	<b>METHODS AND REQUIREMENTS FOR INSTALLING RESIDENTIAL UNDERGROUND ELECTRIC SERVICES 0 – 600 V TO CUSTOMER-OWNED FACILITIES</b>		<b>063927</b>
	<b>Asset Type:</b> Electric Distribution	<b>Function:</b> Design	
<b>Issued by:</b> Lisseth Villareal (LDV2) <i>Lisseth Villareal</i>	<b>Date:</b> 11-01-18		
<b>Rev. #22:</b> This document replaces PG&E Document 063927, Rev. #21. For a description of the changes, see Page 4.			

**This document is also included in the following manual:**

- [Electric and Gas Service Requirements \(Greenbook\)](#)
- [Electric Design Manual](#)

**Purpose and Scope**

This document shows the methods and requirements for installing PG&E-owned, underground service cables in customer-owned, residential, terminating facilities. See [Document 058817](#) for terminating underground services.

**General Information**

1. Underground electric service laterals will normally be installed in a joint trench with natural gas and communication service facilities.
2. To determine the most satisfactory meter location, PG&E should be contacted for requirements while the building is in the planning stage.
3. When it is necessary to install a service 75 feet or longer, the applicant must contact PG&E before ordering the service riser, conduit, or termination enclosure. If the service riser and/or conduit specified in Table 2 on Page 3 of this document will not accept the cable required to meet flicker and/or voltage drop requirements, a larger conduit must be installed. This could require the installation of a larger termination enclosure.
4. Install a splice box whenever cable pulling tensions may be exceeded or whenever there is a change in cable or conduit size.

**Residential Services Information**

5. A “residential service” is a service supplying a single- or multi-metered residential building. This document addresses services through 800 amp, single-phase. For three-phase residential services or services larger than 800 amps, see [Document 063928](#).
  - A. Standard voltage for single metered residential building is 120/240 V.
  - B. All single-phase, 120/208 V services require full-sized neutral.
6. Residential includes mobile homes installed on California state-approved foundation systems in locations other than mobile home parks.
7. Conduit is required for residential services, including multi-metered residential buildings.
8. The applicant shall provide the trench, conduit, and backfill in accordance with [Electric Rule 16](#) and PG&E requirements. PG&E will furnish and install the service cables and make the connection at the point of service delivery in the applicant’s service termination enclosure.
 

Qualification of material for use as backfill is the responsibility of the job foreman or, in the case of contract work, the inspector or their designer. A visual inspection of the material is sufficient for evaluation of the material. The source of the backfill, native or import, is immaterial to the suitability of the backfill for use in the trench. In new construction areas, the developer may have a soils report available, which will assist in determining if import backfill is necessary.
9. The conduit type for PG&E’s service conductors, on or under the foundation up to 10’ past the outside wall of the applicant’s building, shall be UL PVC Schedule 40 or 80. Schedule 40 shall not be used in locations where it would be subject to physical damage. To avoid cable insulation damage, the ends of conduits shall be provided with a suitable fitting, such as a bushing, nipple, hub, cable protector, or end bell.
 

**Note:** Conduits shall not pass under or through one building to supply adjacent buildings.

**Methods and Requirements for Installing Residential  
Underground Electric Services 0 – 600 V  
to Customer-Owned Facilities**

---

10. When an applicant's main service panel is installed in an electric meter and service termination room, the room must be built with one wall and a door that leads to the outside of the applicant's building. See [\(Greenbook\) section 5.3.4. Electric Meter Rooms](#).
11. Potential water intrusion into service conduits and meter termination facilities.
  - A. Water intrusion into service conduits and meter termination facilities may occur if the source side of the service facilities (e.g., secondary splice box) is at an elevation greater than the meter termination facilities.
  - B. [CPUC General Order 128, Rule 31.6](#) requires "Lateral ducts for services to buildings, through which water may enter buildings, shall be plugged or sealed."
  - C. When the intrusion of water can reasonably be expected, as identified above, the following actions are required:
    - (1) PG&E is responsible for sealing the conduit at the meter termination facilities as shown in [Document 062288](#). If the meter termination facilities are significantly lower than the source side facilities, then the conduit should be sealed at both ends. The Rayflate Duct Sealing System (RDSS) conduit sealing system can be ordered for this purpose. [Document 062288](#).
    - (2) The applicant is responsible for providing a means to prevent the accumulation of excess water or water pressure in the service conduit system. This is accomplished by installing a splice box at the base of the riser to the meter panel, or at a maximum of 6 feet away from the meter panel along the service run. Use a secondary #3 splice box instead of a secondary #5 splice box for drainage purpose. Table 1 footnote 5 shown in [Document 028028](#) does not apply when the #3 splice box is used for drainage purpose.
12. Prior to cable installation, all conduits shall be proven free and clear by means of a mandrel or other methods acceptable to PG&E. A polyester flat pulling tape, white with sequential footage markings every foot, 2,500 minimum tensile strength, and approved by PG&E (Code 560154), shall be installed in all conduits and attached to an end cap (see [Document 063928](#)).

