December 27, 2019

REVISION OF SECTION 613

LIGHTING

1. **NOTICE**

This is a standard special provision that revises or modifies CDOT’s *Standard Specifications for Road and Bridge Construction*. It has gone through a formal review and approval process and has been issued by CDOT’s Project Development Branch with formal instructions regarding its use on CDOT construction projects. It is to be used as written without change. Do not use modified versions of this special provision on CDOT construction projects, and do not use this special provision on CDOT projects in a manner other than that specified in the instructions unless such use is first approved by the Standards and Specifications Unit of the Project Development Branch. The instructions for use on CDOT construction projects appear below.

Other agencies that use the *Standard Specifications for Road and Bridge Construction* to administer construction projects may use this special provision as appropriate and at their own risk.

**Instructions for use on CDOT construction projects:**

Use this standard special provision on all projects with roadway lighting.

Section 613 of the Standard Specifications is hereby deleted for this project and replaced with the following:

## DESCRIPTION

**613.01** This work consists of furnishing and installing foundations, light standards, luminaires, light sources, lamps, conduit, cable, wiring, and incidental materials for highway lighting in accordance with these specifications and in conformance with the details, lines, grades, and locations shown on the plans or established.

## MATERIALS

**613.02** Roadway lighting materials shall conform to Section 715, and shall be compatible with the requirements of the local electrical utility company.

1. *Foundation.* Concrete Foundation Pads and Light Standard Foundations shall be cast-in-place concrete. A complete foundation includes the concrete, reinforcing steel, grounding electrode, connector bolts, and anchor bolts.

Connector bolts and anchor bolts shall accommodate the anchorage of the light pole from its base flange to the base or transformer base, and from the base or transformer base to the light standard foundation.

1. *Light Standard.* A complete light standard includes the metal light pole, mast arm or arms, base or transformer base, approved breakaway device (optional), in-use receptacles (optional), grounding system, and all hardware. When a transformer base is not used, the pole shall have a handhole.

Pole and mast arm or arms shall be the type and size shown on the plans.

1. *Conduit*. Conduit includes all elbows and fittings required to install complete runs.
2. *Electrical Warning Tape*. Electrical warning tape shall consist of pre- manufactured non-adhesive polyethylene material that is unaffected by acids, alkalis, and other soil components. The tape shall be detectable. The color of the tape shall be red, and it shall be a minimum 3.5 mils thick and 6 inches wide. Its tensile strength shall be 1,750 psi lengthwise.

The electrical tape shall include the following identification printed in black letters continuously along the length of the tape: “CAUTION BURIED ELECTRIC LINE BELOW”.

The identification note and color of tape shall conform to the requirements of the “American Public Works Association (APWA) Uniform Color Codes (Red) – Electrical Power Lines, Cables, Conduit and Lighting Cables”.

