



**SPECIAL PROVISIONS
FOR
ROADWAY AND TRAIL LIGHTING**

**Linn County
STP-A-4775(627)--86-57**

**Effective Date
May 19, 2015**

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

PART 1 – GENERAL

1.01 Section Includes

- A. Underground**
- B. Cabinet**
- C. Poles and Fixtures**

1.02 DESCRIPTION OF WORK

This part of the specifications includes the furnishing of all materials and equipment necessary to complete, in place and operational, roadway and trail lighting as described in the project plans.

1.03 SUBMITTALS

Follow the Standard Specifications as well as the following:

- A. Schedule of Unit Prices:** Within 30 days after awarding of the contract for the project submit a completed schedule of unit prices. Estimates of the work performed on the project will be made by the Contracting Authority and the unit costs will be used to prepare progress payments to the Contractor.
- B. Material and Equipment List:** Within 30 days after awarding of the contract for the project, submit a completed list of materials and equipment. Submit two copies to the Engineer for written approval before any equipment or materials are ordered.
- C. Contractor Certification:** Submit the name and contact information of the licensed electrician and /or certified tech that will be working on the project.
- D. Shop Drawings:** Submit three copies of shop drawings for light signal poles and structures to be

furnished on the project. Submit three copies of catalog cuts and manufacturer's specifications for all items in the equipment list.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver only materials that fully conform to these Specifications, or for which substitution has been approved.
 - 1. The Bidder awarded the Contract shall complete the equipment list by writing in the name of the equipment manufacturer and catalog number of each item listed which he proposes to install. Before beginning work on the project, the Contractor shall submit two copies of the equipment list, and three copies of catalog cuts for all materials supplied by the Contractor.
 - 2. Prior to ordering any materials the Contractor shall provide certification from the manufacturers of all electrical equipment, conduit, and cable stating said material complies with the Specifications.
- B. Store material in accordance with the manufacturers' recommendations and in locations which will minimize the interference with operations, minimize environmental damage, and protect adjacent areas.
- C. Remove and dispose of unacceptable materials in accordance with the contract documents.

1.05 SCHEDULING AND CONFLICTS

- A. Schedule work to minimize disruption of public streets and facilities.
- B. Discontinue work which will be affected by any conflicts discovered or any changes needed to accommodate unknown or changed conditions and notify the Engineer.
- C. Contractor shall coordinate routing and installation of conduit system with existing and proposed utilities, structures and equipment. Contractor shall be responsible to obtain locates on all underground utilities and verify clearances before boring, trenching or excavation.

1.06 SPECIAL REQUIREMENTS

- A. All work and materials incorporated into this project shall conform to all applicable local, state, and Federal requirements.
- B. Installation shall be in accordance with the National Electrical Code and all state and local ordinances.
- C. Furnish upon request from the Engineer, a sample of any item or material proposed for use on for this Project.
- D. Any modifications of the installation are subject to the approval of the Engineer.
- E. The painted surface of any equipment damaged in shipping or installation shall be retouched or repainted in a manner satisfactory to the Engineer.

1.07 MEASUREMENT AND PAYMENT

- A. Roadway and Trail Lighting:
 - 1. **Measurement:** Lighting Pole item will be measured by each, electrical circuit by linear feet and handhole + junction box by each.

2. **Payment:** Payment will be at the contract unit price for each item. All roadway and trail lighting part of this contract must be installed and functional, prior to any payments being made. For all roadway and trail lighting successfully installed in accordance with the plans, the Contractor will be paid the contract unit price per item. This payment shall include all materials, equipment, labor and tools, necessary to install the roadway and trail lighting in accordance with the plans.

PART 2 PRODUCTS

2.01 UNDERGROUND

A. Conduit:

1. General:

- a. Furnish weatherproof fittings of identical or compatible material to the conduit. Use standard factory elbows, couplings, and other fittings.
- b. Use a manufactured conduit sealing compound that is readily workable material at temperatures as low as 30°F and will not melt or run at temperatures as high as 300°F.

