



Requirements for Installation of Underground Electric Systems in Residential Subdivisions

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1. Purpose

This guide is intended for use by property owners, developers, and their engineers who request the installation of an underground electric distribution system to serve a residential subdivision. The developer/owner should contact the Cooperative early in the planning process to obtain a subdivision application and discuss the electrical design requirements for the project.

See also the *FECC Member Installation Standards for Electric Service* for requirements on the installation of electric service to individual dwellings or premises.

2. Conditions for Providing Underground Systems

2.1. Subdivision Definition

A residential subdivision is defined as a tract of land divided into at least 10 lots for single-family residences.

2.2. Feasibility

The Cooperative will provide underground electric systems as desired by the developer/owner only if, in the Cooperative's judgment, it is feasible to construct, own, operate, and maintain underground facilities at the particular location taking into account the terrain conditions and type of load.

2.3. Application for Underground Residential Subdivision and Cost of Facilities

The Developer must submit a completed, signed application for the installation of the underground system prior to the commencement of the Cooperative's design work. The Developer shall also agree to pay the Cooperative, prior to the commencement of construction work, for the cost of installing underground facilities in excess of the cost of installing overhead facilities.

2.4. Build-Out of Subdivision

Home construction should be done in a period of time deemed reasonable by the Cooperative. In general, the Cooperative expects that 50% of the lots will have homes built and connected to electric service within 3 years of the development's inception. In cases where the rate of home construction is, in the Cooperative's sole judgment, expected to be less than required by the Cooperative, the Developer shall be required to pay 100% of the construction costs up front as a construction deposit. The deposit (less the amount of the underground differential cost which shall be non-returnable) shall not accrue interest and will be reimbursed to the Developer as homes are built and connected to electric service. Such reimbursement shall be made annually for 3 years beginning on the first anniversary of completion of the subdivision's electric system installation. The annual reimbursement amount shall be calculated by dividing the initial construction deposit by one-half of the total number of lots within the subdivision, and multiplying that amount by the number of homes completed during the year. Total reimbursements shall not

exceed the initial deposit, and no reimbursement will be made after the 3rd year. Any deposit remaining after 3 years shall become the property of the Cooperative.

2.5. Project Development

Subdivision developments done in phases should be built in contiguous locations that allow economic expansion of the underground electric system between the developed areas. Phases built in non-contiguous locations may require additional cost to be paid by the Developer.

3. Electric System Design Guidelines

3.1. Layout and Design

FECC will determine the type of construction and location of line routes and locations of electrical lines, transformers, pedestals, and switchgear. FECC will work with the Developer as far as is practicable to locate such routes and equipment in a manner acceptable to both parties. Requests by the Developer to route lines or locate equipment in locations different from the most economical design as determined by FECC will be considered, and if determined to meet FECC design practices, may be done at additional cost to the Developer.

3.2. Environmental Considerations

Underground electric facilities shall be routed so as to avoid open drainage ditches, creeks and marsh areas, or other areas that are environmentally sensitive, historically significant, or may hinder construction or operation of the electric system. Costs associated with areas requiring trench stabilization (retaining walls, concrete encasement, pipe sleeves, rip-rap, etc.) or any required environmental studies shall be paid by the Developer.

3.3. Location of Cables and Equipment

The underground electrical system generally will run along front lot lines approximately 4 feet behind the property line. Pad-mounted transformers, secondary pedestals and switchgear normally will be located on front lot lines in areas accessible for operation and repairs. Pad-mounted transformers will be placed to allow energized switching operations. The front (lock side) of the transformer normally shall face the street, and requires 12 feet clearance to fences, shrubs, or other obstacles.

3.4. Use of Overhead Facilities

Lots adjacent to overhead lines may be served from pole-mounted transformers with underground service lines.

3.5. Water, Sewer, and Gas Lines

Water, sewer, or gas lines shall not share the ditch with FECC primary or secondary distribution lines, and shall be separated horizontally by at least 24 inches of undisturbed earth.

3.6. Telephone & Cable Systems

Telephone or cable TV lines shall not share FECC's primary or secondary distribution ditch unless the telephone or cable company has a valid joint-trench agreement with FECC.