1. *Luminaire*. A complete luminaire includes the housing, lens, Light Emitting Diode (LED) board, luminaire housing, dimming driver or power generator, slip-fitting clamp or approved manufacturer mounting, all necessary internal wiring, and 7-pin photoelectric control receptacle. Luminaires shall operate at either 120 VAC, 60 Hz or 277 VAC, 60 Hz. or 120-277VAC, 60 Hz.
2. *Lighting Control Center*. A complete lighting control center includes the load center, grounding system, contactors, relays, meter disconnect (optional per utility company requirements) meter housing, maintenance receptacle, photoelectric control, NEMA 4 enclosure, HVAC (optional), snow skirt (optional) and all related components, and connections to the power supply.
3. *Meter Power Pedestal*. A complete pedestal includes the NEMA 3R enclosure and all related components, load center, grounding system, meter disconnect (optional per utility company requirements) meter housing, maintenance receptacle, photoelectric control, connections to the power supply, and all components shown on the plans.
4. *Secondary Service Pedestal*. A complete pedestal includes the NEMA 3R enclosure and all related components and connections to the power supply.
5. *Heavy Duty Safety Switch*. Provide switches as shown on drawings, with the following ratings:
6. 30 to 1200 amperes.
7. 250 volts AC; 600 volts AC.
8. 2, 3, 4 and 6 poles (2, 3 and 4 poles on 800 A; 2 and 3 on 1200 A).
9. Fusible and non-fusible.
10. Mechanical lugs suitable for copper conductors.
11. *Wiring*. Complete wiring includes control wiring, luminaire wiring, main circuit wiring, ground wiring, service entrance wiring, and all other wiring necessary for a complete installation.
12. *Materials List*. At the Pre-construction Conference, the Contractor shall submit to the Engineer three copies of a list of all materials and equipment to be incorporated into the work. The Contractor shall include the following items on the list:
13. Light standard foundations.
14. Foundation pads.
15. Light standard type (steel or aluminum).
16. Luminaire manufacturer’s product information including data in Illuminating Engineering Society (IES) format, IES photometric distribution type for vertical and lateral distribution and IES TM-15-11 rating (example: B2-U0-G1, Type III), and a photograph or line drawing.
17. Luminaire mounting hardware.
18. Luminaire initial lumen output.
19. LED dimming driver or power supply.
20. Lighting control centers and photoelectric control devices.
21. Secondary service pedestals.
22. All other items required for a complete installation.

The Engineer will return lists that are incomplete or that include unacceptable materials to the Contractor for correction and re-submission.

The Contractor shall not order materials or equipment until the Engineer and the party or agency responsible for maintenance have reviewed and approved the materials and equipment list. The Engineer’s approval of the list shall not relieve the Contractor of responsibility for the proper functioning of the completed installation.

1. *LED Luminaire Warranty*. The Contractor shall ensure that the LED roadway luminaire has a manufacturer’s minimum warranty of 10 years for all parts, materials, and shipping required to repair or replace the luminaire. The Contractor shall provide the manufacturer’s warranty to the Engineer prior to installing the luminaire.

The warranty shall cover all failures including:

1. Failure in luminaire housing, wiring, connections, drivers, and photoelectric control devices.
2. More than 10 percent decrease in lumen output.
3. Significant change in color.

The warranty shall begin upon the date the Contractor receives the luminaire. The bill of lading shall be provided to the Engineer prior to final payment of the lighting.

1. *Technical Support*. During the manufacturer’s warranty period, technical support shall be available from the manufacturer via telephone within 24 hours of the time the call is made from the Contractor, and this support shall be made available from factory certified personnel or factory certified installers at no additional charge to the Department.
2. *Temporary Lighting*. A complete temporary lighting system includes the temporary light standard, luminaire, mast arm, conduit, wiring, power source, temporary metering per the local utility standards, and all related components and connections to the power source.

**CONSTRUCTION REQUIREMENTS**

* 1. **General**. All work shall conform to these specifications and the National Electrical Code, and shall comply with applicable regulations as specified in subsection 107.01.

Each system shall be installed as shown on the plans or as designated. The Contractor shall furnish and install all incidentals necessary to provide a complete working unit or system.

**613.04 Concrete Foundation Pads and Light Standard Foundations.**

Foundations shall be installed as shown on the plans, complete with grounding electrodes. Concrete and the placing of concrete shall follow requirements listed in Section 412 as required to insure a proper installation.

The Contractor shall test and report soil conditions to the Engineer if any of the following soil conditions are encountered during drilling:

(1) Light standards are not installed within the roadway earthwork prism.

(2) The soil has a high organic content or consists of soft clay with N < 8, or loose soil with N < 15.

(3) The site will not support the weight of the drilling rig.

(4) The foundation soils are not homogenous.

Caissons shall be placed against undisturbed earth. Wet or caving holes shall be backfilled with flow-fill and re-drilled after a three-day curing period without the use of casing. If testing is required, then soil testing shall be performed at the lowest elevation light standard location for all light connected to a single electrical circuit. Foundations shall be installed at the final grade as shown on the plans.

