1. **DESIGN GUIDANCE**
2. OVERHEAD SIGN/SIGNAL SUPPORTS SHALL CONFORM TO AASHTO’S “SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS”, DATED 2013.
3. **DESIGN CALCULATION CRITERIA**
4. THE DESIGN CALCULATIONS SHALL TAKE INTO ACCOUNT THE FOLLOWING CRITERIA:
5. STRUCTURE CRITERIA

* DESIGN LIFE AND RECURRANCE INTERVAL: 50 YEARS
* WIND LOAD: 90 MPH; REFER TO ASCE 7-05 TO VERIFY IF THE SITE IS WITHIN THE SPECIAL WIND REGION AND IF CONFIRMED, USE A WIND LOAD OF 120 MPH

1. FATIGUE CRITERIA

* FATIGUE CATEGORY: 1 FOR OVERHEAD SIGN STRUCTURES, 2 FOR STRUCTURES LOCATED ON ROADWAYS WITH A SPEED LIMIT GREATER THAN 35 MPH, 3 FOR STRUCTURES LOCATED ON ROADWAYS WITH A SPEED LIMIT LESS THAN OR EQUAL TO 35 MPH.
* VORTEX SHEDDING: NOT REQUIRED
* NATURAL WIND GUSTS: INCLUDE
* TRUCK INDUCED WIND GUSTS: INCLUDE FOR ROADWAYS WHERE THE POSTED SPEED LIMIT FOR THE MAINLINE APPROACHES ARE 40 MPH OR GREATER
* GALLOPING: DO NOT INCLUDE

1. FOUNDATION CRITERIA

* CONCRETE: CONCRETE, CLASS B, VTRANS’ “STANDARD SPECIFICATIONS FOR CONSTRUCTION”, SECTION 541.
* REINFORCING STEEL: REINFORCING STEEL, LEVEL I, VTRANS’ “STANDARD SPECIFICATIONS FOR CONSTRUCTION”, SECTION 507.
* GEOTECHNICAL SOIL RESISTANCES TO BE DETERMINED BY CONTRACTOR; GEOTECHNICAL DATA REPORT SUMMARIZING SUBSURFACE INVESTIGATION INCLUDED FOR INFORMATIONAL PURPOSES ONLY.

1. ACTUAL WEIGHTS FOR SIGNALS AND OTHER EQUIPMENT SHALL BE LISTED ON THE FABRICATION DRAWINGS. IN ADDITION TO DEFLECTION CALCULATIONS FOR THE DESIGN LOADING, THE DESIGN CALCULATIONS SHALL INCLUDE DEAD LOAD DEFLECTION FOR ACTUAL LOADS AT THE TIME THE SYSTEM IS PUT INTO SERVICE.
2. **ANCHOR BOLTS** 
   1. GALVANIZED ANCHOR BOLTS WITH TWO HEXAGON NUTS AND TWO WASHERS PER BOLT SHALL BE FURNISHED WITH EACH POLE. ANCHOR BOLT PLATES, WHEN USED, SHALL ALSO BE GALVANIZED.
3. **DESIGN CALCULATION SUBMITTALS**
4. AN EQUIVALENT ALTERNATE DESIGN MAY BE SUBSTITUED FOR THE DETAILS AND MATERIALS SHOWN.
5. THE CONTRACTOR SHALL SUBMIT ONE DIGITAL VERSION OF THE DESIGN CALCULATIONS TO VTRANS PROJECT MANAGER SHOWING THE FOLLOWING INFORMATION FOR EACH OF THE VERTICAL AND HORIZONTAL COMPONENTS OF THE STRUCTURE AND FOUNDATION:
   1. THE DESIGN AXIAL AND SHEAR FORCES AND BENDING AND TORSIONAL MOMENTS ACTING AT THE TOP OF THE FOUNDATION.
   2. THE DESIGN AXIAL, BENDING AND SHEAR STRESSES AND THE COMBINED STRESS RATIO.
   3. VIBRATION AND FATIGUE CALCULATIONS AS SET FORTH IN SECTION 11 OF THE AASHTO STANDARD LISTED.
   4. THE ALLOWABLE AXIAL, BENDING AND SHEAR STRESSES.
   5. ITEMS a, b AND 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 LISTED, SECTION 1.2.5(D)(4)
6. EVERY MEMBER AND CONNECTION IN A CANTILEVERED OVERHEAD TRAFFIC SIGNAL SUPPORT SHALL BE DESIGNED TO PROVIDE ADDITIONAL RESIDUAL CAPACITY FOR FUTURE MODIFICATION EQUIVALENT TO A 5-SECTION TRAFFIC SIGNAL HEAD WITH A 5-INCH LOUVERED BACKPLATE LOCATED ON THE OUTERMOST EXTENT OF THE MAST ARM. OVERHEAD SIGN STRUCTURES AND NON-CANTILEVERED TRAFFIC SIGNAL STRUCTURES SHALL BE DESIGNED TO A MAXIMUM DESIGN RATIO OF 85% FOR EVERY MEMBER AND CONNECTION.
7. **FABRICATION DRAWING SUBMITTALS**
8. FABRICATION DRAWINGS IN A DIGITAL FORMAT SHALL BE SUBMITTED TO VTRANS PROJECT MANAGER FOR APPROVAL PRIOR TO FABRICATION. THE FABRICATION DRAWINGS SHALL INCLUDE THE FOLLOWING INFORMATION:
   1. DETAILED DRAWING OF EACH COMPONENT OF THE STRUCTURE.
   2. MATERIAL SPECIFICATION FOR EACH COMPONENT OF THE STRUCTURE, EITHER BY COMPLETE SPECIFICATION OR REFERENCE TO THE APPLICABLE ASTM STANDARDS.
   3. NOTATION OF PROJECT NAME, PROJECT NUMBER, ROUTE NUMBER AND STRUCTURE STATIONING TO BE INCLUDED ON EACH SHEET.
   4. DETAILS FOR LOCATION OF SIGNS/SIGNALS AND ATTACHMENT HARDWARE FOR THE SUPPORT STRUCTURE.
   5. ALL ELEVATION AND DIMENSIONS NECESSARY TO PROVIDE A COMPLETE SET OF RECORD PLANS.
   6. DEAD LOAD DEFLECTION AND VERTICAL RISE INFORMATION.
   7. WELDING DETAILS AND PROCEDURES ARE REQUIRED FOR ALL WELDS. PROCEDURES SHALL BE SUBMITTED FOR APPROVAL WITH REFERENCE TO EACH WELD IDENTIFIED ON THE FABRICATION DRAWINGS. SEE SUBSECTION 506.10 FOR MORE INFORMATION.
   8. BOLT TENSIONING REQUIREMENTS.