



Electric Service Handbook

June 2019

**Single-Family Residential Projects
Permanent and Temporary Service**



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Customer service—guaranteed

PSE makes two service guarantees to you. First, we commit to keeping scheduled appointments, and second, we commit to restoring power outages as soon as we can.

- If we don't keep an appointment to install new service, reconnect existing service, or inspect natural gas equipment, you'll receive a \$50 credit on your PSE bill.
- If your electric service is out for 120 consecutive hours or longer, you may be eligible to receive a \$50 credit on your PSE bill.

These service guarantees are in addition to nine service quality measures that track PSE's performance, and are subject to certain conditions and may be suspended during unusual and exceptional circumstances.

For more information, visit pse.com/guarantees.

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Preface

This handbook is your guide to Puget Sound Energy's (PSE) requirements for new, altered/modified, or temporary electric service for permanent single-family residential structures. We have also included additional requirements for electric service to outbuildings (barns, shops, pump houses, garages, etc.).

What this handbook contains

In this handbook you will find answers to questions such as:

- What are the installation requirements for permanent and temporary underground and overhead service?
- How do I choose the right service size?
- What are the trenching requirements?
- How do I locate existing underground utilities before I dig?

PSE's service availability

General boundaries for PSE's gas and electric service area are available on [**pse.com/construction-services**](http://pse.com/construction-services). A Customer Construction Services (CCS) Representative can help you to determine the closest available service line and can provide you with cost information for establishing new service.

Codes, permits, and inspections

This handbook should only be used as a guide. It does not cover all possible federal, state, or local code requirements. It is your responsibility to ensure that your project complies with the most recent issue of the National Electric Code (NEC) and any other federal, state, or local codes that may apply.

This handbook shall not be interpreted to conflict with the regulations of the state of Washington or other regulatory bodies having jurisdiction. PSE's metering requirements may be more stringent. Local codes and requirements related to the planned work should be addressed before any construction begins.

Electrical service equipment inspection

Once your service equipment is installed, the state of Washington, or the city with jurisdiction over your area, requires that your installation pass an electrical inspection before PSE can energize your system.

NOTE: It is your responsibility to request an electrical inspection.

Electrical inspections for most areas in the PSE service territory are done by the Washington State Department of Labor and Industries. However, electrical inspections are performed by city personnel in several jurisdictions. Please consult [**pse.com/construction-services/permits-and-inspections**](http://pse.com/construction-services/permits-and-inspections) for a list of the cities and current contact information.

Reconnecting existing electric service after repair or replacement

All electrical equipment and wiring on the customer side of the meter (including meter base and service masts) are owned and maintained by the customer. Therefore, **you are responsible for any repair or replacement of storm-damaged or failed metering equipment.** If you must repair/replace equipment of this kind, your service may need to be de-energized or disconnected.

For more information, refer to Chapter 8, Disconnection and Modification of Service, of this handbook or contact your CCS Representative at **1-888-321-7779**.

Scheduling/Timelines

The time needed for engineering, scheduling, and construction of the work will vary depending upon the complexity of the job, possible right-of-way permits, easements, and the volume of work requested by PSE customers. Contact your CCS Representative at **1-888-321-7779** for current construction scheduling

Underground or overhead service?

Which type of electrical system is available in your area?

The two types of permanent services are underground and overhead.

You can determine if PSE's system is underground or overhead by checking for our facilities along your road. If the power system is underground, you'll see facilities like those in Figure 1. If the power system is overhead, a series of poles similar to Figure 2 will be visible.

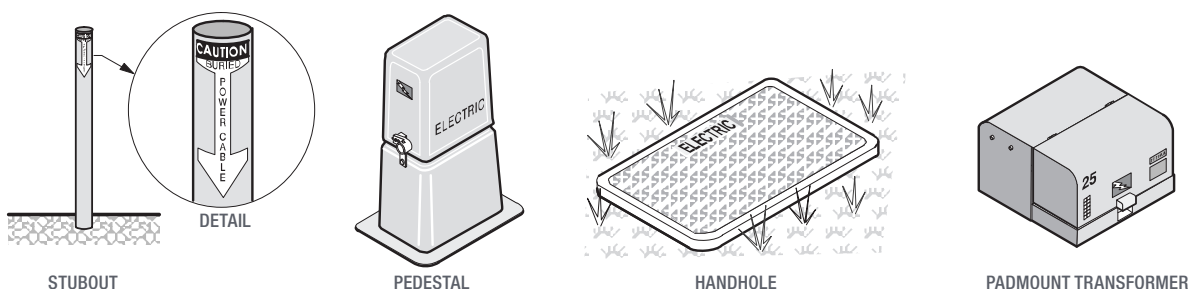
Use Table 1 to help you determine which type of electrical service can be provided. For help determining which type of system is in your area, call your CCS Representative at **1-888-321-7779**.

