



**Underground Secondaries and Services
Customer Reference Specification
6-19-100**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 52 of 101

6-19-100 – Customer Reference Specification

Customer Low-Voltage Switchboards Service Cable Terminal Compartment Arrangements and Clearances

(Replaces A-190556)

THIS CUSTOMER REFERENCE SPECIFICATION (CRS) IS PART OF THE
RULES FOR ELECTRIC METER AND SERVICE INSTALLATION (REMSI) WEBSITE



Underground Secondaries and Services Customer Reference Specification 6-19-100

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 53 of 101

This specification contains basic information which clearly defines PPL EU requirements for the supply terminal compartment of low-voltage switchboards. These rules and sketches are intended to advise the customer, his architect, electrical contractors, and switchgear manufacturers of the minimum clearances acceptable to PPL EU. Compliance with this specification will provide adequate working clearance for pulling-in service lateral cables and making the necessary bus connections.

All details shown here and on the REMSI website must be strictly followed. All low-voltage switchboards must be approved by a PPL EU engineer before the units are built. Unapproved designs or unapproved deviations from this specification can result in long delays or possible refusal to connect service.

Notes:

1. Preapproved List

PPL EU maintains a preapproved list, on the REMSI Website, Table 3 – Approved Switchgear Metering and Termination Compartments. Any switchgear and termination compartments not currently listed may require up to 90 days for review and approval.

2. Approval Process

To secure approval, the customer's contractor must supply PPL EU with two sets of detailed drawings (drawings that are scalable or fully dimensioned) showing:

- terminal compartment bus arrangement,
- neutral bus location and arrangement,
- where service conduits will enter cabinet,
- alignment of service conduits with bus connectors,
- and location of switchboard in mechanical room.

PPL EU engineer will evaluate the design and return one set of drawings signed, dated, and marked "approved without changes" or "approved with corrections as noted". When modifications are required, the customer's contractor is responsible for any follow up with the switchboard manufacturer.

If detailed drawings are not available from the switchboard manufacturer, the electrical contractor can secure preliminary approval based on one of the arrangements shown in this specification. However, PPL EU may refuse to connect service when, in PPL EU's opinion, the customer's installation does not conform to this specification. It is then the responsibility of the customer to make the necessary changes before service will be connected.

3. Interrupting Capacity

Adequate interrupting capacity for protective devices is a specific requirement of the National Electric Code (NEC). Service equipment and its overcurrent protective devices must have short-circuit current rating equal to or greater than the available short-circuit currents listed in Table 1 on Sheet 4 and Table 2 on Sheet 5 of this document. These values do not include short-circuit currents generated by the customer's synchronous and induction machines.

4. Working Clearances

All dimensions shown are minimum. More working clearance may be required depending upon where service conduits enter the cabinet and how they are aligned with the bus connectors.

The cable termination compartment must have a full-width front access panel(s). This panel must be hinged and sealable. Switchboards which require PPL EU linemen to make connections from behind the compartment must also have a full-width rear access panel that is hinged and sealable. Minimum working clearances in mechanical room is shown on Figure 6, see Fig. 6-19-100-G.

5. Pulling Pits

Where a switchboard is designed for bottom entry, as shown in Figure 2 and Figure 3, the use of a "pull-pit" below the floor is not allowed.

6. Service Cables

PPL EU will install the minimum number and size aluminum service cables listed in Table 3 and Table 4, or quantity as specified by the PPL EU Design Engineer. The customer's electrical contractor/switchboard manufacturer must provide the appropriate size and quantity of set-screw type bus connectors.

7. Service Conduits

The customer must provide the minimum number of 4-inch service conduits specified in Table 3 and Table 4 or quantity as specified by the PPL EU Design Engineer. The customer's contractor must install these conduits by one of the following methods:

- A. Use rigid or intermediate grade galvanized steel. All bends must be minimum 36 inch radius. Grounding bushings must be provided at the switchboard entry.
- B. Use PVC conduit encased in concrete envelope as specified in PPL EU CRS 6-15-180. All bends must be rigid or intermediate grade galvanized steel with a minimum 36 inch radius. Concrete envelope must also encase bends to prevent breakage at steel-to-PVC joints. Conduits entering switchboard must be rigid or intermediate steel with grounding bushings.
- C. Bonding jumper per NEC article 250 – Grounding. Ground and neutral buses, along with the conduit grounding bushings must be bonded together and to the cabinet.

8. Cable Limiters

PPL EU will provide and install cable limiters (a type of current-limiting fuse) on certain size WYE 277/480V services, see Table 4. Figure 1 illustrates the type of limiter used, installation method, and special bus bar drilling required to install these limiters. When cable limiters are installed setscrew type bus connectors are not required.

Maximum Available Short-Circuit Current

Table 1 – Underground Service From Overhead Bank

Transformer Bank Size (kVA)	Maximum Available Symmetrical Short-Circuit Current (Amps)	
	WYE 120/208	WYE 277/480
75	17,350	—
150	34,700	15,040
300	55,510	27,760
500	63,210	46,360

Table 2 – Underground Service from 3-Phase Transformer

Transformer Bank Size (kVA)	Maximum Available Symmetrical Short-Circuit Current (Amps)	
	WYE 120/208	WYE 277/480
75	17,350	—
150	34,700	15,040
300	55,520	27,760
500	63,090	40,100
750	39,280	17,020
1000	52,380	22,700
1500	—	34,050
2000	—	45,390
2500	—	56,740

Service Cables and Conduits

TABLE 3 – Wye 120/208 Volt Services

Transformer Size (kVA)	Minimum Number Aluminum Conductors		Minimum No. 4-Inch Service Conduits
	Per Phase	Neutrals	
75	350	4/0	2
150	1-750	1-4/0	2
300	2-750	2-4/0	4
500	4-750	4-4/0	8
750	6-750	6-4/0	10
1000	8-750	8-4/0	12

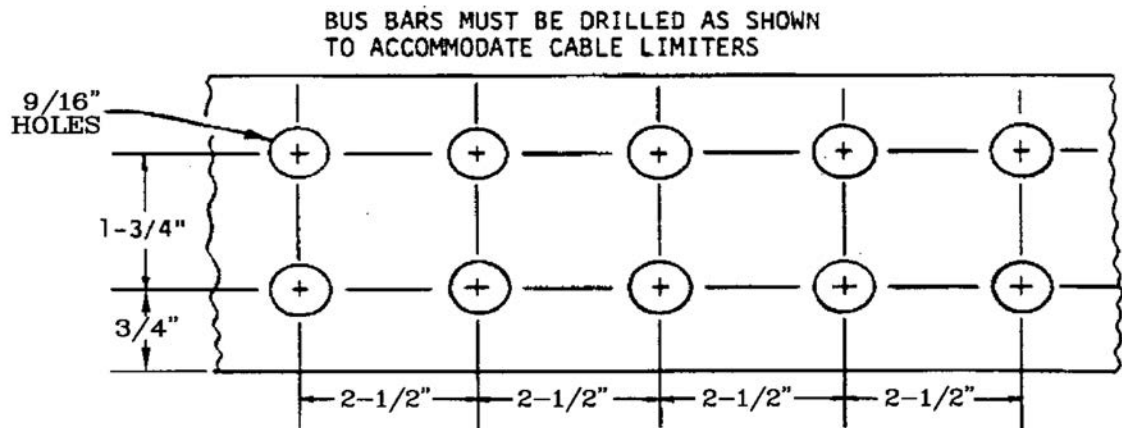
Table 4 – WYE 277/480 Volt Services

Transformer Size (kVA)	Minimum Number Aluminum Conductors		Minimum No. 4-Inch Service Conduits
	Per Phase	Neutrals	
150	350	4/0	2
300	1-750	1-4/0	2
500	2-750	2-4/0	3
750*	3-750	3-4/0	4
1000*	4-750	4-4/0	8
1500*	6-750	6-4/0	10
2000*	8-750	8-4/0	12
2500*	10-750	10-4/0	14

*Requires installation of cable limiters (by PPL EU).
See bus bar details, Figure 1.

