

HIGHWAY LIGHTING SYSTEM (WORK DIRECTED REPAIRS AND MAINTENANCE).

(REV 2-15-24)

ARTICLE 715-1 is deleted and the following substituted:

**SECTION 715
HIGHWAY LIGHTING SYSTEM (WORK DIRECTED REPAIRS AND MAINTENANCE)**

715-1 Description.

Provide all labor, materials, equipment, and incidentals necessary to perform diagnostic services, repairs, and replacements to maintain the highway lighting system, which is comprised of [REDACTED] lighting. Work will be performed on the lighting types as defined in the Contract Documents. The highway lighting system includes the light poles, bases, luminaires, lamps, starters, ballasts, LED drivers, pull boxes, cable/conductors, conduit, substations, expansion joints, protective devices, transformer bases, grounding systems/components, load centers, control devices and all other related appurtenances as originally constructed or currently maintained by the Department.

ARTICLE 715-2 is deleted and the following substituted:

715-2 Contractor Requirements.

Provide a State of Florida Certified Electrical Contractor with active licensure throughout the duration of the contract to coordinate and oversee all services performed under this contract, including obtaining any necessary permits. Provide a journeyman electrician possessing a valid Florida journeyman electrician's license to supervise all work. Provide copies of all licenses, certificates, and registrations to document compliance with this Article upon request by the Engineer.

Perform all work in compliance with all Department requirements, local licensing requirements and ordinances governing performance of the work. Perform all work in accordance with the laws of the State, all municipal ordinances, all regulations and requirements of the Public Service Commission, the current editions of the National Electrical Code (NFPA70), and the National Electrical Safety Code (NESC), the current edition of the and Manual of Uniform Traffic Control Devices, the Department's Standard Plans current at the time of the contract letting, and these Specifications. Ensure employees are familiar with and apply all appropriate safety practices, including but not limited to the current edition of the Handbook for Electrical Safety in the Workplace (NFPA 70E), during the life of this Contract. All persons employed under this Contract must have MANDATORY training in the application of "Occupational Safety and Health Standards" (reference 29 of the Code of Federal Regulations, Part 1910.333), relating to "lockout and tagging" procedures. Incur all costs related to acquiring and maintaining this training.

Immediately report to the Engineer any fatalities or injuries to either employees or members of the public and any damage to property occurring during the performance of any of the work described herein.

Perform all inspection and repair services in such a way as to preserve all active warranties in effect for the full warranty periods. Coordinate with warranty providers as necessary to accomplish this requirement.

ARTICLE 715-3 is deleted and the following substituted:

715-3 Diagnostic Work, Minor and Major Repairs.

715-3.1 Diagnostics and Incidental Minor Repairs: Perform diagnostic work and incidental minor repairs on all non-functioning luminaires, load centers, and circuits at locations as identified on the Work Document.

Perform cleaning and incidental minor repairs for all items specified in 715-3.1.1 at the time of the diagnostic assessment.

For all diagnostic work performed, complete and submit to the Engineer a report detailing the results of the diagnostic assessment and any incidental minor repairs completed, additional minor repairs identified and completed, as well as any major repair work needed that may be included in subsequent Work Documents.

715-3.1.1 Incidental Minor Repair: Replace any of the following missing or defective components when performing the diagnostic work:

1. Hardware, including hinges, latches, fasteners, locks, snaps, cover plates, inspection plates, pole caps, nuts, bolts, washers, ground wire for metal pull box covers, and other small components. New replacement components shall be of the same material composition and also possess equal or greater quality than the item being replaced.

2. Bird guards and reflectors.

3. Gaskets and filters.

4. Electrical shorts not requiring replacement of buried cable.

5. Lamp and photocell sockets (waterproof).

6. All pole or structure wiring from the luminaire to the supply cable connection.

7. Signing Bracket Arm.

8. Leveling of under-deck light fixture or pole mast (bracket) arm.

9. Cleaning refractors (Glassware).

10. Pea rock in pull boxes.

11. Electrical putty on ends of conduit.

All labor, material, and equipment required for cleaning and repair of items specified in 715-3.1.1 are incidental to diagnostic work on each assembly.