Underground service

If your area is served underground, one or more underground facilities should be visible (see Figure 1). Please request a permanent underground service (Chapter 2).

Figure 1

Underground facilities

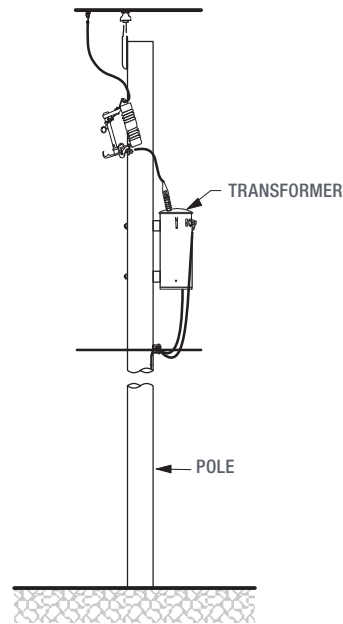


Overhead service

If the power system in your area is overhead, poles should be visible (see Figure 2). Please request a permanent overhead service (Chapter 3).

Figure 2

Overhead facilities



Questions or assistance

If none of the items in Figures 1 or 2 exist in your area, or if you have questions, call **1-888-321-7779** and a CCS Representative will be glad to assist you.

Table 1 Types of electric services

| If available electrical system is . . . | And if . . . | Then your service line will be . . . |
|---|--|--------------------------------------|
| Underground | Your new meter location is less than 225 ft.* from our nearest padmount transformer (see Figure 1). NOTE: If your new meter location is more than 225 ft. from our nearest underground transformer, an additional transformer may be required. | Underground |
| Overhead | The new meter location is less than 200 ft.* from our nearest power pole. The service originates from the pole. The pole has a transformer on it (see Figure 2). | Underground |
| Overhead | The new meter location is less than 125 ft.* from our nearest power pole. The pole has a transformer on it (see Figure 2). Your service line does not cross anyone else's property. | Overhead or Underground |

NOTE: If your situation does not fit the criteria presented, please contact your PSE project manager.

* Based on the typical voltage flicker calculations on underground system and sag calculations on overhead system. Contact a CCS representative regarding evaluation for type of service for your service request.

Other electric service information

If you need information on the installation of permanent or temporary multifamily and nonresidential services, you will find it in the PSE Electric Service Handbook for Commercial/Industrial and Multifamily Projects.

All handbooks are available free of charge from PSE.

pse.com/construction-services

How to contact Puget Sound Energy

You can obtain further information by contacting us through the following:

- Go to **pse.com/construction-services**
- Or call PSE Customer Construction Services (CCS) at **1-888-321-7779**
Monday thru Friday, 7 a.m. – 5 p.m.

If you have questions about Energy Efficiency Programs:

- Go to **pse.com/savingsandenergycenter**
- Or call PSE Energy Advisors at **1-800-562-1482**
Monday thru Friday, 8 a.m. – 5 p.m.

If you have general questions regarding your account, such as changing service or questions about your bill:

- Go to **pse.com/accountsandservices/contact-us**
- Or call Customer Service at **1-888-225-5773**; TTY **1-800-962-9498**
Monday thru Friday, 7:30 a.m. - 6:30 p.m.

If you have an emergency or a service delivery issue, please call:

- Customer Service at **1-888-225-5773**; TTY **1-800-962-9498**
24 hours a day, 7 days a week.

PSE's service providers

PSE contracts with two partner companies to provide construction services: Potelco, Inc. and InfraSource Construction LLC. The employees who install your service may work for these service providers on PSE's behalf.

Overview: new permanent and temporary electric service hookup

This information applies only if PSE has existing power facilities in your area.

