

**SP-120002
(New)**



**SPECIAL PROVISIONS
FOR
STREET LIGHTS AND TRAFFIC SIGNAL**

**Dubuque County
NHSX-052-2(83)--3H-31**

**Effective Date
October 16, 2012**

THE 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.

**CITY OF DUBUQUE –
STREET LIGHTS AND TRAFFIC SIGNAL SPECIFICATIONS**

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1. GENERAL.

- 1.1 This part of the specifications includes the furnishing of all material and equipment necessary to complete, in place and operational, a traffic control signal(s) as described in the project plans.
- 1.2 The installation of the traffic control signals and appurtenances shall be in conformance with the current edition of the Manual On Uniform Traffic Control Devices.

2. EQUIPMENT AND MATERIALS.

- 2.1 Fabrication or assembly process materials shall comply with the applicable parts of Section 2523 of the Standard Specifications with the additions as stated herein.
- 2.2 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.
- 2.3 Six copies of catalog cuts and manufacturer's specifications shall be furnished for all standard "off-the-shelf" items.

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

- 2.4 All electrical equipment shall conform to the standards of the National Electrical Manufacturers Association (NEMA), and all material and work shall conform to the requirements of the National Electrical Code (NEC), the Standards of the American Society for Testing Materials (ASTM), the American Standards Association (ASA), and local ordinances. Miscellaneous electrical equipment and materials shall be UL approved.

Wherever reference is made in these specifications or in the standard provisions to the code, the safety orders, the general order, or the standards mentioned above, the reference shall be construed to mean the code, order, or standard that is in effect at the date of advertising of these Specifications.

- 2.5 Certification from the manufacturers of all electrical equipment, signal supports, conduit and cable shall be supplied by the Contractor stating said material complies with this Specification.
- 2.6 Any existing traffic signal equipment designated to be removed on the project shall remain the property of the City of Dubuque, unless Dave Ness, City of Dubuque, 563-589-1722, indicates the Contractor shall retain ownership. The Contractor shall deliver any removed equipment to the City of Dubuque Public Works Department at the address given by the City Engineer. The Contractor shall take all reasonable precautions in protecting existing equipment. If any equipment is damaged, the Contractor shall be liable for replacement. The existing signal shall remain in operation until the new system is ready for service. The Contractor shall notify the Engineer prior to any operational shutdown of the traffic signals, either existing or new.

6. HANDHOLES/VAULTS.

- 6.1 Handholes/Vaults shall be installed at the locations shown on the plans, and at such additional points as the Contractor, at his own expense, may desire to facilitate the work.

Furnish precast concrete handhole or fiber vault, or fiberglass handhole, each with cast iron ring and cover or heavy duty fiberglass cover as specified in plans.

6.2 24 inch Round Handhole

The 24 inch round handhole shall be a 5 inch thick concrete 24 inches in diameter by 36 inches in depth with a 22.25 inch cast iron manhole cover with the legend "Traffic Signal" set flush to the ground. Each HH 24-36 handhole shall have a 5/8 inch by 10 foot ground rod driven into the center of the handhole (for later use). Each HH 24-36 shall include a drainage system as shown in the plans. The body of the pre-cast handhole shall meet the requirements for Class 1500D concrete pipe insofar as applicable. Cast iron ring and cover may be rated light duty for non-traffic areas (145 pounds minimum); but shall be rated heavy duty for traffic areas (320 pounds minimum) where shown on the plans. Deviations in weights shall not exceed plus or minus five percent. All Type I handholes for this project shall be Light Duty. The cover shall have the words "TRAFFIC SIGNAL" cast on the top of the cover. Four cable hooks shall be provided in all handholes as detailed on the plans. Cable hooks shall be galvanized steel with a minimum diameter of 3/8 inches and a minimum length of 5 inches and anchored in the wall of the handhole utilizing appropriate anchoring devices.

6.3 Fiber Vault, Square

Fiber Optics Junction Vault shall be a square 48 inches by 48 inches outside dimension, 36 inches by 36 inches inside dimension fiber vault manhole. Vault shall 48 inches deep (inside dimension). Each vault shall include a drainage system as shown on in the plans. This vault will have four 3/4 inch drain holes in the sump pit for water to drain. The fiber vault shall include the following:

A minimum of four cable hooks will be installed in each vault to support fiber optic cables. Maintain 18 inches of clean stone beneath and around the structure.

Fiber optic square hand holes will be installed at the locations specified on the construction documents (Typically 500 feet apart or less).