All anchor bolts shall be positioned by means of steel templates. The center of the template shall coincide with the center of the base.

Conduits shall be properly positioned and anchored before the concrete is placed.

All foundations shall have ground electrodes conforming to the National Electrical Code. All foundations on structures shall be bonded to the structure steel by a method that is in accordance with the National Electric Code and which is approved by the Engineer.

**613.05 Light Standards.** Poles shall be set plumb on the light standard foundation using non-corrosive metal shims or upper and lower nuts. Poles shall be level and plumb to the foundation. Defects and scratches on galvanized poles shall be given two coats of acceptable zinc-rich paint as directed. Defects and scratches on painted poles shall be primed and painted to match undamaged pole sections.

**613.06 Luminaires, Light Sources, and Lamps.** Roadway luminaires shall be mounted on the mast arm by a slip-fitter clamp or other approved device. Luminaires shall be adjusted vertically and horizontally to be plumb with the foundation and provide the required orientation and maximum light distribution on the roadway and meet Illuminating Engineering Society (IES) TM-15 uplight rating of U0.

Each luminaire shall be controlled by a photoelectric control in a centralized control cabinet. For modified systems, individual photoelectric control may be used. The photoelectric control shall be positioned northward to minimize sun interference.

After installation and prior to acceptance, refractors and lenses shall be cleaned to provide maximum lumen output.

Luminaires of the specified type and initial lumen output shall be installed as shown on the plans. The type and initial lumen output shall be marked on each luminaire or pole in accordance with American National Standards Institute (ANSI) specifications.

ANSI approved tags shall be provided and installed by the Contractor.

Wall type luminaires for use under overpass structures shall be mounted as shown on the plans. All wall type luminaires shall include side shielding to prevent glare in the motorist’s view. The beam angle setting shall be adjusted to meet the illumination requirements.

**613.07 Conduit.** The electrical conduit system shall be installed in accordance with CDOT’s “A Policy on the Accommodation of Utilities on Colorado Highways Rights-of-Way” and the following:

Conduit shall be in accordance with subsection 715.06.

In the conduit system the locations of conduit, pull boxes, splice boxes and expansion joints shown on the plans are approximate. Actual locations shall be established during construction. The conduit system shall be located to avoid interference with known present or known future construction installations. All underground conduit runs and conduit risers on poles shall be installed as needed even though they may not be shown on the plans.

All conduit installed under the roadway shall be at least 2 inch inside diameter unless otherwise designated on the plans. The Contractor may use larger conduit than specified. If larger conduit is used, it shall be for the entire run from outlet to outlet. Reducer couplings shall not be used.

Existing underground conduit to be incorporated into a new system shall be cleaned with a round wire brush the same size as the internal diameter of the conduit. Then proofed with a mandrel ¼” less in diameter than the conduit inner diameter size, then blown out with compressed air.

Where new conductors are to be added to existing conductors in a conduit, all conductors shall be removed and the conduit cleaned as described above. All conductors shall be pulled into the conduit as a unit.

Conduit terminating in standards or pedestals shall extend approximately 2 inches vertically above the foundations and shall slope toward the handhole opening.

Conduit entering pull boxes shall terminate 2 inches inside the box wall and 2 to 5 inches above the bottom, and shall slope toward the top of the box to facilitate pulling of conductors. Conduit entering through the bottom of a pull box shall be located near the end walls to leave the major portion of the box clear. All conduits shall be labeled as to the direction of their run.

The ends of all conduits, whether shop or field cut, shall be reamed to remove burrs and rough edges. Cuts shall be made square and true so that the ends will butt or come together for their full circumference.

