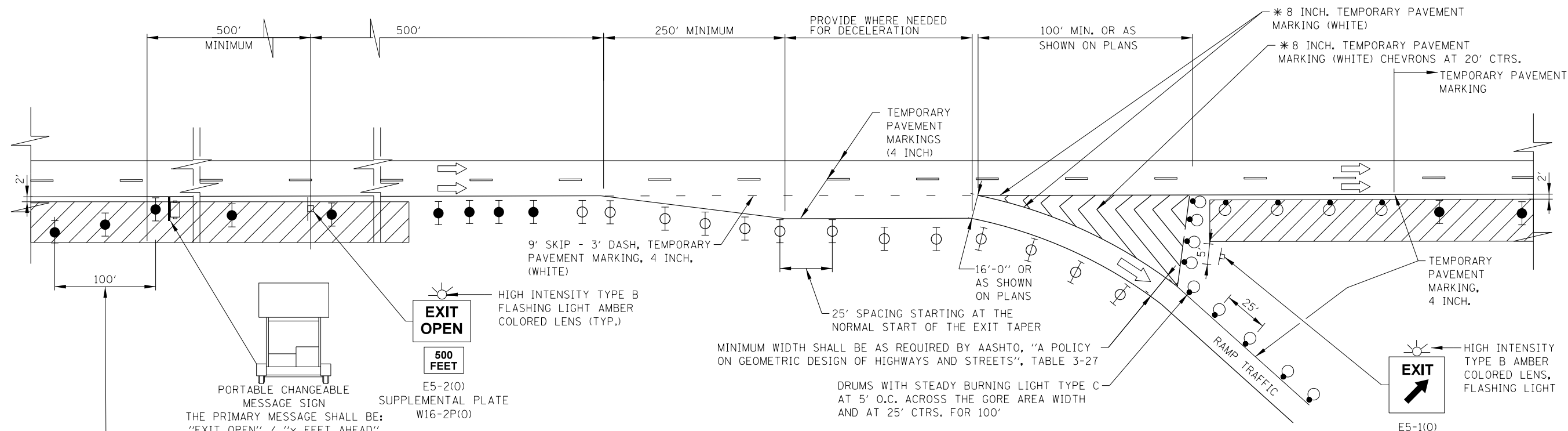
DATE	REVISIONS
3-01-2023	REVISED DRUM W/LIGHT ARTICLE NO., REVISED SKIP DASH, REVISED RAMP MINIMUM WIDTH NOTE
3-01-2020	PROVIDED DETAILS FOR INSIDE AND OUTSIDE WORK ZONES, PROVIDED ACCEL. & DECEL. DISTANCE WHERE VIABLE

APPROVED BY:

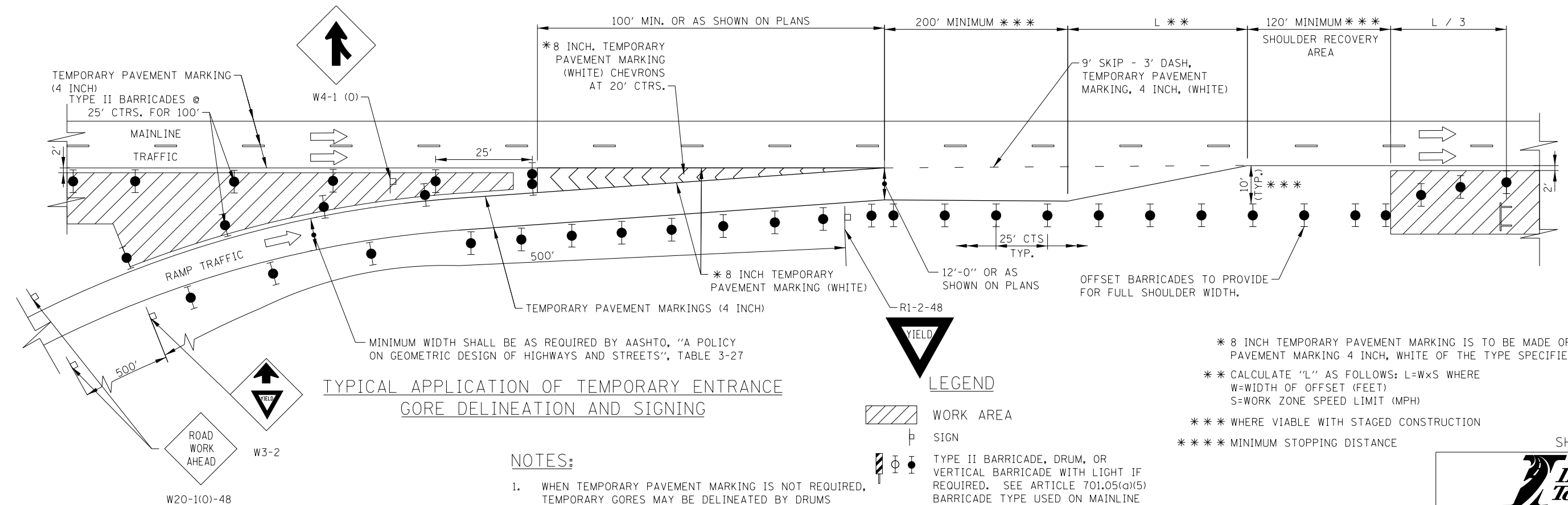
DATE:

APPROVED BY:  
  
CHIEF ENGINEERING OFFICER

03/01/2023



TYPICAL APPLICATION OF TEMPORARY EXIT  
GORE DELINEATION AND SIGNING



TYPICAL APPLICATION OF TEMPORARY ENTRANCE  
GORE DELINEATION AND SIGNING

NOTES:

- WHEN TEMPORARY PAVEMENT MARKING IS NOT REQUIRED, TEMPORARY GORES MAY BE DELINEATED BY DRUMS WITH STEADY BURN LIGHTS AT 25' C-C ACCORDING TO THE CONFIGURATIONS SHOWN.
- THE TAPER LENGTHS ARE MINIMUMS. EXISTING ACCELERATION, DECELERATION, AND TAPER LENGTHS SHOULD BE PRESERVED TO THE EXTENT POSSIBLE.

LEGEND

- WORK AREA
- SIGN
- TYPE II BARRICADE, DRUM, OR VERTICAL BARRICADE WITH LIGHT IF REQUIRED. SEE ARTICLE 701.05(a)(5)
- BARRICADE TYPE USED ON MAINLINE SHALL BE DIFFERENT THAN BARRICADE TYPE USED ON TAPER.
- DRUM WITH LIGHT IF REQUIRED SEE ARTICLE 701.05(a)(5)
- TYPE III BARRICADE

- \* 8 INCH TEMPORARY PAVEMENT MARKING IS TO BE MADE OF 2-TEMPORARY PAVEMENT MARKING 4 INCH, WHITE OF THE TYPE SPECIFIED.
- \*\* CALCULATE "L" AS FOLLOWS:  $L=W \times S$  WHERE  
W=WIDTH OF OFFSET (FEET)  
S=WORK ZONE SPEED LIMIT (MPH)
- \*\*\* WHERE VIABLE WITH STAGED CONSTRUCTION
- \*\*\*\* MINIMUM STOPPING DISTANCE

SHEET 2 OF 2

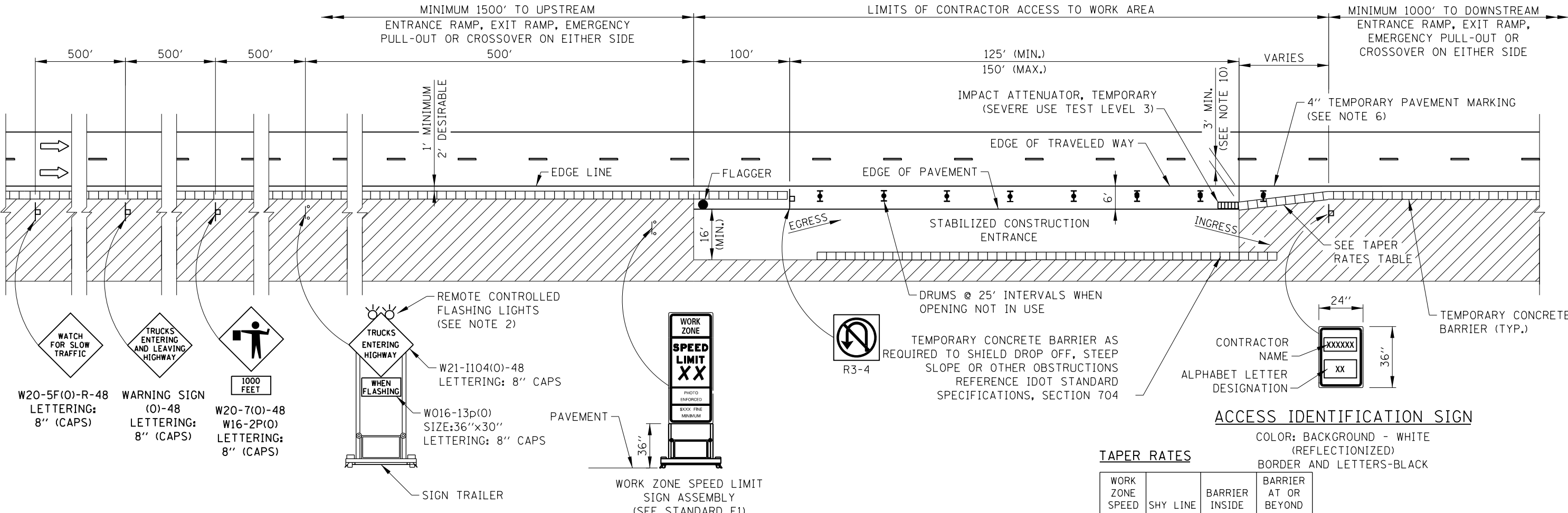


TEMPORARY GORE  
DETAILS

STANDARD E5-10

APPROVED BY: *Manan Nasir*  
CHIEF ENGINEERING OFFICER

DATE: 03/01/2023



NOTES:

- SIGNS DESIGNATED FOR THIS ACCESS TO WORK AREA SHALL BE COVERED OR TURNED AWAY FROM THE TRAFFIC WHEN THE FLAGGER IS NOT ON STATION AND THE ACCESS OPENINGS ARE NOT IN USE.
- THE FLASHING WARNING LIGHT SHALL MEET THE REQUIREMENTS OF ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS AND BE OPERATED BY THE FLAGGER REMOTELY. THE LIGHTS SHALL BE FLASHING ONLY WHEN A VEHICLE IS ENTERING THE ILLINOIS TOLLWAY.
- WHEN THREE LANES OR MORE ARE OPENED TO TRAFFIC, ADVANCE WARNING SIGNS AND ASSEMBLIES SHALL BE PROVIDED ON BOTH SIDES OF TRAVELED WAY.
- WHEN CONTRACTOR ACCESS TO WORK AREA IS ON OPPOSITE SIDE FROM SHOWN, ALL INSTALLATIONS ARE MIRROR IMAGE.
- FOR NIGHTTIME OPERATIONS, TEMPORARY LIGHTING OF CONSTRUCTION ACCESS TO WORK AREA SHALL BE PROVIDED.
- TEMPORARY PAVEMENT MARKINGS SHALL BE REPLACED AS OFTEN AS NECESSARY TO DELINEATE OPENINGS.
- IF POSSIBLE, LANE CLOSURES SHALL BE UTILIZED TO ELIMINATE THE MERGING OF CONSTRUCTION TRAFFIC INTO THROUGH TRAFFIC LANES.
- A 1'-0" MINIMUM/2'-0" DESIRABLE SHY DISTANCE SHALL BE PROVIDED, MEASURED BETWEEN EDGE OF PAVEMENT LANE MARKING TO THE EDGE OF THE TRAFFIC CONTROL DEVICES.
- "TRUCKS ENTERING HIGHWAY" SIGN MAY BE SUPPORTED BY OPTIONAL POST OR STAND MOUNTED DEVICES WHEN POSITIONED BEHIND TEMPORARY CONCRETE BARRIER.
- A TEMPORARY EXCEPTION TO THE 3' MINIMUM CLEARANCE BETWEEN EDGE OF TRAVELED WAY AND EDGE OF ATTENUATOR MAY BE REQUESTED FOR PCC PAVING OPERATIONS WHEN THIS CONFIGURATION DOES NOT PROVIDE 4' OF CLEARANCE BETWEEN BACK OF ATTENUATOR AND THE PROPOSED EDGE OF THE LANE BEING CONSTRUCTED IN THE CURRENT STAGE. THE DURATION OF REDUCED CLEARANCE SHALL BE LIMITED TO 24 HOURS.
- CONTRACTOR ACCESS LOCATIONS SHALL BE SPACED NO CLOSER THAN 2,600 FEET BETWEEN AREAS, EXCEPT FOR BRIDGE WORK WHERE 1 ACCESS LOCATION MAY BE PROVIDED ON EACH SIDE OF THE STRUCTURE. AT THESE LOCATIONS, ONLY 1 ACCESS LOCATION AT A TIME WILL BE ALLOWED TO BE OPEN FOR USE.
- EXITING THE WORK ZONE AT ANY PLACE OTHER THAN AT WORK ZONE EXIT OPENING WILL BE PROHIBITED.
- ALL VEHICLES SHALL USE THEIR TURN SIGNALS TO WARN MOTORISTS WHEN ENTERING AND EXITING THE WORK ZONE OPENINGS.
- FLAGGERS SHALL NOT STOP TRAFFIC OR DIRECT TRAFFIC INTO AN ADJACENT LANE.
- IN WORK ZONES WITH NO POSITIVE PROTECTION, A TRUCK MOUNTED ATTENUATOR (TMA) SHALL BE PROVIDED WITH A BUFFER AREA BETWEEN THE FRONT OF THE TMA AND WORKERS OR EQUIPMENT. THE BUFFER AREA SHALL BE 200' UNLESS OTHERWISE DETERMINED. WHERE WORKERS OR EQUIPMENT ARE PRESENT BEYOND THE WORK AREA, AN ADDITIONAL TMA SHALL BE PROVIDED FOR EACH WORK AREA. A WORK AREA IS DEFINED AS STARTING AT THE END OF THE BUFFER AREA, EXTENDING 1000 FEET BEYOND THIS POINT.

TAPER RATES

WORK ZONE SPEED (mph)	SHY LINE (ft.)	BARRIER INSIDE SHY LINE	BARRIER AT OR BEYOND SHY LINE
65	8.5	28:1	19:1
60	8	26:1	18:1
55	7	24:1	16:1
50	6.5	21:1	14:1
45	6	18:1	12:1
40	5	16:1	10:1
35	4.5	15:1	9:1
30	4	13:1	8:1

LEGEND

- FLAGGER
- SPOTTER
- ▮ CONSTRUCTION SIGN ON SUPPORT PER ILLINOIS TOLLWAY STANDARD UNLESS NOTED
- ➡ DIRECTION OF TRAFFIC FLOW
- ▨ WORK AREA
- ⚡ DRUM WITH LIGHT IF REQUIRED. SEE ARTICLE 701.05(a)(5)
- 🚚 TRUCK MOUNTED ATTENUATOR (TMA) (ROLL WITH MOVING OPERATION)

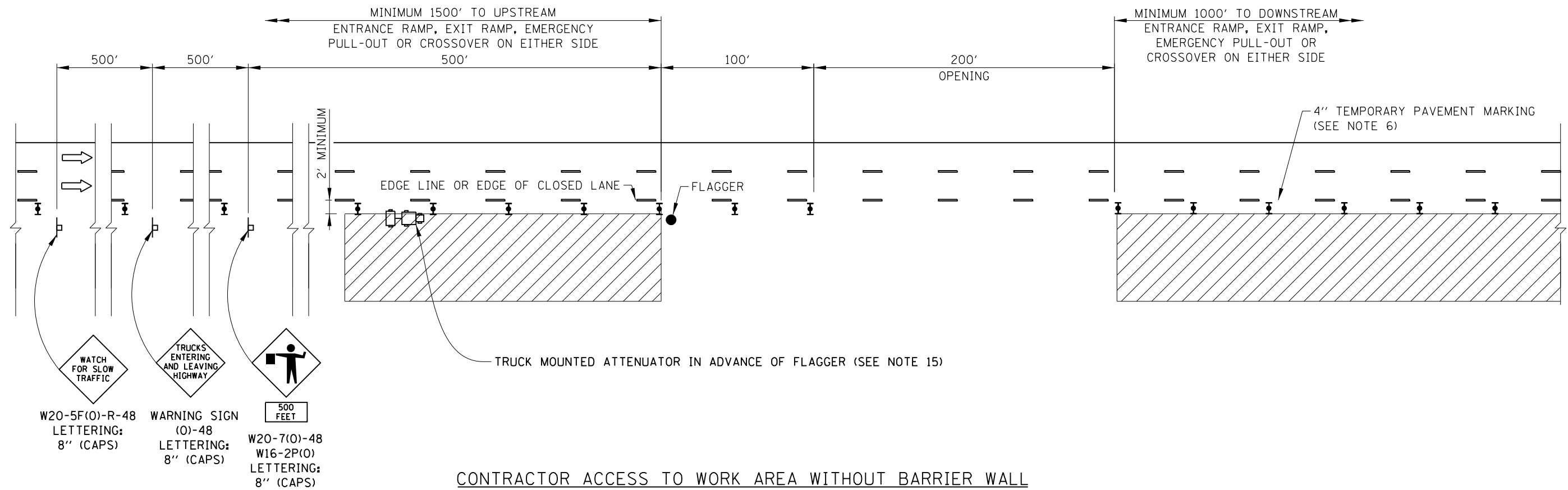


DATE	REVISIONS
3-01-2024	ADDED NOTE 15 IN CALLOUT
3-01-2023	REVISED DRUM W/LIGHT ARTICLE NO.
3-01-2020	CLARIFIED TMA REQUIREMENTS & UPDATED BARRICADE LIGHT REQ.
3-01-2019	ADDED SHEET FOR DETAILS WITHOUT BARRIER WALL

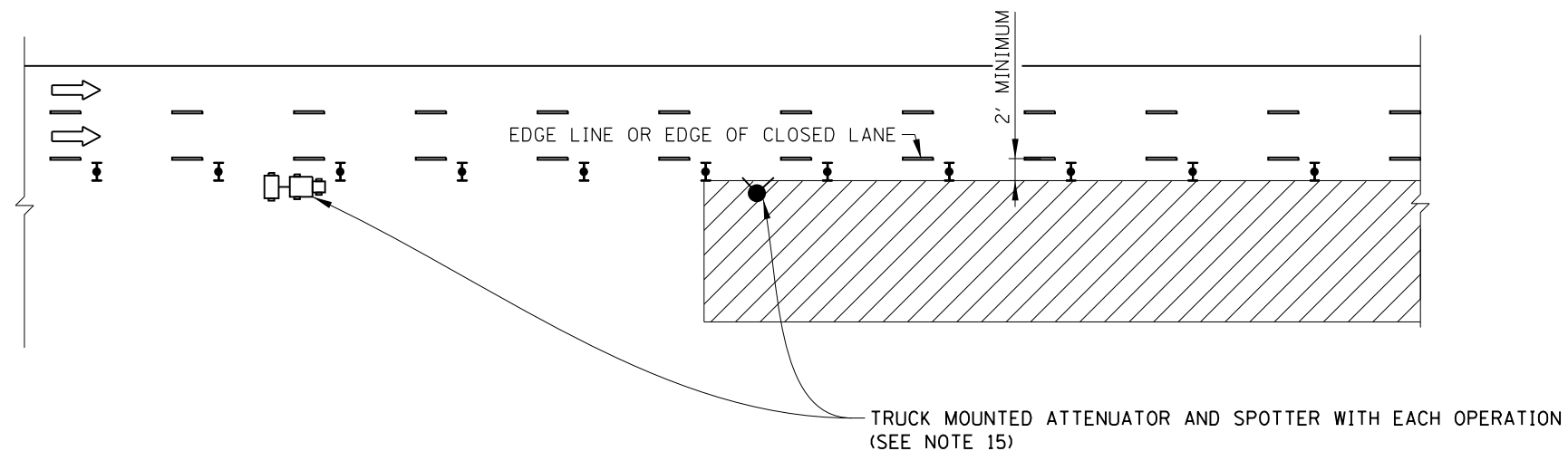
CONTRACTOR ACCESS TO WORK AREA

STANDARD E6-08

APPROVED BY:  DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER



- LEGEND**
- FLAGGER
  - SPOTTER
  - CONSTRUCTION SIGN ON SUPPORT PER ILLINOIS TOLLWAY STANDARD UNLESS NOTED
  - ➡ DIRECTION OF TRAFFIC FLOW
  - WORK AREA
  - DRUM WITH LIGHT IF REQUIRED. SEE ARTICLE 701.05(a)(5)
  - TRUCK MOUNTED ATTENUATOR (TMA) (ROLL WITH MOVING OPERATION)



SPOTTER AND TMA AT WORK AREA

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER

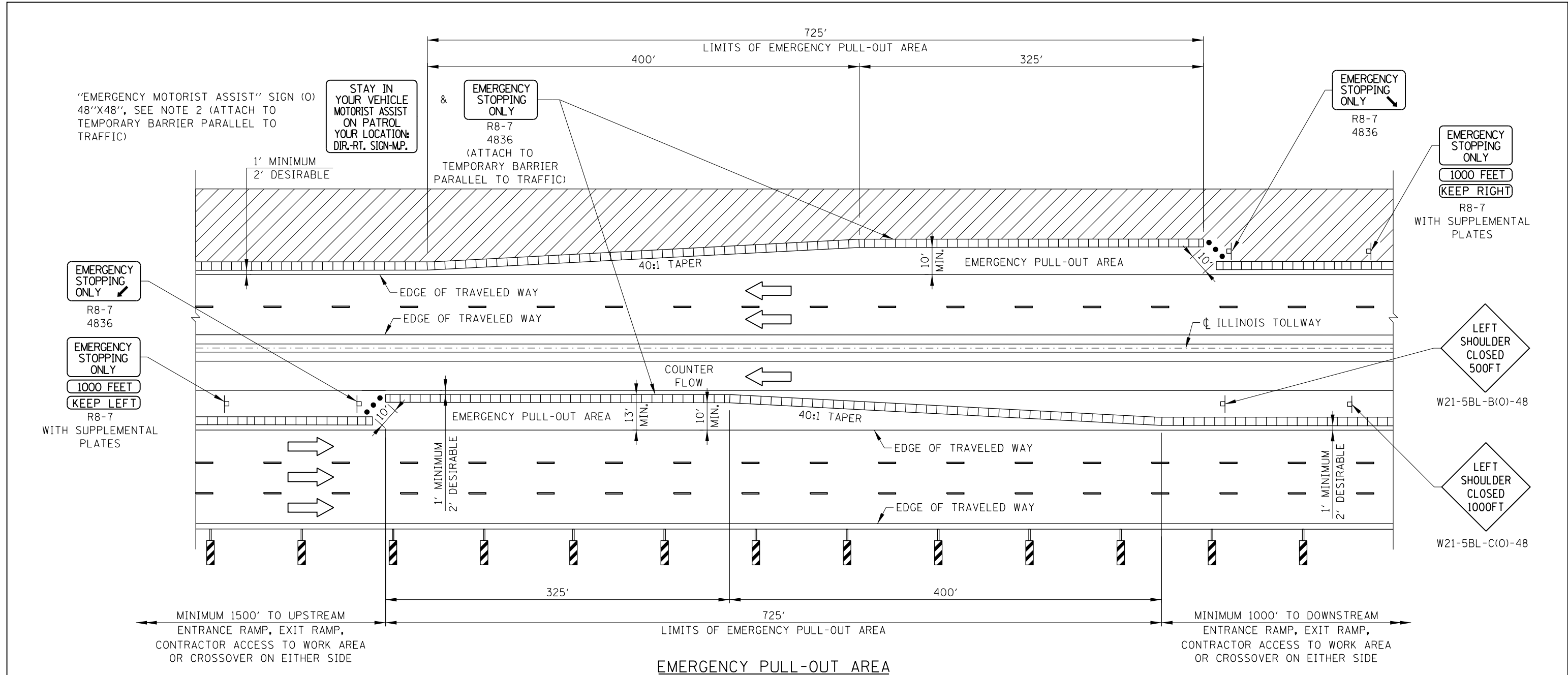
DATE: 03/01/2024

SHEET 2 OF 2



CONTRACTOR ACCESS  
TO WORK AREA

STANDARD E6-08



EMERGENCY PULL-OUT AREA

LEGEND

- TEMPORARY CONCRETE BARRIER WITH BARRIER DELINEATORS ON TRAFFIC SIDE
- VERTICAL PANELS @ 100 FT CENTERS ALONG ROADWAY (TANGENT) AND 50 FT CENTERS ALONG TAPERS.
- WORK AREA
- FLEXIBLE DELINEATOR POSTS
- DIRECTION OF TRAFFIC FLOW
- CONSTRUCTION SIGN ON SUPPORT PER ILLINOIS TOLLWAY STANDARD UNLESS NOTED.

NOTES:

- PULL-OUT AREA SPACED PER CONTRACT DOCUMENTS.
- ENGINEER TO DETERMINE EMERGENCY ASSIST SIGN'S INFORMATION FOR DIRECTION - ROUTE SIGN - MILEPOST ONCE THE LOCATION HAS BEEN ACCEPTED.
- A 1'-0" MINIMUM/2'-0" DESIRABLE SHY DISTANCE SHALL BE PROVIDED, MEASURED BETWEEN EDGE OF PAVEMENT LANE MARKING TO THE EDGE OF THE TRAFFIC CONTROL DEVICE.
- FLEXIBLE DELINEATORS TO BE 48" IN HEIGHT ABOVE BASE, TUBULAR POSTS (ORANGE) WITH 360 DEGREES FULL VIEW TWO-4" FLORESCENT ORANGE REFLECTORIZED TAPE BANDS. FLEXIBLE DELINEATORS SHALL BE CAPABLE OF BENDING UNDER REPEATED IMPACTS AND RETURN TO AN UPRIGHT POSITION WITHOUT DAMAGE TO THE IMPACTING VEHICLE OR THE DELINEATORS. THE DELINEATOR'S BASE SHALL BE SECURELY MOUNTED TO THE ROADWAY SURFACE. THE POSTS SHALL BE REMOVABLE FROM THE BASES TO PERMIT REPLACEMENT OF DAMAGED UNITS AS REQUIRED.

APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2020	REMOVED LIGHTS FROM VERTICAL PANELS
3-11-2015	REVISED NOTES
3-31-2014	ADDED ENFORCEMENT PULL-OUT AREA
3-01-2013	REVISED "EMERGENCY MOTORIST ASSIST" SIGN NOTE.

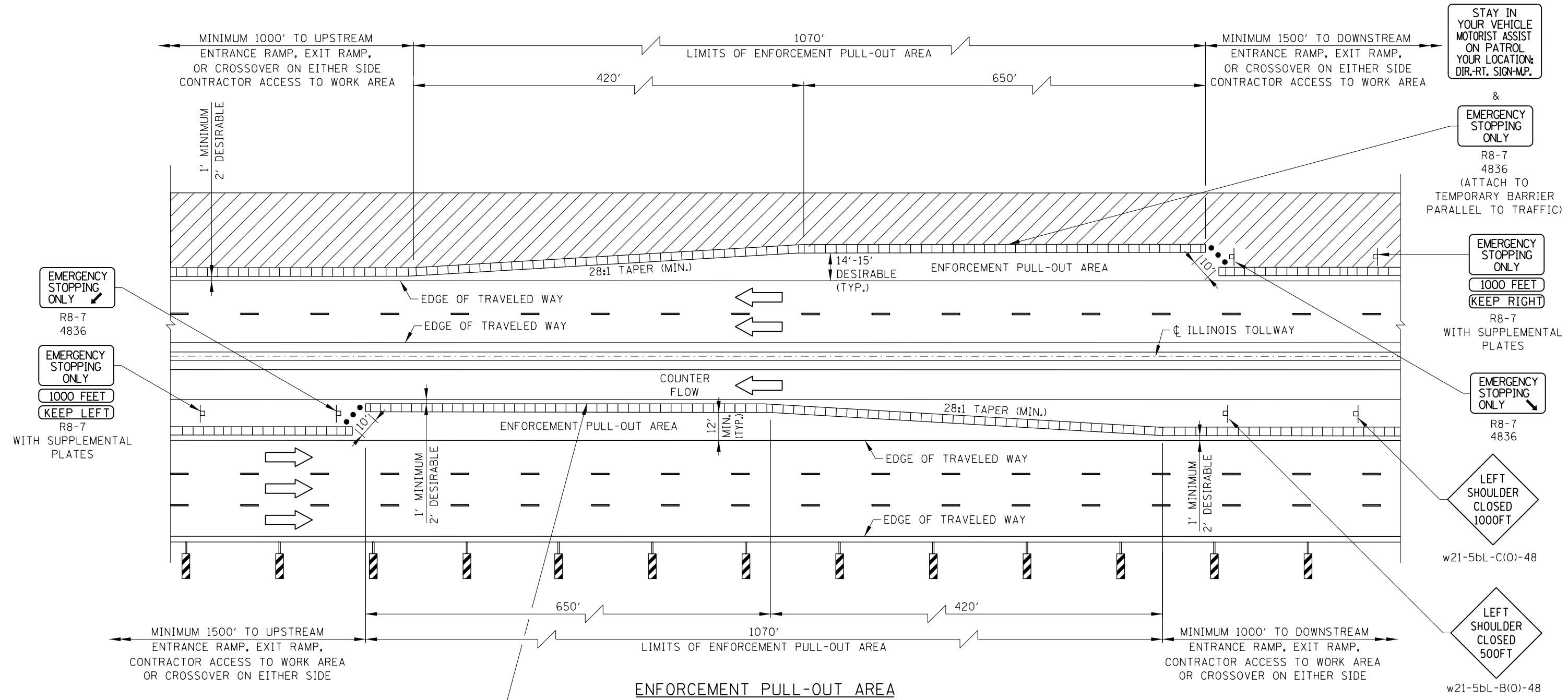
SHEET 1 OF 2

PULL-OUT AREA

STANDARD E7-05



"EMERGENCY MOTORIST ASSIST" SIGN (O)  
48"x48", SEE NOTE 2 (ATTACH TO  
TEMPORARY BARRIER PARALLEL TO TRAFFIC)



"EMERGENCY MOTORIST ASSIST" SIGN (O)  
48"x48", SEE NOTE 2 (ATTACH TO  
TEMPORARY BARRIER PARALLEL TO TRAFFIC)

STAY IN  
YOUR VEHICLE  
MOTORIST ASSIST  
ON PATROL  
YOUR LOCATION:  
DIR-RT. SIGN-MP.

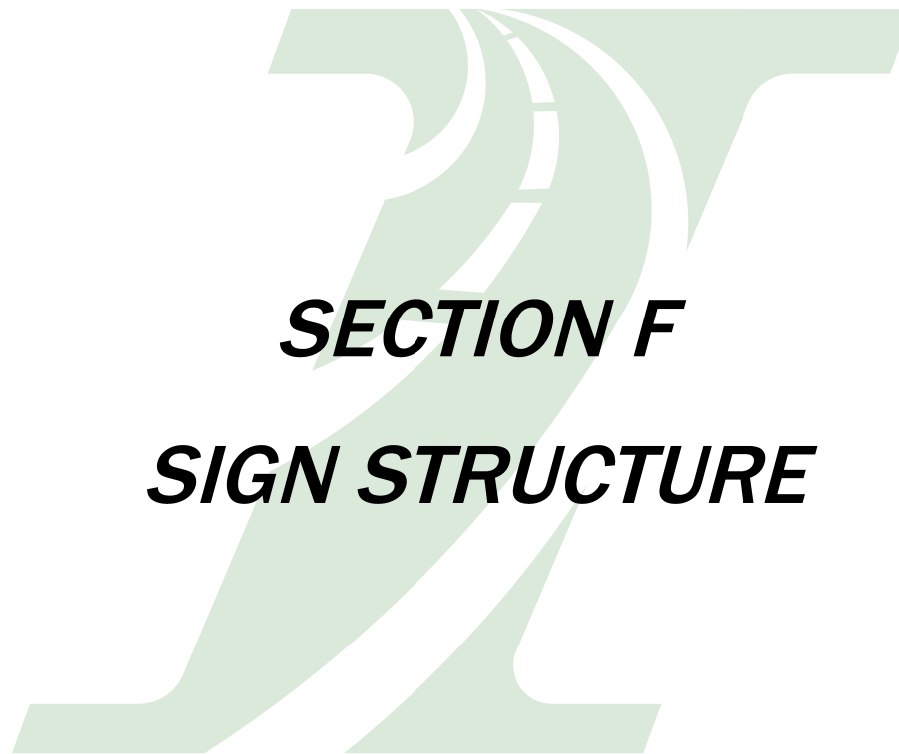
EMERGENCY  
STOPPING  
ONLY  
R8-7  
4836  
(ATTACH TO  
TEMPORARY BARRIER  
PARALLEL TO TRAFFIC)

- LEGEND**
- TEMPORARY CONCRETE BARRIER WITH BARRIER DELINEATORS ON TRAFFIC SIDE
  - VERTICAL PANELS @ 100 FT CENTERS ALONG ROADWAY (TANGENT) AND 50 FT CENTERS ALONG TAPERS.
  - WORK AREA
  - FLEXIBLE DELINEATOR POSTS
  - DIRECTION OF TRAFFIC FLOW
  - CONSTRUCTION SIGN ON SUPPORT PER ILLINOIS TOLLWAY STANDARD UNLESS NOTED.

SEE SHEET 1 IN THIS  
SERIES FOR NOTES.

APPROVED BY: *Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE: 02/07/2012

# ***STANDARD DRAWINGS***



## ***SECTION F*** ***SIGN STRUCTURE***

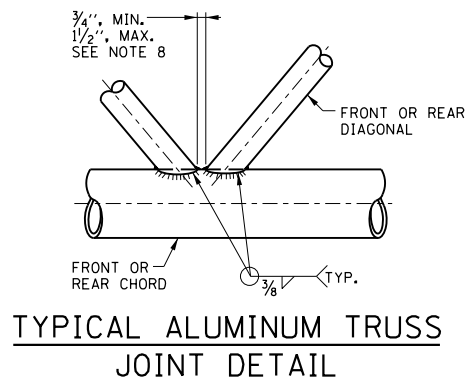
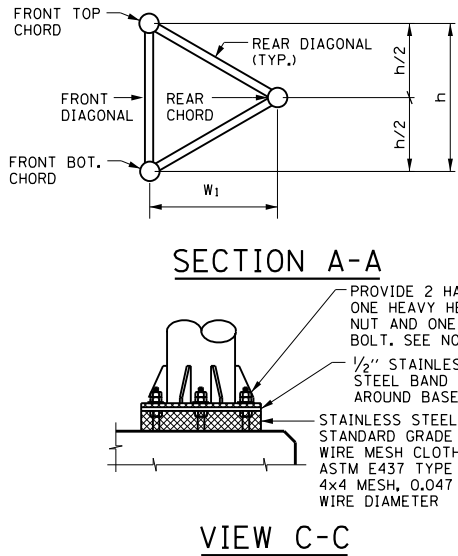
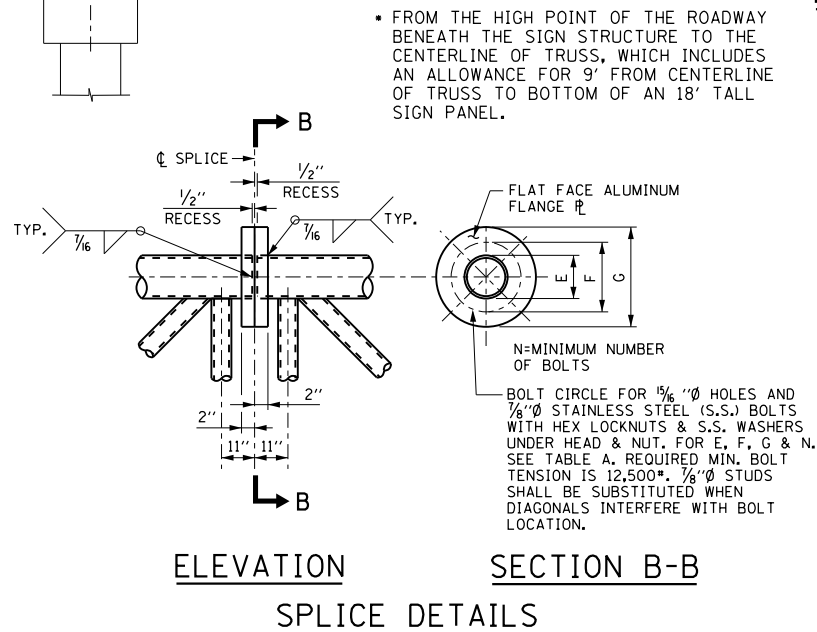
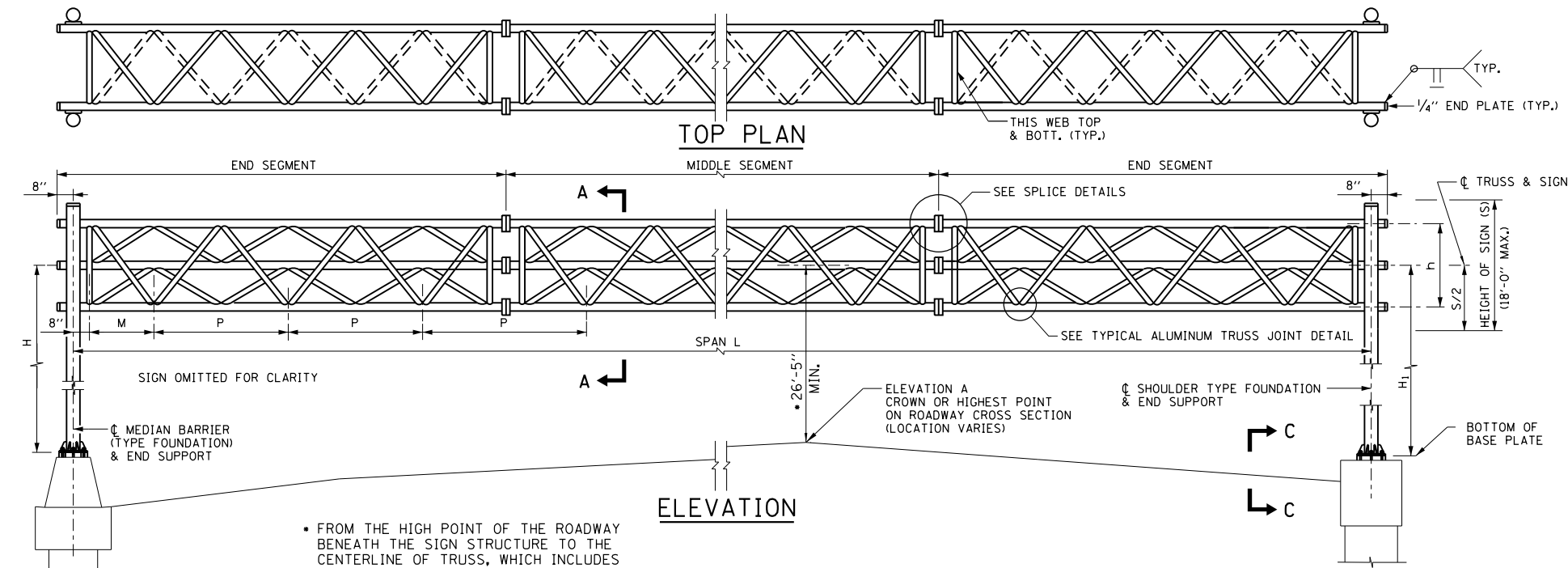
MARCH 2024

Illinois Tollway Standard Drawing Revisions
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Section F	Sign Structure		
	Standard	Modification Summary	Effective: 03-01-2024
	F1-14	Overhead Sign Structure Span Type Structure Details	
	Sheet 5	Updated utility callout to "STORM SEWER". Added minimum clearance requirement for the utility.	
	F13-09	Overhead Sign Structure Monotube Type (Steel) Mainline Structure Details	
	Sheet 1	Added pay items limits for entrance and exit monotubes. Replaced callouts for single face barrier with concrete barrier.	
	Sheet 2,3,6	Replaced callouts for single face barrier with concrete barrier.	
	Sheet 8	Updated section A-A, B-B, and C-C to clarify reinforcement details. Updated quantity table to show quantities for entrance and exit monotubes and added pay item for double face barrier. Replaced callouts for single face barrier with concrete barrier. Added Note 5 and 6 to clarify the pay items for concrete barrier.	
	F15-08	Overhead Sign Structure Monotube Type (Steel) Structure Details for AET Ramp	
	Sheet 1	Added pay items limits for entrance and exit monotubes. Replaced callouts for single face barrier with concrete barrier.	
	Sheet 2,3,6	Replaced callouts for single face barrier with concrete barrier.	
	Sheet 7	Updated section A-A, B-B, and C-C to clarify reinforcement details. Updated quantity table to show quantities for entrance and exit monotubes. Replaced callouts for single face barrier with concrete barrier. Added Note 6 and 7 to clarify the pay items for concrete barrier.	
	F16-07	Overhead Sign Structure Monotube Type (Steel) Structure Details for IPOPO Ramp	
	Sheet 1-6	Removed cash and replaced IPO with IPOPO.	
	F17-09	Overhead Sign Structure Span Type (Steel) Structure Details	
	Sheet 9	Updated utility callout to "STORM SEWER". Added minimum clearance requirement for the utility.	

New Sheet

Retired Standard



### GENERAL NOTES:

- WORK THIS SHEET WITH OVERHEAD SIGN STRUCTURES SPAN TYPE SUMMARY AND TOTAL BILL OF MATERIAL.
- AFTER ADJUSTMENTS TO LEVEL TRUSS AND ENSURE ADEQUATE VERTICAL CLEARANCE, ALL TOP AND LEVELING NUTS SHALL BE TIGHTENED AGAINST THE BASE PLATE WITH A MINIMUM TORQUE OF 200 LB.-FT. STAINLESS STEEL MESH SHALL THEN BE PLACED AROUND THE PERIMETER OF THE BASE PLATE. SECURE TO BASE PLATE WITH STAINLESS STEEL BANDING.
- SIGN SUPPORT STRUCTURES MAY BE SUBJECT TO DAMAGING VIBRATIONS AND OSCILLATIONS WHEN SIGN PANELS ARE NOT IN PLACE DURING ERECTION OR MAINTENANCE OF THE STRUCTURE. TO AVOID THESE, ATTACH TEMPORARY BLANK SIGN PANELS OR OTHER BRACING TO THE STRUCTURE UNTIL PERMANENT SIGNS ARE INSTALLED.
- TRUSS SEGMENTS SHALL BE SHIPPED INDIVIDUALLY WITH ADEQUATE PROVISION TO PREVENT DETRIMENTAL MOTION DURING TRANSPORT. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONFIGURATION AND PROTECTION OF THE TRUSSES.
- ONLY SIGN PANELS ARE PERMITTED TO BE MOUNTED ON THIS TRUSS.

### DESIGN SPECIFICATIONS:

- 2015 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 1ST EDITION WITH 2020 INTERIM REVISIONS, INSTRUCTIONS AND INFORMATION.
- FOUNDATION DESIGN IS IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020

### CONSTRUCTION SPECIFICATIONS:

- ALL MATERIALS, EXCEPT AS SHOWN, FABRICATION, ERECTION AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 733 OF THE LATEST ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS.

### LOADING:

- BOTH END SUPPORTS ARE DESIGNED FOR 60% OF THE TOTAL LOAD.
- WIND LOADING SHALL BE A MINIMUM OF 50 PSF ON SIGN PANELS AND 35 PSF NORMAL TO TRUSS ELEMENTS NOT BEHIND SIGN PANELS.
- ICE LOAD, OSHA, WALKWAY = 3 P.S.F. APPLIED WITH A FACTOR OF 1.0 FOR STRENGTH I ONLY.

### FABRICATION NOTES:

- NO SPLICES SHALL BE LOCATED WITHIN 0.1xL OF THE CENTERLINE OF THE SPAN.
- MATERIALS: ALUMINUM SHALL CONFORM TO ASTM B221, ALLOY 6061 TEMPER T6. ALL STRUCTURAL STEEL PIPE SHALL BE ASTM A53 GRADE B OR A106 GRADE B OR API 5L GRADE B OR X42 OR X52. ALL STRUCTURAL STEEL HSS SHALL BE ASTM A500 GRADE B OR C. ALL STRUCTURAL STEEL PLATES AND SHAPES SHALL CONFORM TO ASTM A36 (AASHTO M183) OR ASTM A572 GRADE 50. STAINLESS STEEL FOR SHIMS, SLEEVES AND HANDHOLE COVERS SHALL BE ASTM A240, TYPE 302 OR 304, OR ANOTHER ALLOY SUITABLE FOR EXTERIOR EXPOSURE AND ACCEPTABLE TO THE ENGINEER. THE STEEL HSS AND STIFFENING RIBS AT THE BASE PLATE FOR THE COLUMN SHALL HAVE A MINIMUM LONGITUDINAL CHARPY V-NOTCH (CVN) ENERGY OF 15 LB.-FT. AT 40° F. (ZONE 2) BEFORE GALVANIZING.
- WELDING: ALL WELDS TO BE CONTINUOUS UNLESS OTHERWISE SHOWN. ALL WELDING TO BE DONE IN ACCORDANCE WITH CURRENT AWS D1.1 AND D1.2 STRUCTURAL WELDING CODES (STEEL AND ALUMINUM) AND THE IDOT STANDARD SPECIFICATIONS. ALUMINUM WELD FILLER SHALL BE ALLOY 5556.
- FASTENERS FOR ALUMINUM TRUSSES: HIGH STRENGTH BOLTS SHALL SATISFY THE REQUIREMENTS OF AASHTO M164 (ASTM A325), OR APPROVED ALTERNATE, AND SHALL HAVE MATCHING LOCK NUTS. THREADED STUDS FOR SPLICES (IF MEMBERS INTERFERE) SHALL SATISFY THE REQUIREMENTS OF ASTM A449, ASTM A193, GRADE B7, OR APPROVED ALTERNATE, AND SHALL HAVE MATCHING LOCK NUTS. BOLTS AND LOCK NUTS NOT REQUIRED TO BE HIGH STRENGTH SHALL SATISFY THE REQUIREMENTS OF ASTM A307. ALL BOLTS AND LOCK NUTS SHALL BE HOT DIP GALVANIZED PER AASHTO M232, EXCEPT STAINLESS STEEL FASTENERS, NUTS AND WASHERS. THE LOCK NUTS SHALL HAVE NYLON OR STEEL INSERTS. A STAINLESS STEEL FLAT WASHER CONFORMING TO ASTM A240 TYPE 302 OR 304, IS REQUIRED UNDER BOTH HEAD AND NUT OR UNDER BOTH NUTS WHERE THREADED STUDS ARE USED. HIGH STRENGTH BOLT INSTALLATION SHALL CONFORM TO ARTICLE 505.04 (F)(2)(d) OF THE IDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. ROTATIONAL CAPACITY ("ROCAP") TESTING OF BOLTS WILL NOT BE REQUIRED.
- U-BOLTS: U-BOLTS SHALL BE STAINLESS STEEL AND SHALL CONFORM TO ASTM 193, CLASS I, GRADE BB (AISI TYPE 304). WASHERS FOR U-BOLTS SHALL CONFORM TO ASTM A240, TYPE 302. NUTS FOR U-BOLTS SHALL CONFORM TO ASTM A194 (AASHTO M292), GRADE 8F (AISI TYPE 303).
- GALVANIZING: ALL STEEL GRATING, PLATES, SHAPES, HSS AND PIPE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111. PAINTING IS NOT PERMITTED.
- SEE TABLE "SIGN STRUCTURE MEMBER SCHEDULE" FOR "W" AND "W1".
- DIAGONALS SHALL BE DETAILED TO MINIMIZE OFFSET FOR THEORETICAL PANEL POINT AND PROVIDE 3/4" TO 1 1/2" INCH CLEARANCE BETWEEN DIAGONALS AND PROVIDE CLEARANCE FOR U-BOLT CONNECTIONS OF SIGNS OR WALKWAY BRACKETS.
- FOR ANY DESIGN SPAN LENGTH THAT FALLS BETWEEN TWO CONSECUTIVE SPANS PROVIDED IN COLUMN 2 OF TABLE "SIGN STRUCTURE MEMBER SCHEDULE", THE LARGER DESIGN SPAN LENGTH SHALL BE USED (I.E. FOR A 92' SPAN LENGTH FALLING BETWEEN 90' AND 95' DESIGN SPAN LENGTHS IN TABLE, THE 95' DESIGN SPAN LENGTH TRUSS AND POST DETAILS SHALL BE USED).

SIGN STRUCTURE MEMBER SCHEDULE																
TRUSS NO.	DIMENSIONS					ALUMINUM TRUSS *				STEEL END SUPPORT						
	TRUSS SPAN L (MAX.)	P (MAX.)	M	h	W <sub>1</sub>	MAXIMUM ALLOWABLE SIGN PANEL AREA	DL (TRUSS) DEFLECTION	MIDDLE SEGMENT OR END SEGMENT				W	HSS COLUMN (NOMINAL DIAMETER)			
								CHORD (O.D.)		DIAGONAL (O.D.)			HSS 12.75x0.500		HSS 14x0.625	
								FRONT	REAR	FRONT	REAR		H OR H <sub>1</sub>	H OR H <sub>1</sub>		
T-80	80'-0"	9'-0"	3'-4"	4'-6"	3'-10 <sup>3</sup> / <sub>4</sub> "	900 S.F.	1"	5 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	5 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	2 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	2 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	5'-9"	32'-0" (MAX)	38'-0" (MAX)		
T-85	85'-0"	9'-6"	3'-10"	4'-9"	4'-1 <sup>3</sup> / <sub>8</sub> "	955 S.F.	1 <sup>1</sup> / <sub>16</sub> "	6 <sup>7</sup> / <sub>8</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	6 <sup>7</sup> / <sub>8</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	3" ∅ x <sup>1</sup> / <sub>4</sub> "	3" ∅ x <sup>1</sup> / <sub>4</sub> "	6'-7"	31'-0" (MAX)	38'-0" (MAX)		
T-90	90'-0"	10'-0"	4'-4"	5'-0"	4'-4"	1010 S.F.	1 <sup>1</sup> / <sub>8</sub> "	6 <sup>7</sup> / <sub>8</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	6 <sup>7</sup> / <sub>8</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	3" ∅ x <sup>1</sup> / <sub>4</sub> "	3" ∅ x <sup>1</sup> / <sub>4</sub> "	6'-7"	31'-0" (MAX)	38'-0" (MAX)		
T-95	95'-0"	10'-6"	4'-10"	5'-3"	4'-6 <sup>5</sup> / <sub>8</sub> "	1065 S.F.	1 <sup>3</sup> / <sub>16</sub> "	6 <sup>7</sup> / <sub>8</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	6 <sup>7</sup> / <sub>8</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	3" ∅ x <sup>1</sup> / <sub>4</sub> "	3" ∅ x <sup>1</sup> / <sub>4</sub> "	6'-7"	31'-0" (MAX)	38'-0" (MAX)		
T-100	100'-0"	11'-4"	4'-0"	5'-8"	4'-10 <sup>7</sup> / <sub>8</sub> "	1125 S.F.	1 <sup>1</sup> / <sub>4</sub> "	7" ∅ x <sup>1</sup> / <sub>2</sub> "	7" ∅ x <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	7'-5"	31'-0" (MAX)	38'-0" (MAX)		
T-105	105'-0"	12'-0"	3'-10"	6'-0"	5'-2 <sup>3</sup> / <sub>8</sub> "	1180 S.F.	1 <sup>5</sup> / <sub>16</sub> "	7" ∅ x <sup>1</sup> / <sub>2</sub> "	7" ∅ x <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	7'-5"	31'-0" (MAX)	38'-0" (MAX)		
T-110	110'-0"	12'-6"	4'-4"	6'-3"	5'-5"	1200 S.F.	1 <sup>3</sup> / <sub>8</sub> "	7" ∅ x <sup>1</sup> / <sub>2</sub> "	7" ∅ x <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	7'-5"	31'-0" (MAX)	38'-0" (MAX)		
T-115	115'-0"	13'-0"	4'-10"	6'-6"	5'-7 <sup>5</sup> / <sub>8</sub> "	1200 S.F.	1 <sup>1</sup> / <sub>2</sub> "	7 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	7 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	10'-2"	34'-0" (MAX)	40'-0" (MAX)		
T-120	120'-0"	13'-8"	4'-8"	6'-10"	5'-11"	1200 S.F.	1 <sup>5</sup> / <sub>8</sub> "	7 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	7 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>2</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	3 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	10'-2"	34'-0" (MAX)	40'-0" (MAX)		
T-130	130'-0"	15'-0"	4'-4"	7'-6"	6'-5 <sup>3</sup> / <sub>8</sub> "	1200 S.F.	1 <sup>1</sup> / <sub>6</sub> "	9" ∅ x <sup>1</sup> / <sub>2</sub> "	9" ∅ x <sup>1</sup> / <sub>2</sub> "	4" ∅ x <sup>1</sup> / <sub>4</sub> "	4" ∅ x <sup>1</sup> / <sub>4</sub> "	10'-2"	NOT APPLICABLE	40'-0" (MAX)		
T-140	140'-0"	16'-3"	4'-4"	8'-2"	7'-0 <sup>7</sup> / <sub>8</sub> "	1200 S.F.	1 <sup>11</sup> / <sub>16</sub> "	10" ∅ x <sup>1</sup> / <sub>2</sub> "	10" ∅ x <sup>1</sup> / <sub>2</sub> "	4" ∅ x <sup>1</sup> / <sub>4</sub> "	4" ∅ x <sup>1</sup> / <sub>4</sub> "	10'-2"	NOT APPLICABLE	40'-0" (MAX)		
T-150	150'-0"	17'-6"	4'-4"	8'-10"	7'-7 <sup>3</sup> / <sub>4</sub> "	1200 S.F.	1 <sup>13</sup> / <sub>16</sub> "	11" ∅ x <sup>1</sup> / <sub>2</sub> "	11" ∅ x <sup>1</sup> / <sub>2</sub> "	4 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	4 <sup>1</sup> / <sub>2</sub> " ∅ x <sup>1</sup> / <sub>4</sub> "	10'-2"	NOT APPLICABLE	40'-0" (MAX)		

\* SUBSTITUTION OF LARGER TRUSS SIZE IS ACCEPTABLE.

### NOTES:

- A PAIR OF MAIN HSS COLUMN SIZES FOR EACH SUPPORT SHALL BE SELECTED INDEPENDENTLY BASED ON SPECIFIC NEEDS.

CAMBER	
SPAN IN FEET	CAMBER IN INCHES
80 THRU 95	1 1/2"
96 THRU 110	1 5/8"
111 THRU 120	1 7/8"
121 THRU 130	1 7/8"
131 THRU 140	2"
141 THRU 150	2 1/8"

PROVIDE THE ABOVE CAMBER AT MIDDLE OF SPAN OF STRUCTURES

TABLE A			
CHORD O.D.	E	F	G
5 1/2" φ	10"	13"	8
6 7/8" φ & 7" φ	11 1/2"	14 1/2"	10
7 1/2" φ	12 1/2"	15 1/2"	12
9" φ	13 1/2"	16 1/2"	14
10" φ	15 1/2"	18 1/2"	16
11" φ	17 1/2"	20 1/2"	18

APPROVED BY:   
DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER

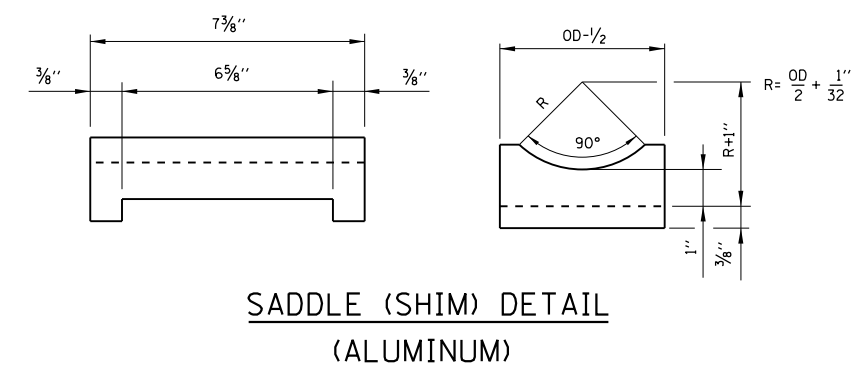
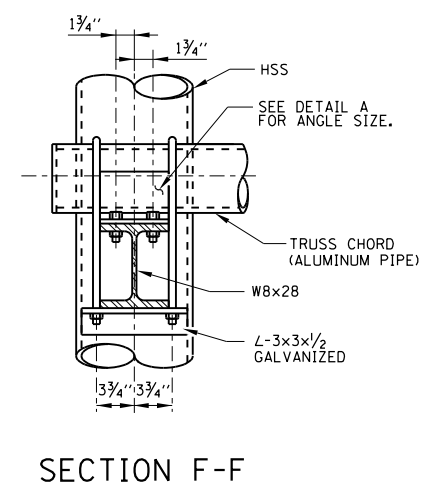
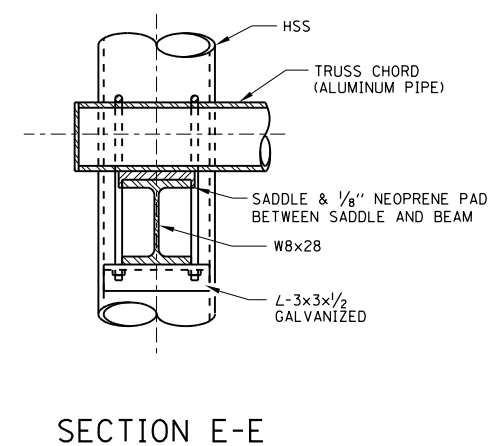
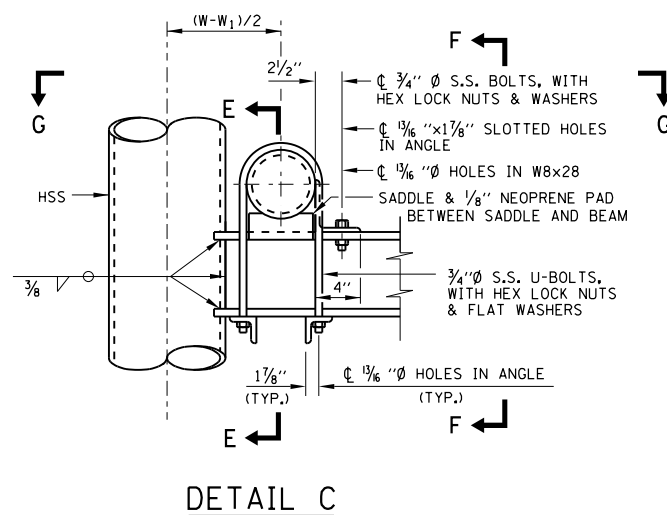
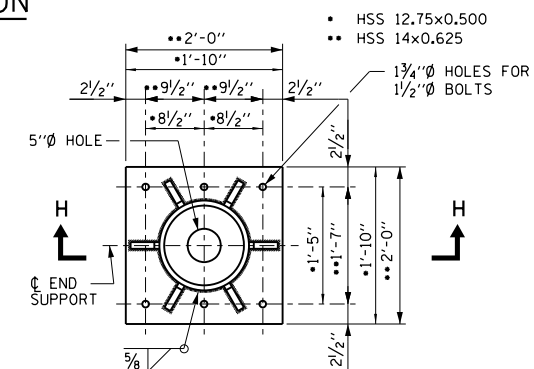
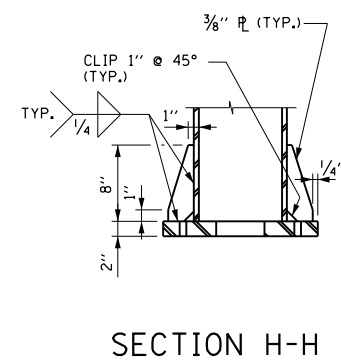
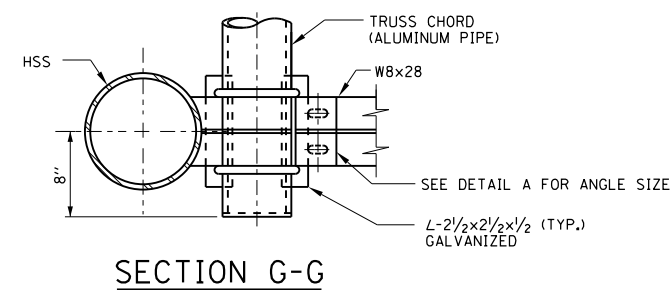
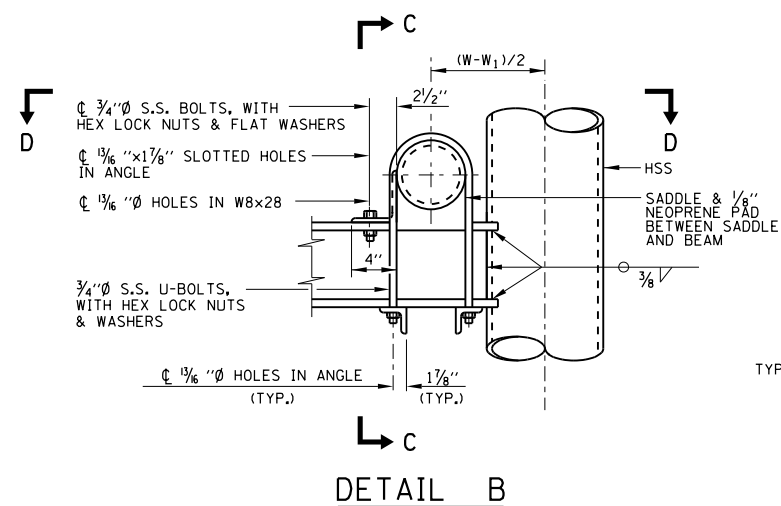
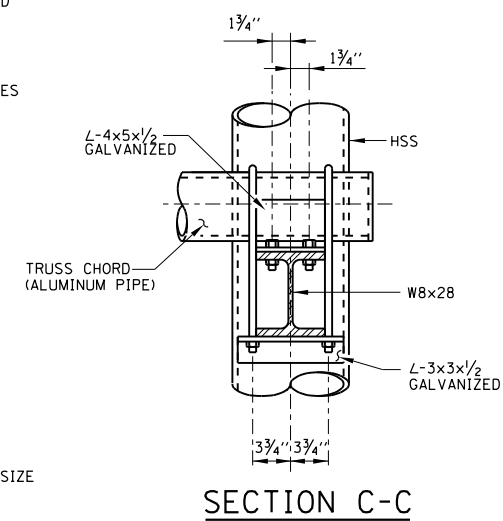
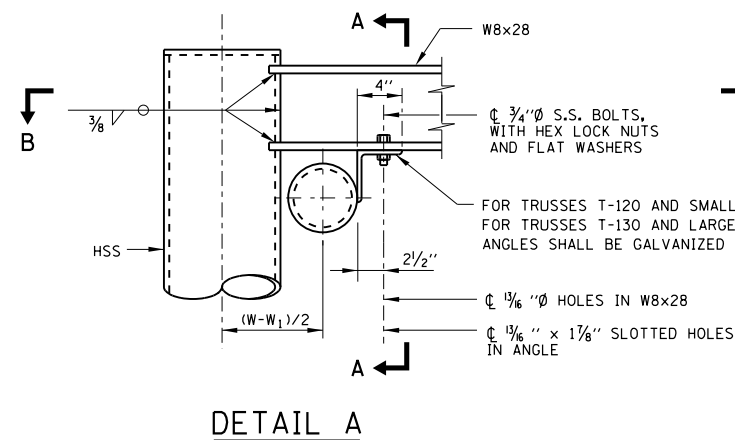
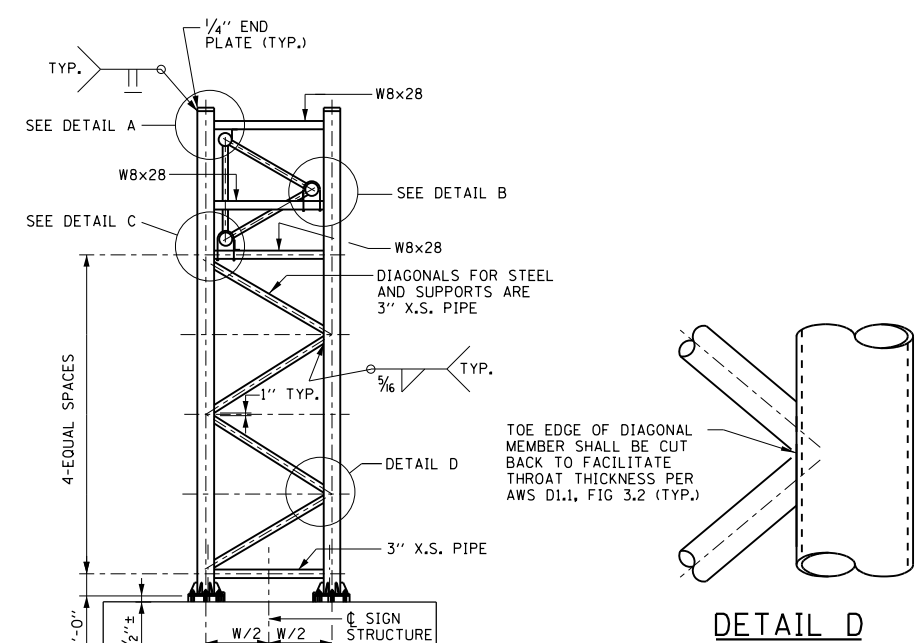
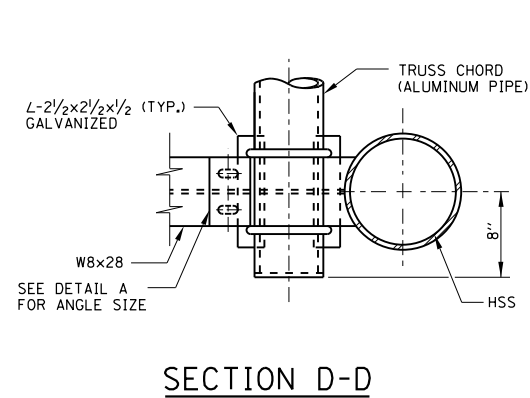
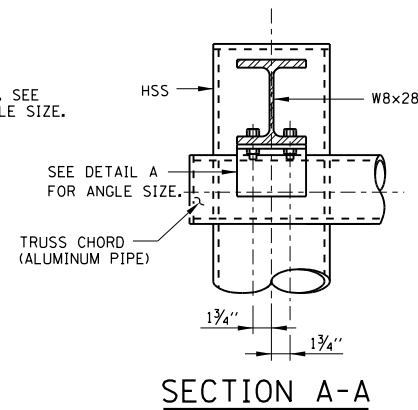
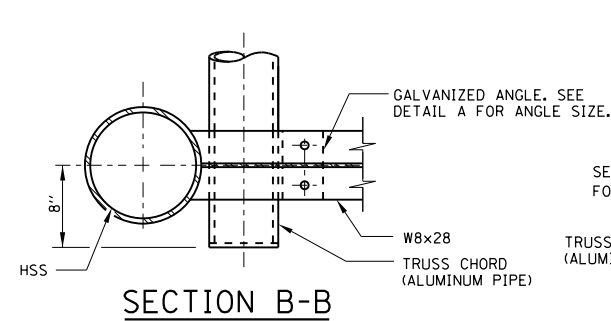
DATE	REVISIONS
3-01-2024	ADDED UTILITY CLEARANCE REQ.
3-01-2023	REV. 'N' DIM. IN ELEV. TO 'M', REV. NUMBER OF v(E) BARS SHTS. 3 & 4 & INC. SHAFT, BAR SIZE AND DIMS. RELATIVE TO THE SHAFTS ON SHT. 4

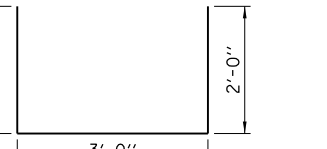
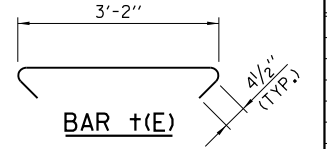
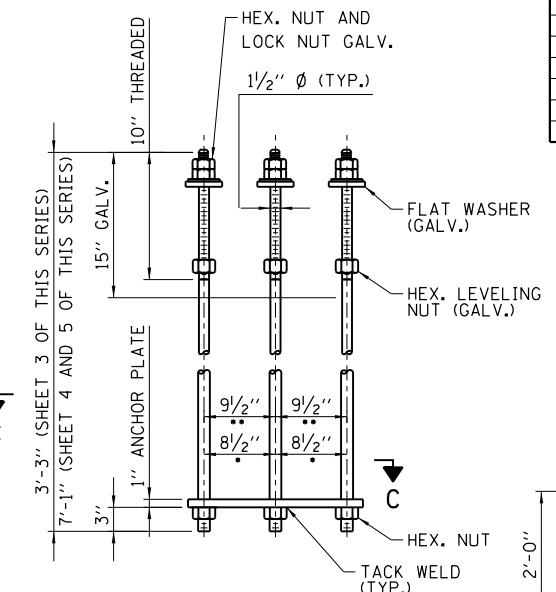
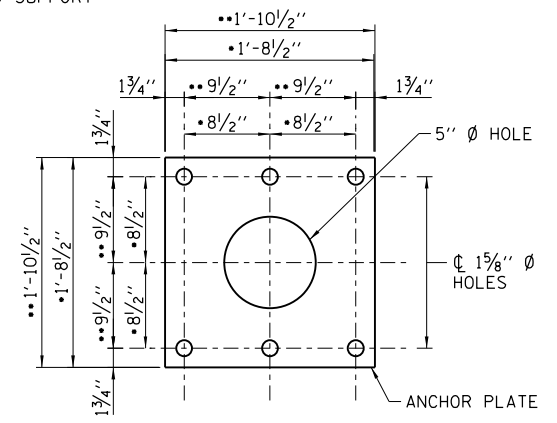
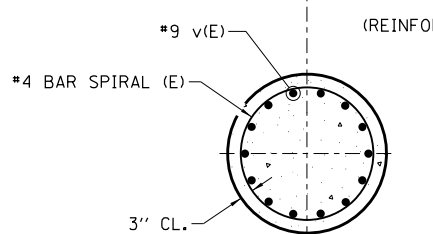
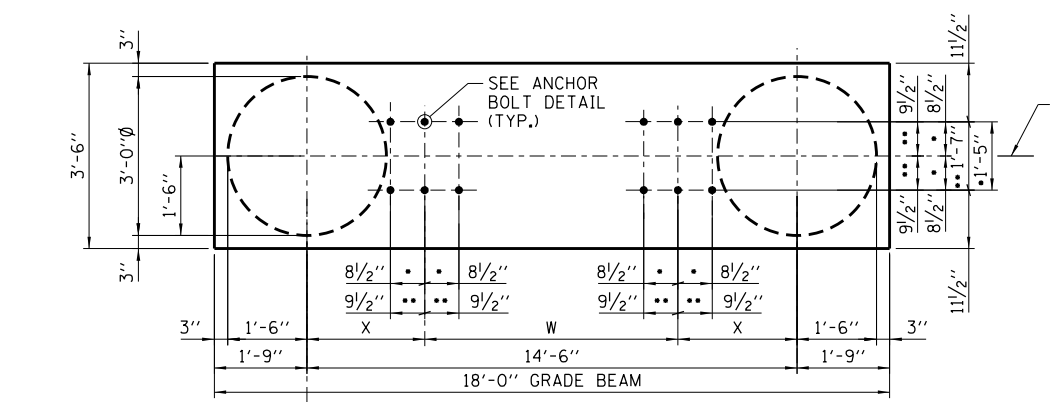
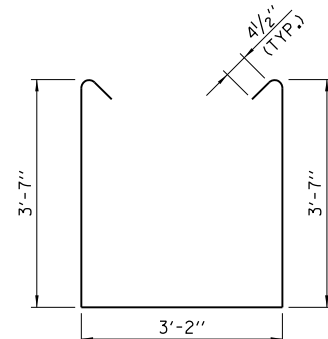
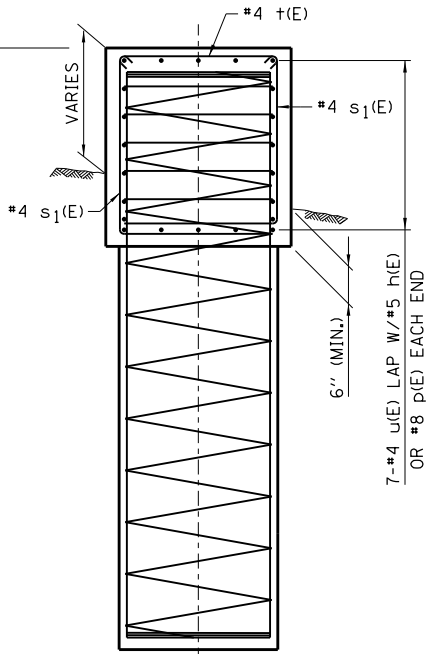
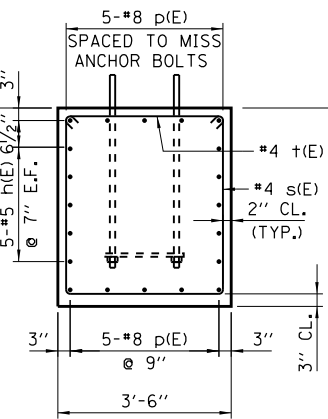
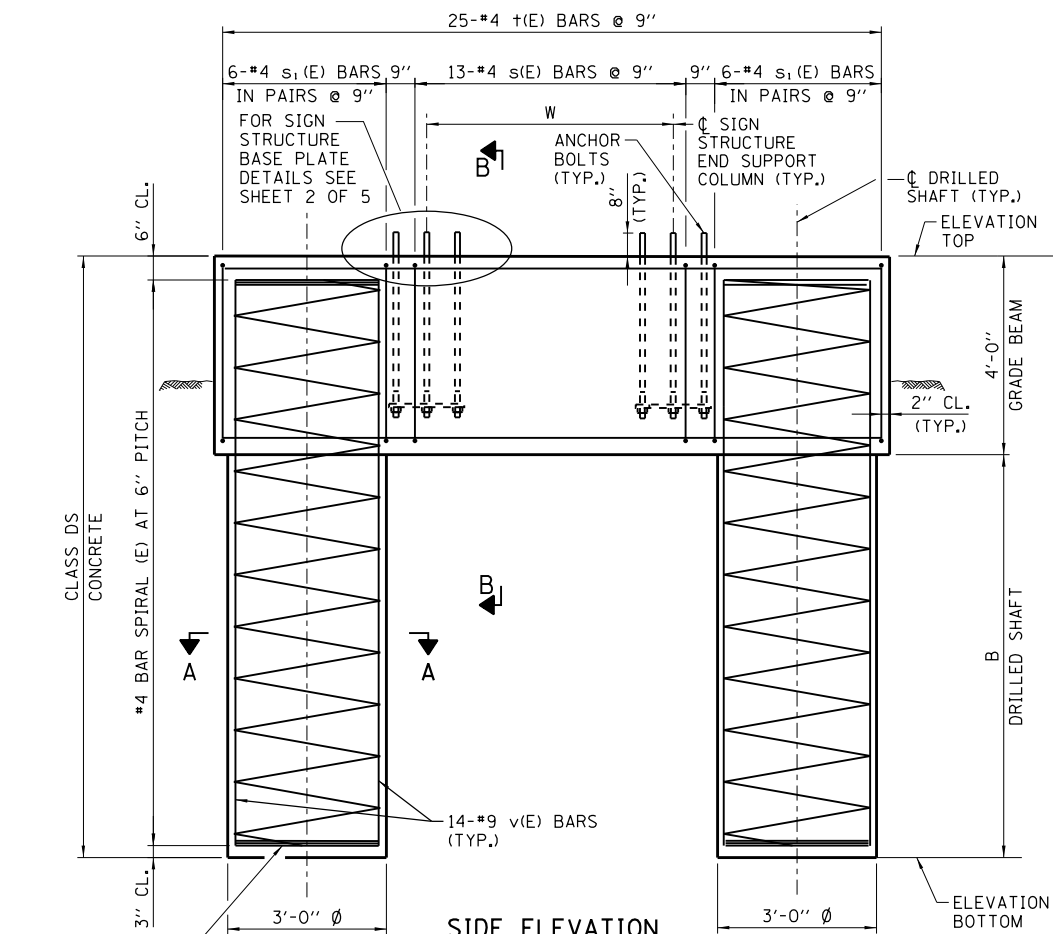
OVERHEAD SIGN STRUCTURE  
SPAN TYPE  
STRUCTURE DETAILS

STANDARD F1-14

SHEET 1 OF 5







# NOTES:

- THE FOUNDATION DETAILS SHOWN ARE BASED ON THE PRESENCE OF MOSTLY COMMON COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (QU) > 1.25 TON/SQ. FT. WHICH SHALL BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOBSITE. WHEN OTHER CONDITIONS ARE INDICATED, THE FOUNDATION DIMENSIONS SHOWN SHALL BE INCLUDED IN THE PLANS AND THE FOUNDATION DIMENSIONS SHOWN SHALL BE THE RESULT OF SITE SPECIFIC DESIGNS. IF CONDITIONS ENCOUNTERED IN THE FIELD ARE DIFFERENT THAN THOSE INDICATED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE IF THE FOUNDATION DIMENSIONS NEED TO BE MODIFIED.
- ANCHOR BOLTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M314 OR ASTM F1554 GRADE 55. ALL OTHER MATERIAL, FABRICATION, AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 734 OF THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS.
- CONCRETE SHALL BE PLACED MONOLITHICALLY, WITHOUT CONSTRUCTION JOINTS UNLESS NOTED OTHERWISE.
- BACKFILL SHALL BE PLACED PER SECTION 502 OF THE IDOT STANDARD SPECIFICATION AND PRIOR TO ERECTION OF SUPPORT COLUMN.
- A NORMAL SURFACE FINISH FOLLOWED BY A CONCRETE SEALER APPLICATION WILL BE REQUIRED ON CONCRETE SURFACES ABOVE THE LOWEST ELEVATION 6" BELOW FINISHED GROUND LINE.
- ALL REBAR DESIGNATED (E) SHALL BE EPOXY COATED. REBAR SHALL BE POSITIONED SO THAT THERE WILL BE NO INTERFERENCE BETWEEN VERTICAL REINFORCEMENT AND ANCHOR BOLTS.
- SITE GROUNDING ELECTRODE SYSTEM TO BE PROVIDED AS INDICATED ON THE PLANS.
- NO SONOTUBES OR DECOMPOSABLE FORMS SHALL BE USED 6" BELOW THE FINISHED GROUND LINE. PERMANENT METAL FORMS OR OTHER SHIELDING SHALL NOT BE LEFT IN PLACE BELOW THE ELEVATION WITHOUT THE ENGINEER'S WRITTEN PERMISSION. EXCAVATIONS SHALL BE DEWATERED BEFORE CONCRETE PLACEMENT IF DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST.
- IF NECESSARY TO INCREASE STEEL END SUPPORT HEIGHT ABOVE THE LIMITATIONS SHOWN IN SIGN STRUCTURE MEMBER SCHEDULE ON SHEET 1 OF THIS SERIES, GRADE BEAM DEPTH SHALL BE INCREASED UP TO 6'-0" WITHOUT CHANGES TO THE DRILLED SHAFT DESIGN. GRADE BEAM REINFORCEMENT, CONCRETE VOLUME AND LENGTH OF ANCHOR BOLTS SHALL BE REVISED ACCORDINGLY.

CLASS DS CONC. AND REINF. BARS QUANTITIES SHOWN IN THE TABLE ARE FOR 2 DRILLED SHAFTS AND 1 GRADE BEAM

TRUSS No.	W	X	B	CLASS DS CONC. CY	REINF. BARS POUND
T-80	5'-9"	4'-4 1/2"	40'-0"	30.3	6090
T-85	6'-7"	3'-11 1/2"	50'-0"	35.5	7250
T-90	6'-7"	3'-11 1/2"	50'-0"	35.5	7250
T-95	6'-7"	3'-11 1/2"	50'-0"	35.5	7250
T-100	7'-5"	3'-6 1/2"	50'-0"	35.5	7250
T-105	7'-5"	3'-6 1/2"	50'-0"	35.5	7250
T-110	7'-5"	3'-6 1/2"	50'-0"	35.5	7250
T-115	10'-2"	2'-2"	50'-0"	35.5	7250
T-120	10'-2"	2'-2"	50'-0"	35.5	7250
T-130	10'-2"	2'-2"	55'-0"	38.1	7830
T-140	10'-2"	2'-2"	55'-0"	38.1	7830
T-150	10'-2"	2'-2"	55'-0"	38.1	7830

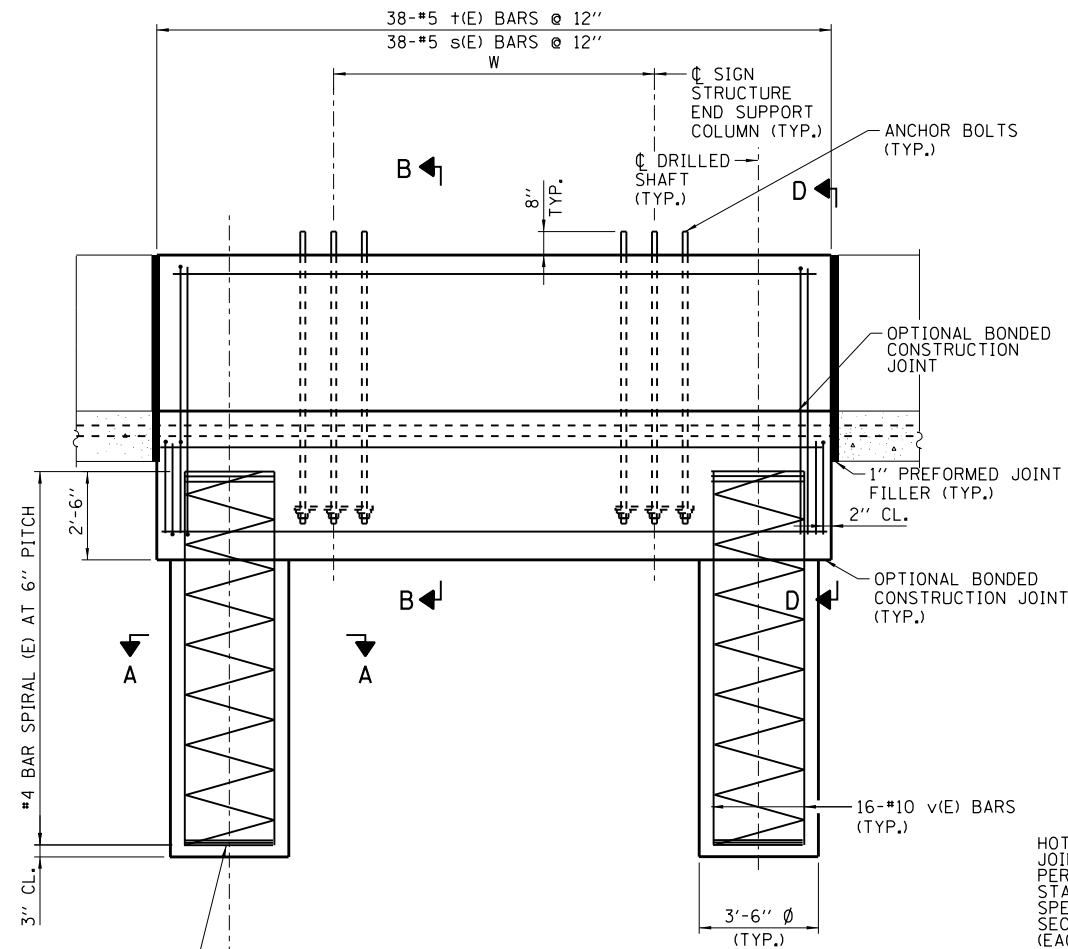
## BAR LIST - EACH FOUNDATION (2 SHAFT AND 1 GRADE BEAM)

BAR	NUMBER	SIZE	LENGTH	SHAPE
h(E)	10	#5	17'-8"	—
p(E)	10	#8	17'-8"	—
s(E)	13	#4	11'-1"	⌈
s <sub>1</sub> (E)	24	#4	6'-11 1/2"	⌈
t(E)	25	#4	3'-11"	⌈
u(E)	14	#4	7'-0"	⌈
v(E)	28	#9	B ADD 3'-3"	—

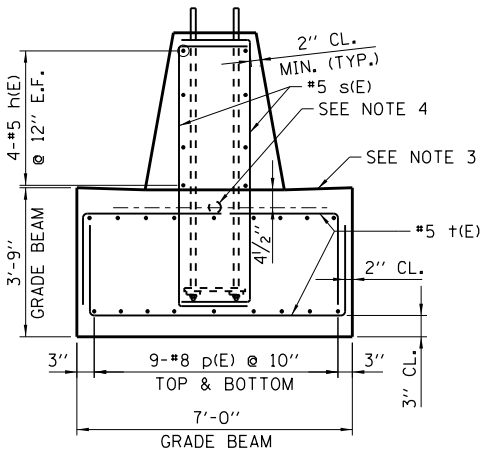
#4 BAR SPIRAL (E) - SEE SIDE ELEVATION

- HSS 12.75x0.500
- HSS 14x0.625

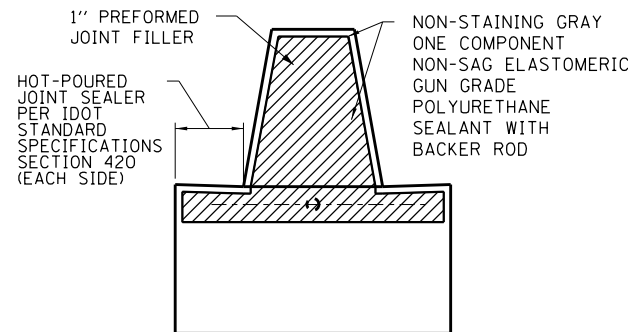
APPROVED BY: *Manar Nashif*  
DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER



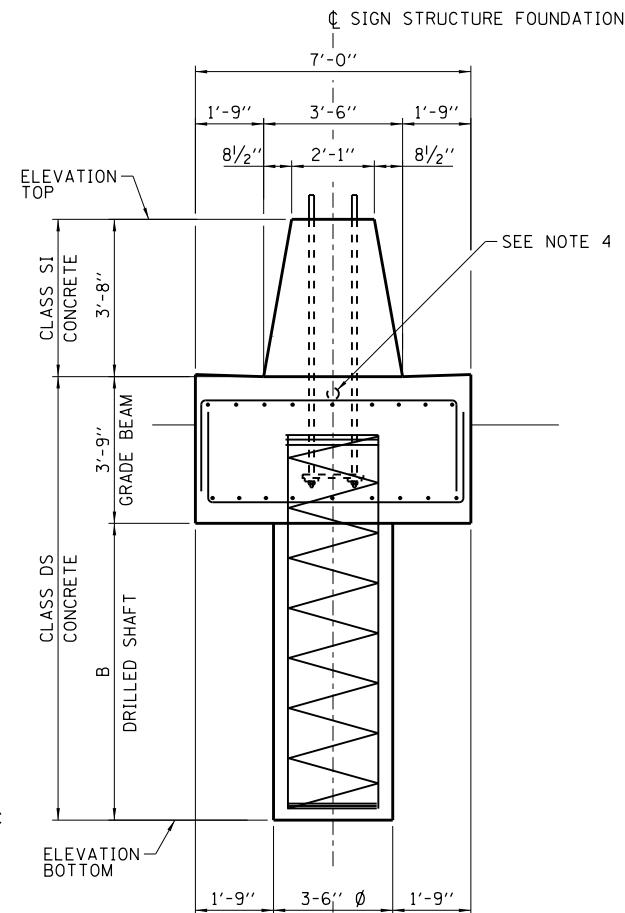
**SIDE ELEVATION**  
(REINFORCEMENT IN GRADE BEAM NOT SHOWN FOR CLARITY)



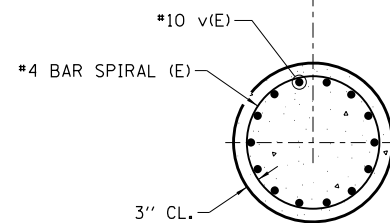
**SECTION B-B**



**SECTION D-D**



**END VIEW**

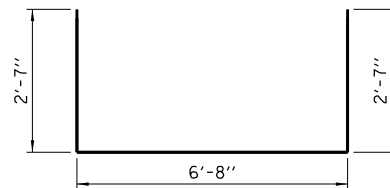


**SECTION A-A**  
(TYPICAL BOTH SHAFTS)

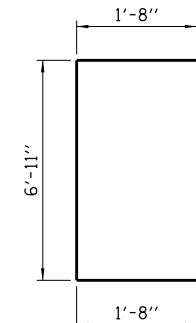
**BAR LIST - EACH FOUNDATION**

BAR	NUMBER	SIZE	LENGTH	SHAPE
h(E)	8	#5	17'-8"	
p(E)	18	#8	17'-8"	
s(E)	38	#5	10'-3"	C
t(E)	38	#5	11'-10"	
v(E)	32	#10	B ADD 2'-3"	

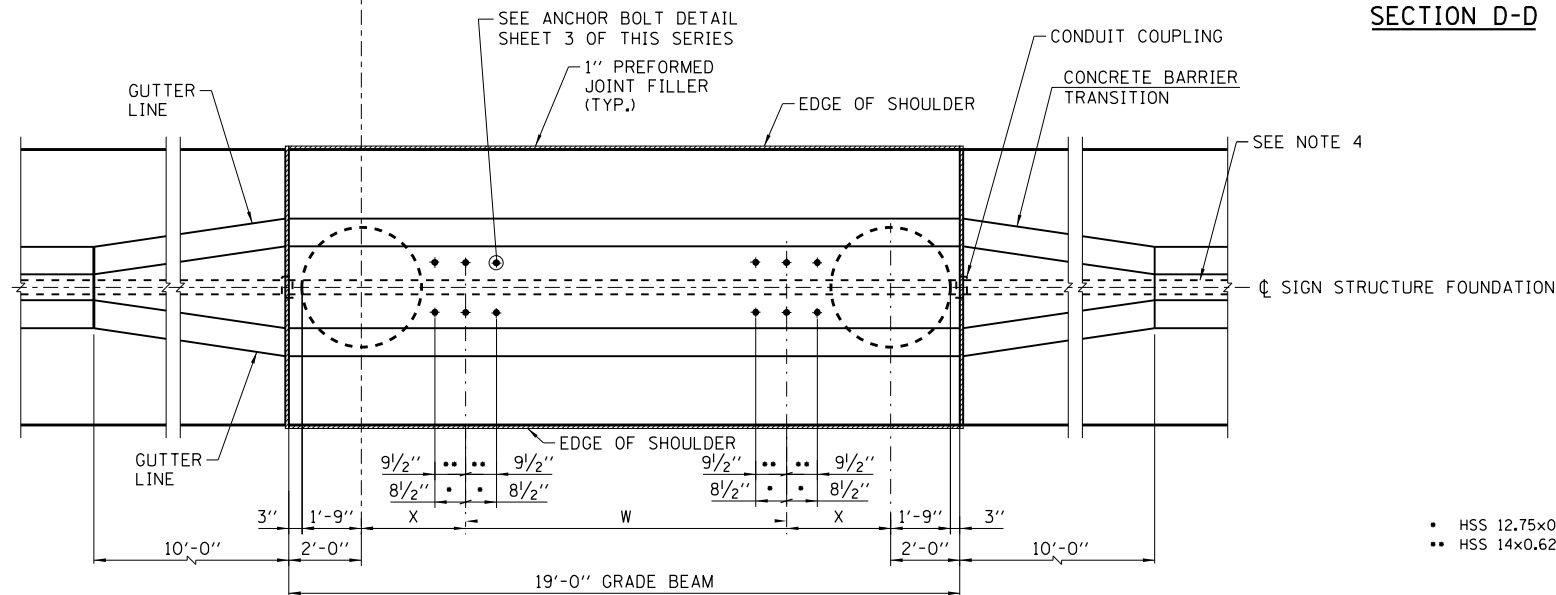
#4 BAR SPIRAL (E) - SEE SIDE ELEVATION



**BAR t(E)**



**BAR s(E)**



**PLAN**

(REINFORCEMENT NOT SHOWN FOR CLARITY)

- HSS 12.75x0.500
- HSS 14x0.625

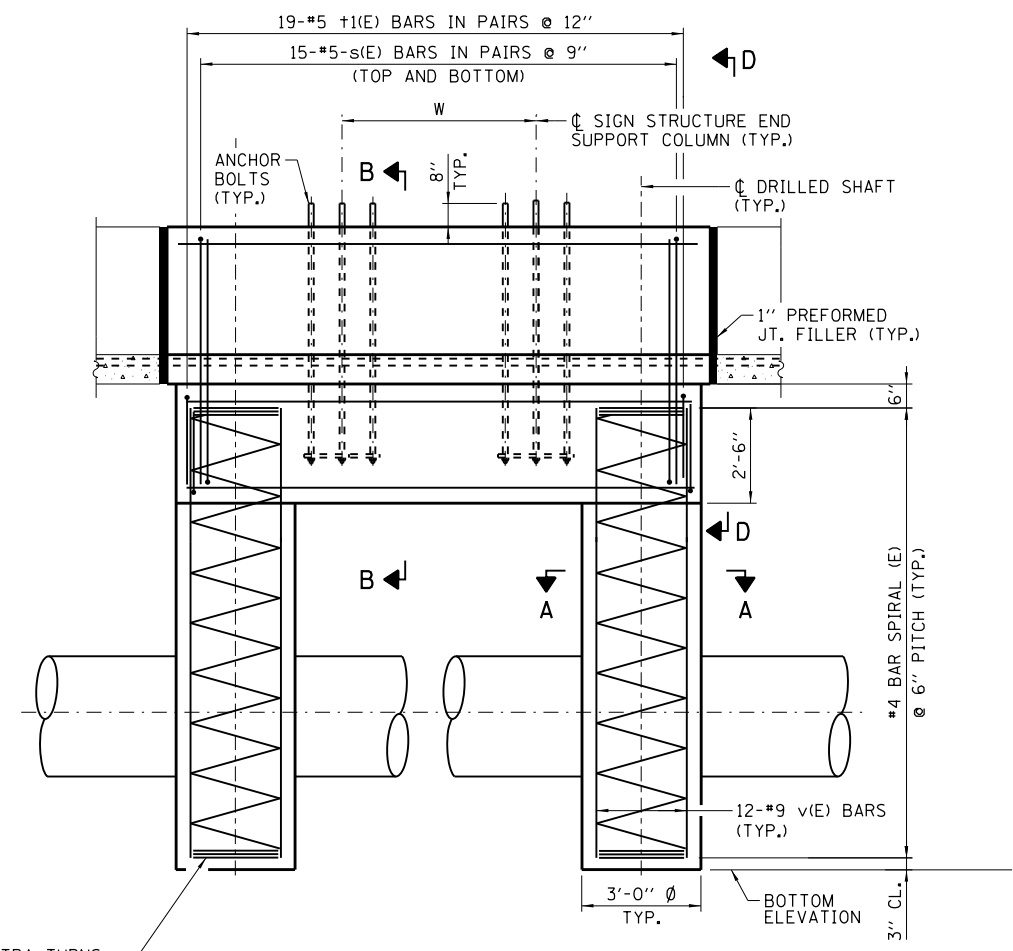
DESIGN TABLE FOR DRILLED SHAFTS IN COHESIVE SOILS (OU > 1.25 TON/SQ. FT.)							
TRUSS No.	W	X	B	CLASS DS CONC. CU. YD.	CLASS SI CONC. CU. YD.	REINF. BARS POUND	PROTECTIVE COAT SQ. YD.
T-80	5'-9"	4'-7 1/2"	50'-0"	54.1	7.2	10460	27.5
T-85	6'-7"	4'-2 1/2"	55'-0"	57.7	7.2	11280	27.5
T-90	6'-7"	4'-2 1/2"	55'-0"	57.7	7.2	11280	27.5
T-95	6'-7"	4'-2 1/2"	55'-0"	57.7	7.2	11280	27.5
T-100	7'-5"	3'-9 1/2"	55'-0"	57.7	7.2	11280	27.5
T-105	7'-5"	3'-9 1/2"	55'-0"	57.7	7.2	11280	27.5
T-110	7'-5"	3'-9 1/2"	55'-0"	57.7	7.2	11280	27.5
T-115	10'-2"	2'-5"	55'-0"	57.7	7.2	11280	27.5
T-120	10'-2"	2'-5"	55'-0"	57.7	7.2	11280	27.5
T-130	10'-2"	2'-5"	60'-0"	61.2	7.2	12090	27.5
T-140	10'-2"	2'-5"	60'-0"	61.2	7.2	12090	27.5
T-150	10'-2"	2'-5"	60'-0"	61.2	7.2	12090	27.5

CLASS DS CONC. QUANTITIES SHOWN IN THE TABLE ARE FOR 2 DRILLED SHAFTS AND 1 GRADE BEAM. CLASS SI CONC. QUANTITIES SHOWN IN THE TABLE ARE FOR 1 TWO-FACE BARRIER OVER GRADE BEAM. REINF. BAR AND PROTECTIVE COAT QUANTITIES SHOWN IN THE TABLE ARE FOR 2 DRILLED SHAFTS, 1 GRADE BEAM, AND 1 TWO-FACE BARRIER OVER GRADE BEAM.

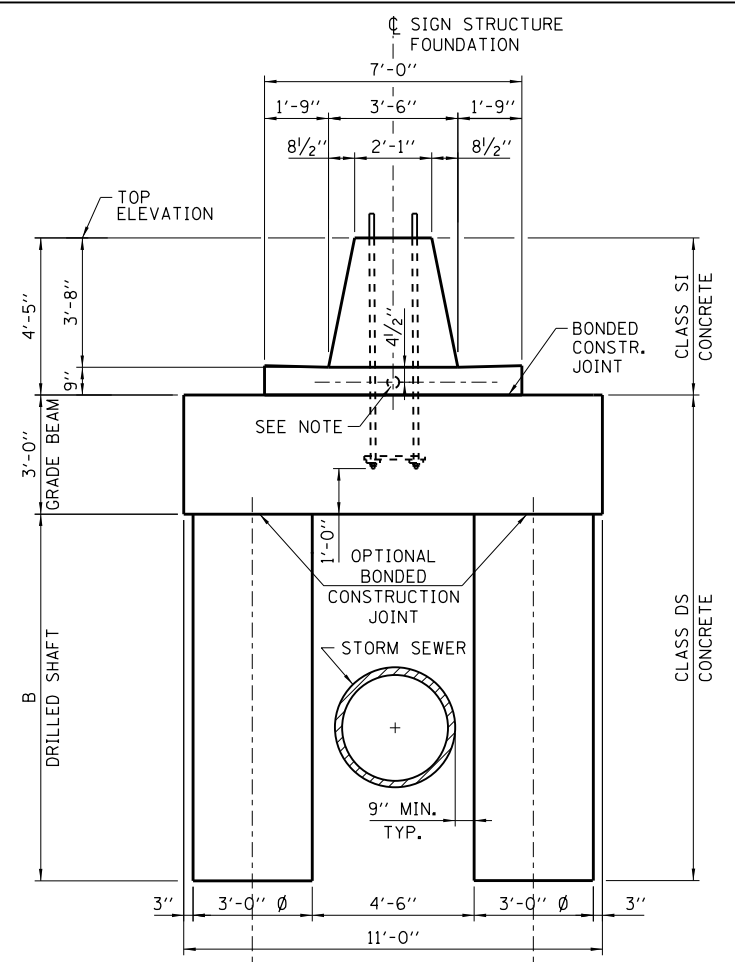
**NOTES:**

- SEE SHEET 3 OF THIS SERIES FOR GENERAL NOTES AND DESIGN CRITERIA.
- FOR SIGN STRUCTURE BASE PLATE DETAIL, SEE SHEET 2 OF THIS SERIES.
- REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C5 FOR GUTTER SLOPE.
- COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS, CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT BARS, DO NOT CUT REINFORCEMENT BARS.
- PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF THE BARRIER AND TOP FACE OF GUTTER.





**SIDE ELEVATION**  
(REINFORCEMENT IN GRADE BEAM NOT SHOWN FOR CLARITY)



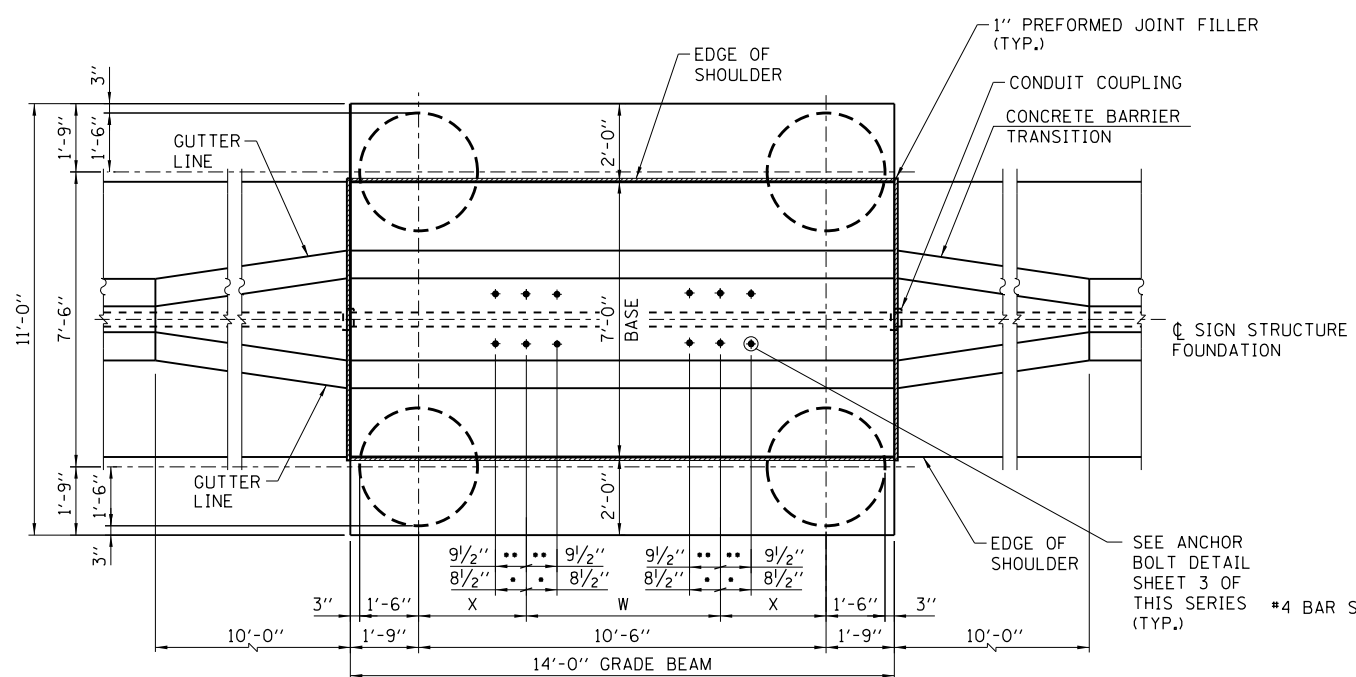
**END VIEW**

DESIGN TABLE FOR DRILLED SHAFTS IN COHESIVE SOILS (QU > 1.25 TON/SQ. FT.)							
TRUSS No.	W	X	B	CLASS DS CONC. CU. YD.	CLASS SI CONC. CU. YD.	REINF. BARS POUND	PROTECTIVE COAT SQ. YD.
T-80	5'-9"	2'-4 1/2"	25'-0"	43.3	8.0	9570	20.3
T-85	6'-7"	1'-11 1/2"	25'-0"	43.3	8.0	9570	20.3
T-90	6'-7"	1'-11 1/2"	25'-0"	43.3	8.0	9570	20.3
T-95	6'-7"	1'-11 1/2"	25'-0"	43.3	8.0	9570	20.3
T-100	7'-5"	1'-6 1/2"	25'-0"	43.3	8.0	9570	20.3
T-105	7'-5"	1'-6 1/2"	30'-0"	48.5	8.0	10600	20.3
T-110	7'-5"	1'-6 1/2"	30'-0"	48.5	8.0	10600	20.3
T-115	10'-2"	0'-2"	30'-0"	48.5	8.0	10600	20.3
T-120	10'-2"	0'-2"	30'-0"	48.5	8.0	10600	20.3
T-130	10'-2"	0'-2"	35'-0"	53.7	8.0	11630	20.3
T-140	10'-2"	0'-2"	35'-0"	53.7	8.0	11630	20.3
T-150	10'-2"	0'-2"	35'-0"	53.7	8.0	11630	20.3

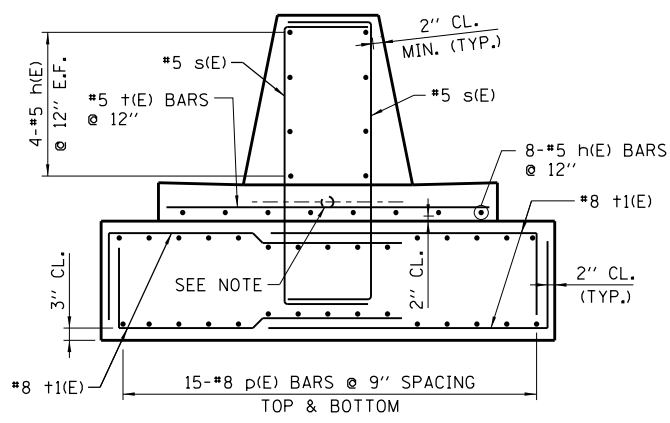
**BAR LIST - EACH FOUNDATION**

BAR	NUMBER	SIZE	LENGTH	SHAPE
h(E)	16	#5	13'-8"	—
p(E)	30	#8	13'-8"	—
s(E)	38	#5	10'-3"	C
+ (E)	15	#5	6'-8"	—
+1(E)	60	#8	12'-7"	—
v(E)	48	#9	B. ADD 2'-3"	—

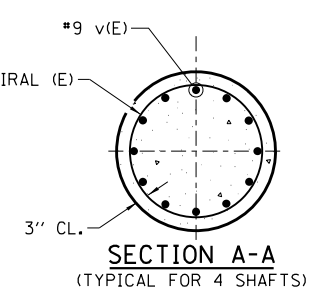
#4 BAR SPIRAL (E) - SEE SIDE ELEVATION



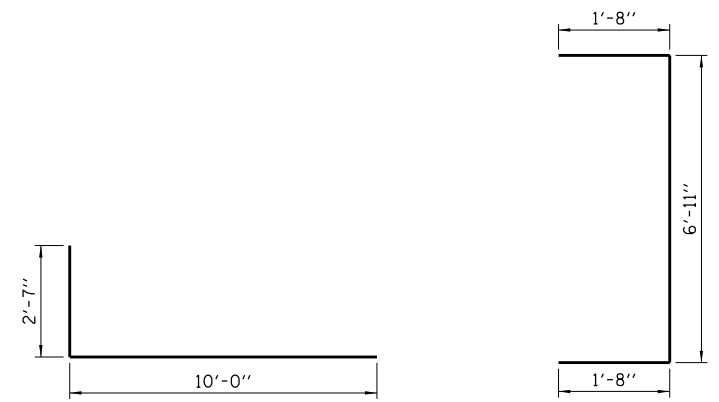
**PLAN**  
(REINFORCEMENT NOT SHOWN FOR CLARITY)



**SECTION B-B**

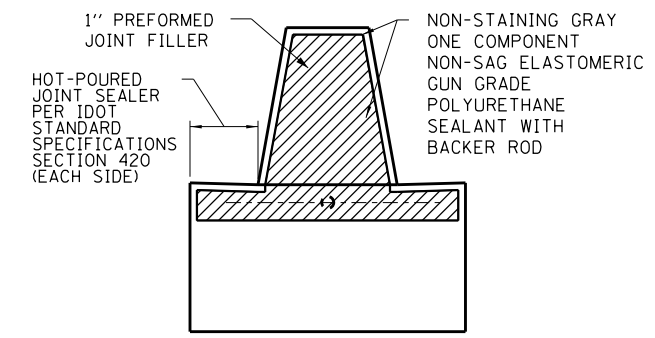


**SECTION A-A**  
(TYPICAL FOR 4 SHAFTS)



**BAR +1(E)**

**BAR s(E)**



**SECTION D-D**

**NOTE:**  
1. SEE NOTES ON SHEET 4 OF THIS SERIES.

APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024

- HSS 12.75x0.500
- HSS 14x0.625

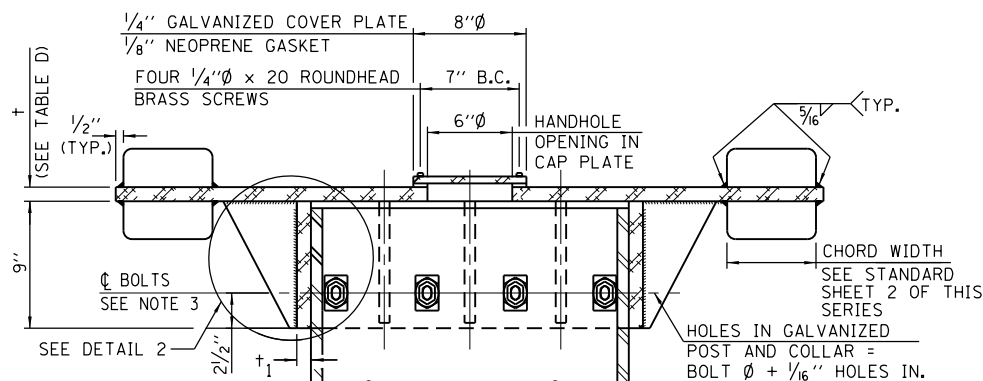




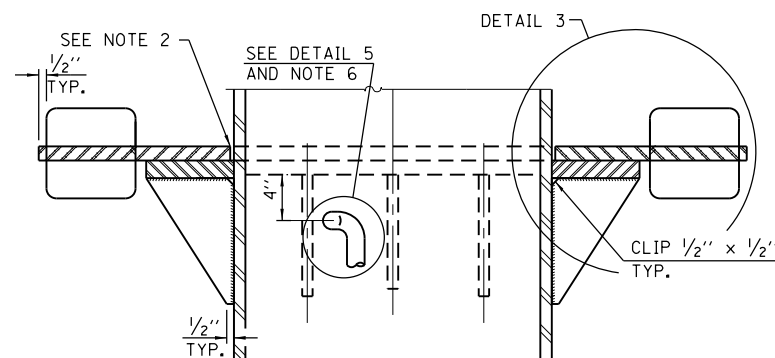
APPROVED BY:  DATE: 03/01/2024

CHIEF ENGINEERING OFFICER

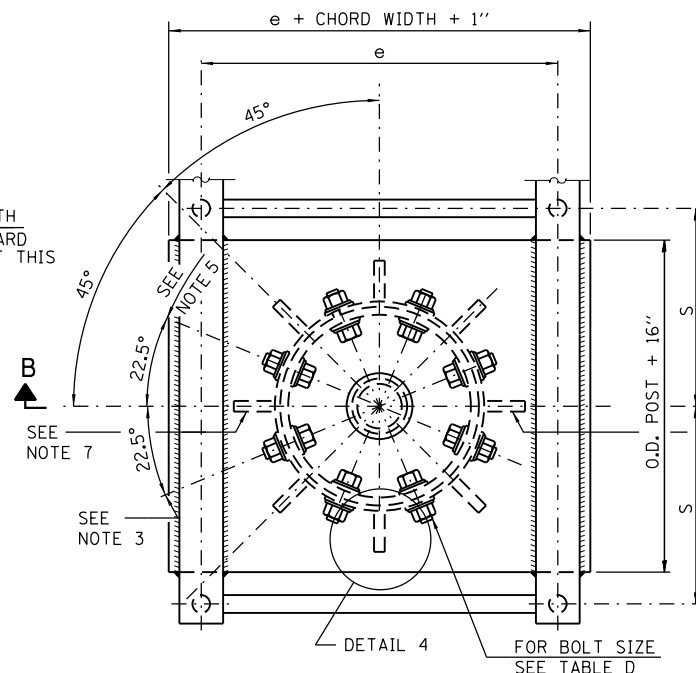




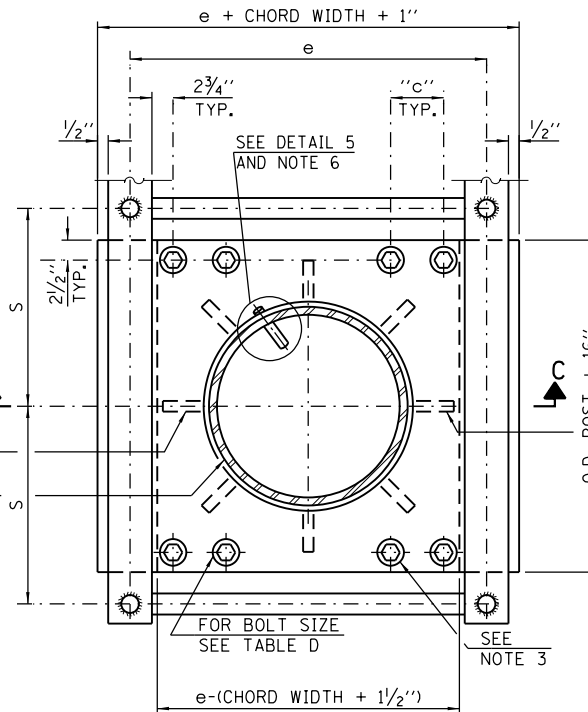
SECTION B-B



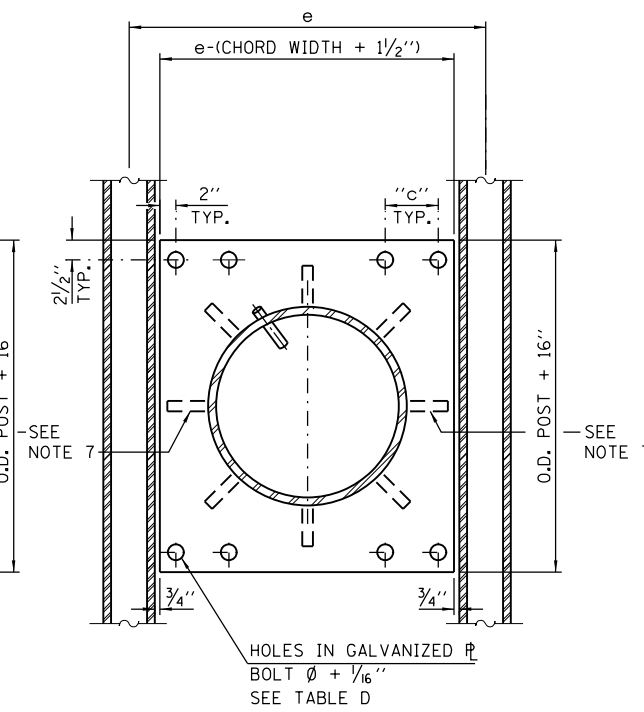
SECTION C-C



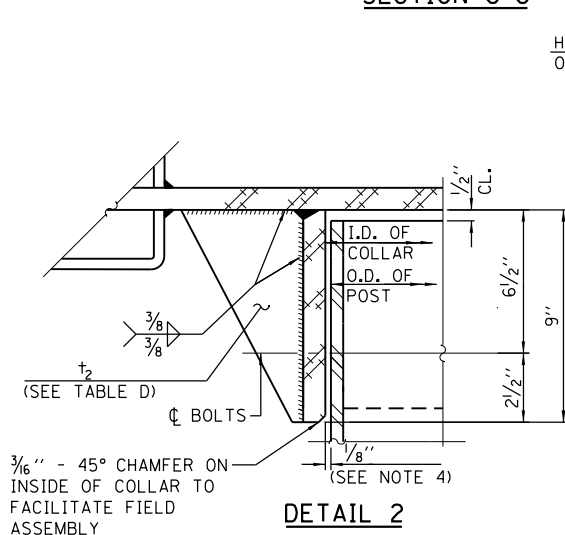
VIEW D-D  
(CAP PLATE)



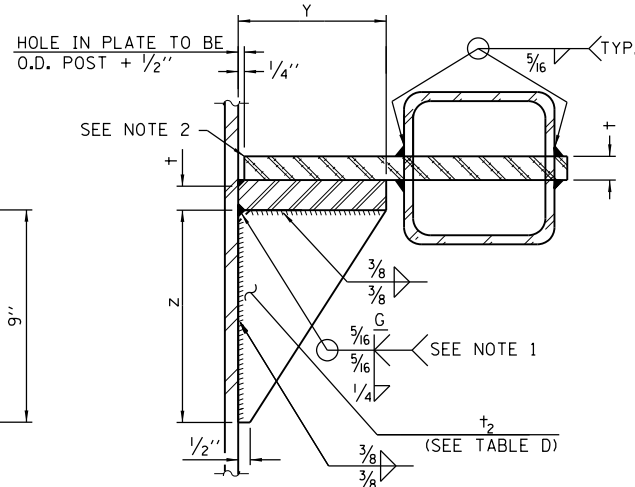
SECTION E-E  
(JUNCTURE PLATE)



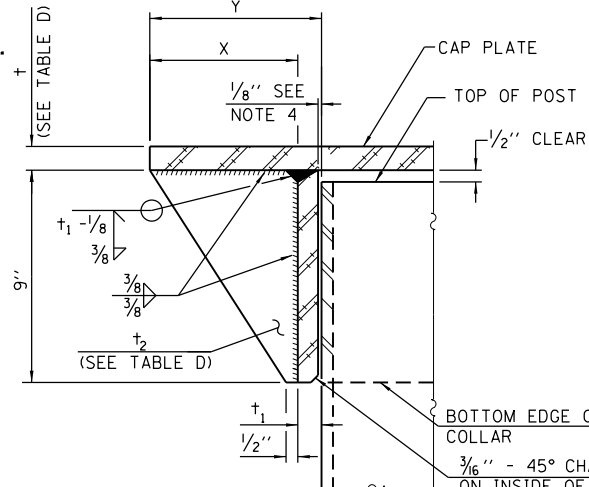
SECTION F-F  
(SETTING PLATE)



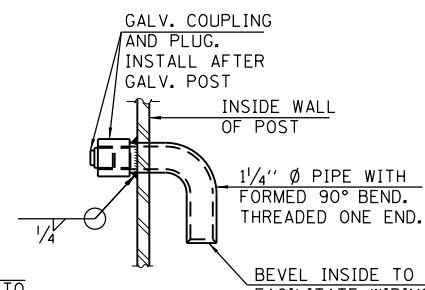
DETAIL 2  
(SEE DETAIL 4 FOR  
ADDITIONAL INFORMATION)



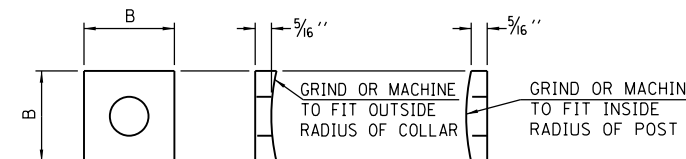
DETAIL 3  
(SEE DETAIL 4 FOR  
ADDITIONAL INFORMATION)



DETAIL 4



DETAIL 5



BOLT SIZE	CONTOURED WASHERS	
	HOLE DIA.	B
1/8"	1/4"	2/4"
1/4"	3/8"	2/4"
1/2"	5/8"	2/4"

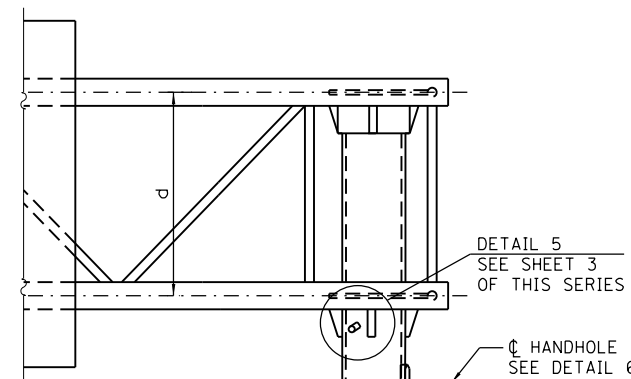
CONTOURED WASHERS  
(ASTM A240, TYPE 304)

## NOTES:

- GRIND TOP IF REQUIRED TO FULLY SEAT PLATE. REPAIR DAMAGED GALVANIZING BEFORE ASSEMBLY.
- AFTER TIGHTENING LOWER CONNECTION BOLTS, FILL GAP WITH NON - HARDENING SILICONE CAULK SUITABLE FOR EXTERIOR EXPOSURE AND ACCEPTABLE TO THE ENGINEER.
- CONNECTION BOLTS IN COLLAR AND BOLTS AT LOWER CHORD CONNECTION SHALL BE HIGH STRENGTH WITH MATCHING LOCKNUTS. LOWER CONNECTION BOLTS SHALL HAVE 2 FLAT WASHERS EACH.
- AFTER GALVANIZING, COLLAR I.D. SHALL EQUAL O.D. OF GALVANIZED POST PLUS 1/8" (±1/16") MAXIMUM GAP BETWEEN POST AND COLLAR AT ANY LOCATION SHALL BE 1/8" BEFORE TIGHTENING BOLTS.
- OPTIONAL FULL PENETRATION WELD IN COLLAR. (TWO LOCATIONS MAXIMUM (180° APART) X-RAY OR UT 100%) ALL BOLTS SHOWN ARE HIGH STRENGTH.
- ORIENT PIPE TOWARD SIGN PANEL SIDE. HOLE IN POST = O.D. PIPE + 1/8".
- OMIT INDICATED STIFFENER IN TRUSS TYPE 20-D.

TABLE D: BOLT SCHEDULE

SPAN LENGTH	POST OUTSIDE DIAMETER	JUNCTURE & COLLAR CONNECTION BOLT DIAMETER	LOWER JUNCTURE BOLT SPACING DIMENSION "C"	PLATE THICKNESS		STIFFENER THICKNESS (t <sub>2</sub> )	NO. OF STIFFENERS	STIFFENERS		
				(t)	(t <sub>1</sub> )			x	y	z
< = 20'	18"	1/8"	3/8"	1"	3/4"	1/2"	6	5"	6"	8"
21'-30'	18"	1/2"	3 3/4"	1/8"	7/8"	3/4"	8	5"	6"	8"
31'-40'	24"	1/2"	4 1/2"	1/4"	1"	3/4"	8	7"	8"	10 1/2"
41'-50'	24"	1/2"	4 1/2"	1/4"	1"	3/4"	8	7"	8"	10 1/2"



CONCRETE COLUMN SEE SHEET 5 OF THIS SERIES FOR DETAILS

3 1/2" STAINLESS STEEL STD. GR. WIRE CLOTH, 1/4" MAX. OPENING WITH MAXIMUM WIRE DIAMETER OF AWG NO. 16 WITH 2" LAP. SECURE WITH 3/4" STAINLESS STEEL BANDING AFTER ANCHOR BOLT NUTS ARE FULLY TIGHTENED.

GRADE BEAM SEE SHEET 6 OF THIS SERIES

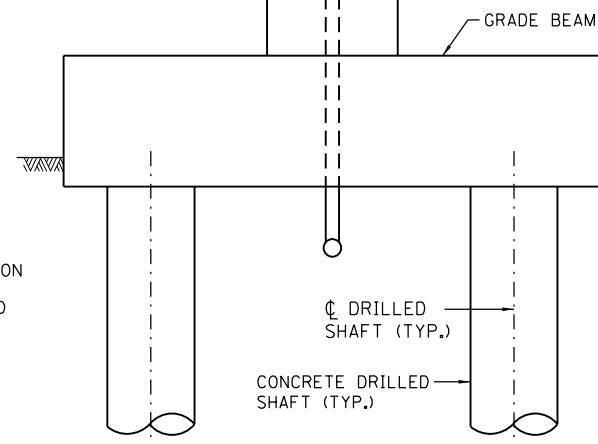
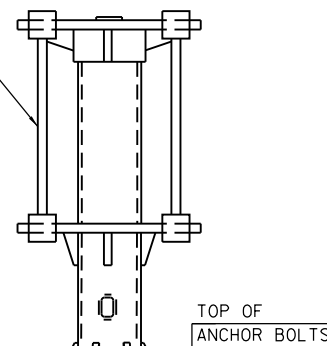
CONCRETE DRILLED SHAFT SEE SHEET 6 OF THIS SERIES

CL DRILLED SHAFT (TYP.)

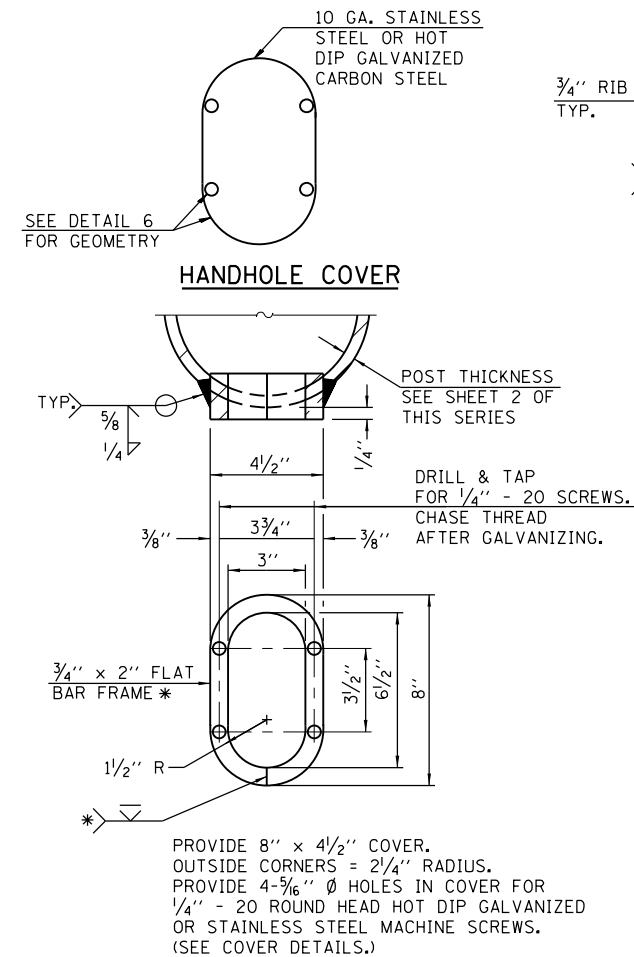
SITE GROUNDING ELECTRODE SYSTEM TO BE PROVIDED AS INDICATED ON THE PLANS.

FRONT ELEVATION

ALL METALLIC MEMBERS ATTACHED TO THE CANTILEVER STEEL POST STRUCTURE SHALL BE BONDED TOGETHER BY MEANS OF A COPPER BONDING JUMPER TO CREATE A CONTINUOUS LOW IMPEDANCE PATH TO THE SITE GROUNDING ELECTRODE SYSTEM.



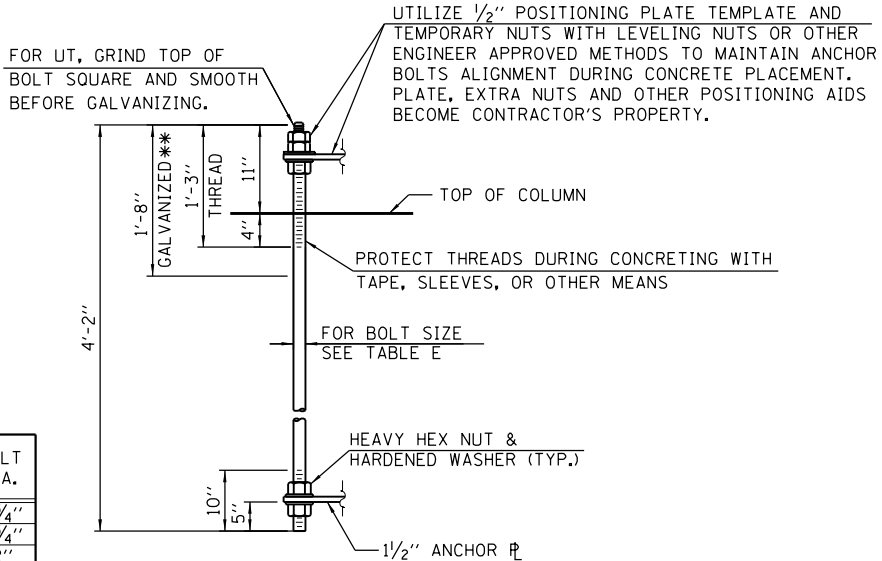
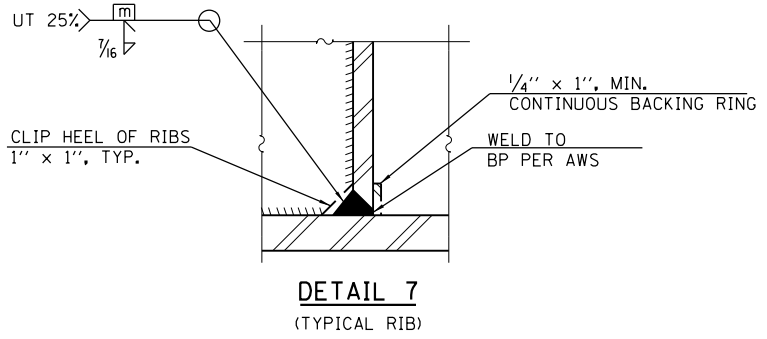
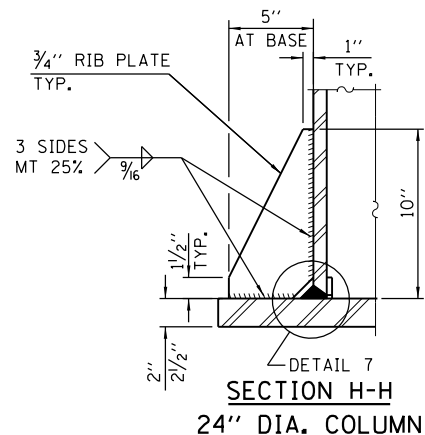
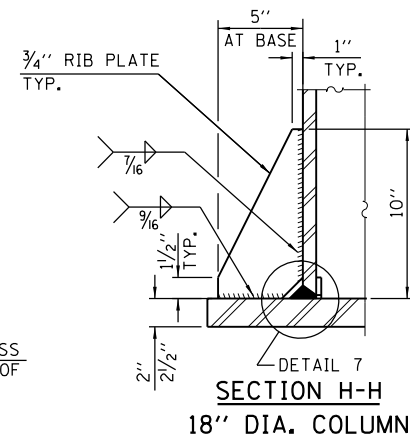
SIDE ELEVATION



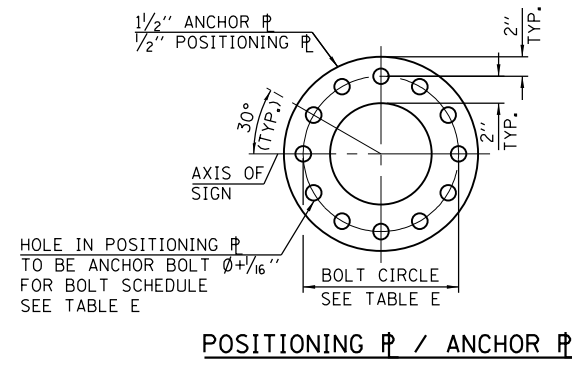
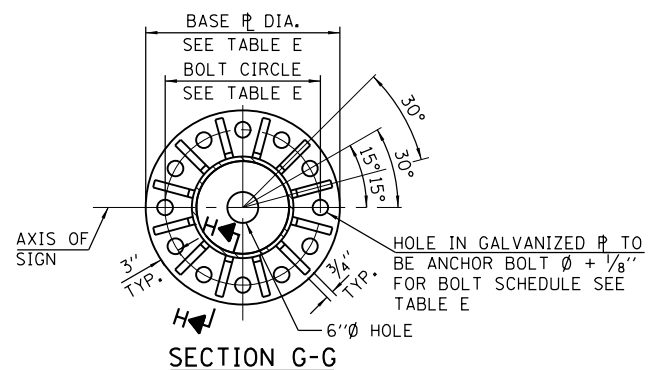
- \* BENT BARS MAY BE BUTT WELDED TOP AND BOTTOM OR BOTTOM ONLY. IN LIEU OF FABRICATED HANDHOLE FRAME AS SHOWN, MAY CUT FROM 2" PLATE (ROLLING DIRECTION VERTICAL). ALL CUT FACES TO BE GROUND TO ANSI ROUGHNESS OF 500 μIN OR LESS.
- \* \* 18" IS MINIMUM TO BE GALVANIZED. ENTIRE BOLT MAY BE GALVANIZED AT CONTRACTOR'S OPTION.

TABLE E: BASE PLATE DETAIL

SPAN LENGTH (L)	POST OUTSIDE DIAMETER	BASE PLATE		BOLT CIRCLE	BOLT DIA.
		DIAMETER	THICKNESS		
< 20'	18"	30"	2"	24"	1 3/4"
21'-30'	18"	30"	2"	24"	1 3/4"
31'-40'	24"	36"	2 1/2"	30"	2"
41'-50'	24"	36"	2 1/2"	30"	2 1/4"



ANCHOR BOLT DETAIL



**NOTE:**

ANCHOR BOLTS SHALL CONFORM TO AASHTO M314 OR ASTM F1554 AND MEET CHARPY V-NOTCH (CVN) ENERGY OF 15 LB.-FT. AT 10° F. BEFORE GALVANIZING. GALVANIZE THE UPPER 18" (MINIMUM \*\*) AND ASSOCIATED M291, GRADE A, C OR DH HEAVY HEX NUTS, HEAVY HEX LOCK NUTS AND HARDENED WASHERS PER AASHTO M293. NO WELDING SHALL BE PERMITTED ON BOLTS. PROVIDE AN UNFINISHED NUT AT BOTTOM, A HEXAGON LOCKNUT, HEXAGON NUT AND WASHER ABOVE BASE PLATE AND A LEVELING NUT AND WASHER BELOW BASE PLATE. NUTS SHALL EACH BE TIGHTENED WITH 200 LB.-FT. MINIMUM TORQUE AGAINST BASE PLATE. BEFORE OR AFTER THREADING, BUT BEFORE GALVANIZING, EACH ANCHOR BOLT SHALL BE ULTRASONICALLY TESTED (UT) BY A LEVEL II OR III INSPECTOR, QUALIFIED IN ACCORDANCE WITH ANSI GUIDELINES, USING A STRAIGHT BEAM, 1/2" Ø 3.5 MHZ. TRANSDUCER, TO ENSURE NO REJECTABLE FLAWS EXIST IN THE UPPER 18" (TENSION CRITERIA).

APPROVED BY: *Manar Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER



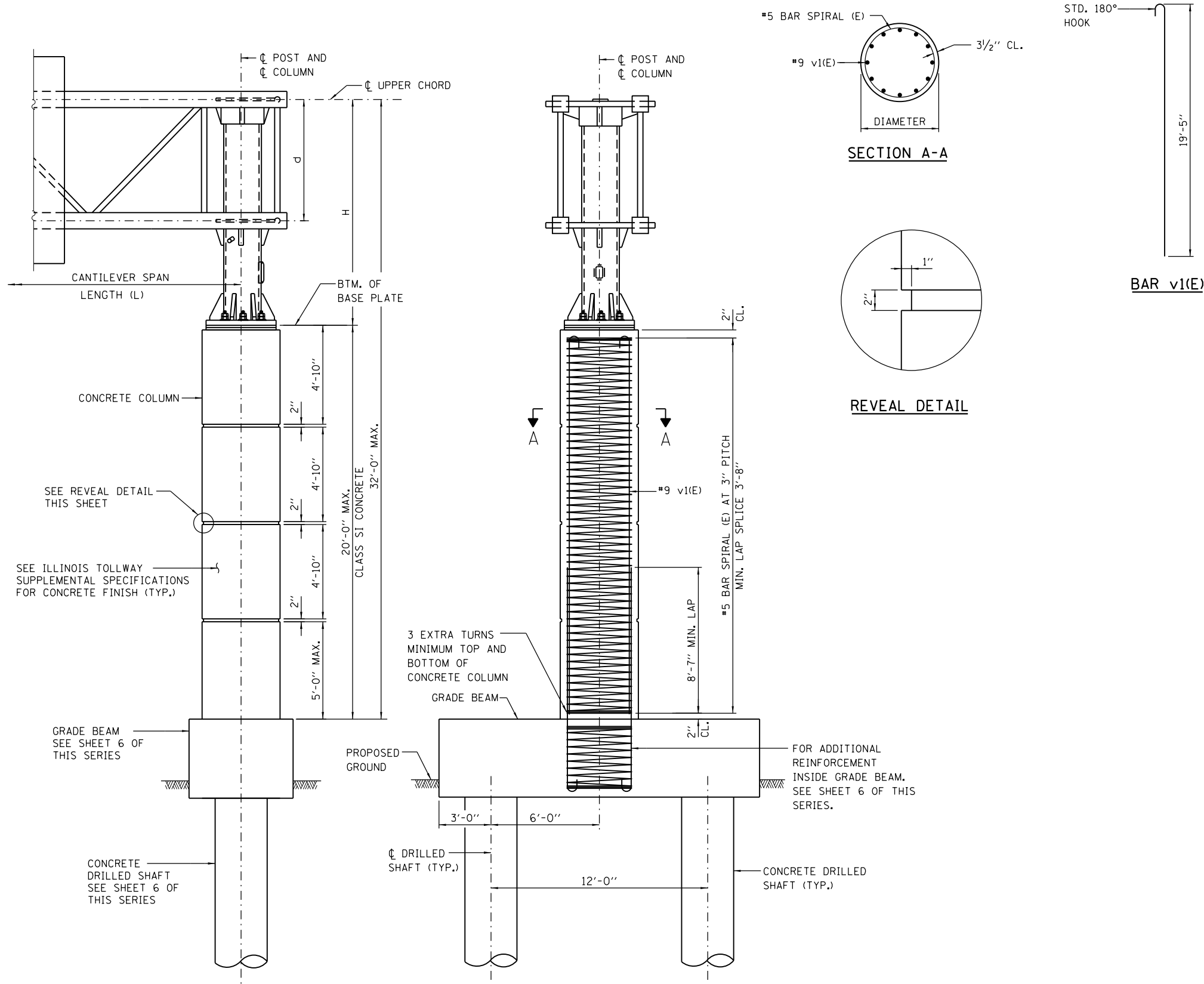
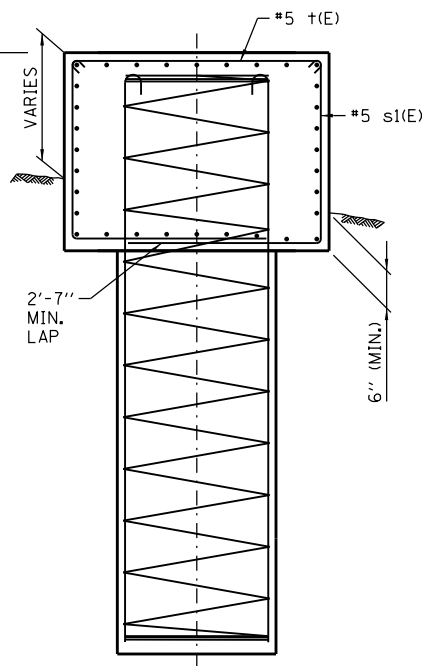
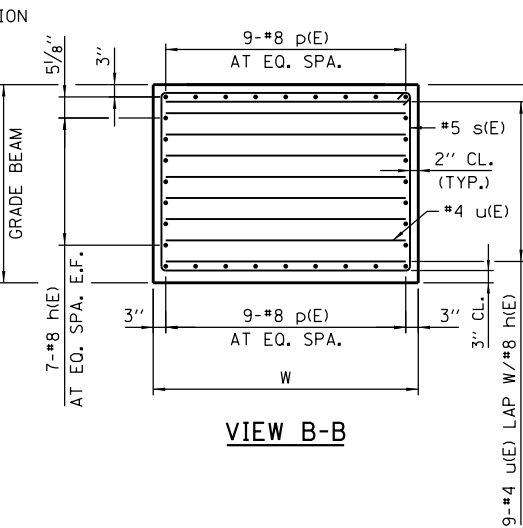
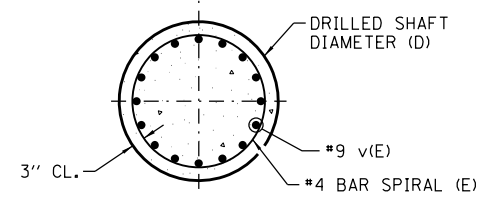
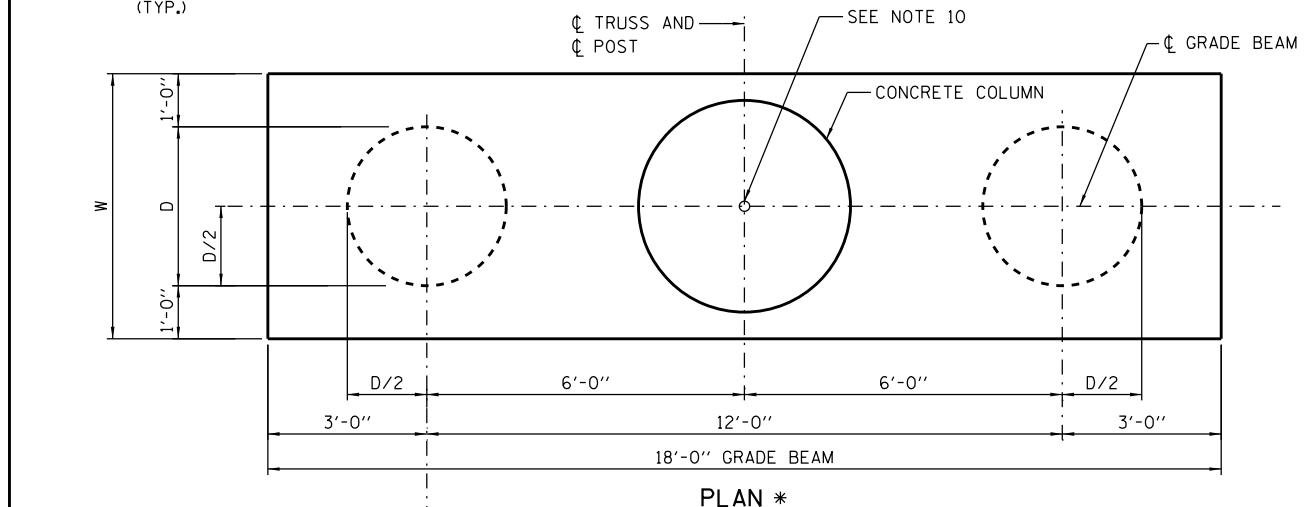
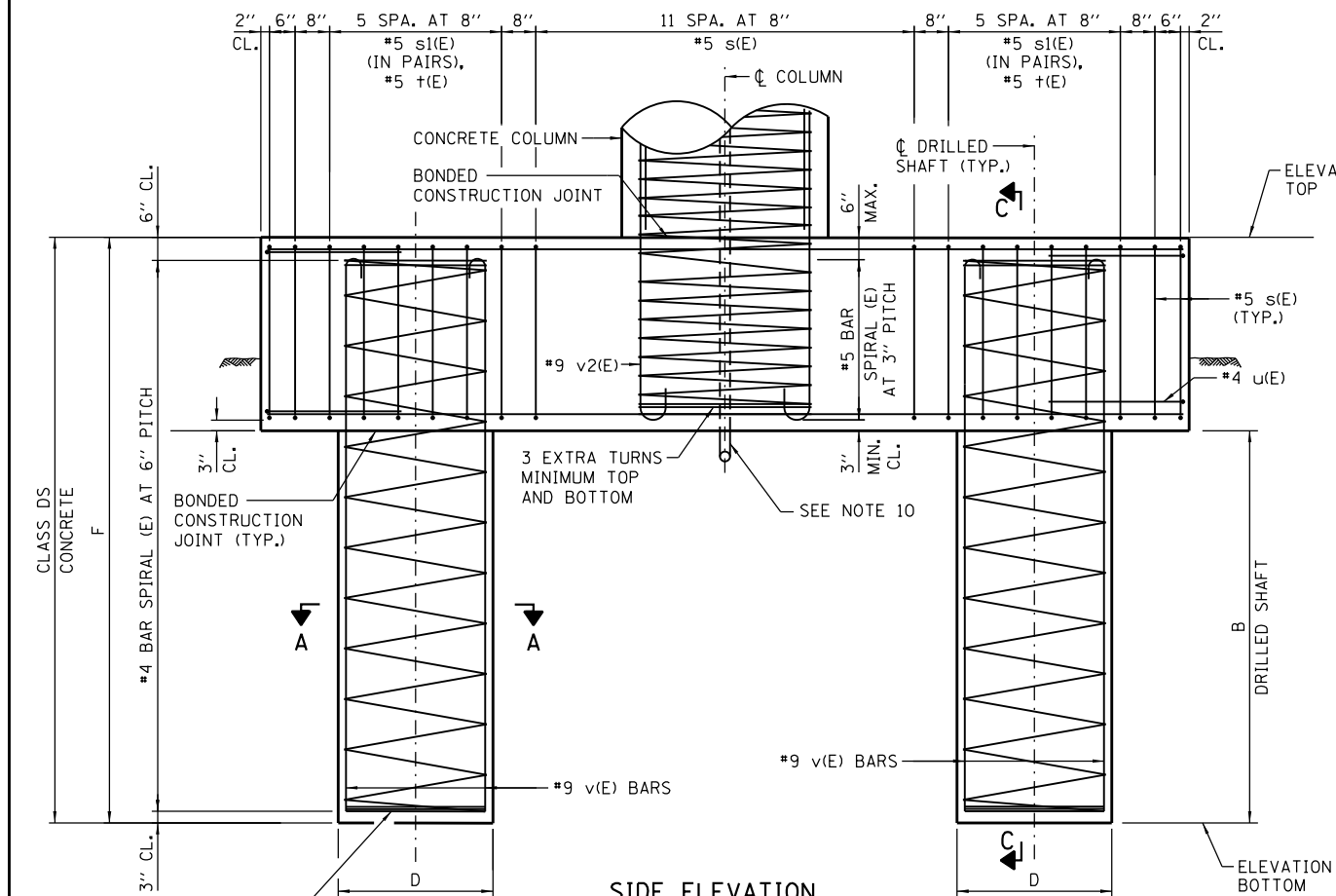


TABLE F: CONCRETE COLUMN DESIGN TABLE

SPAN LENGTH (L)	STEEL POST DIAMETER	CONCRETE COLUMN			
		DIAMETER	VERTICAL BAR #	CLASS SI CONC. CU. YD.*	REINF. BARS POUND *
< = 20'	18"	3'-6"	16-#9	7.1	1,910
21'-30'	18"	3'-6"	16-#9	7.1	1,910
31'-40'	24"	4'-0"	20-#9	9.2	2,330
41'-50'	24"	4'-0"	20-#9	9.2	2,330

\* CONCRETE VOLUME AND REBAR WEIGHT ARE DETERMINED FOR 20'-0" CONCRETE COLUMN HEIGHT. ADJUST CONCRETE VOLUME AND REBAR WEIGHT ACCORDINGLY IF CONCRETE COLUMN HEIGHT IS LESS THAN 20'-0".



- NOTES:**
1. THE FOUNDATION DETAILS SHOWN ARE BASED ON THE PRESENCE OF MOSTLY COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (QU) > 1.25 TON/SQ. FT. WHICH SHALL BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOBSITE. WHEN OTHER CONDITIONS ARE INDICATED, THE BORING DATA SHALL BE INCLUDED IN THE PLANS AND THE FOUNDATION DIMENSIONS SHOWN SHALL BE THE RESULT OF SITE SPECIFIC DESIGNS. IF CONDITIONS ENCOUNTERED IN THE FIELD ARE DIFFERENT THAN THOSE INDICATED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE IF THE FOUNDATION DIMENSIONS NEED TO BE MODIFIED.
  2. ALL MATERIAL, FABRICATION, AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 734 OF THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS.
  3. CONCRETE SHALL BE PLACED MONOLITHICALLY, WITHOUT CONSTRUCTION JOINTS UNLESS NOTED OTHERWISE.
  4. BACKFILL SHALL BE PLACED PER SECTION 502 OF THE STANDARD SPECIFICATION AND PRIOR TO ERECTION OF CONCRETE COLUMN.
  5. PROVIDE RUBBED SURFACE FINISH FOLLOWED BY CONCRETE SEALER APPLICATION ON ENTIRE SURFACE OF CONCRETE COLUMN AND NORMAL SURFACE FINISH ON GRADE BEAM, EXCEPT BOTTOM SURFACE. COST IS INCLUDED IN THE COST OF "FOUNDATION FOR OVERHEAD SIGN STRUCTURE, CANTILEVER TYPE".
  6. ALL REBAR DESIGNATED (E) SHALL BE EPOXY COATED. REBAR SHALL BE POSITIONED SO THAT THERE WILL BE NO INTERFERENCE BETWEEN VERTICAL REINFORCEMENT AND STIRRUPS.
  7. NO SONOTUBES OR DECOMPOSABLE FORMS SHALL BE USED 6" BELOW THE FINISHED GROUND LINE. PERMANENT METAL FORMS OR OTHER SHIELDING SHALL NOT BE LEFT IN PLACE BELOW THE ELEVATION WITHOUT THE ENGINEER'S WRITTEN PERMISSION. EXCAVATIONS SHALL BE DEWATERED BEFORE CONCRETE PLACEMENT IF DIRECTED BY THE ENGINEER AT NO ADDITIONAL COST.
  8. FOR SIZE AND NUMBER OF PVC COATED STEEL CONDUITS, SEE ELECTRICAL CONSTRUCTION DRAWINGS.
  9. TYPICAL SIGN STRUCTURE FOUNDATION IS SHOWN ON THIS SHEET. SEE SHEET 7 OF THIS SERIES FOR FOUNDATION LOCATED IN ROADWAY MEDIAN.
  10. COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT BARS. DO NOT CUT REINFORCEMENT BARS.

TABLE G: DESIGN TABLE FOR DRILLED SHAFTS IN COHESIVE SOILS

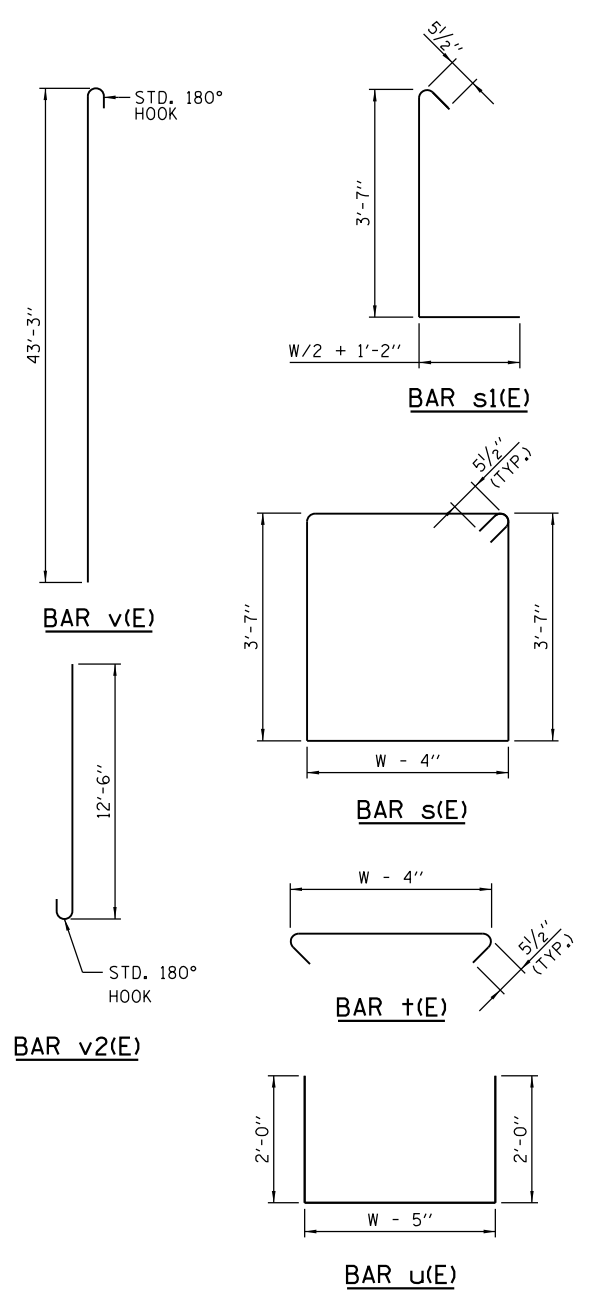
SPAN LENGTH (L)	W	D	B	F	VERTICAL BAR			CLASS DS CONC. CU. YD.**	CLASS DS CONC. CU. YD.	REINF. BARS POUND
					v(E) SHAFT 1	v(E) SHAFT 2	v2(E)			
< = 20'	5'-0"	3'-0"	40'	44'	12-#9	12-#9	16-#9	13.4	21	4,610
21'-30'	5'-0"	3'-0"	40'	44'	12-#9	12-#9	16-#9	13.4	21	4,610
31'-40'	6'-0"	4'-0"	40'	44'	20-#9	20-#9	20-#9	16	37.3	7,420
41'-50'	6'-0"	4'-0"	40'	44'	20-#9	20-#9	20-#9	16	37.3	7,420

BAR SPIRAL LAP SPLICE	
BAR	MIN. LAP
#4	2'-11"
#5	3'-8"

BAR LIST - EACH FOUNDATION

(2 SHAFT AND 1 GRADE BEAM)

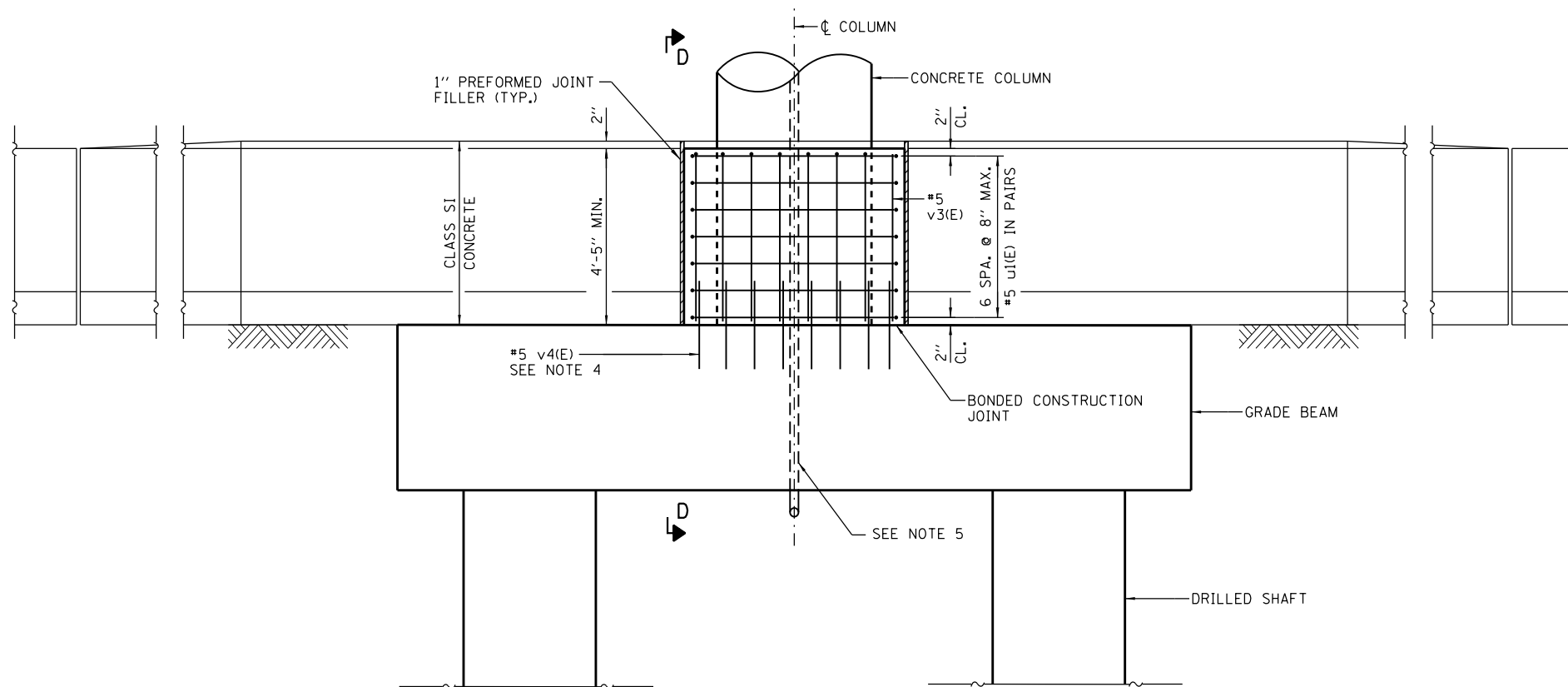
BAR	NUMBER	SIZE	LENGTH		SHAPE
			D = 3'-0"	D = 4'-0"	
h(E)	14	#8	17'-8"	17'-8"	—
p(E)	18	#8	17'-8"	17'-8"	—
s(E)	16	#5	17'-5"	19'-5"	□
sl(E)	24	#5	7'-8 1/2"	8'-2 1/2"	⌋
t(E)	12	#5	5'-7"	6'-7"	⌋
u(E)	18	#4	8'-7"	9'-7"	⌋
v(E)	SEE TABLE G	#9	44'-6"	44'-6"	⌋
v2(E)	SEE TABLE G	#9	13'-9"	13'-9"	⌋
#4 BAR SPIRAL (E) - SEE SIDE ELEVATION					
#5 BAR SPIRAL (E) - SEE SIDE ELEVATION					



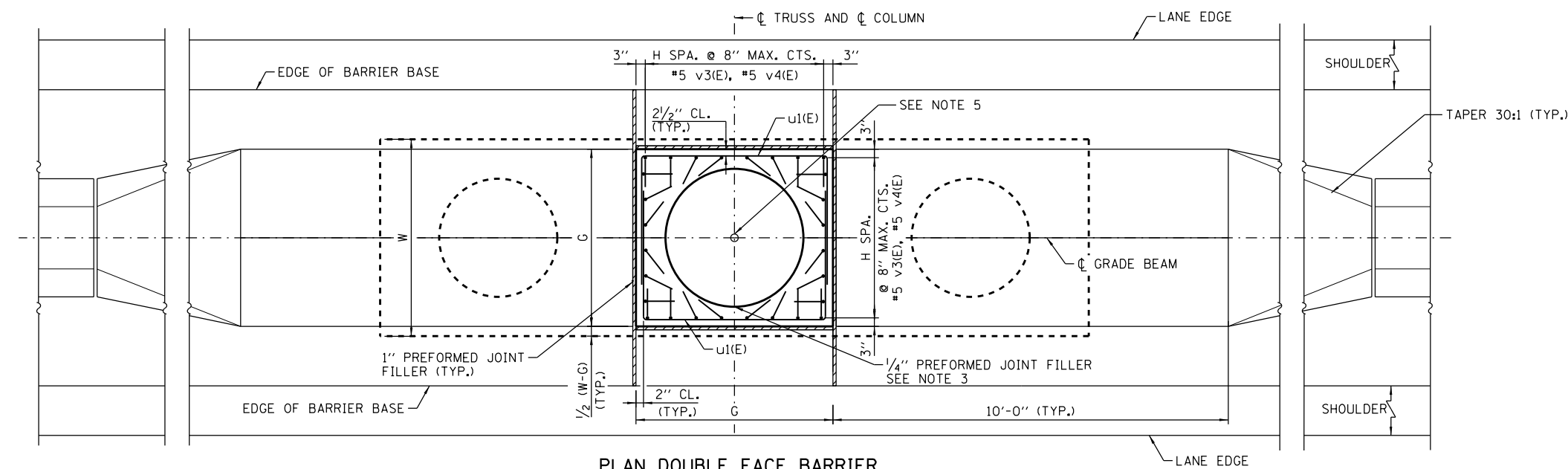
OVERHEAD SIGN STRUCTURE  
CANTILEVER TYPE  
STRUCTURE DETAILS

STANDARD F4-14

APPROVED BY: *Manan Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024



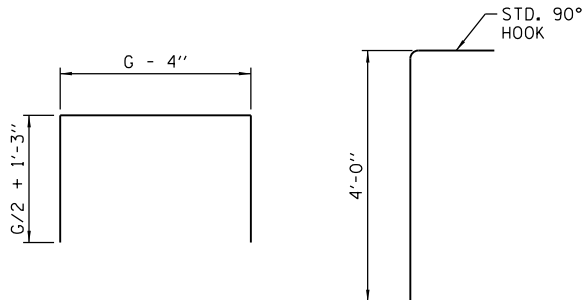
SIDE ELEVATION



PLAN DOUBLE FACE BARRIER

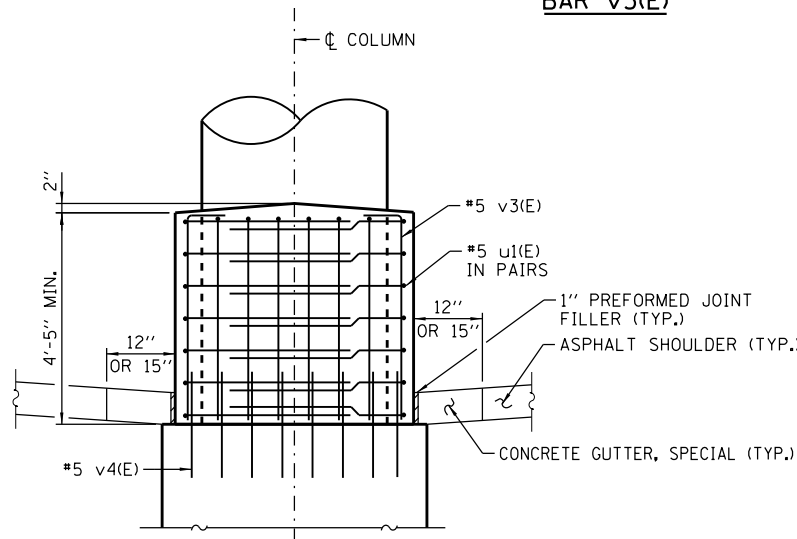
BAR LIST - CRASHWALL

BAR	SIZE	G = 4'-6"		G = 5'-0"		SHAPE
		NUMBER	LENGTH	NUMBER	LENGTH	
u1(E)	#5	14	11'-2"	14	12'-2"	U
v3(E)	#5	24	4'-10"	28	4'-10"	V
v4(E)	#5	24	2'-0"	28	2'-0"	V



BAR u1(E)

BAR v3(E)



SECTION D-D

NOTES:

- SEE SHEET 6 OF THIS SERIES FOR ADDITIONAL NOTES.
- GRADE BEAM AND DRILLED SHAFT DIMENSIONS, DETAILS, QUANTITIES AND BAR LIST ARE SHOWN ON SHEET 6 OF THIS SERIES.
- SEAL EXPOSED SURFACE OF 1/4" PREFORMED JOINT FILLER WITH BACKER ROD AND SILICONE SEALER (1" DEEP AND HOLD 1/8" BELOW SURFACE OF CONCRETE).
- #5 DRILLED ANCHOR BARS WILL BE EPOXY GROUTED AASHTO M31, GRADE 60 REBAR. PROVIDE 12" MINIMUM EMBEDMENT. INSTALL ANCHORS ACCORDING TO STANDARD SPECIFICATIONS SECTION 584. LOCATE GRADE BEAM REBAR PRIOR TO DRILLING. DO NOT DAMAGE GRADE BEAM REBAR DURING INSTALLATION.
- COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT BARS. DO NOT CUT REINFORCEMENT BARS.
- PROTECTIVE COAT SHALL BE APPLIED TO TRAFFIC AND TOP FACES OF CRASHWALL.

SHEET 7 OF 12

TABLE H: DESIGN TABLE FOR CRASHWALL

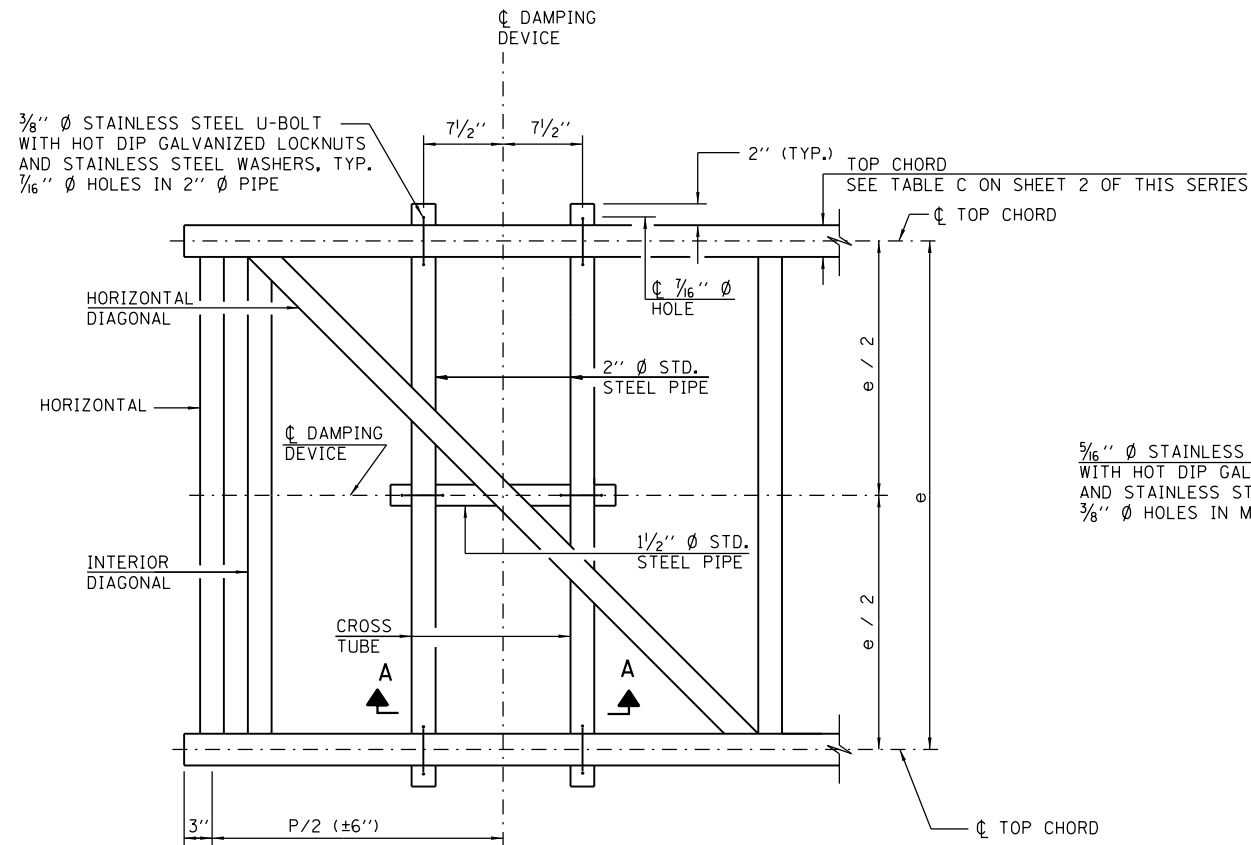
SPAN LENGTH (L)	W	G	H	CLASS SI CONCRETE CU. YD.	REINF. BARS POUND	PROTECTIVE COAT SQ. YD.
< = 20'	5'-0"	4'-6"	6	1.7	340	6.0
21'-30'	5'-0"	4'-6"	6	1.7	340	6.0
31'-40'	6'-0"	5'-0"	7	2.0	350	7.0
41'-50'	6'-0"	5'-0"	7	2.0	350	7.0



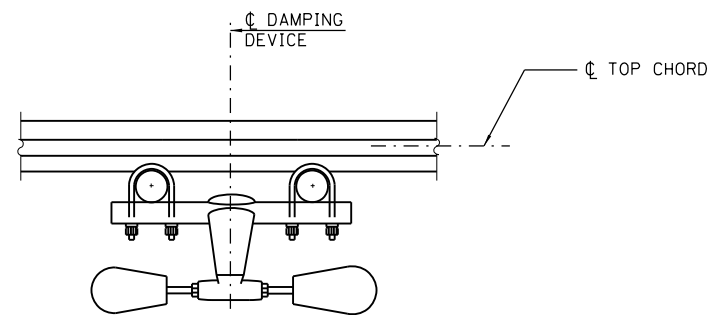
OVERHEAD SIGN STRUCTURE  
CANTILEVER TYPE  
STRUCTURE DETAILS

STANDARD F4-14

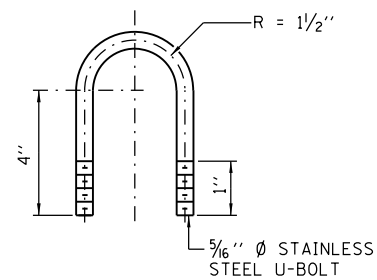
APPROVED BY: *Mamun Nashid*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024



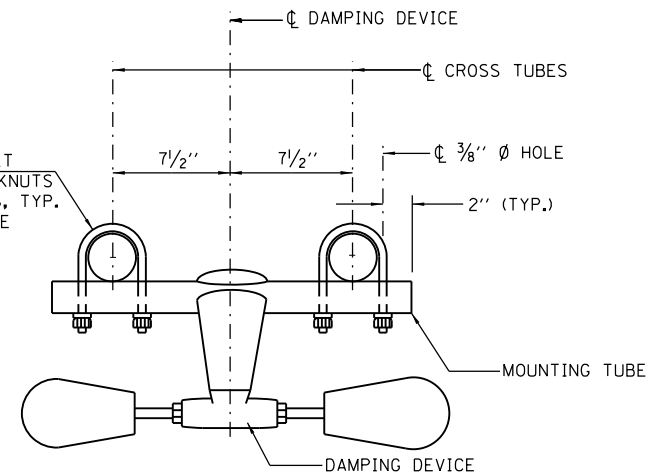
PLAN DETAIL



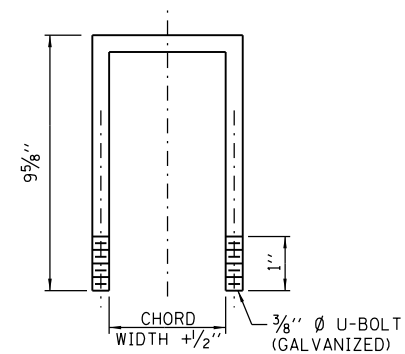
SECTION A-A



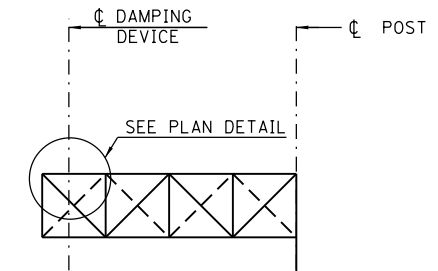
DAMPING DEVICE MOUNTING  
TUBE U-BOLT DETAIL  
(TYPICAL)



TRUSS DAMPING  
DEVICE CONNECTION DETAIL



TOP CHORD TO CROSS TUBE  
U-BOLT DETAIL  
(TYPICAL)



ELEVATION

**NOTE:**  
DAMPER: ONE DAMPER PER TRUSS. (31 LBS. STOCKBRIDGE-TYPE  
29" MINIMUM BETWEEN ENDS OF WEIGHTS.)



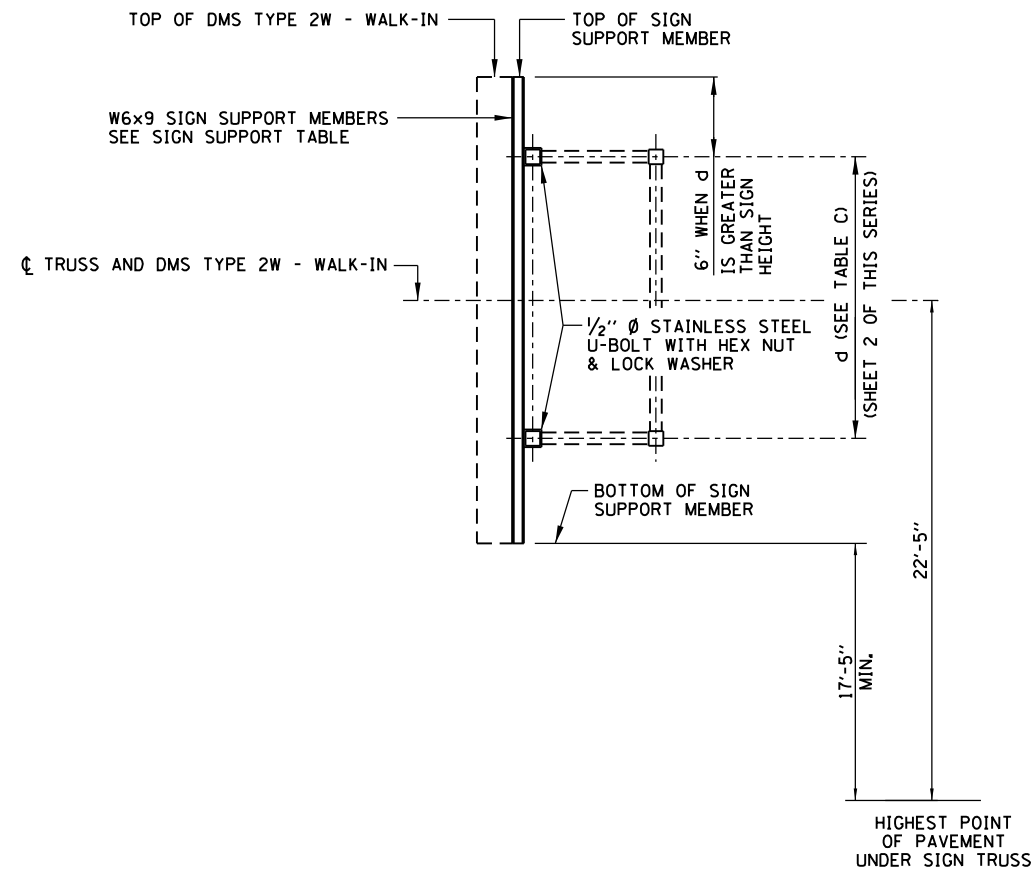
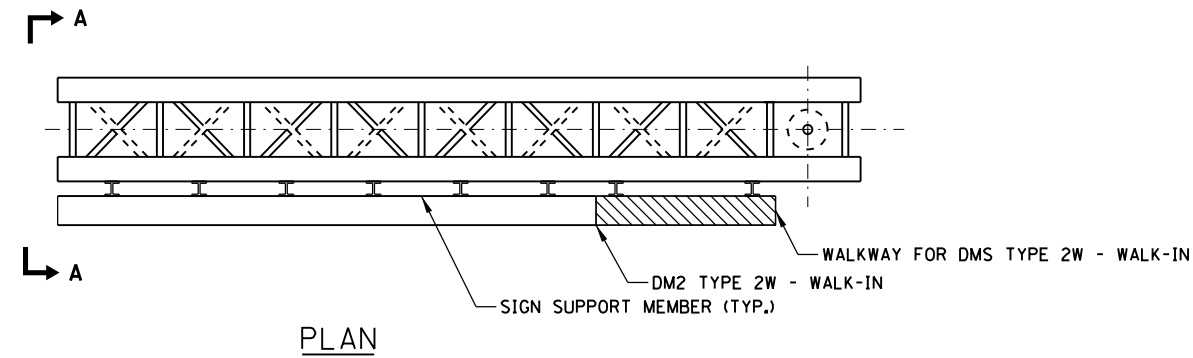
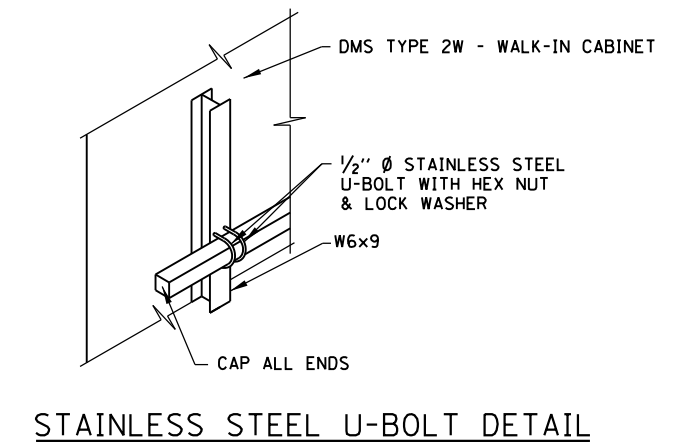


TABLE I: SIGN SUPPORT TABLE

W6x9		
SIGN WIDTH		NUMBER OF SIGN SUPPORTS REQUIRED
GREATER THAN	LESS THAN OR EQUAL TO	
8'-0"	8'-0"	2
14'-0"	14'-0"	3
20'-0"	20'-0"	4
26'-0"	26'-0"	5
32'-0"	32'-0"	6

TABLE J: DMS TYPE  
2W - WALK-IN TABLE

MAXIMUM TRUSS LENGTH				MAXIMUM WEIGHT
	HEIGHT	WIDTH	DEPTH	
40 FEET	8'-0"	26'-6"	3'-4 1/2"	4200 LBS.



NOTES:

1. DMS TYPE 2W - WALK-IN SHALL BE ATTACHED TO TRUSS AS CLOSE TO PANEL JOINTS AS POSSIBLE.
2. VERIFY SIGN SUPPORT MEMBER LENGTH PRIOR TO FABRICATION.
3. DMS TYPE 2W - WALK-IN MANUFACTURER SHALL DESIGN, PROVIDE AND INSTALL HORIZONTAL MOUNTING MEMBERS. VERTICAL SPACING OF HORIZONTAL MEMBERS SHALL BE DESIGNED BY DMS TYPE 2W - WALK-IN MANUFACTURER. VERIFY VERTICAL SPACING WITH HOLES FOR STAINLESS STEEL U-BOLT.

APPROVED BY:

*Manan Nashif*  
CHIEF ENGINEERING OFFICER

DATE:

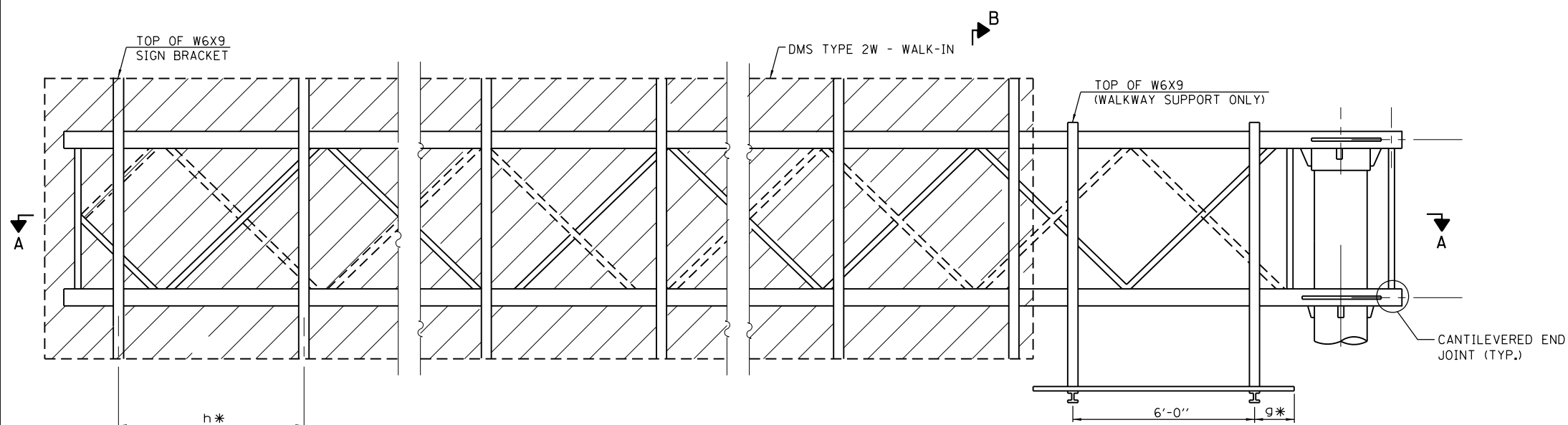
03/01/2024

SHEET 9 OF 12



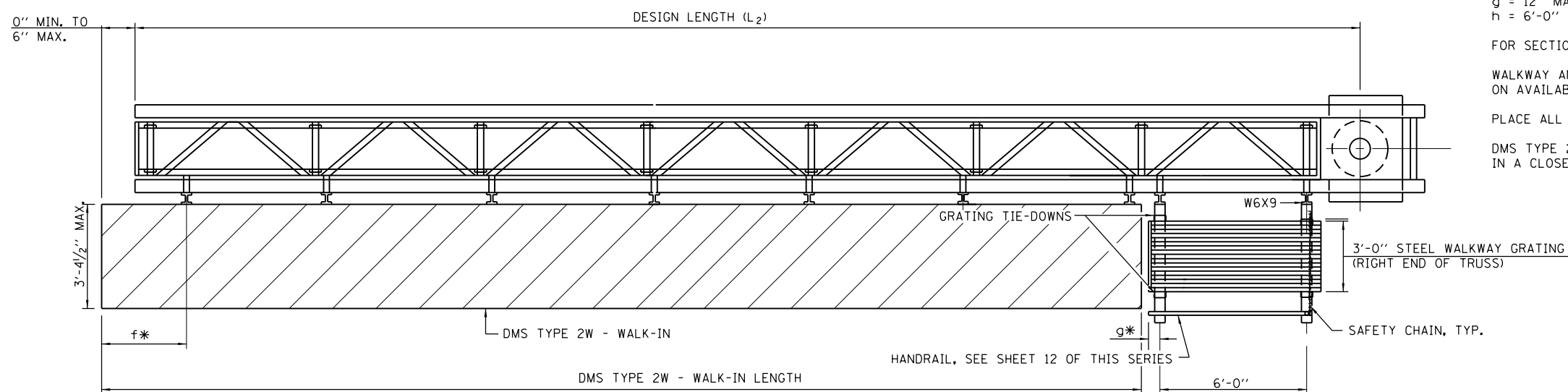
OVERHEAD SIGN STRUCTURE  
CANTILEVER TYPE  
STRUCTURE DETAILS

STANDARD F4-14



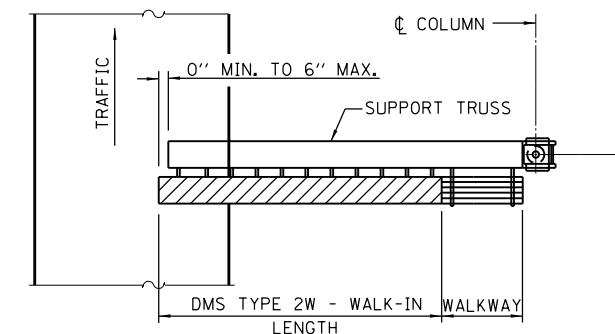
\* BRACKET AND GRATING DIMENSIONS ARE NOMINAL AND WILL VARY BASED ON ACTUAL DMS TYPE 2W - WALK-IN DIMENSIONS PLUS MANUFACTURER'S MOUNTING DEVICES.

**TYPICAL FRONT ELEVATION**  
WITH HANDRAIL OMITTED FOR CLARITY.  
FOR SECTION B-B, SEE SHEET 11 OF THIS SERIES.



**SECTION A-A**

PLACE ALL SIGN AND WALKWAY BRACKETS AS CLOSE TO PANEL POINTS AS PRACTICAL.



**PLAN**  
**WALKWAY AND HANDRAIL SKETCH**  
(ROAD PLAN BENEATH TRUSS VARIES)  
WALKWAY MAY BE LOCATED AT RIGHT OR LEFT END OF TRUSS.

**NOTES:**

SPACE WALKWAY BRACKETS AND SIGN BRACKETS W6X9 FOR EFFICIENCY AND WITHIN LIMITS SHOWN:

f = 12" MAXIMUM, 4" MINIMUM (END OF SIGN TO  $\phi$  OF NEAREST BRACKET)  
g = 12" MAXIMUM, 4" MINIMUM (END OF WALKWAY GRATING TO  $\phi$  OF NEAREST SUPPORT BRACKET)  
h = 6'-0" MAXIMUM ( $\phi$  TO  $\phi$  SIGN AND/OR WALKWAY SUPPORT BRACKETS, W6X9)

FOR SECTION B-B, SEE SHEET 11 OF THIS SERIES.

WALKWAY AND TRUSS GRATING WIDTH DIMENSIONS ARE NOMINAL AND MAY VARY  $\pm 1/2$ " BASED ON AVAILABLE STANDARD WIDTH.

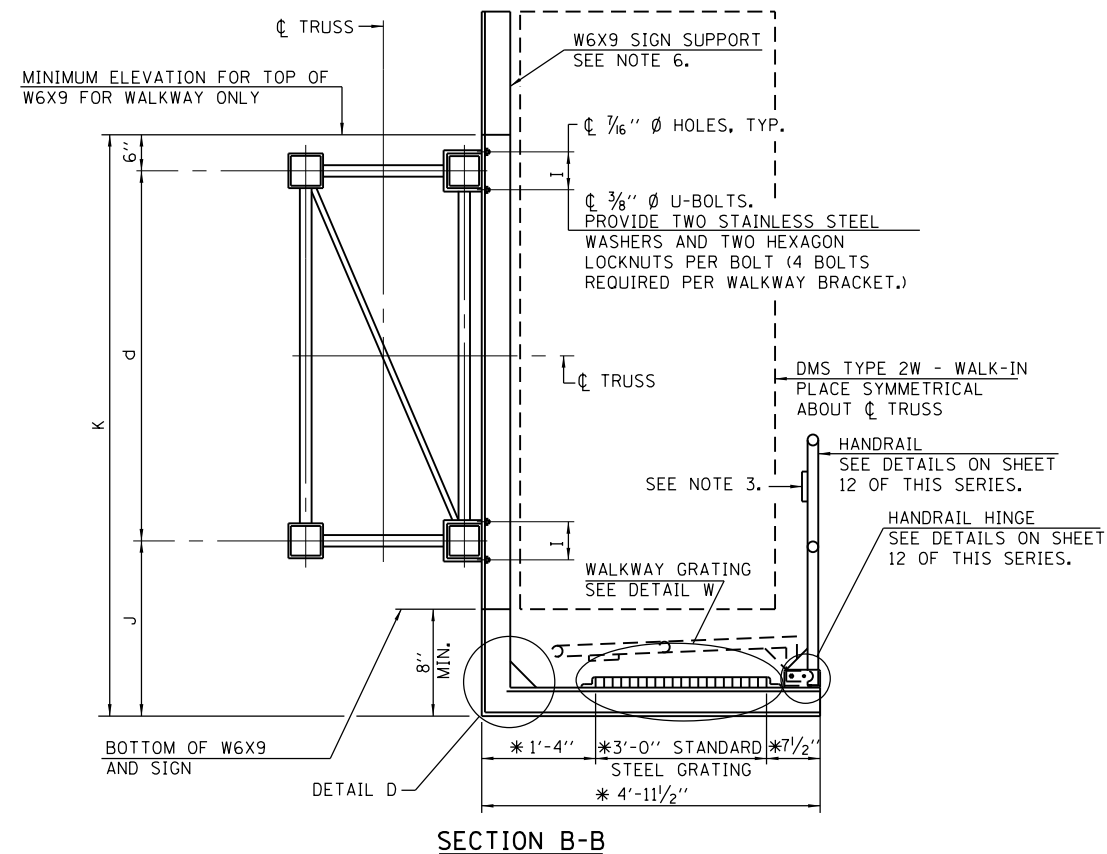
PLACE ALL SIGN AND WALKWAY BRACKETS AS CLOSE TO PANEL POINTS AS PRACTICAL.

