

SECTION 408 -- POLES AND TOWERS

408.01 -- Description

1. The word "pole," when used in this Section, shall be taken to mean a lighting standard 15 m or less in mounting height. Units with mounting heights greater than 15 m will be referred to as "towers." Poles and towers have many different configurations. The type to be provided shall be as shown in the plans and described in the special provisions.

2. This Section describes the 3 general pole and tower requirements:

a. New Pole and Tower Installation:

(1) The Contractor shall furnish and install poles and towers of the size and type shown in the plans. Each pole and tower, complete with all of its components, shall be designed according to AASHTO, "Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals" to withstand a 130 km/h wind loading with a 1.3 gust factor.

(2) Conventional light poles, unless shown or stated otherwise, shall be furnished complete with pole shaft, base plate, mast arm(s), handhole with cover, anchor bolts with nuts, nut covers, luminaire(s), foundation, breakaway device (if required), in-line fuses and fuse holders, wire and cable in the pole and mast arm(s), and all excavation, backfilling, compaction, labor, tools, equipment, and incidentals necessary to complete the work.

(3) High mast towers, unless shown or stated otherwise, shall be furnished complete with tower shaft, base plate, handhole with cover, anchor bolts with nuts, high mast lowering system powered by an internal motor, electrical wires and cables, winch cable(s), hoisting cables, foundations, and all other items required to provide a complete and workable unit.

(4) All items associated with a lighting unit of either type must be compatible and work together to provide a reliable and efficient unit.

b. Pole and Tower Relocations:

(1) The Contractor shall relocate poles and towers as shown in the plans. Poles shall be carefully dismantled and all items stored and protected from damage until installed at their new locations. Towers shall be carefully lowered and stored on timber cribbing with the shaft in essentially straight alignment with no part of the unit in contact with the ground. The tower and its components shall be protected from damage until installed at their new location. The Engineer will designate specific areas for temporary storage of the material.

(2) Pole and tower relocations shall consist of removing the pole and/or tower with all associated items from its foundation and reinstalling the pole and/or tower on a new foundation at a new location together with removing or breaking back (removing the concrete pole foundation, including steel and anchor bolts to a minimum depth of 600 mm below finish grade) the old foundation and all necessary excavation, backfilling, removal of

debris, compaction, labor, tools, equipment, and incidentals necessary to complete the work. Constructing a new concrete foundation, if required, is a part of this work.

c. Temporary Pole Installation:

(1) The Contractor shall install temporary poles as shown in the plans. Temporary poles are usually supplied by the Department.

(2) Items not furnished by the Department and required for a complete system will be furnished by the Contractor.

408.02 -- Material Requirements

1. Pole and tower materials shall conform to the requirements of Section 1073 and to the requirements shown in the plans.

2. a. Department-furnished poles and other lighting items and the locations where they are to be picked up are shown in the plans.

b. Items not furnished by the Department and required for a complete system shall be furnished by the Contractor.

c. The Contractor will contact the Engineer to determine when and where to pick up the State-furnished material. The Engineer will supply the Contractor with a completed "Stock Requisition." The Contractor will not be issued materials without a properly completed stock requisition.

3. The entire assembly shall meet all applicable local, county, state, and national codes.

408.03 -- Construction Methods

1. The Contractor shall assemble and install poles and towers in accordance with the manufacturer's instructions, plan details, or as directed by the Engineer.

2. a. All poles shall be plumb under the deadload. If shimming is required, all shims shall be placed between the top of the foundation and the bottom of the transformer base (bottom of the pole base if no breakaway device is being used). Only regular "U" shaped shim stock shall be used and installed with the back edge of the shim flush with the bottom edge of transformer base or bottom edge of the pole base.

b. If concrete foundations are being used, the foundation shall be dressed to provide for proper seating and leveling.

c. Each pole shall be grounded to a ground rod and to the system grounding conductor.

3. Breakaway devices, when used on conventional pole installations, shall be installed in strict compliance with the manufacturer's details and instructions.