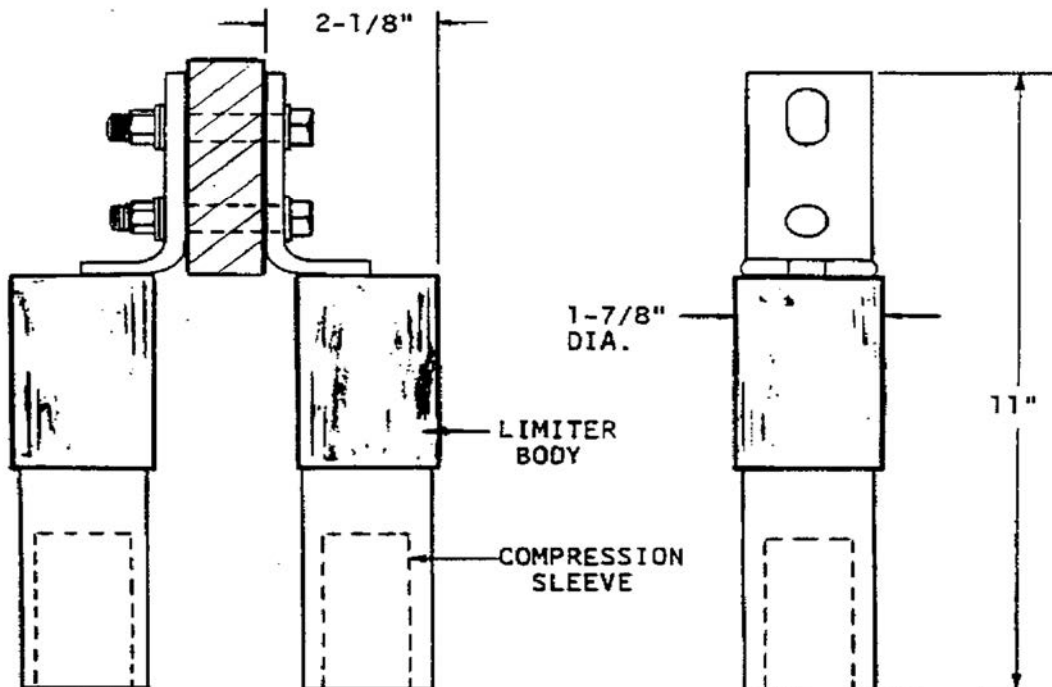
Figure 1

CABLE LIMITER INSTALLATION DETAILS



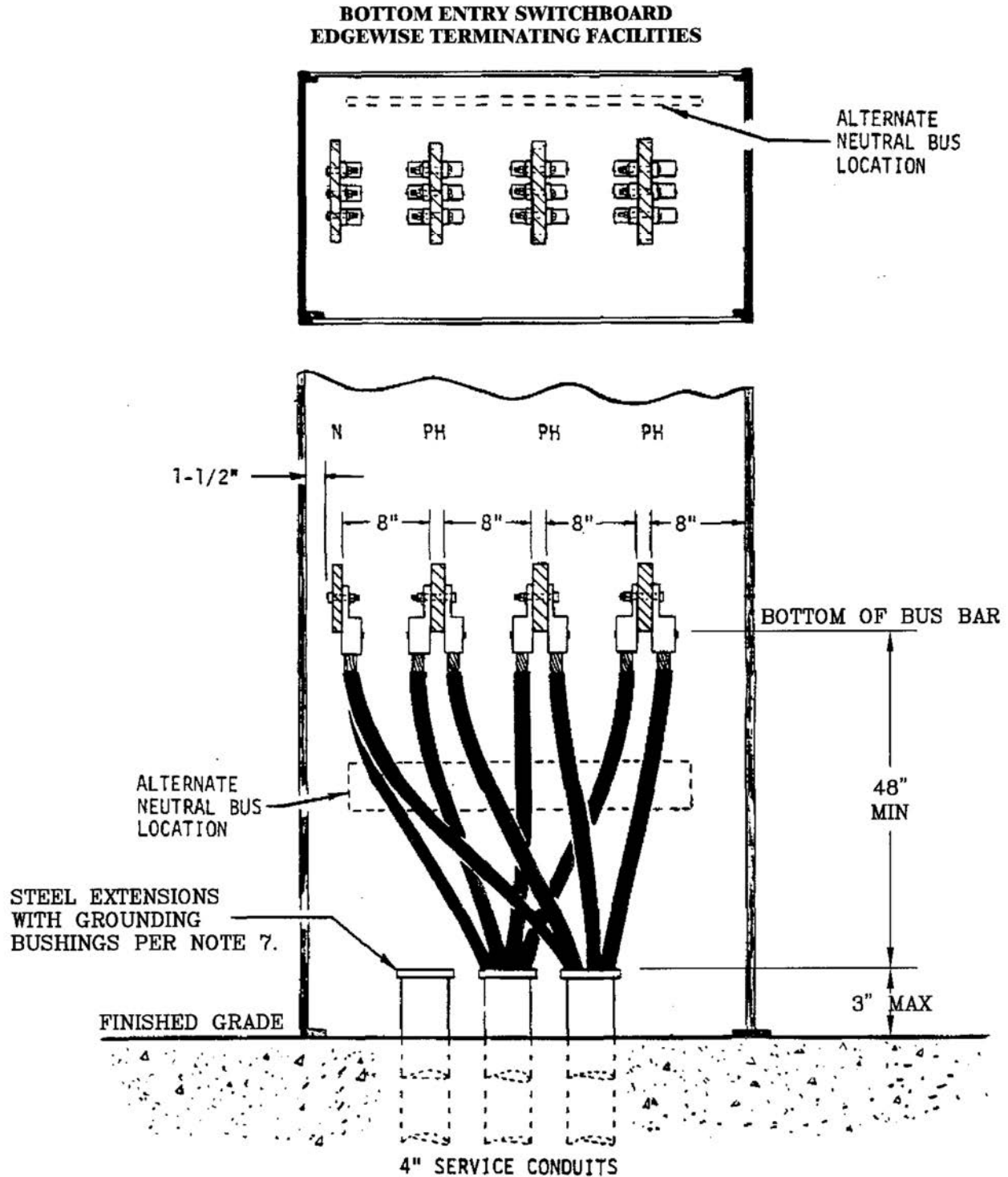
6-19-100-A

CABLE LIMITER DIMENSIONS



6-19-100-B

Figure 2



6-19-100-C

Figure 3

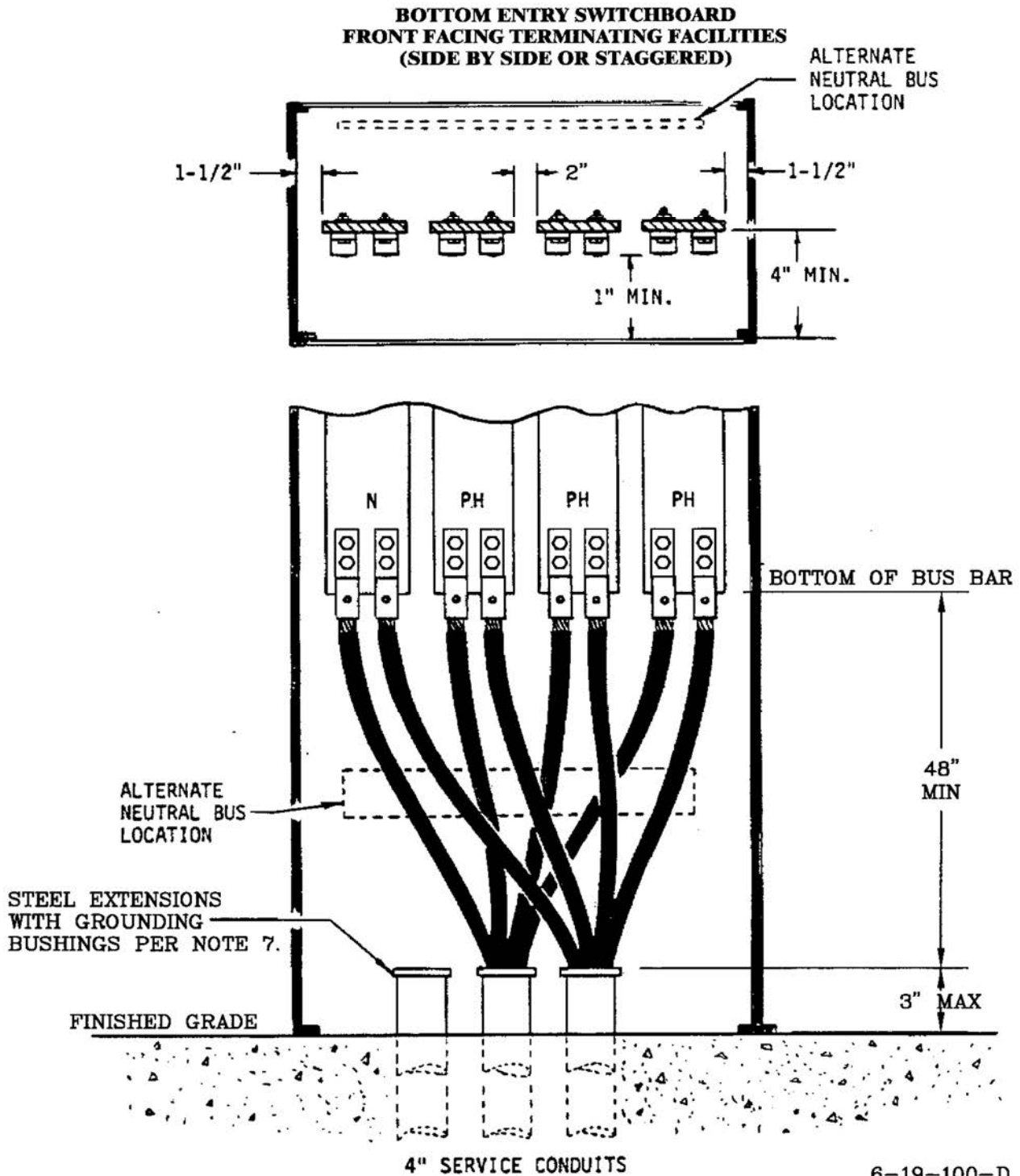


Figure 4

**BACK ENTRY SWITCHBOARD (TOP OR BOTTOM)
EDGEWISE TERMINATING FACILITIES**

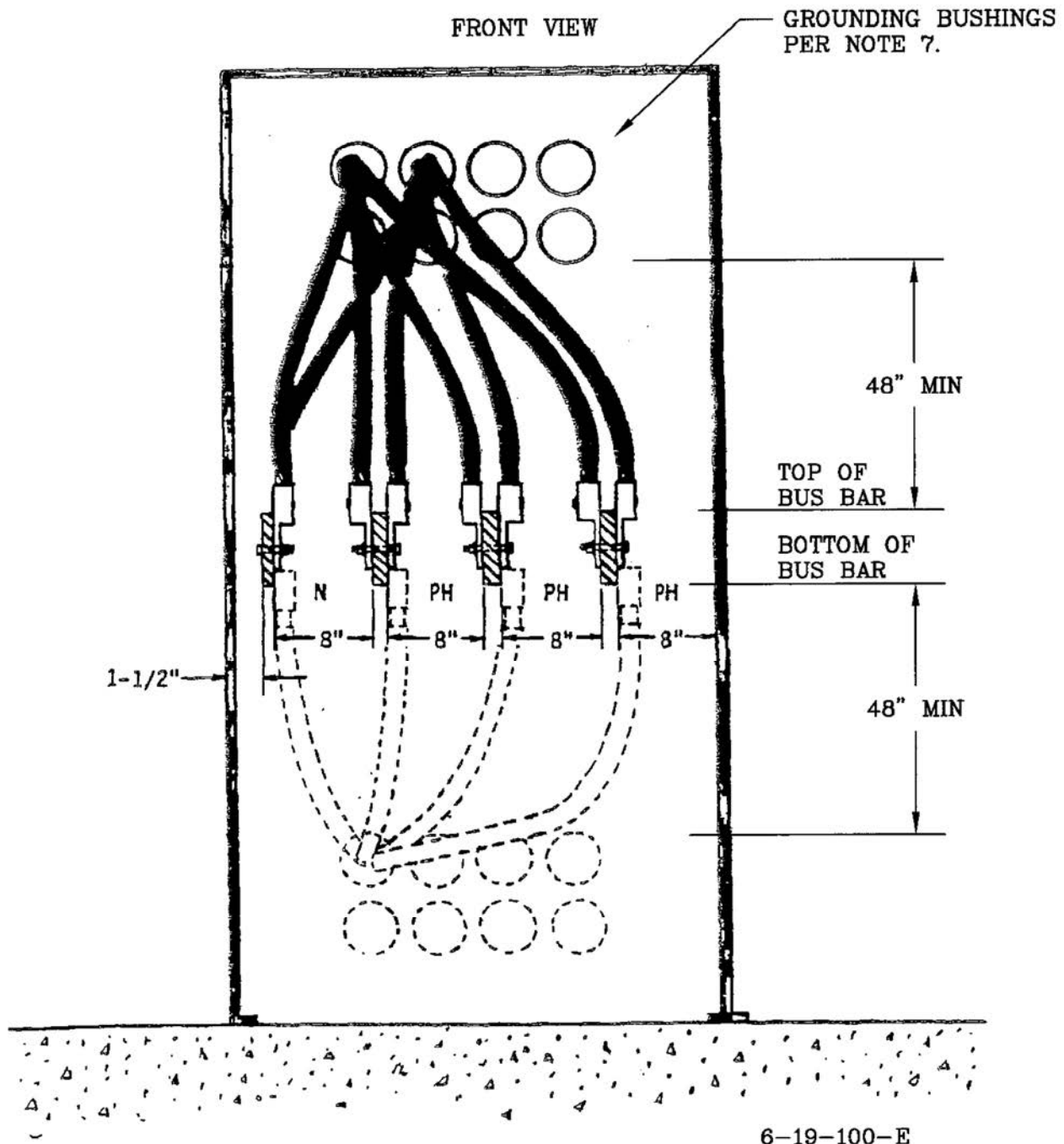
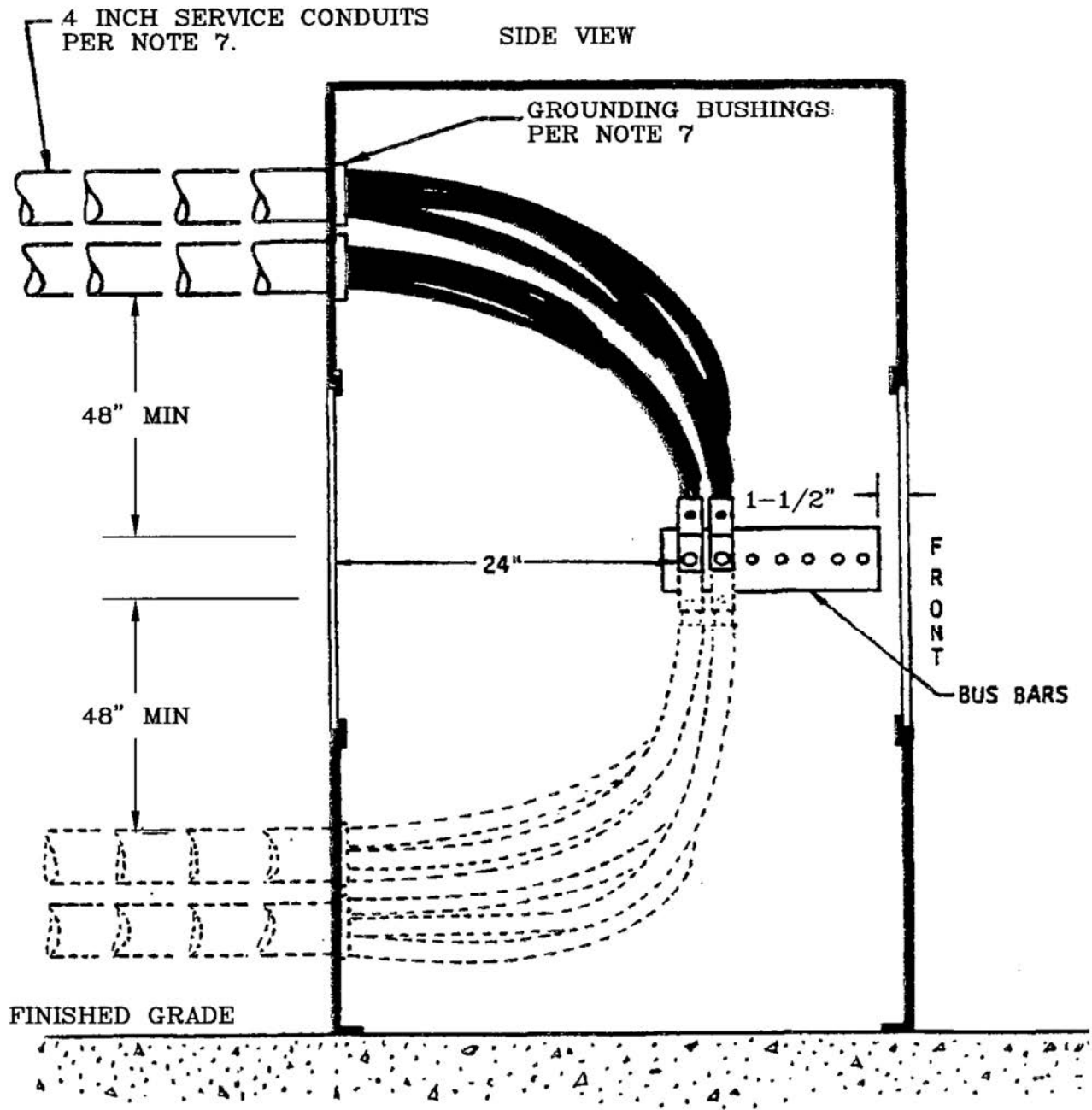


Figure 5

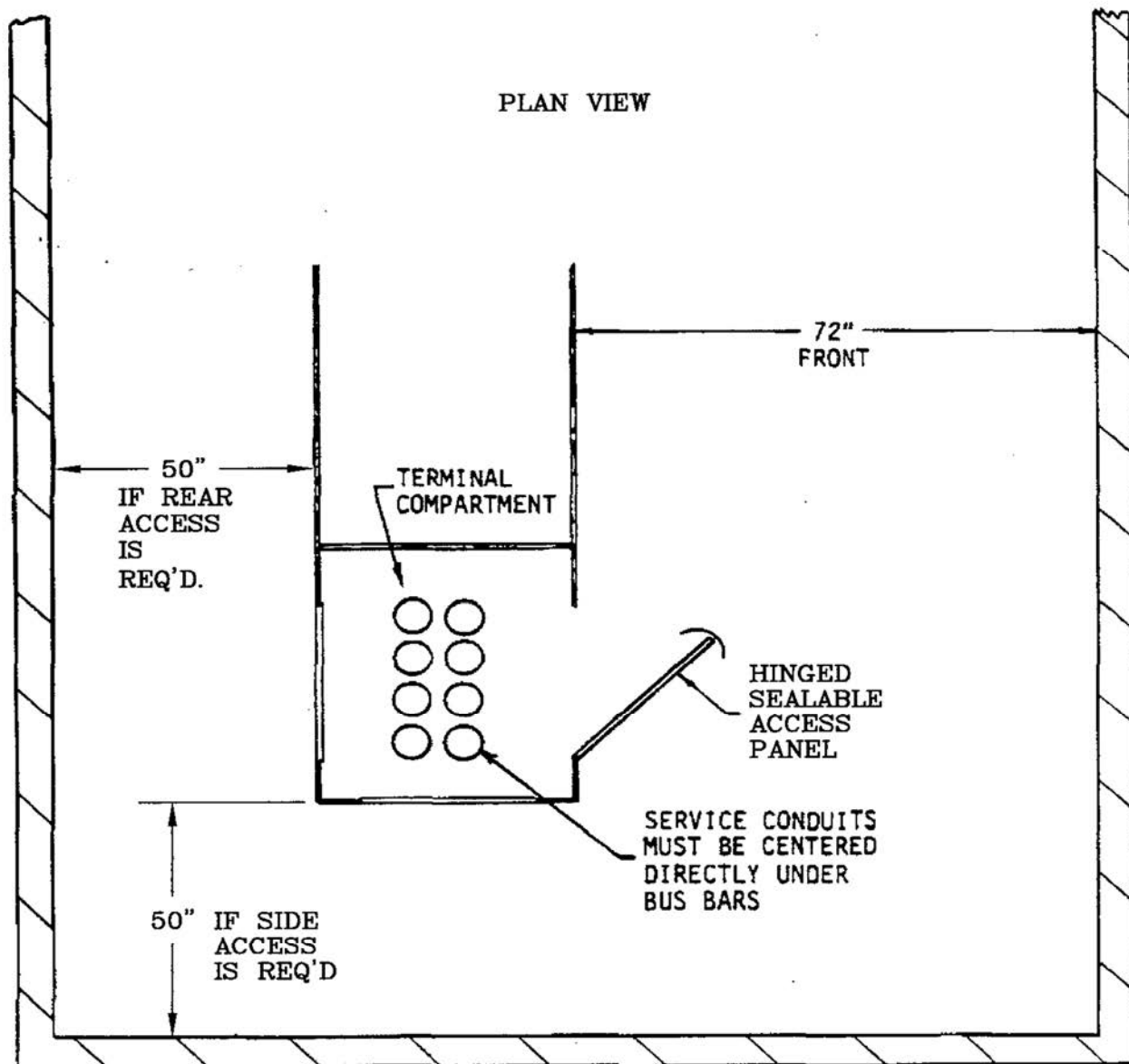
BACK ENTRY SWITCHBOARD (TOP OR BOTTOM)



6-19-100-F

Figure 6

**WORKING SPACE REQUIREMENTS
IN MECHANICAL ROOM**



6-19-100-G



**Underground Secondaries and Services
Customer Reference Specification
6-19-133**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 64 of 101

6-19-133 – Customer Reference Specification

**Installation of 120/240 Volt Single-Phase
Underground Lateral Sharing a Trench
with Other Utilities
(Joint Trench)**

(Replaces CRS-1014)

THIS CUSTOMER REFERENCE SPECIFICATION (CRS) IS PART OF THE
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**Underground Secondaries and Services
Customer Reference Specification
6-19-133**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 65 of 101

This CRS contains basic information which defines two possible scenarios for PPL Electric Utilities(PPL EU) installation of 120/240 volt single-phase underground service lateral sharing a trench with other utilities (joint trench).

Scenario A pertains to situations when the customer or customers contractor will be tying pull line and connecting the customer conduit to the PPL EU conduit stub.