2. Steel Conduit and Fittings:

- a. Comply with ANSI C80.1.
- b. Use weatherproof expansion fittings with galvanized, malleable iron, fixed and expansion heads jointed by rigid steel conduit sleeves. As an option, the fixed head may be integral with the sleeve, forming a one piece body of galvanized malleable iron.
- c. Provide steel bushings.

3. PVC and HDPE Plastic Conduit and Fittings:

- a. PVC Schedule 40 and 80 conduit and fittings complying with NEMA TC-2 (pipe), NEMA TC-3 (fittings), and UL 651.
- b. HDPE complying with NEMA TC-7.
- c. Solvent welded, socket type fittings, except where otherwise specified in the contract documents.
- d. Threaded adaptors for jointing plastic conduit to rigid metal ducts.
- e. Provide bell end fittings or bushings.

- B. **Wiring and Cable:** Provide wire that is plainly marked on the outside of the sheath with the manufacturer's name and identification of the type of the cable.

1. Service Conductor (Power Cable):

- a. 600 volt rated.
- b. Single-conductor copper with thermosetting cross-linked polyethylene (XPL) insulation, type RHH/RHW-2 for phase, neutral, and ground conductors.
- c. XHHW or THWN insulation is required.
- d. Single conductor cable shall comply with Article 4185.12 of the Standard Specifications and shall be U.L. listed for type "USE"
- e. The sheath shall be black for the positive cable and white for the negative cables

C. Foundations:

1. Foundations may be cast in place when approved by the Engineer, otherwise precast foundations should be used conforming to Standard Road Plan LI-201.
2. Use Class C structural concrete complying with Section 2403 of the Standard Specifications.
3. Use reinforcing steel complying with Section 2404 of the Standard Specifications.

4. In lieu of a full depth concrete base, the Contractor may provide and install a helical instant foundation with concrete collar with acceptance of the Engineer and without additional cost to the Contracting Authority. The helical foundation shall be sized appropriate for the pole.

D. Bonding and Grounding:

1. Grounding Rods: Provide 5/8 inch by 8 foot copper clad, steel ground rod at each pole and cabinet footing. Other methods may be submitted for review.
2. Bonding Jumper or Connecting Wire: Provide No. 6 AWG bare conductor, copper wire.

E. Handholes

1. In grade boxes shall be composite type with composite lid with lettering "Electrical" embossed.
2. Rectangular in shape, sized as required for wire pulling and per N.E.C.

2.02 CABINET

- A. Controller shall be a direct burial single meter pedestal. The enclosure shall be a stainless steel, Type 3R construction with ringless meter socket, horn bypass and lockable stainless steel latch. Cabinet shall be 200 Amp, 120/240 volt, single phase, three wire meter socket, with short circuit withstand rating of 22K A/C. Photoelectric sensor shall be installed on the meter pedestal.
- B. Versa-Ped U5136-0-100S or U123-0-200S or approved equal.

2.03 POLES AND FIXTURES

- A. This section of the Specification describes minimum design, material, and fabrication requirements for the light poles. Poles shall be manufactured in accordance with the requirements of the latest Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals as approved by the AASHTO.
- B. Submit certificates of compliance from the manufacturer that steel and iron materials utilized on this project comply with Article 1107.06 of the Standard Specifications and Federal Highway Administration (FHWA) 23 USC 313 – Buy America 23 CFR 635.410.
- C. The light poles shall be continuous tapered, round, steel poles of the transformer base type as shown on the plans. The poles shall be fabricated from one length of steel sheet with one continuous arc welded vertical seam, unless otherwise approved by the Engineer.
- D. The poles shall be fabricated from low carbon (minimum carbon 0.30%) steel of U.S. Standard gauge. The base and flange plates shall be of structural steel conforming to AASHTO M 183 (ASTM A 36) and cast steel conforming to ASTM A 27, Grade 65-35 or better. After manufacture, poles shall have minimum yield strength of 55,000 PSI.
- E. The pole shall be designed to support the light and banners as shown on the plans. The pole shall be equipped with a minimum 8 inch by 12 inch handhole and cover located in the transformer base of the pole. Securing of the cover to the base shall be done with the use of simple tools. Hardware shall be corrosion resistant.
- F. The poles shall be equipped with all the necessary hardware, shims and anchor bolts to provide for a complete installation without additional parts.
 - The anchor bolts shall meet the requirements of ASTM A 36 or better.
 - The anchor bolts shall be hot dip galvanized for a minimum of 12 inches on the threaded end.