If electric power is not readily available, please contact: **Customer Construction Services 1-888-321-7779** or **pse.com/construction-services**

Single-family residential customer responsibilities

- Determine if you need overhead or underground service.
- Call PSE to set up an account and submit an order. Allow adequate time for possible engineering, right-of-way permits, and easement review.
- Obtain an electrical work permit.
- If temporary service, install temporary service facility and meter base.
- If permanent service, determine the service size amp rating you want (200, 320, or 400 A).
- Determine an approved permanent meter location.
- Ensure that existing underground utilities are located before you dig. Call 811 two business days prior to digging for a free service that will mark the location of underground lines.
- Prepare job site by providing a clear path/trench for your service line for proper vault entrance requirements per PSE standards.
- Provide site preparation and installation requirements (site plans) according to PSE installation standards in the Gas and Electric Underground Service Installation Requirements handout.
- Obtain an approved electrical inspection.
- After the electrical inspection has been completed and approved, request that PSE install and energize your system.

PSE's responsibilities

- Connect temporary service.
- Determine if engineering is required.
- Install your overhead or underground permanent service line conductors.
- Install your meter and energize your system

Scheduling/time frame

- If engineering is not required, services are typically installed and energized 3 to 5 days after you have passed your inspection. Engineering, right-of-way permits, etc., **can extend time frames by 8 weeks or more.**

Permanent and temporary service charge

- Charges vary due to the type of service you request and the type of system we have in your area. Contact your Customer Construction Services Representative for current rate information.

Chapter 1

Steps to a successful permanent electric service installation

Definitions

PSE defines a single-family residence as a structure that is:

- Located on a legal residential lot.
- Approved for occupancy as a permanent single-family residence by the local governing agency or agencies.
- A parcel where the lot line is extended to the public thoroughfare, even if the unit(s) shares a common wall(s) with other like living units, such as in zero-lot-line construction.

A mobile or manufactured home will be considered a single-family residence if it meets the above requirements, and:

- Is permanently located on a foundation.
- Has had the axles and wheels removed.
- Meets all other requirements for a mobile home permit as required by the local governing agency or agencies.

NOTE: A mobile or manufactured home located in a mobile home park in which each home owner DOES NOT own the parcel that the home sits on does not qualify as a single-family residence.

Service installation responsibilities

Installing new electrical service to your single-family residence is a joint project between you and PSE.

Puget Sound Energy

PSE is responsible for:

- Installing the service line conductors to a customer-installed and maintained service mast or underground meter service riser.
- Installing the meter in a customer-installed and maintained meter base/socket.
- Energizing your system.

Customer

You are responsible for:

- Determining if you need overhead or underground service.
- Setting up an account and submitting an Application for Service.
- Obtaining an electrical work permit.
- Determining the service size amp rating you want.
- Determining an approved meter location.
- Providing site preparation and installation requirements according to PSE installation standards in the Gas and Electric Underground Service Installation Requirements handout.
- Before any digging project, **calling the 811 “Call Before You Dig”** hotline a minimum of two business days before digging.
- Installing the meter base/socket on the outside wall in an approved location.
- Installing all the electrical wiring inside your residence.
- Obtaining a city or state inspection and approval of your installation.
- After your electrical inspection is complete, calling PSE to request that your service be installed and energized.
- Keeping your meter base/socket accessible to PSE
- Coordination with other utility companies being installed in a joint trench.

Starting the installation process

Setting up an account or ordering a new service

You may establish your billing account when you are ready to initiate your temporary service order, order your permanent service, or after the state electrical inspection is complete and your trench is ready (if applicable).

To establish an account with PSE, call CCS at **1-888-321-7779**. The CCS Representative will ask for your billing information and the address for new service. (New addresses are obtained from the U.S. Postal Service or the County Addressing Department.)

To order a new service, submit an Electric Service Application Single-Family Residential 100E to your CCS Representative. All forms can be downloaded from **pse.com/construction-services**.

Will your project need engineering?

A CCS Representative will ask you the following questions to help determine how your project is handled:

- What kind of residential building is this service for (home, barn, shop, etc.)?
- What is the building's square footage?
- What kind of electrical or gas appliances will you have (furnace, heat pump, air conditioning, water heater, etc.)?
- What size service panel will you be installing?
- When will you be ready for service?
- Do you need underground or overhead service?
- Will any other utility be sharing the trench?
- Is the PSE utility connection point adjacent to your property or across the street?