DMS TYPE 2W - WALK-IN SHALL HAVE THE DOOR AT THE END, OPPOSITE THE WALKWAY SECURED IN A CLOSED POSITION.

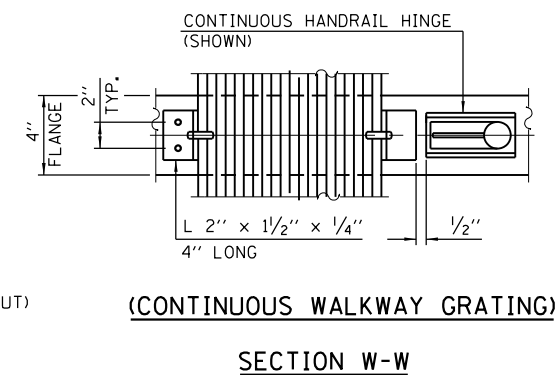
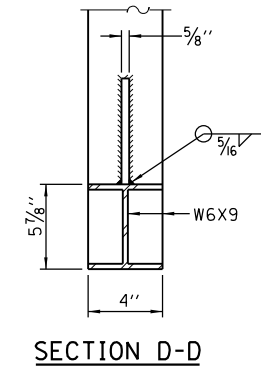
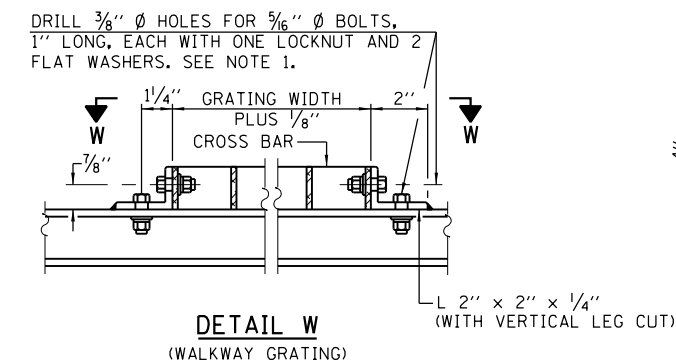
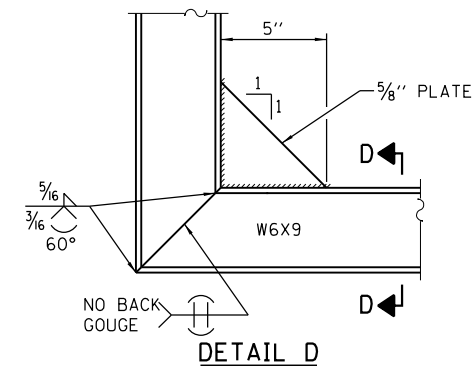
**BRACKET TABLE**

W6X9		
SIGN WIDTH		NUMBER OF BRACKETS REQUIRED
GREATER THAN	LESS THAN OR EQUAL TO	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6



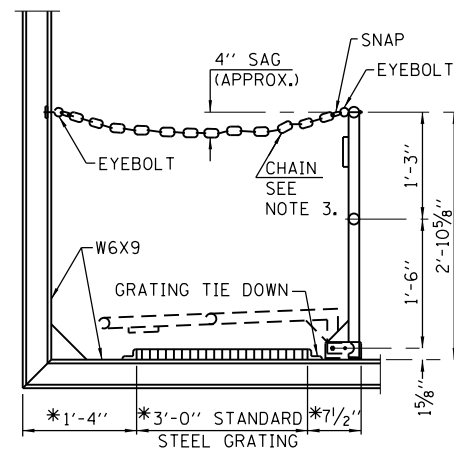


\*BRACKET AND GRATING DIMENSIONS ARE NOMINAL AND WILL VARY BASED ON ACTUAL DMS TYPE 2W - WALK-IN DIMENSIONS PLUS MANUFACTURERS MOUNTING DEVICE.



#### NOTES:

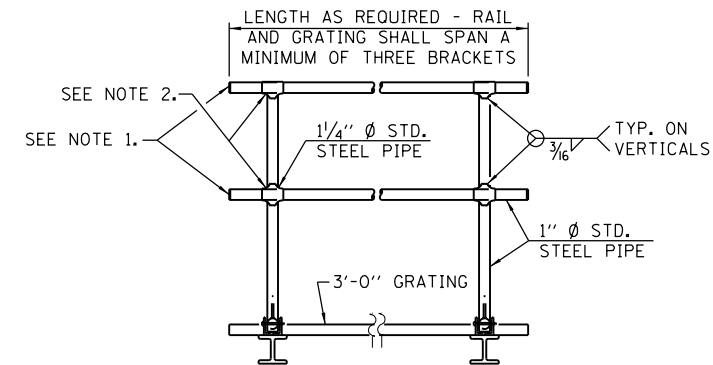
1. DRILLING HOLES IN GRATING MAY BE DONE IN SHOP OR FIELD, BASED ON CONTRACTOR'S PREFERENCE AND SUBJECT TO ACCURATE ALIGNMENT.
2. IF HANDRAIL JOINT PRESENT, WELD ANGLE TO W6X9 AND 1/4" EXTENSION BARS. SEE SHEET 12 OF THIS SERIES.
3.  $\# 1/8" \times 1/2" \times 2"$  WELDED TO HANDRAIL POSTS TO PROTECT LOCATIONS THAT CONTACT GRATING.
4. DMS TYPE 2W - WALK-IN MANUFACTURER SHALL DESIGN AND SUPPLY HARDWARE FOR CONNECTION TO W6X9. BOLTS SHALL BE STAINLESS STEEL OR HOT DIP GALVANIZED HIGH STRENGTH PER IDOT SPECIFICATIONS.



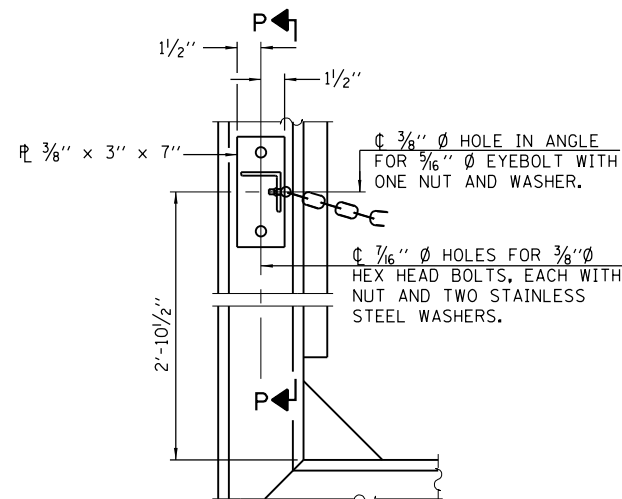
**SIDE ELEVATION**  
(SHOWING SAFETY CHAIN W/O SIGN)

\* BRACKET AND GRATING DIMENSIONS ARE NOMINAL AND WILL VARY BASED ON ACTUAL DMS TYPE 2W - WALK-IN DIMENSIONS PLUS MANUFACTURERS MOUNTING DEVICE.

**HANDRAIL DETAILS**

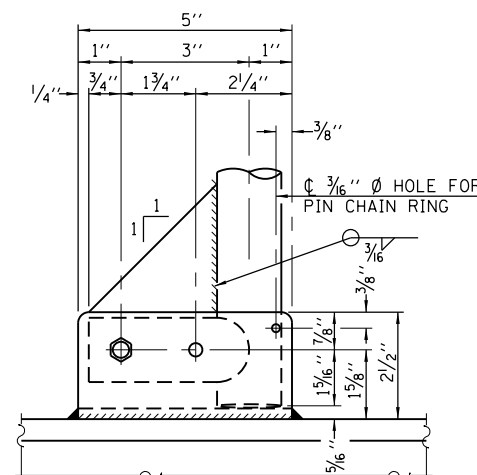


**FRONT ELEVATION**

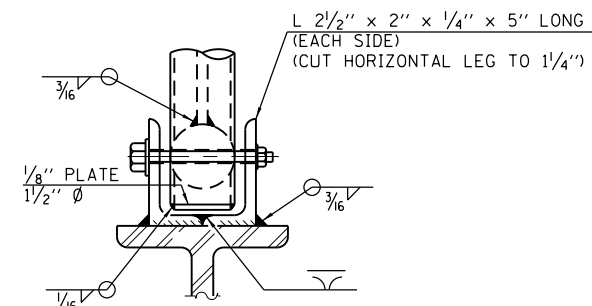


**ALTERNATE SAFETY CHAIN ATTACHMENT**

ITEMS NOT SHOWN SAME AS "SIDE ELEVATION" OF "HANDRAIL DETAILS"

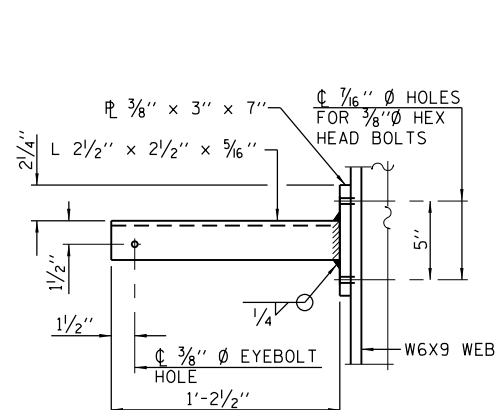


**SIDE ELEVATION**

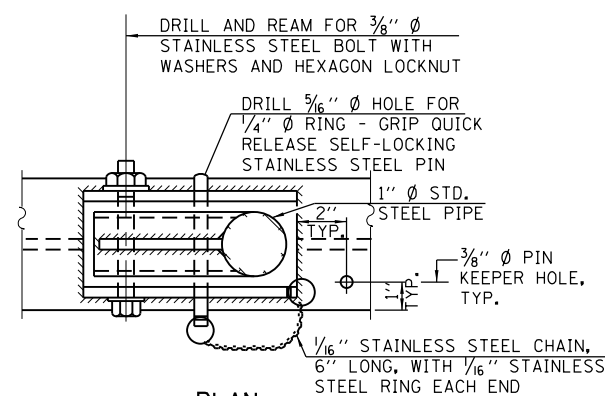


**FRONT ELEVATION**

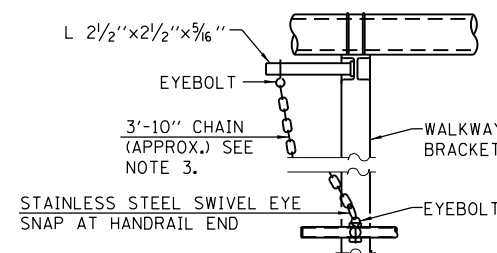
DETAILS NOT SHOWN SAME AS "ELEVATION" AT RIGHT.



**SECTION P-P**

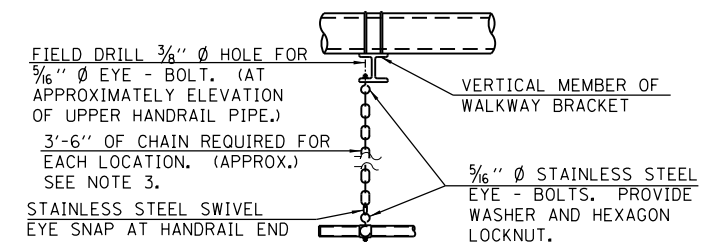


**PLAN**  
**DETAIL E HANDRAIL HINGE**



**ALTERNATE SAFETY CHAIN ATTACHMENT**

DETAILS NOT SHOWN SIMILAR TO "SAFETY CHAIN" DETAILS (WALKWAY OMITTED FOR CLARITY)

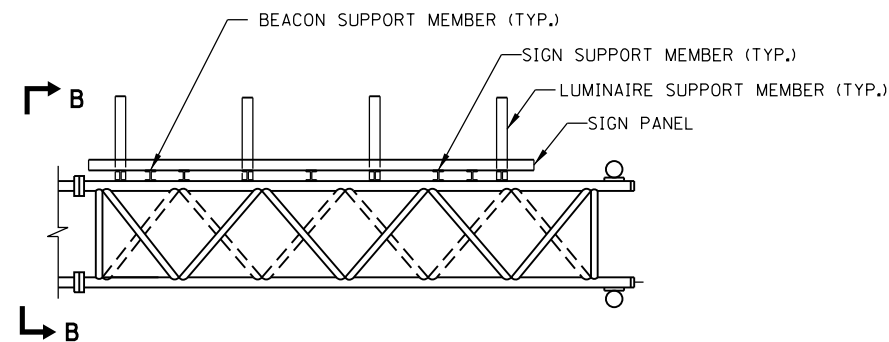
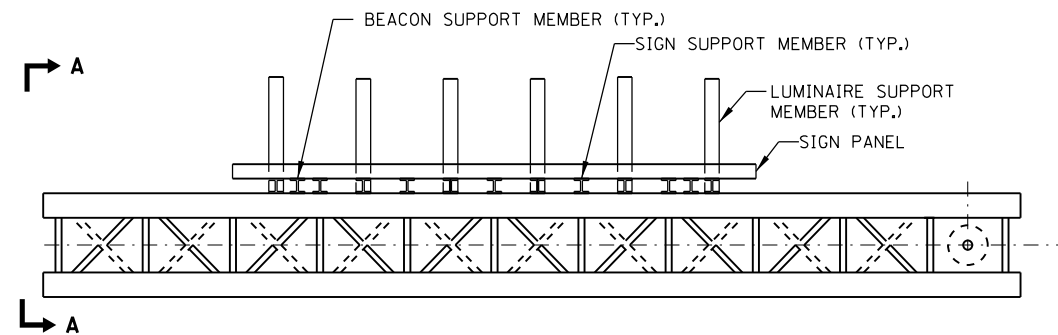


**SAFETY CHAIN**

ONE REQUIRED FOR EACH END OF WALKWAY.

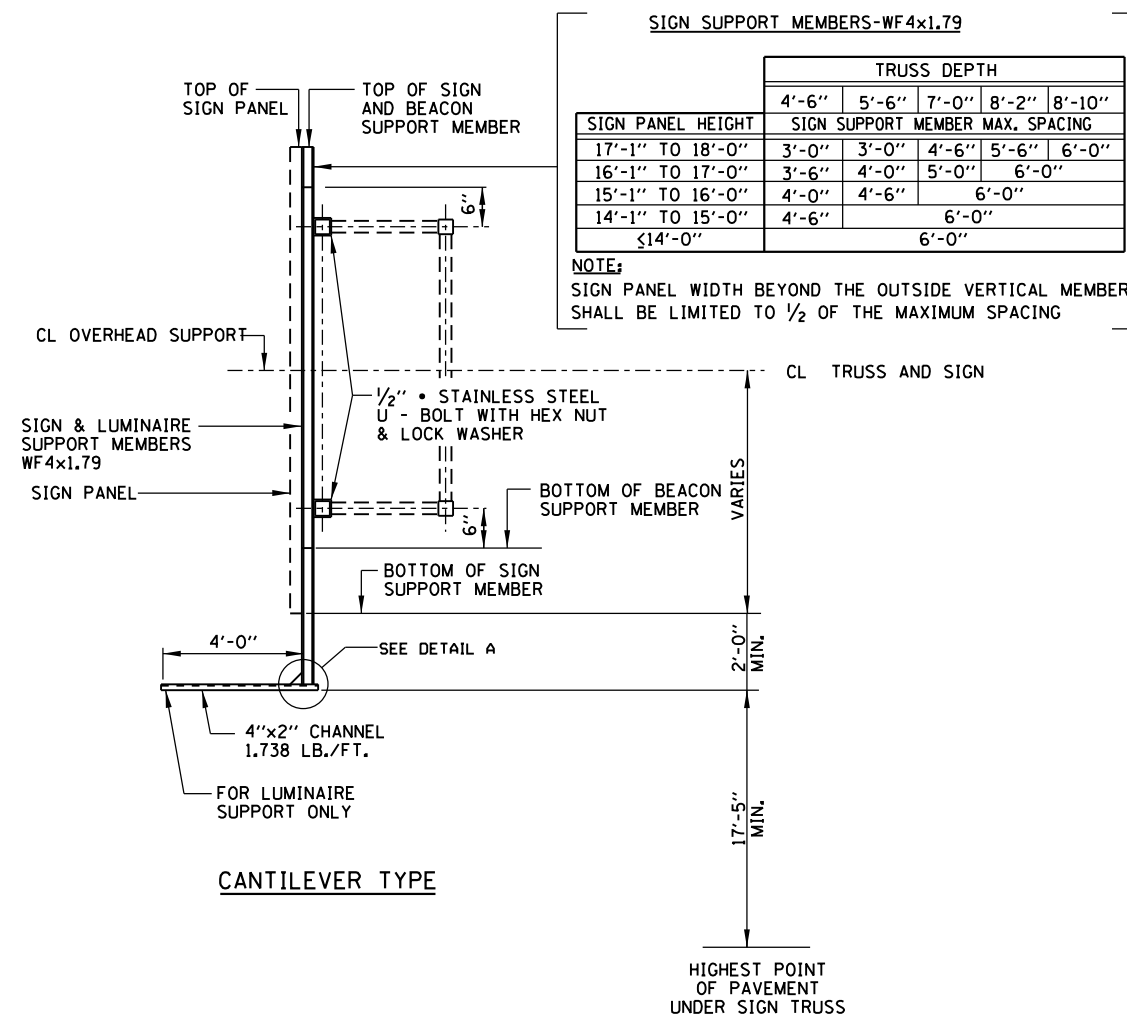
**NOTES:**

1. INSTALL STANDARD FORCE - FIT END CAPS OR WELD 1/8" END PLATES WITH 1/8" C.F.W. AND GRIND SMOOTH. (ALL RAIL ENDS)
2. HORIZONTAL HANDRAIL MEMBER SHALL BE CONTINUOUS THRU 1 1/4" DIAMETER PIPE. PROVIDE 3/16" DIAMETER HOLE IN 1 1/4" DIAMETER PIPE FOR 3/8" DIAMETER BOLT. FIELD DRILL 3/16" DIAMETER HOLE IN HORIZONTAL RAIL MEMBER. PROVIDE LOCKNUT AND TWO STAINLESS STEEL WASHERS FOR BOLT. (USE 3/16" EYEBOLTS IN 1/16" DIAMETER HOLES ON TOP RAIL AT ENDS ONLY.)
3. 3/16" TYPE 304L STAINLESS STEEL CHAIN, APPROXIMATELY 12 LINKS PER FOOT.

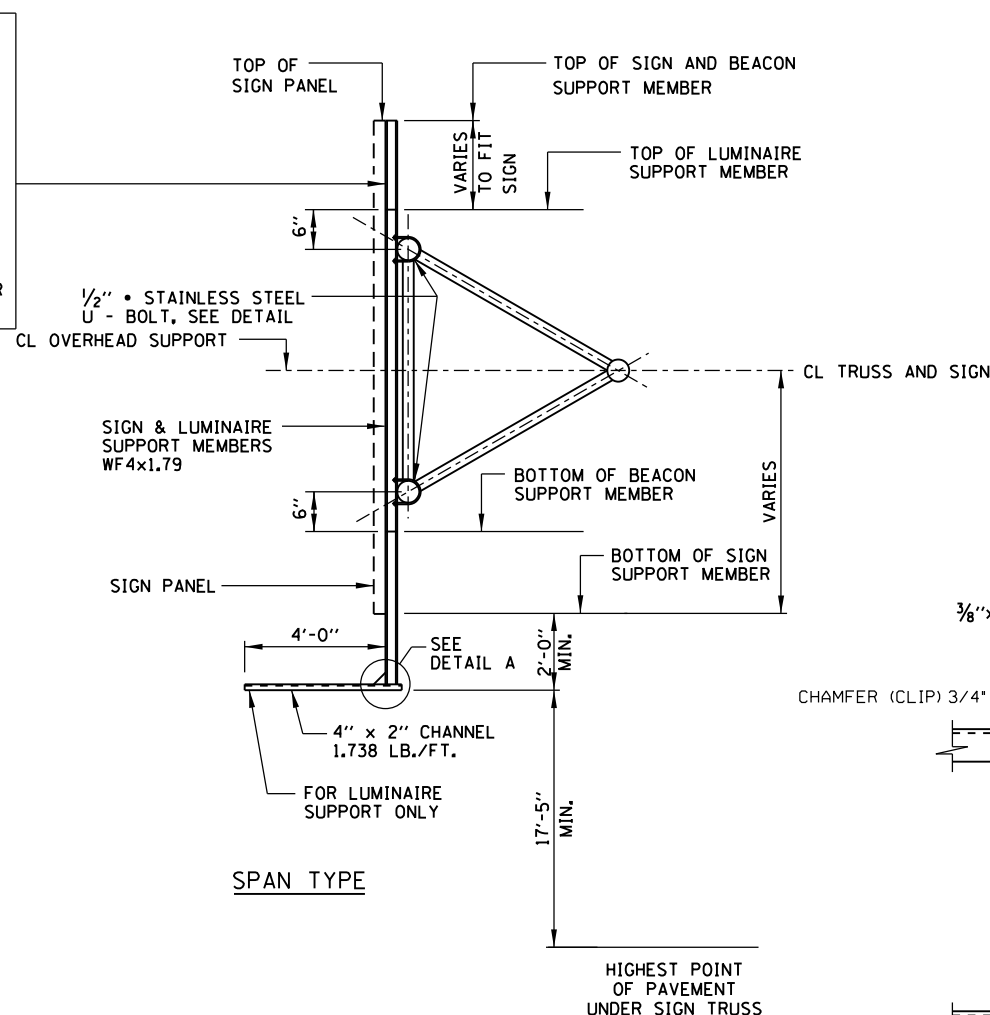


PLAN

PLAN



SECTION A-A



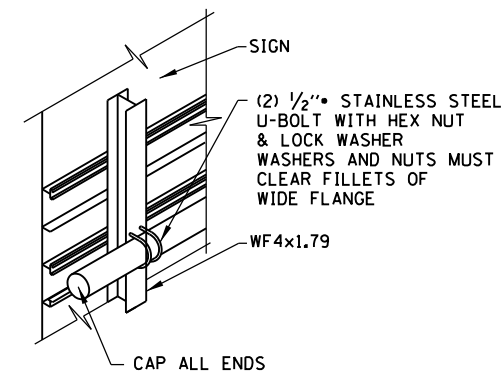
SECTION B-B

SIGN AND LUMINAIRE SUPPORT DETAIL

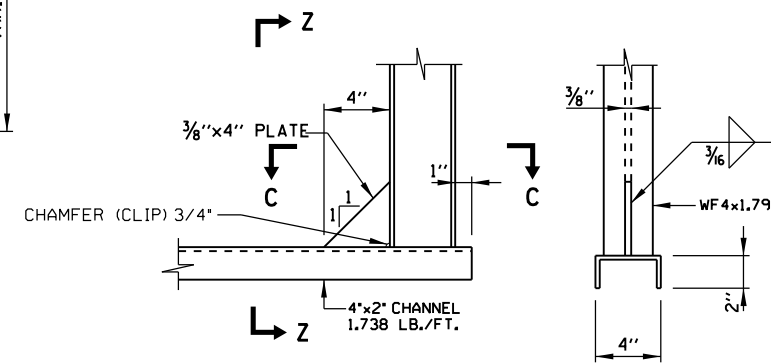
NOTES:

1. SIGN PANEL SHALL BE ATTACHED TO TRUSS AS CLOSE TO PANEL JOINTS AS POSSIBLE.
2. LUMINAIRE SUPPORT MEMBERS TO BE INSTALLED ONLY WHEN SIGN STRUCTURE IS TO BE ILLUMINATED.
3. BEACON SUPPORT MEMBERS TO BE INSTALLED ONLY WHEN FLASHING BEACON IS REQUIRED.
4. WF4x1.79 AND 4"x2" CHANNEL SHALL BE 6061-T6 ALUMINUM.
5. WELDS MUST BE IN ACCORDANCE WITH AWS D1.2.
6. LUMINAIRES SHALL NOT HAVE A PROJECTED AREA FOR WIND LOADS LARGER THAN 144IN.

7. THE C.G. OF THE LUMINAIRE SHALL NOT EXCEED 6" VERTICALLY OR HORIZONTALLY FROM WHERE IT ATTACHES ON THE 4"x2" CHANNEL.
8. THE MAXIMUM WEIGHT FOR THE LUMINAIRE SHALL BE 15LBS.

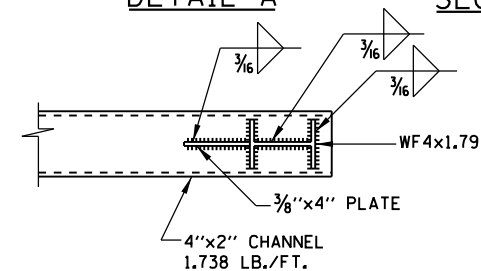


STAINLESS STEEL U-BOLT DETAIL



DETAIL A

SECTION Z-Z



SECTION C-C

NOTES:

ALL MATERIAL IS ALUMINUM (UNLESS OTHERWISE NOTED).

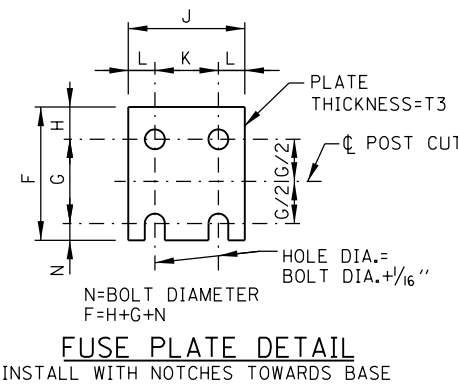
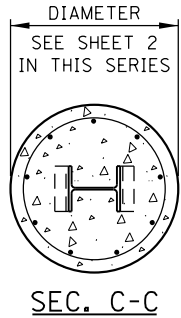
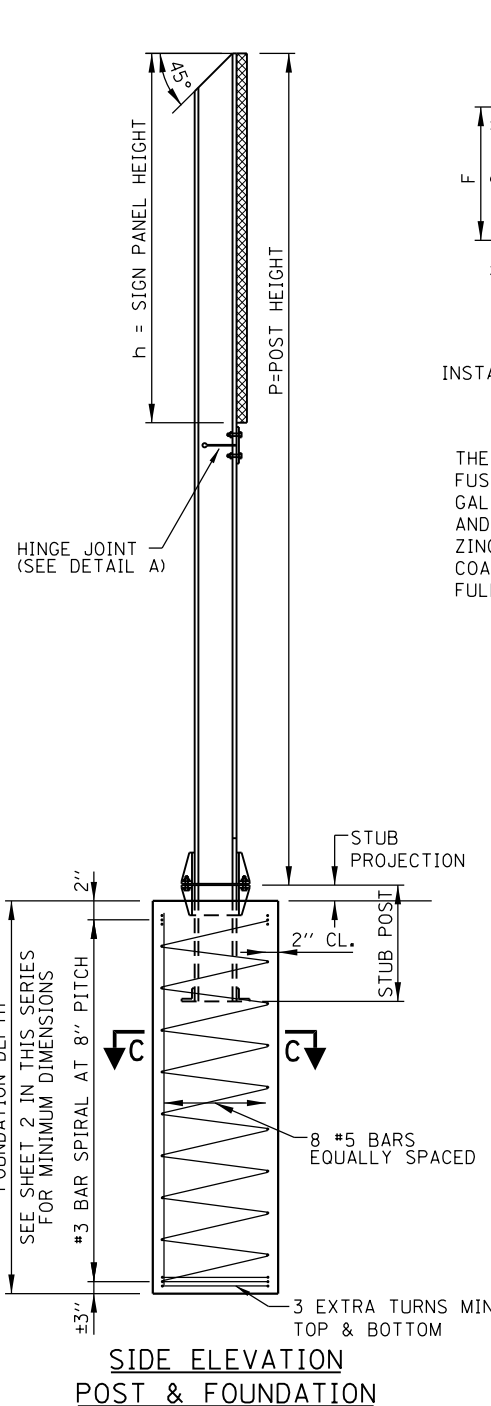


OVERHEAD SIGN STRUCTURE  
SIGN, LUMINAIRE AND BEACON  
SUPPORTS

STANDARD F8-09

DATE	REVISIONS
3-01-2021	UPDATED DESIGN LOADING AND DESIGN CRITERIA.
3-01-2020	ADDED BEACON DETAILS.
3-01-2019	REVISED NOTE 2.
3-01-2018	ADDED VERTICAL CLEARANCE.

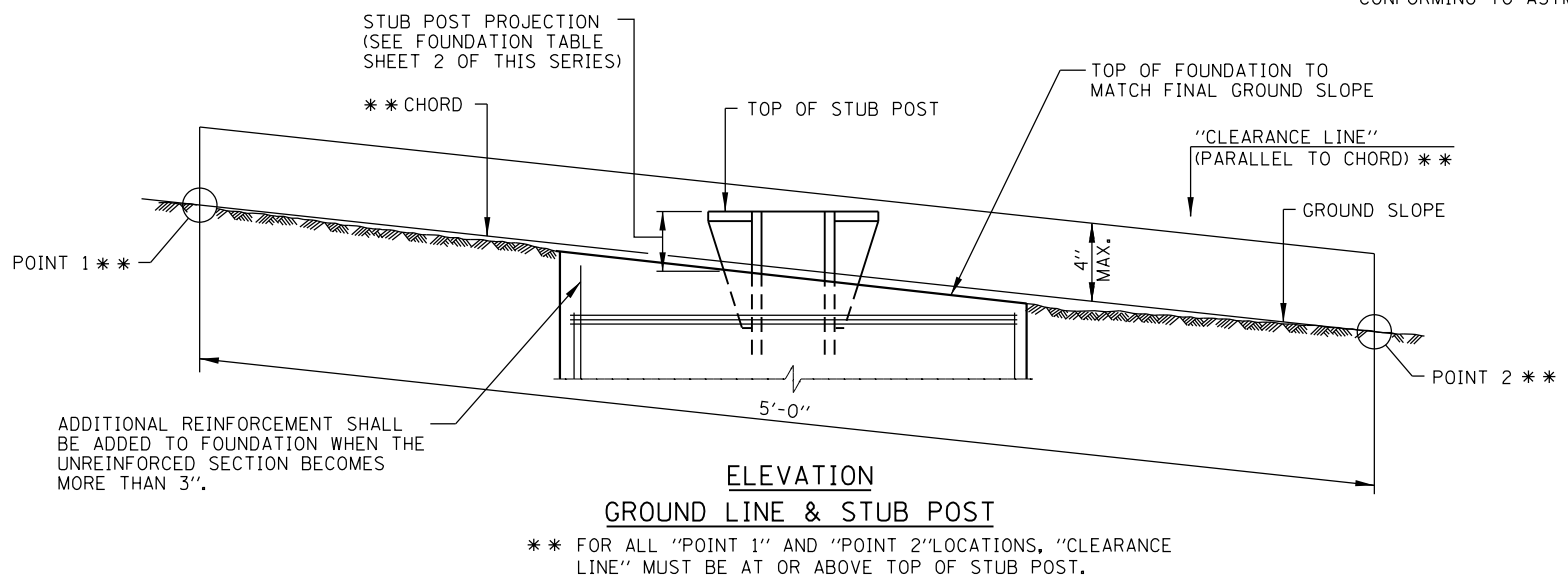
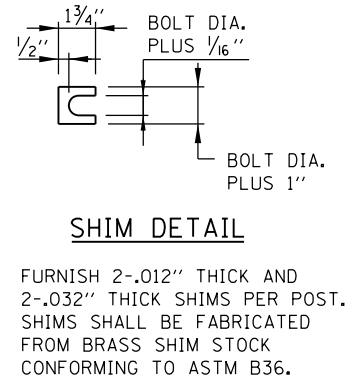
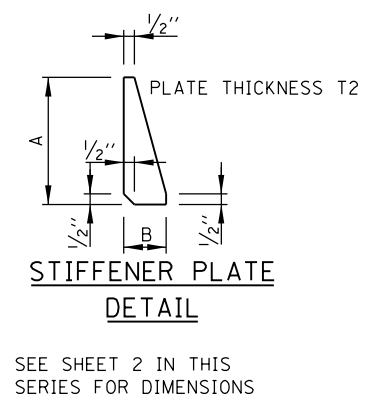
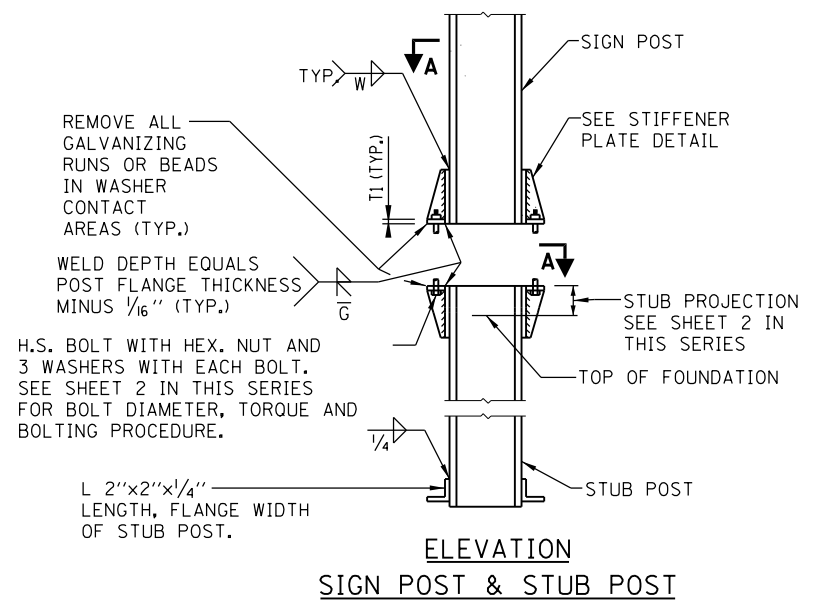
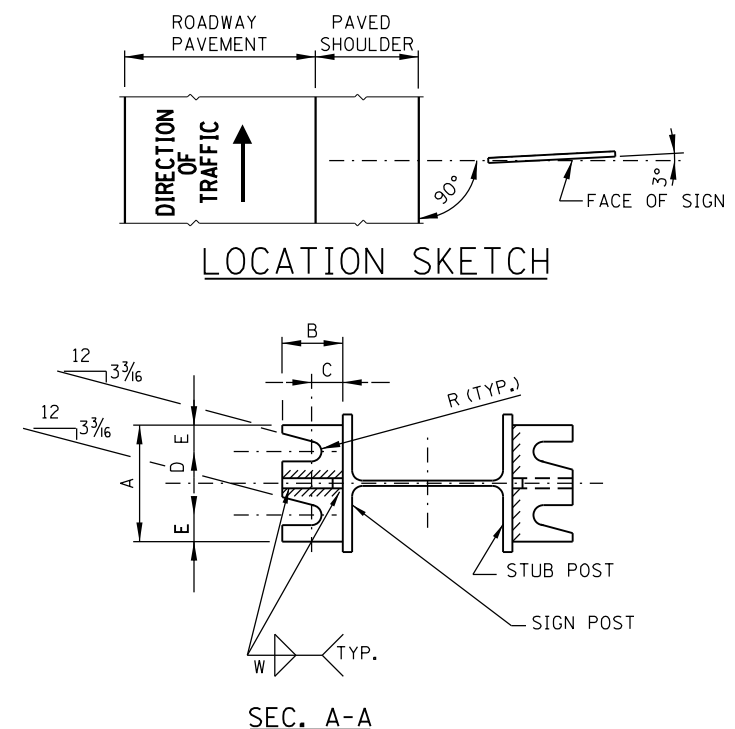
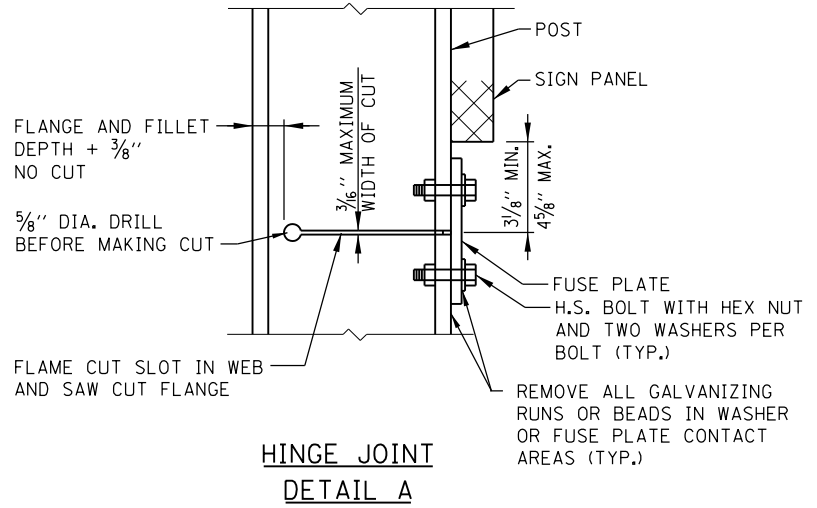
APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER



G & H DIM. TABLE		
BOLT DIA.	G	H
1/2"	2"	1 1/8"
5/8"	2 1/4"	1 1/4"
3/4"	2 1/2"	1 3/8"
7/8"	2 3/4"	1 1/2"
1"	3"	1 5/8"
1 1/8"	3 1/4"	1 3/4"
1 1/4"	3 1/2"	1 7/8"

**FABRICATORS NOTES**

THE SLOT AND THE 5/8" DIA. HOLE IN THE WEB AND THE FUSE PLATE BOLT HOLES IN THE FLANGE SHALL BE MADE BEFORE GALVANIZING. POST FLANGE SHALL BE SAW CUT AFTER GALVANIZING AND BARE METAL SURFACES SHALL BE COATED WITH AN APPROVED ZINC SOLDER OR ZINC-RICH PAINT. THESE SURFACES SHALL NOT BE COATED UNTIL THE FUSE PLATE IS INSTALLED AND BOLTS FULLY TIGHTENED.



**GENERAL NOTES**

**DESIGN:** 2015 AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 1ST EDITION, WITH 2020 INTERIM REVISIONS, INSTRUCTIONS AND INFORMATION

**CONSTRUCTION:** STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS.

**LOADING:** FOR 120 MPH WIND VELOCITY PLUS 14% GUST FACTOR NORMAL TO SIGN.

CONTROLLING LOAD COMBINATION (EXTREME 1) PER AASHTO: 1.1DC + 1.0W

**DESIGN STRESSES:**  
STRUCTURAL STEEL - PER AASHTO 36,000 P.S.I.  
REINFORCING STEEL - 60,000 P.S.I.  
CLASS SI CONCRETE - 3,500 P.S.I.

**FOUNDATION:** MINIMUM UNCONFINED COMPRESSIVE STRENGTH,  $Q_u$  FOR ALL LAYERS FOR COHESIVE SOILS (CLAYS) SHALL BE 1.25 TON/SQ.FT.

**WELDING:** ALL WELDING TO BE CONTINUOUS UNLESS OTHERWISE SHOWN. ALL WELDING TO BE DONE IN ACCORDANCE WITH CURRENT AWS SPECIFICATIONS, AND STANDARD SPECIFICATIONS.

**MATERIALS:** ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 AND LRFD SPECIFICATIONS. ALL PLATES SHALL CONFORM TO ASTM A572-GR50.

ALL HIGH STRENGTH STEEL BOLTS, NUTS AND WASHERS SHALL CONFORM TO STANDARD SPECIFICATIONS.

HIGH STRENGTH STEEL BOLTS, NUTS AND HARDENED WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M232.

HIGH STRENGTH BOLTS IN BASE PLATES SHALL BE TIGHTENED TO THE TORQUE SHOWN ON SHEET 2 IN THIS SERIES.

AFTER FABRICATION, THE POST, FUSE PLATE, BASE PLATE AND UPPER 6" OF STUB POST SHALL BE HOT - DIP GALVANIZED ACCORDING TO ASTM M111, EXCEPT AS NOTED UNDER FABRICATOR NOTES.



APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2023

DATE	REVISIONS
3-01-2023	REV. W6x15 & W16x45 AND W10x22
3-01-2021	MAX. PS. SPC. FOR 8'-6" SIGN DEPTH
3-01-2021	UPDATE DESIGN LOADING, CRITERIA AND ADDED TABLES FOR SIGN SPACING
3-01-2019	CLARIFIED DESIGN STRESS FOR SOIL PRESSURE

BREAKAWAY SIGN SUPPORT DETAILS

STANDARD F9-07

POST	FOUNDATION TABLE												BASE CONNECTION DATA TABLE										
	FOUNDATION			REINFORCEMENT						STUB POST			BOLT SIZE AND TORQUE	A	B	C	D	E	T1	T2	W	R	
				VERTICAL BARS			BAR SPIRALS				STUB LGTH.	STUB PROJECTION											LBS.***
	DIA.	MIN. DEPTH	CY.* CONC.	NO.	SIZE	LGTH.	SIZE	O.D.	LGTH.	LBS.**													
W6x9	2'-0"	6'-0"	.70	8	#5	5'-9"	#3	20½"	79'	78	2'-3"	3"	44	5⁄8" × 3¼" LG. TORQUE = 450" #	6"	2¼"	1¼"	3½"	1¼"	¾"	½"	¼"	11⁄32" "
W6x15	2'-0"	6'-0"	.70	8	#5	5'-9"	#3	20½"	79'	78	2'-6"	3"	71										
W8x18	2'-0"	6'-0"	.70	8	#5	5'-9"	#3	20½"	79'	78	2'-6"	3"	85										
W10x22	2'-6"	7'-0"	1.27	8	#5	6'-3"	#3	26½"	105'	92	3'-0"	2½"	110	¾" × 3¾" LG. TORQUE = 750" #	6"	2½"	1¾"	3¼"	1¾"	1"	½"	5⁄16"	13⁄32" "
W10x26	2'-6"	7'-6"	1.39	8	#5	6'-9"	#3	26½"	112'	98	3'-0"	2½"	137										
W12x26	2'-6"	7'-9"	1.41	8	#5	7'-6"	#3	26½"	119'	107	3'-0"	2½"	140										
W14x30	3'-0"	8'-6"	2.23	8	#5	7'-0"	#3	32½"	145'	113	3'-0"	2½"	150	7⁄8" × 4" LG. TORQUE = 950" #	7"	2¾"	1½"	4"	1½"	1"	¾"	3⁄8"	15⁄32" "
W14x38	3'-0"	9'-0"	2.36	8	#5	7'-9"	#3	32½"	153'	122	3'-6"	2½"	208										
W16x45	3'-0"	9'-6"	2.49	8	#5	8'-3"	#3	32½"	162'	130	3'-6"	2½"	233										
														1" × 4½" LG. TORQUE = 1100" #	7½"	3"	1¾"	4"	1¾"	1¼"	¾"	17⁄32" "	

- \* QUANTITY OF CLASS SI CONCRETE CONSISTS OF ALL CONCRETE NECESSARY FOR ONE FOUNDATION. (CUBIC YARDS)
- \*\* THIS INCLUDES REINFORCEMENT BARS AND SPIRAL HOOPING REQUIRED FOR ONE FOUNDATION.
- \*\*\* INCLUDES WEIGHT OF STUB POST WITH ANGLES, GUSSETS, BASE PLATES, BOLTS, NUTS, WASHERS, PLUS BASE PLATES AND GUSSETS ON MAIN POST, PLUS FUSE PLATE (IF ANY) WITH BOLTS, NUTS AND WASHERS. (ONE POST)

EQUIVALENT TORQUE VALUES

450" # = 37.5' #  
750" # = 62.5' #  
950" # = 79.2' #  
1100" # = 91.7' #

POST	FUSE PLATE DATA TABLE				FUSE PLATE BOLT SIZE TABLE											
					SIGN PANEL HEIGHT (h)											
	J	K	L	T3	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	
W6x9	4"	2¼"	7⁄8"	¼"	½"Øx1½"	½"Øx1½"	½"Øx1½"	---	---	---	---	---	---	---	---	---
W6x15	6"	3½"	1¼"	3⁄8"	5⁄8"Øx2"	5⁄8"Øx2"	¾"Øx2"	¾"Øx2"	¾"Øx2"	¾"Øx2"	¾"Øx2"	---	---	---	---	---
W8x18	5¼"	2¾"	1¼"	3⁄8"	½"Øx1¾"	5⁄8"Øx2"	¾"Øx2"	¾"Øx2"	¾"Øx2"	¾"Øx2"	¾"Øx2"	7⁄8"Øx2¼"	7⁄8"Øx2¼"	---	---	---
W10x22	5¾"	2¾"	1½"	½"	½"Øx1½"	5⁄8"Øx2"	¾"Øx2¼"	¾"Øx2¼"	7⁄8"Øx2¼"	7⁄8"Øx2¼"	7⁄8"Øx2¼"	7⁄8"Øx2¼"	7⁄8"Øx2¼"	7⁄8"Øx2¼"	1"Øx2½"	
W10x26	5¾"	2¾"	1½"	5⁄8"	½"Øx2"	5⁄8"Øx2¼"	¾"Øx2½"	¾"Øx2½"	7⁄8"Øx2½"	1"Øx2¾"	1"Øx2¾"	1"Øx2¾"	1"Øx2¾"	1"Øx2¾"	1"Øx2¾"	
W12x26	6½"	3½"	1½"	5⁄8"	---	---	---	---	---	7⁄8"Øx2½"	---	---	1"Øx2½"	1"Øx2½"	1"Øx2½"	
W14x30	6¾"	3½"	15⁄8"	½"	½"Øx2"	½"Øx2"	5⁄8"Øx2"	¾"Øx2¼"	¾"Øx2¼"	7⁄8"Øx2½"	7⁄8"Øx2½"	1"Øx2½"	1"Øx2½"	1"Øx2½"	1"Øx2½"	
W14x38	6¾"	3½"	15⁄8"	½"	---	½"Øx2"	5⁄8"Øx2¼"	5⁄8"Øx2¼"	¾"Øx2½"	7⁄8"Øx2½"	7⁄8"Øx2½"	1"Øx2½"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	
W16x45	7"	3½"	1¾"	½"	---	---	---	5⁄8"Øx2¼"	¾"Øx2½"	¾"Øx2½"	7⁄8"Øx2½"	1"Øx2¾"	1"Øx2¾"	1⁄8"Øx3"	1¼"Øx3"	
POST	FUSE PLATE DATA TABLE				FUSE PLATE BOLT SIZE TABLE											
					SIGN PANEL HEIGHT (h)											
	J	K	L	T3	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	---	
W6x9	4"	2¼"	7⁄8"	¼"	---	---	---	---	---	---	---	---	---	---	---	
W6x15	6"	3½"	1¼"	3⁄8"	---	---	---	---	---	---	---	---	---	---	---	
W8x18	5¼"	2¾"	1¼"	3⁄8"	---	---	---	---	---	---	---	---	---	---	---	
W10x22	5¾"	2¾"	1½"	½"	1"Øx2½"	---	---	---	---	---	---	---	---	---	---	
W10x26	5¾"	2¾"	1½"	5⁄8"	1"Øx2¾"	1"Øx2¾"	1"Øx2¾"	---	---	---	---	---	---	---	---	
W12x26	6½"	3½"	1½"	5⁄8"	1"Øx2½"	1"Øx2½"	1⁄8"Øx3"	1¼"Øx3"	---	---	---	---	---	---	---	
W14x30	6¾"	3½"	15⁄8"	½"	1"Øx2½"	1"Øx2½"	1⁄8"Øx3"	1¼"Øx3"	1¼"Øx3"	---	---	---	---	---	---	
W14x38	6¾"	3½"	15⁄8"	½"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	---	
W16x45	7"	3½"	1¾"	½"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	1¼"Øx3"	---	

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1. ASSEMBLE POST TO STUB WITH H.S. BOLTS AND ONE OF THE THREE FLAT WASHERS ON EACH BOLT BETWEEN PLATES AS SHOWN.
2. SHIMS MAY BE USED BETWEEN PLATES TO LEVEL POST.
3. TIGHTEN BOLTS IN BASE PLATE IN A SYSTEMATIC ORDER TO THE REQUIRED TORQUE.
4. LOOSEN EACH BOLT AND RETIGHTEN TO THE REQUIRED TORQUE IN SAME ORDER AS INITIAL TIGHTENING.
5. BURR OR CENTER PUNCH THREADS AT JUNCTURE OF BOLT AND NUT TO PREVENT NUT FROM LOOSENING.

PROCEDURE FOR FUSE PLATE BOLT TIGHTENING:

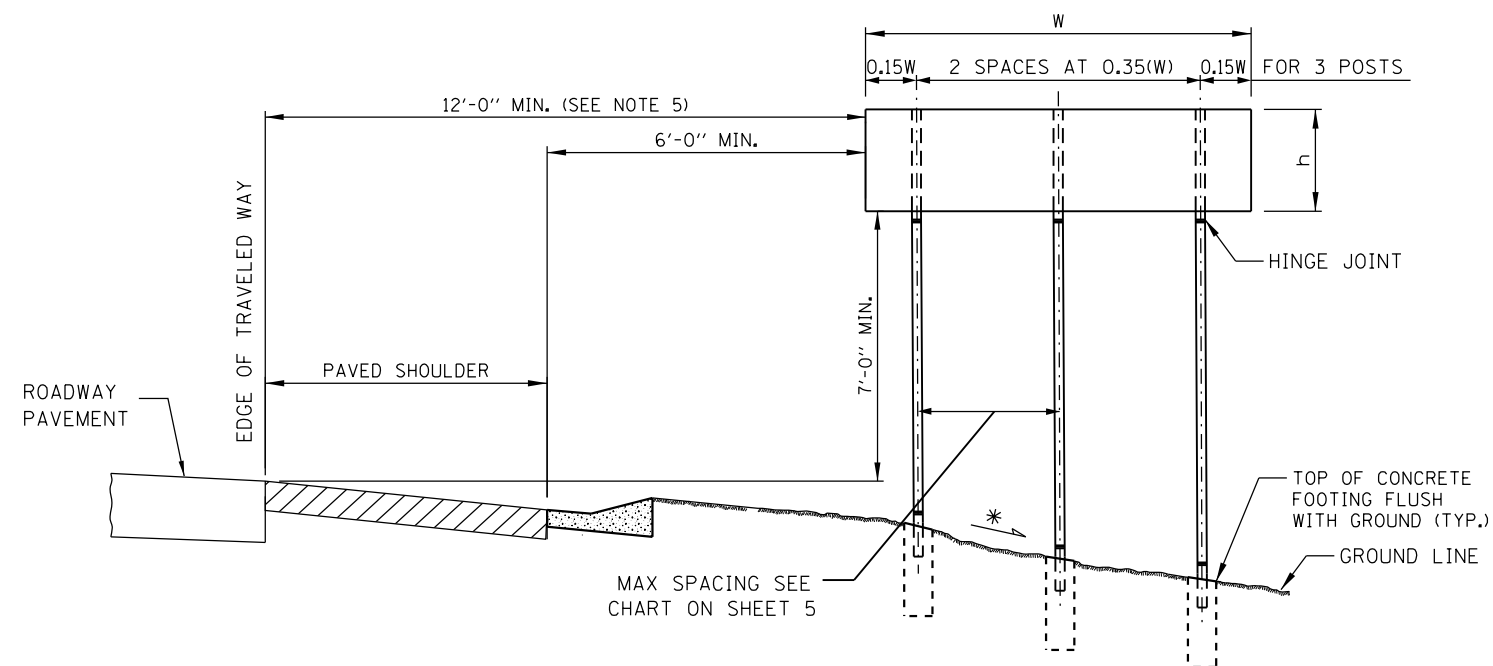
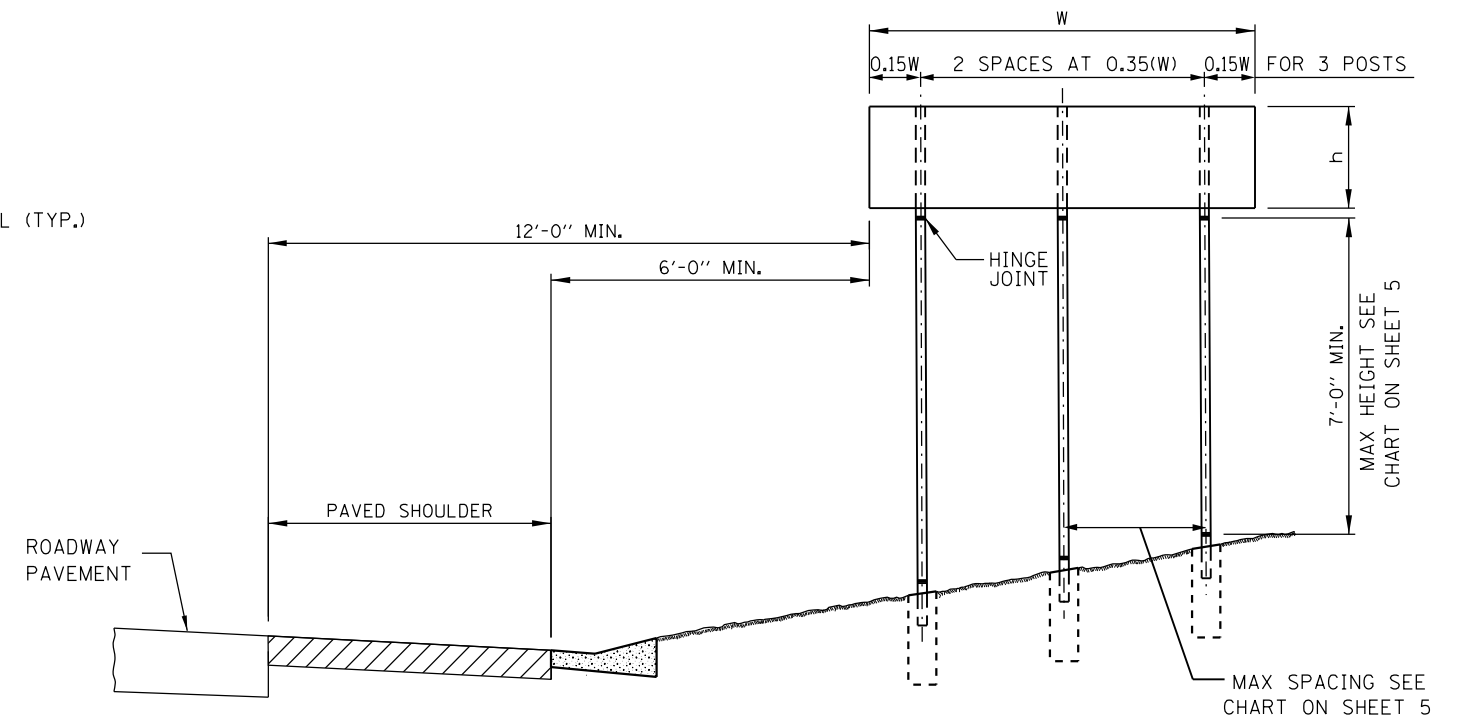
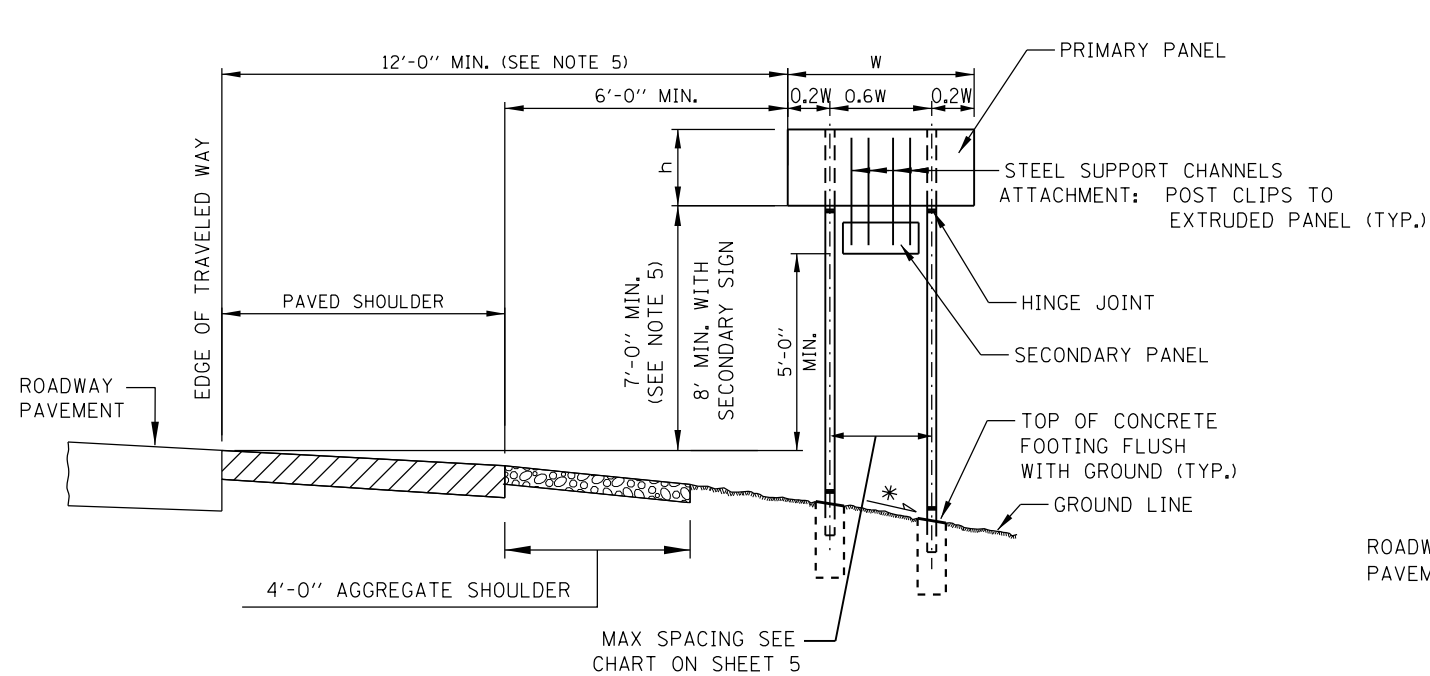
ALL FRICTION FUSE BOLTS SHALL BE TIGHTENED IN THE SHOP AS APPROVED BY THE ENGINEER ACCORDING TO ONE OF THE FOLLOWING METHODS:

1. TURN-OF-NUT TIGHTENING.
2. TIGHTENING BY USE OF A DIRECT TENSION INDICATOR.

THE ABOVE METHODS OF INSTALLATION AND TIGHTENING SHALL CONFORM TO THE LATEST ISSUE OF THE SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A-325 OR A-490 BOLTS, FOR SLIP - CRITICAL CONNECTIONS AS ISSUED BY THE RESEARCH COUNCIL ON RIVETED AND BOLTED STRUCTURAL JOINTS OF THE ENGINEERING FOUNDATION.

TIGHTENING SHALL BE TO SUCH A DEGREE AS TO OBTAIN THE FOLLOWING MINIMUM RESIDUAL TENSION IN EACH BOLT.

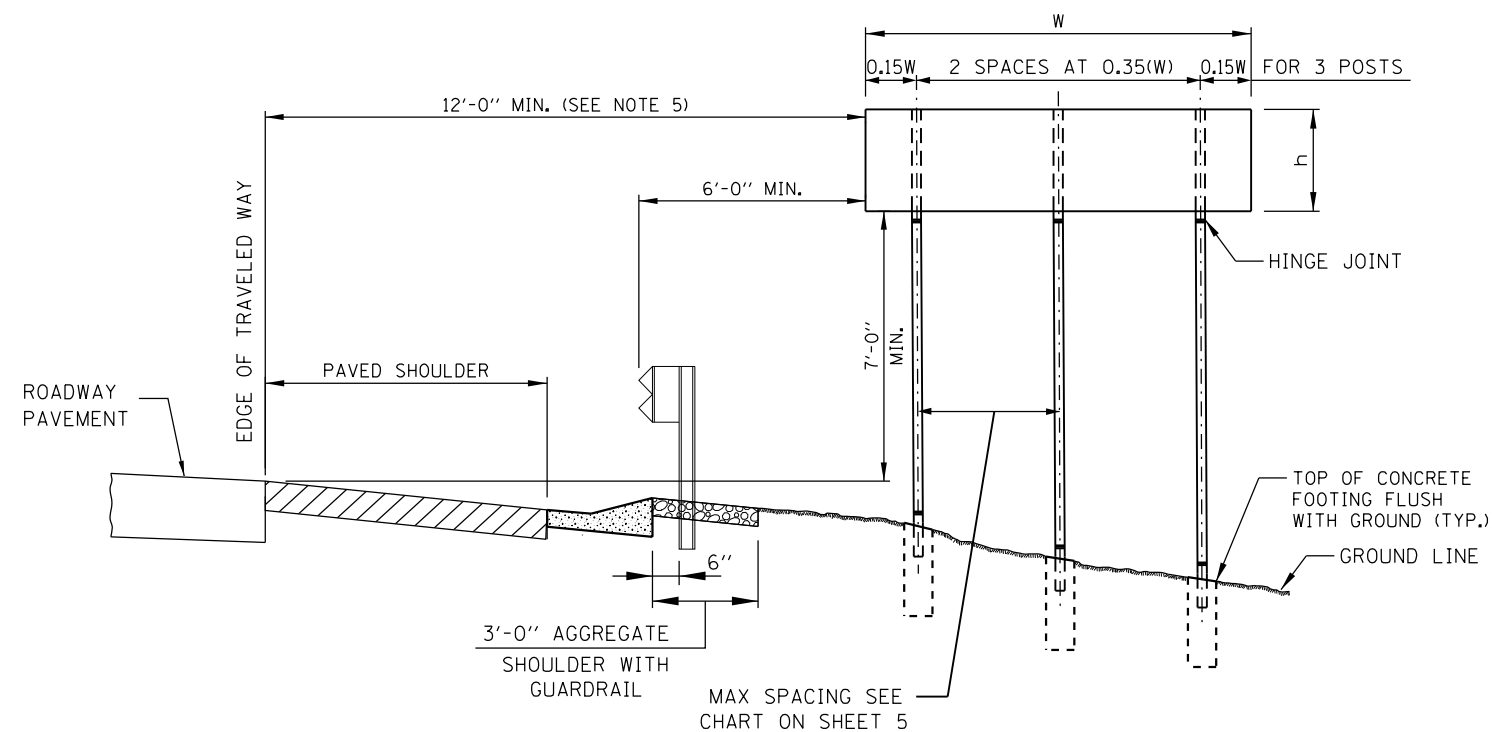
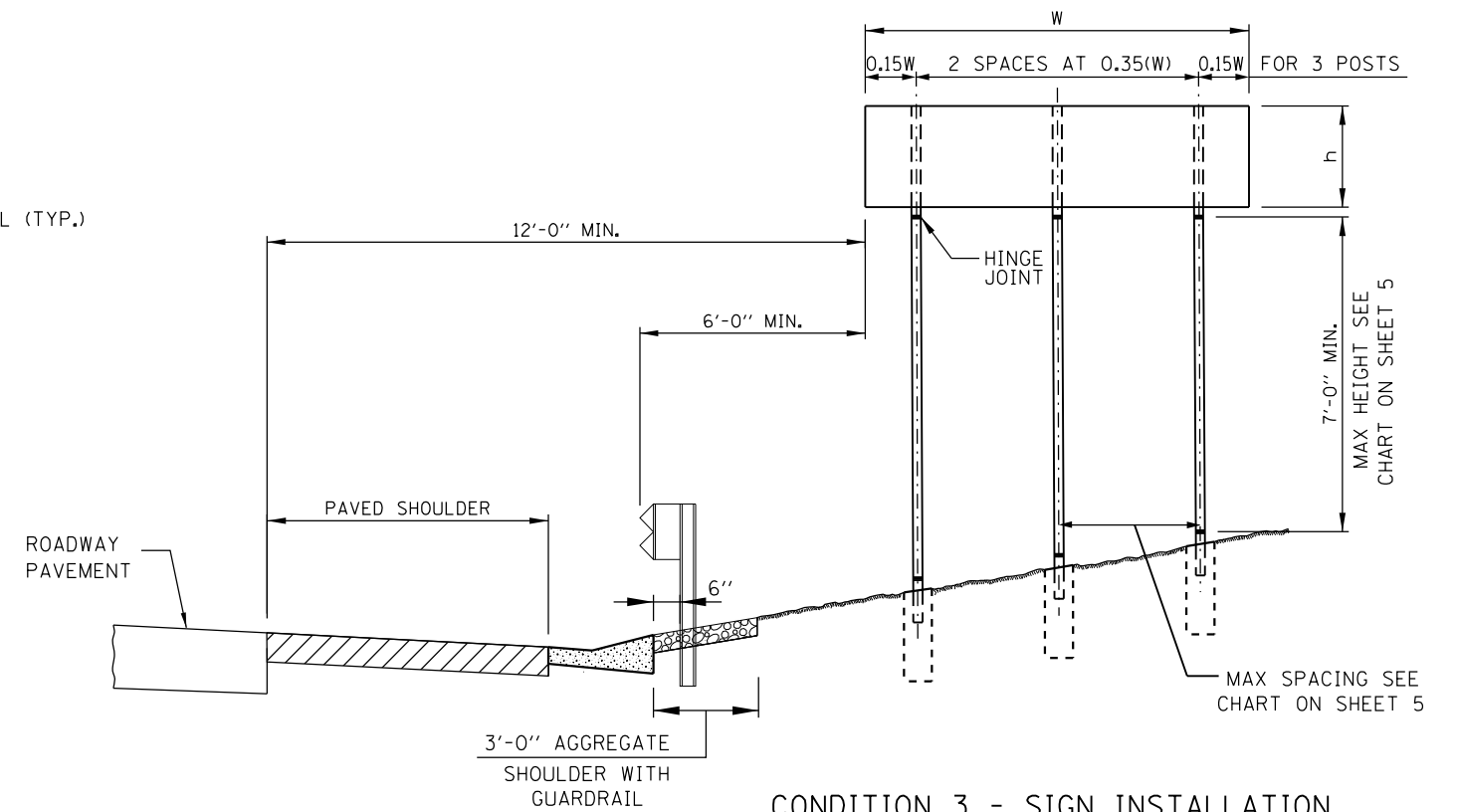
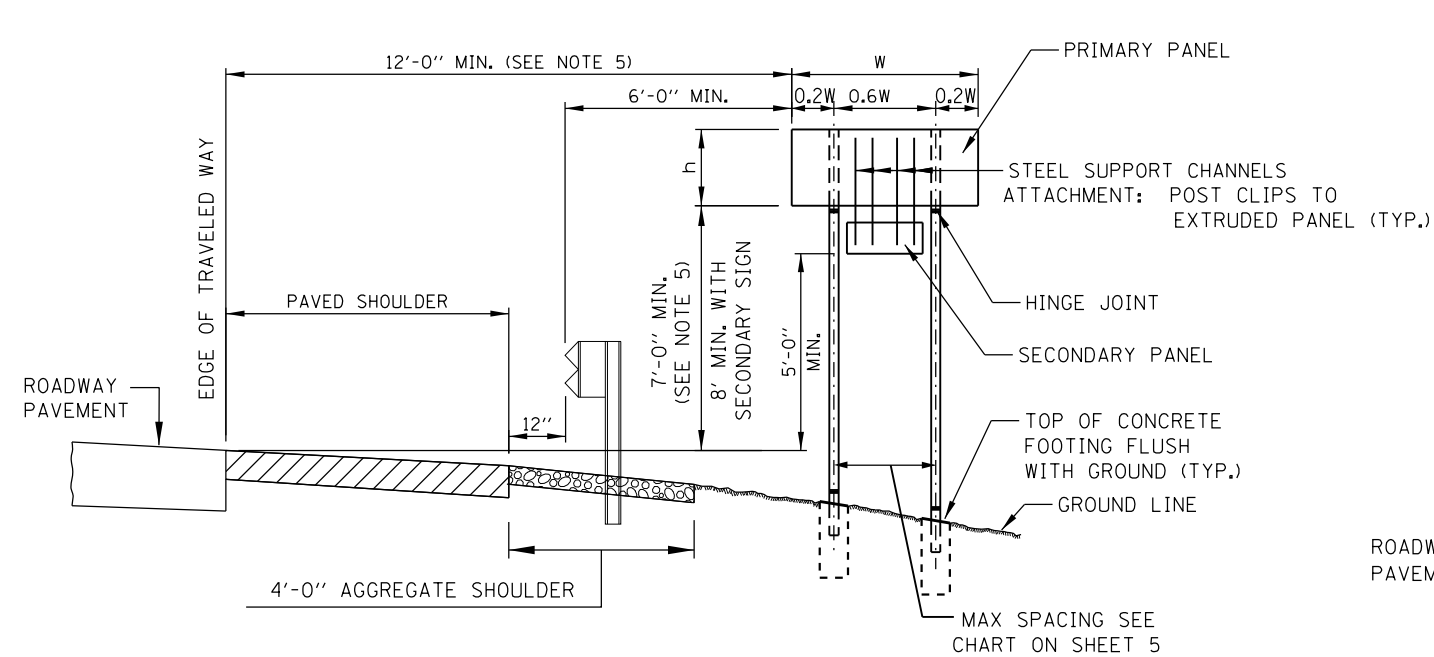
BOLT DIA.	MIN. RESIDUAL BOLT TENSION	BOLT DIA.	MIN. RESIDUAL BOLT TENSION	BOLT DIA.	MIN. RESIDUAL BOLT TENSION
½"	12,050	7⁄8"	39,250	1¼"	71,700
5⁄8"	19,200	1"	51,500		
¾"	28,400	1⅛"	56,450		



- NOTES:

1. SEE SIGN INSTALLATION SCHEDULE IN CONTRACT PLANS FOR DIMENSIONS.
2. THE DIMENSIONS OF ALL POSTS FOR GROUND MOUNTED SIGNS ARE BASED ON DESIGN CROSS SECTIONS. THE CONTRACTOR SHALL VERIFY REQUIRED POST LENGTHS IN THE FIELD, PRIOR TO SUBMITTING SHOP DRAWINGS AND POST FABRICATION TO MAINTAIN THE CLEARANCES SHOWN.
3. SIGN FOUNDATION ELEVATIONS TO BE BASED ON FINISHED SLOPES.
4. ANY ADDITIONAL SIGN TO BE ADDED LATER MUST BE SUPPORTED BY THE EXISTING SIGN PANEL AND NOT THE SIGN POST. MINIMUM CLEARANCES SHALL BE MAINTAINED.
5. SIGNS THAT ARE PLACED WELL OUTSIDE THE CLEAR ZONE MAY BE INSTALLED WITH A MINIMUM HEIGHT OF 5 FEET, MEASURED VERTICALLY FROM THE BOTTOM OF THE SIGN TO THE HORIZONTAL ELEVATION OF THE NEAR EDGE OF TRAVELED ROADWAY.
6. MINIMUM HEIGHT OF LOWEST POST SHALL BE 7'-0" MEASURED BETWEEN STUB PROJECTION AND HINGE JOINT.
7. FOR TWO POSTS SPACED LESS THAN 7 FEET APART, EACH POST SHALL HAVE A MASS LESS THAN 18 lb/ft.
8. WHEN THE TOTAL COMBINED WEIGHT OF THE TWO POSTS LOCATED WITHIN 7 FEET OF EACH OTHER EXCEEDS 600 lbs., THE SIGN SHALL BE PLACED WELL OUTSIDE THE CLEAR ZONE OR BE SHIELDED FROM VEHICULAR IMPACT.





NOTES:

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POST SIZE W6x15	SIGN DEPTH						
	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"
CLEAR HEIGHT	POST MAX SPACING						
6'-0"	11'-6"	9'-0"	7'-0"	6'-0"	5'-0"	4'-0"	3'-6"
8'-0"	8'-0"	6'-6"	5'-6"	4'-6"	3'-6"	3'-0"	-
10'-0"	6'-0"	5'-0"	4'-0"	3'-6"	3'-0"	-	-
12'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-
14'-0"	3'-6"	3'-0"	-	-	-	-	-
16'-0"	3'-0"	-	-	-	-	-	-

POST SIZE W6x9	SIGN DEPTH		
	4'-0"	5'-0"	6'-0"
CLEAR HEIGHT	POST MAX SPACING		
6'-0"	5'-6"	4'-0"	3'-0"
8'-0"	4'-0"	3'-0"	-
10'-0"	3'-0"	-	-
12'-0"	-	-	-

POST SIZE W14x30	SIGN DEPTH															
	4'-0''	5'-0''	6'-0''	7'-0''	8'-0''	9'-0''	10'-0''	11'-0''	12'-0''	13'-0''	14'-0''	15'-0''	16'-0''	17'-0''	18'-0''	19'-0''
CLEAR HEIGHT	POST MAX SPACING															
6'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	11'-6''	10'-0''	8'-0''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''
8'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	11'-0''	9'-6''	8'-0''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-
10'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	10'-6''	9'-0''	7'-6''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-	-
12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	10'-0''	8'-6''	7'-6''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-
14'-0''	12'-0''	12'-0''	11'-0''	9'-6''	8'-6''	7'-6''	6'-6''	5'-6''	5'-0''	4'-0''	3'-6''	3'-0''	-	-	-	-
16'-0''	12'-0''	11'-0''	9'-6''	8'-0''	7'-0''	6'-0''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-
18'-0''	10'-6''	9'-0''	8'-0''	7'-0''	6'-0''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-
20'-0''	8'-6''	7'-6''	6'-6''	6'-0''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-	-
22'-0''	7'-6''	6'-6''	6'-0''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-	-	-	-
24'-0''	6'-6''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-	-	-	-
26'-0''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-	-	-	-	-
28'-0''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-	-	-	-	-	-
30'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-	-	-	-	-	-	-

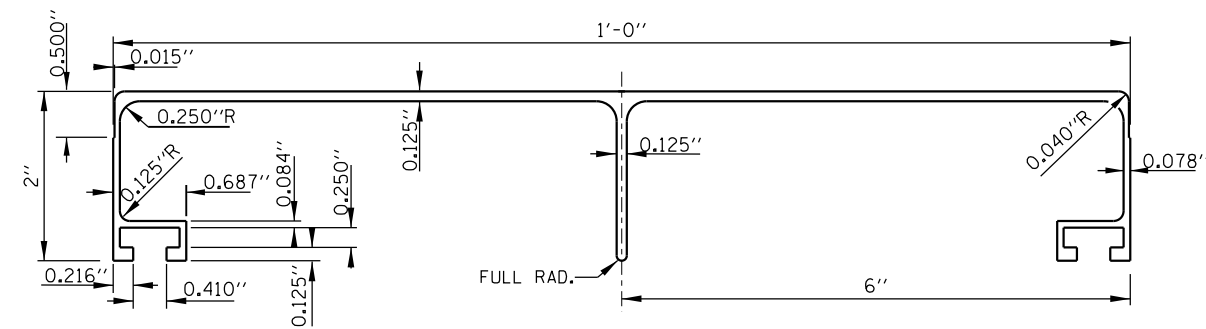
POST SIZE W14x38	SIGN DEPTH																				
	4'-0''	5'-0''	6'-0''	7'-0''	8'-0''	9'-0''	10'-0''	11'-0''	12'-0''	13'-0''	14'-0''	15'-0''	16'-0''	17'-0''	18'-0''	19'-0''	20'-0''	21'-0''	22'-0''	23'-0''	24'-0''
CLEAR HEIGHT	POST MAX SPACING																				
6'-0''	-	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	10'-6''	9'-0''	7'-6''	6'-6''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-
8'-0''	-	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	11'-6''	10'-0''	8'-6''	7'-6''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-
10'-0''	-	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	11'-0''	9'-6''	8'-6''	7'-6''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-
12'-0''	-	12'-0''	12'-0''	12'-0''	12'-0''	12'-0''	10'-6''	9'-0''	8'-0''	7'-0''	6'-0''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-
14'-0''	-	12'-0''	12'-0''	12'-0''	11'-6''	10'-0''	9'-0''	8'-0''	7'-0''	6'-0''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-
16'-0''	-	12'-0''	12'-0''	11'-0''	9'-6''	8'-6''	7'-6''	6'-6''	6'-0''	5'-6''	4'-6''	4'-0''	3'-6''	-	-	-	-	-	-	-	-
18'-0''	-	12'-0''	10'-6''	9'-6''	8'-6''	7'-6''	6'-6''	6'-0''	5'-0''	4'-6''	4'-0''	3'-6''	-	-	-	-	-	-	-	-	-
20'-0''	-	10'-6''	9'-0''	8'-0''	7'-0''	6'-6''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-	-	-	-
22'-0''	-	9'-0''	8'-0''	7'-0''	6'-6''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-	-	-	-	-	-
24'-0''	-	7'-6''	7'-0''	6'-0''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-	-	-	-	-	-	-
26'-0''	-	6'-6''	6'-0''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-	-	-	-	-	-	-	-
28'-0''	-	6'-0''	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-	-	-	-	-	-	-	-	-
30'-0''	-	5'-6''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-	-	-	-	-	-	-	-	-	-

POST SIZE W16x45	SIGN DEPTH																				
	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	18'-0"	19'-0"	20'-0"	21'-0"	22'-0"	23'-0"	24'-0"
CLEAR HEIGHT	POST MAX SPACING																				
6'-0"	-	-	-	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	11'-0"	10'-0"	9'-0"	7'-6"	6'-6"	6'-0"	5'-0"	4'-6"	4'-0"	3'-6"
8'-0"	-	-	-	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	11'-6"	10'-0"	8'-6"	7'-6"	6'-6"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"
10'-0"	-	-	-	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	11'-0"	10'-0"	8'-6"	7'-6"	6'-6"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-
12'-0"	-	-	-	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	11'-0"	9'-6"	8'-6"	7'-6"	6'-6"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-
14'-0"	-	-	-	12'-0"	12'-0"	12'-0"	12'-0"	10'-6"	9'-0"	8'-0"	7'-0"	6'-6"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-
16'-0"	-	-	-	12'-0"	12'-0"	11'-6"	10'-0"	9'-0"	8'-0"	7'-0"	6'-6"	5'-6"	5'-0"	4'-0"	4'-0"	3'-6"	3'-0"	-	-	-	-
18'-0"	-	-	-	12'-0"	11'-0"	10'-0"	9'-0"	8'-0"	7'-0"	6'-0"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-	-	-
20'-0"	-	-	-	10'-6"	9'-6"	8'-6"	7'-6"	7'-0"	6'-0"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-	-	-	-
22'-0"	-	-	-	9'-0"	8'-6"	7'-6"	6'-6"	6'-0"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-	-	-	-	-
24'-0"	-	-	-	8'-0"	7'-6"	6'-6"	6'-0"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-	-	-	-	-	-
26'-0"	-	-	-	7'-0"	6'-6"	6'-0"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	3'-0"	-	-	-	-	-	-	-	-
28'-0"	-	-	-	6'-6"	6'-0"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	3'-0"	-	-	-	-	-	-	-	-	-
30'-0"	-	-	-	5'-6"	5'-0"	4'-6"	4'-6"	4'-0"	3'-6"	3'-0"	3'-0"	-	-	-	-	-	-	-	-	-	-

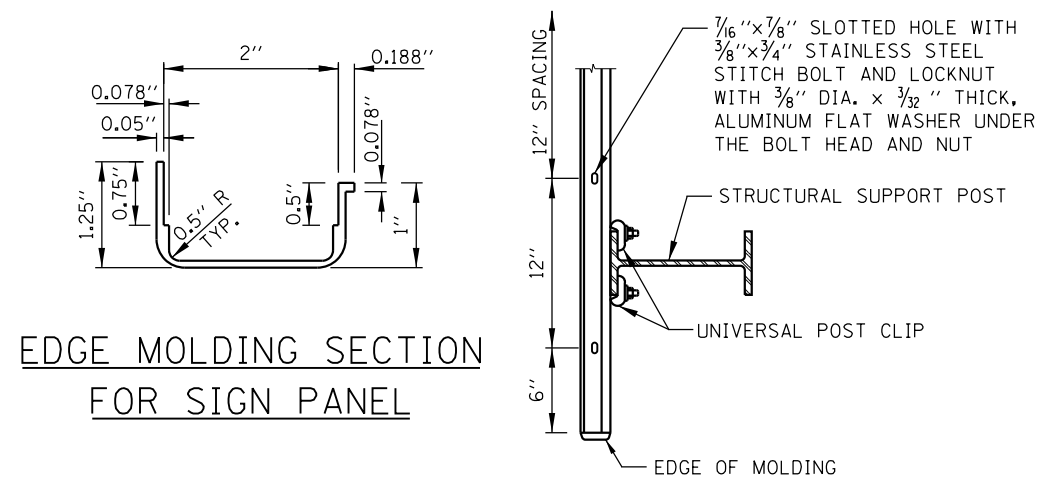
POST SIZE W12x26	SIGN DEPTH															
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CLEAR HEIGHT	POST MAX SPACING															
6'-0''	-	-	-	-	-	12'-0''	-	-	8'-0''	6'-6''	5'-6''	4'-6''	4'-0''	3'-0''	3'-0''	
8'-0''	-	-	-	-	-	10'-6''	-	-	6'-6''	5'-6''	4'-6''	4'-0''	3'-0''	-	-	
10'-0''	-	-	-	-	-	8'-6''	-	-	5'-6''	4'-6''	4'-0''	3'-0''	-	-	-	
12'-0''	-	-	-	-	-	7'-0''	-	-	4'-6''	4'-0''	3'-0''	-	-	-	-	
14'-0''	-	-	-	-	-	6'-0''	-	-	4'-0''	3'-0''	-	-	-	-	-	
16'-0''	-	-	-	-	-	5'-0''	-	-	3'-6''	3'-0''	-	-	-	-	-	
18'-0''	-	-	-	-	-	4'-0''	-	-	3'-0''	-	-	-	-	-	-	
20'-0''	-	-	-	-	-	3'-6''	-	-	-	-	-	-	-	-	-	
22'-0''	-	-	-	-	-	3'-0''	-	-	-	-	-	-	-	-	-	
24'-0''	-	-	-	-	-	3'-0''	-	-	-	-	-	-	-	-	-	

POST SIZE W10x26	SIGN DEPTH														
	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0"	
CLEAR HEIGHT	POST MAX SPACING														
6'-0"	12'-0"	12'-0"	12'-0"	12'-0"	12'-0"	11'-6"	9'-6"	8'-0"	7'-0"	6'-0"	5'-0"	4'-0"	3'-6"	3'-0"	
8'-0"	12'-0"	12'-0"	12'-0"	12'-0"	10'-6"	9'-0"	7'-6"	6'-6"	5'-6"	5'-0"	4'-0"	3'-6"	3'-0"	-	
10'-0"	12'-0"	12'-0"	12'-0"	10'-0"	8'-6"	7'-6"	6'-0"	5'-6"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	
12'-0"	12'-0"	11'-6"	9'-6"	8'-0"	7'-0"	6'-0"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-	
14'-0"	11'-0"	9'-0"	8'-0"	7'-0"	6'-0"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-	-	
16'-0"	9'-0"	7'-6"	6'-6"	5'-6"	5'-0"	4'-6"	4'-0"	3'-6"	3'-0"	-	-	-	-	-	
18'-0"	7'-6"	6'-6"	5'-6"	5'-0"	4'-0"	3'-6"	3'-6"	3'-0"	-	-	-	-	-	-	
20'-0"	6'-6"	5'-6"	5'-0"	4'-0"	3'-6"	3'-0"	3'-0"	-	-	-	-	-	-	-	
22'-0"	5'-6"	4'-6"	4'-0"	3'-6"	3'-0"	3'-0"	-	-	-	-	-	-	-	-	
24'-0"	4'-6"	4'-0"	3'-6"	3'-0"	3'-0"	-	-	-	-	-	-	-	-	-	
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28'-0"	3'-6"	3'-0"	3'-0"	-	-	-	-	-	-	-	-	-	-	-	
30'-0"	3'-0"	3'-0"	-	-	-	-	-	-	-	-	-	-	-	-	

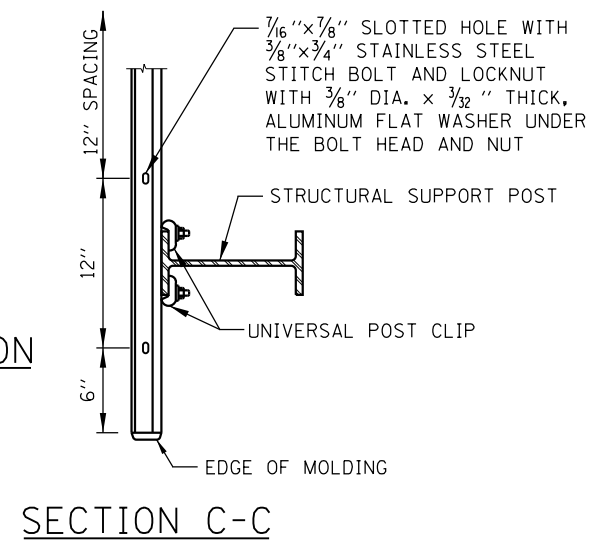
POST SIZE W10x22	SIGN DEPTH													
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CLEAR HEIGHT	POST MAX SPACING													
6'-0''	12'-0''	12'-0''	12'-0''	12'-0''	10'-6''	9'-0''	7'-6''	6'-0''	5'-0''	4'-0''	3'-6''	3'-0''		
8'-0''	12'-0''	12'-0''	11'-0''	10'-0''	8'-6''	7'-0''	6'-0''	5'-0''	4'-0''	3'-6''	3'-0''	-		
10'-0''	12'-0''	11'-6''	9'-6''	8'-0''	6'-6''	5'-6''	5'-0''	4'-0''	3'-6''	3'-0''	-	-		
12'-0''	11'-0''	9'-0''	7'-6''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-		
14'-0''	9'-0''	7'-6''	6'-6''	5'-6''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-		
16'-0''	7'-0''	6'-0''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-		
18'-0''	6'-0''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-		
20'-0''	5'-0''	4'-6''	4'-0''	3'-6''	3'-0''	-	-	-	-	-	-	-		
22'-0''	4'-6''	3'-6''	3'-6''	3'-0''	-	-	-	-	-	-	-	-		
24'-0''	3'-6''	3'-0''	3'-0''	-	-	-	-	-	-	-	-	-		
26'-0''	3'-0''	3'-0''	-	-	-	-	-	-	-	-	-	-		
28'-0''	3'-0''	-	-	-	-	-	-	-	-	-	-	-		



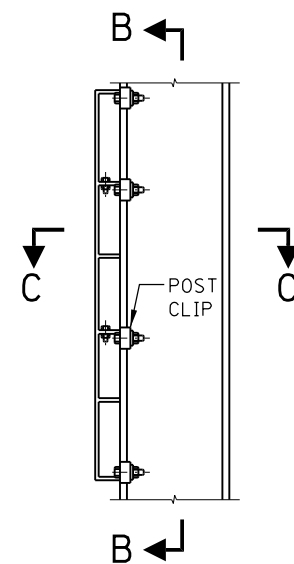
12" PANEL  
TYPE B SIGN PANEL EXTRUSIONS



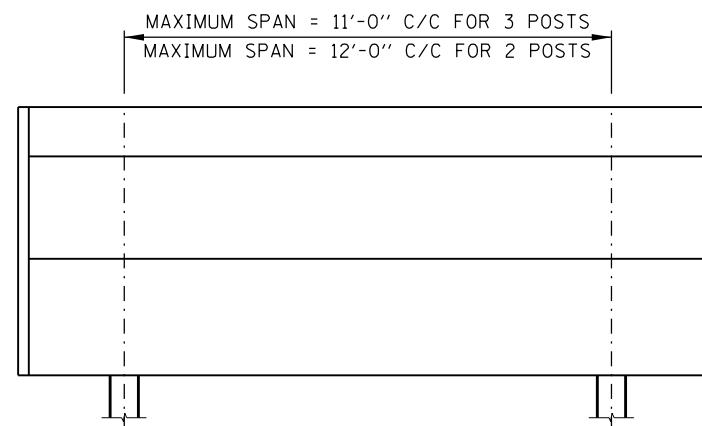
EDGE MOLDING SECTION  
FOR SIGN PANEL



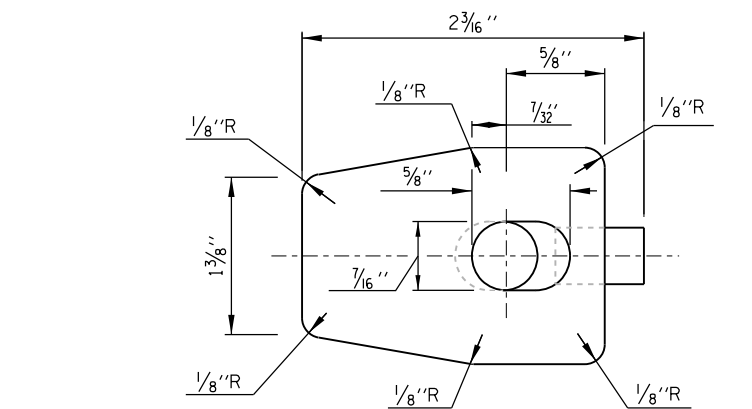
SECTION C-C



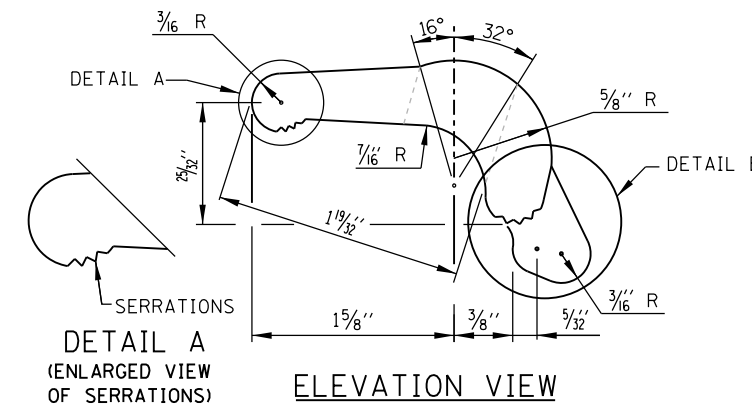
SECTION A-A



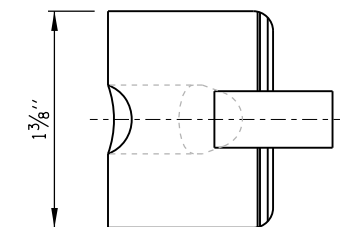
FACE OF SIGN PANEL



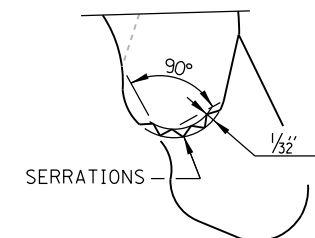
PLAN VIEW



ELEVATION VIEW

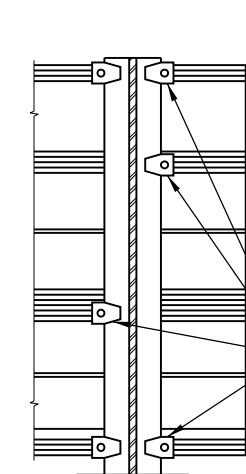


END VIEW

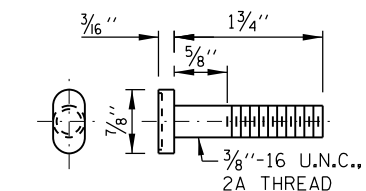


DETAIL B  
(ENLARGED DETAIL  
OF SERRATIONS)

UNIVERSAL POST CLIP DETAIL



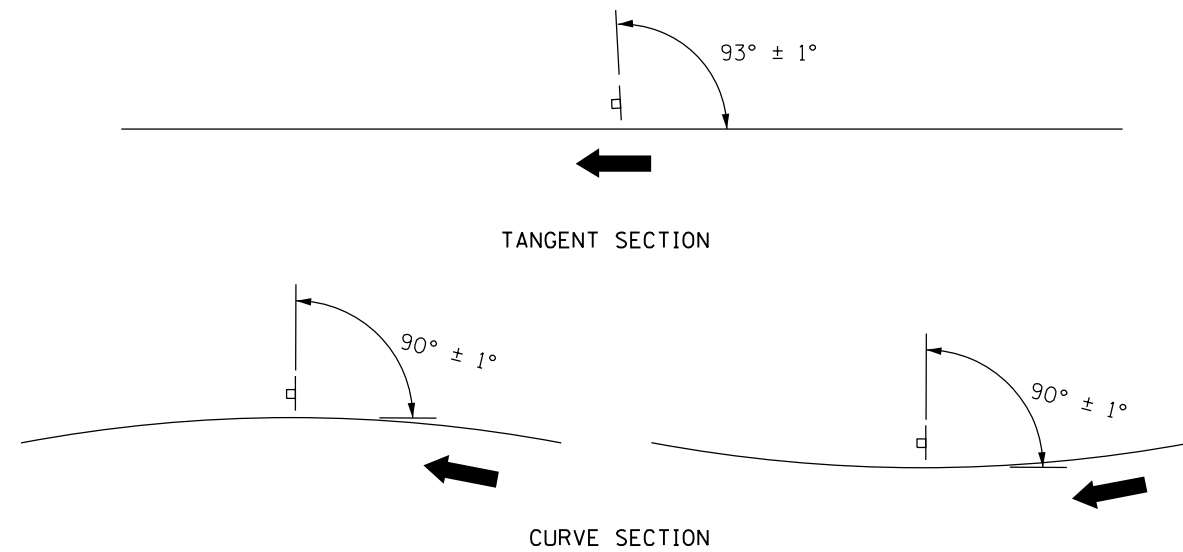
SECTION B-B



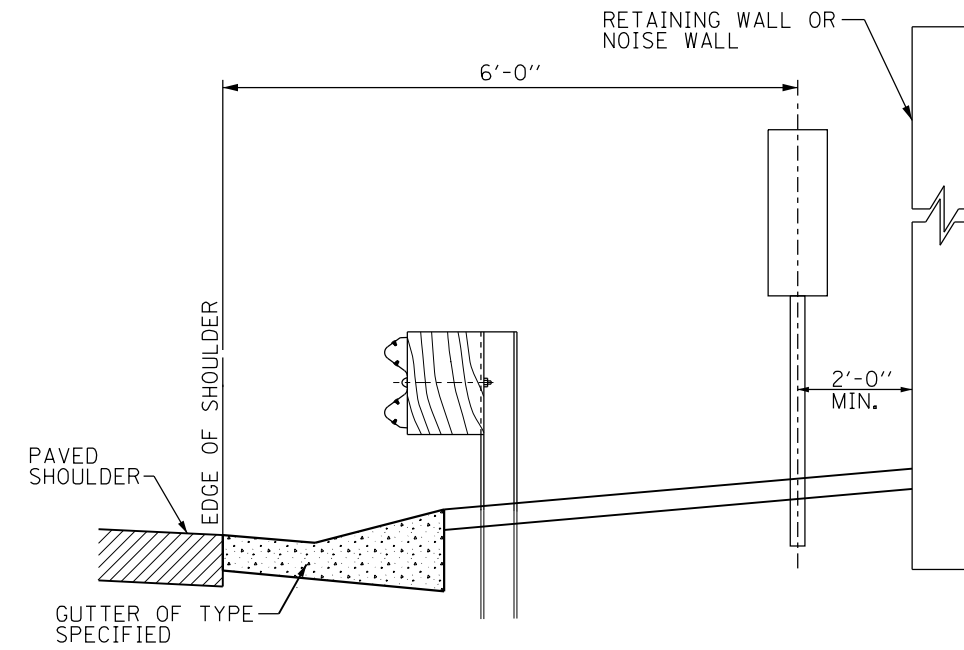
POST CLIP BOLT  
STAINLESS STEEL

PROVIDE TWO (2) POST CLIPS AT TOP AND BOTTOM. ALTERNATE INTERIOR POST CLIPS ON SIGNS UNDER 24 FEET LONG AND OVER HEAD MOUNTED SIGNS. DO NOT ALTERNATE INTERIOR CLIPS ON OTHER SIGNS. A 3/8" DIA. x 3/32" THICK ALUMINUM FLAT WASHER SHALL BE USED UNDER EACH NUT TO PREVENT GOUGING OF THE CLIP.

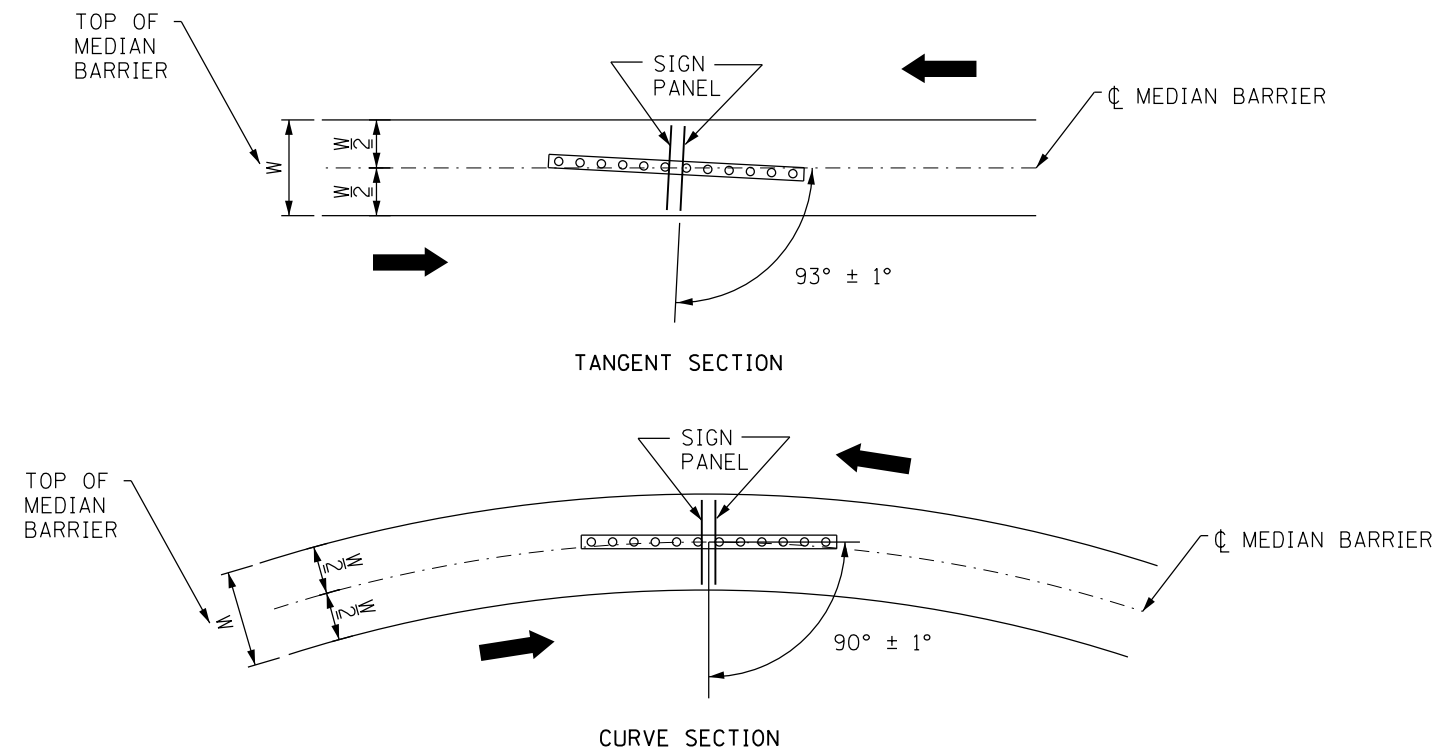
DATE	REVISIONS
3-11-2015	ADDED WASHERS TO CONNECTION DETAILS.
2-7-2012	REMOVED DETAIL FOR MOUNTING 2 PANEL SIGN.
1-1-2009	MODIFIED TYPE B SIGN PANEL DIM. MODIFIED POST CLIP DETAIL.



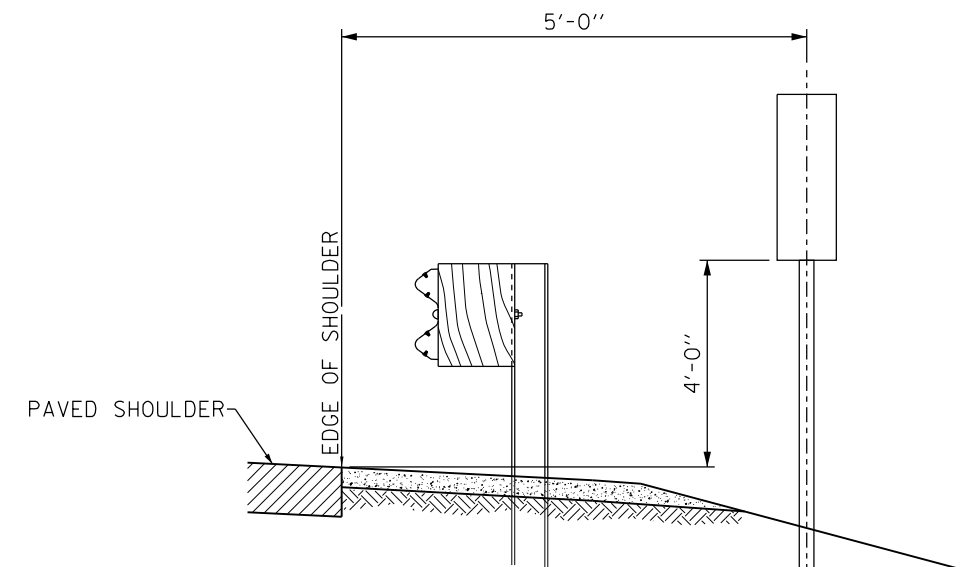
GROUND MOUNT SIGN POSITIONING  
NOT TO SCALE



SECTION WITH GUTTER  
NOT TO SCALE



MEDIAN BARRIER SIGN POSITIONING  
NOT TO SCALE



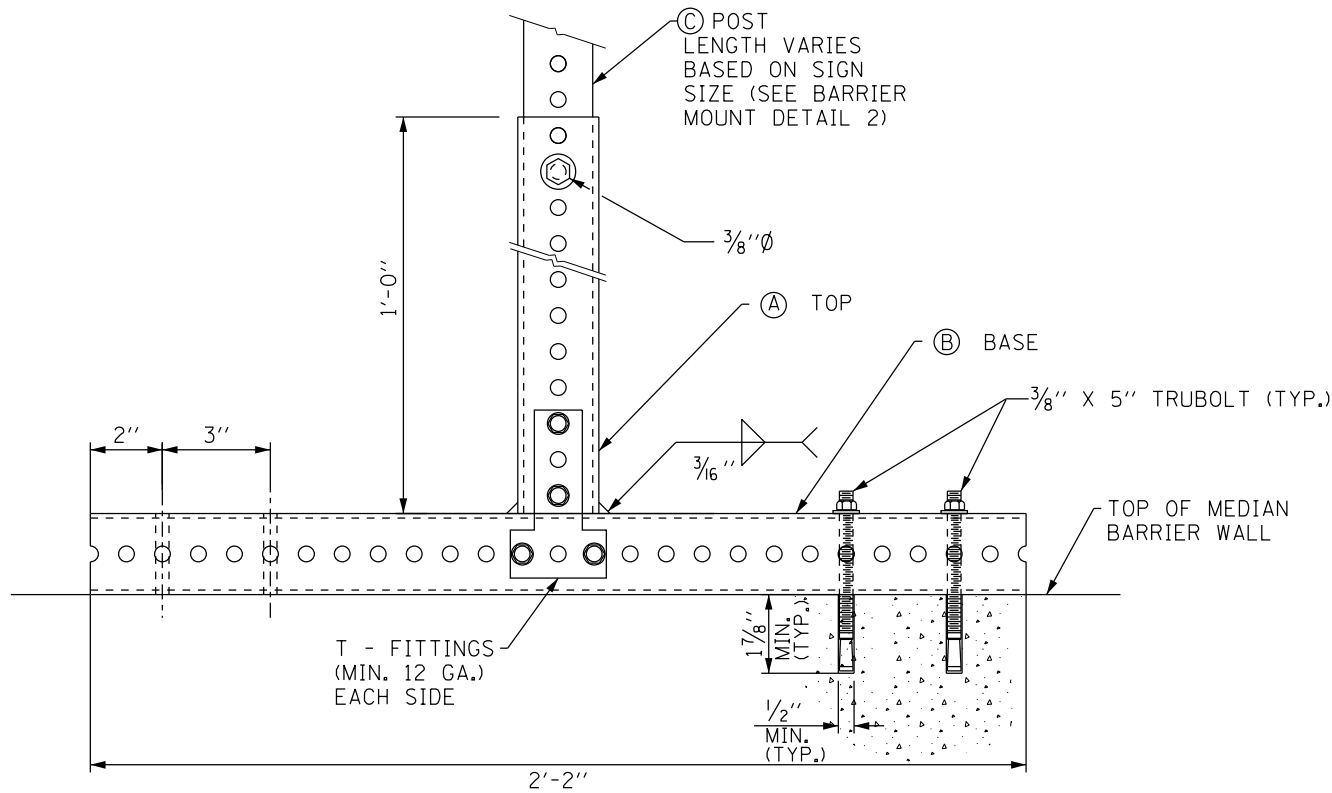
SECTION WITHOUT GUTTER  
NOT TO SCALE

LEGEND:

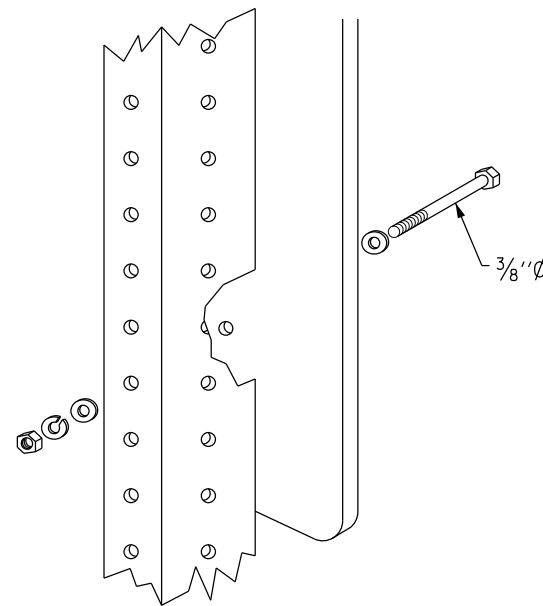
← DIRECTION OF TRAFFIC



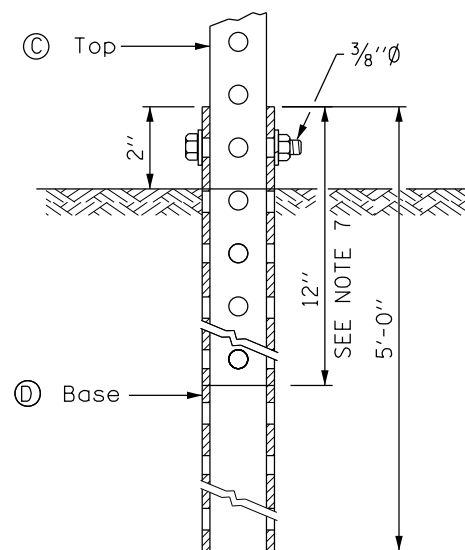
DATE	REVISIONS
2-13-2020	REVISED BARRIER MOUNT DETAIL AND GENERAL NOTES, ADDED MILEPOST HEIGHT FROM EDGE OF SHOULDER.
3-01-2019	REMOVED "LIGHT POLE/SIGN STRUCTURE MOUNT DETAIL."
3-31-2016	REVISED BOLT NOTE.



**BARRIER MOUNT DETAIL**  
NOT TO SCALE

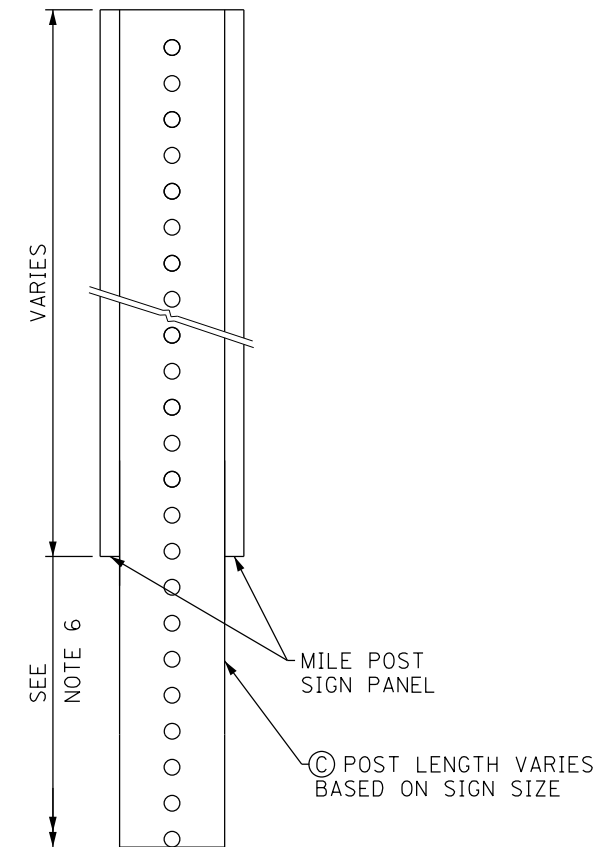


**TELESCOPING STEEL POSTS**  
NOT TO SCALE

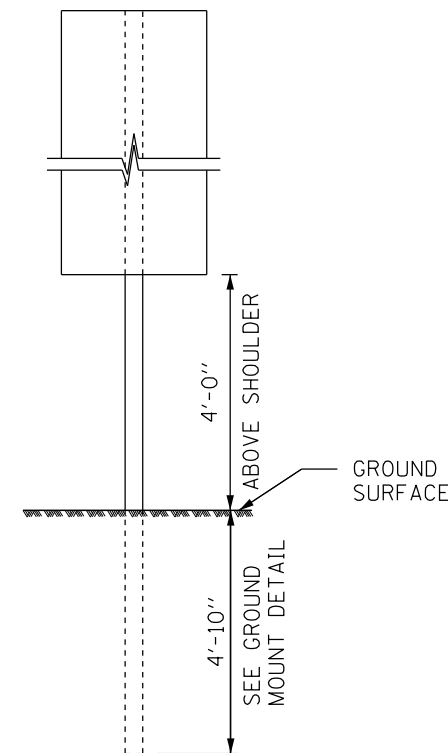


**GROUND MOUNT DETAIL**  
NOT TO SCALE

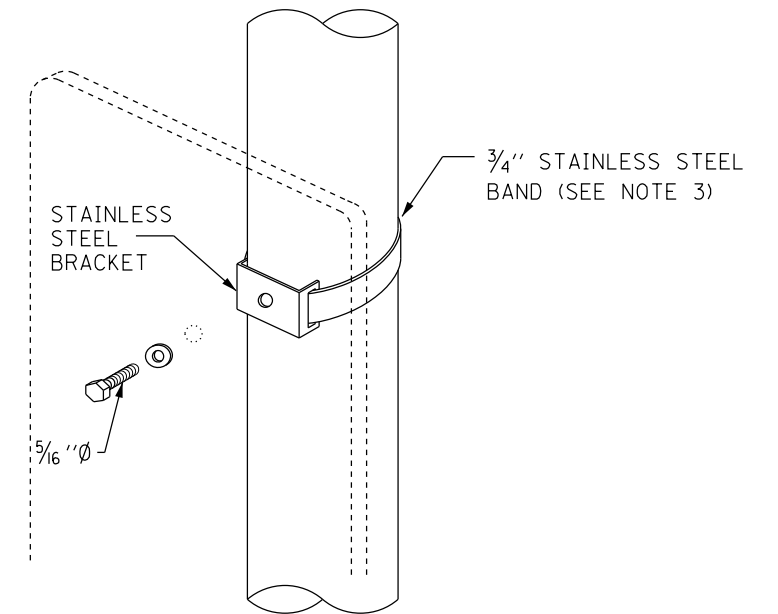
(A)	2 1/4" x 2 1/4" x 1'-0" (12 GA.)
(B)	2 1/4" x 2 1/4" x 2'-2" (12 GA.)
(C)	2" x 2" x VARIES (12 GA.)
(D)	2 1/4" x 2 1/4" x 5'-0" (12 GA.)



**BARRIER MOUNT DETAIL 2**  
NOT TO SCALE



**ONE POST INSTALLATION**  
NOT TO SCALE



**LIGHT POLE/SIGN STRUCTURE  
MOUNT DETAIL**  
NOT TO SCALE

**GENERAL NOTES:**

1. ALL ANCHOR BOLTS FOR MEDIAN BARRIER MOUNT DETAIL SHALL BE 3/8" DIA. RED HEAD "TRUBOLT" OR APPROVED EQUAL.
2. ALL DIMENSIONS ARE IN INCHES UNLESS SHOWN OTHERWISE.
3. FOLLOWING ARE THE STEPS FOR FASTENING THE MILEPOST MARKER SIGN PANEL. ALL MOUNTING DETAILS SHOWN ON THIS SHEET APPLY:
  - a. CENTER ALL FASTENERS ON THE SIGN PANEL.
  - b. START AND FINISH THE FASTENER SPACING USING A MINIMUM OF 3" TO A MAXIMUM OF 6" FROM THE TOP AND BOTTOM EDGE OF THE SIGN PANEL.
  - c. THE DISTANCE BETWEEN SUCCESSIVE FASTENERS SHALL NOT EXCEED 2'-0".
4. CENTER THE 5/16" DIA. BOLT IN THE MIDDLE OF THE SIGN.
5. USE THE SAME ATTACHMENT FOR BACK TO BACK MILEPOST MARKER SIGN.
6. DISTANCE FROM THE GROUND TO THE BOTTOM OF THE MILEPOST MARKER SIGN SHALL BE A MINIMUM OF 4'-0" REGARDLESS OF BARRIER TYPE.
7. THE TOP SECTION SHALL BE TELESKOPEDED INTO THE BASE SECTION 12 INCHES AND FASTENED TOGETHER.
8. FOR ATTACHMENT TO BRIDGE PARAPET USE BARRIER WALL MOUNT DETAIL. ONLY ONE PANEL REQUIRED WHEN ATTACHED TO PARAPET ALONG OUTSIDE SHOULDER.
9. BASE AND POST ASSEMBLY SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111 OR AS SPECIFIED IN THE SPECIAL PROVISION.

SHEET 2 OF 2

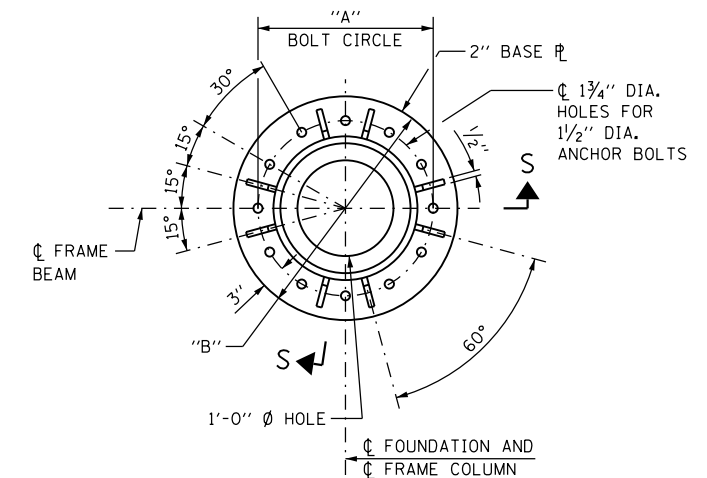
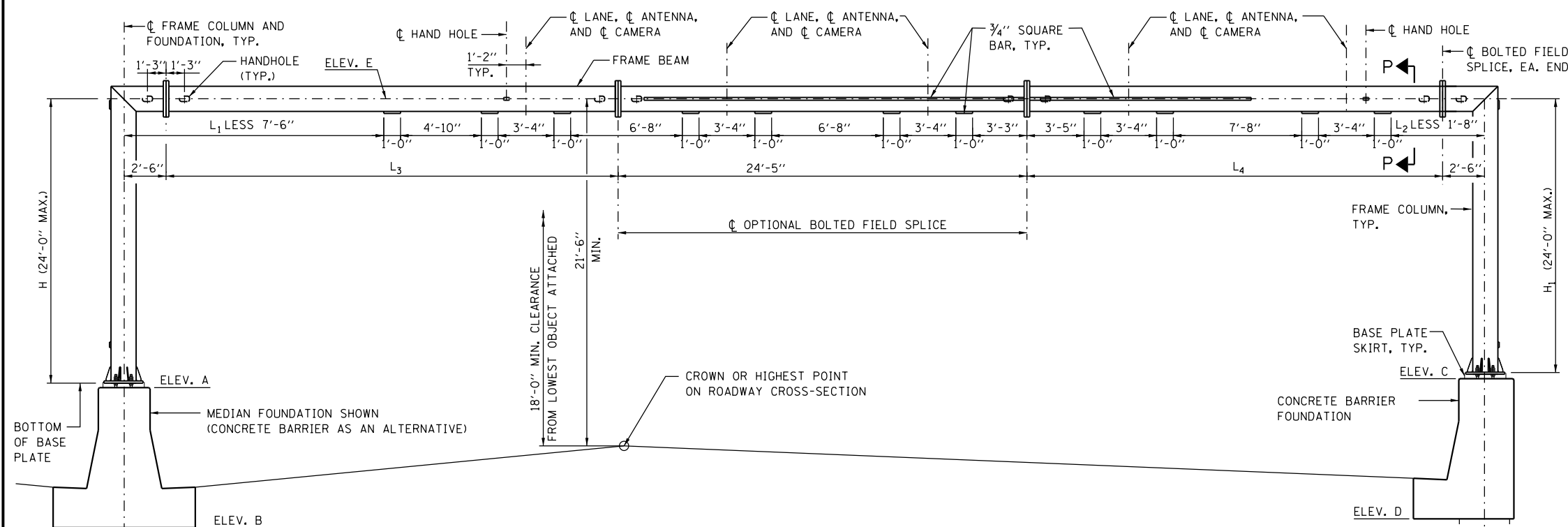
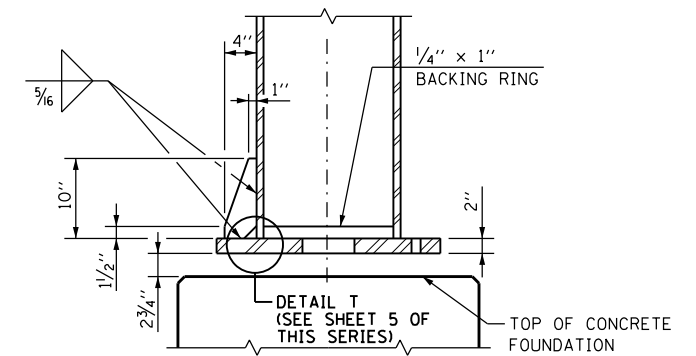
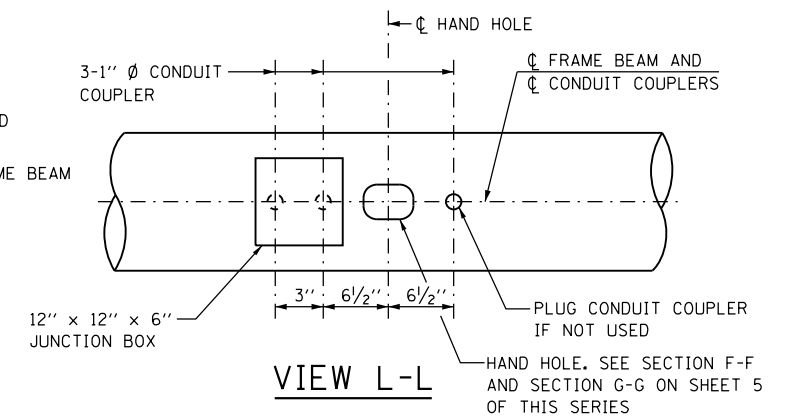
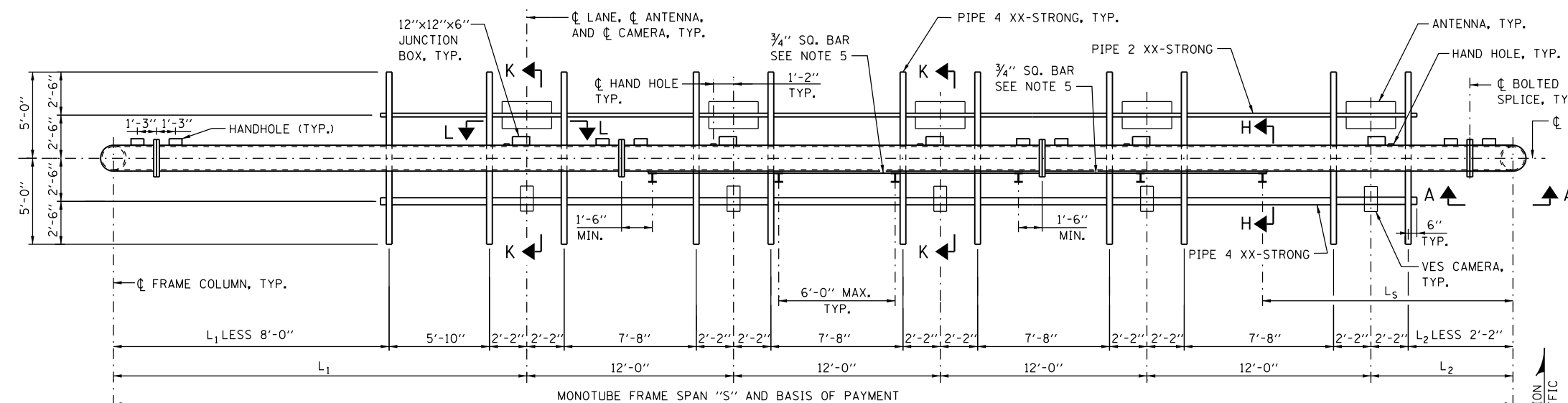


MILEPOST MARKER

STANDARD F11-06

APPROVED BY: *Paul Kovacs* DATE: 04/06/2009  
CHIEF ENGINEERING OFFICER





NOTES:

1. FOUNDATIONS FOR PLAZA FRAMES ARE SHOWN ON SHEETS 6 AND 7 OF THIS SERIES.
2. FOR SECTIONS A-A, H-H, K-K, BASE PLATE SKIRT AND HAND HOLE DETAILS, SEE SHEET 5 OF THIS SERIES.
3. FOR SECTION P-P SEE SHEET 4 OF THIS SERIES.
4. PROVIDE CAMBER AT MIDSPAN OF STRUCTURE.
5. DISCONTINUE  $\frac{3}{4}$ " SQUARE BAR TO ALLOW  $\frac{1}{2}$ "  $\emptyset$  U-BOLT INSTALLATION.
6. WORK THIS SHEET WITH, OVERHEAD SIGN STRUCTURES ENTRANCE/EXIT MONOTUBE TYPE (STEEL) MAINLINE SUMMARY AND TOTAL BILL OF MATERIAL SHEET.

MONOTUBE FRAME TABLE

TYPE	SPAN "S"	FRAME COLUMN	FRAME BEAM	CAMBER	"A"	"B"
I	≤ 70'	HSS 16x0.500	HSS 16x0.500	2¾"	1'-8"	2'-2"
II	71'-80'	HSS 18x0.500	HSS 18x0.500	4"	1'-10"	2'-4"
III	81'-90'	HSS 18x0.500	HSS 18x0.500	4½"	1'-10"	2'-4"

APPROVED BY:

DATE: \_\_\_\_\_

**Manan Nashif**  
CHIEF ENGINEERING OFFICER

03/01/2024

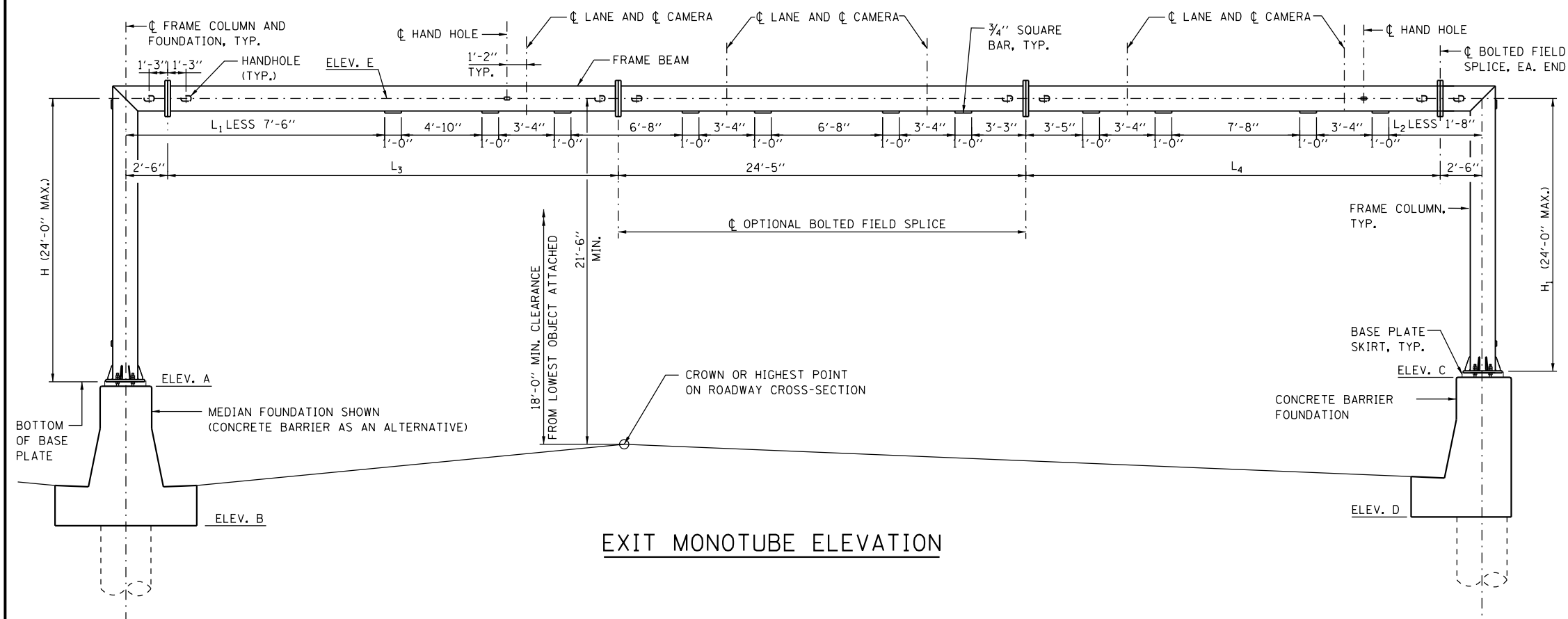
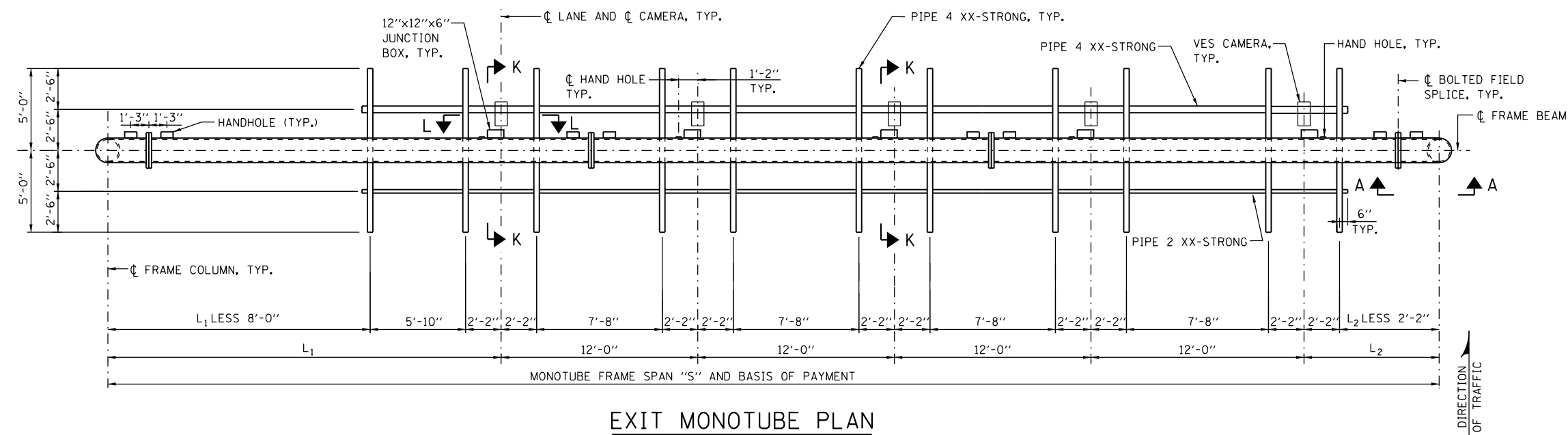
CHIEF ENGINEERING OFFICE

SHEET 2 OF 8



OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
MAINLINE STRUCTURE DETAILS

STANDARD F13-09



NOTES:

1. SEE SHEET 2 OF THIS SERIES FOR MONOTUBE FRAME TABLE, VIEW L-L, BASE PLATE DETAIL, AND ADDITIONAL NOTES.
2. WORK THIS SHEET WITH, OVERHEAD SIGN STRUCTURES EXIT MONOTUBE TYPE (STEEL) SUMMARY AND TOTAL BILL OF MATERIAL SHEET.



GENERAL NOTES:

- 1. SEE THE ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL FOR MINIMUM VERTICAL CLEARANCE.
- 2. AFTER ADJUSTMENTS TO LEVEL FRAME BEAM AND ENSURE ADEQUATE VERTICAL CLEARANCE, TIGHTEN ALL TOP AND LEVELING NUTS AGAINST THE BASE PLATE WITH A MINIMUM TORQUE OF 200 LB.-FT. THEN PLACE STAINLESS STEEL MESH AROUND THE PERIMETER OF THE BASE PLATE. SECURE TO BASE PLATE WITH STAINLESS STEEL BANDING.
- 3. REINFORCEMENT BARS DESIGNATED "E)" SHALL BE EPOXY COATED.

STRUCTURAL STEEL:

- 1. MATERIAL FOR THE HSS MONOTUBE FRAME SHALL CONFORM TO THE REQUIREMENT OF ASTM A500 GRADE B OR GRADE C. OTHER STRUCTURAL STEEL SHAPES AND PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36, UNLESS NOTED OTHERWISE.
- 2. PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A53 GRADE B.
- 3. ANCHOR BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F1554 (AASHTO M314) GRADE 55, WITH A MINIMUM TENSILE STRENGTH OF 75,000 PSI. INSTALLATION AND INSPECTION OF ANCHOR BOLTS SHALL COMPLY WITH ILLINOIS TOLLWAY SPECIAL PROVISION "INTELLIGENT TRANSPORTATION SYSTEMS GANTRY FRAME "STEEL". ANCHORS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (AASHTO M232). SEE SHEET 6 OF THIS SERIES FOR GALVANIZED LENGTH.
- 4. U-BOLTS SHALL BE STAINLESS STEEL AND SHALL CONFORM TO ASTM 193, CLASS I, GRADE B8 (AISI TYPE 304). WASHERS FOR U-BOLTS SHALL CONFORM TO ASTM A240, TYPE 302. NUTS FOR U-BOLTS SHALL CONFORM TO ASTM A194 (AASHTO M292), GRADE 8F (AISI TYPE 303).
- 5. BOLTS (EXCLUDING ANCHOR BOLTS AND U-BOLTS) SHALL BE HIGH STRENGTH AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325 (AASHTO M164). THEY SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (AASHTO M232).
- 6. NUTS SHALL CONFORM TO ASTM A563 GRADE DH AND GALVANIZED ACCORDING TO ASTM A153 (AASHTO M232).
- 7. HARDENED STEEL WASHERS SHALL CONFORM TO ASTM F436 AND GALVANIZED ACCORDING TO ASTM A153 (AASHTO M232).
- 8. HSS FOR MONOTUBE FRAME, PIPES, STRUCTURAL STEEL SHAPES AND PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER FABRICATION.
- 8. THE MONOTUBE FRAME BEAM, COLUMNS, BASE PLATE MATERIAL, AND SPLICES ARE CONSIDERED TENSION MEMBERS AND SHALL CONFORM TO THE IMPACT TESTING REQUIREMENT, ZONE 2.
- 10. WELDING SHALL BE PERFORMED BY CERTIFIED WELDERS USING E70-XX ELECTRODES, AND SHALL CONFORM TO AWS D1.1-08 "STRUCTURAL WELDING CODE - STEEL". ALL WELDS ON ARCHITECTURAL EXPOSED STEEL (AES) MEMBERS ARE TO BE GROUND SMOOTH AND FILLED.

DESIGN LOADING:

WIND LOAD CRITERIA:  
BASIC WIND SPEED = 120 M.P.H.  
G = 1.14  
I<sub>F</sub> = 1.00  
K<sub>Z</sub> = 1.00  
SIGN PANEL = 50 P.S.F.  
COLUMN/BEAM = 35 P.S.F.

SIGN DEAD LOAD = 3 P.S.F.

ICE = 3 P.S.F. (APPLIED WITH A FACTOR OF 1.0 FOR STRENGTH I ONLY)

EQUIPMENT LOADS:

CAMERA ASSEMBLY W/MOUNTING HARDWARE 40 LB.  
ANTENNA W/MOUNTING HARDWARE 24 LB.

DESIGN STRESSES FOR REINFORCED CONCRETE:

f'c = COMPRESSIVE STRENGTH OF CONCRETE AT 14 DAYS (CLASS SI) = 3,500 P.S.I.  
f'c = COMPRESSIVE STRENGTH OF CONCRETE AT 14 DAYS (CLASS DS) = 4,000 P.S.I.  
f<sub>y</sub> = YIELD STRENGTH OF REINFORCEMENT BARS (GRADE 60) = 60,000 P.S.I.

FOUNDATION:

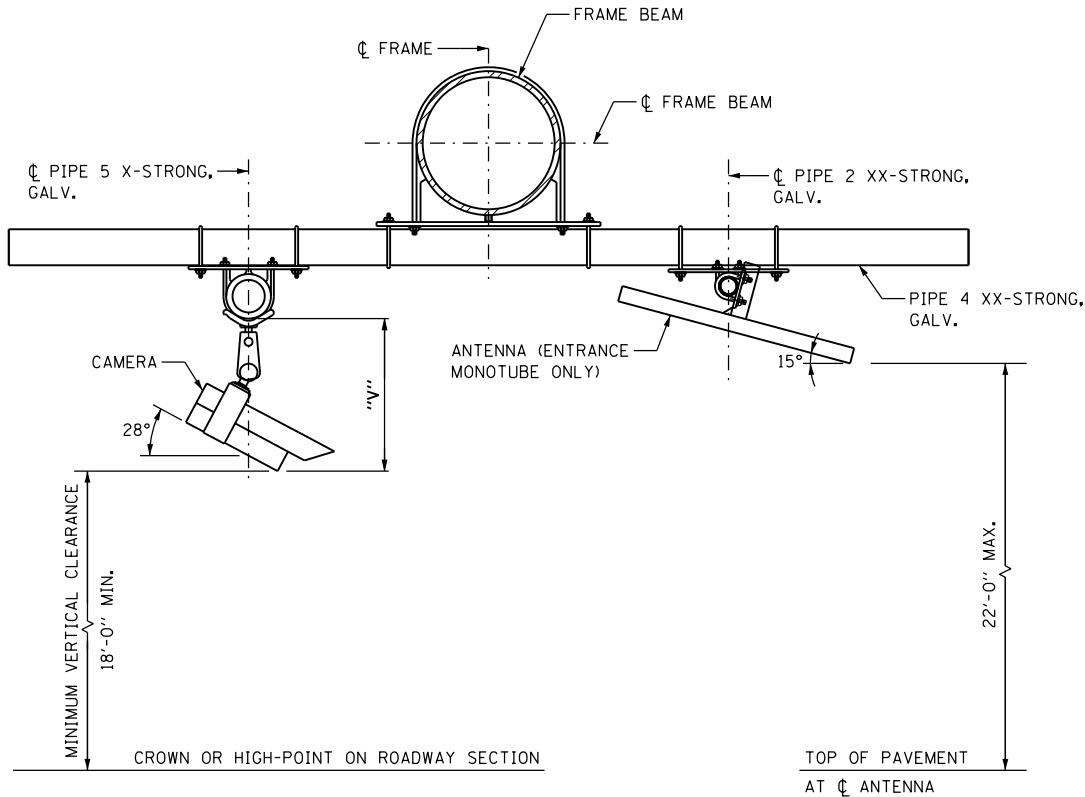
MINIMUM UNCONFINED COMPRESSIVE STRENGTH, Q<sub>u</sub> FOR ALL LAYERS OF COHESIVE SOILS (CLAYS) SHALL BE 1.25 TON/SQ.FT. AT PLAZA FRAMES.

DESIGN SPECIFICATIONS:

- 1. ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL, LATEST EDITION.
- 2. AASHTO LRFD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, 1ST EDITION.
- 3. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020.
- 4. ILLINOIS DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL, JANUARY 2012

CONSTRUCTION SPECIFICATIONS:

- 1. ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS TO THE ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.
- 2. ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.



NOTE:

VERIFY DIMENSION "V" WITH CAMERA MANUFACTURER.

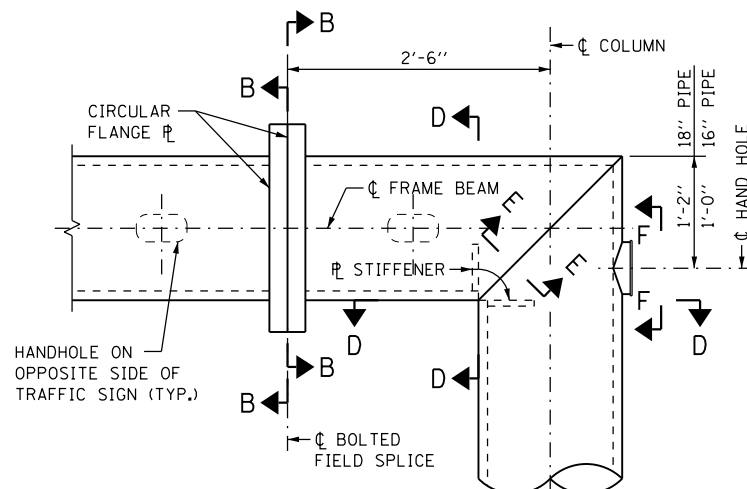
APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

SECTION P-P



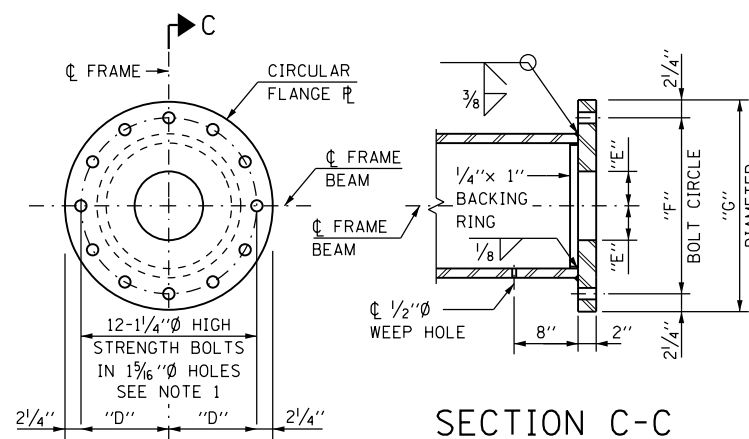
OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
MAINLINE STRUCTURE DETAILS

STANDARD F13-09



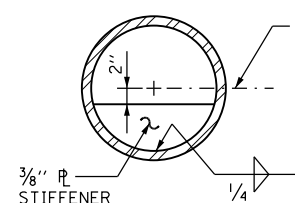
SECTION A-A

(SEE SHEET 1 OF THIS SERIES FOR LOCATION)



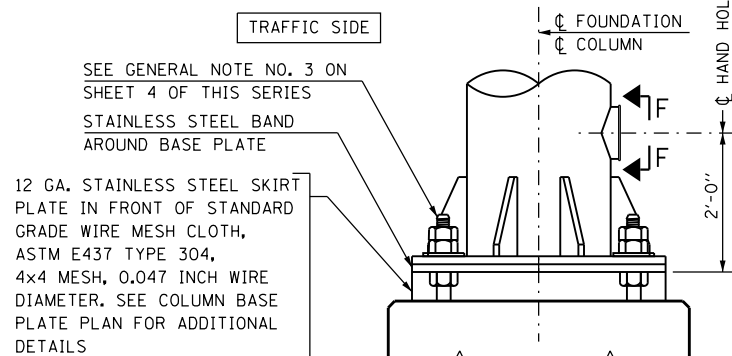
SECTION C-C

SECTION B-B

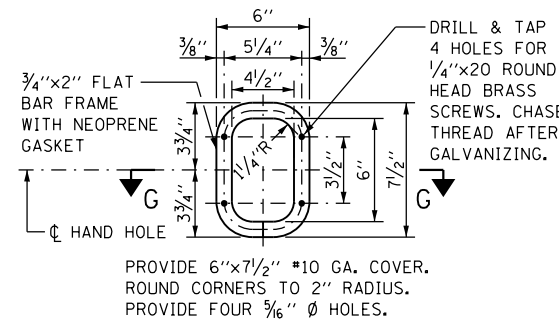


SECTION D-D

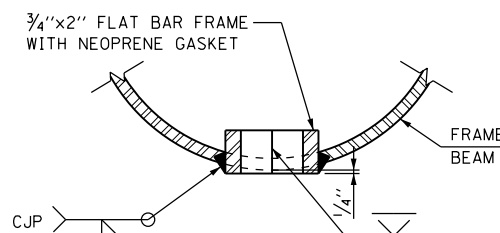
SECTION E-E



COLUMN BASE

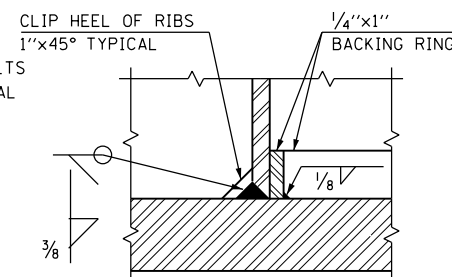


SECTION F-F

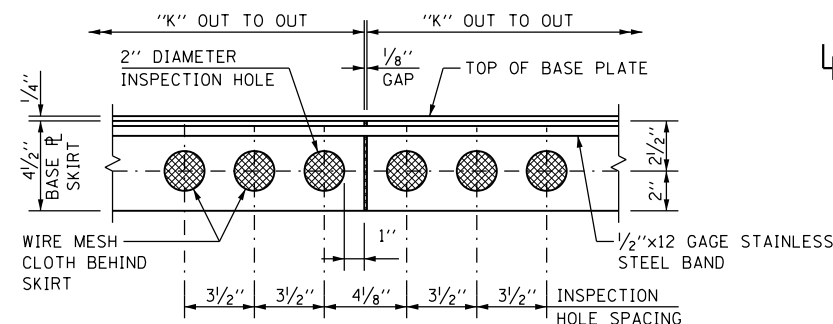


SECTION G-G

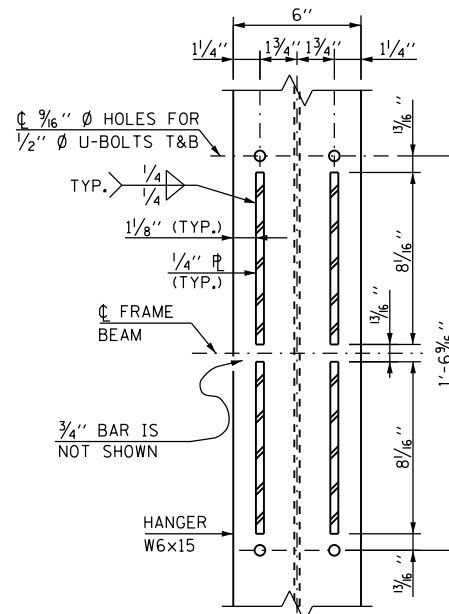
FRAME BEAM	"D"	"E"	"F"	"G"
HSS 16x0.500	10"	6"	1'-8"	2'-0 1/2"
HSS 18x0.500	11"	6"	1'-10"	2'-2 1/2"



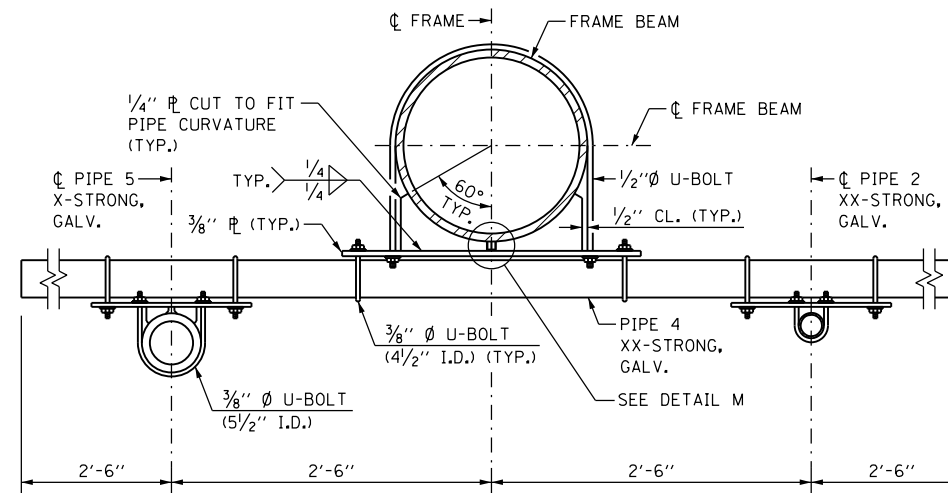
DETAIL T



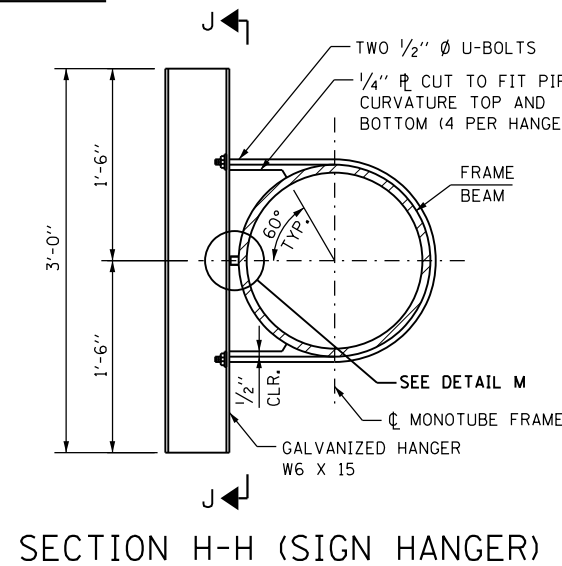
VIEW R-R (BASE PLATE SKIRT)



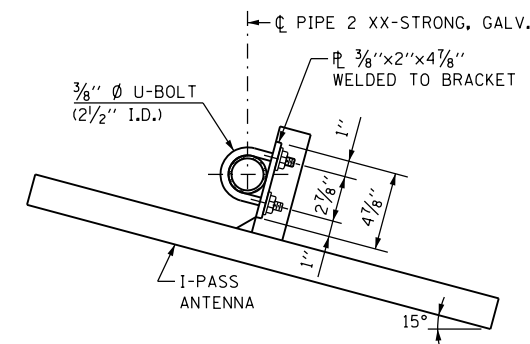
SECTION J-J



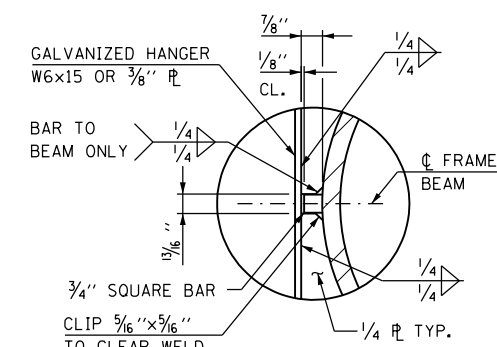
SECTION K-K



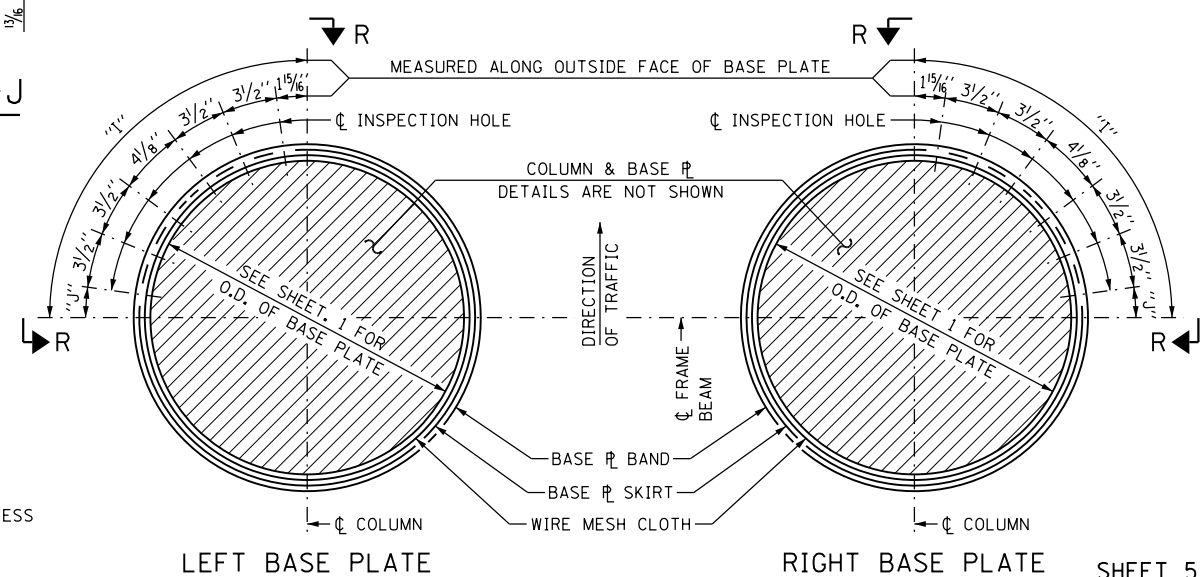
SECTION H-H (SIGN HANGER)



ANTENNA HANGER



DETAIL M



LEFT BASE PLATE

RIGHT BASE PLATE

COLUMN BASE PLATE PLAN

FRAME COLUMN	"I"	"J"	"K"
HSS 16x0.500	1'-8 7/16"	3/8"	6'-9 9/16"
HSS 18x0.500	1'-10"	1 5/16"	7'-3 7/8"



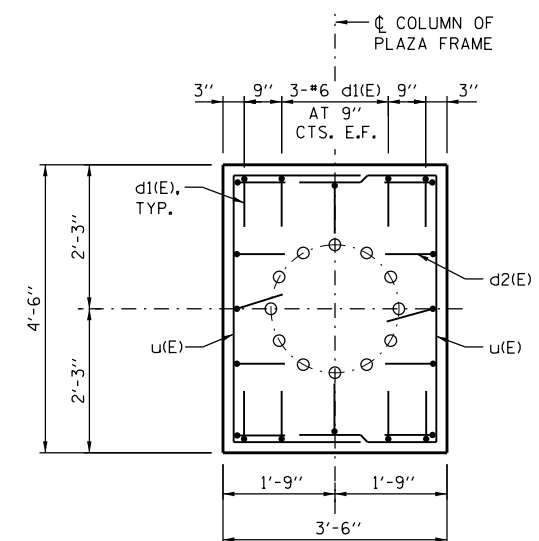
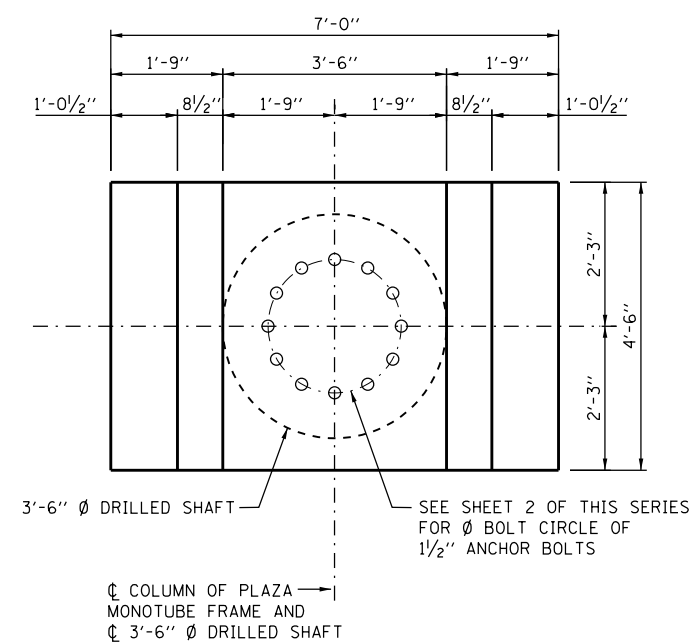
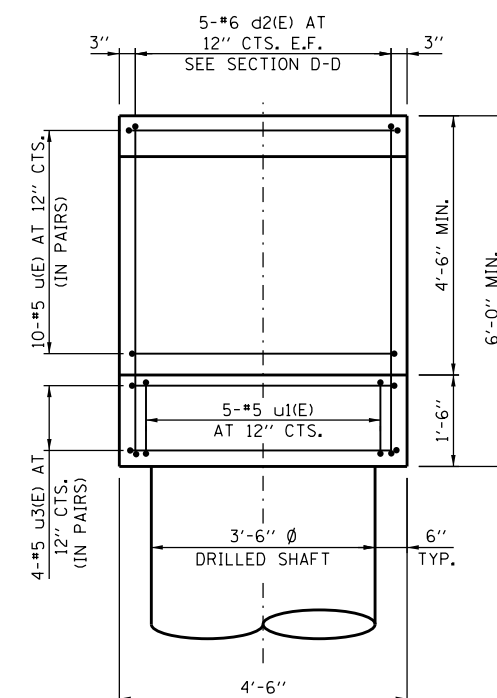
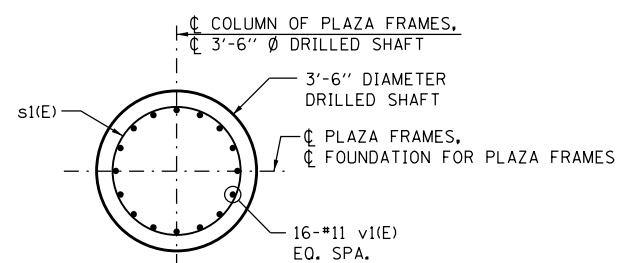
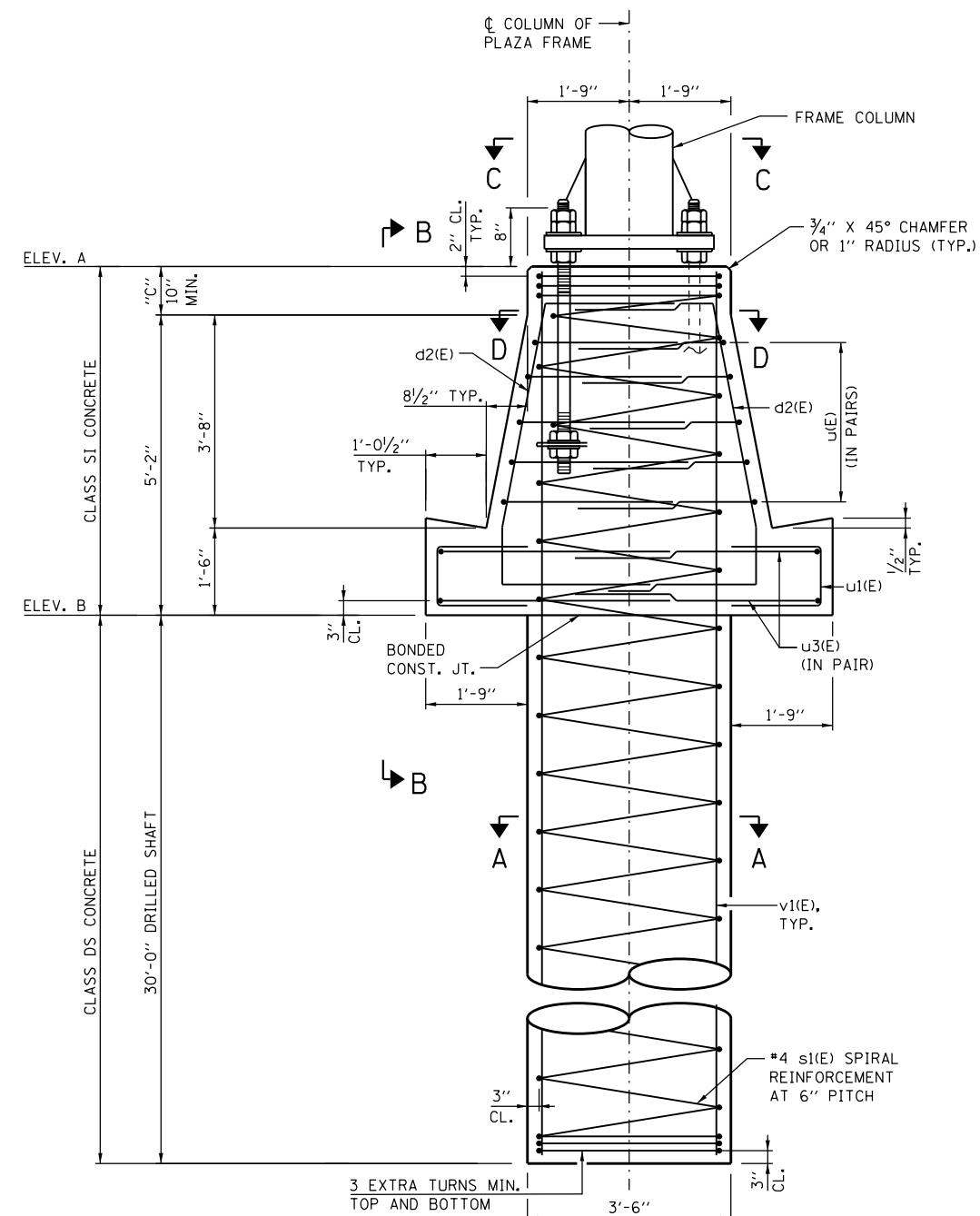
OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
MAINLINE STRUCTURE DETAILS

STANDARD F13-09

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

SHEET 5 OF 8



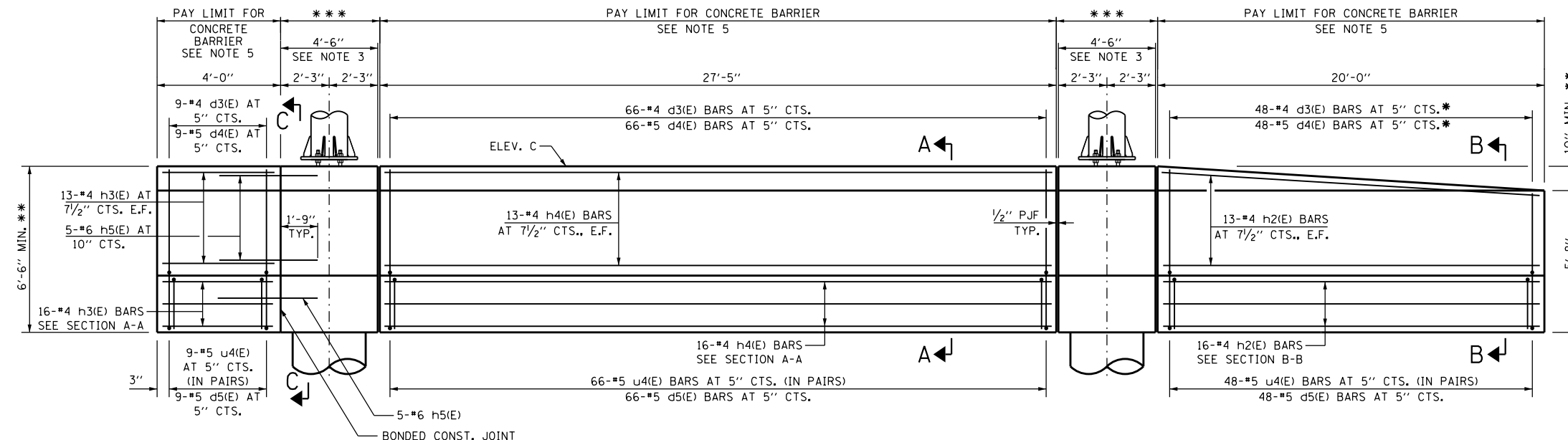


NOTES:

1. ANCHOR BOLT ASSEMBLY DETAIL, ANCHOR PLATE DETAIL AND BAR BENDING DIAGRAMS AND QUANTITIES ARE SHOWN ON SHEET 6 OF THIS SERIES.
2. SEE SHEET 6 OF THIS SERIES FOR ADDITIONAL NOTES.
3. SITE GROUNDING ELECTRODE SYSTEM TO BE PROVIDED AS INDICATED ON THE PLANS.
4. SEE SHEET 1 FOR BARRIER HEIGHT TAPER.

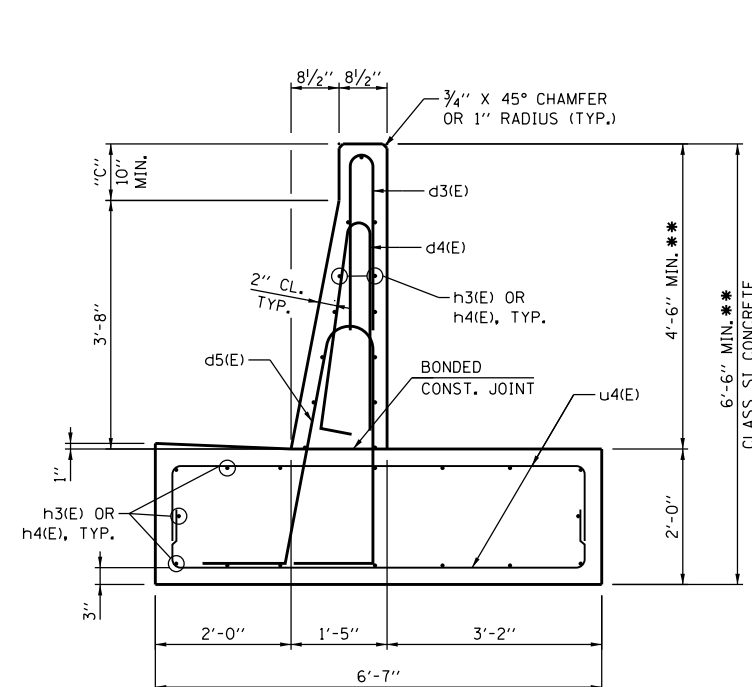
LEGEND:

E.F. - EACH FACE  
CTS. - CENTERS

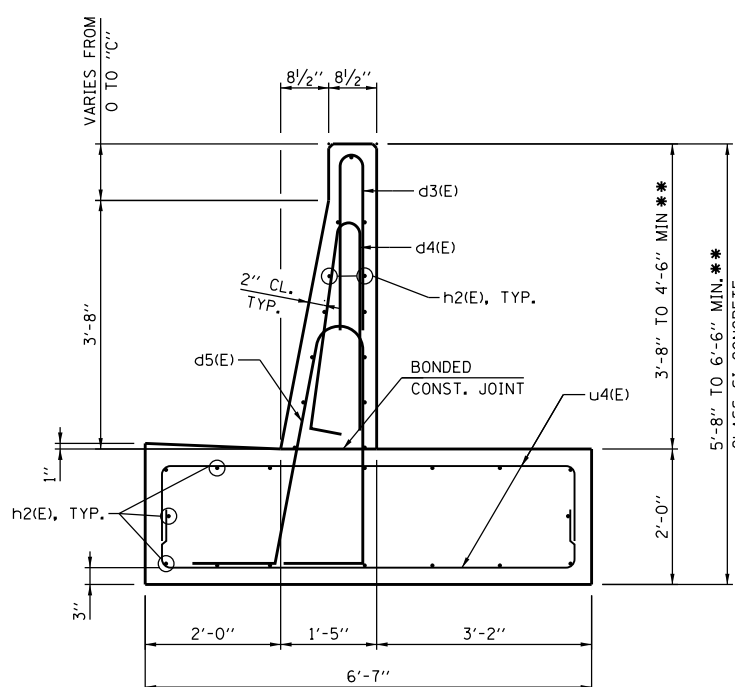


OUTSIDE SHOULDER CONCRETE BARRIER ELEVATION  
INSIDE FACE BARRIER IS SHOWN

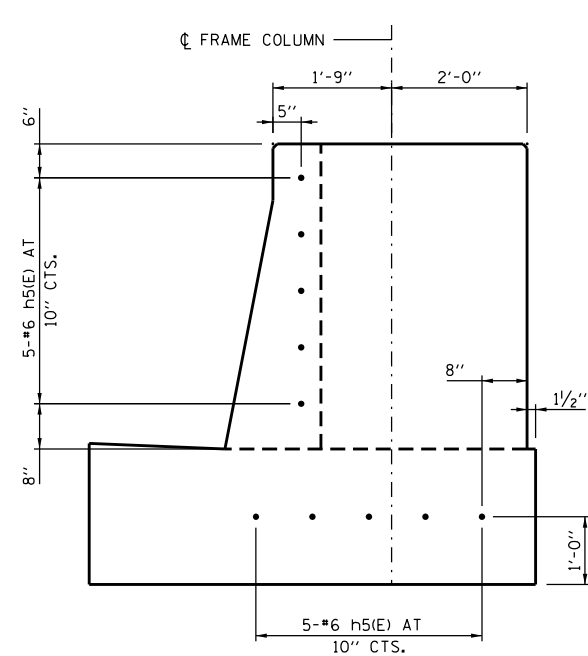
\* CUT IN FIELD AS REQUIRED TO FIT TAPER  
\*\* BASED ON DIMENSION "C" = 10"  
\*\*\* PAY LIMIT FOR FOUNDATION FOR OVERHEAD SIGN STRUCTURE



SECTION A-A



SECTION B-B



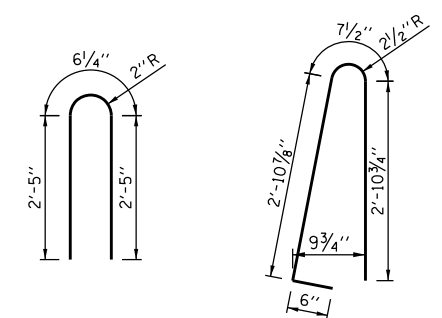
SECTION C-C

ESTIMATED QUANTITY

	ITEM	UNIT	ENTRANCE MONOTUBE	EXIT MONOTUBE	TOTAL
OUTSIDE SHOULDER CONCRETE BARRIER	CONCRETE STRUCTURES	CU. YD.	21.8	11.6	33.4
	REINFORCEMENT BARS, EPOXY COATED	POUND	3,920	2,090	6,010
	PROTECTIVE COAT	SQ. YD.	26.8	14.3	41.1
MEDIAN SHOULDER CONCRETE BARRIER	CONCRETE BARRIER MEDIAN TRANSITION, DOUBLE FACE, AT PLAZA MONOTUBE	FOOT	31.8	31.8	63.5
	CONCRETE BARRIER MEDIAN, DOUBLE FACE, AT PLAZA MONOTUBE	FOOT	13.8	13.8	27.5
	PROTECTIVE COAT	SQ. YD.	60.2	60.2	120.5

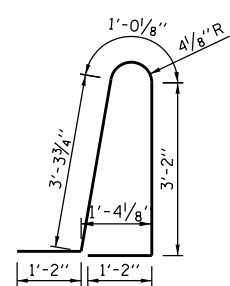
BAR LIST - ONE BARRIER

BAR	NO.	SIZE	LENGTH	SHAPE
d3(E)	123	#4	5'-5"	U
d4(E)	123	#5	7'-0"	U
d5(E)	123	#5	9'-10"	U
h2(E)	29	#4	19'-7"	I
h3(E)	29	#4	3'-8"	I
h4(E)	29	#4	27'-1"	I
h5(E)	10	#6	3'-9"	I
u4(E)	246	#5	9'-3"	L

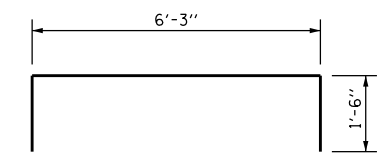


BAR d3(E)

BAR d4(E)



BAR d5(E)



BAR u4(E)

NOTES:

1. PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF THE BARRIER, TOP FACE OF THE GUTTER AND TO THE ENTRANCE SIDE FACE (AT THE BEGINNING OF THE PLAZA PAVEMENT) FOR THE FULL HEIGHT OF THE BARRIER.
2. FOR LOCATION OF ELECTRICAL JUNCTION BOXES ON THE WALL, SEE ELECTRICAL DETAIL SHEETS.
3. FOR CONCRETE BARRIER FOUNDATION DETAILS FOR PLAZA FRAMES SEE SHEET 6 OF THIS SERIES.
4. QUANTITIES FOR CONCRETE BARRIER ARE DETERMINED USING "C" = 10". IF DIMENSION "C" IS GREATER THAN 10", ADJUST QUANTITIES ACCORDINGLY.
5. OUTSIDE SHOULDER CONCRETE BARRIER AND BASE DETAILED ON THIS SHEET WILL BE PAID FOR UNDER THE ITEMS: CONCRETE STRUCTURES, REINFORCEMENT BARS, EPOXY COATED AND PROTECTIVE COAT.
6. ALL CONCRETE BARRIERS LOCATED OUTSIDE THE LIMITS SHOWN ON THESE SHEETS WILL BE PAID SEPARATELY.



OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
MAINLINE STRUCTURE DETAILS

STANDARD F13-09

APPROVED BY: *Manar Nashif*  
DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER

ALTERNATE DIRECTION OF HORIZONTAL  
DIAGONALS FOR EACH BAY IN  
PLANES OF UPPER AND LOWER CHORDS

UPPER HORIZONTAL  
DIAGONALS, TYP.

LOWER HORIZONTAL  
DIAGONALS, TYP.

TYPICAL PLAN

ALTERNATE VERTICAL DIAGONAL BRACING FOR EACH  
BAY IN PLANES OF FRONT AND BACK CHORDS

STEEL POST,  
COLUMN AND CABINET  
(SEE NOTE 4)

DMS TYPE 2

HEIGHT OF  
SIGN ( $D_s$ )

LOWEST PART OF  
STRUCTURE ABOVE  
ELEVATION A.

MINIMUM VERTICAL CLEAR.

ELEV.  $A_1$   
(LOCATION VARIES)

ELEV. A = ELEVATION AT POINT OF MINIMUM  
CLEARANCE TO SIGN OR TRUSS.

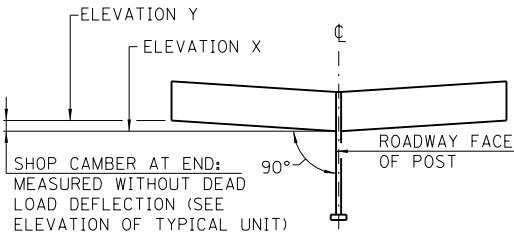
\* ELEVATION  $A_2$  AND DIMENSION  $D_2$   
NOT USED WHEN BUTTERFLY  
STRUCTURE IS MOUNTED ON  
RIGHT SIDE OF THE SHOULDER.

TYPICAL ELEVATION

LOOKING IN DIRECTION OF TRAFFIC

SHOP CAMBER TABLE

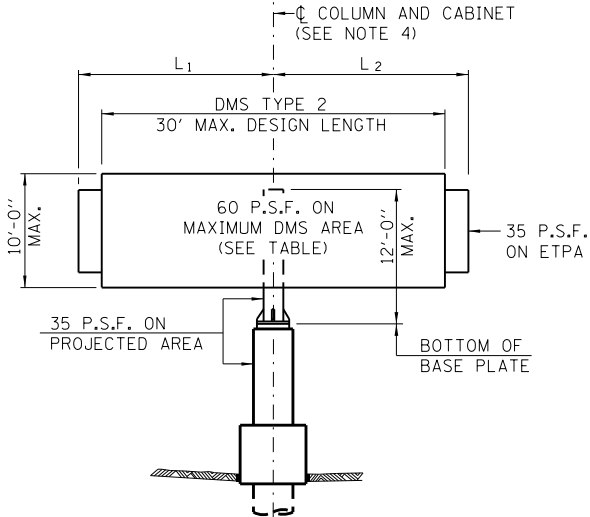
UNIT LENGTH $L_1$ OR $L_2$	SHOP CAMBER AT END
15'	1/4"
20'	1/2"
25'	3/4"



CAMBER DIAGRAM  
(FOR FABRICATION ONLY)

DMS TYPE 2 TABLE

TRUSS MOUNTING	MAXIMUM TOTAL AREA	MAXIMUM ALLOWABLE WEIGHT
ONE FACE	300 SQ. FT.	5000 LB. - CENTERED ON STRUCTURE
TWO FACE	300 SQ. FT.	6000 LB. - CENTERED ON STRUCTURE



DESIGN WIND LOADING DIAGRAM

ETPA = EFFECTIVE TRUSS PROJECTED AREA

FABRICATION NOTES:

- MATERIALS: ALL STRUCTURAL STEEL PIPE SHALL BE ASTM A53 GRADE B OR ASTM A106 GRADE B OR API 5L GRADE X42 OR API 5L GRADE X52 OR ASTM A500 GRADE B OR C. ALL STRUCTURAL STEEL PLATES AND SHAPE SHALL CONFORM TO ASTM A36 (AASHTO M183) OR ASTM A572 GRADE 50. STAINLESS STEEL FOR SHIMS, SLEEVES AND HANDHOLE COVERS SHALL BE ASTM A240, TYPE 302 OR 304, OR ANOTHER ALLOY SUITABLE FOR EXTERIOR EXPOSURE AND ACCEPTABLE TO THE ENGINEER. THE STEEL PIPE AND STIFFENING RIBS AT THE BASE PLATE FOR THE COLUMN SHALL HAVE A MINIMUM LONGITUDINAL CHARPY V-NOTCH (CVN) ENERGY OF 15 LB.-FT. AT 40° F (ZONE 2) BEFORE GALVANIZING.
- WELDING: ALL WELDS TO BE CONTINUOUS UNLESS OTHERWISE SHOWN. ALL WELDING TO BE DONE IN ACCORDANCE WITH CURRENT AWS D1.1 STRUCTURAL WELDING CODE AND THE STANDARD SPECIFICATIONS.
- FASTENERS: HIGH STRENGTH BOLTS SHALL SATISFY THE REQUIREMENTS OF AASHTO M164 (ASTM A325), OR APPROVED ALTERNATE, AND SHALL HAVE MATCHING LOCKNUTS. THREADED STUDS FOR SPLICES (IF MEMBERS INTERFERE) SHALL SATISFY THE REQUIREMENTS OF ASTM A449, ASTM A193, GRADE B7, OR APPROVED ALTERNATE, AND SHALL HAVE MATCHING LOCKNUTS. BOLTS AND LOCKNUTS NOT REQUIRED TO BE HIGH STRENGTH SHALL SATISFY THE REQUIREMENTS OF ASTM A307. ALL BOLTS AND LOCKNUTS SHALL BE HOT DIP GALVANIZED PER AASHTO M232, EXCEPT STAINLESS STEEL FASTENERS, NUTS AND WASHERS. THE LOCKNUTS SHALL HAVE NYLON OR STEEL INSERTS. A STAINLESS STEEL FLAT WASHER CONFORMING TO ASTM A240 TYPE 302 OR 304, IS REQUIRED UNDER BOTH HEAD AND NUT OR UNDER BOTH NUTS WHERE THREADED STUDS ARE USED. HIGH STRENGTH BOLT INSTALLATION SHALL CONFORM TO ARTICLE 505.04(f)(2)d OF THE IDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. ROTATIONAL CAPACITY ("ROCAP") TESTING OF BOLTS WILL NOT BE REQUIRED.
- U-BOLTS SHALL BE STAINLESS STEEL AND SHALL CONFORM TO ASTM 193, CLASS I, GRADE B8 (AISI TYPE 304). WASHERS FOR U-BOLTS SHALL CONFORM TO ASTM A240, TYPE 302. NUTS FOR U-BOLTS SHALL CONFORM TO ASTM A194 (AASHTO M292), GRADE 8F (AISI TYPE 303).
- GALVANIZING: ALL STEEL PLATES, SHAPES AND PIPE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111. PAINTING IS NOT PERMITTED.
- ANCHOR BOLTS: SHALL CONFORM TO AASHTO M314 OR ASTM F1554 GRADE 55.

GENERAL NOTES:

- WORK THIS SHEET WITH OVERHEAD SIGN STRUCTURE BUTTERFLY TYPE (STEEL) SUMMARY AND TOTAL BILL OF MATERIAL SHEET.
- AFTER ADJUSTMENTS TO LEVEL TRUSS AND ENSURE ADEQUATE VERTICAL CLEARANCE, ALL TOP AND BOTTOM LEVELING NUTS SHALL BE TIGHTENED AGAINST THE BASE PLATE WITH A MINIMUM TORQUE OF 200 LB.-FT. STAINLESS STEEL MESH SHALL THEN BE PLACED AROUND THE PERIMETER OF THE BASE PLATE. SECURE TO BASE PLATE WITH STAINLESS STEEL BANDING.
- CENTERLINE DMS TYPE 2 SHALL BE LOCATED AT CENTERLINE OF COLUMN.
- SIGN SUPPORT STRUCTURES MAY BE SUBJECT TO DAMAGING VIBRATIONS AND OSCILLATIONS WHEN DMS ARE NOT IN PLACE DURING ERECTION OR MAINTENANCE OF THE STRUCTURE. TO AVOID THESE VIBRATIONS AND OSCILLATIONS, CONSIDERATION SHOULD BE GIVEN TO ATTACHING TEMPORARY BLANK SIGN PANELS TO THE STRUCTURE.
- TRUSSES SHALL BE SHIPPED INDIVIDUALLY WITH ADEQUATE PROVISION TO PREVENT DETRIMENTAL MOTION DURING TRANSPORT. THIS MAY REQUIRE ROPES BETWEEN HORIZONTALS AND DIAGONALS OR ENERGY DISSIPATING (ELASTIC) TIES TO THE VEHICLE. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONFIGURATION AND PROTECTION OF THE TRUSSES.
- PROVIDE RUBBED SURFACE FINISH FOLLOWED BY CONCRETE SEALER APPLICATION ON ENTIRE SURFACE OF CONCRETE COLUMN AND ALL SURFACES OF CRASHWALL, EXCEPT BOTTOM SURFACE.
- REINFORCEMENT BARS: REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- PARAMETERS SHOWN ARE BASIS FOR THIS STANDARD. INSTALLATION NOT WITHIN DIMENSIONAL LIMITS SHOWN REQUIRE SPECIAL ANALYSIS FOR ALL COMPONENTS.
- IT IS PERMISSIBLE TO MOUNT TWO DMS TYPE 2 ON THE BUTTERFLY TRUSS, ONE ON EACH FACE OF THE TRUSS. THE TOTAL COMBINED DEPTH OF DMS TYPE 2 SHALL NOT EXCEED 4'-4" AND THE TOTAL COMBINED WEIGHT SHALL NOT EXCEED 6000 LB. CENTER THE DMS TYPE 2 ON STEEL POST. DO NOT INSTALL SIGN PANEL IN CONJUNCTION WITH DMS TYPE 2 SIGN CABINETS ON ONE FACE OF THE TRUSS. A SIGN PANEL ON ONE FACE AND DMS TYPE 2 ON THE OTHER IS PERMITTED.
- SIGN PANEL DIMENSIONS MAY NOT EXTEND BEYOND DMS LIMITS.

CONSTRUCTION SPECIFICATIONS:

- ALL MATERIALS, EXCEPT AS SHOWN, FABRICATION, ERECTION AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 733 AND 734 OF THE LATEST ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS.

LOADING:

- WIND LOADING SHALL BE A MINIMUM OF 60 PSF ON DMS TYPE 2 AND 35 PSF NORMAL TO TRUSS ELEMENTS NOT BEHIND DMS TYPE 2.
- PROVIDE ANCHORAGE FOR ATTACHMENT OF PERSONAL FALL ARREST SYSTEMS PER OSHA SECTION 1926.502(D). ANCHORAGE SHALL BE INSTALLED AS CLOSE TO PANEL POINTS AS POSSIBLE AND SHALL BE CAPABLE OF SUPPORTING AT LEAST 5000 LBS.
- ICE LOAD OF 3 PSF APPLIED WITH A FACTOR OF 1.0 FOR STRENGTH I ONLY.

DESIGN SPECIFICATIONS:

2015 AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 1ST EDITION WITH 2020 INTERIM REVISIONS, INSTRUCTIONS AND INFORMATION.

CONCRETE COLUMN, CRASH WALL AND DRILLED SHAFT ARE DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020.

DESIGN UNIT STRESSES FOR REINFORCED CONCRETE:

CLASS SI CONCRETE:  $f'_c$  = 3,500 P.S.I.  
CLASS DS CONCRETE:  $f'_c$  = 4,000 P.S.I.  
REINFORCING STEEL:  $f_y$  = 60,000 P.S.I.



OVERHEAD SIGN STRUCTURE  
BUTTERFLY TYPE  
STRUCTURE DETAILS

STANDARD F14-07

DATE	REVISIONS
3-01-2022	REVISE FABRICATION NOTES 1 & 4.
3-01-2021	UPDATE DESIGN LOADING AND DESIGN CRITERIA.
3-01-2020	UPDATED CRASH WALL HEIGHT.
	ADDED HEAVY HEX NUT TO ANCHORS.

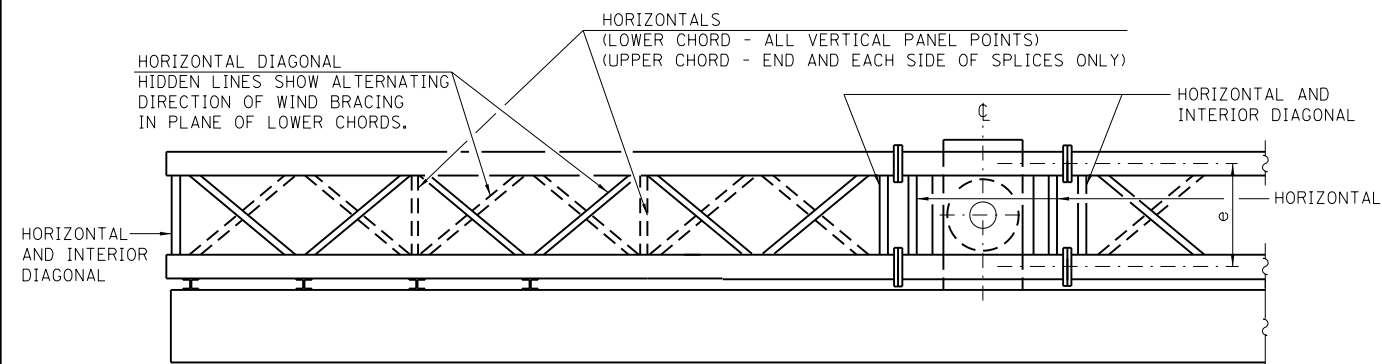
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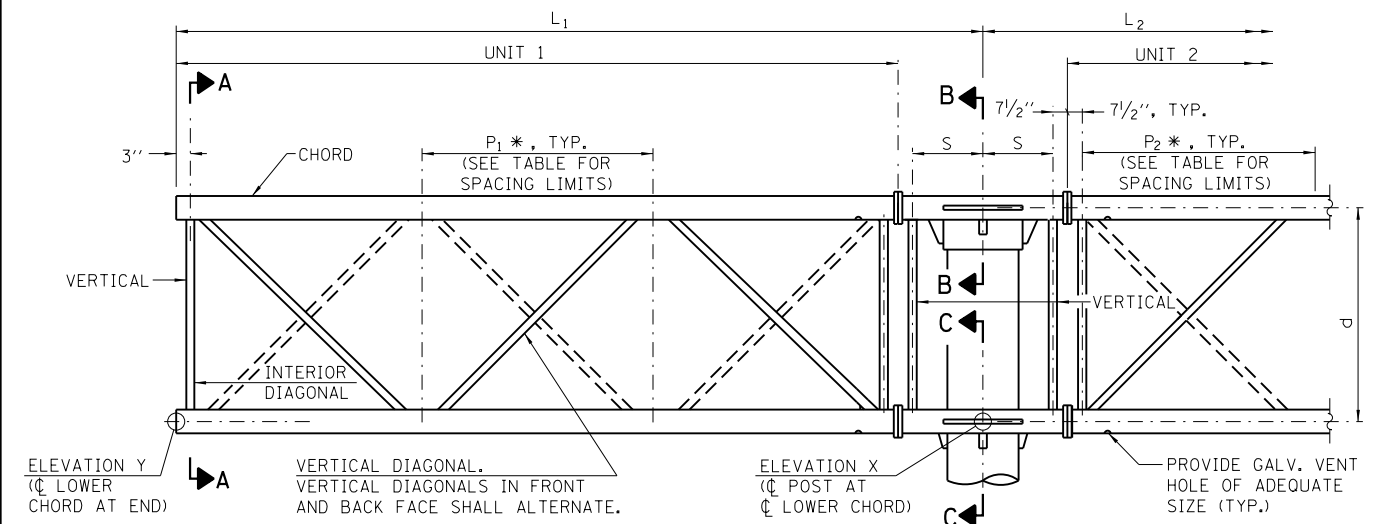
Paul Kovacs

CHIEF ENGINEERING OFFICER

03/31/2014



**PLAN**

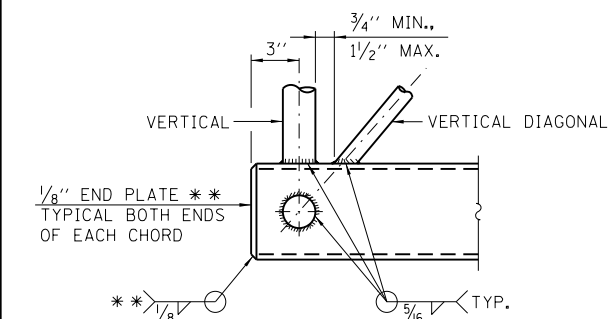


**ELEVATION**

(SIGN OMITTED FOR CLARITY)

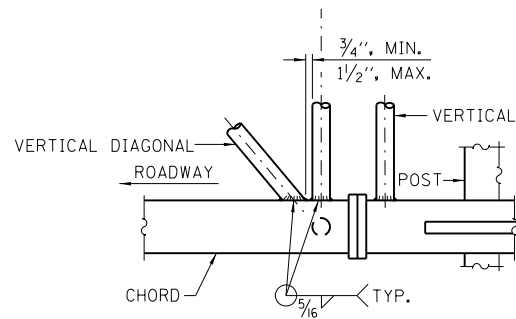
**TYPICAL TRUSS UNIT**

FOR SECTION B-B AND SECTION C-C, SEE SHEET 3 OF THIS SERIES

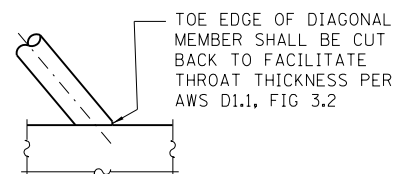


**BUTTERFLY END JOINT DETAIL**

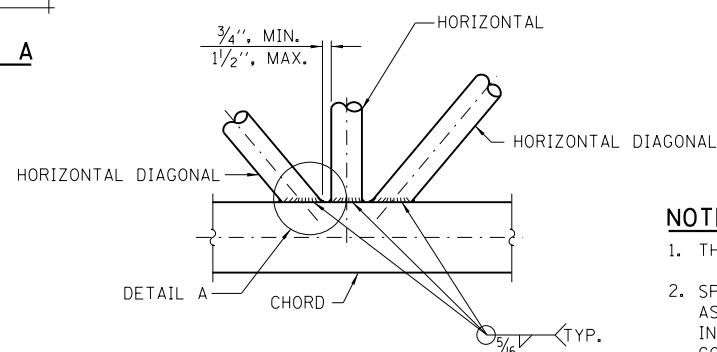
\*\* CONTRACTOR MAY ALTERNATIVELY USE STANDARD STEEL DRIVE - FIT CAP TO CLOSE ENDS. 1/2" Ø DRAIN HOLE IN END PLATE / DRIVE - FIT CAP.