- The anchor bolts shall be threaded a minimum of 6 inches at one end and have a 4 inch long, 90 degree bend at the other end.
- G. The fabricator shall submit drawings for anchor bolts and base design. All hardware shall be steel, hot dipped galvanized meeting the requirements of ASTM A 153, Class D or electrodeposited coated of the same coating thickness and so designed for this purpose.
- H. Welding and fabrication shall conform to the Structural Welding Code AWS D1-180, as modified by AASHTO 1981 Standard Specifications for Welding of Structural Steel Highway Bridges. Longitudinal butt welds shall have a minimum 60% penetration for plates 3/8 inch and less in thickness, and minimum of 80% penetration for plates over 3/8 inch in thickness. Personnel performing nondestructive testing shall be qualified in accordance with the American Society for Nondestructive Testing Recommended Practice No. SNT-TC-IA and applicable Supplements B (Magnetic Particle) and C (Ultrasonic). Evidence shall be presented for approval of the Engineer, concerning their qualifications. A report shall be required showing that welds have been inspected and either found satisfactory or found unsatisfactory but repaired and re-inspected and found satisfactory. The cost of all nondestructive testing shall be paid by the Contractor and will be considered incidental to other items in the contract. The pole assemblies shall be galvanized inside and out in accordance with ASTM A 123, latest revision.
- I. If the painted or galvanized surface of any equipment is damaged in shipping or installation, such equipment shall be retouched or repaired in a manner satisfactory to the Engineer.
- J. All light fixtures shall have tool-free access to the interior of the luminaire. All light fixtures shall be watertight and airtight with a silicon gasket.
- K. Pole mounted receptacles shall be 120 Volt, 20 Amp, GFCI, duplex, weather resistance, with pad-lockable weatherproof-while-in use metallic covers, same color as pole and fixtures.
- L. Roadway Light
1. LED: Alumilite VK5110/LED-UV-40K-RF3-CG-PM/SA-BK
 2. HPS: Hadco C6349 luminaire, 250 HPS.
- M. Trail Light
1. LED: Alumilite VK5040/LED-UV-40K-RF3-CG-PM/SA-BK, 40W/4000LM
 2. HPS: single arm pole: Hadco C6349D, 100 W
 3. HPS: double arm pole: Hadco C6349F, 150 W
- N. Commercial Light
1. LED: Hadco RX1 Ledgine (80 LED's)(RX180)
- O. Roadway Pole
1. Valmont City of Marion custom DB00940
 2. Decorative 25 foot fluted tapered steel pole, double banner arms, roadway mastarm at 25 feet, receptacle box, painted black
 3. Pole mounted receptacle, NEMA 5-20R, GFCI at 18 feet
 4. Decorative base cover OC17AC
 5. Non-breakaway Banner-arm at 13 feet, 18 feet, 23 feet
- P. Combination Roadway and Trail Pole
1. Valmont City of Marion custom DB00940
 2. Decorative 25 foot fluted tapered steel pole, roadway mastarm at 25 feet and 14 feet 6 inch, receptacle box, painted black
 3. Pole mounted receptacle, NEMA 5-20R, GFCI at 18 feet
 4. Decorative base cover OC17AC
 5. Non-breakaway Banner-arm at 13 feet, 18 feet, 23 feet

Q. Trail Pole

1. Valmont City of Marion Model No. TRAIL092FL-14AAVE72-BLK2 OPT K
2. Decorative 14 foot fluted tapered steel pole, painted black
3. Decorative base cover

