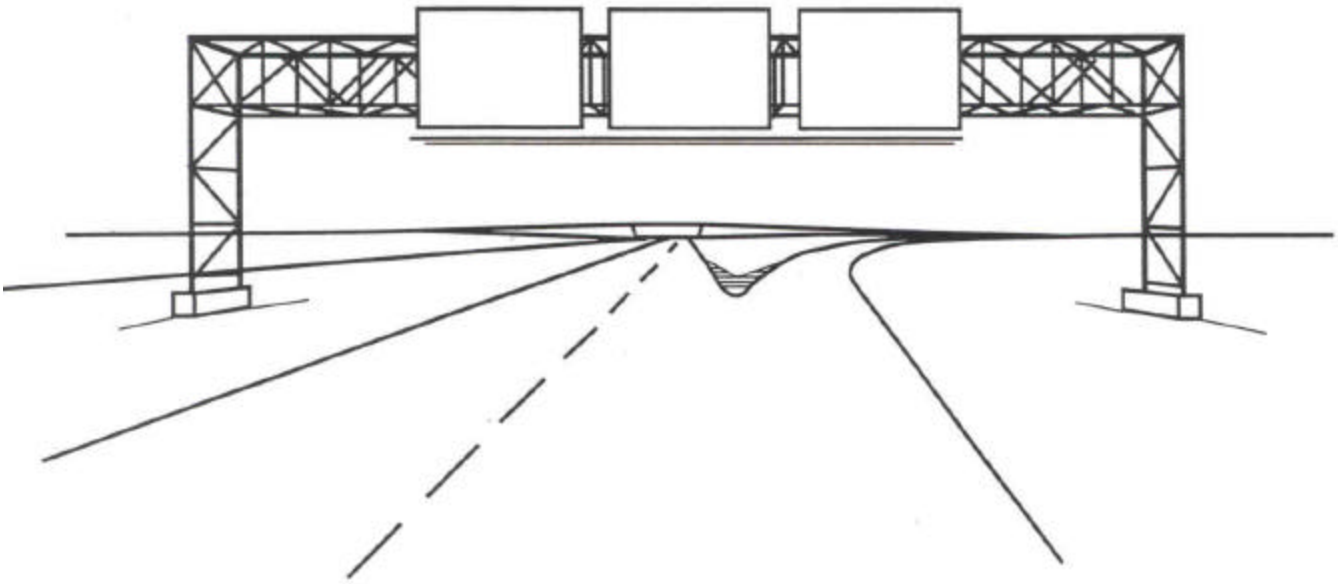
Sign Structures Manual



Illinois Department of Transportation
Bureau of Bridges and Structures

Sign Structures Manual

Title Page

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STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION BUREAU OF BRIDGES AND STRUCTURES	**FILE CLASSIFICATION:** Sign Structures Manual
	SIGN STRUCTURES MANUAL CHANGE LETTER NO. – 12-1
To: *All users of the Sign Structures Manual*	**DATE ISSUED:** June 1, 2012

The Sign Structures Manual has been revised.

The June 2012 edition located on the IDOT website replaces the June 2007 edition. The cell libraries on the IDOT web site have been updated with the June 1, 2012 base sheets.

The base sheets and manual have undergone some corrections, updates and additions. Some of the more significant revisions are listed below.

REVISION	SECTION (S)
Walkway requirements clarified	2.1, 2.2, 2.3, 2.7, 2.8, 2.9, 2.10
Chord end drain holes added to cantilevers and butterflies	2.2, 2.7, (base sheets)
Trichord truss panel spacing corrected	2.10
Cantilever and butterfly anchor bolt testing requirements	2.2, 2.7, 2.9 (base sheets)
Support height calculation set to 15' default sign height	2.1, 2.2, 2.7, 2.8, 2.9, 2.10
L-bracket height defined by actual sign height	2.1, 2.2, 2.7, 2.8, 2.9, 2.10
Reactions and weight tables added	References
Over-height columns clarified for cantilever, butterfly and monotube	2.2, 2.4, 2.7, 2.9
Over-height sign allowances clarified for bridge-mounted	2.3
Sign structure number for local routes clarified	1.8

D. Carl Puzey
Engineer of Bridges and Structures

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Section 1 - Introduction

1.1 Purpose

According to the Illinois Department of Transportation's "Manual on Uniform Traffic Control Devices" (MUTCD)(adopted from the FHWA Manual with addenda), "The purpose of traffic control devices, as well as the principles for their use, is to promote highway safety and efficiency by providing for the orderly movement of all road users on streets and highways throughout the Nation. Traffic control devices notify road users of regulations and provide warning and guidance needed for the reasonably safe, uniform, and efficient operation of all elements of the traffic stream."

This manual provides a basis for traffic engineers or technicians to select standard sign structures and prepare sign structure plan sheets without the involvement of a structural engineer. The Bureau of Bridges and Structures (BBS) prepares and administers the "Sign Structures Manual."

1.2 Sign Structure Styles

The MUTCD and other IDOT policies govern the number, types, locations and geometries of required traffic signs. The MUTCD doesn't always specify styles of structures to support the signs, so the plan preparer must consider site conditions and limitations, economy and future demands. The following styles of sign structures are included in this Manual:

1. Span Sign Structures (aluminum and steel box, steel trichord truss)
2. Cantilever Sign Structures (aluminum and steel box truss)
3. Bridge Mounted Sign Structures
4. Monotube Sign Structures (single and dual)
5. Breakaway Wide Flange and Tubular Steel Signposts
6. Butterfly Sign Structures (aluminum truss)

Traffic signal mast arm and standard light pole structures may carry small signage, but are not defined as, or included with sign structures. The primary use of traffic signal mast arms is supporting signals and lights, but standard designs include small guide and street signs within the limitations given on Highway Standards. Plan preparers must consult with District Operations before considering additional signage. Standard light pole designs do not include any signage, although they sometimes carry small speed limit or guide signs. Operation's approval is still required before adding signs to light poles.

1.3 Economic Considerations

Sign size and location with respect to traffic lanes are the governing factors in sign structure selection. Other local considerations may mandate selection of specific structures (e.g., cantilever and span sign structures) even if more economical sign structures could support the required signs. According to the MUTCD, restraints which may influence this decision are: traffic volume at or near capacity; complex interchange design; multiple lanes in each direction; restricted sight distance; closely spaced interchanges; multi-lane exits; large percentage of trucks; street lighting in background; high speed traffic; consistency of sign message location through a series of interchanges; insufficient space for ground mounted signs; junction of an interstate route with another freeway and left exit ramps.

Engineering judgment is necessary to provide economy while ensuring appropriate sign structure parameters as described in the MUTCD. For example, if the MUTCD stipulates sign placement 100 feet before an exit ramp and an overpass fascia beam occurs 90 feet before the ramp, using a bridge-mount sign structure on the overpass in lieu of constructing a span or cantilever sign structure is reasonable compliance with MUTCD guidance.

For large contracts with several sign locations, group sign structures by type (I-A, II-C-A, etc.) and length. For economical fabrication, avoid slight variations in truss length and consider making all trusses the same length as much as possible within a contract.

1.4 Discontinued Designs

BBS discontinued some sign structure designs due to structural and/or economic considerations. Most notably was the 1994 suspension of the painted (brown) tubular steel Vierendeel cantilever and span sign structures. Vierendeel structures are not recommended for use on future contracts unless essential either to match existing adjacent structures or for other overriding considerations on specific projects. If Vierendeels are proposed, submit plans to the BBS for review well in advance of the letting. Alternate base plate details that will match existing Vierendeel anchor bolt patterns are available for the aluminum span and cantilever designs. If replacement of Vierendeels becomes necessary, and inspections of existing foundations find them serviceable, use the aluminum, steel or trichord designs with alternate post details.

1.5 General

The edition of AASHTO “Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals” (AASHTO) current at the date shown on the base sheets governs design and the IDOT Standard Specifications for Road and Bridge Construction current at the time of the project’s advertisement for letting, controls construction.

For best efficiency, avoid selecting a larger than necessary truss type. Unless the proposed total sign area is near the maximum for a given truss type or there is a significant possibility that more sign area will be added in the near future,

select truss type based on span length, total sign area and maximum end support height, as detailed in this manual.

Design of the sign structures includes dead loads, wind loads, and ice loads. AASHTO combines loads into groups, and the combination producing the maximum effect proportions each element of the structure. The three group loads are Dead Load (Group I), Dead Load plus Wind (Group II), and Dead Load plus Ice plus 1/2 Wind (Group III). Group II and Group III load combinations allow increasing member stresses by 33 percent.

Design of the vertical end supports for the sign structures considers the effects of wind in any direction and locating the signs near one end. AASHTO requires factoring wind loads into normal and transverse components that act on the supports simultaneously. The basic load (BL) of wind on the structure includes horizontal loads applied at the geometric centers of the respective areas, distributed accordingly to the structure components. Combination 1 is 1.0 x BL (normal to sign) and 0.2 x BL (parallel to sign), while Combination 2 is 0.6 x BL (normal to sign) and 0.3 x BL (parallel to sign). Combination loads distribute equally among supports assuming the maximum permitted design sign area, except for special installations. In addition to the preceding, the Fatigue Design section of the AASHTO specification applies to cantilever and butterfly sign structures.

1.6 Foundations

The spread footing dimension “M” and drilled shaft foundation depth “B” depend on common cohesive soils (silty or sandy clay). Standard foundation dimensions require a minimum average unconfined compressive strength (Q_u) below the bottom of the spread footing and for all strata within and below the “B” portion of the drilled shaft. Soil exploration prior to plan development is required to determine actual Q_u at or near the proposed foundations’ location and confirm

foundation parameters. If average Q_u values are less than the value specified on the foundation standards, then the sign structure foundation will require a special design. The drilled shaft foundation alternative is more economical and better suited for the majority of site conditions encountered.

Site conditions that may preclude using drilled shaft foundations are rock strata within the shaft depth, unsuitable soil conditions at the site (e.g. boulders, low Q_u or collapsing/cohesionless sand) or drilling obstructions from existing utilities, adjacent buildings or appurtenances. The presence of such conditions may require a spread footing or pile-supported foundation.

Site conditions that may preclude using spread footing foundations include unsuitable soil conditions at the site (e.g. loess and organic, compressible soils), excavation restrictions with existing utilities, infrastructure or adjacent right-of-way or permeable soils with high water table above the footing base. Borings revealing such conditions may require drilled shaft foundations. For either a special design or review of consultant's special design, submit soil-boring data, site plans and proposed sign structure plans to the BBS.

1.7 Non-Standard Designs

Design of the sign structures in this Manual is limited to standard extruded aluminum sign panels as defined in the Standard Specifications, or dynamic-variable message signs as defined herein, with maximum dimensions within the limits shown. When proposed sign installations exceed these limits or alternate sign structure styles are required, submit plans prepared by a structural engineer well in advance of the letting to the BBS for review and/or approval. Examples of non-standard designs include sign areas, end support heights, weights or span lengths exceeding the maximum allowable dimensions or custom designed, non-tapered, long span, rigid frame monotubes for SPUDI projects.

Installations using changeable / dynamic / variable message sign cabinets use only span Type III-A or III-S structures, or butterfly structures with the sign cabinet centered on the column.

1.8 Sign Structure Number

Each sign structure (span, cantilever, butterfly, monotube and bridge mounted only) in the state is assigned a fifteen digit structure number used to identify the type and location of each structure. Plan preparers must establish a structure number for all new sign structures and enter it into the tables located on several of the sign structure standards. To ensure accuracy and consistency, consultants should check with the District office before assigning a sign structure number. The fifteen-digit number is composed of seven segments of information as follows:

Structure Number	1	S	022	I	355	L	048.6
Segment	1	2	3	4	5	6	7

Segment 1. One number that indicates the District (1 through 9) in which the sign structure is located.

Segment 2. One letter indicating the style of sign structure as follows:

B	Bridge Mounted Sign Structures
C	Cantilever Sign Structures
F	Butterfly Sign Structures
M	Monotube Sign Structures
S	Span Sign Structures

The Cantilever (C) and Span (S) designations include aluminum, steel, trichord and Vierendeel design styles. District offices should use only these designations, but include the style with “type of structure” in databases.

Segment 3. Three numbers that list the county location of the sign structure as follows:

County Numbers

Adams	001	Fayette	026	Lawrence	051	Pulaski	077
Alexander	002	Ford	027	Lee	052	Putnam	078
Bond	003	Franklin	028	Livingston	053	Randolph	079
Boone	004	Fulton	029	Logan	054	Richland	080
Brown	005	Gallatin	030	McDonough	055	Rock Island	081
Bureau	006	Greene	031	McHenry	056	St. Clair	082
Calhoun	007	Grundy	032	McLean	057	Saline	083
Carroll	008	Hamilton	033	Macon	058	Sangamon	084
Cass	009	Hancock	034	Macoupin	059	Schuyler	085
Champaign	010	Hardin	035	Madison	060	Scott	086
Christian	011	Henderson	036	Marion	061	Shelby	087
Clark	012	Henry	037	Marshall	062	Stark	088
Clay	013	Iroquois	038	Mason	063	Stephenson	089
Clinton	014	Jackson	039	Massac	064	Tazewell	090
Coles	015	Jasper	040	Menard	065	Union	091
Cook	016	Jefferson	041	Mercer	066	Vermilion	092
Crawford	017	Jersey	042	Monroe	067	Wabash	093
Cumberland	018	JoDaviess	043	Montgomery	068	Warren	094
DeKalb	019	Johnson	044	Morgan	069	Washington	095
DeWitt	020	Kane	045	Moultrie	070	Wayne	096
Douglas	021	Kankakee	046	Ogle	071	White	097
DuPage	022	Kendall	047	Peoria	072	Whiteside	098
Edgar	023	Knox	048	Perry	073	Will	099
Edwards	024	Lake	049	Piatt	074	Williamson	100
Effingham	025	LaSalle	050	Pike	075	Winnebago	101
				Pope	076	Woodford	102

Segment 4. One letter indicating the type of road on which the sign structure is located:

I	Interstate highways
L	Local routes
N	Non-marked routes
S	State highways
U	U.S. numbered highways
B	Business routes

Segment 5. Three numbers or letters that list the highway or abbreviate the named route on which the sign structure is located, for example:

067	U.S. Highway 67
155	Interstate Highway 155
WIL	Willow Road

Segment 6. One letter, “L” or “R” describes the side of the highway over which the sign structure is primarily located. The right or left side of the highway is always determined when standing between the opposing traffic lanes facing in the direction of the increasing milepost markers. Milepost markers normally increase from West to East and South to North. If the sign structure spans over all lanes and/or has signs facing both directions, use “R” as the default.

Segment 7. The last segment is four numbers plus a decimal point indicating the milepost or estimated milepost nearest the location of the sign structure to the nearest tenth of a mile.

For example, Structure Number 1S022I355L030.2 is a Span Sign Structure, located in District 1, in DuPage County, on Interstate 355, on the left side, at milepost marker 030.2.

1.9 CADD Instructions

Digitized CADD plans are available through the IDOT web site. Use the base sheets in these libraries by, first, attaching and placing the Design Border Cell (C00010 in “bridge.cel” library), then, attaching the desired base sheet cell(s). Do not attempt to use the plan sheets presented in this Manual. Prior to preparing a set of plans, always check the BBS link at the IDOT website for the most recently updated cell libraries.

These base sheets facilitate efficient production of sign structure plans for planners, designers and technicians. All the details given in the cell libraries for each sheet must be included without omission or alteration. The only additions necessary are completing the tables based on criteria for truss and support member dimensions, field data regarding elevations and offsets and contract specific information in the tables and the upper and lower right hand corners of the plans. Consultants may also add their name or logo to the box in the lower right hand corner. Coordination with the BBS is required prior to preparing a set of plans, for projects with special details not covered by the cell libraries.

Section 2 - Design

2.1 Aluminum Span Sign Structures

When the MUTCD warrants overhead signs, aluminum span sign structures are the standard used by IDOT for freeway and expressway guide signing. Span sign structures are the least economical sign structure type. The plan preparer should consider all MUTCD governing factors and alternatives before selecting overhead spans. Use the following procedures and policies when preparing plans:

1. Determine the 15-digit sign structure number and the station.

2. Determine the location of the sign over the roadway, distance from the right foundation to edge of pavement (D), design span length (center to center support frames to nearest even foot), proposed height of sign(s) (D_S), total sign area and roadway cross section/Elevation A for point of minimum clearance to sign structure (sign, sign bracket, walkway support, or truss).

3. With the design span length and total sign area, select type of truss and truss member sizes from the following table on page 2.1-2. Design of each structure listed in the table accounts for the maximum span length, total sign area, and maximum end support height. Always choose the next largest structure design that will meet all three parameters. For example, a project requires a 70 ft. span with 560 sq. ft. total sign area and 28 ft. maximum end support height. Because the total sign area is greater than the 550 square feet maximum for the second 70 ft. span in the table, choose a 70 ft. span, Type I-A structure using the members and foundation dimensions for the 80 ft. span, Type I-A. In addition, since total sign area is already significant, consider using the 90-foot Type I-A or the 90-foot Type II-A design for more

future additional sign capacity. Before making a final structure selection, complete Step 4 for end support height.

ALUMINUM SPAN SIGN STRUCTURE DESIGNS

MAX. SPAN LENGTH (FT)	MAX. SIGN AREA (SQ FT)	CHORD ALUMINUM TUBE SIZE (IN)	*WEB MEMBERS ALUMINUM TUBE SIZE (IN)	END SUPPORT STEEL PIPE SIZE X WALL (IN)	MAX. END SUPPORT HEIGHT(H) (FT)	SPREAD FOOTING DIM. "M" (FT)	DRILLED SHAFT DIM. "B" (FT)
TYPE I-A (4'-0" X 4'-6")							
** 70	350	4 1/2 X 1/4	2 1/4 X 1/4	6 X 0.280	25.0	14.0	10.0
70	550	5 X 1/4	2 1/2 X 1/4	8 X 0.322(Std)	28.0	18.5	13.5
80	570	5 X 5/16	2 1/2 X 5/16	8 X 0.322(Std)	28.0	19.5	14.5
90	610	5 X 5/16	2 1/2 X 5/16	10 X 0.279	31.0	21.5	16.5
100	610	5 1/2 X 5/16	2 1/2 X 5/16	10 X 0.279	31.0	21.5	16.5
TYPE II-A (4'-6" X 5'-3")							
90	740	5 1/2 X 5/16	3 X 5/16	10 X 0.365 (Std)	31.0	22.5	17.5
100	740	6 X 5/16	3 X 5/16	10 X 0.365 (Std)	31.0	22.5	17.5
110	740	6 1/2 X 5/16	3 X 5/16	10 X 0.365 (Std)	31.0	24.5	20.5
120	740	7 X 5/16	3 X 5/16	10 X 0.365 (Std)	31.0	24.5	20.5
130	740	7 X 3/8	3 X 5/16	10 X 0.365 (Std)	31.0	25.0	21.0
TYPE III-A (5'-0" X 7'-0")							
120	900	7 X 5/16	3 1/4 X 5/16	12 X 0.33	34.0	28.0	18.0
130	975	7 X 3/8	3 1/4 X 5/16	12 X 0.33	34.0	31.0	19.0
140	1050	7 X 1/2	3 1/4 X 5/16	12 X 0.375 (Std)	34.0	33.0	22.0
150	1125	8 1/2 X 1/2	3 1/2 X 5/16	12 X 0.5 (XS)	36.0	36.0	25.0
160	1200	9 X 1/2	3 1/2 X 5/16	12 X 0.5 (XS)	36.0	38.0	27.0

* (Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals)
** Use only for off-interstate applications or mounting on bridge parapets

Note: For installations using large, heavyweight dynamic message sign cabinets, use Type III-A structures only. The cell library includes special walkway details for interior cabinet access.

4. Determine height dimensions H and A and final pipe size for each support frame using the following criteria:

   (a) Minimum vertical clearance is 17 feet 3 inches from Elevation A to sign, walkway support, or truss.

   (b) Top of foundation above grade elevation is a minimum of 2 feet and a maximum of 4 feet 6 inches for spread footings and a minimum of 2 feet and a maximum of 3 feet 6 inches for dual drilled shafts, as shown on the plans.

   (c) Use a minimum sign height of 15'-0" to calculate the end support heights. To calculate H for a span structure with walkway brackets: To Elevation A, add 17' 3", plus 1' 3" (8" for DMS), plus 7'-6" or half the height of the tallest sign (whichever is greater), plus half the truss height, plus 7 ½", minus top of foundation elevation, minus 2".

   (d) If the height dimension H exceeds the maximum end support height allowed for the selected truss design, choose a truss design with the appropriate maximum end support height. For example, if the 70 ft. span with 560 sq. ft. total sign area requires a 30 ft. maximum end support height, choose a 70 ft. span Type I-A structure using the members and foundation dimensions designed for the 90 ft. span Type I-A structure, which allows up to a 31 ft. end support height.

   There may be situations where tall signs are required and the end support is taller than the maximum height allowed for Type I-A and II-A structures. For these cases, make the following adjustments to the column wall thickness:

If a Type I-A structure requires an end support height greater than 31 feet and up to 35 feet, use 10-inch diameter by 0.365-inch wall thickness pipes for the end supports. For a Type II-A structure with a height greater than 31 feet up to 35 feet, use a pipe 10-inch diameter by 0.500-inch wall thickness.

5. With the corresponding truss type and chord size entered, select splicing flange details from the following charts:

Type I-A Truss	Use chart on page 2.1-9
Type II-A Truss	Use chart on page 2.1-11
Type III-A Truss	Use chart on page 2.1-13

Note: When completing the table on base sheet OS4-A-2 under “Splicing Flange”, “Bolts”, “No. /Splice”, enter 6 or 8.

6. Using the proposed span length, select camber at mid-span of truss from the following charts:

Type I-A Truss	Use chart on page 2.1-10
Type II-A Truss	Use chart on page 2.1-12
Type III-A Truss	Use chart on page 2.1-14

For shorter spans, not included on the camber graphs:
Minimum AASHTO Camber = L (in.)/1000.

7. Determine the number of exterior and interior truss units required. Use the minimum number of units for each truss, keeping the maximum unit length at approximately 40 feet or less. For example, use only two exterior units for a design length (L) of 80 feet, even though one or both may be slightly greater than 40 feet. Calculate exterior unit panel spacing (P) by dividing the Unit

Length (L_e) minus 22.5 inches (± 1 inch), by the number of panels. Calculate interior unit panel spacing (P) by dividing the Unit Length (L_i) minus 15 inches, by number of panels. The minimum panel spacing for all truss types is 4 feet. Maximum panel spacing is 5.0 feet for Type I-A trusses and 5 feet 6 inches for type II-A and III-A trusses.

To maintain the pattern of the vertical diagonals, single interior units must have an even number of panels per unit while exterior units may have an odd or even number of panels. When two interior units are used, each interior unit may have an odd or even number of panels, resulting in an even number for all interior units combined. For ease of fabrication and the most economical design, all panels on a truss should be the same length. Tables of recommended dimensions are on pages 2.1-15, 2.1-16 and 2.1-17. For Type III-A structures less than 100 feet in length use the Type II-A tables.

8. Obtain soil-boring data and determine the average Q_u per Section 1.6 at the bottom of the spread footing or for all strata within and below the "B" portion of the dual drilled shaft foundation. If average and minimum Q_u values meet the requirements of Section 1.6, use dimension "M" for the spread footing or the depth "B" for dual drilled shaft foundations from the selected sign structure design in the table on page 2.1-2. Dimension "N" may be determined from the spread footing foundation standards OS-F1, OS-F2, OS-F3 or OS-F4 and the soil boring data. As described in Section 1.6, if average and minimum Q_u values do not meet the requirements, the BBS must provide a special design.

9. With the information from Steps 4(b) and 8, and/or information obtained from the BBS, determine the spread footing or drilled shaft vertical limits (Elevation Top, Elevation Bottom), dimensions "M" and "N" for a spread footing foundation or dimensions "A", "B", and "F" for a dual drilled shaft foundation.

The traffic barrier shaped foundations on sheets OS4-MED or OS4-MED2 are required for all new span overhead sign structure end supports located within medians of divided highways.

10. Walkway and/or truss grating have two alternate sets of plans: 1-1/2 inch deep aluminum grating and galvanized steel plank grating. The plan preparer should consult District personnel for grating preference and select the correct sheets. Walkway grating should cover the full width of all signs and extend a minimum of 4 feet past the edge of pavement into the shoulder unless the shoulder width is less than 10 feet. If shoulder width is less than 10 feet or if the structure is on a low speed ramp, the walkway grating may begin at edge of pavement, while still covering the full width of all signs. Truss inspection grating extends full length of the truss, unless specifically exempted by the District and BBS. For projects that omit front walkway and lighting, details provide the option of plain vertical sign supports in lieu of the L-brackets.

11. For installations using large, heavy-weight dynamic message sign cabinets which require walkways for door access, use span Type III-A structures only and make the following walkway sheet substitutions:

Replace:	With:
OS-A-9 and/or OS-A-9S	OS-A-9-DMS
OS-A-10 and/or OS-A-10S	OS-A-10-DMS
OS-A-11	OS-A-11-DMS

12. If the left and right support heights on a structure are not equal, fill in two rows of the table on the “Support Frame” sheet for that structure, checking the boxes labeled “Left” and “Right” to designate each end support.

13. Include the “Damping Device” base sheet OS-A-D with all aluminum span sign structure projects.

14. Fill in all tables on applicable base sheets including sign structure number, station, height of tallest sign, total sign area, support heights and sign bracket and foundation dimensions.

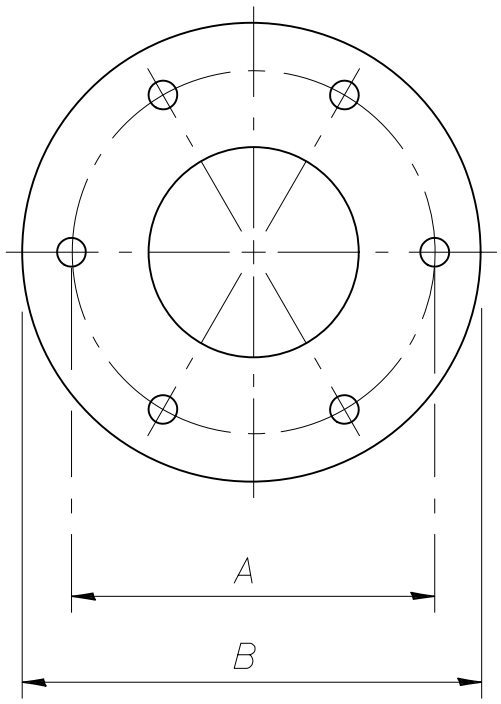
15. Calculate quantities as needed for foundations and complete the Total Bill of Material.

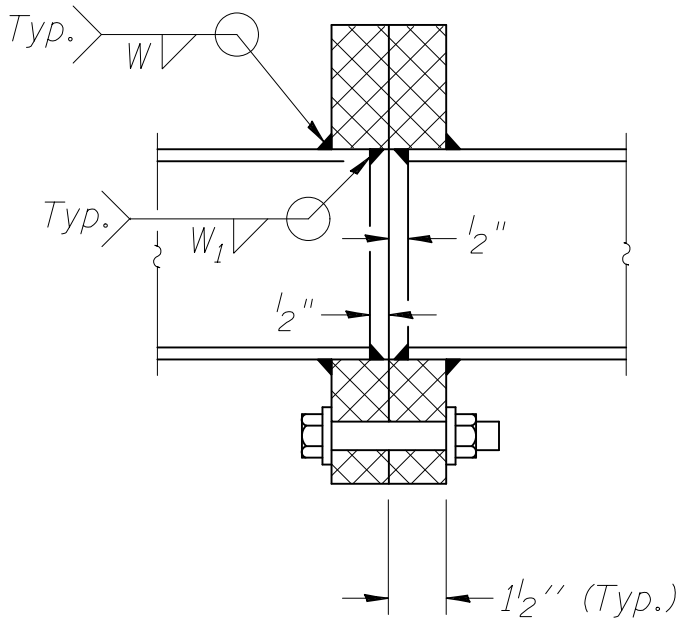
16. If the proposed structure is replacing a Vierendeel span on an existing foundation, contact the BBS for special support frame and foundation designs and details.

17. Submit proposed designs exceeding dimensional and/or loading limits to the BBS for special analysis and/or approval.

18. To provide uniformity on all aluminum span sign structure plans, place the sheets in the following order:

    General Plan and Elevation (OS-A-1)
    Aluminum Truss Details (OS-A-2 followed by OS4-A-2)
    Damping Device (OS-A-D)
    Support Frame for applicable Aluminum truss types
    Support Frame Details for applicable Aluminum truss types
    (i.e., OS-A-3 followed by OS-A-3A, OS-A-4 followed by OS-A-4A, etc.)
    Aluminum Walkway Details (OS-A-9)
    Alternate Steel Walkway Details (OS-A-9S) (optional)
    Aluminum Walkway Details (OS-A-10)
    Alternate Steel Walkway Details (OS-A-10S) (optional)
    Aluminum Handrail Details (OS-A-11)
    Foundation Details required for truss types, support frame sizes and jobsite conditions

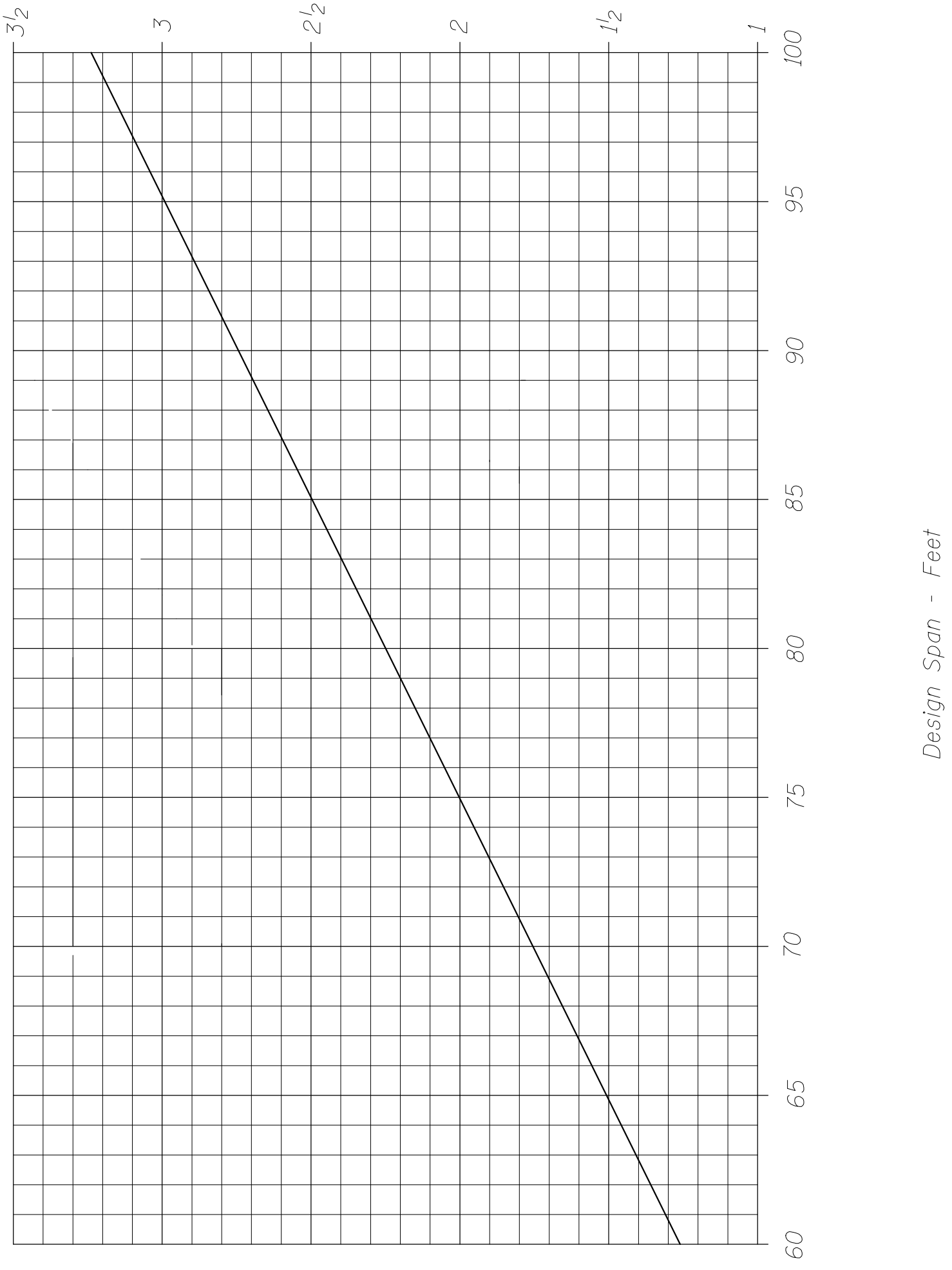




6-BOLT SPLICE

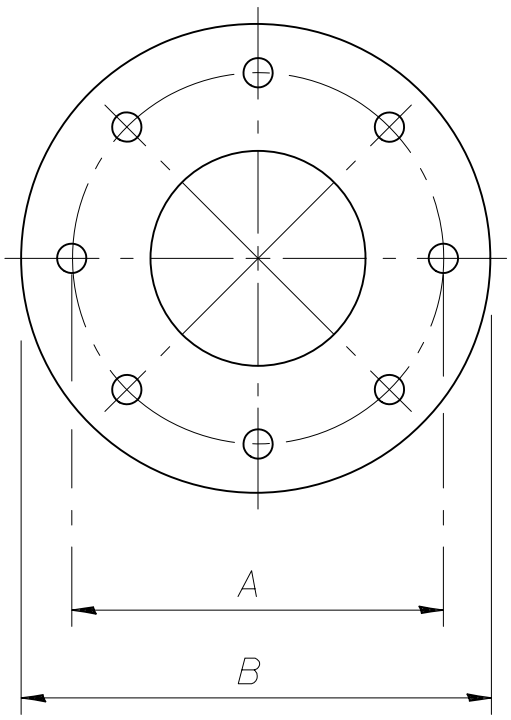
CHORD SIZE	BOLT SIZE	W	W_1	A	B
4 1/2" x 1/4"	3/4"	1/4"	3/16"	8 1/4"	11 1/4"
5" x 1/4"	7/8"	5/16"	1/4"	8 3/4"	11 3/4"
5" x 5/16"	7/8"	5/16"	1/4"	8 3/4"	11 3/4"
5 1/2" x 5/16"	7/8"	3/8"	1/4"	9 1/4"	12 1/4"

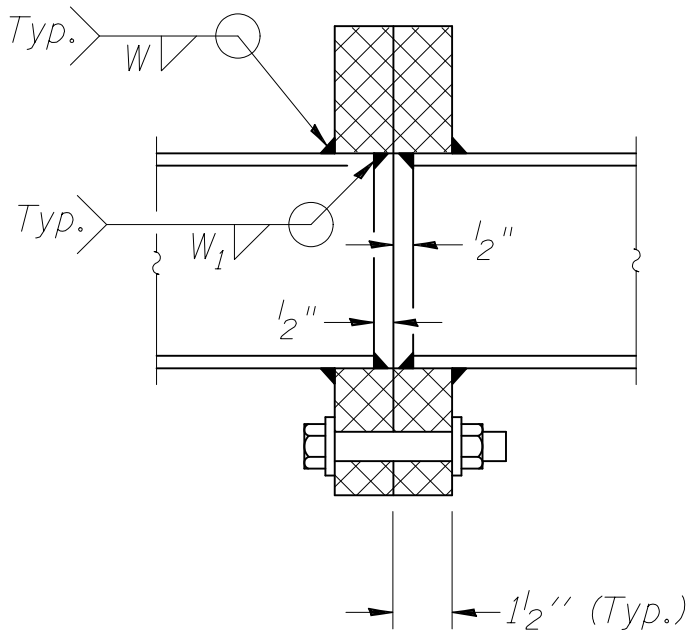
SPLICING PLATE for ALUMINUM TRUSS TYPE I-A (4'-0" x 4'-6")



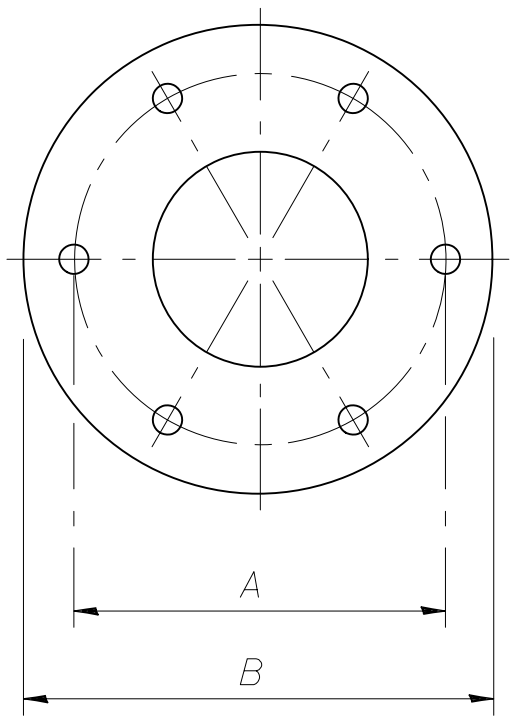
Note: For shorter spans, not included on the graph, minimum AASHTO camber = $L/1000$

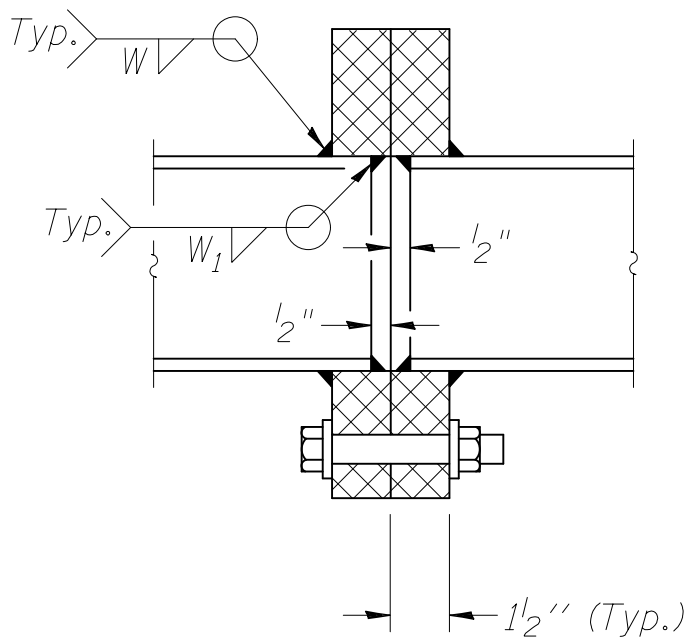
CAMBER for ALUMINUM TRUSS TYPE I-A (4′-0" x 4′-6")





8-BOLT SPLICE

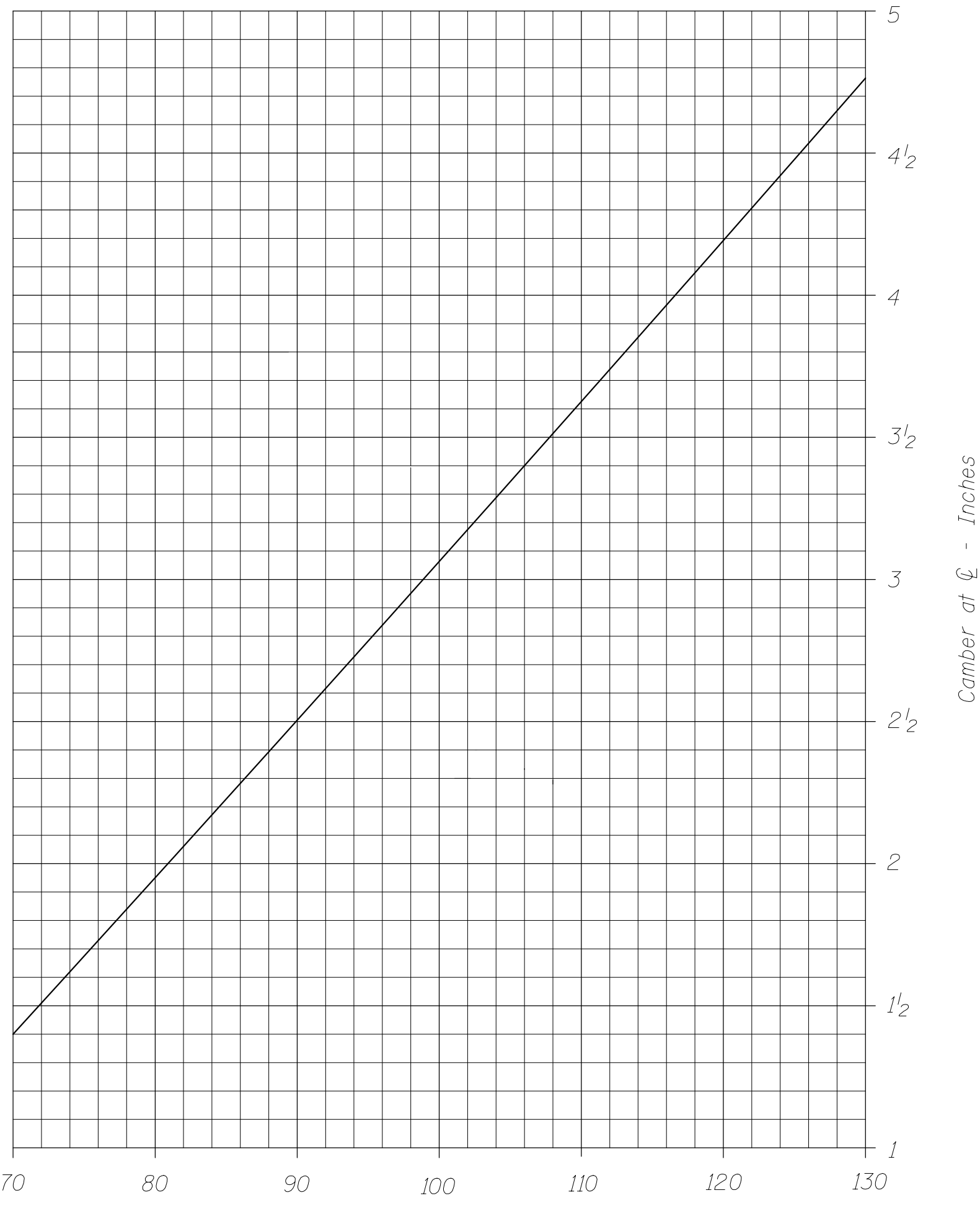




6-BOLT SPLICE

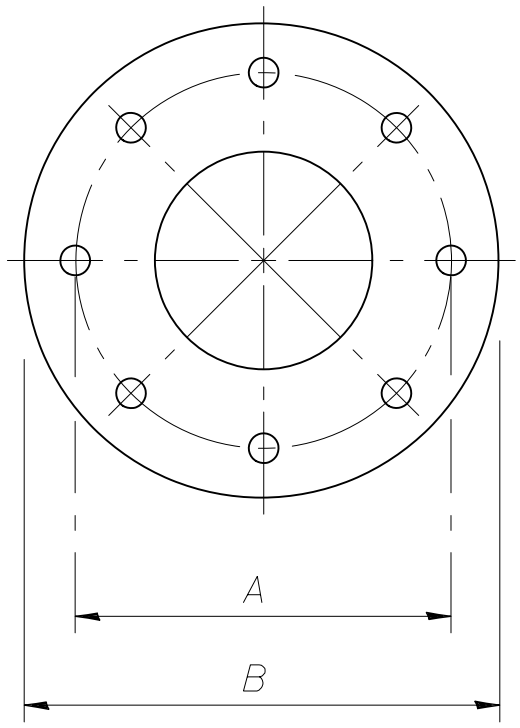
CHORD SIZE	BOLT SIZE	W	W_1	A	B	No. Bolts
5 1/2" x 5/16"	7/8"	3/8"	1/4"	9 1/4"	12 1/4"	6
6" x 5/16"	7/8"	3/8"	1/4"	10 1/4"	13 3/4"	6
6 1/2" x 5/16"	1"	3/8"	1/4"	11"	14 1/2"	6
7" x 5/16"	1"	3/8"	1/4"	11 1/2"	15 "	6
7" x 3/8"	1"	7/16"	5/16"	11 1/2"	15"	8

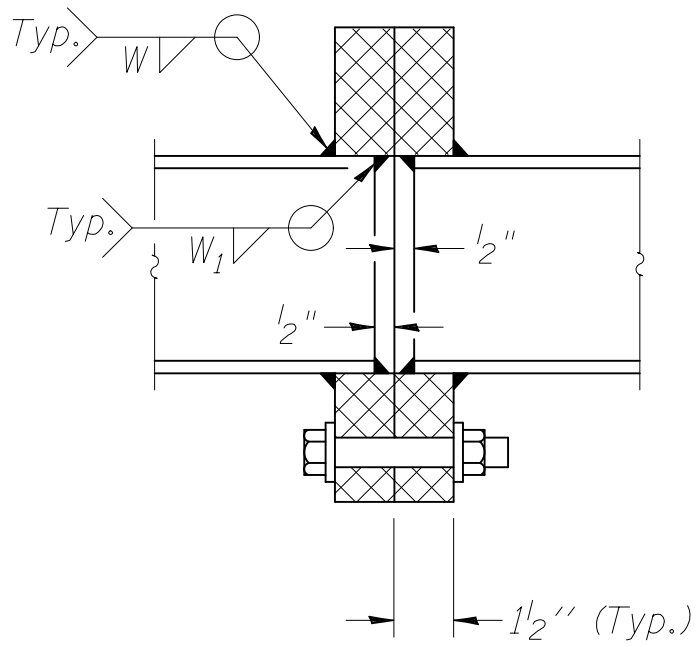
SPLICING PLATE for ALUMINUM TRUSS TYPE II-A (4'-6" x 5'-3")



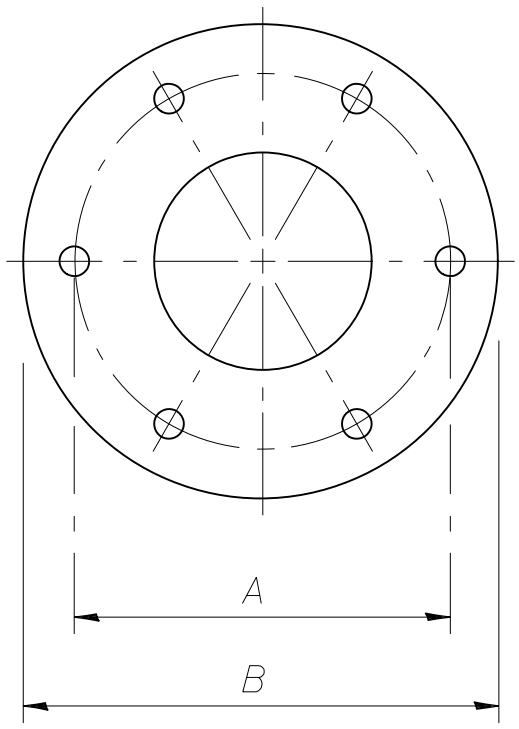
Note: For shorter spans, not included on the graph, minimum AASHTO camber = L/1000

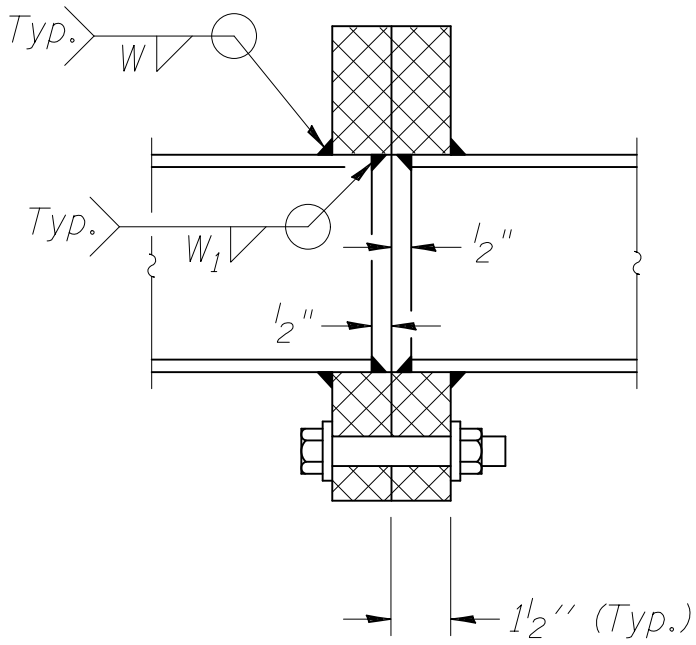
CAMBER for ALUMINUM TRUSS TYPE II-A (4'-6" x 5'-3")





8-BOLT SPLICE

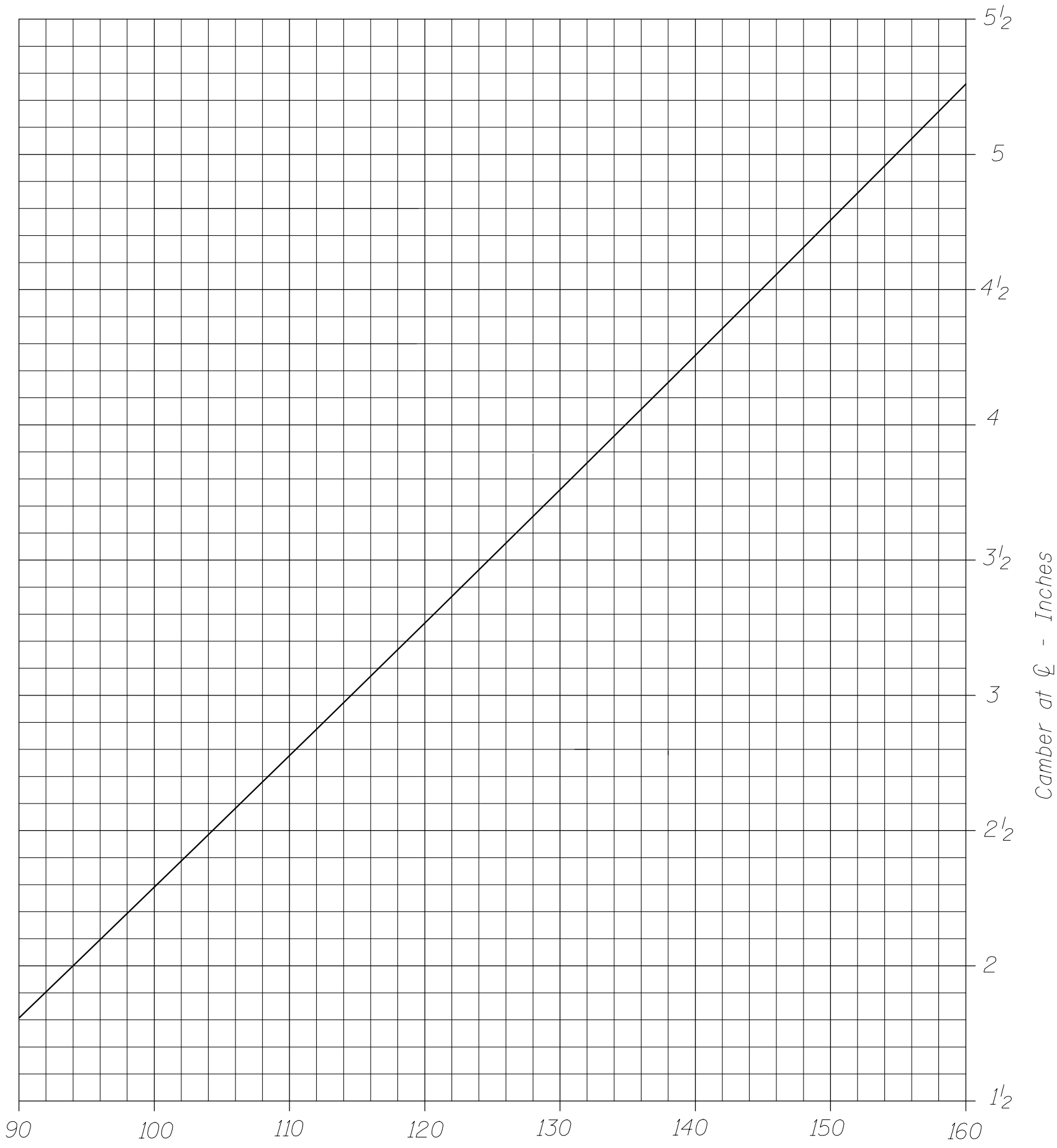




6-BOLT SPLICE

CHORD SIZE	BOLT SIZE	W	W_1	A	B	No. Bolts
7" x 5/16"	1"	7/16"	5/16"	11 1/2"	15"	6
7" x 3/8"	1"	9/16"	7/16"	11 1/2"	15"	8
7" x 1/2"	1"	9/16"	7/16"	11 1/2"	15"	8
8 1/2" x 1/2"	1 1/4"	9/16"	7/16"	13"	16 1/2"	8
9" x 1/2"	1 1/4"	9/16"	7/16"	13 1/2"	17"	8

SPLICING PLATE for ALUMINUM TRUSS TYPE III-A (5'-0" x 7'-0")



Note: For shorter spans, not included on the graph,
minimum AASHTO camber = $L/_{1000}$

CAMBER for ALUMINUM TRUSS TYPE III-A (5′-0" x 7′-0")

Recommended Dimensions

Type I-A Sign Truss

Variable End Dimension = 5 1/2" + - 1" (See sheet OS-A-2)

Truss Length (ft)	Variable End Dimension (in)	Exterior Units (2)			Interior Unit(s)			
		No. Panels Per Unit	Unit Length (L_e)	Panel Length (P)	Number Required	No. of Panels Per Unit	Unit Length (L_i)	Panel Length (P)
60	4 1/2"	6	30' - 10 1/2"	4' - 10"	0	-	-	-
61	4 1/2"	6	31' - 4 1/2"	4' - 11"	0	-	-	-
62	4 1/2"	6	31' - 10 1/2"	5' - 0"	0	-	-	-
63	6 1/2"	7	32' - 2 1/2"	4' - 4"	0	-	-	-
64	5 1/2"	7	32' - 9 1/2"	4' - 5"	0	-	-	-
65	4 1/2"	7	33' - 4 1/2"	4' - 6"	0	-	-	-
66	5 1/4"	7	33' - 9 3/4"	4' - 6 3/4"	0	-	-	-
67	6"	7	34' - 3"	4' - 7 1/2"	0	-	-	-
68	5"	7	34' - 10"	4' - 8 1/2"	0	-	-	-
69	5 3/4"	7	35' - 3 1/4"	4' - 9 1/4"	0	-	-	-
70	6 1/2"	7	35' - 8 1/2"	4' - 10"	0	-	-	-
71	5 1/2"	7	36' - 3 1/2"	4' - 11"	0	-	-	-
72	4 1/2"	7	36' - 10 1/2"	5' - 0"	0	-	-	-
73	6 1/2"	8	37' - 2 1/2"	4' - 5"	0	-	-	-
74	4 1/2"	8	37' - 10 1/2"	4' - 6"	0	-	-	-
75	6 1/2"	8	38' - 2 1/2"	4' - 6 1/2"	0	-	-	-
76	4 1/2"	8	38' - 10 1/2"	4' - 7 1/2"	0	-	-	-
77	6 1/2"	8	39' - 2 1/2"	4' - 8"	0	-	-	-
78	4 1/2"	8	39' - 10 1/2"	4' - 9"	0	-	-	-
79	5"	5	25' - 6 1/4"	4' - 8 3/4"	1	6	29' - 7 1/2"	4' - 8 3/4"
80	5"	5	25' - 10"	4' - 9 1/2"	1	6	30' - 0"	4' - 9 1/2"
81	5"	5	26' - 1 3/4"	4' - 10 1/4"	1	6	30' - 4 1/2"	4' - 10 1/4"
82	5"	5	26' - 5 1/2"	4' - 11"	1	6	30' - 9"	4' - 11"
83	5"	5	26' - 9 1/4"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
84	5 1/4"	6	28' - 9"	4' - 5 3/4"	1	6	28' - 1 1/2"	4' - 5 3/4"
85	4 1/2"	6	29' - 1 1/2"	4' - 6 1/2 "	1	6	28' - 6"	4' - 6 1/2 "
86	6"	6	29' - 4 1/2"	4' - 7"	1	6	28' - 9"	4' - 7"
87	5 1/4"	6	29' - 9"	4' - 7 3/4"	1	6	29' - 1 1/2"	4' - 7 3/4"
88	4 1/2"	6	30' - 1 1/2"	4' - 8 1/2"	1	6	29' - 6"	4' - 8 1/2"
89	6"	6	30' - 4 1/2"	4' - 9"	1	6	29' - 9"	4' - 9"
90	5 1/4"	6	30' - 9"	4' - 9 3/4"	1	6	30' - 1 1/2"	4' - 9 3/4"
91	4 1/2"	6	31' - 1 1/2"	4' - 10 1/2"	1	6	30' - 6"	4' - 10 1/2"
92	6"	6	31' - 4 1/2"	4' 11"	1	6	30' - 9"	4' 11"
93	5 1/4"	6	31' - 9"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
94	6 1/2"	7	33' - 6 1/4"	4' - 6 1/4"	1	6	28' - 4 1/2"	4' - 6 1/4"
95	5"	7	33' - 11 1/2"	4' - 7"	1	6	28' - 9"	4' - 7"
96	6"	7	34' - 3"	4' - 7 1/2"	1	6	29' - 0"	4' - 7 1/2"
97	4 1/2"	7	34' - 8 1/4"	4' - 8 1/4"	1	6	29' - 4 1/2"	4' - 8 1/4"
98	5 1/2"	7	34' - 11 3/4"	4' - 8 3/4"	1	6	29' - 7 1/2"	4' - 8 3/4"
99	6 1/2"	7	35' - 3 1/4"	4' - 9 1/4"	1	6	29' - 10 1/2"	4' - 9 1/4"
100	5"	7	35' - 8 1/2"	4' - 10"	1	6	30' - 3"	4' - 10"

Recommended Dimensions

Type II-A Sign Truss

Variable End Dimension = 5 1/2" + - 1" (See sheet OS-A-2)

Truss Length (ft)	Variable End Dimension (in)	Exterior Units (2)			Interior Unit(s)			
		No. Panels Per Unit	Unit Length (L_e)	Panel Length (P)	Number Required	No. Panels Per Unit	Unit Length (L_i)	Panel Length (P)
70	6 1/2"	7	35' - 8 1/2"	4' - 10"	0	-	-	-
71	5 1/2"	7	36' - 3 1/2"	4' - 11"	0	-	-	-
72	4 1/2"	7	36' - 10 1/2"	5' - 0"	0	-	-	-
73	5 1/4"	7	37' - 3 3/4"	5' - 0 3/4"	0	-	-	-
74	6"	7	37' - 9"	5' - 1 1/2"	0	-	-	-
75	5"	7	38' - 4"	5' - 2 1/2"	0	-	-	-
76	5 3/4"	7	38' - 9 1/4"	5' - 3 1/4"	0	-	-	-
77	6 1/2"	7	39' - 2 1/2"	5' - 4"	0	-	-	-
78	5 1/2"	7	39' - 9 1/2"	5' - 5"	0	-	-	-
79	5 3/4"	5	28' 10 1/4"	5' - 4 3/4"	1	4	22' - 10"	5' - 4 3/4"
80	6 1/2"	5	29' - 2"	5' - 5 1/2"	1	4	23' - 1"	5' - 5 1/2"
81	5"	5	26' - 1 3/4"	4' - 10 1/4"	1	6	30' - 4 1/2"	4' - 10 1/4"
82	5"	5	26' - 5 1/2"	4' - 11"	1	6	30' - 9"	4' - 11"
83	5"	5	26' - 9 1/4"	4' 11 3/4"	1	6	31' - 1 1/2"	4' 11 3/4"
84	5"	5	27' - 1"	5' - 0 1/2"	1	6	31' - 6"	5' - 0 1/2"
85	5"	5	27' - 4 3/4"	5' - 1 1/4"	1	6	31' - 10 1/2"	5' - 1 1/4"
86	5"	5	27' - 8 1/2"	5' - 2"	1	6	32' - 3"	5' - 2"
87	5"	5	28' - 0 1/4"	5' - 2 3/4"	1	6	32' - 7 1/2"	5' - 2 3/4"
88	5"	5	28' - 4"	5' - 3 1/2"	1	6	33' - 0"	5' - 3 1/2"
89	5"	5	28' - 7 3/4"	5' - 4 1/4"	1	6	33' - 4 1/2"	5' - 4 1/4"
90	5"	5	28' - 11 1/2"	5' - 5"	1	6	33' - 9"	5' - 5"
91	5"	5	29' - 3 1/4"	5' - 5 3/4"	1	6	34' - 1 1/2"	5' - 5 3/4"
92	6"	6	31' - 4 1/2"	4' - 11"	1	6	30' - 9"	4' - 11"
93	5 1/4"	6	31' - 9"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
94	4 1/2"	6	32' - 1 1/2"	5' - 0 1/2"	1	6	31' - 6"	5' - 0 1/2"
95	6"	6	32' - 4 1/2"	5' - 1"	1	6	31' - 9"	5' - 1"
96	5 1/4"	6	32' - 9"	5' - 1 3/4"	1	6	32' - 1 1/2"	5' - 1 3/4"
97	4 1/2"	6	33' - 1 1/2"	5' - 2 1/2"	1	6	32' - 6"	5' - 2 1/2"
98	6"	6	33' - 4 1/2"	5' - 3"	1	6	32' - 9"	5' - 3"
99	5 1/4"	6	33' - 9"	5' - 3 3/4"	1	6	33' - 1 1/2"	5' - 3 3/4"
100	4 1/2"	6	34' - 1 1/2"	5' - 4 1/2"	1	6	33' - 6"	5' - 4 1/2"
101	6"	6	34' - 4 1/2"	5' - 5"	1	6	33' - 9"	5' - 5"
102	4 1/2"	7	36' - 5 1/4"	4' - 11 1/4"	1	6	30' - 10 1/2"	4' - 11 1/4"
103	5 1/2"	7	36' - 8 3/4"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
104	6 1/2"	7	37' - 0 1/4"	5' - 0 1/4"	1	6	31' - 4 1/2"	5' - 0 1/4"
105	5"	7	37' - 5 1/2"	5' - 1"	1	6	31' - 9"	5' - 1"
106	6"	7	37' - 9"	5' - 1 1/2"	1	6	32' - 0"	5' - 1 1/2"
107	4 1/2"	7	38' - 2 1/4"	5' - 2 1/4"	1	6	32' - 4 1/2"	5' - 2 1/4"
108	5 1/2"	7	38' - 5 3/4"	5' - 2 3/4"	1	6	32' - 7 1/2"	5' - 2 3/4"
109	6 1/2"	7	38' - 9 1/4"	5' - 3 1/4"	1	6	32' - 10 1/2"	5' - 3 1/4"
110	5"	7	39' - 2 1/2"	5' - 4"	1	6	33' - 3"	5' - 4"
111	6"	7	39' - 6"	5' - 4 1/2"	1	6	33' - 6"	5' - 4 1/2"
112	4 1/2"	7	39' - 11 1/4"	5' - 5 1/4"	1	6	33' - 10 1/2"	5' - 5 1/4"
113	6"	8	38' - 4 1/2"	4' - 6 3/4"	1	8	37' - 9"	4' - 6 3/4"
114	6"	8	38' - 8 1/2"	4' - 7 1/4"	1	8	38' - 1"	4' - 7 1/4"
115	6"	8	39' - 0 1/2"	4' - 7 3/4"	1	8	38' - 5"	4' - 7 3/4"
116	6"	8	39' - 4 1/2"	4' - 8 1/4"	1	8	38' - 9"	4' - 8 1/4"
117	6"	8	39' - 8 1/2"	4' - 8 3/4"	1	8	39' - 1"	4' - 8 3/4"
118	6"	8	40' - 0 1/2"	4' - 9 1/4"	1	8	39' - 5"	4' - 9 1/4"
119	4 1/2"	6	30' - 6"	4' - 9 1/4"	2	6	29' - 10 1/2"	4' - 9 1/4"
120	4 1/2"	6	30' - 9"	4' - 9 3/4"	2	6	30' - 1 1/2"	4' - 9 3/4"
121	4 1/2"	6	31' - 0"	4' 10 1/4"	2	6	30' - 4 1/2"	4' 10 1/4"
122	4 1/2"	6	31' - 3"	4' - 10 3/4"	2	6	30' - 7 1/2"	4' - 10 3/4"
123	4 1/2"	6	31' - 5"	4' - 11 1/4"	2	6	30' - 10 1/2"	4' - 11 1/4"
124	4 1/2"	6	31' - 9"	4' - 11 3/4"	2	6	31' - 1 1/2"	4' - 11 3/4"
125	4 1/2"	6	32' 0 "	5' - 0 1/4"	2	6	31' - 4 1/2"	5' - 0 1/4"
126	4 1/2"	6	32' - 3"	5' - 0 3/4"	2	6	31' - 7 1/2"	5' - 0 3/4"
127	4 1/2"	6	32' - 6"	5' - 1 1/4"	2	6	31' - 10 1/2"	5' - 1 1/4"
128	4 1/2"	6	32' - 9"	5' - 1 3/4"	2	6	32' - 1 1/2"	5' - 1 3/4"
129	4 1/2"	6	33' - 0"	5' - 2 1/4"	2	6	32' - 4 1/2"	5' - 2 1/4"
130	4 1/2"	6	33' - 3"	5' - 2 3/4"	2	6	32' - 7 1/2"	5' - 2 3/4"

Recommended Dimensions

Type III-A Sign Truss

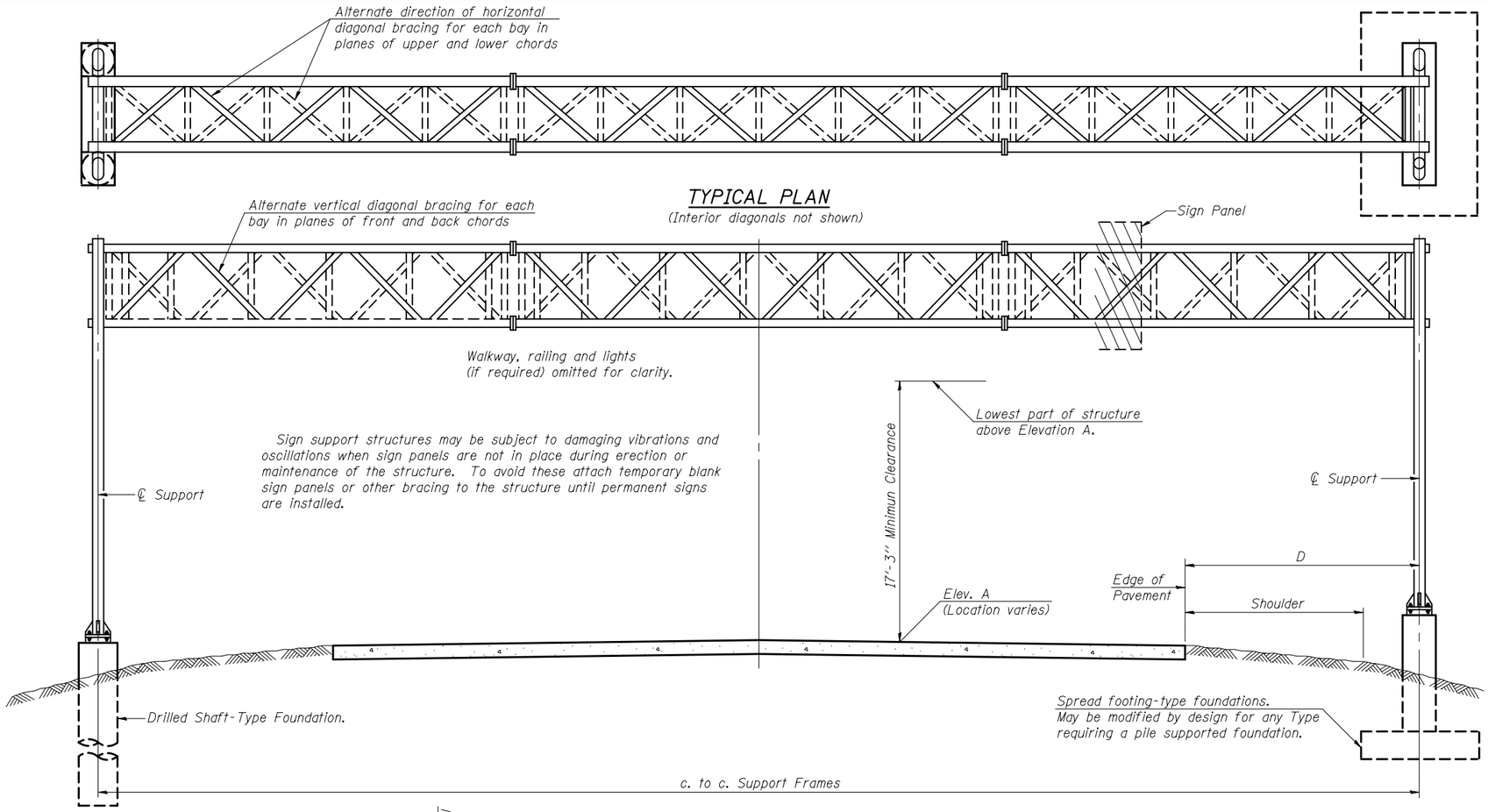
Variable End Dimension = 5 1/2" + - 1" (See sheet OS-A-2)
(For Type III-A truss lengths less than 100 feet, use Type II-A dimensions on preceding page)

Truss Length (ft)	Variable End Dimension (in)	Exterior Units (2)			Interior Unit(s)			
		No. Panels Per Unit	Unit Length (L_e)	Panel Length (P)	Number Required	No. Panels Per Unit	Unit Length (L_i)	Panel Length (P)
100	4 1/2"	6	34' - 1 1/2"	5' - 4 1/2"	1	6	33' - 6"	5' - 4 1/2"
101	6"	6	34' - 4 1/2"	5' - 5"	1	6	33' - 9"	5' - 5"
102	4 1/2"	7	36' - 5 1/4"	4' - 11 1/4"	1	6	30' - 10 1/2"	4' - 11 1/4"
103	5 1/2"	7	36' - 8 3/4"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
104	6 1/2"	7	37' - 0 1/4"	5' - 0 1/4"	1	6	31' - 4 1/2"	5' - 0 1/4"
105	5"	7	37' - 5 1/2"	5' - 1"	1	6	31' - 9"	5' - 1"
106	6"	7	37' - 9"	5' - 1 1/2"	1	6	32' - 0"	5' - 1 1/2"
107	4 1/2"	7	38' - 2 1/4"	5' - 2 1/4"	1	6	32' - 4 1/2"	5' - 2 1/4"
108	5 1/2"	7	38' - 5 3/4"	5' - 2 3/4"	1	6	32' - 7 1/2"	5' - 2 3/4"
109	6 1/2"	7	38' - 9 1/4"	5' - 3 1/4"	1	6	32' - 10 1/2"	5' - 3 1/4"
110	5"	7	39' - 2 1/2"	5' - 4"	1	6	33' - 3"	5' - 4"
111	6"	7	39' - 6"	5' - 4 1/2"	1	6	33' - 6"	5' - 4 1/2"
112	4 1/2"	7	39' - 11 1/4"	5' - 5 1/4"	1	6	33' - 10 1/2"	5' - 5 1/4"
113	6"	8	38' - 4 1/2"	4' - 6 3/4"	1	8	37' - 9"	4' - 6 3/4"
114	6"	8	38' - 8 1/2"	4' - 7 1/4"	1	8	38' - 1"	4' - 7 1/4"
115	6"	8	39' - 0 1/2"	4' - 7 3/4"	1	8	38' - 5"	4' - 7 3/4"
116	6"	8	39' - 4 1/2"	4' - 8 1/4"	1	8	38' - 9"	4' - 8 1/4"
117	6"	8	39' - 8 1/2"	4' - 8 3/4"	1	8	39' - 1"	4' - 8 3/4"
118	6"	8	40' - 0 1/2"	4' - 9 1/4"	1	8	39' - 5"	4' - 9 1/4"
119	4 1/2"	6	30' - 6"	4' - 9 1/4"	2	6	29' - 10 1/2"	4' - 9 1/4"
120	4 1/2"	6	30' - 9"	4' - 9 3/4"	2	6	30' - 1 1/2"	4' - 9 3/4"
121	4 1/2"	6	31' - 0"	4' - 10 1/4"	2	6	30' - 4 1/2"	4' - 10 1/4"
122	4 1/2"	6	31' - 3"	4' - 10 3/4"	2	6	30' - 7 1/2"	4' - 10 3/4"
123	4 1/2"	6	31' - 6"	4' - 11 1/4"	2	6	30' - 10 1/2"	4' - 11 1/4"
124	4 1/2"	6	31' - 9"	4' - 11 3/4"	2	6	31' - 1 1/2"	4' - 11 3/4"
125	4 1/2"	6	32' - 0"	5' - 0 1/4"	2	6	31' - 4 1/2"	5' - 0 1/4"
126	4 1/2"	6	32' - 3"	5' - 0 3/4"	2	6	31' - 7 1/2"	5' - 0 3/4"
127	4 1/2"	6	32' - 6"	5' - 1 1/4"	2	6	31' - 10 1/2"	5' - 1 1/4"
128	4 1/2"	6	32' - 9"	5' - 1 3/4"	2	6	32' - 1 1/2"	5' - 1 3/4"
129	4 1/2"	6	33' - 0"	5' - 2 1/4"	2	6	32' - 4 1/2"	5' - 2 1/4"
130	4 1/2"	6	33' - 3"	5' - 2 3/4"	2	6	32' - 7 1/2"	5' - 2 3/4"
131	4 1/2"	6	33' - 6"	5' - 3 1/4"	2	6	32' - 10 1/2"	5' - 3 1/4"
132	4 1/2"	6	33' - 9"	5' - 3 3/4"	2	6	33' - 1 1/2"	5' - 3 3/4"
133	4 1/2"	6	34' - 0"	5' - 4 1/4"	2	6	33' - 4 1/2"	5' - 4 1/4"
134	4 1/2"	6	34' - 3"	5' - 4 3/4"	2	6	33' - 7 1/2"	5' - 4 3/4"
135	4 1/2"	6	34' - 6"	5' - 5 1/4"	2	6	33' - 10 1/2"	5' - 5 1/4"
136	4 1/2"	6	34' - 9"	5' - 5 3/4"	2	6	34' - 1 1/2"	5' - 5 3/4"
137	6 1/2"	6	32' - 4 1/2"	5' - 1"	2	7	36' - 10"	5' - 1"
138	6"	6	32' - 7 1/2"	5' - 1 1/2"	2	7	37' - 1 1/2"	5' - 1 1/2"
139	5 1/2"	6	32' - 10 1/2"	5' - 2"	2	7	37' - 5"	5' - 2"
140	5"	6	33' - 1 1/2"	5' - 2 1/2"	2	7	37' - 8 1/2"	5' - 2 1/2"
141	4 1/2"	6	33' - 4 1/2"	5' - 3"	2	7	38' - 0"	5' - 3"
142	5 5/8"	6	33' - 6 3/4"	5' - 3 3/8"	2	7	38' - 2 5/8"	5' - 3 3/8"
143	5 1/8"	6	33' - 9 3/4"	5' - 3 7/8"	2	7	38' - 6 1/4"	5' - 3 7/8"
144	6 1/4"	6	34' - 0"	5' - 4 1/4"	2	7	38' - 8 3/4"	5' - 4 1/4"
145	5 3/4"	6	34' - 3"	5' - 4 3/4"	2	7	39' - 0 1/4"	5' - 4 3/4"
146	5 1/4"	6	34' - 6"	5' - 5 1/4"	2	7	39' - 3 3/4"	5' - 5 1/4"
147	4 3/4"	6	34' - 9"	5' - 5 3/4"	2	7	39' - 7 1/4"	5' - 5 3/4"
148	4 1/2"	7	37' - 9"	5' - 1 1/2"	2	7	37' - 1 1/2"	5' - 1 1/2"
149	5 1/4"	7	37' - 11 5/8"	5' - 1 7/8"	2	7	37' - 4 1/8"	5' - 1 7/8"
150	6"	7	38' - 2 1/4"	5' - 2 1/4"	2	7	37' - 6 3/4"	5' - 2 1/4"
151	5"	7	38' - 5 3/4"	5' - 2 3/4"	2	7	37' - 10 1/4"	5' - 2 3/4"
152	5 3/4"	7	38' - 8 3/8"	5' - 3 1/8"	2	7	38' - 0 7/8"	5' - 3 1/8"
153	6 1/2"	7	38' - 11"	5' - 3 1/2"	2	7	38' - 3 1/2"	5' - 3 1/2"
154	5 1/2"	7	39' - 2 1/2"	5' - 4"	2	7	38' - 7"	5' - 4"
155	4 1/2"	7	39' - 6"	5' - 4 1/2"	2	7	38' - 10 1/2"	5' - 4 1/2"
156	5 1/4"	7	39' - 8 5/8"	5' - 4 7/8"	2	7	39' - 1 1/8"	5' - 4 7/8"
157	6"	7	39' - 11 1/4"	5' - 5 1/4"	2	7	39' - 3 3/4"	5' - 5 1/4"
158	4 7/8"	6	32' - 3 3/4"	5' - 0 7/8"	3	6	31' - 8 1/4"	5' - 0 7/8"
159	5 1/4"	6	32' - 6"	5' - 1 1/4"	3	6	31' - 10 1/2"	5' - 1 1/4"
160	5 5/8"	6	32' - 8 1/4"	5' - 1 5/8"	3	6	32' - 0 3/4"	5' - 1 5/8"

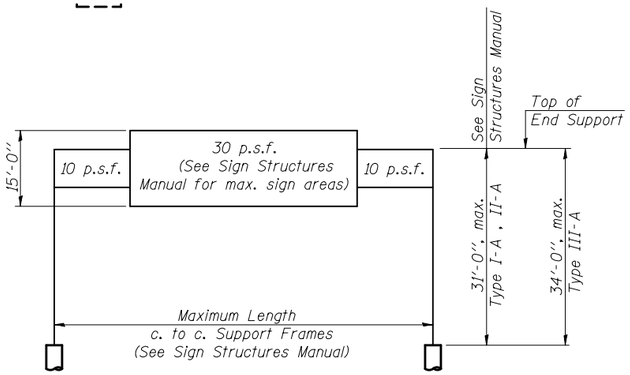
Aluminum Span Sign Structure Base Sheets

U. S. Standard Units

SHEET	TITLE
OS - A - 1	General Plan, Aluminum Truss & Steel Supports
OS - A - 2	Aluminum Truss Details Truss Type I-A, II-A, & III-A
OS4 - A - 2	Aluminum Truss Details Truss Type I-A, II-A, & III-A
OS - A - D	Damping Device
OS - A - 3	6” Dia. Pipe Support Frame for Type I-A Aluminum Truss
OS - A - 3A	6” Dia. Pipe Support Frame Details
OS - A - 4	8” Dia. Pipe Support Frame for Aluminum Truss
OS - A - 4A	8” Dia. Pipe Support Frame Details
OS - A - 6	10” Dia. Pipe Support Frame for Aluminum Truss
OS - A - 6A	10” Dia. Pipe Support Frame Details
OS4 - A- 8a	12” Dia. Pipe Support Frame for Type III-A Aluminum Truss
OS4 - A - 8aA	12” Dia. Pipe Support Frame Details
OS - A - 9	Aluminum Walkway Details
OS - A - 9 - DMS	Alternate Aluminum Walkway Details for DMS
OS - A - 9S	Alternate Steel Walkway Details
OS - A - 10	Aluminum Walkway Details
OS - A – 10 - DMS	Alternate Aluminum Walkway Details for DMS
OS - A - 10S	Alternate Steel Walkway Details
OS - A - 11	Aluminum Handrail Details
OS - A – 11 - DMS	Alternate Aluminum Handrail Details for DMS
OS - F1	Foundation Details (6” Dia. Pipe, Spread Footing)
OS - F2	Foundation Details (8” Dia. Pipe, Spread Footing)
OS - F3	Foundation Details (10” Dia. Pipe, Spread Footing)
OS – F4	Foundation Details (12” Dia. Pipe, Spread Footing)
OS4 - F1	Foundation Details (6” Dia. Pipe, Drilled Shaft)
OS4 - F2	Foundation Details (8” Dia. Pipe, Drilled Shaft)
OS4 - F3	Foundation Details (10” Dia. Pipe, Drilled Shaft)
OS4 - F4	Foundation Details (12” Dia. Pipe, Drilled Shaft)
OS4 – MED	Median Support Foundation Details
OS4 – MED2	Median Support Foundation Details



TYPICAL PLAN
(Interior diagonals not shown)



DESIGN WIND LOADING DIAGRAM

Parameters shown are basis for I.D.O.T. Standards and Sign Manual Tables. Installations not within dimensional limits shown require special analysis for all components.

TYPICAL ELEVATION
(Looking at Face of Signs**)

Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

Structure Number	Station	Design Truss Type	c. to c. Supports	Elev. A	Dim. D	Height of Tallest Sign	Total Sign Area

**Looking upstation for structures with signs both sides.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES:
Field Units
f'c = 3,500 p.s.i.
fy = 60,000 p.s.i. (reinforcement)

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.

MATERIALS: Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53. All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W*. 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.

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.

U-BOLTS AND 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 lock nut.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for Concrete Foundations and Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE SPAN TYPE I-A	Foot	
OVERHEAD SIGN STRUCTURE SPAN TYPE II-A	Foot	
OVERHEAD SIGN STRUCTURE SPAN TYPE III-A	Foot	
OVERHEAD SIGN STRUCTURE WALKWAY TYPE A	Foot	
CONCRETE FOUNDATIONS	Cu. Yds.	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

OS-A-1 6-1-12

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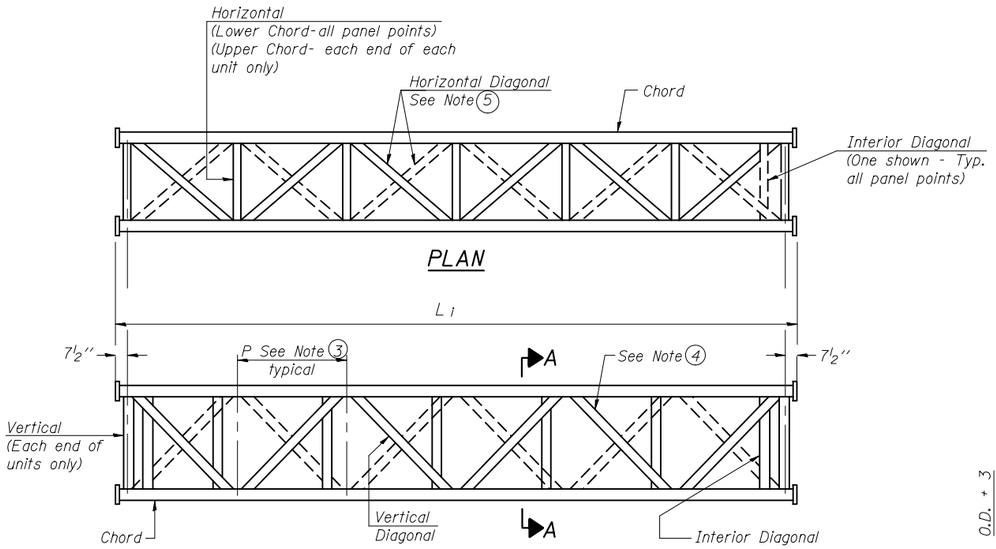
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – GENERAL PLAN & ELEVATION – ALUMINUM TRUSS & STEEL SUPPORTS

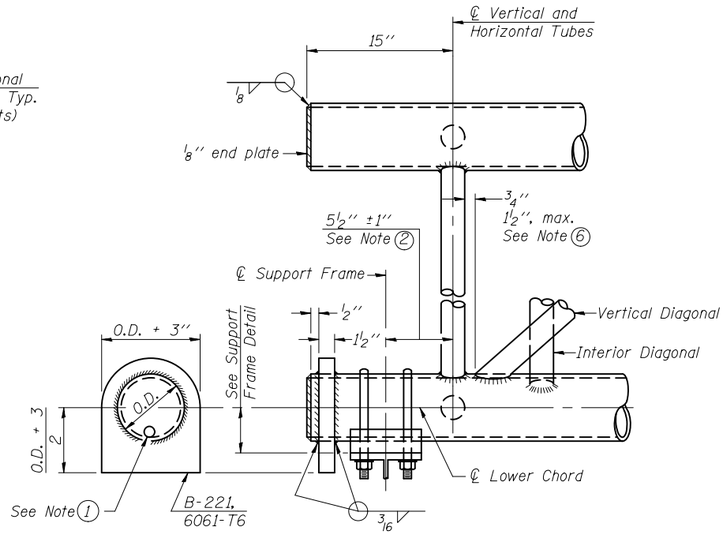
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

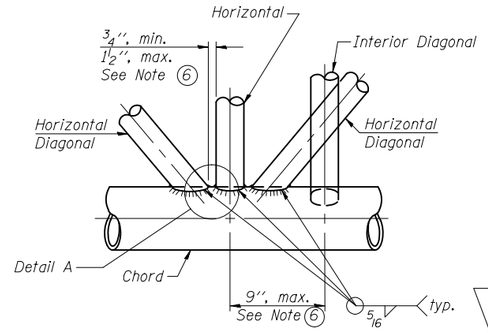


ELEVATION
TYPICAL INTERIOR UNIT

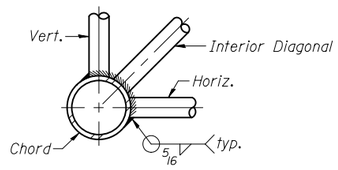
Even number of panels/interior unit required.

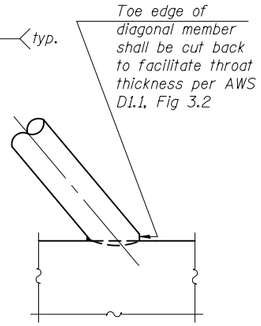


SUPPORT END DETAIL FOR EXTERIOR UNIT

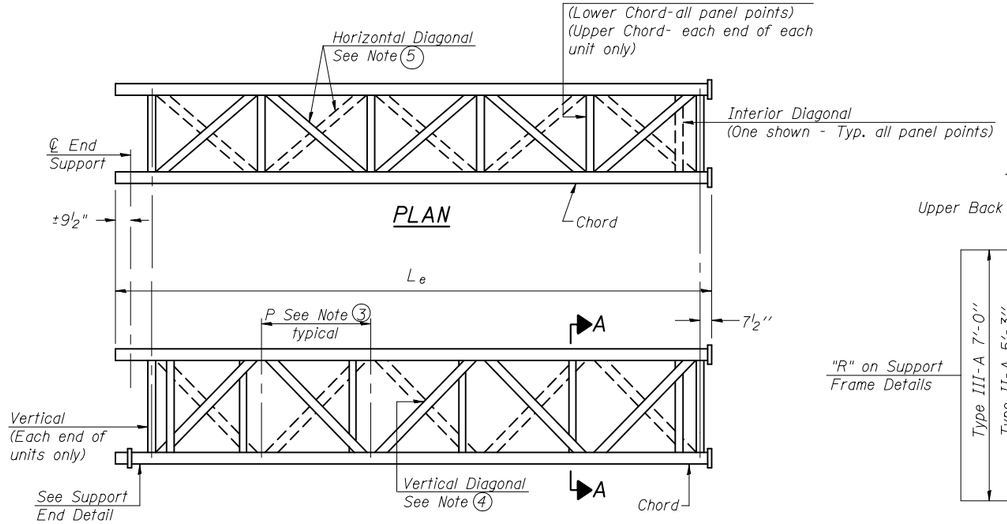


TYPICAL JOINT DETAILS



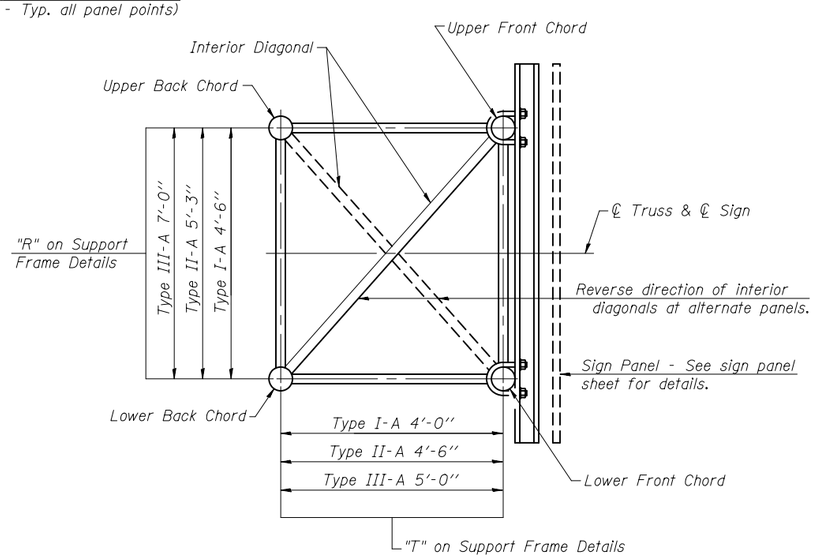


DETAIL A



ELEVATION
TYPICAL EXTERIOR UNIT

Even or odd number of panels/exterior units allowed.



SECTION A-A

1. Contractor may alternatively use standard aluminum drive-fit cap to close end. ½" ϕ drain hole in end plate/drive-fit cap. (Typ. at ends of all chords)
2. 5½" end dimension may vary by ±1" to provide uniform panel spacing (P).
3. Panel spacing (P) shall be uniform for entire truss and between 4'-0" and 5'-0" for Type I-A or 4'-0" and 5'-6" for Types II-A and III-A.
4. Vertical Diagonals in front and back face shall alternate.
5. Hidden lines show wind bracing alternates direction between planes of top and bottom chords.
6. All diagonals shall be detailed for minimum offset from the panel point based on the following: Offset shall be such as to provide a ¾" minimum to 1½" maximum clearance between any diagonal and any horizontal or vertical member, and to provide clearance for U-bolt connections of signs or walkway brackets.

OS-A-2 6-1-12

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

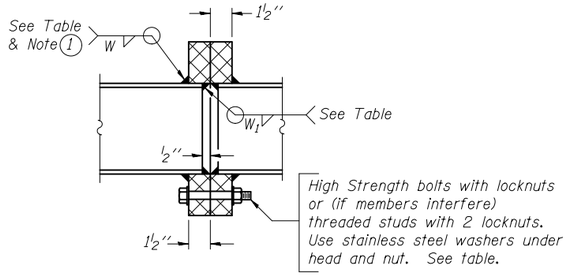
OVERHEAD SIGN STRUCTURES – ALUMINUM TRUSS
DETAILS FOR TRUSS TYPES I–A, II–A AND III–A

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

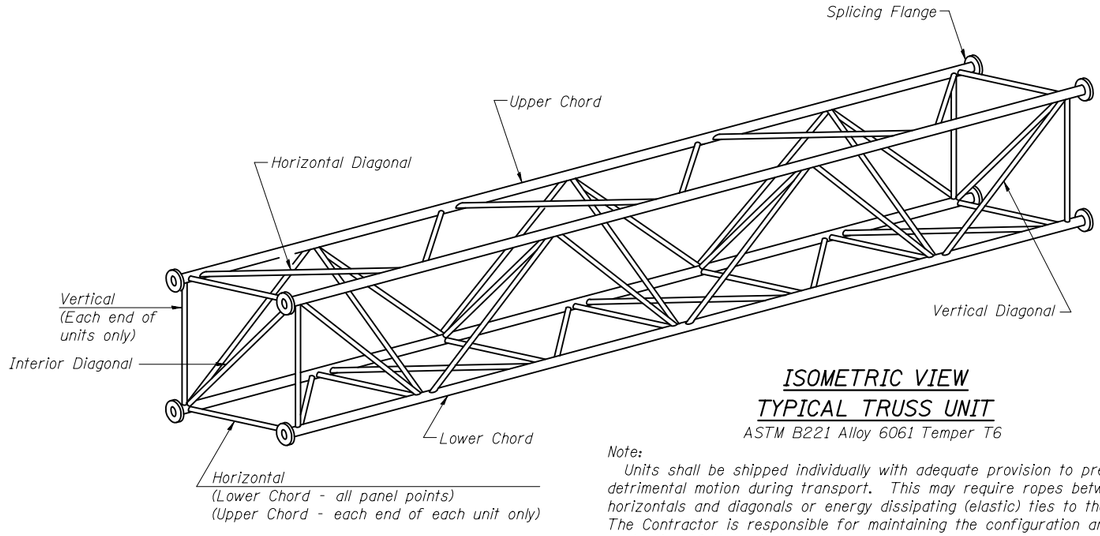
TRUSS UNIT TABLE

Structure Number	Station	Design Truss Type	Exterior Units (2)			Interior Unit				Upper & Lower Chord		Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals		Camber at Midspan	Splicing Flange					
			No. Panels per Unit	Unit Lgth.(L_e)	Panel Lgth.(P)	No. Req'd.	No. Panels per Unit	Unit Lgth.(L_I)	Panel Lgth.(P)	O.D.	Wall	O.D.	Wall		Bolts		Weld Sizes		A	B
															No./Splice	Dia.	W	W_1		



SECTION B-B

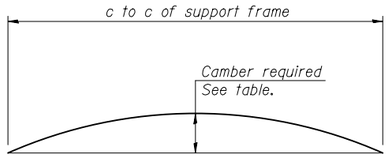
(1) Splicing Flanges shall be attached to each truss unit with the truss shop assembled to camber shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external welds or tacks shall be made to secure flanges until remaining welds are made after disassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.



ISOMETRIC VIEW
TYPICAL TRUSS UNIT

ASTM B221 Alloy 6061 Temper T6

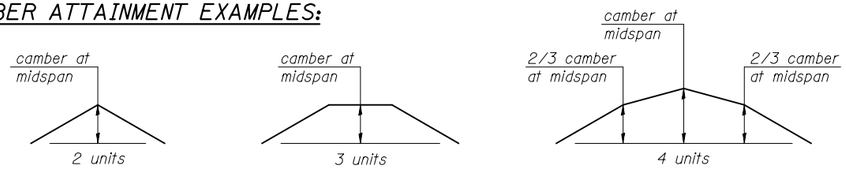
Note:
Units shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The Contractor is responsible for maintaining the configuration and protection of the units.



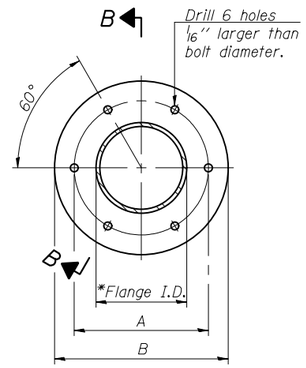
CAMBER DIAGRAM

Camber curve shown is theoretical. Actual camber attained by slope changes at splices between units.

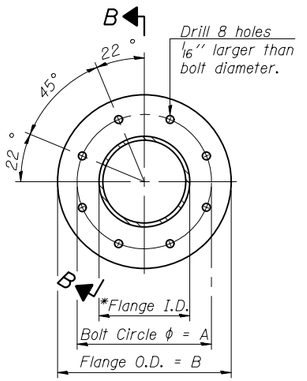
CAMBER ATTAINMENT EXAMPLES:



Camber shown is for fabrication only, measured with truss fully supported. (No-load condition)



TRUSS TYPES I-A, II-A, & III-A



TRUSS TYPES II-A & III-A

SPLICING FLANGES

ASTM B221, Alloy 6061-T6
or ASTM B209, Alloy 6061-T651
*To fit O.D. of Chord with maximum gap of 1/16''.

OS4-A-2 6-1-12

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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – ALUMINUM TRUSS DETAILS FOR TRUSS TYPES I–A, II–A AND III–A

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

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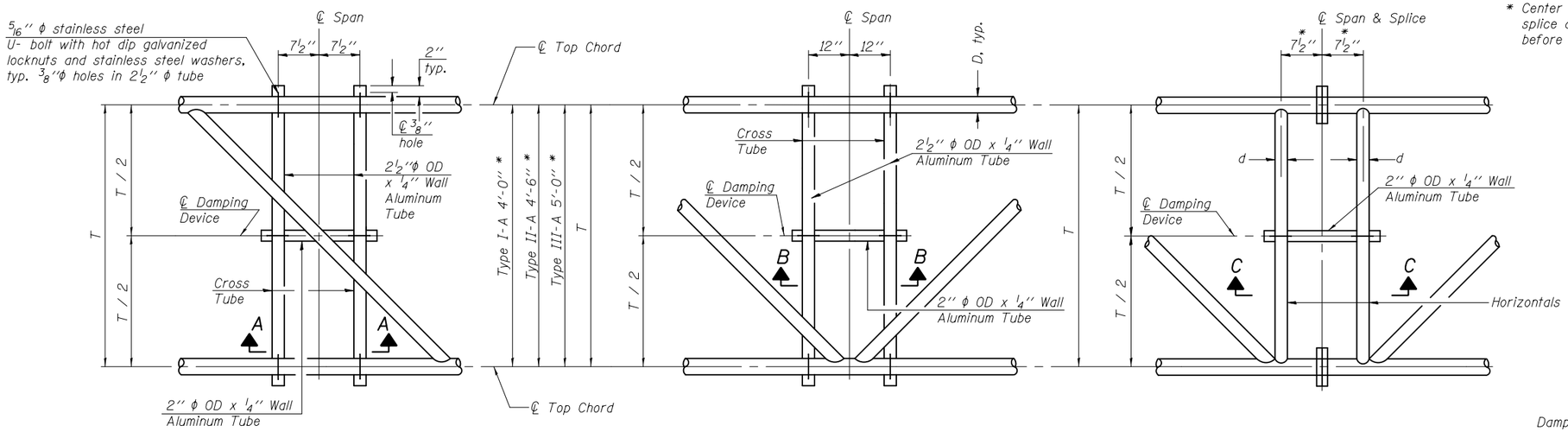


* Center of horizontal to center of splice dimension may vary. Verify before drilling holes in mounting tube.

PLAN DETAIL "A"
℄ Span between Panel Points

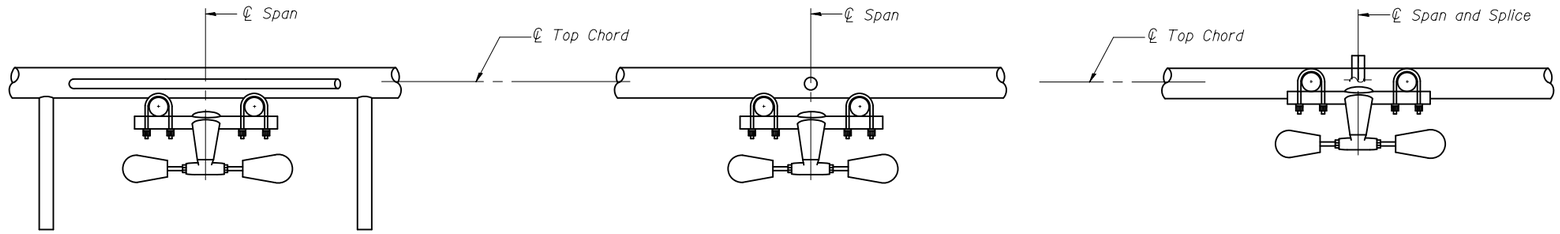
PLAN DETAIL "B"
℄ Span at Panel Point

PLAN DETAIL "C"
℄ Span at ℄ Chord Splice

NOTES

Damper: One damper per truss. (31 lbs. minimum Stockbridge-Type Aluminum - 29" minimum between ends of weights) Cost included in Overhead Sign Structure...

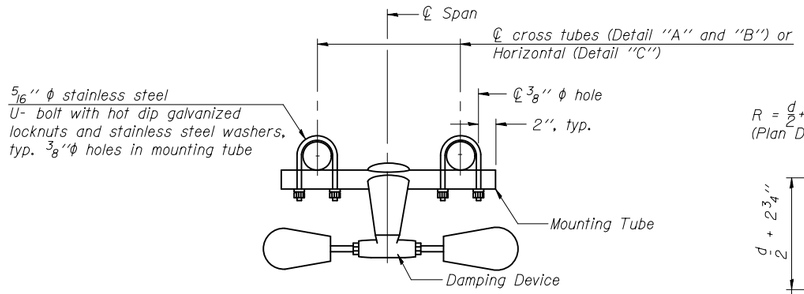
Materials: Materials: Aluminum tubes shall be ASTM B221 alloy 6061 temper T6. Cost included in Overhead Sign Structure...



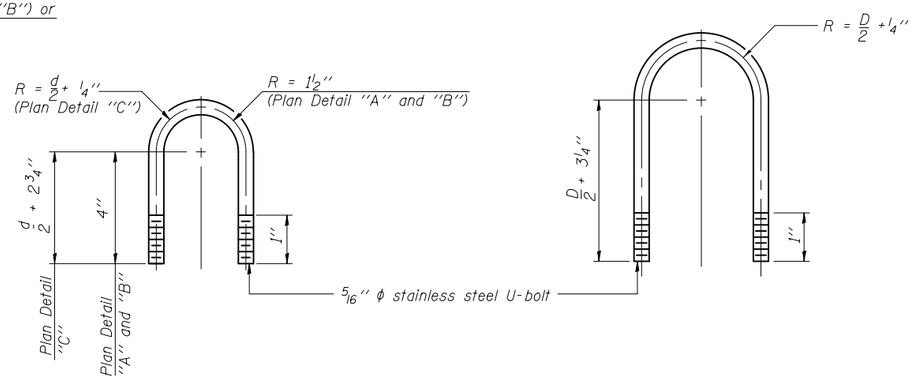
SECTION A-A

SECTION B-B

SECTION C-C

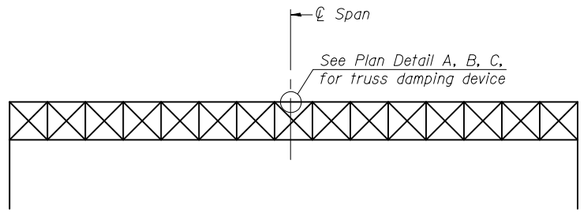


TRUSS DAMPING DEVICE CONNECTION DETAIL
(Typical)



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL
(Typical)

TOP CHORD TO CROSS TUBE U-BOLT DETAIL
(Typical - Detail "A" and "B")



ELEVATION
Aluminum Overhead Sign Truss

OS-A-D 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
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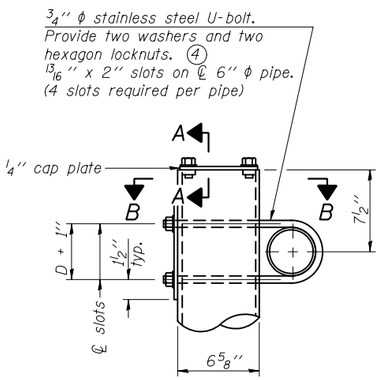
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

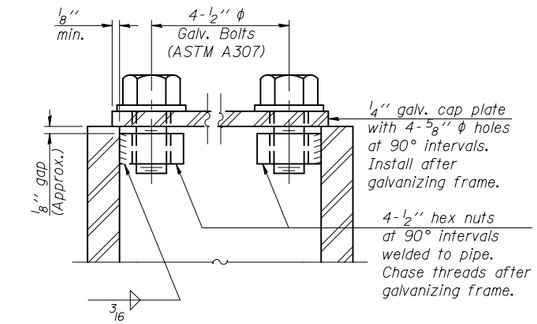
OVERHEAD SIGN STRUCTURE
DAMPING DEVICE
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.
ILLINOIS FED. AID PROJECT

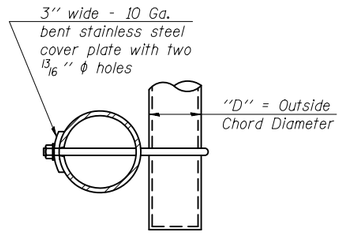


DETAIL A

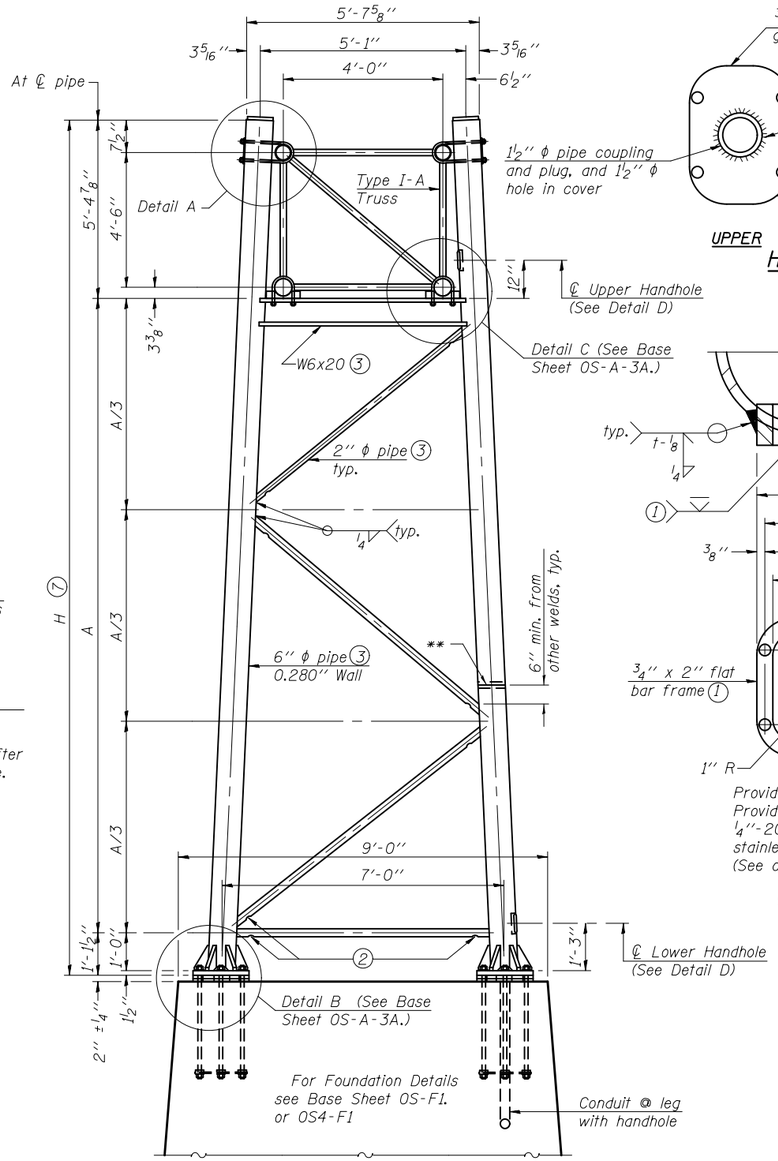


SECTION A-A

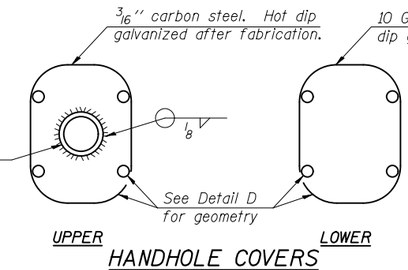
As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.



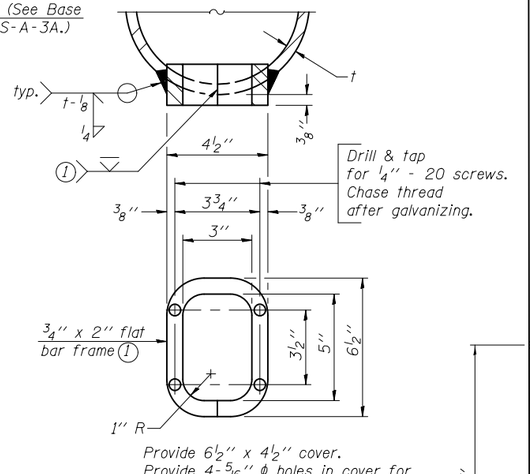
SECTION B-B



SIDE ELEVATION

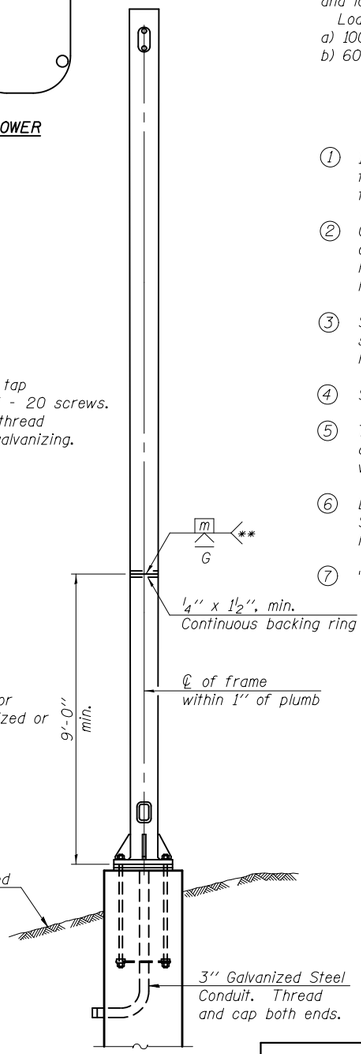


HANDHOLE COVERS



Provide 6½" x 4½" cover.
Provide 4-5/16" ϕ holes in cover for 1/4"-20 round head hot dip galvanized or stainless steel machine screws.
(See cover details)

DETAIL D



END ELEVATION

Support Design Loads: See Base Sheet OS-A-1 for design and loading criteria.
Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

(1) 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.

(2) Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.

(3) Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-A-1.

(4) See General Notes for fasteners.

(5) This standard may be utilized for special short-span and/or short end support applications subject to verification of maximum loads and capacities by the designer.

(6) Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.

(7) "H" based on 15'-0" or actual sign height, whichever is greater.

6"ϕ PIPE TRUSS SUPPORT DETAILS

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Structure Number	Station	Support Left	Support Right	H (7)	A

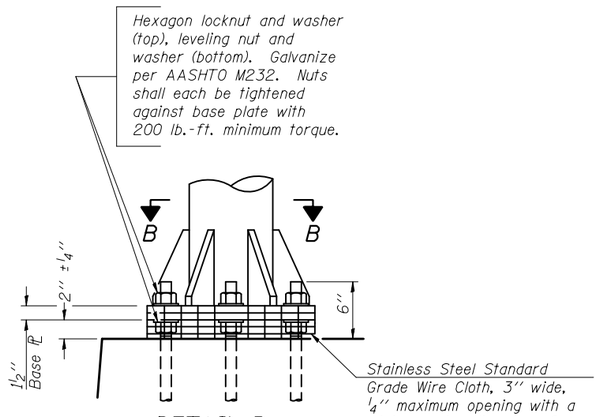
OS-A-3 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

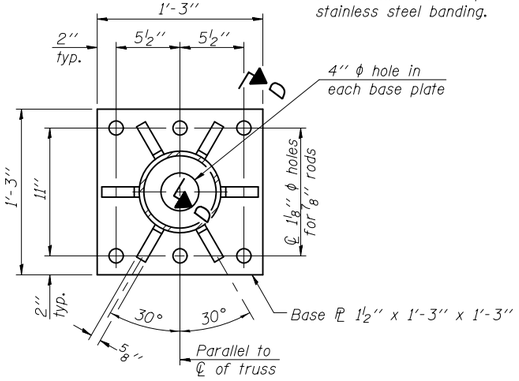
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR TYPE I-A ALUMINUM TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

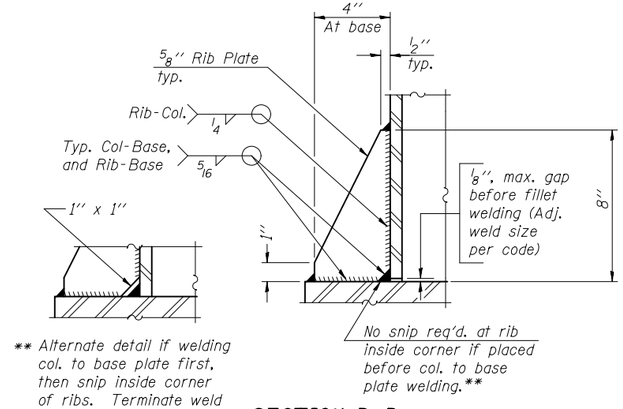


DETAIL B

Ribs shall be cut to fit slope of pipe.

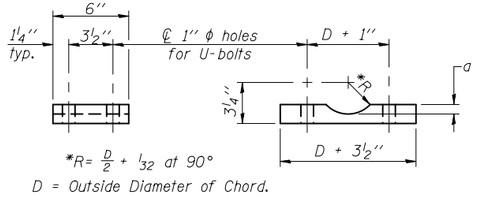


SECTION B-B



** Alternate detail if welding col. to base plate first, then snip inside corner of ribs. Terminate weld on rib 1/4'' from snip.

SECTION D-D



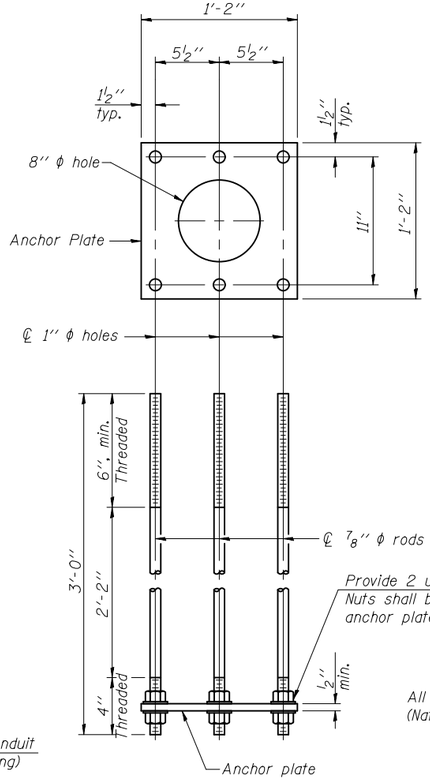
*R = D/2 + 1/32 at 90°

D = Outside Diameter of Chord.

SADDLE SHIM DETAIL

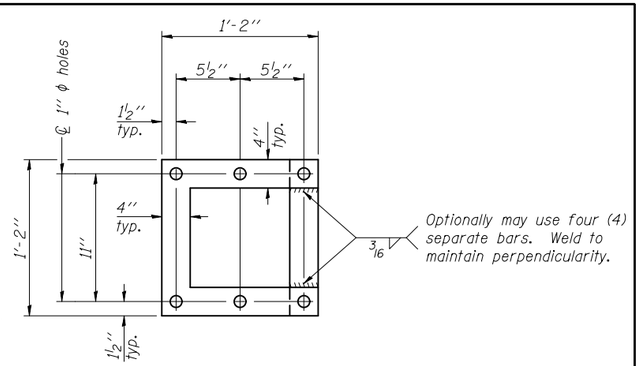
ASTM B26 Alloy 356-F
or
ASTM B209 Alloy 6061-T651
(4 required per sign truss)

Truss Chord Nominal Dia.	a
4 1/2''	11/16''
5''	3/4''
5 1/2''	13/16''

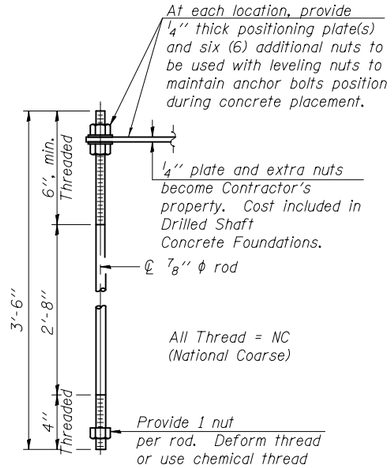


ANCHOR ROD DETAIL

Spread Footing Foundation



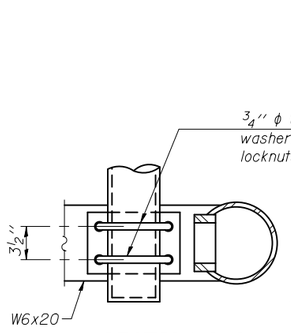
POSITIONING PLATE(S)



ANCHOR ROD DETAIL

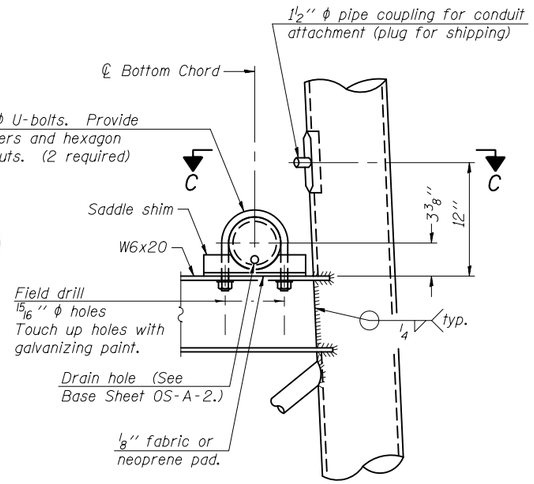
Drilled Shaft Foundation

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



SECTION C-C

(Handhole cover not shown)



DETAIL C

TYPE I-A TRUSS
6'' ϕ PIPE SUPPORT FRAME DETAILS

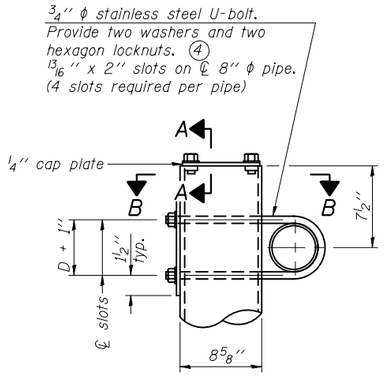
OS-A-3A 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

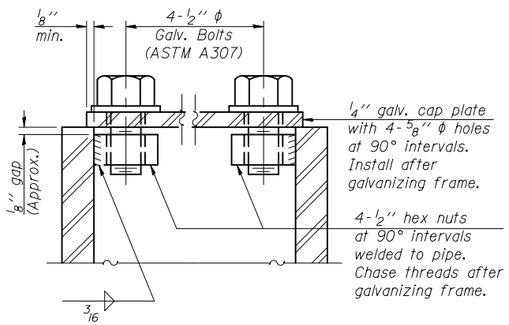
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SUPPORT FRAME DETAILS ALUMINUM TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

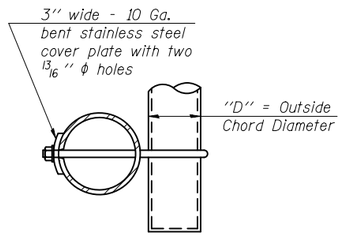


DETAIL A

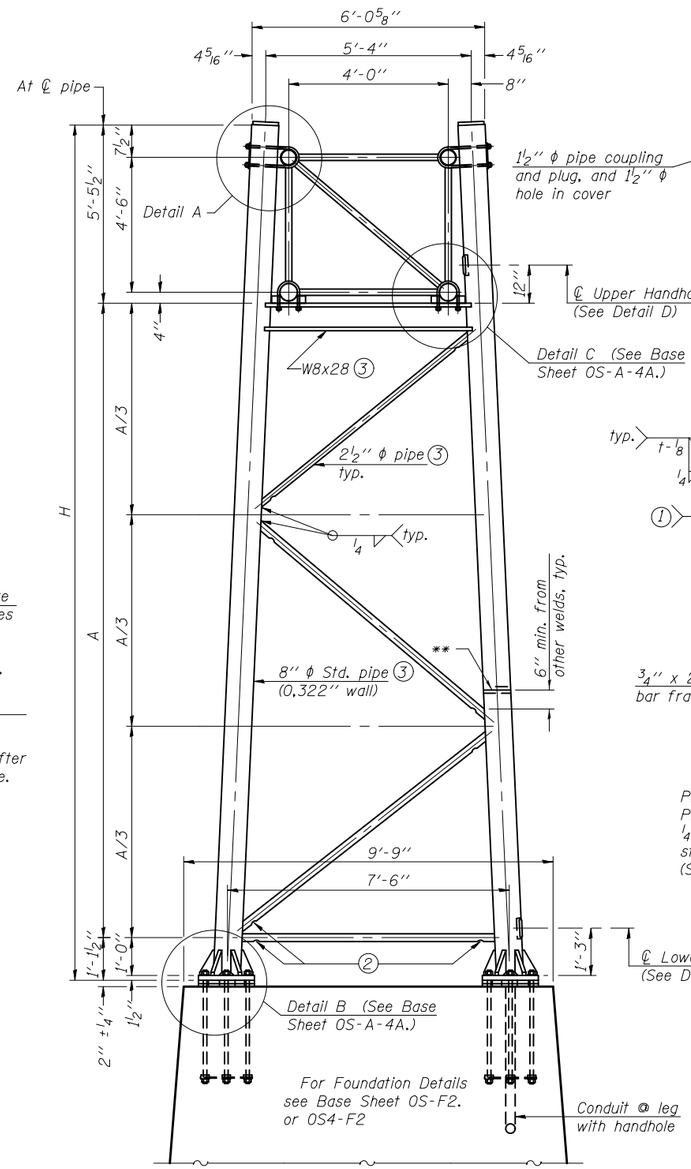


SECTION A-A

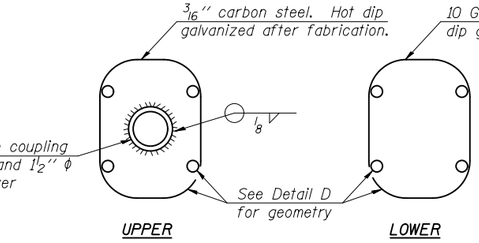
As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.



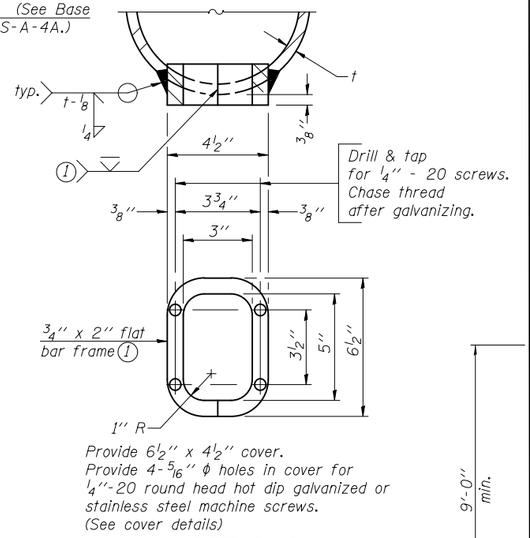
SECTION B-B



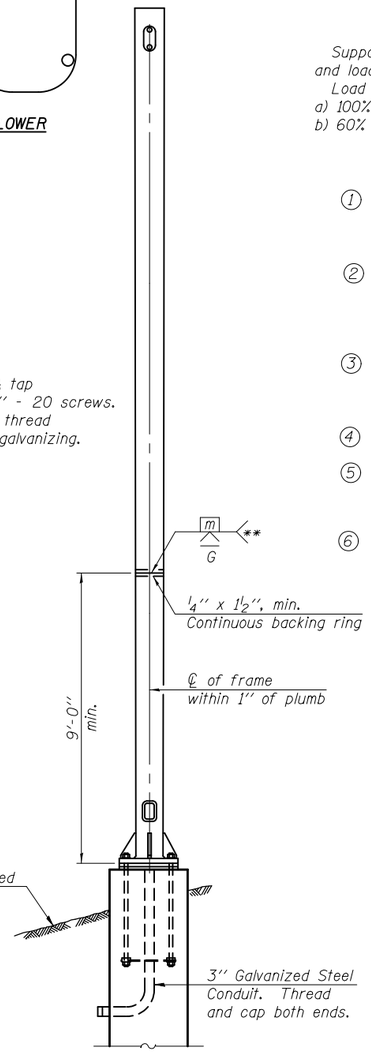
SIDE ELEVATION



HANDHOLE COVERS



DETAIL D



END ELEVATION

Support Design Loads: See Base Sheet OS-A-1 for design and loading criteria.
Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

(1) 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.

(2) Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.

(3) Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-A-1.

(4) See General Notes for fasteners.

(5) Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.

(6) "H" based on 15'-0" or actual sign height, whichever is greater.

8" ϕ PIPE TRUSS SUPPORT FRAME

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Structure Number	Station	Support Left	Support Right	H (6)	A

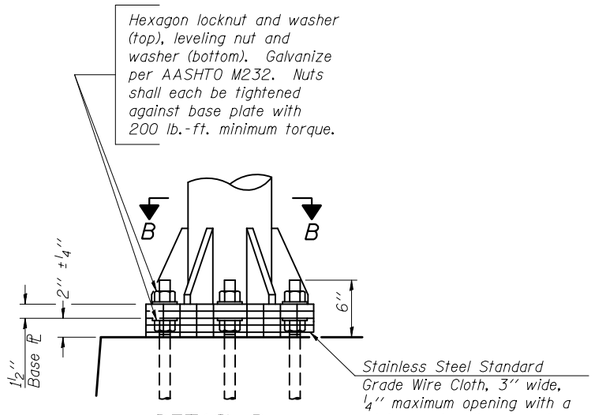
OS-A-4 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

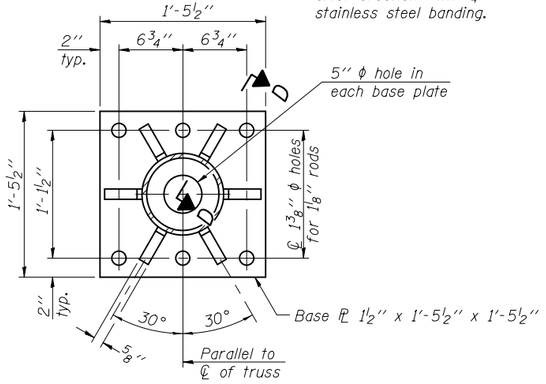
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR TYPE I-A ALUMINUM TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

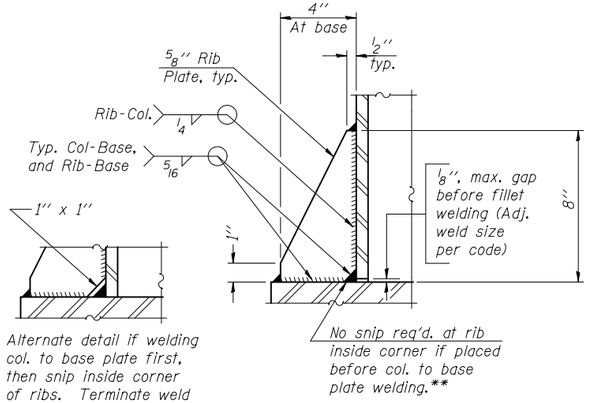


DETAIL B

Ribs shall be cut to fit slope of pipe.

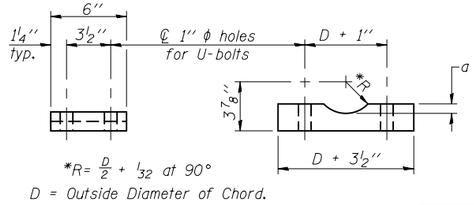


SECTION B-B



** Alternate detail if welding col. to base plate first, then snip inside corner of ribs. Terminate weld on rib 1/4'' from snip.

SECTION D-D



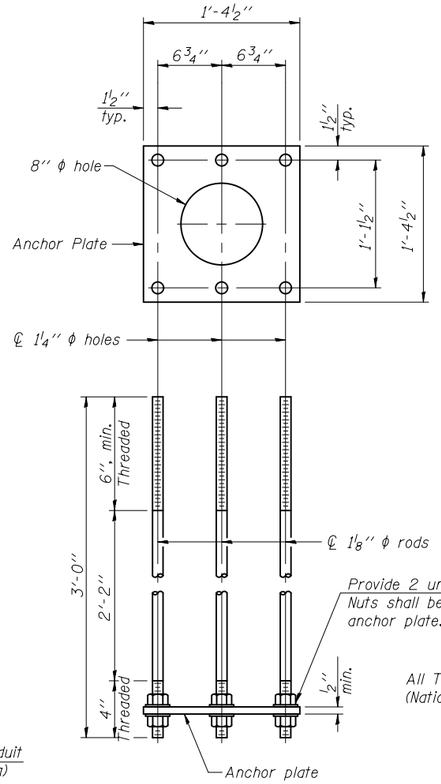
*R = D/2 + 1/32 at 90°

D = Outside Diameter of Chord.

SADDLE SHIM DETAIL

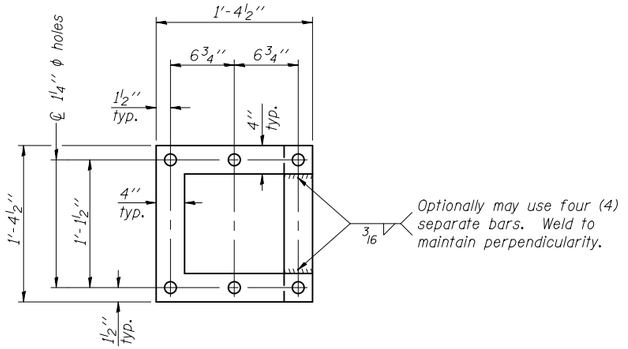
ASTM B26 Alloy 356-F
or
ASTM B209 Alloy 6061-T651
(4 required per sign truss)

Truss Chord Nominal Dia.	a
5''	3/4''
5 1/2''	13/16''
6''	7/8''
6 1/2''	15/16''

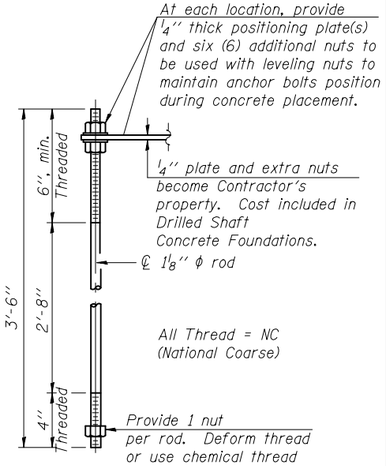


ANCHOR ROD DETAIL

Spread Footing Foundation



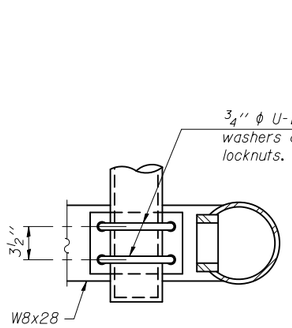
POSITIONING PLATE(S)



ANCHOR ROD DETAIL

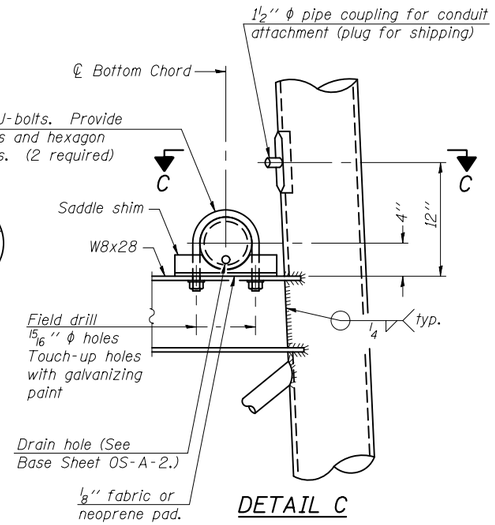
Drilled Shaft Foundation

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



SECTION C-C

(Handhole cover not shown)



DETAIL C

TYPE I-A TRUSS
8'' ϕ PIPE SUPPORT FRAME DETAILS

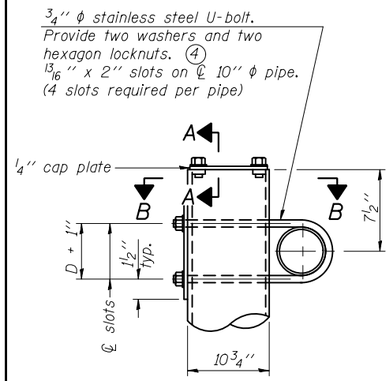
OS-A-4A 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

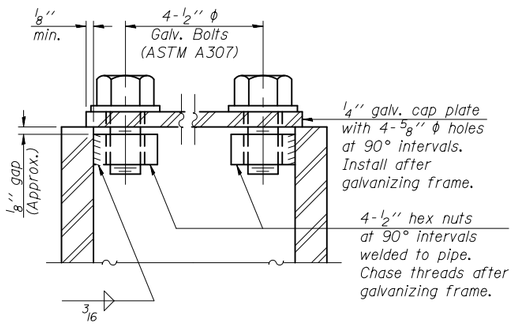
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SUPPORT FRAME DETAILS – ALUMINUM TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

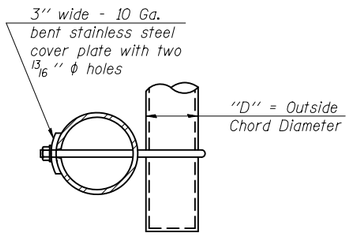


DETAIL A

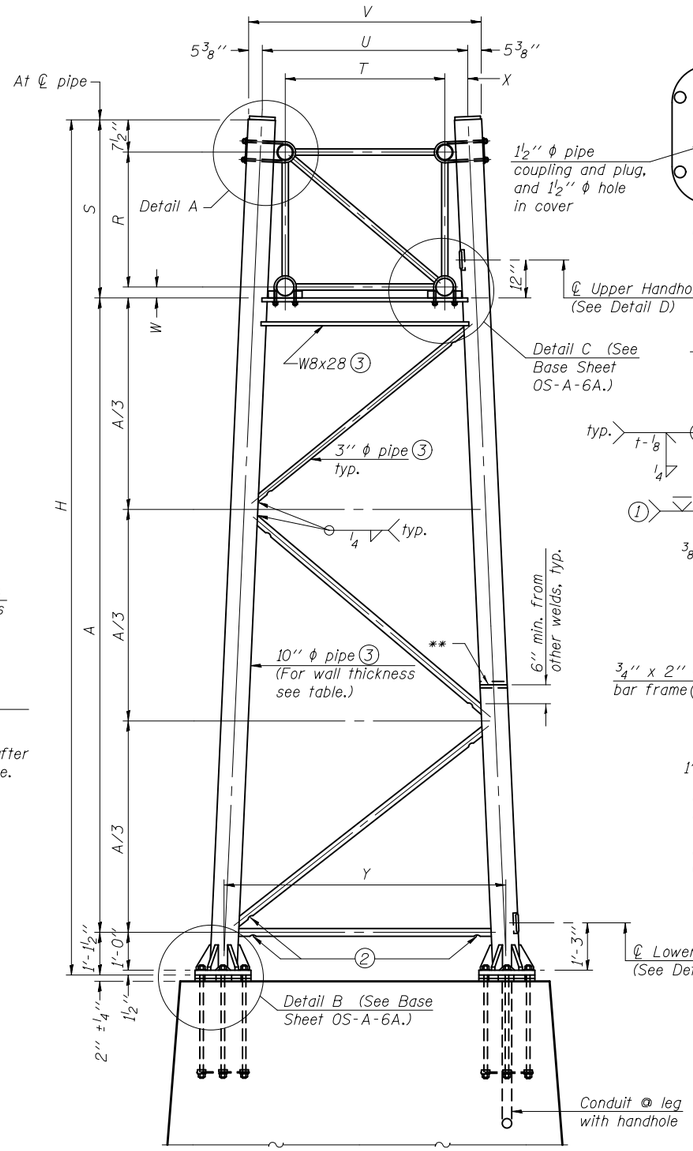


SECTION A-A

As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.