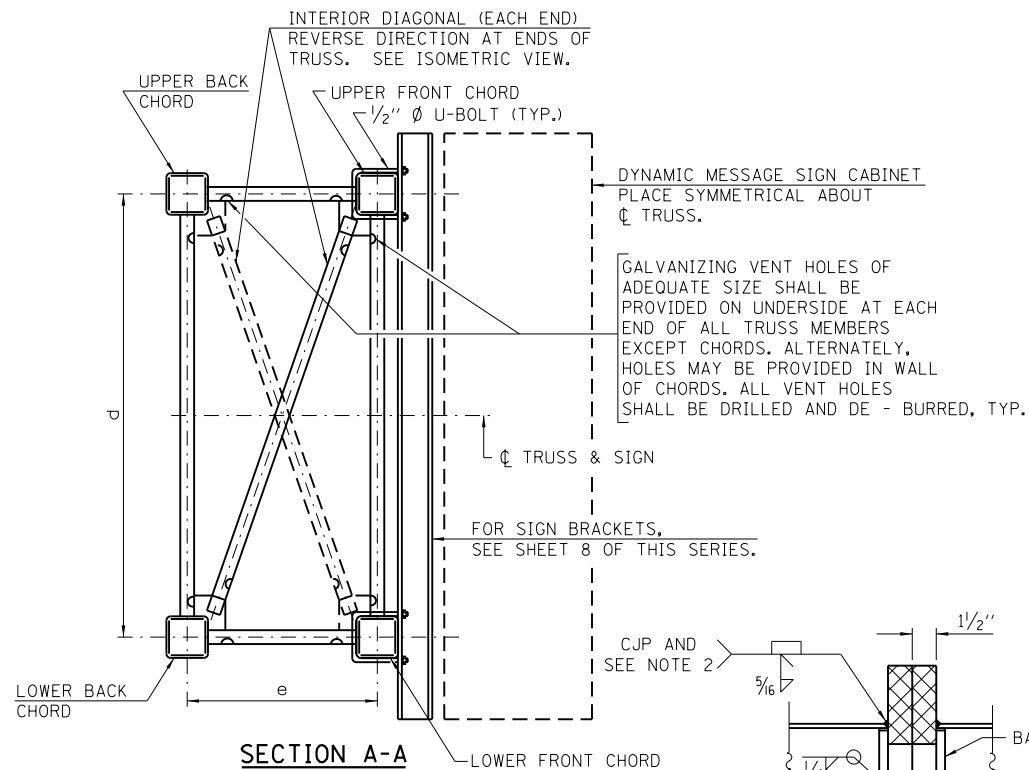
**POST END JOINT DETAIL**



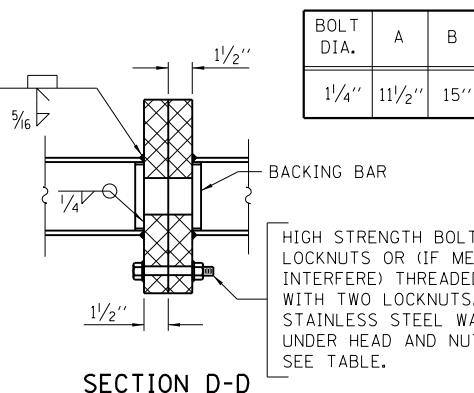
**DETAIL A**



**TRUSS INTERIOR JOINT DETAIL**

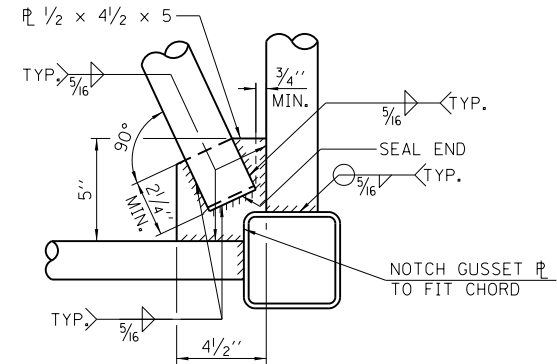


**SECTION A-A**

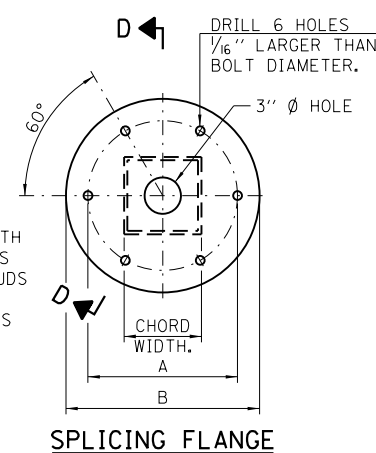


**SECTION D-D**

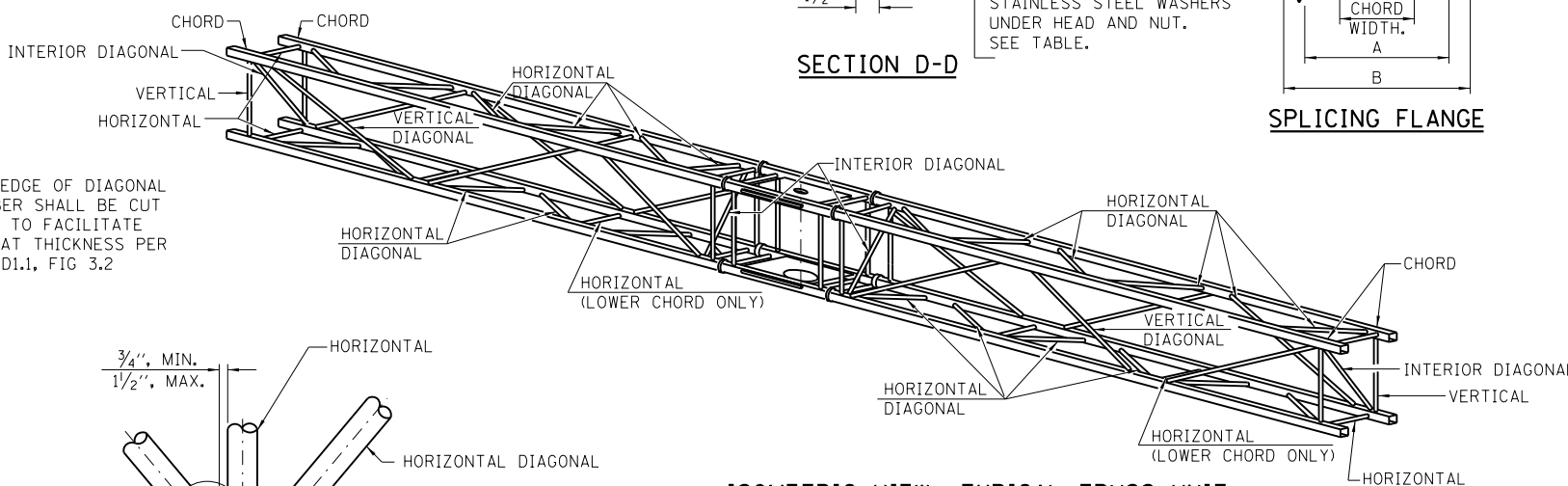
BOLT DIA.	A	B
1/4"	11 1/2"	15"



**GUSSET PL FOR INTERIOR DIAG. DETAIL**



**SPlicing FLANGE**



**ISOMETRIC VIEW- TYPICAL TRUSS UNIT**

**NOTES:**

1. THERE ARE TWICE AS MANY HORIZONTAL DIAGONALS AS THERE ARE VERTICAL DIAGONALS.
2. SPlicing FLANGES SHALL BE ATTACHED TO EACH TRUSS UNIT WITH THE TRUSS SHOP ASSEMBLED TO CAMBER SHOWN ON SHEET 1 OF THIS SERIES. TRUSS UNITS SHALL BE IN PROPER ALIGNMENT AND FLANGE SURFACES SHALL BE SHOP BOLTED INTO FULL CONTACT BEFORE WELDING. SUFFICIENT EXTERNAL WELDS OR TACKS SHALL BE MADE TO SECURE FLANGES UNTIL REMAINING WELDS ARE MADE AFTER DISASSEMBLY. ADJACENT FLANGES SHALL BE "MATCH MARKED" TO INSURE PROPER FIELD ASSEMBLY.
3. NOMINAL WALL THICKNESS SHOWN. THICKER WALL IS PERMITTED UPON ENGINEER'S APPROVAL.

**TRUSS UNIT TABLE**

TRUSS SIZE		MAXIMUM DMS TYPE 2 SIGN LENGTH	STEEL SUPPORT POST (COLUMN)				TRUSS MEMBERS AND DETAILS						
e	d		DIAMETER	WEIGHT	WALL THICKNESS (SEE NOTE 3)	H (MAX.)	TOP & BOTTOM CHORD	VERTICAL	VERTICAL DIAG.	HORIZONTAL	HORIZONTAL DIAG.	INTERIOR DIAG.	LIMITS FOR PANEL SPACING (P) *
3'-9"	7'-0"	30'-0"	24"	125.61 (#/FT)	1/2"	12'-0"	HSS 6x6x5/16	3" Ø X.S	4" Ø X.X.S	2" Ø X.S	2 1/2" Ø X.S	2" Ø X.S	48" MIN. TO 66" MAX.
													1'-9"

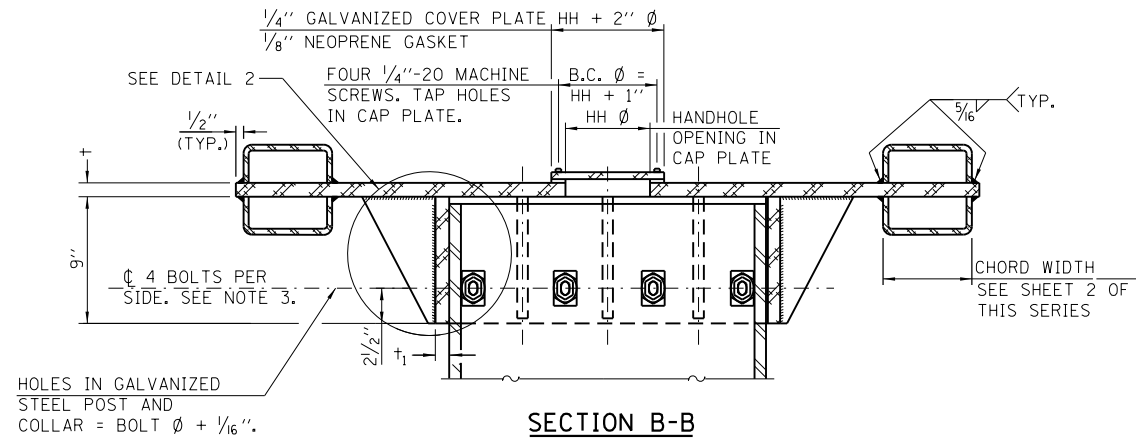
\* P =  $\frac{L-S-1'-6"}{\# \text{ PANELS}}$

APPROVED BY: *Paul Kovacs* CHIEF ENGINEERING OFFICER  
DATE: 03/31/2014



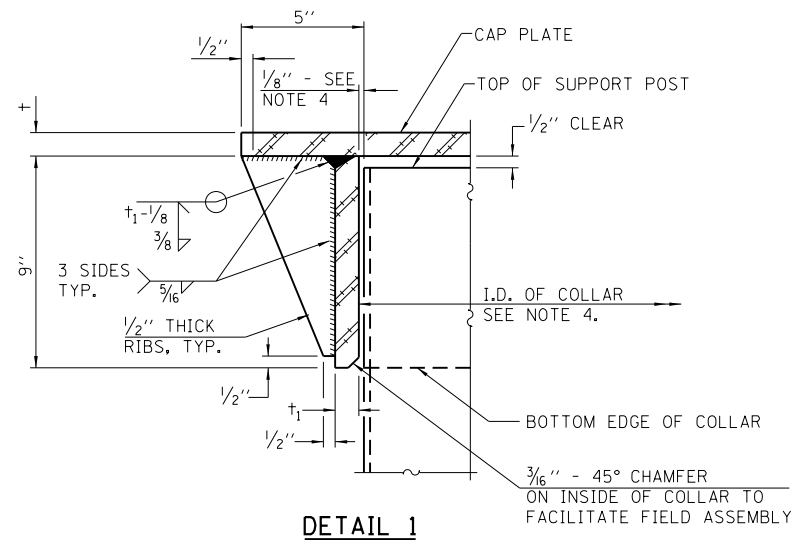
OVERHEAD SIGN STRUCTURE  
BUTTERFLY TYPE  
STRUCTURE DETAILS

STANDARD F14-07

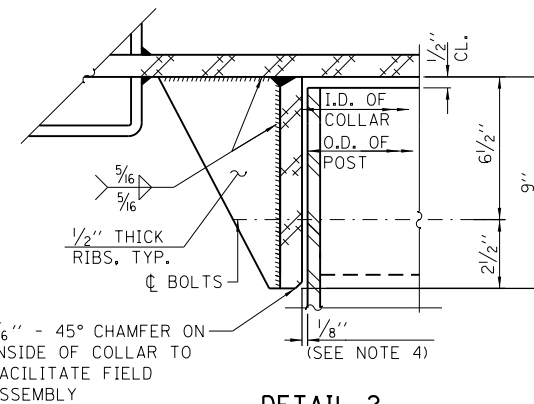


**SECTION B-B**

BOLTS SHALL BE HIGH STRENGTH WASHERS (INCLUDING CONTOURED WASHERS), AND LOCKNUTS SHALL BE STAINLESS STEEL.

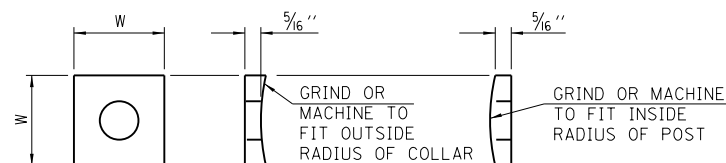


**DETAIL 1**



**DETAIL 2**

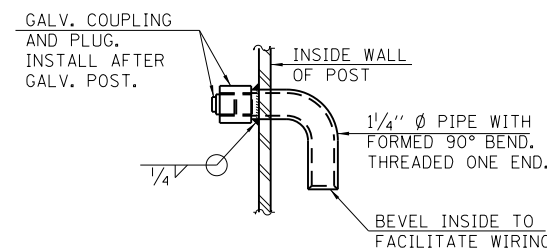
(FOR DETAILS NOT SHOWN, SEE DETAIL 3)



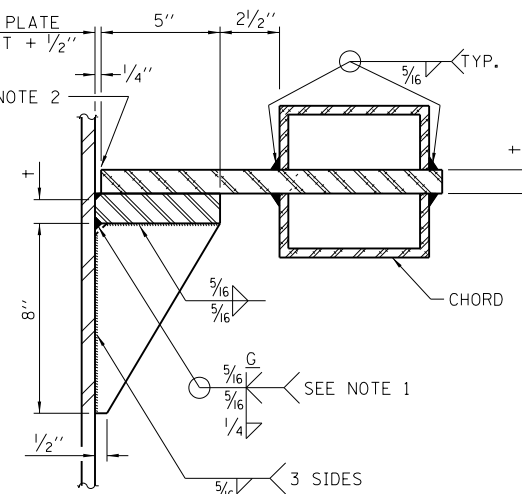
**CONTOURED WASHERS**

BOLT SIZE	CONTOURED WASHERS HOLE DIA.	W
7/8"	1"	2 1/2"
1"	1 1/8"	3"
1 1/4"	1 3/8"	3 1/4"

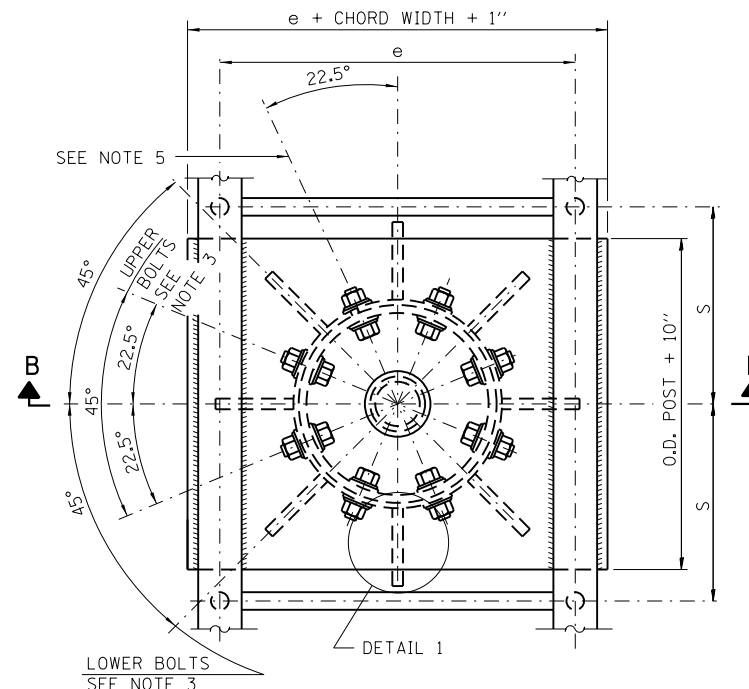
(ASTM A240, TYPE 304)



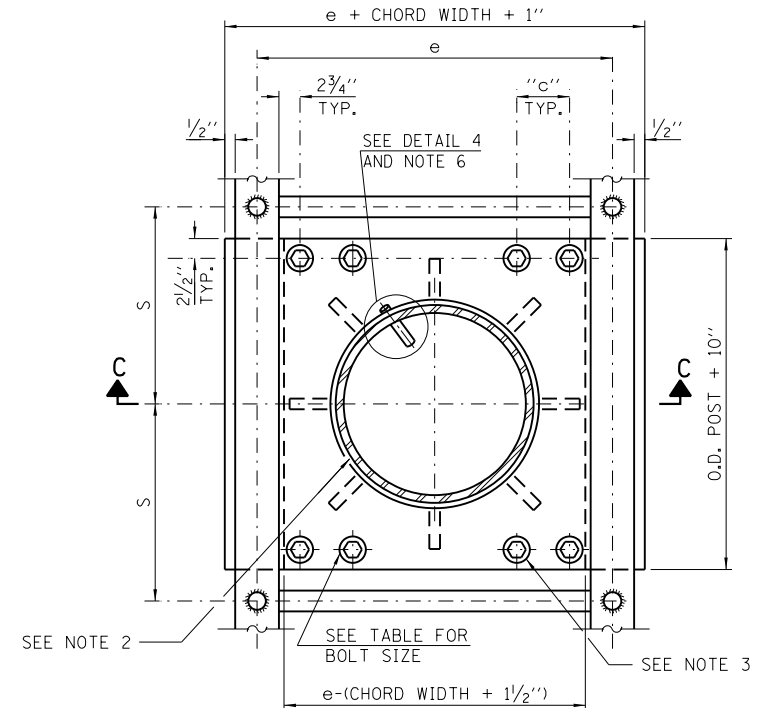
**DETAIL 4**



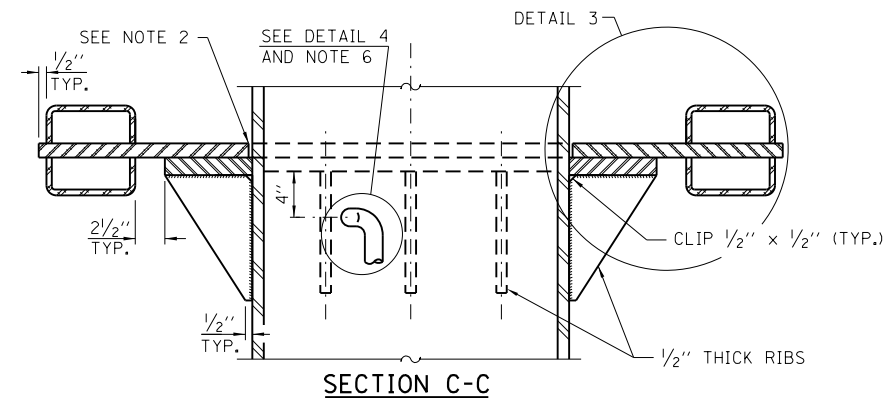
**DETAIL 3**



**PLAN VIEW - TOP OF COLUMN**



**SECTION THRU POST ABOVE LOWER CHORDS**



**SECTION C-C**

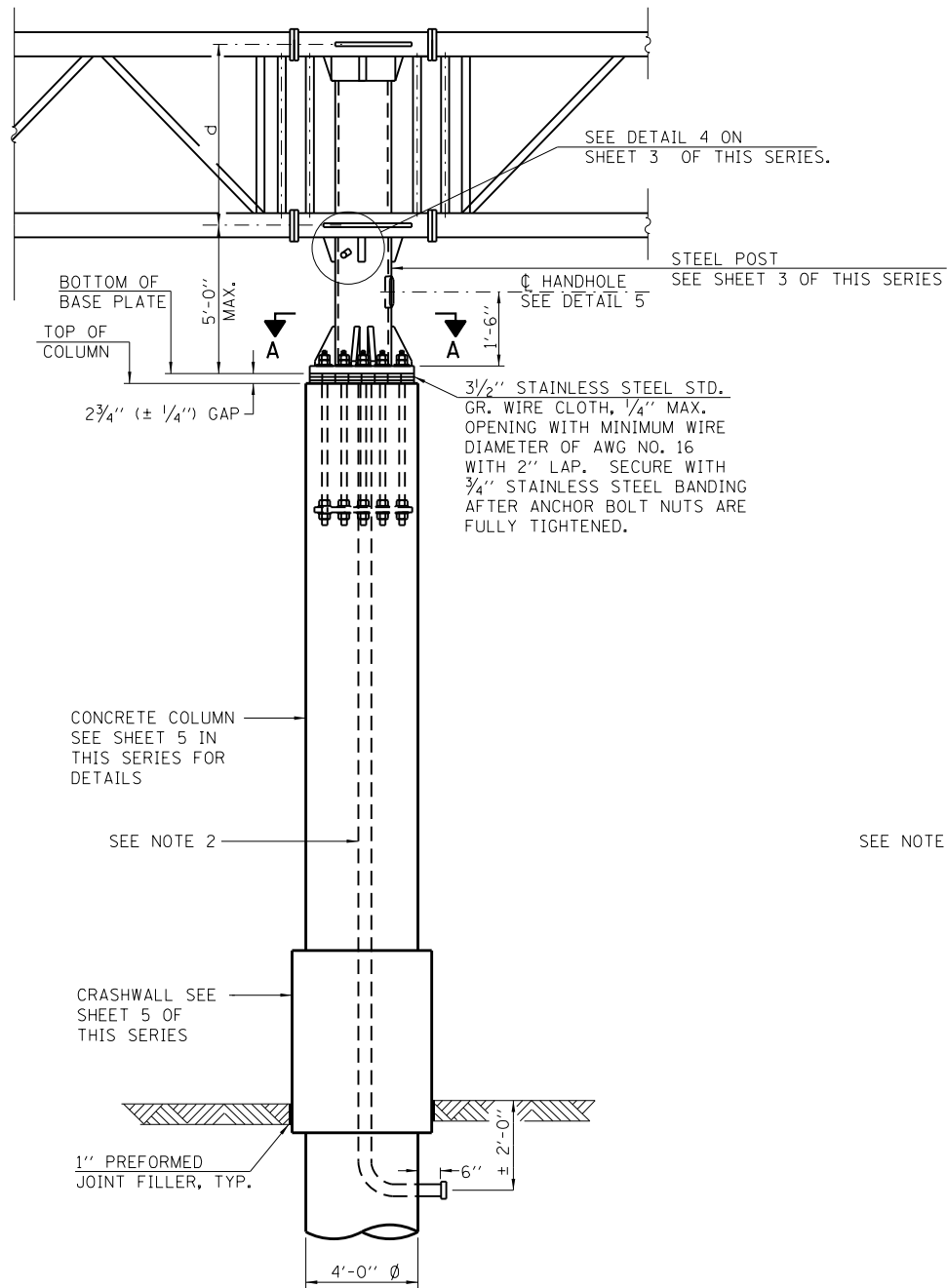
**NOTES:**

- GRIND TOP IF REQUIRED TO FULLY SEAT PLATE. REPAIR DAMAGED GALVANIZING BEFORE ASSEMBLY.
- AFTER TIGHTENING LOWER CONNECTION BOLTS, FILL GAP WITH NON - HARDENING, SILICONE CAULK SUITABLE FOR EXTERIOR EXPOSURE AND ACCEPTABLE TO THE ENGINEER.
- CONNECTION BOLTS IN COLLAR AND BOLTS AT LOWER CHORD CONNECTION SHALL BE HIGH STRENGTH WITH MATCHING LOCKNUTS. CONNECTION BOLTS SHALL HAVE TWO STAINLESS STEEL FLAT WASHERS EACH.
- COLLAR I.D. SHALL BE MANUFACTURED TO CORRESPOND TO O.D. OF ACTUAL GALVANIZED POST PLUS 1/8" ( $\pm 1/16$ "). MAXIMUM GAP BETWEEN POST AND COLLAR AT ANY LOCATION EQUALS 1/8" BEFORE TIGHTENING BOLTS.
- OPTIONAL FULL PENETRATION WELD IN COLLAR. (TWO LOCATIONS MAXIMUM (180° APART) X-RAY OR UT 100%)
- ORIENT PIPE TOWARD WALKWAY SIDE. HOLE IN POST = O.D. PIPE + 1/8".

**CONNECTION TABLE**

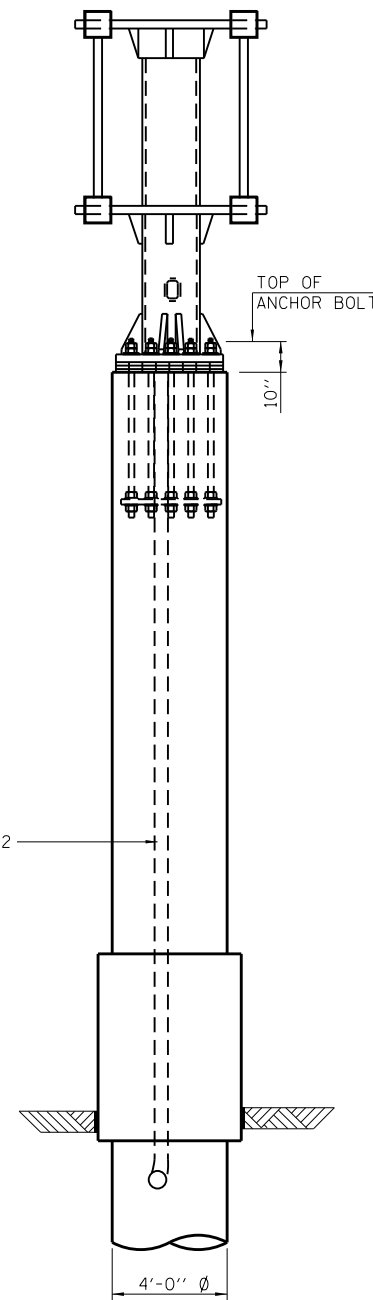
POST OUTSIDE DIAMETER	UPPER & LOWER CONNECTION BOLT DIAMETER (SEE NOTE 3)	LOWER JUNCTURE BOLT SPACING DIMENSION "C" (SEE NOTE 3)	OPENING IN CAP PLATE "HH"	PLATE THICKNESS (+)	COLLAR THICKNESS (t <sub>1</sub> )
24"	1 1/4"	3 1/2"	6"	1"	7/8"



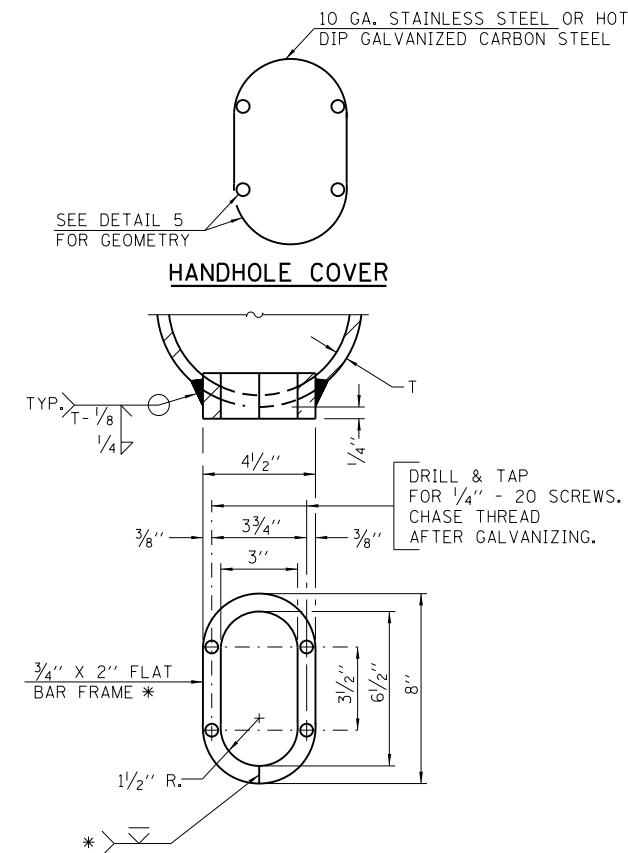


**FRONT ELEVATION**

SEE SHEET 5 OF THIS SERIES FOR FOUNDATION DETAILS.  
(DMS TYPE 2 SIGN CABINET NOT SHOWN FOR CLARITY)



**SIDE ELEVATION**

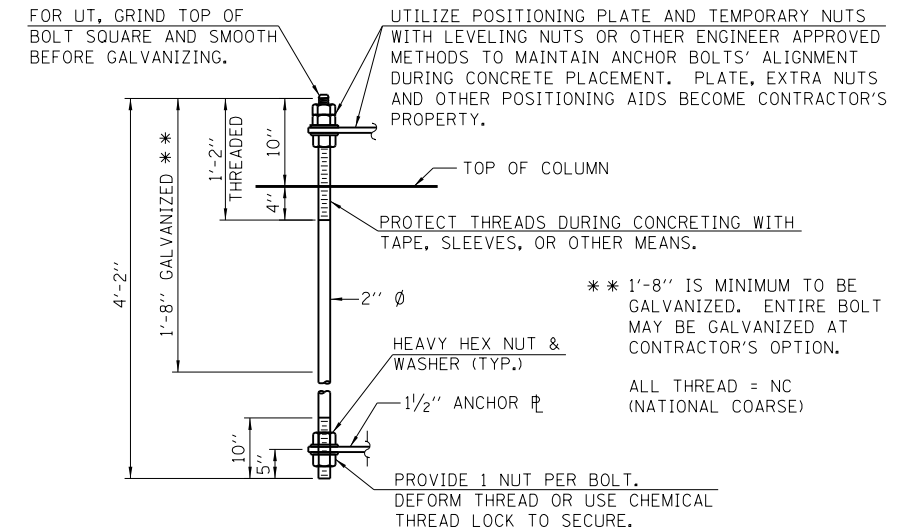


**DETAIL 5**

\* BENT BARS MAY BE BUTT WELDED TOP AND BOTTOM OR BOTTOM ONLY. IN LIEU OF FABRICATED HANDHOLE FRAME AS SHOWN, MAY CUT FROM 2" PLATE (ROLLING DIRECTION VERTICAL). ALL CUT FACES TO BE GRIND TO ANSI ROUGHNESS OF 500  $\mu$ in OR LESS.

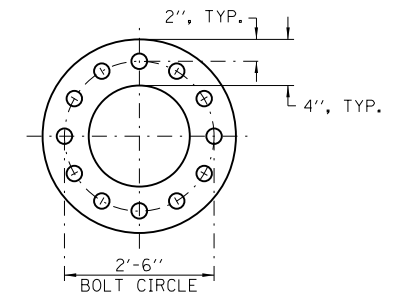
**NOTE:**

1. SITE GROUNDING ELECTRODE SYSTEM TO BE PROVIDED AS INDICATED ON PLANS.
2. SEE PLAN SHEETS FOR TYPE, SIZE AND NUMBER OF CONDUITS.

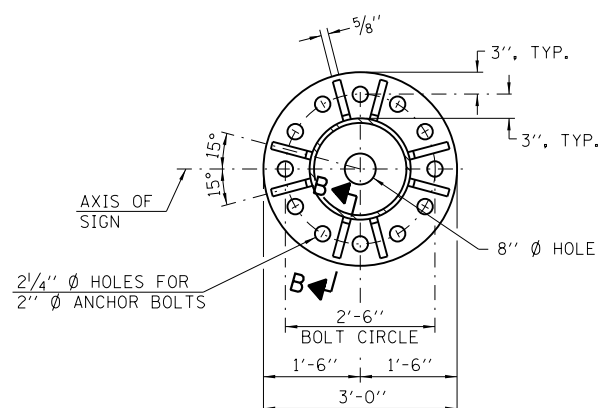


**ANCHOR BOLT DETAIL**

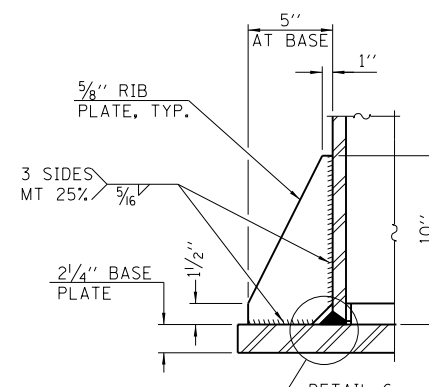
ANCHOR BOLTS SHALL CONFORM TO AASHTO M314 OR ASTM F1554 GRADE 55. GALVANIZE THE UPPER 1'-8" (MINIMUM (\*\*)) AND ASSOCIATED AASHTO M291, GRADE A, C OR DH HEAVY HEX NUTS AND HARDENED WASHERS PER AASHTO M232. NO WELDING SHALL BE PERMITTED ON BOLTS. PROVIDE A NUT AT BOTTOM, A HEXAGON LOCKNUT AND WASHER ABOVE BASE PLATE AND A LEVELING NUT AND WASHER BELOW BASE PLATE. NUTS SHALL EACH BE TIGHTENED WITH 200 LB.-FT. MINIMUM TORQUE AGAINST BASE PLATE. BEFORE OR AFTER THREADING, BUT BEFORE GALVANIZING, EACH ANCHOR BOLT SHALL BE ULTRASONICALLY TESTED (UT) BY A LEVEL II OR III INSPECTOR, QUALIFIED IN ACCORD WITH ANSI GUIDELINES, TO ENSURE NO REJECTABLE FLAWS EXIST IN THE UPPER 18" (TENSION CRITERIA).



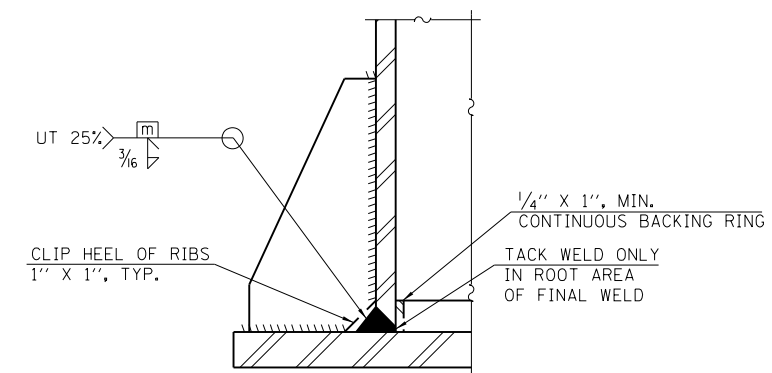
**POSITIONING PLATE/ANCHOR  $\Phi$**



**SECTION A-A**

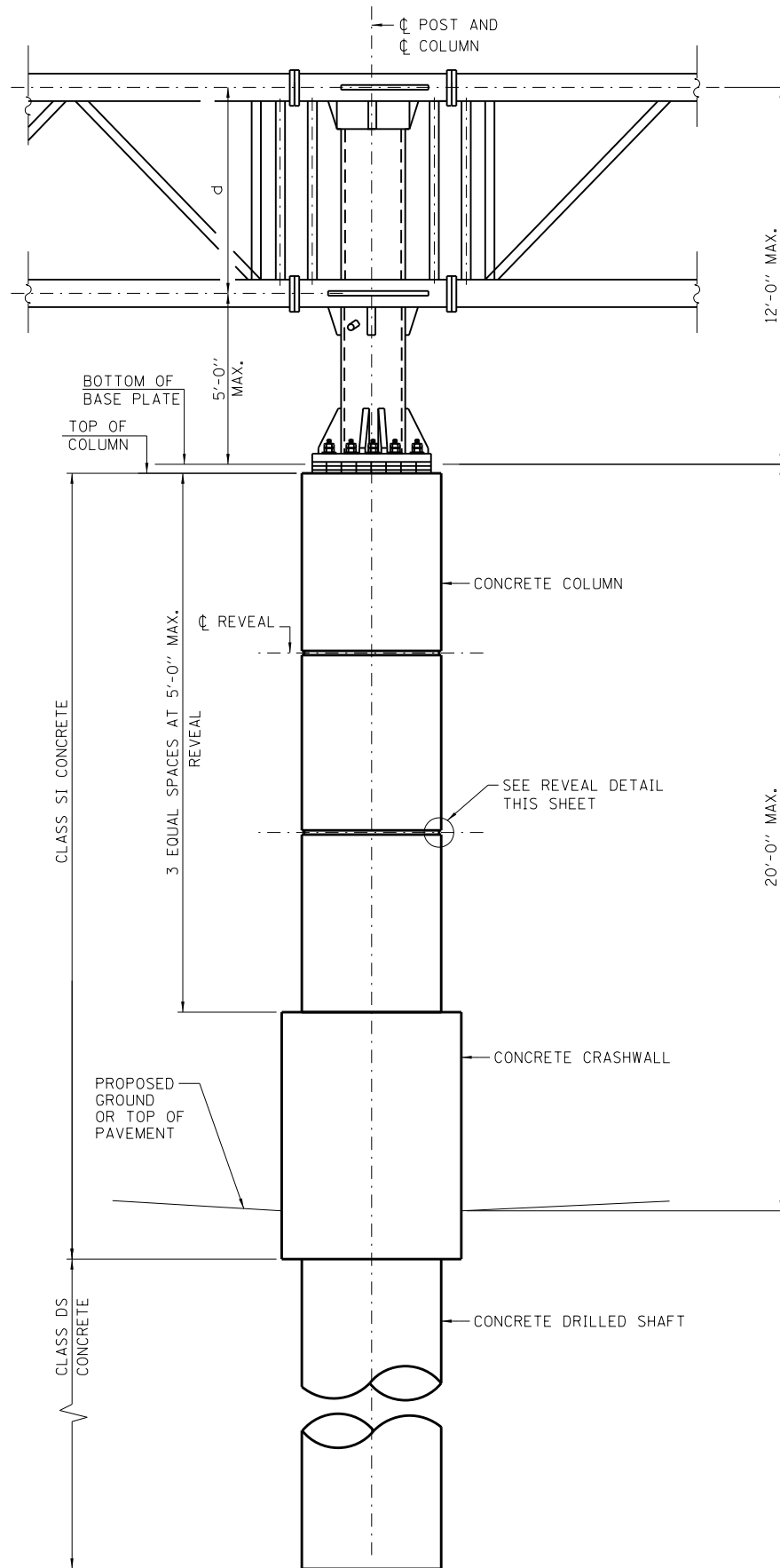


**SECTION B-B**



**DETAIL 6**  
(TYPICAL RIB)

APPROVED BY: *Paul Kovacs* DATE: 03/31/2014  
CHIEF ENGINEERING OFFICER



### BILL OF MATERIAL - EACH FOUNDATION

CLASS SI CONC. CY	CLASS DS CONC. CY	REBAR POUNDS	PROTECTIVE COAT SQ. YD.
12.9	11.7	4,830	6.0

### NOTES:

- COLUMN CONCRETE VOLUME AND BAR s1(E) LENGTH ARE COMPUTED BASED ON 15'-0" COLUMN HEIGHT. IF COLUMN HEIGHT IS NOT EQUAL 15'-0", QUANTITIES SHALL BE CALCULATED BASED ON ACTUAL COLUMN HEIGHT.
- PROTECTIVE COAT SHALL BE APPLIED TO TRAFFIC AND TOP FACES OF CRASHWALL AND PERIMETER OF THE COLUMN.

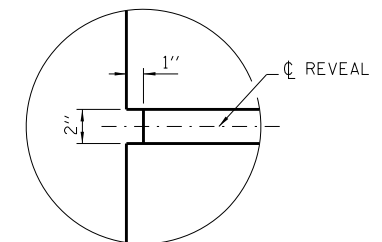
### BAR LIST - EACH FOUNDATION (COLUMN, CRASHWALL AND DRILLED SHAFT)

BAR	NUMBER	SIZE	LENGTH	SHAPE
v(E)	20	#9	38'-3"	—
v1(E)	20	#9	15'-8"	—
s(E)	1	#4	31'-1"	WWWW
s1(E)	1	#4	14'-5"	WWWW
u(E)	16	#5	12'-2"	—
u1(E)	24	#5	8'-7"	—

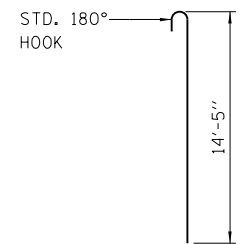
\* THE LENGTH OF SPIRAL SHOWN IS THE HEIGHT OF SPIRAL

	"B"	"A"
BAR	"A"	"B"
u(E)	3'-9"	4'-8"
u1(E)	1'-3"	6'-1"

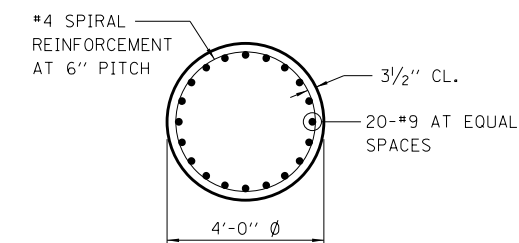
BAR u(E), u1(E)



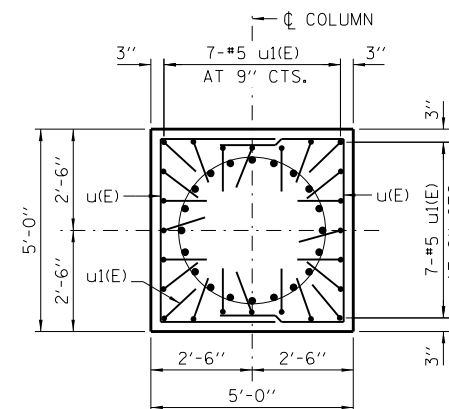
REVEAL DETAIL



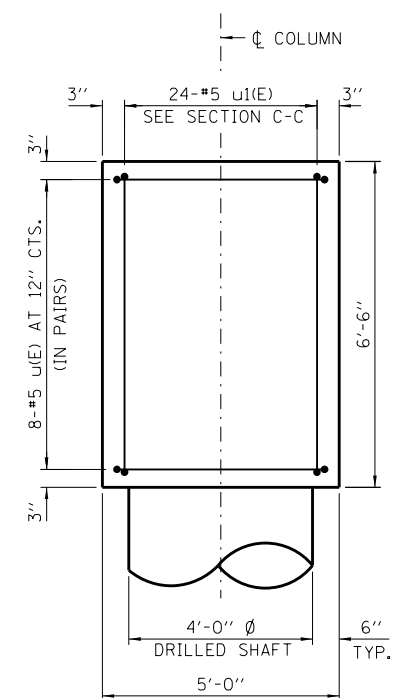
BAR v1(E)



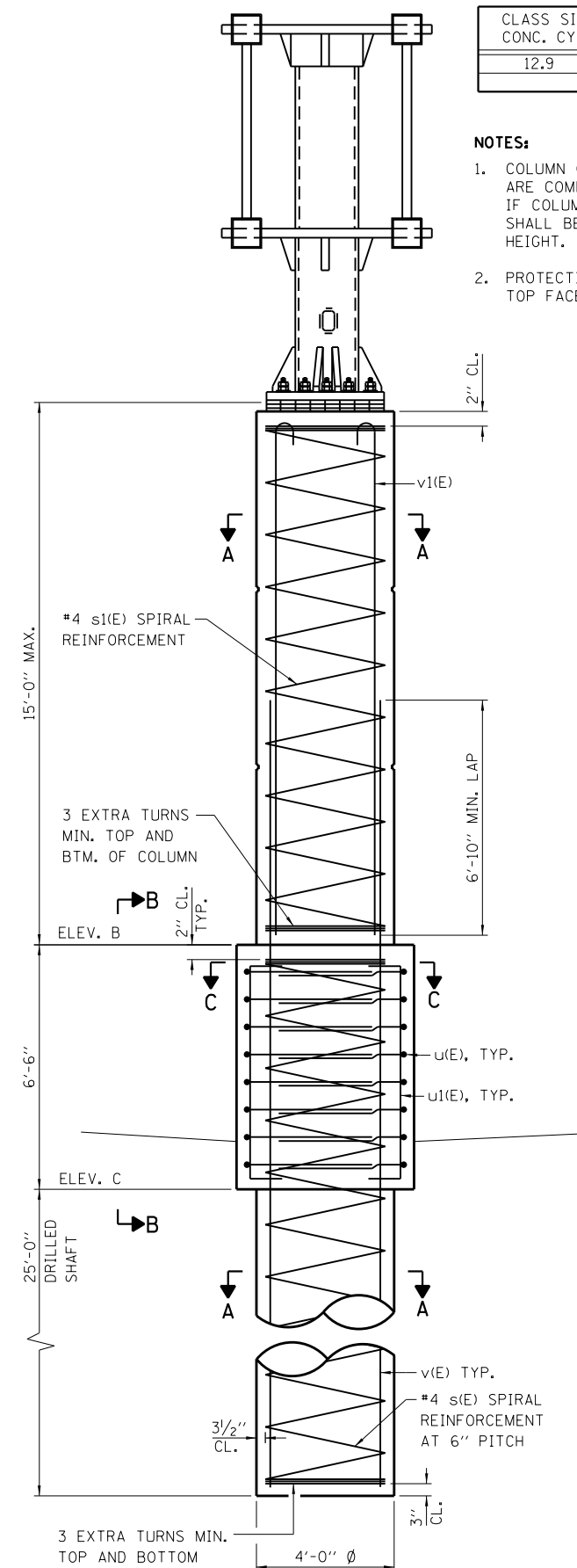
SECTION A-A



SECTION C-C

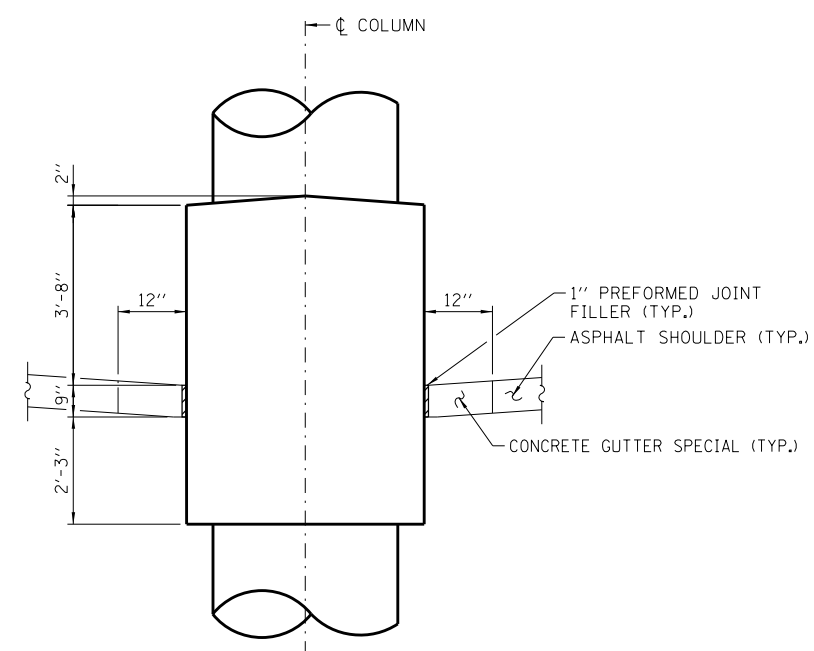
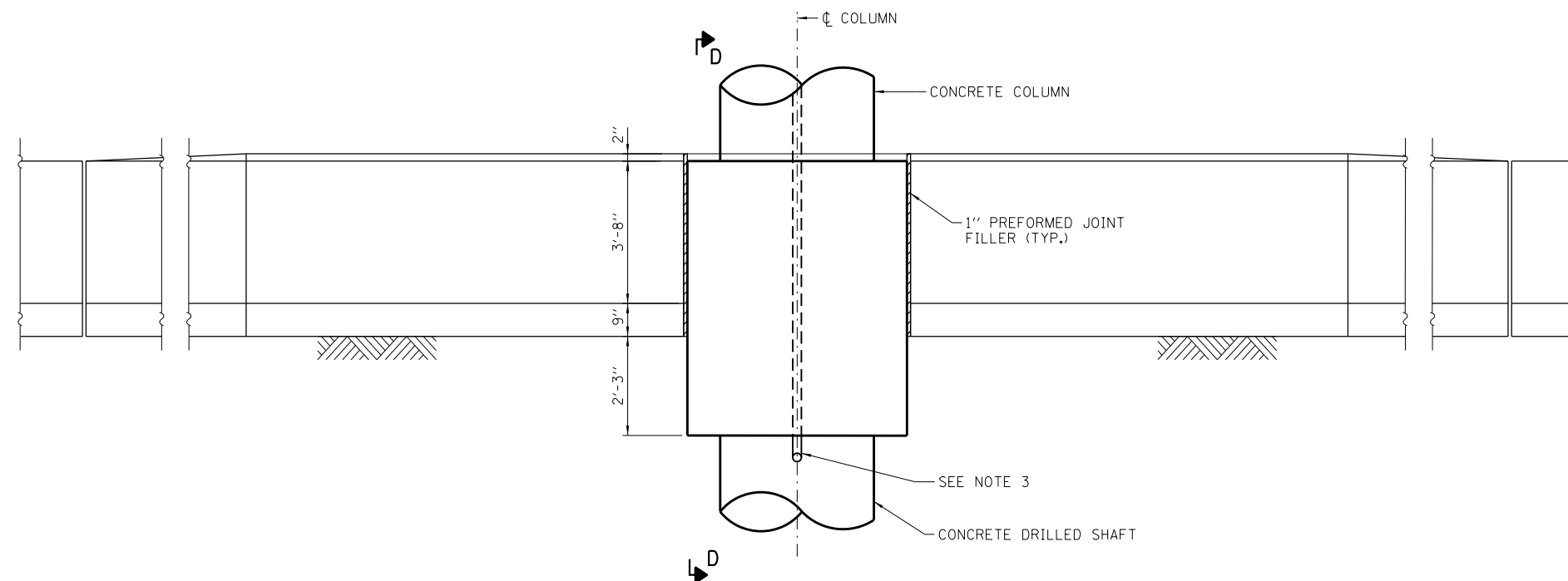


SECTION B-B

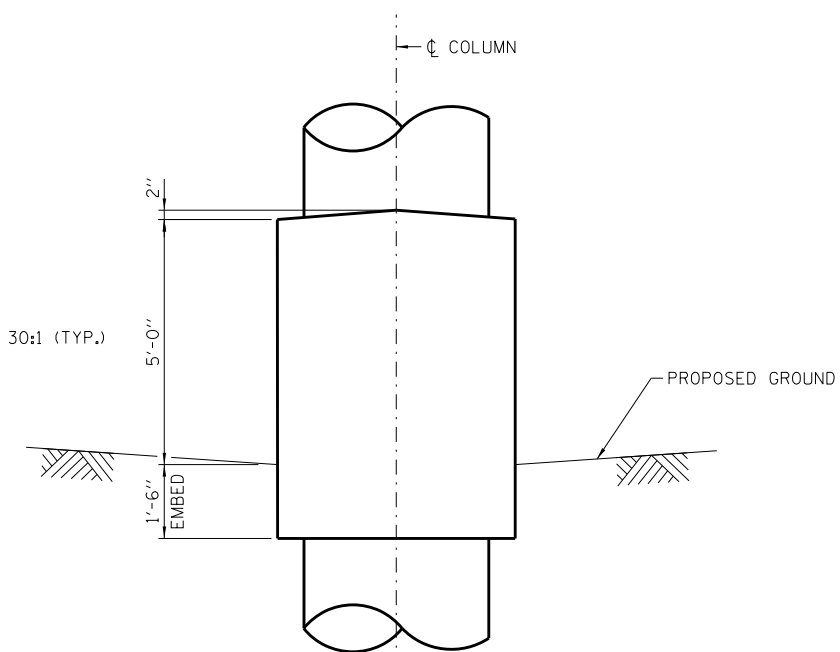
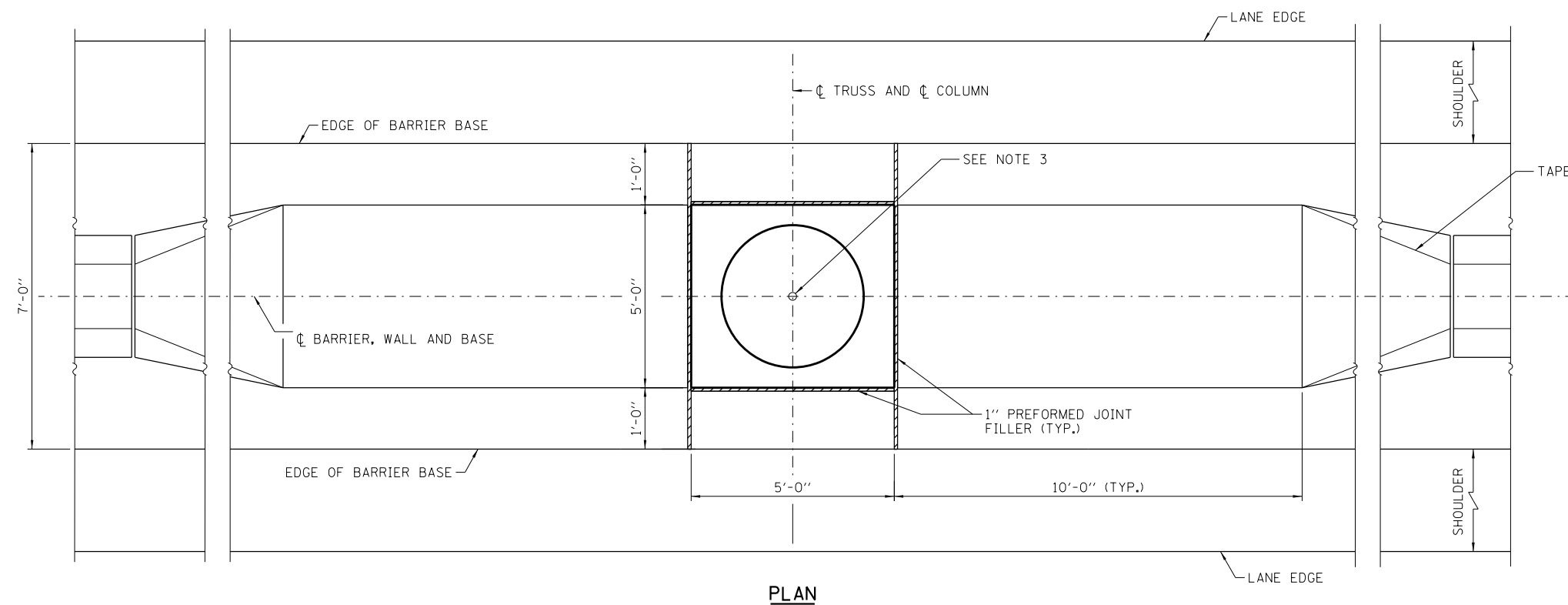


### FOUNDATIONS:

THE FOUNDATION DETAILS SHOWN ARE BASED ON THE PRESENCE OF MOSTLY COMMON COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (QU) > 1.25 TON/SQ. FT. WHICH SHALL BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOBSITE. WHEN OTHER CONDITIONS ARE INDICATED, THE BORING DATA SHALL BE INCLUDED IN THE PLANS AND THE FOUNDATION DIMENSIONS SHOWN SHALL BE THE RESULT OF SITE SPECIFIC DESIGNS. IF CONDITIONS ENCOUNTERED IN THE FIELD ARE DIFFERENT THAN THOSE INDICATED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE IF THE FOUNDATION DIMENSIONS NEED TO BE MODIFIED.



**SECTION D-D**  
FOUNDATION LOCATED IN PAVED ROADWAY MEDIAN



**SECTION D-D**  
FOUNDATION LOCATED IN UNPAVED ROADWAY MEDIAN

NOTES:

1. SIDE ELEVATION AND PLAN VIEW ARE SHOWN FOR FOUNDATION LOCATED IN PAVED MEDIAN.
2. SEE SHEET 5 OF THIS SERIES FOR REINFORCEMENT DETAILS.
3. COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT BARS. DO NOT CUT REINFORCEMENT BARS.

APPROVED BY:

DATE: \_\_\_\_\_

Paul Kovacs  
CHIEF ENGINEERING OFFICER

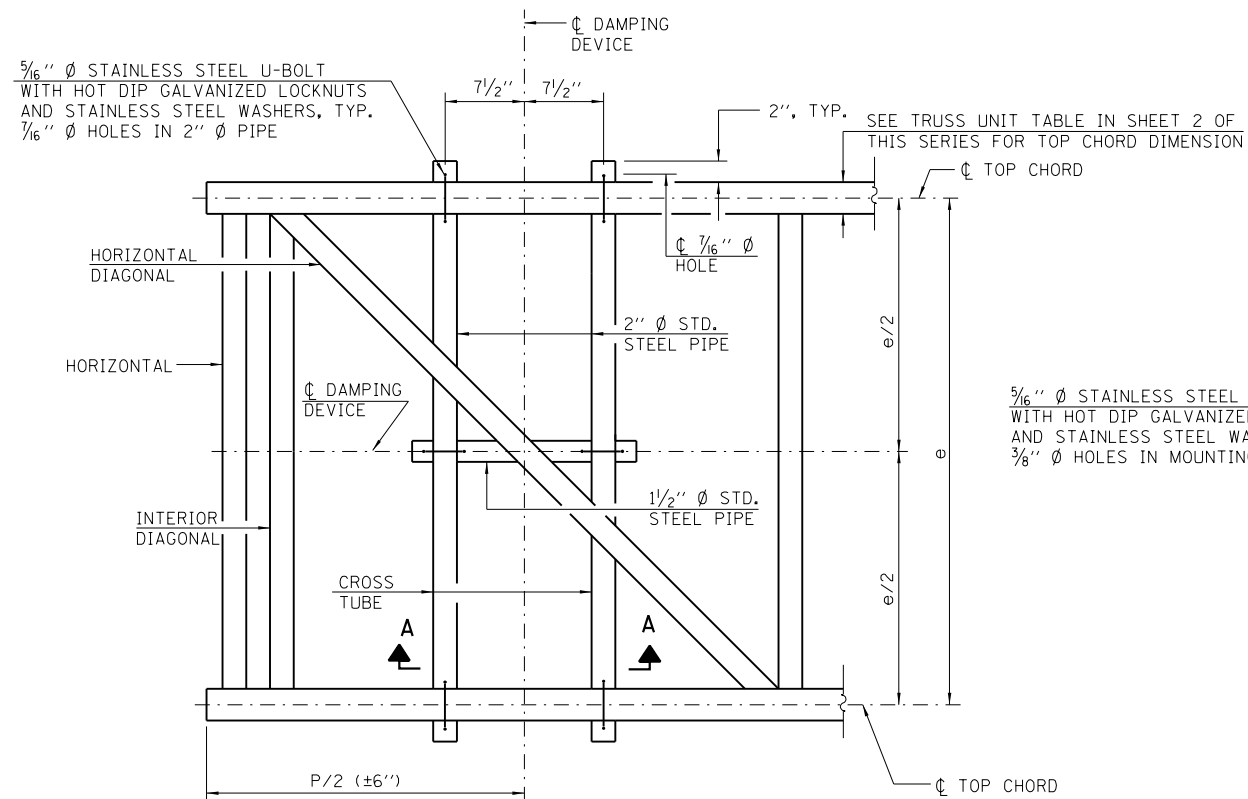
03/31/2014

SHEET 6 OF 8

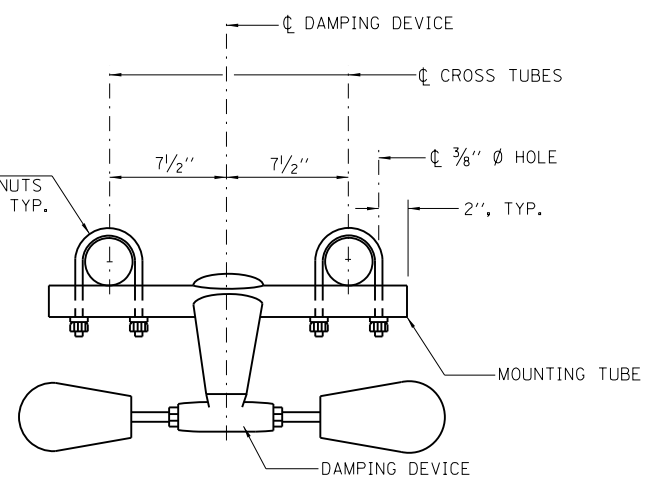


### OVERHEAD SIGN STRUCTURE BUTTERFLY TYPE STRUCTURE DETAILS

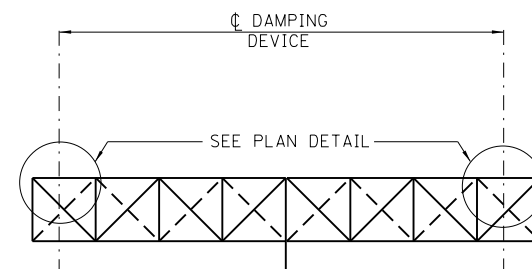
STANDARD F14-07



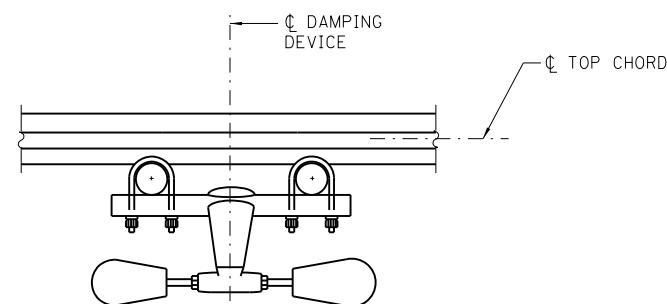
PLAN DETAIL



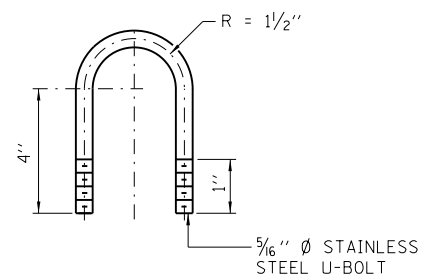
TRUSS DAMPING  
DEVICE CONNECTION DETAIL



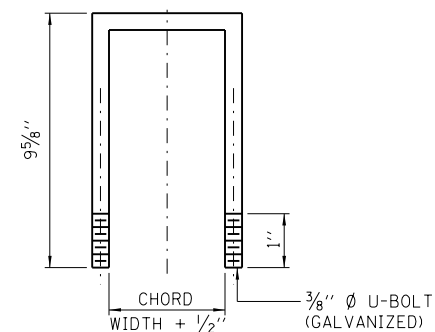
ELEVATION  
STEEL BUTTERFLY SIGN STRUCTURE



SECTION A-A



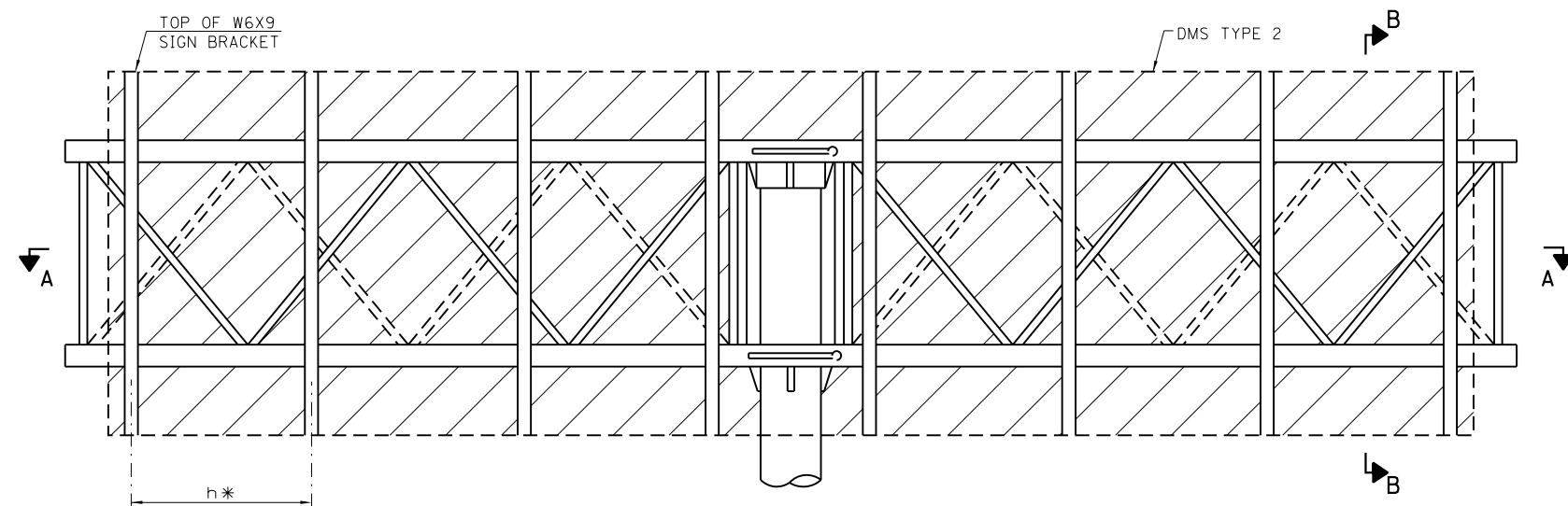
DAMPING DEVICE MOUNTING  
TUBE U-BOLT DETAIL  
(TYPICAL)



TOP CHORD TO CROSS TUBE  
U-BOLT DETAIL  
(TYPICAL)

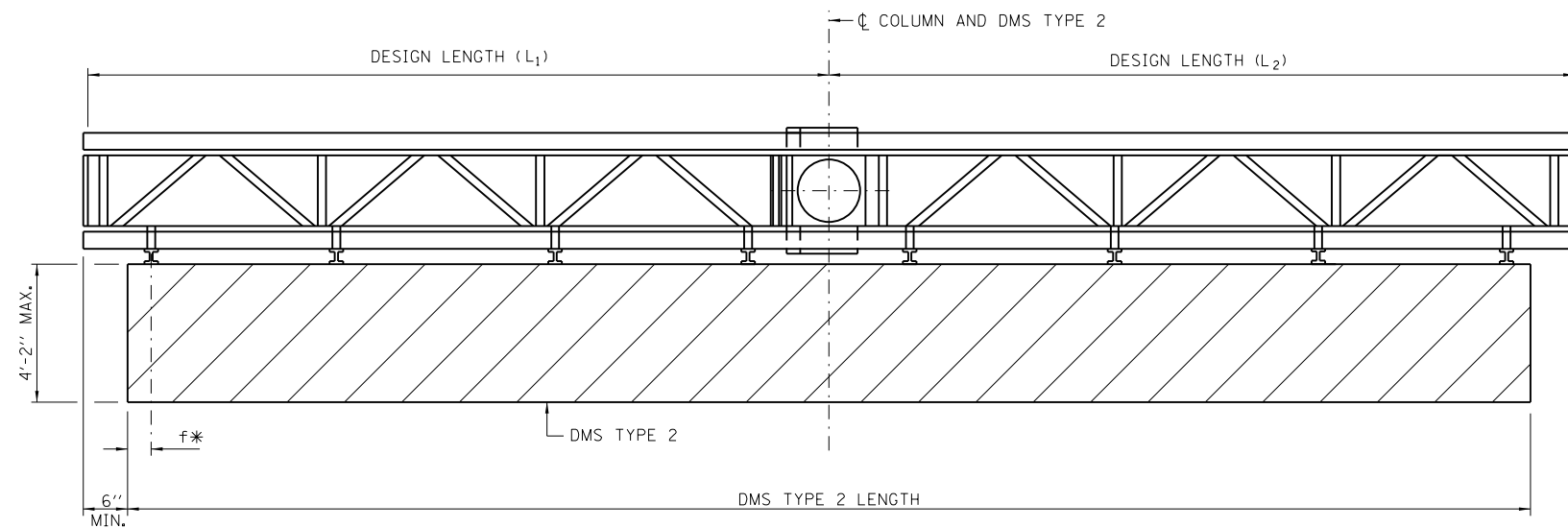
**NOTE:**

DAMPER: ONE DAMPER PER TRUSS. (31 LBS. STOCKBRIDGE-TYPE 29" MINIMUM BETWEEN ENDS OF WEIGHTS).



\* BRACKET DIMENSIONS ARE NOMINAL AND WILL VARY BASED ON ACTUAL DMS TYPE 2 DIMENSIONS PLUS MANUFACTURER'S MOUNTING DEVICES.

**TYPICAL FRONT ELEVATION**



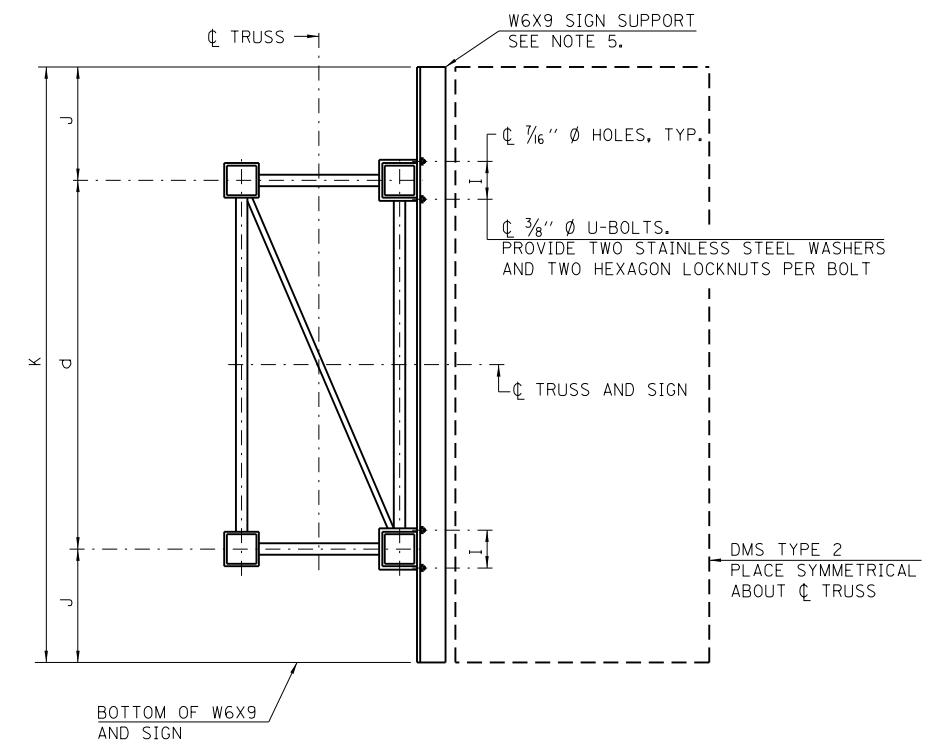
**SECTION A-A**

PLACE ALL SIGN BRACKETS AS CLOSE TO PANEL POINTS AS PRACTICAL.

(ROAD PLAN BENEATH TRUSS VARIES)  
BUTTERFLY MAY BE LOCATED IN SHOULDER AREA.

**NOTES:**

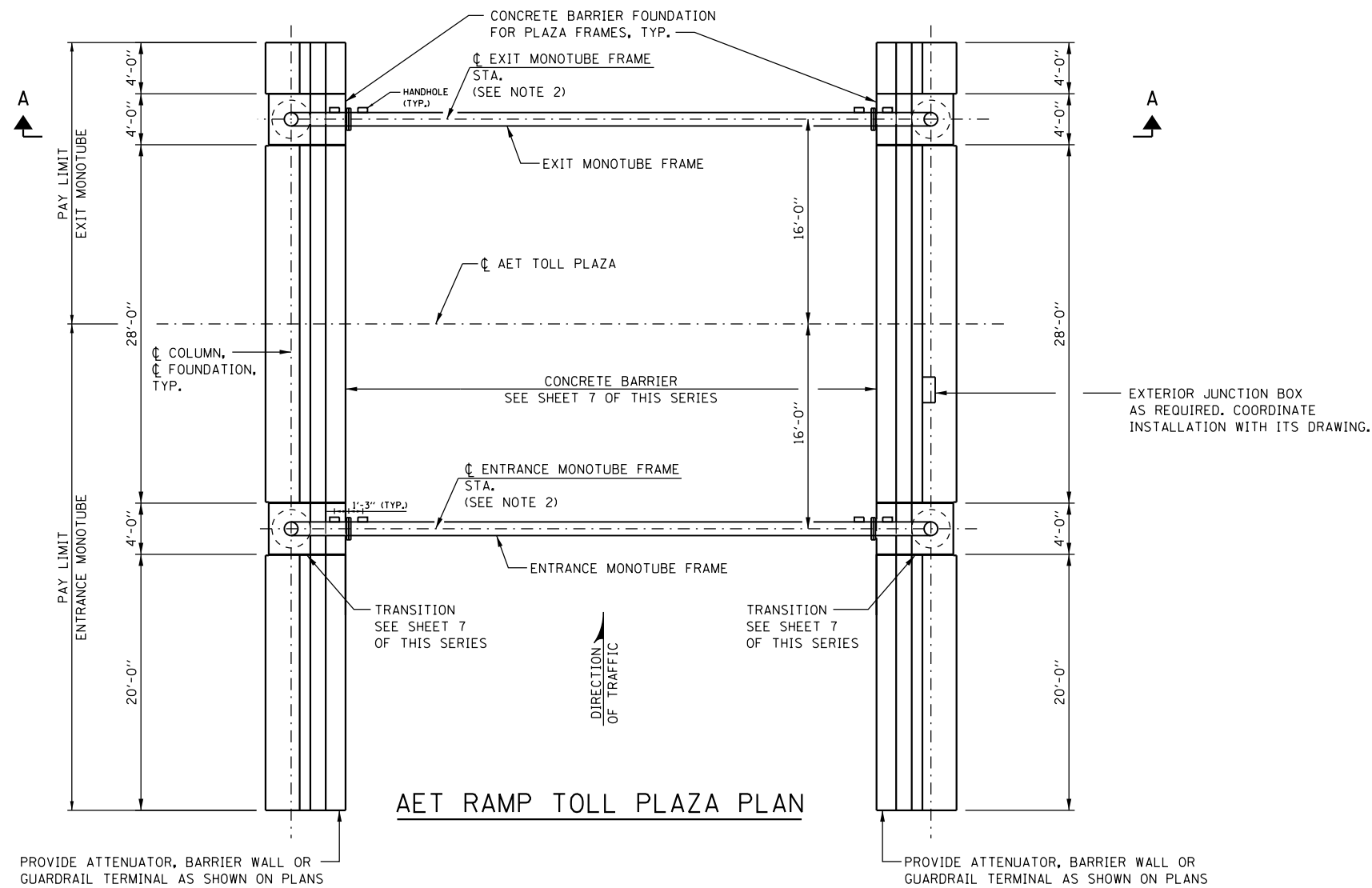
1. SPACE SIGN BRACKETS W6X9 FOR EFFICIENCY AND WITHIN LIMITS SHOWN:
2.  $f = 12''$  MAXIMUM,  $4''$  MINIMUM (END OF SIGN TO  $\phi$  OF NEAREST BRACKET)  
 $h = 6'-0''$  MAXIMUM ( $\phi$  TO  $\phi$  SIGN SUPPORT BRACKETS, W6X9)
3. MAXIMUM DMS TYPE 2 WEIGHT = 5000 LBS.
4.  $4'-2''$  MAXIMUM DEPTH INCLUDES DEPTH OF DMS TYPE 2 PLUS CONNECTION TO W6X9.
5. DMS TYPE 2 MANUFACTURER SHALL DESIGN AND SUPPLY HARDWARE FOR CONNECTION TO W6X9. BOLTS SHALL BE STAINLESS STEEL OR HOT DIP GALVANIZED HIGH STRENGTH PER THE STANDARD SPECIFICATION.



**SECTION B-B**

**BRACKET TABLE**

W6X9		
SIGN WIDTH		NUMBER OF BRACKETS REQUIRED
GREATER THAN	LESS THAN OR EQUAL TO	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6



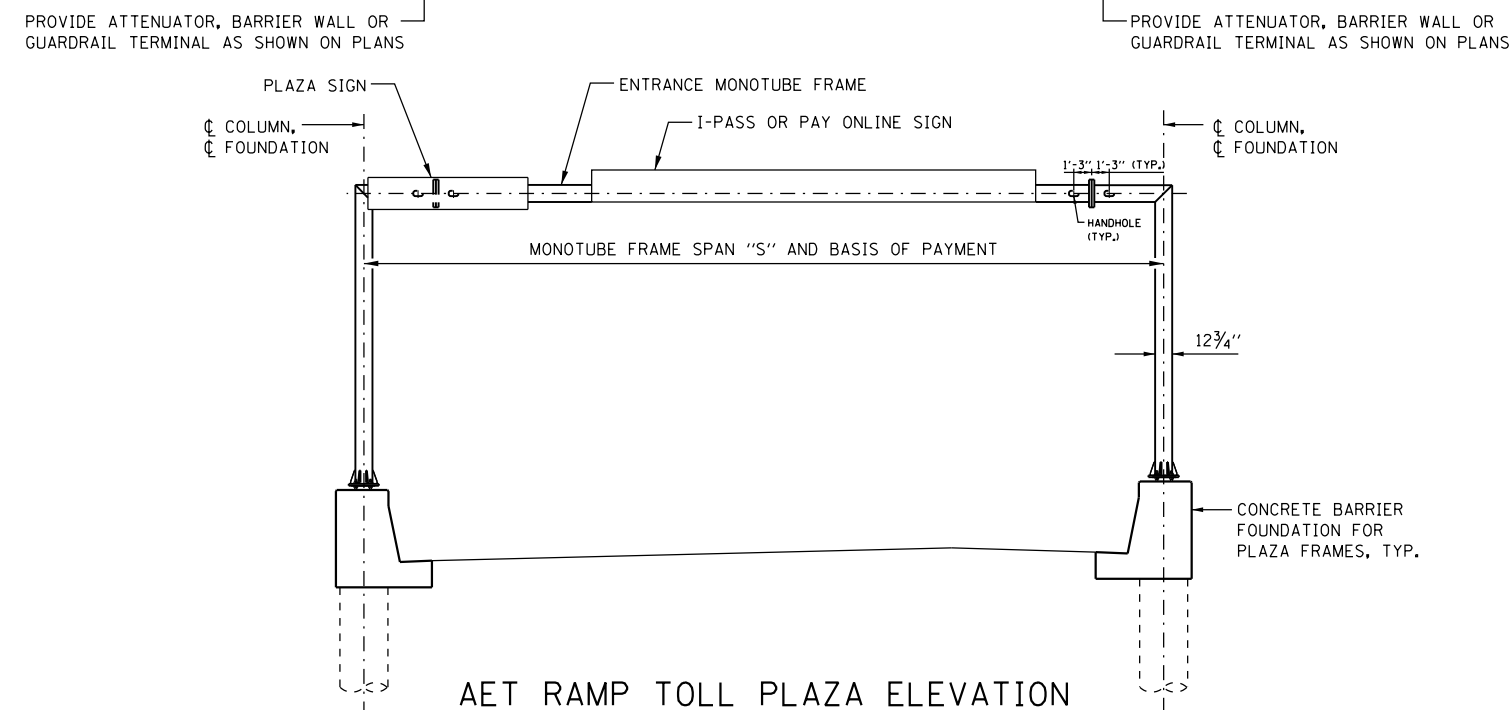
**AET RAMP TOLL PLAZA PLAN**

**SIGN TABLE**

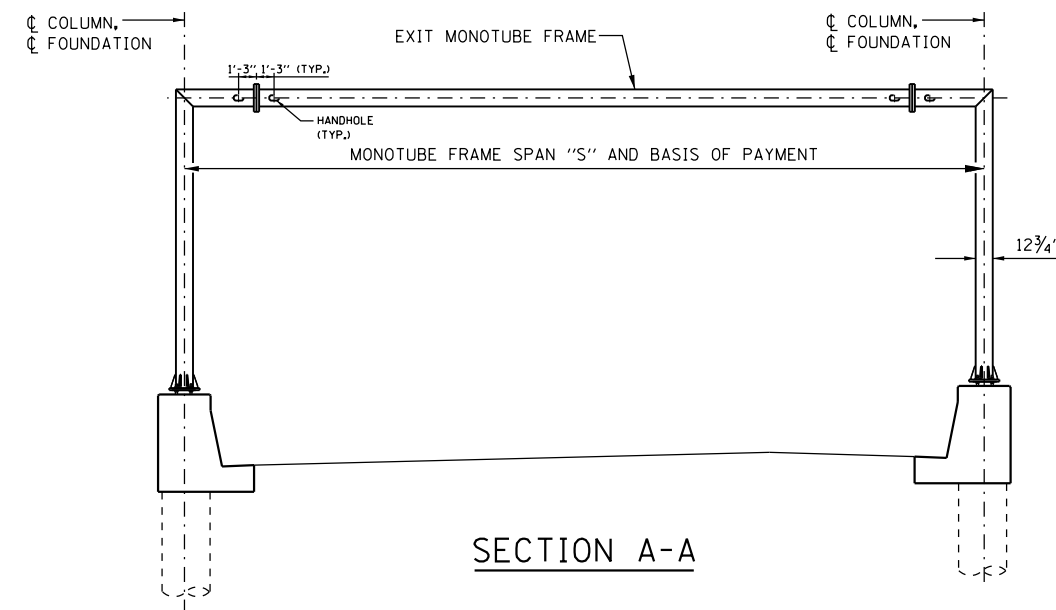
SIGN	MAXIMUM AREA	MAXIMUM LENGTH
PLAZA SIGN	24 S.F.	8'-0"
I-PASS OR PAY ONLINE SIGN	60 S.F.	20'-0"

**NOTE:**

1. SEE CONTRACT PLANS FOR SIGN SIZE AND LOCATION.
2. PROVIDE ENTRANCE AND EXIT MONOTUBE FRAME STATIONS IN CONTRACT PLANS.



**AET RAMP TOLL PLAZA ELEVATION**

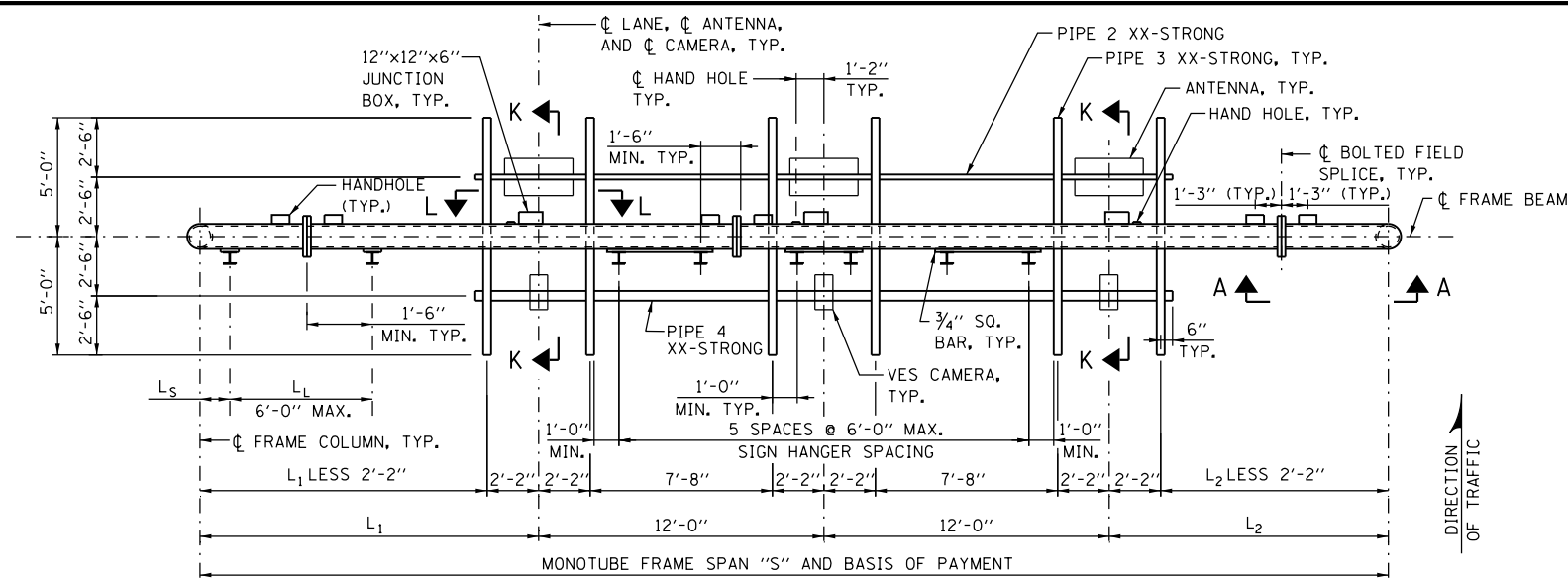


**SECTION A-A**

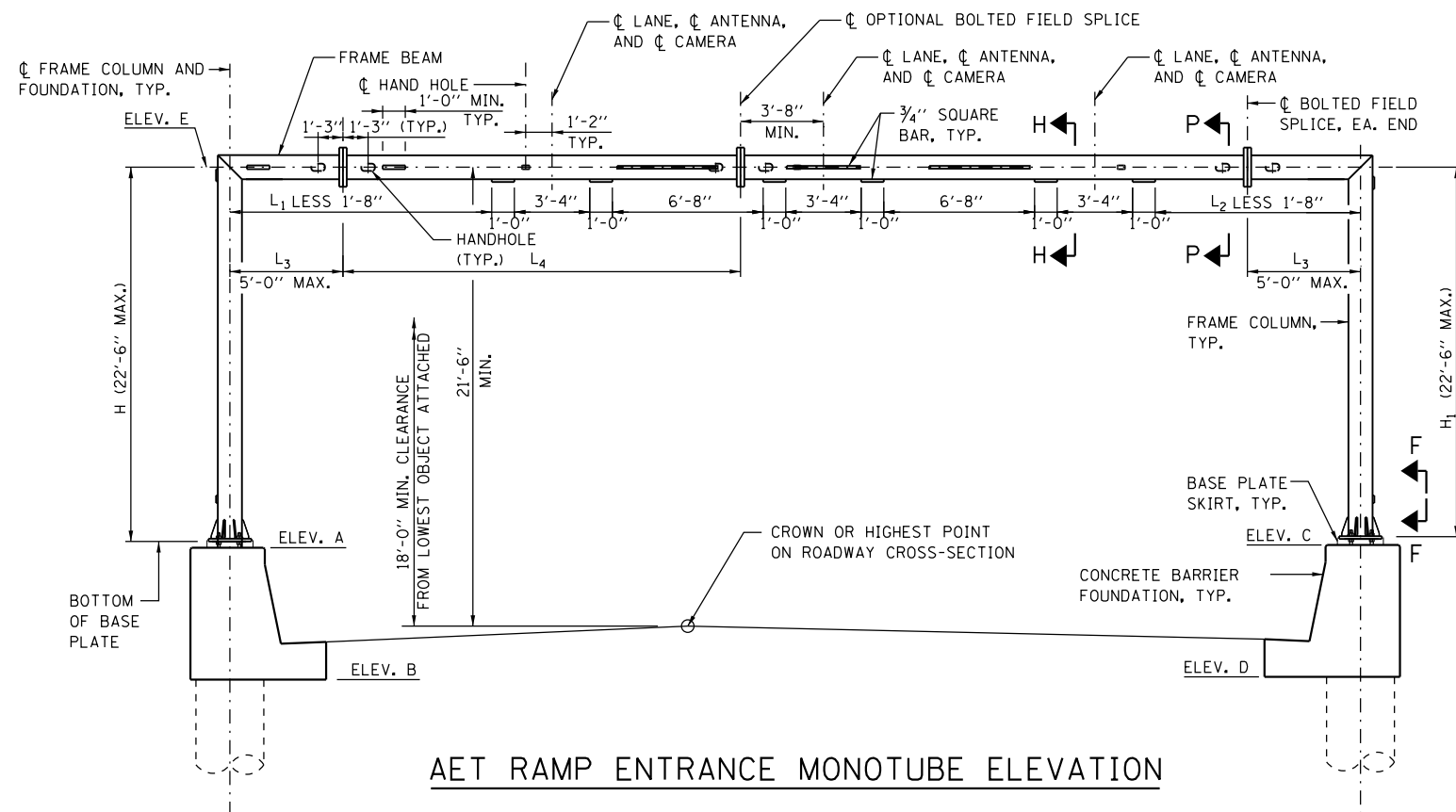


DATE	REVISIONS
3-01-2024	ADDED NOTE FOR BARRIER PAYMENT
3-01-2023	CLARIFIED PAY ITEMS FOR MONOTUBES
3-01-2023	CHANGE HORZ. PIPE TO 4XX-STRONG, PIPE & REV. NUMBER OF V(E) BARS
3-01-2022	REV. STRUCT. STEEL NOTES 1 & 4, CAMERA SUPPORT & UPDATE LOADS.

OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR AET RAMP  
STANDARD F15-08



AET RAMP ENTRANCE MONOTUBE PLAN



AET RAMP ENTRANCE MONOTUBE ELEVATION

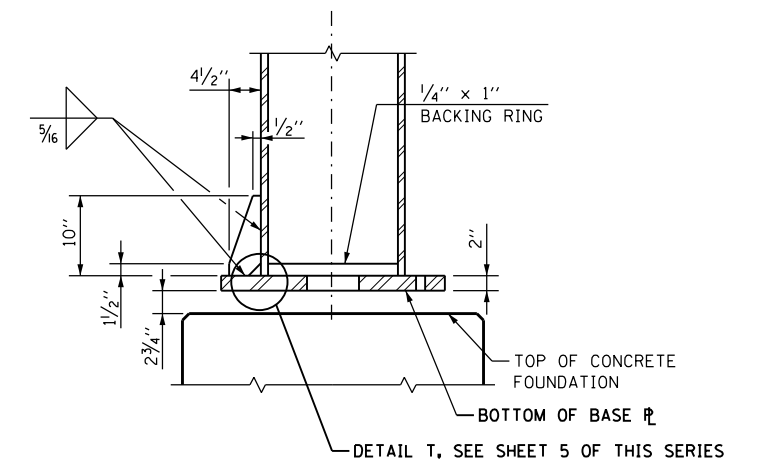
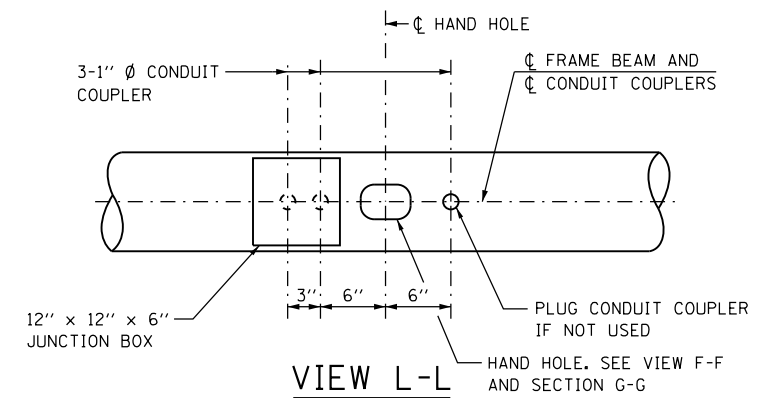
NOTES:

- FOUNDATIONS FOR MONOTUBE FRAMES ARE SHOWN ON SHEET 6 OF THIS SERIES.
- SEE SHEET 5 OF THIS SERIES FOR SECTIONS A-A, G-G, H-H, K-K, VIEW F-F AND BASE PLATE SKIRT.
- SEE SHEET 4 OF THIS SERIES FOR SECTION P-P.
- PROVIDE CAMBER AT MIDSPAN OF STRUCTURE.
- LOCATE OPTIONAL BOLTED FIELD SPLICE NEAR MIDSPAN.
- WORK THIS SHEET WITH, OVERHEAD SIGN STRUCTURE ENTRANCE MONOTUBE TYPE (STEEL) AET RAMP SUMMARY AND TOTAL BILL OF MATERIAL SHEET.

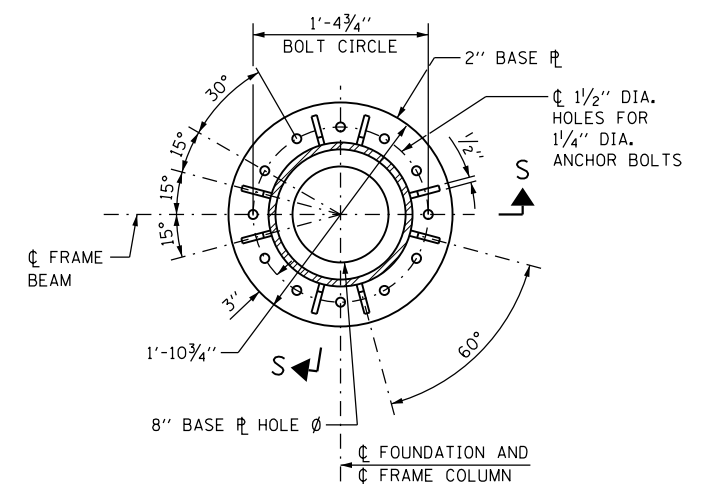
ENTRANCE MONOTUBE FRAME TABLE

SPAN "S"	FRAME COLUMN	FRAME BEAM	CAMBER
50' MAX.	HSS 12.75x0.500	HSS 12.75x0.500	1 3/4"

SEE ILLINOIS TOLLWAY STANDARD DRAWING F13 FOR SPANS GREATER THAN 50'.



SECTION S-S

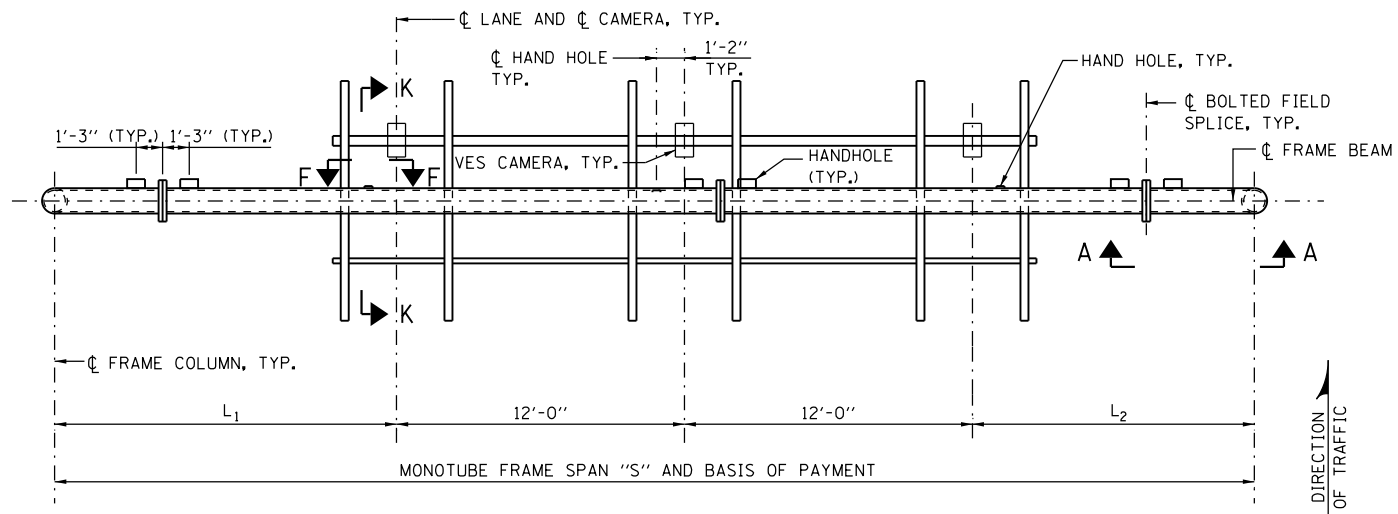


BASE PLATE PLAN  
ENTRANCE AND EXIT MONOTUBE

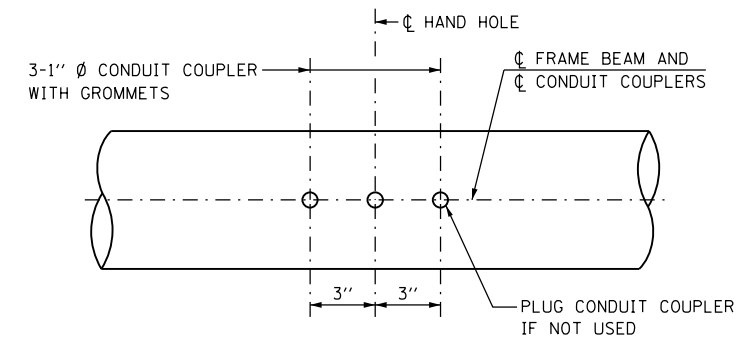


OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR AET RAMP

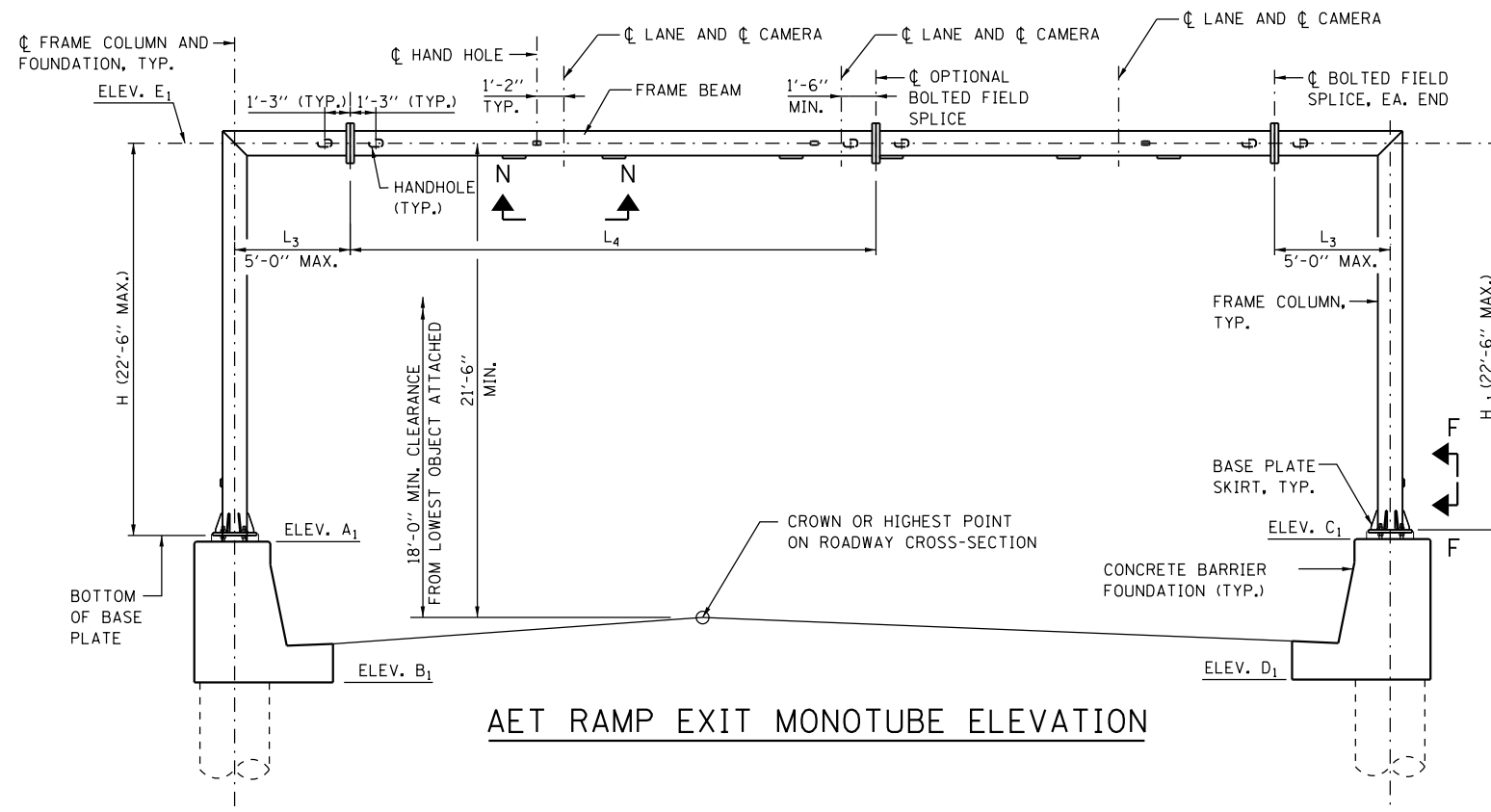
STANDARD F15-08



AET RAMP EXIT MONOTUBE PLAN



VIEW N-N (CONDUIT COUPLER DETAIL)



AET RAMP EXIT MONOTUBE ELEVATION

EXIT MONOTUBE FRAME TABLE

SPAN "S"	FRAME COLUMN	FRAME BEAM	CAMBER
50' MAX.	HSS 12.75x0.500	HSS 12.75x0.500	1 3/4"

SEE STANDARD F13 FOR SPANS GREATER THAN 50'.

**NOTES:**

1. SEE SHEET 2 OF THIS SERIES FOR SECTION S-S, BASE PL PLAN AND ADDITIONAL NOTES.
2. SEE SHEET 4 OF THIS SERIES FOR SECTION O-O.
3. SEE SHEET 5 OF THIS SERIES FOR SECTIONS A-A AND G-G, AND BASE PLATE SKIRT.
4. WORK THIS SHEET WITH, OVERHEAD SIGN STRUCTURE EXIT MONOTUBE TYPE (STEEL) AET RAMP SUMMARY AND TOTAL BILL OF MATERIAL SHEET.

APPROVED BY: *Manar Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER



GENERAL NOTES:

1. AFTER ADJUSTMENTS TO LEVEL FRAME BEAM AND ENSURE ADEQUATE VERTICAL CLEARANCE, TIGHTEN ALL TOP AND LEVELING NUTS AGAINST THE BASE PLATE WITH A MINIMUM TORQUE OF 200 LB.-FT. THEN PLACE STAINLESS STEEL MESH AROUND THE PERIMETER OF THE BASE PLATE. SECURE TO BASE PLATE WITH STAINLESS STEEL BANDING.
2. REINFORCEMENT BARS DESIGNATED “(E)” SHALL BE EPOXY COATED.

STRUCTURAL STEEL:

1. MATERIAL FOR THE HSS MONOTUBE FRAME SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C. BASE PLATE AND STIFFENER PLATE SHALL CONFORM TO ASTM A709 GRADE 50. OTHER STRUCTURAL STEEL SHAPES AND PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36, UNLESS NOTED OTHERWISE.
2. PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A53 GRADE B.
3. ANCHOR BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F1554 (AASHTO M314) GRADE 55, WITH A MINIMUM TENSILE STRENGTH OF 75,000 PSI. INSTALLATION AND INSPECTION OF ANCHOR BOLTS SHALL COMPLY WITH ILLINOIS TOLLWAY SPECIAL PROVISION “INTELLIGENT TRANSPORTATION SYSTEMS GANTRY FRAME “STEEL”. ANCHORS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (AASHTO M232). SEE SHEET 6 OF THIS SERIES FOR GALVANIZED LENGTH.
4. U-BOLTS SHALL BE STAINLESS STEEL AND SHALL CONFORM TO ASTM 193, CLASS 1, GRADE B8 (AISI TYPE 304). WASHERS FOR U-BOLTS SHALL CONFORM TO ASTM A240, TYPE 302. NUTS FOR U-BOLTS SHALL CONFORM TO ASTM A194 (AASHTO M292), GRADE 8F (AISI TYPE 303).
5. BOLTS (EXCLUDING ANCHOR BOLTS AND U-BOLTS) SHALL BE HIGH STRENGTH STEEL BOLTS.
6. HSS FOR MONOTUBE FRAME, PIPES, STRUCTURAL STEEL SHAPES AND PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER FABRICATION.
7. THE MONOTUBE FRAME BEAM, COLUMNS, BASE PLATE MATERIAL, AND SPLICES ARE CONSIDERED TENSION MEMBERS AND SHALL CONFORM TO THE IMPACT TESTING REQUIREMENT, ZONE 2.

DESIGN LOADING:

WIND LOAD CRITERIA  
BASIC WIND SPEED = 120 M.P.H.  
G = 1.14  
I<sub>F</sub> = 1.00  
K<sub>Z</sub> = 1.00  
SIGN PANEL        50 P.S.F.  
COLUMN/BEAM     35 P.S.F.

SIGN DEAD LOAD = 3 P.S.F.

ICE = 3 P.S.F. (APPLIED WITH A FACTOR OF 1.0 FOR STRENGTH I ONLY)

EQUIPMENT LOADS:

CAMERA ASSEMBLY W/MOUNTING HARDWARE    40 LB.  
ANTENNA W/MOUNTING HARDWARE                24 LB.

DESIGN STRESSES FOR REINFORCED CONCRETE:

f'c = COMPRESSIVE STRENGTH OF CONCRETE (CLASS SI)        = 3,500 P.S.I.  
f'c = COMPRESSIVE STRENGTH OF CONCRETE (CLASS DS)       = 4,000 P.S.I.  
f<sub>y</sub> = YIELD STRENGTH OF REINFORCEMENT BARS (GRADE 60) = 60,000 P.S.I.

FOUNDATION:

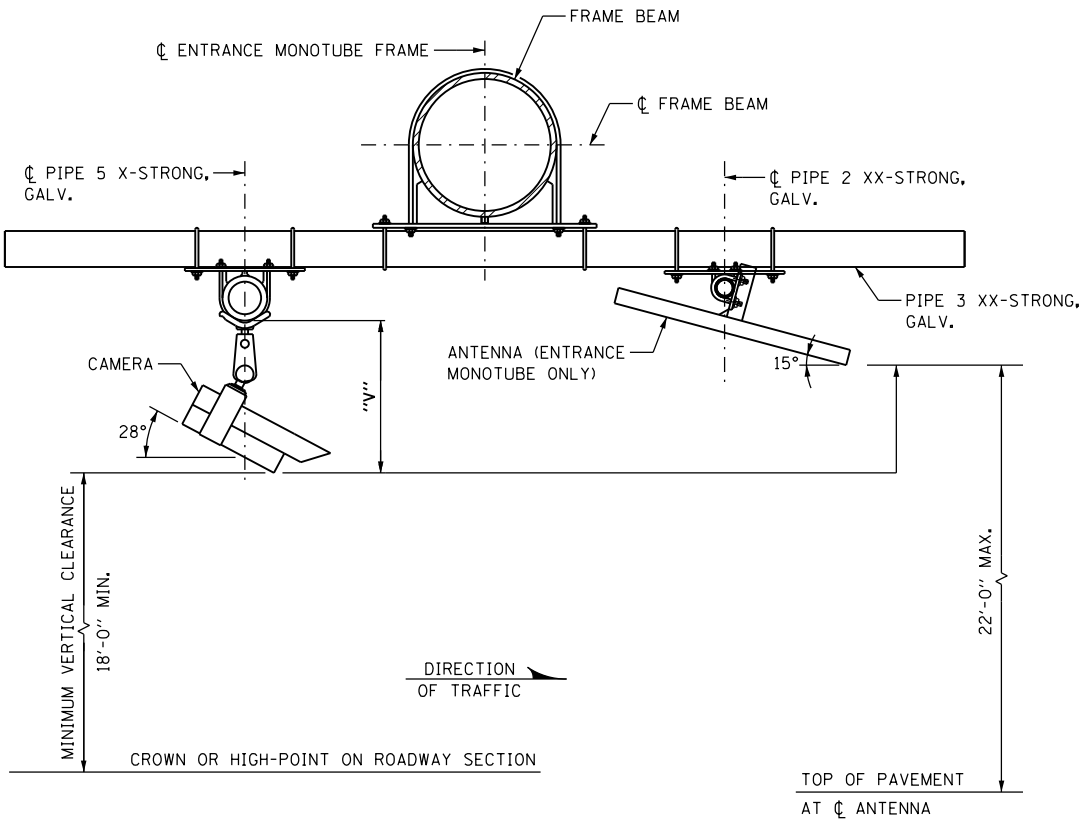
MINIMUM UNCONFINED COMPRESSIVE STRENGTH, Q<sub>u</sub> FOR ALL LAYERS OF COHESIVE SOILS (CLAYS) SHALL BE 1.25 TON/SQ.FT. AT MONOTUBE FRAMES.

DESIGN SPECIFICATIONS:

1. ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL, LATEST EDITION.
2. AASHTO LRFD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, 1ST EDITION.
3. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020.
4. ILLINOIS DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL, JANUARY 2012.

CONSTRUCTION SPECIFICATIONS:

1. ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS TO THE ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.
2. ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.



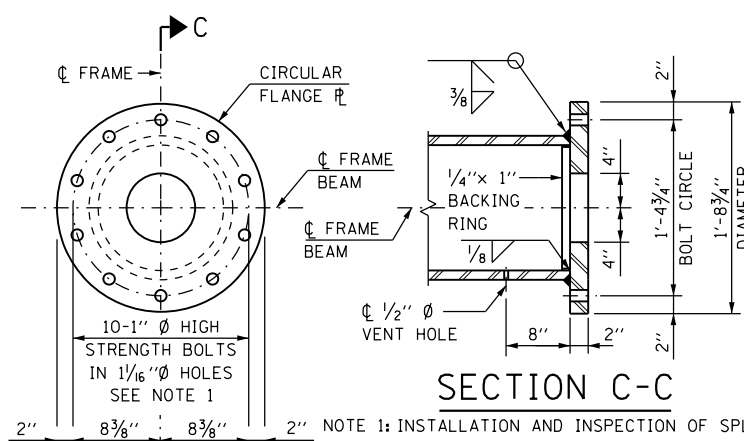
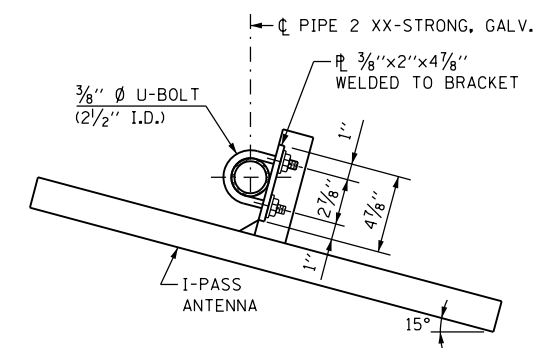
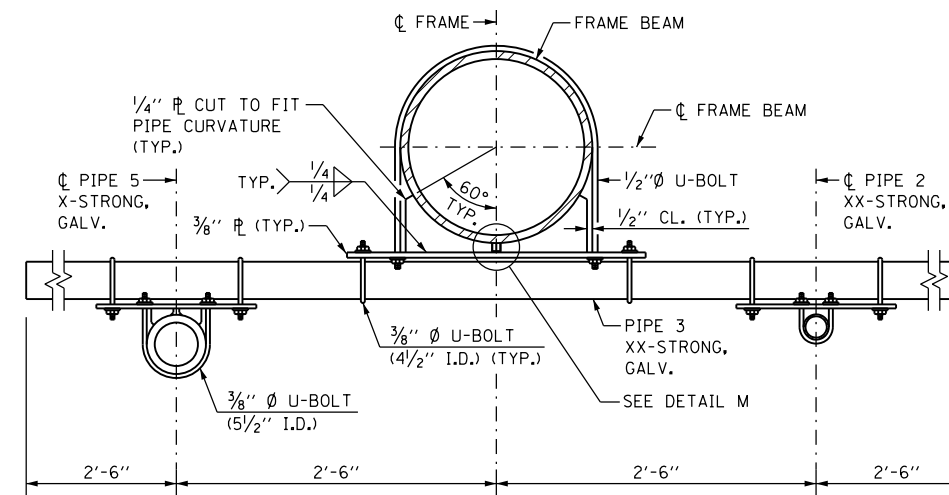
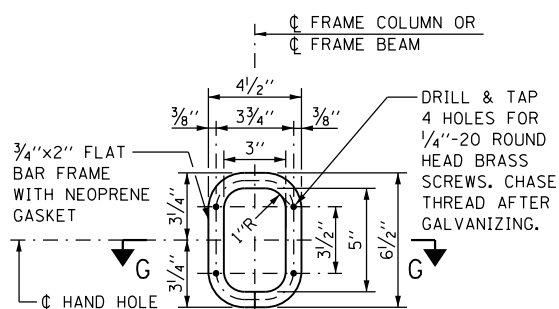
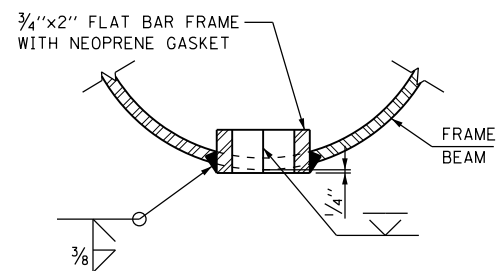
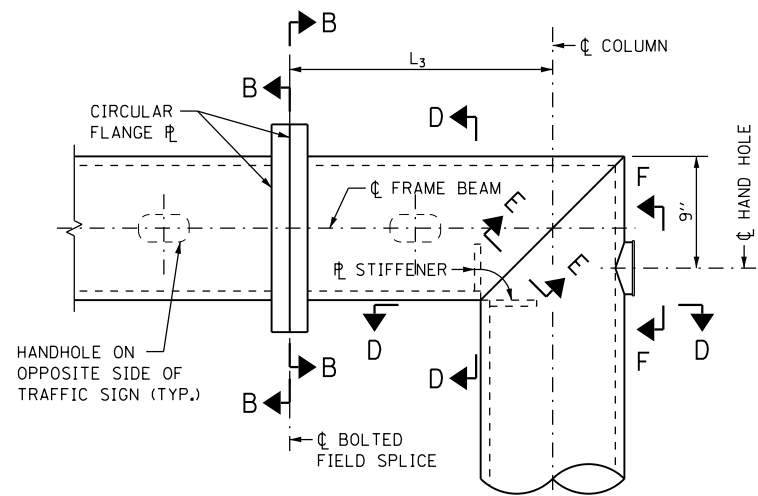
SECTION P-P

NOTE:  
VERIFY DIMENSION "V" WITH  
CAMERA MANUFACTURER.

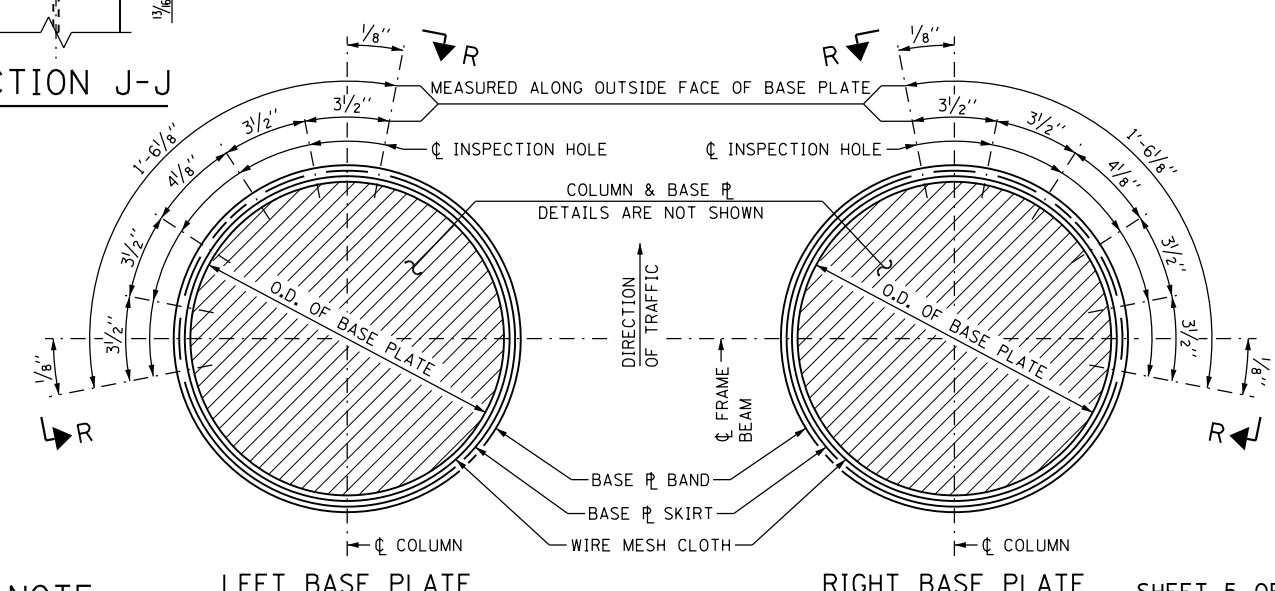
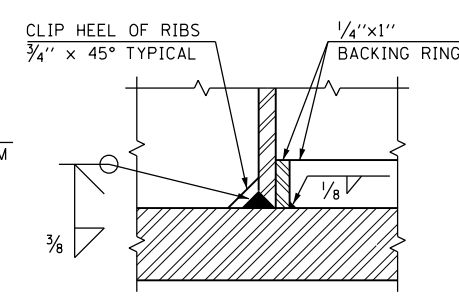
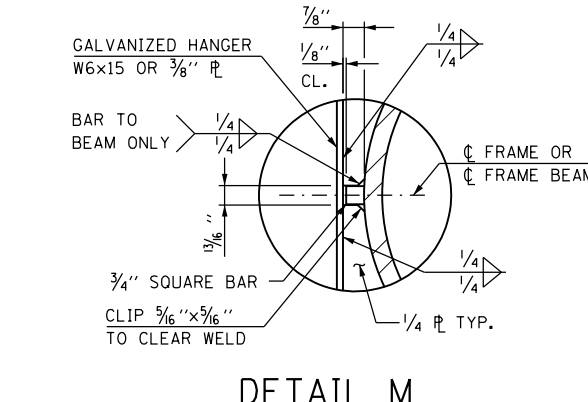
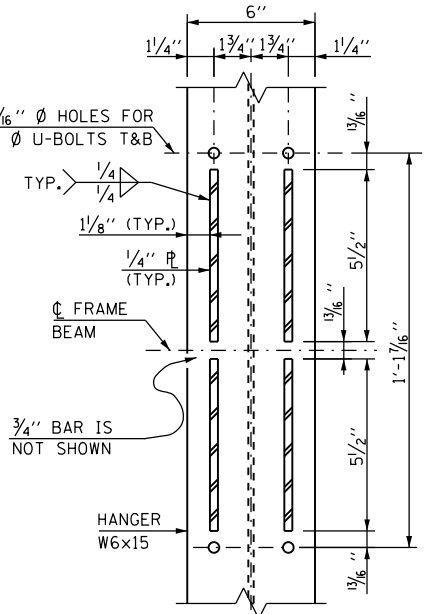
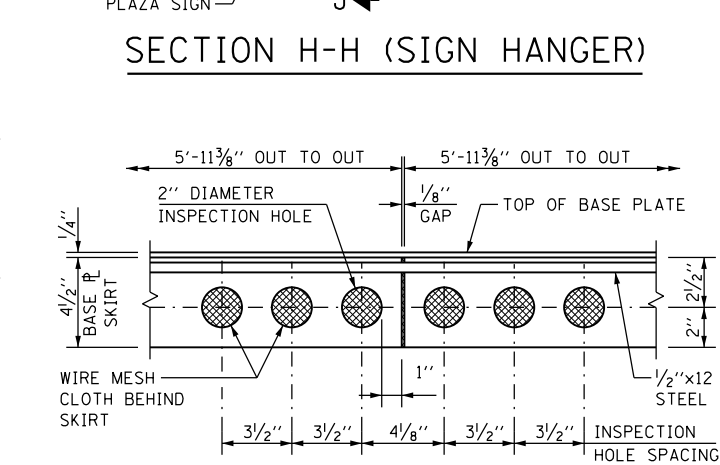
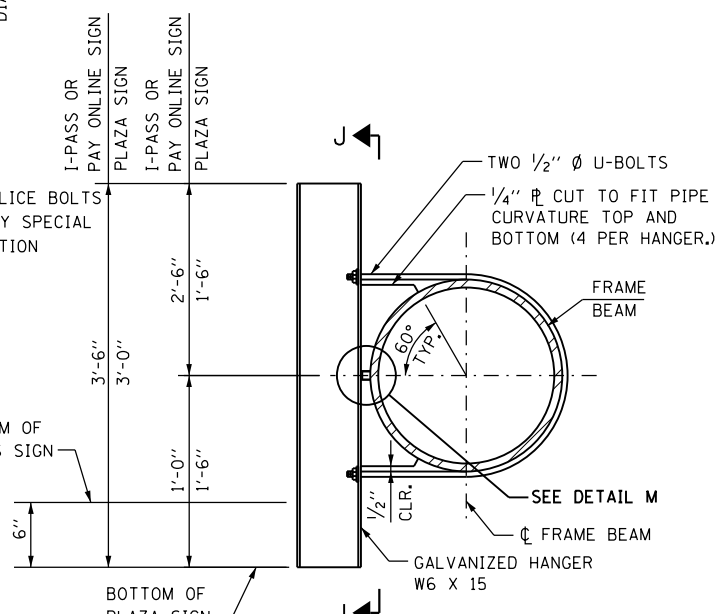
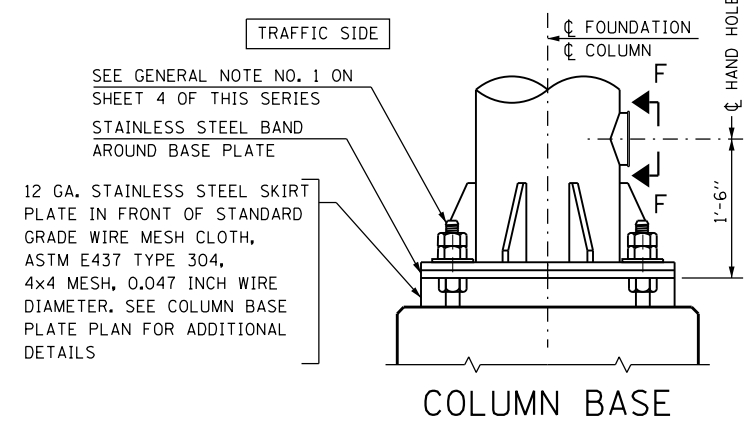
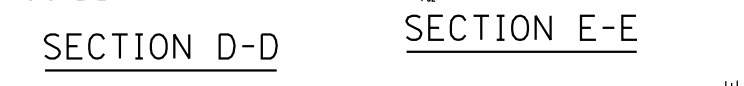
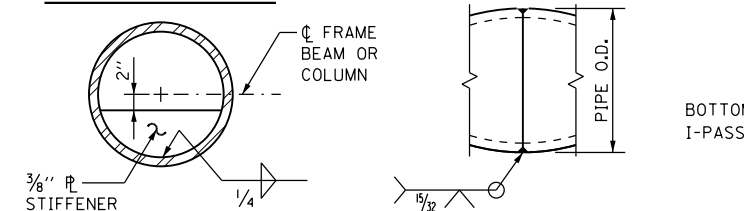


OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR AET RAMP

STANDARD F15-08



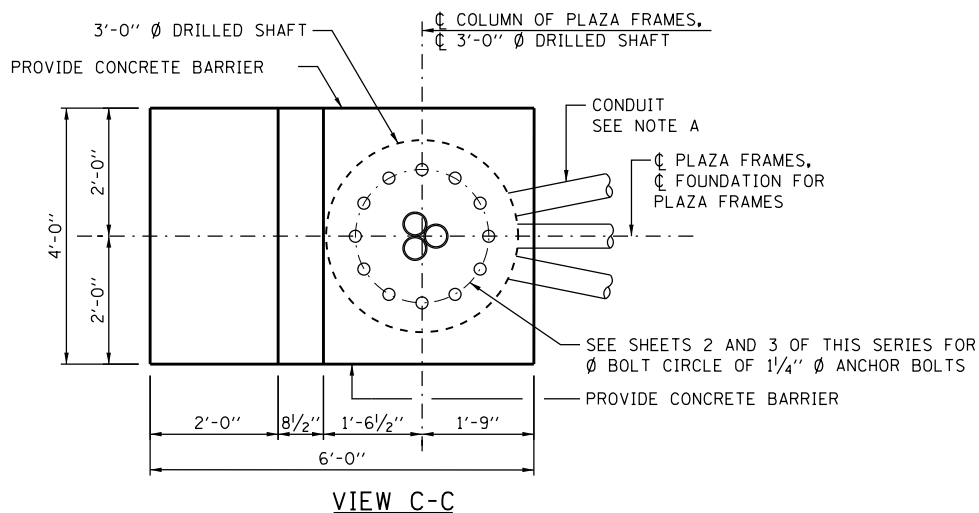
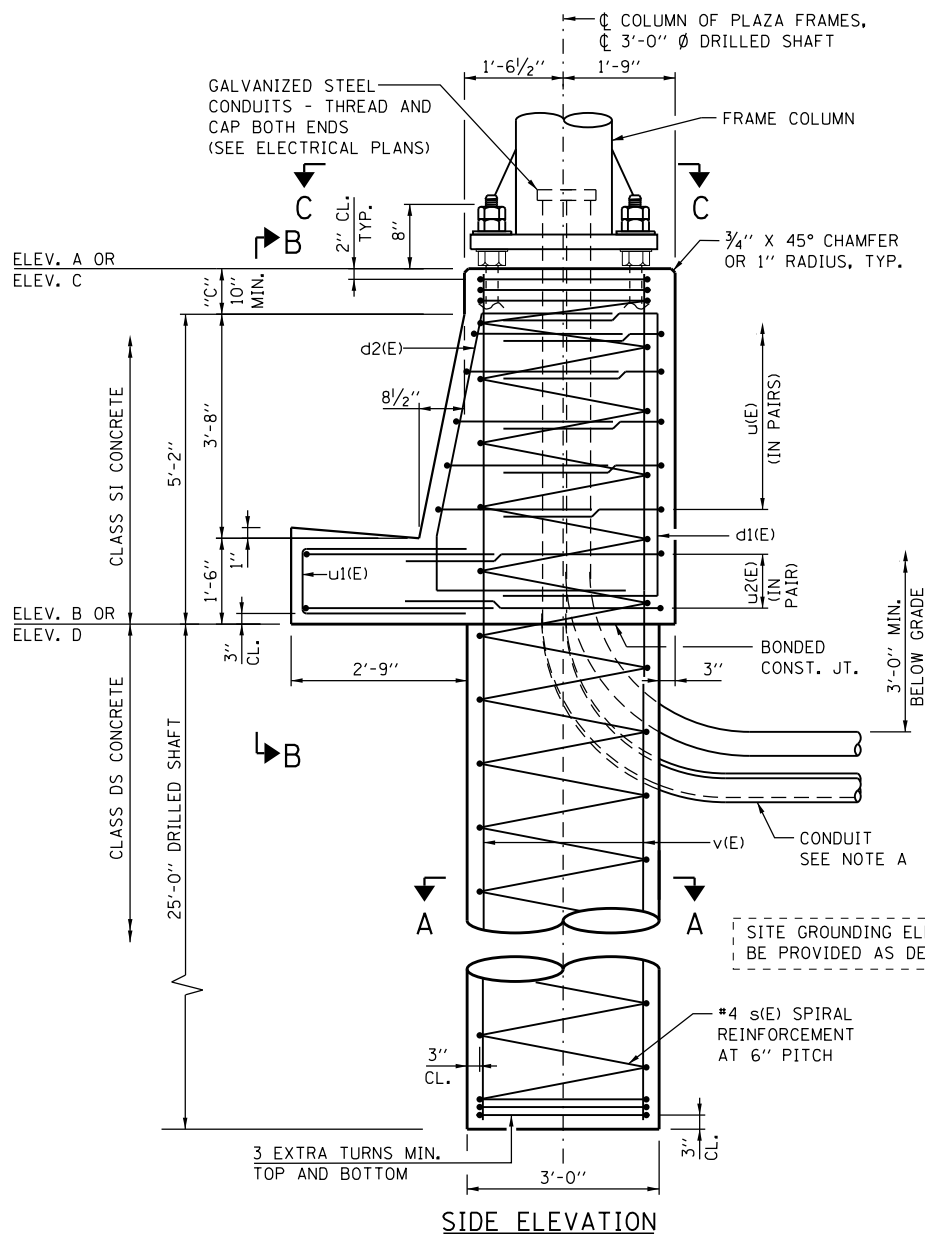
NOTE 1: INSTALLATION AND INSPECTION OF SPICE BOLTS SHALL COMPLY WITH ILLINOIS TOLLWAY SPECIAL PROVISION "INTELLIGENT TRANSPORTATION SYSTEMS GANTRY FRAME (STEEL)".



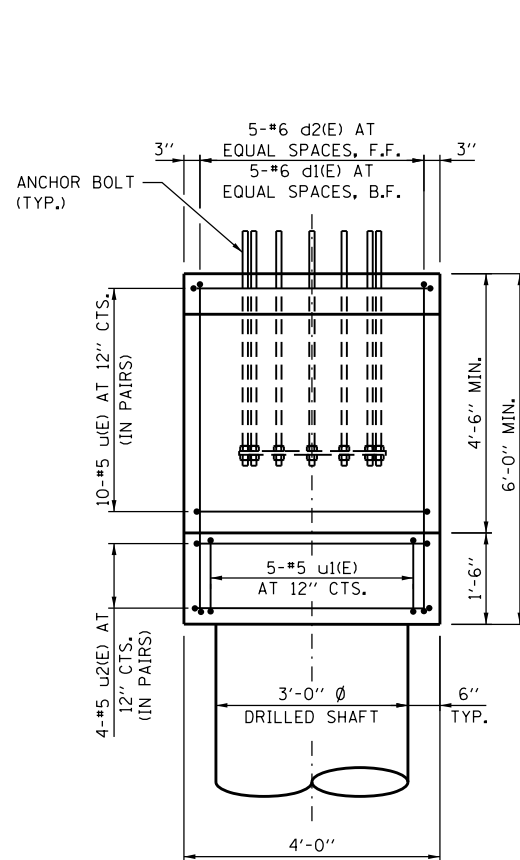
NOTE: SEE SHEET 2 OF THIS SERIES FOR BASE PLATE OUTSIDE DIAMETER.

COLUMN BASE PLATE PLAN

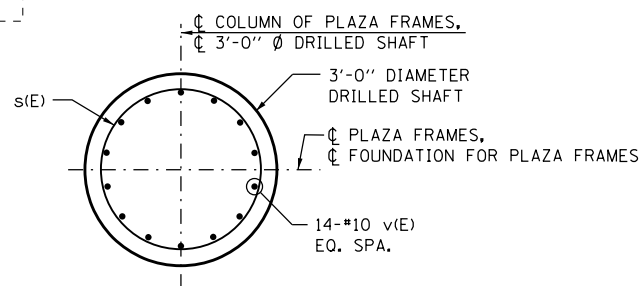
APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024



CONCRETE BARRIER FOUNDATION FOR PLAZA FRAMES



VIEW B-B



SECTION A-A

**NOTE A:**

1. COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. PROVIDE CONDUIT COUPLERS AS REQUIRED.
2. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT. CUTTING OF REINFORCEMENT SHALL NOT BE ALLOWED.

**NOTE B:**

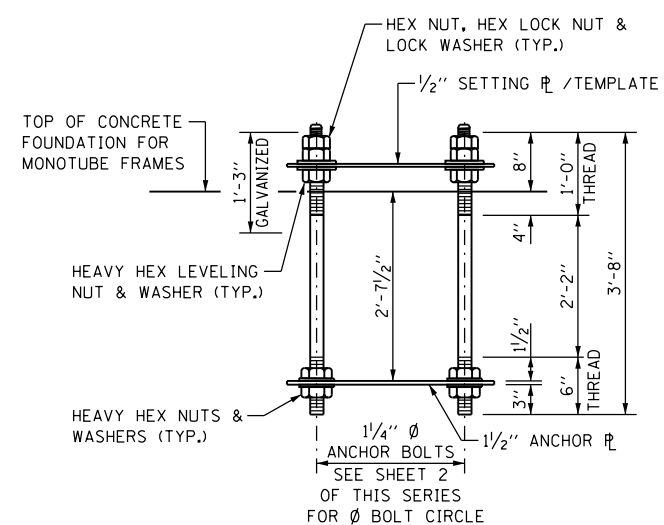
PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF THE BARRIER AND TOP OF GUTTER

**FOUNDATION NOTE:**

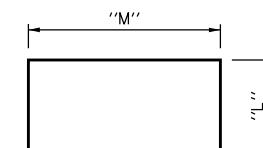
THE FOUNDATION DETAILS SHOWN ARE BASED ON THE PRESENCE OF MOSTLY COMMON COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (QU) > 1.25 TON/SQ. FT. WHICH MUST BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOB SITE. WHEN OTHER CONDITIONS ARE INDICATED, THE BORING DATA SHALL BE INCLUDED IN THE PLANS AND THE FOUNDATION DIMENSIONS SHOWN SHALL BE THE RESULT OF SITE SPECIFIC DESIGNS. IF CONDITIONS ENCOUNTERED IN THE FIELD ARE DIFFERENT THAN THOSE INDICATED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE IF THE FOUNDATION DIMENSIONS NEED TO BE MODIFIED.

**LEGEND:**

F.F. - FRONT FACE  
B.F. - BACK FACE  
CTS. - CENTERS

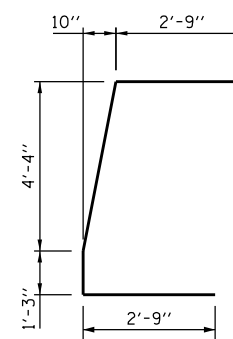


ANCHOR BOLT ASSEMBLY



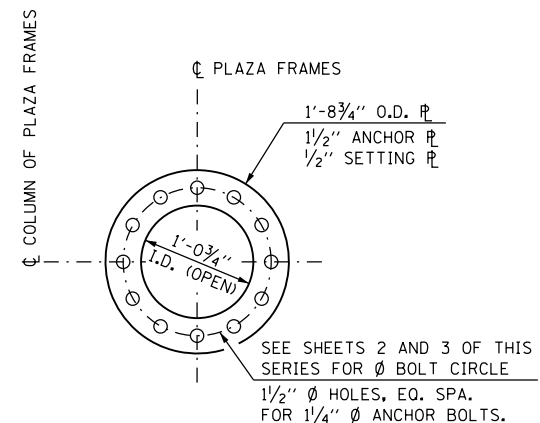
BAR	"L"	"M"
d1(E)	2'-9"	5'-7"
u(E)	2'-9"	3'-8"
u1(E)	3'-3"	1'-1"
u2(E)	3'-10"	3'-8"

BARS d1(E), u(E),  
u1(E) AND u2(E)



BAR d2(E)

FRAME COLUMN	ANCHOR BOLT
HSS 12.75x0.500	12



ANCHOR BOLT / SETTING BOLT

BAR LIST-ONE FOUNDATION

BAR	NO.	SIZE	LENGTH	SHAPE
d1(E)	5	#6	11'-1"	
d2(E)	5	#6	11'-2"	
s(E)	1	#4	30'-7"	
v(E)	14	#10	30'-7"	
u(E)	10	#5	9'-2"	
u1(E)	5	#5	7'-7"	
u2(E)	4	#5	11'-4"	

\* THE LENGTH OF SPIRAL SHOWN IS THE HEIGHT OF SPIRAL, COMPUTED USING "C" = 10". ADJUST LENGTH ACCORDINGLY IF "C" IS GREATER THAN 10".

\*\* BAR LENGTH IS COMPUTED USING "C" = 10". ADJUST BAR LENGTH ACCORDINGLY IF "C" IS GREATER THAN 10".

ESTIMATED QUANTITY

ITEM	UNIT	CONCRETE BARRIER FDN.
CLASS SI CONCRETE	CU. YD.	3.8
CLASS DS CONCRETE	CU. YD.	6.6
REINFORCEMENT BARS, EPOXY COAT	POUND	2,540
PROTECTIVE COAT	SQ. YD.	4.4

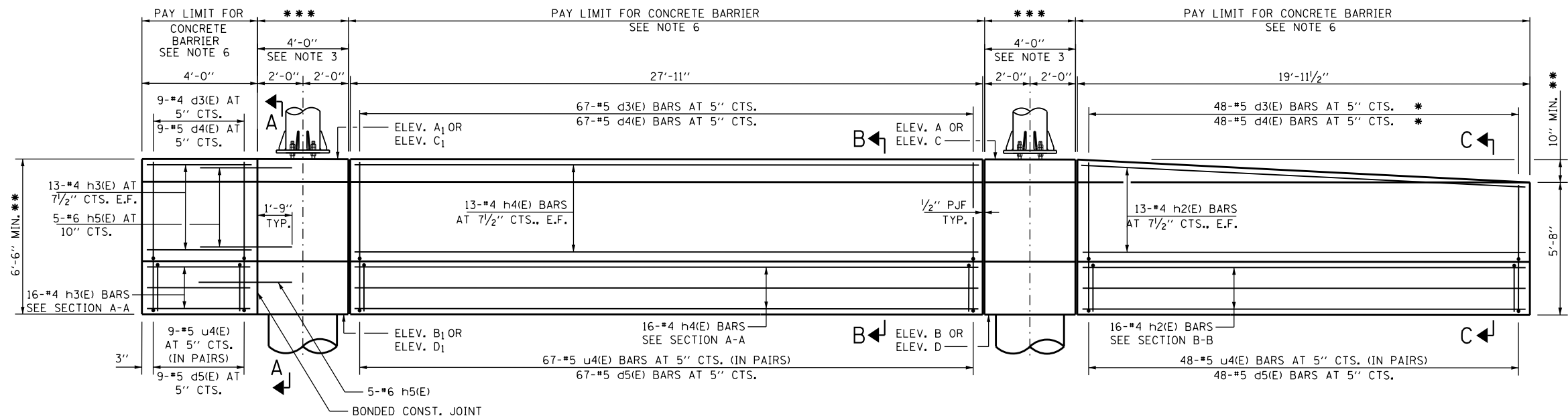
**NOTE:**

QUANTITIES FOR CONCRETE BARRIER FOUNDATION ARE DETERMINED USING "C" = 10". IF DIMENSION "C" IS GREATER THAN 10", ADJUST QUANTITIES ACCORDINGLY.



OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR AET RAMP

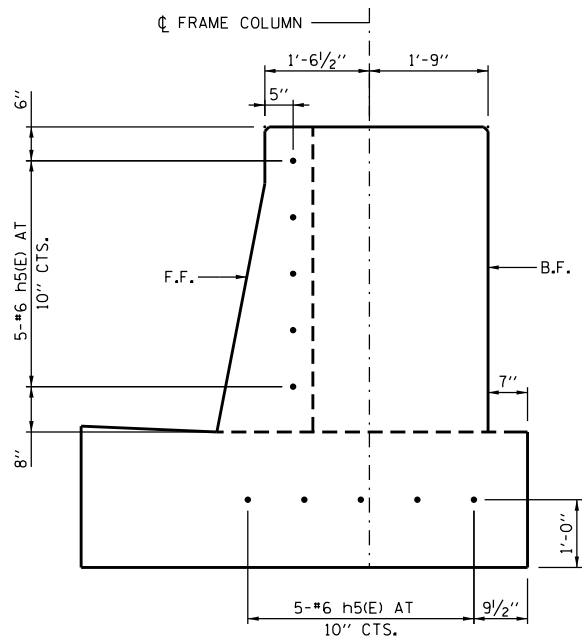
STANDARD F15-08



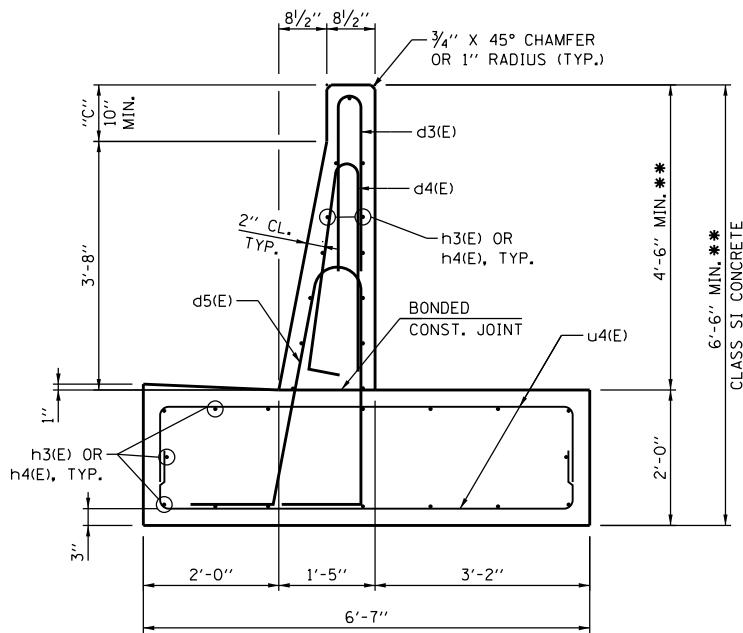
CONCRETE BARRIER AND BARRIER BASE ELEVATION

INSIDE FACE OF RIGHT BARRIER IS SHOWN  
(MIRROR ELEVATION OF LEFT BARRIER)

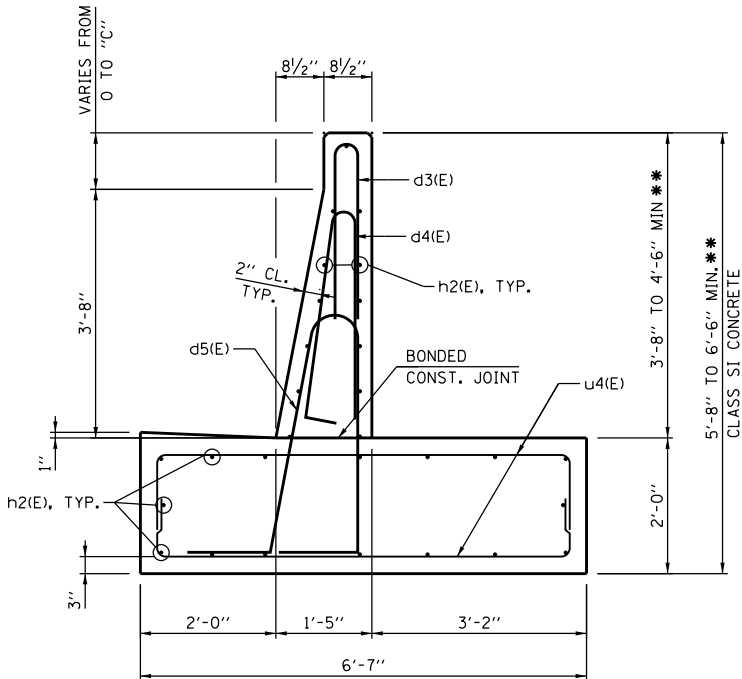
- \* CUT IN FIELD AS REQUIRED TO FIT TAPER
- \*\* BASED ON DIMENSION "C" = 10"
- \*\*\* PAY LIMIT FOR FOUNDATION FOR OVERHEAD SIGN STRUCTURE



SECTION A-A



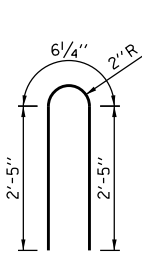
SECTION B-B



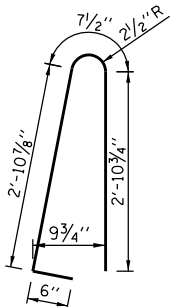
SECTION C-C

BAR LIST - FOR ONE BARRIER

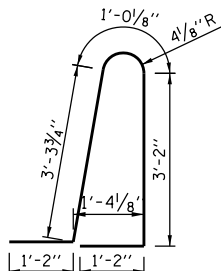
BAR	NO.	SIZE	LENGTH	SHAPE
d3(E)	124	#4	5'-5"	U
d4(E)	124	#5	7'-0"	U
d5(E)	124	#5	9'-10"	U
h2(E)	29	#4	19'-7"	I
h3(E)	29	#4	3'-8"	I
h4(E)	29	#4	27'-7"	I
h5(E)	10	#6	3'-9"	I
u4(E)	248	#5	9'-3"	C



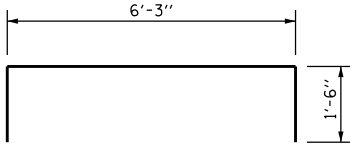
BAR d3(E)



BAR d4(E)



BAR d5(E)



BAR u4(E)

NOTES:

- PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF THE BARRIER, GUTTER AND TO THE ENTRANCE SIDE FACE (AT THE BEGINNING OF THE RAMP PLAZA PAVEMENT) FOR THE FULL HEIGHT OF THE BARRIER.
- ELECTRICAL JUNCTION BOXES SHALL BE EXTERIOR MOUNTED ON THE BACK FACE OF BARRIER.
- FOR CONCRETE BARRIER FOUNDATION DETAILS FOR MONOTUBE FRAMES, SEE SHEET 6 OF THIS SERIES.
- QUANTITIES FOR CONCRETE BARRIER ARE DETERMINED USING "C" = 10". IF DIMENSION "C" IS GREATER THAN 10", ADJUST QUANTITIES ACCORDINGLY.
- SEE OVERHEAD SIGN STRUCTURE ENTRANCE MONOTUBE TYPE (STEEL) AET RAMP SUMMARY AND TOTAL BILL OF MATERIAL IN CONTACT PLANS FOR COMPLETE BILL OF MATERIAL.
- CONCRETE BARRIER AND BASE DETAILED ON THIS SHEET WILL BE PAID FOR UNDER THE ITEMS: CONCRETE STRUCTURES, REINFORCEMENT BARS, EPOXY COATED AND PROTECTIVE COAT.
- CONCRETE BARRIER LOCATED OUTSIDE THE LIMITS SHOWN ON THESE SHEETS WILL BE PAID FOR SEPARATELY.

ESTIMATED QUANTITY

(FOR ONE CONCRETE BARRIER)

ITEM	UNIT	ENETERANCE MONOTUBE	EXIT MONOTUBE	TOTAL
CONCRETE STRUCTURES	CU. YD.	22.0	11.7	33.7
REINFORCEMENT BARS, EPOXY COATED	POUND	3,945	2,115	6,060
PROTECTIVE COAT	SQ. YD.	26.9	14.5	41.4

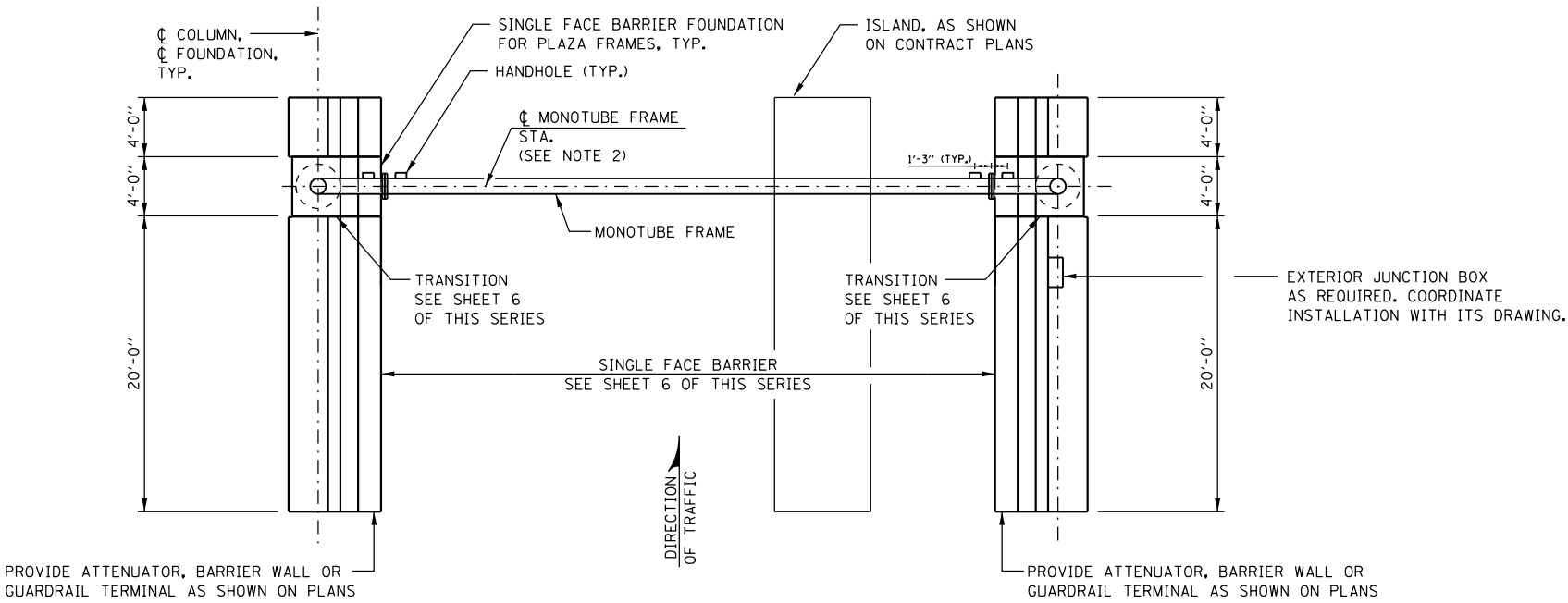
APPROVED BY: *Manar Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER

SIGN TABLE

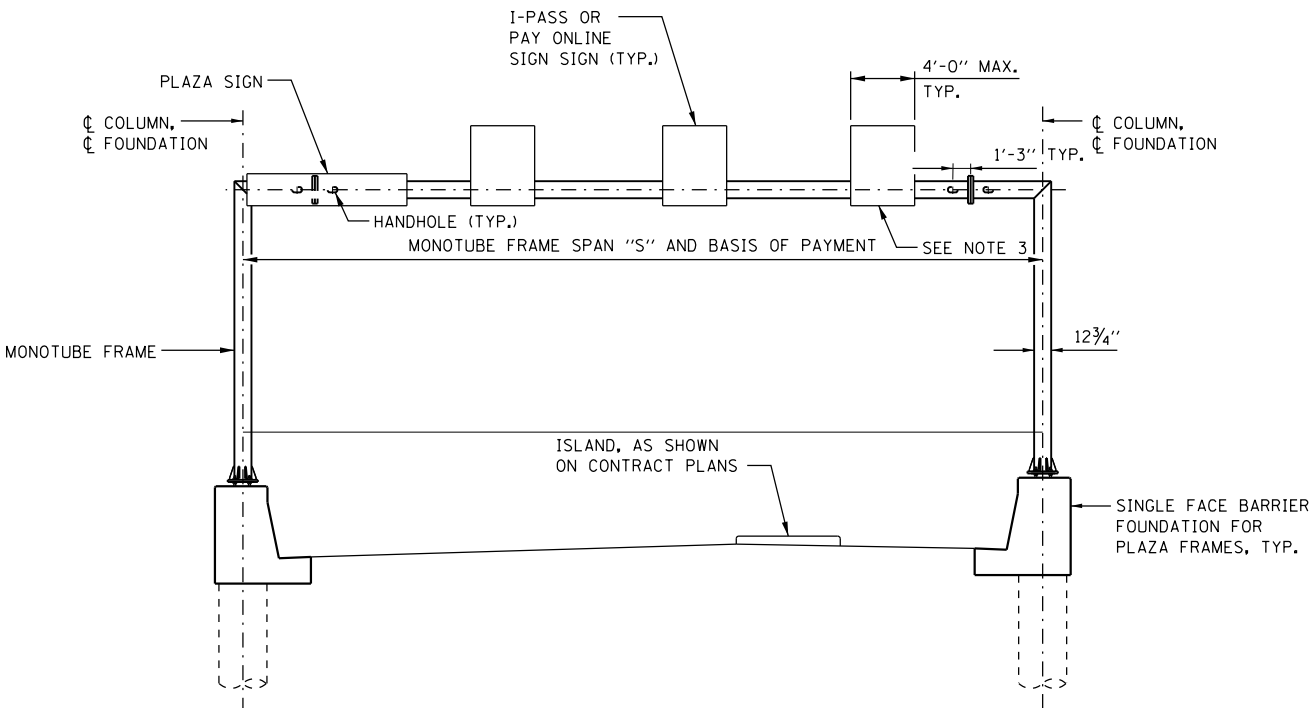
SIGN	MAXIMUM AREA	MAXIMUM LENGTH
PLAZA SIGN	24 S.F.	8'-0"
I-PASS OR PAY ONLINE SIGN	20 S.F.	4'-0"

NOTE:

1. SEE CONTRACT PLANS FOR SIGN SIZE AND LOCATION.
2. PROVIDE MONOTUBE FRAME STATION IN CONTRACT PLANS.



IPOPO RAMP TOLL PLAZA PLAN



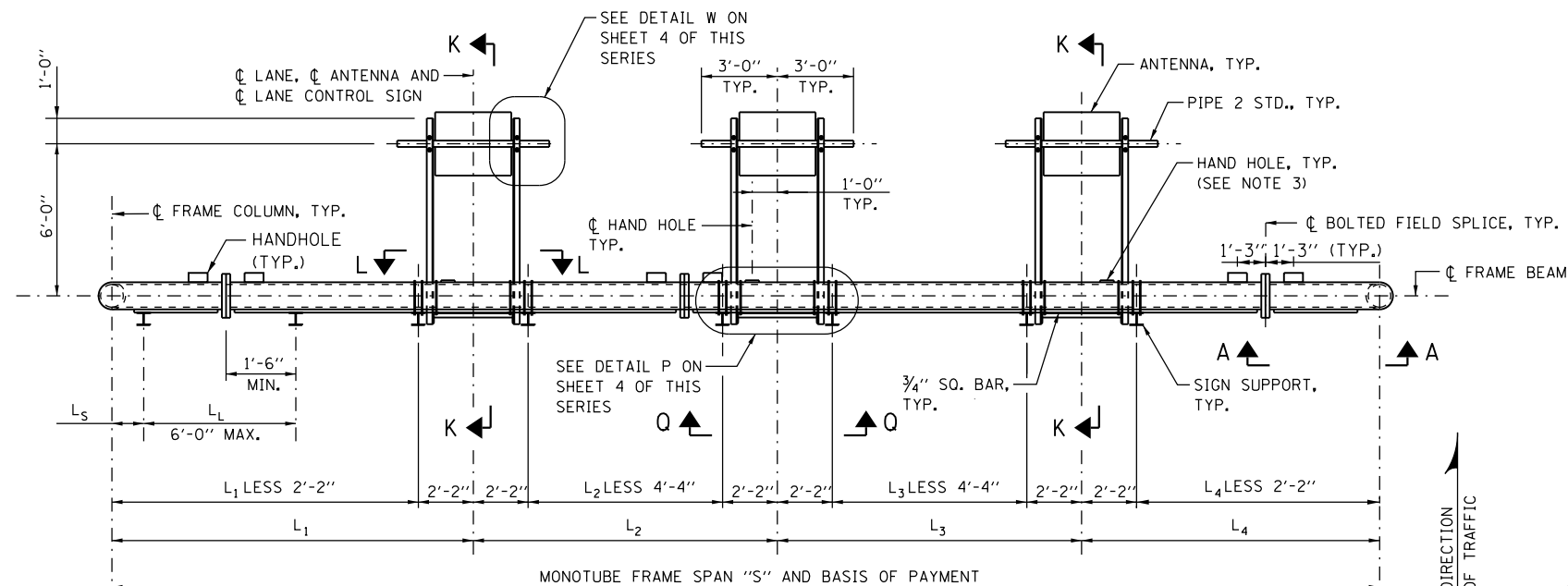
IPOPO RAMP TOLL PLAZA ELEVATION



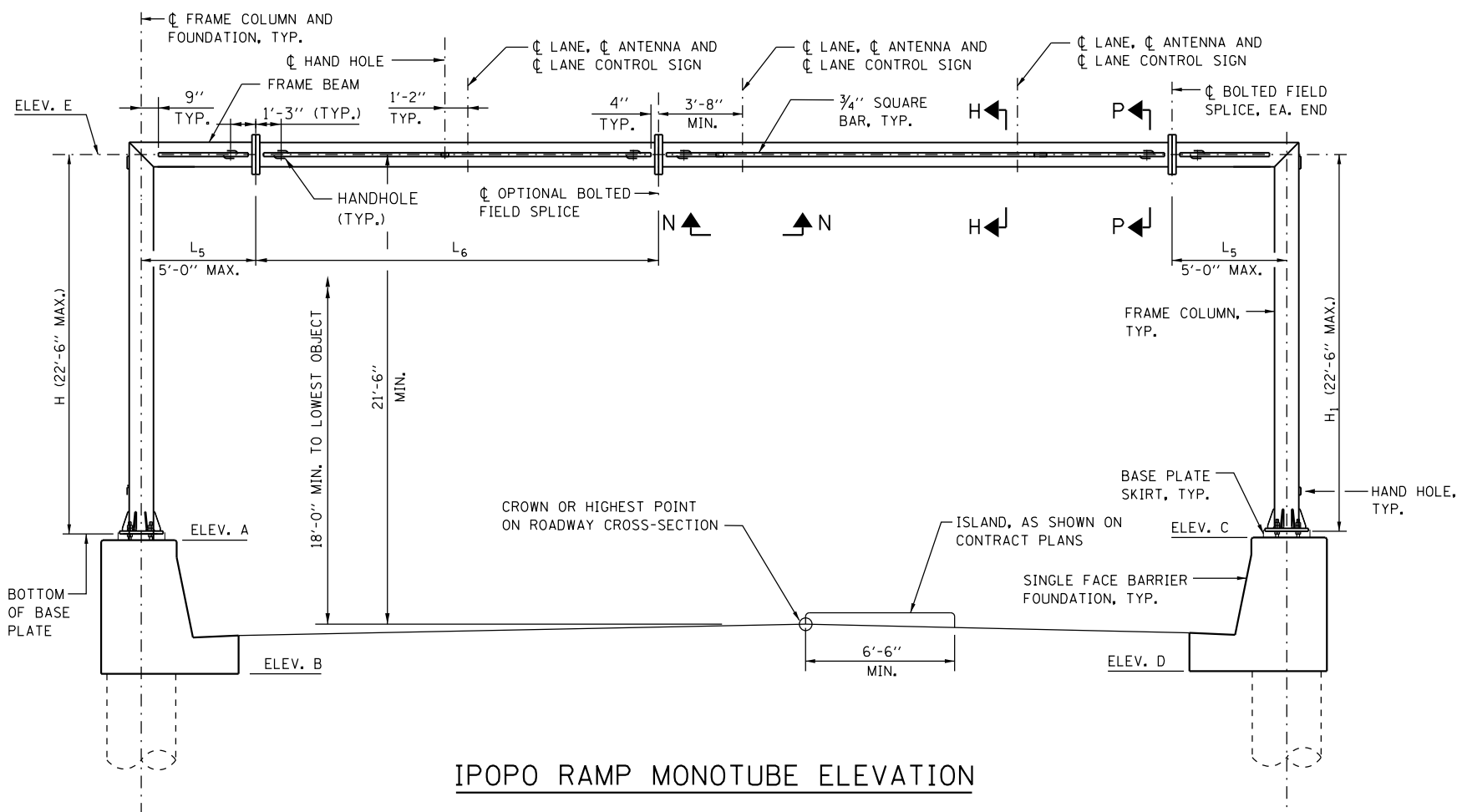
APPROVED BY: *Manar Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2024	REM. CASH REP. IPO WITH IPOPO.
3-01-2023	REV. SHEET TITLES, REMOVE WELD CALLOUT DET. T & REV. NUMBER OF V(E) BARS
3-01-2022	REV. STRUCT. STEEL NOTES 4 & 6.
3-01-2021	UPDATE DESIGN LOADING & CRITERIA

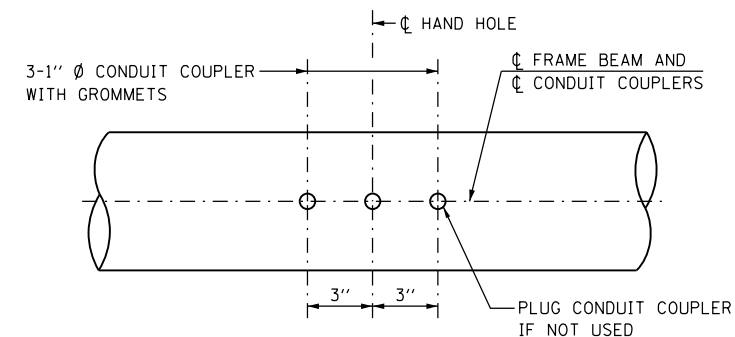
OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR IPOPO RAMP  
STANDARD F16-07



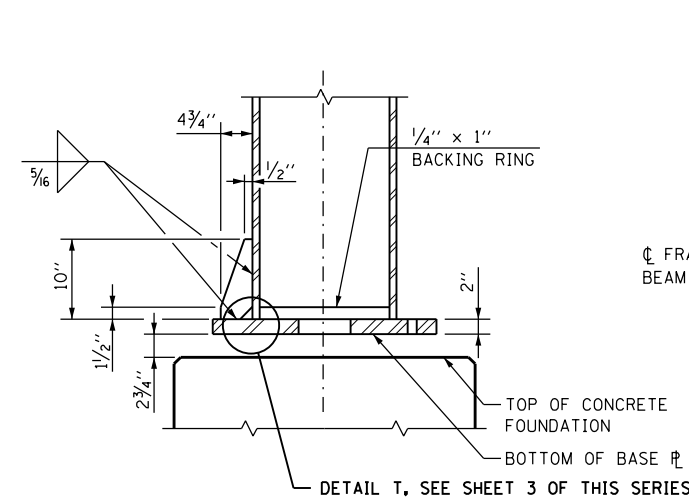
IPOPO RAMP MONOTUBE PLAN



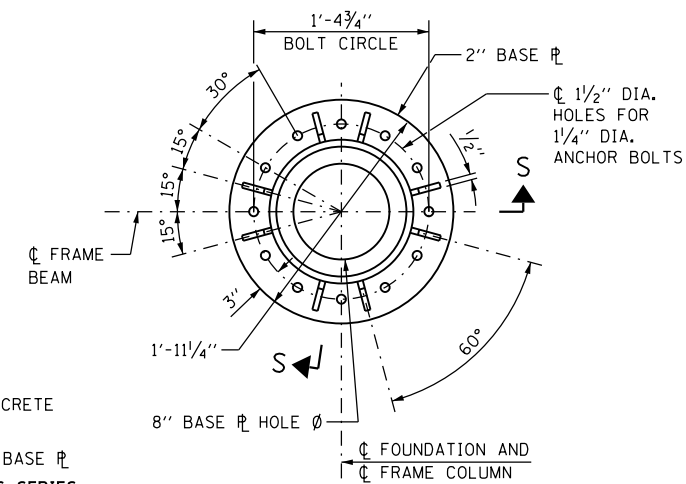
IPOPO RAMP MONOTUBE ELEVATION



VIEW N-N (CONDUIT COUPLER DETAIL)



SECTION S-S



BASE PLATE PLAN MONOTUBE FRAME

MONOTUBE FRAME TABLE

SPAN "S"	FRAME COLUMN	FRAME BEAM	CAMBER
60' MAX.	HSS 12.75x0.500	HSS 12.75x0.500	2 1/2"

SEE STANDARD F13 FOR SPANS GREATER THAN 60'

### NOTES:

1. WORK THIS SHEET WITH OVERHEAD SIGN STRUCTURE MONOTUBE TYPE (STEEL) IPOPO RAMP, SUMMARY AND TOTAL BILL OF MATERIAL SHEET.
2. FOUNDATION FOR MONOTUBE FRAME IS SHOWN ON SHEET 5 OF THIS SERIES.
3. SEE SHEET 4 OF THIS SERIES FOR SECTIONS G-G, H-H AND K-K, VIEWS A-A AND O-O, AND HAND HOLE DETAILS.
4. SEE SHEET 3 OF THIS SERIES FOR SECTION P-P AND BASE PLATE SKIRT.
5. PROVIDE CAMBER AT MIDSPAN OF STRUCTURE.
6. LOCATE OPTIONAL BOLTED FIELD SPICE NEAR MIDSPAN.

SHEET 2 OF 6



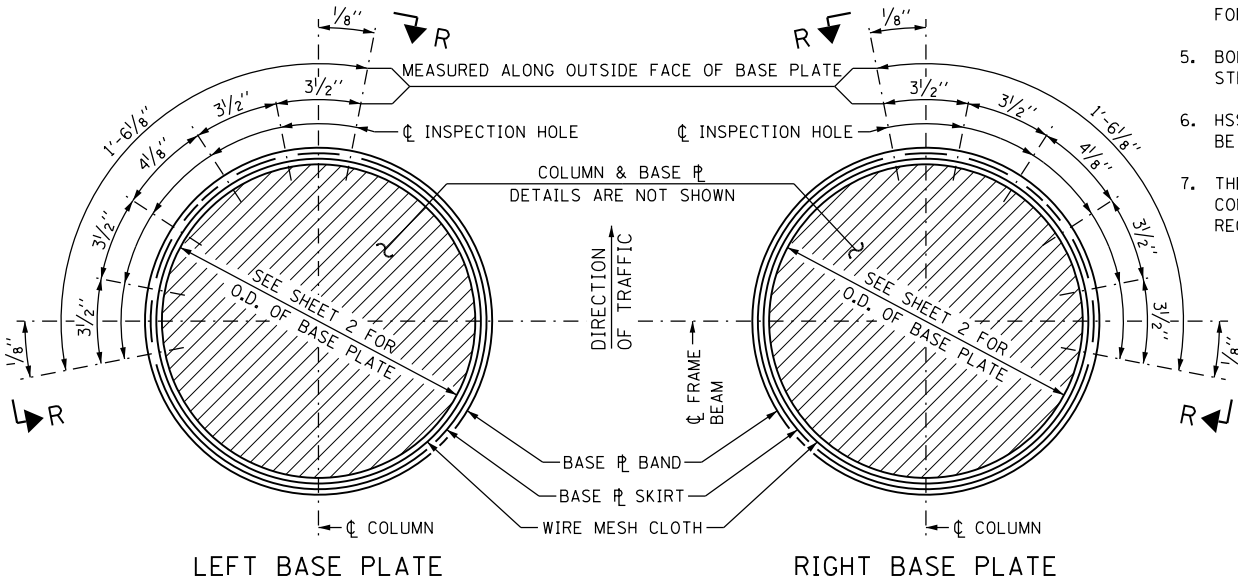
OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR IPOPO RAMP

STANDARD F16-07

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

GENERAL NOTES:

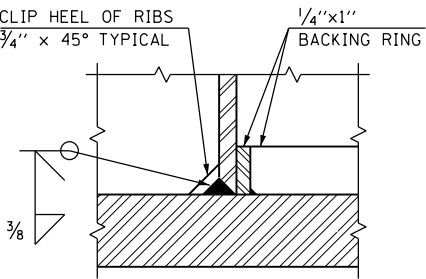
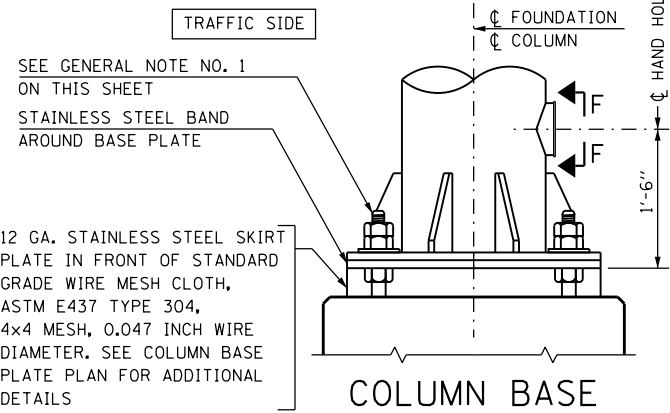
1. AFTER ADJUSTMENTS TO LEVEL FRAME BEAM AND ENSURE ADEQUATE VERTICAL CLEARANCE, TIGHTEN ALL TOP AND LEVELING NUTS AGAINST THE BASE PLATE WITH A MINIMUM TORQUE OF 200 LB.-FT. THEN PLACE STAINLESS STEEL MESH AROUND THE PERIMETER OF THE BASE PLATE. SECURE TO BASE PLATE WITH STAINLESS STEEL BANDING.
2. REINFORCEMENT BARS DESIGNATED "E" SHALL BE EPOXY COATED.
3. FINAL LOCATION OF I-PASS ANTENNAE SHALL BE AS DIRECTED BY THE ILLINOIS TOLLWAY.



COLUMN BASE PLATE PLAN

NOTE:

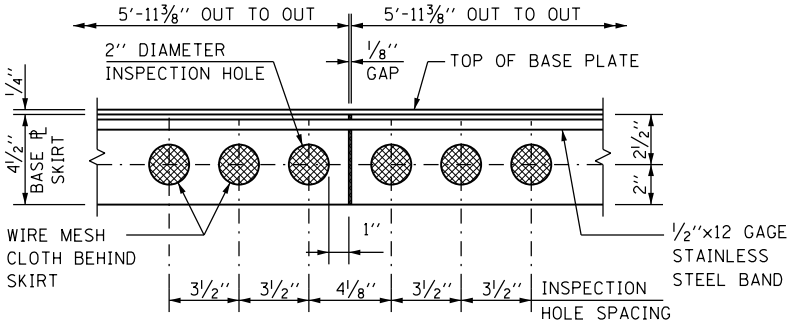
SEE SHEET 4 OF THIS SERIES FOR VIEW F-F.



DETAIL T

STRUCTURAL STEEL:

1. MATERIAL FOR THE HSS MONOTUBE FRAME AND RECTANGULAR HSS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A500 GRADE B OR C. BASE PLATE AND STIFFENER PLATE SHALL CONFORM TO ASTM A709 GRADE 50. OTHER STRUCTURAL STEEL SHAPES AND PLATES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36, UNLESS NOTED OTHERWISE.
2. PIPES SHALL CONFORM TO THE REQUIREMENTS OF ASTM A53 GRADE B.
3. ANCHOR BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F1554 (AASHTO M314) GRADE 55, WITH A MINIMUM TENSILE STRENGTH OF 75,000 PSI. INSTALLATION AND INSPECTION OF ANCHOR BOLTS SHALL COMPLY WITH ILLINOIS TOLLWAY SPECIAL PROVISION "INTELLIGENT TRANSPORTATION SYSTEMS GANTRY FRAME "STEEL". ANCHORS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (AASHTO M232). SEE SHEET 6 OF THIS SERIES FOR GALVANIZED LENGTH.
4. U-BOLTS SHALL BE STAINLESS STEEL AND SHALL CONFORM TO ASTM 193, CLASS 1, GRADE B8 (AISI TYPE 304). WASHERS FOR U-BOLTS SHALL CONFORM TO ASTM A240, TYPE 302. NUTS FOR U-BOLTS SHALL CONFORM TO ASTM A194 (AASHTO M292), GRADE 8F (AISI TYPE 303).
5. BOLTS (EXCLUDING ANCHOR BOLTS AND U-BOLTS) SHALL BE HIGH STRENGTH STEEL BOLTS.
6. HSS FOR MONOTUBE FRAME, PIPES, STRUCTURAL STEEL SHAPES AND PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER FABRICATION.
7. THE MONOTUBE FRAME BEAM, COLUMNS, BASE PLATE MATERIAL, AND SPLICES ARE CONSIDERED TENSION MEMBERS AND SHALL CONFORM TO THE IMPACT TESTING REQUIREMENT, ZONE 2.



VIEW R-R (BASE PLATE SKIRT)

DESIGN LOADING:

WIND LOAD CRITERIA  
BASIC WIND SPEED = 120 M.P.H.  
G = 1.14  
I<sub>F</sub> = 1.00  
K<sub>z</sub> = 1.00  
SIGN PANEL 50 P.S.F.  
COLUMN/BEAM 35 P.S.F.

SIGN DEAD LOAD = 3 P.S.F.

ICE = 3 P.S.F. (APPLIED WITH A FACTOR OF 1.0 FOR STRENGTH I ONLY)

EQUIPMENT LOADS:

LED LANE CONTROL SIGN 50 LB.  
ANTENNA W/MOUNTING HARDWARE 28 LB.

DESIGN STRESSES FOR REINFORCED CONCRETE:

f'<sub>c</sub> = COMPRESSIVE STRENGTH OF CONCRETE (CLASS SI) = 3,500 P.S.I.  
f'<sub>c</sub> = COMPRESSIVE STRENGTH OF CONCRETE (CLASS DS) = 4,000 P.S.I.  
f<sub>y</sub> = YIELD STRENGTH OF REINFORCEMENT BARS (GRADE 60) = 60,000 P.S.I.

FOUNDATION:

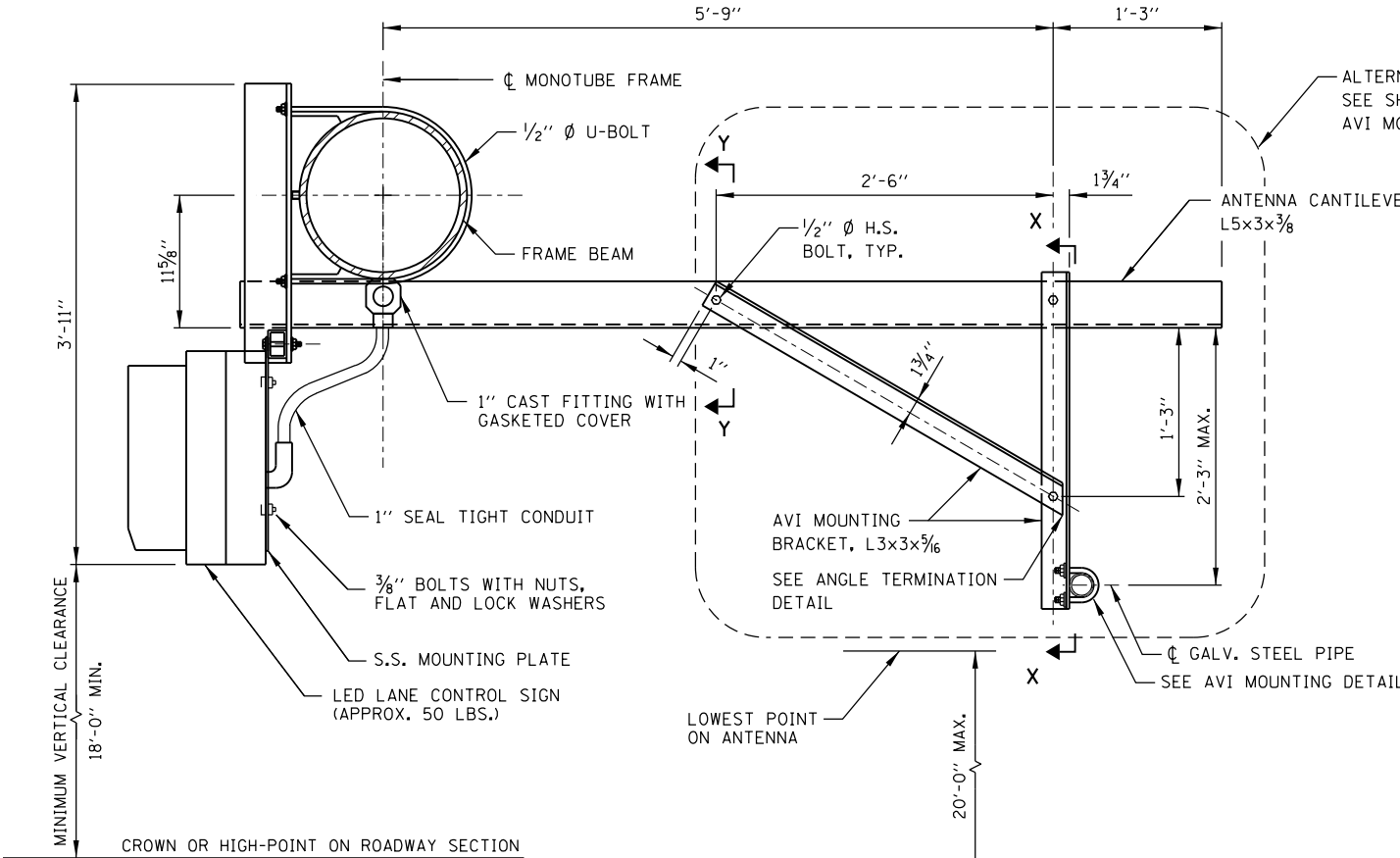
MINIMUM UNCONFINED COMPRESSIVE STRENGTH, Q<sub>u</sub> FOR ALL LAYERS OF COHESIVE SOILS (CLAYS) SHALL BE 1.25 TON/SQ.FT. AT RAMP FRAMES.

DESIGN SPECIFICATIONS:

1. ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL, LATEST EDITION.
2. AASHTO LRFD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, 1ST EDITION.
3. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020.
4. ILLINOIS DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL, JANUARY 2012

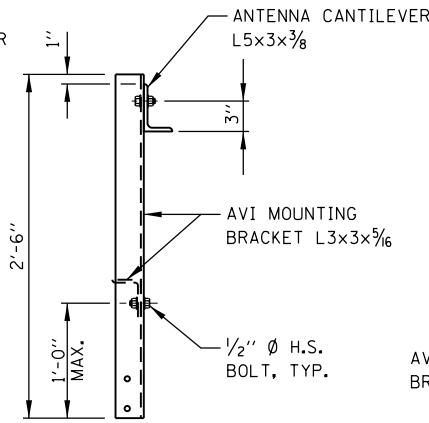
CONSTRUCTION SPECIFICATIONS:

1. ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS TO THE ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.
2. ILLINOIS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION.