715-3.2 Other Routine Minor Repair: When the following minor repair needs are identified during the diagnostic evaluation, notify the Contract Coordinator for direction as to whether to complete these repairs/replacements before demobilizing from the location if the minor repairs needed are anticipated to exceed 5% of the Work Document issued:

1. Lamps.

2. Ballast/Driver assembly.

3. Refractors (glassware).

4. Grounding/Bonding wires and rods.

5. Fuses, Fuse Holders, High Mast Pole Breakers, Safety Switches, Surge Protectors, Sockets, and other such Electrical Components.

6. Re-tightening of bridge mounted pole base bolts

If so directed, labor, material, and equipment required for repair of items specified in this Article will be paid under the individual component pay items for accomplishing the work, in addition to the payment for diagnostic assessment.

715-3.3 Major Repairs: Perform major repairs including replacement or repair of light poles, foundations, load centers, load center bases, luminaires, fixture arms, buried cable, conduit between poles, high mast lowering devices, and other components of a complete lighting system not previously mentioned including wiring (re-wiring), all hardware, covers, caps, splices, and related parts necessary to make a complete replacement installation in accordance with the Work Document issued by the Engineer.

For replacement of light poles and load centers, expedite the preparation of shop drawings, where shop drawings are required, and pole assembly order so as not to cause a delay in its replacement. Replace poles as originally constructed or by an alternate method approved in writing by the Engineer.

ARTICLE 715-4 is deleted.

ARTICLE 715-6 is deleted and the following substituted:

715-6 Maintenance Repair Standards.

Meet the materials and equipment requirements of Section 992. When substitutions are proposed for existing systems, they must be both functionally and aesthetically compatible with the existing components and approved in advance by the Engineer.

715-6.1 Incidental and Routine Minor Repair Standards.

715-6.1.1 General: The following standards apply to the work identified in 715-3.1 and 715-3.2.

715-6.1.2 Luminaire: Inspect luminaries for rust, chromatic aberrations (e.g., emission of light that is blue, purple, or violet in hue) or oxidation and replace it with a new luminaire if damaged or missing. Use the make and model of the existing luminaire(s). Equivalent luminaires may be substituted if the Contractor proves photometric and electrical equivalence and use of the substitution is approved in writing by the Engineer.

Use only luminaires listed on the Department's Approved Product List (APL).

715-6.1.3 Lamps: Check lamps for looseness. If the lamp is loose, remove and inspect the socket. Repair or replace lamps or lamp sockets operating improperly.

Lamps used on this Contract must meet or exceed the minimum industry standards for power consumption, life expectancy, and amount of light output as defined in the American National Standards Institute (ANSI), Section C78. Lamps must be compatible with existing field hardware such as ballasts, starters, luminaires, wiring, etc., without extensive modifications or additional parts.

Visually check new lamps for defects before installation. Mark the base of all new lamps showing the date of installation using the scratch numbers and letters provided on the pole base to facilitate the identification of installation dates for warranty and inspection purposes.

715-6.1.4 Glassware or Plastic: Clean refractors (glassware) when any minor repair is performed on an assembly. The cost of cleaning refractor(s) will be included in the repair pay item(s).

Remove, wash, rinse twice and dry refractor glassware. Brush and remove bugs from the fixture and the reflector. Unfasten and clean with compressed air the second portion of the hinged-door fixtures. Do not disturb the wires while removing debris.

Replace glassware in need of replacement with the same type and pattern as removed. Glass refractors may be replaced with plastic refractors when approved in writing by the Engineer.

715-6.1.5 Reflectors: Clean and/or polish the inner surface of reflectors with removable polish. If reflective qualities cannot be restored, replace the reflector. If the reflector cannot be purchased, a complete, new fixture must be installed.

715-6.1.6 Gaskets and Filters: Clean foreign material, oxidation, and spray with a special treatment to stop oxidation and sticking of all neoprene or silicon gaskets. Replace all gaskets not functioning properly. Replace all felt or dacron gaskets with dacron sutron gaskets of the proper thickness and width to form a weather resistant seal. Glue gaskets with non-hardening material and install correctly to prevent entry of insects. Check filters and replace them when necessary.

