<table>
<thead>
<tr>
<th>ARTICLE</th>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>25.00</td>
<td>GENERAL</td>
<td>2502</td>
</tr>
<tr>
<td>25.01</td>
<td>ELECTRICAL CONDUIT</td>
<td>2503</td>
</tr>
<tr>
<td>25.02</td>
<td>ELECTRICAL CONNECTORS</td>
<td>2503</td>
</tr>
<tr>
<td>25.03</td>
<td>SECONDARY FUSES AND FUSE HOLDERS</td>
<td>2503</td>
</tr>
<tr>
<td>25.04</td>
<td>GROUND RODS</td>
<td>2503</td>
</tr>
<tr>
<td>25.05</td>
<td>POLES</td>
<td>2503</td>
</tr>
<tr>
<td></td>
<td>A. EMBEDDED STEEL POLES</td>
<td>2503</td>
</tr>
<tr>
<td></td>
<td>B. FIBERGLASS POLES</td>
<td>2503</td>
</tr>
<tr>
<td>25.06</td>
<td>LUMINAIRES</td>
<td>2504</td>
</tr>
<tr>
<td>25.07</td>
<td>BLANK ON PURPOSE</td>
<td>2504</td>
</tr>
<tr>
<td>25.08</td>
<td>ELECTRICAL CABLE</td>
<td>2504</td>
</tr>
<tr>
<td>25.09</td>
<td>PHOTOELECTRIC CONTROLS</td>
<td>2504</td>
</tr>
<tr>
<td>25.10</td>
<td>FERROUS HARDWARE</td>
<td>2504</td>
</tr>
<tr>
<td>25.11</td>
<td>PULL BOXES</td>
<td>2504</td>
</tr>
<tr>
<td>25.12</td>
<td>GRADES</td>
<td>2504</td>
</tr>
<tr>
<td>25.13</td>
<td>TRENCHING AND BACKFILLING</td>
<td>2505</td>
</tr>
<tr>
<td>25.14</td>
<td>RESTORING STREET SURFACES AND CONCRETE WORK</td>
<td>2505</td>
</tr>
<tr>
<td>25.15</td>
<td>INSTALLATION OF POLES</td>
<td>2505</td>
</tr>
<tr>
<td></td>
<td>A. EMBEDDED STEEL POLES</td>
<td>2505</td>
</tr>
<tr>
<td></td>
<td>B. FIBERGLASS POLES</td>
<td>2505</td>
</tr>
</tbody>
</table>
ARTICLE | TITLE | PAGE
--- | --- | ---
25.16 | INSTALLATION OF LUMINAIRES | 2506
25.17 | INSTALLATION OF CABLE AND CONDUIT | 2506
25.18 | INSTALLATION OF PHOTOELECTRIC CONTROLS | 2507
25.19 | POWER SUPPLY AND RISER | 2507
25.20 | TREE TRIMMING | 2507
25.21 | SECONDARY CONNECTIONS | 2507
25.22 | REMOVING AND RESETTING MAILBOXES | 2507
25.23 | BASIS OF PAYMENT | 2507
CHAPTER 25
ORNAMENTAL STREET LIGHTING

25.00 GENERAL

The Work covered in this chapter shall include the furnishing of certain materials and equipment and the installation of all necessary materials and equipment to provide an ornamental street lighting installation complete, in place, and ready for operation in conformance with the plans and these Standard Specifications. No Work shall be done on any electrical circuits without making sure the connection to the source of supply has been broken. Arrangements for clearance shall be made with System Operations of the Lincoln Electric System (LES).

The City will furnish the material and/or equipment listed in the Special Provisions. All other material, equipment, and labor required to provide an ornamental street lighting installation in conformance with the plans and these Standard Specifications shall be furnished by the Contractor. Refer to the General Provisions and Requirements of the City of Lincoln Standards for procedures to be followed in handling City furnished materials and/or equipment.