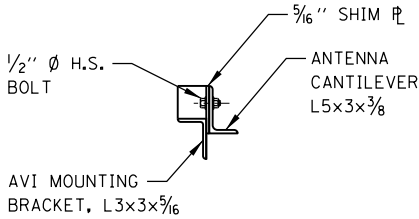


SECTION P-P  
(LED LANE CONTROL SIGNAL MOUNTING DETAIL)

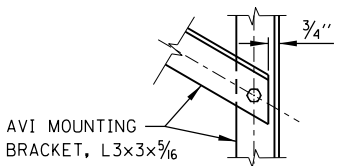
ALTERNATE AVI MOUNTING DETAIL  
SEE SHEET 4 OF THIS SERIES FOR  
AVI MOUNTING ON ANTENNA CANTILEVER



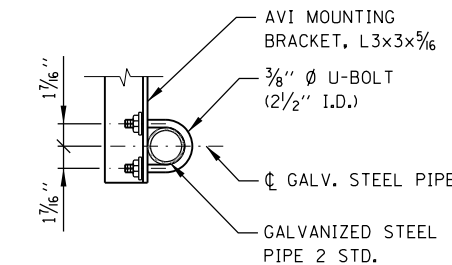
SECTION X-X



SECTION Y-Y



ANGLE TERMINATION



AVI MOUNTING DETAIL

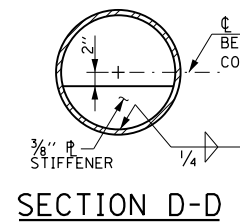
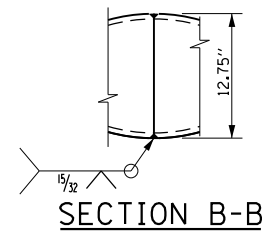
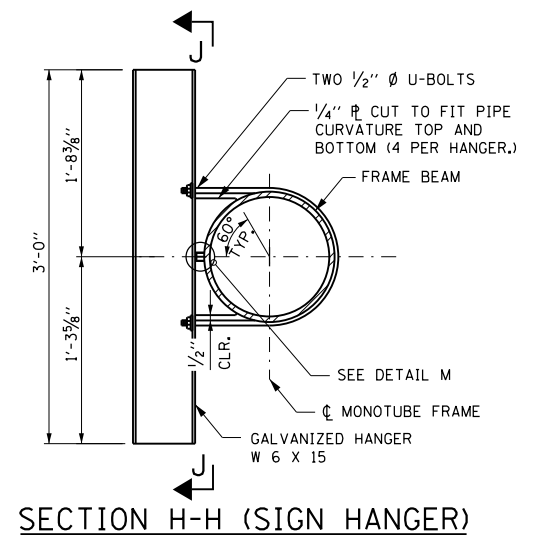
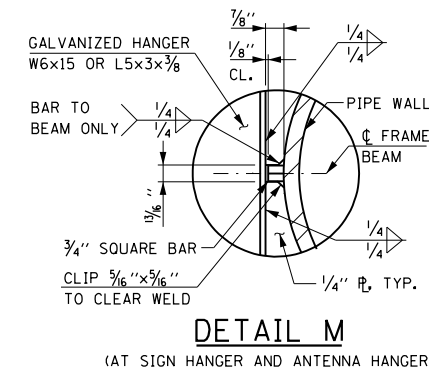
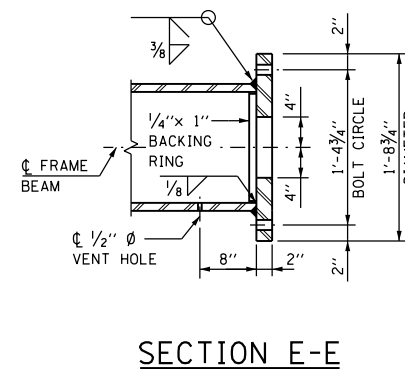
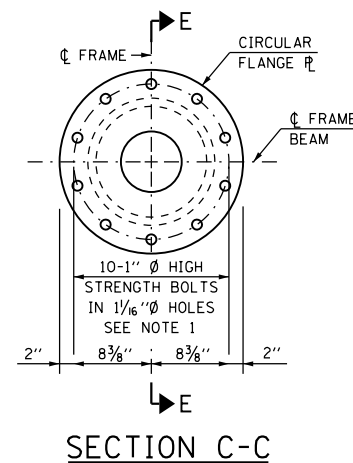
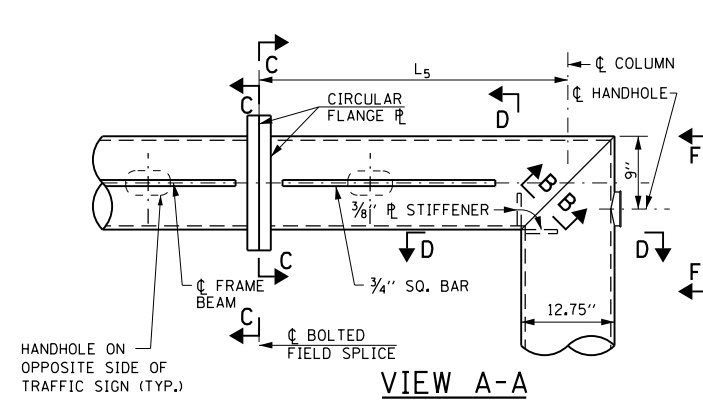
SHEET 3 OF 6



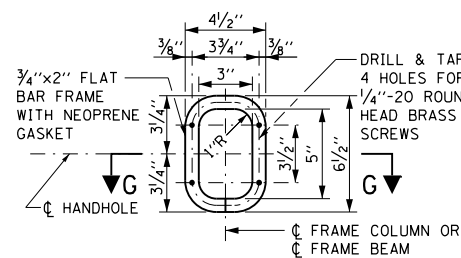
OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR IPOPO RAMP

STANDARD F16-07

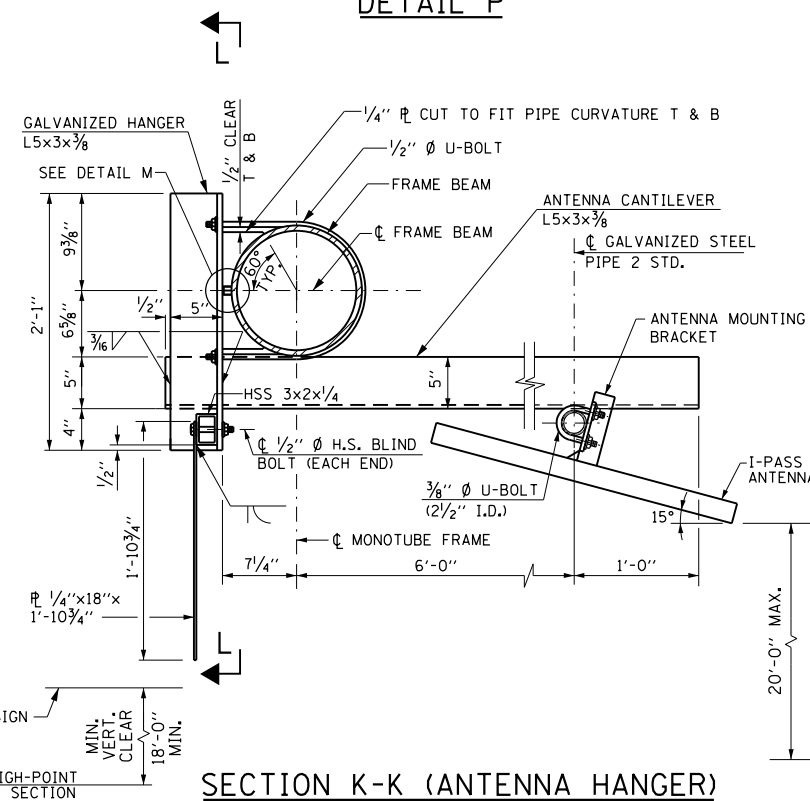
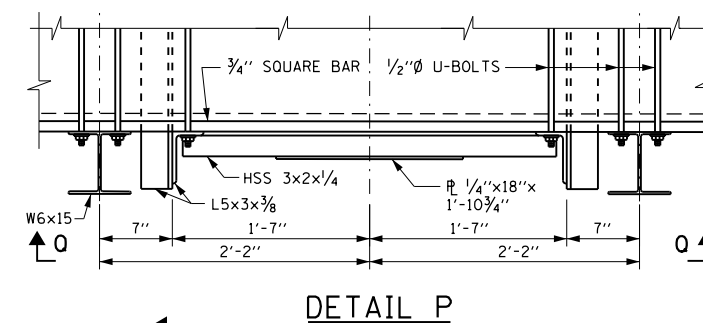
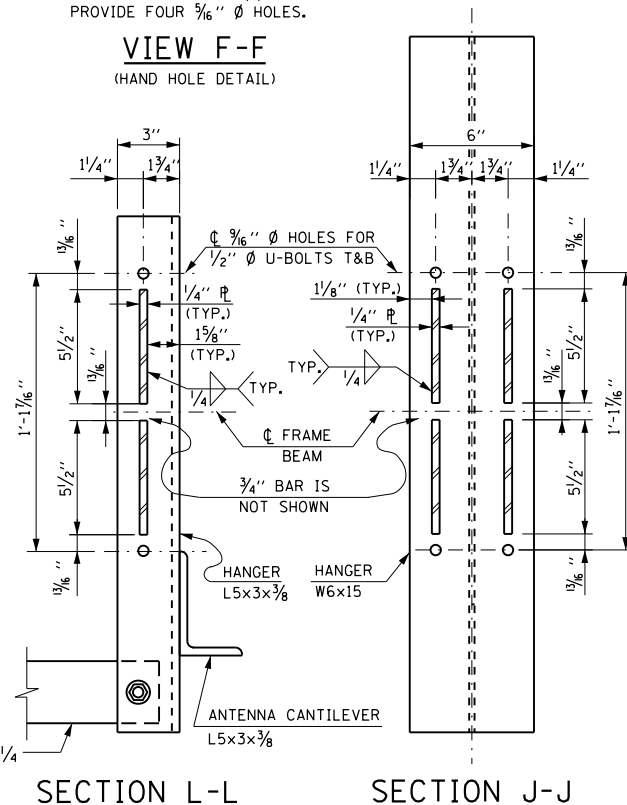
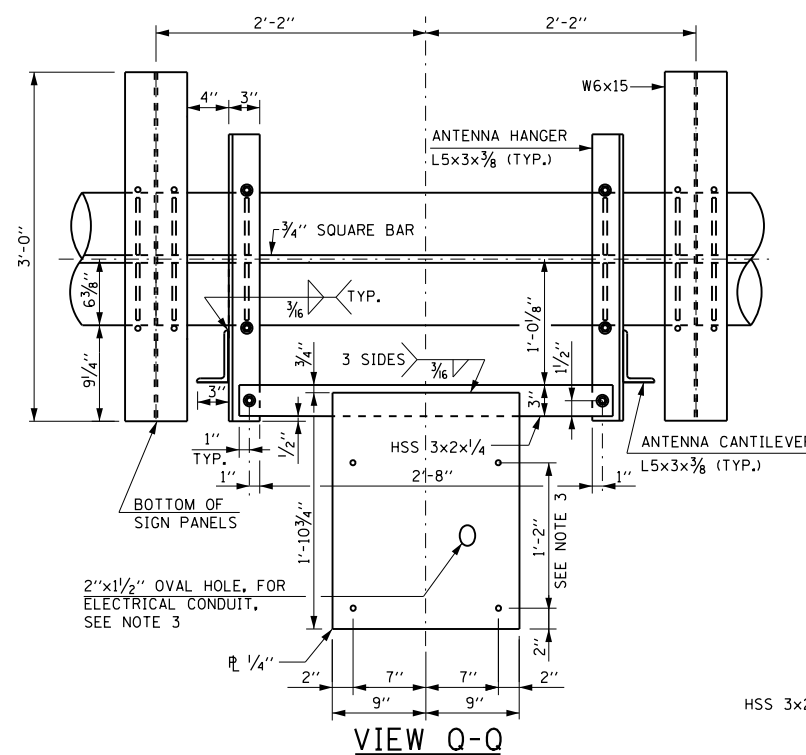
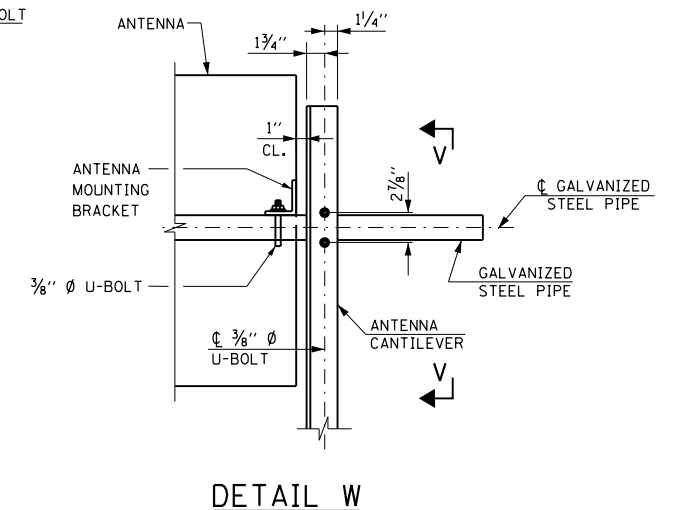
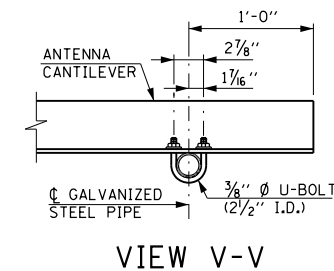
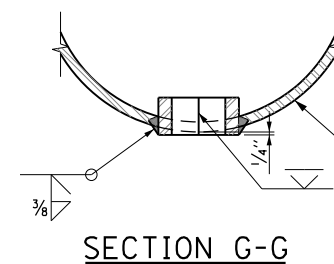
APPROVED BY: *Manar Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER



NOTE 1: INSTALLATION AND INSPECTION OF SPLICE BOLTS SHALL COMPLY WITH ILLINOIS TOLLWAY SPECIAL PROVISION "INTELLIGENT TRANSPORTATION SYSTEMS GANTRY FRAME (STEEL)".



PROVIDE 6 1/2" x 4 1/2" #10 GA. COVER. ROUND CORNERS TO 1 3/4" RADIUS. PROVIDE FOUR 3/8" Ø HOLES.



## NOTES:

- SIGN AND SIGN HANGER ARE OMITTED FROM VIEW A-A FOR CLARITY.
- FOR DETAILS OF ATTACHMENT BETWEEN HANGER AND SIGN PANELS, SEE ILLINOIS TOLLWAY STANDARD DRAWING F10.
- CONTRACTOR SHALL VERIFY LOCATION AND SIZE OF HOLES WITH LANE CONTROL SIGNAL PRIOR TO FABRICATION OF 1/4" PLATE.
- T&B DENOTE TOP AND BOTTOM.
- PROVIDE ANTENNA MOUNTING BRACKET ACCORDING TO ANTENNA MANUFACTURER'S RECOMMENDATION.
- SEE SHEET 2 OF THIS SERIES FOR HANDHOLE LOCATIONS.

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

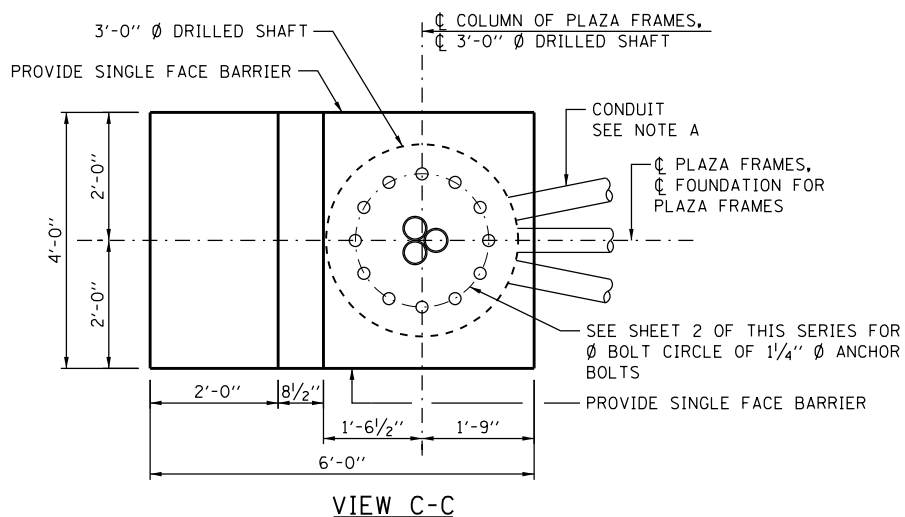
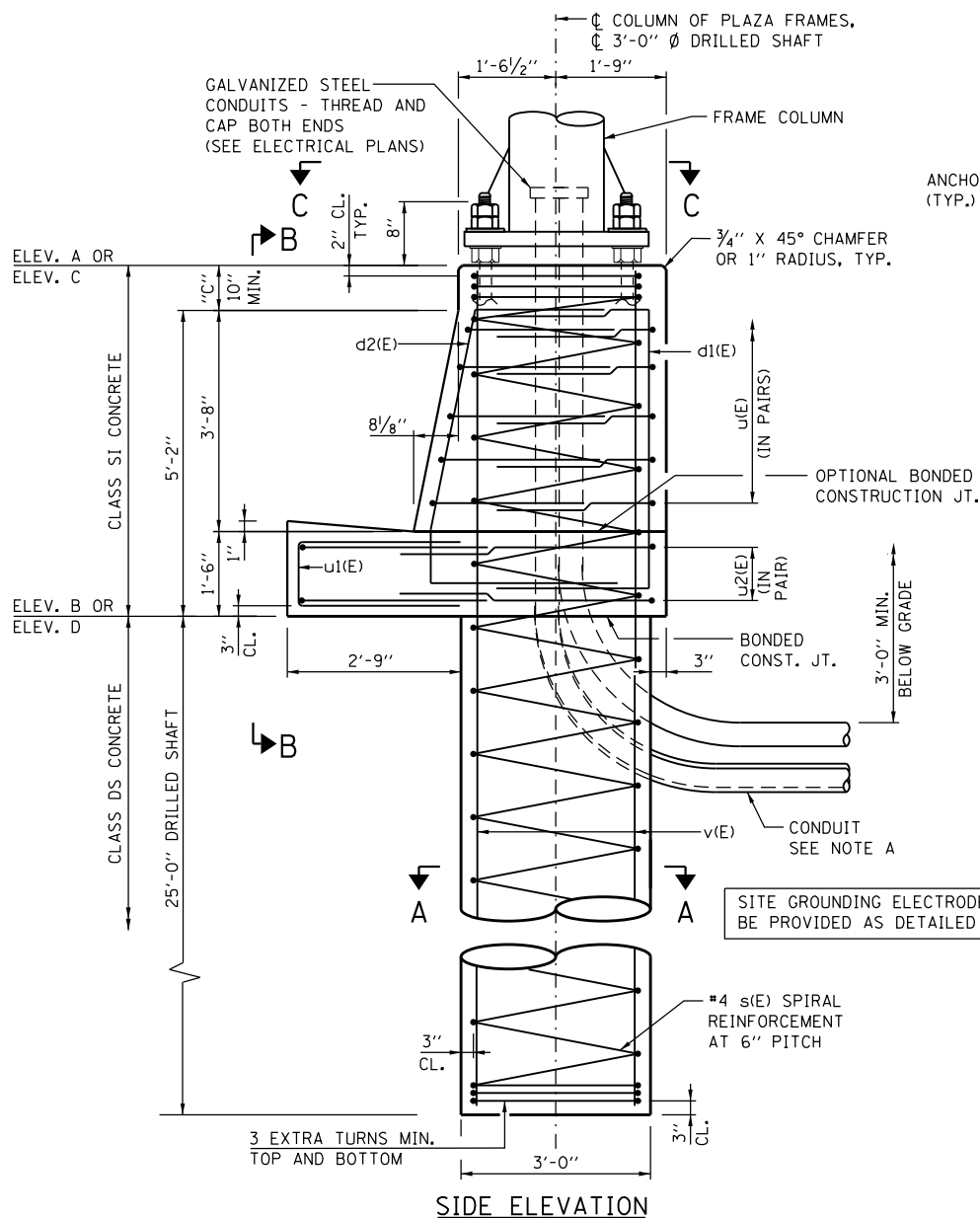
SHEET 4 OF 6



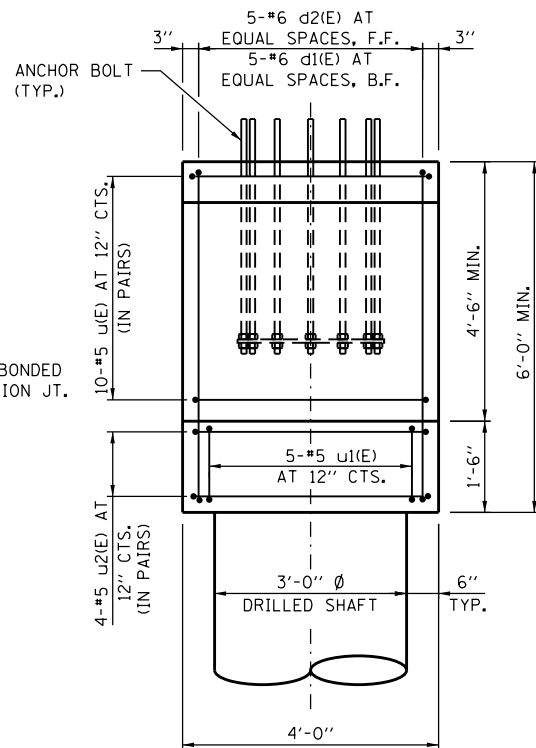
OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR IPOPO RAMP

STANDARD F16-07

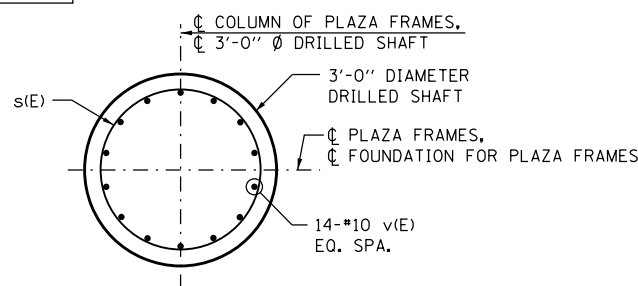




**SINGLE FACE BARRIER FOUNDATION FOR PLAZA FRAMES**



**VIEW B-B**



**SECTION A-A**

**NOTE A:**

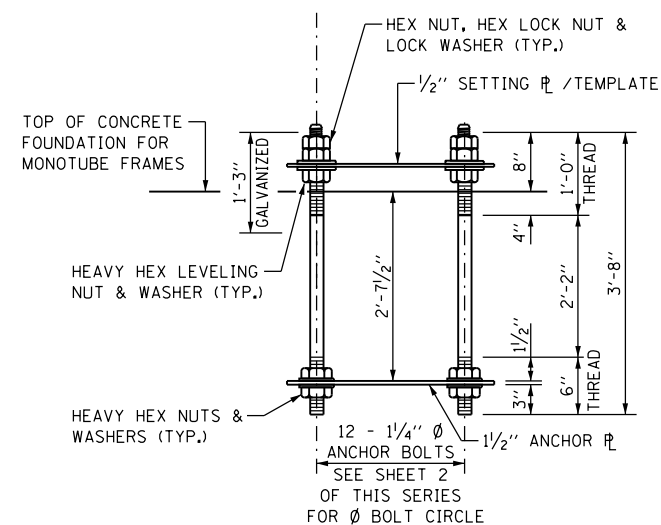
1. COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. PROVIDE CONDUIT COUPLERS AS REQUIRED.
2. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT. CUTTING OF REINFORCEMENT SHALL NOT BE ALLOWED.
3. COST INCLUDED IN FOUNDATION FOR OVERHEAD SIGN STRUCTURE, RAMP MONOTUBE TYPE.
4. PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF BARRIER AND TOP OF GUTTER.

**FOUNDATIONS:**

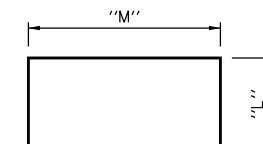
THE FOUNDATION DETAILS SHOWN ARE BASED ON THE PRESENCE OF MOSTLY COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (QU) > 1.25 TON/SQ. FT. WHICH SHALL BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOBSITE. WHEN OTHER CONDITIONS ARE INDICATED, THE BORING DATA SHALL BE INCLUDED IN THE PLANS AND THE FOUNDATION DIMENSIONS SHOWN SHALL BE THE RESULT OF SITE SPECIFIC DESIGNS. IF CONDITIONS ENCOUNTERED IN THE FIELD ARE DIFFERENT THAN THOSE INDICATED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE IF THE FOUNDATION DIMENSIONS NEED TO BE MODIFIED.

**LEGEND:**

F.F. - FRONT FACE  
B.F. - BACK FACE  
CTS. - CENTERS



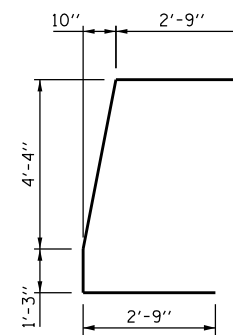
**ANCHOR BOLT ASSEMBLY**



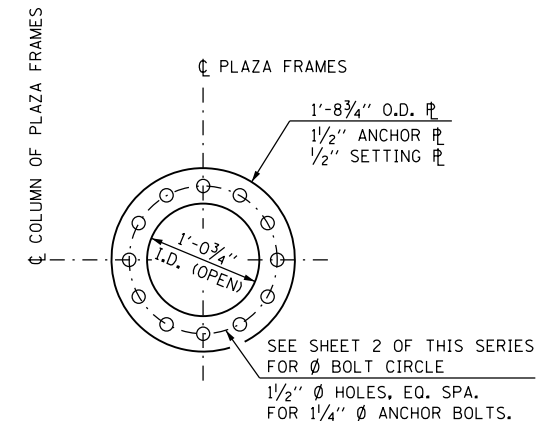
BAR	"L"	"M"
d1(E)	2'-9"	5'-7"
u(E)	2'-9"	3'-8"
u1(E)	3'-3"	1'-1"
u2(E)	3'-10"	3'-8"

\*\*

**BARS d1(E), u(E),  
u1(E) AND u2(E)**



**BAR d2(E)**



**ANCHOR BOLT / SETTING BOLT**

**REINFORCEMENT BAR SCHEDULE  
FOR ONE FOUNDATION**

BAR	NO.	SIZE	LENGTH	SHAPE
d1(E)	5	#6	11'-1"	
d2(E)	5	#6	11'-2"	
s(E)	1	#4	30'-7"	
v(E)	14	#10	30'-7"	
u(E)	10	#5	9'-2"	
u1(E)	5	#5	7'-7"	
u2(E)	4	#5	11'-4"	

\* THE LENGTH OF SPIRAL SHOWN IS THE HEIGHT OF SPIRAL, COMPUTED USING "C" = 10". ADJUST LENGTH ACCORDINGLY IF "C" IS GREATER THAN 10".

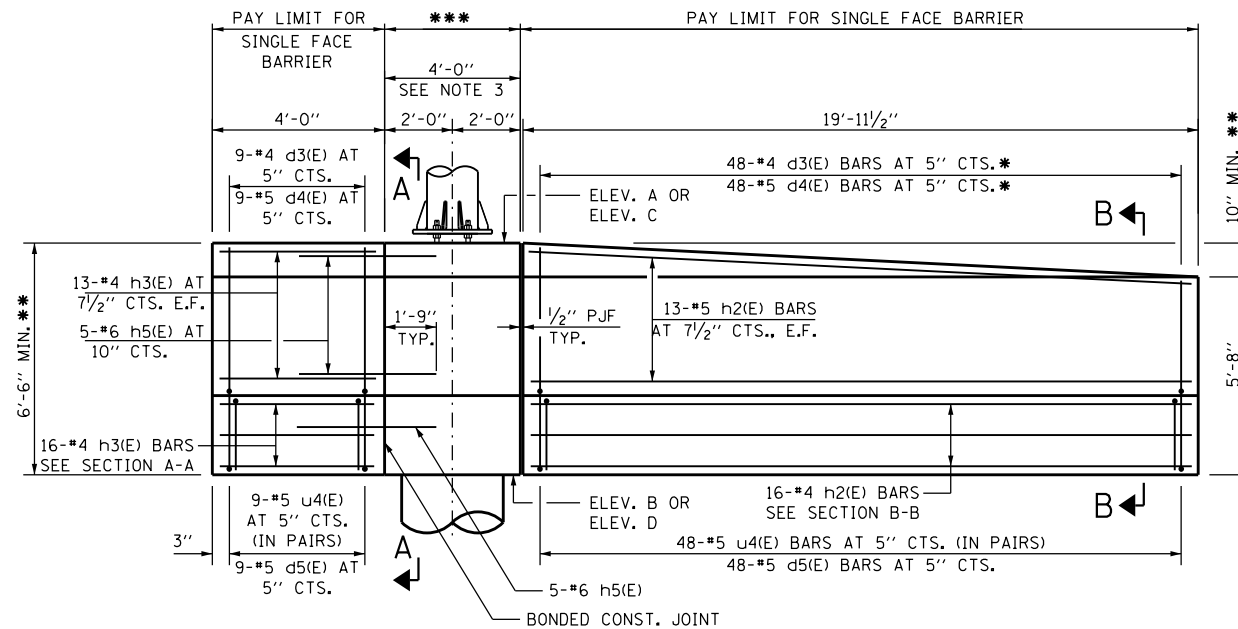
\*\* BAR LENGTH IS COMPUTED USING "C" = 10". ADJUST BAR LENGTH ACCORDINGLY IF "C" IS GREATER THAN 10".

**ESTIMATED QUANTITY**

ITEM	UNIT	SINGLE FACE BARRIER FDN.
CLASS S1 CONCRETE	CU. YD.	3.8
CLASS DS CONCRETE	CU. YD.	6.6
REINFORCEMENT BARS, EPOXY COATED	POUND	2,540
PROTECTIVE COAT	SQ. YD.	4.4

**NOTE:**

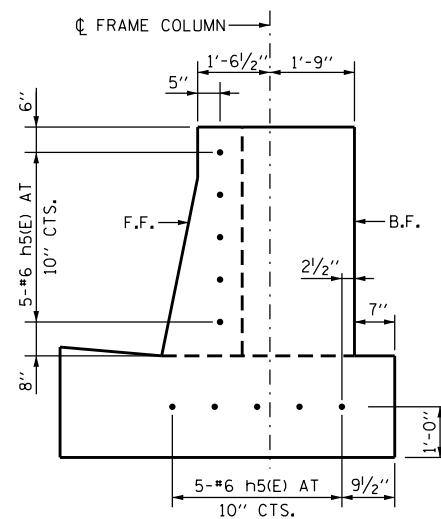
QUANTITIES FOR SINGLE FACE BARRIER FOUNDATION ARE DETERMINED USING "C" = 10". IF DIMENSION "C" IS GREATER THAN 10", ADJUST QUANTITIES ACCORDINGLY.



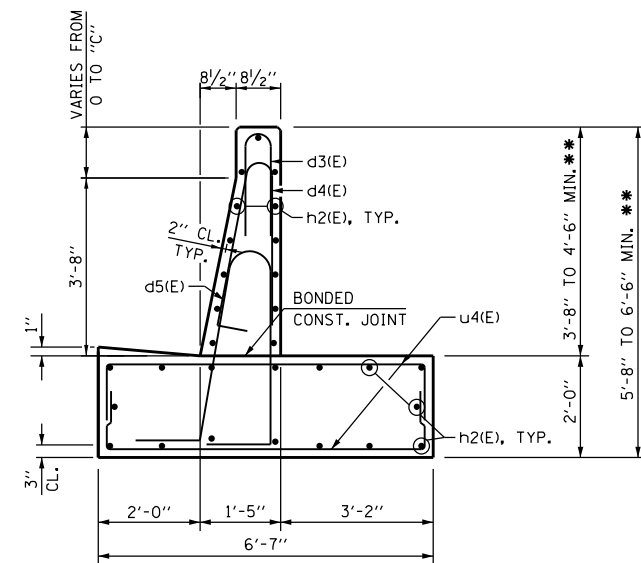
- \* CUT IN FIELD AS REQUIRED TO FIT TAPER
- \*\* BASED ON DIMENSION "C" = 10"
- \*\*\* PAY LIMIT FOR FOUNDATION FOR OVERHEAD SIGN STRUCTURE

### SINGLE FACE BARRIER ELEVATION

INSIDE FACE OF RIGHT BARRIER IS SHOWN  
(MIRROR ELEVATION OF LEFT BARRIER)



SECTION A-A



SECTION B-B

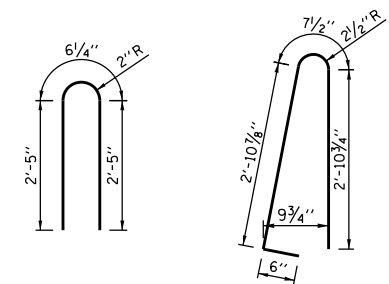
### ESTIMATED QUANTITY

(FOR ONE SINGLE FACE BARRIER)

ITEM	UNIT	TOTAL
CONCRETE STRUCTURES	CU. YD.	15.4
REINFORCEMENT BARS, EPOXY COATED	POUND	2,820
PROTECTIVE COAT	SQ. YD.	18.9

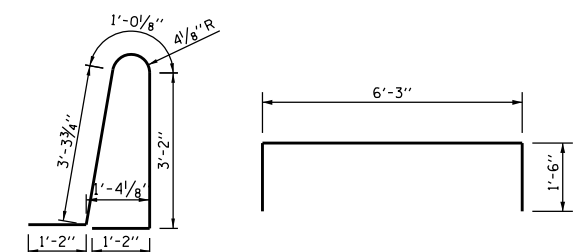
### BAR LIST - ONE BARRIER

BAR	NO.	SIZE	LENGTH	SHAPE
d3(E)	57	#4	5'-5"	U
d4(E)	57	#5	7'-0"	U
d5(E)	57	#5	9'-10"	U
h2(E)	29	#4	19'-7"	I
h3(E)	29	#4	3'-8"	I
h5(E)	10	#6	3'-9"	I
u4(E)	114	#5	9'-3"	U



BAR d3(E)

BAR d4(E)



BAR d5(E)

BAR u4(E)

### NOTES:

- PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF THE BARRIER, GUTTER AND TO THE ENTRANCE SIDE FACE (AT THE BEGINNING OF THE RAMP PLAZA PAVEMENT) FOR THE FULL HEIGHT OF THE BARRIER.
- ELECTRICAL JUNCTION BOXES SHALL BE EXTERIOR MOUNTED ON THE BACK FACE OF BARRIER.
- FOR SINGLE FACE BARRIER FOUNDATION DETAILS FOR MONOTUBE FRAMES, SEE SHEET 5 OF THIS SERIES.
- QUANTITIES FOR SINGLE FACE BARRIER ARE DETERMINED USING "C" = 10". IF DIMENSION "C" IS GREATER THAN 10", ADJUST QUANTITIES ACCORDINGLY.
- WORK THIS SHEET WITH, OVERHEAD SIGN STRUCTURE MONOTUBE TYPE (STEEL) CASH-IPO RAMP SUMMARY AND TOTAL BILL OF MATERIAL SHEET.

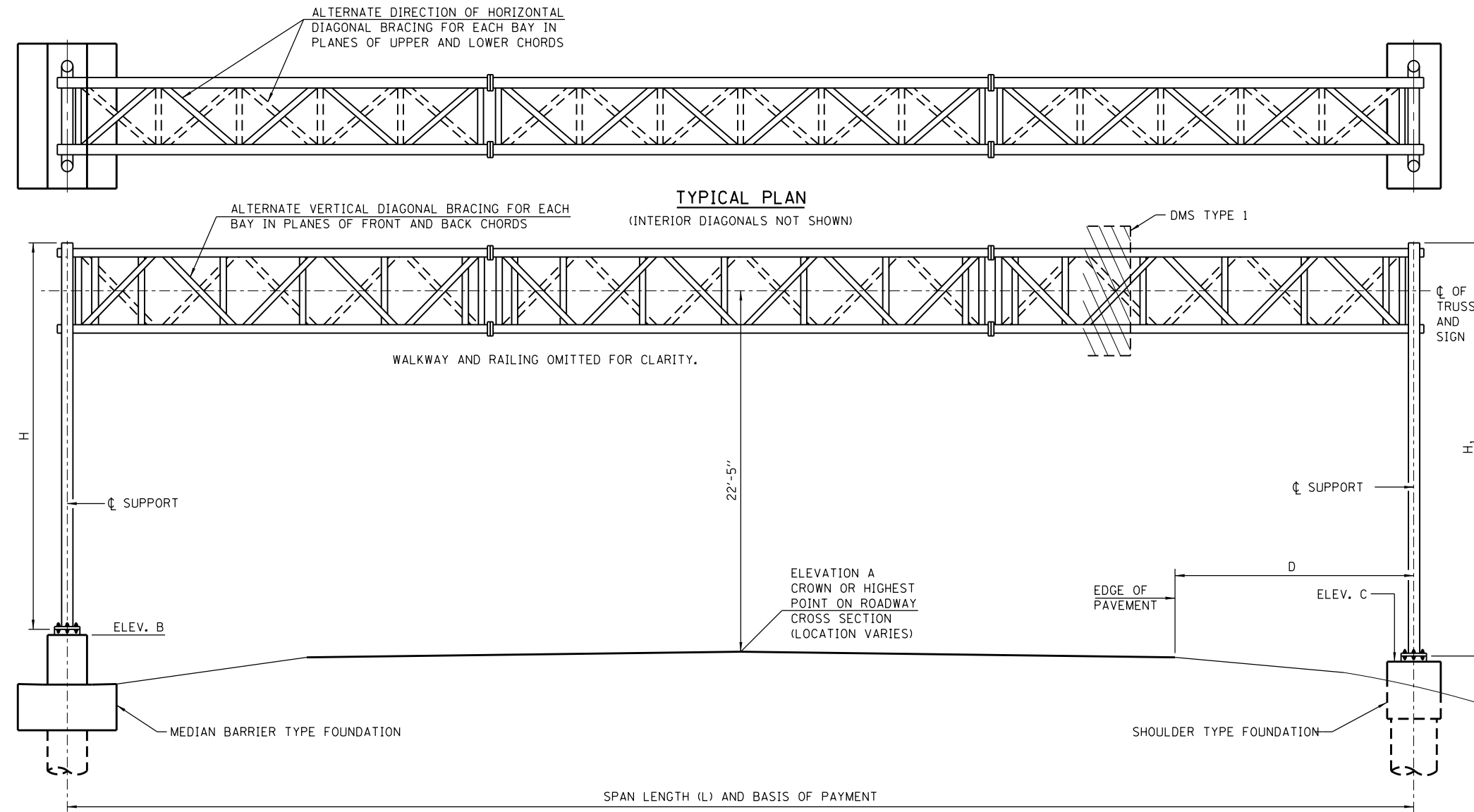
SHEET 6 OF 6



OVERHEAD SIGN STRUCTURE  
MONOTUBE TYPE (STEEL)  
STRUCTURE DETAILS  
FOR IPOPO RAMP

STANDARD F16-07

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024



### GENERAL NOTES:

1. WORK THIS SHEET WITH, OVERHEAD SIGN STRUCTURE SPAN TYPE (STEEL) SUMMARY AND BILL OF MATERIAL SHEET.
2. AFTER ADJUSTMENTS TO LEVEL TRUSS AND ENSURE ADEQUATE VERTICAL CLEARANCE, ALL TOP AND LEVELING NUTS SHALL BE TIGHTENED AGAINST THE BASE PLATE WITH A MINIMUM TORQUE OF 200 LB.-FT. STAINLESS STEEL MESH SHALL THEN BE PLACED AROUND THE PERIMETER OF THE BASE PLATE. SECURE TO BASE PLATE WITH STAINLESS STEEL BANDING.
3. SIGN SUPPORT STRUCTURES MAY BE SUBJECT TO DAMAGING VIBRATIONS AND OSCILLATIONS WHEN DMS IS NOT IN PLACE DURING ERECTION OR MAINTENANCE OF THE STRUCTURE. TO AVOID THESE, ATTACH TEMPORARY BLANK SIGN PANELS OR OTHER BRACING TO THE STRUCTURE UNTIL DMS IS INSTALLED.
4. TRUSS UNITS SHALL BE SHIPPED INDIVIDUALLY WITH ADEQUATE PROVISION TO PREVENT DETRIMENTAL MOTION DURING TRANSPORT. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONFIGURATION AND PROTECTION OF THE TRUSS UNITS.
5. ALL WELDS SHALL BE CONTINUOUS UNLESS OTHERWISE SHOWN. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH CURRENT AWS D1.1 STRUCTURE WELDING CODE AND THE STANDARD SPECIFICATIONS.
6. INSTALLATIONS NOT WITHIN DIMENSIONAL LIMITS SHOWN REQUIRE SPECIAL ANALYSIS FOR ALL COMPONENTS.
7. ONE DMS TYPE 1 IS PERMITTED TO BE MOUNTED ON A SPAN TRUSS. DO NOT MOUNT SIGN PANELS ON THIS TRUSS.

### FABRICATION NOTES:

1. MATERIALS: SEE MATERIAL SPECIFICATIONS TABLE FOR MATERIAL SPECIFICATIONS FOR OVERHEAD SIGN STRUCTURE SPAN TYPE (STEEL). STAINLESS STEEL FOR SHIMS, SLEEVES AND HANDHOLE COVERS SHALL BE ASTM A240, TYPE 302 OR 304 OR ANOTHER ALLOY SUITABLE FOR EXTERIOR EXPOSURE AND ACCEPTABLE TO THE ENGINEER. THE STEEL PIPE AND STIFFENING RIBS AT THE BASE PLATE FOR THE STEEL POST SHALL HAVE A MINIMUM LONGITUDINAL CHARNPY V-NOTCH (CVN) ENERGY OF 15 LB.-FT. AT 40°F (ZONE 2) BEFORE GALVANIZING.
2. WELDING: ALL MATERIALS, WELDING PROCEDURES AND INSPECTION USED FOR THE SPAN TYPE OVERHEAD SIGN STRUCTURE SHALL CONFORM TO AWS D1.1-15 FOR TUBULAR, CYCLICALLY LOADED STRUCTURES. ADDITIONALLY, ALL WELDED MATERIALS USED SHALL BE PREQUALIFIED FOR USE WITH WPS PER AWS D1.1-15, TABLE 3.1.
3. FASTENERS FOR STEEL TRUSSES: HIGH STRENGTH BOLTS SHALL SATISFY THE REQUIREMENTS OF AASHTO M164 (ASTM A325), OR APPROVED ALTERNATE, AND SHALL HAVE MATCHING LOCKNUTS. THREADED STUDS FOR SPLICES (IF MEMBERS INTERFERE) SHALL SATISFY THE REQUIREMENTS OF ASTM A449, ASTM A193 GRADE B7, OR APPROVED ALTERNATE, AND SHALL HAVE MATCHING LOCKNUTS. BOLTS AND LOCKNUTS NOT REQUIRED TO BE HIGH STRENGTH SHALL SATISFY THE REQUIREMENTS OF ASTM A307. ALL BOLTS AND LOCKNUTS SHALL BE HOT DIP GALVANIZED PER AASHTO M232, EXCEPT STAINLESS STEEL FASTENERS, NUTS AND WASHERS. THE LOCKNUTS SHALL HAVE NYLON OR STEEL INSERTS. A STAINLESS STEEL FLAT WASHER CONFORMING TO ASTM A240 TYPE 302 OR 304, IS REQUIRED UNDER BOTH HEAD AND NUT OR UNDER BOTH NUTS WHERE THREADED STUDS ARE USED. HIGH STRENGTH BOLT INSTALLATION SHALL CONFORM TO ARTICLE 505.04(f)(2)d OF THE IDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION. ROTATIONAL CAPACITY ("ROCAP") TESTING OF BOLTS WILL NOT BE REQUIRED.
4. U-BOLTS: U-BOLTS SHALL BE STAINLESS STEEL AND SHALL CONFORM TO ASTM 193, CLASS I, GRADE B8 (AISI TYPE 304). WASHERS FOR U-BOLTS SHALL CONFORM TO ASTM A240, TYPE 302. NUTS FOR U-BOLTS SHALL CONFORM TO ASTM A194 (AASHTO M292), GRADE 8F (AISI TYPE 303).
5. STEEL GRATING: STEEL BARS FOR GRATING ELEMENTS SHALL CONFORM TO ASTM A36 OR AN EQUIVALENT MATERIAL ACCEPTABLE TO THE ENGINEER.
6. GALVANIZING: ALL PLATES, SHAPES AND PIPE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111. PAINTING IS NOT PERMITTED. ALL FASTENERS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111 OR M232 AS APPROPRIATE FOR THE PRODUCT (EXCEPT STAINLESS STEEL FASTENERS).

### CONSTRUCTION SPECIFICATIONS:

ALL MATERIALS, EXCEPT AS SHOWN, FABRICATION, ERECTION AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE LATEST STANDARD SPECIFICATIONS.

### LOADING:

1. SPAN TYPE (STEEL) TRUSS ARE DESIGNED FOR A 10'-0" DEEP DMS, WITH A MAXIMUM LENGTH OF 30'-0" AND A MAXIMUM THICKNESS OF 4'-2".
2. SPAN TYPE (STEEL) TRUSS ARE DESIGNED FOR 35 PSF WIND PRESSURE ON TRUSS MEMBERS AND 60 PSF ON DMS.
3. WALKWAY LOADING SHALL INCLUDE DEAD LOAD PLUS 500 LBS. CONCENTRATED LIVE LOAD.
4. WALKWAY HANDRAILS ARE DESIGNED FOR A 200-LB LOAD ON TOP RAIL AND A 150-LB LOAD ON MID RAIL, APPLIED IN ANY DIRECTION.
5. PROVIDE ANCHORAGE FOR ATTACHMENT OF PERSONAL FALL ARREST SYSTEMS PER OSHA SECTION 1926.502(D). ANCHORAGE SHALL BE INSTALLED AS CLOSE TO PANEL POINTS AS POSSIBLE AND SHALL BE CAPABLE OF SUPPORTING AT LEAST 5000 LBS.
6. ICE LOAD OF 3 PSF APPLIED WITH A FACTOR OF 1.0 FOR STRENGTH I ONLY.

### DESIGN SPECIFICATIONS:

2015 AASHTO LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, 1ST EDITION WITH 2020 INTERIM REVISIONS, INSTRUCTIONS AND INFORMATION.

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 9TH EDITION, 2020

SHEET 1 OF 13



OVERHEAD SIGN STRUCTURE  
SPAN TYPE (STEEL)  
STRUCTURE DETAILS

STANDARD F17-09

DATE	REVISIONS
3-01-2024	ADDED UTILITY CLEARANCE REQ.
3-01-2023	CHANGE VERT. DIAG. & INT. DIAG. TO 4X-STRONG PIPE, END SUP. DIAG. TO 4XX-STRONG PIPE, REV. NUM. OF v(E)
	BARS ON SHT. 7 & 8 & INC. SHAFT, BAR SIZE AND DIMS.

### DESIGN WIND LOADING DIAGRAM

ETPA = EFFECTIVE TRUSS PROJECTED AREA.  
MAXIMUM DMS WEIGHT = 5000 LBS.

MATERIAL SPECIFICATIONS TABLE  
FOR STRUCTURAL STEEL AND FASTENERS

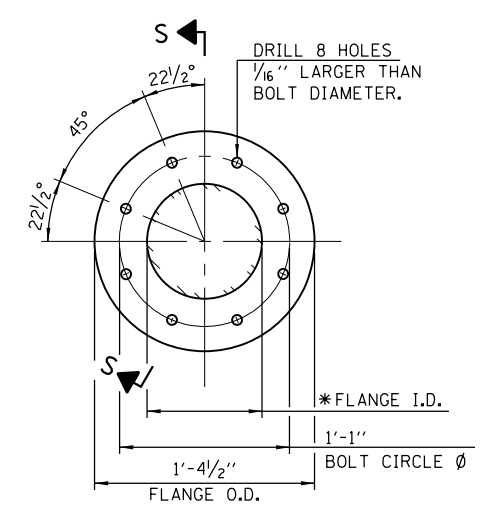
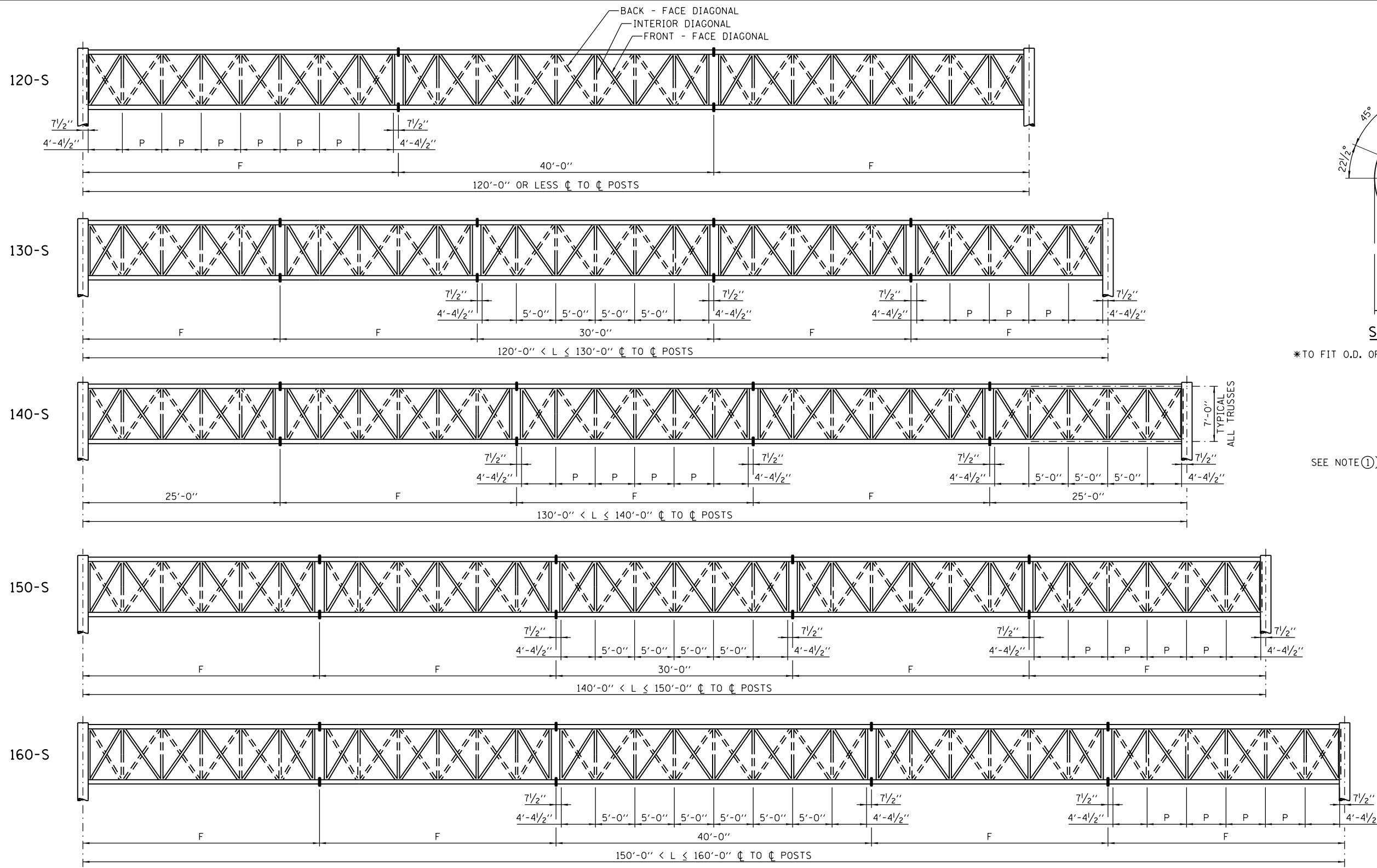
ELEMENT OF STRUCTURE	SPECIFICATION	MINIMUM YIELD STRENGTH (K.S.I.)	MINIMUM ULTIMATE STRENGTH (K.S.I.)
HOLLOW STRUCTURAL SECTIONS (HSS)	ASTM A500 GRADE B	42	58
STRUCTURAL STEEL PIPE	ASTM A53, TYPE E OR S, GRADE B	35	60
STRUCTURAL STEEL BAR, PLATES AND SHAPES	ASTM A572 GRADE 50	50	65
STAINLESS STEEL BOLTS	ASTM A193 GRADE B8 OR B8M	30	75
STRUCTURAL STEEL BOLTS	ASTM 325, TYPE 1	--	105
STAINLESS STEEL LOCKNUTS	ASTM A194 GRADE 8F ASTM A194 GRADE 2H	--	--
NUTS	ASTM A563 GRADE DH	--	--
STEEL WASHERS	ASTM F436	--	--
STAINLESS STEEL WASHERS	ASTM A240, TYPE 302	--	--
STEEL ANCHOR BOLTS	AASHTO M314 OR ASTM F1554	105	125

APPROVED BY:

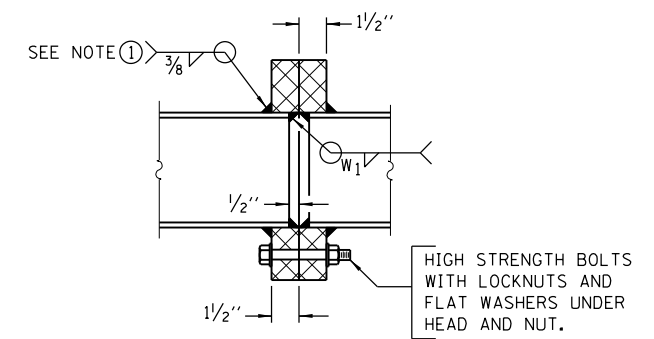
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:

03/01/2024



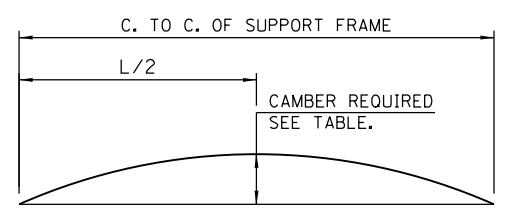
\*TO FIT O.D. OF CHORD WITH MAXIMUM GAP OF 1/16".



**NOTE:**  
① SPLICING FLANGES SHALL BE ATTACHED TO EACH TRUSS UNIT WITH THE TRUSS SHOP ASSEMBLED TO CAMBER SHOWN. TRUSS UNITS SHALL BE IN PROPER ALIGNMENT AND FLANGE SURFACES SHALL BE SHOP BOLTED INTO FULL CONTACT BEFORE WELDING. SUFFICIENT EXTERNAL WELDS OR TACKS SHALL BE MADE TO SECURE FLANGES UNTIL REMAINING WELDS ARE MADE AFTER DISASSEMBLY. ADJACENT FLANGES SHALL BE "MATCH MARKED" TO INSURE PROPER FIELD ASSEMBLY.

PART ELEVATION VIEWS

SPAN LENGTH (L)	CAMBER
120' OR LESS	2 3/4"
120' < L ≤ 130'	3 1/4"
130' < L ≤ 140'	4"
140' < L ≤ 150'	4 1/4"
150' < L ≤ 160'	5"

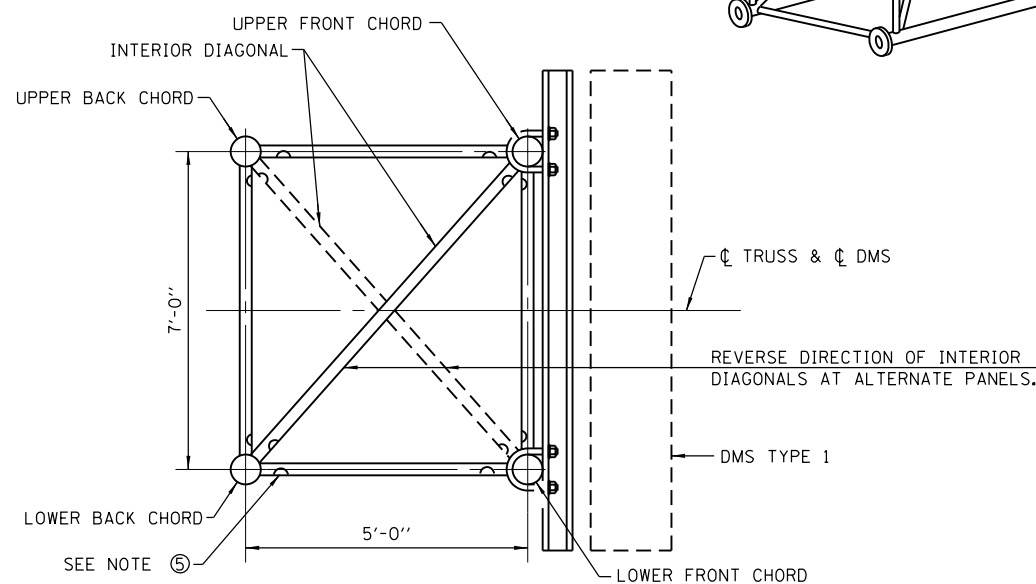
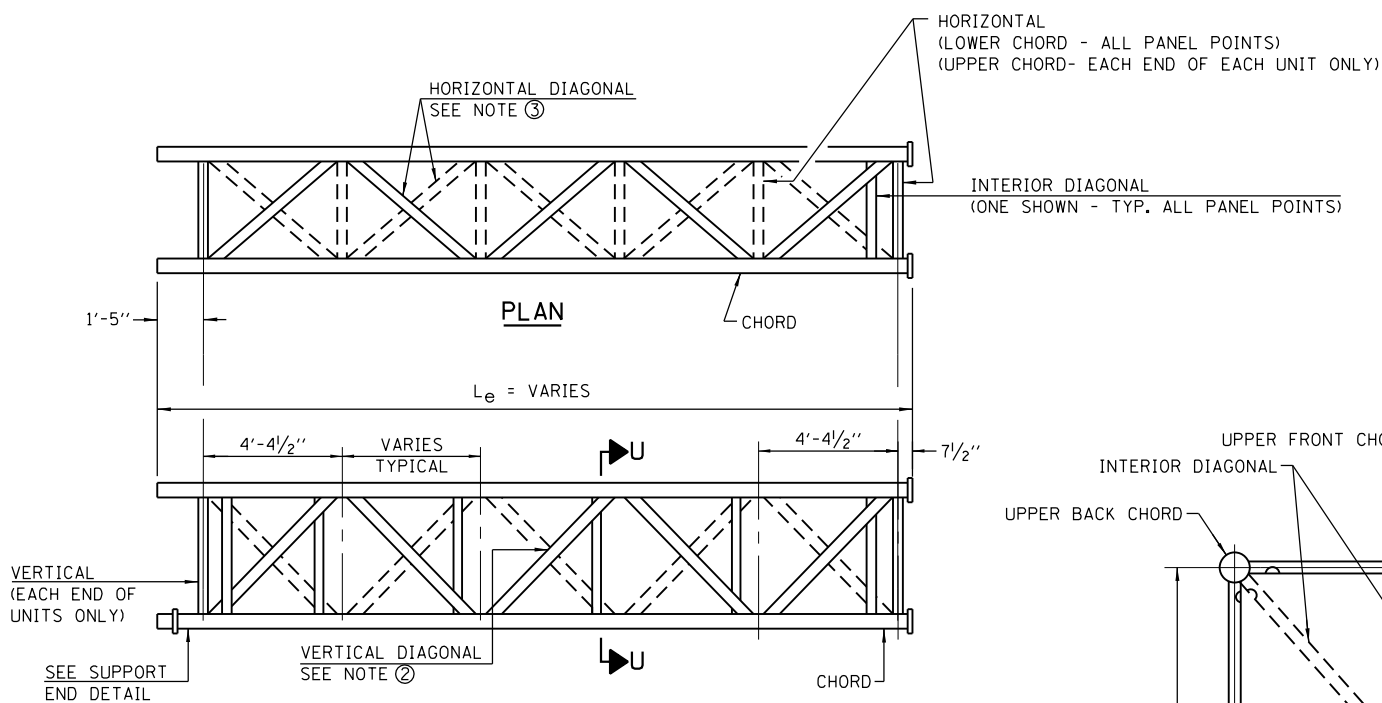
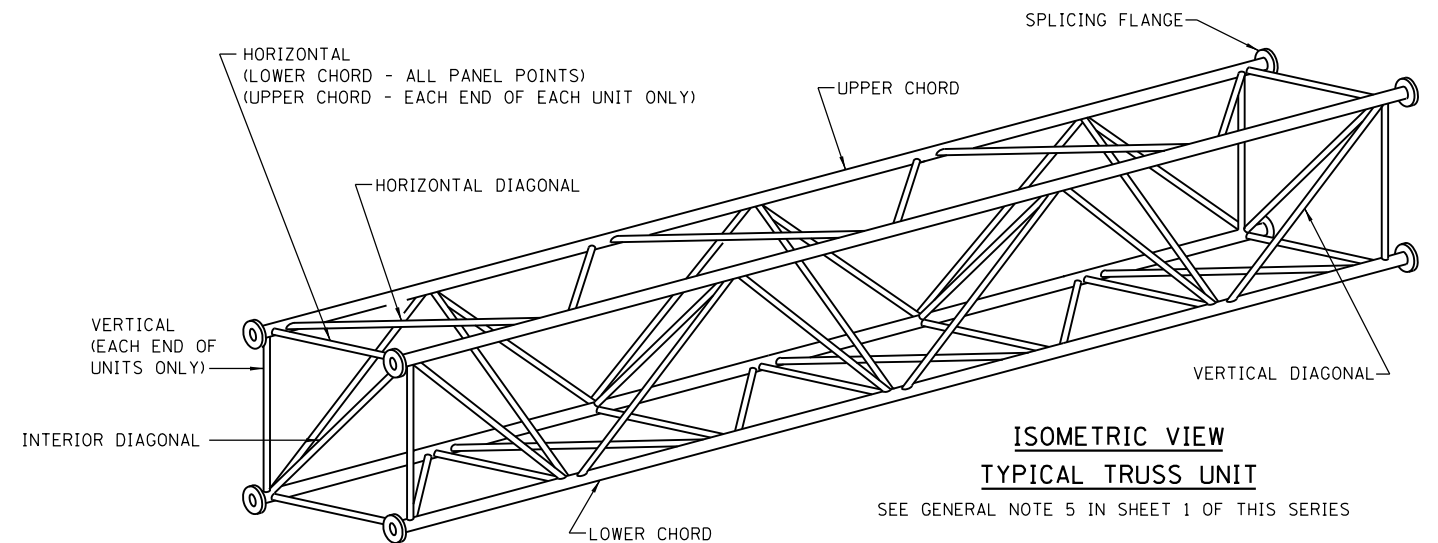
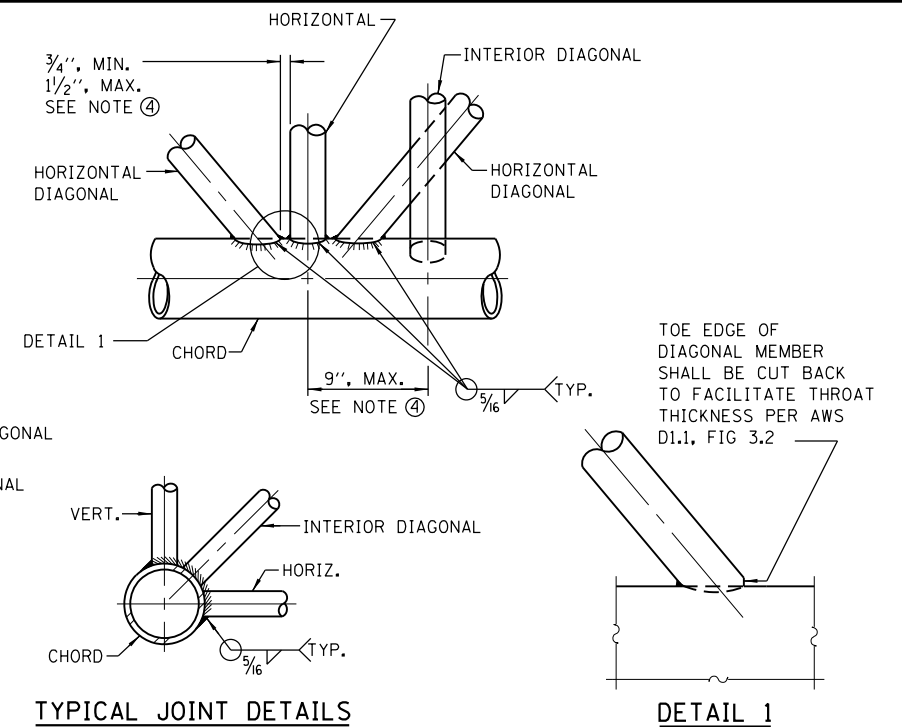
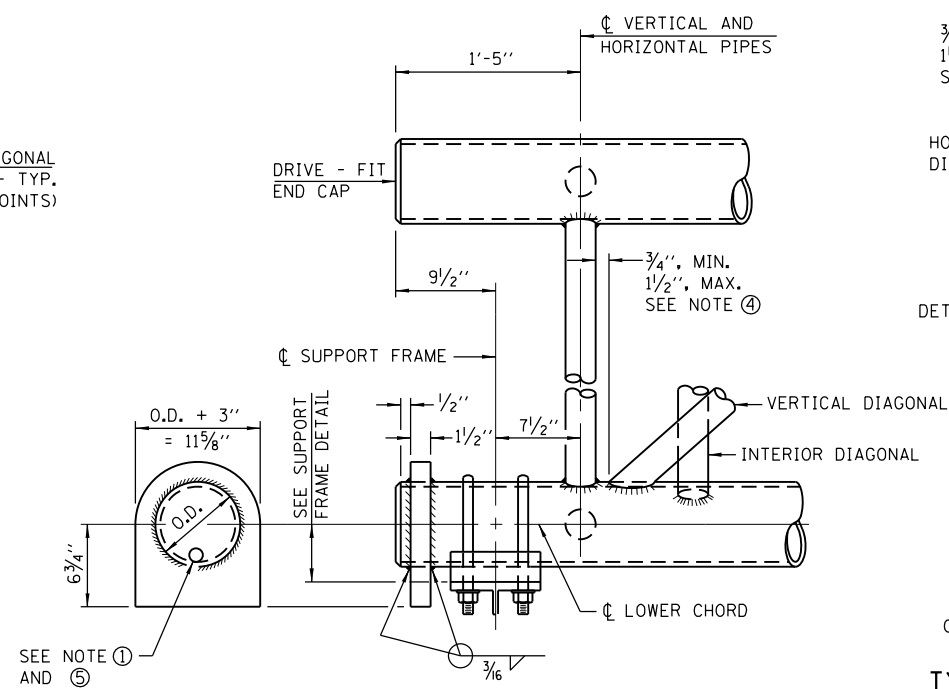
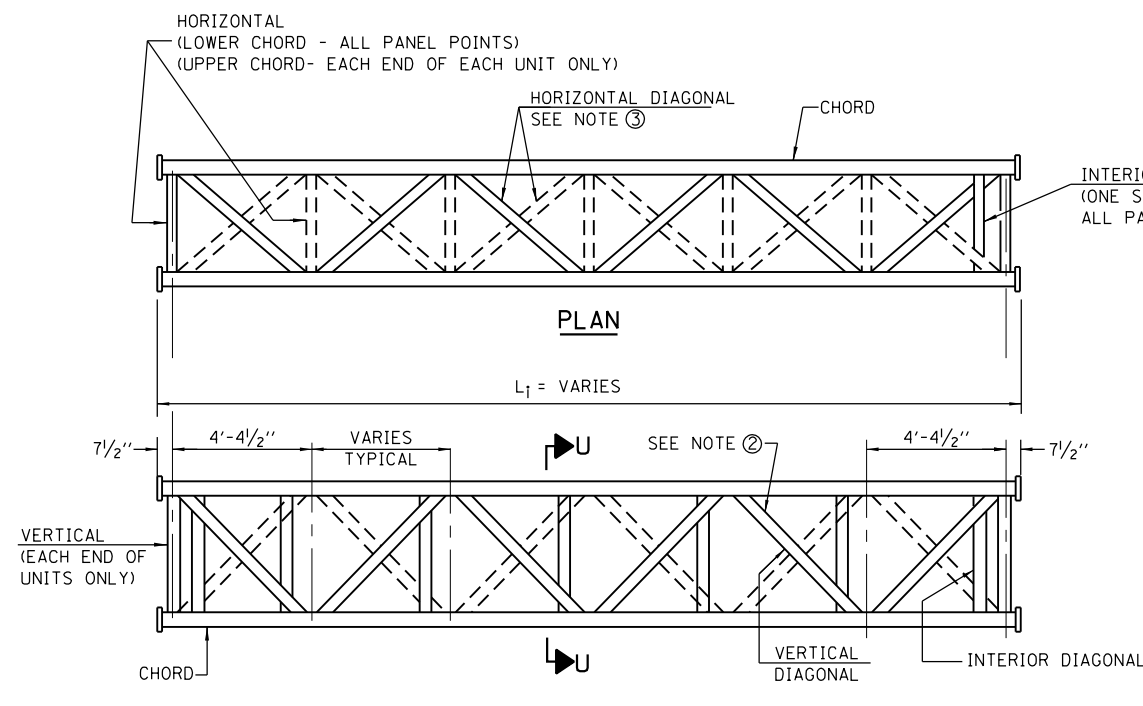


- NOTE:
- FABRICATE TRUSS WITH CHORDS CURVED SMOOTHLY TO PROVIDE CAMBER.
  - DO NOT CAMBER BY SHIMMING AT TRUSS FIELD SPLICES OR CUTTING AND REWELDING CHORD.

TRUSS MEMBER SCHEDULE

DESIGN TRUSS TYPE	SPAN	CHORDS	VERTICAL DIAGONALS, VERTICALS AND INTERIOR DIAGONALS	HORIZONTAL DIAGONALS	HORIZONTALS	SPLICING FLANGE		
						H.S. BOLTS NO./SPLICE	WELD SIZE DIA.	W1
120-S	120' OR LESS	HSS 8.625x0.322	PIPE 4 X-STRONG	PIPE 3 XX-STRONG	PIPE 3 X-STRONG	8	1"	1/4"
130-S	120' < L ≤ 130'	HSS 8.625x0.375	PIPE 4 X-STRONG	PIPE 3 XX-STRONG	PIPE 3 X-STRONG	8	1"	5/16"
140-S	130' < L ≤ 140'	HSS 8.625x0.375	PIPE 4 X-STRONG	PIPE 3 XX-STRONG	PIPE 3 X-STRONG	8	1"	5/16"
150-S	140' < L ≤ 150'	HSS 8.625x0.500	PIPE 4 X-STRONG	PIPE 3 XX-STRONG	PIPE 3 X-STRONG	8	1"	7/16"
160-S	150' < L ≤ 160'	HSS 8.625x0.500	PIPE 4 X-STRONG	PIPE 3 XX-STRONG	PIPE 3 X-STRONG	8	1 1/4"	7/16"





#### NOTES

- ① CONTRACTOR SHALL USE STANDARD DRIVE - FIT CAP TO CLOSE END. 1/2" Ø DRAIN HOLE IN DRIVE - FIT CAP INSTALLED AFTER GALVANIZING. (TYP. AT NON - SPliced ENDS OF CHORDS)
- ② VERTICAL DIAGONALS IN FRONT AND BACK FACE SHALL ALTERNATE INCLINATION.
- ③ HIDDEN LINES SHOW WIND BRACING ALTERNATES DIRECTION BETWEEN PLANES OF TOP AND BOTTOM CHORDS.
- ④ ALL DIAGONALS SHALL BE OFFSET FROM THE PANEL POINT BASED ON THE FOLLOWING:  
OFFSET SHALL PROVIDE A 3/4" MINIMUM TO 1 1/2" MAXIMUM CLEARANCE BETWEEN DIAGONAL AND ANY OTHER DIAGONAL, HORIZONTAL OR VERTICAL MEMBER, AND TO PROVIDE CLEARANCE FOR U-BOLT CONNECTIONS OF DMS TYPE 1 OR WALKWAY BRACKETS.
- ⑤ GALVANIZING VENT HOLES OF ADEQUATE SIZE SHALL BE PROVIDED ON UNDERSIDE AT EACH END OF TRUSS MEMBERS EXCEPT CHORDS. ALTERNATELY, HOLES MAY BE PROVIDED IN WALL OF CHORDS. ALL VENT HOLES SHALL BE DRILLED AND DE - BURRED, TYP.

SHEET 3 OF 13

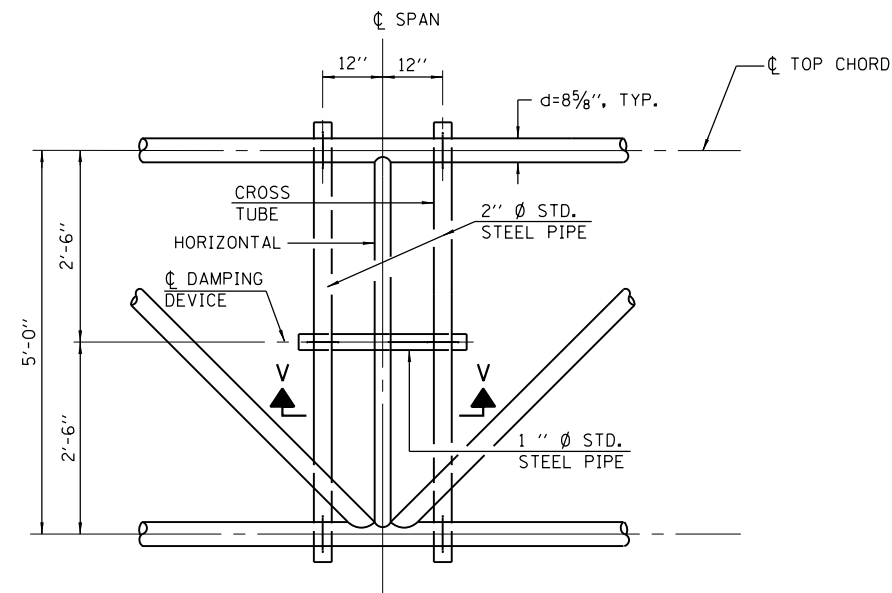


OVERHEAD SIGN STRUCTURE  
SPAN TYPE (STEEL)  
STRUCTURE DETAILS

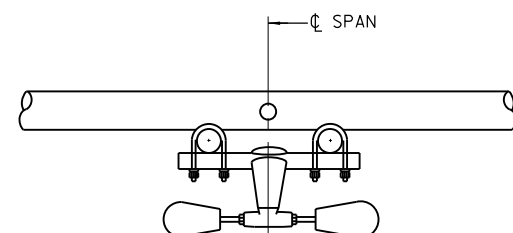
STANDARD F17-09

APPROVED BY:  
*Mamun Nasir*  
CHIEF ENGINEERING OFFICER

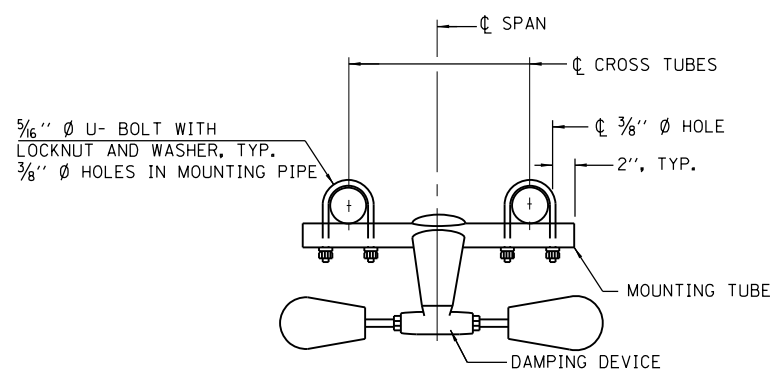
DATE:  
03/01/2024



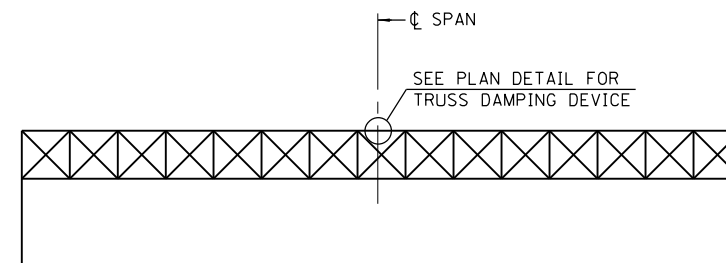
**PLAN DETAIL**  
CL SPAN AT PANEL POINTS



**SECTION V-V**



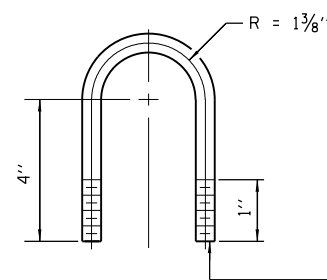
**TRUSS DAMPING  
DEVICE CONNECTION DETAIL**  
(TYPICAL)



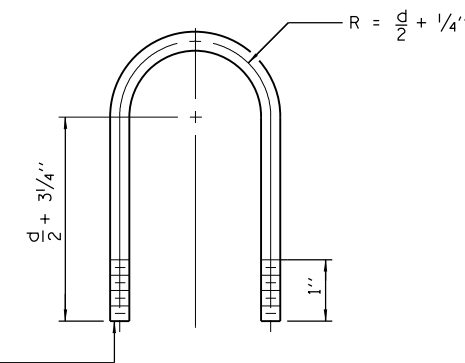
**ELEVATION**  
STEEL OVERHEAD  
SIGN TRUSS

**DAMPER NOTE:**

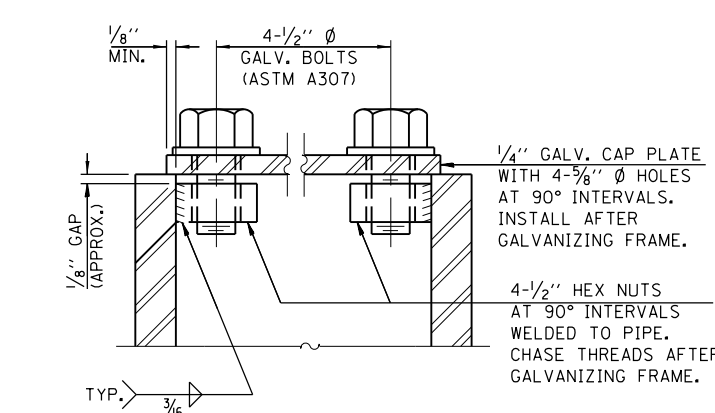
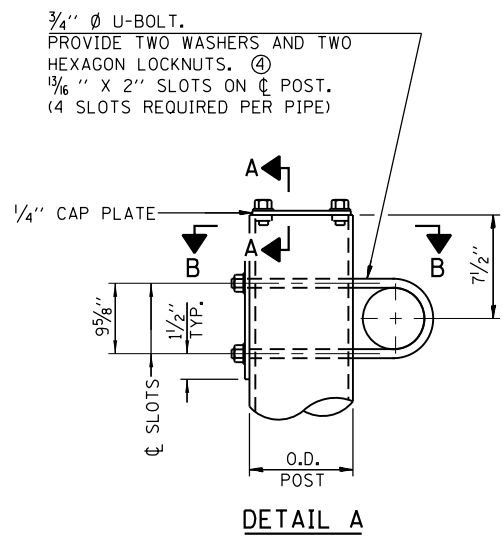
ONE DAMPER PER TRUSS. (31 LBS. STOCKBRIDGE-TYPE - 29" MINIMUM BETWEEN ENDS OF WEIGHTS).



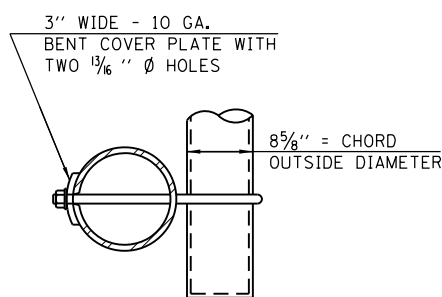
**DAMPING DEVICE MOUNTING  
TUBE U-BOLT DETAIL**  
(TYPICAL)



**TOP CHORD TO CROSS TUBE  
U-BOLT DETAIL**  
(TYPICAL)

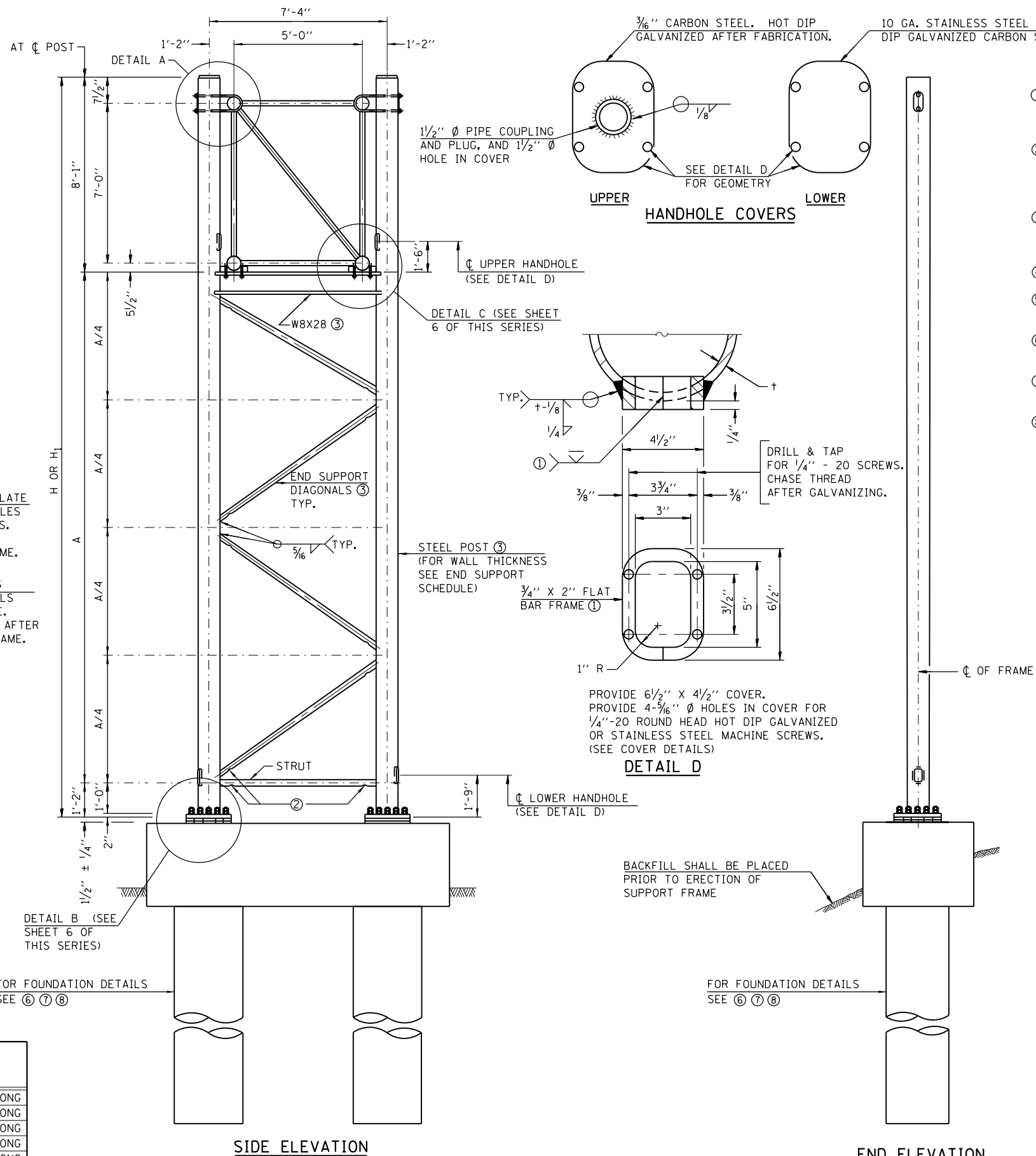


AS AN ALTERNATE TO BOLTS, MAY USE GALVANIZED  
DRIVE - FIT CAPS INSTALLED AFTER GALVANIZING FRAME.



#### END SUPPORT SCHEDULE

DESIGN TRUSS TYPE	H OR H <sub>1</sub>	+	POSTS	DIAGONALS, STRUT
120-S	34' MAX.	1/2"	HSS 12.75x0.500	PIPE 4 XX-STRONG
130-S	34' MAX.	1/2"	HSS 14x0.500	PIPE 4 XX-STRONG
140-S	34' MAX.	1/2"	HSS 14x0.500	PIPE 4 XX-STRONG
150-S	36' MAX.	1/2"	HSS 16x0.500	PIPE 4 XX-STRONG
160-S	36' MAX.	1/2"	HSS 16x0.500	PIPE 4 XX-STRONG



#### NOTES:

- IN LIEU OF FABRICATED HANDHOLE FRAME AS SHOWN, MAY CUT FROM 2" PLATE (ROLLING DIRECTION VERTICAL). ALL CUT FACES TO BE GROUND TO ANSI ROUGHNESS OF 500 µIN OR LESS.
- GALVANIZING VENT HOLES OF ADEQUATE SIZE SHALL BE PROVIDED ON UNDERSIDE AT EACH END OF BRACING PIPES. ALTERNATELY, HOLES MAY BE PROVIDED IN WALL OF PIPE COLUMN. ALL VENT HOLES SHALL BE DRILLED AND DE - BURRED, TYP.
- STEEL PIPE, PLATE, CARBON STEEL HANDHOLE COVERS AND ROLLED SECTIONS SHALL BE HOT DIP GALVANIZED AFTER FABRICATION. PAINTING IS NOT PERMITTED. SEE SHEET 1 OF THIS SERIES.
- SEE GENERAL NOTES FOR FASTENERS.
- NONSTANDARD APPLICATIONS SHALL HAVE DIMENSIONS VERIFIED OR AMENDED AS APPROPRIATE.
- SEE SHEET 7 OF THIS SERIES FOR SHOULDER TYPE FOUNDATION DETAILS.
- SEE SHEET 8 OF THIS SERIES FOR MEDIAN BARRIER TYPE FOUNDATION DETAILS.
- SEE SHEET 9 OF THIS SERIES FOR MEDIAN BARRIER TYPE FOUNDATION DETAILS WHEN EXISTING UTILITY IS PRESENT.

#### END SUPPORT DETAILS

SHEET 5 OF 13

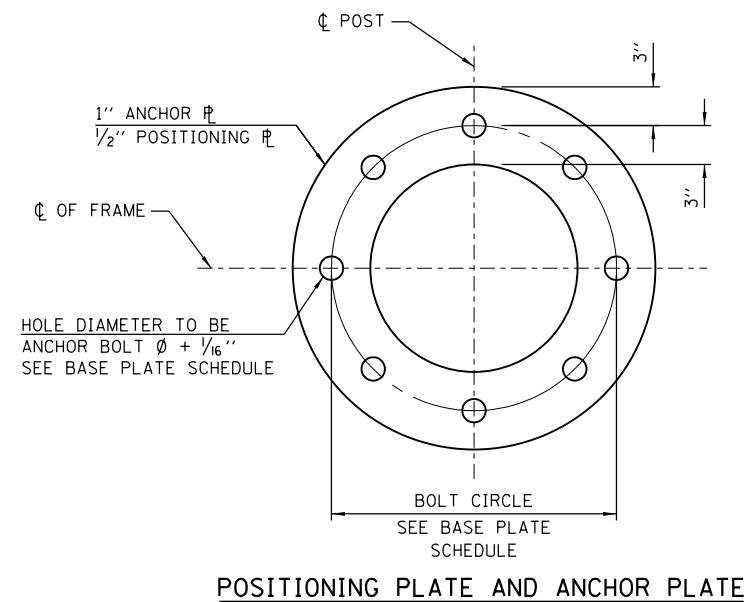
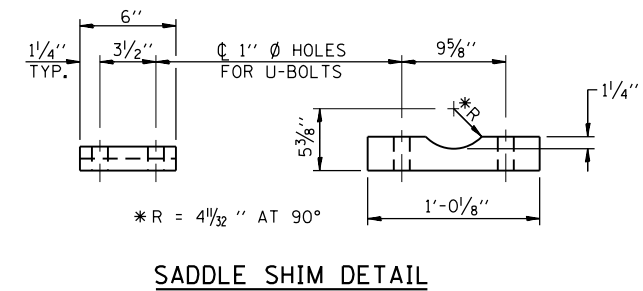
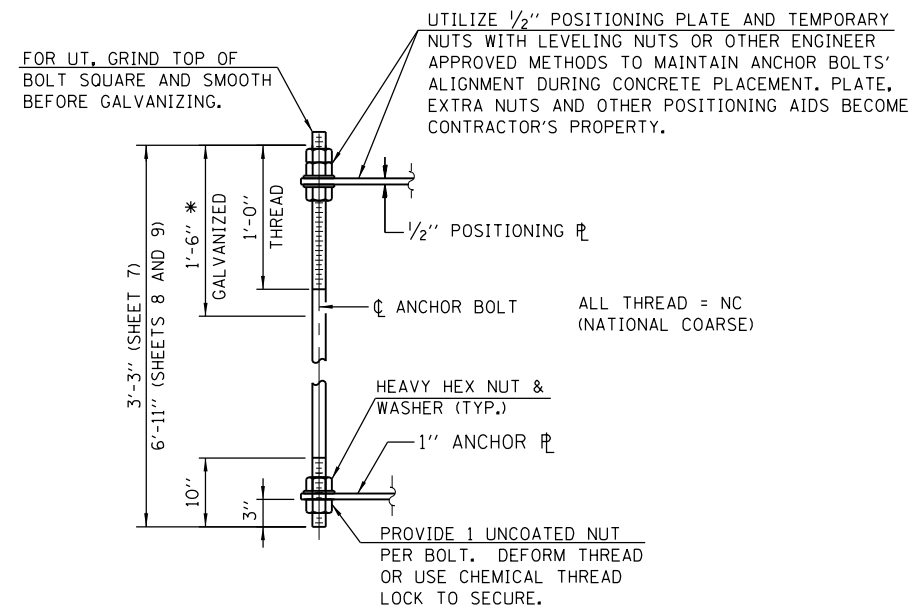
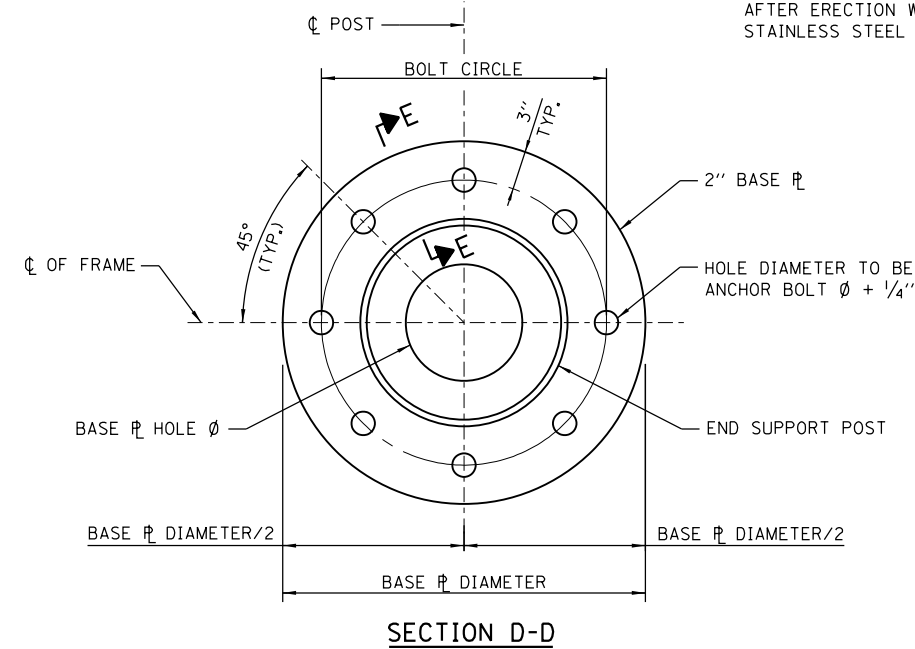
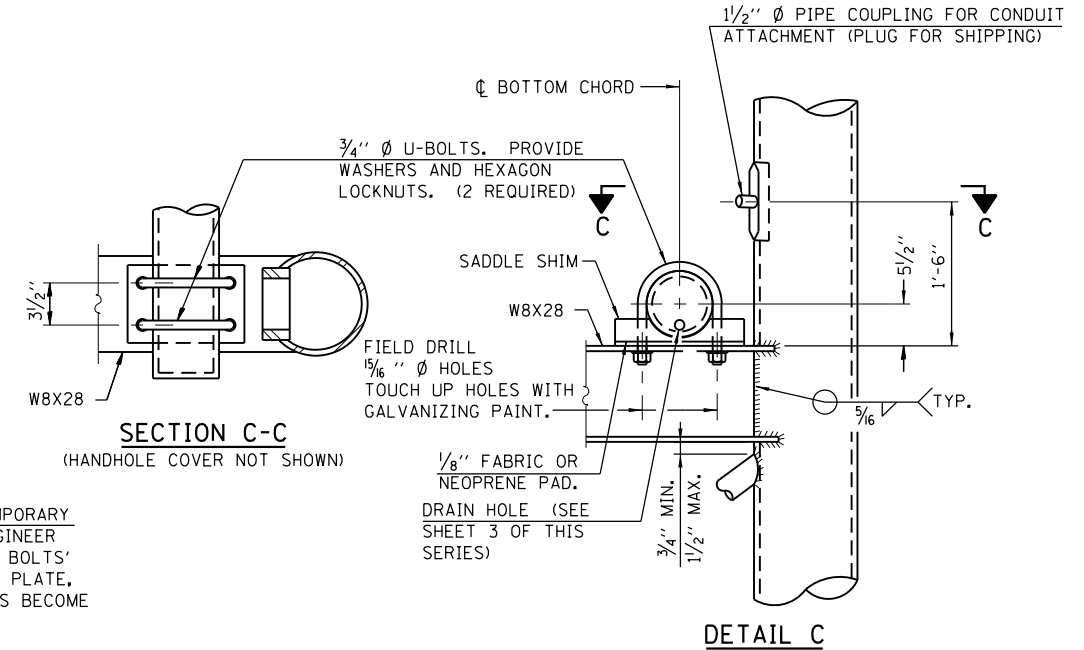
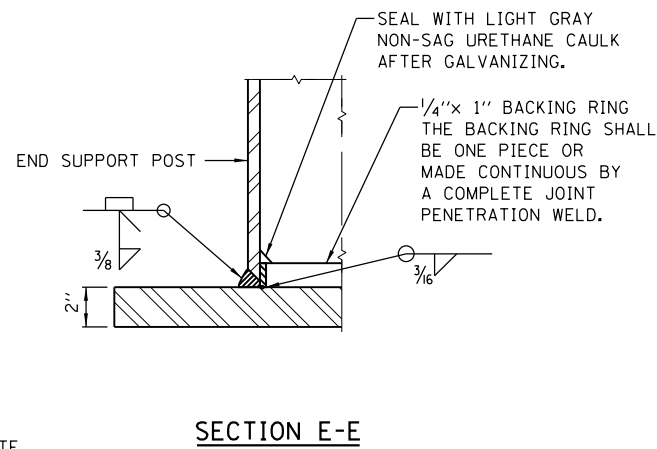
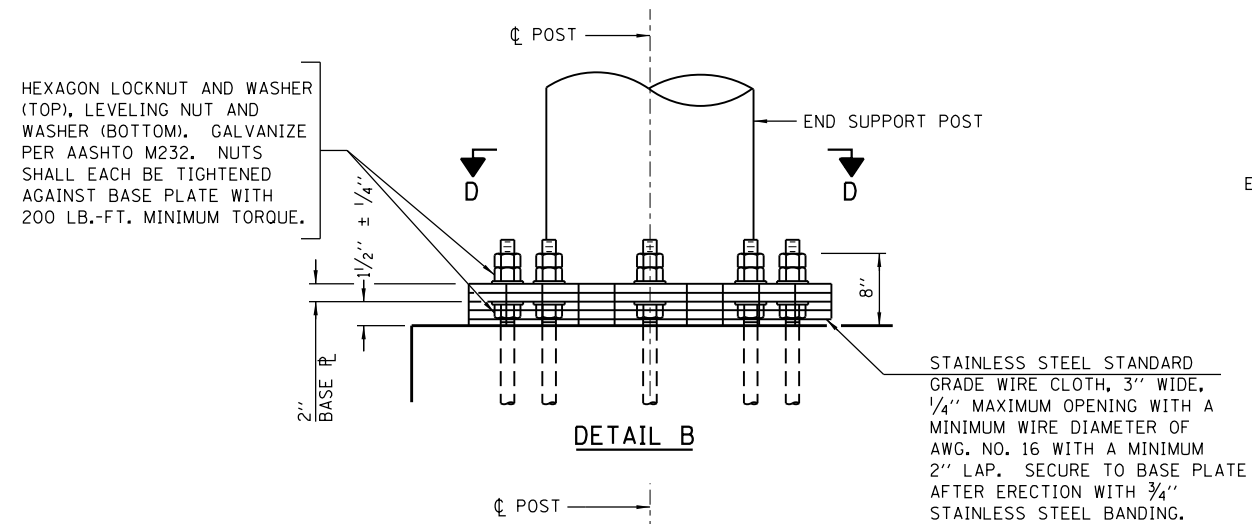


OVERHEAD SIGN STRUCTURE  
SPAN TYPE (STEEL)  
STRUCTURE DETAILS

STANDARD F17-09

APPROVED BY: *Mamun Nasir*  
CHIEF ENGINEERING OFFICER

DATE: 03/01/2024



#### BASE PLATE SCHEDULE

DESIGN TRUSS TYPE	END SUPPORT POST OUTSIDE DIAMETER	BASE PLATE		BOLT CIRCLE	ANCHOR BOLT DIA.
		DIAMETER	HOLE Ø		
120-S	1'-0 3/4"	2'-0 3/4"	6.75"	1'-6 3/4"	1 1/2"
130-S	14"	2'-2"	8"	1'-8"	1 1/2"
140-S	14"	2'-2"	8"	1'-8"	1 1/2"
150-S	16"	2'-4"	8"	1'-10"	1 1/2"
160-S	16"	2'-4"	8"	1'-10"	1 3/4"

SHEET 6 OF 13



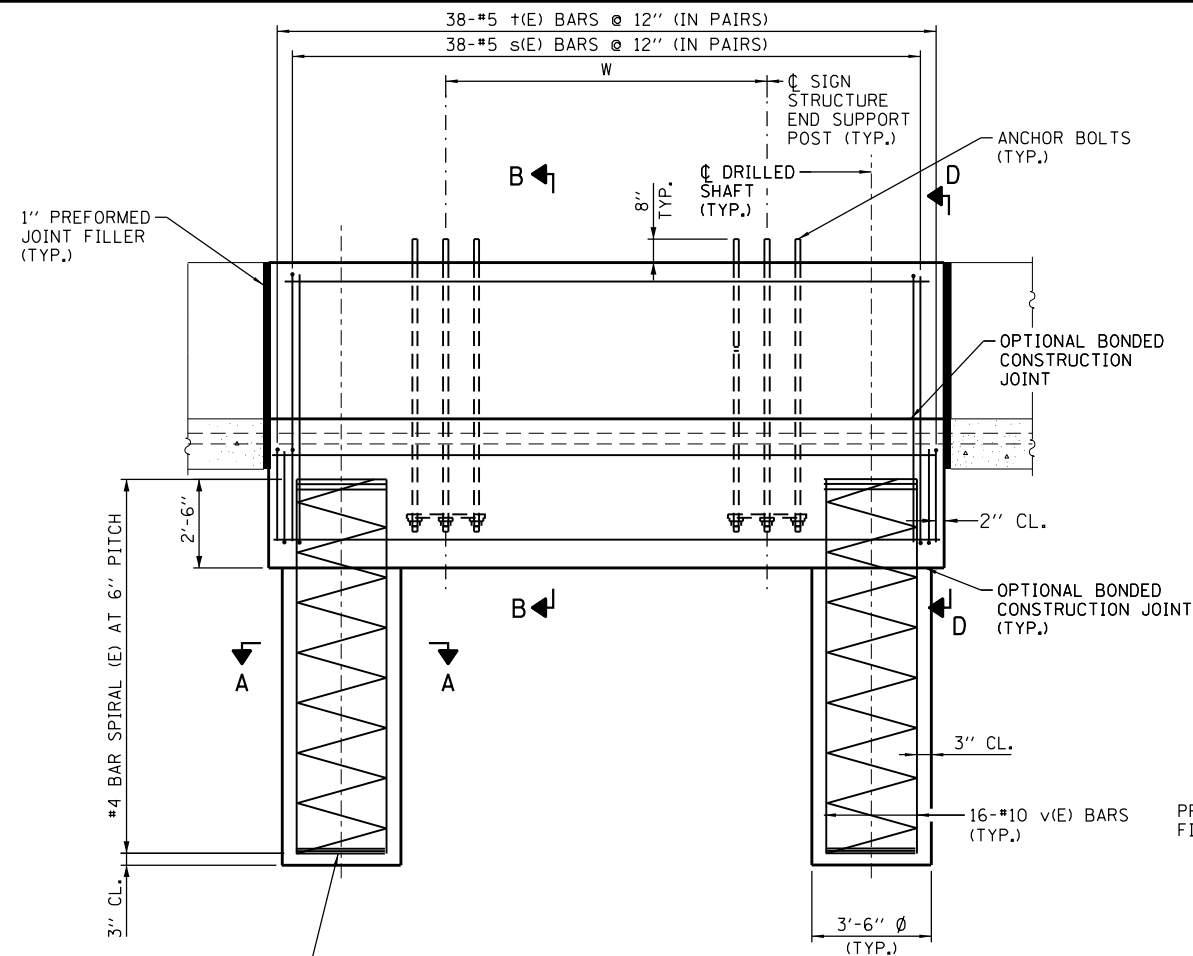
OVERHEAD SIGN STRUCTURE  
SPAN TYPE (STEEL)  
STRUCTURE DETAILS

STANDARD F17-09

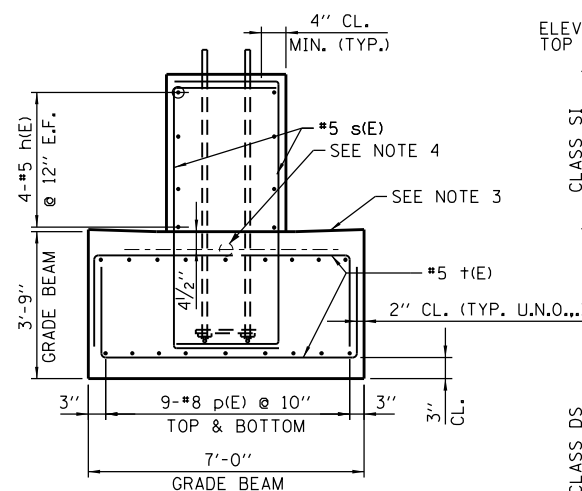
APPROVED BY: *Mamun Nasir*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024



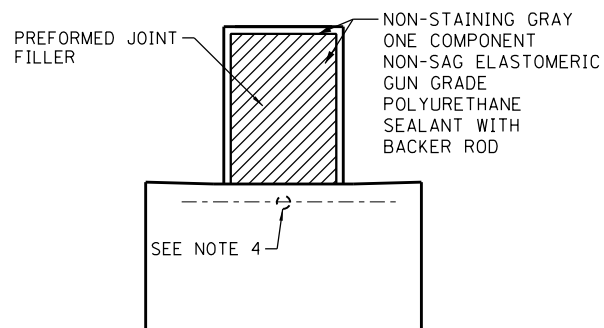




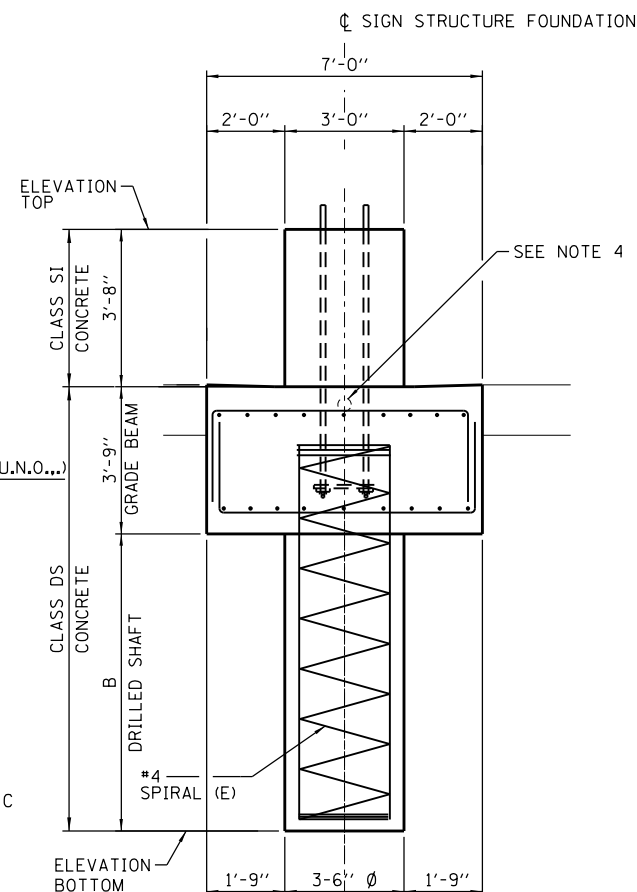
**SIDE ELEVATION \***



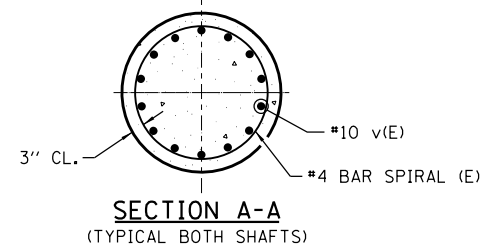
**SECTION B-B**



**SECTION D-D**



**END VIEW**

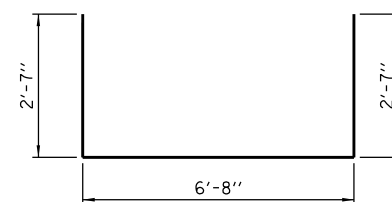


**SECTION A-A  
(TYPICAL BOTH SHAFTS)**

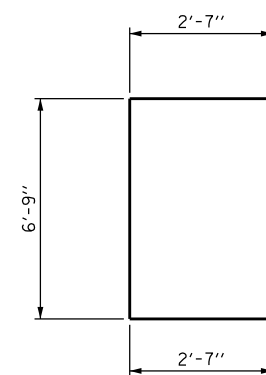
**BAR LIST - EACH FOUNDATION**

BAR	NUMBER	SIZE	LENGTH	SHAPE
h(E)	8	#5	17'-8"	
p(E)	18	#8	17'-8"	
s(E)	38	#5	11'-3"	C
t(E)	38	#5	11'-10"	U
v(E)	32	#10	B ADD 2'-3"	

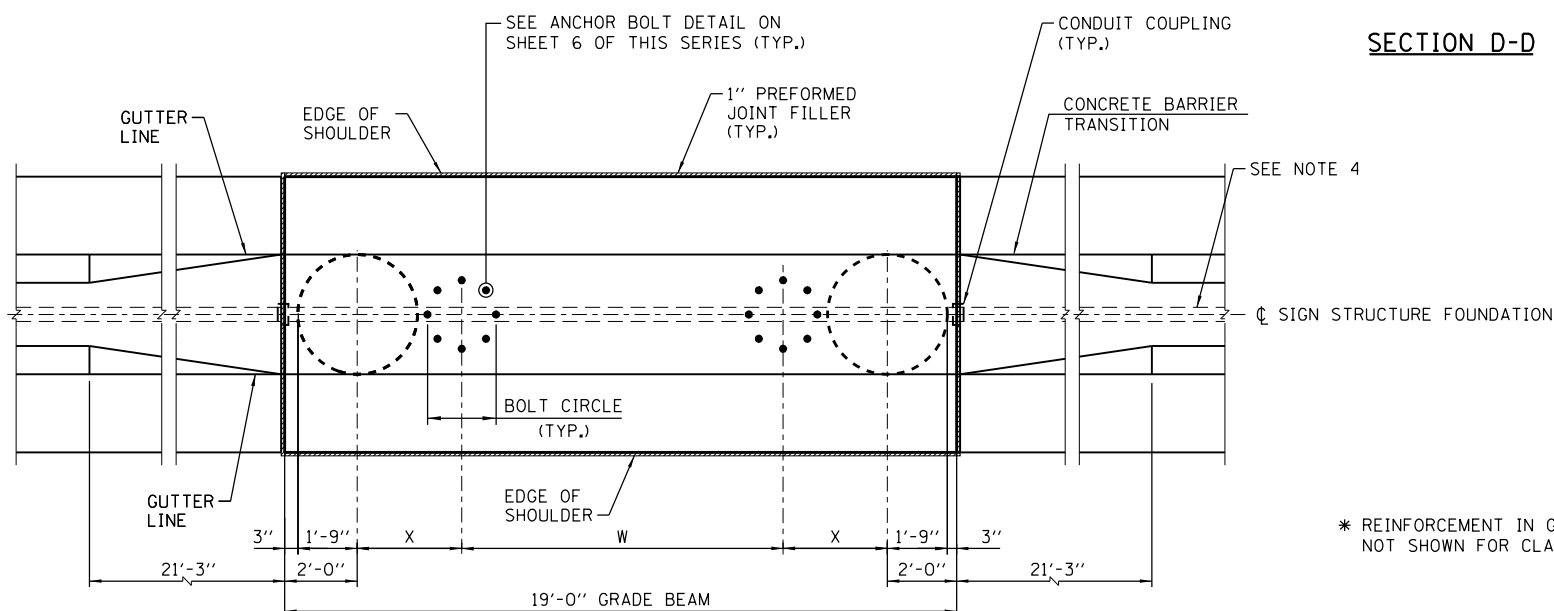
\*4 BAR SPIRAL (E) - SEE SIDE ELEVATION



**BAR t(E)**



**BAR s(E)**



**PLAN \***

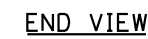
**MEDIAN BARRIER FOUNDATION SCHEDULE**

DESIGN TRUSS TYPE	W	X	B	CLASS SI CONCRETE (CU YD)	CLASS DS CONCRETE (CU YD)	REINFORCEMENT BARS (POUNDS)	PROTECTIVE COAT (SQ YD)
120-S	7'-4"	3'-10"	55'-0"	7.7	57.7	11320	30.3
130-S	7'-4"	3'-10"	55'-0"	7.7	57.7	11320	30.3
140-S	7'-4"	3'-10"	60'-0"	7.7	61.2	12130	30.3
150-S	7'-4"	3'-10"	65'-0"	7.7	64.8	12950	30.3
160-S	7'-4"	3'-10"	65'-0"	7.7	64.8	12950	30.3

**NOTES:**

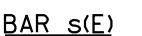
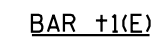
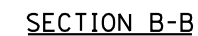
- SEE SHEET 7 OF THIS SERIES FOR FOUNDATION NOTES AND DESIGN CRITERIA.
- FOR SIGN STRUCTURE BASE PLATE DETAIL, SEE SHEET 6 OF THIS SERIES.
- REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C5 FOR GUTTER SLOPE.
- COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT BARS. DO NOT CUT REINFORCEMENT BARS.
- PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF BARRIER AND TOP FACE OF GUTTER.



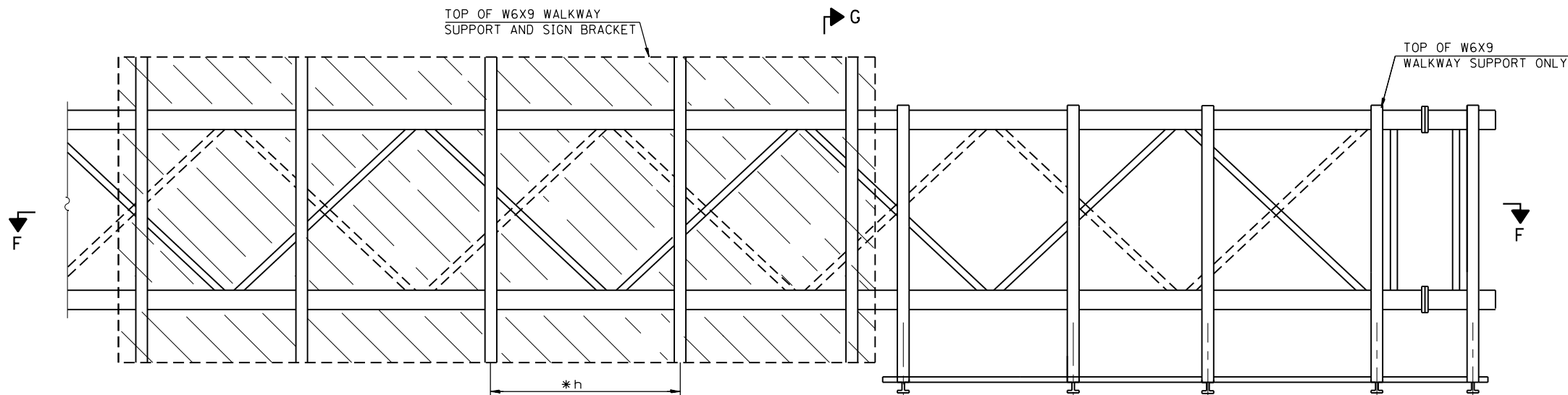


BAR	NUMBER	SIZE	LENGTH	SHAPE
h(E)	16	#5	13'-8"	_____
p(E)	30	#8	13'-8"	_____
s(E)	30	#5	11'-3"	C _____
t(E)	15	#5	6'-8"	_____
†(E)	76	#8	12'-7"	L _____
v(E)	48	#9	B ADD 2'-3"	_____
*4 BAR SPIRAL (E) - SEE SIDE ELEVATION				

DESIGN TRUSS TYPE	W	X	B	CLASS SI CONCRETE (CU YD)	CLASS DS CONCRETE (CU YD)	REINFORCEMENT BARS (POUNDS)	PROTECTIVE COAT (SQ YD)
120-S	7'-4"	1'-7"	40'-0"	8.5	59.0	13130	22.3
130-S	7'-4"	1'-7"	40'-0"	8.5	59.0	13130	22.3
140-S	7'-4"	1'-7"	45'-0"	8.5	64.2	14160	22.3
150-S	7'-4"	1'-7"	50'-0"	8.5	69.5	15190	22.3
160-S	7'-4"	1'-7"	50'-0"	8.5	69.5	15190	22.3



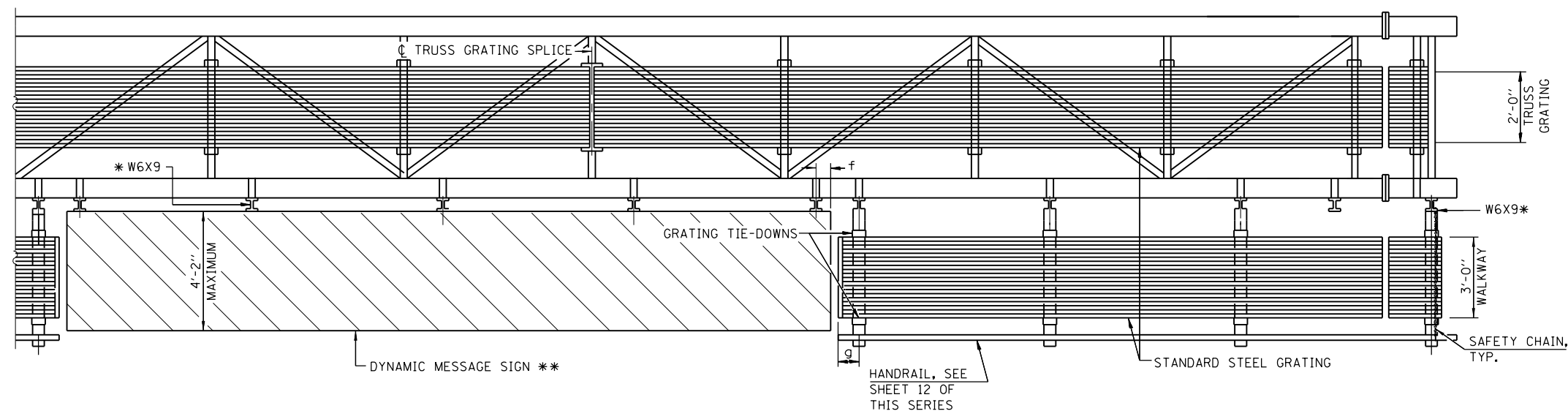
1. SEE SHEET 7 FOR FOUNDATION NOTES AND DESIGN CRITERIA.
2. FOR SIGN STRUCTURE BASE PLATE DETAIL, SEE SHEET 6 OF THIS SERIES.
3. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C5 FOR GUTTER SLOPE.
4. COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT BARS. DO NOT CUT REINFORCEMENT BARS.
5. PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF BARRIER AND TOP FACE OF GUTTER.



WALKWAY AND TRUSS GRATING WIDTH DIMENSIONS ARE NOMINAL AND MAY VARY  $\pm 1/2$ " BASED ON AVAILABLE STANDARD WIDTHS.

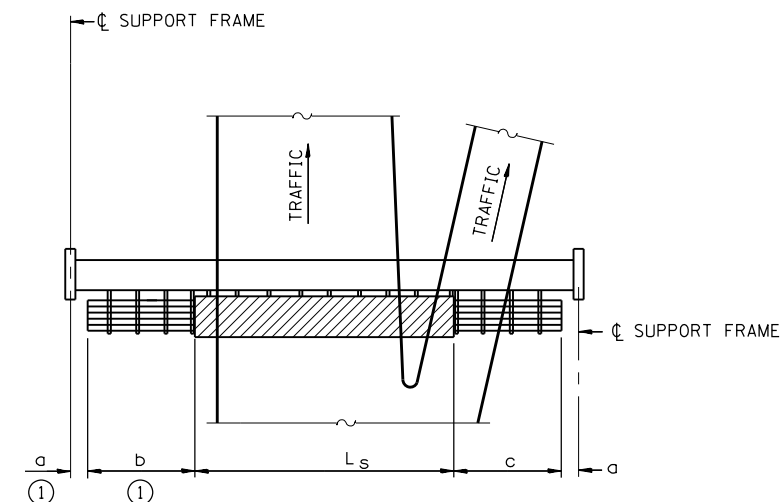
**TYPICAL FRONT ELEVATION**  
WITH HANDRAIL OMITTED FOR CLARITY.

BRACKET AND GRATING DIMENSIONS ARE NOMINAL AND WILL VARY BASED ON ACTUAL DMS DIMENSIONS PLUS MANUFACTURER'S MOUNTING DEVICES.



**SECTION F-F**

HANDRAIL AND WALKWAY SHALL SPAN A MINIMUM OF THREE BRACKETS BETWEEN SPLICES AND/OR GAP JOINTS. PLACE ALL SIGN AND WALKWAY BRACKETS AS CLOSE TO PANEL POINTS AS PRACTICAL. GRATING AND HANDRAIL SPLICES PLACED AS NEEDED.



**PLAN**  
**WALKWAY AND HANDRAIL SKETCH**  
(ROAD PLAN BENEATH TRUSS VARIES)

**BRACKET TABLE**

W6X9		
SIGN WIDTH		NUMBER BRACKETS REQUIRED
GREATER THAN	LESS THAN OR EQUAL TO	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

**NOTES:**

\* SPACE W6X9 WALKWAY BRACKETS AND SIGN BRACKETS FOR EFFICIENCY AND WITHIN LIMITS SHOWN:

f = 12" MAXIMUM, 4" MINIMUM (END OF SIGN TO CL OF NEAREST BRACKET)

g = 12" MAXIMUM, 4" MINIMUM (END OF WALKWAY GRATING TO CL OF NEAREST SUPPORT BRACKET)

h = 6'-0" MAXIMUM (CL TO CL SIGN AND/OR WALKWAY SUPPORT BRACKETS, W6X9)

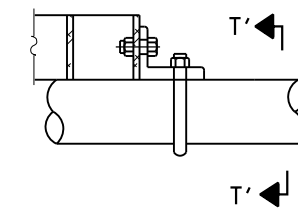
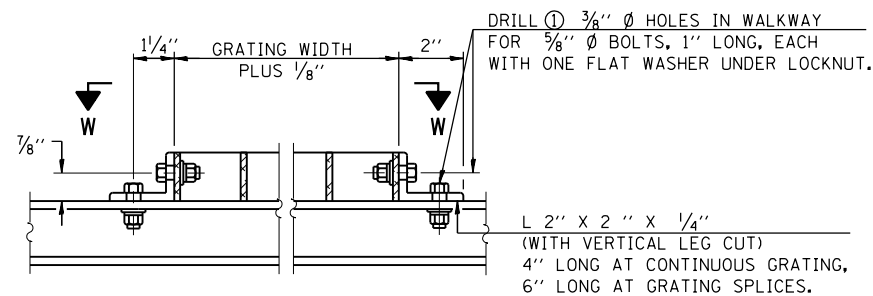
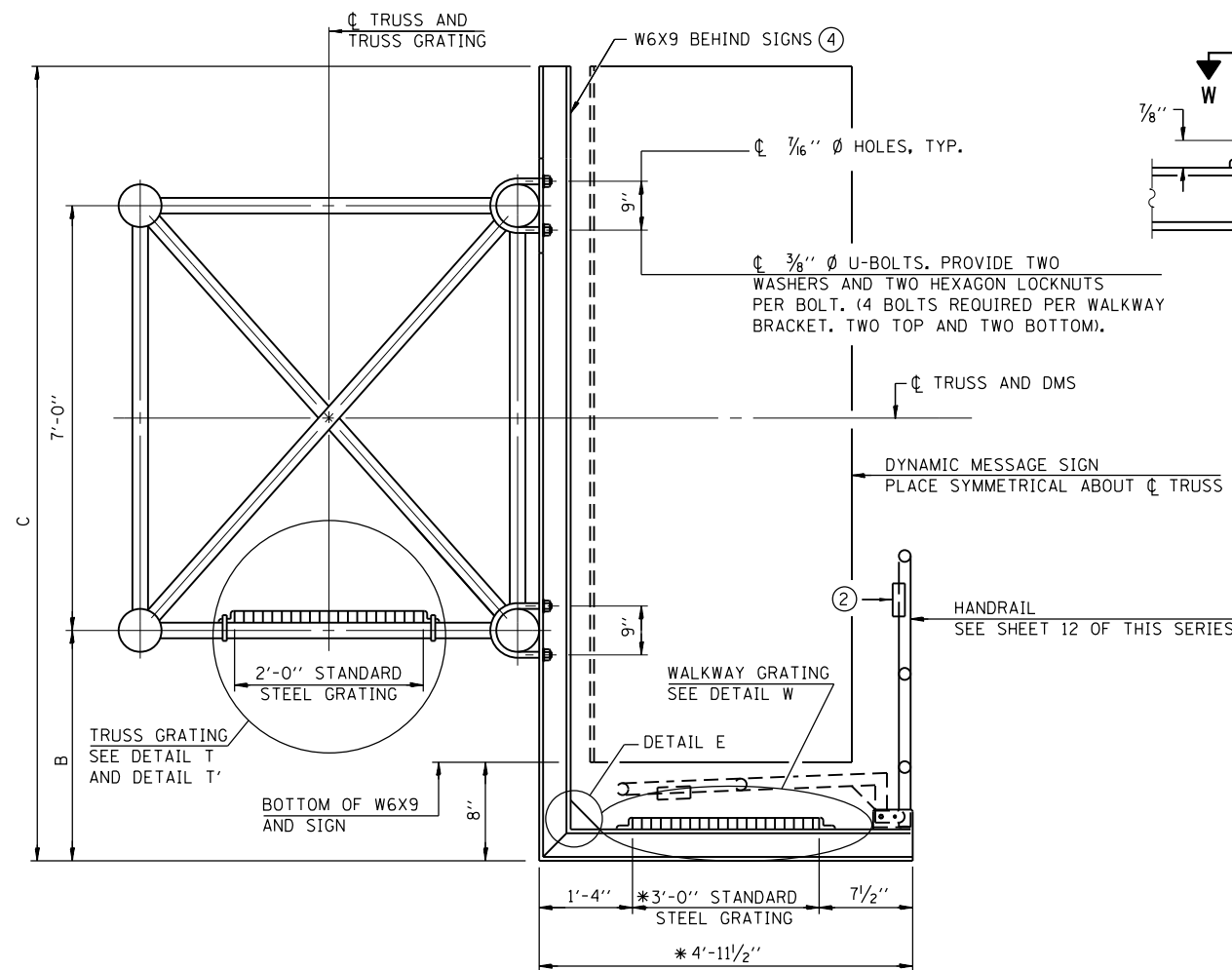
\*\* MAXIMUM DMS WEIGHT = 5000 LBS. 4'-2" MAXIMUM THICKNESS INCLUDES THICKNESS OF DMS TYPE 1 PLUS CONNECTION TO W6X9.

FOR SECTION G-G AND GRATING SPLICE DETAILS, SEE SHEET 11 OF THIS SERIES. FOR HANDRAIL SPLICE DETAILS, SEE SHEET 12 OF THIS SERIES.

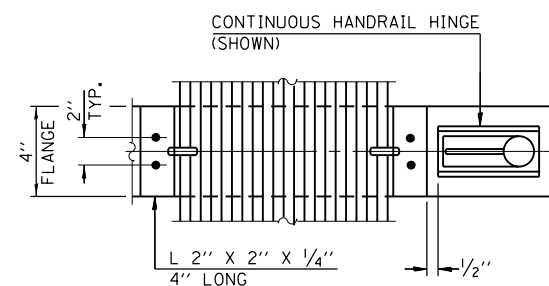
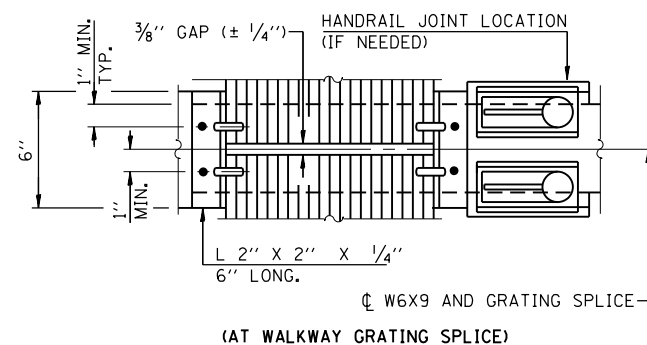
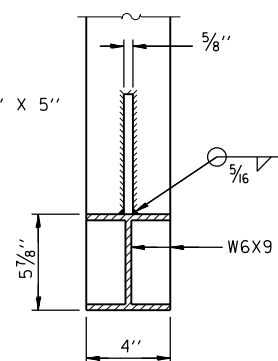
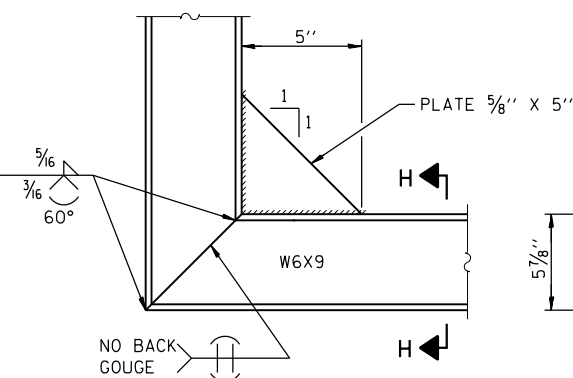
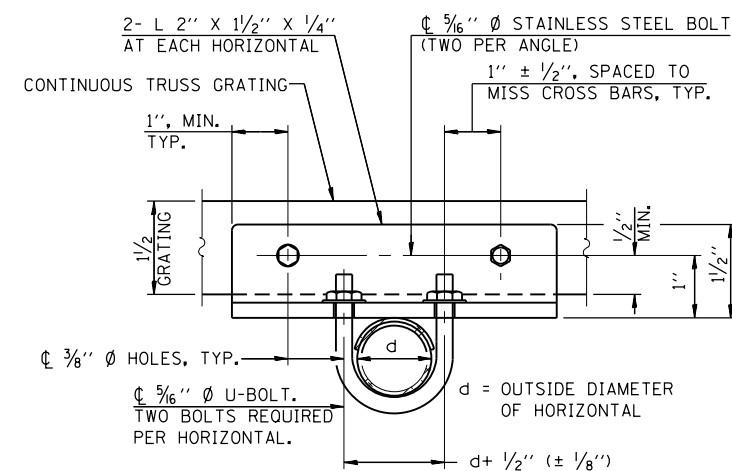
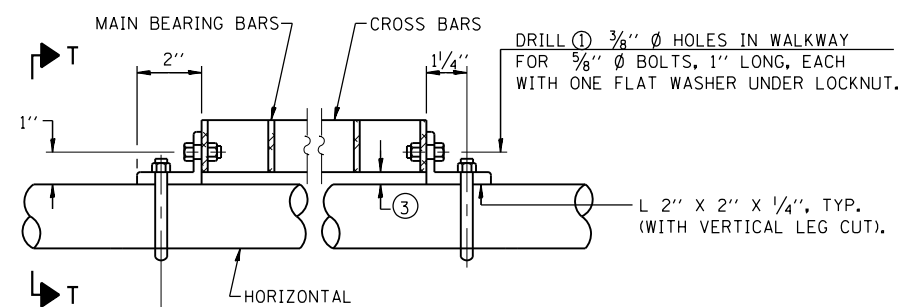
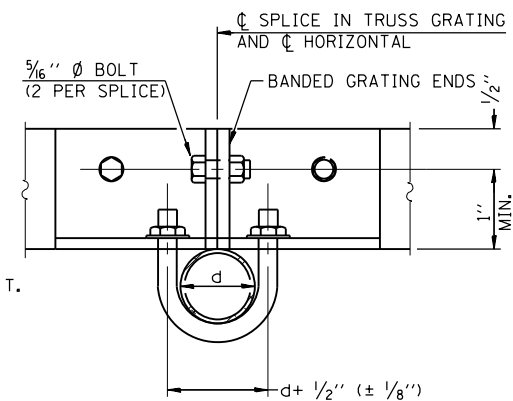
TRUSS GRATING TO FACILITATE INSPECTION SHALL RUN FULL LENGTH (CENTER TO CENTER OF SUPPORT FRAMES)  $\pm 12$ " ON OVERHEAD TRUSSES.

- ① IF WALKWAY IS REQUIRED LEFT OF THE DMS, a = 1'-6" AND b = WALKWAY LENGTHS. IF WALKWAY IS NOT REQUIRED LEFT OF THE DMS, b = 0 AND "a" IS DIMENSION FROM LEFT SUPPORT FRAME TO LEFT END OF DMS.





DETAIL T'  
(TRUSS GRATING SPLICE)  
DETAILS NOT SHOWN SAME AS DETAIL T.  
ALTERNATE MATERIALS MAY BE USED  
SUBJECT TO THE ENGINEER'S REVIEW  
AND APPROVAL.



### NOTES:

- DRILLING HOLES IN GRATING MAY BE DONE IN SHOP OR FIELD, BASED ON CONTRACTOR'S PREFERENCE AND SUBJECT TO ACCURATE ALIGNMENT.
- 1/8" X 1/2" X 2" WELDED TO HANDRAIL POSTS TO PROTECT LOCATIONS THAT CONTACT GRATING.
- PIPE TO GRATING GAP MAY VARY FROM 0 TO 1/2", MAX. TO ALIGN WALKWAY, ALLOW FOR CAMBER, ETC.
- DMS MANUFACTURER SHALL DESIGN AND SUPPLY HARDWARE FOR CONNECTION OF DMS TO W6X9. BOLTS SHALL BE STAINLESS STEEL OR HOT DIP GALVANIZED HIGH STRENGTH PER ILLINOIS TOLLWAY SPECIFICATIONS.

\* BRACKET AND GRATING DIMENSIONS ARE NOMINAL AND WILL VARY BASED ON ACTUAL DMS DIMENSIONS PLUS MANUFACTURER'S MOUNTING DEVICES.

### BARS SIZES FOR STANDARD STEEL GRATING

TRUSS GRATING: MAIN BEARING BARS 3/16" X 1 1/2" ON 1 3/16" CENTERS.  
CROSS BARS 3/16" X 1 1/2" ON 4" CENTERS.

WALKWAY GRATING: MAIN BEARING BARS 3/16" X 1 1/2" ON 1 3/16" CENTERS.  
CROSS BARS 3/16" X 1 1/2" ON 4" CENTERS.

APPROVED BY:

*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:

03/01/2024

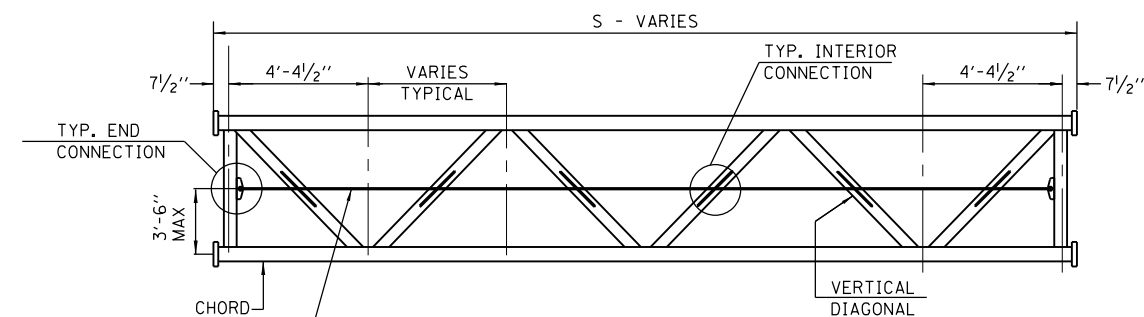
SHEET 11 OF 13



OVERHEAD SIGN STRUCTURE  
SPAN TYPE (STEEL)  
STRUCTURE DETAILS

STANDARD F17-09

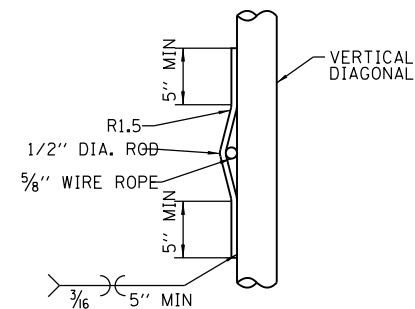




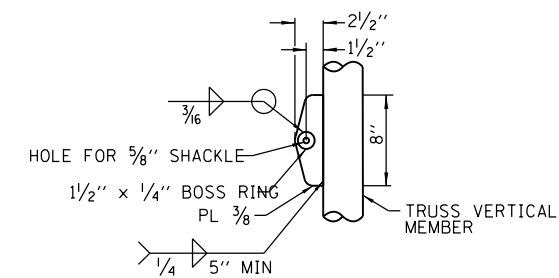
5/8" GALV. WIRE ROPE, THIMBLE, TURN ROPE BACK 12" AND SECURE WITH MIN (3) WIRE ROPE CLIPS. PROVIDE 1 BOLT TYPE ANCHOR SHACKLE PER SIDE WITH MIN 3-TON CAPACITY FOR ATTACHMENT TO BRACKET PLATE

**TRUSS TYPICAL  
INTERIOR ELEVATION**

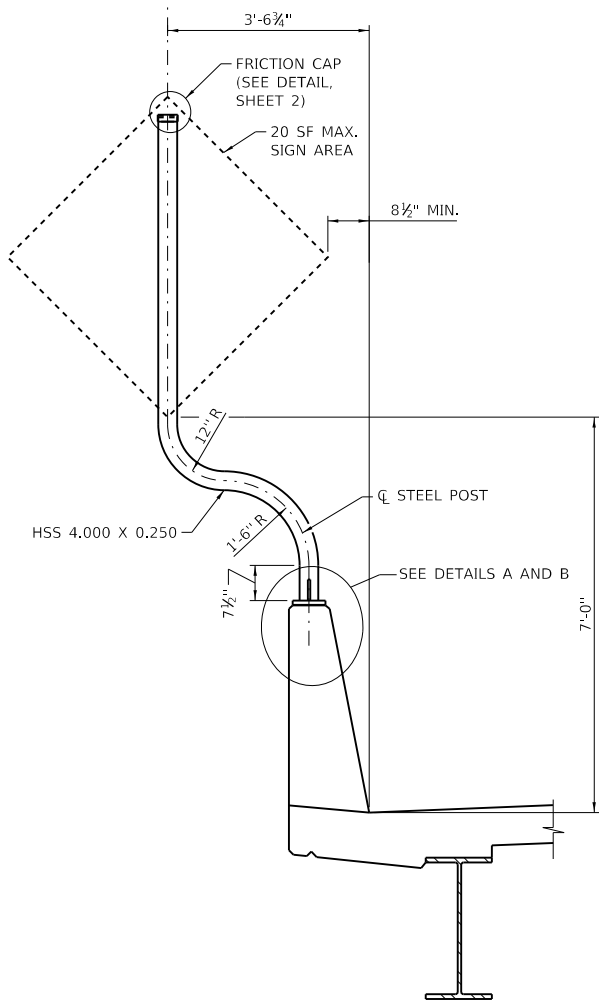
EVEN OR ODD NUMBER OF PANELS/EXTERIOR UNITS ALLOWED.



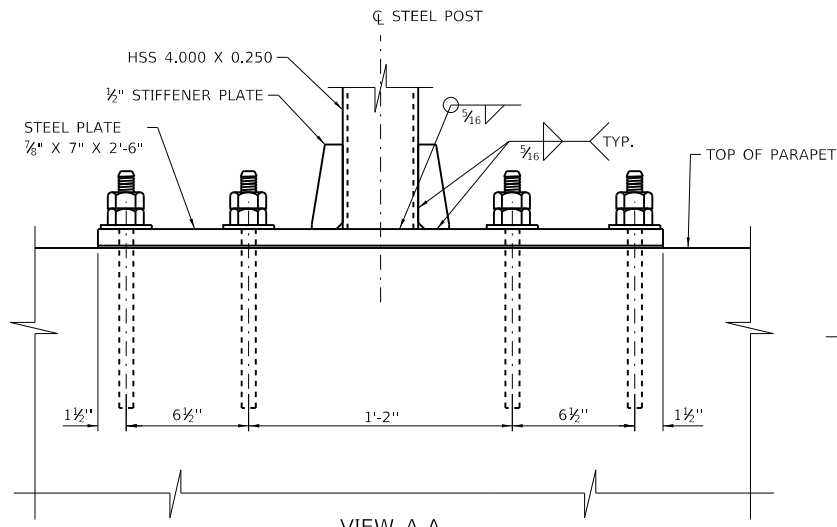
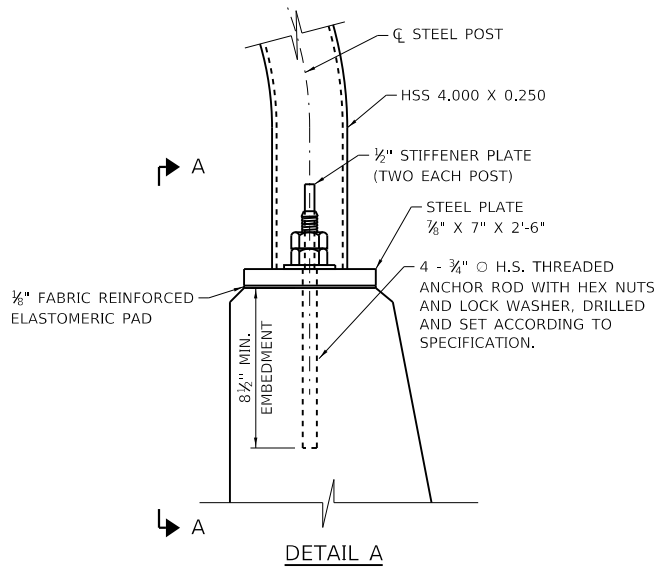
**TYP INTERIOR  
CONNECTION**



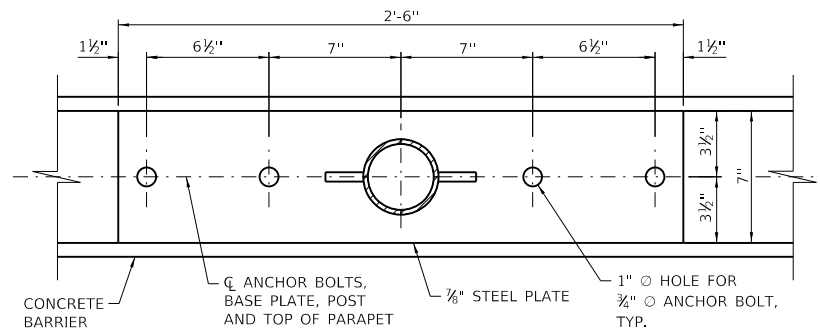
**TYP END  
CONNECTION**



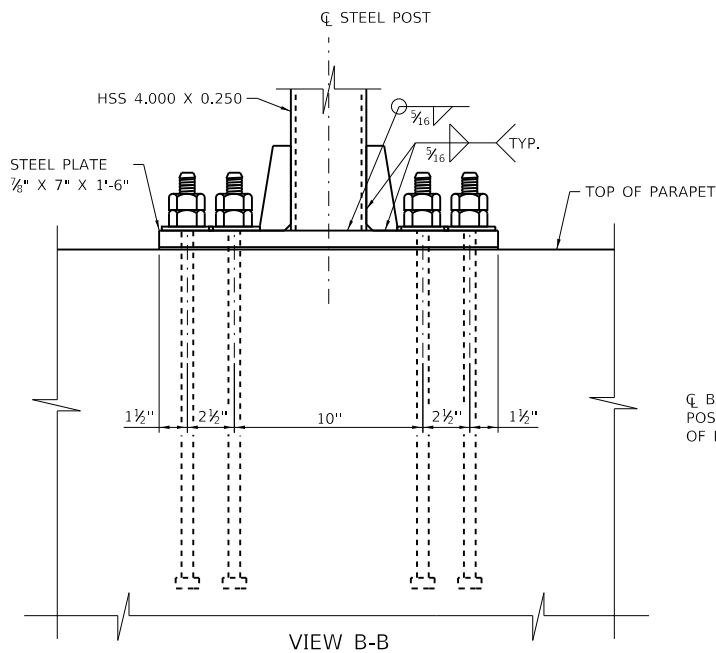
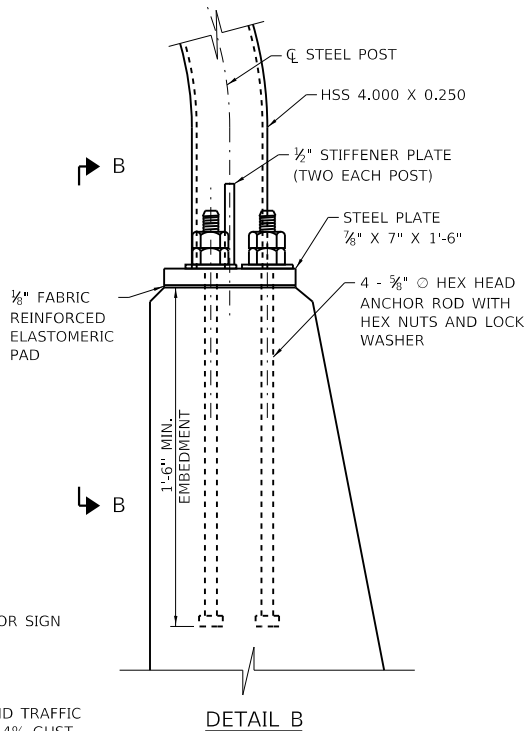
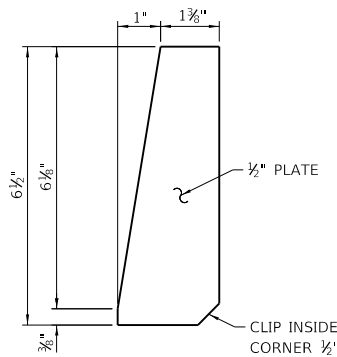
PARAPET MOUNTED SIGN  
(MAXIMUM SIGN AREA 20 SF)



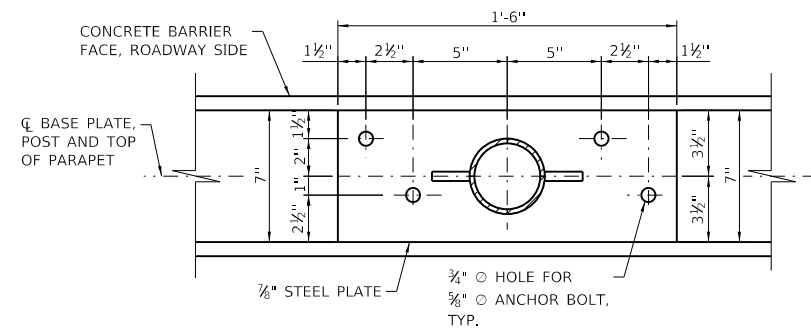
POST INSTALLED DETAIL  
(MAXIMUM SIGN AREA 20 SF)



BASE PLATE DETAIL  
(FOR POST INSTALLED CONDITION)



CAST-IN-PLACE DETAIL  
(MAXIMUM SIGN AREA 20 SF)



BASE PLATE DETAIL  
(CAST-IN-PLACE INSTALLATION)

NOTES:

- FOR MATERIAL, FABRICATION, ERECTION, AND OTHER REQUIREMENTS, REFER TO ILLINOIS TOLLWAY "STRUCTURAL SUPPORT FOR SIGN PANELS" SPECIAL PROVISION.
- THESE DETAILS ARE NOT INTENDED FOR PORTABLE AND/OR PRECAST BARRIER.
- DESIGN CONFORMS TO THE 2015 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS WITH 2017 INTERIM SPECIFICATIONS THERETO. DESIGN WIND SPEEDS OF 3-5 GUST WITH SPEED OF 120 MPH PLUS 14% GUST FACTOR, AND A WIND IMPORTANCE FACTOR OF 1.0 (50 YEAR MEAN RECURRENCE INTERVAL) FOR THE SUPPORTING STRUCTURES.
- THE PARAPET WALL SHALL BE DESIGNED TO SAFELY SUPPORT THE PROPOSED SIGN PANELS IN ACCORDANCE WITH NOTE 3.
- WELDED PLATES MAY BE USED IN LIEU OF THE BENT PLATE OF MOUNTING PLATE SHOWN. ALL STEEL ELEMENTS SHALL BE GALVANIZED AFTER FABRICATION.
- EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURES MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. THE CONTRACTOR SHALL LOCATE THE POSITION OF THE REINFORCING BARS AT THE LOCATIONS OF THE CONCRETE ANCHORS. DRILLED HOLES FOR ANCHOR RODS SHALL BE CAREFULLY PLACED TO AVOID INTERFERENCE WITH EXISTING REINFORCEMENT.
- NO ANCHOR BOLT SHALL BE PLACED CLOSER THAN 12" FROM PARAPET WALL EXPANSION JOINT.
- TWO STIFFENER PLATES (ONE ON EACH SIDE OF POST) SHALL BE WELDED AS SHOWN ON PLANS IN DIRECTION PERPENDICULAR TO SIGN.
- INSTALLATION SHALL BE DONE IN ACCORDANCE WITH ILLINOIS TOLLWAY SPECIAL PROVISION "SIGN INSTALLATION".
- THIS STANDARD SHALL BE UTILIZED TO MOUNT SIGN SUPPORT ON SINGLE FACE PARAPETS CONSTRUCTED ON BRIDGES, WALLS AND MOMENT SLABS.

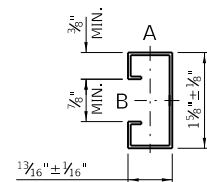
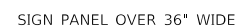
MATERIAL SPECIFICATIONS FOR  
STRUCTURAL STEEL AND FASTENERS

ELEMENTS OF STRUCTURE	MINIMUM YIELD STRENGTH (K.S.I.)	MINIMUM ULTIMATE STRENGTH (K.S.I.)
STRUCTURAL STEEL HSS	42	58
STEEL ANCHOR BOLTS	36	58

APPROVED BY:  DATE: 02/24/2020  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2022	REVISED CALLOUTS TO HSS



SHEET 2 OF 2

## PARAPET MOUNTED SIGN SUPPORT

STANDARD F18-01

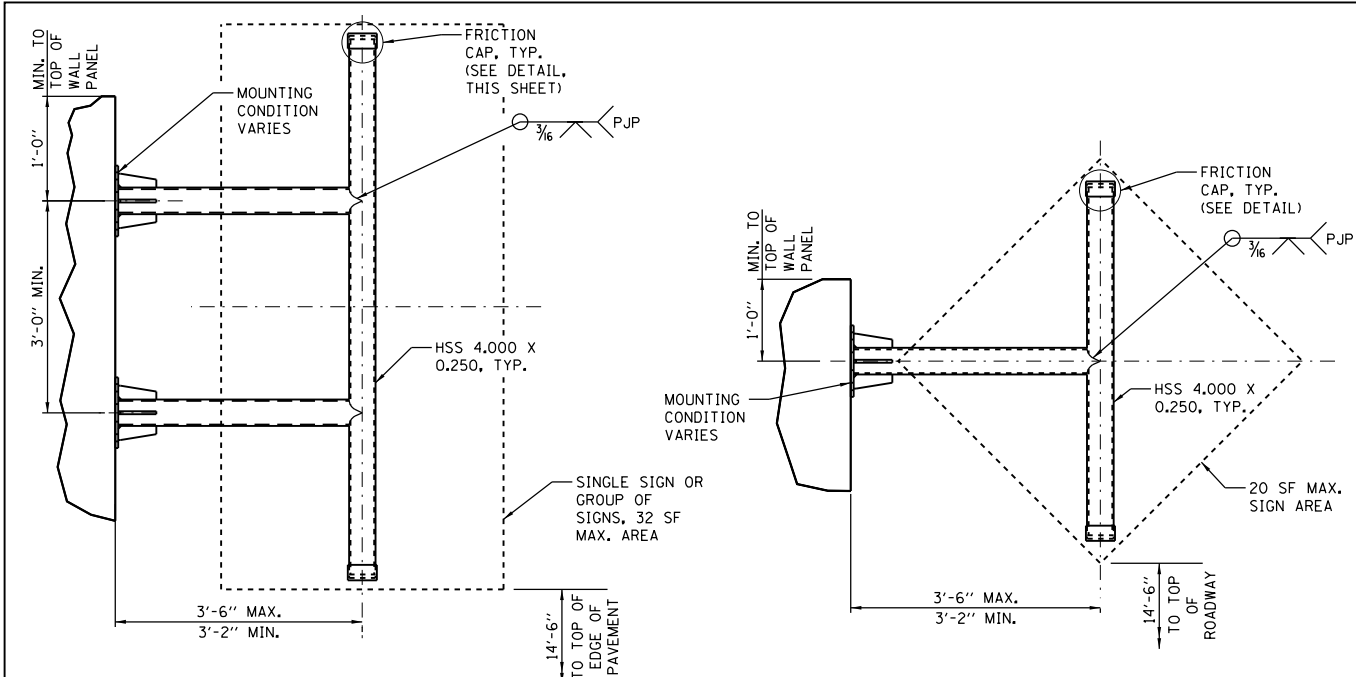
APPROVED BY:

DATE:

Paul Kovacs  
CHIEF ENGINEERING OFFICER

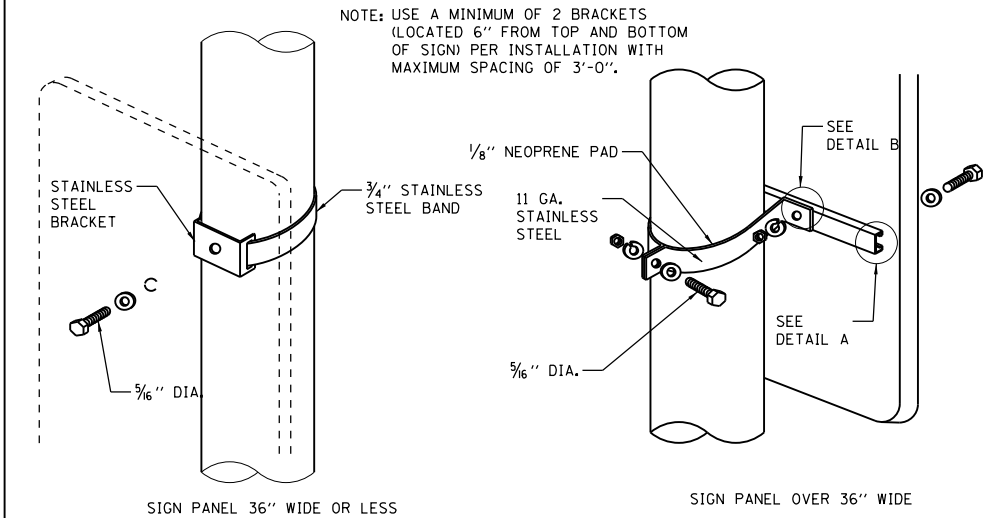
02/24/2020

## MOUNTING BRACKET DETAILS



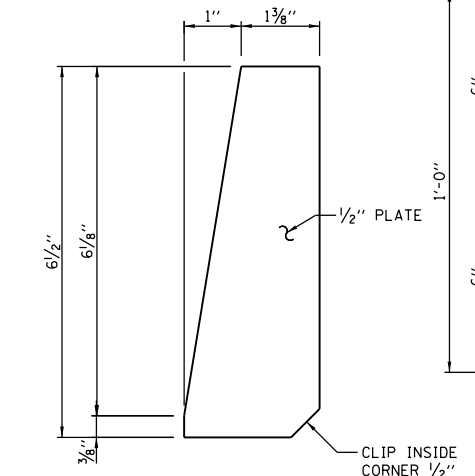
**SIGN PANEL MOUNT**  
(MAXIMUM SIGN AREA 32 SF)

**SIGN PANEL MOUNT**  
(MAXIMUM SIGN AREA 20 SF)

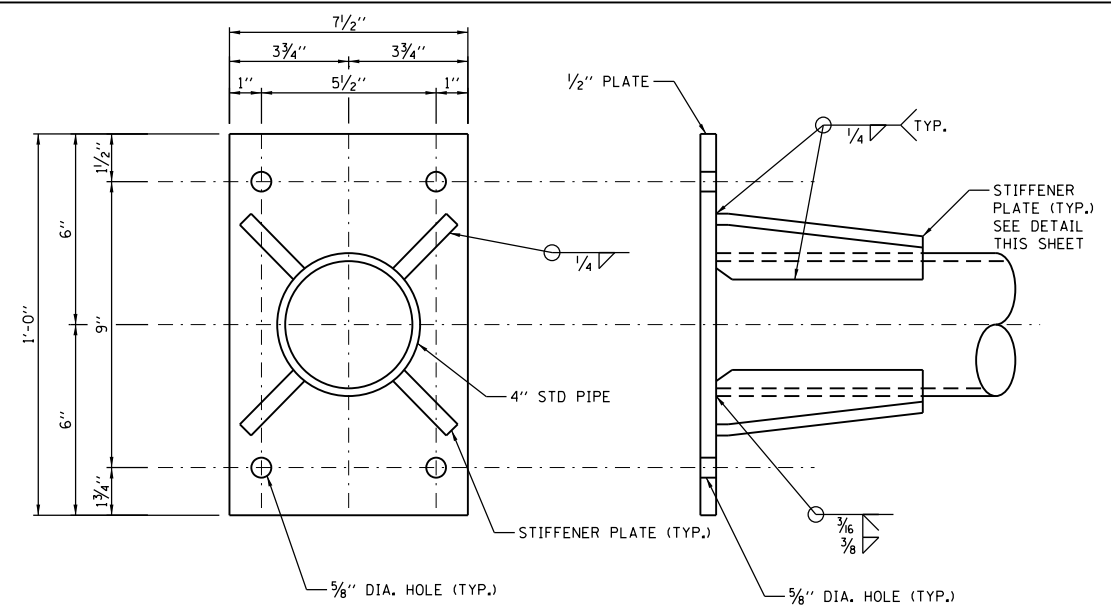


**MOUNTING BRACKET DETAIL**

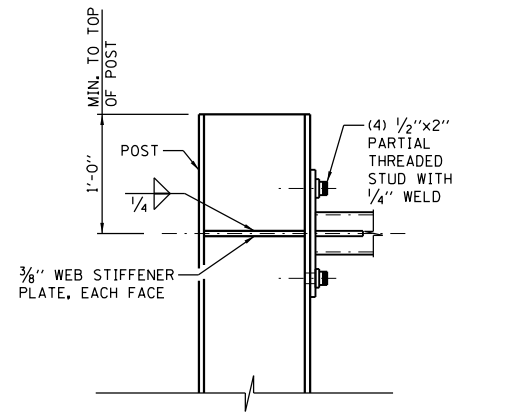
**MOUNTING BRACKET DETAIL**



**STIFFENER PLATE DETAIL**

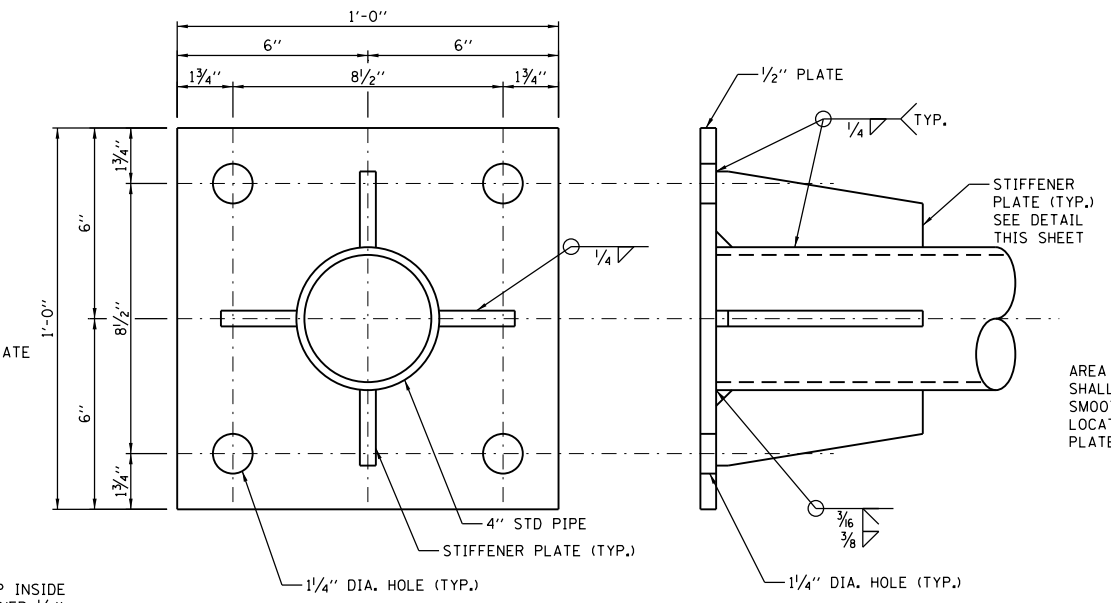


**BASE PLATE DETAILS (POST CONNECTION)**

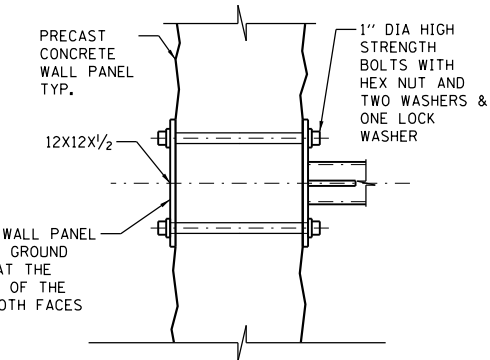


**CONNECTION TO POST**

(APPLIES WHERE CONNECTION TO WALL PANEL IS NOT FEASIBLE DUE TO 14'-6" CLEARANCE REQUIREMENT)

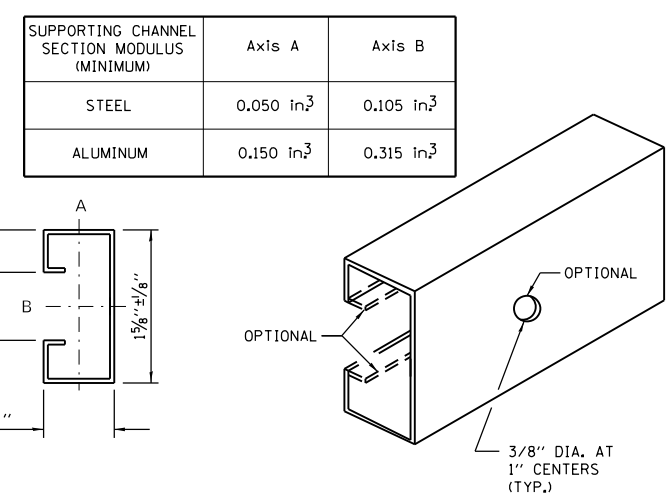


**BASE PLATE DETAILS (PANEL CONNECTION)**

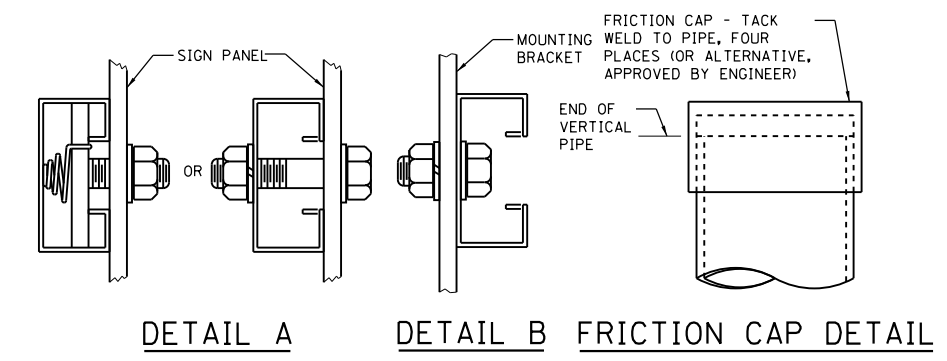


**CONNECTION TO PANEL**

- NOTES:**
- FOR MATERIAL, FABRICATION, ERECTION, AND OTHER REQUIREMENTS, REFER TO ILLINOIS TOLLWAY "STRUCTURAL SUPPORT FOR SIGN PANELS" SPECIAL PROVISION.
  - DESIGN CONFORMS TO THE 2015 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS WITH 2017 INTERIM SPECIFICATIONS THERETO. DESIGN WIND SPEEDS OF 3-5 GUST WITH SPEED OF 120 MPH PLUS 14% GUST FACTOR, AND A WIND IMPORTANCE FACTOR OF 1.0 (50 YEAR MEAN RECURRENCE INTERVAL) FOR THE SUPPORTING STRUCTURES.
  - ALL FABRICATION SHALL BE COMPLETE AND READY FOR ASSEMBLY BEFORE GALVANIZING. NO PUNCHING, DRILLING, CUTTING, NOR WELDING SHALL BE PERMITTED AFTER GALVANIZING.
  - THE WALL PANELS AND/OR POSTS SHALL BE DESIGNED TO SAFELY SUPPORT THE PROPOSED SIGN PANELS IN ACCORDANCE WITH NOTE 2.
  - FOR SIGN CONNECTION TO MOUNTING BRACKET, SHOP DRILL HOLES ON SIGN IN ACCORDANCE WITH THE CURRENT STANDARD HIGHWAY SIGN DESIGNS FOR ILLINOIS. ADDITIONAL HOLES) NEEDED TO MEET A STIPULATED TYPE MOUNTING MAY BE FIELD DRILLED.
  - ALL THREADED RODS SHALL CONFIRM TO ASTM F1554 GRADE 105, EACH WITH ONE PLATE WASHER AND LOCKNUT AND BE HOT DIP GALVANIZED PER ASTM A153 (AASHTO M232). THEY SHALL BE INSTALLED IN ACCORDANCE WITH SECTION 1211 OF ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS TO THE IDOT STANDARD SPECIFICATIONS.
  - PARTIAL THREADED STUDS SHALL BE TYPE A MILD STEEL, 61,000 PSI MINIMUM ULTIMATE AND 49,000 PSI MINIMUM YIELD STRENGTH.
  - A NYLON WASHER SHALL BE PLACED BETWEEN THE SIGN FACE AND ANY OTHER WASHER REQUIRED ON SIGNS CONSTRUCTED OF ASTM TYPE III OR IV SHEETING.
  - CONTRACTOR SHALL VERIFY APPLICABLE FIELD DIMENSIONS BEFORE FABRICATION. HOLES DRILLED THROUGH NOISE ABATEMENT WALL SHALL BE DRILLED WITH ROTARY (CORING OR MASONRY DRILL) TYPE EQUIPMENT. PERCUSSION (STAR) DRILLING SHALL NOT BE ALLOWED.
  - CENTER LINE OF BOLTS INTO NOISE ABATEMENT WALL SHALL BE AT LEAST 12" TO CENTER LINE OF OPEN JOINT IN WALL.



**SUPPORTING CHANNEL DETAILS**



**DETAIL A**

**DETAIL B**

**FRICION CAP DETAIL**

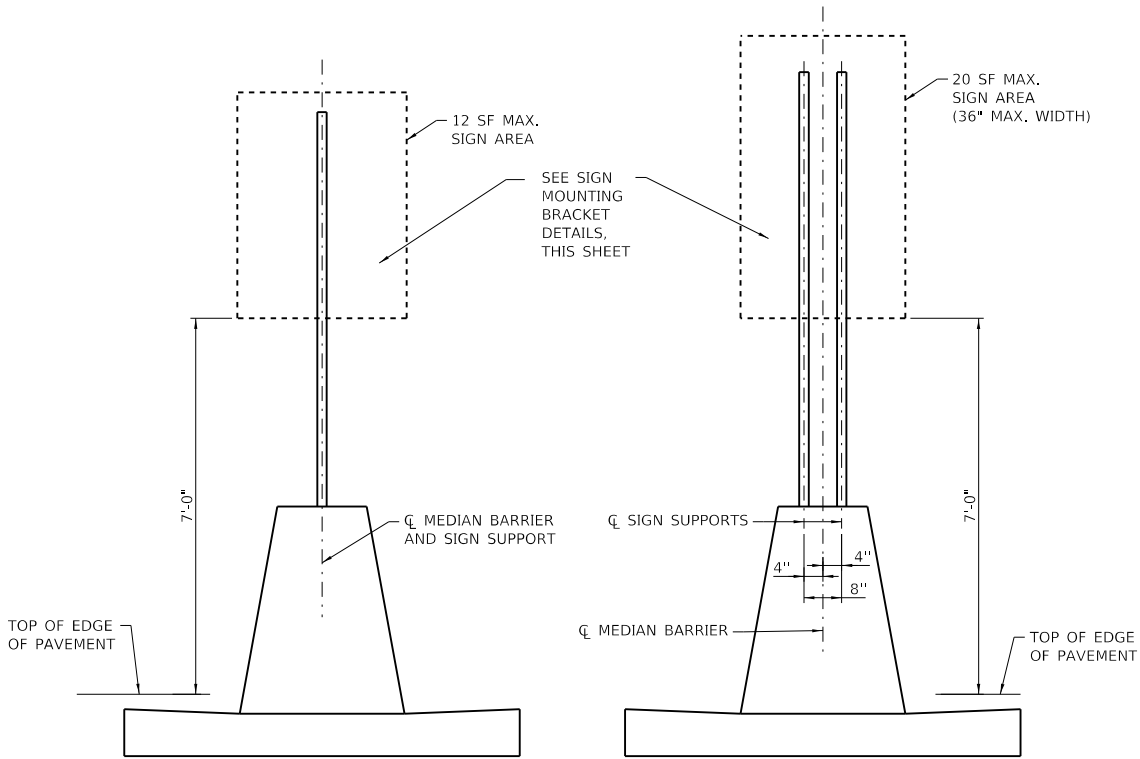
APPROVED BY: *Manar Nashif* DATE: 03/01/2023  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2023	SPECIFY LENGTH AND WELD SIZE FOR PARTIAL THREADED STUD
3-01-2021	ADD MATERIAL NOTE FOR PARTIAL THREADED STUDS.
7-17-2020	REVISE BASE PLATE DETAILS FOR POST AND PANEL CONNECTIONS.



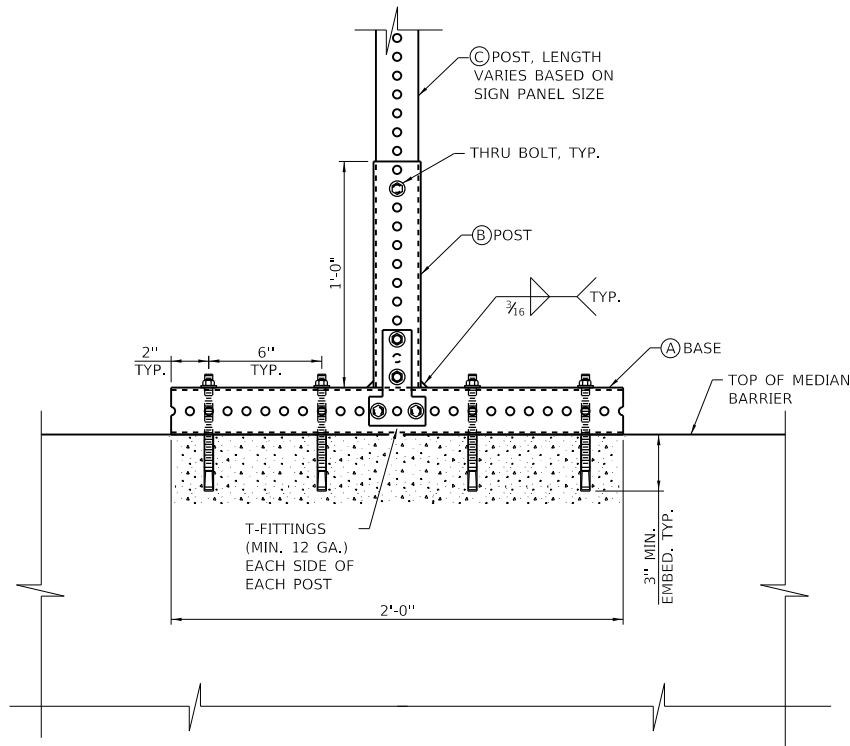
NOISE ABATEMENT WALL MOUNTED SIGN SUPPORT

STANDARD F19-03



ONE POST INSTALLATION

TWO POSTS INSTALLATION



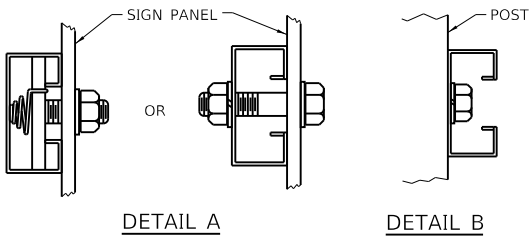
SIDE ELEVATION - BARRIER MOUNT DETAIL  
(LOOKING PERP. TO TRAFFIC)

NOTES:

- ALL ANCHOR BOLTS FOR MEDIAN BARRIER MOUNTED SIGN SUPPORT ASSEMBLY SHALL BE  $\frac{3}{8}$ " DIA. EXPANSION ANCHORS.
- THE TOP SECTION SHALL BE TELESOPED INTO THE BASE SECTION 12 INCHES AND FASTENED TOGETHER.
- DESIGN CONFORMS TO THE 2015 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS WITH 2017 INTERIM SPECIFICATIONS THERETO, DESIGN WIND SPEEDS OF 3-s GUST WITH SPEED OF 120 MPH PLUS 14% GUST FACTOR, AND A WIND IMPORTANCE FACTOR OF 1.0 (50 YEAR MEAN RECURRENCE INTERVAL) FOR THE SUPPORTING STRUCTURES.
- NO ANCHOR BOLT SHALL BE PLACED CLOSER THAN 12" FROM CENTER LINE OF MEDIAN BARRIER JOINT.
- SIGN FABRICATION AND INSTALLATION SHALL BE DONE IN ACCORDANCE WITH ILLINOIS TOLLWAY SPECIAL PROVISION "SIGN INSTALLATION".
- BASE AND POST ASSEMBLY SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASTHO M111 OR AS SPECIFIED IN THE SPECIAL PROVISION "TELESCOPING STEEL SIGN SUPPORT, BARRIER ASSEMBLY".
- ALL MATERIALS FOR THE SIGN SUPPORT ASSEMBLY SHALL BE INCLUDED IN THE COST OF "TELESCOPING STEEL SIGN SUPPORT, BARRIER ASSEMBLY".

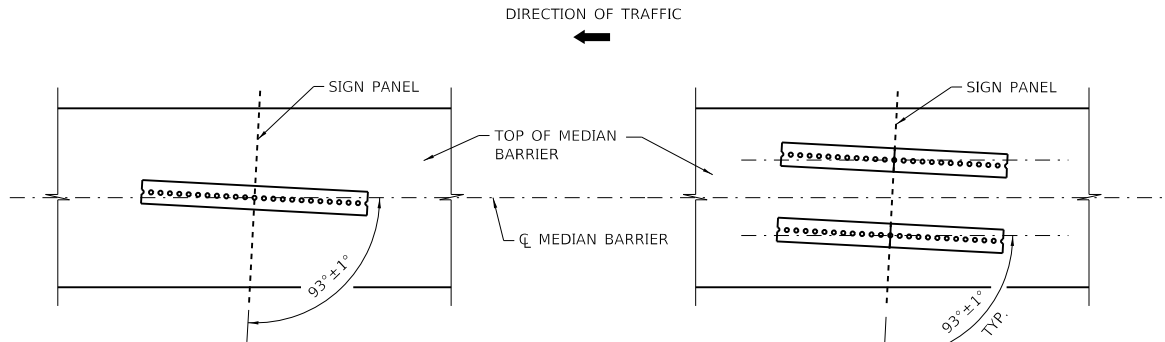
MEMBER DETAILS

(A)	2½" x 2½" x 2'-0" (12 GA.)
(B)	2½" x 2½" x 1'-0" (12 GA.)
(C)	2¼" x 2¼" x VARIES (12 GA.)



DETAIL A

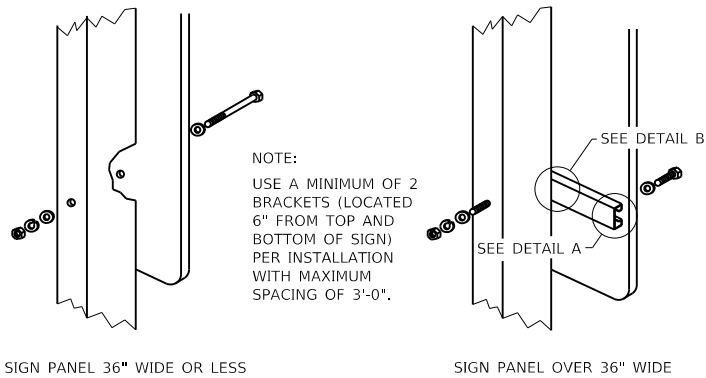
DETAIL B



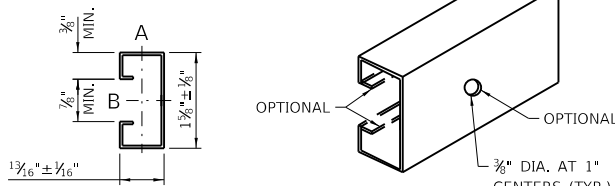
ONE POST INSTALLATION

TWO POSTS INSTALLATION

PLAN VIEW



MOUNTING BRACKET DETAILS



SUPPORTING CHANNEL DETAILS

SUPPORTING CHANNEL SECTION MODULUS (MINIMUM)	Axis A	Axis B
STEEL	0.050 in. <sup>3</sup>	0.105 in. <sup>3</sup>
ALUMINUM	0.150 in. <sup>3</sup>	0.315 in. <sup>3</sup>

DATE	REVISIONS

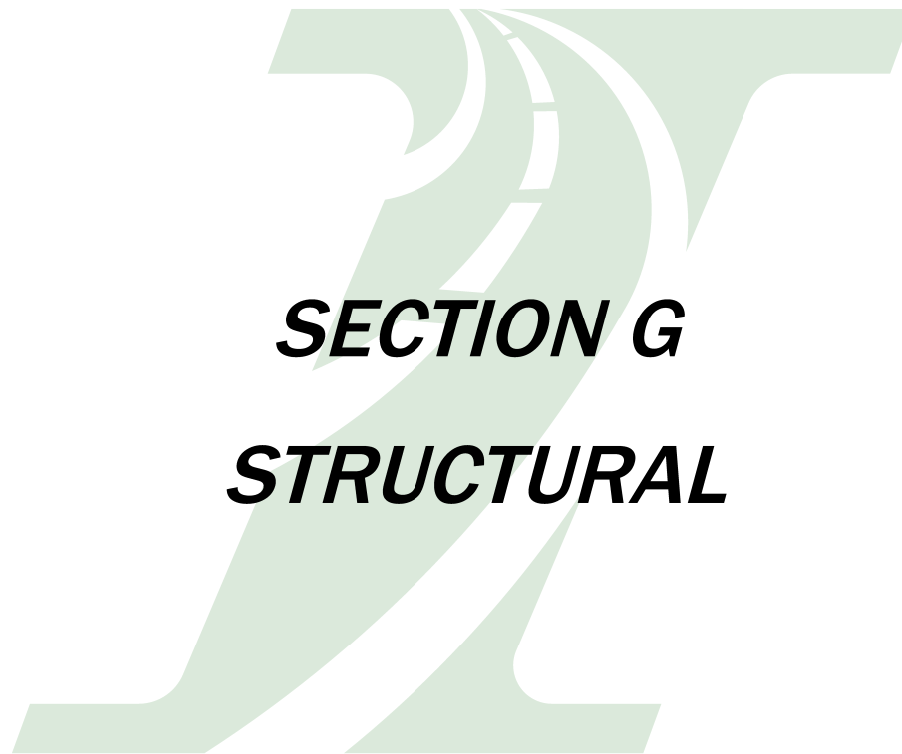


MEDIAN BARRIER MOUNTED  
SIGN SUPPORT

STANDARD F20-00

APPROVED BY: *Paul Kovacs* DATE: 02/24/2020  
CHIEF ENGINEERING OFFICER

# ***STANDARD DRAWINGS***



## ***SECTION G*** ***STRUCTURAL***

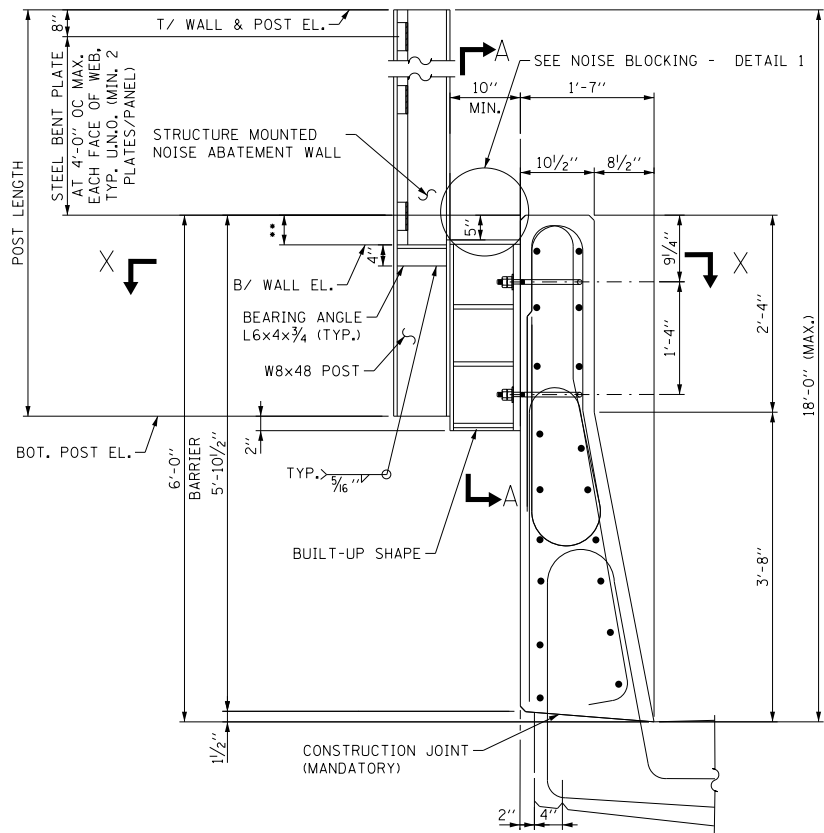
MARCH 2024

Illinois Tollway Standard Drawing Revisions
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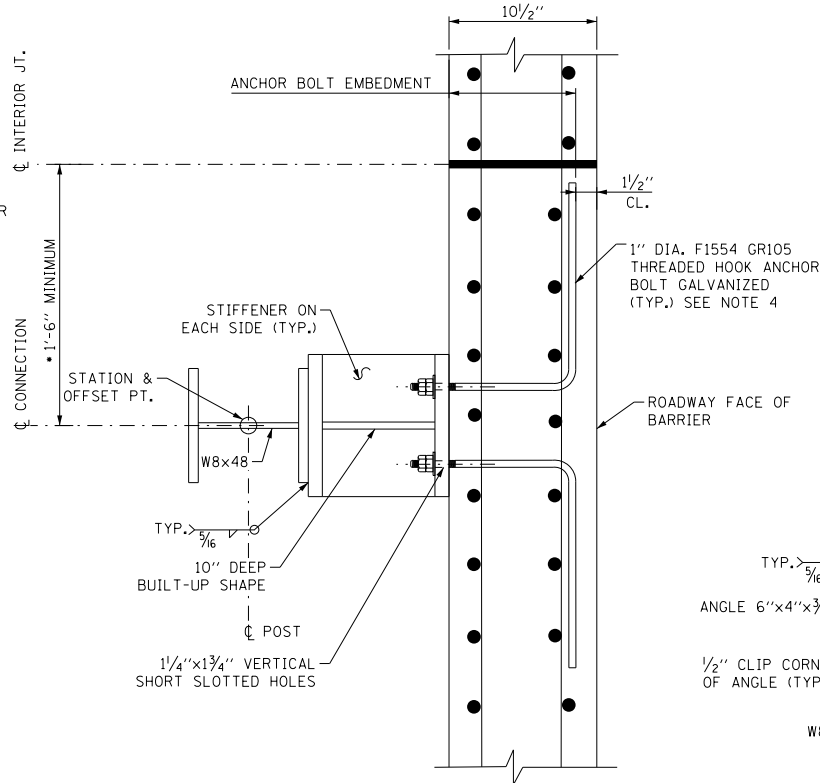
Section G	Structural		
	Standard	Modification Summary	Effective: 03-01-2024
	G16-05	CRASHWORTHY GROUND MOUNTED NOISE ABATEMENT WALL DETAILS	
	Sheet 1	Added Detail 3 to clarify the smooth finish requirements for the precast panels.	
	Sheet 2	Removed 3 5/8" dimension for smooth finish. Referenced Detail 3 for smooth finish requirements	
	Sheet 3	Redrawn NAW Transition Detail Plan and Detail 2 to scale. Largest post size used to show most critical case for clearance between the post and the wall.	

New Sheet

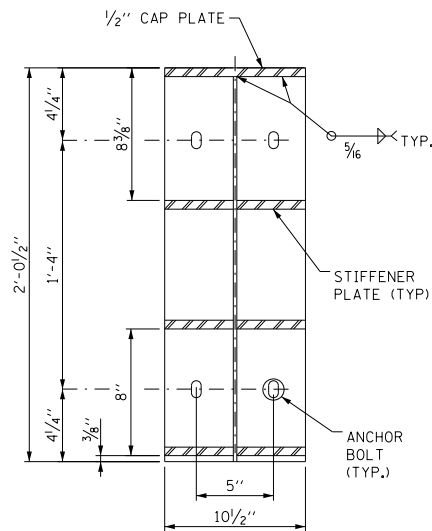
Retired Standard



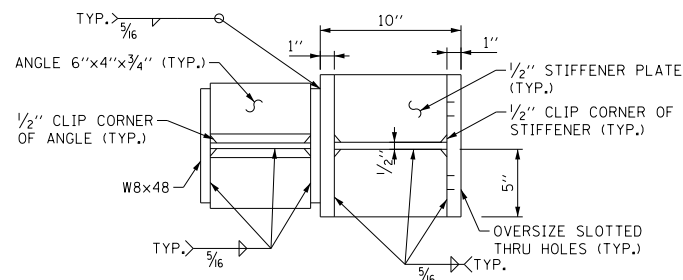
• BEARING SEAT IS 6" MAX. BELOW TOP OF BARRIER OR 3" MAX. ABOVE TOP OF BARRIER.



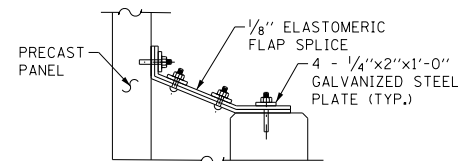
• USE 4'-10" MINIMUM FROM FULL HEIGHT JOINTS ON BRIDGES, OTHERWISE USE 1'-10" MINIMUM FOR END POSTS AND POSTS LOCATED ON APPROACH SLABS OR MOMENT SLABS.



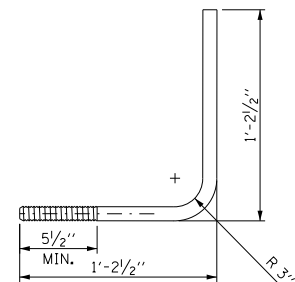
SECTION A-A



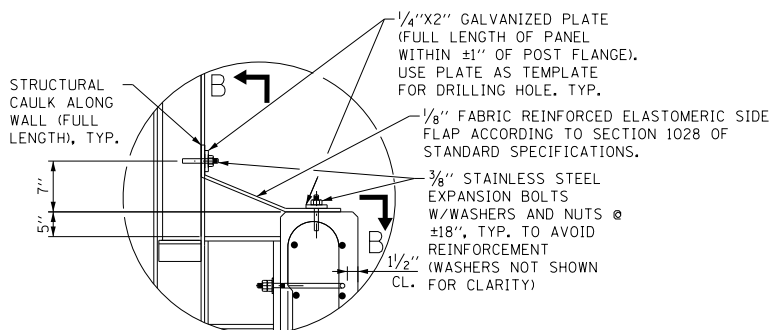
BUILT UP SHAPE



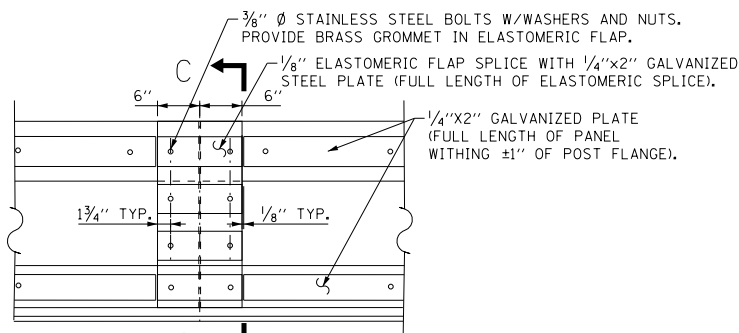
SECTION C-C



BENT ANCHOR BOLT



DETAIL 1  
NOISE BLOCKING ASSEMBLY

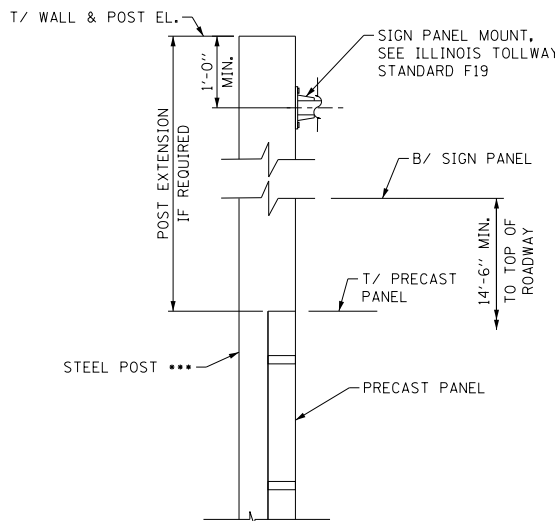


VIEW B-B  
AT ASSEMBLY SPLICE

## ILLINOIS TOLLWAY CONSTANT SLOPE BARRIER - DETAILS

NOTES:

- STEEL POST MAXIMUM SPACING IS 11'-8".
- SLIPFORMING OF THE BARRIER IS NOT PERMITTED.
- REFER TO ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL FOR SHOWN DECK REINFORCEMENT, JOINT DETAILS AND OTHER MISCELLANEOUS DETAILS NOT DETAILED IN THIS STANDARD.
- ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE SUPPLIED BY THE FABRICATOR OF AN ADVANCE PROCUREMENT CONTRACT FOR THE STRUCTURAL STEEL POSTS. BENT ANCHOR BOLTS SHALL BE INSTALLED WITH ILLINOIS TOLLWAY CONSTANT SLOPE BARRIER. SEE SPECIAL PROVISION FOR FURNISHING NOISE ABATEMENT WALL STRUCTURAL STEEL.
- MINIMUM DISTANCE BETWEEN CENTERLINE OF POST TO CENTERLINE OF LIGHT POLE IS 4'-7" DESIRABLE AND 3'-7" MINIMUM.



SIGN PANEL MOUNT  
POST EXTENSION DETAIL

••• STEEL POSTS HAVE BEEN DESIGNED TO ACCOMMODATE A 17'-3 1/2" POST WITH MAX 32 SF SIGN AREA IN ACCORDANCE WITH ILLINOIS TOLLWAY STANDARD F19

## GENERAL NOTES

- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" X 45° CHAMFER, EXCEPT WHERE SHOWN OTHERWISE. NO CHAMFER WILL BE ALLOWED AT HORIZONTAL JOINTS BETWEEN PANELS.
- REINFORCEMENT BARS, INCLUDING EPOXY-COATED REINFORCEMENT BARS, SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31 (ASTM A706), GRADE 60, DEFORMED BARS.
- REINFORCEMENT BARS DESIGNATED "E" SHALL BE EPOXY COATED.
- REINFORCEMENT BAR BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE LATEST "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315.
- REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
- CONSTRUCTION CONTRACTOR SHALL NOT SCALE DIMENSIONS FROM THE CONTRACT PLANS FOR CONSTRUCTION PURPOSES. SCALES SHOWN ARE FOR INFORMATION ONLY.

## DESIGN SPECIFICATIONS

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION DATED SEPTEMBER 2017.

## DESIGN STRESSES

f'c = 4,000 PSI (CLASS BS). (BARRIERS)  
f'c = 5,000 PSI AT 28 DAYS (CLASS PC)  
(PRECAST CONCRETE NAW PANELS)  
fy = 60,000 PSI (REINFORCEMENT)

GRADE 50, Fy = 50,000 PSI, ASTM A709 (AASHTO M270) - STRUCTURAL STEEL POST  
GRADE 36, Fy = 36,000 PSI, ASTM A709 (AASHTO M270) ALL OTHER STEEL (UNLESS NOTED OTHERWISE)  
ALL STEEL SHALL BE HOT - DIP GALVANIZED

## DESIGN LOADING

CONCRETE = 150 PCF  
STEEL = 490 PCF  
WIND LOADS = 50PSF (STR III)  
= 15PSF (SERV I)  
VEHICLE IMPACT - 4KIPS APPLIED AT THE HIGHEST POINT UP TO 14FT ABOVE SURFACE OF PAVEMENT IN FRONT OF BARRIER.

PRECAST PANEL MAX. ALLOWABLE DEFLECTION - L/180

STEEL POST MAX. ALLOWABLE DEFLECTION - H/360

## MISCELLANEOUS STEEL CONNECTION QUANTITY

DESCRIPTION	WEIGHT
BUILT-UP SHAPE	219 LBS.
BEARING ANGLE (2 ANGLES)	28 LBS.
STEEL BENT PLATE ALLOWANCE (8 PLATES)	29 LBS.
ANCHOR BOLT ASSEMBLY (4 BOLTS)	26 LBS.
TOTAL	302 LBS.
NOISE BLOCKING ASSEMBLY BETWEEN POSTS (2 PLATES)	3.4 PLF
NOISE BLOCKING ASSEMBLY SPLICE (4 PLATES)	7 LBS.