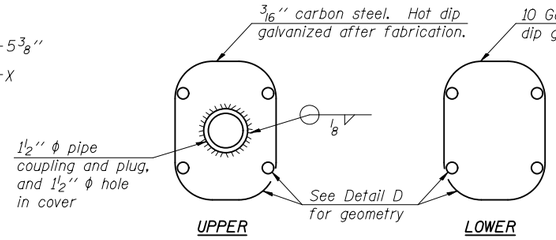


SECTION B-B

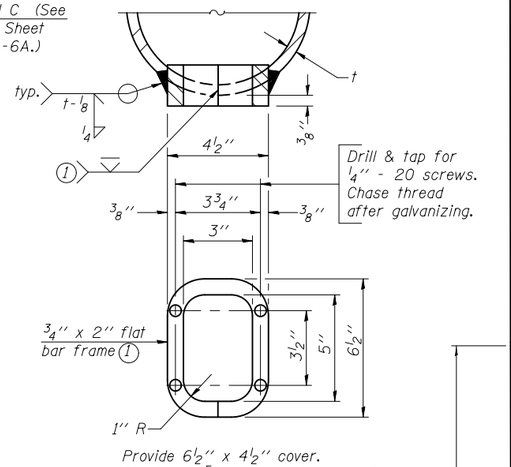


For Foundation Details, see base sheet OS-F3 (Spread Footing) or OS4-F3 (Drilled Shaft).

SIDE ELEVATION

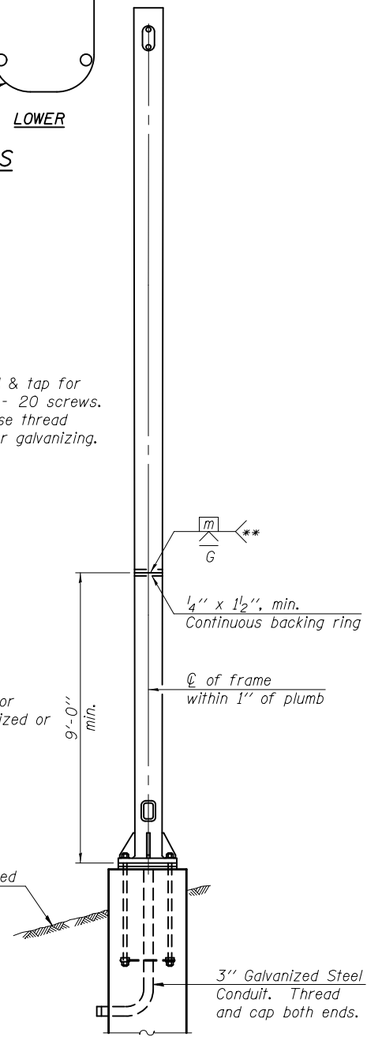


HANDHOLE COVERS



Provide 6 1/2'' x 4 1/2'' cover.
Provide 4-5/16'' ϕ holes in cover for 1/4''-20 round head hot dip galvanized or stainless steel machine screws.
(See cover details)

DETAIL D



END ELEVATION

Support Design Loads: See Base Sheet OS-A-1 for design and loading criteria.
Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

(1) 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.

(2) Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.

(3) Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-A-1.

(4) See General Notes for fasteners.

(5) Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.

(6) "H" based on 15'-0'' or actual sign height, whichever is greater.

Truss Type	Dimensions							
	R	S	T	U	V	W	X	Y
I-A	4'-6''	5'-5 1/2''	4'-0''	5'-6''	6'-4 3/4''	4''	9''	8'-3''
II-A (5)	5'-3''	6'-3 1/4''	4'-6''	6'-1''	6'-11 3/4''	4 3/4''	9 1/2''	8'-3''

10'' ϕ PIPE TRUSS SUPPORT FRAME

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Structure Number	Station	Support		Truss Type	Pipe Wall Thickness	H (6)	A
		Left	Right				

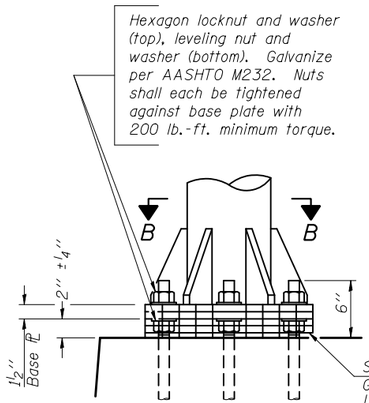
OS-A-6 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

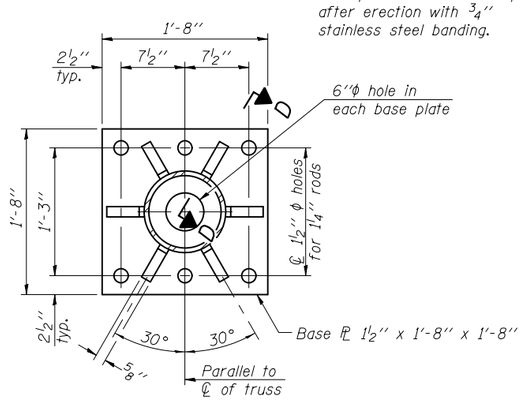
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR ALUMINUM TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
ILLINOIS FED. AID PROJECT				

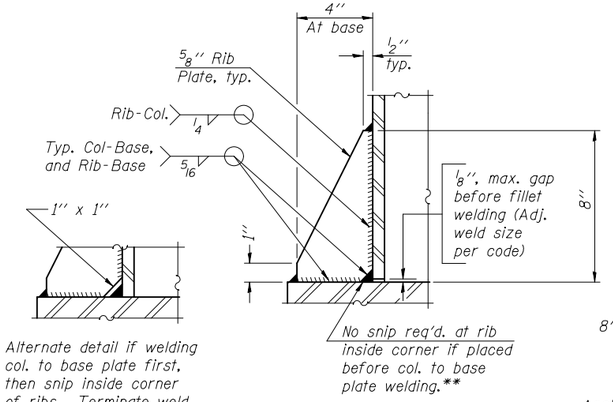


DETAIL B

Ribs shall be cut to fit slope of pipe.

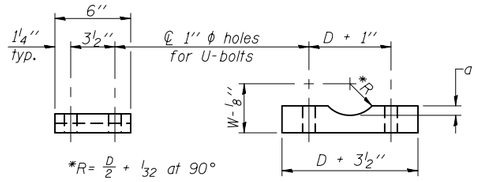


SECTION B-B



** Alternate detail if welding col. to base plate first, then snip inside corner of ribs. Terminate weld on rib 1/4'' from snip.

SECTION D-D



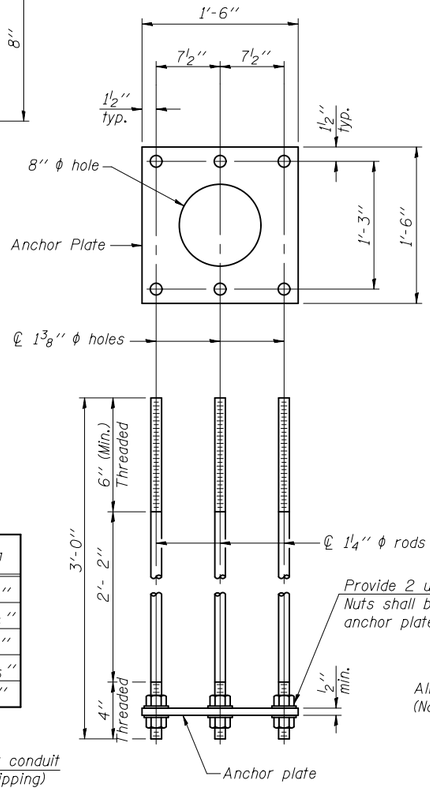
*R= D/2 + 1/32 at 90°

D = Outside Diameter of Chord.
For W, see Base Sheet OS-A-6.

SADDLE SHIM DETAIL

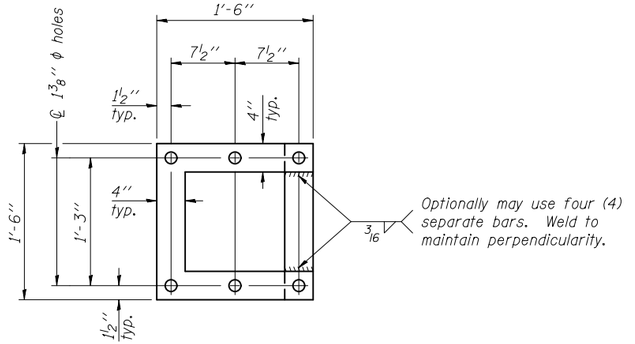
ASTM B26 Alloy 356-F
or
ASTM B209 Alloy 6061-T651
(4 required per sign truss)

Truss Chord Nominal Dia.	a
5''	3/4''
5 1/2''	13/16''
6''	7/8''
6 1/2''	15/16''
7''	1''

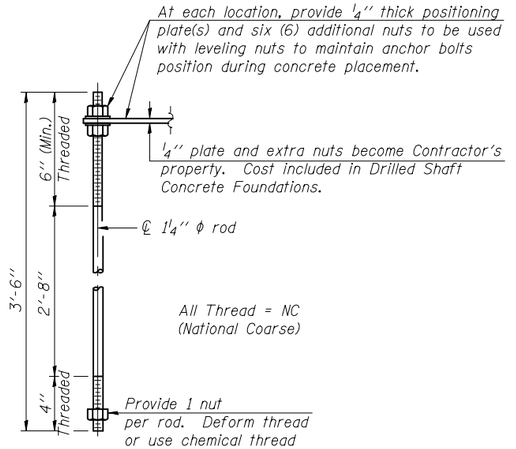


ANCHOR ROD DETAIL

Spread Footing Foundation



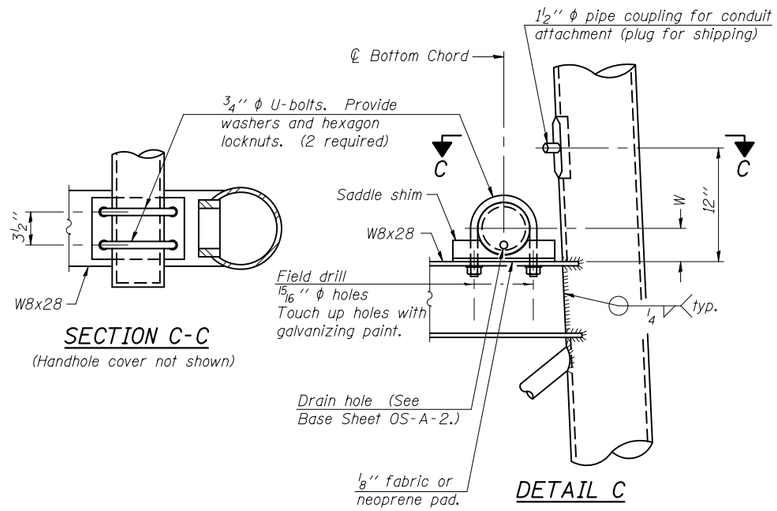
POSITIONING PLATE(S)



ANCHOR ROD DETAIL

Drilled Shaft Foundation

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



SECTION C-C

(Handhole cover not shown)

DETAIL C

10'' ϕ PIPE SUPPORT FRAME DETAILS

OS-A-6A 6-1-12

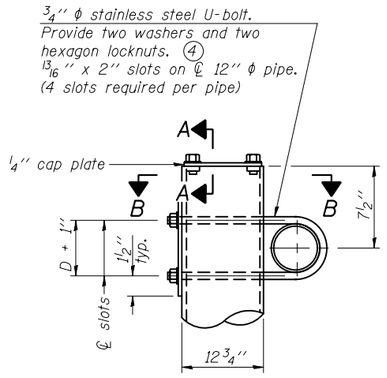
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

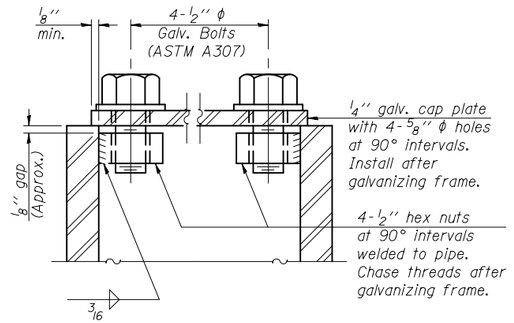
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME DETAILS – ALUMINUM TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.
ILLINOIS FED. AID PROJECT

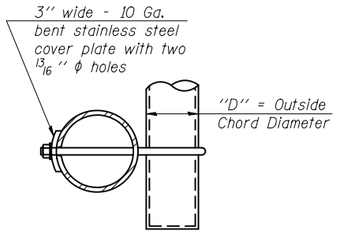


DETAIL A

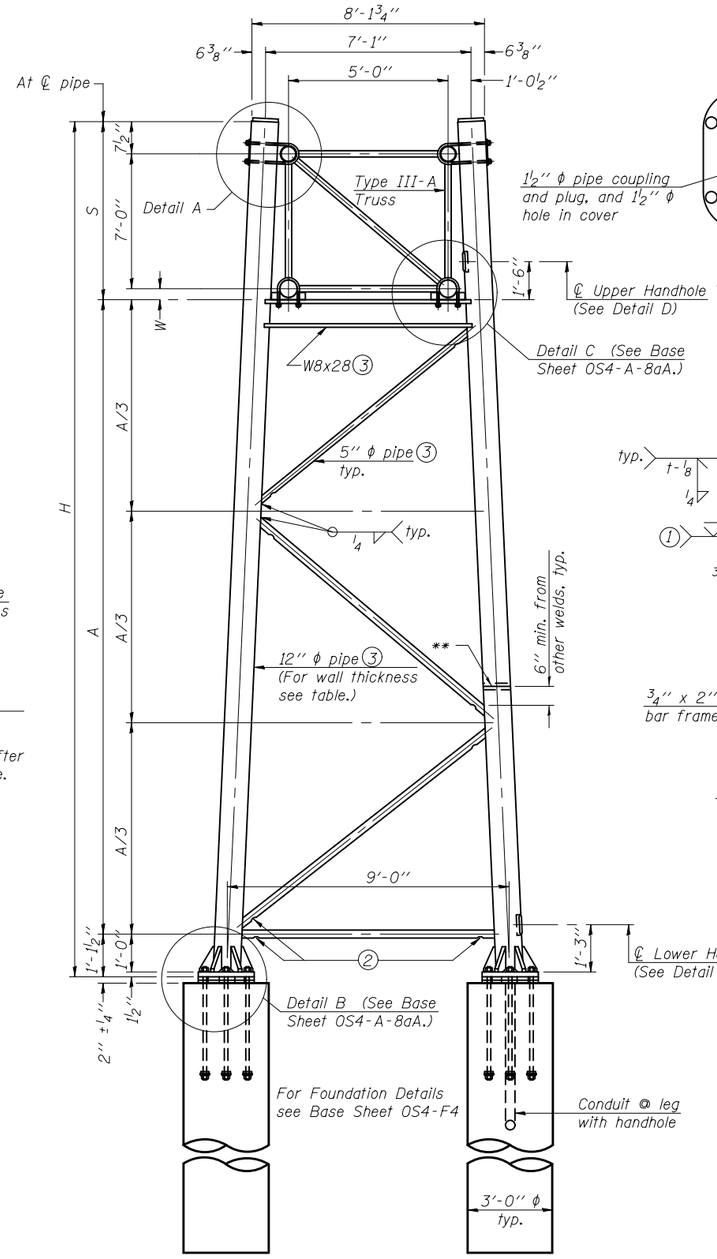


SECTION A-A

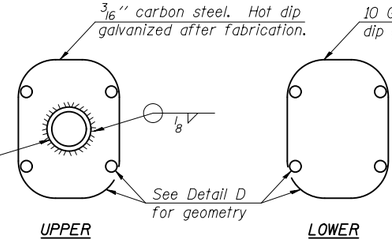
As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.



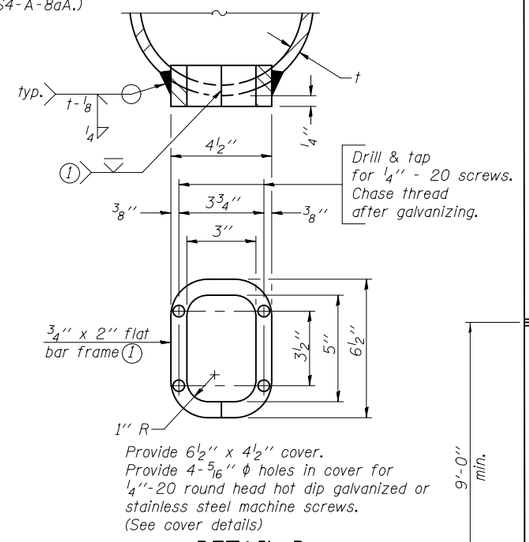
SECTION B-B



SIDE ELEVATION



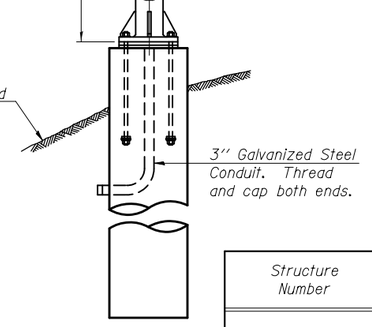
HANDHOLE COVERS



Provide 6 1/2" x 4 1/2" cover.
Provide 4-5/16" ϕ holes in cover for 1/4"-20 round head hot dip galvanized or stainless steel machine screws.
(See cover details)

DETAIL D

Dimensions		
Truss Chord Nominal Dia.	W	S
7"	4 3/4"	8'-0 1/4"
8 1/2"	5 1/2"	8'-1"
9"	5 3/4"	8'-1 1/4"



END ELEVATION

TRUSS SUPPORT DETAILS

(12" ϕ Pipe-Type III-A Truss

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Support Design Loads: See Base Sheet OS-A-1 for design and loading criteria.

Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

(1) 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.

(2) Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.

(3) Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-A-1.

(4) See General Notes for fasteners.

(5) Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.

(6) "H" based on 15'-0" or actual sign height, whichever is greater.

* For dynamic message sign installations, provide upper and lower handholes in both legs of each support frame.

Structure Number	Station	Support		Pipe Wall Thickness	H (6)	A
		Left	Right			

OS4-A-8a 6-1-12

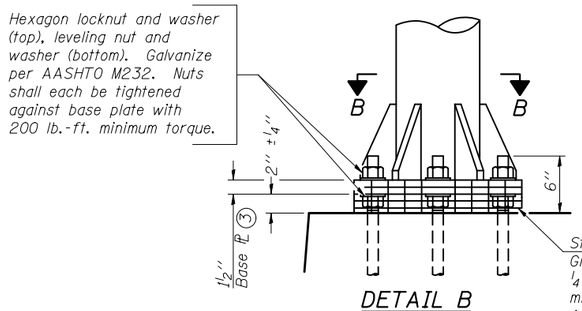
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – SUPPORT FRAME FOR TYPE III-A ALUMINUM TRUSS

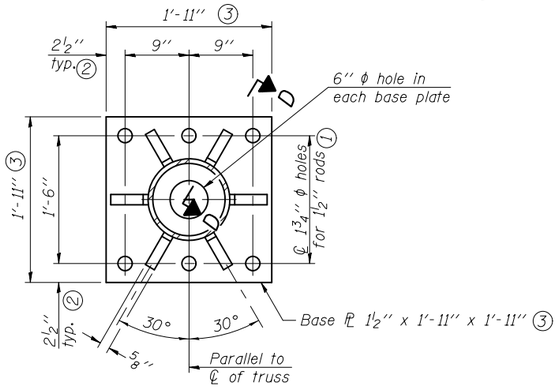
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
ILLINOIS FED. AID PROJECT				

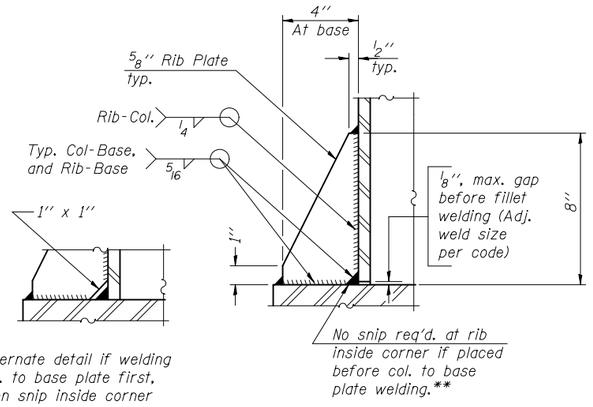


DETAIL B

Ribs shall be cut to fit slope of pipe.

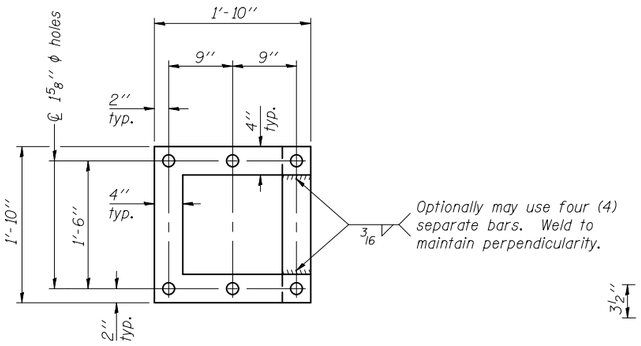


SECTION B-B

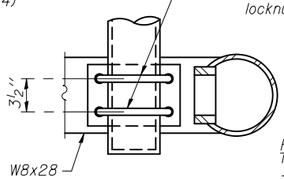


** Alternate detail if welding col. to base plate first, then snip inside corner of ribs. Terminate weld on rib 1/4'' from snip.

SECTION D-D

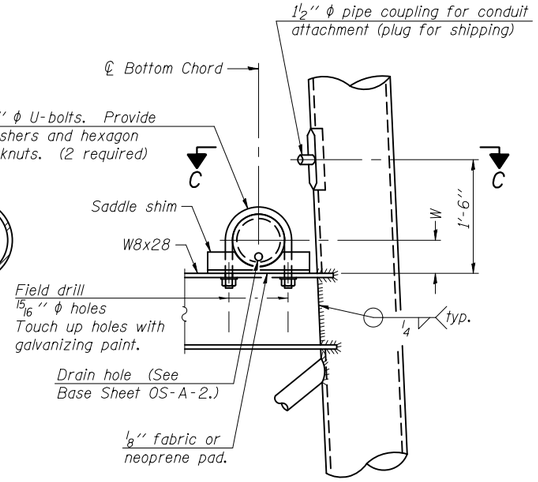


POSITIONING PLATE(S)

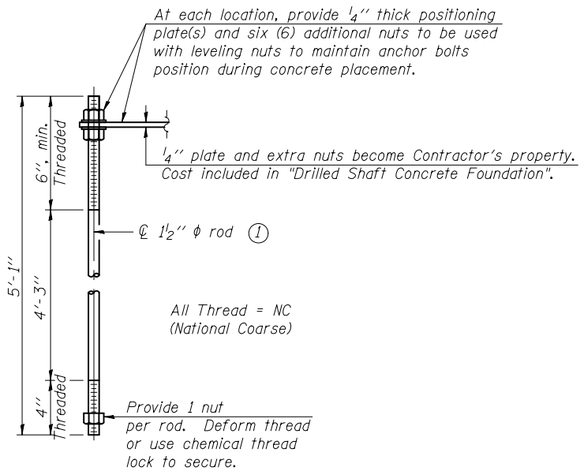


SECTION C-C

(Handhole cover not shown)

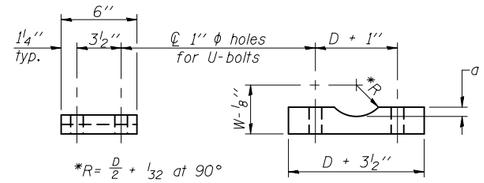


DETAIL C



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105 Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



*R= D/2 + 1/32 at 90°

D = Outside Diameter of Chord. For W, see Base Sheet OS-A-6.

Truss Chord Nominal Dia.	a
7''	1''
8 1/2''	1 1/4''
9''	1 3/8''

SADDLE SHIM DETAIL

ASTM B26 Alloy 356-F
or
ASTM B209 Alloy 6061-T651
(4 required per sign truss)

TYPE III-A TRUSS
12'' ϕ PIPE SUPPORT FRAME DETAILS

Notes:
For Type III-A Truss spans greater than 150 ft. and up to 160 ft.:

1. 1 3/4'' ϕ rod, 2'' ϕ holes
2. 2 3/4'' edge distance
3. Base Pl 1 5/8'' x 1'-11 1/2'' x 1'-11 1/2''

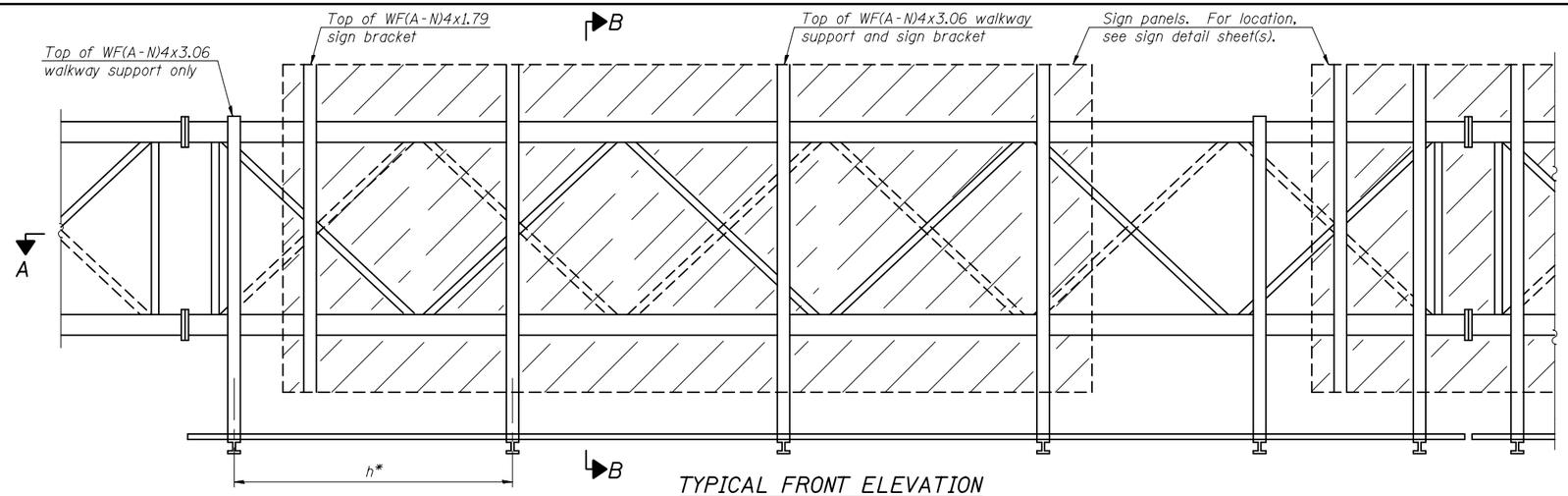
OS4-A-8aA 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

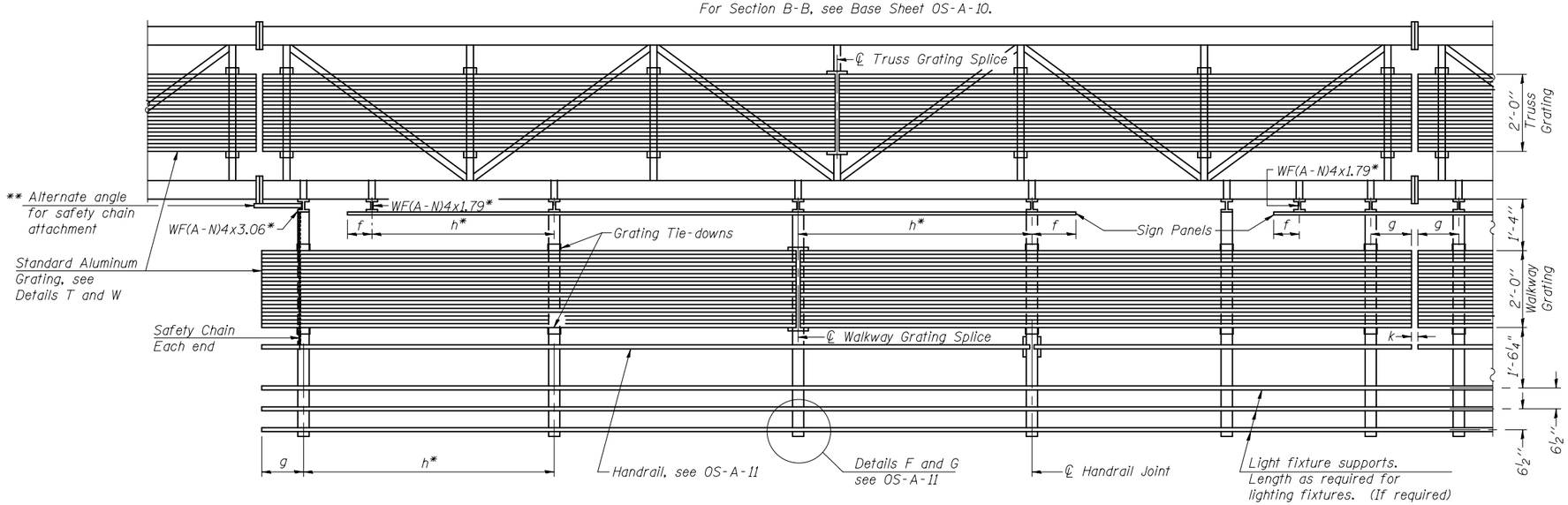
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR TYPE III-A ALUMINUM TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



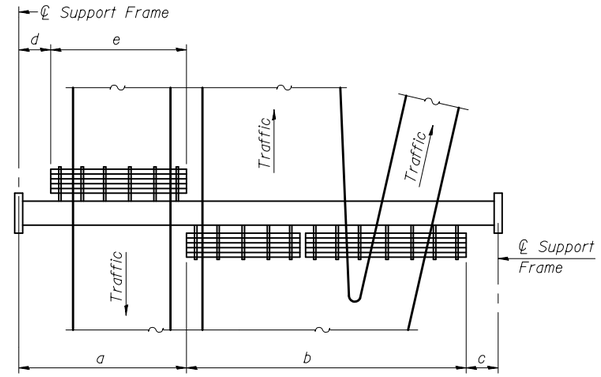
TYPICAL FRONT ELEVATION

With lights and handrail omitted for clarity.
For Section B-B, see Base Sheet OS-A-10.



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.
Handrail joints, grating, and light support splices placed as needed.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)

BRACKET TABLE

WF(A-N)4x1.79 or WF(A-N)4x3.06 ASTM B308, Alloy 6061-T6		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

Notes:

* Space walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 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, WF(A-N)4x1.79 or WF(A-N)4x3.06)
k = 2" maximum gap between adjacent walkway grating sections and handrail ends

** If walkway bracket at safety chain location is behind sign, add angle to bracket, see Alternate Safety Chain Attachment on Base Sheet OS-A-11.

For Details T and W, Section B-B and Grating Splice Details see Base Sheet OS-A-10.
For Handrail Details see Base Sheet OS-A-11.

Structure Number	Station	a	b	c	d	e	Walkway Grating and Handrail Lengths

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".

Walkway and Truss Grating width dimensions are nominal and may vary ±½" based on available standard widths.

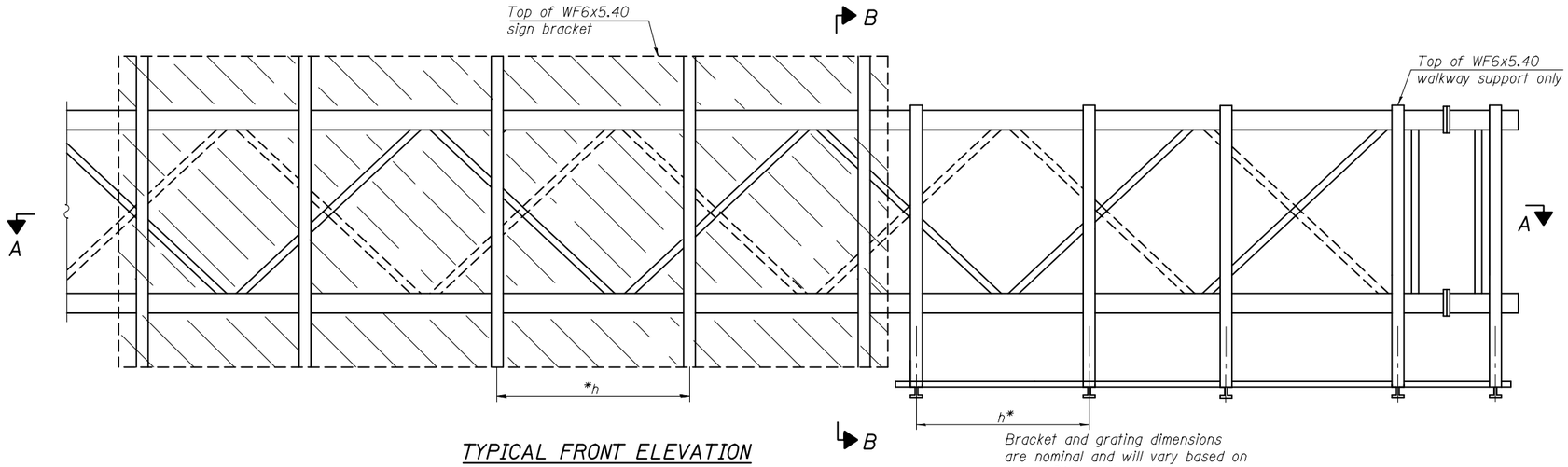
OS-A-9 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
ALUMINUM WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

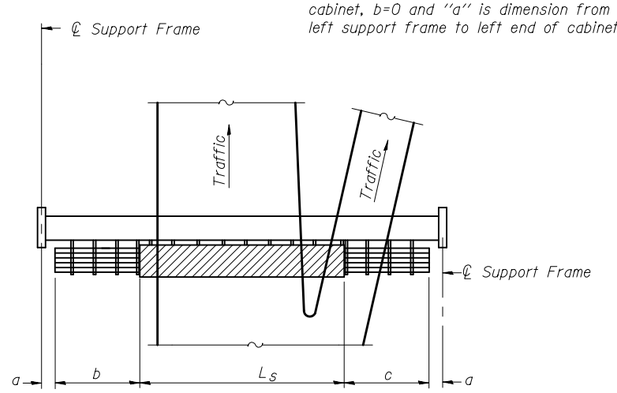


TYPICAL FRONT ELEVATION

With handrail omitted for clarity.

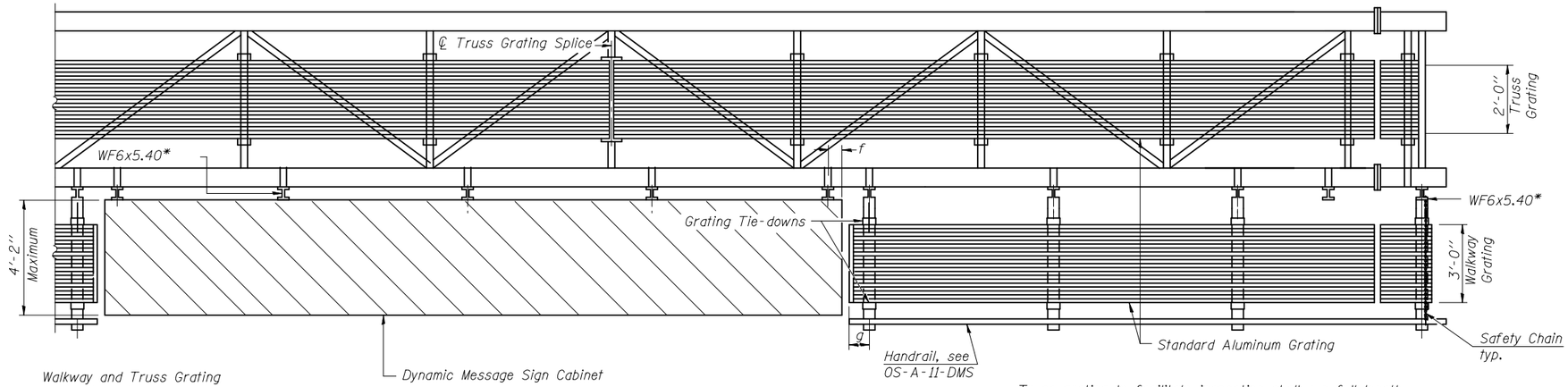
Bracket and grating dimensions are nominal and will vary based on actual DMS cabinet dimensions plus manufacturer's mounting devices.

(1) If walkway is required left of the DMS cabinet, a=1'-6" and b=walkway lengths. If walkway is not required left of the DMS cabinet, b=0 and "a" is dimension from left support frame to left end of cabinet.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)



Walkway and Truss Grating width dimensions are nominal and may vary ±1/2" based on available standard widths.

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".

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 and handrail splices placed as needed.

BRACKET TABLE

WF6x5.40 ASTM B308, Alloy 6061-T6		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

Structure Number	Station	a	b	c	L_s	Walkway Grating and Handrail Lengths

Notes:
* Space walkway brackets WF6x5.40 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, WF6x5.40

Maximum DMS weight = 5000 lbs. 4'-2" maximum cabinet depth includes depth of cabinet plus connection to WF6x5.40.
For Section B-B and Grating Splice Details, see Base Sheet OS-A-10-DMS.
For Handrail Splice Details, see Base Sheet OS-A-11-DMS.

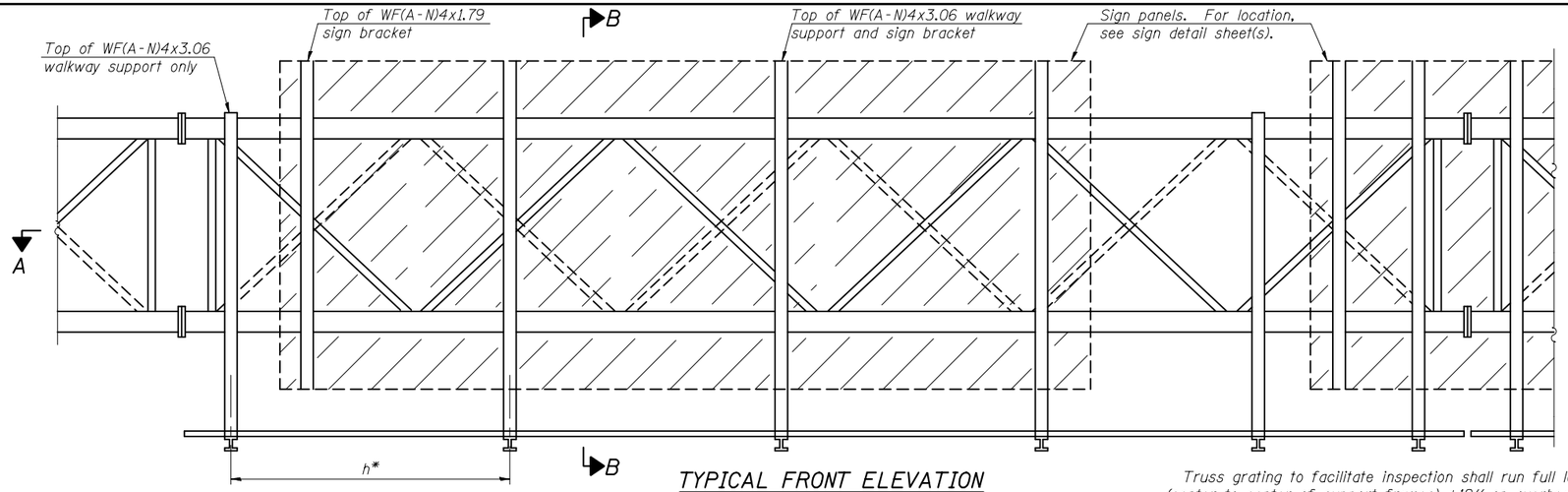
OS-A-9-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
ALTERNATE ALUMINUM WALKWAY DETAILS FOR DMS
SHEET NO. OF SHEETS

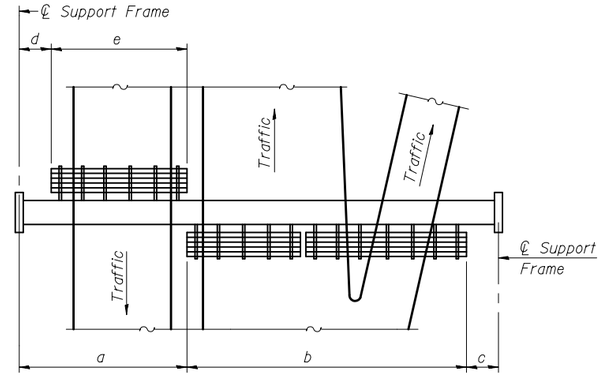
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



TYPICAL FRONT ELEVATION

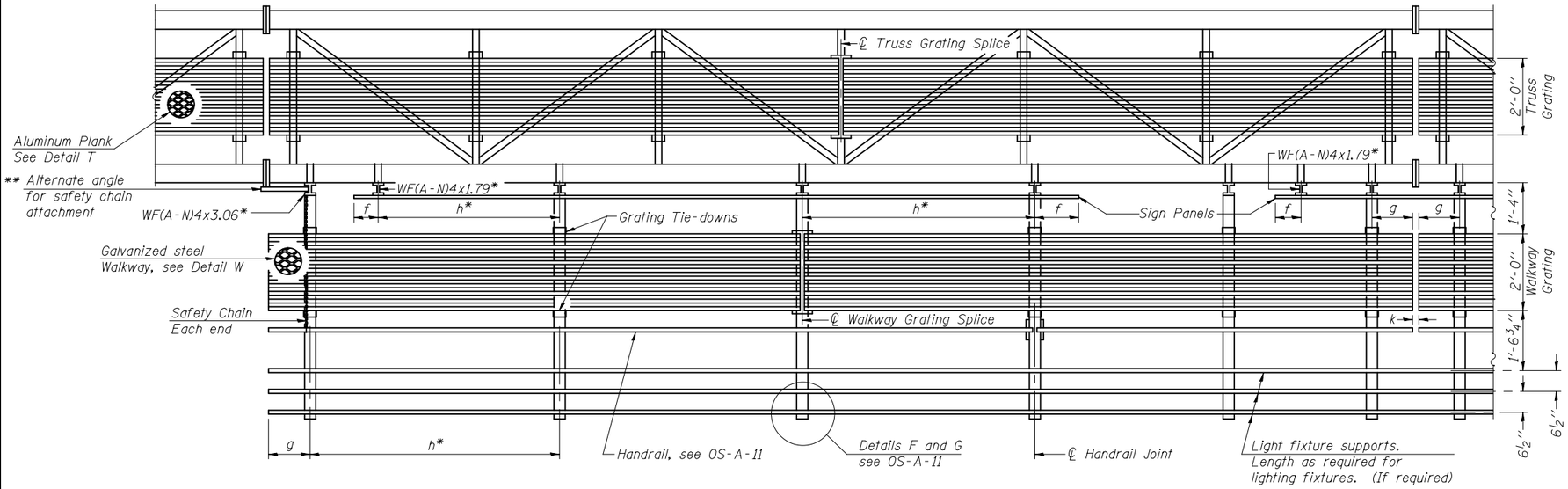
With lights and handrail omitted for clarity.
For Section B-B, see Base Sheet OS-A-10.

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".



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)



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.
Handrail joints, grating, and light support splices placed as needed.

BRACKET TABLE

WF(A-N)4x1.79 or WF(A-N)4x3.06
ASTM B308, Alloy 6061-T6

Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8′-0″	2
8′-0″	14′-0″	3
14′-0″	20′-0″	4
20′-0″	26′-0″	5
26′-0″	32′-0″	6

Notes:

* Space walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 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, WF(A-N)4x1.79 or WF(A-N)4x3.06)
k = 2″ maximum gap between adjacent walkway grating sections and handrail ends

** If walkway bracket at safety chain location is behind sign, add angle to bracket, see Alternate Safety Chain Attachment on Base Sheet OS-A-11.

For Details T and W, Section B-B and Grating Splice Details see Base Sheet OS-A-10.
For handrail details see base sheet OS-A-11.

Note:
Details shown are considered equal alternatives to the Aluminum Walkway on Base Sheet OS-A-9, and may be substituted by Contractor at no change in contract cost.

Walkway and Truss Grating width dimensions are nominal and may vary ±½″ based on available standard widths.

Structure Number	Station	a	b	c	d	e	Walkway Grating and Handrail Lengths

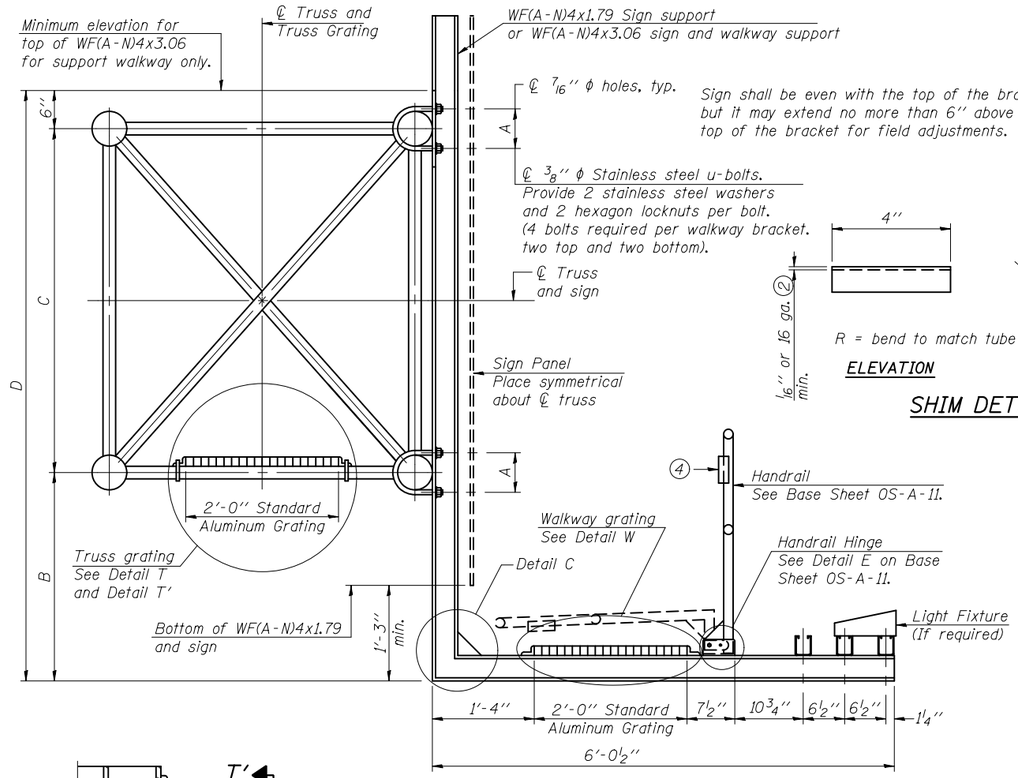
OS-A-9S 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

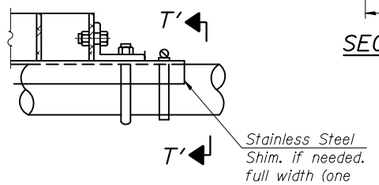
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
ALTERNATE WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		



SECTION B-B



DETAIL T'

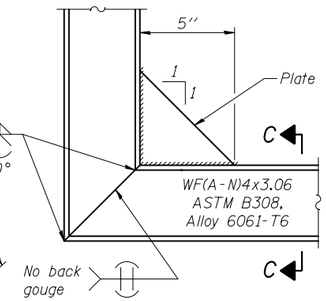
(Truss grating splice)

Details not shown same as Detail T. Alternate materials may be used subject to the Engineer's review and approval.

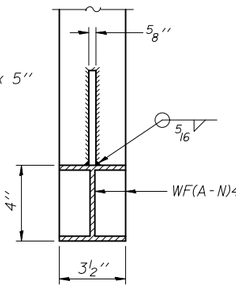
R = bend to match tube (approximately)

ELEVATION END VIEW

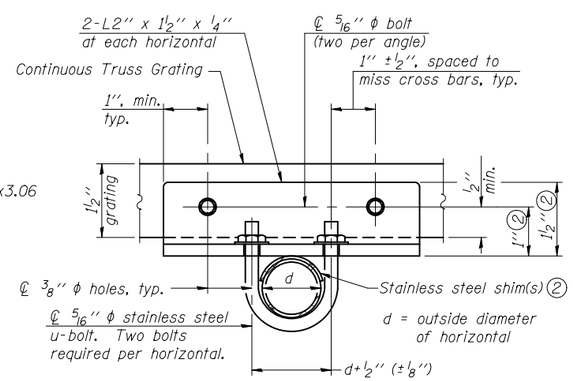
SHIM DETAIL



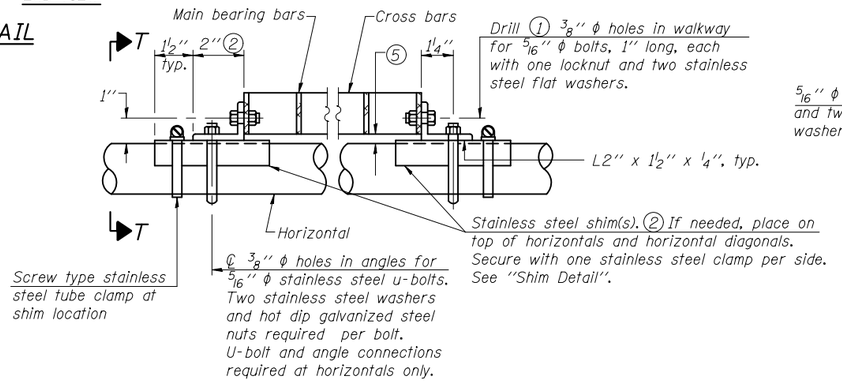
DETAIL C



SECTION C-C

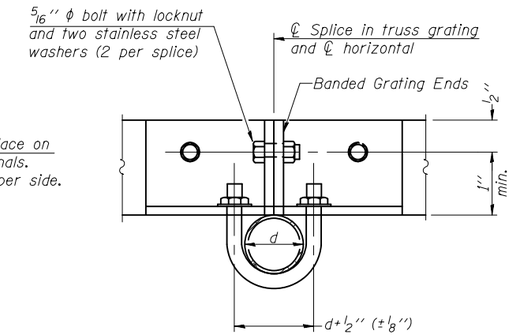


SECTION T-T

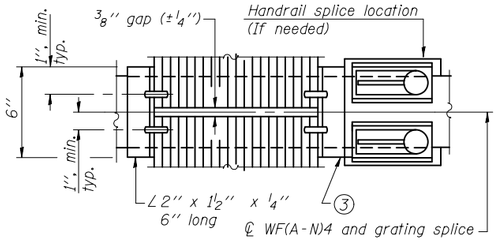


DETAIL T

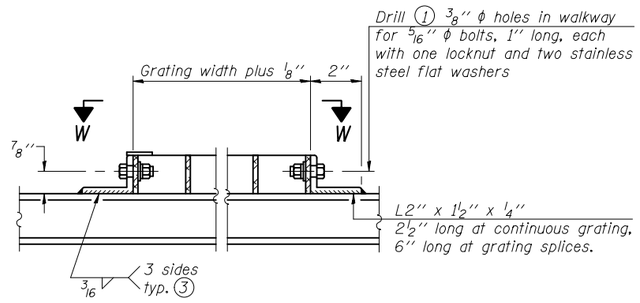
(Continuous Truss grating)



SECTION T'-T'

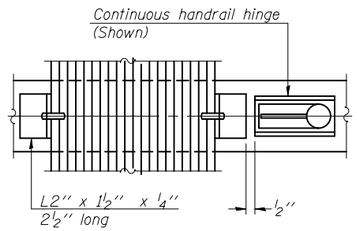


(AT WALKWAY GRATING SPLICE)



DETAIL W

(Walkway grating)



(CONTINUOUS WALKWAY GRATING)

SECTION W-W

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

Main Bearing Bars shall be 3/16" x 1 1/2" on 1 3/16" centers and conform to ASTM B221 Alloy 6061-T6.

Cross bars shall be 3/16" x 1 1/2" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

OR

Aluminum Grating with modified "t" sections for main bearing bars shall meet the following requirements:

Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in.^{3} per bar, a depth of 1 1/2", spaced on 1 3/16" centers.

Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.

Structure Number	Station	A	(6) B	C	(6) D

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) 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.

(3) If Handrail Joint present, weld angle to WF(A-N)4 and 1/4" extension bars. (See Base Sheet OS-A-11.)

(4) ℄ 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) Based on actual height of tallest sign given on OS-A-1.

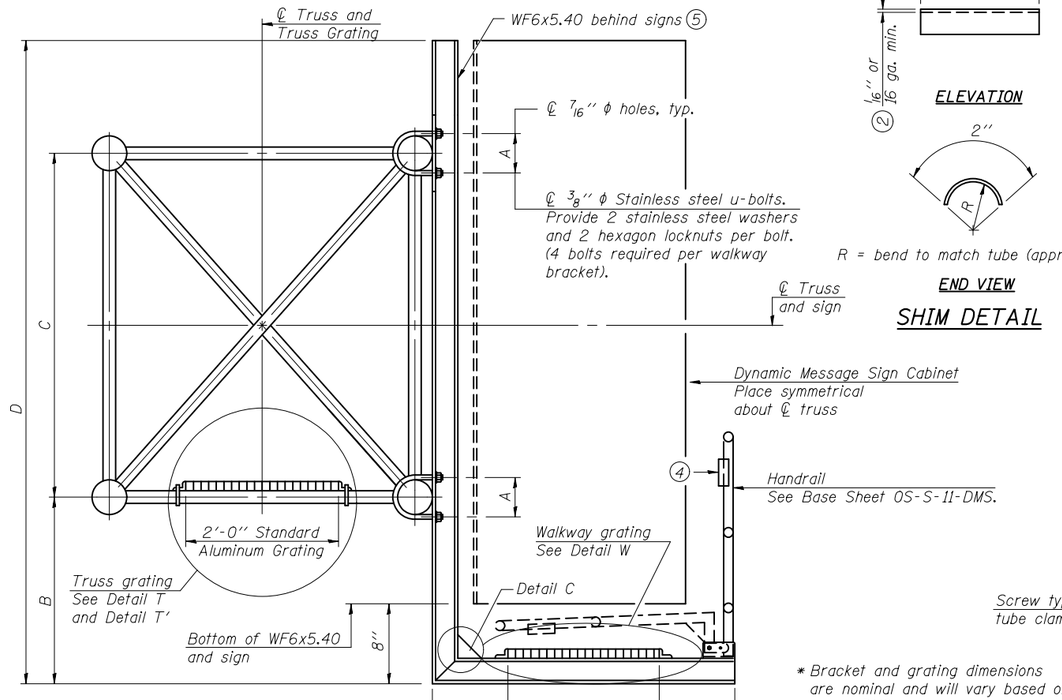
OS-A-10 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

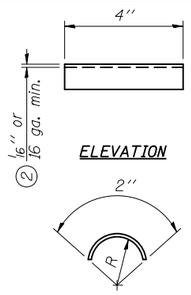
OVERHEAD SIGN STRUCTURES
ALUMINUM WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

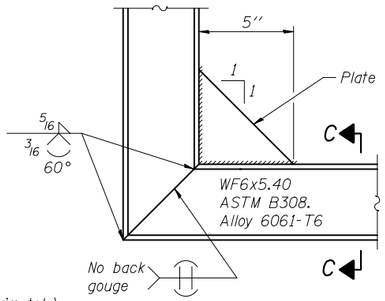


SECTION B-B

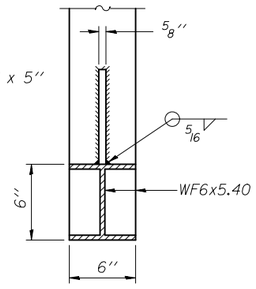
* Bracket and grating dimensions are nominal and will vary based on actual DMS cabinet dimensions plus manufacturer's mounting devices.



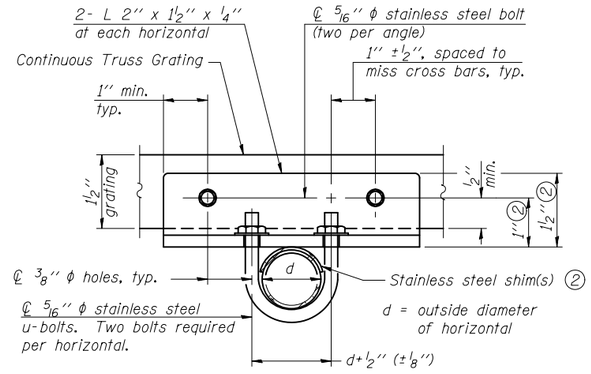
SHIM DETAIL



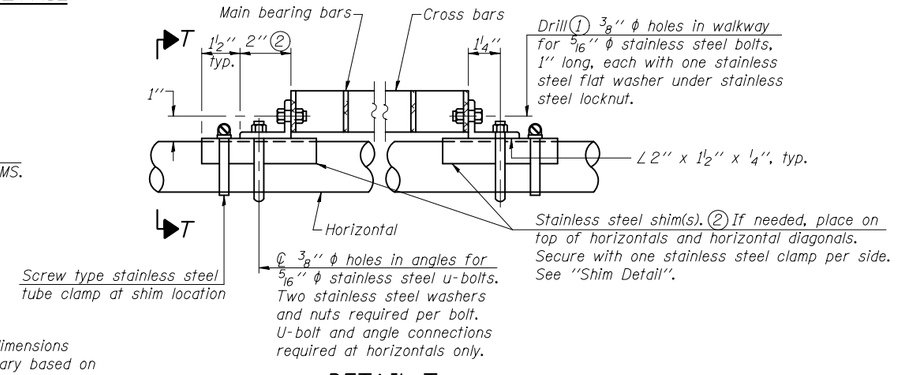
DETAIL C



SECTION C-C

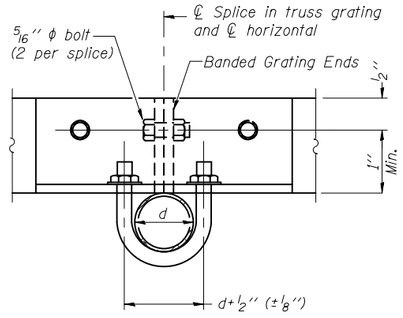


SECTION T-T

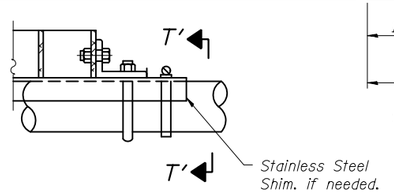


DETAIL T

(Continuous Truss grating)

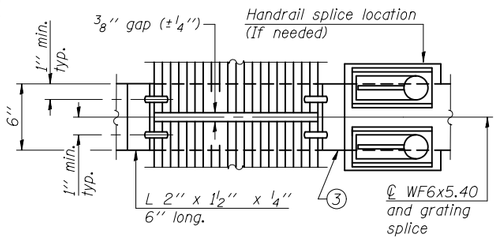


SECTION T'-T'

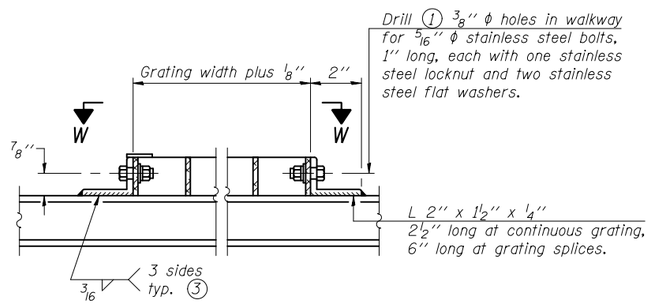


DETAIL T'

(Truss grating splice)
Details not shown same as Detail T.
Alternate materials may be used subject to the Engineer's review and approval.

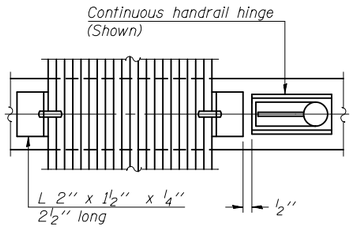


(AT WALKWAY GRATING SPLICE)



DETAIL W

(Walkway grating)



(CONTINUOUS WALKWAY GRATING)

SECTION W-W

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

Main Bearing Bars shall be 3/16" x 1 1/2" on 1 3/16" centers and conform to ASTM B211 Alloy 6061-T6.

Cross bars shall be 3/16" x 1 1/2" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

OR

Aluminum Grating with modified "I" sections for main bearing bars shall meet the following requirements:

Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in. per bar, a depth of 1 1/2", spaced on 1 3/16" centers.

Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.

Structure Number	Station	A	(6) B	C	(6) D

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) 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.

(3) If Handrail Joint present, weld angle to WF(A-N)4 and 1/4" extension bars. (See Base Sheet OS-A-11.)

(4) PL 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(5) Cabinet manufacturer must design and supply hardware for connection of cabinet to WF6's. Bolts must be stainless steel or hot dip galvanized high strength per IDOT specifications.

(6) Based on actual height of tallest sign given on OS-A-1.

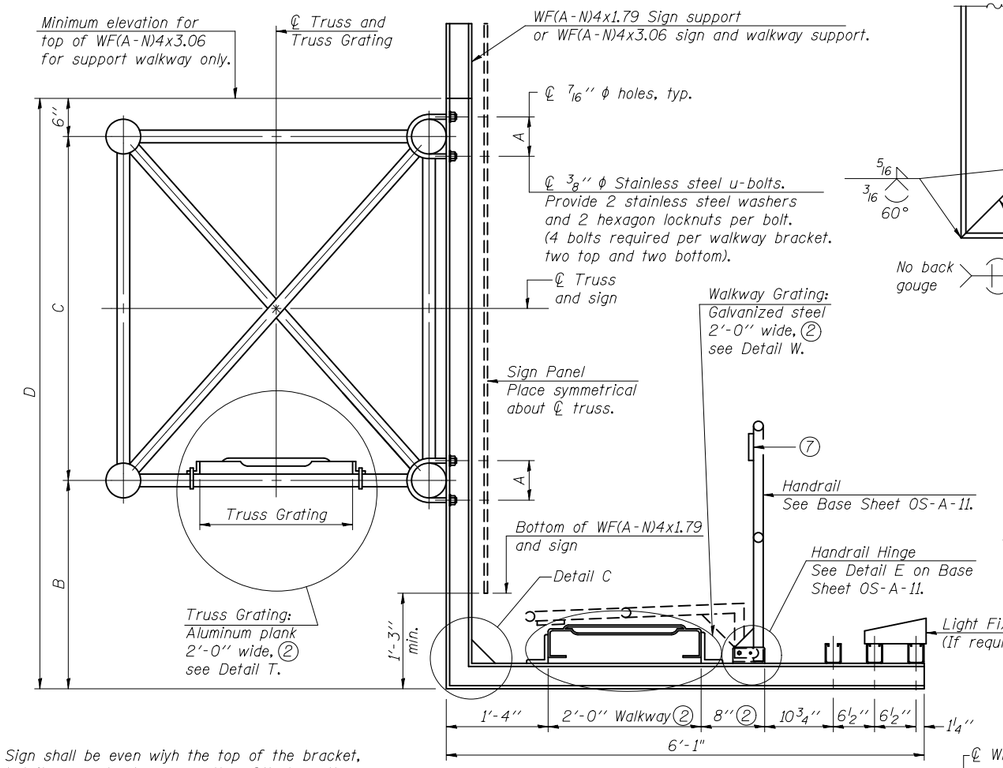
OS-A-10-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

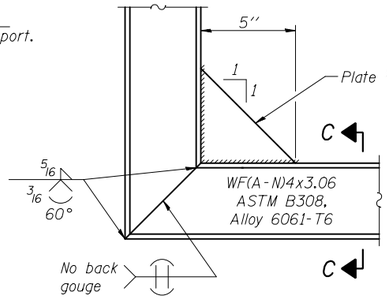
OVERHEAD SIGN STRUCTURES
ALTERNATE ALUMINUM WALKWAY DETAILS FOR DMS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

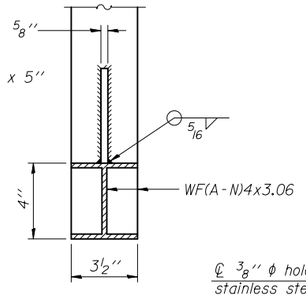


Sign shall be even wiyh the top of the bracket, but it may extend no more than 6" above the top of the bracket for field adjustments.

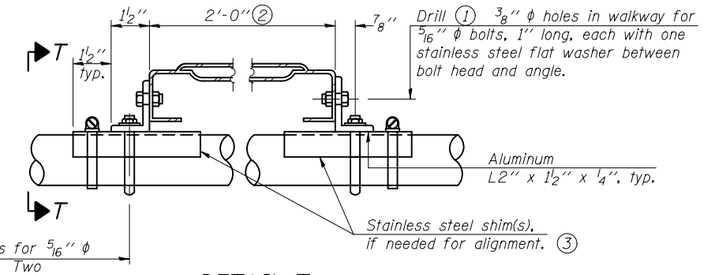
SECTION B-B



DETAIL C

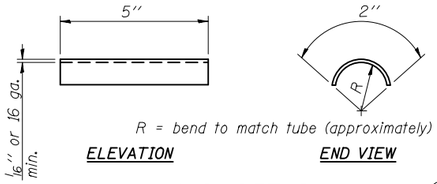


SECTION C-C

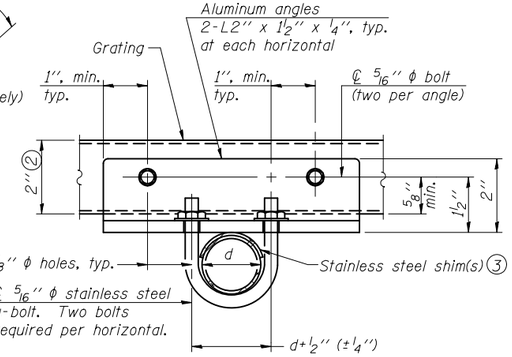


℄ 3/8" ϕ holes in angles for 5/16" ϕ stainless steel u-bolts. Two stainless steel washers and hot dip galvanized steel nuts required per bolt. U-bolt and angle connections required at horizontals only.

DETAIL T
(Truss grating at horizontal)

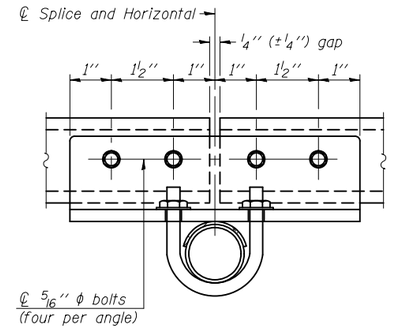


SHIM DETAIL



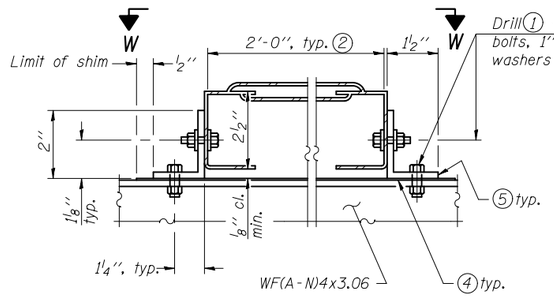
SECTION T-T
(Truss Grating Continuous)

d = outside diameter of horizontal

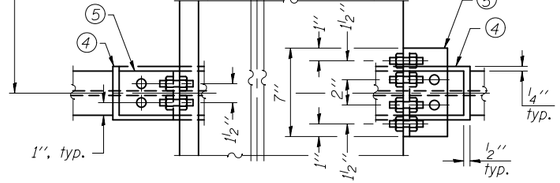


SECTION T-T
(Truss Grating Splice)

Alternate splice details and locations may be used subject to the Engineer's review and approval.



DETAIL W
GALVANIZED STEEL WALKWAY GRATING



WALKWAY GRATING CONTINUOUS AT WALKWAY GRATING SPLICE

SECTION W-W

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) Perforated or expanded metal grating providing a skid resistant (non-serrated) surface and capable of supporting a 500 pound concentrated load with a 6'-0" clear span. Walkway and truss grating dimensions are nominal and may vary (width ±1/2", depth ±1/2") based on available standard sizes. Cut ends of grating shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

(3) Stainless steel shims shall be placed under angles at horizontals and horizontal diagonals if needed to compensate for alignment variations and differences in horizontal diagonal pipe sizes beyond adjustment provided by angles. Secure with one stainless steel clamp per location, see "Shim Detail". Thicker shim plates may be used when needed subject to shims performing properly.

(4) 1/16" (or 16 ga.) x 2 1/2" x 4" stainless steel shim adhered to top of WF(A-N)4x3.06 beneath each galvanized angle. Adhesives for shims shall be suitable for materials joined and full exposure conditions.

(5) Galvanized steel L2" x 2" x 1/4", 3 1/2" long with continuous grating, 7" long at grating splice.

(6) Details shown are considered equal alternatives to the Aluminum Walkway on Base Sheet OS-A-10 and may be substituted by Contractor at no change in contract cost.

(7) ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(8) Based on actual height of tallest sign given on OS-A-1.

Structure Number	Station	A	(8) B	C	(8) D

ALUMINUM TRUSS GRATING

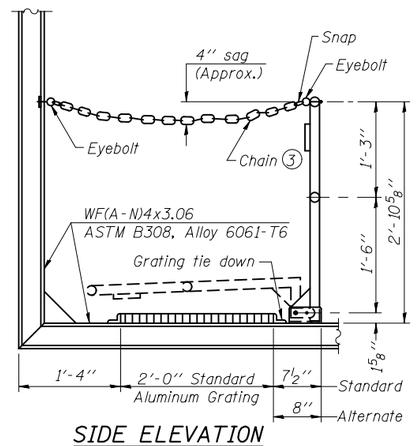
OS-A-10S 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

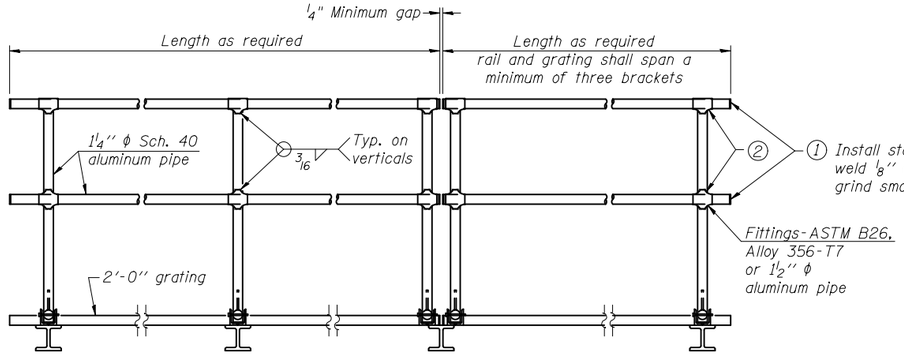
OVERHEAD SIGN STRUCTURES
ALTERNATE WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



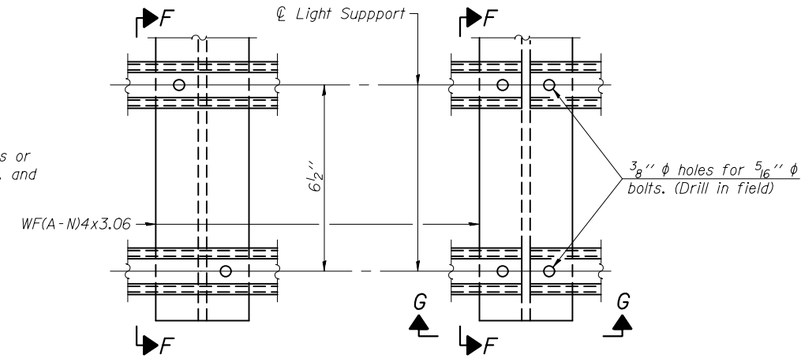
SIDE ELEVATION

(Showing safety chain w/o sign)



FRONT ELEVATION

(2) Horizontal handrail member shall be continuous thru fitting. Provide 7/16" ϕ hole in fitting for 3/8" ϕ bolt. Field drill 7/16" ϕ hole in horizontal rail member. Provide locknut and two stainless steel washers for bolt. (Use 5/16" eyebolts in 7/16"ϕ holes on top rail at ends only.)

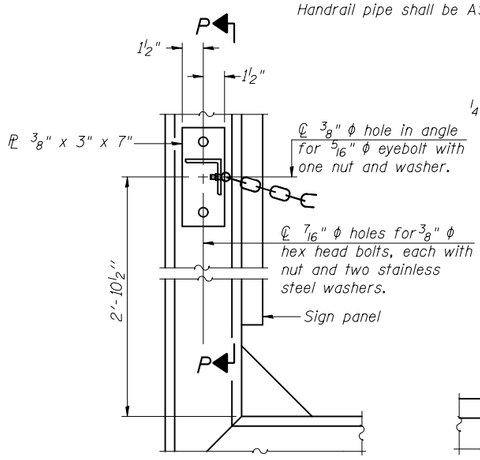


DETAIL F

DETAIL G

HANDRAIL DETAILS

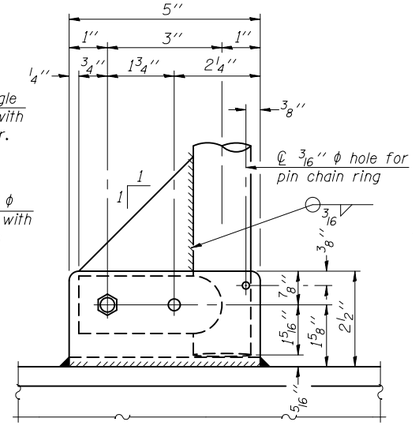
Handrail pipe shall be ASTM B241 or B429, Alloy 6063-T6 or Alloy 6061-T6.



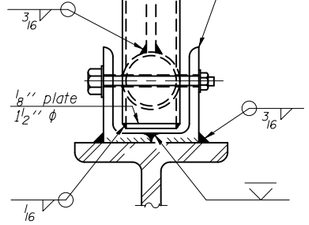
ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)

Items not shown same as "Side Elevation" of "Handrail Details"

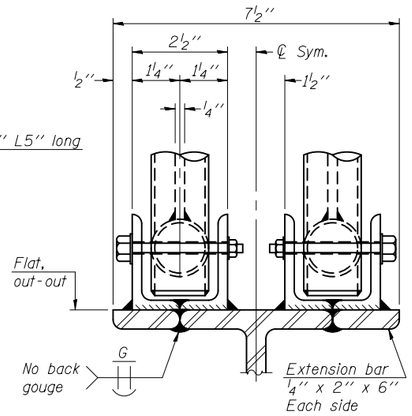


SIDE ELEVATION

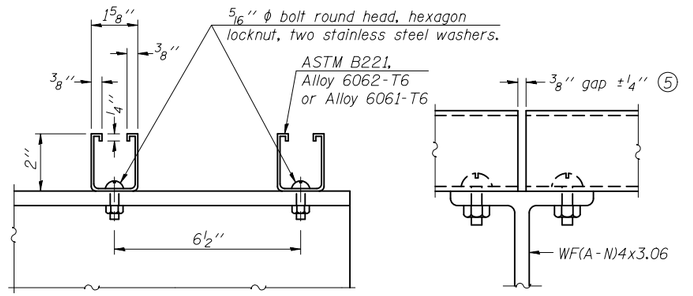


FRONT ELEVATION

See "Elevation" at right for dimensions.



ELEVATION AT HANDRAIL JOINT (4)

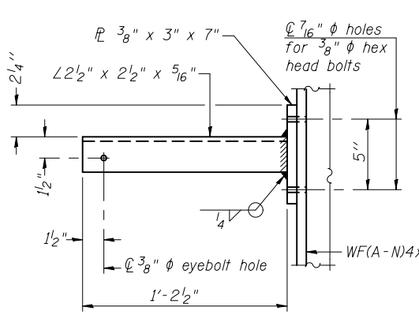


SECTION F-F

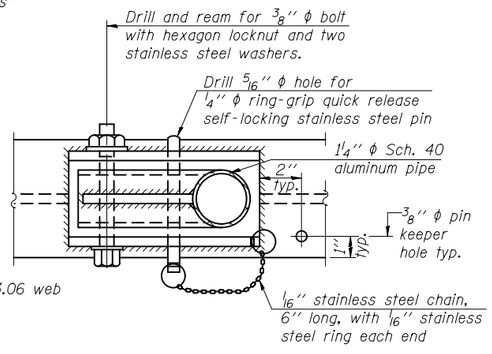
SECTION G-G

LIGHTING FIXTURE MOUNTS (IF REQUIRED)

(5) Field cut ends of light support channels shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

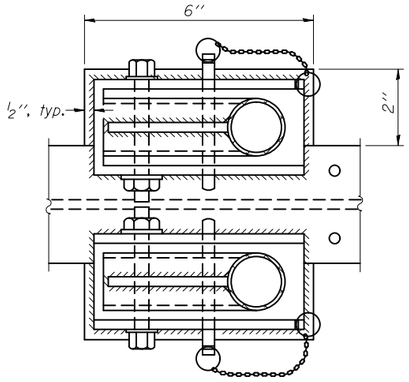


SECTION P-P



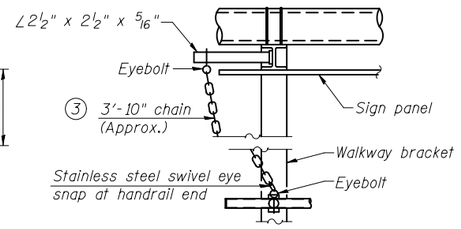
PLAN

DETAIL E HANDRAIL HINGE



PLAN AT HANDRAIL JOINT

Details not shown same as "PLAN"

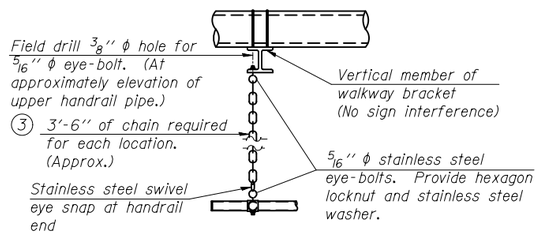


ALTERNATE SAFETY CHAIN ATTACHMENT

Details not shown similar to "Safety Chain" Details
(Walkway omitted for clarity)

(3) 3/16" Type 304L stainless steel chain, approximately 12 links per foot.

(4) Extrusions may be used in lieu of the details shown, with approval of the Engineer.



SAFETY CHAIN

One required for each end of each walkway.

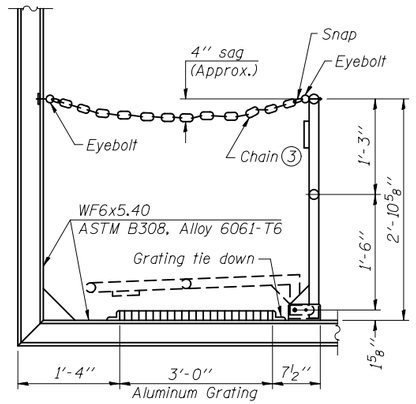
OS-A-11 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

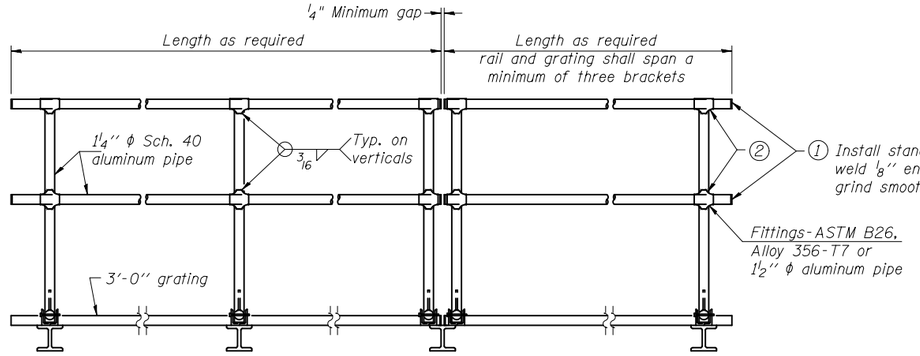
OVERHEAD SIGN STRUCTURES
ALUMINUM HANDRAIL DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

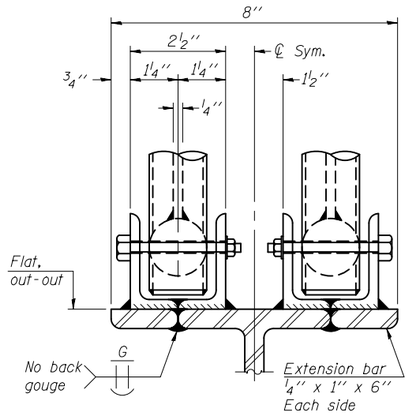


SIDE ELEVATION

(Showing safety chain w/o sign)



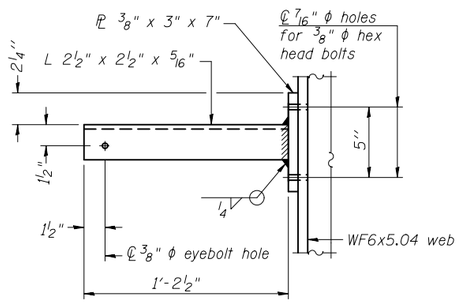
FRONT ELEVATION



ELEVATION AT HANDRAIL JOINT (4)

HANDRAIL DETAILS

Handrail pipe shall be ASTM B241, Alloy 6063-T6 or Alloy 6061-T6.

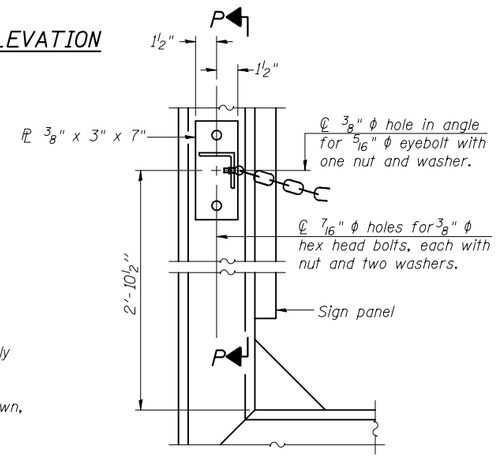


SECTION P-P

(2) Horizontal handrail member shall be continuous thru fitting. Provide 7/16'' ϕ hole in fitting for 3/8'' ϕ bolt. Field drill 7/16'' ϕ hole in horizontal rail member. Provide washer and locknut for bolt. (Use 5/16'' eyebolts in 7/16'' ϕ holes on top rail at ends only.)

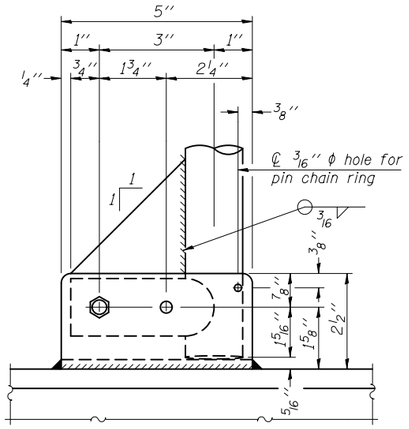
(3) 3/16'' type 304L stainless steel chain, approximately 12 links per foot.

(4) Extrusions may be used in lieu of the details shown, with approval of the Engineer.

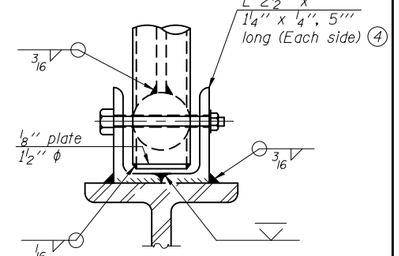


ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)
Items not shown same as ''Side Elevation'' of "Handrail Details"

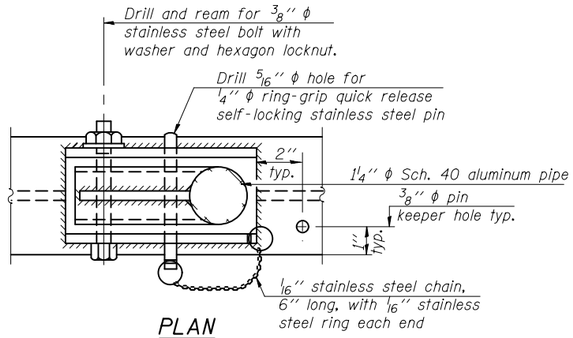


SIDE ELEVATION

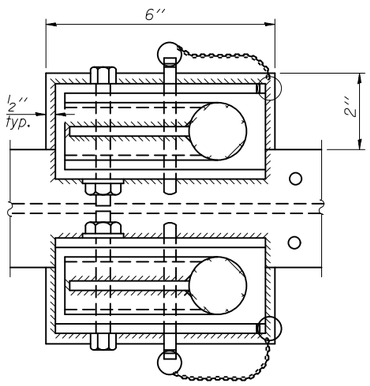


FRONT ELEVATION

See "ELEVATION" at right for dimensions.

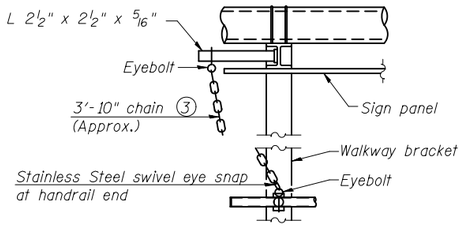


PLAN
DETAIL E HANDRAIL HINGE



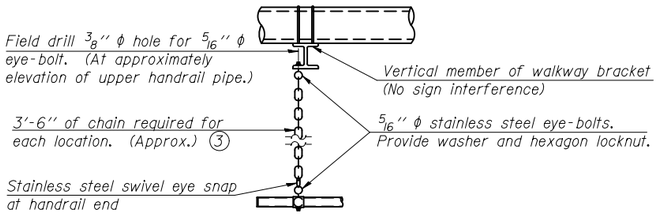
PLAN AT HANDRAIL JOINT

Details not shown same as "PLAN"



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.

OS-A-11-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

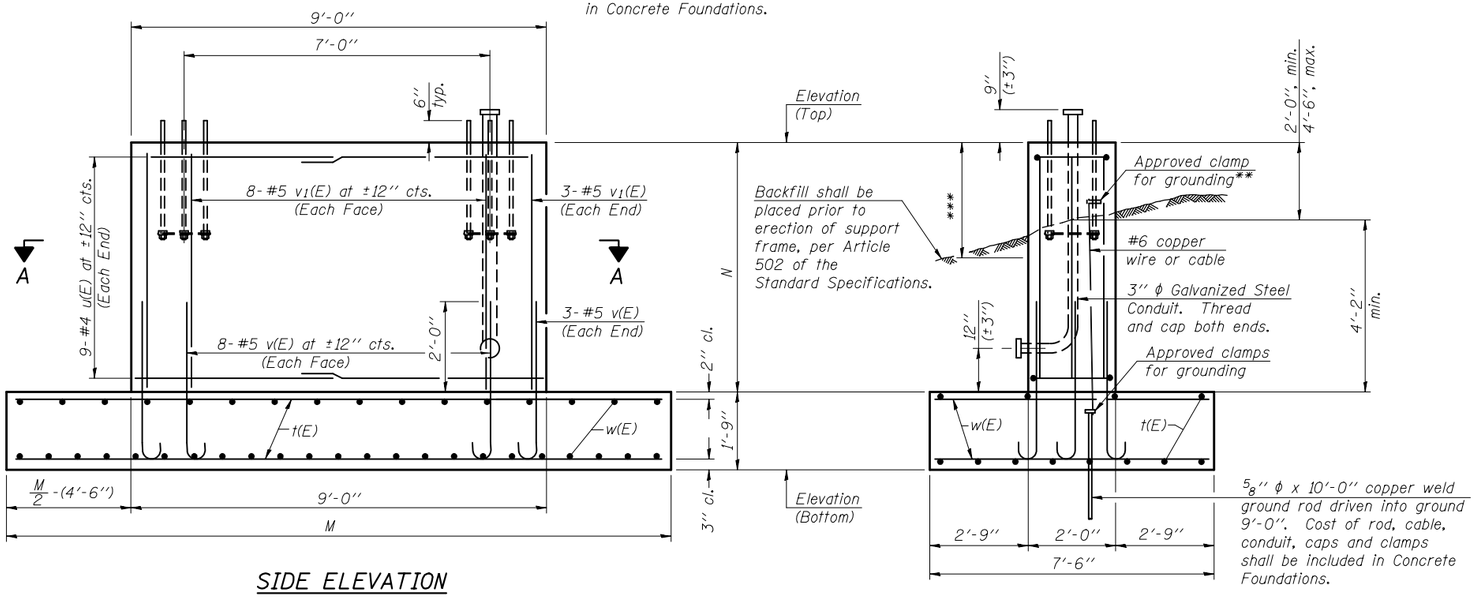
OVERHEAD SIGN STRUCTURES
ALTERNATE ALUMINUM HANDRAIL DETAILS FOR DMS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

For anchor rod size and placement, see Support Frame Detail Sheet.

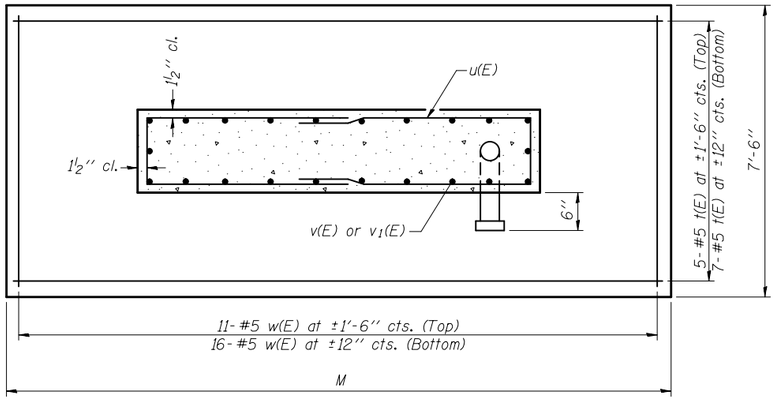
** Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

*** A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Concrete Foundations.

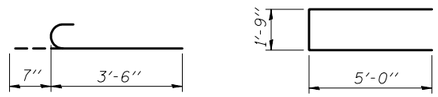


SIDE ELEVATION

END ELEVATION



SECTION A-A



BAR v(E) BAR u(E)

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
t(E)	12	#5	*	
u(E)	18	#4	11'-9"	
v(E)	22	#5	4'-1"	
v1(E)	22	#5	*	
w(E)	27	#5	7'-3"	

*Length of t(E) bar = (Dim. M) - 6"
v1(E) bar = (Dim. N) - 3"

Structure Number	Station	Left Foundation				Right Foundation				Class SI Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	N	M	Elevation Top	Elevation Bottom	N	M	

Note:
The foundation dimensions shown are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.0 tsf, 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 site specific designs.

During construction, if footing length or width or wall height change by more than 12", or if reinforcement is changed, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

DETAILS FOR 6" ϕ SUPPORT FRAME

OS-F1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SPREAD FOOTING DETAILS
SHEET NO. OF SHEETS

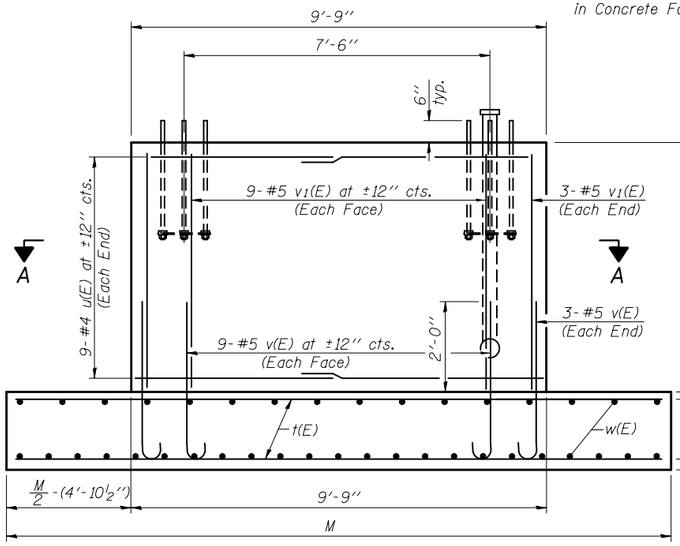
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.
ILLINOIS FED. AID PROJECT

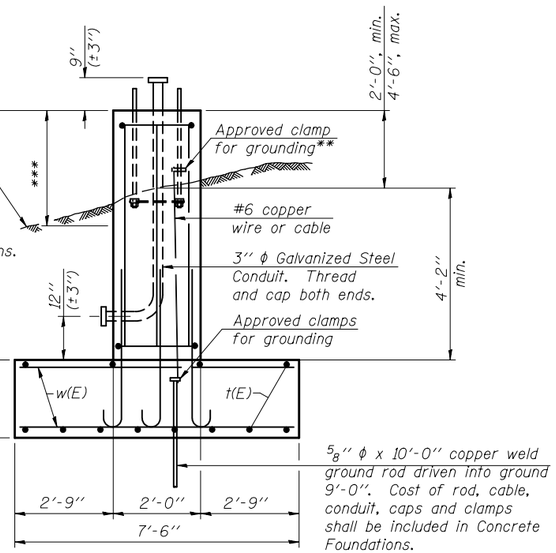
For anchor rod size and placement, see Support Frame Detail Sheet.

** Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

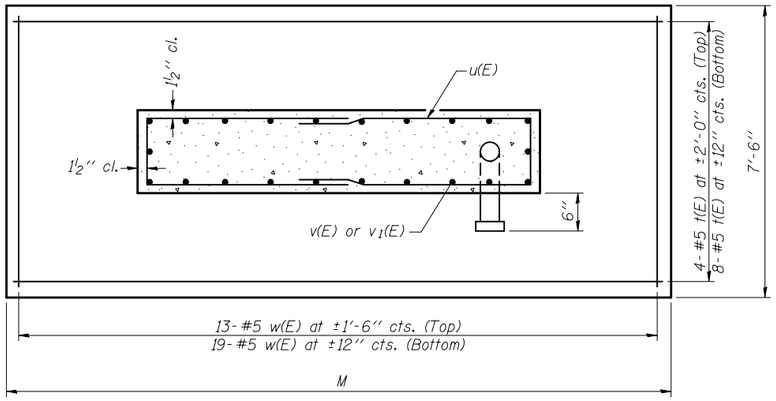
*** A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6'' below finished ground line. Cost included in Concrete Foundations.



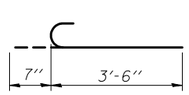
SIDE ELEVATION



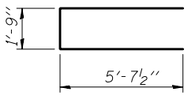
END ELEVATION



SECTION A-A



BAR v(E)



BAR u(E)

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
t(E)	12	#5	*	
u(E)	18	#4	13'-0''	
v(E)	24	#5	4'-1''	
v1(E)	24	#5	*	
w(E)	32	#5	7'-3''	

*Length of t(E) bar = (Dim. M) - 6''
v1(E) bar = (Dim. N) - 3''

Structure Number	Station	Left Foundation				Right Foundation				Class SI Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	N	M	Elevation Top	Elevation Bottom	N	M	

Note:
The foundation dimensions shown are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.0 tsf, 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 site specific designs.

During construction, if footing length or width or wall height change by more than 12'', or if reinforcement is changed, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

DETAILS FOR 8'' ϕ SUPPORT FRAME

OS-F2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SPREAD FOOTING DETAILS
SHEET NO. OF SHEETS

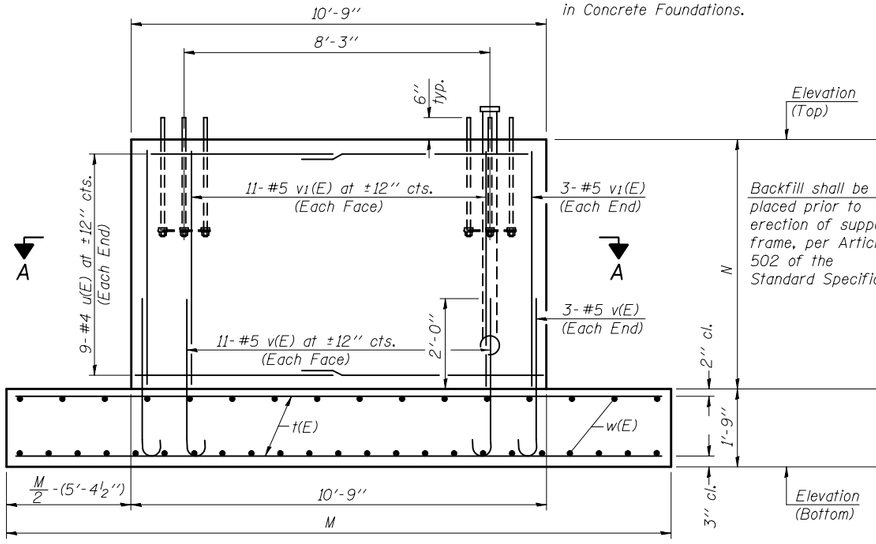
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.
ILLINOIS FED. AID PROJECT

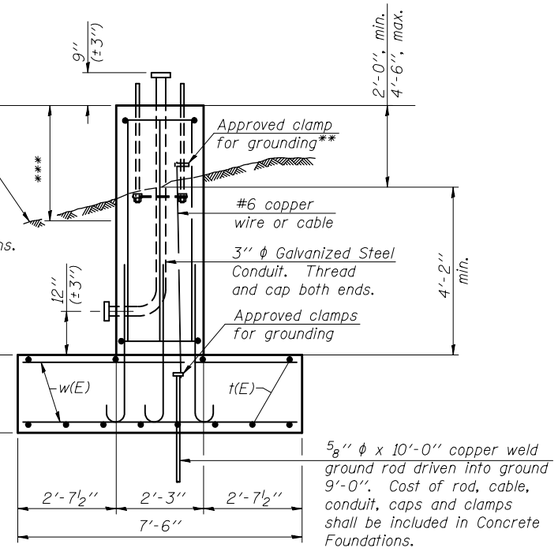
For anchor rod size and placement, see Support Frame Detail Sheet.

** Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

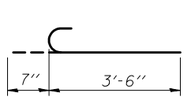
*** A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Concrete Foundations.



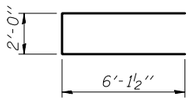
SIDE ELEVATION



END ELEVATION



BAR v(E)

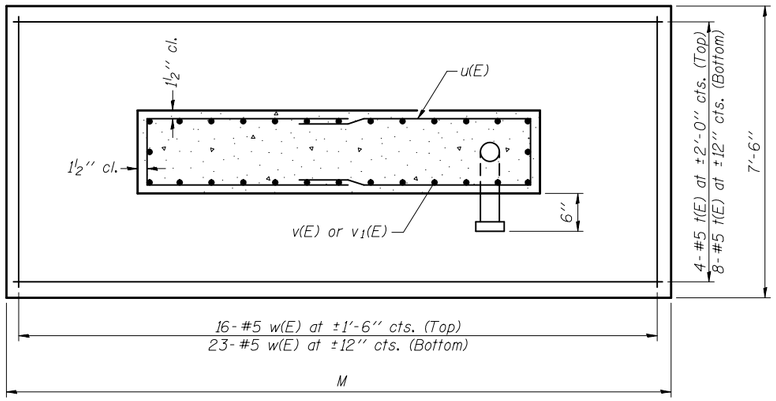


BAR u(E)

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
t(E)	12	#5	*	
u(E)	18	#4	14'-3"	
v(E)	28	#5	4'-1"	
v_1(E)	28	#5	*	
w(E)	39	#5	7'-3"	

*Length of t(E) bar = (Dim. M) - 6"
v_1(E) bar = (Dim. N) - 3"



SECTION A-A

Structure Number	Station	Left Foundation				Right Foundation				Class SI Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	N	M	Elevation Top	Elevation Bottom	N	M	

Note:
The foundation dimensions shown are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.0 tsf, 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 site specific designs.

During construction, if footing length or width or wall height change by more than 12", or if reinforcement is changed, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

DETAILS FOR 10" ϕ SUPPORT FRAME

OS-F3 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

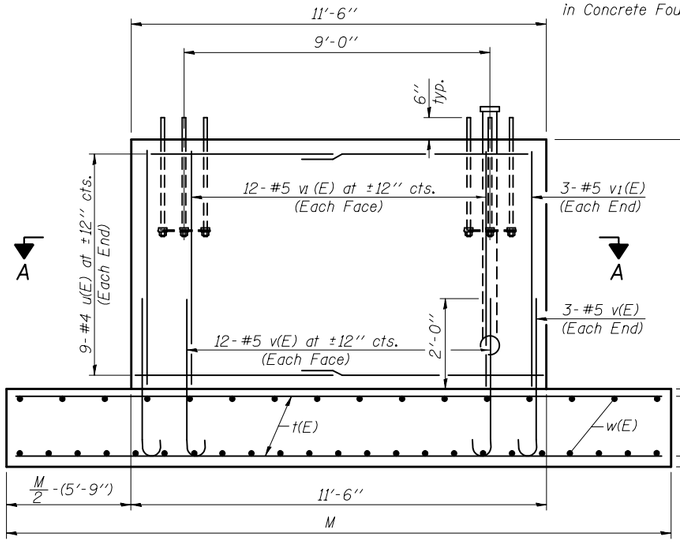
OVERHEAD SIGN STRUCTURES
SPREAD FOOTING DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

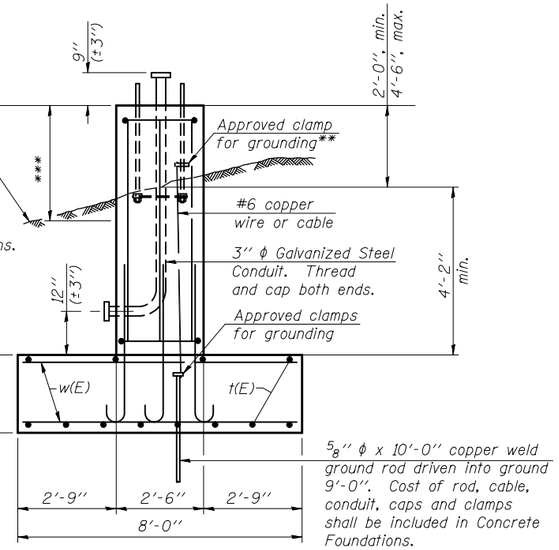
For anchor rod size and placement, see Support Frame Detail Sheet.

** Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

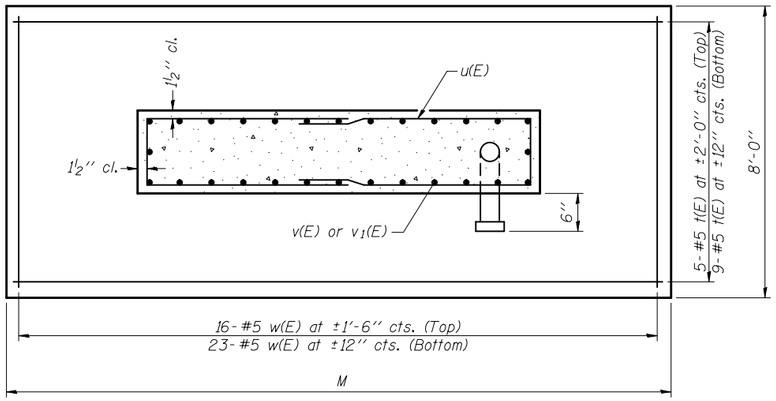
*** A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6'' below finished ground line. Cost included in Concrete Foundations.



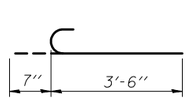
SIDE ELEVATION



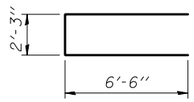
END ELEVATION



SECTION A-A



BAR v(E)



BAR u(E)

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
t(E)	14	#5	*	
u(E)	18	#4	15'-3''	
v(E)	30	#5	4'-1''	
v1(E)	30	#5	*	
w(E)	39	#5	7'-9''	

*Length of t(E) bar = (Dim. M) - 6''
v1(E) bar = (Dim. N) - 3''

Structure Number	Station	Left Foundation				Right Foundation				Class SI Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	N	M	Elevation Top	Elevation Bottom	N	M	

Note:
The foundation dimensions shown are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.0 tsf, 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 site specific designs.

During construction, if footing length or width or wall height change by more than 12'', or if reinforcement is changed, ''as-built'' plans shall be prepared and submitted to the District Bureau of Operations for future reference.

DETAILS FOR 12'' ϕ SUPPORT FRAME

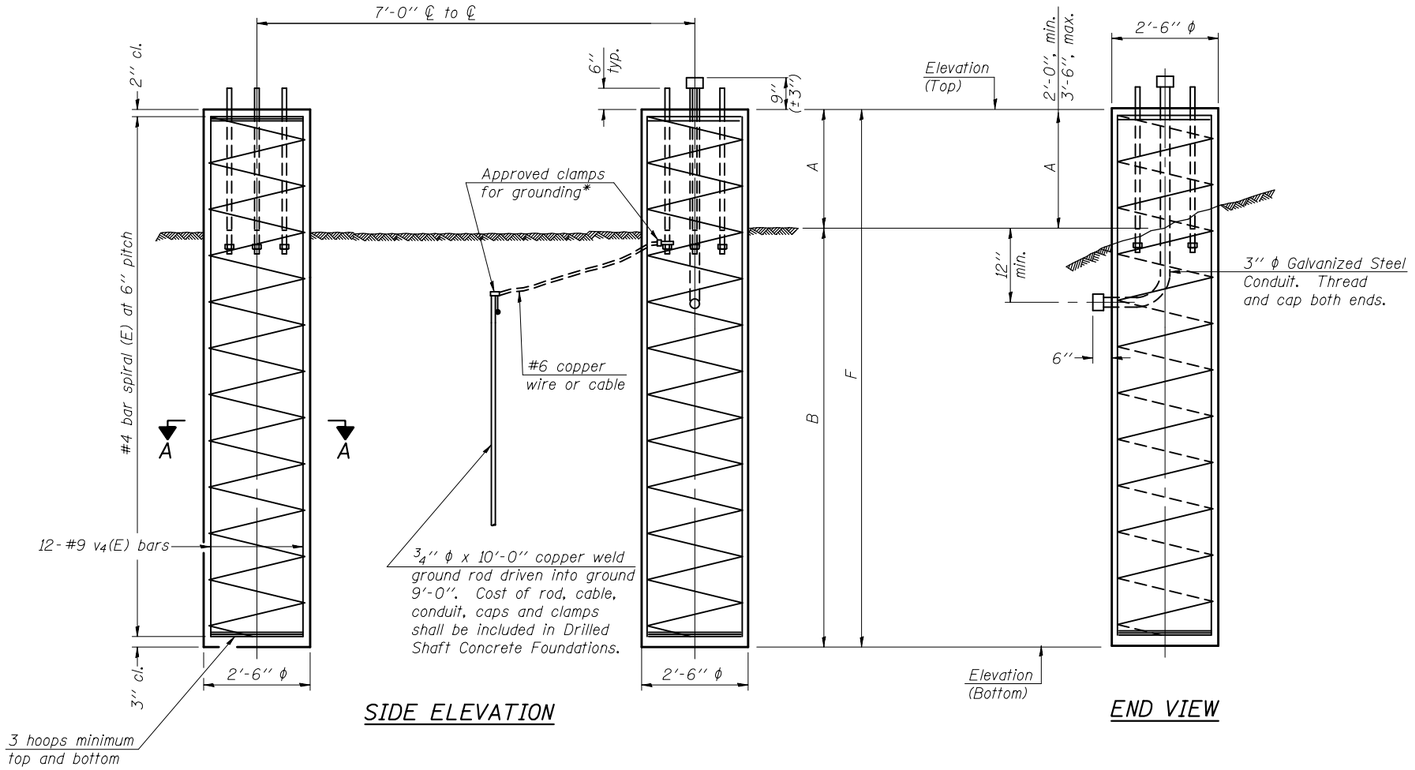
OS-F4 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

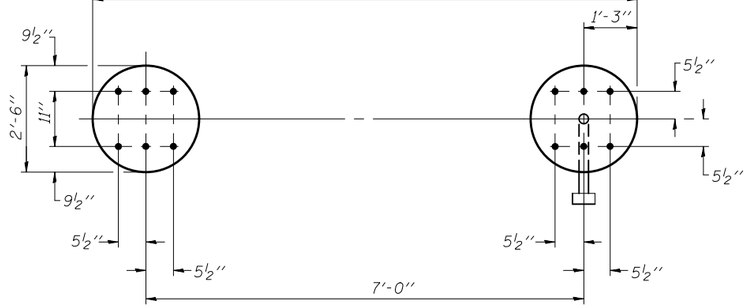
OVERHEAD SIGN STRUCTURES
SPREAD FOOTING DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



SIDE ELEVATION

END VIEW



PLAN

For anchor rod size and placement, see Support Frame Detail Sheet.

* Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
v4(E)	16	#9	F less 5"	——
#4 bar spiral (E) - see Side Elevation				

NOTES:

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 tsf, 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 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

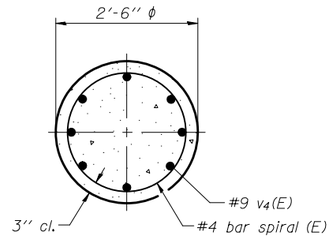
No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.



SECTION A-A

DETAILS FOR 6" ϕ SUPPORT FRAME TYPE I-A TRUSS

Structure Number	Station		Left Foundation				Right Foundation					Class DS Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	A	B	F	Elevation Top	Elevation Bottom	A	B	F	

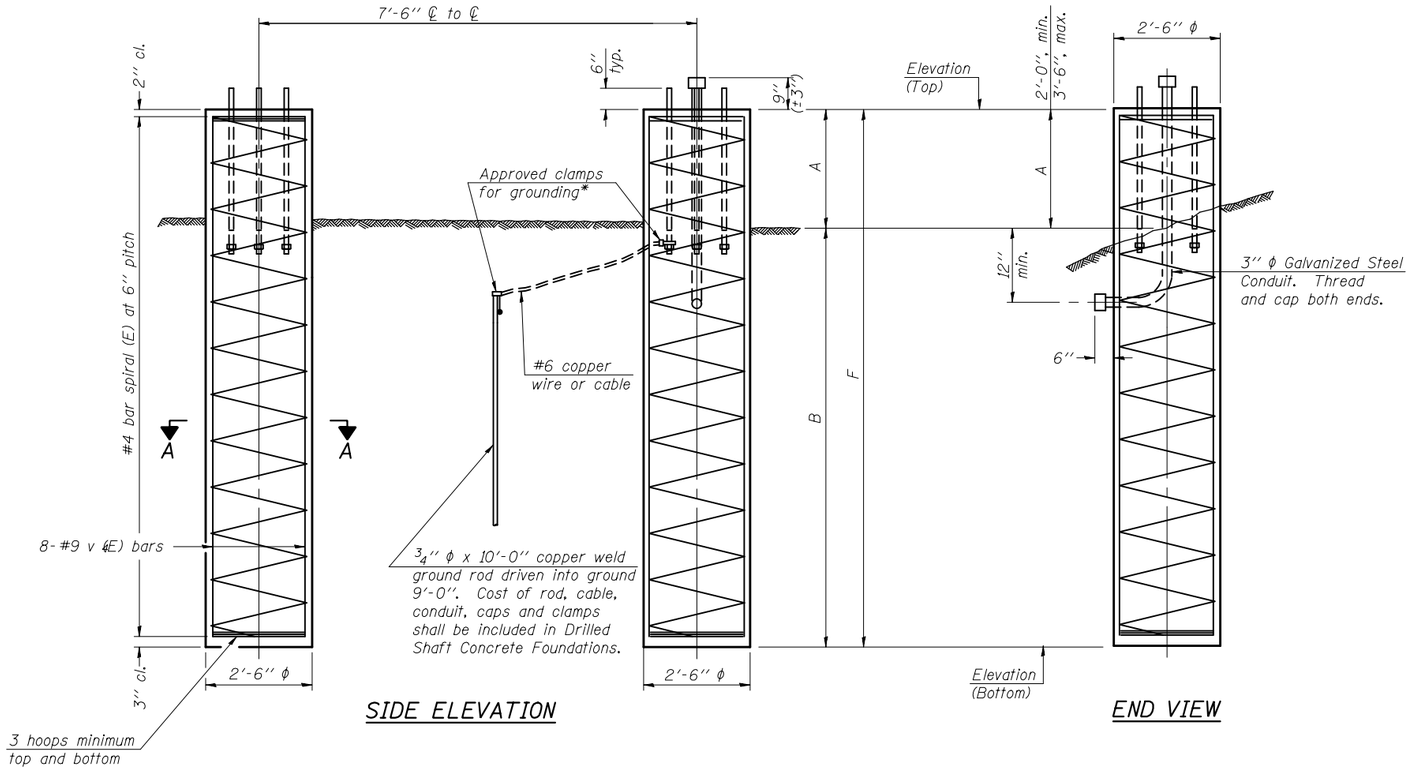
OS4-F1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

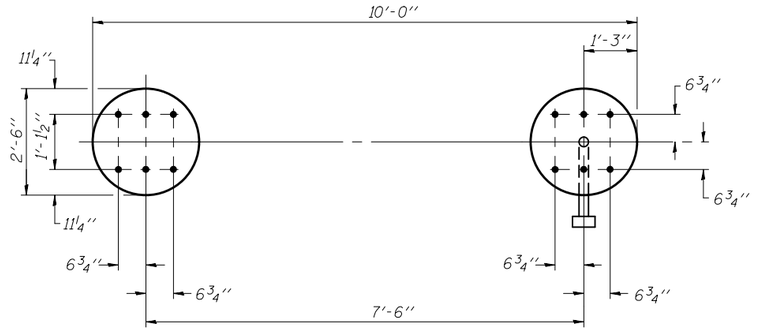
OVERHEAD SIGN STRUCTURES
DRILLED SHAFT DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



SIDE ELEVATION

END VIEW



PLAN

For anchor rod size and placement, see Support Frame Detail Sheet.

* Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
v4(E)	16	#9	F less 5"	——
#4 bar spiral (E) - see Side Elevation				

NOTES:

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 tsf, 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 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

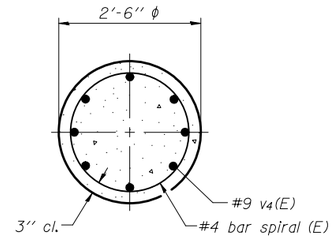
No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.



SECTION A-A

DETAILS FOR 8" ϕ SUPPORT FRAME TYPE I-A TRUSS

Structure Number	Station		Left Foundation				Right Foundation					Class DS Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	A	B	F	Elevation Top	Elevation Bottom	A	B	F	

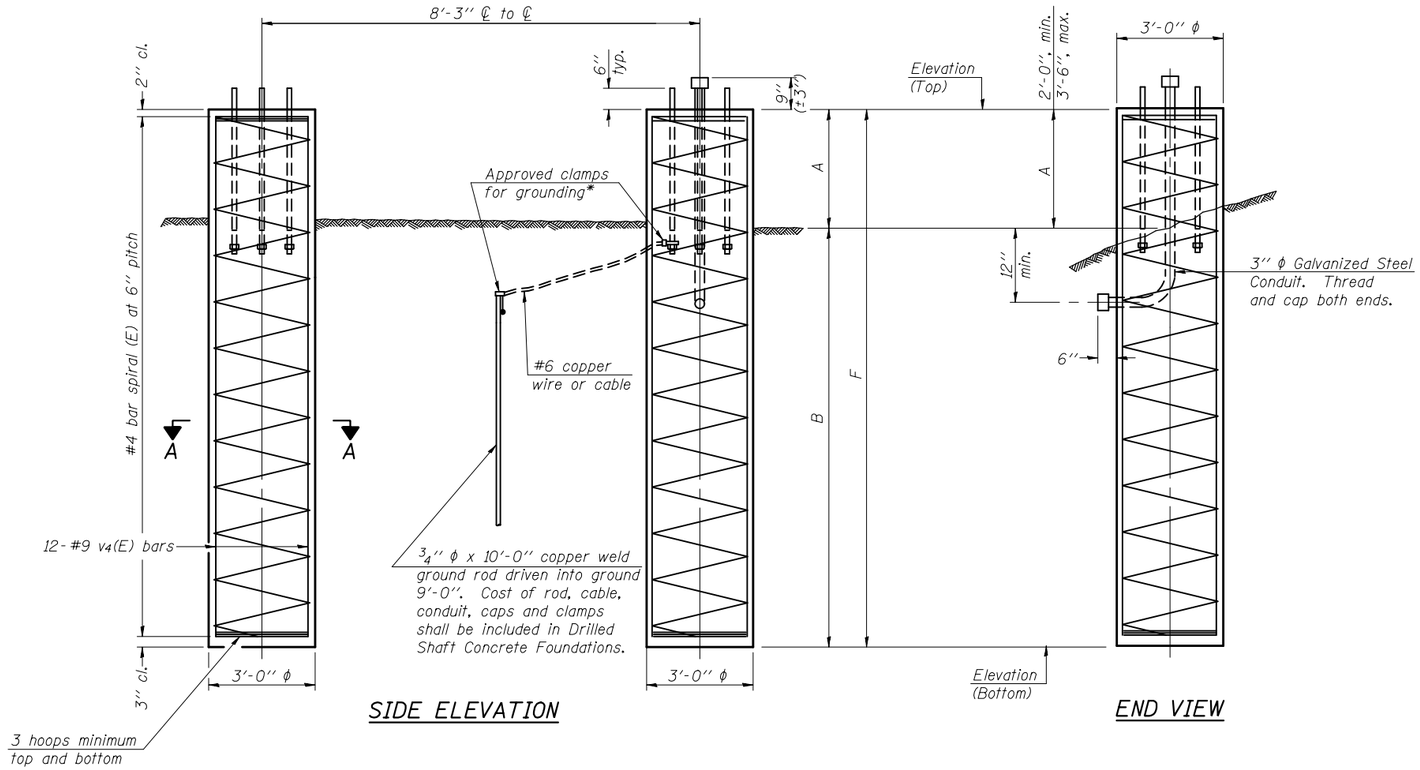
OS4-F2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

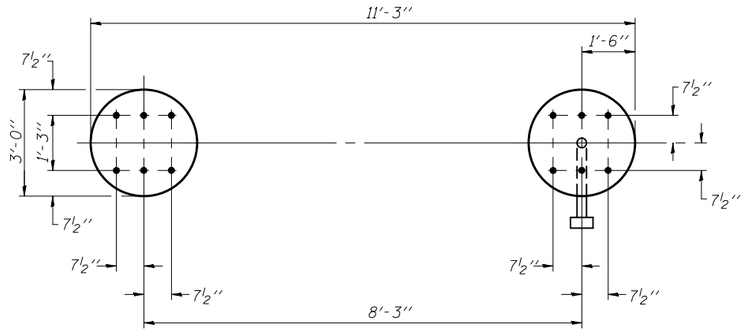
OVERHEAD SIGN STRUCTURES
DRILLED SHAFT DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



SIDE ELEVATION

END VIEW



PLAN

For anchor rod size and placement, see Support Frame Detail Sheet.

* Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
v4(E)	24	#9	F less 5"	——
#4 bar spiral (E) - see Side Elevation				

NOTES:

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 tsf, 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 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

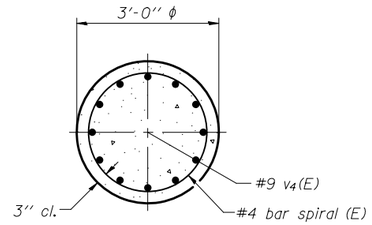
No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.



SECTION A-A

DETAILS FOR 10" ϕ SUPPORT FRAME TYPE I-A or II-A TRUSS

Structure Number	Station	Left Foundation					Right Foundation					Class DS Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	A	B	F	Elevation Top	Elevation Bottom	A	B	F	

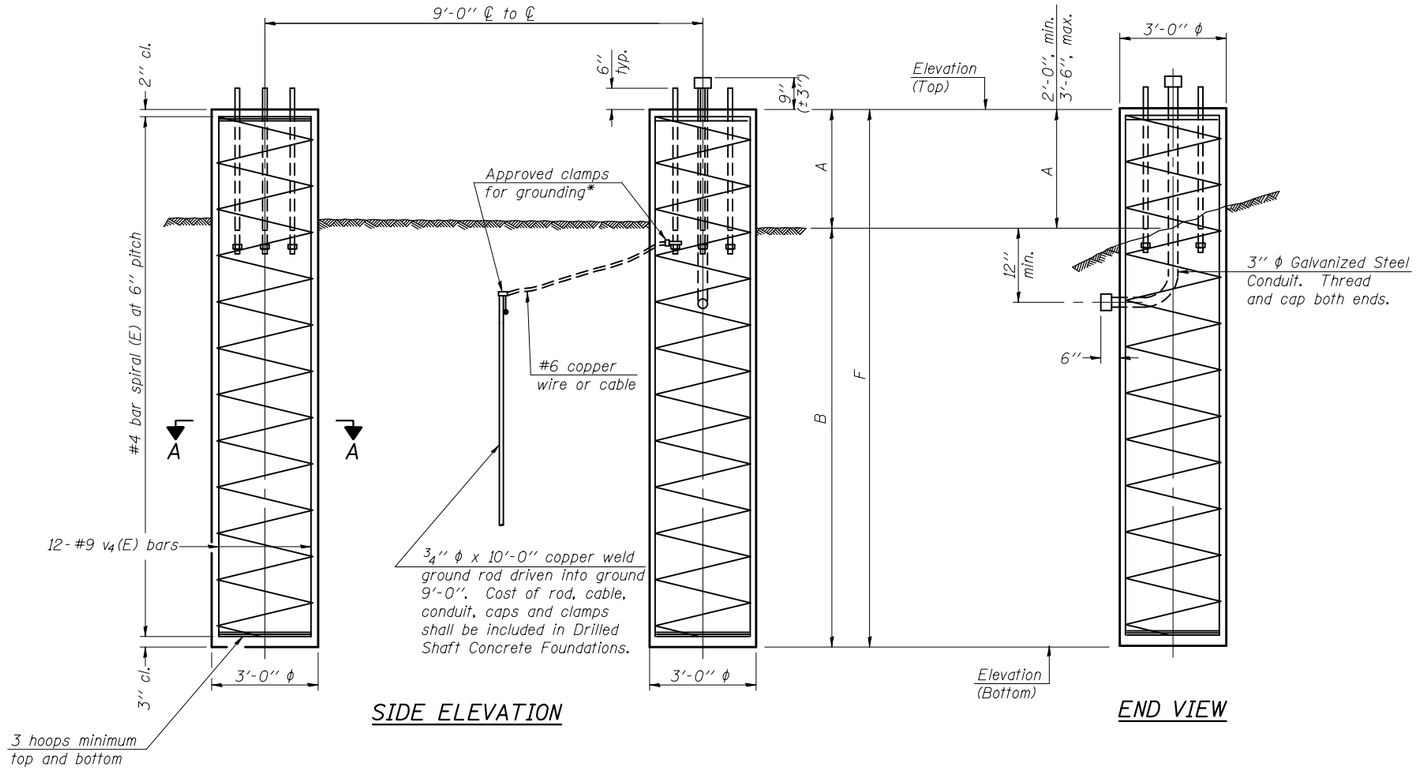
OS4-F3 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

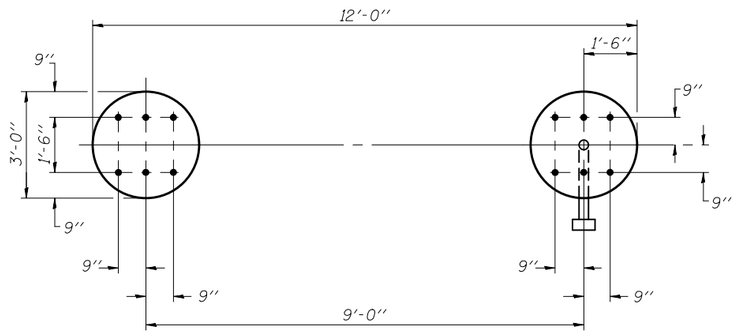
OVERHEAD SIGN STRUCTURES
DRILLED SHAFT DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



SIDE ELEVATION

END VIEW



PLAN

For anchor rod size and placement, see Support Frame Detail Sheet.

* Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
v4(E)	24	#9	F less 5"	——
#4 bar spiral (E) - see Side Elevation				

NOTES:

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 tsf, 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 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

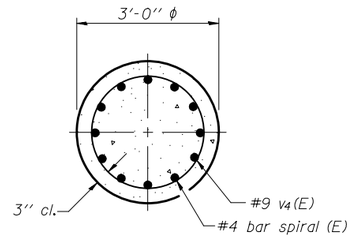
No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.



SECTION A-A

DETAILS FOR 12" ϕ SUPPORT FRAME TYPE III-A TRUSS

Structure Number	Station	Left Foundation					Right Foundation					Class DS Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	A	B	F	Elevation Top	Elevation Bottom	A	B	F	

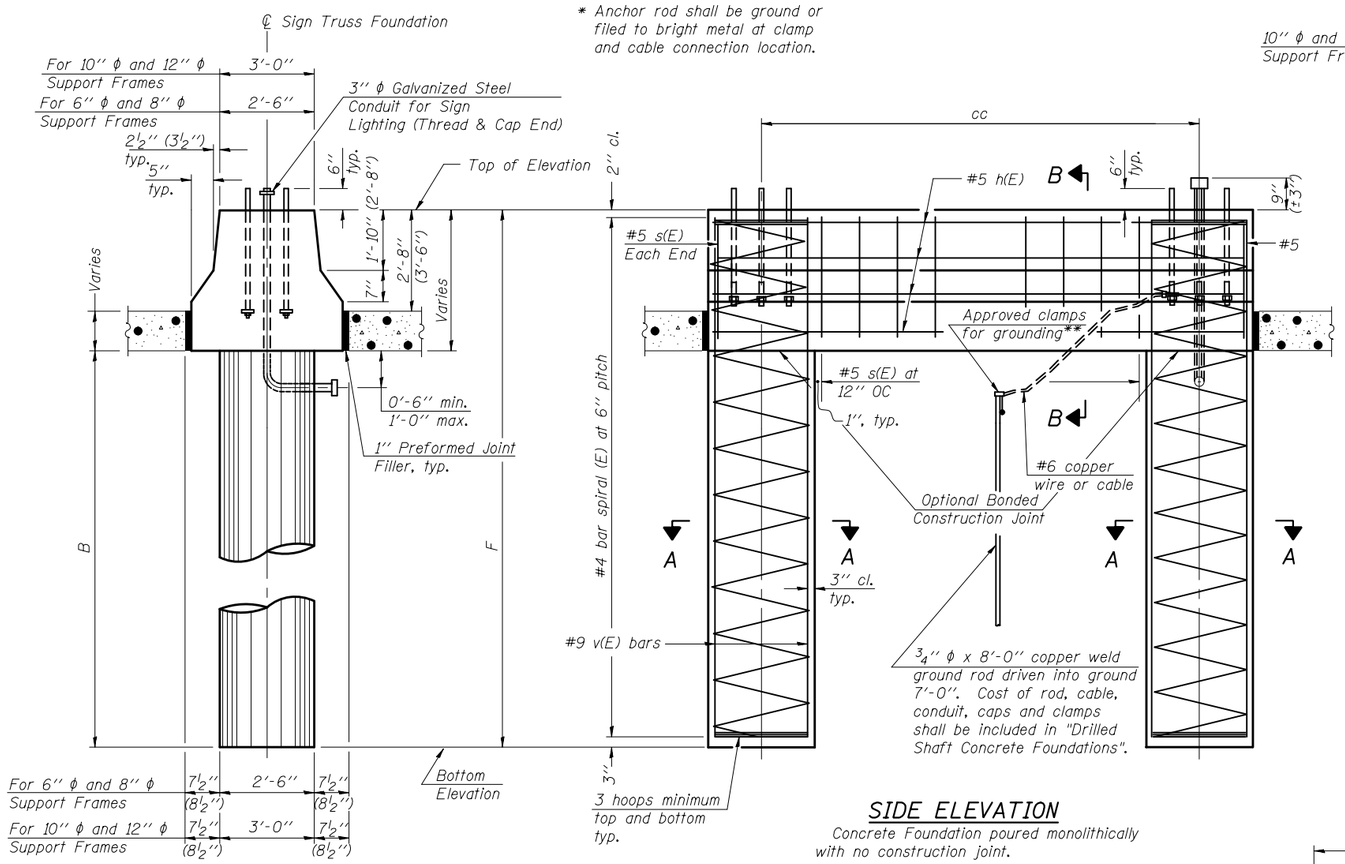
OS4-F4 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
DRILLED SHAFT DETAILS
SHEET NO. OF SHEETS

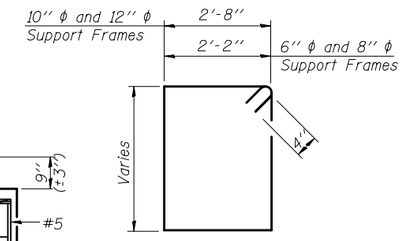
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



END VIEW

SIDE ELEVATION

Concrete Foundation poured monolithically with no construction joint.



BAR s(E)

NOTES:

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 tsf, 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 site specific designs.

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No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6'' below finished ground line. Cost included in Drilled Shaft Concrete Foundation.

BAR LIST - EACH FOUNDATION

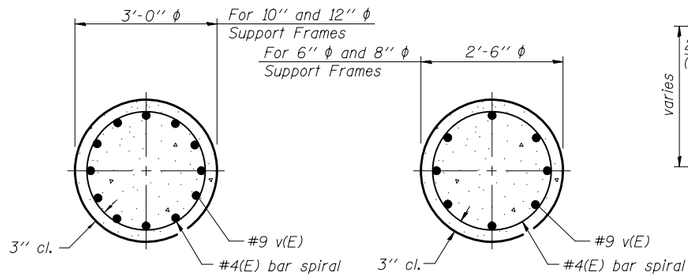
Bar	Number	Size	Length	Shape
h(E)	10	#5	M less 4''	——
s(E)	Varies	#5	Varies	□
v(E)	16	#9	F less 0'-5''	——
v(E)	24	#9	F less 0'-5''	——
#4(E) bar spiral _ see Side Elevation				

6'' ϕ and 8'' ϕ Support Frame

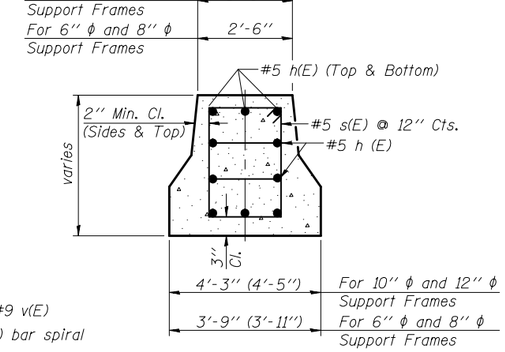
10'' ϕ and 12'' ϕ Support Frame

Pipe Support Frames	cc	M	a	a/2
6''ϕ	7'-0''	9'-6''	0'-11''	5½''
8''ϕ	7'-6''	10'-0''	1'-1½''	6¾''
10''ϕ	8'-3''	11'-3''	1'-3''	7½''
12''ϕ	9'-0''	12'-0''	1'-6''	9''

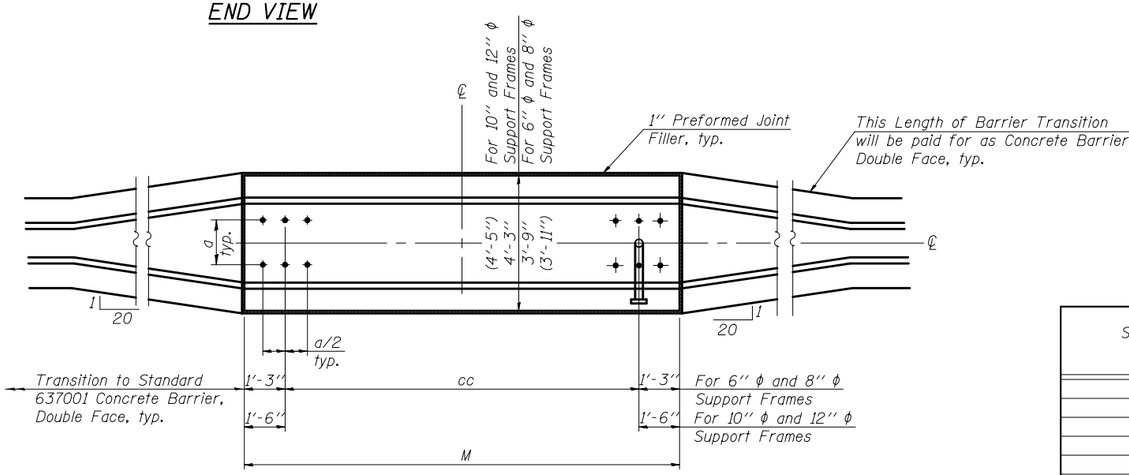
All dimensions in parenthesis are for 42'' high barrier.



