



Cuivre River Electric Cooperative

A Touchstone Energy® Cooperative 

Specification for:

Underground Commercial Electric Distribution

Revision 3.5, January 15, 2018
Form No. UG-50

1. Application

This document specifies the minimum requirements an Owner/Developer must meet with the installation of overhead and underground electric facilities for the purpose of Cuivre River Electric Cooperative, Inc. providing electric service to a development. The Owner/Developer will be responsible for correcting or compensating the Cooperative, at the Cooperative's option, for correcting any installed facilities not in compliance with these specifications. All facilities supplied and installed for the intended use of Cuivre River Electric Cooperative will upon acceptance by the Cooperative become the property of the Cooperative as contributed by the Owner/Developer as an aid to construction for the project.

2. General

2.1 The latest editions of all applicable building and safety codes will be a minimum requirement in the installation of the electric underground distribution system. The editions include, but are not limited to:

2.1.1 National Electrical Safety Code (NESC)

2.1.2 Local City and County Building and Fire Codes

2.1.3 American Concrete Institute (ACI)

2.2 Upon receipt of necessary information, including but not limited to final project plans, building load sheet(s), building electric service entrance location(s), support service requirements, street lighting, easement restriction and all other information pertinent to utility service the Cooperative will provide a preliminary project plan indicating conduit routing, pull box, switch, transformer, and pedestal locations.

2.3 Prior to construction a meeting will be held to discuss and coordinate construction and inspection procedures and to develop a final electric facility plan.

2.4 Cooperative will require a notarized easement or recorded plat incorporating a ten (10) foot center line easement for all underground primary facilities and an effective thirty (30) foot centerline easement for all overhead facilities prior to Cooperative installing electric facilities.

2.5 Approval for joint use trenches will be determined on an individual basis with spacing requirements of twelve (12) inches horizontal and vertical.

3. Cooperative Responsibility

3.1 Cooperative will provide a conduit circuit diagram, equipment location specifications and any special instructions prior to construction.

- 3.2 Cooperative will provide timely inspections prior to the back filling of all conduit, pull box, switch and transformer locations. **Cooperative reserves the right to bill Developer at the rate of \$75.00 per hour for all man hours associated with second time inspection which fails to meet these specifications.**
- 3.3 Cooperative will inspect all three phase transformer locations prior to the pouring of concrete.
- 3.4 Cooperative will coordinate all changes with project manager.
- 3.5 Cooperative will supply and install all primary voltage conductors.
- 3.6 Cooperative will supply pull boxes and switch sleeves to be installed by Developer.
- 3.7 Cooperative will set transformers on pads installed by developer and will make all primary and secondary connections in the transformers.
- 3.8 Cooperative will supply metering equipment necessary for electric point of service metering of three phase and single phase commercial services rated greater than 320 amps Developer will provide Cooperative approved meter bases for self-contained (320 or less) three phase and single phase services. See section 4.7 for additional metering information.
- 3.9 **In the Residential portion of Residential developments, on a job specific basis,** the Cooperative will provide all materials, with the exception of any trench backfill materials, for the installation of primary and secondary conduit systems. Conduit systems shall begin at one foot (1') above grade at any riser pole or switch location on the primary side and will extend to one foot (1') above grade at each home site on the secondary side. All conduits not contained within an enclosure at the time of installation shall be plugged to prevent the entrance of foreign material into the conduit. Cooperative will deliver conduit and transformer pads to the job site, all other materials will be available for bulk receipt at our Lake Saint Louis warehouse facility.

4. Owner/Developer Responsibility

4.1 General

4.1.1 Owner/Developer will provide a Site Plan indicating all easements, an Elevation Plan, a Storm Water and Sanitary Sewer Plan and electric load information. Owner/Developer will identify and correct any conflicts between the electric service plan and any other utilities both current and future.