**Upgraded Panel**

13. For upgraded panels where the new specified size of service conductor will fit in the existing conduit, it is not necessary to upgrade the conduit to the currently specified size for the new panel if both of the following are met:
  - A. The maximum fill ratio is not exceeded.
  - B. The calculated cable pulling tensions along the conduit route is within limits of the new cable.
14. If the new panel is able to accommodate it, the existing service conductor may be reused provided it meets the load, voltage drop, and flicker requirements of the new load. If the service conductor size must be upgraded, the existing conduit must be proofed with a mandrel.
15. Notes 13 and 14 do not apply to the following conditions:
  - A. Direct buried or Cable-In-Conduit (CIC) service cables. Direct buried and CIC service cables need to be replaced with approved service cable and installed in approved service conduit.
  - B. Upgraded electric meter panels that are within 36 inches of the gas service riser. The clearance requirements in [Greenbook Section 5.4.3](#), "Meter Set Clearance Requirements" must be met for upgraded and relocated meter panels.

**Cover**

16. A minimum of 24 inches of cover for secondary (0 - 750 V) electric service, or 36 inches minimum cover for primary (over 750 V) is required. Cover is the distance from the outer surface of an underground facility to the top of the final grade. The actual trench depth will be greater (approximately 30 inches or 42 inches minimum respectively) to accommodate the underground facility, bedding, enclosures, riser sweeps, and joint trench installations with other utilities.

**Temporary Service**

17. The policy of using permanent service panels to supply temporary power is expanding. Schedule 40 or 80 PVC riser conduit may be damaged by staples and nails, and this has resulted in damage to service cables. Therefore, for those locations where cable will be installed or that will be energized prior to completion of the wall, the conduit shall be Schedule 40, rigid steel conduit, to protect the service cables from damage caused by siding nails, etc. Refer to [Greenbook Section 5.9.1](#), "Temporary Service Using Permanent Service Panels".

**Methods and Requirements for Installing Residential  
Underground Electric Services 0 – 600 V  
to Customer-Owned Facilities**

<b>References</b>	<b>Location</b>	<b>Document</b>
<a href="#">Secondary Electric Underground Enclosures Terminating Underground Electric Services 0–600 Volts in Customer-Owned Facilities</a> .....	<a href="#">UG-1: Enclosures/Greenbook</a> .....	<a href="#">028028</a>
<a href="#">Underground Conduits</a> .....	<a href="#">UG-1: Conduits/Greenbook</a> .....	<a href="#">062288</a>
<a href="#">Methods and Requirements for Installing Non-Residential Underground Electric Services 0–600 Volts to Customer-Owned Facilities</a> .....	<a href="#">UG-1: Services/Greenbook</a> .....	<a href="#">058817</a>
		<a href="#">062288</a>
	<a href="#">UG-1: Services/Greenbook</a> .....	<a href="#">063928</a>

**Table 1 Service Conduit Types Approved for Underground Application**

Type	Specification <sup>1</sup> (must be marked on conduit)
PVC, DB 120 <sup>2</sup>	ASTM F512, DB 120, Cell Class 12164B or 12264B
Co-extruded Cellular Core PVC, DB 120	ASTM F512, DB 120, Cell Class 12254B
Hot-Dip, Galvanized, Rigid Steel	ANSI Spec. C80.1
PVC, Co-extruded Cellular Core PVC, Schedule 40 or 80	UL 651

<sup>1</sup> The entire “conduit system” shall meet the specifications listed above. The conduit system includes conduits, conduit bends, conduit fittings or couplings and all related components (e.g., end bells and cable protectors) that are needed to install PG&E cables and conductors.

<sup>2</sup> This type of conduit is not approved for 2” conduit.

