

## INDEX FOR ROADSIDE D.M.S. SUPPORT STANDARDS

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### PROCEDURE FOR TIGHTENING ANCHOR BOLT NUTS:

- THIS WORK SHALL BE PERFORMED ONLY ON DAYS WITH WINDS LESS THAN 15 MPH. ALL TIGHTENING OF THE NUTS IS TO BE DONE IN THE PRESENCE OF THE INSPECTOR. ONCE THE TIGHTENING PROCEDURE IS STARTED IT MUST BE COMPLETED ON ALL OF THE BASE PLATE NUTS WITHOUT PAUSE OR DELAY.
  - PROPERLY SIZED WRENCHES DESIGNED FOR TIGHTENING NUTS AND/OR BOLTS SHALL BE USED TO AVOID ROUNDING OR OTHER DAMAGE TO THE NUTS. ADJUSTABLE END OR PIPE WRENCHES MAY NOT BE USED.
  - BASE PLATE, ANCHOR RODS AND NUTS ARE TO BE FREE OF ANY DIRT OR DEBRIS.
  - APPLY STICK WAX OR BEES WAX TO THE THREADS AND BEARING SURFACES OF THE ANCHOR BOLT, NUTS, AND WASHERS.
  - TIGHTEN TOP NUTS SO THEY FULLY CONTACT THE BASE PLATE. TIGHTEN LEVELING NUTS TO SNUG TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE FULL EFFORT OF ONE PERSON ON A WRENCH WITH A LENGTH EQUAL TO 14 TIMES THE BOLT DIAMETER BUT NOT LESS THAN 18 INCHES. APPLY THE FULL EFFORT AS CLOSE TO THE END OF THE WRENCH AS POSSIBLE. PULL FIRMLY BY LEANING BACK AND USING ENTIRE BODY WEIGHT ON THE END OF THE WRENCH UNTIL THE NUT STOPS ROTATING. USE A MINIMUM OF TWO SEPARATE PASSES OF TIGHTENING. SEQUENCE THE TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL OF THE NUTS IN THAT PASS HAVE BEEN TIGHTENED.
  - TIGHTEN TOP NUTS TO SNUG TIGHT AS DESCRIBED FOR THE LEVELING NUTS.
  - MATCH-MARK THE TOP NUTS AND BASE PLATE USING PAINT, CRAYON, OR OTHER APPROVED MEANS TO PROVIDE A REFERENCE FOR DETERMINING THE RELATIVE ROTATION OF THE NUT AND BASE PLATE DURING TIGHTENING. USING A STRIKING OR HYDRAULIC WRENCH, FURTHER TIGHTEN THE TOP NUTS IN TWO PASSES AS LISTED IN THE FOLLOWING TABLE. USE A SEQUENCE OF TIGHTENING IN EACH PASS SO THAT THE NUT ON THE OPPOSITE SIDE, TO THE EXTENT POSSIBLE, WILL BE SUBSEQUENTLY TIGHTENED UNTIL ALL NUTS IN THAT PASS HAVE BEEN TURNED. DO NOT ROTATE THE LEVELING NUT DURING THE TOP NUT TIGHTENING.
- | ANCHOR BOLT SIZE                       | FIRST PASS | SECOND PASS | TOTAL ROTATION |
|--|------------|-------------|----------------|
| LESS THAN OR EQUAL TO $1\frac{1}{2}$ " | 1/6 TURN   | 1/6 TURN    | 1/3 TURN       |
- LUBRICATE, PLACE AND TIGHTEN THE JAM NUTS TO SNUG TIGHT.

### SPECIFICATIONS:

DESIGN: A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2009 WITH CURRENT INTERIMS.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2009, PLUS APPLICABLE GENERAL SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT.

### DESIGN STRESSES:

DESIGN STRESSES FOR MATERIALS ARE IN ACCORDANCE WITH A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2009 WITH CURRENT INTERIMS.  
 REINFORCING STEEL IN ACCORDANCE WITH LRFD AASHTO SECTION 5, GRADE 60.  
 CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5,  $f'c = 3,500$  PSI,

### STAINLESS STEEL BOLTING NOTE:

UNLESS OTHERWISE NOTED ON THE PLAN, ALL STAINLESS STEEL BOLTS AND U-BOLTS SHALL BE FURNISHED WITH STAINLESS STEEL REGULAR HEXAGONAL NUTS, JAM NUTS AND WASHERS UNDER BOTH HEADS AND NUTS.