Scenario B pertains to situations when the customer or customers contractor will be laying the customer conduit, running pull line and then plugging the customer conduit end for PPL EU to attach the conduit to the PPL EU conduit stub at a later date.

From the general notes to Figure 6-19-133-C of this CRS covers information that pertain to both scenarios. Information on these pages is specific to one scenario or the other, it is labeled accordingly.

The detail show in Figures 6-19-133-D through 6-19-133-G covers Scenario A only.

Figures 6-19-133-H through 6-19-133-K covers details for Scenario B only.

The PPL EU technician will tell you which scenario is applicable to your job and when various trench inspections are required.

All details of this specification shall be strictly followed. Any deviation must be approved by the PPL EU Technician . Unapproved deviations are usually costly for the customer to correct and can result in delays or possible refusal to connect service.

Requirements for installation of primary and secondary in a trench with gas, and/or telecommunication lines are specified in Customer Reference Specification 6-14-122.

Requirements for installation of 120/240 volt underground service laterals in a trench with only electric lines are specified in Customer Reference Specification 6-19-134.

Requirements for installation of primary and secondary in a trench with no other utilities are specified in Customer Reference Specification 6-14-121.

Definitions:

Single Wall Flexible Pipe – Coreflo

Double Wall Flexible Pipe – Super Coreflo

Service Lateral Conduit

The first 5' of horizontal conduit at the meter end of the trench.

General Notes:

1. The Pennsylvania Underground Utility Line Protection Act requires any person doing excavation or demolition work to:
 - A. Ascertain the location and types of utility lines at each work site.
 - B. Request location of lines from utility at least 3 working days before beginning excavation or demolition work by calling PA One Call at 811 or 1-800-242-1776.
 - C. Notify PA One Call of any break or damage to its line made or discovered during excavation or demolition.
2. The depth dimension shown on Fig. 6-19-133-A and Fig. 6-19-133-B is minimum. Minimum separation for other (non-joint trench) utilities may require deeper trench due to obstacles or to maintain the following separation from other utilities.
 - A. Water, sewer, etc. – 12 inches of earth.
 - B. Steam, heat mains – 72 inches of earth.
 - C. Propane – 36 inches of earth; never above electric.

Occupational Safety and Health Administration (OSHA) approved shoring is required for trenches deeper than 60 inches.
3. Do not use power excavating equipment within 24 inches of any existing buried cables or other electrical or communications equipment.
4. **Site Preparation – by Customer:**
 - A. Clear ground of trees, stumps, roots, rocks, and other obstructions.
 - B. Rough grade trench route to within 6 inches of final grade.
5. **Trench Preparation – by Customer:**
 - A. Excavate all service trenches 48 inches deep.
 - B. Material excavated from trench must be placed on only one side of trench and far enough away so piles of excavated material pose no danger or obstacle to people working in trench. Keep one side of trench clear so workers have clear access to trench.
 - C. Provide an adequate amount of bedding material for use as protective backfill over PPL EU conduits and if required, to bed the bottom of rough/uneven trenches. Distribute bedding material along trench route on same side of trench as removed trench material.

- D. Grade trench free of high spots, rock projections, stones, and depressions. If the bottom of the trench is rough/uneven, the customer must excavate 3 additional inches and bed the trench with stone fines or sand, 3 inches deep.
- E. Trench must be clear of standing water before PPL EU crews will install electric facilities.

6. Flexible Pipe or Conduit – by Customer:

- A. The customer may install flexible pipe of a twin wall construction with a smooth inside wall and a corrugated outside wall. The flexible pipe must meet the material and performance requirements of NEMA standard TC-5.

For identification purposes, the pipe should be marked with 1 yellow and 2 red stripes equally spaced apart throughout the length of the pipe. In addition, the pipe should be marked at least every 10 feet with the NEMA standard number – TC-5. All conduits must be same diameter as the service lateral conduit.

Scenario B – When PPL EU will be making the connection to the service stub, the pipe must be long enough to extend from the service lateral conduit to 5 feet beyond the PPL EU service stub marker or riser pole.

The pipe must have couplings at both ends. Fasten the coupling at the meter end to the service lateral conduit using PVC conduit adhesive.

IMPORTANT: Install the pulling line from the meter base to the end of the pipe at the service stub marker or pole and seal the pipe end. PPL EU will connect pipe to the PPL EU conduit stub, see Fig. 6-19-133-F and Fig. 6-19-133-G).

- B. The customer may install gray schedule 40 PVC conduit (UL approved). Couplings are preferred to bell ends. All joints must be glued with appropriate PVC conduit cement. The conduit must be the same diameter as the service lateral conduit. All conduit bends must have a minimum 36 inch radius. Per National Electrical Code (NEC) 344.26, there shall not be more than the equivalent of 3 quarter (90 degree) bends in the run for maximum of (270°).

Scenario B – A pulling line from the meter base to the end of the conduit at the service stub, stub marker or pole must be installed and the conduit end sealed.

- C. Any service conduit that is installed in the rear zone of the house must be gray schedule 40 PVC conduit (UL approved) encased in concrete (minimum 3 inch thickness). The rear zone is defined as an area extending 20 feet from rear of the house.
- D. **Scenario A** – Install a flexible pipe or conduit from PPL EU's conduit stub to the service lateral conduit at the meter base. Connect the pipe or conduit to the PPL EU conduit stub using the PPL EU provided coupling installed at the end of the PPL EU conduit stub. Hand dig near PPL EU conduit stub to avoid damaging conduit or coupling. Connect the other end of the pipe or conduit to the meter service lateral conduit using an appropriate coupling. Install a pull line from the PPL EU conduit stub to the meter

base. Fasten this pull line to the PPL EU pull line in the PPL EU conduit stub and tie off other end in the meter base. Details are shown on pages 67 thru 70.

Backfill trench as specified below remembering that, should PPL EU be unable to pull its conductor through this customer installed conduit system, service will be delayed until the customer makes the conduit system pullable.

- E. **Scenario B** – PPL EU will connect conduit to PPL EU conduit stub (Fig. 6-19-133-H through Fig. 6-19-133-K).

7. Pulling Line – by Customer:

- A. The only acceptable pulling line is a flat polyester, woven, prelubed tape, 1/2 inch in width with a minimum breaking strength of 1200 pounds.
- B. When installing pulling line in PVC conduit, be sure conduit adhesive is dry before installing the pulling line to avoid gluing the pulling line to joint.
- C. **Scenario A** – Join flat pulling line from the customer side conduit run to the flat pulling line from the PPL EU conduit run; firmly knot the two pulling lines together. A secure knot is shown on Fig. 6-19-133-C.

8. Backfilling – by Customer:

- A. Coordinate installation of communication cables and gas facilities.
- B. Using stone screenings or sand, backfill first 12 inches of the trench in layers, thoroughly tamping each layer to eliminate air pockets.
- C. Do not run wheels or tracks of equipment along trench to compact the backfill.
- D. **Scenario B** – When the connection is being made at a later time; do not backfill the last 15 feet of the trench until PPL EU has completed connecting the customer provided conduit/pipe to the PPL EU conduit stub.
- E. Maintain spacings between the various utilities as shown on Fig. 6-19-133-A and Fig. 6-19-133-B. Once the gas company has completed covering their facilities, the remainder of the trench may be backfilled using select backfill tamping in layers. Select backfill can be:
 - a. Earth removed from the trench excavation provided it is mostly soil which contains some round gravel but no stones larger than one inch in diameter.
 - or
 - b. Material such as: sand, stone screenings or earth meeting definition (a) transported to the site by the customer at his cost. Shaley earth containing sharp angular stones, coal fines, fly ash, and/or cinders are not select backfill.



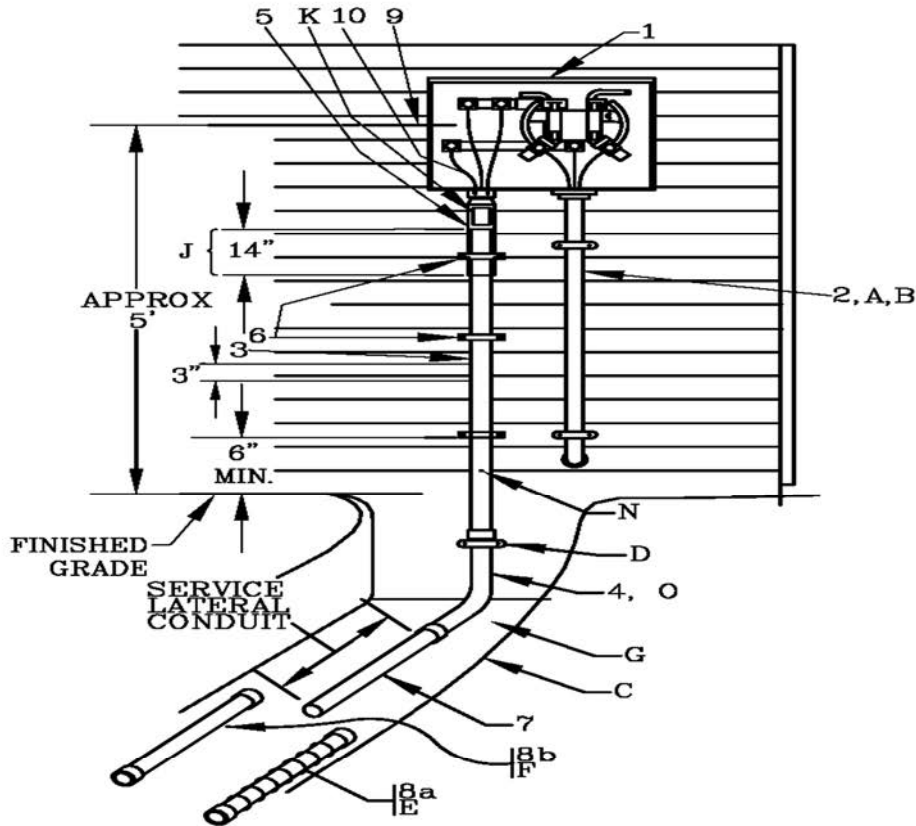
**Underground Secondaries and Services
Customer Reference Specification
6-19-133**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 69 of 101

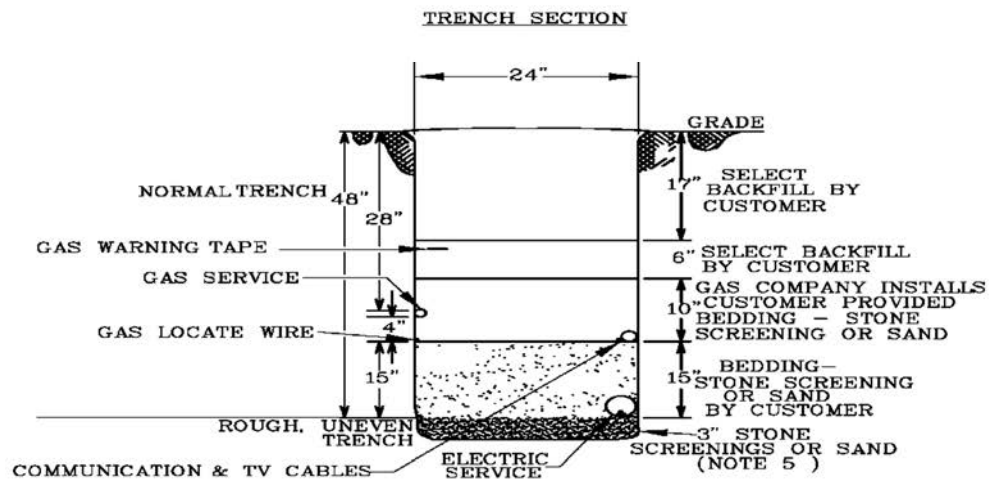
9. Installation of Cable – by PPL EU

- A. PPL EU will pull cable into conduit or flexible plastic pipe using customer installed pulling line. If PPL EU is unable to pull cable through the customer installed conduit system, or finds that PPL EU specifications were not followed, service installation will be delayed until the customer makes the necessary repairs to the conduit system to make it correct and pullable.

Information Found on This Sheet Refers to the Notes on Pages 69 & 70.



6-19-133-A
NOT TO SCALE



6-19-133-B
NOT TO SCALE



**Underground Secondaries and Services
Customer Reference Specification
6-19-133**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 71 of 101

Information Found on This Sheet Refers to the Drawings on Figures 6-19-133-A and 6-19-133-B

Customer Furnishes, Installs and Maintains:

1. Meter trough approved by PPL for aluminum or copper conductor.
2. Service entrance cable or conductors in conduit (per NEC 300-5, PVC plastic conduit may have to be Schedule 80).
3. Meter riser conduit (consult with PP EU technician for conduit size)-3 inch min. threaded galvanized rigid or intermediate steel conduit with bushing or gray Schedule 40 PVC conduit (UL approved).
4. 90° elbow, 36-inch radius (schedule 40 PVC or galvanized steel). (consult PPLEU technician for material).
5. Install slip riser on all single-phase residential services. See approved slip riser table.
6. Conduit straps to be same size to allow conduit to move within strap.

Customer Furnishes and Installs, PPL Maintains:

7. Service lateral conduit – 5' gray Schedule 40 PVC conduit 3" min. (UL approved) (size to match meter riser conduit).
8. a) Flexible pipe with twin wall construction, inside smooth, outside corrugated, per NEMA TC5.
b) Gray Schedule 40 PVC conduit 3" min. (UL approved) diameter to service lateral conduit.

PPL Furnishes, Installs and Maintains:

9. Meter (not shown)
10. Service lateral conductors installed inside of customer provided conduit terminating on line side terminals in meter base.

Notes:

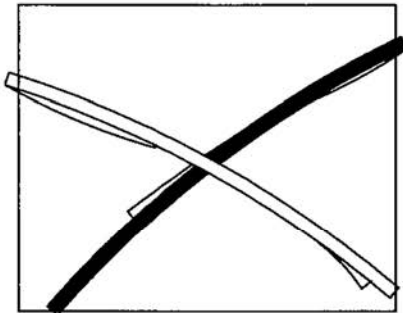
- A. When service entrance conductors are 300 kcmil or larger, contact PPL for specifications of metering equipment and service lateral conduit.
- B. Securely fasten together all conduit pieces, (thread steel, solvent weld plastic). Ream ends of conduit to remove any sharp burrs. Secure conduit to house with conduit straps.
- C. Contact PPL EU for exact trench location.



**Underground Secondaries and Services
Customer Reference Specification
6-19-133**

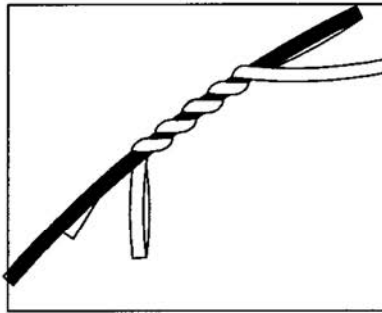
0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 72 of 101

- D. Secure elbow (Item 4) to foundation with two-hole conduit strap installed just below elbow bend coupling.
- E. Install flexible pipe from PPL EU's conduit stub to service lateral conduit or from service lateral conduit to the riser pole. Provide pulling line and seal end. (See pages 67 & 68)
- F. If using schedule 40 PVC conduit, see pages 67 & 68 for installation details.
- G. Tamp base of trench near house so trench will not settle and pull service conduits off house.
- H. See REMSI SKETCH #55 for clearances to gas meters.
- I. Gas refers to natural gas. Propane or LP-gas is not permitted; 36-inch minimum separation.
- J. Extend conduit approximately 14 inches into the slip riser.
- K. No attachment sticker-provided by PPL EU – PPL CID #943016.
- L. Do not install any attachments on conduit or slip riser per NEC and IRC. See SKETCH #55.
- M. 50 " minimum clear space in front of meter base. See Rule 13, SKETCH #55 and SKETCH #55A (side view).
- N. Drill 2-1/4" holes in back of conduit 3" above ground prior to pulling cable.
- O. Drill 2-1/4" holes in bottom side of elbow prior to pulling cable.
- P. See REMSI SKETCH #7 and SKETCH #7A for more detail.



