

March 6, 2019

**ADDENDUM NO. 2**

**ENG19-06 COOPER STREET LIGHTING**

Notice is hereby given that the following additional information and changes shall become part of the specifications of the above referenced contract. You are to acknowledge the addenda on the Proposal Sheet.

- 1) The Special Provisions for Electrical and Lighting dated 08-21-18 on pages SP15 through SP21 of 54 is removed from the proposal.
- 2) The attached Special Provision for Electrical and Lighting dated 03-06-19 (8 pages) is added to the proposal.

END OF ADDENDUM

# CITY OF JACKSON, MICHIGAN

## SPECIAL PROVISION FOR ELECTRICAL AND LIGHTING

COJ

1 of 8

03/06/18

**a. Description.** This work shall consist of furnishing all labor, equipment and materials in connection with providing fully functioning electrical street lighting and power systems. Materials and work shall be in accordance with the referenced standards and sections of the 2012 Michigan Department of Transportation Standard Specifications for Construction (MDOT Specifications) with the modifications and additions included in this Special Provision and shall meet all National Electric Code requirements.

The Contractor will provide storage and protect from damage during construction the poles, luminaires and lamps and all equipment procured as part of this project.

The Contractor shall provide all other items, articles, materials, operations, or methods mentioned, listed, or scheduled on the Drawings and this Special Provision including all labor, materials, equipment, and all incidentals required for completion and operation of all systems. Items not specifically mentioned in this Special Provision or noted on the Drawings, but which are obviously necessary to make a complete working installation, shall be included. This work shall be considered to be included in contract pay items.

The following abbreviations are used throughout this special provision:

NEC - National Electric Code  
ANSI - American National Standards Institute, Inc.  
NEMA - National Electrical Manufacturers Association  
U.L. - Underwriters Laboratory  
THWN - Moisture Resistant Thermoplastic Conductor  
A – Amperes  
V – Volts  
W – Watts  
LED – Light Emitting Diode

**b. Materials.** Electrical materials and equipment shall be new and shall be the standard products of manufacturers regularly engaged in the production of such materials. Material and equipment shall be the manufacturer's latest standard design and shall be free from all defects and imperfections that might affect the serviceability of the finished product. Manufacturer's trade names and equipment specified indicate the quality and description only. Comparable products of other manufacturer of the same quality and equal to that specified may be accepted. Should the cost of alternate or substitute equipment proposed by the Contractor require redesign, all costs incurred shall be borne by the Contractor, and the redesign approved by the Engineer prior to construction. The Contractor shall remain responsible for a complete and functional system.

Submit shop drawings for approval prior to ordering equipment and materials.

1. Poles including bolt pattern and dimensions
2. Luminaires
3. Grounding rods
4. Conduits and conductors
5. Hand holes
6. Wiring Devices

All threads of equipment and materials shall be coated with an approved deoxidization compound.

ANCHOR BOLTS shall be galvanized steel as specified in Section 908.14D of the MDOT Specifications.

CONCRETE shall be Grade D per MDOT Specification Section 701.

RIGID METAL CONDUIT (RMC): Conduit with a diameter of one inch or less shall be galvanized steel conduit with associated couplings and fittings per Section 918 of the MDOT Specifications.

SMOOTH-WALL PVC CONDUIT: Conduit with a diameter greater than one inch that is installed by open trench type construction shall be smooth-wall Schedule 80 PVC conduit and fittings per Section 918 of the MDOT Specifications. All joints shall be cemented with a "Brush-Type" cement. Conduit, fittings, elbows and cement shall be the products of the same manufacturer.

SMOOTH-WALL HDPE CONDUIT: Conduit with a diameter greater than one inch that is installed by directional drill type construction shall be Schedule 40 High Density Polyethylene, Type III, Grade P-33, Category 5, Class C conduit per Section 918 of the MDOT Specifications. Compression type fittings manufactured specifically for use with the selected conduit shall be available for making repairs, splices or jointing to standard PVC conduit. The fittings must not require thermal welding, grooving tool or threading to make joints. Conduit and fittings shall be UL listed.

ELECTRICAL PANELS shall be as shown on the plans, complete with the circuit breakers, spaces and ratings as indicated.

