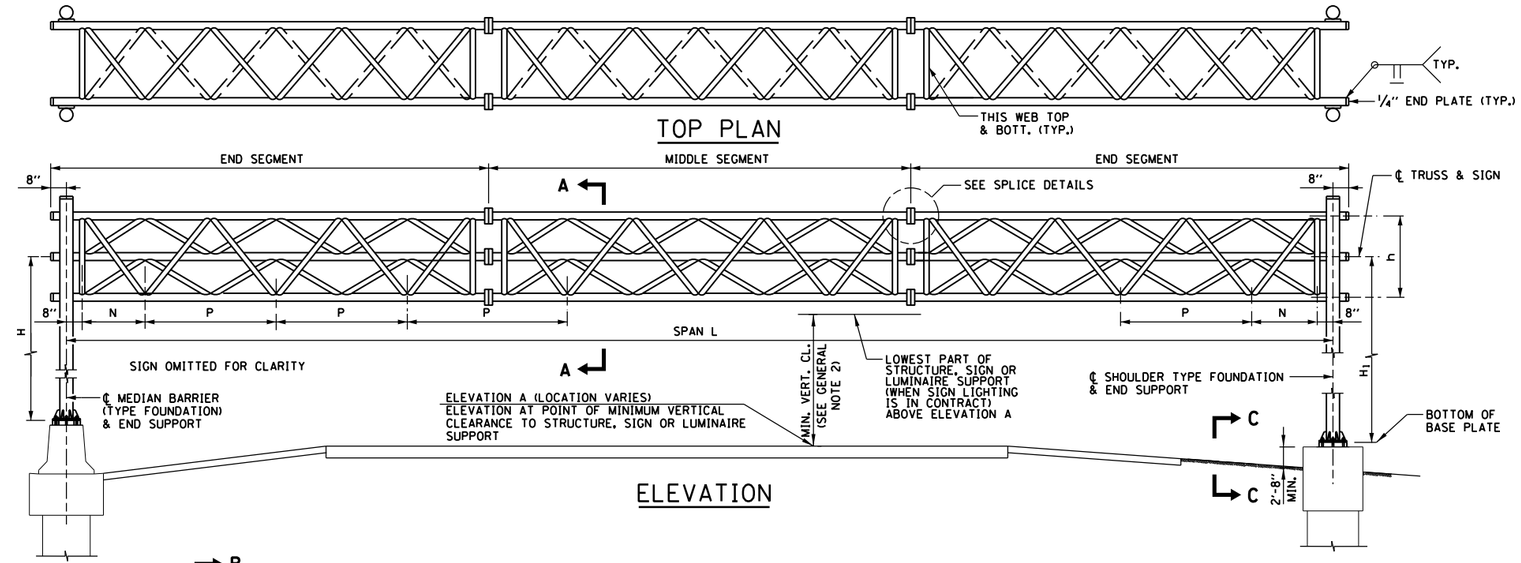
Tollway Standard Drawing Revisions

Section F	Sign Structure	Effective 3/31/2014
	Standard	**Modification Summary**
	All Sheets	**Illinois Tollway Standard Logo Inserted In Title Block.**
	F1	**Overhead Sign Structure-Span Type, Structure Details**
	Sheets 1-5	Revised Sign Structure Member Schedule
		New Truss Span Lengths: 130', 140' and 150'
		Revised Camber Table
		Revised Table A
		Revised Material Notes: Replaced Steel A500 Grade B With A106 Grade B
	F2	**Reserved**
	F3	**Reserved**
		Overhead Sign Structure Span Type, Foundations Moved to F1
	F4	**Overhead Sign Structure-Cantilever Type, Structure Details**
	Sheets 1-9	Cantilever Sign Structure Completely Redesigned
		Revised Steel Support Post Columns
		New Concrete Column Support
		New Foundation Grade beam Supported By Two Drilled Shafts
	F5	**Reserved**
		Overhead Sign Structure-Cantilever Type, Foundations Moved to F4
	F6	**Reserved**
	F7	**Reserved**
		Overhead Sign Structure-Cantilever Type, Foundations Moved to F4
	F8	**Overhead Sign Structure Sign and Luminaire Supports**
		Increased sign support members for sign width 16'-22' from 4 to 6.
		Increased sign support members for sign width 22'-28' from 5 to 6.
	F13	**Overhead Sign Structure-Monotube Type, Structure Details**
	Sheets 1-8	
	F14	**Overhead Sign Structure-Butterfly Type, Structure Details**
	Sheets 1-10	

New Sheet



GENERAL NOTES:

1. WORK THIS SHEET WITH BASE SHEET M27.
2. SEE THE TOLLWAY STRUCTURE DESIGN MANUAL FOR MINIMUM VERTICAL CLEARANCE.
3. 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.
4. 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.
5. TRUSSES SHALL BE SHIPPED INDIVIDUALLY WITH ADEQUATE PROVISON TO PREVENT DETRIMENTAL MOTION DURING TRANSPORT. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONFIGURATION AND PROTECTION OF THE TRUSSES.

DESIGN SPECIFICATIONS:

1. 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, 6TH EDITION.

CONSTRUCTION SPECIFICATIONS:

1. ALL MATERIALS, EXCEPT AS SHOWN, FABRICATION, ERECTION AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 733 OF THE LATEST IDOT STANDARD SPECIFICATIONS.
2. THE COST OF FURNISHING AND INSTALLATING THE STAINLESS STEEL BAND AND WIRE MESH CLOTH IS INCLUDED IN THE COST OF OVERHEAD SIGN STRUCTURE SPAN TYPE.

LOADING:

1. BOTH END SUPPORTS ARE DESIGNED FOR 60% OF THE TOTAL LOAD.
2. WIND LOADING SHALL BE A MINIMUM OF 35 PSF ON SIGN PANELS AND 10 PSF ON GROSS AREAS DEFINED BY THE PERIMETER OF TRUSS MEMBERS NOT COVERED BY SIGN PANEL AREAS.
3. THE AASHTO GROUP II AND III ALLOWABLE STRESS SHALL BE 133% (ALLOWABLE STRESS DESIGN).

FABRICATION NOTES:

1. MATERIALS: ALUMINUM ALLOYS AS SHOWN THROUGHOUT PLANS. ALL STRUCTURAL STEEL PIPE SHALL BE ASTM A53 GRADE B OR A106 GRADE B. ALL STRUCTURAL STEEL PLATES AND SHAPES SHALL CONFORM TO AASHTO M270 GR. 36 OR GR. 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.
2. 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 STANDARD SPECIFICIATIONS.
3. FASTENERS FOR ALUMINUM TRUSSES: ALL BOLTS NOTED AS "HIGH STRENGTH" MUST SATISFY THE REQUIREMENTS OF AASHTO M164 (ASTM A325), OR APPROVED ALTERNATE, AND MUST HAVE MATCHING LOCK NUTS. THREADED STUDS FOR SPLICES (IF MEMBERS INTERFERE) MUST SATISFY THE REQUIREMENTS OF ASTM A449, ASTM A193, GRADE B7, OR APPROVED ALTERNATE, AND MUST HAVE MATCHING LOCK NUTS. BOLTS AND LOCK NUTS NOT REQUIRED TO BE HIGH STRENGTH MUST SATISFY THE REQUIREMENTS OF ASTM A307. ALL BOLTS AND LOCK NUTS MUST BE HOT DIP GALVANIZED PER AASHTO M232. THE LOCK NUTS MUST 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 MUST BE PRODUCED FROM ASTM A276 TYPE 304, 304L, 316 OR 316L, CONDITION A, COLD FINISHED STAINLESS STEEL, OR AN EQUIVALENT MATERIAL ACCEPTABLE TO THE ENGINEER. ALL NUTS FOR U-BOLTS MUST BE LOCK NUTS EQUIVALENT TO ASTM A307 WITH NYLON OR STEEL INSERTS AND HOT DIP GALVANIZED PER AASHTO M232. A STAINLESS STEEL FLAT WASHER CONFORMING TO ASTM A240, TYPE 302 OR 304, IS REQUIRED UNDER EACH U-BOLT LOCK NUT.
5. GALVANIZING: ALL STEEL GRATING, PLATES, SHAPES AND PIPE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111. PAINTING IS NOT PERMITTED.
6. SEE TABLE "SIGN STRUCTURE MEMBER SCHEDULE" FOR "W" AND "W_1".

SIGN STRUCTURE MEMBER SCHEDULE

TRUSS NO.	DIMENSIONS					ALUMINUM TRUSS						STEEL END SUPPORT		
	TRUSS SPAN L	P	N	h	W_1	MAXIMUM ALLOWABLE SIGN PANEL AREA	DL (TRUSS) DEFLECTION	MIDDLE SEGMENT OR END SEGMENT				W	PIPE COLUMN (NOMINAL DIAMETER)	
								CHORD (O.D.)		DIAGONAL (O.D.)			10" X.X.S. (104.13#/FT.)	12" X.X.S. (125.49#/FT.)
								FRONT	REAR	FRONT	REAR		H OR H_1	H OR H_1
T-80	80'-0"	9'-0"	3'-4"	4'-6"	3'-10 3/4"	900 S.F.	1"	5 1/2"Ø x 1/2"	5 1/2"Ø x 1/2"	2 1/2"Ø x 1/4"	2 1/2"Ø x 1/4"	5'-8"	32'-0" (MAX)	38'-0" (MAX)
T-85	85'-0"	9'-6"	3'-10"	4'-9"	4'-1 3/8"	955 S.F.	1 1/16"	6 7/8"Ø x 1/2"	6 7/8"Ø x 1/2"	3"Ø x 1/4"	3"Ø x 1/4"	6'-4"	31'-0" (MAX)	38'-0" (MAX)
T-90	90'-0"	10'-0"	4'-4"	5'-0"	4'-4"	1010 S.F.	1 1/8"	6 7/8"Ø x 1/2"	6 7/8"Ø x 1/2"	3"Ø x 1/4"	3"Ø x 1/4"	6'-4"	31'-0" (MAX)	38'-0" (MAX)
T-95	95'-0"	10'-6"	4'-10"	5'-3"	4'-6 5/8"	1065 S.F.	1 3/16"	6 7/8"Ø x 1/2"	6 7/8"Ø x 1/2"	3"Ø x 1/4"	3"Ø x 1/4"	6'-4"	31'-0" (MAX)	38'-0" (MAX)
T-100	100'-0"	11'-4"	4'-0"	5'-8"	4'-10 7/8"	1125 S.F.	1 1/4"	7"Ø x 1/2"	7"Ø x 1/2"	3 1/2"Ø x 1/4"	3 1/2"Ø x 1/4"	7'-4"	31'-0" (MAX)	38'-0" (MAX)
T-105	105'-0"	12'-0"	3'-10"	6'-0"	5'-2 3/8"	1180 S.F.	1 5/16"	7"Ø x 1/2"	7"Ø x 1/2"	3 1/2"Ø x 1/4"	3 1/2"Ø x 1/4"	7'-4"	31'-0" (MAX)	38'-0" (MAX)
T-110	110'-0"	12'-6"	4'-4"	6'-3"	5'-5"	1200 S.F.	1 3/8"	7"Ø x 1/2"	7"Ø x 1/2"	3 1/2"Ø x 1/4"	3 1/2"Ø x 1/4"	7'-4"	31'-0" (MAX)	38'-0" (MAX)
T-115	115'-0"	13'-0"	4'-10"	6'-6"	5'-7 5/8"	1200 S.F.	1 1/2"	7 1/2"Ø x 1/2"	7 1/2"Ø x 1/2"	3 1/2"Ø x 1/4"	3 1/2"Ø x 1/4"	10'-2"	34'-0" (MAX)	40'-0" (MAX)
T-120	120'-0"	13'-8"	4'-8"	6'-10"	5'-11"	1200 S.F.	1 5/8"	7 1/2"Ø x 1/2"	7 1/2"Ø x 1/2"	3 1/2"Ø x 1/4"	3 1/2"Ø x 1/4"	10'-2"	34'-0" (MAX)	40'-0" (MAX)
T-130	130'-0"	15'-0"	4'-4"	7'-6"	6'-5 7/8"	1200 S.F.	1 13/16"	9"Ø x 1/2"	9"Ø x 1/2"	4" Øx1/4"	4" Øx1/4"	10'-2"	NOT APPLICABLE	40'-0" (MAX)
T-140	140'-0"	16'-3"	4'-4"	8'-2"	7'-0 7/8"	1200 S.F.	1 11/16"	10"Ø x 1/2"	10"Ø x 1/2"	4" Øx1/4"	4" Øx1/4"	10'-2"	NOT APPLICABLE	40'-0" (MAX)
T-150	150'-0"	17'-6"	4'-4"	8'-10"	7'-7 3/4"	1200 S.F.	1 3/16"	11"Ø x 1/2"	11"Ø x 1/2"	4 1/2"Ø x 1/4"	4 1/2"Ø x 1/4"	10'-2"	NOT APPLICABLE	40'-0" (MAX)

NOTES:

1. XXS DENOTES DOUBLE EXTRA STRONG PIPE.
2. A PAIR OF MAIN PIPE 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	N
5 1/2"Ø	10"	13"	8
6 7/8"Ø & 7"Ø	11 1/2"	14 1/2"	10
7 1/2"Ø	12 1/2"	15 1/2"	12
9"Ø	13 1/2"	16 1/2"	14
10"Ø	15 1/2"	18 1/2"	16
11"Ø	17 1/2"	20 1/2"	18

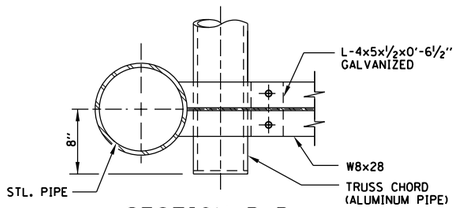
Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 2-7-2012

DATE	REVISIONS
2-7-2012	REVISED FOUNDATIONS AND REVISED NOTES.
2-1-2013	REVISED TABLES, ELEVATION, AND NOTES
12-12-2013	REVISED TABLES AND NOTES
3-31-2014	REVISED SIGN STRUCTURE DETAILS.

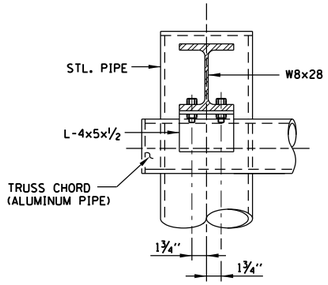
Illinois Tollway

OVERHEAD SIGN STRUCTURE
SPAN TYPE
STRUCTURE DETAILS

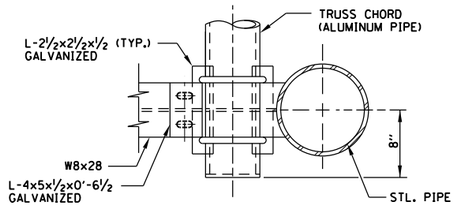
STANDARD F1-04



SECTION B-B



SECTION A-A



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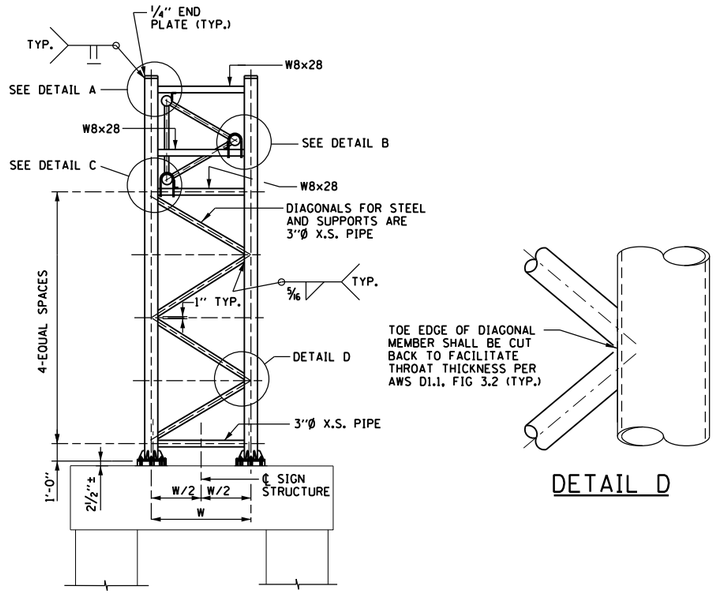
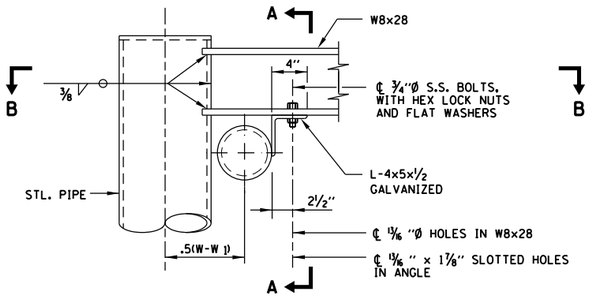
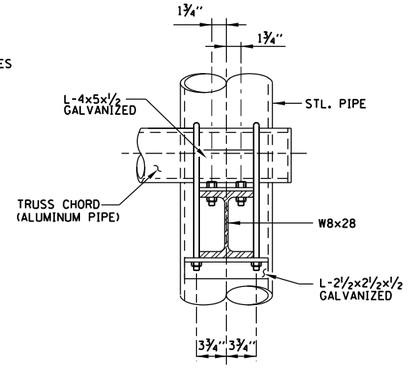


TYPICAL END SUPPORT ELEVATION

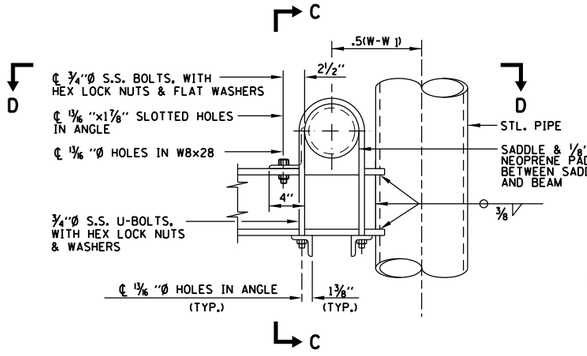
DETAIL D



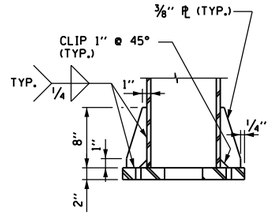
DETAIL A



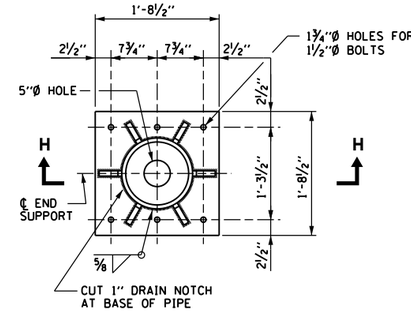
SECTION C-C



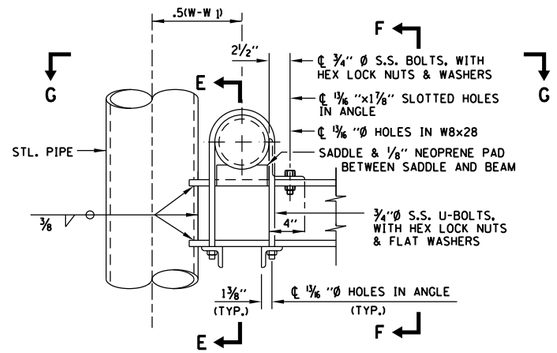
DETAIL B



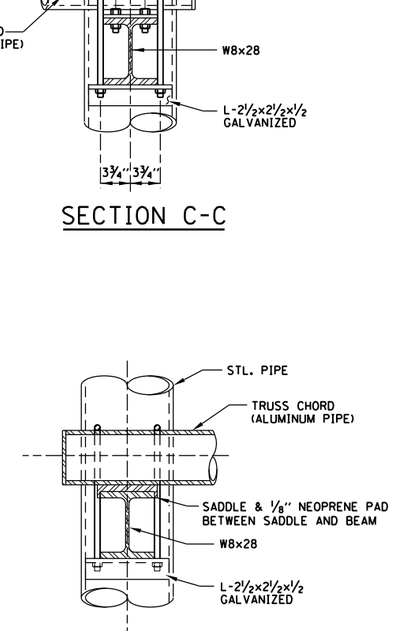
SECTION H-H



BASE PLATE PLAN



DETAIL C



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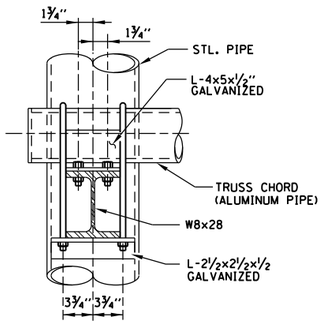
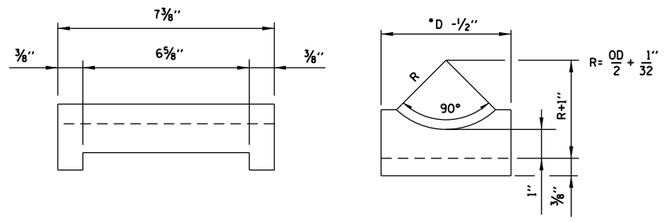


SECTION F-F



SADDLE (SHIM) DETAIL (ALUMINUM)

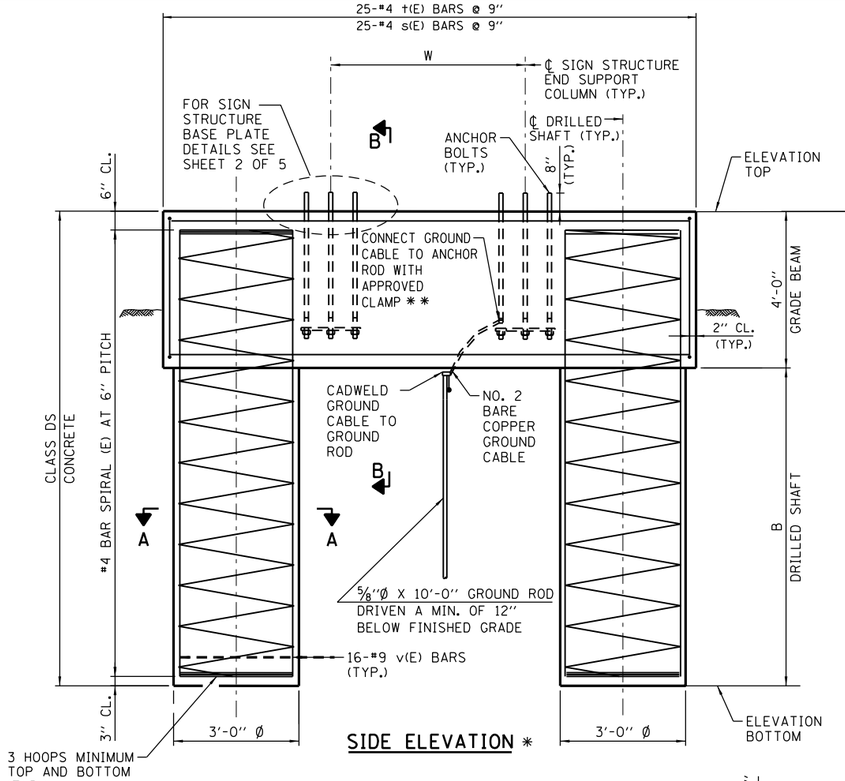
SHEET 2 OF 5

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 2-7-2012

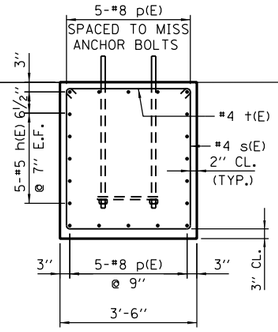
Illinois Tollway

OVERHEAD SIGN STRUCTURE
SPAN TYPE
STRUCTURE DETAILS

STANDARD F1-04



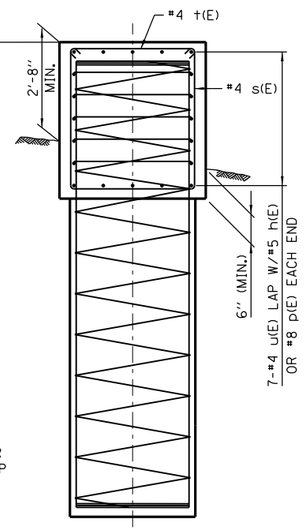
SIDE ELEVATION *



SECTION B-B

* REINFORCEMENT IN GRADE BEAM NOT SHOWN FOR CLARITY

** ANCHOR ROD SHALL BE GROUND OR FILED TO BRIGHT METAL AT CLAMP AND GROUND CABLE CONNECTION.



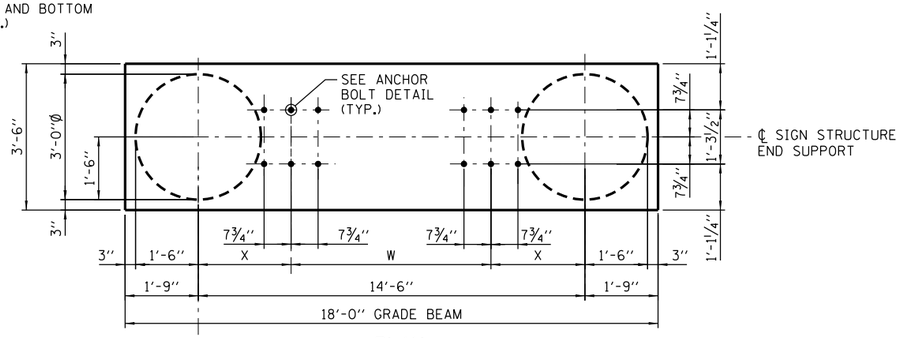
END VIEW

NOTES:

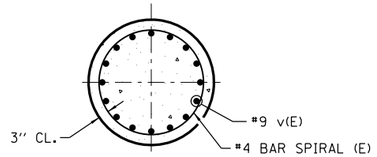
1. THE FOUNDATION DETAILS SHOWN ARE BASED ON COMMON COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE QU > 1.25 TON/SQ. FT. NO STANDARD DRILLED SHAFT FOUNDATIONS WERE DESIGNED OR DETAILED FOR COHESION LESS SOIL CONDITIONS. REGARDLESS THE DESIGN SECTION ENGINEER (DSE) MUST CONDUCT A SUBSURFACE INVESTIGATION AT EACH OVERHEAD SIGN FOUNDATION TO DETERMINE THE ACTUAL SOIL PROPERTIES. SHOULD THE INVESTIGATION REVEL THE PRESENCE OF COHESION LESS SOIL OR COHESIVE SOILS WITH PROPERTIES LESS THAN THE AVERAGES INDICATED HEREIN, THE DSE SHALL DESIGN AND DETAIL THE DRILLED SHAFT FOUNDATIONS TO MEET THE ACTUAL SOIL CONDITIONS.
2. ALL MATERIAL, FABRICATION, AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 734 OF THE IDOT STANDARD SPECIFICATIONS.
3. CONCRETE SHALL BE PLACED MONOLITHICALLY, WITHOUT CONSTRUCTION JOINTS UNLESS NOTED OTHERWISE.
4. BACKFILL SHALL BE PLACED PER SECTION 502 OF THE IDOT STANDARD SPECIFICATION AND PRIOR TO ERECTION OF SUPPORT COLUMN.
5. 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. COST INCLUDED IN THE COST OF THE FOUNDATION.
6. 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.
7. FURNISHING AND INSTALLING ALL CONDUIT, FITTINGS AND GROUNDING SYSTEM IS INCLUDED IN THE COST OF THE FOUNDATION.
8. NO SONOTUBES OR DECOMPOSABLE FORMS SHALL BE USED 6" BELOW THE FINISHED GROUND LINE. PERMANENT METAL FORMS OR OTHER SHIELDING MAY 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 ADDITION COST.
9. IF NECESSARY TO INCREASE STEEL END SUPPORT HEIGHT ABOVE THE LIMITATIONS SHOWN IN SIGN STRUCTURE MEMBER SCHEDULE ON SHEET 1, GRADE BEAM DEPTH MAY 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.

DESIGN SPECIFICATIONS:

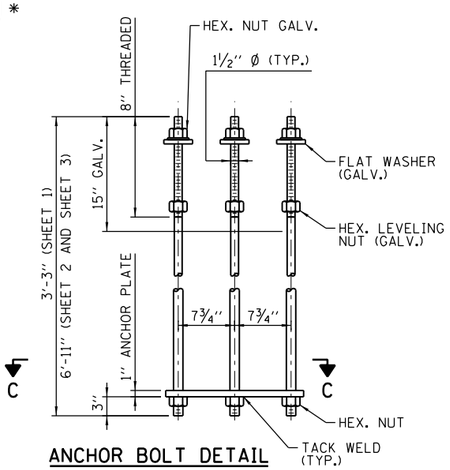
THESE FOUNDATIONS ARE DESIGNED TO SATISFY THE 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS, SIXTH EDITION.



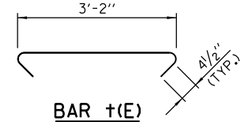
PLAN *



SECTION A-A
(TYPICAL BOTH SHAFTS)



ANCHOR BOLT DETAIL
(TYP. FOR ALL FOUNDATIONS)



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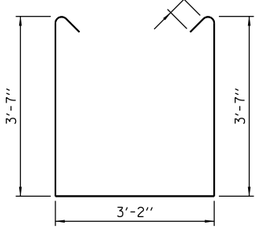
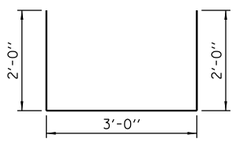
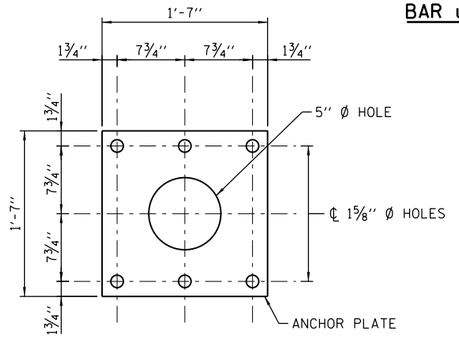


BAR s(E)



BAR u(E)



SECTION C-C

DESIGN TABLE FOR DRILLED SHAFTS IN COHESIVE SOILS					
TRUSS No.	W	X	B	CLASS DS CONC. CY	REBAR POUNDS
T-80	5'-8"	4'-5"	40'-0"	30.3	6620
T-85	6'-4"	4'-1"	50'-0"	35.5	7910
T-90	6'-4"	4'-1"	50'-0"	35.5	7910
T-95	6'-4"	4'-1"	50'-0"	35.5	7910
T-100	7'-4"	3'-7"	50'-0"	35.5	7910
T-105	7'-4"	3'-7"	50'-0"	35.5	7910
T-110	7'-4"	3'-7"	50'-0"	35.5	7910
T-115	10'-2"	2'-2"	50'-0"	35.5	7910
T-120	10'-2"	2'-2"	50'-0"	35.5	7910
T-130	10'-2"	2'-2"	55'-0"	38.1	8560
T-140	10'-2"	2'-2"	55'-0"	38.1	8560
T-150	10'-2"	2'-2"	55'-0"	38.1	8560

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)	25	#4	11'-1"	⌐¬
t(E)	25	#4	3'-11"	⟷
u(E)	14	#4	7'-0"	⊐
v(E)	32	#9	F LESS 9"	——
#4 BAR SPIRAL (E) - SEE SIDE ELEVATION				

Paul Kovacs
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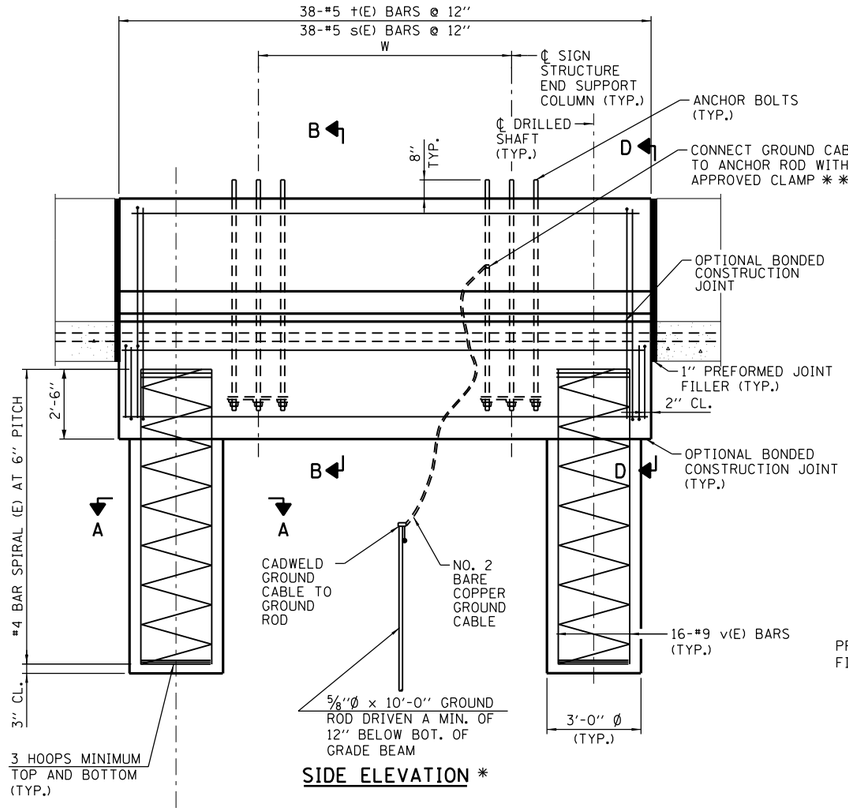
SHEET 3 OF 5

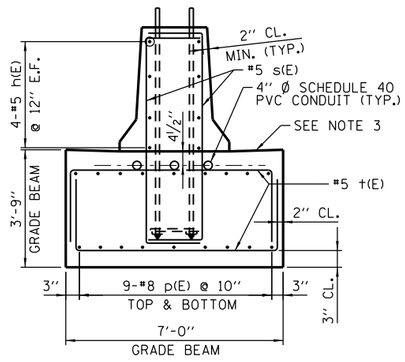
Illinois Tollway

OVERHEAD SIGN STRUCTURE
SPAN TYPE
STRUCTURE DETAILS

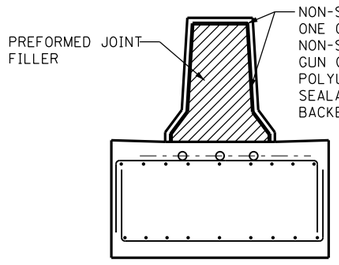
STANDARD F1-04



SIDE ELEVATION *



SECTION B-B



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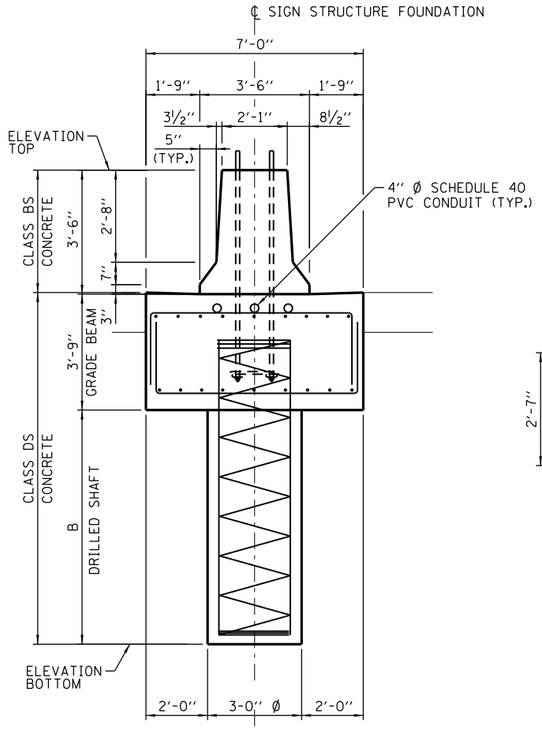
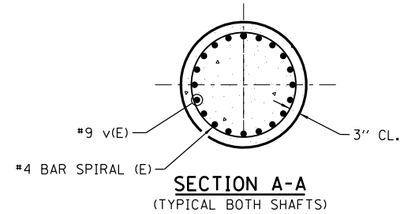


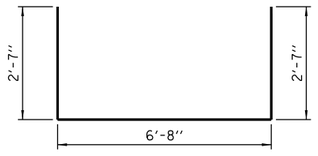
END VIEW



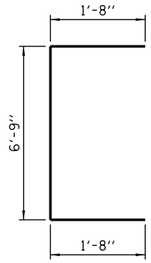
SECTION A-A
(TYPICAL BOTH SHAFTS)

BAR LIST - EACH FOUNDATION

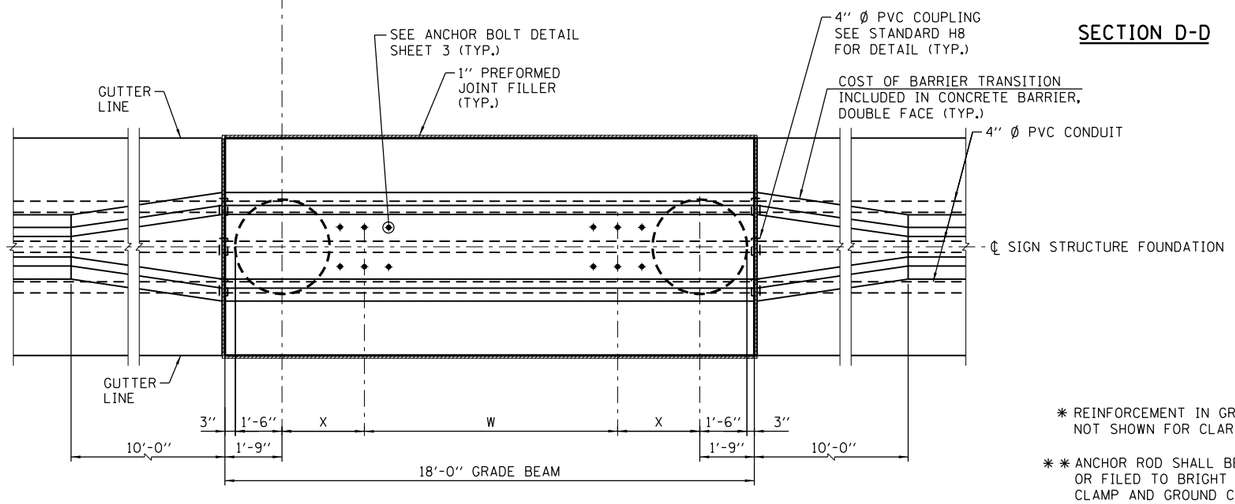
BAR	NUMBER	SIZE	LENGTH	SHAPE
h(E)	8	#5	17'-8"	——
p(E)	18	#8	17'-8"	——
s(E)	38	#5	10'-1"	⊏
t(E)	38	#5	11'-10"	⊔
v(E)	40	#9	B ADD 2'-3"	——
#4 BAR SPIRAL (E) - SEE SIDE ELEVATION				



BAR t(E)



BAR s(E)



PLAN *

(REINFORCEMENT NOT SHOWN FOR CLARITY)

* REINFORCEMENT IN GRADE BEAM NOT SHOWN FOR CLARITY

* * ANCHOR ROD SHALL BE GROUND OR FILED TO BRIGHT METAL AT CLAMP AND GROUND CABLE CONNECTION.