NOTE: If a transformer or electrical service stubout is located on your property, your project probably will not require engineering. If no transformer or stubout is available, your project will require engineering and/or needs a municipality right-of-way permit, and our CCS Representative will ask you to complete and submit an Electric Service Application Single-Family Residential 100E. This form can be downloaded at pse.com/construction-services.

Choosing the right service size

Service voltages PSE offers their customers the voltages shown in Table 2.

Table 2 Standard voltages for residential customers

| Service type | Voltage |
|--------------|---------------------|
| Single-phase | 120/240 V, 3-wire * |
| Three-phase | 120/208 V, 4-wire |
| | 277/480 V, 4-wire |

* Available for loads to a maximum demand of 100 kW. Larger loads may be served, if determined feasible by a PSE engineer. All motors must be rated 7-1/2 HP or less.

Service sizes PSE offers several service sizes for single-family residential structures and for outbuildings. The service size you need depends on both the size of your home and the power requirements of the equipment you will be installing in it. Table 3 explains the sizes that are available.

Table 3 Service sizes available from PSE

| Voltage | Ampere rating | Typical use |
|---------|---------------|-------------------------------------|
| 120/240 | 200 A | 0-1500 Sq. Ft. or 1501-2500 Sq. ft. |
| | 320 or 400 A | 2501-3500 Sq. ft. |
| | Over 400 A | greater than 3500 Sq. ft. |

Sizes less than 200 A

You may install a service panel or meter base/socket that is sized less than 200 A, but the service line and meter that PSE installs will be sized as if you were installing a 200 A service.

If you are installing an underground service that is less than 200 A, your meter base/socket must meet the dimensional requirements for a 200 A underground meter base/socket (refer to Chapter 5, Meter Installation, located in this handbook).

Determining an approved meter location
Customer-installed meter base/socket location

NOTE: Only authorized and qualified PSE personnel shall install and remove meters.

You are required to install your meter base/socket in compliance with the requirements in Chapter 5. All locations are subject to approval by a PSE Representative.

If you have questions regarding meter locations, call your CCS Representative at **1-888-321-7779**.

Meter base/sockets, including current transformer (CT) enclosures, must be located:

- Outside.
- On the front 1/3 of your home closest to normal drivable public access.
- In an area that is not subject to being fenced-in (patios, decks, porches, breezeways and backyards are bad locations).
- On a structure that is owned by you.

These approved locations allow us to:

- Read your meter in a cost-effective manner.
- Maintain your meter efficiently.
- Disconnect your service if there is a fire.

NOTE: Refer to the Gas and Electric Underground Service Installation Requirements handout for more information (Form 6080 and 3885).

Know what's below: Call 811 before you dig


**Know what's below.
Call before you dig.**

Before excavating, Washington law requires you to call 811 to locate underground utility lines. Doing so will enable you to avoid potential injury, fines, costly repair of PSE utility facilities, and electric or natural gas service disruptions. Call 811 at least two to five full business days prior to digging. (For example, call Wednesday to dig on Monday.) When you call, an operator will record information about your dig and notify affected utility companies, including PSE. PSE locates and marks its own lines for free, but privately owned utility lines must be located by a separate vendor, typically for a fee.

Table 4

The locate service uses the following color codes to identify underground utilities:
Color codes for locating utilities

| Color | Utility |
|--------|--|
| White | Proposed excavation area |
| Pink | Temporary survey markings |
| Red | Electric power lines, cables, conduit, and lighting cables |
| Yellow | Gas, oil, steam, petroleum, or gaseous materials |
| Orange | Communication, alarm or signal lines, cables, or conduit |
| Blue | Potable water |
| Purple | Reclaimed water, irrigation, and slurry lines |
| Green | Sewers and drain lines |

NOTE: Use white paint to mark the area within which you want utility locations.

Once all utilities are located:

- Do not dig with machinery within 3 feet of the locate marks.
- Hand dig to expose all utilities to be crossed.

Coordinating utility trenching and construction

New construction typically involves the installation of telephone cables, cable television cables, and natural gas lines; as well as electric power cables.

It is the responsibility of you and your builder to notify each utility about your intended electric service installation as well as all other utilities providing service to your new structure.