ELECTRICAL WIRE AND CABLE shall be per Section 918.03 of the MDOT Specifications with the following additional requirements: Power cable shall be single conductor stranded copper with NEC type THWN insulation rated 75 degrees C dry or wet, 600 volt. Wire size shall be as indicated on the drawings.

EQUIPMENT GROUNDING CONDUCTOR shall be bare, stranded copper wire or insulated THWN in accordance to articles 251.19, 251.22, 250.62 of the National Electric Code.

GROUND RODS shall be 3/4 inch x 10 foot copper clad steel as specified in Section 918.02 of the MDOT Specifications.

HAND HOLE boxes and covers shall be polymer concrete in accordance with Section 918.05D of the MDOT Specifications with the following exceptions: The hand hole size shall be 12" by 12" or 11" by 18" as indicated. The Hand holes shall have an open bottom and be stackable. Hand hole covers shall have a logo imprint of "ELECTRIC".

MANHOLES shall be constructed of precast concrete per Section 918.06 of the MDOT Specifications and MDOT Standard Plan SIG-021-A for Handhole – Precast, Polymer Concrete (the word "Handhole" in the referenced detail shall be interchangeable and have the same meaning as the word "Manhole").

MANHOLE COVERS shall be grey iron castings manufactured in accordance with section 908 of the MDOT specifications by East Jordan Iron Works (1581Z frame with 1580A cover with "COMMUNICATION" lettering) or approved equal.

LUMINAIRES FOR DECORATIVE TYPE LIGHTS shall be Lumecon Decorative Ring of Fire 54W Standard Post Top LROF-2-1-NW-A-CL-9-X-X-S-B-X-X-L with 740-5001 fitter. No substitutions allowed.

LUMINAIRES FOR SHOEBOX TYPE LIGHTS shall be RAB Lighting LOTBLASTER 110 W Type 3 black Area Light LOT-3T-110/D10/UPA RAL 9011 with 5000K color temperature. No substitutions allowed.

LUMINAIRES FOR STREET TYPE LIGHTS shall be American Electric Lighting Autobahn LED Roadway Series ATBM-D-MVOLT-R3-BK-NR with 4000K color temperature. No substitutions allowed.

POLES FOR DECORATIVE TPE LIGHTS shall be VISCO high gloss black cast iron lamp posts VI-B17-CI-13'1"-3" TENON with a 15A, 120V, GFCI receptacle with a weatherproof cover located in-line with access door at based of pole and three inches from top of pole. No substitutions allowed.

POLES FOR SHOEBOX TYPE LIGHTS shall be Lumecon poles U-SSSS-20-5-7-STD-D1-BK with pole height of 20 feet, 5-inch square shaft of 7 gage steel, black finish, drill mount option D1 and a 15A, 120V, GFCI receptacle with a weather proof cover located opposite of upswing arm and 14 inches from top of pole. No substitutions allowed.

POLES FOR STREET TYPE LIGHTS shall be Cooper Lighting- Eaton poles RTS-8-A-(20 or 30)-Y-S-S-1-8-E of the height specified, 8-inch diameter round shaft with a wall thickness of 0.12 inches, square steel base, black finish, standard upsweep bracket UB1-8-2 for a single 8-foot arm and a 15A, 120V, GFCI receptacle with a weather proof cover (located in-line with access door at base of pole) located 24 inches from top of pole. No substitutions allowed.

REINFORCING STEEL BARS shall be ASTM A615, Grade 60.

TREE RECEPTACLES shall be outdoor rated (weather resistant) WR-GFCI receptacles with cover assemblies that are covered in turn by an in-use outdoor receptacle covers. Receptacles shall be installed in single gang cast steel device boxes.

**c. Construction.** All electrical work shall comply with referenced sections of the MDOT Specifications, the latest applicable rules of the Construction Code Commission of the State of Michigan, the NEC, and local codes as their jurisdiction applies.

1. The Contractor shall obtain all permits, licenses, and inspections necessary to complete the work in accordance with all Federal, State and local codes. Upon completion of the work, the Contractor shall furnish to the City all certificates of inspection and approval which are customary for the classes of work involved. Work shall be coordinated with Consumers Energy and other Contractors.

