SP- 231070
(New)

SPECIAL PROVISIONS

FOR

TRAFFIC SIGNALIZATION

Story County
STP-U-0155(716)--70-85

Effective Date
February 17, 2025

THE STANDARD SPECIFICATIONS, SERIES 2023, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

231070.01 DESCRIPTION.

A. Scope.

1. Sections 2525 and 4189 of the Standard Specifications, as modified by these Special Provisions, shall apply to this project. The installation of the traffic control signals and appurtenances shall be in conformance with the MUTCD, as adopted by the Iowa DOT per IAC 761, Chapter 130.

2. These Special Provisions cover the work described in the contract documents. It covers furnishing all labor, equipment and materials, and performing all required operations to complete the work as per contract documents and to provide a completely operational and working signal system. Unless otherwise modified by the Special Provisions, all work, including equipment, material and installation, shall be in accordance with the appropriate Iowa DOT standard and supplemental specifications. Where reference is made to the codes, standard specifications, supplemental specifications, the safety orders, the general orders, the standards, laws, and ordinances, it shall mean the version of the reference that is in effect on the bid advertising date.

3. All requirements of other specifications contained or referred to in the contract documents which conflict with the Special Provisions will be considered void.

4. The Contractor shall be responsible for ONE-CALL locates of the traffic and interconnect cables installed under this project until acceptance of the project by the City.

5. At the completion of the project, the Contractor shall provide the city with as-built drawings of the signal installation.

6. At the completion of the project, the Contractor shall mark the location of all conduits with paint and flags. The Ames Public Works Department will then utilize their GPS equipment to map the conduit, footing, and handhole locations.

7. The Contractor shall submit to the Engineer a list of traffic signal items (catalog cuts acceptable) that are proposed for installation.

8. The Contractor must have an IMSA Level II certified Signal Technician on site at all times when work is being performed.

9. The Contractor shall notify Ames Public Works Department in writing of any discrepancy or ambiguity as to the intent or meaning of the contract documents or Special Provision before starting to work on that area. Ames Public Works Department will supply the Contractor in writing with the intent. The decision of Ames Public Works Department shall be final and conclusive.

B. Definitions.

Terms used in this Special Provision shall have the meanings defined below:

- City means City of Ames, Iowa, or its representatives.
- APWD means City of Ames Public Works Department.
- Punch List means a list of items that need to be corrected by the Contractor on the project before the final acceptance can be made.
- Response Time means the elapsed time from when the Contractor is given a notice to take certain actions to the time the Contractor actually starts the action.

231070.02 MATERIALS AND CONSTRUCTION.

A. General.

1. Fabrication or assembly process materials shall comply with the applicable parts of Section 2523 of the Standard Specifications with additions as stated herein.

2. Equipment and materials shall be of new stock unless the plans provide for the relocation of or the use of fixtures furnished by others. New equipment and materials shall be the product of reputable manufacturers of electrical equipment, and shall meet Engineer approval.

3. A PDF file of shop drawings shall be furnished for steel mast arm poles to be furnished on the Project. A PDF file of catalog cuts and manufacturer’s specifications shall be furnished for all standard “off-the-shelf” items.

4. Engineer review of shop drawings and catalog cuts shall not relieve the Contractor of any responsibility under the Contract documents.

5. All electrical equipment shall conform to the standards of NEMA, and all material and work shall conform to the requirements of the NEC, the ASTM, the ASA, and local ordinances. Miscellaneous electrical equipment and materials shall be UL approved.

6. Certification from the manufacturers of all electrical equipment, signal supports, conduit and cable shall be supplied by the Contractor stating said materials complies with these Specifications.

7. Any existing traffic signal equipment designated to be removed on the project shall remain the property of the City of Ames. The Contractor shall deliver any removed equipment to the City of Ames Public Works Facility, 2207 Edison Street.