SECTION A-A



SECTION B-B



PLAN

Structure Number	Station	Left Foundation				Right Foundation				Class DS Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	B	F	Elevation Top	Elevation Bottom	B	F	

OS4-MED 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

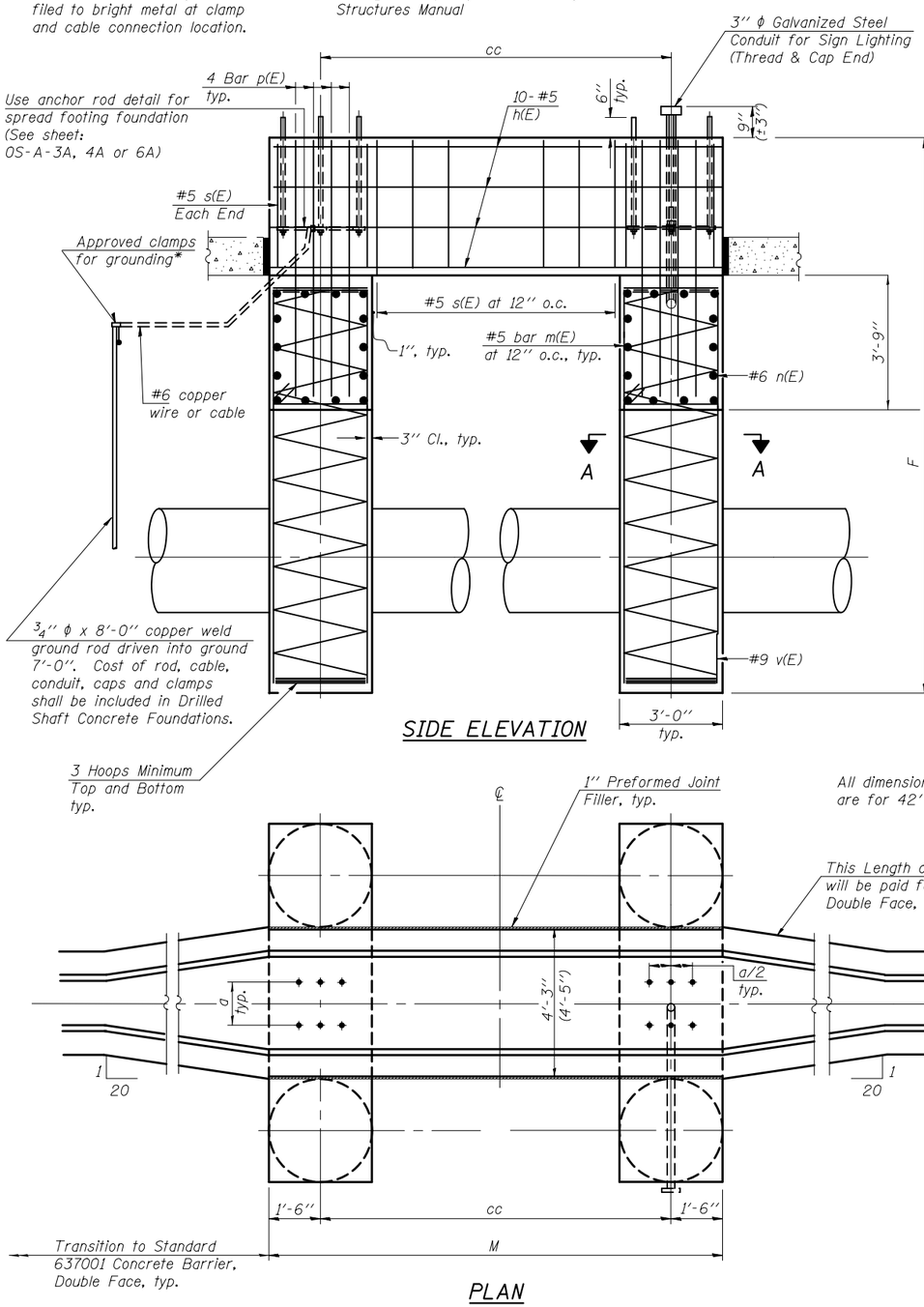
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
MEDIAN SUPPORT FOUNDATION DETAILS
SHEET NO. OF SHEETS

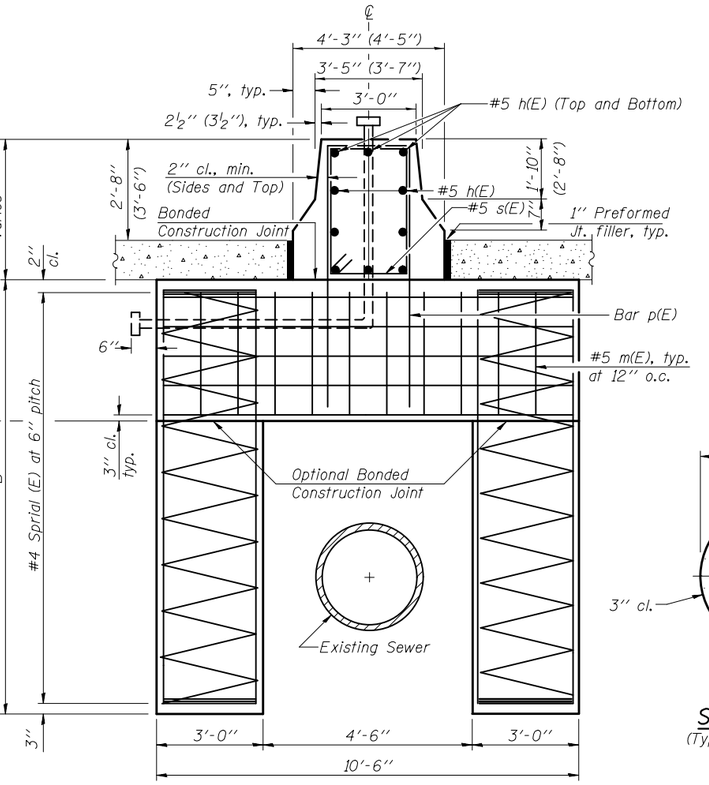
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

* Anchor rod shall be ground or filed to bright metal at clamp and cable connection location.

** B = $\frac{1}{2}$ the depth given in the Sign Structures Manual

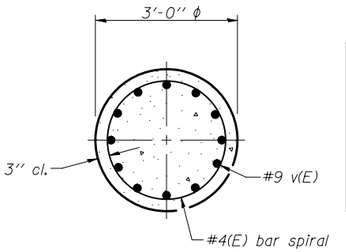


SIDE ELEVATION



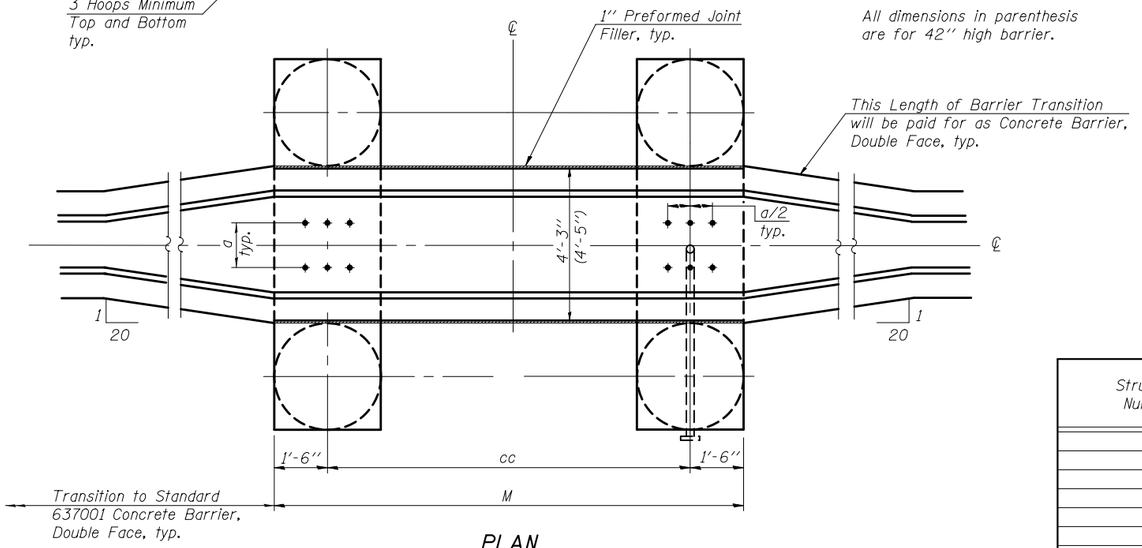
END VIEW

(Anchor rods not shown)

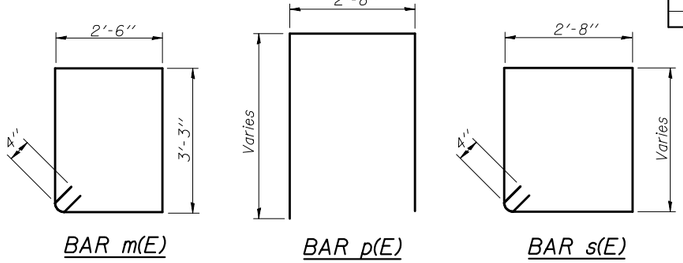


SECTION A-A

(Typical for 4 Shafts)



PLAN



BAR m(E) BAR p(E) BAR s(E)

NOTES:

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 tsf, 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 site specific designs.

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Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

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A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.

BAR LIST - EACH FOUNDATION

Bar	Number	Size	Length	Shape
h(E)	10	#5	M less 4"	——
s(E)	Varies	#5	Varies	□
v(E)	48	#9	B less 0'-5"	——
m(E)	22	#5	12'-0"	□
n(E)	28	#6	10'-0"	——
p(E)	8	#5	Varies	⊓
#4 Bar Spiral - See Side Elevation				

Pipe Support Frames	cc	M	a	a/2
6"ϕ	7'-0"	9'-6"	0'-11"	5½"
8"ϕ	7'-6"	10'-0"	1'-1½"	6¾"
10"ϕ	8'-3"	11'-3"	1'-3"	7½"
12"ϕ	9'-0"	12'-0"	1'-6"	9"

Structure Number	Station	Left Foundation				Right Foundation				Class DS Concrete (Cu. Yds.)
		Elevation Top	Elevation Bottom	B	F	Elevation Top	Elevation Bottom	B	F	

OS4-MED2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
MEDIAN SUPPORT FOUNDATION DETAILS II
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT

2.2 Aluminum Cantilever Sign Structures

When the MUTCD warrants overhead direction signs at single exits and lane drops on freeways and expressways, aluminum cantilever sign structures are the standard structure used by IDOT. Cantilever sign structures are usually more economical than span sign structures, but less economical than bridge mounted sign structures or breakaway signposts. The plan preparer should consider all MUTCD governing factors and alternatives before selecting cantilevers.

Do not use cantilever structures for installations with large walk-in changeable / dynamic / variable message sign cabinets - use only Type III-A or III-S span structures or butterfly structures with the sign centered on the column. When small, lightweight, front access LED variable message signs are proposed, use cantilever sign structures under the following limitations:

Type	Maximum Truss Length	Maximum VMS Sign Size, Weight
I-C-A	25 feet	4’ H. X 10’ W. X 1’ D. X 1200 lbs.
II-C-A	30 feet	5’ H. X 16’ W. X 1’ D. X 2000 lbs.
III-C-A	40 feet	8’ H. X 30’ W. X 1’-2” D. X 2500 lbs.

Alternate sign dimensions may be acceptable provided the proposed signs don’t exceed maximum weight and depth limitations and sign areas listed on the base sheets. Before using signs with alternate dimensions, consult with the BBS.

The use of these deeper signs will result in elimination of lighting and moving the walkway grating and handrail outward along the horizontal strut of the L-bracket. District offices may opt for plain sign brackets, with no walkway or lighting.

Use the following procedures when preparing plans:

1. Determine the 15-digit sign structure number, station, location of the sign over the roadway, distance from foundation to edge of pavement (D), design length (L), proposed height of sign (D_S), sign area and roadway cross section/Elevation A for point of minimum clearance to lowest point on sign structure (usually the sign and walkway bracket). Select the appropriate structure from the three design types shown below:

Cantilever Type	Maximum Length (feet)	Maximum Sign Area (square feet)
I-C-A	25	170
II-C-A	30	340
III-C-A	40	400

With cantilever sign trusses, the maximum sign areas in the table above apply to any span length for each given truss type. For example, the maximum sign area for a 28-foot Type II-C-A truss is 340 square feet. For a 32-foot Type III-C-A truss, the maximum sign area is 400 square feet.

2. Determine a constant panel spacing (P) by dividing the centerline column to end of truss cantilever length (L), minus the centerline column to first vertical distance ("s"), minus the last vertical to end of truss dimension (3 inches), into the least whole number of panels. Below are the panel spacing limits for each structure:

Cantilever Type	Panel Spacing (feet)
I-C-A	3.0 minimum to 4.0 maximum
II-C-A	3.5 minimum to 4.5 maximum
III-C-A	4.0 minimum to 5.5 maximum

3. Determine the column height (dimension H) using the following criteria:

   (a) Minimum vertical clearance is 17 feet 3 inches from Elevation A to sign, walkway support, or truss.

   (b) Top of foundation is a minimum of 2 feet and a maximum of 3 feet 6 inches above grade elevation at centerline of foundation.

   (c) The total column height is not to exceed 30 feet, unless allowed by the BBS. Smaller sign areas on specific projects may allow taller columns.

   (d) Use a minimum sign height of 15'-0" to calculate the column height. To calculate H from bottom of base plate to centerline bottom chord for a cantilever with walkway brackets: To Elevation A, add 17' 3" plus 1' 3" plus 7'-6" or half the height of the tallest sign (whichever is greater), minus half the truss height, minus top of foundation elevation, minus 2¾".

4. Obtain soil-boring data and determine the average Q_u per Section 1.6 for all strata within and below the "B" portion of the drilled shaft foundation. If average and minimum Q_u values meet the requirements of Section 1.6, the depths are on the drilled shaft foundation standard OSC-A-9. As described in Section 1.6, if average and minimum Q_u values do not meet the requirements, the BBS must provide a depth or a special design.

5. With the information from Steps 3(b) and 4, and/or information obtained from the BBS, determine the drilled shaft vertical limits (Elevation Top, Elevation Bottom), and dimensions "A", "B", and "F".

6. Walkway and/or truss grating have two alternate sets of plans: 1-1/2 inch deep aluminum grating and galvanized steel plank grating. The plan

preparer should consult District personnel for grating preference and select the correct sheets. Walkway grating should cover the full width of all signs and extend a minimum of 4 feet past the edge of pavement into the shoulder unless the shoulder width is less than 10 feet. If shoulder width is less than 10 feet or if the structure is on a low speed ramp, the walkway grating may begin at edge of pavement, while still covering the full width of all signs. Truss inspection grating extends full length of the truss, unless specifically exempted by the District and BBS. For projects that omit front walkway and lighting, details provide the option of plain vertical sign supports in lieu of the L-brackets.

7. Include the "Damping Device" base sheet OSC-A-D with all aluminum cantilever sign structure projects.

8. Fill in all tables on applicable base sheets including sign structure number, station, height of tallest sign, total sign area, column heights and sign bracket and foundation dimensions.

9. Calculate quantities as needed for foundations and complete the Total Bill of Material.

10. Submit proposed designs exceeding dimensional and/or loading limits to the BBS for special analysis and/or approval.

11. To provide uniformity for all aluminum cantilever sign structure plans, place the sheets in the following order:

    General Plan and Elevation (OSC- A -1)
    Aluminum Truss Details (OSC- A -2)
    Damping Device (OSC- A -D)
    Juncture Details (OSC- A -3)
    Truss Support Post Details for applicable aluminum cantilever truss types
    (i.e., OSC- A -4 for Type I-C-A, OSC- A -5 for Type II-C-A or III-C-A)
    Aluminum Walkway Details (OSC- A -6)

Alternate Steel Walkway Details (OSC- A -6S) (optional)

Aluminum Walkway Details (OSC- A -7)

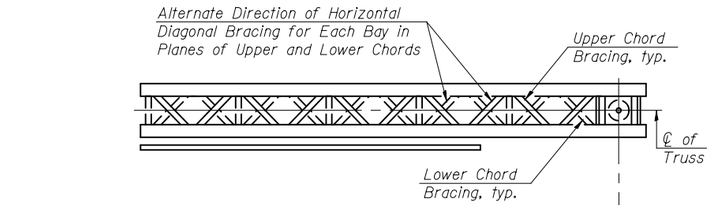
Alternate Steel Walkway Details (OSC- A -7S) (optional)

Aluminum Handrail Details (OSC- A -8)

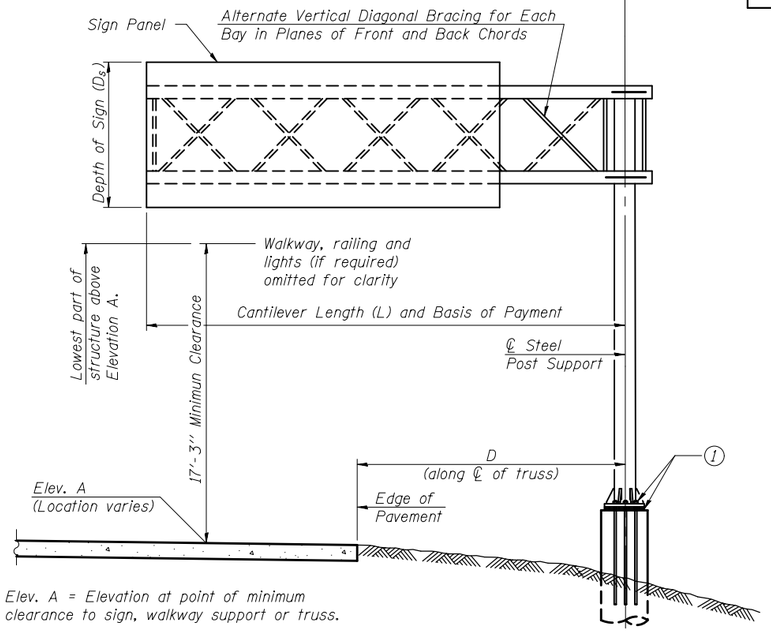
Drilled Shaft Foundation (OSC- A -9)

Aluminum Cantilever Sign Structure Base Sheets
U. S. Standard Units

SHEET TITLE



TYPICAL PLAN
(Walkway not shown)



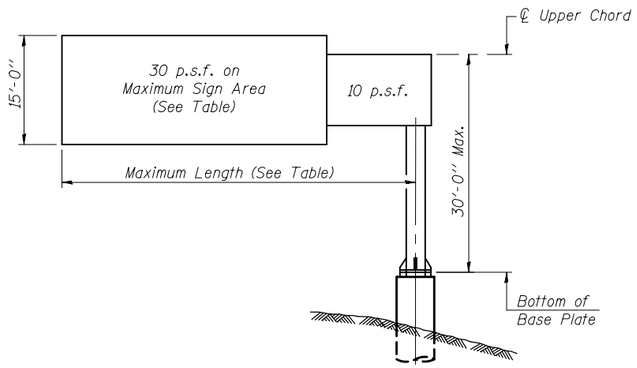
Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

TYPICAL ELEVATION
Looking in Direction of Traffic

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 vibrations and oscillations, consideration should be given to attaching temporary blank sign panels to the structure.

Structure Number	Station	Design Truss Type	Cantilever Length (L)	Elev. A	Dim. D	D_s	Total Sign Area

Truss Type	Maximum Sign Area	Maximum Length
I-C-A	170 Sq. Ft.	25 Ft.
II-C-A	340 Sq. Ft.	30 Ft.
III-C-A	400 Sq. Ft.	40 Ft.



DESIGN WIND LOADING DIAGRAM
Parameters shown are basis for I.D.O.T. Standards Installations not within dimensional limits shown require special analysis for all components.

Note:
Trusses shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The contractor is responsible for maintaining the configuration and protection of the trusses.

(1) After adjustments to level truss and insure 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.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES:
Field Units
f'_c = 3,500 p.s.i.
fy = 60,000 p.s.i. (reinforcement)

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.

MATERIALS: Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.
All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W*. 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.

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.

U-BOLTS AND 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 lock nut.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE CANTILEVER TYPE I-C-A	Foot	
OVERHEAD SIGN STRUCTURE CANTILEVER TYPE II-C-A	Foot	
OVERHEAD SIGN STRUCTURE CANTILEVER TYPE III-C-A	Foot	
OVERHEAD SIGN STRUCTURE WALKWAY, TYPE A	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

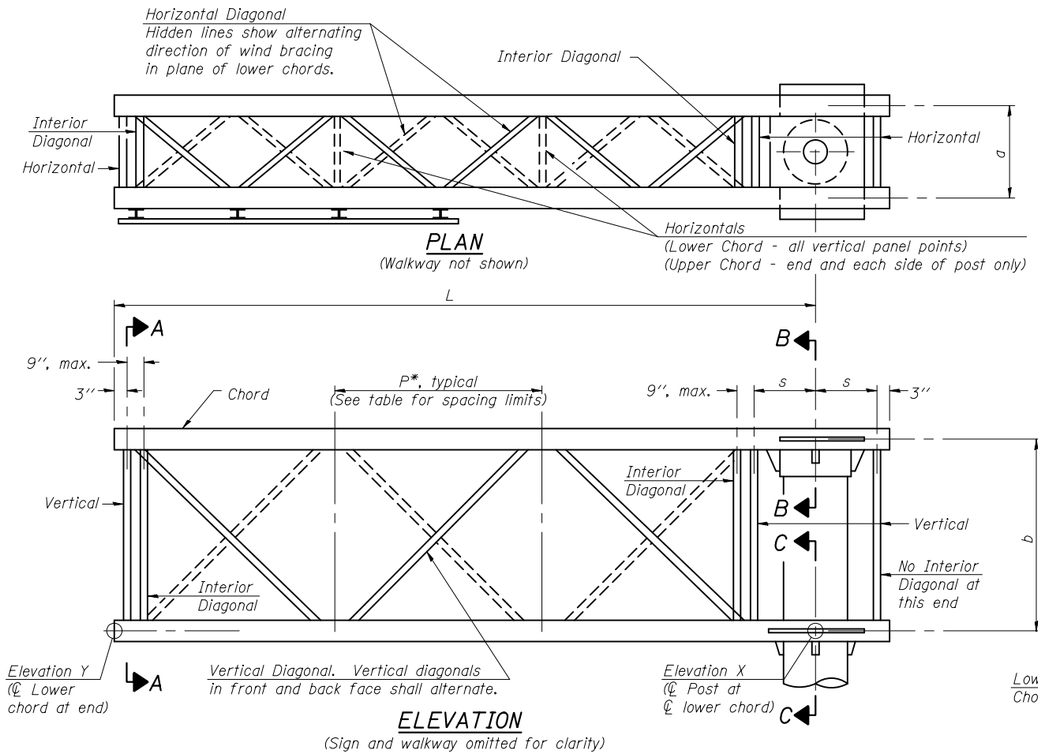
OSC-A-1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – GENERAL PLAN & ELEVATION
ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



TYPICAL TRUSS UNIT

For Section B-B and Section C-C, see Base Sheet OSC-A-3.

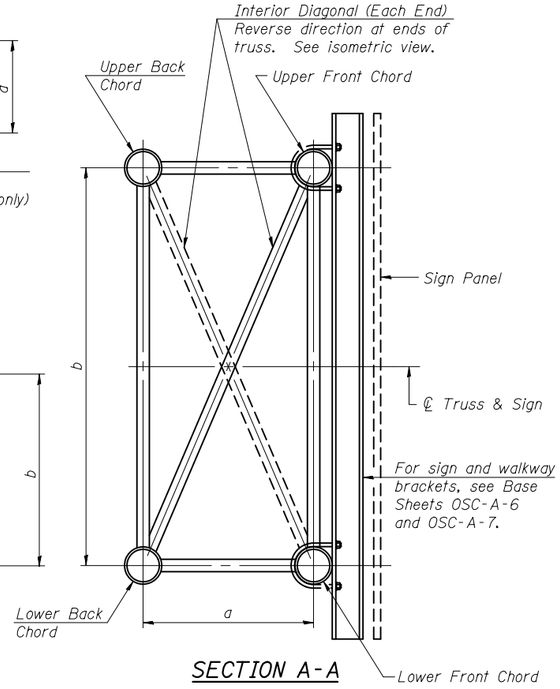
Note:
There are twice as many horizontal diagonals as there are vertical diagonals.

TRUSS UNIT TABLE

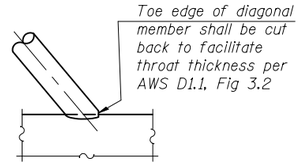
Truss Type	Dimension "a"	Dimension "b"	Dimension "s"	Limits for Panel Spacing (P)*	Up. & Low. Chord		Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals	
					O.D.	Wall	O.D.	Wall
I-C-A	24''	54''	16''	36'' min. to 48'' max.	5''	5/16''	2 1/2''	5/16''
II-C-A	36''	66''	21''	42'' min. to 54'' max.	6 1/2''	5/16''	3 1/4''	5/16''
III-C-A (35' Max.)	36''	84''	21''	48'' min. to 66'' max.	7''	3/8''	3 1/2''	3/8''
III-C-A (>35' to 40')	36''	84''	21''	48'' min. to 66'' max.	8''	3/8''	3 1/2''	3/8''

$$*P = \frac{L - s - 3''}{\#\ Panels}$$

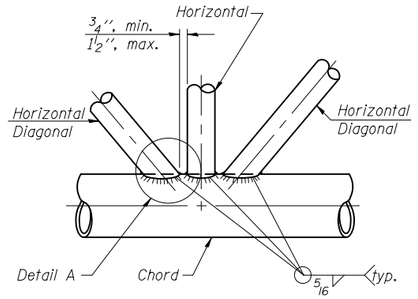
Structure Number	Station	Truss Type	Design Length (L)	Number of Panels Per Unit	Panel Length (P)*



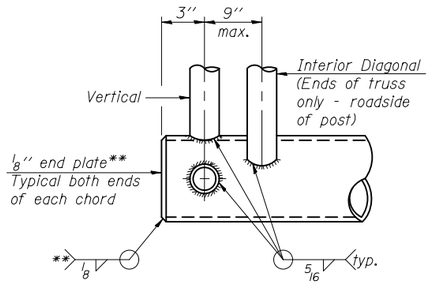
SECTION A-B



DETAIL A

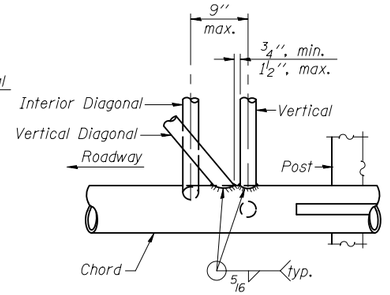


TRUSS INTERIOR JOINT DETAIL

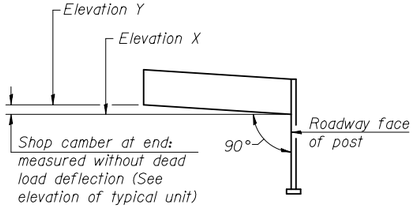


CANTILEVER END JOINT DETAIL

** Contractor may alternatively use standard aluminum drive-fit cap to close ends. 1/2'' ϕ Drain hole in end plate / drive-fit cap.



POST END JOINT DETAIL

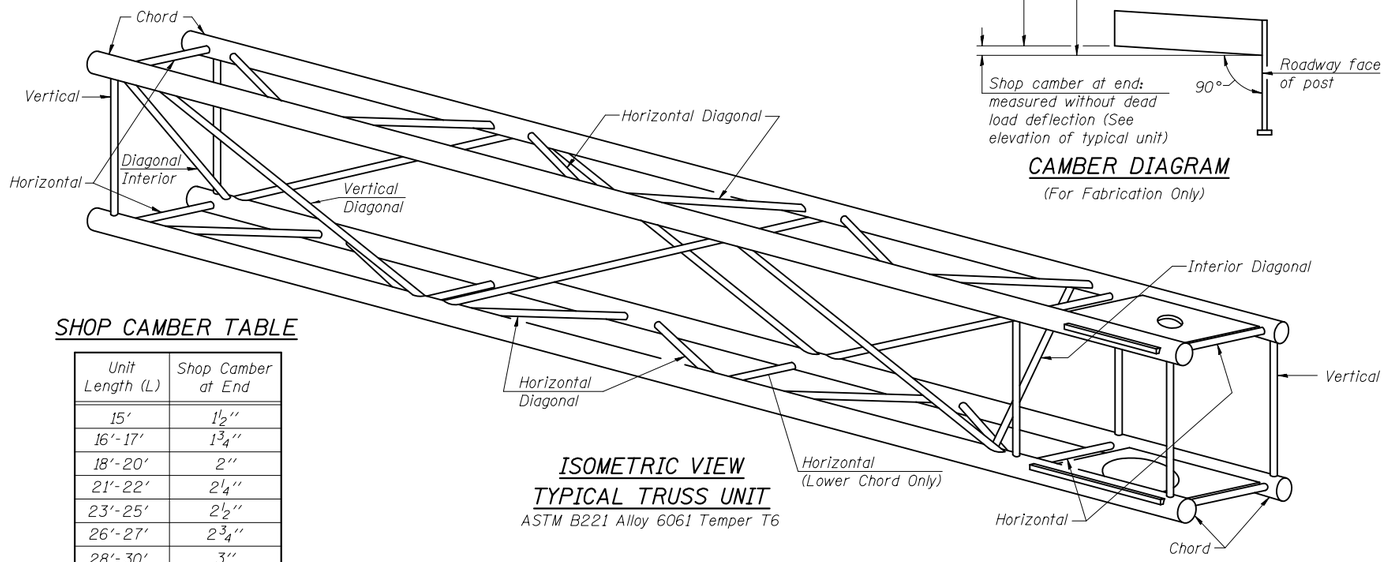


CAMBER DIAGRAM

(For Fabrication Only)

SHOP CAMBER TABLE

Unit Length (L)	Shop Camber at End
15'	1 1/2''
16'-17'	1 3/4''
18'-20'	2''
21'-22'	2 1/4''
23'-25'	2 1/2''
26'-27'	2 3/4''
28'-30'	3''
31'-32'	3 1/4''
33'-35'	3 1/2''
36'-37'	4''
38'-40'	4 1/2''



ISOMETRIC VIEW

TYPICAL TRUSS UNIT

ASTM B221 Alloy 6061 Temper T6

OSC-A-2 6-1-12

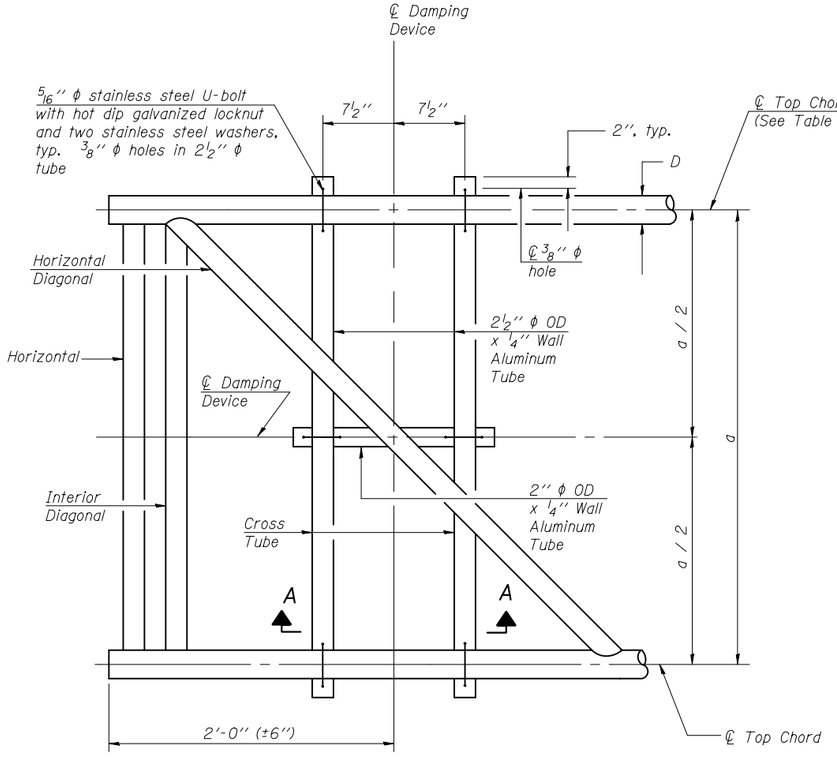
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

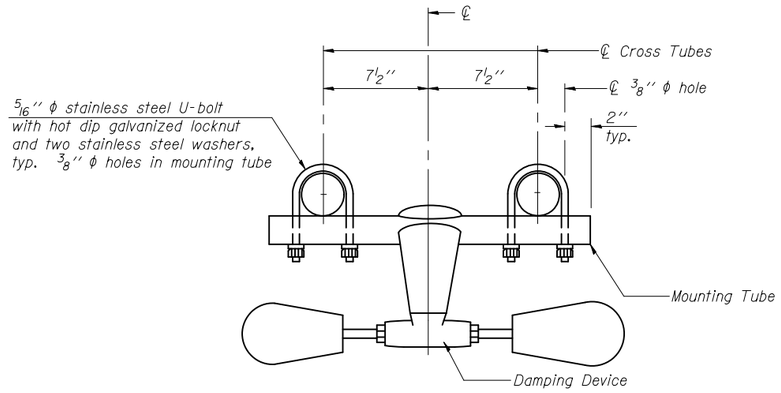
CANTILEVER SIGN STRUCTURES – TRUSS DETAILS
ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

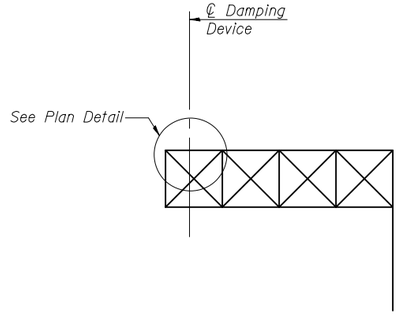
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



PLAN DETAIL



TRUSS DAMPING DEVICE CONNECTION DETAIL



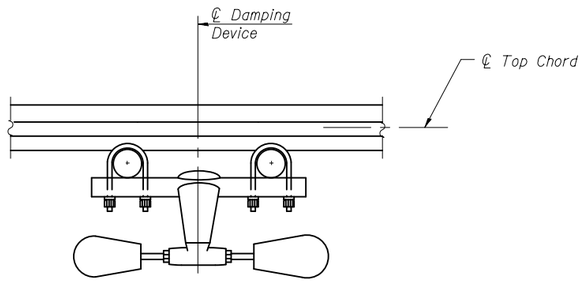
ELEVATION

Aluminum Cantilever Sign Structure

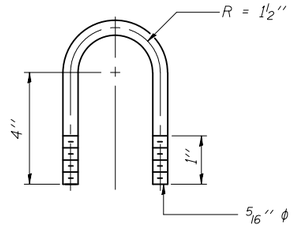
GENERAL NOTES

Damper: One damper per truss. (31 lbs. Stockbridge-Type Aluminum-29'' minimum between ends of weights)

Materials: Aluminum tubes shall be ASTM B221 alloy 6061 temper T6

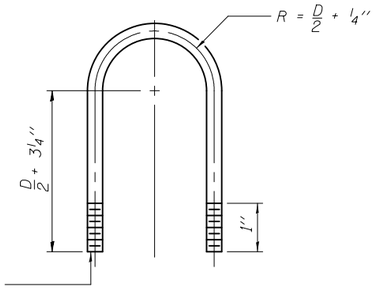


SECTION A-A



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL

(Typical)

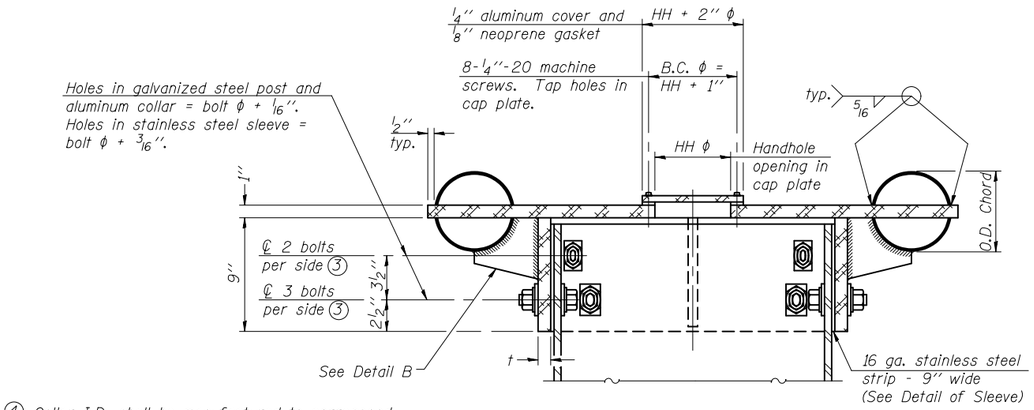


TOP CHORD TO CROSS TUBE U-BOLT DETAIL

(Typical)

OSC-A-D 6-1-12

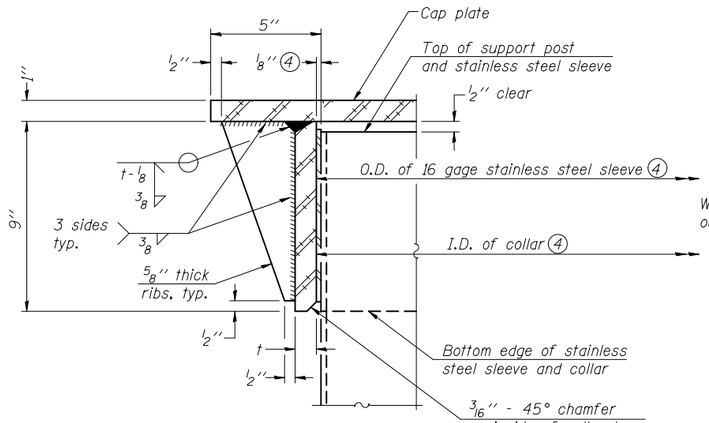
FILE NAME =	USER NAME =	DESIGNED -	REVISED	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	CANTILEVER SIGN STRUCTURE DAMPING DEVICE	F.A. RTE.	SECTION / COUNTY / TOTAL SHEETS / SHEET NO.
		CHECKED -	REVISED				
	PLOT SCALE =	DRAWN -	REVISED				CONTRACT NO.
	PLOT DATE =	CHECKED -	REVISED		SHEET NO. OF SHEETS		ILLINOIS FED. AID PROJECT



SECTION B-B

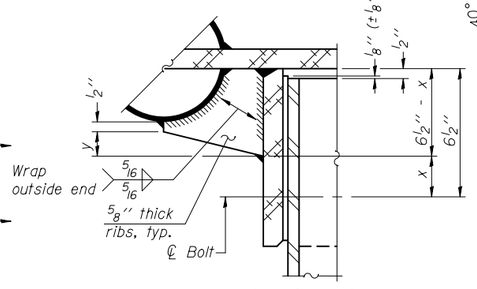
Bolts, washers (including contoured washers), and locknuts shall be stainless steel.

④ Collar I.D. shall be manufactured to correspond to O.D. of actual galvanized post and stainless steel sleeve plus 1/8'' (±1/16''). Maximum gap between post and collar at any location equals 1/8'' before tightening bolts.



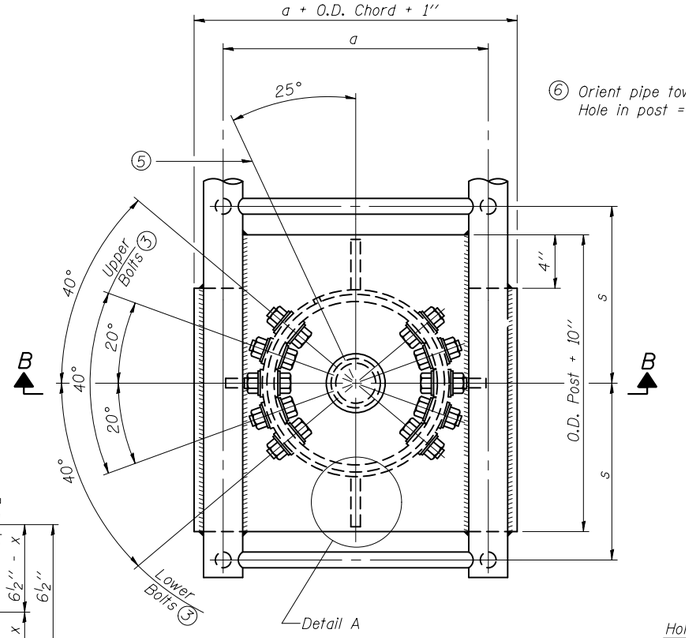
DETAIL A

(Two locations)



DETAIL B

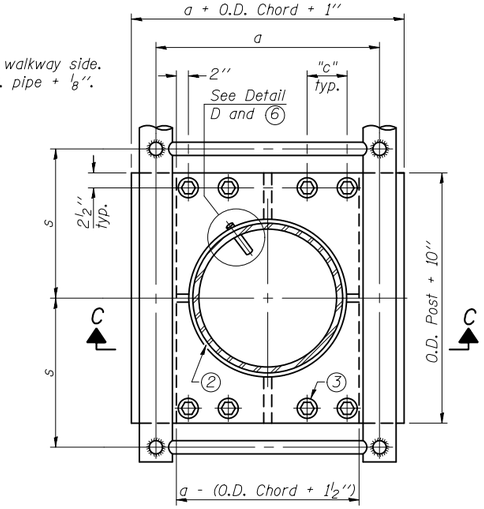
Two locations
(For details not shown, see Detail C)



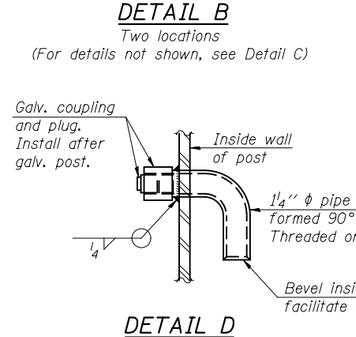
PLAN VIEW - TOP OF COLUMN

⑤ Optional full penetration weld in collar.
(Two locations maximum....(180° apart)....X-ray or UT 100%)

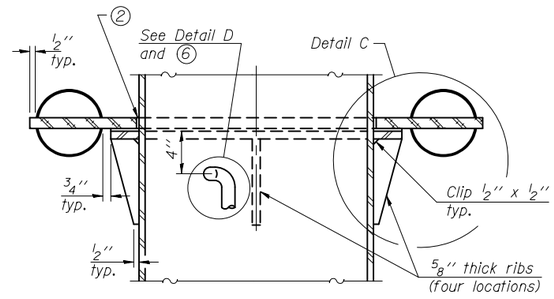
⑥ Orient pipe toward walkway side.
Hole in post = O.D. pipe + 1/8''.



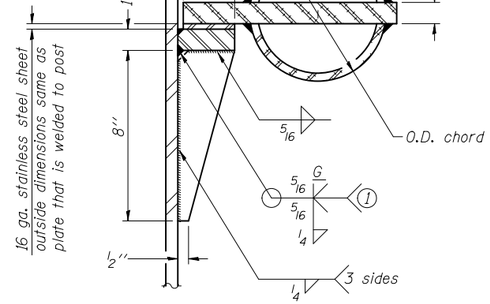
SECTION THRU POST ABOVE LOWER CHORDS



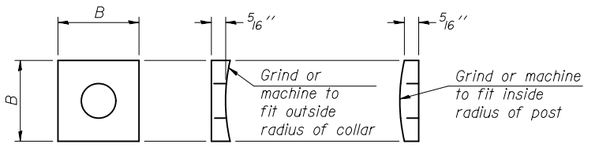
DETAIL D



SECTION C-C

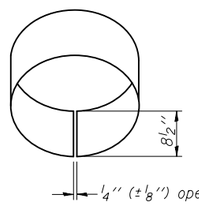


DETAIL C



CONTOURED WASHERS

Bolt Size	Contoured Washers	
	Hole Dia.	B
7/8''	1''	2 1/2''
1''	1 1/8''	3''
1 1/4''	1 3/8''	3 1/4''



DETAIL OF STAINLESS STEEL SLEEVE

Weld to post after galvanizing.
(Prepare post surface to insure tight, uniform fit and allow welding.)
Welds to be 1 1/2'' long at 6'' cts. along top edge and at 1/4'' opening.

Truss Type	Post Size	Upper & Lower Connection Bolt Diameter (3)	Lower Juncture Bolt Spacing Dimension "c" (3)	Opening in Cap Plate "HH"	Collar Thickness (t)	Side Ribs	
						x	y
I-C-A	16'' ϕ (83#/')	7/8''	3 1/4''	8''	5/8''	1 3/4''	2 1/4''
II-C-A	24'' ϕ (125#/')	1''	3 1/2''	12''	7/8''	2''	1 1/4''
III-C-A (35' max.)	24'' ϕ (125#/')	1 1/4''	3 1/2''	12''	7/8''	2''	1''
III-C-A (>35' to 40')	24'' ϕ (171#/')	1 1/4''	3 1/2''	12''	7/8''	2''	1''

(1) Grind top if required to fully seat aluminum plate and stainless steel sheet.

(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) Upper and lower connection bolts in collar and bolts at lower chord connection shall be high strength with matching locknuts. Connection bolts shall have 2 stainless steel flat washers each.

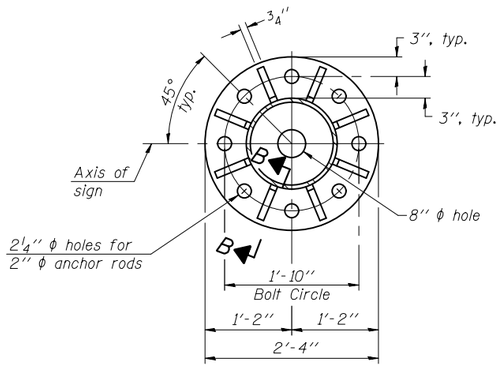
OSC-A-3 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

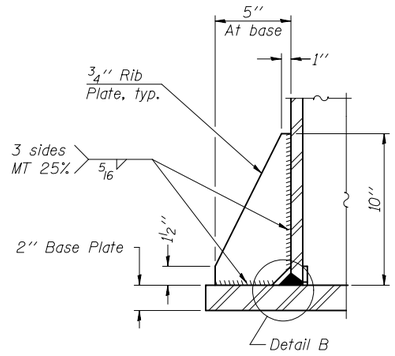
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – JUNCTURE DETAILS
ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

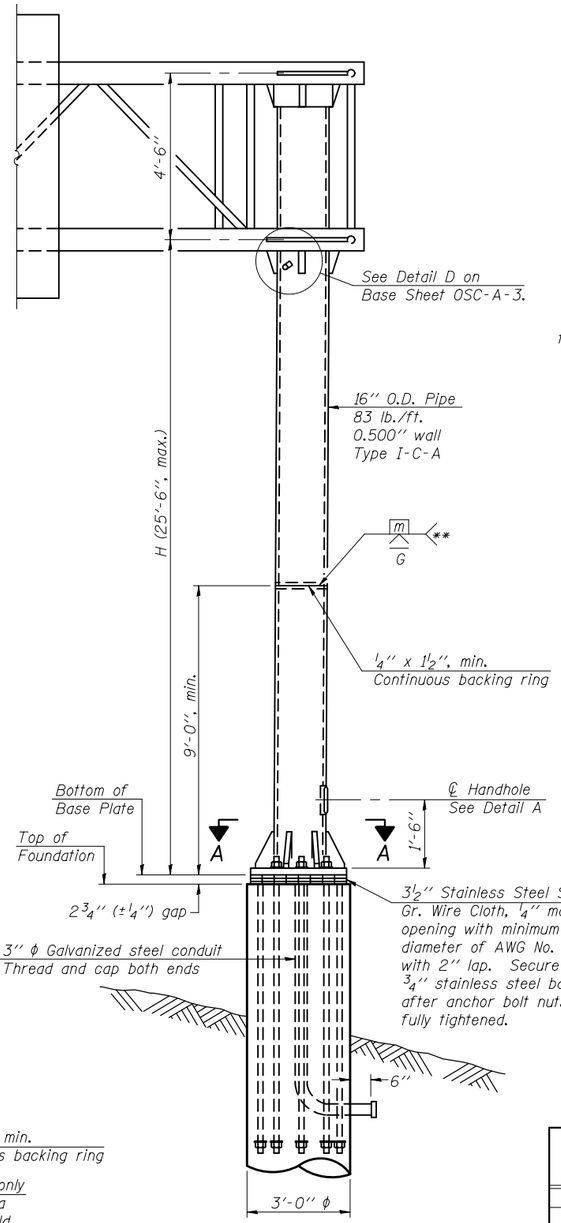
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
			CONTRACT NO.	
		ILLINOIS FED. AID PROJECT		



SECTION A-A

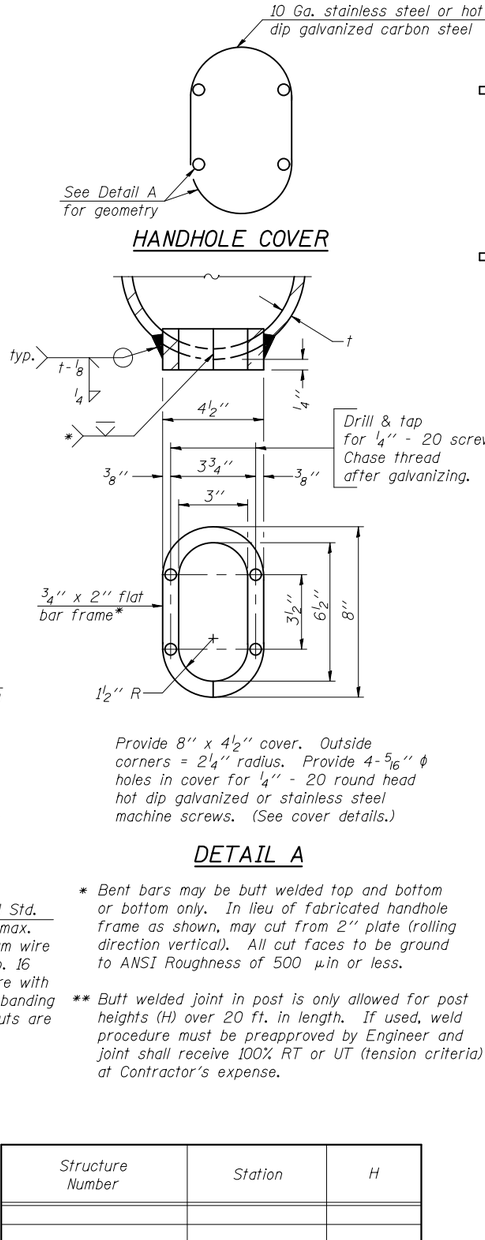


SECTION B-B



FRONT ELEVATION

For Foundation Details see Base Sheet OSC-A-9.

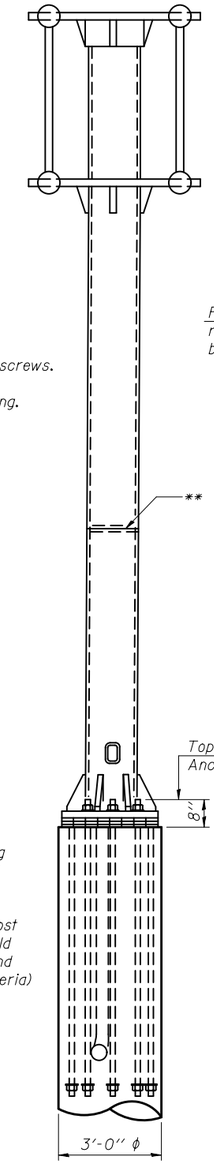


HANDHOLE COVER

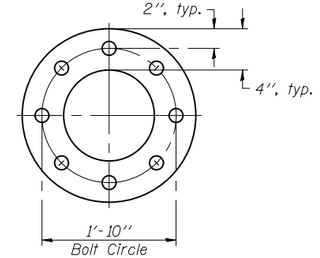
DETAIL A

* 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.

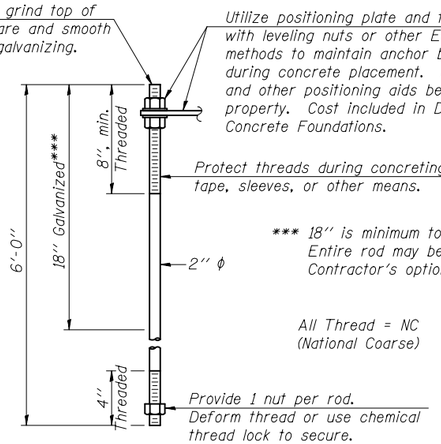
** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.



SIDE ELEVATION

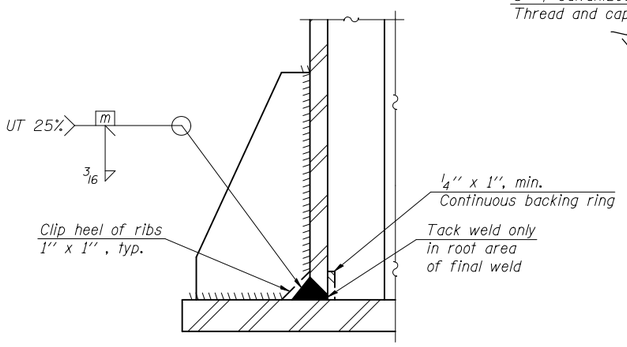


SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.



DETAIL B

(Typical rib)

Structure Number	Station	H

Note: "H" based on 15'-0" or actual sign height, whichever is greater.

OSC-A-4 6-1-12

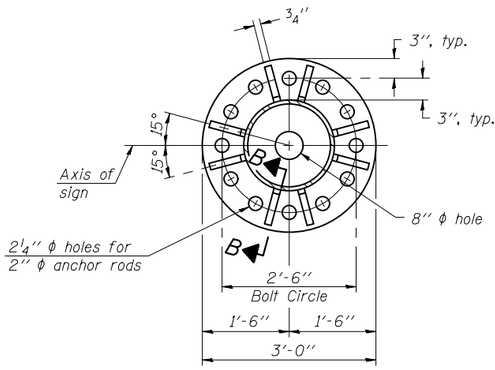
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

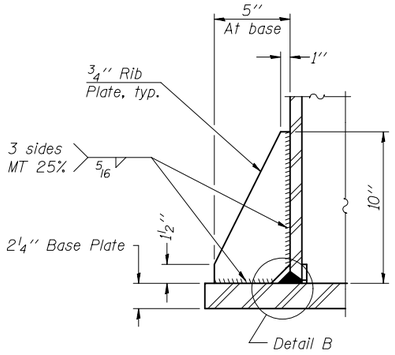
CANTILEVER SIGN STRUCTURES – TYPE I-C-A TRUSS
SUPPORT POST – ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

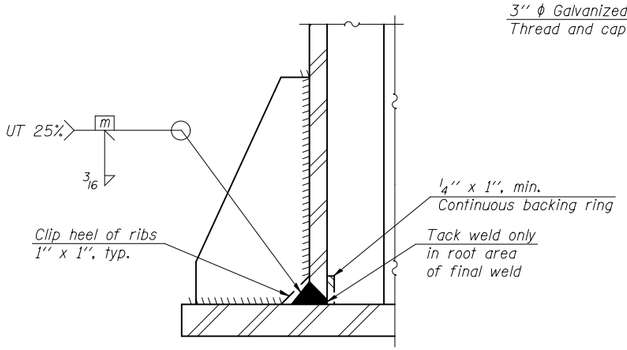
CONTRACT NO.
ILLINOIS FED. AID PROJECT



SECTION A-A

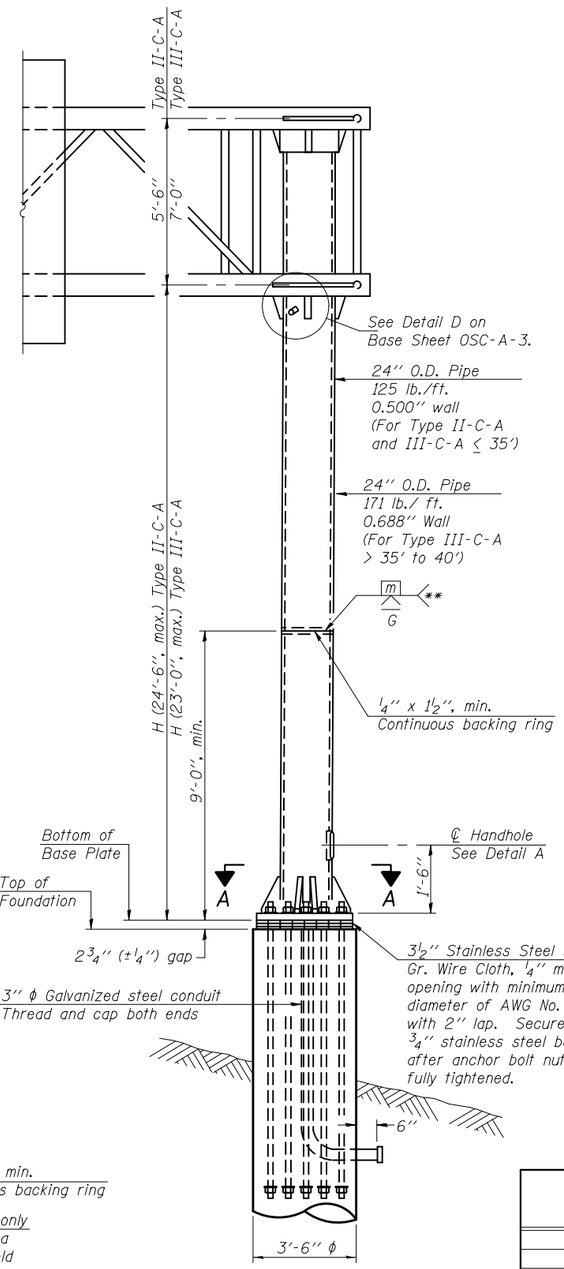


SECTION B-B



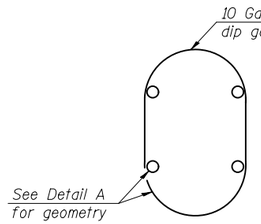
DETAIL B

(Typical rib)

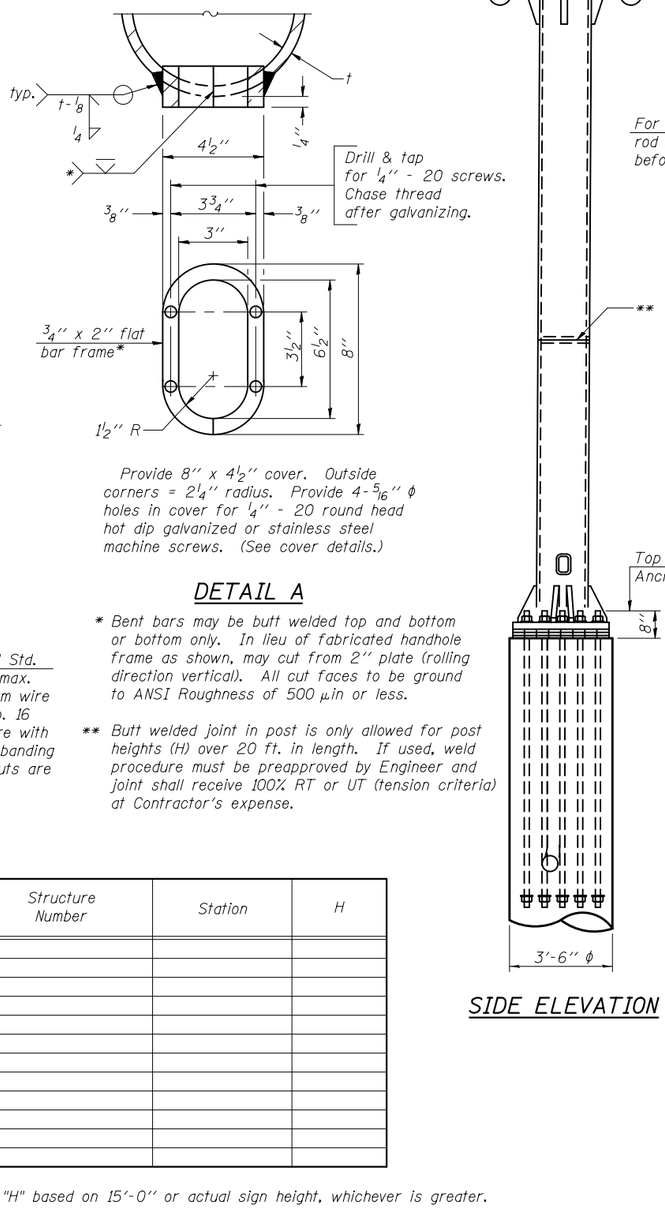


FRONT ELEVATION

For Foundation Details see Base Sheet OSC-A-9.



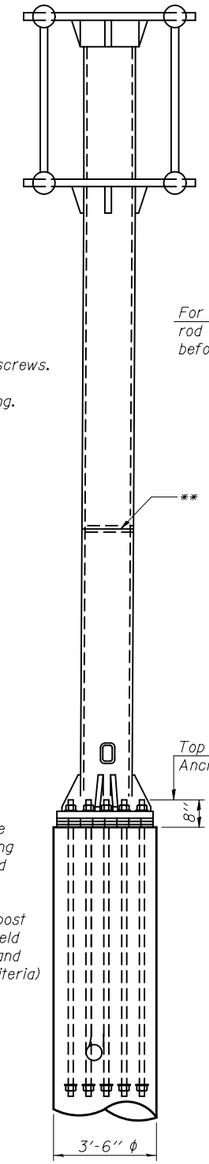
HANDHOLE COVER



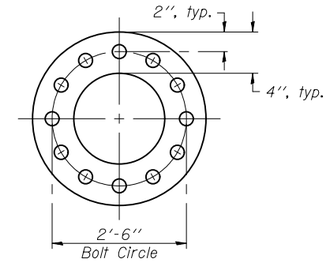
DETAIL A

* 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.

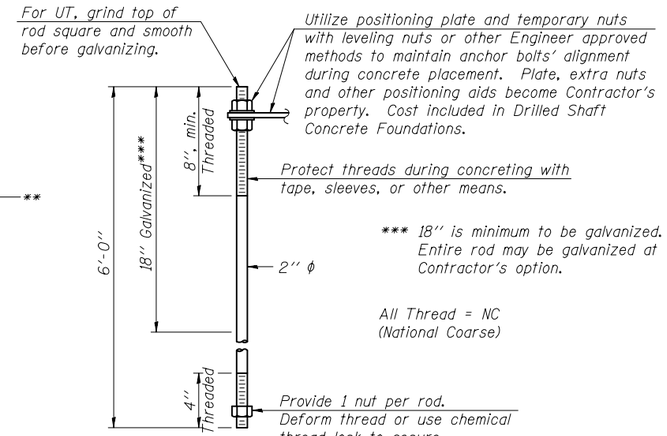
** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.



SIDE ELEVATION



SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.

Structure Number	Station	H

Note: "H" based on 15'-0'' or actual sign height, whichever is greater.

OSC-A-5 6-1-12

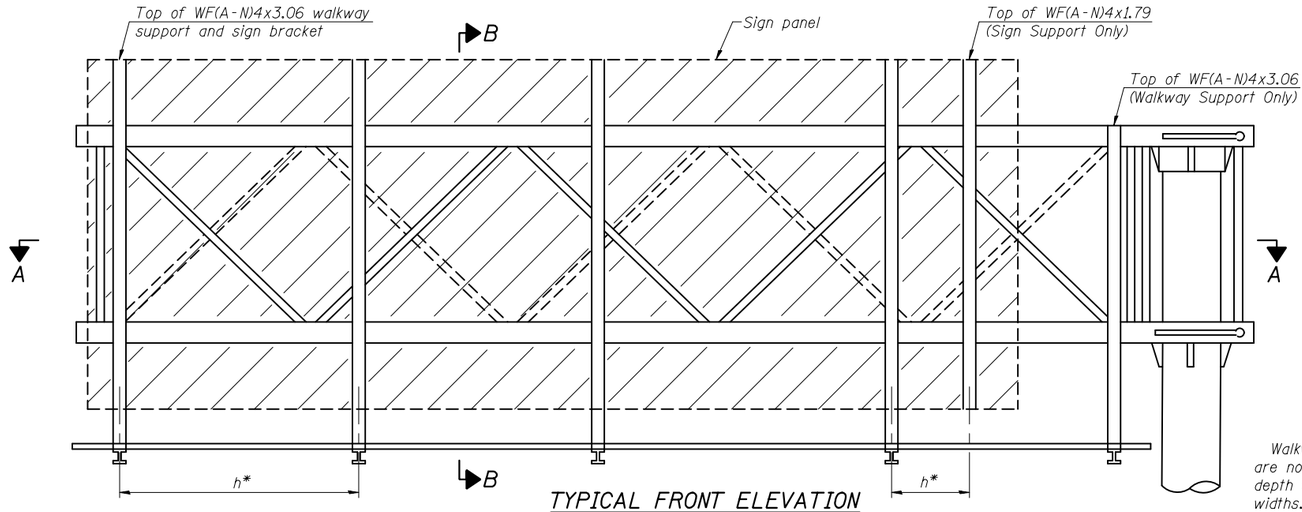
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – TYPE II-C-A & III-C-A
TRUSS SUPPORT POST – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

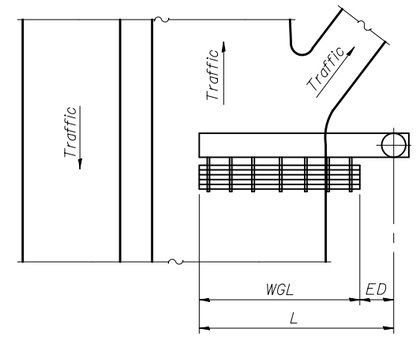
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



TYPICAL FRONT ELEVATION

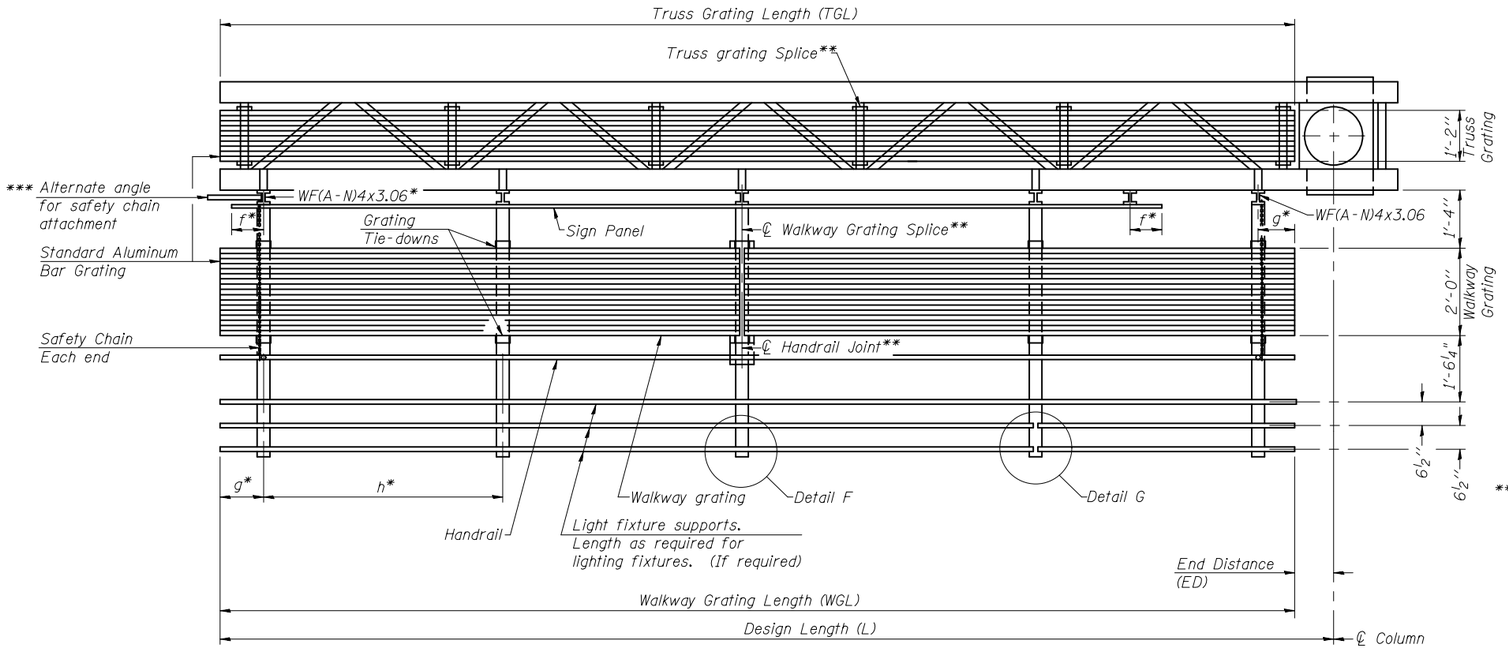
With lights and handrail omitted for clarity.

Walkway and truss grating dimensions are nominal and may vary (width ±½", depth ±½") based on available standard widths.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)



SECTION A-A

Truss grating to facilitate inspection shall run full length of cantilevers. Cost of truss grating is included in Overhead Sign Structure Cantilever.

Handrail and walkway grating shall span a minimum of three brackets between splices.

** Use and location of handrail joints or grating splices are optional, based on lengths needed and material availability.

$$TGL = L - \left(\frac{\text{Post O.D.}}{2} + 6''\right)$$

Structure Number	Station	WGL	ED	TGL

Notes:

* Space walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 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 to ℄ of nearest bracket)
h = 6'-0" maximum (℄ to ℄ sign and/or walkway support brackets. WF(A-N)4x1.79 or WF(A-N)4x3.06)

*** If walkway bracket at safety chain location is behind sign, add angle to bracket. See alternate safety chain attachment on base sheet OSC-A-8

For details of sign placement, sign/walkway brackets, truss and walkway gratings, grating splices and Section B-B, see Base Sheet OSC-A-7.

For details of handrail, handrail joint, safety chain and Details F and G, see Base Sheet OSC-A-8.

BRACKET TABLE

WF(A-N)4x1.79 or WF(A-N)4x3.06
ASTM B308, Alloy 6061-T6

Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

OSC-A-6 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

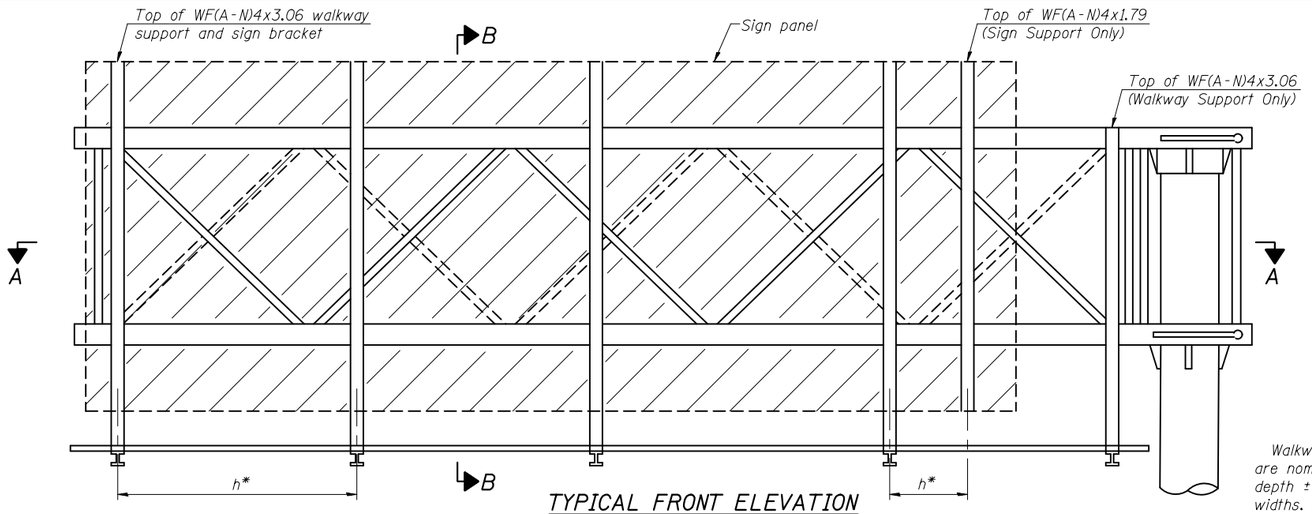
CANTILEVER SIGN STRUCTURES – ALUMINUM WALKWAY
DETAILS – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

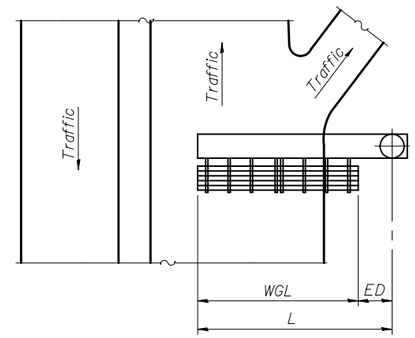
ILLINOIS FED. AID PROJECT



TYPICAL FRONT ELEVATION

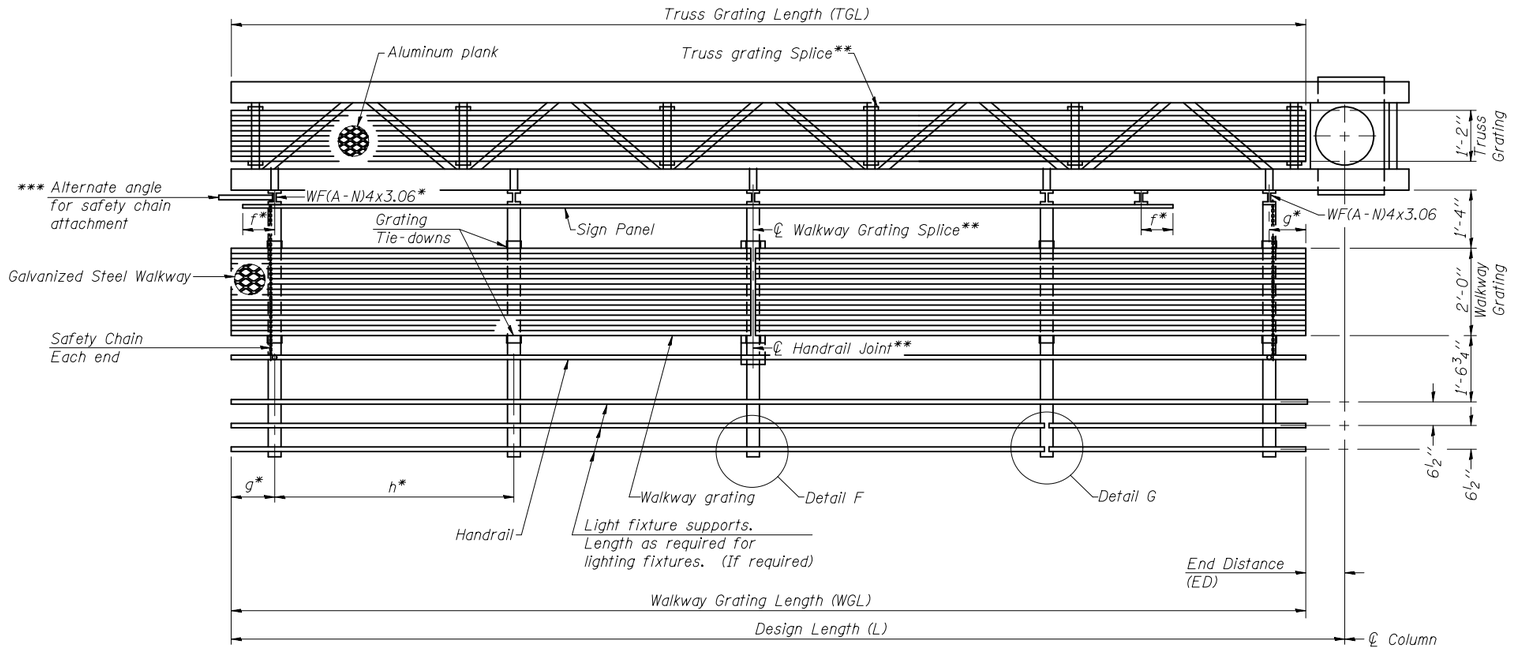
With lights and handrail omitted for clarity.

Walkway and truss grating dimensions are nominal and may vary (width ±½", depth ±½") based on available standard widths.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)



SECTION A-A

Truss grating to facilitate inspection shall run full length of cantilevers. Cost of truss grating is included in Overhead Sign Structure Cantilever.

Handrail and walkway grating shall span a minimum of three brackets between splices.
** Use and location of handrail joints or grating splices are optional, based on lengths needed and material availability.

$$TGL = L - \left(\frac{\text{Post O.D.}}{2} + 6''\right)$$

Structure Number	Station	WGL	ED	TGL

Notes:

* Space walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 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 to ℄ of nearest bracket)
h = 6'-0" maximum (℄ to ℄ sign and/or walkway support brackets, WF(A-N)4x1.79 or WF(A-N)4x3.06)

*** If walkway bracket at safety chain location is behind sign, add angle to bracket. See alternate safety chain attachment on base sheet OSC-A-8.

For details of sign placement, sign/walkway brackets, truss and walkway gratings, grating splices and Section B-B, see Base Sheet OSC-A-7S.
For details of handrail, handrail joint, safety chain and Details F and G, see Base Sheet OSC-A-8.

BRACKET TABLE

WF(A-N)4x1.79 or WF(A-N)4x3.06
ASTM B308, Alloy 6061-T6

Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

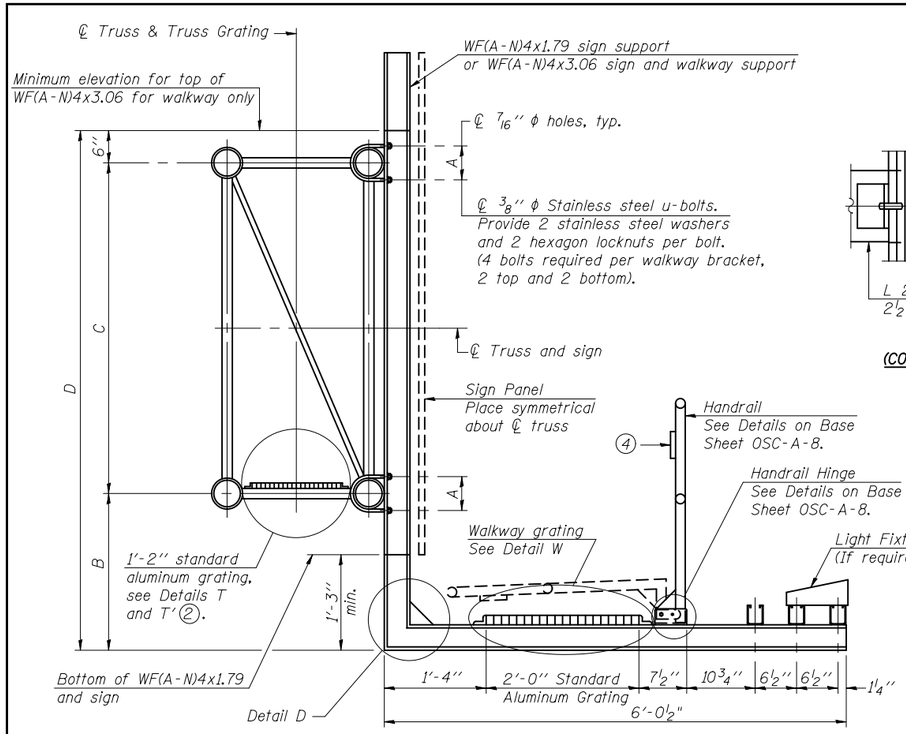
OSC-A-6S 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

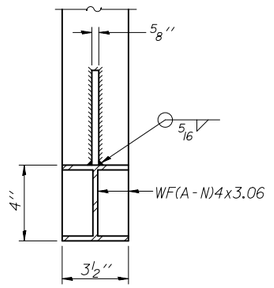
CANTILEVER SIGN STRUCTURES – ALTERNATE STEEL
WALKWAY DETAILS – ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

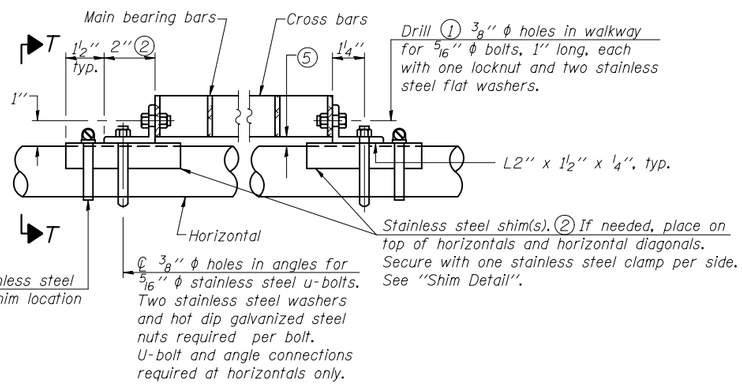


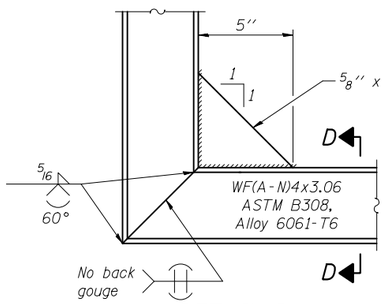
SECTION B-B

Sign shall be even with the top of the bracket, but it may extend no more than 6" above the top of the bracket for field adjustments.



SECTION D-D

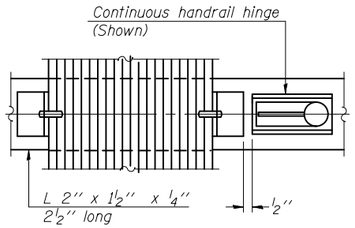




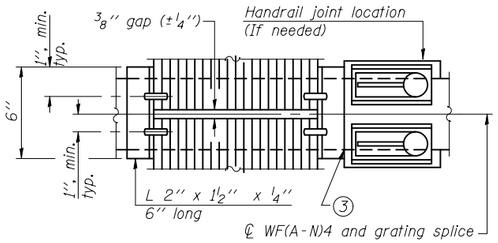
DETAIL D

DETAIL T

(Continuous Truss grating)

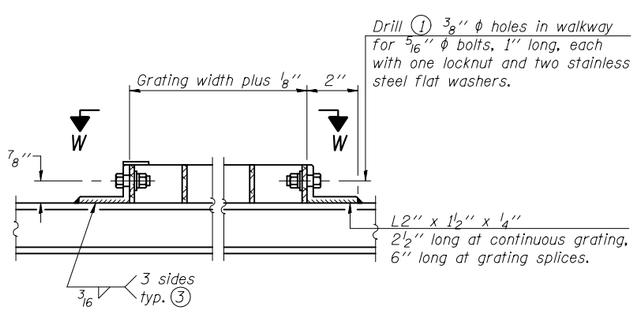


(CONTINUOUS WALKWAY GRATING)



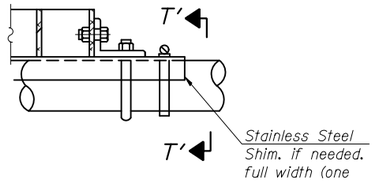
(AT WALKWAY GRATING SPLICE)

SECTION W-W



DETAIL W

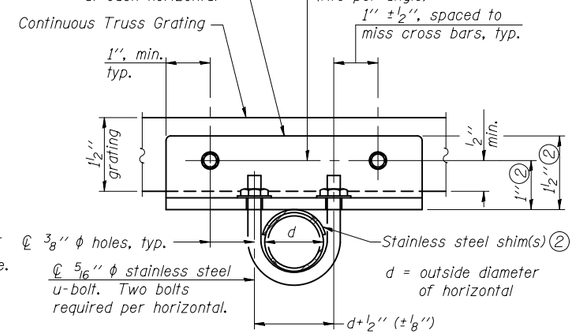
(Walkway grating)



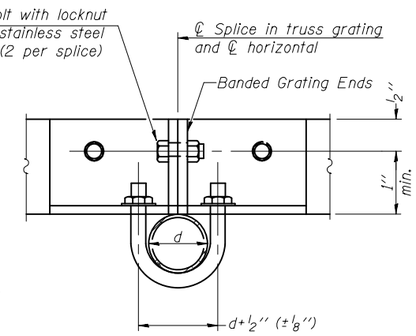
DETAIL T'

(Truss grating splice)

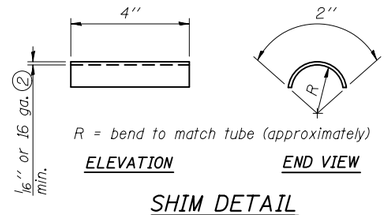
Details not shown same as Detail T. Alternate materials may be used subject to the Engineer's review and approval.



SECTION T-T



SECTION T'-T'



SHIM DETAIL

Structure Number	Station	A	(6) B	C	(6) D

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

Main Bearing Bars (MBB) shall be 3/16" x 1 1/2" on 1 3/16" centers and conform to ASTM B211 Alloy 6061-T6.

Cross bars (CB) shall be 3/16" x 1 1/2" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

OR

Aluminum Grating with modified "T" sections for main bearing bars shall meet the following requirements:

Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in.³ per bar, a depth of 1 1/2", spaced on 1 3/16" centers.

Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) 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.

(3) If Handrail Joint present, weld angle to WF(A-N)4 and 1/4" extension bars. (See Base Sheet OSC-A-8.)

(4) ℄ 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) Based on actual sign height, D_S, given on OSC-A-1.

OSC-A-7

6-1-12

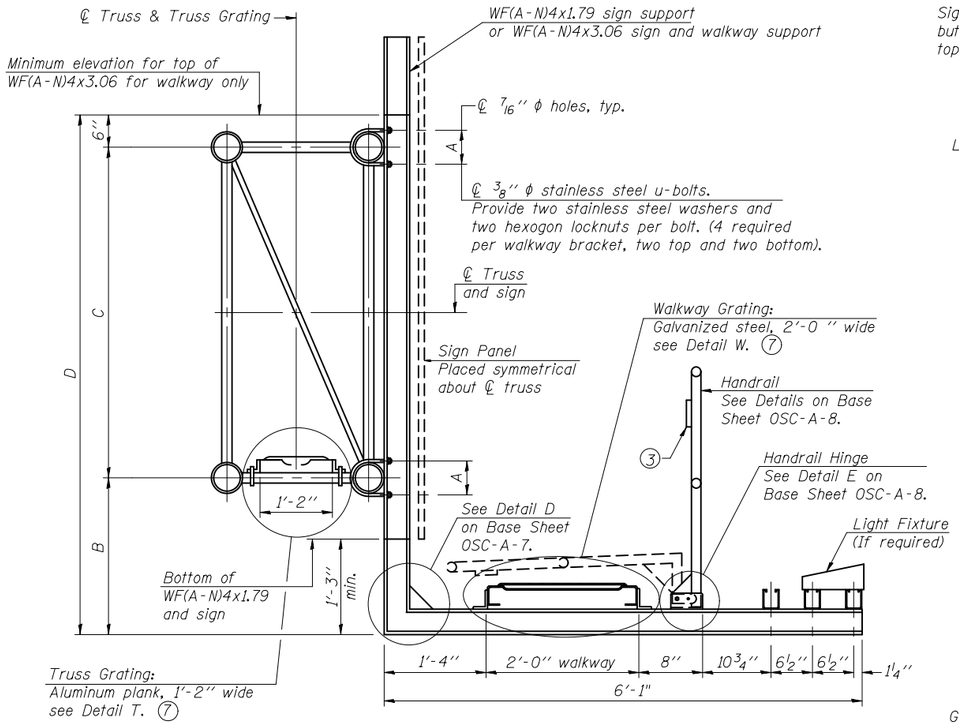
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – WALKWAY DETAILS
ALUMINUM TRUSS & STEEL POST

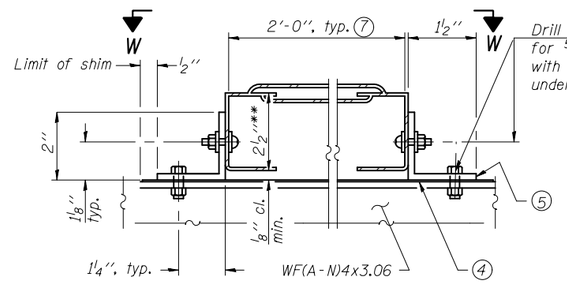
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

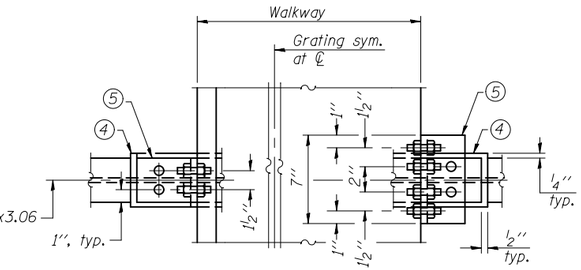


SECTION B-B

Sign shall be even with the top of the bracket, but it may extend no more than 6'' above the top of the bracket for field adjustments.

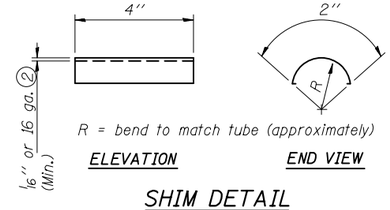


DETAIL W
GALVANIZED STEEL WALKWAY GRATING

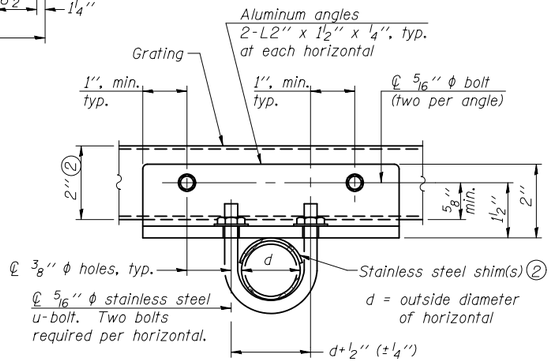


WALKWAY GRATING CONTINUOUS AT WALKWAY GRATING SPLICE

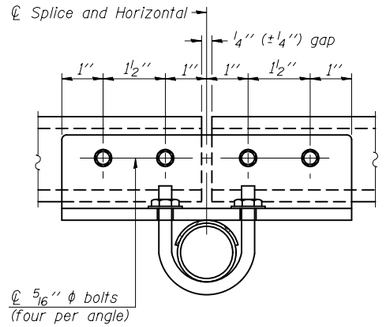
SECTION W-W



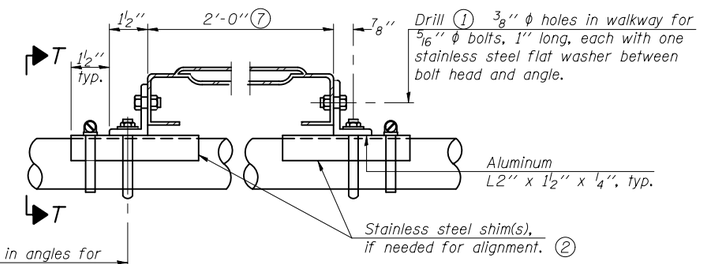
SHIM DETAIL



SECTION T-T
(Truss Grating Continuous)



SECTION T-T
(Truss Grating Splice)
Alternate splice details and locations may be used subject to the Engineer's review and approval.



DETAIL T
(Truss grating at horizontal)

ALUMINUM TRUSS GRATING

Structure Number	Station	A	(8) B	C	(8) D

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) Stainless steel shims shall be placed under angles at horizontals and horizonal diagonals if needed to compensate for alignment variations and differences in horizontal diagonal pipe sizes beyond adjustment provided by angles. Secure with one stainless steel clamp per location, se ''Shim Detail''. Thicker shim plates may be used when needed subject to shims performing properly.

(3) ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(4) 1/16'' (or 16 ga.) x 2 1/2'' x 4'' stainless steel shim adhered to top of WF(A-N)4x3.06 beneath each galvanized angle, typ. Adhesives for shims shall be suitable for materials joined and full exposure conditions.

(5) Galvanized steel L2'' x 2'' x 1/4'', 3 1/2'' long with continuous grating 7'' long at grating splice.

(6) Details shown are considered equal alternatives to Aluminum Walkway Details and may be substituted by Contractor at no charge in contract cost.

(7) Perforated or expanded metal grating providing a skid resistant (non-serrated) surface and capable of supporting a 500 pound concentrated load with a 6'-0'' clear span. Walkway and truss grating dimensions are nominal and may vary (width ±1/2'', depth 1/2'') based on available standard sizes. Cut ends of grating shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

(8) Based on actual sign height, Ds, given on OSC-A-1.

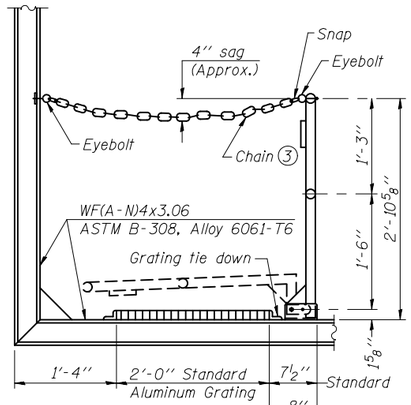
OSC-A-7S 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

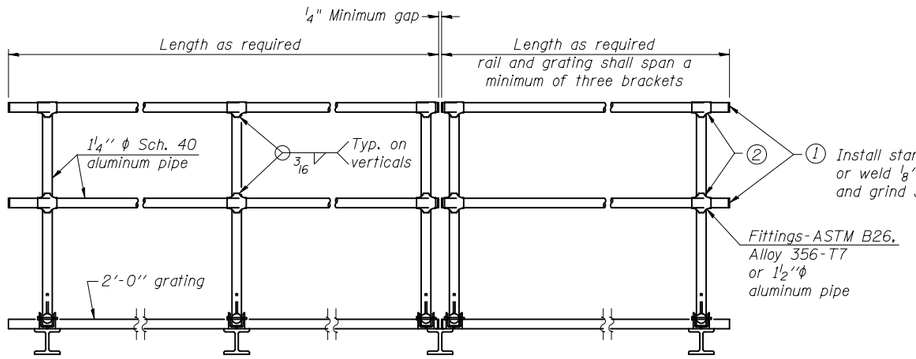
CANTILEVER SIGN STRUCTURES
ALTERNATE WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

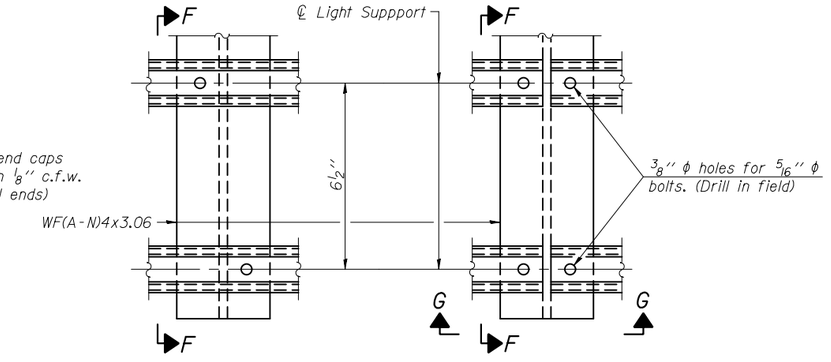


SIDE ELEVATION

(Showing Safety Chain W/O Sign)



FRONT ELEVATION



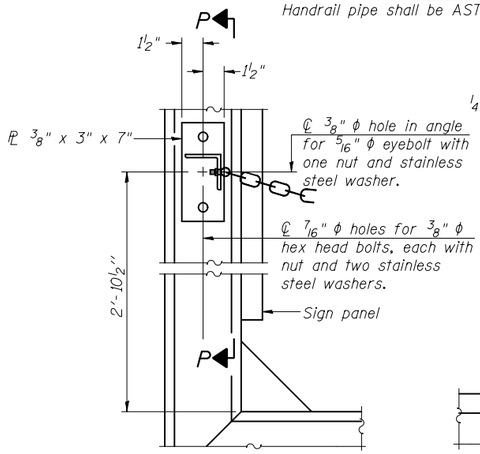
DETAIL F

DETAIL G

HANDRAIL DETAILS

Handrail pipe shall be ASTM B241 or B429, Alloy 6063-T6 or Alloy 6061-T6.

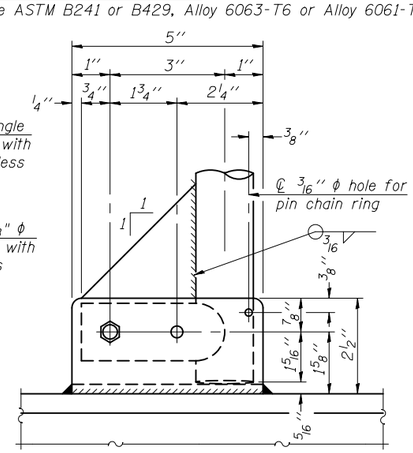
(2) Horizontal handrail member shall be continuous thru fitting. Provide 7/16'' ϕ hole in fitting for 3/8'' ϕ bolt. Field drill 7/16'' ϕ hole in horizontal rail member. Provide locknut and two stainless steel washers for bolt. (Use 5/16'' eyebolts in 7/16'' ϕ holes on top rail at ends only.)



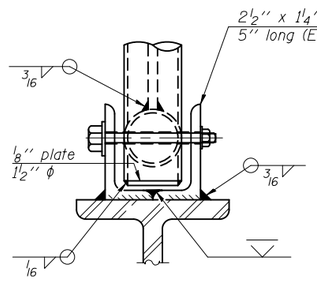
ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)

Items not shown same as ''Side Elevation'' of "Handrail Details"

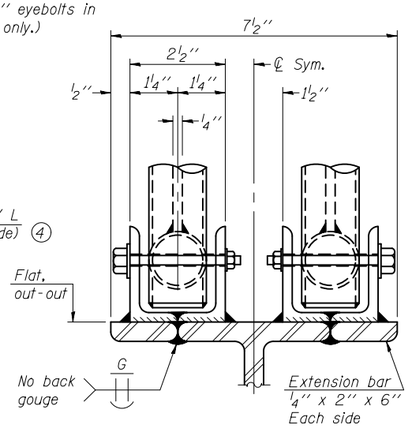


SIDE ELEVATION



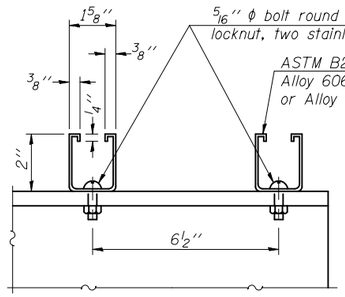
FRONT ELEVATION

Details not shown same as "ELEVATION" at right.

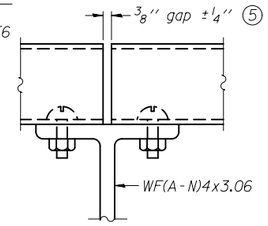


ELEVATION AT HANDRAIL JOINT (4)

Details not shown same as "FRONT ELEVATION"



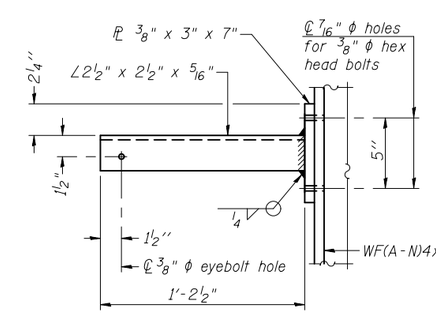
SECTION F-F



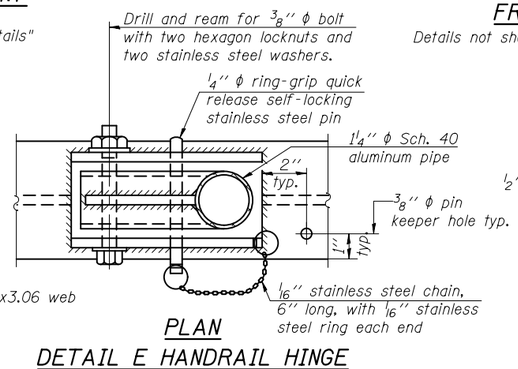
SECTION G-G

LIGHTING FIXTURE MOUNTS (IF REQUIRED)

(5) Field cut ends of light support channels shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

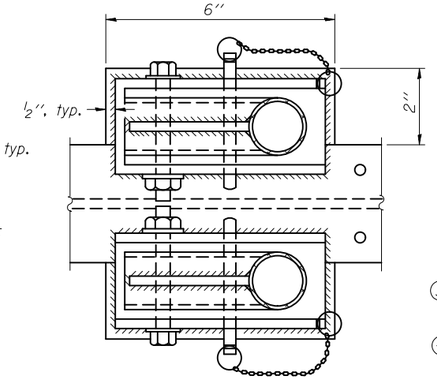


SECTION P-P



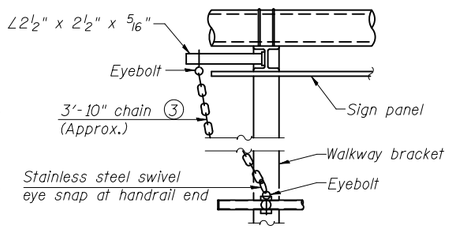
PLAN

DETAIL E HANDRAIL HINGE



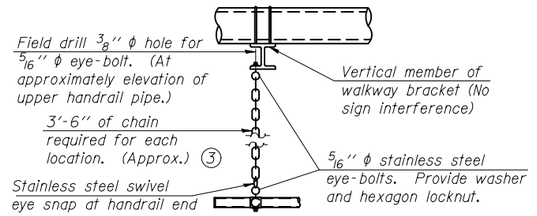
PLAN AT HANDRAIL JOINT

Details not shown same as "PLAN"



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.

(3) 3/16'' Type 304L stainless steel chain, approximately 12 links per foot.

(4) Extrusions may be used in lieu of the details shown, with approval of the Engineer.

OSC-A-8 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

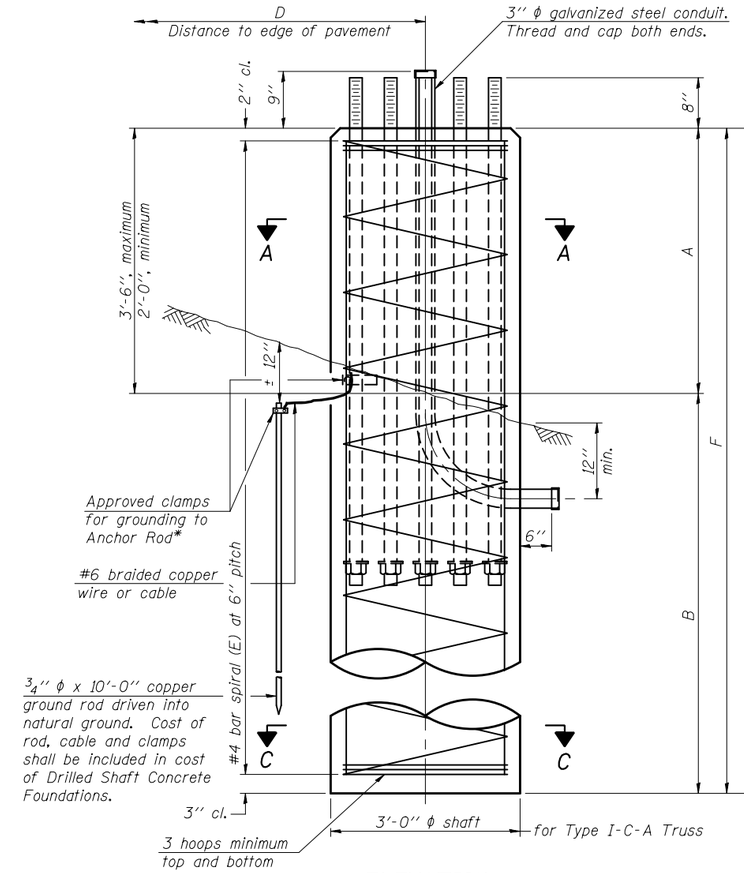
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – HANDRAIL DETAILS
ALUMINUM TRUSS & STEEL POST

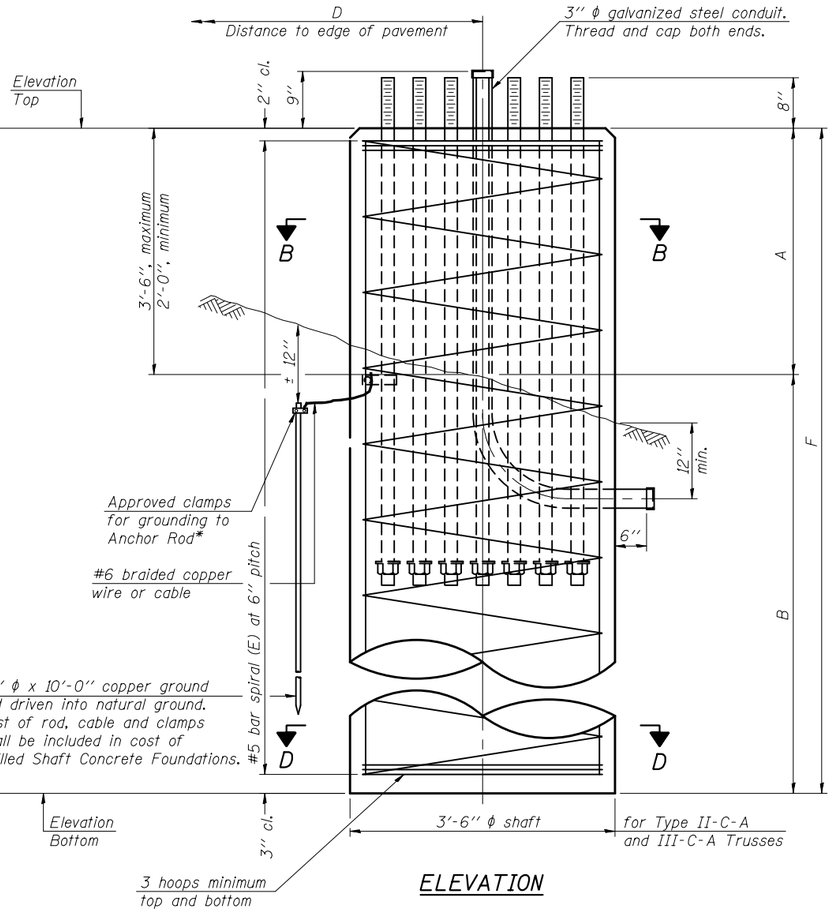
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

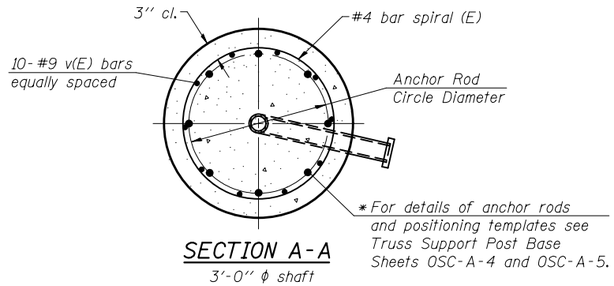
* Grind anchor rod to bright finish at ground clamp location before installing clamp.



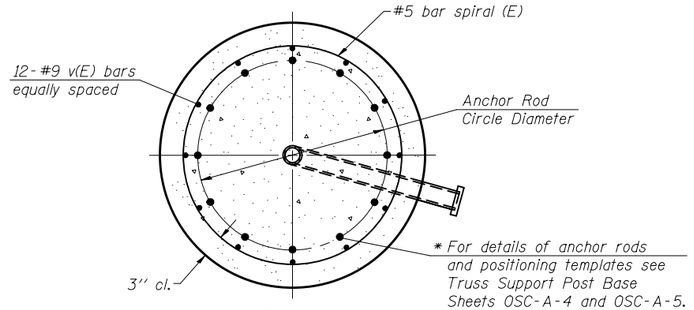
ELEVATION



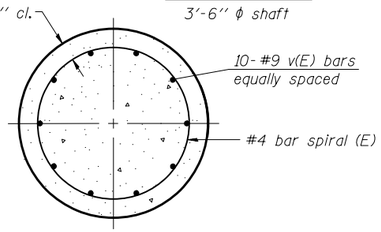
ELEVATION



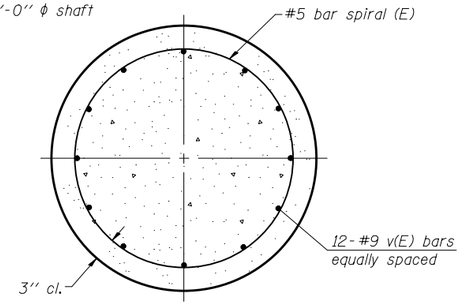
SECTION A-A
3'-0'' ϕ shaft



SECTION B-B
3'-6'' ϕ shaft



SECTION C-C
3'-0'' ϕ shaft



SECTION D-D
3'-6'' ϕ shaft

NOTES:

The foundation dimensions shown in the Foundation Design Table are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, 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 in the Foundation Data Table will be the result of 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in "Drilled Shaft Concrete Foundation".

FOUNDATION DESIGN TABLE

Truss Type	Post Base Sheet	Maximum CantileverLength (ft)	Maximum Total Sign Area (sq ft)	Shaft Diameter (in)	"B" Depth (ft)	Anchor Rods		Anchor Rod Circle Diameter (in)
						No.	Diameter (in)	
I-C-A	OSC-A-4	25	170	3.0	16.0	8	2	22
II-C-A	OSC-A-5	30	170	3.5	17.0	12	2	30
II-C-A	OSC-A-5	30	340	3.5	21.5	12	2	30
III-C-A	OSC-A-5	35	170	3.5	19.0	12	2	30
III-C-A	OSC-A-5	35	250	3.5	22.5	12	2	30
III-C-A	OSC-A-5	35	400	3.5	26.5	12	2	30
III-C-A	OSC-A-5	40	400	3.5	32.0	12	2	30

FOUNDATION DATA TABLE

Structure Number	Station	Truss Type	Shaft Diameter	Elevation Top	Elevation Bottom	Qu	A	B	F	Class DS Concrete Cubic Yards

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FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – DRILLED SHAFT
ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
			CONTRACT NO.	
		ILLINOIS	FED. AID PROJECT	

2.3 Bridge Mounted Sign Structures

Bridge mounted sign structures are usually more economical than span or cantilever sign structures, but less economical than breakaway signposts. Use the following procedures when preparing plans:

1. For mounting sign supports on the fascia of existing bridges, critical dimensions correlating new and existing elements should be field measured and verified before plans are finalized (whenever possible).

2. For skews (angle between the centerline of the road under the bridge and a line perpendicular to the fascia beam of the bridge) up to 15 degrees, signs must be parallel to the fascia beam. For skews greater than 15 degrees, the distance angle between the back of the sign and fascia beam is limited by dimensions "k" and " ℓ " shown on the plans. The maximum for "k" must be 10 feet and for " ℓ ", 8 feet.

3. The maximum allowable sign height “m” is 15 feet, but may be taller for specific projects. For specific installations requiring sign heights over 15 feet, up to 18 feet, revise all W6 x 12 to W6 X 16 and rename all base sheets, “BM-1-Special”, etc. When possible within dimensional limits, all signs must share a common horizontal centerline. On bridges with excessive grades, especially with multiple large signs, bracket elevations must be constant for each sign (sign set horizontal), but brackets may need to be stepped vertically between sign panels, using the T-bracket (details available).

4. The sign will not extend more than 6 inches above the top of the brackets.

5. Locate all holes drilled in steel beams or girders in the middle half of the member’s depth. On shallow beams, align centerline of brackets

approximately with the centerline of the web. There must be no holes drilled in the lower quarter of a concrete member's depth. For a cast-in-place reinforced concrete (RC) beam, the depth is the area from the bottom of the deck to the bottom of the girder at the bracket location.

6. For new RC or pre-stressed beams, coordinate locations of bracket connection holes with the bridge's structural designer, since specifications require forming holes before casting. For existing beams, determine pre-stressing strand and/or primary tension and shear reinforcement locations and space brackets so holes miss strands by 6 inches minimum.

7. Walkway grating should extend a minimum of 4 feet past the edge of pavement into the shoulder unless the shoulder width is less than 10 feet. If shoulder width is less than 10 feet or if the sign structure is over a low speed ramp, the walkway grating may begin at edge of pavement.

8. Submit proposed designs exceeding dimensional and/or loading limits to the BBS for special analysis and/or approval.

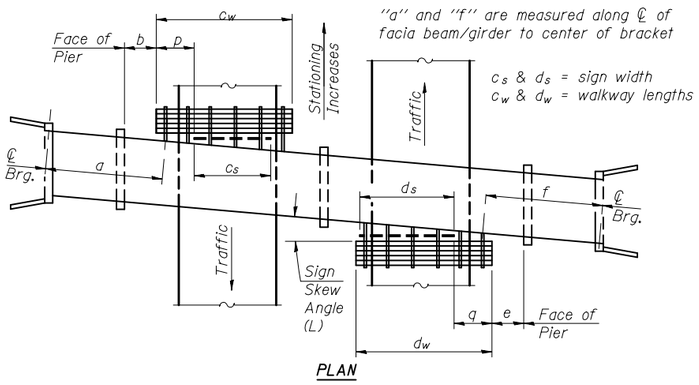
9. In the table on sheet BM-1, record the 15-digit sign structure number and the bridge structure number.

10. For projects with aesthetic mandates requiring bridge mounted sign structures painted a specific color over the galvanizing, consult the Bureau of Materials and Physical Research (BMPR) early in the planning process to determine acceptable color alternatives and allow time for testing and pre-approval.

Bridge Mounted Sign Structure Base Sheets

U. S. Standard Units

SHEET TITLE

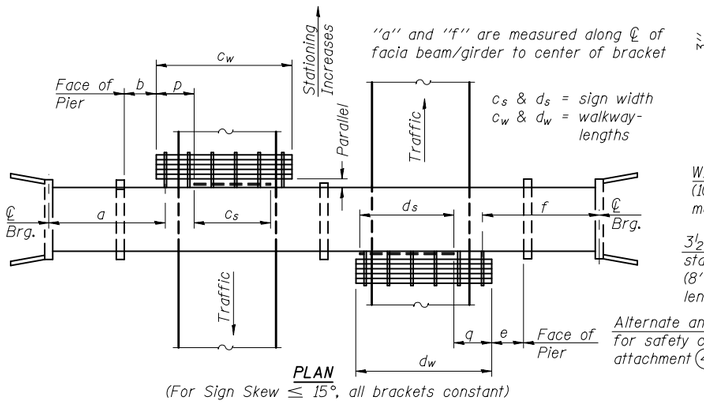


PLAN

(Left Sign Skew > 15°)

WALKWAY AND HANDRAIL SKETCH

(Road plan beneath structure varies.)

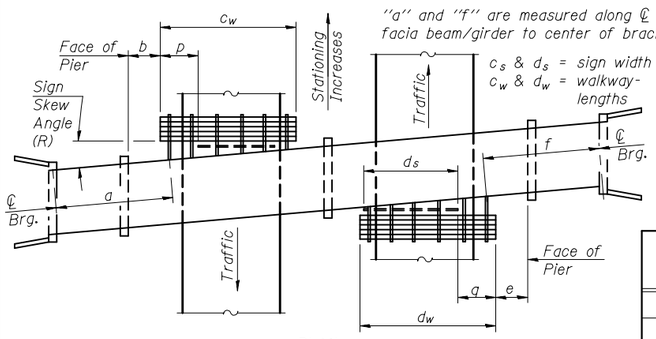


PLAN

(For Sign Skew ≤ 15°, all brackets constant)

WALKWAY AND HANDRAIL SKETCH

(Road plan beneath structure varies.)

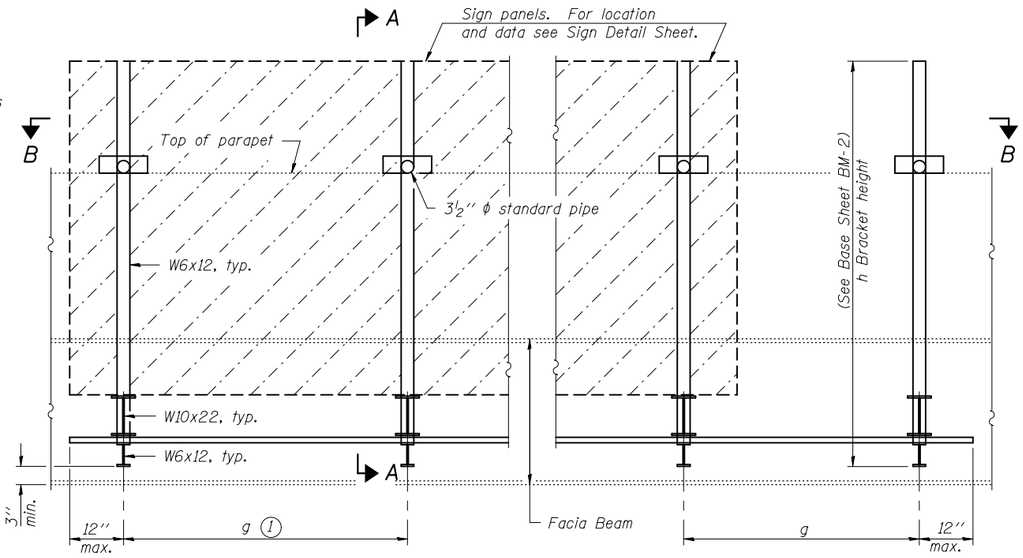


PLAN

(Right Sign Skew > 15°)

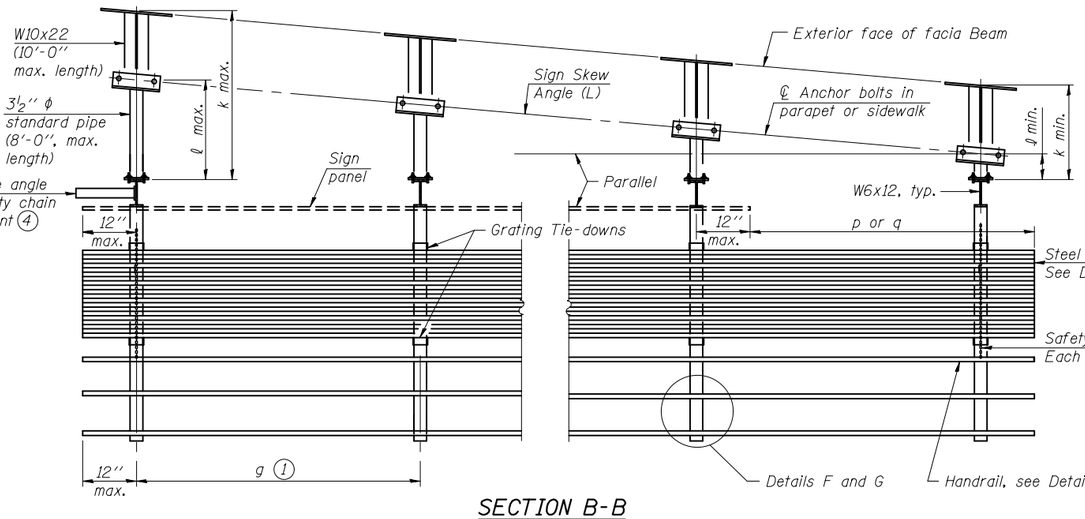
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath structure varies.)



TYPICAL FRONT ELEVATION

(With lights, safety chain and handrail omitted for clarity.)



SECTION B-B

(Shown: Left Sign Skew > 15°)

Structure Number	Sign Skew Angle (L) or (R)	Bridge Station	Bridge Structure Number	Contract Route Designation	a	b	c_s	c_w	d_s	d_w	e	f	g	No. of Brackets (Total)	p	q	Total Grating/ Hndrl. Lengths (c_w + d_w)

Dimensions a, b, e, f & g may vary as approved by the Engineer, see (1).
When c_w < c_s and/or d_w < d_s, use alternate brackets without walkway supports where applicable, see (3).

GENERAL NOTES

SPECIFICATIONS:

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications") (2)

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

MINIMUM CLEARANCE: 3" greater than bridge members at all locations. (All Obstructions)

WELDING: All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 Structural Welding Code (Steel) and the Standard Specificiations.

MATERIALS: All Structural Steel Pipe shall be ASTM A53 Grade B with a minimum yield of 35,000 p.s.i., or A500 Grade B or C with a minimum yield of 46,000 p.s.i. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.
All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 (M183, M223 Gr. 50,).

HIGH STRENGTH BOLTS: All bolts, washers, nuts and locknuts shall satisfy the requirements of ASTM designation A307 unless noted as "H.S." which shall require AASHTO M164 (A325), ASTM A449, or approved alternate. All fasteners shall be hot dip galvanized per AASHTO M232 unless otherwise specified.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: All-threaded rod shall conform to ASTM F1554 Grade 105, $\frac{3}{4}$" ϕ x 12" long, each with one plate washer and locknut and be hot dip galvanized per AASHTO M232. They shall be either cast into the concrete or epoxy grouted in accordance with Section 584 of the Standard Specifications. Minimum embedment in concrete shall be 9".

(1) Bracket spacing g ≤ 6'-0", max. Spacing shall be uniform if possible but may vary ±6" to miss existing obstruction (rail post, light poles, web stiffeners, splice plates, etc.). Adjust bracket lengths accordingly on skewed structures.

(2) Any design modifications shall be based on the current version of applicable specifications and submitted for the Engineer's approval.

(3) Unit price includes grating, handrail, brackets, supports, anchor bolts, fasteners, fabrication, delivery, erection, field drilling and other necessary items. Limits of payment are based on grating length (cw, dw) unless otherwise specified. For Safety Chain Details and Details D, F and G, see Base Sheet BM-4.

(4) If walkway bracket at safety chain location is behind sign, add angle to bracket. See detail on Base Sheet BM-4.

TOTAL BILL OF MATERIAL

(3) OVERHEAD SIGN STRUCTURE-BRIDGE MOUNTED	Foot	

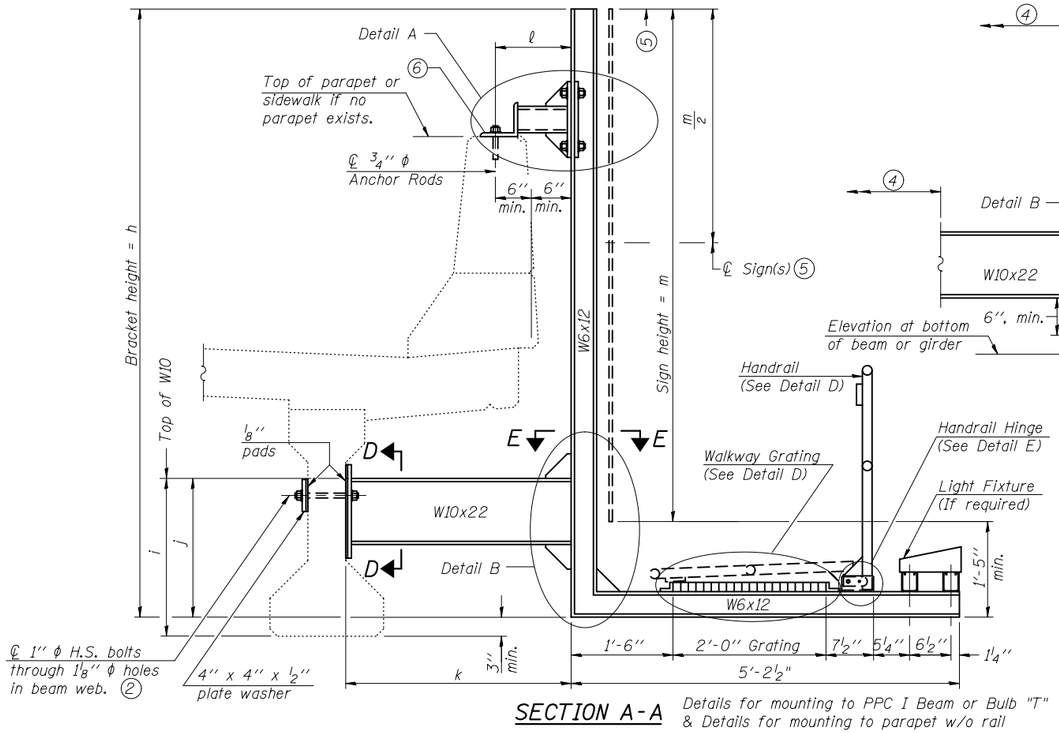
BM-1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

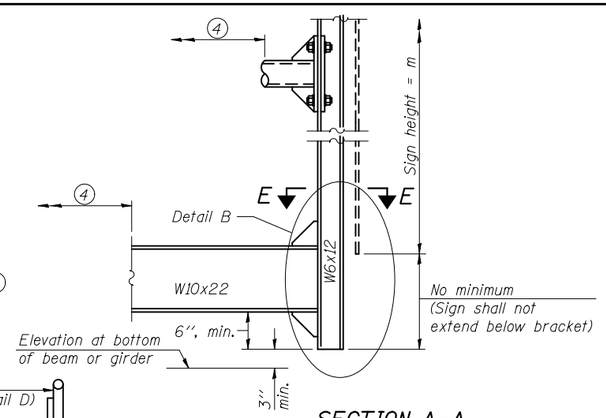
BRIDGE MOUNT SIGN STRUCTURES
GENERAL PLAN AND ELEVATION
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



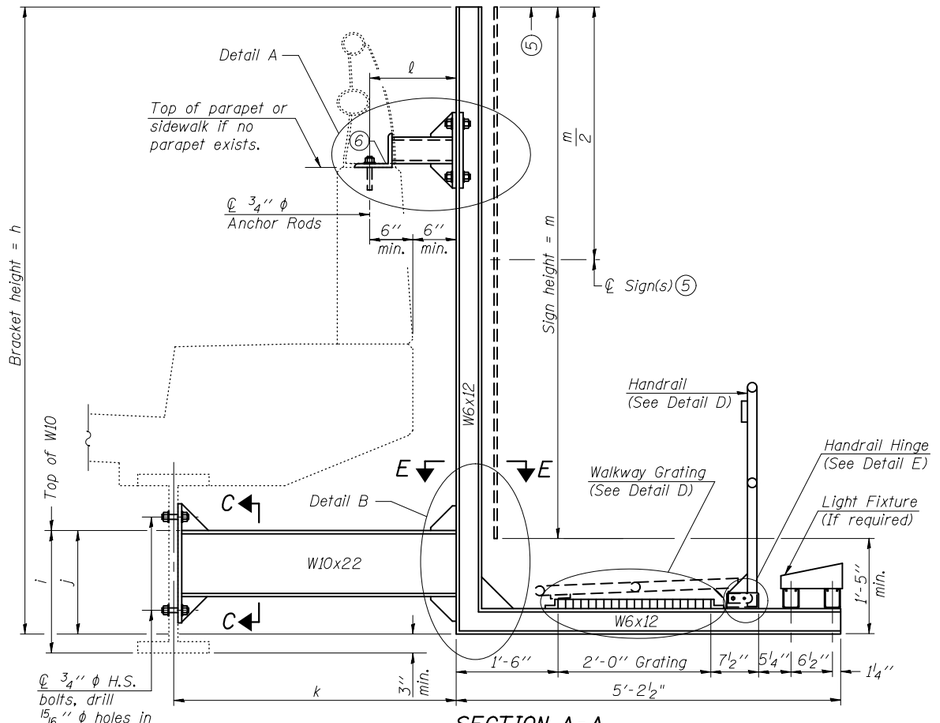
SECTION A-A

Details for mounting to PPC I Beam or Bulb "T" & Details for mounting to parapet w/o rail



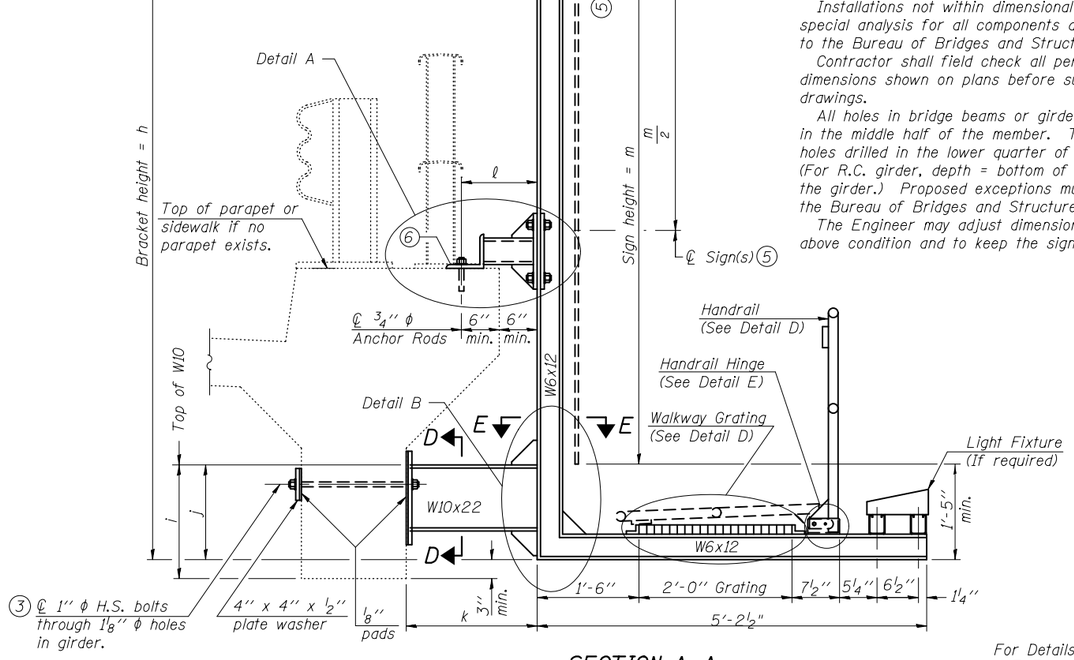
SECTION A-A

Alternate with no lights or walkways



SECTION A-A

Details for mounting to steel beam or girder & Details for mounting with existing parapet mounted rail



SECTION A-A

Details for mounting to integral reinforced concrete girder & Details for mounting on safety curb with surface-mount bridge rail

Notes:

Installations not within dimensional limits shown require special analysis for all components and must be submitted to the Bureau of Bridges and Structures for approval.

Contractor shall field check all pertinent existing bridge dimensions shown on plans before submitting shop drawings.

All holes in bridge beams or girders should be located in the middle half of the member. There shall be no holes drilled in the lower quarter of the member's depth. (For R.C. girder, depth = bottom of deck to bottom of the girder.) Proposed exceptions must be approved by the Bureau of Bridges and Structures.

The Engineer may adjust dimension "i" to meet the above condition and to keep the sign level.

① *Holes in new steel members may be drilled in the fabrication shop or in the field. Field drill existing members.*

② *For new PPC I beams, holes shall be formed during casting. For existing PPC I beams, prestressing strand locations shall be determined and spaced to miss strands by 6", min. Minimize spalling during field drilling of existing beams.*

③ *For new construction, form holes. For existing RC beams, locate primary reinforcement and space holes to miss by 6", min. Minimize spalling and concrete fracturing/damage during field drilling of existing concrete. Spalls over 1/4" deep or beyond the coverage of the 4x4 plate washer shall be repaired with epoxy mortar before installing washer.*

④ *For attachment details of 3 1/2" pipe and W10x22, see other sections as applicable.*

⑤ *Sign shall not extend more than 6" above top of bracket, and this dimension may vary to keep sign level if bridge is on grade or vertical curve. Multiple signs of various heights shall share a common horizontal centerline and use equal bracket heights. If no sign is attached to a W6x12 vertical (bracket only supporting walkway), dimension h shall be the same as an adjacent bracket with a sign attached, unless Engineer specifically directs shorter brackets due to locational restraints on future uses. (See Detail A for minimum bracket height.)*

⑥ *For bridge mounted sign structures installed on new bridges with railing, during design, bracket spacing must be coordinated with railing post spacing and the Contractor must install upper brackets prior to railing installation. For bridge mounted sign structures installed on existing bridges with railing, during design, brackets spacing must be coordinated with railing post spacing and the Contractor must temporarily remove sections of railing to facilitate upper bracket installation. If it is determined during design that existing railings can't be removed, alternate upper connection details must be developed for the contract plans and approved by the Bureau of Bridges and Structures.*

For Details A & B, Sections C-C, D-D and E-E, see Base Sheet BM-3.
For Details D & E, see Base Sheet BM-4.

Structure Number	Station	h	i	j	k max. (10'-0" max.)	ℓ max. (8'-0" max.)	m (15'-0" max.)

BM-2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

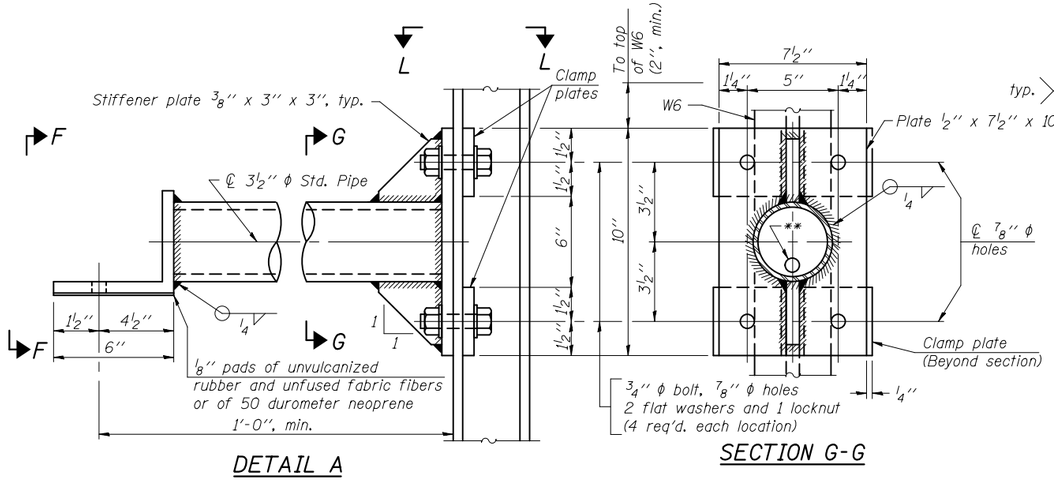
BRIDGE MOUNT SIGN STRUCTURES
WALKWAY AND CONNECTION DETAILS

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

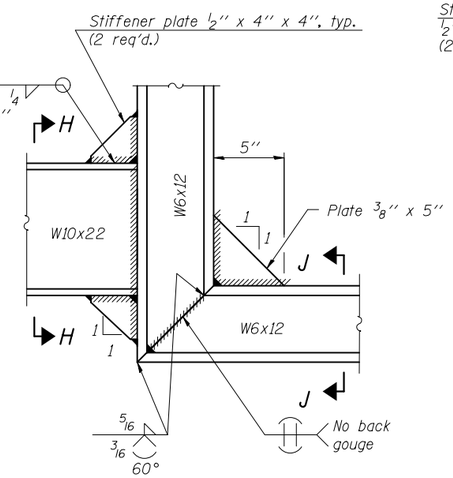
CONTRACT NO.

