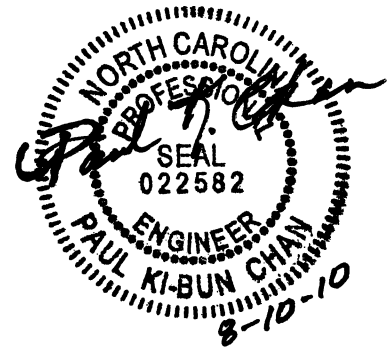


PROJECT SPECIAL PROVISIONS
Roadway Lighting



1.00 DESCRIPTION

The work covered by this Section consists of furnishing, installing, connecting, and placing into satisfactory operating condition roadway lighting at locations shown on the plans. The work involves removing existing lighting equipment and installing high mast light standards. All removed material shall be coordinated with the City of Winston-Salem DOT for disposal/storage. Contact Rodd Ring for the address of the City of Winston-Salem DOT warehouse.

Rodd Ring
City of Winston-Salem
Department of Transportation
(336) 747-6990
Fax (336) 748-3370

Perform all work in accordance with these Special Provisions, the Plans, the National Electrical Code, and North Carolina Department of Transportation "Standard Specifications for Roads and Structures" (Standard Specifications).

Perform all work in conformance with Division 14 of the Standard Specifications except as modified or added to by these Special Provisions.

Install all bore pits outside the clear zone, as defined in the AASHTO Roadside Design Guide or as directed by the Engineer.

In addition to the requirements of Division 1400, other specific Sections of the Standard Specifications applicable to the work on this project are listed below.

Section 1400	Roadway Lighting
Section 1401	High Mount Standard and Portable Drive Unit
Section 1402	High Mount Foundation
Section 1403	High Mount Luminaires
Section 1404	Light Standards
Section 1405	Standard Foundation
Section 1406	Light Standard Luminaires
Section 1407	Electric Service Pole and Lateral
Section 1408	Light Control System
Section 1409	Electrical Duct
Section 1410	Feeder Circuits
Section 1411	Electrical Junction Boxes

2.00 WIRING METHODS

2.10 DESCRIPTION

Amend Section 1400-4(F) to include the following:

Pull conductors by hand, or use motorized cable-pulling equipment designed for pulling multiple cables into conduit. Use sheaves or rollers, as required to prevent damage to conductor insulation. Do not use an automobile to generate cable pulling forces. Use equipment similar to the Greenlee model UT2 cable pulling system, or Engineer approved equal.

3.00 INSPECTIONS

3.10 DESCRIPTION

Amend Section 1400-5 to include the following:

Provide the personnel and equipment necessary for removing and replacing fuse holders and/ or operating circuit breakers to facilitate the insulation resistance test described elsewhere in the Special Provisions.

A "LIGHTING SYSTEM INSPECTION CHECKLIST" is included at the back of these Special Provisions. Coordinate with the project inspector to have the checklist items inspected as work progresses, and at the end of the project to prevent delays in preparing the final inspection punch list.

4.00 PERFORMANCE TESTS

4.10 DESCRIPTION

Amend Section 1400-6 to include the following:

Provide a calibrated MegOhmMeter, with certification that calibration was done recently (within one year of use). Provide a meter manufactured by Fluke, Amprobe, Biddle, or Engineer approved equal. Present the meter for inspection at the pre-lighting-work meeting described elsewhere in these Special Provisions.

Removing water from the conduit of a faulty circuit is not considered a repair. Water in the conduit allows current to flow between skinned places in the conductors insulation. If a circuit fails the insulation resistance test, and removing water allows the circuit to pass, replace the conductors and re-test the new circuit.

5.00 CONSTRUCTION PHASING

5.10 DESCRIPTION

Amend Section 1400-11 to include the following:

Schedule a pre-lighting-work meeting before beginning work on the lighting system. Include staff members from the prime contractor, electrical sub-contractor, Resident Engineer's office, and the Lighting/ Electrical squad in the Roadway Design Unit in Raleigh.

