

ENGINEERING DIRECTIVE

Patricia A. Leavenworth, P.E. (signature on Original)

CHIEF ENGINEER

Overhead Signal Structure **Standard Drawings**

General

This Directive supersedes Engineering Directive E-11-007, “Mast Arm and Foundation Details Standard Drawings” dated October 7, 2011. Effective immediately, the following [Overhead Signal Structure Standard Drawings](#), dated December 2015, shall be used on projects that include mast arm and span wire traffic signal structures, as specified herein:

- Title Sheet
- 15’-40’ Arm Load Diagrams
- 45’-60’ Arm Load Diagrams
- Mast Arm Details
- Mast Arm Cored Pier Foundations
- Span Wire Details
- Span Wire Cored Pier Foundation Details

These standard drawings supersede the following drawings, dated February 24, 2011:

- Title Sheet
- Light, Medium & Short Span Load Diagrams
- Heavy Load Diagrams
- Details
- Cored Pier Foundations

These standard drawings also supersede the following drawings, dated January 2, 1985:

- Span Wire Assembly With Tether Wire
- Span Wire Assembly Foundation Details
- Span Wire Assembly Foundation Design Charts

Design Standards

The *Overhead Signal Structure Standard Drawings* were developed in accordance with the *AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 6th Edition (2013). These standard drawings streamline the process for designing, selecting, and fabricating mast arm and span wire signal structures.

These drawings include typical load diagrams for mast arms with lengths ranging from 15' to 60'. For proposed loading conditions that exceed these typical designs or any other proposed overhead signal structure that does not conform to these standard drawings such as mast arms longer than 60' or dual mast arms, the design shall conform to the latest version of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* utilizing the same or more conservative design parameters such as design life and design wind speed. Non-standard designs shall be stamped and signed by a Structural Engineer registered in Massachusetts.

Guidelines for Use

For new design projects and active design projects that have not been submitted for review at the 75% design stage as of January 29, 2016, the *Overhead Signal Structure Standard Drawings* shall be used on all projects that include mast arm and span wire signal structures.

For active design projects that have progressed beyond the 75% design submission as of January 29, 2016, the *Overhead Signal Structure Standard Drawings* may be used on projects that include mast arm and span wire signal structures at the discretion of the project proponent.

Additional Design Guidance

These standard drawings shall be identified with other standard specifications, drawings and details on the Title and Cover Sheet for each specific project and, therefore, should not be included as individual sheets within the design plan set, as done in past practice.

Designs shall utilize a Design Wind Speed of 130 MPH for all locations within Barnstable, Berkshire, Bristol, Dukes, Nantucket, Plymouth, and Suffolk counties and within coastal towns in Essex, Middlesex, and Norfolk counties. For all other locations, designs may utilize a Design Wind Speed of 110 MPH.

Soil borings to determine soil classification shall be included in the 100% Submittal for all projects that construct new overhead signal structures. This information should be included within the Special Provisions. For projects that are constructed by a private entity through the Highway Access Permit process, soil classification may be omitted from the 100% Submittal, but must be included with the As-Built submission.

There may be circumstances that warrant the use of spread footings or coring into rock. For these occasions the design engineer is responsible for designing the spread footing or the rock socket connection details into ledge for MassDOT review and approval.

The Contractor is not required to submit load calculations for mast arm designs that conform to these drawings. Shop drawings should be limited to identifying the dimensions of the mast arm and foundation. For span wire signal structures, the Contractor shall submit calculations for the moment at the base of the strain pole and select the corresponding foundation design from the standard tables.

In all cases, any costs associated with using the *Overhead Signal Structure Standard Drawings*, including soil classification for foundation design, shall be borne solely by the project proponent (the entity responsible for funding the design phase services).