DESIGN TABLE FOR DRILLED SHAFTS IN COHESIVE SOILS						
TRUSS No.	W	X	B	CLASS DS CONC. CY	CLASS BS CONC. CY	REBAR POUNDS
T-80	5'-8"	4'-5"	50'-0"	43.7	6.0	10100
T-85	6'-4"	4'-1"	55'-0"	46.3	6.0	10880
T-90	6'-4"	4'-1"	55'-0"	46.3	6.0	10880
T-95	6'-4"	4'-1"	55'-0"	46.3	6.0	10880
T-100	7-4"	3'-7"	55'-0"	46.3	6.0	10880
T-105	7-4"	3'-7"	55'-0"	46.3	6.0	10880
T-110	7-4"	3'-7"	55'-0"	46.3	6.0	10880
T-115	10'-2"	2'-2"	55'-0"	46.3	6.0	10880
T-120	10'-2"	2'-2"	55'-0"	46.3	6.0	10880
T-130	10'-2"	2'-2"	55'-0"	46.3	6.0	10880
T-140	10'-2"	2'-2"	55'-0"	46.3	6.0	10880
T-150	10'-2"	2'-2"	55'-0"	46.3	6.0	10880

NOTES:

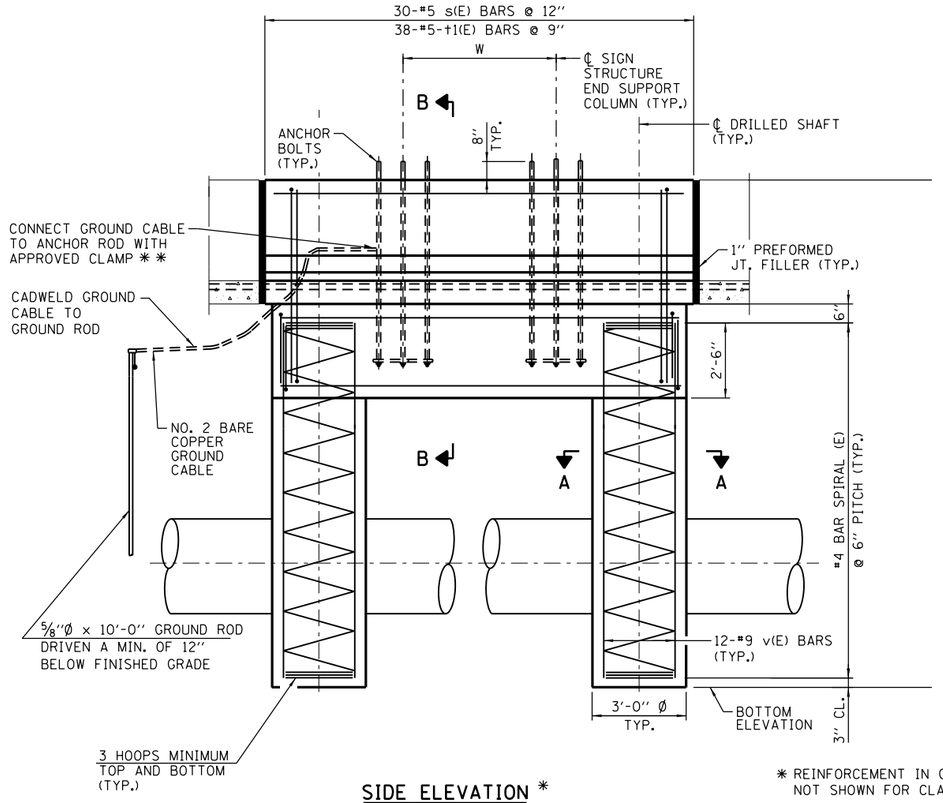
1. SEE SHEET 3 FOR GENERAL NOTES AND DESIGN CRITERA.
2. FOR SIGN STRUCTURE BASE PLATE DETAIL, SEE SHEET 2
3. REFERENCE C5 FOR GUTTER SLOPE.

Paul Kovacs
APPROVED ..... DATE 2-7-2012
CHIEF ENGINEER

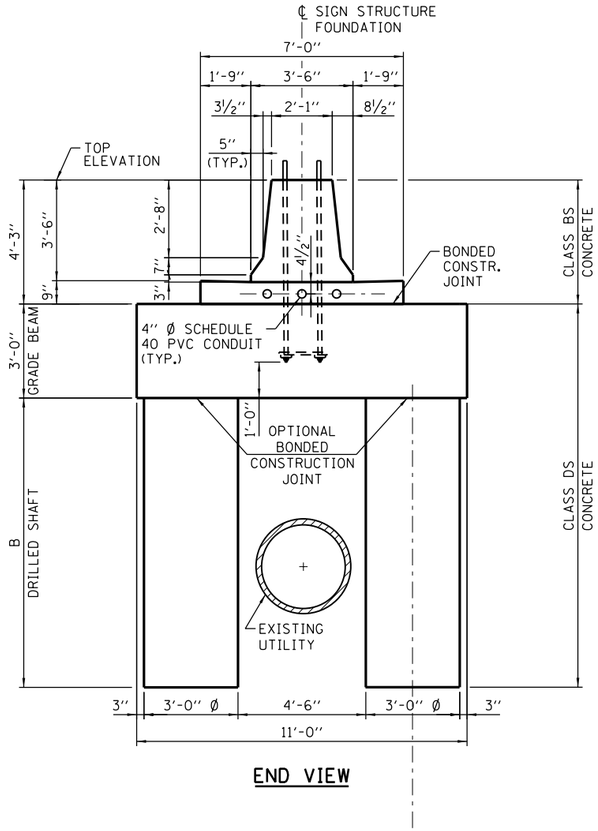
Illinois Tollway

OVERHEAD SIGN STRUCTURE
SPAN TYPE
STRUCTURE DETAILS

STANDARD F1-04



SIDE ELEVATION *



END VIEW

* REINFORCEMENT IN GRADE BEAM NOT SHOWN FOR CLARITY

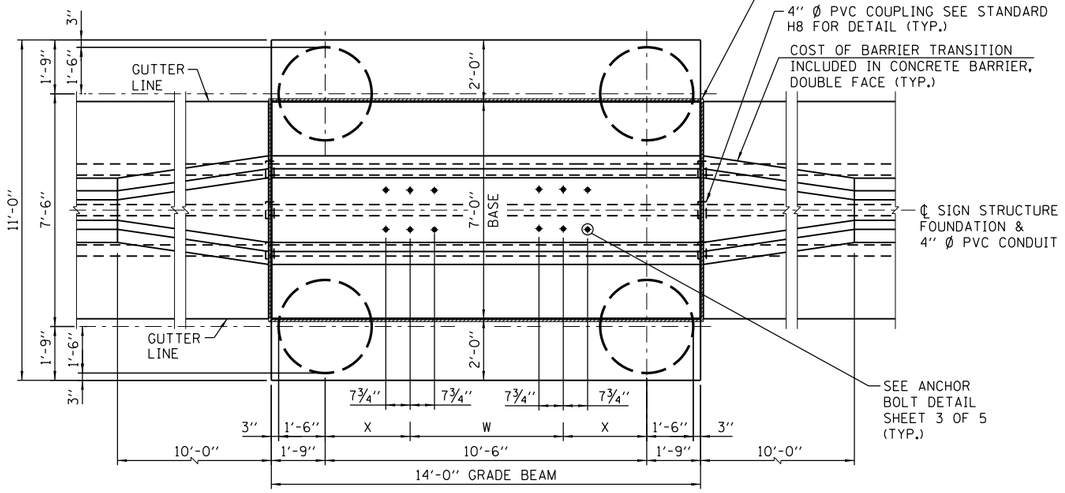
* * ANCHOR ROD SHALL BE GROUND OR FILED TO BRIGHT METAL AT CLAMP AND GROUND CABLE CONNECTION.

BAR LIST - EACH FOUNDATION

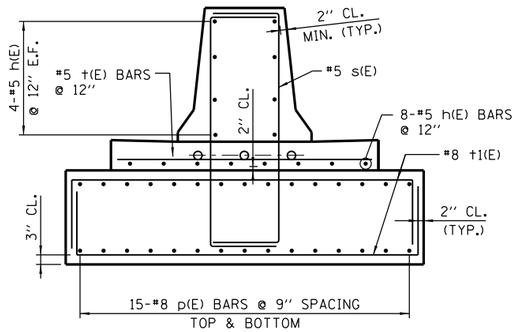
BAR	NUMBER	SIZE	LENGTH	SHAPE
h(E)	16	#5	13'-8"	——
p(E)	30	#8	13'-8"	——
s(E)	30	#5	10'-1"	⊏
t(E)	15	#5	6'-8"	——
t1(E)	38	#8	15'-10"	——
v(E)	48	#9	B ADD 2'-3"	——
#4 BAR SPIRAL (E) - SEE SIDE ELEVATION				

DESIGN TABLE FOR DRILLED SHAFTS IN COHESIVE SOILS

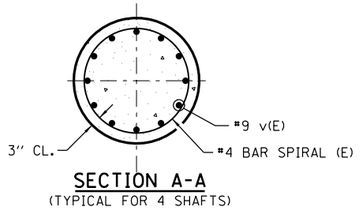
TRUSS No.	W	X	B	CLASS DS CONC. CY	CLASS BS CONC. CY	REBAR POUNDS
T-80	5'-8"	2'-5"	25'-0"	43.3	7.4	9030
T-85	6'-4"	2'-1"	25'-0"	43.3	7.4	9030
T-90	6'-4"	2'-1"	25'-0"	43.3	7.4	9030
T-95	6'-4"	2'-1"	25'-0"	43.3	7.4	9030
T-100	7-4"	1'-7"	25'-0"	43.3	7.4	9030
T-105	7-4"	1'-7"	30'-0"	48.5	7.4	10050
T-110	7-4"	1'-7"	30'-0"	48.5	7.4	10050
T-115	10'-2"	0'-2"	30'-0"	48.5	7.4	10050
T-120	10'-2"	0'-2"	30'-0"	48.5	7.4	10050
T-130	10'-2"	0'-2"	30'-0"	48.5	7.4	10050
T-140	10'-2"	0'-2"	30'-0"	48.5	7.4	10050
T-150	10'-2"	0'-2"	30'-0"	48.5	7.4	10050



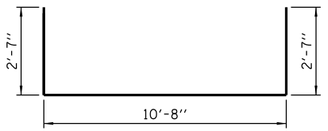
PLAN *



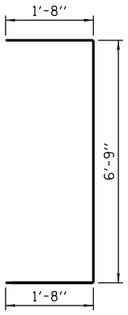
SECTION B-B



SECTION A-A
(TYPICAL FOR 4 SHAFTS)



BAR t1(E)



BAR s(E)

Paul Kovacs
APPROVED ..... DATE 2-7-2012
CHIEF ENGINEER

SHEET 5 OF 5

Illinois Tollway

OVERHEAD SIGN STRUCTURE
SPAN TYPE
STRUCTURE DETAILS

STANDARD F1-04

RESERVED

Paul Kovacs
APPROVED . . . . . DATE 2-7-2012
CHIEF ENGINEER

DATE	REVISIONS

Illinois Tollway

STANDARD F2-00

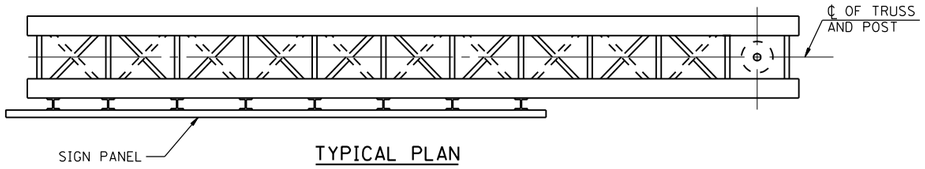
RESERVED

Paul Kovacs
APPROVED . . . . . DATE 3-31-2014
CHIEF ENGINEER

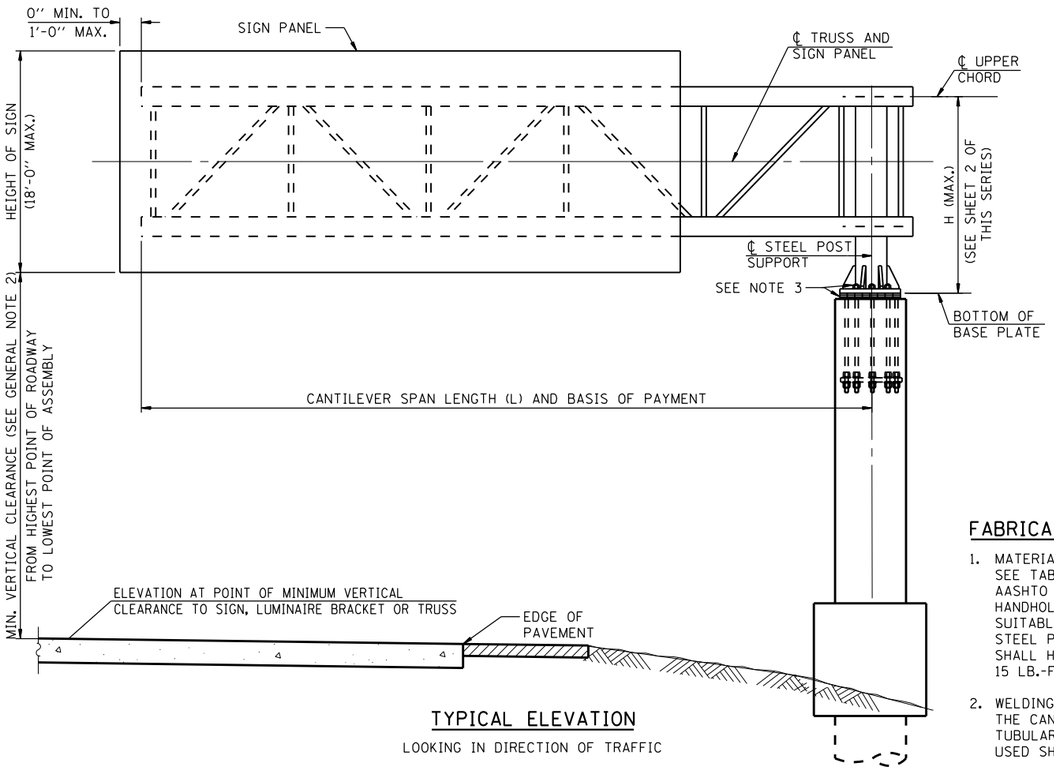
DATE	REVISIONS

Illinois Tollway

STANDARD F3-00



TYPICAL PLAN

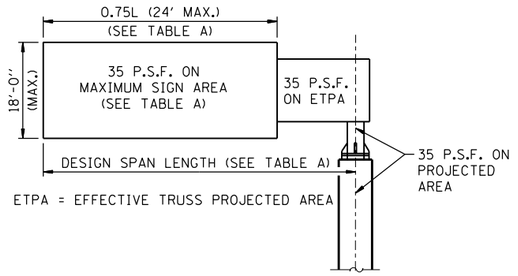


TYPICAL ELEVATION

LOOKING IN DIRECTION OF TRAFFIC

TABLE A: MAXIMUM LIMITS FOR SIGNS

TRUSS TYPE	DESIGN SPAN LENGTH (FT.)	MAXIMUM SIGN AREA (SQ. FT.)	MAXIMUM SIGN LENGTH (FT.)
20-D	20	270	15
25-D	25	338	18.75
30-D	30	405	22.5
35-D	35	432	24
40-D	40	432	24
45-D	45	432	24
50-D	50	432	24



DESIGN WIND LOADING DIAGRAM

GENERAL NOTES:

1. WORK THIS SHEET WITH BASE SHEET M28.
2. SEE THE TOLLWAY STRUCTURE DESIGN MANUAL FOR MINIMUM VERTICAL CLEARANCE.
3. 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.
4. 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.
5. TRUSSES SHALL BE SHIPPED INDIVIDUALLY WITH ADEQUATE PROVISON TO PREVENT DETRIMENTAL MOTION DURING TRANSPORT. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONFIGURATION AND PROTECTION OF THE TRUSSES.
6. 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.
7. ALL STEEL PLATES, SHAPES AND PIPE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.
8. PROVIDE NORMAL SURFACE FINISH FOLLOWED BY CONCRETE SEALER APPLICATION ON ENTIRE SURFACE OF CONCRETE COLUMN AND ALL SURFACES OF GRADE BEAM, EXCEPT BOTTOM SURFACE. COST IS INCLUDED IN THE COST OF "FOUNDATION FOR OVERHEAD SIGN STRUCTURE, CANTILEVER TYPE".
9. REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
10. INSTALLATIONS NOT WITHIN DIMENSIONAL LIMITS SHOWN REQUIRE SPECIAL ANALYSIS FOR ALL COMPONENTS.
11. DMS TYPE II SIGN CABINET IS PERMITTED TO BE INSTALLED ON CANTILEVER TRUSS. DO NOT INSTALL SIGN PANEL IN CONJUCTION WITH DMS TYPE II SIGN CABINET. SEE SHEET 9 OF THIS SERIES FOR PERMISSIBLE SIGN SIZE AND WEIGHT.

CONSTRUCTION SPECIFICATIONS:

1. ALL MATERIALS, EXCEPT AS SHOWN, FABRICATION, ERECTION AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 733 OF THE LATEST IDOT STANDARD SPECIFICATIONS.
2. THE COST OF FURNISHING AND INSTALLING THE STAINLESS STEEL BAND AND WIRE MESH CLOTH IS INCLUDED IN THE COST OF "OVERHEAD SIGN STRUCTURE, CANTILEVER TYPE (STEEL)".

LOADING:

1. ALL CANTILEVER TRUSSES ARE DESIGNED FOR AN 18'-0" DEEP SIGN PANEL OVER 75% OF THE ARM LENGTH, WITH A MAXIMUM PANEL WIDTH OF 24'-0".
2. ALL CANTILEVER TRUSSES ARE DESIGNED FOR 35 PSF WIND PRESURE ON TRUSS MEMBERS AND SIGN PANEL.
3. THE AASHTO GROUP II AND III ALLOWABLE STRESS SHALL BE 133% (ALLOWABLE STRESS DESIGN).

DESIGN SPECIFICATIONS:

THESE STRUCTURES ARE DESIGNED TO SATISFY THE 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SIXTH EDITION.

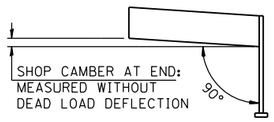
CONCRETE COLUMN, GRADE BEAM AND DRILLED SHAFT ARE DESIGNED IN ACCORDANCE WITH THE 2012 EDITION OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (INCLUDING THE 2013 INTERIM REVISIONS).

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 ---------- fy = 60,000 P.S.I.

SHOP CAMBER TABLE

CANTILEVER LENGTH (L)	SHOP CAMBER AT END
20'	1½"
25'	1½"
30'	2"
35'	2½"
40'	2½"
45'	3"
50'	3½"



CAMBER DIAGRAM

(FOR FABRICATION ONLY)

TABLE B: MATERIAL SPECIFICATIONS FOR STRUCTURAL STEEL AND FASTENERS

ELEMENT OF STRUCTURE	SPECIFICATION	MINIMUM YIELD STRENGTH (K.S.I.)	MINIMUM ULTIMATE STRENGTH (K.S.I.)
STRUCTURAL STEEL TUBE	ASTM A500 GRADE B	46	58
STRUCTURAL STEEL POST AND PIPE	API 5L GRADE B OR X42 OR X52	35	52
	ASTM A106 GRADE B OR C	35	60
	ASTM A53, TYPE E OR S, GRADE B	35	60
STEEL BAR AND STEEL PLATES	ASTM A572 GRADE 50	50	65
STAINLESS STEEL BOLTS	ASTM A193, CLASS 1, GRADE B8	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	55	75

FABRICATION NOTES:

1. MATERIALS: FOR MATERIAL SPECIFICATIONS FOR CANTILEVER SIGN STRUCTURES, SEE TABLE B. ALL STRUCTURAL STEEL PLATES AND SHAPES SHALL CONFORM TO AASHTO M270 GR. 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 STEEL POST SHALL HAVE A MINIMUM LONGITUDINAL CHARPY 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 CANTILEVER OVERHEAD SIGN STRUCTURE SHALL CONFORM TO AWS D1.1-10 FOR TUBULAR, CYCLICALLY LOADED STRUCTURES. ADDITIONALLY, ALL WELDED MATERIALS USED SHALL BE PREQUALIFIED FOR USE WITH WPS AS PER AWS D1.1-10, TABLE 3.1.
3. FASTENERS FOR STEEL TRUSSES: ALL BOLTS NOTED AS "HIGH STRENGTH" MUST SATISFY THE REQUIREMENTS OF AASHTO M164 (ASTM A325), OR APPROVED ALTERNATE, AND MUST HAVE MATCHING LOCKNUTS. THREADED STUDS FOR SPLICES (IF MEMBERS INTERFERE) MUST SATISFY THE REQUIREMENTS OF ASTM A449. ASTM A193 GRADE B7, OR APPROVED ALTERNATE, AND MUST HAVE MATCHING LOCKNUTS. BOLTS AND LOCKNUTS NOT REQUIRED TO BE HIGH STRENGTH MUST SATISFY THE REQUIREMENTS OF ASTM A307. ALL BOLTS AND LOCKNUTS MUST BE HOT DIP GALVANIZED PER AASHTO M232. THE LOCKNUTS MUST 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 MUST BE PRODUCED FROM ASTM A276 TYPE 304, 304L, 316 OR 316L, CONDITION A, COLD FINISHED STAINLESS STEEL, OR AN EQUIVALENT MATERIAL ACCEPTABLE TO THE ENGINEER. ALL NUTS FOR U-BOLTS MUST BE LOCKNUTS EQUIVALENT TO ASTM A307 WITH NYLON OR STEEL INSERTS AND HOT DIP GALVANIZED PER AASHTO M232. A STAINLESS STEEL FLAT WASHER CONFORMING TO ASTM A240, TYPE 302 OR 304, IS REQUIRED UNDER EACH U-BOLT LOCKNUT.
5. 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).

Paul Kovacs
APPROVED..... DATE 3-31-2014.
CHIEF ENGINEER

Illinois Tollway

DATE	REVISIONS
2-7-2012	REDESIGNED TO 2009 AASHTO
2-1-2013	REVISED SIGN PARAMETERS
12-12-2013	REVISED TABLES AND NOTES
2-07-2014	REVISED STEEL POST TO CONCRETE
3-31-2014	ADDED DMS TYPE II

OVERHEAD SIGN STRUCTURE CANTILEVER TYPE STRUCTURE DETAILS

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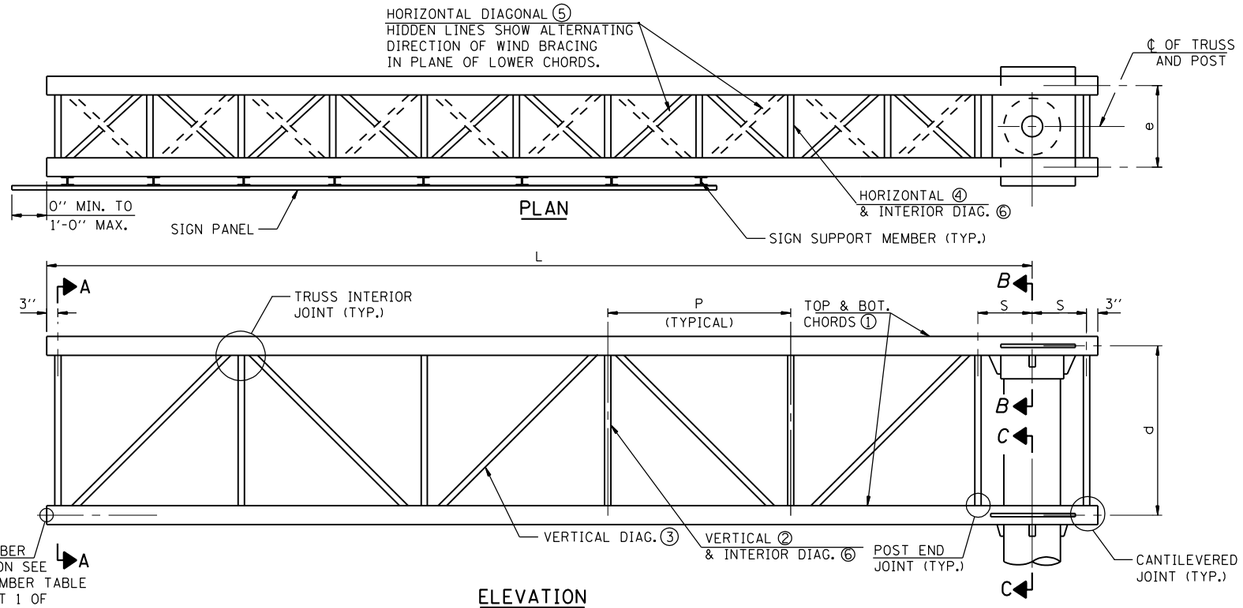
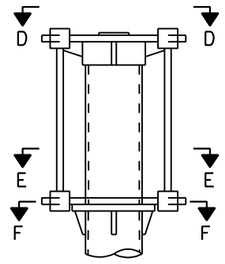
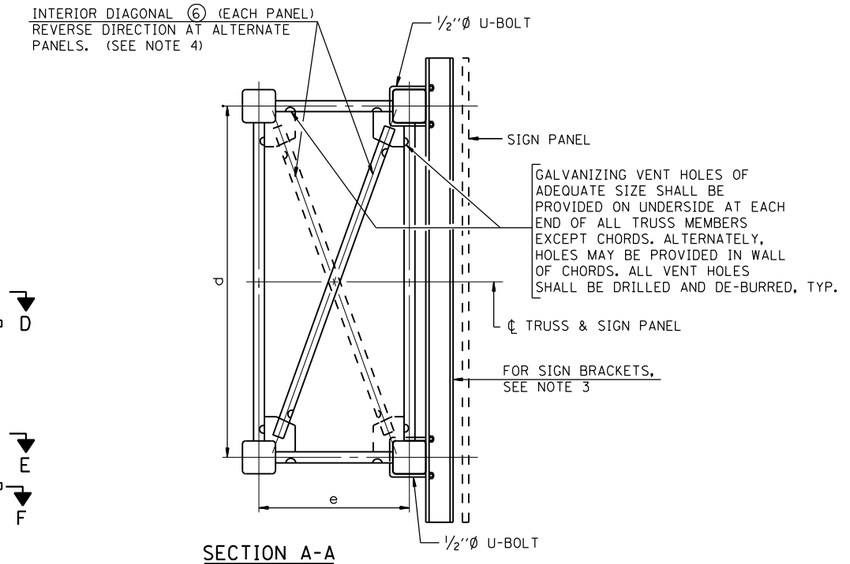
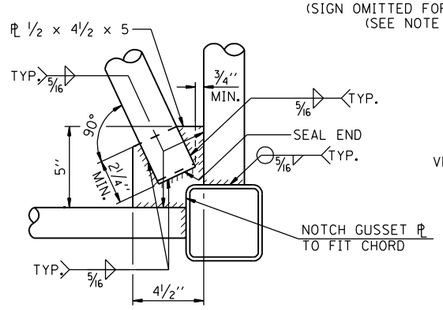
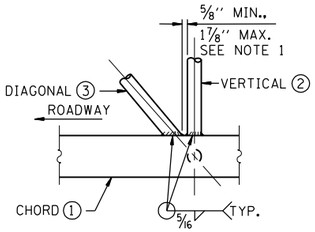




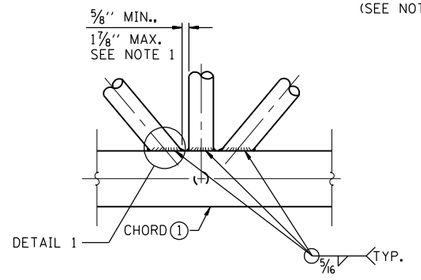




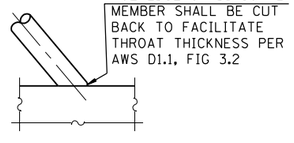
GUSSET ℄ FOR INTERIOR DIAG. DETAIL



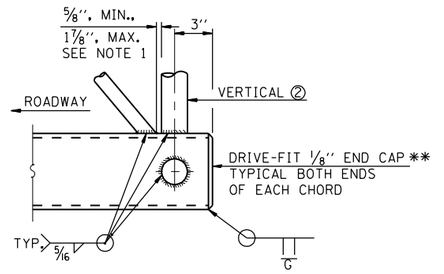
POST END JOINT DETAIL



TRUSS INTERIOR JOINT DETAIL



DETAIL 1



CANTILEVER END JOINT DETAIL

TABLE C: TRUSS AND POST DETAILS FOR 18'-0'' (MAX.) SIGN HEIGHT

DESIGN SPAN LENGTH (L)	TRUSS TYPE	TRUSS SIZE		ACTUAL SPAN LENGTH	MAXIMUM SIGN LENGTH	STEEL SUPPORT POST (COLUMN)				TRUSS MEMBERS AND DETAILS														
											VERTICAL ②		VERTICAL DIAG. ③		HORIZONTAL ④		HORIZONTAL DIAG. ⑤		INTERIOR DIAG. ⑥		PANELS		
		e	d			DIAMETER	WEIGHT	* WALL THICKNESS	H (MAX.)	TOP & BOTTOM CHORD ①	PIPE	WALL	PIPE	WALL	PIPE	WALL	PIPE	WALL	PIPE	WALL	NO.	P	S
20'	20-D	2'-6''	5'-6''	20'-1''	15'-0''	18''	138.30 (#/FT)	0.75''	12'-0''	HSS 5x5x¼	2½''Ø X.S	0.276''	3''Ø X.X.S	0.600''	1½''Ø X.S	0.200''	2½''Ø X.S	0.276''	1½''Ø X.S	0.200''	4	4'-7''	1'-6''
25'	25-D	3'-6''	5'-6''	24'-11''	18'-9''	18''	181.73 (#/FT)	1''	12'-0''	HSS 5x5x¼	2½''Ø X.S	0.276''	3''Ø X.X.S	0.600''	2''Ø X.S	0.218''	2½''Ø X.S	0.276''	2''Ø X.S	0.218''	5	4'-7''	1'-9''
30'	30-D	3'-6''	7'-0''	30'-2''	22'-6''	18''	181.73 (#/FT)	1''	12'-0''	HSS 6x6x¼	3''Ø X.S	0.300''	4''Ø X.X.S	0.674''	2''Ø X.S	0.218''	2½''Ø X.S	0.276''	2''Ø X.S	0.218''	5	5'-7''	2'-0''
35'	35-D	4'-0''	7'-0''	35'-0''	24'-0''	24''	186.41 (#/FT)	0.75''	12'-0''	HSS 6x6x¼	3''Ø X.S	0.300''	4''Ø X.X.S	0.674''	2''Ø X.S	0.218''	2½''Ø X.S	0.276''	2''Ø X.S	0.218''	5	6'-6''	2'-3''
40'	40-D	4'-0''	7'-0''	40'-0''	24'-0''	24''	186.41 (#/FT)	0.75''	12'-0''	HSS 6x6x¼	3''Ø X.S	0.300''	4''Ø X.X.S	0.674''	2''Ø X.S	0.218''	2½''Ø X.S	0.276''	2''Ø X.S	0.218''	6	6'-3''	2'-3''
45'	45-D	4'-6''	7'-0''	45'-0½''	24'-0''	24''	245.87 (#/FT)	1''	12'-0''	HSS 6x6x¼	3''Ø X.S	0.300''	4''Ø X.X.S	0.674''	2''Ø X.S	0.218''	2½''Ø X.S	0.276''	2''Ø X.S	0.218''	7	6'-0½''	2'-6''
50'	50-D	4'-6''	7'-0''	50'-1''	24'-0''	24''	245.87 (#/FT)	1''	12'-0''	HSS 6x6x¼	3''Ø X.S	0.300''	4''Ø X.X.S	0.674''	2''Ø X.S	0.218''	2½''Ø X.S	0.276''	2''Ø X.S	0.218''	8	5'-11''	2'-6''

* NOMINAL WALL THICKNESS SHOWN. THICKER WALL IS PERMITTED UPON ENGINEER'S APPROVAL.

NOTES:

1. TRUSS MEMBERS SHALL BE SPACED A MINIMUM OF 3 TIMES THE WALL THICKNESS OF THE LARGEST CONNECTING MEMBERS TO ENSURE PROPER WELD SPACING.
2. FOR SECTIONS B-B, C-C, D-D, E-E AND F-F SEE SHEET 3 OF THIS SERIES.
3. FOR SIGN SUPPORT DETAILS, SEE STANDARD F8. FOR DMS TYPE II SIGN SUPPORT DETAILS, SEE SHEET 9 OF THIS SERIES.
4. DIRECTION OF INTERIOR DIAGONALS SHOWN IN SECTION A-A CORRECTLY DEPICTS TRUSSES HAVING AN ODD NUMBER OF PANELS. TRUSSES WITH AN EVEN NUMBER OF PANELS WILL HAVE DIAGONALS IN A REVERSED DIRECTION THAN AS SHOWN.
5. FOR ANY DESIGN SPAN LENGTH THAT FALL BETWEEN TWO CONSECUTIVE SPANS, PROVIDED IN COLUMN 1 OF TABLE C, THE LARGER DESIGN SPAN LENGTH SHALL BE USED (I.E. FOR A 32' SPAN LENGTH FALLING BETWEEN 30' AND 35' DESIGN SPAN LENGTHS IN TABLE C, THE 35' DESIGN SPAN LENGTH TRUSS AND POST DETAILS SHALL BE USED).

Paul Kovacs
APPROVED..... CHIEF ENGINEER DATE 3-31-2014

Illinois Tollway

OVERHEAD SIGN STRUCTURE
CANTILEVER TYPE
STRUCTURE DETAILS

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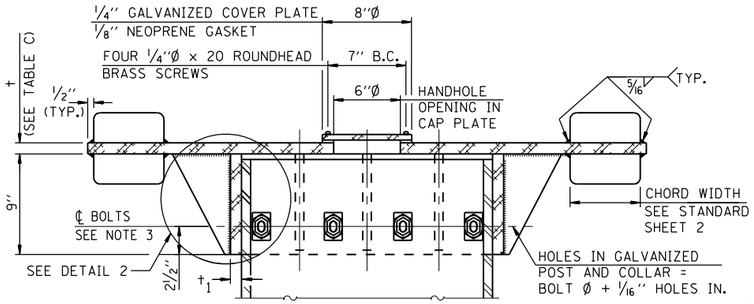
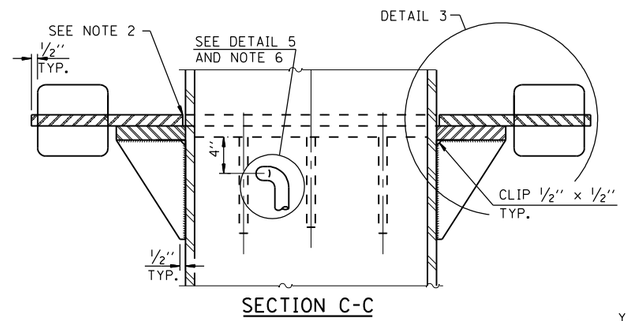
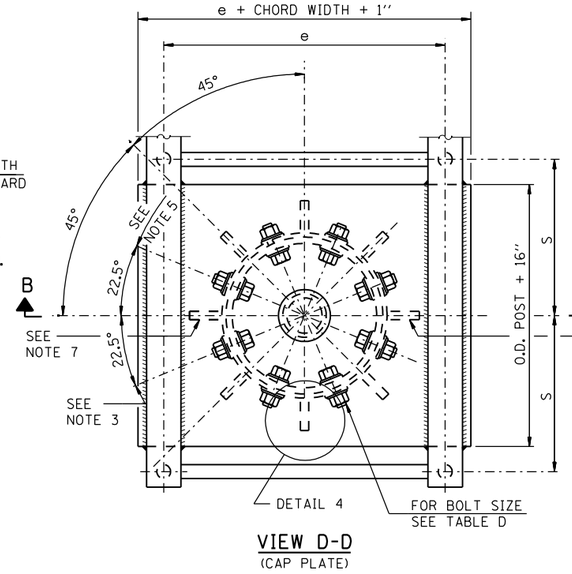


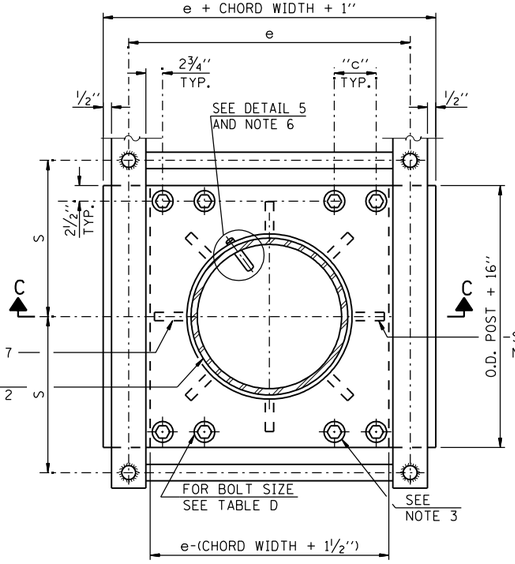
SECTION B-B



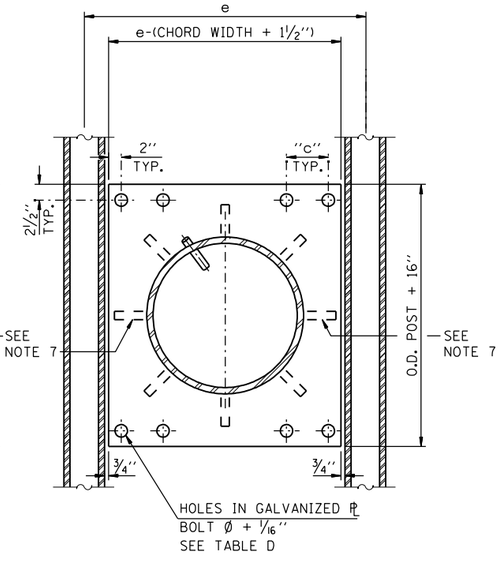
SECTION C-C



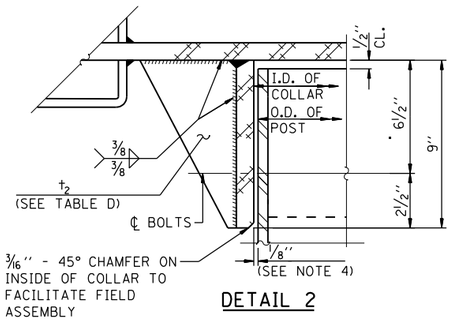
VIEW D-D
(CAP PLATE)



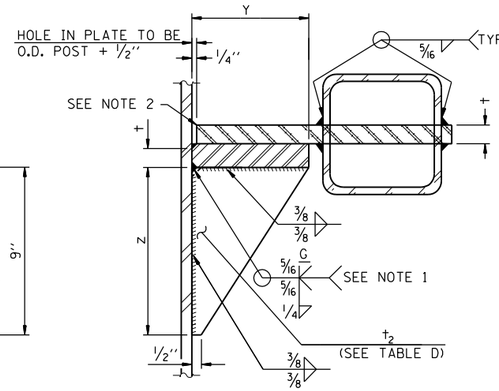
SECTION E-E
(JUNCTURE PLATE)



SECTION F-F
(SETTING PLATE)



DETAIL 2



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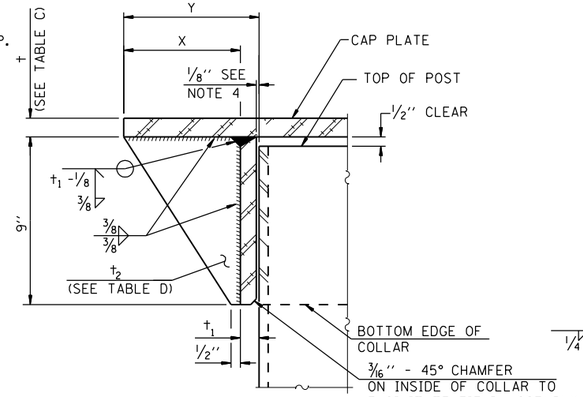

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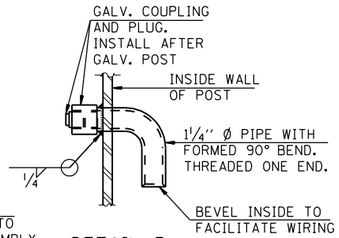
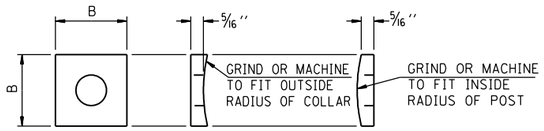


DETAIL 5



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

CONTOURED WASHERS
(ASTM A240, TYPE 304)

NOTES:

1. GRIND TOP IF REQUIRED TO FULLY SEAT PLATE. REPAIR DAMAGED GALVANIZING BEFORE ASSEMBLY.
2. AFTER TIGHTENING LOWER CONNECTION BOLTS, FILL GAP WITH NON-HARDENING SILICONE CAULK SUITABLE FOR EXTERIOR EXPOSURE AND ACCEPTABLE TO THE ENGINEER. COST IS INCLUDED IN OVERHEAD SIGN STRUCTURE CANTILEVER.
3. CONNECTION BOLTS IN COLLAR AND BOLTS AT LOWER CHORD CONNECTION MUST BE HIGH STRENGTH WITH MATCHING LOCKNUTS. LOWER CONNECTION BOLTS MUST HAVE 2 FLAT WASHERS EACH.
4. 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.
5. OPTIONAL FULL PENETRATION WELD IN COLLAR. (TWO LOCATIONS MAXIMUM (180° APART) X-RAY OR UT 100%) ALL BOLTS SHOWN ARE HIGH STRENGTH.
6. ORIENT PIPE TOWARD SIGN PANEL SIDE. HOLE IN POST = O.D. PIPE + 1/8".
7. OMIT INDICATED STIFFENER IN TRUSS TYPE 20-D.