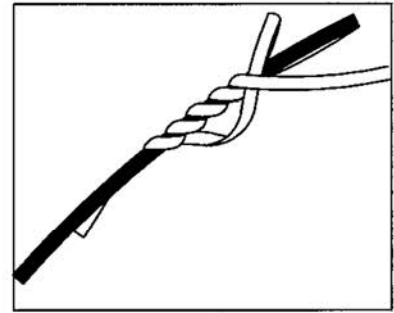
1.

Take each end of the flat pulling line to be spliced, and without twisting, fold so that each end is doubled for approximately 18 inches. Take the end on the right and cross it over the end on the left.



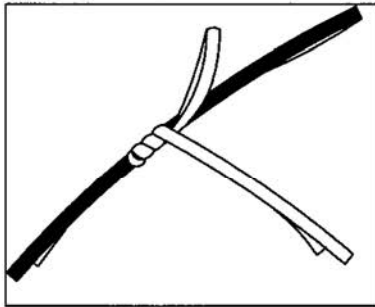
2.

Now, take the same end and make four turns around the other line.



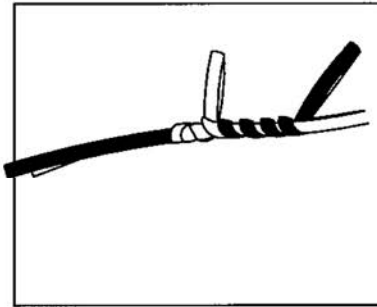
3.

Without twisting, bend the wrapped end back and insert it between the looped lines at the point where they crossed initially (in step 1).



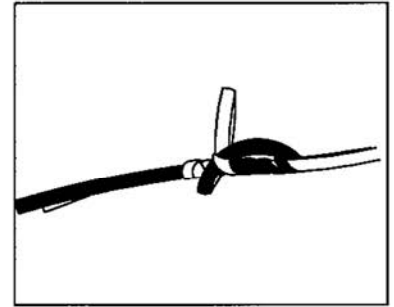
4.

Wraps and loops should now be snugged as shown above.



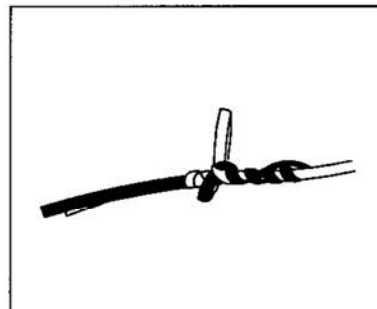
5.

Using the other end, repeat the process outlined in step 2. After concluding this process, both ends should be sticking up as shown.



6.

Insert the tape end used in step 5 down through the same hole where the looped lines crossed initially, as in step 3.



7.

The knot is complete but loose. The knot can now be drawn up by grasping the lines on either side of the knot and pulling.

6-19-133-C



**Underground Secondaries and Services
Customer Reference Specification
6-19-133**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 74 of 101

From this point forward this CRS has been split into separate sections,

Scenario A – Fig. 6-19-133-D through Fig. 6-19-133-G

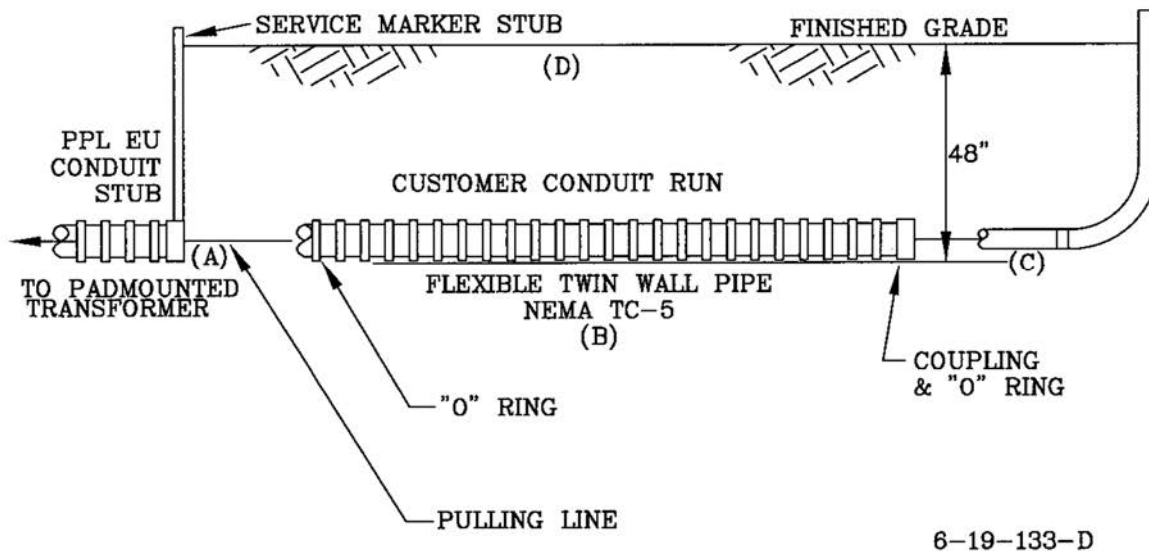
Scenario A pertains to situations when the customer or customers' contractor will be tying pull line and connecting the customers' side conduit to the PPL EU conduit stub.

Scenario B – Fig. 6-19-133-H through Fig. 6-19-133-K

Scenario B pertains to situations when the customer or customers' contractor will be laying the customer conduit, running pull line and then plugging the customer conduit end for PPL EU to attach the conduit to the PPL EU conduit stub at a later date.

Scenario A

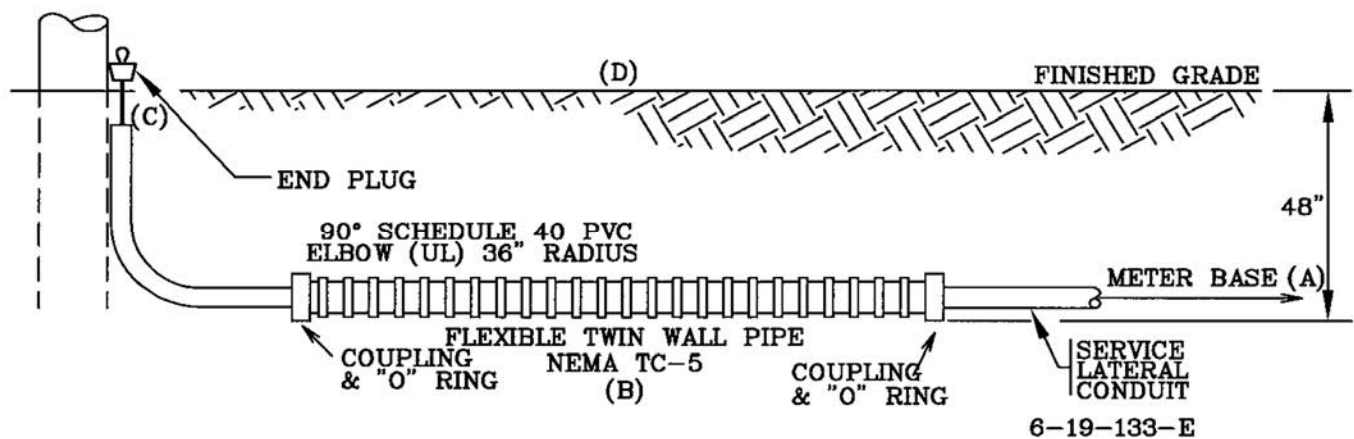
Customer Installation of Service Run to PPLEU Conduit Stub Using Twin Wall Flexible Pipe



- A. Excavate 48-inch deep trench from PPL EU service stub marker to meter base. Hand dig near service stub marker to expose about 12 inches of the PPLEU conduit stub. Use care not to damage conduit or coupling. The end of the conduit should have been sealed with a plug by PPLEU. Unscrew plug seal. The PPL EU pulling line and a rubber "O" ring should be tied to the plug. Untie pulling line and remove "O" ring. Save plug to install in meter base.
- B. Install enough twin wall flexible pipe to reach from PPLEU conduit stub to service lateral conduit. Install the PPL EU supplied "O" ring on the first groove of the twin wall flexible pipe. Install pulling line into twin wall flexible pipe. Securely tie pulling line to the PPL EU pulling line using steps on page 71. Coat "O" ring with silicone sealant (GE RTV 102 or PPL-approved equivalent). Insert pipe with "O" ring into PPL EU coupling until pipe contacts other pipe. Using vinyl tape, tape across the joint.
- C. Install customer purchased "O" ring in first groove of service lateral end of twin wall flexible pipe. Coat "O" ring with silicone sealant (GE RTV 102 or PPL-approved equivalent). Insert twin wall pipe into customer-purchased twin-wall-to-PVC coupling. Feed pulling line through service lateral conduit into meter base. Using the plug from PPLEU conduit stub, tie pulling line to plug and install plug into conduit end in meter base. Coat coupling and service lateral conduit with PVC adhesive and push coupling onto service lateral conduit. Using vinyl tape, tape conduit across the joint.
- D. Backfill trench per Fig. 6-19-133-A and Fig. 6-19-133-B.

Scenario A (cont'd.)

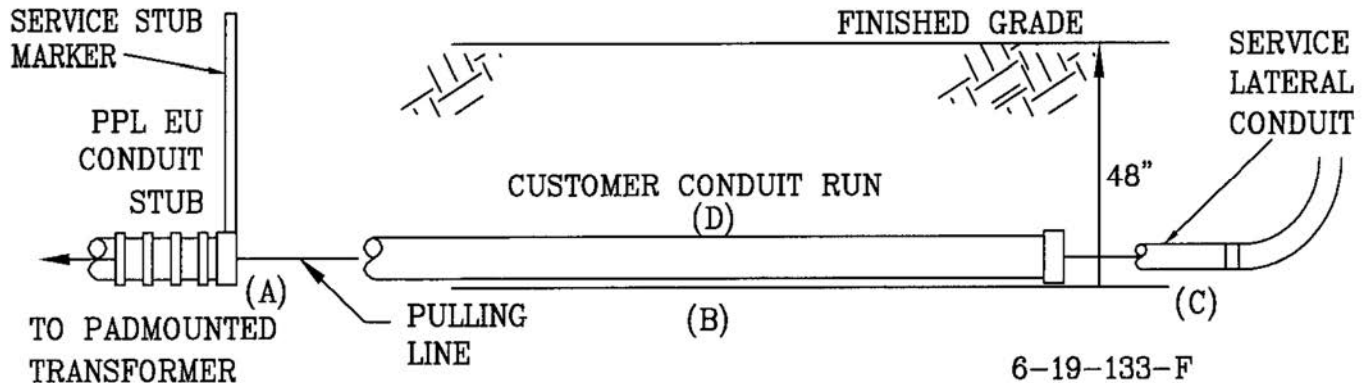
Customer Installation of Service Run to PPL EU Pole Using Twin Wall Flexible Pipe



- A. Excavate 48-inch deep trench from PPL EU pole to meter base.
- B. Install twin wall flexible plastic pipe from service lateral conduit to pole. Installation will require two twin wall – PVC couplings and two “O” rings. Install “O” rings on first groove on each end of twin wall flexible pipe run. Coat “O” ring with silicone sealant (GE RTV 102 or PPLEU approved equivalent). Push on couplings to center stop. Install 90 degree elbow at location on pole designated by PPL EU technician (all 90 degree elbows must have 36-inch radius sweeps). PPL EU technicians will specify whether the elbow is plastic or steel. Join twin wall flexible pipe to PVC couplings at both ends to PVC fittings using PVC adhesive.
- C. Install pulling line from elbow at pole to meter base. Tie pulling line ends to conduit plugs and seal both ends of conduit run with the plugs.
- D. Backfill trench per Fig. 6-19-133-A and Fig. 6-19-133-B.

Scenario A (cont'd.)

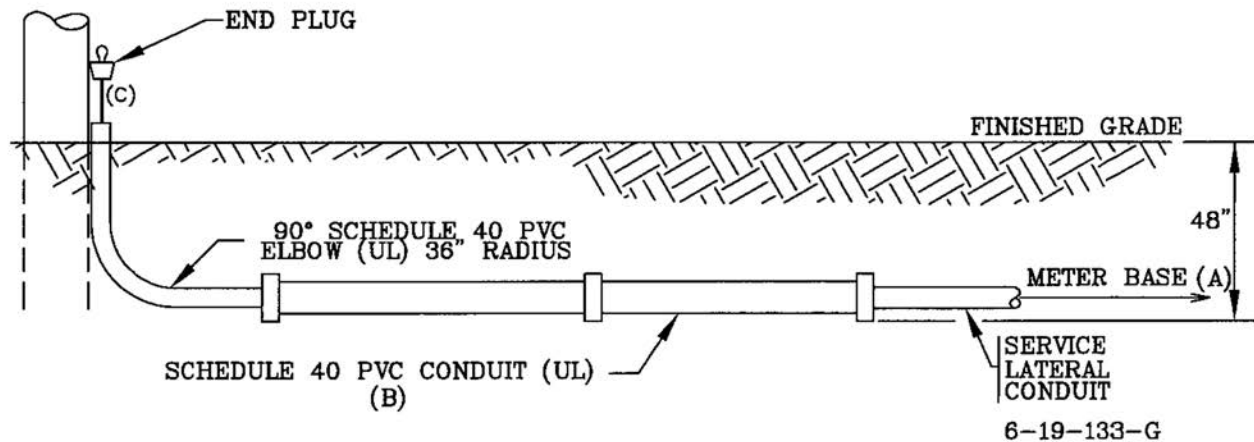
Customer Installation of Service Run to PPL EU Conduit Stub Using Gray Schedule 40 PVC Conduit



- A. Excavate 48-inch deep trench from PPL EU service stub marker to meter base. Hand dig near service stub marker to expose about 12-inches of the PPL EU conduit stub. Use care not to damage conduit or coupling. The end of the conduit should have been sealed with a plug by PPLEU. Unscrew the plug seal. The PPL EU pulling line and a rubber "O" ring should be tied to the plug. Untie pulling line and remove "O" ring. Save plug to install in meter base. Carefully cut off PPLEU provided coupling and discard. Install "O" ring on first groove of twin wall pipe. Coat "O" ring with silicone sealant (GE RTV 102 or PPL EU approved equivalent) and install customer purchased twin wall to PVC coupling.
- B. Glue together enough gray Schedule 40 PVC conduit sections to reach the service lateral conduit. When adhesive is dry, install pulling line. Securely tie this pulling line to PPLEU pulling line and insert gray Schedule 40 PVC conduit into coupling using PVC adhesive. Using vinyl tape, tape across the joint.
- C. At service lateral end, install a PVC coupling using PVC adhesive. Feed pulling line through service lateral conduit into meter base. Using the plug from PPL EU conduit stub, tie pulling line to plug and install plug into conduit end in meter base. Using PVC adhesive, connect coupling on conduit run to service lateral conduit.
- D. Backfill trench per Fig. 6-19-133-A and Fig. 6-19-133-B.

