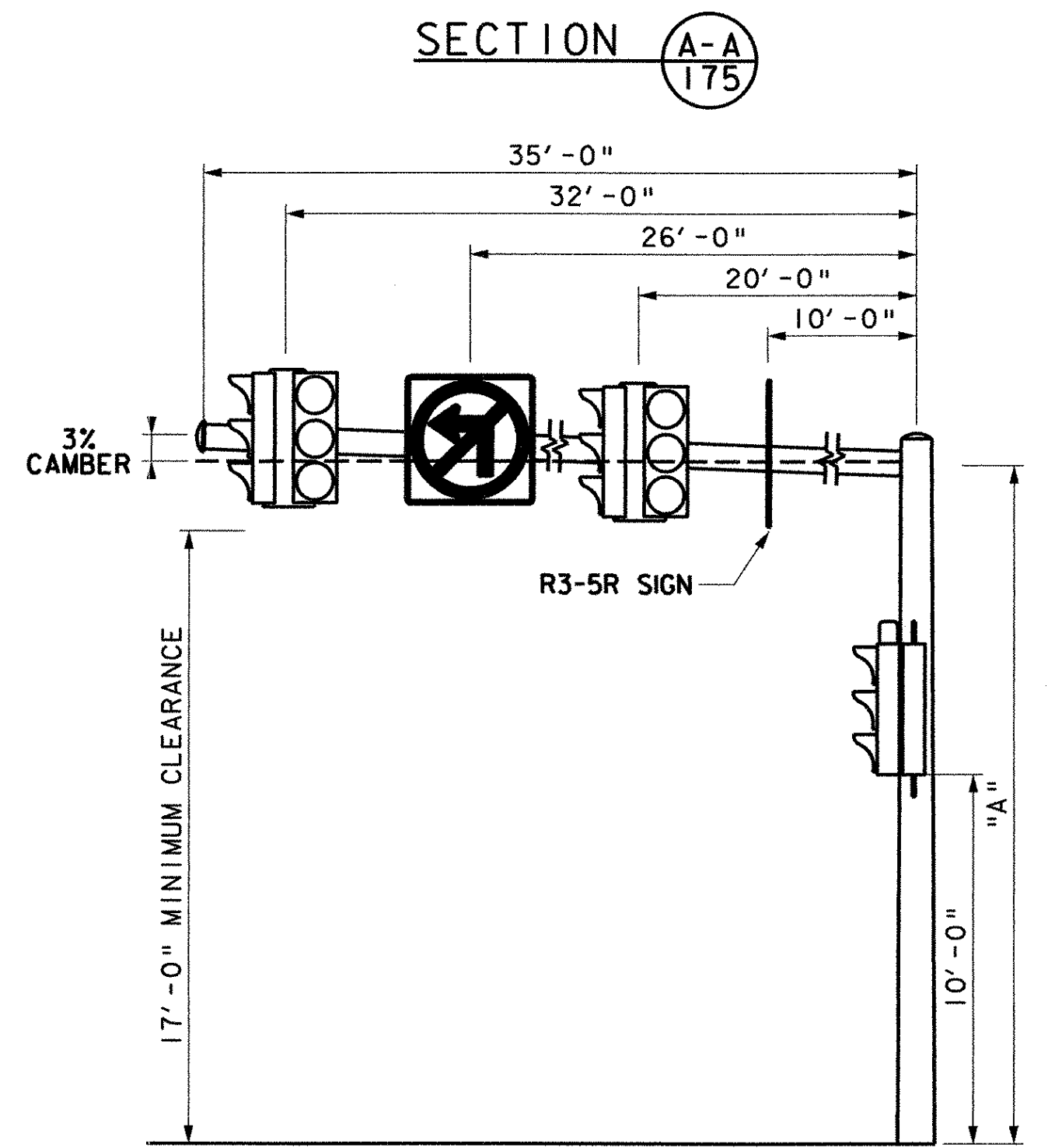
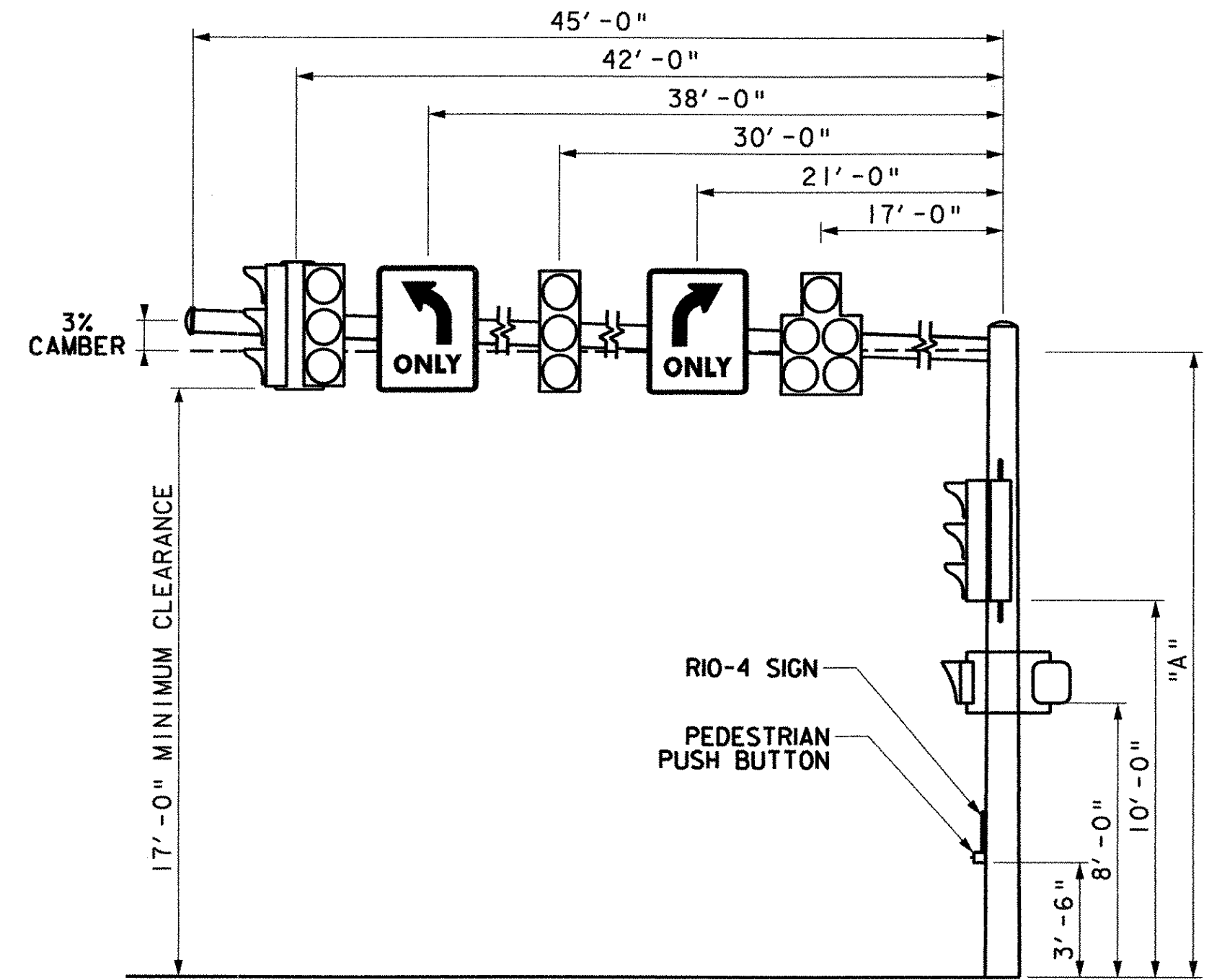


CANTILEVER SIGNAL SUPPORT NOTES

1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE STATE OF VERMONT AGENCY OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR CONSTRUCTION", DATED 2001, WITH CURRENT MODIFICATIONS.