Vaults shall be installed in a neat and workmanlike manner. Damaged vaults will not be accepted. All conduits shall enter the vault at a depth of 24 inches from the bottom of the vault. Any deviations from this requirement shall be approved by the Engineer. All holes cut into vaults for conduit entry/exit shall be core drilled from the inside out or shall use manufactured knock-outs of appropriate size. All penetrations shall be sealed with hydraulic cement. The ends of all conduit leading into the handhole shall fit approximately 2 inches beyond the inside wall. If primary conduit leading into vault contains four smaller conduits, a quadplex plug is to be installed on the conduit. Any empty conduits should also be plugged at detailed in the conduit section of the specifications. A coarse aggregate drain conforming to the dimensions shown on the plan details shall be provided. Cast iron rings and covers for handholes shall be set flush with the sidewalk or pavement and 1 inch above the surface of the ground when installed in an earth shoulder away from the pavement edge. Any backfilling necessary under a pavement or paved sidewalk or within 2 feet of the pavement edge shall be made with stone screening.

Installation of the fiber vault shall include all transportation, labor, material, connections, excavation, backfilling, and compaction necessary to completely install the Fiber Optics Junction Vault at the locations specified on the plan.

6.4 Fiber Vault, Round

Use the 48Dia-48-FOB which is an internal 48 inch diameter by 48 inch deep fiber vault manhole. This vault will have a 4 inch or larger opening in the bottom sump area to which the drain tile will be fastened; eight knockout locations, each measuring 2 feet 2 inches by 6 inches by 2 1/4 inches every 45 degrees in angle; and a 48 inch lid with a 24 inch cast iron cover marked "Fiber Optics" as shown on the details in the plans. A minimum of 8 cable hooks will be installed in each vault to support fiber optic cables. All components are to be plastic, aluminum, or stainless steel to avoid rusting. Each vault shall have a 5/8 inch by 10 foot ground rod driven into the ground near the sump pit opening. This ground and the tracer wires shall be wired into the locator station. Each vault shall include a drainage system as shown on in the plans.

Vaults shall be installed in a neat and workmanlike manner. Damaged vaults will not be accepted. All conduits shall enter the vault at a depth of 24 inches from the bottom of the vault. Any deviations from this requirement shall be approved by the Engineer. All holes cut into vaults for conduit entry/exit shall be core drilled from the inside out or shall use manufactured knock-outs of appropriate size. All penetrations shall be sealed with hydraulic cement. The ends of all conduit leading into the handhole shall fit approximately 2 inches beyond the inside wall. If primary conduit leading into vault contains four smaller conduits, a quadplex plug is to be installed on the conduit. Any empty conduits should also be plugged as detailed in the conduit section of the specifications. A coarse aggregate drain conforming to the dimensions shown on the plan details shall be provided. Cast iron rings and covers for handholes shall be set flush with the sidewalk or pavement and 1 inch above the surface of the ground when installed in an earth shoulder away from the pavement edge. Any backfilling necessary under a pavement or paved sidewalk or within 2 feet of the pavement edge shall be made with stone screening.

Installation of the fiber vault shall include all transportation, labor, material, connections, excavation, backfilling, and compaction necessary to completely install the Fiber Optics Junction Vault at the locations specified on the plan.

6.5 Traffic Signal Tub. (Indicated as "Handhole" and located adjacent to the Control Cabinet

Tubs shall be polymer concrete 17 inches by 30 inches by 24 inches stackable hand-holes with the legend "Traffic Signal" on the lid and having a two stainless steel bolt lid (or approved equal). A minimum of four cable hooks will be installed in each hand-hole to support the signal cables. Hand-holes shall be constructed with no base in box bottom. Covers shall support an 8000 pound load over a 10 inch square with a minimum test load of 12,000 pounds. Covers subject to heavy loads shall support a 15,000 pound load over a 10 inch square with a minimum test load of 22,568 pounds. A coarse aggregate drain shall be provided. All tub covers for this project shall be heavy duty due to the likelihood of contact with mowing equipment. Tubs shall be a Quazite PG1730 BA24 with a PG1730 HAOO heavy duty cover (split lid) labeled "Traffic".

6.6 Handholes/Vaults in the immediate intersection shall have a 5/8 inch by 10 foot ground rod driven in the handhole. Ground wires shall be connected to the ground rods with one piece non-ferrous clamps which employ set screws as tightening devices. Handholes used at the advanced signal loop detectors do not require ground rods.