SHEET 1 OF 2



STRUCTURE MOUNTED  
NOISE ABATEMENT WALL  
DETAILS

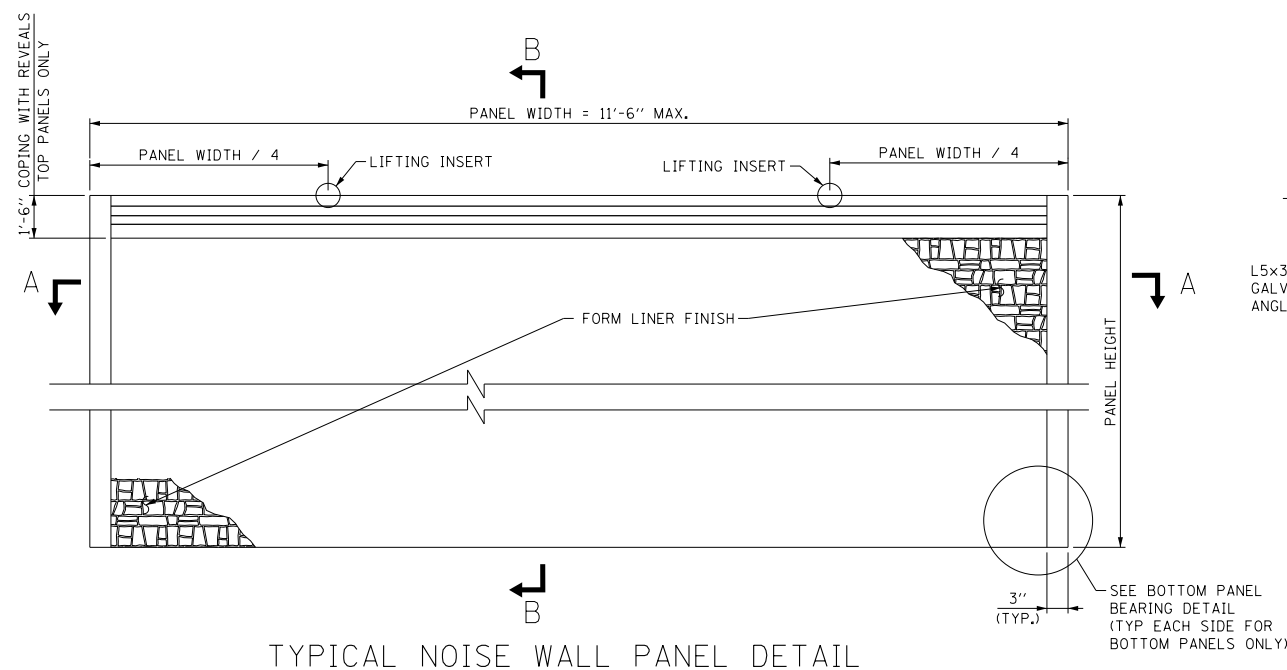
STANDARD G12-04

DATE	REVISIONS
2-23-2023	ADD STEEL PL. SPA. & MIN. NUMBER, REV. BENT PL., STEEL QUANTITIES AND LIFTING INSERT NOTES
3-01-2022	UPDATE ERECTION ANCHOR CALLOUT CHANGE BENT PLATE TO 1" AND CLARIFY NOISE BLOCKING PL. LENGTH

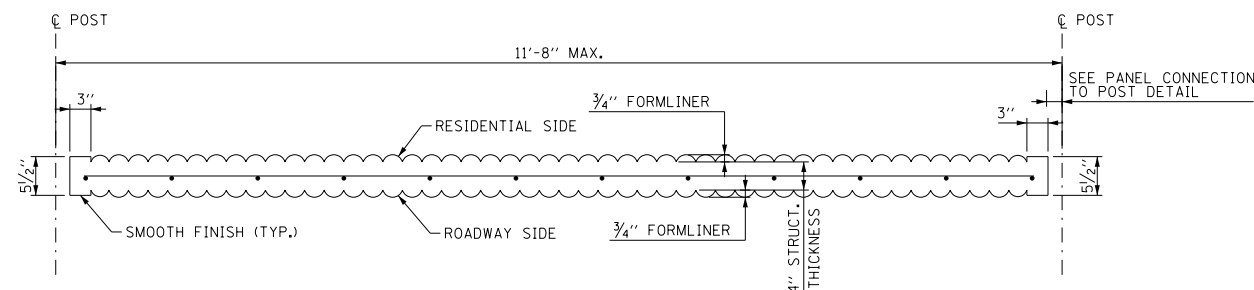
APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:

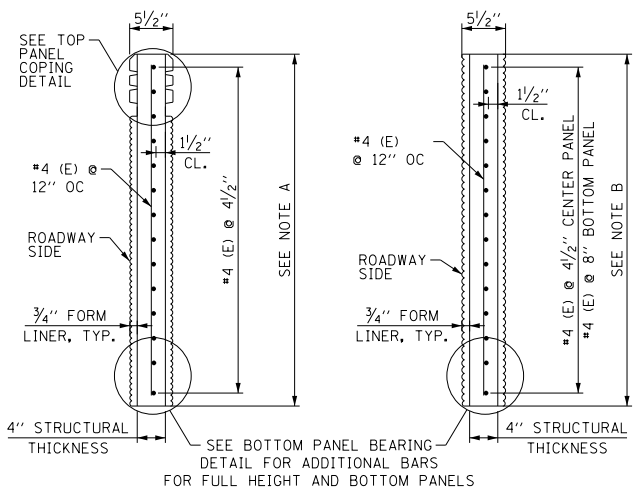
03/01/2023



TYPICAL NOISE WALL PANEL DETAIL



TYPICAL PLAN VIEW THRU NOISE ABATEMENT WALL  
SECTION A-A

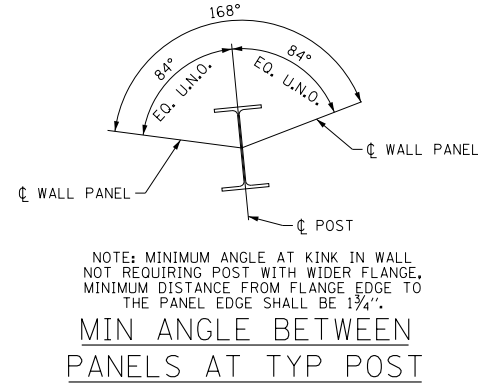


TOP PANEL OR  
FULL HEIGHT PANEL  
SECTION B-B

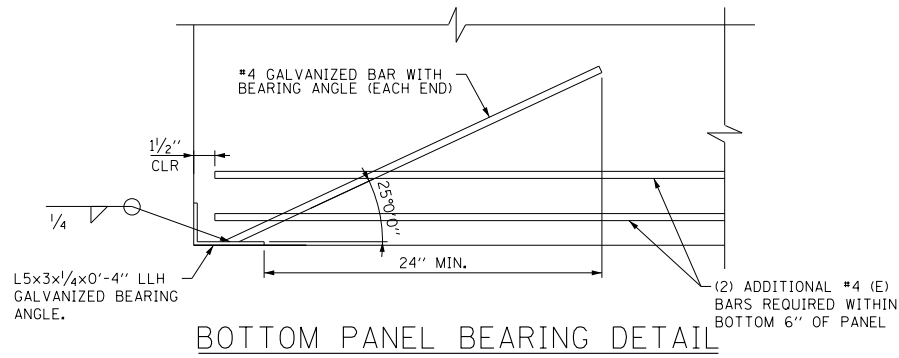
CENTER OR  
BOTTOM PANEL  
SECTION B-B

NOTE A  
TO ACCOMMODATE VARYING HEIGHT NAW, TOP PANEL HEIGHTS ARE PERMITTED TO BE 4'-0", 5'-0", 6'-0", 7'-0", OR 8'-0". FULL HEIGHT PANELS ARE PERMITTED TO BE 4'-0", 4'-6", 5'-0", 5'-6", 6'-0", 6'-6", 7'-0", 7'-6" OR 8'-0".

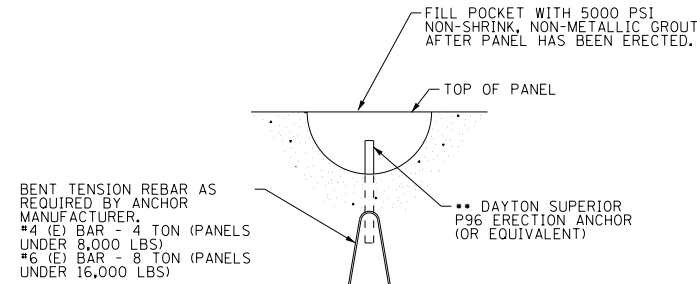
NOTE B  
BOTTOM PANEL HEIGHTS ARE PERMITTED TO BE 4'-0" OR 4'-6". CONTRACTOR MAY INCREASE BOTTOM PANEL HEIGHTS AND USE UP TO AN 8FT (NON-STANDARD) MAXIMUM HEIGHT PANEL. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION. CENTER PANEL HEIGHT IS 4'-0".



- NOTES:
- STRUCTURAL CAULK - SIKADUR 51 NS FLEXIBLE EPOXY CONTROL -JOINT SEALER / ADHESIVE OR EQUIVALENT. CAULK SHALL BE APPLIED PER MANUFACTURER'S SPECIFICATION AND RECOMMENDATIONS.
  - BACKER ROD: MILE HIGH FOAM PRODUCT SIZED PER BACKER ROD MANUFACTURING, INC OR EQUIVALENT.
  - NON - STRUCTURAL CAULK SEALANT: SIKAFLEX 15 LM PER MANUFACTURERS STANDARD OR EQUIVALENT.
  - SHIMS: VERSA-A-SHIM HIGH IMPACT PLASTIC SHIMS ASTM D792 & ASTM D695
  - LIFTING INSERTS SHALL HAVE A FACTOR OF SAFETY OF 4:1
  - THE NAW INSTALLATION PROCEDURES SHOWN ON THIS SHEET PROVIDE GENERAL INSTALLATION SEQUENCE AND PROCEDURES FOR THE CONTRACTOR. THE CONTRACTOR SHALL RETAIN SOLE RESPONSIBILITY FOR THE MEANS, METHODS, AND TECHNIQUES OF CONSTRUCTION OF THE NAW FOR COMPLIANCE WITH LAWS, REGULATIONS, AND CODES, AND FOR THE SAFETY OF CONSTRUCTION APPLICABLE TO THIS WORK.
  - THE OPTIONAL TONGUE AND GROOVE DETAIL MAY BE USED IN LIEU OF THE CAULK SHOWN IN THE HORIZONTAL JOINT DETAIL.

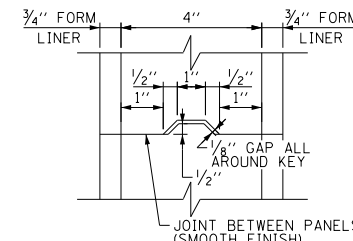


BOTTOM PANEL BEARING DETAIL

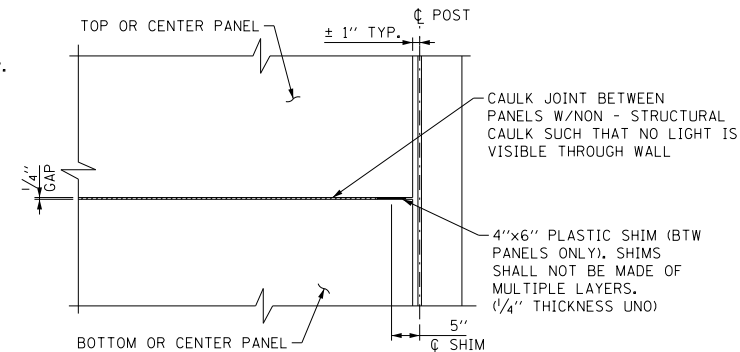


TYPICAL LIFTING INSERT DETAIL

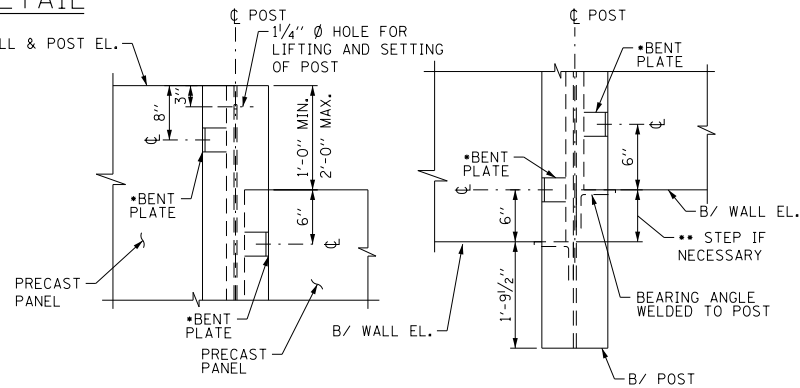
•• ERECTION ANCHORS SHALL BE HOT-DIPPED GALVANIZED



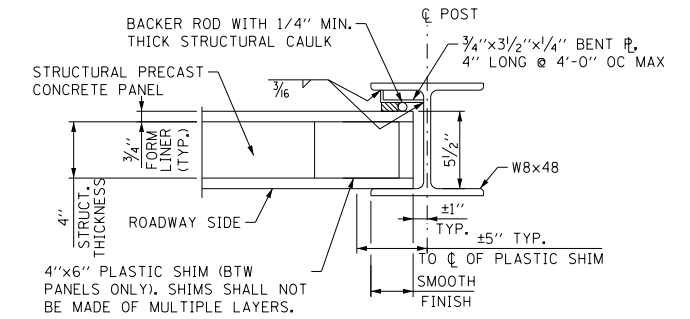
OPTIONAL TONGUE AND GROOVE DETAIL  
(IN LIEU OF SHIM AND CAULK)



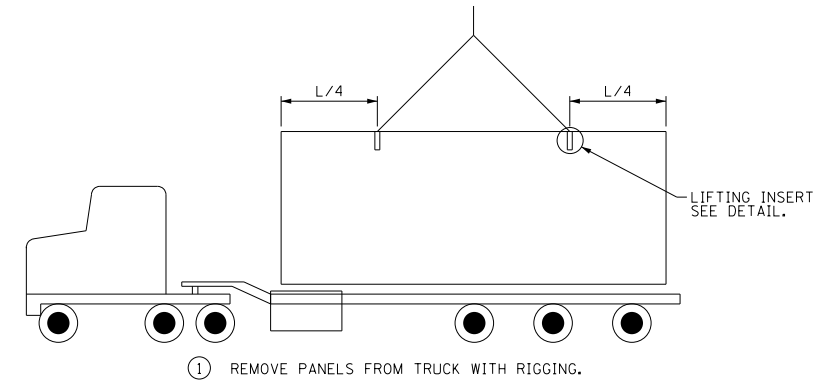
HORIZONTAL JOINT DETAIL



TOP OF POST AT BEARING ANGLE  
BENT PLATE DETAILS



PANEL CONNECTION TO POST DETAIL



SUGGESTED TYPICAL NOISE ABATEMENT WALL  
INSTALLATION SEQUENCE AND PROCEDURE

- STEEL BENT PLATE AT 4'-0" OC MAX. EACH FACE OF WEB, TYP. U.N.O. (MIN. 2 PLATES/PANEL)
- MAXIMUM DIMENSION OF BEARING ANGLE BELOW BARRIER IS 6" AND 3" ABOVE THE TOP OF THE BARRIER.

SHEET 2 OF 2



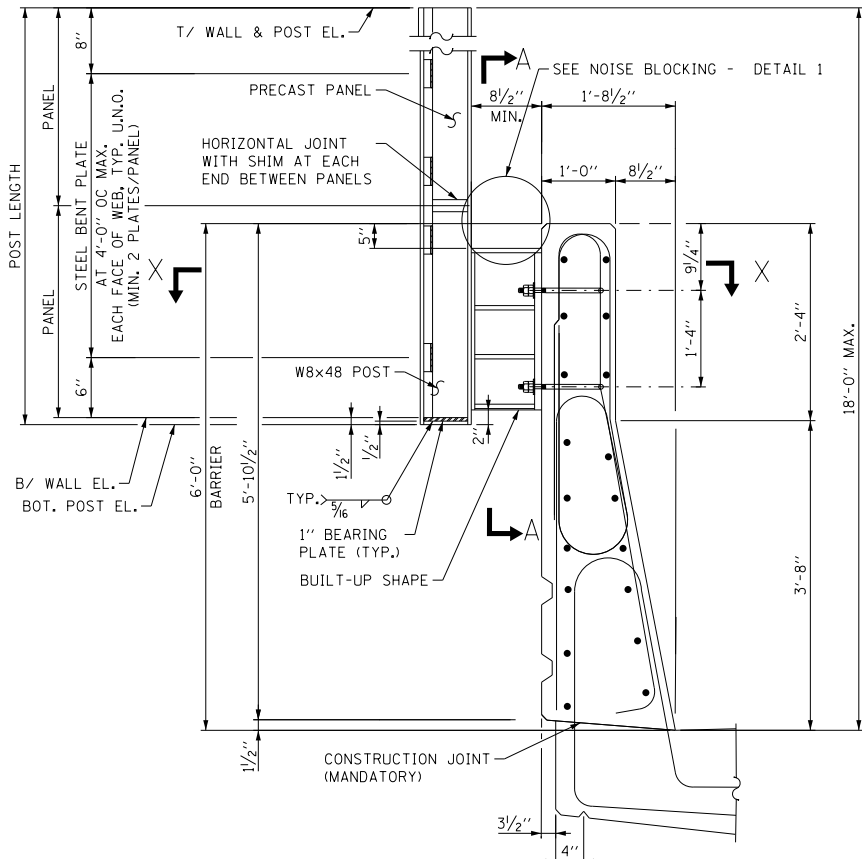
STRUCTURE MOUNTED  
NOISE ABATEMENT WALL  
DETAILS

STANDARD G12-04

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER

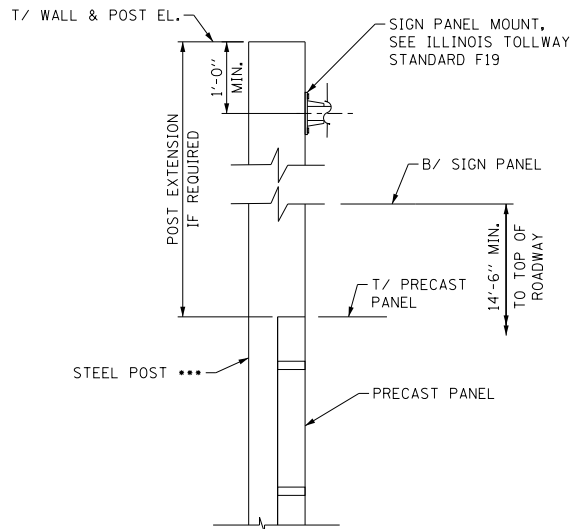
DATE: 03/01/2023





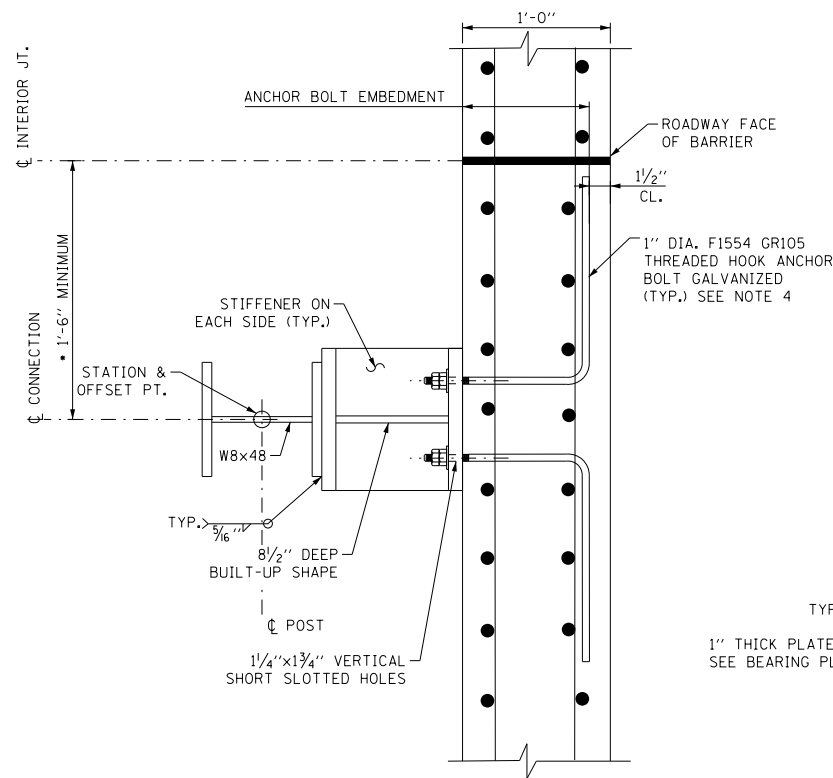
## ILLINOIS TOLLWAY CONSTANT SLOPE BARRIER - DETAILS

- NOTES: 1. STEEL POST MAXIMUM SPACING IS 11'-8".
2. SLIPFORMING OF THE BARRIER IS NOT PERMITTED.
3. REFER TO ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL FOR DECK REINFORCEMENT, JOINT DETAILS AND OTHER MISCELLANEOUS DETAILS NOT DETAILED IN THIS STANDARD.
4. ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE SUPPLIED BY THE FABRICATOR OF AN ADVANCE PROCUREMENT CONTRACT FOR THE STRUCTURAL STEEL POSTS. BENT ANCHOR BOLTS SHALL BE INSTALLED WITH ILLINOIS TOLLWAY CONSTANT SLOPE BARRIER. SEE SPECIAL PROVISION FOR FURNISHING NOISE ABATEMENT WALL STRUCTURAL STEEL.
5. MINIMUM DISTANCE BETWEEN CENTERLINE OF POST AND CENTERLINE OF LIGHT POLE IS 4'-7" DESIRABLE AND 3'-7" MINIMUM.



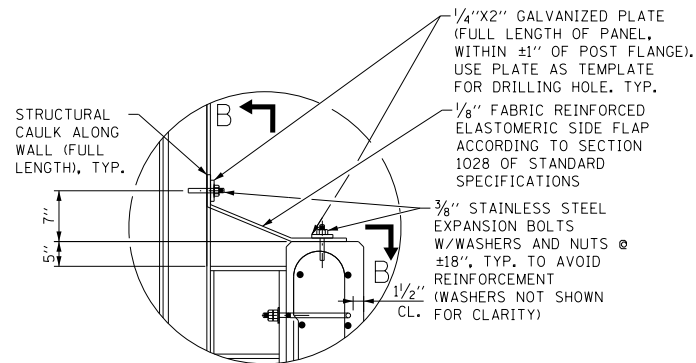
### SIGN PANEL MOUNT POST EXTENSION DETAIL

...STEEL POSTS HAVE BEEN DESIGNED TO ACCOMMODATE A 17'-7 1/2" POST WITH MAX 32 SF SIGN AREA IN ACCORDANCE WITH ILLINOIS TOLLWAY STANDARD F19

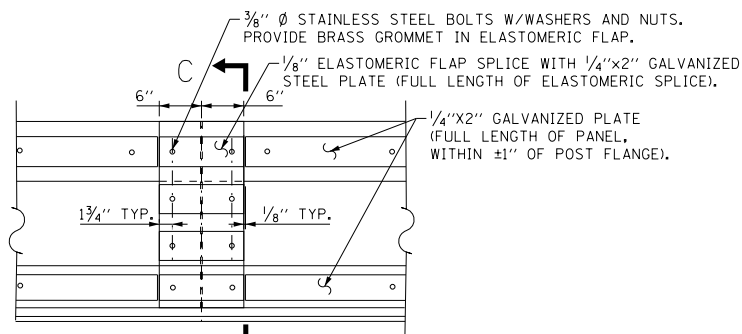


### SECTION X-X

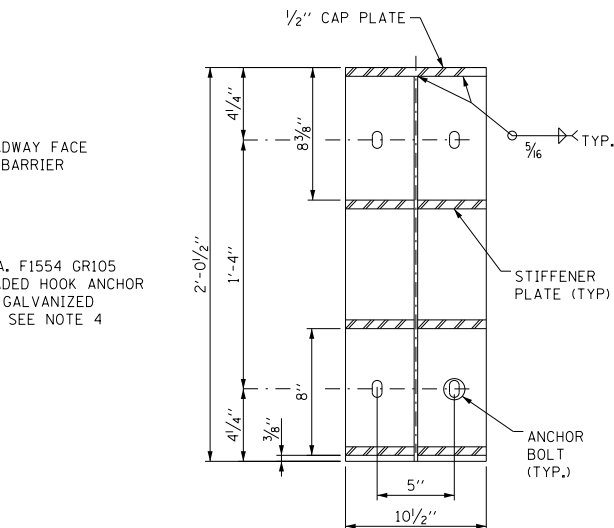
- USE 4'-10" MINIMUM FROM FULL HEIGHT JOINTS ON BRIDGES, OTHERWISE USE 1'-10" MINIMUM FOR END POSTS AND POSTS LOCATED ON APPROACH SLABS OR MOMENT SLABS.



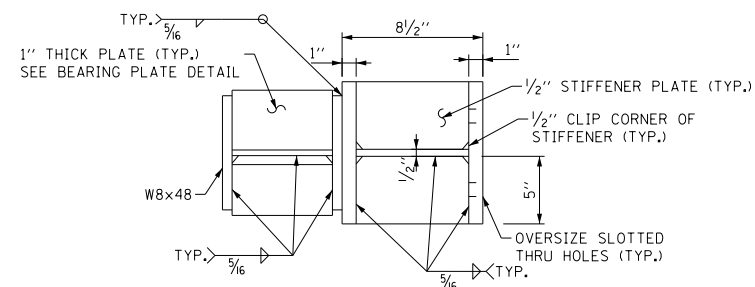
### DETAIL 1 NOISE BLOCKING ASSEMBLY



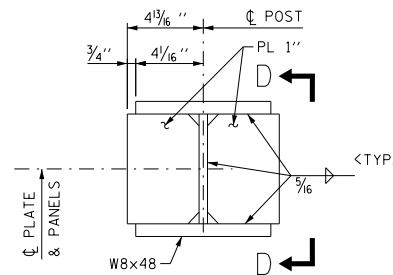
### VIEW B-B AT ASSEMBLY SPLICE



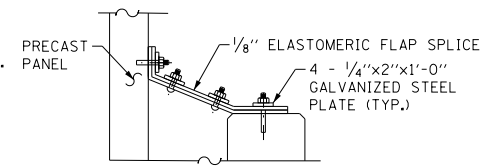
### SECTION A-A



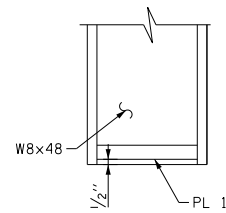
### BUILT UP SHAPE



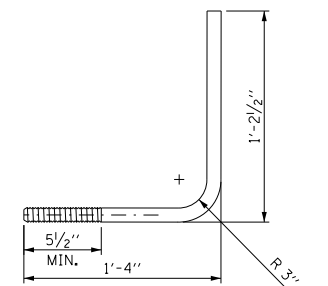
### BEARING PLATE DETAIL



### SECTION C-C



### VIEW D-D



### BENT ANCHOR BOLT

## GENERAL NOTES

- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" X 45° CHAMFER, EXCEPT WHERE SHOWN OTHERWISE. NO CHAMFER WILL BE ALLOWED AT HORIZONTAL JOINTS BETWEEN PANELS.
- REINFORCEMENT BARS, INCLUDING EPOXY-COATED REINFORCEMENT BARS, SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31 (ASTM A706), GRADE 60, DEFORMED BARS.
- REINFORCEMENT BARS DESIGNATED "E" SHALL BE EPOXY COATED.
- REINFORCEMENT BAR BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE LATEST "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315.
- REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
- CONSTRUCTION CONTRACTOR SHALL NOT SCALE DIMENSIONS FROM THE CONTRACT PLANS FOR CONSTRUCTION PURPOSES. SCALES SHOWN ARE FOR INFORMATION ONLY.

## DESIGN SPECIFICATIONS

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.  
8TH EDITION DATED SEPTEMBER 2017.

## DESIGN STRESSES

f'c = 4,000 PSI (CLASS BS), (BARRIERS)  
f'c = 5,000 PSI AT 28 DAYS (CLASS PC)  
(PRECAST CONCRETE NAW PANELS)  
fy = 60,000 PSI (REINFORCEMENT)

GRADE 50, Fy = 50,000 PSI, ASTM A709 (AASHTO M270) -  
STRUCTURAL STEEL POST  
GRADE 36, Fy = 36,000 PSI, ASTM A709 (AASHTO M270) ALL  
OTHER STEEL (UNLESS NOTED OTHERWISE)  
ALL STEEL SHALL BE HOT - DIP GALVANIZED

## DESIGN LOADING

CONCRETE = 150 PCF  
STEEL = 490 PCF  
WIND LOADS = 50PSF (STR III)  
= 15PSF (SERV I)  
VEHICLE IMPACT - 4KIPS APPLIED AT THE HIGHEST POINT UP TO  
14FT ABOVE SURFACE OF PAVEMENT IN FRONT OF BARRIER.

PRECAST PANEL MAX. ALLOWABLE DEFLECTION - L/180

STEEL POST MAX. ALLOWABLE DEFLECTION - H/360

## MISCELLANEOUS STEEL CONNECTION QUANTITY

DESCRIPTION	WEIGHT
BUILT-UP SHAPE	205 LBS.
BEARING PLATE (2 PIECES)	19 LBS.
STEEL BENT PLATE ALLOWANCE (8 PIECES)	29 LBS.
ANCHOR BOLT ASSEMBLY (4 BOLTS)	27 LBS.
TOTAL	280 LBS.
NOISE BLOCKING ASSEMBLY BETWEEN POSTS (2 PLATES)	3.4 PLF
NOISE BLOCKING ASSEMBLY SPLICE (4 PLATES)	7 LBS.

SHEET 1 OF 2



CENTRAL TRI-STATE  
STRUCTURE MOUNTED  
NOISE ABATEMENT WALL  
DETAILS

STANDARD G13-04

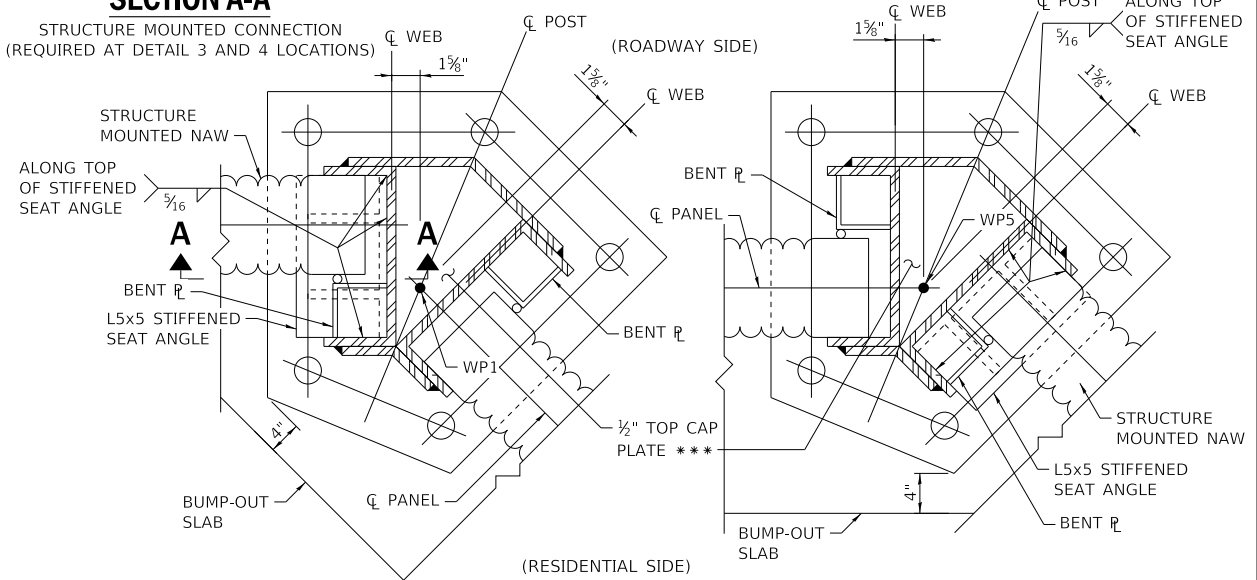
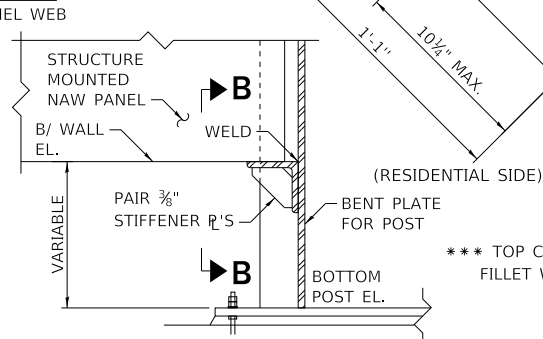
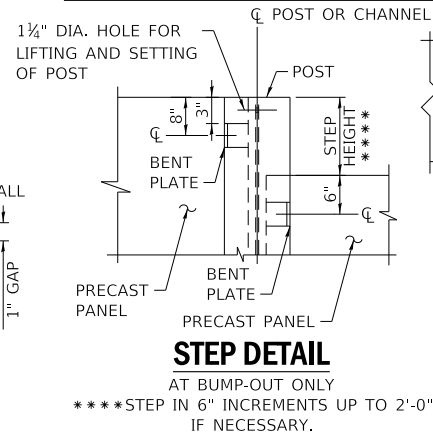
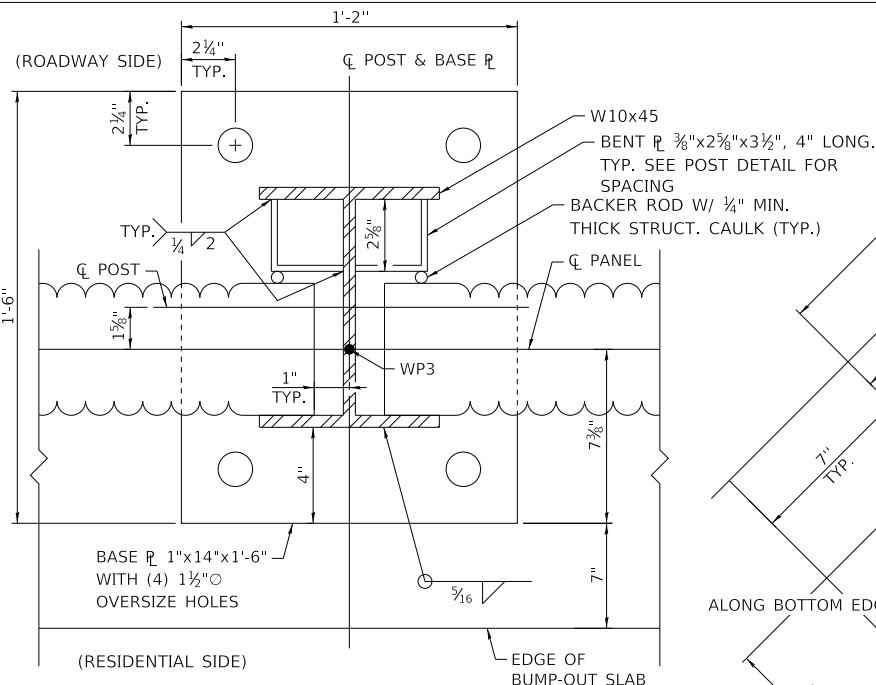
DATE	REVISIONS
2-23-2023	REV. DIM. TO BENT PL., BENT PL. SIZE, CONN. QUANTITIES & UPDATE LIFTING INSERT DETAIL NOTES
3-01-2022	UPDATE ERECTION ANCHOR CALLOUT CHANGE BENT PLATE TO 1" AND CLARIFY NOISE BLOCKING PL. LENGTH

APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2023

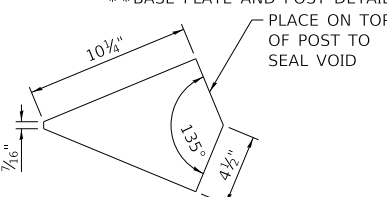
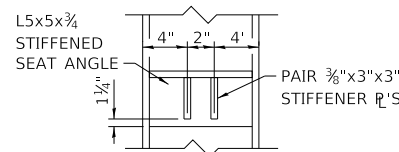




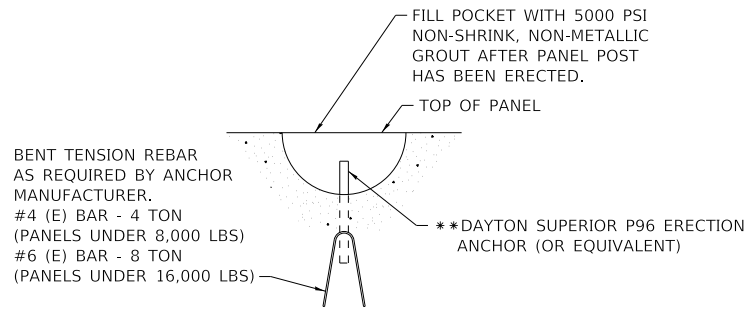


\*\*\*BASE PLATE AND POST DETAILS 3 AND 4 ARE SIMILAR TO BASE PLATE AND POST DETAIL 2, EXCEPT AS NOTED

SHEET 1 OF 2

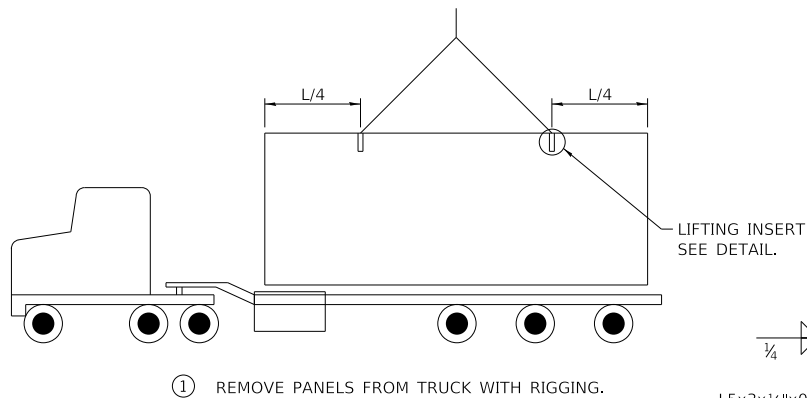


DATE	REVISIONS
3-01-2023	REV. DIM. TO BENT PL., REDUCE BENT PL. LEG, REV. LIFTING
	INSERT NOTES & ADD NOISE
	BLOCKING DETAIL
3-01-2022	UPDATE ERECTION ANCHOR CALLOUT

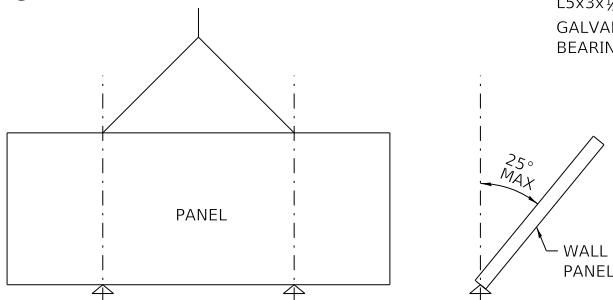


### TYPICAL LIFTING INSERT DETAIL

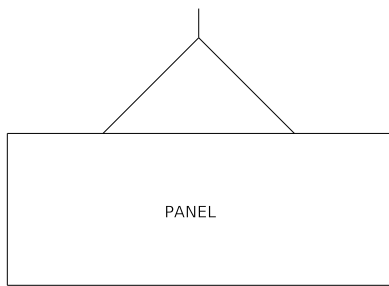
\*\*ERECTION ANCHORS SHALL BE HOT-DIPPED GALVANIZED



① REMOVE PANELS FROM TRUCK WITH RIGGING.



② TEMPORARILY SHORE PANELS STANDING UPRIGHT ON SITE ON SOLID SUBSTRATES.

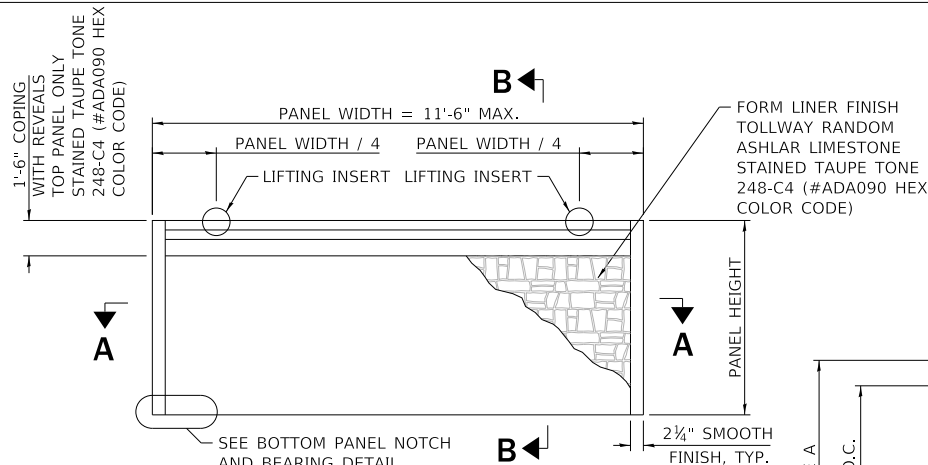


③ ERECT PANELS BETWEEN POSTS

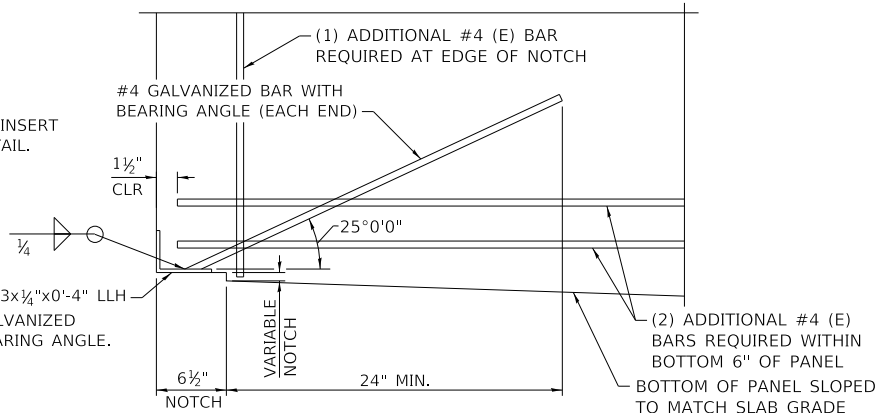
### SUGGESTED TYPICAL NOISE ABATEMENT WALL INSTALLATION SEQUENCE AND PROCEDURE

#### NOTES:

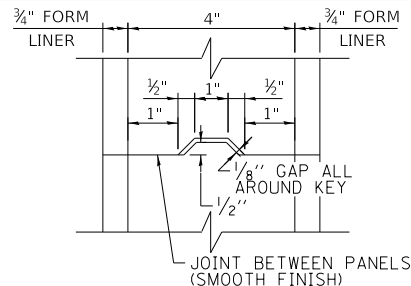
- LIFTING INSERTS SHALL HAVE A FACTOR OF SAFETY OF 4:1
- THE NAW INSTALLATION PROCEDURES SHOWN ON THIS SHEET PROVIDE GENERAL INSTALLATION SEQUENCE AND PROCEDURES FOR THE CONTRACTOR. THE CONTRACTOR SHALL RETAIN SOLE RESPONSIBILITY FOR THE MEANS, METHODS, AND TECHNIQUES OF CONSTRUCTION OF THE NAW FOR COMPLIANCE WITH LAWS, REGULATIONS, AND CODES, AND FOR THE SAFETY OF CONSTRUCTION APPLICABLE TO THIS WORK.



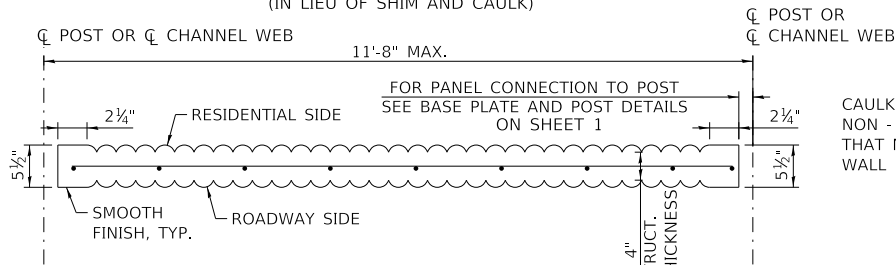
### TYPICAL NOISE WALL PANEL DETAIL



### BOTTOM PANEL NOTCH AND BEARING DETAIL



### OPTIONAL TONGUE AND GROOVE DETAIL (IN LIEU OF SHIM AND CAULK)



### TYPICAL PLAN VIEW THRU NOISE ABATEMENT WALL

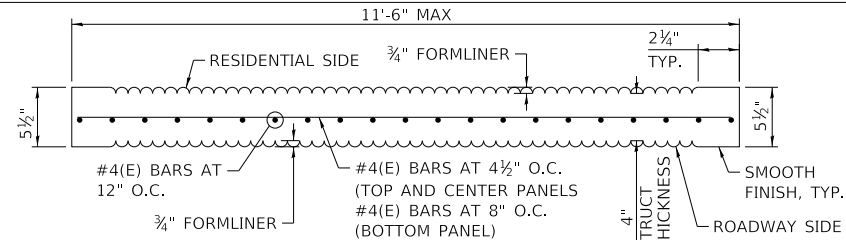
### MISCELLANEOUS STEEL QUANTITY

#### W POST

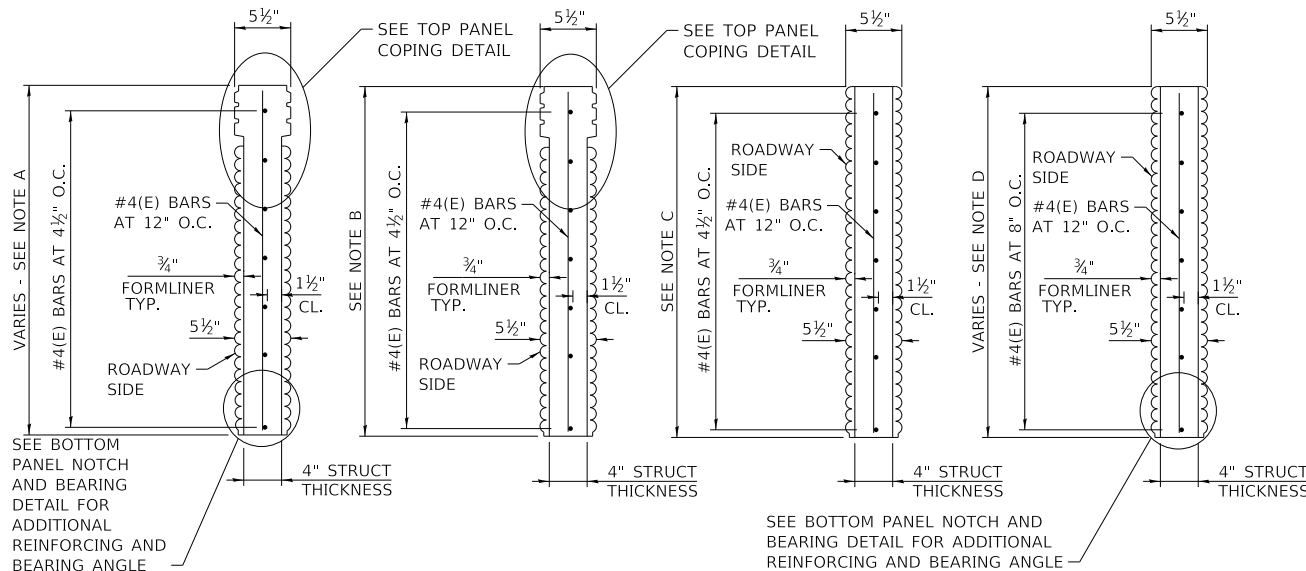
DESCRIPTION	WEIGHT
BASE PLATE	71 LBS.
BENT PLATE ALLOWANCE (16 PIECES)	44 LBS.
ANCHOR BOLT ASSEMBLY (4 EACH)	32 LBS.
TOTAL	147 LBS.

#### BUILT-UP POST

DESCRIPTION	WEIGHT
BASE PLATE	95 LBS.
TOP CAP PLATE	7 LBS.
BENT PLATE ALLOWANCE (16 PIECES)	44 LBS.
ANCHOR BOLT ASSEMBLY (5 EACH)	39 LBS.
STRUCTURE MOUNTED CONNECTION	21 LBS.
TOTAL	206 LBS.



### SECTION A-A



#### FULL HEIGHT PANEL

### SECTION B-B

#### TOP PANEL

### SECTION B-B

#### CENTER PANEL

### SECTION B-B

#### BOTTOM PANEL

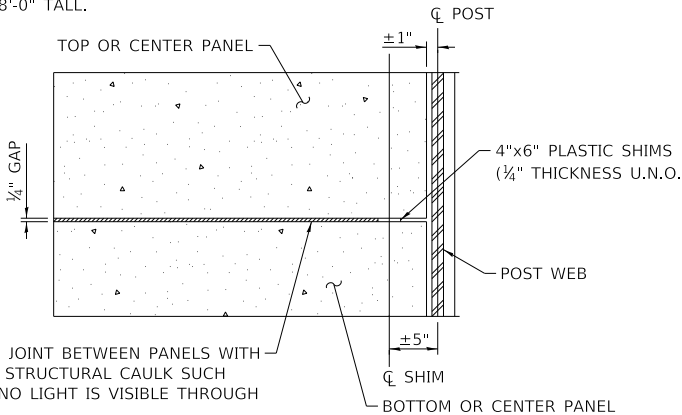
### SECTION B-B

**NOTE A**  
TO ACCOMMODATE VARYING SLAB GRADES, FULL HEIGHT PANEL WILL VARY TO FOLLOW SLOPE ON BUMP-OUT SLAB AND TO MAINTAIN A 1" GAP.

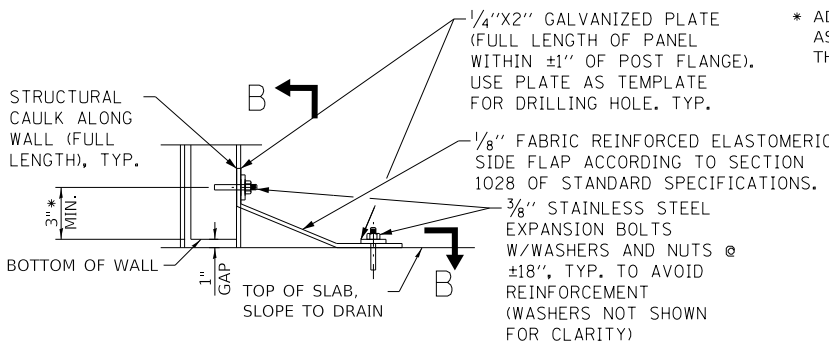
**NOTE B**  
TO ACCOMMODATE VARYING HEIGHT NAW, TOP PANEL IS PERMITTED TO BE 4'-0", 5'-0", 6'-0", 7'-0" OR 8'-0" TALL.

**NOTE C**  
TO ACCOMMODATE VARYING HEIGHT NAW, CENTER PANEL IS PERMITTED TO BE 4'-0" OR 4'-6" TALL. CONTRACTOR MAY INCREASE THE STANDARD CENTER PANEL HEIGHTS, MAXIMUM 8FT, TO MINIMIZE THE NUMBER OF JOINTS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

**NOTE D**  
TO ACCOMMODATE VARYING SLAB GRADES, BOTTOM PANEL HEIGHT WILL VARY TO FOLLOW SLOPE ON BUMP-OUT SLAB AND TO MAINTAIN A 1" GAP. PANEL HEIGHT SHOULD NOT EXTEND ABOVE BOTTOM OF STRUCTURE MOUNTED BOTTOM PANEL.



### HORIZONTAL JOINT DETAIL



### NOISE BLOCKING ASSEMBLY

\* ADJUST THE HEIGHT OF THE NOISE BLOCKING ASSEMBLY TO PROVIDE 1% SLOPE TOWARDS THE 3" OPENING AT THE END POSTS.

SHEET 2 OF 2

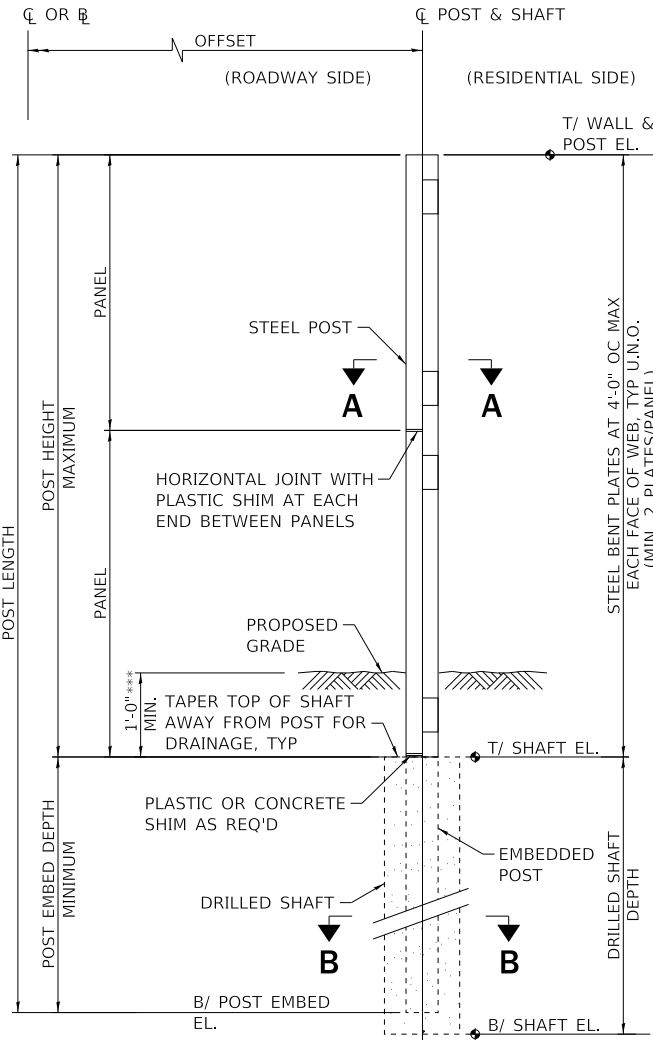


CENTRAL TRI-STATE  
BUMP-OUT MOUNTED  
NOISE ABATEMENT WALL  
DETAILS

STANDARD G14-04

APPROVED BY: *Mamun Nashif* DATE: 03/01/2023  
CHIEF ENGINEERING OFFICER

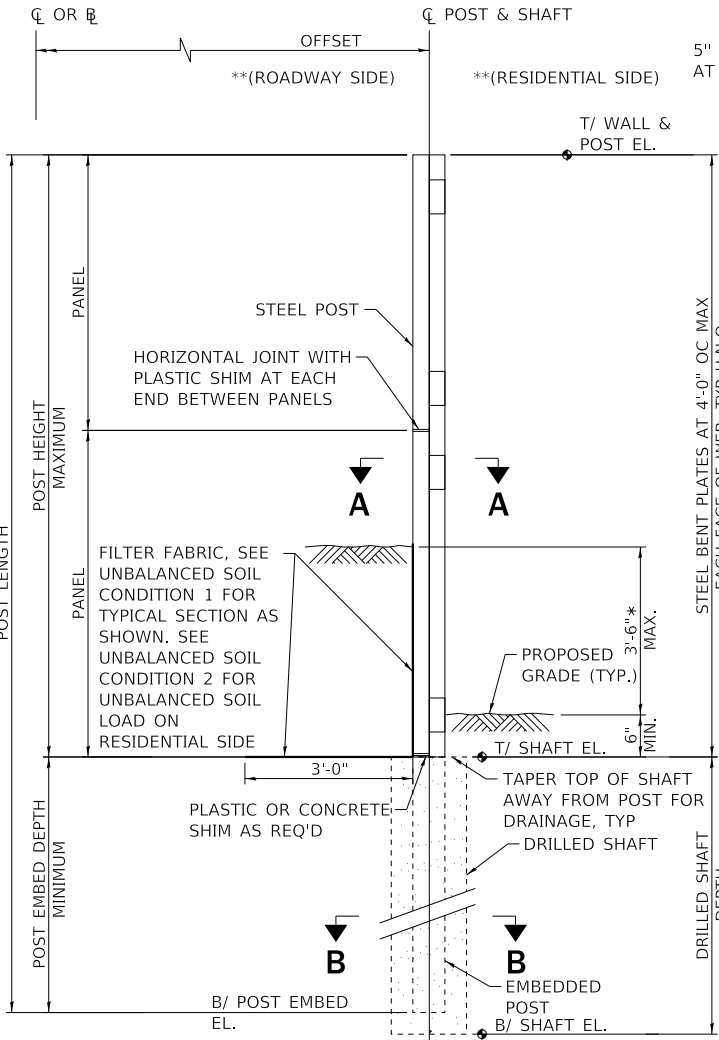




### TYPICAL CROSS SECTION

(BALANCED SOIL LOAD)

\*\*\* BALANCED SOIL CONDITION CAN ACCOMMODATE UP TO A 9" UNBALANCED SOIL LOAD



### TYPICAL CROSS SECTION

(UNBALANCED SOIL LOAD)

\*\* TYPICAL SECTION SHOWS ROADWAY ON THE HIGH SIDE. DETAILS OF POST FOR ROADWAY ON THE LOW SIDE ARE MIRRORED.

\* UNBALANCED SOIL LOAD VARIES 9" (MIN.) AND 3'-6" (MAX.) WHEN NAW IS PLACED OUTSIDE CLEAR ZONE. FOR NAW'S WITHIN CLEAR ZONE ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL AND TRAFFIC BARRIER GUIDELINES FOR TEST LEVEL AND DROP OFF REQUIREMENTS SHALL APPLY.

## POST & DRILLED SHAFT DESIGN FOR COHESIVE SOILS

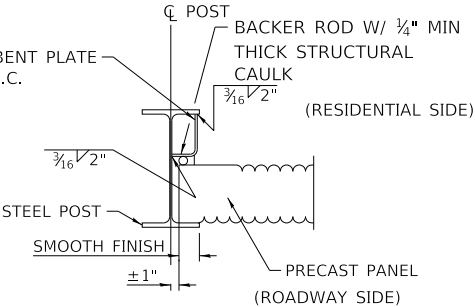
NAW TYPE	MAX POST HEIGHT	MIN POST EMBED DEPTH	MAX DRILLED SHAFT SPACING	DRILLED SHAFT DEPTH	STEEL POST SIZE	Y	BENT PLATE M x N1 x THICK.	N2	Z	DIA	A	B
NON-CRASHWORTHY GROUND MOUNTED I	15'-0"	10'-0"	20'-0"	12'-0"	W18X35	3 1/16"	7"x2 3/4"x3/8"	3 1/2"	5 5/8"	2'-6"	90°00'00"	180°00'00"
NON-CRASHWORTHY GROUND MOUNTED II	20'-0"	13'-0"	20'-0"	16'-0"	W21X50	5 3/8"	10"x2 3/4"x3/8"	3 3/8"	4 1/8"	2'-6"	86°01'13"	172°02'26"
NON-CRASHWORTHY GROUND MOUNTED III	25'-0"	12'-6"	20'-0"	15'-0"	W21X68	5 3/8"	10"x3 1/2"x3/8"	3 1/2"	6 5/8"	3'-0"	86°25'00"	172°50'00"
NON-CRASHWORTHY GROUND MOUNTED IV	28'-0"	13'-6"	20'-0"	15'-6"	W21X83	5 3/8"	10"x3 1/2"x3/8"	3 1/2"	9 1/2"	3'-6"	86°49'09"	173°38'18"

^ USE W18x65 FOR NON-CRASHWORTHY GROUND MOUNTED I AND W21x68 FOR NON-CRASHWORTHY GROUND MOUNTED II WHEN SIGN PANEL MOUNT POST EXTENSION IS USED TO ACCOMMODATE A SIGN PANEL ATTACHED TO POST

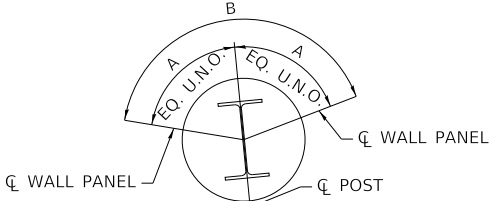
## POST & DRILLED SHAFT DESIGN FOR COHESIONLESS SOILS

NAW TYPE	MAX POST HEIGHT	MIN POST EMBED DEPTH			MAX DRILLED SHAFT SPACING	DRILLED SHAFT DEPTH			STEEL POST SIZE	Y	BENT PLATE M x N1 x THICK.	N2	Z	DIA	A	B
		PHI=30°-34°	PHI=35°-39°	PHI=40°+		PHI=30°-34°	PHI=35°-39°	PHI=40°+								
NON-CRASHWORTHY GROUND MOUNTED I	15'-0"	12'-6"	11'-6"	10'-0"	20'-0"	14'-6"	12'-6"	11'-6"	W21X44	5 3/8"	10"x2 3/4"x3/8"	3 1/8"	4 1/8"	2'-6"	90°00'00"	180°00'00"
NON-CRASHWORTHY GROUND MOUNTED II	20'-0"	13'-6"	12'-0"	11'-0"	20'-0"	16'-0"	14'-0"	12'-6"	W24X55	6 1/16"	12 3/4"x2 1/2"x3/8"	3 3/8"	2 1/16"	2'-6"	86°12'14"	172°24'28"
NON-CRASHWORTHY GROUND MOUNTED III	25'-0"	14'-0"	12'-6"	11'-6"	20'-0"	17'-6"	15'-0"	13'-6"	W27X84	8 1/16"	15 1/2"x4 3/8"x3/8"	4 3/8"	3 3/4"	3'-0"	86°37'46"	173°15'22"
NON-CRASHWORTHY GROUND MOUNTED IV	28'-0"	14'-0"	12'-6"	11'-6"	20'-0"	17'-0"	15'-0"	13'-6"	W30X90	9 5/8"	18 1/2"x4 3/8"x3/8"	4 5/8"	5 3/8"	3'-6"	85°33'22"	171°06'44"

^^ USE W21x68 FOR NON-CRASHWORTHY GROUND MOUNTED I AND W24x76 FOR NON-CRASHWORTHY GROUND MOUNTED II WHEN SIGN PANEL MOUNT POST EXTENSION IS USED TO ACCOMMODATE A SIGN PANEL ATTACHED TO POST

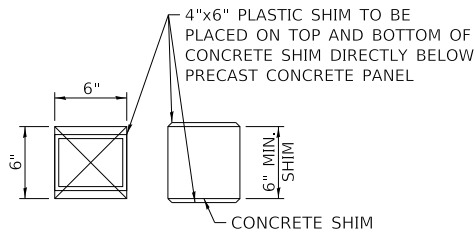


### PANEL TO POST CONNECTION DETAIL



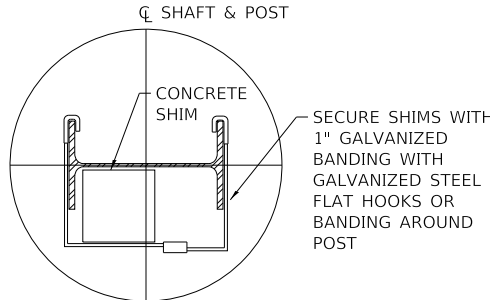
NOTE: MINIMUM ANGLE AT KINK IN WALL NOT REQUIRING POST WITH WIDER FLANGE, MINIMUM DISTANCE FROM FLANGE EDGE TO THE PANEL EDGE SHALL BE 1 3/4".

### MIN ANGLE BETWEEN PANELS AT TYP POST

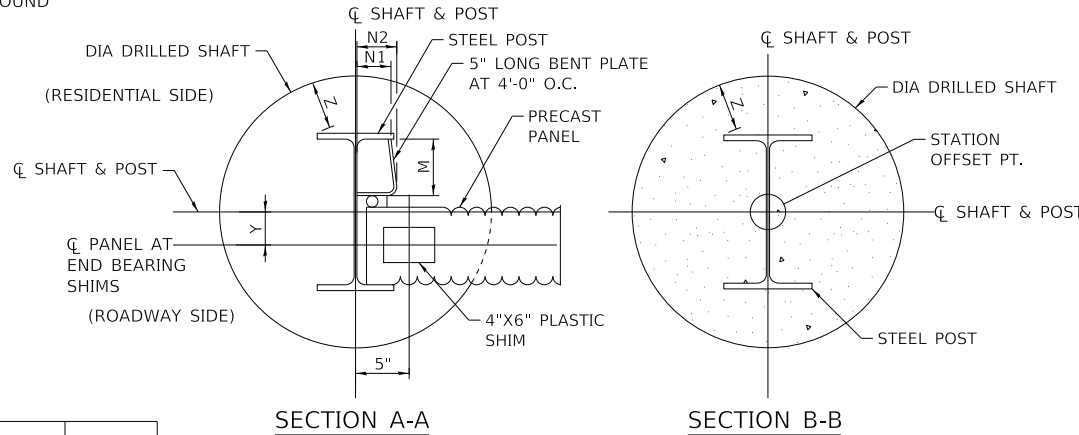


### CONCRETE SHIM DETAIL 1

SHIMS TO BE SECURED TO THE POST, SEE DETAIL 2.



### SHIM TO POST CONNECTION DETAIL 2



SHEET 1 OF 3

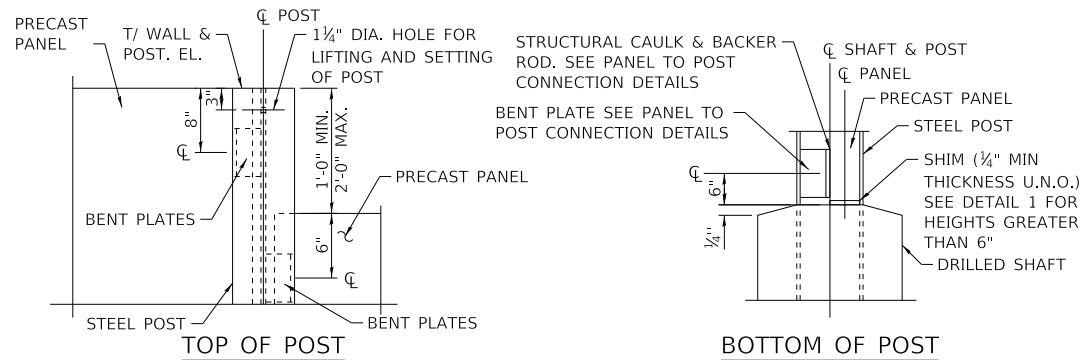
APPROVED BY: *Mamun Nasir*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2023

DATE	REVISIONS
2-23-2023	REV. LIFTING INSERT NOTES, DIM. GAP IN 90 DEG. TURN DETAIL & INC. SMOOTH DIM. ON BACK FACE TO MATCH ALL PANELS
3-01-2022	UPDATE ERECTION ANCHOR CALLOUT

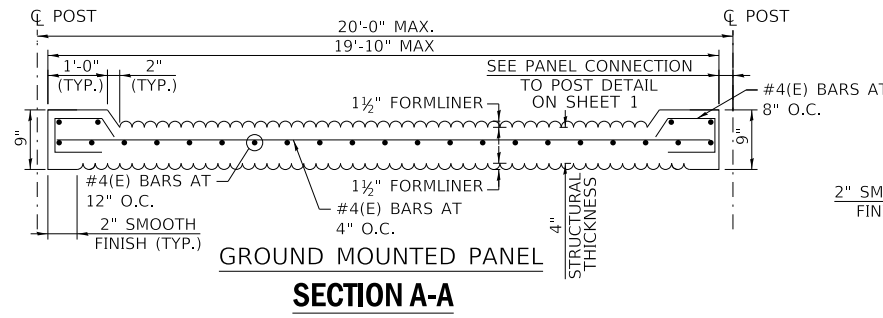
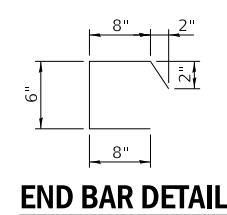
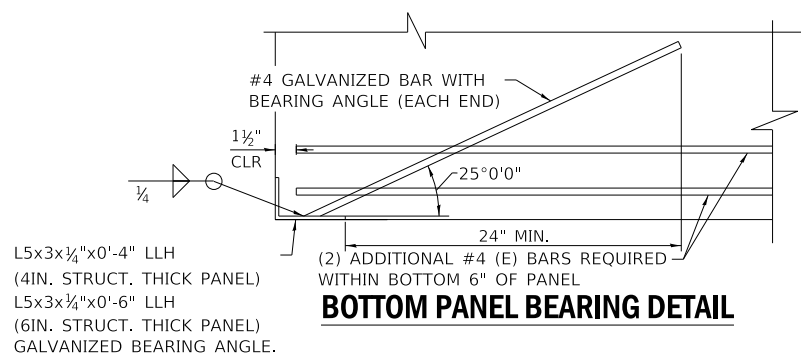
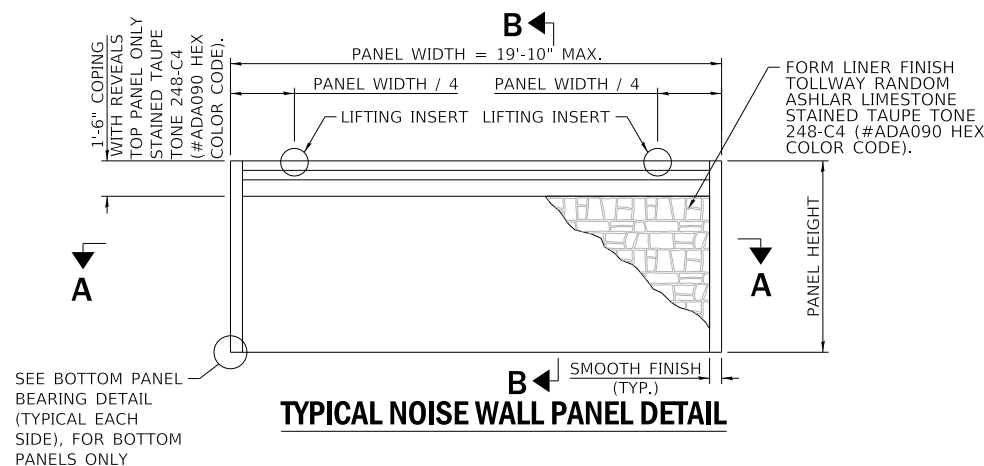
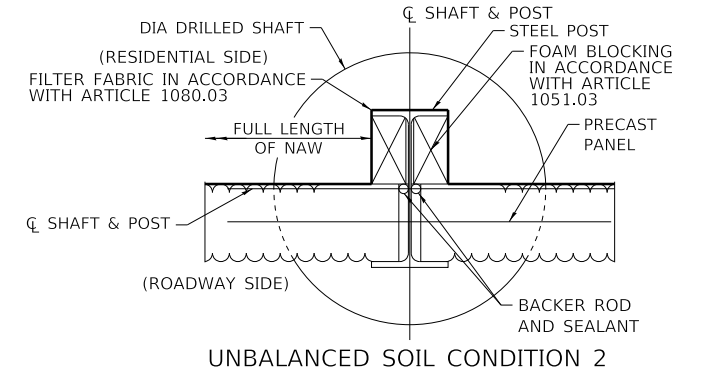
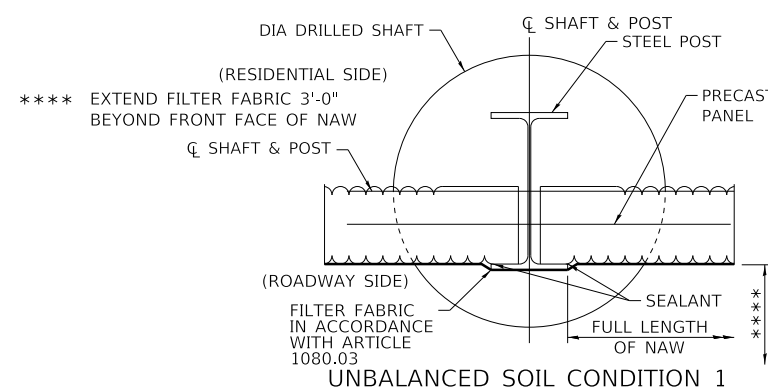
**Illinois Tollway**

NON-CRASHWORTHY GROUND MOUNTED NOISE ABATEMENT WALL DETAILS

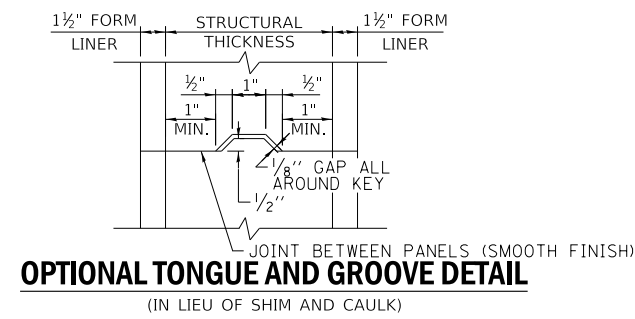
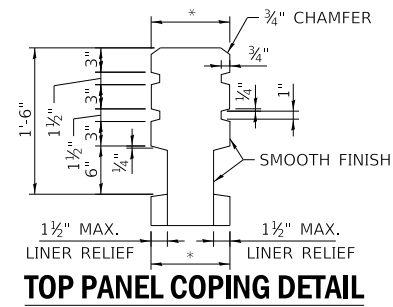
STANDARD G15-04



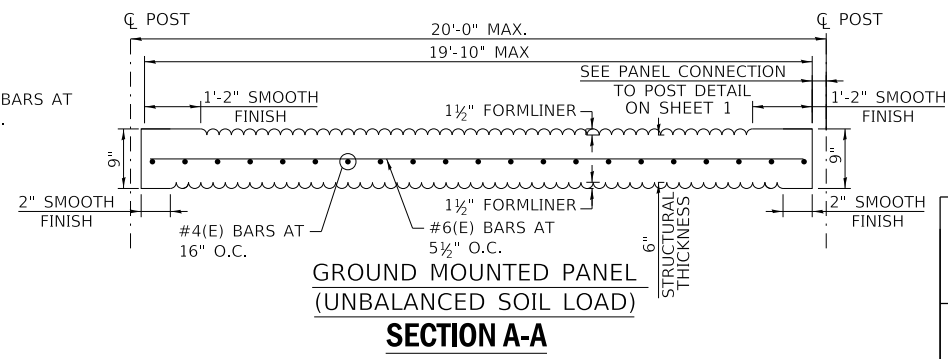
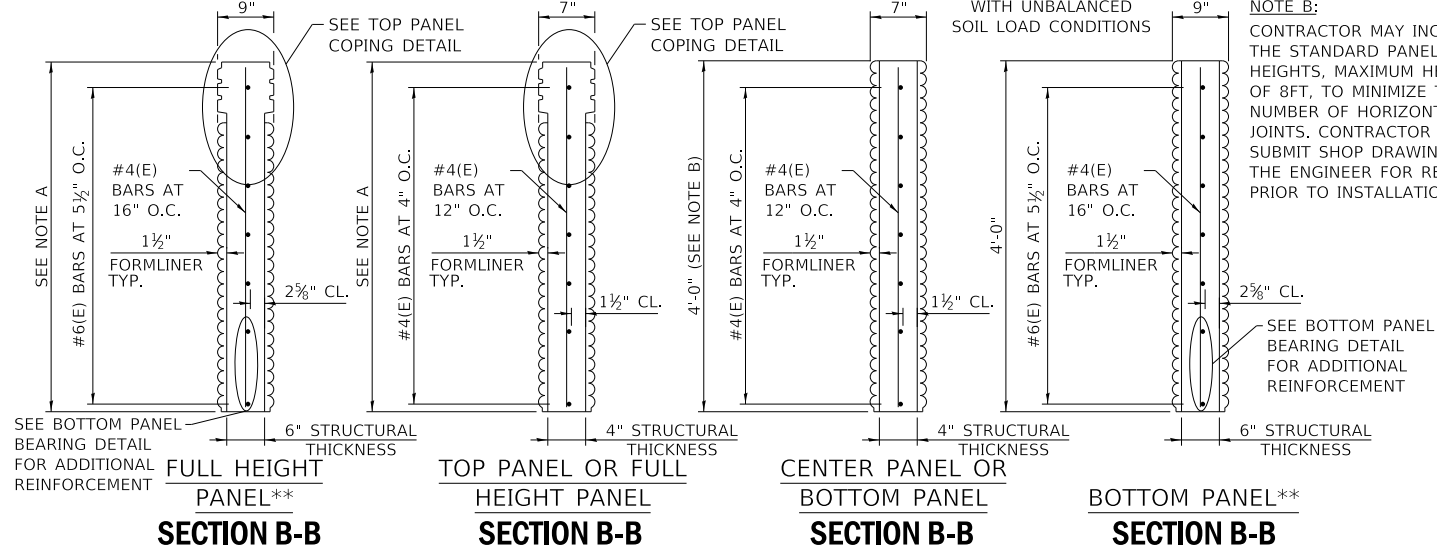
**BENT PLATE DETAILS**

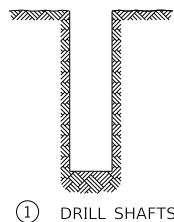


\* 9" FOR UNBALANCED SOIL LOADS OR 7" FOR ALL OTHER CONDITIONS

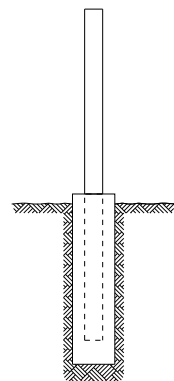


NOTE A:  
TO ACCOMMODATE VARYING HEIGHT NAW, FULL HEIGHT AND TOP PANELS ARE PERMITTED TO BE 4'-0", 5'-0", 6'-0", 7'-0" OR 8'-0" TALL

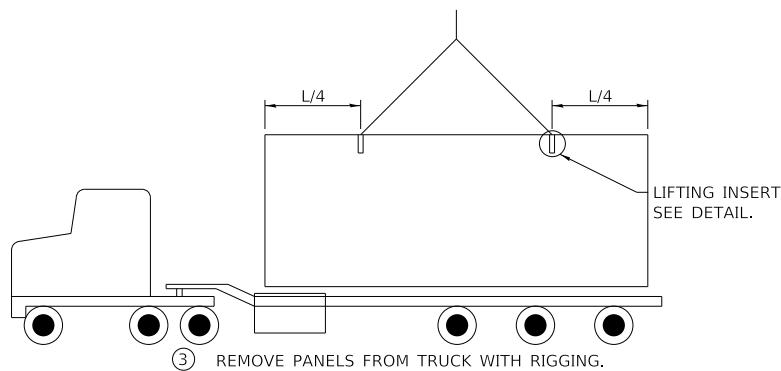




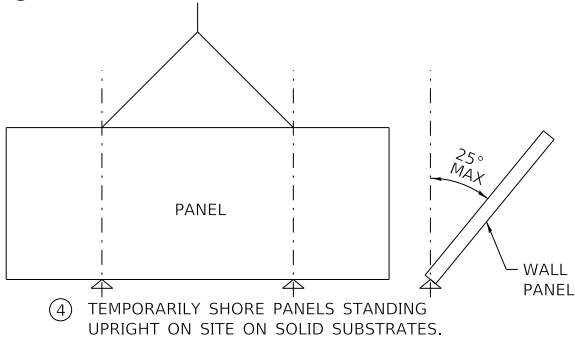
① DRILL SHAFTS



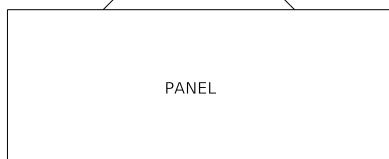
② POUR CONCRETE AND SET EMBEDDED POSTS



③ REMOVE PANELS FROM TRUCK WITH RIGGING.



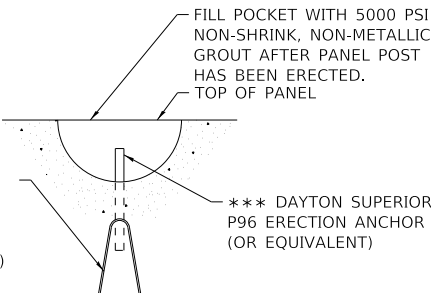
④ TEMPORARILY SHORE PANELS STANDING UPRIGHT ON SITE ON SOLID SUBSTRATES.



⑤ ERECT PANELS BETWEEN POSTS

### SUGGESTED TYPICAL NOISE ABATEMENT WALL INSTALLATION SEQUENCE AND PROCEDURE

BENT TENSION REBAR AS REQUIRED BY ANCHOR MANUFACTURER.  
#4 (E) BAR - 4 TON (PANELS UNDER 8,000 LBS)  
#6 (E) BAR - 8 TON (PANELS UNDER 16,000 LBS)

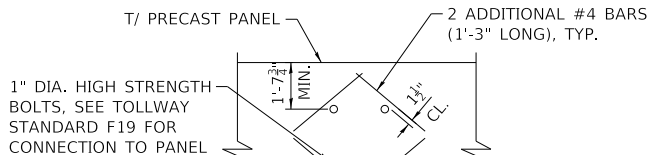


### TYPICAL LIFTING INSERT DETAIL

\*\*\* ERECTION ANCHORS SHALL BE HOT-DIPPED GALVANIZED

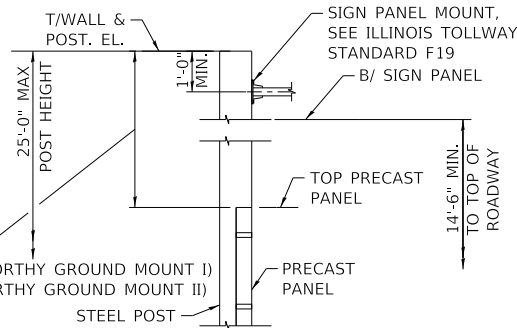
#### NOTES:

- LIFTING INSERTS SHALL HAVE A FACTOR OF SAFETY OF 4:1
- THE NAW INSTALLATION PROCEDURES SHOWN ON THIS SHEET PROVIDE GENERAL INSTALLATION SEQUENCE AND PROCEDURES FOR THE CONTRACTOR. THE CONTRACTOR SHALL RETAIN SOLE RESPONSIBILITY FOR THE MEANS, METHODS, AND TECHNIQUES OF CONSTRUCTION OF THE NAW FOR COMPLIANCE WITH LAWS, REGULATIONS, AND CODES, AND FOR THE SAFETY OF CONSTRUCTION APPLICABLE TO THIS WORK.



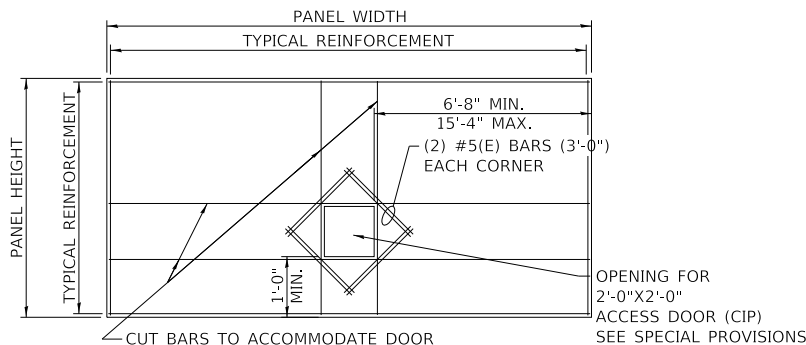
### SIGN PANEL MOUNT TO PANEL DETAIL

PRECAST PANELS HAVE BEEN DESIGNED TO ACCOMMODATE SIGN PANEL MOUNTED WITH MAX 32 SF SIGN AREA IN ACCORDANCE WITH ILLINOIS TOLLWAY STANDARD F19. MIN. PANEL HEIGHT SUPPORTING SIGN SHALL BE 5'-0".

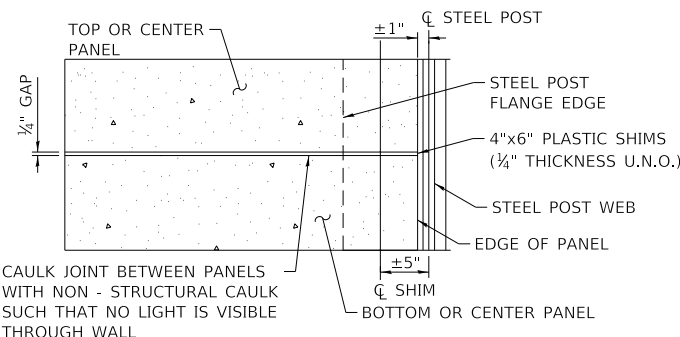


### SIGN PANEL MOUNT POST EXTENSION DETAIL

STEEL POSTS HAVE BEEN DESIGNED TO ACCOMMODATE A POST EXTENSION WITH MAX 32 SF SIGN AREA IN ACCORDANCE WITH ILLINOIS TOLLWAY STANDARD F19 UP TO A MAXIMUM POST HEIGHT OF 25'-0"



### FIRE HYDRANT ACCESS OPENING DETAIL



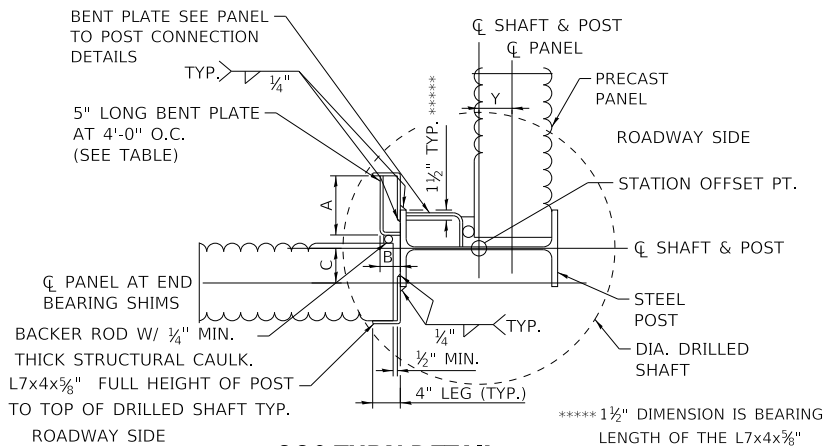
### HORIZONTAL JOINT DETAIL

### 90° TURN BENT PLATE TABLE FOR COHESIVE SOILS

NAW TYPE	BENT PLATE A x B x THICK.	DIM. C
NON-CRASHWORTHY GROUND MOUNTED I	6"x3"x $\frac{3}{8}$ "	3 $\frac{3}{8}$ "
NON-CRASHWORTHY GROUND MOUNTED II	6 $\frac{1}{2}$ "x3"x $\frac{3}{8}$ "	3 $\frac{5}{8}$ "
NON-CRASHWORTHY GROUND MOUNTED III	8 $\frac{1}{2}$ "x3"x $\frac{3}{8}$ "	4 $\frac{1}{2}$ "
NON-CRASHWORTHY GROUND MOUNTED IV	8 $\frac{1}{2}$ "x3"x $\frac{3}{8}$ "	4 $\frac{9}{16}$ "

### 90° TURN BENT PLATE TABLE FOR COHESIONLESS SOILS

NAW TYPE	BENT PLATE A x B x THICK.	DIM. C
NON-CRASHWORTHY GROUND MOUNTED I	6 $\frac{1}{2}$ "x3"x $\frac{3}{8}$ "	3 $\frac{3}{8}$ "
NON-CRASHWORTHY GROUND MOUNTED II	7"x3"x $\frac{3}{8}$ "	3 $\frac{7}{8}$ "
NON-CRASHWORTHY GROUND MOUNTED III	10"x3"x $\frac{3}{8}$ "	5 $\frac{3}{8}$ "
NON-CRASHWORTHY GROUND MOUNTED IV	10 $\frac{1}{4}$ "x3"x $\frac{3}{8}$ "	5 $\frac{9}{16}$ "



### 90° TURN DETAIL

\*\*\*\*\* 1 $\frac{1}{2}$ " DIMENSION IS BEARING LENGTH OF THE L7x4x $\frac{5}{8}$ " ANGLE ON THE POST FLANGE

APPROVED BY:  
*Mamun Nasir*  
CHIEF ENGINEERING OFFICER

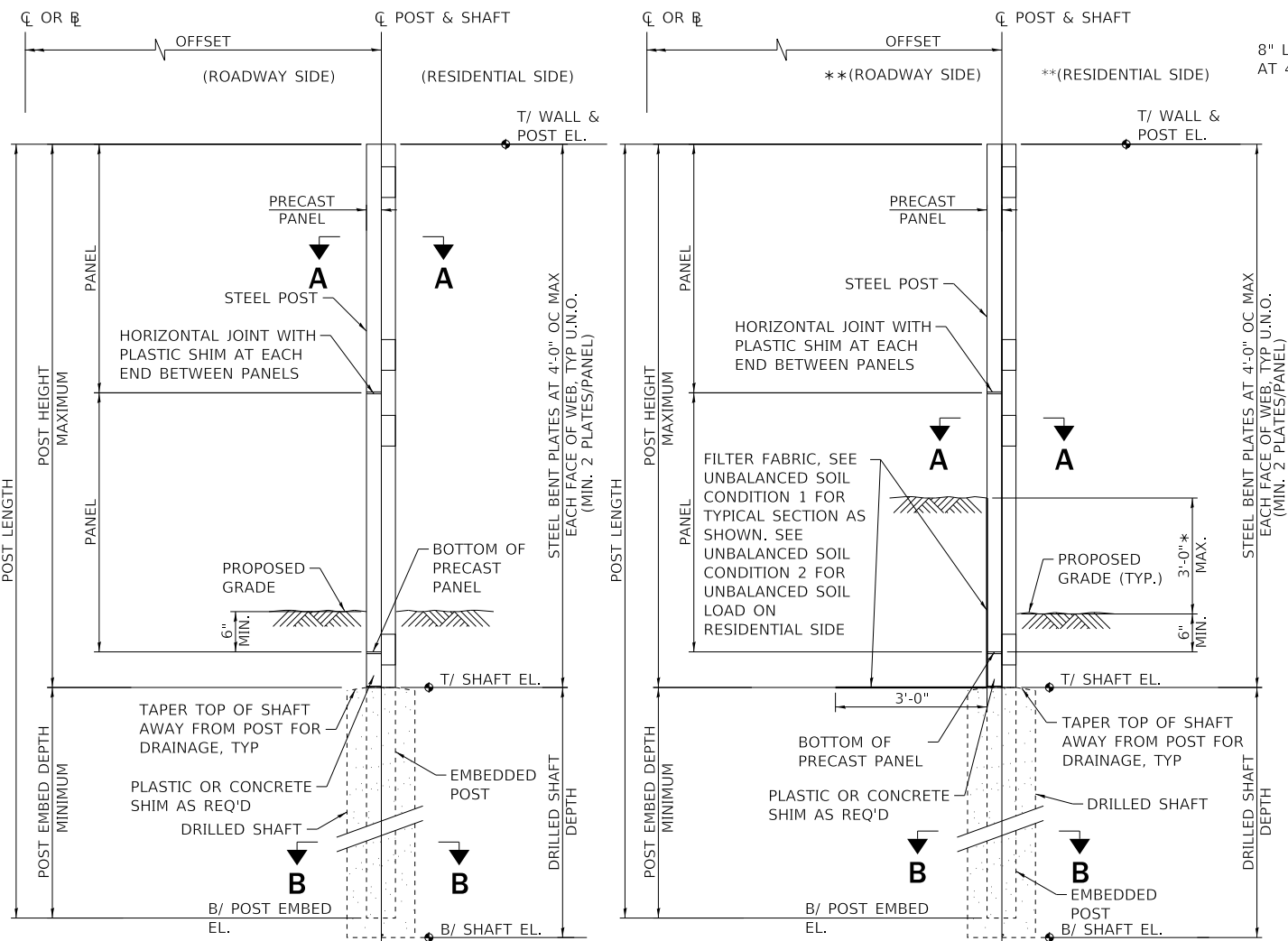
DATE:  
03/01/2023



NON-CRASHWORTHY  
GROUND MOUNTED  
NOISE ABATEMENT WALL  
DETAILS

STANDARD G15-04

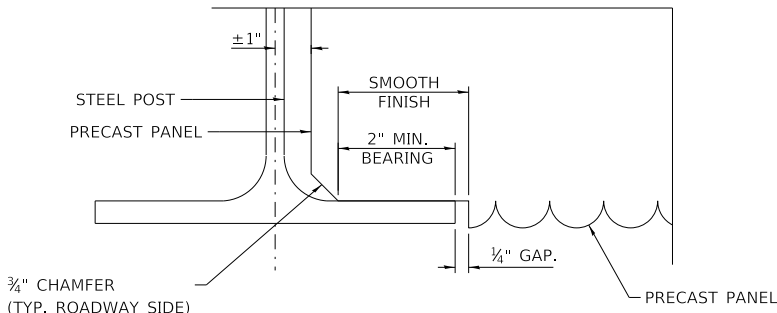




**TYPICAL CROSS SECTION**  
(BALANCED SOIL LOAD)

**TYPICAL CROSS SECTION**  
(UNBALANCED SOIL LOAD)

\*\* TYPICAL SECTION SHOWS ROADWAY ON THE HIGH SIDE. DETAILS OF POST FOR ROADWAY ON THE LOW SIDE ARE MIRRORED.



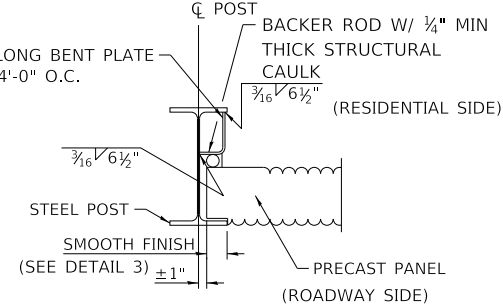
**DETAIL 3**

**POST & DRILLED SHAFT DESIGN FOR COHESIVE SOILS**

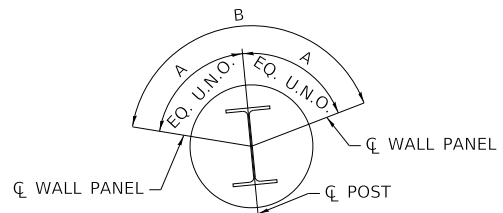
NAW TYPE	MAX POST HEIGHT	MIN POST EMBED DEPTH	MAX DRILLED SHAFT SPACING	DRILLED SHAFT DEPTH	STEEL POST SIZE	Y	BENT PLATE M x N x THICK.	Z	DIA	A	B
CRASHWORTHY GROUND MOUNTED	28'-0"	16'-6"	15'-0"	19'-0"	W21x68	5 1/16"	8 1/2"x3 1/2"x 1/2"	6 3/8"	3'-0"	86°25'00"	172°50'00"

**POST & DRILLED SHAFT DESIGN FOR COHESIONLESS SOILS**

NAW TYPE	MAX POST HEIGHT	MIN POST EMBED DEPTH			MAX DRILLED SHAFT SPACING	DRILLED SHAFT DEPTH			STEEL POST SIZE	Y	BENT PLATE M x N x THICK.	Z	DIA	A	B
		PHI=30°-34°	PHI=35°-39°	PHI=40°+		PHI=30°-34°	PHI=35°-39°	PHI=40°+							
CRASHWORTHY GROUND MOUNTED	28'-0"	17'-0"	14'-6"	13'-0"	15'-0"	21'-0"	18'-0"	15'-0"	W27X84	7 1/16"	14 1/4"x4 3/8"x 1/2"	3 3/4"	3'-0"	86°25'25"	172°50'50"

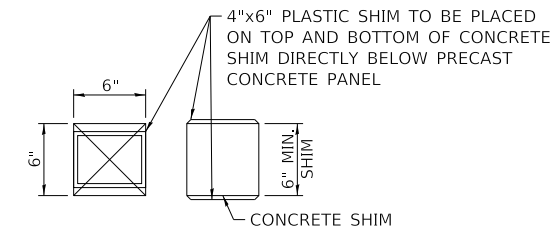


**PANEL TO POST CONNECTION DETAIL**



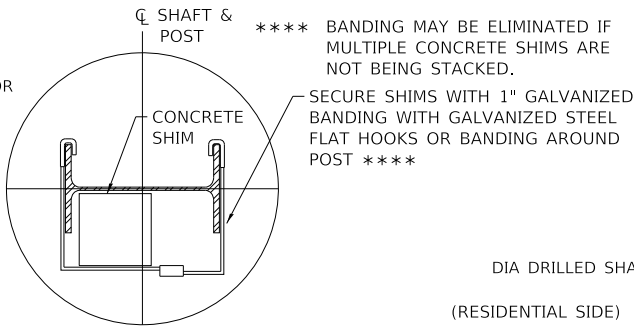
NOTE: MINIMUM ANGLE AT KINK IN WALL NOT REQUIRING POST WITH WIDER FLANGE, MINIMUM DISTANCE FROM FLANGE EDGE TO THE PANEL EDGE SHALL BE 1 3/4".

**MIN ANGLE BETWEEN PANELS AT TYP POST**



**CONCRETE SHIM DETAIL 1**

SHIMS TO BE SECURED TO THE POST SEE DETAIL 2



**SHIM TO POST CONNECTION DETAIL 2**

**GENERAL NOTES**

- ALL EXPOSED CONCRETE EDGES SHALL HAVE A 3/4" X 45° CHAMFER, EXCEPT WHERE SHOWN OTHERWISE. CHAMFER ON VERTICAL EDGES SHALL BE CONTINUED A MINIMUM OF ONE FOOT BELOW FINISHED GROUND LEVEL. NO CHAMFER WILL BE ALLOWED AT HORIZONTAL JOINTS BETWEEN PANELS.
- REINFORCEMENT BARS, INCLUDING EPOXY-COATED REINFORCEMENT BARS, SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-31 (ASTM A706), GRADE 60, DEFORMED BARS.
- REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
- REINFORCEMENT BAR BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE LATEST "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315.
- REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
- CONTRACTOR SHALL NOT SCALE DIMENSIONS FROM THE CONTRACT PLANS FOR CONSTRUCTION PURPOSES. SCALES SHOWN ARE FOR INFORMATION ONLY.
- END POSTS SHALL HAVE NO BENT PLATES ON EXPOSED SIDE.
- THE FOUNDATION DETAILS SHOWN ARE SOIL DEPENDENT. THE FOUNDATION DETAILS FOR COHESIVE SOILS ARE BASED ON THE PRESENCE OF MOSTLY COMMON COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (QU) > 1.25 TONS/SQ. FT. WHICH SHALL BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOB SITE. THE FOUNDATION DETAILS FOR COHESIONLESS SOILS ARE BASED ON THE PRESENCE OF MOSTLY COHESIONLESS CLEAN SANDS, WITH FINES CONTENT LESS THAN 12% AND AN AVERAGE FRICTION ANGLE (PHI) GREATER THAN 30 DEGREES, WHICH SHALL BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOBSITE. THE IDOT GEOTECHNICAL MANUAL SHALL BE USED TO CORRELATE AVERAGE STANDARD PENETRATION RESISTANCE "N - VALUES"(BLOW COUNTS PER FOOT) TO FRICTION ANGLES (PHI), TAKING INTO ACCOUNT FIELD CORRECTIONS. IF CONDITIONS ENCOUNTERED IN THE FIELD ARE DIFFERENT THAN THOSE INDICATED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER TO DETERMINE IF THE FOUNDATION DIMENSIONS NEED TO BE MODIFIED.

**DESIGN LOADS**

CRASHWORTHY GROUND MOUNTED

WIND LOAD = 35 PSF (STR. III)  
= 15 PSF (SERV I)

RETAINED EARTH:

HORIZONTAL SOIL LOAD = 120 PCF  
LIVE LOAD SURCHARGE = 2FT

TL-4 VEHICLE COLLISION LOADING:

54 KIP APPLIED AT 6'-0"  
ABOVE ROADWAY PAVEMENT

SECONDARY IMPACT (NO TL-4 IMPACT):  
4 KIP APPLIED AT THE HIGHEST

POINT UP TO 14FT ABOVE SURFACE  
OF PAVEMENT IN FRONT OF NAW

DEFLECTION:

PANEL = L/240  
POST = H/360

**DESIGN STRESSES**

PRECAST CONCRETE (GROUND MOUNTED NAW):

f'c = 5,000 PSI AT 28 DAYS (CLASS PC)

f'c = 3,500 PSI AT 5 DAYS (SHIPPING)

DENSITY = 150 PCF

FOUNDATION CONCRETE CLASS SI:

f'c = 3,500 PSI AT 14 DAYS PER SECTION 1020  
OF IDOT STANDARD SPECIFICATIONS.

STEEL POSTS:

ASTM A709 (AASHTO M270)

GRADE 50, fy = 50 KSI

ALL STEEL POSTS SHALL BE HOT - DIP GALVANIZED

BENT PLATE AND BEARING ANGLES:

ASTM A709 (AASHTO M270)

GRADE 36, fy = 36 KSI U.N.O.

ALL STEEL SHALL BE HOT - DIP GALVANIZED

REINFORCING STEEL:

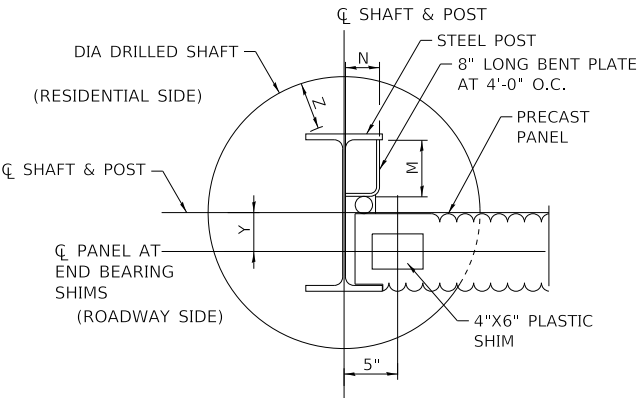
fy = 60,000 PSI (EPOXY COATED)

**DESIGN SPECIFICATIONS**

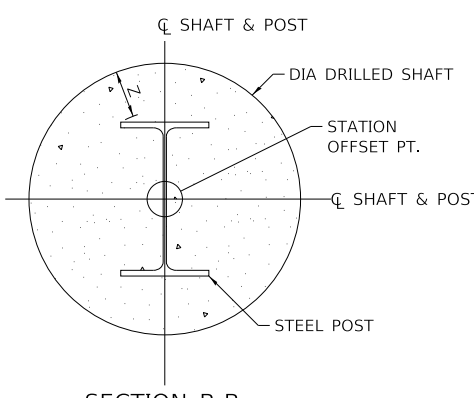
AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS 9TH EDITION DATED APRIL 2020.

ILLINOIS TOLLWAY STRUCTURE DESIGN MANUAL, LATEST EDITION

ILLINOIS TOLLWAY GEOTECHNICAL MANUAL, LATEST EDITION

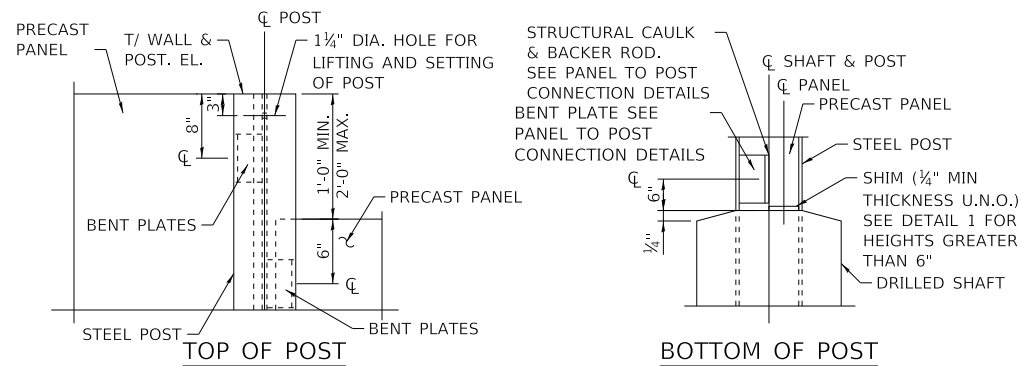


**SECTION A-A**

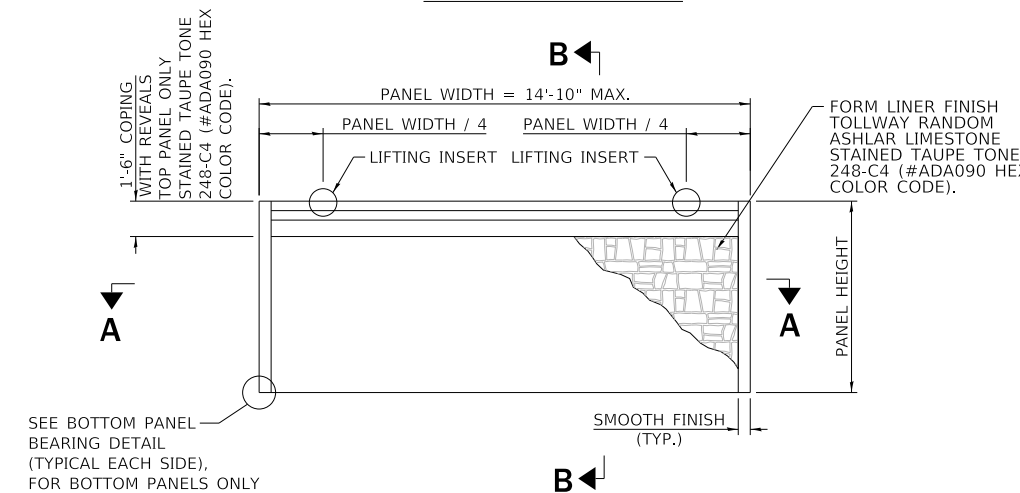


**SECTION B-B**

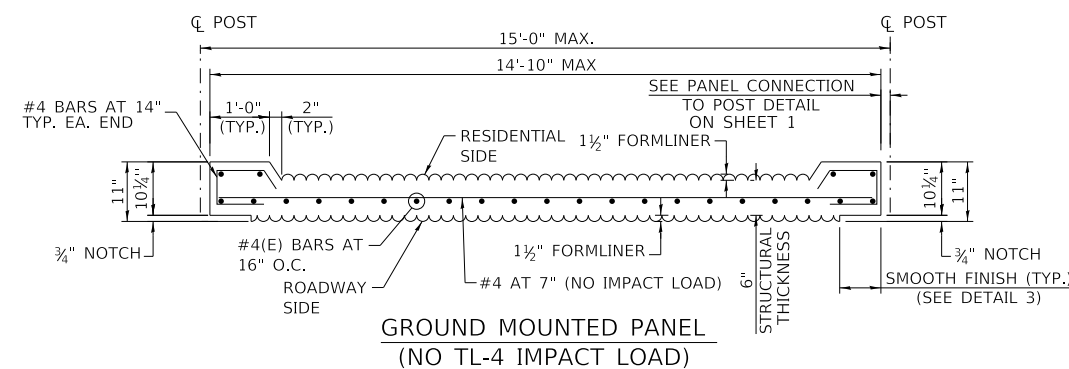
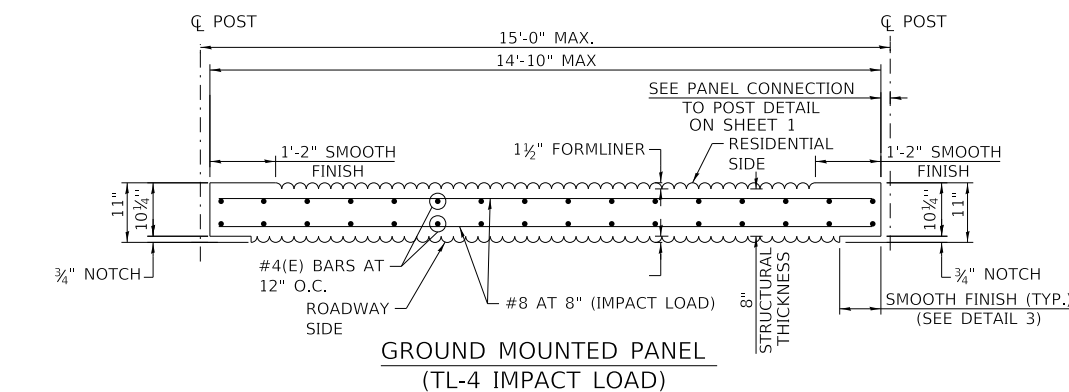
DATE	REVISIONS
3-01-2024	UPDATED POST SIZE NAW DETAIL
	ADDED DETAIL 3 SMOOTH FINISH
2-23-2023	REM. 1FT MIN. DIM. TO GROUND,
	ADD 6" MIN. DIM. TO PANEL, INC.
	COHEHESIONLESS PL. TO 1/2", REV.
	LIFT. INSERT NOTE, DIM.



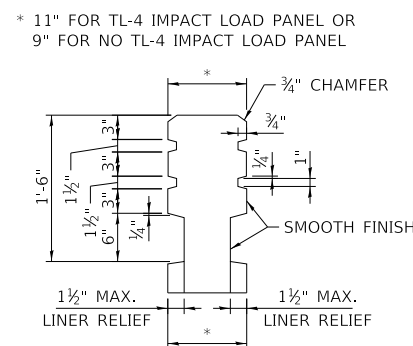
**BENT PLATE DETAILS**



**TYPICAL NOISE WALL PANEL DETAIL**

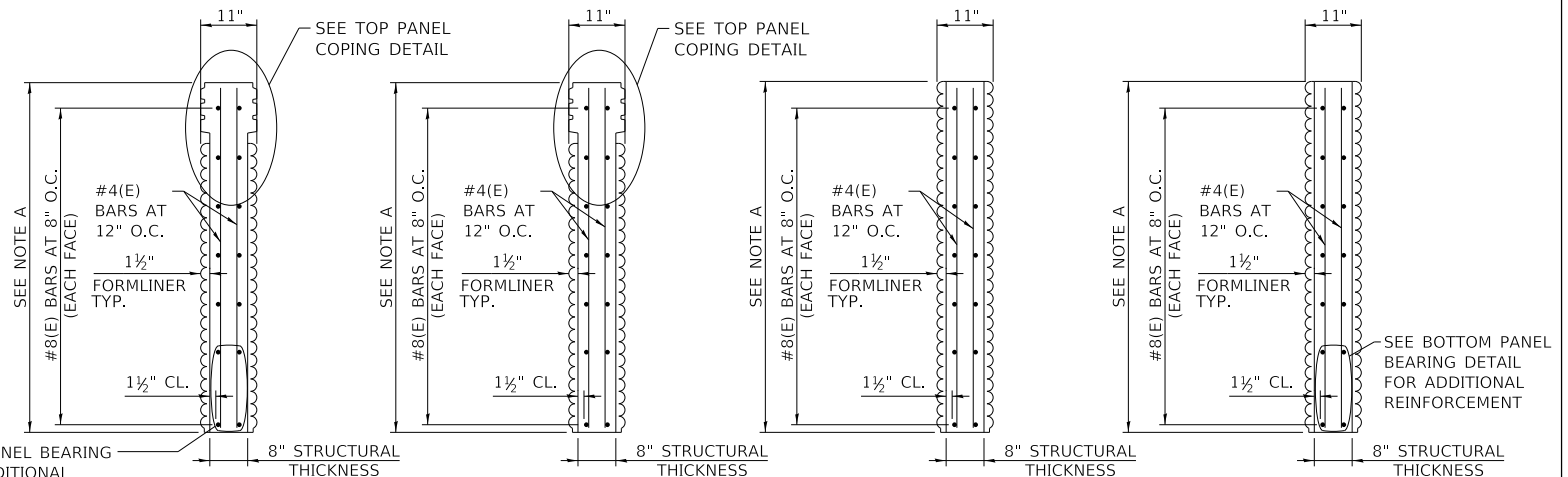


**SECTION A-A**



**TOP PANEL COPING DETAIL**

SEE BOTTOM PANEL BEARING DETAIL FOR ADDITIONAL REINFORCEMENT



**FULL HEIGHT PANEL (TL-4 IMPACT LOAD)**

**TOP PANEL (TL-4 IMPACT LOAD)**

**CENTER PANEL (TL-4 IMPACT LOAD)**

**BOTTOM PANEL (TL-4 IMPACT LOAD)**

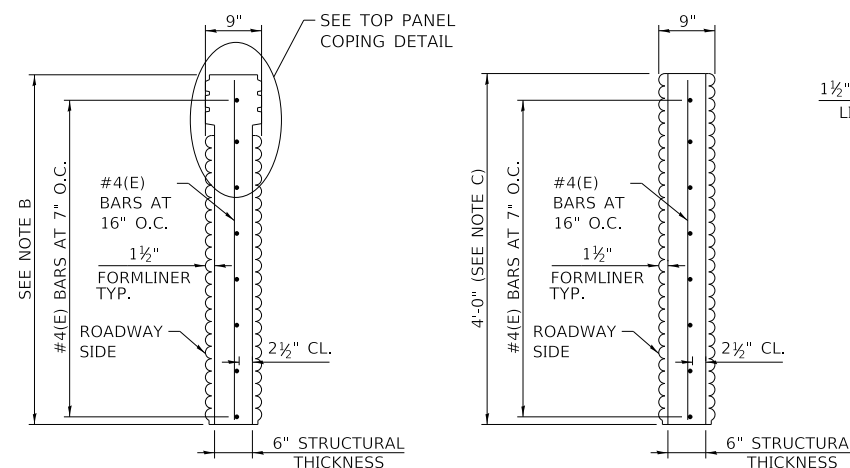
**SECTION B-B**

**SECTION B-B**

**SECTION B-B**

**SECTION B-B**

NOTE A:  
TO ACCOMMODATE VARYING HEIGHT NAW PANELS ARE PERMITTED TO BE 6'-0", 7'-0", 8'-0" OR 9'-0" TALL



**TOP PANEL (NO TL-4 IMPACT LOAD)**

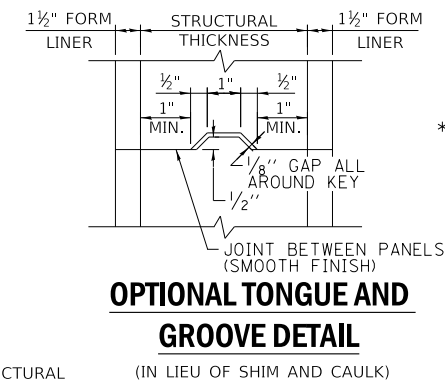
**CENTER PANEL (NO TL-4 IMPACT LOAD)**

**SECTION B-B**

**SECTION B-B**

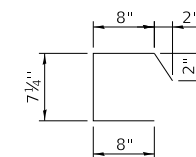
NOTE B:  
TO ACCOMMODATE VARYING HEIGHT NAW, TOP PANEL (NO TL-4 IMPACT LOAD) IS PERMITTED TO BE 5'-0", 6'-0", 7'-0", 8'-0" OR 9'-0" TALL

NOTE C:  
CONTRACTOR MAY INCREASE THE STANDARD PANEL HEIGHTS, MAXIMUM HEIGHT OF 9FT, TO MINIMIZE THE NUMBER OF HORIZONTAL JOINTS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

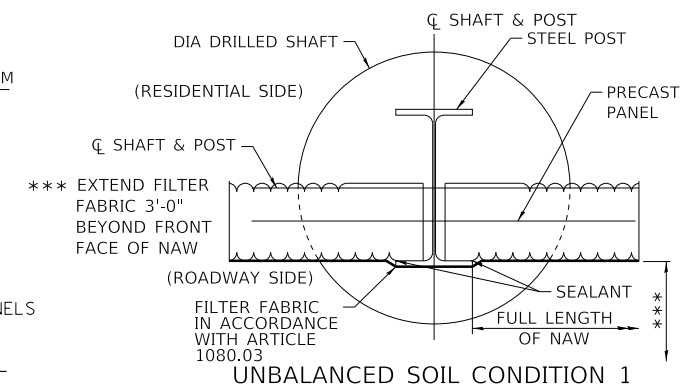


**OPTIONAL TONGUE AND GROOVE DETAIL**

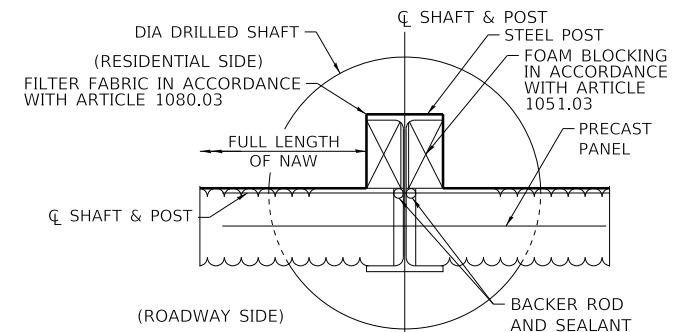
(IN LIEU OF SHIM AND CAULK)



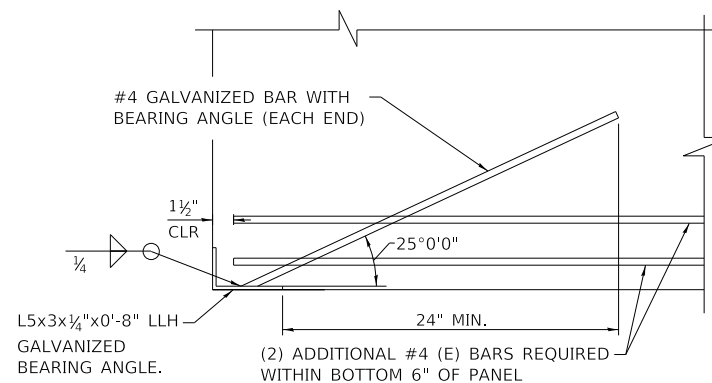
**END BAR DETAIL**



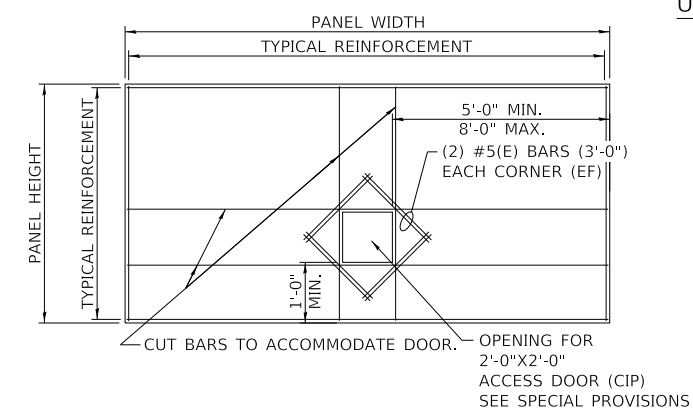
**UNBALANCED SOIL CONDITION 1**



**UNBALANCED SOIL CONDITION 2**

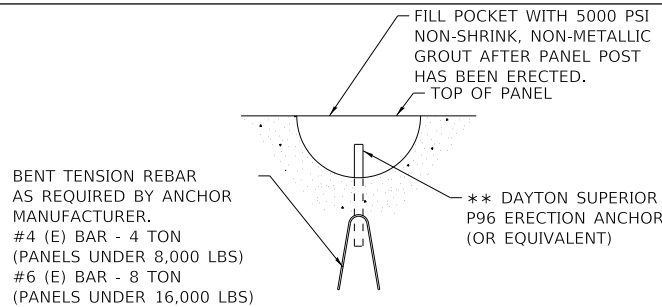


**BOTTOM PANEL BEARING DETAIL**



**FIRE HYDRANT ACCESS OPENING DETAIL**



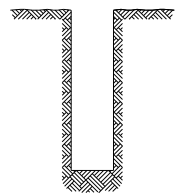


### TYPICAL LIFTING INSERT DETAIL

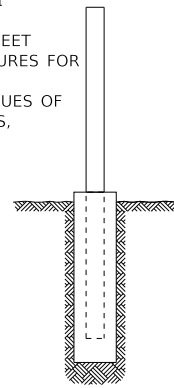
\*\* ERECTION ANCHORS SHALL BE HOT-DIPPED GALVANIZED

#### NOTES:

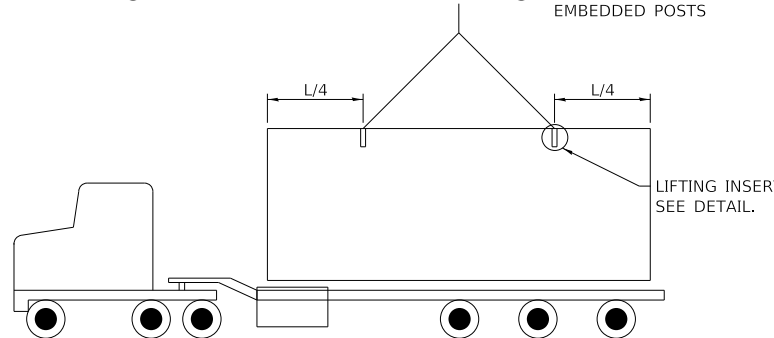
- LIFTING INSERTS SHALL HAVE A FACTOR OF SAFETY OF 4:1
- THE NAW INSTALLATION PROCEDURES SHOWN ON THIS SHEET PROVIDE GENERAL INSTALLATION SEQUENCE AND PROCEDURES FOR THE CONTRACTOR. THE CONTRACTOR SHALL RETAIN SOLE RESPONSIBILITY FOR THE MEANS, METHODS, AND TECHNIQUES OF CONSTRUCTION OF THE NAW FOR COMPLIANCE WITH LAWS, REGULATIONS, AND CODES, AND FOR THE SAFETY OF CONSTRUCTION APPLICABLE TO THIS WORK.



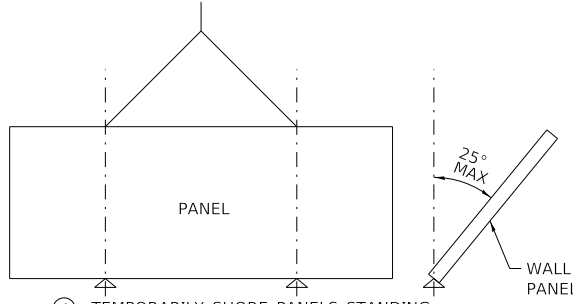
① DRILL SHAFTS



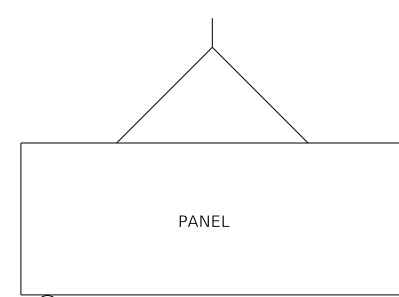
② POUR CONCRETE AND SET EMBEDDED POSTS



③ REMOVE PANELS FROM TRUCK WITH RIGGING.

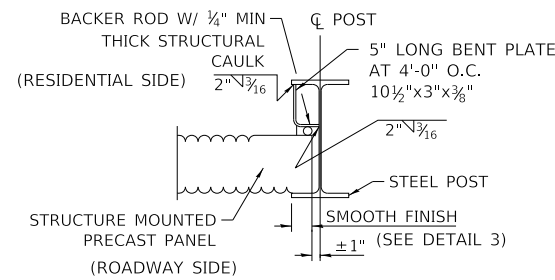


④ TEMPORARILY SHORE PANELS STANDING UPRIGHT ON SITE ON SOLID SUBSTRATES.

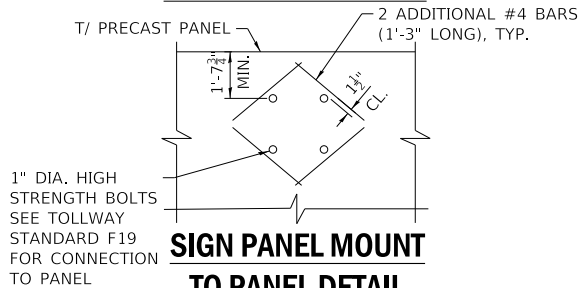


⑤ ERECT PANELS BETWEEN POSTS

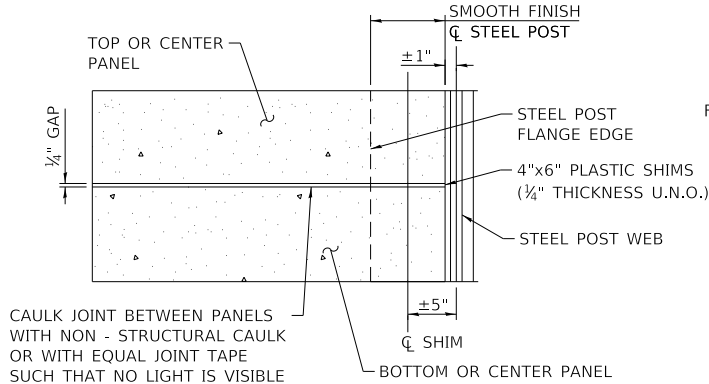
### SUGGESTED TYPICAL NOISE ABATEMENT WALL INSTALLATION SEQUENCE AND PROCEDURE



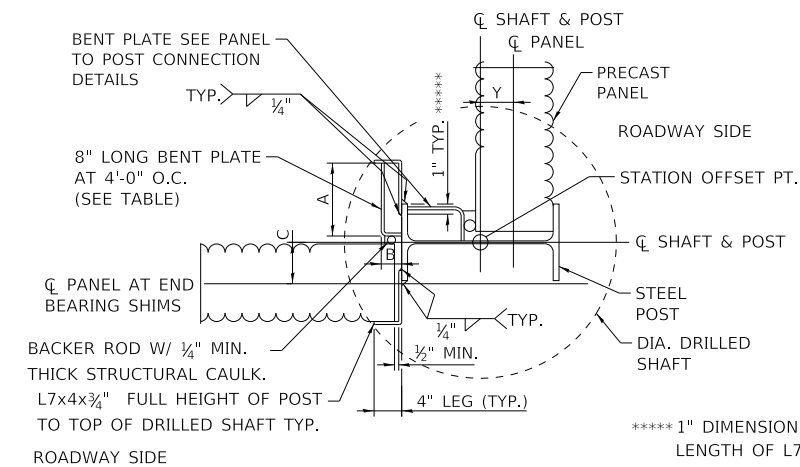
### STRUCTURE MOUNTED PANEL TO POST CONNECTION DETAIL



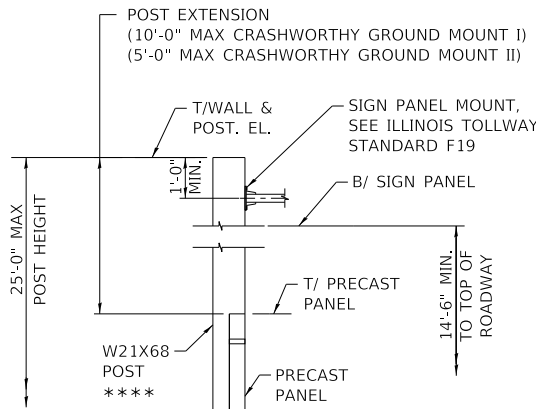
\*\*\* PRECAST PANELS HAVE BEEN DESIGNED TO ACCOMMODATE SIGN PANEL MOUNT WITH MAX 32 SF SIGN AREA IN ACCORDANCE WITH ILLINOIS TOLLWAY STANDARD F19. MIN. PANEL HEIGHT SUPPORTING SIGN SHALL BE 5'-0".



### HORIZONTAL JOINT DETAIL

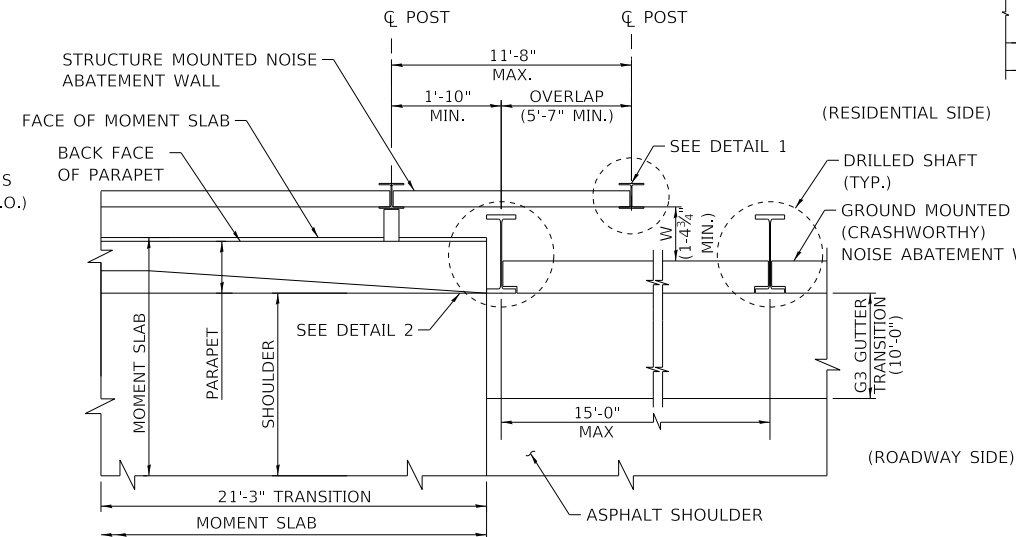


### 90° TURN DETAIL

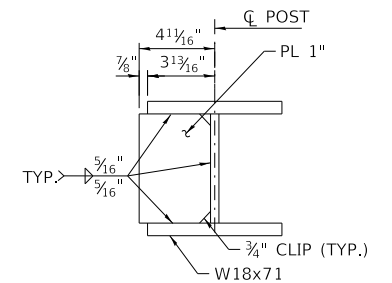


### SIGN PANEL MOUNT POST EXTENSION DETAIL

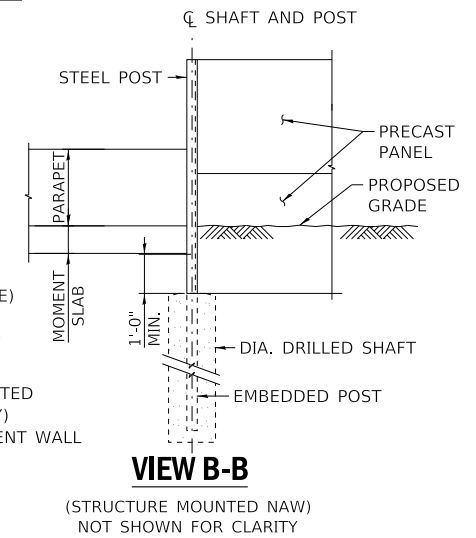
\*\*\*\* W18X71 POSTS HAVE BEEN DESIGNED TO ACCOMMODATE A POST EXTENSION WITH MAX 32 SF SIGN AREA IN ACCORDANCE WITH ILLINOIS TOLLWAY STANDARD F19 UP TO A MAXIMUM POST HEIGHT OF 25'-0"



### NAW TRANSITION DETAIL PLAN

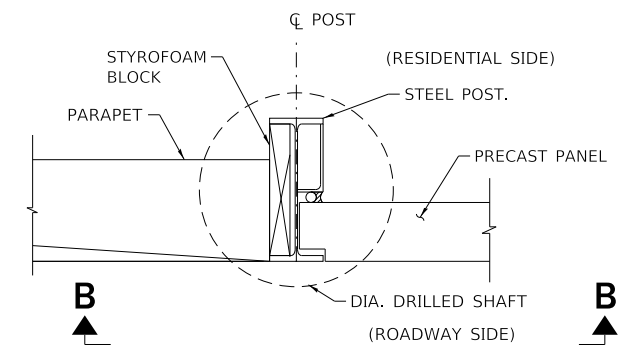


### BEARING PLATE DETAIL



### DETAIL 1

### DETAIL 2



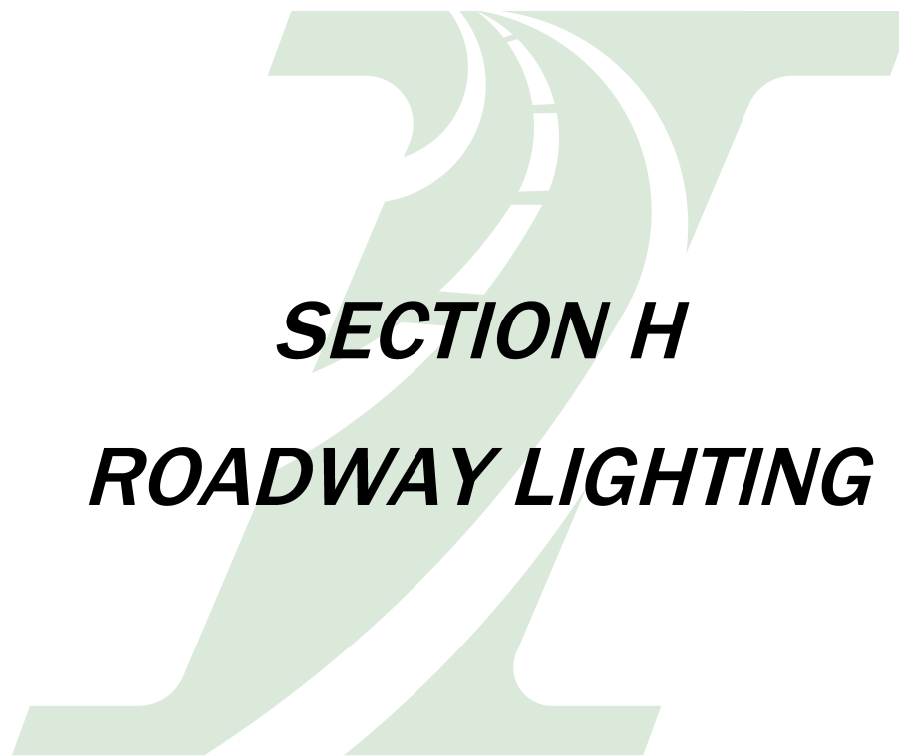
CRASHWORTHY GROUND MOUNTED NAW TRANSITION TO PARAPET

### 90° TURN BENT PLATE TABLE

STEEL POST TYPE	BENT PLATE A x B x THICK.	DIM. C
W21x68	7 3/4"x3"x3/8"	4 5/8"
W27x84	9 1/2"x3"x3/8"	5 1/2"

\*\*\*\*\* 1" DIMENSION IS BEARING LENGTH OF L7x4x3/4" ANGLE ON THE POST FLANGE

# ***STANDARD DRAWINGS***



## ***SECTION H*** ***ROADWAY LIGHTING***

MARCH 2024

Illinois Tollway Standard Drawing Revisions

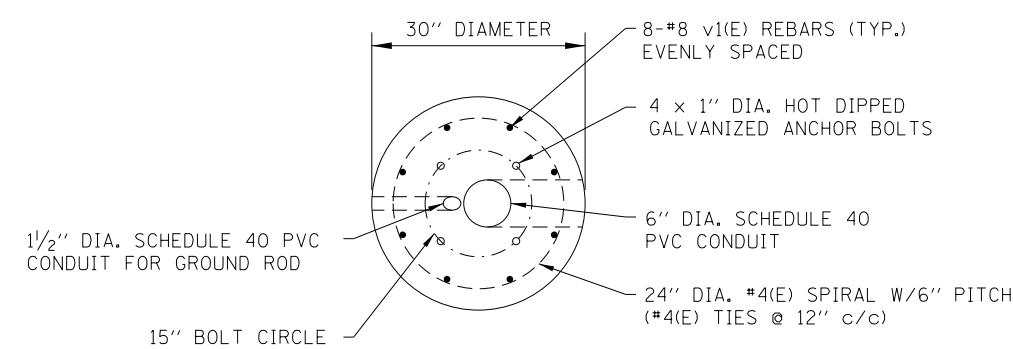
Section H	Roadway Lighting		
	Standard	Modification Summary	Effective: 03-01-2024
	H1-12	LIGHT STANDARD FOUNDATION	
	Sheet 1	Revised the bolt projection dimension from 3-1/3" to 2-1/2".	
		Added detailed notes to Note 1 to address the grading changes surrounding the light standard foundation.	
	Sheet 2	Revised the bolt projection dimension from 3-1/3" to 2-1/2" max or as needed.	
		Added note of reference to hardware and attachment details.	
		Added reference to the graded aggregate pad at finished grade.	
		Revised the description of the steel helix mounting plate.	
	Sheet 3	Revised the dimension to 44-inches from 42-inches within the Light Standard Foundation detail title.	
	Sheet 4	Revised the dimension to 44-inches from 42-inches within the Light Standard Foundation detail title.	
	Sheet 5	Revised the dimension to 44-inches from 42-inches within the Light Standard Foundation detail title.	
	Sheet 6	Revised the dimension within the Light Standard Foundation detail title to 44-inches from 42-inches.	
		Revised all references to aggregate from level.	
	Sheet 7	Revised grading details to account for slope adjustments.	
		Revised all references to aggregate from level.	
	Sheet 8	Revised grading details to account for slope adjustments.	
		Revised grading details to account for slope adjustments.	
	Sheet 9	Revised grading details to account for slope adjustments.	
	Sheet 10	Revised the class DS concrete Class SI concrete to be shown below the conduit.	
		Removed the dimension of the anchor bolt from the elevation view.	
	H2-10	LIGHT STANDARD DETAILS	
	Sheet 1	Removed references to HPS.	
		Revisions to notes 6 and 8.	
	Sheet 2	Revised callouts for light standard mounting detail ground mounted units.	
	Sheet 3	Removed surge protectors and added a dedicated neutral wire to each fixture.	
	H3-08	BRIDGE CONDUIT DETAILS	
	Sheet 1	Removed the dimension of the anchor bolt from the Section A-A view.	
	Sheet 2	Added the transition slab to the Integral/Semi-Integral abutment with parapet on approach parapet detail.	
	Sheet 3	Revised callouts for Section A-A view.	
	Sheet 4	Revised callouts to the elevation view.	
	H4-06	HEAVY-DUTY HANDHOLE AND BURIED WIRING DETAILS	
		Added Note 7 and callout to Note 7 at the handhole elevation view.	
	H10-05	BRIDGE MOUNT SIGN LIGHTING DETAILS	
	Sheet 1	Revised note 5 to address sign lighting updates.	
	H11-06	SPAN TYPE STRUTURE SIGN LIGHTING DETAILS	
		Revised note 6 to address sign lighting updates.	

Illinois Tollway Standard Drawing Revisions

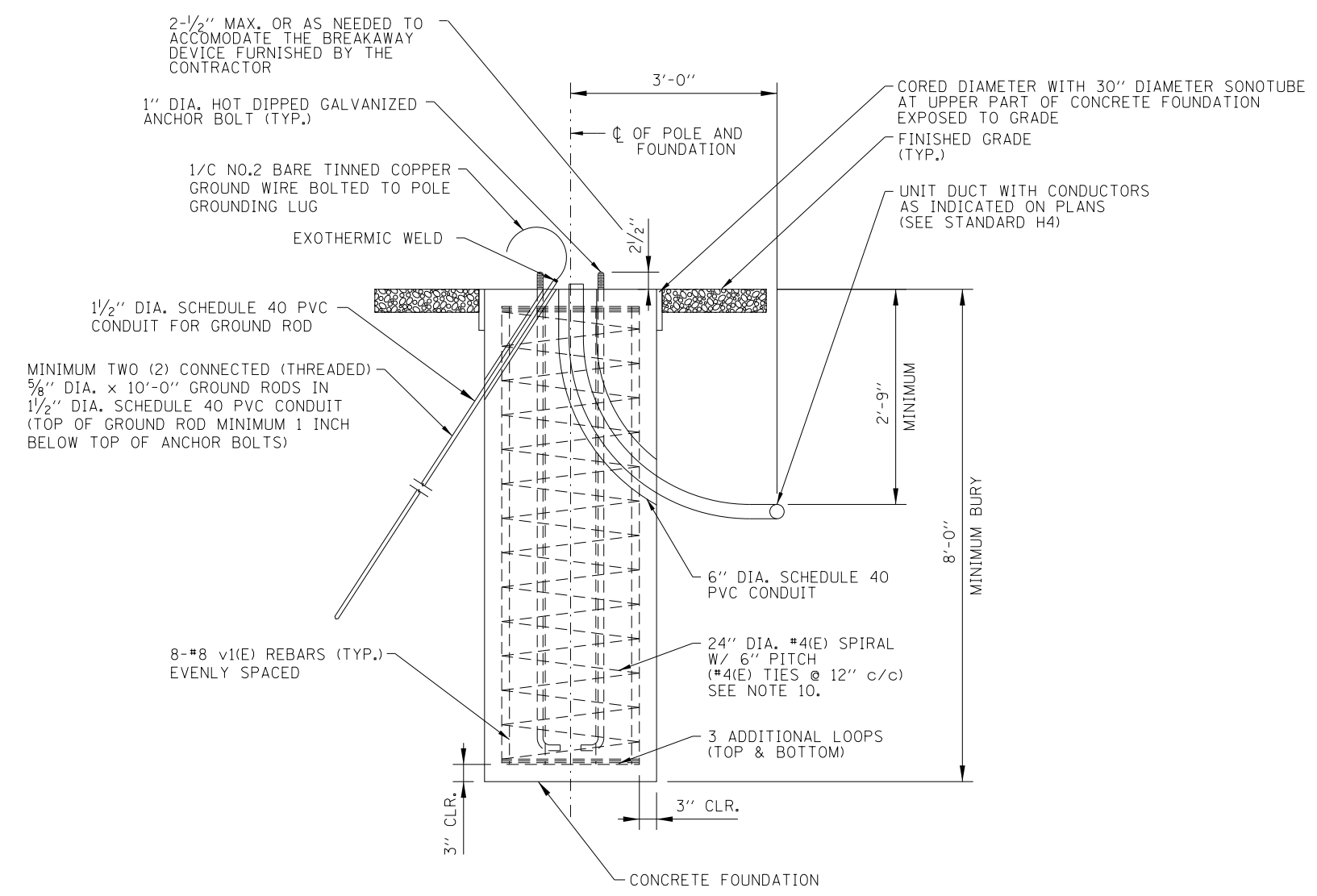
Section H	Roadway Lighting		
	Standard	Modification Summary	Effective: 03-01-2024
	H12-05	CANTILEVER STRUCTURE SIGN LIGHTING DETAILS	
	Sheet 1	Revised note 4 to address sign lighting updates.	
	H16-02	MAST ARM CABLE ASSEMBLY (TWIN MAST ARM)	
		Added details regarding the hardware used to secure the luminaire housing.	
	H17-02	MAST ARM CABLE ASSEMBLY (SINGLE MAST ARM)	
		Added details regarding the hardware used to secure the luminaire housing.	
	H19-00	CONCRETE BARRIER CONDUIT AND JUNCTION BOX DETAILS	
		Added new standard H19.	

 New Sheet

 Retired Standard



PLAN

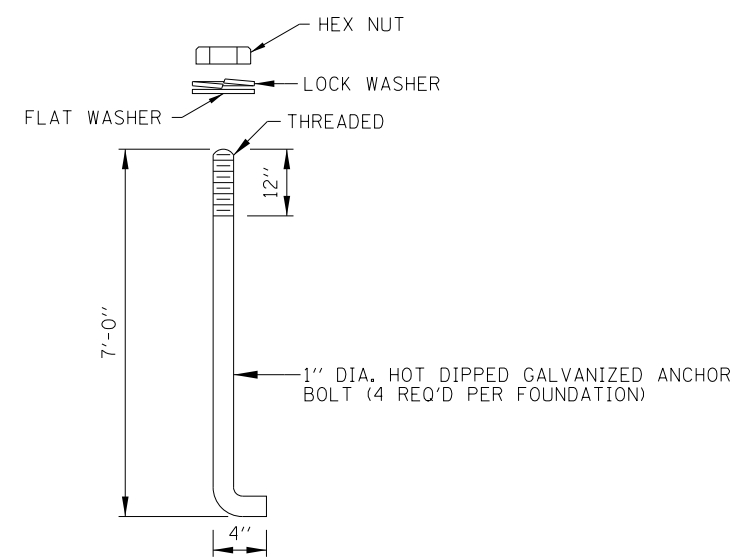


ELEVATION

NOTES:

- AT LOCATIONS NOT SHIELDED BY A GUARDRAIL, THE LIGHT POLE FOUNDATION SHALL BE FLUSH WITH SURROUNDING AGGREGATE PAD AS DETAILED ON SHEETS 7 AND 8 OF THIS STANDARD. CROSS SLOPES OF THE AGGREGATE PAD SHALL BE PER THE FOLLOWING TABLE:
- AGGREGATE PADS SHALL BE CONSTRUCTED OF AGGREGATE SHOULDERS WITH FILTER FABRIC, TYPE B, 4".
- PROVIDE SEEDING, POTASSIUM FERTILIZER NUTRIENT, AND EROSION CONTROL BLANKET AS REQUIRED.
- THE TOP OF FOUNDATION SHALL BE AT THE SAME ELEVATION AS THE GRADED AGGREGATE PAD AT THE CENTER OF THE LIGHT POLE WHEN SLOPED AS DESCRIBED IN NOTE 1.
- ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
- ALL GROUND MOUNTED LIGHT POLES SHALL BE PROVIDED WITH AN ACCEPTED FHWA BREAKAWAY BASE OR DEVICE PER THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS SECTION 1070.
- FOR DETAILS OF FUSE HOLDER, POLE BASE WIRING AND CONDUCTOR SPLICE SEE STANDARD H2.
- ALL REINFORCEMENT BARS SHALL BE EPOXY COATED.
- ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
- FOR ALL MEDIAN BARRIER FOUNDATIONS, THE ANCHOR BOLTS SHALL BE CENTERED AROUND THE MEDIAN BARRIER WALL CENTERLINE.
- ADJUST SPIRAL BAR SPACING AS NEEDED TO ACCOMMODATE CONDUIT ENTRANCE.

ADJACENT ROADWAY SIDESLOPE	REQUIRED CROSS SLOPE OF PAD
FORESLOPE 1:6H OR FLATTER	MATCH PROPOSED ROADWAY SIDESLOPE
FORESLOPE STEEPER THAN 1:6H	1:6H CROSS SLOPE
BACKSLOPE 1:4H OR FLATTER	MATCH PROPOSED ROADWAY SIDESLOPE
BACKSLOPE STEEPER THAN 1:4H	1:4H CROSS SLOPE

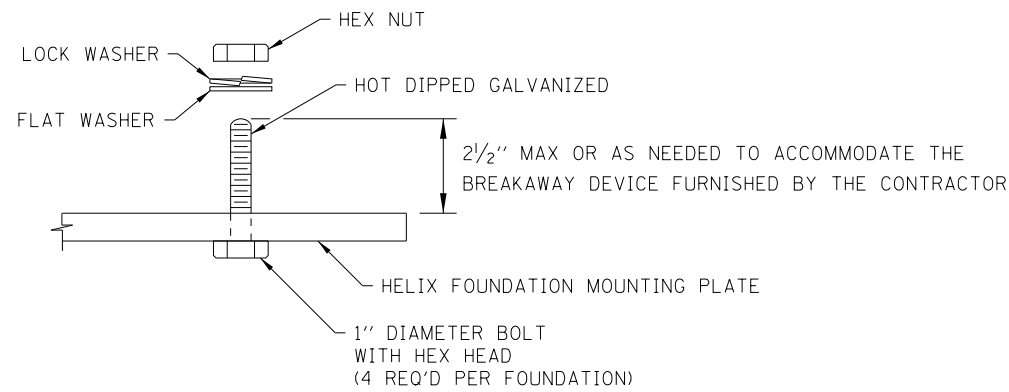


ANCHOR BOLT DETAIL

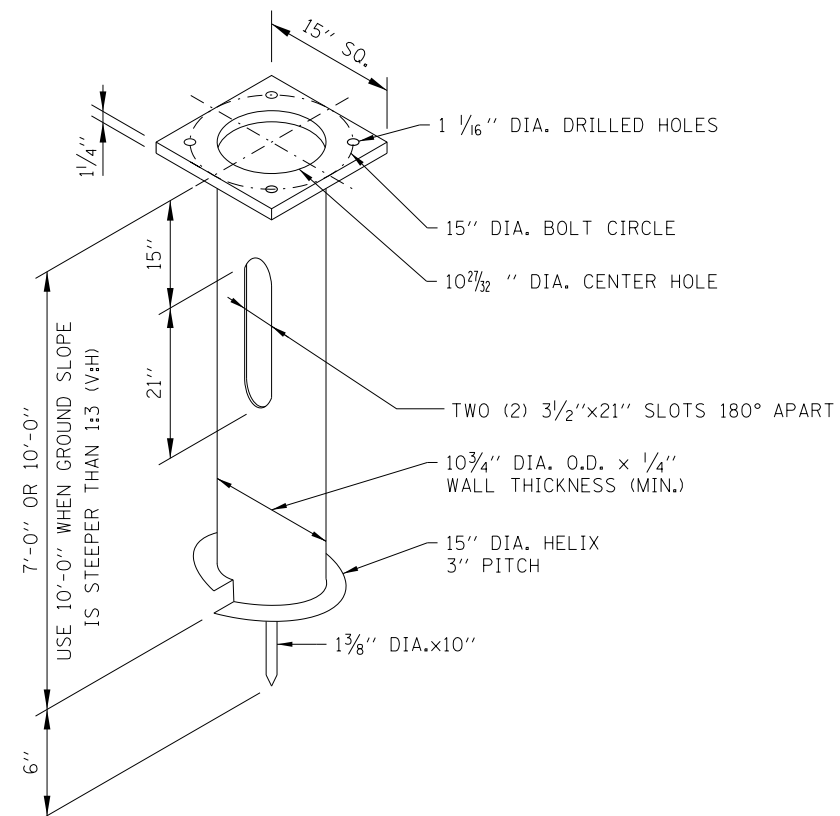


LIGHT STANDARD FOUNDATION DETAILS - CONCRETE  
(GROUND MOUNTED UNITS)

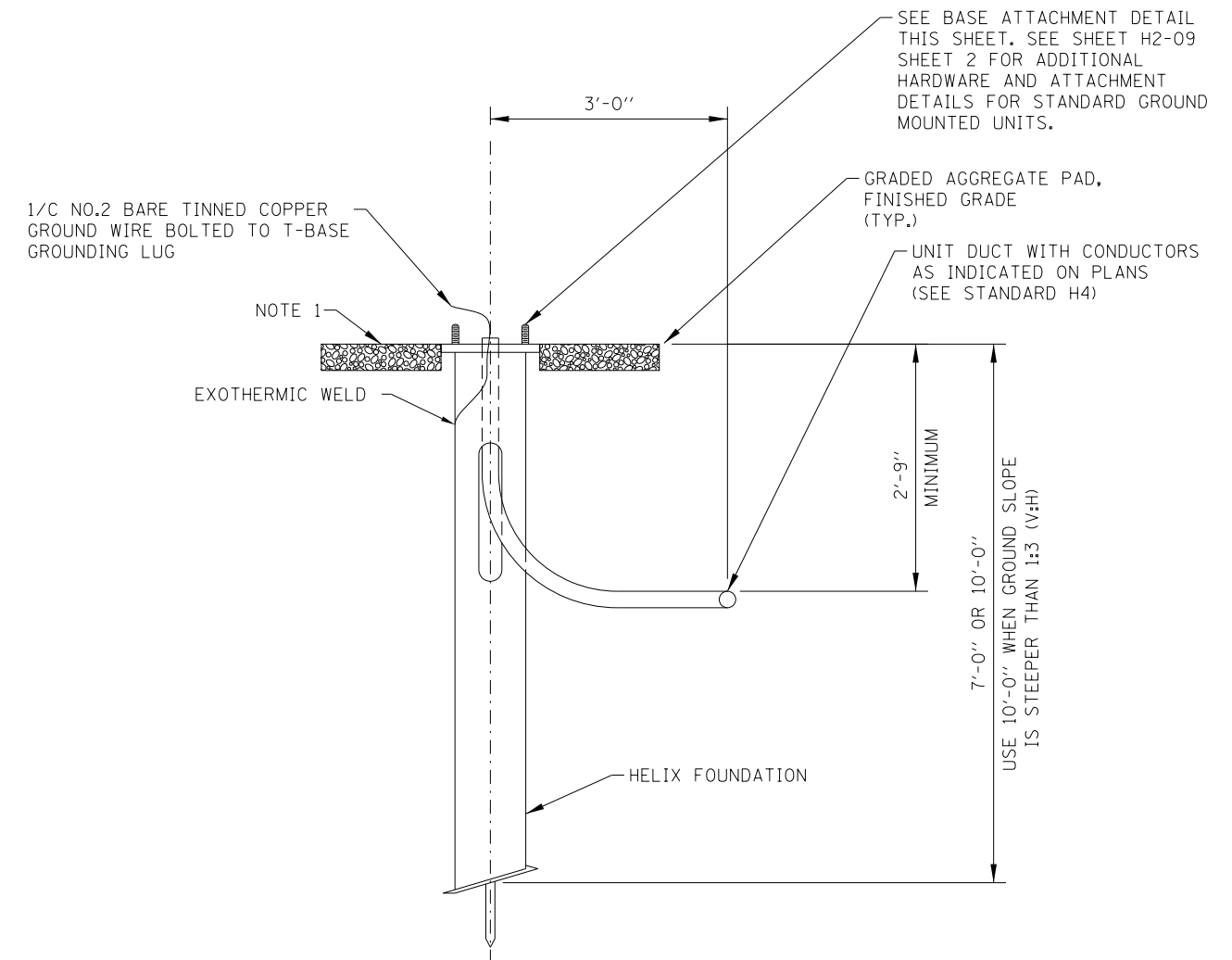
DATE	REVISIONS
3-01-2024	REVISED THE BOLT PROJECTION DIMENSION FROM 3-1/2" TO 2-1/2". ADDED DETAILED NOTES TO ADDRESS THE GRADING CHANGES SURROUNDING THE LIGHT STANDARD FOUNDATION. REVISED DIMENSIONS OF THE MEDIAN BARRIER. REVISED ALL REFERENCES TO AGGREGATE FROM LEVEL. REVISED GRADING DETAILS.



## BASE ATTACHMENT DETAIL



## ISOMETRIC



## ELEVATION

SHEET 2 OF 10



LIGHT STANDARD FOUNDATION

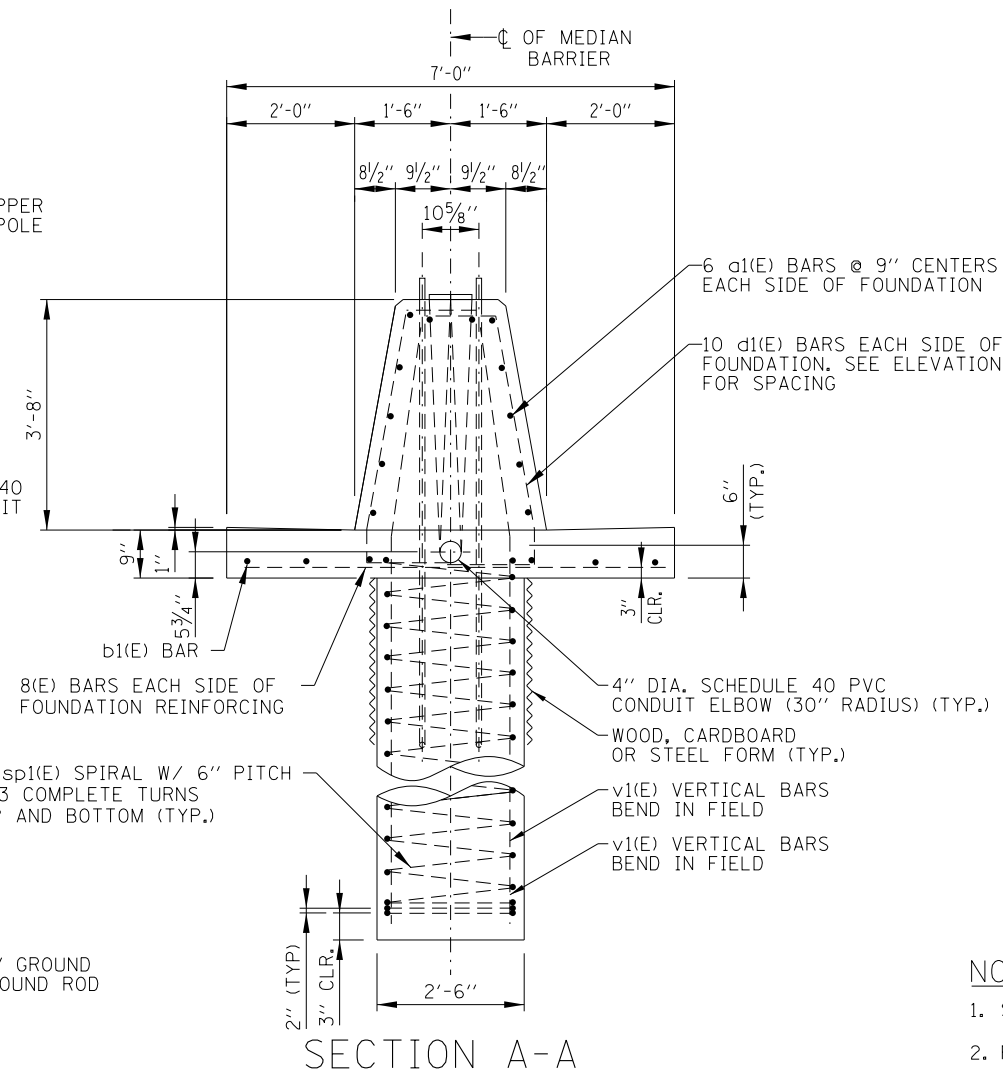
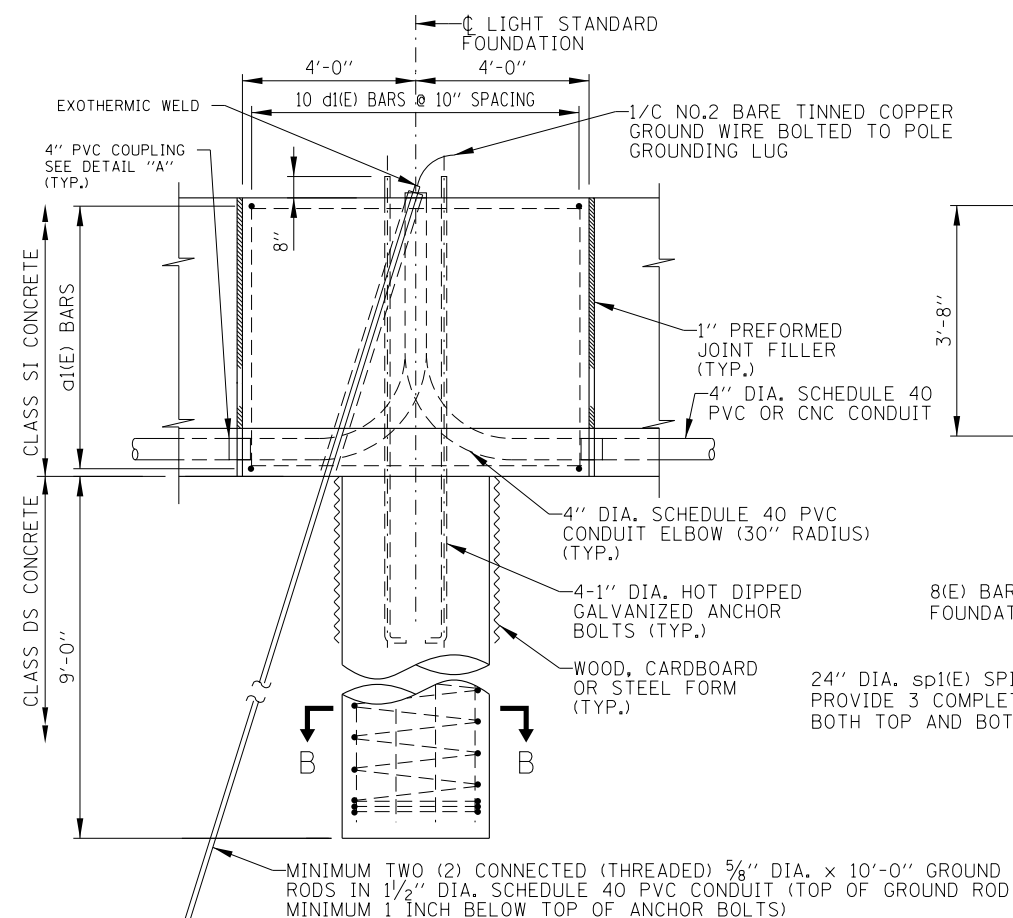
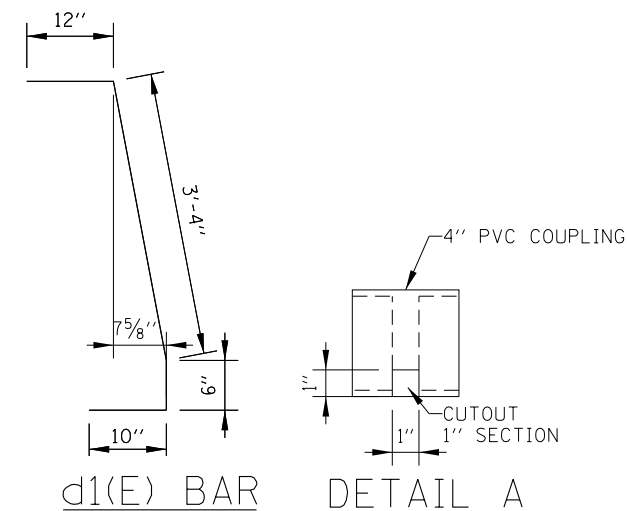
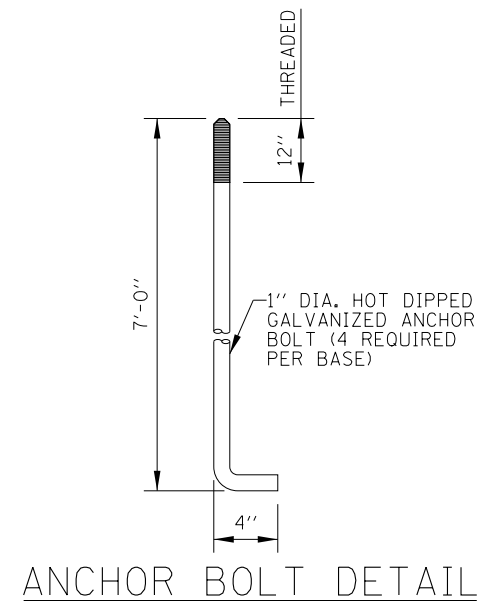
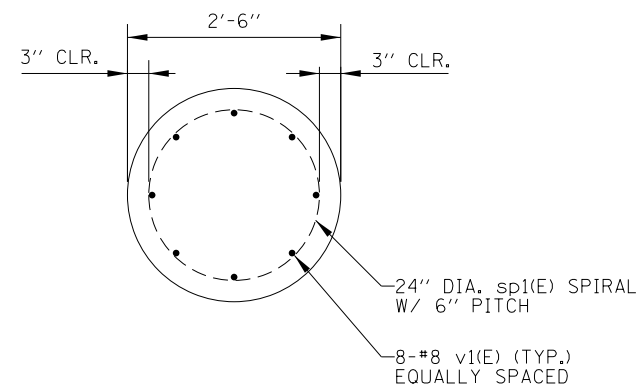
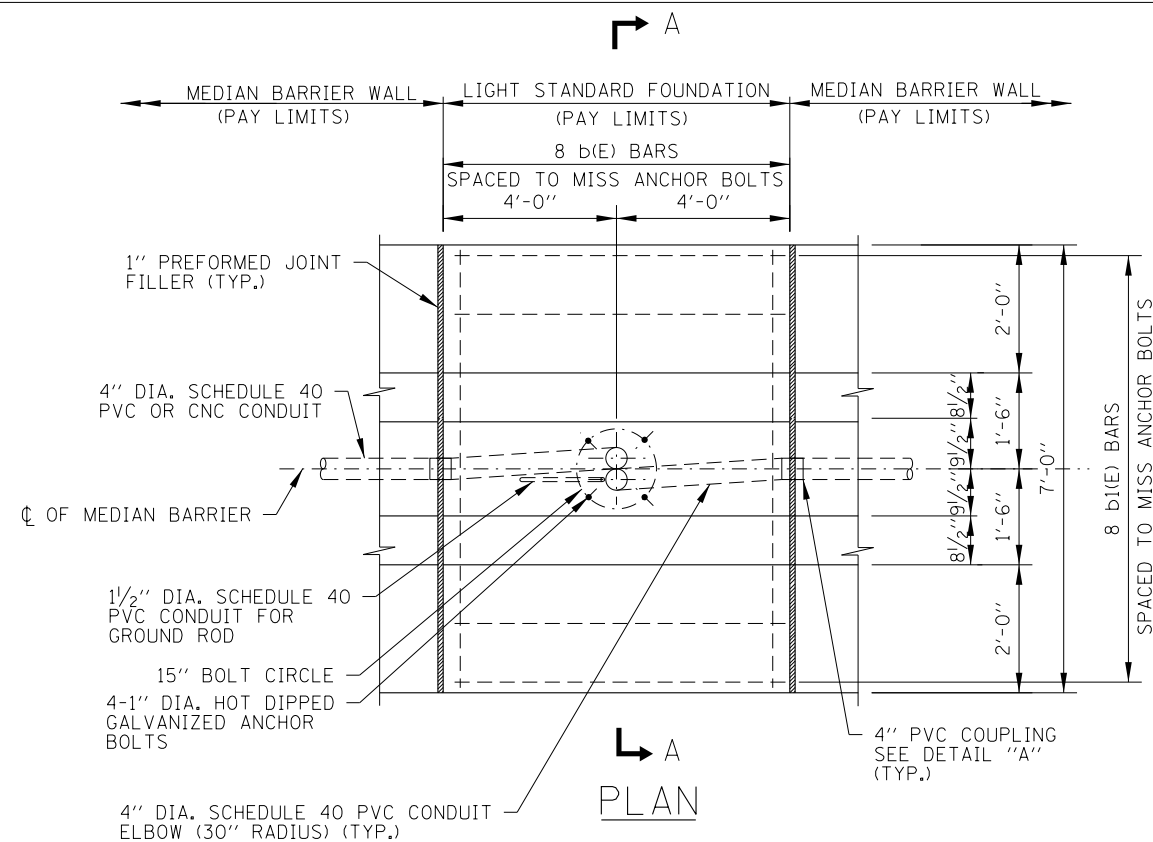
STANDARD H1-12

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE: 03/01/2024

## LIGHT STANDARD FOUNDATION DETAILS - HELIX (GROUND MOUNTED UNITS)

NOTES:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.



REINFORCEMENT BARS SCHEDULE					
BAR	NO.	SIZE	LENGTH	WT. LB.	SHAPE
d1(E)	12	#4	7'-6"	60	—
b(E)	8	#4	6'-6"	35	—
b1(E)	8	#4	7'-8"	41	—
d1(E)	20	#4	5'-8"	76	└┐
sp1(E)	1	#4	*	99	W
v1(E)	8	#8	11'-9"	251	—

\* SEE SECTION A-A

#### NOTES:

- SEE SHEET 1 OF THIS SERIES FOR NOTES.
- FOR SLIP FORM, SEE SHEET 6 OF THIS SERIES.