### STEEL NOTES:

ALL STEEL SHAPES, BARS, AND PLATES SHALL COMPLY WITH ASTM A36 EXCEPT MINOR PARTS APPROVED BY THE ENGINEER MAY COMPLY WITH ASTM A575 GRADE M1020. THE GALVANIZED METAL BAR GRATING INCLUDING BEARING BAR, CROSS BARS AND BANDING BARS SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A1011 TYPE 2.

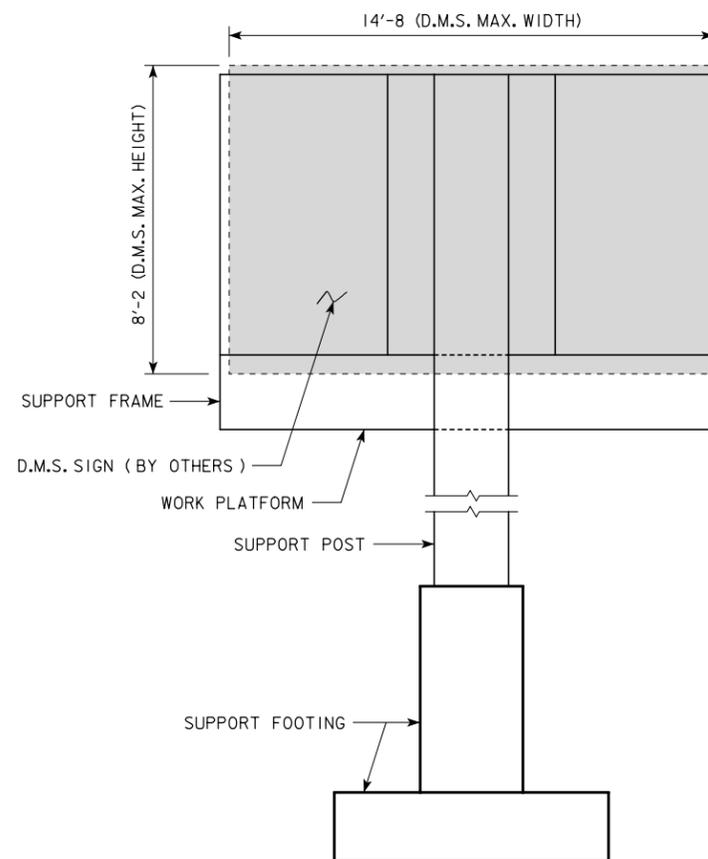
ALL STEEL PIPE SHALL BE "EXTRA STRONG" (X.S.) AND COMPLY WITH THE REQUIREMENTS OF ASTM A53 GRADE B, TYPE E OR S OR THE AMERICAN PETROLEUM INSTITUTE (API) 5L GRADE B. ALL ROUND HOLLOW STRUCTURAL SECTIONS (HSS) SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A 500 GRADE B. ALL STEEL SECTIONS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. PROVIDE VENT HOLES FOR GALVANIZING.

ALL ANCHOR BOLT MATERIAL SHALL COMPLY WITH THE REQUIREMENTS OF IOWA DOT MATERIALS IM 453.08.

STEEL WELDING SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE AWS SPECIFICATIONS D1.1, STRUCTURAL WELDING CODE-STEEL.

ULTRASONIC TESTING SHALL BE PERFORMED ON THE POST TO BASE PLATE WELDS.

THE  $\frac{3}{4}$ "  $\phi$  A325 GALVANIZED BOLTS SHALL BE TENSIONED BY TURN OF THE NUT METHOD.



### GENERAL INFORMATION VIEW

D.M.S. LIMITS FOR SIGN SUPPORT DESIGN:  
 1700 LBS. MAX. AND 1'-4" MAX. DEPTH

### GENERAL NOTES:

ALL DYNAMIC MESSAGE SIGN (D.M.S.) SUPPORTS ARE DESIGNED FOR 40 lb/ft<sup>2</sup> WIND PRESSURE ON MEMBERS AND SIGN PANELS.

ALL PIPES, SHAPES, AND PLATES SHALL BE STRUCTURAL STEEL COMPLYING WITH THE ASTM SPECIFICATIONS NOTED.

SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW.

CLEAR DISTANCE FROM FACE OF CONCRETE TO THE NEAREST REINFORCING BAR SHALL BE 2" UNLESS OTHERWISE SHOWN.