ILLINOIS FED. AID PROJECT

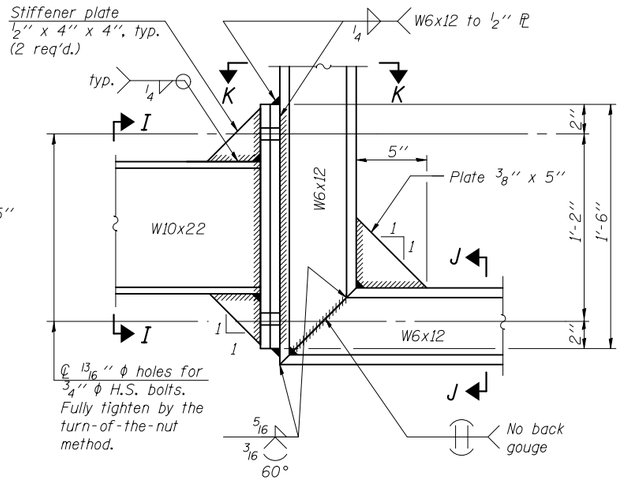


DETAIL A

SECTION G-G

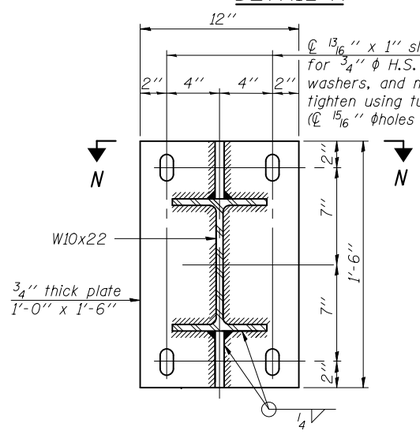


DETAIL B - WELDED W10x22 TO W6x12 CONNECTION



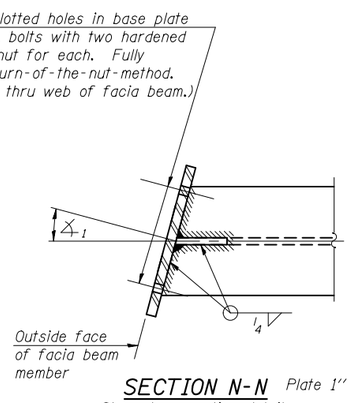
DETAIL B - ALTERNATE BOLTED W10x22 TO W6x12 CONNECTION

Alternate may be substituted by contractor to facilitate construction or galvanizing, especially on long struts for skewed bridges.



SECTION C-C

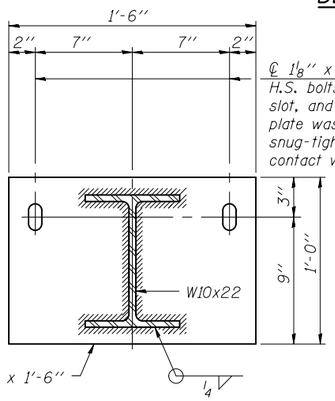
Steel beam or girder connection plate details



SECTION N-N

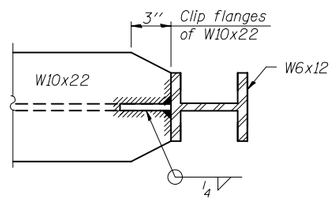
Skewed connection detail for W10x22 to facia beam.

Plate 1" x 12" x 1'-6"

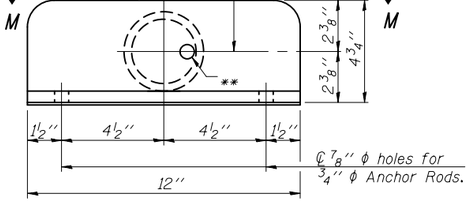


SECTION D-D

Concrete beam or girder connection plate details.

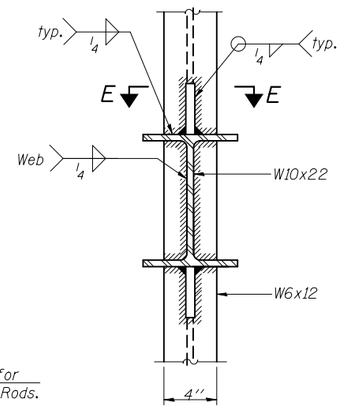


SECTION E-E

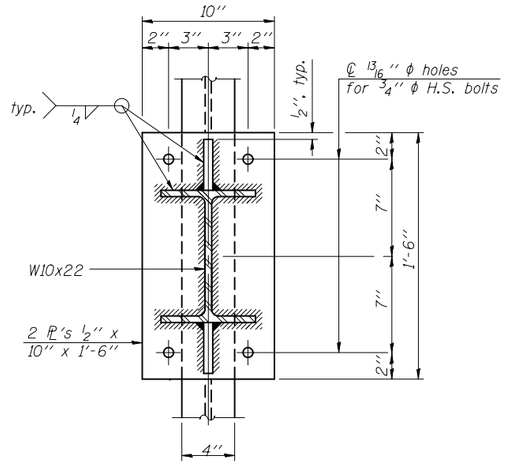


VIEW F-F

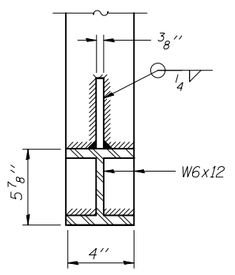
** 13/16" ϕ holes for galvanizing. After galvanizing, install 7/8" ϕ A307 hot-dip galvanized bolt to close hole in angle. (No bolt required in 1/2" plate.)



SECTION H-H

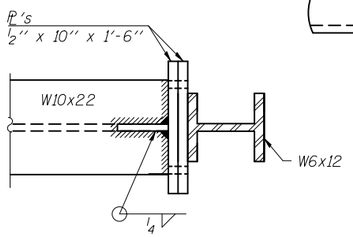


SECTION I-I

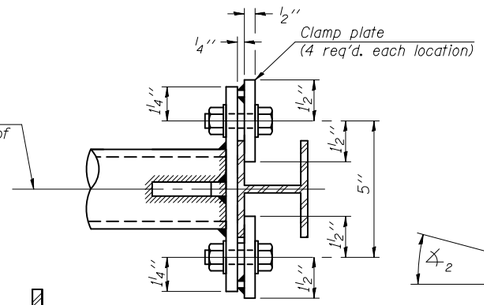


SECTION J-J

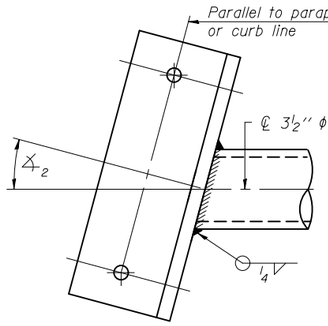
Note: For constant slab overhang at facia beam, ∠1 = ∠2 = sign angle. For flared beams or other special cases where ∠1 ≠ ∠2, ∠1 = sign angle.



SECTION K-K

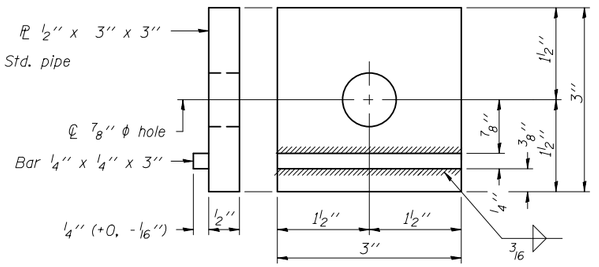


SECTION L-L



SECTION M-M

Skewed connection detail for 3 1/2" ϕ pipe to parapet.



CLAMP PLATE DETAILS

BM-3

6-1-12

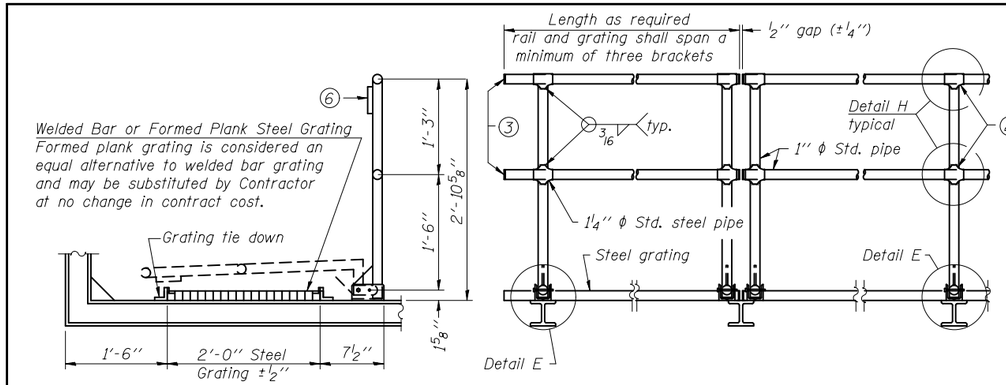
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BRIDGE MOUNT SIGN STRUCTURES
CONNECTION DETAILS

SHEET NO. OF SHEETS

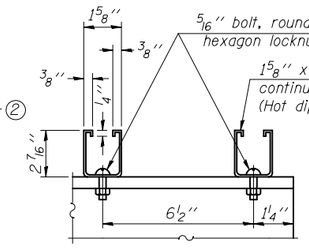
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



SIDE ELEVATION

DETAIL D HANDRAIL

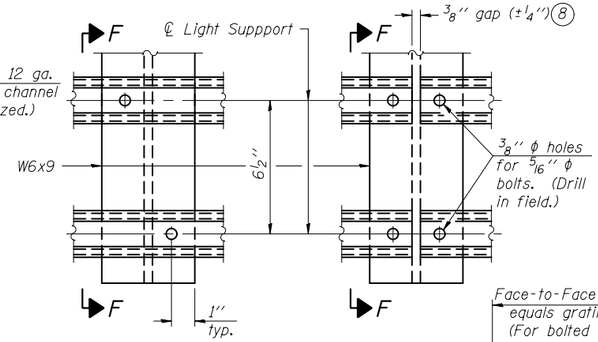
FRONT ELEVATION



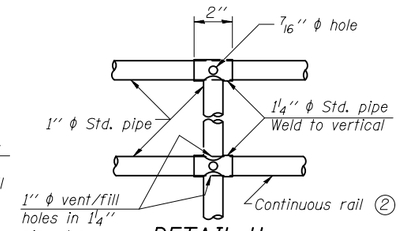
SECTION F-F

LIGHTING FIXTURE MOUNTS

(If required)



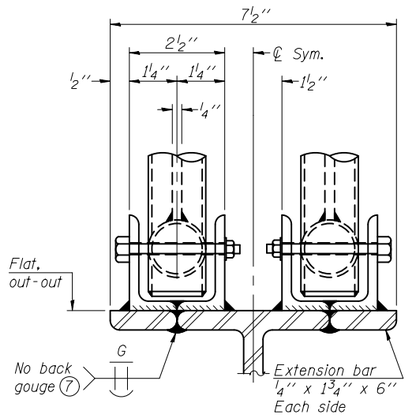
DETAIL F



DETAIL H

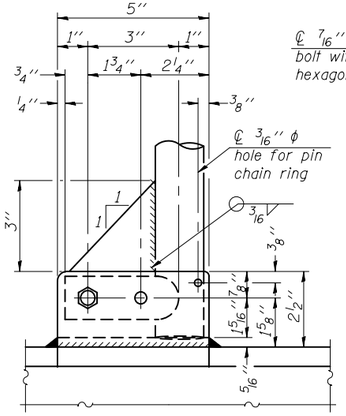
Welds 3/16" continuous

DETAIL G

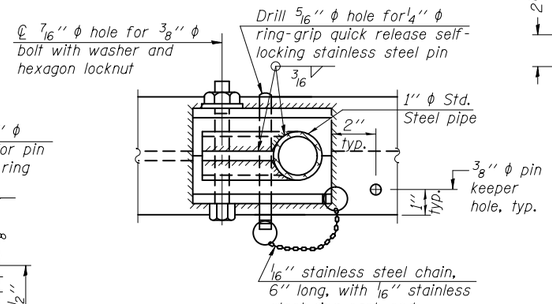


ELEVATION AT HANDRAIL JOINT

(Details not shown same as "FRONT ELEVATION")

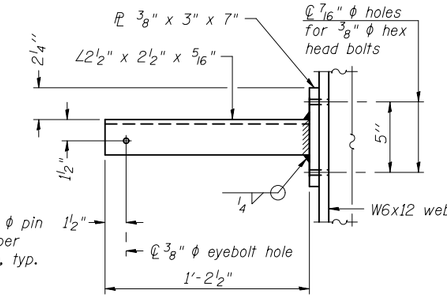


SIDE ELEVATION

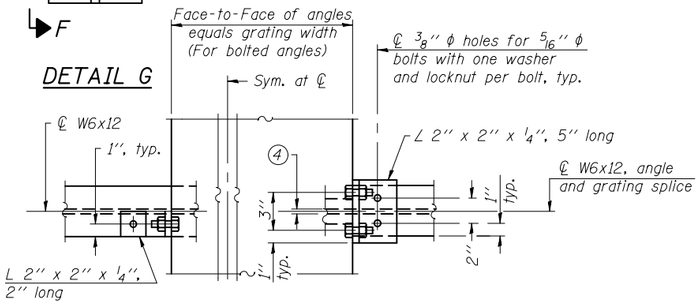


PLAN AT SINGLE HANDRAIL HINGE

DETAIL E

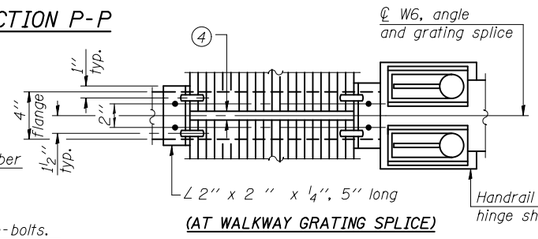


SECTION P-P

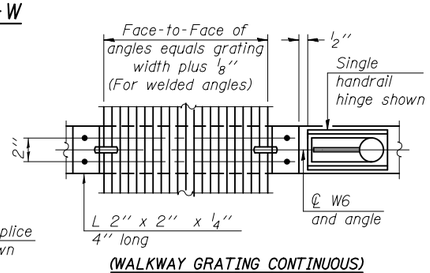


GRATING CONTINUOUS AT GRATING SPLICE

VIEW W-W

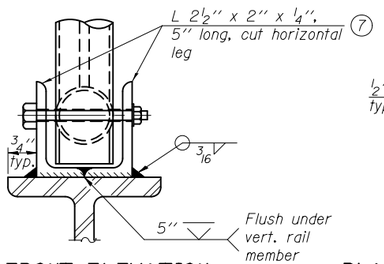


(AT WALKWAY GRATING SPLICE)



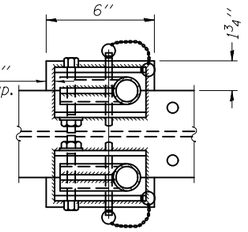
(WALKWAY GRATING CONTINUOUS)

PLAN



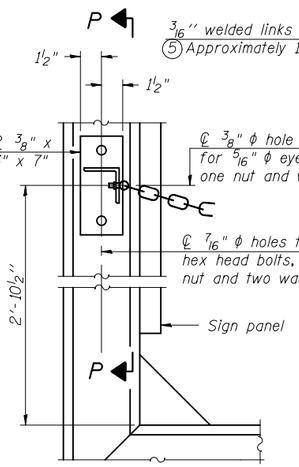
FRONT ELEVATION

(See above Elevations for dimensions.)



PLAN AT HANDRAIL JOINT

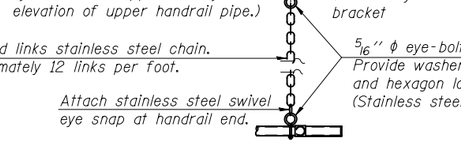
(For Details, see Elevations.)



SAFETY CHAIN ATTACHMENT

(With Sign Present)

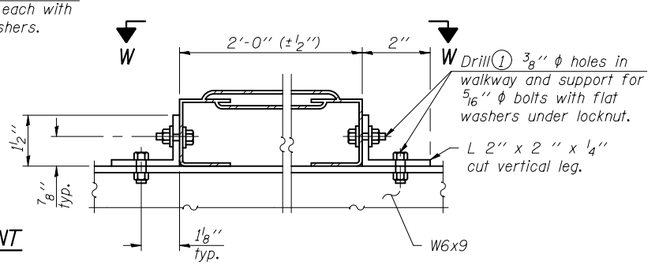
Items not shown same as "SIDE ELEVATION" and "SAFETY CHAIN"



No Sign at Bracket

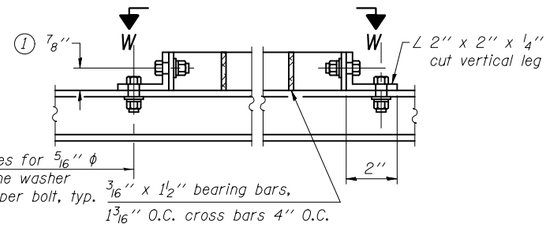
SAFETY CHAIN

One (1) required for each end of each walkway.



ALTERNATE FORMED PLANK GRATING DETAILS

Plank Grating: nominal depth = 2 1/2" (±1/2"); perforated or expanded steel sheet with a non-skid surface (non-serrated) concentrated load capacity = 500 lbs. with 6'-0" clear span.



WELDED BAR GRATING DETAILS

NOTES

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment. Field drilled holes must be touched up with galvanized paint.

(2) Horizontal rail member shall be continuous thru 1 1/4" ϕ pipe. Provide 7/16" ϕ hole in 1 1/4"ϕ pipe for 3/8" ϕ bolt. Field drill 7/16" ϕ hole in horizontal rail member. Provide washer and locknut for bolt. (Use 5/16" eyebolts in 7/16" ϕ holes on top rail at ends only.)

(3) Install standard force-fit end caps or weld 1/8" end plates with 1/8" c.f.w. and grind smooth. (All rail ends.)

(4) 3/8" (±1/4") gap between grating panels at splice.

(5) Chain to be type 304L stainless steel suitable for prolonged exterior exposure. Approximately 3'-6" long chain per location. Maximum sag with handrail erected = 4".

(6) PL 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(7) Extrusions may be used in lieu of details shown, with approval by Engineer.

(8) Field cut ends of light support channels shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

BM-4

6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BRIDGE MOUNT SIGN STRUCTURES
WALKWAY DETAILS

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT

2.4 Monotube Sign Structures

Monotube sign structures are economical when total sign area is small, compared to those mounted on large truss structures, and span length is 100 feet or less. In addition, consider using monotubes for traffic signals, if there is no interference with sight lines or other space limitations. The monotubes included herein are thin-walled, tapered steel tubes, similar to those used for traffic signal mast arms and have pinned joints at the arm-to-column connection. Some SPUDI projects may require non-tapered, long span, rigid frame monotubes mounted to the bridge substructure and details are available from BBS on request.

Monotubes are primarily for mounting trailblazers and other small directional signs over state or business routes passing through urban areas and generally not for use over interstate highways. In addition, for installations requiring large and heavy changeable / dynamic / variable message sign cabinets do not use monotube structures - use Type III-A, III-S span or center mounted butterfly structures only. However, span monotubes and the cantilever equivalent shown in the catalogs of traffic pole manufacturers may have the capacity for smaller, relatively flat panel LED signs. The maximum allowable total area of signs plus signals is 160 square feet for the single monotube or 300 square feet for the dual, but may be larger for specific projects and within manufacturers' limits.

Use the following procedures when preparing contract plans:

1. Determine the 15-digit sign structure number, station, location of the sign(s)/signal(s) over the roadway, design length (center to center poles), distance from the right foundation to edge of pavement, total area of proposed sign(s)/signal(s) and roadway cross section/Elevation A for point of minimum clearance to lowest part of sign structure (signs, lights, signals).

2. Determine pole height dimensions for the right and left poles using the following criteria:

(a) Minimum vertical clearance is 17 feet 3 inches from Elevation A to lowest point on structure (signs, sign brackets, lights, light brackets, signals).

(b) Top of foundation is a minimum of 2 inches and a maximum of 24 inches above grade elevation at centerline of foundation.

(c) The total pole height will not exceed 25 feet for single monotubes or 28 feet for double monotubes, unless allowed by the BBS.

3. Obtain soil-boring data and determine the average Q_u per Section 1.6 for all strata within and below the "B" portion of the drilled shaft foundation. If average and minimum Q_u values meet the requirements of Section 1.6, the depth may be determined from the Foundation Depth Table on the applicable monotube standard. As described in Section 1.6, if average and minimum Q_u values do not meet the requirements, the BBS must provide a depth or a special design.

4. With the information from Steps 2(b) and 3, and/or information obtained from the BBS, determine the drilled shaft vertical limits (Elevation Top, Elevation Bottom), and dimensions "A" and "B".

5. Fill in all tables on base sheets including sign structure number, station, total sign area and foundation dimensions.

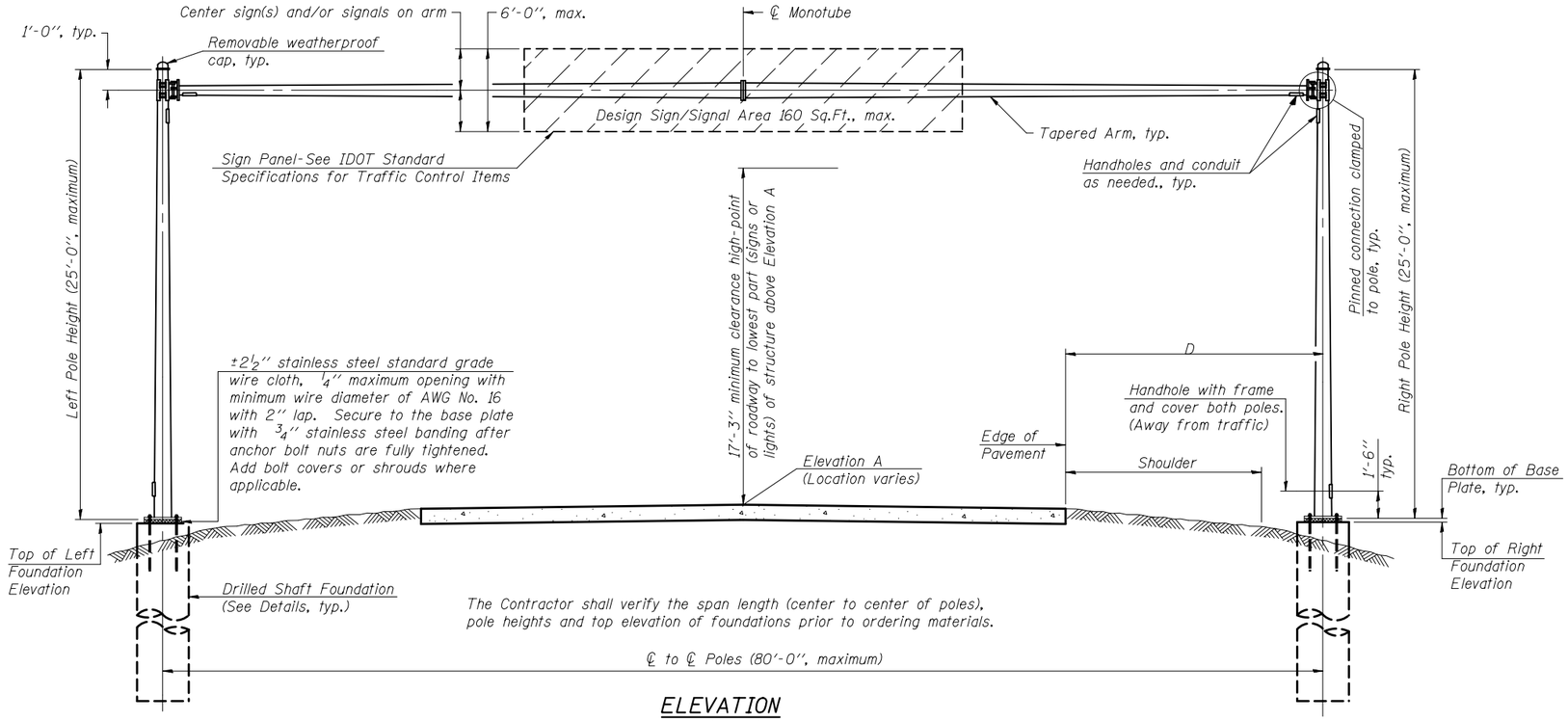
6. Calculate quantities as needed for foundations and complete the Total Bill of Material.

7. The Contractor will submit detailed shop drawings from the manufacturer showing design materials, diameter and thickness of sections, camber, weld sizes, sign panel/signal mounting hardware, anchor bolts, etc., for structural review by the BBS.

Monotube Sign Structure Base Sheets

U. S. Standard Units

SHEET TITLE



ELEVATION

Looking at face of signs.
Looking upstation for structures with signs both sides.

GENERAL NOTES

DESIGN: Current (at time of letting) AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (Fatigue Category II - natural wind gust only).

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Recurring Special Provisions. ("Standard Specifications") All references to "Mast Arm Assembly and Pole" are applicable, unless otherwise noted.

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.

ANCHOR RODS: Shall conform to ASTM F1554 Grade 105. No welding shall be permitted on rods.

FASTENERS: All connection bolts shall be High Strength Bolts M164, Galvanize M232 (A153), Type 3, or stainless steel heavy hex conforming to ASTM A193, Grade B8 or B8M, Class 1. U-bolts shall be produced from ASTM A276 Type 304, 304L, 316 or 316L, Condition A, cold finished, or an equivalent material acceptable to the Engineer. Nuts for stainless steel bolts shall be stainless steel conforming to ASTM A194, Grade 8 (AISI Type 304) or Grade 8F (AISI Type 303). All nuts shall be "locknuts" with nylon or steel inserts and semifinished hexagonal heads equivalent to the finished heavy hex series of the American National Standard. Washers for stainless steel bolts shall be stainless steel conforming to ASTM A240, Type 302 or 304.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

CAMBER: Minimum AASHTO camber = L / 1000 + dead load camber.

FOUNDATIONS: The contract unit price for Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

SIGN STRUCTURE DATA TABLE

Structure Number	Station	℄ to ℄ Poles	Elevation A	Dimension D	Actual Sign/Signal Area	Left Foundation					Right Foundation					Class SI Concrete (Cu. Yds.)
						Elevation Top	Elev. Bottom	A	B	F	Elevation Top	Elev. Bottom	A	B	F	

BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE MONOTUBE SINGLE	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

MONOTUBE - 1 6-1-12

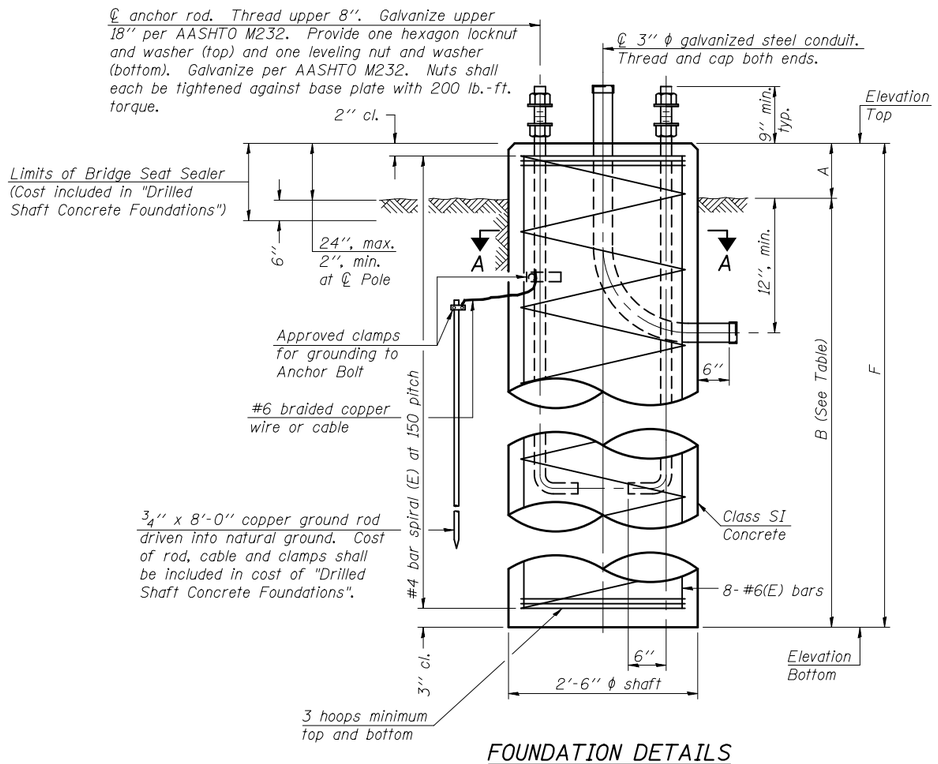
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

MONOTUBE SIGN STRUCTURE

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



FOUNDATION DETAILS

Typical, except conduit may only be required at one foundation. Provide conduit openings both poles.

Foundation Design Table	
Span (Ft.)	B (Ft.)
Span ≤ 45	9
45 < Span ≤ 65	10
65 < Span ≤ 80	11

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 tsf, 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 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. If dimensions "B" or "F" are revised by more than 12'' by the Contractor, ''as-built'' plans shall be prepared and submitted to the District Bureau of Operations for future reference.

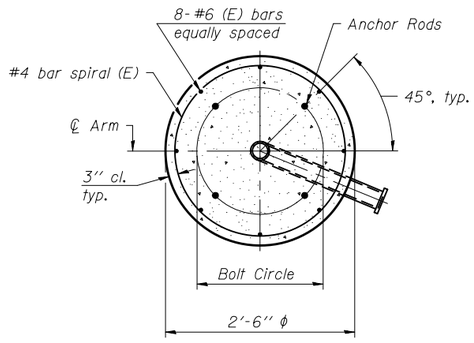
No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

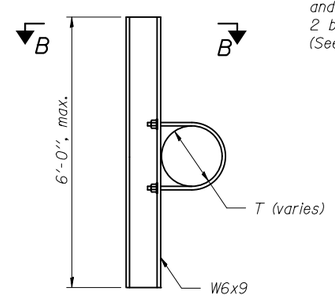
Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6'' below finished ground line. Cost included in Drilled Shaft Concrete Foundation.

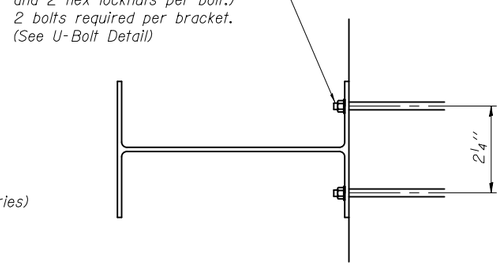


SECTION A-A



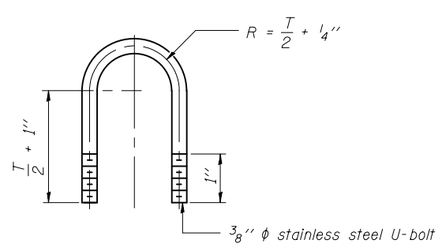
SIGN MOUNTING BRACKET

(Minimum 2 Brackets Each Sign)



SECTION B-B

6'-0'' maximum spacing.
2'-0'' maximum sign overhang beyond end bracket.



U-BOLT DETAIL

(Typical)

MONOTUBE - 2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

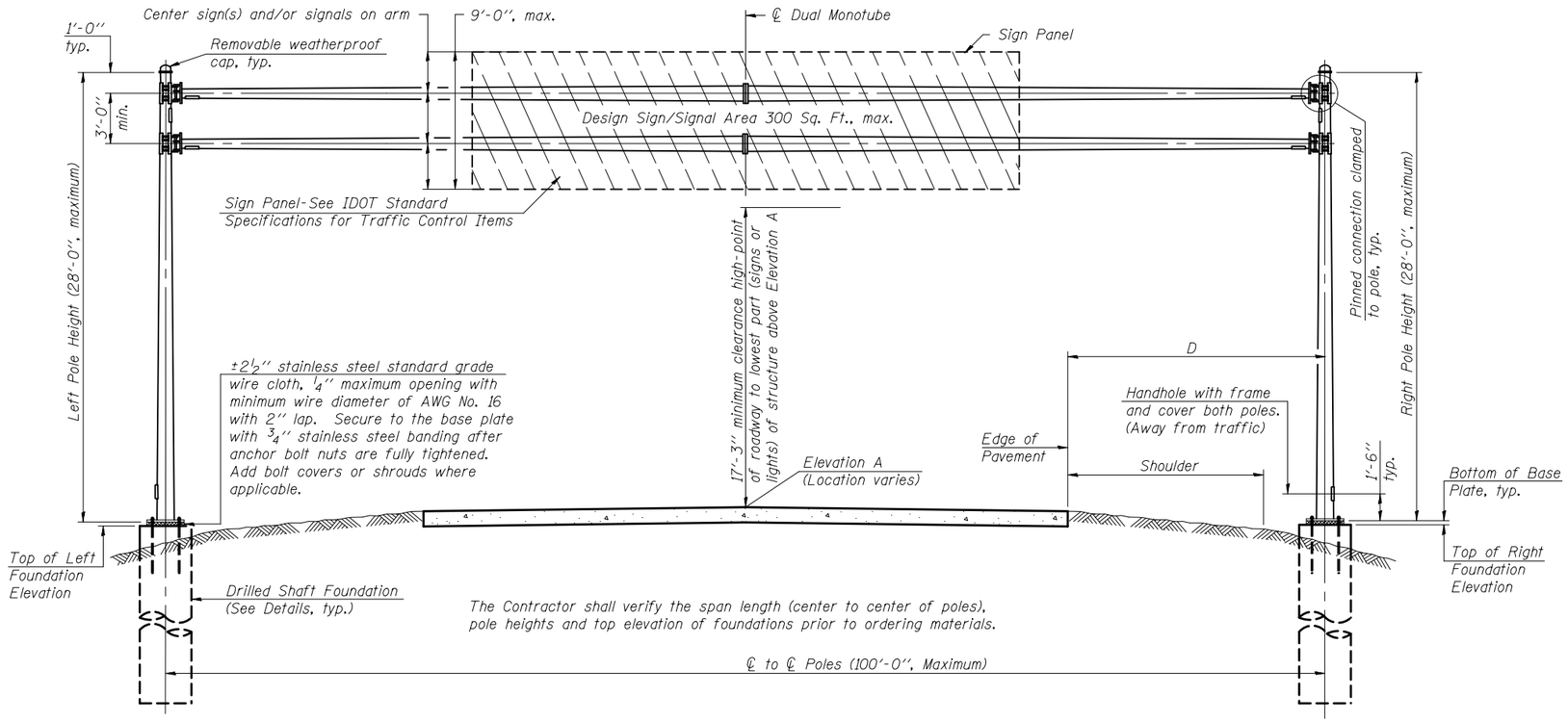
MONOTUBE SIGN STRUCTURE
FOUNDATION AND SIGN BRACKETS

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT



ELEVATION

Looking at face of signs.
Looking upstation for structures with signs both sides.

GENERAL NOTES

DESIGN: Current (at time of letting) AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (Fatigue Category II - natural wind gust only).

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Recurring Special Provisions. ("Standard Specifications") All references to "Mast Arm Assembly and Pole" are applicable, unless otherwise noted.

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.

ANCHOR RODS: Shall conform to ASTM F1554 Grade 105. No welding shall be permitted on rods.

FASTENERS: All connection bolts shall be High Strength Bolts M164, Galvanize M232 (A153), Type 3, or stainless steel heavy hex conforming to ASTM A193, Grade B8 or B8M, Class 1. U-bolts shall be produced from ASTM A276 Type 304, 304L, 316 or 316L, Condition A, cold finished, or an equivalent material acceptable to the Engineer. Nuts for stainless steel bolts shall be stainless steel conforming to ASTM A194, Grade 8 (AISI Type 304) or Grade 8F (AISI Type 303). All nuts shall be "locknuts" with nylon or steel inserts and semifinished hexagonal heads equivalent to the finished heavy hex series of the American National Standard. Washers for stainless steel bolts shall be stainless steel conforming to ASTM A240, Type 302 or 304.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

CAMBER: Minimum AASHTO camber = L / 1000 + dead load camber

FOUNDATIONS: The contract unit price for Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

SIGN STRUCTURE DATA TABLE

Structure Number	Station	℄ to ℄ Poles	Elevation A	Dimension D	Actual Sign/Signal Area	Left Foundation					Right Foundation					Class SI Concrete (Cu. Yds.)
						Elevation Top	Elev. Bottom	A	B	F	Elevation Top	Elev. Bottom	A	B	F	

BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE MONOTUBE DUAL	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

DUALTUBE - 1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

DUAL MONOTUBE SIGN STRUCTURE

SHEET NO. OF SHEETS

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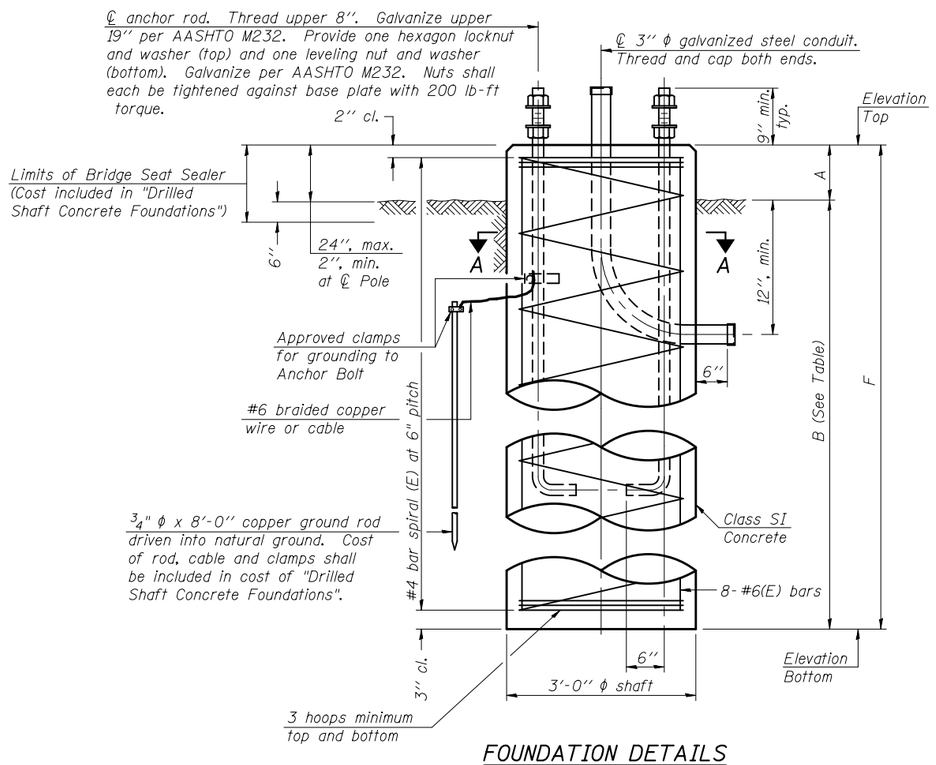
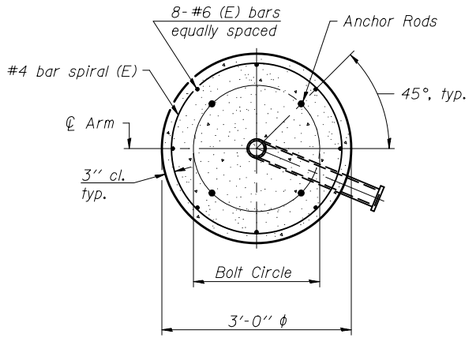


FOUNDATION DETAILS

Typical, except conduit may only be required at one foundation. Provide conduit openings both poles.



SECTION A-A

Foundation Design Table	
Span (Ft.)	B (Ft.)
Span ≤ 65	12
65 < Span ≤ 85	13
85 < Span ≤ 100	14

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 tsf, 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 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. If dimensions "B" or "F" are revised by more than 12'' by the Contractor, ''as-built'' plans shall be prepared and submitted to the District Bureau of Operations for future reference.

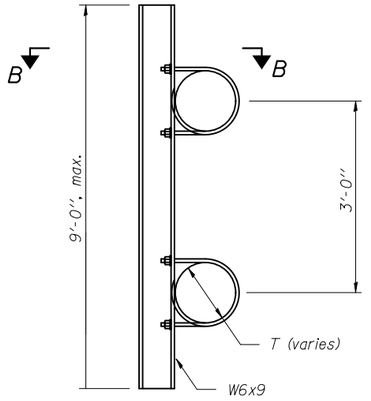
No sonotubes or decomposable forms shall be used below the lower conduit entrance.

Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

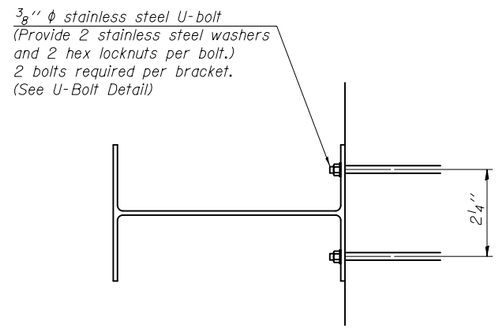
Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6'' below finished ground line. Cost included in ''Drilled Shaft Concrete Foundation''.

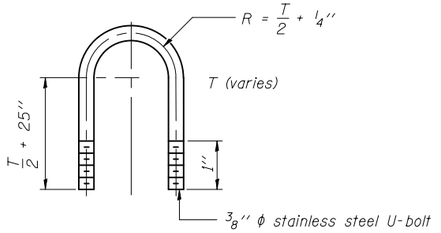


SIGN MOUNTING BRACKET



SECTION B-B

6'-0'' maximum spacing.
2'-0'' maximum sign overhang beyond end bracket.



U-BOLT DETAIL

(Typical)

DUALTUBE - 2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
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2.5 Breakaway Wide Flange Steel Signposts

Breakaway wide flange steel signposts are the most economical sign structures when similar tubular posts are not adequate. In general, locate ground-mounted signs on level ground for shorter posts and accompanying cost savings (see the Bureau of Operations Traffic Policies and Procedures Manual for guidance). Use the minimum number of posts that satisfy the design criteria. Whenever practical, avoid placing posts directly in ditch flow lines or in other areas where debris accumulates and erosion is likely, or if seasonal icing would be deep enough to interfere with proper operation of the slip base.

Use the following procedures for selecting wide flange breakaway designs:

1. Utilize the latest version of the Breakaway Wide Flange Signpost base sheets.

2. Determine actual sign area in terms of design width and height. (See Figure 1, page 2.5-3)

3. Calculate “Clear Height”. Clear height is the difference in elevation between the top of the foundation (or grade elevation at centerline of post) and the bottom edge of sign for the longest post.

4. Check the calculated clear height at longest post with respect to the following criteria: (See Figure 2, page 2.5-3).
   (a). For signs less than 30 feet from edge of pavement, the bottom edge of sign must be set level at an elevation of at least 7 feet above grade elevation at edge of pavement (supplemental panels may be set at 6 feet).

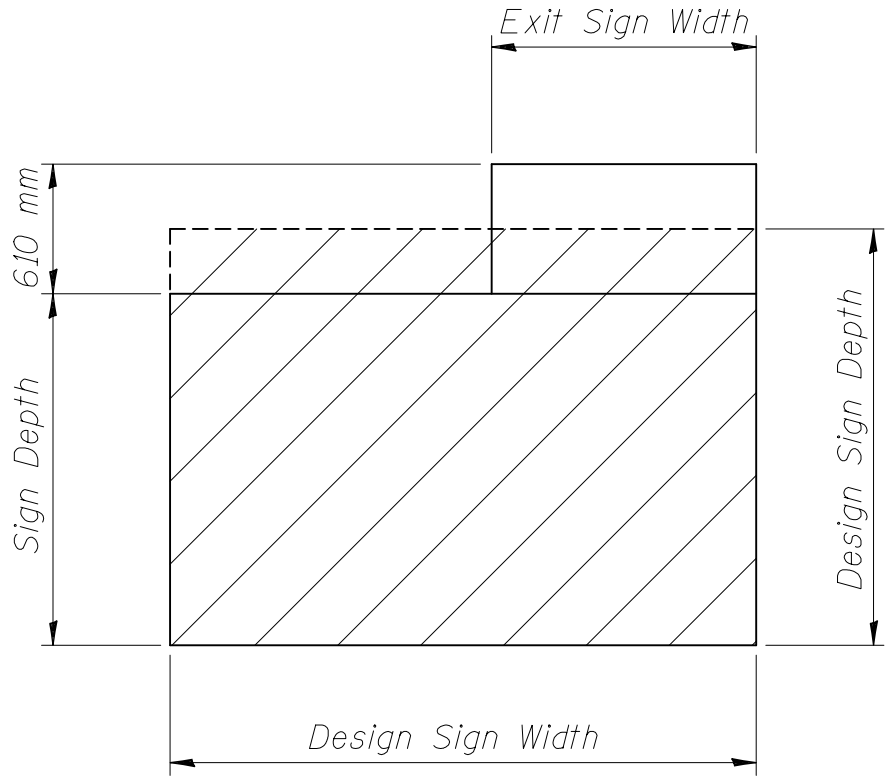
(b). For signs 30 feet and greater from edge of pavement, the bottom edge of sign must be set level at an elevation of at least 5 feet above grade elevation at edge of pavement.

(c). For signs on rising embankment slopes, the bottom edge of sign must be set to provide at least 7 feet between it and the top of the stub post for the shortest post. This may be reduced to 5 feet when either the distance from the edge of pavement is greater than 30 feet and the slope is greater than 2:1 (horizontal: vertical) or where other factors would prevent an out of control vehicle from reaching the post.

5. With sign height, width and clear height, enter the charts and select the number and size of posts.

6. In cases where the sign and post dimensions fall between those tabulated on the selection charts, the plan preparer should round up to the larger post size.

7. In cases where the sign dimensions are greater than the maximum 40 feet width by 24 feet height given in the charts, the plan preparer must contact the BBS for post designs.



Hatched area is the equivalent design sign area.

Figure 1

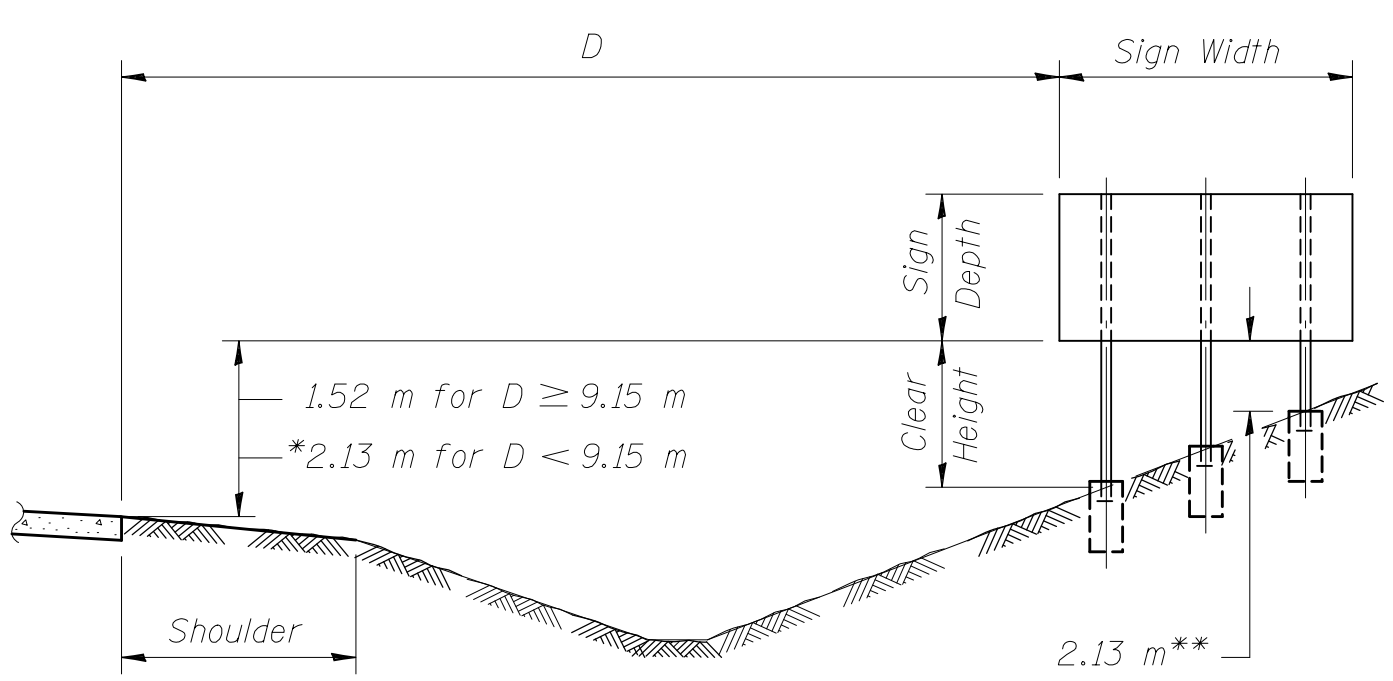


Figure 2

*May be reduced to 1.83 m when a supplemental panel is mounted below the main panel.

**Between top of stud post and fuse plate. May be reduced to 1.52 m when D = 9.15 m and the slope is 2:1 or steeper or where it would be unlikely for an out of control vehicle to reach the post.

The criteria illustrated in Figure 2 above is for expressways or fully access controlled freeways. All mounting heights shall be in accordance with the latest edition of the Illinois Manual on Uniform Traffic Control Devices.

SIGN WIDTH = 10 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15
10	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18
12	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
16	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26
18	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W12 X 26	W12 X 26	W14 X 30
20	W8 X 18	W10 X 22	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38
22	W10 X 22	W10 X 22	W12 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38
24	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 22	W12 X 26
8	W8 X 18	W8 X 18	W10 X 22	W10 X 26	W10 X 26	W12 X 26	W14 X 30
10	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W12 X 26	W14 X 30	W14 X 38
12	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
14	W12 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
16	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
18	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
20	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
22	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
24	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
26	W16 X 45	W16 X 45	W16 X 45				
28	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 30	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
14	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45	W16 X 45	W16 X 45				
18	W16 X 45						

SIGN WIDTH = 12 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
10	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
12	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26
16	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
20	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
24	W10 X 26	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 22	W10 X 26	W12 X 26
8	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
10	W10 X 22	W10 X 26	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38
12	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
14	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
20	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
22	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
24	W16 X 45	W16 X 45					
26	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
14	W16 X 45	W16 X 45	W16 X 45				
16	W16 X 45						

SIGN WIDTH = 14 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18
10	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
12	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
14	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30
16	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
18	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
20	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
24	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
28	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
30	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W8 X 18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
8	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
10	W10 X 26	W12 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38
12	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
14	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
20	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
22	W16 X 45	W16 X 45					
24	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
10	W14 X 38	W16 X 45	W16 X 45	W16 X 45			
12	W16 X 45	W16 X 45	W16 X 45				
14	W16 X 45						

SIGN WIDTH = 16 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
8	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
10	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 26
12	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26
14	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 30
16	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38
18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
20	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
24	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
28	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
30	W14 X 38	W14 X 38	W16 X 45	W16 X 45			

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
8	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
20	W16 X 45	W16 X 45	W16 X 45				
22	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	18	19	20	21	22
6	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45			

SIGN WIDTH = 16 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15
10	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
12	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
16	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30
18	W8 X 18	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
20	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
24	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26
8	W8 X 18	W10 X 22	W8 X 18	W10 X 26	W10 X 26	W12 X 26	W14 X 30
10	W10 X 22	W10 X 26	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
12	W10 X 26	W12 X 26	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38
14	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
16	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
20	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
22	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
24	W16 X 45	W16 X 45	W16 X 45				
26	W16 X 45	W16 X 45					
28	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45	W16 X 45					
18	W16 X 45						

SIGN WIDTH = 18 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
8	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
10	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
12	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W10 X 26	W14 X 30
14	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
16	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
20	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W16 X 45	W16 X 45
22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
24	W14 X 30	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45		
28	W14 X 38	W14 X 38	W16 X 45	W16 X 45			
30	W14 X 38	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
8	W10 X 26	W12 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
16	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45	W16 X 45				
20	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	18	19	20	21
6	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45		
12	W16 X 45			

SIGN WIDTH = 18 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
10	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
12	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26
16	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38
20	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
24	W10 X 26	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
26	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 22	W10 X 26	W12 X 26
8	W10 X 22	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
10	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
12	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
14	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
20	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
22	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
24	W16 X 45	W16 X 45					
26	W16 X 45						
28	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
14	W16 X 45	W16 X 45	W16 X 45				
16	W16 X 45						

SIGN WIDTH = 20 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18
8	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
10	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W12 X 26
12	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
14	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38
16	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
18	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
20	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
22	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
24	W14 X 30	W14 X 38	W14 X 38	W16 X 45	W16 X 45		
26	W14 X 38	W14 X 38	W16 X 45	W16 X 45			
28	W14 X 38	W16 X 45	W16 X 45	W16 X 45			
30	W14 X 38	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
8	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
16	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
18	W16 X 45	W16 X 45					
20	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)		
	18	19	20
6	W14 X 38	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45		

SIGN WIDTH = 20 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
10	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
12	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
14	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30
16	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
18	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
20	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
22	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
24	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
28	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
30	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26	W12 X 26	W14 X 30
8	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
10	W10 X 26	W12 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38
12	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
20	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
22	W16 X 45	W16 X 45					
24	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45	W16 X 45				
14	W16 X 45	W16 X 45					

SIGN WIDTH = 20 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15
10	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18
12	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
16	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26
18	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38
20	W8 X 18	W10 X 22	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38
22	W10 X 22	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
24	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
26	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26
8	W8 X 18	W10 X 22	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
10	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W12 X 26	W14 X 30	W14 X 38
12	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
14	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
16	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
18	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
20	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	W16 X 45
22	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
24	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
26	W16 X 45	W16 X 45					
28	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
14	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45	W16 X 45	W16 X 45				
18	W16 X 45						

SIGN WIDTH = 22 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
10	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
12	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 26	W10 X 26
14	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
16	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
18	W8 X 18	W10 X 22	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38
20	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
22	W10 X 26	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
24	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	
28	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45		
30	W14 X 38	W14 X 38	W16 X 45	W16 X 45			

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 30
8	W10 X 22	W10 X 26	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38
10	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
18	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
20	W16 X 45	W16 X 45	W16 X 45				
22	W16 X 45	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	18	19	20	21	22	23
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45				
14	W16 X 45					

SIGN WIDTH = 22 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
10	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
12	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 22	W10 X 26
16	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
20	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
24	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 22	W10 X 26	W12 X 26
8	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26	W12 X 26	W14 X 30
10	W10 X 22	W10 X 26	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
12	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
14	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
20	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
22	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
24	W16 X 45	W16 X 45	W16 X 45				
26	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45	W16 X 45	W16 X 45				
16	W16 X 45	W16 X 45					

SIGN WIDTH = 24 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
8	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
10	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 26
12	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26
14	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26	W14 X 30
16	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38
18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
20	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
24	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
28	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
30	W14 X 38	W16 X 45	W16 X 45	W16 X 45			

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 30	W14 X 38
8	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
20	W16 X 45	W16 X 45					
22	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	18	19	20	21	22
6	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45			

SIGN WIDTH = 24 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W8 X 18
10	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22
12	W6 X 9	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26
16	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 30	W14 X 38
20	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
22	W10 X 22	W10 X 26	W10 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38
24	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
26	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
8	W10 X 22	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
10	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
12	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
14	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
20	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
22	W16 X 45	W16 X 45	W16 X 45				
24	W16 X 45	W16 X 45					
26	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
14	W16 X 45	W16 X 45	W16 X 45				
16	W16 X 45						

SIGN WIDTH = 26 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
8	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18	W10 X 22
10	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
12	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30
14	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
16	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
20	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
24	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	
26	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45		
28	W14 X 38	W14 X 38	W16 X 45	W16 X 45			
30	W14 X 38	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
8	W10 X 22	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
16	W14 X 38	W16 X 45	W16 X 45	W16 X 45			
18	W16 X 45	W16 X 45	W16 X 45				
20	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	18	19	20	21
6	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45			

SIGN WIDTH = 26 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18
10	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
12	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
14	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26
16	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30	W14 X 38
18	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
20	W10 X 22	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
22	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45
24	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
28	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
30	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W8 X 18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30
8	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
10	W10 X 22	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
18	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
20	W14 X 38	W16 X 45	W16 X 45	W16 X 45			
22	W16 X 45	W16 X 45	W16 X 45				
24	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45	W16 X 45				
14	W16 X 45	W16 X 45					

SIGN WIDTH = 26 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	4	5	6	7	8	9	10
6	W6 X 9	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15
8	W6 X 9	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W6 X 15
10	W6 X 9	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W8 X 18
12	W6 X 15	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22
14	W6 X 15	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26
16	W6 X 15	W6 X 15	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W14 X 30
18	W6 X 15	W8 X 18	W10 X 22	W10 X 26	W10 X 26	W14 X 30	W14 X 38
20	W8 X 18	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
24	W10 X 22	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
26	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
28	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	11	12	13	14	15	16	17
6	W6 X 15	W8 X 18	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26
8	W8 X 18	W10 X 22	W10 X 22	W10 X 26	W10 X 26	W10 X 26	W14 X 30
10	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
12	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
14	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
16	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
18	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
20	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
22	W14 X 38	W16 X 45	W16 X 45	W16 X 45			
24	W16 X 45	W16 X 45	W16 X 45				
26	W16 X 45	W16 X 45					
28	W16 X 45						

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)						
	18	19	20	21	22	23	24
6	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
14	W16 X 45	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45	W16 X 45					
18	W16 X 45						

SIGN WIDTH = 28 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W12 X 26	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45	W16 X 45				
16	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)	
	20	21
6	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45

SIGN WIDTH = 28 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 26	W12 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38
8	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
10	W14 X 38	W14 X 38	W10 X 26	W14 X 38	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
16	W16 X 45	W16 X 45	W16 X 45			
18	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
10	W16 X 45	W16 X 45			
12	W16 X 45				

SIGN WIDTH = 28 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
8	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	W16 X 45
18	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
20	W16 X 45	W16 X 45				
22	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45				

SIGN WIDTH = 30 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45	W16 X 45			
14	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)
	20
6	W16 X 45
8	W16 X 45

SIGN WIDTH = 30 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
8	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
16	W16 X 45	W16 X 45	W16 X 45			
18	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	20	21	22	23
6	W14 X 38	W16 X 45	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45		

SIGN WIDTH = 30 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W12 X 26	W14 X 38	W14 X 38	W14 X 38
8	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45	W16 X 45			
20	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45			

SIGN WIDTH = 32 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45	W16 X 45			
14	W16 X 45					

SIGN WIDTH = 32 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
14	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45	W16 X 45				
18	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)		
	20	21	22
6	W14 X 38	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45		

SIGN WIDTH = 32 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
8	W12 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
16	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45				
20	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45				

SIGN WIDTH = 32 FEET **NUMBER OF POSTS = 6**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
8	W10 X 26	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38
10	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
18	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
20	W16 X 45	W16 X 45	W16 X 45			
22	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45				

SIGN WIDTH = 34 FEET **NUMBER OF POSTS = 3**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45				
14	W16 X 45					

SIGN WIDTH = 34 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
14	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)		
	20	21	22
6	W16 X 45	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	

SIGN WIDTH = 34 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W14 X 30	W14 X 30	W14 X 38	W14 X 38
8	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
10	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
16	W16 X 45	W16 X 45	W16 X 45			
18	W16 X 45	W16 X 45				
20	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
10	W16 X 45	W16 X 45			

SIGN WIDTH = 34 FEET **NUMBER OF POSTS = 6**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W10 X 26	W12 X 26	W14 X 30	W14 X 38
8	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
18	W16 X 45	W16 X 45	W16 X 45			
20	W16 X 45	W16 X 45				
22	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W16 X 45	W16 X 45			
14	W16 X 45				

SIGN WIDTH = 36 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)	
	20	21
6	W16 X 45	W16 X 45
8	W16 X 45	

SIGN WIDTH = 36 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
8	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
10	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
16	W16 X 45	W16 X 45	W16 X 45			
18	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45		
10	W16 X 45	W16 X 45			

SIGN WIDTH = 36 FEET **NUMBER OF POSTS = 6**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W10 X 26	W14 X 30	W14 X 38	W14 X 38
8	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45	W16 X 45			
20	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45	W16 X 45			

SIGN WIDTH = 36 FEET **NUMBER OF POSTS = 7**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 22	W10 X 26	W10 X 26	W14 X 30	W14 X 30
8	W10 X 26	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
10	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
18	W14 X 38	W16 X 45	W16 X 45	W16 X 45		
20	W16 X 45	W16 X 45	W16 X 45			
22	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
12	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45				

SIGN WIDTH = 38 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45	W16 X 45				
16	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)
	20
6	W16 X 45
8	W16 X 45

SIGN WIDTH = 38 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
8	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
14	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
16	W16 X 45	W16 X 45				
18	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	20	21	22	23
6	W14 X 38	W16 X 45	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45	
10	W16 X 45			

SIGN WIDTH = 38 FEET **NUMBER OF POSTS = 6**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
8	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
16	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45				
20	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45		
12	W16 X 45				

SIGN WIDTH = 38 FEET **NUMBER OF POSTS = 7**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38
8	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
18	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
20	W16 X 45	W16 X 45				
22	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45	W16 X 45		
14	W16 X 45				

SIGN WIDTH = 40 FEET **NUMBER OF POSTS = 4**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
8	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45	W16 X 45			
14	W16 X 45	W16 X 45				

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)
	20
6	W16 X 45
8	W16 X 45

SIGN WIDTH = 40 FEET **NUMBER OF POSTS = 5**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
8	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
10	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
12	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45	
14	W16 X 45	W16 X 45	W16 X 45			
16	W16 X 45	W16 X 45				
18	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)		
	20	21	22
6	W14 X 38	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	
10	W16 X 45		

SIGN WIDTH = 40 FEET **NUMBER OF POSTS = 6**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38
8	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38
10	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
16	W16 X 45	W16 X 45	W16 X 45	W16 X 45		
18	W16 X 45	W16 X 45				
20	W16 X 45					

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
8	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
10	W16 X 45	W16 X 45			
12	W16 X 45				

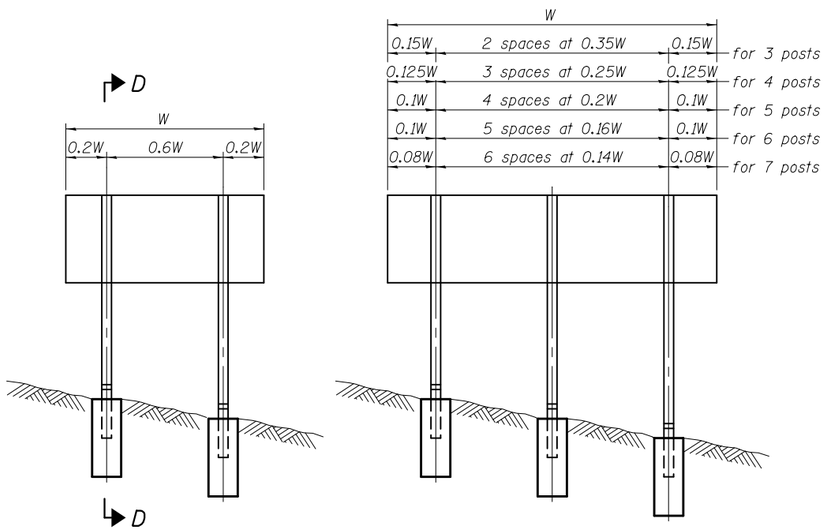
SIGN WIDTH = 40 FEET **NUMBER OF POSTS = 7**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)					
	14	15	16	17	18	19
6	W10 X 22	W10 X 26	W10 X 26	W12 X 26	W14 X 30	W14 X 38
8	W10 X 26	W12 X 26	W14 X 30	W14 X 38	W14 X 38	W14 X 38
10	W14 X 30	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W14 X 38
12	W14 X 38	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
14	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
16	W14 X 38	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
18	W16 X 45	W16 X 45	W16 X 45			
20	W16 X 45	W16 X 45				
22	W16 X 45					

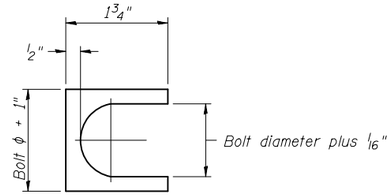
CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)				
	20	21	22	23	24
6	W14 X 38	W14 X 38	W14 X 38	W16 X 45	W16 X 45
8	W14 X 38	W14 X 38	W16 X 45	W16 X 45	W16 X 45
10	W16 X 45	W16 X 45	W16 X 45	W16 X 45	
12	W16 X 45	W16 X 45			

Breakaway Wide Flange Steel Signpost Standards
U. S. Standard Units

SHEET TITLE

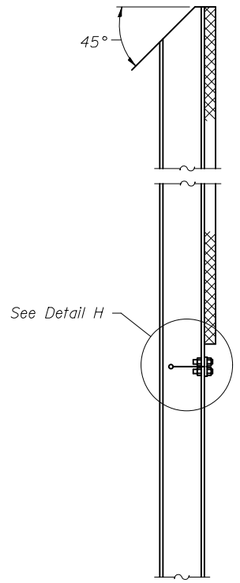


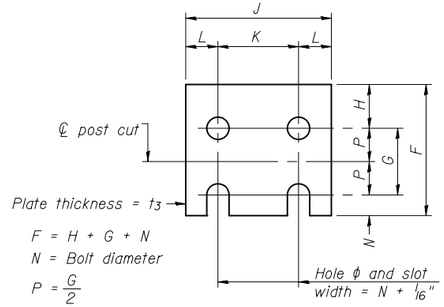
ELEVATION



SHIM DETAIL

Furnish two 0.01" thick and two 0.03" thick stainless steel or brass (ASTM B36) shims per post.

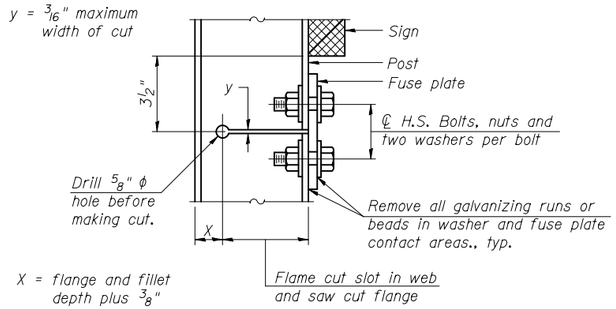




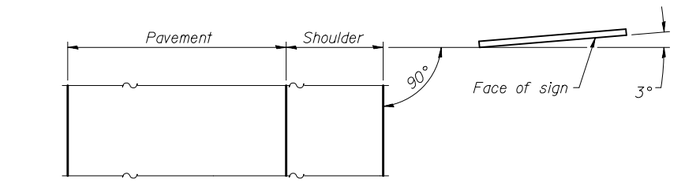
FUSE PLATE DATA		
N = Bolt Diameter	G	H
1/2"	2"	1 1/8"
5/8"	2 1/4"	1 1/4"
3/4"	2 1/2"	1 3/8"
7/8"	2 3/4"	1 1/2"
1"	3"	1 5/8"
1 1/8"	3 1/4"	1 3/4"
1 1/4"	3 1/2"	1 7/8"

FUSE PLATE DETAIL

(Install with notches down.)



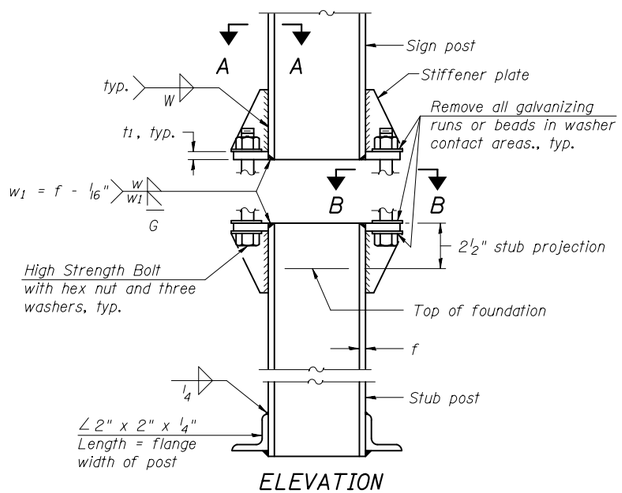
DETAIL H



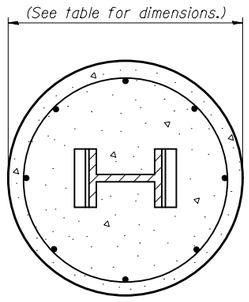
LOCATION SKETCH

SECTION A-A

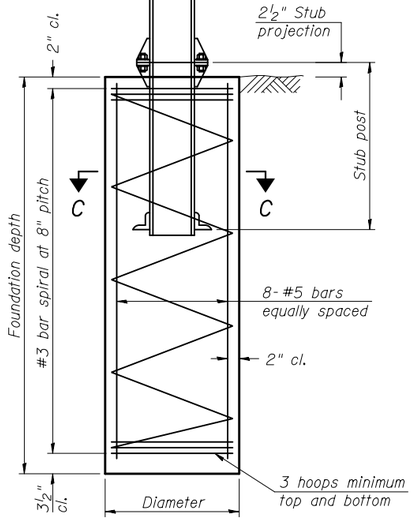
SECTION B-B



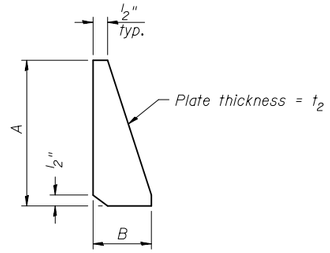
ELEVATION SIGN POST & STUB POST



SECTION C-C



SECTION D-D



STIFFENER PLATE DETAIL

Diameter

GENERAL NOTES

Posts shall be plumbed by using shims with post-to-stub post connection bolts snug tight only. Final tightening of all High Strength Bolts shall be in accordance with Article 727.05 and threads at the junction of the bolt and nut shall be burred or center punched to prevent the nut from loosening.

LOADING: 80 m.p.h. wind with 30% gust factor, normal to sign.

DESIGN STRESSES:
Structural steel - 20,000 p.s.i.
Reinforcing steel - 20,000 p.s.i.
Concrete - 1,400 p.s.i.
Footing soil pressure - 2,000 p.s.f.

After fabrication, the post, fuse plate and upper 6", min. of the stub post shall be hot-dip galvanized in accordance with AASHTO M111. All bolts, nuts and washers shall be hot-dip galvanized in accordance with AASHTO M232.

Work this sheet with Base Sheet BAW-A-2.

BAW-A-1 6-1-12

(Sheet 1 of 2)

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BREAK-AWAY WIDE FLANGE STEEL SIGN POST DETAILS

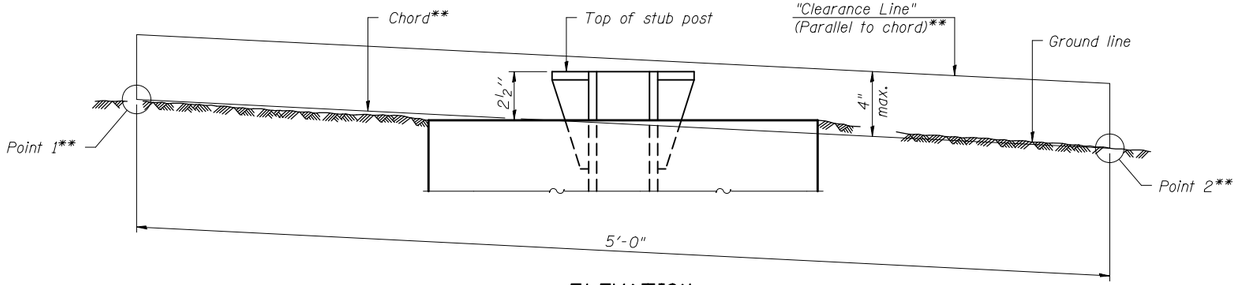
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

POST	CONCRETE FOUNDATION TABLE							POST TO STUB POST CONNECTION DATA										FUSE PLATE DATA			
	Foundation			Reinforcement			Stub Post														
	Diameter	* Minimum Depth	Concrete (1) cu. yds.)	Vertical Bars Length	Bar Spirals Diameter	Bar Spirals Length	lbs. (2)	Length	Bolt Size	A	B	C	D	E	t_1	t_2	R	W	J	K	L	t_3
W6x9	2'-0"	6'-0"	0.70	5'-9"	1'-8½"	79'-0"	78	2'-3"	⅝" x 3¼"	6"	2¼"	1¼"	3½"	1¼"	¾"	½"	11/32"	¼"	4"	2¼"	⅞"	¼"
W6x15	2'-0"	6'-0"	0.70	5'-9"	1'-8½"	79'-0"	78	2'-6"	⅝" x 3¼"	6"	2¼"	1¼"	3½"	1¼"	¾"	½"	11/32"	¼"	6"	3½"	1¼"	⅜"
W8x18	2'-0"	6'-0"	0.70	5'-9"	1'-8½"	79'-0"	78	2'-6"	¾" x 3¾"	6"	2½"	1⅜"	3¼"	1⅜"	1"	½"	13/32"	5/16"	5¼"	2¾"	1¼"	⅜"
W10x22	2'-6"	6'-6"	1.18	6'-3"	2'-2½"	105'-0"	92	3'-0"	¾" x 3¾"	6"	2½"	1⅜"	3¼"	1⅜"	1"	½"	13/32"	5/16"	5¾"	2¾"	1½"	½"
W10x26	2'-6"	7'-0"	1.27	6'-9"	2'-2½"	112'-0"	98	3'-0"	⅞" x 4"	7"	2¾"	1½"	4"	1½"	1"	¾"	15/32"	⅜"	5¾"	2¾"	1½"	⅝"
W12x26	2'-6"	7'-9"	1.41	7'-6"	2'-2½"	119'-0"	107	3'-0"	⅞" x 4"	7"	2¾"	1½"	4"	1½"	1"	¾"	15/32"	⅜"	6½"	3½"	1½"	⅝"
W14x30	3'-0"	7'-3"	1.90	7'-0"	2'-8½"	145'-0"	113	3'-0"	⅞" x 4"	7"	2¾"	1½"	4"	1½"	1"	¾"	15/32"	⅜"	6¾"	3½"	1⅝"	½"
W14x38	3'-0"	8'-0"	2.09	7'-9"	2'-8½"	153'-0"	122	3'-6"	1" x 4½"	7½"	3"	1¾"	4"	1¾"	1¼"	¾"	17/32"	⅜"	6¾"	3½"	1⅝"	½"
W16x45	3'-0"	8'-6"	2.23	8'-3"	2'-8½"	162'-0"	130	3'-6"	1" x 4½"	7½"	3"	1¾"	4"	1¾"	1¼"	¾"	17/32"	⅜"	7"	3½"	1¾"	½"

*Dimensional changes required for varying site conditions shall be approved by the Engineer.

POST	FUSE PLATE BOLT SIZE Sign Height																				
	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"	11'-0"	12'-0"	13'-0"	14'-0"	15'-0"	16'-0"	17'-0''	18'-0''	19'-0''	20'-0''	21'-0''	22'-0''	23'-0''	24'-0''
W6x9	½" x 1½"	½" x 1½"	½" x 1½"	½" x 1½"	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
W6x15	½" x 1¾"	½" x 1¾"	½" x 1¾"	⅝" x 2"	⅝" x 2"	¾" x 2"	¾" x 2"	¾" x 2"	¾" x 2"	——	——	——	——	——	——	——	——	——	——	——	——
W8x18	½" x 1¾"	½" x 1¾"	½" x 1¾"	½" x 1¾"	⅝" x 2"	⅝" x 2"	¾" x 2"	¾" x 2"	¾" x 2"	¾" x 2"	——	——	——	——	——	——	——	——	——	——	——
W10x22	½" x 2"	½" x 2"	½" x 2"	½" x 2"	½" x 2"	⅝" x 2"	⅝" x 2"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	——	——	——	——	——	——	——	——
W10x26	½" x 2"	½" x 2"	½" x 2"	½" x 2"	½" x 2"	⅝" x 2¼"	⅝" x 2¼"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	——	——	——	——	——	——	——
W12x26	½" x 2"	½" x 2"	½" x 2"	½" x 2"	½" x 2"	⅝" x 2¼"	⅝" x 2¼"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	——	——	——	——	——	——
W14x30	½" x 2"	½" x 2"	½" x 2"	½" x 2"	½" x 2"	⅝" x 2"	⅝" x 2"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	¾" x 2¼"	——	——	——	——	——
W14x38	½" x 2"	½" x 2"	½" x 2"	½" x 2"	½" x 2"	⅝" x 2¼"	⅝" x 2¼"	¾" x 2½"	¾" x 2½"	¾" x 2½"	¾" x 2½"	⅞" x 2½"	⅞" x 2½"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"
W16x45	——	½" x 2"	½" x 2"	½" x 2"	½" x 2"	½" x 2"	½" x 2"	⅝" x 2¼"	⅝" x 2¼"	⅝" x 2¼"	¾" x 2½"	¾" x 2½"	⅞" x 2½"	⅞" x 2½"	⅞" x 2½"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"	1" x 2¾"



ELEVATION
GROUND LINE & STUB POST

** For all "Point 1" and "Point 2" locations, "Clearance Line" must be at or above top of stub post.

(1) Quantity includes all concrete necessary for one foundation.

(2) Includes reinforcement bars and spiral hooping for one foundation.

BAW-A-2 6-1-12

(Sheet 2 of 2)

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BREAK-AWAY WIDE FLANGE STEEL SIGN POST TABLES

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

2.6 Breakaway Tubular Steel Signposts

Breakaway tubular steel signposts are the most economical sign structure when clear height and sign size allow the use of no more than two posts. In general, locate ground-mounted signs on level ground for shorter posts and accompanying cost savings (see the Bureau of Operations Traffic Policies and Procedures Manual for guidance). Use the minimum number of posts that satisfy the design criteria, noting that tubular posts are more expensive than wide flange posts of similar weight and length. Whenever practical, avoid placing posts directly in ditch flow lines or in other areas where debris accumulates and erosion is likely, or if seasonal icing would be deep enough to interfere with proper operation of the slip base.

Use the following procedures for selecting tubular steel breakaway designs:

1. Utilize the latest version of the Breakaway Tubular Signpost base sheets.

2. Determine actual sign area in terms of design width and height (See Figure 1, page 2.5-3).

3. Determine “Clear Height”. Clear height is the difference in elevation between the top of the foundation (or grade elevation at centerline of post) and the bottom edge of sign for the longest post.

4. Check the calculated clear height at longest post with respect to the following criteria: (See Figure 2, page 2.5-3).
   (a). For signs less than 30 feet from edge of pavement, the bottom edge of sign must be set level at an elevation of at least 7 feet above grade

elevation at edge of pavement (supplemental panels may be set at 6 feet).

(b). For signs 30 feet and greater from edge of pavement, the bottom edge of sign must be set level at an elevation of at least 5 feet above grade elevation at edge of pavement.

(c). For signs on rising embankment slopes, the bottom edge of sign must be set to provide at least 7 feet between it and the top of the stub post for the shortest post. This may be reduced to 5 feet when either the distance from the edge of pavement is greater than 30 feet and the slope is greater than 2:1 (horizontal: vertical) or where other factors would prevent an out of control vehicle from reaching the post.

5. With sign width, height and clear height, enter the charts and select the number and size of posts.

6. In cases where the sign and post dimensions fall between those tabulated on the selection charts, the plan preparer should round up to the dimensions giving the larger post size.

SIGN WIDTH = 3 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
7	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
8	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
9	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
10	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
11	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
12	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
13	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
14	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
15	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
16	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
17	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
18	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
5	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
6	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
7	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
8	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
9	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
10	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
11	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
12	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
13	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
14	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
15	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
16	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
17	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16
18	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4

SIGN WIDTH = 4 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
7	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
8	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
9	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
10	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
11	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
12	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
13	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
14	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
15	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
16	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
17	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
18	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
5	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
6	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
8	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
9	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
10	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
11	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
12	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16
13	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
14	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
15	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
16	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
17	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
18	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4

SIGN WIDTH = 4 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
7	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
8	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
9	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
10	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
11	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
12	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
13	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
14	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
15	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
16	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
17	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
18	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
7	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
8	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
9	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
10	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
11	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
12	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
13	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
14	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
15	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
16	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
17	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
18	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4

SIGN WIDTH = 5 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
6	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
7	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
8	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
9	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
10	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
11	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
12	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
13	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
14	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
15	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
16	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16
17	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
18	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
5	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
6	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
8	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
9	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
10	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
11	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
12	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
13	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
14	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
15	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
17	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
18	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4

SIGN WIDTH = 5 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
7	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
8	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
9	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
10	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
11	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
12	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
13	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
14	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
15	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
16	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
17	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
18	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
6	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
7	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
8	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
9	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
10	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
11	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
12	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
13	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
14	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
15	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
16	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
17	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
18	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16

SIGN WIDTH = 6 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
5	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
6	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
7	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
8	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
9	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
10	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
11	HSS4 X 2 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
12	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
13	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
14	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
15	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
16	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
17	HSS5 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
18	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
5	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
6	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
7	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
8	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
9	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
10	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
11	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS8 X 4 X 1/4	HSS8 X 4 X 1/4
12	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4
13	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
14	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
15	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4	
16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4	
17	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4		
18	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4		

SIGN WIDTH = 6 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
7	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
8	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
9	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
10	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
11	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
12	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
13	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
14	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
15	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
16	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
17	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
18	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
5	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
6	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
7	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
8	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
9	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
10	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
11	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
12	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
13	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
14	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
15	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
16	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
17	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16
18	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4

SIGN WIDTH = 7 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
5	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
6	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
7	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
8	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
9	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
10	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
11	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
12	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
13	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
14	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
15	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
16	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
17	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
18	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
5	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
6	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
7	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
8	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
9	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
10	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
11	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4
12	HSS6 X 4 X 5/16	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4	
13	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4	
14	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4		
15	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4		
16	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4		
17	HSS8 X 6 X 1/4			
18	HSS8 X 6 X 1/4			

SIGN WIDTH = 7 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
7	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
8	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
9	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
10	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
11	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
12	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
13	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
14	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
15	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
16	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
17	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
18	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
5	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
6	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
7	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
8	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
9	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
10	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
11	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
12	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
13	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
14	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16
15	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
16	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
17	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
18	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4

SIGN WIDTH = 8 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
5	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
6	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
8	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
9	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
10	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
11	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
12	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
13	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
14	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
15	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
16	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
17	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
18	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
5	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16
6	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
7	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
8	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
9	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
10	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
11	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	
12	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4		
13	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4		
14	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4		
15	HSS8 X 6 X 1/4			
16	HSS8 X 6 X 1/4			
17				
18				

SIGN WIDTH = 8 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
7	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
8	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
9	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
10	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
11	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
12	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
13	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
14	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
15	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
16	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
17	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
18	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
5	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
6	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
8	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
9	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
10	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
11	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
12	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16
13	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
14	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
15	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
16	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
17	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
18	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4

SIGN WIDTH = 9 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
5	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
6	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
8	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
9	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
10	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
11	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
12	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4
13	HSS5 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS8 X 4 X 1/4
14	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
15	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
16	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4
17	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
18	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
5	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
6	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
7	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
8	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
9	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
10	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
11	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4		
12	HSS8 X 4 X 1/4			
13	HSS8 X 6 X 1/4			
14	HSS8 X 6 X 1/4			
15				
16				
17				
18				

SIGN WIDTH = 9 FEET **NUMBER OF POSTS = 2**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
6	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
7	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
8	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
9	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
10	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
11	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
12	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
13	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
14	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
15	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
16	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
17	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
18	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
5	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
6	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
8	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
9	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
10	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
11	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
12	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
13	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
14	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
15	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
16	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
17	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
18	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4

SIGN WIDTH = 10 FEET **NUMBER OF POSTS = 1**

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
5	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
6	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
8	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
9	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
10	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
11	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4
12	HSS5 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
13	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
14	HSS6 X 3 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
15	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS8 X 4 X 1/4	HSS8 X 6 X 1/4
16	HSS6 X 4 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	
17	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	
18	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16
5	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
6	HSS6 X 4 X 5/16	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4
7	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
8	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
9	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
10	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4	
11	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4		
12	HSS8 X 6 X 1/4			
13				
14				
15				
16				
17				
18				

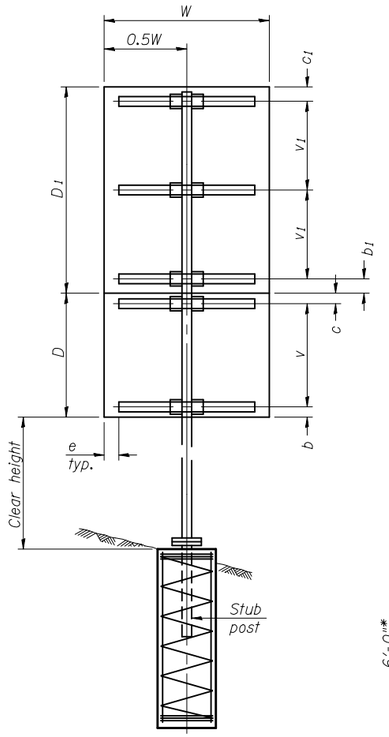
SIGN WIDTH = 10 FEET **NUMBER OF POSTS = 2**

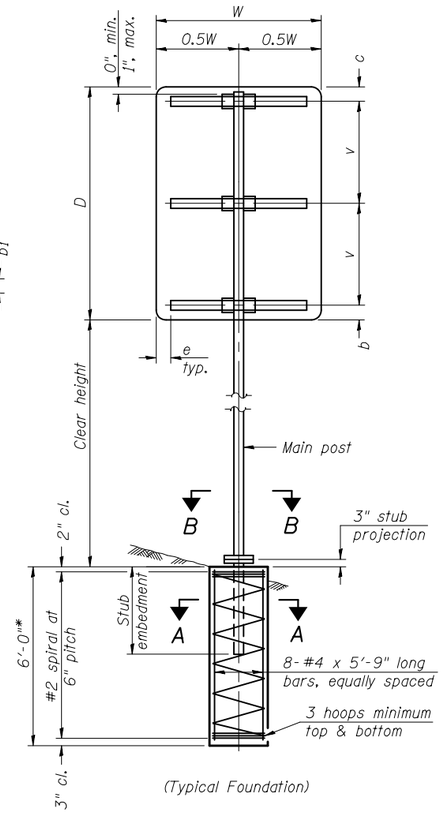
CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	3	4	5	6
4	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4
5	HSS3 X 2 X 1/4	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
6	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4
7	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4
8	HSS3 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
9	HSS4 X 2 X 1/4	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
10	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4
11	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
12	HSS4 X 2 X 1/4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
13	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
14	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
15	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
16	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
17	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
18	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16

CLEAR HEIGHT (FEET)	SIGN HEIGHT (FEET)			
	7	8	9	10
4	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4
5	HSS4 X 3 X 1/4	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4
6	HSS5 X 3 X 1/4	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4
7	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
8	HSS5 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4
9	HSS6 X 3 X 1/4	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4
10	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16
11	HSS6 X 3 X 1/4	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4
12	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4
13	HSS6 X 4 X 1/4	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
14	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 4 X 1/4
15	HSS6 X 4 X 5/16	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
16	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
17	HSS7 X 5 X 1/4	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4
18	HSS7 X 5 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4	HSS8 X 6 X 1/4

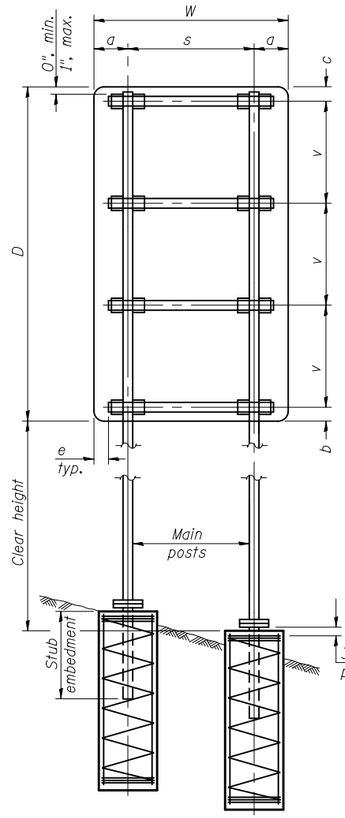
Breakaway Tubular Steel Signpost Standards
U. S. Standard Units

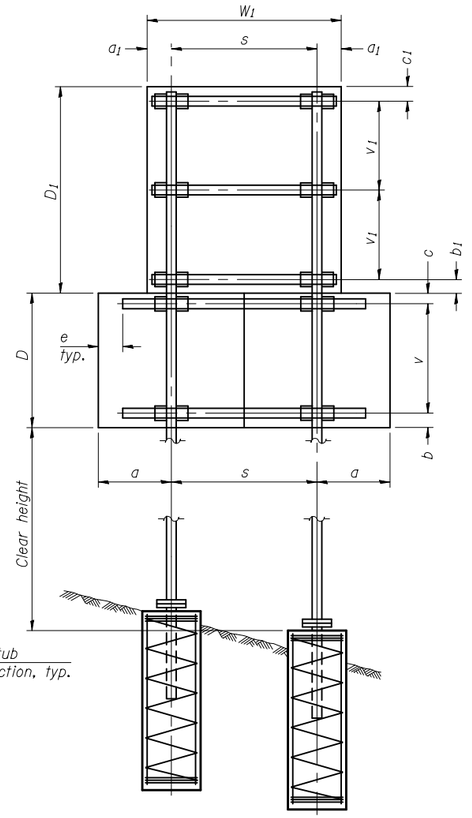
SHEET TITLE





(Typical Foundation)





SINGLE POST ASSEMBLY EXAMPLES

* Dimensional changes required for varying site conditions shall be approved by the Engineer.

a or a_1 = 6" min. to 2'-0" max. (Approximately 0.2W or 0.2W_1)
b or b_1 = 3" min. to 4" max
c or c_1 = 3" min. to 4" max
e = 0" min. to 6" max
s = 3'-0" min. to 6'-0" max. (Approximately 0.6W or 0.6W_1)
v or v_1 = 2'-0" min. to 2'-11" max.

DUAL POST ASSEMBLY EXAMPLES

MAIN POST STEEL TUBING	WEIGHT PER FOOT (POUND)	STUB POST TABLE		MAIN POST TABLE				
		Stub Embedment	Stub Post Length	Bolt Size	A	t	R	Bolt Circle
3" x 2" x 1/4"	7.11	2'-0"	2'-3"	1/2" x 2 3/4"	8 1/4"	5/8"	9/32"	6 1/2"
4" x 2" x 1/4"	8.81	2'-0"	2'-3"	1/2" x 2 3/4"	8 1/4"	5/8"	9/32"	6 1/2"
4" x 3" x 1/4"	10.51	2'-3"	2'-6"	5/8" x 3 1/4"	10"	3/4"	11/32"	8"
5" x 3" x 1/4"	12.21	2'-3"	2'-6"	5/8" x 3 1/4"	10"	3/4"	11/32"	8"
6" x 3" x 1/4"	13.91	2'-3"	2'-6"	5/8" x 3 1/4"	11 1/2"	3/4"	11/32"	9 1/2"
6" x 4" x 1/4"	15.62	2'-3"	2'-6"	3/4" x 3 1/2"	11 1/2"	3/4"	13/32"	9 1/2"
6" x 4" x 5/16"	19.08	2'-3"	2'-6"	3/4" x 3 1/2"	11 1/2"	3/4"	13/32"	9 1/2"
7" x 5" x 1/4"	19.02	2'-6"	2'-9"	3/4" x 3 1/2"	1'-2"	3/4"	13/32"	1'-0"
8" x 4" x 1/4"	19.02	2'-6"	2'-9"	3/4" x 3 1/2"	1'-2"	3/4"	13/32"	1'-0"
8" x 6" x 1/4"	22.42	2'-6"	2'-9"	7/8" x 3 1/2"	1'-2"	3/4"	15/32"	1'-0"

GENERAL NOTES

Posts shall be plumbed by using shims with post-to-stub post connection bolts snug tight only. Final tightening of all High Strength Bolts shall be in accordance with Article 727.05 and threads at the junction of the bolt and nut shall be burred or center punched to prevent the nut from loosening.

One foundation requires 0.7 cubic yards of concrete and 46 pounds of reinforcement bars and spiral hoops.

LOADING: 80 mph wind with 30% gust factor, normal to sign.

DESIGN STRESSES:
Structural steel - 20,000 psi
Reinforcing steel - 20,000 psi
Concrete - 1,400 psi
Footing soil pressure - 2,000 psf

After fabrication, the post, fuse plate, base plate and upper 6", min. of the stub post shall be hot-dip galvanized in accordance with AASHTO M111. All bolts, nuts and washers shall be hot-dip galvanized in accordance with AASHTO M232.

For Sections A-A and B-B, see Base Sheet BAT-A-2.

FOUNDATIONS:
All necessary excavation or drilling (except in rock); backfilling with excavated material; disposal of unsuitable or surplus material; formwork; and furnishing and placing the Class SI Concrete and reinforcement bars, shall be included in the pay item used for foundations.

The measurement of the tubular steel shall be computed on the basis of the weight per foot of the support, multiplied by the combined length of the main posts and stub posts.

BAT-A-1 6-1-12

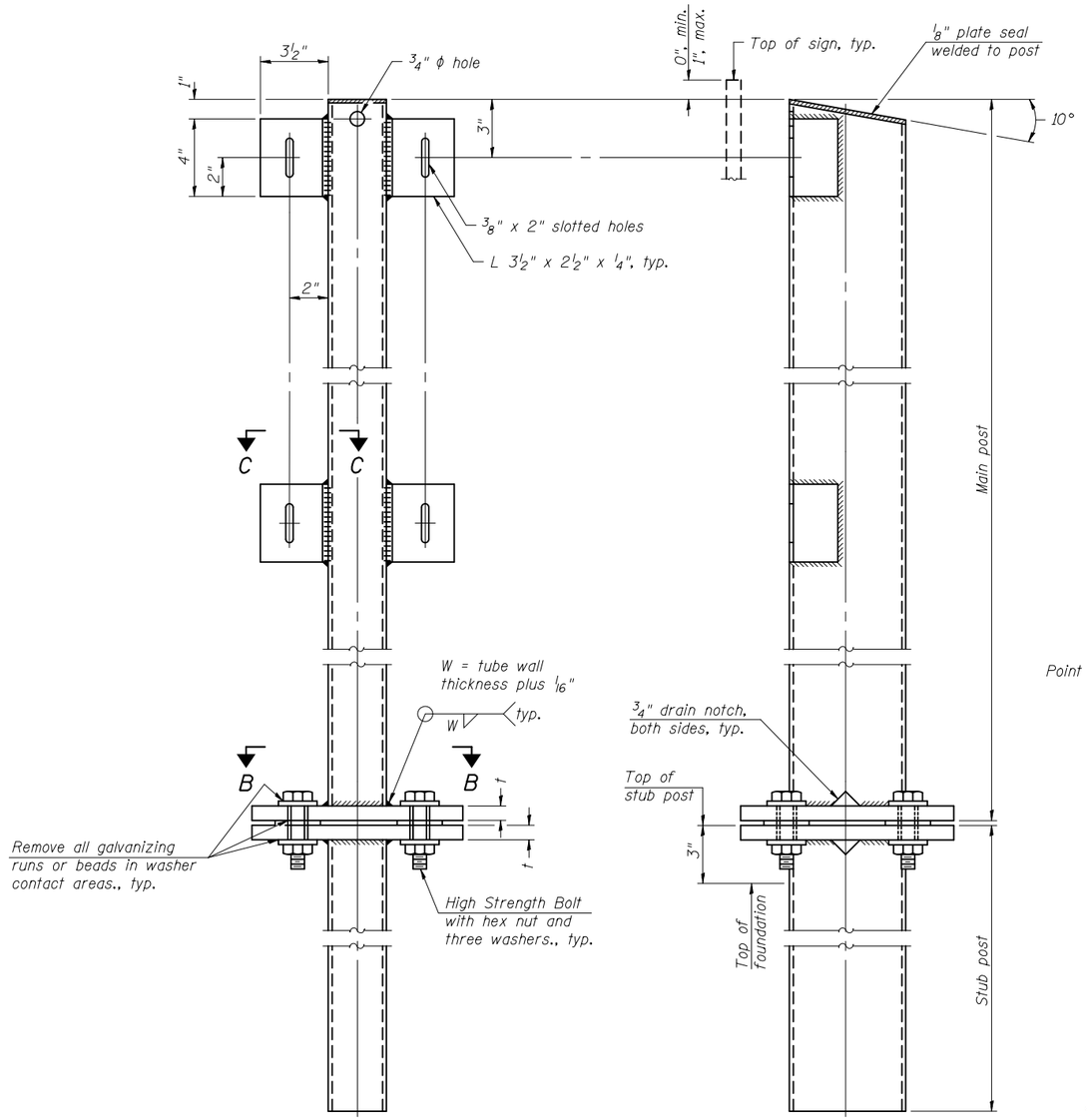
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BREAK-AWAY TUBULAR STEEL SIGN POSTS AND FOUNDATIONS

SHEET NO. OF SHEETS

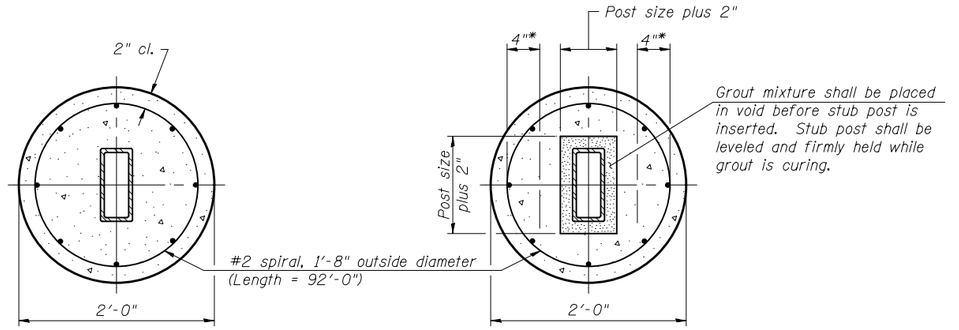
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



FRONT ELEVATION

SIDE ELEVATION

MAIN POST & STUB POST

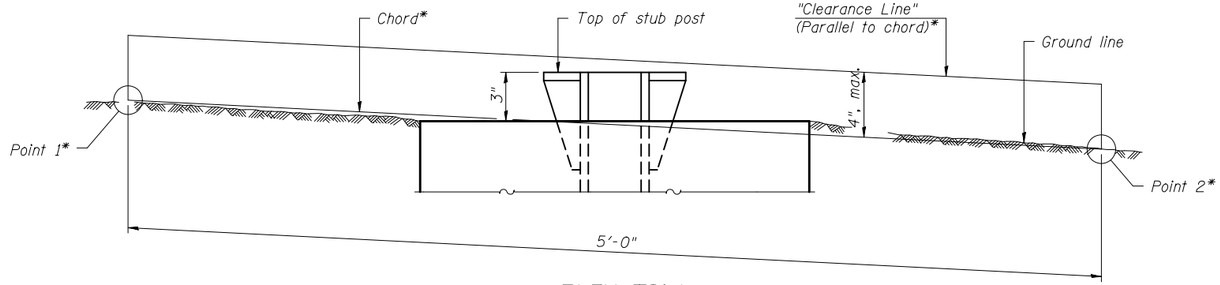


SECTION A-A
(CAST-IN-PLACE)

OR

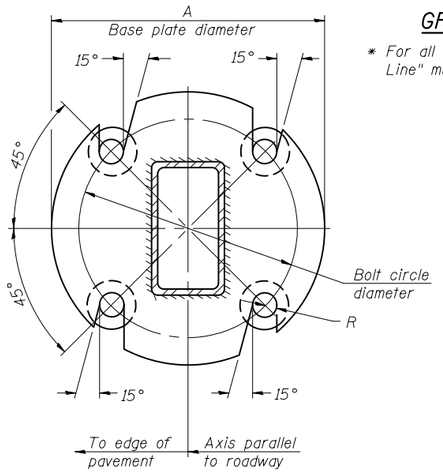
SECTION A-A
(PRECAST)

* Hot dip galvanized lifting loops or inserts may be placed in precast foundation inside the spiral reinforcement but not within 6" of the long axis of the post. Inserts must be adequate for safely lifting a total of 3,000 pounds and must not interfere with installation of the stub post or proper functioning of the slip base.

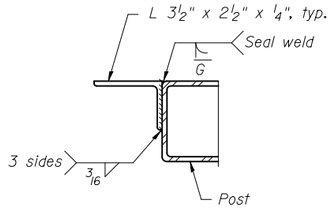


ELEVATION
GROUND LINE & STUB POST

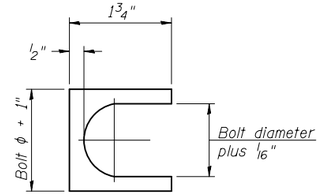
* For all "Point 1" and "Point 2" locations, "Clearance Line" must be at or above top of stub post.



SECTION B-B



SECTION C-C
Weld continuously around corners.



SHIM DETAIL
Furnish two 0.01" thick and two 0.03" thick stainless steel or brass (ASTM B36) shims per post.

BAT-A-2 6-1-12

(Sheet 2 of 2)

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BREAK-AWAY TUBULAR STEEL SIGN POSTS AND DETAILS

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

2.7 Aluminum Butterfly Sign Structures

Use butterfly sign structures for the condition where a center median barrier is close to both outside left lanes of an interstate or expressway and warrants require signing for traffic in both directions. The plan preparer should consider all MUTCD governing factors and alternatives before selecting butterflies. For installations using changeable / dynamic / variable message sign cabinets, butterfly structures are acceptable, only with the sign cabinet centered on the column. Do not mount heavy DMS cabinets on the end of a cantilever truss.

Use the following procedures when preparing plans:

1. Determine the 15-digit sign structure number, station, location of the sign over the roadway, distance from foundation to edge of pavement (D_1 and D_2), design length (L_1 and L_2), proposed height of signs (D_{s1} and D_{s2}) and total sign areas and roadway cross section/Elevation A for point of minimum clearance to sign structure (usually the sign and walkway bracket). Select the appropriate structure from the three design types shown below:

Butterfly Type	Maximum Length each Wing (feet)	Maximum Sign Area each Wing (square feet)
I-F-A	25	100
II-F-A	30	200
III-F-A	35	200

With butterfly sign trusses, the maximum sign areas in the table above apply to any span length for each given truss type. For example, the maximum sign area for a 23-foot wing on a Type I-F-A butterfly is 100 square feet. For

a 32-foot wing on a Type III-F-A truss, the maximum sign area is 200 square feet.

2. Determine a constant panel spacing (P) by dividing the centerline column to end of truss cantilever length (L_1 or L_2) minus the centerline column to second vertical distance ("s" + 15 inches for splice) minus the last vertical to end of truss dimension (3 inches), into the least whole number of panels. Below are the panel spacing limits for each structure:

Butterfly Type	Panel Spacing (feet)
I-F-A	3.0 minimum to 4.0 maximum
II-F-A	3.5 minimum to 4.5 maximum
III-F-A	4.0 minimum to 5.5 maximum

3. Determine the column height (dimension H) using the following criteria:

   (a) Minimum vertical clearance is 17 feet 3 inches from highest Elevation A to sign, walkway support, or truss.

   (b) Top of foundation is a minimum of 2 feet and a maximum of 3 feet 6 inches above grade elevation at centerline of foundation.

   (c) The total column height must not exceed 30 feet, unless allowed by the BBS. Smaller sign areas on specific projects may allow taller columns.

   (d) Use a minimum sign height of 15'-0" to calculate the column height. To calculate H for a butterfly with walkway brackets: To Elevation A, add 17' 3" plus 1' 3" (8" for DMS), plus 7'-6" or half the height of the tallest sign (whichever is greater), minus half the truss height, minus top of foundation elevation minus 2 ¾".

4. Obtain soil-boring data and determine the average Q_u per Section 1.6 for all strata within and below the "B" portion of the drilled shaft foundation. If average and minimum Q_u values meet the requirements of Section 1.6, the depth may be determined from the drilled shaft foundation standard OSF-A-9. As described in Section 1.6, if average and minimum Q_u values do not meet the requirements, the BBS must provide a depth or a special design.

5. With the information from Steps 3(b) and 4, and/or information obtained from the BBS, determine the drilled shaft vertical limits (Elevation Top, Elevation Bottom), and dimensions "A", "B", and "F".

6. Walkway and/or truss grating have two alternate sets of plans: 1-1/2 inch deep aluminum grating and galvanized steel plank grating. The plan preparer should consult District personnel for grating preference and select the correct sheets. Walkway grating should cover the full width of all signs and extend a minimum of 4 feet past the edge of pavement into the shoulder unless the shoulder width is less than 10 feet. If shoulder width is less than 10 feet or if the structure is on a low speed ramp, the walkway grating may begin at edge of pavement, while still covering the full width of all signs. Truss inspection grating extends full length of the truss, unless specifically exempted by the District and BBS. For projects that omit front walkway and lighting, details provide the option of plain vertical sign supports in lieu of the L-brackets.

7. For installations using large, heavy-weight dynamic message sign cabinets which require walkways for door access, use Type III-F-A butterfly structures only, center the sign cabinet on the column (do not mount cabinets at the ends of cantilevers) and make the following general plan, detail and walkway sheet substitutions (other standard sheets for foundations, handrails, etc. still required to make a complete set – see item 13 following):

Replace:	With:
OSF-A-1	OSF-A-1-DMS
OSF-A-2	OSF-A-2-DMS
OSF-A-5	OSF-A-5-DMS
OSF-A-6 and/or OSF-A-6S	OSF-A-6-DMS
OSF-A-7 and/or OSF-A-7S	OSF-A-7-DMS

8. For shoulder installations using smaller, lighter-weight variable message sign cabinets with front access not requiring walkways, use Type I-F-A butterfly structures, center the sign cabinet on the column (do not mount cabinets at the ends of cantilevers) and use the following general plan and detail sheets for a complete set of plans:

Replace:	With:
OSF-A-1	OSF-A-1-VMS
OSF-A-2	OSF-A-2-VMS
OSF-A-2A	OSF-A-2A-VMS
OSF-A-3	OSF-A-3-VMS
OSF-A-4	OSF-A -4-VMS
OSF-A-9	OSF-A-9-VMS

9. The Truss Damper base sheet OSF-A-D will be included with all butterfly sign structure projects, except on 20’ maximum length trusses for front access VMS.

10. Fill in all tables on applicable base sheets including sign structure number, station, height of tallest sign, total sign area, column heights and sign bracket and foundation dimensions.

11. Calculate quantities as needed for foundations and complete the Total Bill of Material.

12. Submit proposed designs exceeding dimensional and/or loading limits to the BBS for special analysis and/or approval.

13. To provide uniformity for all aluminum butterfly sign structure plans, place the sheets in the following order:

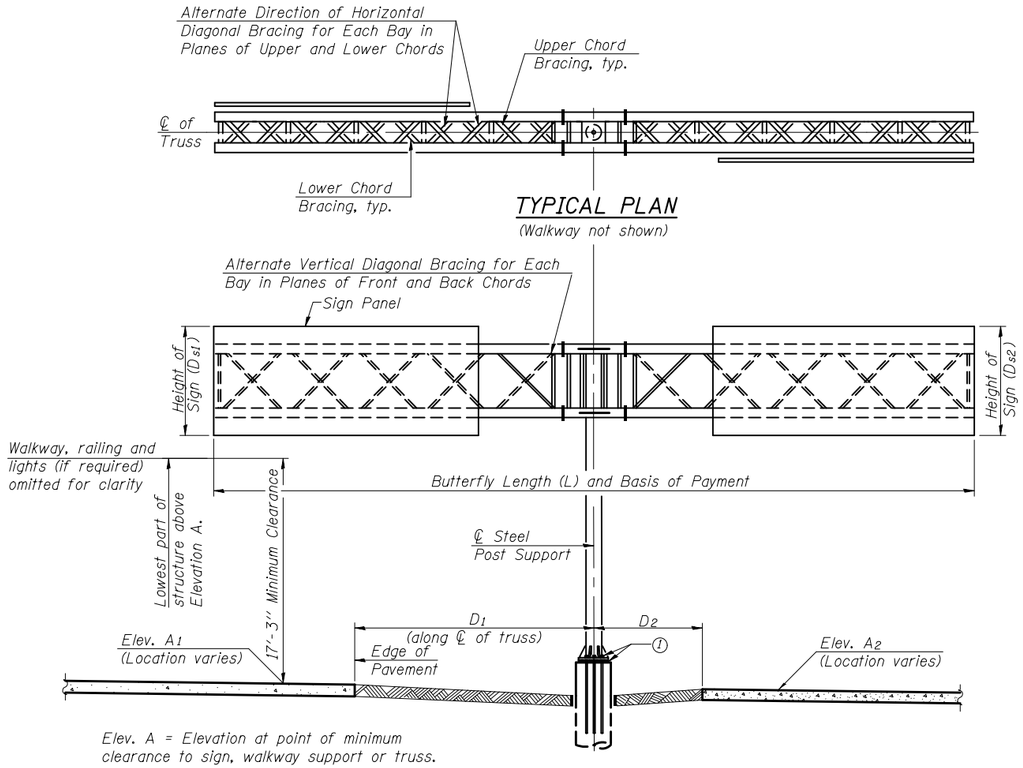
    General Plan and Elevation (OSF- A - 1)
    Aluminum Truss Details (OSF- A - 2) & (OSF-A-2A)
    Damping Device (OSF- A - D)
    Juncture Details (OSF- A - 3)
    Truss Support Post Details for applicable aluminum cantilever truss types
    (i.e., OSF- A -4 for Type I-F-A, OSF- A -5 for Type II-F-A or III-F-A)
    Aluminum Walkway Details (OSF- A - 6)
    Alternate Steel Walkway Details (OSF- A - 6S) (optional)
    Aluminum Walkway Details (OSF- A -7)
    Alternate Steel Walkway Details (OSF- A - 7S) (optional)
    Aluminum Handrail Details (OSF- A - 8)
    Drilled Shaft Foundation (OSF- A - 9)

Aluminum Butterfly Sign Structure Base Sheets

U. S. Standard Units

SHEET TITLE

OSF - A - 1 ..... General Plan & Elevation, Aluminum Truss & Steel Post
OSF - A - 1 - DMS ..... Alternate General Plan & Elevation For DMS
OSF - A - 2 ..... Truss Details Aluminum Truss & Steel Post
OSF - A - 2 - DMS ..... Alternate Truss Details For DMS
OSF - A - 2A ..... Truss Details Aluminum Truss & Steel Post
OSF - A - D ..... Damping Device
OSF - A - 3 ..... Juncture Details Aluminum Truss & Steel Post
OSF - A - 4 ..... Type I-F-A Truss Support, Aluminum Truss & Steel Post
OSF - A - 5 ..... Type II-F-A & III-F-A Truss Support
OSF - A - 5 - DMS ..... Alternate Type III-F-A Truss Support For DMS
OSF - A - 6 ..... Aluminum Walkway Details, Aluminum Truss & Steel Post
OSF - A - 6 - DMS ..... Alternate Aluminum Walkway Details For DMS
OSF - A - 6S ..... Alternate Steel Walkway Details
OSF - A - 7 ..... Walkway Details Aluminum Truss & Steel Post
OSF - A - 7 - DMS ..... Alternate Walkway Details For DMS
OSF - A - 7S ..... Alternate Steel Walkway Details
OSF - A - 8 ..... Handrail Details, Aluminum Truss & Steel Post
OSF - A - 9 ..... Drilled Shaft Foundation Detail
OSF - A - 1 - VMS ..... Plan & Elevation For Front Access VMS
OSF - A - 2 - VMS ..... Truss Details For Front Access VMS
OSF - A - 2A - VMS .... Truss Details For Front Access VMS
OSF - A - 3 - VMS ..... Juncture Details For Front Access VMS
OSF - A - 4 - VMS ..... Type I-F-A Support Post For Front Access VMS
OSF - A - 9 - VMS ..... Drilled Shaft For Front Access VMS



Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

TYPICAL ELEVATION

Looking in Direction of Traffic

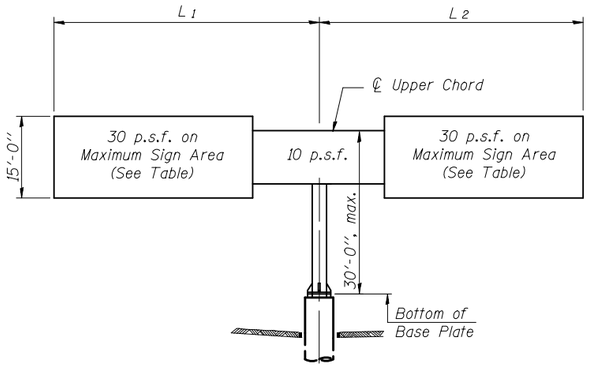
Sign support structures may be subject to damaging vibrations and oscillations when sign panels are not in place during erection or maintenance of the structure. To avoid these vibrations and oscillations, consideration should be given to attaching temporary blank sign panels to the structure.

Structure Number	Station	Design Truss Type	Total Butterfly Length (L)	Elev. A_1	Elev. A_2	Dim. D_1	Dim. D_2	D_{s1}	D_{s2}	Total Sign Area 1	Total Sign Area 2

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE BUTTERFLY TYPE I-F-A	Foot	
OVERHEAD SIGN STRUCTURE BUTTERFLY TYPE II-F-A	Foot	
OVERHEAD SIGN STRUCTURE BUTTERFLY TYPE III-F-A	Foot	
OVERHEAD SIGN STRUCTURE WALKWAY, TYPE A	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

TRUSS TYPE	MAXIMUM SIGN AREA EACH WING	MAXIMUM LENGTH EACH WING
I-F-A	100 Sq. Ft.	25 Ft.
II-F-A	200 Sq. Ft.	30 Ft.
III-F-A	200 Sq. Ft.	35 Ft.



DESIGN WIND LOADING DIAGRAM

Parameters shown are basis for I.D.O.T. Standards Installations not within dimensional limits shown require special analysis for all components.

Note:

Trusses shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The contractor is responsible for maintaining the configuration and protection of the trusses.

(1) *After adjustments to level truss and insure 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.*

* *If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.*

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES
FIELD UNITS
f'c = 3,500 p.s.i.
fy = 60,000 p.s.i. (reinforcement)

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 Specifications.

MATERIALS: Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.

All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W (M183, M223 Gr. 50, or M222). 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.

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.

U-BOLTS AND 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 lock nut.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

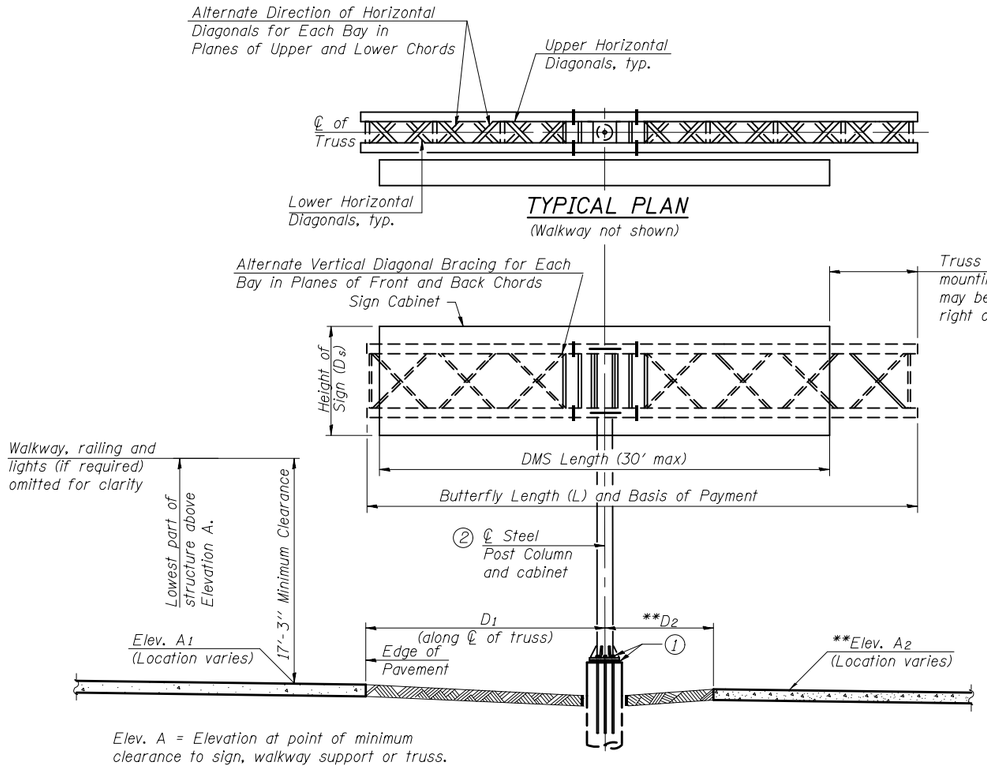
OSF-A-1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES
GENERAL PLAN & ELEVATION – ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

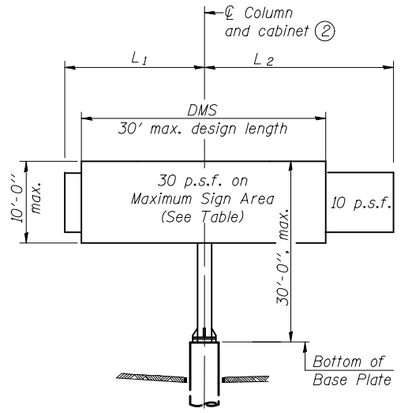


** Elevation A2 and dimension D2 not used when butterfly structure is mounted on right side of the shoulder.

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.

TRUSS TYPE	MAXIMUM TOTAL DMS SIGN CABINET AREA
III-F-A	300 Sq. Ft.

Mamimum DMS weight = 5000 LB.



DESIGN WIND LOADING DIAGRAM

Parameters shown are basis for I.D.O.T. Standards Installations not within dimensional limits shown require special analysis for all components.

Note:
Trusses shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The contractor is responsible for maintaining the configuration and protection of the trusses.

① After adjustments to level truss and insure 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.

② Centerline cabinet must be located at centerline of column.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY
WIND LOADING: 30 p.s.f. normal to DMS Cabinet Area and truss elements not behind sign Loading Diagram.
WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES
FIELD UNITS
f′c = 3,500 p.s.i.
fy = 60,000 p.s.i. (reinforcement)

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 Specifications.

MATERIALS: Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.
All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W* (M183, M223 Gr. 50, or M222). 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.

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.

U-BOLTS AND 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 lock nut.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6″ below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

Structure Number	Station	Total Butterfly Length (L)	Elev. A_1	Elev. A_2	Dim. D_1	Dim. D_2	D_s	Total Sign Area	Access door and walkway location (Right or Left end)

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE BUTTERFLY TYPE III-F-A	Foot	
OVERHEAD SIGN STRUCTURE WALKWAY, TYPE A	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

OSF-A-1-DMS 6-1-12

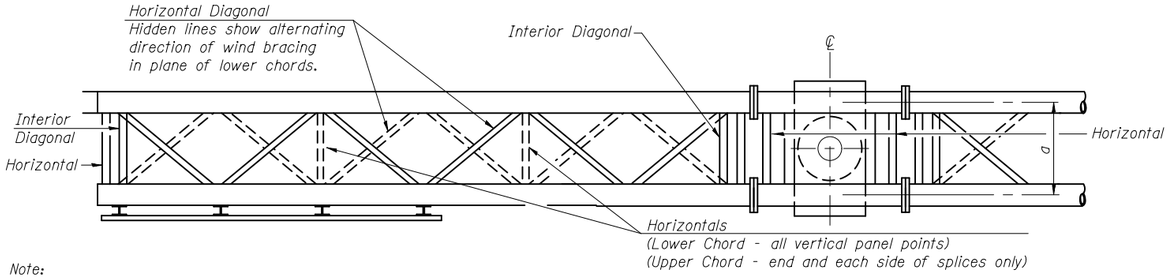
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – ALTERNATE PLAN & ELEVATION FOR DMS – ALUMINUM TRUSS & STEEL POST

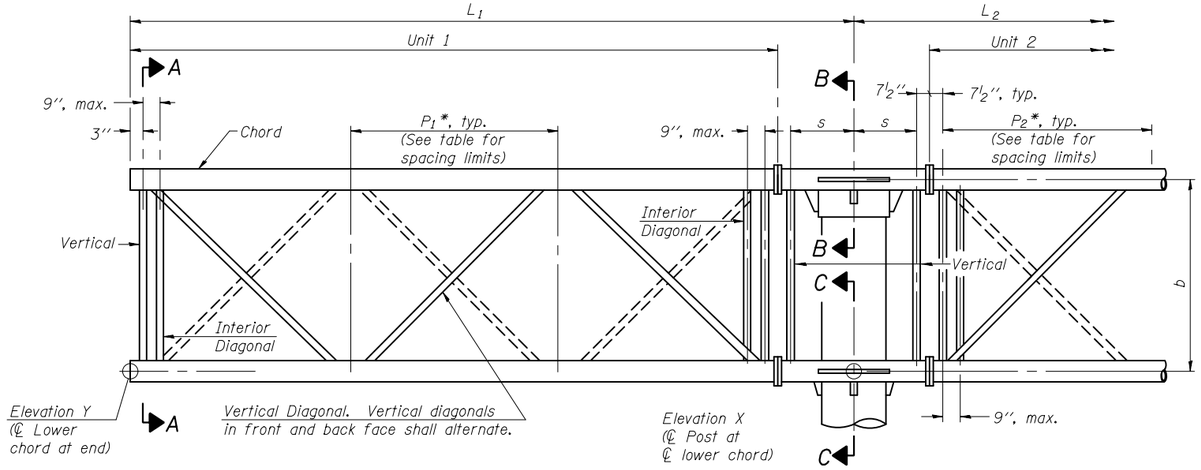
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
ILLINOIS	FED. AID PROJECT			



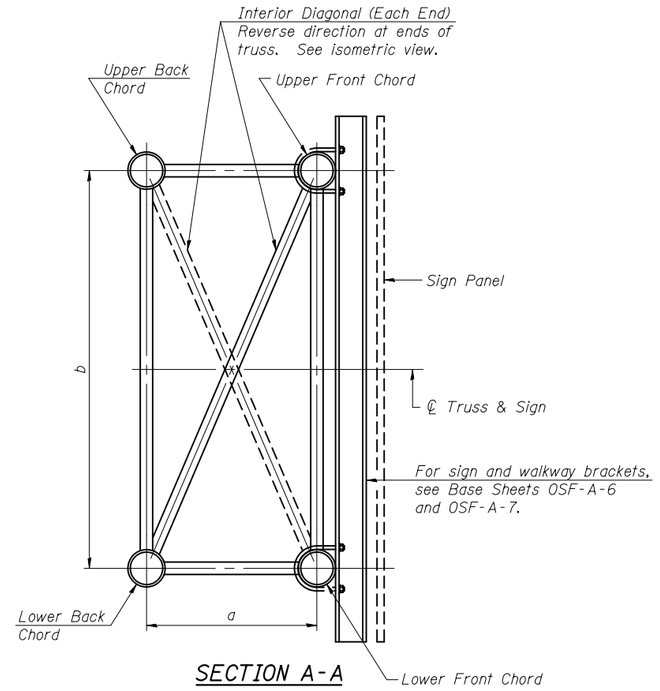
Note:
There are twice as many horizontal diagonals as there are vertical diagonals.

PLAN
(Walkway not shown)



ELEVATION
(Sign and walkway omitted for clarity)

TYPICAL TRUSS UNIT
For Section B-B and Section C-C, see Base Sheet OSF-A-3.



SECTION A-A

TRUSS UNIT TABLE

Truss Type	Dimension "a"	Dimension "b"	Dimension "s"	Limits for Panel Spacing (P)*	Up. & Low. Chord O.D.	Up. & Low. Chord Wall	Verticals; Horizontals; Vertical Horizontals; and Interior Diagonals	
I-F-A	24"	54"	16"	36" min. to 48" max.	5"	5/16"	2½"	5/16"
II-F-A	36"	66"	21"	42" min. to 54" max.	6½"	5/16"	3¼"	5/16"
III-F-A	36"	84"	21"	48" min. to 66" max.	7"	3/8"	3½"	3/8"

$*P = \frac{L - s - 1'-6''}{\#\ Panels}$

Structure Number	Station	Truss Type	L_1	L_2	Number of Panels Unit 1	Panel Length (P_1)*	Number of Panels Unit 2	Panel Length (P_2)*

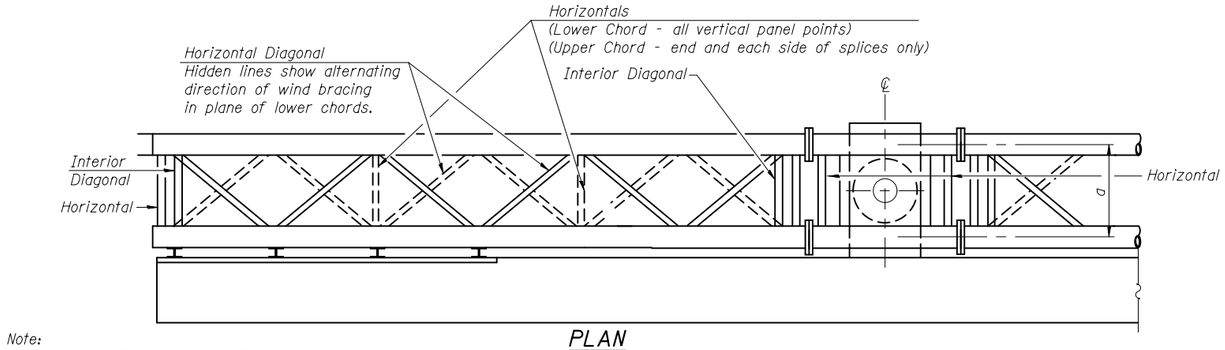
OSF-A-2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES
TRUSS DETAILS – ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

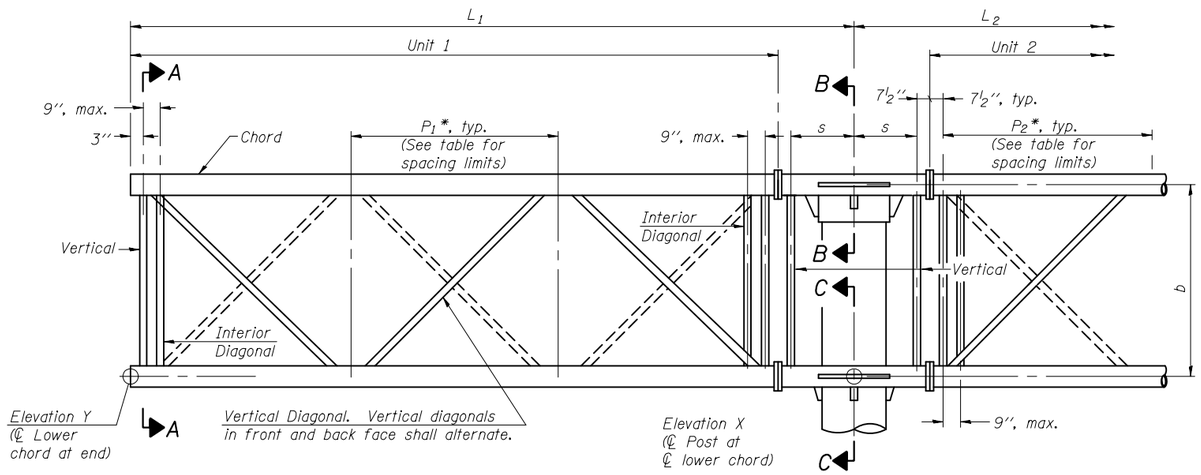
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



Note:
There are twice as many horizontal diagonals as there are vertical diagonals.

PLAN

(Walkway not shown)



ELEVATION

(Sign and walkway omitted for clarity)

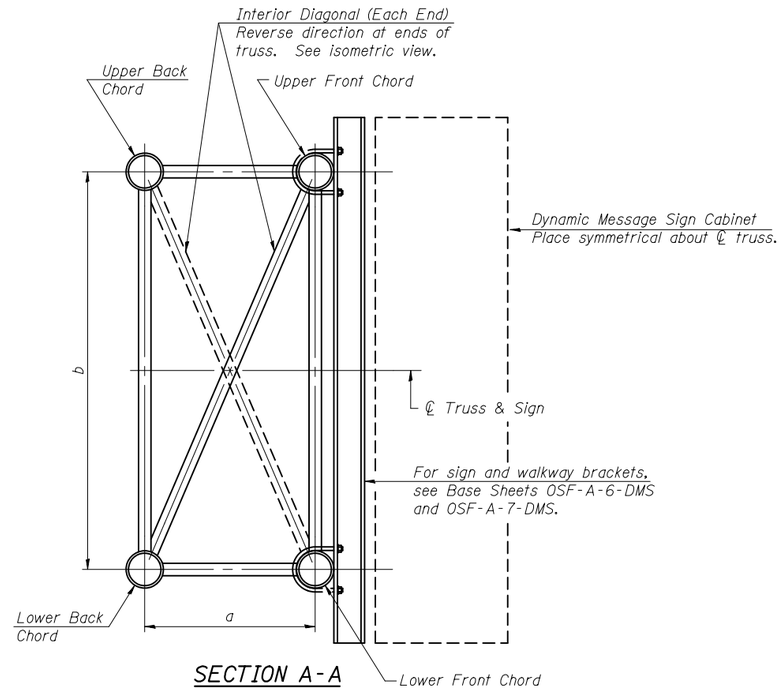
TYPICAL TRUSS UNIT

For Section B-B and Section C-C, see Base Sheet OSF-A-3-DMS

TRUSS UNIT TABLE

Truss Type	Dimension "a"	Dimension "b"	Dimension "s"	Limits for Panel Spacing (P)*	Up. & Low. Chord		Verticals; Horizontals; Vertical Horizontals; and Interior Diagonals	
					O.D.	Wall		
III-F-A	36″	84″	21″	48″ min. to 66″ max.	7″	$\frac{3}{8}$″	$3\frac{1}{2}$″	$\frac{3}{8}$″

$$*P = \frac{L - s - 1'\text{-}6''}{\#\ \text{Panels}}$$



SECTION A-A

Structure Number	Station	Truss Type	L_1	L_2	Number of Panels Unit 1	Panel Length (P_1)*	Number of Panels Unit 2	Panel Length (P_2)*

OSF-A-2-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
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	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

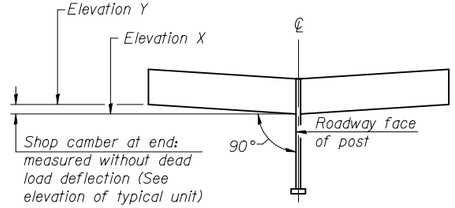
BUTTERFLY SIGN STRUCTURES – ALTERNATE TRUSS DETAILS FOR DMS
ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

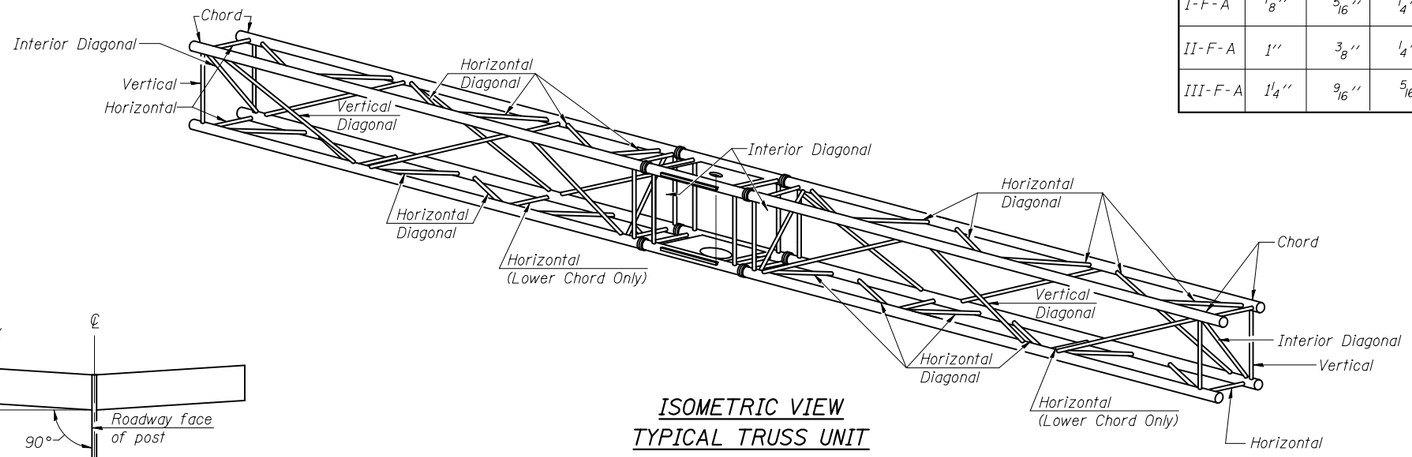
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

SHOP CAMBER TABLE

Unit Length L_1 or L_2	Shop Camber at End
15′	$1\frac{1}{2}''$
16′-17′	$1\frac{3}{4}''$
18′-20′	2″
21′-22′	$2\frac{1}{4}''$
23′-25′	$2\frac{1}{2}''$
26′-27′	$2\frac{3}{4}''$
28′-30′	3″
31′-32′	$3\frac{1}{4}''$
33′-35′	$3\frac{1}{2}''$

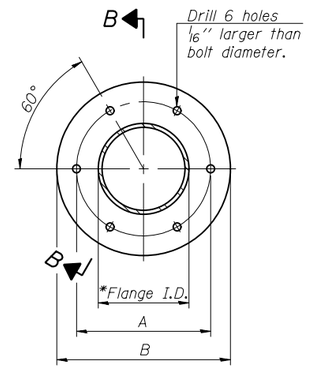


CAMBER DIAGRAM
(For Fabrication Only)



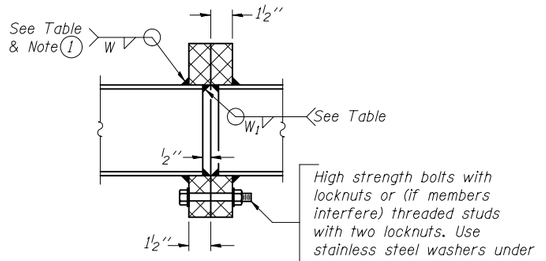
ISOMETRIC VIEW TYPICAL TRUSS UNIT
ASTM B221 Alloy 6061 Temper T6

Truss Type	Bolts Dia.	Weld Sizes W	Weld Sizes W_1	A	B
I-F-A	$\frac{7}{8}''$	$\frac{5}{16}''$	$\frac{1}{4}''$	$8\frac{3}{4}''$	$11\frac{3}{4}''$
II-F-A	1″	$\frac{3}{8}''$	$\frac{1}{4}''$	11″	$14\frac{1}{2}''$
III-F-A	$1\frac{1}{4}''$	$\frac{9}{16}''$	$\frac{5}{16}''$	$11\frac{1}{2}''$	15″

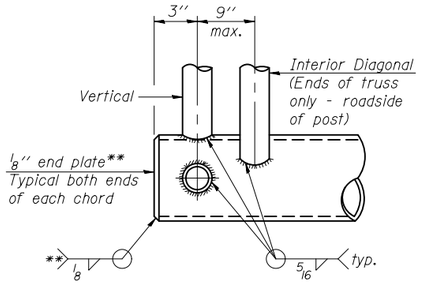


SPLICING FLANGE
ASTM b221, Alloy 6061-T6
or ASTM B209, Alloy 6061-T651

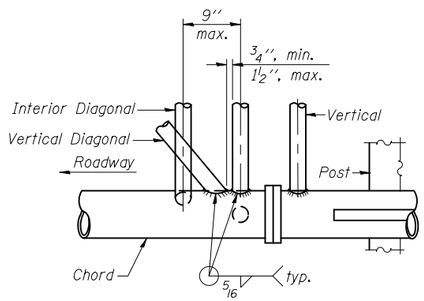
* To fit O.D. of Chord with maximum gap of $\frac{1}{16}''$.