6.00 LIGHT CONTROL SYSTEM

6.10 DESCRIPTION

Same as Section 1408-1.

6.20 MATERIALS

Amend Section 1408-2 of the Standard Specifications as follows:

The completed light control system shall be marked "Suitable for Use as Service Equipment", in a prominent location in the enclosure, in accordance with NEC article 409.110.

Provide a polymer concrete (PC junction box measuring 36"L x 24"W x 18"H (PC36) and meeting the requirements of Section 1411 of the Standard Specifications.

6.30 CONSTRUCTION METHODS

Amend Section 1408-3 of the Standard Specifications to add the following:

Install PC36 junction box within 2' of edge of pad in front of Control System. Stub all feeder circuit conduits and spare conduits from Control System in this junction box. See plans for conduit sizes. Place pull cord in any unused conduits and cap unused conduit in junction box.

6.40 MEASUREMENT AND PAYMENT

Measurement will be in accordance with Section 1408-4.

Payment will be made under:

Light Control Equipment, RW, 240/480V..... Each

7.00 HIGH MOUNT STANDARD

7.10 DESCRIPTION

Same as Section 1401-1.

7.20 MATERIALS

Amend paragraph five (5) of Section 1401-2 of the Standard Specifications as follows:

Have the design of the support including base plate and anchorages conform to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, and the Interim Specifications valid at the time of letting. Fatigue Category II shall be used in design. The welding design and fabrication shall be in accordance with Article 1072-20. The support is to be designed for the wind velocity shown on the plans.

Test all base plate to upright welds using magnetic particle testing (MPT) prior to galvanizing. All base plates must be tested at 100%.

The two criteria listed below shall apply to 60-ft, 80-ft, 100-ft and 120-ft high mount light poles.

1. Provide 8 or more anchor rods for each pole.
2. Provide base plate thickness of at least 2.5 inches.

7.30 CONSTRUCTION METHODS

Amend Section 1401-3 to include the following:

Anchor Rod Nut Tightening Requirements for Metal Poles

Prior to installation

Protect the anchor rod threads from damage prior to installation and during installation.

Prior to installation of the rods in the foundation, turn nuts onto and off the rods, well past the elevation of the bottom of the leveling nuts. Turn by the effort of one worker using an ordinary wrench without a cheater bar. Report to the Engineer thread damage requiring unusually large effort.

During installation

1. Place leveling nuts (bottom nuts) on the anchor rods.
2. Place leveling nut washers on top of the anchor rod leveling nuts.
3. Place a rigid template on top of the leveling nuts to check the level of the nuts. If the anchor nut and washer cannot be brought into firm contact with the template, then beveled washers shall be used.
4. Verify that the distance between the bottom of the leveling nut and the top of the concrete foundation is no more than one anchor rod diameter. If an upright is required to be back-raked, then the distance between the bottom of the leveling nut and the top of the concrete foundation should be no more than one anchor rod diameter, averaged over the anchor rod group.
5. Place the base plate and structural element to which it is attached. However, do not attach to the upright element, during tightening of the anchor nuts, cantilever beams or arms with span in excess of 10 feet. Luminaire arms and fixtures may be attached prior to standing the pole on the foundation.
6. Place top nut washers.
7. Do not use lock washers.
8. Lubricate threads and bearing surfaces of top nuts. Lubricant shall be beeswax, stick paraffin, or other approved lubricant.
9. Place top nuts. If the anchor nut and washer cannot be brought into firm contact with the base plate, then beveled washers shall be used.
10. Tighten top nuts to snug tight. A snug-tight condition is defined as the washer and nut being in full contact with the base plate, and the application of the full effort of a workman on a 12-inch wrench. Turn top nuts in increments following a star pattern (using at least two full tightening cycles).
11. To ensure proper pretensioning, after all top nuts have been brought to snug-tight condition, repeat the procedure on the leveling nuts. Turn leveling nuts in increments following a star pattern (using at least two full tightening cycles).
12. At this point, verify if beveled washers are required. Beveled washers are necessary under the leveling nut or top nut if any face of the base plate has a slope greater than 1:20 and / or any nut can not be brought into firm contact with the base plate.
13. Before further nut turning, mark the reference position of the nut in the snug-tight condition with a suitable marking (ink or paint that is not water-soluble). Mark on the corner at the intersection of two flats with a corresponding reference mark on the base plate at each nut. After tightening, verify the nut rotation.
14. Achieve pretensioning by turn-of-nut method. Turn the top nuts to 1/6 of a turn. Do so in a star pattern using at least two full-tightening cycles.
15. After installation, ensure that firm contact exists between the anchor rod nuts, washers, and base plate on any anchor rod installed.
16. For overhead sign assemblies: The span type truss or the cantilever truss may be placed on the uprights or attached to the upright at this time. For signal support structures: The span wires or mast arms may be attached to the upright at this time.
17. After a period of no less than 4 days, and no more than 2 weeks, and in the presence of the Engineer, use a torque wrench to verify that a torque at least equal to 600 foot-pounds