Slip joints or running threads shall not be used for coupling conduit. When a standard coupling cannot be used for coupling metal type conduit, an approved threaded union coupling shall be used. All threads on ferrous metal conduit, not previously treated with a corrosion preventative, shall be painted with rust preventive paint before couplings are connected. All couplings for metal type conduit shall be tightened providing a continuous connection throughout the entire length of the conduit run to increase raceway mechanical strength. Areas where the coating on ferrous metal conduit has been damaged shall be painted with rust preventive paint.

Non-metallic conduit shall be cut with a hacksaw or other approved tool. Non- metallic conduit connections shall be the solvent-weld type or approved equal.

All metal conduit ends shall be threaded and capped until wiring is started. When caps are removed, the threaded ends shall be provided with conduit bushings. Non-metallic conduit ends shall be capped until wiring is started.

Surface conduit connections at junction or splice boxes shall be tightly secured and waterproofed. All conduit ends shall be sealed with duct seal after installation of wiring. The duct seal shall be rated for outdoor use and easily removable.

When specified, conduit shall be installed under existing pavement by jacking or drilling operations. Where plans show that existing pavement is to be removed, jacking the conduit is not required. Boring, jacking or drilling pits shall be kept a minimum of 2 feet clear of the edge of pavement. Water shall not be used as an aid in the jacking or drilling operations, except when required to cool the cone head for directional boring

When trenching is specified to place conduit under existing pavement that is not to be removed, the trench width shall be 6 inches or less. Trenches shall be filled to 2 inches below the existing grade with structure backfill (flowfill), or another material if directed. The remaining 2 inches shall be filled to existing grade with hot mix asphalt within one calendar day after the roadway is trenched, in accordance with subsection 403.03.

Trenching shall be backfilled and compacted as follows: Backfill shall be deposited in uniform layers. The thickness of each layer shall be 6 inches or less thick prior to compaction under all hardscape. The space under the conduit shall be completely filled. The remainder of the trench and excavation shall be backfilled to the finished grade. The backfill material shall be compacted to the density of at least 95 percent of maximum dry density. The maximum dry density and optimum moisture content (OMC) for A-1, A-2-4. A-2-5 and A-3 materials will be determined in accordance with AASHTO T 180 as modified by CP 23. The maximum dry density and OMC for all other materials will determined in accordance with AASHTO T 99 as modified by CP 23. Materials shall be compacted at ± 2 percent of Optimum Moisture Content (OMC). Materials having greater than 35 percent passing the 75 µm (No. 200) sieve shall be compacted at 0 to 3 percent above OMC. Each layer shall be mechanically compacted by tamping with power tools approved by the Engineer. Compaction methods or equipment that damage the conduit shall not be used.

Red, detectable electrical warning tape shall be installed between 6 inches and 12 inches below finished grade for all underground trenched conduit runs.

Underground conduit shall be buried a minimum of 30 inches below finished grade. There shall be no sag between boxes. Conduit under roadways shall be buried at 48 inches below finished grade. If the Contractor encounters bedrock such that the minimum conduit depths cannot be achieved, the Contractor shall be allowed to cover the conduit with 2 inches or more of concrete at a lesser burial depth.

Rigid metallic conduits on bridges shall have an expansion fitting at every expansion joint of the bridge. Expansion joint fittings shall be precisely aligned with the conduit run to ensure proper expansion and deflection and to prevent binding. For vertical conduit runs, the fitting shall be installed close to the top of the structure to prevent water running across the fitting and entering the conduit.

The fitting’s deflection sleeve coupling, and pressure bushing at the barrel of the expansion body, shall be installed flush with the structure ends; only the connecting expansion nipple shall cross the opening between structures.

The fitting shall be supported by points on the conduit immediately adjacent to the fitting. The metal conduit fitting shall have an external bonding jumper.

All schedule 80 PVC conduits shall have slip fit expansion fittings at 100 foot intervals and 6 feet (maximum from each elbow). Expansion fittings will be installed per N.E.C. requirements for 65 °F temperature change.