Scenario A (cont'd.)

Customer Installation of Service Run to PPL EU Pole Using Gray Schedule 40 PVC Conduit

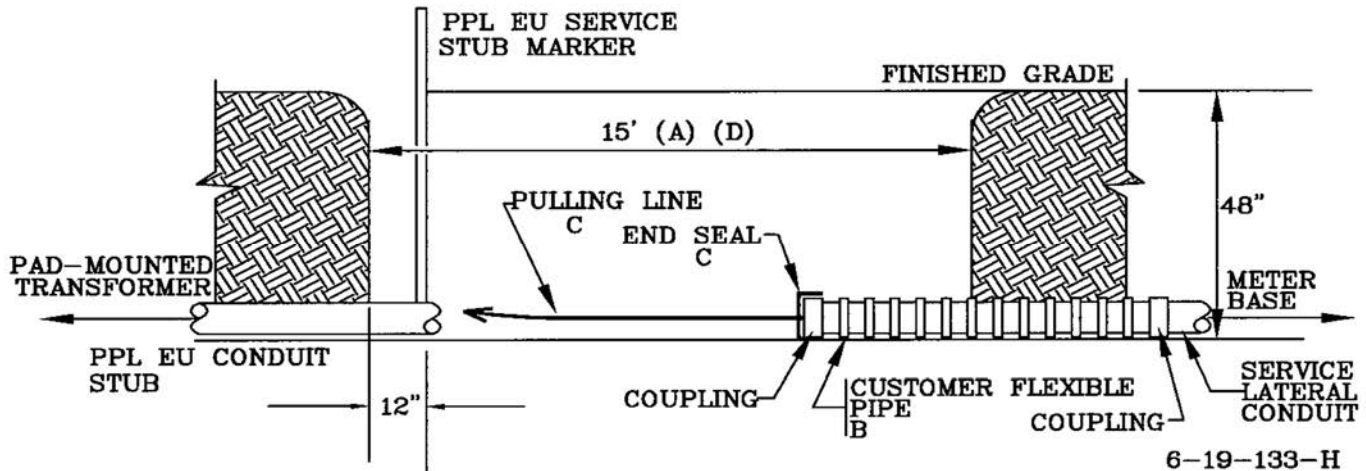


- A. Excavate 48-inch deep trench from PPL EU pole to meter base.
- B. Install conduit from service lateral conduit to pole. Install 90 degree elbow at location on pole designated by PPL EU technician. All 90 degree elbows must have 36-inch radius sweeps. Glue all joints using PVC adhesive. PPL EU technicians will specify whether elbow is plastic or steel.
- C. Install pulling line from elbow at pole to meter base. Tie pulling line ends to conduit plugs and seal both ends of conduit run with the plugs.
- D. Backfill trench per Fig. 6-19-133-A and Fig. 6-19-133-B.

End of Scenario A

Scenario B

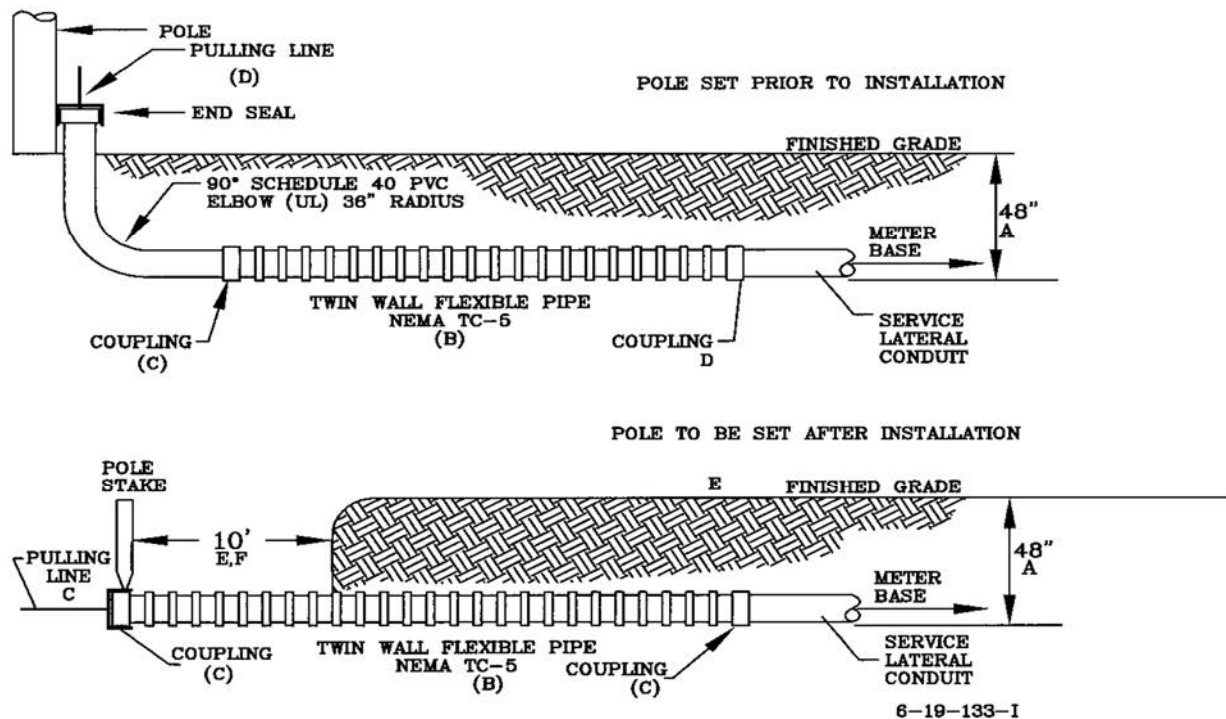
Customer Installation of Service Run to PPL EU Service Stub Marker Using Twin Wall Flexible Pipe



- A. Excavate 48-inch deep trench to one foot past PPL EU service marker, exposing PPL EU conduit stub while taking care not to damage conduit stub. Leave final 15 feet of trench open for PPL EU. Minimum trench width in this area is 24-inches.
- B. Install enough flexible pipe to extend 5 feet past PPLEU service stub marker. Install couplings on both ends of flexible plastic pipe. Fasten coupling at meter end to service lateral conduit using PVC adhesive. PPL EU will fasten coupling at stub end to their conduit stub. If PPLEU cannot pull conductors through the flexible pipe run, the customer shall make pipe system pullable.
- C. Install pulling line from meter base to pipe end. Install end seal and backfill (see Fig. 6-19-133-A and Fig. 6-19-133-B) the entire conduit run except for last 15 feet.
- D. After PPL EU completes installation of cable into flexible pipe, backfill the remaining open trench accommodating the other utilities as shown in Fig. 6-19-133-A and Fig. 6-19-133-B.

Scenario B (cont'd.)

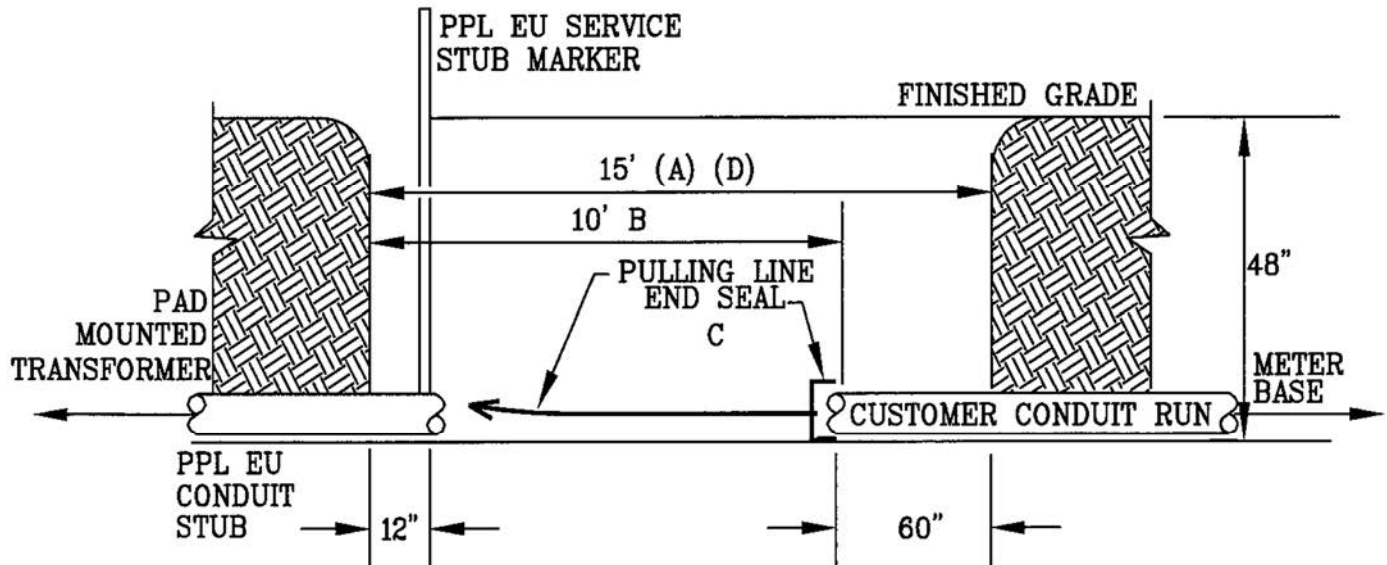
Customer Installation of Service Run to PPL EU Pole Using Twin Wall Flexible Pipe



- A. Excavate 48-inch deep trench to pipe or pole stake. Minimum trench width in the area at the pole is 24- inches.
- B. Install flexible pipe from service lateral conduit to pole. Install PVC elbow at location on pole designated by PPL EU technician.
- C. Install couplings (twin wall – PVC) on both ends of flexible pipe and fasten to service lateral conduit and elbow conduit using PVC adhesive.
- D. Install pulling line in pipe run. Seal elbow end. (See Fig. 6-19-133-A and Fig. 6-19-133-B). Backfill entire conduit run.
- E. If pole is not set yet, install flexible pipe to reach the pole stake per page 68. Backfill all but last 10' of pipe run. Provide enough flexible pipe, appropriate elbow and couplings for PPLEU to complete installation.
- F. After PPL EU completes installation of cable into flexible pipe, backfill the remaining open trench accommodating the other utilities as shown in Fig. 6-19-133-A and Fig. 6-19-133-B.

Scenario B (cont'd.)

Customer Installation of Service Run to PPL EU Service Stub Marker Using PVC Conduit

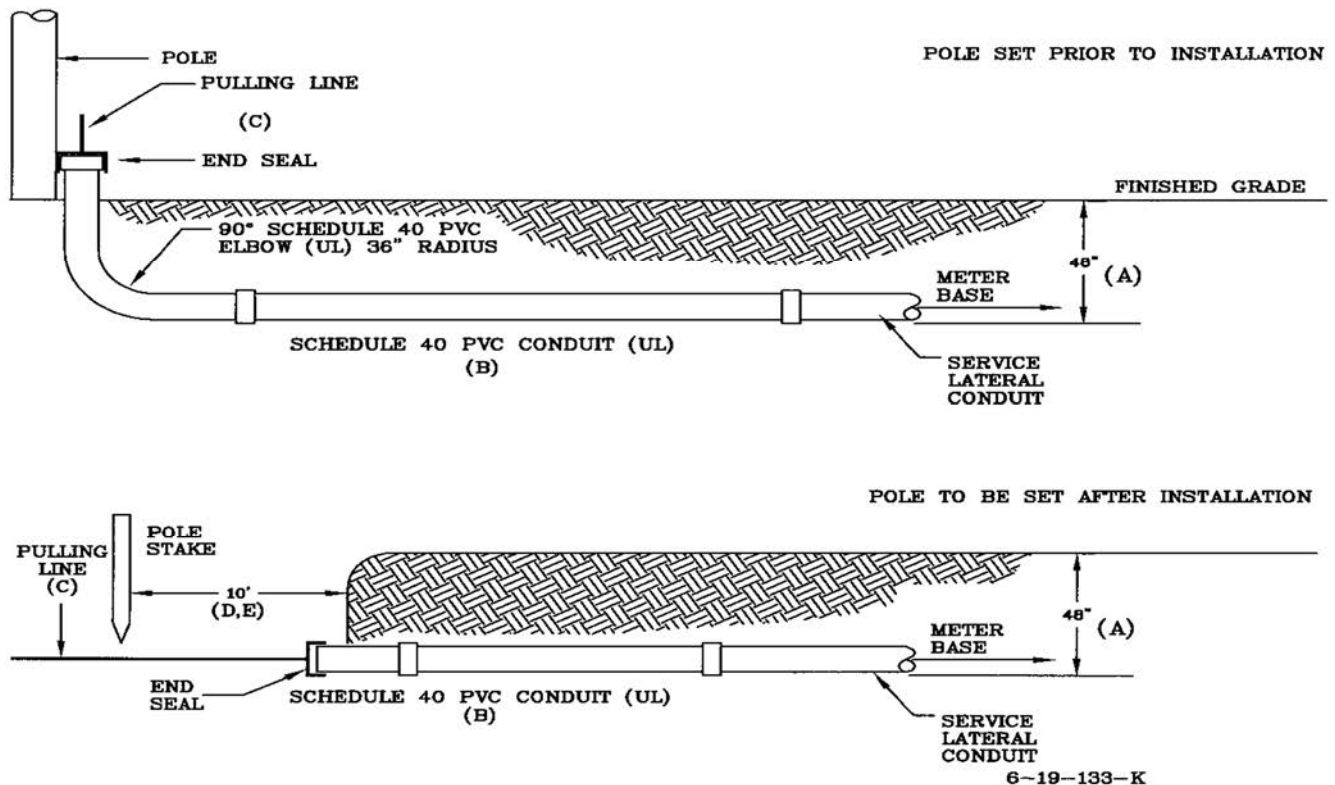


6-19-133-J

- A. Excavate 48-inch deep trench to one foot past PPL EU service marker, exposing PPL EU conduit stub while taking care not to damage conduit stub. Leave final 15 feet of trench open for PPLEU. Minimum trench width in this area is 24-inches.
- B. Provide but do not install final 10 foot piece of conduit. PPLEU completes the conduit connection. If PPL EU cannot pull the conductors through the conduit run, the customer must make the conduit system pullable.
- C. Install pulling line from meter base to conduit end, install end seal, and backfill (see Fig. 6-19-133-A and Fig. 6-19-133-B) the entire conduit run except for last 15 feet.
- D. After PPL EU completes installation of cable into conduit, backfill remaining open trench accommodating the other utilities as shown in Fig. 6-19-133-A and Fig 6-19-133-B.

Scenario B (cont'd.)