2. OVERHEAD SIGN/SIGNAL SUPPORTS SHALL CONFORM TO AASHTO'S PUBLICATION ENTITLED "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS", 4TH EDITION, DATED 2001, OR ITS LATEST REVISIONS.
3. ADDITIONAL DESIGN CRITERIA ARE AS FOLLOWS:
 - CONCRETE FC = 1400 PSI F'C = 3 500 PSI, CLASS B
 - REINFORCING FS = 24 000 PSI (GRADE 60)
 - SEE MATERIAL AND RESEARCH SECTION MEMORANDUM ENTITLED "HARTFORD RS 013(40) - MAST ARM FOUNDATION EVALUATION" AND DATED DECEMBER 13, 2006 FOR ADDITIONAL SOIL DATA AND FOOTING REQUIREMENTS.
 - WIND LOAD AND ICE LOAD PER AASHTO "STANDARD SPECIFICATIONS"
4. ANCHOR BOLTS
FOUR STAINLESS STEEL ANCHOR BOLTS WITH TWO HEXAGON NUTS, ONE WASHER AND ONE LOCK WASHER PER BOLT SHALL BE FURNISHED WITH EACH HOLE. SEE SUBSECTION 714.09.
5. FLANGE BOLTS
ALL FLANGE BOLTS AND HEX NUTS SHALL BE HIGH STRENGTH STEEL AND SHALL CONFORM TO AASHTO M 164, TYPE 1 BOLTS, GALVANIZED PER AASHTO M 232 SPECIFICATION, THE FLANGE BOLTS SHALL BE CAPABLE OF RESISTING 133% OF THE FULL DESIGN STRESS OF THE TUBE AT ITS YIELD STRENGTH STRESS.
6. HORIZONTAL AND VERTICAL MEASURES
STEEL TUBES SHALL BE FORMED AND WELDED WITH ONE CONTINUOUS LONGITUDINAL WELD ONLY. AFTER FORMING AND WELDING THEY SHALL BE COLD ROLLED TO ENSURE UNIFORMITY OF SIZE AND SMOOTHNESS OF WELD. THEY SHALL HAVE A MINIMUM YIELD STRENGTH OF 48 KSI. THERE SHALL BE NO TRANSVERSE WELDING EXCEPT AT THE FLANGE CONNECTIONS AND POLE BASE PLATES, WHERE THE TUBES SHALL TELESCOPE THE FLANGES AND PLATES AND BE CONTINUOUSLY WELDED BOTH SIDES INSIDE AND OUT TO WITHSTAND THE FULL TRANSFER OF THE BENDING STRENGTH TO THE BOLTS. OPTIONALLY, THE MEMBERS MAY BE A SERIES OF TWO OR THREE DIFFERENT DIAMETER PIPES WELDED TOGETHER.
7. GALVANIZING
ALL STEEL COMPONENTS, EXCEPT CONCRETE REINFORCING AND STAINLESS STEEL HARDWARE AND FLANGE FASTENERS, ARE TO BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH AASHTO M 111 AFTER FABRICATION. THE ASSEMBLIES SHALL BE DESIGNED AND FABRICATED TO PERMIT GALLON ALL INTERIOR AND EXTERIOR SURFACES AND SHALL BE FREE OF POCKETS AND OTHER STRUCTURAL OBSTRUCTIONS THAT WILL NOT PERMIT PROPER DEPOSITION OF ZINC COATING.
8. WELDING
 - A. ALL DESIGN DETAILS, WORKMANSHIP, PROCEDURES AND INSPECTION SHALL CONFORM WITH SUBSECTION 506.J0.
 - B. ALL WELDS SHALL BE AT LEAST AS STRONG AS THE MATERIAL(S) BEING WELDED.
9. FOOTINGS
 - A. FOOTINGS SHALL BE DESIGNED IN ACCORDANCE WITH THE MATERIAL AND RESEARCH SECTION MEMORANDUM ENTITLED "HARTFORD RS 013(40) - MAST ARM FOUNDATION EVALUATION" AND DATED DECEMBER 13, 2006.