Paul Kovacs
APPROVED..... CHIEF ENGINEER DATE 3-31-2014

B.C. = BOLT CIRCLE

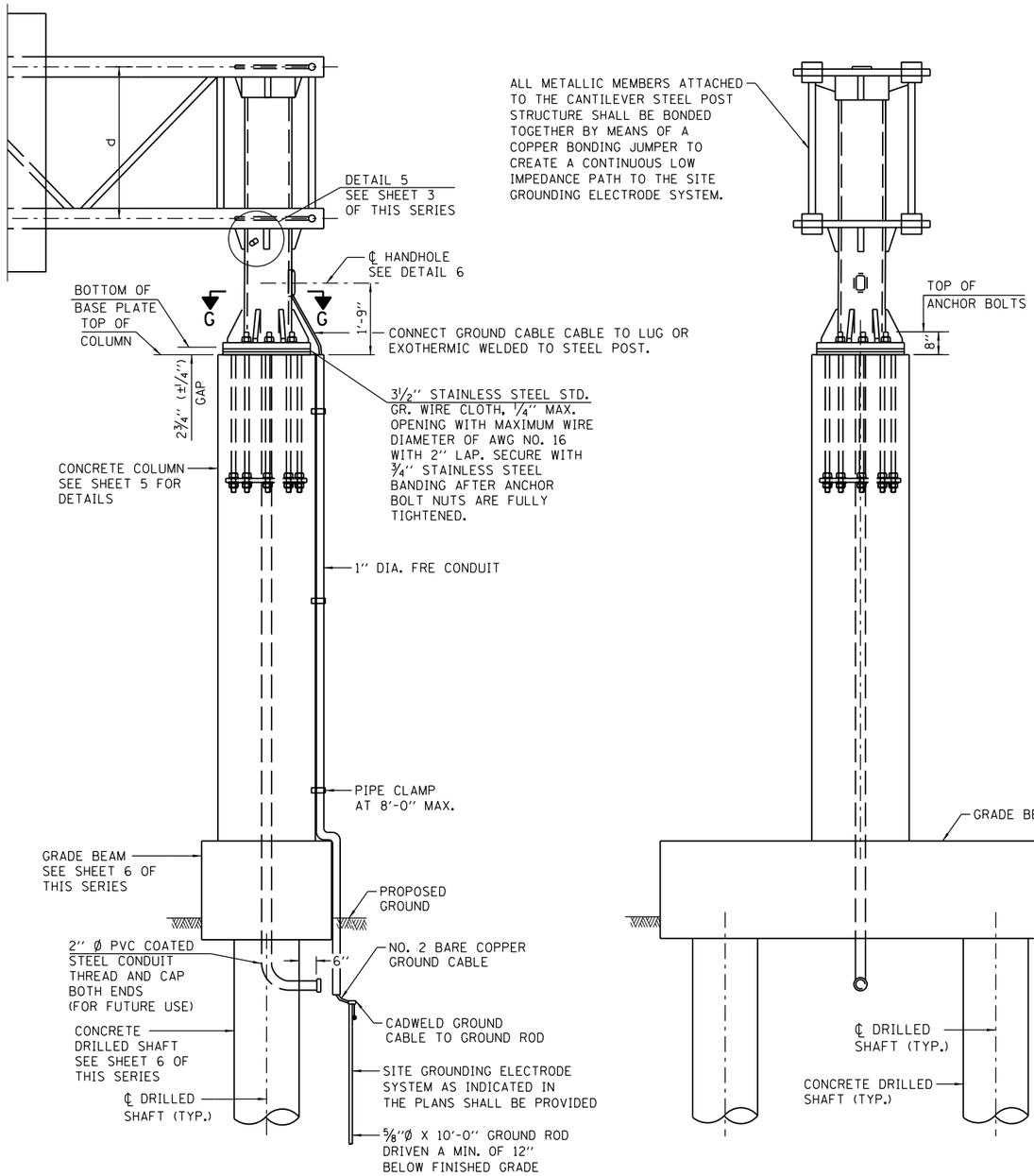
TABLE D: BOLT SCHEDULE

SPAN LENGTH	POST OUTSIDE DIAMETER	JUNCTURE & COLLAR CONNECTION BOLT DIAMETER	LOWER JUNCTURE BOLT SPACING DIMENSION "c"	PLATE THICKNESS		STIFFENER THICKNESS	NO. OF STIFFENERS	STIFFENERS		
				(t)	(t_1)	(t_2)		x	y	z
< = 20'	18"	1 1/8"	3 1/8"	1"	3/4"	1/2"	6	5"	6"	8"
21'-30'	18"	1 1/2"	3 3/4"	1 1/8"	7/8"	3/4"	8	5"	6"	8"
31'-40'	24"	1 1/2"	4 1/2"	1 1/4"	1"	3/4"	8	7"	8"	10 1/2"
41'-50'	24"	1 1/2"	4 1/2"	1 1/4"	1"	3/4"	8	7"	8"	10 1/2"

Illinois Tollway

OVERHEAD SIGN STRUCTURE
CANTILEVER TYPE
STRUCTURE DETAILS

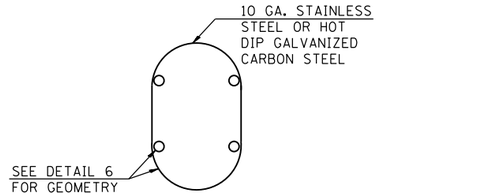
STANDARD F4-05



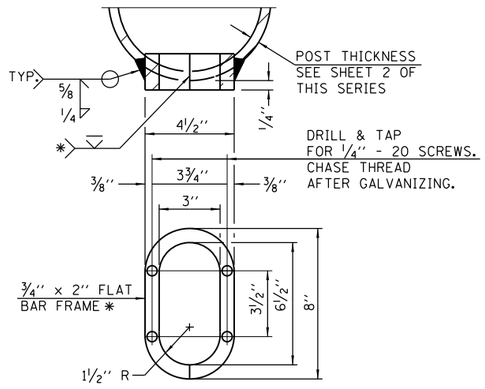
FRONT ELEVATION

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



HANDHOLE COVER



PROVIDE 8" x 4½" COVER.
OUTSIDE CORNERS = 2¼" RADIUS.
PROVIDE 4-5/16" Ø HOLES IN COVER FOR
¼" - 20 ROUND HEAD HOT DIP GALVANIZED
OR STAINLESS STEEL MACHINE SCREWS.
(SEE COVER DETAILS.)

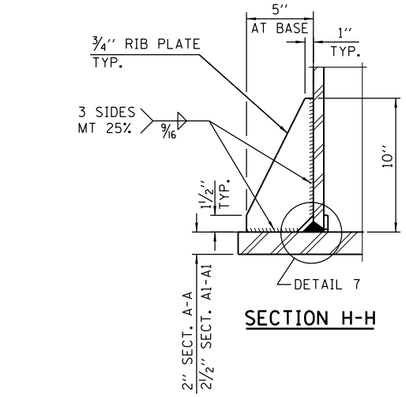
DETAIL 6

* 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.

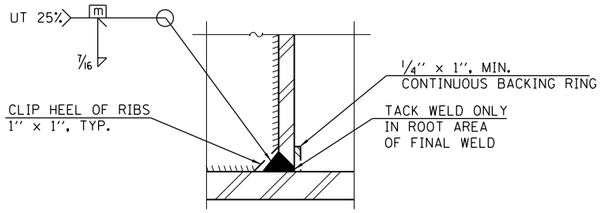
** 18" IS MINIMUM TO BE GALVANZIED. ENTIRE BOLT MAY BE GALVANIZED AT CONTRACTOR'S OPTION.

TABLE E: BASE PLATE DETAIL

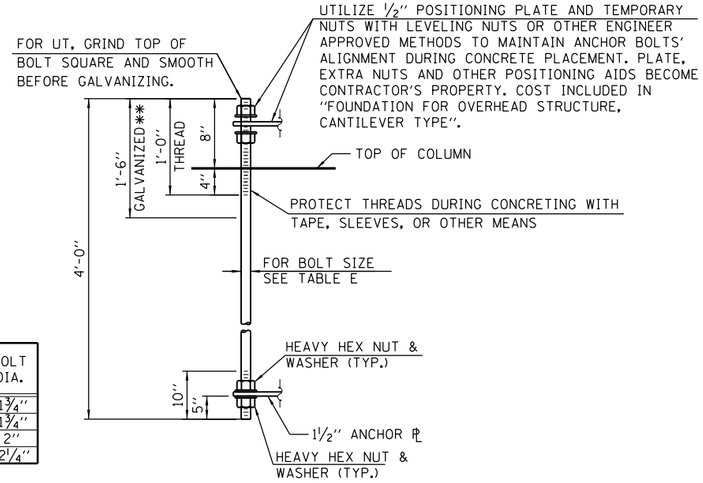
SPAN LENGTH (L)	POST OUTSIDE DIAMETER	BASE PLATE		BOLT CIRCLE	BOLT DIA.
		DIAMETER	THICKNESS		
< = 20'	18"	30"	2"	24"	1¾"
21'-30'	18"	30"	2"	24"	1¾"
31'-40'	24"	36"	2½"	30"	2"
41'-50'	24"	36"	2½"	30"	2¼"



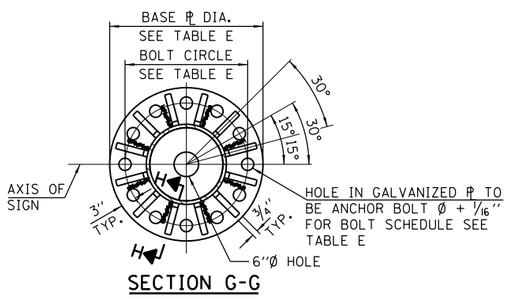
SECTION H-H



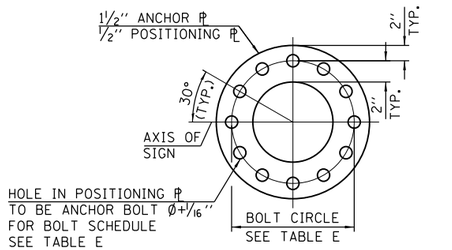
DETAIL 7
(TYPICAL RIB)



ANCHOR BOLT DETAIL



SECTION G-G



POSITIONING ℄ / ANCHOR ℄

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 AND HARDENED WASHERS PER AASHTO M293. NO WELDING SHALL BE PERMITTED ON BOLTS. PROVIDE AN UNFINISHED 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 ACCORDANCE WITH ANSI GUIDELINES, USING A STRAIGHT BEAM, ½" Ø 3.5 MHZ. TRANSDUCER, TO INSURE NO REJECTABLE FLAWS EXIST IN THE UPPER 18" (TENSION CRITERIA). COST OF TESTING INCLUDED IN THE COST OF "FOUNDATION FOR OVERHEAD STRUCTURE, CANTILEVER TYPE".

Paul Kovacs
APPROVED
CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

OVERHEAD SIGN STRUCTURE
CANTILEVER TYPE
STRUCTURE DETAILS

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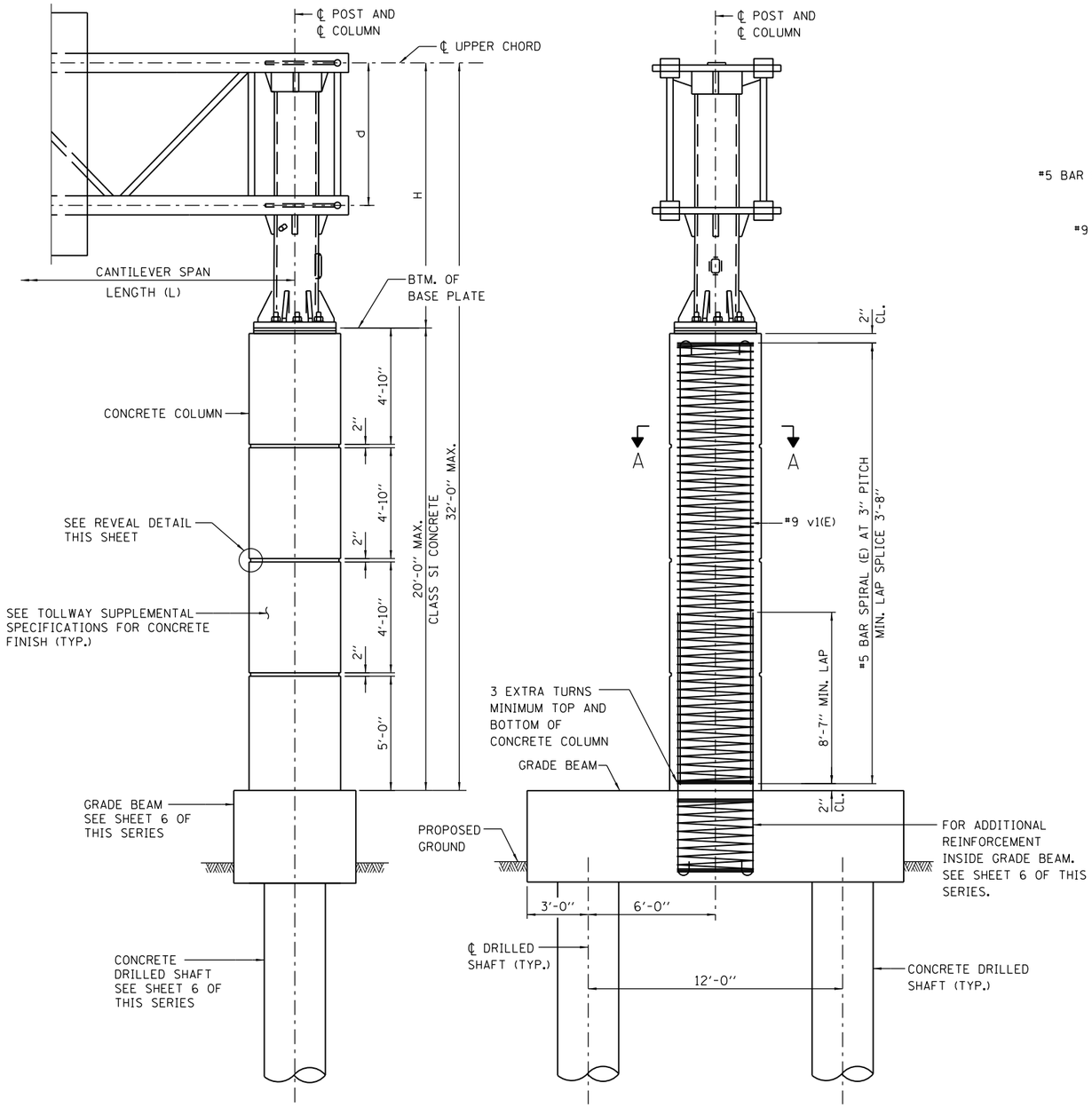
TABLE F: CONCRETE COLUMN DESIGN TABLE

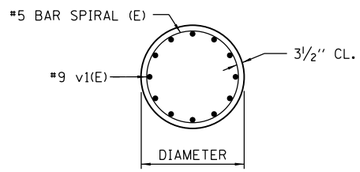
SPAN LENGTH (L)	STEEL POST DIAMETER	CONCRETE COLUMN			
		DIAMETER	VERTICAL BAR	CLASS SI CONC. CY*	REBAR POUNDS*
< = 20'	18''	3'-6''	16-#9	7.1	1,910
21'-30'	18''	3'-6''	16-#9	7.1	1,910
31'-40'	24''	4'-0''	20-#9	9.2	2,330
41'-50'	24''	4'-0''	20-#9	9.2	2,330

* 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''.

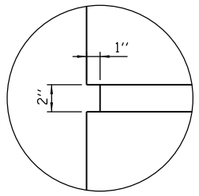


FRONT ELEVATION

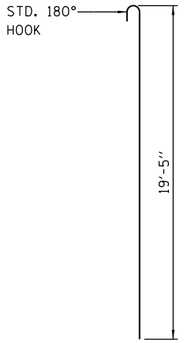
SIDE ELEVATION



SECTION A-A



REVEAL DETAIL



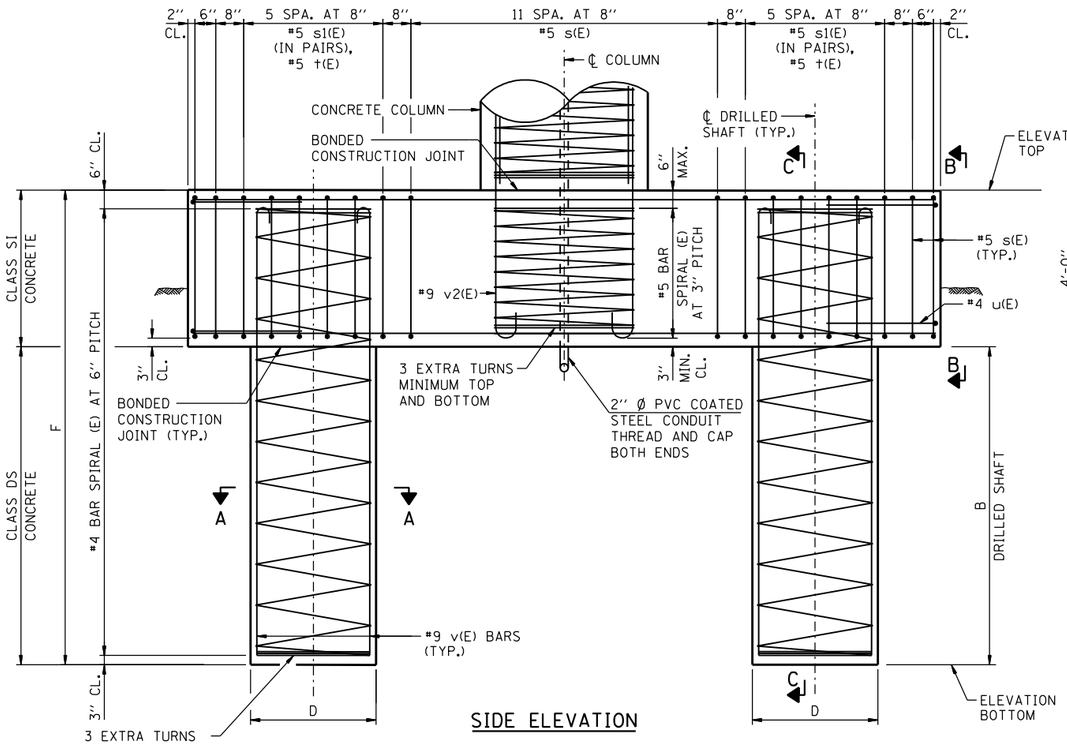
BAR v1(E)

Paul Kovacs
APPROVED . . . . . CHIEF ENGINEER
DATE 3-31-2014

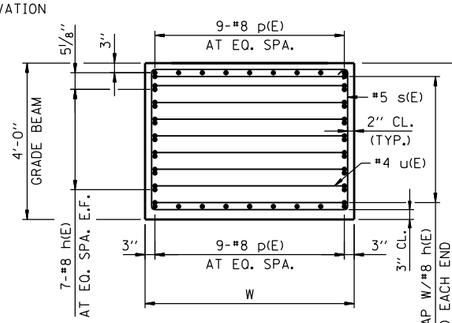
Illinois Tollway

OVERHEAD SIGN STRUCTURE
CANTILEVER TYPE
STRUCTURE DETAILS

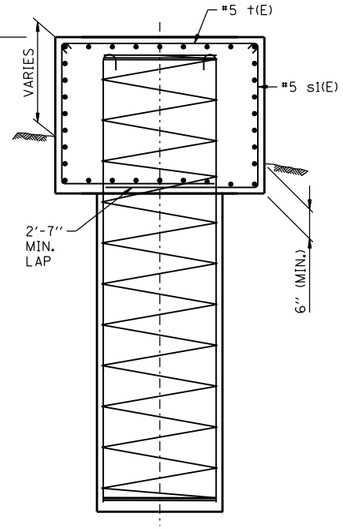
STANDARD F4-05



SIDE ELEVATION



VIEW B-B

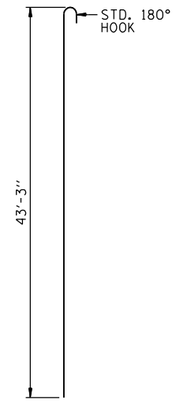


SECTION C-C

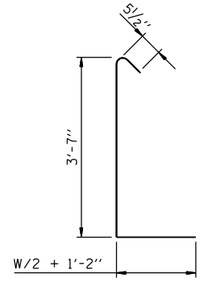
BAR LIST - EACH FOUNDATION

(2 SHAFT AND 1 GRADE BEAM)

BAR	NUMBER	SIZE	LENGTH D = 3'-0''	LENGTH D = 4'-0''	SHAPE
h(E)	14	#8	17'-8''	17'-8''	
p(E)	18	#8	17'-8''	17'-8''	
s(E)	16	#5	17'-5''	19'-5''	
s1(E)	24	#5	7'-8½''	8'-2½''	
†(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					



BAR v(E)



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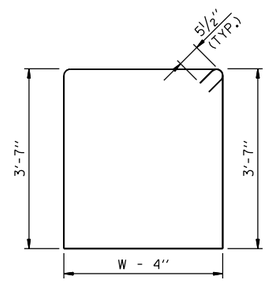

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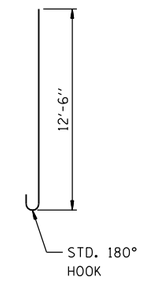

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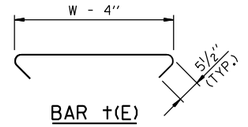
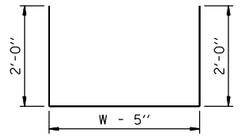
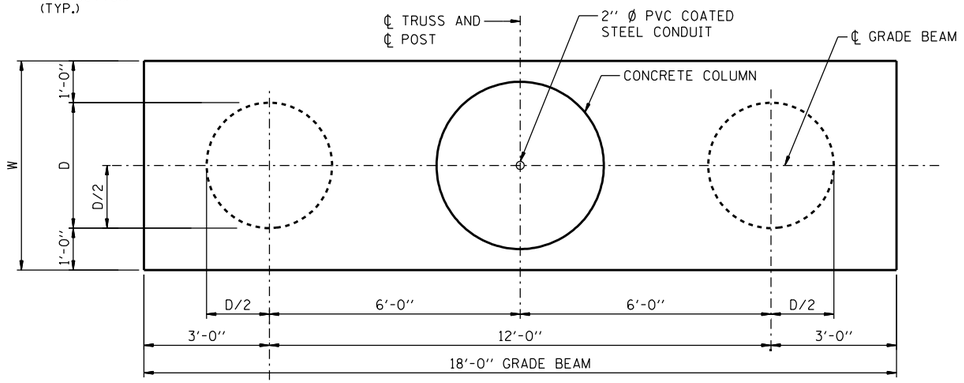


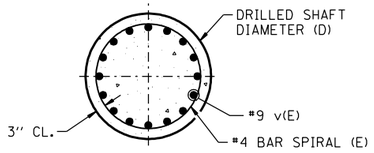
BAR †(E)



BAR u(E)



PLAN *



SECTION A-A

(TYPICAL BOTH SHAFTS)

NOTE:

* REINFORCEMENT IN GRADE BEAM NOT SHOWN FOR CLARITY.

** FOR GRADE BEAM ONLY.

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

NOTES:

1. THE FOUNDATION DETAILS SHOWN ARE BASED ON COMMON COHESIVE SOIL CONDITIONS (SILTY OR SANDY CLAY), WITH AN AVERAGE Qu > 1.25 TON/SQ. FT. NO STANDARD DRILLED SHAFT FOUNDATIONS WERE DESIGNED OR DETAILED FOR COHESIONLESS SOIL CONDITIONS. REGARDLESS THE DESIGN SECTION ENGINEER (DSE) MUST CONDUCT A SUBSURFACE INVESTIGATION AT EACH OVERHEAD SIGN FOUNDATION TO DETERMINE THE ACTUAL SOIL PROPERTIES. SHOULD THE INVESTIGATION REVEAL THE PRESENCE OF COHESIONLESS SOIL OR COHESIVE SOILS WITH PROPERTIES LESS THAN THE AVERAGES INDICATED HEREIN, THE DSE SHALL DESIGN AND DETAIL THE DRILLED SHAFT FOUNDATIONS TO MEET THE ACTUAL SOIL CONDITIONS.
2. ALL MATERIAL, FABRICATION, AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 734 OF THE 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 IDOT STANDARD SPECIFICATION AND PRIOR TO ERECTION OF CONCRETE COLUMN.
5. SEE NOTE 8 OF GENERAL NOTES ON SHEET 1 OF THIS SERIES.
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. FURNISHING AND INSTALLING ALL CONDUIT, FITTINGS AND GROUNDING SYSTEM IS INCLUDED IN THE COST OF "FOUNDATION FOR OVERHEAD SIGN STRUCTURE, CANTILEVER TYPE".
8. NO SONOTUBES OR DECOMPOSABLE FORMS SHALL BE USED 6" BELOW THE FINISHED GROUND LINE. PERMANENT METAL FORMS OR OTHER SHIELDING MAY 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.
9. FOR SIZE AND NUMBER OF PVC COATED STEEL CONDUITS, SEE ELECTRICAL CONSTRUCTION DRAWINGS.
10. TYPICAL SIGN STRUCTURE FOUNDATION IS SHOWN ON THIS SHEET. SEE SHEET 7 OF THIS SERIES FOR FOUNDATION LOCATED IN ROADWAY MEDIAN.

TABLE G: DESIGN TABLE FOR DRILLED SHAFTS IN COHESIVE SOILS

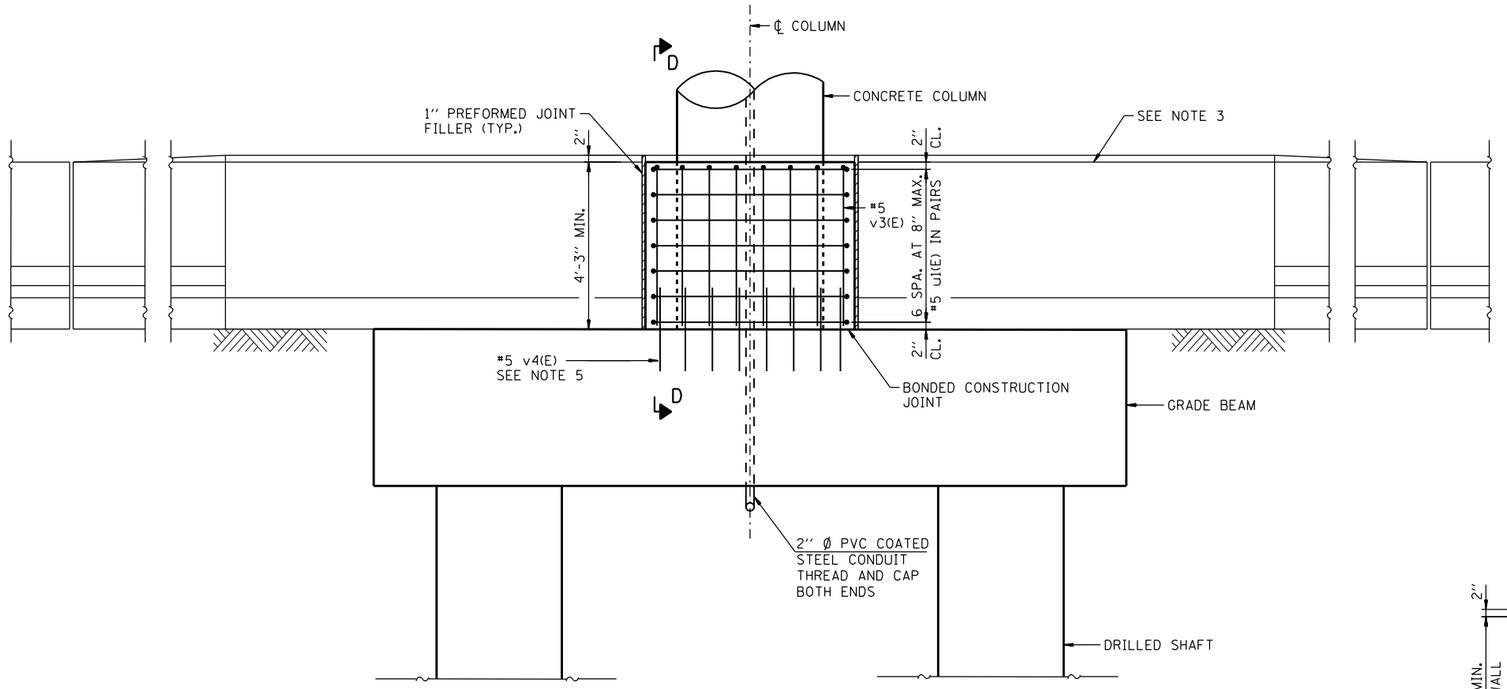
SPAN LENGTH (L)	W	D	B	F	VERTICAL BAR v(E)	VERTICAL BAR v2(E)	CLASS SI CONC. CY **	CLASS DS CONC. CY	REBAR POUNDS
< = 20'	5'-0''	3'-0''	40'	44'	12-#9	16-#9	13.4	21	7,680
21'-30'	5'-0''	3'-0''	40'	44'	12-#9	16-#9	13.4	21	7,680
31'-40'	6'-0''	4'-0''	40'	44'	20-#9	20-#9	16	37.3	9,570
41'-50'	6'-0''	4'-0''	40'	44'	20-#9	20-#9	16	37.3	9,570

Paul Kovacs
APPROVED..... CHIEF ENGINEER
DATE 3-31-2014.

Illinois Tollway

OVERHEAD SIGN STRUCTURE CANTILEVER TYPE STRUCTURE DETAILS

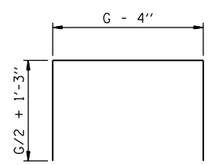
STANDARD F4-05



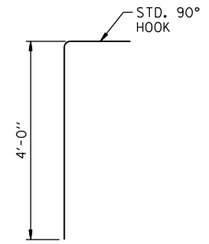
SIDE ELEVATION

BAR LIST - CRASHWALL

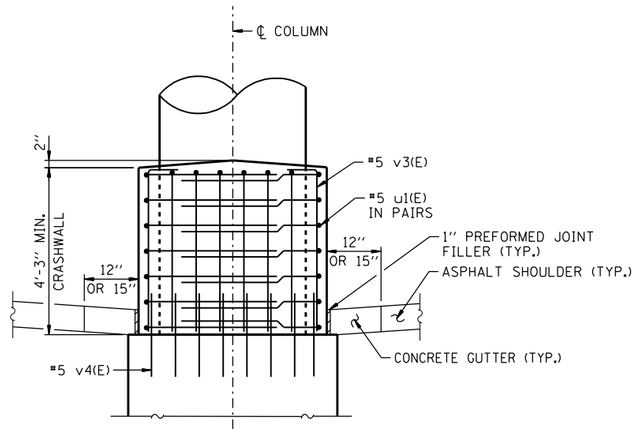
BAR	SIZE	G = 4'-6"		G = 5'-0"		SHAPE
		NUMBER	LENGTH	NUMBER	LENGTH	
u1(E)	#5	14	11'-2"	14	12'-2"	⊐
v3(E)	#5	24	4'-10"	28	4'-10"	⊐
v4(E)	#5	24	2'-0"	28	2'-0"	—



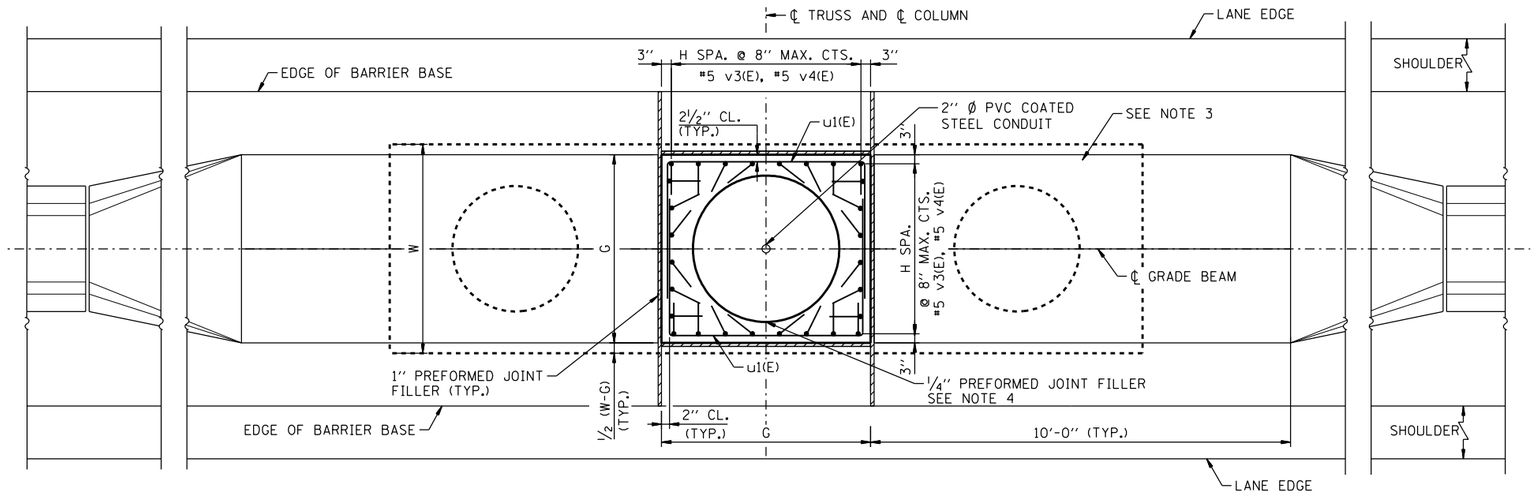
BAR u1(E)



BAR v3(E)



SECTION D-D



PLAN

NOTES:

1. SEE SHEET 6 OF THIS SERIES FOR ADDITIONAL NOTES.
2. GRADE BEAM AND DRILLED SHAFT DIMENSIONS, DETAILS, QUANTITIES AND BAR LIST ARE SHOWN ON SHEET 6 OF THIS SERIES.
3. SEE STANDARD C13 FOR CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-F.
4. SEAL EXPOSED SURFACE OF ¼" PREFORMED JOINT FILLER WITH BACKER ROD AND SILICONE SEALER (1" DEEP AND HOLD ⅛" BELOW SURFACE OF CONCRETE).
5. #5 DRILLED ANCHOR BARS WILL BE EPOXY GROUTED AASHTO M31, GRADE 60 REBAR. PROVIDE 12" MINIMUM EMBEDMENT. INSTALL ANCHORS ACCORDING TO IDOT STANDARD SPECIFICATIONS SECTION 584. LOCATE GRADE BEAM REBAR PRIOR TO DRILLING. DO NOT DAMAGE GRADE BEAM REBAR DURING INSTALLATION.

TABLE H: DESIGN TABLE FOR CRASHWALL

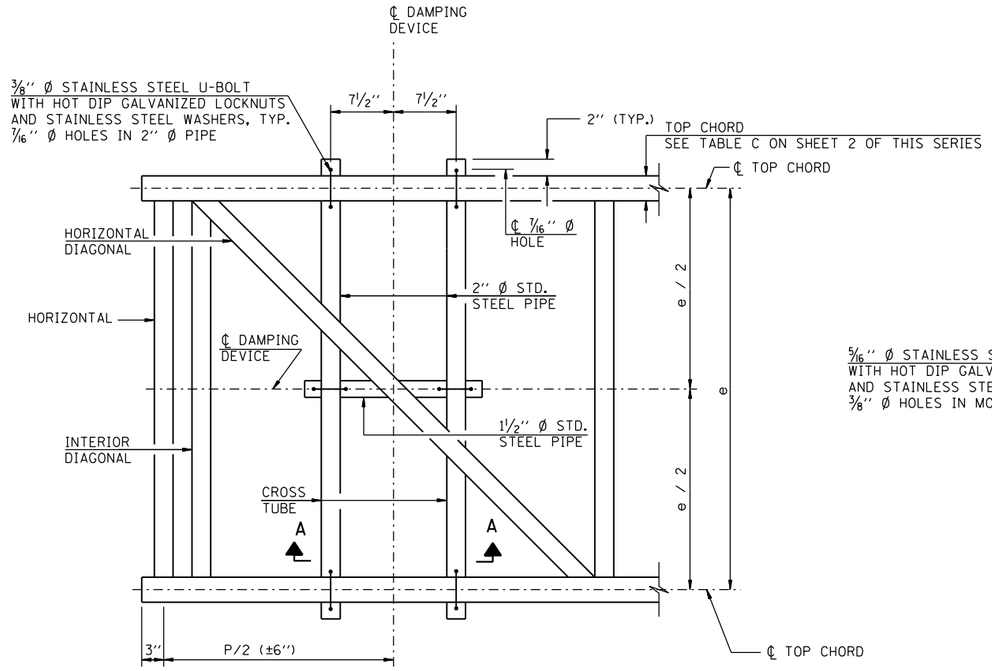
SPAN LENGTH (L)	W	G	H	CLASS SI CONC. CY	REBAR POUNDS
< = 20'	5'-0"	4'-6"	6	1.7	340
21'-30'	5'-0"	4'-6"	6	1.7	340
31'-40'	6'-0"	5'-0"	7	2.0	380
41'-50'	6'-0"	5'-0"	7	2.0	380

Paul Kovacs
APPROVED..... CHIEF ENGINEER
DATE 3-31-2014

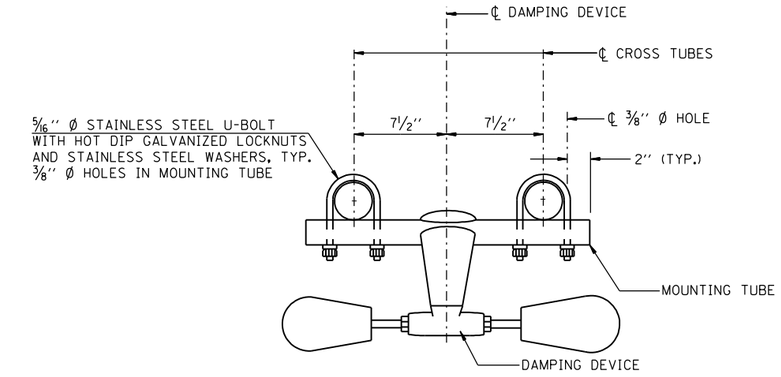
Illinois Tollway

OVERHEAD SIGN STRUCTURE
CANTILEVER TYPE
STRUCTURE DETAILS

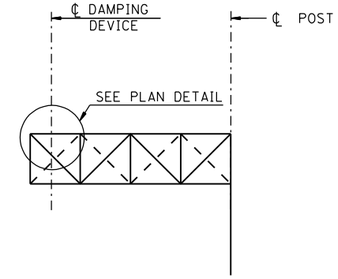
STANDARD F4-05



PLAN DETAIL



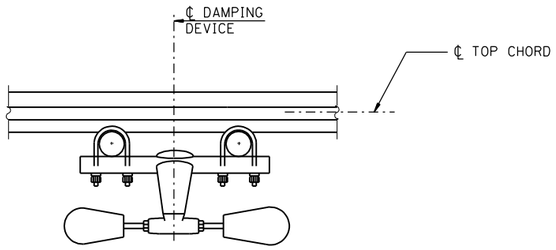
TRUSS DAMPING DEVICE CONNECTION DETAIL



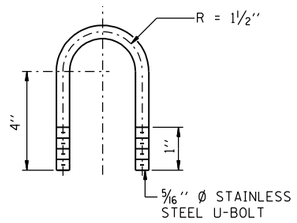
ELEVATION

NOTE:

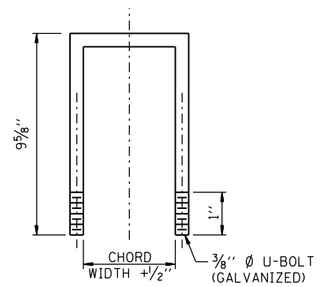
DAMPER: ONE DAMPER PER TRUSS. (31 LBS. STOCKBRIDGE-TYPE 29'' MINIMUM BETWEEN ENDS OF WEIGHTS) COST INCLUDED IN THE COST OF "OVERHEAD SIGN STRUCTURE, CANTILEVER TYPE (STEEL)."



SECTION A-A



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL
(TYPICAL)



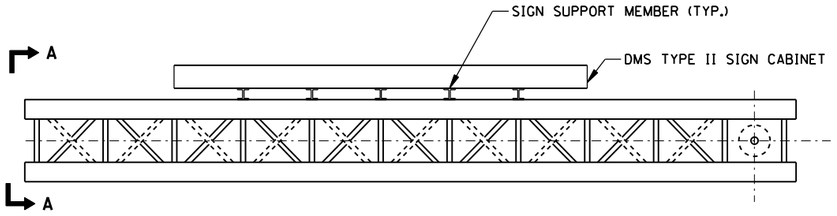
TOP CHORD TO CROSS TUBE U-BOLT DETAIL
(TYPICAL)

Paul Kovacs
APPROVED ..... DATE 3-31-2014
CHIEF ENGINEER

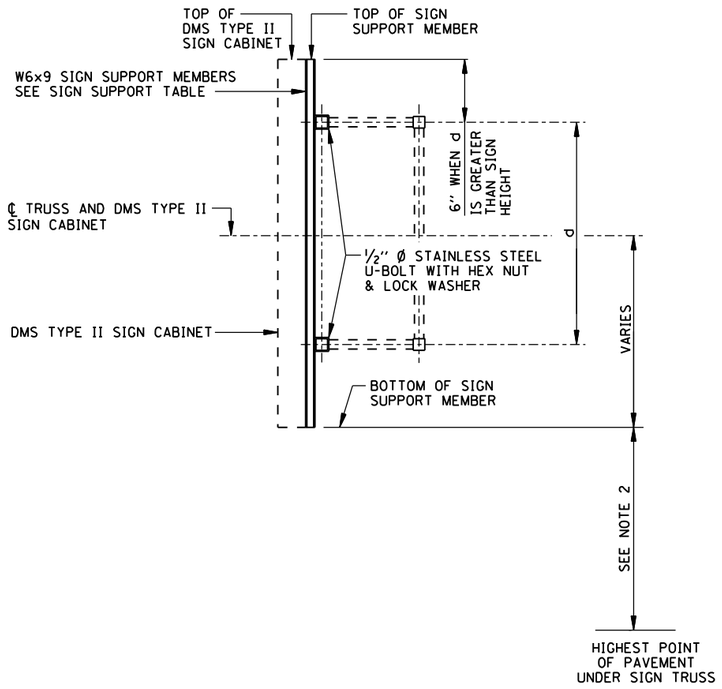
Illinois Tollway

OVERHEAD SIGN STRUCTURE
CANTILEVER TYPE
STRUCTURE DETAILS

STANDARD F4-05



PLAN



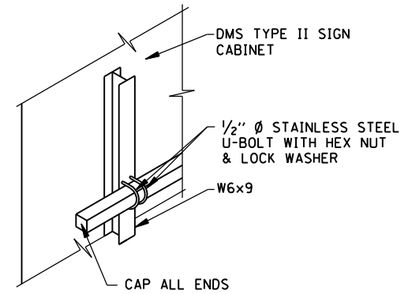
SECTION A-A

TABLE I: SIGN SUPPORT TABLE

W6x9		
SIGN WIDTH		NUMBER OF SIGN SUPPORTS 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

TABLE J: DMS TYPE II SIGN TABLE

MAXIMUM TRUSS LENGTH	MAXIMUM DMS TYPE II SIGN SIZE			MAXIMUM WEIGHT
	HEIGHT	WIDTH	DEPTH	
25 FEET	4'-0"	10'-0"	1'-0"	1200 LBS.
30 FEET	5'-0"	16'-0"	1'-0"	2000 LBS.
40 FEET	8'-0"	26'-0"	2'-2"	3100 LBS.