Telephone and cable lines shall be separated horizontally by at least 24 inches of undisturbed earth unless a joint-trench agreement is in place.

3.7. Street Lighting

If street lighting and/or area lighting layouts are required, they shall be designed concurrent with project layout and installation coordinated with other trenching. Street lighting can be installed only upon execution of an appropriate lighting contract.

3.8. Sewer Lift Stations

Three-phase facilities required for sewer lift stations or other three-phase loads installed in subdivisions that otherwise do not require three-phase service will be paid for at full cost by Developer. See FECC Member Installation Standards for Electric Service.

3.9. Temporary Builder's Service

Temporary service may be furnished from overhead facilities or from pad-mounted transformers. Reasonable time must be allowed for construction of needed facilities.

Temporary facilities will be installed and removed at the Developer's expense. See FECC Member Installation Standards for Electric Service.

3.10. Service to Residences

Underground service routes will be run as short and straight as possible from the Cooperative's secondary facilities to the home's service meter location. Service conduit shall be furnished and installed by the homebuilder/owner and shall extend from the meter location to the Cooperative's secondary source location. See the FECC Member Installation Standards for Electric Service.

4. Developer's Responsibility for Drawings and Documentation

4.1. Plat Drawings

The Developer must provide a plat drawing stamped by a PE or RLS in digital file format to FECC before electrical design work can begin. File format and drawing requirements are as follows:

4.1.1. Acceptable file types:

- Auto Cad drawing file (.dwg)
- ESRI shapefile (.shp)
- ESRI Personal Geodatabase (.pgdb)
- ESRI File Geodatabase (.gdb)

- 4.1.2. Use of a geographically referenced map coordinate system is required.
- The preferred Projected Coordinate System is NAD 1983 State Plane Arkansas South FIPS 0302 (feet). If another coordinate system is used, it shall contain:
 1. Identification of the coordinate system used within the digital map file.
 2. The defined datum point.
 3. The defined scale and unit of linear measurement.
- 4.1.3. The plat map shall show the final and complete property description. The plat submittal is not to be a preliminary drawing or preliminary proposal of the subdivision. The following information shall be included in the plat map:
- Property lots are in the correct location with referenced coordinates corresponding with submitted datum and coordinate system.
 - Streets are named and in the final location.
 - Buildings are in final location.
 - Lot numbers are correct and final.
 - Subdivision name is included on the plat.
 - Changes to any area of the digital map file will require a complete resubmittal of the entire plat map with the above requirements redefined.
- 4.1.4. The drawings shall include a utility plan detailing the location, size, and type of all utilities being constructed to service the subdivision. The utility plan must detail the following information:
- Water mains.
 - Gas mains.
 - Sewer mains and lift stations.
 - Storm sewers and drop inlets.
 - Storm water retention areas.
 - Telephone, communication, and CATV cable routes and equipment locations.
- The Developer must provide FECC with any easement or separation requirements that other utilities require the developer to maintain. FECC will not be responsible for spatial conflicts if created by unknown third party agreements.

4.2. **Electric Load Information**

Provide information concerning expected dwelling size, planned use of natural gas or LPG for heating or water heating, or other information or restrictions that may affect residential energy requirements. Also include information regarding voltage and load requirements for any non-residential subdivision facilities, such as sewer lift stations, swimming pools, community buildings, etc.

4.3. **Easements**

Provide suitable easements for electric service as determined by the Cooperative representative, including restrictions to prevent encroachments that may interfere with the continued operation and maintenance of the underground electric facilities.

4.4. **Covenant Requirements**

Insert the following language in the restrictive covenants covering this subdivision: “Developer has requested and First Electric Cooperative has agreed to provide underground electrical distribution facilities, with Developer having approved the system design. Any request to subsequently relocate any portion of the underground facilities shall be consistent with the Cooperative’s design and operating practices and the requesting party shall bear all costs associated with such relocation. All pad-mounted transformers shall have no less than twelve (12) feet of unencumbered space in front of the transformer doors for operation and maintenance of the equipment. Cooperative is hereby granted access across property as necessary for maintenance and/or replacement of transformers and underground power lines. Cooperative shall only be required to fill, grade and restore ground cover back to original grade as a result of any excavation. Cooperative shall not be liable for payment or for repair of any damage to landscaping, shrubbery, fence, walk, patio, or driveway in connection with the installation, maintenance, or relocation of the underground electric system.”