715-6.1.7 Bird Guards: Replace bird guards if missing or damaged. Devise and install new bird guard if bird guards are not available to fit the specifications of the existing fixture.

715-6.1.8 Hinges and Latches: Repair hinges and latches according to the manufacturer's specifications. Replace the fixture or part of the fixture on which the hinge or latch is located if parts cannot be repaired.

715-6.1.9 Fasteners and Snaps: Replace all fixtures having broken fasteners or snaps that cannot be repaired or replaced, with fixtures meeting the Department's current design criteria. The Engineer must approve replacements in writing.

715-6.1.10 Leveling: Make adjustments as needed to ensure all fixtures are level. Shim the pole base so the pole will be vertical.

For adjustable fixture arms, bring the head to proper alignment by adjusting the adjustable fixture arm. For non-adjustable fixture arms, use the leveling device in the head to adjust the fixture ~~on a non-adjustable fixture arm~~.

715-6.1.11 Luminaire Bracket Fixture Arms: Inspect for rust or oxidation. Reposition or replace bent or incorrectly positioned luminaire bracket arms. Notify the Engineer if the fixture arm is beyond repair and needs to be replaced.

715-6.1.12 Photoelectric Cells: Check for proper on/off cycling of all photoelectric cells, whether on the fixture, pole, or remote. Replace any photoelectric cell failing to turn on at proper time. Obtain permission from the utility pole owner prior to inspecting the photoelectric cell for continuity. Only photoelectric cells and the associated contacts that are owned by the Department are included in this Contract.

715-6.1.13 Sockets: Replace photoelectric cell sockets that are defective. Replace defective amp sockets or socket holders. Correct improper connections.

715-6.1.14 Hand Hole Plates: Check, repair, or replace where necessary all hand-hole plates (door assemblies). Determine the size of the hand-hole plates when replacement is necessary. Replacement with nonmetallic plates may be allowed, if approved in writing by the Engineer.

715-6.1.15 Wiring:

715-6.1.15.1 Luminaries: Perform wiring/re-wiring, as needed, on the integral ballast or driver using methods prescribed for wiring in high heat environments and using materials that will withstand high temperatures. Notify the Engineer when luminaire repairs are too extensive for completion in the field. Perform all repairs to conform to the manufacturer's specifications.

715-6.1.15.2 Pole Risers: Re-wire the pole when chaffing, shorting, or openings that could affect the operation of the luminaire exist in the pole riser conductors. Conform to the wire size in the Design Standards when wiring/re-wiring poles. Maintain lightning protection by connecting all metal components, i.e., luminaire housing, bracket arm, etc., to the associated ground rod at the base of each pole meeting the Standard Plans. Connect the current carrying neutral wire to ground at the distribution panel.

715-6.1.15.3 Grounding Wires: Perform ground wiring in accordance with Section 620.

715-6.1.15.4 Pole Bases/Electrical: Weatherproof, pull-apart connectors are required at all poles. Properly install and vulcanize as necessary. Lubricate with a non-conductive lubricant, seal, and protect from chaffing. Weatherproof, pull-apart "Y" fused connectors, and in-line, pull-apart weatherproof, connectors are authorized provided connections are made with compression sleeves, split bolts, or are soldered before being made weatherproof. Place fuse inserts in the "hot leg" of the pole riser. Place blank conductor inserts in the neutral leg of the pole riser. Fuse both legs where there is no neutral conductor. Leave sufficient slack in all wires to allow the wire and connectors to be pulled and worked on outside the hand hole. Seal with electrical putty the ends of the conduits.

715-6.1.15.5 Circuit Current Carrying Conductors: Install wire that meets the National Electrical Code, Florida Department of Transportation Standard Specifications for Road and Bridge Construction and is consistent with the existing lighting system. All new underground wiring must be installed in duct or conduit. Place conduit in trenches with vertical walls at a minimum depth of 32 inches with warning tape at a depth of 20 inches. Use non-conductive lubrication and pulling aids when pulling new conductors into existing ducts to avoid damaging the insulation.