STAINLESS STEEL U-BOLT DETAIL

DMS TYPE II SIGN SUPPORT DETAIL

NOTES:

1. DMS TYPE II SIGN CABINET SHALL BE ATTACHED TO TRUSS AS CLOSE TO PANEL JOINTS AS POSSIBLE.
2. SEE THE TOLLWAY STRUCTURE DESIGN MANUAL FOR MINIMUM VERTICAL CLEARANCE.
3. VERIFY SIGN SUPPORT MEMBER LENGTH PRIOR TO FABRICATION.
4. DMS TYPE II SIGN MANUFACTURER SHALL DESIGN, PROVIDE AND INSTALL HORIZONTAL MOUNTING MEMBERS. VERTICAL SPACING OF HORIZONTAL MEMBERS SHALL BE DESIGNED BY DMS TYPE II MANUFACTURER. VERIFY VERTICAL SPACING WITH HOLES FOR STAINLESS STEEL U-BOLT.
5. ALTERNATE DMS TYPE II SIGN DIMENSIONS MAY BE ACCEPTABLE UPON TOLLWAY'S APPROVAL. CONSULT WITH THE TOLLWAY BEFORE USING DMS TYPE II SIGNS WITH ALTERNATE DIMENSIONS.

Paul Kovacs
APPROVED ..... DATE 3-31-2014
CHIEF ENGINEER

Illinois Tollway

OVERHEAD SIGN STRUCTURE
CANTILEVER TYPE
STRUCTURE DETAILS

STANDARD F4-05

RESERVED

Paul Kovacs
APPROVED ..... DATE 3-31-2014
CHIEF ENGINEER

DATE	REVISIONS

Illinois Tollway

STANDARD F5-00

RESERVED

Paul Kovacs
APPROVED ..... DATE 2-7-2012
CHIEF ENGINEER

DATE	REVISIONS

Illinois Tollway

STANDARD F6-00

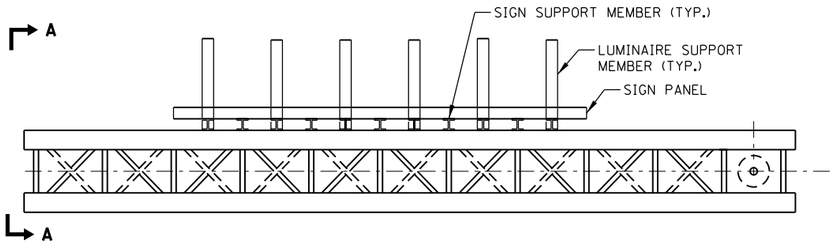
RESERVED

Paul Kovacs
APPROVED . . . . . DATE 3-31-2014
CHIEF ENGINEER

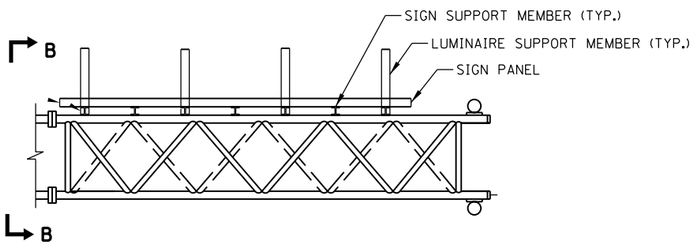
DATE	REVISIONS

Illinois Tollway

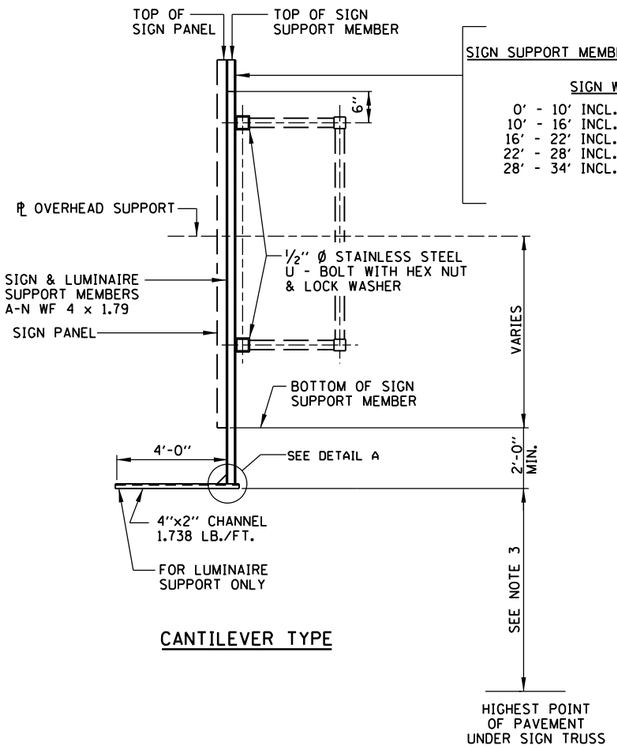
STANDARD F7-00



PLAN

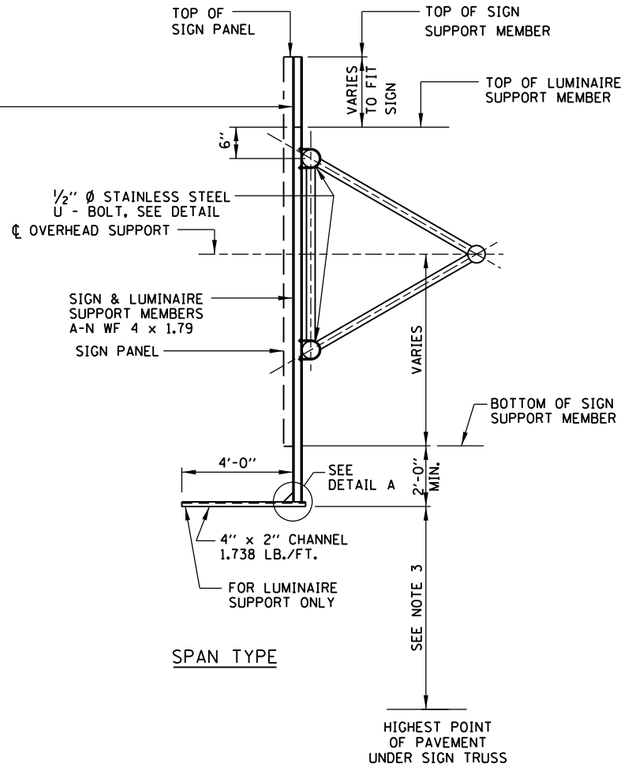


PLAN



CANTILEVER TYPE

SECTION A-A



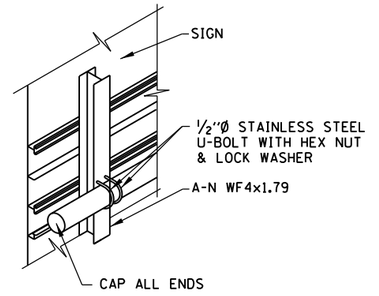
SPAN TYPE

SECTION B-B

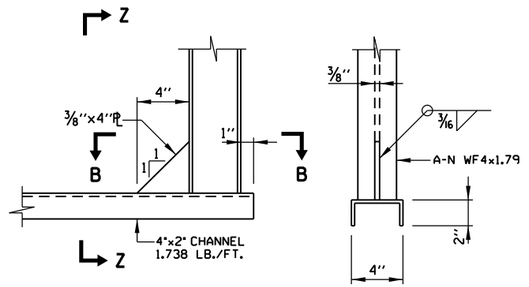
SIGN AND LUMINAIRE SUPPORT DETAIL

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. DESIGNER TO DETERMINE REQUIREMENTS BASED ON ROADWAY GEOMETRY.
3. SEE THE TOLLWAY STRUCTURE DESIGN MANUAL FOR MINIMUM VERTICAL CLEARANCE.

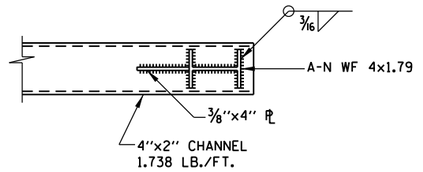


STAINLESS STEEL U-BOLT DETAIL



DETAIL A

SECTION Z-Z



SECTION B-B

NOTES:

ALL MATERIAL IS ALUMINUM (UNLESS OTHERWISE NOTED).

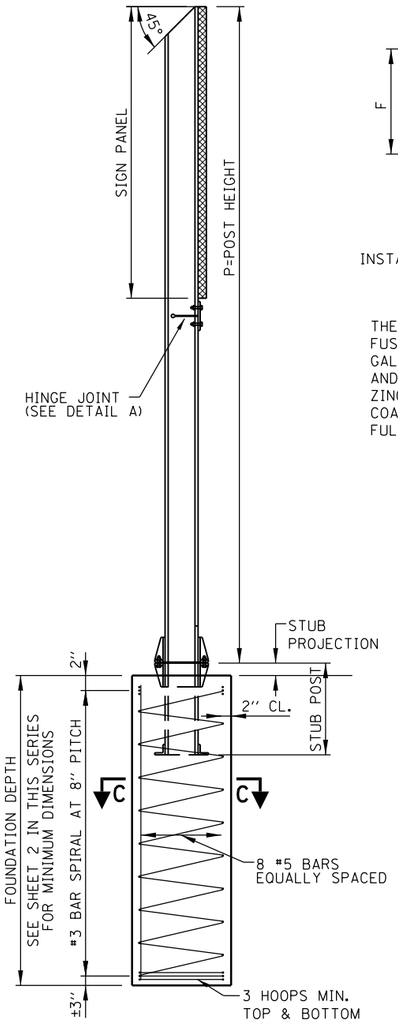
Paul Kovacs
APPROVED ..... DATE 2-7-2012
CHIEF ENGINEER

DATE	REVISIONS
1-1-2009	ADDED PLAN VIEWS FOR SIGN STRUCTURES
2-7-2012	REVISED OVERHEAD SIGN STRUCTURE CANTILEVER DIAGONALS
2-1-2013	REMOVED VERTICAL CLEARANCE.
3-31-2014	REVISED SIGN SUPPORT MEMBERS

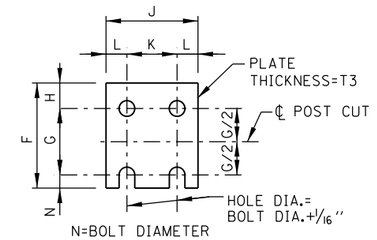
Illinois Tollway

OVERHEAD SIGN STRUCTURE SIGN AND LUMINAIRE SUPPORTS

STANDARD F8-04



SIDE ELEVATION
POST & FOUNDATION

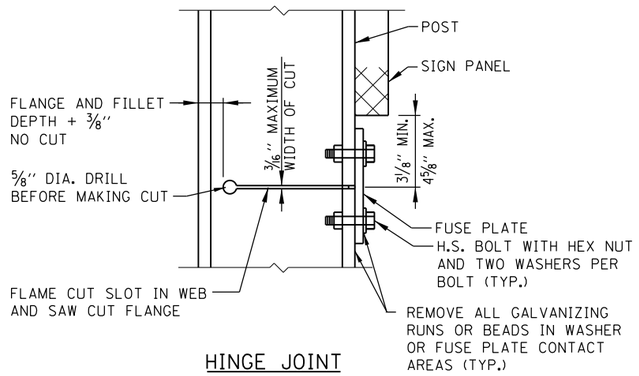


FUSE PLATE DETAIL
INSTALL WITH NOTCHES TOWARDS BASE

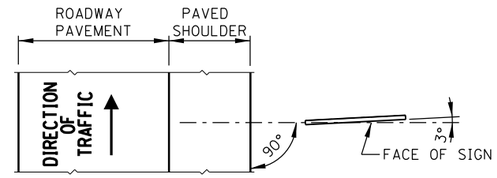
G & H DIM. TABLE		
BOLT DIA.	G	H
1/2"	2"	1 1/8"
5/8"	2 1/4"	1 1/4"
3/4"	2 1/2"	1 3/8"
7/8"	2 3/4"	1 1/2"
1"	3"	1 5/8"
1 1/8"	3 1/4"	1 3/4"
1 1/4"	3 1/2"	1 7/8"

FABRICATORS NOTES

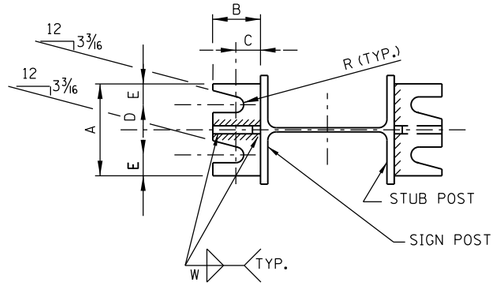
THE SLOT AND THE 5/8" DIA. HOLE IN THE WEB AND THE FUSE PLATE BOLT HOLES IN THE FLANGE SHALL BE MADE BEFORE GALVANIZING. POST FLANGE SHALL BE SAW CUT AFTER GALVANIZING AND BARE METAL SURFACES SHALL BE COATED WITH AN APPROVED ZINC SOLDER OR ZINC-RICH PAINT. THESE SURFACES SHALL NOT BE COATED UNTIL THE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



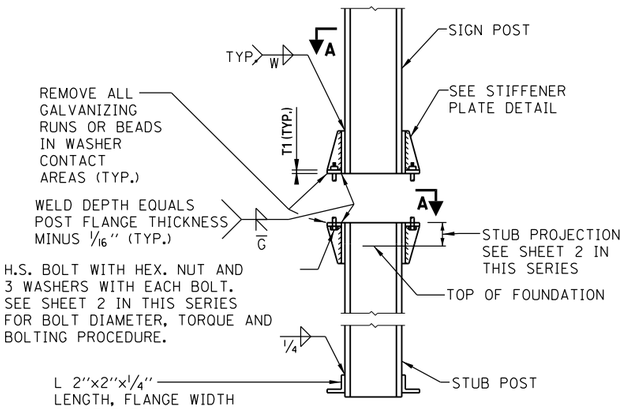
HINGE JOINT
DETAIL A



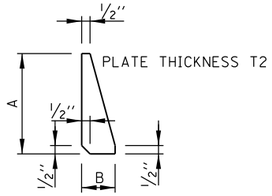
LOCATION SKETCH



SEC. A-A

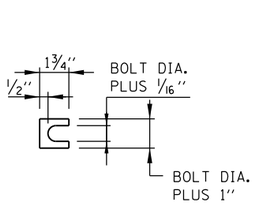


ELEVATION
SIGN POST & STUB POST



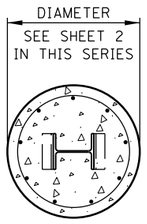
STIFFENER PLATE
DETAIL

SEE SHEET 2 IN THIS
SERIES FOR DIMENSIONS

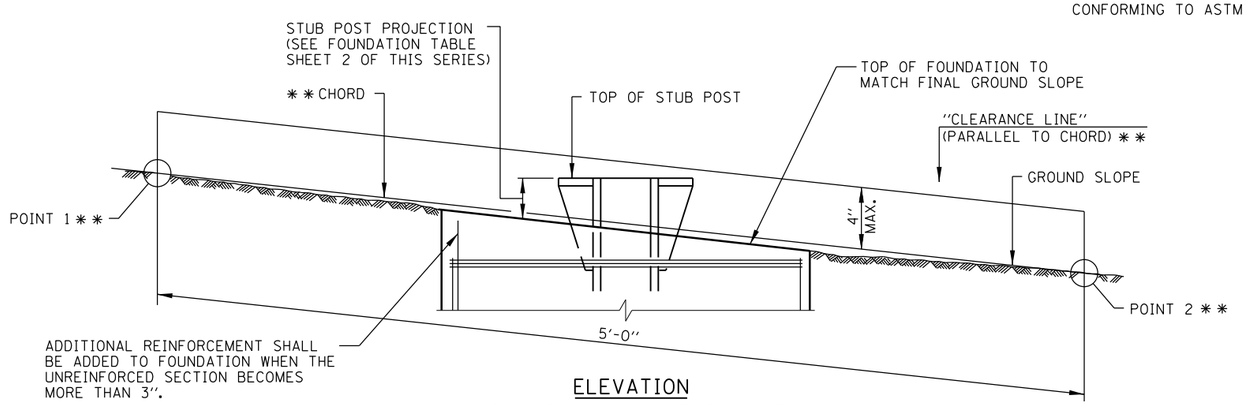


SHIM DETAIL

FURNISH 2-.012" THICK AND
2-.032" THICK SHIMS PER POST.
SHIMS SHALL BE FABRICATED
FROM BRASS SHIM STOCK
CONFORMING TO ASTM B36.



SEC. C-C



ELEVATION
GROUND LINE & STUB POST

* * FOR ALL "POINT 1" AND "POINT 2"LOCATIONS, "CLEARANCE LINE" MUST BE AT OR ABOVE TOP OF STUB POST.

GENERAL NOTES

DESIGN: THE LATEST EDITION OF THE "AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRE AND TRAFFIC SIGNALS".

CONSTRUCTION: IDOT STANDARD SPECIFICATIONS AND THE SPECIAL PROVISIONS.

LOADING: FOR 80 MPH WIND VELOCITY PLUS 30% GUST FACTOR NORMAL TO SIGN.

DESIGN STRESSES:
STRUCTURAL STEEL - PER AASHTO 20,000 P.S.I.
REINFORCING STEEL - 24,000 P.S.I.
CLASS SI CONCRETE - 1,400 P.S.I.
MINIMUM SOIL PRESSURE - 1.25 TONS/SQ. FT.

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

MATERIALS: ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 AND IDOT STANDARD SPECIFICATIONS.

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

Paul Kovacs
APPROVED ..... DATE 1-1-2010
CHIEF ENGINEER

DATE	REVISIONS
2-7-2012	ADDED STUB POST CLEARANCE DIMENSIONS, REVISED SIGN INSTALLATION CLEARANCE DIMENSIONS
11-1-2012	REVISED NOTES, MODIFIED SLOPE REQUIREMENTS FOR BREAKAWAY SUPPORTS

Illinois Tollway

BREAKAWAY SIGN SUPPORT DETAILS

STANDARD F9-04

POST	FOUNDATION TABLE												BASE CONNECTION DATA TABLE									
	FOUNDATION			REINFORCEMENT							STUB POST			BOLT SIZE AND TORQUE	A	B	C	D	E	T1	T2	W	R
	DIA.	MIN. DEPTH	CY.* CONC.	VERTICAL BARS			BAR SPIRALS			LBS.**	STUB LGTH.	STUB PROJECTION	LBS.***										
				NO.	SIZE	LGTH.	SIZE	O.D.	LGTH.													
W6x9	2'-0"	6'-0"	.70	8	#5	5'-9"	#3	20½"	79'	78	2'-3"	3"	44	5/8" Ø x 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	¾" Ø x 3¾" LG. TORQUE = 750" #	6"	2½"	1⅜"	3¼"	1⅜"	1"	½"	5/16"	13/32 "
W10x22	2'-6"	6'-6"	1.18	8	#5	6'-3"	#3	26½"	105'	92	3'-0"	2½"	110										
W10x26	2'-6"	7'-0"	1.27	8	#5	6'-9"	#3	26½"	112'	98	3'-0"	2½"	137	7/8" Ø x 4" LG. TORQUE = 950" #	7"	2¾"	1½"	4"	1½"	1"	¾"	⅜"	15/32 "
W12x26	2'-6"	7'-9"	1.41	8	#5	7'-6"	#3	26½"	119'	107	3'-0"	2½"	140										
W14x30	3'-0"	7'-3"	1.90	8	#5	7'-0"	#3	32½"	145'	113	3'-0"	2½"	150										
W14x38	3'-0"	8'-0"	2.09	8	#5	7'-9"	#3	32½"	153'	122	3'-6"	2½"	208	1" Ø x 4½" LG. TORQUE = 1100" #	7½"	3"	1¾"	4"	1¾"	1¼"	¾"	⅜"	17/32 "
W16x45	3'-0"	8'-6"	2.23	8	#5	8'-3"	#3	32½"	162'	130	3'-6"	2½"	233										

- QUANTITY OF IDOT CLASS DS 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' #

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.

POST	FUSE PLATE DATA TABLE				FUSE PLATE BOLT SIZE TABLE										
					SIGN DEPTH										
	J	K	L	T3	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'
W6x9	4"	2¼"	7/8"	¼"	½"Ø x 1½"	½"Ø x 1½"	½"Ø x 1½"	5/8"Ø x 1¾"	5/8"Ø x 1¾"	5/8"Ø x 1¾"	---	---	---	---	---
W6x15	6"	3½"	1¼"	⅜"	½"Ø x 1¾"	½"Ø x 1¾"	5/8"Ø x 2"	5/8"Ø x 2"	¾"Ø x 2"	¾"Ø x 2"	¾"Ø x 2"	¾"Ø x 2"	⅞"Ø x 2"	⅞"Ø x 2"	---
W8x18	5¼"	2¾"	1¼"	⅜"	½"Ø x 1¾"	½"Ø x 1¾"	½"Ø x 1¾"	5/8"Ø x 2"	5/8"Ø x 2"	¾"Ø x 2"	¾"Ø x 2"	⅞"Ø x 2¼"	⅞"Ø x 2¼"	⅞"Ø x 2¼"	⅞"Ø x 2¼"
W10x22	5¾"	2¾"	1½"	½"	½"Ø x 2"	½"Ø x 2"	½"Ø x 2"	5/8"Ø x 2"	5/8"Ø x 2"	¾"Ø x 2¼"	¾"Ø x 2¼"	⅞"Ø x 2¼"	¾"Ø x 2¼"	⅞"Ø x 2½"	1"Ø x 2½"
W10x26	5¾"	2¾"	1½"	5/8"	½"Ø x 2"	½"Ø x 2"	½"Ø x 2"	5/8"Ø x 2¼"	5/8"Ø x 2¼"	¾"Ø x 2½"	¾"Ø x 2½"	⅞"Ø x 2½"	⅞"Ø x 2½"	1"Ø x 2¾"	1"Ø x 2¾"
W12x26	6½"	3½"	1½"	5/8"	---	---	---	---	---	5/8"Ø x 2¼"	---	---	⅞"Ø x 2½"	⅞"Ø x 2½"	1"Ø x 2½"
W14x30	6¾"	3½"	1⅝"	½"	½"Ø x 2"	½"Ø x 2"	½"Ø x 2"	½"Ø x 2"	½"Ø x 2"	5/8"Ø x 2"	5/8"Ø x 2¼"	¾"Ø x 2¼"	¾"Ø x 2¼"	⅞"Ø x 2½"	1"Ø x 2½"
W14x38	6¾"	3½"	1⅝"	½"	---	½"Ø x 2"	½"Ø x 2"	½"Ø x 2"	½"Ø x 2"	5/8"Ø x 2¼"	5/8"Ø x 2¼"	¾"Ø x 2½"	¾"Ø x 2½"	⅞"Ø x 2½"	⅞"Ø x 2½"
W16x45	7"	3½"	1¾"	½"	---	---	---	½"Ø x 2"	½"Ø x 2"	5/8"Ø x 2¼"	5/8"Ø x 2¼"	5/8"Ø x 2¼"	¾"Ø x 2½"	¾"Ø x 2½"	⅞"Ø x 2½"

POST	FUSE PLATE DATA TABLE				FUSE PLATE BOLT SIZE TABLE										
					SIGN DEPTH										
	J	K	L	T3	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	---
W6x9	4"	2¼"	7/8"	¼"	---	---	---	---	---	---	---	---	---	---	---
W6x15	6"	3½"	1¼"	⅜"	---	---	---	---	---	---	---	---	---	---	---
W8x18	5¼"	2¾"	1¼"	⅜"	⅞"Ø x 2¼"	⅞"Ø x 2¼"	---	---	---	---	---	---	---	---	---
W10x22	5¾"	2¾"	1½"	½"	1"Ø x 2¾"	1"Ø x 2¾"	1"Ø x 2¾"	1"Ø x 2¾"	1"Ø x 2¾"	1"Ø x 2¾"	---	---	---	---	---
W10x26	5¾"	2¾"	1½"	5/8"	1"Ø x 2¾"	1⅛"Ø x 3"	1⅛"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	---
W12x26	6½"	3½"	1½"	5/8"	1"Ø x 2¾"	1"Ø x 2¾"	1⅛"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	---
W14x30	6¾"	3½"	1⅝"	½"	1"Ø x 2¾"	1"Ø x 2¾"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	---
W14x38	6¾"	3½"	1⅝"	½"	1"Ø x 2½"	1"Ø x 2¾"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	---
W16x45	7"	3½"	1¾"	½"	⅞"Ø x 2½"	1"Ø x 2¾"	1"Ø x 2¾"	1⅛"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	1¼"Ø x 3"	---

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.

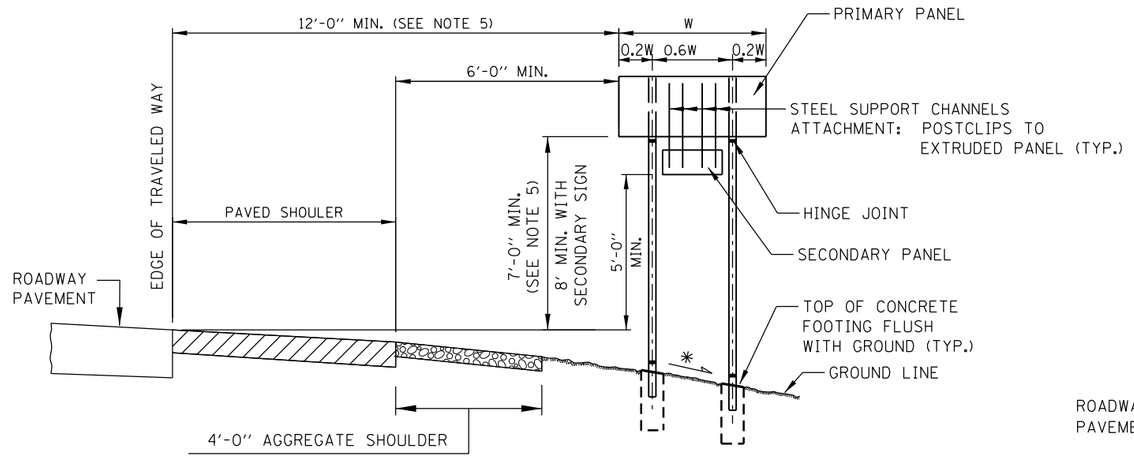
BOLT DIA.	MIN. RESIDUAL BOLT TENSION	BOLT DIA.	MIN. RESIDUAL BOLT TENSION	BOLT DIA.	MIN. RESIDUAL BOLT TENSION
½"	12,050	⅞"	39,250	1¼"	71,700
5/8"	19,200	1"	51,500		
¾"	28,400	1⅛"	56,450		

Paul Kovacs
APPROVED ..... DATE 1-1-2010
CHIEF ENGINEER

Illinois Tollway

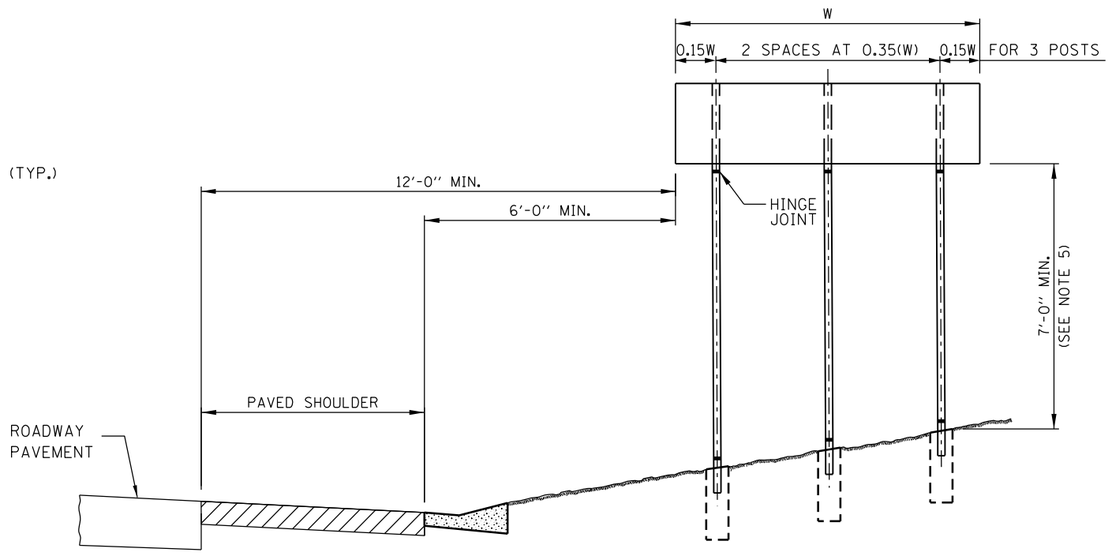
BREAKAWAY SIGN SUPPORT DETAILS

STANDARD F9-04

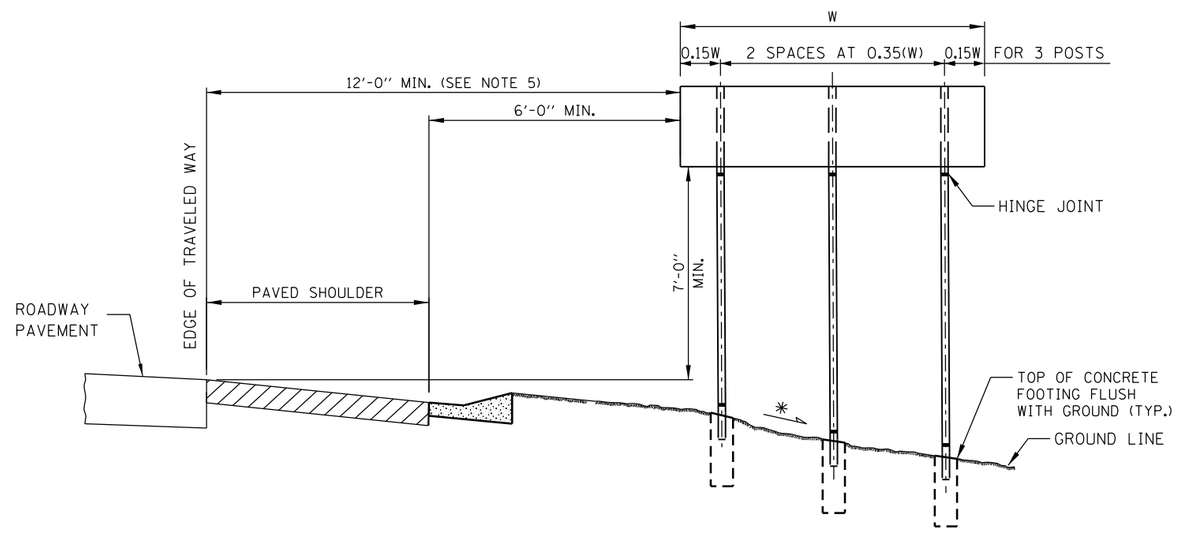


CONDITION 1 - SIGN INSTALLATION

(*) FORESLOPE 1:6 (V:H) OR FLATTER



CONDITION 3 - SIGN INSTALLATION



CONDITION 2 - SIGN INSTALLATION

(*) FORESLOPE 1:6 (V:H) OR FLATTER

UNSHIELDED SLOPE

NOTES:

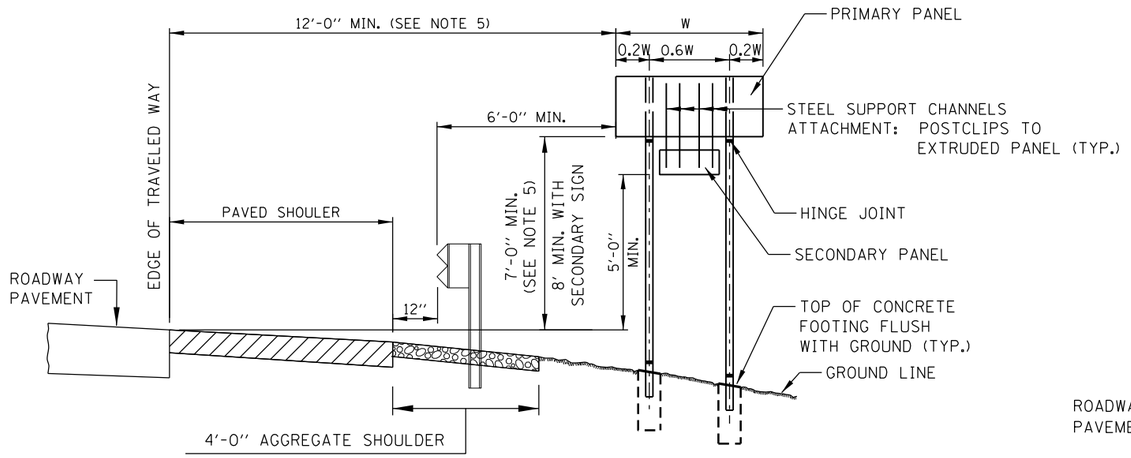
1. SEE SIGN INSTALLATION SCHEDULE IN CONTRACT PLANS FOR DIMENSIONS.
2. THE DIMENSIONS OF ALL POSTS FOR GROUND MOUNTED SIGNS ARE BASED ON DESIGN CROSS SECTIONS. THE CONTRACTOR SHALL VERIFY REQUIRED POST LENGTHS IN THE FIELD, PRIOR TO SUBMITTING SHOP DRAWINGS AND POST FABRICATION TO MAINTAIN THE CLEARANCES 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 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.

Paul Kovacs
APPROVED ..... DATE 1-1-2010
CHIEF ENGINEER

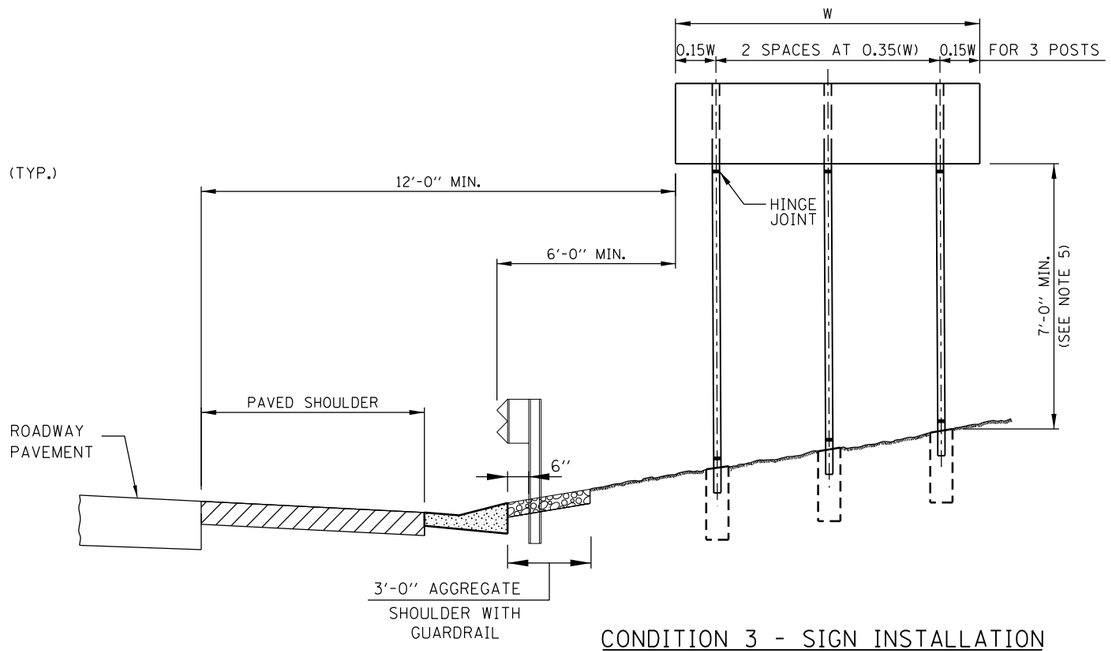
Illinois Tollway

BREAKAWAY SIGN SUPPORT DETAILS

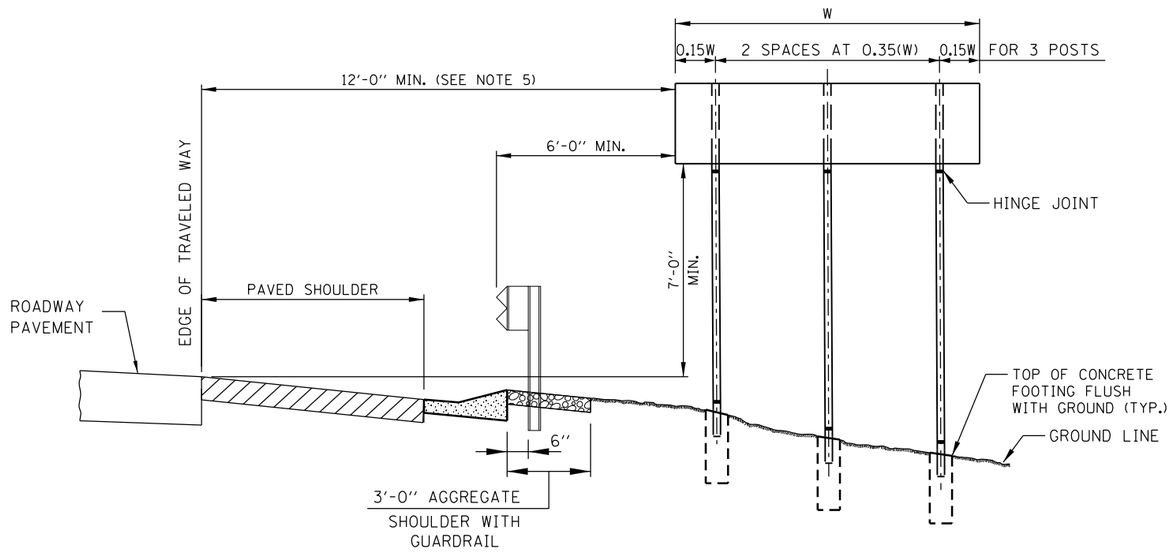
STANDARD F9-04



CONDITION 1 - SIGN INSTALLATION



CONDITION 3 - SIGN INSTALLATION



CONDITION 2 - SIGN INSTALLATION

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 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.