6.7 Handholes/Vaults shall be installed in a neat and workmanlike manner. When the use of forms is required they shall be set level and of sufficient thickness to prevent warping or other deflections from the specified pattern. A means shall be provided for holding conduit runs rigidly in place while the concrete is placed. All conduits shall enter the handhole at a depth of 12 inches from the bottom of the handhole unless otherwise specified. Any deviations from this requirement shall be approved by the Engineer. The ends of all conduit leading into the handhole shall fit approximately 2 inches beyond the inside wall. A coarse aggregate drain

conforming to the dimensions shown on the plan details shall be provided. Cast iron rings and covers for handholes shall be set flush with the sidewalk or pavement and 1 inch above the surface of the ground when installed in an earth shoulder away from the pavement edge. Any backfilling necessary under a pavement or paved sidewalk or within 2 feet of the pavement edge shall be made with stone screening. Damaged handholes/vaults or covers will not be accepted. Damaged handholes/vaults will need to be replaced prior to acceptance. Handholes/vaults are not to be installed in the flow lines of a ditch.

7. CONDUIT SYSTEM.

- 7.1 The number, type, and size of conduit shall be as shown on the plans. Conduit shall meet the requirements of Articles 2523.03, N and 4185.10 of the Standard Specifications.
- 7.1.1 Conduit shown on the plans as rigid steel shall be galvanized steel meeting the requirements of ANSI Standard Specification C80.1, latest revision.
- 7.1.2 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.
- 7.1.3 Conduit for interconnect runs shall be Inner duct as shown on the plans. Inner duct conduit shall be schedule 40 high density polyethylene. Conduit shall provide nominal duct size as indicated on the plans, shall be orange in color unless otherwise specified, and be longitudinally ribbed on the inside wall.
- 7.1.4 Conduit attached to structures shall be nonmetallic, similar in color to the structure, and rigid enough not to sag under its own weight plus the weight of its contents between brackets.
- 7.2 Conduit shall be placed as shown on the plans. All locations subject to minor changes per the Engineer. 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.
- 7.3 When it is necessary to cut and thread steel conduit, no exposed threads will be permitted. 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.
- 7.4 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 conduit. In all bases, conduit shall extend a minimum of 4 inches above the finished surface.
- 7.5 Whenever converting from PE to PVC or PE to PE or PVC to PVC conduits splicing shall be accomplished as follows:
- 7.5.1 If splicing from PE to PE a fusion splice is required. Fusion splicing shall not cause significant interior deformation or ridges. If deformation or ridges are present the conduit needs to be cut and refused.
- 7.5.2 If splicing from PE to PVC the approved coupling is a Shurlock II system as manufactured by AD Technologies or approved equal for the appropriate size conduit.
- 7.5.3 If splicing from PVC to PVC, an approved PVC primer must be applied along with an approved PVC glue to seal the connection.
- 7.5.4 If existing splices are in place and need to be repaired, or coupling is needed for conduits with existing infrastructure, the approved coupling is the MOR Clamp or approved

equal. The MOR Clamp is manufactured by AD Technologies. The MOR Clamp shall only be used with the approval of the engineer.

- 7.6 Conduit buried in open trenches shall be placed a minimum of 24 inches deep unless otherwise directed by the Engineer. Open trench methods of placing conduit will be permitted except where the conduit is to be placed under existing pavement. If conduit is installed in an open trench, the conduit must be placed on backfill for support. 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.
- 7.7 Inner duct and conduit containing fiber optic cable shall be buried a minimum of 42 inches.
- 7.7.1 Generally 4 inch fiber conduit between vaults will contain four 1 inch HDPE inner-ducts as detailed below. One exception to this rule is when there is not a receiving vault at the end of this conduit, in which case the conduit shall be capped with a tracer wire installed. Installation of 1 inch conduits shall be with a pulley system at the same horizontal level as the conduit. This is to prevent tearing, or crushing of the 4 inch conduit.
- 7.7.2 2 inch HDPE SDR 13.5 fiber conduit from the fiber vault to the traffic control cabinet shall make a direct path between the two structures and should be kept separate from any intersection wiring conductors and handholes. This fiber conduit shall terminate in the back left side of the traffic control cabinet.
- 7.7.3 In areas where fiber inner duct is open trenched, it shall also contain 3 inch non-detectable underground tape: "CAUTION BURIED FIBER OPTIC LINE BELOW" (Orange) at approximately 18 inches to 24 inches in depth.
- 7.7.4 Tracer wire will be tied together at all fiber vault locations.
- 7.7.5 All larger conduits that contain smaller 1 inch conduits shall have a Quadplex type seal installed between the larger conduit and the four smaller conduits. An Orange 10-gauge tracer wire shall also be pulled along with the four 1 inch conduits. This tracer shall follow along one of the smaller conduits as the Quadplex seal is installed. These four smaller conduits shall be the following colors: RED, GREEN, BLUE, and YELLOW. These four smaller conduits shall not extend more than 3 inches nor less than 1 inch past the end of the larger conduit. Follow manufacturer's specifications for PE and allow for the proper amount of shrinkage after the inner-duct is pulled. The tracer wire shall not be installed inside any of the 1 inch inner ducts.
- 7.8 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.
- 7.9 Whenever excavation is made across parkways, driveways or sodded areas, the sod, topsoil, crushed stone or gravel shall be replaced or restored as nearly as possible to its original condition and the whole area involved shall be left in a neat and presentable condition. Concrete sidewalks, pavements, base courses and bituminous surfaces shall be replaced with new materials. Surface restoration in grass areas shall be considered incidental to the bid items of the project and will not be paid for separately unless a bid item has been provided for the surface replacement.
- 7.10 "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.