Customer Installation of Service Run to PPL EU Pole Using PVC Conduit



- Excavate 48-inch deep trench to pole or pole stake. Minimum trench width in the area at the pole is 24-inches.
- Install conduit from service lateral conduit to pole. Install PVC elbow at location on pole designated by PPL EU technician.
- Install pulling line in conduit run, (see Fig. 6-19-133-A and Fig. 6-19-133-B), backfill entire conduit run. Seal elbow end. All 90 degree elbows must have 36 inch radius sweeps.
- If pole is not set yet, install conduit to within 10 feet of the pole stake. Per Fig. 6-19-133-A and Fig. 19-133-B, backfill all but last 10' of conduit run. Provide enough conduit and appropriate elbow for PPL EU to complete installation after pole is set.
- After PPL EU completes installation of cable into conduit, backfill the remaining open trench per Sheet 7, accommodating the other utilities as shown in Fig. 6-19-133-A and Fig. 6-19-133-B.



**Underground Secondaries and Services
Customer Reference Specification
6-19-134**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 83 of 101

6-19-134 – Customer Reference Specification

**Requirements for Trenching and Backfilling by
Customer for 120/240 V Underground
Service Laterals Installation in a Trench with only
Electric Lines
(Non-Joint Trench)**

(Replaces CRS-1009)

THIS CUSTOMER REFERENCE SPECIFICATION (CRS) IS PART OF THE
RULES FOR ELECTRIC METER AND SERVICE INSTALLATION (REMSI) WEBSITE



**Underground Secondaries and Services
Customer Reference Specification
6-19-134**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 84 of 101

This CRS contains basic information which defines two possible scenarios for PPL Electric Utilities (PPL EU) requirements for Trenching and Backfilling by Customer for 120/240V Underground Service Laterals Installation in a Trench with only Electric Lines.

Scenario A – pertains to situations when the customer or customers’ contractor will be tying pull line and connecting the customer side conduit to the PPL EU conduit stub at a later date.

Scenario B – pertains to situations when the customer or customers’ contractor will be laying the customer side conduit side conduit, running pull line and then plugging the customers side conduit end for PPL EU to attach the conduit to the PPL EU conduit stub at a later date.

Page 92 through Page 98 of this CRS covers information that pertains to both scenarios. If information on these pages is specific to one scenario or the other, it is labeled accordingly.

Page 92 through Page 95 covers details for Scenario A only.

Page 96 through Page 98 covers details for Scenario B only.

The PPL EU Technician will tell you which scenario is applicable to your job and when various trench inspections are required.

All details of this specification shall be strictly followed. Any deviation must be approved by the PPL EU designer. Unapproved deviations are usually costly for the customer to correct and can result in delays or possible refusal to connect service.

Requirements for trenching and backfilling by developer/customer for primary and secondary installation in a trench with only electric lines are specified in Customer Reference Specification 6-14-121.

Requirements for trenching and backfilling by customer for 120/240 volt underground service laterals installation in a trench with electric and/or gas telecommunication lines are specified in Customer Reference Specification 6-19-133.

Requirements for trenching and backfilling by developer/customer for primary and secondary installation in a trench with electric and/or gas telecommunication are specified in Customer Reference Specification 6-14-122.

Definitions:

Single Wall Flexible Pipe – Coreflo

Twin Wall Flexible Pipe – Super Coreflo

General Notes:

1. The Pennsylvania Underground Utility Line Protection Act requires any person doing excavation or demolition work to:
 - A. Ascertain the location and types of utility lines at each work site.
 - B. Request location of lines from utility at least 3 working days before beginning excavation or demolition work by calling PA One Call at 800-242-1776.
 - C. Notify PA One Call of any break or damage to its line made or discovered during excavation or demolition.
2. The depth dimension shown on Fig. 6-19-134A is minimum. Deeper trenches may be required due to obstacles or to maintain the following separation from other utilities.
 - A. Water, sewer, etc. – 12 inches of earth.
 - B. Steam, heat mains – 72 inches of earth.
 - C. Propane – 36 inches of earth; never above electric.
 - D. Gas, 6 inches minimum, 12 inches preferred: never below electric.
 - E. Communication – 6 inches minimum, 12 inches preferred. No deliberate separation is required by agreement between communication company and PPL EU.

Occupational Safety and Health Administration (OSHA) approved shoring is required for trenches deeper than 60 inches.
3. Do not use power excavating equipment within 24 inches of any existing buried cables or other electrical or communications equipment.
4. **Site Preparation – by Customer:**
 - A. Clear ground of trees, stumps, roots, rocks, and other obstructions.
 - B. Rough grade trench route to within 6 inches of final grade.
5. **Trench Preparation – by Customer:**
 - A. Excavate all service trenches 39 inches deep.
 - B. Material excavated from trench must be placed on only one side of trench and far enough away so piles of excavated material pose no danger or obstacle to people working in trench. Keep one side of trench clear so workers have clear access to trench.

- C. Provide an adequate supply of bedding material for use as protective backfill over PPL conduits and, if required, to bed the bottom of rough/uneven trenches. Distribute bedding material along trench route on same side of trench as removed trench material.
- D. Grade trench free of high spots, rock projections, stones, and depressions. If the bottom of the trench is rough/uneven, the customer must excavate 3 additional inches and bed the trench with stone fines or sand, 3 inches deep.
- E. Trench must be clear of standing water before PPL EU crews will install electric facilities.
- F. Customer must dig trench on their own property or will be subject to additional charges

6. Flexible Pipe or Conduit – by Customer:

- A. The customer may install flexible pipe of a twin wall construction with a smooth inside wall and a corrugated outside wall. The flexible pipe must meet the material and performance requirements of NEMA standard TC-5.

For identification purposes, the pipe should be marked with 1 yellow and 2 red stripes equally spaced apart throughout the length of the pipe. In addition, the pipe should be marked at least every 10 feet with the NEMA standard number – TC-5. The pipe must be same diameter as the service lateral conduit.

Scenario B – When PPL EU will be making the connection to the service stub, the pipe must be long enough to extend from the service lateral conduit to 5 feet beyond the PPL EU service stub marker or riser pole.

The pipe must have couplings at both ends. Fasten the coupling at the meter end to the service lateral conduit using PVC conduit adhesive.

IMPORTANT: Install the pulling line from the meter base to the end of the pipe at the service stub marker or pole and seal the pipe end. PPL EU will connect pipe to the PPL EU conduit stub, Fig. 6-19-134H, Fig. 6-19-134I, and Fig. 6-19-134J.

- B. The customer may install gray schedule 40 PVC conduit (UL approved). Couplings are preferred to bell ends. All joints must be glued with appropriate PVC conduit cement. The conduit must be the same diameter as the service lateral conduit. All conduit bends must have a minimum 36 inch radius. Per National Electrical Code (NEC) 344-14, there shall not be more than the equivalent of 4 quarter (90 degree) bends in the run (360°).

Scenario B – A pulling line from the meter base to the end of the conduit at the service stub, stub marker or pole must be installed and the conduit end sealed.

- C. Any service conduit that is installed in the rear zone of the house must be gray schedule 40 PVC conduit (UL approved) encased in concrete (minimum 3-inch thickness). The rear zone is defined as an area extending 20 feet from rear of the house.

- D. Scenario A – Install a flexible pipe or conduit from PPL EU’s conduit stub to the service lateral conduit at the meter base. Connect the pipe or conduit to the PPL EU’s conduit stub using the PPL EU provided coupling installed at the end of the PPL EU conduit stub. Hand dig near PPL EU’s conduit stub to avoid damaging conduit or coupling. Connect the other end of the pipe or conduit to the meter service lateral conduit using an appropriate coupling. Install a pull line from the PPL EU’s conduit stub to the meter base. Fasten this pull line to the PPL EU pull line in the PPL EU conduit stub and tie off other end in the meter base. Details are shown on Fig. 6-19-134D, Fig. 6-19-134E, and Fig. 6-19-134F. Backfill trench as specified below remembering that, should PPL EU be unable to pull its conductor through this customer installed conduit system, service will be delayed until the customer makes the conduit system pullable.
- E. Scenario B – PPL EU will connect conduit to PPL EU conduit stub Fig. 6-19-134K.

7. Pulling Line – by Customer:

- A. The only acceptable pulling line is a flat polyester, woven, prelubed tape, ½ inch in width with a minimum breaking strength of 1200 pounds.
- B. When installing pulling line in PVC conduit, be sure conduit adhesive is dry before installing the pulling line to avoid gluing the pulling line to joint.
- C. Scenario A - When joining flat pulling line to PPL EU’s flat pulling line be sure to adequately knot the two pulling lines together. A secure knot is shown at Fig. 6-19-134C.

8. Backfilling – by Customer

- A. Coordinate installation of communication cables.
- B. Once conduit installations are complete, use stone screenings or sand to fill the first 15 inches of trench depth.
- C. Backfill trench in layers, thoroughly tamping each layer to eliminate air pockets.
- D. Do not run wheels or tracks of equipment along trench to compact the backfill.
- E. Scenario B – When the connection is being made at a later time, do not backfill the last 15 feet of the trench until PPL EU has completed connecting the customer provided conduit/pipe to the PPL EU conduit stub.
- F. Fill the remainder of the trench depth with select backfill. Select backfill is defined as:
- Earth removed from the trench excavation provided it is mostly soil which contains some round gravel but no stones larger than one inch in diameter.

or



**Underground Secondaries and Services
Customer Reference Specification
6-19-134**

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 88 of 101

- Material such as: sand, stone screenings or earth meeting definition (A) transported to the site by the customer at his cost. Shaley earth containing sharp angular stones, coal fines, fly ash, and/or cinders are not select backfill.

9. Installation of Cable – by PPL EU

- A. PPL EU will pull cable into conduit or flexible plastic pipe using customer installed pulling line. If PPL EU is unable to pull cable through the customer-installed conduit system, or finds that PPL EU specifications were not followed, service installation will be delayed until the customer makes the necessary repairs to the conduit system to make it correct and pullable.



Underground Secondaries and Services
Customer Reference Specification
6-19-134

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 89 of 101

From this point forward, this CRS has been split into separate sections:

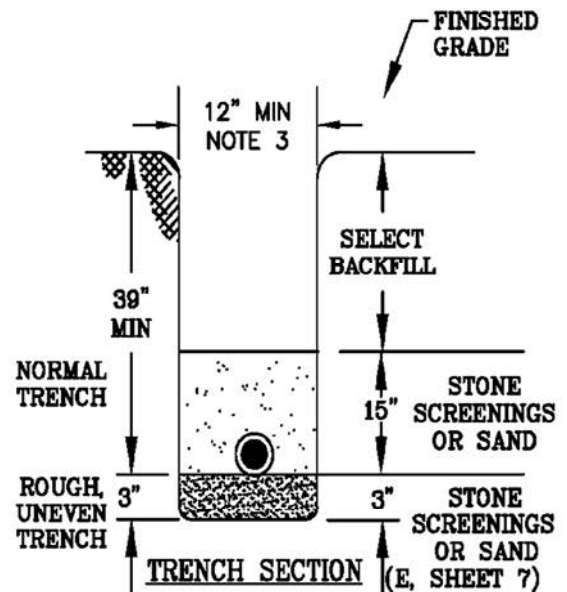
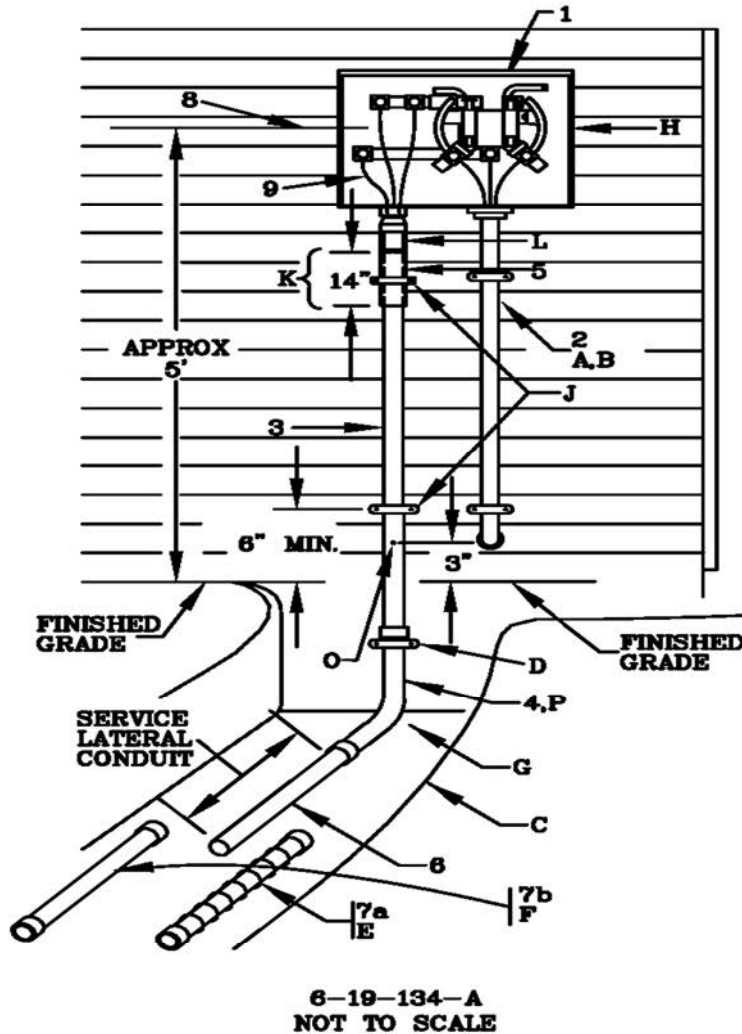
Scenario A – Page 92 through Page 95

Scenario A pertains to situations when the customer or customers' contractor will be tying pull line and connecting the customers' side conduit to the PPL EU conduit stub.

Scenario B – Page 96 through Page 98

Scenario B pertains to situations when the customer or customers' contractor will be laying the customer side conduit, running pull line and then plugging the customers side conduit end for PPL EU to attach the conduit to the PPL EU conduit stub at a later date.

Information Found on This Sheet Refers to the Notes on Pages 89 & 90



Information Found on This Page Refers to the Figures 6-19-134A and 6-19-134B

Customer Furnishes, Installs and Maintains:

1. Meter base approved by PPL EU for aluminum or copper conductor.
2. Service entrance, cable or conductors in conduit (per NEC 300-5, PVC conduit may have to be schedule 80).
3. Meter riser conduit (consult with PPL EU technician for conduit size)– 3 inch min. threaded galvanized rigid or intermediate steel conduit with bushing or gray schedule 40 PVC conduit (UL approved).
4. 90° elbow, 36 inch radius (schedule 40 PVC or galvanized steel). (Consult PPL EU technician for material).
5. Install slip riser on all single phase residential services. See approved slip riser table.

Customer Furnishes, Installs and PPL Maintains:

6. Service lateral conduit – 5' gray schedule 40 PVC conduit 3" min. (UL approved) size to match meter riser conduit.
7. a) Flexible pipe with twin wall construction. Inside smooth, outside corrugated per NEMA TC-5.
b) Gray schedule 40 PVC conduit 3" min. (UL approved) size to match meter riser conduit.

PPL Furnishes, Installs and Maintains:

8. Meter (not shown).
9. Service lateral conductors installed inside of customer provided conduit terminating on line side terminals in meter base.

Notes:

- A. When service entrance conductors are 300 KCMIL or larger, contact PPL EU for specifications of metering equipment and service lateral conduit.
- B. Securely fasten together all conduit pieces, (thread steel, solvent weld plastic). Ream ends of conduit to remove any sharp burrs. Secure conduit to house with conduit straps.
- C. Contact PPL EU for exact trench location.
- D. Secure elbow (Item 4) to foundation with two hole conduit strap installed just below elbow bend coupling.