SHEET 3 OF 10

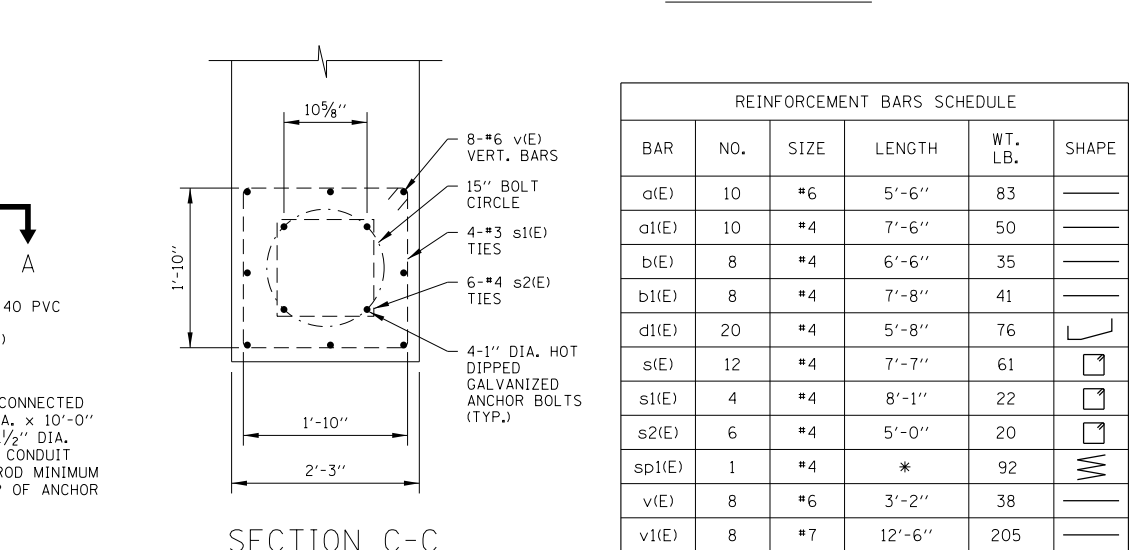
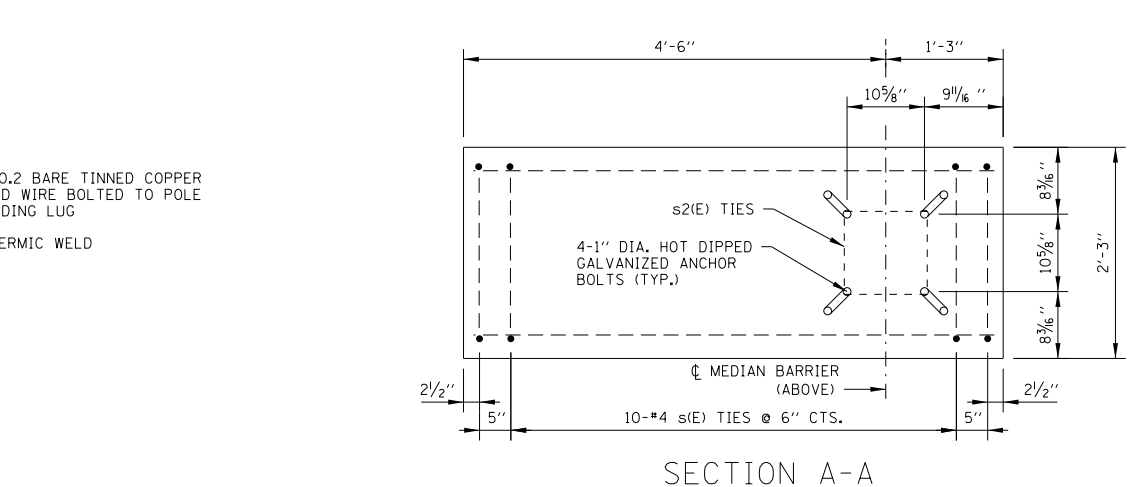
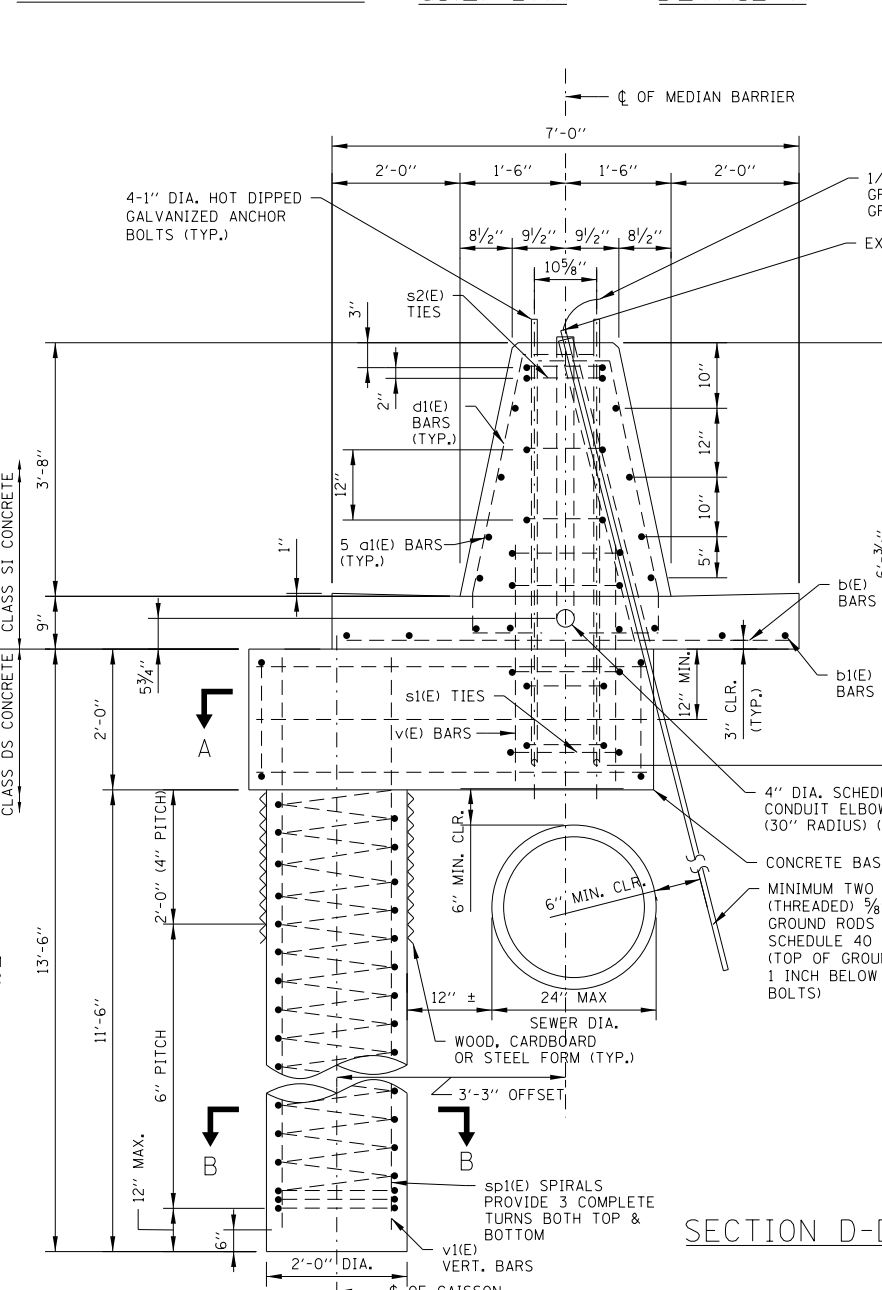
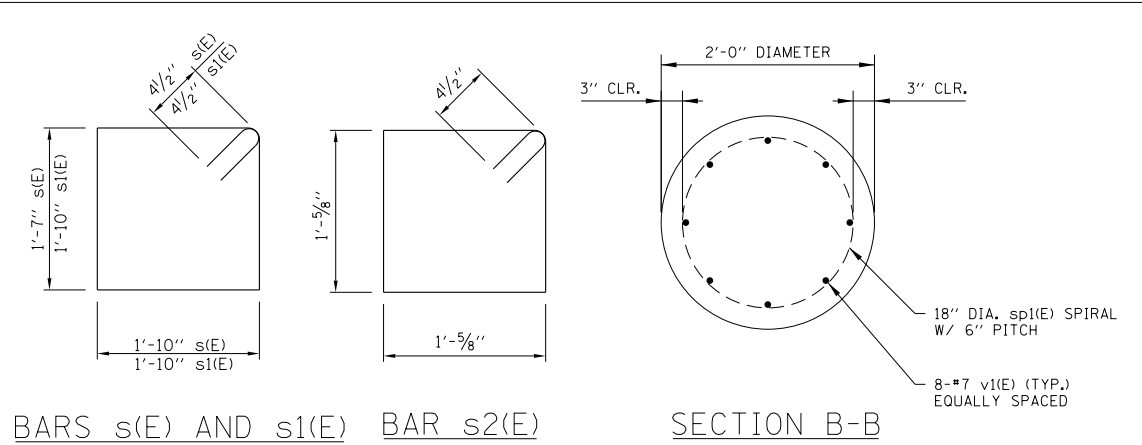
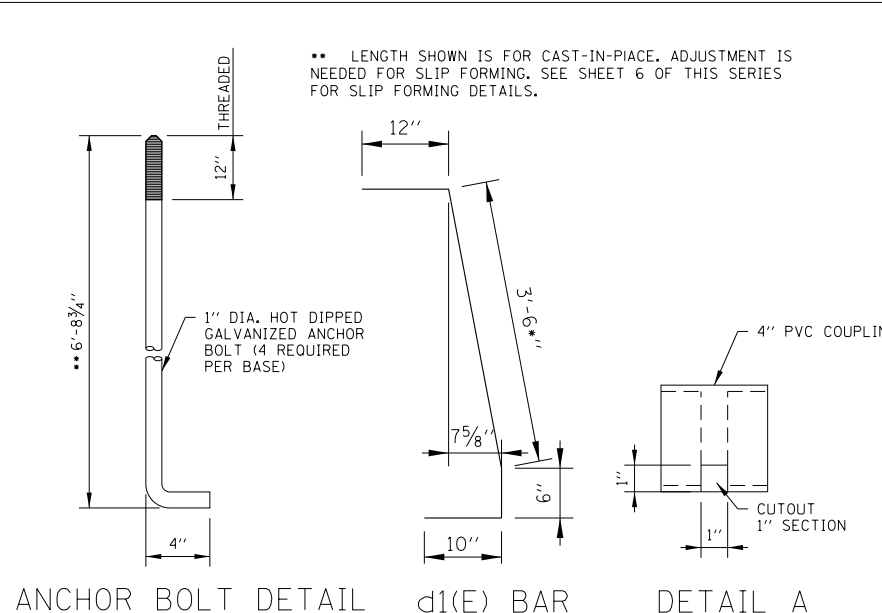
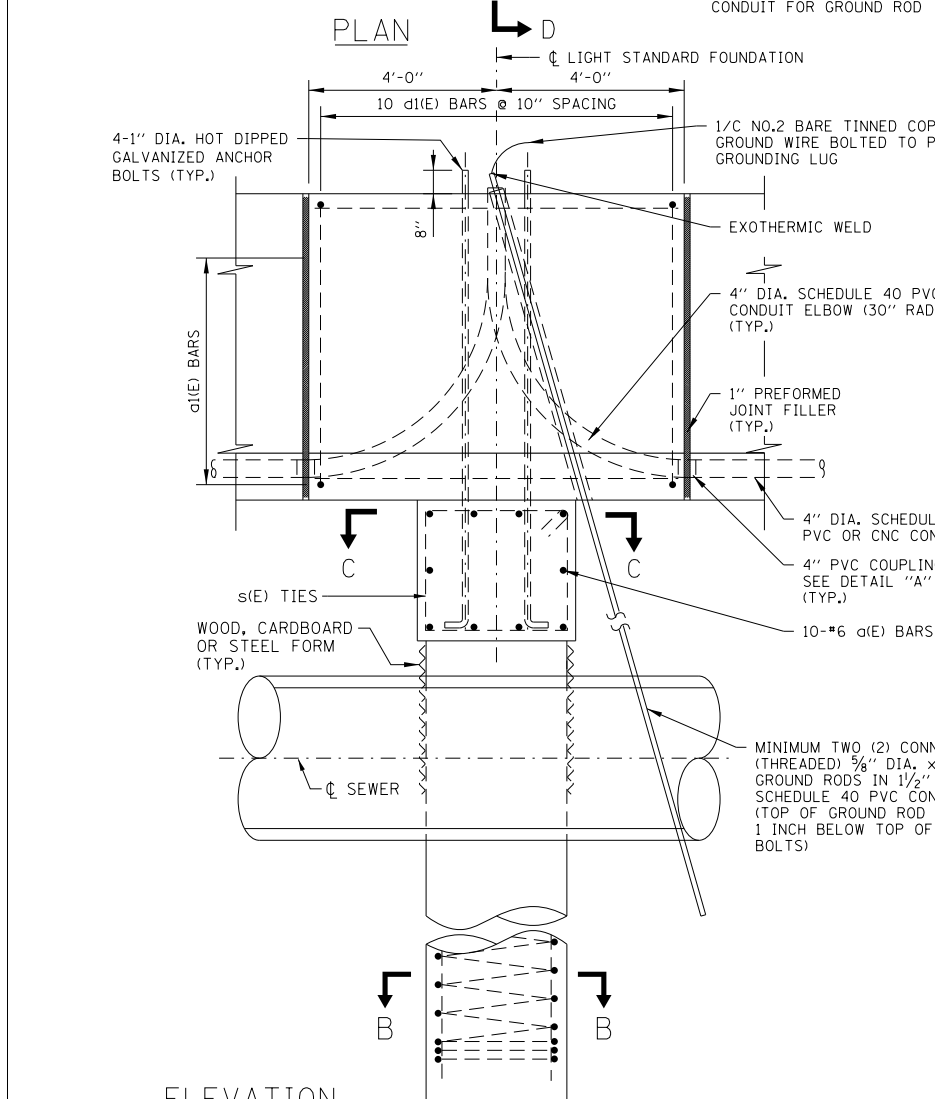
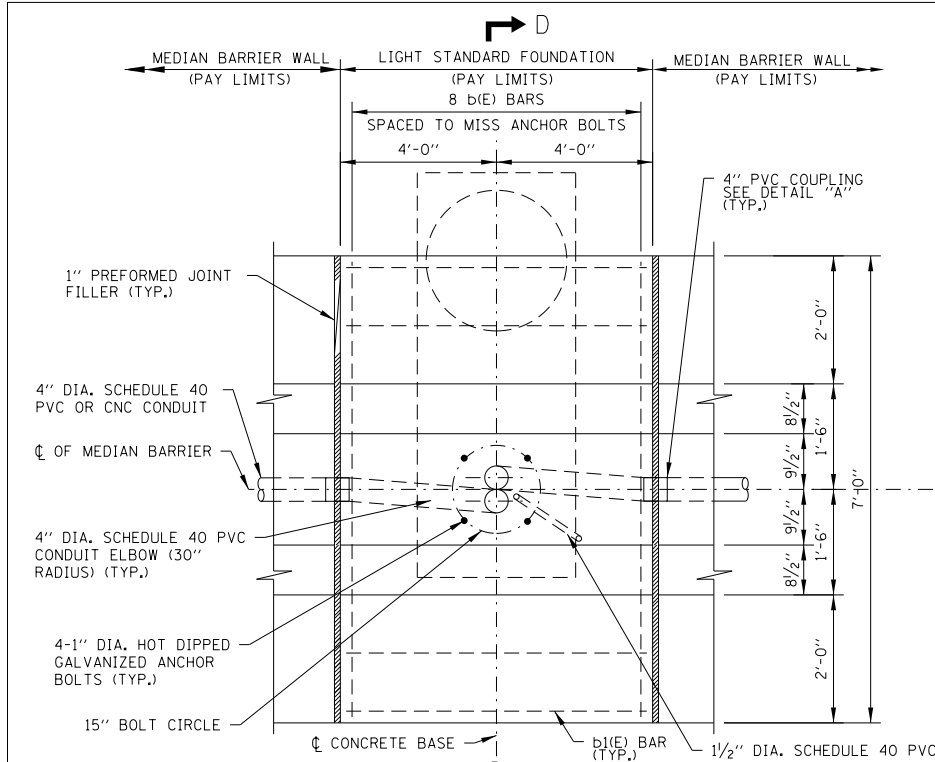


LIGHT STANDARD  
FOUNDATION

STANDARD H1-12

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

## LIGHT STANDARD FOUNDATION DETAILS - MEDIAN BARRIER (TYPE 1 CENTERED CAISSON, 44" BARRIER)



REINFORCEMENT BARS SCHEDULE					
BAR	NO.	SIZE	LENGTH	WT. LB.	SHAPE
a(E)	10	#6	5'-6"	83	—
a1(E)	10	#4	7'-6"	50	—
b(E)	8	#4	6'-6"	35	—
b1(E)	8	#4	7'-8"	41	—
d1(E)	20	#4	5'-8"	76	└┐
s(E)	12	#4	7'-7"	61	□
s1(E)	4	#4	8'-1"	22	□
s2(E)	6	#4	5'-0"	20	□
sp1(E)	1	#4	*	92	⋈
v(E)	8	#6	3'-2"	38	—
v1(E)	8	#7	12'-6"	205	—

\* SEE D-D

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER

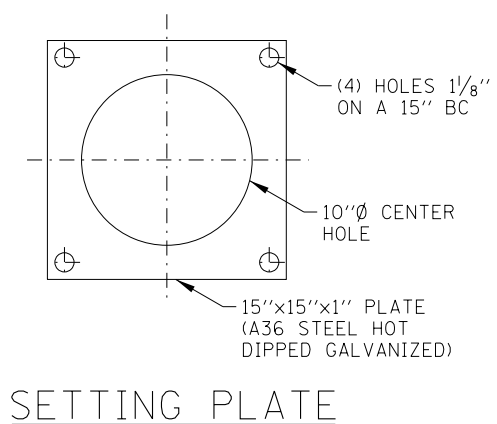
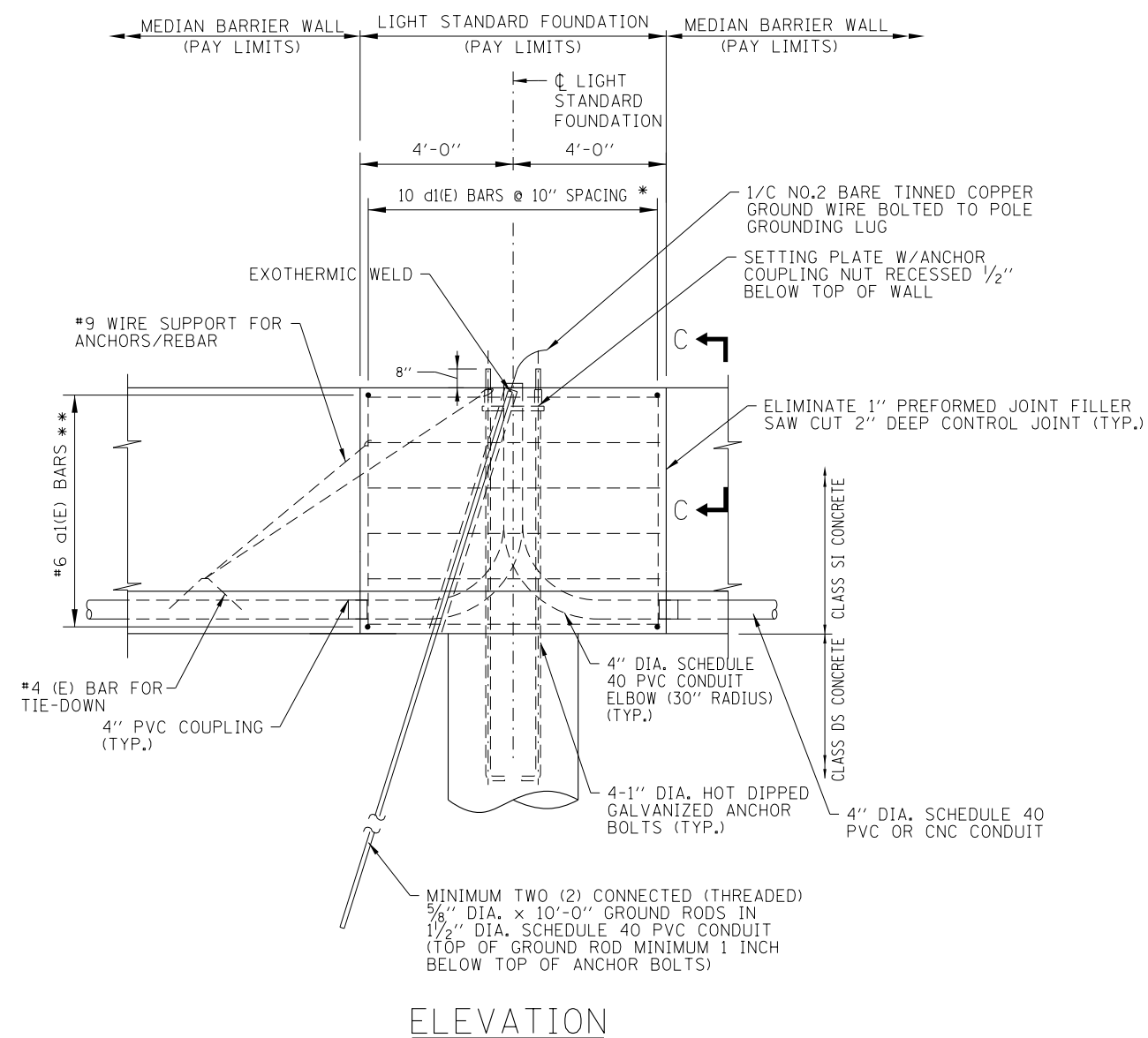
DATE: 03/01/2024

LIGHT STANDARD FOUNDATION DETAILS - MEDIAN BARRIER  
(TYPE 2 OFFSET CAISSON, 44" BARRIER)

NOTES:  
1. SEE SHEET 1 OF THIS SERIES FOR NOTES.  
2. FOR SLIP FORM, SEE SHEET 6 OF THIS SERIES







STANDARD H1-12

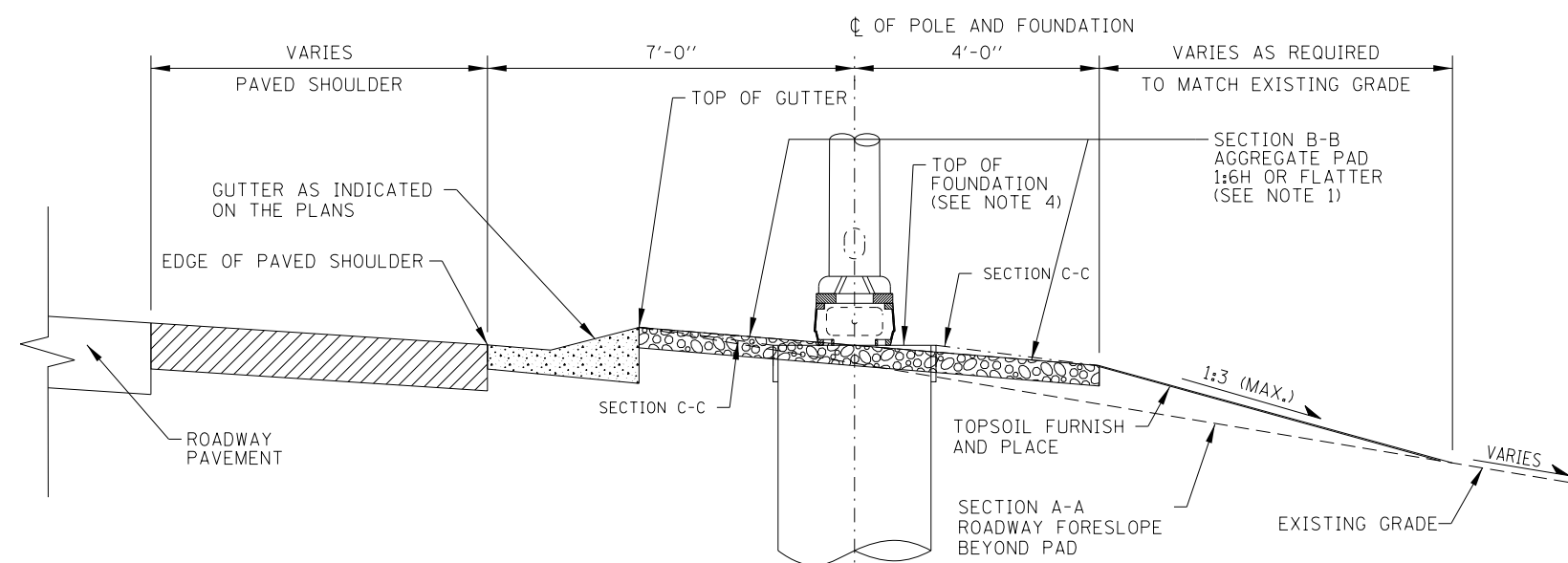
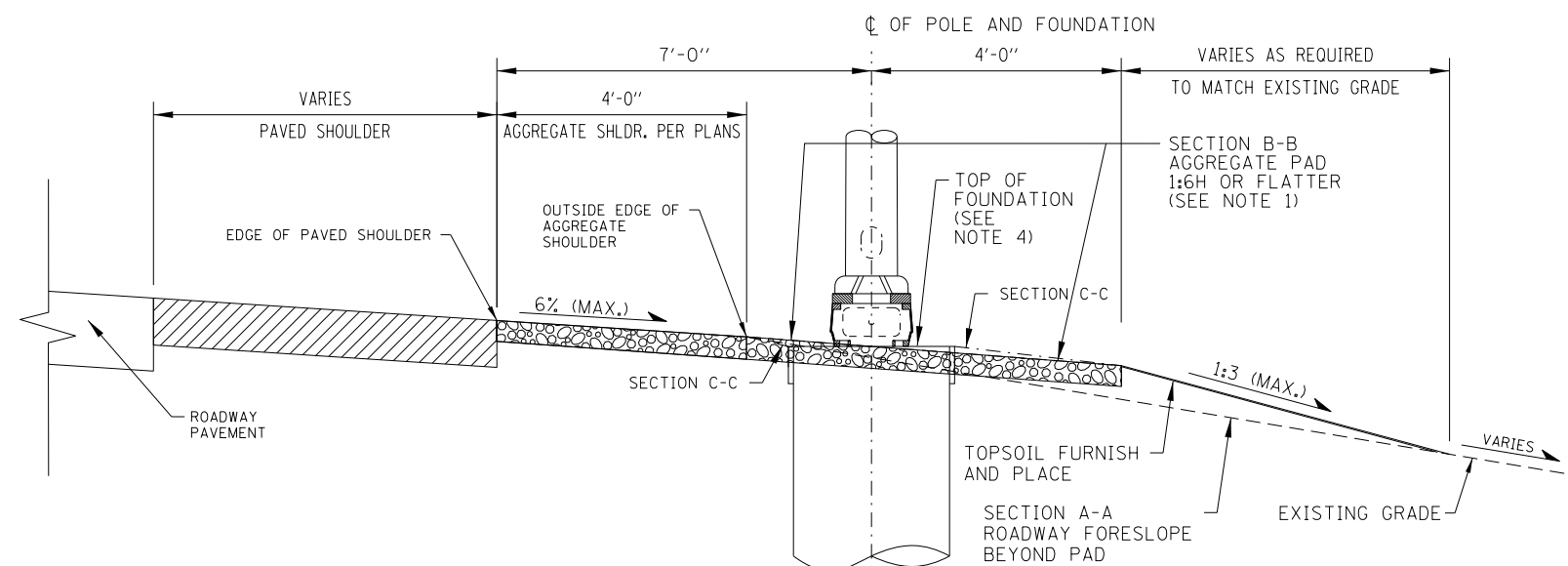
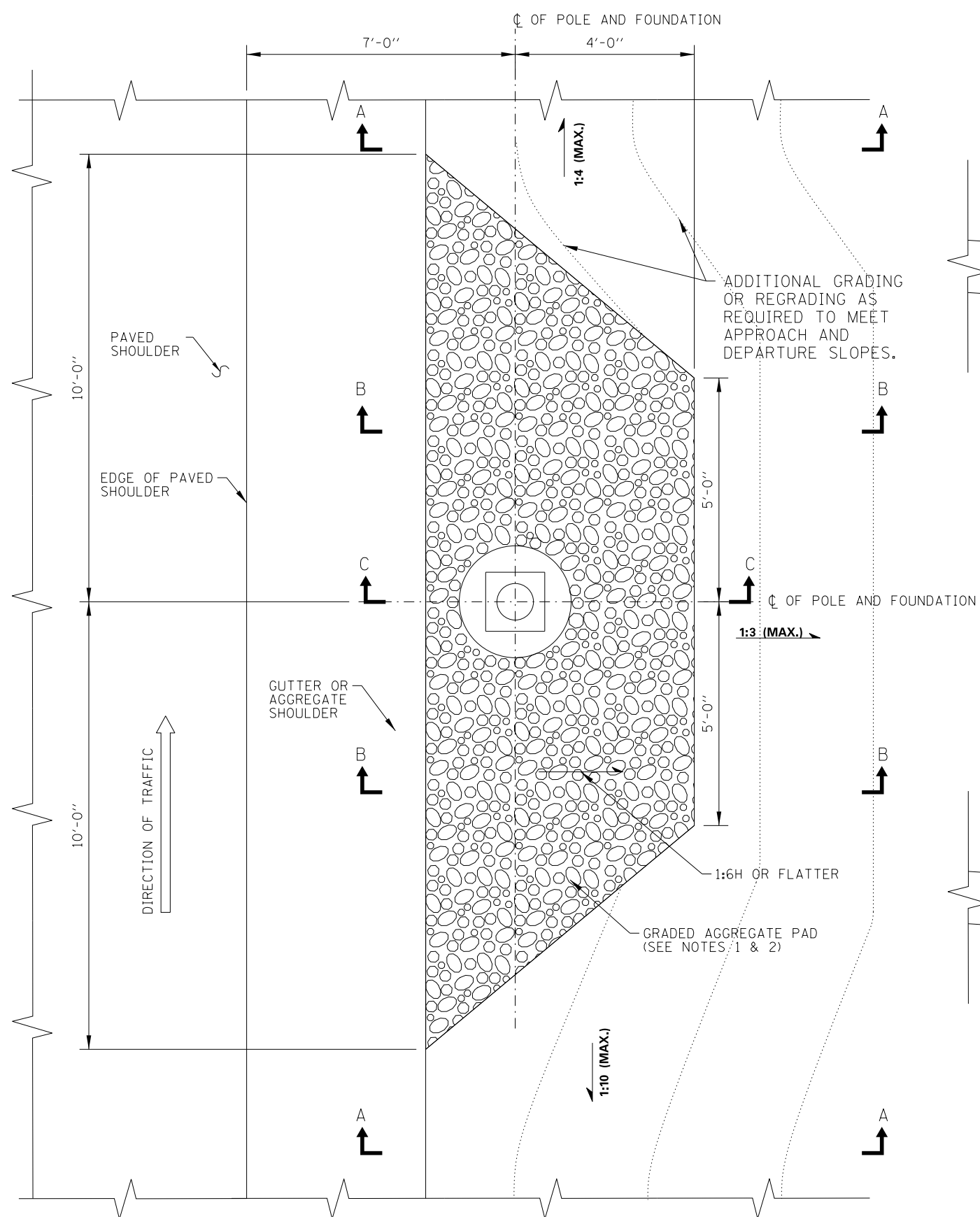
APPROVED BY:

*Manan Nashif*

CHIEF ENGINEERING OFFICER

03/01/2024

LIGHT STANDARD FOUNDATION DETAILS - MEDIAN BARRIER  
(MODIFICATIONS FOR SLIPFORM POUR, 44" BARRIER)



SHEET 7 OF 10



LIGHT STANDARD  
FOUNDATION

STANDARD H1-12

NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

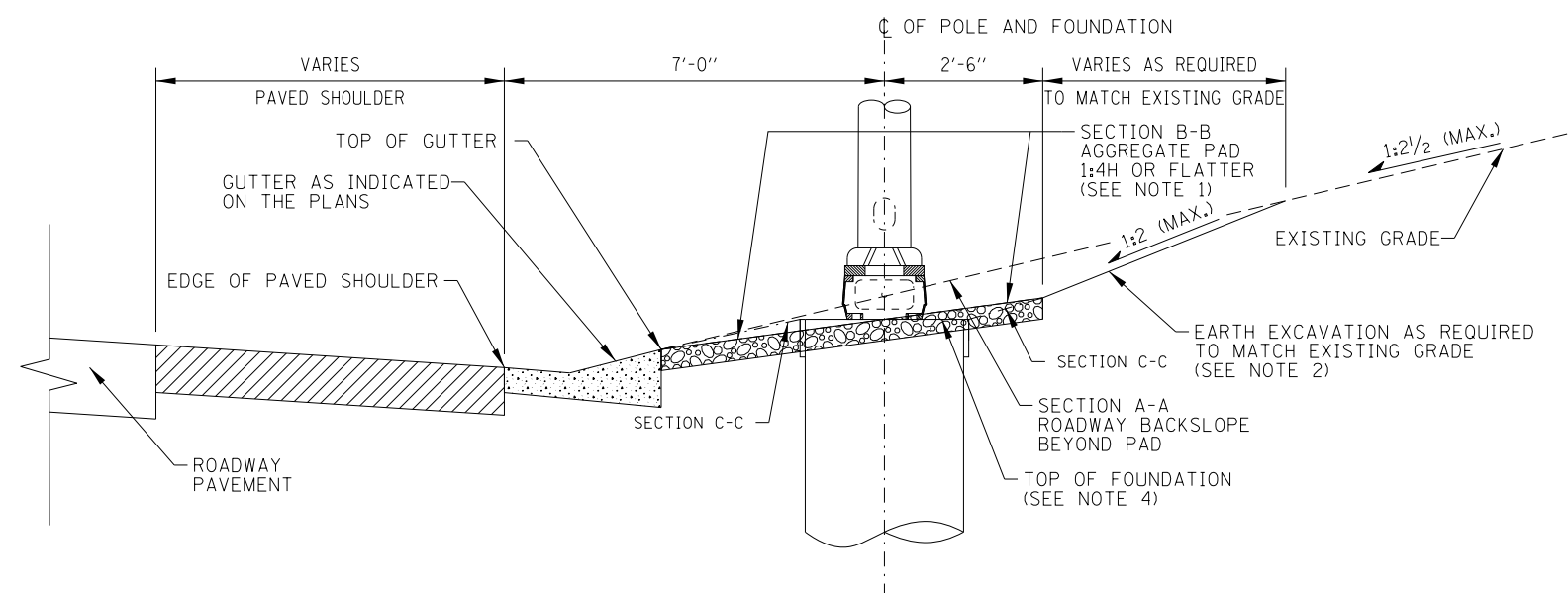
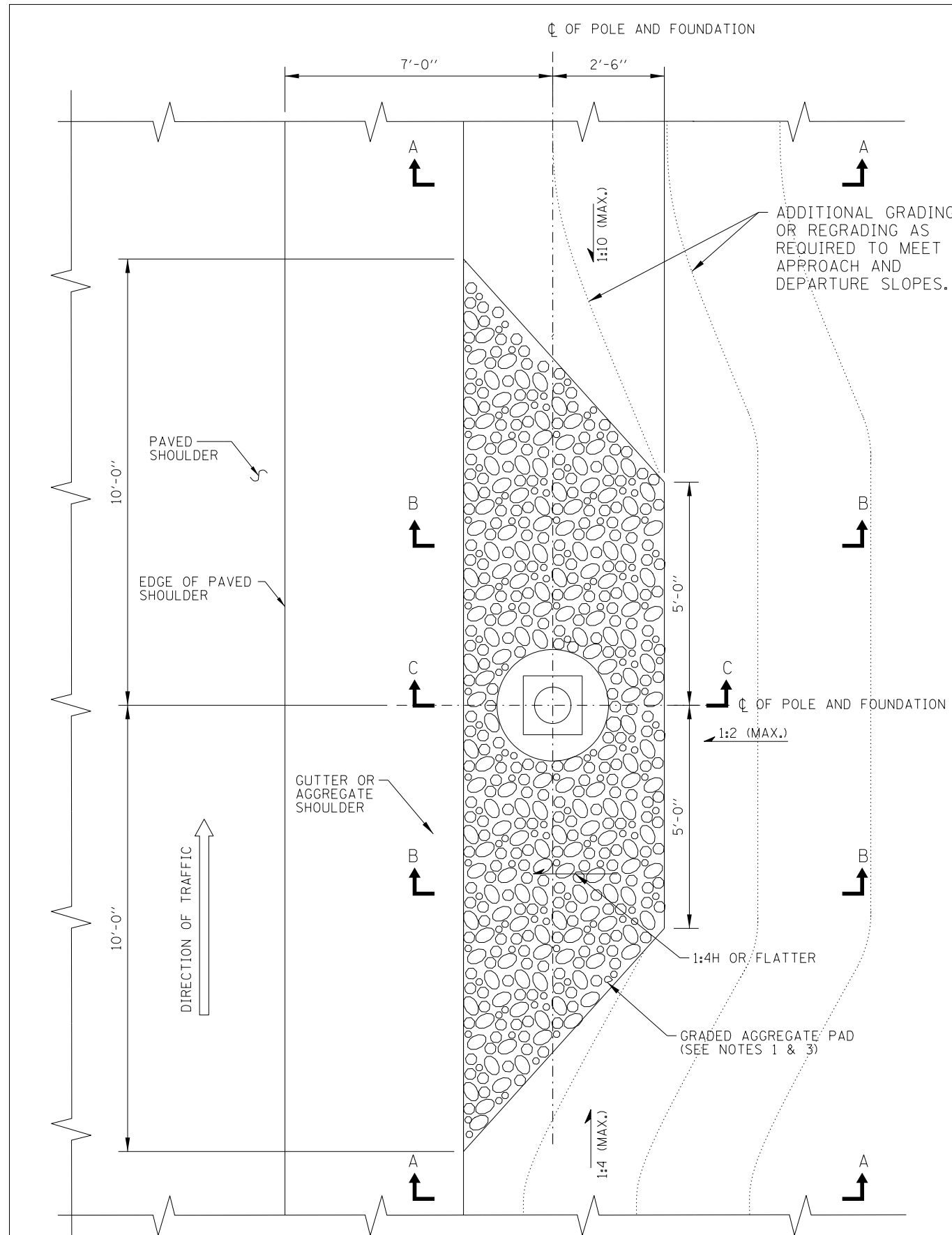
LIGHT STANDARD FOUNDATION DETAILS - GRADING W/ FORESLOPE  
(GROUND MOUNTED UNITS)

APPROVED BY:

*Manan Nashif*

CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024



# LIGHT STANDARD FOUNDATION ADJACENT TO GUTTER

## LIGHT STANDARD FOUNDATION DETAILS - GRADING W/ BACKSLOPE (GROUND MOUNTED UNITS)

APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024

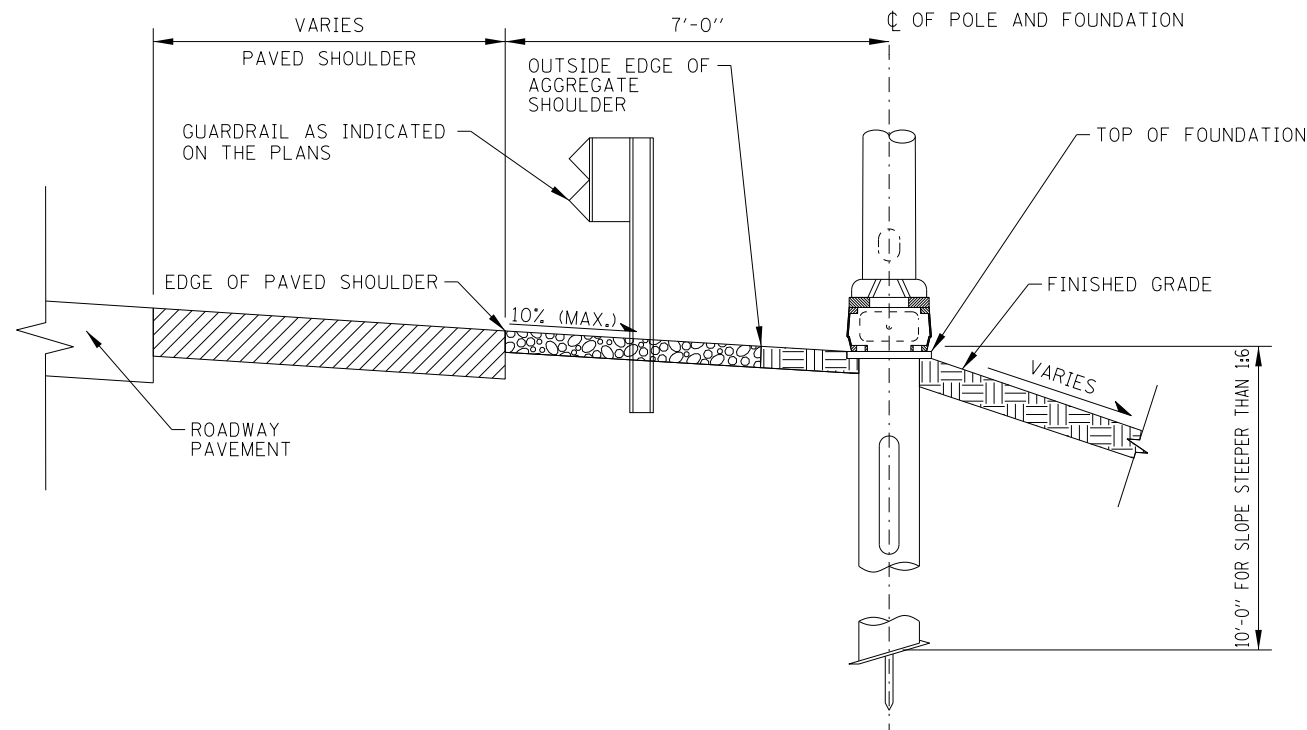
NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 8 OF 10

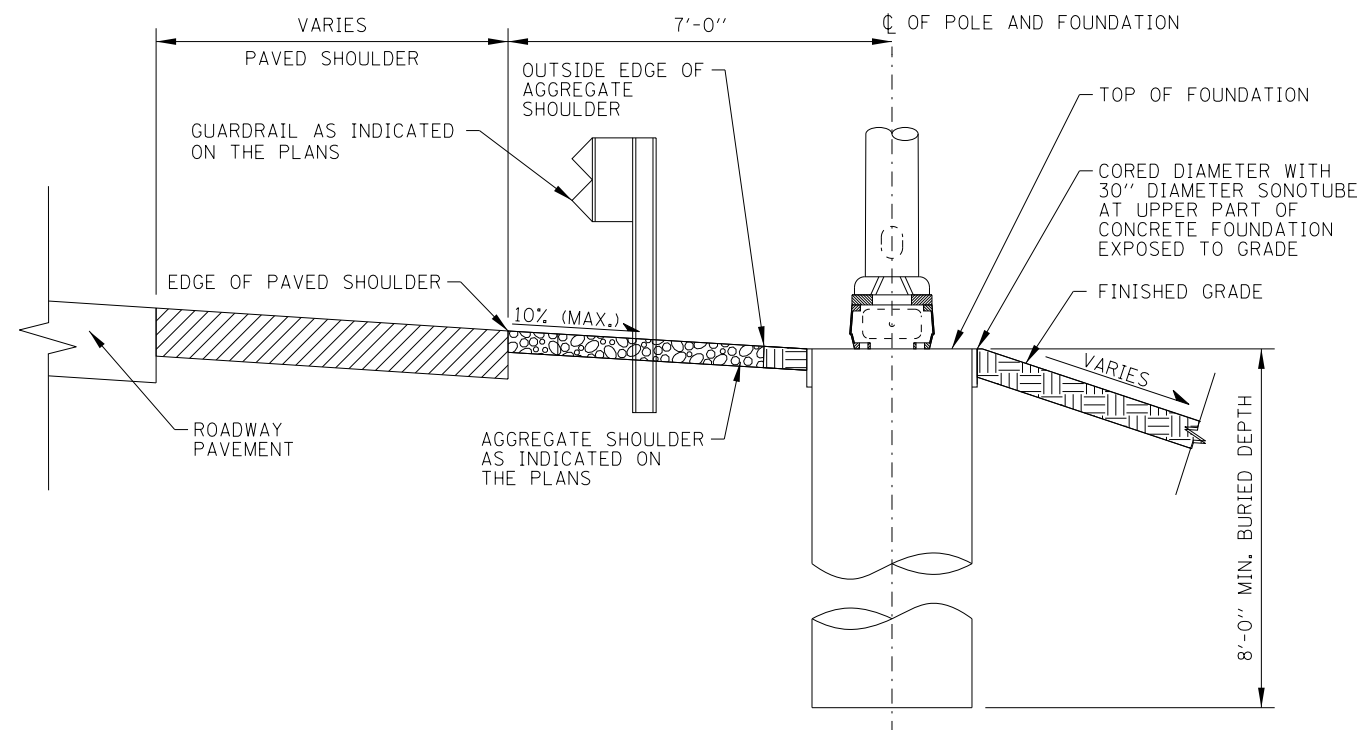


LIGHT STANDARD  
FOUNDATION

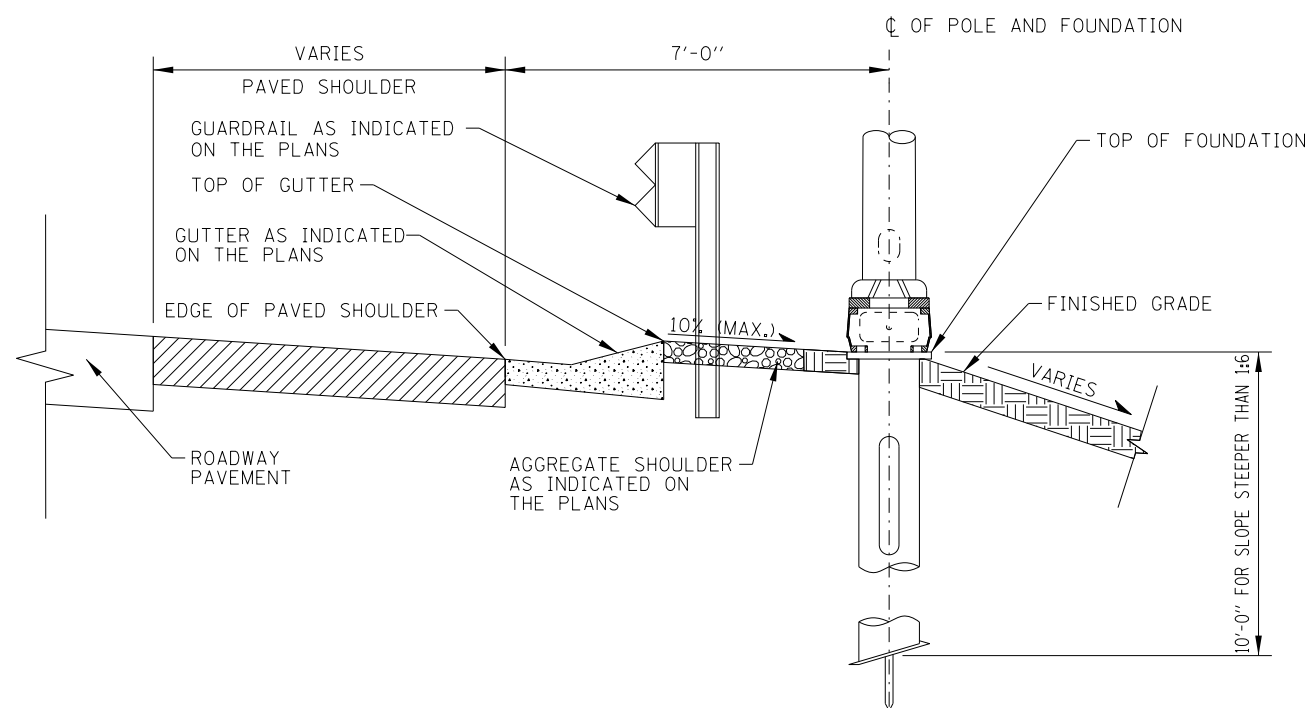
STANDARD H1-12



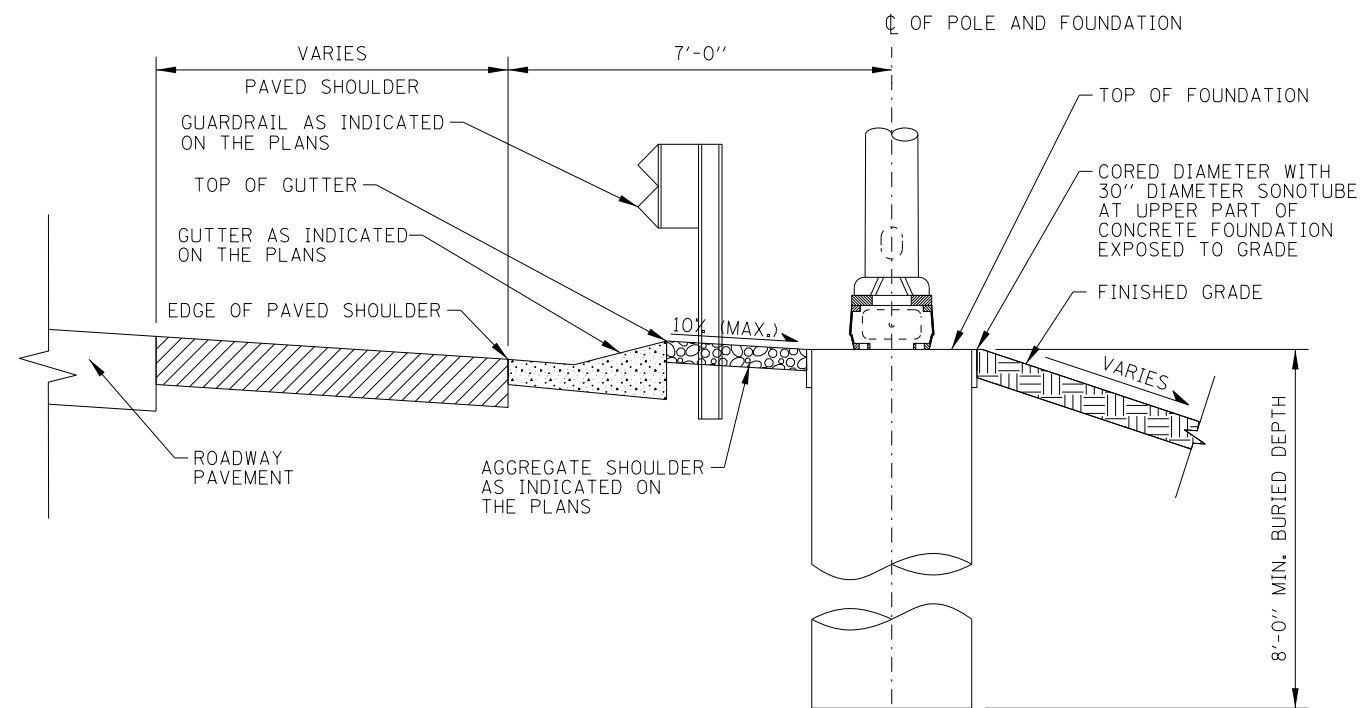
LIGHT STANDARD FOUNDATION - HELIX  
ADJACENT TO AGGREGATE SHOULDER



LIGHT STANDARD FOUNDATION - CONCRETE  
ADJACENT TO AGGREGATE SHOULDER



LIGHT STANDARD FOUNDATION - HELIX  
ADJACENT TO GUTTER



LIGHT STANDARD FOUNDATION - CONCRETE  
ADJACENT TO GUTTER

LIGHT STANDARD FOUNDATION DETAILS - ADJACENT TO GUARDRAIL  
(GROUND MOUNTED UNITS)

APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/01/2024

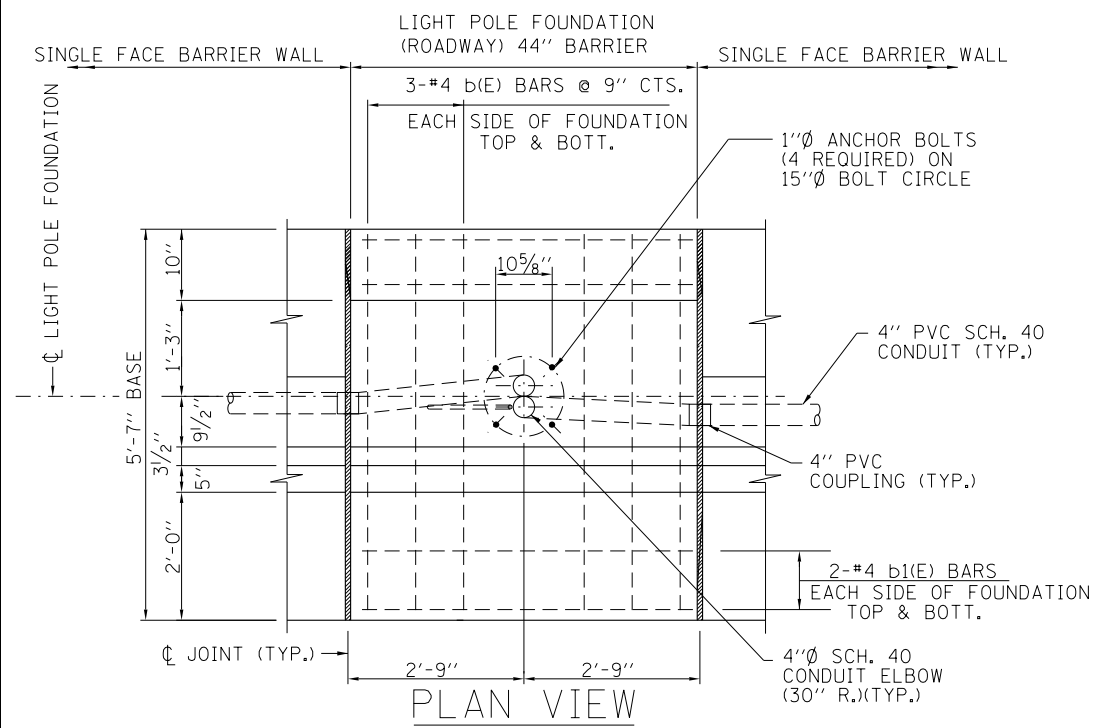
NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 9 OF 10










LIGHT STANDARD  
FOUNDATION

STANDARD H1-12

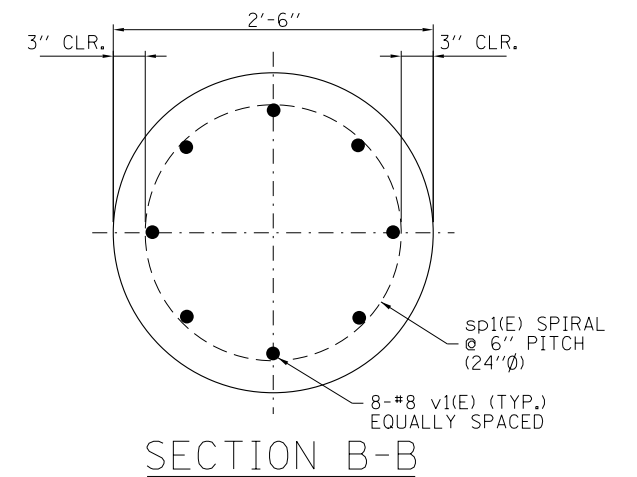
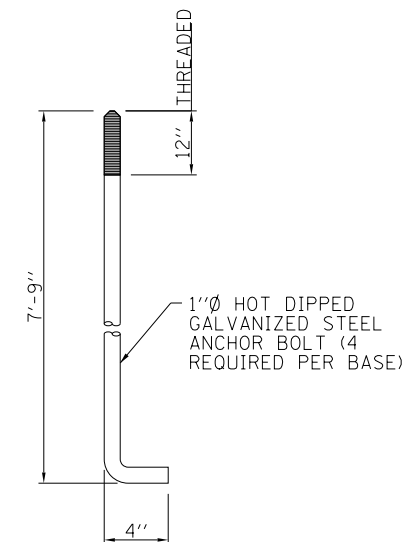
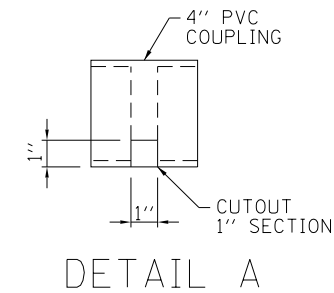
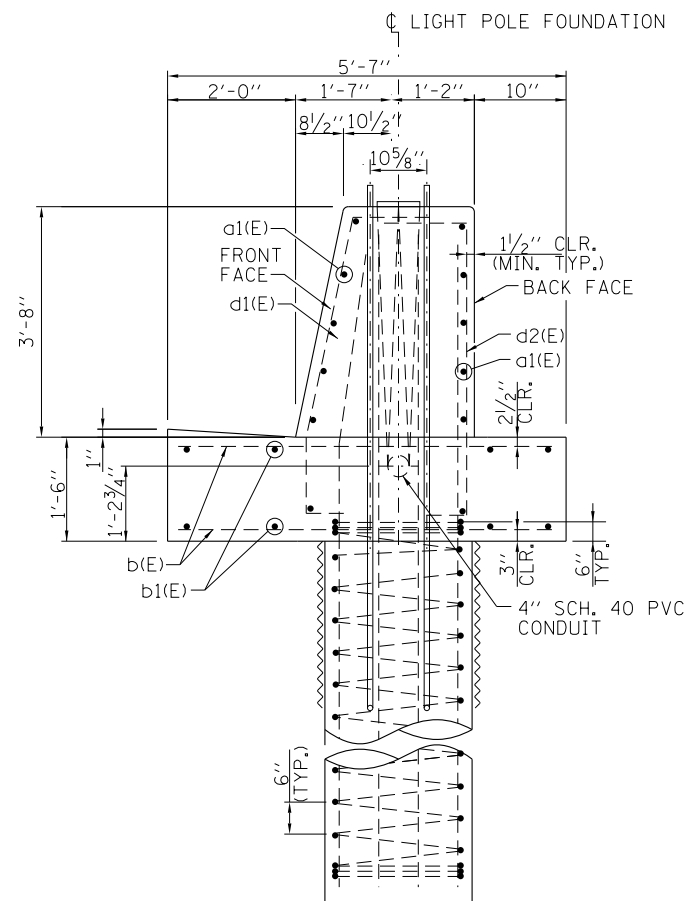
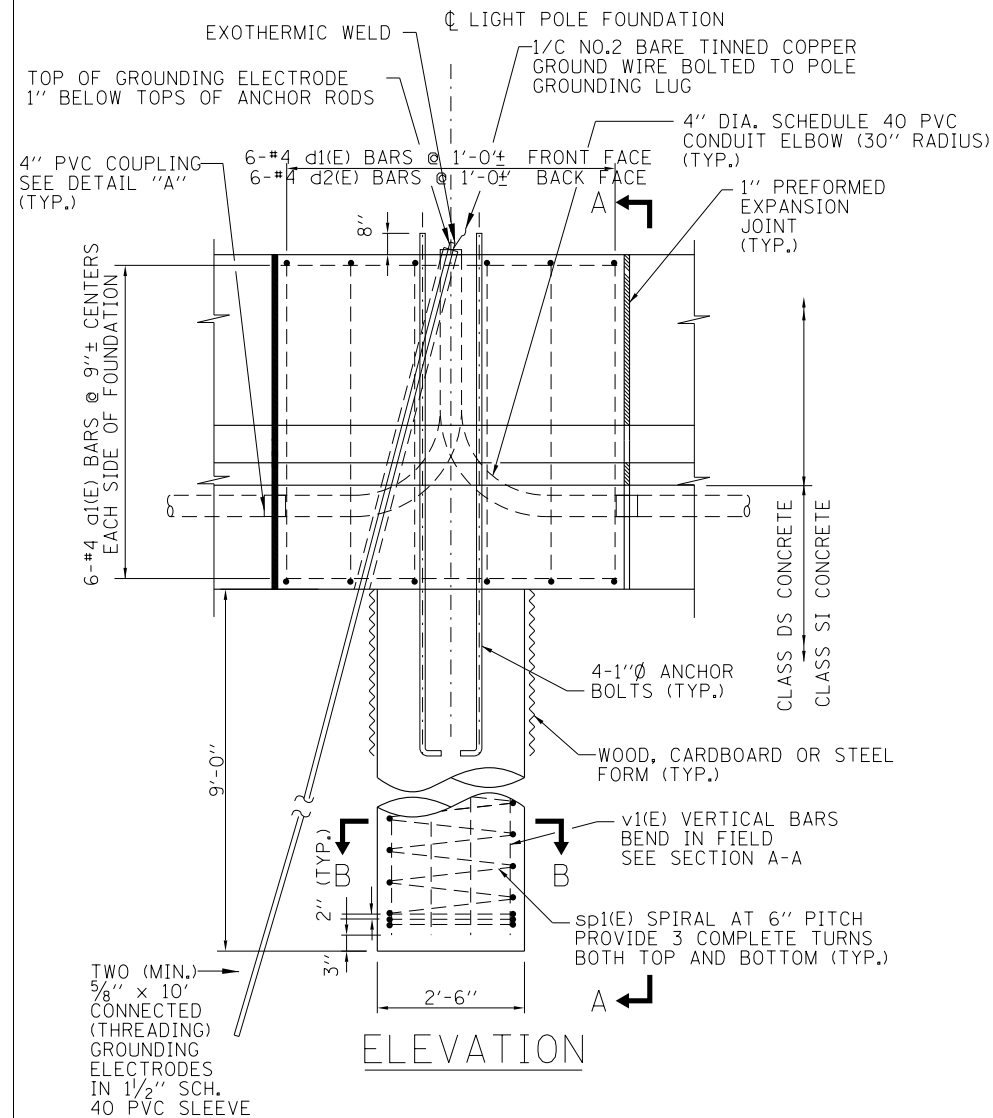
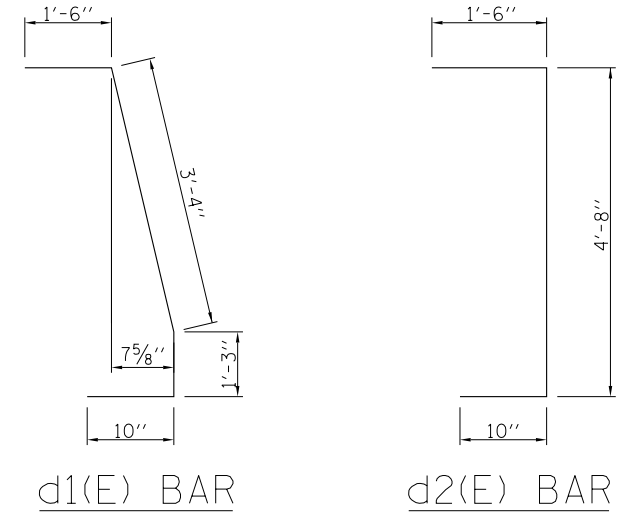


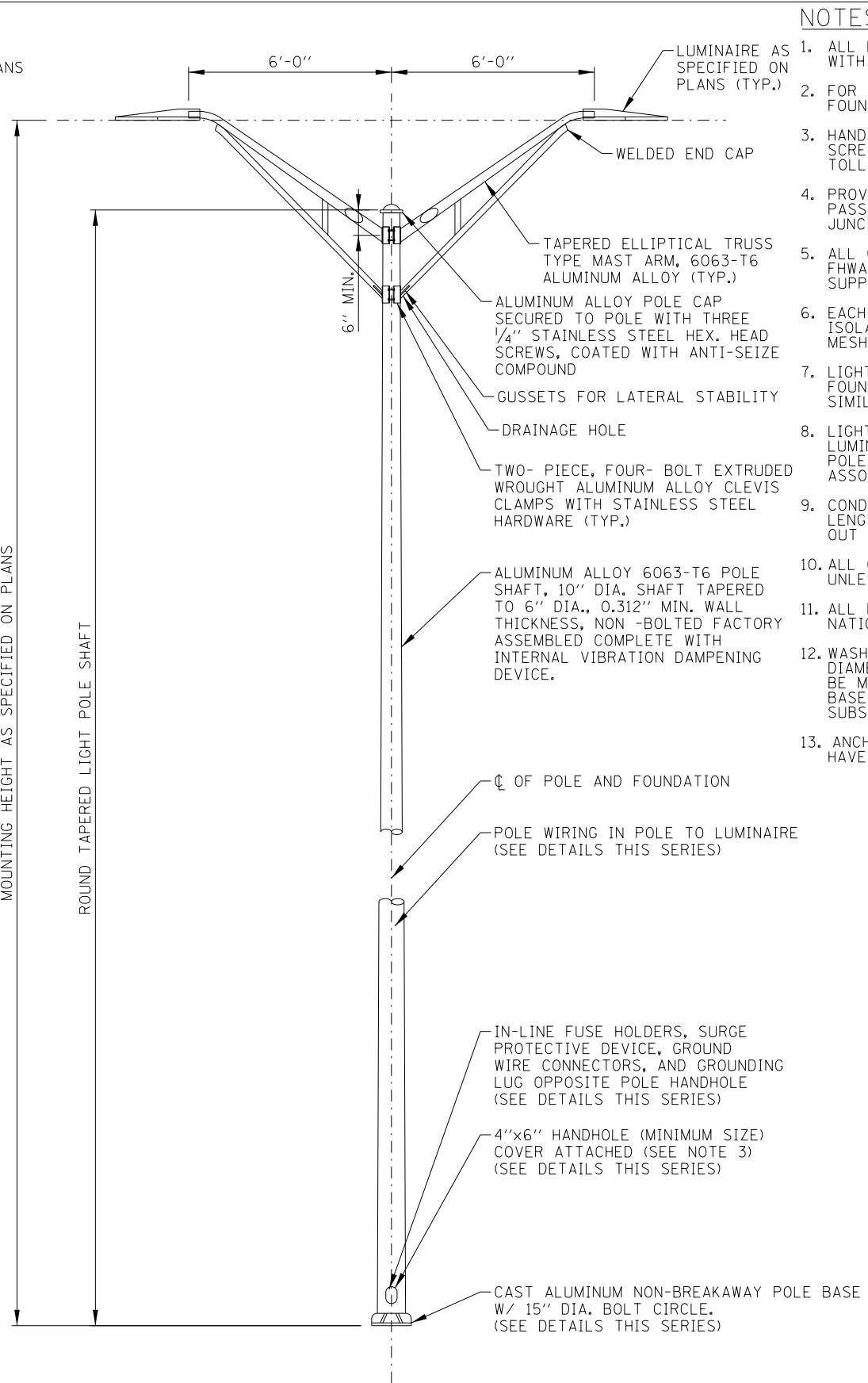
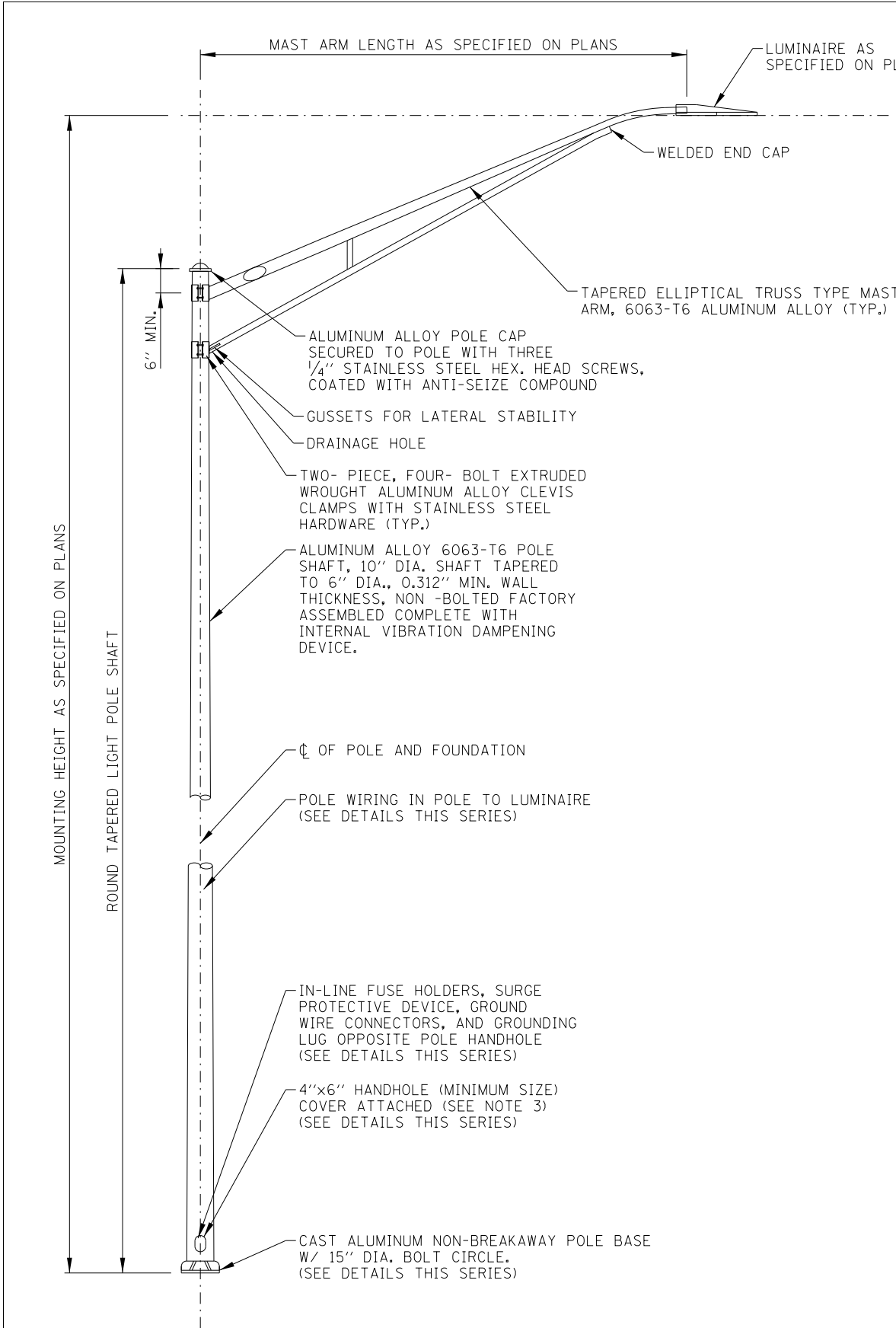
NOTES:

1. ALL BARS SHALL BE EPOXY COATED.
2. CONCRETE, REINFORCEMENT BARS, ANCHOR BOLTS, AND ALL OTHER COMPONENTS OF THE LIGHT POLE FOUNDATION ARE INCLUDED IN THE COST OF LIGHT POLE FOUNDATION (ROADWAY) 44" BARRIER.

REINFORCING BAR SCHEDULE					
BAR	NO.	SIZE	LENGTH	WT. LBS.	SHAPE
a1(E)	12	#4	5'-0"	40	
b(E)	12	#4	5'-1"	41	
b1(E)	8	#4	5'-2"	28	
d1(E)	6	#4	6'-11"	28	
d2(E)	6	#4	7'-0"	27	
sp1(E)	•	#4	•	97	
v1(E)	8	#8	12'-6"	267	

\* SEE SECT. A-A

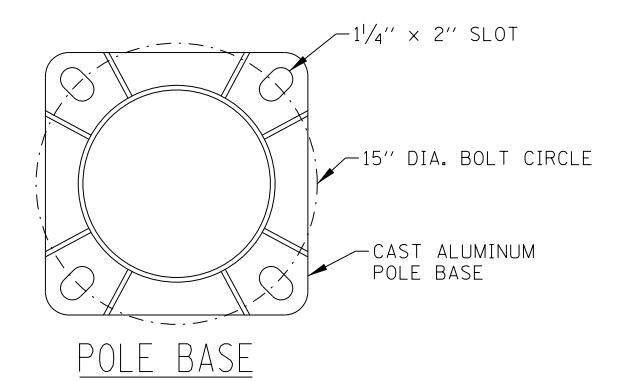




- NOTES:
1. ALL LIGHT STANDARDS, BOTH NEW AND EXISTING, ARE SHOWN ON PLANS WITH THE SAMPLE DESCRIPTIONS SHOWN ON THIS SHEET.
  2. FOR FOUNDATION DETAILS SEE STANDARD H1. FOR STRUCTURAL PARAPET FOUNDATION DETAILS, SEE STRUCTURAL PLANS.
  3. HANDHOLE COVERS SHALL BE FASTENED USING TWO STAINLESS STEEL SCREWS WITH CAPTIVE STAINLESS STEEL NUTS OR INSERTS, PER ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATION SECTION 1069.
  4. PROVIDE A 24" LONG POLYETHYLENE TUBE TO PROTECT CABLES WHERE THEY PASS THROUGH THE GROMMETTED OPENING AT THE POLE/MAST ARM JUNCTION.
  5. ALL GROUND MOUNTED LIGHT POLES SHALL BE PROVIDED WITH AN ACCEPTED FHWA BREAKAWAY BASE OR DEVICE PER THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS SECTION 1070.
  6. EACH BRIDGE MOUNTED LIGHT STANDARD SHALL BE PROVIDED WITH ISOLATION VIBRATION PADS, NUTS, WASHERS, LEVELING PLATE AND WIRE MESH FOR INSTALLATION ON THE FOUNDATION AS SHOWN ON THE PLANS.
  7. LIGHT STANDARD WIRING DETAIL FOR INSTALLATION WITH CONCRETE FOUNDATION SHOWN. DETAIL FOR INSTALLATION WITH HELIX FOUNDATION IS SIMILAR.
  8. LIGHT STANDARD WIRING DETAILS SHOWN FOR TWIN MAST ARM (2 LUMINAIRES PER POLE) INSTALLATIONS. SINGLE MAST ARM (1 LUMINAIRE PER POLE) INSTALLATIONS SHALL OMIT TWO (2) IN-LINE FUSE HOLDERS AND ASSOCIATED WIRING.
  9. CONDUCTORS EXTENDED INTO LIGHT POLE BASE SHALL BE OF SUFFICIENT LENGTH TO WITHDRAW SPLICES AND/OR INSULATED JOINTS A MINIMUM 18" OUT OF THE POLE HANDHOLE.
  10. ALL CONDUCTORS ORIGINATING IN POLE SHALL BE A 1/C NO. 10 AWG UNLESS OTHERWISE NOTED.
  11. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
  12. WASHERS BETWEEN HEX NUTS AND POLE BASES SHALL BE 2.5" OUTER DIAMETER. WASHERS ON PARAPET OR MEDIAN MOUNTED LIGHT POLES SHALL BE MINIMUM 1/4" THICK. BENT OR DEFORMED WASHERS OR DAMAGED POLE BASES WILL NOT BE ACCEPTED. MULTIPLE STACKED WASHERS SHALL NOT BE SUBSTITUTED FOR APPROPRIATELY SIZED WASHERS.
  13. ANCHOR BOLTS SHALL EXTEND OVER THE TOP OF HEX NUTS AND SHALL HAVE SUFFICIENT THREAD EXPOSED FOR LOCK NUT TABS TO MAKE CONTACT.

MOUNTING HEIGHT  
ARM LENGTH  
CIRCUIT NUMBER  
STATION OF LIGHT STANDARD  
STA. 0 + 20  
S15-50-C4  
TYPE A  
DISTRIBUTION TYPE AS SPECIFIED ON THE PLANS

LIGHT STANDARD DESCRIPTION



LIGHT STANDARD - SINGLE MAST ARM

LIGHT STANDARD - TWIN MAST ARM

LIGHT STANDARD DETAILS

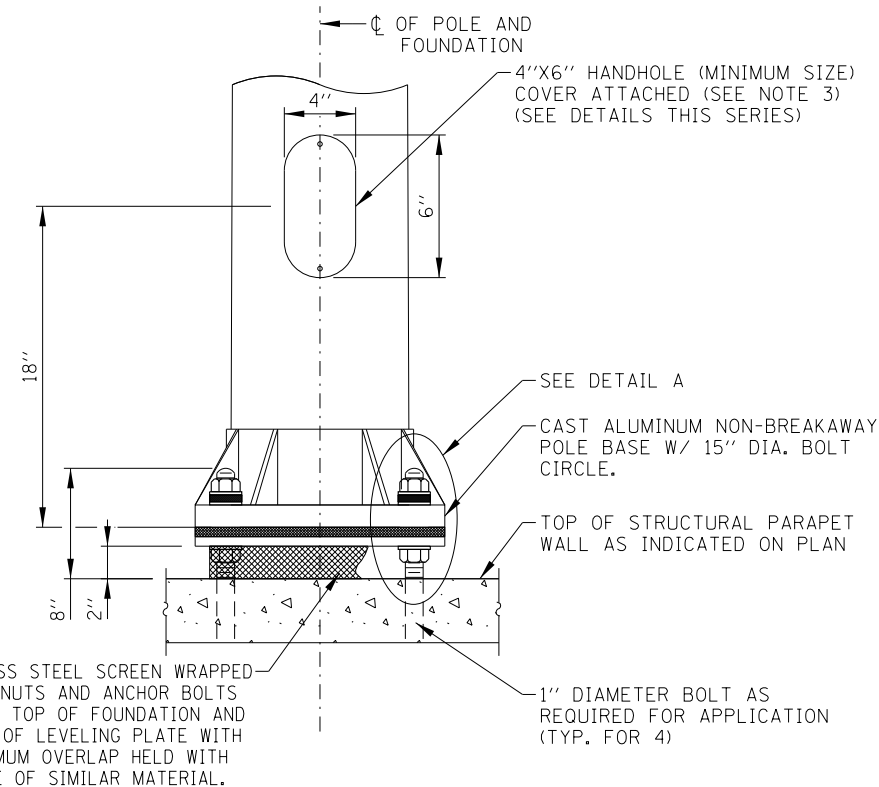
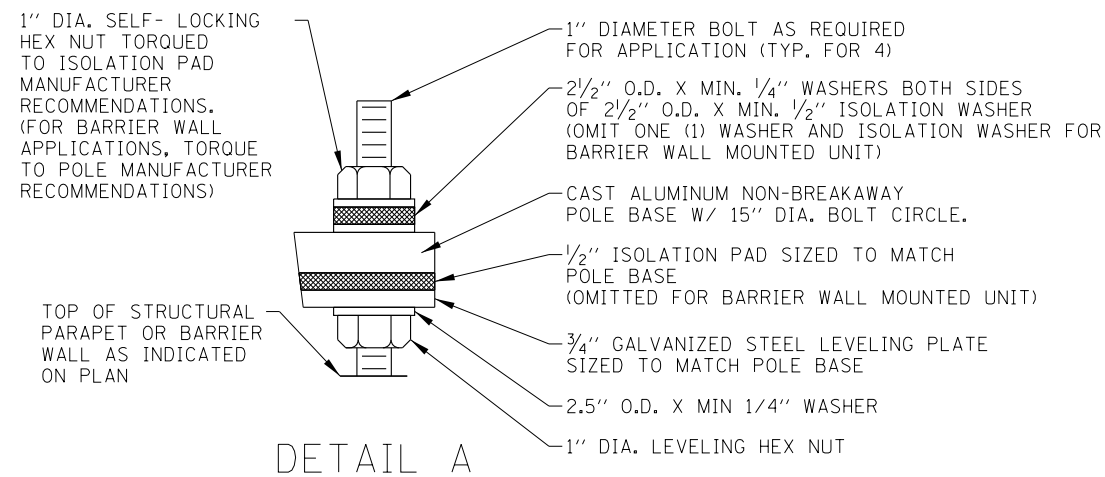
APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

DATE	REVISIONS
3-01-2024	REMOVED REFERENCES TO HPS. REVISIONS TO NOTES, REVISED
	CALL-OUTS FOR LIGHT STANDARD
	MOUNTING DETAIL GROUND MOUNTED
	UNITS. REMOVED SURGE PROTECTORS
	AND ADDED A DEDICATED NEUTRAL.

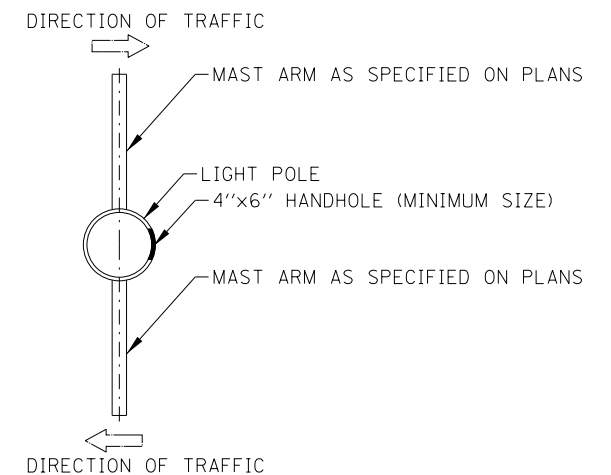
ILLINOIS  
Tollway

LIGHT STANDARD  
DETAILS

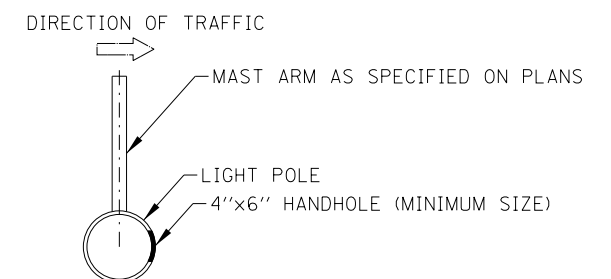
STANDARD H2-10



**LIGHT STANDARD MOUNTING DETAIL  
(BRIDGE MOUNTED UNITS)**

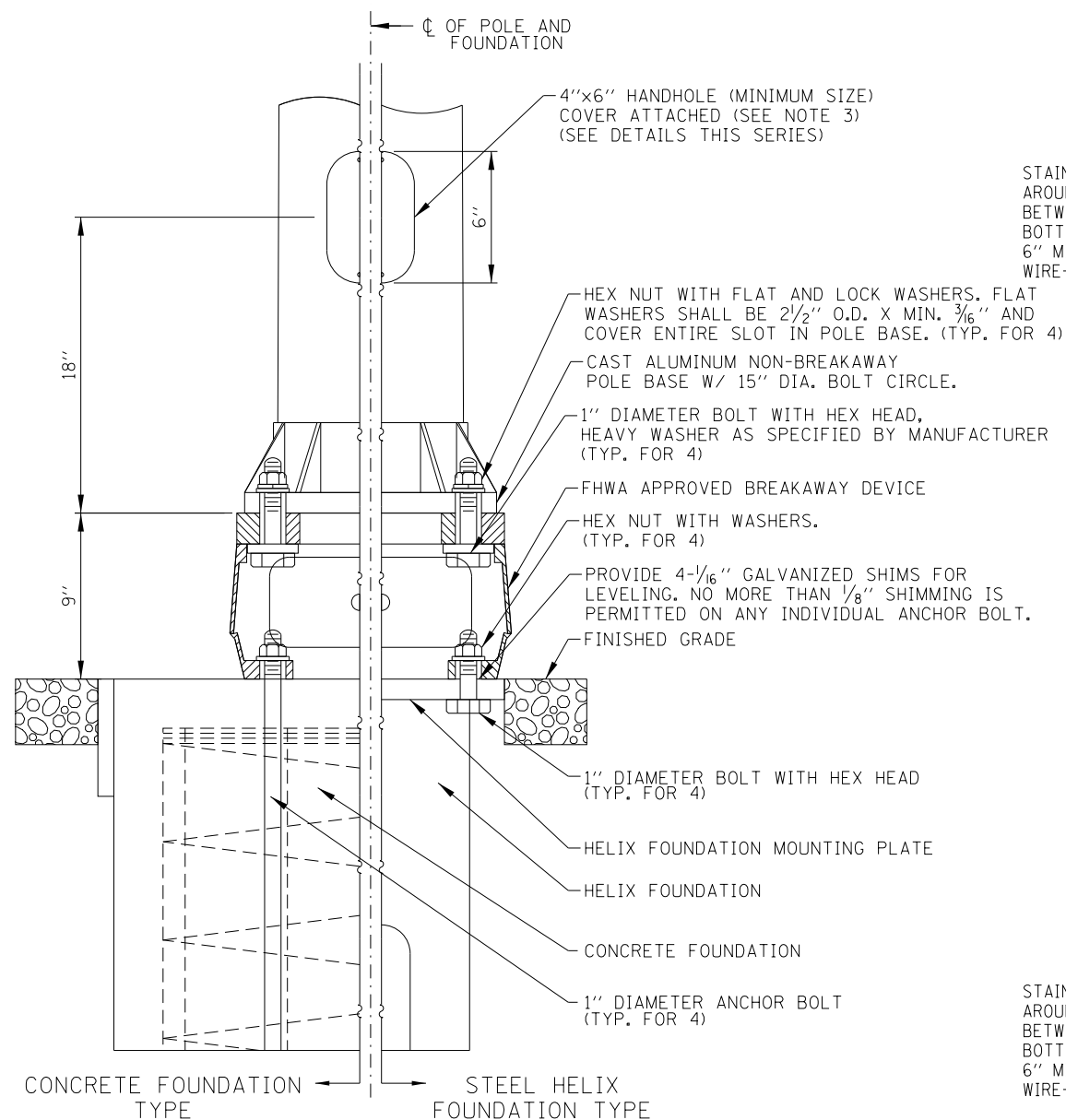


**MEDIAN BARRIER WALL MOUNTED UNITS**

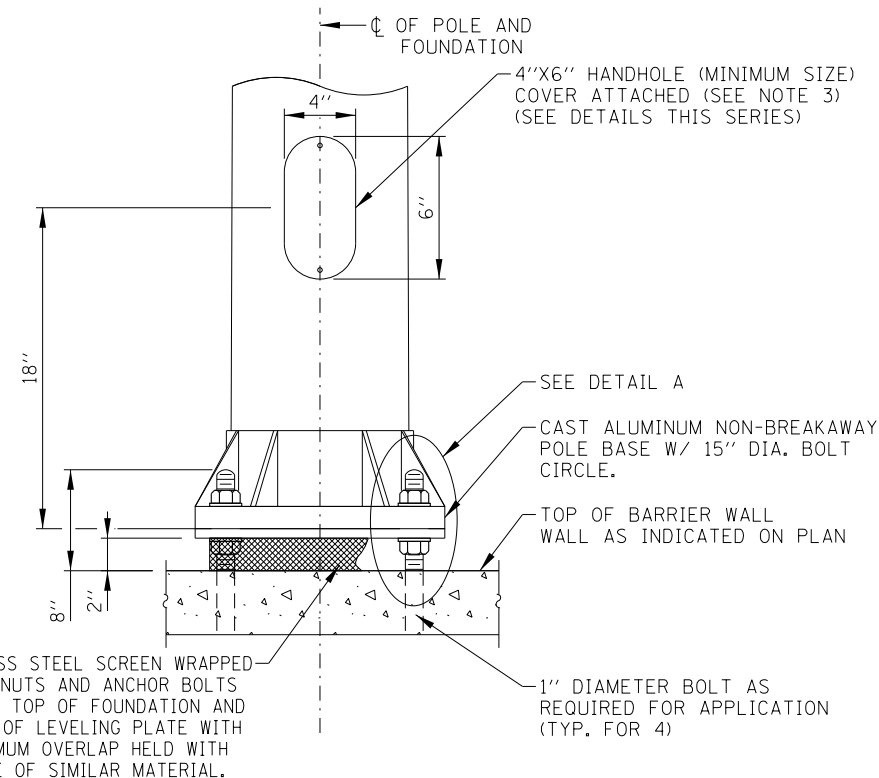


**SHOULDER GROUND AND STRUCTURAL  
PARAPET WALL MOUNTED UNITS**

**LIGHT STANDARD HANDHOLE  
ORIENTATION DETAIL**



**LIGHT STANDARD MOUNTING DETAIL  
(GROUND MOUNTED UNITS)**



**LIGHT STANDARD MOUNTING DETAIL  
(BARRIER WALL MOUNTED UNITS)**

**LIGHT STANDARD MOUNTING DETAILS**

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE: 03/01/2024

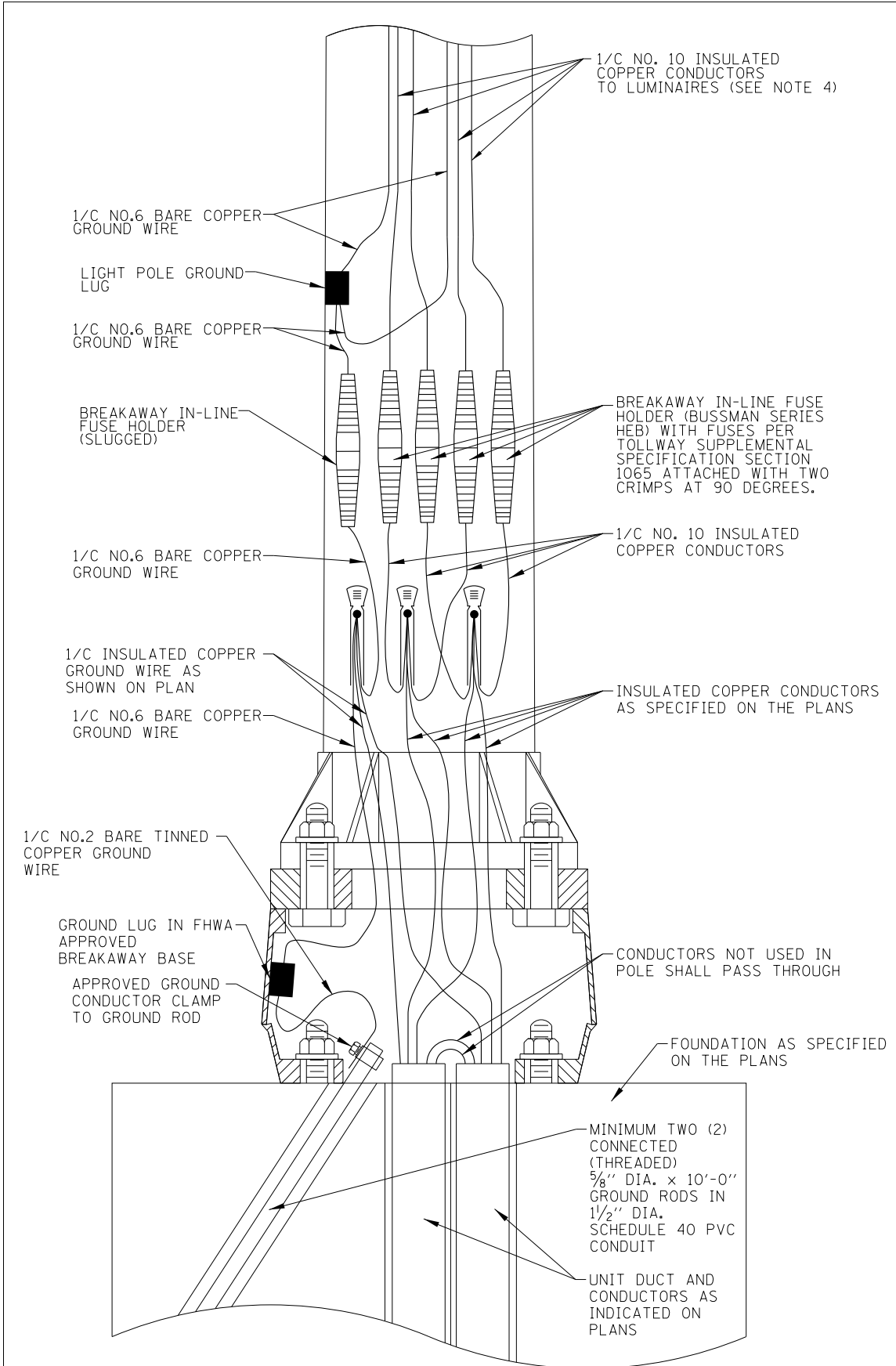
NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 2 OF 3

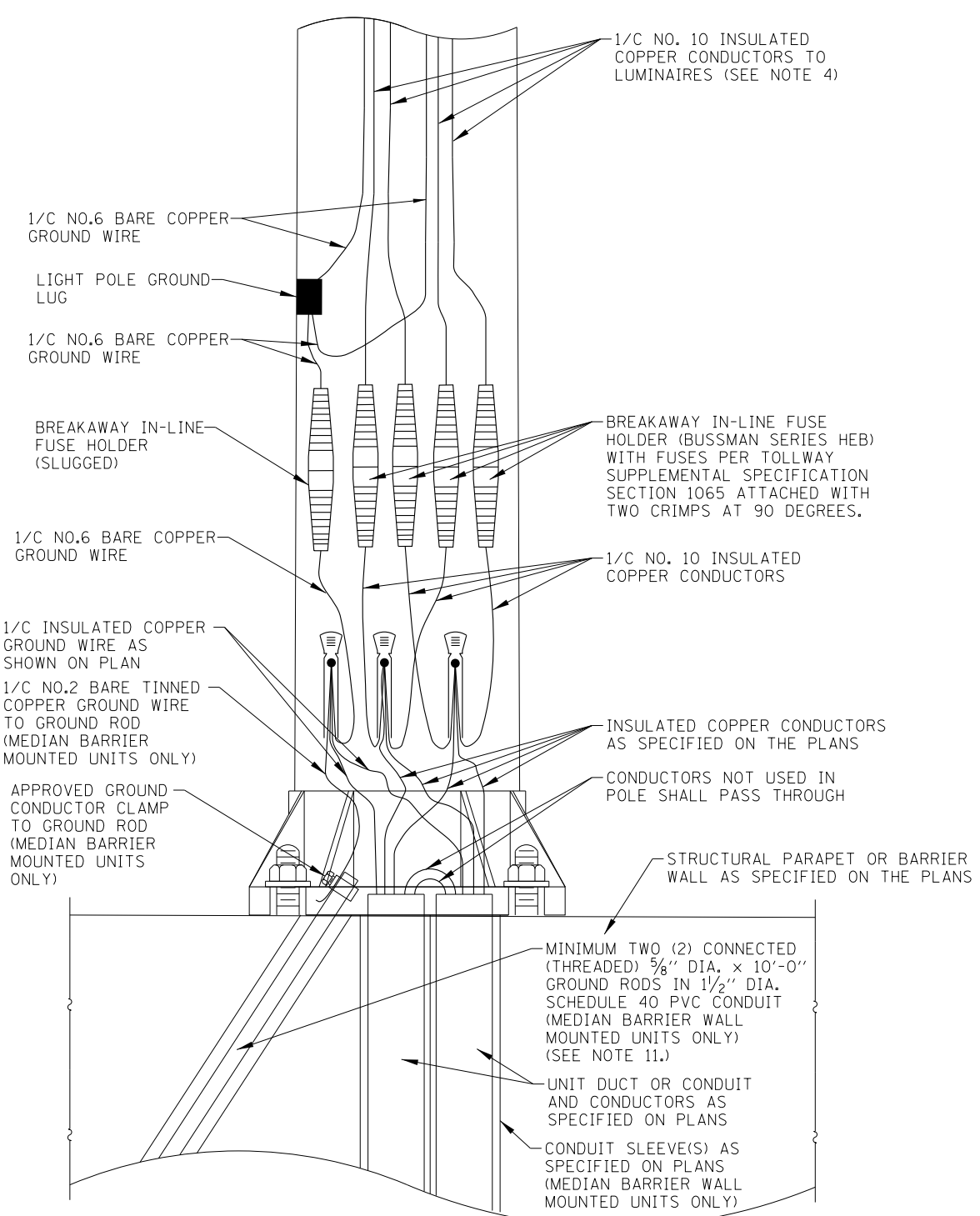


LIGHT STANDARD  
DETAILS

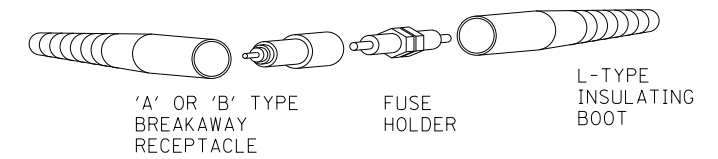
STANDARD H2-10



**LIGHT STANDARD WIRING DETAIL**  
**(GROUND MOUNTED UNITS)**  
 (SEE NOTES 7 & 8)



**LIGHT STANDARD WIRING DETAIL**  
**(STRUCTURAL AND BARRIER WALL MOUNTED UNITS)**



**IN-LINE FUSE HOLDER WITH  
 BREAKAWAY FEATURE DETAIL**

APPROVED BY:  
*Mamun Nashif*  
 CHIEF ENGINEERING OFFICER  
 DATE:  
 03/01/2024

**LIGHT STANDARD WIRING DETAILS**

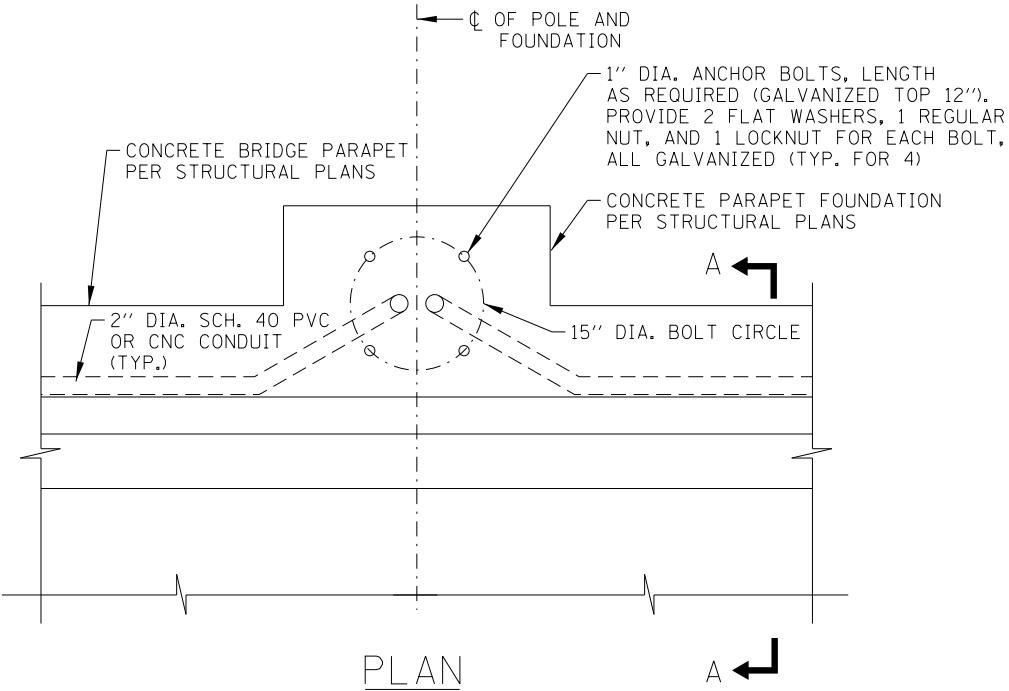
NOTE:  
 SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 3 OF 3

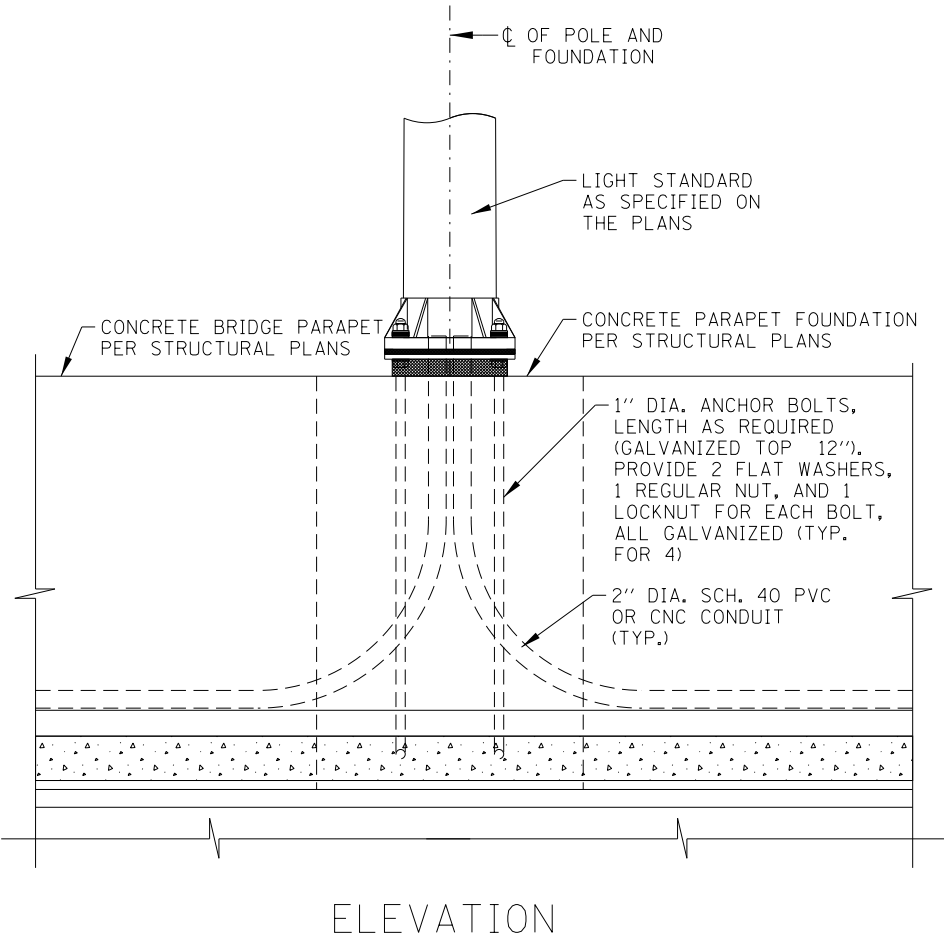
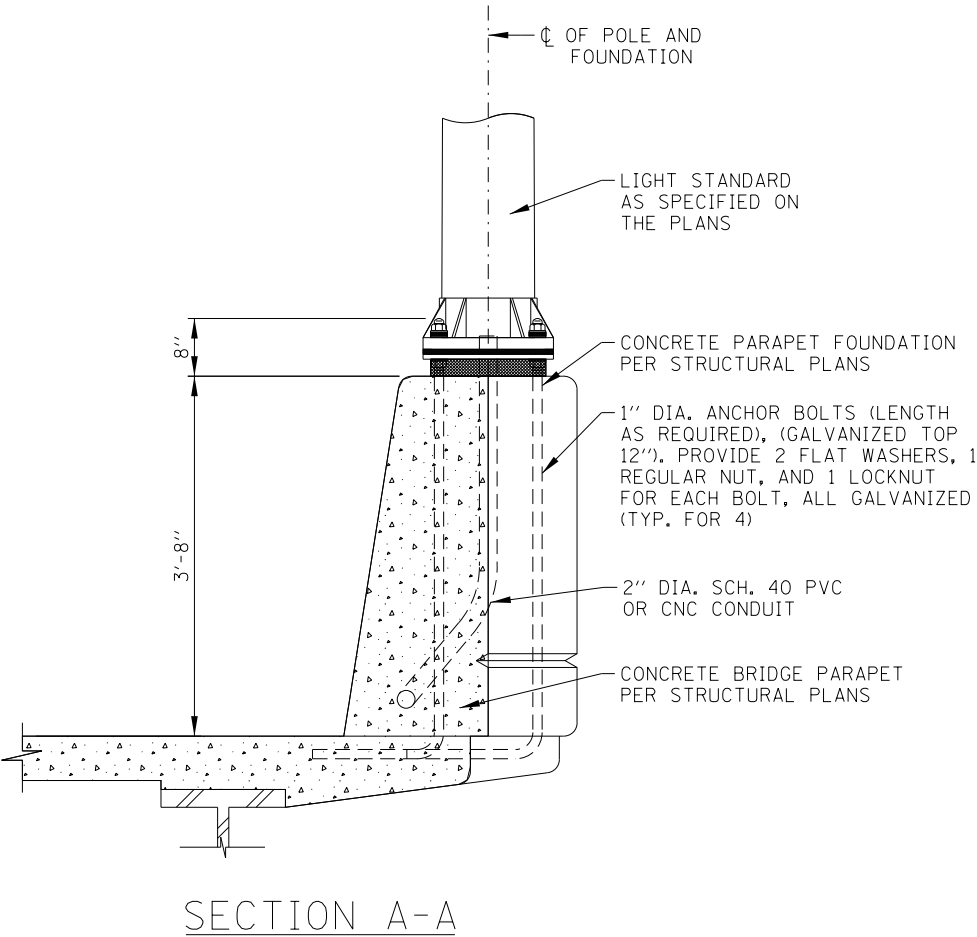
LIGHT STANDARD  
 DETAILS

STANDARD H2-10

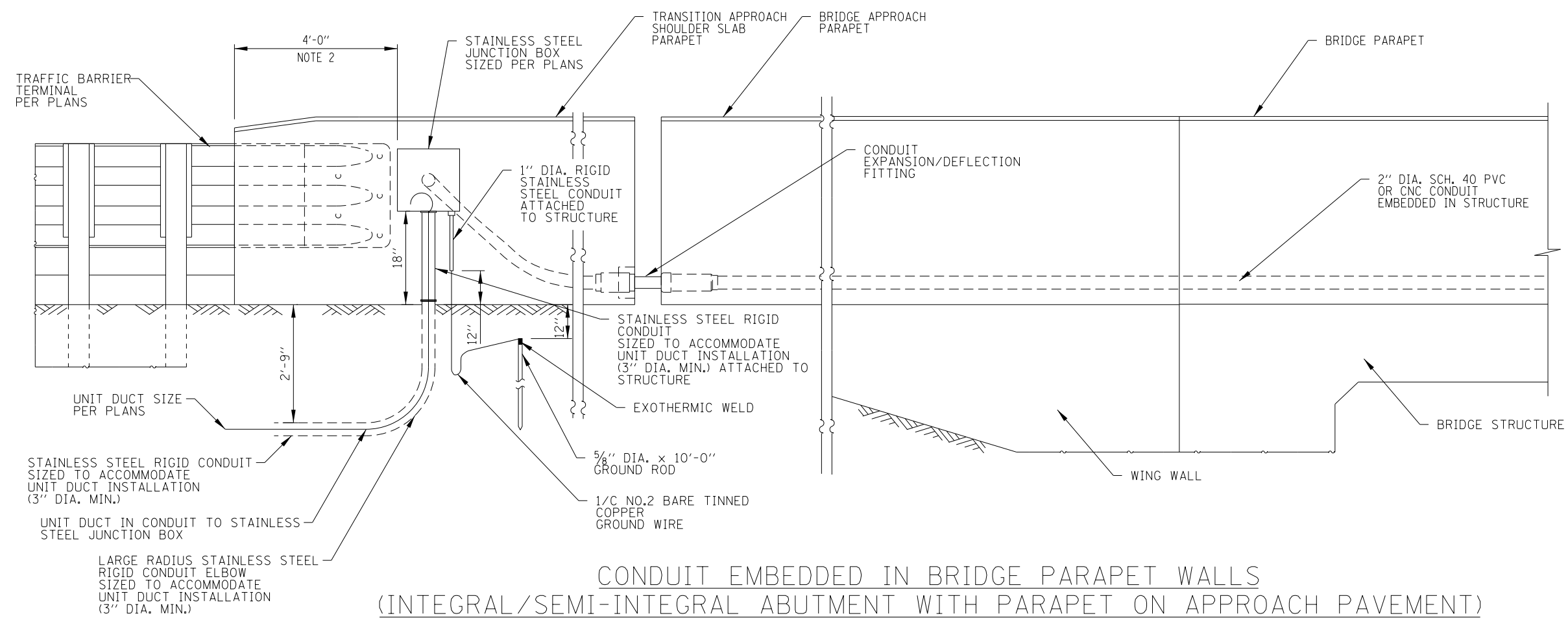




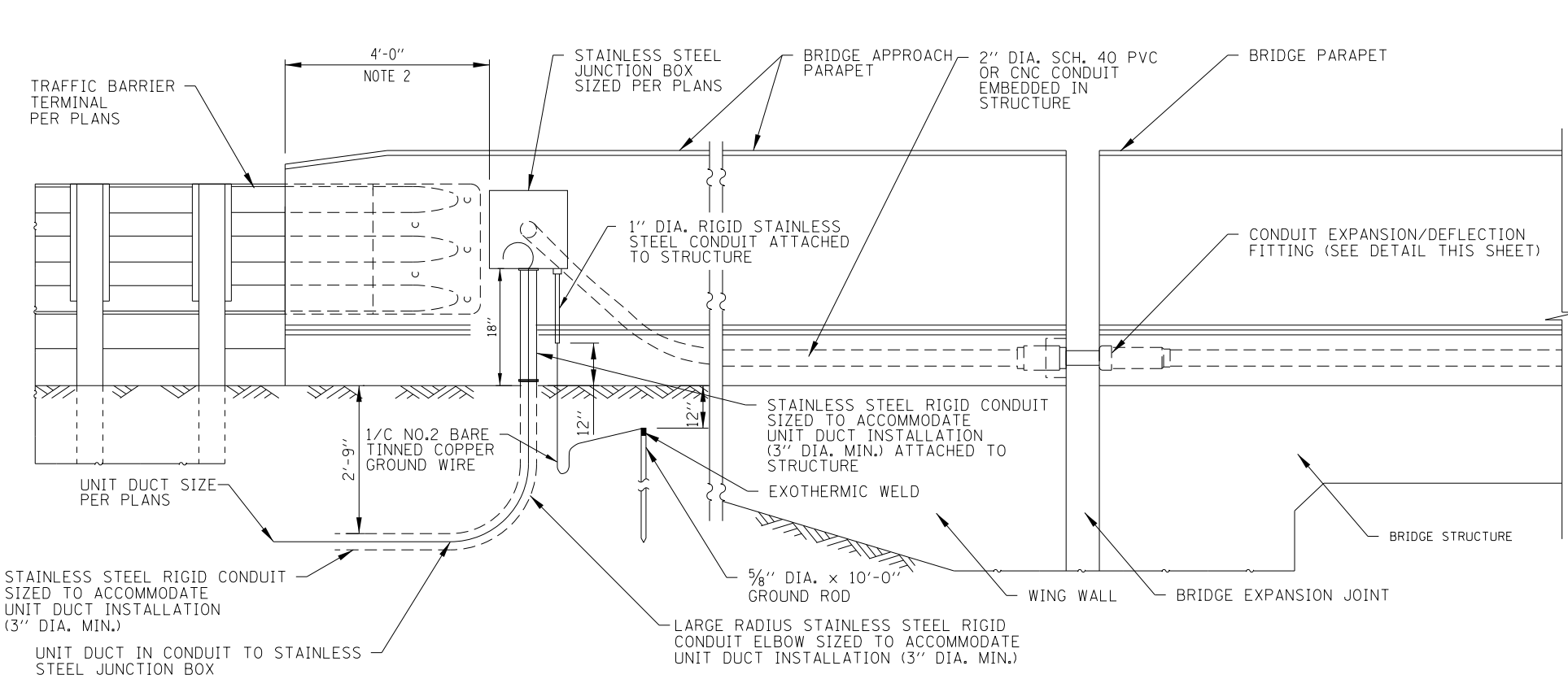
- NOTES:
- FOR STRUCTURAL PARAPET FOUNDATION DETAILS, SEE STRUCTURAL PLANS.
  - THE END 4'-0" SECTION OF WINGWALL/PARAPET SHALL BE KEPT FREE FROM ANY ATTACHMENTS TO AVOID CONFLICT FROM TRAFFIC BARRIER TERMINAL.
  - ALL CONDUIT, JUNCTION BOXES AND APPURTENANCES MOUNTED TO STRUCTURE SHALL BE OFFSET FROM THE FACE OF THE STRUCTURE A MINIMUM OF ONE (1) INCH BY MEANS OF A STAINLESS STEEL C-CHANNEL. C-CHANNEL SHALL BE SECURED TO BRIDGE PARAPET WITH 1/2" DIA. EXPANSION ANCHORS (MIN. 2" LONG). EXPANSION ANCHORS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION AND SHALL BE MADE BY PARABOLT, KWIK-BOLT OR WEJ-IT. CONDUIT SHALL BE SECURED WITH APPROVED CLAMPS A MINIMUM OF 5 FEET FROM CENTER AND A MINIMUM OF 2 FEET FROM ANY CHANGE IN DIRECTION OR JUNCTION BOX.
  - THE BARREL IN THE EXPANSION JOINT FITTING SHALL BE FULLY EMBEDDED IN THE CONCRETE ON ONE SIDE OF THE EXPANSION JOINT. ONE HALF THE LENGTH OF THE DEFLECTION FITTING SHALL BE EMBEDDED IN THE CONCRETE ON THE OTHER SIDE OF THE EXPANSION JOINT.
  - EXPANSION/DEFLECTION JOINTS SHALL BE PROVIDED AT ALL BRIDGE EXPANSION JOINTS.
  - ALL CLAMPS AND HARDWARE FOR CONDUIT MOUNTING SHALL BE OF LIKE MATERIAL AS THE CONDUIT.
  - ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.



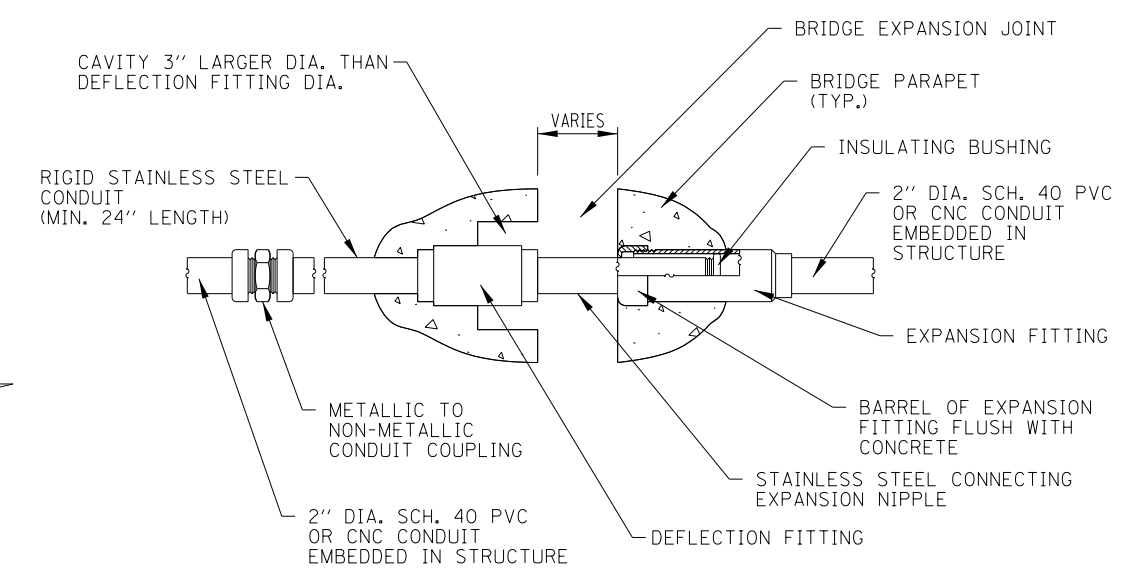
DATE	REVISIONS
3-01-2024	REMOVED THE DIMENSION OF THE ANCHOR BOLT FROM THE SECTION A-A VIEW. ADDED THE TRANSITION SLAB DETAIL. REVISED CALL-OUTS FOR SECTION A-A VIEW. REVISED CALL-OUTS TO THE ELEVATION VIEW.



**CONDUIT EMBEDDED IN BRIDGE PARAPET WALLS**  
**(INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ON APPROACH PAVEMENT)**



**CONDUIT EMBEDDED IN BRIDGE PARAPET WALLS**  
**(JOINTED ABUTMENT WITH PARAPET ON APPROACH PAVEMENT)**

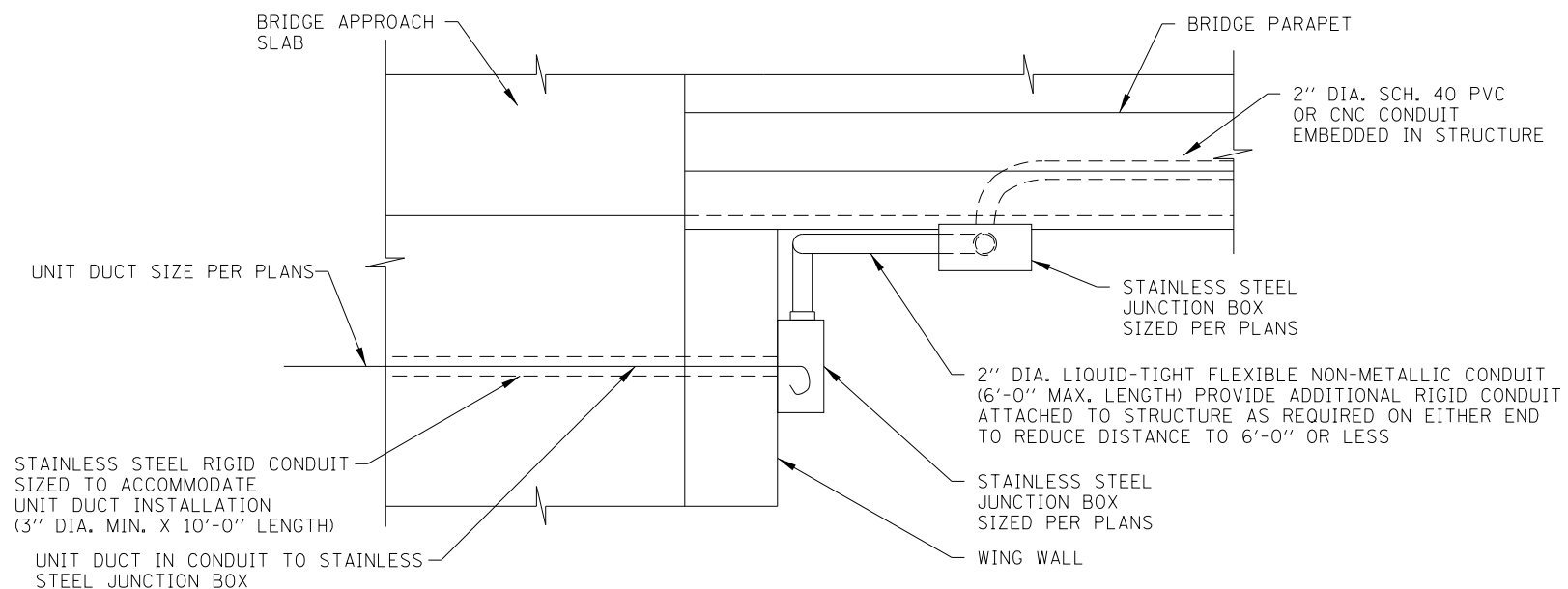


**COMBINATION EXPANSION/ DEFLECTION FITTING**  
 (SEE NOTES 4 & 5)

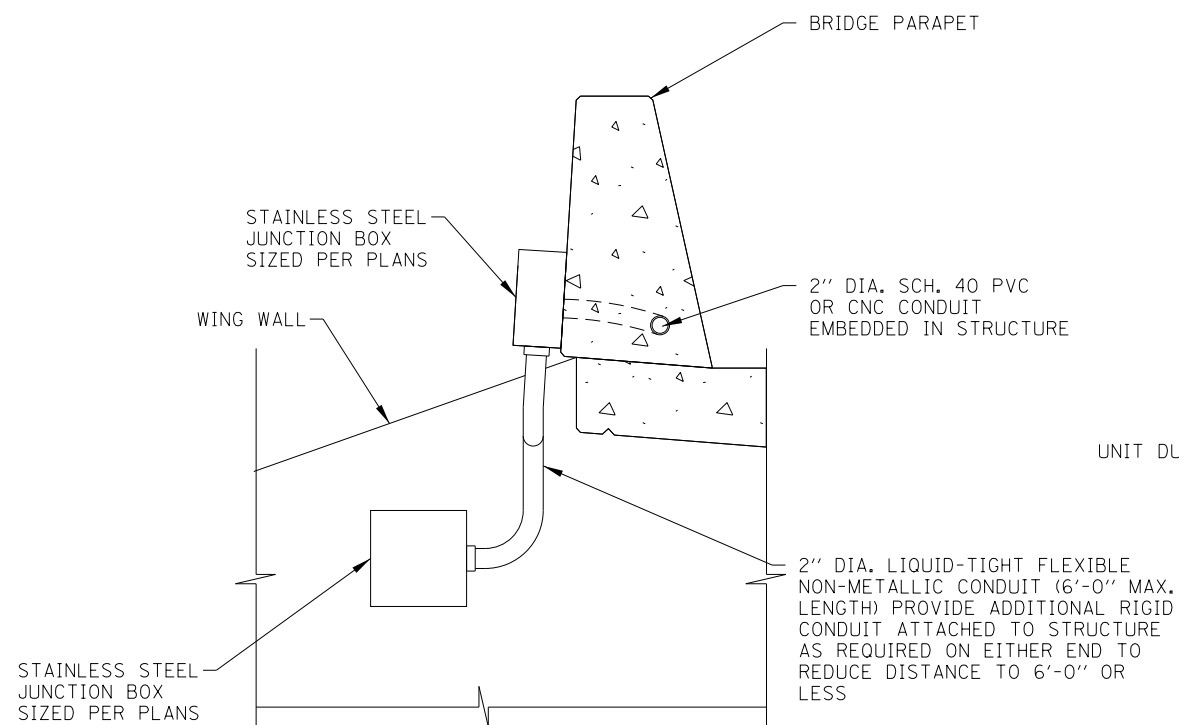
APPROVED BY: *Mamun Nashif*  
 CHIEF ENGINEERING OFFICER  
 DATE: 03/01/2024

NOTE:  
 SEE SHEET 1 OF THIS SERIES FOR NOTES.

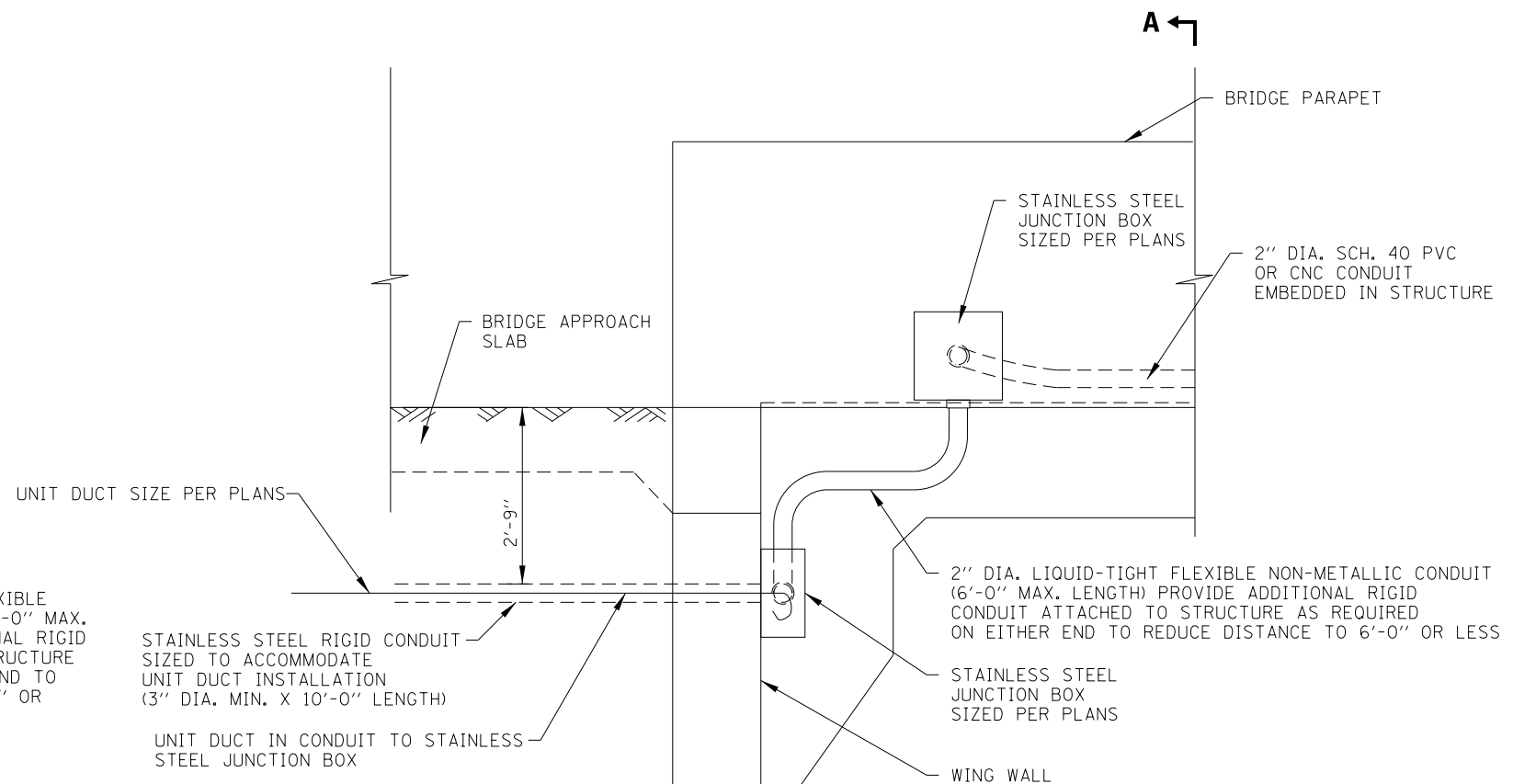
BRIDGE CONDUIT DETAILS
STANDARD H3-08



PLAN



SECTION A-A



ELEVATION

NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 3 OF 4

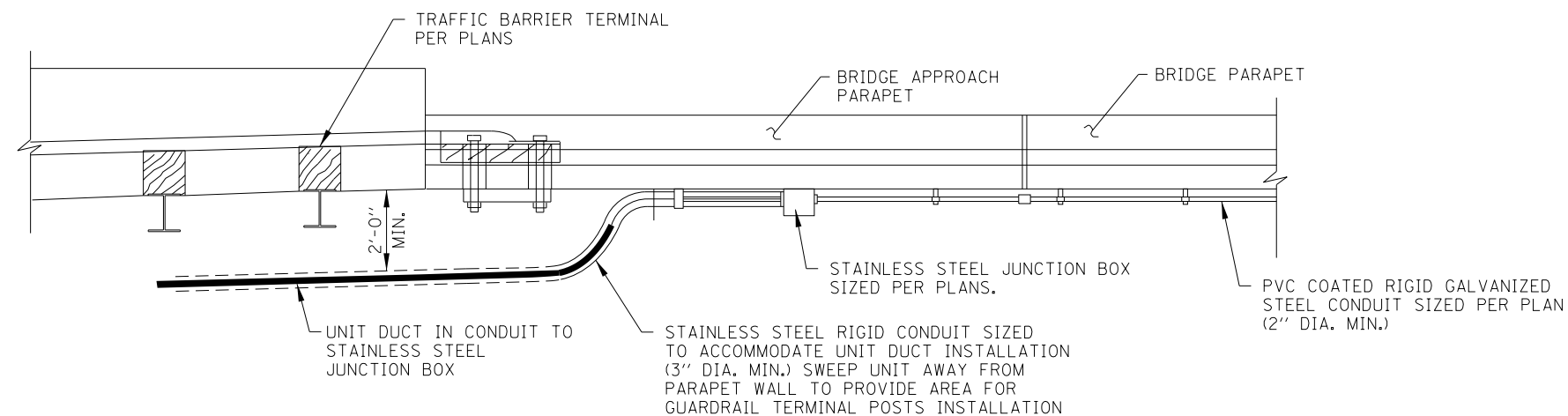


BRIDGE  
CONDUIT DETAILS

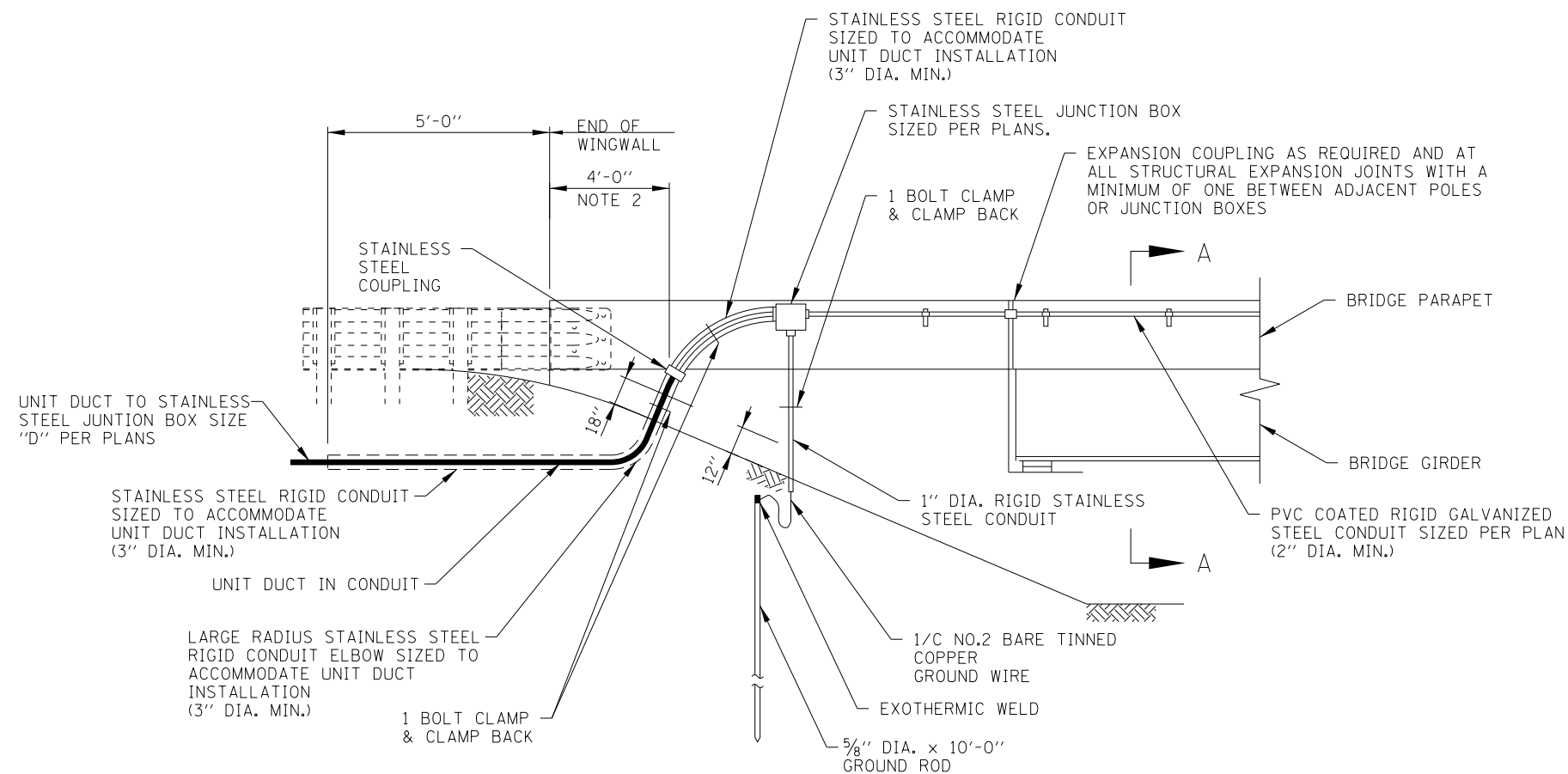
STANDARD H3-08

APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/01/2024

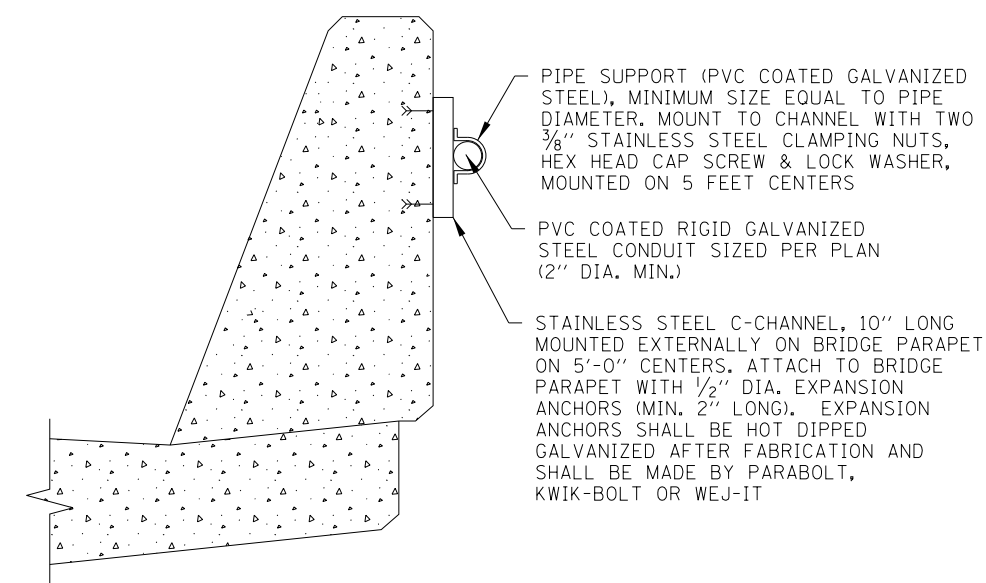
CONDUIT EMBEDDED IN BRIDGE PARAPET WALLS  
(INTEGRAL/SEMI-INTEGRAL ABUTMENT WITH PARAPET ENDING ON BRIDGE DECK)



PLAN VIEW



ELEVATION OF TYPICAL WINGWALL CONDUIT TRANSITION



SECTION A-A

SHEET 4 OF 4



BRIDGE  
CONDUIT DETAILS

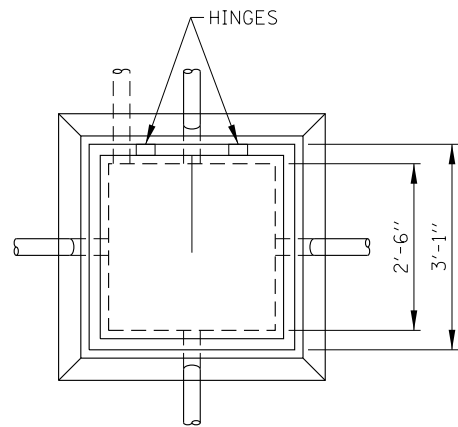
STANDARD H3-08

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

## CONDUIT ATTACHED TO BRIDGE PARAPET

NOTE:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

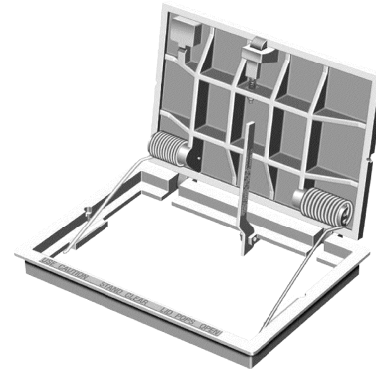
DIRECTION OF TRAFFIC



PLAN



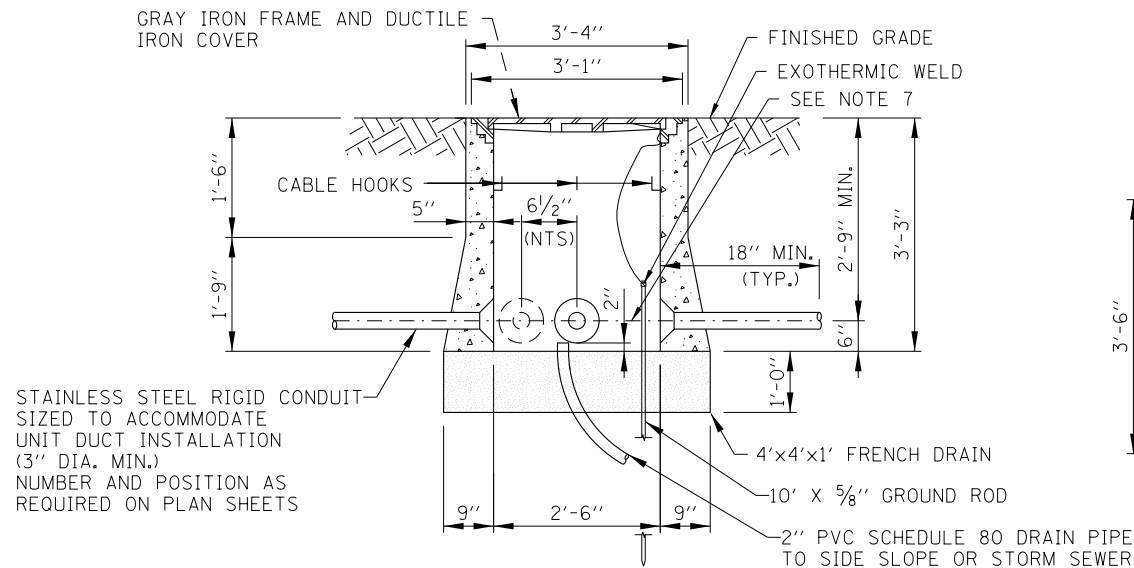
EAST JORDAN  
EJ 8216



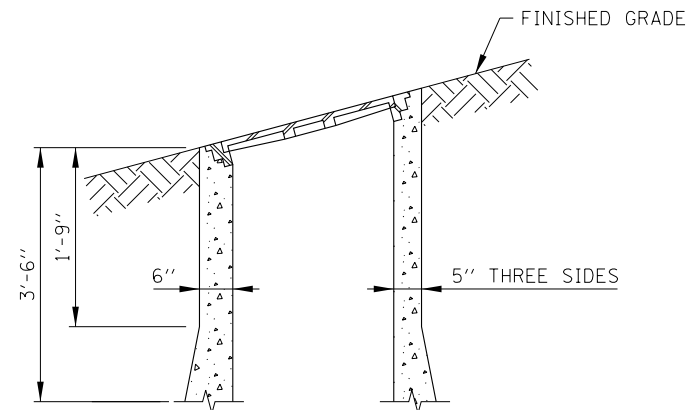
NEENAH  
R-6662-PS

NOTES:

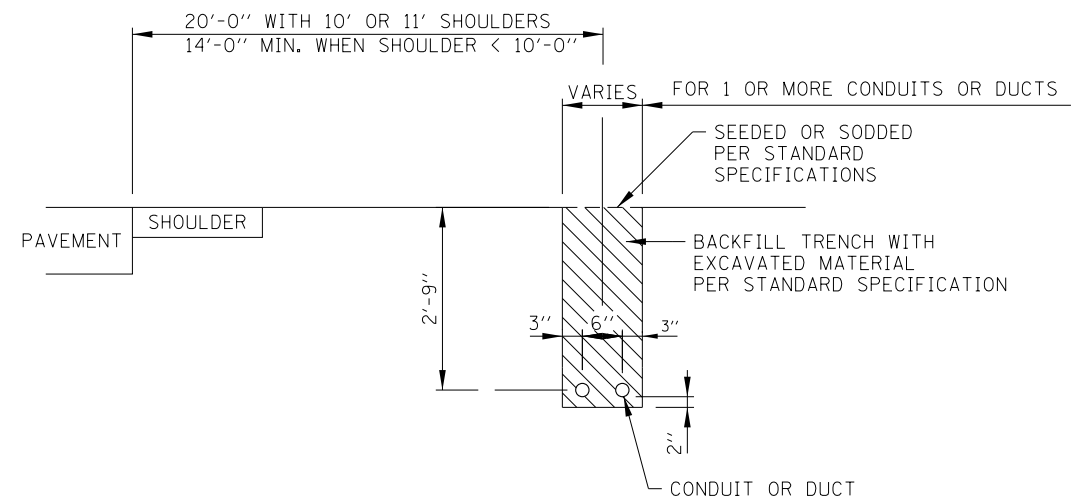
1. HEAVY-DUTY HANDHOLE LOCATED IN UNPAVED AREAS AND NOT SHIELDED BY GUARDRAIL SHALL BE CONSTRUCTED WITH THE TOP FLUSH WITH THE ADJACENT SLOPE.
2. HEAVY-DUTY HANDHOLE SHALL BE CONSTRUCTED IN NON-PAVED AREAS. THE FRAME AND HINGED COVER SHALL BE EITHER NEENAH FOUNDRY R-6662-PS WITH TYPE G LIFTING HANDLE OR EAST JORDAN IRON WORKS EJ 8216 WITH MPIC OR APPROVED EQUAL. THE HINGED COVER SHALL BE PROVIDED WITH A LIFT ASSIST MECHANISM. THERE SHALL BE TWO SETS OF HINGES AND THE DESIGN SHALL ALLOW FOR THE COVER TO OPEN > 90 DEGREES. THE COVER SHALL BE PROVIDED WITH A HOLD OPEN SAFETY ARM THAT CATCHES TO PREVENT ACCIDENTAL CLOSURE. THE COVER SHALL ALSO BE ABLE TO BE MADE FULLY REMOVABLE. THE FRAME COVER SHALL BE INSTALLED WITH THE HINGES TO THE SIDE FACING APPROACHING TRAFFIC.
3. AGGREGATE FOR FRENCH DRAIN SHALL BE PER ARTICLE 1003.04 OF THE STANDARD SPECIFICATIONS.
4. 10 FEET OF EXTRA CABLE SHALL BE COILED IN EACH HANDHOLE.
5. ALL METALLIC COMPONENTS OF THE HANDHOLE SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS SECTION 814, THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
6. THE HANDHOLE COVER SHALL BE LETTERED "ELECTRIC". LETTERING SHALL BE 2" FLAT FACE GOTHIC AND BE FLUSH WITH THE SLIP RESISTANT SURFACE.
7. CONDUCTOR SPLICES SHALL BE MADE ONLY WITHIN ACCESSIBLE ABOVE GRADE LOCATIONS, SUCH AS WITHIN POLE BASES, JUNCTION BOXES AND WITHIN ENCLOSURES. BELOW GRADE CONDUCTOR SPlicing SHALL ONLY BE ACCEPTABLE AT THE APPROVAL OF THE TOLLWAY. IF A BELOW GRADE SPLICE IS APPROVED FOR USE BY THE TOLLWAY, THE SPLICES SHALL BE WATERPROOF OF THE RESIN EPOXY ENCAPSULATED TYPE.



ELEVATION



SLOPE INSTALLATION



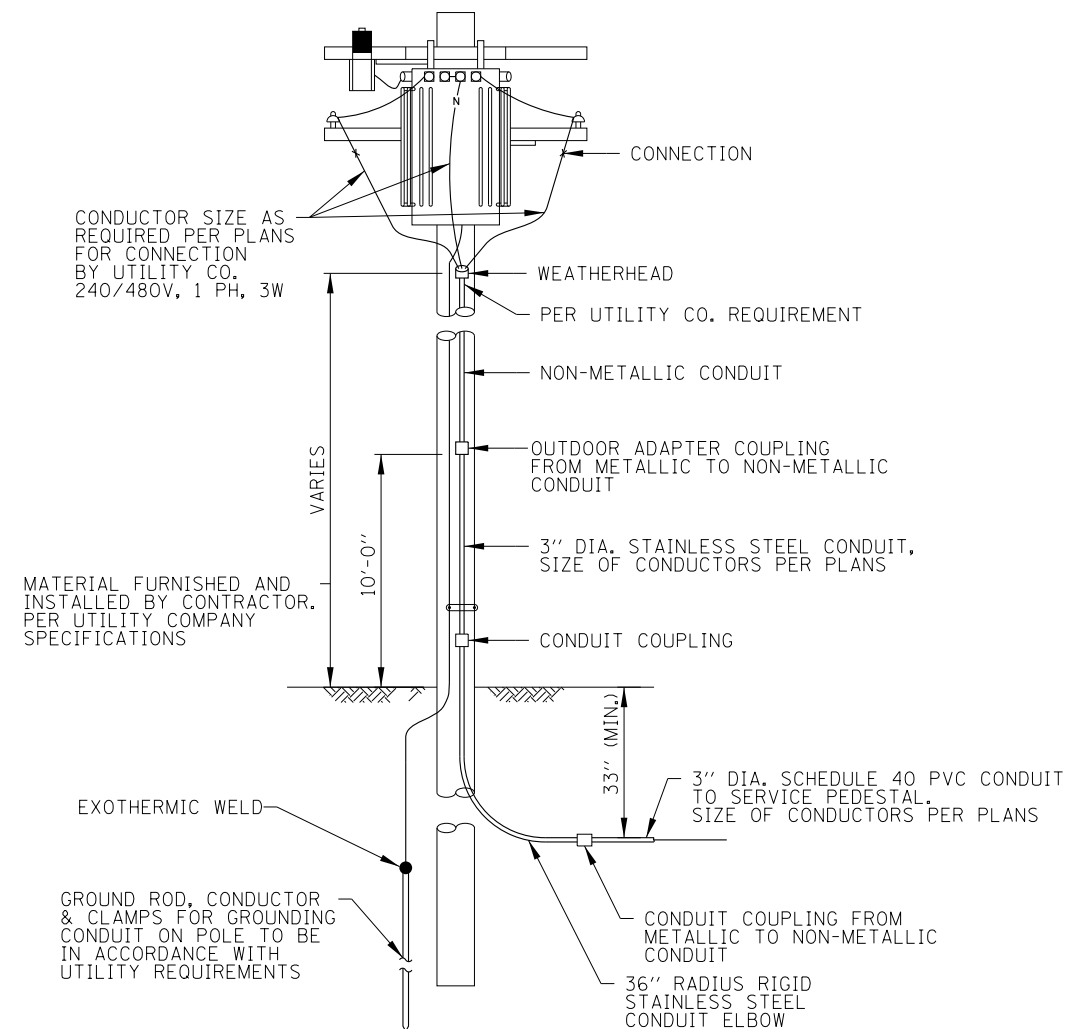
TRENCHING FOR CONDUIT IN NON-PAVED AREAS

HEAVY-DUTY HANDHOLE DETAILS

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

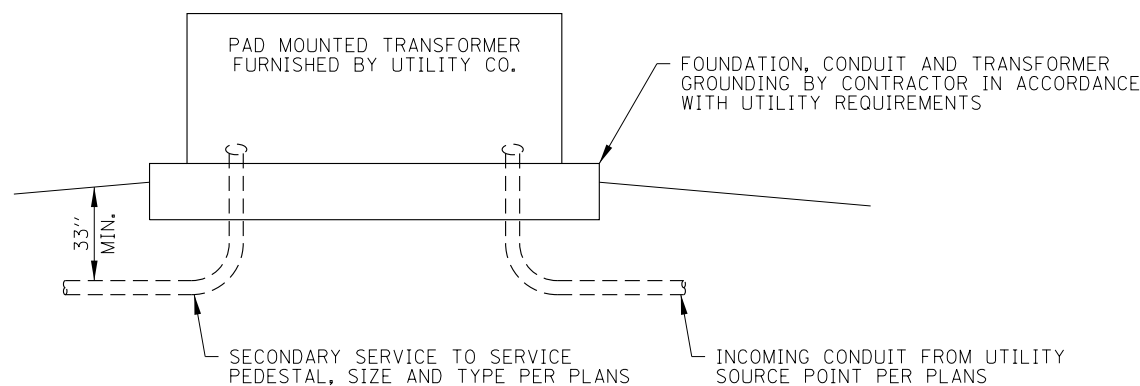
DATE	REVISIONS
3-01-2024	REVISED TO REFERENCE DETAILS FOR BURIED WIRING. ADDED NOTE 7
3-01-2021	REMOVED SAND FROM CONDUIT TRENCH. GROUND ROD SHOWN IN ELEV. VIEW.
3-31-2017	REVISED NOTES. REMOVED GROUND ROD FROM DETAIL.

**Illinois Tollway**  
HEAVY-DUTY HANDHOLE AND  
BURIED WIRING DETAILS  
STANDARD H4-06



## UTILITY SERVICE POLE

SUBJECT TO UTILITY COMPANY APPROVAL

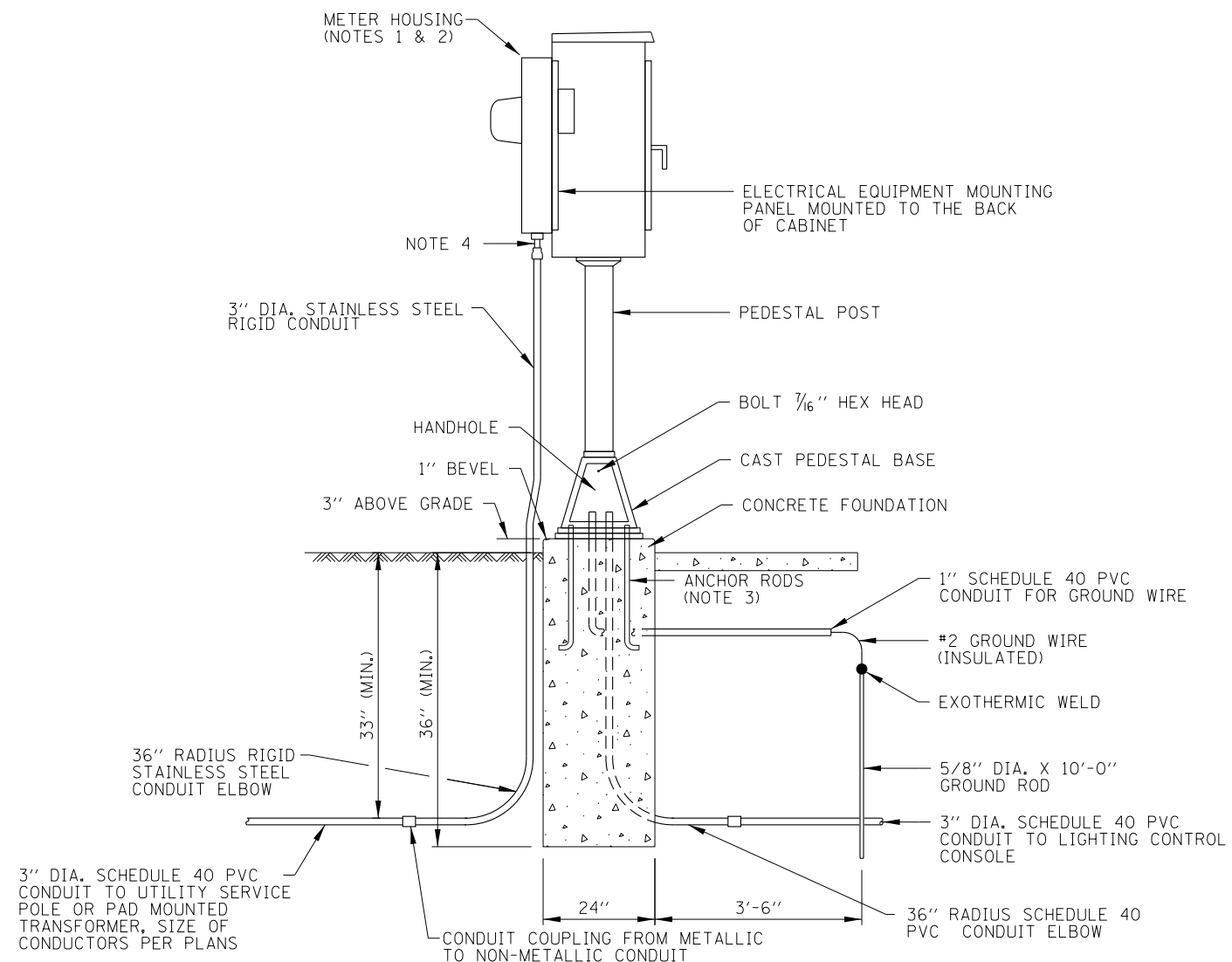


## UTILITY PAD MOUNTED TRANSFORMER

SUBJECT TO UTILITY COMPANY APPROVAL

### NOTES:

1. METER HOUSING SHALL BE MOUNTED TO BACK WALL OF CONTROL CABINET. PROVIDE A GATE IN R.O.W. FENCE TO ALLOW UTILITY ACCESS TO READ THE METER.
2. CABLES FROM METER HOUSING SHALL PASS THROUGH BACK WALL OF CONTROL CABINET.
3. CONTRACTOR MUST COORDINATE WITH PEDESTAL BASE SUPPLIER AND FURNISH THE NECESSARY ANCHOR RODS.
4. PROVIDE A 2 1/2" CONDUIT HUB, 2 1/2" NIPPLE AND 2 1/2" TO 3" CONDUIT REDUCER FITTING.
5. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.



## SERVICE PEDESTAL WITH METER DETAIL

SHEET 1 OF 3



DATE	REVISIONS
3-01-2021	ADDED COMBINED LIGHTING/ITS PEDESTAL.
3-01-2018	TYPOGRAPHICAL CORRECTIONS.
3-31-2017	ADDED EQUIPMENT LAYOUTS.
3-31-2016	REVISED CONDUIT DEPTH.

SERVICE POLE AND  
PEDESTAL DETAILS

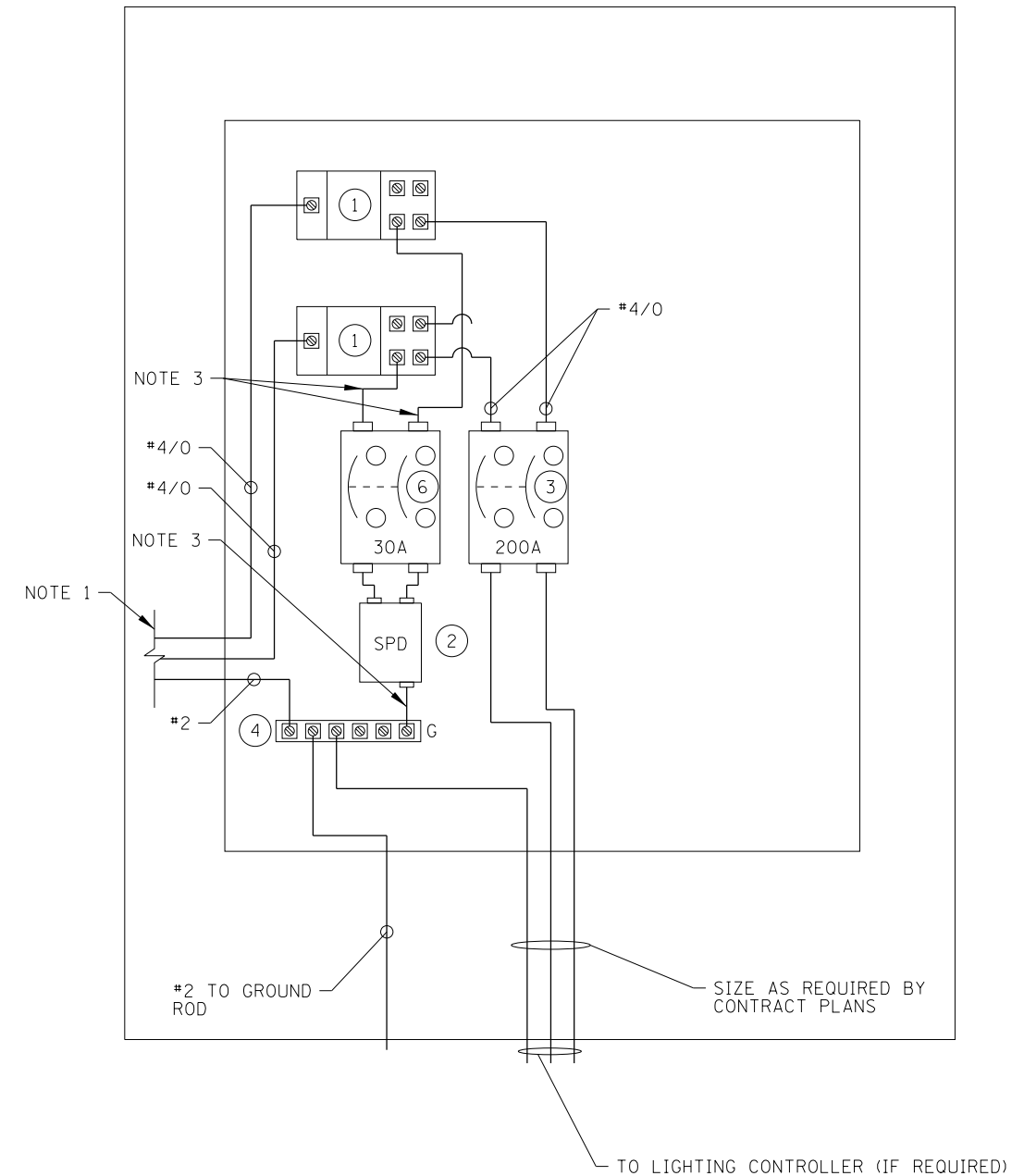
STANDARD H5-06

APPROVED BY:

DATE:

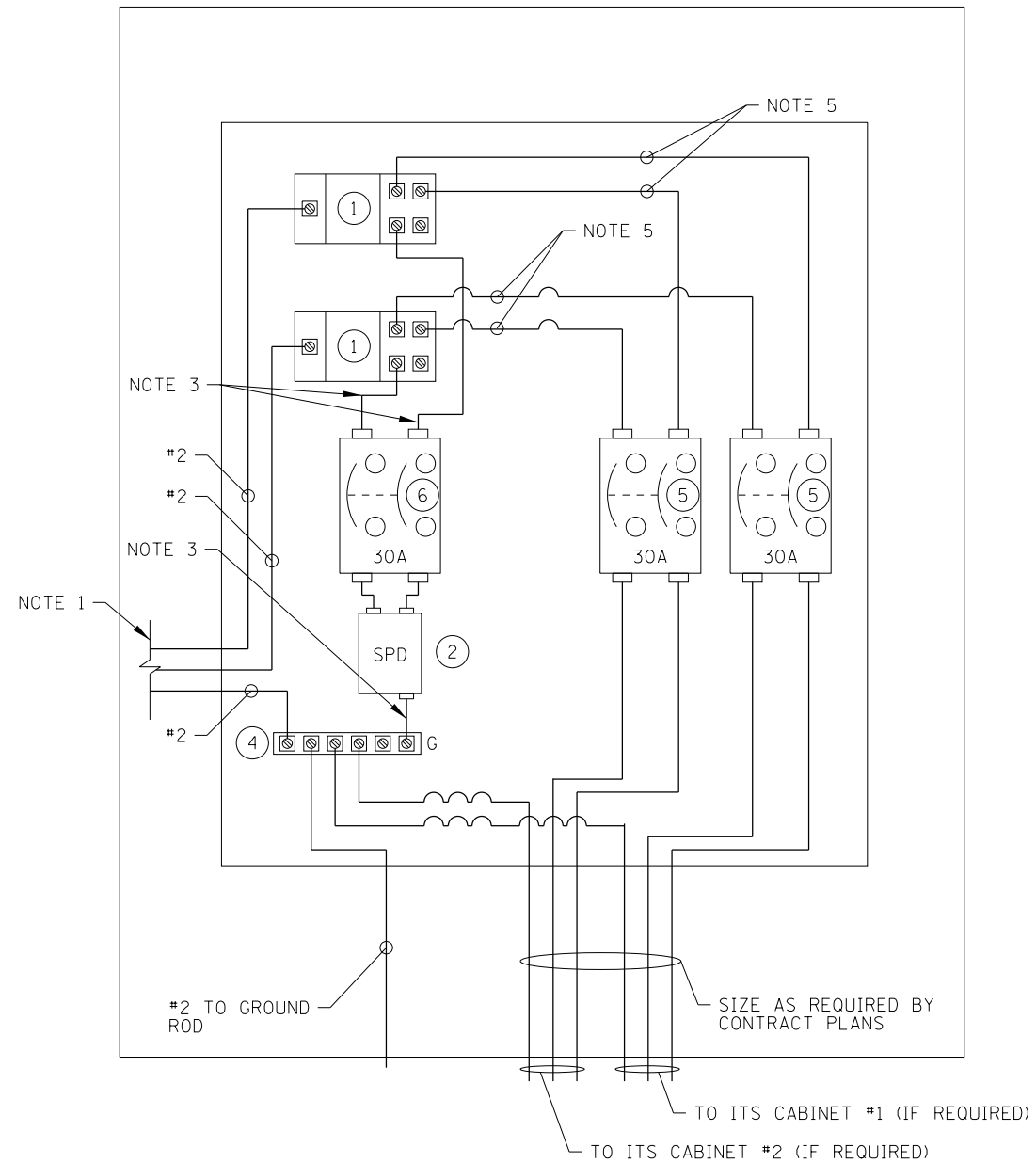
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

02/07/2012



SERVICE PEDESTAL INTERIOR ELECTRIC  
EQUIPMENT LAYOUT & WIRING DIAGRAM

ROADWAY LIGHTING



SERVICE PEDESTAL INTERIOR ELECTRIC  
EQUIPMENT LAYOUT & WIRING DIAGRAM

ROADWAY ITS

# ITEM DESCRIPTION

- ① POWER DISTRIBUTION/TERMINAL BLOCK, WITH INGRESS PROTECTION RATING IP20.
- ② SURGE PROTECTION DEVICE
- ③ CIRCUIT BREAKER, 200 AMPERE, 2-POLE, 600 VOLT RATED
- ④ GROUNDING AND/OR NEUTRAL BUS
- ⑤ CIRCUIT BREAKER, 30 AMPERE (OR AS REQUIRED BY CONTRACT PLANS), 2-POLE, 600 VOLT RATED
- ⑥ CIRCUIT BREAKER, 30 AMPERE, 2-POLE, 600 VOLT RATED

## NOTES:

1. ELECTRIC SERVICE CONDUCTORS FROM METER HOUSING.
2. ELECTRIC SERVICE CONDUCTORS TO LIGHTING CONTROL CONSOLE. SIZE AS INDICATED ON THE PLANS.
3. SURGE PROTECTION DEVICE CONDUCTORS SIZE SHALL BE ACCORDING TO MANUFACTURER'S RECOMMENDATION.
4. ELECTRIC CONDUCTORS SHOWN WITH MINIMUM SIZES. LARGER SIZES SHALL BE USED AS REQUIRED OR AS SHOWN ON THE PLANS.
5. CABLES SHALL BE MINIMUM #4 AWG OR AS REQUIRED FOR CIRCUIT BREAKER.

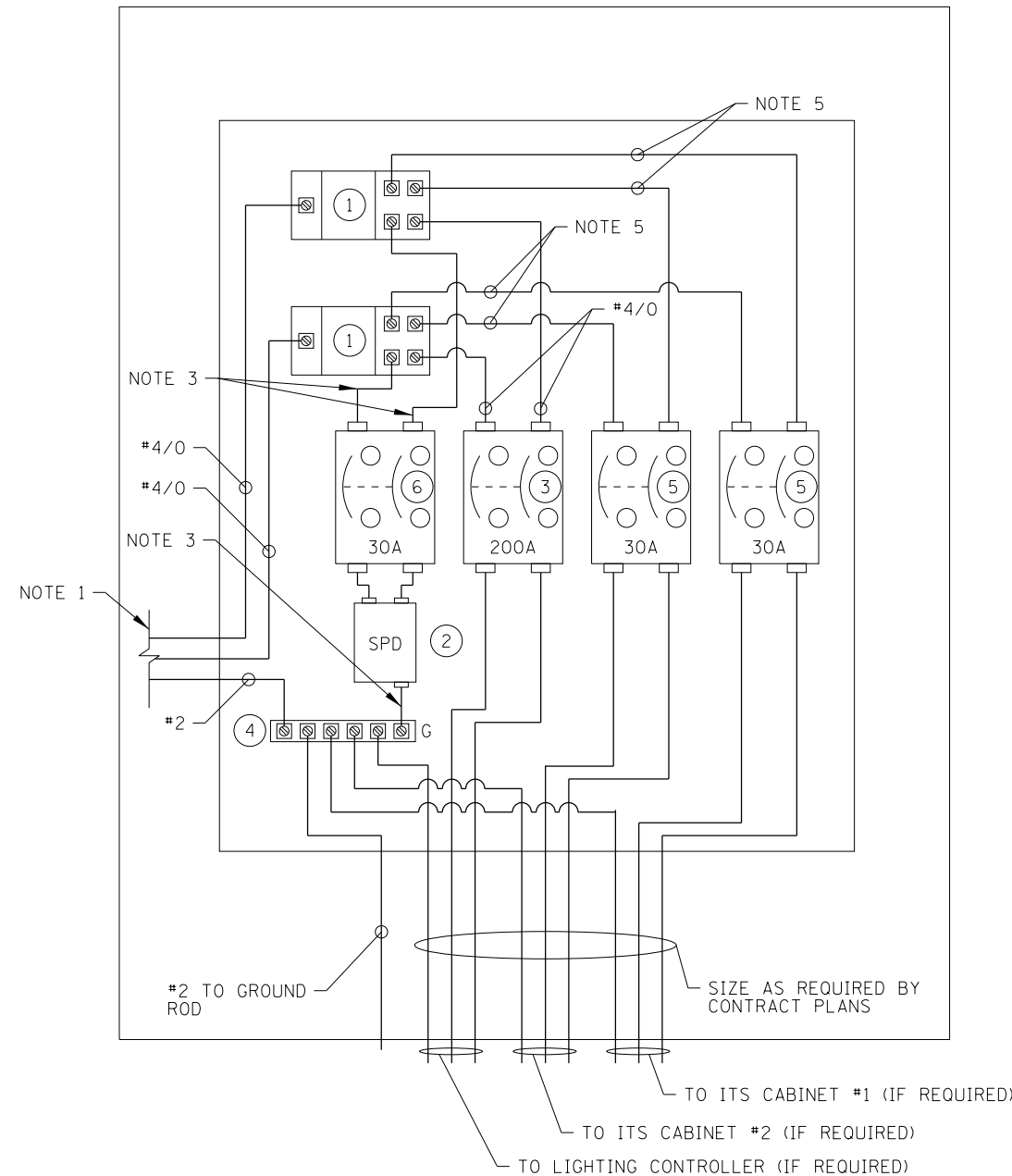
SHEET 2 OF 3



SERVICE POLE AND  
PEDESTAL DETAILS

STANDARD H5-06

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
02/07/2012



## SERVICE PEDESTAL INTERIOR ELECTRIC EQUIPMENT LAYOUT & WIRING DIAGRAM

COMBINED ROADWAY LIGHTING / ITS

### ITEM DESCRIPTION

- ① POWER DISTRIBUTION/TERMINAL BLOCK, WITH INGRESS PROTECTION RATING IP20.
- ② SURGE PROTECTION DEVICE
- ③ CIRCUIT BREAKER, 200 AMPERE, 2-POLE, 600 VOLT RATED
- ④ GROUNDING AND/OR NEUTRAL BUS
- ⑤ CIRCUIT BREAKER, 30 AMPERE (OR AS REQUIRED BY CONTRACT PLANS), 2-POLE, 600 VOLT RATED
- ⑥ CIRCUIT BREAKER, 30 AMPERE, 2-POLE, 600 VOLT RATED

### NOTES:

- 1. ELECTRIC SERVICE CONDUCTORS FROM METER HOUSING.
- 2. ELECTRIC SERVICE CONDUCTORS TO LIGHTING CONTROL CONSOLE. SIZE AS INDICATED ON THE PLANS.
- 3. SURGE PROTECTION DEVICE CONDUCTORS SIZE SHALL BE ACCORDING TO MANUFACTURER'S RECOMMENDATION.
- 4. ELECTRIC CONDUCTORS SHOWN WITH MINIMUM SIZES. LARGER SIZES SHALL BE USED AS REQUIRED OR AS SHOWN ON THE PLANS.
- 5. CABLES SHALL BE MINIMUM #4 AWG OR AS REQUIRED FOR CIRCUIT BREAKER.

SHEET 3 OF 3



SERVICE POLE AND  
PEDESTAL DETAILS

STANDARD H5-06

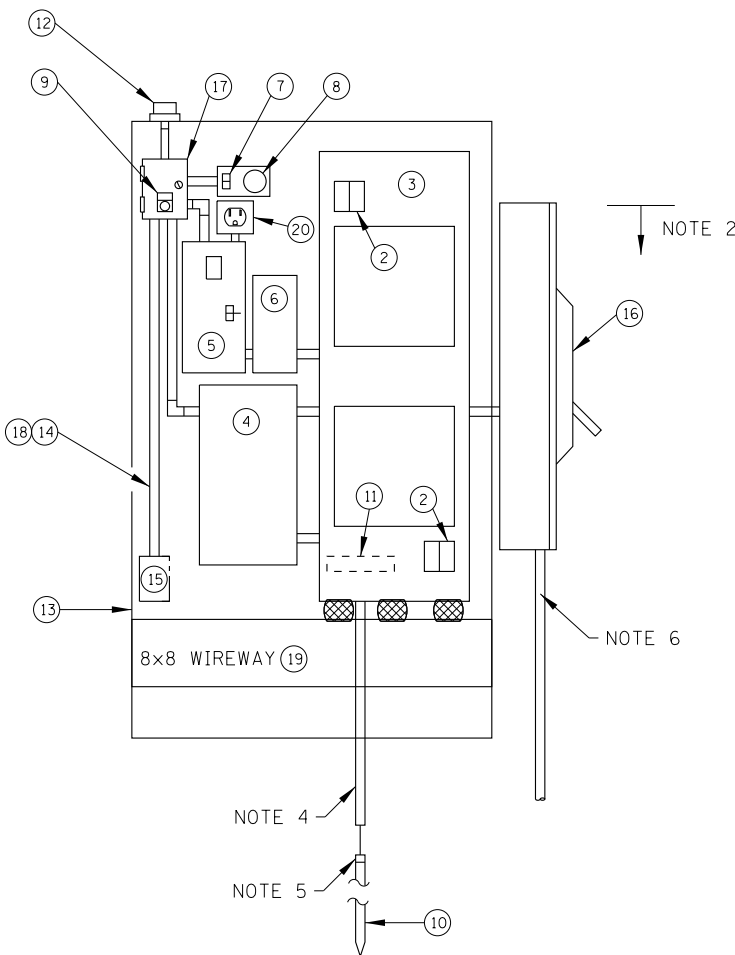
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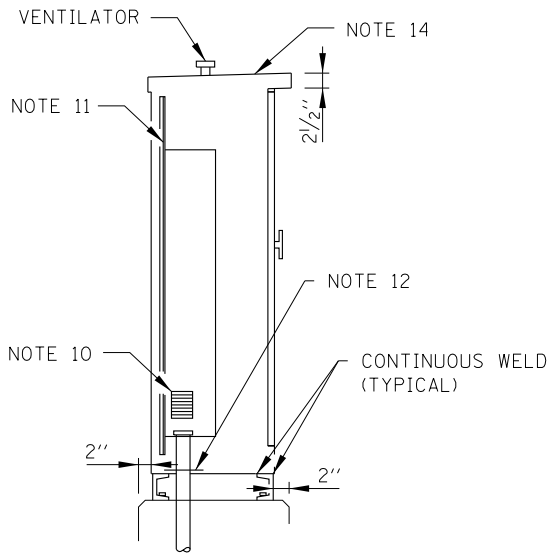
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER

02/07/2012

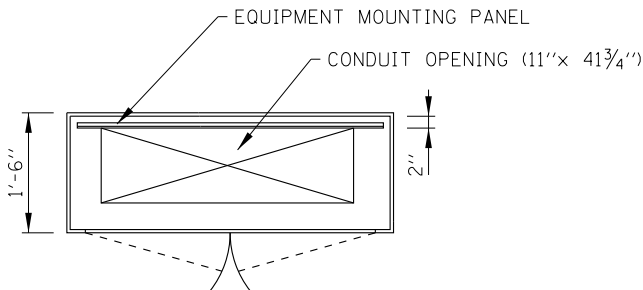




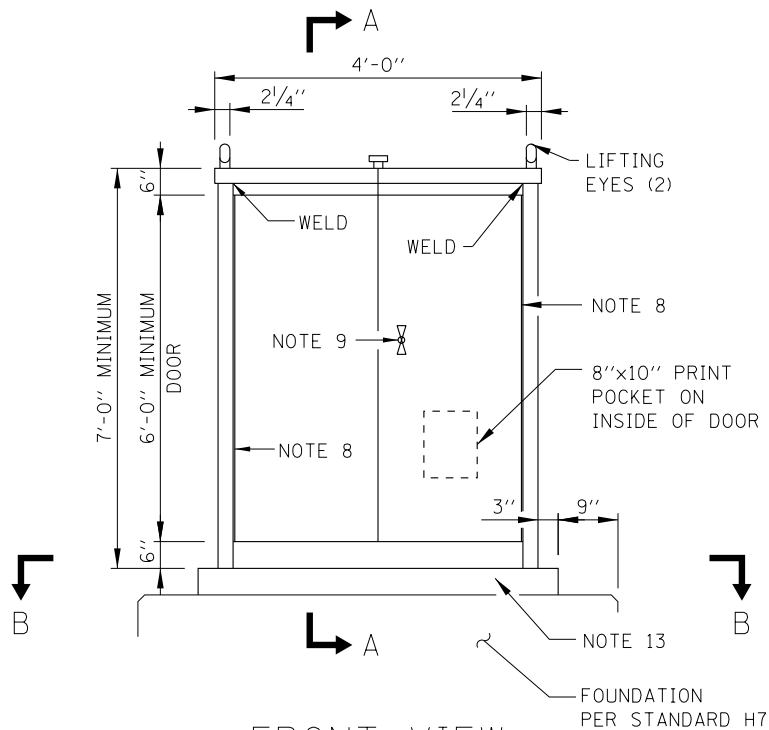
INTERIOR EQUIPMENT LAYOUT



SECTION A-A



SECTION B-B



FRONT VIEW

CONTROL CONSOLE DETAILS  
(EXTERIOR INSTALLATION)

NOTES:

1. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
2. 5'-0" MAXIMUM HEIGHT ABOVE GRADE.
3. NOT USED.
4. 3/4" PVC CONDUIT IN CONCRETE, SEE FOUNDATION DETAILS (STANDARD H7).
5. EXOTHERMIC WELD NO. 2 BARE TINNED COPPER GROUND CABLE TO GROUND ROD.
6. TO SERVICE PEDESTAL AS INDICATED ON PLANS.
7. NOT USED.
8. CONTINUOUS STAINLESS STEEL PIANO HINGES.
9. 3-POINT LATCH VAULT TYPE HANDLE WITH MASTER KEYED CHICAGO CYLINDER LOCK CATALOG NO. 60
10. SCREENED LOUVERS ON SIDES OF CABINET.
11. 10 GAUGE GALVANIZED STEEL EQUIPMENT MOUNTING PANEL (PAINTED WHITE).
12. REMOVABLE #10 GAUGE 13"x43 3/4" STAINLESS STEEL PLATE. DRILL PLATE AS REQUIRED FOR CONDUIT ENTRY.
13. 4" x 2 1/2" STAINLESS STEEL CHANNEL (2 REQUIRED-FRONT AND BACK). EXTEND CHANNEL 3" BEYOND ENCLOSURE (CONTINUOUSLY WELD CHANNEL TO ENCLOSURE).
14. TOP SLOPED 1/2" TO REAR FOR DRAINAGE.
15. FOR WIRING DIAGRAM SEE SHEET 2 OF THIS SERIES.
16. ALL EQUIPMENT WITHIN LIGHTING CONTROLLER SHALL BE SEPARATED A MINIMUM OF THREE (3) INCHES FROM EACH OTHER.
17. MAIN PANELBOARD (ITEM 3) SHALL BE POSITIONED SUCH THAT BOTH DOORS (DOOR-IN-DOOR) OF THE PANELBOARD MAY BE FULLY OPENED WITHIN EXTERIOR ENCLOSURE (ITEM 13) WITHOUT REMOVAL

ITEM DESCRIPTION:

- 1 NOT USED.
- 2 SECONDARY SURGE ARRESTERS, 2 POLE, 650 VOLT.
- 3 MAIN PANELBOARD IN A NEMA 1 ENCLOSURE, 480/240 VOLT, 1 PHASE, 3 WIRE, 2 SECTION, 200 AMP, 2 POLE MAIN CIRCUIT BREAKER 65,000 AMPERES SYMMETRICAL INTERRUPTING CAPACITY WITH CIRCUIT BREAKERS PER SCHEDULE ON PLANS. DOOR HINGES ON RIGHT SIDE.
- 4 LIGHTING CONTRACTOR, ELECTRICALLY HELD, 480 VOLT, 200 AMP, 2 POLE, 120 VOLT CONTROL, WITH 250 VOLT, 15 AMP CONTROL LINE FUSE, IN A NEMA 1 ENCLOSURE.
- 5 SECONDARY BREAKER, 15 AMPERE TRIP, 120 VOLT, SINGLE POLE, 65,000 AMPERES SYMMETRICAL INTERRUPTING CAPACITY IN A NEMA 1 SURFACE MOUNTED ENCLOSURE.
- 6 STEP DOWN TRANSFORMER, 1500 VA, 480 VOLT PRIMARY, 120 VOLT SECONDARY, SINGLE PHASE, 60 HERTZ, DRY TYPE, NEMA 3R ENCLOSURE.
- 7 SINGLE POLE, 15 AMPERE SWITCH, IN A NEMA 1 ENCLOSURE (WITH ITEM 8), RATED AT 120-277 VAC.
- 8 LAMP HOLDER 660W, 600V, MOUNTED ON A NEMA 1 ENCLOSURE (WITH ITEM 7), W/LED LAMP.
- 9 HAND-OFF-AUTO SELECTOR SWITCH WITH LEGEND PLATE. MOUNTED IN THE COVER OF ITEM 17.
- 10 5/8" DIA. x 10'-0" LONG GROUND ROD DRIVEN EXTERNAL TO THE FOUNDATION WITHIN GROUND WELL.
- 11 GROUND BUS MOUNTED IN PANELBOARD ENCLOSURE.
- 12 PHOTO ELECTRIC CONTROL SWITCH, WITH RECEPTACLE.
- 13 NEMA TYPE 3R STAINLESS STEEL ENCLOSURE WITH DRIP SHIELD AND STAINLESS STEEL HARDWARE. ENCLOSURE SHALL CONFORM TO J.I.C. STANDARDS WITH CELLULAR NEOPRENE GASKETED DOORS, ALL SEAMS CONTINUOUSLY WELDED, 10 GAUGE STAINLESS STEEL BODY, REMOVABLE STEEL (PAINTED WHITE) PANEL INSIDE THE BACK AND A FACTORY INSTALLED DRIP SHIELD. THE ENCLOSURE SHALL HAVE CONTINUOUS HINGED DOORS MEETING IN THE CENTER, OVERLAPPED AND GASKETED, WITH NO CENTER POS T. AN OIL TIGHT KEY LOCKING HANDLE WITH 3 POINT LATCH SHALL BE PROVIDED (FURNISH 6 KEYS). EACH END OF THE ENCLOSURE SHALL HAVE A SCREENED, GASKETED VENTILATING LOUVER AND THE TOP OF THE ENCLOSURE SHALL HAVE A VENTILATOR. INTERNAL CONDUIT SHALL HAVE LOCKNUTS, INSULATING BUSHING AND CONDULET FITTINGS AS REQUIRED. INTERNAL WIRING SHALL BE XLP INSULATED NEC TYPE RHH/RHW-2. PROVIDE A WIRING DIAGRAM IN A PRINT POCKET ON THE INSIDE OF THE CABINET DOOR.
- 14 INTERNAL CONTROL WIRING SHALL BE #12 AWG, STRANDED, XLP INSULATED NEC TYPE RHH/RHW-2 RATED 600 VOLT, WITH SUITABLE COLOR CODING TO BE APPROVED BY THE ENGINEER BEFORE CONSTRUCTION.
- 15 200 WATT, 120 VOLT CABINET HEATER WITH INTEGRAL THERMOSTAT.
- 16 SERVICE SAFETY SWITCH, 200 AMP, 600 VOLT, NON-FUSED, NEMA 4X STAINLESS STEEL ENCLOSURE.
- 17 NEMA TYPE 1, 8"x6"x4" JUNCTION BOX & COVER WITHOUT KNOCKOUTS. ITEM 9 IS MOUNTED IN THE COVER.
- 18 INTERNAL CONDUIT AND FITTINGS SHALL BE 3/4" MINIMUM.
- 19 8"x8" WIREWAY WITH 3-3" NIPPLES.
- 20 GCFI OUTLET.

DATE	REVISIONS
3-01-2018	REMOVED CONTRACTOR RELAY, ADDED GCFI OUTLET.
3-31-2017	REMOVED METER HOUSING.
3-31-2016	REVISED NOTE 2.
3-11-2015	REVISED CONDUITS TO STAINLESS STEEL.

SHEET 1 OF 2

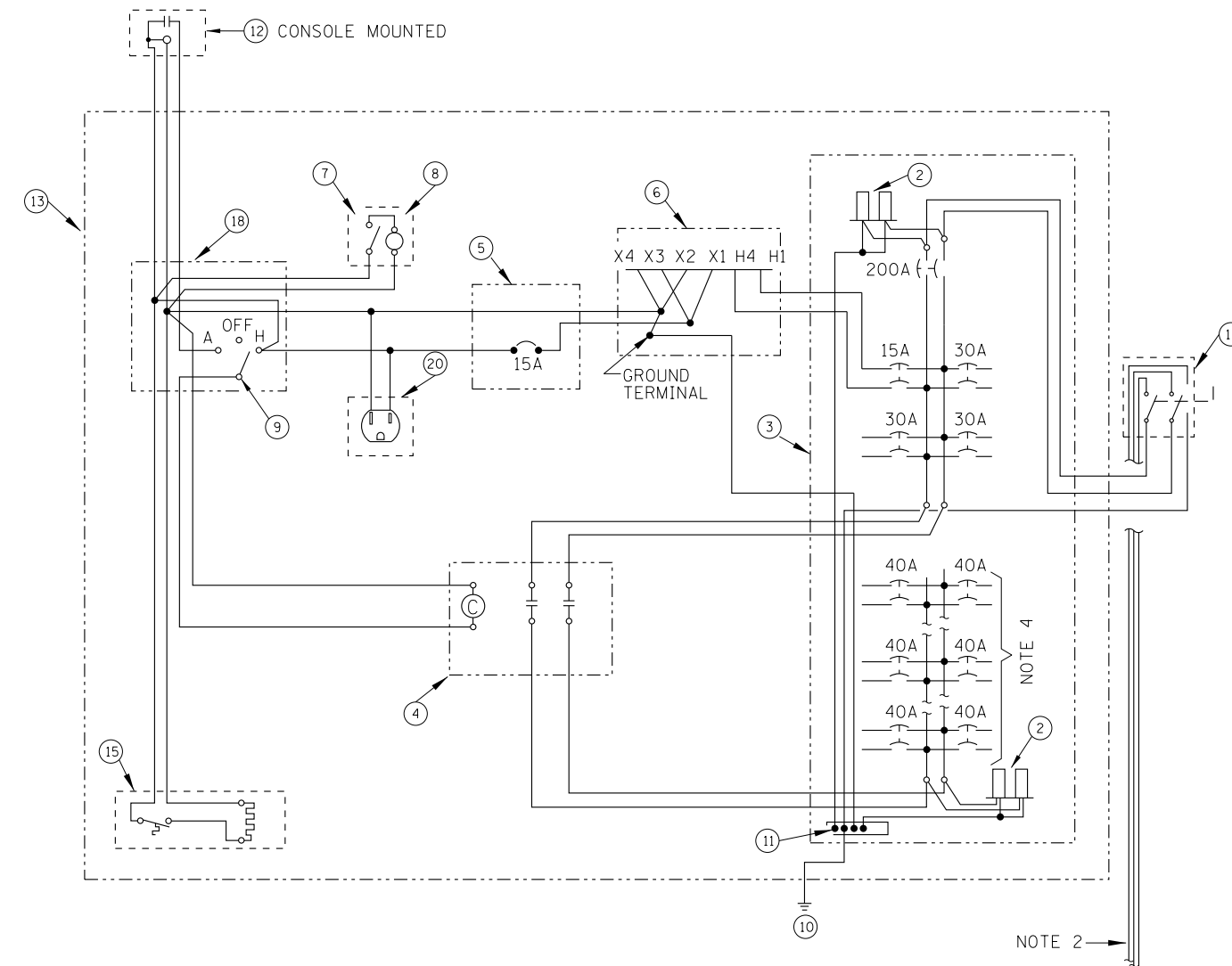


EXTERIOR  
CONTROL CONSOLE  
DETAILS

STANDARD H6-06

NOTES:

1. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
2. TO SERVICE PEDESTAL, 480/240V, 1 PHASE, 3 WIRE, GROUNDED. SEE STANDARD H5.
3. ITEM NUMBERS REFER TO EQUIPMENT LIST ON SHEET 1 OF THIS SERIES.
4. PROVIDE CIRCUIT BREAKERS PER SCHEDULE ON THE CONTRACT PLANS (MINIMUM OF 12).
5. FOR INTERIOR EQUIPMENT LAYOUT SEE SHEET 1 OF THIS SERIES.



## CONTROL CONSOLE WIRING DIAGRAM

SHEET 2 OF 2



## EXTERIOR CONTROL CONSOLE DETAILS

STANDARD H6-06

APPROVED BY:

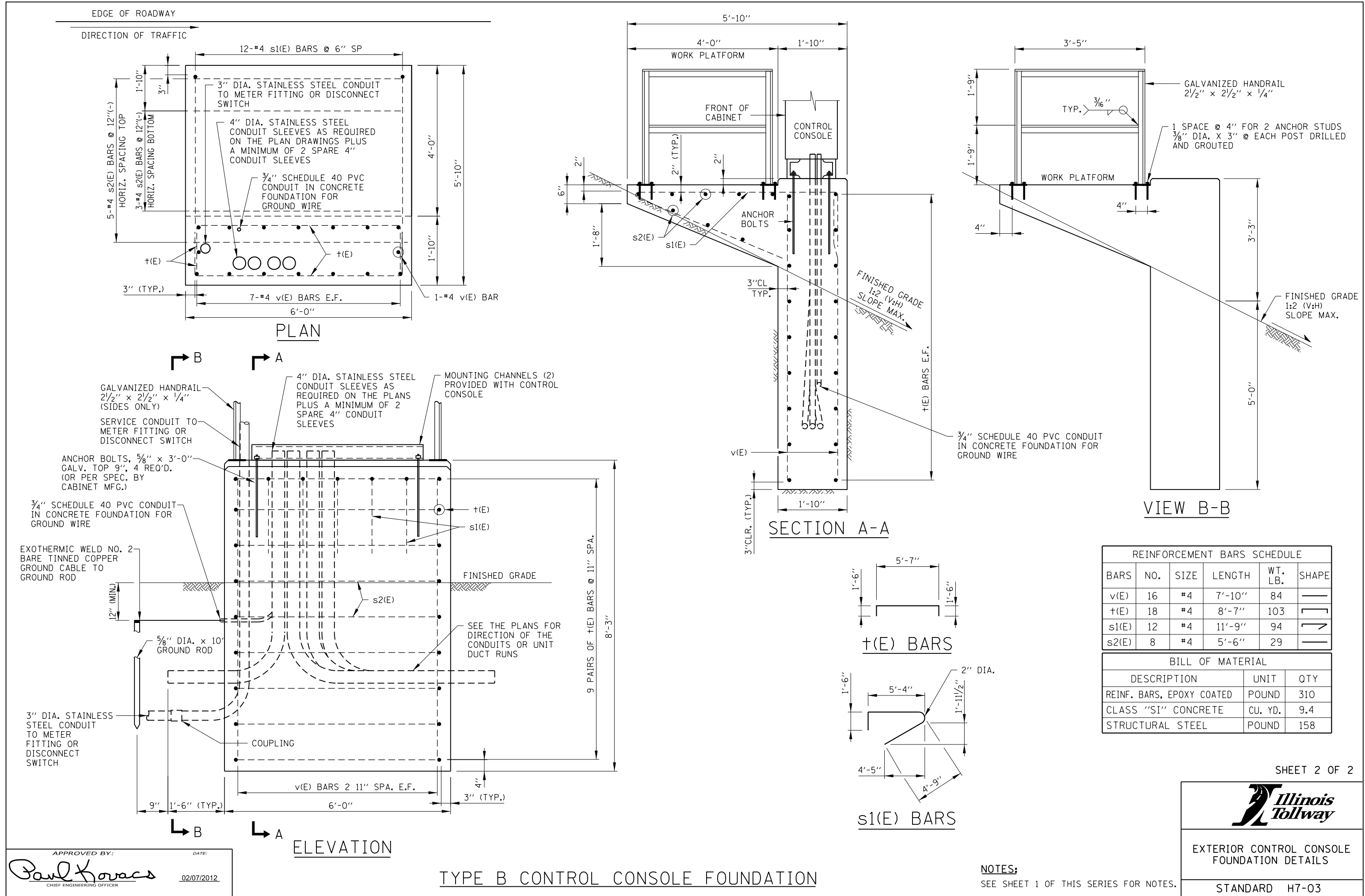
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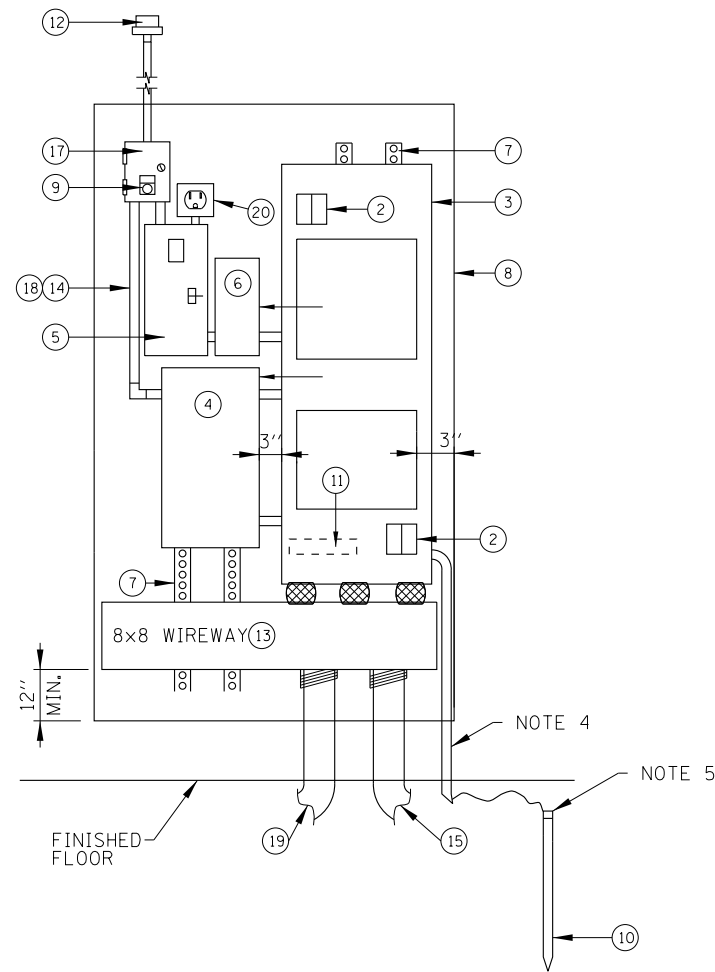
Paul Kovacs  
CHIEF ENGINEERING OFFICER

02/07/2012

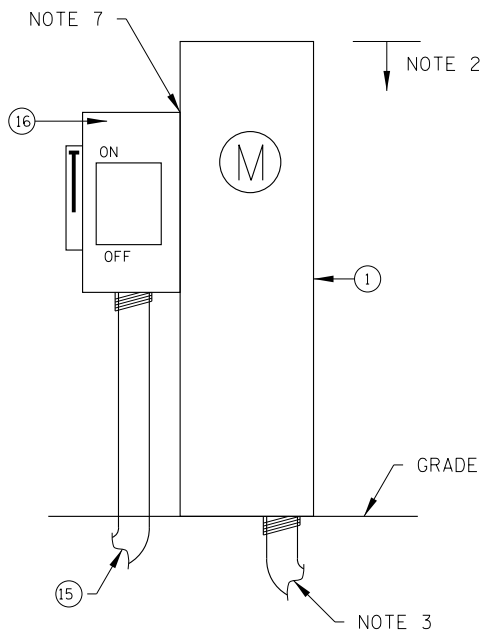
### CONTROL CONSOLE DETAILS (EXTERIOR INSTALLATION)







INTERIOR EQUIPMENT LAYOUT



SERVICE ENTRANCE DETAIL

NOTES:

1. PROVIDE POWER UTILITY CO. METER HOUSING AS INDICATED ON PLANS.
2. 5'-0" MAXIMUM HEIGHT ABOVE GRADE.
3. STAINLESS STEEL CONDUIT TO UTILITY SERVICE AS INDICATED ON PLANS.
4. 3/4" PVC CONDUIT.
5. EXOTHERMIC WELD NO. 2 BARE TINNED COPPER GROUND CABLE TO GROUND ROD 12"-24" BELOW GRADE.
6. TO POWER UTILITY COMPANY, SERVICE AS INDICATED ON PLANS.
7. CONDUIT AND CABLE BETWEEN METER FITTING AND DISCONNECT SWITCH. CONDUIT AND CABLE SHALL BE THE SAME AS THE SERVICE.
8. LABEL ALL EQUIPMENT AS "ROADWAY LIGHTING" + DEVICE AND BUILDING\* (IF APPLICABLE).
9. FOR WIRING DIAGRAM SEE SHEET 2 OF THIS SERIES.
10. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.

ITEM

DESCRIPTION

- 1 METER HOUSING, MILBANK U8436-0.
- 2 SECONDARY SURGE ARRESTERS, 2 POLE, 650 VOLT.
- 3 MAIN PANELBOARD IN A NEMA 1 ENCLOSURE, 480/240 VOLT, 1 PHASE, 3 WIRE, 2 SECTION, 200 AMP, 2 POLE MAIN CIRCUIT BREAKER 65,000 AMPERES SYMMETRICAL INTERRUPTING CAPACITY WITH CIRCUIT BREAKERS PER SCHEDULE ON PLANS. DOOR HINGES ON RIGHT SIDE.
- 4 LIGHTING CONTRACTOR, ELECTRICALLY HELD, 480 VOLT, 200 AMP, 2 POLE, 120 VOLT CONTROL, WITH 250 VOLT, 15 AMP CONTROL LINE FUSE, IN A NEMA 1 ENCLOSURE.
- 5 SECONDARY BREAKER, 15 AMPERE TRIP, 120 VOLT, SINGLE POLE, 65,000 AMPERES SYMMETRICAL INTERRUPTING CAPACITY IN A NEMA 1 SURFACE MOUNTED ENCLOSURE.
- 6 STEP DOWN TRANSFORMER, 1500 VA, 480 VOLT PRIMARY, 120 VOLT SECONDARY, SINGLE PHASE, 60 HERTZ, DRY TYPE, NEMA 3R ENCLOSURE.
- 7 1 1/4" X 3/4" C-CHANNEL (UNISTRUT) FOR ALL EQUIPMENT STANDOFF
- 8 1/2" EQUIPMENT MOUNTING PANEL (4' W X 7' H)
- 9 HAND-OFF-AUTO SELECTOR SWITCH WITH LEGEND PLATE. MOUNTED IN THE COVER OF ITEM 17.
- 10 ROUTED TO BUILDING GROUND SYSTEM. IF NO GROUND AVAILABLE CONTRACTOR SHALL PROVIDE 5/8" DIA. X 10'-0" LONG GROUND ROD WITHIN GROUND WELL.
- 11 GROUND BUS MOUNTED IN PANELBOARD ENCLOSURE.
- 12 PHOTO ELECTRIC CONTROL SWITCH MOUNTED ON SOUTH EXTERIOR SIDE OF BUILDING (VIEW UNOBSTRUCTED).
- 13 8"x8" WIREWAY WITH 3-3" NIPPLES.
- 14 INTERNAL CONTROL WIRING SHALL BE #12 AWG, STRANDED, INSULATED NEC TYPE THWN/THHN RATED 600 VOLT, WITH SUITABLE COLOR CODING TO BE APPROVED BY THE ENGINEER BEFORE CONSTRUCTION.
- 15 2" STAINLESS STEEL CONDUIT FROM SERVICE SAFETY SWITCH TO LIGHTING CONTROLLER WIREWAY.
- 16 SERVICE SAFETY SWITCH, 200 AMP, 600 VOLT, NON-FUSED, NEMA 4X STAINLESS STEEL ENCLOSURE.
- 17 NEMA TYPE 1, 8"x6"x4" JUNCTION BOX & COVER WITHOUT KNOCKOUTS. ITEM 9 IS MOUNTED IN THE COVER.
- 18 INTERNAL CONDUIT AND FITTINGS SHALL BE 3/4" MINIMUM.
- 19 (2) 4" STAINLESS STEEL CONDUIT TO LIGHTING CONTROLLER HANDHOLE. REFER TO SITE PLAN FOR LOCATION.
- 20 GCFI OUTLET.

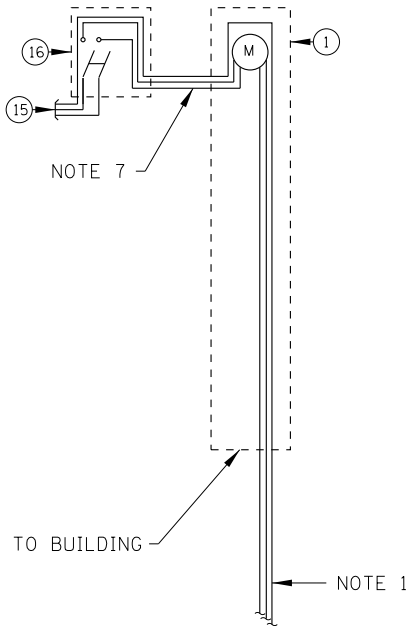
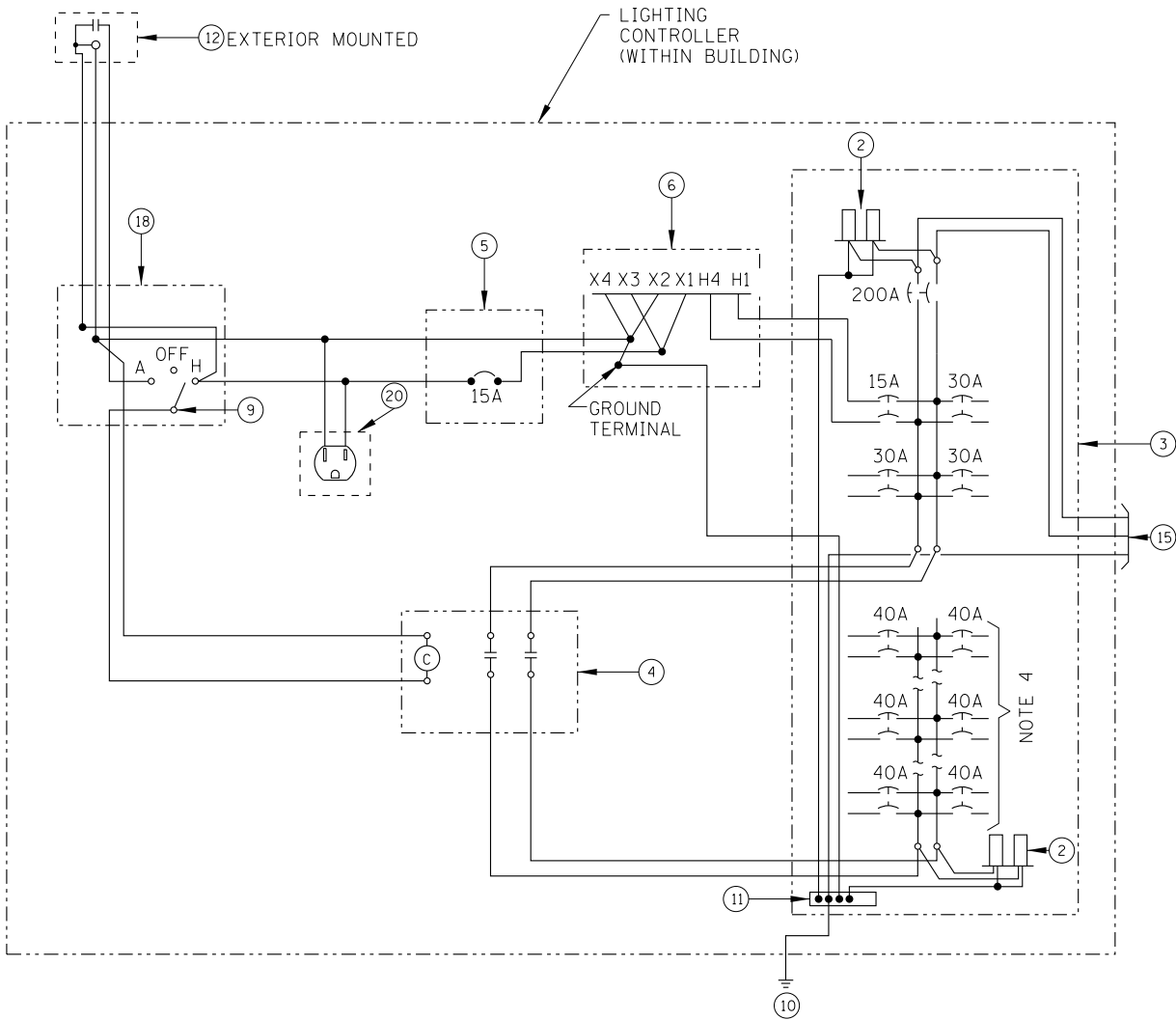


DATE	REVISIONS
3-01-2018	REMOVED CONTRACTOR RELAY, ADDED GCFI OUTLET.
3-01-2017	REMOVED MFR. & PART NUMBERS.
3-31-2016	REVISED NOTE 2.

CONTROL CONSOLE DETAILS  
(INTERIOR INSTALLATION)

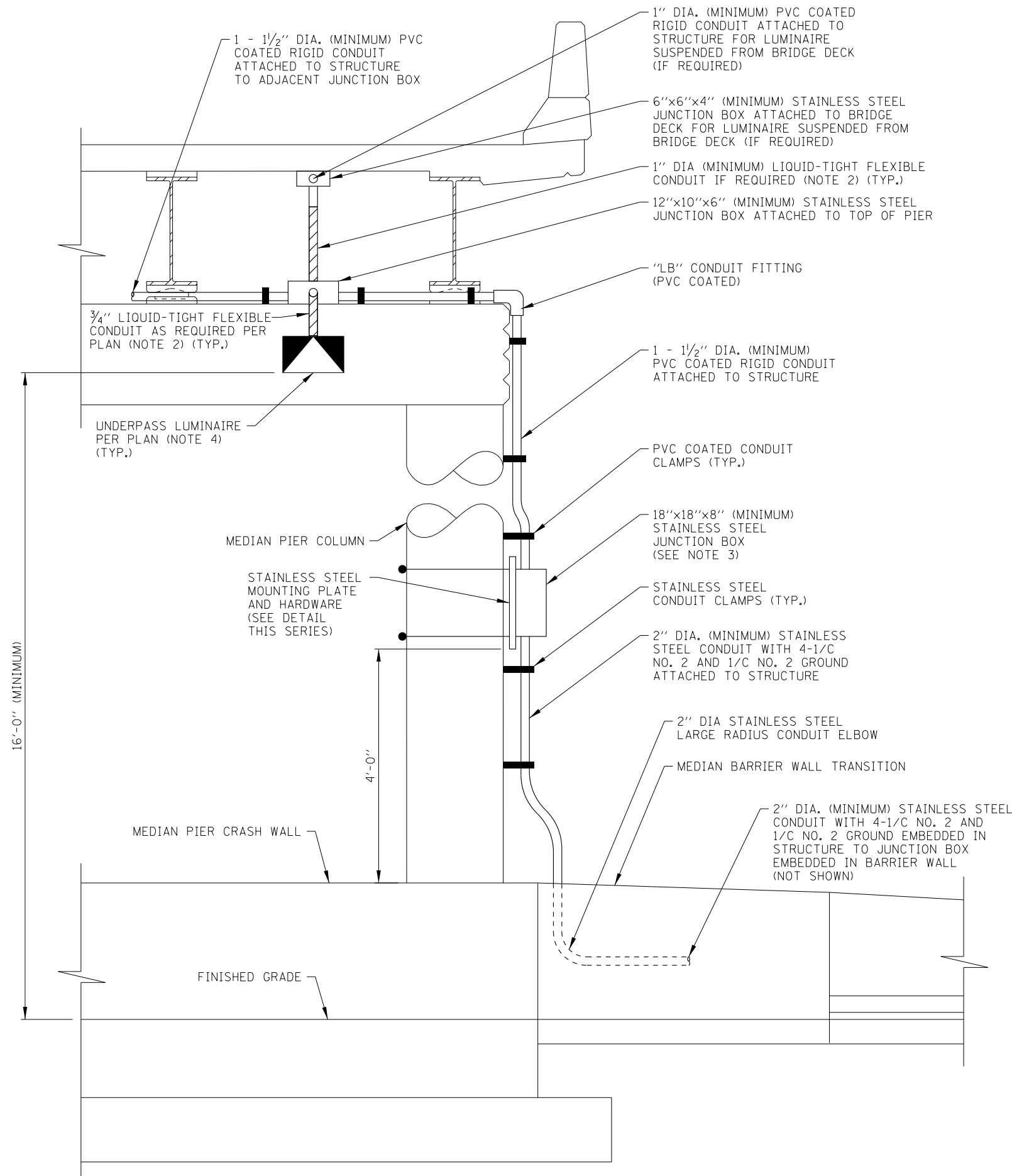
NOTES:

- 1. TO UTILITY SERVICE. 480/240V, 1 PHASE, 3 WIRE, GROUNDED, WHEN A METER HOUSING IS REQUIRED (FED FROM PAD MOUNTED UTILITY TRANSFORMER WITHIN ILLINOIS TOLLWAY RIGHT-OF-WAY).
- 2. TO SERVICE PEDESTAL, 480/240V, 1 PHASE, 3 WIRE, GROUNDED. SEE STANDARD H5.
- 3. ITEM NUMBERS REFER TO EQUIPMENT LIST ON SHEET 1 OF THIS SERIES.
- 4. PROVIDE CIRCUIT BREAKERS PER SCHEDULE ON THE CONTRACT PLANS (MINIMUM OF 12).
- 5. FOR INTERIOR EQUIPMENT LAYOUT SEE SHEET 1 OF THIS SERIES.
- 6. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
- 7. CONDUIT AND CABLE BETWEEN METER FITTING AND DISCONNECT SWITCH ROUTED BETWEEN CONTROL CONSOLE AND CONCRETE FOUNDATION, WHEN A METER HOUSING IS REQUIRED. CONDUIT AND CABLE SHALL BE THE SAME AS THE SERVICE.