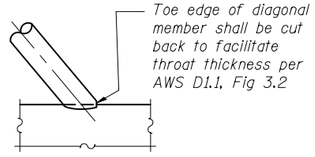
SECTION B-B



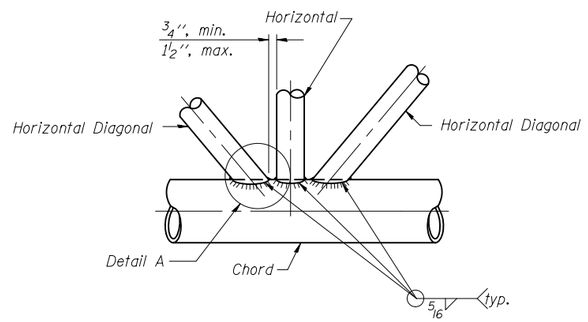
BUTTERFLY END JOINT DETAIL
** Contractor may alternatively use standard aluminum drive-fit cap to close ends. ½″ ϕ Drain hole in end plate / drive-fit cap.



POST END JOINT DETAIL



DETAIL A



TRUSS INTERIOR JOIT DETAIL

(1) Splicing Flanges shall be attached to each truss unit with the truss shop assembled to camber shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external welds or tacks shall be made to secure flanges until remaining welds are made after disassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.

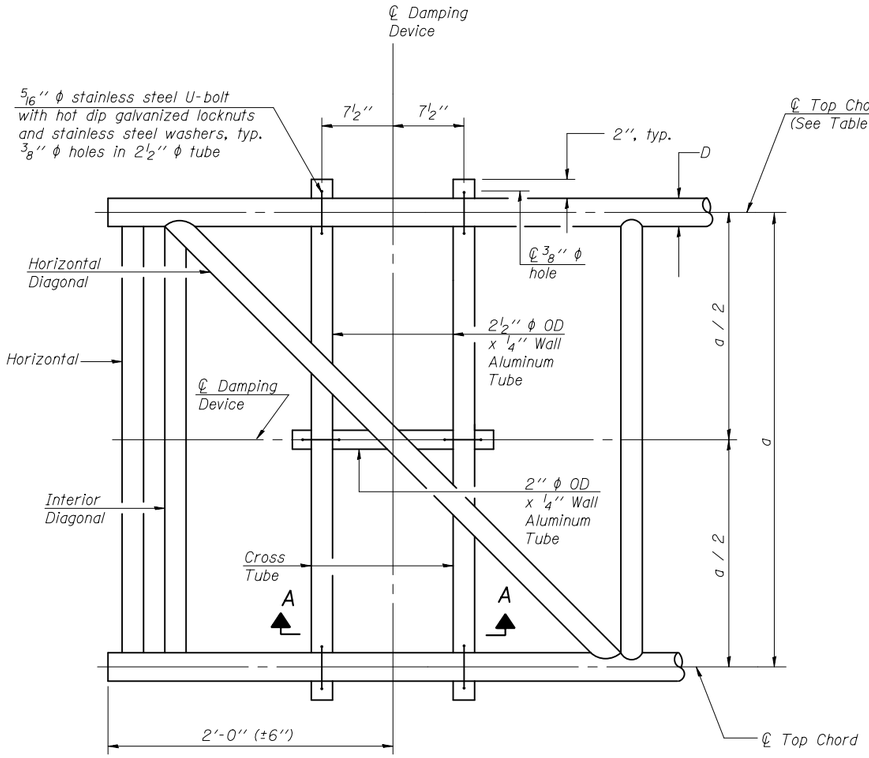
OSF-A-2A 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

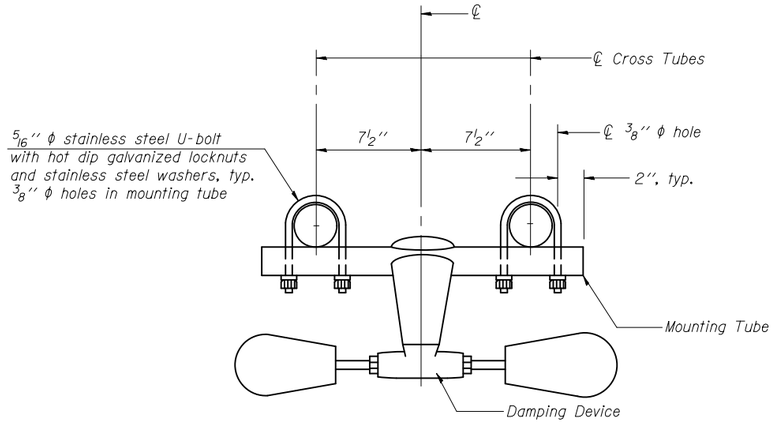
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – TRUSS DETAILS
ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

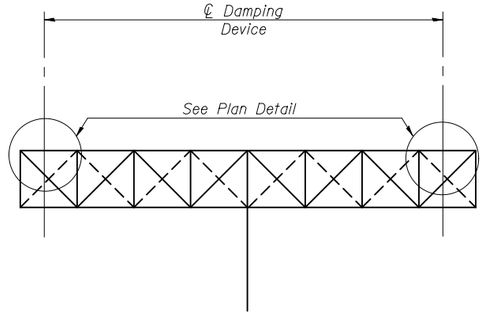
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



PLAN DETAIL



TRUSS DAMPING DEVICE CONNECTION DETAIL



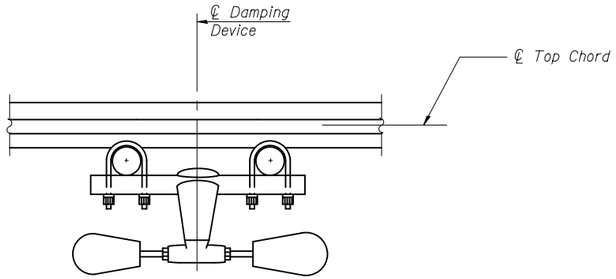
ELEVATION

Aluminum Butterfly Sign Structure

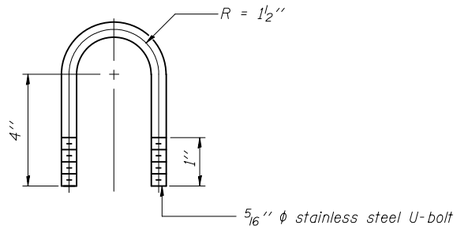
GENERAL NOTES

Damper: One damper per truss. (31 lbs. Stockbridge-Type Aluminum-29'' minimum between ends of weights)

Materials: Aluminum tubes shall be ASTM B221 alloy 6061 temper T6

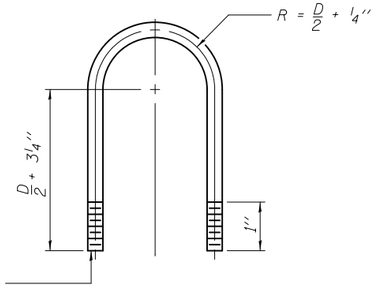


SECTION A-A



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL

(Typical)



TOP CHORD TO CROSS TUBE U-BOLT DETAIL

(Typical)

OSF-A-D 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
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	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

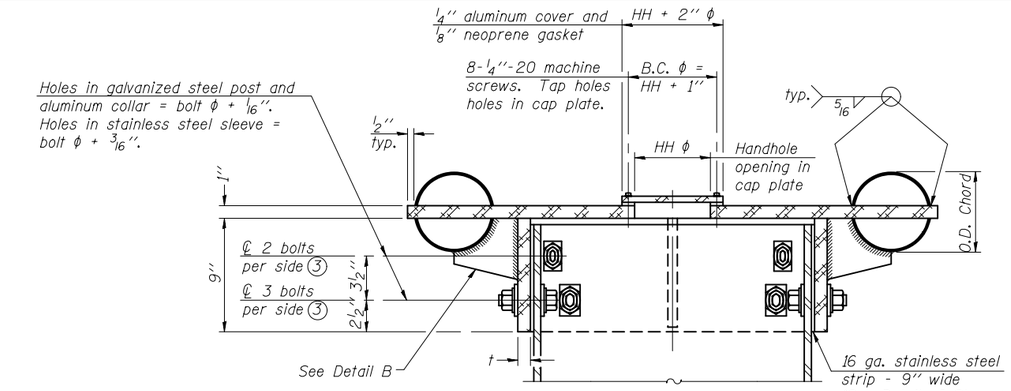
BUTTERFLY SIGN STRUCTURE
DAMPING DEVICE

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

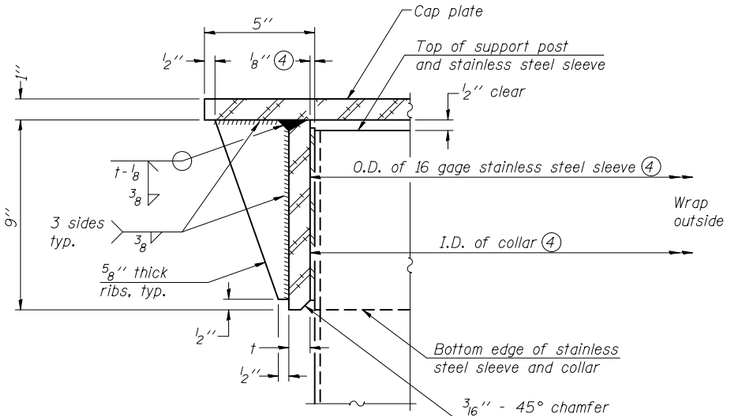
ILLINOIS FED. AID PROJECT



SECTION B-B

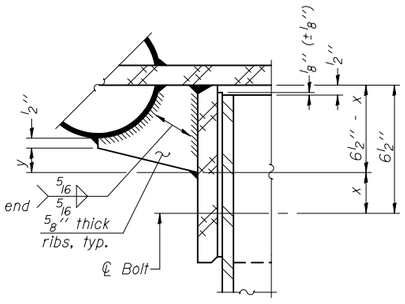
Bolts, washers (including contoured washers), and locknuts shall be stainless steel.

④ Collar I.D. shall be manufactured to correspond to O.D. of actual galvanized post and stainless steel sleeve plus 1/8'' (±1/16''). Maximum gap between post and collar at any location equals 1/8'' before tightening bolts.



DETAIL A

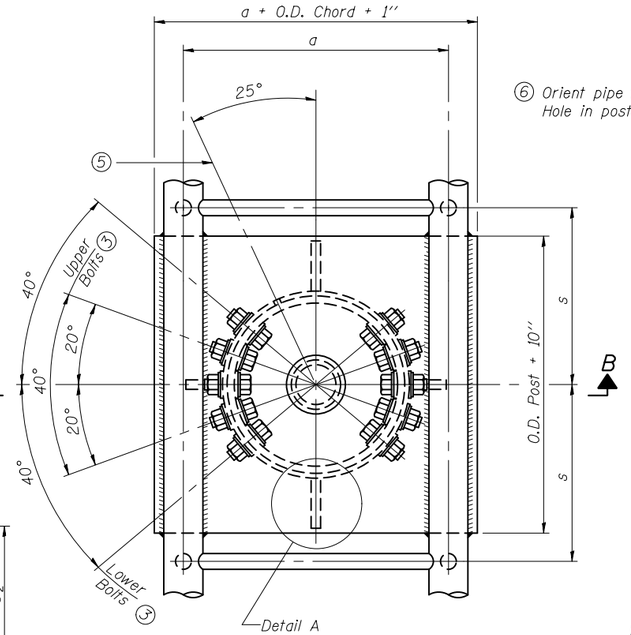
(Two locations)



DETAIL B

Two locations

(For details not shown, see Detail C)

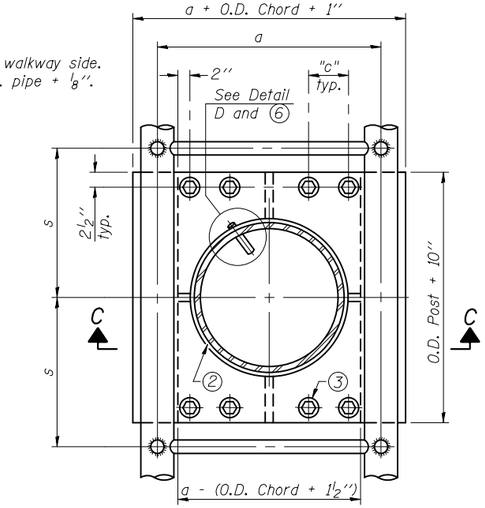


PLAN VIEW - TOP OF COLUMN

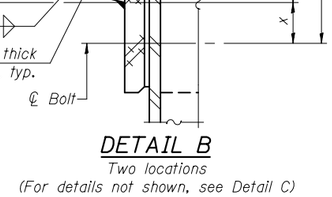
⑤ Optional full penetration weld in collar.

(Two locations maximum....(180° apart)....X-ray or UT 100%)

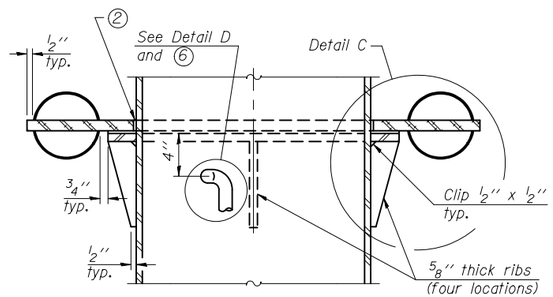
⑥ Orient pipe toward walkway side. Hole in post = O.D. pipe + 1/8''.



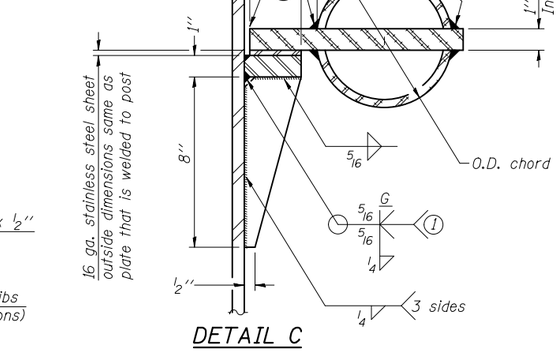
SECTION THRU POST ABOVE LOWER CHORDS



DETAIL D



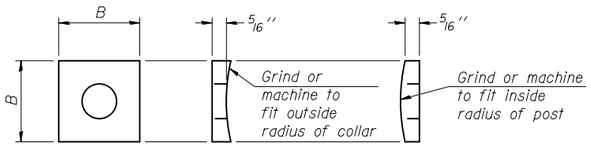
SECTION C-C



DETAIL C

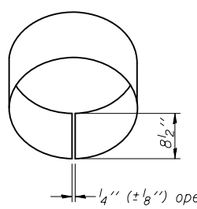
① Grind top if required to fully seat aluminum plate and stainless steel sheet.

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.



CONTOURED WASHERS

Bolt Size	Contoured Washers	
	Hole Dia.	B
7/8''	1''	2 1/2''
1''	1 1/8''	3''
1 1/4''	1 3/8''	3 1/4''



DETAIL OF STAINLESS STEEL SLEEVE

Weld to post after galvanizing. (Prepare post surface to insure tight, uniform fit and allow welding.) Welds to be 1 1/2'' long at 6'' cts. along top edge and at 1/4'' opening.

Truss Type	Post Size	Upper & Lower Connection Bolt Diameter (3)	Lower Juncture Bolt Spacing Dimension "c" (3)	Opening in Cap Plate "HH"	Collar Thickness (t)	Side Ribs	
						x	y
I-F-A	16'' ϕ (83#/')	7/8''	3 1/4''	8''	5/8''	1 3/4''	2 1/4''
II-F-A	24'' ϕ (125#/')	1''	3 1/2''	12''	7/8''	2''	1 1/4''
III-F-A	24'' ϕ (125#/')	1 1/4''	3 1/2''	12''	7/8''	2''	1''

③ Upper and lower 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.

OSF-A-3 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
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	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

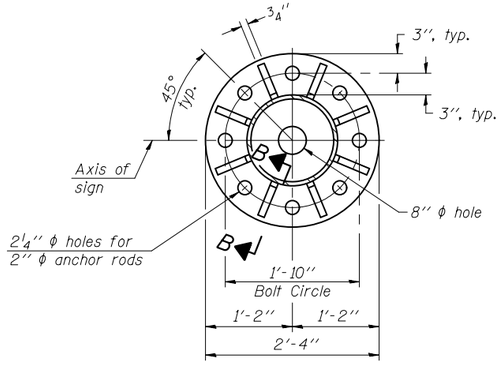
BUTTERFLY SIGN STRUCTURES – JUNCTURE DETAILS
ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

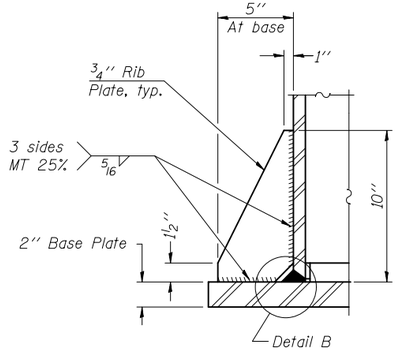
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

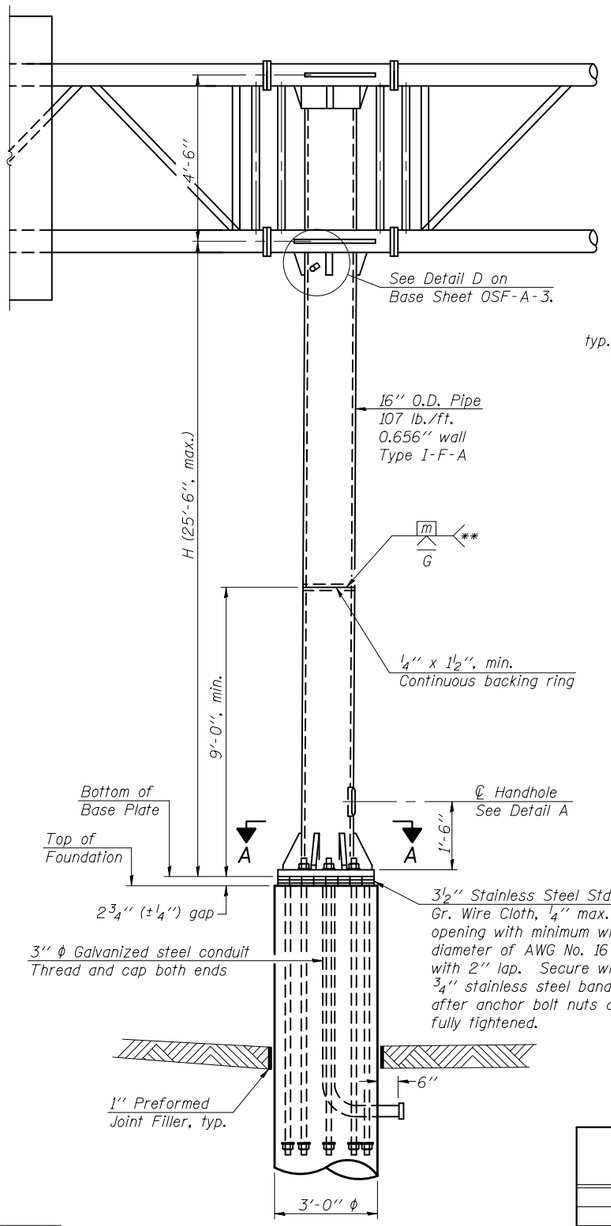
ILLINOIS FED. AID PROJECT



SECTION A-A

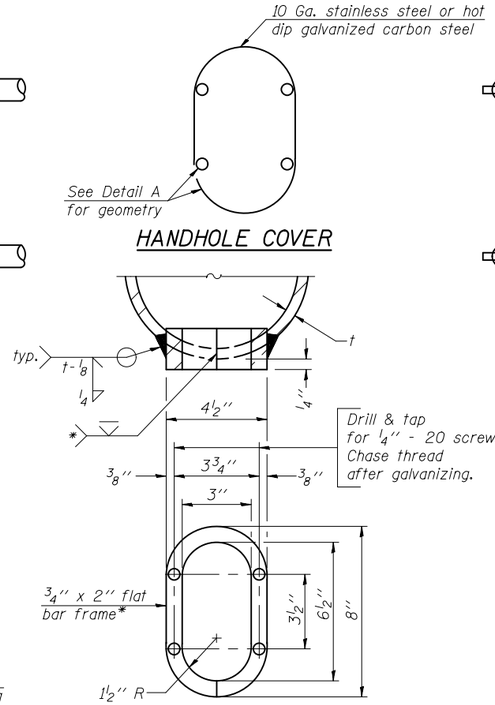


SECTION B-B



FRONT ELEVATION

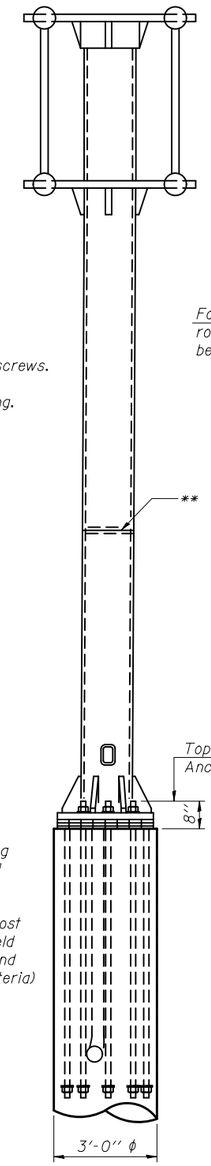
For Foundation Details see Base Sheet OSF-A-9.



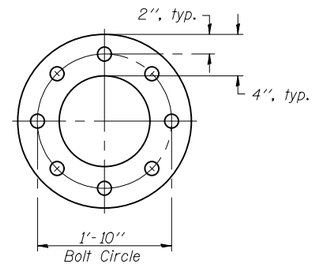
DETAIL A

* 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.

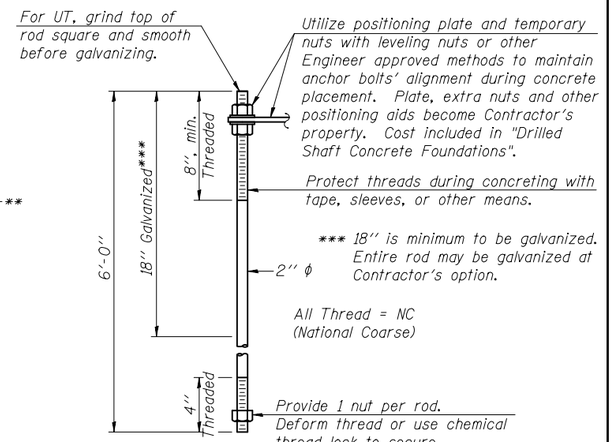
** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.



SIDE ELEVATION

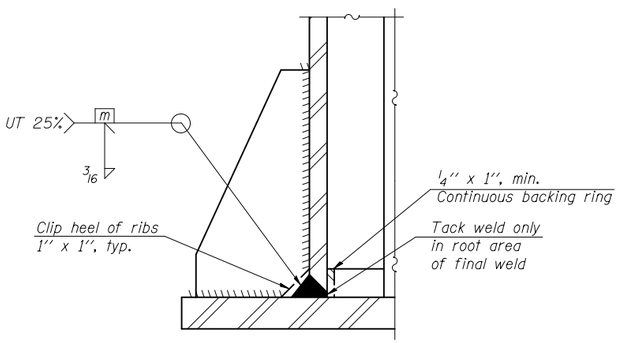


SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.



DETAIL B

(Typical rib)

Structure Number	Station	H

Note: "H" based on 15'-0'' or actual sign height, whichever is greater.

OSF-A-4

6-1-12

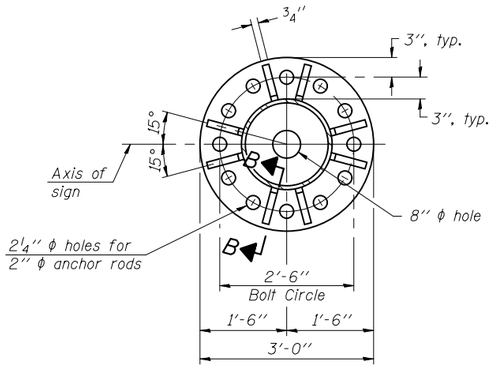
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

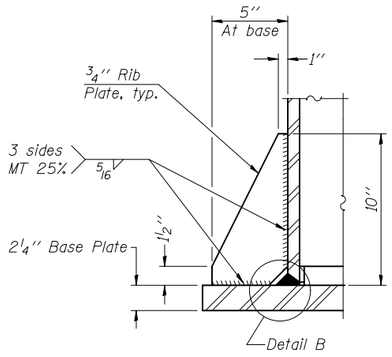
BUTTERFLY SIGN STRUCTURES – TYPE I-F-A TRUSS
SUPPORT POST – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

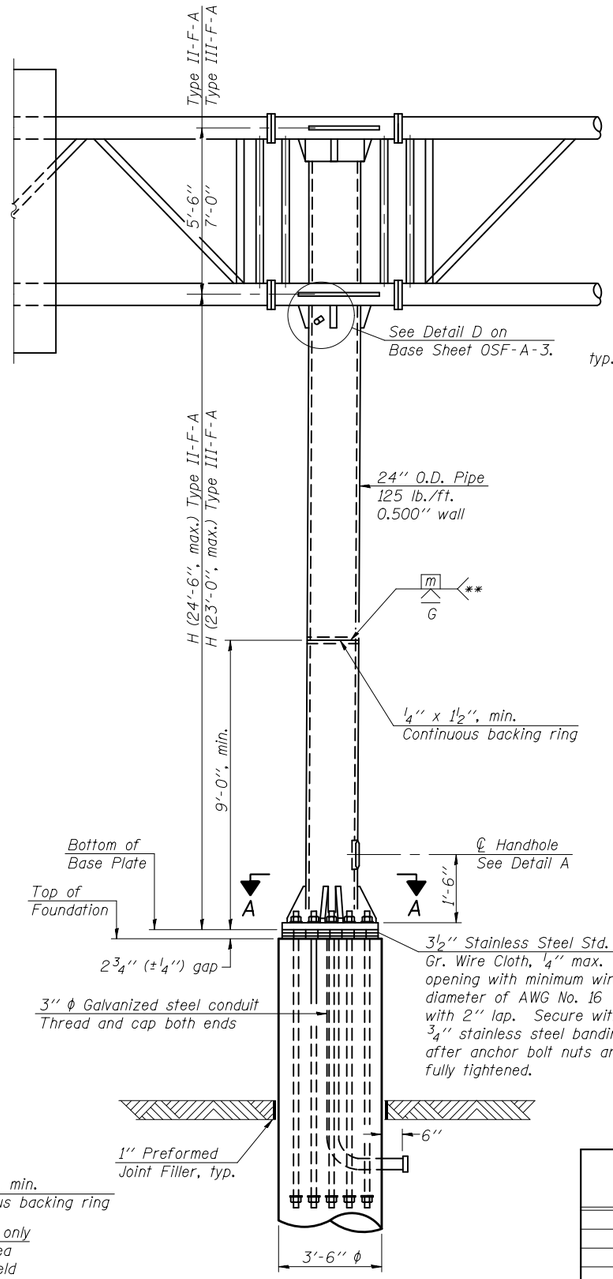
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
		ILLINOIS FED. AID PROJECT		



SECTION A-A

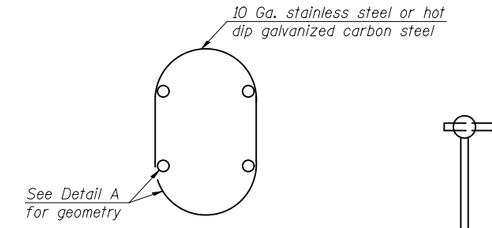


SECTION B-B

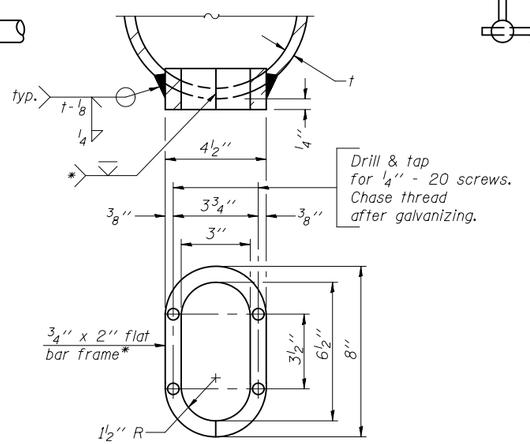


FRONT ELEVATION

For Foundation Details see Base Sheet OSF-A-9.



HANDHOLE COVER

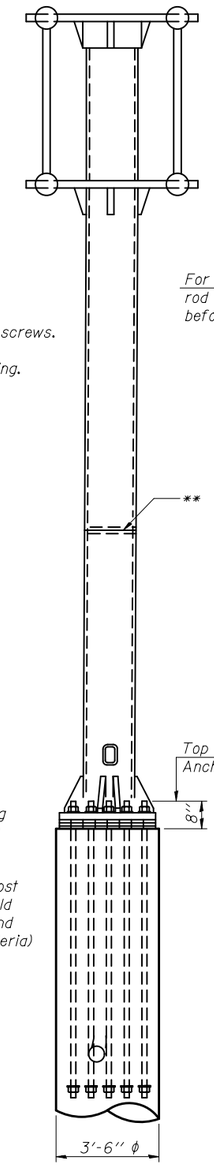


Provide 8" x 4 1/2" cover. Outside corners = 2 1/4" radius. Provide 4-5/16" ϕ holes in for 1/4" - 20 round head hot dip galvanized or stainless steel machine screws. (See cover details.)

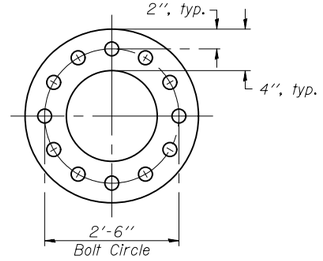
DETAIL A

* 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.

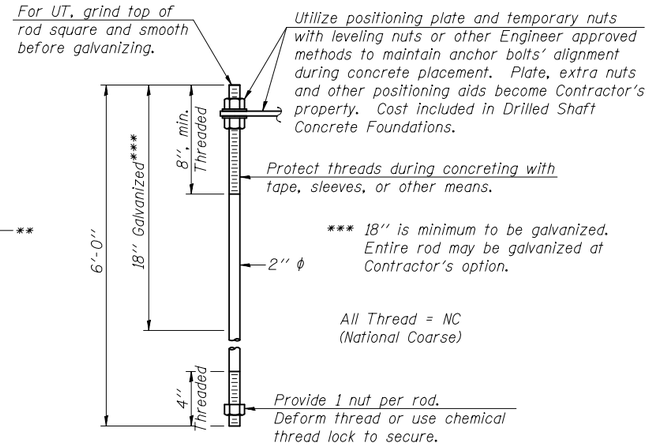
** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.



SIDE ELEVATION

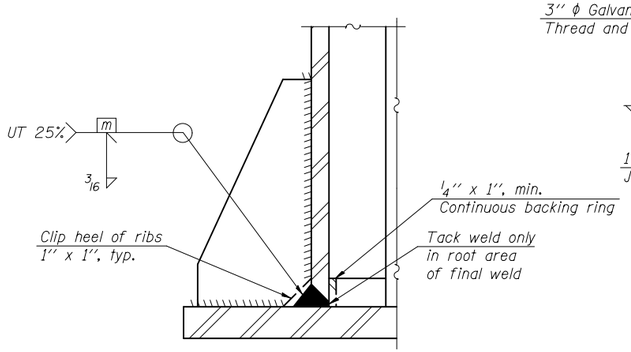


SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.



DETAIL B

(Typical rib)

Structure Number	Station	H

Note: "H" based on 15'-0" or actual sign height, whichever is greater.

OSF-A-5 6-1-12

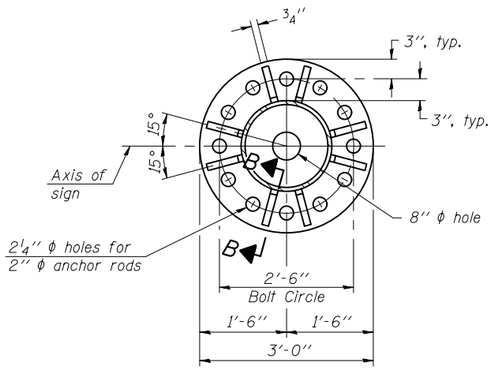
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

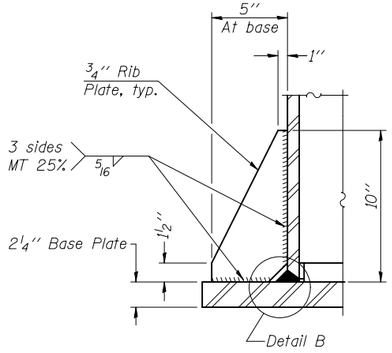
BUTTERFLY SIGN STRUCTURES – TYPE II–F–A & III–F–A
TRUSS SUPPORT POST – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

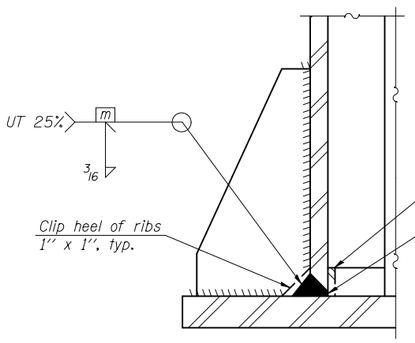
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



SECTION A-A

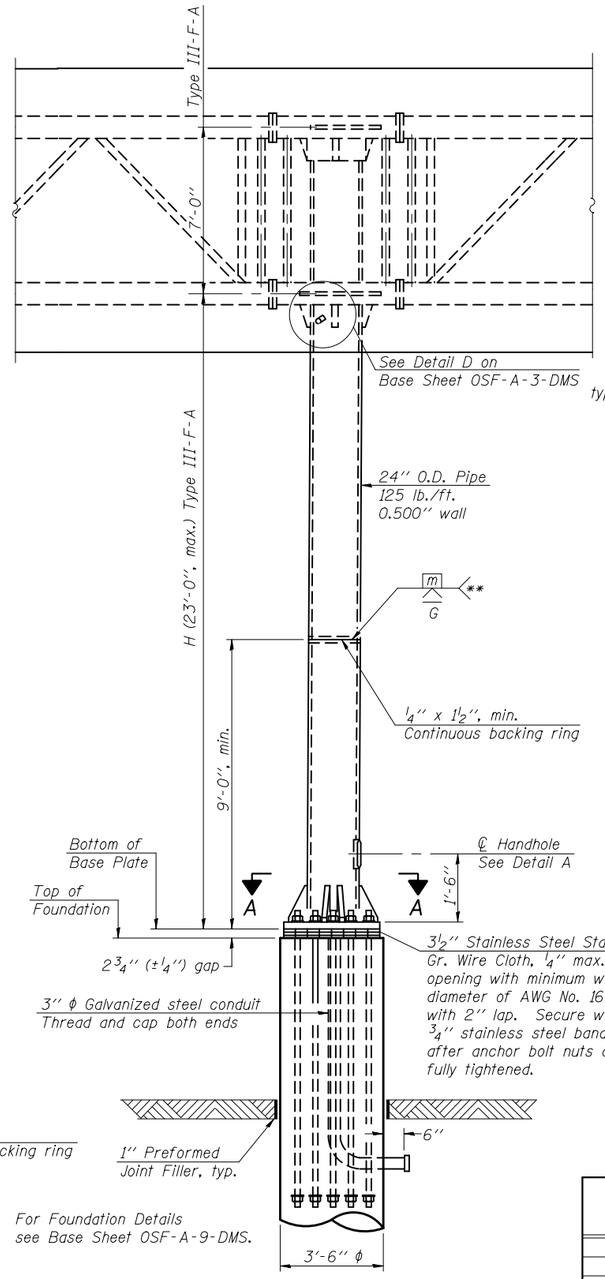


SECTION B-B



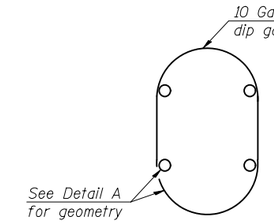
DETAIL B

(Typical rib)

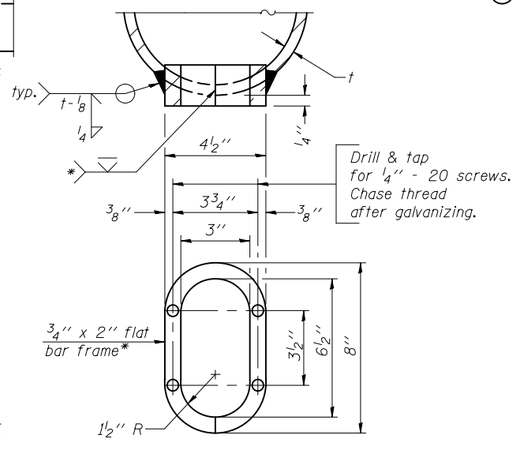


For Foundation Details see Base Sheet OSF-A-9-DMS.

FRONT ELEVATION



HANDHOLE COVER

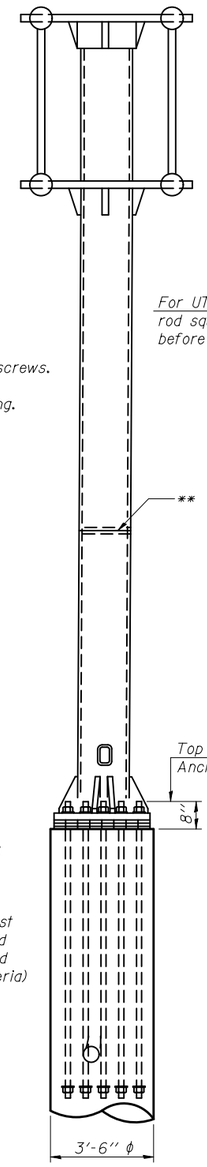


Provide 8'' x 4 1/2'' cover. Outside corners = 2 1/4'' radius. Provide 4 - 5/16'' ϕ holes in for 1/4'' - 20 round head hot dip galvanized or stainless steel machine screws. (See cover details.)

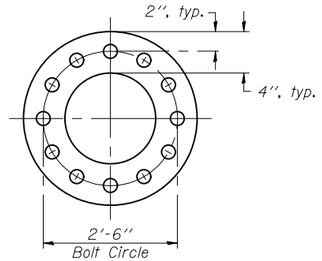
DETAIL A

* 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.

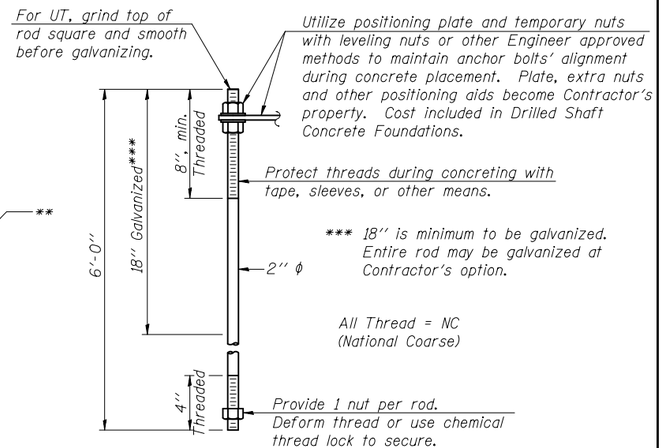
** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.



SIDE ELEVATION



SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.

Structure Number	Station	H

Note: "H" based on 15'-0'' or actual sign height, whichever is greater.

OSF-A-5-DMS 6-1-12

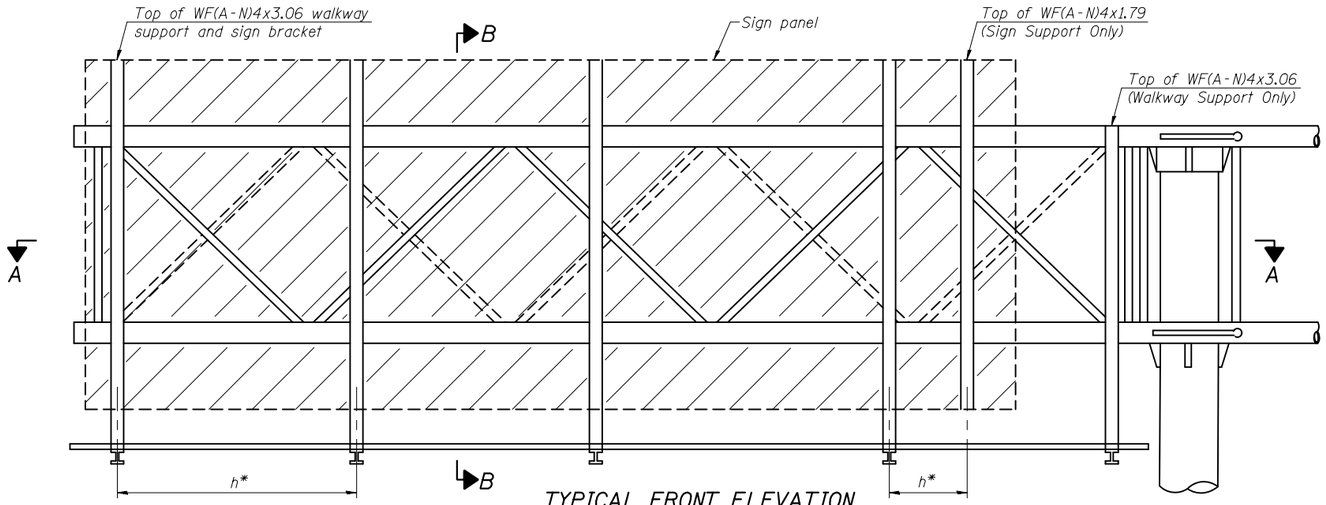
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – TYPE II-F-A TRUSS SUPPORT POST FOR DMS ALUMNINUM TRUSS & STEEL POST

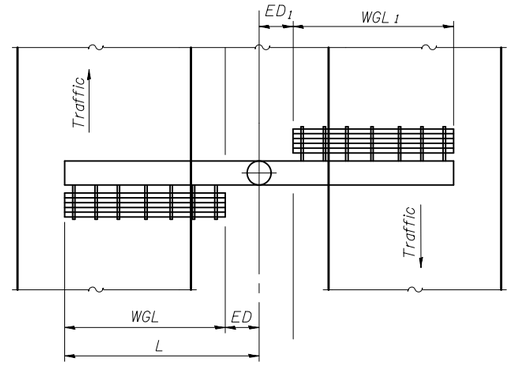
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



TYPICAL FRONT ELEVATION

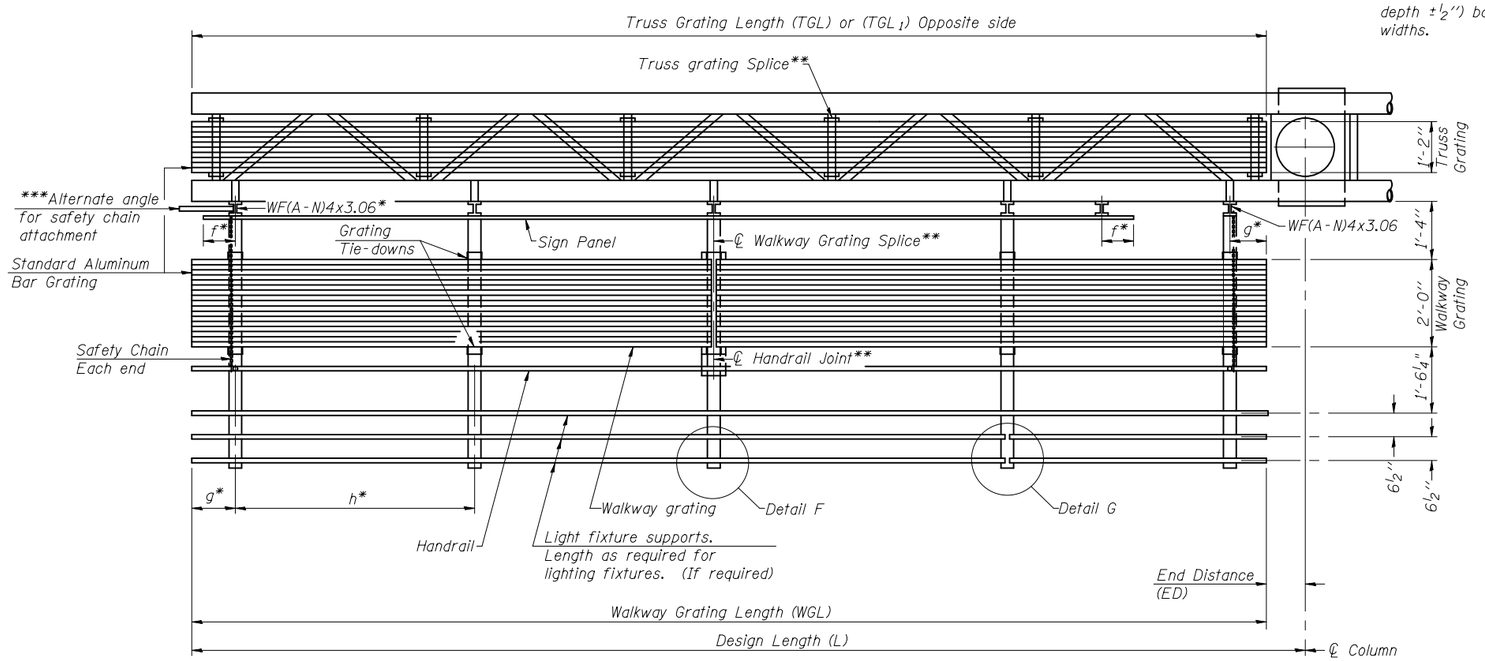
With lights and handrail omitted for clarity.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)

Walkway and truss grating dimensions are nominal and may vary (width ±½", depth ±½") based on available standard widths.



SECTION A-A

Handrail and walkway grating shall span a minimum of three brackets between splices.
***Use and location of handrail joint or grating splices are optional, based on lengths needed and material availability.*

$$TGL = L - \left(\frac{\text{Post O.D.}}{2} + 6''\right)$$

Truss grating to facilitate inspection shall run full length of cantilevers. Cost of truss grating is included in "Overhead Sign Structure Butterfly".

Structure Number	Station	WGL	ED	TGL	WGL 1	ED 1	TGL 1

Notes:

* *Space walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 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 to ℄ of nearest bracket)
h = 6'-0" maximum (℄ to ℄ sign and/or walkway support brackets, WF(A-N)4x1.79 or WF(A-N)4x3.06)

*** *If walkway bracket at safety chain location is behind sign, add angle to bracket. See alternate safety chain attachment on base sheet OSF-A-8.*

For details of sign placement, sign/walkway brackets, truss and walkway gratings, grating splices and Section B-B, see Base Sheet OSF-A-7.
For details of handrail, handrail joint, safety chain and Details F and G, see Base Sheet OSF-A-8.

BRACKET TABLE

WF(A-N)4x1.79 or WF(A-N)4x3.06
ASTM B308, Alloy 6061-T6

Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

OSF-A-6 6-1-12

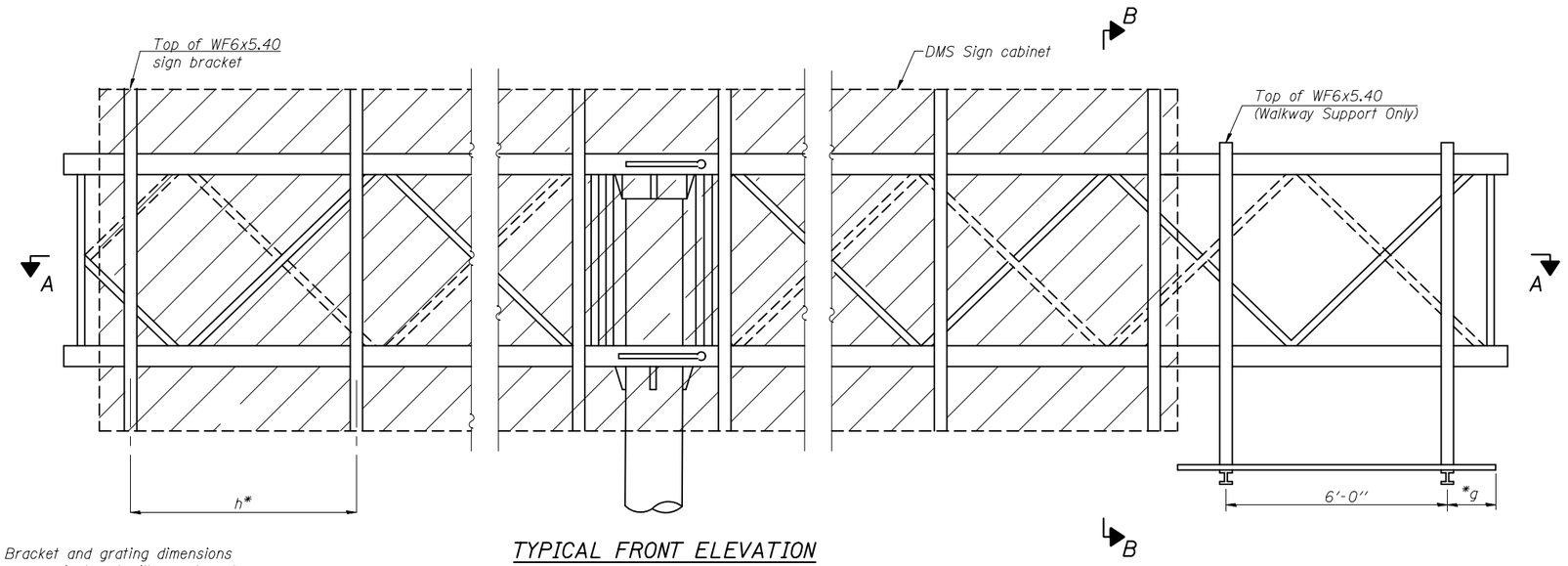
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – ALUMINUM WALKWAY
DETAILS – ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

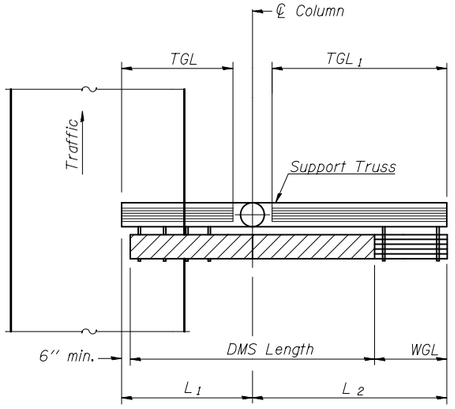
CONTRACT NO.
ILLINOIS FED. AID PROJECT



Bracket and grating dimensions are nominal and will vary based on actual DMS cabinet dimensions plus manufacturer's mounting devices.

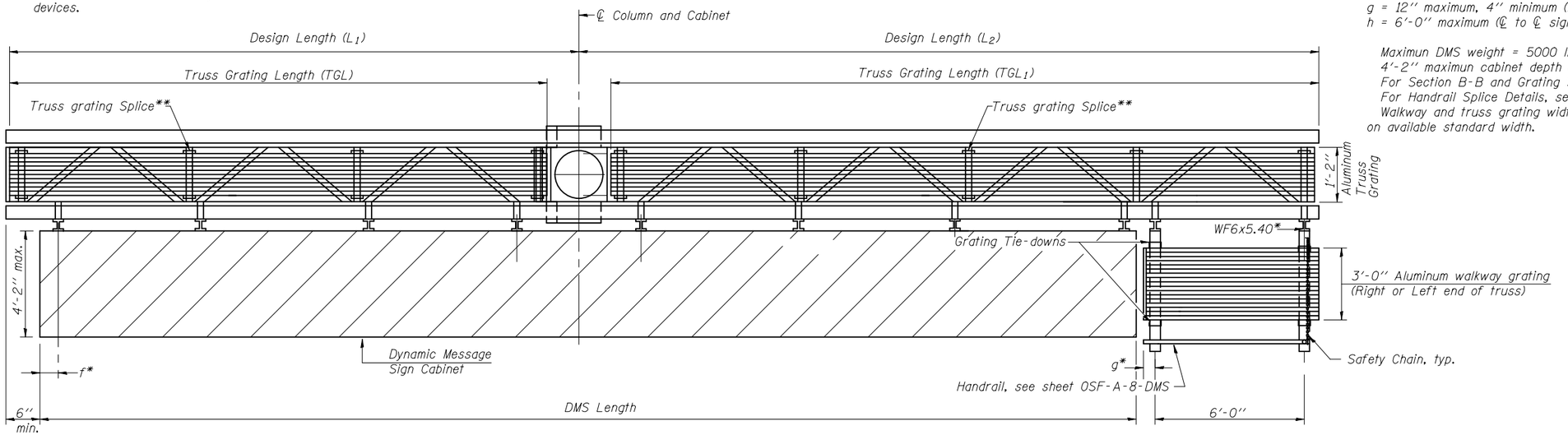
TYPICAL FRONT ELEVATION

With handrail omitted for clarity.
For section B-B see base sheet OSF-A-7-DMS



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.



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 Butterfly Sign Structure.

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

Notes:
Space walkway brackets and sign brackets WF6x5.40 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, WF6x5.40

Maximun DMS weight = 5000 lbs.
4'-2" maximun cabinet depth includes depth of cabinet plus connection to WF6x5.40
For Section B-B and Grating Splice Details, see Base Sheet OSF-A-7-DMS.
For Handrail Splice Details, see Base Sheet OSF-A-8-DMS.
Walkway and truss grating width dimensions are nominal and may vary ±½" based on available standard width.

BRACKET TABLE

WF(A-N)4x3.06
ASTM B308, Alloy 6061-T6

Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

Structure Number	Station	DMS Length	TGL	TGL 1	Walkway Location (Right or Left end of Truss)

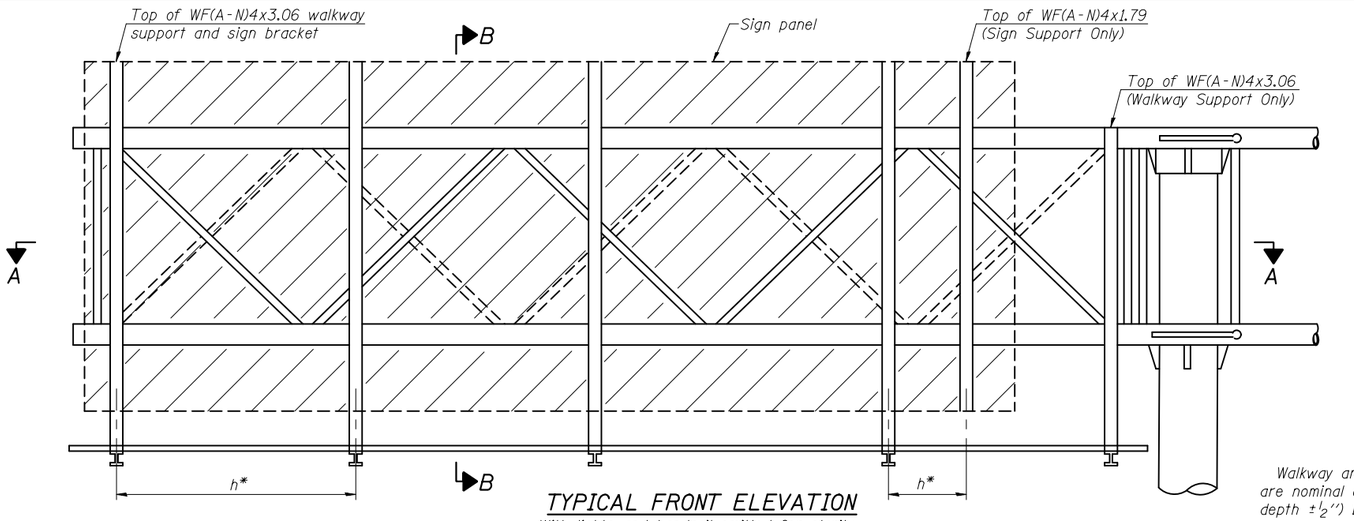
OSF-A-6-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – ALTERNATE
ALUMINUM WALKWAY DETAILS FOR DMS
SHEET NO. OF SHEETS

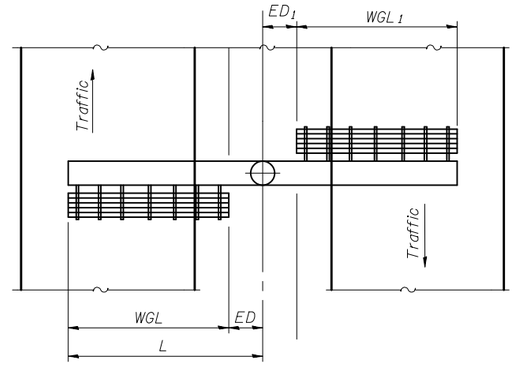
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



TYPICAL FRONT ELEVATION

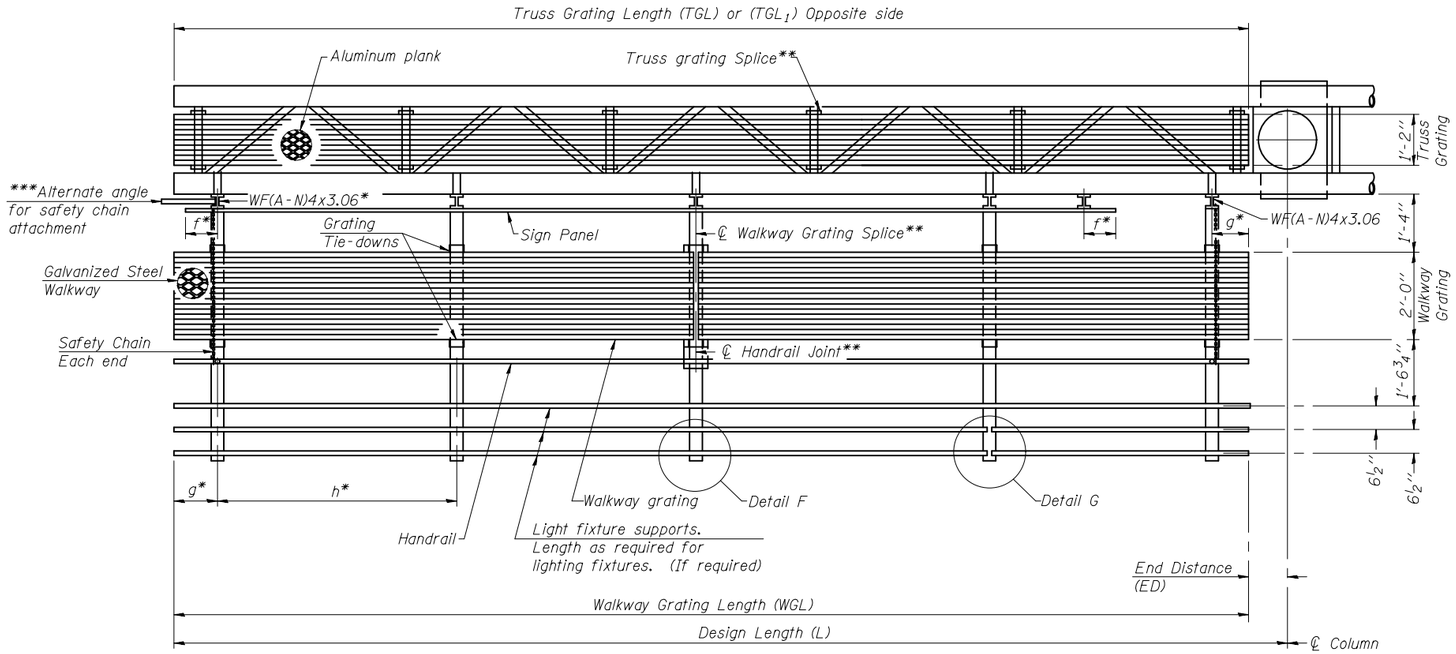
With lights and handrail omitted for clarity.

Walkway and truss grating dimensions are nominal and may vary (width ±1/2", depth ±1/2") based on available standard widths.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)



SECTION A-A

Handrail and walkway grating shall span a minimum of three brackets between splices.
**Use and location of handrail joint or grating splices are optional, based on lengths needed and material availability.

$$TGL = L - \left(\frac{\text{Post O.D.}}{2} + 6''\right)$$

Truss grating to facilitate inspection shall run full length of cantilevers. Cost of truss grating is included in "Overhead Sign Structure Butterfly".

Structure Number	Station	WGL	ED	TGL	WGL 1	ED 1	TGL 1

Notes:

* Space walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 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 to ℄ of nearest bracket)
h = 6'-0" maximum (℄ to ℄ sign and/or walkway support brackets, WF(A-N)4x1.79 or WF(A-N)4x3.06)

*** If walkway bracket at safety chain location is behind sign, add angle to bracket. See alternate safety chain attachment on base sheet OSF-A-8.

For details of sign placement, sign/walkway brackets, truss and walkway gratings, grating splices and Section B-B, see Base Sheet OSF-A-7S.
For details of handrail, handrail joint, safety chain and Details F and G, see Base Sheet OSF-A-8.

BRACKET TABLE

WF(A-N)4x1.79 or WF(A-N)4x3.06
ASTM B308, Alloy 6061-T6

Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

OSF-A-6S 6-1-12

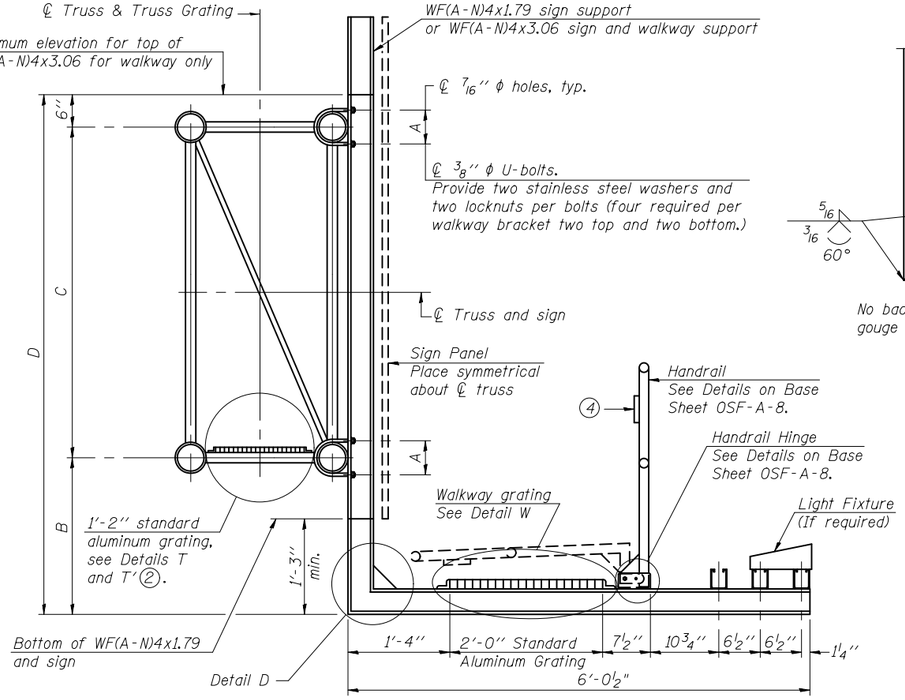
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

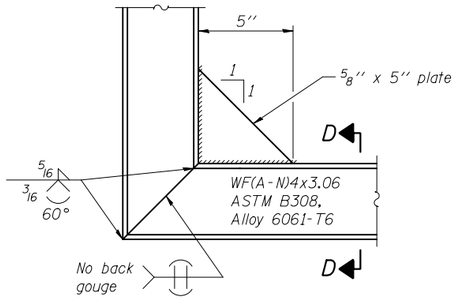
BUTTERFLY SIGN STRUCTURES – ALTERNATE STEEL WALKWAY DETAILS – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

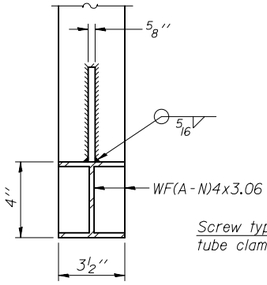
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



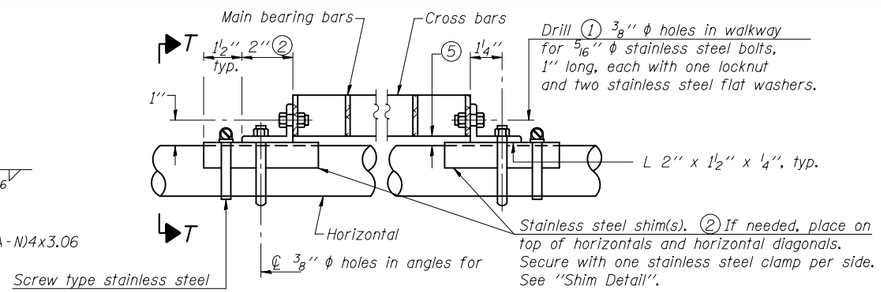
SECTION B-B



DETAIL D

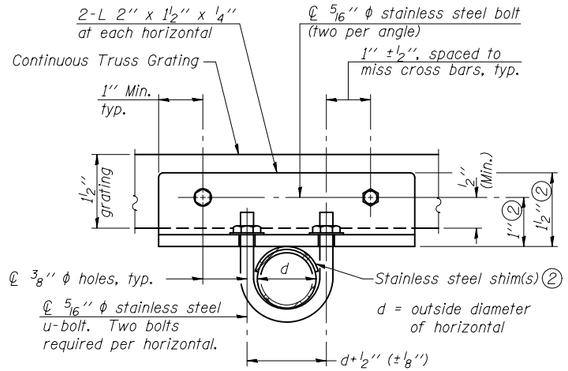


SECTION D-D

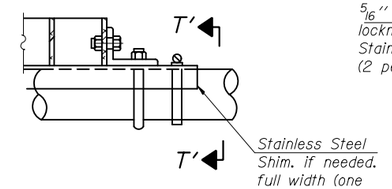


DETAIL T

(Truss grating at horizontal)



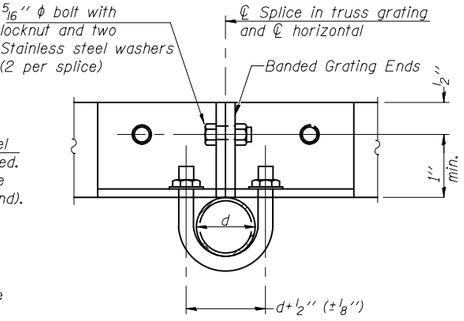
SECTION T-T



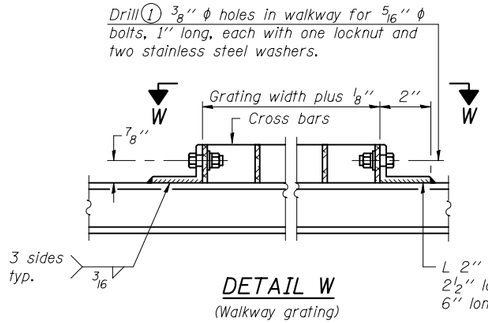
DETAIL T'

(Truss grating splice)

Details not shown same as Detail T. Alternate materials may be used subject to the Engineer's review and approval.



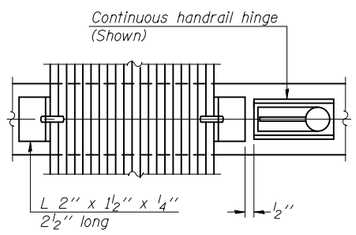
SECTION T'-T'



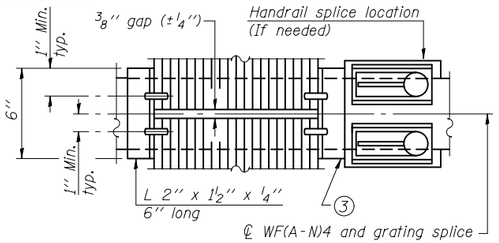
DETAIL W

(Walkway grating)

Sign shall be even with the top of the bracket, but it may extend to no more than 6" above the top of the bracket for field adjustments.



(CONTINUOUS WALKWAY GRATING)



(AT WALKWAY GRATING SPLICE)

SECTION W-W

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

Main Bearing Bars (MBB) shall be 3/16" x 1½" on 1 3/16" centers and conform to ASTM B211 Alloy 6061-T6.

Cross bars (CB) shall be 3/16" x 1½" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

OR

Aluminum Grating with modified "T" sections for main bearing bars shall meet the following requirements:

Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in.³ per bar, a depth of 1½", spaced on 1 3/16" centers.

Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) 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.

(3) If Handrail Joint present, weld angle to WF(A-N)4 and ¼" extension bars. (See Base Sheet OSF-A-8)

(4) PL ⅛" x ½" x 2" welded to handrail posts to protect locations that contact grating.

(5) Tube to grating gap may very from 0 to ½" max. to align walkway, allow for camber, etc.

(6) Based on actual sign height, D_{S1} or D_{S2}, given on OSF-A-1.

Structure Number	Station	A	B	(6) C	(6) D

OSF-A-7 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

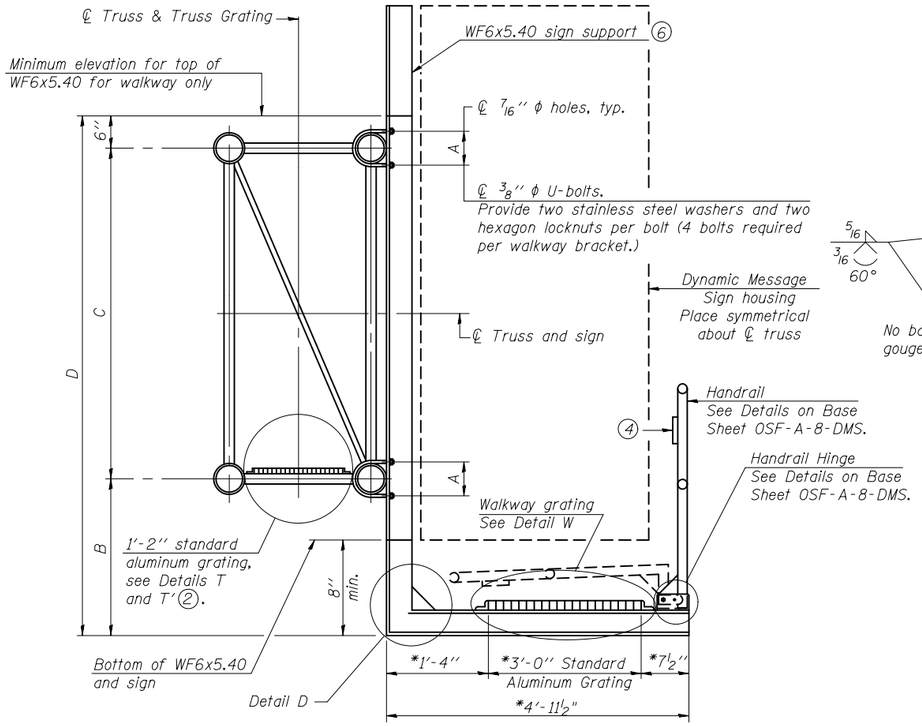
BUTTERFLY SIGN STRUCTURES – WALKWAY DETAILS
ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

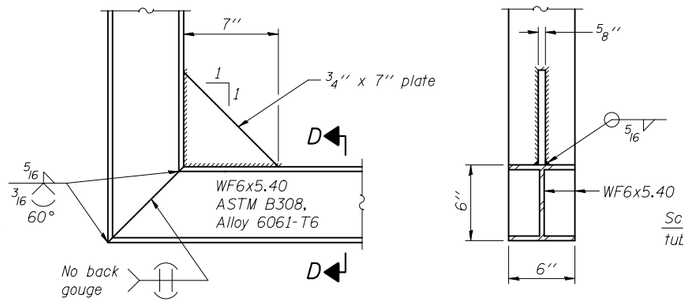
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT

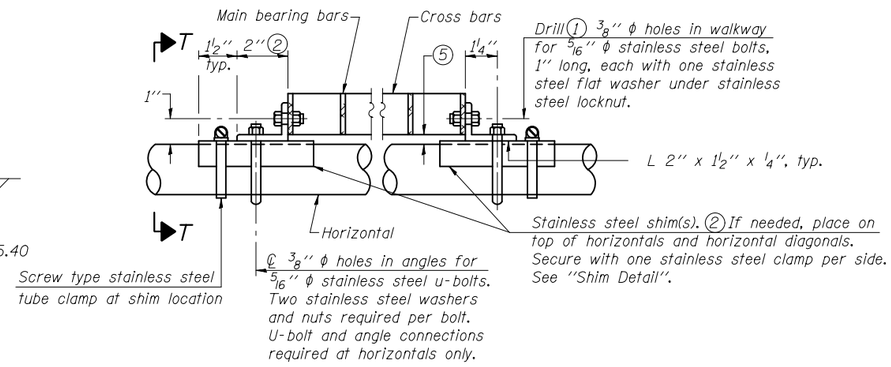


SECTION B-B

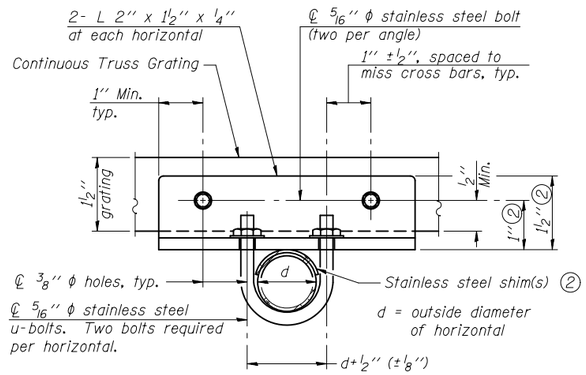


DETAIL D

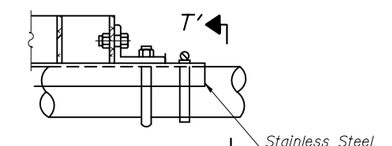
SECTION D-D



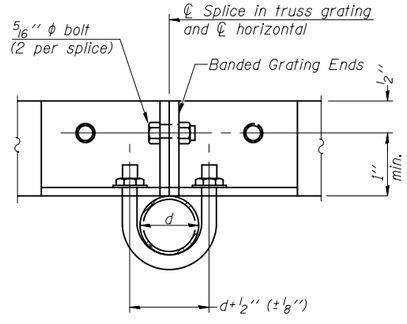
DETAIL T
(Continuous Truss grating)



SECTION T-T



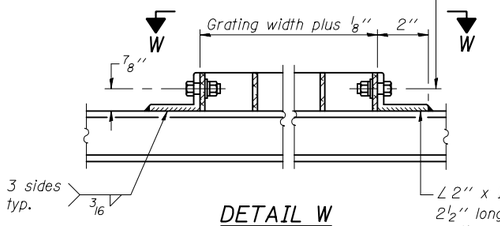
DETAIL T'
(Truss grating splice)
Details not shown same as Detail T. Alternate materials may be used subject to the Engineer's review and approval.



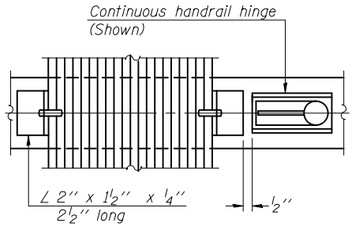
SECTION T'-T'

* Bracket and grating dimensions are nominal and will vary based on actual DMS cabinet dimensions plus manufacturers mounting device.

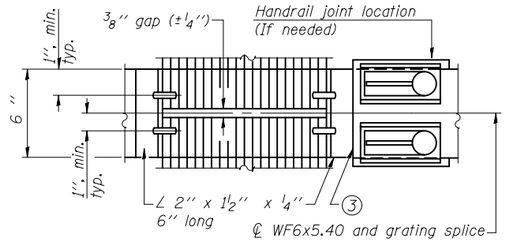
Drill (1) 3/8" ϕ holes in walkway for 5/16" ϕ stainless steel bolts, 1" long, each with one stainless steel locknut and 2 stainless steel flat washers.



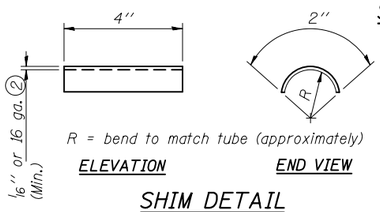
DETAIL W
(Walkway grating)



(CONTINUOUS WALKWAY GRATING)



(AT WALKWAY GRATING SPLICE)



SHIM DETAIL

SECTION W-W

Structure Number	Station	A	(7) B	C	(7) D

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

Main Bearing Bars (MBB) shall be 3/16" x 1 1/2" on 1 3/16" centers and conform to ASTM B211 Alloy 6061-T6.

Cross bars (CB) shall be 3/16" x 1 1/2" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

OR

Aluminum Grating with modified "t" sections for main bearing bars shall meet the following requirements:

Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in.^{3} per bar, a depth of 1 1/2", spaced on 1 3/16" centers.

Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) 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.

(3) If Handrail Joint present, weld angle to WF(A-N)4 and 1/4" extension bars. (See Base Sheet OSF-A-8)

(4) ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(5) Tube to grating gap may very 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 WF6's. Bolts must be stainless steel or hot dip galvanized high strength per IDOT specifications.

(7) Based on actual sign height, Ds, given on OSF-A-1-DMS.

OSF-A-7-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

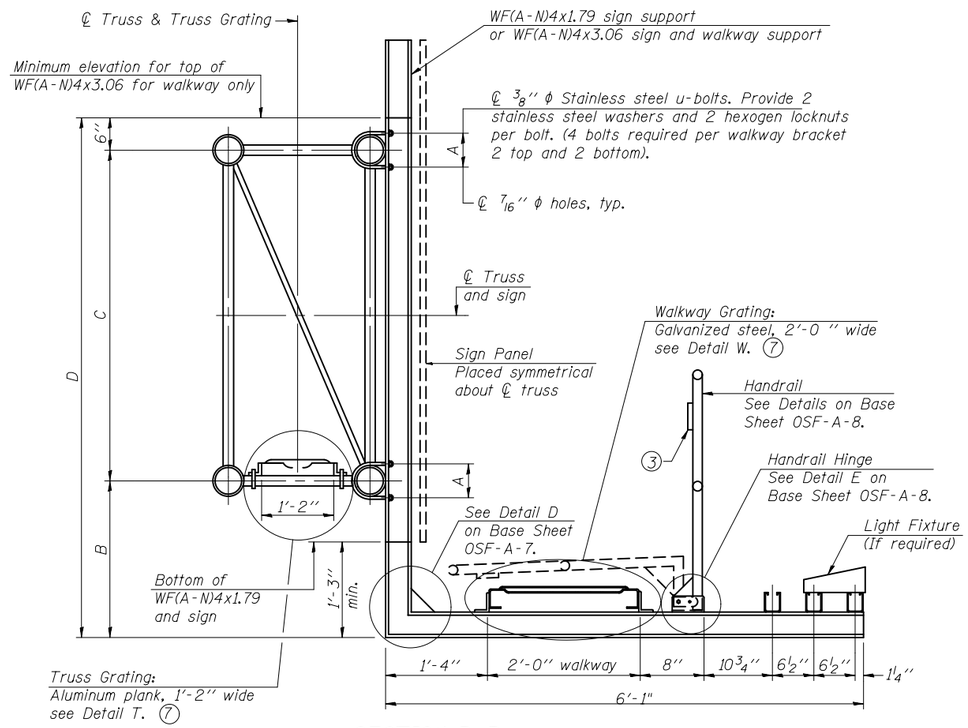
BUTTERFLY SIGN STRUCTURES – ALTERNATE WALKWAY
DETAILS FOR DMS – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

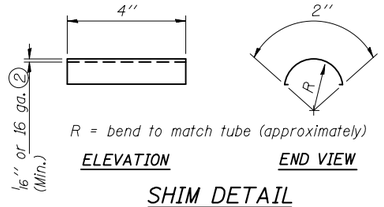
ILLINOIS FED. AID PROJECT



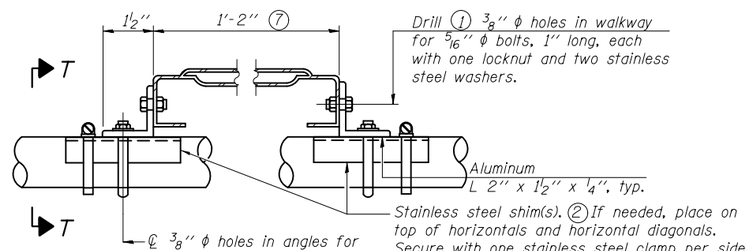
SECTION B-B

Sign shall be even with the top of the bracket, but it may extend to no more than 6" above the top of the bracket for field adjustments.

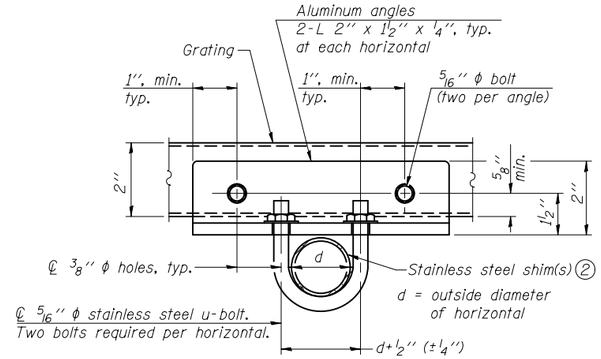
DETAIL W
GALVANIZED STEEL WALKWAY GRATING



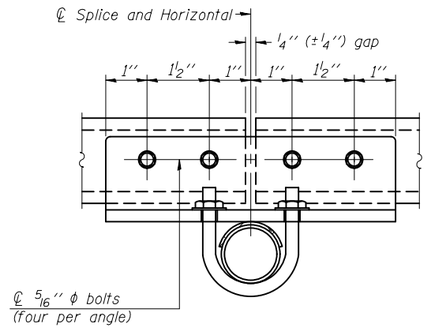
SHIM DETAIL



DETAIL T
(Truss Grating at Horizontal)

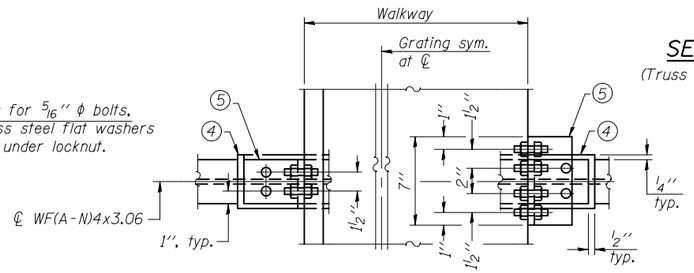


SECTION T-T
(Truss Grating Continuous)



SECTION T-T
(Truss Grating Splice)

Alternate splice details and locations may be used subject to the Engineer's review and approval.



WALKWAY GRATING CONTINUOUS AT WALKWAY GRATING SPLICE

SECTION W-W

Structure Number	Station	A	(8) B	C	(8) D

ALUMINUM TRUSS GRATING

(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 details or other methods in accord with grating manufacturer's recommendation and subject to the Engineer's review and approval.

(3) ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(4) 1/16" (or 16 ga.) x 2 1/2" x 4" stainless steel shim adhered to top of WF(A-N)4x3.06 beneath each galvanized angle, typ. Adhesives for shims shall be suitable for materials joined and full exposure conditions.

(5) Galvanized steel L2" x 2" x 1/4", 3 1/2" long with continuous grating 7" long at grating splice.

(6) Details shown are considered equal alternatives to Aluminum Walkway Details and may be substituted by Contractor at no charge in contract cost.

(7) Perforated or expanded metal grating providing a skid resistant (non-serrated) surface and capable of supporting a 500 pound concentrated load with a 6'-0" clear span. Walkway and truss grating dimensions are nominal and may vary (width ±1/2", depth ±1/2") based on available standard sizes. Cut ends of grating shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

(8) Based on actual sign height, D_{S1} or D_{S2}, given on OSF-A-1.

OSF-A-7S 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
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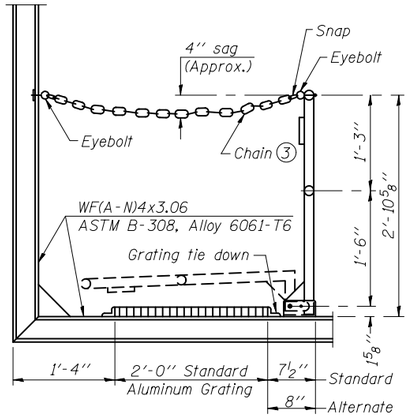
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

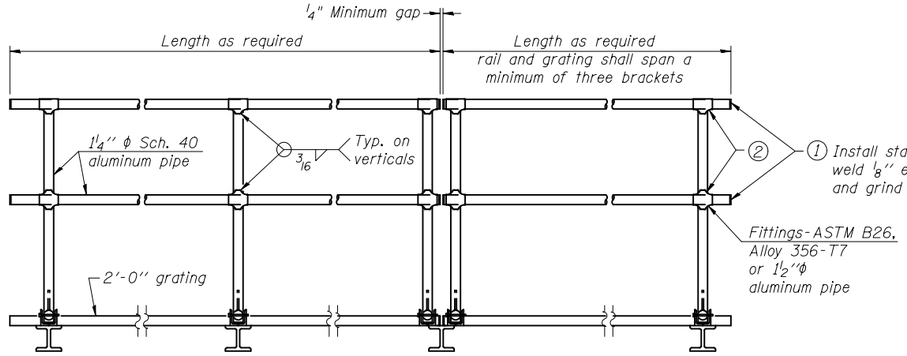
BUTTERFLY SIGN STRUCTURES
ALTERNATE WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



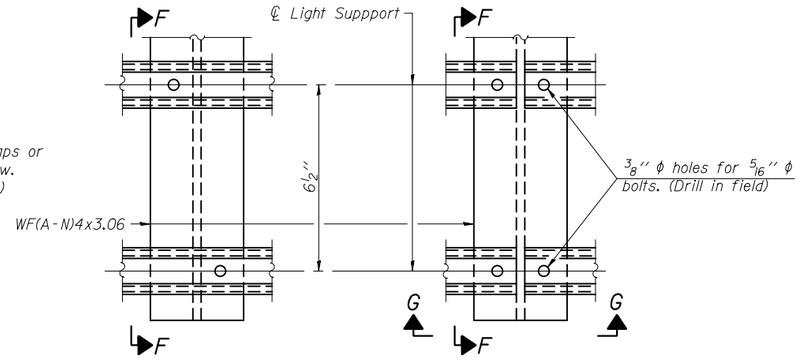
SIDE ELEVATION

(Showing Safety Chain W/O Sign)



FRONT ELEVATION

(2) Horizontal handrail member shall be continuous thru fitting. Provide 7/16'' ϕ hole in fitting for 3/8'' ϕ bolt. Field drill 7/16'' ϕ hole in horizontal rail member. Provide locknut and two stainless steel washers for bolt. (Use 5/16'' eyebolts in 7/16'' ϕ holes on top rail at ends only.)

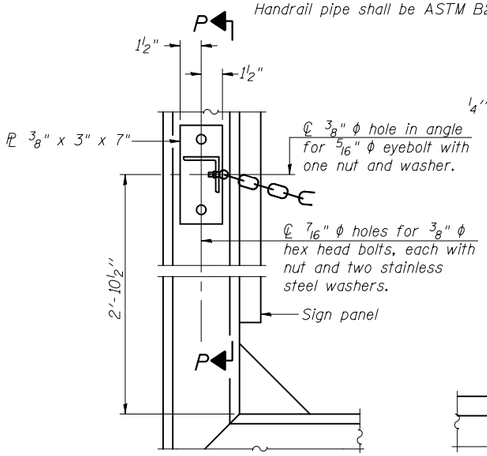


DETAIL F

DETAIL G

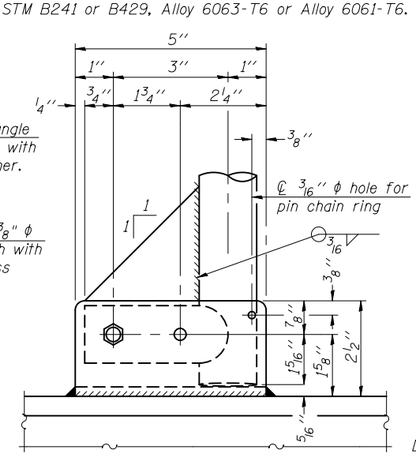
HANDRAIL DETAILS

Handrail pipe shall be ASTM B241 or B429, Alloy 6063-T6 or Alloy 6061-T6.

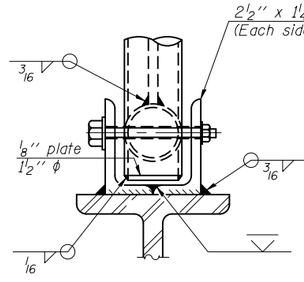


ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)
Items not shown same as "Side Elevation" of "Handrail Details"

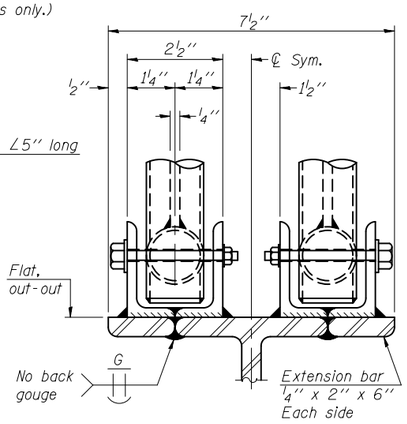


SIDE ELEVATION



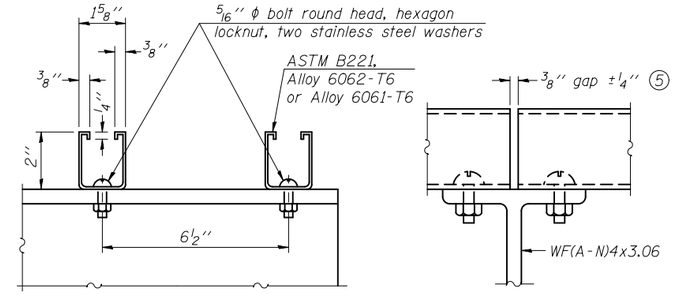
FRONT ELEVATION

Details not shown same as "ELEVATION" at right.



ELEVATION AT HANDRAIL JOINT (4)

Details not shown same as "FRONT ELEVATION"

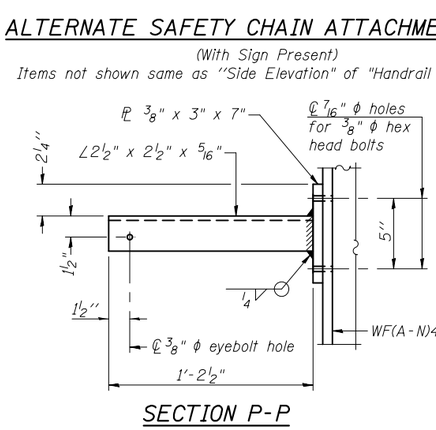


SECTION F-F

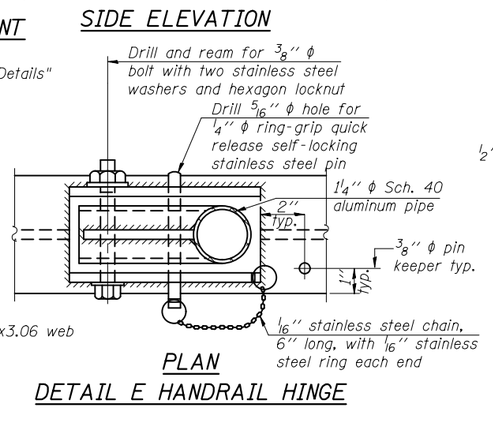
SECTION G-G

LIGHTING FIXTURE MOUNTS (IF REQUIRED)

(5) Field cut ends of light support channels shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

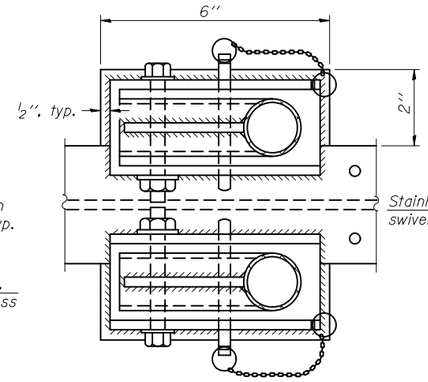


SECTION P-P



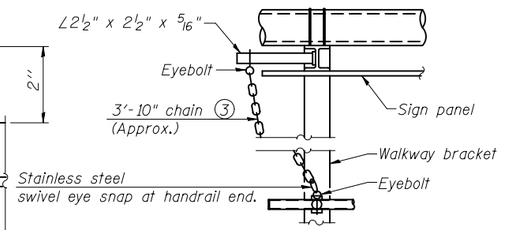
PLAN

DETAIL E HANDRAIL HINGE



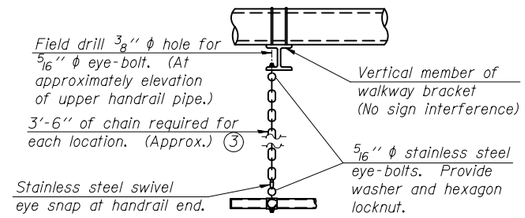
PLAN AT HANDRAIL JOINT

Details not shown same as "PLAN"



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.

(3) 3/16'' type 304L stainless steel chain, approximately 12 links per foot.

(4) Extrusions may be used in lieu of the details shown, with approval of the Engineer.

OSF-A-8 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
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	PLOT DATE =	CHECKED -	REVISED

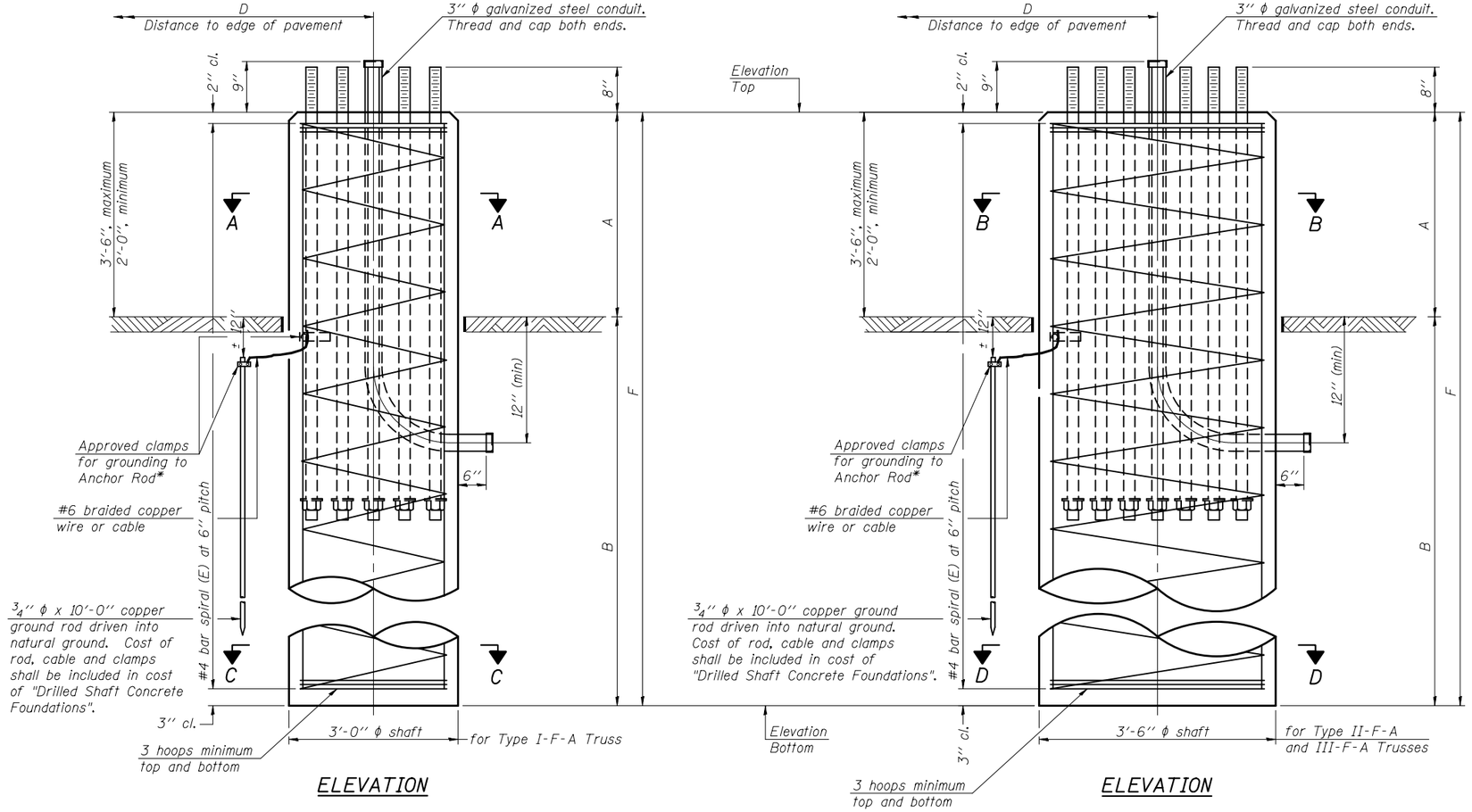
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

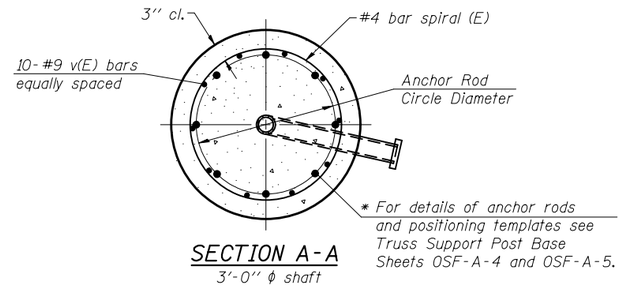
BUTTERFLY SIGN STRUCTURES – HANDRAIL DETAILS
ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

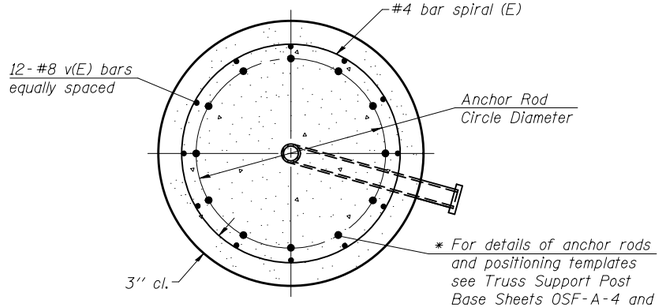
CONTRACT NO.
ILLINOIS FED. AID PROJECT

* Grind anchor rod to bright finish at ground clamp location before installing clamp.

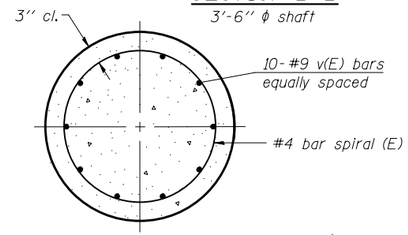




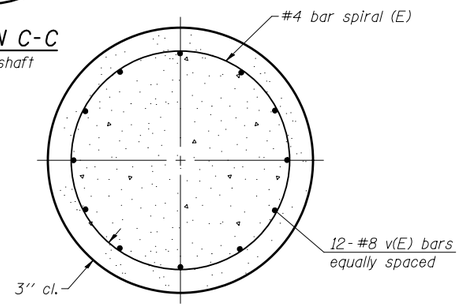
SECTION A-A
3'-0'' ϕ shaft



SECTION B-B
3'-6'' ϕ shaft



SECTION C-C
3'-0'' ϕ shaft



SECTION D-D
3'-6'' ϕ shaft

NOTES:

The foundation dimensions shown in the Foundation Design Table are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, 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 in the Foundation Data Table will be the result of 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in "Drilled Shaft Concrete Foundation".

FOUNDATION DESIGN TABLE

Truss Type	Post Base Sheet	Maximum CantileverLength (ft)	Maximum Total Sign Area (sq ft)	Shaft Diameter (in)	"B" Depth (ft)	Anchor Rods		Anchor Rod Circle Diameter (in)
						No.	Diameter (in)	
I-F-A	OSF-A-4	25	200	3.0	17'-6''	8	2	22
II-F-A	OSF-A-5	30	400	3.5	22'-0''	12	2	30
III-F-A	OSF-A-5	35	400	3.5	24'-0''	12	2	30

FOUNDATION DATA TABLE

Structure Number	Station	Truss Type	Shaft Diameter	Elevation Top	Elevation Bottom	A	B	F	Class DS Concrete Cubic Yards

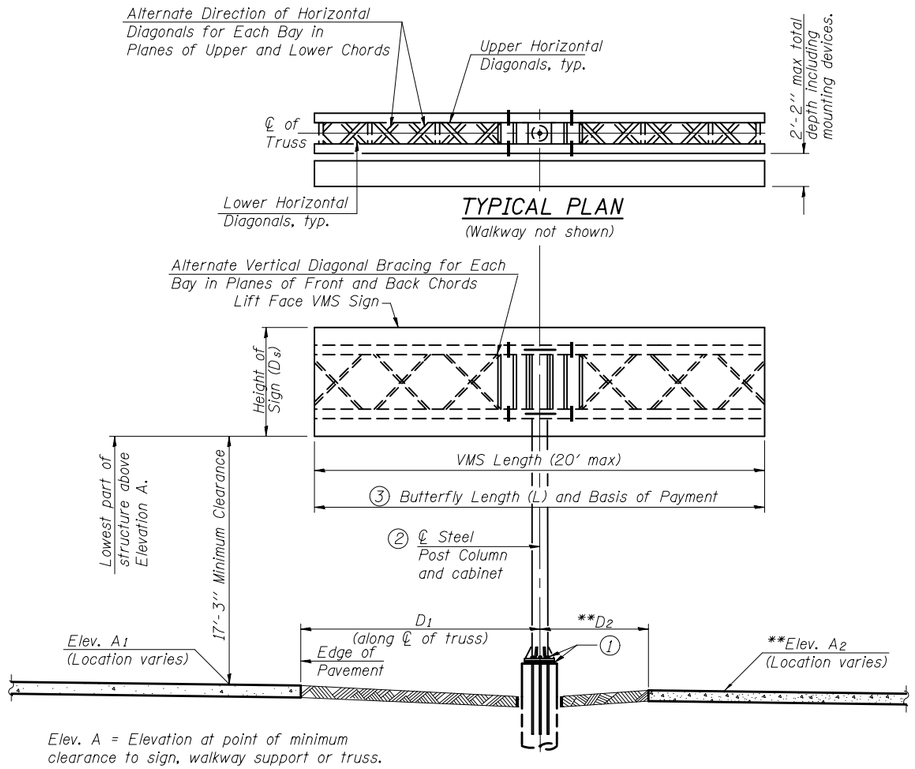
OSF-A-9 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – DRILLED SHAFT
ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

TYPICAL PLAN

(Walkway not shown)

TYPICAL ELEVATION

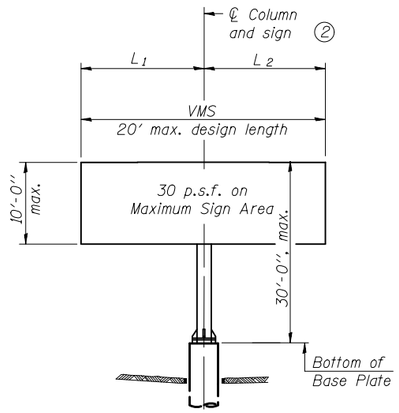
Looking in Direction of Traffic

** Elevation A_2 and dimension D_2 not used when butterfly structure is mounted on right side of the shoulder.

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.

TRUSS TYPE	MAXIMUM TOTAL VMS AREA
I-F-A	200 Sq. Ft.

Maximum VMS (Variable Message Sign) Weight = 2500 LB.



DESIGN WIND LOADING DIAGRAM

Parameters shown are basis for I.D.O.T. Standards. Installations not within dimensional limits shown require special analysis for all components.

Note:
Trusses shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The contractor is responsible for maintaining the configuration and protection of the trusses.

① After adjustments to level truss and insure 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.

② Centerline sign must be located at centerline of column.

③ Total truss length to match VMS length.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY
WIND LOADING: 30 p.s.f. normal to DMS Cabinet Area and truss elements not behind sign Loading Diagram.
WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES
FIELD UNITS
f'_c = 3,500 p.s.i.
f_y = 60,000 p.s.i. (reinforcement)

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 Specifications.

MATERIALS: Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.
All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W* (M183, M223 Gr. 50, or M222). 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.

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.

U-BOLTS AND 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 lock nut.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6'' below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

Structure Number	Station	③ Total Butterfly Length (L)	Elev. A_1	Elev. A_2	Dim. D_1	Dim. D_2	D_s	Total Sign Area

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE BUTTERFLY TYPE I-F-A	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

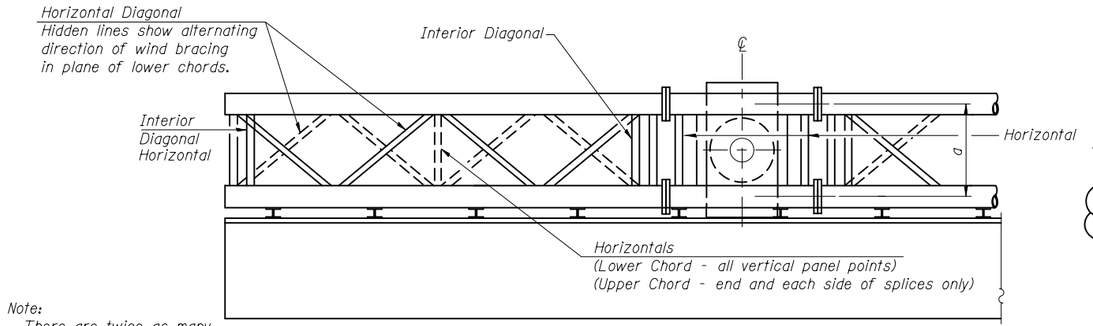
OSF-A-1-VMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

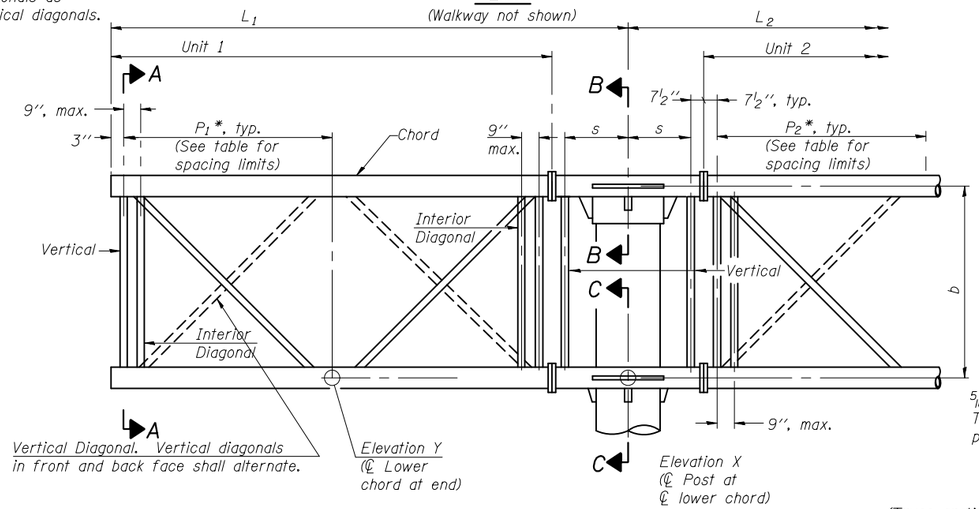
BUTTERFLY SIGN STRUCTURES – PLAN & ELEVATION
FOR FRONT ACCESS VMS – ALUMINUM TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



PLAN

Note:
There are twice as many horizontal diagonals as there are vertical diagonals.

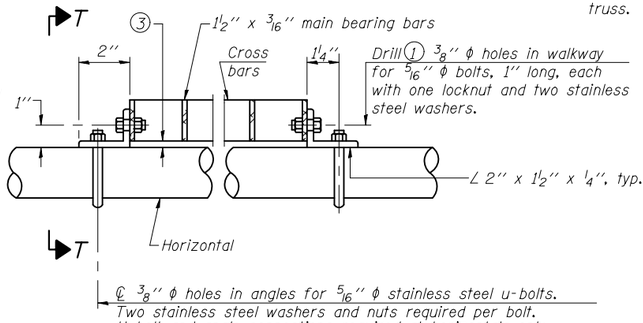


ELEVATION

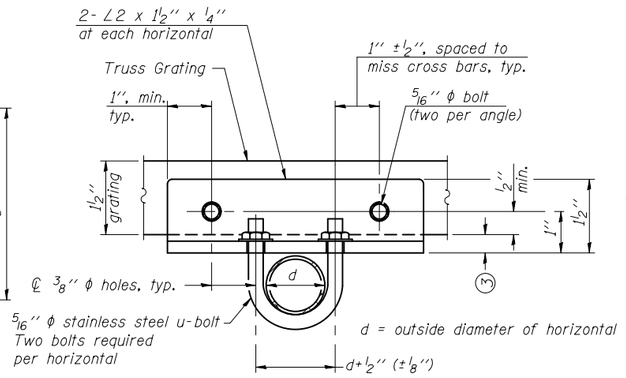
(Sign omitted for clarity)

TYPICAL TRUSS UNIT

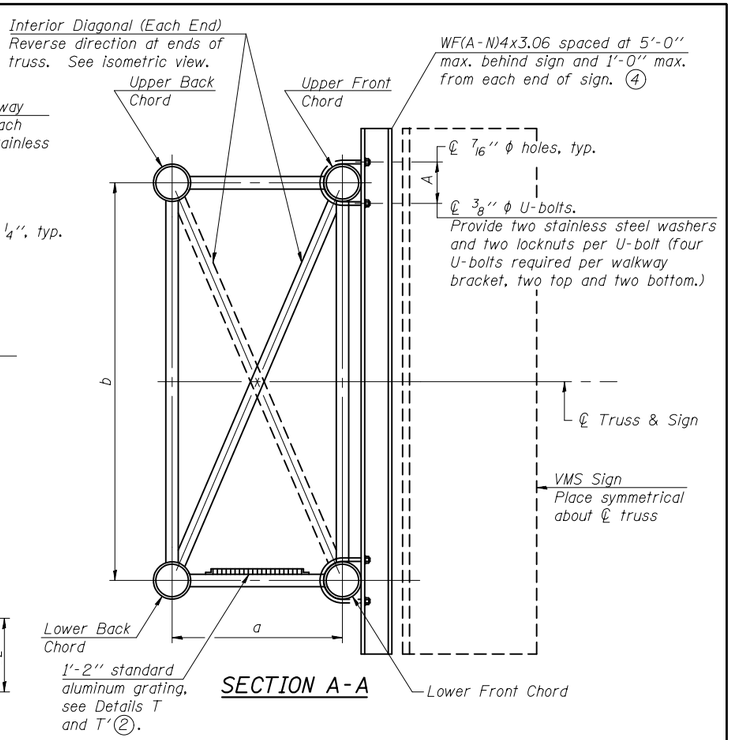
For Section B-B and Section C-C, see Base Sheet OSF-A-3-VMS.



DETAIL T



SECTION T-T



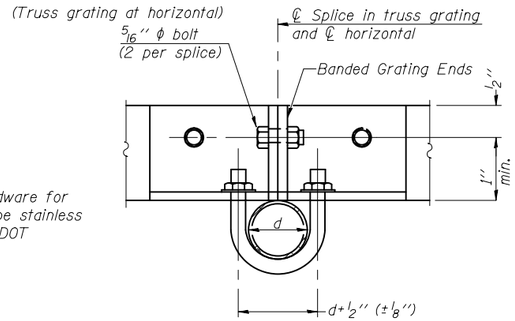
SECTION A-A

SPECIFICATIONS FOR STANDARD ALUMINUM GRATING

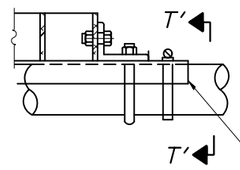
Main Bearing Bars (MBB) shall be 3/16" x 1½" on 1 3/16" centers and conform to ASTM B211 Alloy 6061-T6.
Cross bars (CB) shall be 3/16" x 1½" on 4" centers and conform to ASTM B221 Alloy 6063-T5 or 6061-T6.

OR

Aluminum Grating with modified "T" sections for main bearing bars shall meet the following requirements:
Main bars shall conform to ASTM B221 Alloy 6061-T6 and have a minimum section modulus equal to 0.0705 in.³ per bar, a depth of 1½", spaced on 1 3/16" centers.
Cross bars shall conform to ASTM B221 Alloy 6063-T5 or T-42 and spaced on 4" centers.



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.

① Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

② 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.

③ Tube to grating gap may vary from 0 to ½" max. to align walkway, allow for camber, etc.

④ Sign manufacturer must design and supply hardware for connection of VMS to WF(A-N)4's. Bolts must be stainless steel or hot dip galvanized high strength per IDOT specifications

Structure Number	Station	Truss Type	L_1	L_2	Number of Panels Unit 1	Panel Length (P_1)*	Number of Panels Unit 2	Panel Length (P_2)*
		I-F-A			2		2	

TRUSS UNIT TABLE

Truss Type	Dimension "a"	Dimension "b"	Dimension "s"	Limits for Panel Spacing (P)*	Up. & Low. Chord O.D.	Up. & Low. Chord Wall	Verticals; Horizontals; Vertical Horizontals; and Interior Diagonals	
I-F-A	24"	54"	16"	36" min. to 48" max.	5"	5/16"	2½"	5/16"

*P = (L - s - 1'-6") / # Panels

OSF-A-2-VMS 6-1-12

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		CHECKED -	REVISED
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

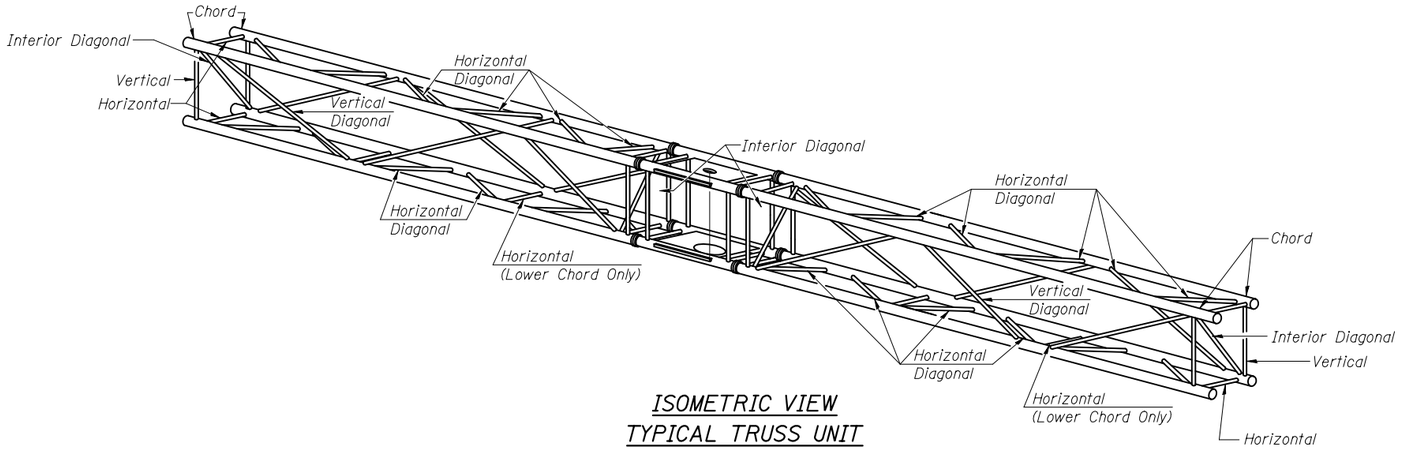
BUTTERFLY SIGN STRUCTURES – TRUSS DETAILS FOR FRONT ACCESS VMS – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

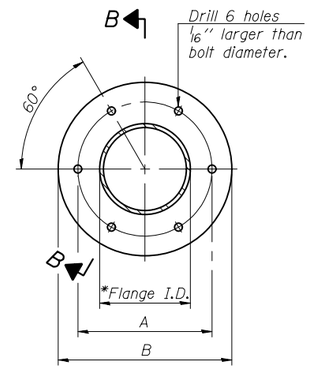
CONTRACT NO.

ILLINOIS FED. AID PROJECT



ISOMETRIC VIEW TYPICAL TRUSS UNIT

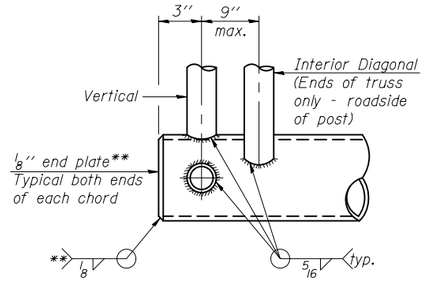
ASTM B221 Alloy 6061 Temper T6



SPLICING FLANGE

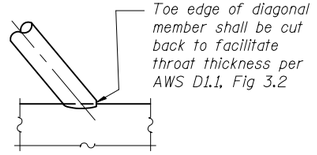
ASTM b221, Alloy 6061-T6
or ASTM B209, Alloy 6061-T651

* To fit O.D. of Chord with maximum gap of 1/16".

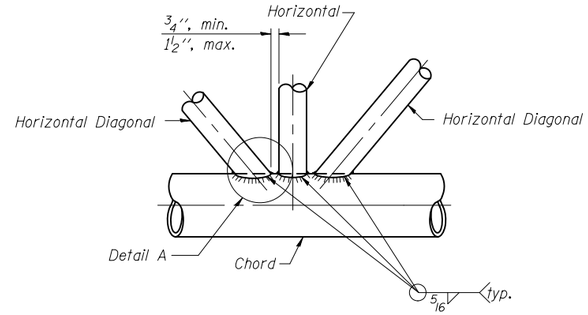


BUTTERFLY END JOINT DETAIL

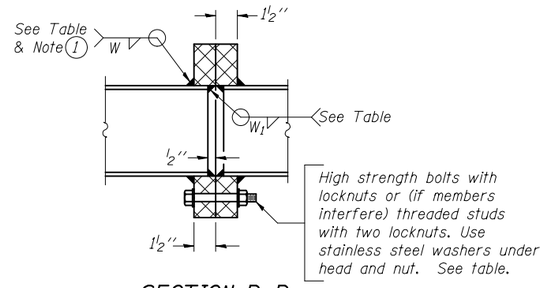
** Contractor may alternatively use standard aluminum drive-fit cap to close ends.



DETAIL A

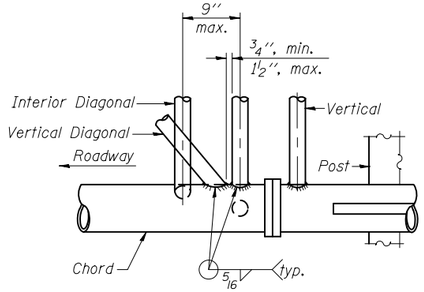


TRUSS INTERIOR JOINT DETAIL



SECTION B-B

(1) Splicing Flanges shall be attached to each truss unit with the truss shop assembled to camber shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external welds or tacks shall be made to secure flanges until remaining welds are made after disassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.



POST END JOINT DETAIL

Truss Type	Bolts	Weld Sizes		A	B
	Dia.	W	W_1		
I-F-A	7/8"	5/16"	1/4"	8 3/4"	11 3/4"

OSF-A-2A-VMS 6-1-12

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BUTTERFLY SIGN STRUCTURES – TRUSS DETAILS FOR FRONT ACCESS VMS – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

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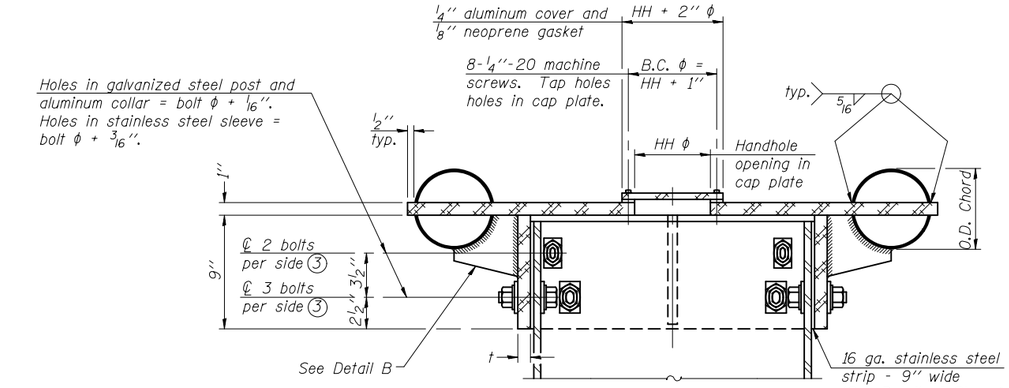
CONTRACT NO.

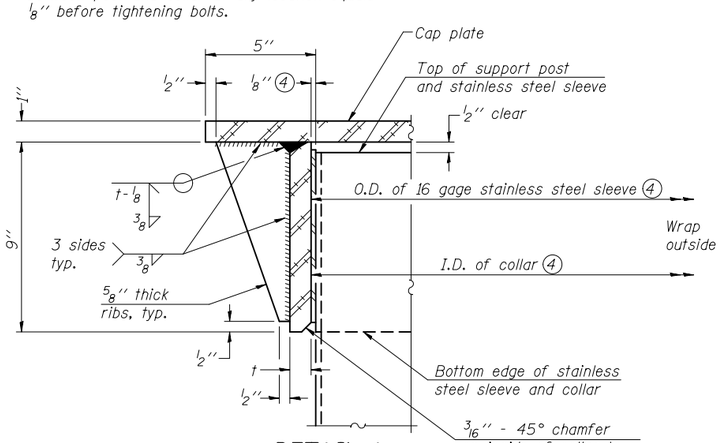
ILLINOIS FED. AID PROJECT



SECTION B-B

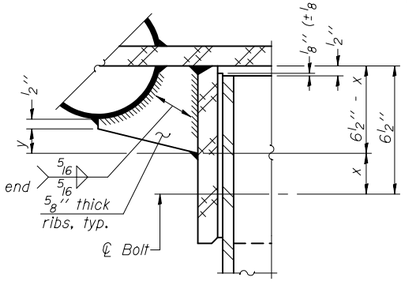
Bolts, washers (including contoured washers), and locknuts shall be stainless steel.

④ Collar I.D. shall be manufactured to correspond to O.D. of actual galvanized post and stainless steel sleeve plus 1/8" (±1/16"). Maximum gap between post and collar at any location equals 1/8" before tightening bolts.



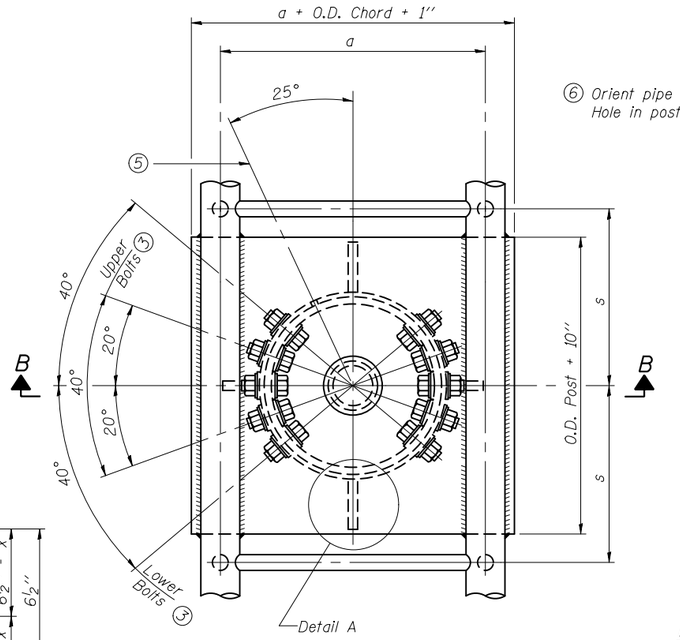
DETAIL A

(Two locations)



DETAIL B

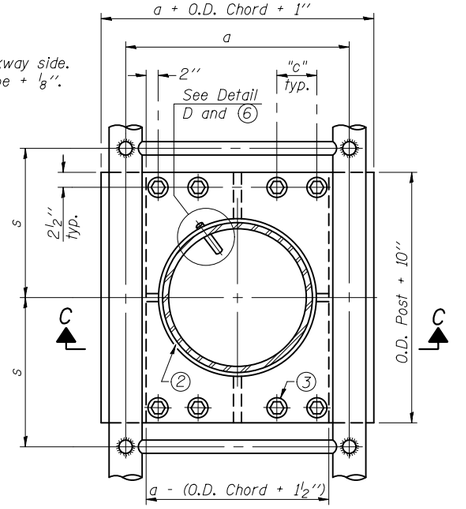
Two locations
(For details not shown, see Detail C)



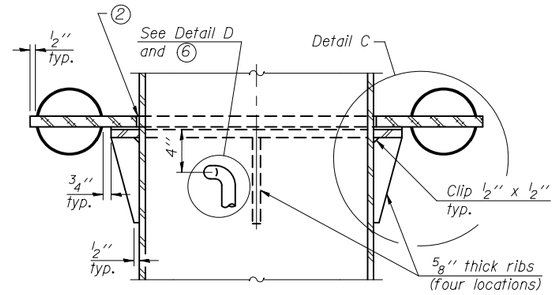
PLAN VIEW - TOP OF COLUMN

⑤ Optional full penetration weld in collar.
(Two locations maximum....(180° apart)....X-ray or UT 100%)

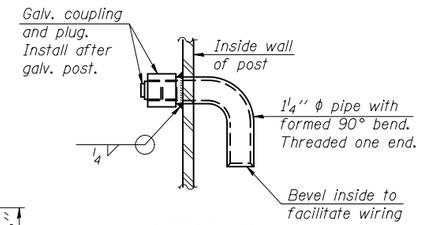
⑥ Orient pipe toward walkway side. Hole in post = O.D. pipe + 1/8".



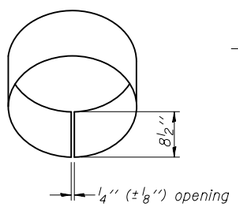
SECTION THRU POST ABOVE LOWER CHORDS



SECTION C-C

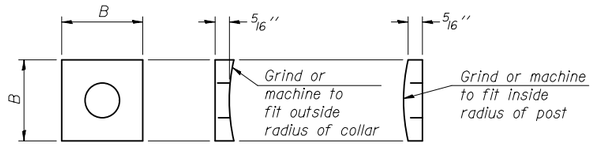


DETAIL D



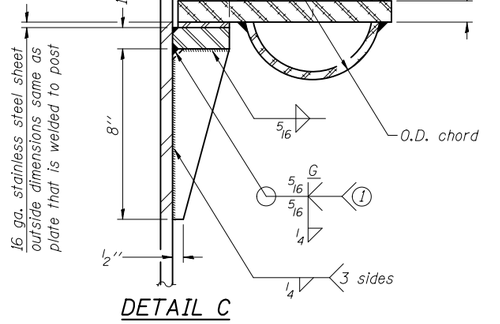
DETAIL OF STAINLESS STEEL SLEEVE

Weld to post after galvanizing.
(Prepare post surface to insure tight, uniform fit and allow welding.)
Welds to be 1 1/2" long at 6" cts. along top edge and at 1/4" opening.



CONTOURED WASHERS

Bolt Size	Contoured Washers	
	Hole Dia.	B
7/8"	1"	2 1/2"



DETAIL C

Truss Type	Post Size	Upper & Lower Connection Bolt Diameter (3)	Lower Juncture Bolt Spacing Dimension "c" (3)	Opening in Cap Plate "HH"	Collar Thickness (t)	Side Ribs	
						x	y
I-F-A	16" ϕ (83#/')	7/8"	3 1/4"	8"	5/8"	1 3/4"	2 1/4"

③ Upper and lower 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.

① Grind top if required to fully seat aluminum plate and stainless steel sheet.

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.

OSF-A-3-VMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
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STATE OF ILLINOIS
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BUTTERFLY SIGN STRUCTURES – JUNCTURE DETAILS FOR FRONT ACCESS VMS – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

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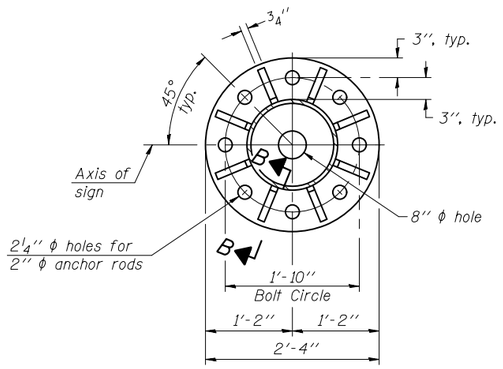
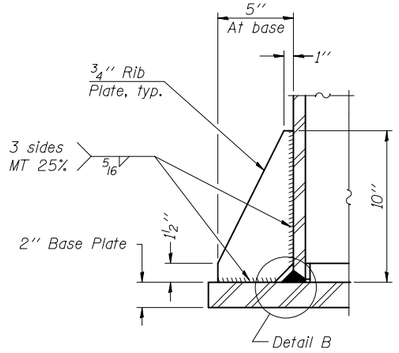
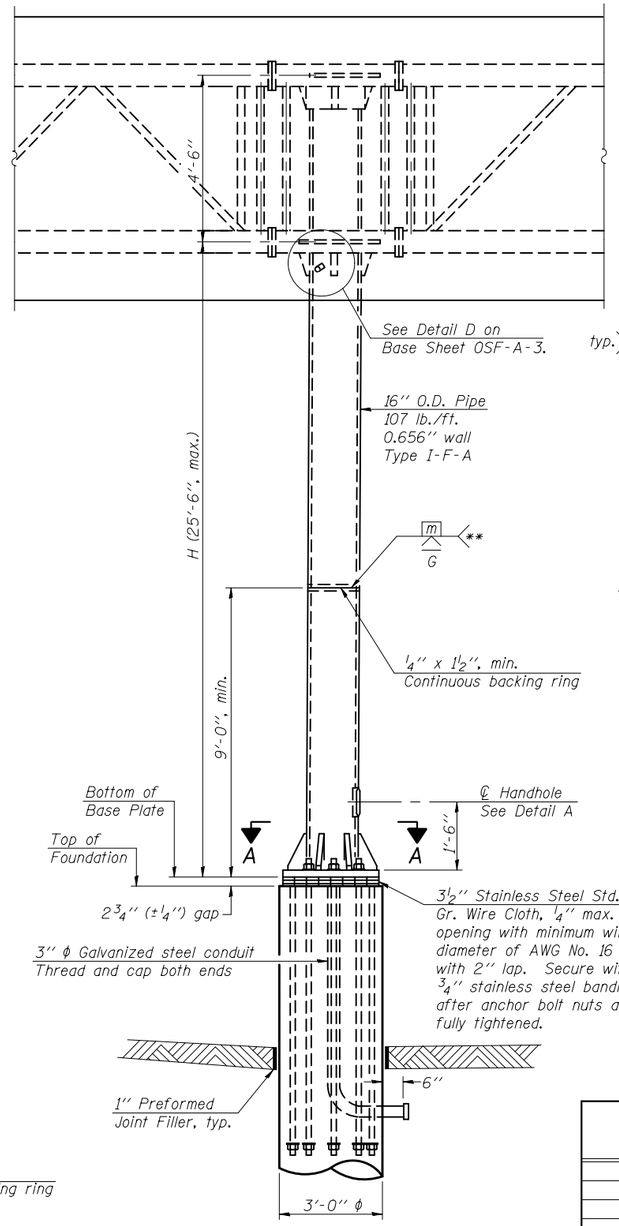


SECTION A-A

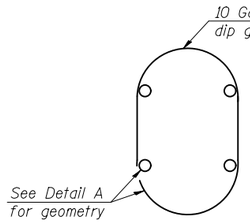


SECTION B-B

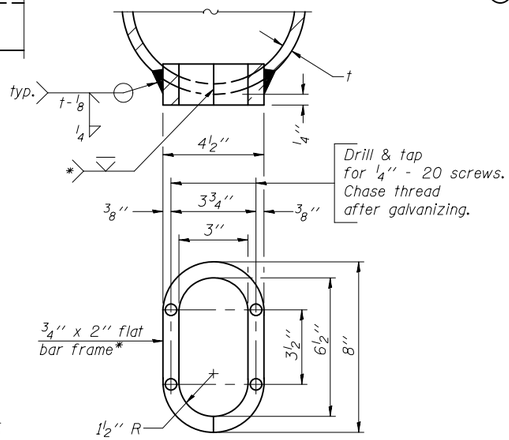


FRONT ELEVATION

For Foundation Details see Base Sheet OSF-A-9.