4.5. **Street Lighting**

Execute a street lighting agreement with the Cooperative if street lighting is desired initially. Street lighting inside municipal limits may need approval by the appropriate city official and comply with any applicable local ordinance. All lights not billed to a local governing body will be billed to the legally incorporated property owners association.

4.6. **Final Plat & Bill of Assurance**

Upon acceptance of the subdivision by the planning jurisdiction:

- 4.6.1. Furnish a copy of the executed, recorded final plat (in electronic format as indicated above) showing detailed layout including property and lot-lines, street names, buildings, dedicated easements, water, sewage, drainage and any other underground facilities.
- 4.6.2. Furnish a copy of the recorded bill of assurance detailing all restrictive covenants, which must include the language as shown in section 4.4 above.

5. Developer’s Responsibility for Construction

5.1. **Property Corners**

Identify, install, and maintain permanent property corners with lot numbers identified on stakes in advance of any design or construction work to be performed by the Cooperative.

5.2. **Locate Underground Facilities**

Provide information and arrange field spotting of gas, water, sewer, drainage, and other facilities when requested by FECC. Cooperative will assume no responsibility for damage to facilities not marked.

5.3. Excavation

The Developer shall be responsible for the opening of all trenches, excavating for the transformer vault, if required, preparing trench for cable installation and, after the cable and associated accessories have been installed, backfilling all trenches, all according to Cooperative specifications (see Section 7 for typical excavation details). All permits or notifications required for excavation are the responsibility of the Developer. Developer is responsible for installation and maintenance of any required erosion or storm water controls.

5.4. Road Crossings

Install any required road crossing conduit prior to the completion of the roadways. The Developer shall install underground line road crossing conduit as specified by the FECC representative prior to or during subdivision road construction (PVC conduit shall be provided by FECC and shall be picked up by the Developer at FECC's yard). Ends of conduit shall be sealed to prevent entry of materials and shall be marked clearly using stakes or posts to enable workers to locate both ends of the conduit during subsequent construction activities. See Section 7 for typical road crossing details.

5.5. Equipment Locations

Provide a reasonably flat 8' by 8' area at final grade for pad-mounted equipment locations.

5.6. Work Scheduling

The Developer or the developer's excavation contractor shall schedule and coordinate ditching and inspection activity with FECC in order to make the most efficient use of both the excavation and installation crews.

5.7. Right-of-Way

Clear the right-of-way as required by FECC and establish final grade along the underground line route before the start of any excavation. Any changes in grade that require changes or relocation of FECC's electrical facilities shall be at Developer's expense.

5.8. Changes to Approved Plan

Immediately notify the Cooperative of any changes to the original approved plat of lot-lines, easements, or roadway layout, or any changes involving the relocation of FECC or other utilities' facilities. Developer shall be required to pay total cost of relocation of the Cooperative's facilities (including engineering cost) due to field changes after print approval.

5.9. Service Installations

Any temporary or permanent electrical service installations requested by the Developer shall comply with the requirements of the latest edition of the FECC Member Installation Standards for Electric Service.

5.10. Damages to Cooperative Facilities

The developer will reimburse the Cooperative for any relocation of, or damages to, the Cooperative's conduit system, transformers, pedestals, or other distribution equipment caused by actions of the Developer or the developer's contractors or agents.

6. Cooperative Responsibilities

6.1. Plans and Estimates

Prepare electrical distribution layout, lighting layout, road crossing plans, and cost estimate for Developer's written approval prior to construction, after which changes requested by the Developer that result in additional costs to the Cooperative will be at the Developer's expense. Written approval may be defined as a signed copy of the distribution layout prepared by the Cooperative.