CONTROL CONSOLE WIRING DIAGRAM

CONTROL CONSOLE DETAILS  
(INTERIOR INSTALLATION)



- NOTES:**
- USE OF THIS STANDARD DETAIL IS LIMITED TO THE INSTALLATION OF LIGHT EMITTING DIODE LUMINAIRES ONLY. FOR INSTALLATION OF OTHER LIGHT SOURCE TYPES, REFER TO PLAN DETAILS.
  - LIQUID-TIGHT FLEXIBLE CONDUIT, MAXIMUM LENGTH 6'-0", TYPICAL FOR EACH INSTANCE AS SHOWN. PROVIDE SUFFICIENT LENGTH OF PVC COATED RIGID GALVANIZED STEEL CONDUIT AS REQUIRED SO THE MAXIMUM LENGTH OF REQUIRED LIQUID-TIGHT DOES NOT EXCEED 6'-0". LIQUID-TIGHT FLEXIBLE CONDUIT.
  - PROVIDE TWO (2) 2-POLE 30A, 600 VOLT CIRCUIT BREAKERS (EATON HFD OR APPROVED EQUAL), TWO (2) SURGE PROTECTION DEVICES (IN ACCORDANCE WITH ARTICLE 1065.02 OF THE STANDARD SPECIFICATIONS) AND SUFFICIENT 30 AMPERE, 600 VOLT TERMINAL BLOCKS TO SPLIT 480 VOLT WIRING FROM CIRCUIT BREAKER TO TWO (2) NO. 10 WIRES FOR EACH LUMINAIRE.
  - WIRING SHALL BE 2-1/C NO. 10 WITH 1/C NO. 10 GROUND OR AS INDICATED ON THE PLANS TERMINATING AT EACH LUMINAIRE. SEE PLANS FOR REMAINING WIRING REQUIREMENTS.
  - THE CONTRACTOR SHALL PROVIDE EXPANSION/DEFLECTION FITTINGS (O-Z/GEDNEY TYPE AXDX) WHERE CONDUITS CROSS STRUCTURE EXPANSION JOINTS.
  - IN NEW BRIDGE DECKS, PROVIDE STAINLESS STEEL SINGLE COIL, FLARED LOOP INSERTS CAST IN THE DECK FOR 3/4" DIAMETER STAINLESS STEEL THREADED RODS. IN EXISTING BRIDGE DECKS, PROVIDE DRILLED STAINLESS STEEL EXPANSION TYPE ANCHORS FOR 3/4" DIAMETER STAINLESS STEEL THREADED RODS. EXPANSION TYPE ANCHORS SHALL HAVE A MINIMUM OF 500 POUNDS CAPACITY EACH.
  - NOT USED.
  - ALL ITEMS MOUNTED TO BRIDGE PIER SHALL BE OFFSET FROM THE STRUCTURE A MINIMUM OF ONE (1) INCH BY USE OF STAINLESS STEEL C-CHANNEL.
  - WHERE BEAM DEPTH EXCEEDS FIVE (5) FEET, THE DESIGNER SHALL PROVIDE A METHOD FOR ATTACHMENT OF THE HANGER ASSEMBLIES SUCH THAT THE LENGTH OF THE ASSEMBLIES DO NOT EXCEED FIVE (5) FEET.
  - DETAILS SHOWN ARE FOR UNDERPASS LIGHTING INSTALLATIONS FED FROM THE MEDIAN BARRIER WALL. FOR INSTALLATIONS FED FROM A BRIDGE ABUTMENT, REFER TO THE PLAN DETAILS.
  - UNDERPASS LUMINAIRES SUSPENDED FROM BRIDGE DECK SHALL BE INSTALLED CENTERED BETWEEN THE BRIDGE BEAMS. THE LUMINAIRE SHALL BE LOCATED SUCH THAT IT IS SETBACK A MINIMUM OF 1 FOOT FROM THE OUTSIDE EDGE OF THE SHOULDER PAVEMENT WITH THE TOP OF THE LUMINAIRE MOUNTING PLATE A MAXIMUM OF 1 INCH FROM THE BOTTOM OF THE BRIDGE BEAM. IN NO CASE SHALL ANY PORTION OF THE SUSPENDED LUMINAIRE OR SUPPORTING HARDWARE BE LOWER THAN 14'-6" WHEN MEASURED TO THE OUTSIDE EDGE OF THE ADJACENT SHOULDER PAVEMENT.
  - IN NO INSTANCE SHALL ANY UNDERPASS LUMINAIRE OR ANY OTHER ELECTRICAL EQUIPMENT BE INSTALLED BELOW THE ELEVATION OF THE BOTTOM OF THE BRIDGE BEAM WHEN OVER ANY PAVEMENT (ROADWAY OR SHOULDER) WITH EXCEPTION OF THOSE MOUNTED TO THE MEDIAN PIER AT WHICH CASE THE MINIMUM HEIGHT SHALL BE 16'-0" WHEN MEASURED TO THE LOWEST PORTION OF THE LUMINAIRE OR SUPPORTING HARDWARE.
  - LUMINAIRE MOUNTING PLATE FOR LUMINAIRES SUSPENDED FROM BRIDGE DECK SHALL BE OF THE DIMENSIONS NECESSARY AND FIELD DRILLED TO ACCOMMODATE THE SPECIFIC LUMINAIRE PROVIDED AND ASSOCIATE LUMINAIRE HANGER ASSEMBLIES.
  - SEE PLANS FOR UNDERPASS LUMINAIRE LOCATIONS AND MOUNTING HEIGHTS.
  - SEE STRUCTURAL DRAWINGS FOR SPECIFIC STRUCTURE DETAILS.
  - ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.

UNDERPASS LIGHTING  
(MEDIAN PIER MOUNTED LUMINAIRE & FEEDER INSTALLATION)

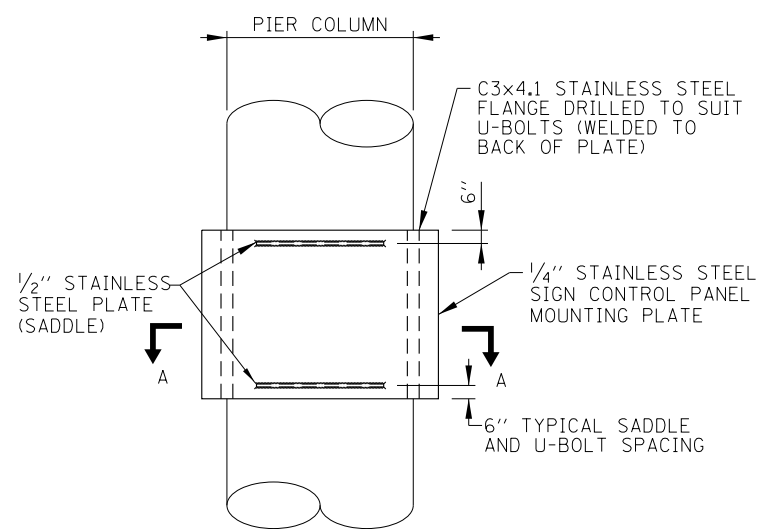
APPROVED BY: *Paul Kovacs* DATE: 03/31/2016  
CHIEF ENGINEERING OFFICER

DATE	REVISIONS
3-01-2022	REVISED CALLOUT FOR STAINLESS STEEL VIBRATION DAMPER ASSEMBLY
3-31-2017	REVISED NOTES TO REMOVE INCIDENTALS

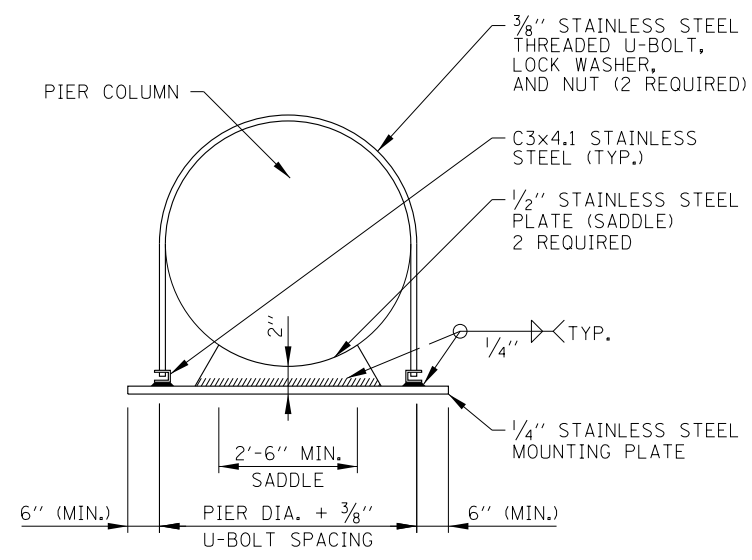


UNDERPASS LIGHTING  
INSTALLATION DETAILS

STANDARD H9-02

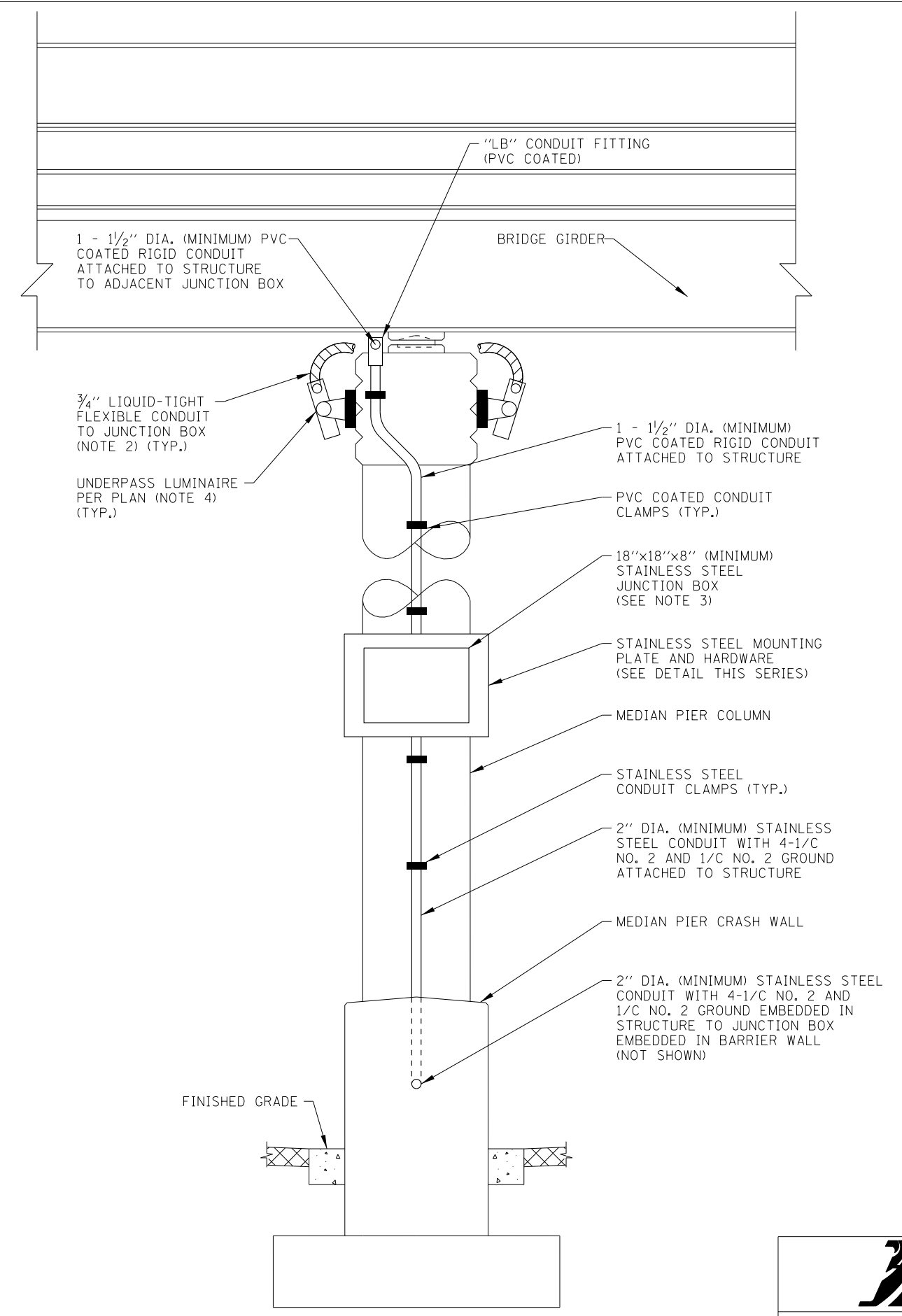


ELEVATION



SECTION A-A

MEDIAN PIER JUNCTION BOX MOUNTING PLATE DETAIL

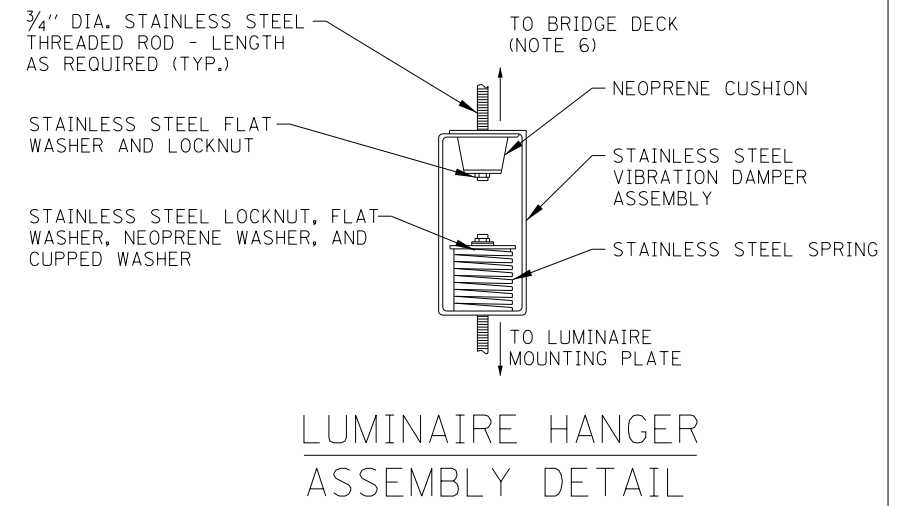
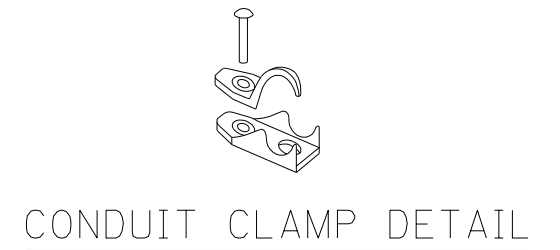
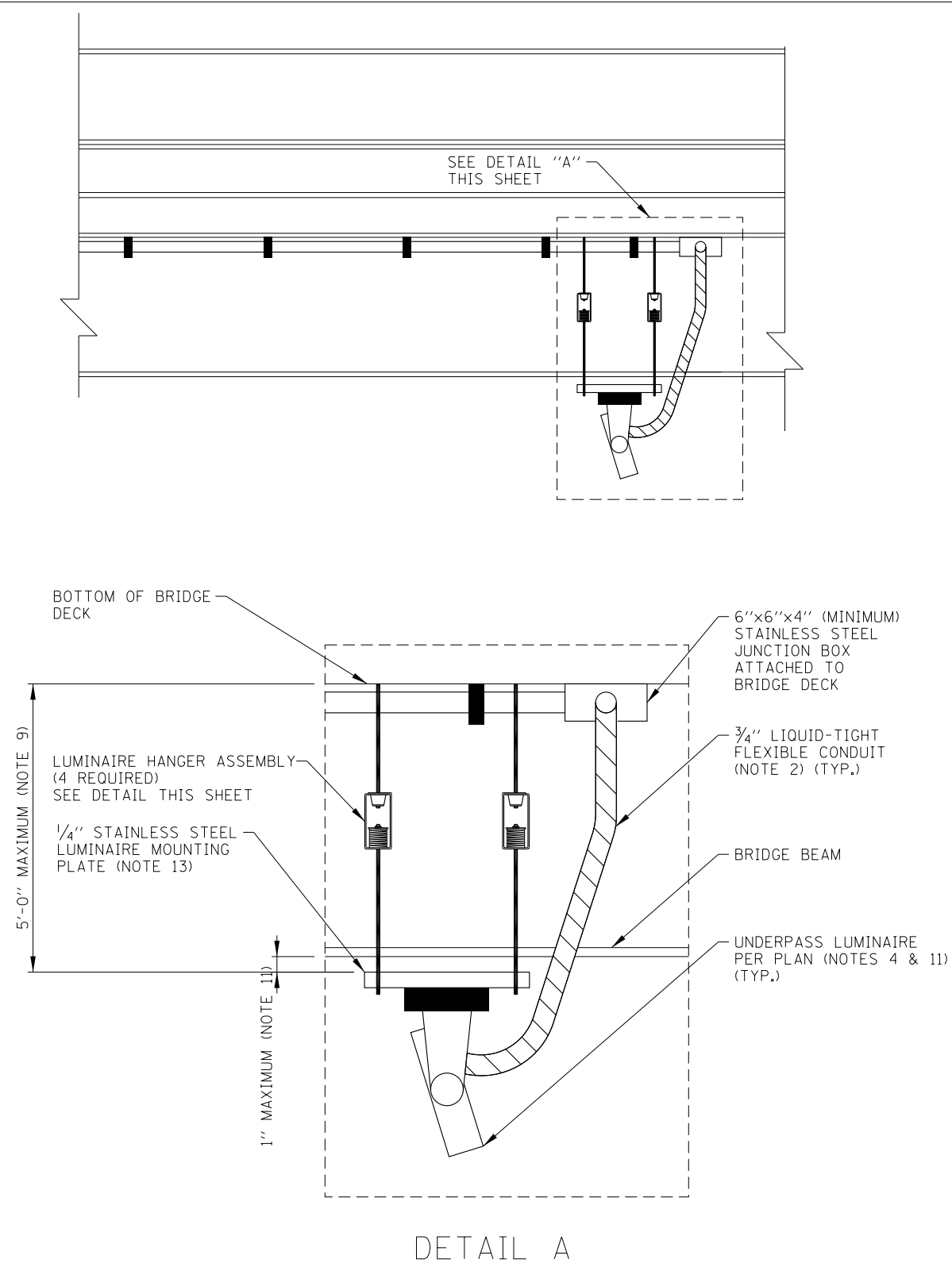
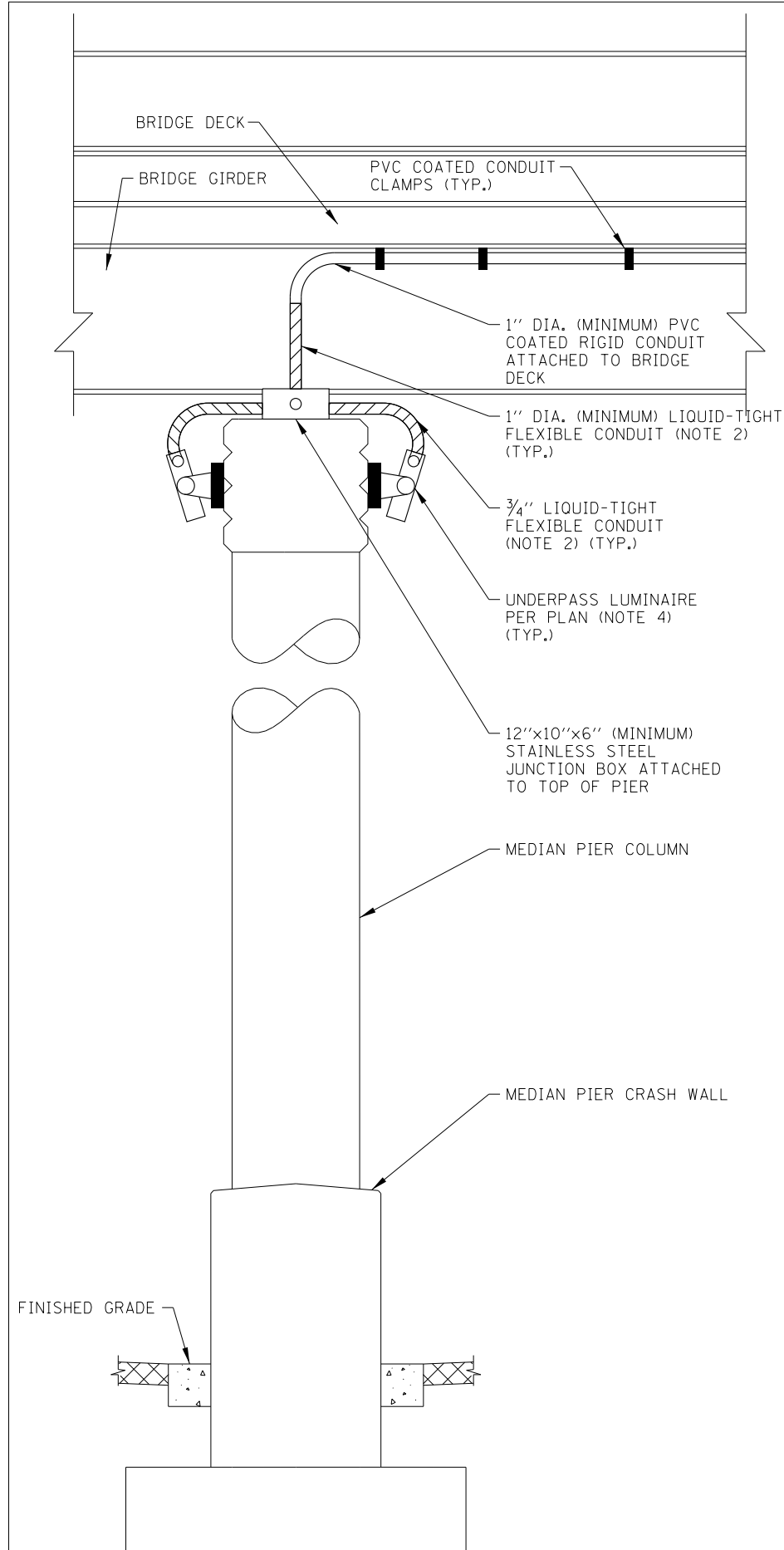


UNDERPASS LIGHTING  
(MEDIAN PIER MOUNTED LUMINAIRE & FEEDER INSTALLATION)

NOTE:  
FOR NOTES SEE SHEET 1 OF THIS SERIES.

APPROVED BY:  
*Paul Kovacs*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/31/2016





APPROVED BY:

*Paul Kovacs*

CHIEF ENGINEERING OFFICER

DATE:

03/31/2016

## UNDERPASS LIGHTING (BRIDGE DECK SUSPENDED LUMINAIRE & MISCELLANEOUS DETAILS)

NOTE:

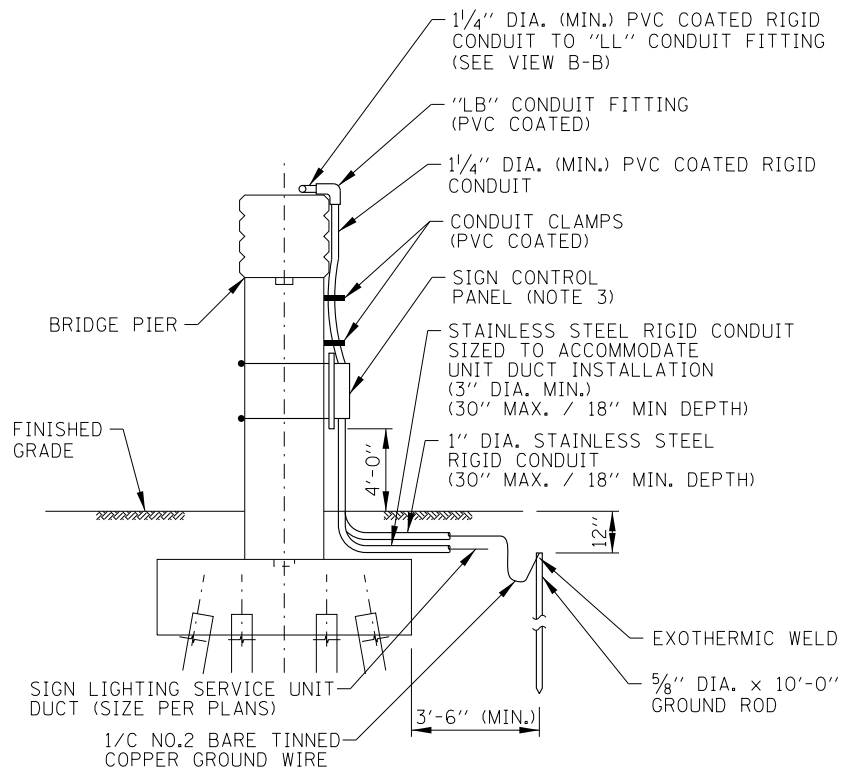
FOR NOTES SEE SHEET 1 OF THIS SERIES.

SHEET 3 OF 3

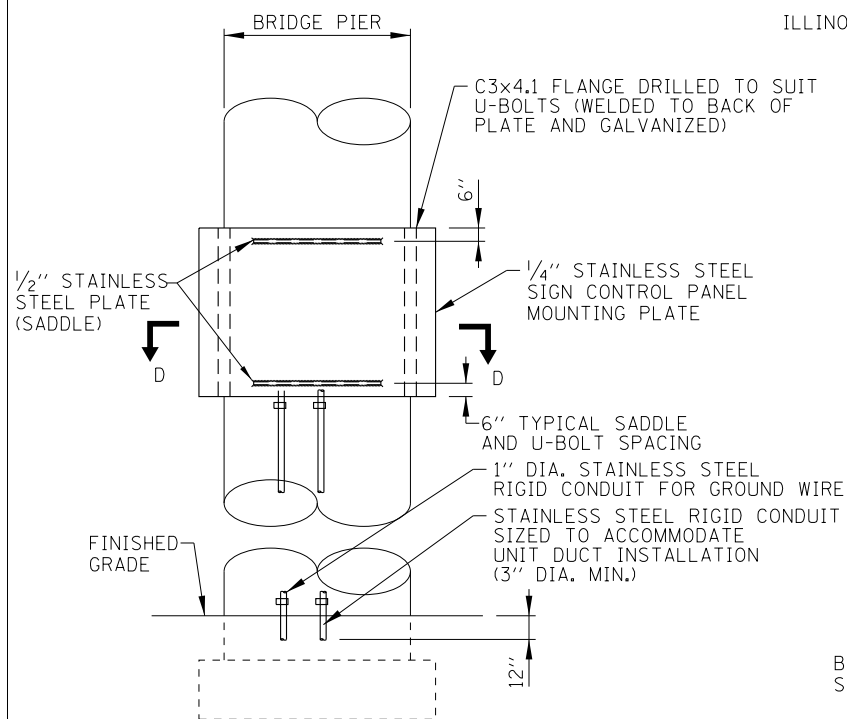


UNDERPASS LIGHTING  
INSTALLATION DETAILS

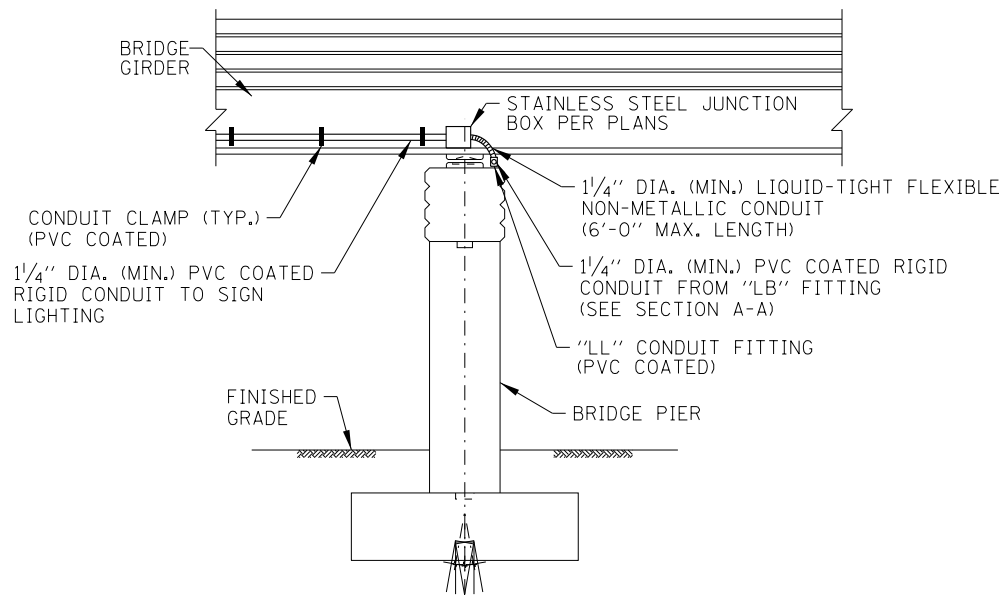
STANDARD H9-02



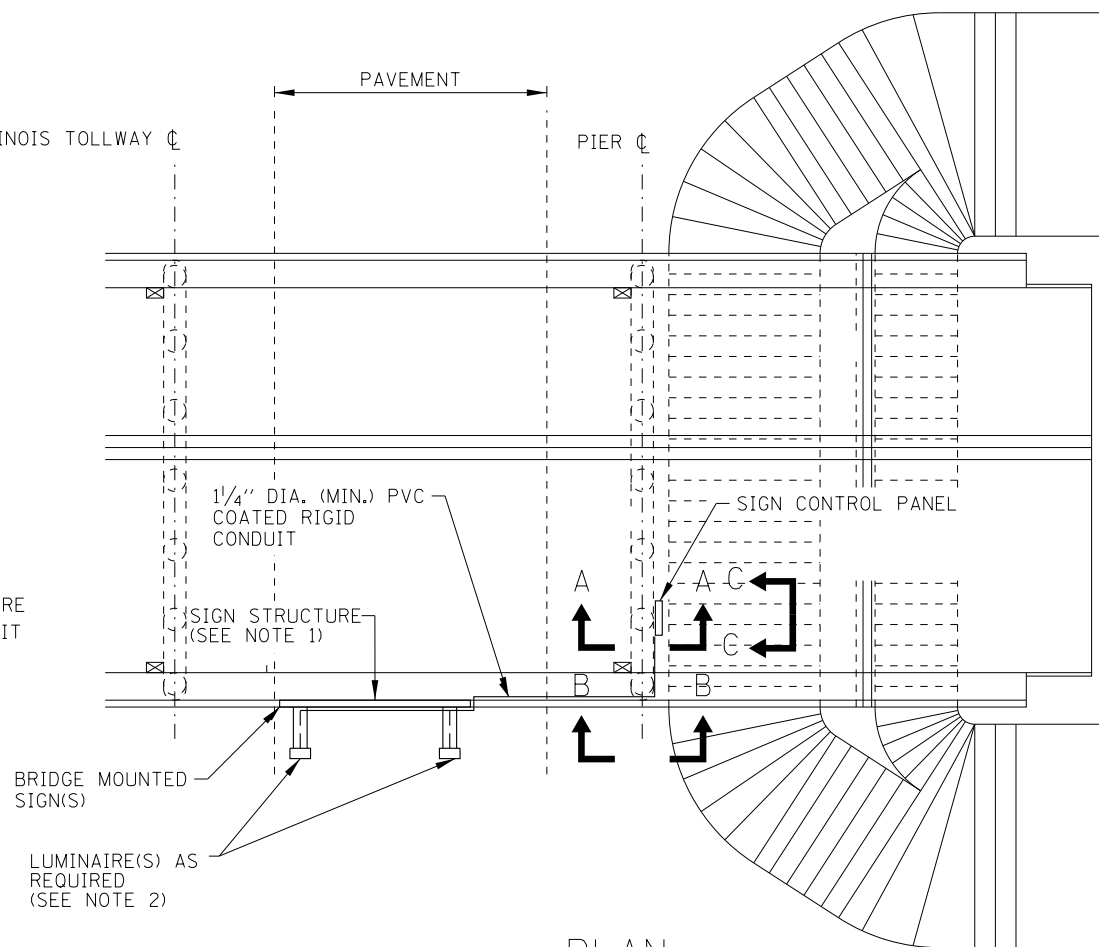
SECTION A-A



VIEW C-C



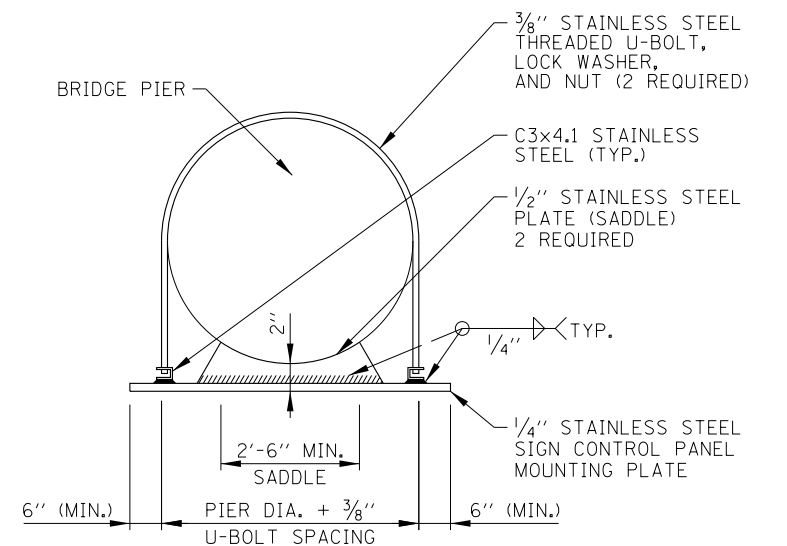
SECTION B-B



PLAN

## NOTES:

- FOR SIGN STRUCTURE INSTALLATION DETAILS SEE SHEET 3 OF 3 IN THIS SERIES.
- FOR SIGN LUMINAIRE INSTALLATION AND WIRING AND FOR INSTALLATION OF CONDUIT IN FIXTURE SUPPORT CHANNEL, SEE STANDARD H14.
- FOR TYPICAL SIGN CONTROL PANEL DETAILS SEE SHEET 2 OF 3 IN THIS SERIES.
- DETAILS SHOWN ON THIS SHEET ARE WITHOUT FLASHING BEACON. INSTALLATION OF FLASHING BEACON REQUIRES ADDITIONAL WORK AS SHOWN ON TYPICAL SIGN CONTROL PANEL DETAIL (SHEET 2 OF 3 IN THIS SERIES).
- LUMINAIRE SUPPORT MEMBERS TO BE INSTALLED ONLY WHEN THE SIGN IS TO BE ILLUMINATED. DESIGNER TO DETERMINE REQUIREMENTS FOR SIGN LIGHTING BASED ON ROADWAY GEOMETRY.
- PROVIDE 12" FLASHING BEACON ONLY WHERE INDICATED ON PLANS. FLASHING BEACON TO BE ATTACHED TO SUPPORT WITH STAINLESS STEEL SCREWS AND NEOPRENE SPACERS. DRILLED SCREW HOLES TO BE SEALED WATER-TIGHT.
- SEE STRUCTURAL DRAWINGS FOR DETAILS OF SIGN SUPPORTS AND FIXTURE SUPPORT CHANNELS.
- CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES ATTACHED TO ALUMINUM STRUCTURAL SUPPORTS SHALL BE PVC COATED ALUMINUM. PVC COATED GALVANIZED STEEL CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES SHALL BE UTILIZED WHERE ATTACHED TO STEEL STRUCTURAL SUPPORTS OR WHERE ATTACHED TO CONCRETE STRUCTURES UNLESS NOTED OTHERWISE HEREIN. THREADED JOINTS BETWEEN DISSIMILAR METALS SHALL BE COATED WITH AN APPROVED THREAD LUBRICANT.
- ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.



SECTION D-D

SHEET 1 OF 3



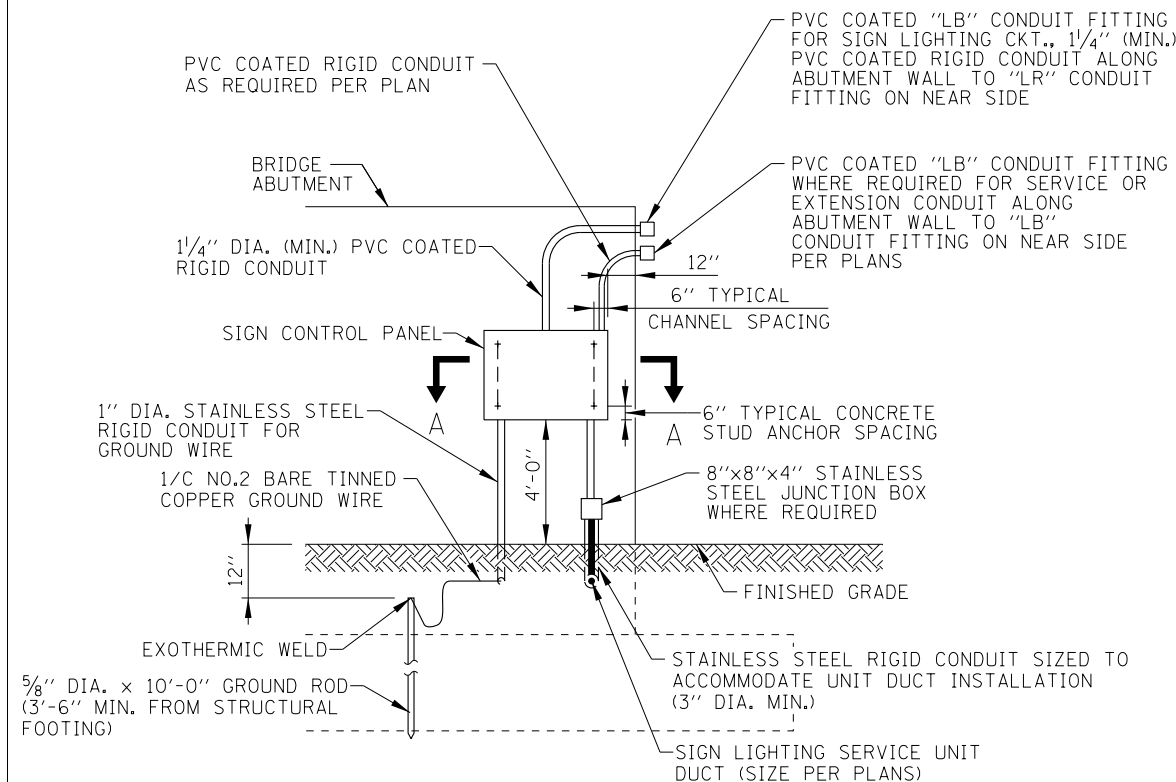
DATE	REVISIONS
3-01-2024	REVISED NOTE 5 TO ADDRESS SIGN LIGHTING UPDATES.
3-01-2019	REVISED TO SHOW SINGLE SLOPE PARAPET.
3-01-2018	ADDED SURGE PROTECTION DEVICE.

BRIDGE MOUNT SIGN LIGHTING DETAILS

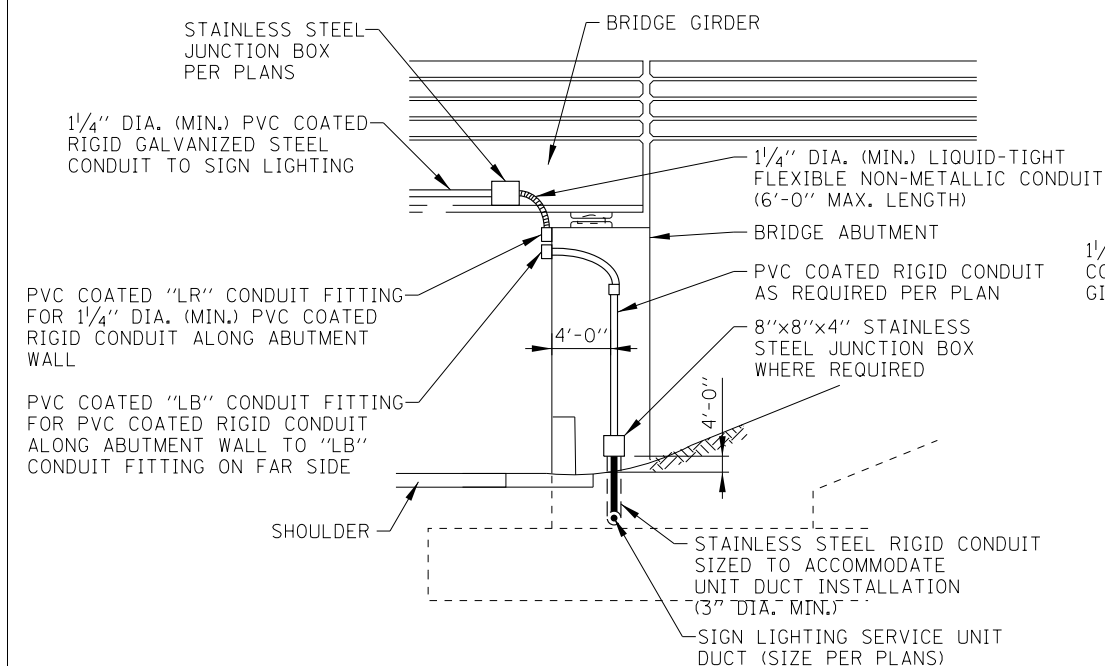
STANDARD H10-05

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

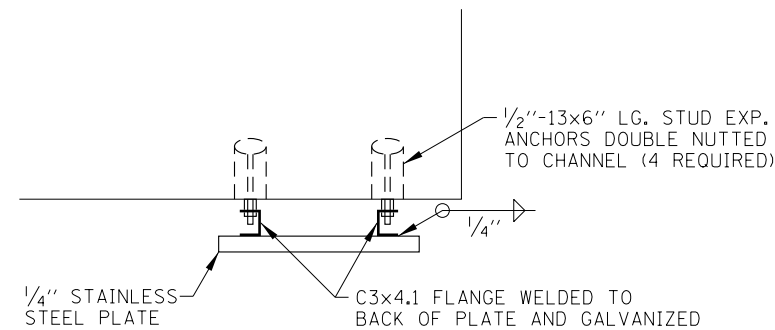
## BRIDGE MOUNTED SIGN LIGHTING (BRIDGE PIER MOUNTED FEEDER INSTALLATION)



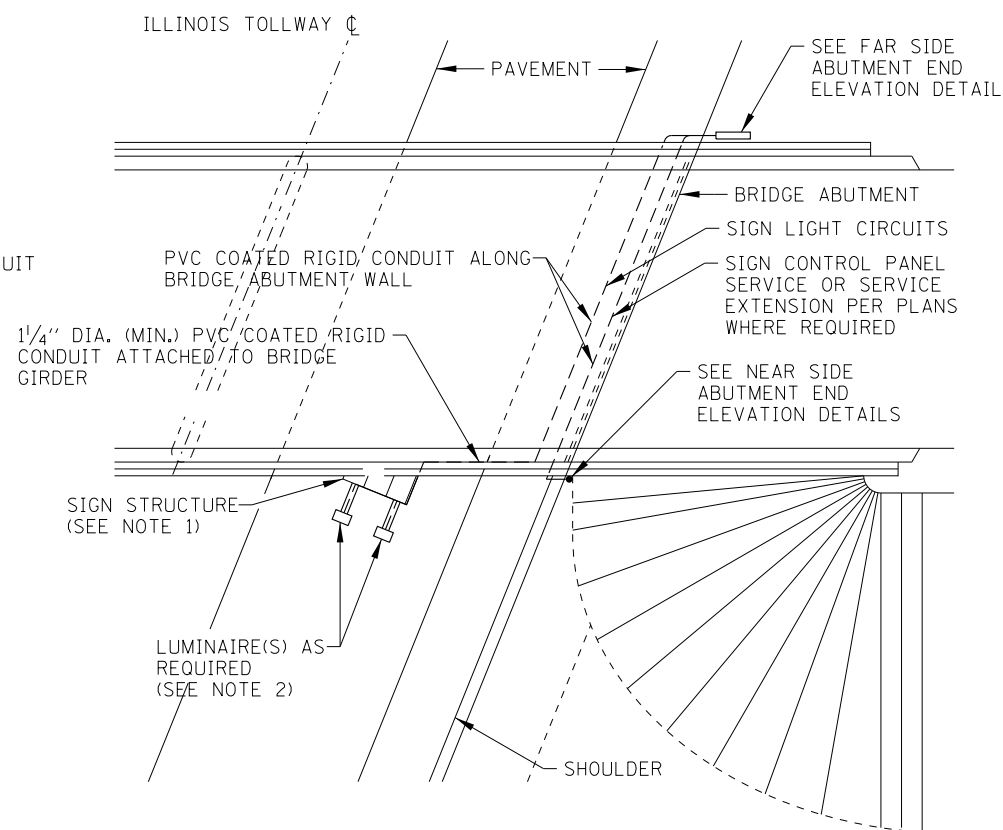
FAR SIDE ABUTMENT END ELEVATION



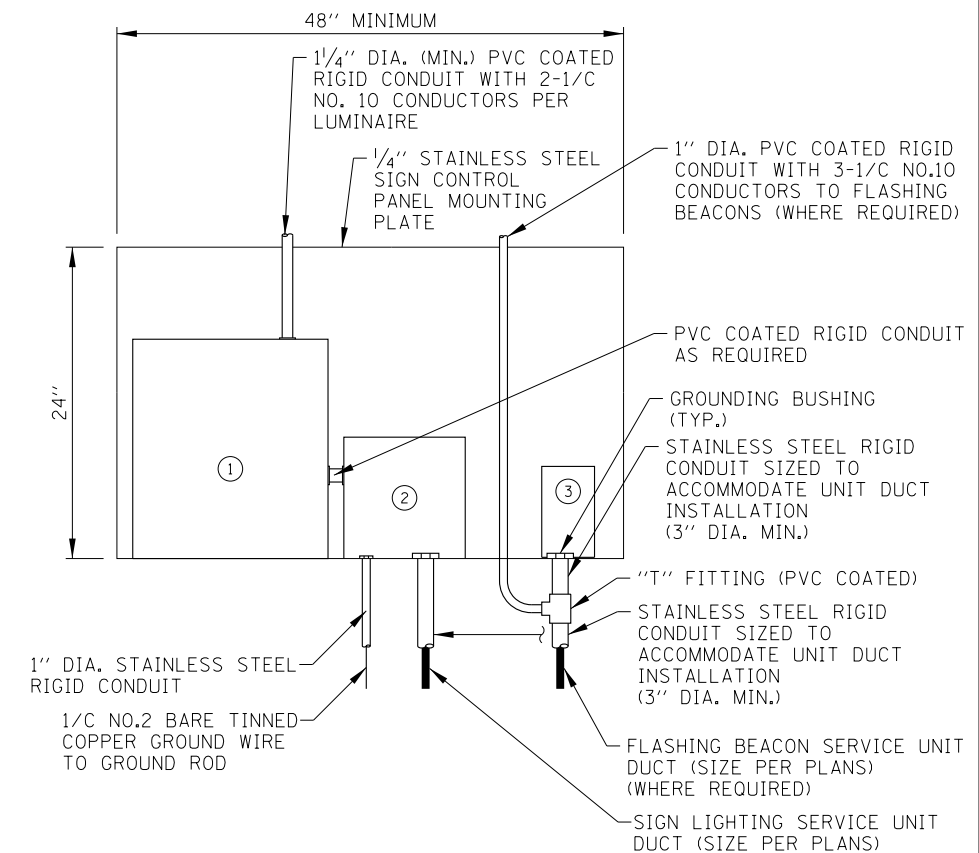
NEAR SIDE ABUTMENT END ELEVATION



SECTION A-A



PLAN



LEGEND:

- 18"x18"x8" STAINLESS STEEL JUNCTION BOX. PROVIDE SUFFICIENT 30 AMPERE, 600 VOLT TERMINAL BLOCKS TO SPLIT 480 VOLT WIRING FROM SIGN SERVICE CIRCUIT BREAKER TO TWO NO. 10 WIRES FOR EACH LUMINAIRE.
- SIGN LIGHTING SERVICE - CIRCUIT BREAKER (30 AMP/2 POLE) IN NEMA TYPE 4 C.I. ENCLOSURE, OZ TYPE "YW" WITH MOUNTING FEET OR APPROVED EQUAL. PROVIDE SURGE PROTECTION DEVICE (IN ACCORDANCE WITH ARTICLE 1065.02 OF THE STANDARD SPECIFICATIONS).
- FLASHING BEACON CONTROLLER.

TYPICAL SIGN CONTROL PANEL DETAIL

(FOR TYPICAL WIRING DIAGRAM SEE STANDARD H14)

APPROVED BY: *Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE: 03/01/2024

BRIDGE MOUNTED SIGN LIGHTING  
(BRIDGE ABUTMENT MOUNTED FEEDER INSTALLATION)

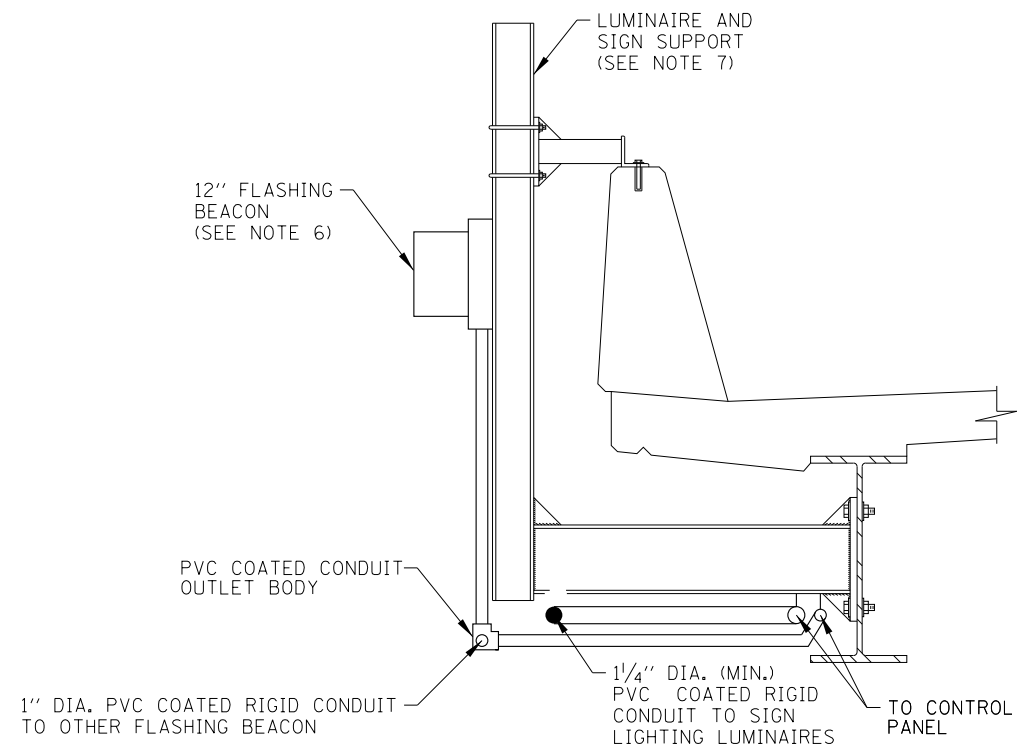
NOTES:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 2 OF 3

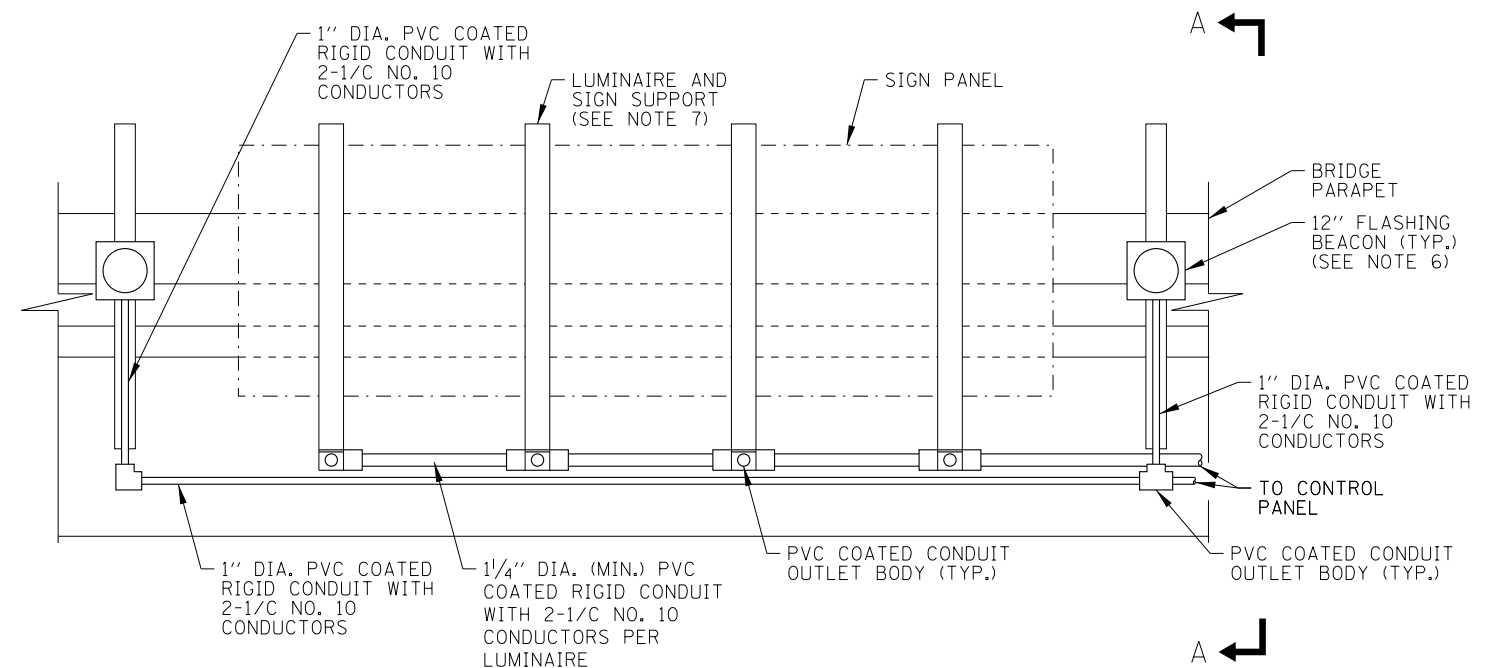


BRIDGE MOUNT SIGN  
LIGHTING DETAILS

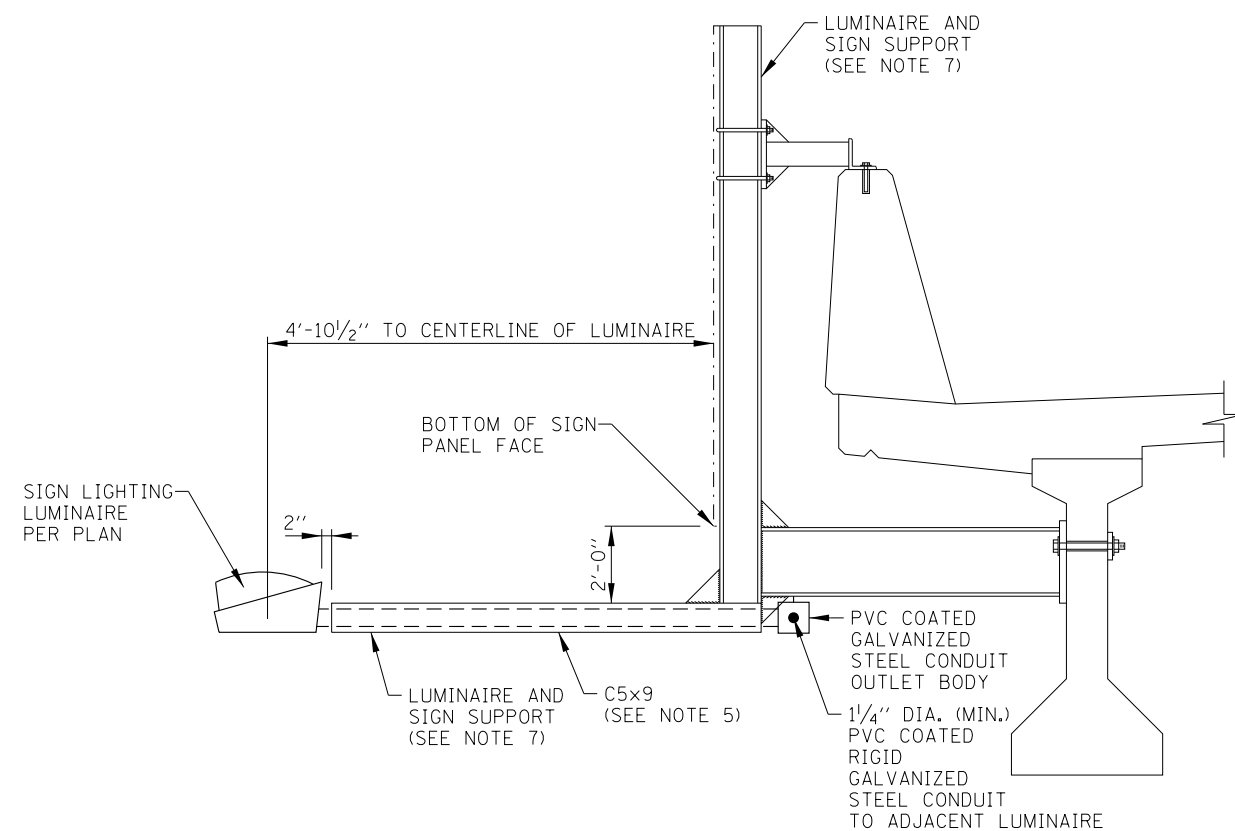
STANDARD H10-05



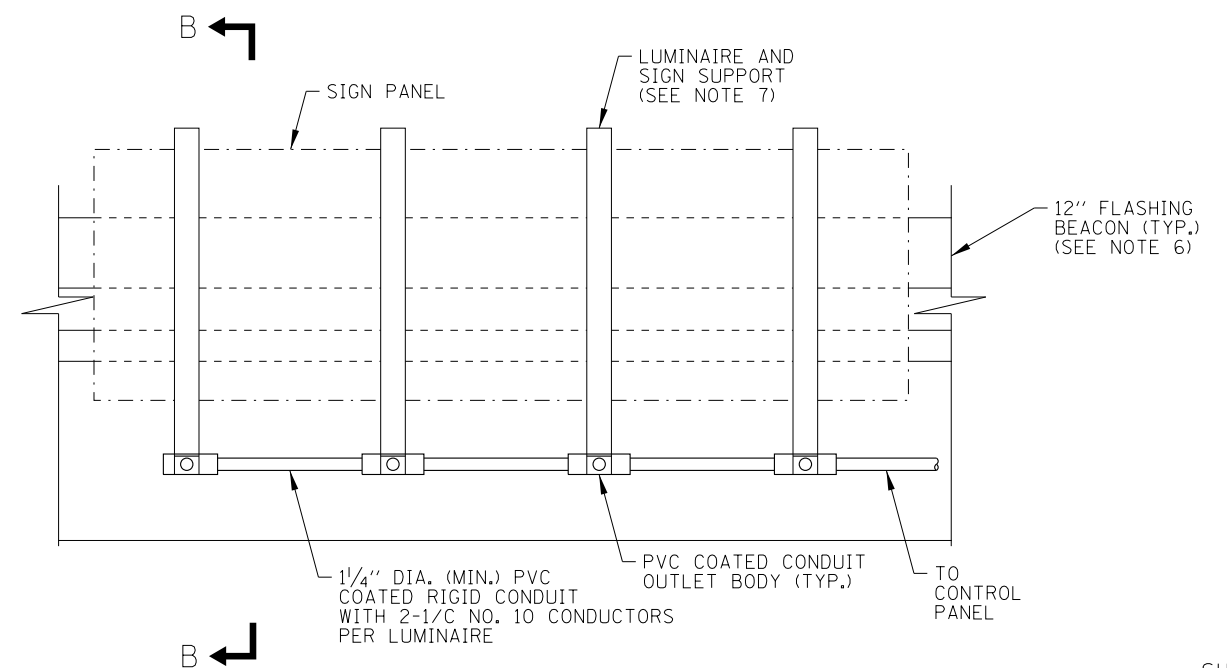
SECTION A-A  
(STEEL BRIDGE SHOWN)



TYPICAL FRONT ELEVATION WITH FLASHING BEACON  
(LUMINAIRES NOT SHOWN FOR CLARITY)



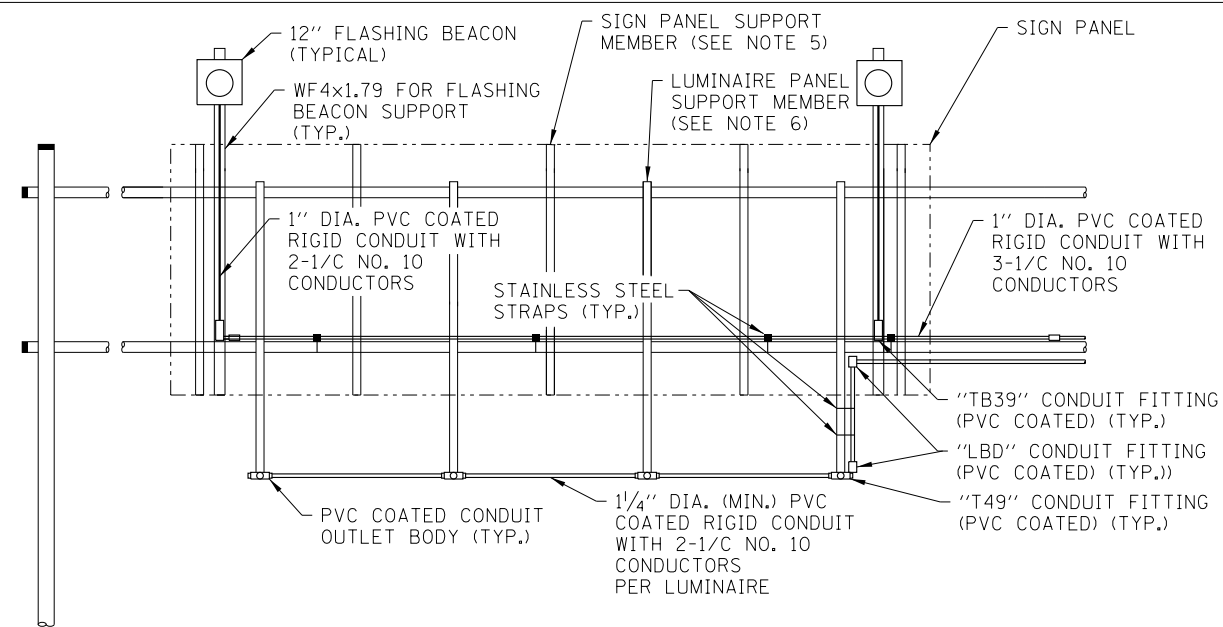
SECTION B-B  
(CONCRETE BRIDGE SHOWN)



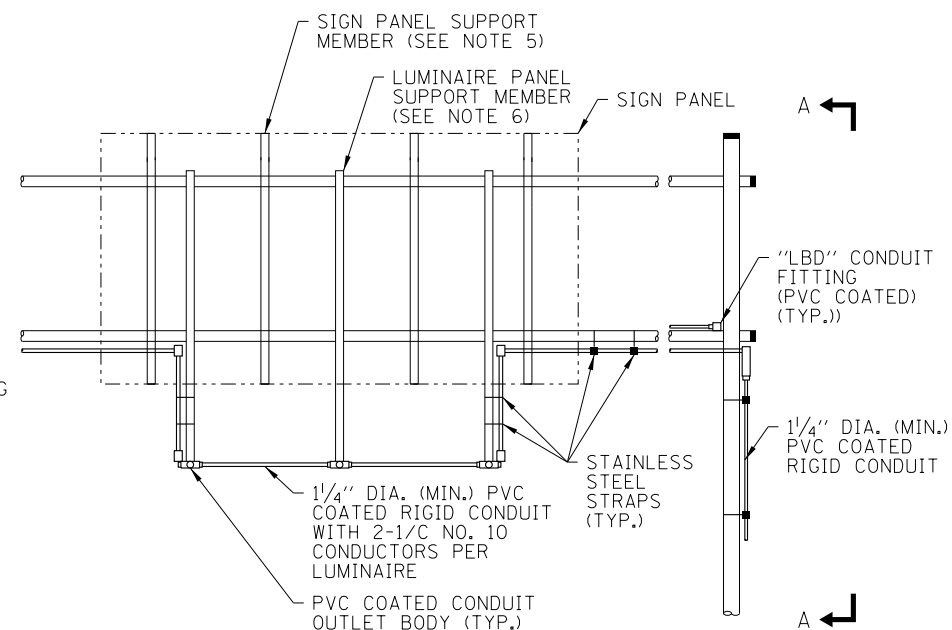
TYPICAL FRONT ELEVATION  
WITHOUT FLASHING BEACON  
(LUMINAIRES NOT SHOWN FOR CLARITY)

# BRIDGE MOUNTED SIGN LIGHTING (LUMINAIRE MOUNTING & CONDUIT DETAILS)

NOTES:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.



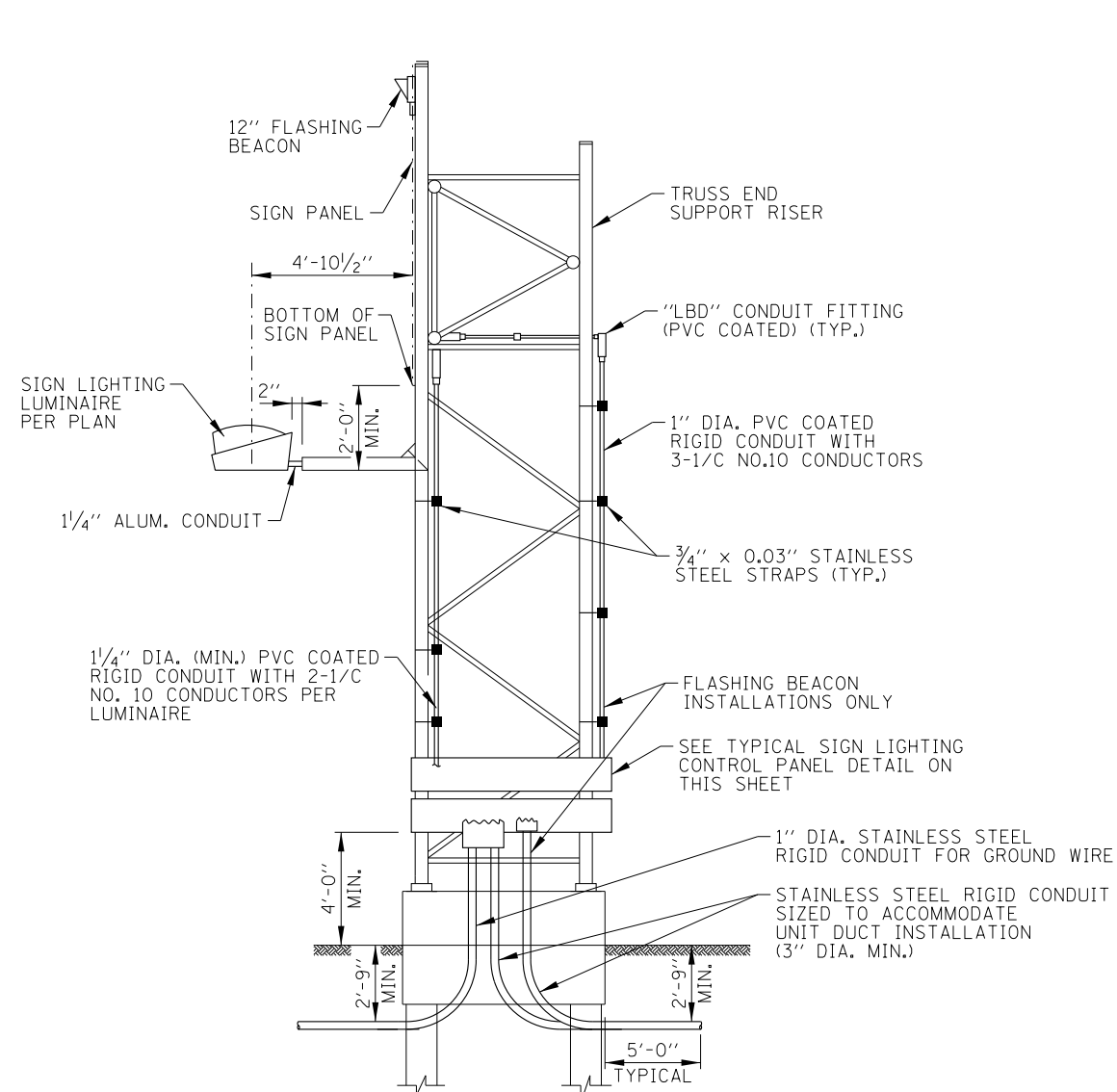
FRONT ELEVATION WITH FLASHING BEACON  
(LUMINAIRES NOT SHOWN FOR CLARITY)



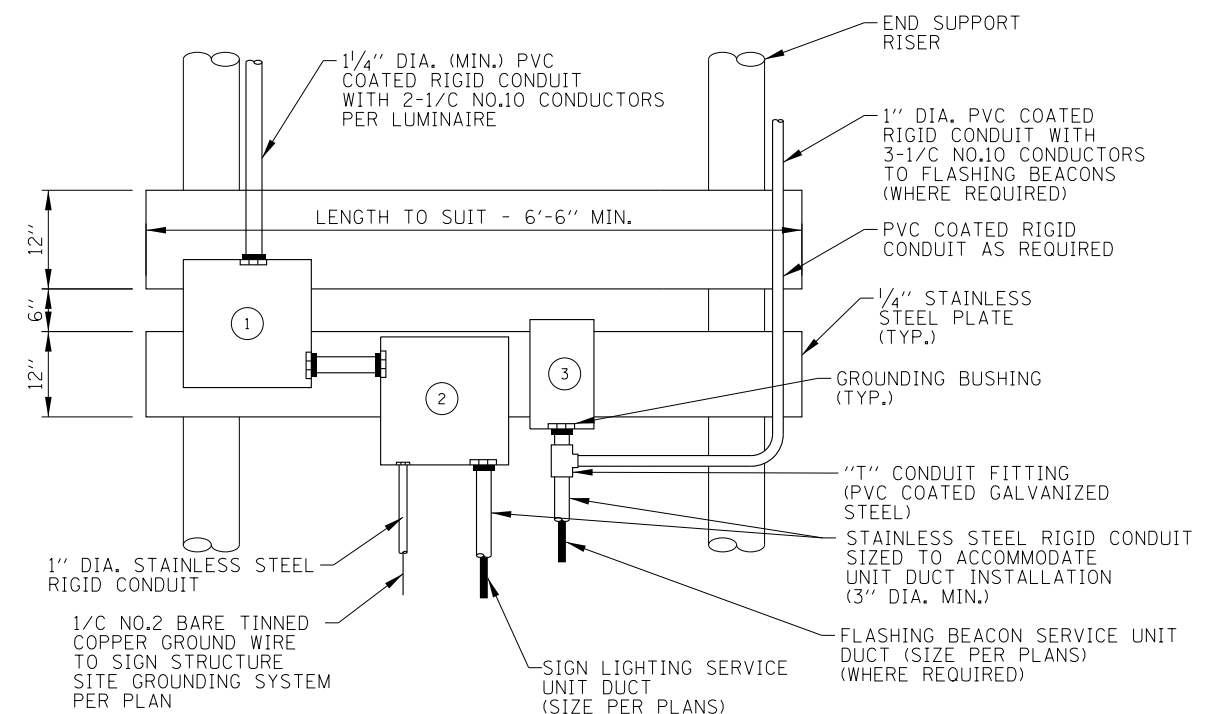
FRONT ELEVATION WITHOUT FLASHING BEACON  
(LUMINAIRES NOT SHOWN FOR CLARITY)

# NOTES:

- CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES ATTACHED TO ALUMINUM STRUCTURAL SUPPORTS SHALL BE PVC COATED ALUMINUM. PVC COATED GALVANIZED STEEL CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES SHALL BE UTILIZED WHERE ATTACHED TO STEEL STRUCTURAL SUPPORTS OR WHERE ATTACHED TO CONCRETE STRUCTURES UNLESS NOTED OTHERWISE HEREIN. THREADED JOINTS BETWEEN DISSIMILAR METALS SHALL BE COATED WITH AN APPROVED THREAD LUBRICANT.
- PROVIDE 12" FLASHING BEACON ONLY WHERE INDICATED ON PLANS. FLASHING BEACON TO BE ATTACHED TO SUPPORT WITH STAINLESS STEEL SCREWS AND NEOPRENE SPACERS. DRILLED SCREW HOLES TO BE SEALED WATER-TIGHT.
- ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
- ALL STEEL TO BE HOT DIPPED GALVANIZED AFTER WELDING PER ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATION SECTION 733.
- SEE STRUCTURAL DRAWINGS FOR DETAILS OF SIGN SUPPORTS AND FIXTURE SUPPORT CHANNELS.
- LUMINAIRE SUPPORT MEMBERS TO BE INSTALLED ONLY WHEN STRUCTURE IS TO BE ILLUMINATED. DESIGNER TO DETERMINE REQUIREMENTS FOR SIGN LIGHTING BASED ON ROADWAY GEOMETRY.
- FOR SIGN LUMINAIRE INSTALLATION AND WIRING AND FOR INSTALLATION OF CONDUIT IN FIXTURE SUPPORT CHANNEL, SEE STANDARD H14.



SECTION A-A  
FULL ELEVATION (OUTSIDE FOUNDATION)



## LEGEND:

- 18"x18"x8" STAINLESS STEEL JUNCTION BOX. PROVIDE SUFFICIENT 30 AMPERE, 600 VOLT TERMINAL BLOCKS TO SPLIT 480 VOLT WIRING FROM SIGN SERVICE CIRCUIT BREAKER TO TWO NO. 10 WIRES FOR EACH LUMINAIRE.
- SIGN LIGHTING SERVICE - CIRCUIT BREAKER (30 AMP/2 POLE) IN NEMA TYPE 4 STAINLESS STEEL TYPE 316 WITH MOUNTING FEET OR APPROVED EQUAL. PROVIDE SURGE PROTECTION DEVICE (IN ACCORDANCE WITH ARTICLE 1065.02 OF THE STANDARD SPECIFICATIONS).
- FLASHING BEACON CONTROLLER.

TYPICAL SIGN LIGHTING CONTROL PANEL  
(FOR TYPICAL WIRING DIAGRAM SEE STANDARD H14)

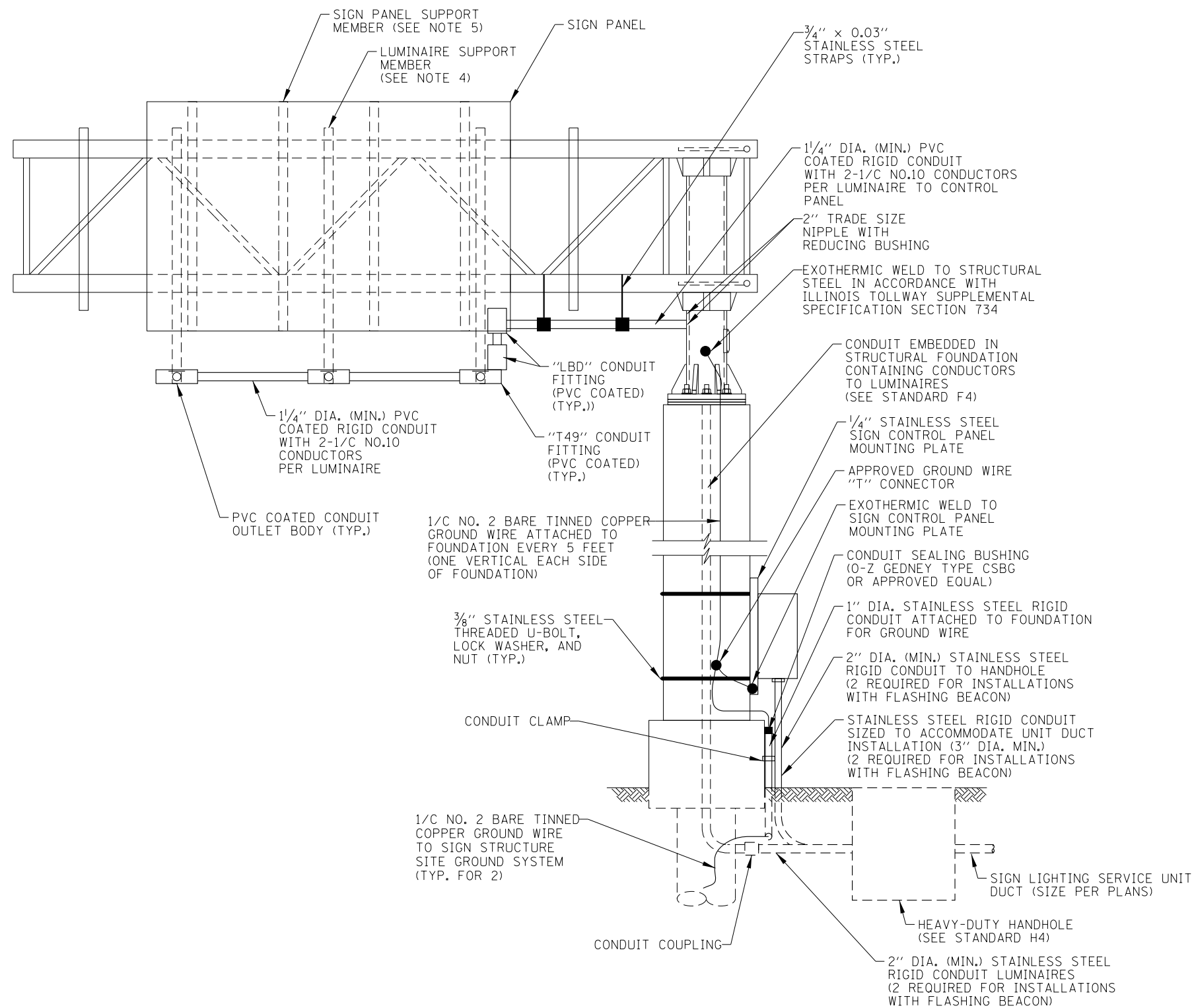
APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/01/2024



SPAN TYPE STRUCTURE  
SIGN LIGHTING DETAILS

STANDARD H11-06

DATE	REVISIONS
3-01-2024	REVISED NOTE 6 TO ADDRESS SIGN LIGHTING UPDATES.
3-01-2019	STAINLESS STEEL SERVICE JUNCTION BOX.
3-01-2018	ADDED SURGE PROTECTIVE DEVICE.
3-11-2015	REVISED CONDUIT MATERIALS.



TYPICAL FRONT ELEVATION WITH FLASHING BEACON  
(LUMINAIRES NOT SHOWN FOR CLARITY)

## NOTES:

1. A GROUND WIRE (NO. 12 AWG.) WILL BE RUN FROM THE GROUNDING BUSHING (OVERHEAD SUPPORT) TO THE GROUNDING BUSHING IN THE JUNCTION BOX.
2. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
3. CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES ATTACHED TO ALUMINUM STRUCTURAL SUPPORTS SHALL BE PVC COATED ALUMINUM. PVC COATED GALVANIZED STEEL CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES SHALL BE UTILIZED WHERE ATTACHED TO STEEL STRUCTURAL SUPPORTS OR WHERE ATTACHED TO CONCRETE STRUCTURES UNLESS NOTED OTHERWISE HEREIN. THREADED JOINTS BETWEEN DISSIMILAR METALS SHALL BE COATED WITH AN APPROVED THREAD LUBRICANT.
4. LUMINAIRE SUPPORT MEMBERS TO BE INSTALLED ONLY WHEN THE SIGN IS TO BE ILLUMINATED. DESIGNER TO DETERMINE REQUIREMENTS FOR SIGN LIGHTING BASED ON ROADWAY GEOMETRY.
5. SEE STRUCTURAL DRAWINGS FOR DETAILS OF SIGN SUPPORTS AND FIXTURE SUPPORT CHANNELS.
6. FOR SIGN LUMINAIRE INSTALLATION AND WIRING AND FOR INSTALLATION OF CONDUIT IN FIXTURE SUPPORT CHANNEL, SEE STANDARD H14.
7. ALL STEEL TO BE HOT DIPPED GALVANIZED AFTER WELDING PER ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATION SECTION 733.
8. PROVIDE 12" FLASHING BEACON ONLY WHERE INDICATED ON PLANS. FLASHING BEACON TO BE ATTACHED TO SUPPORT WITH STAINLESS STEEL SCREWS AND NEOPRENE SPACERS. DRILLED SCREW HOLES TO BE SEALED WATERTIGHT.

SHEET 1 OF 2



DATE	REVISIONS
3-01-2024	REVISED NOTE 4 TO ADDRESS SIGN LIGHTING UPDATES.
3-01-2018	ADDED SURGE PROTECTION DEVICE.
3-11-2015	REVISED CONDUITS TO STAINLESS STEEL.

CANTILEVER STRUCTURE  
SIGN LIGHTING DETAILS

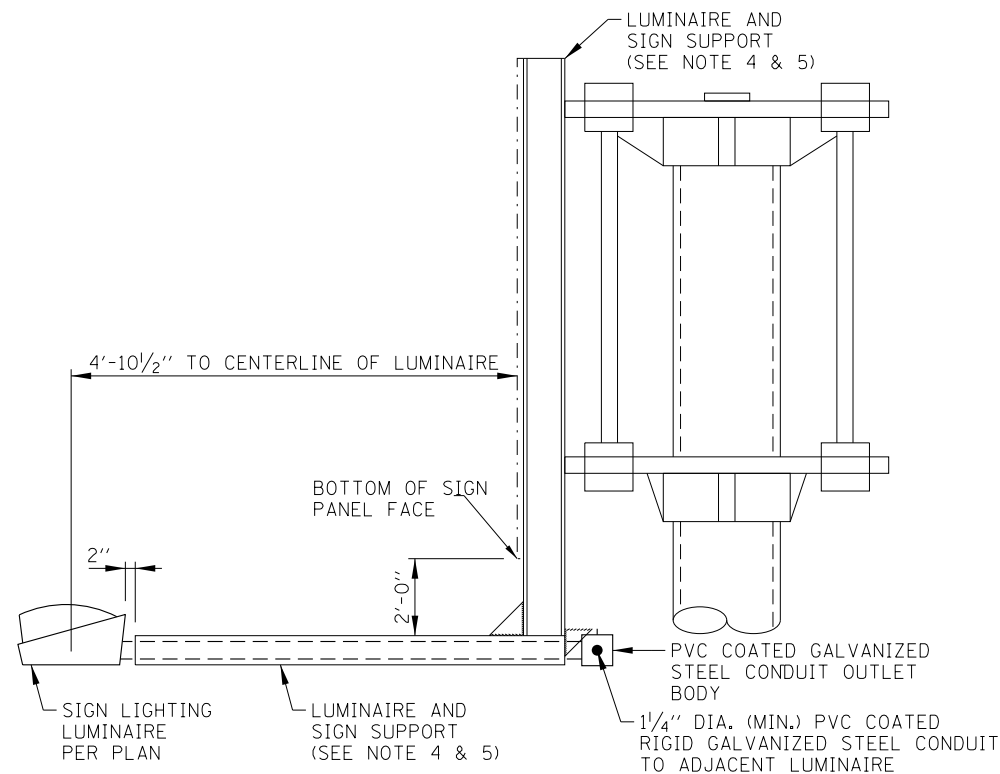
STANDARD H12-05

APPROVED BY:

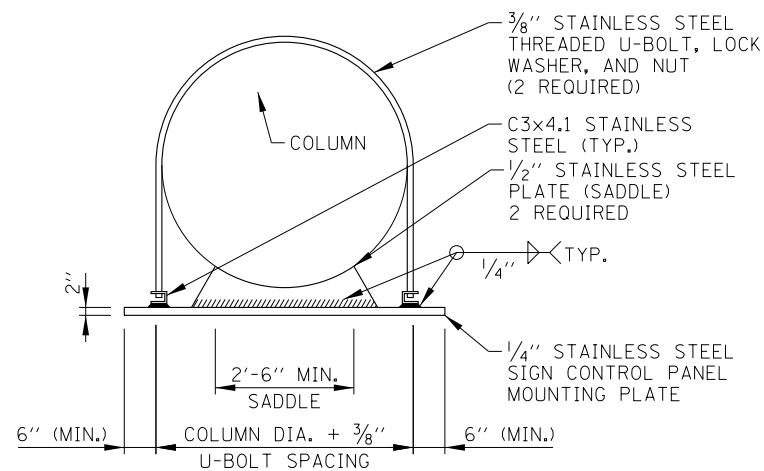
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE:

03/01/2024

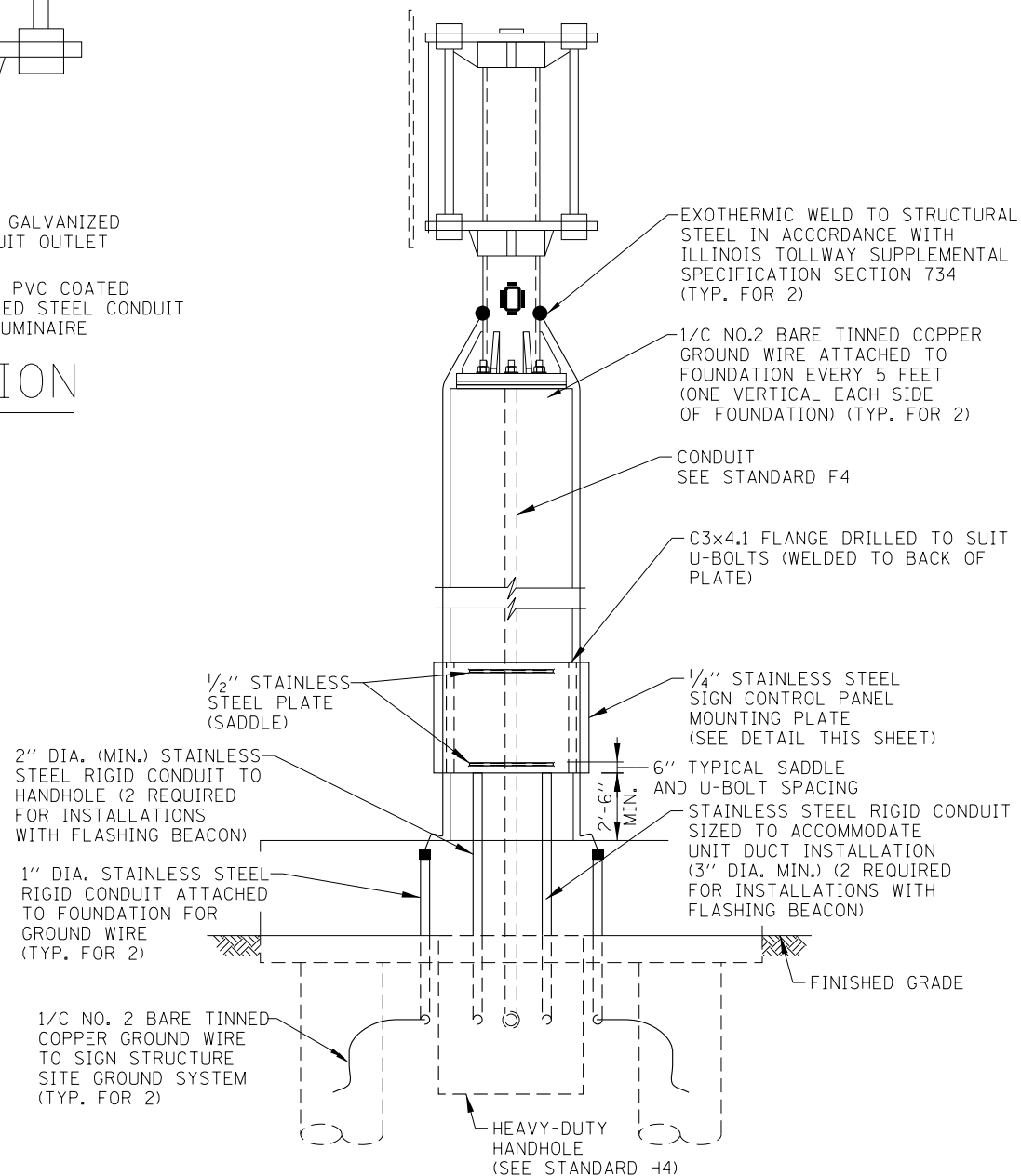


## SIGN LUMINAIRE INSTALLATION



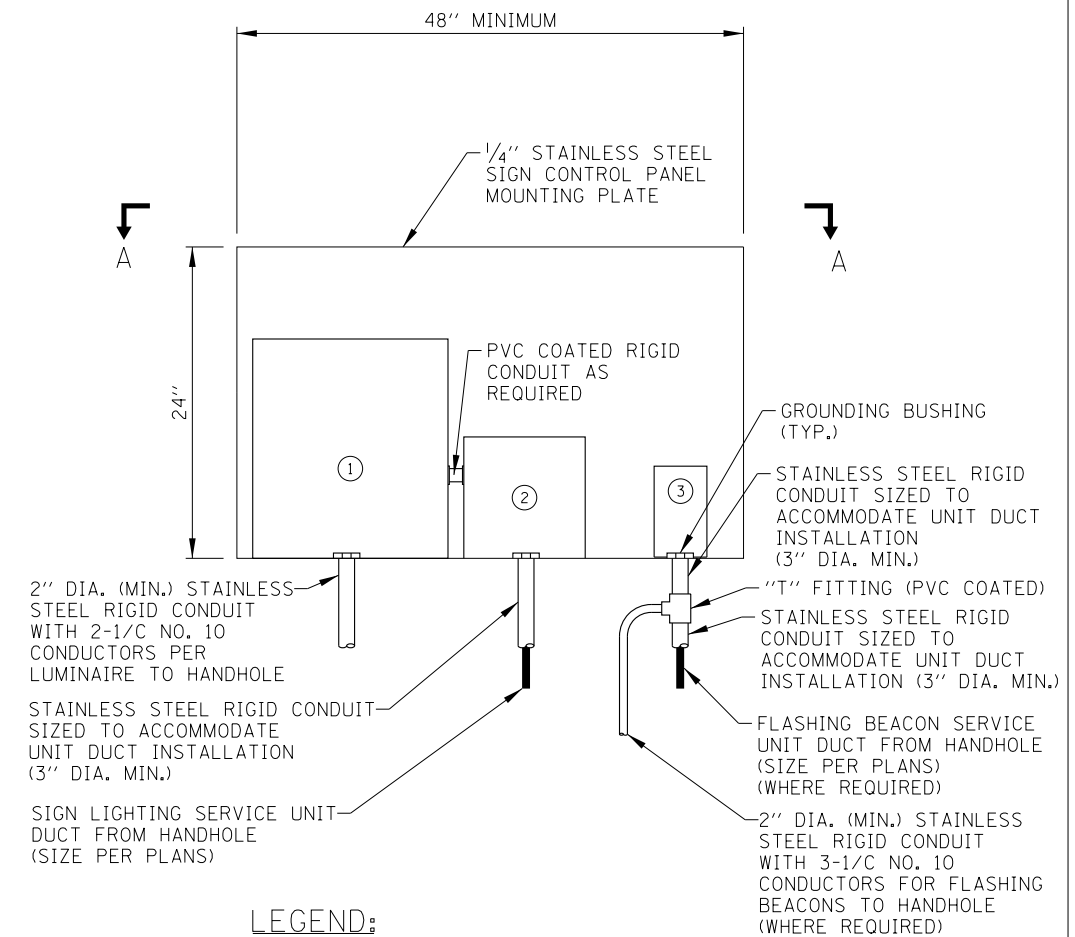
### SECTION A-A

(CONTROL EQUIPMENT NOT SHOWN FOR CLARITY)



## TYPICAL SIDE ELEVATION

(LUMINAIRES NOT SHOWN FOR CLARITY)



### LEGEND:

- ① 18"x18"x8" STAINLESS STEEL JUNCTION BOX. PROVIDE SUFFICIENT 30 AMPERE, 600 VOLT TERMINAL BLOCKS TO SPLIT 480 VOLT WIRING FROM SIGN SERVICE CIRCUIT BREAKER TO TWO NO. 10 WIRES FOR EACH LUMINAIRE.
- ② SIGN LIGHTING SERVICE - CIRCUIT BREAKER (30 AMP/2 POLE) IN NEMA TYPE 4 C.I. ENCLOSURE, OZ TYPE "YW" WITH MOUNTING FEET OR APPROVED EQUAL. PROVIDE SURGE PROTECTION DEVICE (IN ACCORDANCE WITH ARTICLE 1065.02 OF THE STANDARD SPECIFICATIONS).
- ③ FLASHING BEACON CONTROLLER.

## TYPICAL SIGN CONTROL PANEL DETAIL

(FOR TYPICAL WIRING DIAGRAM SEE STANDARD H14)

APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024

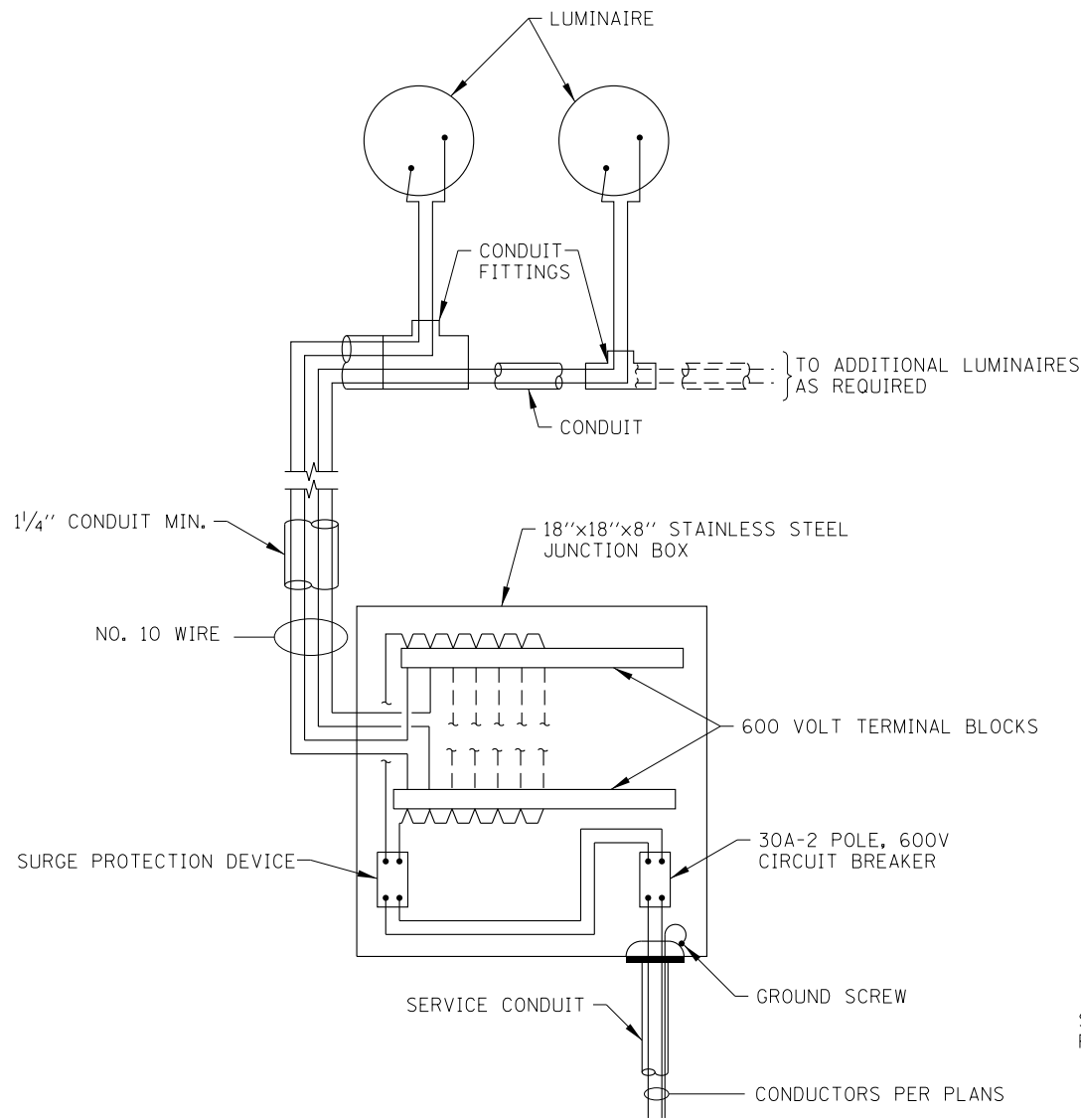
NOTES:  
SEE SHEET 1 OF THIS SERIES FOR NOTES.

SHEET 2 OF 2



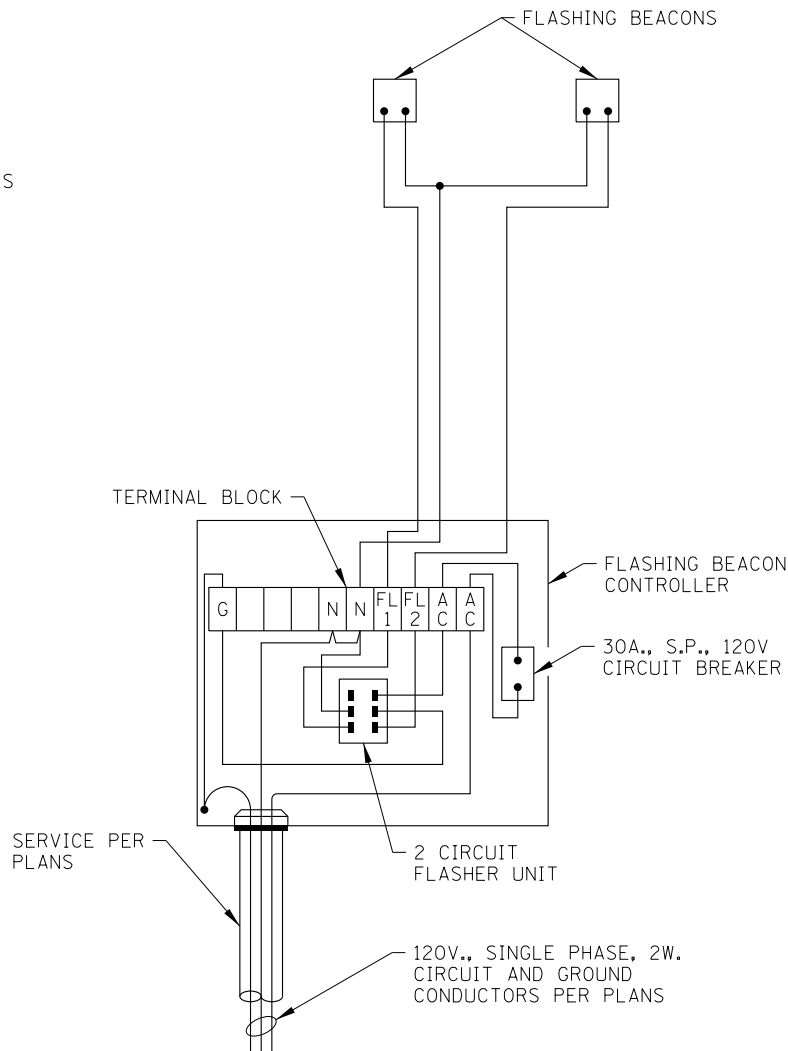
CANTILEVER STRUCTURE  
SIGN LIGHTING DETAILS

STANDARD H12-05



SIGN WIRING DIAGRAM

NO SCALE

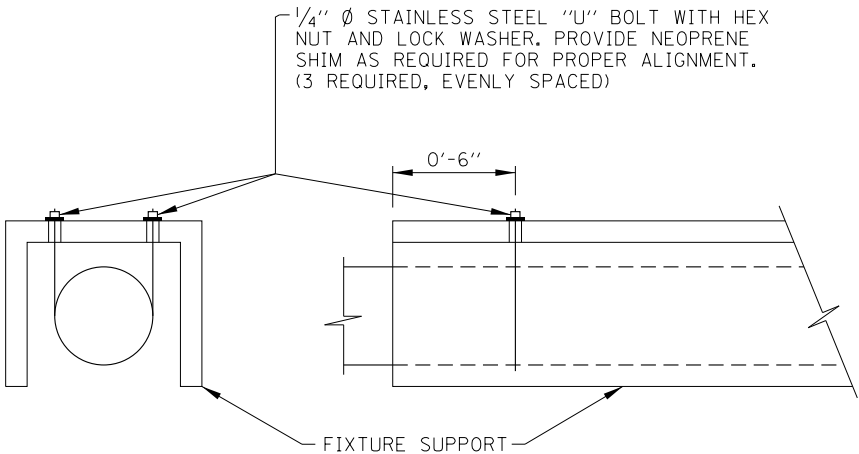


FLASHING BEACON WIRING DIAGRAM

NO SCALE

NOTES:

1. SEE STRUCTURAL DRAWINGS FOR DETAILS OF SIGN SUPPORTS AND FIXTURE SUPPORT CHANNELS.
2. CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES ATTACHED TO ALUMINUM STRUCTURAL SUPPORTS SHALL BE PVC COATED ALUMINUM. PVC COATED GALVANIZED STEEL CONDUITS, CONDUIT FITTINGS, CLAMPS, AND APPURTENANCES SHALL BE UTILIZED WHERE ATTACHED TO STEEL STRUCTURAL SUPPORTS OR WHERE ATTACHED TO CONCRETE STRUCTURES UNLESS NOTED OTHERWISE HEREIN. THREADED JOINTS BETWEEN DISSIMILAR METALS SHALL BE COATED WITH AN APPROVED THREAD LUBRICANT.
3. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
4. INSTALL SURGE PROTECTION DEVICE IN ACCORDANCE WITH ARTICLE 1065.02 OF THE SUPPLEMENTAL SPECIFICATIONS.



LUMINAIRE SUPPORT DETAIL

NO SCALE

APPROVED BY: *Paul Kovacs* DATE: 02/07/2012  
CHIEF ENGINEERING OFFICER

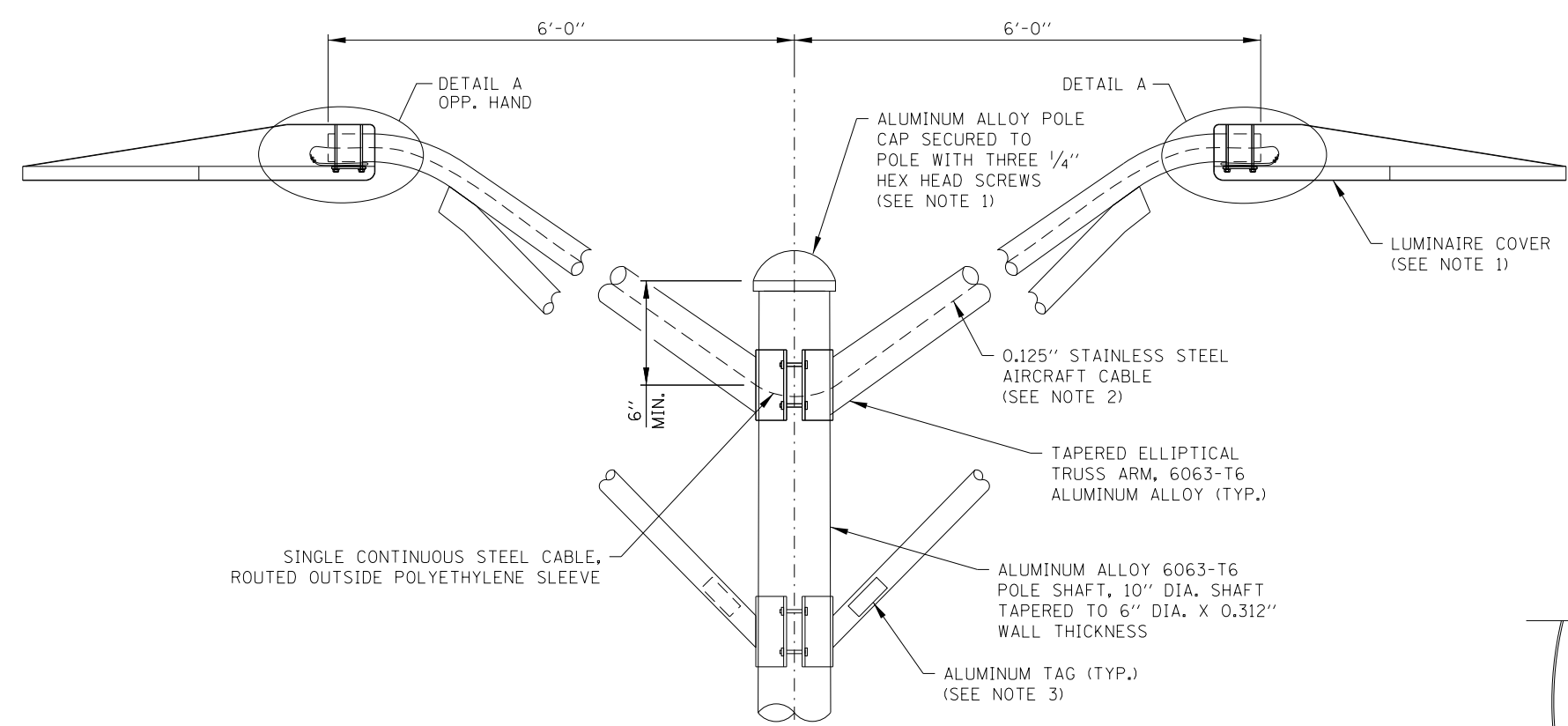
DATE	REVISIONS
3-01-2020	REVISED NOTES.
3-01-2018	TYPOGRAPHICAL CORRECTIONS.
3-11-2015	REVISED NOTES.
2-07-2012	REMOVED CANISTER BALLASTS, NEW JUNCTION BOX AND TERMINAL BLOCKS.



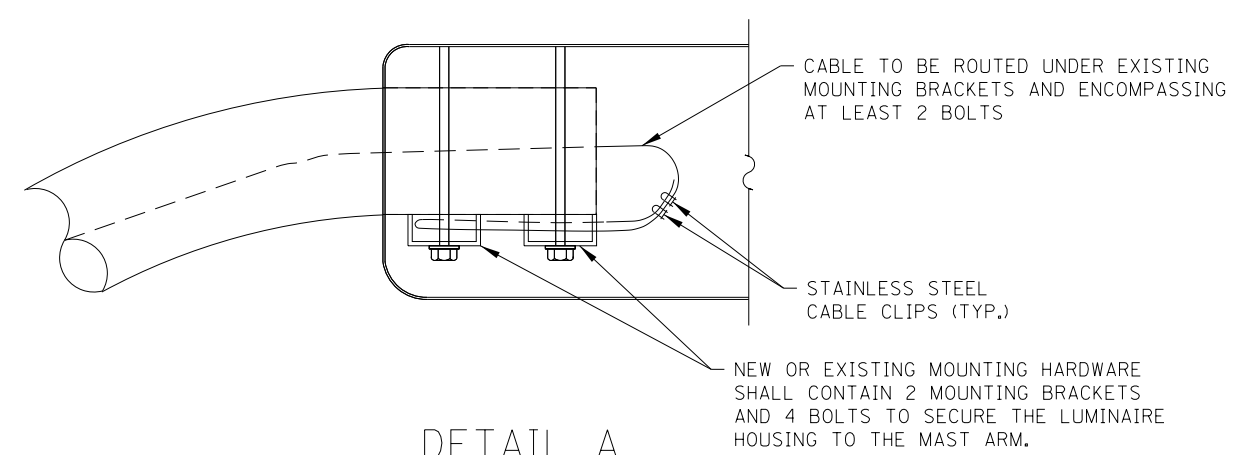
SIGN LUMINAIRE  
MOUNTING DETAIL  
AND WIRING DIAGRAMS

STANDARD H14-04





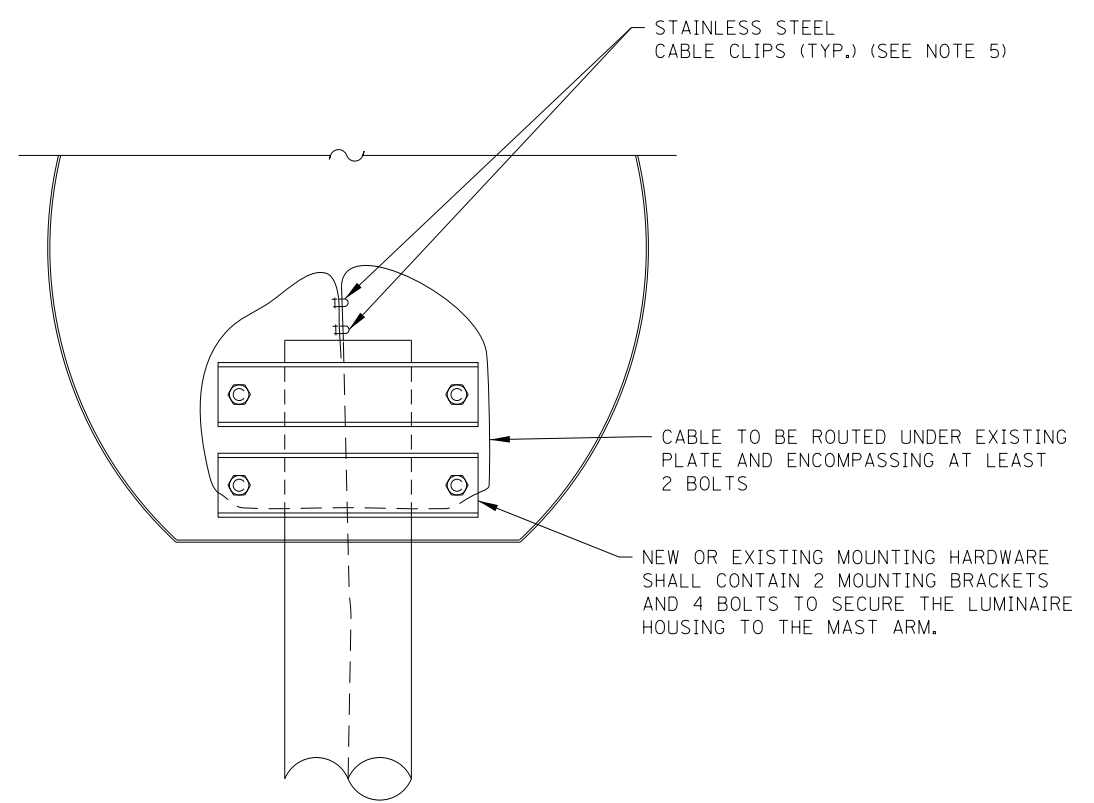
LIGHT STANDARD - TRUSS ARM  
(TWIN TRUSS ARM SHOWN, TWIN MAST ARM SIMILAR)  
N.T.S.



DETAIL A  
N.T.S.

NOTES:

1. POLE CAP TO BE REMOVED AND LUMINAIRE LID TO BE OPENED FOR PLACEMENT OF THE CABLE ASSEMBLY AND PUT BACK IN PLACE. NEW CAP SCREWS SHALL BE USED.
2. THE BREAKING STRENGTH OF THE ASSEMBLED CABLE SHALL BE 1,700 POUNDS MINIMUM. ALLOW FOR 9" TO 12" SLACK IN THE CABLE.
3. ALUMINUM TAG WITH POLE IDENTIFICATION NUMBERS AS PER SPECIAL PROVISIONS.
4. CONTRACTOR SHALL ROUTE CABLE WITHIN LUMINAIRE IN SUCH A WAY THAT IT DOES NOT BECOME PINCHED BETWEEN THE MAST ARM AND MOUNTING BRACKET.
5. CABLE LOOPS SHALL BE CLOSED SUCH THAT EACH END OF THE CABLE PASSES THROUGH CLIPS IN OPPOSING DIRECTIONS.
6. MINIMIZE SLACK WITHIN LUMINAIRE.




BOTTOM VIEW  
N.T.S.

APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024

DATE	REVISIONS
3-01-2024	ADDED DETAILS REGARDING THE HARDWARE USED TO SECURE THE LUMINAIRE HOUSING.
3-01-2020	REVISED BRACKET AND ROUTING DETAILS.



ILLINOIS  
TOLLWAY

MAST ARM  
CABLE ASSEMBLY  
(TWIN MAST ARM)

STANDARD H16-02

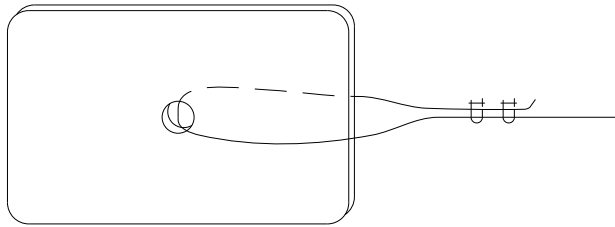
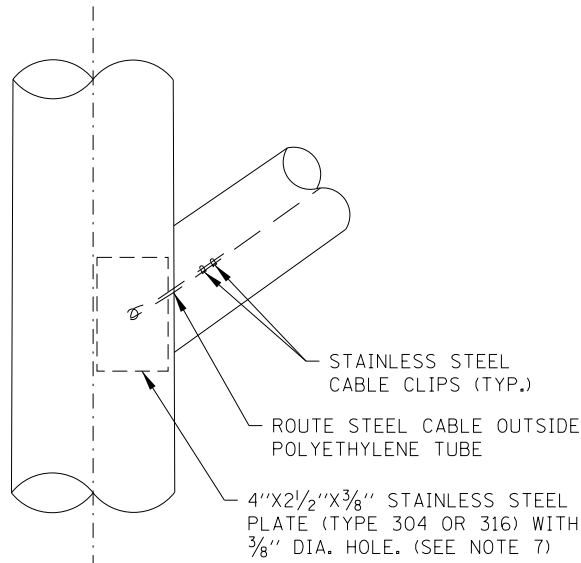
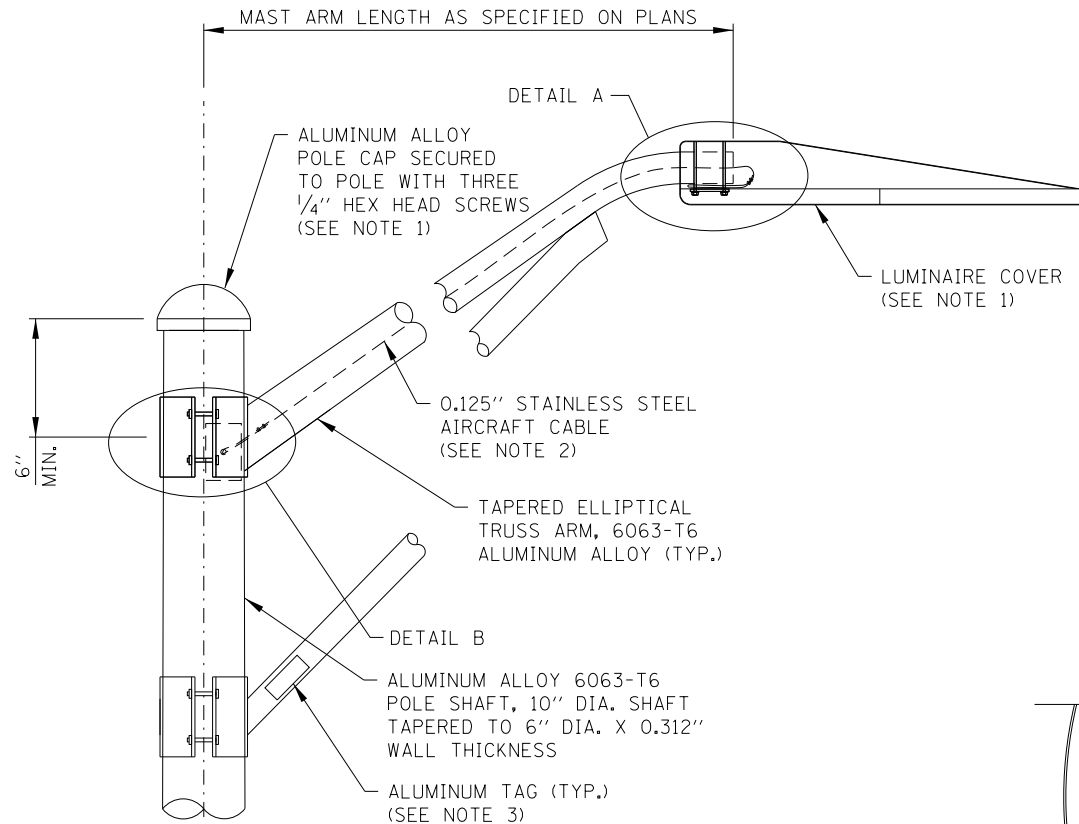


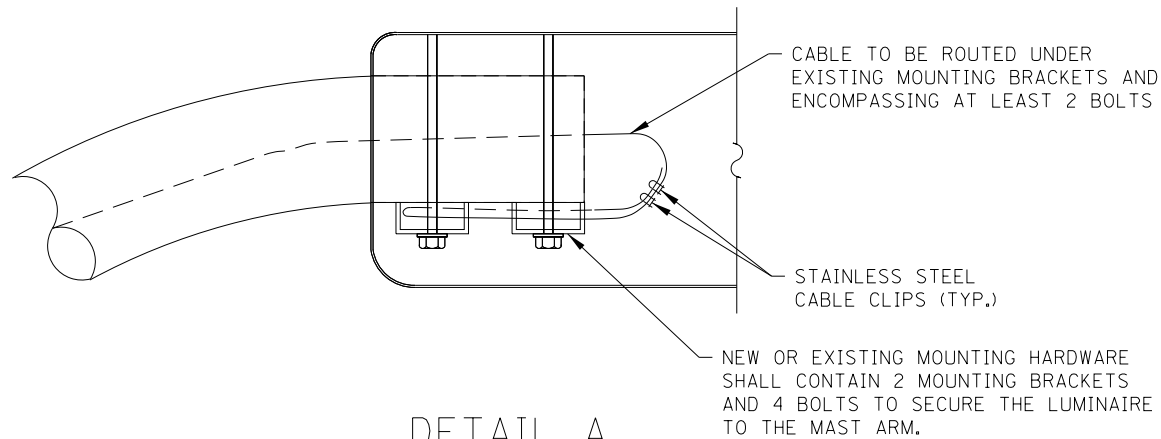
PLATE ATTACHMENT DETAIL



DETAIL B  
(BRACKET CLAMPS OMITTED  
FOR CLARITY)  
N.T.S.



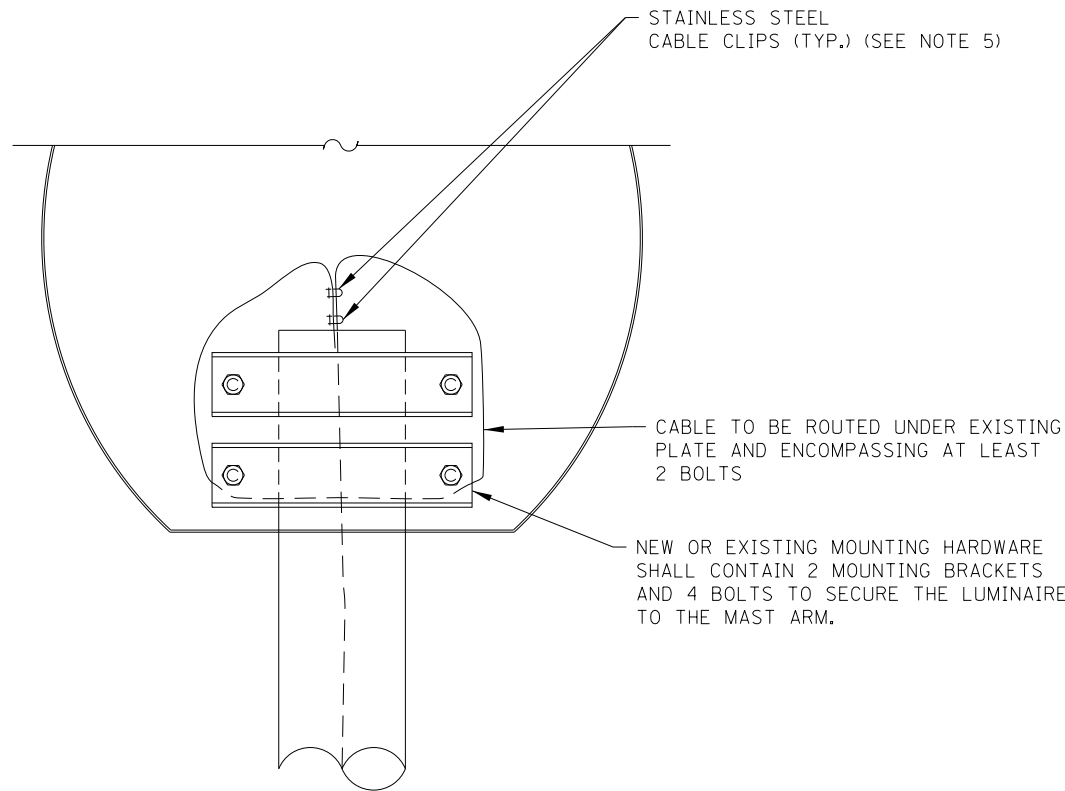
LIGHT STANDARD - TRUSS ARM  
(SINGLE TRUSS ARM SHOWN, SINGLE MAST ARM SIMILAR)  
N.T.S.



DETAIL A  
N.T.S.

NOTES:

1. POLE CAP TO BE REMOVED AND LUMINAIRE LID TO BE OPENED FOR PLACEMENT OF THE CABLE ASSEMBLY AND PUT BACK IN PLACE. NEW CAP SCREWS SHALL BE USED.
2. THE BREAKING STRENGTH OF THE ASSEMBLED CABLE SHALL BE 1,700 POUNDS MINIMUM. ALLOW FOR 9" TO 12" SLACK IN THE CABLE.
3. ALUMINUM TAG WITH POLE IDENTIFICATION NUMBERS AS PER SPECIAL PROVISIONS.
4. CONTRACTOR SHALL ROUTE CABLE WITHIN LUMINAIRE IN SUCH A WAY THAT IT DOES NOT BECOME PINCHED BETWEEN THE MAST ARM AND MOUNTING BRACKET.
5. CABLE LOOPS SHALL BE CLOSED SUCH THAT EACH END OF THE CABLE PASSES THROUGH CLIPS IN OPPOSING DIRECTIONS.
6. MINIMIZE SLACK WITHIN LUMINAIRE.
7. ALL PLATE EDGES SHALL BE SMOOTH.



BOTTOM VIEW  
N.T.S.

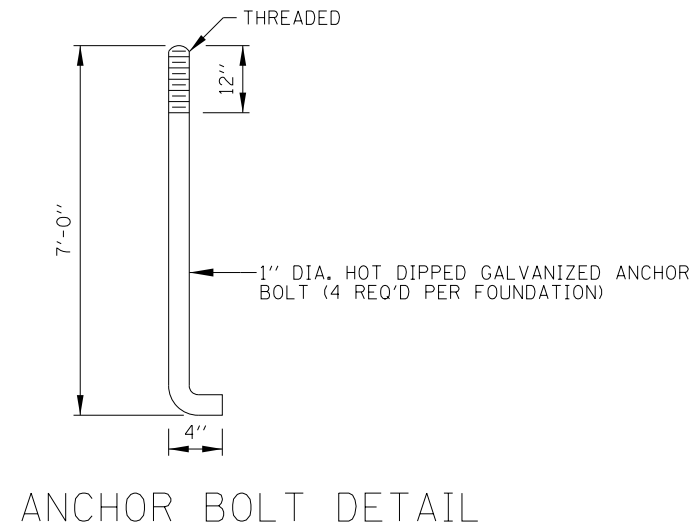
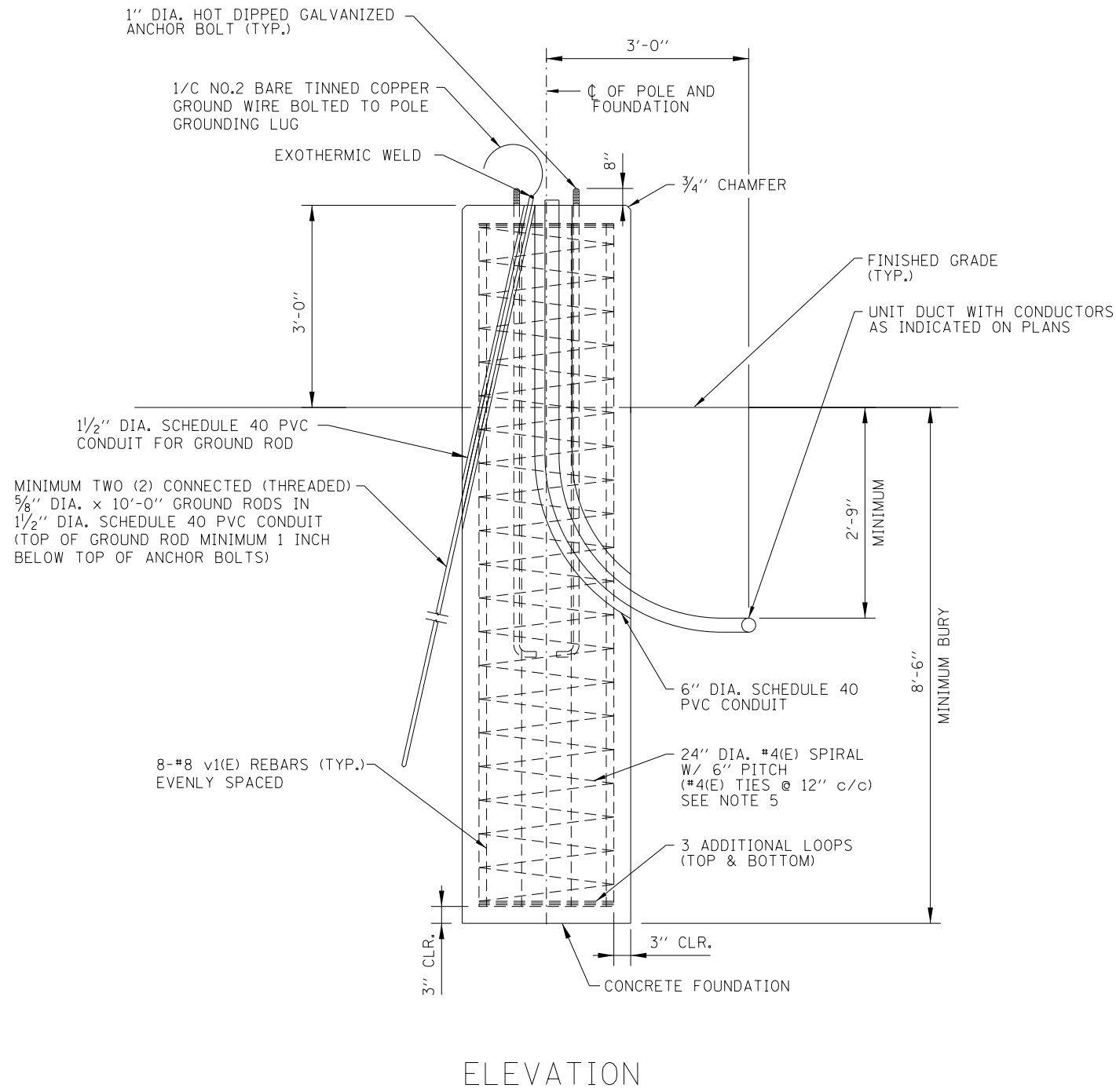
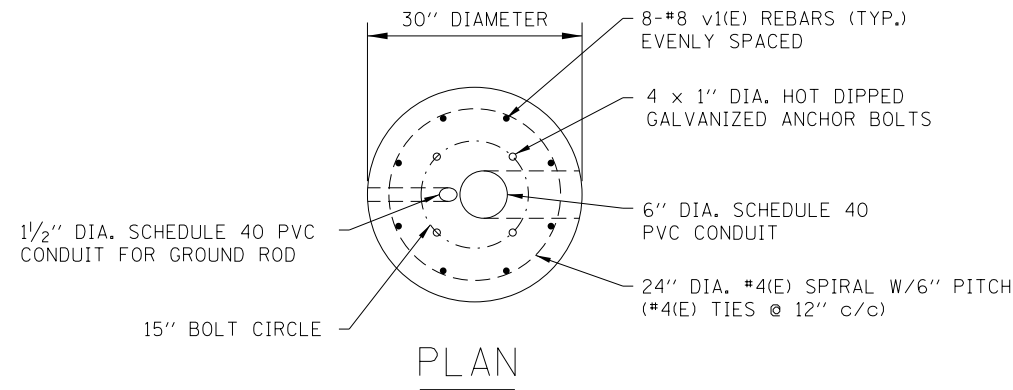
APPROVED BY:  
*Mamun Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/01/2024

DATE	REVISIONS
3-01-2024	ADDED DETAILS REGARDING THE HARDWARE USED TO SECURE THE LUMINAIRE HOUSING.
3-01-2020	REVISED BRACKET AND ROUTING DETAILS.



MAST ARM  
CABLE ASSEMBLY  
(SINGLE MAST ARM)

STANDARD H17-02



NOTES:

1. FOR DETAILS OF FUSE HOLDER, POLE BASE WIRING AND CONDUCTOR SPLICE SEE STANDARD H2.
2. ALL REINFORCEMENT BARS SHALL BE EPOXY COATED.
3. ALL EQUIPMENT SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND THE NATIONAL ELECTRICAL SAFETY CODE.
4. POLE SHALL BE MOUNTED AND WIRED PER DETAIL FOR "BARRIER WALL MOUNTED UNITS" ON LIGHT STANDARD DETAILS (STANDARD H2)
5. ADJUST SPIRAL BAR SPACING AS NEEDED TO ACCOMMODATE CONDUIT ENTRANCE.

APPROVED BY:

*Mamun Nashif*

CHIEF ENGINEERING OFFICER

DATE:

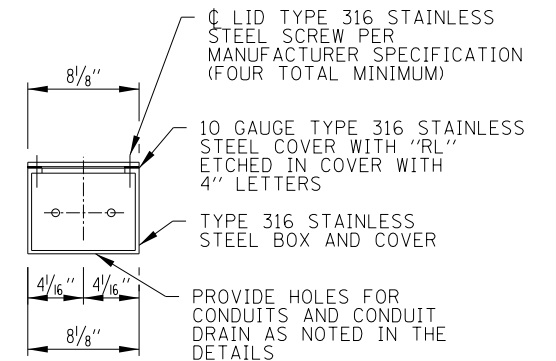
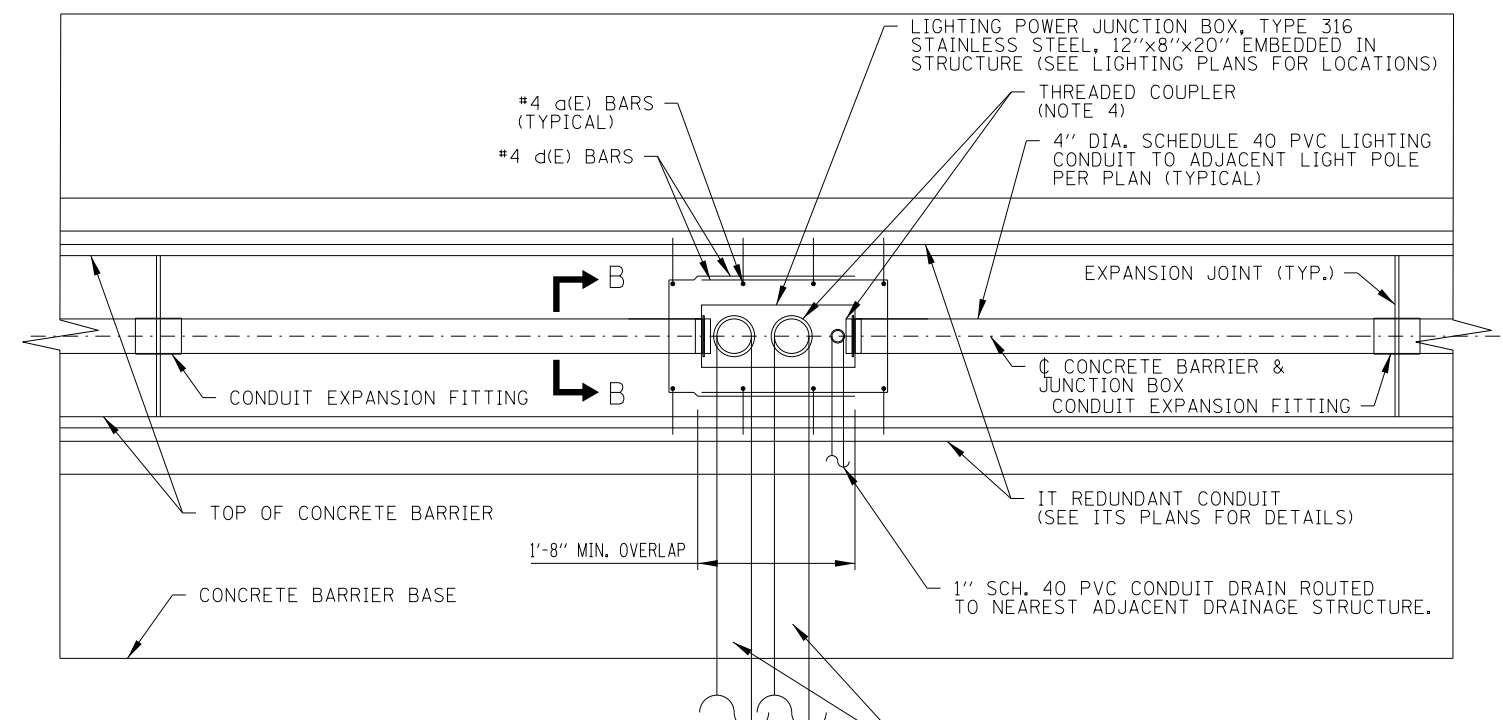
03/01/2023

DATE	REVISIONS
3-01-2023	REVISED v1(E) BARS FROM #6 TO #8.
3-01-2022	INCREASED ANCHOR BOLT PROJECTION.

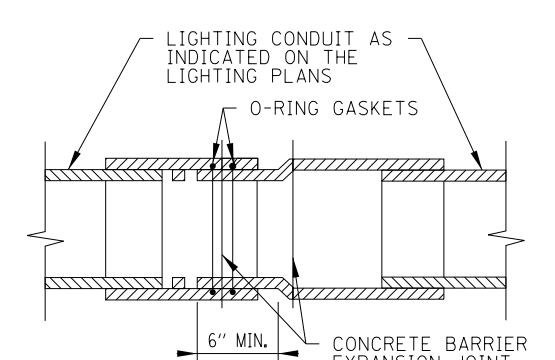
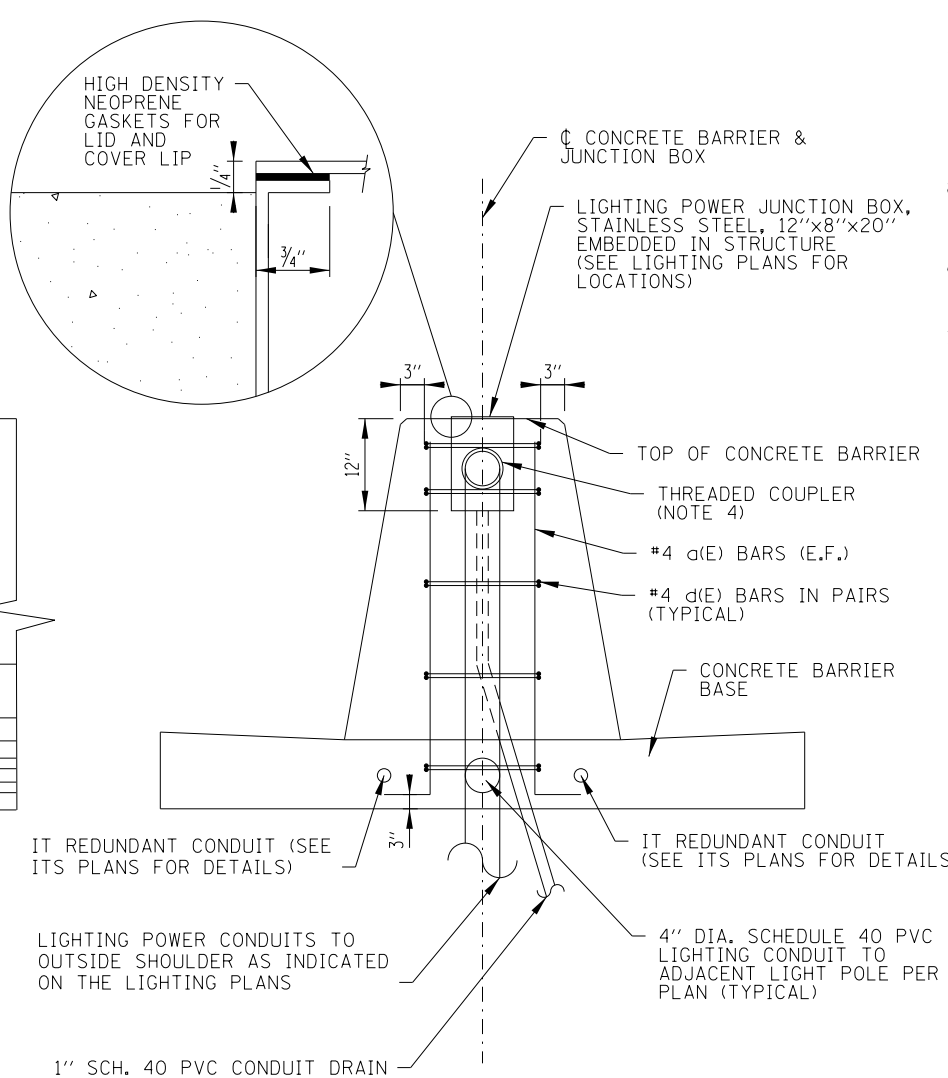
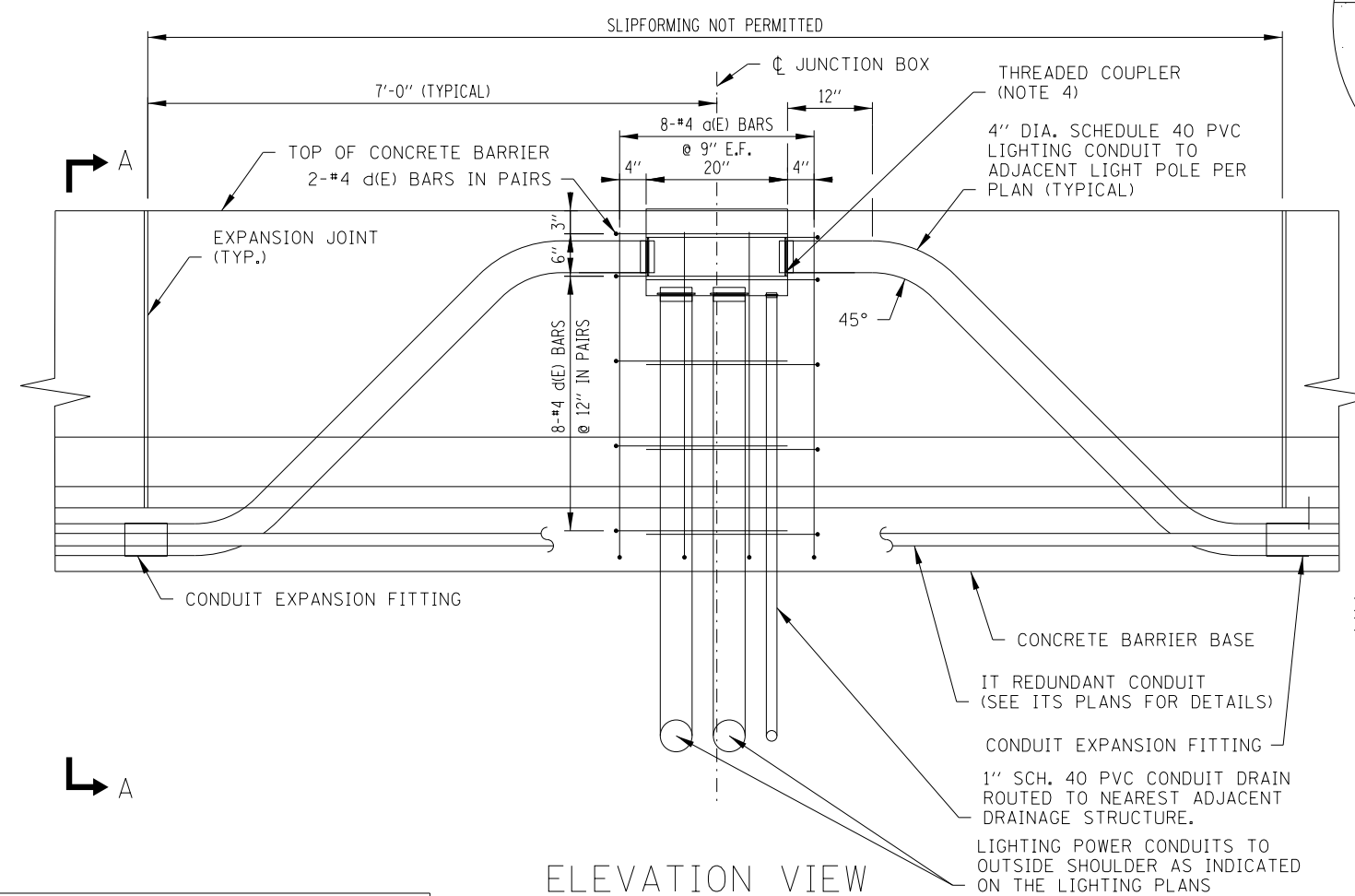
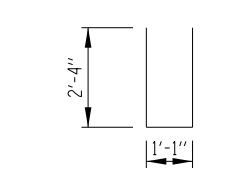
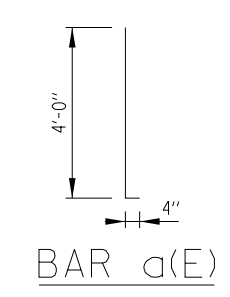


PARKING LOT  
LIGHT FOUNDATION  
DETAILS

STANDARD H18-02



REINFORCEMENT BAR SCHEDULE					
BAR	NO.	SIZE	LENGTH	WT. LB.	SHAPE
d(E)	8	#4	4'-4"	23	
d(E)	10	#4	5'-9"	45	



CONDUIT EXPANSION FITTING DETAIL  
NOT TO SCALE

NOTES:

1. THE 1" PVC CONDUIT DRAIN SHALL SWEEP TO AN ADJACENT DRAINAGE STRUCTURE WITH CONTINUOUS DOWN SLOPE (NO LOW POINTS WITHIN CONDUIT SWEEP). CONDUIT DRAIN SHALL CONSIST OF STAINLESS STEEL WIRE MESH, WITH BETWEEN 50% TO 65% OPEN AREA, CLAMPED OVER 1" CONDUIT USING A STAINLESS STEEL WORM GEAR CLAMP. THE CONDUIT DRAIN SHALL BE SET AT THE LOWEST CONDUIT OPENING POINT IN THE JUNCTION BOX AS FLUSH AS POSSIBLE WITH THE BOTTOM OF THE JUNCTION BOX TO MINIMIZE WATER ACCUMULATION. THE CONDUIT DRAIN SHALL BE INCIDENTAL TO THE JUNCTION BOX.
2. CONTRACTOR SHALL INSTALL CONDUIT PLUGS IN EACH CONDUIT ENTERING JUNCTION BOX TO PREVENT WATER/DIRT ENTRY PRIOR TO INSTALLATION. PULL TAPE SHALL BE SECURED AND ACCESSIBLE INSIDE JUNCTION BOXES.
3. PROVIDE CONDUIT EXPANSION FITTINGS AT ALL LOCATIONS WHERE MEDIAN BARRIER EXPANSION JOINTS ARE ENCOUNTERED.
4. PROVIDE THREADED COUPLER FOR ALL CONDUITS ENTERING JUNCTION BOX.
5. REINFORCEMENT BARS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M-3 (ASTM A706) GRADE 60, DEFORMED BARS.
6. REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.
7. REINFORCEMENT BAR BENDING DETAILS SHALL BE IN ACCORDANCE WITH THE LATEST "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", ACI 315. REINFORCEMENT BAR BENDING DIMENSIONS ARE OUT TO OUT.
8. MOVE VERTICAL REINFORCEMENT BARS ALONG THE LENGTH OF THE BARRIER TO ALLOW FOR JUNCTION BOX.
9. MOVE HORIZONTAL REINFORCEMENT BARS TO ACCOMMODATE JUNCTION BOX.
10. CONDUITS WITHIN JUNCTION BOX SHALL BE SPACED EVENLY ALONG INTERIOR WALL OF JUNCTION BOX. MINIMUM SPACING BETWEEN WALL OF JUNCTION BOX AND CONDUITS AND BETWEEN ADJACENT CONDUITS SHALL BE 1".

APPROVED BY: *Mamam Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

DATE	REVISIONS

**Illinois Tollway**

CONCRETE BARRIER CONDUIT AND JUNCTION BOX DETAILS

STANDARD H19-00

# ***STANDARD DRAWINGS***



## ***SECTION K***

### ***EROSION CONTROL AND LANDSCAPE***

MARCH 2024

Illinois Tollway Standard Drawing Revisions
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Section K	Erosion Control & Landscape		
	Standard	Modification Summary	Effective: 03-01-2024
	K1-13	EROSION CONTROL & LANDSCAPE	
	Sheet 2	Replaced regional with nationwide in note 34.	
	Sheet 13	Added callouts related to root flare to all tree details, replaced root ball with root flare in Note 13.	

 New Sheet

 Retired Standard

GENERAL NOTES - EROSION CONTROL & LANDSCAPE

1.

THE WORK DESCRIBED ON THESE DRAWINGS IS AN INTEGRAL PART OF THE STORM WATER POLLUTION PREVENTION PLAN USED TO OBTAIN AN NPDES PERMIT FROM IEPA FOR THE CONSTRUCTION OF THIS PROJECT.
2.

THE PURPOSE OF THE EROSION AND SEDIMENT CONTROL MEASURES INCLUDED FOR THIS PROJECT IS TO LIMIT THE SEDIMENT POLLUTION IMPACT OF ANY STORM WATER DISCHARGES THAT ORIGINATE ON THIS SITE OR OFF-SITE FLOWS THAT FLOW OVER THE DISTURBED AREAS.
3.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT SEDIMENT TRANSPORT OFF THE SITE IS REDUCED BY A COMBINATION OF MINIMIZATION OF EROSION AT THE SOURCE AND INSTALLATION OF SPECIFIC MEASURES TO CONTROL OR REDUCE THE TRANSPORT OF SEDIMENT.
4.

A COPY OF THE EROSION AND SEDIMENT CONTROL PLAN, NOI, SWPPP AND ALL ASSOCIATED REVISIONS, ANY OTHER DOCUMENTS REFERENCED, AND INSPECTION LOG BEING IMPLEMENTED BY THE CONTRACTOR SHALL BE ON THE CONSTRUCTION SITE AT ALL TIMES.
5.

TO THE MAXIMUM EXTENT POSSIBLE EROSION SHALL BE MINIMIZED AT THE SOURCE. ALL FLOWS ORIGINATING OFF THE CONSTRUCTION SITE SHALL BE DIVERTED AROUND DISTURBED AREAS OR SHALL BE CONVEYED THROUGH THE SITE IN A MANNER THAT UNTREATED ON-SITE RUNOFF SHALL BE MINIMIZED AND DOES NOT MIX WITH THE OFF-SITE RUNOFF.
6.

ALL RUNOFF ORIGINATING ON DISTURBED AREAS ASSOCIATED WITH THIS PROJECT SHALL PASS THROUGH ONE OR MORE MEASURES THAT SHALL MINIMIZE THE OFF-SITE SEDIMENT IMPACTS OF THE CONSTRUCTION ACTIVITY.
7.

THE CONTRACTOR SHALL INSTALL INITIAL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO BEGINNING ANY ACTIVITIES WHICH WILL POTENTIALLY CAUSE ERODIBLE CONDITIONS.
8.

ALL PERMANENT SEDIMENT BASINS, PERMANENT STORM WATER CONTROL MEASURES, PERIMETER SILT FENCE, AND RUNOFF CONTROL MEASURES REQUIRED TO KEEP OFF-SITE RUNOFF FROM FLOWING OVER THE CONSTRUCTION AREA SHALL BE INSTALLED BEFORE CLEARING AND STRIPPING OF THE SITE PROCEEDS.
9.

PRIOR TO PROCEEDING WITH EARTHWORK ON A PROJECT THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER A PROPOSED EROSION AND SEDIMENT CONTROL SCHEDULE FOR REVIEW AND APPROVAL.
10.

A MAXIMUM OF 10 ACRES IS ALLOWED TO BE IN SOME STAGE OF GRADING AT A SINGLE TIME. ADDITIONAL AREAS (UP TO 10 ACRES) MAY BE CLEARED BUT SHALL NOT BE STRIPPED OF VEGETATION UNTIL THE GRADED AREAS HAVE BEEN PROTECTED FROM EROSION THROUGH INSTALLATION OF EITHER TEMPORARY OR PERMANENT MEASURES. WHENEVER POSSIBLE, THE GRADING SHALL BE COMPLETED TO THE DESIGN GRADE AND THE PERMANENT VEGETATION PLAN IMPLEMENTED PRIOR TO STARTING GRADING ACTIVITIES ON THE NEXT SITE.

A.

WHEN BALANCING EARTHWORK (BORROW FROM A CUT USED AS FILL AT A LOCATION DISTANT FROM THE CUT) THE CHIEF ENGINEER MAY ALLOW MORE THAN 10 ACRES OF CONSTRUCTION WORK AREAS AND STORAGE AREAS.

B.

WHERE NEW INTERCHANGES ARE BEING CONSTRUCTED THE ALLOWABLE AREA BEING GRADED MAY BE LARGER THAN 10 ACRES WHEN THE CONTRACT DRAWINGS AND SWPPP DEFINE SUCH INCREASES.

C.

VARIATIONS TO THE ABOVE MAY BE CONSIDERED BY THE CHIEF ENGINEER UNDER ALL THE FOLLOWING CONDITIONS:

• IF THE CONTRACTOR FALLS BEHIND SCHEDULE THROUGH NO FAULT OF HIS OWN.

• THE CONTRACTOR SHALL PRESENT A SCHEDULE DEMONSTRATING THE NEED FOR SUCH VARIATION IN ORDER TO COMPLETE THE WORK ON TIME.

• THE CONTRACTOR SHALL COMPLY WITH ALL OTHER CONTRACT AND PERMIT REQUIREMENTS.
11.

STABILIZATION OF DISTURBED AREAS SHALL, AT A MINIMUM, BE INITIATED IMMEDIATELY WHENEVER ANY CLEARING, GRADING, EXCAVATING, OR OTHER EARTH DISTURBING ACTIVITIES HAVE PERMANENTLY CEASED ON ANY PORTION OF THE SITE, OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE AND SHALL NOT RESUME FOR A PERIOD EXCEEDING 14 CALENDAR DAYS. STABILIZATION OF DISTURBED AREAS SHALL BE INITIATED WITHIN 1 WORKING DAY OF PERMANENT OR TEMPORARY CESSATION OF EARTH DISTURBING ACTIVITIES AND SHALL BE COMPLETED AS SOON AS POSSIBLE BUT NOT LATER THAN 14 DAYS FROM THE INITIATION OF STABILIZATION WORK IN AN AREA. WHERE THE INITIATION OF STABILIZATION MEASURES IS PRECLUDED BY SNOW COVER, STABILIZATION MEASURES SHALL BE INITIATED AS SOON AS PRACTICABLE. THE ENGINEER MAY REQUIRE THAT CRITICAL LOCATIONS BE STABILIZED IMMEDIATELY, AND THE CONTRACTOR SHALL IMPLEMENT TEMPORARY STABILIZATION MEASURES TO THESE AREAS WITHIN 24 HOURS OF SUCH DIRECTIVE, PURSUANT TO ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATION ARTICLE 280.15(C), TO ESTABLISH TEMPORARY COVER.

12.

STABILIZATION OF CUT OR FILL SLOPES WITH TEMPORARY OR PERMANENT EROSION CONTROL MEASURES IS REQUIRED WHENEVER THE CUT OR FILL ACTIVITY REACHES 15 FEET VERTICALLY OR THE FINISHED SLOPE EQUALS 50 FEET, WHICHEVER IS MORE RESTRICTIVE. ONCE THE STABILIZATION MEASURES ARE INSTALLED, THE PLACEMENT OF FILL OR EXCAVATION ACTIVITIES ARE ALLOWED TO PROCEED.

13.

THE CONTRACTOR SHALL DESIGNATE ONE OF HIS EMPLOYEES AS EROSION AND SEDIMENT CONTROL MANAGER. THIS PERSON SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF THE EROSION AND SEDIMENT CONTROL PLAN ON ALL DISTURBED AREAS. THIS PERSON SHALL POSSESS THE NECESSARY TRAINING AND CERTIFICATION ON EROSION AND SEDIMENT CONTROL MEASURES FOR ACCEPTANCE BY THE ILLINOIS TOLLWAY. THIS EMPLOYEE IS TO HAVE THE AUTHORITY TO CARRY OUT THE IMPLEMENTATION OF ANY INSTRUCTIONS CONCERNING THE EROSION AND SEDIMENT CONTROL PLAN GIVEN BY THE ENGINEER. INSPECTIONS MAY BE REDUCED TO ONCE PER MONTH WHEN CONSTRUCTION ACTIVITIES HAVE CEASED DUE TO FROZEN CONDITIONS. WEEKLY INSPECTIONS SHALL RECOMMENCE WHEN CONSTRUCTION ACTIVITIES ARE RESUMED. SEE TOLLWAY SUPPLEMENTAL SPECIFICATIONS, SECTION 280.02(3).

14.

ALL MEASURES SHALL BE INSPECTED BY THIS INDIVIDUAL AND THE ENGINEER ON A REGULAR BASIS (AT LEAST ONCE EVERY 7 DAYS) AND AFTER ANY RAINFALL EVENT GREATER THAN 0.5 INCHES, OR EQUIVALENT SNOWMELT (I.E. + 5").

15.

SEDIMENT TRAPS, SEDIMENT BASINS, DITCHES, SILT FENCES, FENCES, STONE OUTLET STRUCTURES, EARTH BERMS, ETC. SHALL BE MAINTAINED DURING THE CONSTRUCTION SEASON AS WELL AS THE WINTER MONTHS AND OTHER TIMES WHEN THE PROJECT IS CLOSED DOWN. TRAPS SHALL BE CLEANED WHEN THEY ARE 50% FILLED. SILT FENCE AND STONE OUTLET STRUCTURES SHALL HAVE SEDIMENT REMOVED WHEN IT REACHES 50% THE HEIGHT OF THE CONTROL DEVICE. THESE SPOILS SHALL BE REMOVED TO AN APPROVED SITE.

16.

SALVAGED TOPSOIL SHALL BE PLACED ON WELL DRAINED LAND AWAY FROM INTERMITTENT AND LIVE STREAMS OR WETLANDS WITH THE APPROPRIATE RUNOFF CONTROL AND SEDIMENT CONTROL MEASURES INSTALLED AROUND THE STORAGE SITE. SALVAGED TOPSOIL SHALL BE STABILIZED WITH STRAW MULCH IMMEDIATELY AFTER SHAPING OF THE PILE IN ACCORDANCE WITH THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS. SILT FENCE SHALL BE PROVIDED AT THE PERIMETER OF THE STOCKPILE.

17.

MATERIALS EXCAVATED FOR THE CONSTRUCTION OR CLEAN OUT OF SEDIMENT CONTROLS SHALL NOT BE STOCKPILED IN THE VICINITY OF THE CONTROL MEASURE. IT SHALL BE PLACED IN AN EMBANKMENT OR WASTED AS DIRECTED BY THE ENGINEER.
18.

EXCAVATION TO BE USED FOR EMBANKMENTS SHALL NOT BE STOCKPILED UNLESS PERIMETER CONTROLS ARE UTILIZED. WHEN THIS MATERIAL IS STOCKPILED FOR THE CONVENIENCE OF THE CONTRACTOR THE COST OF PROVIDING THE CONTROLS ARE THE RESPONSIBILITY OF THE CONTRACTOR. IF THE MATERIAL IS STOCKPILED AT THE DIRECTION OF THE ENGINEER THE ILLINOIS TOLLWAY SHALL ASSUME THE COSTS OF THE CONTROLS. TEMPORARY SOIL STOCKPILE LOCATIONS SHALL BE APPROVED BY THE ENGINEER PRIOR TO TOPSOIL REMOVAL OR OTHER GRADING OPERATIONS BEING PERFORMED.

19.

SEDIMENT LADEN DEWATERING DISCHARGE SHALL BE DIRECTED TO AN APPROVED SEDIMENT TRAPPING MEASURE PRIOR TO RELEASE FROM THE SITE.

20.

ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE CONSIDERED TEMPORARY. THESE MEASURES SHALL BE REMOVED BY THE CONTRACTOR AS DESIGNATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER. DISTURBED AREAS SHALL BE RESTORED UPON REMOVAL.

21.

WHEN THE CONTRACTOR REQUESTS A CHANGE TO POSTPONE COMPLETION OF THE EXCAVATION OF A SPECIFIC AREA AS A CONTINUOUS OPERATION AND PLACING THE TOPSOIL AS DEFINED IN THE STANDARD SPECIFICATIONS, THE ENGINEER MAY ALLOW THE CONTRACTOR TO STABILIZE THE AREA USING TEMPORARY STABILIZATION WITH STRAW MULCH PROVIDED THE FOLLOWING CONDITIONS ARE MET:

A.

ALL AREAS BEING STABILIZED ARE 1:3 (V:H) SLOPES OR FLATTER.

B.

THE COST OF PREPARING THE SEED BED AND STABILIZING THE AREA WITH TEMPORARY STABILIZATION WITH STRAW MULCH IS THE RESPONSIBILITY OF THE CONTRACTOR.

C.

ALL REQUIRED SEDIMENT CONTROL MEASURES FOR THE SECTION OF ROAD IN QUESTION HAVE BEEN INSTALLED AND ARE BEING MAINTAINED.

22.

THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN ACCORDANCE WITH THE STANDARD DRAWINGS AND SPECIAL PROVISION (SP) 111, STORM WATER POLLUTION PREVENTION PLAN INCLUDING CONTROLS AND SPILL PREVENTION-MATERIAL MANAGEMENT PRACTICES. THE CONTRACTOR AND ALL SUBCONTRACTORS SHALL SIGN THE CONTRACTOR'S CERTIFICATION STATEMENT. LIST THE MATERIALS OR SUBSTANCES EXPECTED TO BE PRESENT ON-SITE IN THE INVENTORY FOR POLLUTION PREVENTION PLAN AND SHALL NAME TWO ADDITIONAL INDIVIDUALS TO ASSIST IN SPILL PREVENTION AND CLEAN UP AT THE PRECONSTRUCTION CONFERENCE. THE CONTRACTOR SHALL SUBMIT THE SUBMITTAL ITEMS SPECIFIED IN S.P. 111.2, STORM WATER POLLUTION PREVENTION PLAN, WHICH SHALL BE INCORPORATED INTO AND BECOME PART OF THE SWPPP.

23.

AT THE TIME OF THE PRECONSTRUCTION CONFERENCE, THE CONTRACTOR SHALL SUBMIT FOR APPROVAL THE PROPOSED CONCRETE TRUCK WASHOUT LOCATIONS AS REQUIRED IN SPECIAL PROVISION 111. RUNOFF FROM WASH AREAS SHALL BE CONTAINED IN DESIGNATED AREAS SO THAT RUNOFF DOES NOT REACH THE STORM SEWER OR DITCH SYSTEMS. WASHOUT WATER SHALL BE TAKEN TO AN APPROVED DISCHARGE LOCATION.

24.

IF AN ALTERNATIVE SIZE DITCH CHECK IS PROPOSED BY THE CONTRACTOR FOR USE ON THE PROJECT, A CONTRACT DITCH CHECK SPACING SHALL BE RECALCULATED BY THE CONTRACTOR IN ACCORDANCE WITH THE ILLINOIS TOLLWAY EROSION AND SEDIMENT CONTROL, LANDSCAPE DESIGN CRITERIA MANUAL. ANY RESULTING QUANTITY CHANGES SHALL BE APPROVED BY THE ENGINEER PRIOR TO START OF WORK.

25.

ALL ABOVE GRADE, UN-SHIELDED SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE LOCATED OUTSIDE THE CLEAR ZONE. THE CONTRACTOR SHALL REVIEW THE LOCATIONS OF ALL MEASURES AND PERFORM A BARRIER WARRANT ANALYSIS, IF NECESSARY, TO ENSURE ROADSIDE OBSTACLES ARE NOT CREATED.

26.

ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).

27.

THE CONTRACTOR SHALL REFER TO SECTION 280.02 OF THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS FOR PENALTIES FOR NON-CONFORMANCE.
- | R E V I S I O N S |  |
|-------------------|--|
| DATE              | DESCRIPTION  |
| 03-01-2024        | UPDATED CADD FORMAT, REPLACED REGIONAL WITH NATIONWIDE IN NOTE 34. |
|                   | REPLACED ROOT BALL WITH ROOT FLARE IN SHEET 13.                    |
|                   |  |
|                   |  |
|                   |  |
- 
- EROSION CONTROL AND LANDSCAPE
- |          |           |         |
|----------|-----------|---------|
| VERSION: | STANDARD: | SHEET:  |
| 2024-03  | K1-13     | 1 OF 13 |
- APPROVED BY:

DATE:

03/01/2024

CHIEF ENGINEERING OFFICER

GENERAL NOTES - EROSION CONTROL & LANDSCAPE

28. THE EROSION AND SEDIMENT CONTROLS SHOWN IN THE PLANS REPRESENT THE MINIMUM REQUIREMENTS. ADDITIONAL MEASURES MAY BE REQUIRED BY THE ENGINEER OR REPRESENTATIVES OF REGULATORY OR PERMITTING AGENCIES. ANY EMERGENCY CONTROL MEASURES REQUESTED BY A REGULATORY OR PERMITTING AGENCY MUST BE INSTALLED IMMEDIATELY.
29. SOIL DISTURBANCE SHALL BE CONDUCTED IN SUCH A MANNER AS TO MINIMIZE EROSION. SOIL STABILIZATION MEASURES SHALL CONSIDER THE TIME OF YEAR, SITE CONDITIONS, AND THE USE OF TEMPORARY AND/OR PERMANENT MEASURES. TO THE MAXIMUM EXTENT POSSIBLE, EROSION SHALL BE MINIMIZED AT ITS SOURCE.
30. TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES SHALL BE CONSTRUCTED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. ANY DEVIATION FROM THE TEMPORARY EROSION AND SEDIMENT CONTROL PLAN OR SCHEDULE SHALL BE AT THE DISCRETION OF THE ENGINEER.
31. UNLESS OTHERWISE INDICATED, ALL STABILIZATION AND STRUCTURAL PRACTICES AND OTHER CONTROL MEASURES SPECIFIED IN THE SWPPP SHALL BE CONSTRUCTED ACCORDING TO THE MINIMUM STANDARDS OF THE ILLINOIS TOLLWAY SUPPLEMENTAL SPECIFICATIONS AND THE ILLINOIS URBAN MANUAL (LATEST EDITION).
32. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INFORM ANY SUBCONTRACTORS WHO PERFORM WORK ON THE PROJECT OF THE REQUIREMENTS OF THE SWPPP AND ILR10 PERMIT ISSUED BY THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IF APPLICABLE).
33. THE CONDITION OF THE CONSTRUCTION SITE FOR WINTER SHUTDOWN SHALL BE ADDRESSED EARLY IN THE FALL GROWING SEASON SO THAT DISTURBED AREAS MAY BE STABILIZED WITH TEMPORARY AND/OR PERMANENT VEGETATIVE COVER FOR EROSION CONTROL. AREAS TO BE WORKED AND DISTURBED BEYOND THE END OF THE GROWING SEASON MUST INCORPORATE TEMPORARY STABILIZATION MEASURES THAT DO NOT RELY ON VEGETATIVE COVER SUCH AS EROSION CONTROL BLANKET.
34. IF THE PROJECT REQUIRES PERMIT(S) FROM THE UNITED STATES ARMY CORPS OF ENGINEERS (USACE 404 PERMIT) AND THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA 401 WATER QUALITY CERTIFICATION THROUGH THE USACE NATIONWIDE PERMIT). IF APPLICABLE, THE PERMIT APPLICATION WILL BE SUBMITTED TO THE USACE AND IEPA BY THE ILLINOIS TOLLWAY. THE CONTRACTOR SHALL NOT DISTURB OR OTHERWISE IMPACT JURISDICTIONAL WETLANDS OR WATERWAYS UNTIL THESE PERMITS ARE RECEIVED AND PROVIDED TO THE CONTRACTOR. NO REMOVALS, TEMPORARY OR PERMANENT CONSTRUCTION ACTIVITIES, OR OTHER WORK THAT WOULD IMPACT THESE RESOURCES, IS ALLOWED UNTIL THESE PERMITS ARE OBTAINED. ON PROJECTS WHICH INCLUDE IN-STREAM WORK, NO WORK IS ALLOWED BEYOND THE PERMITTED AREA.
35. PERMANENT LANDSCAPE ITEMS SHALL BE IMPLEMENTED IN CONJUNCTION WITH CONSTRUCTION STAGING. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR PROLONG FINAL GRADING SO THAT THE ENTIRE PROJECT CAN BE PERMANENTLY STABILIZED AT ONE TIME.
36. FOR THE DURATION OF THE PROJECT, THE CONTRACTOR SHALL PROTECT ALL ON-SITE, ADJACENT AND/OR DOWNSTREAM SEWERS, DITCHES, AND WATERCOURSES FROM CONTAMINATION BY WATERBORNE SILTS, SEDIMENTS, FUELS, SOLVENTS, DETERGENTS, LUBRICANTS, OR OTHER TOXIC OR HAZARDOUS POLLUTANTS ORIGINATING FROM ANY WORK DONE ON OR IN SUPPORT OF THE PROJECT.
37. TEMPORARY STABILIZED CONSTRUCTION ENTRANCES, GRAVELED ROADS, ACCESS DRIVES, AND PARKING AREAS OF SUFFICIENT WIDTH AND LENGTH SHALL BE PROVIDED TO PREVENT SOIL FROM BEING TRACKED ONTO PUBLIC OR PRIVATE ROADWAYS. THE LOCATIONS OF ALL STABILIZED ENTRANCES ARE SUBJECT TO APPROVAL BY THE ENGINEER. SUGGESTED OR POTENTIAL LOCATIONS MAY BE SHOWN ON THE PLANS.

APPROVED BY:



DATE:

03/01/2024




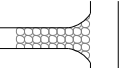









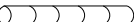






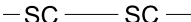



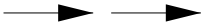



CHIEF ENGINEERING OFFICER

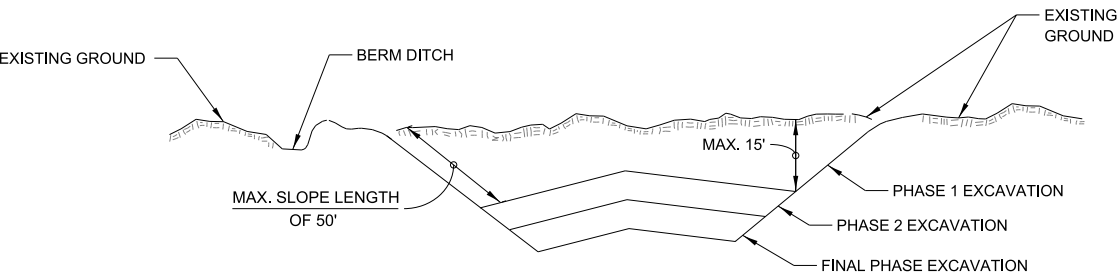


EROSION CONTROL AND LANDSCAPE



STANDARD SYMBOLS

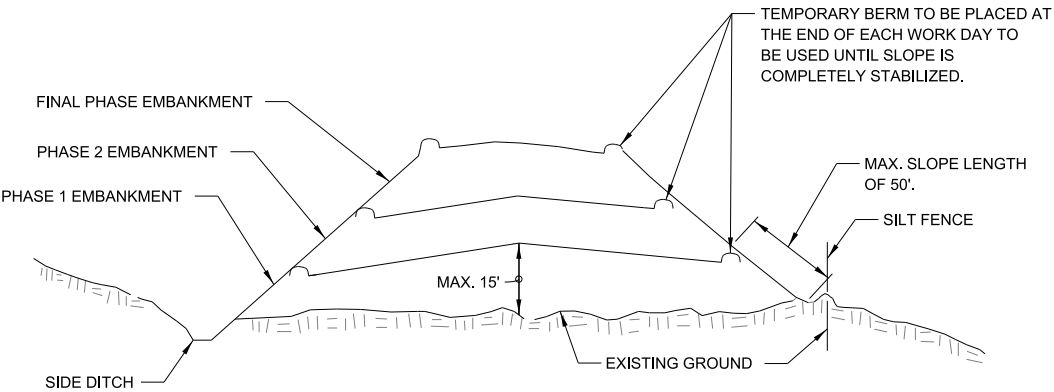
	CLEARING & GRADING LIMITS (LIMITS OF CONSTRUCTION)		SILT FENCE
	CULVERT INLET PROTECTION-FENCE		STABILIZED CONSTRUCTION ENTRANCE
	CULVERT INLET PROTECTION-STONE		STONE OUTLET STRUCTURE SEDIMENT TRAP
			STREAM DIVERSION
	DEWATERING BASINS		SUPER SILT FENCE
	DIVERSION DIKE		TEMPORARY DITCH CHECK
	DRAINAGE DIVIDE		TEMPORARY PIPE SLOPE DRAIN
	EXISTING DRAINAGE PATH		TEMPORARY RIPRAP
	FILTER FABRIC INLET PROTECTION, COVER TYPE		TEMPORARY ROCK CHECK DAM
	FILTER FABRIC INLET PROTECTION, BASKET TYPE		TEMPORARY STREAM CROSSING
	SILT CURTAIN		TEMPORARY SWALE
	INITIAL CONSTRUCTION ITEM		TREE PROTECTION
	PROPOSED DRAINAGE PATH		
	RECTANGULAR INLET PROTECTION		
	SEDIMENT BASIN AGGREGATE BERM		
	SEDIMENT BASIN		



**NOTES:**

- ALL CUT SLOPES SHALL BE EXCAVATED AND STABILIZED (PLACE TOPSOIL, PREPARE SEEDBED, APPLY SEED, PROTECT SLOPE WITH MULCH OR EROSION BLANKET) AS THE WORK PROGRESSES.
- CONSTRUCTION SEQUENCE:
  - EXCAVATE AND STABILIZE BERM, SIDE AND OUTLET DITCHES, PROVIDE SEDIMENT TRAPS FOR DITCHES.
  - PERFORM PHASE 1 EXCAVATION AND STABILIZE SLOPES WITH PERMANENT SEEDING.
  - PERFORM PHASE 2 EXCAVATION AND STABILIZE SLOPES WITH PERMANENT SEEDING. OVER SEED PHASE 1 SLOPES, IF REQUIRED.
  - PERFORM FINAL PHASE EXCAVATION, DRESS, SEED AND MULCH SLOPES WITH PERMANENT SEEDING. STABILIZE SURFACE DRAIN DITCHES. OVER SEED PHASE 1 & 2 SLOPES, IF REQUIRED, AS DETERMINED BY THE ENGINEER.
- IF PERMANENT SEEDING CANNOT BE PLACED DUE TO CONTRACT REQUIREMENTS REGARDING PLANTING SEASONS, THE CUT SLOPE IS TO HAVE TOPSOIL PLACED AND SEEDING PREPARED PRIOR TO USING TEMPORARY STABILIZATION WITH STRAW MULCH OR TEMPORARY SEEDING WITH EROSION BLANKET.
- THE CONTRACTOR HAS THE OPTION OF DELAYING TOPSOIL SEEDING BEYOND THE 15 FOOT LIMITATION. IF THIS OPTION IS CHOSEN, THE CUT SLOPE MUST BE "TEMPORARY STABILIZED" AT NO COST TO THE ILLINOIS TOLLWAY.
- ONCE THE EXCAVATION WITHIN A SPECIFIC AREA HAS BEGUN, THE OPERATION SHALL BE CONTINUOUS FROM STRIPPING THROUGH THE COMPLETION OF THE GRADING AND PLACEMENT OF SLOPE STABILIZATION MEASURES. ANY INTERRUPTIONS IN THE OPERATION OF 14 DAYS OR MORE MUST BE APPROVED BY THE ENGINEER. ANY VIOLATION OF THIS REQUIREMENT WILL RESULT IN THE CONTRACTOR ASSUMING THE RESPONSIBILITY OF PLACING TEMPORARY STABILIZATION AT HIS OWN COST AND EXPENSE.

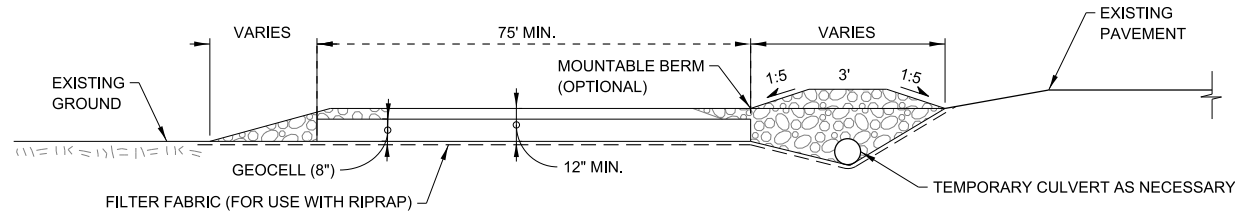
**EXCAVATION PHASING PLAN - CUT SECTION**



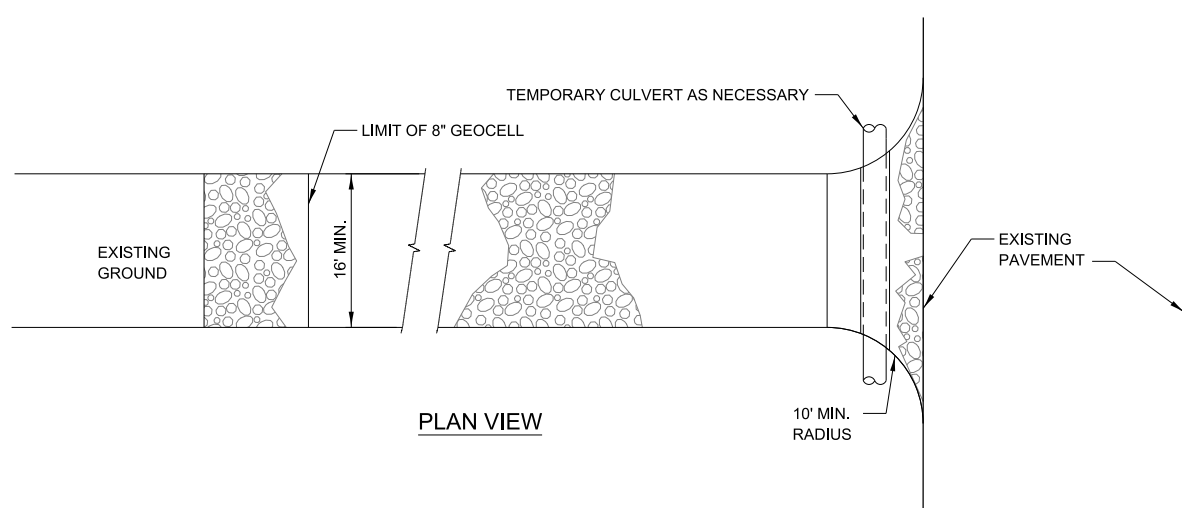
**NOTES:**

- THE EMBANKMENT WILL BE MADE IN STAGES NOT TO EXCEED 15' IN HEIGHT OR 50' IN SLOPE LENGTH. THE EMBANKMENT SLOPES WILL BE STABILIZED USING TEMPORARY MEASURES BEFORE BEGINNING NEXT STAGE.
- AT THE END OF EACH WORK DAY TEMPORARY BERMS (EARTH) AND TEMPORARY PIPE SLOPE DRAINS WILL BE CONSTRUCTED ALONG THE TOP EDGE(S) OF THE EMBANKMENT TO INTERCEPT SURFACE RUNOFF.
- CONSTRUCTION SEQUENCE:
  - EXCAVATE AND STABILIZE SIDE DITCH AND/OR INSTALL PROPOSED PERIMETER CONTROLS AT THE TOE OF SLOPE.
  - PLACE PHASE 1 EMBANKMENT AND STABILIZE WITH TEMPORARY SEEDING AND MULCH.
  - PLACE PHASE 2 EMBANKMENT AND STABILIZE WITH TEMPORARY SEEDING AND MULCH.
  - PLACE FINAL PHASE EMBANKMENT AND STABILIZE WITH PERMANENT VEGETATIVE PLAN ON THE ENTIRE SLOPE.
- ONCE THE PLACEMENT OF FILL WITHIN A SPECIFIC AREA HAS BEGUN, THE OPERATION SHALL BE CONTINUOUS FROM STRIPPING THROUGH THE COMPLETION OF THE GRADING AND PLACEMENT OF PERMANENT VEGETATIVE PLAN. ANY INTERRUPTIONS IN THE OPERATION OF 14 DAYS OR MORE MUST BE APPROVED BY THE ENGINEER. ANY VIOLATION OF THIS REQUIREMENT WILL RESULT IN THE CONTRACTOR ASSUMING THE RESPONSIBILITY OF PLACING TEMPORARY STABILIZATION AT HIS OWN COST AND EXPENSE.

**EMBANKMENT PHASING PLAN - FILL SECTION**



PROFILE



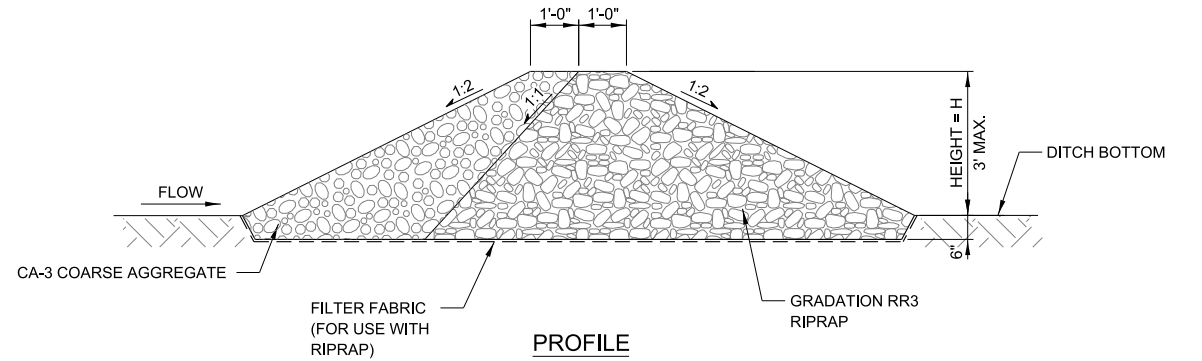
PLAN VIEW

NOTES:

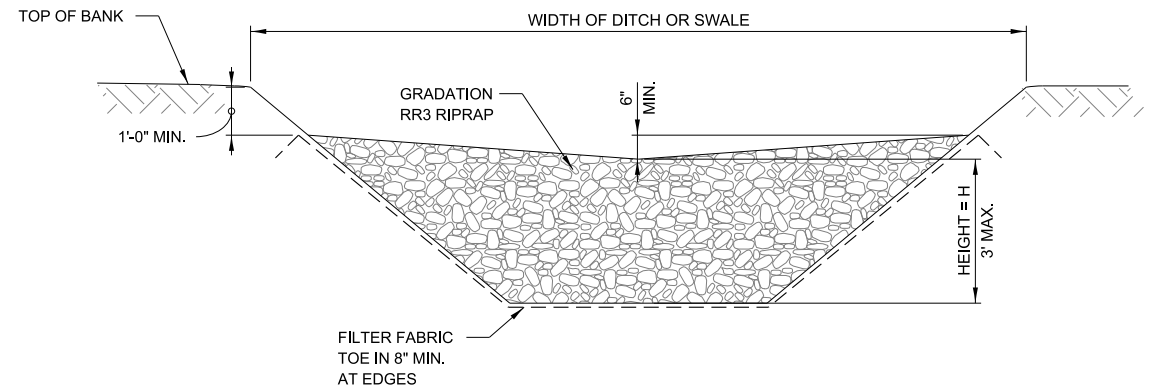
- STONE
  - STONE SIZE - CA-3
  - LENGTH - AS REQUIRED, BUT NOT LESS THAN 75'.
  - THICKNESS - NOT LESS THAN 4" ABOVE TOP OF GEOCELL.
- WIDTH - 16' MINIMUM FOR ONE WAY TRAFFIC; 24' MINIMUM FOR TWO-WAY TRAFFIC; BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
- GEOCELL NOT LESS THAN 8" IN DEPTH WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
- SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 1:5 SLOPES WILL BE PERMITTED.
- MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY SHALL BE REMOVED IMMEDIATELY.
- PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER HEAVY USE AND EACH RAINFALL EVENT.
- TO BE USED TO REDUCE OR ELIMINATE TRACKING OF SEDIMENT ONTO PUBLIC STREETS. PLACE AT ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS. DISTURBED AREAS TO BE RESTORED UPON REMOVAL.

STABILIZED CONSTRUCTION ENTRANCE

STANDARD SYMBOL



PROFILE



CROSS SECTION  
CENTERLINE LOOKING DOWNSTREAM

NOTES:

- FOR LOCATIONS AND HEIGHTS OF ROCK CHECK DAMS REFER TO CONSTRUCTION DRAWINGS.
- TEMPORARY ROCK CHECK DAMS SHALL BE REPLACED WHEN THEY CEASE TO FUNCTION AS INTENDED DUE TO WASHOUT OR CONSTRUCTION TRAFFIC DAMAGE.
- SEDIMENT SHALL BE REMOVED WHEN IT REACHES 50% OF DAM HEIGHT. THIS PRACTICE IS NOT A SUBSTITUTE FOR MAJOR PERIMETER TRAPPING SUCH AS A TEMPORARY SEDIMENT TRAP OR BASIN.
- SPACING BETWEEN DAMS SHALL BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS TOP OF RIPRAP AT THE CENTER OF THE DOWNSTREAM DAM.
- WHEN A TEMPORARY ROCK CHECK DAM IS IN THE CLEAR ZONE, IT MUST BE MADE TRAVERSABLE TO AN ERRANT VEHICLE. THE MAXIMUM UNSHIELDED TRANSVERSE SLOPE ALLOWED TO FACE TRAFFIC SHALL BE 1:10 (V:H) AND THE MAXIMUM TRANSVERSE FACING AWAY FROM TRAFFIC SHALL BE 1:4 (V:H). AN UNSHIELDED TEMPORARY ROCK CHECK DAM SHALL HAVE AN ADDITIONAL LAYER OF CA-3 COARSE AGGREGATE (6" MIN.) PLACED ON THE DOWNSTREAM SIDE OF THE ROCK CHECK DAM. THE FILTER FABRIC SHALL BE PLACED ALONG THE ENTIRE BASE OF THE TEMPORARY ROCK CHECK DAM.

TEMPORARY ROCK CHECK DAM

STANDARD SYMBOL



EROSION CONTROL AND  
LANDSCAPE

VERSION: 2024-03 STANDARD: K1-13 SHEET: 5 OF 13

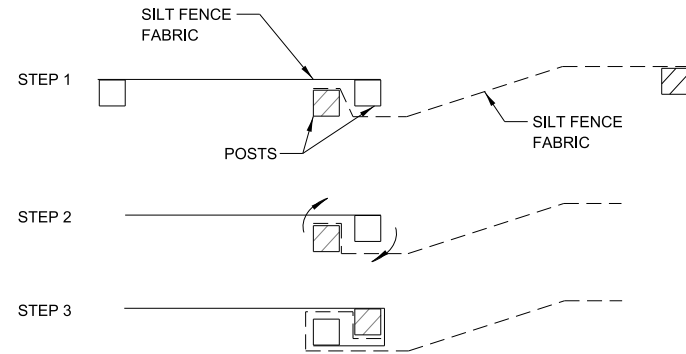
APPROVED BY:

Manar Nashif

CHIEF ENGINEERING OFFICER

DATE:

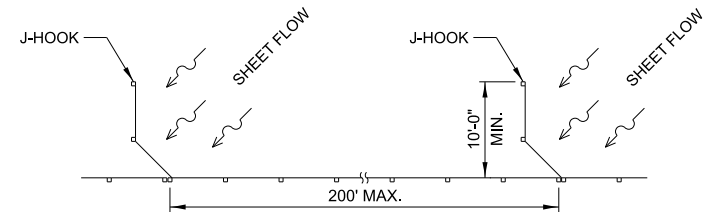
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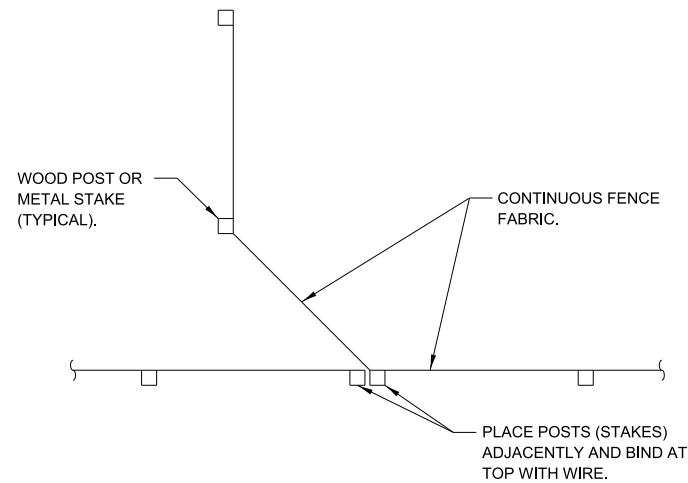
**NOTES:**

1. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE.
2. ROTATE BOTH POSTS AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL.
3. DRIVE BOTH POSTS A MINIMUM OF 24" INTO THE GROUND.