4.1.2 Owner/Developer will coordinate the required inspections of all Owner/Developer installed Cooperative facilities.

- 4.1.3 Owner/Developer will coordinate and/or supervise all construction related activities and ensure the security and integrity of all staged and installed materials.
- 4.1.4 Owner/Developer will coordinate all excavation in the area of installed conduits to ensure the integrity of these facilities. Owner/Developer will provide flagged and painted locations for all installed conduits prior to Cooperative installing its conductors. If the responsible party cannot be determined Owner/Developer will be ultimately responsible for any excavation damage to conduits and related facilities.
- 4.1.5 Owner/Developer will provide for testing and specification verification of all installed facilities deemed necessary by Cooperative.
- 4.1.6 Owner/Developer will guarantee the use for the intended purpose of all installed facilities.
- 4.1.7 Owner/Developer will replace, at Owner/Developer's expense, any damaged equipment or correct any work not in compliance with specifications.
- 4.1.8 Owner/Developer will determine and establish the final grade for the development including the final grade at all conduit, pull box and surface mounted equipment locations. Any changes in grade at equipment locations will be approved by and coordinated with Cooperative. Owner/Developer is responsible for staking prescribed locations for Cooperative improvements and equipment.
- 4.1.9 Owner/Developer will ensure that Cooperative equipment is not placed in swales, waterways, or at grades which would allow for surface water to enter the conduit system.
- 4.1.10 Owner/Developer will establish the location and elevations for Cooperative equipment and any reference points to curbs, buildings, or other utilities necessary for Cooperative to verify compatibility of the site.
- 4.1.11 Owner/Developer will install ground sleeves for Cooperative switch gear at specific locations in accordance with attached drawings.
- 4.1.12 Owner/Developer will pour in place or set concrete pads for Cooperative owned transformers utilized for supplying user rated voltage for buildings and other facilities.
- 4.1.13 Owner/Developer will install bollards to protect any Cooperative equipment installed near vehicle use areas as required by Cooperative. Bollards will be six

(6) inch x 0.25 inch min. steel pipe set to a height of thirty-six (36) inches and a depth of thirty-six (36) inches in an eighteen (18) inch diameter concrete foundation. Bollards will be concrete filled and capped and painted to owners specifications. Bollards will be placed outside of obstruction free zones as indicated on Cooperative detail sheets.

4.1.14 Owner/Developer will install all conduits required for a single phase transformer installation in accordance with the attached specification. All excavation under a pad site shall be backfill to grade level with 1" minus limestone rock. The Cooperative supplied transformer pad will be set, leveled and properly orientated at the required grade level.

4.2 Conduit

- 4.2.1 The standard minimum depths for all primary conduits is forty-eight (48) inches to the top of conduit. Cooperative requires a trench depth of thirty six (36) inches for all secondary single phase conduits.
- 4.2.2 Conduits will transition to an installed depth of seventy two (72) inches at all ground sleeve locations (Cooperative switch locations) in order to allow for 90 degree conduit elbow with a thirty six (36) inch radius to be installed under the sleeves.
- 4.2.3 Installations will maintain a vertical clearance of twelve (12) inches for other utilities crossing the electric conduits or provide bedding, granular backfill, or concrete which prevents vertical pressure from the crossing utility on the electric conduit.
- 4.2.4 Owner/Developer will provide all labor, equipment and material to install a properly glued conduit system. Conduit will be electric grade, schedule 40 or 80 as gray PVC, black PE with one or more red stripes, or rigid galvanized steel as specified and sized by the Cooperative.
- 4.2.5 With all six inch conduit installations, Owner/Developer will install galvanized steel elbows at all ninety (90) degree turns unless Cooperative exempts specific locations. Elbows will have a minimum bend radius of thirty-six (36) inches and a minimum sidewall of schedule 40.
- 4.2.6 Backfilling of conduit trenches under paved areas and backfilling under pad-mounted transformer, pull boxes and switch sleeves will be in accordance with city or county specifications but will be a minimum of two (2) inch clean rock or granular fill compacted to ninety-five (95) percent of the density of surrounding undisturbed soil.