HANDHOLE COVER



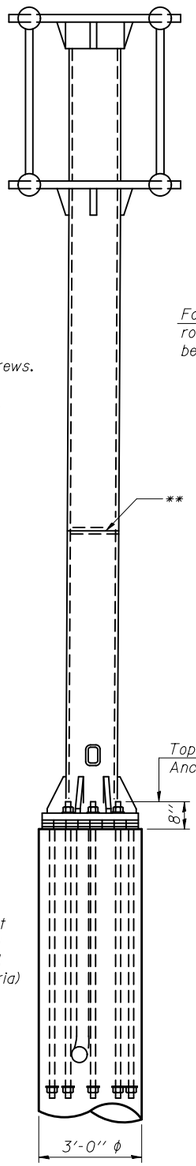
Provide 8" x 4 1/2" cover. Outside corners = 2 1/4" radius. Provide 4-5/16" ϕ holes in for 1/4" - 20 round head hot dip galvanized or stainless steel machine screws. (See cover details.)

DETAIL A

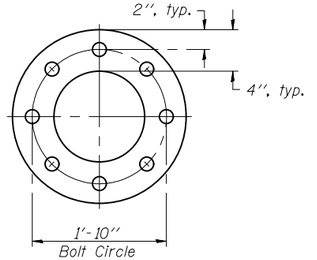
* Bent bars may be butt welded top and bottom or bottom only. In lieu of fabricated handhole frame as shown, may cut from 2" plate (rolling direction vertical). All cut faces to be ground to ANSI Roughness of 500 μin or less.

** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

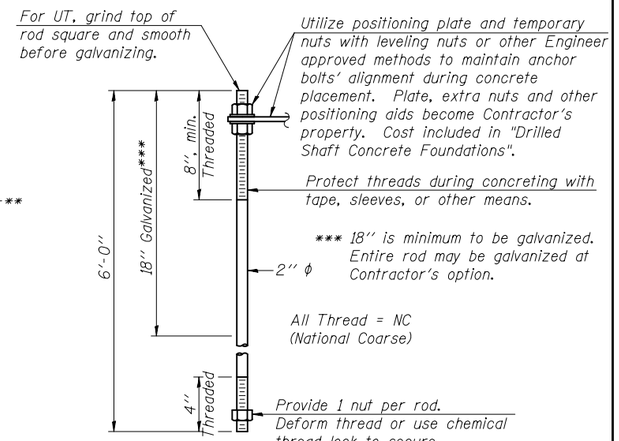
Structure Number	Station	H



SIDE ELEVATION

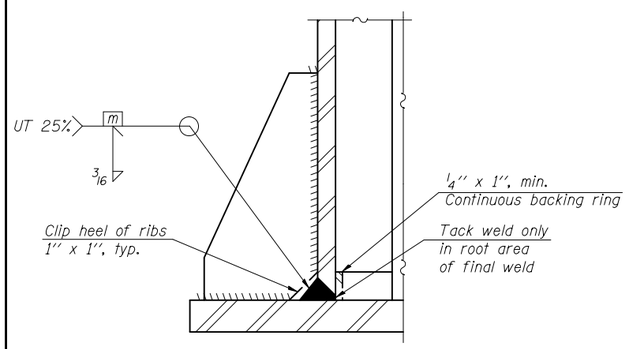


SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.



DETAIL B

(Typical rib)

OSF-A-4-VMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – TYPE I-F-A SUPPORT POST FOR FRONT ACCESS VMS – ALUMINUM TRUSS & STEEL POST

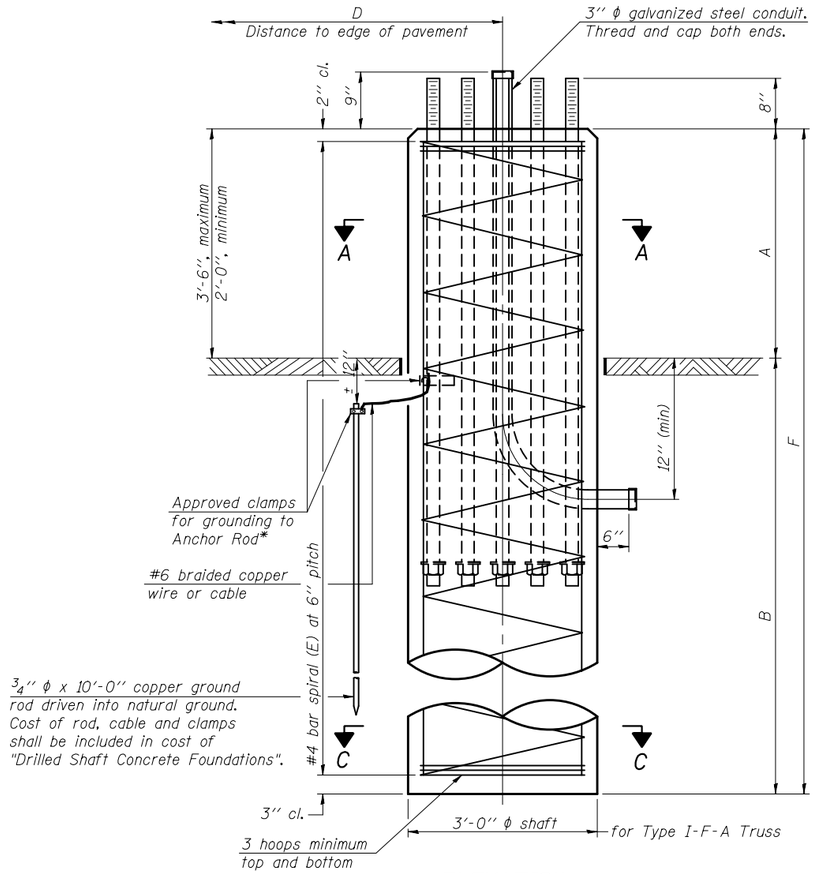
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

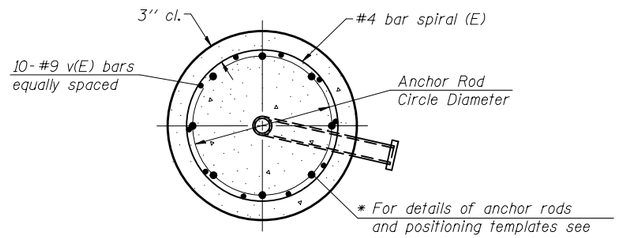
CONTRACT NO.

ILLINOIS FED. AID PROJECT

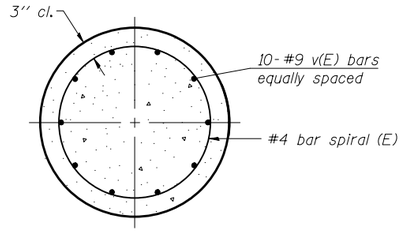
* Grind anchor rod to bright finish at ground clamp location before installing clamp.



ELEVATION



SECTION A-A
3'-0'' ϕ shaft



SECTION C-C
3'-0'' ϕ shaft

NOTES:

The foundation dimensions shown in the Foundation Design Table are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, 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 in the Foundation Data Table will be the result of 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in "Drilled Shaft Concrete Foundation".

FOUNDATION DATA TABLE

Structure Number	Station	Truss Type	Shaft Diameter	Elevation Top	Elevation Bottom	A	B	F	Class DS Concrete Cubic Yards

FOUNDATION DESIGN TABLE

Truss Type	Post Base Sheet	Maximum CantileverLength (ft)	Maximum Total Sign Area (sq ft)	Shaft Diameter (in)	"B" Depth (ft)	Anchor Rods		Anchor Rod Circle Diameter (in)
						No.	Diameter (in)	
I-F-A	OSF-A-4	10	200	3.0	17'-6''	8	2	22

OSF-A-9-VMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES – DRILLED SHAFT FOR FRONT ACCESS VMS – ALUMINUM TRUSS & STEEL POST

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT

Aesthetic Sign Structures

2.8 Steel Span Sign Structures

Use galvanized steel trusses only for projects with aesthetic mandates requiring span sign structures painted a specific color. To determine acceptable color alternatives and allow time for testing and pre-approval, consult the Bureau of Materials and Physical Research (BMPR) early in the planning process.

The current designs of span sign structures with galvanized steel trusses originated for the Peoria area Interstate 74 project, which had an aesthetic mandate requiring structures painted black. To avoid potential problems with painting aluminum, the BBS designed galvanized steel trusses and the BMPR developed a “Painting Galvanized Steel Structures” special provision. A paint system of epoxy over-coated with urethane was already in use for bridges and compatible with application over pre-treated galvanized steel. In addition to the benefit of satisfying aesthetic mandates, the duplex system of paint over galvanizing may significantly extend the life of the structures’ corrosion protection.

Span sign structures are the least economical sign structure type. The plan preparer should consider all MUTCD governing factors and alternatives before selecting spans. Use the following procedures when preparing plans:

1. Determine the 15-digit sign structure number, station, location of the sign over the roadway, distance from right foundation to edge of pavement (D), design span length (center to center support frames), proposed height of sign(s) (D_S), total sign area and Elevation A for point of minimum clearance to sign structure (sign, sign bracket, walkway support, or truss).

2. With the design span length and total sign area, select type of truss and truss member sizes from the following table. Design of each structure listed in the table accounts for the maximum span length, total sign area and maximum end support height. Always choose the next largest structure design that will

meet all three parameters. For example, a project requires a 70 ft. span with 560 sq. ft. total sign area and 28 ft. maximum end support height. Because the total sign area is greater than the 550 square feet maximum for the 70 ft. span listed in the table, choose a 70 ft. span, Type I-S structure using the members and foundation dimensions for the 80 ft. span, Type I-S. In addition, since total sign area is already significant, consider using the 90-foot Type I-S or the 90-foot Type II-S design for more future additional sign capacity. Before making a final structure selection, complete Step 3 for end support height.

STEEL SPAN SIGN STRUCTURE DESIGNS

MAX. SPAN LENGTH (FT)	MAX. SIGN AREA (SQ FT)	CHORD STEEL PIPE SIZE (IN)	*WEB MEMBERS STEEL PIPE SIZE (IN)	END SUPPORT STEEL PIPE SIZE X WALL (IN)	MAX. END SUPPORT HEIGHT(H) (FT)	SPREAD FOOTING DIM. "M" (FT)	DRILLED SHAFT DIM. "B" (FT)
TYPE I-S (4'-0" X 4'-6")							
70	550	4 X 0.237(Std)	2 X 0.154(Std)	8 X 0.322(Std)	28.0	18.5	13.5
80	570	5 X 0.258(Std)	2 1/2 X 0.203(Std)	8 X 0.322(Std)	28.0	19.5	14.5
90	610	5 X 0.258(Std)	2 1/2 X 0.203(Std)	10 X 0.279	31.0	21.5	16.5
100	610	5 X 0.258(Std)	2 1/2 X 0.203(Std)	10 X 0.279	31.0	21.5	16.5
TYPE II-S (4'-6" X 5'-3")							
90	740	5 X 0.258(Std)	2 1/2 X 0.203(Std)	10 X 0.365 (Std)	31.0	22.5	17.5
100	740	5 X 0.258(Std)	2 1/2 X 0.203(Std)	10 X 0.365 (Std)	31.0	22.5	17.5
110	740	6 X 0.280(Std)	2 1/2 X 0.203(Std)	10 X 0.365 (Std)	31.0	24.5	20.5
120	740	6 X 0.280(Std)	2 1/2 X 0.203(Std)	10 X 0.365 (Std)	31.0	24.5	20.5
130	740	6 X 0.344	2 1/2 X 0.203(Std)	10 X 0.365 (Std)	31.0	25.0	21.0
TYPE III-S (5'-0" X 7'-0")							
120	900	6 X 0.28(Std)	2 1/2 X 0.203(Std)	12 X 0.33	34.0	---	18.0
130	975	8 X 0.322(Std)	3 X 0.216(Std)	12 X 0.33	34.0	---	19.0
140	1050	8 X 0.322(Std)	3 X 0.216(Std)	12 X 0.375 (Std)	34.0	---	22.0
150	1125	8 X 0.375	3 X 0.216(Std)	12 X 0.5 (XS)	36.0	---	25.0
160	1200	8 X 0.406	3 X 0.216(Std)	12 X 0.5 (XS)	36.0	---	27.0

* (Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals)

Note: For installations using large, heavyweight dynamic message sign cabinets, use Type III-S structures only. The cell library includes special walkway details for interior cabinet access.

3. Determine height dimensions H and A and final pipe size for each support frame using the following criteria:

   (a) Minimum vertical clearance is 17 feet 3 inches from Elevation A to sign, walkway support, or truss.

   (b) Top of foundation above grade elevation is a minimum of 2 feet and a maximum of 4 feet 6 inches for spread footings and a minimum of 2 feet and a maximum of 3 feet 6 inches for dual drilled shafts, as shown on the plans.

   (c) Use a minimum sign height of 15'-0" to calculate the end support heights. To calculate H for a span structure with walkway brackets: To Elevation A, add 17' 3", plus 1' 3" (8" for DMS), plus 7'-6" or half the height of the tallest sign (whichever is greater), plus half the truss height, plus 7 ½", minus top of foundation elevation, minus 2".

   (d) If the height dimension H exceeds the maximum end support height allowed for the selected truss design, choose a truss design with the appropriate maximum end support height. For example, if the 70 ft. span with 560 sq. ft. total sign area requires a 30 ft. maximum end support height, choose a 70 ft. span Type I-S structure using the members and foundation dimensions designed for the 90 ft. span Type I-S structure, which allows up to a 31 ft. end support height.

   There may be situations where tall signs are required and the end support is taller than the maximum height allowed for Type I-S and II-S

structures. For these cases, make the following adjustments to the column wall thickness:

If a Type I-S structure requires an end support height greater than 31 feet and up to 35 feet, use a pipe 10-inch diameter by 0.365-inch wall thickness for the end supports. For a Type II-S structure requiring a height greater than 31 feet and up to 35 feet, use a pipe 10-inch diameter by 0.500-inch wall thickness.

4. With the truss type and chord size, select splicing flange details from the following charts:

Type I-S Truss	Use chart on page 2.8-9
Type II-S Truss	Use chart on page 2.8-11
Type III-S Truss	Use chart on page 2.8-13

Note: When completing the table on base sheet OS4-S-2 under “Splicing Flange” “Bolts” “No. /Splice”, enter 6 or 8.

5. Using the proposed span length, select camber at mid-span of truss from the following charts:

Type I-S Truss	Use chart on page 2.8-10
Type II-S Truss	Use chart on page 2.8-12
Type III-S Truss	Use chart on page 2.8-14

For shorter spans, not included on the camber graphs:
Minimum AASHTO Camber = L (in.)/1000.

6. Determine the number of exterior and interior truss units required. Use the minimum number of units for each truss, keeping the maximum unit length

at approximately 40 feet or less. For example, use only two exterior units for a design length (L) of 80 feet, even though one or both may be slightly greater than 40 feet. Calculate exterior unit panel spacing (P) by dividing the Unit Length (L_e) minus 22.5 inches (± 1 inch), by the number of panels. Calculate interior unit panel spacing (P) by dividing the Unit Length (L_i) minus 15 inches, by number of panels. The minimum panel spacing for all truss types is 4 feet. Maximum panel spacing is 5.0 feet for Type I-S trusses and 5 feet 6 inches for Type II-S and III-S trusses.

To maintain the pattern of the vertical diagonals, single interior units must have an even number of panels per unit while exterior units may have an odd or even number of panels. When two interior units are used, each interior unit may have an odd or even number of panels, resulting in an even number for all interior units combined. For ease of fabrication and the most economical design, all panels on a truss should be the same length. The aluminum truss tables on pages 2.1-15, 2.1-16 and 2.1-17 provide recommended dimensions for one-foot increment span lengths. Use the dimensions in the Type II tables for Type III structures less than 100 feet.

7. Obtain soil-boring data and determine the average Q_u per Section 1.6 at the bottom of the spread footing or for all strata within and below the "B" portion of the dual drilled shaft foundation. If average and minimum Q_u values meet the requirements of Section 1.6, use dimension "M" for the spread footing or the depth "B" for dual drilled shaft foundations from the selected sign structure design in the table on page 2.8-2. Dimension "N" may be determined from the spread footing foundation standards OS-F1, OS-F2, OS-F3 or OS-F4 and the soil boring data. As described in Section 1.6, if average and minimum Q_u values do not meet the requirements, the BBS must provide a special design.

8. With the information from Steps 3(b) and 7, and/or information obtained from the BBS, determine the spread footing or drilled shaft vertical limits (Elevation Top, Elevation Bottom), dimensions “M” and “N” for a spread footing foundation or dimensions “A”, “B”, and “F” for a dual drilled shaft foundation. The traffic barrier shaped foundations on sheets OS4-MED or OS4-MED2 are required for all new span overhead sign structure end supports located within medians of divided highways.

9. Walkway and/or truss grating have two alternate sets of plans: 1-1/2 inch deep galvanized steel and galvanized steel plank grating. The plan preparer should consult District personnel for grating preference and select the correct sheets. Walkway grating should cover the full width of all signs and extend a minimum of 4 feet past the edge of pavement into the shoulder unless the shoulder width is less than 10 feet. If shoulder width is less than 10 feet or if the structure is on a low speed ramp, the walkway grating may begin at edge of pavement, while still covering the full width of all signs. Truss inspection grating extends full length of the truss, unless specifically exempted by the District and BBS. For projects that omit front walkway and lighting, details provide the option of plain vertical sign supports in lieu of the L-brackets.

10. For installations using large, heavy weight dynamic message sign cabinets which require walkways for interior access, use span Type III-S structures only and make the following walkway sheet substitutions:

Replace:	With:
OS-S-9 and/or OS-S-9S	OS-S-9-DMS
OS-S-10 and/or OS-S-10S	OS-S-10-DMS
OS-S-11	OS-S-11-DMS

11. If the left and right support heights on a structure are not equal, fill in two rows of the table on the "Support Frame" sheet for that structure, checking the boxes labeled "Left" and "Right" to designate each end support.

12. Include the Damping Device base sheet OS-S-D with all steel span sign structure projects.

13. Fill in all tables on base sheets including sign structure number, station, height of tallest sign, total sign area, support heights and sign bracket and foundation dimensions.

14. Calculate quantities as needed for foundations and complete the Total Bill of Material.

15. If the proposed structure is replacing a Vierendeel span on an existing foundation, contact the BBS for special support frame and foundation designs and details.

16. Submit proposed designs exceeding dimensional and/or loading limits to the BBS for special analysis and/or approval.

17. To provide uniformity for all steel span sign structure plans, place the sheets in the following order:

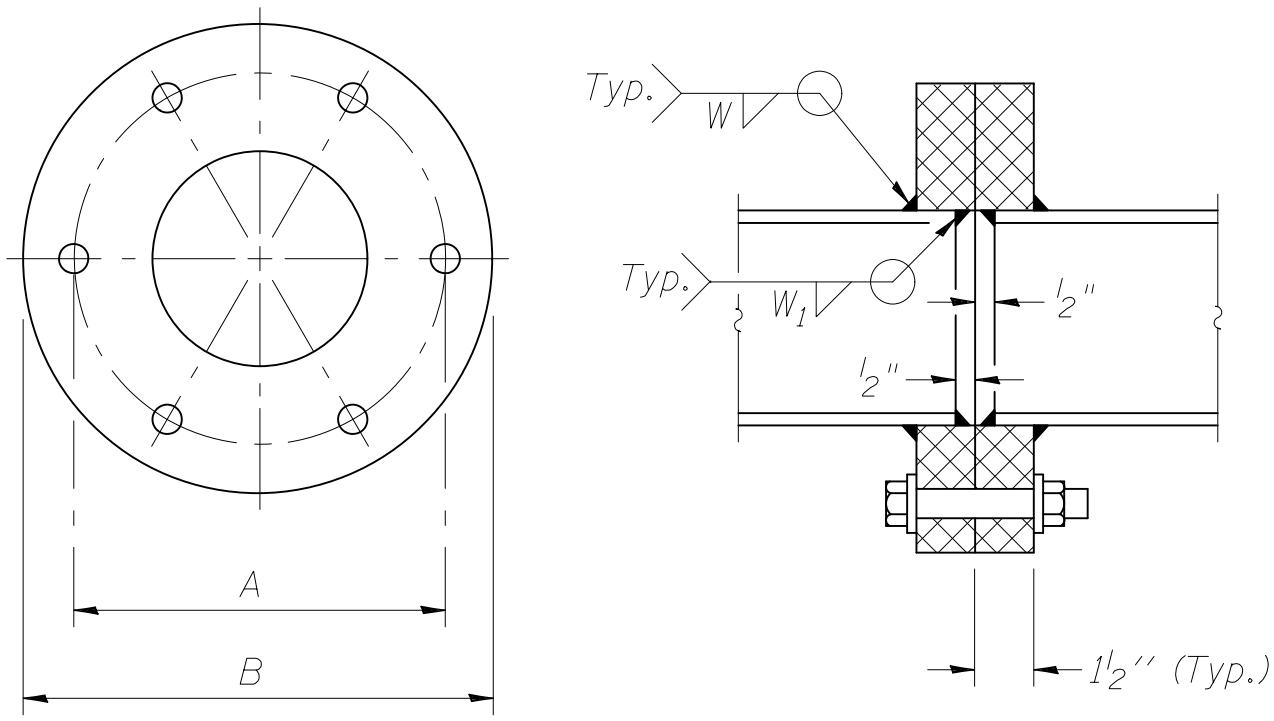
    General Plan and Elevation (OS-S-1)
    Steel Truss Details (OS-S-2 followed by OS4-S-2)
    Damping Device (OS-S-D)
    Support Frame for applicable Steel truss types
    Support Frame Details for applicable Steel truss types
    (i.e., OS-S-3 followed by OS-S-3A, OS-S-4 followed by OS-S-4A, etc.)
    Steel Walkway Details (OS-S-9)
    Alternate Walkway Details (OS-S-9S) (optional)

Steel Walkway Details (OS-S-10)

Alternate Walkway Details (OS-S-10S) (optional)

Steel Handrail Details (OS-S-11)

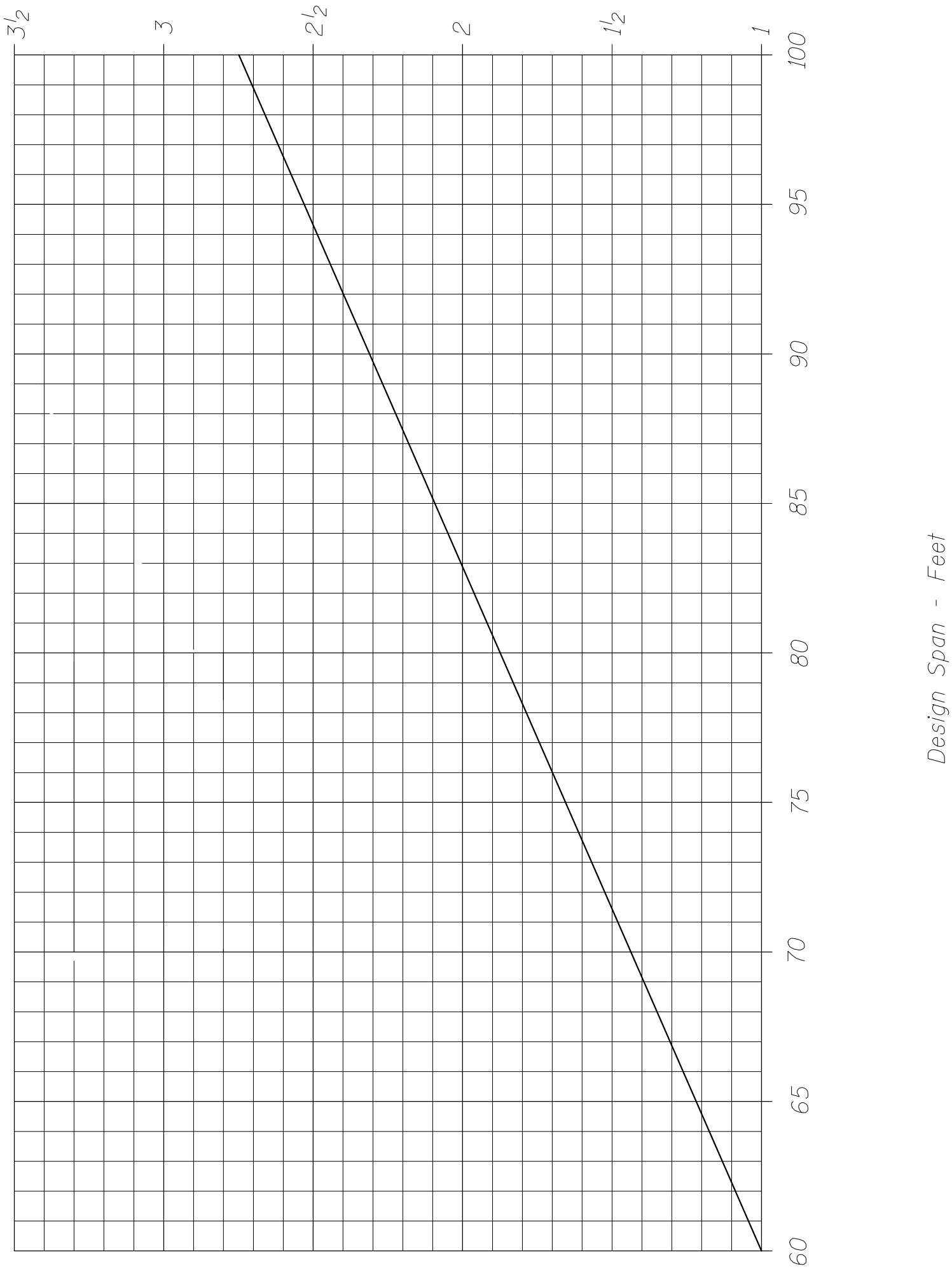
Include Foundation Details required for truss types and support frame sizes, using the same foundation sheets used for aluminum trusses, with a choice between dual drilled shafts or spread footings.



6-BOLT SPLICE

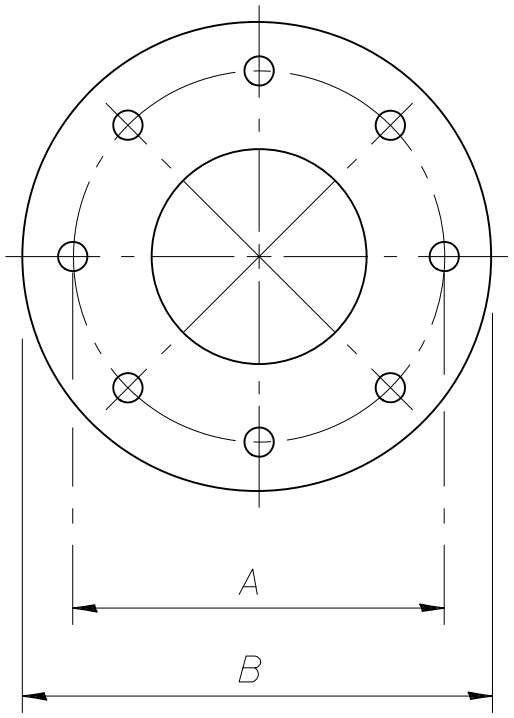
CHORD SIZE	BOLT SIZE	W	W_1	A	B
4'' ϕ Std. Pipe	3/4"	1/4"	3/16"	8 1/4"	11 1/4"
5'' ϕ Std. Pipe	7/8"	3/8"	1/4"	9 1/4"	12 1/4"

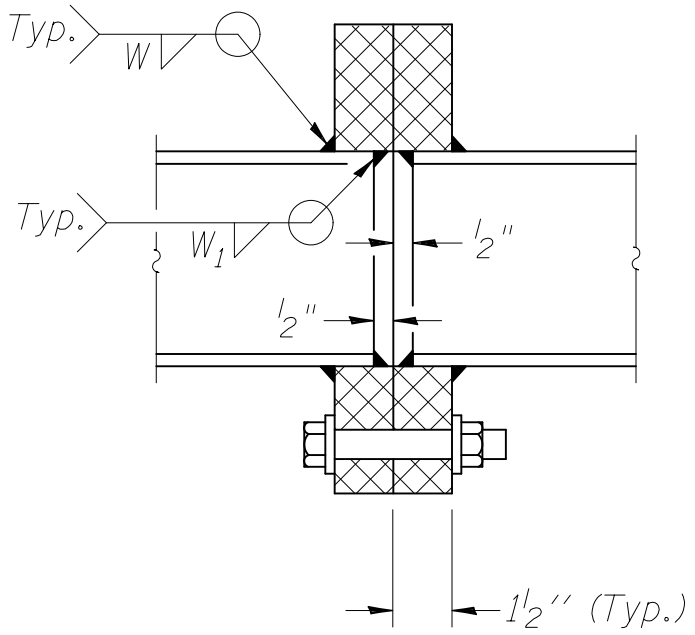
SPLICING PLATE for STEEL TRUSS TYPE I-S (4'-0" x 4'-6")



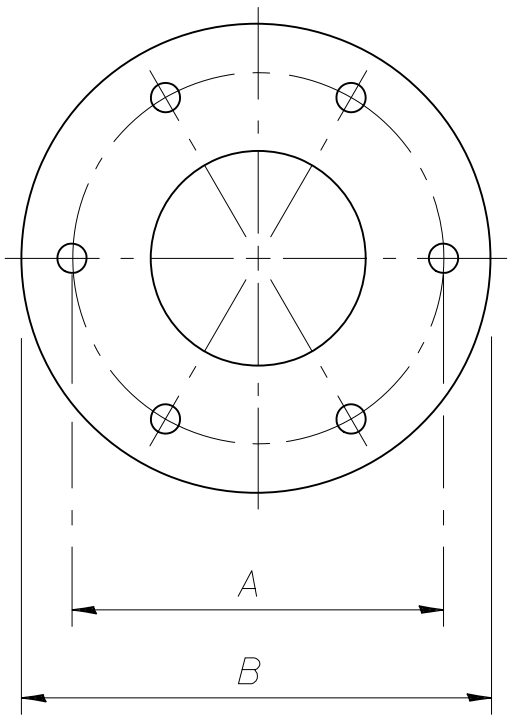
Note: For shorter spans, not included on the graph, minimum AASHTO camber = L/1000

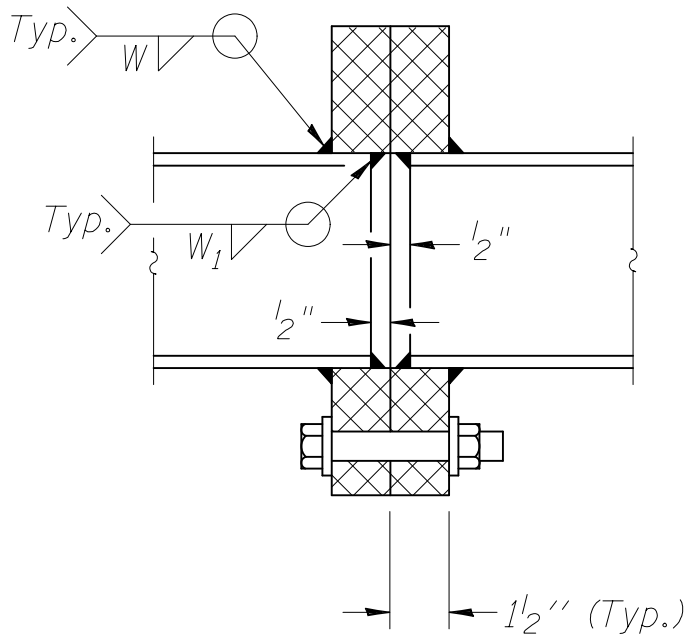
CAMBER for STEEL TRUSS TYPE I-S (4′-0" x 4′-6")





8-BOLT SPLICE

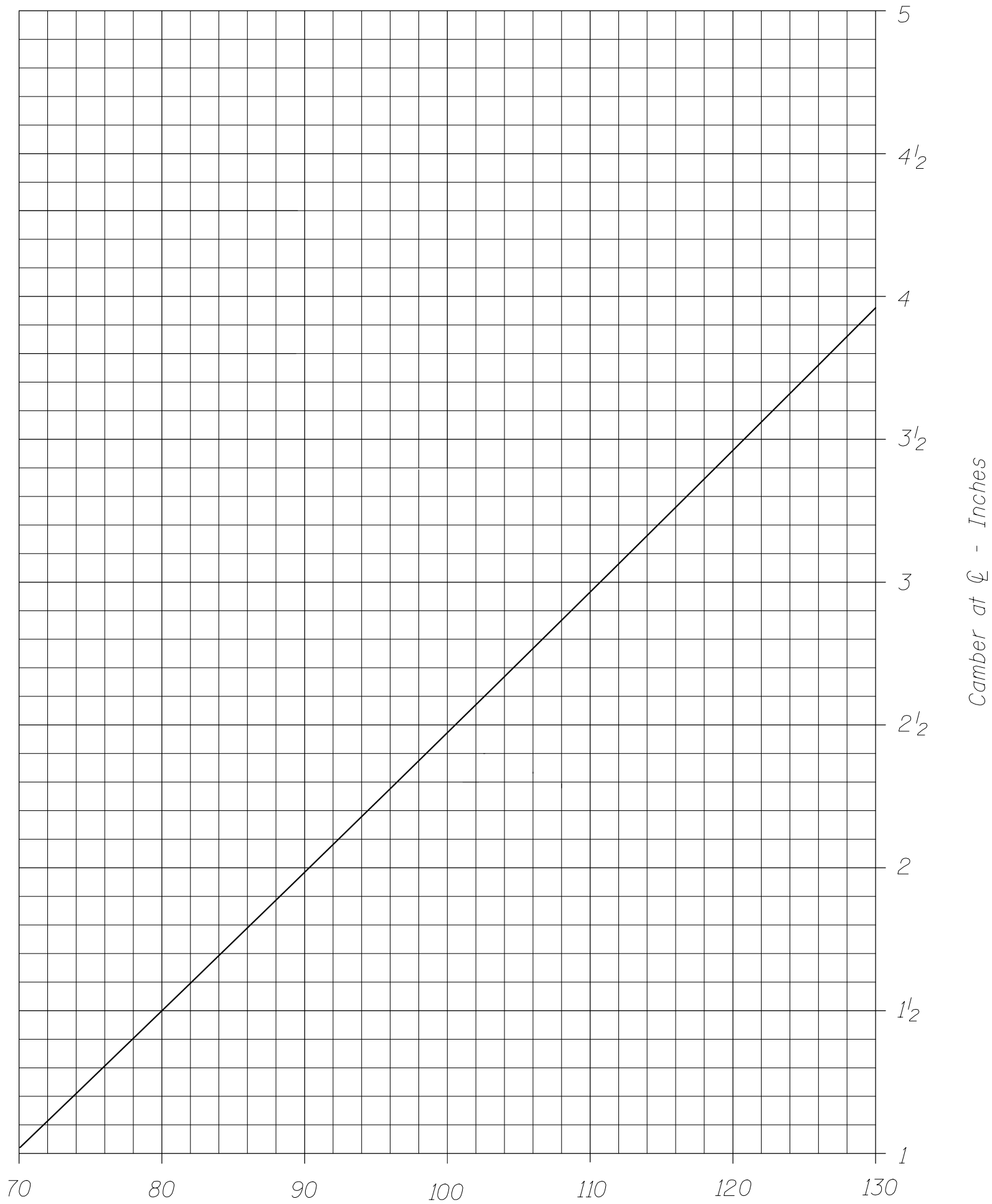




6-BOLT SPLICE

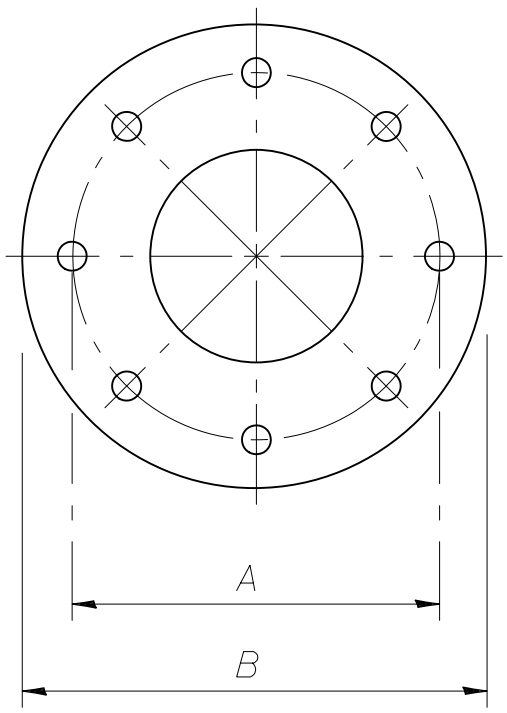
CHORD SIZE	BOLT SIZE	W	W_1	A	B	No. Bolts
5" ϕ Std. Pipe	7/8"	3/8"	1/4"	9 1/4"	12 1/4"	6
6" ϕ Std. Pipe	7/8"	3/8"	1/4"	11 1/2"	15 "	8
6" ϕ x 0.344" Pipe	7/8"	7/16"	5/16"	11 1/2"	15"	8

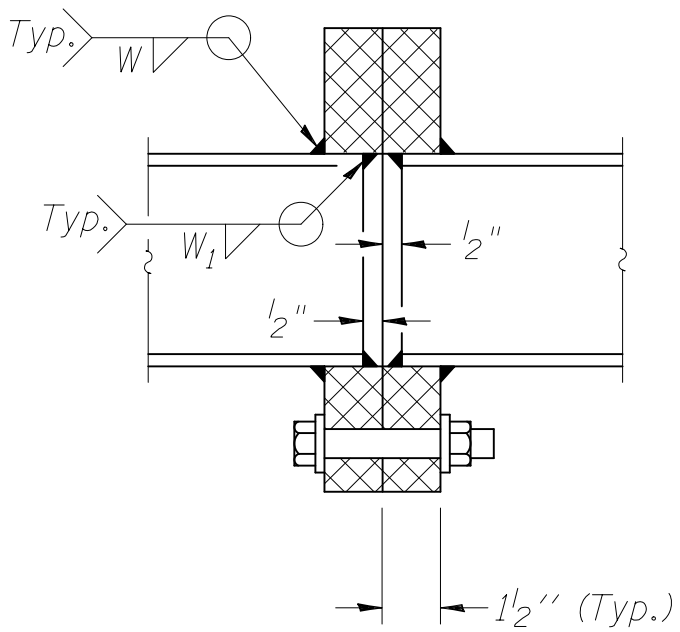
SPLICING PLATE for STEEL TRUSS TYPE II-S (4'-6" x 5'-3")



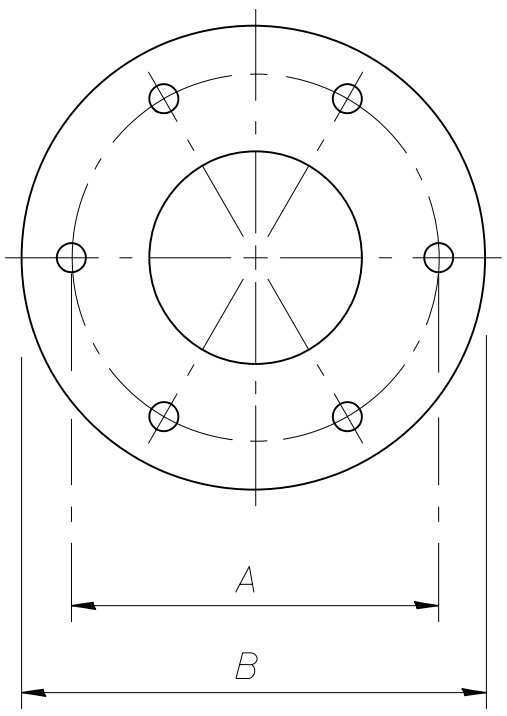
Note: For shorter spans, not included on the graph,
minimum AASHTO camber = L/1000

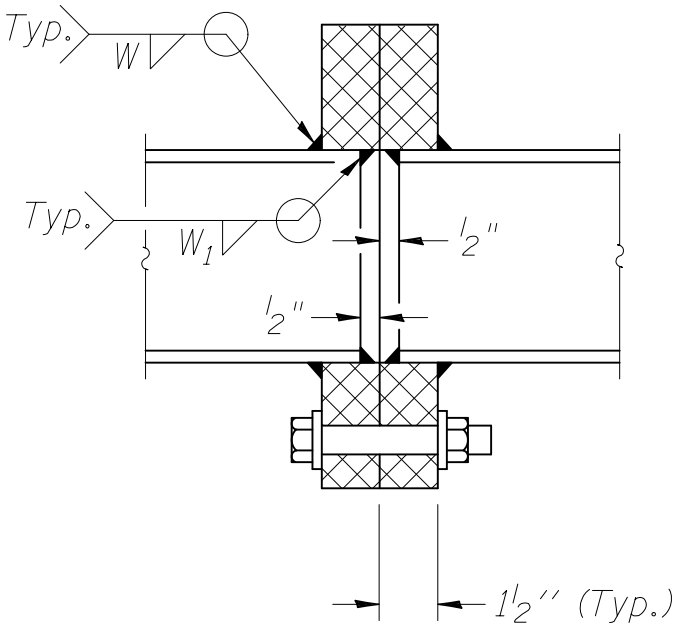
CAMBER for STEEL TRUSS TYPE II-S (4'-6" x 5'-3")





8-BOLT SPLICE

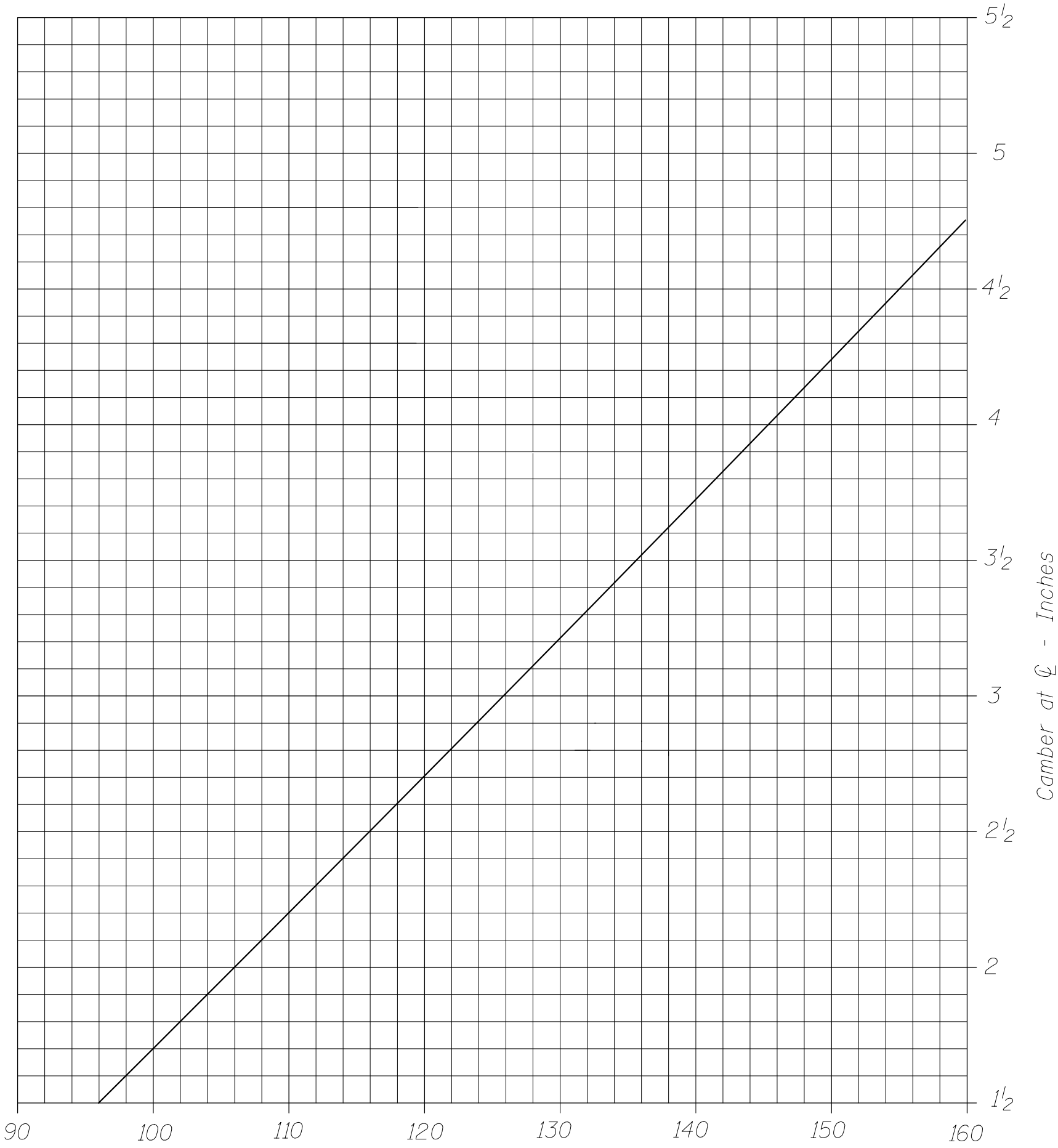




6-BOLT SPLICE

CHORD SIZE	BOLT SIZE	W	W_1	A	B	No. Bolts
6'' ϕ Std. Pipe	1"	7/16"	5/16"	11 1/2"	15"	6
8'' ϕ Std. Pipe	1"	9/16"	7/16"	13 "	16 1/2"	8
8'' ϕ x 0.375''	1"	9/16"	7/16"	13 "	16 1/2"	8
8'' ϕ x 0.406''	1 1/4"	9/16"	7/16"	13"	16 1/2"	8

SPLICING PLATE for STEEL TRUSS TYPE III-S (5'-0" x 7'-0")



Note: For shorter spans, not included on the graph, minimum AASHTO camber = $L/_{1000}$

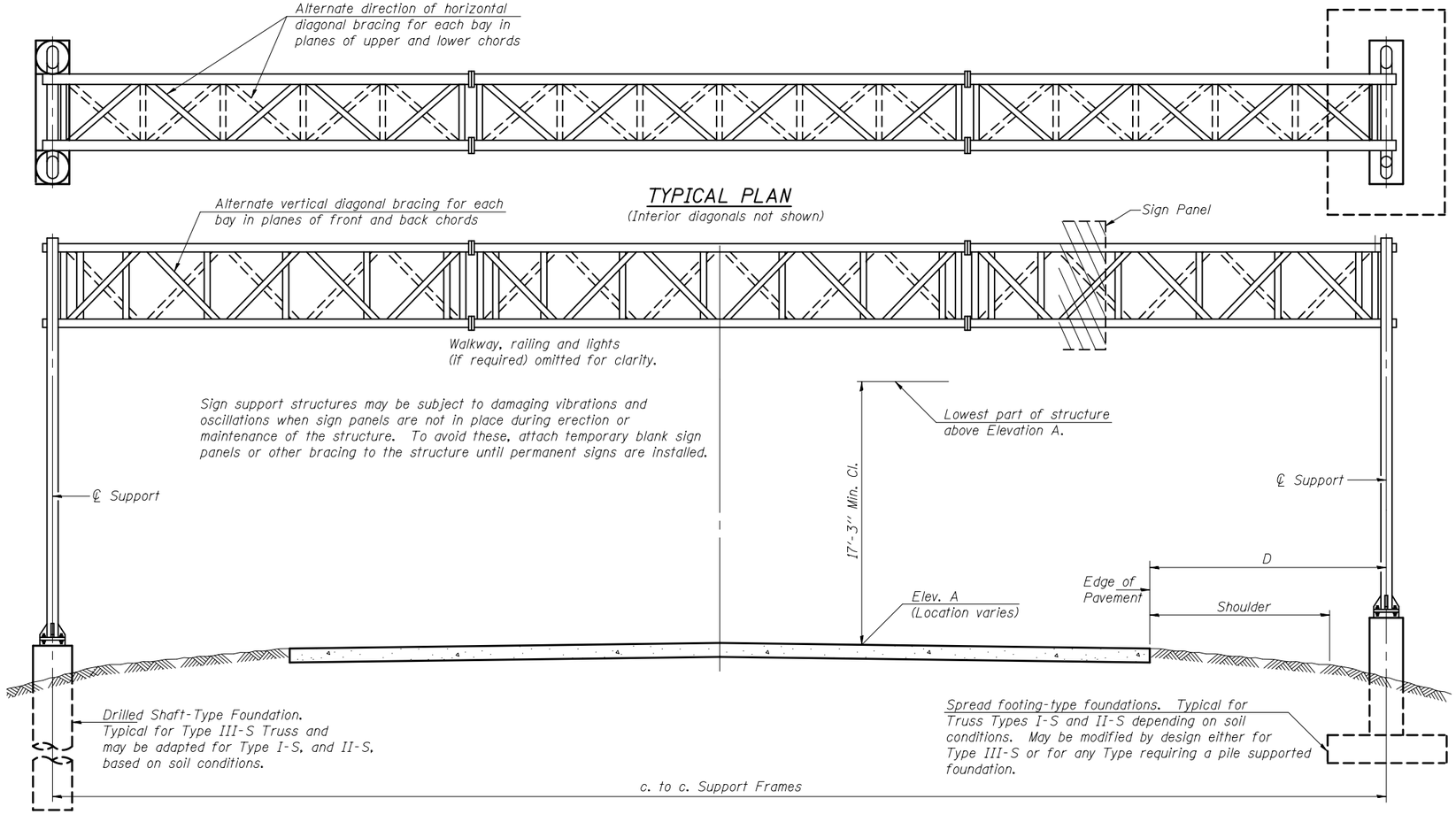
CAMBER for STEEL TRUSS TYPE III-S (5′-0" x 7′-0")

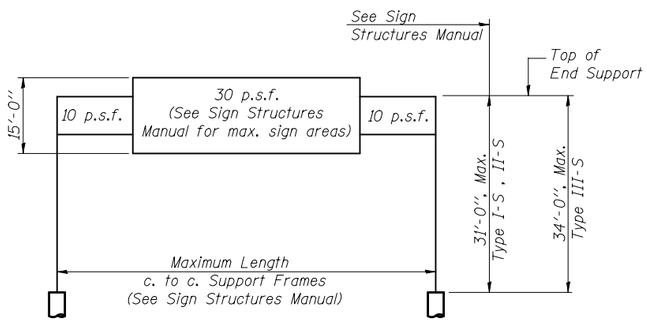
Steel Span Sign Structure Base Sheets
U. S. Standard Units

SHEET	TITLE
OS - S - 1	General Plan, Steel Truss & Steel Supports
OS - S - 2	Steel Truss Details Truss Type I-S, II-S, & III-S
OS4 - S - 2	Steel Truss Details Truss Type I-S, II-S, & III-S
OS - S - D	Damping Device
OS - S - 3	6” Dia. Pipe Support Frame for Type I-S Steel Truss
OS - S - 3A	6” Dia. Pipe Support Frame Details
OS - S - 4	8” Dia. Pipe Support Frame for Steel Truss
OS - S - 4A	8” Dia. Pipe Support Frame Details
OS - S - 6	10” Dia. Pipe Support Frame for Steel Truss
OS - S - 6A	10” Dia. Pipe Support Frame Details
OS4 - S- 8a	12” Dia. Pipe Support Frame for Type III-S Steel Truss
OS4 - S - 8aA	12” Dia. Pipe Support Frame Details
OS - S - 9	Steel Walkway Details
OS - S – 9 - DMS	Alternate Steel Walkway Details For DMS
OS - S - 9S	Alternate Steel Walkway Details
OS - S - 10	Steel Walkway Details
OS - S – 10 - DMS	Alternate Steel Walkway Details For DMS
OS - S - 10S	Alternate Steel Walkway Details
OS - S - 11	Steel Handrail Details
OS - S – 11 - DMS	Alternate Steel Handrail Details For DMS

Foundations – (same sheets used with Aluminum Span Sign Structures):

OS - F1	Foundation Details (6” Dia. Pipe, Spread Footing)
OS - F2	Foundation Details (8” Dia. Pipe, Spread Footing)
OS - F3	Foundation Details (10” Dia. Pipe, Spread Footing)
OS – F4	Foundation Details (12” Dia. Pipe, Spread Footing)
OS4 - F1	Foundation Details (6” Dia. Pipe, Drilled Shaft)
OS4 - F2	Foundation Details (8” Dia. Pipe, Drilled Shaft)
OS4 - F3	Foundation Details (10” Dia. Pipe, Drilled Shaft)
OS4 - F4	Foundation Details (12” Dia. Pipe, Drilled Shaft)
OS4 – MED	Median Support Foundation Details
OS4 – MED2	Median Support Foundation Details





DESIGN WIND LOADING DIAGRAM

Parameters shown are basis for I.D.O.T. Standards and Sign Manual Tables. Installations not within dimensional limits shown require special analysis for all components.

TYPICAL ELEVATION

*(Looking at Face of Signs**)*

Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

Structure Number	Station	Design Truss Type	c. to c. Supports	Elev. A	Dim. D	Height of Tallest Sign	Total Sign Area

**Looking upstation for structures with signs both sides.

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE SPAN TYPE I-S	Foot	
OVERHEAD SIGN STRUCTURE SPAN TYPE II-S	Foot	
OVERHEAD SIGN STRUCTURE SPAN TYPE III-S	Foot	
OVERHEAD SIGN WALKWAY TYPE S	Foot	
CONCRETE FOUNDATIONS	Cu. Yds.	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

ALLOWABLE UNIT STRESSES:
Structural Steel - 20,000 p.s.i.
Reinforcing Steel - 20,000 p.s.i.
Class SI Concrete - 1,400 p.s.i.
Allowable unit stresses due to wind load in combination with other forces, are increased 1.33

MINIMUM CLEARANCE: Vertical Roadway Clearance = 17'-3" (All Obstructions)

WELDING: All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 Structural Welding Code (Steel) and the Standard Specificiations.

MATERIALS: All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.

All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W* (M183, M223 Gr. 50 or M222). Stainless steel for 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.

FASTENERS FOR STEEL TRUSSES: All bolts noted as "high strength" (HS) must satisfy the requirements of AASHTO M164 (ASTM A325), ASTM A449, or an Engineer approved alternate, and must have matching lock nuts and washers. All bolts, u-bolts, eye bolts, lock nuts and washers not specified to be "high strength" must satisfy the requirements of ASTM A307 Gr B. All lock nuts must have nylon or steel inserts. High strength bolt installation shall conform to Article 505.04 (f) (2)d of the Standard Specifications. Rotational capacity ("ROCAP") testing will not be required. All bolts, locknuts and washers must be hot dip galvanized per AASHTO M232.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

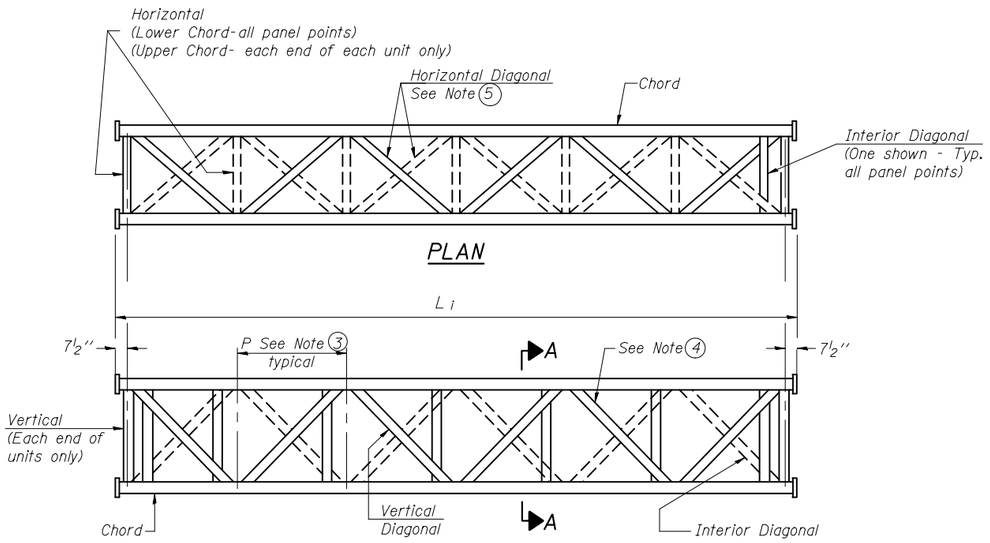
REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for "Concrete Foundations" or "Drilled Shaft Concrete Foundations" shall include: All necessary excavation or drilling (except in rock); backfilling with excavated material; disposal of unsuitable or surplus material; formwork; and furnishing and placing the Concrete, reinforcement bars, conduit, anchor bolts, nuts, washers and ground rods complete in place.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

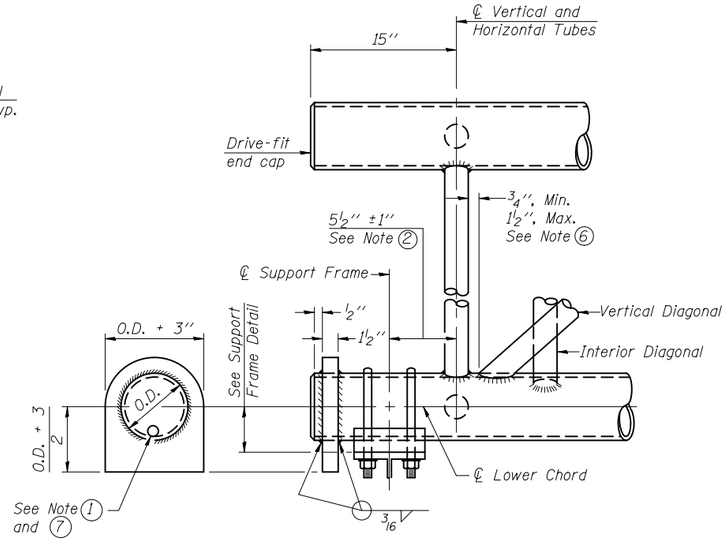
OS-S-1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	OVERHEAD SIGN STRUCTURES – GENERAL PLAN & ELEVATION – STEEL TRUSS & STEEL SUPPORTS	F.A. RTE.	SECTION / COUNTY / TOTAL SHEETS / SHEET NO.
		CHECKED -	REVISED				
	PLOT SCALE =	DRAWN -	REVISED		SHEET NO. OF SHEETS		CONTRACT NO.
	PLOT DATE =	CHECKED -	REVISED				ILLINOIS / FED. AID PROJECT

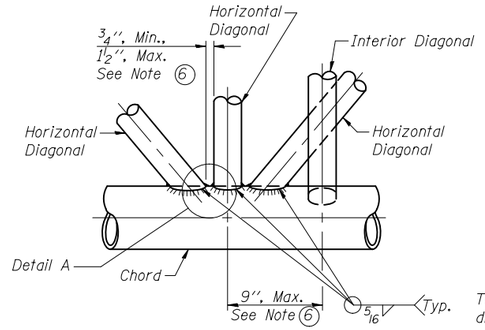


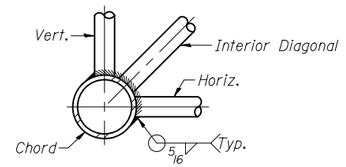
ELEVATION
TYPICAL INTERIOR UNIT

Even number of panels/interior unit required.

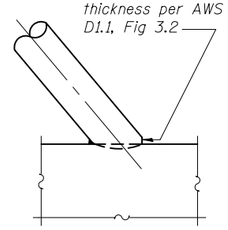


SUPPORT END DETAIL FOR EXTERIOR UNIT

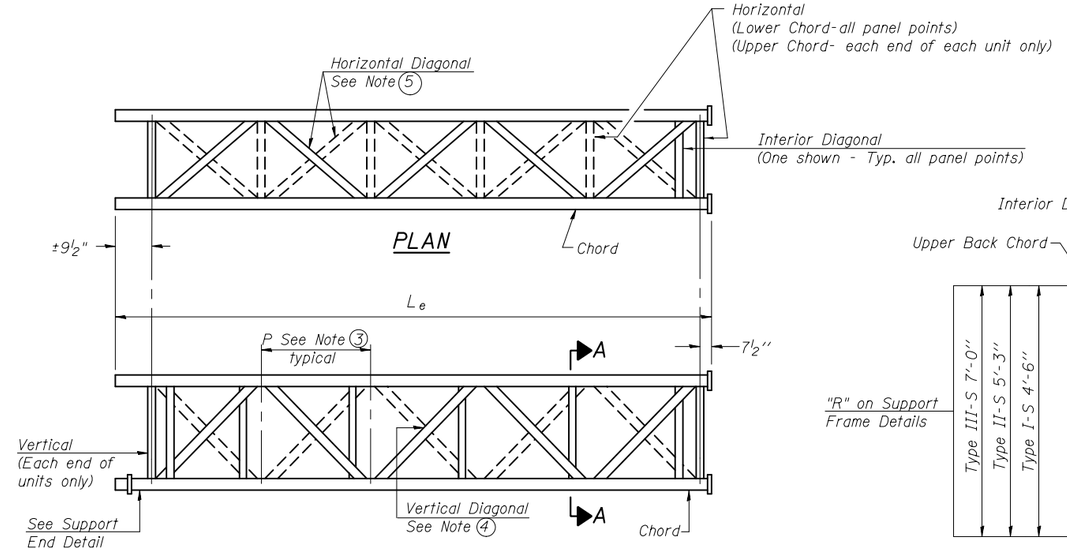




TYPICAL JOINT DETAILS

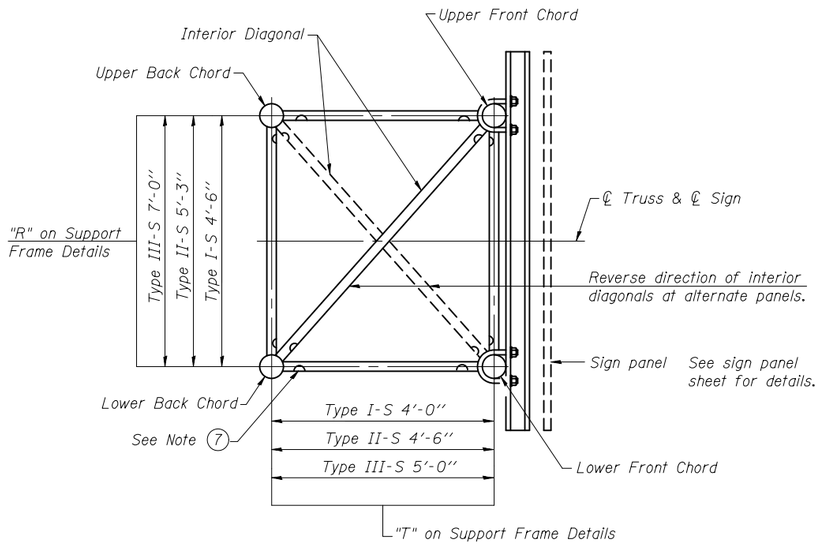


DETAIL A



ELEVATION
TYPICAL EXTERIOR UNIT

Even or odd number of panels/exterior units allowed.



SECTION A-A

(Vertical and horizontal diagonals not shown)

NOTES

(1) Contractor must use standard drive-fit cap to close end. ½" ϕ drain hole in drive-fit cap installed after galvanizing. (Typ. at non-splice ends of chords)

(2) 5½" end dimension may vary by ±1" to provide uniform panel spacing (P).

(3) Panel spacing (P) shall be uniform for entire truss and between 4'-0" and 5'-0" for Type I-S or 4'-0" and 5'-6" for Types II-S and III-S.

(4) Vertical Diagonals in front and back face shall alternate inclination.

(5) Hidden lines show wind bracing alternates direction between planes of top and bottom chords.

(6) All diagonals shall be offset from the panel point based on the following: offset shall provide a ¾" minimum to 1½" maximum clearance between diagonal and any other diagonal, horizontal or vertical member, and to provide clearance for U-bolt connections of signs or walkway brackets.

(7) Galvanizing vent holes of adequate size shall be provided on underside at each end of truss members except chords. Alternately, holes may be provided in wall of chords. All vent holes shall be drilled and de-burred, typ.

OS-S-2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – STEEL TRUSS DETAILS FOR TRUSS TYPES I-S, II-S AND III-S

SHEET NO. OF SHEETS

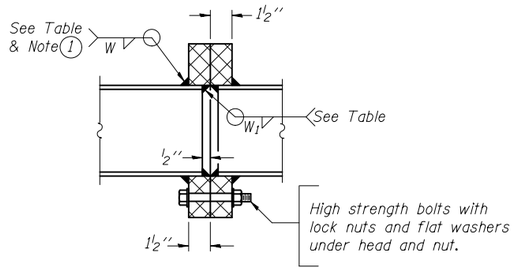
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT

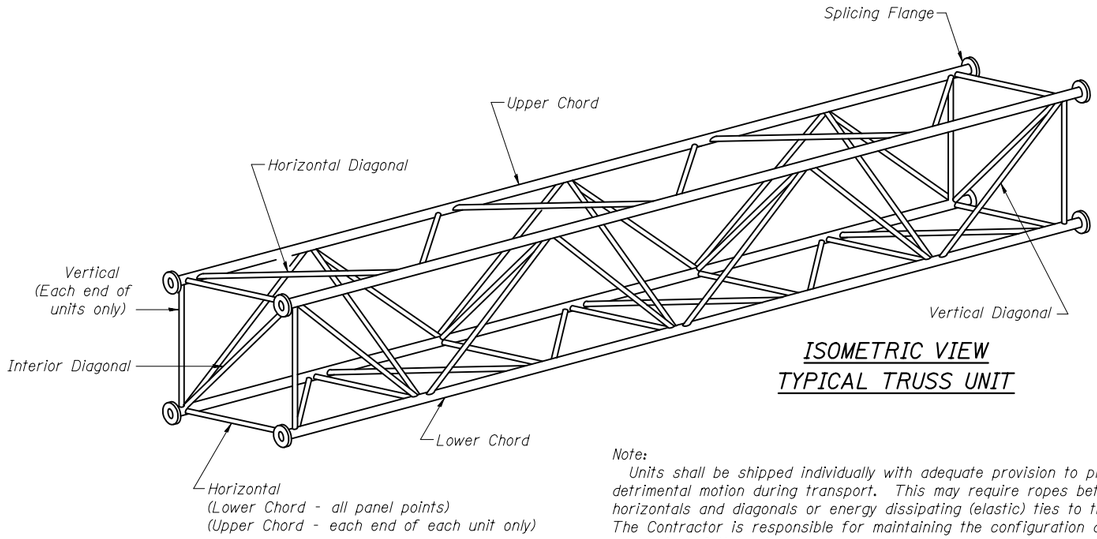
TRUSS UNIT TABLE

Structure Number	Station	Design Truss Type	Exterior Units (2)			Interior Unit				Upper & Lower Chord		Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals		Camber at Midspan	Splicing Flange					
			No. Panels per Unit	Unit Lgth.(Le)	Panel Lgth.(P)	No. Req'd.	No. Panels per Unit	Unit Lgth.(Li)	Panel Lgth.(P)	O.D.	Wall	O.D.	Wall		H.S. Bolts		Weld Sizes		A	B
															No./Splice	Dia.	W	W_1		



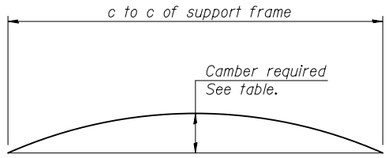
SECTION B-D

(1) Splicing Flanges shall be attached to each truss unit with the truss shop assembled to camber shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external welds or tacks shall be made to secure flanges until remaining welds are made after disassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.



ISOMETRIC VIEW TYPICAL TRUSS UNIT

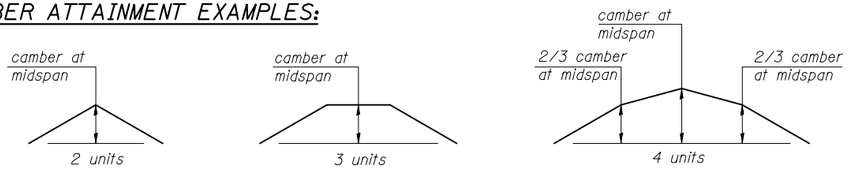
Note:
Units shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The Contractor is responsible for maintaining the configuration and protection of the units.



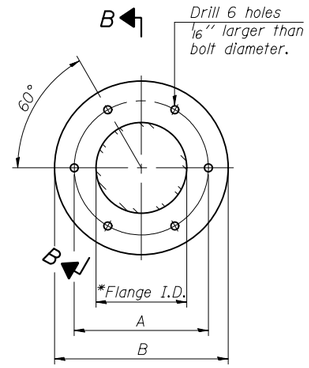
CAMBER DIAGRAM

Camber curve shown is theoretical. Actual camber attained by slope changes at splices between units.

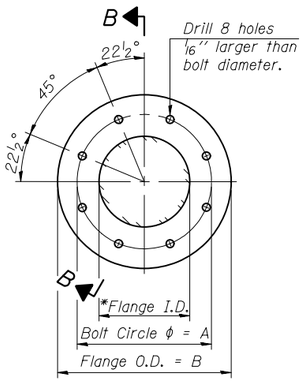
CAMBER ATTAINMENT EXAMPLES:



Camber shown is for fabrication only, measured with truss fully supported. (No-load condition)



TRUSS TYPES I-S, II-S, & III-S



TRUSS TYPES II-S & III-S

SPLICING FLANGES

*To fit O.D. of Chord with maximum gap of 1/16''.

OS4-S-2 6-1-12

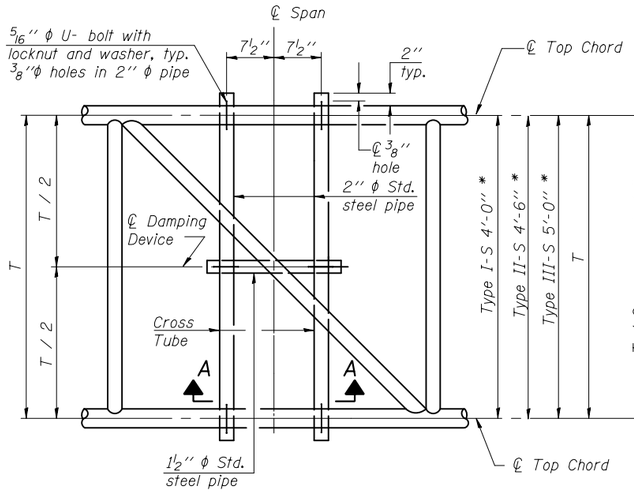
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – STEEL TRUSS DETAILS FOR TRUSS TYPES I–S, II–S AND III–S

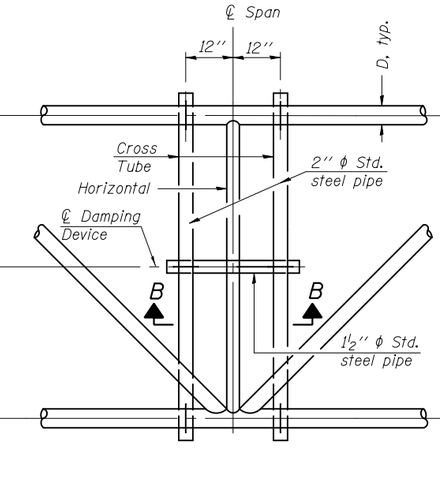
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



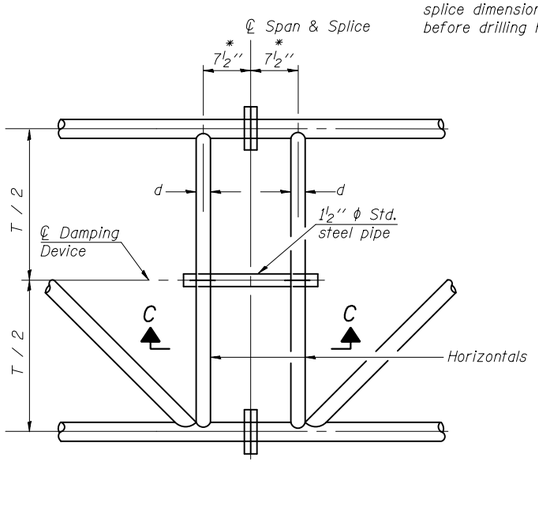
PLAN DETAIL "A"

℄ Span between panel points



PLAN DETAIL "B"

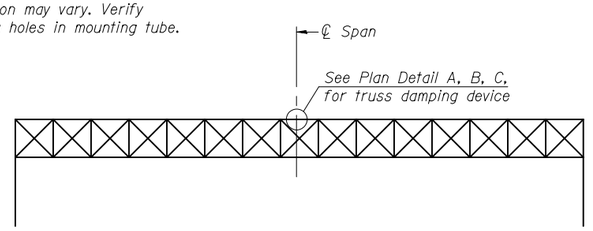
℄ Span at panel point



PLAN DETAIL "C"

℄ Span at ℄ chord splice

Center of horizontal to center of splice dimension may vary. Verify before drilling holes in mounting tube.

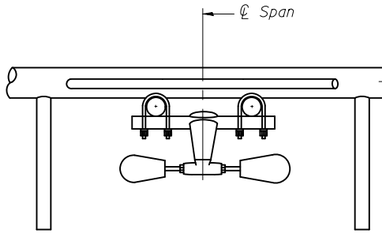


ELEVATION

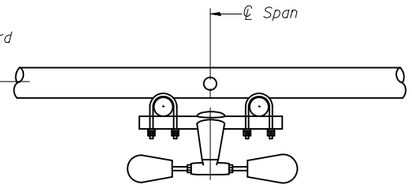
Steel Overhead Sign Truss

NOTES

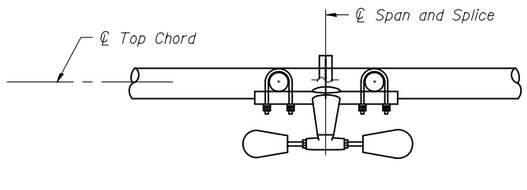
Damper: One damper per truss. (31 Lbs. Stockbridge-Type - 29" minimum between ends of weights) Cost included in Overhead Sign Structure...



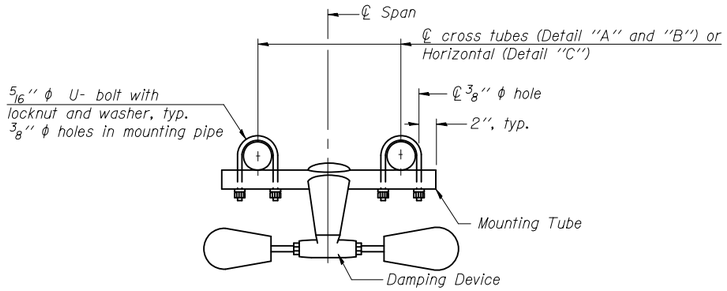
SECTION A-A



SECTION B-B

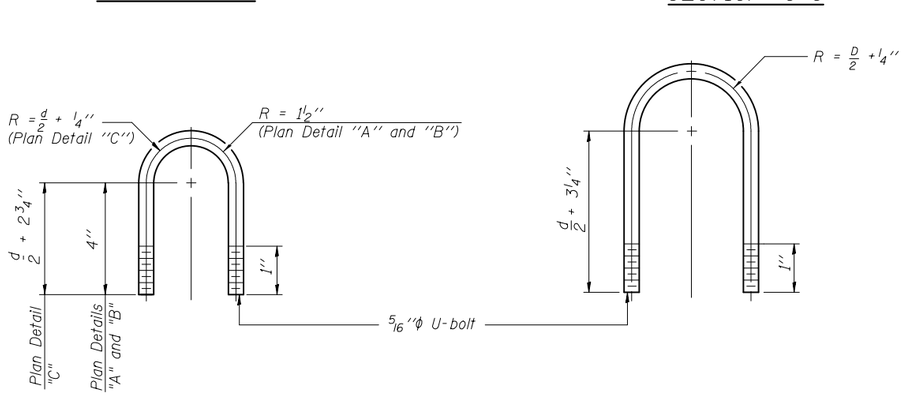


SECTION C-C



TRUSS DAMPING DEVICE CONNECTION DETAIL

(Typical)



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL

(Typical)

TOP CHORD TO CROSS TUBE U-BOLT DETAIL

(Typical - Detail "A" and "B")

OS-S-D 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

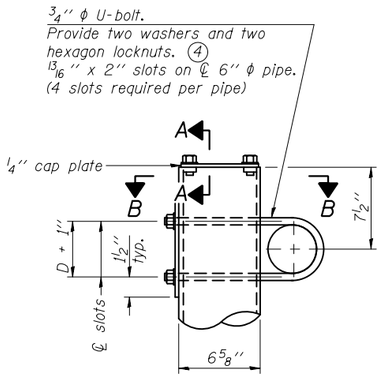
OVERHEAD SIGN STRUCTURES
DAMPING DEVICE

SHEET NO. OF SHEETS

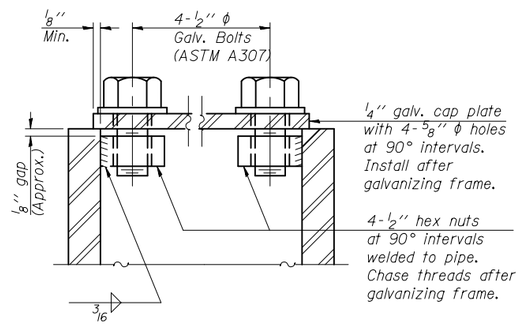
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT

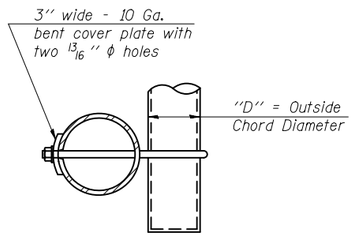


DETAIL A

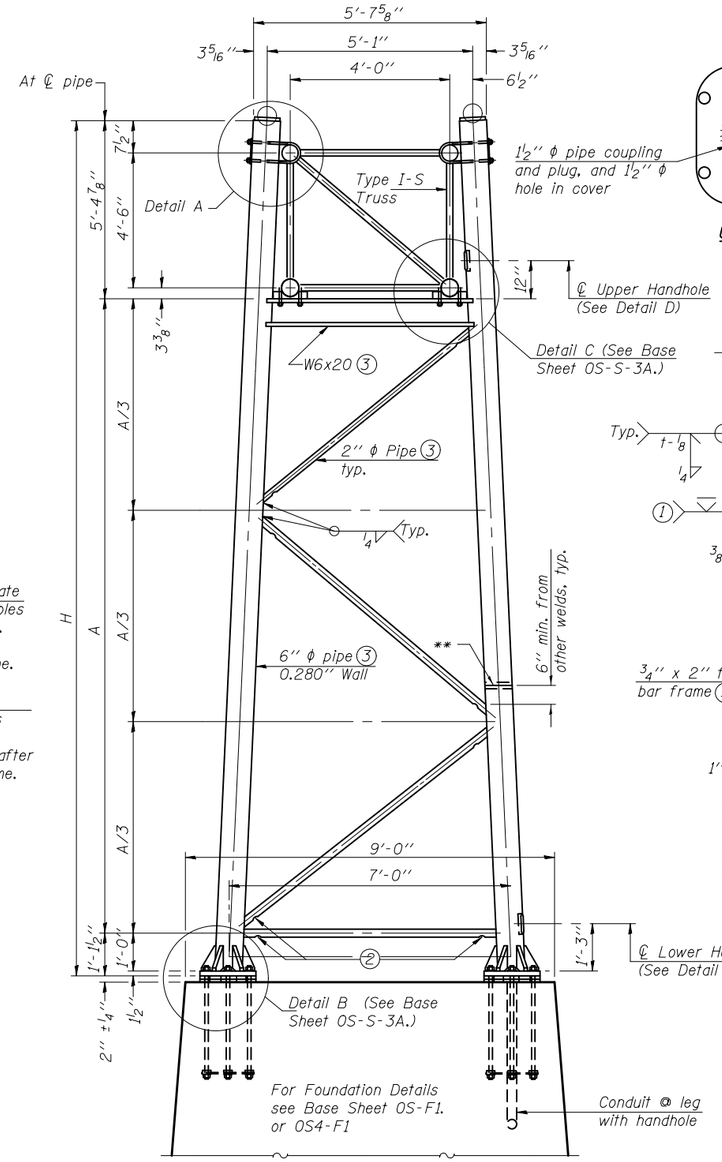


SECTION A-A

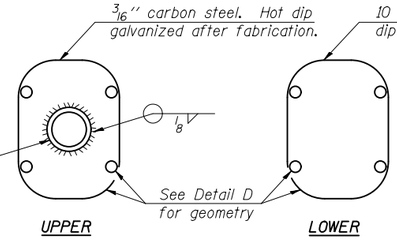
As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.



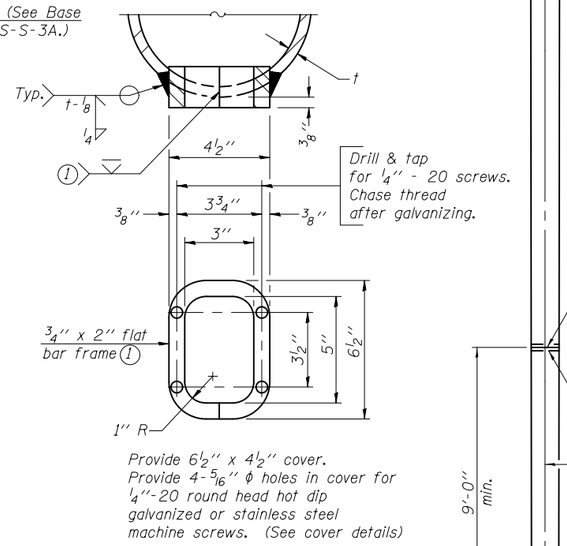
SECTION B-B



SIDE ELEVATION

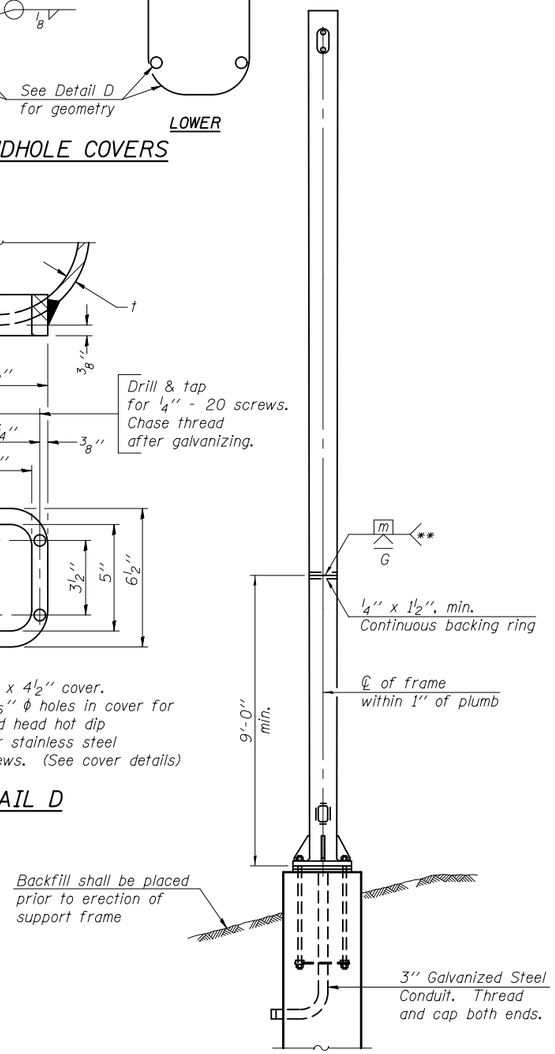


HANDHOLE COVERS



Provide 6 1/2" x 4 1/2" cover. Provide 4-5/16" ϕ holes in cover for 1/4"-20 round head hot dip galvanized or stainless steel machine screws. (See cover details)

DETAIL D



END ELEVATION

Support Design Loads:
See Base Sheet OS-S-1 for design and loading criteria.

Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

(1) 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.

(2) Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.

(3) Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-S-1.

(4) See General Notes for fasteners.

(5) This standard may be utilized for special short span and/or short end support applications subject to verification of maximum loads and capacities by the designer.

(6) Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.

(7) "H" based on 15'-0" or actual sign height, whichever is greater.

6"ϕ PIPE TRUSS SUPPORT DETAILS

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Structure Number	Station	Support		H (7)	A
		Left	Right		

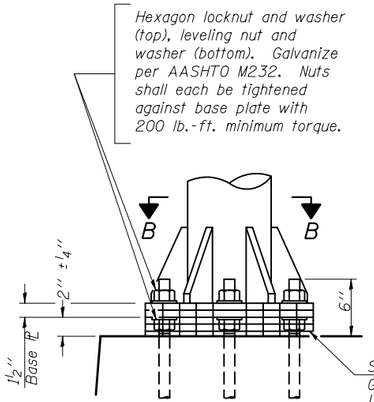
OS-S-3 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

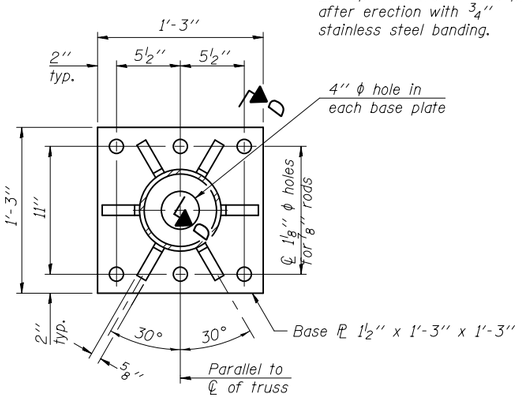
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR TYPE I-S STEEL
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

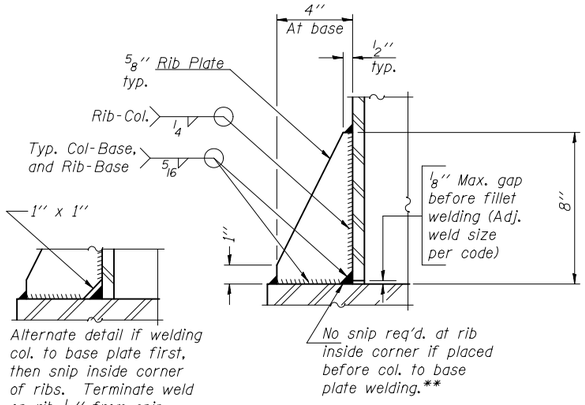


DETAIL B

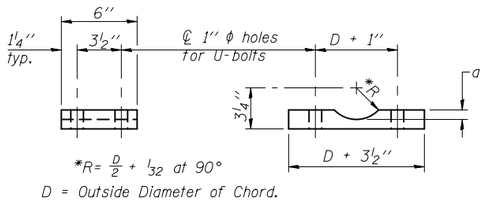
Ribs shall be cut to fit slope of pipe.



SECTION B-B

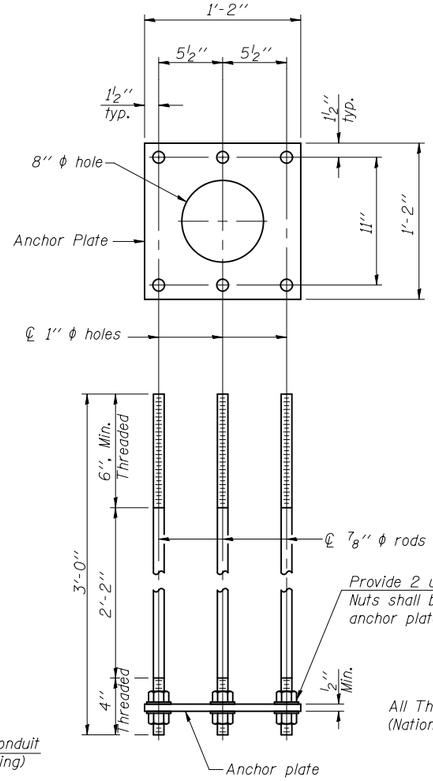


SECTION D-D



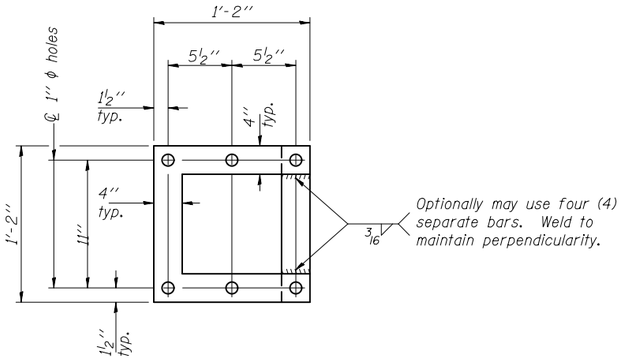
SADDLE SHIM DETAIL

Truss Chord Nominal Dia.	a
4 1/2''	11/16''
5''	3/4''
5 1/2''	13/16''

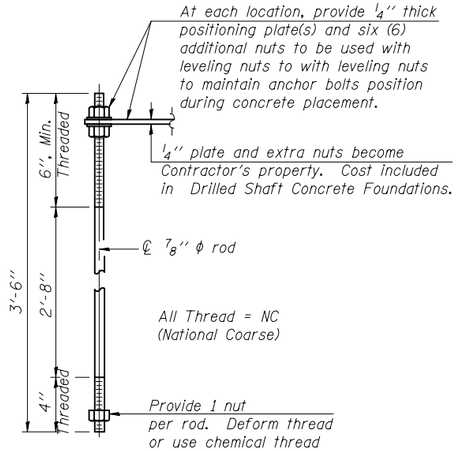


ANCHOR ROD DETAIL

Spread Footing Foundation



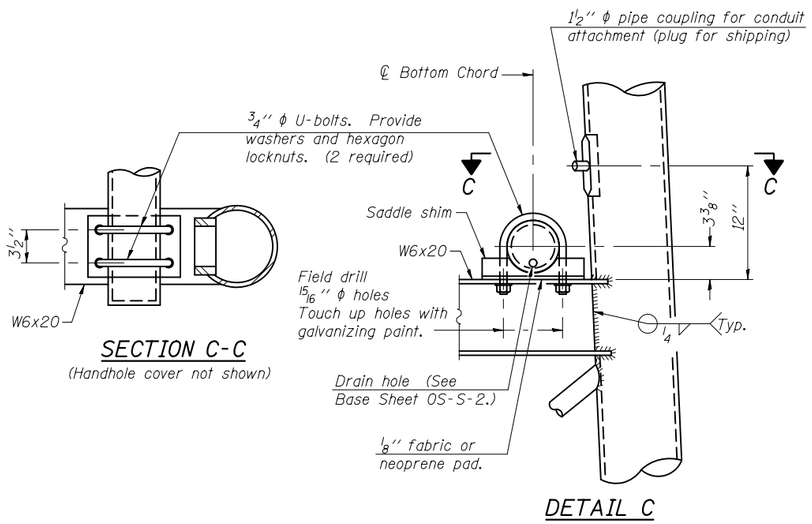
POSITIONING PLATE(S)



ANCHOR ROD DETAIL

Drilled Shaft Foundation

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



SECTION C-C

(Handhole cover not shown)

DETAIL C

TYPE I-S STEEL TRUSS
6'' ϕ PIPE SUPPORT FRAME DETAILS

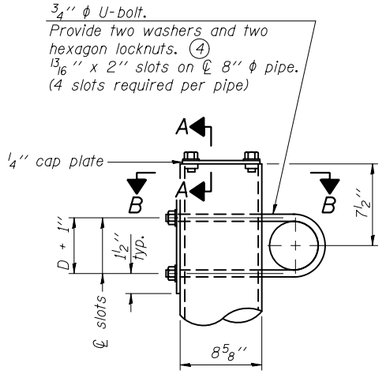
OS-S-3A 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

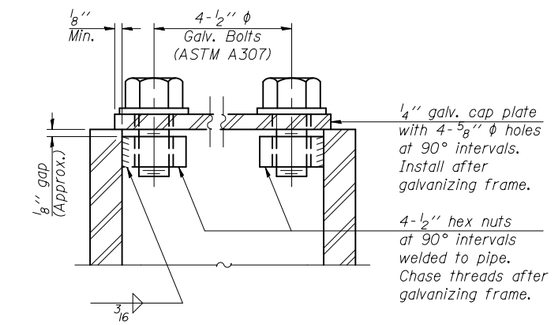
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR TYPE I-S STEEL TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

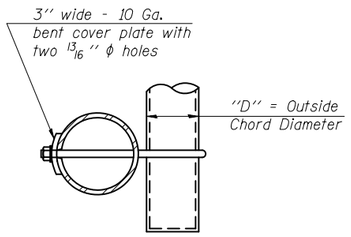


DETAIL A

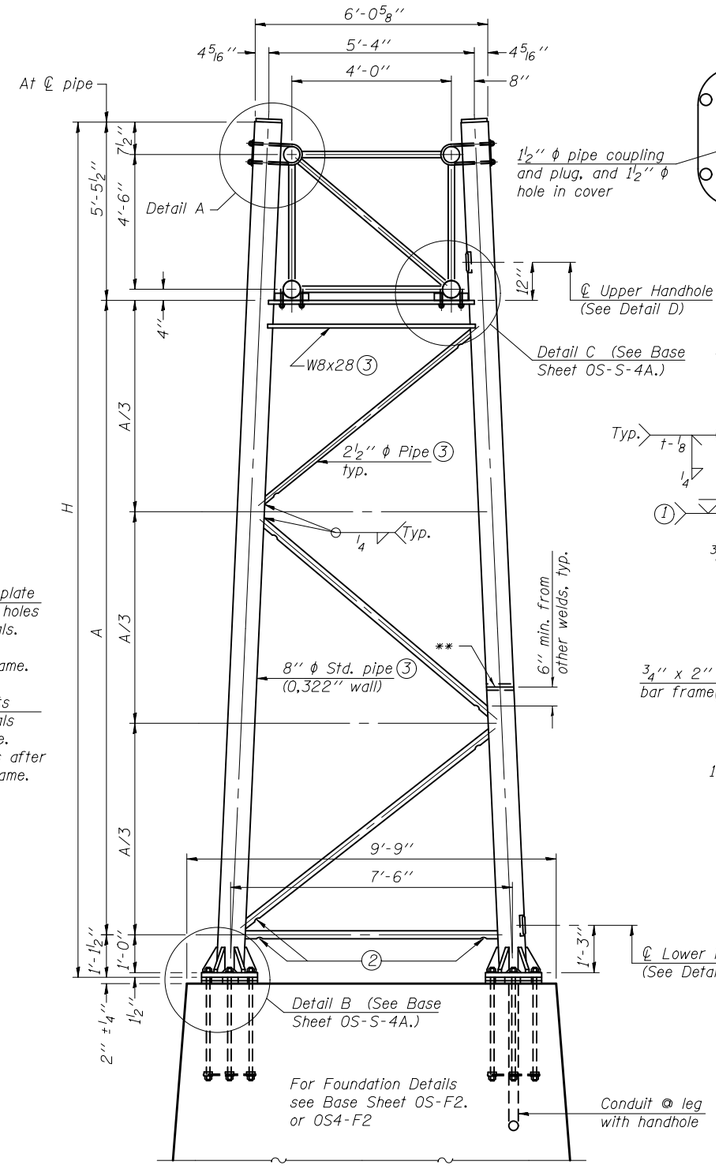


SECTION A-A

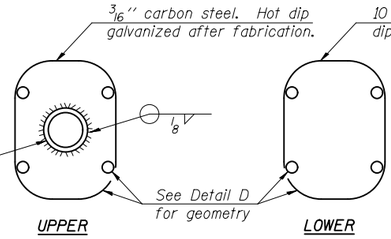
As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.



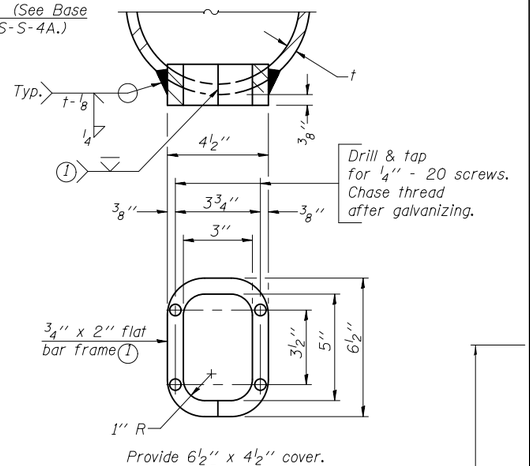
SECTION B-B



SIDE ELEVATION

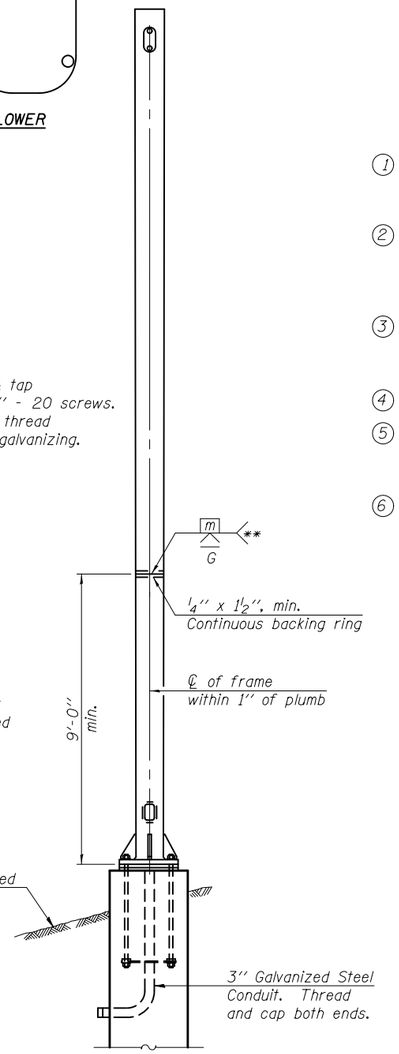


HANDHOLE COVERS



Provide 6 1/2" x 4 1/2" cover.
Provide 4-5/16" ϕ holes in cover for 1/4"-20 round head hot dip gavanized or stainless steel machine screws.
(See cover details)

DETAIL D



END ELEVATION

Support Design Loads:
See Base Sheet OS-S-1 for design and loading criteria.

Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

1. 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.
2. Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.
3. Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-S-1.
4. See General Notes for fasteners.
5. Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.
6. "H" based on 15'-0" or actual sign height, whichever is greater.

8" ϕ PIPE TRUSS SUPPORT FRAME

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Structure Number	Station	Support		H	A
		Left	Right	(6)	

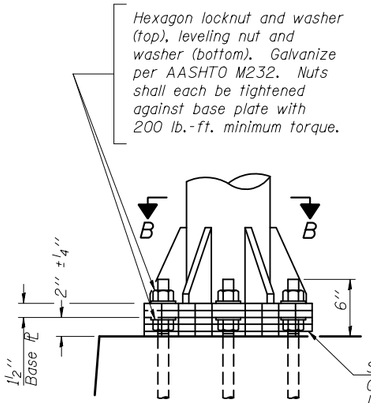
OS-S-4 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

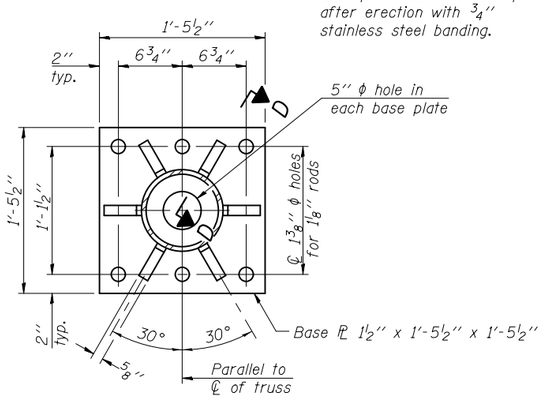
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR TYPE I-S STEEL TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

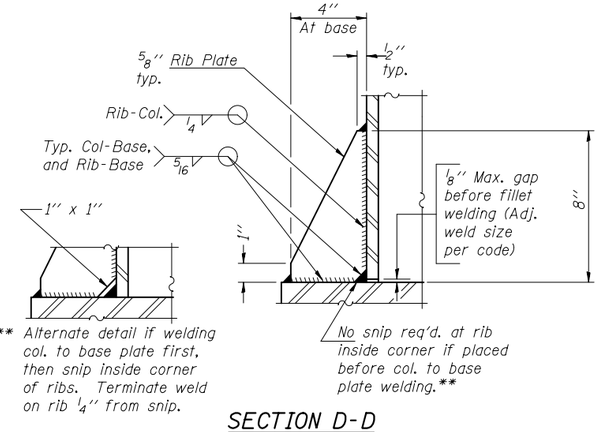


DETAIL B

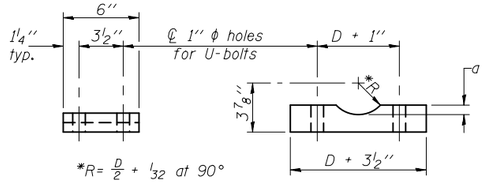
Ribs shall be cut to fit slope of pipe.



SECTION B-B

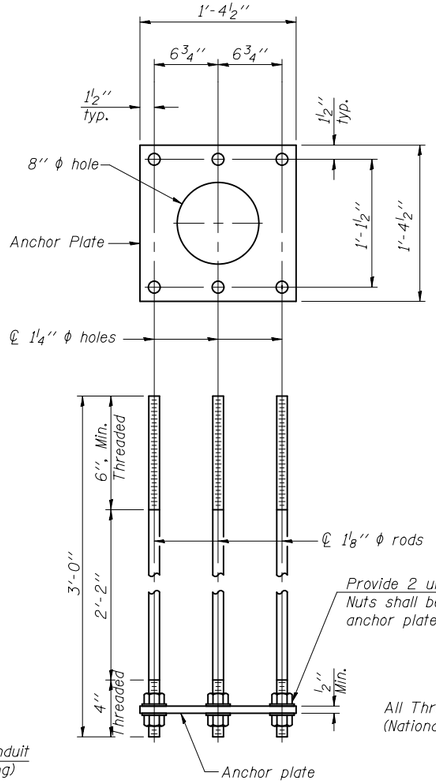


SECTION D-D



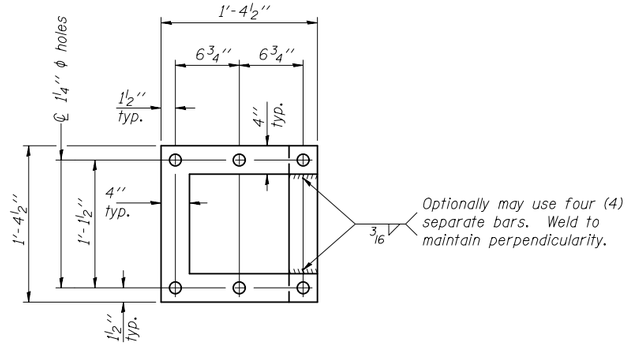
SADDLE SHIM DETAIL

Truss Chord Nominal Dia.	a
5''	3/4''
5 1/2''	13/16''
6''	7/8''
6 1/2''	15/16''

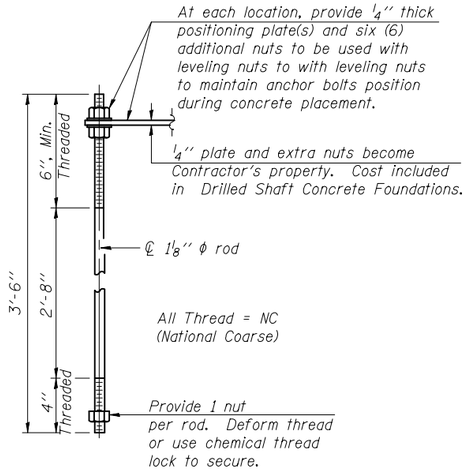


ANCHOR ROD DETAIL

Spread Footing Foundation



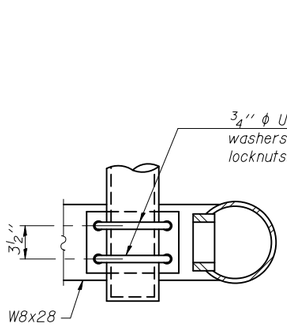
POSITIONING PLATE(S)



ANCHOR ROD DETAIL

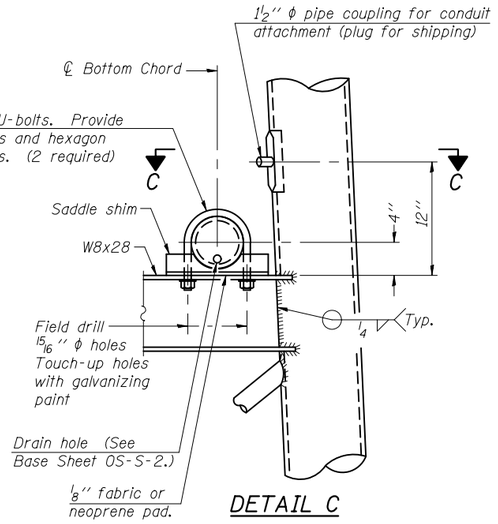
Drilled Shaft Foundation

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



SECTION C-C

(Handhole cover not shown)



DETAIL C

TYPE I-S TRUSS
8'' ϕ PIPE SUPPORT FRAME DETAILS

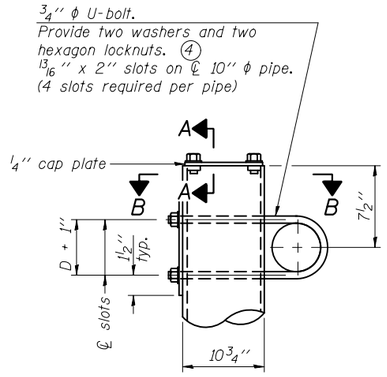
OS-S-4A 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

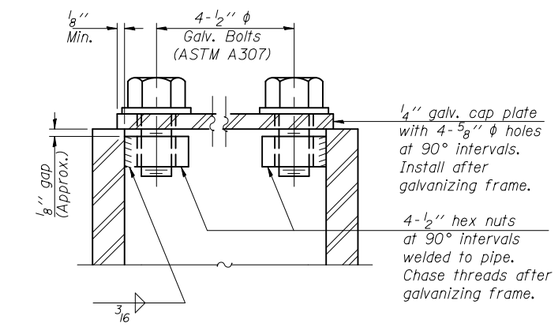
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR I-S STEEL TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

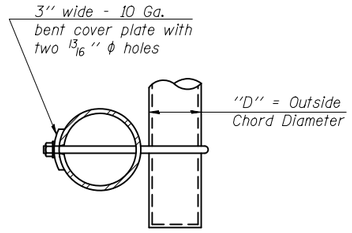


DETAIL A

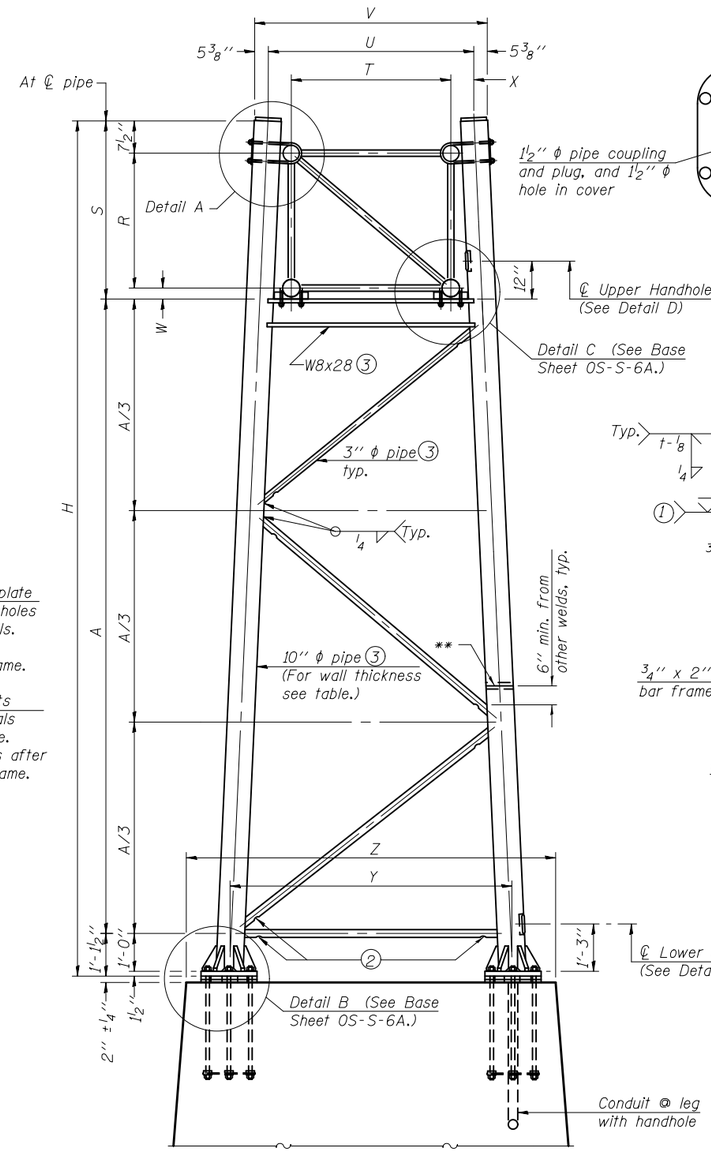


SECTION A-A

As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.

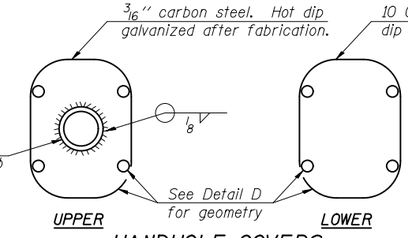


SECTION B-B

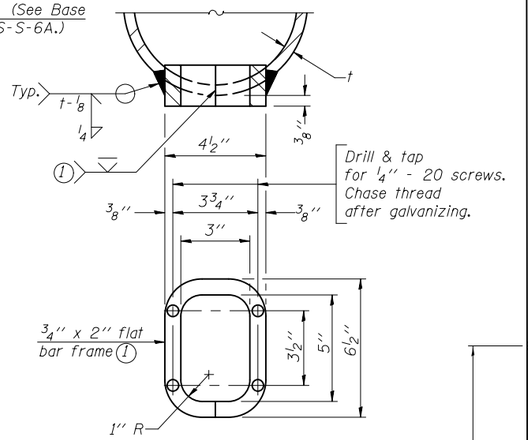


FOR FOUNDATION DETAILS SEE BASE SHEET OS-F3 (Spread Footing) or OS4-F3 (Drilled Shaft).

SIDE ELEVATION

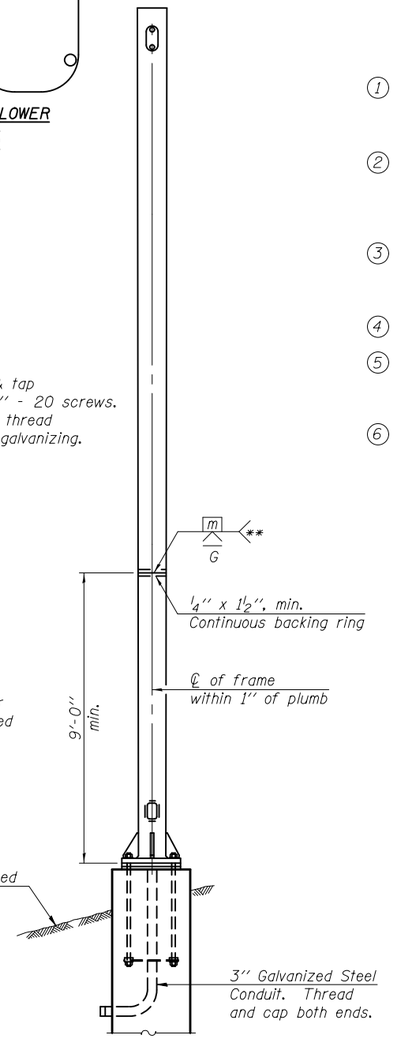


HANDHOLE COVERS



Provide 6 1/2" x 4 1/2" cover. Provide 4-5/16" ϕ holes in cover for 1/4"-20 round head hot dip gavanized or stainless steel machine screws. (See cover details)

DETAIL D



END ELEVATION

Support Design Loads:
See Base Sheet OS-S-1 for design and loading criteria.

Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

(1) 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.

(2) Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.

(3) Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-S-1.

(4) See General Notes for fasteners.

(5) Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.

(6) "H" based on 15'-0" or actual sign height, whichever is greater.

10" ϕ PIPE TRUSS SUPPORT FRAME

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Truss Type	Dimensions								
	R	S	T	U	V	W	X	Y	Z
I-S	4'-6"	5'-5 1/2"	4'-0"	5'-6"	6'-4 3/4"	4"	9"	8'-3"	10'-9"
II-S (5)	5'-3"	6'-3 1/4"	4'-6"	6'-1"	6'-11 3/4"	4 3/4"	9 1/2"	8'-3"	10'-9"

Structure Number	Station	Support		Truss Type	Pipe Wall Thickness	H (6)	A
		Left	Right				

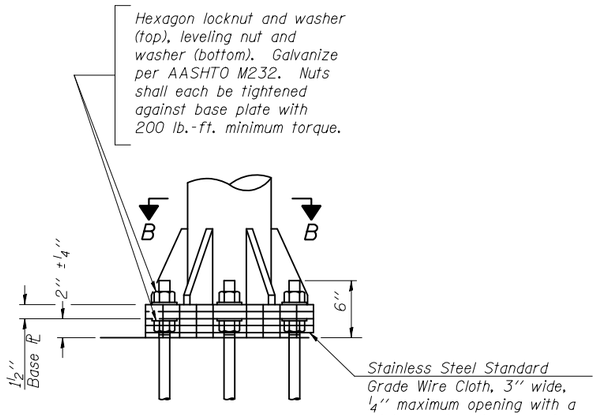
OS-S-6 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

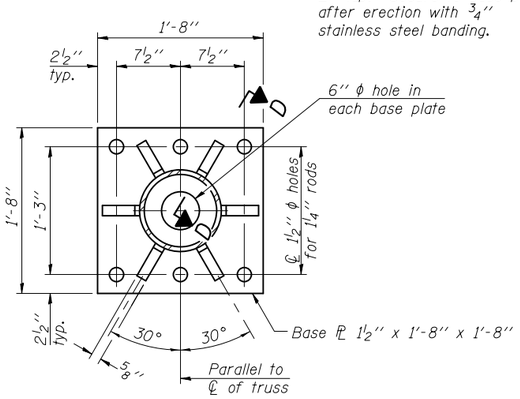
OVERHEAD SIGN STRUCTURES
SUPPORT FRAME FOR STEEL TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

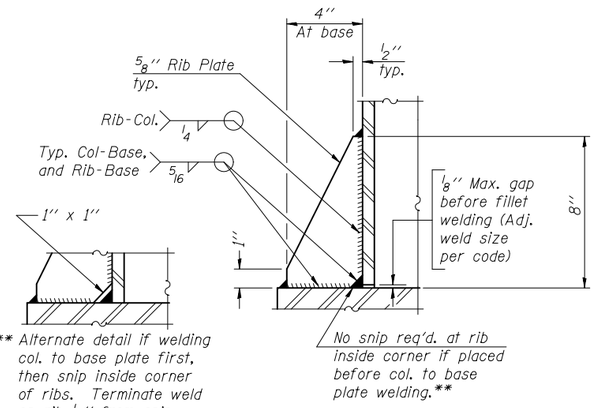


DETAIL B

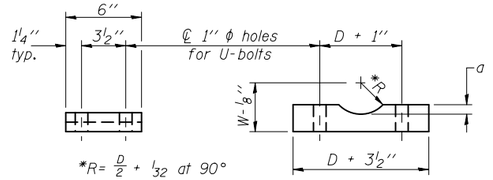
Ribs shall be cut to fit slope of pipe.



SECTION B-B

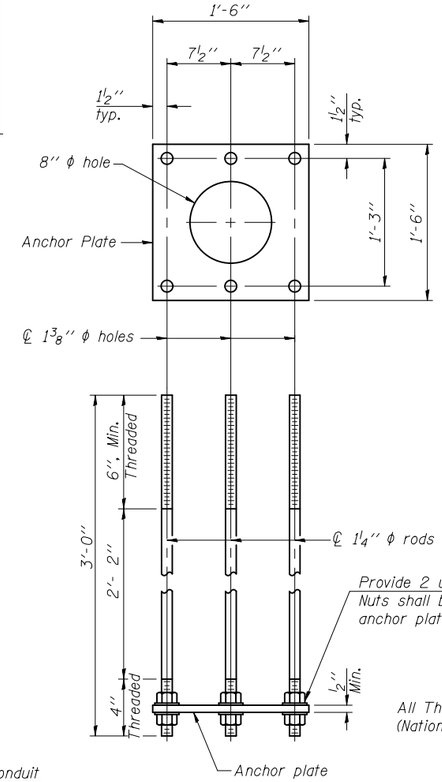


SECTION D-D



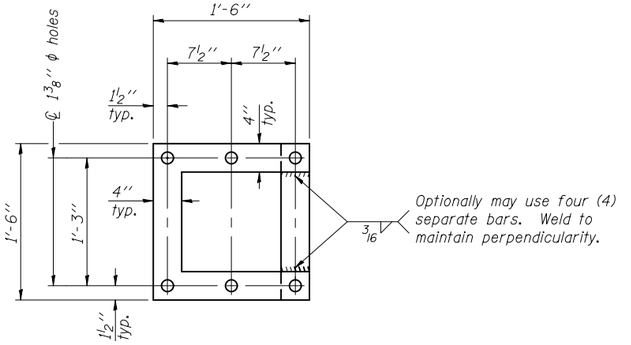
SADDLE SHIM DETAIL

Truss Chord Nominal Dia.	a
5''	3/4''
5 1/2''	13/16''
6''	7/8''
6 1/2''	15/16''
7''	1''

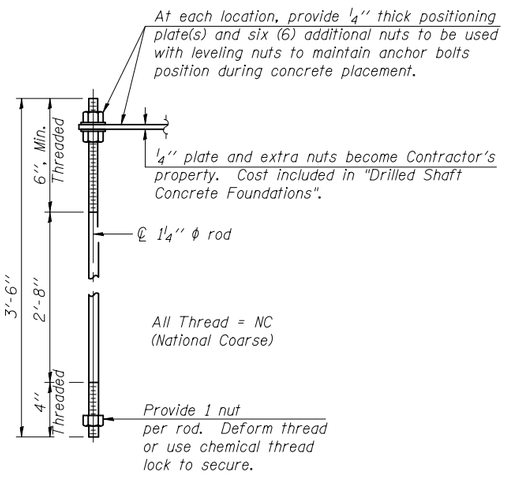


ANCHOR ROD DETAIL

Spread Footing Foundation



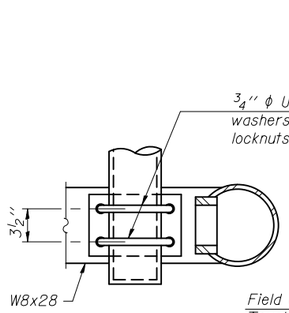
POSITIONING PLATE(S)



ANCHOR ROD DETAIL

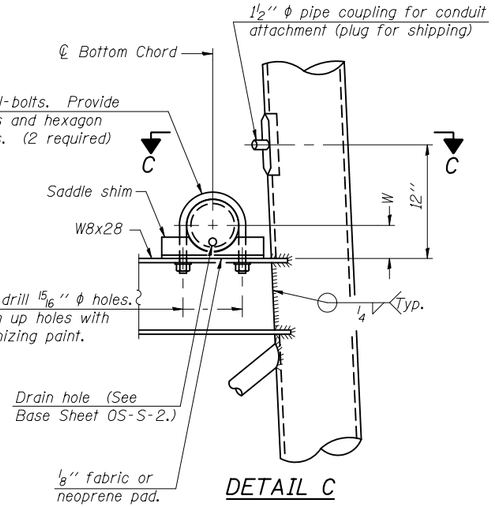
Drilled Shaft Foundation

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



SECTION C-C

(Handhole cover not shown)



DETAIL C

10'' ϕ PIPE SUPPORT FRAME DETAILS

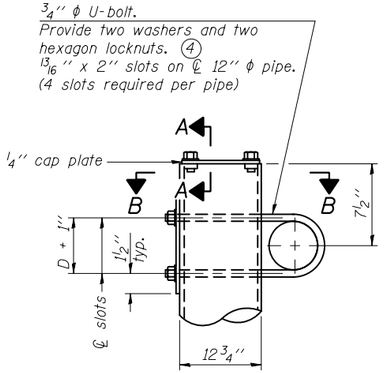
OS-S-6A 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

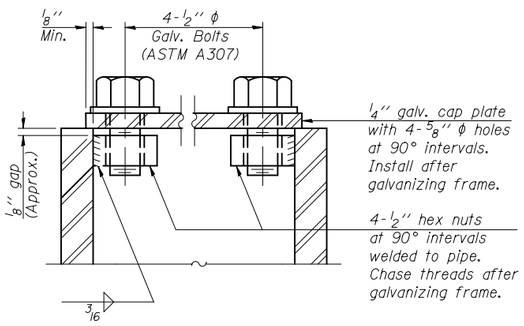
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
SUPPORT FRAME DETAILS STEEL TRUSS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

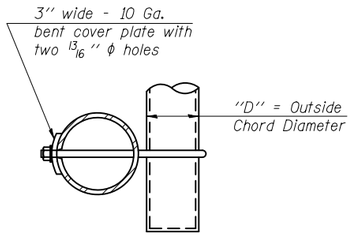


DETAIL A

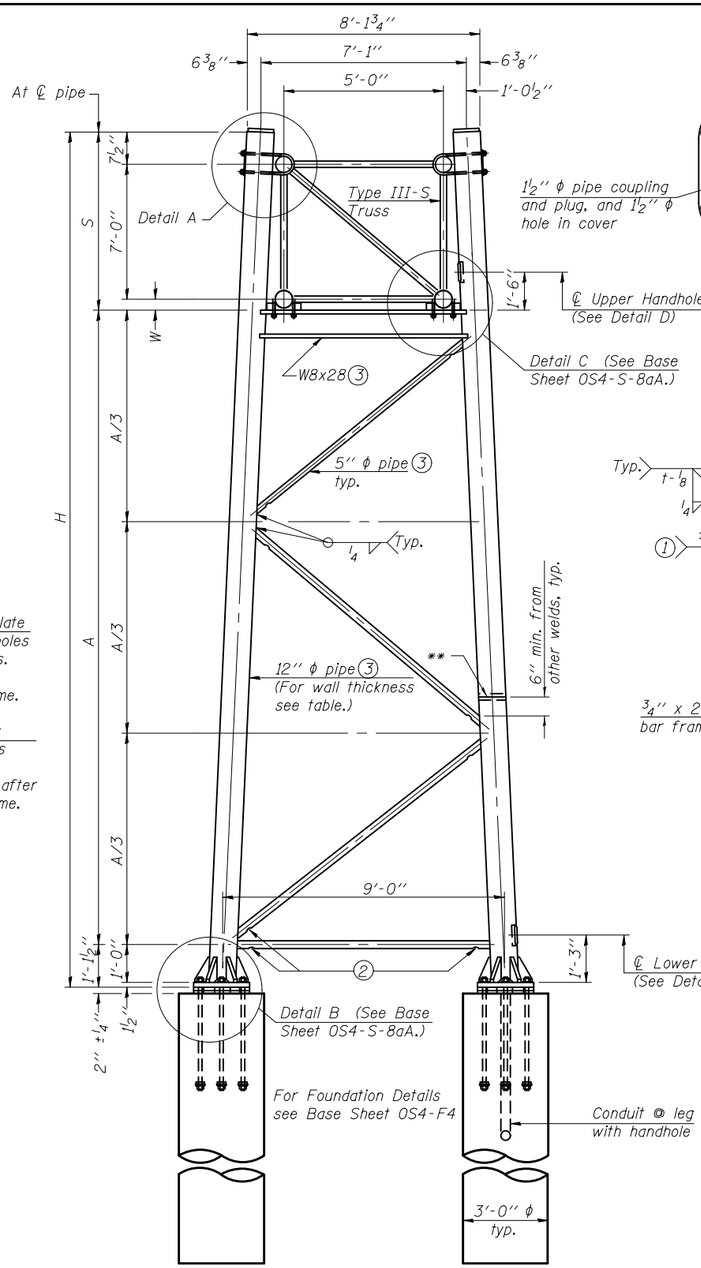


SECTION A-A

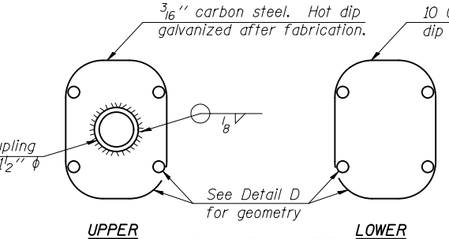
As an alternate to bolts, may use galvanized drive-fit caps installed after galvanizing frame.



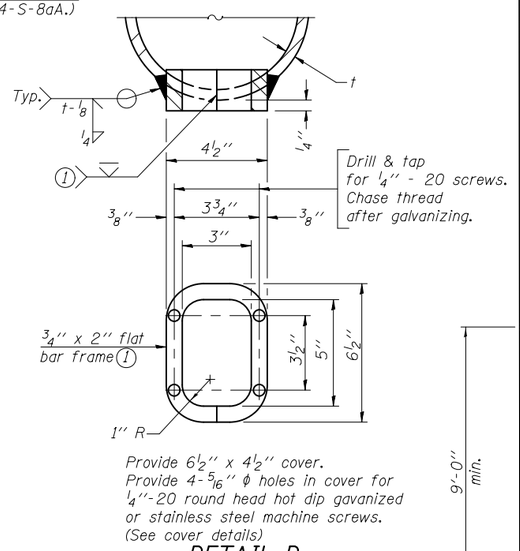
SECTION B-B



SIDE ELEVATION



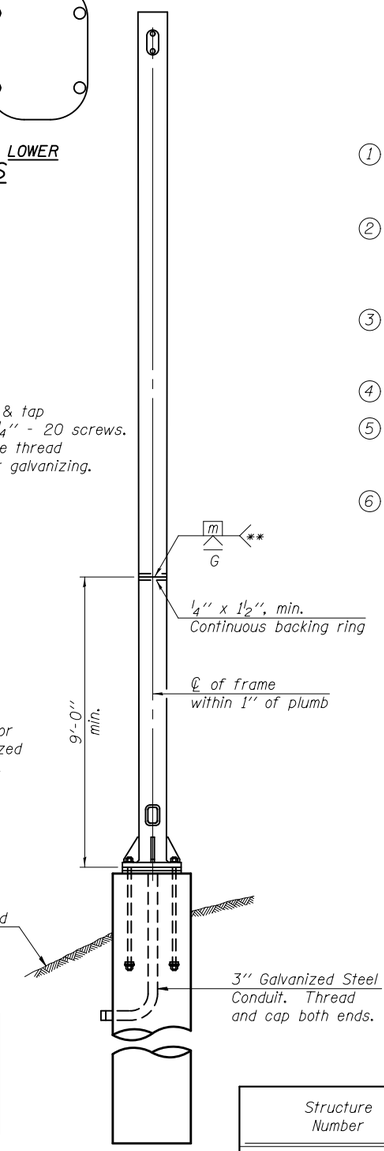
HANDHOLE COVERS



Provide 6 1/2" x 4 1/2" cover.
Provide 4-5/16" ϕ holes in cover for 1/4"-20 round head hot dip gavanized or stainless steel machine screws.
(See cover details)

DETAIL D

Dimensions		
Truss Chord Nominal Dia.	W	S
6"	4 3/4"	8'-0 1/4"
8"	5 1/2"	8'-1"



END ELEVATION

Support Design Loads:
See Base Sheet OS-S-1 for design and loading criteria.

Load combinations checked include deadload plus:
a) 100% wind normal to sign, 20% parallel to sign
b) 60% wind normal to sign, 30% parallel to sign

(1) 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.

(2) Galvanizing vent holes of adequate size shall be provided on underside at each end of bracing pipes. Alternately, holes may be provided in wall of pipe column. All vent holes shall be drilled and de-burred, typ.

(3) Steel pipe, plate, carbon steel handhole covers and rolled sections shall be hot dip galvanized after fabrication. Painting is not permitted. See Base Sheet OS-S-1.

(4) See General Notes for fasteners.

(5) Dimensions shown are based on selection criteria in the Sign Structures Manual. Nonstandard applications must have dimensions verified or amended as appropriate.

(6) "H" based on 15'-0" or actual sign height, whichever is greater.

* For dynamic message sign installations, provide upper and lower handholes in both legs of each support frame.

TRUSS SUPPORT DETAILS
12" ϕ PIPE-TYPE III-S TRUSS

** One butt welded joint is allowed only on one post per support frame. If used, weld procedure must be pre-approved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Structure Number	Station	Support		Pipe Wall Thickness	H (6)	A
		Left	Right			

OS4-S-8a 6-1-12

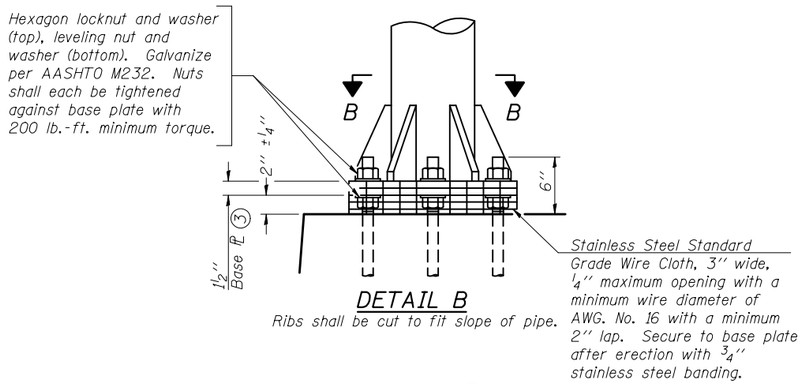
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – SUPPORT FRAME FOR TYPE III–S STEEL TRUSS

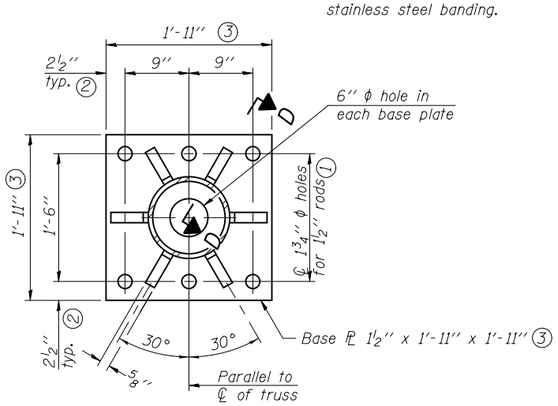
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
ILLINOIS FED. AID PROJECT				

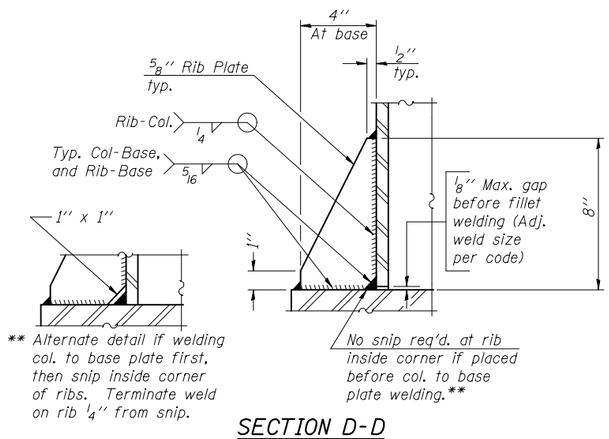


DETAIL B

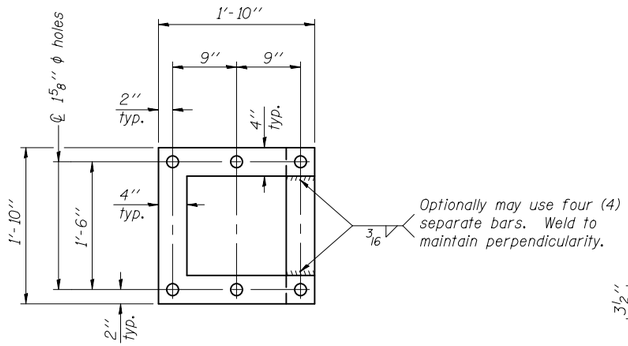
Ribs shall be cut to fit slope of pipe.