B. Equipment And Materials.

A representative from the manufacturer and/or supplier of pushbutton system shall be at the project site when the pushbutton system is ready to be turned on, to provide technical assistance including, as a minimum, programming of all necessary input data. After pushbutton turn-on, and prior to final acceptance of the operational push button system, the Contractor shall respond, within 24 hours, to perform maintenance or repair of any failure or malfunction reported.

C. Warranties.

1. The Contractor shall transfer all available equipment warranties on the date of final acceptance to the City.

D. Conduit System.

1. The number, type, and size of conduit shall be as shown on the plans. Conduit shall meet the requirements of Articles 2523.10 and 4185.10 of the Standard Specifications.

2. Conduit shown on the plans as rigid steel shall be galvanized steel meeting the requirements of ANSI Standard Specification C80.1, latest revision.

3. Conduit shown on the plans as polyvinyl chloride (PVC) conduit shall meet the requirements of NEMA TC-2, Type 2, and applicable UL Standards. HDPE conduit, with an SDR of 13.5 will be allowed to be used in place of PVC conduit. HDPE conduit shall be orange in color for traffic signal purposes and green in color for fiber optic signal network purposes.

4. Conduit shall be placed as shown on the plans. Change in direction of conduit shall be accomplished by bending such that the conduit will not be injured or its internal diameter changed. Bends shall be of uniform curvature and the inside radius of curvature of any bend shall not be less than six times the internal diameter of the conduit.

5. When it is necessary to cut and thread steel conduit, no exposed threads will be permitted. Whenever HDPE conduit needs to be joined with PVC conduit, one of the following couplers shall be used:
   a. Duraline E-Loc Couplers may be used for 2 inch and smaller conduits
   b. Duraline Shur-Lock II Couplers may be used for all size conduits

6. All couplings shall be tightened until the ends of conduits are brought together so that an electrical connection will be made throughout the entire length of the conduit run. All conduit and fittings shall be free from burrs and rough places and all conduit runs shall be cleaned, swabbed, and reamed before cables are installed. Nipples shall be used to eliminate cutting and threading where short lengths of conduit are required. Damaged galvanized finish on conduit shall be painted with zinc rich paint. All fittings used with rigid steel conduit shall be galvanized steel only.

7. Approved conduit bushings shall be installed on the exposed ends of rigid steel conduit. Bell end fittings shall be installed on the exposed ends of PVC or HDPE conduit. In all bases, conduit shall extend a minimum of 4 inches above the finished surface.

8. Conduit buried in open trenches shall be placed a minimum of 24 inches deep unless otherwise directed by the Engineer or on the plans. Open trench methods of placing conduit will be permitted except where the conduit is to be placed under existing pavement. Conduit

in pavement areas shall be placed to a minimum depth of 24 inches below the finished pavement surface or as directed by the Engineer.

9. The backfill material in open trenches shall be deposited in layers not to exceed 6 inches in depth and each layer shall be thoroughly compacted before the next layer is placed. Backfill material shall be free of cinders, broken concrete, or other hard or abrasive materials. All surplus material shall be removed from the public right-of-way.

10. Pushed conduit shall be placed by jacking, pushing, boring, or any other means necessary to place the conduit without cutting, removing, or disturbing existing pavement. The size of a bored hole shall not exceed the outside diameter of the conduit that is to be placed. Tunneling under the pavement or water jetting will not be permitted. Pits for boring shall not be closer than 2 feet to the back of curb unless otherwise directed by the Engineer.

11. All conduit openings in the controller cabinet, hub cabinet, hand holes, and bases shall be sealed with an approved sealing compound. This compound shall be readily workable soft plastic. It shall be workable at temperatures as low as 30°F, and shall not melt or run at temperatures as high as 300°F.

12. All conduits shall enter the hand hole at a depth of 12 inches from the top of the hand hole. Any deviations from this requirement shall be approved by the Engineer. The ends of all conduit leading into the hand hole shall fit approximately 2 inches beyond the inside wall.

E. Wiring.

1. Where practical, color codes shall be followed so that the red insulated conductor connects to the red indication terminal, yellow to yellow, and green to green. Circuits shall be properly labeled at the controller by durable labels, or other appropriate methods, attached to the cables.

