



Electric Service Construction Standards Customer-Installed Underground

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General

These specifications provide for the construction of underground facilities as specified by Mountain Parks Electric, Inc. (MPEI) for customer-installed conduits & vaults. Staking sheet must be on site and used when having inspections. All trenching and conduits must be installed as shown on staking sheet.

1. **Workmanship:** All construction work shall be done in a safe, thorough, and professional manner in accordance with MPEI plans, specifications, standards, and construction drawings, as well as applicable manufacturer instructions. Customer/contractor is responsible to comply with all applicable local OSHA codes and requirements. They must follow all applicable rules and regulations provided by agreement signed with MPEI.
2. **Damage Prevention:** The contractor shall take all steps necessary to prevent damage or interference with existing power lines, communication facilities, roadways, waterways, buried cables, pipelines, and other facilities adjacent to or crossing the project right-of-way.
3. **Construction Staging Area:** The contractor shall make all necessary arrangements for a construction staging area to be used for material & equipment and vehicle storage.
4. **Material Handling and Storage:** The contractor shall exercise care in the handling of all material. The contractor shall not install any material found to be defective or damaged. The contractor shall furnish the necessary equipment to load and haul to the job-site all material furnished by MPEI. The contractor shall bear the cost of all handling, such as, loading, hauling, and unloading. The contractor is responsible for the safe keeping of all materials that are checked out by MPEI and picked up by the contractor for the project. All material and equipment to be used in construction must be stored with protection from deteriorating effects of the elements. If outdoor storage cannot be avoided, the material and equipment must be stacked on supports well above the ground line and protected from the elements as appropriate, and with due regard to public safety. Applicant has 10 days from the date of the trench inspection to return any unused/uncut material to MPEI warehouse. Material issued for this project shall not be used on other projects.
5. **Work Week and Daily Schedule:** Contractors shall coordinate a lineman meet with operations for the trench inspection whose normal hours of work shall be 8 AM to 3 PM, Monday through Thursday.
6. **Communications & Contact Capabilities:** The contractor shall provide a telephone number for contacting his job superintendent as needed during specified normal working hours; this number shall be furnished to the staking technician.
7. **Clearances to Other Underground Utilities:** MPEI requires primary is 10 feet for secondary and 5 feet for of horizontal separation from gas lines, and 10 feet minimum separation from water and sewer lines. A minimum 12-inch separation horizontally if possible and vertically if approved is required to communication cables. A minimum separation of 12-inches measured vertically is required for all utility crossings, including storm water culverts.
8. **Multiple MPEI conduits** need to be at a depth of 48" required to top of conduit for primary and 36" is required to top of conduit for the secondary and installed on opposite sides of the trench.
9. **Clearances to buildings:** Primary conduit and equipment requires a minimum 10' separation to any building (including decks, overhangs, and footers). Secondary conduit and equipment requires a minimum 5 ft separation to any building.
10. Any changes to design or material will require notification to the staking technician and is subject to additional cost.

Right-of-Way Clearing

Right-of-way shall be cleared for 20 feet in width (or other specified easement width) to be measured 10 feet (or half) on each side of the line. This includes clearing of underbrush, tree removal, and such tree trimming as is required so that the right-of-way, except for tree stumps which shall not exceed 6-inches in height, shall be clear from the ground up of the width specified. However, low growing shrubs, which will not interfere with the operation or maintenance of the line, shall be left undisturbed if so directed by MPEI. Slash may be chipped and blown on the right-of-way if so specified. The landowner's written permission shall be received prior to cutting trees outside of the right-of-way. Trees fronting each side of the right-of-way shall be trimmed symmetrically unless otherwise specified.

Trenching

1. Prior to any trenching, the contractor shall meet at the project site with the staking technician to review the plans and verify grade & property pins. MPEI shall inspect and approve contractor's staked location of vaults/pedestals and trench centerlines prior to trenching. Site must be within 6" of final grade at time of the meeting. Subgrade is acceptable in roadways where conduits will be installed, but the minimum specified depth to the top of conduit shall be measured from subgrade.
2. All trenching depths specified are minimums as measured from the final grade to the top surface of the conduit. The routing must be as shown on the plan drawings and specifications unless conditions encountered are such that changes are necessary to accomplish the work. In such event, the staking technician shall be notified promptly, and all changes authorized in writing by the staking technician. If rock or other difficult digging is involved, the contractor shall determine the nature and extent of the difficulty, and the staking technician shall determine whether rerouting, rock trenching, or other changes are necessary. Loose soil or crumbly rock shall not be considered difficult digging. If additional material is required additional cost will be invoiced.
3. Care shall be exercised to minimize the likelihood of water flow since this may cause trench damage and reduction in trench depth. If this occurs, the water must be cleared to the specified depth before installing the conduits. Costs of pumps, etc are at the customer's/contractor's expense.
4. All trenches must follow straight lines between staked points to the greatest extent possible and match the design shown on the staking sheet. Secondary trenches must extend in a straight line from takeoff points wherever possible. Road crossings should be done at a right angle to the road. The trenches must be dug so that the bottom has a smooth grade. Large rocks, stones, and gravel in excess of 1 inch must be removed from the bottom of the trench. Where this cannot be accomplished, a 2-inch or greater bed of sand or clean soil must be placed in the bottom of the trench as necessary to smooth the bottom. If jobs changes staking technician needs to be identified.
5. Prior to installation of conduits, MPEI shall inspect the trench for adequate depth, width, and smooth bottom.