 - B. TWO TYPES OF FOUNDATIONS SHALL BE ALLOWED (SEE MATERIAL AND RESEARCH SECTION MEMORANDUM ENTITLED "HARTFORD RS 013(40) - MAST ARM FOUNDATION EVALUATION" AND DATED DECEMBER 13, 2006)
 - 1. DRILLED SHAFTS
 - 2. SPREAD FOOTINGS
 - C. DRILLED SHAFT FOOTINGS SHALL BE POURED IN DRILLED SHAFTS IN ACCORDANCE WITH THE MATERIAL AND RESEARCH SECTION MEMORANDUM ENTITLED "HARTFORD RS 013(40) - MAST ARM FOUNDATION EVALUATION" AND DATED DECEMBER 13, 2006.
 - D. AS AN ALTERNATIVE TO THE DRILLED HOLES, FOOTINGS MAY BE POURED IN EXCAVATED HOLES USING THE PROPER FORMS, WHICH MUST BE REMOVED. THE EXCAVATED HOLES SHALL BE AT LEAST 2' CLEAR OF THE FOOTING. THE BACKFILL MATERIAL SHALL BE COMPACTED AS DESCRIBED IN SUBSECTION 204.J2.
 - E. WHEN THE DESIGN DEPTH OF A FOOTING CANNOT BE OBTAINED DUE TO UNFORESEEN FIELD CONDITIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND SUBMIT A REVISED FOOTING DETAIL TO THE ENGINEER FOR APPROVAL.
 - F. ANY BACKFILL PLACED ADJACENT TO THE FOOTING SHALL BE GRANULAR MATERIAL MEETING THE REQUIREMENTS FOR GRANULAR BACKFILL FOR STRUCTURES, SUBSECTION 704.08. CONCRETE FOR FOOTING SHALL CONFORM TO THE REQUIREMENTS OF CONCRETE, CLASS B, SECTION 501, STRUCTURAL CONCRETE. GROUT MATERIAL SHALL BE NON-SHRINKING MORTAR CONFORMING TO SUBSECTION 707.03 (MORTAR TYPE IV).
 - G. SIGNALS/SIGNS SHALL BE MOUNTED AND LEVELED AND POLES SHALL BE PLUMB PRIOR TO PLACING GROUT UNDER POLE BASE.
10. SHOP DRAWINGS (6 COPIES OF EACH) SHALL BE SUBMITTED TO THE STATE OF VERMONT, AGENCY OF TRANSPORTATION, PROJECT MANAGER FOR APPROVAL, PRIOR TO FABRICATION. THE SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING INFORMATION:
 - A. DETAILED DRAWING OF EACH COMPONENT OF THE STRUCTURE.
 - B. MATERIAL SPECIFICATIONS FOR EACH COMPONENT OF THE STRUCTURE, EITHER BY COMPLETE SPECIFICATION OR REFERENCE TO APPLICABLE ASTM STANDARDS.
 - C. NOTATION OF PROJECT NAME, PROJECT NUMBER, ROUTE NUMBER AND POLE NUMBER TO BE INCLUDED ON EACH SHEET.
 - D. DETAILS FOR LOCATION OF SIGNS/SIGNALS AND ATTACHMENT HARDWARE FOR THE SUPPORT STRUCTURE.

10. (CONTINUED)
 - E. ALL ELEVATIONS AND DIMENSIONS NECESSARY TO PROVIDE A COMPLETE SET OF RECORD PLANS.
 - F. DEAD LOAD DEFLECTION AND CAMBER INFORMATION.
 - G. WELDING DETAILS AND PROCEDURES ARE REQUIRED FOR ALL WELDS. PROCEDURES SHALL BE SUBMITTED FOR APPROVAL WITH REFERENCE TO EACH WELD IDENTIFIED ON THE SHOP DRAWINGS (SEE SUBSECTION 506.J0).
11. EACH OVERHEAD TRAFFIC SIGNAL/SIGN SUPPORT SHALL BE GROUNDED. THE GROUND SHALL CONSIST OF:
 - A. AN INTERNAL GROUND LUG OPPOSITE THE HAND HOLE.