R. Commercial Pole

1. Valmont MRNGL-25-12
2. T Base

PART 3 EXECUTION

4.01 Underground

A. Conduit:

1. General:

- a. Place conduit to a minimum depth of 30 inches and a maximum depth of 60 inches below the gutterline. When conduit is placed behind the curb, place to a minimum depth of 24 inches and a maximum depth of 36 inches below top of curb.
- b. Change direction at handholes or by bending, such that the conduit will not be injured or its internal diameter changed. Ensure bends are uniform in curvature and the inside radius of curvature of any bend is no less than six times the internal diameter of the conduit.
- c. On the exposed ends of conduit, place bell-end fittings on PVC or HDPE conduit and bushings on steel conduit prior to installing cable. Extend all conduits a minimum of 2 inches and a maximum of 4 inches above the finished surface of any footing or structural base. Conduit emerging from grade outside any footing or structural base shall be protected to a minimum depth of 18 inches below finished surface by any of the following:
 - 1) Rigid metal conduit
 - 2) Intermediate metal conduit
 - 3) Schedule 80 PVC conduit
 - 4) Electrical metallic tubing
 - 5) Reinforced thermosetting resin conduit (RTRC)
 - 6) Other approved means
- d. When it is necessary to cut and thread steel conduit, do not allow exposed threads. Ensure conduits and fittings are free from burrs and rough places. Clean, swab, and ream conduit runs before cables are installed. Use nipples to eliminate cutting and threading where short lengths of conduit are required. Coat damaged galvanized finish on conduit with zinc rich paint. Use only galvanized steel fittings with steel conduit.
- e. Pack conduit ends with a conduit sealing compound.
- f. When heating PVC conduit for a bend, an approved conduit heating device shall be used. Direct flame shall not be applied to the conduit.
- g. Standard manufactured elbows, nipples, tees, reducers, bends, couplings, unions, etc., of the same materials and treatment as the straight conduit pipe shall be used throughout the conduit line.

2. Trenched Installation:

- a. Place backfill in layers not to exceed 6 inches in depth with each layer thoroughly compacted before the next layer is placed. Ensure backfill material is free of cinders, broken concrete, or other hard or abrasive materials.
- b. Install marking tag 1 foot above conduit.
- c. Remove all surplus material from the public right-of-way as soon as possible.

3. Trenchless Installation:

- a. If trenchless methods that compact soils in the bore path are used, provide sufficient cover to prevent heaving of overlying paved surfaces.
- b. Do not allow pits for boring to be closer than 2 feet to the back of curb, unless otherwise specified in the contract documents.

B. Wiring:

1. All wiring shall be in conformance with the National Electrical Code. Wiring shall be completed by a licensed electrician in conformance with Iowa Code Section 103.
2. Where practical, follow color codes so that the black and/or red insulated conductor connects to the positive terminal, and white to the neutral terminal. Ensure cables are properly labeled at the cabinet by durable labels, or other appropriate methods, attached to the cables.
3. Install continuous runs of power lead-in cables from the service point to the meter socket and from the meter socket to the cabinet.
4. Install a tracer wire in all conduits. Use a silicon-filled wire nut to splice the tracer wire to form a continuous run.
5. Each wiring or conduit run shall contain additional nylon or mule tape for future use.

C. Foundations:

1. **Excavation:** Excavate to the size, shape, and depth specified in the contract documents. Ensure the bottom of all foundations rest securely on firm undisturbed soil. Minimize over excavation to ensure support and stability of the foundation.
2. **Footing:** Provide a means for holding all of the following elements rigidly in place while the concrete is being placed.
 - a. **Forms:**
 - 1) Set the forms level or sloped to meet the adjacent paved areas.
 - 2) When adjacent to paved areas, shape the top 10 inches of the footing to be square and flush with the surrounding paved area. Provide preformed expansion material between the footing and paved areas.
 - 3) When installed in an unpaved area, set the top of the footing 2 inches above the surface of the ground.
 - b. **Reinforcing Steel:** Install reinforcing steel.
 - c. **Conduit:** Install conduit.
 - d. **Anchor Bolts:**
 - 1) Set anchor bolts using a template constructed to accommodate the specified elevation, orientation, and spacing according to the pole and cabinet manufacturer's requirements.
 - 2) Center the pole anchor bolts within the concrete footing.
 - 3) Protect the anchor bolts until poles are erected.
 - 4) Orient cabinet footing with the back of the cabinet toward the street such that the lights can be viewed while facing the cabinet, unless otherwise directed by the Engineer.
 - e. **Concrete:**
 - 1) The Contractor shall pump excavation dry from water prior to pouring the base.