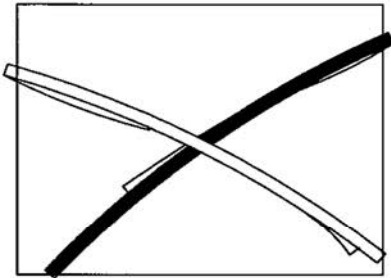


Underground Secondaries and Services
Customer Reference Specification
6-19-134

0000-000-ST-6019
Custom ID: DCS 6-19
Revision: 03
Effective Date: 10/24/2016
Page 92 of 101

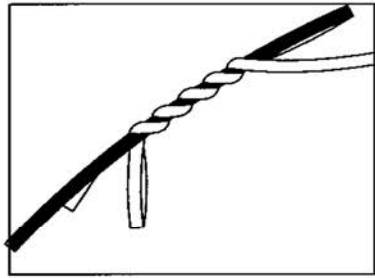
- E. Install flexible pipe from PPL EU's conduit stub to service lateral conduit or from service lateral conduit to the riser pole. Provide pulling line and seal end. (See page 88).
- F. If using schedule 40 PVC conduit, see sheet 6 for installation details.
- G. Tamp base of trench near house so trench will not settle and pull service conduits off house.
- H. See REMSI SKETCH #55 for clearances to gas meters.
- I. Gas refers to natural gas. Propane or LP gas is not permitted; 36 inch minimum separation.
- J. Conduit straps to be same size to allow lower conduit to move within strap.
- K. Extend conduit approximately 14 inches into the slip riser.
- L. No attachment sticker – provided by PPL EU (PPL EU CID #943016).
- M. Do not install any attachments on conduit or slip riser per NEC & IRC. See SKETCH #55.
- N. 50" minimum clear space in front of meter base. See Rule 13, SKETCH #55 and SKETCH #55A (side view).
- O. Drill 2-1/4" holes in back of conduit 3" above ground prior to pulling cable.
- P. Drill 2-1/4" holes in bottom side of elbow prior to pulling cable.
- Q. See REMSI SKETCH #7 and SKETCH #7A for more detail.

Instructions for Splicing Pulling Rope (MUELTAPE)



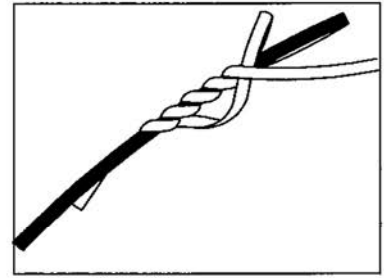
1.

Take each end of the flat pulling line to be spliced, and without twisting, fold so that each end is doubled for approximately 18 inches. Take the end on the right and cross it over the end on the left.



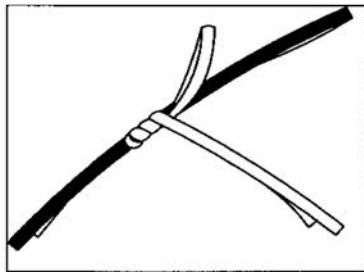
2.

Now, take the same end and make four turns around the other line.



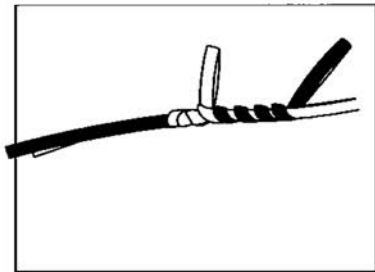
3.

Without twisting, bend the wrapped end back and insert it between the looped lines at the point where they crossed initially (in step 1).



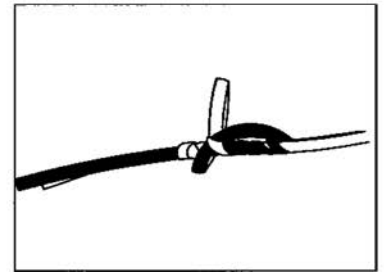
4.

Wraps and loops should now be snugged as shown above.



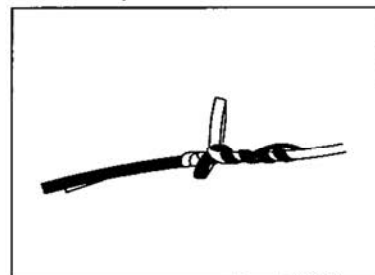
5.

Using the other end, repeat the process outlined in step 2. After concluding this process, both ends should be sticking up as shown.



6.

Insert the tape end used in step 5 down through the same hole where the looped lines crossed initially, as in step 3.



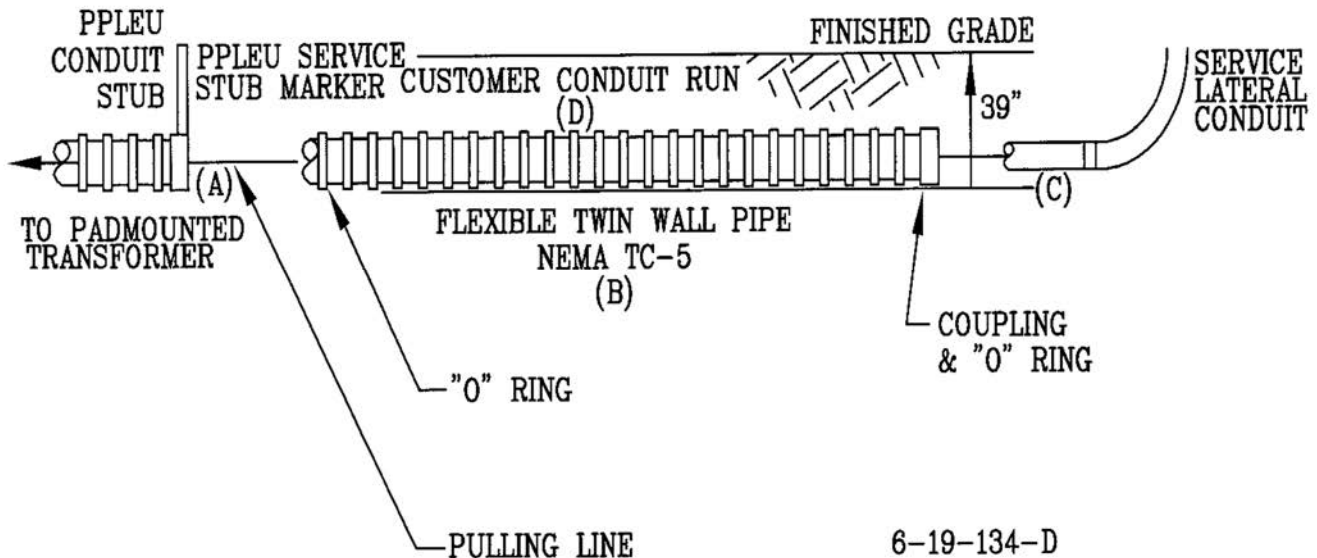
7.

The knot is complete but loose. The knot can now be drawn up by grasping the lines on either side of the knot and pulling.

6-19-133-C

Scenario A

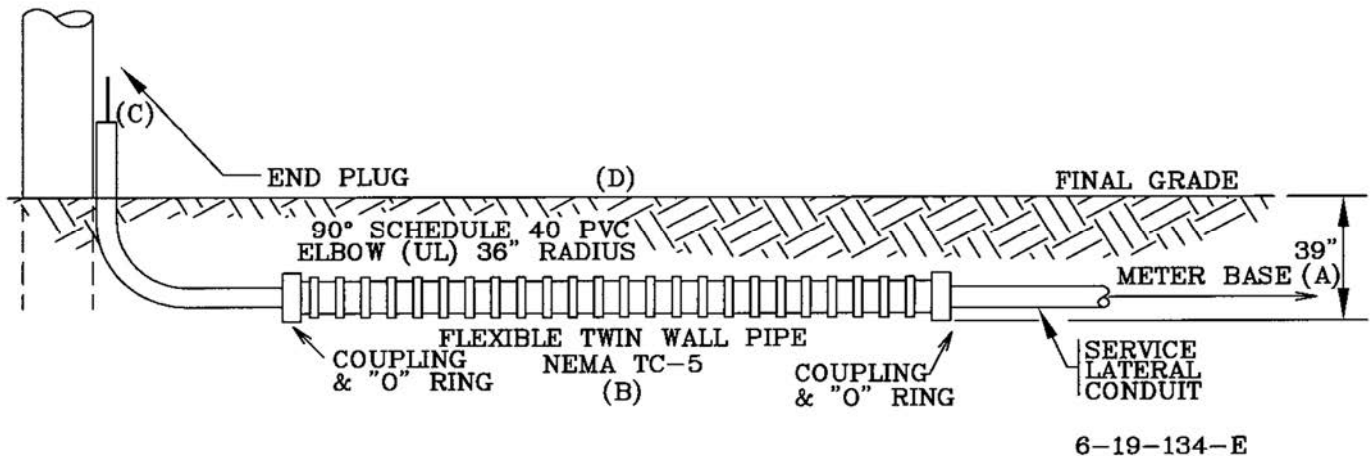
Customer Installation of Service Run to PPL EU Conduit Stub Using Twin Wall Flexible Pipe



- A. Excavate 39 inch deep trench from PPL EU service stub marker to meter base. Hand dig near service stub marker to expose about 12 inches of the PPL EU conduit stub. Use care not to damage conduit or coupling. The end of the conduit should have been sealed with a plug by PPL EU. Unscrew plug seal. The PPL EU pulling line and a rubber "O" ring should be tied to the plug. Untie pulling line and remove "O" ring. Save plug to install in meter base.
- B. Install enough twin wall flexible pipe to reach from PPL EU conduit stub to service lateral conduit. Install the PPL EU supplied "O" ring on the first groove of the twin wall flexible pipe. Install pulling line into twin wall flexible pipe. Securely tie pulling line to the PPL EU pulling line. Coat "O" ring with silicone sealant (GE RTV 102 or PPL EU approved equivalent). Insert pipe with "O" ring into PPLEU coupling until pipe contacts other pipe. Using vinyl tape, tape across the joint.
- C. Install customer purchased "O" ring in first groove of service lateral end of twin wall flexible pipe. Coat "O" ring with silicone sealant (GE RTV 102 or PPL EU approved equivalent). Insert twin wall pipe into customer purchased twin wall to PVC coupling. Feed pulling line through service lateral conduit into meter base. Using the plug from PPL conduit stub, tie pulling line to plug and install plug into conduit end in meter base. Coat coupling and service lateral conduit with PVC adhesive and push coupling onto service lateral conduit. Using vinyl tape, tape conduit across the joint.
- D. Backfill trench per instructions on page 89.

Scenario A

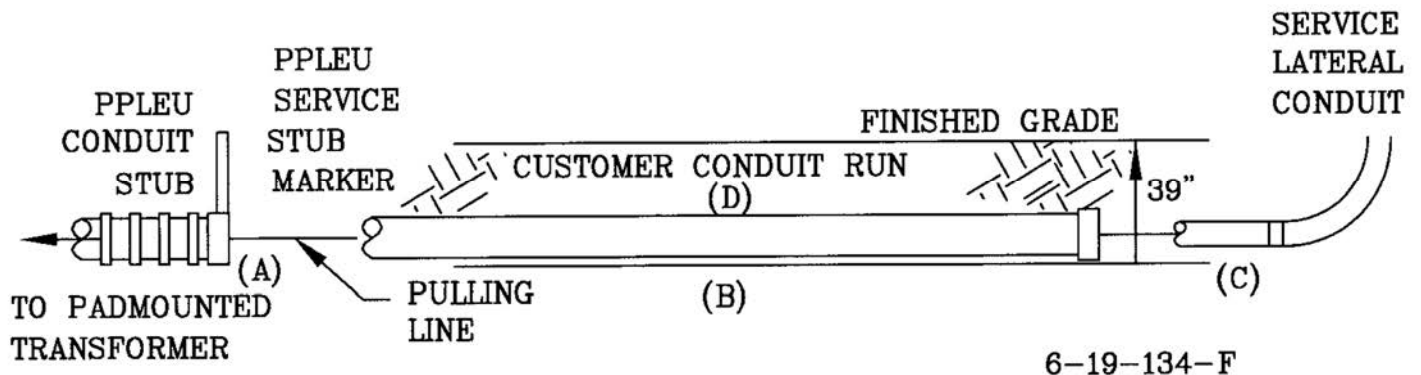
Customer Installation of Service Run to PPL EU Pole Using Twin Wall Flexible Pipe



- A. Excavate 39 inch deep trench from PPL EU pole to meter base.
- B. Install twin wall flexible plastic pipe from service lateral conduit to pole. Installation will require two twin wall – PVC couplings and two “O” rings. Install “O” rings on first groove on each end of twin wall flexible pipe run. Coat “O” ring with silicone sealant (GE RTV 102 or PPLEU approved equivalent). Push on couplings to center stop. Install 90 degree elbow at location on pole designated by PPLEU technician (all 90 degree elbows must have 36 inch radius sweeps). PPL EU technicians will specify whether the elbow is PVC or steel. Join twin wall flexible pipe to PVC couplings at both ends to PVC fittings using PVC adhesive.
- C. Install pulling line from elbow at pole to meter base. Tie pulling line ends to conduit plugs and seal both ends of conduit run with the plugs.
- D. Backfill trench per instructions on page 89.

Scenario A

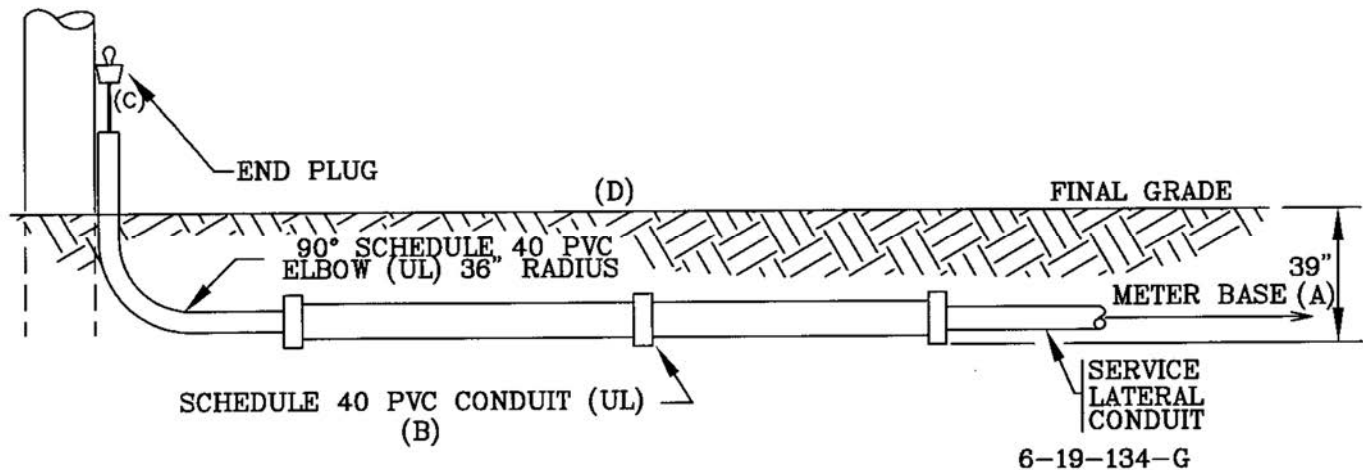
Customer Installation of Service Run to PPL EU Conduit Stub Using Gray Schedule 40 PVC Conduit



- Excavate 39 inch deep trench from PPL EU service stub marker to meter base. Hand dig near service stub marker to expose about 12 inches of the PPL EU conduit stub. Use care not to damage conduit or coupling. The end of the conduit should have been sealed with a plug by PPL EU. Unscrew plug seal. The PPL EU pulling line and a rubber "O" ring should be tied to the plug. Untie pulling line and remove "O" ring. Save plug to install in meter base. Carefully cut off PPL provided coupling and discard. Install "O" ring on first groove of twin wall pipe. Coat "O" ring with silicone sealant (GE RTV 102 or PPL EU approved equivalent) and install customer purchased twin wall to PVC coupling.
- Glue together enough gray schedule 40 PVC conduit sections to reach the service lateral conduit. When adhesive is dry, install pulling line. Securely tie this pulling line to PPL EU pulling line and insert PVC conduit into coupling using PVC adhesive. Using vinyl tape, tape across the joint.
- At service lateral end, install a PVC coupling using PVC adhesive. Feed pulling line through service lateral conduit into meter base. Using the plug from PPLEU conduit stub, tie pulling line to plug and install plug into conduit end in meter base. Using PVC adhesive, connect coupling on conduit run to service lateral conduit.
- Backfill trench per instructions on page 89.