 - B. A 6 AWG (MIN.) SOFT DRAWN COPPER GROUNDING ELECTRODE CONDUCTOR.
 - C. A 3/4" THE RESISTANCE TO GROUND SHALL BE 25 OHMS OR LESS. ADDITIONAL GROUNDING ELECTRODES MAY BE REQUIRED (MINIMUM SPACING SHALL BE 6 FT). WHEN A POWER SERVICE, METER AND DISCONNECT ARE ATTACHED TO A POLE, THERE SHALL BE A CONTINUOUS GROUND WIRE FROM THE METER AND DISCONNECT WHICH MAY RUN INTERNAL TO THE UPRIGHT, THROUGH THE 1/2" INCH FLEXIBLE TUBING IN THE CONCRETE BASE TO THE REQUIRED GROUNDING ELECTRODE(S). THE GROUND WIRE FROM THE POLE GROUNDING LUG, CONTROLLER CABINET AND/OR LUMINAIRE MAY ATTACH TO THIS CONTINUOUS GROUNDING ELECTRODE CONDUCTOR FROM THE SERVICE METER AND DISCONNECT. THE CONTRACTOR SHALL PERFORM A RESISTANCE TO GROUND TEST ON THE CONTINUOUS GROUNDING ELECTRODE CONDUCTOR FROM THE SERVICE METER AND DISCONNECT AND PROVIDE A WRITTEN STATEMENT TO THE AREA ELECTRICAL INSPECTOR THAT THE GROUNDING ELECTRODE CONDUCTOR IS CONTINUOUS FROM THE SERVICE METER AND DISCONNECT AND THE RESISTANCE TO GROUND IS 25 OHMS OR LESS.
12. THE COST OF OVERHEAD TRAFFIC SIGN SUPPORTS, INCLUDING ALL HARDWARE, SIGN BRACKETS, AND FOOTING, SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 677.J2. THE COST OF TRAFFIC CONTROL SIGNAL SYSTEMS INCLUDING ALL HARDWARE, BRACKETS, FOOTINGS, LUMINAIRE AND LUMINAIRE ARMS SHALL BE INCLUDED IN ITEM 678.J5. THE COMPONENTS SHALL CONFORM TO ALL APPLICABLE PROVISION OF SECTION 677, 678, AND 679.
13. HORIZONTAL MEMBERS SHALL BE CAMBERED AND THE VERTICAL POLES BACKRACKED (WHERE APPLICABLE) TO THE ANTICIPATED DEAD LOAD DEFLECTION PLUS THE CAMBER, IF ANY, SPECIFIED ON THE PLANS.
14. AN EQUIVALENT ALTERNATE DESIGN MAY BE SUBSTITUTED FOR THE DETAILS AND MATERIALS SHOWN.
15. THE DETAILS OF DESIGN FOR THE STRUCTURE AND FOOTINGS ARE TO BE SUPPLIED BY THE CONTRACTOR AND/OR BY THE MANUFACTURER. THE STRUCTURE SHALL BE DESIGNED TO RESIST THE MAXIMUM LOADING AS OUTLINED IN THE AASHTO STANDARD SPECIFICATIONS (SEE NOTE 2). ALL DETAILS OF THE STRUCTURE AND THE FOOTING SHALL BE CHECKED AND STAMPED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF VERMONT PRIOR TO SUBMITTAL OF THE SHOP DRAWINGS TO THE VERMONT AGENCY OF TRANSPORTATION, PROJECT MANAGER.
16. IN ADDITION TO THE SHOP DRAWINGS OUTLINED IN NOTE 10, THE CONTRACTOR SHALL SUBMIT ALL DESIGN CALCULATIONS TO THE VERMONT AGENCY OF TRANSPORTATION, STRUCTURES DIVISION, SHOWING THE FOLLOWING INFORMATION FOR EACH OF THE VERTICAL AND HORIZONTAL COMPONENTS OF THE STRUCTURE AND FOOTING.