THE ANCHOR BOLT ASSEMBLY SHALL BE CENTERED AT THE CENTER OF SHAFT AND SECURELY WIRED IN PLACE BEFORE CONCRETE IS PLACED.

THE FOOTING SHALL BE BACKFILLED PRIOR TO ERECTING THE D.M.S. SUPPORT FRAME.

THE FOOTING DESIGN IS BASED ON A ALLOWABLE SOIL BEARING OF 0.75 TON PER SQ. FT. FOR LOCATIONS WITHIN 30 FEET OF THE EDGE OF PAVEMENT.

FOR LOCATIONS MORE THAN 30 FEET FROM THE EDGE OF PAVEMENT THE ENGINEER SHALL INSPECT THE SOIL IN CONSULTATION WITH SOILS DESIGN TO MAKE SURE THE SOIL IS MEETING THE 0.75 TON PER SQ. FT. ALLOWABLE SOIL BEARING CAPACITY.

ALL REINFORCING TO BE GRADE 60.

ALL CONCRETE TO BE CLASS "C" STRUCTURAL CONCRETE.

KEYWAY DIMENSIONS SHOWN ON THE PLANS ARE BASED ON NOMINAL DIMENSIONS UNLESS STATED OTHERWISE. IN ADDITION, THE BEVEL USED ON THE KEYWAY SHALL BE LIMITED TO A MAXIMUM OF 10 DEGREES FROM VERTICAL.

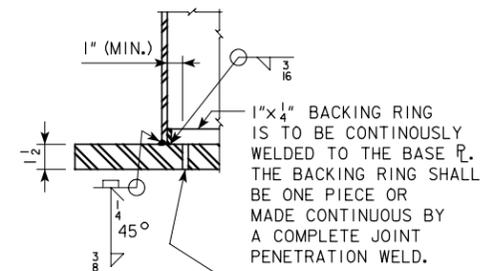
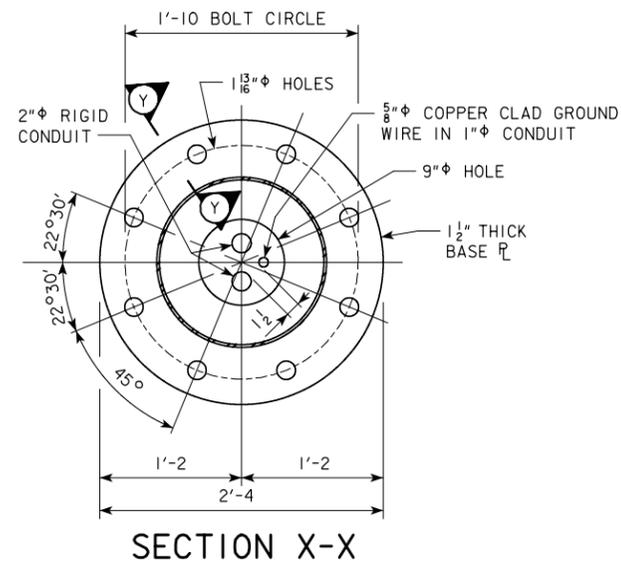
### STRUCTURAL ALIGNMENT/TOLERANCE NOTES:

- THE ELEVATION AT THE TOP OF THE FOUNDATION SHALL BE WITHIN 1 INCH OF PLAN ELEVATION.
- ANCHOR BOLT GROUPS SHALL BE LOCATED ACCURATELY BY TEMPLATE OR OTHER POSITIVE MEANS, WITH CENTERS OF ADJACENT ANCHOR BOLT GROUPS WITHIN  $\frac{3}{16}$  INCH OF THE CORRECT DISTANCE APART.
- ANCHOR BOLTS SHALL BE PLUMB WITHIN  $\frac{1}{4}$  INCH PER FOOT FROM VERTICAL.
- ANCHOR BOLTS SHALL PROJECT ABOVE TOP OF FOUNDATION WITHIN  $\frac{1}{4}$  INCH OF THE PLAN DIMENSION.
- WELDING OR BENDING OF ANCHOR BOLTS SHALL NOT BE ALLOWED. THE CONTRACTOR SHALL OBTAIN A TEMPLATE FROM THE MANUFACTURER / FABRICATOR FOR PROPER PLACEMENT OF THE ANCHOR BOLTS.
- THE SUPPORT POST SHALL BE PLUMB WITHIN  $\frac{1}{16}$  INCH PER FOOT OF VERTICAL IN TWO PERPENDICULAR DIRECTIONS, IN THE COMPLETED STRUCTURE.
- A HORIZONTAL LINE ALONG EACH MAST ARM SHALL BE LEVEL WITHIN  $\frac{1}{16}$  INCH PER FOOT OF HORIZONTAL, IN THE COMPLETED STRUCTURE.

LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 Iowa Department of Transportation Highway Division	
		STANDARD DESIGN ROADSIDE DYNAMIC MESSAGE SIGN (D.M.S.) SUPPORT SEPTEMBER, 2010	
		GENERAL NOTES	DMS-SSI-10

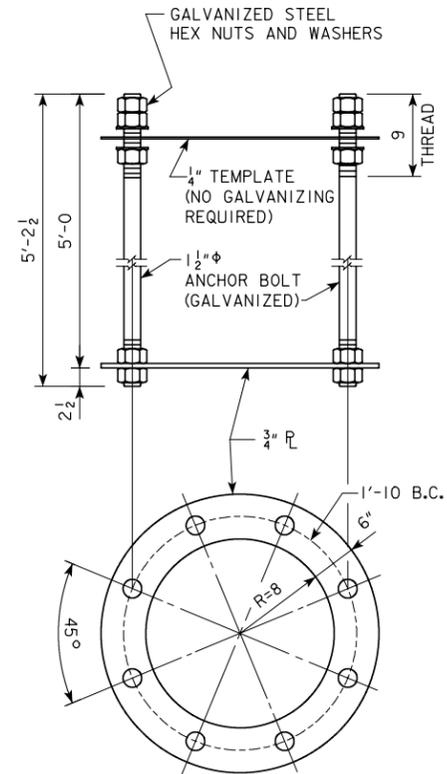






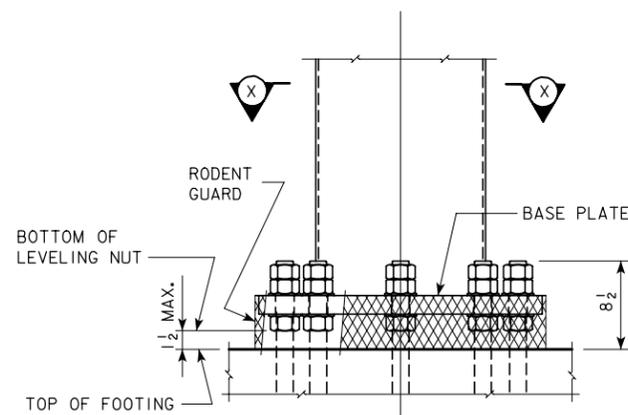
3/8" φ GALVANIZING VENT HOLE. GALVANIZING VENTS SHALL BE LOCATED IN THE BASE PLATE IF NEEDED. NO VENT HOLE SHALL BE DRILLED THROUGH THE BACKING RING OR HSS 16x1/2

SECTION Y-Y



ANCHOR BOLT ASSEMBLY

(ALL ANCHOR BOLT MATERIAL SHALL COMPLY WITH THE REQUIREMENTS OF IOWA DOT MATERIALS I.M. 453.08.)



POST BASE DETAIL

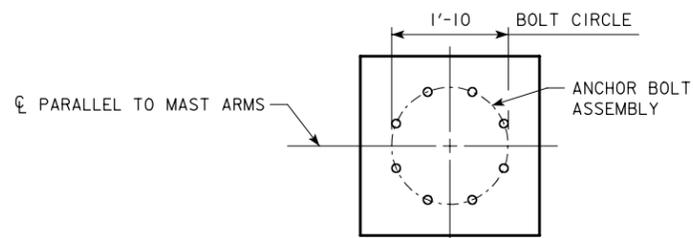
(SHOWING THE RODENT GUARD)

THE RODENT GUARD SHALL BE PLACED AROUND THE BASE PLATE.

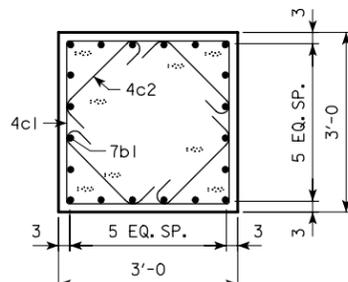
THE RODENT GUARD IS STAINLESS STEEL STANDARD GRADE WIRE CLOTH, 1/4" MAXIMUM OPENING WITH A MINIMUM WIRE DIAMETER OF AWG NO. 16 WITH A MINIMUM 2" LAP.