All materials and equipment furnished by the Contractor shall be new and shall conform to the applicable standards of the National Electrical Manufacturers Association (NEMA), the Insulated Cable Engineers Association (ICEA), the International Municipal Signal Association (IMSA), the American Society for Testing Materials (ASTM), and the American National Standards Institute (ANSI). Installation of equipment shall conform to the requirements of the National Electrical Safety Code, and the ordinances of the City of Lincoln. Wherever reference is made in these Standard Specifications to the codes or standards mentioned above, the reference shall be construed to mean the code or standard currently in effect.

Material shall be as specified on the plans and in these Standard Specifications. Wherever manufacturer’s catalogue numbers are used, that specific item is to be used unless approved equal material or another manufacturer’s material is specifically authorized by the City’s Project Manager.

Before ordering any material, the Contractor shall submit to the City’s Project Manager for approval 2 copies of the manufacturer’s Specifications and drawings for all of the equipment and materials indicated below. Materials shall be on the Lincoln Electric System’s Standard Material List. The City shall not be liable for any equipment or materials ordered or purchased by the Contractor prior to approval.

- Paint
- Poles
- Luminaires
- Cables, Splicing and Termination Devices
- Conduits
- Fuseholders and Fuses
- Control Equipment, Breakers, Switches, Contractors, Relays
- Lightning Arrestors, Enclosures, etc.
- Brackets, Hardware, etc.
- Pull Boxes
- Wiring and Connection Diagrams of All Cabinets, Circuits
- Connectors

The manufacturer’s Specifications and drawings shall include the brand name, any identifying numbers, required technical data, and any other information necessary for the City’s Project Manager’s review and for procuring exact replacements of any and all equipment and material used on this project.
25.01 ELECTRICAL CONDUIT

Electrical conduit shall be of the size and type shown on the plans. Quality and installation of electrical conduit shall be in conformance with Chapter 24 of these Standard Specifications.

25.02 ELECTRICAL CONNECTORS

See Chapter 24 of these Standard Specifications.

25.03 SECONDARY FUSES AND FUSE HOLDERS

See Chapter 24 of these Standard Specifications.

25.04 GROUND RODS

Ground rods shall be of high strength steel rod with a chemically bonded copper covering to provide high conductivity and prevent electrolytic action. Ground rods shall be at least 5/8" in diameter and 10' in length. Ground rods shall comply with the IMSA Specification No. 62-1956. Ground wires shall be connected to ground rods with one-piece nonferrous clamps which employ set screws as tightening devices. Connections to ground rods need not be taped.

25.05 POLES

A. EMBEDDED STEEL POLES

See Chapter 24 of these Standard Specifications.

B. FIBERGLASS POLES

1. General

The pole shall be hollow and nonporous, constructed of nonconductive fibrous glass and polyester resin. The pole shall be inert to soil chemicals, smog by-products, insecticides, herbicides, animal urine, mild acids and alkalis, deicing salts and saltwater. The surface finish shall be smooth.

The pole shall not be affected by ultraviolet radiation or weathering to the extent that no visible checking, chalking, deterioration or change of strength will occur during the normal life of the pole. The pole shall also be free from degradation by freeze-thaw cycles. The pole shall not support combustion.

2. Dimensions

a. Overall Length 23' Nominal
b. Burial Depth 4' Minimum
c. Mounting Height Per plan to light center of luminaire
d. Handhole and Cover 2.5" diameter round, 18" above grade
e. Alternate Handhole and Cover 2.5" to 3" by 5" oval
f. Tenon Top 3" outside diameter by 3.5" long steel or molded
25.05 POLES (Continued)

B. FIBERGLASS POLES (Continued)

2. Dimensions (Continued)

g. Wire Entrance Hole 1" to 1.5" minimum grommeted, 24" below grade

h. Pole Butt Approximately 7" diameter, square or non-symmetrical

i. Taper 0.120" to 0.150" per foot of length

3. Weight: Not greater than 65 pounds

4. Color: Black or grey, as specified on the plans

25.06 LUMINAIRES

All luminaires shall have an LED light source and shall be supplied as directed on the plans.