is provided on each top nut. For cantilever structures, verify the torque after erection of the remainder of the structure and any heavy attachments to the structure.

- 18. If any top nut torque reveals less than 600 foot-pounds of effort is required to move the nut, and then tighten the nut to no less than 600 foot-pounds.
- 19. Calibrate, at least annually, the torque indicator on the wrench used for tightening the nuts. Provide the Engineer a certification of such calibration.
- 20. Because inspection or re-tightening of the leveling nuts would be prevented, and to reduce moisture retention and associated corrosion, do not place grout under the base plate.

7.40 MEASUREMENT AND PAYMENT

Measurement will be in accordance with Section 1408-4.

Payment will be made under:

60' HIGH MOUNT STANDARD	Each
80' HIGH MOUNT STANDARD	Each
100' HIGH MOUNT STANDARD ..	Each

8.0 REMOVE LIGHT STANDARDS

8.10 DESCRIPTION

The work covered by this section consists of the removal of existing metal light standards and concrete foundations. The standards are single arms at 45' mounting height and are attached to the foundations with anchor bolts.

8.20 MATERIALS

No materials are required for this work except such miscellaneous items as tape, foundation cover materials, and terminal devices to dead-end circuits serving the light standards.

8.30 CONSTRUCTION METHODS

Maintain operation of the existing lighting system until such time that it becomes in conflict with the actual construction work, or it becomes a hazard to traffic as determined by the Engineer.

The Contractor shall coordinate his work with the Duke Energy and the City of Winston-Salem to assure that circuits can be de-energized where and when necessary.

The Contractor shall conduct his work so those portions of the lighting system, which are not in conflict with construction, will be maintained in continuous nighttime operation.

Remove luminaires from pole-arms and deliver the luminaires in good condition to the City of Winston-Salem storage facility.

Breakaway devices, including transformer bases with doors, couplings, anchor nuts, washers and connecting bolts, shall be detached from the standard and bundled together and delivered in good condition to the City of Winston-Salem storage facility.

Breakaway fuse holders shall be disconnected from the circuitry. If circuitry connections to the fuse holders are by compression connectors, then the connector shall be left intact, and the conductors shall be cut leaving a 12" lead to the connector. Fuse holders shall be delivered in good condition to the City of Winston-Salem storage facility.

Deliver all salvaged materials (luminaires, standards, breakaway devices, and fuse holders) to the City of Winston-Salem DOT storage facility. The City of Winston-Salem DOT Engineer, Rodd Ring, will provide the exact location and time when delivery may be made.

All hoisting and lifting shall be with rope or web slings fastened in such a manner as to prevent damaging or marking any of the salvaged materials. The Contractor shall provide proper transportation and supports so that standards will not be warped and shall provide protection so that the luminaire and circuitry will not be damaged by rain, etc. The Contractor shall furnish cranes, labor, and blocking materials to unload and properly store all salvaged materials at the location specified by the City of Winston-Salem.