SECURE TO BASE PLATE AFTER ERECTION WITH 3/4" STAINLESS STEEL BANDING. THE RODENT GUARD SHALL NOT EXTEND ABOVE THE TOP OF THE BASE PLATE.

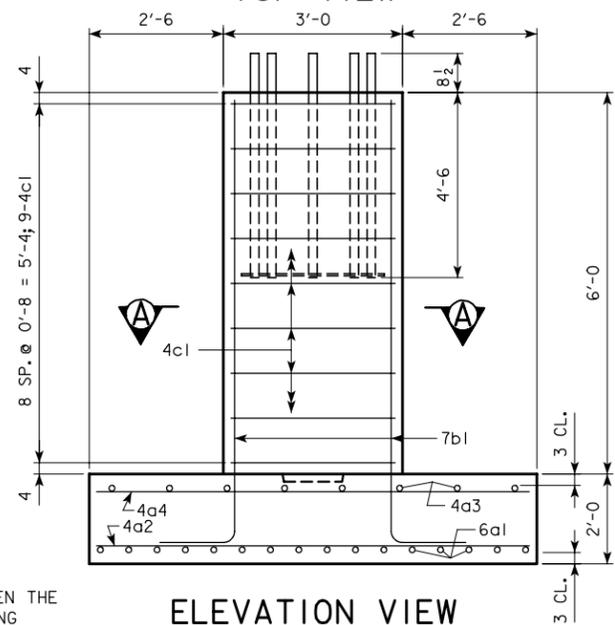
LATEST REVISION DATE	 APPROVED BY BRIDGE ENGINEER	 <b>Iowa Department of Transportation</b> Highway Division	
		STANDARD DESIGN <b>ROADSIDE DYNAMIC MESSAGE SIGN (D.M.S.) SUPPORT</b> SEPTEMBER, 2010	
		SUPPORT POST BASE DETAILS	DMS-SS4-10