6.2. Installation of Primary Distribution Facilities

Furnish, install, connect, and maintain all required primary distribution conduits, cables, pad-mounted equipment, and single-phase transformer pads (excluding street crossing conduit, which is the Developer's responsibility). All primary system excavation work shall be performed by the Developer per the Cooperative's plans and specifications. See FECC Member Installation Standards for Electric Service.

6.3. Installation of Secondary Distribution Facilities

Furnish and install secondary distribution conduits, cable, and pedestals (excluding street crossing conduit, which is the Developer's responsibility).

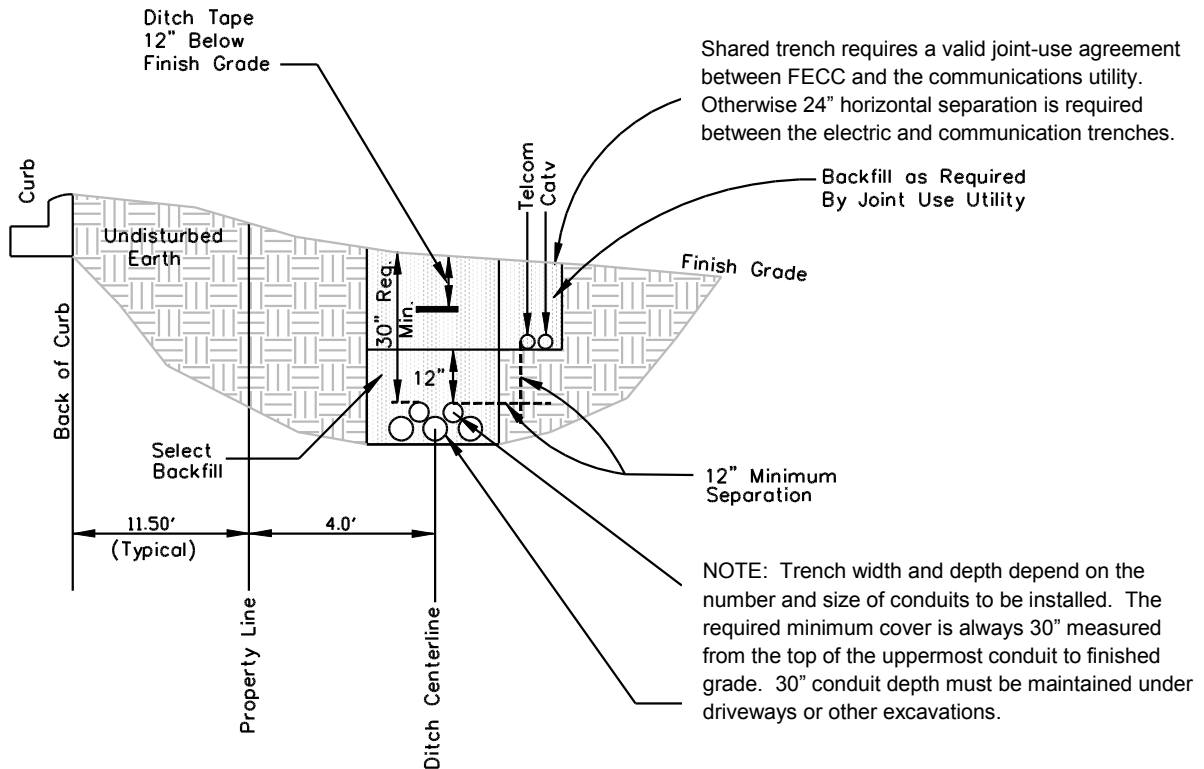
6.4. Installation of Services

Furnish and install service conductors from transformer or pedestal to permanent meter installations rated up to 320 amps (service conduit is furnished and installed by builder/owner). Builder/owner provides and installs conduit and conductors for services rated above 320 amps. See FECC Member Installation Standards.