Conduit Installation

1. For road and alley crossings, primary and secondary conduits shall be installed a minimum of

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- 48 inches or meet local requirements whichever is greater from the top of the conduit to final grade per town and county road requirements.
2. Installation of red marker tape (warning of buried electric line) 12 inches above the conduit is required. Red marker tape should extend approximately 12 inches beyond each end of the buried trench and be installed directly above conduit location. The initial lift of backfill shall be at least 12 inches of compacted soil measured from the top of the conduit and contain rock less than 1 inch diameter or sand above and surrounding the conduit prior to backfilling. Rocks larger than 6 inches in diameter shall not be pushed directly on top of the initial 12 inch lift.
 3. Conduit must be placed in the trench as soon after the trenching operation as feasible. The conduit must be carefully placed in the trench by hand. All conduit placements will be inspected by scheduling a lineman meet or qualified line inspector with operations for trench and conduit installation to assure that no damage to conduit occurs.
 4. Where more than one conduit is to be placed in a trench, the spacing required by the specifications must be observed. Specification shows 12" between any conduit group, 4" separation between primary conduits in the group. Care must be taken so that any soil falling into the trench during the laying of the first conduit does not reduce the clearances of the last conduit below that specified. Should this occur, the excess soil must be removed carefully by hand or with equipment that will not damage the installed conduit.
 5. Conduit entering concrete vaults shall extend no more than 4" into the vault. A bead of expansion foam shall be applied to seal and fill any void left between the conduit and access holes in concrete vaults. Conduit shall extend 6-8 inches above the base-grade inside fiberglass vaults, pedestals, and road rated vaults and shall not be cut.
 6. No conduit joints or sweeps are allowed within 10 feet of a concrete vault.
 7. Couplings attached to sweeps and used for vertical conduit extension into vaults shall be located a minimum of 1 inch under the base grade of the vault.
 8. All exposed ends of conduit must be plugged during construction to prevent the entrance of foreign matter and moisture into the conduit.
 9. Burrs or sharp projections that might damage the cable must be removed.
 10. Conduit shall be assembled such that all joints are fully inserted into bell ends and couplings using appropriate PVC primer and cement in sufficient quantity so that an excess amount of cement is expelled from the bell end.
 11. The total of all bends in a conduit run between vaults/junction pedestals/risers shall be a maximum of 270- degrees horizontally, not counting up to two vertical 90 degree sweeps.
 12. Where specified by the staking sheet, marker balls and/or stakes/carsonite posts supplied by MPEI shall be installed in the trench above conduit stub ends.
 13. Pull tape/Mule tape with tracer wire shall be pulled in and left in each conduit with an additional 10 feet excess coiled and left in the vault on each end. Tracer wire shall be stripped and clamped to the ground rod using a ground rod clamp. All conduits require installation of mule tape.
 14. All conduit intended for future MPEI use shall be purchased through MPEI and approved by the staking technician during installation. Applicant is responsible and assumes all risk for establishing the proper locations for all conduits. Conduit acquired from other project shall not be used on future projects.

Boring

Any project that includes boring is not eligible for customer dig.

Identification/Marking of Equipment

Identification/Marking of Conduits at Vaults/Risers/Pedestals: As the conduits are laid, they must be identified and marked at each end accessible in vaults/pedestals/risers, the identification must be done with a permanent marker indicating remote end station number that corresponds to staking sheet. For example, "Stn 1, Stn 2, etc.

Inspection of Underground Units

Before backfilling operations begin, the contractor and lineman meet or qualified line inspector with that is inspecting shall jointly inspect all trenches, vaults, conduit size/quantity/placement, risers, pedestals, and other construction that will not be accessible after backfilling. If corrections are required, a second inspection shall be made after completion of the changes this may incur an additional charge for second inspection. Customer shall schedule inspections with opening equipment to stub in conduit.