All work shall be performed in a workmanlike manner under the supervision of a competent supervisor who shall be designated as an authorized representative of the Contractor. Disputes over the quality and suitability of the workmanship shall be decided by the Engineer and shall be based on the requirement that all work shall be performed in a manner acceptable to the project and standards for the trade. Surfaces damaged or soiled shall be restored to their original condition as determined by the Engineer.

Light pole, hand hole and electrical equipment locations, and general arrangement of the conduit and wiring system are shown on the drawings. Final locations may be modified by the Engineer in the field.

2. Underground direct bury conduit shall be constructed in accordance with MDOT Specification Section 819.03A with the following additions and modifications.

Each pipe shall be inspected for possible defects before being placed in the trench. Joint surfaces shall be free of earth or frozen material. Upon completion of placement of the pipe bedding, the contractor shall place caution tape 4 – 6 inches above all conduit runs, and complete the trench backfill.

Underground conduits shall have 24 inches minimum bury. It is intended that conduits use direct routes, long sweep elbows and offsets. Changes in grade or direction shall be sufficient length to allow a gradual change. The use of 90 degree elbows or offset will not be allowed in straight runs of conduit. A conduit run between access points shall contain not more than the equivalent of four (4) quarter bends.

3. Conductors. All wiring shall be installed in conduit. Conductors shall be continuous with splices made only within hand holes. When necessary to use a lubricant for pulling wires, it shall be UL listed and leave no obstruction or tackiness that would hinder future wire pulling. Conductors shall be carefully handled to avoid injury to the insulation. Provide 12 inches minimum of slack at each pole and at each hand hole.

The conductors shall terminate in correctly sized wire nuts wrapped with Scotch 130C and covered with Scotch 88 electrical tapes. The minimum radius of bends for the conductors shall comply with the NEC. The conductors shall have sufficient overlap at the ends to provide undamaged insulation for splicing or terminations. Conductors to be spliced shall have their ends overlap the proposed splice by at least 24 inches. Termination of the wire shall be done in such a manner as to maintain the insulation level and current carrying capacity of the wire. All terminations shall be coated with an approved deoxidization compound. Splices or taps in hand holes must meet the minimum requirements for splices in wet locations according to the NEC and approval of the local authority.

Where a number of wires are trained through a box, manhole or hand hole, they shall be grouped by circuit where applicable and bundled using appropriate cable ties and supported to minimize pressure or strain on cable insulation. All lighting wiring shall be identified at each termination with numerical tags, or a combination of numerical and alphabetical tags. All conductors shall have colored phase identification including neutral and grounding conductors. The A phase shall be black, B phase shall be red and receptacle wiring shall be blue in color.

After installation backfilling operations, the cable shall be field tested for continuity, shorts and grounds. Wire failing to pass the field test shall be replaced with new wire at no additional cost to the City.

4. Directional drilling is a method of trenchless construction using a surface launched steerable drilling tool controlled from a mobile drilling frame, and includes a field power unit, mud mixing system and mobile spoils extraction system. The drilling frame is set back from an access pit that has been dug at the location of the proposed utility and a high-pressure fluidjet toolhead that uses a drilling mixture is launched and guided to the correct invert elevation and line required. Using a guidance system attached behind or within the toolhead, and which measures Inclination the toolhead is guided through the soil to create a pilot tunnel. Upon reaching the pit dug at the section location, the toolhead is removed and a reamer with the product pipe attached is joined to a swivel connected to the pulling head and pulled back through the tunnel. A vacuum spoils extraction system may be necessary to remove spoils generated during the installation or as directed by the Engineer.

The drilling procedures and equipment shall provide for the protection of workers particularly against electrical shock. The drilling equipment will have an alarm system capable of detecting electrical current.

The Contractor is responsible for locating all existing utilities prior to any underground activities. Utilities shall be pot holed to determine the depth. The costs of any pot holing shall be included in the project.

The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable bore head. The hydraulic power system shall be self-contained with sufficient pressure and volume to directional boring operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations.

The drilling equipment must be capable of placing the pipe within the planned line and grade.