Scenario A

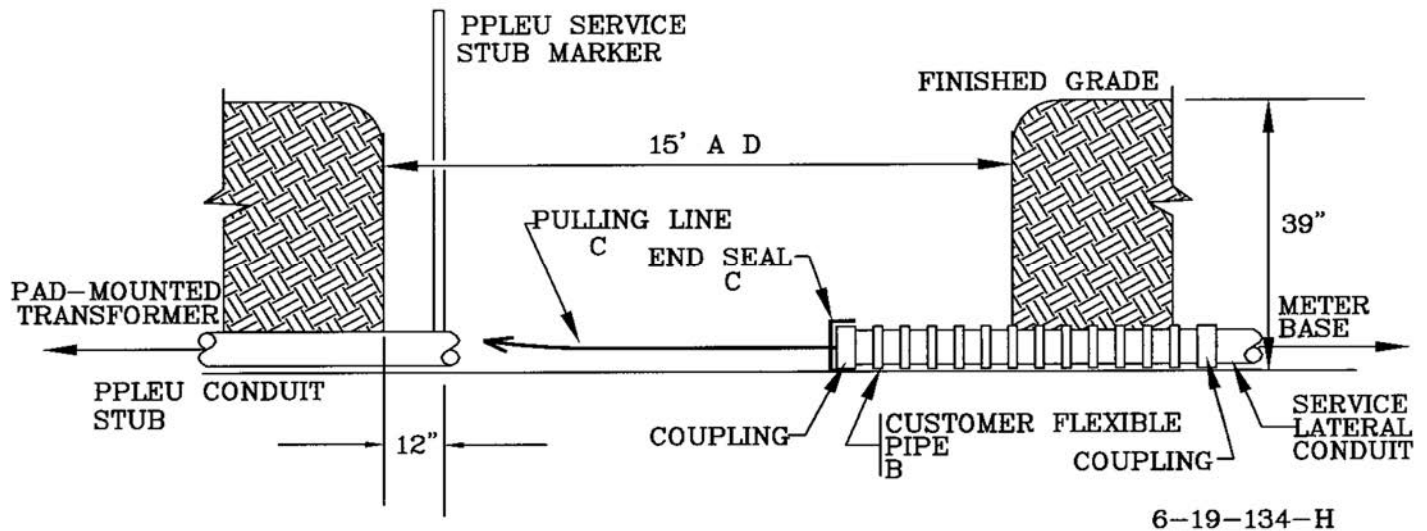
Customer Installation of Service Run to PPL EU Pole Using Gray Schedule 40 PVC Conduit



- A. Excavate 39 inch deep trench from PPL EU pole to meter base.
- B. Install conduit from service lateral conduit to pole. Install 90 degree elbow at location on pole designated by PPL EU technician. All 90 degree elbows must have 36 inch radius sweeps. Glue all joints using PVC adhesive. PPL EU technicians will specify whether elbow is plastic or steel.
- C. Install pulling line from elbow at pole to meter base. Tie pulling line ends to conduit plugs and seal both ends of conduit run with the plugs.
- D. Backfill trench per instruction on page 89.

Scenario B

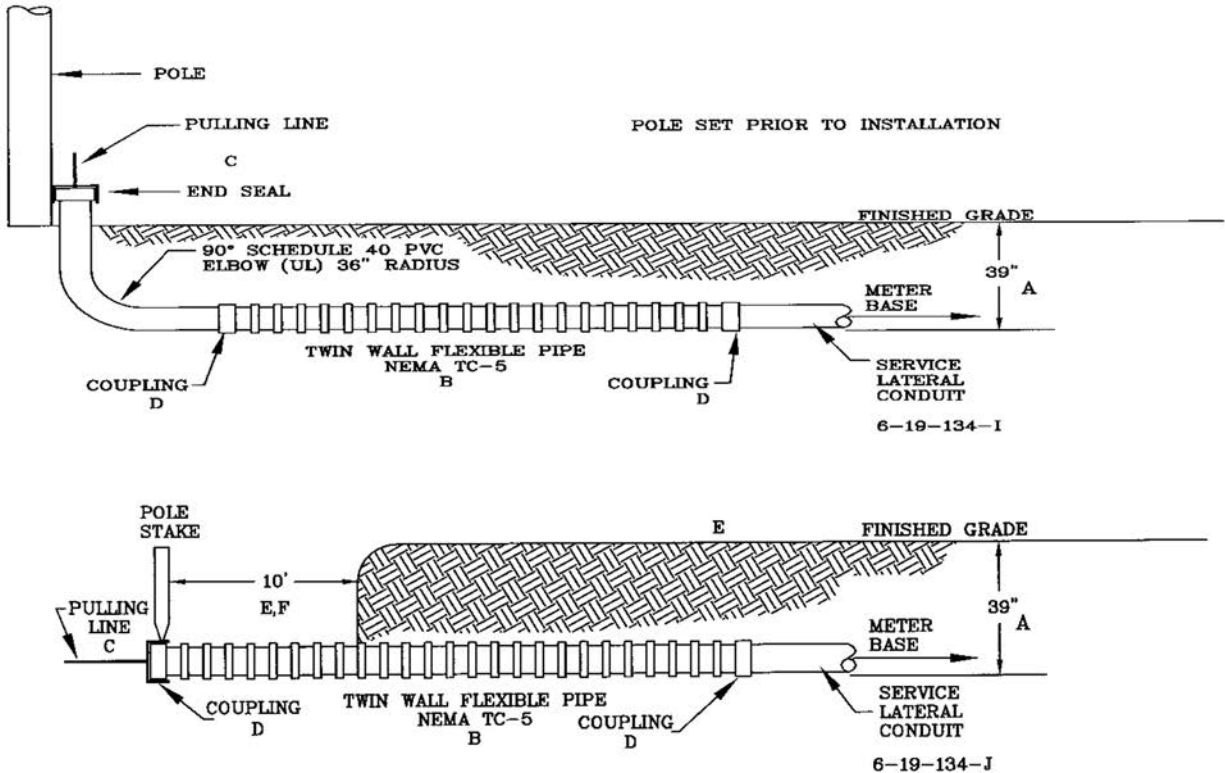
Customer Installation of Service Run to PPL EU Service Stub Marker Using Twin Wall Flexible Pipe



- A. Excavate a 39 inch deep trench to one foot past PPL EU service marker, exposing PPL EU conduit stub while taking care not to damage conduit stub. Leave final 15 feet of trench open for PPL EU. Minimum trench width in this area is 24 inches.
- B. Install enough flexible pipe to extend 5 feet past PPL EU service stub marker. Install couplings on both ends of flexible plastic pipe. Fasten coupling at meter end to service lateral conduit using PVC adhesive. PPL EU will fasten coupling at stub end to their conduit stub. If PPL EU cannot pull conductors through the flexible pipe run, the customer must make pipe system pullable.
- C. Install pulling line from meter base to pipe end. Install end seal and backfill (see page 89) the entire conduit run except for last 15 feet.
- D. After PPL EU completes installation of cable into flexible pipe, backfill the remaining open trench (see page 89).

Scenario B

Customer Installation of Service Run to PPL EU Pole Using Twin Wall Flexible Pipe

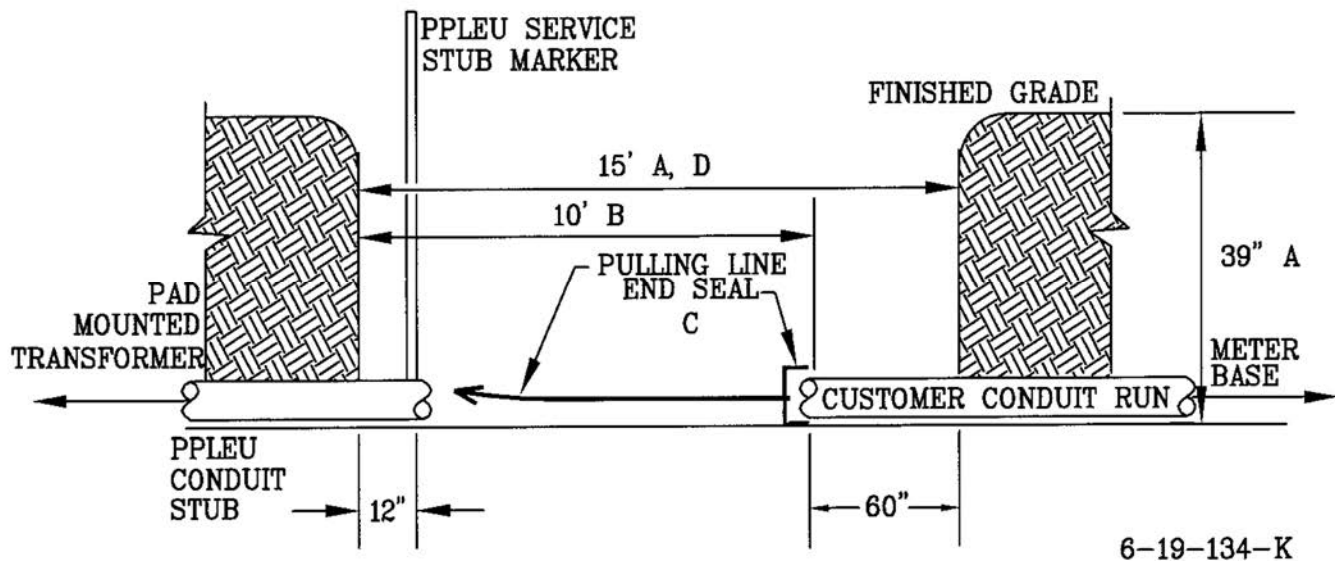


- A. Excavate 39 inch deep trench to pole or pole stake. Minimum trench width in the area at the pole is 24 inches.
- B. Install flexible pipe from service lateral conduit to pole. Install PVC elbow at location on pole designated by PPL EU technician.
- C. Seal elbow end. Install pulling line in pipe run. (See page 89). Backfill entire conduit run.
- D. Install couplings (twin wall – PVC) on both ends of flexible pipe and fasten to service lateral conduit and elbow conduit using PVC adhesive.
- E. If pole is not set yet, install flexible pipe to reach the pole stake. (see page 89) backfill all but last 10' of pipe run. Provide enough flexible pipe, appropriate elbow, and couplings for PPL EU to complete installation.

- F. After PPL completes installation of cable into flexible pipe, backfill the remaining open trench (see page 89).

Scenario B

Customer Installation of Service Run to PPL EU Service Stub Marker Using Gray Schedule 40 PVC Conduit

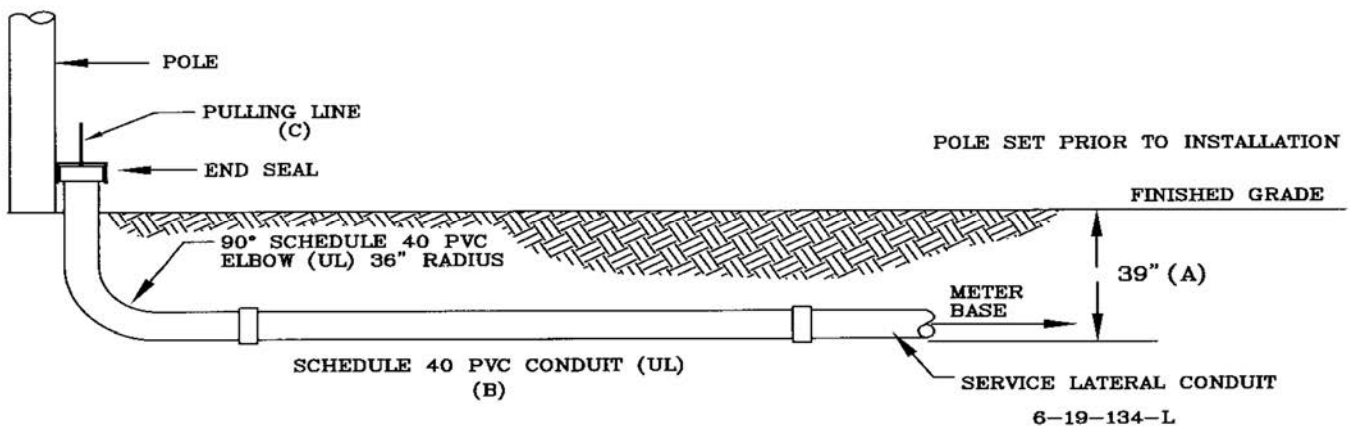


- A. Excavate 39 inch deep trench to one foot past PPL EU service marker, exposing PPL EU conduit stub while taking care not to damage conduit stub. Leave final 15 feet of trench open for PPL EU. Trench should gradually meet depth of PPL EU's conduit stub. Minimum trench width in this area is 24 inches.
- B. Provide but do not install final 10 foot piece of conduit. PPL EU completes the conduit connection. If PPL EU cannot pull the conductors through the conduit run, the customer must make the conduit system pullable.
- C. Install pulling line from meter base to conduit end, install end seal, and backfill (see page 89) the entire conduit run except for last 15 feet.
- D. After PPL EU completes installation of cable into conduit, backfill remaining open trench (see page 89).

Customer Installation of Service Run to PPL Pole Using PVC Conduit:

- A. Excavate 39 inch deep trench to pole or pole stake. Minimum trench width in the area at the pole is 24 inches.
- B. Install conduit from service lateral conduit to pole. Install PVC elbow at location on pole designated by PPL EU technician.
- C. Seal elbow end. Install pulling line in conduit. Backfill entire conduit run per page 85.

All 90 degree elbows must have 36 inch radius sweeps.



- D. If pole is not set yet, install conduit to within 10 feet of pole stake. Per page 85, backfill all but last 10' of conduit run. Provide enough conduit and appropriate elbow for PPL EU to complete installation after pole is set.
- E. After PPL EU completes installation of cable into conduit, backfill the remaining open trench per page 85.