715-6.1.15.6 Distribution Boxes: Be responsible for the distribution box or circuit breaker panel board enclosure, which controls the lights in this Contract and provide a padlock with a type of lock specified by the Engineer. Furnish an extra padlock key to the Engineer.

715-6.1.16 Ballasts: Check all ballasts and replace any that are defective. Replacement ballasts shall be the regulator type and shall be wired for the appropriate voltage.

715-6.1.17 Fuses: Fuses are located as part of the pull-apart connectors either in the pole hand-hole or in the transformer base. Lubricate the pull-apart connector with non-conductive lubricant whenever the fuse is checked. Replace blown fuses with dual element, 600V 10 Amp, type FNQ or equivalent. Replace blown fuses caused during testing repaired circuits at no cost to the Department.

715-6.1.18 Poles: Replace pole caps, inspection plates, or hand-hole covers if missing. Replace missing or broken bolts, using stainless-steel, tamper-proof bolts replaced in proper position and re-tap holes where necessary. Replace any portion of the riser wire going from the base of the pole to the socket in the head of the fixture if frayed or damaged with new wire. Plug conduit coming out of the foundation with electrical putty. Shim the base of the pole

if leaning to return it to proper position. Repair damaged poles, if possible, by replacing the damaged shoe base and pole section with replacement parts so that fixture arm position and hand-hole position remain per design. Retain breakaway capability.

715-6.2 Major Repair Standards.

715-6.2.1 General: Repair major lighting system components as directed by the Engineer. When substitutions are proposed for existing systems, they must be both functionally and aesthetically compatible with the existing components and approved in writing by the Engineer.

715-6.2.3 Foundations. Straighten, repair, or re-pour the foundations in accordance with the current Department's Standard Plans. The Engineer may permit the use of pre-cast foundations. Provide environmentally safe areas to dispose of existing foundations removed.

715-6.2.4 Grounding: Ground all poles. Meet the grounding requirements of Section 620 and the Department's Standard Plans.

715-6.2.5 Transformer Base: Replace the doors of the transformer base if missing. Remove broken bolts and re-tap holes. Use stainless steel bolts to hold the door securely in place and to protect the inside of the base from the elements and unauthorized persons. Clean the inside wall of the base and the surface of the concrete foundation using compressed air. Disconnect, clean, lubricate, and reconnect pull-apart connectors in all transformer bases.

Replace all transformer bases with an equivalent transformer base as directed by the Engineer.

715-6.2.6 Poles: Use replacement poles of the same type, height and arm length as the original pole unless otherwise approved in writing by the Engineer.

715-6.3 Sign Lights and Under Deck Lights:

715-6.3.1 General: Apply the following requirements of 715-6 where applicable:

715-6.3.2 Fixture: Clear obstructions from fixture drain holes and position luminaires to afford optimum illumination of the sign face.

715-6.3.3 Gaskets: Seal or re-seal all gaskets during diagnostics.

715-6.3.4 Ballasts/Drivers: Replace defective ballasts/drivers with ballasts/drivers of the manufacturer's recommended type and wire for the appropriate voltage. Notify the Engineer of any ballasts/drivers that are in a location that is difficult to service. Relocate ballasts/drivers to an area on the structure that provides easier accessibility upon written approval of the Engineer. Any such relocation shall utilize wiring properly rated and sized in consideration of the new position of the ballasts/drivers.

715-6.4 Storage of Materials: Maintain storage sites outside the right-of-way limits on any state-maintained highway. Materials may be temporarily stored on the right-of-way outside of the clear recovery zone for a period not to exceed 24 hours, or the allowable number of days to perform the work as approved in writing by the Engineer. No materials or equipment may be stored in medians.

715-6.5 Equipment: Perform work with equipment in compliance with Section 100 of the Standard Specifications. Comply with the requirements of "Occupational Safety and Health Standards" (reference 29 of the Code of Federal Regulations, Part 1910); "Mobile and Locomotive Cranes" (American Society of Mechanical Engineers International, ASME B30.5); "Vehicle Mounted Elevating and Rotating Devices" (American National Standard Institute, ANSI/SIA A92.2).