**Table 2 Cable and Conduit Requirements for Residential Services**

Service Equipment Rating (amps) <sup>1</sup>	Conduit Size and Number <sup>2</sup>	Minimum Vertical Radius	Minimum Horizontal Radius	Aluminum Cable Required to Serve Maximum Load AWG or kcmil	
				(Per Phase)	Neutral
100–125	1–2”	24”	36”	1–1/0	1–#2
126–225	1–3”	24”	36”	1–4/0	1–1/0
320 <sup>3</sup>	1–3”	24”	36”	1–350	1–4/0
400 <sup>4</sup>	1–4”	36”	36”	1–750	1–4/0
600 <sup>4</sup>	2–3”	24”	36”	2–350	2–4/0
800 <sup>4</sup>	2–4”	36”	36”	2–750	2–4/0

<sup>1</sup> Service rating shall be the termination section, pullcan, service section, or main service switch continuous current rating, whichever is greater.

<sup>2</sup> See Note 3 on Page 1 for size and distance limitations, Note 9 on Page 1 for conduit type allowed on or within buildings, and Table 1 above for conduit type allowed underground.

<sup>3</sup> Require manual bypass facilities.

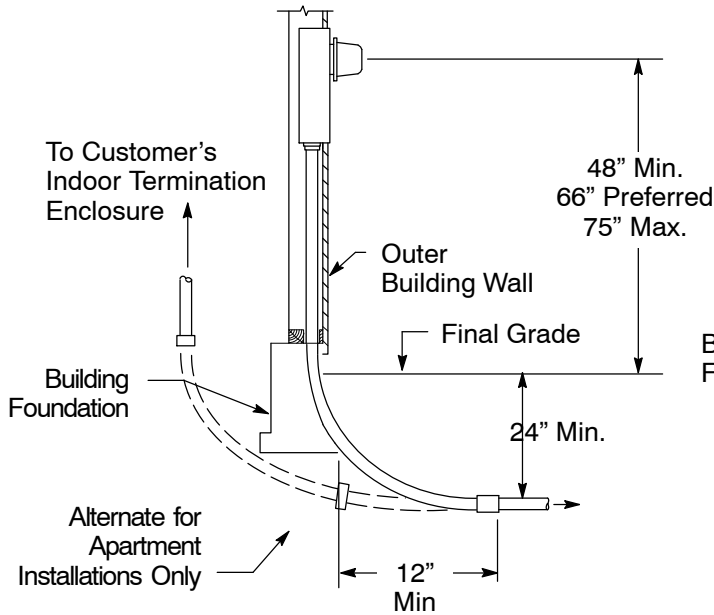
<sup>4</sup> Require transformer rated meter.

<sup>5</sup> Continuous current rating.

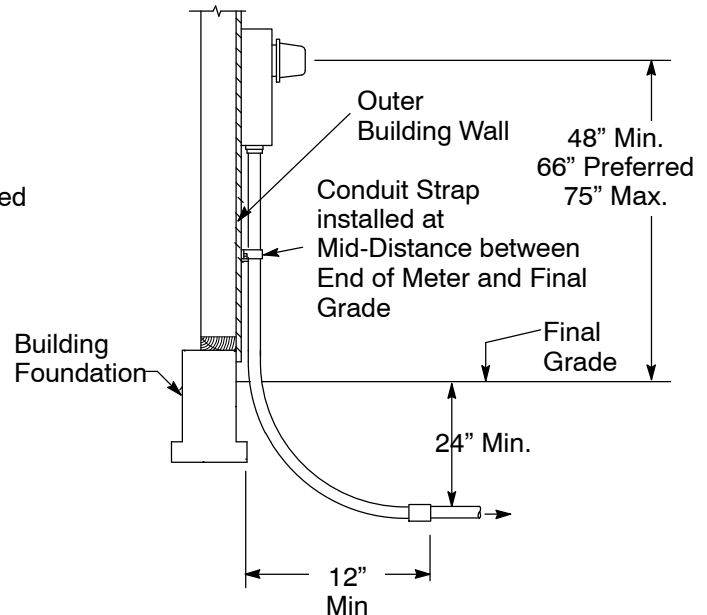
## Service Installation

### Note

1. A Vertical 90° manufactured sweep is required to be installed to meet trench grade. The riser conduit must not protrude away from the wall or mounted panel.
2. The conduit end must extend at least 12 inches beyond the foundation. Install the sweep in the direction of the service trench. If a deeper trench is required, the sweep must extend to the same depth as the conduit in the trench.
3. A minimum of 24 inches of cover must be maintained from the top of conduit to final grade.



**Figure 1**  
**Recessed-Mounted Service Termination Enclosure**



**Figure 2**  
**Surface-Mounted Service Termination Enclosure**

### Revision Notes

Revision 22 has the following changes:

1. Revised Note 4 on Page 1.
2. Revised Note 11.C (2) on Page 2.
3. Revised Notes on Page 4.
4. Updated Figure 1 and Figure 2.