**Drilling Fluid.** Drilling fluid consists of bentonite clay, potable water and appropriate additives. No hazardous additives may be used. Water and additives shall be mixed thoroughly and be absent of any clumps or clods. Drilling fluid shall be maintained at a viscosity sufficient to suspend cuttings and maintain the integrity of the bore hole.

The drilling equipment must have a minimum pullback rating of 25,000 lbs., torque rating of 1,500 lbs., and mud flow of 18 gallons per minute.

**Environmental protection.** The contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. The contractor shall adhere to all applicable environmental regulations.

**Safety.** The Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner.

The guidance system must have the capability of measuring the inclination. The guidance system must have an independent means to ensure the accuracy of the installation. The guidance system requirements may need to be capable of generating a plot of the borehole survey for the purpose of as-build drawings, as determined by the field engineer.

If rocky soil is encountered, a rock drilling bit will be used with a PSJ rating of up to 12000. If rock is encountered that cannot be drilled at this rating contact the Engineer.

After successfully reaming bore hole, the contractor will install a swivel to the reamer and commence pullback operations. Pre-reaming of the tunnel may be necessary and is at the option of the Contractor. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations contractor will not apply more than the manufacturer's maximum safe pipe pull pressure at any time. The amount of force applied to pipe during pull-back shall be controlled and limited by a device such as hydraulic regulators or load sensors between pulling equipment and pipe.

Reaming diameter will not exceed 1.5 times the diameter of the product pipe being installed.

5. Hand holes shall be provided at each light pole and other connection points as indicated on the plans and in accordance with MDOT Specification Section 819.03E. The main electrical distribution wiring including splicing is in the hand holes. Only the wiring for the individual

street light and receptacle go to the pole. A ground rod shall be provided in every hand hole. The frame and cover shall be installed flush with the top of the hand hole and both shall be flush with the pavement or sidewalk.

6. Light Pole Concrete Base shall be constructed in accordance with the details on the plans and MDOT Specification Section 819.03F. Foundations shall be properly protected and guarded to prevent injury to persons until lights are installed.
7. Lights shall be installed so that the hand hole in the light base is on the side away from oncoming traffic. The wiring joints and splices with the fuses will be permitted only at access points such as the hand hole at the base. Lights shall be grounded according to NEC for grounding of equipment.
8. Equipment Grounding: Bond non-current carrying parts of all lights installed under this contract by means of bare copper cable to the grounding system as shown on the drawings. All circuits shall have a separate, insulated ground conductor sized per NEC and as shown on the drawings.
9. Cleanup: Contractor shall be responsible for continuous cleanup as the work progresses and shall keep the site free from construction and material debris resulting from the work.
10. Tree receptacle installations shall include the placement of one-inch rigid conduit from the nearest hand hole from which receptacle will be fed to the base of the tree the receptacle will service, installation of a 90-degree bend and a riser of one-inch rigid conduit that extends to twelve inches above finished grade to a single gang steel device box. The receptacle shall be fed by #12 conductors colored black, white and green.
11. Existing receptacles scheduled for removal shall be demolished by removing existing receptacle and conduit from the nearest hand hole from which it is fed after the branch circuit wiring has been disconnected in that hand hole.

**d. Measurement and Payment. The completed work as measured for Electrical and Lighting will be paid for at the contract unit price for the following contract items (pay items):**

<b><u>Contract Item (Pay Item)</u></b>	<b><u>Pay Unit</u></b>
Concrete Base for Light Pole, ___ inch	Each
Conductor, THWN, in Conduit, 600V, 1C, # ____ AWG	Foot
Conduit, ____ inch, RMC (Empty)	Foot
Conduit, ____ inch, Sch 80/PVC (Empty)	Foot
Conduit, ____ inch, Sch 40/HDPE (Empty)	Foot
Equipment Grounding Conductor, in Conduit, 1C, # ____ AWG	Foot
Hand Hole, Polymer Conc, ____ inch x ____ inch	Each
Light, ( <u>Type – Decorative, Shoebox or Street</u> ), Furnish	Each
Light, ( <u>Type – Decorative, Shoebox or Street</u> ), Install	Each
Light, ( <u>Type – Decorative, Shoebox or Street</u> ), Salvage	Each
Receptacle, Demolish	Each
Receptacle, Tree	Each

**Concrete Base for Light Pole** includes payment for furnishing the labor, materials and equipment including excavation, backfilling, concrete, reinforcing steel, anchor bolts, conduit to the associated hand hole and all miscellaneous hardware required to complete the construction of the foundation as detailed on the plans and of the depth specified.

