SPECIAL SPECIFICATION

7638

Preventive Maintenance of Signal Equipment

1. **Description.** Replace damaged signal parts, signal heads, illumination parts, ground boxes, and down guys. Repair signal assemblies and maintain controller cabinets. Clean camera lenses and inspect signal installations at intersections and interchanges. Inform the Engineer of damage observed.

2. **Materials.** The Department will furnish materials that are part of the final work unless otherwise specified. Submit a list of required materials to the Department at least 24 hours in advance of the requested pickup date between the hours of 8:00 AM and 4:00 PM at sites designated in the General Notes. Designate in writing the persons authorized to pick up the material.

Assume responsibility for materials furnished by the Department. Use material furnished by the Department for this Contract only. Return unused or removed material deemed salvageable upon completion of the work and prior to final payment at the location shown in the plans. Dispose of material deemed unsalvageable in accordance with federal, state, and local regulations.

3. **Equipment.** Furnish equipment and labor necessary for completion of the work described. Use only equipment, tools, and machinery in good repair and operating condition. Repair or replace any equipment that may affect safety or quality of work.

4. **Methods.** Conform to the NEC, local utility requirements and the requirements of this item.

A. **Preventive Maintenance.** Perform the following work for each traffic signal installation:

1. **Cables.** Inspect each span cable and signal cable for damage or deterioration, proper attachment, excess slack and tangled cables. Relash, tighten and straighten span cables as necessary. Document span and signal cables that show signs of damage or deterioration. Submit written notification to the Engineer or necessary repairs.

2. **Pole and Mast Arms.** Inspect pole bases, foundations, mast arms. Check welds on pole for fatigue or cracking. Tighten bolts as needed. Remove debris from pole bases.

3. **Span Wire.** Inspect brackets, set screws, clamps, and fittings. Tighten, align, or replace as directed. Adjust signal height to 18 ft.

4. **Conduit.** Inspect conduit affixed to poles and reattach as necessary. Seal conduit ends with an approved sealant.

5. **Pedestrian Buttons.** Inspect pedestrian push buttons for proper operation. Report malfunctions. Replace as directed.

6. **Ground Boxes.** Inspect ground boxes, clean out debris, and replace or install missing lid bolts.

7. **Illumination.** Test illumination circuits.
8. **Signal/Pedestrian Heads.** Inspect signal and pedestrian head lenses, reflectors, visors and back plates for visibility or damage. Clean with soft cloth, soap and water. Submit written notification to the Engineer of necessary LED bulb replacement. Pass the wiring to each signal head from the mast arm through the signal head bracing or attachment hardwire to the signal head. Exposed cable or wiring is not permitted. Ensure correct alignment of signal heads as directed.

9. **Down Guys.** Inspect down guys. Tighten as directed. (including down guy guard.)

10. **VIVDS.** When Video Detection Cameras are present at the intersection, clean camera lenses and tighten brackets.

**B. Illumination.** Replace as necessary any lamps, photoelectric cells, and heads.

**C. Pedestrian Buttons.** Replace push buttons. Push buttons must meet Americans with Disability Act (ADA) requirements.

**D. Install Ground Box w/ Apron.** Install ground boxes in conformance with the details shown on the plans. Wiring connections required inside the box are considered subsidiary to this bid item.

**E. Signal Heads/Countdown Pedestrian Heads.** Replace complete traffic or countdown pedestrian signal head, brackets and back plates as directed. Undamaged LED signal sections or material deemed salvageable by the Engineer must remain the property of the Department and must be delivered to the location as shown on the plans.

Pass the wiring to each signal head from the mast arm through the signal head bracing or attachment hardwire to the signal head. Exposed cable or wiring is not permitted. Ensure correct alignment of signal heads as directed.

**F. LED Signal Lamp.** Install, replace, or remove LED lamp in accordance with Item 682, “Vehicle and Pedestrian Signal Heads,” as shown on the plans or as directed.

**G. Traffic Signal Support System.** Replace complete traffic signal support system, as directed.

**H. Signal-Related Signs.** Install, repair, replace, remove, or modify small post-mounted or overhead signs.

**I. Down Guy Replacement.** Replace down guy including guard.

**J. Splices.** Splices will not be permitted except as shown on the plans, unless the Engineer approves each individual splice. Ensure allowed splices are water tight. Insulate splices using heavy duty heat shrinkable tubing with factory applied sealant.

**K. Controller Cabinet.** Perform the following maintenance services to the controller cabinet as shown on the plans or as directed:

1. Clean filters.
2. Replace filters.
3. Lubricate hinges and lock.
4. Check weatherproof seal (gasket).
5. Check anchor bolts.
6. Check for water accumulation and duct sealant.
7. Check ground rod and entire grounding system.
8. Check wiring schematics and records.
9. Check operation of fan and heater.
10. Check ground fault receptacle.
11. Measure voltages at service inputs in cabinet.
12. Check and record current being drawn.
14. Wipe dirt from controller shelves.
15. Replace cabinet lamp as necessary.
16. Apply pesticides as directed.

5. **Measurement.** This Item will be measured as follows:

   A. **Preventive Maintenance.** This Item will be measured by each traffic signal location. Signal locations are considered as one complete location regardless of the number of signal heads at the location including advanced warning flashers and “Signal Ahead” flashers. A diamond intersection will count as two installations if it has two cabinets.

   B. **Illumination Lamp.** By the each replaced.

   C. **Photoelectric Cell.** By the each replaced.

   D. **Illumination Head.** By the each replaced.

   E. **Pedestrian Buttons.** By the each replaced.

   F. **Install Ground Box.** By the each installed with apron and required conductor connections.

   G. **Signal Heads/Countdown Pedestrian Heads.** By the each traffic or countdown pedestrian signal head replaced.

   H. **Removal, Replacement or Installation of LED Signal Lamp.** By each LED Signal lamp unit removed, replaced or installed.

   I. **Traffic Signal Support System.** By each traffic signal support system replaced. Measurement for this Item will also include each ground box, signal head, illumination head, illumination lamp, photo cell, pedestrian push button, traffic signal support system, solder and weatherproof splice, maintain controller cabinet, and down guy, inspected, replaced or installed. Signal fittings and replacing signal visors will be subsidiary to pertinent Items.

   J. **Removal, Replacement, or Installation of Signal Related Signs.** By each signal assembly removed, replaced, or installed.

   K. **Down Guy.** By the each replaced.

   L. **Splices.** By the each regardless of the number of conductors in a cable.

   M. **Controller Cabinet.** By the each.
N. **Replace Span Cable.** By the foot.

O. **Replace Ground Rod.** By the each as directed.

6. **Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit bid for “Preventive Maintenance,” “Illumination Lamp (Replace),” “Photo Cell (Replace),” “Illumination Head (Replace),” “Pedestrian Push Button (Replace),” “Ground Box (Install),” of the type specified,” “Traffic Signal Head (Replace, of the type specified,” “Countdown Pedestrian Head (Install),” of the type specified,” “LED Signal Lam (Replace),” of the type specified,” “Traffic Signal Support System (Replace),” “Signal-Related Signs (Replace),” “Down Guy (Replace),” “Down Guy w/ Guard (Replace),” “Solder and Weatherproof Wire Splice,” “Maintain Controller Cabinet,” “Span Cable (Install),” and “Ground Rod (Install).” This price is full compensation for inspections, repairs and replacement and for furnishing labor, tools, equipment and incidentals.