Pull or splice boxes shall be installed a maximum distance of 400 feet or less. Boxes shall be placed at conduit ends, at all wiring splices, at all conduit angle points, where total conduit bends within a stretch of conduit exceeds 360 degrees, and at all other locations shown on the plans. The Contractor may install additional pull or splice boxes to facilitate the work.

Where practical, pull and splice boxes near curbs shall be placed adjacent to the back of the curb. Pull boxes adjacent to light standards shall be placed along the side of foundations as shown on the plans.

Unless otherwise shown on the plans, pull and splice boxes shall be installed so that the top of the covers are flush with the sidewalk and match the sidewalk slope and grade. Covers shall be level with the surrounding ground when no grade is established.

Where a conduit stub-out is called for on the plans, a sweeping elbow shall be installed in the direction indicated. The stub out shall be terminated in a box. All conduit stub outs shall be capped.

**613.08 Wiring**. Unless otherwise authorized, the multiple system of electrical distribution shall be used. Conductors of the size and material required, whether single or in cable, shall be installed for control wiring, luminaire wiring, main circuit wiring, ground wiring, service entrance wiring, and all other wiring necessary for a complete installation.

Conductors shall be sized to prevent a voltage drop of more than 3 percent per feeder run at the ambient temperature. All conductors shall be installed in conduit.

When 120-volt luminaires are installed, 120/240 VAC shall be brought to the base of each light standard, and individual luminaires shall be connected to one leg or the other in a manner that minimizes overall voltage drop.

A complete grounding system shall be installed for the entire lighting installation. Grounding shall consist of: ground cables, conduits, grounding electrodes, wire or strap, and ground fittings, as required by the National Electrical Code. Permissible grounding electrodes shall be: ground rods, concrete-encased electrodes, grounding plates and grounding rings. Alternative grounding electrodes per the National Electric Code shall be approved by the Project Engineer prior to installation.

All electrical conductors shall be identified and tagged as follows: Electrical conductor cable tags shall be located at each splice termination. The tags shall be attached with cable ties. The information shall be written on the tag with a permanent marker. The information shall include the direction and approximate length of the cable, and the feeder or circuit destination (line and load sides). Each incoming (line side) conductor shall be individually color coded with one tape mark; each outgoing conductor (load side) shall be coded with two tape marks.

Bonding and grounding shall conform to the requirements of subsection 614.10(c).

**613.09 Lighting Control Center, Meter Power Pedestal and Secondary Service Pedestals.** Each Lighting Control Center, Meter Power Pedestal, and Secondary Service Pedestals shall include a load center, a panelboard, contactors, a maintenance receptacle, a meter housing, a photoelectric control, a grounding electrode system with ground wells (if applicable), a NEMA 4 and/or NEMA 3R enclosure with all related components, HVAC (optional), snow skirt (optional), and connections to the power supply.

One copy of the cabinet drawings, one-line diagram, a luminaire schedule, and a list of all system components and their manufacturers shall be placed in a heavy duty plastic envelop with side opening that is attached to the inside cabinet door.

**613.10 Heavy Duty Safety Switch**. Install disconnect (safety) switches as required for a complete operating system. Each safety switch shall include pad-lockable handle, reinforced fuse clips, NEMA 3R enclosure unless otherwise noted, grounding system, and shall connect with conduit and wiring as required for a complete operating system.

**613.11 Temporary Lighting**. The temporary lighting system shall include the temporary light standard, luminaire, mast arm, conduit, wiring, power source, temporary metering per the local utility standards, and all related components and connections to the power source. Temporary lighting system shall be installed per Section 613 and meet the requirements of Section 715 unless otherwise approved by the Engineer. For temporary lighting, wood poles may be substituted for metal poles.

(a) *Temporary Lighting Levels*. Temporary lighting shall provide lighting levels equal to or exceeding the existing lighting levels and quality. Temporary luminaires shall meet backlight, uplight, and glare ratings listed in Table 715-1. Permanent luminaires shall meet all requirements listed in Section 715.