**Conductor, THWN, in Conduit, 600V, 1C, # \_\_ AWG** will be measured in place for the total length of the specified single conductor. Measurements shall be taken at grade between centers of hand holes and electrical service locations. No additional allowance will be made for looping, sag, splicing, slack length, vertical length at hand holes and equipment, or length inside equipment. Payment includes furnishing all conductor, labor, equipment and materials; and for making all splices and connections. Payment includes removal of any existing conductors and cleaning of existing conduit prior to installation of new conductors. Payment for conductors between hand hole and light base will be included with those pay items.

**Conduit, \_\_\_\_ inch, RMC (Empty)** includes payment for furnishing the labor, materials and equipment, including excavation, granular material Class II backfill, backfilling, disposing of excess materials, and installing the conduit complete. Measurements shall be taken at grade between centers of hand holes and service locations. No additional allowance will be made for vertical length at hand holes and equipment. Payment includes furnishing all conduit and fittings.

**Conduit, \_\_\_\_ inch, Sch 80/PVC (Empty)** includes payment for furnishing the labor, materials and equipment, including excavation, Granular Material Class II backfill, backfilling, disposing of excess materials, and installing the conduit complete. Measurements shall be taken at grade between centers of hand holes and service locations. No additional allowance will be made for vertical length at hand holes and equipment. Payment includes furnishing all conduit and fittings. Payment for conduit between hand hole and light base will be included with those pay items.

**Conduit, \_\_\_\_ inch, Sch 40/HDPE (Empty)** includes all labor, equipment, and materials necessary to provide and install the specified conduit by the directional drill method as specified herein and detailed on the plans. Measurements shall be taken at grade and shall be paid for per foot as measured HORIZONTALLY between the centers of hand holes with no allowance for curvature of the pipe. This item includes all utility location, excavation, granular material Class II backfill, backfilling, drilling/boring, connection to other conduits at the ends of the bore, cleanup and all other miscellaneous items of work necessary to complete the bore and install the conduit.

**Equipment Grounding Conductor, in Conduit, 1C, #\_\_ AWG** will be measured in place for the total length of the specified grounding conductor. Measurements shall be taken at grade between centers of hand holes and electrical service locations. No additional allowance will be made for looping, sag, splicing, slack length, vertical length at hand holes and equipment, or length inside equipment. Payment includes furnishing all conductor, labor, equipment and materials; and for making all splices and connections. Payment includes removal of existing conductors and cleaning of existing conduit prior to installation of new conductors. Payment for conductors between hand hole and light base will be included with those pay items.

**Hand Hole, Polymer Conc, \_\_ inch x \_\_ inch (Open Bottom)** includes payment for furnishing the labor, materials and equipment, including covers, fittings and ground rods, excavation, backfilling, disposing of surplus materials required for the construction and installation of the hand hole.

**Light, (Type – Decorative, Shoebox or Street), Furnish** includes payment for all labor, materials and equipment required to furnish a light assembly (pole, luminaire and, where applicable, upsweep bracket) of the type and dimensions specified.

**Light, (Type – Decorative, Shoebox or Street), Install** includes payment for all labor, materials and equipment required to install a furnished light assembly (pole, luminaire and, where applicable, upsweep bracket) of the type and dimension specified. Installation of the street light shall include furnishing and installing wiring to the associated hand hole, fuses and miscellaneous hardware as indicated on the plans.

**Light, (Type – Decorative, Shoebox or Street), Salvage** includes payment for all labor and equipment to remove an existing light assembly (pole, luminaire and, where applicable, upsweep bracket) of the type specified and delivering it to the Department of Public Works yard at 521 Water Street for safe storage until reinstallation on a new base.

**Receptacle, Demolish** includes payment for all labor, materials and equipment necessary to remove an existing tree receptacle.

**Receptacle, Tree** includes all labor, materials, equipment, wire and splices to the nearest hand hole or light pole, and all miscellaneous hardware required to install the receptacle at the base of a tree.