%REVISED 09-2014: MODIFIED NOTES.
%REVISED 03-2019: MODIFIED GALVANIZED STEEL NOTES TO ADDRESS MATERIAL AVAILABILITY ISSUES. MODIFIED GALVANIZED STEEL FASTENER NOTES TO ADDRESS CHANGES IN ASTM SPECIFICATIONS. UPDATED SHOP DRAWING SUBMITTAL NOTE TO CONFORM TO CURRENT IOWA DOT STANDARD SPECIFICATIONS. UPDATED DESIGN SPECIFICATIONS AND DESIGN STRESSES TO COMPLY WITH AASHTO LTS-6 (2013). REMOVED STRUCTURE DIMENSION LINES SHOWN IN GENERAL INFORMATION VIEW FOR IMPROVED CLARITY. UPDATED BRIDGE ENGINEER SIGNATURE.
%REVISED 04-2020: CHANGED "FULL-PENETRATION GROOVE WELD" TO "COMPLETE-JOINT-PENETRATION GROOVE WELD" TO CONFORM TO AWS NOMENCLATURE.
-ROADSIDEDMSSUPPORT.DGN - RDMS-01-13 - THIS SHEET ISSUED 04-2013.

INDEX FOR ROADSIDE DMS SUPPORT STANDARDS

RDMS-01-13	INDEX AND NOTES FOR DMS SIGN SUPPORT	
RDMS-02-13	SUPPORT FRAME DETAILS	
RDMS-03-13	WORK PLATFORM DETAILS	
RDMS-04-13	SUPPORT POST BASE DETAILS	
RDMS-05-13	FOUNDATION DETAILS	
RDMS-06-13	3D PDF ROTATIONAL VIEW	"DMS"='DYNAMIC MESSAGE SIGN

ANCHOR-BOLT`NUT`TIGHTENING`PROCEDURE:

1) 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.

2) PROPERLY SIZED WRENCHES DESIGNED FOR TIGHTENING NUTS AND/OR BOLTS SHALL BE USED TO AVOID ROUNDING OR OTHER DAMAGE TO THE NUTS. ADJUSTABLE END WRENCHES OR PIPE WRENCHES MAY NOT BE USED.

3) BASE PLATE, ANCHOR BOLTS AND NUTS ARE TO BE FREE OF ANY DIRT OR DEBRIS.

4) APPLY STICK WAX OR BEES WAX TO THE THREADS AND BEARING SURFACES OF THE ANCHOR BOLTS, NUTS AND WASHERS.

5) 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 FORCE 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 NUTS IN THAT PASS HAVE BEEN TIGHTENED.

6) TIGHTEN TOP NUTS TO SNUG TIGHT AS DESCRIBED FOR THE LEVELING NUTS.

7) 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 BELOW. SEQUENCE THE 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
1½"5/64	1/6 TURN	1/6 TURN	1/3 TURN

8) LUBRICATE, PLACE AND TIGHTEN THE JAM NUTS TO SNUG TIGHT.

SPECIFICATIONS:

DESIGN: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2013 WITH INTERIMS.

CONSTRUCTION: IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, 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 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS, SERIES OF 2013 WITH INTERIMS.

REINFORCING STEEL IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002, SECTION 8, GRADE 60.

CONCRETE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SERIES OF 2002, SECTION 8, f'c = 4.0 KSI.

GALVANIZED STEEL NOTES:

ALL STEEL MAST ARMS SHALL COMPLY WITH ASTM A53 GRADE B, TYPE E OR S; THE AMERICAN PETROLEUM INSTITUTE (API) 5L GRADE B; ASTM A500 GRADE B; ASTM A500 GRADE C; ASTM A1085; API 5L GRADE X42; OR API 5L GRADE X52. THESE MEMBERS DESIGNATED AS STEEL PIPE SHALL HAVE A MINIMUM YIELD STRENGTH OF 35 KSI.

THE STEEL SUPPORT POST SHALL COMPLY WITH ASTM A500 GRADE B, ASTM A500 GRADE C, ASTM A1085, API 5L GRADE X42 OR API 5L GRADE X52. THIS MEMBER DESIGNATED AS A 16.000 x 0.500 HOLLOW STRUCTURAL SECTION (HSS) SHALL HAVE A MINIMUM YIELD STRENGTH OF 42 KSI.

ALL STEEL BARS AND PLATES SHALL COMPLY WITH ASTM A36, ASTM A572 GRADE 50, ASTM A709 GRADE 36 OR ASTM A709 GRADE 50. ALL STEEL W-SECTIONS SHALL COMPLY WITH ASTM A992, ASTM A36, ASTM A572 GRADE 50, ASTM A709 GRADE 36, ASTM A709 GRADE 50, OR ASTM A709 GRADE 50S. ALL STEEL BAR GRATING SECTIONS INCLUDING BEARING BARS, CROSS BARS AND BANDING BARS SHALL COMPLY WITH ASTM A1011 TYPE 2.

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

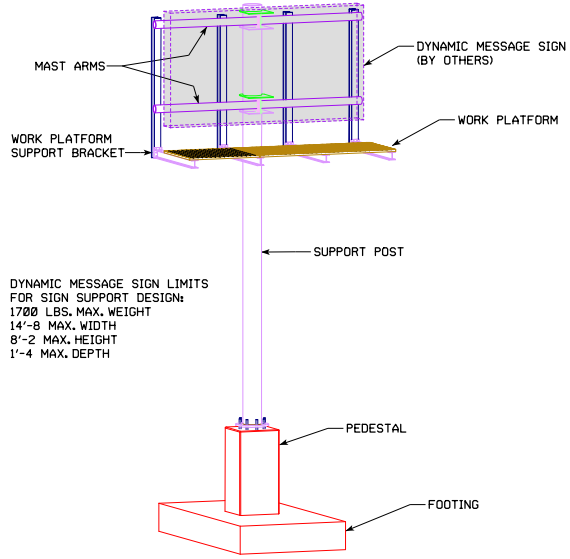
ULTRASONIC TESTING SHALL BE PERFORMED ON THE POST-TO-BASE-PLATE COMPLETE-JOINT-PENETRATION GROOVE WELD.