25.07 BLANK ON PURPOSE

25.08 ELECTRICAL CABLE

See Chapter 24 of these Standard Specifications

25.09 PHOTOELECTRIC CONTROLS

See Chapter 24 of these Standard Specifications

25.10 FERROUS HARDWARE

All ferrous metal used in line hardware items shall be hot dip galvanized in conformity with “Standard Specifications for Zinc Coating (Hot Dip) on Iron and Steel Hardware”, ASTM Designation A153-53. The grade of steel and part design shall conform to Edison Electric Institute (EEI) Specifications where applicable. All hardware items shall have a minimum strength capable of supporting the maximum load to which they may be subjected.

25.11 PULL BOXES

All Work shall conform to Chapter 24 of these Standard Specifications.

25.12 GRADES

All Work shall conform to Chapter 24 of these Standard Specifications.
25.13 TRENCHING AND BACKFILLING

All cables, trenched or plowed, shall be 24" in depth on rear lot lines and 30" in depth on front and side lot lines. Cable route along the curb shall be centered approximately 5.5' from the sidewalk side of the curb unless otherwise specified on the plans.

All trenches shall be backfilled and compacted daily unless properly protected. All trenches for burial of electrical cable and conduit shall not exceed 6" in width.

The first 4" of backfill shall consist of finely pulverized earth and shall contain no broken glass, rocks, or other sharp material that might damage the cable. Where the cable enters conduit, care shall be taken to protect the cable as outlined elsewhere in these Standard Specifications.

The remainder of the backfill material will normally be earth excavated from the trench unless such earth is water saturated or frozen. Backfill material shall be substantially dry, loose, clean earth free from rocks and debris. Excessively dry or excessively sandy material is not permitted.

Before backfilling, all standing water shall be removed from the trench. Tamping shall be done at no more than 12" backfill level intervals to ensure proper compaction throughout the depth of the void. The foot of the compressed air or hydraulic tamper to be used to compact the backfill shall be sized in conformance with the width of the trench. Hand tamping is not permitted. All excess backfill material shall be removed promptly from the site.

Directional boring may be used by the Contractor with the City’s Project Manager’s approval.

25.14 RESTORING STREET SURFACES AND CONCRETE WORK

Improvements such as sidewalks, curbs, gutters, Portland cement concrete and asphaltic concrete pavement, bituminous surfacing, base material, and any other improvements removed, broken, or damaged by the Contractor shall be replaced or reconstructed in conformance with the applicable chapters of these Standard Specifications.

25.15 INSTALLATION OF POLES

A. EMBEDDED STEEL POLES

See 24.08.D of these Standard Specifications.

B. FIBERGLASS POLES

Fiberglass poles shall be installed in the same manner as set forth in 24.08.D, except that grounding shall be as specified in this Article and the use of polyurethane foam is optional.

An alternative to polyurethane foam backfill for fiberglass poles is earth backfill. Where earth backfill is used the diameter of the hole shall be sized in conformance with the diameter of the foot of the compressed air or hydraulic tamper to be used to compact the backfill. Hand tamping is not permitted. The distance between any point on the ground line of the pole to the perimeter of the hole shall be a minimum of 2" plus the diameter of the tamper foot, but not greater than the tamper foot diameter plus 6".

Backfill material will normally be earth excavated from the hole unless such earth is water saturated or frozen. Backfill material shall be substantially dry, loose, clean earth free from rocks and debris. Excessively dry or excessively sandy material is not permitted.
25.15 INSTALLATION OF POLES (Continued)

B. FIBERGLASS POLES (Continued)

Before backfilling, all standing water shall be removed from the hole. Crushed rock in conformance with 24.08.D shall be installed in the bottom of the hole. After the pole is plumbed and held fast in a true position, approved backfill material shall be installed in the voids between the pole and the hole perimeter. Tamping shall be done at not more than 12" backfill level intervals to ensure proper compaction throughout the depth of the void. After backfilling and tamping are completed, additional earth shall be banked around the ground line perimeter of the pole to a height of 3". All excess backfill material shall be removed promptly from the site.