If you need a PSE gas service, please call 1-888-321-7779 and complete an application for gas service at pse.com/construction-services.

Transformer locations

PSE will install padmount transformers using the clearances listed in Table 5 and shown in Figures 3 through 6.

Clearances between padmount transformers and structures must be measured from the metal portion of the transformer closest to the building or structure (including any overhangs).

A clear and level working space is necessary for the operation and maintenance of padmount transformers (Figure 6).

The working space should be free from obstructions such as trees, shrubbery, poles, buildings, retaining walls, structures, fences, fire hydrants, utility pedestals, decorative screens, ditches, streams, roadways, etc.

Shrubs, hedges, plants, ground cover, or other vegetation with invasive root, vine, or branch systems that may grow underneath or into PSE equipment are prohibited.

Table 5 Clearances for padmount transformers

| Feature | Clearance distance |
|---|--|
| Combustible walls or roof (including stucco). | 10 feet (3 feet from a combustible wall if using a reduced flammability transformer). See Figure 4. |
| Noncombustible walls (including brick, concrete, steel, and stone), provided the side of the transformer facing the wall does not have doors. | 3 feet. See Figure 4. |
| Fire sprinkler valves, standpipes, and fire hydrants. | 6 feet. See Figure 3 |
| Doors, windows, vents, fire escapes, and other building openings. | 10 feet. See Figure 3. |
| The water's edge of a swimming pool or any body of water. | 15 feet. See Figure 3. |
| Individual domestic and irrigation wells. | 100 feet. See Figure 3. |
| Facilities used to dispense or store LP or hazardous liquids or fuels. | 20 feet. See Figure 5. 10 feet. See Figure 5. |
| Gas service meter relief vents. | 3 feet. See Figure 3. |