- 4.2.7 All conduit installations will be protected from protruding objects such as rocks and other debris found in the bottom of the trench or in the backfill material. If the bottom of the trench or the backfill material contains any rock greater than four inches (4") in any diameter, the conduit(s) will be bedded in one (1) inch minus rock. The bed of the trench will have a minimum fill of six inch (6") and the conduits will be topped with a minimum of six inch (6") of cover prior to backfilling with any native material. The maximum sized rock that will be allowed in native soil for backfill above the bedding material is twelve inch (12") diameter in any direction.
- 4.2.8 Cooperative must specifically approve all conduit installations that will not be installed to required depth. Cooperative may require the breaking or cutting of rock to obtain depth, the use of a granular back fill with warning tap, and/or a dyed concrete cap.
- 4.2.9 Owner/Developer will install a one-half (½) inch pull tape with an embedded trace wire (Tone-Tape) equivalent to Anco WP12 LC in all conduits. The pull tape will allow for Cooperative to pull a mandrel and pulling cable through the conduit. The trace wire component will aid in locating conduits prior to cable installation.

4.3 Transformers

- 4.3.1 All foreign utilities located beneath the pad-mounted transformer will be in schedule 40 conduit. No access to foreign conduits will be provided at the pad opening. No water or sewer lines will be permitted below the transformer.
- 4.3.2 Three phase transformer pads will be located to provide hard surface access within ten (10) feet of the location. Locations will be free of any obstruction which will impede the safe operation of transformer. Clearances will be three (3) feet on the sides and back and ten (10) feet in front of transformer. If transformer adjoins a public access area, site will be protected with bollards on adjoining sides set on centers not greater than six (6) feet set outside of the obstruction free zones surrounding the equipment.
- 4.3.3 Piers are required at all transformer locations sized 500 KVA or greater, unless waived by Cooperative. Piers may be waived if suitable compacted backfill material is provided. The depth of piers will extend to native rock or a change in soil conditions sufficient to bear the load of the pad and transformer.
- 4.3.4 Three phase transformers 500 KVA and less, Owner/Developer has the option of installing a manufactured pad provided by Cooperative or pouring pads in place. Manufactured pads will not be permitted at sloped terrain locations. Pads at

sloped terrain locations will be formed such that the uphill side of the pad is at least six (6) inches above final grade. Retaining walls will be provided by Owner/Developers to control erosion of soil onto Cooperative equipment.

- 4.3.5 Owner/Developer will secure the inspection and approval of premise facilities by county or city inspector prior to connection of electric facilities.
- 4.3.6 Owner/Developer will make all connections on load side of the point of delivery. These connections include all labor and materials necessary to install meter bases, current transformers (CTs) and potential transformers (PTs). Point of delivery for all three phase commercial services is the secondary bushings on the utility transformer. Connectors and terminations in transformer will be provided by Cooperative.
- 4.3.7 Owner/Developer will supply and install all secondary conduits and three-phase service conductors.

4.4 Pull Boxes

- 4.4.1 Owner/Developer will install pull boxes supplied by Cooperative. Pull boxes will be set on prepared granular backfill. Top of pull box will be at grade level or contour.
- 4.4.2 Conduits will enter pull boxes on the short faces. Ninety (90) degree elbows will be installed beyond pull boxes for conduits perpendicular to the length of the pull box. Exceptions may be granted for conduit runs which may be difficult to pull wire through by nature of length or number of bends.
- 4.4.3 Conduit continuations will be within the same line and plane within pull boxes.
- 4.4.4 Conduits will enter pull boxes in holes provided by Owner/Developer. Conduit will be slip fit through the pull box wall with all intrusion sealed with caulk or foam to prevent erosion. All conduit ends will be within two (2) to six (6) inches from inside walls, with temporary plugs installed.
- 4.4.5 Pull boxes will be backfilled with gravel to within six (6) inches of final grade.