The Contractor shall keep the existing lighting system, the approve temporary replacements, or temporary construction lighting in effective operation for the benefit of the traveling public during Construction progress, except when shutdown is permitted to allow alteration or final removal of the system. Lighting system shutdowns shall not interfere with the regular lighting schedule unless otherwise permitted. Shutdown schedules are subject to approval by the Engineer. Existing installations to be removed shall be kept in operation until the new installations are ready to be turned on, or as otherwise directed by the Engineer.

The Contractor shall maintain, provide, and install temporary roadway lighting within the project limits throughout the entire construction schedule. The contractor is responsible for the design and maintaining of all temporary roadway lighting throughout all stages of the project throughout the project duration. Use of the existing lighting system, temporary roadway lighting poles and installation of the permanent lighting shall be permitted to achieve the required lighting level criteria.

The Contractor shall submit a design for approval of the temporary roadway lighting. The submission shall show direct association to the proposed staging and construction schedule. No work shall commence until a temporary lighting design is approved by the Engineer.

All luminaires that have been used for temporary lighting shall be cleaned before being reinstalled as temporary lighting. Reusable equipment damaged when the Contractor is removing and salvaging existing material shall be replaced or repaired at the Contractor's expense.

The Contractor shall keep temporary Construction lighting installations in effective operation until they are no longer required for the protection of the traveling public.

(b) *Electrical Service*. The Contractor is responsible for all work in gaining approvals and coordinating with the appropriate electrical utility, and for arranging service work to provide power source location, and for paying annual or monthly bill, and for any other tasks to provide electrical service for the temporary lighting.

(c) *Existing Systems*. All circuits to lighting outside of Project scope shall stay energized without interruption. If damage is caused by the Contractors’ operations, damaged facilities shall be repaired or replaced promptly at no additional compensation.

The Contractor shall determine the exact location of existing conduit runs and pull boxes before using equipment that may damage such facilities or interfere with any system.

Where roadways are to remain open to traffic and existing lighting systems are to be modified, the existing systems shall be kept in operation until the final connection to the modified circuit is made. The modified circuit shall be complete and operating by nightfall of the same day the existing system is disconnected.

Existing materials which interfere with or which are incompatible with new Construction shall be removed or salvaged in the order directed, as specified or approved, before completion of the new Construction. The Contractor shall notify CDOT and the appropriate utility at least four calendar days in advance of removing or salvaging the existing materials. Material damaged by the removal and salvage operations shall be repaired or replaced at the Contractor’s expense.

(d) *Temporary Service*. The Contractor shall be responsible for notifying CDOT and the appropriate utility of cancelation of temporary electrical service.

All temporary lighting standards and temporary meters shall be protected behind barrier or appropriate impact attenuator, as approved by the Project Engineer.

The Contractor shall install and energize the temporary lighting system prior to de-energizing and removing the existing lighting system.

The Contractor shall be responsible for obtaining and paying for temporary power through the duration of the project. The Contractor shall be responsible for removing the temporary lighting system after the permanent lighting system has been installed and energized. After removing the temporary lighting and temporary meter, the Contractor shall be responsible for canceling the temporary power service with the utility.

**613.12 Testing**. Prior to final acceptance, the Contractor shall demonstrate to the Engineer's satisfaction that all electrical and lighting equipment installations are in proper working condition. Temporary power and all cable connections required for testing shall be provided by the Contractor.

The Contractor shall operate the lighting system from sunset to sunrise for ten consecutive days. Light sources, lamps, drivers or power sources, power generators, control systems and/or photoelectric control that fail shall be replaced immediately. However, replacement of these items will not require a restart of the test.

The Contractor shall perform grounding tests at each grounding system location including light standards, lighting control centers, meter power pedestals, and other grounding electrode locations. Grounding tests shall show that the ground resistance is 10 ohms or less. If the measured resistance to ground exceeds 10 ohms, additional grounding electrodes shall be

added to the grounding electrode system.