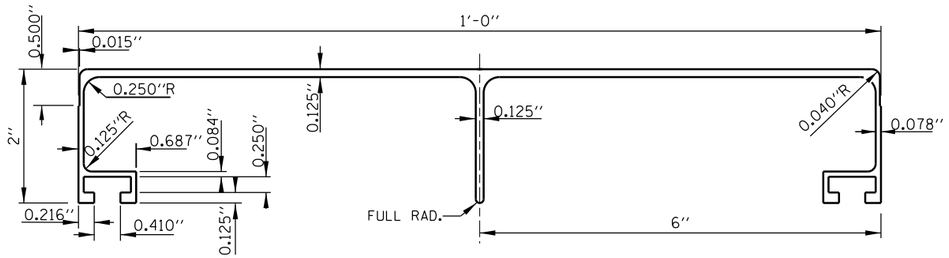
SHIELDED SLOPE

Paul Kovacs
APPROVED ..... DATE 1-1-2010
CHIEF ENGINEER

Illinois Tollway

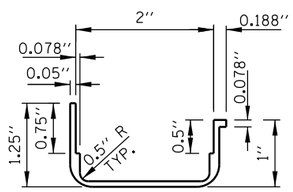
BREAKAWAY SIGN SUPPORT DETAILS

STANDARD F9-04

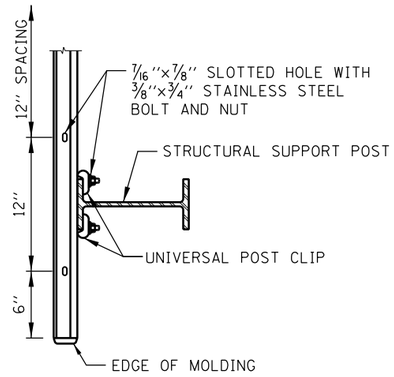


12'' PANEL

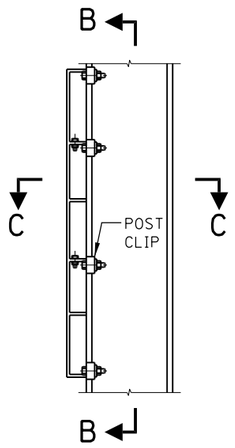
TYPE B SIGN PANEL EXTRUSIONS



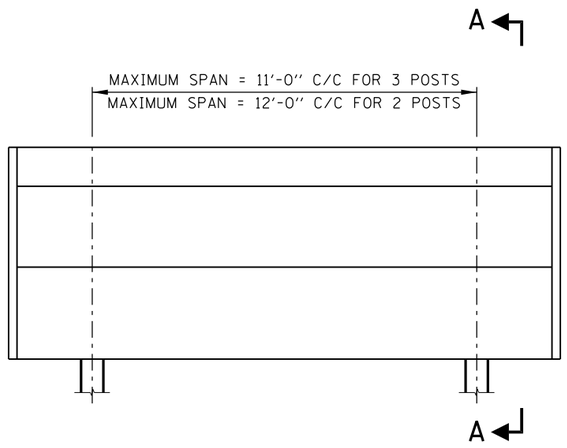
EDGE MOLDING SECTION FOR SIGN PANEL



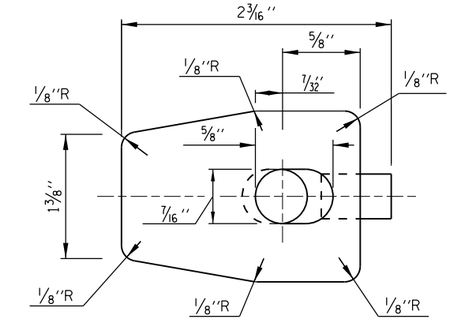
SECTION C-C



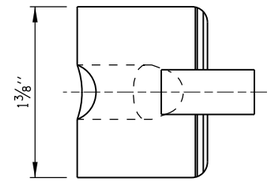
SECTION A-A



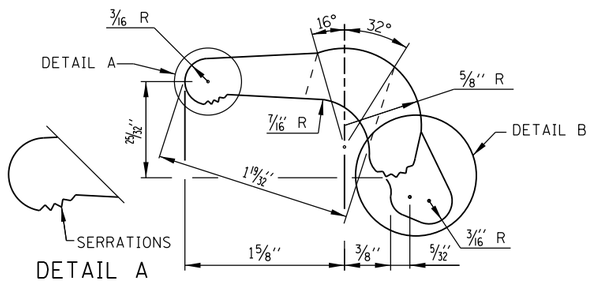
FACE OF SIGN PANEL



PLAN VIEW

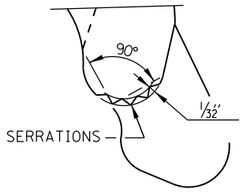


END VIEW



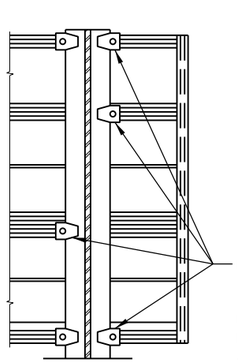
ELEVATION VIEW

DETAIL A
(ENLARGED VIEW OF SERRATIONS)



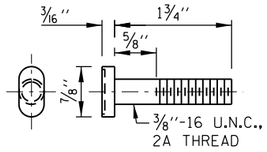
DETAIL B
(ENLARGED DETAIL OF SERRATIONS)

ALUMINUM CLIP DETAIL



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.

SECTION B-B



POST CLIP BOLT STAINLESS STEEL

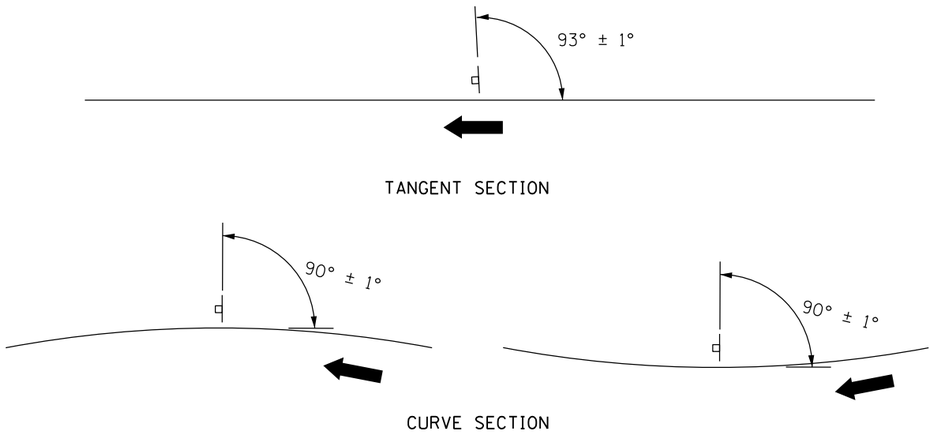
Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 2-7-2012

Illinois Tollway

DATE	REVISIONS
1-1-2009	MODIFIED TYPE B SIGN PANEL DIM.
	MODIFIED POST CLIP DETAIL
2-7-2012	REMOVED DETAIL FOR MOUNTING 2 PANEL SIGN

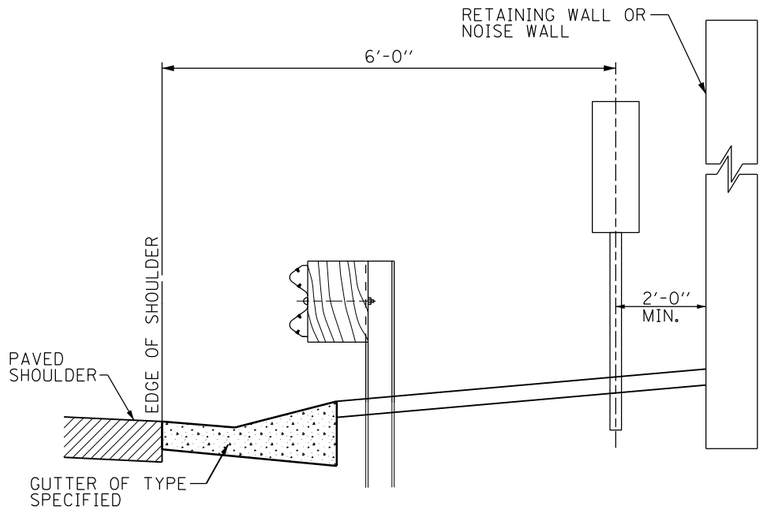
MISCELLANEOUS DETAILS AND ALUMINUM SIGN PANELS

STANDARD F10-02



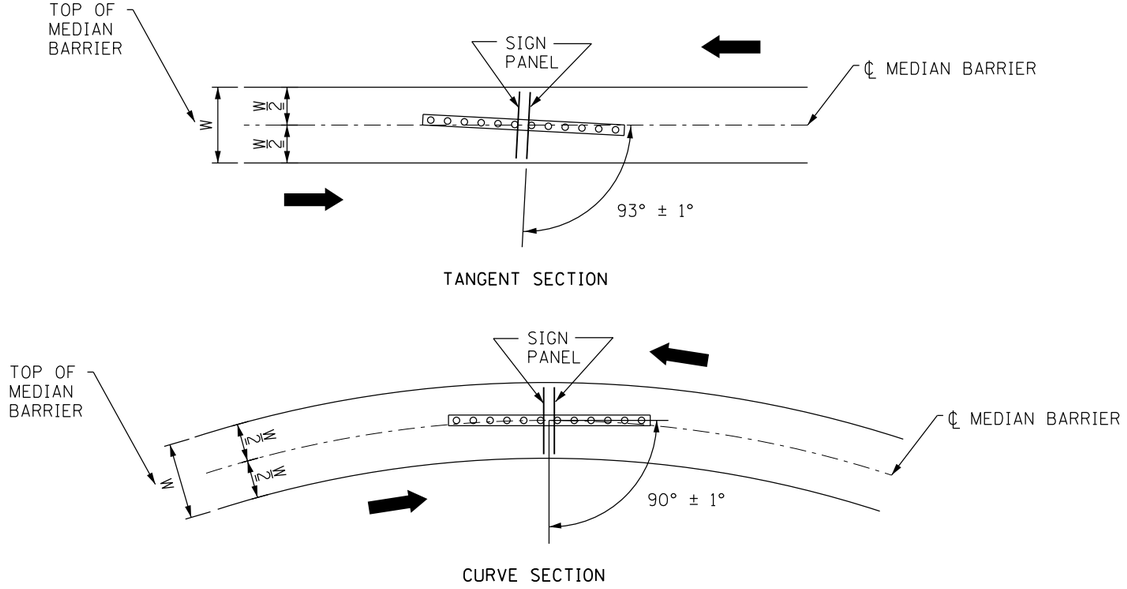
GROUND MOUNT SIGN POSITIONING

NOT TO SCALE



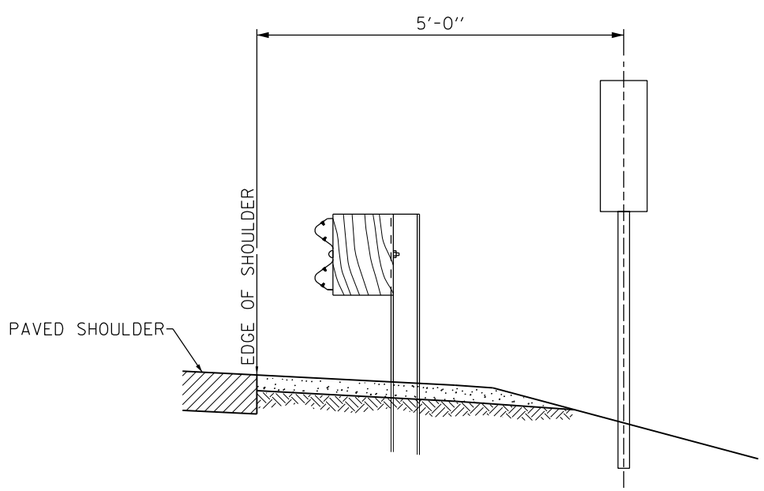
SECTION WITH GUTTER

NOT TO SCALE



MEDIAN BARRIER SIGN POSITIONING

NOT TO SCALE



SECTION WITHOUT GUTTER

NOT TO SCALE

DIRECTION OF TRAFFIC

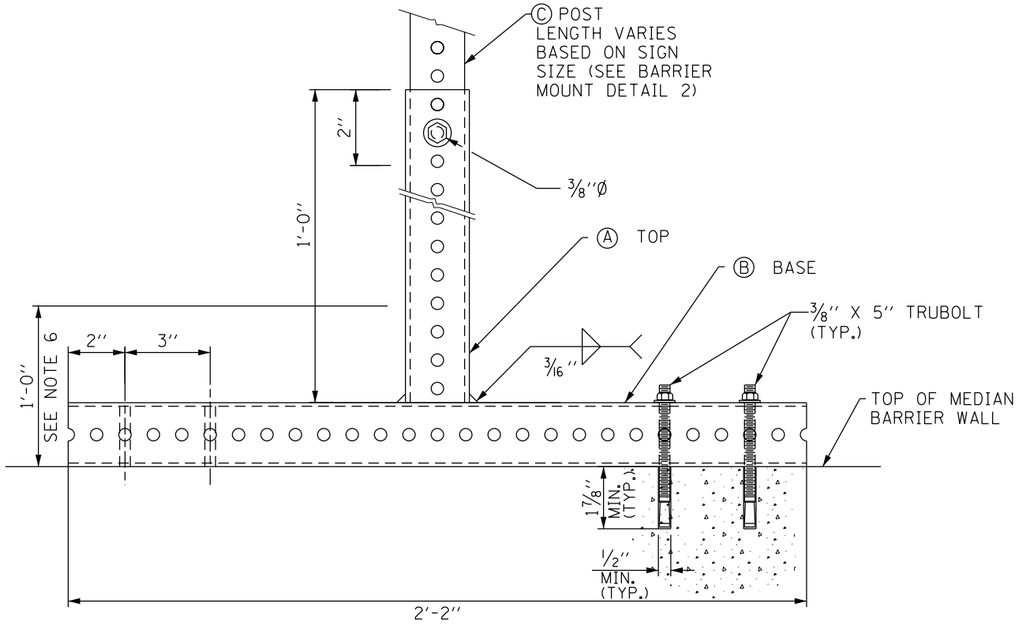
Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 4-6-2009

Illinois Tollway

DATE	REVISIONS
5-8-2009	POSITIONING DETAILS
8-1-2009	REVISED BARRIER WALL MOUNT
3-1-2013	REMOVED MILE POST SIGNS

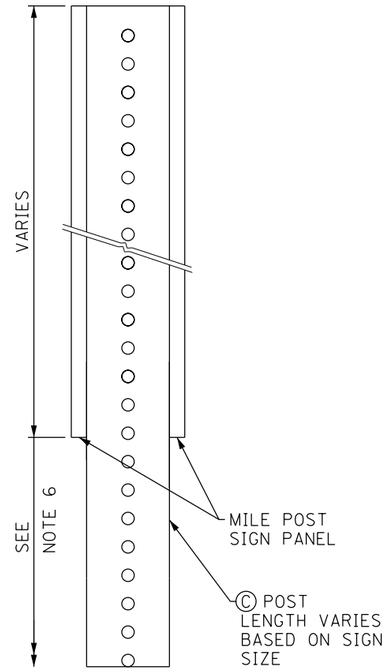
MILEPOST MARKER

STANDARD F11-03



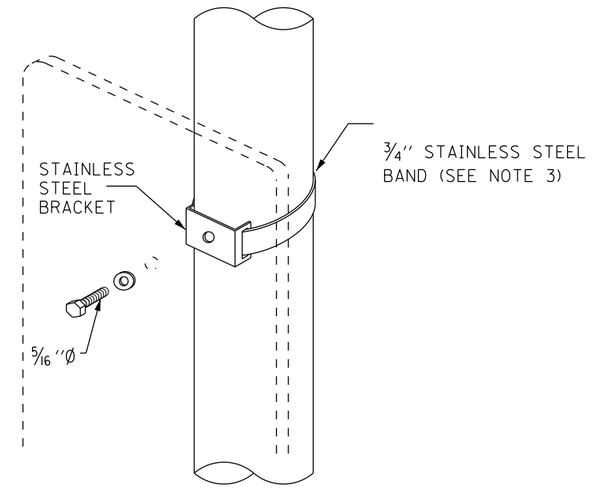
BARRIER WALL MOUNT DETAIL

NOT TO SCALE



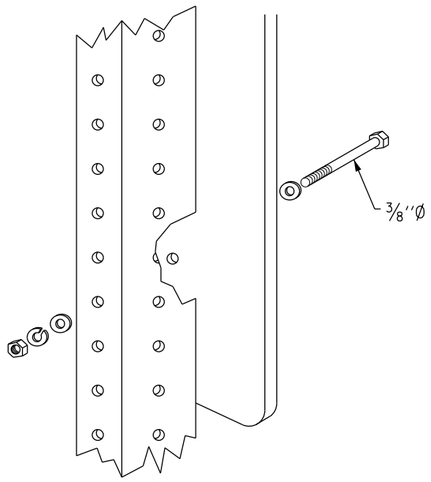
BARRIER WALL MOUNT DETAIL 2

NOT TO SCALE



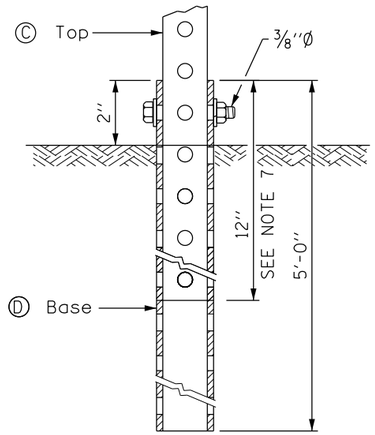
LIGHT POLE/SIGN STRUCTURE
MOUNT DETAIL

NOT TO SCALE



TELESCOPING STEEL POSTS

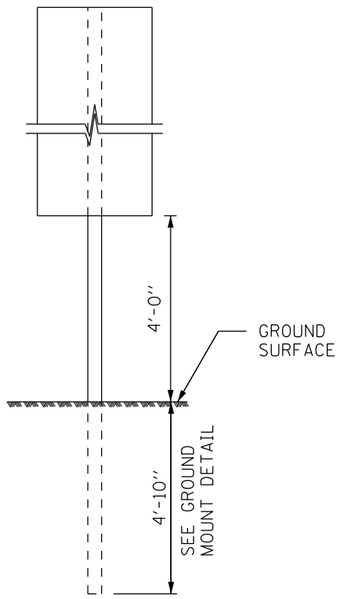
NOT TO SCALE



GROUND MOUNT DETAIL

NOT TO SCALE

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



ONE POST INSTALLATION

NOT TO SCALE

GENERAL NOTES:

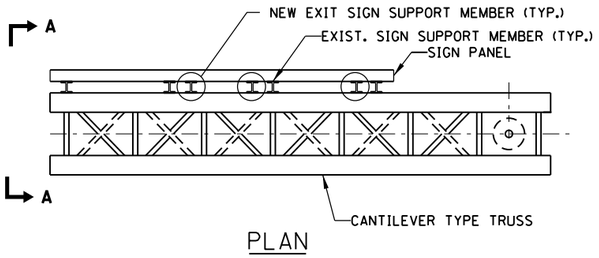
1. ALL ANCHOR BOLTS FOR MEDIAN BARRIER MOUNT DETAIL SHALL BE 3/8'' DIA. RED HEAD ''TRUBOLT'' OR APPROVED EQUAL.
2. ALL DIMENSIONS ARE IN INCHES UNLESS SHOWN OTHERWISE.
3. FOLLOWING ARE THE STEPS FOR FASTENING THE MILEPOST MARKER SIGN PANEL. ALL MOUNTING DETAILS SHOWN ON THIS SHEET APPLY:
   a. CENTER ALL FASTENERS ON THE SIGN PANEL.
   b. START AND FINISH THE FASTERNER 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 HAVE A MINIMUM OF 4'-0'' REGARDLESS OF BARRIER TYPE.
7. THE TOP SECTION SHALL BE TELESCOPED INTO THE BASE SECTION 12 INCHES AND FASTENED TOGETHER.
8. ALL BOLTS SHALL BE GALVANIZED, A325 GRADE UNLESS OTHERWISE NOTED.
9. FOR ATTACHMENT TO BRIDGE PARAPET USE BARRIER MOUNT WALL DETAIL. ONLY ONE PANEL REQUIRED WHEN ATTACHED TO PARAPET ALONG OUTSIDE SHOULDER.

Paul Kovacs
APPROVED ..... DATE 4-6-2009
CHIEF ENGINEER

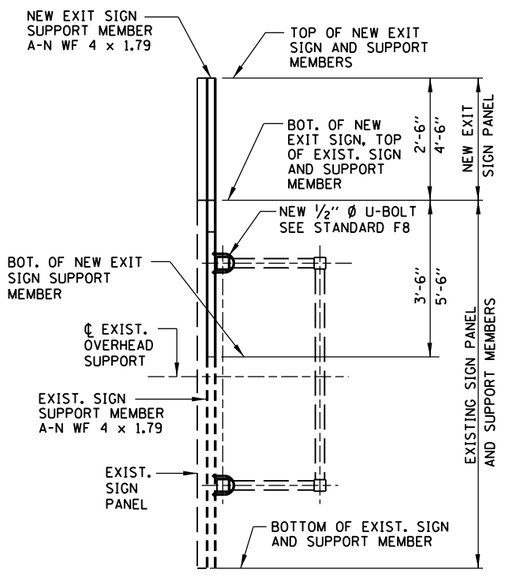
Illinois Tollway

MILEPOST MARKER

STANDARD F11-03

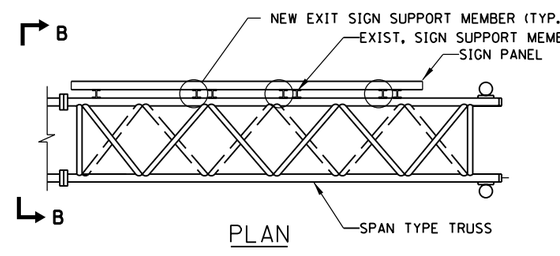


PLAN

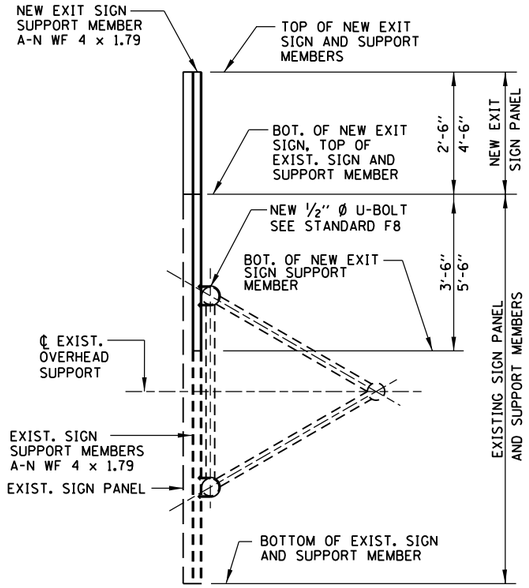


SECTION A-A

OVERHEAD CANTILEVER TYPE SIGN SUPPORT

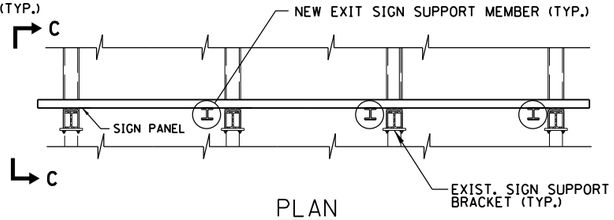


PLAN

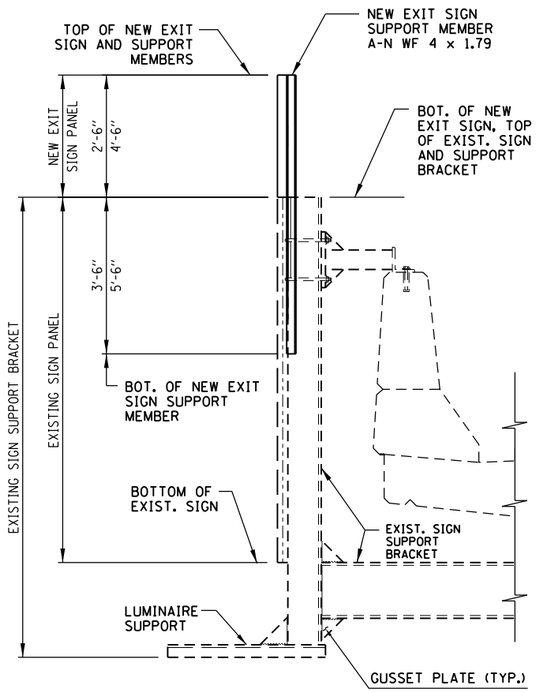


SECTION B-B

OVERHEAD SPAN TYPE SIGN SUPPORT

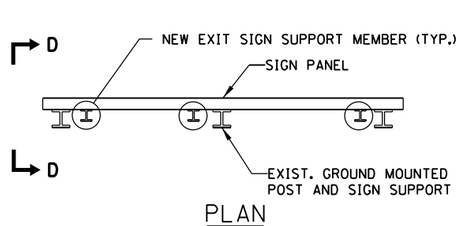


PLAN

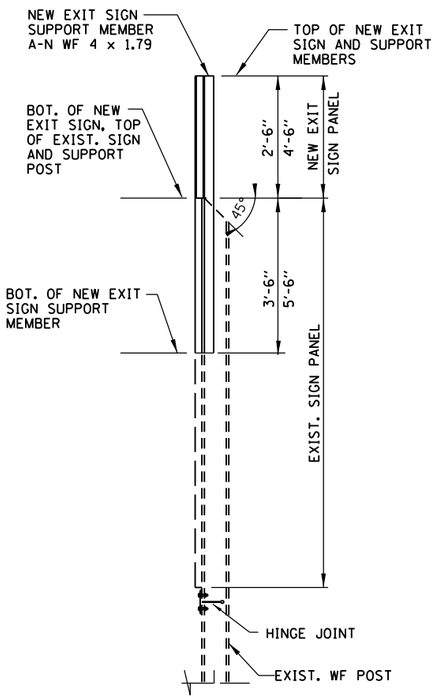


SECTION C-C

BRIDGE MOUNTED SIGN SUPPORT



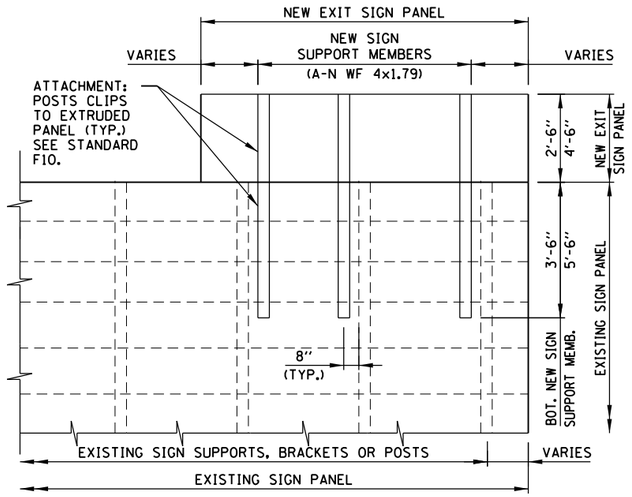
PLAN



SECTION D-D

GROUND MOUNTED SIGN SUPPORT

DETAILS FOR RETROFITTING NEW EXIT SIGN



PARTIAL REAR ELEVATION OF SIGN PANELS AND SUPPORT MEMBERS

NO. SUPPORT MEMBERS	
SIGN WIDTH	REQ'D. NO.
0' - 10'	2
10' - 16'	3
16' - 22'	4
22' - 28'	5
28' - 34'	6

Paul Kovacs
APPROVED ..... DATE 3-1-2013
CHIEF ENGINEER

NOTES:

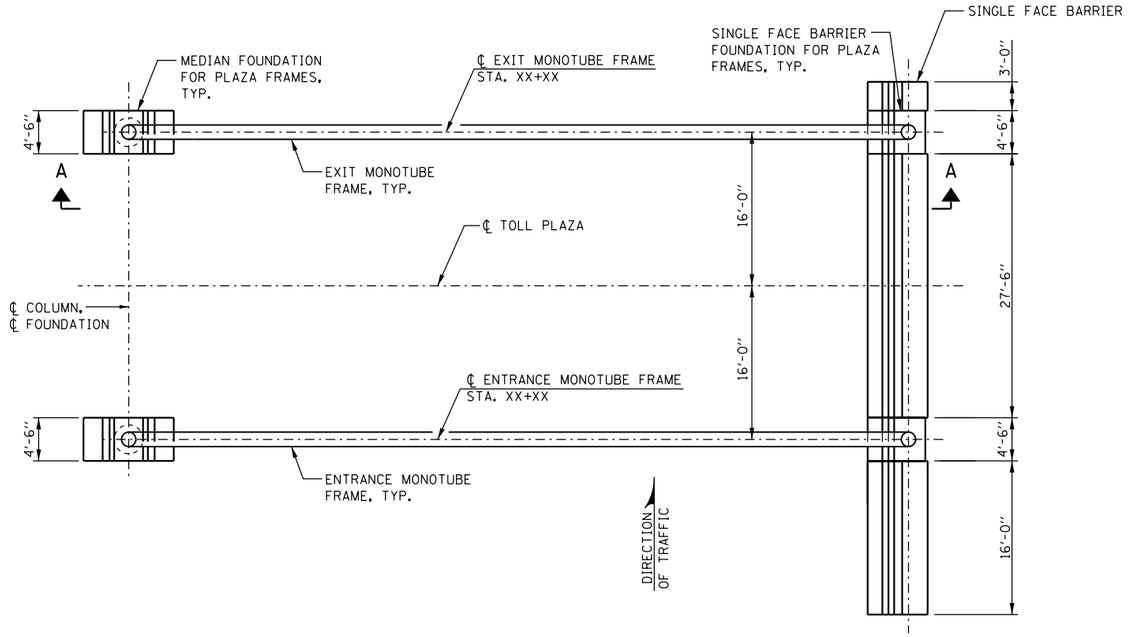
1. ALL MATERIAL IS ALUMINUM IN ACCORDANCE WITH SECTION 733 OF THE LATEST IDOT STANDARD SPECIFICATIONS. (UNLESS OTHERWISE NOTED).
2. EXISTING TRUSS AND SUPPORT MEMBERS SHALL BE CHECKED FOR STRUCTURAL ADEQUECY TO SUPPORT THE ADDITIONAL SIGN PANEL AREA.

DATE	REVISIONS

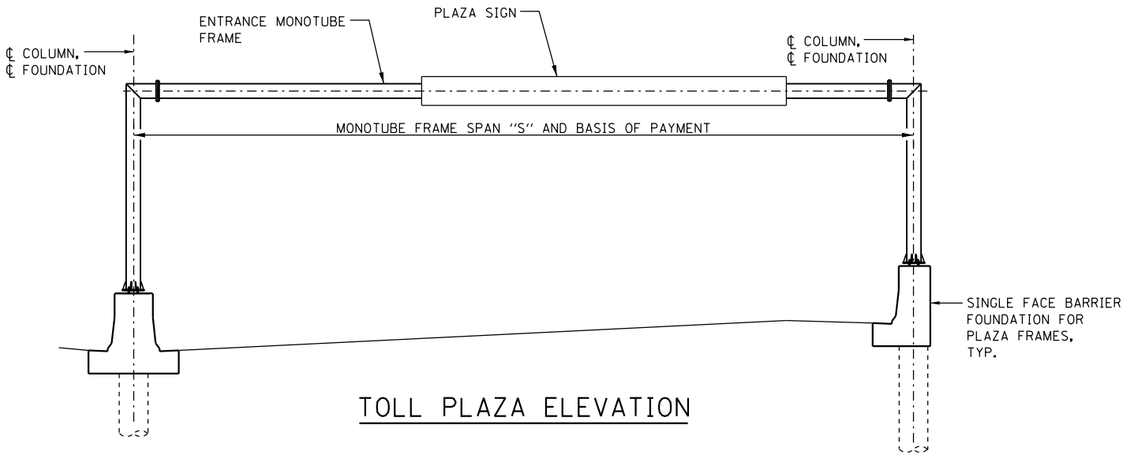
Illinois Tollway

MOUNTING DETAILS FOR RETROFITTING NEW EXIT SIGN PANELS

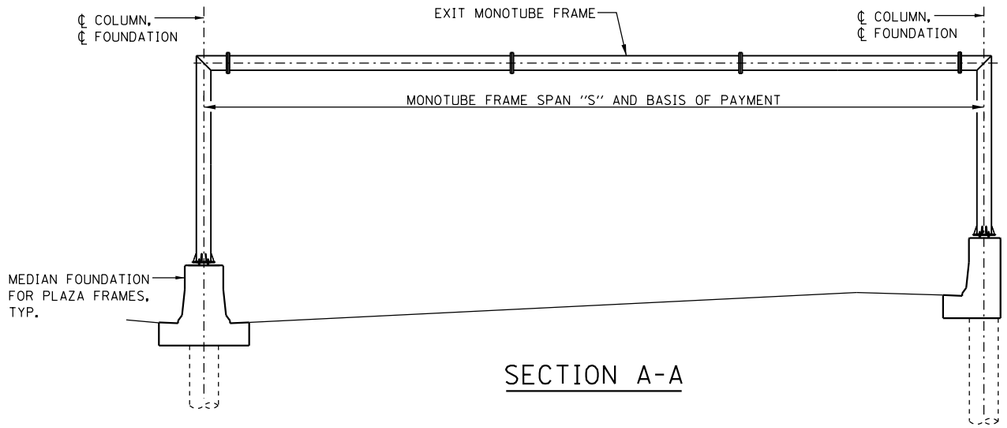
STANDARD F12-00



TOLL PLAZA PLAN



TOLL PLAZA ELEVATION



SECTION A-A

NOTES:

1. SEE PROJECT PLANS FOR SIGN SIZE AND LOCATION.
2. MAXIMUM PLAZA SIGN AREA IS 108 SQ. FT.
   MAXIMUM PLAZA SIGN LENGTH IS 36 FT.

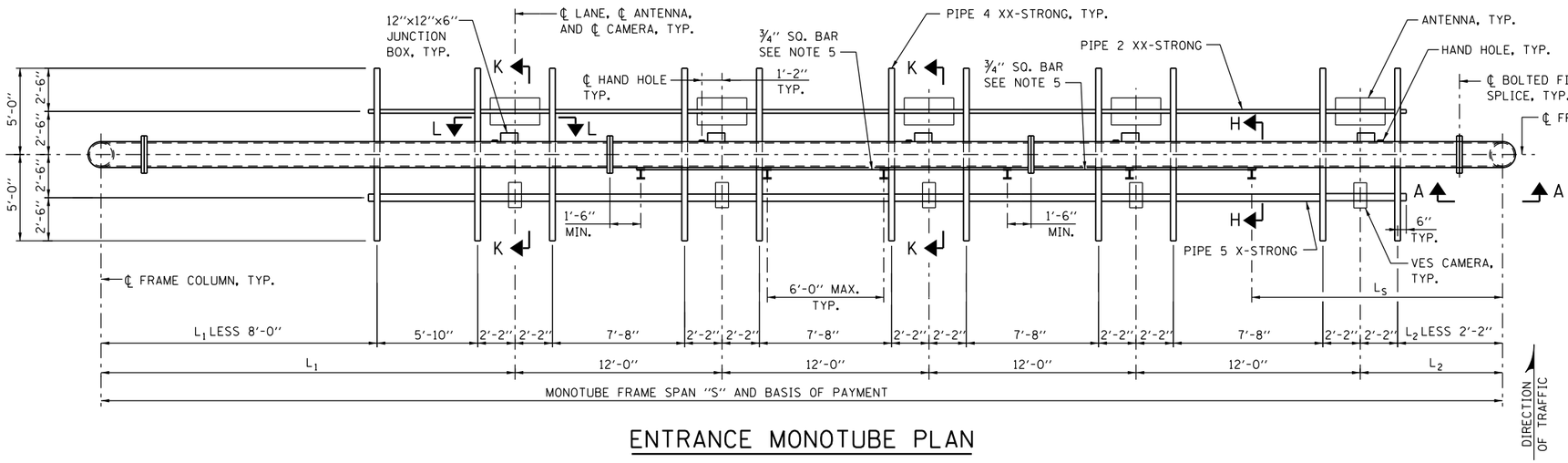
Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

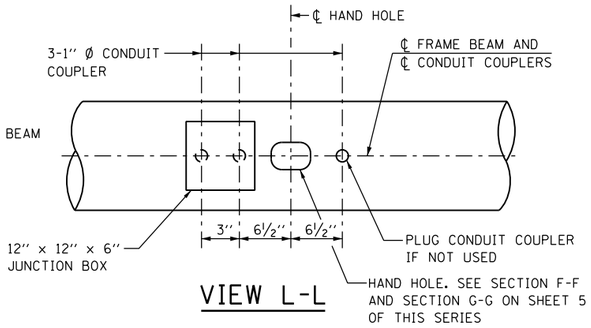
DATE	REVISIONS

OVERHEAD SIGN STRUCTURE
MONOTUBE TYPE (STEEL)
STRUCTURE DETAILS

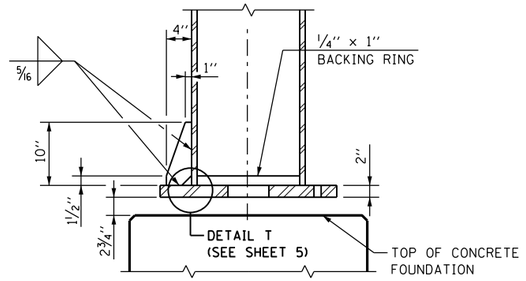
STANDARD F13-00



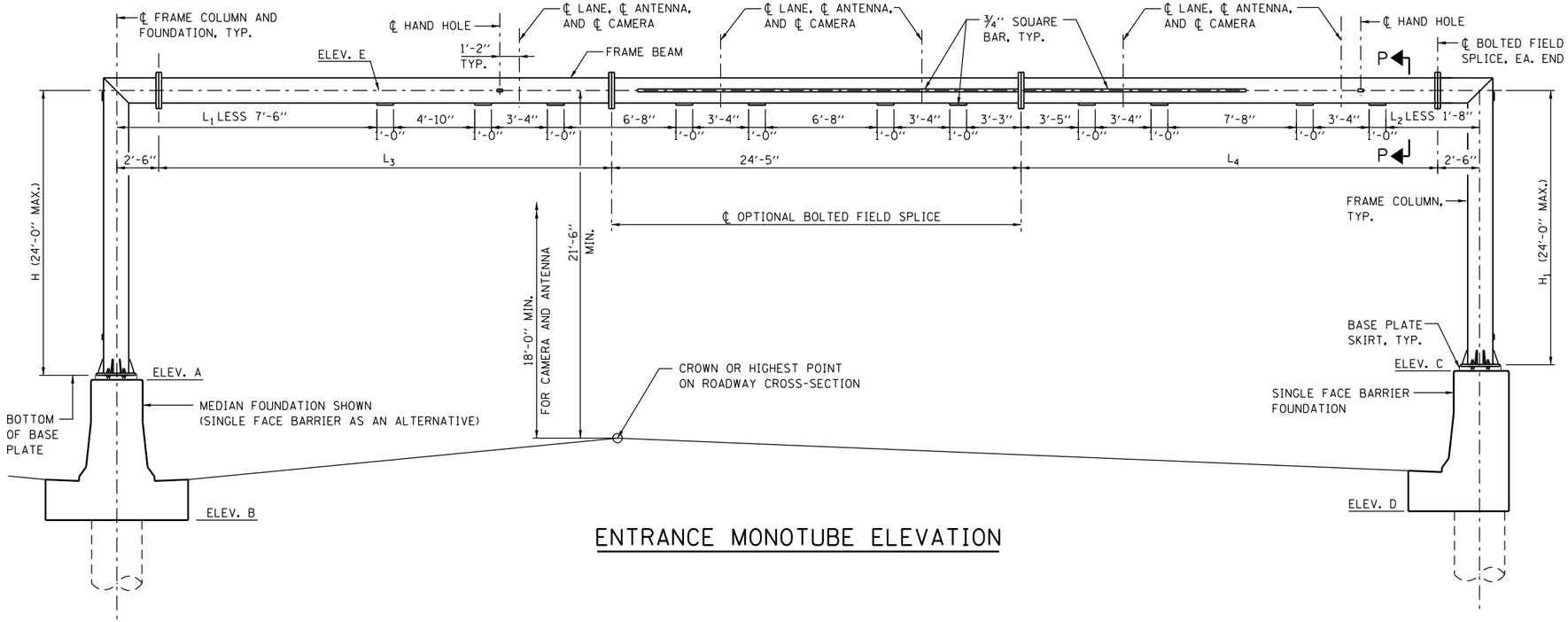
ENTRANCE MONOTUBE PLAN



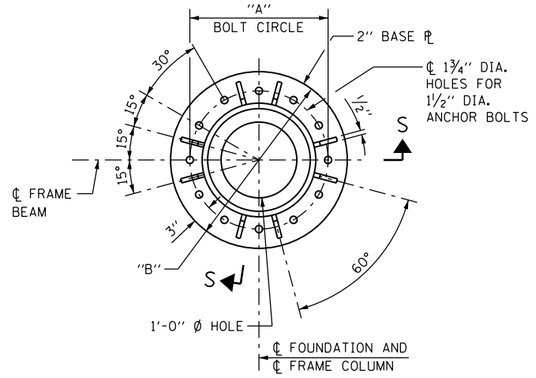
VIEW L-L



SECTION S-S



ENTRANCE MONOTUBE ELEVATION



BASE PLATE PLAN MONOTUBE FRAMES

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 ¾" SQUARE BAR TO ALLOW ½" Ø U-BOLT INSTALLATION.