ALL STEEL SECTIONS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. PROVIDE VENT HOLES FOR GALVANIZING. SHOW LOCATION AND SIZE OF VENT HOLES ON SHOP DRAWINGS.

GALVANIZED STEEL FASTENER NOTES:

GALVANIZED STEEL FASTENERS SHALL BE IN ACCORDANCE WITH ARTICLE 2408.03, S AND ARTICLE 4187.01, C, 2 OF THE STANDARD SPECIFICATIONS. REGULAR NUTS AND JAM NUTS SHALL BE ASTM A563 GRADE DH HEAVY HEX. REGULAR NUTS MAY BE SUBSTITUTED FOR JAM NUTS. LOCK WASHERS SHALL NOT BE SUBSTITUTED FOR JAM NUTS. ASTM A449 TYPE 1 BOLTS OR ASTM F3125 GRADE A325-T TYPE 1 BOLTS MAY BE SUBSTITUTED FOR ASTM F3125 GRADE A325 TYPE 1 BOLTS WHERE NECESSARY TO ASSURE PROPER BOLT LENGTH AND THREAD LENGTH.

UNLESS OTHERWISE NOTED ON THE PLANS, GALVANIZED STEEL FASTENERS SHALL BE TENSIONED BY TURN-OF-NUT METHOD.



GENERAL INFORMATION VIEW

GENERAL NOTES:

ALL ROADSIDE DYNAMIC MESSAGE SIGN (DMS) SUPPORTS ARE DESIGNED FOR 40 LB/FT$^{5}/_{64}$ WIND PRESSURE ON MEMBERS AND DMS PANEL.

SHOP DRAWINGS SHALL BE SUBMITTED BY THE CONTRACTOR IN ACCORDANCE WITH ARTICLE 1105.03 OF THE STANDARD SPECIFICATIONS.

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

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

ROADSIDE DMS SUPPORTS SHALL NOT BE USED ON BRIDGES.

THE FOUNDATION SHALL BE BACKFILLED PRIOR TO ERECTING THE DMS SUPPORT FRAME.

THE FOUNDATION DESIGN IS BASED ON AN ALLOWABLE SOIL BEARING OF 0.75 TON/FT$^{5}/_{64}$ 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 IOWA DOT SOILS DESIGN SECTION TO MAKE SURE THE SOIL IS MEETING THE 0.75 TON/FT$^{5}/_{64}$ ALLOWABLE SOIL BEARING CAPACITY.

STRUCTURAL ALIGNMENT/TOLERANCE NOTES:

THE PRECISE INSTALLATION AND ALIGNMENT OF ALL COMPONENTS OF THE ROADSIDE DYNAMIC MESSAGE SIGN SUPPORT SHALL BE CONSIDERED ESSENTIAL. THE CONTRACTOR SHALL SUBMIT DOCUMENTATION TO THE ENGINEER SHOWING THAT THE VARIOUS COMPONENTS HAVE BEEN MEASURED AND ARE LOCATED WITHIN THE TOLERANCES LISTED BELOW.

1) THE ELEVATION AT THE TOP OF THE FOUNDATION SHALL BE WITHIN 1 INCH OF PLAN ELEVATION.

2) ANCHOR BOLT GROUPS SHALL BE LOCATED ACCURATELY BY TEMPLATE OR OTHER POSITIVE MEANS, WITH CENTERS OF ADJACENT ANCHOR BOLT GROUPS WITHIN 3/16 INCH OF THE CORRECT DISTANCE APART.

3) ANCHOR BOLTS SHALL BE PLUMB WITHIN ¼ INCH PER FOOT FROM VERTICAL.

4) ANCHOR BOLTS SHALL PROJECT ABOVE TOP OF FOUNDATION WITHIN ¼ INCH OF THE PLAN DIMENSION.

5) 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.

6) THE SUPPORT POST SHALL BE PLUMB WITHIN 1/16`INCH PER FOOT OF VERTICAL IN TWO PERPENDICULAR DIRECTIONS, IN THE COMPLETED STRUCTURE.

7) A HORIZONTAL LINE ALONG EACH MAST ARM SHALL BE LEVEL WITHIN 1/16`INCH PER FOOT OF ORIZONTAL, IN THE COMPLETED STRUCTURE.

U-BOLT NOTES:

U-BOLTS MAY BE MADE OF GALVANIZED STEEL OR STAINLESS STEEL AND SHALL BE IN ACCORDANCE WITH ARTICLE 4187.01, C, 2 OF THE STANDARD SPECIFICATIONS. WASHERS, REGULAR NUTS AND JAM NUTS SHALL USE THE SAME ALLOY PROPERTIES AS THOSE OF THE U-BOLTS SPECIFIED. REGULAR NUTS MAY BE SUBSTITUTED FOR JAM NUTS. LOCK WASHERS SHALL NOT BE SUBSTITUTED FOR JAM NUTS.

04-2020
LATEST REVISION DATE

APPROVED BY BRIDGE ENGINEER

IOWA DOT Highway Division

STANDARD DESIGN

ROADSIDE DYNAMIC MESSAGE SIGN (DMS) SUPPORT

APRIL, 2013

INDEX AND NOTES

RDMS-01-13