Bedding and Backfilling

1. In lieu of cleaning the trench to smooth the bottom, the contractor may, at the contractor's option, place a 2-inch minimum bed of clean sand or soil (bedding) under the conduit as necessary to achieve a smooth trench bottom.
2. The first lift of trench backfill above and surrounding the conduit shall be free from rock greater than 1 inch diameter or other material that might damage the conduit during compaction. This initial lift must be carefully compacted to prevent damage to the conduit. The initial lift must be compacted to a depth of 12 inches above the top of the conduit. After compaction of the first lift, but prior to installation of CATV/phone cables/conduits above that level, the the lineman inspecting shall verify adequate vertical separation (minimum 12 inches) and warning tape installation located directly above conduit and be laid in flat.
3. Backfill material shall be free of vegetation, tree stumps/slash, ash, fly ash, cinders, etc. Backfill material shall also be free of frost, ice, and snow that might result in excessive trench settlement. All backfill material above the initial 12-inch lift shall be free of solid material larger than 6-inch diameter.
4. Backfilling must be completed in such a manner that voids will be minimized. Excess soil must be piled on top and must be well tamped or wheel compacted. All rock and debris must be removed from the site, and any damage to the premises repaired immediately.
5. Pieces of scrap conduit or other material remaining after installation shall not be buried in the trench as a means of disposal.
6. Customer can only return new unused conduit that is not modified within 10 days of final inspection to MPEI warehouse

Vaults & Junction Pedestals (UK5)

Vaults and pedestals shall be located in utility easements as shown on the plan drawings. Excavations for vaults and pedestals shall be made so as to not disturb the surrounding earth as little as practical. Vaults and pedestals shall be installed plumb and level on machine compacted soil. When vaults/pedestals are of fiberglass, plastic, or other semi-flexible material, backfilling shall be done with covers in place and with careful tamping so as to avoid distortion of the vault or pedestal base. Class C or $\frac{3}{4}$ inch road base shall be used to backfill around vaults and pedestal. When installation is complete, the top of vaults shall be 6-12 inches higher than final grade and the top of pedestal bases shall be 6-8 inches above final grade. Other utilities shall not be installed under or within 2 feet of vaults and pedestals. Soil in the immediate vicinity shall be tamped and sloped away from the enclosure. At the contractor's option, the excess soil shall be removed from the site or spread evenly over the surface of the ground to the satisfaction of the lineman that is inspecting trench.

Concrete Manhole/Switchgear Vaults (UM1-6CSG)

Applicant shall coordinate at least 2-3 weeks in advance with MPEI's purchasing agent to schedule delivery of concrete vaults to the project site by MPEI's supplier and shall provide address/directions for/to the delivery site. The supplier will off-load these products and the concrete vault can be installed if the excavation site is suitable as specified. If the products are not installed at the time of delivery, it is applicant's responsibility to arrange for adequate equipment (maximum weight of 22,900lbs) for the installation of the products. An inspection will be required before installation and delivery of vault. All concrete vaults will require 1 1/2" gravel bedding installed before vault installation.

Installations on Hillsides and Slopes:

1. Retaining walls or hill holders shall be provided at equipment (vault and or pedestal) locations where required by MPEI due to adjacent slopes and likelihood of soil erosion or slides. Hill holders are designed to support material and prevent erosion behind certain vaults and pedestals. Hill holders may only be installed where approved by MPEI. MPEI will require a retaining wall or other support structure be constructed where slopes exceed the limitations of hill holders. It is the responsibility of applicant to have retaining walls or other support structures designed and approved by a professional engineer prior to installation. Retaining walls and support structures shall be designed and constructed to comply with all MPEI respective equipment clearance and workspace requirements.
2. Depending on the severity of a downhill slope, MPEI may require that equipment (vaults and or pedestal) be elevated to provide a flat and safe workspace. These raised grade equipment sites shall be constructed of suitable backfill material and comply with all MPEI respective equipment clearance and workspace requirements. Note: The need of these requirements may not be discovered until the preconstruction meeting.

Ground Rods

A copper-clad ground rod with minimum length of 8 feet shall be installed at all risers, fiberglass vaults, and pedestals as shown in the construction drawings. Each ground rod shall be driven to a minimum depth in soil of 7.5 feet in vaults (i.e. a maximum of 6 inches left above soil) and 8 feet next to poles or pedestals (i.e. flush to ground level) and shall not be cut. Ground Rods must be available for inspection.

Location Markers and Bollards (UM12-C, UM12S-C, & UM1-BP-C)

Permanent cable markers and bollards shall be installed at locations if shown on the Staking sheets, as well as at each vault and at each pedestal.

Conduit Depth

If conduit cannot practically be installed to a minimum depth of 48 inches of cover, it shall be installed at a shallower depth with red dye concrete encasement using a minimum 2000-psi mix and a minimum 3-inch envelope (under, above, between, and both sides using spacers designed for such application). The MPEI inspector shall authorize all such depth variances in writing and shall inspect and approve conduit assembly prior to concrete encasement. At least two feet (2') of flow fill.

Drawings