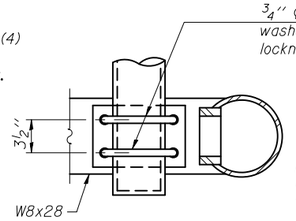
SECTION B-B



SECTION D-D

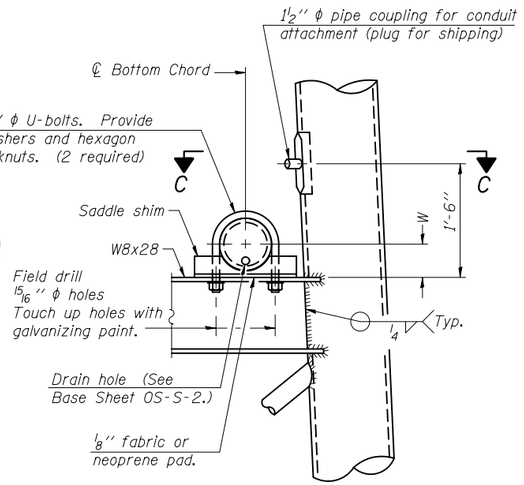


POSITIONING PLATE(S)

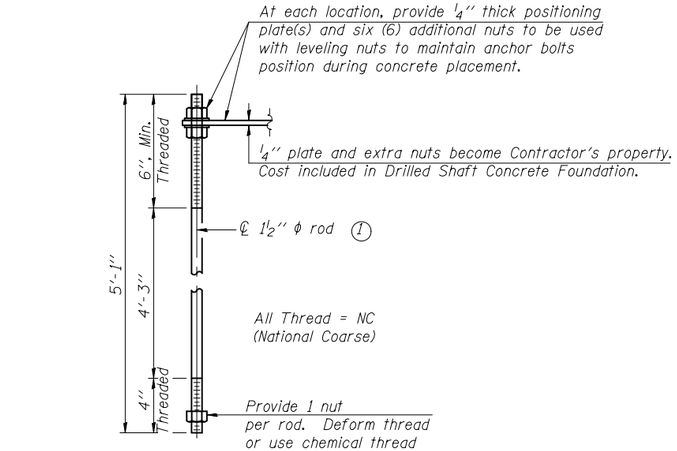


SECTION C-C

(Handhole cover not shown)

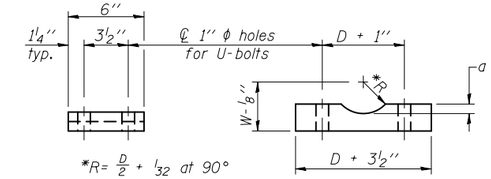


DETAIL C



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. Galvanize upper 12'' minimum per AASHTO M232. No welding shall be permitted on rods.



D = Outside Diameter of Chord.
For W, see Base Sheet OS-S-6.

Truss Chord Nominal Dia.	a
7''	1''
8 1/2''	1 1/4''
9''	1 3/8''

SADDLE SHIM DETAIL

TYPE III-S STEEL TRUSS
12'' ϕ PIPE SUPPORT FRAME DETAILS

Notes:
For Type III-S Truss spans greater than 150 ft, and up to 160 ft.:

① 1 3/4'' ϕ rod, 2'' ϕ holes

② 2 3/4'' edge distance

③ Base ℙ 1 5/8'' x 1'-11 1/2'' x 1'-11 1/2''

OS4-S-8aA 6-1-12

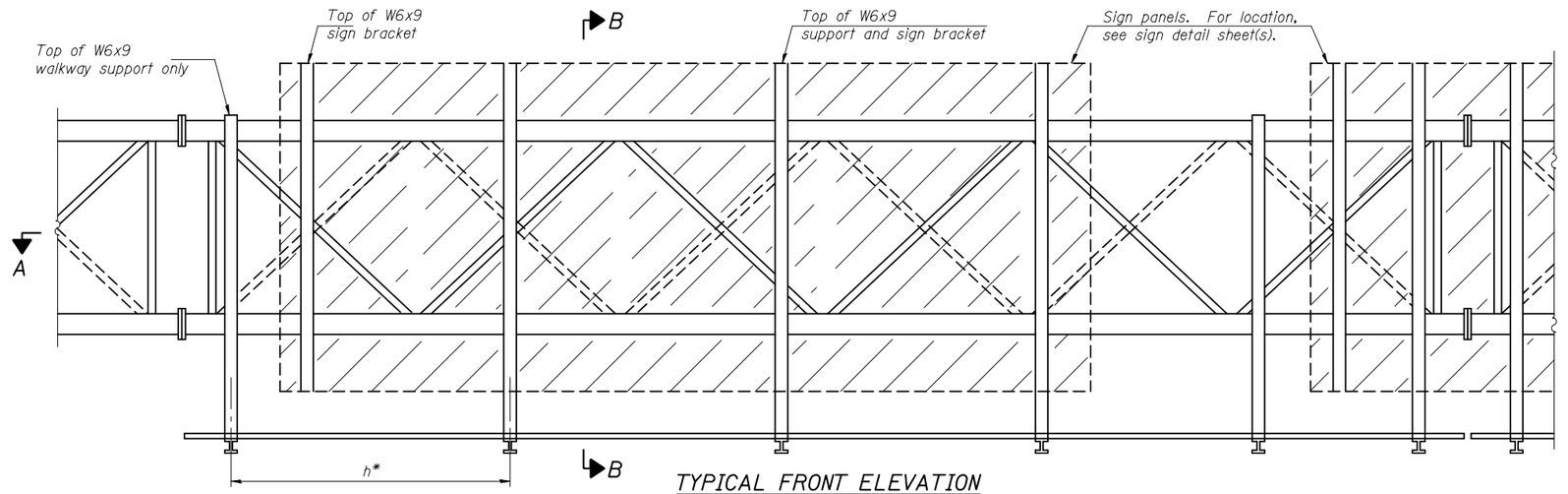
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – SUPPORT FRAME
FOR TYPE III–S STEEL TRUSS

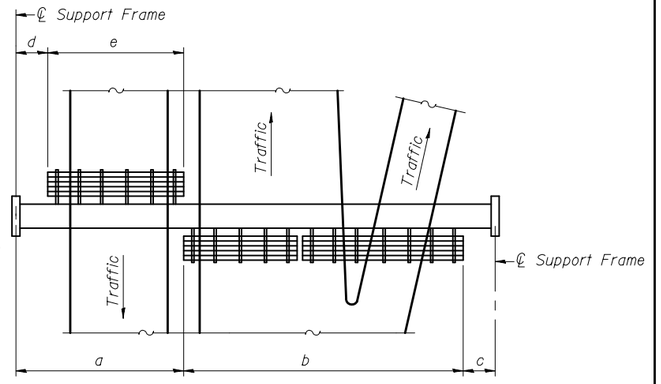
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



TYPICAL FRONT ELEVATION

With lights and handrail omitted for clarity.



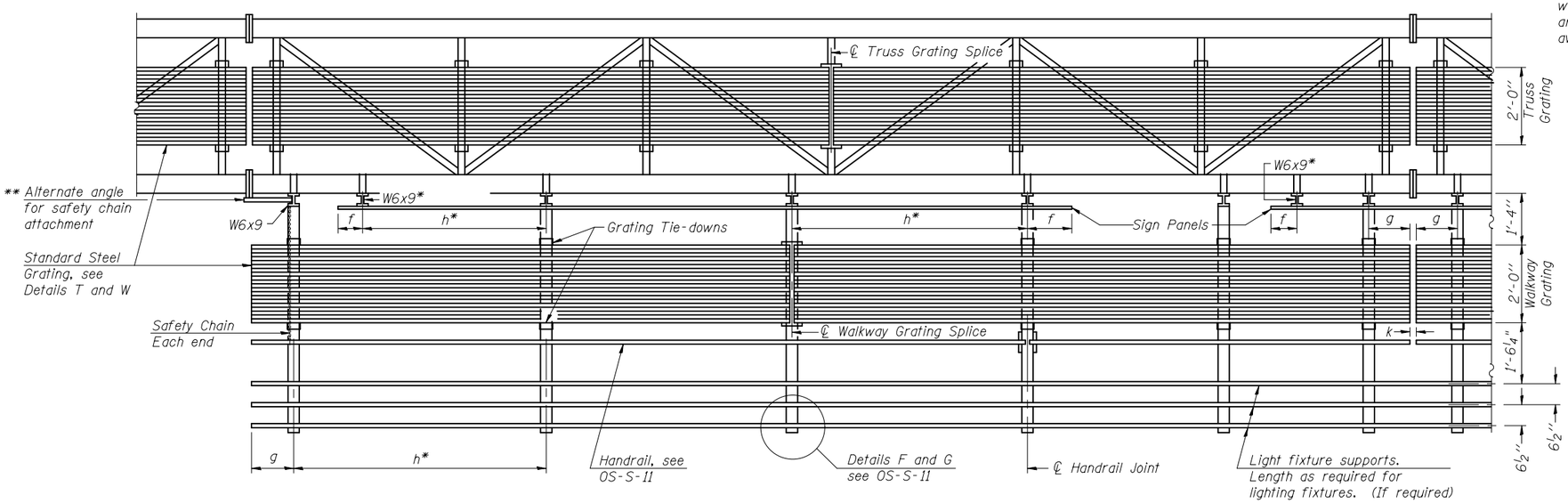
PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)

Walkway and Truss Grating width dimensions are nominal and may vary ±½" based on available standard widths.

BRACKET TABLE

W6x9		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6



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.
Handrail joints, grating, and light support splices placed as needed.

Notes:

* Space W6x9 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)
k = 2" maximum gap between adjacent walkway grating sections and handrail ends

** If walkway bracket at safety chain location is behind sign, add angle to bracket, see Alternate Safety Chain Attachment on Base Sheet OS-S-11

For Details T and W, Section B-B and Grating Splice Details, see Base Sheet OS-S-10.
For Handrail Details, see Base Sheet OS-S-11.

Structure Number	Station	a	b	c	d	e	Walkway Grating and Handrail Lengths

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".

OS-S-9 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

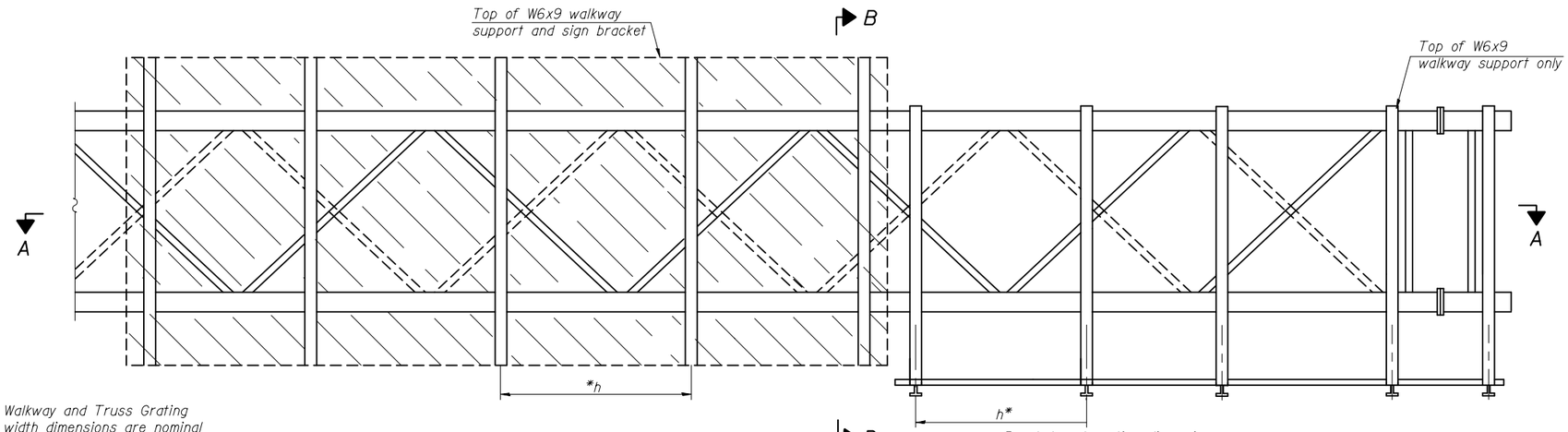
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
STEEL WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.
ILLINOIS FED. AID PROJECT

(1) *If walkway is required left of the DMS cabinet, a=1'-6'' and b=walkway lengths. If walkway is not required left of the DMS cabinet, b=0 and "a" is dimension from left support frame to left end of cabinet.*

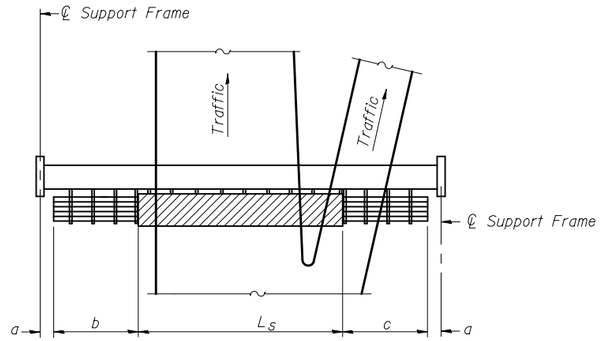


Walkway and Truss Grating width dimensions are nominal and may vary ±1/2'' based on available standard widths.

Bracket and grating dimensions are nominal and will vary based on actual DMS cabinet dimensions plus manufacturer's mounting devices.

TYPICAL FRONT ELEVATION

With handrail omitted for clarity.

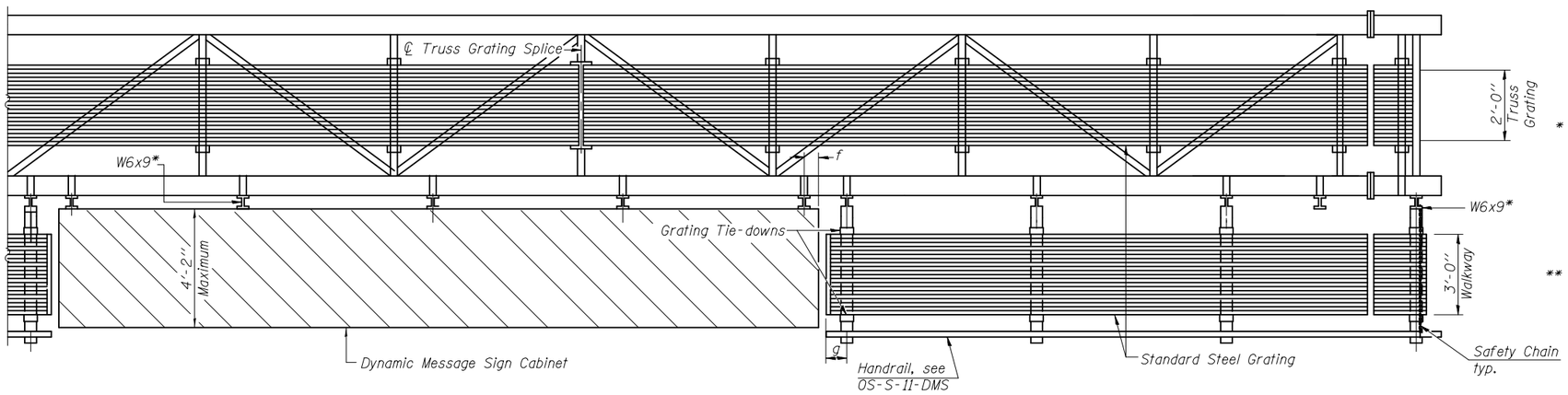


PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)

BRACKET TABLE

W6x9		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0''	2
8'-0''	14'-0''	3
14'-0''	20'-0''	4
20'-0''	26'-0''	5
26'-0''	32'-0''	6



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 and handrail splices placed as needed.

Notes:

* *Space W6x9 walkway brackets and sign brackets 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)

** *Maximum DMS weight = 5000 lbs. 4'-2'' maximum cabinet depth includes depth of cabinet plus connection to WF6x5.40.*

For Section B-B and Grating Splice Details, see Base Sheet OS-S-10-DMS.
For Handrail Splice Details, see Base Sheet OS-S-11-DMS.

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".

Structure Number	Station	a	b	c	L_s	Walkway Grating and Handrail Lengths

OS-S-9-DMS 6-1-12

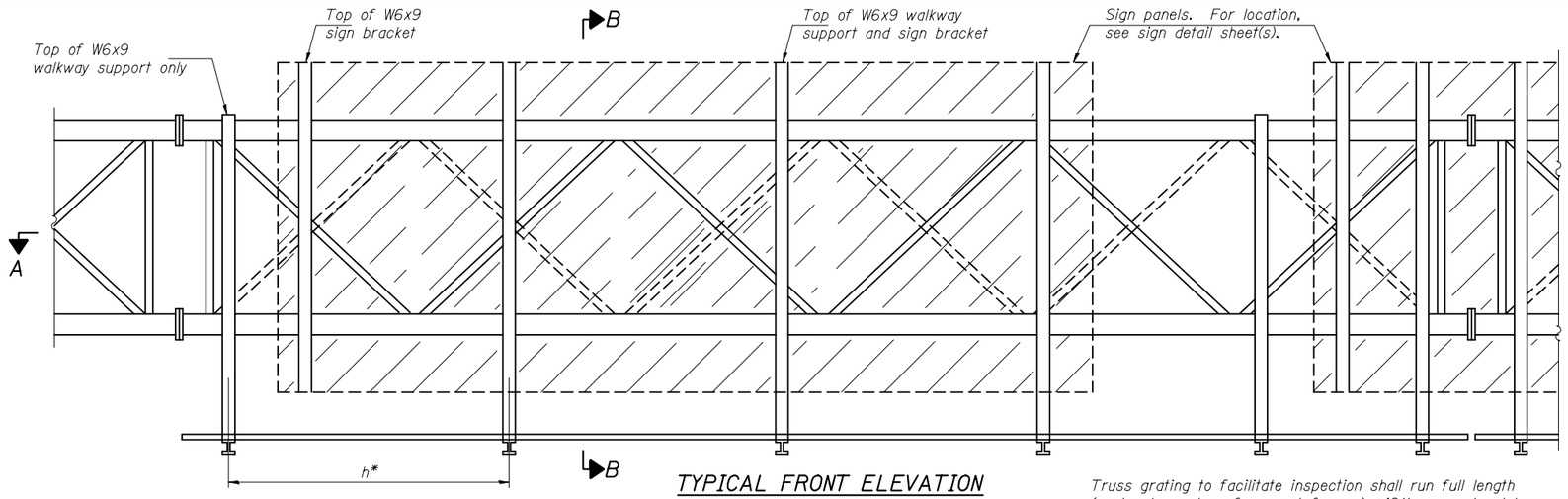
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – ALTERNATE
STEEL WALKWAY DETAILS FOR DMS

SHEET NO. OF SHEETS

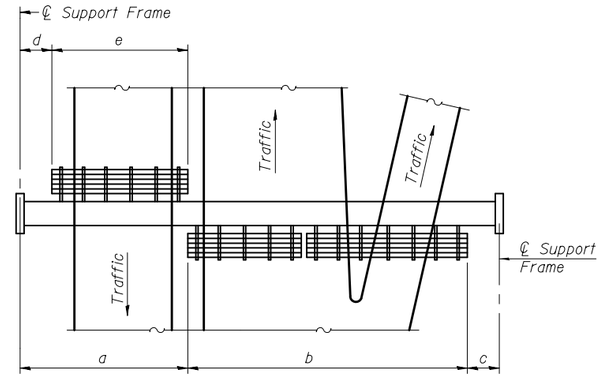
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
ILLINOIS FED. AID PROJECT				



TYPICAL FRONT ELEVATION

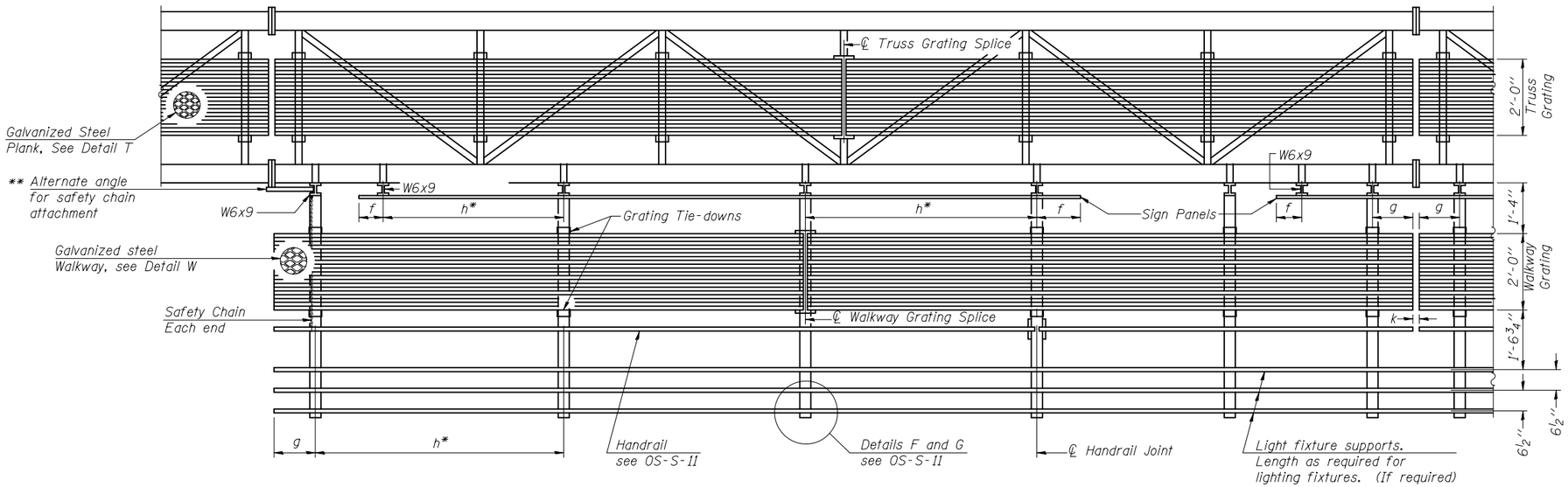
With lights and handrail omitted for clarity.
For Section B-B, see Base Sheet OS-S-10.

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".



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)



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, handrail and light support splices placed as needed.

Walkway and Truss Grating width dimensions are nominal and may vary ±½″ based on available standard widths.

BRACKET TABLE

W6x9		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8′-0″	2
8′-0″	14′-0″	3
14′-0″	20′-0″	4
20′-0″	26′-0″	5
26′-0″	32′-0″	6

Structure Number	Station	a	b	c	d	e	Walkway Grating and Handrail Lengths

Note:
Details shown are considered equal alternatives to the Steel Walkway on Base Sheet OS-S-9, and may be substituted by Contractor at no change in contract cost.

Notes:
* Space W6x9 walkway brackets and sign brackets 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)
k = 2″ maximum gap between adjacent walkway grating sections and handrail ends

** If walkway bracket at safety chain location is behind sign, add angle to bracket, see Alternate Safety Chain Attachment on Base Sheet OS-S-11.

For Details T and W, Section B-B and Grating Splice Details, see Base Sheet OS-S-10.
For Handrail Details, see Base Sheet OS-S-11.

OS-S-9S 6-1-12

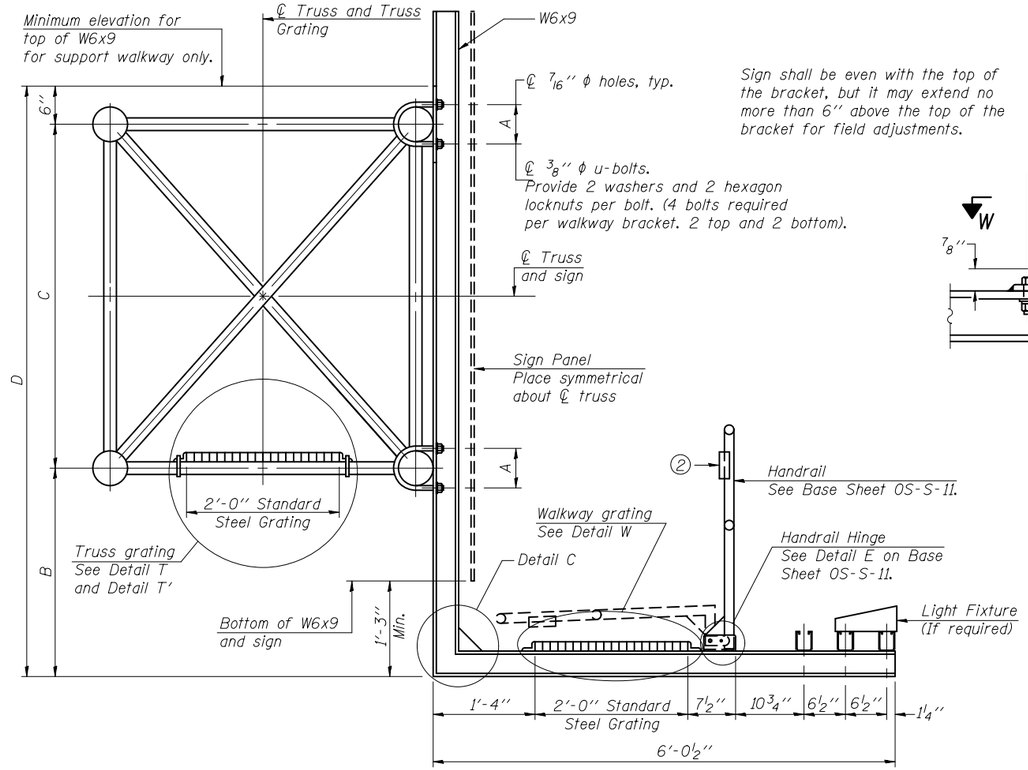
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

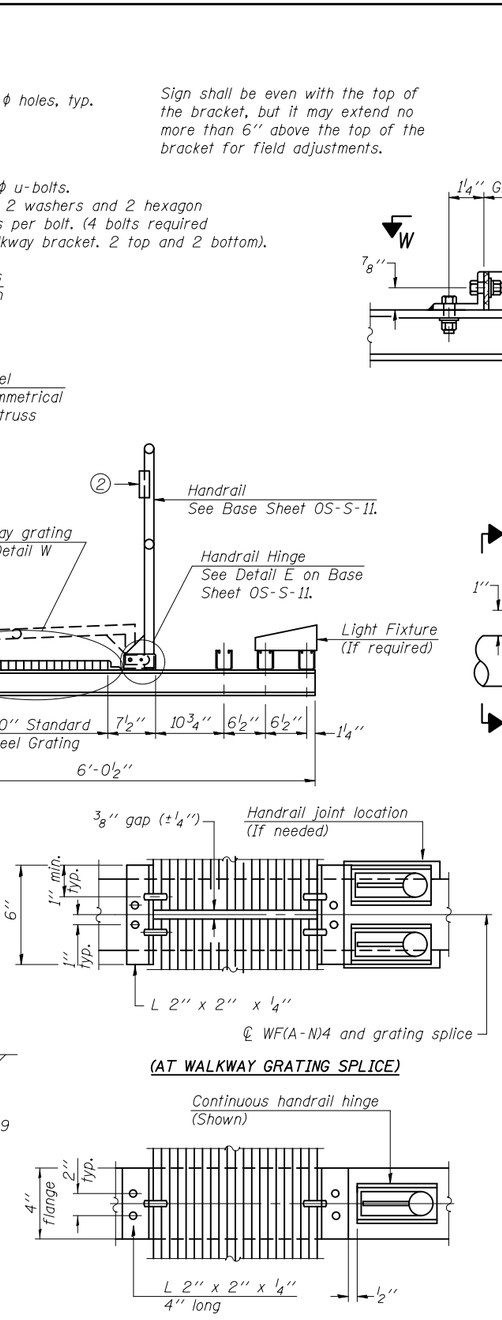
OVERHEAD SIGN STRUCTURES
ALTERNATE STEEL WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

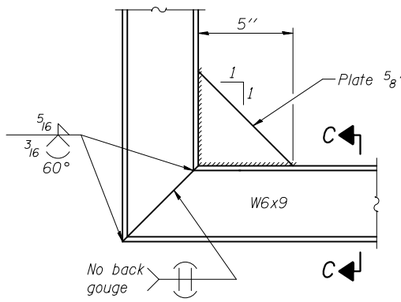
CONTRACT NO.
ILLINOIS FED. AID PROJECT



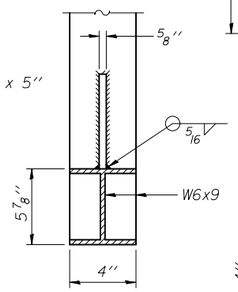
SECTION B-B



(AT WALKWAY GRATING SPLICE)



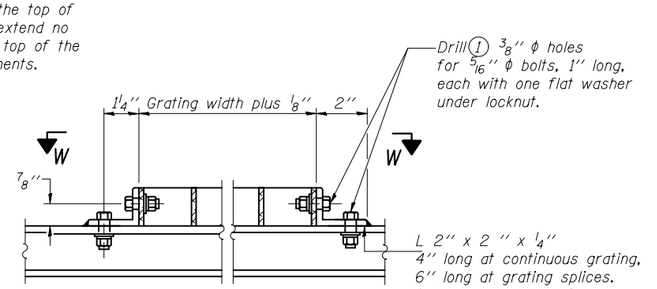
DETAIL C



SECTION C-C

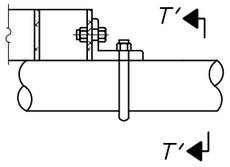
(CONTINUOUS WALKWAY GRATING)

SECTION W-W



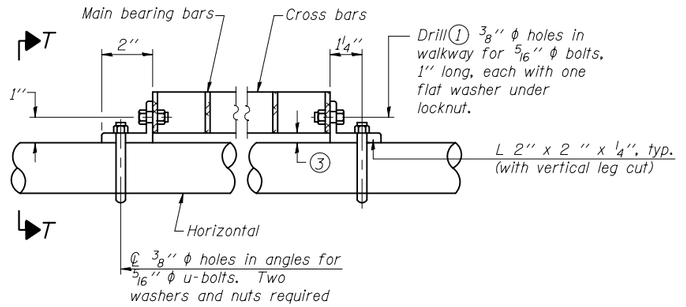
DETAIL W

(Walkway grating)



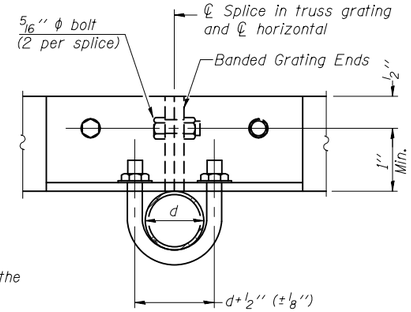
DETAIL T'

(Truss grating splice)
Details not shown same as Detail T.
Alternate materials may be used subject to the Engineer's review and approval.

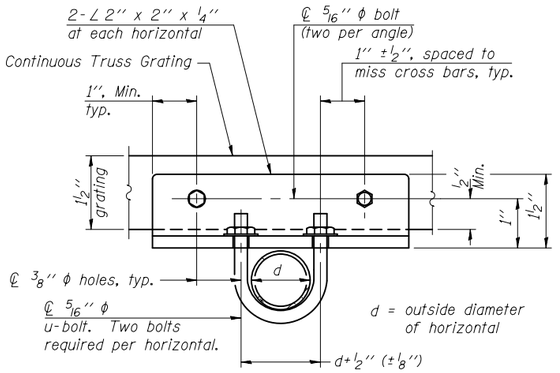


DETAIL T

(Continuous Truss grating)



SECTION T-T



SECTION T-T

BARS SIZES FOR STANDARD STEEL GRATING

TRUSS GRATING	Main bearing bars 1/8" x 1 1/2" on 1 3/16" centers. Cross bars 3/16" x 1 1/2" on 4" centers.
WALKWAY GRATING	Main bearing bars 3/16" x 1 1/2" on 1 3/16" centers. Cross bars 3/16" x 1 1/2" on 4" centers.

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(3) Tube to grating gap may vary from 0 to 1/2", max. to align walkway, allow for camber, etc.

(4) Based on actual height of tallest sign given on OS-S-1.

Structure Number	Station	A	(4) B	C	(4) D

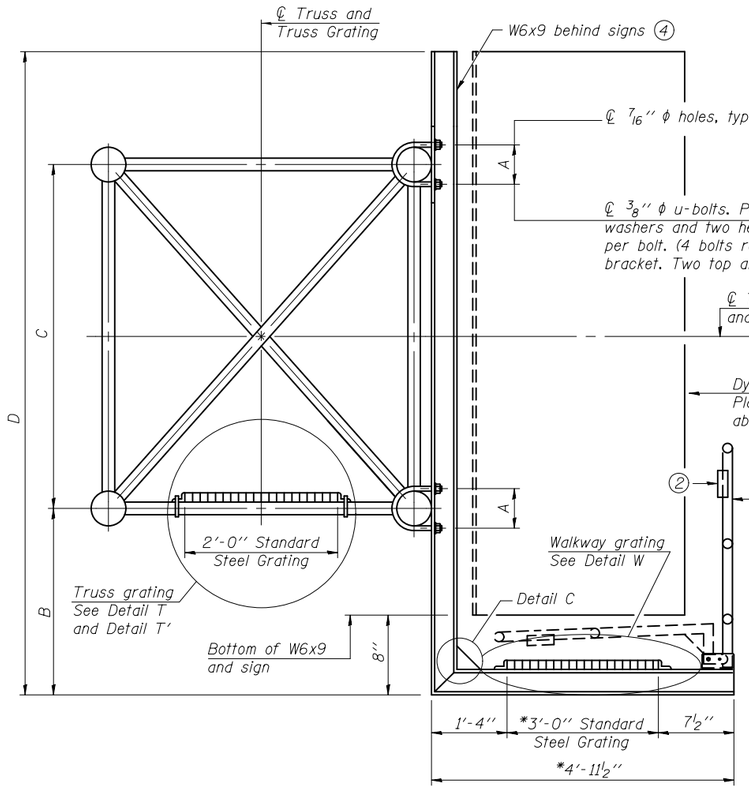
OS-S-10 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

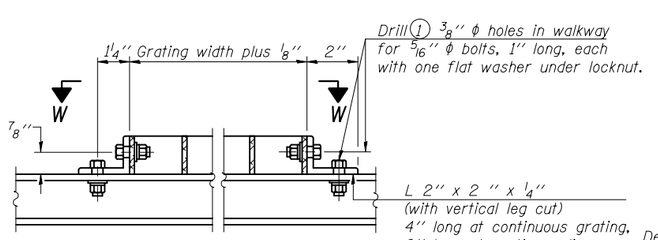
OVERHEAD SIGN STRUCTURES
STEEL WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



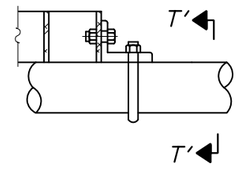
SECTION B-B

* Bracket and grating dimensions are nominal and will vary based on actual DMS cabinet dimensions plus manufacturer's mounting devices.



DETAIL W

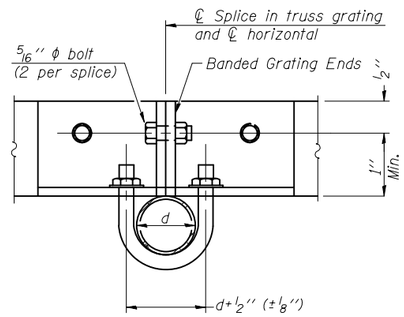
(Walkway grating)



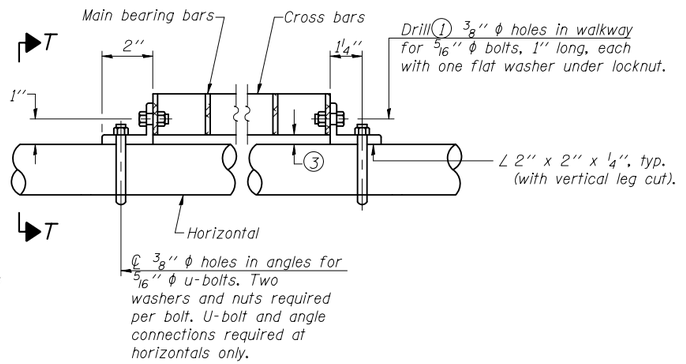
DETAIL T'

(Truss grating splice)

Details not shown same as Detail T. Alternate materials may be used subject to the Engineer's review and approval.

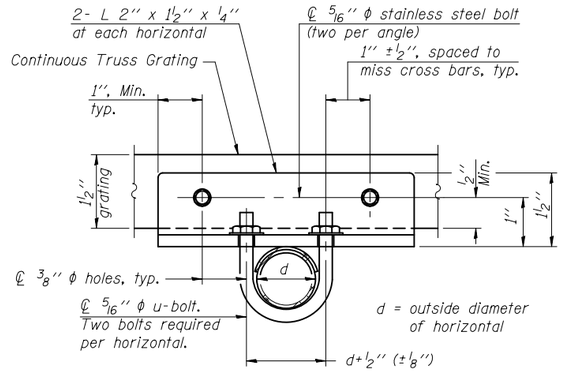


SECTION T'-T'

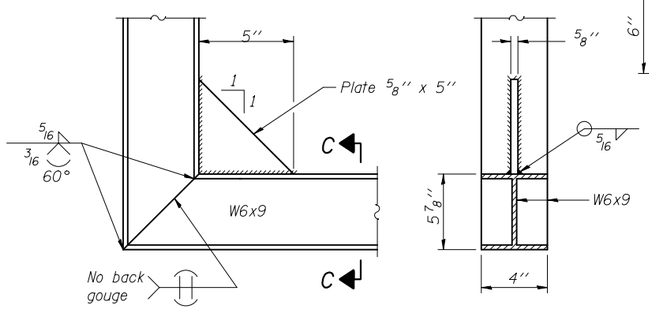


DETAIL T

(Continuous Truss grating)

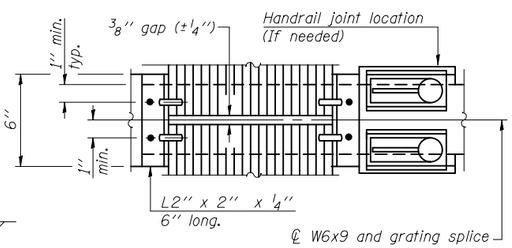


SECTION T-T

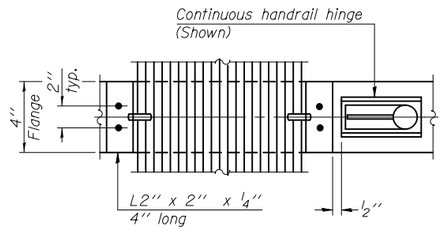


DETAIL C

SECTION C-C



(AT WALKWAY GRATING SPLICE)



(CONTINUOUS WALKWAY GRATING)

SECTION W-W

BARS SIZES FOR STANDARD STEEL GRATING

TRUSS GRATING	Main bearing bars 3/16" x 1 1/2" on 1 3/16" centers. Cross bars 3/16" x 1 1/2" on 4" centers.
WALKWAY GRATING	Main bearing bars 3/16" x 1 1/2" on 1 3/16" centers. Cross bars 3/16" x 1 1/2" on 4" centers.

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(3) Tube to grating gap may vary from 0 to 1/2", max. to align walkway, allow for camber, etc.

(4) Cabinet manufacturer must design and supply hardware for connection of cabinet to WF6's. Bolts must be stainless steel or hot dip galvanized high strength per IDOT specifications.

(5) Based on actual height of tallest sign given on OS-S-1.

Structure Number	Station	A	(5) B	C	(5) D

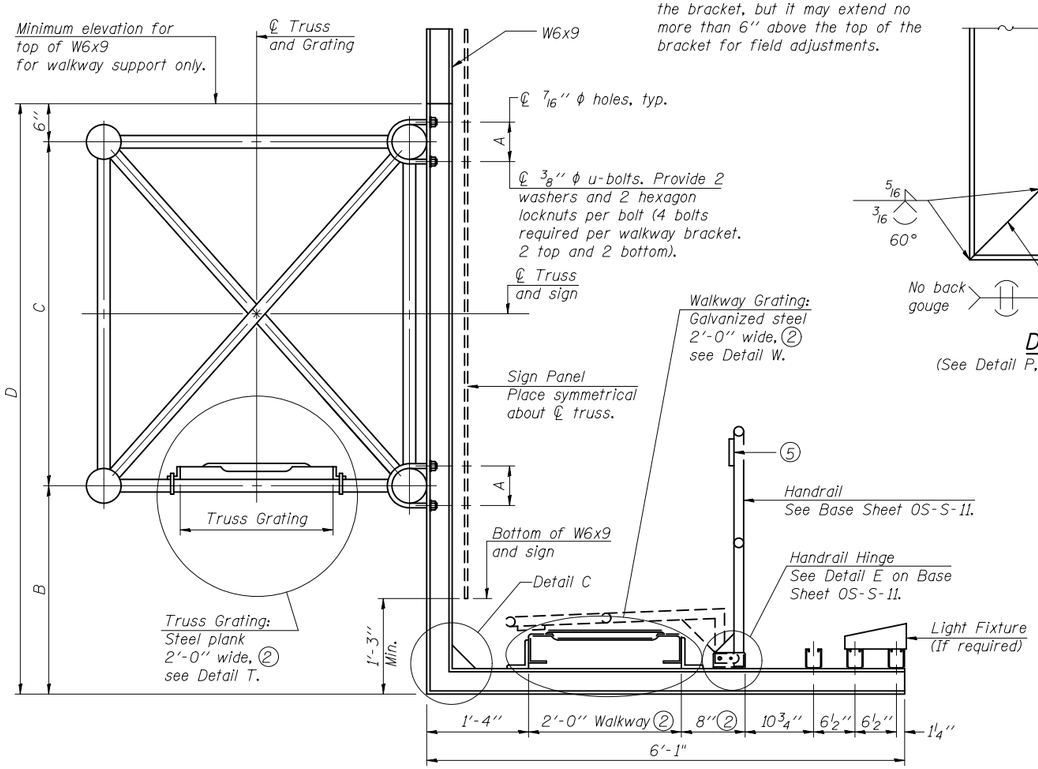
OS-S-10-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

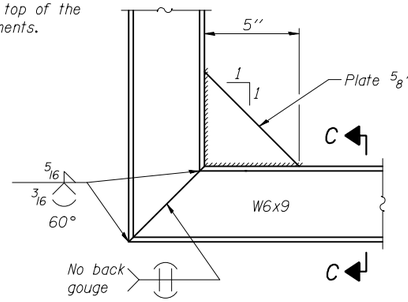
OVERHEAD SIGN STRUCTURES – ALTERNATE
STEEL WALKWAY DETAILS FOR DMS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



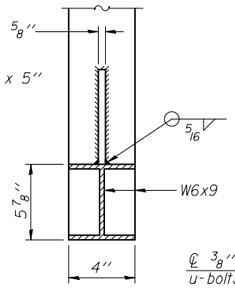
SECTION B-B

Sign shall be even with the top of the bracket, but it may extend no more than 6" above the top of the bracket for field adjustments.

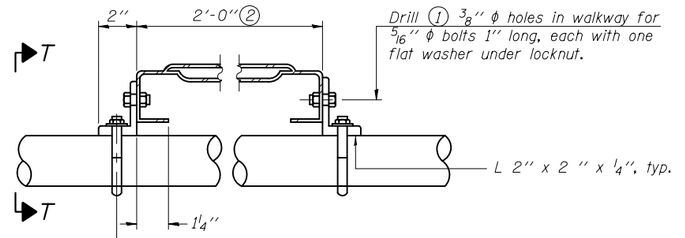


DETAIL C

(See Detail P, on Base Sheet OS-S-11.)



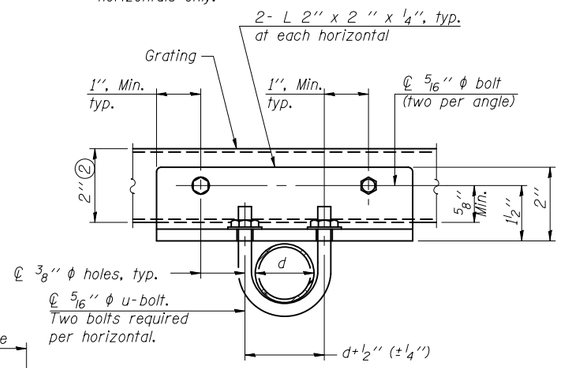
SECTION C-C



℄ 3/8" ϕ holes in angles for 5/16" ϕ u-bolts. Two washers and nuts required per bolt. U-bolt and angle connections required at horizontals only.

DETAIL T

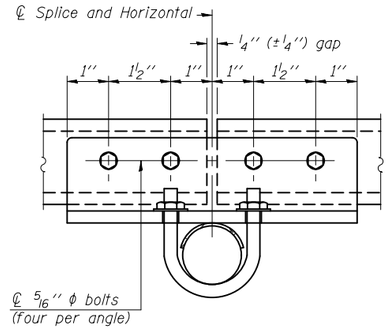
(Truss grating at horizontal)



SECTION T-T

(Truss Grating Continuous)

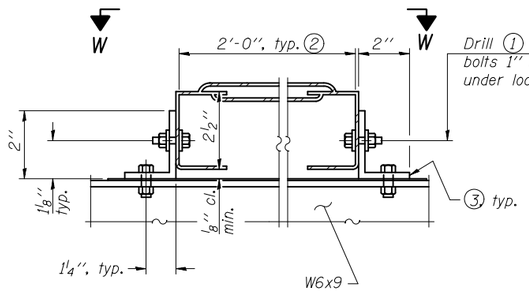
d = outside diameter of horizontal



SECTION T-T

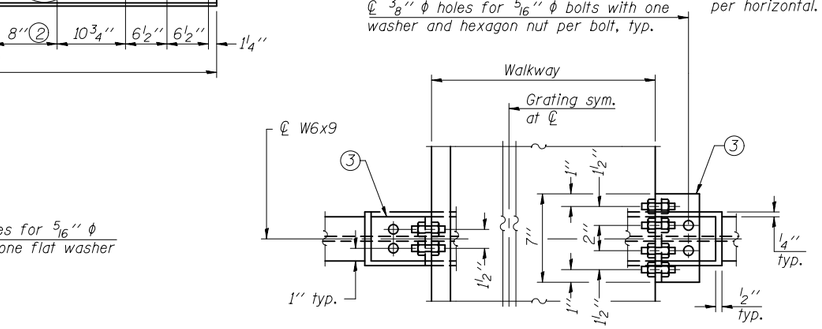
(Truss Grating Splice)

Alternate splice details and locations may be used subject to the Engineer's review and approval.



DETAIL W

GALVANIZED STEEL WALKWAY GRATING



WALKWAY GRATING CONTINUOUS AT WALKWAY GRATING SPLICE

SECTION W-W

STEEL TRUSS GRATING

Structure Number	Station	A	(6) B	C	(6) D

(1) Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.

(2) Perforated or expanded metal grating providing a skid resistant (non-serrated) surface and capable of supporting a 500 pound concentrated load with a 6'-0" clear span. Walkway and truss grating dimensions are nominal and may vary (width ±1/2", depth ±1/2") based on available standard sizes. Cut ends of grating shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

(3) Galvanized steel L 2" x 2 " x 1/4", 3 1/2" long with continuous grating, 7" long at grating splice.

(4) Details shown are considered equal alternatives to the on Base Sheet OS-S-10 and may be substituted by Contractor at no change in contract cost.

(5) ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.

(6) Based on actual height of tallest sign given on OS-S-1.

OS-S-10S 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

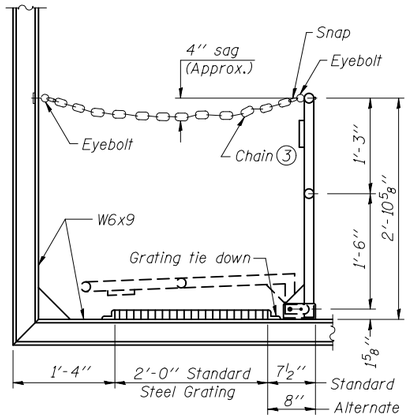
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES
ALTERNATE STEEL WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

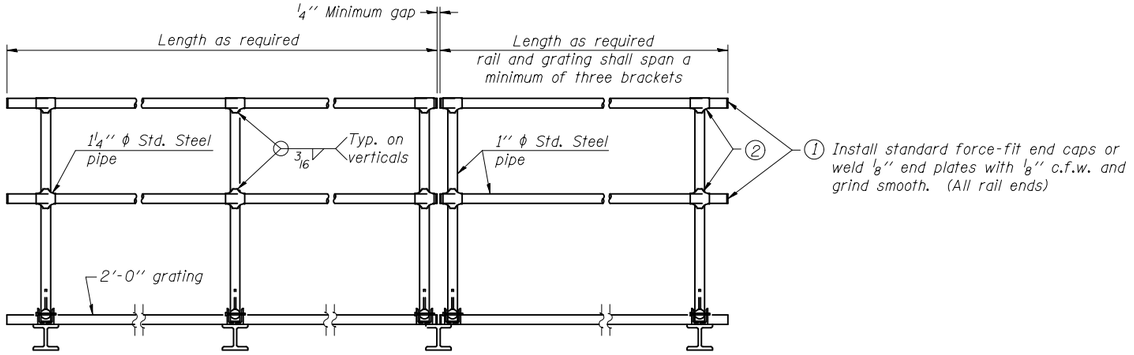
ILLINOIS FED. AID PROJECT



SIDE ELEVATION

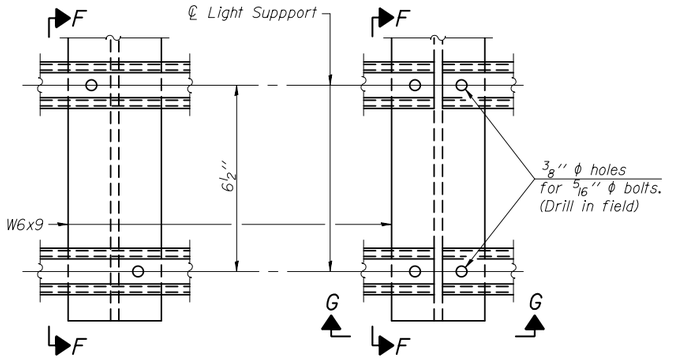
(Showing safety chain w/o sign)

HANDRAIL DETAILS



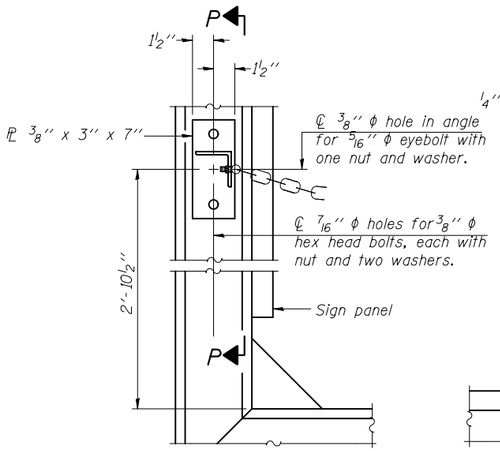
FRONT ELEVATION

(2) Horizontal handrail member shall be continuous thru 1¼"ϕ pipe. Provide 7/16" ϕ hole in 1¼"ϕ pipe for 3/8" ϕ bolt. Field drill 7/16" ϕ hole in horizontal rail member. Provide washer and locknut for bolt. (Use 5/16" eyebolts in 7/16" ϕ holes on top rail at ends only.)



DETAIL F

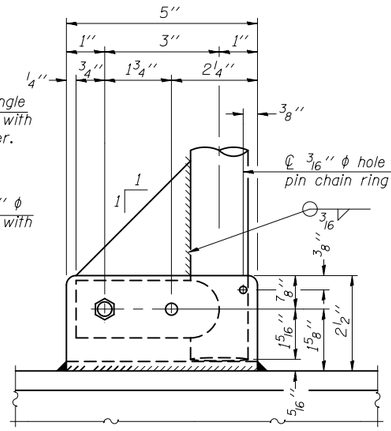
DETAIL G



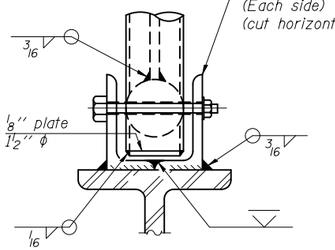
ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)

Items not shown same as "Side Elevation" of "Handrail Details"

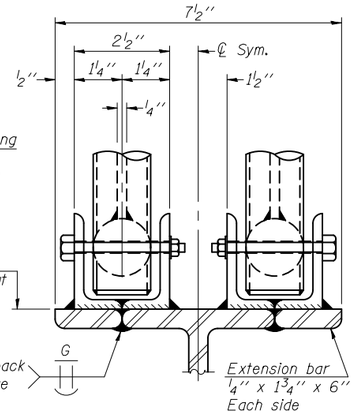


SIDE ELEVATION

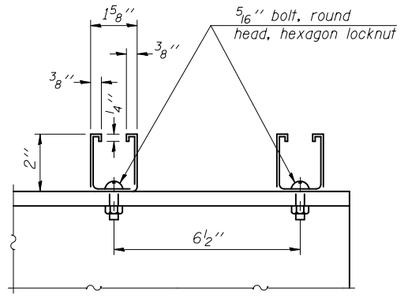


FRONT ELEVATION

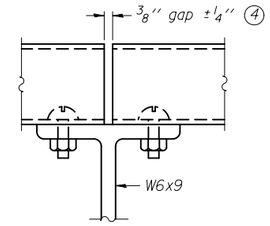
See "ELEVATION" at right for dimensions.



ELEVATION AT HANDRAIL JOINT



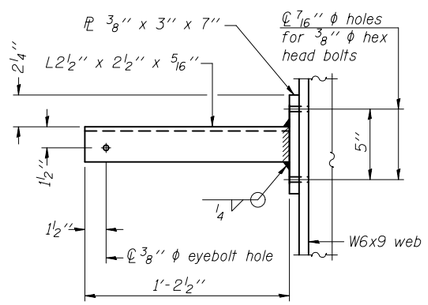
SECTION F-F



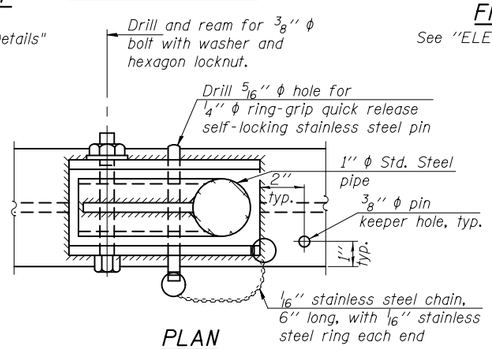
SECTION G-G

LIGHTING FIXTURE MOUNTS (IF REQUIRED)

(4) Field cut ends of light support channels shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

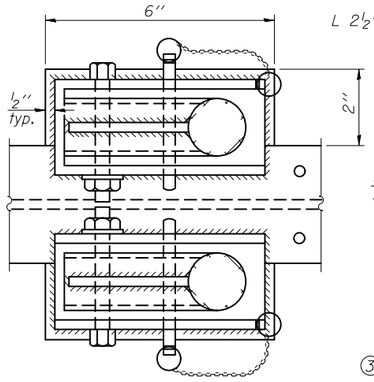


SECTION P-P



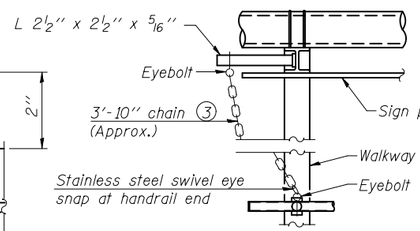
PLAN

DETAIL E HANDRAIL HINGE



PLAN AT HANDRAIL JOINT

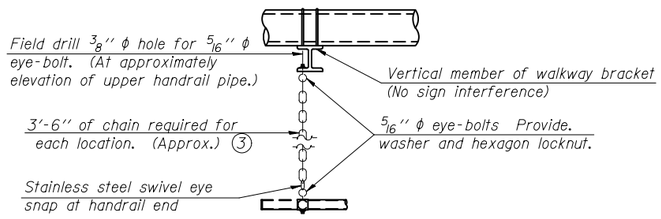
Details not shown same as "PLAN"



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.

(3) 3/16" Type 304L stainless steel chain, approximately 12 links per foot.

OS-S-11 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

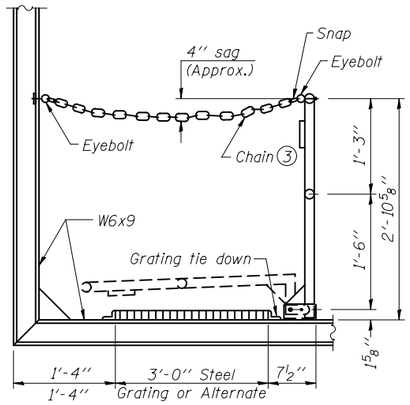
OVERHEAD SIGN STRUCTURES
STEEL HANDRAIL DETAILS

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

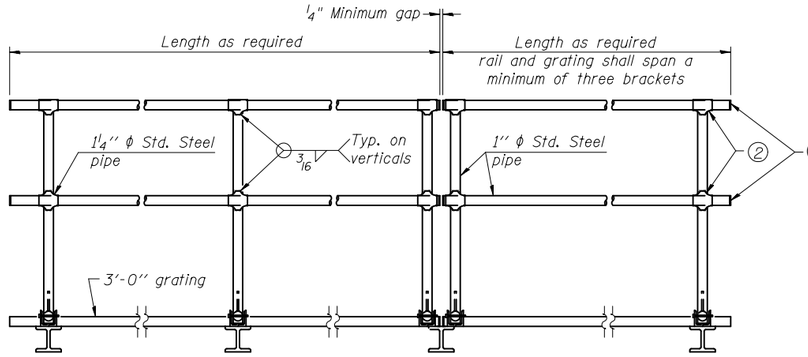
ILLINOIS FED. AID PROJECT



SIDE ELEVATION

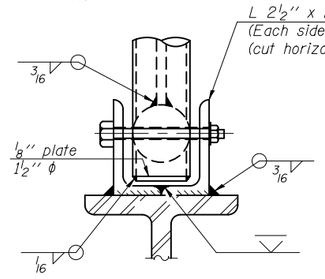
(Showing safety chain w/o sign)

HANDRAIL DETAILS



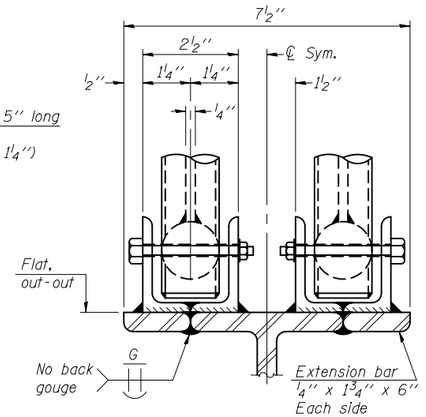
FRONT ELEVATION

(2) Horizontal handrail member shall be continuous thru 1 1/4''ϕ pipe. Provide 7/16'' ϕ hole in 1 1/4''ϕ pipe for 3/8'' ϕ bolt. Field drill 7/16'' ϕ hole in horizontal rail member. Provide washer and locknut for bolt. (Use 5/16'' eyebolts in 7/16'' ϕ holes on top rail at ends only.)

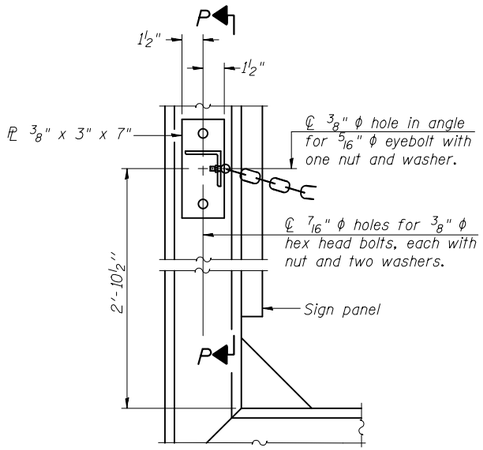


FRONT ELEVATION

See "ELEVATION" at right for dimensions.



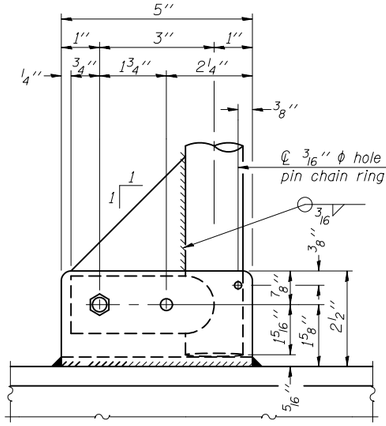
ELEVATION AT HANDRAIL JOINT



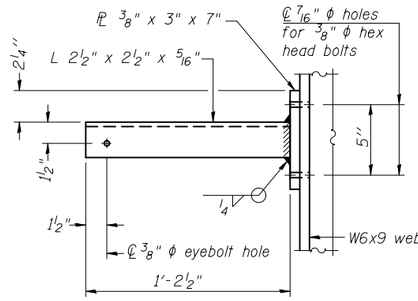
ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)

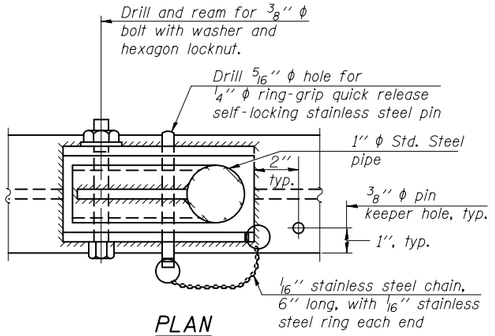
Items not shown same as ''Side Elevation'' of "Handrail Details"



SIDE ELEVATION

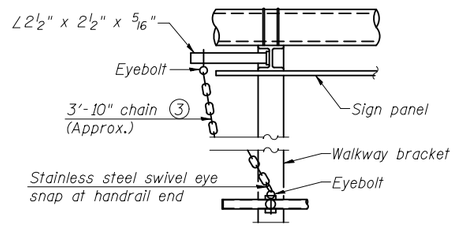


SECTION P-P



PLAN

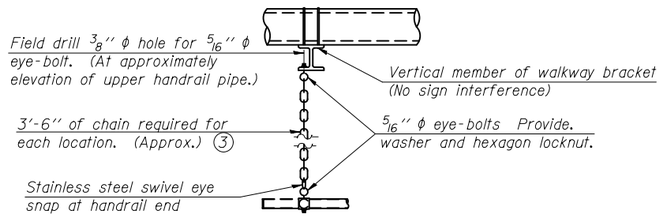
DETAIL E HANDRAIL HINGE



ALTERNATE SAFETY CHAIN ATTACHMENT

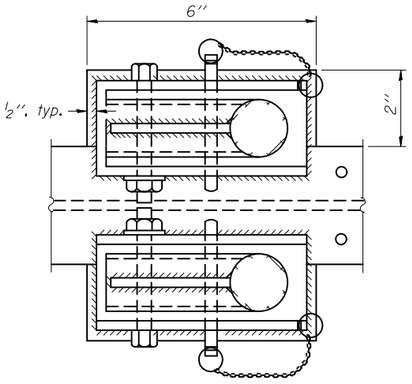
Details not shown similar to ''Safety Chain'' Details

(Walkway omitted for clarity)



SAFETY CHAIN

One required for each end of each walkway.



PLAN AT HANDRAIL JOINT

Details not shown same as "PLAN"

(3) 3/16'' Type 304L stainless steel chain, approximately 12 links per foot.

OS-S-11-DMS 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

OVERHEAD SIGN STRUCTURES – ALTERNATE
STEEL HANDRAIL DETAILS FOR DMS

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

Aesthetic Sign Structures

2.9 Steel Cantilever Sign Structures

Use galvanized steel cantilever trusses only for projects with aesthetic mandates requiring sign supports painted a specific color. To determine acceptable color alternatives and allow time for testing and pre-approval, consult the Bureau of Materials and Physical Research (BMPR) early in the planning process.

The current designs of cantilever sign structures with galvanized steel trusses originated for the Peoria area Interstate 74 project, which had an aesthetic mandate requiring structures painted black. To avoid potential problems with painting aluminum, the BBS designed galvanized steel trusses and the BMPR developed a “Painting Galvanized Steel Structures” special provision. A paint system of epoxy over-coated with urethane was already in use for bridges and compatible with application over pre-treated galvanized steel. In addition to the benefit of satisfying aesthetic mandates, the duplex system of paint over galvanizing may significantly extend the life of the structures’ corrosion protection.

Cantilever sign structures are usually more economical than span sign structures, but less economical than bridge mounted sign structures or break away signposts. The plan preparer should consider all MUTCD governing factors and alternatives before selecting cantilevers.

Do not use cantilever structures for installations with large walk-in changeable / dynamic / variable message sign cabinets - use only Type III-A or III-S span structures or butterfly structures with the sign centered on the column. When small, lightweight, front access LED variable message signs are proposed, use cantilever sign structures under the following limitations:

Type	Maximum Truss Length	Maximum VMS Sign Size, Weight
I-C-S	25 feet	4’ H. X 10’ W. X 1’ D. X 1200 lbs.
II-C-S	30 feet	5’ H. X 16’ W. X 1’ D. X 2000 lbs.
III-C-S	40 feet	8’ H. X 30’ W. X 1’-2” D. X 2500 lbs.

Alternate sign dimensions may be acceptable provided the proposed signs don’t exceed maximum weight and depth limitations and sign areas listed on the base sheets. Before using signs with alternate dimensions, consult with the BBS.

The use of these deeper signs will result in elimination of lighting and moving the walkway grating and handrail outward along the horizontal strut of the L-bracket. District offices may opt for plain sign brackets, with no walkway or lighting.

Use the following procedures when preparing plans:

1. Determine the 15-digit sign structure number, station, location of the sign over the roadway, distance from foundation to edge of pavement (D), design length (L), proposed height of sign (D_S), sign area and Elevation A for point of minimum clearance to lowest point on sign structure (usually the sign and walkway bracket). Select the appropriate structure from the three design types shown below:

Cantilever Type	Maximum Length (feet)	Maximum Sign Area (square feet)
I-C-S	25	170
II-C-S	30	340
III-C-S	40	400

With cantilever sign trusses, the maximum sign areas in the table above apply to any span length for each given truss type. For example, the

maximum sign area for a 28-foot Type II-C-S truss is 340 square feet. For a 32-foot Type III-C-S truss, the maximum sign area is 400 square feet.

2. Determine a constant panel spacing (P) by dividing the centerline column to end of truss cantilever length (L), minus the centerline column to first vertical distance ("s"), minus the last vertical to end of truss dimension (3 inches), into the least whole number of panels. Below are the panel spacing limits for each structure:

Cantilever Type	Panel Spacing (feet)
I-C-S	3.0 minimum to 4.0 maximum
II-C-S	3.5 minimum to 4.5 maximum
III-C-S	4.0 minimum to 5.5 maximum

3. Determine the column height (dimension H) using the following criteria:

   (a) Minimum vertical clearance is 17 feet 3 inches from Elevation A to sign, walkway support, or truss.

   (b) Top of foundation is a minimum of 2 feet and a maximum of 3 feet 6 inches above grade elevation at centerline of foundation.

   (c) The total column height must not exceed 30 feet, unless allowed by the BBS. Smaller sign areas on specific projects may allow taller columns.

   (d) Use a minimum sign height of 15'-0" to calculate the column height. To calculate H for a cantilever with walkway brackets: To Elevation A, add 17' 3" plus 1' 3" plus half the height of the tallest sign minus half the truss height, minus top of foundation elevation minus 2 ¾".

4. Obtain soil-boring data and determine the average Q_u per Section 1.6 for all strata within and below the "B" portion of the drilled shaft foundation. If average and minimum Q_u values meet the requirements of Section 1.6, the depth may be determined from the drilled shaft foundation standard OSC-S-9. As described in Section 1.6, if average and minimum Q_u values do not meet the requirements, the BBS must provide a depth or a special design.

5. With the information from Steps 3(b) and 4, and/or information obtained from the BBS, determine the drilled shaft vertical limits (Elevation Top, Elevation Bottom), and dimensions "A", "B", and "F".

6. Walkway and/or truss grating have two alternate sets of plans: 1-1/2 inch deep aluminum grating and galvanized steel plank grating. The plan preparer should consult District personnel for grating preference and select the correct sheets. Walkway grating should cover the full width of all signs and extend a minimum of 4 feet past the edge of pavement into the shoulder unless the shoulder width is less than 10 feet. If shoulder width is less than 10 feet or if the structure is on a low speed ramp, the walkway grating may begin at edge of pavement, while still covering the full width of all signs. Truss inspection grating extends full length of the truss, unless specifically exempted by the District and BBS. For projects that omit front walkway and lighting, details provide the option of plain vertical sign supports in lieu of the L-brackets.

7. Include the "Damping Device" base sheet OSC-S-D with all steel cantilever sign structure projects.

8. Fill in all tables on applicable base sheets including sign structure number, station, height of tallest sign, total sign area, column heights and sign bracket and foundation dimensions.

9. Calculate quantities as needed for foundations and complete the Total Bill of Material.

10. Submit proposed designs exceeding dimensional and/or loading limits to the BBS for special analysis and/or approval.

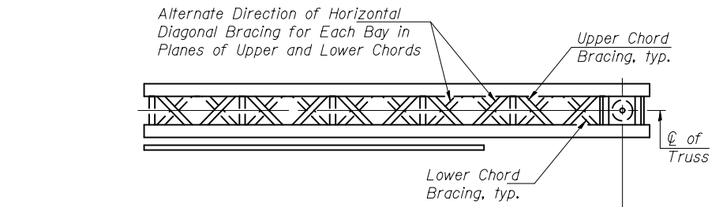
11. To provide uniformity for all steel cantilever sign structure plans, place the sheets in the following order:

    General Plan and Elevation (OSC-S-1)
    Steel Truss Details (OSC-S-2)
    Damping Device (OSC-S-D)
    Juncture Details (OSC-S-3)
    Truss Support Post Details for applicable steel cantilever truss types
    (i.e., OSC-S-4 for Type I-C-S, OSC-S-5 for Type II-C-S or III-C-S)
    Steel Walkway Details (OSC-S-6)
    Alternate Steel Walkway Details (OSC-S-6S) (optional)
    Steel Walkway Details (OSC-S-7)
    Alternate Steel Walkway Details (OSC-S-7S) (optional)
    Steel Handrail Details (OSC-S-8)
    Drilled Shaft Foundation (OSC-S-9)

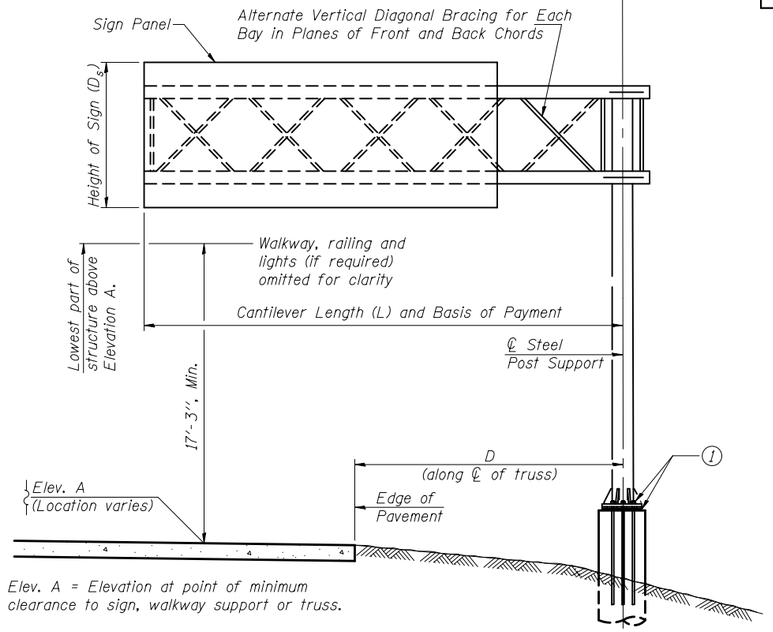
Steel Cantilever Sign Structure Standards

U. S. Standard Units

SHEET TITLE



TYPICAL PLAN
(Walkway not shown)



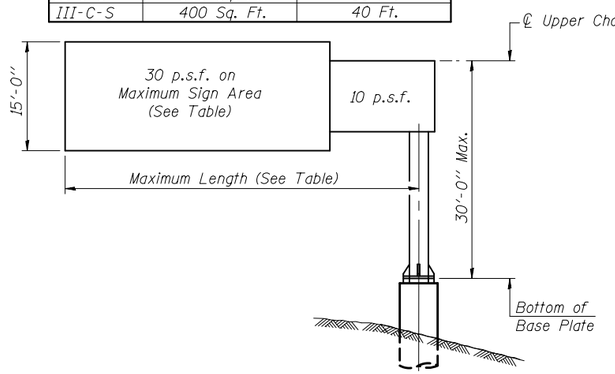
Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

TYPICAL ELEVATION
Looking in Direction of Traffic

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.

Structure Number	Station	Design Truss Type	Cantilever Length (L)	Elev. A	Dim. D	D_s	Total Sign Area

Truss Type	Maximum Sign Area	Maximum Length
I-C-S	170 Sq. Ft.	25 Ft.
II-C-S	340 Sq. Ft.	30 Ft.
III-C-S	400 Sq. Ft.	40 Ft.



DESIGN WIND LOADING DIAGRAM
Parameters shown are basis for I.D.O.T. Standards Installations not within dimensional limits shown require special analysis for all components.

(I) After adjustments to level truss and insure 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.

Note:
Trusses shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The contractor is responsible for maintaining the configuration and protection of the trusses.

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND VELOCITY

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

ALLOWABLE UNIT STRESSES:
Structural Steel - 20,000 p.s.i.
Reinforcing Steel - 20,000 p.s.i.
Class SI Concrete - 1,400 p.s.i.

Allowable unit stresses due to wind load in combination with other forces, are increased 1.33

MINIMUM CLEARANCE: Vertical Roadway Clearance = 17'-3'' (All Obstructions)

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.

MATERIALS: All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.
All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 36, Gr. 50 or Gr. 50W* (M183, M223 Gr. 50 or M222). Stainless steel for 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.

FASTENERS FOR STEEL TRUSSES: All bolts noted as ''high strength'' (HS) must satisfy the requirements of AASHTO M164 (ASTM A325), ASTM A449, or an Engineer approved alternate, and must have matching lock nuts and washers. All bolts, u-bolts, eye bolts, lock nuts and washers not specified to be "high strength" must satisfy the requirements of ASTM A307 Gr. B. All lock nuts must have nylon or steel inserts. High strength bolt installation shall conform to Article 505.04 (f) (2)d of the Standard Specifications. Rotational capacity (''ROCAP'') testing will not be
required. All bolts, locknuts and washers must be hot dip galvanized per AASHTO M232.

GALVANIZING: All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105.

CONCRETE SURFACES: All concrete surfaces above an elevation 6'' below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement Bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for "Concrete Foundations" or "Drilled Shaft Concrete Foundations" shall include: All necessary excavation or drilling (except in rock); backfilling with excavated material; disposal of unsuitable or surplus material; formwork; and furnishing and placing the Concrete, reinforcement bars, conduit, anchor bolts, nuts, washers and ground rods complete in place.

* If M270 Gr. 50W (M222) steel is proposed, chemistry for plate to be used shall first be approved by the Engineer as suitable for galvanizing and welding.

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE CANTILEVER TYPE I-C-S	Foot	
OVERHEAD SIGN STRUCTURE CANTILEVER TYPE II-C-S	Foot	
OVERHEAD SIGN STRUCTURE CANTILEVER TYPE III-C-S	Foot	
OVERHEAD SIGN WALKWAY-CANTILEVER TYPE S	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

OSC-S-1 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

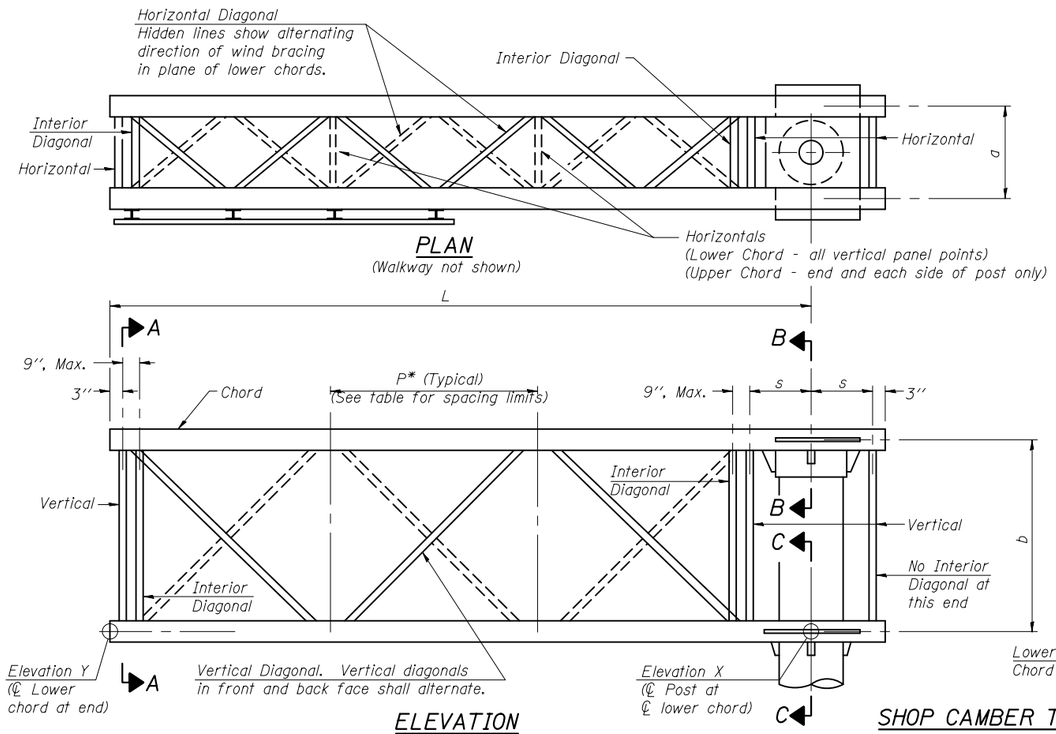
CANTILEVER SIGN STRUCTURES – GENERAL PLAN & ELEVATION – STEEL TRUSS & STEEL POST

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT

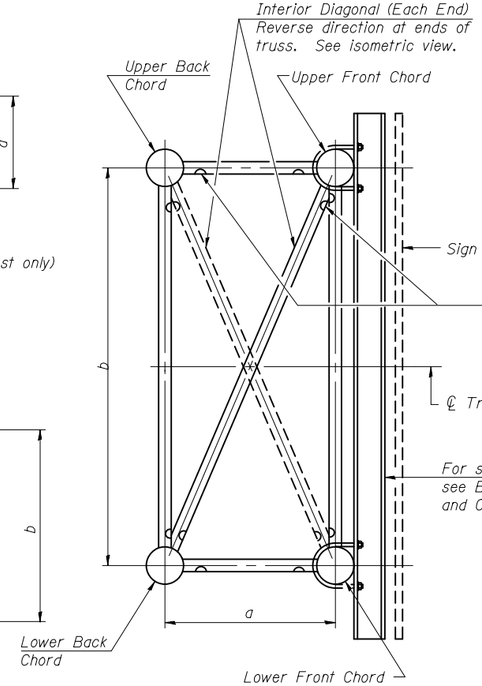


ELEVATION

(Sign and walkway omitted for clarity)

TYPICAL TRUSS UNIT

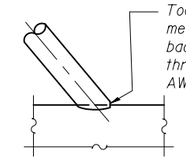
For Section B-B and Section C-C, see Base Sheet OSC-S-3.



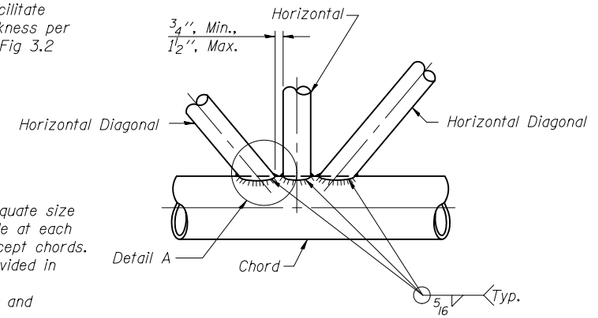
SECTION A-A

Galvanizing vent holes of adequate size shall be provided on underside at each end of all truss members except chords. Alternately, holes may be provided in wall of chords.
All vent holes shall be drilled and de-burred, typ.

For sign and walkway brackets, see Base Sheets OSC-S-6 and OSC-S-7.



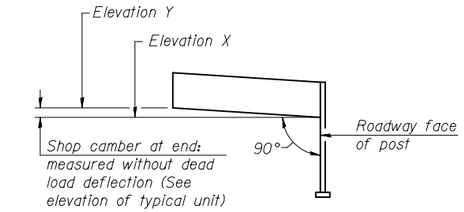
DETAIL A



TRUSS INTERIOR JOINT DETAIL

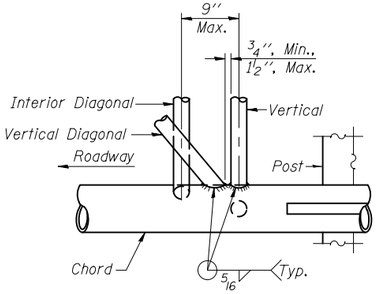
SHOP CAMBER TABLE

Unit Length (L)	Shop Camber at End
15′	2 1/2''
16′-17′	2 3/4''
18′-20′	3''
21′-22′	3 1/4''
23′-25′	3 1/2''
26′-27′	3''
28′-30′	3 1/4''
31′-32′	3 1/2''
33′-35′	3 3/4''
36′-37′	5''
38′-40′	5 1/2''



CAMBER DIAGRAM

(For Fabrication Only)



POST END JOINT DETAIL

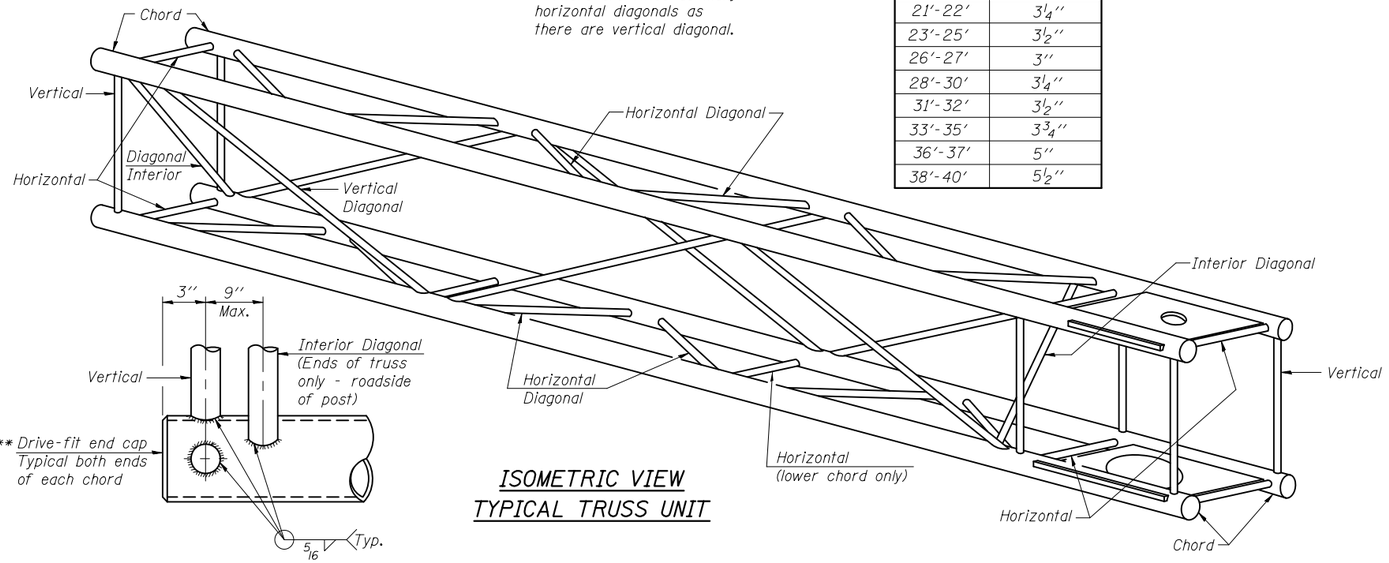
TRUSS UNIT TABLE

Truss Type	Dimension ''a''	Dimension ''b''	Dimension ''s''	Limits for Panel Spacing (P)*	Up. & Low. Chord O.D.	Up. & Low. Chord Wall	Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals O.D.	Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals Wall
I-C-S	24''	54''	16''	36'' Min. to 48'' Max.	5''	0.258''	2''	0.154''
II-C-S	36''	66''	21''	42'' Min. to 54'' Max.	6''	0.28''	2 1/2''	0.203''
III-C-S (35′ Max.)	36''	84''	21''	48'' Min. to 66'' Max.	6''	0.344''	2 1/2''	0.203''
III-C-S (>35′ to 40′)	36''	84''	21''	48'' Min. to 66'' Max.	8''	0.322''	3''	0.216''

$*P = \frac{L - s - 3''}{\#\ Panels}$

Structure Number	Station	Truss Type	Design Length (L)	Number of Panels Per Unit	Panel Length (P)*

Note:
There are twice as many horizontal diagonals as there are vertical diagonal.



ISOMETRIC VIEW
TYPICAL TRUSS UNIT

CANTILEVER END JOINT DETAIL

** Contractor must use standard drive-fit cap to close ends after galvanizing. Drive-fit cap shall have 1/2'' ϕ drain holes at low edge.

OSC-S-2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
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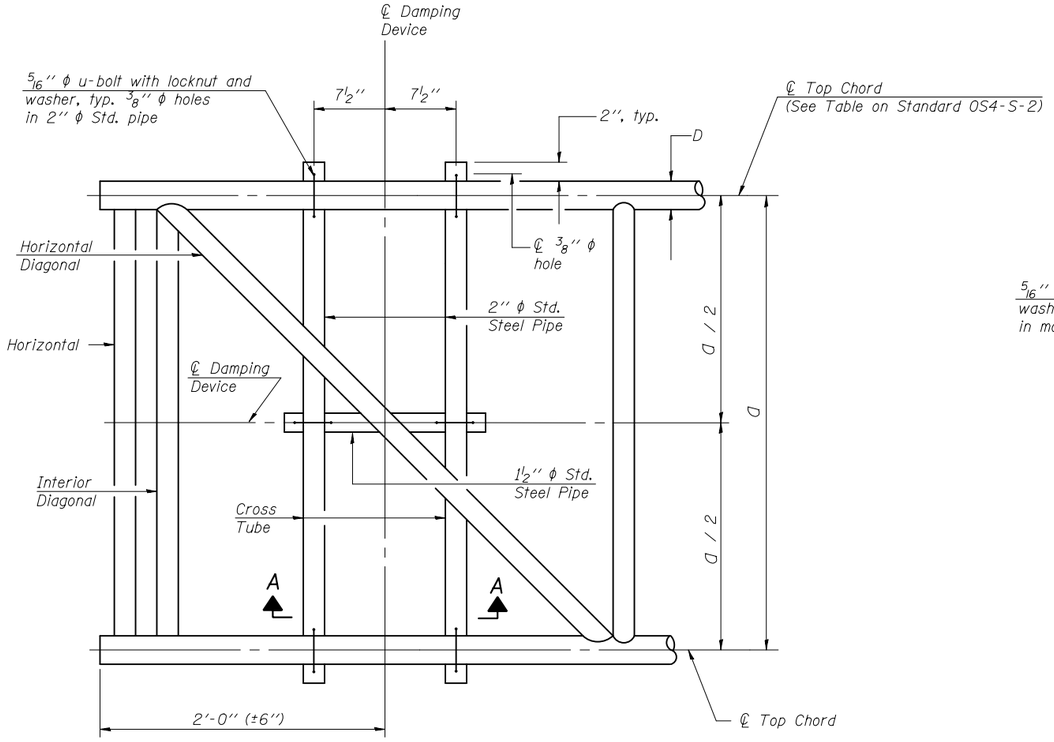
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

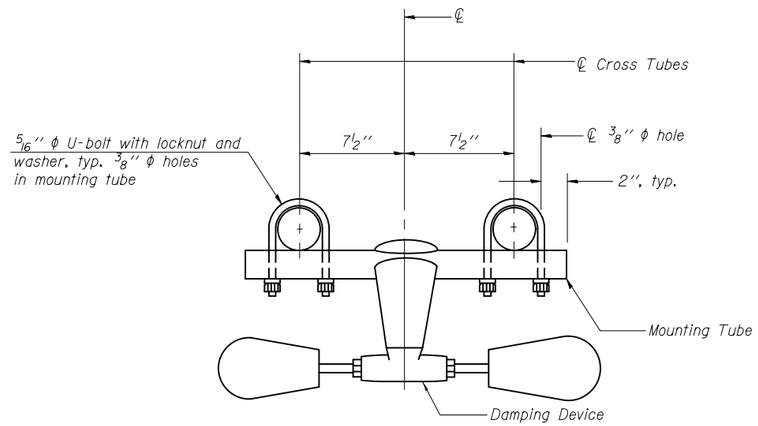
CANTILEVER SIGN STRUCTURES – TRUSS DETAILS
STEEL TRUSS & STEEL POST

SHEET NO. OF SHEETS

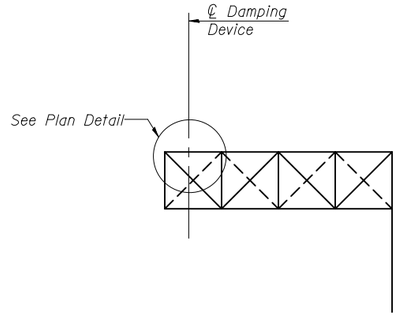
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



PLAN DETAIL



TRUSS DAMPING DEVICE CONNECTION DETAIL

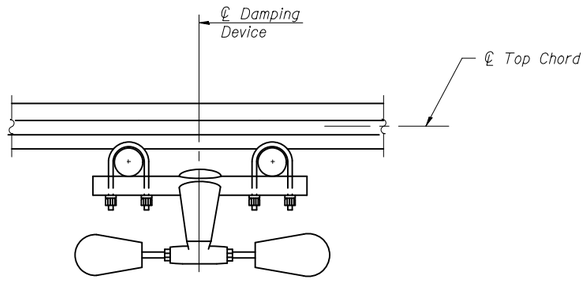


ELEVATION

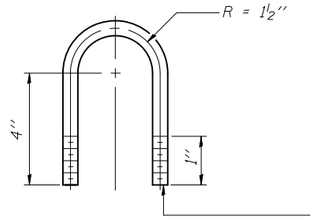
Steel Cantilever Sign Structure

GENERAL NOTES

Damper: One damper per truss. (31 Lbs. Stockbridge-Type - 29'' minimum between ends of weights)

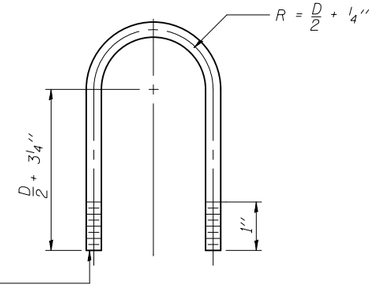


SECTION A-A



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL

(Typical)



TOP CHORD TO CROSS TUBE U-BOLT DETAIL

(Typical)

OSC-S-D 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

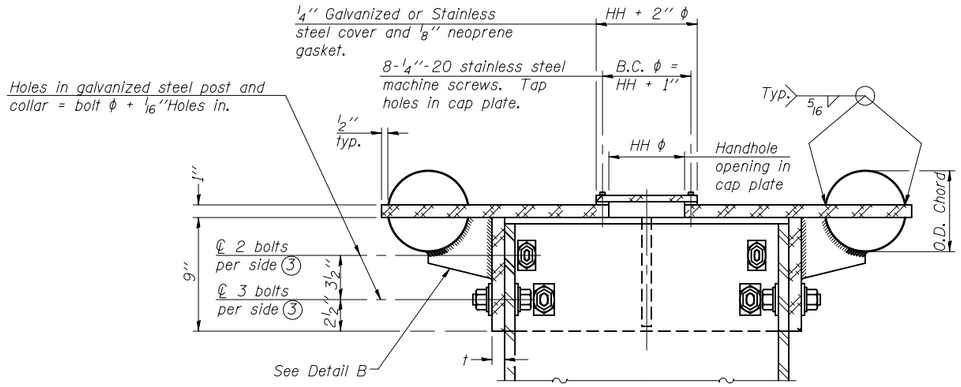
CANTILEVER SIGN STRUCTURES
DAMPING DEVICE

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

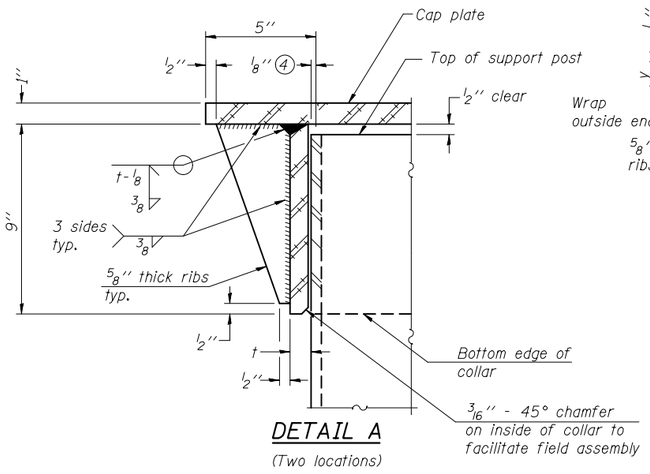
CONTRACT NO.

ILLINOIS FED. AID PROJECT



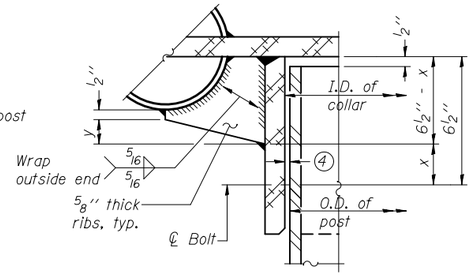
SECTION B-B

(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.



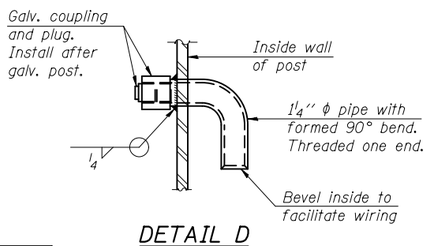
DETAIL A

(Two locations)

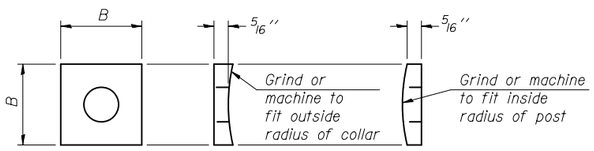


DETAIL B

Two locations
(For details not shown, see Detail C)

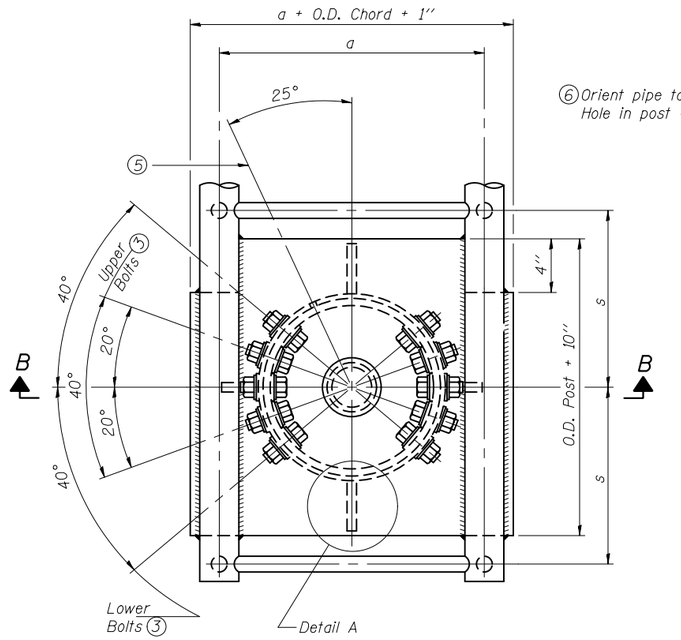


DETAIL D



CONTOURED WASHERS

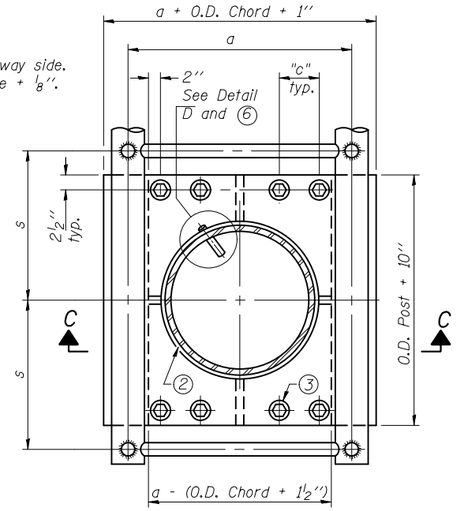
Bolt Size	Contoured Washers	
	Hole Dia.	B
7/8"	1"	2 3/4"
1"	1 1/8"	3"
1 1/4"	1 3/8"	3 1/4"



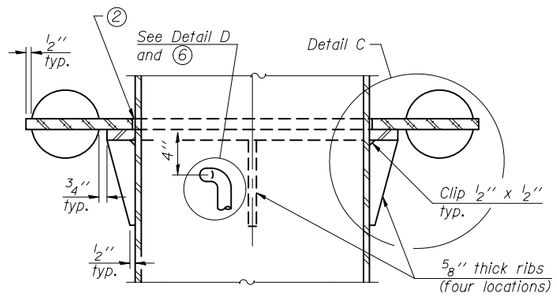
PLAN VIEW - TOP OF COLUMN

(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 walkway side. Hole in post = O.D. pipe + 1/8".



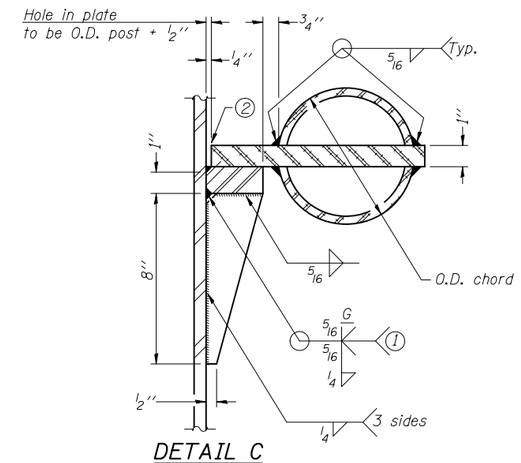
SECTION THRU POST ABOVE LOWER CHORDS



SECTION C-C

Truss Type	Post Size	Upper & Lower Connection Bolt Diameter (3)	Lower Juncture Bolt Spacing Dimension "c" (3)	Opening in Cap Plate "HH"	Collar Thickness (t)	Side Ribs	
						x	y
I-C-S	16" ϕ (107.5#/')	7/8"	3 1/4"	8"	5/8"	1 3/4"	2 1/4"
II-C-S	24" ϕ (125#/')	1"	3 1/2"	12"	7/8"	2"	1 1/4"
III-C-S (35' Max.)	24" ϕ (171#/')	1"	3 1/2"	12"	7/8"	2"	1"
III-C-S (>35' to 40')	24" ϕ (171#/')	1 1/4"	3 1/2"	12"	7/8"	2"	1"

(3) Upper and lower connection bolts in collar and bolts at lower chord connection must be high strength with matching lock nuts. Lower connection bolts must have 2 flat washers each.



DETAIL C

(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.

OSC-S-3 6-1-12

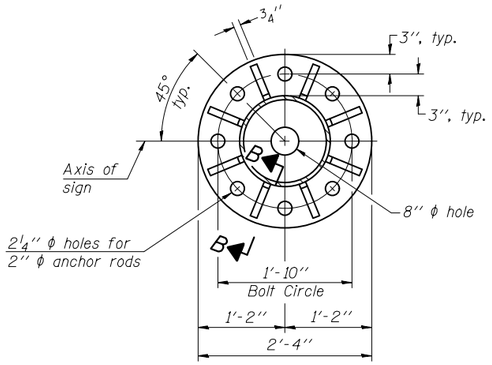
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

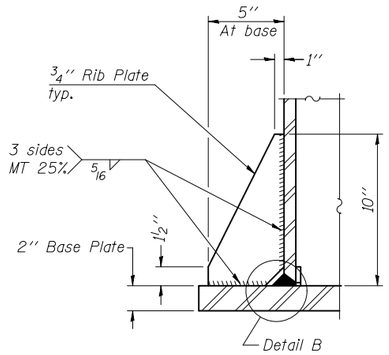
CANTILEVER SIGN STRUCTURES - JUNCTURE DETAILS
STEEL TRUSS & STEEL POST

SHEET NO. OF SHEETS

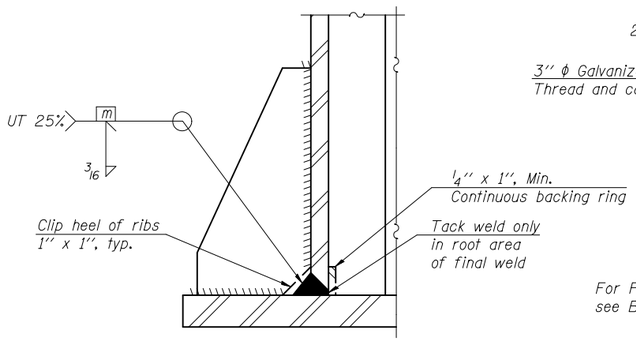
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



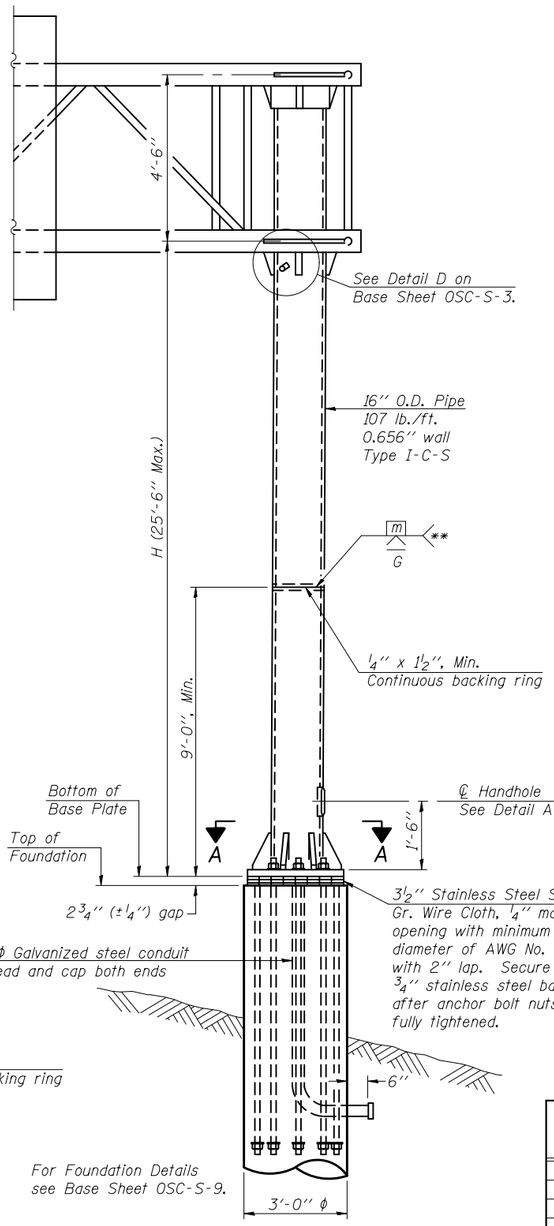
SECTION A-A



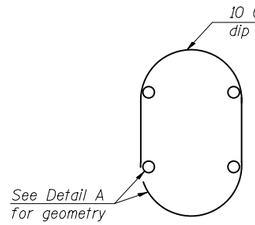
SECTION B-B



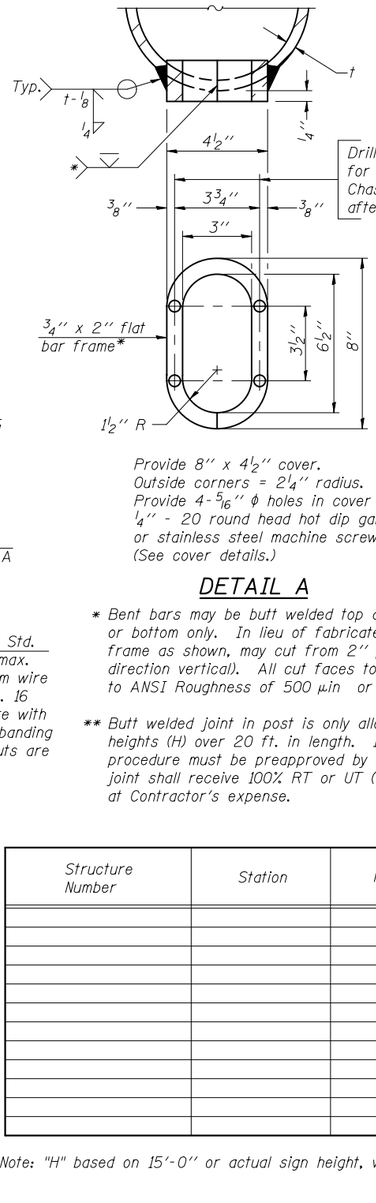
DETAIL B
(Typical rib)



FRONT ELEVATION



HANDHOLE COVER

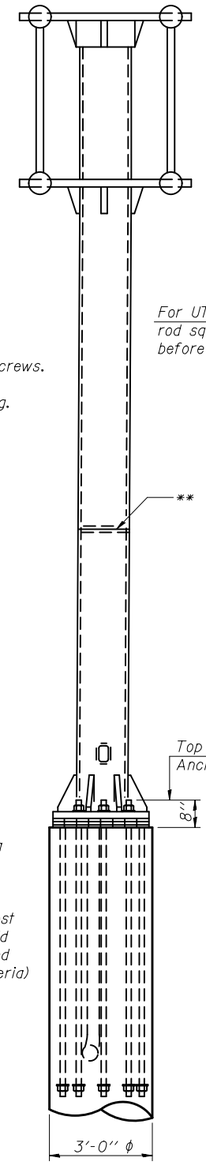


Provide 8'' x 4 1/2'' cover.
Outside corners = 2 1/4'' radius.
Provide 4-5/16'' ϕ holes in cover for 1/4'' - 20 round head hot dip galvanized or stainless steel machine screws.
(See cover details.)

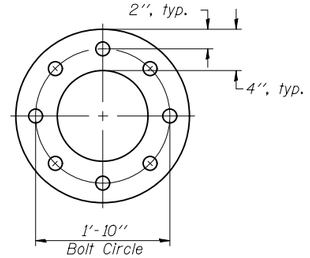
DETAIL A

* 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.

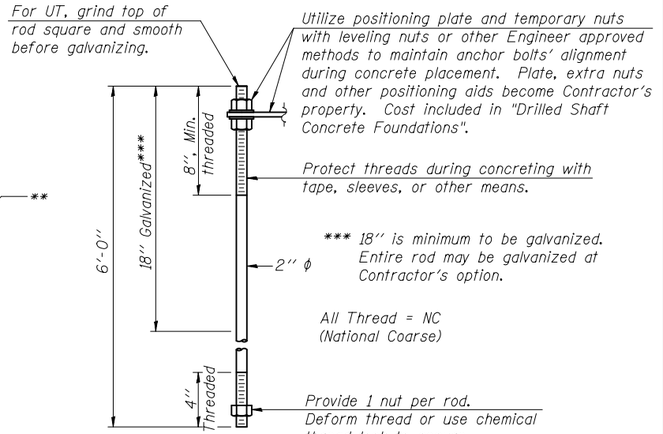
** Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.



SIDE ELEVATION



SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.

Structure Number	Station	H

Note: "H" based on 15'-0'' or actual sign height, whichever is greater.

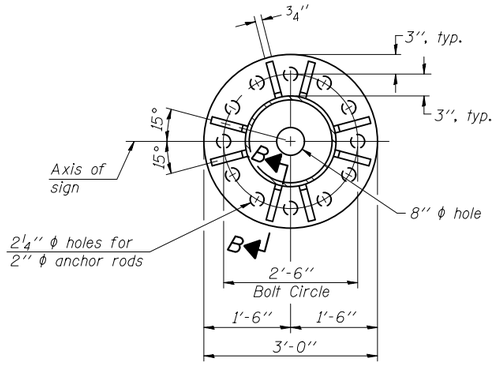
OSC-S-4 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

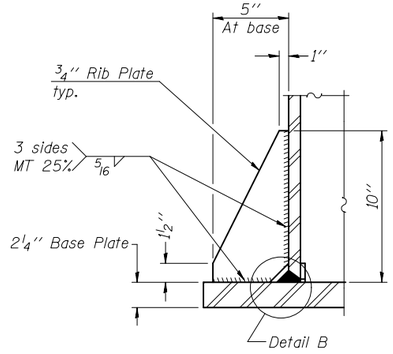
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – TYPE I-C-S TRUSS
SUPPORT POST – STEEL TRUSS & STEEL POST
SHEET NO. OF SHEETS

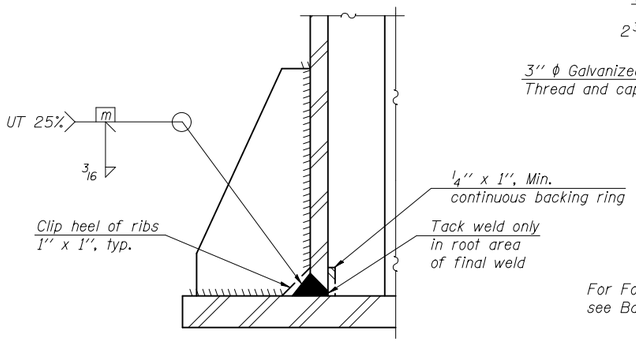
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



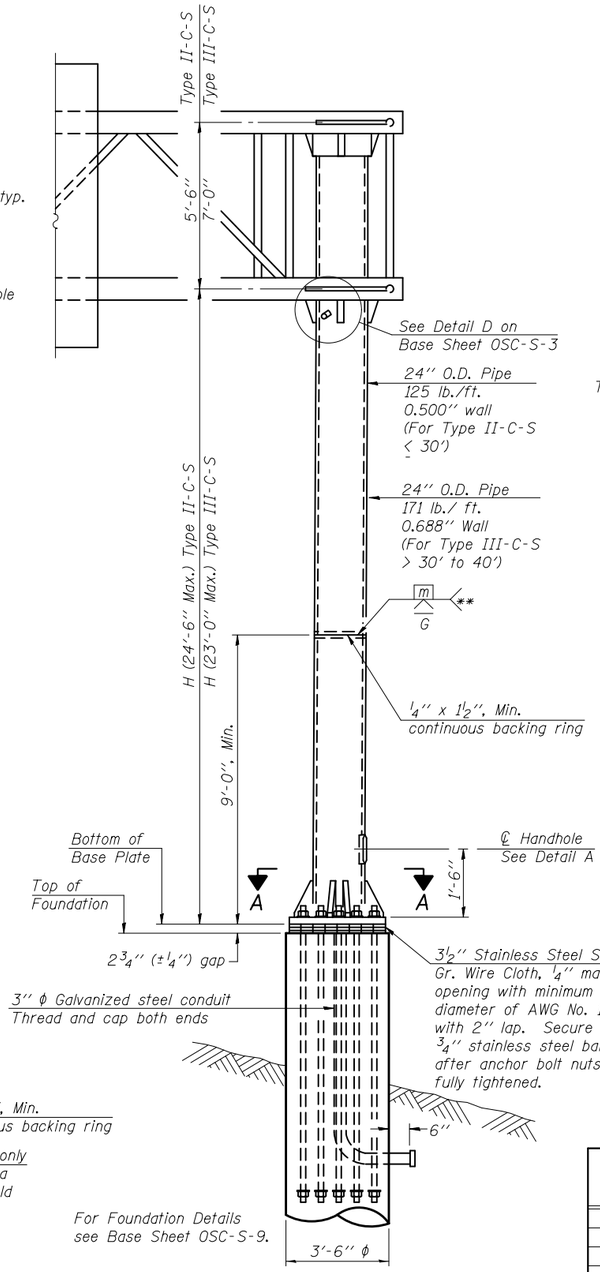
SECTION A-A



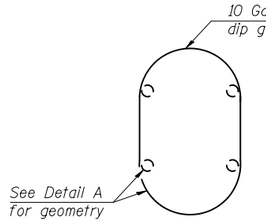
SECTION B-B



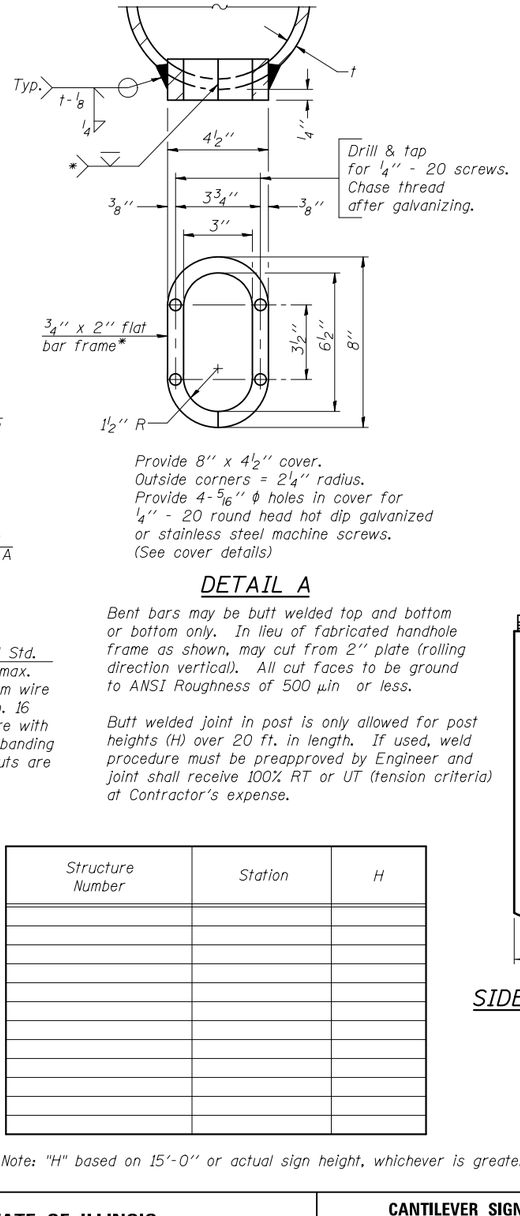
DETAIL B
(Typical rib)



FRONT ELEVATION



HANDHOLE COVER



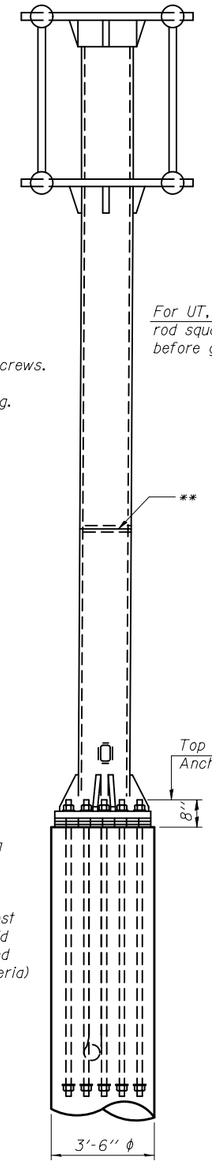
DETAIL A

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.

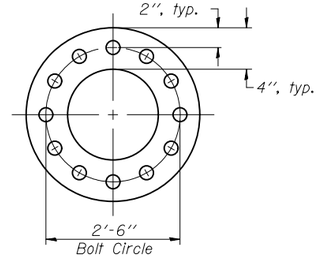
Butt welded joint in post is only allowed for post heights (H) over 20 ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT (tension criteria) at Contractor's expense.

Structure Number	Station	H

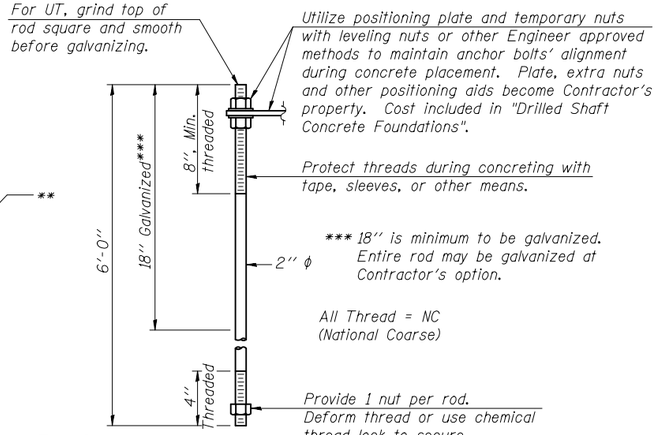
Note: "H" based on 15'-0'' or actual sign height, whichever is greater.



SIDE ELEVATION



SUGGESTED POSITIONING PLATE



ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM F1554 Grade 105. 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 rods. 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 rod 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 Drilled Shaft Concrete Foundations.

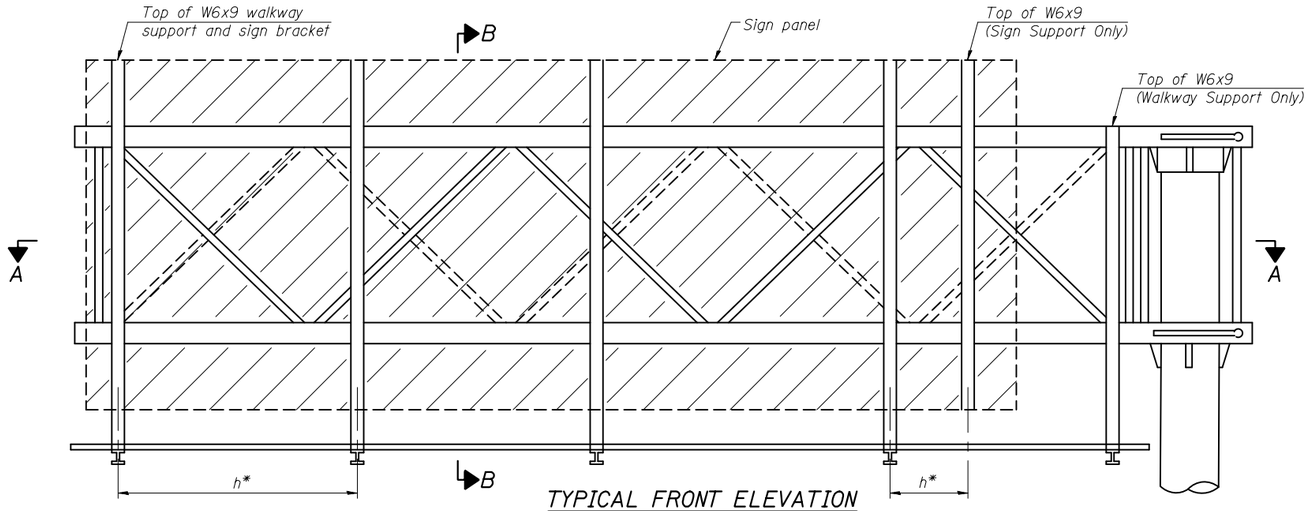
OSC-S-5 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

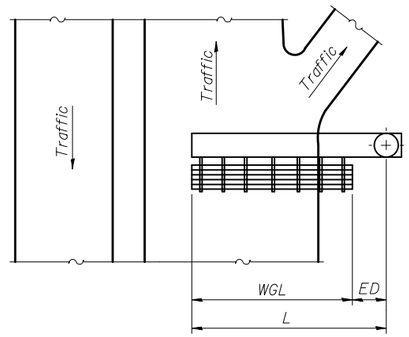
CANTILEVER SIGN STRUCTURES – TYPE II–C–S & III–C–S
TRUSS SUPPORT POST – STEEL TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



TYPICAL FRONT ELEVATION

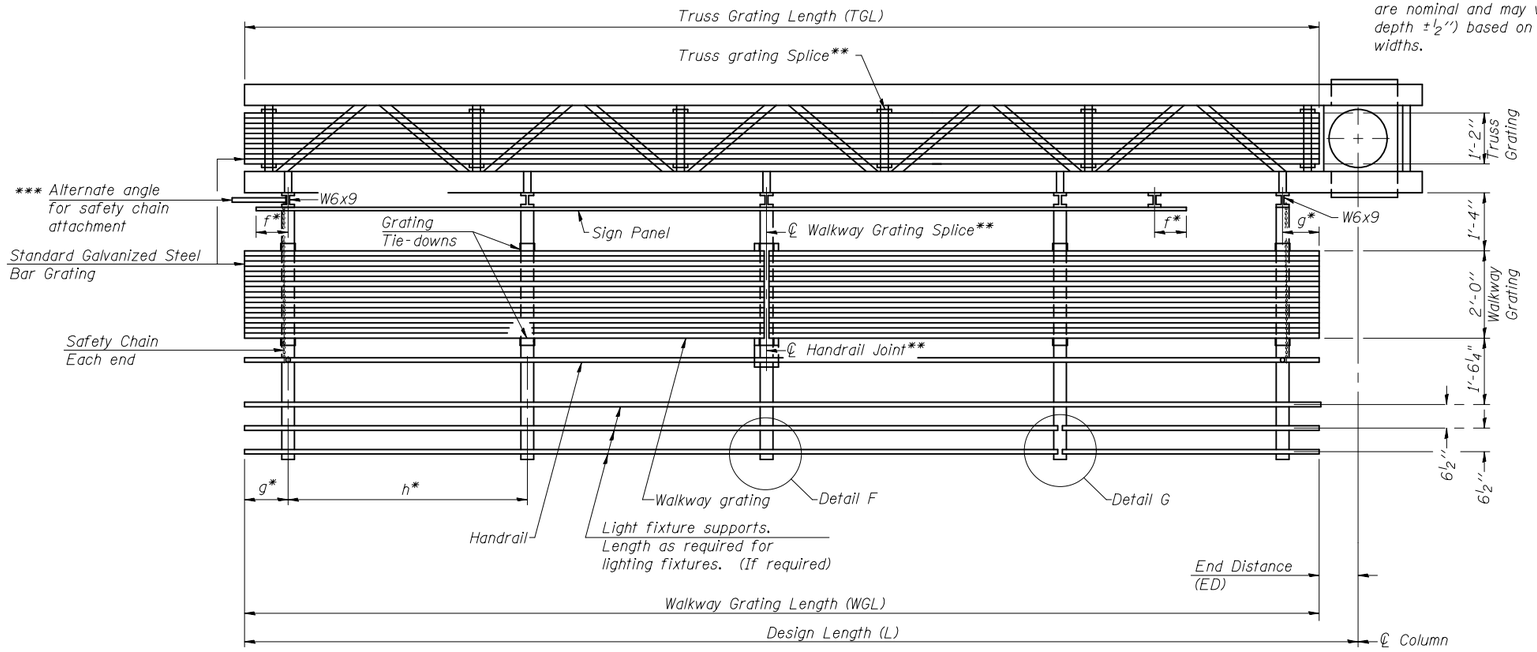
With lights and handrail omitted for clarity.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)

Walkway and truss grating dimensions are nominal and may vary (width ±½", depth ±½") based on available standard widths.



Structure Number	Station	WGL	ED	TGL

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 to ℄ of nearest bracket)
h = 6'-0" maximum (℄ to ℄ sign and/or walkway support brackets, W6x9)

*** If walkway bracket at safety chain location is behind sign, add angle to bracket. See alternate safety chain attachment on base sheet OSC-S-8.
For details of sign placement, sign/walkway brackets, truss and walkway gratings, grating splices and Section B-B, see Base Sheet OSC-S-7.
For details of handrail, handrail joint, safety chain and Details F and G, see Base Sheet OSC-S-8.

SECTION A-A

Truss grating to facilitate inspection shall run full length of cantilevers. Cost of truss grating is included in "Overhead Sign Structure Cantilever".

Handrail and walkway grating shall span a minimum of three brackets between splices.
** Use and location of handrail joints or grating splices are optional, based on lengths needed and material availability.

$$TGL = L - \left(\frac{\text{Post O.D.}}{2} + 6''\right)$$

BRACKET TABLE

W6x9		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	10'-0"	2
10'-0"	16'-0"	3
16'-0"	22'-0"	4
22'-0"	28'-0"	5
28'-0"	34'-0"	6

OSC-S-6 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

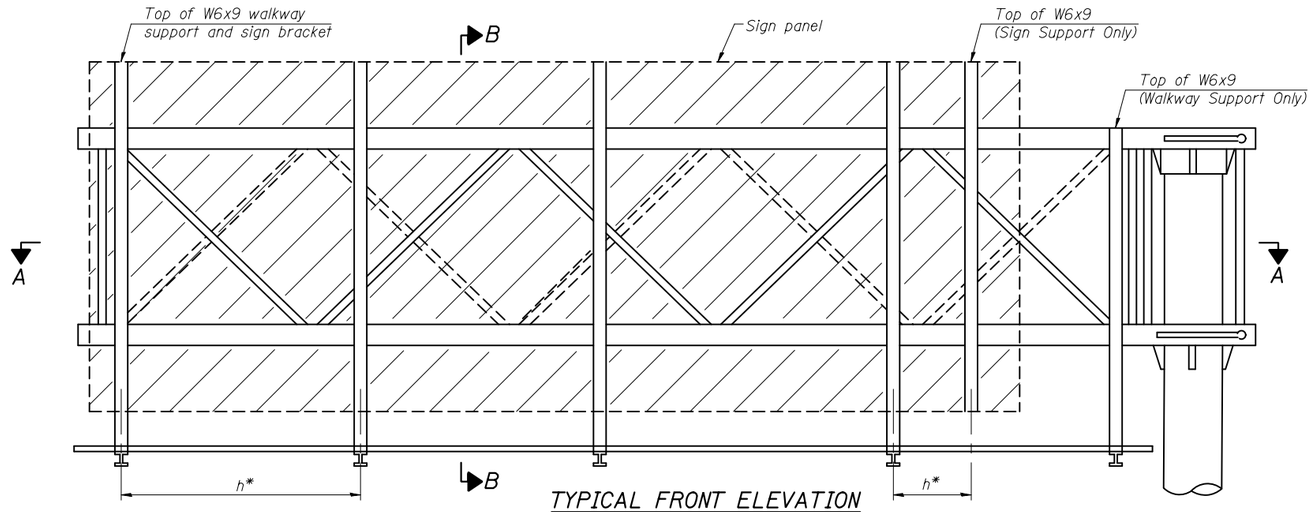
CANTILEVER SIGN STRUCTURES – WALKWAY DETAILS
STEEL TRUSS & STEEL POST

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

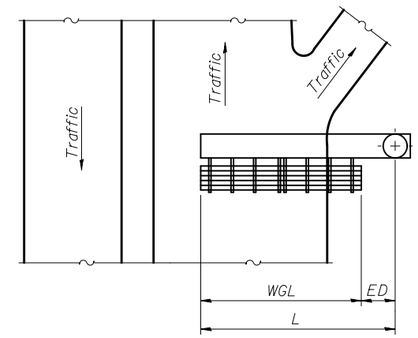
CONTRACT NO.

ILLINOIS FED. AID PROJECT



TYPICAL FRONT ELEVATION

With lights and handrail omitted for clarity.

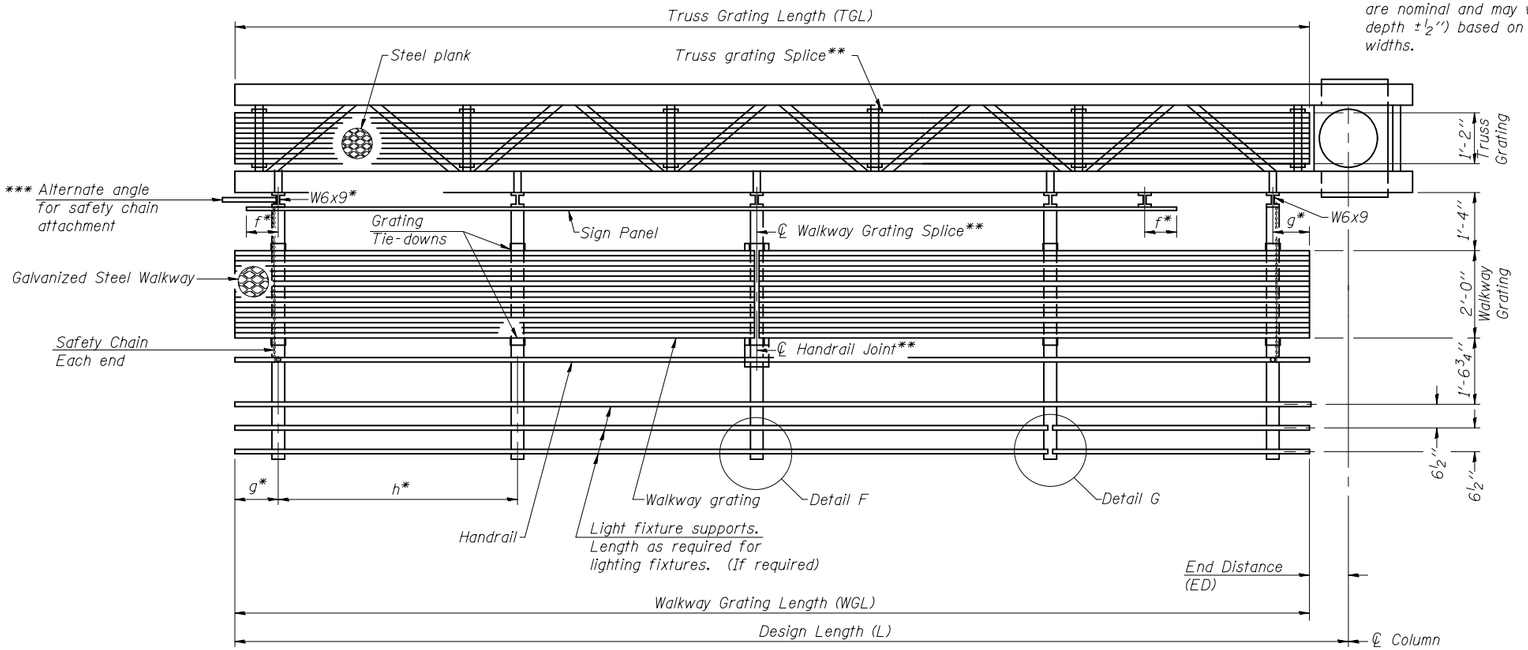


PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)

Walkway and truss grating dimensions are nominal and may vary (width ±½", depth ±½") based on available standard widths.

Structure Number	Station	WGL	ED	TGL



SECTION A-A

Truss grating to facilitate inspection shall run full length of cantilevers. Cost of truss grating is included in "Overhead Sign Structure Cantilever".

Handrail and walkway grating shall span a minimum of three brackets between splices.

** Use and location of handrail joints or grating splices are optional, based on lengths needed and material availability.

$$TGL = L - \left(\frac{\text{Post O.D.}}{2} + 6''\right)$$

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 to ℄ of nearest bracket)
  h = 6'-0" maximum (℄ to ℄ sign and/or walkway support brackets, W6x9)

*** If walkway bracket at safety chain location is behind sign, add angle to bracket. See alternate safety chain attachment on base sheet OSC-S-8.
For details of sign placement, sign/walkway brackets, truss and walkway gratings, grating splices and Section B-B, see Base Sheet OSC-S-7S.
For details of handrail, handrail joint, safety chain and Details F and G, see Base Sheet OSC-S-8.

BRACKET TABLE

W6x9		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

OSC-S-6S 6-1-12

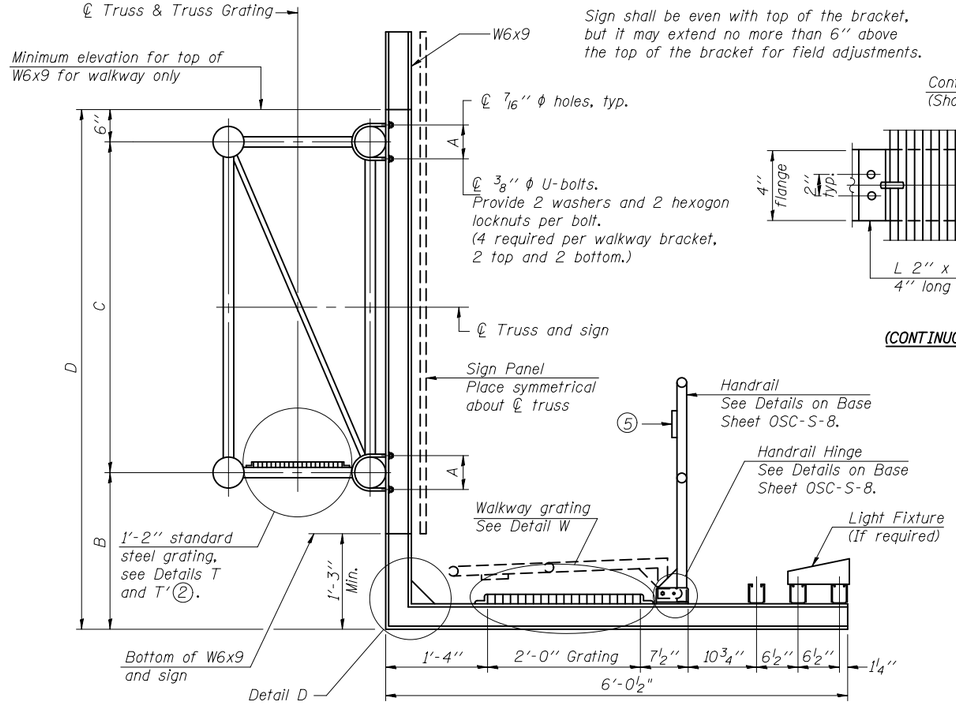
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

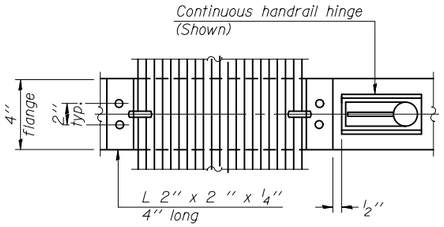
CANTILEVER SIGN STRUCTURES – ALTERNATE STEEL
WALKWAY DETAILS – STEEL TRUSS & STEEL POST

SHEET NO. OF SHEETS

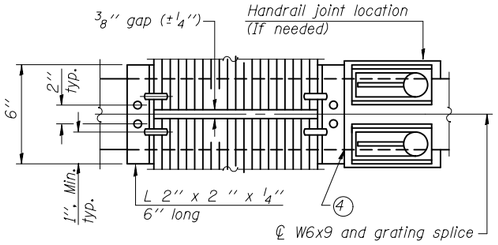
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



SECTION B-B

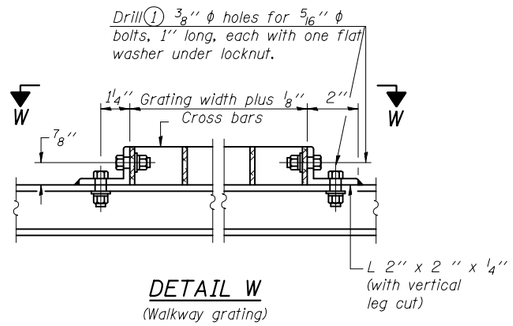


(CONTINUOUS WALKWAY GRATING)



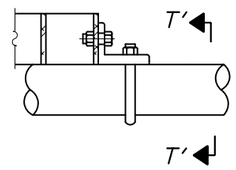
(AT WALKWAY GRATING SPLICE)

SECTION W-W



DETAIL W

(Walkway grating)



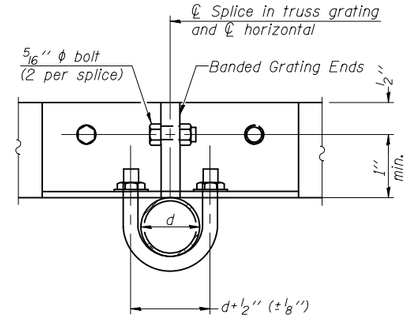
DETAIL T′

(Truss grating splice)
Details not shown same as Detail T.
Alternate materials may be used subject to the Engineer's review and approval.