2. All vehicle and pedestrian signal cable runs shall be continuous from connections made in the handhole compartment of signal pole bases to the terminal compartment in the controller cabinet. Splicing will not be allowed in underground hand holes unless specifically called for on the plans. Cable runs for detection units and emergency vehicle preemption cables shall be continuous from the unit to the control cabinet.

3. Slack for each cable shall be provided by a 4 foot length in each hand hole and a 2 foot length in each signal pole, pedestal and controller base (measured from the hand hole compartment in the pole to the end of the cable). Coil cable slack in hand hole and place on the hooks.

4. Cables shall be pulled through conduit by means of a cable grip designed to provide a firm hold upon the exterior covering of the cable or cables, with a minimum of dragging on the ground or pavement. This shall be accomplished by means of reels mounted on jacks, frame mounted pulleys, or other suitable devices. Only vegetable-based lubricants may be used to facilitate the pulling of cable.

5. The various types of connectors (RJ45, spade, etc.) used throughout the signal installations shall be crimped using the proper crimping tool designed specifically for the connector being used.

6. All connections made in the pole base shall be done using Scotchlok model No. 314 Self-Stripping Electrical Pigtail Connectors or an approved equivalent. Where it is required to splice into existing interconnect in handholes, splices shall be made using watertight connectors.

F. Electric Cable.

1. General.
Electrical cable for intersection signalization shall be rated 600 volts minimum. The number of conductors and size of all electrical cable shall be as shown on the plans. All wire shall be plainly marked on the outside of the sheath with the manufacturer's name and identification of the type of the cable.

2. Signal Cable.
Signal cable shall be 600 volt, multi-conductor copper wire. Signal cable shall meet the requirements of the IMSA. Specification 19-1, latest revision there off or polyethylene insulated, polyvinyl chloride jacketed signal cable. All conductors shall be No. 14 AWG unless otherwise specified on the plans. The conductors shall be stranded and not solid.

3. Detection System Power Cable.
Electrical cable for powering detection units shall meet manufacturer’s recommendations.

4. Tracer Wire.
A tracer wire shall be installed in all conduits with the exception of conduits between detector loops and hand holes. The tracer wire shall be a No. 10 AWG, single conductor, stranded copper, Type THHN, with UL approval and an orange colored jacket. The tracer wire shall be spliced in the hand holes and controller to form a continuous network. The splice shall be a soldered connection and then covered with a wire nut.

G. Concrete Bases.

1. Concrete bases for poles and controllers shall be poured to form a monolithic foundation and shall conform to the dimensions shown on the plans. Excavations for these bases shall be made in a neat and workmanlike manner. If site conditions require the use of vacuum excavation, or sleeving of foundations, this work shall be considered incidental to the respective signal footing bid items. The bottom of all foundations shall rest securely on firm undisturbed ground. The material for the forms shall be of sufficient thickness to prevent warping or other deflections from the specified pattern. The forms shall be set level or sloped slightly to blend with the adjacent ground level and means shall be provided for holding them rigidly in place while the concrete is being deposited. All conduits shall be installed and held rigidly in place before concrete is deposited in the forms. A ground rod shall be placed at each pole and controller base as shown on the plans. Anchor bolts for the signal poles or the controller cabinet shall be set in place by means of a template constructed to space the anchor bolts in accordance with the manufacturer's requirements. The center of the template and the center of the concrete base shall coincide unless the Engineer shall direct otherwise. Concrete shall be consolidated by vibration during placement.

2. The top of the base shall be finished level and the top edges shall be rounded with an edger having a radius of 1/2 inch. In sidewalk areas, adjacent to sidewalks, or in other paved areas, the top 10 inches of the base shall be formed square and shall be flush with the surrounding paved area. Preformed expansion material shall be provided between the base and the other paved area. When installed in an earth shoulder away from the pavement edge, the top of the concrete base shall be approximately 2 inches above the surface of the ground. The exposed surface of the base shall have a broomed surface finish. After the foundation or base has been poured, absolutely no modification 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.