Circuitry to be retained shall be safely terminated and circuitry to the removed light standards shall become the property of the Contractor and shall be removed or abandoned.

The Contractor shall remove or abandon existing concrete light standard foundations. The removed concrete, reinforcing steel, and anchor bolts shall be disposed of in a manner acceptable to the Engineer. The holes shall be backfilled with suitable material and compacted as required.

8.40 MEASUREMENT AND PAYMENT

The quantity of removed light standards to be paid for will be the actual number which have been removed from the project, disposed of and accepted.

The removed light standards measured as provided above will be paid for at the contract unit price per each "Remove Light Standard". Such price and payment will be considered full compensation for removing and delivery of the pole, luminaire and fuse holders. It

also includes the disposal of the pole, backfilling, compaction, and all incidentals necessary to complete the work.

Payment will be made under:

Remove Light Standard..... ..Each

**LIGHTING SYSTEM INSPECTION
CHECKLIST**

137

Date _____

PROJECT # _____

CONTROL SYSTEM _____

1. Line Voltage: ϕ_A -G _____ ϕ_B -G _____ ϕ_A - ϕ_B _____
2. Control System ID _____
3. Conductors Numbered _____
4. Main CB Rating _____
5. Feeder CB Rating _____
6. Control CB Rating _____
7. Selector Switch Label and Operation _____
8. Damaged Galvanizing _____
9. Grounding Electrode Conductor _____
10. Main Bonding Jumper _____
11. Photocontrol Operation _____
12. Clean Enclosure _____
13. Certificate of Inspection _____
14. Meg Circuits: #1 ϕ_A -G _____ #2 ϕ_A -G _____ #3 ϕ_A -G _____
 ϕ_B -G _____ ϕ_B -G _____ ϕ_B -G _____
 ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____
#4 ϕ_A -G _____ #5 ϕ_A -G _____ #6 ϕ_A -G _____
 ϕ_B -G _____ ϕ_B -G _____ ϕ_B -G _____
 ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____ ϕ_A - ϕ_B _____
15. Amperage: #1 ϕ_A _____ ϕ_B _____ #2 ϕ_A _____ ϕ_B _____ #3 ϕ_A _____ ϕ_B _____
#4 ϕ_A _____ ϕ_B _____ #5 ϕ_A _____ ϕ_B _____ #6 ϕ_A _____ ϕ_B _____
16. Verify Wire Size _____
17. Verify Lights on Correct Circuits _____
18. Print Pocket With As-Built Plans in Panel _____

LIGHT STANDARDS

- 1. Proper ID's _____
- 2. Breakaway Fuseholders, Proper Line/Load Connections _____
- 3. Foundation Elevations _____
- 4. Breakaway Bases _____
- 5. Conductor ID's in Base _____

HIGH MOUNT STANDARDS

- 1. Verify ID's _____
- 2. Portable Drive and case Turned Over to Traffic Services _____
- 3. Operation of Lowering Device: HM1 ___ HM2 ___ HM3 ___ HM4 ___ HM5 ___ HM6 ___
- 4. Connection at Carrier Ring: HM1 ___ HM2 ___ HM3 ___ HM4 ___ HM5 ___ HM6 ___
- 5. Door Secure and Not Removable _____
- 6. Wire Mesh at Base _____
- 7. Lay of Cable on Winch _____
- 8. Luminaires Level and Secure _____
- 9. Grounding _____
- 10. Verify Rating of CB _____
- 11. Date Code on Lamps _____

JUNCTION BOXES

- 1. Verify Cleanness _____
- 2. Verify Conductor ID's _____
- 3. Verify Location, Elevation and Cover Secure _____
- 4. Ground Rod Connections _____
- 5. Insulation of Joints and Splices _____
- 6. Sealing of Conduits _____

GENERAL: Two-week Test Period _____