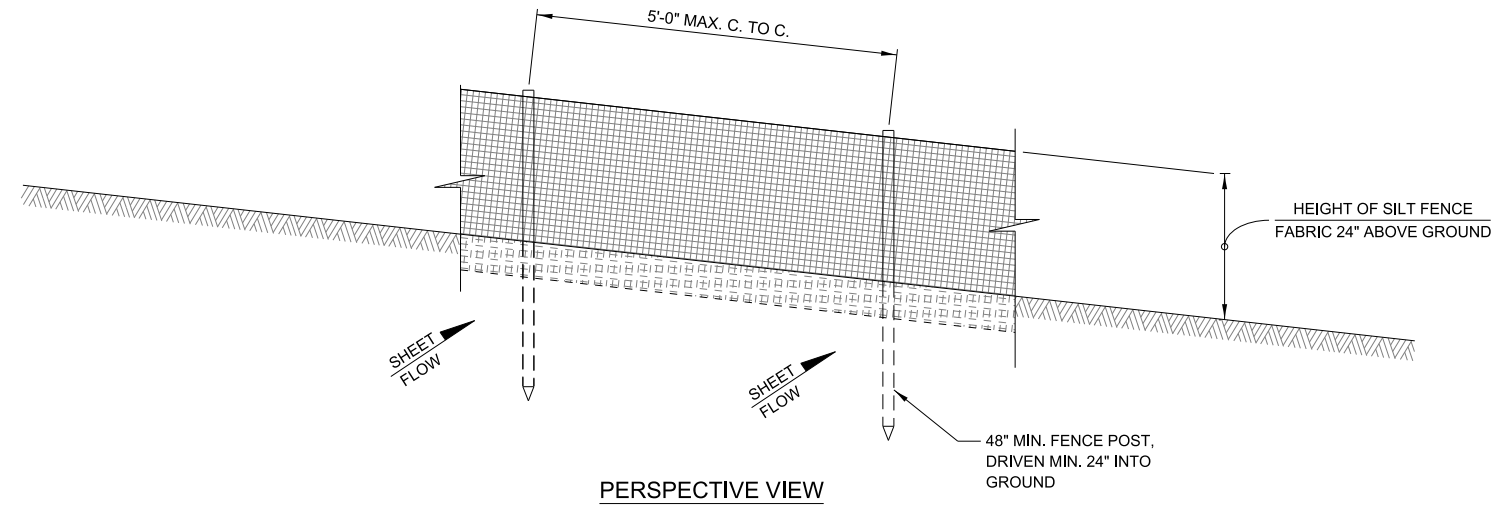
**ATTACHING TWO SILT FENCES**



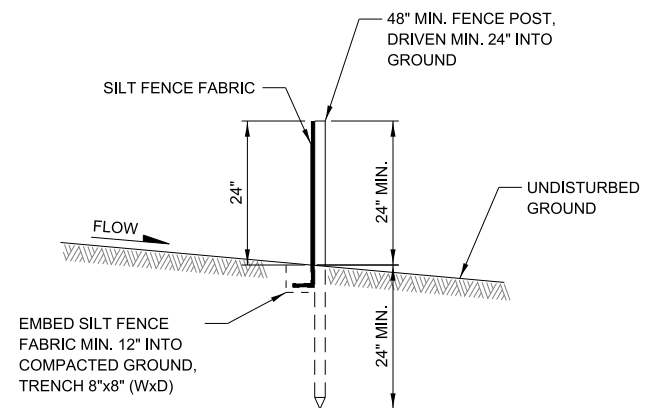
**SILT FILTER J-HOOK PLACEMENT**



**J-HOOK**



**PERSPECTIVE VIEW**



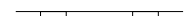
**SECTION**

**NOTES:**

1. SILT FENCE FABRIC TO BE FASTENED SECURELY TO FENCE POSTS.
2. WHEN TWO SECTIONS OF SILT FENCE FABRIC ADJOIN EACH OTHER THEY SHALL BE SECURELY FASTENED PER THE DETAIL ATTACHING TWO SILT FENCES.
3. MAINTENANCE SHALL BE PERFORMED AS NEEDED. SILT BUILD UP AGAINST FENCE SHALL BE REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE, OR WHEN SILT REACHES 50% OF FENCE HEIGHT.
4. SUPPORT POSTS SHALL BE 2" X 2" NOMINAL HARDWOOD, 2" SCHEDULE 40 STEEL PIPE OR STEEL SUPPORT POSTS OF A STANDARD T OR U SECTION WEIGHING NOT LESS THAN 1.33 POUNDS PER LINEAL FOOT.
5. THIS DEVICE IS TO CONTROL SHEET FLOW ONLY. DO NOT USE FOR CONCENTRATED FLOWS, DRAINAGE CHANNELS, ABOVE OR BELOW DRAINAGE PIPES.

**SILT FENCE (SF)**

STANDARD SYMBOL



**EROSION CONTROL AND LANDSCAPE**

APPROVED BY:

*Manar Nashif*

CHIEF ENGINEERING OFFICER

DATE:

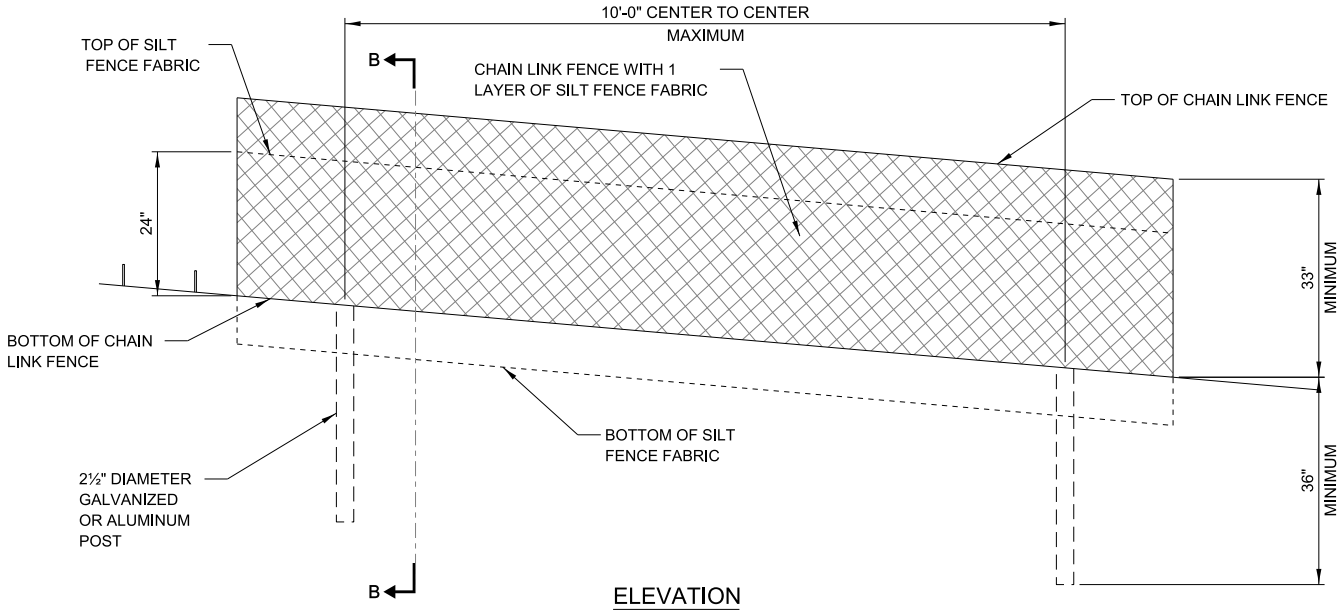
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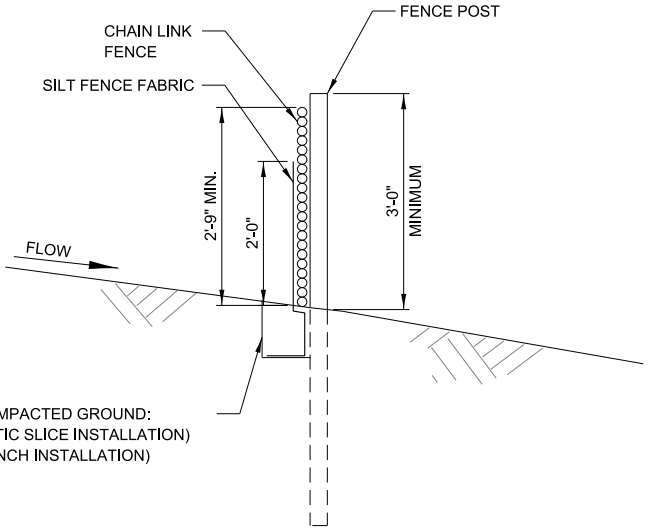
- FENCING SHALL BE 36" IN HEIGHT AND CONSTRUCTED IN ACCORDANCE WITH ILLINOIS TOLLWAY STANDARD DRAWING D1, RIGHT-OF-WAY FENCE, TYPE 1. THE SPECIFICATION FOR A 6' FENCE SHALL BE USED, SUBSTITUTING 36" FABRIC AND 6' LENGTH POSTS.
- CHAIN LINK FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES. THE LOWER TENSION WIRE, BRACE AND TRUSS RODS, DRIVER ANCHORS AND POST CAPS ARE NOT REQUIRED. PULL POSTS, CORNER POSTS, HORIZONTAL BRACING AND TIE RODS ARE NOT REQUIRED.
- SILT FENCE FABRIC SHALL BE FASTENED SECURELY TO THE CHAIN LINK FENCE WITH TIES SPACED EVERY 24" AT THE TOP AND MID SECTION.
- WHEN TWO SECTIONS OF SILT FENCE FABRIC ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED 2' HORIZONTALLY.
- MAINTENANCE SHALL BE PERFORMED AS NEEDED. SILT BUILD-UP AGAINST FENCE SHALL BE REMOVED WHEN SILT REACHES 50% OF FENCE HEIGHT.
- SUPER SILT FENCE IS TO BE USED TO PROTECT ENVIRONMENTALLY SENSITIVE AREAS AND CONTROL SEDIMENT RUNOFF FROM CONSTRUCTION SITES WHEN ADDITIONAL REINFORCEMENT IS REQUIRED DUE TO SLOPE OF SITE OR VOLUME OF STORM WATER RUNOFF.

**SUPER SILT FENCE (SSF)**  
STANDARD SYMBOL

SSF



**ELEVATION**

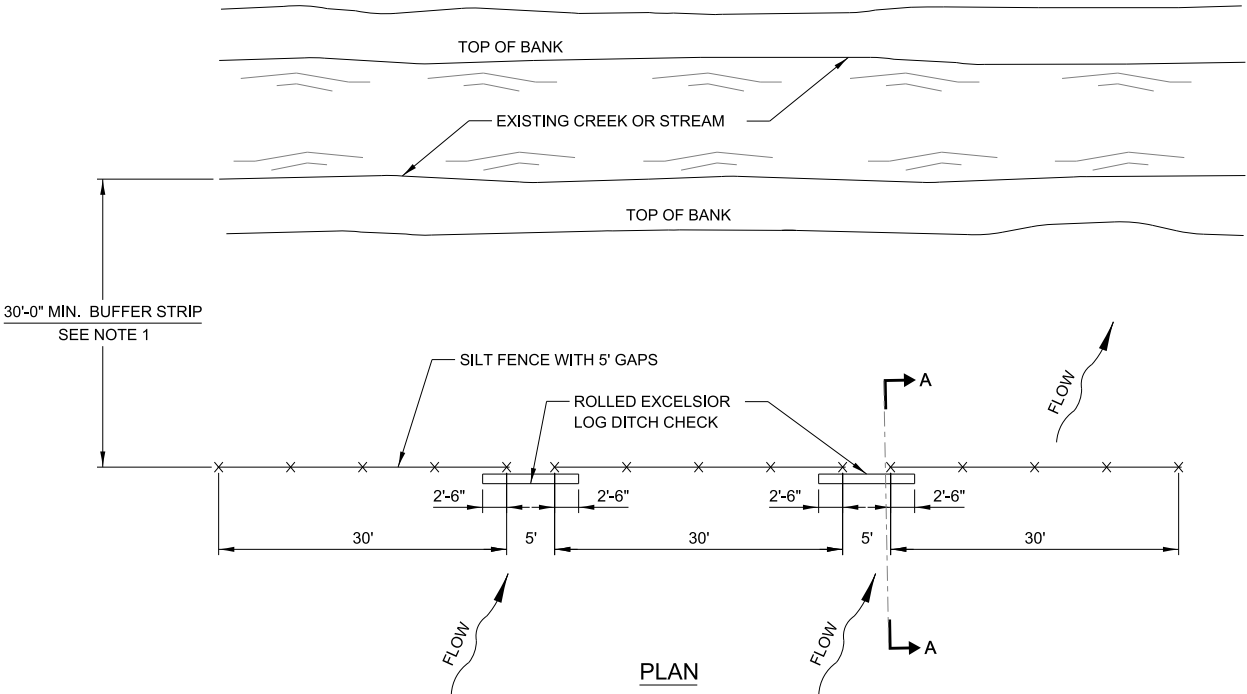


**SECTION B-B**

EMBED VERTICALLY INTO COMPACTED GROUND:  
SILT FENCE FABRIC: 10" (STATIC SLICE INSTALLATION)  
SILT FENCE FABRIC: 12" (TRENCH INSTALLATION)  
TRENCH: 8"x8" (WxD)

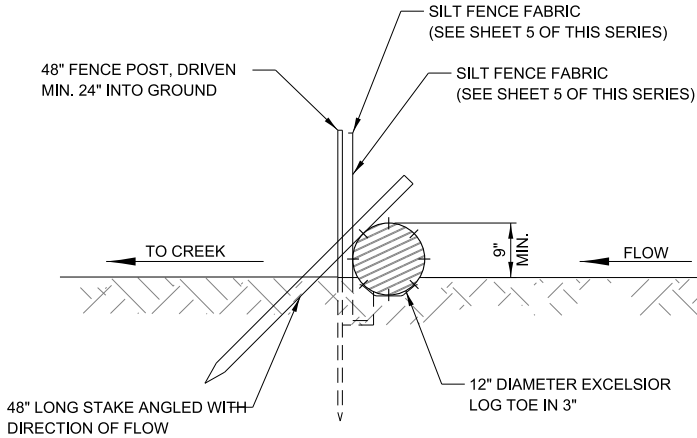
NOTES:

- A MINIMUM 50' WIDE VEGETATED BUFFER STRIP SHALL BE PRESERVED AND/OR RE-ESTABLISHED WHERE POSSIBLE ALONG EXISTING CHANNELS.
  - FOR ANY WATERS OF THE U.S. DETERMINED TO BE A HIGH-QUALITY AQUATIC RESOURCE, THE BUFFER MUST BE A MINIMUM OF 100'.
  - FOR ANY WATERS OF THE U.S. THAT DO NOT QUALIFY AS WETLAND (FOR EXAMPLE LAKES, RIVERS, PONDS, ETC.), THE BUFFER MUST BE A MINIMUM OF 50' FROM THE ORDINARY HIGH WATER MARK (OHWM).
  - FOR ANY JURISDICTIONAL WETLAND, THE BUFFER MUST BE A MINIMUM OF 50'.
- THE 5' GAPS IN THE SILT FENCE AND THE 12" DIAMETER TEMPORARY DITCH CHECKS ARE TO ALLOW FLOODWATER FLOW INTO THE CREEK FROM THE SITE WITHOUT DAMAGE TO THE SILT FENCE.
- MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SILT SHALL BE REMOVED WHEN IT REACHES 50% OF ROLL HEIGHT. WHEN THE ROLLED EXCELSIOR LOG IS REDUCED TO 50% OF ROLL HEIGHT IT SHALL BE REPLACED.



**PLAN**

**CREEK BUFFER STRIP AND SILT FENCE**



**SECTION A-A**



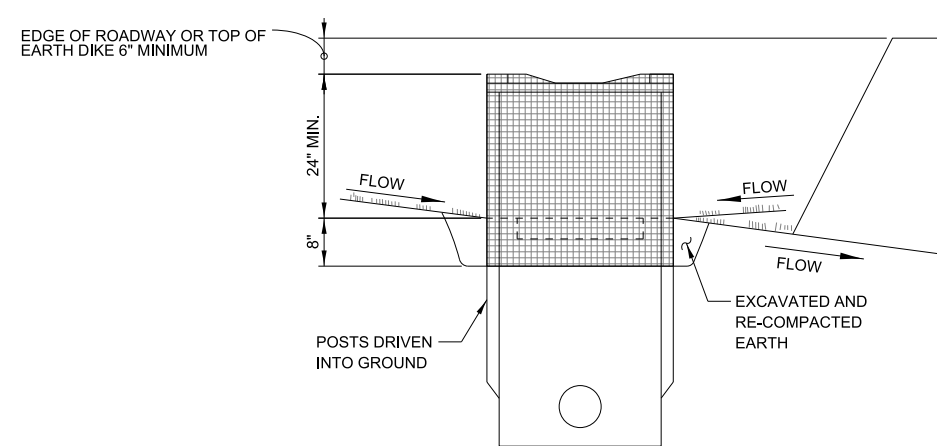
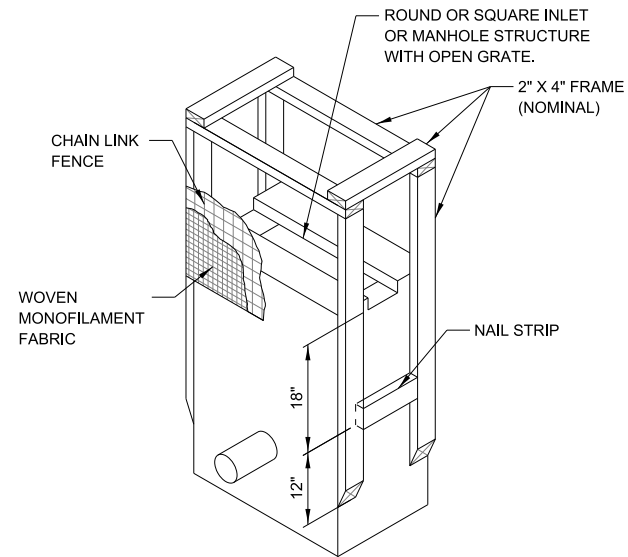
**EROSION CONTROL AND LANDSCAPE**

VERSION: 2024-03 STANDARD: K1-13 SHEET: 7 OF 13

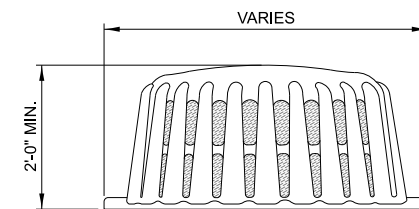
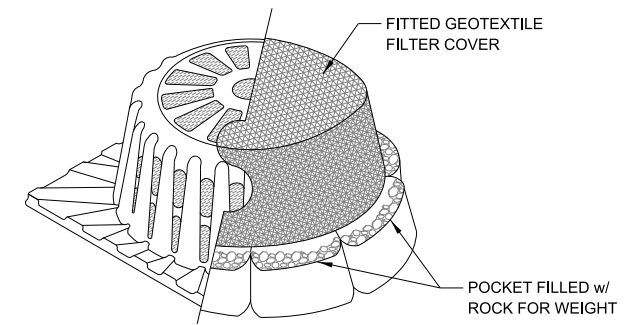
APPROVED BY: *Manar Nashif* DATE: 03/01/2024  
CHIEF ENGINEERING OFFICER







WOOD FRAME



POLYETHYLENE FRAME

NOTES:

1. WOODEN FRAME IS TO BE CONSTRUCTED OF 2"x4" CONSTRUCTION GRADE LUMBER. AT THE CONTRACTOR'S OPTION, THE WOOD FRAME CAN BE SUBSTITUTED USING 2 1/2" GALVANIZED OR ALUMINUM POSTS INSTALLED AS SPECIFIED FOR SUPER SILT FENCE.
2. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SILT REMOVED WHEN IT REACHES 50% OF FENCE HEIGHT.
3. TO BE USED TO PROTECT EXISTING AND NEW INLETS, CATCH BASINS AND MANHOLES WITH OPEN LIDS IN NON-PAVED AREAS.

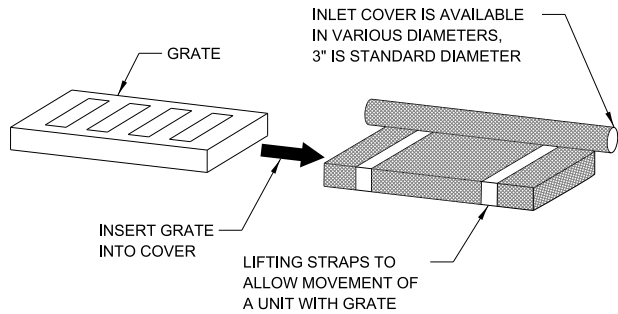
RECTANGULAR INLET PROTECTION  
STANDARD SYMBOL



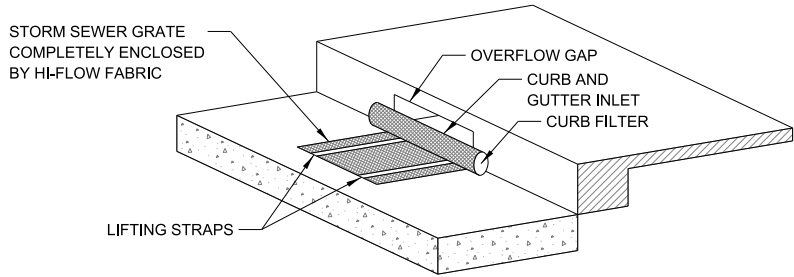
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DATE: 03/01/2024



**EROSION CONTROL AND  
LANDSCAPE**



GRATE AND COVER DETAIL

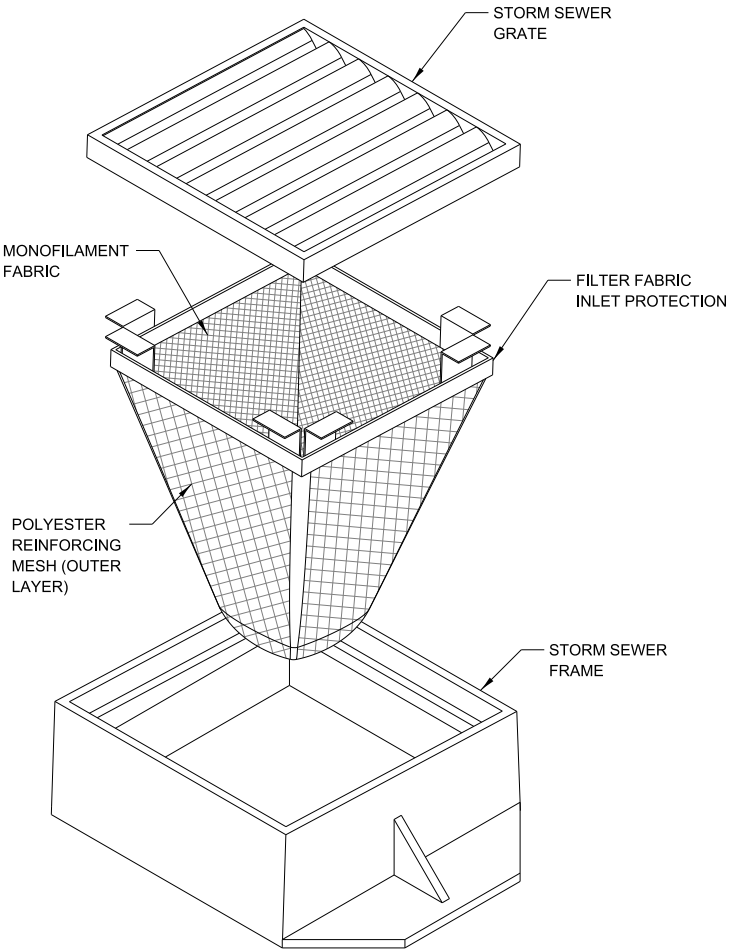


NOTES:

- COVER TYPE INLET PROTECTION SHALL CONSIST OF FABRIC SLEEVE AND, IF NECESSARY, CURB FILTER.
- DEVICE SHALL BE EQUIPPED WITH AN OVERFLOW GAP SO DRAINAGE TO INLET IS NOT COMPLETELY BLOCKED IF DEVICE IS FULL OF SILT.
- MAINTENANCE SHALL BE PERFORMED AS NEEDED. REMOVE SILT FROM FABRIC INSERT WHEN SEDIMENT ACCUMULATES, THE FILTER BECOMES CLOGGED, AND/OR PERFORMANCE IS COMPROMISED. WHEN THERE IS EVIDENCE OF SEDIMENT ACCUMULATION ADJACENT THE INLET PROTECTION MEASURE, THE DEPOSITED SEDIMENT SHALL BE REMOVED BY THE END OF THE SAME BUSINESS DAY IN WHICH IT IS FOUND OR BY THE END OF THE FOLLOWING BUSINESS DAY IF REMOVAL THE SAME BUSINESS DAY IS NOT FEASIBLE.
- STORM SEWER GRATE SHALL BE COMPLETELY ENCLOSED BY FABRIC.
- GRATE AND FILTER ARE TO BE SET SECURELY BACK IN FRAME.

FILTER FABRIC INLET PROTECTION - COVER TYPE

STANDARD SYMBOL

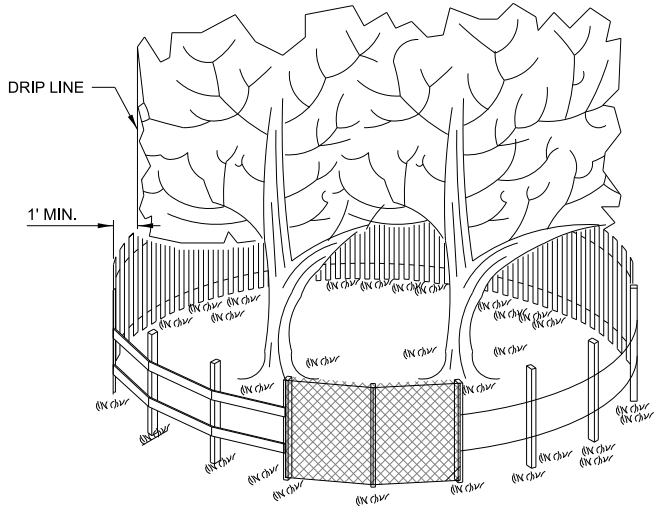


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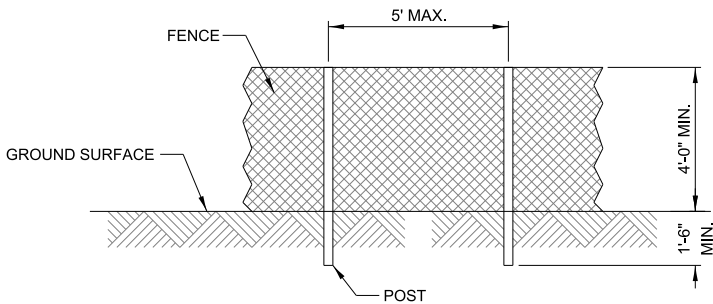
- MONOFILAMENT FABRIC INLET PROTECTION SHALL CONSIST OF INLET BASKET, FRAME AND FABRIC INSERT.
- DEVICE SHALL BE EQUIPPED WITH AN OVERFLOW FEATURE SO DRAINAGE TO INLET IS NOT COMPLETELY BLOCKED IF DEVICE IS FULL OF SILT.
- INLET BASKET IS AVAILABLE TO FIT ROUND, RECTANGULAR, BEEHIVE OR CURB INLET CASTINGS.
- MAINTENANCE SHALL BE PERFORMED AS NEEDED. REMOVE SILT FROM FABRIC INSERT WHEN 50% OF CAPACITY IS REACHED. REMOVE SILT FROM INTERIOR AND EXTERIOR OF INLET COVER WHEN 50% OF COVER HEIGHT IS REACHED. WHEN THERE IS EVIDENCE OF SEDIMENT ACCUMULATION ADJACENT THE INLET PROTECTION MEASURE, THE DEPOSITED SEDIMENT SHALL BE REMOVED BY THE END OF THE SAME BUSINESS DAY IN WHICH IT IS FOUND OR BY THE END OF THE FOLLOWING BUSINESS DAY IF REMOVAL THE SAME BUSINESS DAY IS NOT FEASIBLE.

FILTER FABRIC INLET PROTECTION - BASKET TYPE

STANDARD SYMBOL



SIDE VIEW



POST AND FENCE DETAIL

NOTES:

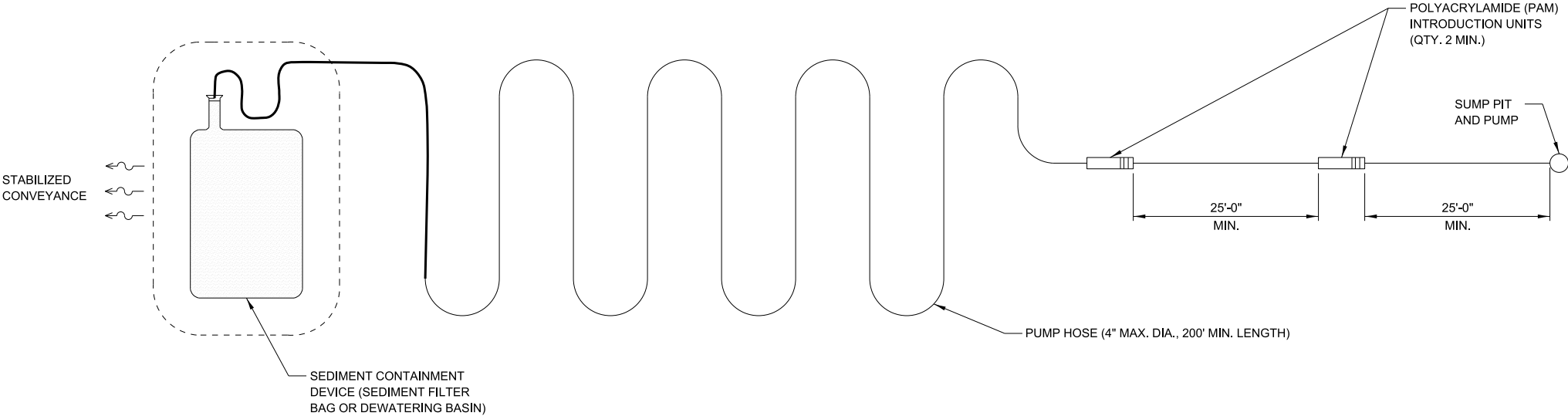
- THE FENCE SHALL BE LOCATED 1 FOOT MINIMUM OUTSIDE THE DRIP LINE OF THE TREE TO BE SAVED AND IN NO CASE CLOSER THAN 5 FEET TO THE TRUNK OF ANY TREE.
- THE FENCE SHALL BE HIGH VISIBILITY PLASTIC OR WOOD LATH SNOW FENCE TO CLEARLY DELINEATE THE PROTECTION AREA.
- USED TO PROTECT TREES FROM DISTURBANCE AND FROM EQUIPMENT TRAVELING OVER THE ROOT ZONE.

TREE PROTECTION

STANDARD SYMBOL







NOTES:

1.

FLOW-THROUGH TREATMENT SYSTEM TO INTRODUCE SITE-SPECIFIC FLOC LOGS (POLYMERS) TO TURBID WATERS IN SUCH A MANNER TO FACILITATE MIXING AND REACTION BETWEEN THE POLYMER AND THE SUSPENDED PARTICLES.
2.

FLOC LOGS (SITE-SPECIFIC) SHALL BE SECURED INSIDE POLYMER INTRODUCTION UNITS WHERE THE TURBID WATER ENTERS THE PIPING SYSTEM AND MIXES WITH THE POLYMER.
3.

A MINIMUM OF TWO POLYMER INTRODUCTION UNITS SHALL BE INSTALLED IN SERIES, A MINIMUM OF 25 FEET FROM THE PUMP INTAKE AND SPACED A MINIMUM OF 25 FEET APART.
4.

A PUMP HOSE SHALL CONNECT THE POLYMER INTRODUCTION UNITS TO A SEDIMENT CONTAINMENT DEVICE AND SHALL BE A MINIMUM OF 200 FEET IN LENGTH.
5.

AFTER INTRODUCTION OF THE POLYMER AND NECESSARY MIXING TIME, THE SYSTEM REQUIRES SEDIMENT CONTAINMENT WHICH CAN BE IN THE FORM OF A FILTER BAG, SEDIMENT TRAP, OR OTHER CONTAINMENT DEVICE.
6.

SOFT BENDS OR CURVES TO THE DISCHARGE HOSE SHALL BE MAINTAINED TO AVOID OBSTRUCTIONS IN FLOW AND ALTERING THE DESIGN POLYMER MIXING TIME.
7.

SYSTEM DESIGN AND LAYOUT SHALL BE BASED ON SITE-SPECIFIC CONDITIONS, IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, AND BE COMPLETED BY A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC).
8.

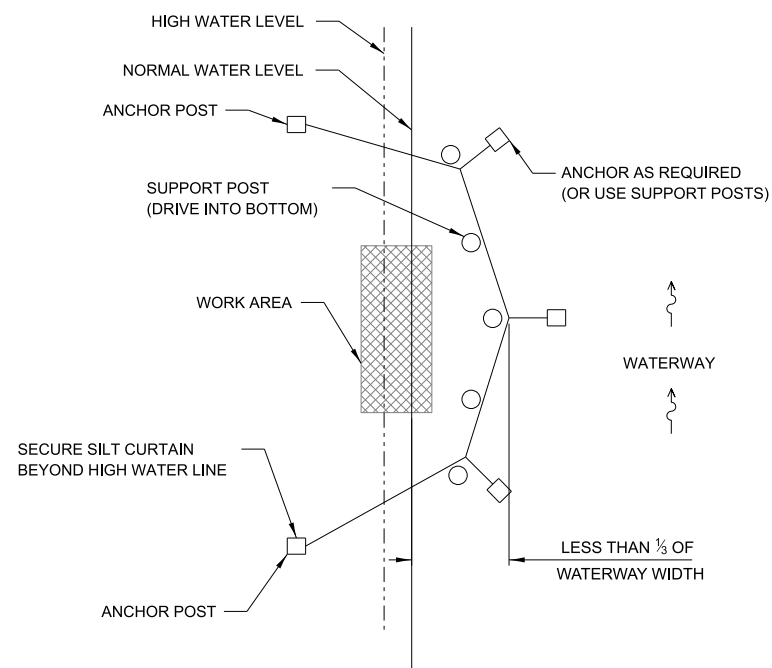
MAINTENANCE SHALL BE PERFORMED AS NEEDED TO ENSURE CONTINUOUS SYSTEM PERFORMANCE THROUGHOUT USE.
9.

THE DISCHARGE SHALL BE VISIBLY CLEAR FOLLOWING TREATMENT.

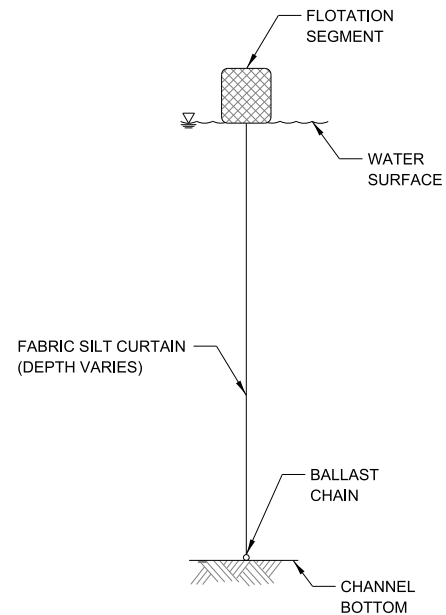
IN-LINE FLOCCULATION SYSTEM

STANDARD SYMBOL

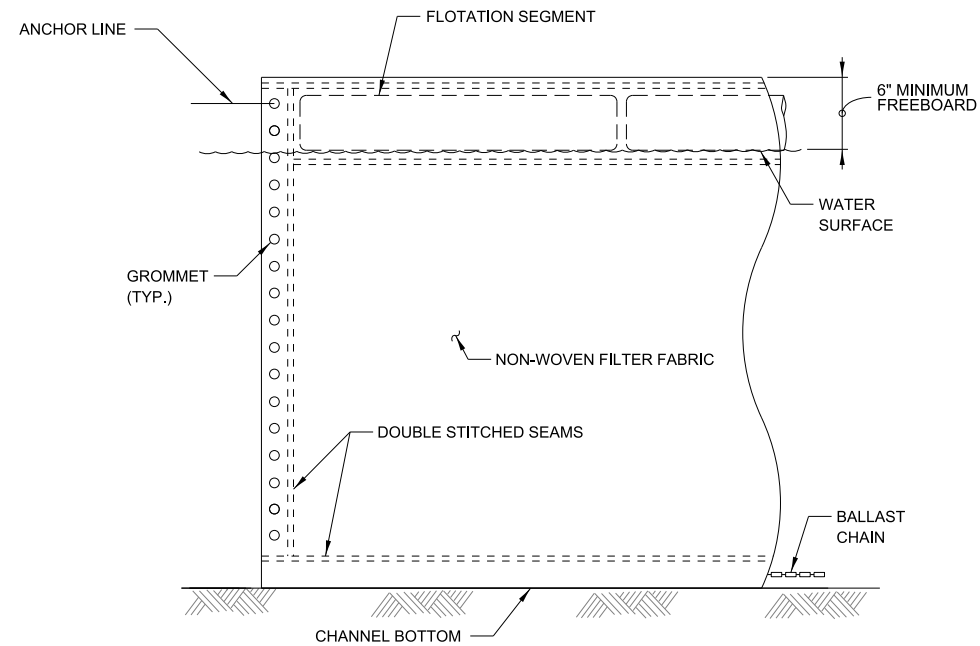




PLAN VIEW



SECTION



ELEVATION

NOTES:

1. SILT CURTAIN FOR USE IN MOVING WATER SHALL BE ANCHORED TO PREVENT DRIFT SHOREWARD OR DOWNSTREAM. SILT CURTAINS ARE NOT TO BE INSTALLED ACROSS FLOWING BODY OF WATER.
2. SHORE ANCHORS SHALL CONSIST OF A POST WITH DEADMAN OR APPROVED EQUAL. STREAM ANCHORS SHALL BE OF SUFFICIENT SIZE TO STABILIZE THE BARRIER WITH NUMBER AND SPACING DEPENDENT ON WATERWAY VELOCITIES.
3. FABRIC SECTIONS SHALL BE CONNECTED END TO END WITH MINIMUM 5/8" DIAMETER POLYPROPYLENE ROPE AND GROMMETTED HOLES OR WITH A MINIMUM OF TWO LINES OF STITCHING.
4. THE SILT CURTAIN SHALL EXTEND THE FULL DEPTH OF THE WATER BODY EXCEPT WHERE SIGNIFICANT WIND OR WAVE ACTION IS PRESENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED. CONTRACTOR SHALL REMOVE THE CURTAIN AT COMPLETION OF WORK IN A MANNER THAT WILL PREVENT SILTATION OF THE WATERWAY.
6. CONSTRUCTION DEBRIS/MATERIALS SHALL BE REMOVED IMMEDIATELY TO PREVENT DAMAGE TO THE CURTAIN AND ENTRY INTO THE WATERWAY.
7. SILT CURTAIN TO BE USED TO CONTROL TURBIDITY WHEN WORKING IN WATERWAYS.
8. SILT CURTAIN SHALL NOT BE USED WHERE THE ANTICIPATED FLOW VELOCITIES WILL EXCEED 5 FT/SEC. AN ALTERNATE CURTAIN TYPE IS REQUIRED IN SUCH INSTANCES.
9. SUPPORT POSTS AND ANCHOR POSTS SHALL BE DRIVEN INTO BOTTOM OF WATERWAY AND EXTEND ABOVE HIGH WATER LEVEL, HIGH WATER MARK OR BEYOND TOP OF EMBANKMENT AS DETERMINED BY THE ENGINEER.
10. ALL UTILITIES PRESENT UNDERNEATH WATERWAY SHALL BE CLEARLY SHOWN AND LABELED TO AVOID CONFLICTS WITH POSTS OR ANCHORS.

SILT CURTAIN  
STANDARD SYMBOL

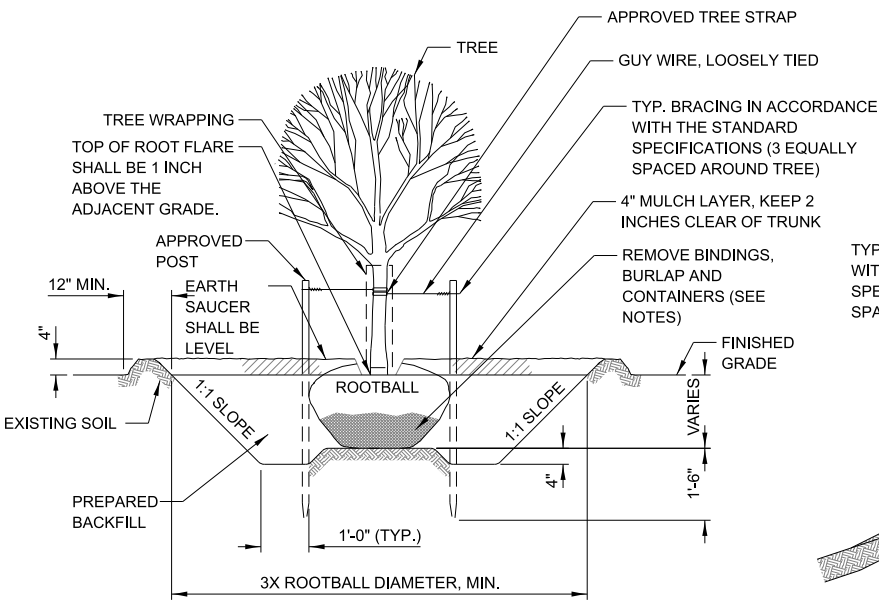
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APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

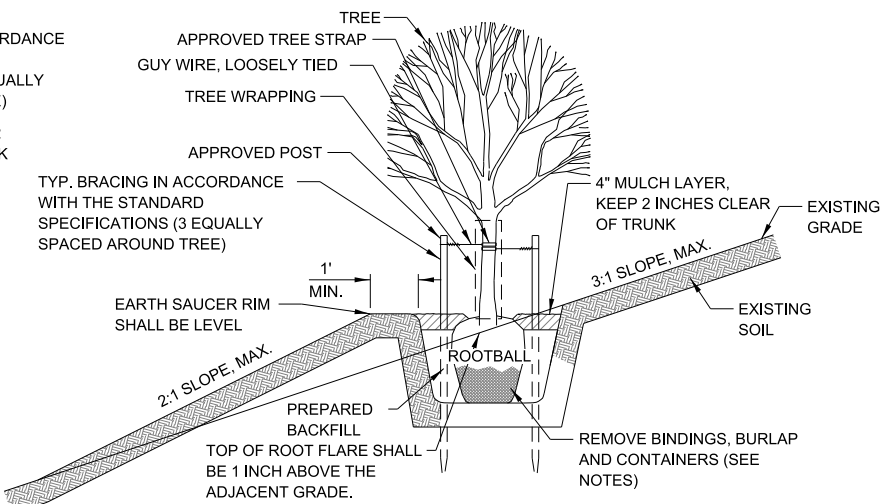


**EROSION CONTROL AND  
LANDSCAPE**

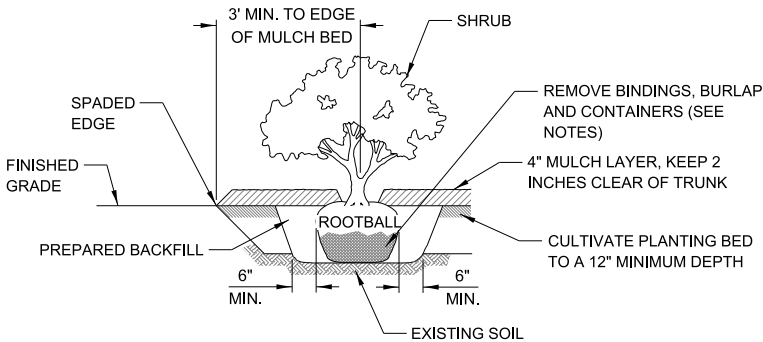
VERSION: 2024-03	STANDARD: K1-13	SHEET: 12 OF 13
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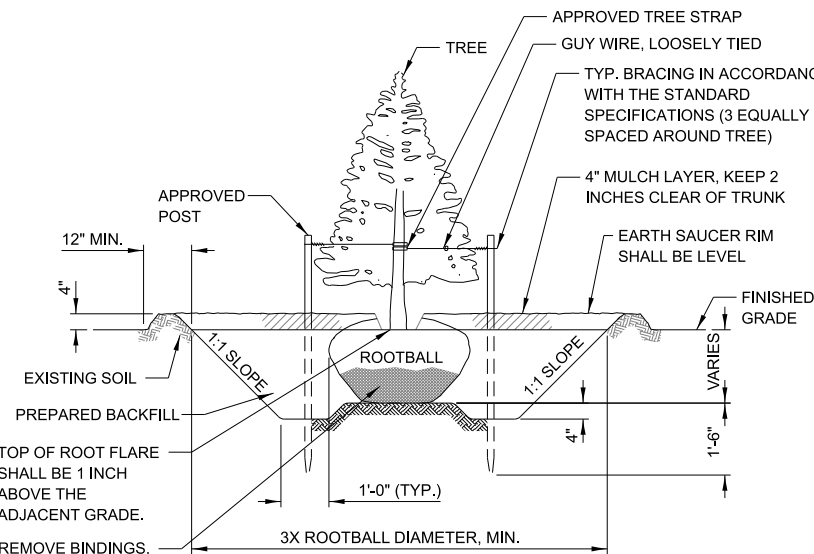
DECIDUOUS TREE PLANTING DETAIL



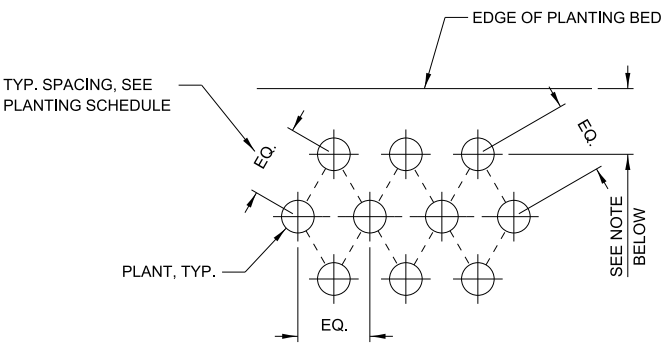
SLOPE PLANTING DETAIL



SHRUB PLANTING DETAIL



EVERGREEN TREE PLANTING DETAIL



NOTES:

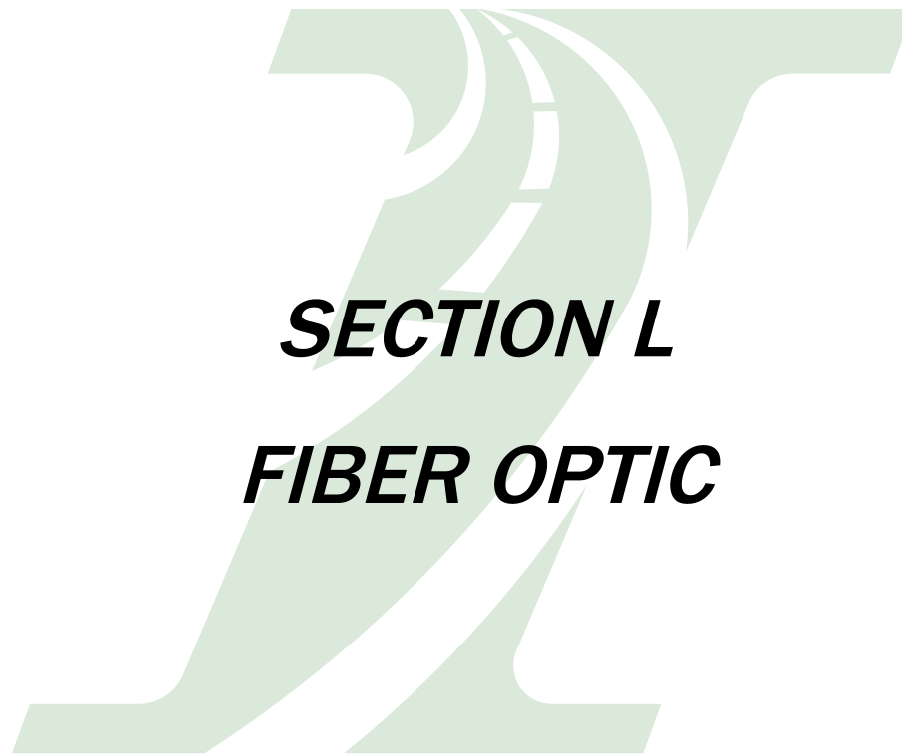
OFFSET OF PLANTS FROM EDGE OF PLANTING AREA SHALL BE EQUAL TO HALF OF THE PLANT SPACING REQUIREMENT FOR EACH PLANT SPECIES AS SHOWN IN THE PLANTING SCHEDULE, OR 3' MINIMUM, UNLESS OTHERWISE INDICATED.

SHRUB AND GROUND COVER SPACING DETAIL

PLANTING NOTES:

1. MARK THE LOCATIONS OF ALL UNDERGROUND UTILITIES BEFORE BEGINNING WORK. FLAG OR STAKE THE ALIGNMENT OF UTILITY LINES THROUGH TREE AND SHRUB PLANTING BEDS TO CONFIRM REQUIRED OFFSETS. REPORT ANY CONFLICTS TO THE ENGINEER IMMEDIATELY FOR RESOLUTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND PROTECTION OF ALL UNDERGROUND, SURFACE AND OVERHEAD UTILITIES REGARDLESS OF LOCATION OR LACK OF LOCATION ON PLANS.
3. PLANTING PLANS ARE DIAGRAMMATIC. PLANT LOCATIONS SHALL BE REVIEWED BY THE CONTRACTOR AND ENGINEER AND OR ILLINOIS TOLLWAY LANDSCAPE ARCHITECT AND ADJUSTED IN THE FIELD AS NECESSARY PRIOR TO PLANTING.
4. TREES SHALL BE LOCATED CLEAR OF ROADWAY PAVEMENT EDGES, SIXTY (60) FEET MINIMUM.
5. TREE AND SHRUB PLANTINGS SHALL NOT BLOCK ACCESS TO GATES IN FENCES, HYDRANTS ON NOISE WALLS OR OTHER SERVICE ACCESS DOORS.
6. TREES PLANTED IN TURF AREAS SHALL BE LOCATED TEN (10) FEET MINIMUM CLEAR FROM THE EDGE OF PLANTING BEDS.
7. TREE AND SHRUB PLANTINGS SHALL BE OFFSET FROM UTILITY LINES, PIPES AND STRUCTURES A MINIMUM OF 10 FEET AND AS REQUIRED BY UTILITY PROVIDERS. TREES SHALL BE LOCATED TEN (10) FEET MINIMUM CLEAR FROM FENCES, WALLS, BRIDGES AND OTHER STRUCTURES. THIS DISTANCE SHALL BE INCREASED, PER THE PROJECTED MATURE TREE CANOPY SIZE, TO PREVENT OVERHANGING LIMBS ON HIGHWAYS AND BRIDGES.
8. THE VERTICAL CLEAR DISTANCE BETWEEN DITCH BOTTOMS, PLANTINGS AND PLANTING BEDS SHALL BE THREE (3) FEET MINIMUM AND NINE (9) FEET MINIMUM HORIZONTAL DISTANCE FOR DITCHES LESS THAN THREE (3) FEET DEEP.
9. PERFORM PERCOLATION TESTS WITHIN PLANTING AREAS, - ONE TEST PER AREA OR 1000 SF OF PLANTING BED, MAX. EXCAVATE A 12 INCH X 12 INCH X 12 INCH PIT AND FILL WITH WATER. RECORD THE PER HOUR RATE OF WATER DISPERSAL FROM THE PIT. IF PERCOLATION IS LESS THAN 2 INCHES PER HOUR, CONTACT THE ENGINEER FOR FURTHER INSTRUCTIONS. RELOCATE PLANTINGS AS INSTRUCTED BY THE ENGINEER. RESTORE PIT TO SURROUNDING CONDITION.
10. PRUNING SHALL ONLY BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS. IMPROPERLY PRUNED PLANTING WILL BE REJECTED AND REPLACEMENTS SHALL IMMEDIATELY BE MADE BY THE CONTRACTOR.
11. SCARIFY THE SIDES OF PLANTING PITS TO LOOSEN SOIL PRIOR TO PLANTING.
12. WHEN INDICATED ON PLANS, TREE WRAPPING SHALL BE INSTALLED ON ALL DECIDUOUS TREES TO PROTECT FROM DEER AND RODENT DAMAGE. WRAPPING SHALL BE ANCHORED TO GROUND AND EXTEND UP TO LOWEST BRANCH. WRAPPING PLACEMENT SHALL NOT BEAR AGAINST OR INHIBIT GROWTH OF TRUNK OR LOWEST BRANCH.
13. TOP OF ROOT FLARE SHALL BE APPROXIMATELY ONE (1) INCH ABOVE ADJACENT FINISHED GRADE. REMOVE DEBRIS AND MULCH FROM AROUND ROOT COLLAR.
14. SHRUB PLANTINGS, UNLESS OTHERWISE NOTED, SHALL BE PLANTED IN MULCHED BEDS. THE EDGE OF THE MULCHED BEDS SHALL EXTEND A MINIMUM OF THREE (3) FEET BEYOND THE CENTERS OF THE PERIPHERAL PLANTS IN THE BED. THE EDGE OF THE MULCHED BED FOR SHRUB PLANTINGS ADJACENT TO A WALL, FENCE, GUARDRAIL, OR OTHER FIXED OBJECT SHALL EXTEND TO THE OBJECT. THE PERIPHERAL PLANTS IN THE BED SHALL BE PLANTED FIVE (5) FEET CLEAR OF THE OBJECT. WHEN A TREE IS LOCATED IN A SHRUB BED, THE MINIMUM DISTANCE BETWEEN THE TREE AND THE ADJACENT SHRUB SHALL BE SIX (6) FEET.
15. ALL FACILITIES AND LANDSCAPE AREAS ON AND OFF SITE DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION.
16. ALL TREE SUPPORTS INCLUDING STAKES AND GUY WIRES, BRACING STRAPS AND ANCHORS SHALL BE REMOVED AFTER ONE (1) YEAR OR AS DIRECTED BY THE ENGINEER.
17. REMOVE ALL BINDING MATERIALS, CONTAINERS, AND MARKING TAPES FROM PLANTINGS PRIOR TO BACKFILLING. REMOVE SYNTHETIC BURLAP ENTIRELY, REMOVE NATURAL BURLAP, TWINE, AND WIRE BASKETS FROM THE TOP HALF OF ROOT BALLS. THE LOWER HALF OF NATURAL BURLAP SHALL BE FOLDED TOWARD THE BOTTOM OF THE ROOT BALL.
18. PLANTINGS SHALL BE INSTALLED PLUMB WITH THE BEST SIDE FACING THE PRIMARY VIEWING DIRECTION.
19. PLANTS SHALL COMPLY WITH ANSI Z60.1. LATEST EDITION, AND SHALL BE WELL FORMED WITH FULL FOLIAGE MASS. PLANTS SHALL BE HEALTHY, VIGOROUS, FREE OF DISEASE, INSECT PESTS AND THEIR EGGS. BASIS OF PLANT REJECTION INCLUDES BUT IS NOT LIMITED TO: PLANT IS MORE THAN 10% DEAD, ROOT BOUND, IMPROPERLY PRUNED, EXHIBITS DISPROPORTIONAL GROWTH PATTERN OR DOES NOT MEET SPECIFIED SIZE REQUIREMENTS.
20. DO NOT DISTURB OR DAMAGE ROOT BALL WHEN PLANTING. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING PLANTING PITS. WHEN PIT IS HALF FULL OF SOIL, LIGHTLY TAMP, WATER THOROUGHLY. ADD REMAINING SOIL AND WATER FURTHER UNTIL SOIL IS COMPLETELY CONSOLIDATED AND NO MORE WATER IS ABSORBED.
21. PREPARED BACKFILL SHALL CONSIST OF EQUAL PARTS TOPSOIL, COMPOST AND EXISTING SITE SOIL SUITABLE FOR PLANT GROWTH. TOPSOIL SHALL COMPLY WITH SECTION 211 OF THE SPECIFICATIONS.
22. THE CONTRACTOR SHALL COMPLETE FORM A-37 TO DOCUMENT MILESTONE DATES ASSOCIATED WITH PLANT INSTALLATION AND ESTABLISHMENT AS REQUIRED BY THE ILLINOIS TOLLWAY.

# ***STANDARD DRAWINGS***



***SECTION L***

***FIBER OPTIC***

MARCH 2024

Illinois Tollway Standard Drawings Revisions

Section L	Fiber Optic		
	Standard	Modification Summary	Effective: 03-01-2024
	L1-06	Fiber Optic System Typicals and Drawings	
	Sheet 2	Removed note "Top casing shall be a min of 120" below lowest Illinois Tollway road surface".	
		Modified profile view to include tracer wire.	
		Removed "DAM" call out from profile view.	
		Added Note 12.	
		Modified side view to include a reference to Note 2.	
	Sheet 3	Removed note "HDPE shall be a minimum of 48" below pavement elevation to top of HDPE, may be greater than 48" as required by city, village, twp/county, and/or governing agency".	
	Sheet 4	Modified detail to include locate wire.	
	Sheet 5	Updated the General Note section.	
	Sheet 6	Removed note "No marking on lid".	
		Removed "Standard Marking" call out.	
		Removed the 2-section split lid from the 48"x72" detail.	
	Sheet 8	Replaced "Pea Gravel" callout with "Coarse Aggregate".	
		Adjusted "42" Min" measurement call out.	
		Removed note "Fiber coil bundle shall be labeled with owner, end locations, fiber type, and fiber count".	
	Sheet 9	Removed Handhole - Plan View.	
		Modified Note 1.	
		Modified Note 2.	
		Modified Note 7.	
		Added detail label "Warning Post".	
		Removed note "Place HDPE over fiber optic cable to provide crush protection extend HDPE 1' inside handhole".	
	Sheet 10	Removed note "Handhole shall not be installed on steep banks or slopes where the cover cannot be leveled within a tolerance of one inch (1") of drop to twelve inches (12") of grade and remain buried.	
		Modified warning locate post in detail.	
	Sheet 11	Modified Note 2.	
		Modified Detail B. Changed from stainless steel to rigid galvanized steel.	
	Sheet 12	Removed the "SS" call out from Manhole Penetration Detail.	
		Removed the "SS" call out from Below Grade Penetration Building.	
		Removed the "SS" call out from Concrete Through Penetration.	
	Sheet 13	Modified Note 2.	
	Sheet 14	Modified Note 4.	
	L2-04	Fiber Optic Splicing Detail	
	Sheet 1	Modified drawing.	
	Sheet 2	Modified Note 1.	
		Modified Note 2.	

 New Sheet

 Retired Standard

TYPES OF BURY  
CABLE AND CONDUIT  
BORED, TRENCHED, AND PLOWED

GENERAL NOTES:

1.

UNDERGROUND CONDUIT SHALL BE PLACED AT 42" MINIMUM COVER UNLESS OTHERWISE SPECIFIED ON THE PLANS.
2.

UNDERGROUND CONDUIT SHALL BE PLACED AT 48" MINIMUM COVER UNDER STREAM, CREEK AND DRAINAGE DITCHES UNLESS OTHERWISE SPECIFIED ON THE PLANS.
3.

IF WHILE LOWERING THE CONDUIT THERE IS NOT ENOUGH SLACK, ADDITIONAL CONDUIT SHALL BE ADDED. EMPTY CONDUITS CAN BE CUT AND HAVE NEW CONDUIT FUSED OR COMPRESSION COUPLED ON. CONDUITS WITH FIBER INSTALLED SHALL BE RING CUT WITH A TUBE CUTTER SO AS NOT TO DAMAGE THE FIBER.
4.

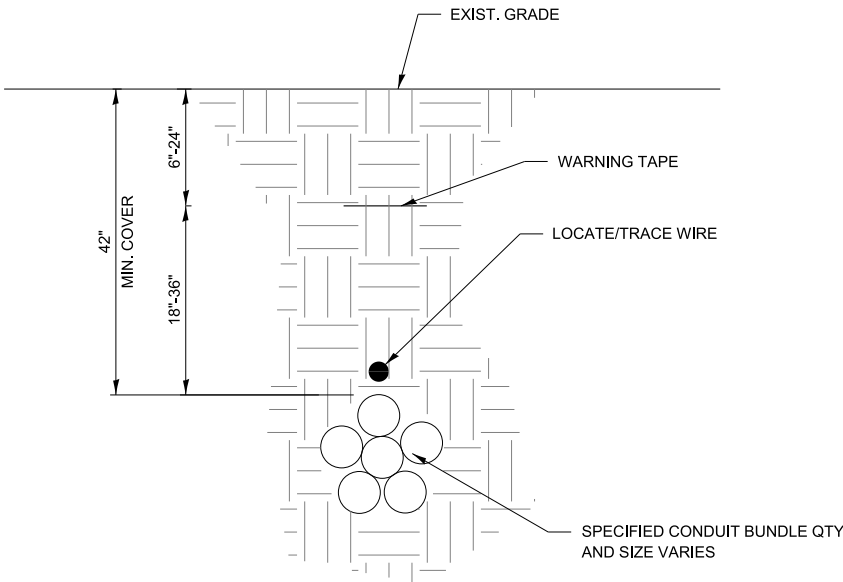
CONDUIT USED ABOVE GROUND SHALL BE STAINLESS STEEL OR FIBERGLASS REINFORCED EPOXY (FRE) CONDUIT. UNDERGROUND CASINGS SHALL BE FRE PER THE SPECIAL PROVISIONS OR HDPE.
5.

LOCATE/TRACE WIRE SHALL BE DIRECT BURIED WITH EVERY CONDUIT BUNDLE PATH AS CLOSE TO THE CENTER OF THE CONDUITS AS POSSIBLE. LOCATE/TRACE WIRE SHALL NOT BE INSTALLED IN A CONDUIT WITHOUT APPROVAL OF THE ENGINEER.
6.

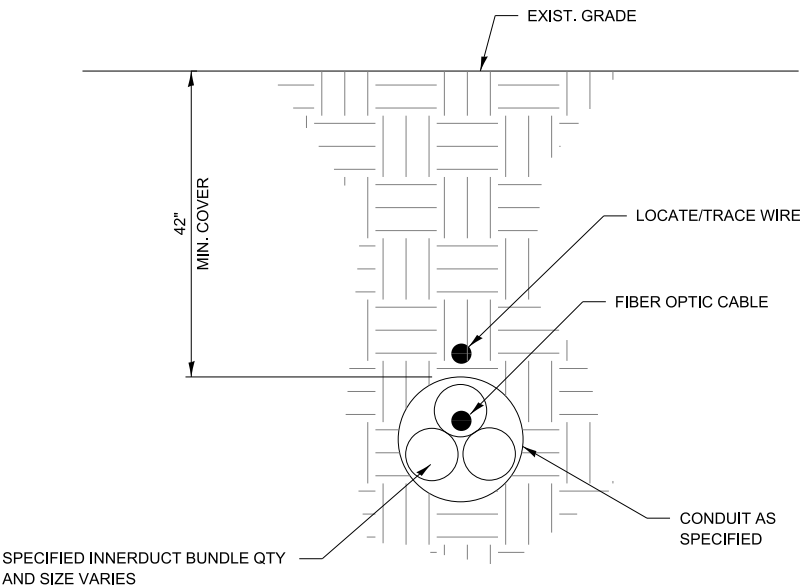
WHEN AN OPTIC FIBER CONDUIT SEPARATES FROM A CONDUIT BUNDLE OR DUCT BANK, AN ADDITIONAL LOCATE WIRE SHALL BE INSTALLED WITH THAT SEPARATE CONDUIT PATH GOING BACK TO THE PREVIOUS HANDHOLE.
7.

ALL LOCATE/TRACE WIRE WILL BE TESTED PER SPECIFICATIONS PRIOR TO ANY FIBER BEING INSTALLED.
8.

ALL UNUSED CONDUIT SHALL HAVE 1200 LB MULE TAPE INSTALLED FOR FUTURE USE.

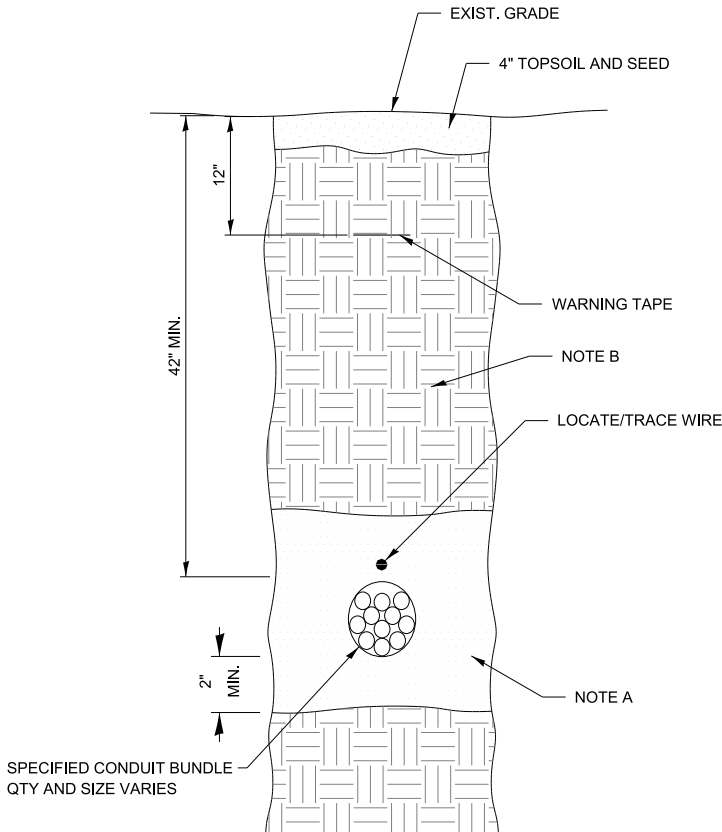


PLOWED CONDUIT BUNDLES  
QTY VARIES



BORED CONDUIT WITH FIBER OPTIC CABLE AND/OR MULTIPLE INNERDUCTS  
AS REQUIRED

NOTE:  
THE PICTURE ABOVE IS A CONCEPT LAYOUT.



CONSTRUCTION NOTES TRENCHED CONDUIT BUNDLES

- A.

A MINIMUM OF 2" OF SAND SHALL BE PLACED UNDER THE CONDUIT. SAND SHALL TRANSITION TO BACKFILL ACCORDING TO NOTE B 4" ABOVE CONDUIT.
- B.

BACKFILL SHALL BE ACCORDING TO ARTICLE 810.04 OF THE STANDARD SPECIFICATIONS.

TRENCHED CONDUIT BUNDLES

R E V I S I O N S	
DATE	DESCRIPTION
03-01-2024	MODIFIED PROFILE VIEW TO INCLUDE TRACER WIRE. MODIFIED SIDE VIEW TO INCLUDE A REFERENCE TO NOTE 2. REMOVED AND MODIFIED NOTES.
	UPDATED THE GENERAL NOTES SECTION. MODIFIED DETAILS.

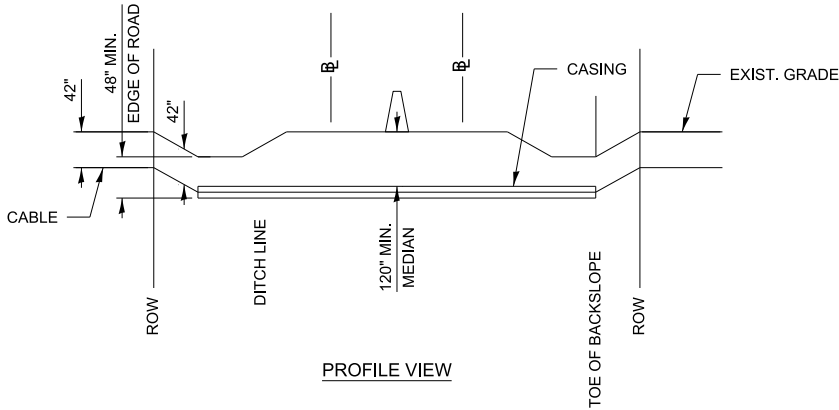
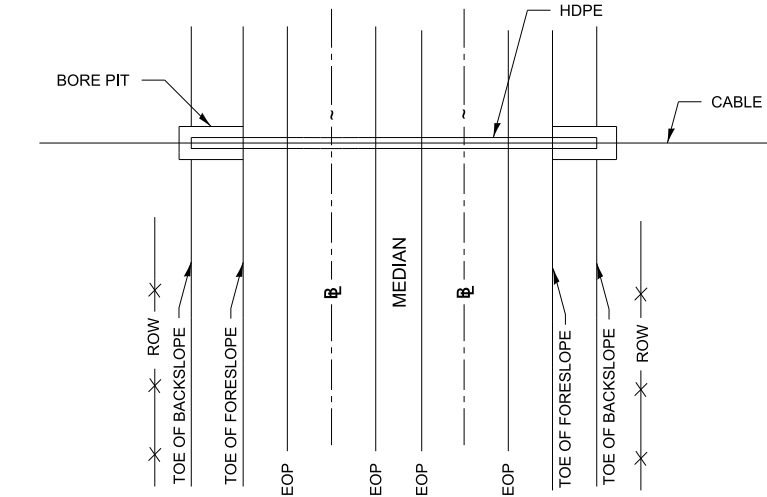


FIBER OPTIC SYSTEM  
TYPICALS AND DRAWINGS

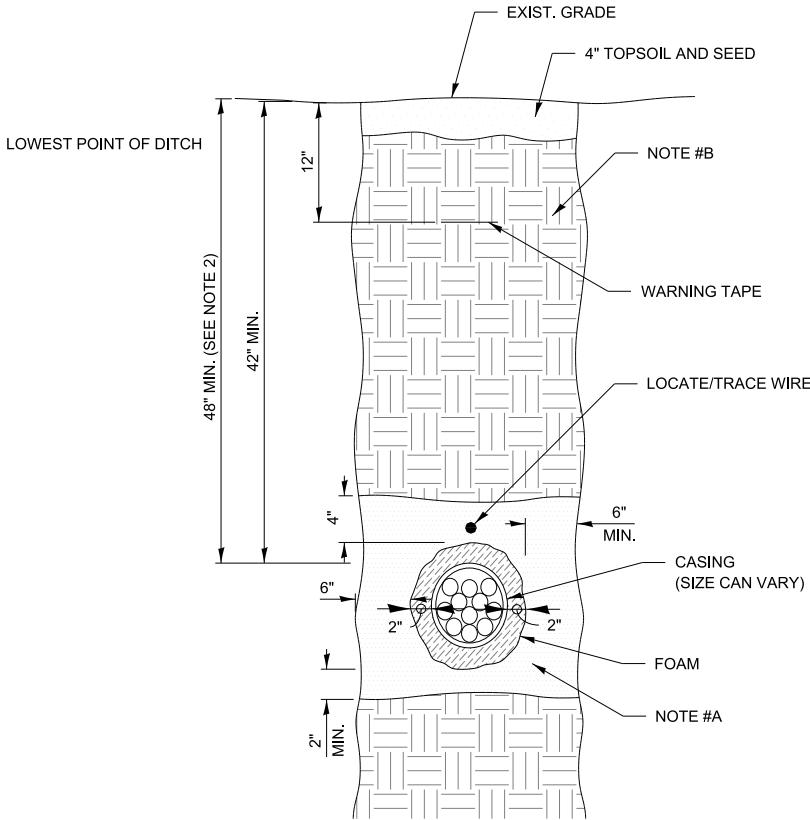
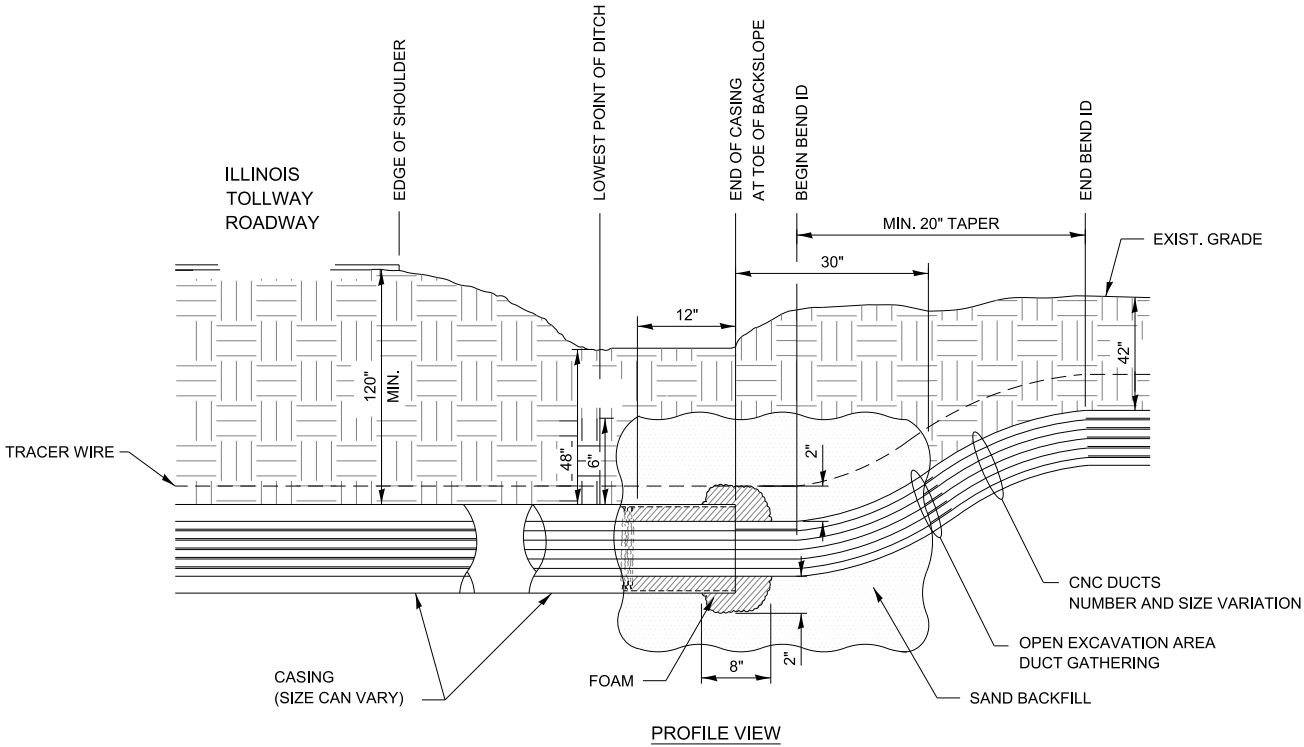
TYPICAL ROAD CROSSINGS

GENERAL NOTES:

- 1. UNDERGROUND CONDUIT SHALL BE PLACED AT 42" MINIMUM COVER UNLESS OTHERWISE SPECIFIED ON THE PLANS.
- 2. UNDERGROUND CONDUIT SHALL BE PLACED AT 48" MINIMUM COVER UNDER STREAM, CREEK AND DRAINAGE DITCHES UNLESS OTHERWISE SPECIFIED ON THE PLANS.
- 3. THE MINIMUM COVER UNDER A PUBLIC ROADWAY, ILLINOIS TOLLWAY HIGHWAY AND RAMPS SHALL BE 120" OR SUCH GREATER DEPTH AS MAY BE REQUIRED TO CLEAR THE PAVEMENT STRUCTURE.
- 4. IF WHILE LOWERING THE DUCTS, THERE IS NOT ENOUGH SLACK IN THE DUCTS, ADDITIONAL DUCT SHALL BE ADDED. EMPTY DUCTS CAN BE CUT AND HAVE NEW DUCT FUSED OR COMPRESSION COUPLED ON. DUCTS WITH FIBER INSTALLED SHALL BE RING CUT WITH A TUBE CUTTER SO AS NOT TO DAMAGE THE FIBER.
- 5. HDPE CASING SHALL EXTEND FROM TOE OF BACK SLOPE TO TOE OF BACK SLOPE UNLESS OTHERWISE APPROVED.
- 6. BORE AND RECEIVING PITS SHALL BE A MINIMUM OF 30 FEET FROM THE EDGE OF SHOULDER ON TOLL HIGHWAYS UNLESS OTHERWISE APPROVED.
- 7. TOP OF CASING SHALL BE A MINIMUM OF 48" BELOW THE DESIGNED DITCH GRADES ON EACH SIDE OF HIGHWAY.
- 8. ENDS OF ALL CASING SHALL BE FOAM PLUGGED. (ARNCO HYDRA-SEAL S-60 OR ENGINEER APPROVED EQUAL).
- 9. PITS FOR BORING ARE NOT PERMITTED IN THE HIGHWAY MEDIAN.
- 10. CONDUIT USED ABOVE GROUND SHALL BE STAINLESS STEEL OR FIBERGLASS REINFORCED EPOXY (FRE) CONDUIT. UNDERGROUND CASINGS SHALL BE FRE PER THE SPECIAL PROVISIONS OR HDPE.
- 11. HANDHOLES SHALL BE INSTALLED ON BOTH SIDES OF ANY STREAM, CREEK, OR RAILROAD CROSSING.
- 12. BORE HOLES SHALL BE LIMITED TO THE MINIMUM DIAMETER NECESSARY FOR INSTALLATION OF THE DUCT BUNDLE OR CASING.



TYPICAL ROAD CROSSING



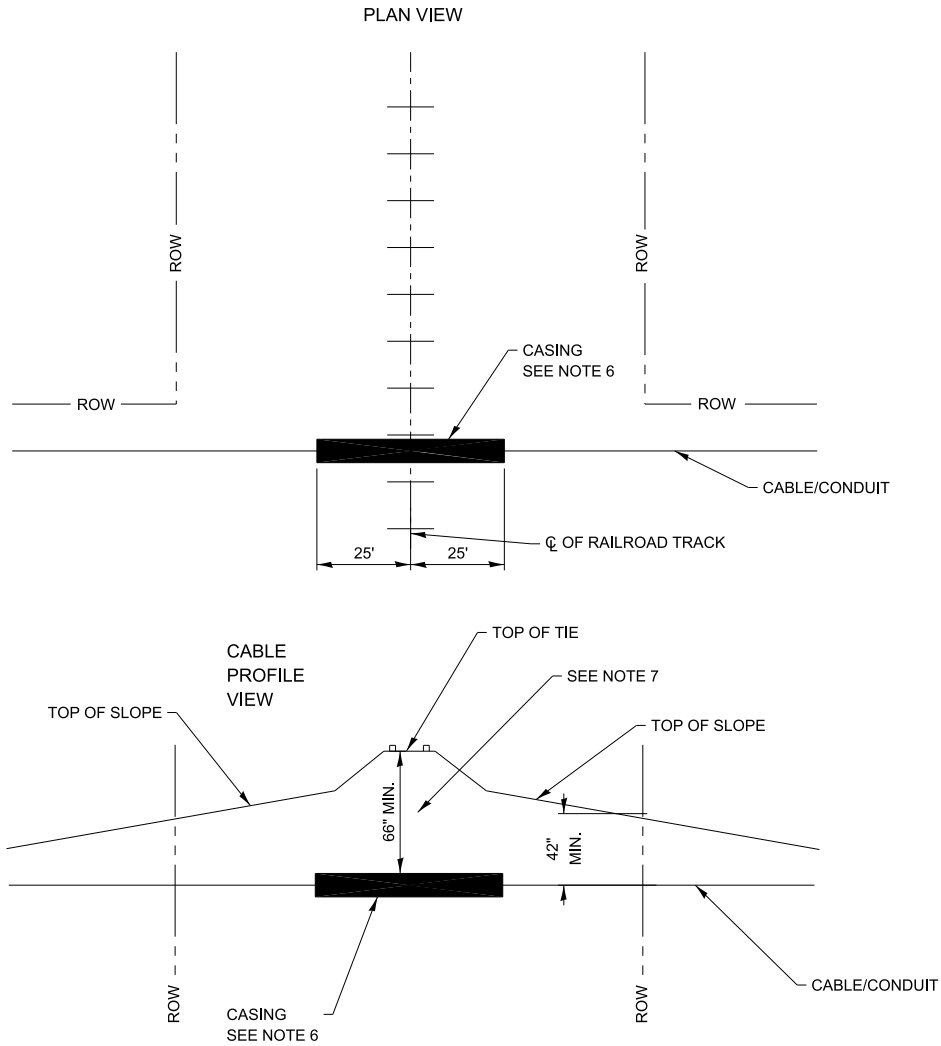
CONSTRUCTION NOTES TRENCHED HDPE BUNDLES

- A. A MINIMUM OF 2" OF SAND SHALL BE PLACED UNDER THE CONDUIT. SAND SHALL TRANSITION TO BACKFILL ACCORDING TO NOTE B 4" ABOVE CONDUIT.
- B. BACKFILL SHALL BE ACCORDING TO ARTICLE 810.04 OF THE STANDARD SPECIFICATIONS.



OUTSIDE PLANT TYPICAL BORES

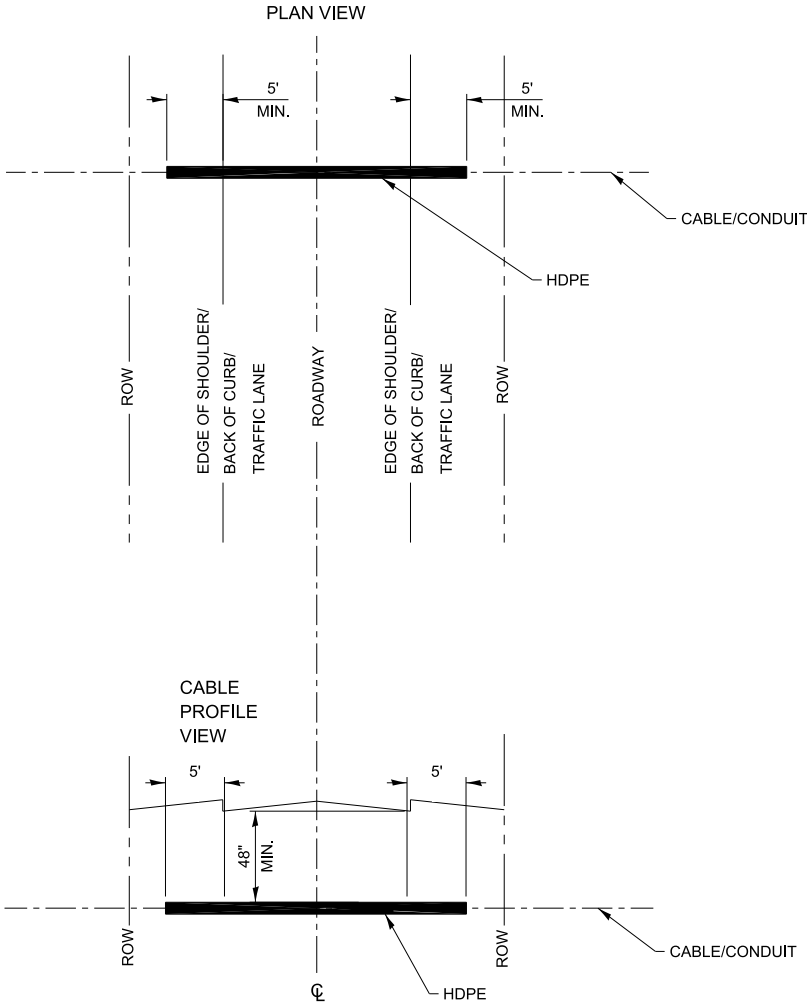
TYPICAL RAILROAD BORE OR JACK



NOTES FOR RAILROAD BORE OR JACK

1. CASING SHALL EXTEND 25 FT. EACH SIDE OF CL OF OUTERMOST TRACK OR AS DICTATED BY RAILROAD PERMIT.
2. R.R. BALLAST SHALL NOT BE DISTURBED.
3. BORE AND RECEIVING PITS SHALL NOT BE EXCAVATED CLOSER THAN 10 FT. FROM THE TOE OF SLOPE ON EACH SIDE OF TRACK.
4. ENDS OF ALL CASING SHALL BE FOAM PLUGGED (ARNCO HYDRA-SEAL S-60 OR ENGINEER APPROVAL EQUAL). SEE SHEET 2 OF THIS SERIES.
5. ALL OPERATIONS SHALL MEET REGULATING AGENCY REQUIREMENTS.
6. CASING AS REQUIRED BY CUSTOMER OR RAILROAD OWNER.
7. DEPTH FROM TOP OF CASING TO TOP OF RR TIE MAY BE GREATER THAN 66" AS REQUIRED BY RAILROAD OWNER, NEVER LESS THAN 66".

TYPICAL CITY ST. AND DRIVEWAY BORE OR JACK



NOTES FOR CITY STREET AND DRIVEWAY BORE OR JACK

1. HDPE SHALL EXTEND 5 FT. EACH SIDE OF EDGE OF SHOULDER/BACK OF CURB.
2. BORE AND RECEIVING PITS SHALL NOT BE EXCAVATED WITHIN 5 FT. OF EDGE OF SHOULDER/BACK OF CURB.
3. ENDS OF ALL HDPE SHALL BE FOAM PLUGGED. (ARNCO HYDRA-SEAL S-60 OR ENGINEER APPROVED EQUAL). SEE SHEET 2 OF THIS SERIES.
4. ALL OPERATIONS SHALL MEET REGULATING AGENCY REQUIREMENTS.

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE: 03/01/2024



FIBER OPTIC SYSTEM  
TYPICALS AND DRAWINGS

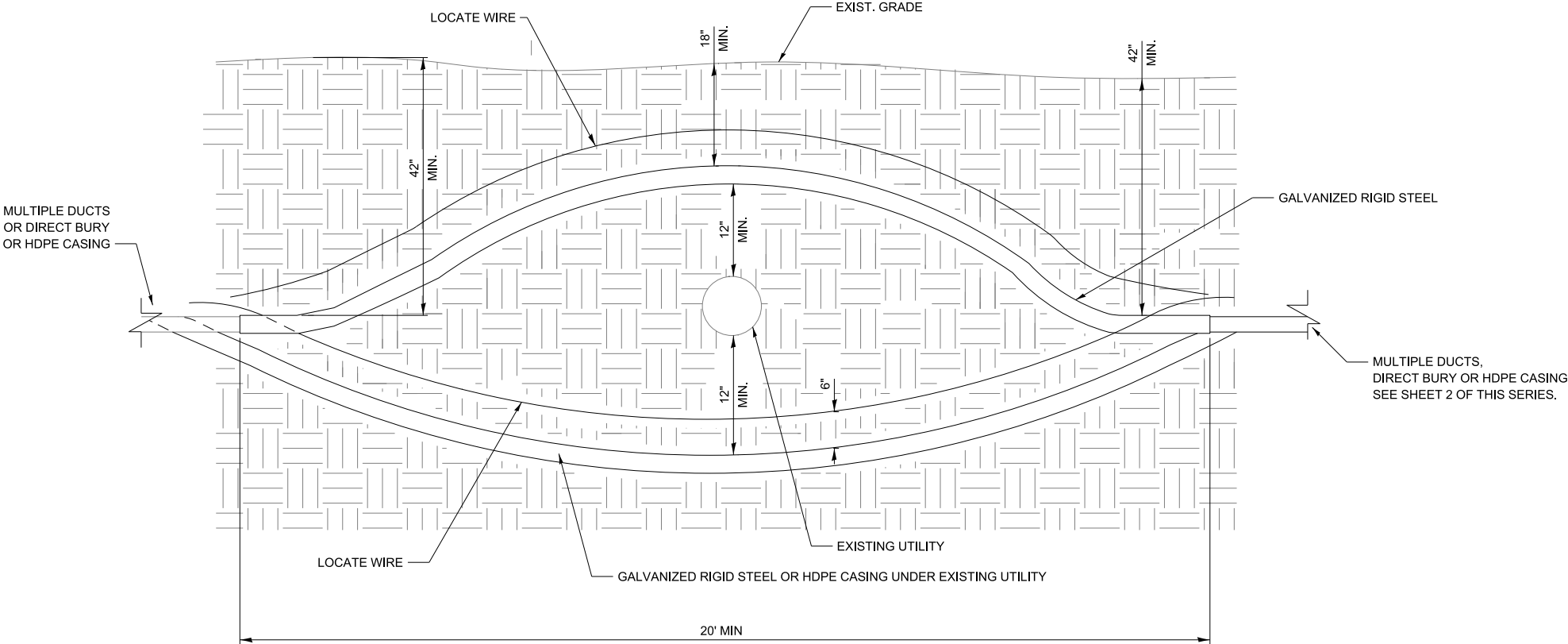
VERSION: 2024-03 STANDARD: L1-06 SHEET: 3 OF 15



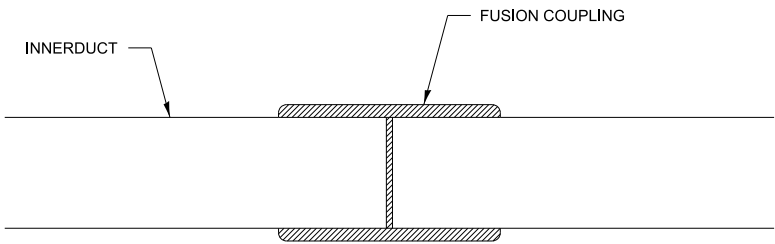
UTILITY AVOIDANCE DETAIL

NOTES:

- 1. IF 18" MIN COVER CANNOT BE ACHIEVED, HDPE(S) MUST BE PLACED UNDER EXISTING UTILITY.
- 2. 12" MIN SEPARATION MUST BE ADHERED TO BETWEEN GALVANIZED RIGID STEEL/CASING HDPE AND EXISTING UTILITY.
- 3. NO DIRECT BURY UNDER ANY EXISTING UTILITY. ALL CROSSINGS SHALL BE VISUALLY VERIFIED.
- 4. MINIMUM 18" TO 24" SEPARATION FOR OIL, GAS UTILITY BETWEEN PIPE AND CONDUIT (OR AS REQUIRED BY UTILITY OWNER).
- 5. IF CROSSING AN EXISTING UTILITY, SHOULD BE CONSTRUCTED AS CLOSE TO 90° AS POSSIBLE.



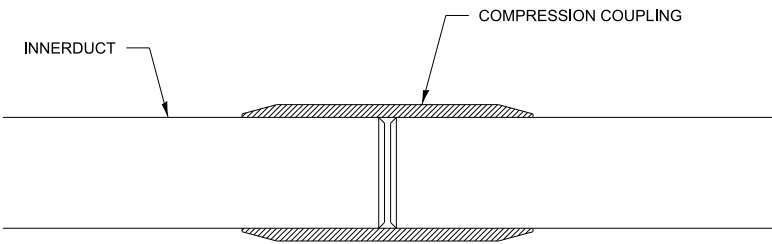
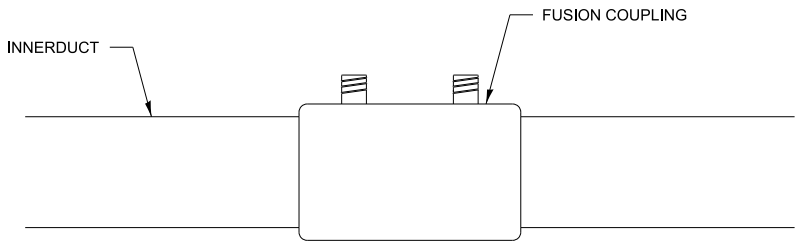
COUPLINGS DETAILS



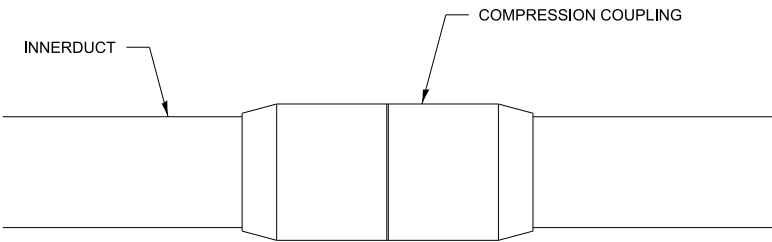
NOTE:

IN A PROPER ELECTROFUSION JOINT, MOLTEN MATERIAL FLOWS TO THE COLD ZONE WHERE IT SOLIDIFIES AND FREEZES OFF THE ESCAPE PATH. WITH THE MOLTEN MATERIAL CONTAINED, MELT PENETRATION WILL BUILD INTERFACE PRESSURE. WIRE WINDINGS WILL FLOW IN A DESIGNED AND CONTROLLED PATTERN AND A PROPER BONDING OF MATERIALS CAN BE OBTAINED.

PROPER FUSION DETAIL



COMPRESSION COUPLING DETAIL



GENERAL NOTES

1. FUSION COUPLING SHALL BE USED FOR ALL NEW INSTALLATION OF DUCT.
2. COMPRESSION COUPLING SHALL BE RESTRICTED TO THE USE ON EXISTING DUCT FOR ACTIONS AS REPAIRS AND DUCT INTERCEPTIONS. INSTALL COMPRESSION COUPLINGS PER MANUFACTURER RECOMMENDATIONS.

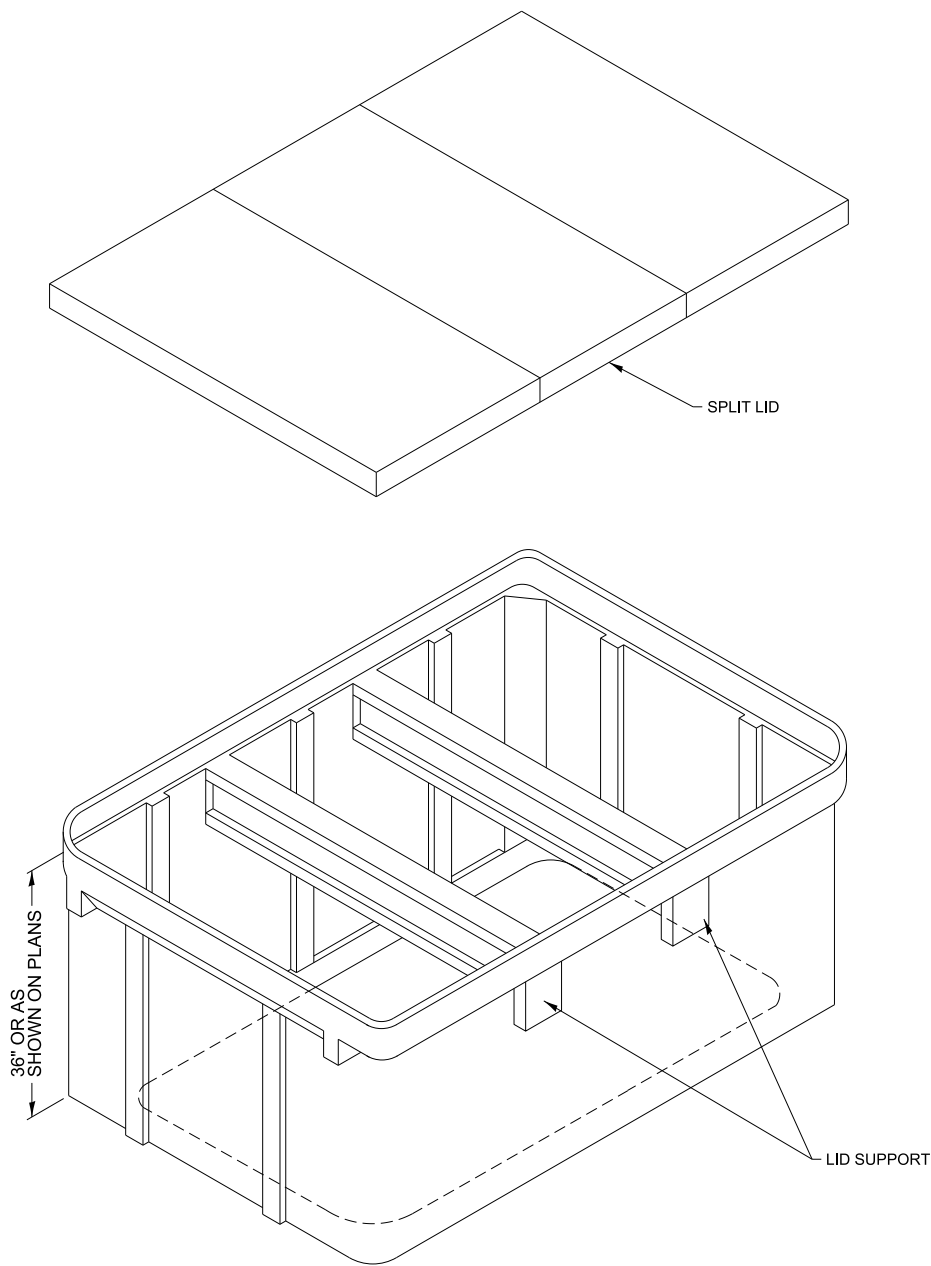
FUSION STANDARD JOINING PROCEDURES

1. SHALL INSTALL PER FUSION COUPLING MANUFACTURER RECOMMENDATIONS.
2. THE PIPE SHALL HAVE A SQUARE EVEN CUT.
3. REMOVE ANY BURRS OR SHAVING FROM THE PIPE ENDS THAT MAY HAVE DEVELOPED DURING THE CUTTING PROCESS.
4. CLEAN PIPE ENDS INSIDE AND OUT WITH A CLEAN CLOTH TO REMOVE ANY DIRT OR CONTAMINANTS.
5. PIPE PREPARATION AND CONTAMINATION ARE VERY IMPORTANT CONSIDERATIONS IN THE ELECTROFUSION PROCESS. THEREFORE, CAREFUL ATTENTION SHALL BE GIVEN TO PROPER SCRAPING AND CLEANING PROCEDURES.
6. SCRAPE PIPE ENDS TO REMOVE ANY OXIDATION OR SURFACE CONTAMINATION. FOR BEST RESULTS, SECURE TOOL ON PIPE AND MAKE TWO REVOLUTIONS.
7. DISCONNECT LEADS FROM FITTING. CLAMPING DEVICE SHALL REMAIN IN PLACE TO SECURE PIPE AND FITTING DURING THE RECOMMENDED COOLING TIME. AFTER REMOVING CLAMP, ADDITIONAL COOLING TIME SHALL BE ALLOWED BEFORE SUBJECTING THE JOINT TO BENDING, BURYING, PRESSURE TESTING, OR SIMILAR HANDLING AND BACKFILL STRESS.

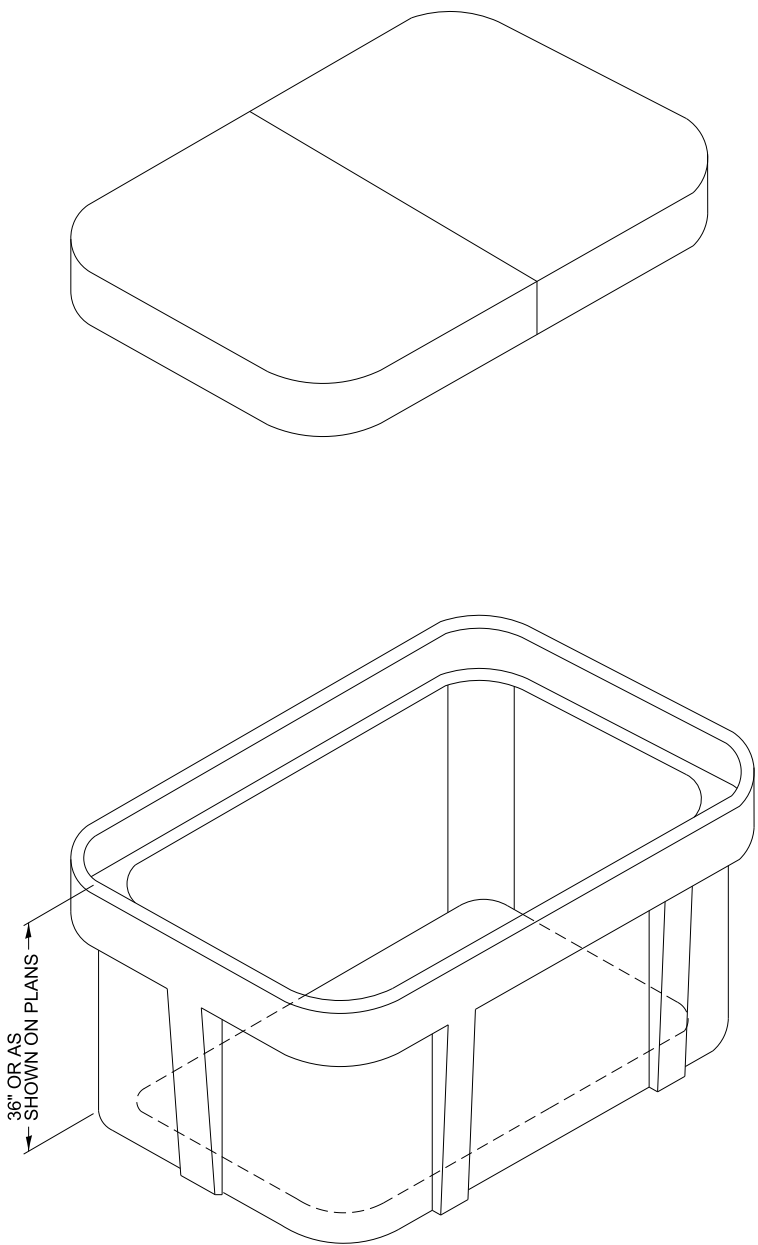
NOTE: IN THE EVENT OF OUT-OF-ROUND PIPE, IT IS IMPORTANT TO ASSURE AN ADEQUATE AND EVEN SCRAPE IS ACHIEVED AROUND THE ENTIRE CIRCUMFERENCE OF THE PIPE. A RUBBER PIPE STOPPER CAN BE PLACED IN THE END OF THE PIPE TO AID IN ROUNDING THE AREA TO BE SCRAPED.

8. MULTIPLE DUCTS FUSION SHALL BE STAGGERED AND AFTER COMPLETION SHALL BE BOUND TOGETHER WITH TY-STRAPS (AT 5' SPACING) SO TO OCCUPY MINIMUM POSSIBLE SPACE AND THEN BACKFILLED.

HANDHOLE



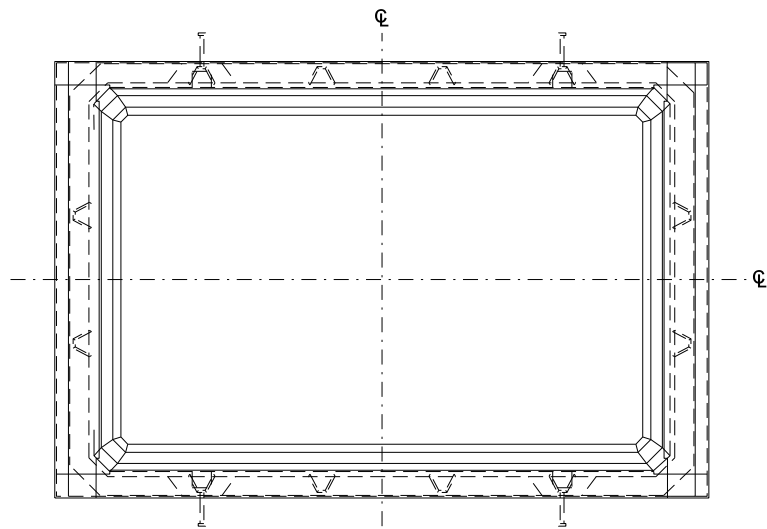
48"x72" HANDHOLE  
3 SECTION SPLIT LID  
(PG STYLE LARGE BOX)  
5 OR MORE DUCTS



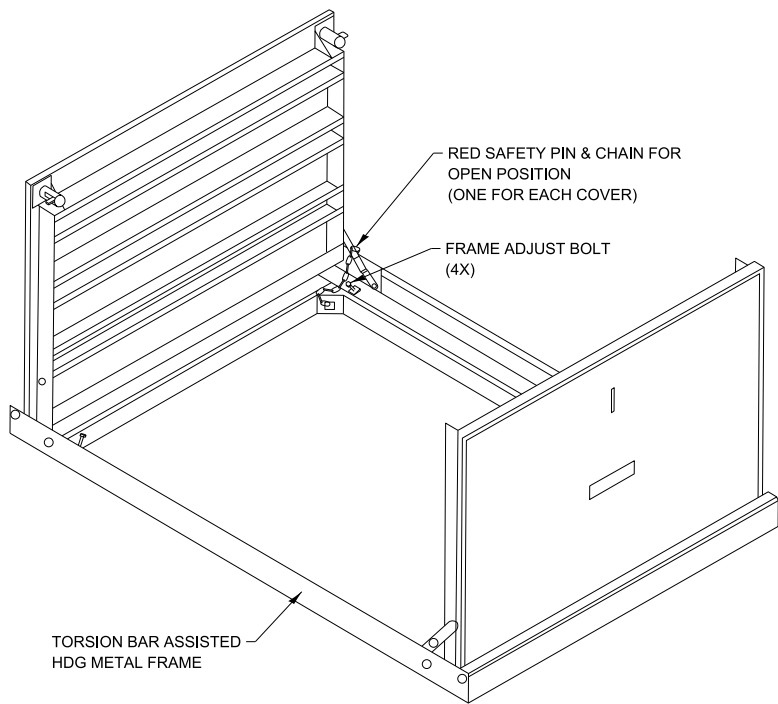
36"x60" HANDHOLE  
2 SECTION SPLIT LID  
LESS THAN 5 DUCTS

NOTE:  
1. NO CORING/DRILLING OR ALTERATION OF  
HANDHOLE SHALL BE ALLOWED.

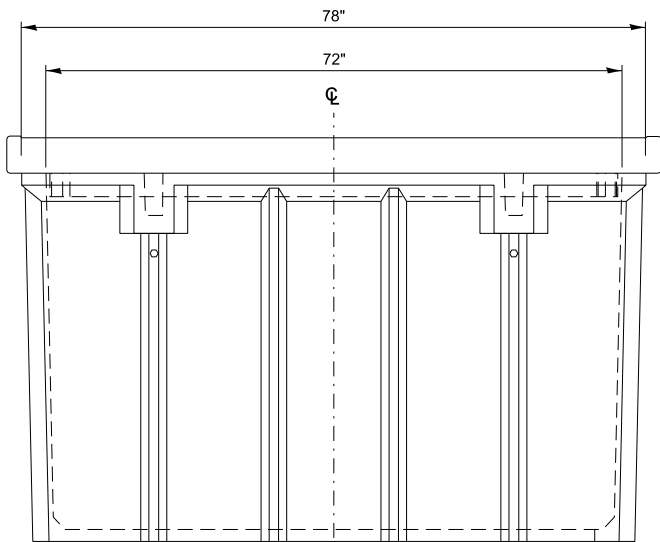
HANDHOLE



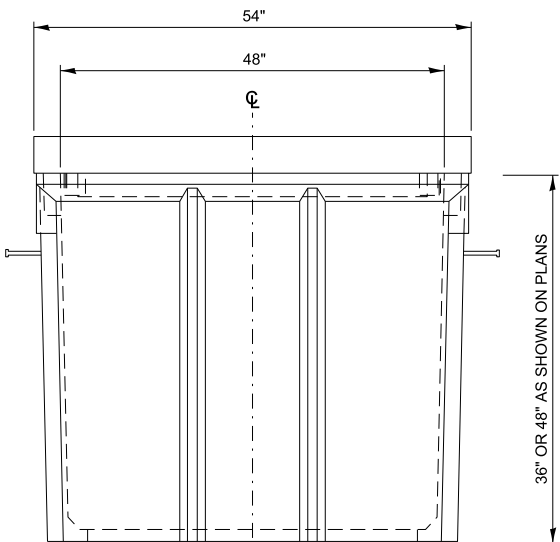
TOP VIEW



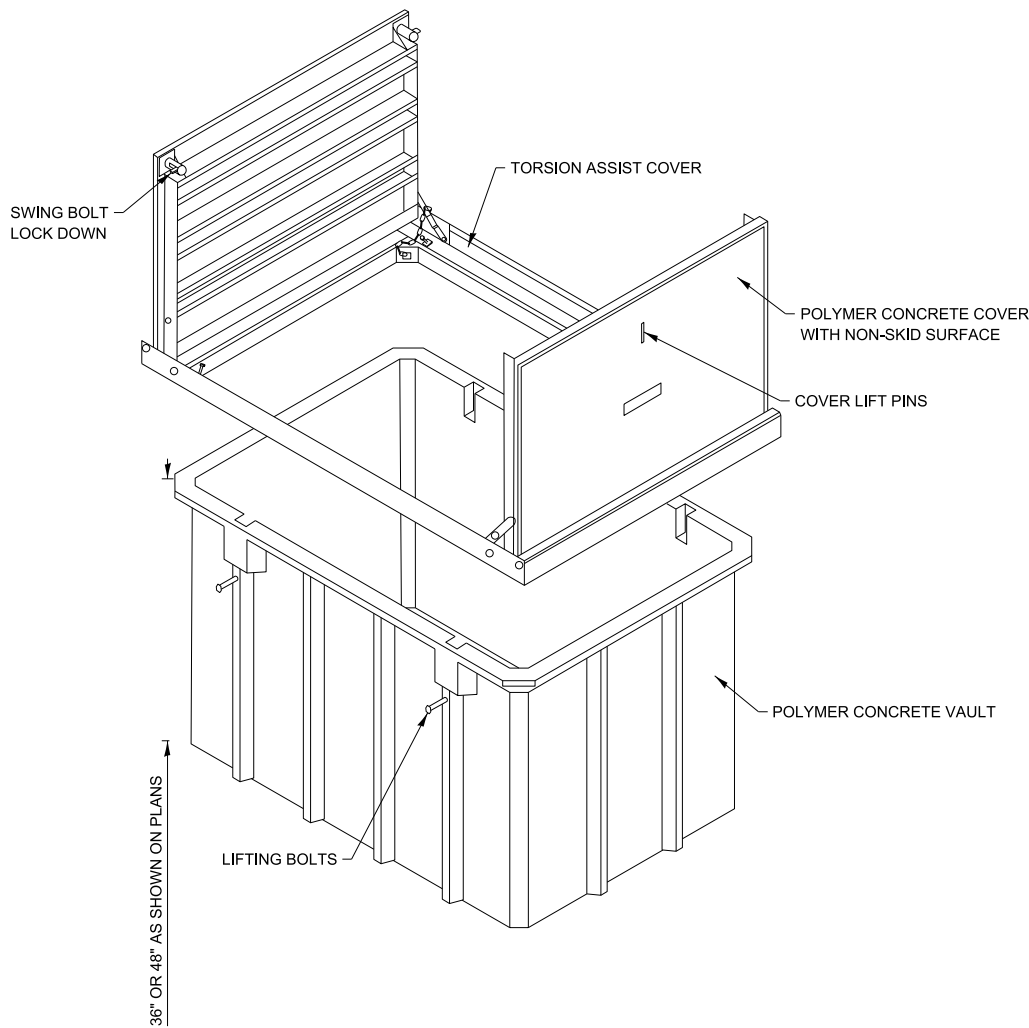
TORSION ASSIST COVER



SIDE VIEW



END VIEW



48"X 72" TORSION ASSIST  
FOR FIBER OPTIC CABLE SPLICE LOCATIONS  
AND SLOPES GREATER THAN OR EQUAL TO 1:4

NOTE:

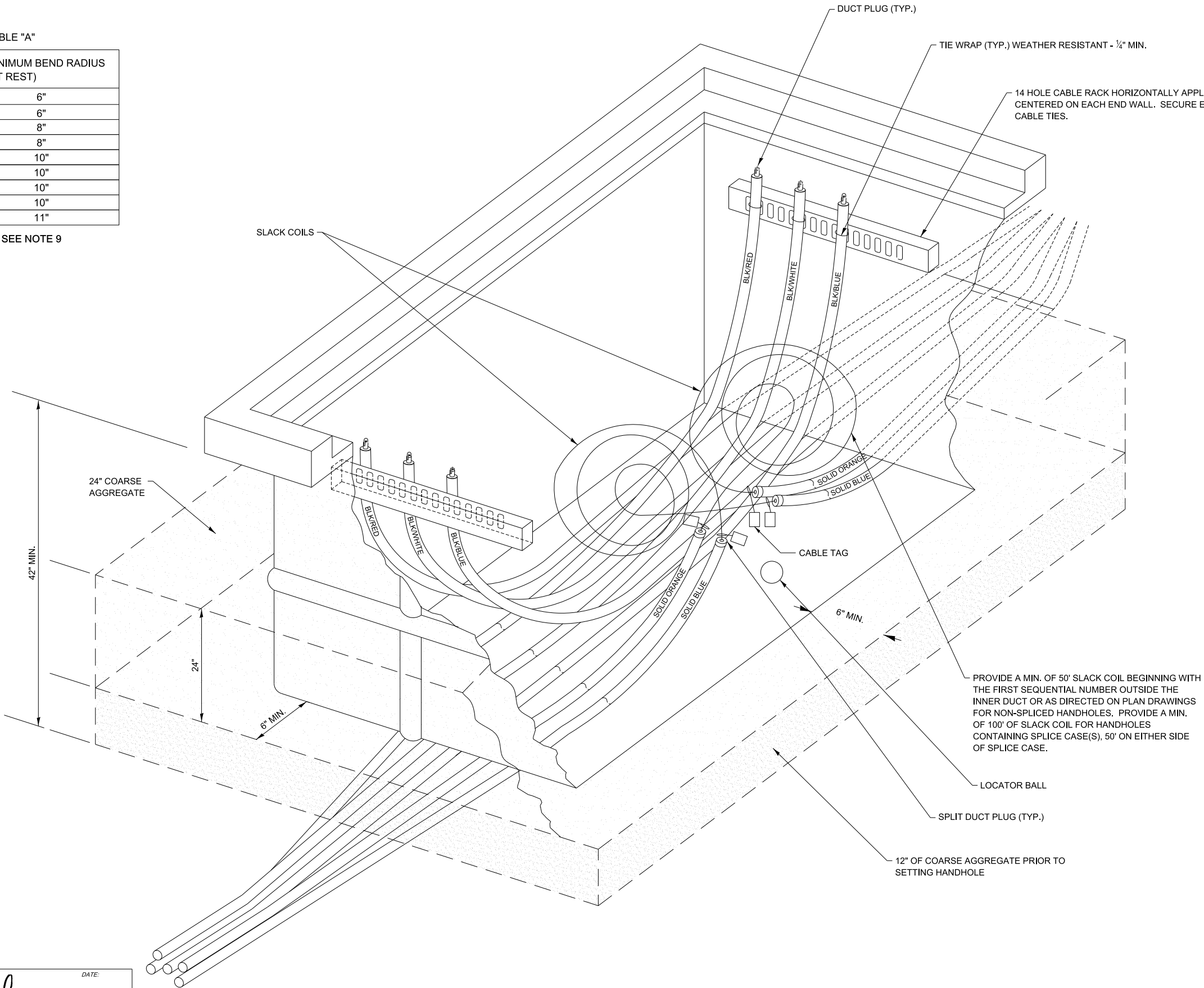
1. NO CORING/DRILLING OR ALTERATION OF  
HANDHOLE SHALL BE ALLOWED

HDPE AND FIBER OPTIC CABLE PLACEMENT IN HANDHOLE

TABLE "A"

FIBER COUNT	MINIMUM BEND RADIUS (AT REST)
24F	6"
48F	6"
72F	8"
96F	8"
144F	10"
188F	10"
288F	10"
432F	10"
864F	11"

SEE NOTE 9



SAMPLE CABLE TAG

NOTES:

- FIBER OPTIC CABLES SHALL HAVE A CABLE I.D. TAG ON BOTH SIDES OF THE SLACK COIL IDENTIFYING THE OWNER, DUCT COLOR, CABLE COUNT, AND DIRECTION.
- COLOR NOTED ON INNERDUCTS IS FOR REFERENCE ONLY.
- COIL FIBER CABLE IN HANDHOLE ENSURING THAT THE BEND RADIUS MEETS THE VALUES IN TABLE "A".
- EACH FIBER CABLE COIL SHALL BE TIED TOGETHER IN A SINGLE TIGHT BUNDLE.
- EACH FIBER COIL BUNDLE SHALL BE COILED TIGHTLY ENOUGH THAT IT IS NOT COMPRESSED WHEN THE HANDHOLE LID IS CLOSED.
- FIBER SPLICE CONTAINER SHALL BE PLACED IN THE HANDHOLE ALLOWING FOR EASY ACCESS AND LABELED WITH OWNER, END LOCATIONS, FIBER TYPE, AND FIBER COUNT.
- FIBER CONDUIT SHALL EXTEND INTO THE HANDHOLE 12 TO 18 INCHES WITH THE END TURNED UP AND SEALED TO MINIMIZE WATER ENTERING THE CONDUIT. SPARE CONDUITS SHALL EXTEND TO CABLE RACK ON OPPOSITE WALL.
- MANUFACTURER'S SPECIFICATIONS OF MINIMUM BEND RADIUS SUPERCEDE TABLE "A".
- LOCATOR BALL SHALL BE PLACES IN HANDHOLES CONTAINING A SPLICE ENCLOSURE. PLACE LOCATOR BALL IN THE MIDDLE OF HANDHOLE.

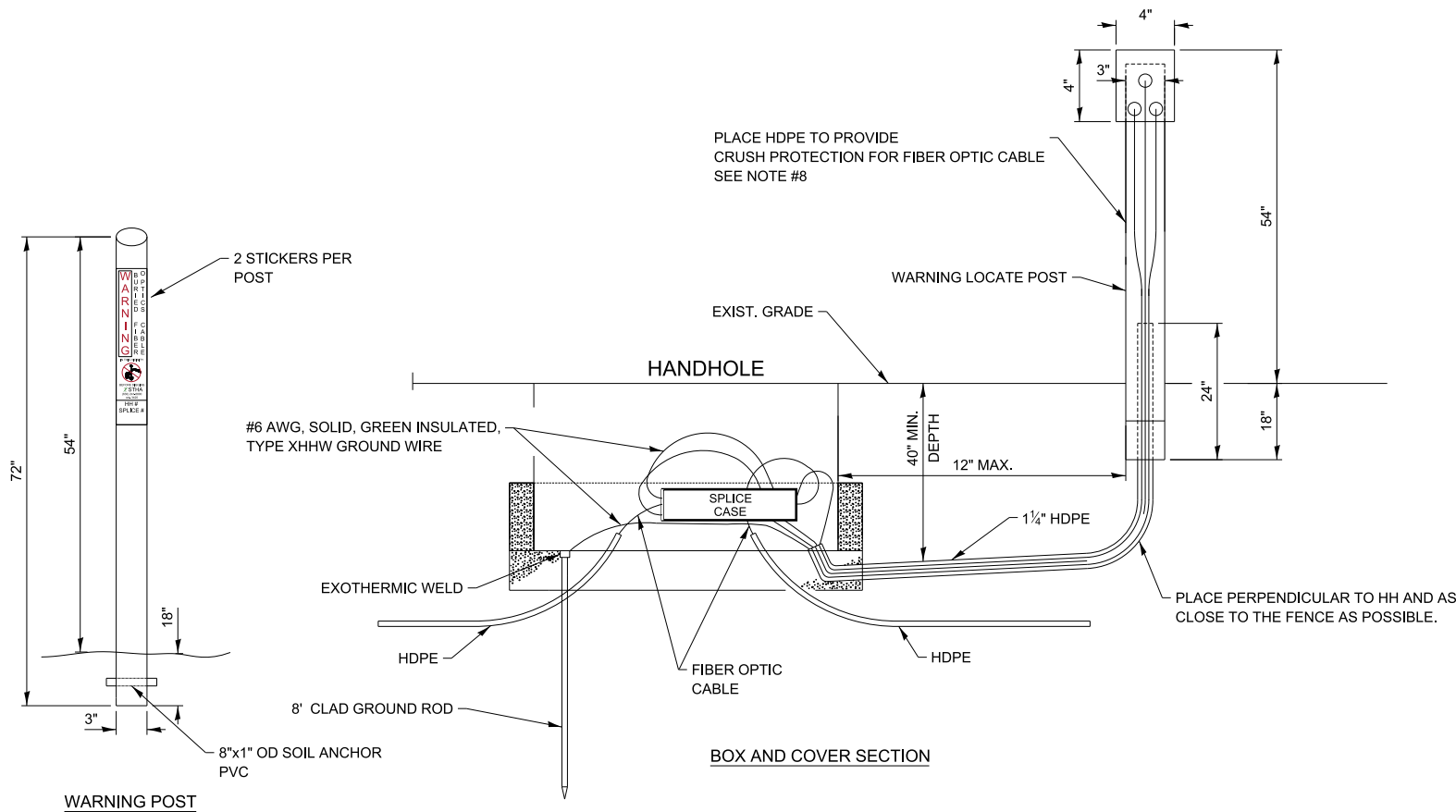
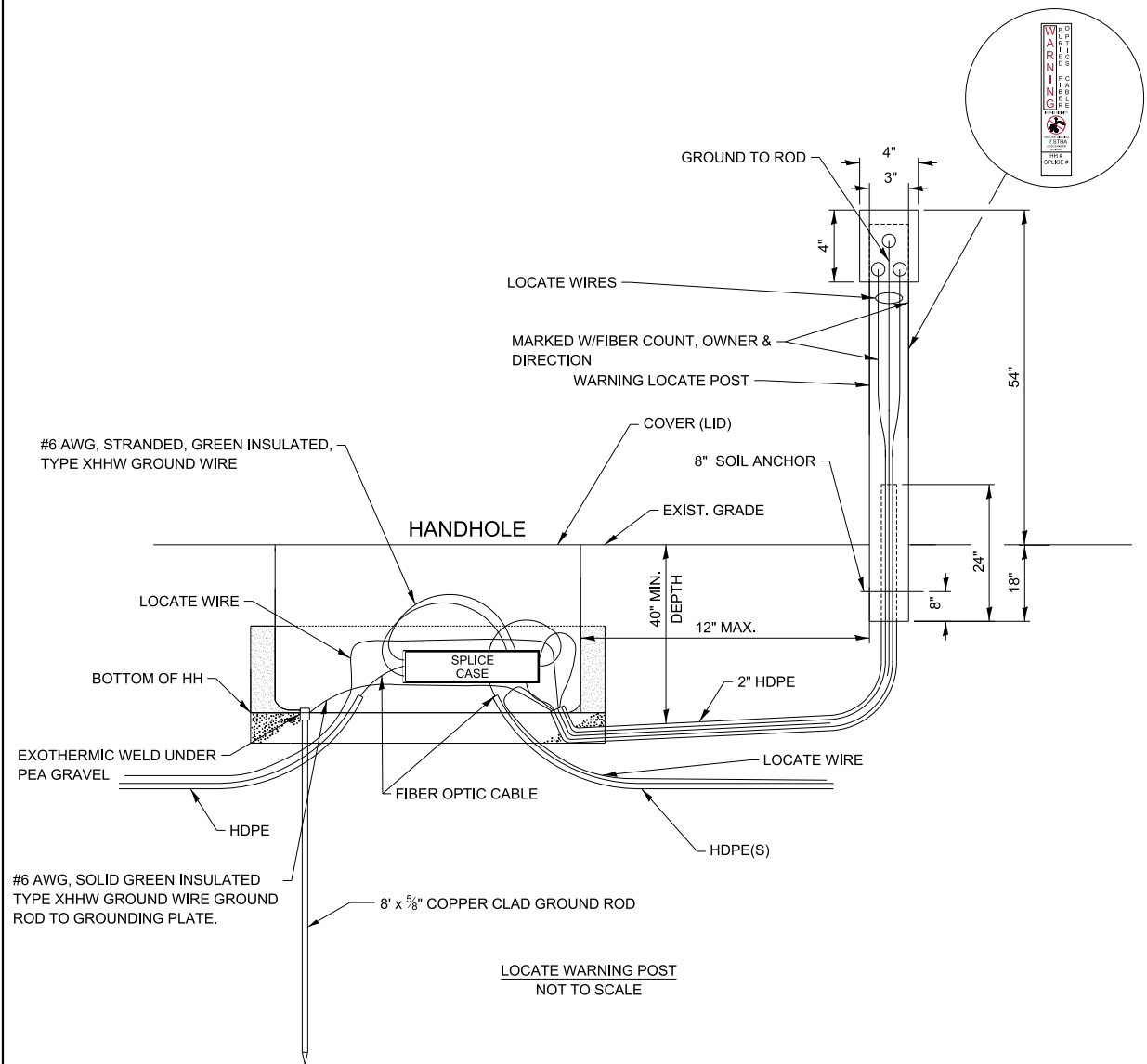
APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER

DATE:  
03/01/2024



FIBER OPTIC SYSTEM  
TYPICALS AND DRAWINGS

FIBER HANDHOLE SITE DETAIL AND GROUNDING



GENERAL NOTES

1. LOCATE WARNING POST SHALL BE PLACED 1 FOOT FROM HANDHOLE OR AT FENCE LINE OR RIGHT-OF-WAY LINE IF POSSIBLE.
2. AREA AROUND THE HANDHOLE SHALL BE BACKFILLED ONLY TO THE TOP OF THE BOX. FLUSH TO EXISTING GRADE.
3. COIL FIBER CABLE IN HANDHOLE ENSURING THAT THE BEND RADIUS SHALL NOT EXCEED VALUES LISTED IN TABLE A ON SHEET 8.
4. INSTALL GROUND ROD & EXOTHERMIC WELD AS PER MANUFACTURER'S INSTRUCTIONS. PLACE THE #6 GROUND WIRE (TYPE XHHW, SOLID, GREEN INSULATED) THAT HAS BEEN ATTACHED TO THE GROUND ROD AND TO THE CENTER LUG OF THE LOCATE POST.
5. BACKFILL MATERIAL SHALL BE COMPACTED TO THE SATISFACTION OF THE ENGINEER.
6. GROUND WIRE SHALL BE BONDED TO BOTH SHEATHS OF ARMORED FIBER OPTIC CABLE IN THE SPLICE ENCLOSURE USING #6 GROUND STRANDED, GREEN INSULATED WIRE. EACH GROUND SHALL BE ISOLATED WITHIN THE ENCLOSURE.
7. INSTALL 2" HDPE CONDUIT FROM HANDHOLE TO WARNING POST TO ALLOW GROUNDING CABLE AND LOCATE TRACE WIRES TO BE INSTALLED.
8. NO HANDHOLES WILL BE ALLOWED IN PAVED ROADWAYS OR SHOULDERS.
9. THE TOPS OF ALL HANDHOLES SHALL BE FLUSH WITH THE EXISTING GRADE.
10. A WATER PROOF SEALING SIMPLEX DUCT PLUG SHALL BE INSTALLED AROUND THE FIBER OPTIC TO SEAL AROUND THE CONDUIT. A WATER PROOF SEALING PLUG SHALL BE INSTALLED IN ALL VACANT CONDUIT.
11. ANY WORK IN AN EXISTING SINGLE MODE HANDHOLE OR INVOLVING AN EXISTING SINGLE MODE DUCT AND FIBER SHALL BE COORDINATED WITH THE TOLLWAY FIBER OPTIC CONTRACTOR. USING A-36 PROCESS.
12. FOR ALL SPLICE AND HANDHOLE, NUMBER DECALS SHALL BE APPLIED AFTER INSTALLATION IS COMPLETED.
13. PLACEMENT OF SIGNS IS PREFERRED OVER POSTS. SIGNS SHALL BE USED ON LOCATIONS WHERE FENCE IS VISIBLE FROM ROAD. POSTS SHALL ONLY BE USED WHERE SIGN WOULD NOT BE VISIBLE FROM ROAD.

APPROVED BY: *Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE: 03/01/2024

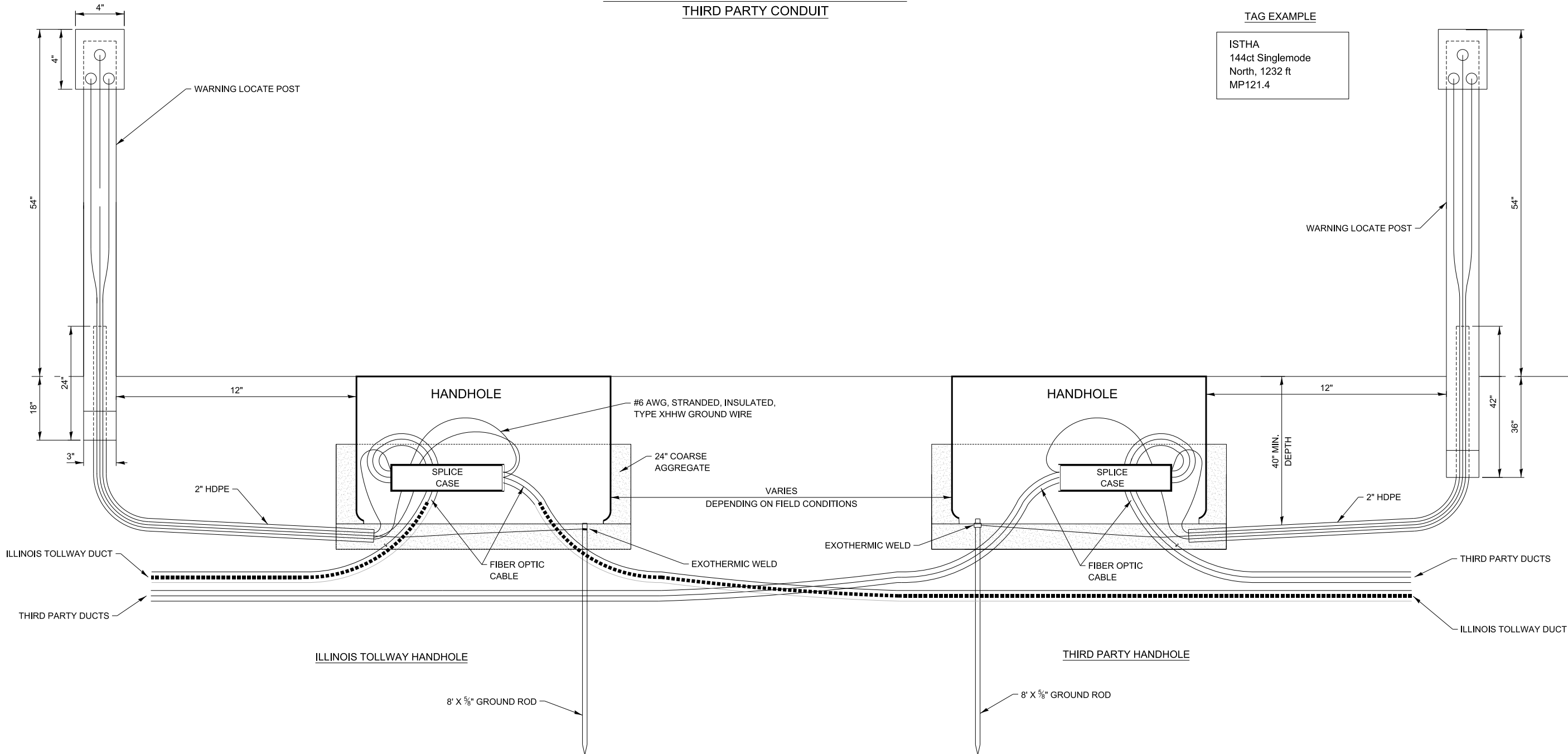


FIBER OPTIC SYSTEM  
TYPICALS AND DRAWINGS

FIBER HANDHOLE SITE DETAIL AND GROUNDING  
THIRD PARTY CONDUIT

TAG EXAMPLE

ISTHA  
144ct Singlemode  
North, 1232 ft  
MP121.4



NOTES:

1. WARNING LOCATE POST SHALL BE PLACED 1 FOOT FROM HANDHOLE OR AT FENCE LINE IF POSSIBLE.
2. AREA AROUND HANDHOLE SHALL BE BACKFILLED ONLY TO THE TOP OF THE BOX FLUSH TO EXISTING GRADE.
3. INSTALL GROUND ROD & EXOTHERMIC WELD AS PER MANUFACTURER'S INSTRUCTIONS. PLACE THE #6 GROUND WIRE (TYPE XHHW, SOLID, GREEN INSULATED) THAT HAS BEEN ATTACHED TO THE GROUND ROD ON THE CENTER LUG OF THE WARNING LOCATE POST.
4. GROUND WIRE SHALL BE BONDED TO BOTH SHEATHS OF ARMORED FIBER OPTIC CABLE IN THE SPLICE ENCLOSURE USING #6 STRANDED GREEN INSULATED TYPE XHHW GROUND WIRE. EACH GROUND SHALL BE ISOLATED WITHIN THE ENCLOSURE.
5. PLACE HDPE OVER FIBER OPTIC CABLE TO PROVIDE CRUSH PROTECTION EXTEND HDPE 1' INSIDE HANDHOLE.
6. NO HANDHOLES SHALL BE ALLOWED IN PAVED ROADWAYS OR SHOULDERS.
7. THE TOPS OF ALL HANDHOLES SHALL BE FLUSH WITH THE EXISTING GRADE UNLESS THE SLOPE IS GREATER THEN 1:4. IF SO, THE HANDHOLE SHALL BE PLACED LEVEL WITH THE EARTH GRADED AROUND IT SO NO PART OF THE SIDES OF THE HANDHOLE IS EXPOSED.
8. A WARNING LOCATE POST SHALL BE INSTALLED AT ALL HANDHOLES.
9. LOCATE WIRE SHALL BE TESTED FROM HANDHOLE TO HANDHOLE PRIOR TO ANY FIBER BEING INSTALLED IN CONDUIT.
10. LOCATE WIRES SHALL BE TAGGED INSIDE LOCATE POST. THE TAG SHALL SHOW THE FIBER OWNER, FIBER COUNT, FIBER TYPE, DIRECTION (N,S,E,W), DISTANCE TO NEXT LOCATE POST, AND MILE POST AT THAT LOCATION.

APPROVED BY:  
*Manar Nashif*  
CHIEF ENGINEERING OFFICER  
DATE:  
03/01/2024



FIBER OPTIC SYSTEM  
TYPICALS AND DRAWINGS

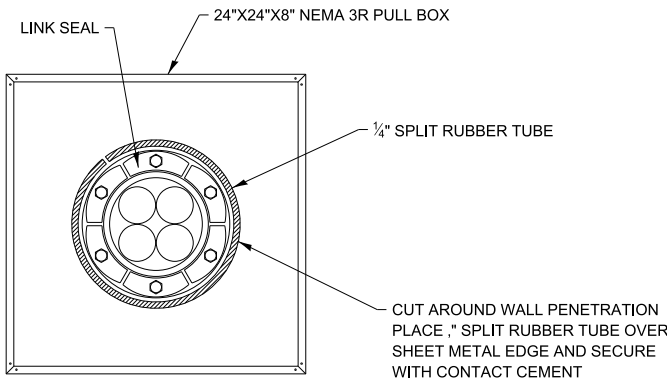
VERSION: 2024-03  
STANDARD: L1-06  
SHEET: 10 OF 15



NOTE:

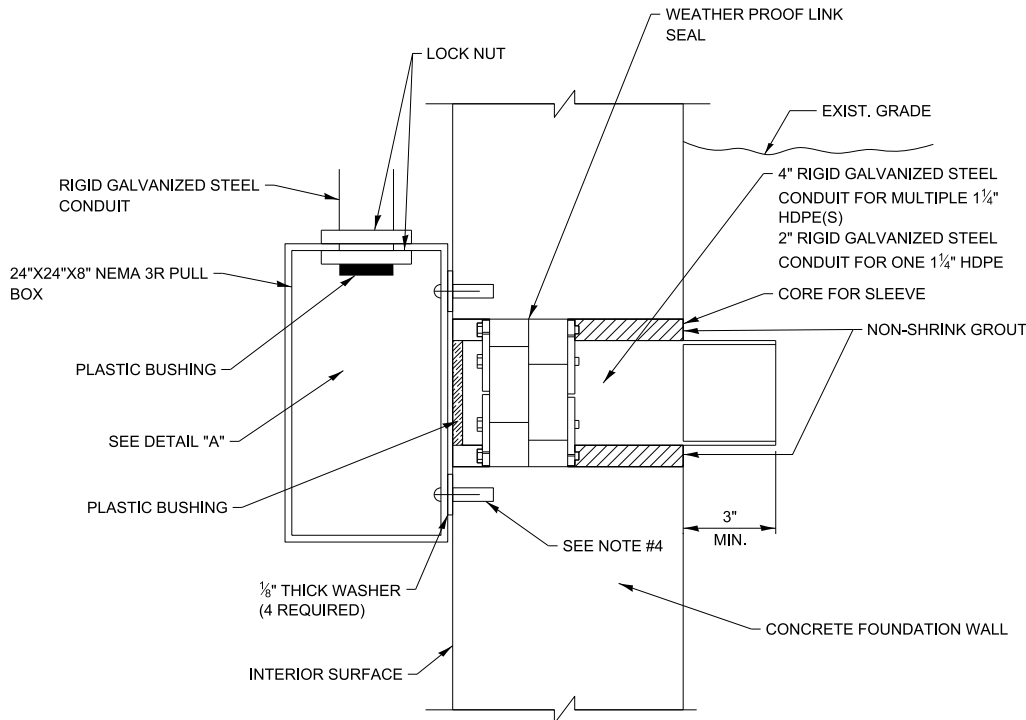
THE MAXIMUM PIPE STRAP SPACING SHALL BE 30" MAX. VERTICAL AND 18" HORIZONTAL MAXIMUM DISTANCE. A MINIMUM OF TWO PIPE STRAPS SHALL BE PLACED FOR ANY CONDUIT PLACED HIGHER THAN 4' ABOVE GRADE.

WALL PENETRATION DETAIL



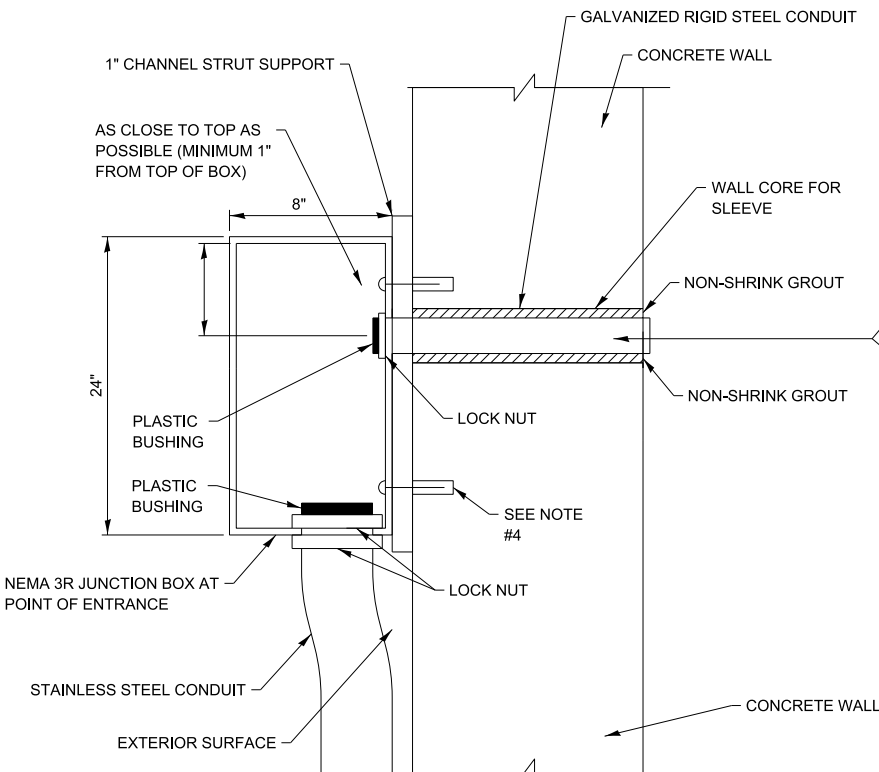
DETAIL A

FRONT VIEW  
BELOW GRADE  
BUILDING ENTRANCE PULL BOX



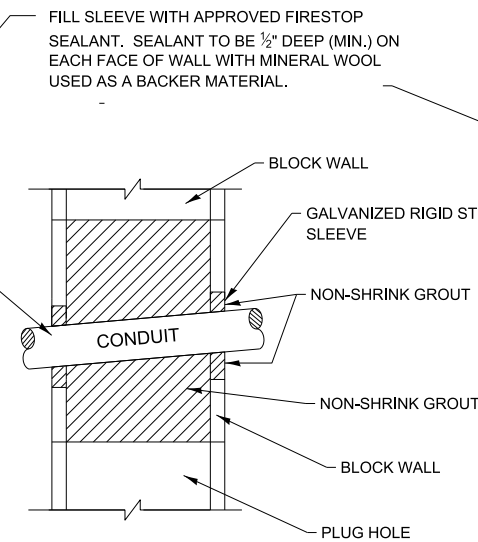
DETAIL B

SIDE VIEW  
BELOW GRADE  
BUILDING ENTRANCE PULL BOX



DETAIL D

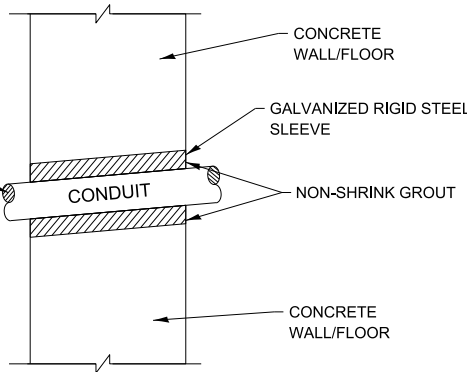
ABOVE GRADE  
BUILDING ENTRANCE PULL BOX



DETAIL E

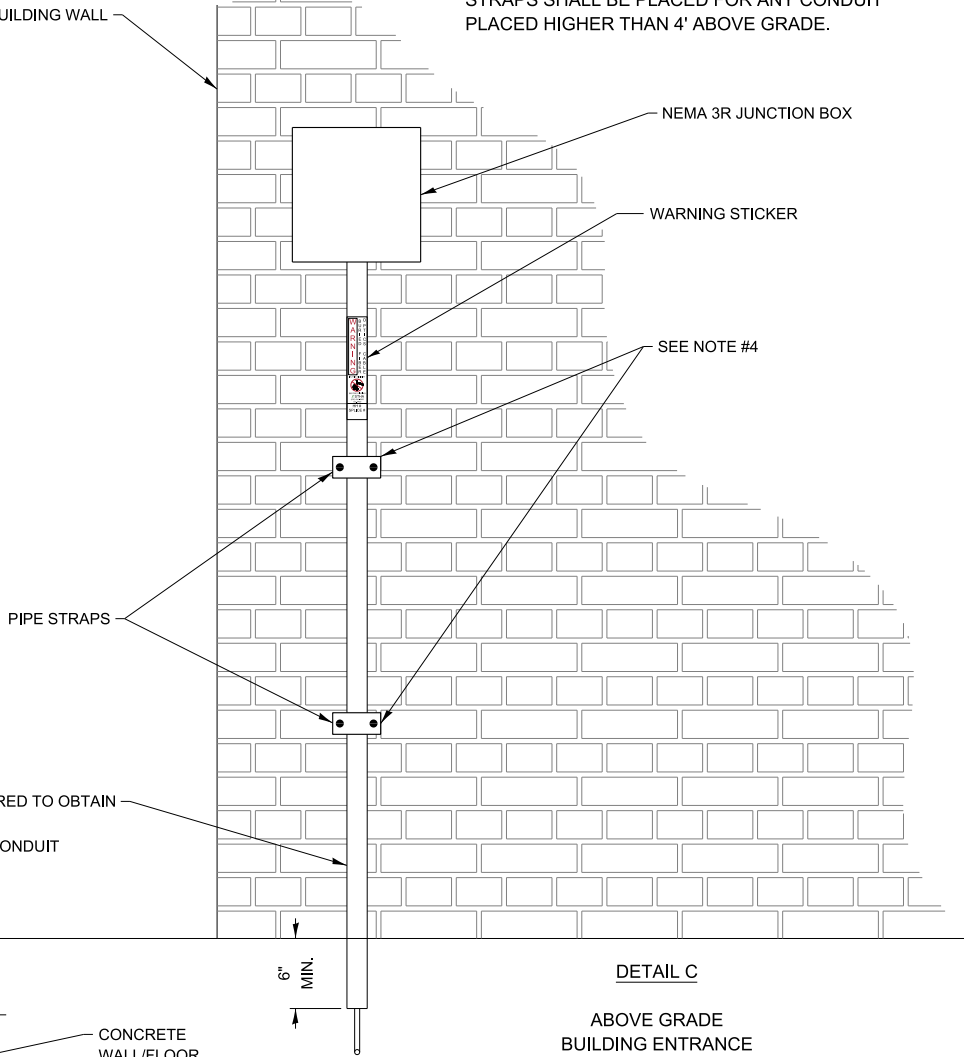
BLOCK WALL PENETRATION

EDGE DISTANCE REQUIRED TO OBTAIN  
MAX. WORKING LOAD  
3 1/8" STAINLESS STEEL CONDUIT



DETAIL F

CONCRETE WALL/FLOOR PENETRATION  
BUILDING PENETRATIONS SPECIFIED AS  
DETAIL F MAY BE A COMBINATION OF  
POURED OR HOLLOW CONCRETE BLOCK  
WITH A BRICK EXTERIOR. IF HOLLOW  
BLOCK IS ENCOUNTERED COMPLETE  
INSTALLATION PER DETAIL E THIS SHEET.



DETAIL C

ABOVE GRADE  
BUILDING ENTRANCE  
CONDUIT

GENERAL NOTES:

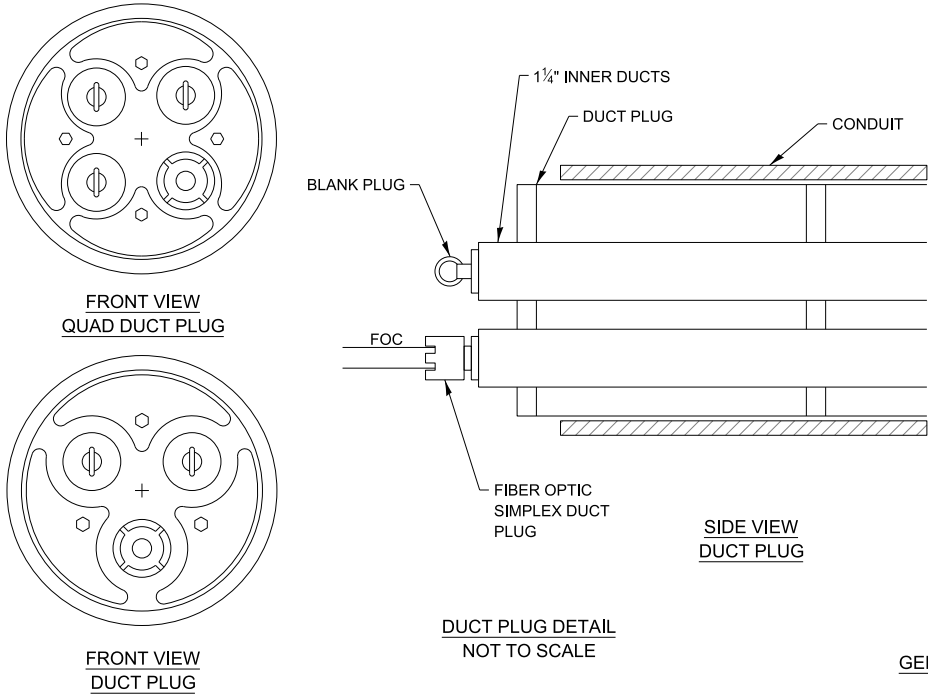
1. ALL PENETRATIONS SHALL UTILIZE EXISTING UNUSED BUILDING PENETRATIONS TO THE MAXIMUM EXTENT POSSIBLE.
2. ALL EXTERIOR MATERIALS SHALL BE STAINLESS STEEL UNLESS OTHERWISE NOTED.
3. ALL ANCHORS SHALL BE INSTALLED IN SOUND CONCRETE OR MASONRY.
4. USE APPROVED MASONRY ANCHOR.
5. ALL CONDUITS ENTERING THE BUILDING SHALL BE PITCHED AWAY FROM BUILDING.



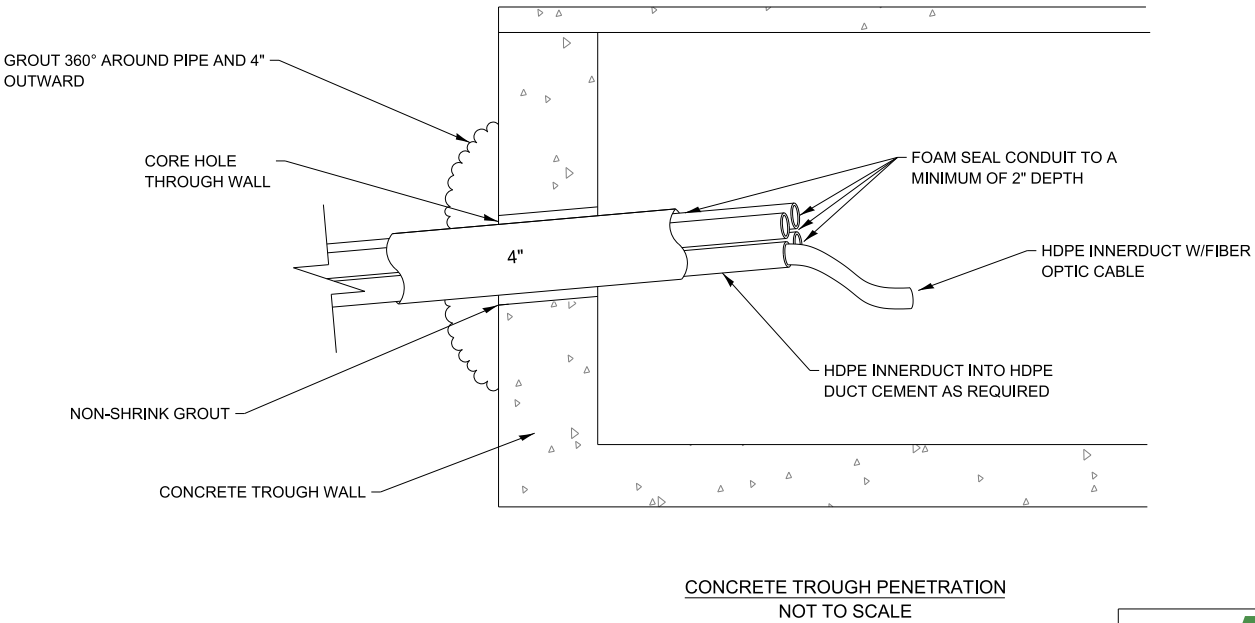
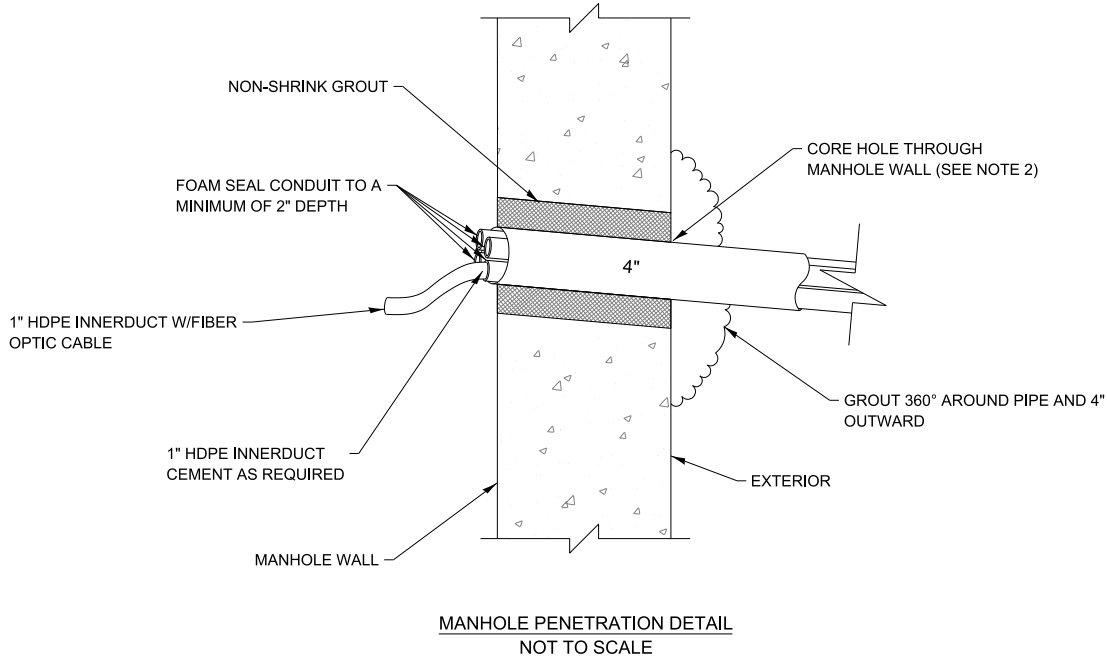
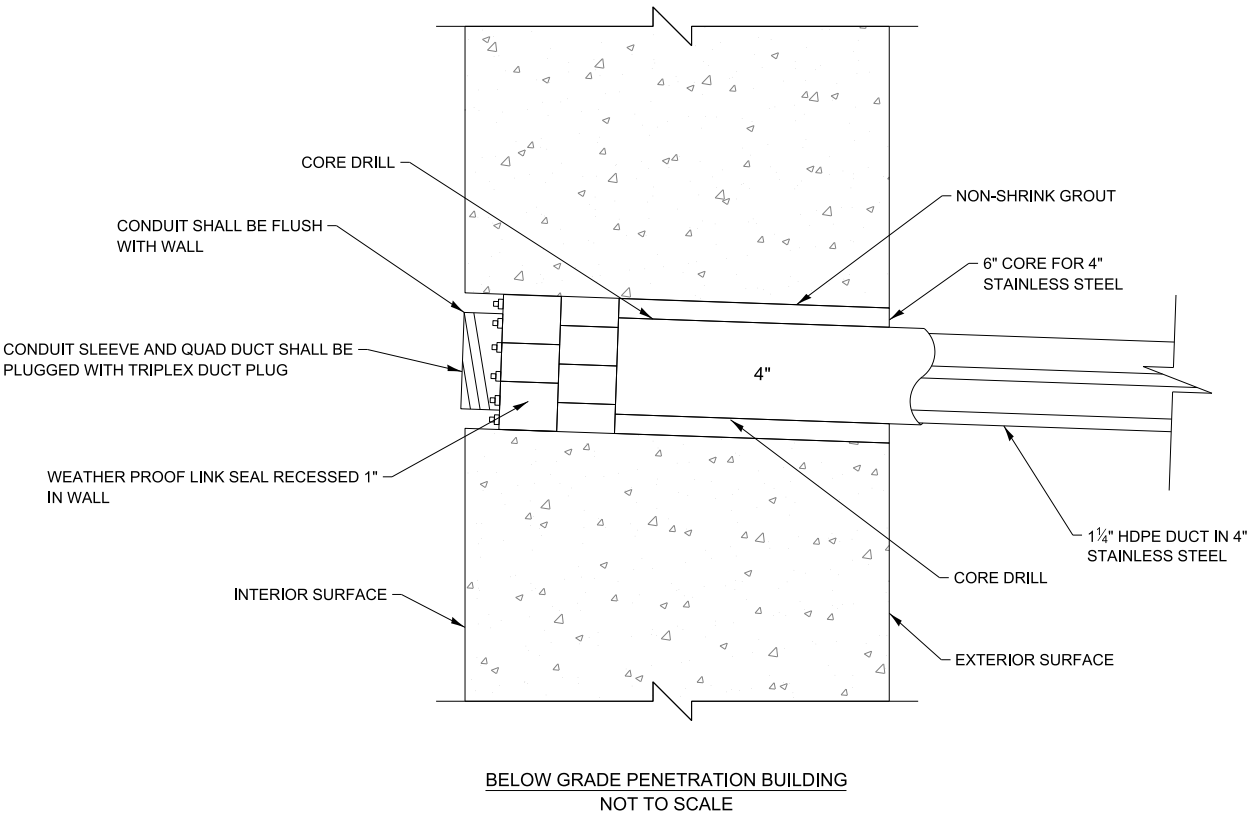
FIBER OPTIC SYSTEM  
TYPICALS AND DRAWINGS

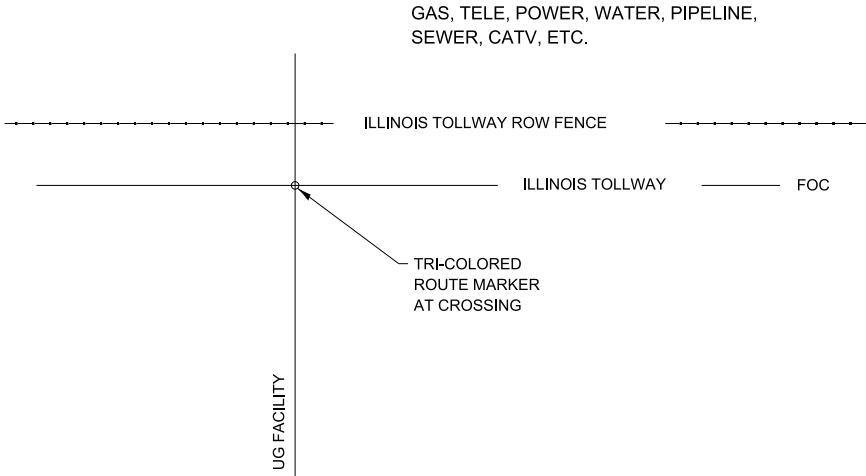


UNDERGROUND PENETRATION DETAIL

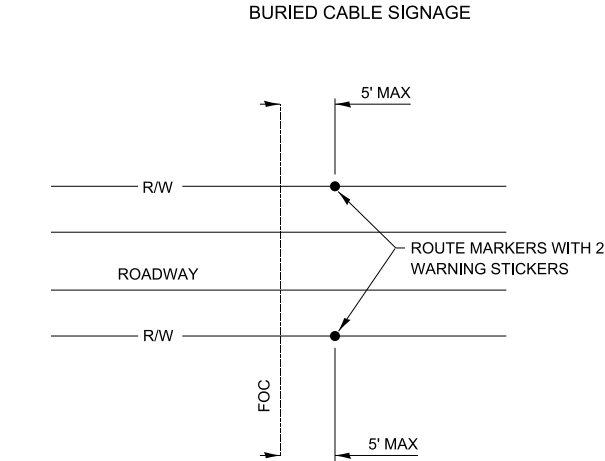


- GENERAL NOTES:
1. STAINLESS STEEL CONDUIT EXTENDING THROUGH FOUNDATION WALL SHALL BE ONE CONTINUOUS PIECE (NO COUPLINGS), SQUARE WITH BUILDING AT A SLIGHT ANGLE TO THE EXTERIOR TO PREVENT WATER SEEPAGE.
  2. MANHOLE CORES SHALL NOT BE THROUGH MANHOLE CONE.

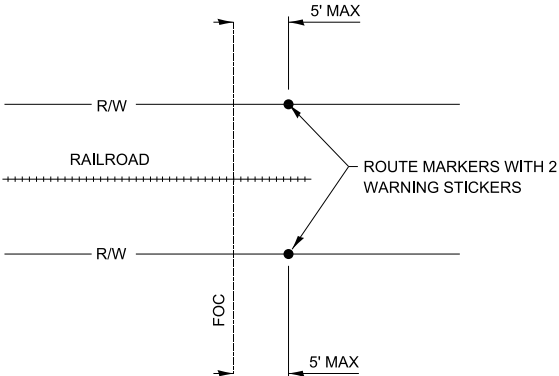




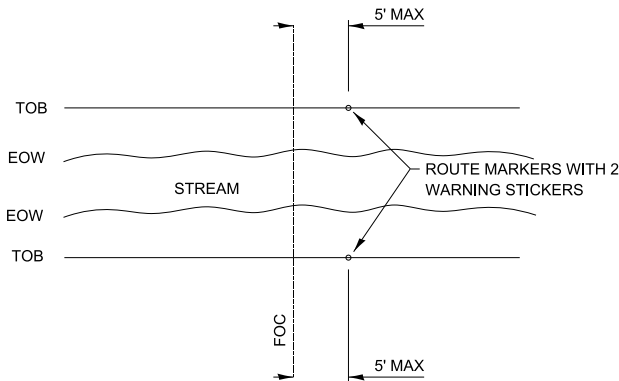
FACILITY CROSSING  
FIG. 1



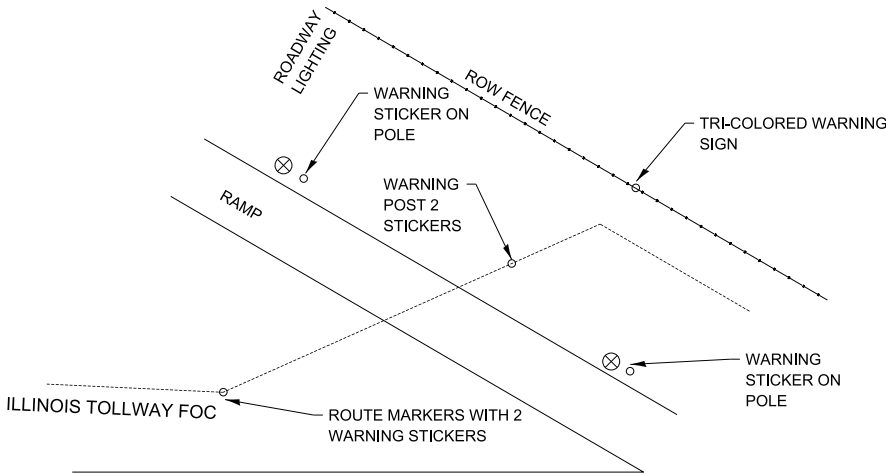
TYPICAL MARKER PLACEMENT AT ROAD AND BRIDGE CROSSING  
FIG. 2



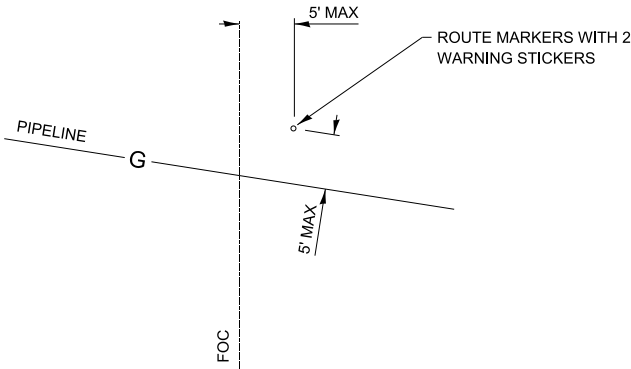
TYPICAL MARKER PLACEMENT AT RAILROAD CROSSING  
FIG. 3



TYPICAL MARKER PLACEMENT AT RIVER,  
CREEK & DRAINAGE DITCH CROSSING  
FIG. 4



ON/OFF RAMP CROSSING  
FIG. 5



TYPICAL MARKER PLACEMENT AT PIPELINE CROSSING  
FIG. 6

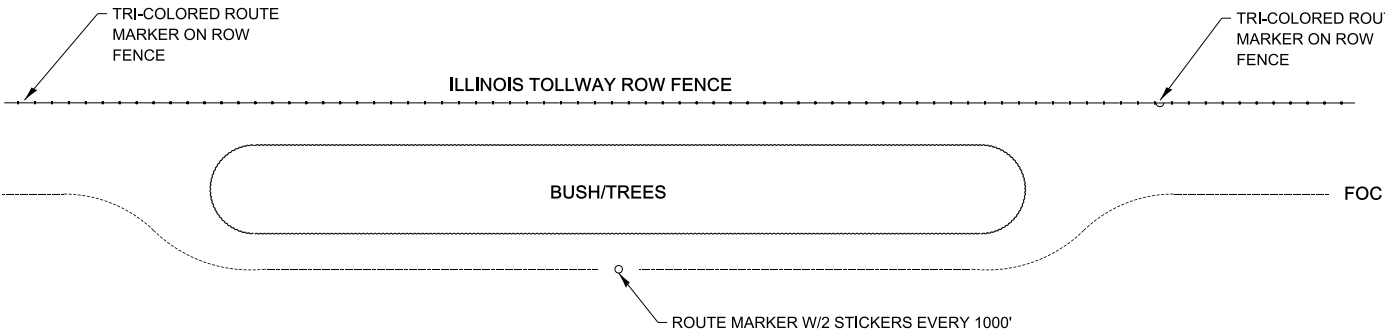
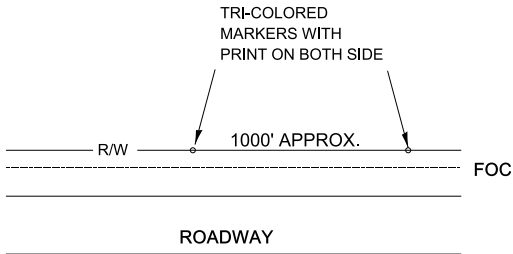


FIG. 7

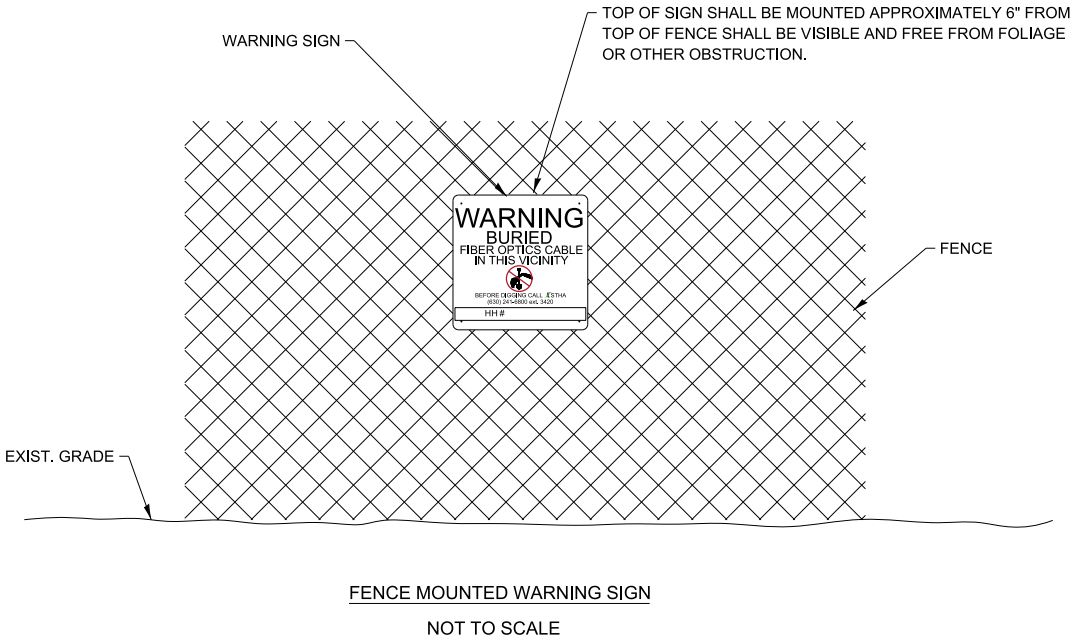


TYPICAL MARKER PLACEMENT  
TO BE PLACED NEXT TO R.O.W. FENCE LINE  
FIG. 8

GENERAL NOTES:

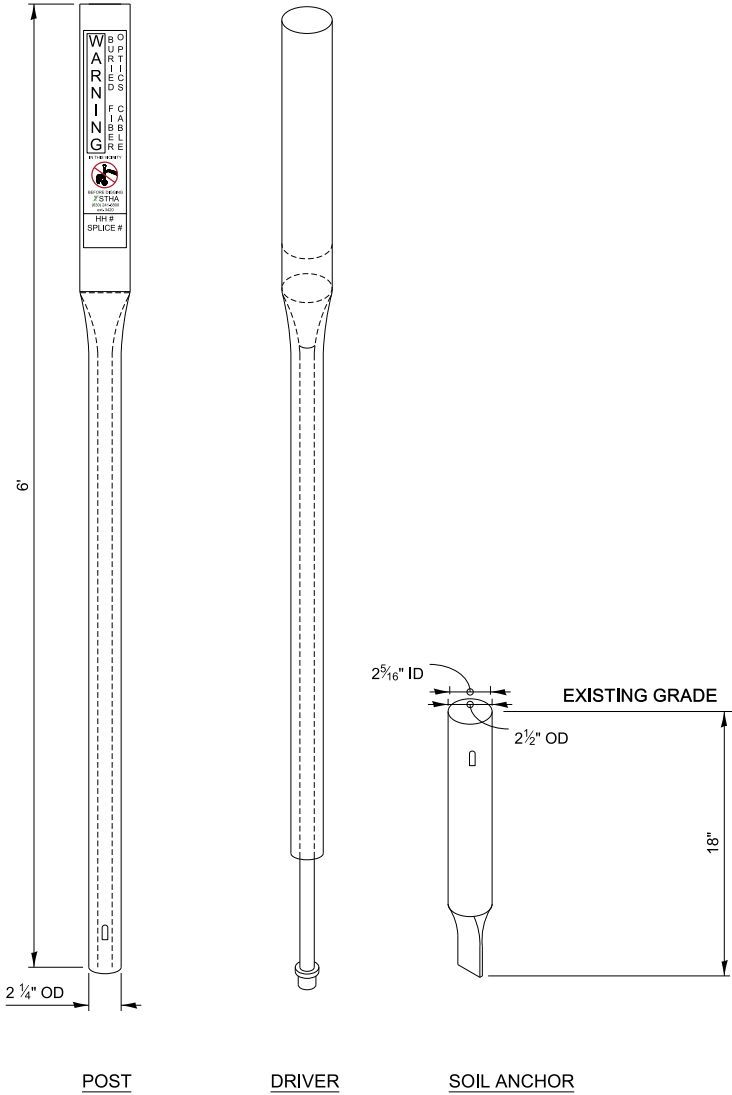
1. MAINTAIN A MINIMUM DISTANCE OF 5' FROM ANY UTILITY POLE OR PEDESTAL SIGN, MARKER POLE, OR ANY OTHER STRUCTURE.
2. WARNING MARKERS SHALL BE PLACED AT 1000' INTERVALS AND AT CHANGES IN CABLE LOCATION/DIRECTION OR AT CROSSING POINT OF OTHER UNDERGROUND FACILITIES. THE CONTRACTOR SHALL ADJUST EXCAVATION AS NECESSARY TO AVOID HIDDEN OBSTACLES AND TO MAINTAIN MAXIMUM DISTANCE FROM THE EDGE OF PAVEMENT. ALL DEVIATIONS SHALL BE APPROVED BY THE ENGINEER.

ROUTE MARKER INSTALLATION PROCEDURE



INSTALLATION OF WARNING POST:

1. INSTALL WARNING POST ACCORDING TO MANUFACTURERS INSTRUCTIONS AND RECOMMENDATIONS.
2. PLACEMENT OF POST SHALL NOT INTERFERE WITH THE REMOVAL OF HANDHOLE LIDS
3. WARNING SIGN SHALL BE ATTACHED TO ROW FENCE WHEREVER POSSIBLE. UV STABILIZED BLACK NYLON CABLE TIES (14" LENGTH, .30" WIDTH, 120 LBS TENSILE STRENGTH), (4 EA.) 3 WRAPS EACH TIE, SHALL BE USED TO ATTACH WARNING SIGN TO FENCE.
4. SEE SHEET 15 OF THIS SERIES FOR FIBER WARNING LABEL AND WARNING SIGN DETAILS.



FIBER WARNING LABEL & WARNING SIGN DETAILS



FENCE SIGN

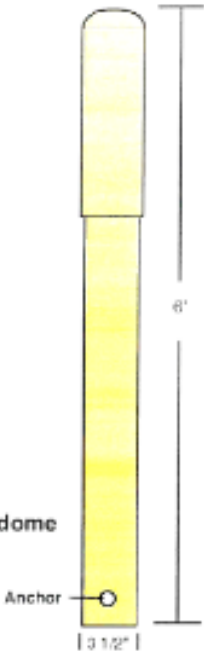


Products provided by:



Part #: SA-ISTHA  
Size: 12" T X 9" W  
Material: Polyethylene  
Color: Black text with Orange bkgd, with white  
Holes: 4 - 3/16"

Part #: PP6-ISTHA  
Size: 6"  
Material: Polydome  
Color: Orange Post and dome



ROUTE MARKER POST

ROUTE MARKER POST  
DECAL

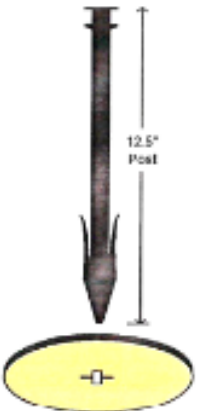


Part #: PTP466000-ISTHA - 4" X 6,000', 6MIL Orange with black text  
WARNING TAPE



FLUSH DISC MARKER

Part #: FMM-6-ISTHA  
Size: 6"  
Material: Clear .125 Lexan  
Color: Black text with Orange bkgd  
Holes: center for 12.5 pastic anchor

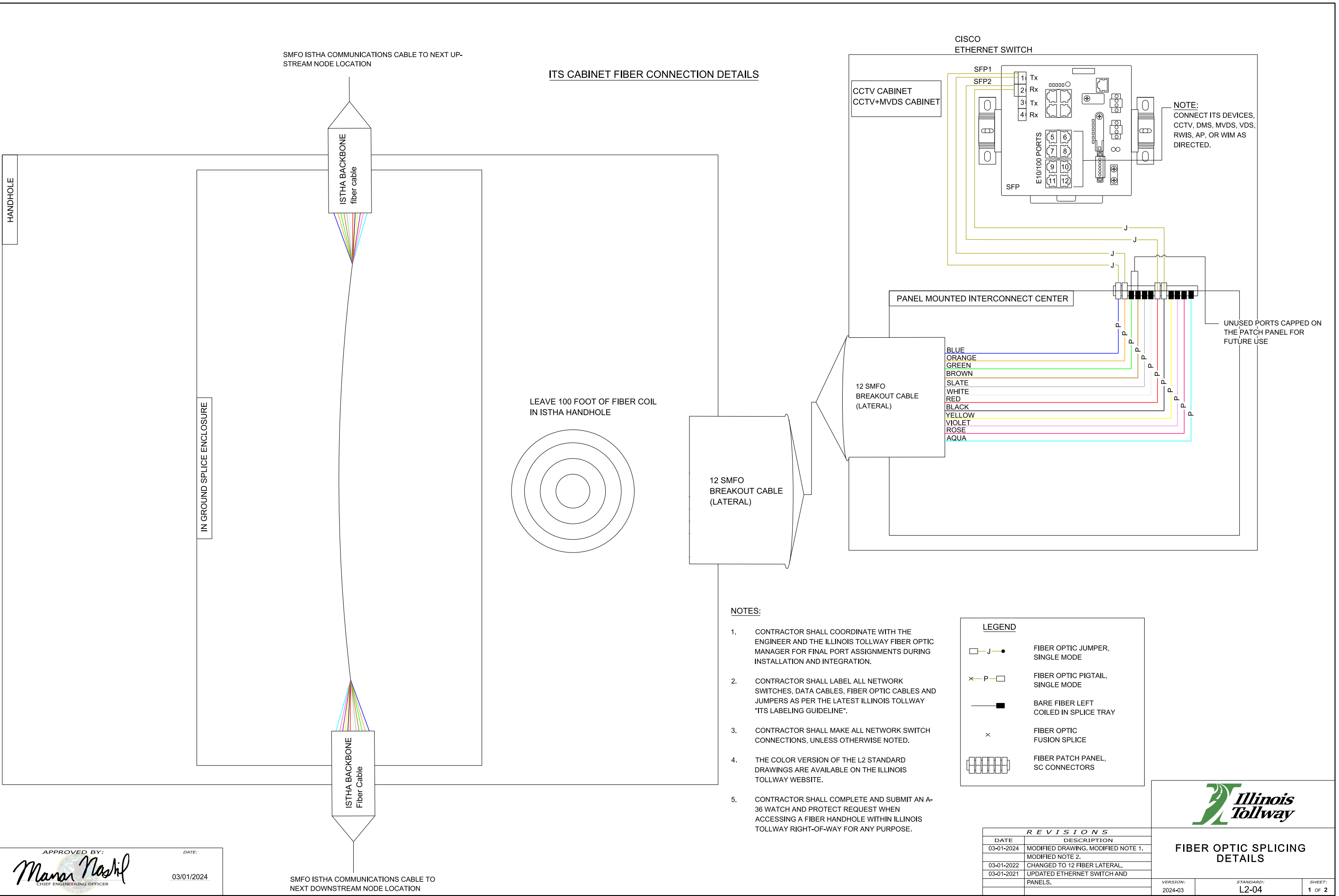


Part #: D-314-ISTHA  
Size: 14" x 3"  
Material: Decal  
Color: Orange with black text, Black "Warning" panel with white text, White no dig  
Scale: Shown @ 50%

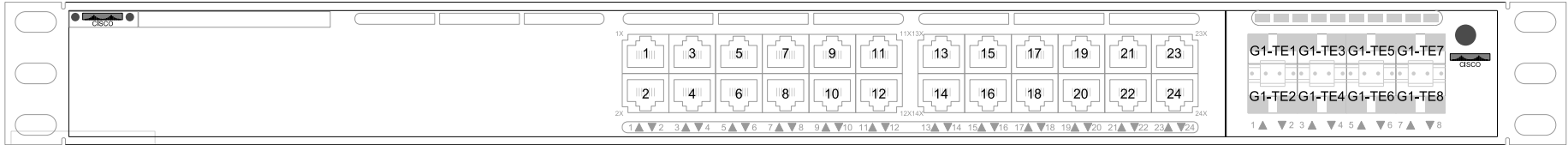


NOTE:

SIGN AND LABEL SHOWN IS AVAILABLE THROUGH ACP INTERNATIONAL. ALTERNATE SIGN LABELS SHALL BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

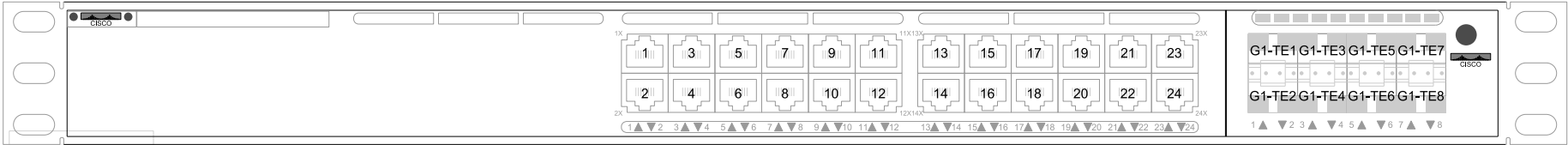


PROPOSED NETWORK SWITCH PORT ASSIGNMENT SCHEMATIC



CISCO ETHERNET SWITCH  
10/100/1000 ETHERNET AND 10G SFP PORT ARRANGEMENT

PORT NUMBER	PORT ASSIGNMENT	PORT NUMBER	PORT ASSIGNMENT	PORT NUMBER	PORT ASSIGNMENT	PORT NUMBER	PORT ASSIGNMENT
TENGIGABITETHERNET1/1/1	PRIMARY N/E LAYER 3 UPLINK	GI1/0/1	TECH ACCESS	GI1/0/9	RESERVED - IT DEVICE - TBD	GI1/0/17	OPEN
TENGIGABITETHERNET1/1/2	SECONDARY N/E LAYER 2 UPLINK	GI1/0/2	RESERVED - IT DEVICE - TBD	GI1/0/10	RESERVED - IT DEVICE - TBD	GI1/0/18	OPEN
TENGIGABITETHERNET1/1/3	N/E LAYER 2 - CAMERA AND VDS	GI1/0/3	RESERVED - IT DEVICE - TBD	GI1/0/11	OPEN	GI1/0/19	OPEN
TENGIGABITETHERNET1/1/4	N/E LAYER 2 - ATM/DMS	GI1/0/4	RESERVED - IT DEVICE - TBD	GI1/0/12	OPEN	GI1/0/20	OPEN
TENGIGABITETHERNET1/1/5	N/E LAYER 2 - VWIM	GI1/0/5	RESERVED - IT DEVICE - TBD	GI1/0/13	OPEN	GI1/0/21	OPEN
TENGIGABITETHERNET1/1/6	FUTURE/TBD	GI1/0/6	RESERVED - IT DEVICE - TBD	GI1/0/14	OPEN	GI1/0/22	OPEN
TENGIGABITETHERNET1/1/7	FUTURE/TBD	GI1/0/7	RESERVED - IT DEVICE - TBD	GI1/0/15	OPEN	GI1/0/23	OPEN
TENGIGABITETHERNET1/1/8	SECONDARY N/E TO S/W LAYER 3 UPLINK	GI1/0/8	RESERVED - IT DEVICE - TBD	GI1/0/16	OPEN	GI1/0/24	OPEN

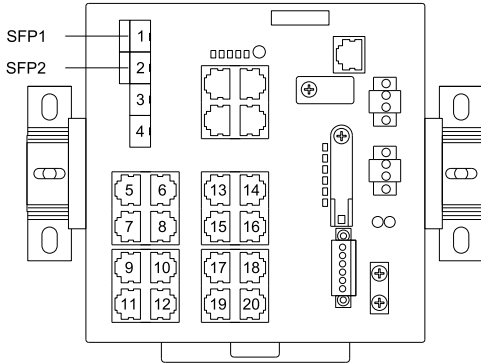
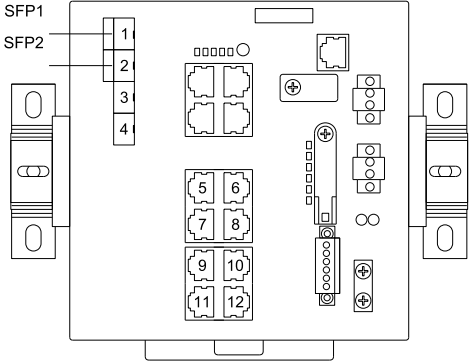


CISCO EXPANSION SWITCH  
10/100/1000 ETHERNET AND 10G SFP PORT ARRANGEMENT

PORT NUMBER	PORT ASSIGNMENT	PORT NUMBER	PORT ASSIGNMENT	PORT NUMBER	PORT ASSIGNMENT	PORT NUMBER	PORT ASSIGNMENT
TENGIGABITETHERNET1/1/1	PRIMARY S/W LAYER 3 UPLINK	GI1/0/1	TECH ACCESS	GI1/0/9	RESERVED - ITS DEVICE - TBD	GI1/0/17	OPEN
TENGIGABITETHERNET1/1/2	SECONDARY S/W LAYER 2 UPLINK	GI1/0/2	RESERVED - ITS DEVICE - TBD	GI1/0/10	RESERVED - ITS DEVICE - TBD	GI1/0/18	OPEN
TENGIGABITETHERNET1/1/3	S/W LAYER 2 - CAMERA AND VDS	GI1/0/3	RESERVED - ITS DEVICE - TBD	GI1/0/11	OPEN	GI1/0/19	OPEN
TENGIGABITETHERNET1/1/4	S/W LAYER 2 - ATM/DMS	GI1/0/4	RESERVED - ITS DEVICE - TBD	GI1/0/12	OPEN	GI1/0/20	OPEN
TENGIGABITETHERNET1/1/5	S/W LAYER 2 - VWIM	GI1/0/5	RESERVED - ITS DEVICE - TBD	GI1/0/13	OPEN	GI1/0/21	OPEN
TENGIGABITETHERNET1/1/6	FUTURE/TBD	GI1/0/6	RESERVED - ITS DEVICE - TBD	GI1/0/14	OPEN	GI1/0/22	OPEN
TENGIGABITETHERNET1/1/7	FUTURE/TBD	GI1/0/7	RESERVED - ITS DEVICE - TBD	GI1/0/15	OPEN	GI1/0/23	OPEN
TENGIGABITETHERNET1/1/8	SECONDARY S/W TO N/E LAYER 3 UPLINK	GI1/0/8	RESERVED - ITS DEVICE - TBD	GI1/0/16	OPEN	GI1/0/24	OPEN

NOTES:

- SEE SHEET 1 OF 2 FOR NOTES.
- ALL NETWORK SWITCH FIBER CONNECTIONS SHOWN ON THIS SHEET SHALL BE PERFORMED BY THE TOLLWAY MAINTENANCE TEAM, IN COORDINATION WITH THE ENGINEER.
- PORT ASSIGNMENT INCLUDED FOR REFERENCE FOR EXISTING ITS SITES WITH 20 PORT SWITCH.
- THE CONTRACTOR SHALL MAKE LOCAL/COPPER CAT-6 CONNECTIONS PER THE PORT ASSIGNMENTS SHOWN ON THIS SHEET, OR AS DIRECTED BY THE ENGINEER. THE ENGINEER SHALL VERIFY CORRECT PORT CONNECTIONS HAVE BEEN MADE DURING SITE TESTING.



CISCO ETHERNET SWITCH  
10/100/1000 SFP PORT ARRANGEMENT

PORT NUMBER	12 PORT SWITCH (CCTV/VDS/DMS) PORT ASSIGNMENT	12 PORT SWITCH (VWIM) PORT ASSIGNMENT	20 PORT SWITCH (CCTV/VDS/DMS) (SEE NOTE 3) PORT ASSIGNMENT	20 PORT SWITCH (FULL ATM/GANTRY) PORT ASSIGNMENT
GI1/1	UPLINK/DOWNLINK	UPLINK/DOWNLINK	UPLINK/DOWNLINK	UPLINK/DOWNLINK
GI1/2	UPLINK/DOWNLINK	UPLINK/DOWNLINK	UPLINK/DOWNLINK	UPLINK/DOWNLINK
GI1/3	RESERVED	RESERVED	RESERVED	RESERVED
GI1/4	RESERVED	RESERVED	RESERVED	RESERVED
GI1/5	TECH ACCESS	VWIM CONTROLLER	TECH ACCESS	TECH ACCESS
GI1/6	CAMERA #1	VWIM VIRTUAL WEB SERVER	MODEM (IF INSTALLED)	WEST/SOUTH - ATM LCS CONTROLLER #1
GI1/7	CAMERA #2	CAMERA #1	DMS	WEST/SOUTH - ATM LCS CONTROLLER #2
GI1/8	SENSYS AP	CAMERA #2	VWIM	WEST/SOUTH - ATM LCS CONTROLLER #3
GI1/9	DMS CONTROLLER	IP RELAY	RESERVED	WEST/SOUTH - ATM LCS CONTROLLER #4
GI1/10	MVDS #1	UPS	RESERVED	WEST/SOUTH - ATM LCS CONTROLLER #5
GI1/11	MVDS #2/UPS	TECH ACCESS	UPS	WEST/SOUTH - ATM LCS CONTROLLER #6
GI1/12	IP RELAY	TECH ACCESS	IP RELAY	SHOULDER
GI1/13	N/A	N/A	CAMERA #1	IP RELAY
GI1/14	N/A	N/A	CAMERA #2	EAST/NORTH - ATM LCS CONTROLLER #1
GI1/15	N/A	N/A	RESERVED	EAST/NORTH - ATM LCS CONTROLLER #2
GI1/16	N/A	N/A	RESERVED	EAST/NORTH - ATM LCS CONTROLLER #3
GI1/17	N/A	N/A	MVDS #1	EAST/NORTH - ATM LCS CONTROLLER #4
GI1/18	N/A	N/A	MVDS #2	EAST/NORTH - ATM LCS CONTROLLER #5
GI1/19	N/A	N/A	MVDS #3	EAST/NORTH - ATM LCS CONTROLLER #6
GI1/20	N/A	N/A	SENSYS AP	EAST/NORTH - ATM LCS CONTROLLER SHOULDER



FIBER OPTIC SPLICING  
DETAILS