A ground rod shall be installed a minimum of 24" from the nearest edge of the augered hole and a minimum of 12" below final grade. A continuous ground wire shall connect the ground rod to the grounding lead in the luminaire by means of the wire opening of the pole shaft.

25.16 INSTALLATION OF LUMINAIRES

All luminaires shall be leveled by means of bubble level after installation and the refractor shall be properly oriented with respect to the street.

25.17 INSTALLATION OF CABLE AND CONDUIT

Conduit shall be installed in conformance with Chapter 24 of these Standard Specifications.

Cable installed in conduits shall be installed in conformance with Chapter 24 of these Standard Specifications.

Aerial cable shall be installed in conformance with Chapter 24 of these Standard Specifications.

Direct burial cable shall be installed in a dug trench at a depth of 24" on rear lot lines and 30" on front and side lot lines unless obstructions interfere. Along the street the cable shall be installed approximately 5.5' from the sidewalk side of the curb unless otherwise specified. Use of an approved cable plow will also be permitted. In areas where trenching may permanently damage the health of mature plants, the boring procedure shall be required.

The cable shall be laid in a single piece from the source to the pole top or from one pole top to the next. No splices shall be permitted in the underground section of the cable. All splices, when required or necessary, are to be made in the base of the pole or in the pull box.

The cable shall be handled with care to avoid nicks or abrasions to the sheath. Any section of the cable which the City’s Project Manager considers to be damaged shall be discarded.

Where necessary to clear permanent obstructions such as manholes, inlets, etc., the cable may be rerouted, but the City’s Project Manager shall approve of such rerouting.

Electrical Connections shall be installed in conformance with Chapter 24 of these Standard Specifications. Care is to be given to ensure that all cable is installed within the designated easements.

The Contractor is responsible for notifying the property adjacent to any construction approximately 1 week prior to doing Work.
25.18 INSTALLATION OF PHOTOELECTRIC CONTROLS

All photoelectric controls shall be seated securely in the twist-lock receptacle and oriented so the “eye” window faces north. Orientation shall be made by means of adjustments provided by the manufacturer.

The Contractor shall plainly record the installation dates on photocells in the spaces provided by the manufacturer.

25.19 POWER SUPPLY AND RISER

Power supplies shall be installed at the locations shown on the plans. The power supply riser shall be 1 1/2”. The riser shall be steel conduit a full 10’ from the in ground 90 up without joints and shall be grounded. All pole risers shall be on stand off brackets provided by LES and can be picked up at LES Storeroom at the Walter Canney Service Center at 27th and Fairfield Streets, between 7:30 a.m. to 4:00 p.m. weekdays, with the exception of holidays. See LSP 83 for spacing detail. Power supplies from transformers or service pedestals shall be installed by the Contractor. The Contractor is responsible for contacting LES, to have LES energize or de-energize any Street Light Cable. Under no circumstance shall the contractor open any LES locked facilities, such as a Transformer or Pedestal.

25.20 TREE TRIMMING

Authorized tree trimming shall be done according to the direction of the City Forester. After trimming, all brush shall be hauled away and the area cleared of leaves and small twigs. Where required by City regulations, the services of a licensed Arborist shall be employed for tree trimming.

25.21 SECONDARY CONNECTIONS

When all Work has been completed and the luminaires are ready to be energized, the Contractor is responsible for contacting LES, to have LES energize or de-energize any Street Light Cable. Under no circumstance shall the contractor open any LES locked facilities, such as a Transformer or Pedestal.

25.22 REMOVING AND RESETTING MAILBOXES

Where rural type mailboxes interfere with cable installation adjacent to the curb, these shall be removed and reset to their original location not more than 2 days after removal. They must be available on the premises at all times in a position to receive mail. The Contractor shall make arrangements with the Post Office Station serving this area for details.

25.23 BASIS OF PAYMENT

Ornamental street lighting shall be measured and paid for on a per unit basis, complete, in place and accepted by the City’s Project Manager. This price and payment shall be full compensation for all labor, equipment, tools, materials, and incidentals necessary to complete the Work.