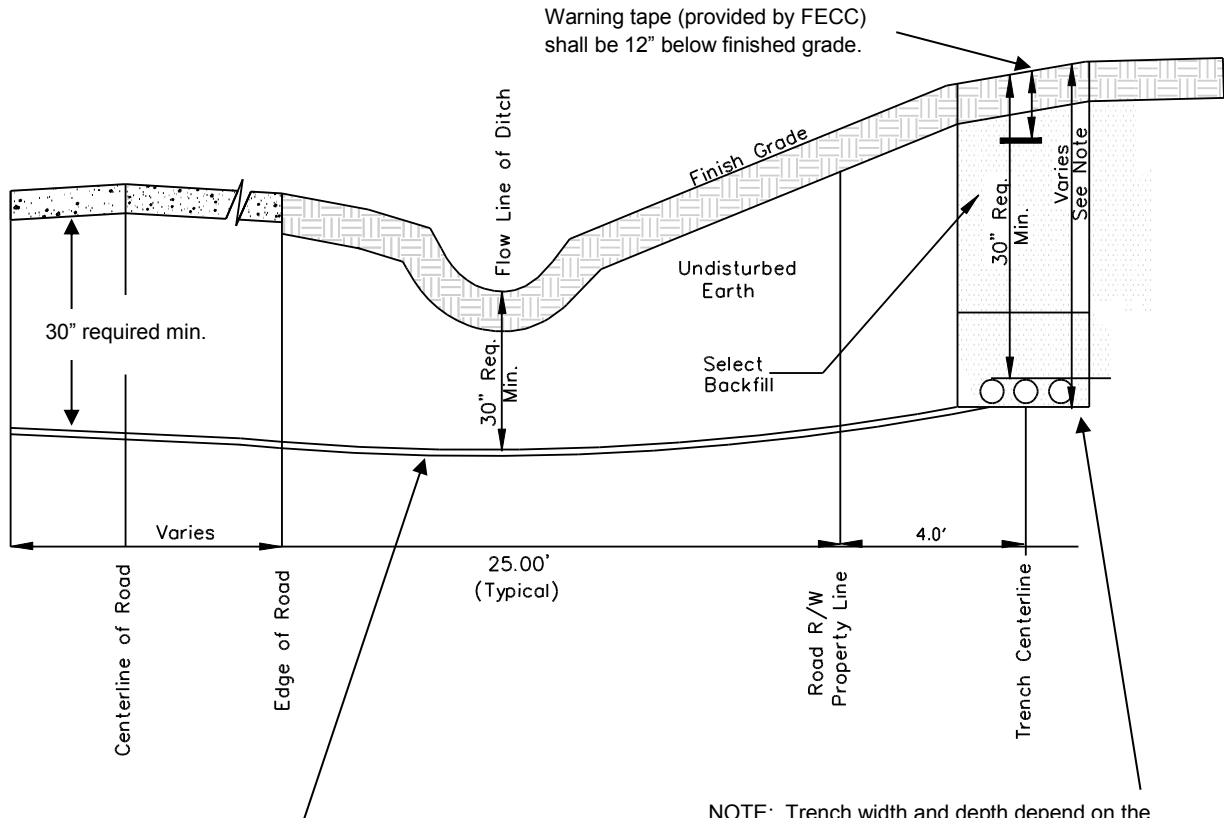
7. Excavation and Conduit Installation Details

The following drawings are typical excavation requirements for FECC's primary distribution system. If special circumstances require different excavation specifications, FECC will provide the specifications to the Developer at the start of the project. In all cases, 30" minimum cover is required for conduits. Please note that service conduit excavation and installation requirements for individual residences or other structures are contained in the FECC Member Installation Standards for Electric Service.

7.1. Typical Multiple Conduit Excavation



7.2. Typical Excavation with Road Crossing



Road crossing conduit must be uniformly graded throughout the crossing. Trench depth shall provide at least 30" of cover between the uppermost conduit and the road surface, and 30" cover between the conduit and the flow line of any drainage ditch.

NOTE: Trench width and depth depend on the number and size of conduits to be installed. The required minimum cover is always 30" measured from the top of the uppermost conduit to finished grade. 30" conduit depth must be maintained under driveways or other excavations.

7.3. Typical Road Crossing Conduit Location