4.5 Switches

- 4.5.1 Owner/Developer will install switch ground sleeves supplied by Cooperative. Sleeves will be set on prepared granular backfill. Top of sleeve will be set level at six (6) inches above final grade.
- 4.5.2 Conduit will enter below the switch sleeve at locations specified by Cooperative.

Conduits will gradually transition, without the use of elbows, to a depth of seventy two (72) inches below the switch to allow for the installation of thirty six (36) inch sweep 90s at the required locations.

- 4.5.3 Conduits will terminate inside sleeve with a ninety (90) degree elbow and short section pipe to allow for twelve (12) inches of one (1) inch clean creek gravel backfill in sleeve cavity. The center of the vertical rise of conduit will be in accordance with attached detail sheets but in no case less than six (6) inches from upper inside lip of sleeve. The entry point of the conduit into sleeve will be within six (6) inches of indicated position.
- 4.5.4 Switch sleeves will be backfilled with one (1) inch clean creek gravel to within six (6) inches of final grade and covered with weed barrier. The creek gravel provides a barrier to rodent intrusion.

4.6 Street Lights

- 4.6.1 Cable in Conduit, CIC provided by Cooperative, will be extended from designated transformers, pedestals, or previously installed street light locations to all new street light locations. The CIC will be installed at the thirty six inch (36") depth and will extend to a street light location with a minimum of six feet (6') of CIC extended above grade. The cable within the conduit must be secured to the conduit prior to extending the CIC.
- 4.6.2 At each street light location Owner/Developer will install a 15" x 48" PE sleeve. The top of the sleeve will be set at grade level. A 3" hole will be bored in the side of the sleeve at the depth of twenty four inches (24") to allow for the entrance of the CIC. A second hole may be required if CIC exits from the location. The CIC shall be ring cut so that it protrudes no more than 4 four inches (4") into the sleeve.
- 4.6.3 The CIC at the street light location shall transition to a depth of 24" at the street light location.
- 4.6.4 The Cooperative will provide standard length PE pipe. The Owner/Developer will be responsible for cutting the PE pipe to required sleeve lengths.
- 4.6.5 The Cooperative will install the street light poles in the PE sleeves.

4.7. Metering

- 4.7.1. Commercial and industrial services exceeding 320 amps will be metered utilizing instrument transformers (current transformers and voltage transformers). CREC will provide these along with the meter base, meter and a metering wiring harness (25 feet or less).
- 4.7.2. The current instrument transformers (CT's) are typically installed in a dedicated compartment. This may be a standalone cabinet or a compartment within the main service panel. The instrument transformer compartment must be UL listed and approved by CREC. Cabinet sizes vary in dimension based on service type and manufacturer. Consult a distributor when ordering.
- 4.7.3. The compartment must consist of a single or double hinged door with latch that can be padlocked and sealed. Bolted removable front covers are not allowed. The meter base must be ground bonded to the CT/PT compartment. Metering conduits shall be a minimum of 1" rigid or flexible conduit. National Electrical Code requires unobstructed access of 3 feet or more to the compartment(s) and adjacent meter base.
- 4.7.4. CT cabinets will include mounting racks for physical and electrical connections appropriate for the CT size and type provided by CREC. Contractor will provide and install mechanical connectors for all wiring interfaces. The CREC provided CT's will have integrated or removable current bars.
- 4.7.5. Voltage instrument transformers (PT's) may be required if the requested service is 480 volts or above and exceeds 320 amps. These along with current transformers will be supplied by CREC and installed by the contractor. A separate voltage transformer compartment mounted adjacent to the CT cabinet is recommended for this type of metering. All 3 wire 480 volt services will require both CT and PT instrument transformers.
- 4.7.6. In special instances and upon request, instrument transformers may be installed by the utility inside the distribution transformer or on a utility pole. The contractor is urged to contact CREC prior to any purchase or installation any related equipment. The meter base must mounted adjacent to the transformer or mounted within 25 feet of the transformer on a building structure.