 - A. THE DESIGN AXIAL AND SHEAR FORCES AND BENDING AND TORSIONAL MOMENTS.
 - B. THE DESIGN AXIAL, BENDING AND SHEAR STRESSES AND THE COMBINED STRESS RATIO.
 - C. VIBRATION AND FATIGUE CALCULATIONS AS SET FORTH IN SECTION 9 OF THE AASHTO PUBLICATION REFERENCED IN NOTE 2.
 - D. THE ALLOWABLE AXIAL, BENDING, AND SHEAR STRESSES.
 - E. ITEMS A, B, D - SHALL BE SHOWN FOR EACH OF THE GROUP LOADINGS (I, II, III) AND FOR THE BASIC WIND LOAD APPLIED TO THE TWO CASES OUTLINED IN THE AASHTO STANDARD SPECIFICATIONS (SEE NOTE 2) SECTION 1.2.5.
 - F. FAILURE TO SUPPLY THE PROPER DESIGN INFORMATION SHALL BE CAUSE FOR REJECTION OF THE STRUCTURE.
 - G. A MINIMUM OF FOUR (4) WEEKS SHALL BE REQUIRED FOR REVIEW BY THE VERMONT AGENCY OF TRANSPORTATION, STRUCTURES DIVISION.
17. THE CONTRACTOR/MANUFACTURER SHALL BE RESPONSIBLE FOR DETERMINING THE "A" DIMENSION ON THE ADJACENT DETAIL AND DETERMINING THE REQUIRED FOOTING SIZES FOR EACH MAST ARM AND TRAFFIC SIGNAL POST IN ACCORDANCE WITH THE REQUIREMENTS AND RECOMMENDATIONS SET FORTH IN THE VTRANS MATERIALS AND RESEARCH SECTION GEOTECHNICAL MEMORANDUM ENTITLED "HARTFORD RS 013(40) - MAST ARM FOUNDATION EVALUATION" DATED DECEMBER 13, 2006, THE STANDARD SPECIFICATIONS AND STANDARD DETAILS E-170, E-171A, E-171B AND E-171C.
18. FOR INSTALLATIONS WHERE BOTH "EXISTING" AND "FUTURE" CONDITIONS ARE SHOWN, THE SUPPORTS SHALL BE DESIGNED FOR THE MORE SEVERE OF THE TWO LOADING CONDITIONS. THE INFORMATION OUTLINED IN NOTE 16 ABOVE SHALL BE PROVIDED FOR BOTH THE LOADING CONDITIONS.
19. THE TRAFFIC SIGNALS SHALL BE MOUNTED TO THE ARM OR POLE USING A FIXED MOUNT SYSTEM AS SHOWN ON STANDARD E-171B, UNLESS OTHERWISE NOTED ON THE CROSS SECTION SHEET.
20. BASE PLATES SHALL BE STAMPED WITH THE VERTICAL POLE DIAMETER, HEIGHT, YIELD STRENGTH, GAUGE AND THE HORIZONTAL MEMBER DIAMETER, LENGTH, YIELD STRENGTH, GAUGE. ALTERNATELY, THE INFORMATION MAY BE STAMPED ON A METAL TAG RIVETED TO THE POLE NEAR THE HANDHOLE.
21. SEE STANDARD E-171A FOR ADDITIONAL NOTES.
22. SEE BORING LAYOUT SHEETS AND BORING LOGS FOR LOCATIONS AND LOGS OF THE BORINGS TO BE USED FOR SIZING THE SIGNAL SUPPORT FOUNDATIONS.



TRAFFIC SIGNAL SHEET 6

DATUM	
VERTICAL	NGVD 1929
HORIZONTAL	N/A

PROJECT: HARTFORD	PROJECT NO.: RS 013(40)
DESIGN FILE NAME: z027bdr.DGN	PLOT DATE: 1/15/2007
IPARM FILE NAME:	SURVEY DATE: 1/87
SURVEYED BY: FANTONI	DRAWN BY: E. ATKINS
SQUAD LEADER: KEN UPMAL	SHEET: 178 OF 239