TOP VIEW

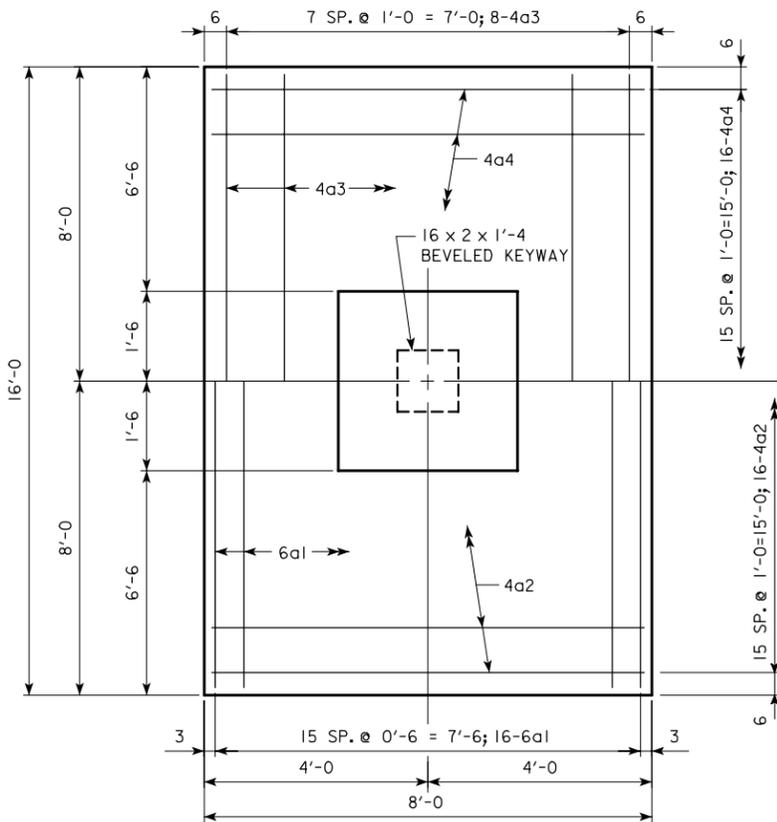


SECTION A-A



ELEVATION VIEW

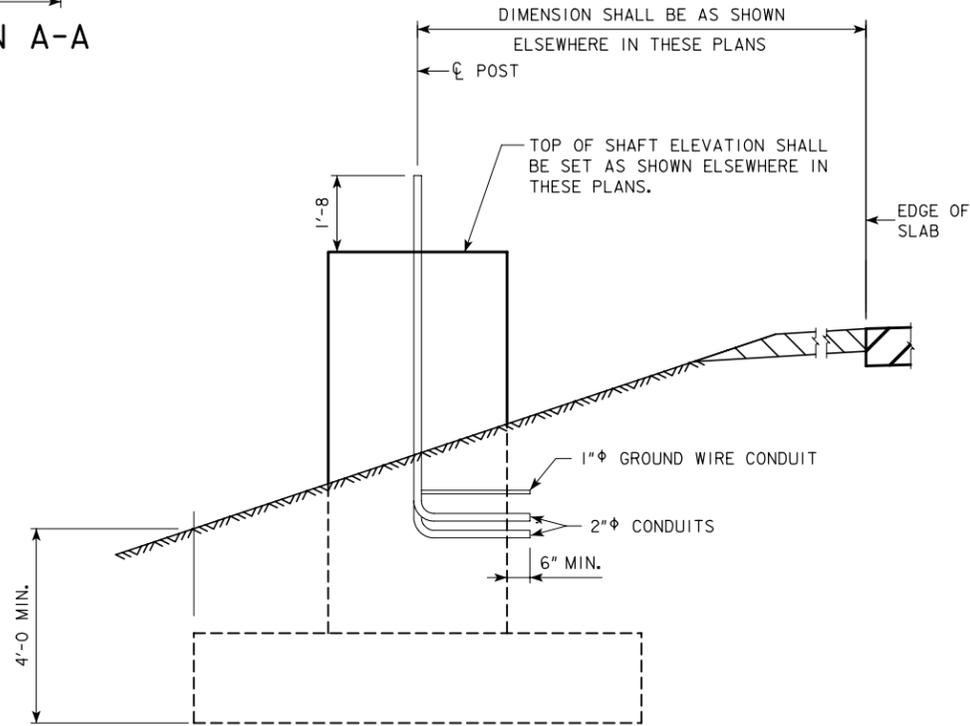
THE JOINT BETWEEN THE SHAFT AND FOOTING SHALL BE ROUGH.



FOOTING PLAN

TOP REINFORCING STEEL

BOTTOM REINFORCING STEEL

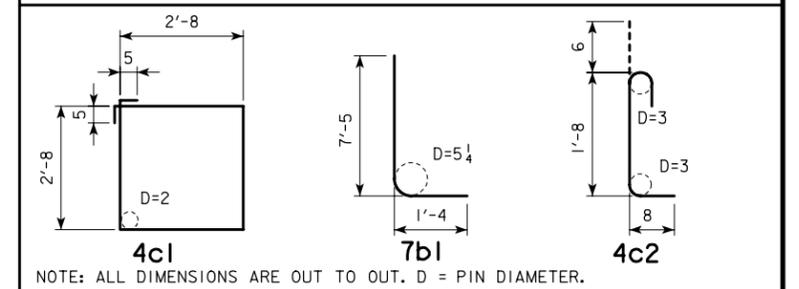


ELEVATION VIEW - TOP OF SHAFT AND BACKFILL

EPOXY-COATED REINFORCING BAR LIST

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	FOOTING BOT., LONGIT.	—	16	15'-8	377
4a2	FOOTING BOT., TRANSV.	—	16	7'-8	82
4a3	FOOTING TOP, LONGIT.	—	8	15'-8	84
4a4	FOOTING TOP, TRANSV.	—	16	7'-8	82
7b1	FOOTING TO SHAFT DOWEL	L	20	8'-9	358
4c1	SHAFT HOOPS	□	9	11'-6	69
4c2	SHAFT TIES	⌒	36	2'-10	68
REINFORCING STEEL - EPOXY COATED TOTAL (LBS.)					1120

BENT BAR DETAILS



NOTE: ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

CONCRETE PLACEMENT QUANTITIES (ONE FOOTING)

SHAFT	2.0
FOOTING	9.5
TOTAL - CU. YDS.	11.5

ESTIMATED FOOTING QUANTITIES (ONE FOOTING)

ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE	CU. YDS.	11.5
REINFORCING STEEL-EPOXY COATED	LBS.	1120

LATEST REVISION DATE

*Thomas E. McQuill*  
APPROVED BY BRIDGE ENGINEER

**Iowa Department of Transportation**  
Highway Division

STANDARD DESIGN  
**ROADSIDE DYNAMIC MESSAGE SIGN (D.M.S.) SUPPORT**  
SEPTEMBER, 2010

FOOTING DETAILS      DMS-SS5-10