MONOTUBE FRAME TABLE

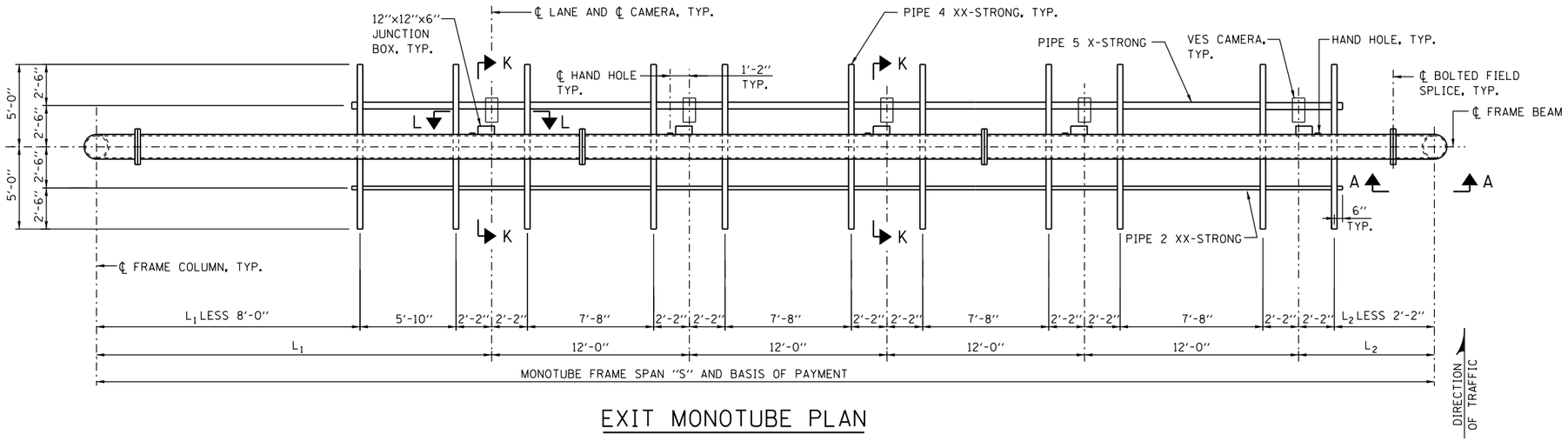
TYPE	SPAN "S"	FRAME COLUMN	FRAME BEAM	CAMBER	"A"	"B"
I	≤70'	HSS 16x0.500	HSS 16x0.500	2¾"	1'-8"	2'-2"
II	71'-80'	HSS 18x0.500	HSS 18x0.500	4"	1'-10"	2'-4"
III	81'-90'	HSS 18x0.500	HSS 18x0.500	4½"	1'-10"	2'-4"

Paul Kovacs
APPROVED ..... DATE 3-31-2014
CHIEF ENGINEER

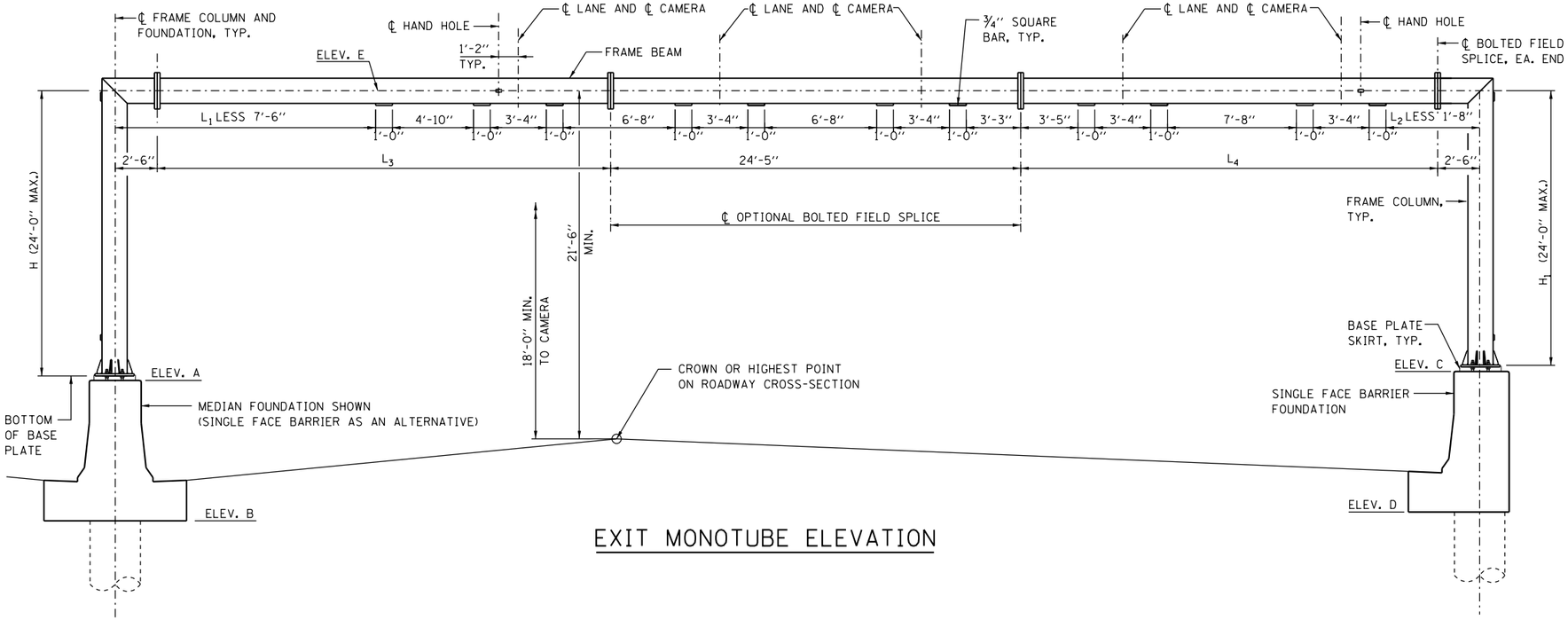
Illinois Tollway

OVERHEAD SIGN STRUCTURE
MONOTUBE TYPE (STEEL)
STRUCTURE DETAILS

STANDARD F13-00



EXIT MONOTUBE PLAN



EXIT MONOTUBE ELEVATION

NOTES:

1. SEE SHEET 2 OF THIS SERIES FOR MONOTUBE FRAME TABLE, VIEW L-L, BASE PLATE DETAIL, AND ADDITIONAL NOTES.

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

OVERHEAD SIGN STRUCTURE
MONOTUBE TYPE (STEEL)
STRUCTURE DETAILS

STANDARD F13-00

GENERAL NOTES:

1. WORK SHEET 2 OF THIS SERIES WITH BASE SHEET M29. WORK SHEET 3 OF THIS SERIES WITH BASE SHEET M30.

2. SEE THE TOLLWAY STRUCTURE DESIGN MANUAL FOR MINIMUM VERTICAL CLEARANCE.

3. 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.

4. REINFORCEMENT BARS DESIGNATED "(E)" SHALL BE EPOXY COATED.

STRUCTURAL STEEL:

1. MATERIAL FOR THE MONOTUBE FRAME SHALL CONFORM TO THE REQUIREMENT OF ASTM A500 GRADE B. 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 GRADE 55, WITH A MINIMUM TENSILE STRENGTH OF 75,000 PSI. THEY SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 (AASHTO M232). SEE SHEET 4 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. TUBES FOR MONOTUBE FRAME, PIPES, STRUCTURAL STEEL SHAPES AND PLATES SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER FABRICATION.

9. 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 = 90 MPH
G = 1.14
I_r = 1.00 (50 YR. RECURRANCE INTERVAL)

EQUIPMENT LOADS:

CAMERA ASSEMBLY	8 LB.
ANTENNA	20 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.
fy = YIELD STRENGTH OF REINFORCEMENT BARS (GRADE 60)	= 60,000 P.S.I.

FOUNDATION:

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

DESIGN SPECIFICATIONS:

1. STRUCTURE DESIGN MANUAL, DATED MARCH, 2013, WITH LATEST DESIGN BULLETINS.

2. AASHTO STANDARD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS, 6TH EDITION.

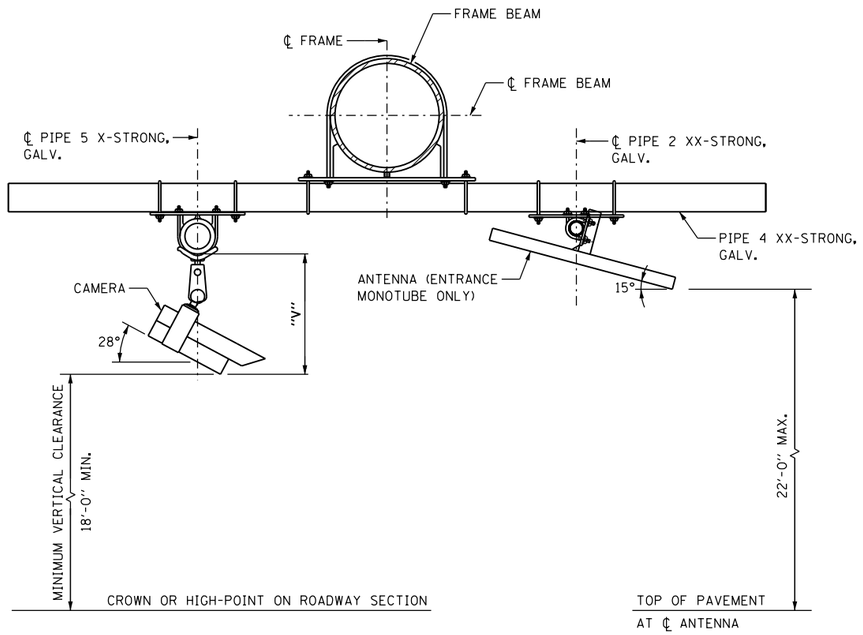
3. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 6TH EDITION DATED FEBRUARY 2012.

4. ILLINOIS DEPARTMENT OF TRANSPORTATION BRIDGE MANUAL, JANUARY 2012

CONSTRUCTION SPECIFICATIONS:

1. 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

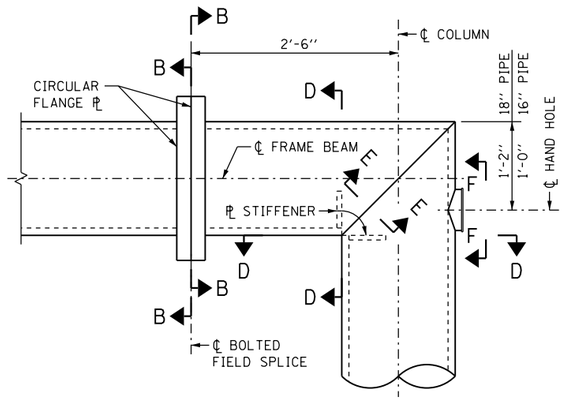
NOTE:
VERIFY DIMENSION "V" WITH CAMERA MANUFACTURER.

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

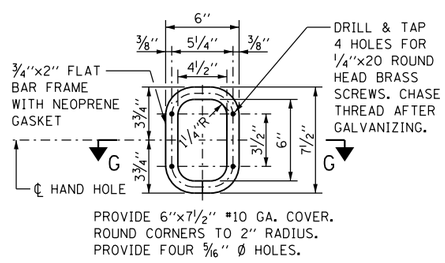
OVERHEAD SIGN STRUCTURE
MONOTUBE TYPE (STEEL)
STRUCTURE DETAILS

STANDARD F13-00

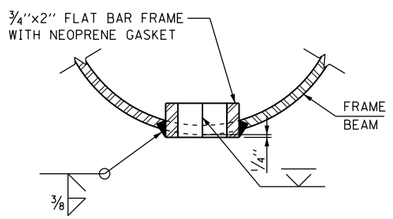


SECTION A-A

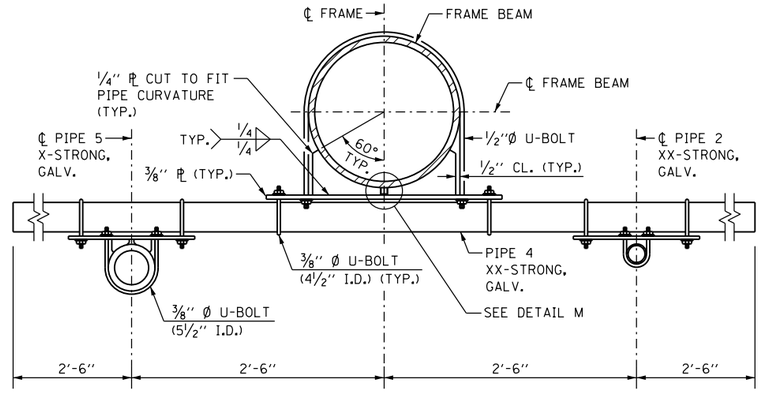
(SEE SHEET 1 FOR LOCATION)



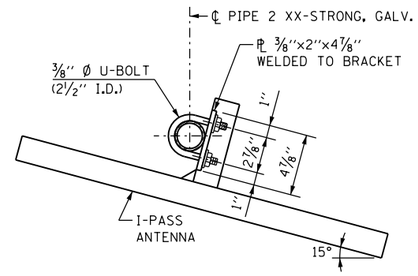
SECTION F-F



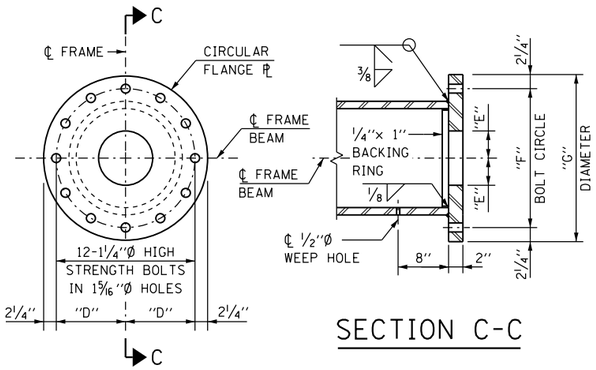
SECTION G-G



SECTION K-K



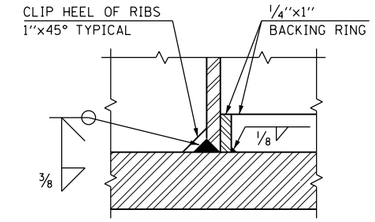
ANTENNA HANGER



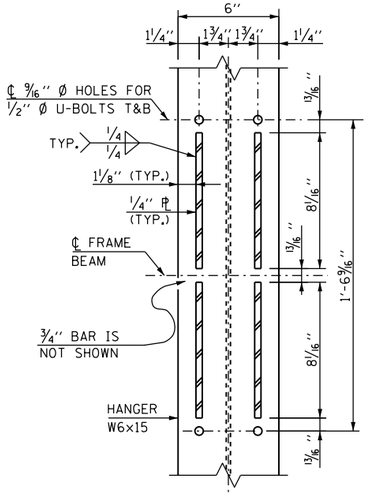
SECTION B-B

SECTION C-C

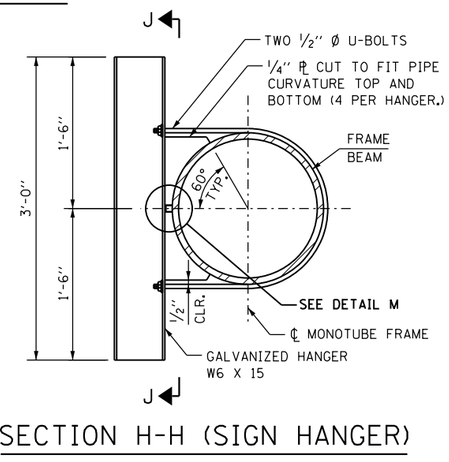
FRAME BEAM	"D"	"E"	"F"	"G"
HSS 16x0.500	10"	6"	1'-8"	2'-0 1/2"
HSS 18x0.500	11"	6"	1'-10"	2'-2 1/2"



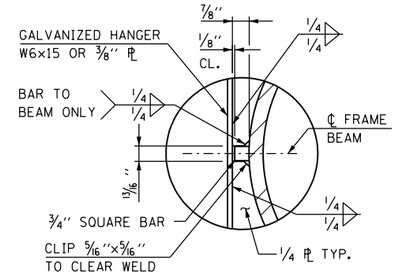
DETAIL T



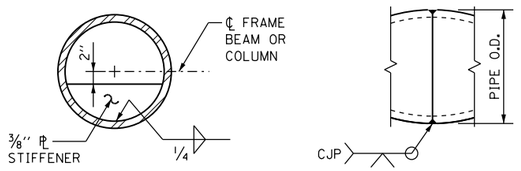
SECTION J-J



SECTION H-H (SIGN HANGER)

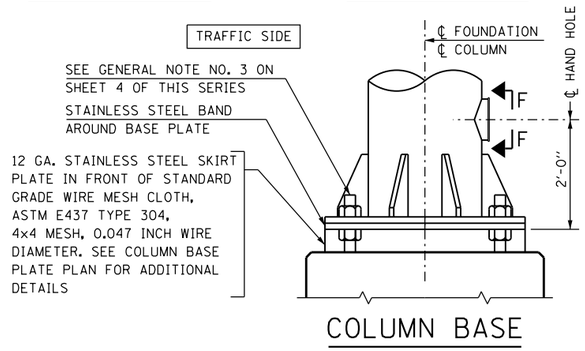


DETAIL M

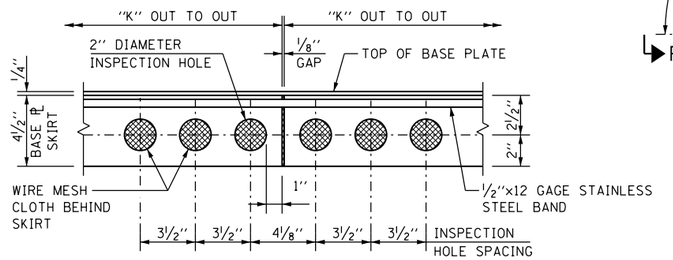


SECTION D-D

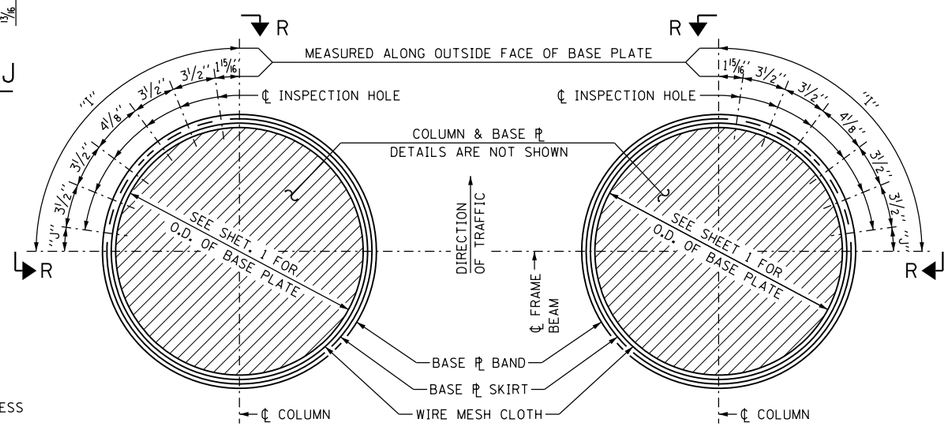
SECTION E-E



COLUMN BASE



VIEW R-R (BASE PLATE SKIRT)



LEFT BASE PLATE

RIGHT BASE PLATE

COLUMN BASE PLATE PLAN

FRAME COLUMN	"I"	"J"	"K"
HSS 16x0.500	1'-8 1/16"	3/8"	6'-9 3/16"
HSS 18x0.500	1'-10"	1 15/16"	7'-3 7/8"

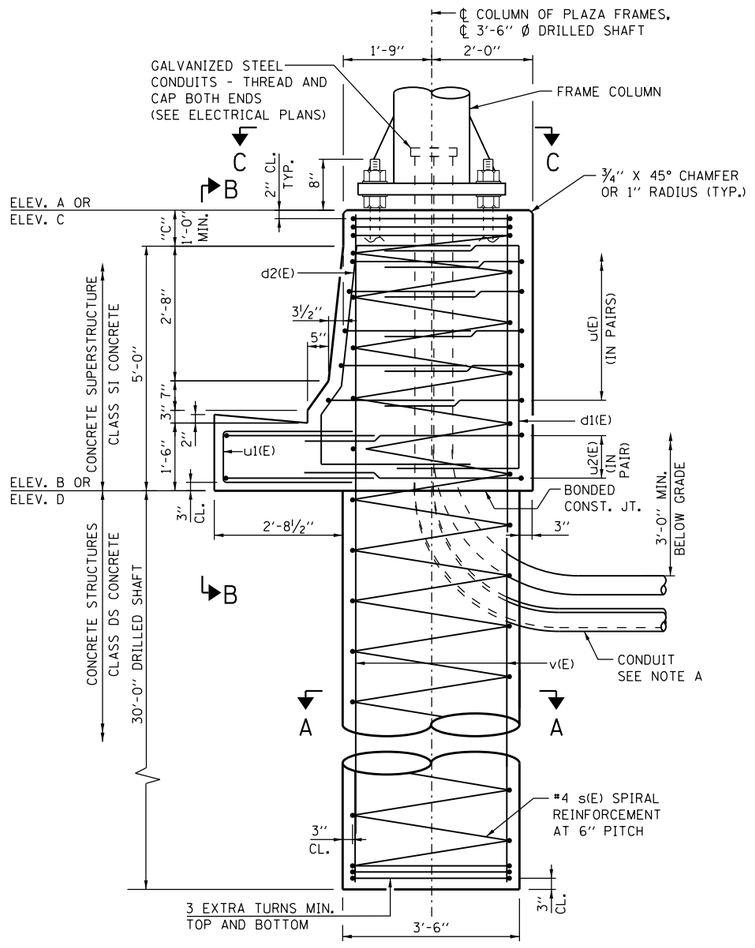
SHEET 5 OF 8

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

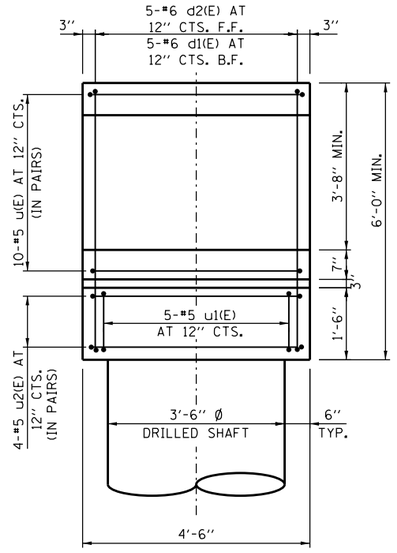
Illinois Tollway

OVERHEAD SIGN STRUCTURE
MONOTUBE TYPE (STEEL)
STRUCTURE DETAILS

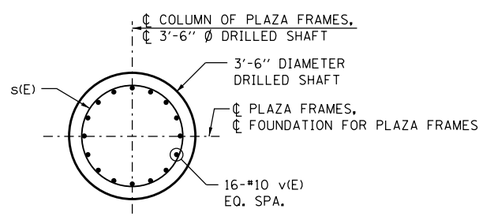
STANDARD F13-00



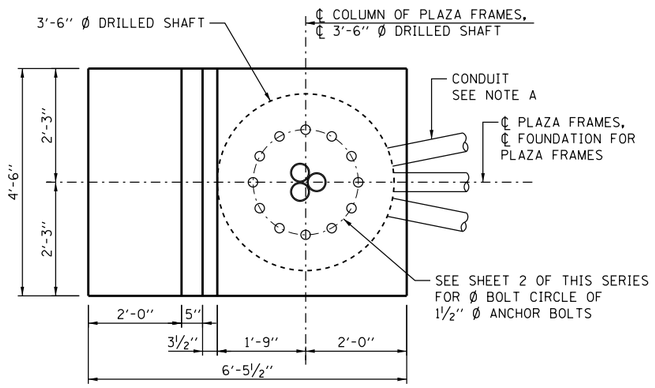
SIDE ELEVATION



VIEW B-B



SECTION A-A



VIEW C-C

SINGLE FACE BARRIER FOUNDATION FOR PLAZA FRAMES

NOTE A:

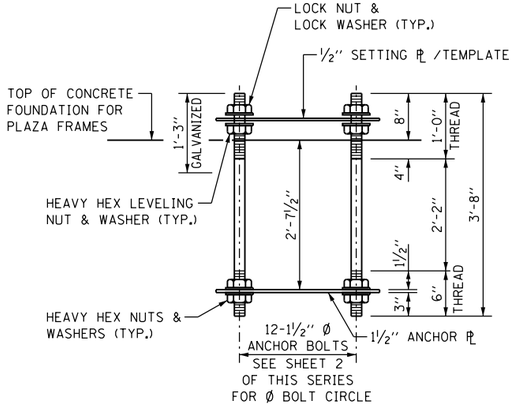
COORDINATE CONDUIT SIZE, LOCATION AND QUANTITY WITH ELECTRICAL PLANS. CONDUITS SHALL BE PLACED TO MISS REINFORCEMENT. CUTTING OF REINFORCEMENT SHALL NOT BE ALLOWED.

FOUNDATIONS:

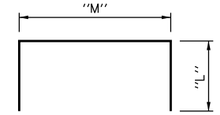
THE FOUNDATION DIMENSIONS SHOWN ARE BASED ON THE PRESENCE OF MOSTLY COHESIVE SOILS WITH AN AVERAGE UNCONFINED COMPRESSIVE STRENGTH (Qu) OF AT LEAST 1.25 TON/SQ. FT., WHICH MUST BE DETERMINED BY PREVIOUS SOIL INVESTIGATIONS AT THE JOBSITE. WHEN OTHER CONDITIONS ARE INDICATED, THE BORING DATA WILL BE INCLUDED IN THE PLANS AND THE FOUNDATION DIMENSIONS SHOWN WILL BE THE RESULT OF THE SITE SPECIFIC DESIGNS. IF THE CONDITIONS ENCOUNTERED 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

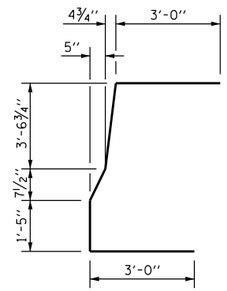


ANCHOR BOLT ASSEMBLY



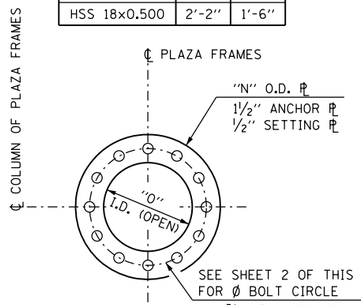
BAR	"L"	"M"	
d1(E)	3'-0"	5'-7"	**
u(E)	3'-0"	4'-2"	
u1(E)	3'-6"	1'-1"	
u2(E)	4'-1"	4'-2"	
u3(E)	5'-10"	4'-2"	

BARS d1(E), u(E), u1(E), u2(E) AND u3(E)



BAR d2(E)

FRAME COLUMN	"N"	"O"
HSS 16x0.500	2'-0"	1'-4"
HSS 18x0.500	2'-2"	1'-6"



ANCHOR ℄ / SETTING ℄ REINFORCEMENT BAR SCHEDULE

FOR ONE FOUNDATION

	BAR	NO. SINGLE FACE BARRIER FDN.	NO. MEDIAN BARRIER FDN.	SIZE	LENGTH	SHAPE
**	d1(E)	5	10	#6	11'-7"	
**	d2(E)	5	10	#6	11'-9"	
*	s(E)	1		#4	35'-7"	
*	s1(E)		1	#4	35'-7"	
	v(E)	16		#10	35'-7"	
	v1(E)		16	#10	35'-7"	
	u(E)	10	10	#5	10'-2"	
	u1(E)	5	10	#5	8'-1"	
	u2(E)	4		#5	12'-4"	
	u3(E)		4	#5	15'-10"	

* THE LENGTH OF SPIRAL SHOWN IS THE HEIGHT OF SPIRAL, COMPUTED USING "C" = 1'-0". ADJUST LENGTH ACCORDINGLY IF "C" IS GREATER THAN 1'-0".

** BAR LENGTH IS COMPUTED USING "C" = 1'-0". ADJUST BAR LENGTH ACCORDINGLY IF "C" IS GREATER THAN 1'-0".

ESTIMATED QUANTITY

ITEM	UNIT	SINGLE FACE BARRIER FDN.	MEDIAN BARRIER FDN.
CONCRETE SUPERSTRUCTURE CLASS SI CONCRETE	CY	4.6	4.7
CONCRETE STRUCTURES CLASS DS CONCRETE	CY	10.7	10.7
REINFORCING BAR	POUNDS	3,310	3,540

NOTE:

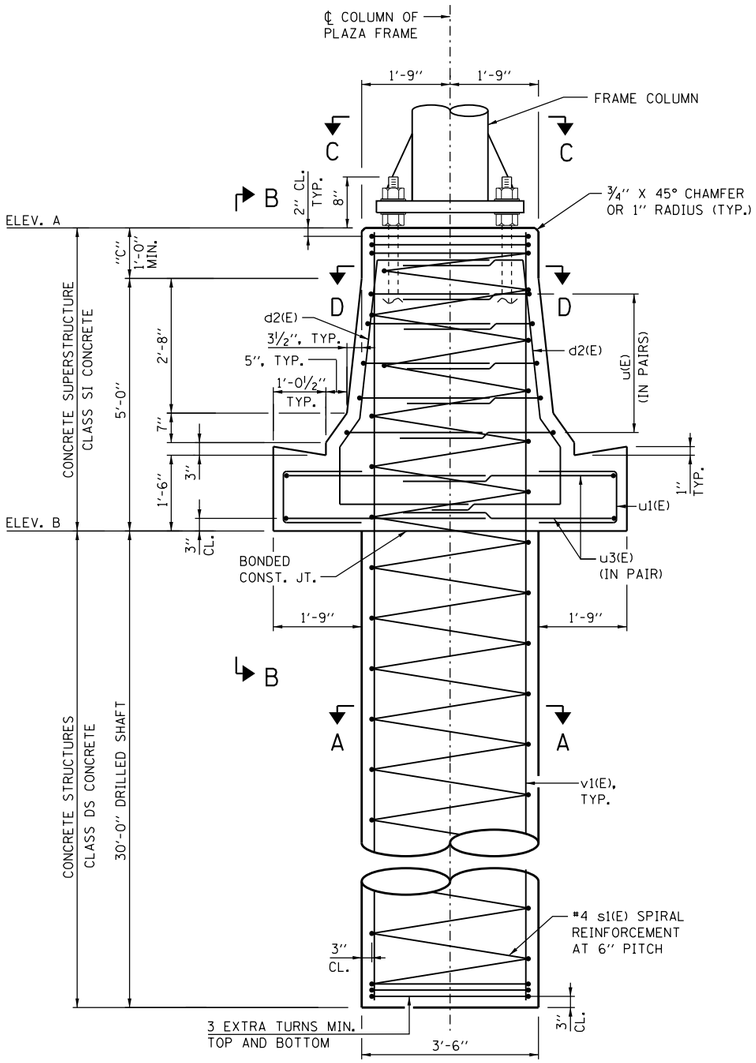
QUANTITIES FOR SINGLE FACE BARRIER FOUNDATION ARE DETERMINED USING "C" = 1'-0". IF DIMENSION "C" IS GREATER THAN 1'-0", ADJUST QUANTITIES ACCORDINGLY.

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

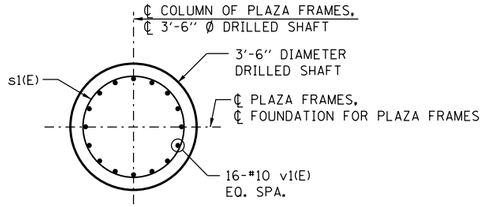
Illinois Tollway

OVERHEAD SIGN STRUCTURE MONOTUBE TYPE (STEEL) STRUCTURE DETAILS

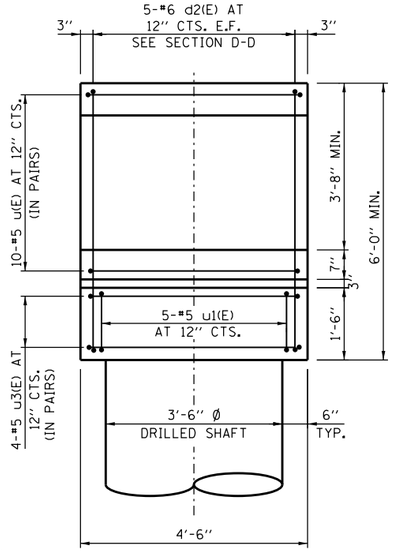
STANDARD F13-00



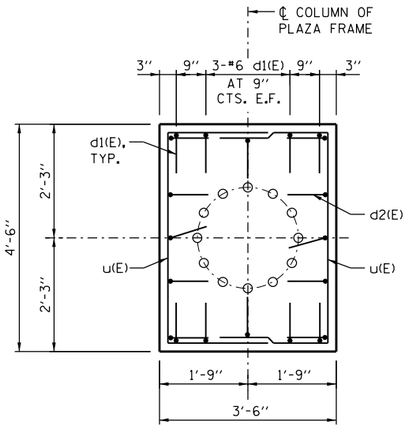
MEDIAN FOUNDATION FOR PLAZA FRAMES



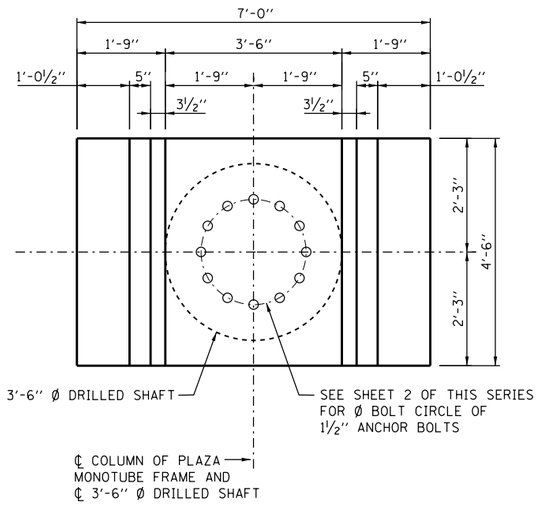
SECTION A-A



VIEW B-B



SECTION D-D



VIEW C-C

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.

LEGEND:

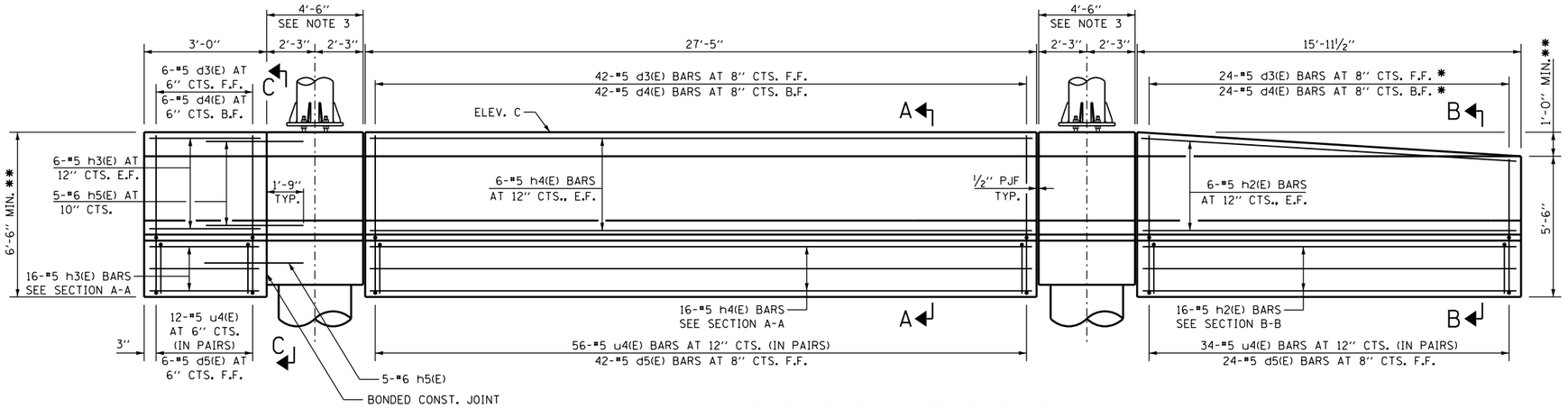
E.F. - EACH FACE
CTS. - CENTERS

Paul Kovacs
APPROVED..... CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

OVERHEAD SIGN STRUCTURE
MONOTUBE TYPE (STEEL)
STRUCTURE DETAILS

STANDARD F13-00



SINGLE FACE BARRIER ELEVATION

INSIDE FACE BARRIER IS SHOWN

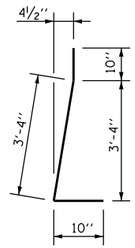
* CUT IN FIELD AS REQUIRED TO FIT TAPER

** BASED ON DIMENSION "C" = 1'-0"

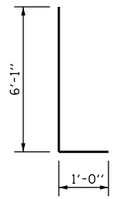
REINFORCEMENT BAR SCHEDULE

(FOR ONE BARRIER)

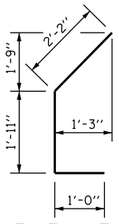
BAR	NO.	SIZE	LENGTH	SHAPE
d3(E)	72	#5	5'-0"	
d4(E)	72	#5	7'-1"	
d5(E)	72	#5	5'-1"	
h2(E)	28	#5	15'-7"	
h3(E)	28	#5	2'-8"	
h4(E)	28	#5	27'-1"	
h5(E)	10	#6	3'-9"	
u4(E)	102	#5	9'-3"	



BAR d3(E)



BAR d4(E)



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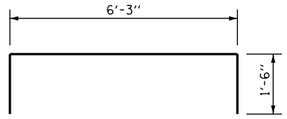
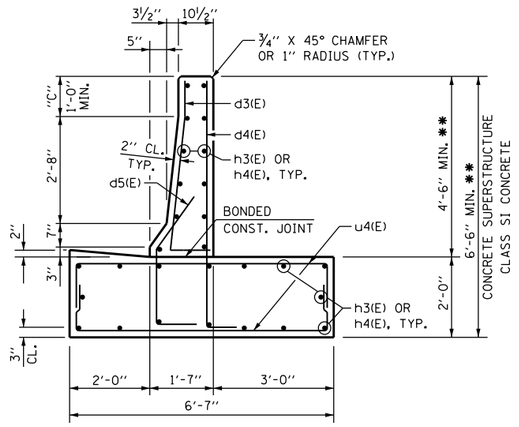
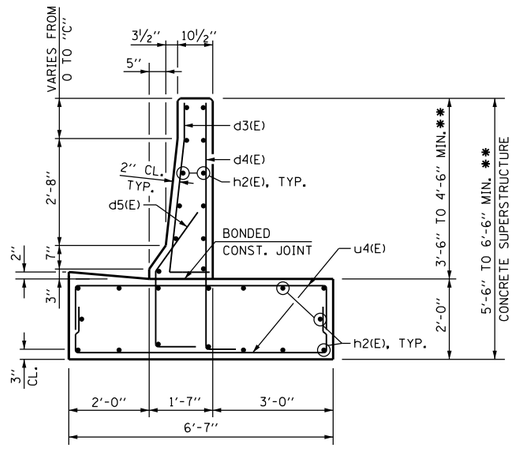


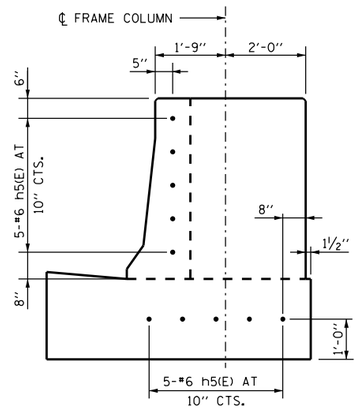
BAR u4(E)



SECTION A-A



SECTION B-B



SECTION C-C

ESTIMATED QUANTITY

ITEM	UNIT	SINGLE FACE BARRIER
CONCRETE SUPERSTRUCTURE CLASS SI CONCRETE	CY	30.9
REINFORCING BAR	POUNDS	3,660

NOTES:

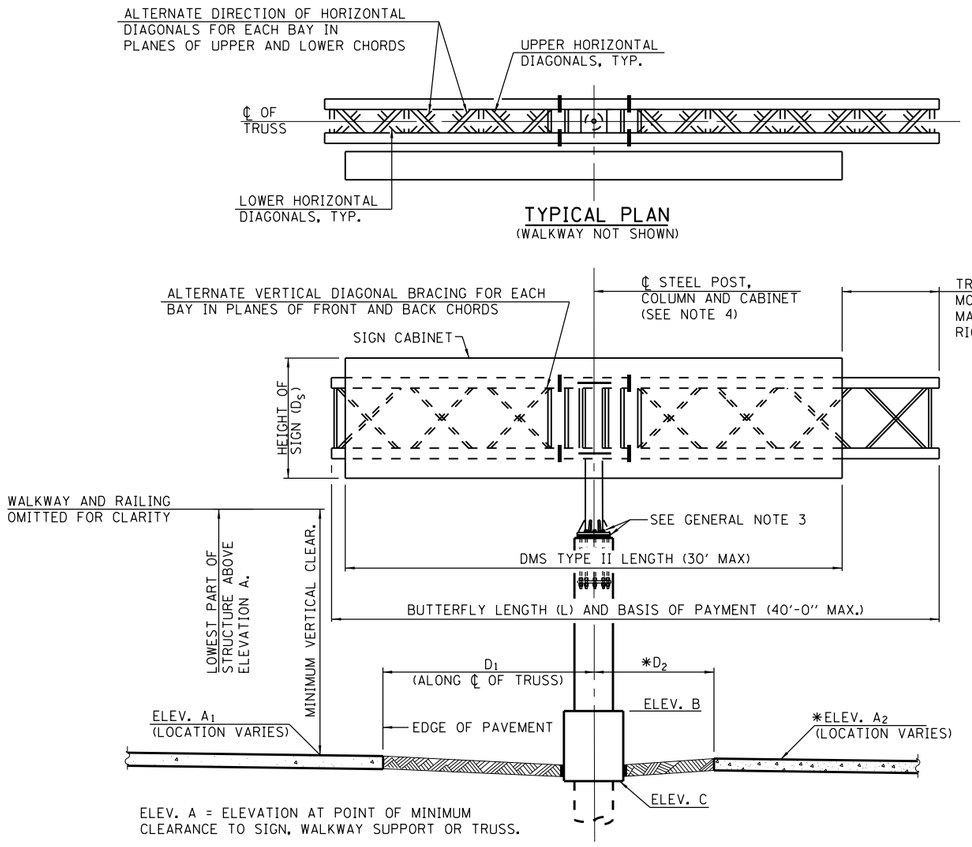
1. PROTECTIVE COAT SHALL BE APPLIED TO THE TRAFFIC AND TOP FACES OF THE BARRIER, TOP FACE OF THE GUTTER AND TO THE ENTRANCE SIDE FACE (AT THE BEGINNING OF THE PLAZA PAVEMENT) FOR THE FULL HEIGHT OF THE BARRIER.
2. FOR LOCATION OF ELECTRICAL JUNCTION BOXES EMBEDDED IN THE WALL, SEE ELECTRICAL DETAIL SHEETS.
3. FOR SINGLE FACE BARRIER FOUNDATION DETAILS FOR PLAZA FRAMES SEE SHEET 6 OF THIS SERIES.
4. QUANTITIES FOR SINGLE FACE BARRIER ARE DETERMINED USING "C" = 1'-0". IF DIMENSION "C" IS GREATER THAN 1'-0", ADJUST QUANTITIES ACCORDINGLY.