- 2) The material for the forms shall be sufficient thickness to prevent warping or other deflections from the specific pattern.
 - 3) Place concrete to form a monolithic foundation. Consolidate concrete by vibration methods.
 - 4) Finish the top of the base level and round the top edges with an edging tool having a radius of 1/2 inch. Provide a rubbed surface finish on the exposed surface of the footing.
 - 5) After the foundation or base has been poured, no modifications of any sort may be made. If the anchor bolts, conduit, or any part of the foundation or base is installed in an incorrect manner as determined by the Engineer, the entire foundation or base shall be removed and a new foundation or base installed at the Contractor's expense.
 - 6) Allow the footings to cure a minimum of 4 days prior to erecting the poles. Times may be shortened if supported by strength test results.
- 3. Backfill:** Deposit backfill material in layers not to exceed 6 inches in depth and compact thoroughly before the next layer is placed. Backfill material shall be free of cinders, broken concrete or other hard or abrasive materials. The contractor shall be responsible for removal and disposal of all access materials unless otherwise stated in the contract documents.

D. Bonding and Grounding:

1. Ensure the installation is grounded as required by the National Electric Safety Code.
2. Install a ground rod at each signal pole and cabinet footing.
3. Use PVC conduit within the footing to accommodate the connection between the top of the footing and the grounding rod.
4. Bond poles to ground rods with copper wire. Connect ground wires to ground rods with approved mechanical connectors.
5. Bond rigid steel conduit ends with copper wire and approved fittings.

E. Handholes:

1. Handholes are required at all conduit bends that are more than six times the internal diameter of the conduit, or at location shown on plans.
2. Handholes are not required at every light location.

4.02 CABINET

A. Cabinet and Auxiliary Equipment:

1. Install according to the manufacturer's recommendations and as specified in the contract documents.
2. Neatly train wiring throughout the cabinet and attach to the interior panels using nonconductive clamps or tie-wraps. Bundles of cables shall be laced, tied, or enclosed in a sheathing material.
3. The contractor shall coordinate electrical service including meter installations, and energization with the utility.

4. The installation shall meet all utility and NEC Codes and requirements.

4.03 POLES AND FIXTURES

A. POLES:

1. Erect all poles vertically under normal load.
2. Securely bolt the bases to the cast-in-place concrete foundations.
3. Level by using two nuts on each anchor bolt or according to the manufacturer's recommendations.
4. After leveling the poles, use non-shrink grout (complying with Materials I.M. 491.13) or 1/4 inch square banded galvanized hardware cloth between the pole base and the foundation. Neatly finish exposed edges of grout to present a pleasing appearance. Place a weep hole in the grout.
5. Apply anti-seize compound to all mechanical fasteners on pole access doors.

4.04 SURFACE RESTORATION

- A. Replace or reconstruct features removed as a part of the work, such as sidewalks, driveways, curbs, roadway pavement, unpaved areas, or any other items.
- B. Complete restoration according the applicable sections of the Standard Specifications or as directed by the Engineer.

4.05 TESTING

- A. Notify the Engineer 48 hours in advance of the time and date the light system will be ready for turn on.
- B. A test period of 30 calendar days will start upon confirmation from the Engineer that the light system is operating consistent with the project requirements. Any failure or malfunction of the equipment furnished by the Contractor, occurring during the test period will be corrected by the Contractor at no additional cost to the Contracting Authority. Upon confirmation by the Engineer that any failure or malfunction has been corrected, a new test period of 30 calendar days will start, exclusive of minor malfunctions such as lamp burnouts. Repeat this procedure until the light equipment has operated satisfactorily for 30 consecutive calendar days.
- C. After light turn on and prior to completion of the 30 calendar day test period, respond, within 24 hours, to perform maintenance or repair of any failure or malfunction reported.

4.06 DOCUMENTATION

- A. Provide file documentation packages with each lighting system consisting of the following:
 1. Complete cabinet wiring diagram.
 2. Complete physical description of the equipment.
 3. Product manuals for all cabinet equipment.
 4. Standard industry warranties on equipment supplied.
 5. One set of as-built construction plans.
- B. Provide two complete sets of documentation: One set to be placed in the cabinet and the other set (less construction plan) to be delivered to the Engineer.