ARTICLE 715-17 is deleted.

ARTICLE 715-18 is deleted and the following substituted:

715-18 Method of Measurement.

The quantities to be paid for will be as follows, completed and accepted:

1. Conduit: Payment will be made in accordance with Section 630.
2. Luminaire and Fixture Arm: The Contract unit price will include the truss arm, luminaire with lamp, and all necessary mounting hardware as indicated in the Plans and Standard Plans.
3. Service Point: Payment will be made in accordance with Section 639.
4. Load Center: The Contract unit price will include the enclosure, panel boards, breakers, lightning arrestor, contactors, photo electric switch, grounding, and the concrete pad as shown in the Plans and Standard Plans.
5. Luminaire: The Contract unit price will include the luminaire with lamp and necessary mounting hardware as indicated in the Plans and Standard Plans.
6. Pull Box: The Contract unit price for installation will include site preparation, required ground rod and clamps, materials, labor, and equipment to make a complete and acceptable installation. The Contract unit price for repair will include grounding of ungrounded cast iron cover and/or repair of pull box contents.
7. High Mast Lighting Pole Complete: The Contract unit price will include the pole, luminaires with lamps, lowering system, breakers and anchor bolts with lock nuts and washers, and foundation as indicated in the Plans and Standard Plans.
When partial foundation removal is called for, remove the pole and foundation to a minimum depth of four feet below existing grade.
When complete foundation removal is called for, completely remove the pole and foundation.
8. Conductor: The quantity to be paid for will be the plan quantity, in feet, completed and accepted. Measurement will be based on the horizontal distance between pull boxes, or between pull boxes and luminaire poles, plus 8 feet for each conductor entering and 8 feet for each conductor leaving the pull box and 8 feet for each conductor entering the luminaire pole.
9. Lighting Pole Complete: The Contract unit price will include the pole, internal vibration damping device, truss arm, luminaire with lamp, anchor bolts with lock nuts and washers, frangible base and foundation.
10. Pole Cable Distribution System: The Contract unit price will include the surge protector, fuse holders with fuses, waterproof connectors and the waterproof wiring connection to the luminaires.
11. Removal of In Place Poles or Components: The Contract unit price for all removal items will include labor, transportation, and equipment when removal is directed by the Engineer.
12. Removal or Relocation of Light Poles: The Contract unit price will include all backfill material required, and disposal of the foundation material removed.

13. Repair Items: The Contract unit price will include transportation, storage, labor, miscellaneous minor materials, and equipment to perform the complete operation, clean up, and disposal of debris.

14. New Luminaires Installation: The Contract unit price will include all components including lamps, starter boards, ballasts, and refractors.

15. Load Center: The Contract unit price will include enclosure, breakers, panel boards, lightning arrestor, contactors, photo electric switch, grounding, and concrete pad.

16. Diagnostic Work: The Contract unit price will be for each location as directed in the Work Document.

17. Incidental Minor Repair Work: The cost for this work performed together with the diagnostic work assessment is included in the cost for Diagnostic Work.

18. New and Repaired Lighting Pole Shafts: Payment for furnishing new or repairing and reusing repaired lighting pole shafts (Conventional/Standard) includes repairs for reuse and all hardware necessary.

19. Fixture Arms: Payment will be for furnishing new or repairing and re-installing existing fixture arms (Conventional/Standard) up to 15 feet in length. Where no distinction is made in the pay item for different design types of fixture arm material, the pay items provided will be full payment for work accomplished.

20. Continuous Phase Transformer: The Contract Unit Price will include all re-wiring, hardware, and labor.

ARTICLE 715-19 is deleted and the following substituted:

715-19 Basis of Payment.

Prices and payments will be full compensation for all completed and accepted work as specified in this Section, including all labor, materials, equipment, diagnostic services, and tests. No payment will be made until appropriate tests of the installation(s) have been completed.

Payment will be made under the items specified in the Bid Price Proposal.