Paul Kovacs
APPROVED..... CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

OVERHEAD SIGN STRUCTURE
MONOTUBE TYPE (STEEL)
STRUCTURE DETAILS

STANDARD F13-00



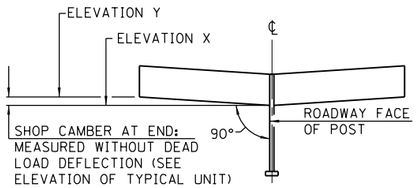
TYPICAL PLAN
(WALKWAY NOT SHOWN)

TYPICAL ELEVATION
LOOKING IN DIRECTION OF TRAFFIC

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

SHOP CAMBER TABLE

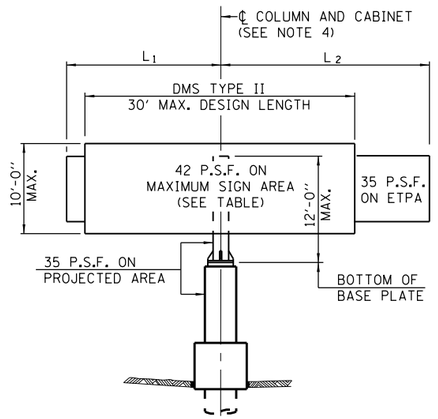
UNIT LENGTH L_1 OR L_2	SHOP CAMBER AT END
15'	1/4"
20'	1/2"
25'	3/4"



CAMBER DIAGRAM
(FOR FABRICATION ONLY)

DMS TYPE II SIGN TABLE

MAXIMUM TOTAL AREA	MAXIMUM CABINET WEIGHT
300 SQ. FT.	5000 LB.



DESIGN WIND LOADING DIAGRAM

ETPA = EFFECTIVE TRUSS PROJECTED AREA

FABRICATION NOTES:

1. MATERIALS: ALL STRUCTURAL STEEL PIPE SHALL BE ASTM A53 GRADE B OR ASTM A106 GRADE B OR A106 GRADE C OR API 5L GRADE X42 OR API 5L GRADE X52. ALL STRUCTURAL STEEL TUBE SHALL CONFORM TO ASTM A500 GRADE B. ALL STRUCTURAL STEEL PLATES AND SHAPE SHALL CONFORM TO AASHTO M270 GRADE 50 (M183 OR M223 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.
2. 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.
3. FASTENERS: ALL BOLTS NOTED AS "HIGH STRENGTH" MUST SATISFY THE REQUIREMENTS OF AASHTO M164 (ASTM A325), OR APPROVED ALTERNATE, AND MUST HAVE MATCHING LOCKNUTS. THREADED STUDS FOR SPLICES (IF MEMBERS INTERFERE) MUST SATISFY THE REQUIREMENTS OF ASTM A449, ASTM A193, GRADE B7, OR APPROVED ALTERNATE, AND MUST HAVE MATCHING LOCKNUTS. BOLTS AND LOCKNUTS NOT REQUIRED TO BE HIGH STRENGTH MUST SATISFY THE REQUIREMENTS OF ASTM A307. ALL BOLTS AND LOCKNUTS MUST BE HOT DIP GALVANIZED PER AASHTO M232. THE LOCKNUTS MUST 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 & EYEBOLTS: U-BOLTS AND EYEBOLTS MUST BE PRODUCED FROM ASTM A276 TYPE 304, 304L, 316 OR 316L, CONDITION A, COLD FINISHED STAINLESS STEEL, OR AN EQUIVALENT MATERIAL ACCEPTABLE TO THE ENGINEER. ALL NUTS FOR U-BOLTS AND EYEBOLTS MUST BE LOCK NUTS EQUIVALENT TO ASTM A307 WITH NYLON OR STEEL INSERTS AND HOT DIP GALVANIZED PER AASHTO M232. A STAINLESS STEEL FLAT WASHER CONFORMING TO ASTM A240, TYPE 302 OR 304, IS REQUIRED UNDER EACH U-BOLT AND EYEBOLT LOCKNUT.
5. GALVANIZING: ALL STEEL GRATING, PLATES, SHAPES AND PIPE SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111. PAINTING IS NOT PERMITTED.
6. ANCHOR BOLTS: SHALL CONFORM TO ASTM F1554 GRADE 55.

GENERAL NOTES:

1. WORK THIS SHEET WITH BASE SHEET M31.
2. SEE THE TOLLWAY STRUCTURE DESIGN MANUAL FOR MINIMUM VERTICAL CLEARANCE.
3. 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.
4. CENTERLINE CABINET MUST BE LOCATED AT CENTERLINE OF COLUMN.
5. SIGN SUPPORT STRUCTURES MAY BE SUBJECT TO DAMAGING VIBRATIONS AND OSCILLATIONS WHEN SIGNS 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.
6. TRUSSES SHALL BE SHIPPED INDIVIDUALLY WITH ADEQUATE PROVISON TO PREVENT DETRIMENTAL MOTION DURING TRANSPORT. THIS MAY REQUIRE ROPES BETWEEN HORIZONTALS AND DIAGONALS OR ENERGY DISSAPATING (ELASTIC) TIES TO THE VEHICLE. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE CONFIGURATION AND PROTECTION OF THE TRUSSES.
7. PROVIDE NORMAL SURFACE FINISH FOLLOWED BY CONCRETE SEALER APPLICATION ON ENTIRE SURFACE OF CONCRETE COLUMN AND ALL SURFACES OF CRASHWALL, EXCEPT BOTTOM SURFACE. COST IS INCLUDED IN THE COST OF "FOUNDATION FOR OVERHEAD SIGN STRUCTURE, BUTTERFLY TYPE."
8. REINFORCEMENT BARS: REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
9. PARAMETERS SHOWN ARE BASIS FOR THIS STANDARD. INSTALLATION NOT WITHIN DIMENSIONAL LIMITS SHOWN REQUIRE SPECIAL ANALYSIS FOR ALL COMPONENTS.
10. IT IS PERMISSIBLE TO MOUNT TWO DMS TYPE II SIGN CABINETS ON THE BUTTERFLY TRUSS, ONE ON EACH FACE OF THE TRUSS. THE TOTAL COMBINED DEPTH DMS TYPE II SIGN CABINETS SHALL NOT EXCEED 4'-4" AND THE TOTAL COMBINED WEIGHT SHALL NOT EXCEED 6000 LB. CENTER THE DMS TYPE II SIGN CABINETS ON ℄ STEEL POST. DO NOT INSTALL SIGN PANEL IN CONJUNCTION WITH DMS TYPE II SIGN CABINETS. DO NOT INSTALL DMS TYPE II SIGN CABINET IN CONJUNCTION WITH DMS TYPE II SIGN PANEL.

CONSTRUCTION SPECIFICATIONS:

1. ALL MATERIALS, EXCEPT AS SHOWN, FABRICATION, ERECTION AND CONSTRUCTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 733 OF THE LATEST IDOT STANDARD SPECIFICATIONS.
2. THE COST OF FURNISHING AND INSTALLING THE STAINLESS STEEL BAND AND WIRE MESH CLOTH IS INCLUDED IN THE COST OF OVERHEAD SIGN STRUCTURE, BUTTERFLY TYPE (STEEL).

LOADING:

1. 90 M.P.H. WIND VELOCITY. WIND LOADING: 42 P.S.F. NORMAL TO DMS TYPE II CABINET AREA AND 35 P.S.F. NORMAL TO TRUSS ELEMENTS NOT BEHIND SIGN LOADING DIAGRAM.
2. THE AASHTO GROUP II AND III ALLOWABLE STRESS SHALL BE 133% (ALLOWABLE STRESS DESIGN).
3. WALKWAY LOADING: DEAD LOAD PLUS 500 LBS. CONCENTRATED LIVE LOAD.

DESIGN SPECIFICATIONS:

THESE STRUCTURES ARE DESIGNED TO SATISFY THE 2013 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SIXTH EDITION.

CONCRETE COLUMN, CRASHWALL AND DRILLED SHAFT ARE DESIGNED IN ACCORDANCE WITH THE 2012 EDITION OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (INCLUDING THE 2013 INTERIM REVISIONS).

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: fy = 60,000 P.S.I.

Paul Kovacs
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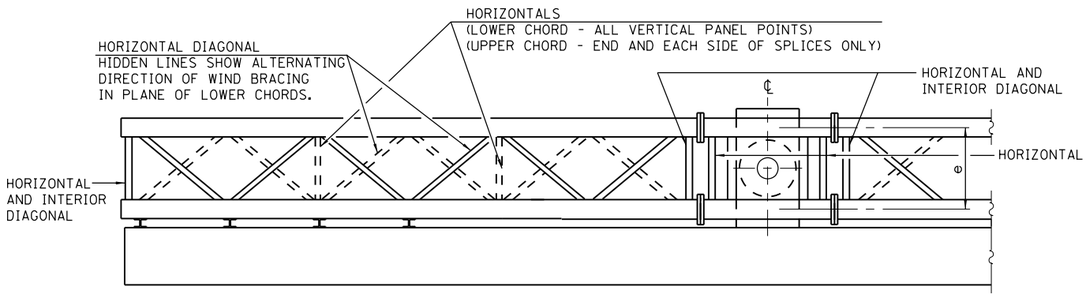
Illinois Tollway

DATE	REVISIONS

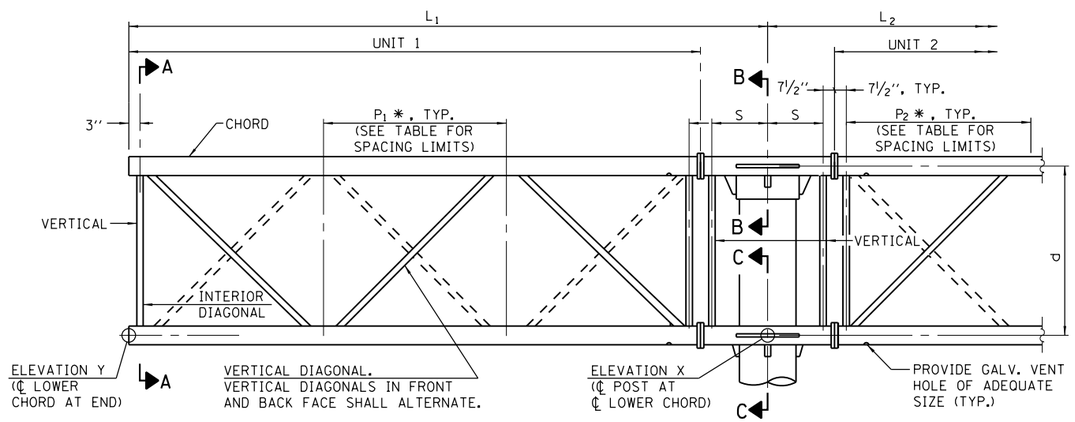
OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

STANDARD F14-00



PLAN

(WALKWAY NOT SHOWN)

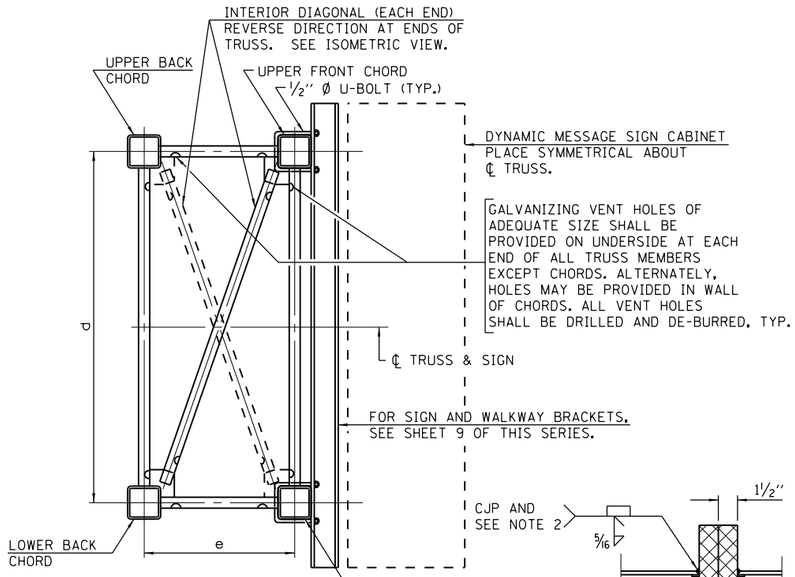


ELEVATION

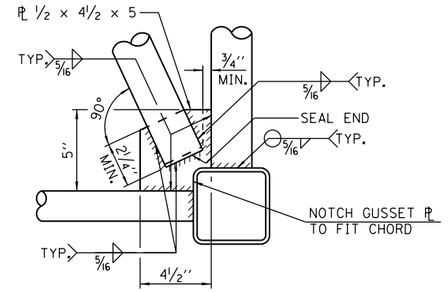
(SIGN AND WALKWAY OMITTED FOR CLARITY)

TYPICAL TRUSS UNIT

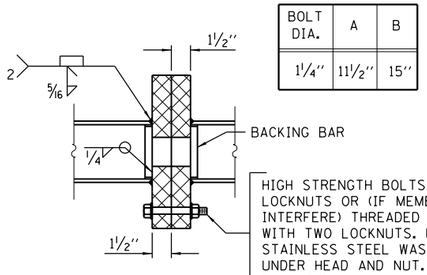
FOR SECTION B-B AND SECTION C-C, SEE SHEET 4 OF THIS SERIES



SECTION A-A

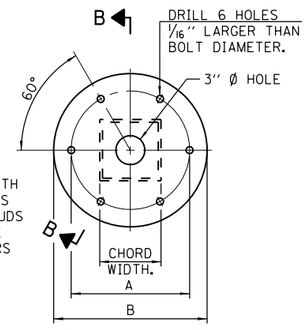


GUSSET ℄ FOR INTERIOR DIAG. DETAIL

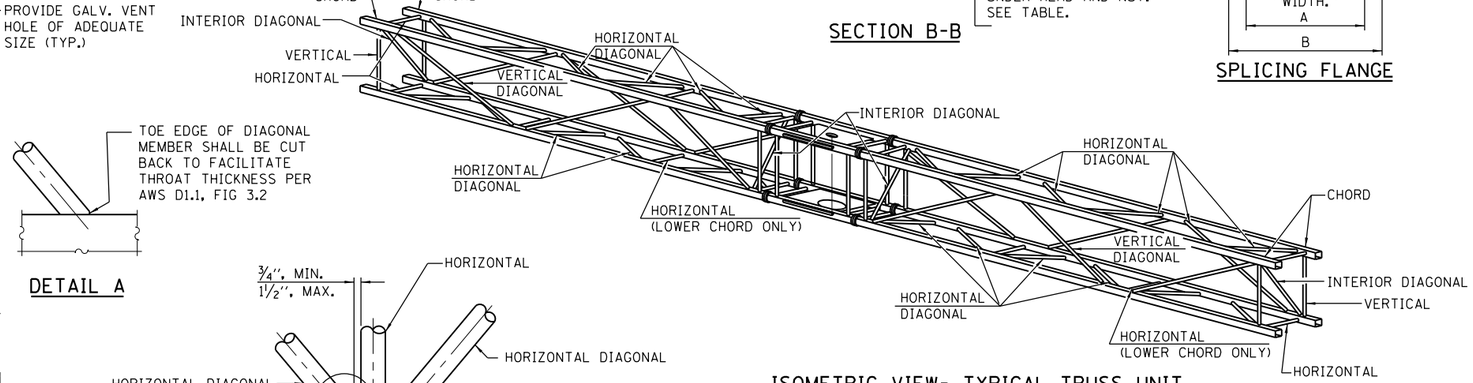


BOLT DIA.	A	B
1¼"	11½"	15"

SECTION B-B

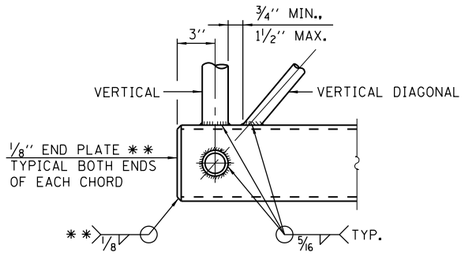


SPLICING FLANGE



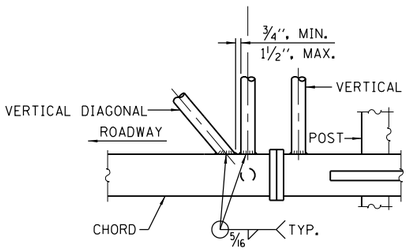
ISOMETRIC VIEW- TYPICAL TRUSS UNIT

DETAIL A

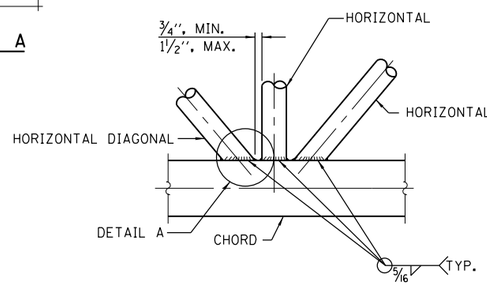


BUTTERFLY END JOINT DETAIL

** CONTRACTOR MAY ALTERNATIVELY USE STANDARD STEEL DRIVE-FIT CAP TO CLOSE ENDS. ½" Ø DRAIN HOLE IN END PLATE / DRIVE-FIT CAP.



POST END JOINT DETAIL



TRUSS INTERIOR JOINT DETAIL

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 II 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 PIPE	VERTICAL DIAG. PIPE	HORIZONTAL PIPE	HORIZONTAL DIAG. PIPE	INTERIOR DIAG. PIPE	LIMITS FOR PANEL SPACING (P) *	DIMENSION S
3'-9"	7'-0"	30'-0"	24"	125.61 (#/FT)	½"	12'-0"	HSS 6×6×5/16	3"Ø X.S	4"Ø X.X.S	2"Ø X.S	2½"Ø X.S	2"Ø X.S	48" MIN. TO 66" MAX.	1'-9"

* P = L-S-1'-6" / # PANELS

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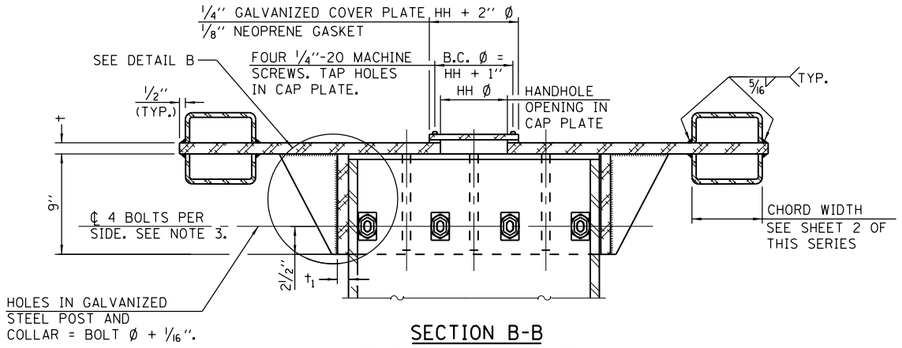
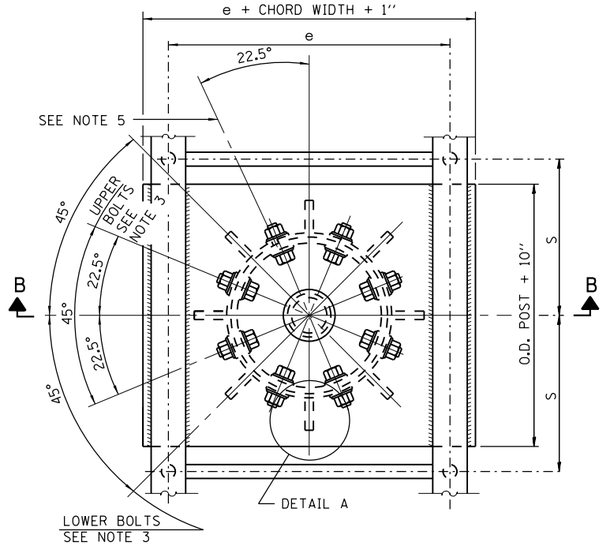
OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

STANDARD F14-00

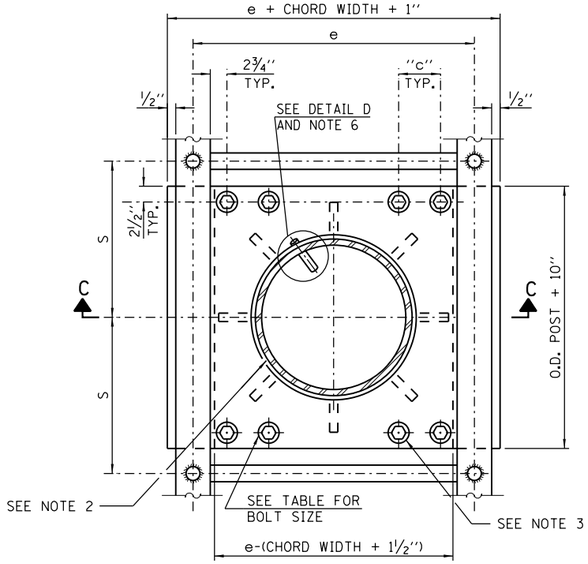


SECTION B-B

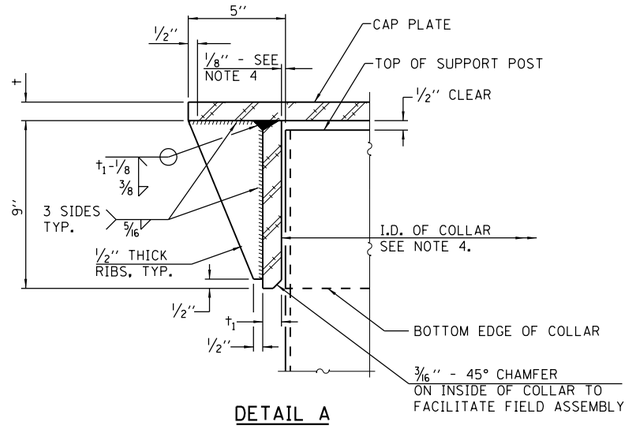
BOLTS SHALL BE HIGH STRENGTH WASHERS (INCLUDING CONTOURED WASHERS), AND LOCKNUTS SHALL BE STAINLESS STEEL.



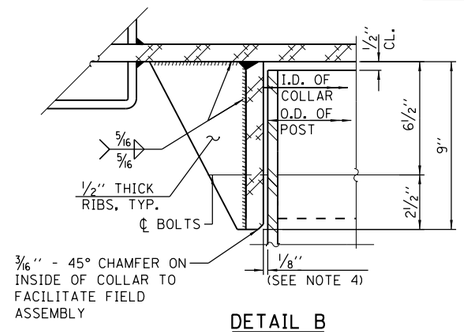
PLAN VIEW - TOP OF COLUMN



SECTION THRU POST ABOVE LOWER CHORDS

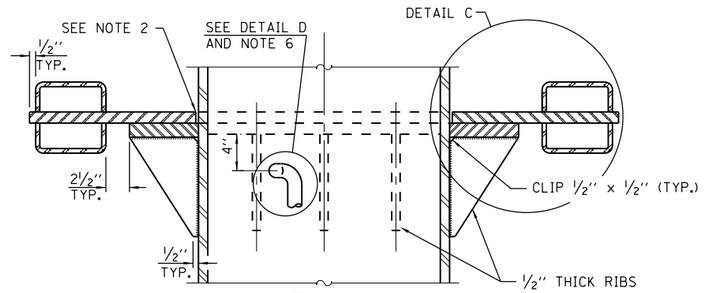


DETAIL A

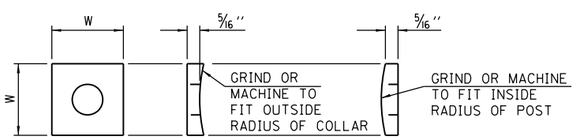


DETAIL B

(FOR DETAILS NOT SHOWN, SEE DETAIL C)



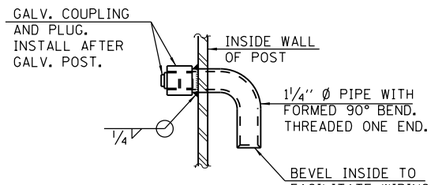
SECTION C-C



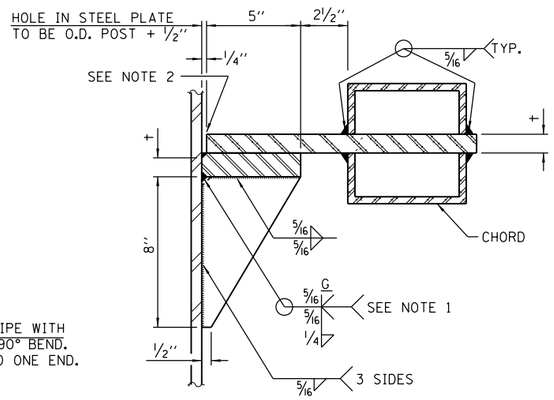
CONTOURED WASHERS

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 D



DETAIL C

NOTES:

1. GRIND TOP IF REQUIRED TO FULLY SEAT PLATE. REPAIR DAMAGED GALVANIZING BEFORE ASSEMBLY.
2. AFTER TIGHTENING LOWER CONNECTION BOLTS, FILL GAP WITH NON-HARDENING, SILICONE CAULK SUITABLE FOR EXTERIOR EXPOSURE AND ACCEPTABLE TO THE ENGINEER. COST IS INCLUDED IN OVERHEAD SIGN STRUCTURE, BUTTERFLY TYPE (STEEL).
3. CONNECTION BOLTS IN COLLAR AND BOLTS AT LOWER CHORD CONNECTION MUST BE HIGH STRENGTH WITH MATCHING LOCKNUTS. CONNECTION BOLTS SHALL HAVE TWO STAINLESS STEEL FLAT WASHERS EACH.
4. COLLAR I.D. SHALL BE MANUFACTURED TO CORRESPOND TO O.D. OF ACTUAL GALVANIZED POST PLUS 1/8'' (± 1/16''). MAXIMUM GAP BETWEEN POST AND COLLAR AT ANY LOCATION EQUALS 1/8'' BEFORE TIGHTENING BOLTS.
5. OPTIONAL FULL PENETRATION WELD IN COLLAR. (TWO LOCATIONS MAXIMUM (180° APART) X-RAY OR UT 100%)
6. 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 (t)	COLLAR THICKNESS (t_1)
24''	1 1/4''	3 1/2''	6''	1''	7/8''

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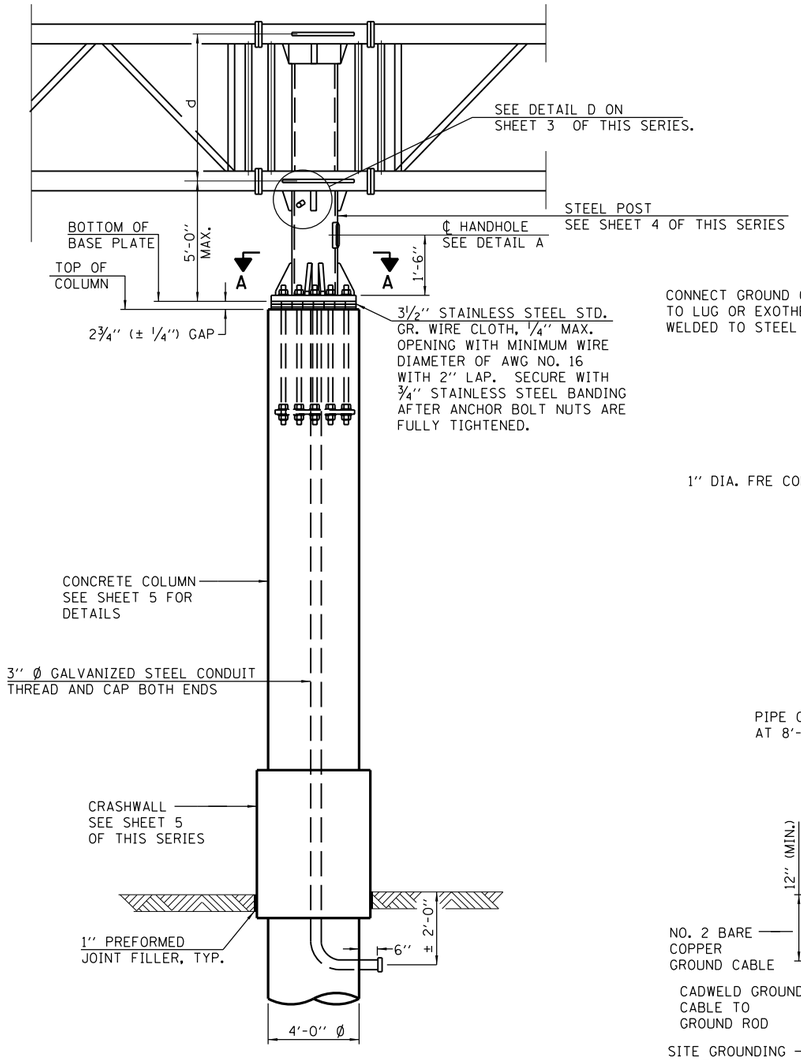
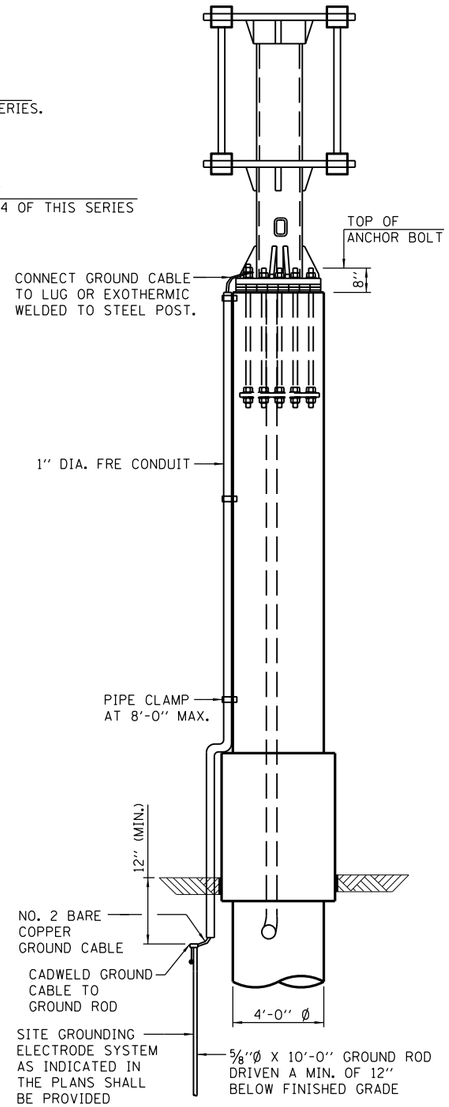
STANDARD F14-00

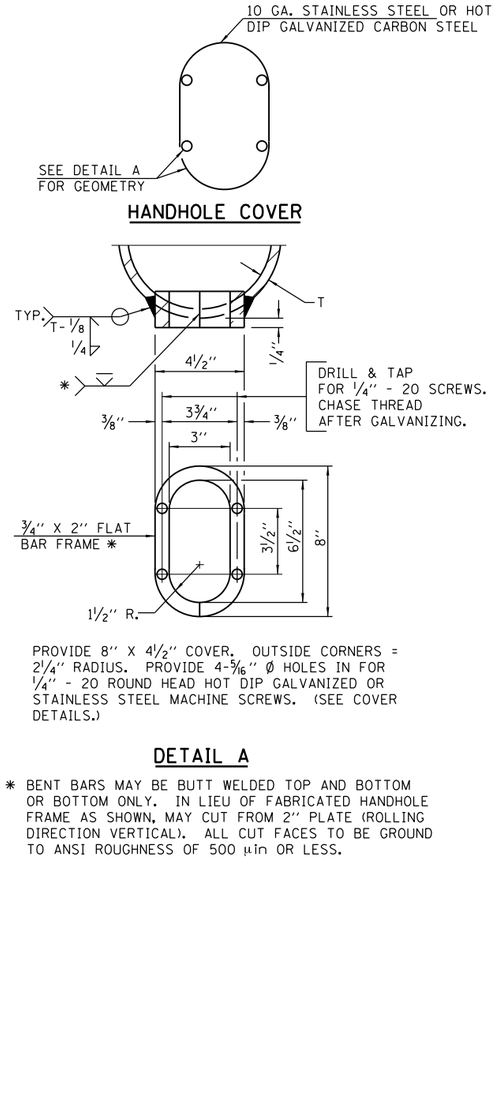


FRONT ELEVATION

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



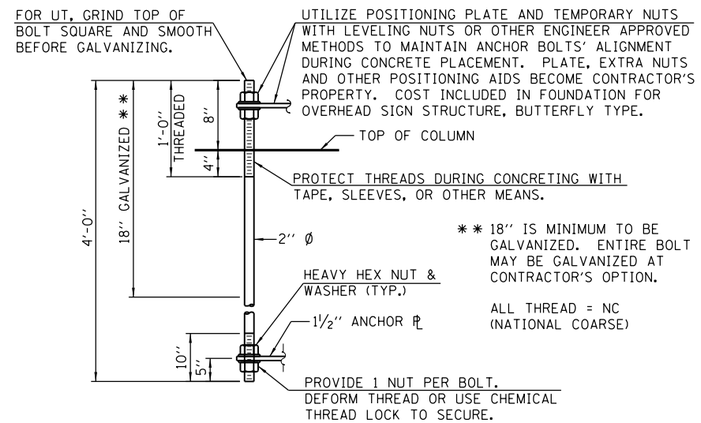
SIDE ELEVATION



PROVIDE 8" X 4½" COVER. OUTSIDE CORNERS = 2¼" RADIUS. PROVIDE 4-5⁄16" Ø HOLES IN FOR ¼" - 20 ROUND HEAD HOT DIP GALVANIZED OR STAINLESS STEEL MACHINE SCREWS. (SEE COVER DETAILS.)

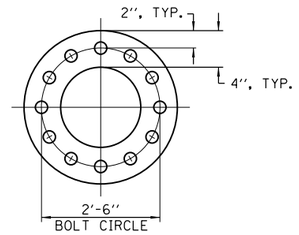
DETAIL A

* 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.

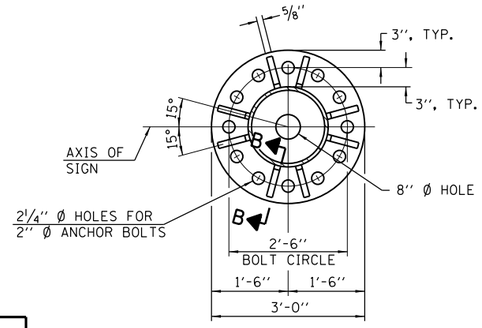


ANCHOR BOLT DETAIL

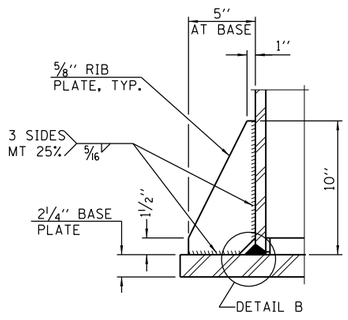
ANCHOR BOLTS SHALL CONFORM TO ASTM F1554 GRADE 55. GALVANIZE THE UPPER 18" (MINIMUM **) AND ASSOCIATED AASHTO M291, GRADE A, C OR DH HEAVY HEX NUTS AND HARDENED WASHERS PER AASHTO M232. NO WELDING SHALL BE PERMITTED ON BOLTS. PROVIDE A NUT AT BOTTOM, A HEXAGON LOCKNUT AND WASHER ABOVE BASE PLATE AND 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 INSURE NO REJECTABLE FLAWS EXIST IN THE UPPER 18" (TENSION CRITERIA). COST OF TESTING INCLUDED IN FOUNDATION FOR OVERHEAD SIGN STRUCTURE, BUTTERFLY TYPE.



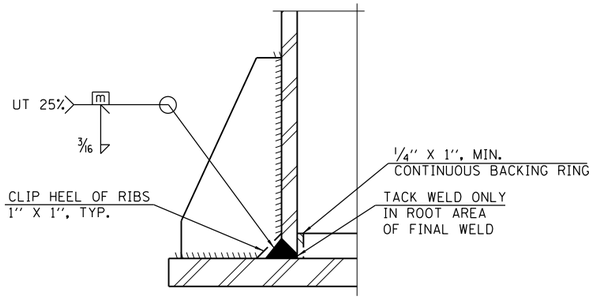
POSITIONING PLATE/ANCHOR PL



SECTION A-A



SECTION B-B



DETAIL B

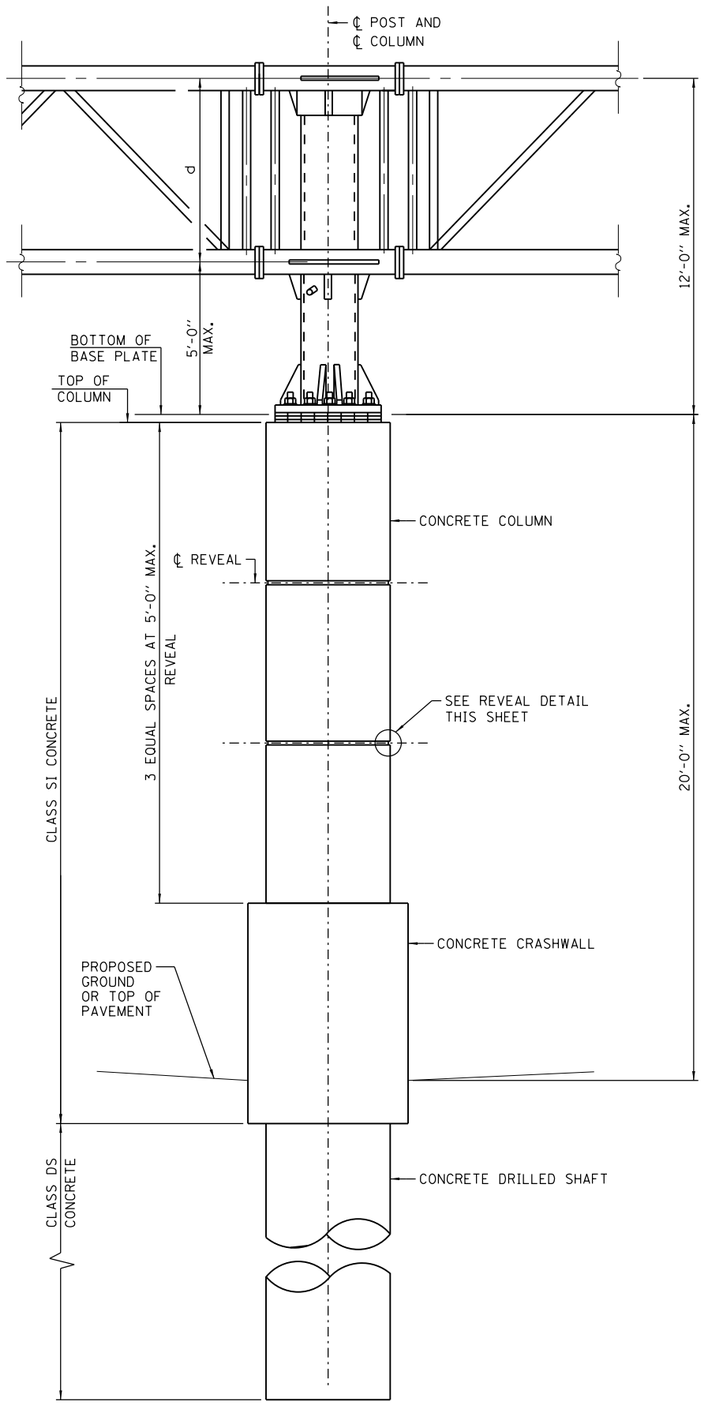
(TYPICAL RIB)

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

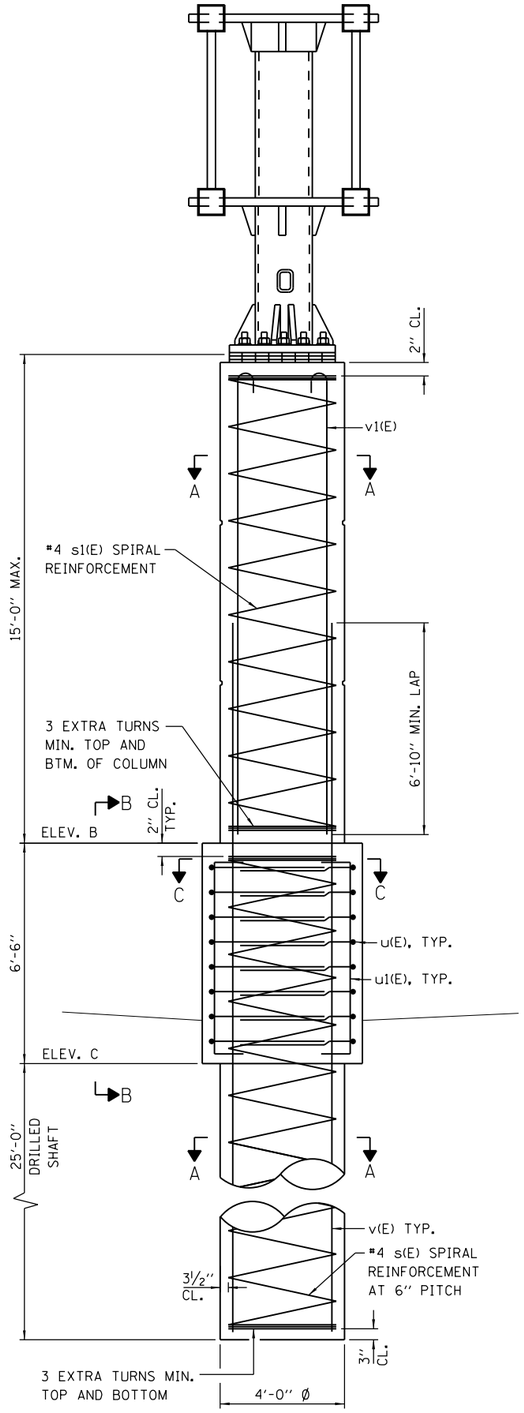
OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

STANDARD F14-00



FRONT ELEVATION

DMS TYPE II SIGN CABINET NOT SHOWN
FOR CLARITY



SIDE ELEVATION

BILL OF MATERIAL-EACH FOUNDATION

CLASS SI CONC. CY	CLASS DS CONC. CY	REBAR POUNDS
12.9	11.7	4,790

NOTE:

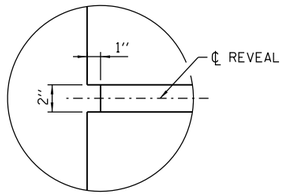
COLUMN CONCRETE VOLUME AND BAR s1(E) LENGTH ARE COMPUTED BASED ON 15'-0" COLUMN HEIGHT. IF COLUMN HEIGHT IS NOT EQUAL 15'-0", QUANTITIES SHALL BE CALCULATED BASED ON ACTUAL COLUMN HEIGHT.