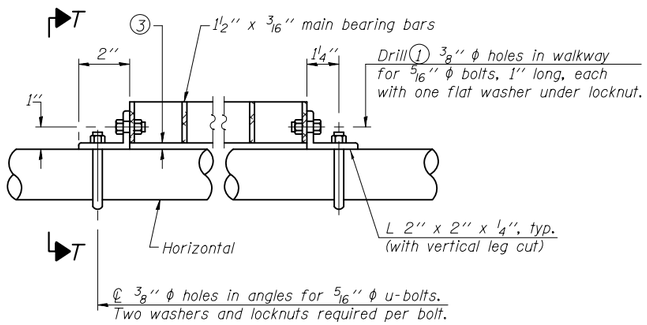
1. Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.
2. When truss grating must be spliced, use suggested detail or other methods subject to the Engineer's review and approval. Locate splice to avoid interference between cross bars and bolt locations.
3. Tube to grating gap may vary from 0 to 1/2" (max.) to align walkway, allow for camber, etc.
4. If Handrail Joint present, weld angle to W6x9 and 1/4" extension bars. (See Base Sheet OSC-S-8)
5. ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.
6. Based on actual sign height, Ds, given on OSC-S-1.

BAR SIZES FOR STANDARD STEEL GRATING

TRUSS GRATING	Main bearing bars 3/16″ x 1 1/2″ on 1 3/16″ centers. Cross bars 3/16″ x 1 1/2″ on 4″ centers.
WALKWAY GRATING	Main bearing bars 3/16″ x 1 1/2″ on 1 3/16″ centers. Cross bars 3/16″ x 1 1/2″ on 4″ centers.

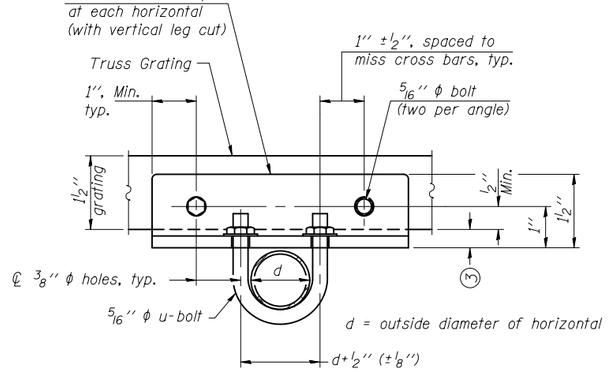


SECTION T′-T′

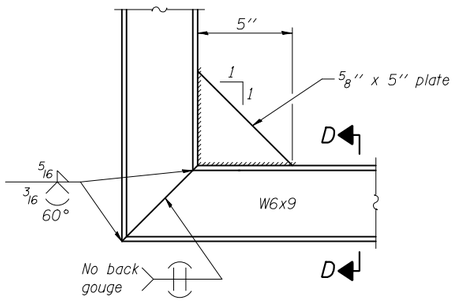


DETAIL T

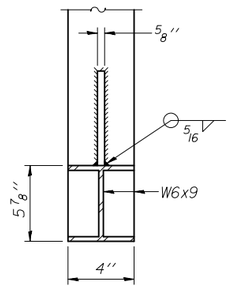
(Truss grating at horizontal)



SECTION T-T



DETAIL D



SECTION D-D

Structure Number	Station	A	(6) B	C	(6) D

OSC-S-7 6-1-12

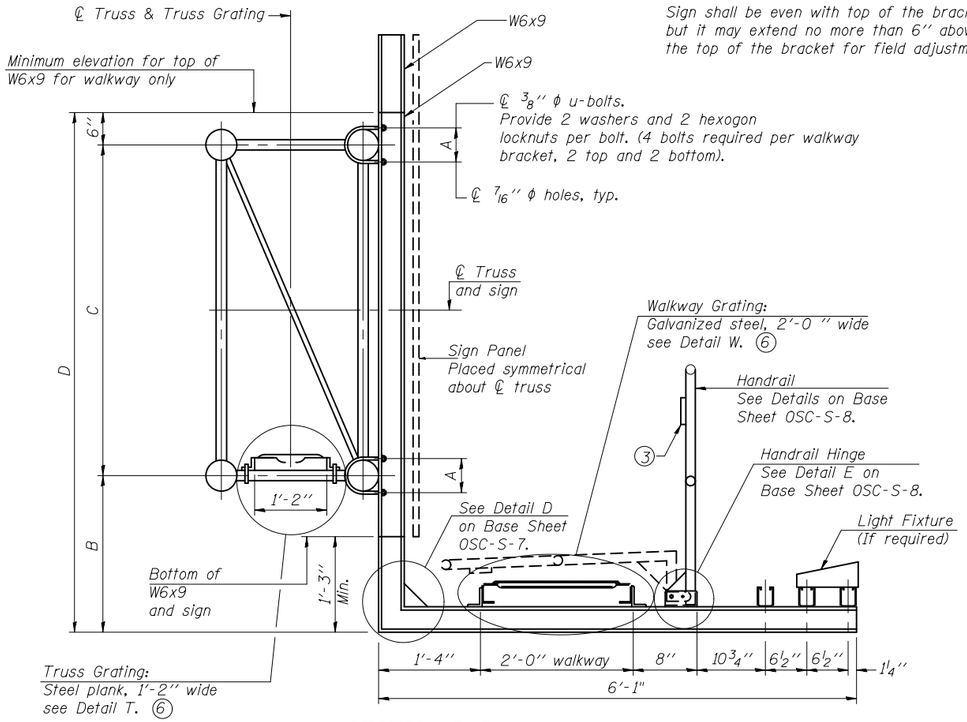
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – WALKWAY DETAILS
STEEL TRUSS & STEEL POST

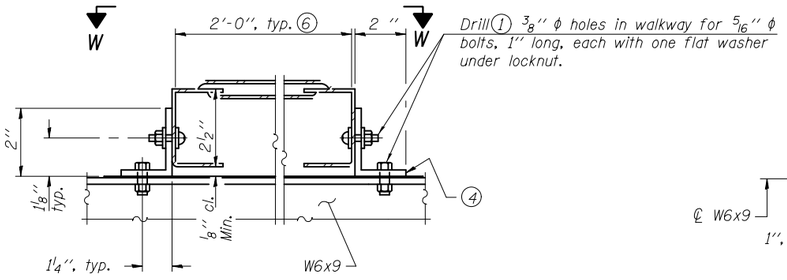
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

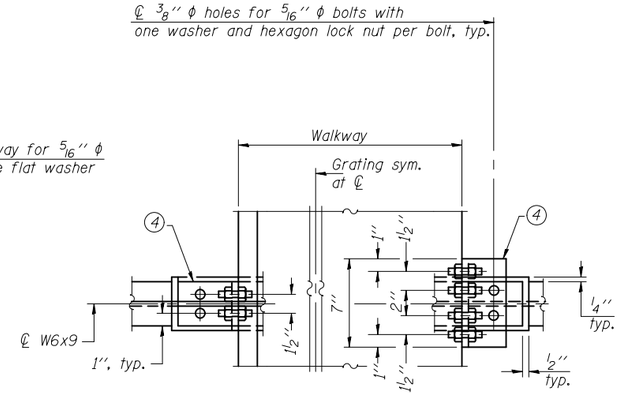


Sign shall be even with top of the bracket, but it may extend no more than 6" above the top of the bracket for field adjustments.

SECTION B-B

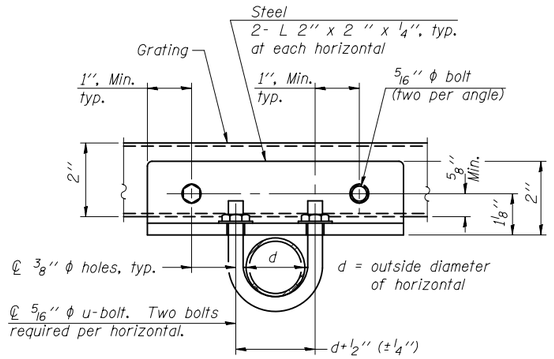


DETAIL W
GALVANIZED STEEL WALKWAY GRATING

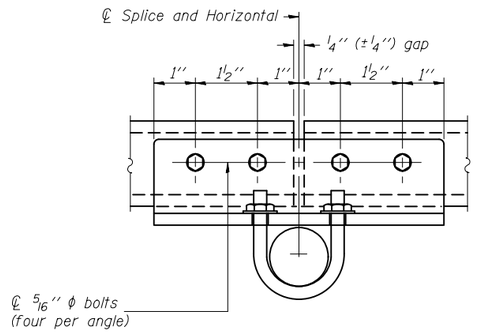


WALKWAY GRATING CONTINUOUS AT WALKWAY GRATING SPLICE

SECTION W-W

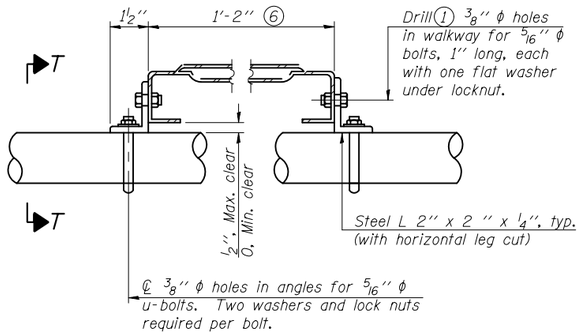


SECTION T-T
(Truss Grating Continuous)



SECTION T-T
(Truss grating splice)

Details not shown same as Section T-T. Alternate splice details and locations may be used subject to the Engineer's review and approval.



DETAIL T
(Truss Grating at Horizontal)

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 details or other methods in accord with grating manufacturer's recommendation and subject to the Engineer's review and approval.
3. ℄ 1/8" x 1/2" x 2" welded to handrail posts to protect locations that contact grating.
4. Galvanized steel L 2" x 2 " x 1/4", 3 1/2" long with continuous grating 7" long at grating splice.
5. Details shown are considered equal alternatives to Standard Steel Walkway Details and may be substituted by Contractor at no charge in contract cost.
6. Perforated or expanded metal grating providing a skid resistant (non-serrated) surface and capable of supporting a 500 pound concentrated load with a 6'-0" clear span. Walkway and truss grating dimensions are nominal and may vary (width ±1/2", depth ±1/2") based on available standard sizes. Cut ends of grating shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.
7. Based on actual sign height, D_S, given on OSC-S-1.

STEEL TRUSS GRATING

Structure Number	Station	A	(7) B	C	(7) D

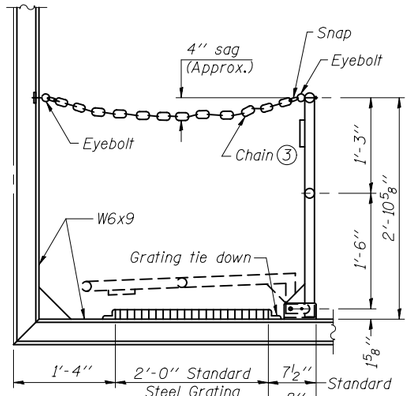
OSC-S-7S 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

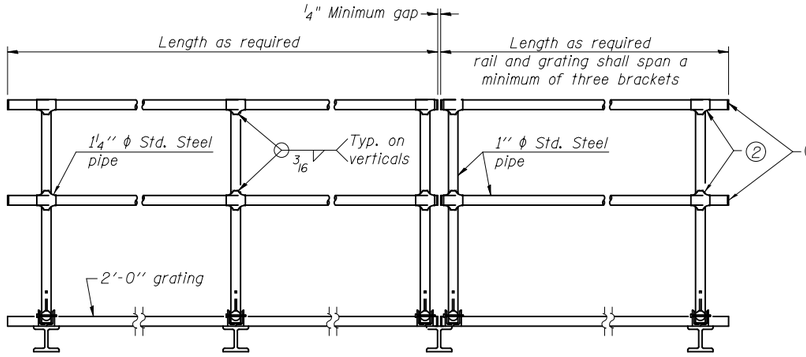
CANTILEVER SIGN STRUCTURES
ALTERNATE WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



SIDE ELEVATION

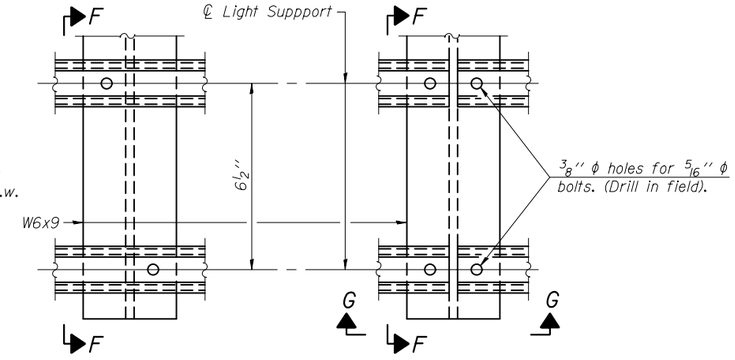
(Showing Safety Chain W/O Sign)



FRONT ELEVATION

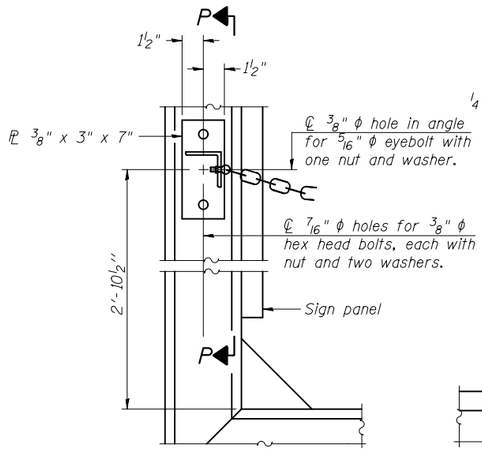
HANDRAIL DETAILS

(2) Horizontal handrail member shall be continuous thru $1\frac{1}{4}''\phi$ pipe. Provide $\frac{7}{16}''\phi$ hole in $1\frac{1}{4}''\phi$ pipe for $\frac{3}{8}''\phi$ bolt. Field drill $\frac{7}{16}''\phi$ hole in horizontal rail member. Provide washer and locknut for bolt. (Use $\frac{5}{16}''$ eyebolts in $\frac{7}{16}''\phi$ holes on top rail at ends only.)



DETAIL F

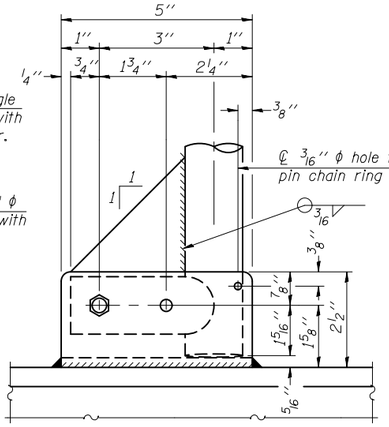
DETAIL G



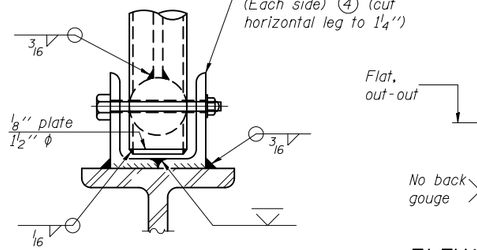
ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)

Items not shown same as "Side Elevation" of "Handrail Details"

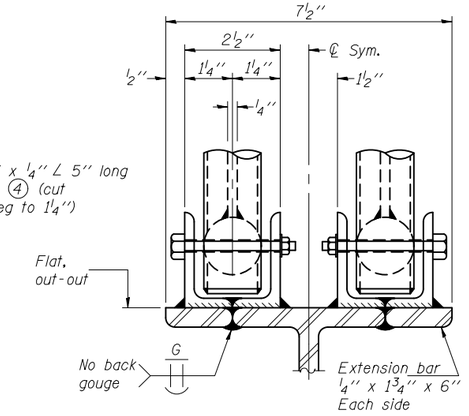


SIDE ELEVATION



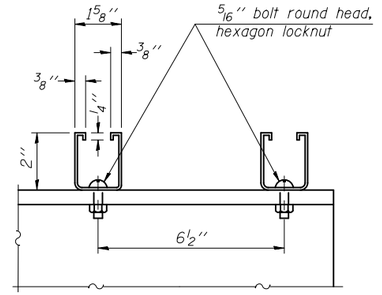
FRONT ELEVATION

Details not shown same as "ELEVATION" at right.

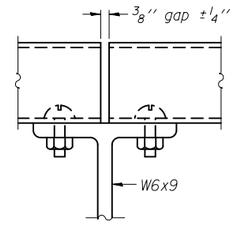


ELEVATION AT HANDRAIL JOINT

Details not shown same as "FRONT ELEVATION"



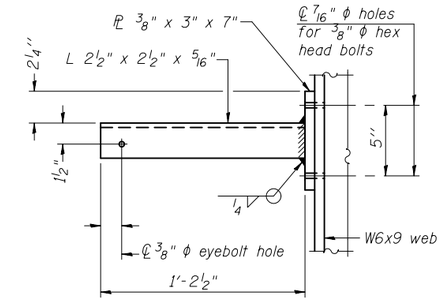
SECTION F-F



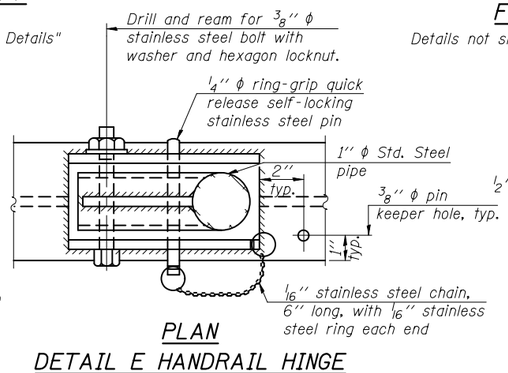
SECTION G-G

LIGHTING FIXTURE MOUNTS (IF REQUIRED)

(4) Field cut ends of light support channels shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.

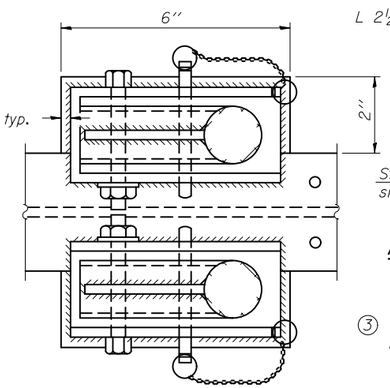


SECTION P-P



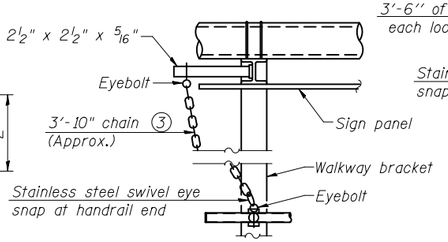
PLAN

DETAIL E HANDRAIL HINGE



PLAN AT HANDRAIL JOINT

Details not shown same as "PLAN"

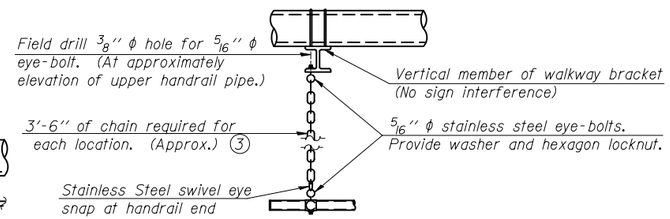


ALTERNATE SAFETY CHAIN ATTACHMENT

Details not shown similar to "Safety Chain" Details

(Walkway omitted for clarity)

(3) 3/16'' Type 304L Stainless steel chain, approximately 12 links per foot.



SAFETY CHAIN

One required for each end of each walkway.

OSC-S-8 6-1-12

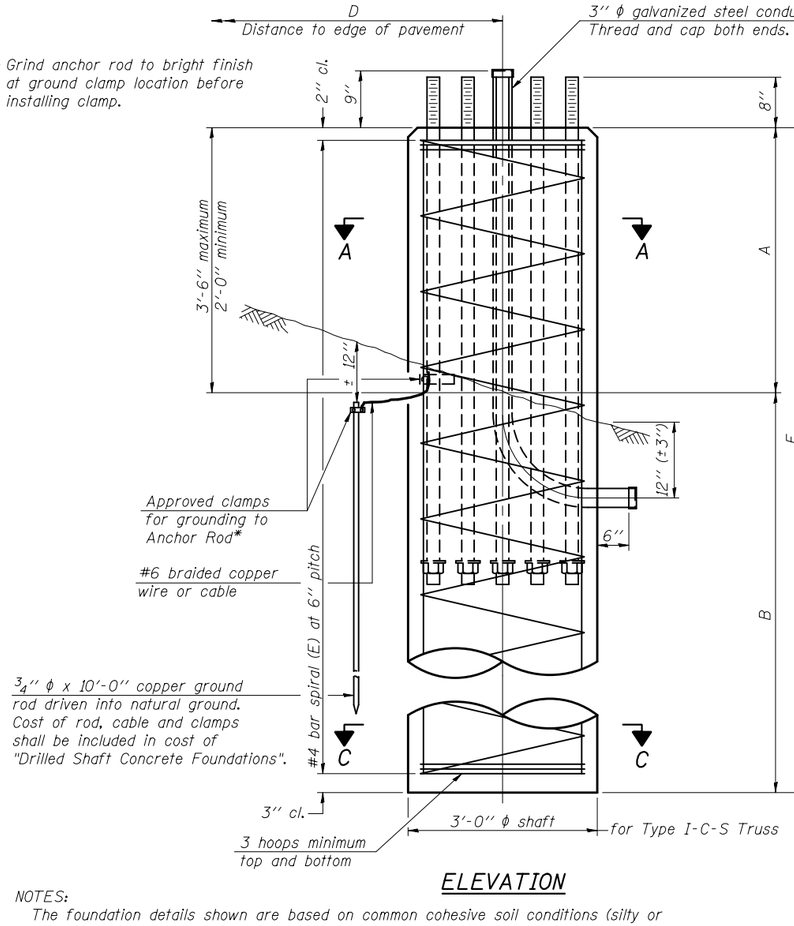
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

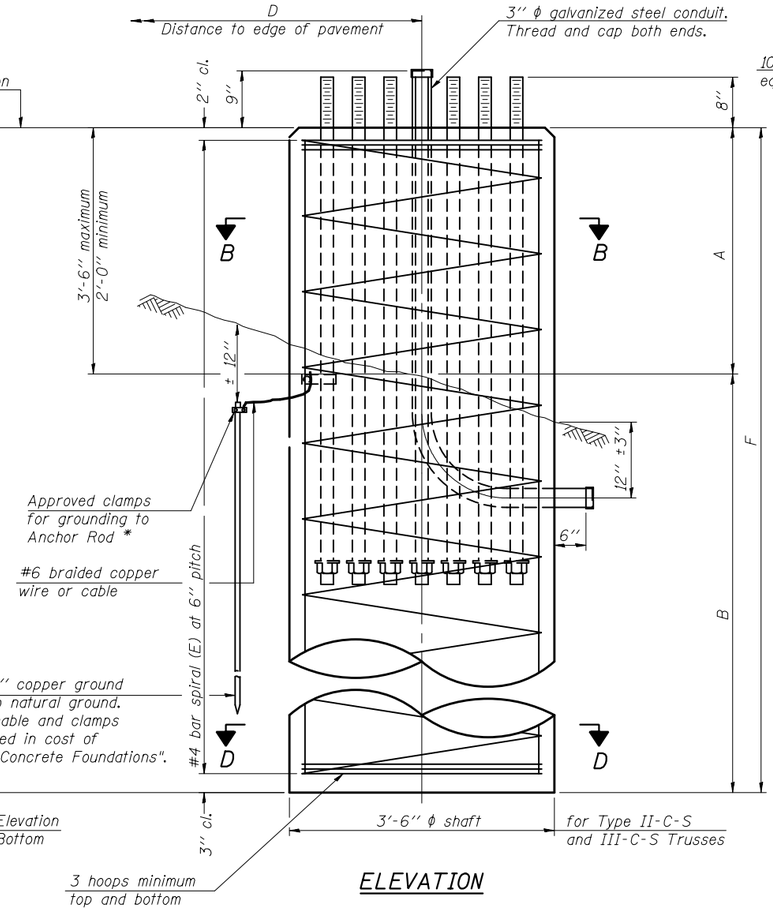
CANTILEVER SIGN STRUCTURES – HANDRAIL DETAILS
STEEL TRUSS & STEEL POST

SHEET NO. OF SHEETS

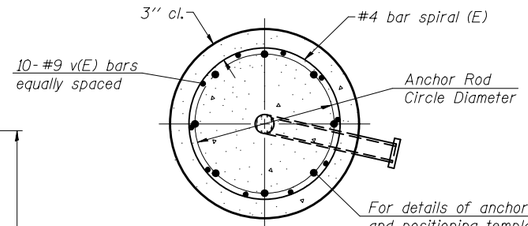
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
			CONTRACT NO.	
		ILLINOIS	FED. AID PROJECT	



ELEVATION

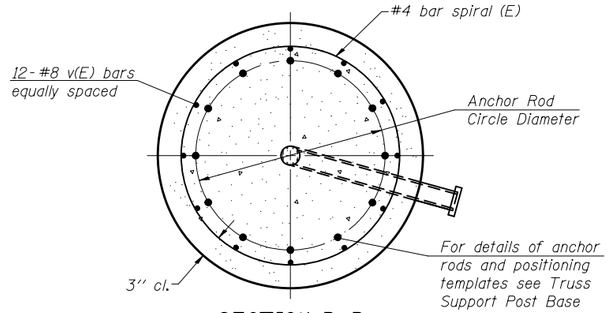


ELEVATION



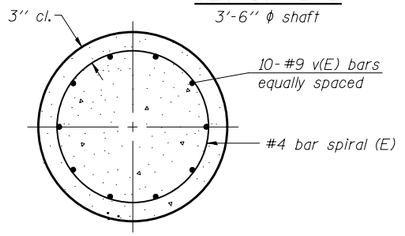
SECTION A-A

3'-0'' ϕ shaft



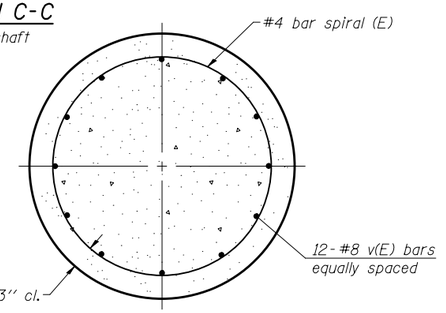
SECTION B-B

3'-6'' ϕ shaft



SECTION C-C

3'-0'' ϕ shaft



SECTION D-D

3'-6'' ϕ shaft

NOTES:

The foundation details shown are based on common cohesive soil conditions (silty or sandy clay) with an average Qu $\geq$ 1.25 ton/sq. ft. for all strata within the "B" portion of the foundation. "Qu", the soil's unconfined compressive strength, shall be determined by the Engineer from either hand penetrometer readings during construction or previous soil investigations at the site. For lower soil strengths or different soil types, the Engineer shall review pertinent data and determine any required revisions to the diameter, depth, reinforcement or configuration of the foundation. If changes are required by the Engineer, or if dimensions "B" and "F" are increased more than 12'' by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference. Actual "B", "Elevation Bottom", and average"Qu" values shall also be entered in the table on this sheet for permanent reference.

No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineers' written permission. Excavations shall be dewatered before concrete placement if directed by the Engineer at no additional cost.

Concrete shall be placed monolithically, without construction joints.

Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6'' below finished ground line. Cost included in Drilled Shaft Concrete Foundation.

FOUNDATION DATA

Truss Type	Post Base Sheet	Maximum CantileverLength (ft)	Maximum Total Sign Area (sq ft)	Shaft Diameter (in)	"B" Depth (ft)	Anchor Rods No.	Anchor Rods Diameter (in)	Anchor Rod Circle Diameter (in)
I-C-S	OSC-S-4	25	170	3.0	15.5	8	2	22
II-C-S	OSC-S-5	30	170	3.5	15.0	12	2	30
II-C-S	OSC-S-5	30	340	3.5	21.5	12	2	30
III-C-S	OSC-S-5	35	170	3.5	19.0	12	2	30
III-C-S	OSC-S-5	35	250	3.5	22.5	12	2	30
III-C-S	OSC-S-5	35	400	3.5	26.5	12	2	30
III-C-S	OSC-S-5	40	400	3.5	30.0	12	2	30

Structure Number	Station	Truss Type	Shaft Diameter	Elevation Top	Elevation Bottom	Qu	A	B	F	Class DS Concrete Cubic Yards

F = A + B

OSC-S-9 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

CANTILEVER SIGN STRUCTURES – DRILLED SHAFT
STEEL TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

Aesthetic Sign Structures

2.10 Steel Trichord Span Sign Structures

Steel trichord sign structure designs provide a span sign structure that is less expensive than a conventional box-type truss structure, has a smaller “footprint” at ground level and carries less total sign area or height for a given span length. The use of only a single column and shaft foundation at each end should fit in better with urban intersection or interstate applications where foundation space is limited.

For all steel trichord span sign structures, the maximum total sign area is 600 square feet and the maximum sign height is 15 feet, but may be taller for specific projects. Plan Preparers must use a box type span sign structure when the proposed tallest sign height or total area exceeds these limits. For locations requiring base mounting on bridge parapets or median barriers, the 36” diameter base is too bulky, so use only a box-type span sign structure with A-frame end supports. In addition, do not mount large sign panels on the single back chord member of a trichord. For locations requiring large signs on both faces of the truss, use only box trusses. For installations using changeable / dynamic / variable message sign cabinets, do not use trichords, use Type III-A or III-S structures only.

Galvanized steel trichords may be pre-treated and painted with the approved epoxy/urethane system for projects with aesthetic mandates, similar to the galvanized steel box truss structures in Section 2-8. To determine acceptable color alternatives and allow time for testing and pre-approval, consult the Bureau of Materials and Physical Research (BMPR) early in the planning process.

Use the following procedures when preparing trichord plans:

1. Determine the 15-digit sign structure number, station, location of the sign over the roadway, distance from right foundation to edge of pavement (D), design span length (center to center support frames), proposed height of sign(s) (D_S), total sign area and roadway Elevation A for point of minimum clearance to sign structure (sign, sign bracket, walkway support, or truss). Select the appropriate structure from the three designs shown below:

Trichord Type	TRI-I-S	TRI-II-S	TRI-III-S	TRI-IV-S
Maximum Span Length (feet)	80	100	120	140

2. Determine height dimension H from bottom of base plate to centerline of top chord (see base sheet TRI-S-5) using the following criteria:

   (a) 17 feet 3 inches is the minimum vertical clearance from Elevation A to sign, walkway support, or truss, whichever is lowest.

   (b) Top of foundation is a minimum of 2 feet and a maximum of 3 feet 6 inches above grade elevation for drilled shafts, as shown on the plans.

   (c) Use a minimum sign height of 15’-0” to calculate the column heights. To calculate H for a trichord structure with walkway brackets:
   To Elevation A, add 17’ 3” (clear), plus 1’ 3” (walkway), plus 7’-6”, plus half the truss height (2’-6”), minus top of foundation elevation, minus 2 inches (round up to the nearest 3-inch increment).

3. Determine the number of exterior and interior truss units required. Use the minimum number of units for each truss, keeping the maximum unit length at approximately 40 feet or less. For example, use only two exterior units for a design length (L) of 80 feet, even though one or both may be slightly greater than 40 feet. Calculate exterior unit panel spacing (P) by dividing the Unit Length (L_e) minus 29.5 inches (± 1 inch), by the number of panels. Calculate

single interior unit panel spacing (P) by dividing the Unit Length (L_i) minus 15 inches, by number of panels. The minimum panel spacing for all trichord truss types is 4 feet and the maximum panel spacing is 5.0 feet.

To maintain the pattern of the vertical diagonals, interior units must have an even number of panels per unit while exterior units may have an odd or even number of panels. When two interior units are used, each interior unit may have an odd or even number of panels, resulting in an even number for all interior units combined. For ease of fabrication and the most economical design, all panels on a truss should be the same length. Tables of recommended dimensions are on pages 2.10-5, 2.10-6 and 2.10-7.

4. Obtain soil-boring data and determine the average Q_u per Section 1.6 for all strata within and below the "B" portion of the drilled shaft foundation. If average and minimum Q_u values meet the requirements of Section 1.6, the depth may be determined from the drilled shaft foundation standard TRI-S-9. As described in Section 1.6, if average and minimum Q_u values do not meet the requirements, the BBS must provide a depth or a special design.

5. With the information from Steps 2(b) and 4, and/or information obtained from the BBS, determine the drilled shaft vertical limits (Elevation Top, Elevation Bottom), and dimensions "A", "B", and "F" for drilled shaft foundations.

6. Walkway grating should cover the full width of all signs and extend a minimum of 4 feet past the edge of pavement into the shoulder unless the shoulder width is less than 10 feet. If shoulder width is less than 10 feet or if the structure is on a low speed ramp, the walkway grating may begin at edge of pavement, while still covering the full width of all signs. Truss inspection grating extends full length of the truss, unless specifically exempted by the District and BBS. For projects that omit front walkway and lighting, details provide the option of plain vertical sign supports in lieu of the L-brackets.

7. If the left and right support heights on a structure are not equal, fill in two rows of the table on the “Truss Support Post” sheet for that structure, checking the boxes labeled “Left” and “Right” to designate each end support.

8. Fill in all tables on applicable base sheets including sign structure number, station, height of tallest sign, total sign area, column heights and sign bracket and foundation dimensions. Calculate all quantities and complete the Total Bill of Material.

9. If the proposed structure is replacing a Vierendeel span on an existing foundation, contact the BBS for special column and foundation designs and details.

10. Submit proposed designs exceeding dimensional and/or loading limits to the BBS for special analysis and/or approval.

11. To provide uniformity for all trichord sign structure plans, place the sheets in the following order:

    General Plan and Elevation (TRI-S-1)
    Steel Truss Details (TRI-S-2 followed by TRI-S-3)
    Damping Device (TRI-S-4)
    Truss Support Post (TRI-S-5)
    Steel Walkway Details (TRI-S-6)
    Steel Walkway Details (TRI-S-7)
    Steel Handrail Details (TRI-S-8)
    Drilled Shaft Foundation Details (TRI-S-9)

Recommended Dimensions

Type TRI-I-S Sign Truss

Variable End Dimension = 12" + - 1" (See sheet TRI-S-2)

Truss Length (ft)	Variable End Dimension (in)	Exterior Units (2)			Interior Unit(s)			
		No. Panels Per Unit	Unit Length (L_e)	Panel Length (P)	Number Required	No. of Panels Per Unit	Unit Length (L_i)	Panel Length (P)
50	12 1/2"	5	25' - 9 1/2"	4' - 8"	0	-	-	-
51	11"	5	26' -5"	4' - 9 1/2"	0	-	-	-
52	12"	5	26' - 10"	4' - 10 1/2"	0	-	-	-
53	13"	5	27' - 3"	4' - 11 1/2"	0	-	-	-
54	12"	6	27' - 10"	4' - 2 3/4"	0	-	-	-
55	12"	6	28' - 4"	4' - 3 3/4"	0	-	-	-
56	12"	6	28' - 10"	4' - 4 3/4"	0	-	-	-
57	12"	6	29' - 4"	4' - 5 3/4"	0	-	-	-
58	12"	6	29' - 10"	4' - 6 3/4"	0	-	-	-
59	12"	6	30' - 4"	4' - 7 3/4"	0	-	-	-
60	12"	6	30' - 10"	4' - 8 3/4"	0	-	-	-
61	12"	6	31' - 4"	4' - 9 3/4"	0	-	-	-
62	12"	6	31' - 10"	4' - 10 3/4"	0	-	-	-
63	12"	6	32' - 4"	4' - 11 3/4"	0	-	-	-
64	12 1/2"	7	32' - 9 1/2"	4' - 4"	0	-	-	-
65	11 1/2"	7	33' - 4 1/2"	4' - 5"	0	-	-	-
66	12 1/4"	7	33' - 9 3/4"	4' - 5 3/4"	0	-	-	-
67	13"	7	34' - 3"	4' - 6 1/2"	0	-	-	-
68	12"	7	34' - 10"	4' - 7 1/2"	0	-	-	-
69	11"	7	35' - 5"	4' - 8 1/2"	0	-	-	-
70	11 3/4"	7	35' - 10 1/4"	4' - 9 1/4"	0	-	-	-
71	12 1/2"	7	36' - 3 1/2"	4' - 10"	0	-	-	-
72	11 1/2"	7	36' - 10 1/2"	4' - 11"	0	-	-	-
73	12 1/4"	7	37' - 3 3/4"	4' - 11 3/4"	0	-	-	-
74	12 1/2"	8	37' - 9 1/2"	4' - 5"	0	-	-	-
75	12 1/2"	8	38' - 3 1/2"	4' - 5 3/4"	0	-	-	-
76	12 1/2"	8	38' - 9 1/2"	4' - 6 1/2"	0	-	-	-
77	12 1/2"	8	39' - 3 1/2"	4' - 7 1/4"	0	-	-	-
78	12 1/2"	8	39' - 9 1/2"	4' - 8"	0	-	-	-
79	12 1/2"	8	40' - 3 1/2"	4' - 8 3/4"	0	-	-	-
80	12 1/2"	8	40' - 9 1/2"	4' - 9 1/2"	0	-	-	-

Recommended Dimensions

Type TRI-II-S (100 ft. max) and TRI-III-S (120 ft. max.) Sign Trusses

Variable End Dimension = 12" + - 1" (See sheet TRI-S-2)

Truss Length (ft)	Variable End Dimension (in)	Exterior Units (2)			Interior Unit(s)			
		No. Panels Per Unit	Unit Length (L_e)	Panel Length (P)	Number Required	No. Panels Per Unit	Unit Length (L_i)	Panel Length (P)
70	11 3/4"	7	35' - 10 1/4"	4' - 9 1/4"	0	-	-	-
71	12 1/2"	7	36' - 3 1/2"	4' - 10"	0	-	-	-
72	11 1/2"	7	36' - 10 1/2"	4' - 11"	0	-	-	-
73	12 1/4"	7	37' - 3 3/4"	4' - 11 3/4"	0	-	-	-
74	12 1/2"	8	37' - 9 1/2"	4' - 5"	0	-	-	-
75	12 1/2"	8	38' - 3 1/2"	4' - 5 3/4"	0	-	-	-
76	12 1/2"	8	38' - 9 1/2"	4' - 6 1/2"	0	-	-	-
77	12 1/2"	8	39' - 3 1/2"	4' - 7 1/4"	0	-	-	-
78	12 1/2"	8	39' - 9 1/2"	4' - 8"	0	-	-	-
79	12 1/2"	8	40' - 3 1/2"	4' - 8 3/4"	0	-	-	-
80	12 1/2"	8	40' - 9 1/2"	4' - 9 1/2"	0	-	-	-
81	11"	5	26' - 5"	4' - 9 1/2"	1	6	30' - 0"	4' - 9 1/2"
82	11"	5	26' - 8 3/4"	4' - 10 1/4"	1	6	30' - 4 1/2"	4' - 10 1/4"
83	11"	5	27' - 0 1/2"	4' 11"	1	6	30' - 9"	4' 11"
84	13"	5	27' - 3"	4' - 11 1/2"	1	6	31' - 0"	4' - 11 1/2"
85	11 1/4"	6	29' - 4"	4' - 5 3/4"	1	6	28' - 1 1/2"	4' - 5 3/4"
86	12 3/4"	6	29' - 7"	4' - 6 1/4"	1	6	28' - 4 1/2"	4' - 6 1/4"
87	12"	6	29' - 11 1/2"	4' - 7"	1	6	28' - 9"	4' - 7"
88	11 1/4"	6	30' - 4"	4' - 7 3/4"	1	6	29' - 1 1/2"	4' - 7 3/4"
89	12 3/4"	6	30' - 7"	4' - 8 1/4"	1	6	29' - 4 1/2"	4' - 8 1/4"
90	12"	6	30' - 11 1/2"	4' - 9"	1	6	29' - 9"	4' - 9"
91	11 1/4"	6	31' - 4"	4' - 9 3/4"	1	6	30' - 1 1/2"	4' - 9 3/4"
92	12 3/4"	6	31' - 7"	4' - 10 1/4"	1	6	30' - 4 1/2"	4' - 10 1/4"
93	12"	6	31' - 11 1/2"	4' - 11"	1	6	30' - 9"	4' - 11"
94	11 1/4"	6	32' - 4"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
95	12 1/2"	7	34' - 1 1/4"	4' - 6 1/4"	1	6	28' - 4 1/2"	4' - 6 1/4"
96	11"	7	34' - 6 1/2"	4' - 7"	1	6	28' - 9"	4' - 7"
97	12"	7	34' - 10"	4' - 7 1/2"	1	6	29' - 0"	4' - 7 1/2"
98	13"	7	35' - 1 1/2"	4' - 8"	1	6	29' - 3"	4' - 8"
99	11 1/2"	7	35' - 6 3/4"	4' - 8 3/4"	1	6	29' - 7 1/2"	4' - 8 3/4"
100	12 1/2"	7	35' - 10 1/4"	4' - 9 1/4"	1	6	29' - 10 1/2"	4' - 9 1/4"
101	11"	7	36' - 3 1/2"	4' - 10"	1	6	30' - 3"	4' - 10"
102	12"	7	36' - 7"	4' - 10 1/2"	1	6	30' - 6"	4' - 10 1/2"
103	13"	7	36' - 10 1/2"	4' - 11"	1	6	30' - 9"	4' - 11"
104	11 1/2"	7	36' - 3 3/4"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
105	12 3/4"	7	34' - 4 3/4"	4' - 6 3/4"	1	8	37' - 9"	4' - 6 3/4"
106	11 7/8"	7	34' - 9 1/8"	4' - 7 3/8"	1	8	38' - 2"	4' - 7 3/8"
107	11"	7	35' - 1 1/2"	4' - 8"	1	8	38' - 7"	4' - 8"
108	11 1/2"	7	35' - 5"	4' - 8 1/2"	1	8	38' - 11"	4' - 8 1/2"
109	12"	7	35' - 8 1/2"	4' - 9"	1	8	39' - 3"	4' - 9"
110	12 1/2"	7	36' - 0"	4' - 9 1/2"	1	8	39' - 7"	4' - 9 1/2"
111	13"	7	36' - 3 1/2"	4' - 10"	1	8	39' - 11"	4' - 10"
112	12"	8	38' - 3 1/2"	4' - 5 3/4"	1	8	37' - 1"	4' - 5 3/4"
113	12"	8	38' - 7 1/2"	4' - 6 1/4"	1	8	37' - 5"	4' - 6 1/4"
114	12"	8	38' - 11 1/2"	4' - 6 3/4"	1	8	37' - 9"	4' - 6 3/4"
115	12"	8	39' - 3 1/2"	4' - 7 1/4"	1	8	38' - 1"	4' - 7 1/4"
116	12"	8	39' - 7 1/2"	4' - 7 3/4"	1	8	38' - 5"	4' - 7 3/4"
117	12"	8	39' - 11 1/2"	4' - 8 1/4"	1	8	38' - 9"	4' - 8 1/4"
118	12"	8	40' - 3 1/2"	4' - 8 3/4"	1	8	39' - 1"	4' - 8 3/4"
119	12"	8	40' - 7 1/2"	4' - 9 1/4"	1	8	39' - 5"	4' - 9 1/4"
120	12"	8	40' - 11 1/2"	4' - 9 3/4"	1	8	39' - 9"	4' - 9 3/4"

Recommended Dimensions

Type TRI-IV-S Sign Truss

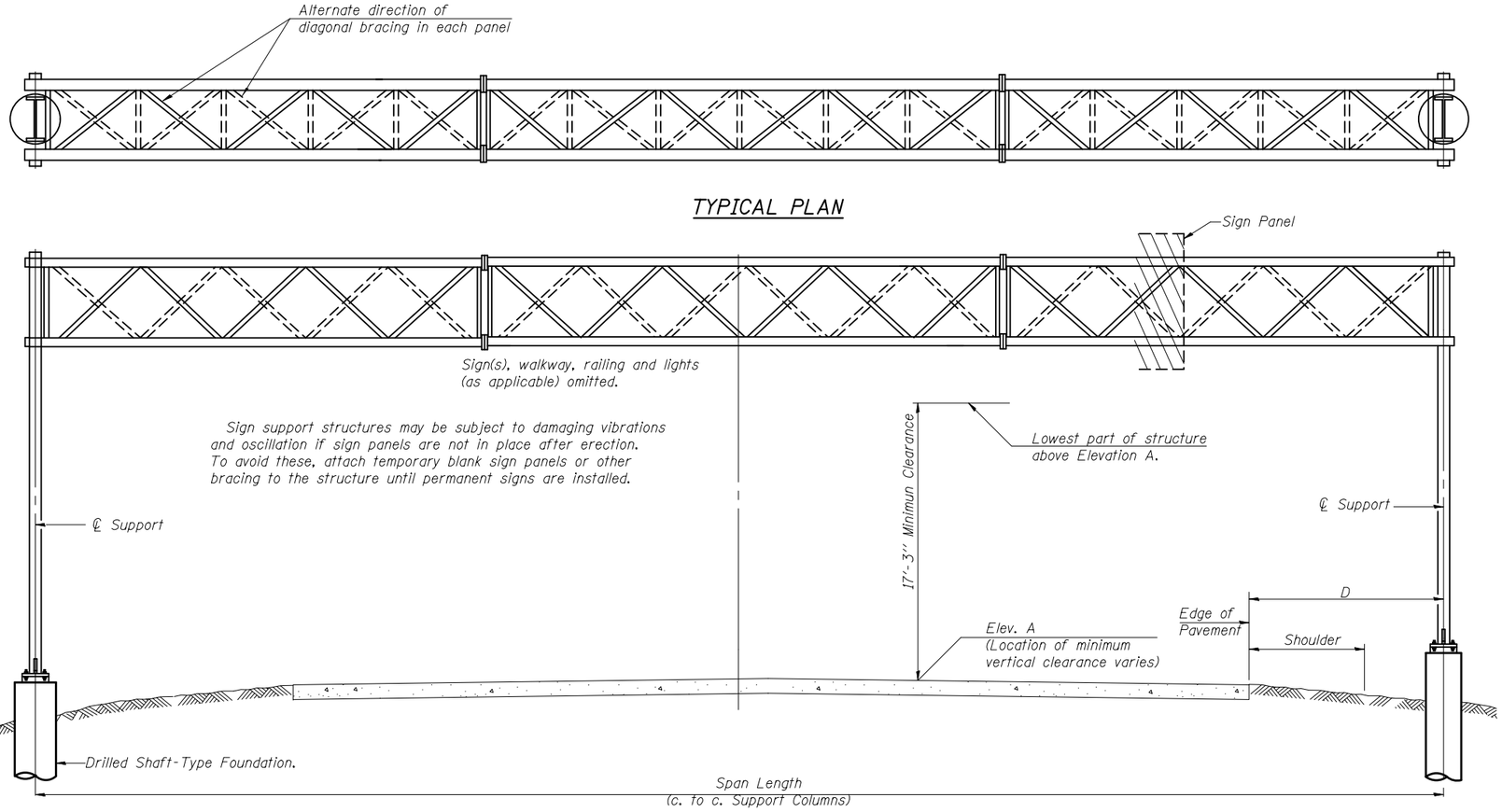
Variable End Dimension = 12" + - 1" (See sheet TRI-S-2)

Truss Length (ft)	Variable End Dimension (in)	Exterior Units (2)			Interior Unit(s)			
		No. Panels Per Unit	Unit Length (L_e)	Panel Length (P)	Number Required	No. Panels Per Unit	Unit Length (L_i)	Panel Length (P)
100	12 1/2"	7	35' - 10 1/4"	4' - 9 1/4"	1	6	29' - 10 1/2"	4' - 9 1/4"
101	11"	7	36' - 3 1/2"	4' - 10"	1	6	30' - 3"	4' - 10"
102	12"	7	36' - 7"	4' - 10 1/2"	1	6	30' - 6"	4' - 10 1/2"
103	13"	7	36' - 10 1/2"	4' - 11"	1	6	30' - 9"	4' - 11"
104	11 1/2"	7	36' - 3 3/4"	4' - 11 3/4"	1	6	31' - 1 1/2"	4' - 11 3/4"
105	12 3/4"	7	34' - 4 3/4"	4' - 6 3/4"	1	8	37' - 9"	4' - 6 3/4"
106	11 7/8"	7	34' - 9 1/8"	4' - 7 3/8"	1	8	38' - 2"	4' - 7 3/8"
107	11"	7	35' - 1 1/2"	4' - 8"	1	8	38' - 7"	4' - 8"
108	11 1/2"	7	35' - 5"	4' - 8 1/2"	1	8	38' - 11"	4' - 8 1/2"
109	12"	7	35' - 8 1/2"	4' - 9"	1	8	39' - 3"	4' - 9"
110	12 1/2"	7	36' - 0"	4' - 9 1/2"	1	8	39' - 7"	4' - 9 1/2"
111	13"	7	36' - 3 1/2"	4' - 10"	1	8	39' - 11"	4' - 10"
112	12"	8	38' - 3 1/2"	4' - 5 3/4"	1	8	37' - 1"	4' - 5 3/4"
113	12"	8	38' - 7 1/2"	4' - 6 1/4"	1	8	37' - 5"	4' - 6 1/4"
114	12"	8	38' - 11 1/2"	4' - 6 3/4"	1	8	37' - 9"	4' - 6 3/4"
115	12"	8	39' - 3 1/2"	4' - 7 1/4"	1	8	38' - 1"	4' - 7 1/4"
116	12"	8	39' - 7 1/2"	4' - 7 3/4"	1	8	38' - 5"	4' - 7 3/4"
117	12"	8	39' - 11 1/2"	4' - 8 1/4"	1	8	38' - 9"	4' - 8 1/4"
118	12"	8	40' - 3 1/2"	4' - 8 3/4"	1	8	39' - 1"	4' - 8 3/4"
119	12"	8	40' - 7 1/2"	4' - 9 1/4"	1	8	39' - 5"	4' - 9 1/4"
120	12"	8	40' - 11 1/2"	4' - 9 3/4"	1	8	39' - 9"	4' - 9 3/4"
121	12"	6	31' - 3 1/4"	4' - 9 5/8"	2	6	30' - 0 3/4"	4' - 9 5/8"
122	12"	6	31' - 6 1/4"	4' - 10 1/8"	2	6	30' - 3 3/4"	4' - 10 1/8"
123	12"	6	31' - 9 1/4"	4' - 10 5/8"	2	6	30' - 6 3/4"	4' - 10 5/8"
124	12"	6	32' - 0 1/4"	4' - 11 1/8"	2	6	30' - 9 3/4"	4' - 11 1/8"
125	12"	6	32' - 3 1/4"	4' - 11 5/8"	2	6	31' - 0 3/4"	4' - 11 5/8"
126	12"	7	34' - 10"	4' - 7 1/2"	2	6	29' - 0"	4' - 7 1/2"
127	11 1/2"	7	35' - 1 1/2"	4' - 8"	2	6	29' - 3"	4' - 8"
128	11"	7	35' - 5"	4' - 8 1/2"	2	6	29' - 6"	4' - 8 1/2"
129	13"	7	33' - 2 3/4"	4' - 4 3/4"	2	7	32' - 0 1/4"	4' - 4 3/4"
130	12"	7	33' - 6 1/4"	4' - 5 1/4"	2	7	32' - 3 3/4"	4' - 5 1/4"
131	11"	7	33' - 9 3/4"	4' - 5 3/4"	2	7	32' - 7 1/4"	4' - 5 3/4"
132	11 3/4"	7	34' - 0 3/8"	4' - 6 1/8"	2	7	32' - 9 7/8"	4' - 6 1/8"
133	12 1/2"	7	34' - 3"	4' - 6 1/2"	2	7	33' - 0 1/2"	4' - 6 1/2"
134	11 1/2"	7	34' - 6 1/2"	4' - 7"	2	7	33' - 4"	4' - 7"
135	12 1/4"	7	34' - 9 1/8"	4' - 7 3/8"	2	7	33' - 6 5/8"	4' - 7 3/8"
136	13"	7	34' - 11 3/4"	4' - 7 3/4"	2	7	33' - 9 1/4"	4' - 7 3/4"
137	12"	7	35' - 3 1/4"	4' - 8 1/4"	2	7	34' - 0 3/4"	4' - 8 1/4"
138	11"	7	35' - 6 3/4"	4' - 8 3/4"	2	7	34' - 4 1/4"	4' - 8 3/4"
139	11 3/4"	7	35' - 9 3/8"	4' - 9 1/8"	2	7	34' - 6 7/8"	4' - 9 1/8"
140	12 1/2"	7	36' - 0"	4' - 9 1/2"	2	7	34' - 9 1/2"	4' - 9 1/2"

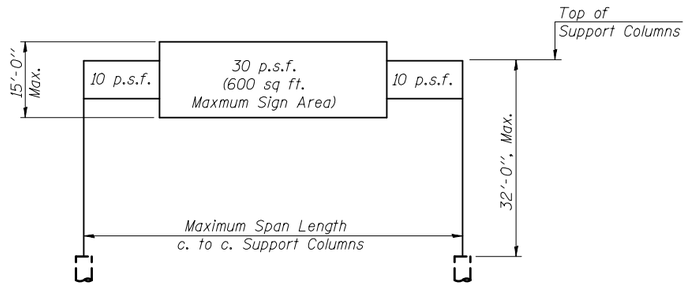
Steel Trichord Sign Structure Standards

U. S. Standard Units

SHEET TITLE



TYPICAL PLAN



DESIGN WIND LOADING DIAGRAM

Parameters shown are basis for I.D.O.T. Standards and Sign Manual Tables. Installations not within dimensional limits shown require special analysis for all components.

TYPICAL ELEVATION

*(Looking at Face of Signs**)*

Elev. A = Elevation at point of minimum clearance to sign, walkway support or truss.

Structure Number	Station	Design Truss Type	c. to c. Supports	Elev. A	Dim. D	Height of Tallest Sign	Total Sign Area

**Looking upstation for structures with signs both sides.

TOTAL BILL OF MATERIAL

ITEM	UNIT	TOTAL
OVERHEAD SIGN STRUCTURE - TRICHORD TYPE TRI-I-S	Foot	
OVERHEAD SIGN STRUCTURE - TRICHORD TYPE TRI-II-S	Foot	
OVERHEAD SIGN STRUCTURE - TRICHORD TYPE TRI-III-S	Foot	
OVERHEAD SIGN STRUCTURE - TRICHORD TYPE TRI-IV-S	Foot	
TRICHORD SIGN WALKWAY TYPE S	Foot	
DRILLED SHAFT CONCRETE FOUNDATIONS	Cu. Yds.	

GENERAL NOTES

DESIGN: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. (2001, 4th edition, 2002 interim) ("AASHTO Specifications")

CONSTRUCTION: Current (at time of letting) Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplemental Specifications and Special Provisions. ("Standard Specifications")

LOADING: 90 M.P.H. WIND

WALKWAY LOADING: Dead load plus 500 lbs. concentrated live load.

DESIGN STRESSES
FIELD UNITS
f'c = 3,500 psi
fy = 60,000 psi (reinforcement)

MINIMUM CLEARANCE: Vertical Roadway Clearance = 17'-3" (All Obstructions)

WELDING: All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 Structural Welding Code (Steel) and the Standard Specificiations.

MATERIALS: Structural steel pipe for chords shall be ASTM A500 Grade C. Structural steel pipe for perpendiculars and diagonals shall be ASTM A53 Grade B or A500 Grade B or C. If A500 pipe is substituted for A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.
All Structural Steel Plates and Shapes shall conform to AASHTO M270 Gr. 50 or ASTM A992 Gr. 50. The W24 columns and stiffening ribs at the base plate shall have a minimum longitudinal Charpy V-Notch (CVN) energy of 15 lb.-ft. at 40° F. (Zone 2) before galvanizing.

GALVANIZING: All steel grating, plates, shapes and pipe shall be hot dip galvanized after fabrication in accordance with AASHTO M111. All bolts, u-bolts, eye bolts, lock nuts and washers must be hot dip galvanized per AASHTO M232.

FASTENERS FOR STEEL TRUSSES: All bolts noted as "high strength" (HS) must satisfy the requirements of AASHTO M164 (ASTM A325), ASTM A449, or an Engineer approved alternate, and must have matching lock nuts and washers. All bolts, u-bolts, eye bolts, lock nuts and washers not specified to be "high strength" must satisfy the requirements of ASTM A307 Gr B. All lock nuts must have nylon or steel inserts. High strength bolt installation shall conform to Article 505.04 (f) (2)d of the Standard Specifications. Rotational capacity ("ROCAP") testing will not be required.

ANCHOR RODS: Shall conform to ASTM F1554 Gr. 105. Galvanize the upper 12" minimum per AASHTO M232.

CONCRETE SURFACES: All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Bridge Seat Sealer in accordance with the Standard Specifications.

REINFORCEMENT BARS: Reinforcement bars designated (E) shall be epoxy coated in accordance with the Standard Specifications.

FOUNDATIONS: The contract unit price for Drilled Shaft Concrete Foundations shall include reinforcement bars complete in place.

TRI-S-1 6-1-12

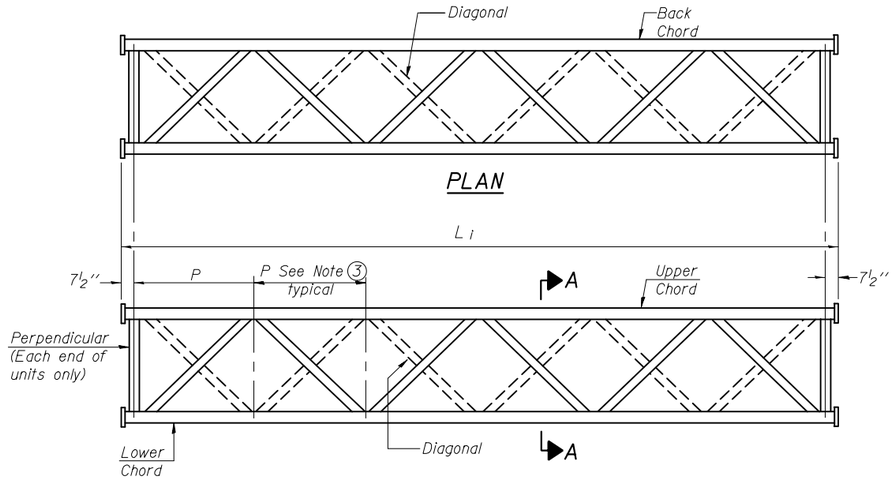
FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TRI-CHORD SIGN STRUCTURES – GENERAL PLAN & ELEVATION – STEEL TRUSS & STEEL SUPPORTS

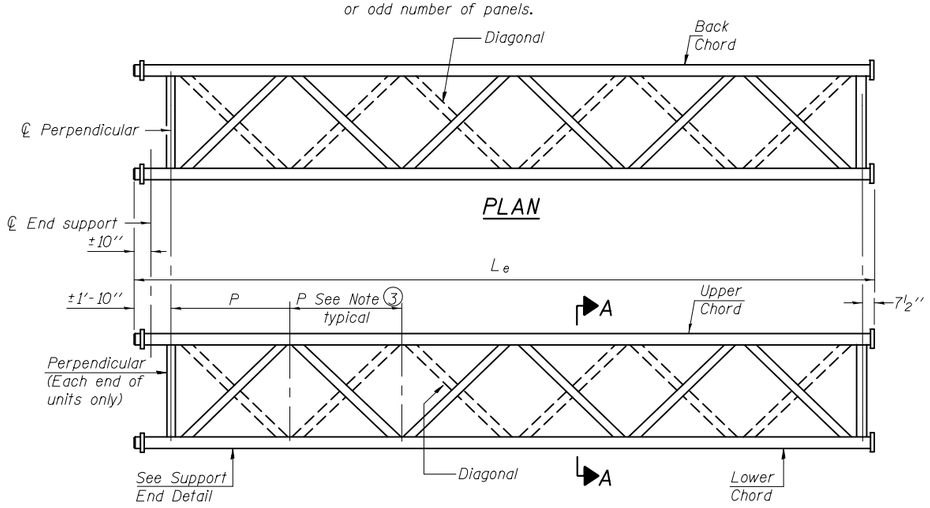
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		



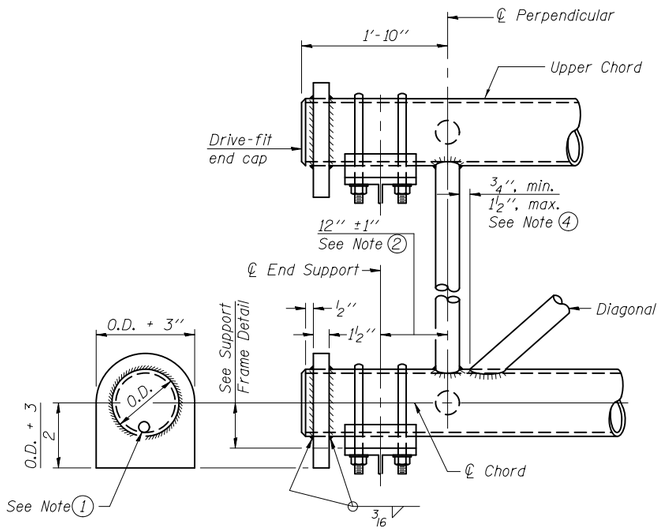
ELEVATION
TYPICAL INTERIOR UNIT

Even number of panels/interior unit required.
For two interior units, each unit may have even or odd number of panels.

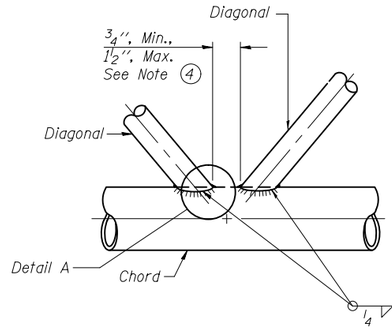


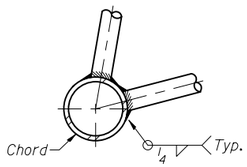
ELEVATION
TYPICAL EXTERIOR UNIT

Even or odd number of panels/exterior unit allowed.

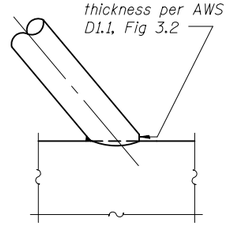


SUPPORT END DETAIL FOR EXTERIOR UNIT

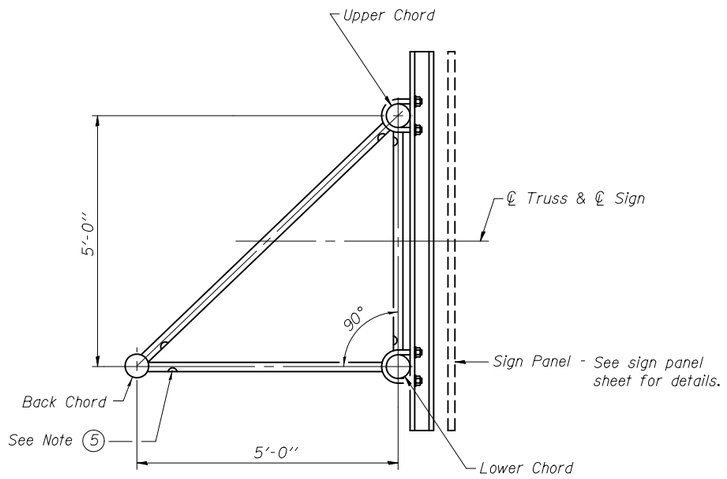




TYPICAL JOINT DETAILS



DETAIL A



SECTION A-A

NOTES

(1) Contractor must use standard drive-fit cap to close end. The drive-fit cap must have a $\frac{1}{2}''$ ϕ drain hole and must be installed after galvanizing. (Typ. at non-splice ends of chords)

(2) 1'-10'' end dimension may vary by ±1'' to provide uniform panel spacing (P).

(3) Panel spacing (P) shall be uniform for entire truss and between 4'-0'' and 5'-0''. (Fabricator may vary for uniform diagonals).

(4) All diagonals shall be offset from the panel point based on the following: offset shall provide a $\frac{3}{4}''$ minimum to $1\frac{1}{2}''$ maximum clearance between diagonal and any other diagonal, or perpendicular member, and to provide clearance for U-bolt connections of signs or walkway brackets.

(5) Galvanizing vent holes of adequate size must be provided at each end of truss members except chords. Place on underside of sloping members and truss side of vertical members. Alternately, holes may be provided in wall of chords. All vent holes must be drilled and de-burred, typ.

TRI-S-2 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
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STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

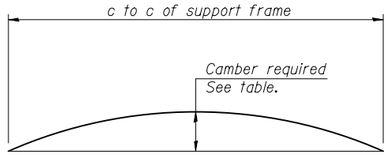
TRI-CHORD SIGN STRUCTURES – STEEL TRUSS DETAILS FOR TRUSS TYPES TRI-I-S, TRI-II-S AND TRI-III-S

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

TRICHORD UNIT TABLE

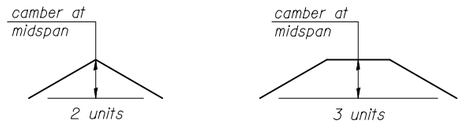
Structure Number	Station	Design Truss Type	Exterior Units (2)			Interior Unit			
			No. Panels per Unit	Unit Lgth.(L_e)	Panel Lgth.(P)	No. Req'd.	No. Panels per Unit	Unit Lgth.(L_i)	Panel Lgth.(P)



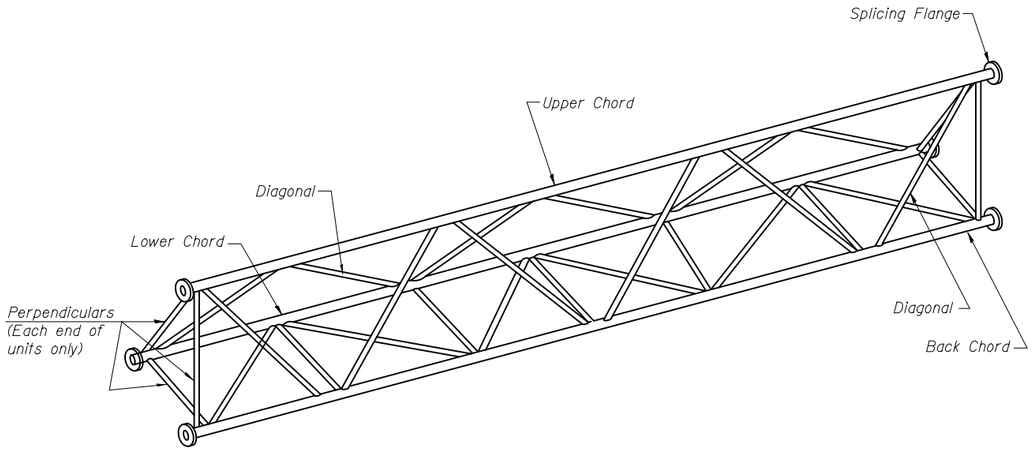
CAMBER DIAGRAM

Camber curve shown is theoretical. Actual camber attained by slope changes at splices between units.

CAMBER ATTAINMENT EXAMPLES:

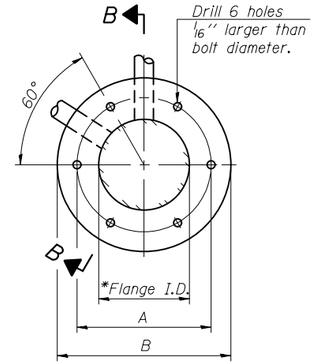


Camber shown is for fabrication only, measured with truss fully supported. (No-load condition)

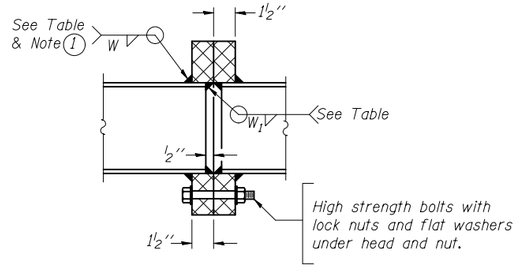


ISOMETRIC VIEW
TYPICAL INTERIOR TRUSS UNIT

Note:
Units shall be shipped individually with adequate provision to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The Contractor is responsible for maintaining the configuration and protection of the units.



TRUSS TYPES I-S, II-S, & III-S



SECTION B-B

(1) Splicing Flanges shall be attached to each truss unit with the truss shop assembled to camber shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external welds or tacks shall be made to secure flanges until remaining welds are made after disassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.

TRICHORD DESIGN TABLE

Truss Type	Maximum Span Length	Chords		Diagonals and Perpendiculars		*Camber at Midspan	Splicing Flange					
							H.S. Bolts		Weld Sizes			
		O.D.	Wall	O.D.	Wall		No./Splice	Diameter	W	W_1	A	B
	(ft.)	(in.)	(in.)	(in.)	(in.)	(in.)	(each)	(in.)	(in.)	(in.)	(in.)	(in.)
TRI-I-S	80	4.500	0.237	2.875	0.203	2.25	6	7/8	1/4	3/16	8 1/4	11 1/4
TRI-II-S	100	5.563	0.258	2.875	0.203	3.25	6	7/8	3/8	1/4	9 1/4	12 1/4
TRI-III-S	120	6.625	0.280	2.875	0.203	5.00	6	1	3/8	1/4	11 1/2	15
TRI-IV-S	140	8.625	0.322	3.500	0.216	6.25	6	1 1/4	9/16	7/16	13	16 1/2

* Note to fabricator: For spans between maximum span lengths given in table, use linear interpolation to determine camber.
Minimum AASTO Camber = L / 1000

TRI-S-3 6-1-12

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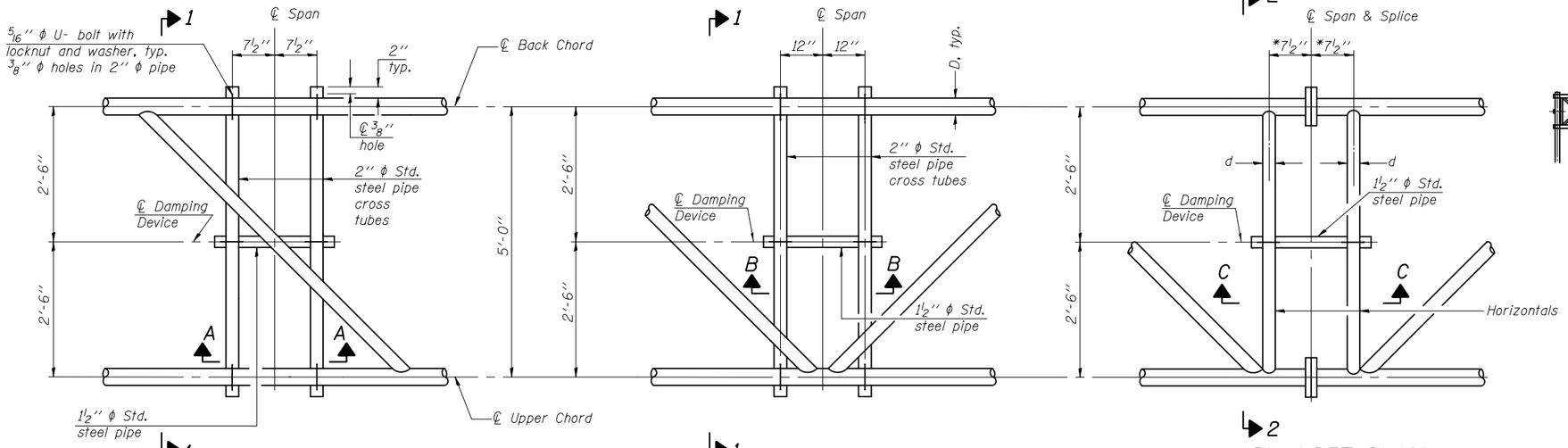
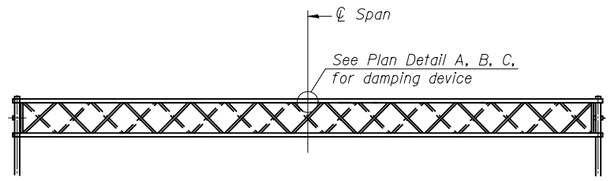
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TRI-CHORD SIGN STRUCTURES – STEEL TRUSS DETAILS FOR TRUSS TYPES TRI-I-S, TRI-II-S AND TRI-III-S

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

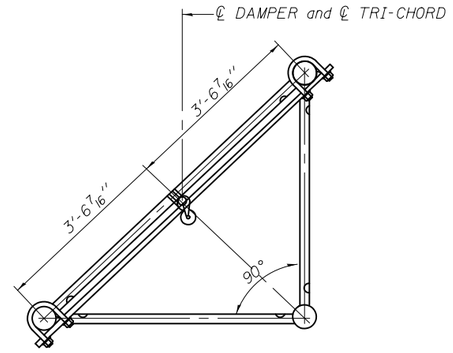




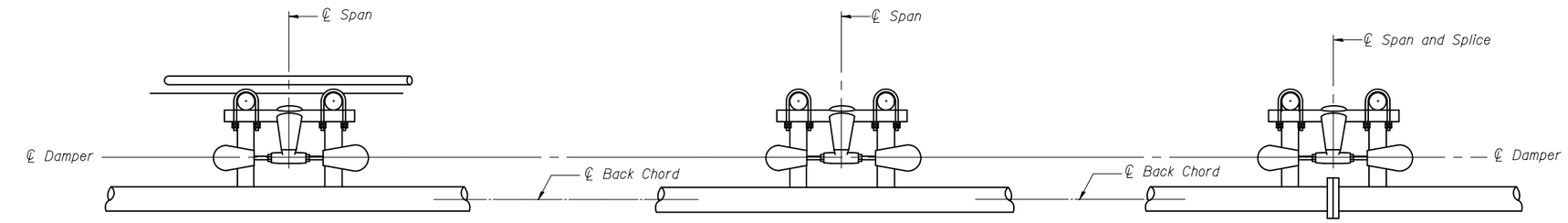
ELEVATION
TRI-CHORD SIGN STRUCTURE

NOTES

Damper: One damper per truss. (31 Lbs. Stockbridge-Type - 29'' minimum between ends of weights) Cost included in TRI-CHORD Sign Structure...



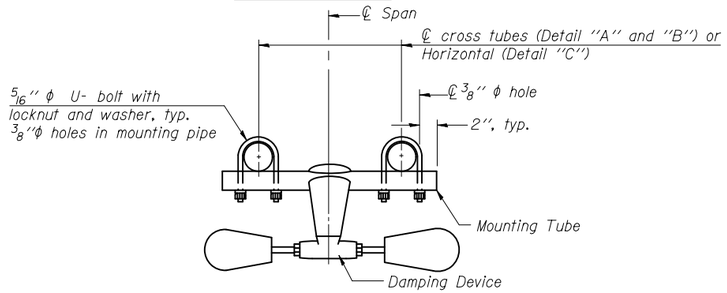
SECTION 1-1



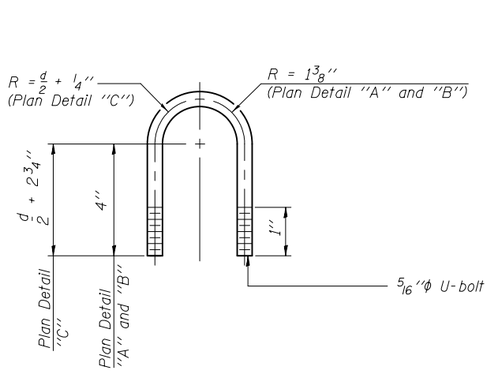
SECTION A-A

SECTION B-B

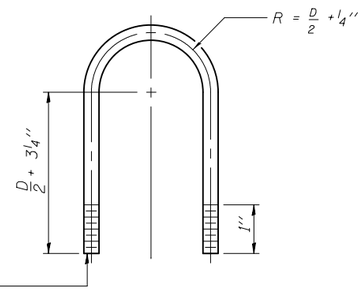
SECTION C-C



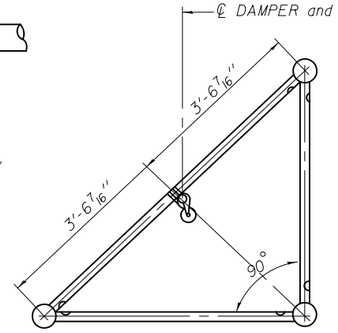
TRUSS DAMPING DEVICE CONNECTION DETAIL
(Typical)



DAMPING DEVICE MOUNTING TUBE U-BOLT DETAIL
(Typical)



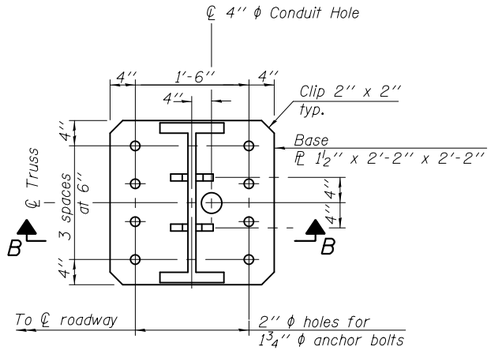
TOP CHORD TO CROSS TUBE U-BOLT DETAIL
(Typical - Detail ''A'' and ''B'')



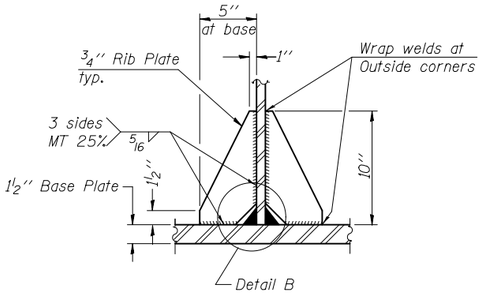
SECTION 2-2

TRI-S-4 6-1-12

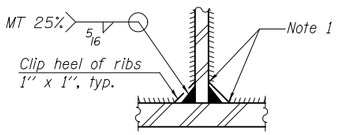
FILE NAME =	USER NAME =	DESIGNED -	REVISED	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	TRI-CHORD SIGN STRUCTURE DAMPING DEVICE	F.A. RTE.	SECTION / COUNTY / TOTAL SHEETS / SHEET NO.
		CHECKED -	REVISED				
	PLOT SCALE =	DRAWN -	REVISED		SHEET NO. OF SHEETS		CONTRACT NO.
	PLOT DATE =	CHECKED -	REVISED				ILLINOIS FED. AID PROJECT



SECTION A-A

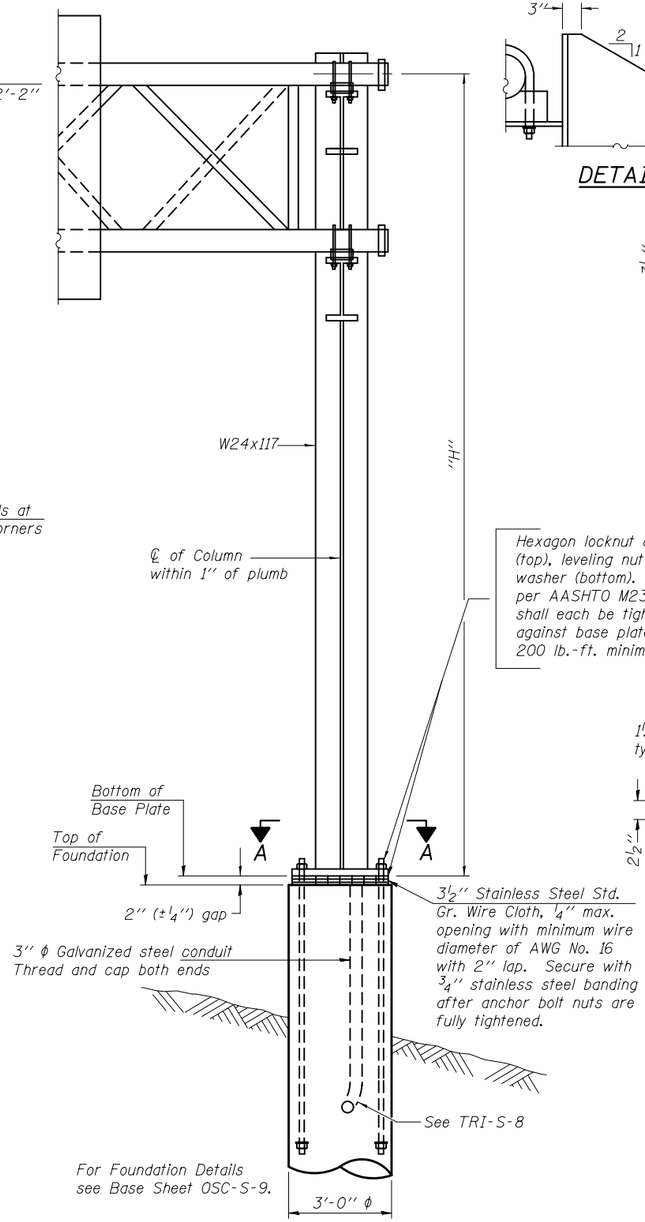


SECTION B-B

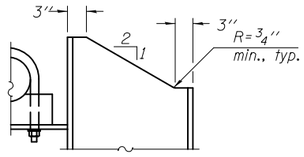


DETAIL B
(Typical rib)

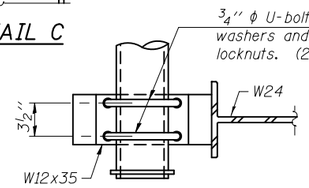
Note 1: Extend welds to clip to facilitate galvanizing.



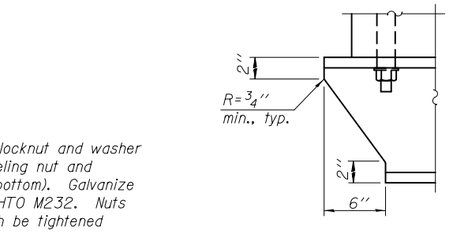
FRONT ELEVATION



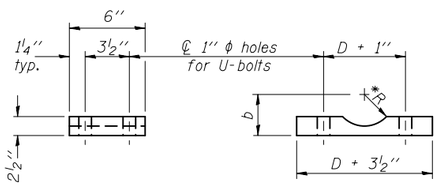
DETAIL C



SECTION C-C

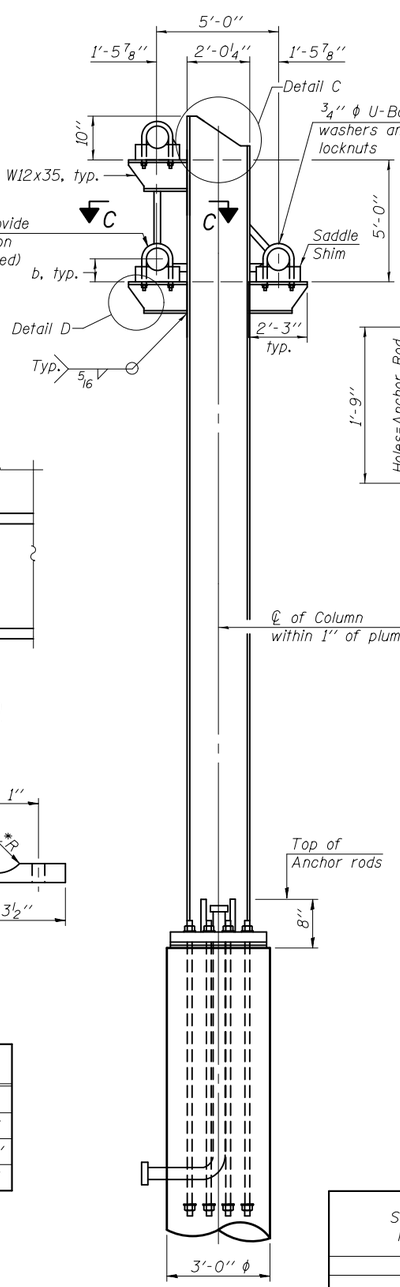


DETAIL D

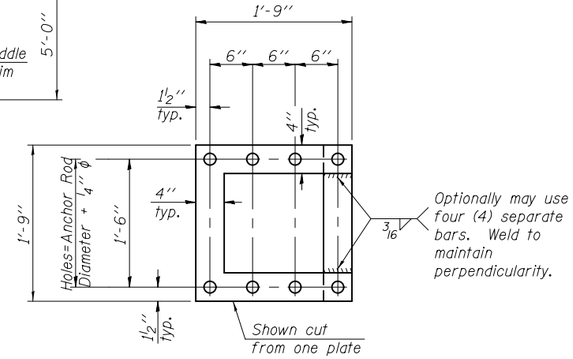


SADDLE SHIM DETAIL

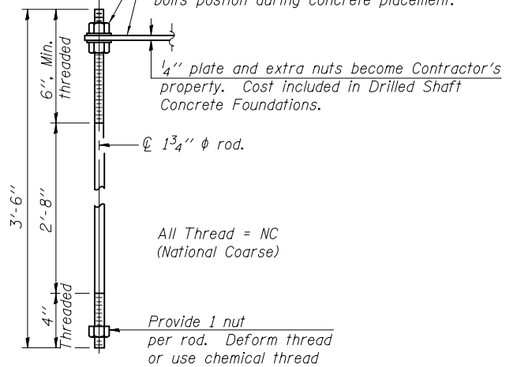
Chord Outside Diameter	R	b
4.500	2 5/16''	4''
5.563	2 7/8''	4½''
6.625	3 3/8''	4 3/4''
8.625	4 3/8''	5½''



END ELEVATION



POSITIONING PLATE(S)



ANCHOR ROD DETAIL
Drilled Shaft Foundation

Structure Number	Station	Column		H (ft.)	Anchor Rod Diameter (in.)
		Left	Right		

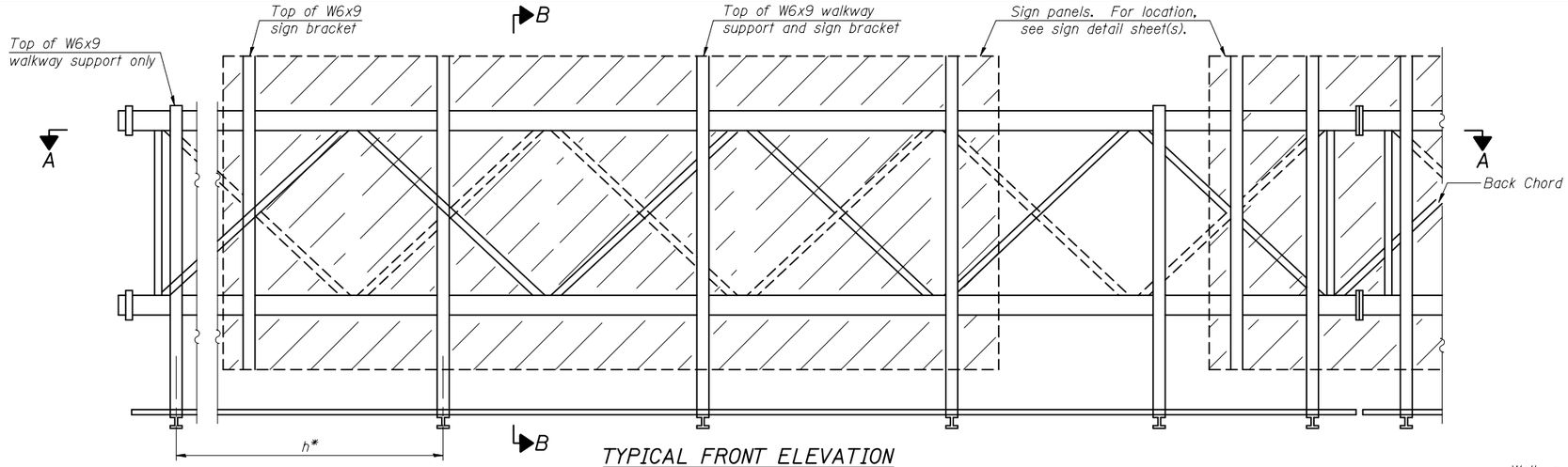
TRI-S-5 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

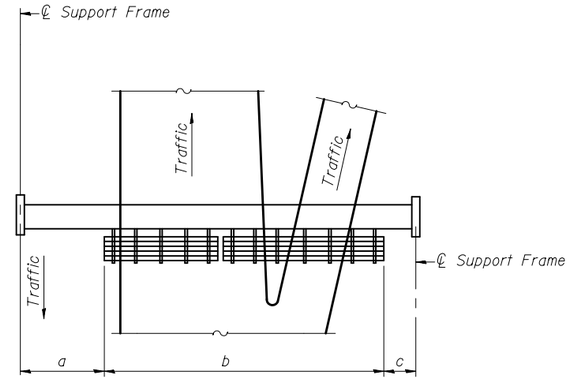
TRI-CHORD SIGN STRUCTURES - TRUSS SUPPORT
COLUMN - STEEL TRUSS & STEEL POST
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			



TYPICAL FRONT ELEVATION

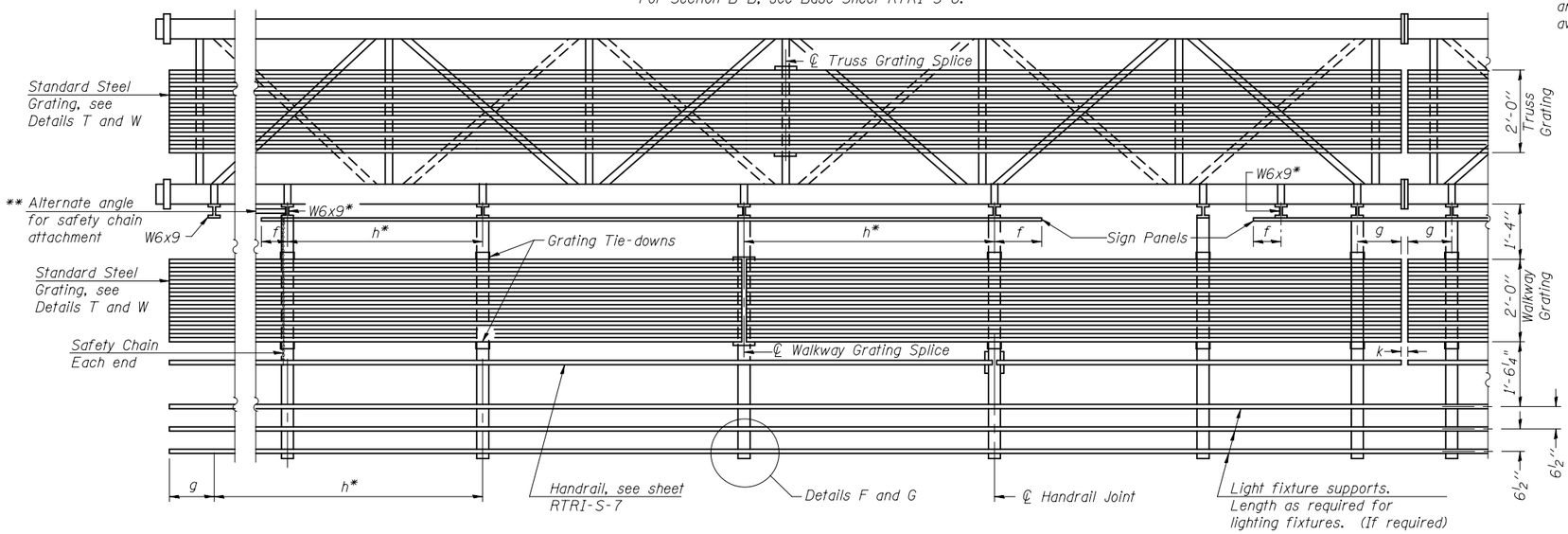
With lights and handrail omitted for clarity.
For Section B-B, see Base Sheet RTRI-S-6.



PLAN
WALKWAY AND HANDRAIL SKETCH

(Road plan beneath truss varies)

Walkway Grating width dimensions is nominal and may vary ±½" based on available standard widths.



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.
Handrail joint, grating and light support splices placed as needed.

BRACKET TABLE

W6x9		
Sign Width		Number Brackets Required
Greater Than	Less Than or Equal To	
	8'-0"	2
8'-0"	14'-0"	3
14'-0"	20'-0"	4
20'-0"	26'-0"	5
26'-0"	32'-0"	6

Structure Number	Station	a	b	c	Walkway Grating and Handrail Lengths

Truss grating to facilitate shall run full length (center to center of support frames) ±12" on overhead trusses. Cost of truss grating is included in "Overhead Sign Structure".

Notes:

* Space W6x9 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)
k = 2" maximum gap between adjacent walkway grating sections and handrail ends

** If walkway bracket at safety chain location is behind sign, add angle to bracket, see Alternate Safety Chain Attachment on Base Sheet RTRI-S-7

For Details T and W, Section B-B and Grating Splice Details, see Base Sheet RTRI-S-6.
For Handrail Details see Base Sheet RTRI-S-7.

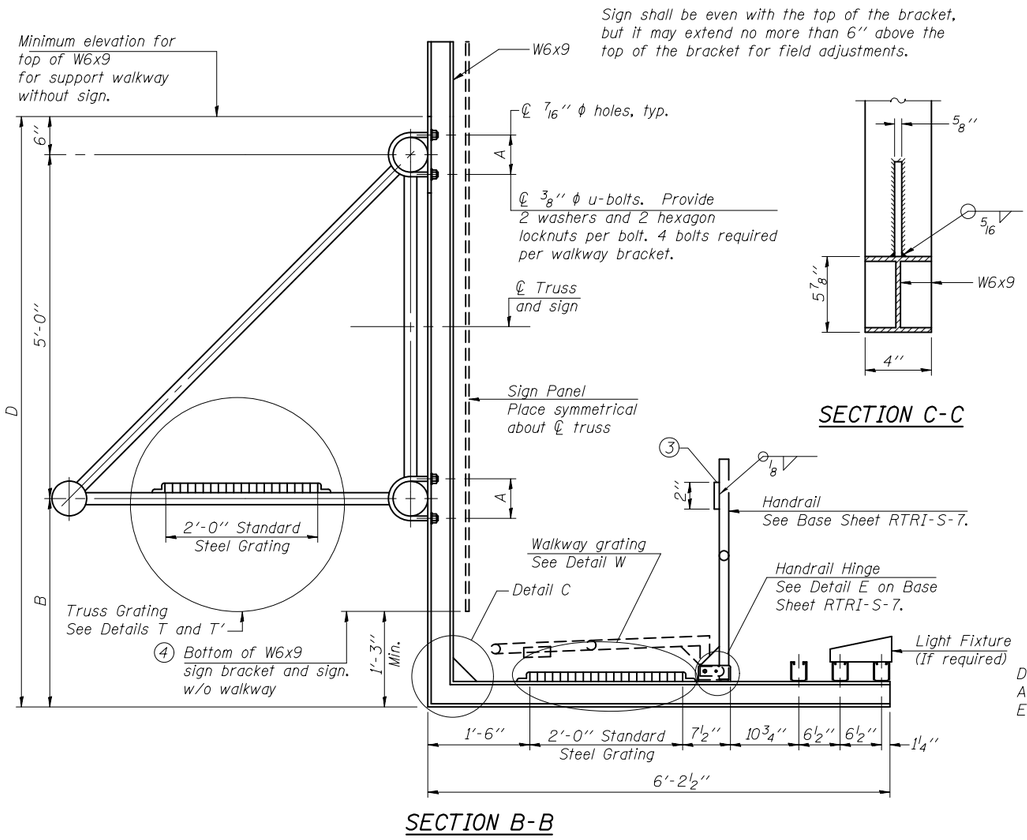
TRI-S-6 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

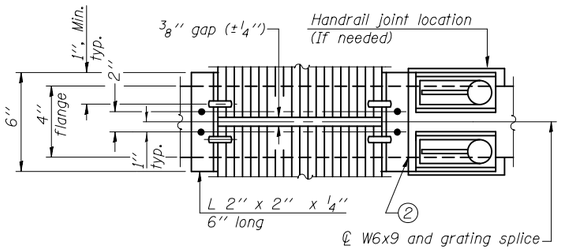
TRI-CHORD SIGN STRUCTURES
STEEL WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

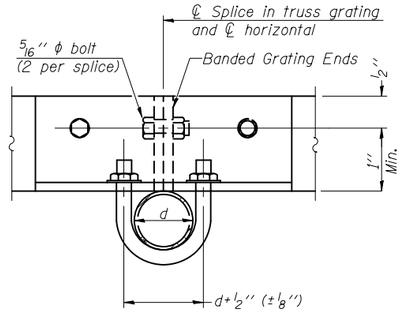


SECTION B-B

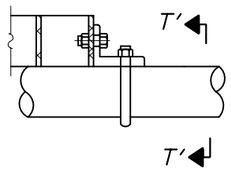
SECTION C-C



(AT WALKWAY GRATING SPLICE)

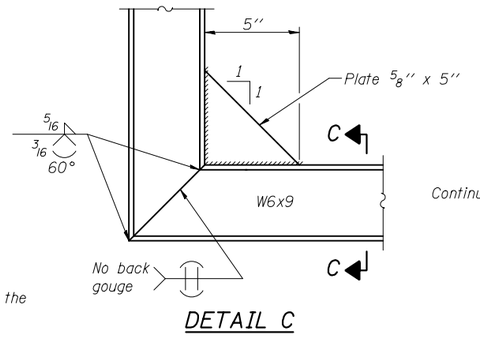


SECTION T'-T'

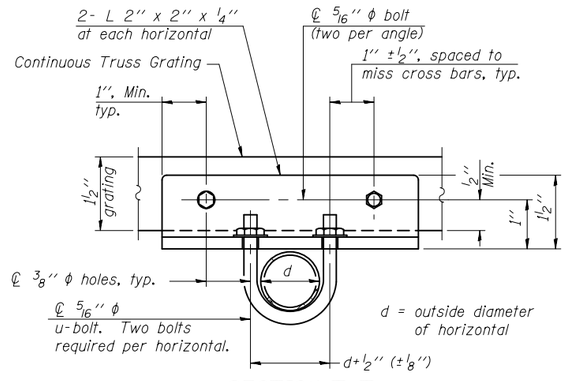


DETAIL T'

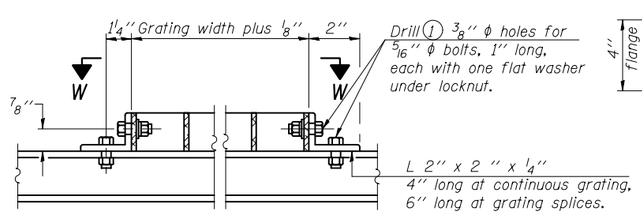
(Truss grating splice)
Details not shown same as Detail T.
Alternate materials may be used subject to the Engineer's review and approval.



DETAIL C

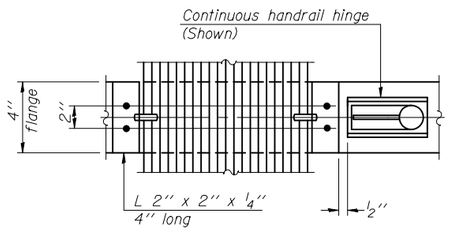


SECTION T-T



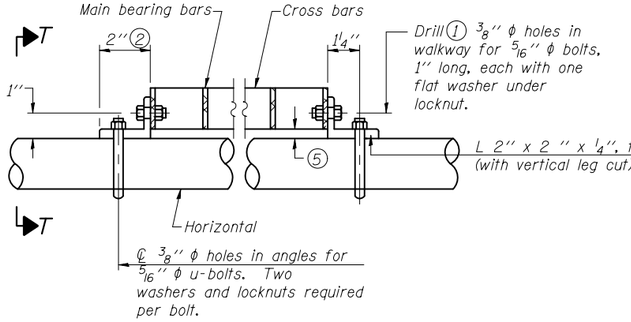
DETAIL W

(Walkway grating)



(CONTINUOUS WALKWAY GRATING)

SECTION W-W



DETAIL T

(Continuous Truss grating)

BARS SIZES FOR STANDARD STEEL GRATING

WALKWAY GRATING — Main bearing bars 3/16'' x 1½'' on 1 3/16'' centers. Cross bars 3/16'' x 1½'' on 4'' centers. All intersects welded.

Structure Number	Station	⑥ A	B	⑥ D

1. Drilling holes in grating may be done in shop or field, based on Contractor's preference and subject to accurate alignment.
2. If Handrail Joint present, weld angle to W6x9 and 1/4'' extension bars. (See Base Sheet TRI-S-7.)
3. ℛ 1/8'' x 1/2'' x 2'' welded to handrail posts to protect locations that contact grating.
4. For projects that don't require walkway and lighting.
5. Tube to grating gap may vary from 0 to 1/2'', max. to align walkway, allow for camber, etc.
6. Based on actual height of tallest sign given on TRI-S-1.

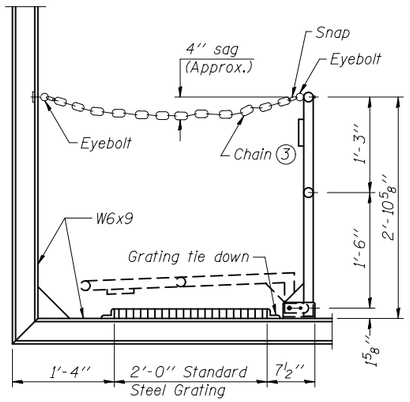
TRI-S-7 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

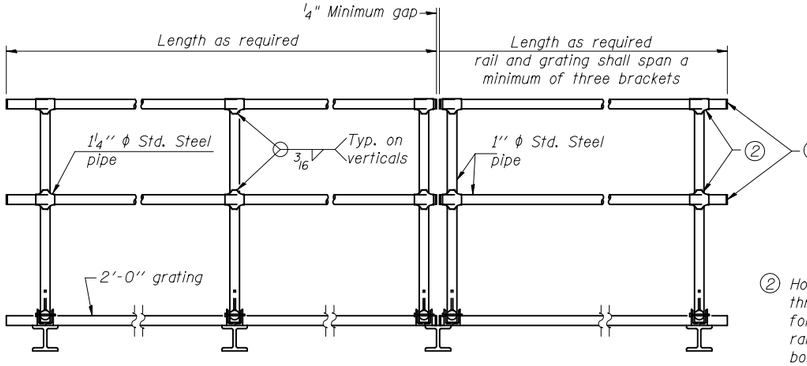
TRI-CHORD SIGN STRUCTURES – STEEL
SIGN BRACKET AND WALKWAY DETAILS
SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS	FED. AID PROJECT		

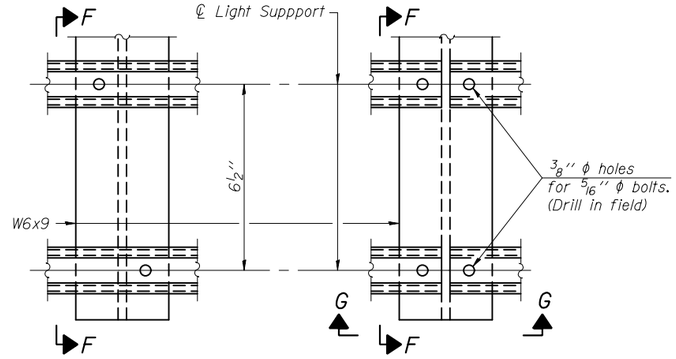


SIDE ELEVATION

(Showing safety chain w/o sign)



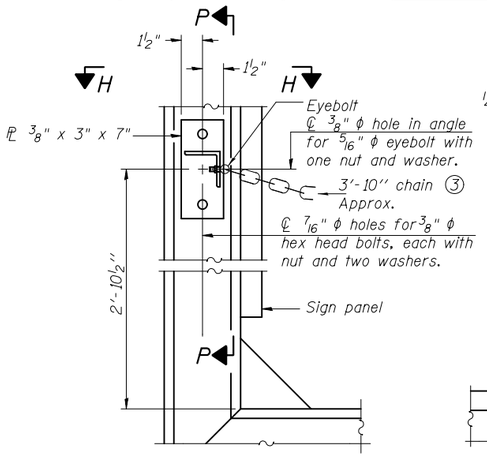
FRONT ELEVATION



DETAIL F

DETAIL G

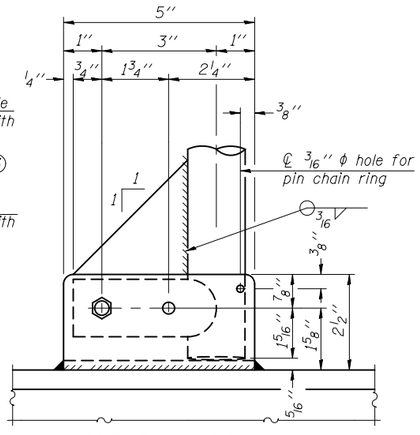
HANDRAIL DETAILS



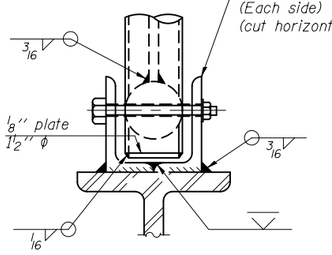
ALTERNATE SAFETY CHAIN ATTACHMENT

(With Sign Present)

Items not shown same as "Side Elevation" of "Handrail Details"

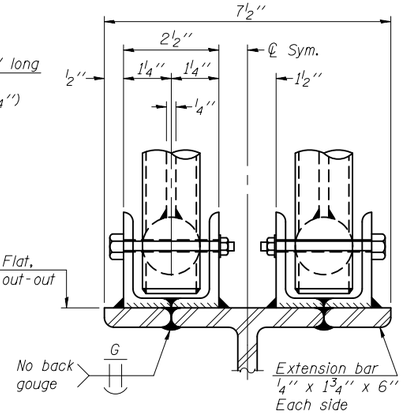


SIDE ELEVATION

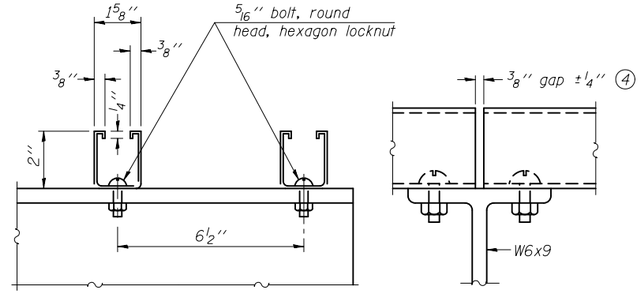


FRONT ELEVATION

See "ELEVATION" at right for dimensions.



ELEVATION AT HANDRAIL JOINT

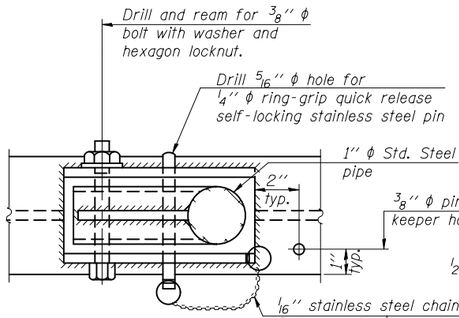


SECTION F-F

SECTION G-G

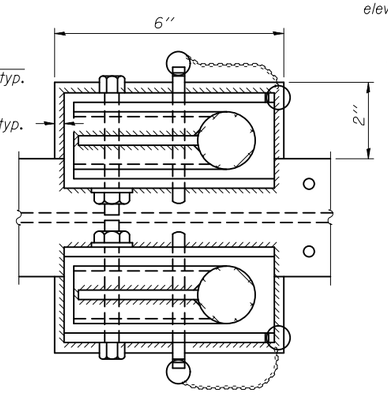
LIGHTING FIXTURE MOUNTS (IF REQUIRED)

(4) Field cut ends of light support channels shall be free of burrs or hazardous projections and coated with zinc-rich primer or equivalent.



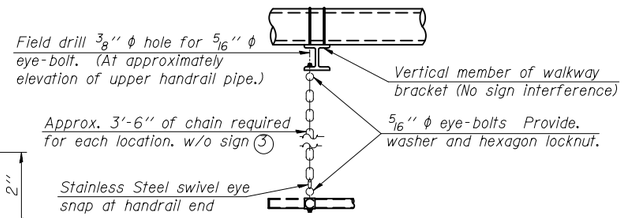
PLAN

DETAIL E HANDRAIL HINGE



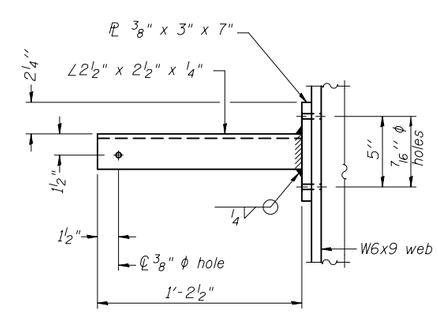
PLAN AT HANDRAIL JOINT

Details not shown same as "PLAN"

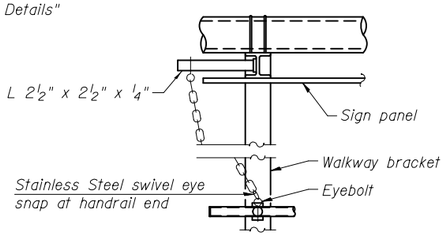


SAFETY CHAIN

One required for each end of each walkway.



SECTION P-P



VIEW H-H

Details not shown similar to "Safety Chain" Details (Walkway omitted)

(3) 3/16'' Type 304L stainless steel chain, approximately 12 links per foot.

TRI-S-8 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	TRI-CHORD SIGN STRUCTURES HANDRAIL DETAILS	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CHECKED -	REVISED							
	PLOT SCALE =	DRAWN -	REVISED		SHEET NO. OF SHEETS			CONTRACT NO.		
	PLOT DATE =	CHECKED -	REVISED				ILLINOIS	FED. AID PROJECT		

* Grind anchor rod to bright finish at ground clamp location before installing clamp.

NOTES:

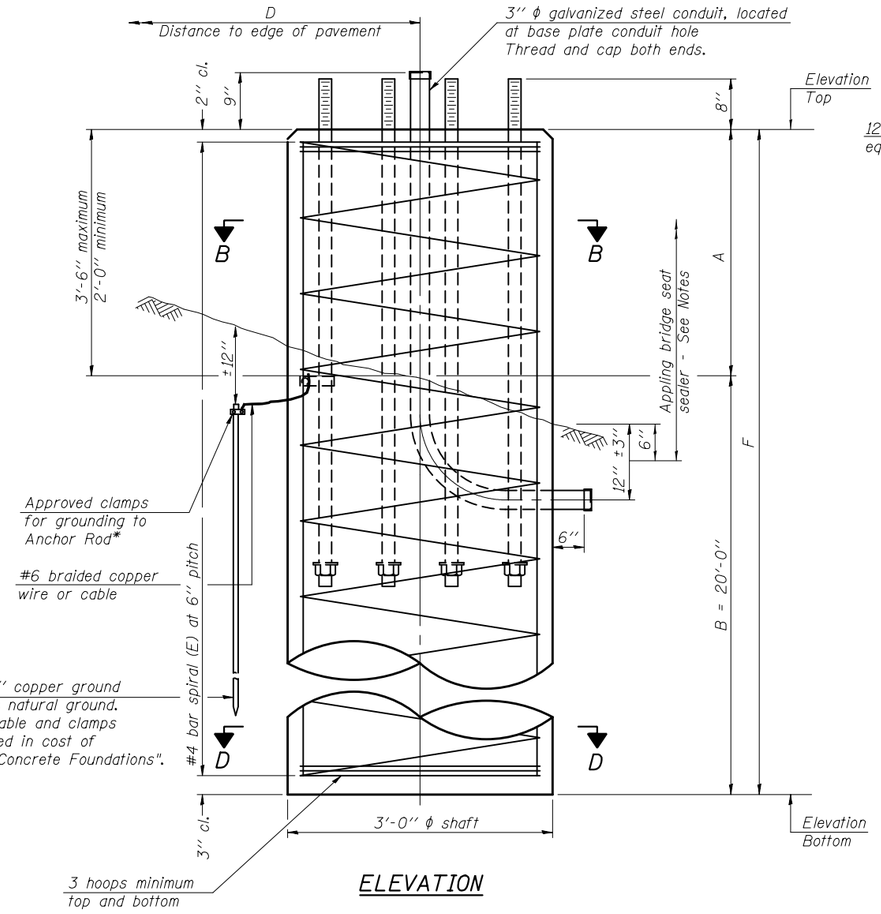
The foundation dimensions shown in the Foundation Design Table are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, which must be determined by previous soil investigations at the jobsite. When other conditions are indicated, the boring data will be included in the plans and the foundation dimensions shown in the Foundation Data Table will be the result of 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. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

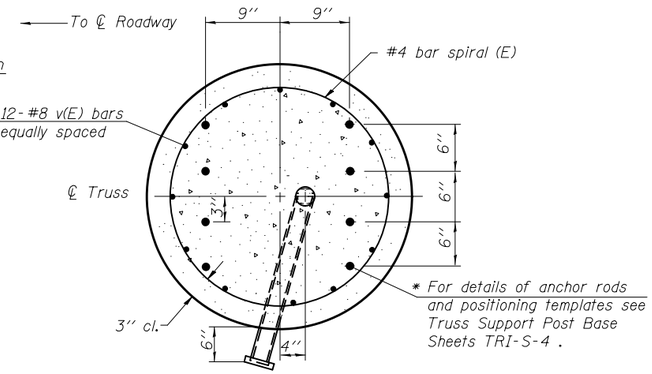
No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed monolithically, without construction joints. Backfill shall be placed per Article 502 of Standard Specification and prior to erection of support column.

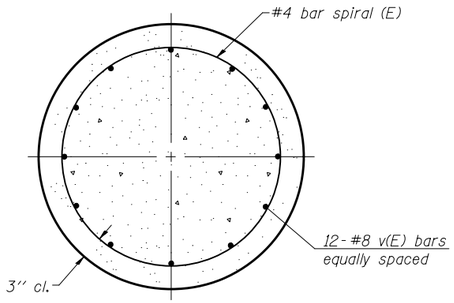
A normal surface finish followed by a Bridge Seat Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in Drilled Shaft Concrete Foundation.



ELEVATION



SECTION B-B
3'-0" ϕ shaft



SECTION D-D
3'-0" ϕ shaft

FOUNDATION DATA TABLE

Structure Number	Station	Truss Type	Left Foundation				Right Foundation				Class DS Concrete (Cu. Yds.)
			Elevation Top	Elev. Bottom	B	F	Elevation Top	Elev. Bottom	B	F	

TRI-S-9 6-1-12

FILE NAME =	USER NAME =	DESIGNED -	REVISED
		CHECKED -	REVISED
	PLOT SCALE =	DRAWN -	REVISED
	PLOT DATE =	CHECKED -	REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

TRI-CHORD SIGN STRUCTURES - DRILLED SHAFT STEEL TRUSS & STEEL POST

SHEET NO. OF SHEETS

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
		CONTRACT NO.		
	ILLINOIS FED. AID PROJECT			

ALUMINUM SPAN SIGN STRUCTURE END SUPPORT BASE REACTIONS
LOAD GROUP II - DEAD + WIND LOAD AT 100% NORMAL PLUS 20% TRANSVERSE

MAX. SPAN LENGTH (FT)	MAX. SIGN AREA (SQ FT)	MAX. END SUPPORT HEIGHT (FT)	LEG	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-ft)	My (kip-ft)	Mz (kip-ft)
TYPE I-A (4'-0" X 4'-6")									
70	350	24.5	BACK	0.6	26.3	6.1	5.8	1.2	-7.6
			FRONT	0.7	-21.7	2.3	2.6	0.7	-8.7
70	550	28.0	BACK	0.9	42.3	9.5	9.8	2.4	-15.8
			FRONT	1.0	-35.9	3.2	4.6	1.5	-17.5
80	570	28.0	BACK	0.9	46.4	10.5	10.6	2.5	-16.1
			FRONT	1.0	-39.5	3.4	4.7	1.5	-17.9
90	610	31.0	BACK	1.0	54.2	11.7	12.5	4.2	-23.1
			FRONT	1.1	-46.0	3.6	5.9	2.7	-25.7
100	610	31.0	BACK	1.0	53.6	12.0	12.8	4.5	-22.3
			FRONT	1.1	-45.1	3.8	6.1	3.0	-25.5
TYPE II-A (4'-6" X 5'-3")									
90	740	31.0	BACK	1.2	59.2	13.7	16.1	3.8	-27.1
			FRONT	1.3	-49.6	3.9	8.4	2.3	-29.8
100	740	31.0	BACK	1.2	59.1	13.6	15.9	4.1	-27.4
			FRONT	1.3	-49.0	3.9	8.3	2.6	-30.5
110	740	31.0	BACK	1.2	70.0	15.6	18.4	5.3	-28.1
			FRONT	1.3	-59.1	4.5	9.5	3.8	-32.0
120	740	31.0	BACK	1.2	65.9	14.8	17.4	4.5	-27.8
			FRONT	1.3	-54.5	4.6	9.6	2.8	-32.0
130	740	31.0	BACK	1.2	68.2	15.7	18.3	5.3	-27.8
			FRONT	1.3	-56.2	4.4	9.5	3.8	-32.0
TYPE III-A (5'-0" X 7'-0")									
120	900	34.0	BACK	1.4	77.2	17.7	21.6	5.6	-37.9
			FRONT	1.8	-64.2	4.7	11.0	4.1	-43.6
130	975	34.0	BACK	1.5	83.1	19.7	23.2	6.0	-41.1
			FRONT	1.9	-68.9	5.3	11.6	4.1	-47.4
140	1050	34.0	BACK	1.6	93.0	20.9	26.0	6.4	-44.5
			FRONT	2.0	-76.4	6.0	14.2	4.7	-51.3
150	1125	34.0	BACK	1.8	103.2	22.7	28.8	6.2	-53.7
			FRONT	2.1	-83.5	6.1	16.2	3.9	-59.3
160	1200	34.0	BACK	2.0	108.9	23.9	30.4	6.6	-57.3
			FRONT	2.2	-87.9	6.4	17.0	4.1	-62.9

Aluminum Cantilever Sign Structure Column Base Reactions
LOAD GROUP II - DEAD + WIND LOAD AT 100% NORMAL PLUS 20% TRANSVERSE

Truss Type	Maximum Total Sign Area (sq ft)	Mx (ft-k)	Mz (ft-k)	Fx (k)	Fz (k)	Torsion (ft-k)	Axial (k)	Shaft Diameter (ft)
I-C-A	170	178.6	83.4	1.3	6.7	108.0	6.1	3.0
II-C-A	170	187.0	104.6	1.5	7.3	139.1	8.1	3.5
II-C-A	340	318.4	158.2	2.4	12.2	217.5	9.9	3.5
III-C-A	170	211.9	135.2	1.6	8.5	184.8	9.1	3.5
III-C-A	250	259.6	153.9	2.1	10.3	224.9	9.4	3.5
III-C-A	400	367.9	193.4	2.9	14.5	273.2	10.9	3.5
III-C-A	400	385.9	233.1	2.9	15.1	343.8	13.1	3.5

Steel Cantilever Sign Structure Column Base Reactions
LOAD GROUP II - DEAD + WIND LOAD AT 100% NORMAL PLUS 20% TRANSVERSE

Truss Type	Maximum Total Sign Area (sq ft)	Mx (ft-k)	Mz (ft-k)	Fx (k)	Fz (k)	Torsion (ft-k)	Axial (k)	Shaft Diameter (ft)
I-C-A	170	178.6	110.6	1.4	6.8	108.1	8.9	3.0
II-C-A	340	318.4	205.8	2.4	12.3	217.6	13.3	3.5
III-C-A	400	365.8	261.2	2.9	14.5	273.2	16.5	3.5
III-C-A	400	373.2	346.5	2.9	14.8	341.7	19.2	3.5

STEEL SPAN SIGN STRUCTURE END SUPPORT BASE REACTIONS
LOAD GROUP II - DEAD + WIND LOAD AT 100% NORMAL PLUS 20% TRANSVERSE

MAX. SPAN LENGTH (FT)	MAX. SIGN AREA (SQ FT)	MAX. END SUPPORT HEIGHT (FT)	LEG	Fx (kip)	Fy (kip)	Fz (kip)	Mx (kip-ft)	My (kip-ft)	Mz (kip-ft)
TYPE I-S (4'-0" X 4'-6")									
70	550	28.0	BACK	0.9	43.3	9.4	9.6	0.6	-16.8
			FRONT	1.0	-34.2	3.3	4.8	0.1	-17.4
80	570	28.0	BACK	1.0	48.1	10.3	10.5	1.2	-17.6
			FRONT	1.0	-36.9	3.6	5.2	0.1	-18.2
90	610	31.0	BACK	1.0	56.1	11.7	12.3	1.9	-24.6
			FRONT	1.1	-43.3	3.6	5.9	0.2	-25.4
100	610	31.0	BACK	1.0	55.8	11.7	12.2	2.1	-24.0
			FRONT	1.1	-42.2	4.1	6.5	0.4	-25.1
TYPE II-S (4'-6" X 5'-3")									
90	740	31.0	BACK	1.2	61.2	13.5	15.7	1.9	-28.6
			FRONT	1.3	-46.8	4.1	8.6	1.1	-29.6
100	740	31.0	BACK	1.3	60.9	13.4	15.5	2.1	-29.0
			FRONT	1.3	-46.2	4.0	8.5	0.4	-30.3
110	740	31.0	BACK	1.3	70.2	15.4	17.9	2.2	-29.2
			FRONT	1.3	-53.0	4.6	9.8	0.6	-30.7
120	740	31.0	BACK	1.3	70.1	15.3	17.7	2.3	-29.5
			FRONT	1.3	-52.2	4.6	9.7	0.6	-31.0
130	740	31.0	BACK	1.3	71.5	15.5	17.8	2.3	-30.0
			FRONT	1.3	-51.9	4.6	9.7	0.6	-31.5
TYPE III-S (5'-0" X 7'-0")									
120	900	34.0	BACK	1.5	78.1	16.9	19.6	2.7	-40.7
			FRONT	1.7	-57.1	5.6	11.1	0.5	-42.4
130	975	34.0	BACK	1.7	87.9	19.7	22.7	2.5	-44.6
			FRONT	1.8	-62.8	5.3	11.5	0.2	-45.7
140	1050	34.0	BACK	1.8	94.7	20.5	24.2	3.2	-47.9
			FRONT	1.9	-67.5	6.4	13.8	0.6	-50.0
150	1125	34.0	BACK	1.9	102.2	22.3	27.7	3.2	-52.9
			FRONT	2.0	-71.0	6.4	16.4	0.5	-55.1
160	1200	34.0	BACK	2.1	114.6	23.6	29.5	3.4	-60.3
			FRONT	2.2	-80.8	6.7	17.2	0.5	-62.1

Aluminum Butterfly Sign Structure Column Base Reactions
LOAD GROUP II - DEAD + WIND LOAD AT 100% NORMAL PLUS 20% TRANSVERSE

Truss Type	Maximum Span Length Each Wing (ft)	Maximum Column Height (ft)	Maximum Total Sign Area Both Wings (sq ft)	Mx (ft-k)	Mz (ft-k)	Fx (k)	Fz (k)	Torsion (ft-k)	Axial (k)	Shaft Diameter (ft)
I-F-A	25	32	200	221.5	58.5	1.5	8.3	73.6	8.5	3.0
II-F-A	30	32	400	412.0	112.4	2.8	15.7	156.6	12.4	3.5
III-F-A	35	32	400	421.9	88.9	2.9	16.6	210.4	14.1	3.5

Steel Trichord Sign Structure Column Base Reactions
LOAD GROUP II - DEAD + WIND LOAD AT 100% NORMAL PLUS 20% TRANSVERSE

Truss Type	Maximum Span Length (ft)	Maximum Column Height (ft)	Maximum Total Sign Area (sq ft)	Mx (ft-k)	Mz (ft-k)	Fx (k)	Fz (k)	Torsion (ft-k)	Axial (k)	Shaft Diameter (ft)
TRI-I-A	80	32	600	323.1	60.7	2.5	12.0	0.2	8.6	3.0
TRI-II-A	100	32	600	328.6	63.6	2.6	12.3	0.2	10.2	3.0
TRI-II-A	120	32	600	350.3	63.1	2.5	13.1	0.3	11.2	3.0
TRI-III-A	140	32	600	367.2	66.2	2.6	13.8	0.3	14.7	3.0

ALUMINUM SPAN SIGN STRUCTURE WEIGHTS

MAX. SPAN LENGTH (FT)	CHORD ALUMINUM TUBE SIZE (IN)	*WEB MEMBERS ALUMINUM TUBE SIZE (IN)	TRUSS WEIGHTS (LB)	END SUPPORT STEEL PIPE SIZE (IN)	MAX. END SUPPORT HEIGHT (FT)	WEIGHT EACH SUPPORT (LB)
TYPE I-A (4'-0" X 4'-6")						
70	4 1/2 X 1/4	2 1/4 X 1/4	2160	6 X 0.280	25.0	1980
70	5 X 1/4	2 1/2 X 1/4	2420	8 X 0.322(Std)	28.0	1980
80	5 X 5/16	2 1/2 X 5/16	3370	8 X 0.322(Std)	28.0	2230
90	5 X 5/16	2 1/2 X 5/16	3850	10 X 0.279	31.0	2480
100	5 1/2 X 5/16	2 1/2 X 5/16	4480	10 X 0.279	31.0	2580
TYPE II-A (4'-6" X 5'-3")						
90	5 1/2 X 5/16	3 X 5/16	4560	10 X 0.365 (Std)	31.0	3010
100	6 X 5/16	3 X 5/16	5270	10 X 0.365 (Std)	31.0	3010
110	6 1/2 X 5/16	3 X 5/16	6030	10 X 0.365 (Std)	31.0	3010
120	7 X 5/16	3 X 5/16	6960	10 X 0.365 (Std)	31.0	3010
130	7 X 3/8	3 X 5/16	8270	10 X 0.365 (Std)	31.0	3010
TYPE III-A (5'-0" X 7'-0")						
120	7 X 5/16	3 1/4 X 5/16	7810	12 X 0.33	34.0	3830
130	7 X 3/8	3 1/4 X 5/16	9180	12 X 0.33	34.0	3830
140	7 X 1/2	3 1/4 X 5/16	11440	12 X 0.375 (Std)	34.0	4230
150	8 1/2 X 1/2	3 1/2 X 5/16	14310	12 X 0.5 (XS)	34.0	5300
160	9 X 1/2	3 1/2 X 5/16	15770	12 X 0.5 (XS)	34.0	5570

* (Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals)

NOTE: Splice plates, bolts, walkways, signs, and etc. not included in truss weights. Base plates, bearing blocks, u-bolts not included in end support weights.

ALUMINUM CANTILEVER SIGN STRUCTURE WEIGHTS

CANTILEVER TYPE	MAX. SPAN LENGTH (FT)	CHORD ALUMINUM TUBE SIZE (IN)	*WEB MEMBERS ALUMINUM TUBE SIZE (IN)	TRUSS WEIGHTS (LB)	COLUMN STEEL PIPE SIZE (IN)	MAXIMUM COLUMN HEIGHT (FT)	COLUMN WEIGHT (LB)
I-C-A	25	5 X 5/16 (Std)	2 1/2X 5/16 (Std)	1080	16 X 0.5 (XS)	30.0	2480
II-C-A	30	6 1/2X 5/16 (Std)	3 1/4 X 5/16 (Std)	1860	24 X 0.5 (XS)	30.0	3770
III-C-A	35	7 X 3/8	3 1/2 X 3/8 (Std)	2640	24 X 0.5 (XS)	30.0	3770
III-C-A	40	8 X 3/8 (Std)	3 1/2 X 3/8 (Std)	3210	24 X 0.688	30.0	5150

* (Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals)

STEEL CANTILEVER SIGN STRUCTURE WEIGHTS

CANTILEVER TYPE	MAXIMUM SPAN LENGTH (FT)	CHORD STEEL PIPE SIZE (IN)	*WEB MEMBERS STEEL PIPE SIZE (IN)	TRUSS WEIGHTS (LB)	COLUMN STEEL PIPE SIZE (IN)	MAXIMUM COLUMN HEIGHT (FT)	COLUMN WEIGHT (LB)
I-C-S	25	5 X 0.258 (Std)	2 X 0.154 (Std)	2280	16 X 0.656	30.0	3230
II-C-S	30	6 X 0.280 (Std)	2 1/2 X 0.203 (Std)	4040	24 X 0.5 (XS)	30.0	3770
III-C-S	35	6 X 0.344	2 1/2 X 0.203 (Std)	5130	24 X 0.688	30.0	5150
III-C-S	40	8 X 0.322 (Std)	3 X 0.216 (Std)	7310	24 X 0.688	30.0	5150

* (Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals)

NOTE: Connection plates, bolts, walkways, signs, lights, etc. not included in truss weights.
Base plates not included in column weights.

STEEL SPAN SIGN STRUCTURE WEIGHTS

MAX. SPAN LENGTH (FT)	CHORD STEEL PIPE SIZE (IN)	*WEB MEMBERS STEEL PIPE SIZE (IN)	TRUSS WEIGHTS (LB)	END SUPPORT STEEL PIPE SIZE (IN)	MAX. END SUPPORT HEIGHT (FT)	WEIGHT EACH SUPPORT (LB)
TYPE I-S (4'-0" X 4'-6")						
70	4 X 0.237	2 1/4 X 0.154	5110	8 X 0.322(Std)	28.0	1980
80	5 X 0.258	2 1/2 X 0.203	8420	8 X 0.322(Std)	28.0	2230
90	5 X 0.258	2 1/2 X 0.203	9610	10 X 0.279	31.0	2480
100	5 X 0.258	2 1/2 X 0.203	10620	10 X 0.279	31.0	2580
TYPE II-S (4'-6" X 5'-3")						
90	5 X 0.258	2 1/2 X 0.203	9740	10 X 0.365 (Std)	31.0	3010
100	5 X 0.258	2 1/2 X 0.203	10790	10 X 0.365 (Std)	31.0	3010
110	6 X 0.28	2 1/2 X 0.203	13740	10 X 0.365 (Std)	31.0	3010
120	6 X 0.28	2 1/2 X 0.203	15180	10 X 0.365 (Std)	31.0	3010
130	6 X 0.344	2 1/2 X 0.203	19550	10 X 0.365 (Std)	31.0	3010
TYPE III-S (5'-0" X 7'-0")						
120	6 X 0.28	2 1/2 X 0.203	16110	12 X 0.33	34.0	3830
130	8 X 0.322	3 X 0.216	24730	12 X 0.33	34.0	3830
140	8 X 0.322	3 X 0.216	26550	12 X 0.375 (Std)	34.0	4230
150	8 X 0.375	3 X 0.216	31070	12 X 0.5 (XS)	34.0	5300
160	8 X 0.406	3 X 0.216	34620	12 X 0.5 (XS)	34.0	5570

* (Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals)

NOTE: Splice plates, bolts, walkways, signs, and etc. not included in truss weights. Base plates, bearing blocks, u-bolts not included in end support weights.

ALUMINUM BUTTERFLY SIGN STRUCTURE WEIGHTS

CANTILEVER TYPE	MAX. SPAN LENGTH (FT)	CHORD ALUMINUM TUBE SIZE (IN)	*WEB MEMBERS ALUMINUM TUBE SIZE (IN)	TRUSS WEIGHTS (LB)	COLUMN STEEL PIPE SIZE (IN)	MAXIMUM COLUMN HEIGHT (FT)	COLUMN WEIGHT (LB)
I-C-A	25	5 X 5/16 (Std)	2 1/2X 5/16 (Std)	2160	16 X 0.656 (XS)	30.0	3250
II-C-A	30	6 1/2X 5/16 (Std)	3 1/4 X 5/16 (Std)	3720	24 X 0.5 (XS)	30.0	3770
III-C-A	35	7 X 3/8	3 1/2 X 3/8 (Std)	5280	24 X 0.5 (XS)	30.0	3770

* (Verticals; Horizontals; Vertical, Horizontal, and Interior Diagonals)

STEEL TRICHORD OVERHEAD SIGN STRUCTURE WEIGHTS

TRUSS TYPE	MAXIMUM SPAN LENGTH (FT)	CHORD NOMINAL STEEL PIPE SIZE	WEB MEMBERS NOMINAL STEEL PIPE SIZE	TRUSS WEIGHTS (LB)	END SUPPORT STEEL WIDE FLANGE SIZE	MAXIMUM SUPPORT HEIGHT (FT)	WEIGHT EACH SUPPORT (LB)
TRI-I-S	80	4 X 0.237	2 X 0.154	5460	W24 X 117	32	4010
TRI-II-S	100	5 X 0.258	2 X 0.154	8060	W24 X 117	32	4010
TRI-II-S	120	6 X 0.28	2 1/2 X 0.203	11150	W24 X 117	32	4010
TRI-III-S	140	8 X 0.322	3 X 0.216	18710	W24 X 117	32	4010

NOTE: Connection plates, bolts, walkways, signs, lights, etc. not included in truss weights.
Base plates not included in column weights.