The Contractor shall perform voltage drop tests at furthest point on each circuit such that voltage drop is within 3 percent of supply voltage.

The Contractor shall certify the records of all testing including grounding, voltage drop (within 3 percent) and other required tests as meeting specification requirements and submit the records to the Engineer.

**METHOD OF MEASUREMENT**

**613.13** Concrete Foundation Pads and Light Standard Foundations will be measured by the actual number installed and accepted.

Light standards will be measured by the number of light standards installed.

Luminaires will be measured by the number of luminaires of the specified wattage or initial lumens installed.

Lighting control centers will be measured by the number of centers installed.

Meter power pedestals will be measured by the number of pedestals installed.

Secondary service pedestals will be measured by the number of pedestals installed.

Heavy Duty Safety Switch will be measured by the number of switches installed.

Conduit will be measured by the linear foot in place.

All wiring necessary for the complete installation will be measured as a single lump sum.

Pull/ splice boxes will be measured by number of boxes installed.

Temporary lighting shall include the temporary light standards, luminaires, mast arms, temporary conduit, temporary wiring, and all other equipment necessary for the complete installation and accepted. Temporary lighting shall be measured as a single lump sum.

**BASIS OF PAYMENT**

**613.14** The accepted quantities will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

|  |  |
| --- | --- |
| Pay Item | Pay Unit |
| Light Standard Foundation | Each |
| Concrete Foundation Pad | Each |
| Light Standard\_\_\_\_(\_\_\_\_Foot) (Furnish Only) (Install Only) | Each |
| Luminaire (\_\_\_\_) (\_\_\_\_Watt) | Each |
| Luminaire (\_\_\_\_) (Wall Type) (\_\_\_\_Watt) | Each |
| Luminaire (\_\_\_\_) (\_\_\_\_Watt) (Furnish Only) (Install Only) | Each |
| Luminaire (Wall Type) (\_\_\_\_) (\_\_\_\_Watt) (Furnish Only) (Install Only)  | Each |
| Luminaire (LED) (\_\_\_\_Lumens) | Each |
| Luminaire (LED) (\_\_\_\_Lumens) (Furnish Only) (Install Only) | Each |
| \_\_\_\_Inch Electrical Conduit (Furnish Only) (Install Only) | Linear Foot |
| \_\_\_\_Inch Electrical Conduit (Plastic) (Furnish Only) (Install Only) | Linear Foot |
| \_\_\_\_Inch Electrical Conduit (Jacked) (Furnish Only) (Install Only) | Linear Foot |
| Wiring | Lump Sum |
| Lighting Control Center | Each |
| Meter Power Pedestal | Each |
| Heavy Duty Safety Switch | Each |
| Temporary Lighting | Lump Sum |

The lump sum price bid for Temporary Lighting shall be full compensation for all work and materials, and the removal of all said temporary lighting at job completion.

Payment for the temporary power shall not be included in the lump sum but shall be paid for under the Force Account Furnish and Install Electrical Service.

When the Contractor, at their option, installs larger conduit than specified, it will be paid for at the original contract price for the size specified.

The following items will not be measured and paid for separately, but shall be included in the work:

(1) Soil testing for foundations

(2) Junction boxes, splice boxes, pull boxes, pull wire, weatherheads, adaptors, and expansion joints for conduit

(3) Additional pull or splice boxes installed at the Contractor's option

(4) Saw cutting; trenching; excavation; backfill; jacking; drilling pits; underground electrical warning tape; removal of pavement, sidewalks, gutters, and curbs and their replacement in kind to match existing grade; and all other work necessary to complete conduit installation

(5) Electrical conductor tagging

(6) Direct burial cable in conduit

(7) Testing of the lighting installation, including temporary power and all required cable connections

The lump sum price bid for wiring will be full compensation for all electrical circuitry necessary to complete the lighting installation as shown on the plans. All conductors in conduit, regardless of type, are part of the wiring item and will not be measured and paid for separately.