REBAR SCHEDULE-EACH FOUNDATION

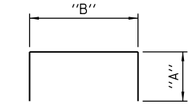
(COLUMN, CRASHWALL AND DRILLED SHAFT)

	BAR	NUMBER	SIZE	LENGTH	SHAPE
	v(E)	20	#9	38'-3"	
	v1(E)	20	#9	15'-8"	
*	s(E)	1	#4	31'-1"	
*	s1(E)	1	#4	14'-5"	
	u(E)	12	#5	12'-2"	
	u1(E)	18	#5	8'-7"	

* THE LENGTH OF SPIRAL SHOWN IS THE HEIGHT OF SPIRAL

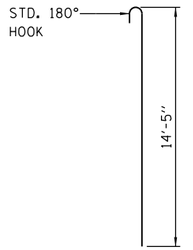


REVEAL DETAIL

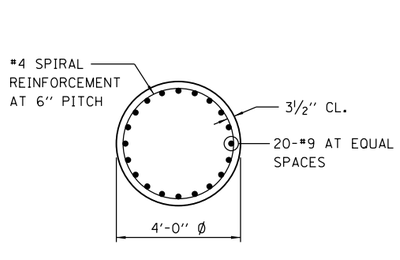


BAR	"A"	"B"
u(E)	3'-9"	4'-8"
u1(E)	1'-3"	6'-1"

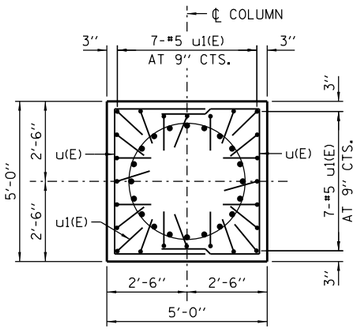
BAR u(E), u1(E)



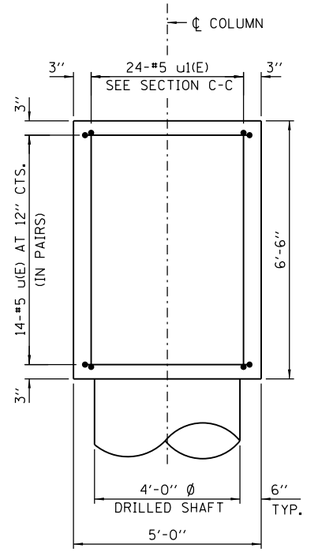
BAR v1(E)



SECTION A-A



SECTION C-C



SECTION B-B

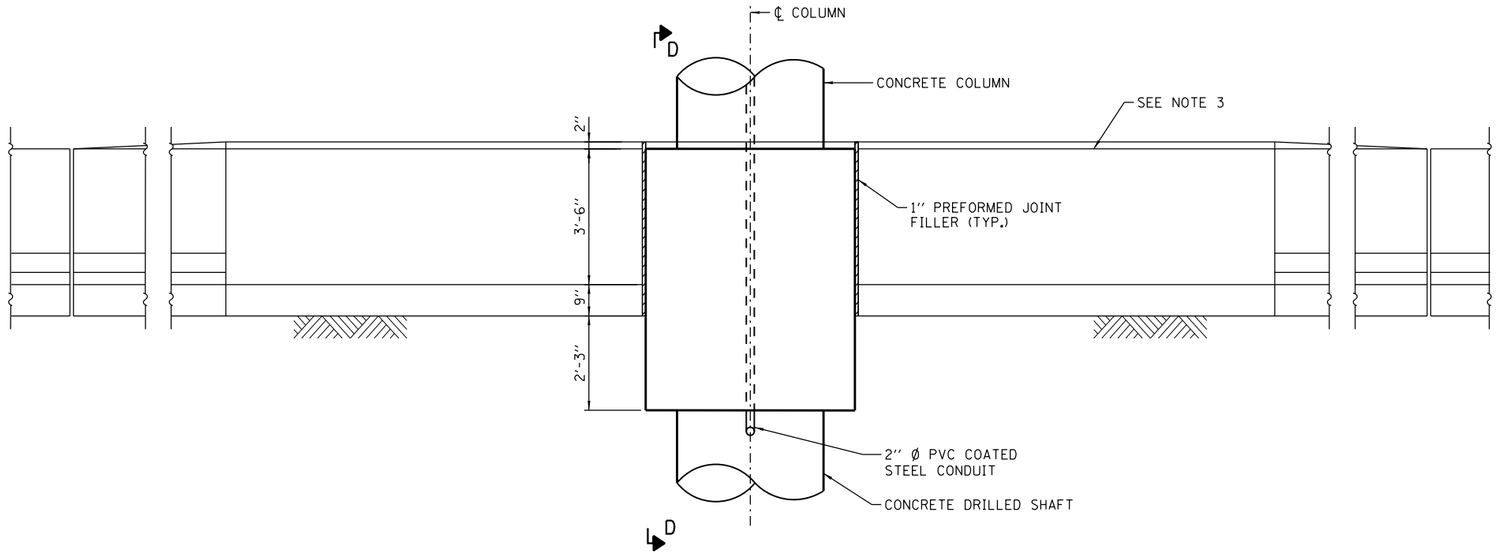
APPROVED Paul Kovacs CHIEF ENGINEER DATE 3-31-2014

SHEET 5 OF 10

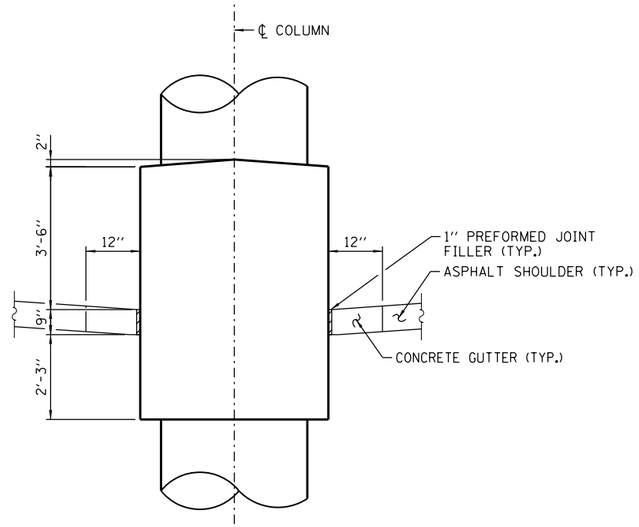
Illinois Tollway

OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

STANDARD F14-00

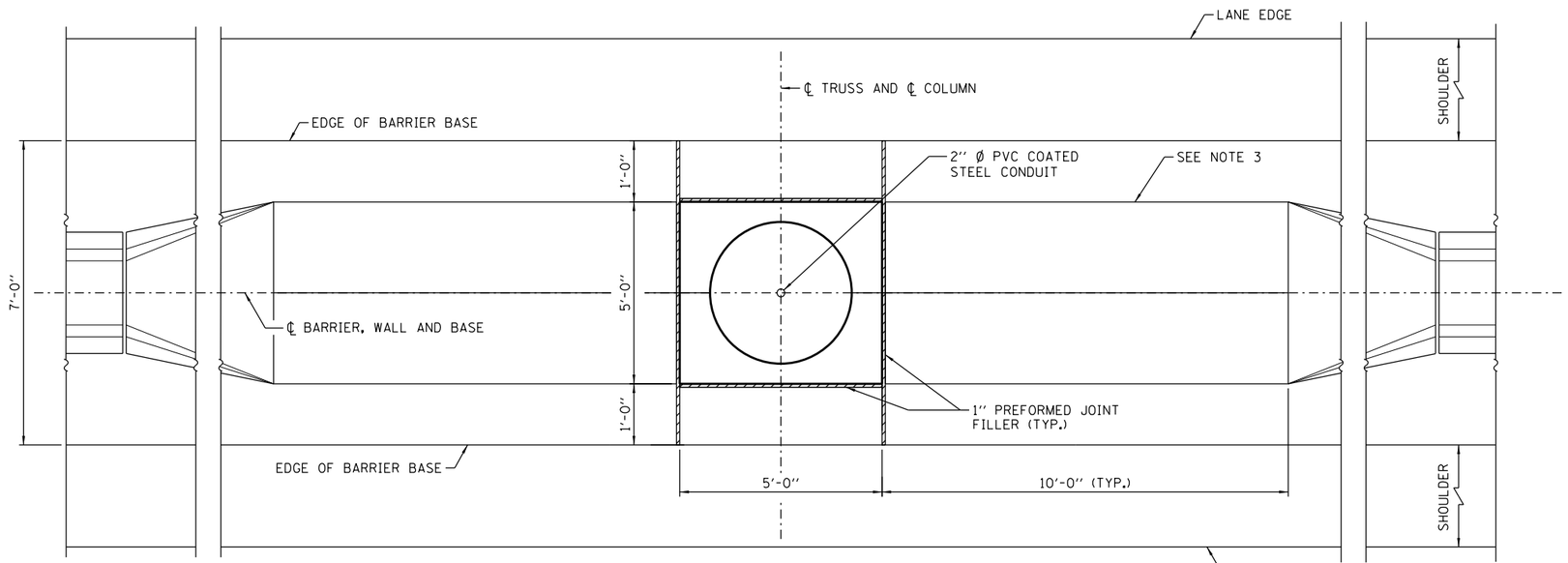


SIDE ELEVATION

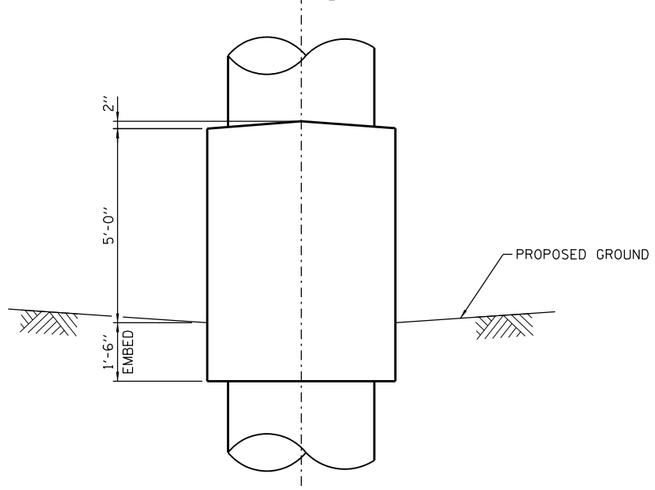


SECTION D-D

FOUNDATION LOCATED IN PAVED ROADWAY MEDIAN



PLAN



SECTION D-D

FOUNDATION LOCATED IN UNPAVED ROADWAY MEDIAN

NOTES:

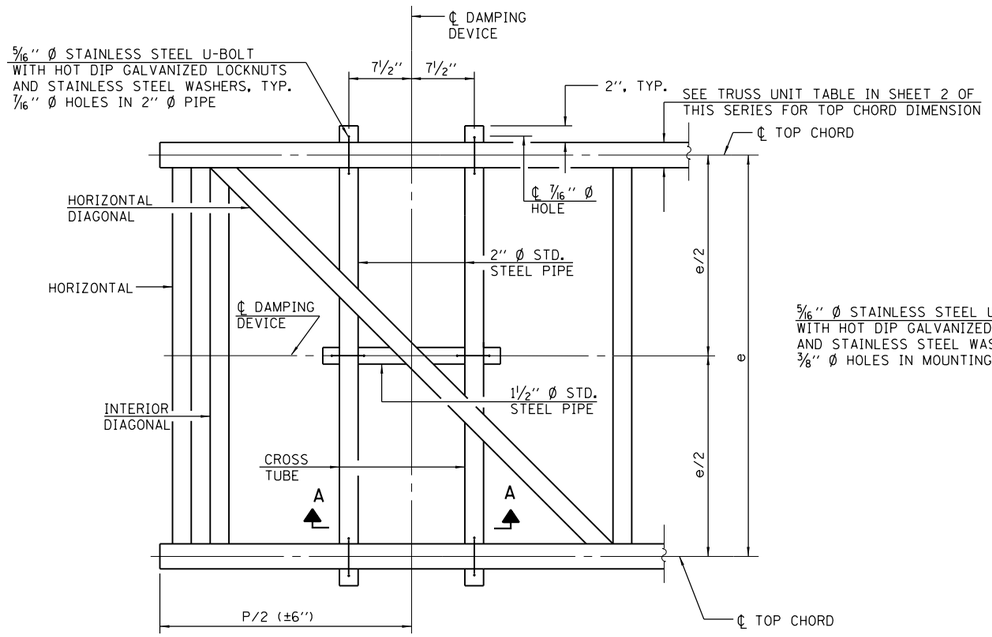
1. SIDE ELEVATION AND PLAN VIEW ARE SHOWN FOR FOUNDATION LOCATED IN PAVED MEDIAN.
2. SEE SHEET 5 OF THIS SERIES FOR REINFORCEMENT DETAILS.
3. SEE STANDARD C13 FOR CONCRETE MEDIAN BARRIER TRANSITION, TYPE V-F.

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

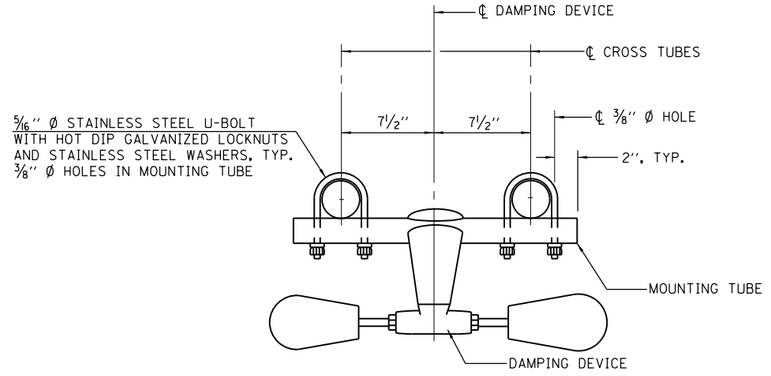
Illinois Tollway

OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

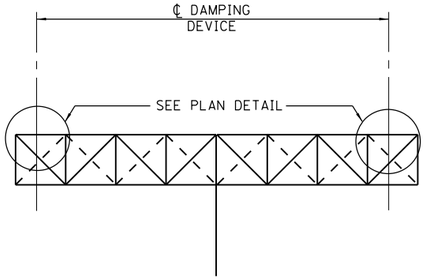
STANDARD F14-00



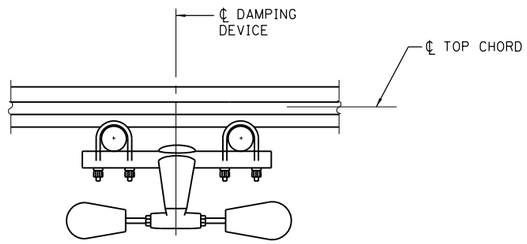
PLAN DETAIL



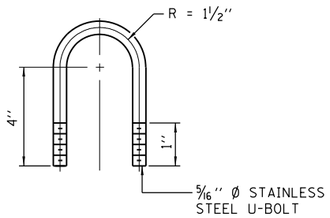
TRUSS DAMPING
DEVICE CONNECTION DETAIL



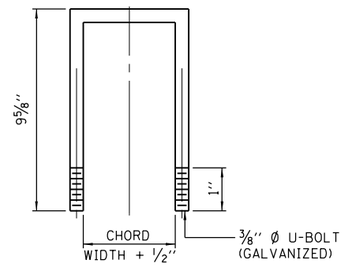
ELEVATION
STEEL BUTTERFLY SIGN STRUCTURE



SECTION A-A



DAMPING DEVICE MOUNTING
TUBE U-BOLT DETAIL
(TYPICAL)



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

NOTE:

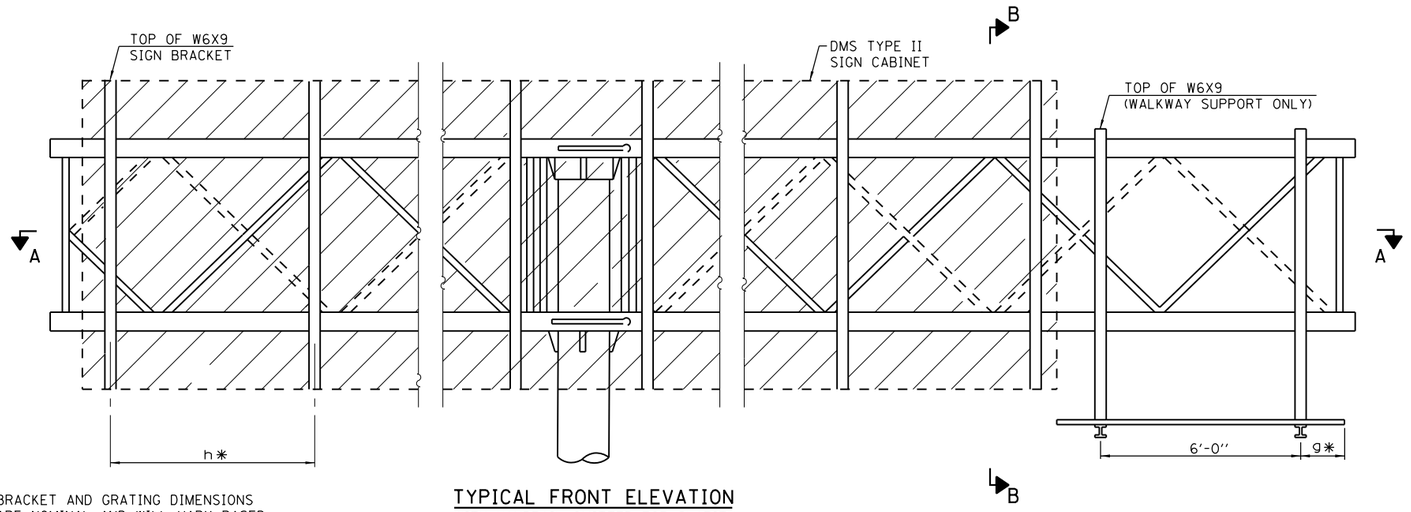
DAMPER: ONE DAMPER PER TRUSS. (31 LBS. STOCKBRIDGE-TYPE 29" MINIMUM BETWEEN ENDS OF WEIGHTS) COST INCLUDED IN THE COST OF "OVERHEAD SIGN STRUCTURE, BUTTERFLY TYPE (STEEL)."

Paul Kovacs
APPROVED..... DATE 3-31-2014
CHIEF ENGINEER

Illinois Tollway

OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

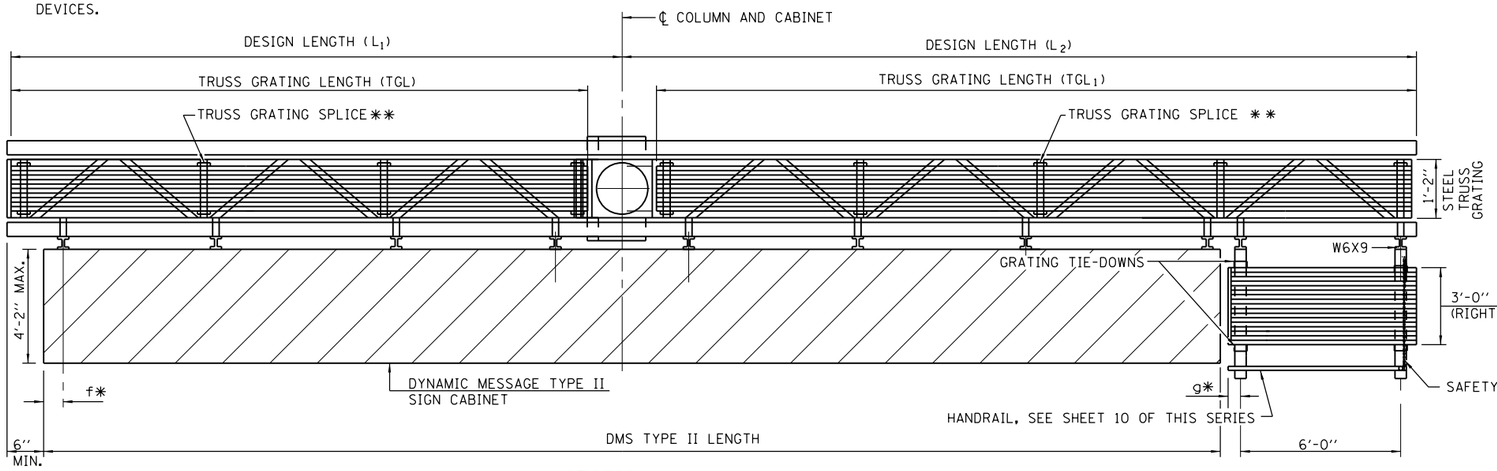
STANDARD F14-00



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

TYPICAL FRONT ELEVATION

WITH HANDRAIL OMITTED FOR CLARITY.
FOR SECTION B-B, SEE SHEET 9 OF THIS SERIES.



SECTION A-A

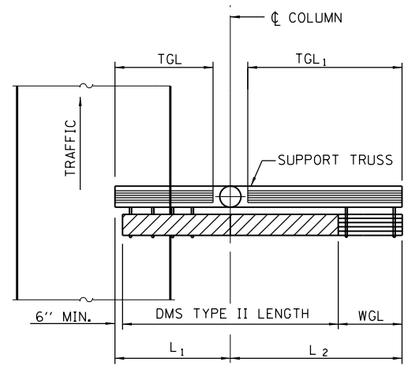
HANDRAIL AND WALKWAY SHALL SPAN A MINIMUM OF THREE BRACKETS BETWEEN SPLICES AND/OR GAP JOINTS.

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

GRATING SPLICES AND HANDRAIL JOINTS PLACED AS NEEDED.

** TRUSS GRATING TO FACILITATE INSPECTION SHALL RUN FULL LENGTH (CENTER TO CENTER OF SUPPORT FRAMES) ±12" ON OVERHEAD TRUSSES. COST OF TRUSS GRATING IS INCLUDED IN OVERHEAD SIGN STRUCTURE, BUTTERFLY TYPE (STEEL).

$$TGL = L_1 - \left(\frac{\text{POST O.D.}}{2} + 6''\right) \qquad TGL_1 = L_2 - \left(\frac{\text{POST O.D.}}{2} + 6''\right)$$



PLAN
WALKWAY AND HANDRAIL SKETCH

(ROAD PLAN BENEATH TRUSS VARIES)
BUTTERFLY MAY BE LOCATED IN SHOULDER AREA.
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 ℄ OF NEAREST BRACKET)
g = 12" MAXIMUM, 4" MINIMUM (END OF WALKWAY GRATING TO ℄ OF NEAREST SUPPORT BRACKET)
h = 6'-0" MAXIMUM (℄ TO ℄ SIGN AND/OR WALKWAY SUPPORT BRACKETS, W6X9)

MAXIMUN DMS TYPE II WEIGHT = 5000 LBS.

4'-2" MAXIMUN CABINET DEPTH INCLUDES DEPTH OF CABINET PLUS CONNECTION TO W6X9

FOR SECTION B-B AND GRATING SPLICE DETAILS, SEE SHEET 10 OF THIS SERIES.

FOR HANDRAIL SPLICE DETAILS, SEE SHEET 10 OF THIS SERIES.

WALKWAY AND TRUSS GRATING WIDTH DIMENSIONS ARE NOMINAL AND MAY VARY ± ½" BASED ON AVAILABLE STANDARD WIDTH.

BRACKET TABLE

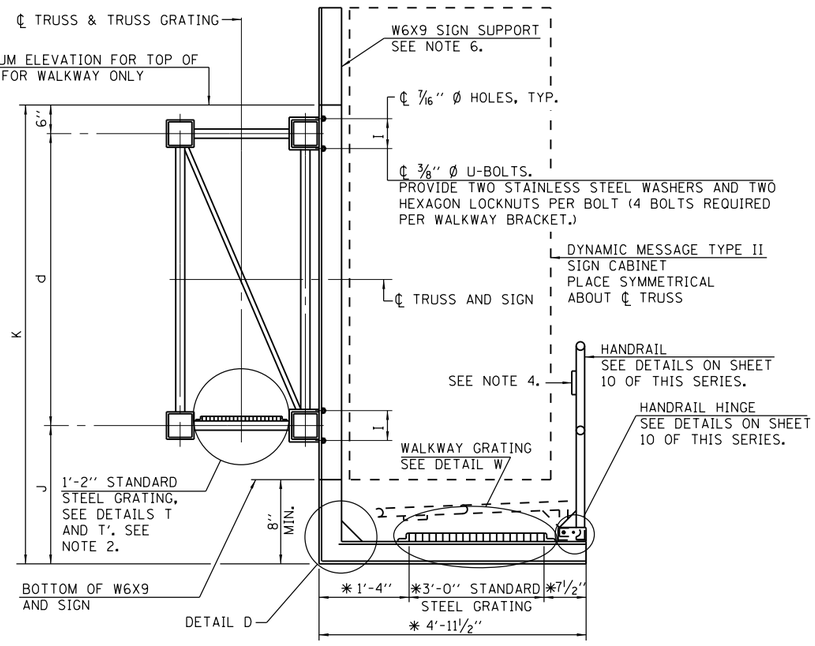
W6X9		
SIGN WIDTH		NUMBER OF BRACKETS REQUIRED
GREATER THAN	LESS THAN OR EQUAL TO	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

Paul Kovacs
APPROVED ..... CHIEF ENGINEER
DATE 3-31-2014

Illinois Tollway

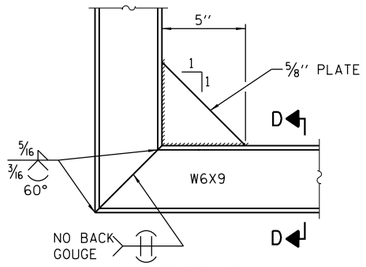
OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

STANDARD F14-00

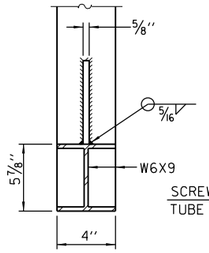


SECTION B-B

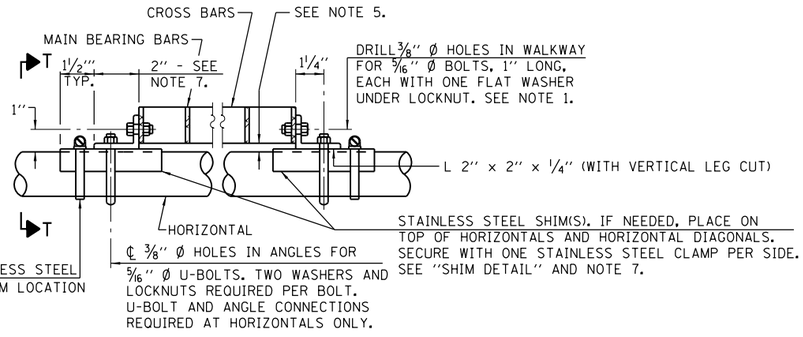
*BRACKET AND GRATING DIMENSIONS ARE NOMINAL AND WILL VARY BASED ON ACTUAL DMS TYPE II CABINET DIMENSIONS PLUS MANUFACTURERS MOUNTING DEVICE.



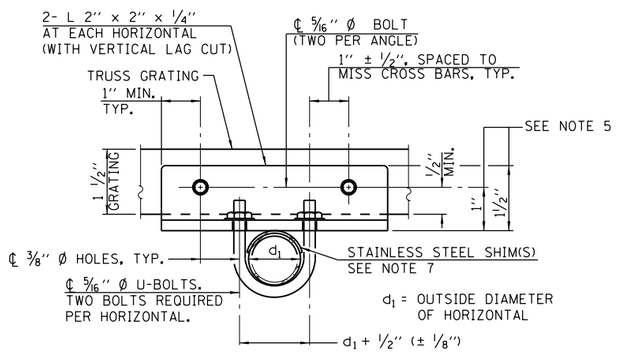
DETAIL D



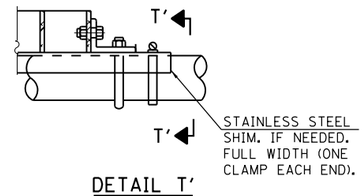
SECTION D-D



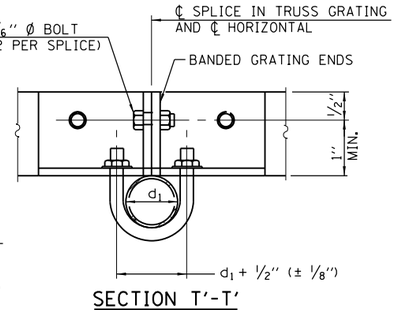
DETAIL T
(TRUSS GRATING AT HORIZONTAL)



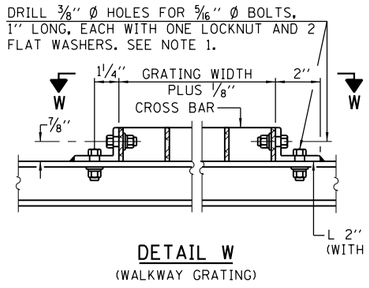
SECTION T-T



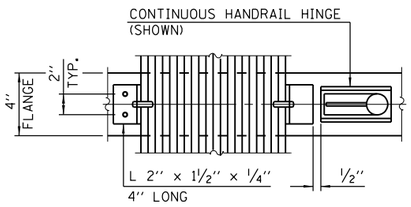
DETAIL T'
(TRUSS GRATING SPLICE)
DETAILS NOT SHOWN SAME AS DETAIL T.
ALTERNATE MATERIALS MAY BE USED SUBJECT TO THE ENGINEER'S REVIEW AND APPROVAL.



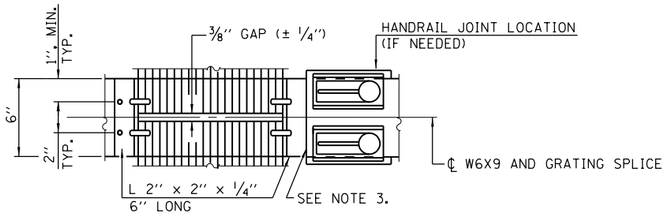
SECTION T'-T'



DETAIL W
(WALKWAY GRATING)

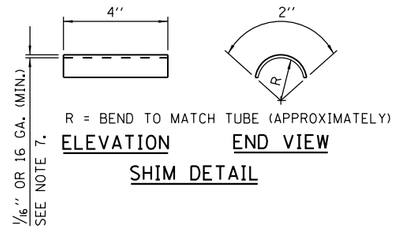


(CONTINUOUS WALKWAY GRATING)



(AT WALKWAY GRATING SPLICE)

SECTION W-W



ELEVATION END VIEW

SHIM DETAIL

NOTES:

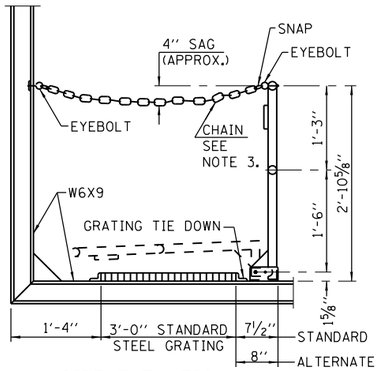
1. DRILLING HOLES IN GRATING MAY BE DONE IN SHOP OR FIELD, BASED ON CONTRACTOR'S PREFERENCE AND SUBJECT TO ACCURATE ALIGNMENT.
2. WHEN TRUSS GRATING MUST BE SPLICED, USE SUGGESTED DETAIL OR OTHER METHODS SUBJECT TO THE ENGINEER'S REVIEW AND APPROVAL. LOCATE SPLICE TO AVOID INTERFERENCE BETWEEN CROSS BARS AND BOLT LOCATIONS.
3. IF HANDRAIL JOINT PRESENT, WELD ANGLE TO W6X9 AND 1/4" EXTENSION BARS. SEE SHEET 10 OF THIS SERIES.
4. PL 1/8" x 1/2" X 2" WELDED TO HANDRAIL POSTS TO PROTECT LOCATIONS THAT CONTACT GRATING.
5. TUBE TO GRATING GAP MAY VARY FROM 0 TO 1/2" MAX. TO ALIGN WALKWAY, ALLOW FOR CAMBER, ETC.
6. CABINET MANUFACTURER MUST DESIGN AND SUPPLY HARDWARE FOR CONNECTION OF CABINET TO W6X9. BOLTS MUST BE STAINLESS STEEL OR HOT DIP GALVANIZED HIGH STRENGTH PER IDOT SPECIFICATIONS.
7. STAINLESS STEEL SHIMS SHALL BE PLACED AS SHOWN IN DETAIL T IF NEEDED TO COMPENSATE FOR ALIGNMENT VARIATIONS BETWEEN HORIZONTAL AND DIAGONAL PIPES BEYOND ADJUSTMENT PROVIDED BY ANGLES. THICKER SHIMS MAY BE USED SUBJECT TO SHIMS PERFORMING PROPERLY.

APPROVED Paul Kovacs CHIEF ENGINEER DATE 3-31-2014

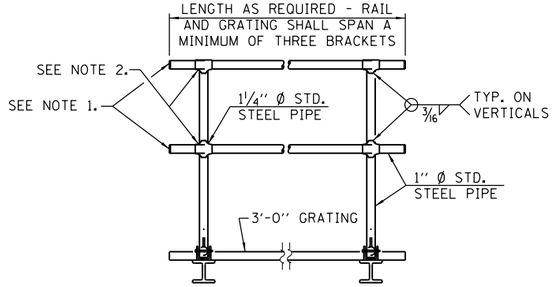
Illinois Tollway

OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

STANDARD F14-00

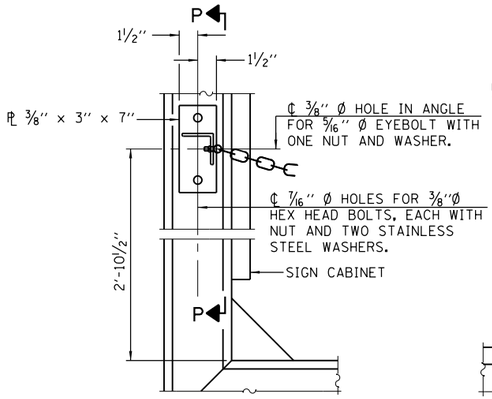


SIDE ELEVATION
(SHOWING SAFETY CHAIN W/O SIGN)

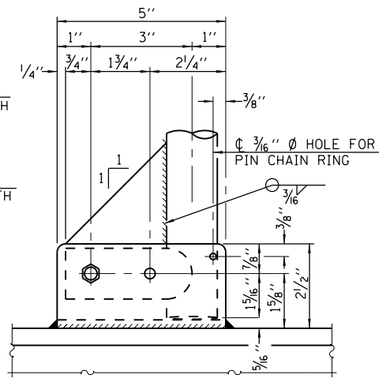


FRONT ELEVATION

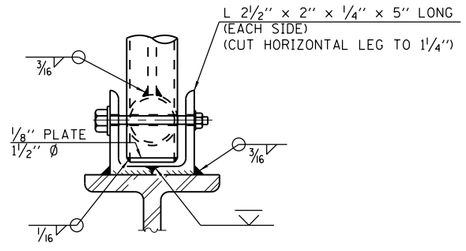
HANDRAIL DETAILS



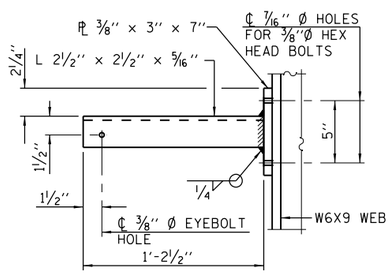
ALTERNATE SAFETY CHAIN ATTACHMENT
(WITH SIGN PRESENT)
ITEMS NOT SHOWN SAME AS "SIDE ELEVATION" OF "HANDRAIL DETAILS"



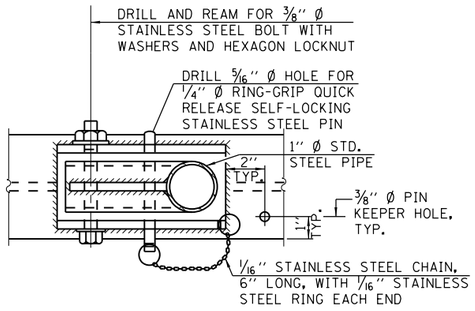
SIDE ELEVATION



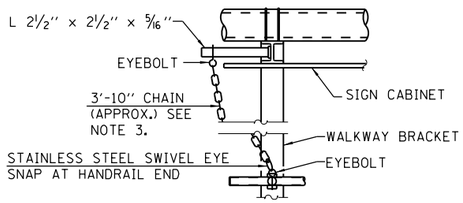
FRONT ELEVATION
DETAILS NOT SHOWN SAME AS "ELEVATION" AT RIGHT.



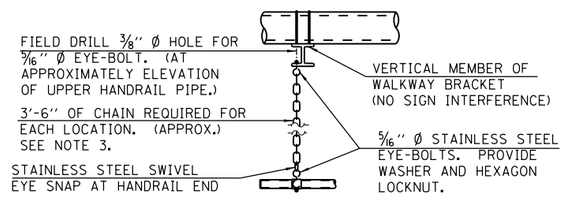
SECTION P-P



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 EACH WALKWAY.

NOTES:

1. INSTALL STANDARD FORCE-FIT END CAPS OR WELD ⅛'' END PLATES WITH ⅛'' C.F.W. AND GRIND SMOOTH. (ALL RAIL ENDS)
2. HORIZONTAL HANDRAIL MEMBER SHALL BE CONTINUOUS THRU 1¼'' Ø PIPE. PROVIDE 7/16'' Ø HOLE IN 1¼'' Ø PIPE FOR ⅜'' Ø BOLT. FIELD DRILL 7/16'' Ø HOLE IN HORIZONTAL RAIL MEMBER. PROVIDE LOCKNUT AND TWO STAINLESS STEEL WASHERS FOR BOLT. (USE 5/16'' EYEBOLTS IN 7/16'' Ø HOLES ON TOP RAIL AT ENDS ONLY.)
3. ⅜'' TYPE 304L STAINLESS STEEL CHAIN, APPROXIMATELY 12 LINKS PER FOOT.

Paul Kovacs
APPROVED..... DATE 3-31-2014
CHIEF ENGINEER

Illinois Tollway

OVERHEAD SIGN STRUCTURE
BUTTERFLY TYPE
STRUCTURE DETAILS

STANDARD F14-00