3. Prior to setting poles, the anchor bolts shall be covered in such a manner as to protect them against damage and to protect the public from possible injury. The foundations must be given a minimum of 7 days to cure before poles are erected.

4. Footings shall be Class C structural concrete meeting the requirements of Section 2403 of the Standard Specifications. Nominal dimensions of footing shall be 12 inch square, 10 inch minimum. Depth of footing shall be 2 feet minimum below finished grade.

5. Reinforcing steel shall be the type and size as shown on the plans and shall conform to the requirements of Section 2404 of the Standard Specifications.

H. Bonding and Grounding.

1. All conduit, steel poles, and pedestals shall be bonded to form a continuous system, and be effectively grounded. Bonding jumpers shall be No. 6 AWG bare copper wire or equal connected to the ground rod by Cadweld connectors. Bare copper ground wires shall be connected together by an approved mechanical crimp type of connector. Split bolt connectors will not be used.

2. Grounding of the conduit and neutral at the service point shall be accomplished as required by the National Electric Safety Code, except bonding jumpers shall be No. 6 AWG or equal.

3. A No. 6 AWG bare copper ground wire shall be installed in all PVC conduits that carry 120 volt signal cables.

I. Pole Erection.

1. All poles shall be erected so as to be vertical under normal load. The bases shall be securely bolted to the cast-in-place concrete foundations. Leveling shall be accomplished by the use of metal shims and/or one nut or two nuts on each anchor rod or as directed by the pole manufacturer. One nut shall be turned on each anchor rod and the pole placed in position on these nuts. The top nuts shall then be turned into place loosely and the pole adjusted to the vertical position by adjusting both the upper and lower nuts.

2. Each pole shall be grounded by installing a No. 6 AWG bare copper ground wire between the pole and the ground rod at the foundation. 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. Replacing Damaged Improvements.

Improvements such as sidewalks, curbs, driveways, roadway pavement and any other improvements removed, broken, or damaged by the Contractor shall be replaced or reconstructed with the same kind of materials found on the work or with materials of equal quality. The new work shall be left in serviceable condition satisfactory to the Engineer. Whenever a part of a square or slab of existing concrete sidewalk, driveway, or pavement is broken or damaged, the entire square or slab shall be removed and the concrete reconstructed. Surface restoration, including sidewalk, driveway, and street surface replacement, and seeding or sodding, shall be completed in accordance with the current edition of "Specification Standards for Public Improvements" of the City of Ames. Unless listed as its own bid item, surface restoration shall be considered incidental to the bid items of the project and will not be paid for separately.

K. Pedestrian Push Button System.

Pedestrian Push Button Detectors shall be manufactured by Polara Engineering, Inc. The button shall be a Polara iDS2 3 R N 0-Y or city approved equal prior to bid. Pedestrian Push Button Central Control Unit shall be Polara iCCU-S2, ACCP, 811-223, or city approved equal prior to bid.

L. Pedestrian Pushbutton Poles.
Pedestrian pushbutton poles shall be Frey Manufacturing CP6 Series CP6LD1CT6040TCSS with clear anodized finish or city approved equal prior to bid. The pedestrian pole shall have a 4 inch diameter aluminum pole, aluminum pedestal base, waterproof aluminum cap, and the appropriate anchor bolts as specified by the manufacturer.

231070.03 METHOD OF MEASUREMENT.
Measurement for Traffic Signalization will be lump sum.

231070.04 BASIS OF PAYMENT.

A. No separate payment will be made for work covered in this part of the Special Provisions except as set forth below. Contract unit prices shall include all costs for each item of work.

B. If items, for which no unit prices are shown on proposal, or schedule of unit prices, are required during construction, contract price shall be adjusted on basis of unit price negotiated with Contractor.

C. Traffic Signalization will be paid for at the contract lump sum price bid, which price shall be full compensation for furnishing all equipment, materials, and all other work necessary or incidental to the construction of the complete signal installation and for all equipment, tools, labor, and incidentals necessary to complete the work.