- 7.11 All conduit openings in the controller cabinet, handholes, and bases shall be sealed with an approved polyurethane expansion joint sealing compound such as BASF Sonolastic NP1, Bostik Chem-Calk 915, Tremco Vulkem 116 or approved equal. 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.
- 7.12 All empty conduits to have flat polyester pull-tape (1250 pounds tensile) with footing markings, including each of the four 1 inch inner ducts. This pull-tape is to be attached to the expandable plug and sealed within conduit with a minimum of 48 inches of slack in the pull-tape on each end (96 inches total).
- 7.13 Conduits entering handholes or vaults shall enter with no more than 4 inches or less than 1 inch of exposed conduit inside of the handhole. All conduits shall contain an orange 10-gauge tracer wire and be plugged with an expandable rubber plug.
- 7.14 Trenches need to be excavated straight and true with bottom uniformly sloped to low points. Excavate trenches to a depth of 3 inches below invert of pipe, unless otherwise indicated. Backfill with porous backfill 2 feet over water lines and conduit followed by native material (no organic material or rocks larger the 1 inch or debris) in all areas where no pavement would be placed. Course sand backfill material with hydraulic compaction can be used in trenches that are too narrow to be compacted by mechanical compactors. Trenches under all paved surfaces will be backfilled with compacted limestone to sub-grade elevation. In lawn areas, any settling that occurs shall be repaired and re-graded before seeding is done.
- 7.15 The length measured for payment shall be the plan distance along a straight line measured between changes in direction and the center of terminal structures.
- 7.16 General Guidelines (unless otherwise specified)
 - 7.16.1 Generally, a 4 inch PVC or HDPE (if bored) will be used between the traffic controller and signal base. A 2 inch PVC or HDPE will be used to connect to the upright pedestal signals. Conduit placed under the street will be assumed to be bored unless otherwise noted.
 - 7.16.2 Street lighting conduit will be installed from the service pedestal into the Quazite hand-hole located next to the traffic controller. The metered service feed for the traffic controller will be fed directly into the front right side of the controller base. The metered service for the Fiber Hub cabinet will be fed directly from the meter pedestal to the right side of the fiber hub base.

10. CONCRETE BASES.

- 10.1 Concrete bases/foundation for traffic control cabinets, fiber hub cabinets, light poles, pedestal poles, electrical services and battery backups should be precast from a pre-approved vendor.
- 10.2 Traffic signal pole footings shall be installed with the conduit shown on the plans plus one additional 2 inch PVC conduit stubbed out of the footing for future use. Precast signal foundations are allowed, if precast foundations are provided, they shall be from an approved vendor. Traffic signal controller footings shall be installed with the conduit shown on the plans plus one additional 2 inch and one additional 3 inch PVC conduit stubbed out of the footing for future use. The ends of the conduit stubs shall be capped.
- 10.3 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 seven days to cure before poles are erected.
- 10.4 Backfilling of structures shall be in accordance with Article 2107.03, O of the Standard Specifications and shall be included in the cost of the structure. Native material may be used for backfill if suitable moisture to obtain 95% density. Otherwise backfill structures with material meeting IDOT Aggregate Gradation Table, Gradation No. 29.
- 10.5 During removal, all existing signal foundations shall be removed and disposed of. If there are circumstances that prevent their removal, the exposed concrete must be removed to 6 inches below the ground surface level.