4. a. All towers shall be plumbed and supported by anchor bolts and nuts. The tower shall not rest on the concrete.

b. The space between the top of the concrete foundation and the bottom of the tower base shall be no greater than 2 anchor bolt diameters. This space shall not be grouted but shall be left open for ventilation and covered with a strip of expanded aluminum mesh as shown in the plans.

5. Mast arm signal and combination mast arm signal/lighting poles shall be leveled by the use of nuts and anchor bolts supplied with the pole. Before the pole is loaded, it shall be raked back in excess of the calculated deflection and plumbed after the loads are applied by adjusting the leveling nuts.

6. a. Poles and towers being relocated shall be installed at their new locations and connected electrically as shown in the plans.

b. Existing luminaires or traffic signals being reinstalled on relocated poles shall be cleaned and provided with new lamps.

c. Relocated towers shall have their luminaires cleaned and new lamps installed.

d. The Contractor shall install new wires with in-line fuses and fuse holders in the relocated pole shaft and new wires in the mast arm.

e. Missing or damaged components must be replaced by the Contractor.

7. a. Aluminum poles may be used in place of steel poles.

b. Design criteria for steel poles will apply to aluminum poles.

c. Aluminum poles shall have bases of cast aluminum.

d. All hardware used with aluminum poles, except the anchor bolts, shall be stainless steel.

8. Foundation dimensions and materials shall be as indicated in the plans. Anchor bolts shall be of the correct size and spacing for the pole(s) being furnished.

9. The cables exiting the pole shaft or mast arm shall have adequate drip loops. The wiring for the luminaires shall be installed with 1 m of cable extending beyond the end of the mast arm.

10. a. Poles or other lighting items being returned to the State must be disassembled, clean and free of internal wiring. Handhold covers shall be in place, and mast arm bolts shall be attached. The Contractor will not be allowed to "off-load" any items not cleaned or prepared.

b. DR Form 147, "Stock Return for Credit", properly filled in and signed by the Engineer, must accompany the items being returned.

408.04 -- Method of Measurement

Installation and relocation of the various types and sizes of poles, towers, lighting units, and signal structures are measured by the each.

408.05 -- Basis of Payment

- | 1. <u>Pay Item</u> | <u>Pay Unit</u> |
|---|-----------------|
| Mast Arm Signal Pole, Type MP _____ | Each (ea) |
| Combination Mast Arm Signal and
Lighting Pole, Type CMP _____ | Each (ea) |
| Span Wire Signal Pole, Type SWP _____ | Each (ea) |
| Combination Span Wire Signal and
Lighting Pole, Type SWP _____ | Each (ea) |
| Pedestal Pole, Type PP _____ | Each (ea) |
| Signal Structure, Type _____ | Each (ea) |
| Street Lighting Unit, Type SL _____ | Each (ea) |
| High Mast Lighting Unit, Type T _____ | Each (ea) |
| Install Mast Arm Signal Pole, Type MP _____ | Each (ea) |
| Install _____ | Each (ea) |
| Install Combination Mast Arm Signal
and Lighting Pole, Type CMP _____ | Each (ea) |
| Install Span Wire Signal Pole, Type SWP _____ | Each (ea) |
| Install Combination Span Wire Signal
and Lighting Pole, Type SWP _____ | Each (ea) |
| Install Pedestal Pole, Type PP _____ | Each (ea) |
| Install Street Lighting Unit,
Type SL _____ | Each (ea) |
| Relocate High Mast Lighting
Unit, Type T _____ | Each (ea) |
| Install High Mast Lighting
Unit, Type T _____ | Each (ea) |
| Relocate _____ | Each (ea) |
| Relocate Street Lighting Unit, Type _____ | Each (ea) |
| Install Temporary Lighting Unit, Type _____ | Each (ea) |
2. Separate payment for pole and tower foundations, if provided, is as described in Section 407.
 3. Foundation anchor bolts are subsidiary to the pole and/or tower except for relocated poles and tower foundations.
 4. Payment is full compensation for all work prescribed in this Section.