Figure 3 Clearances for transformers

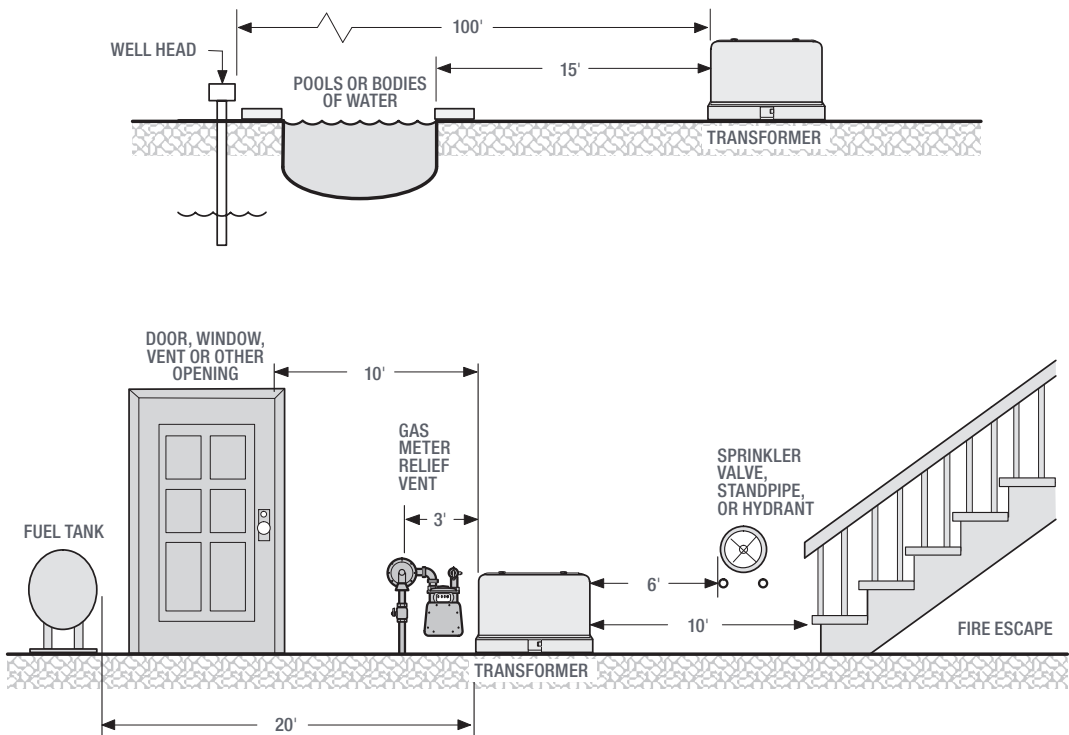


Figure 4 Clearances for transformers from structures

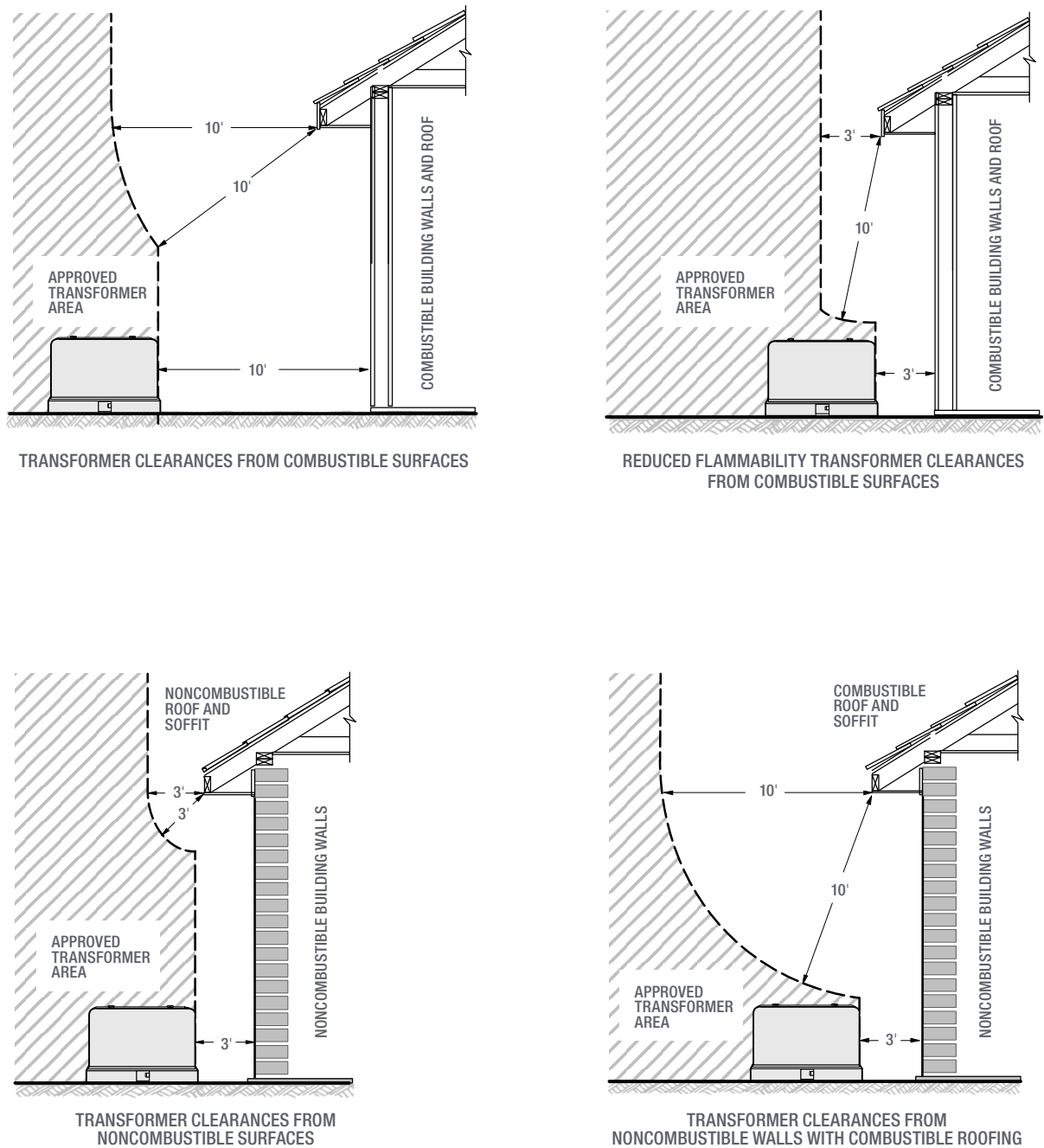


Figure 5 Clear working space for padmount transformers and aboveground J-box enclosures

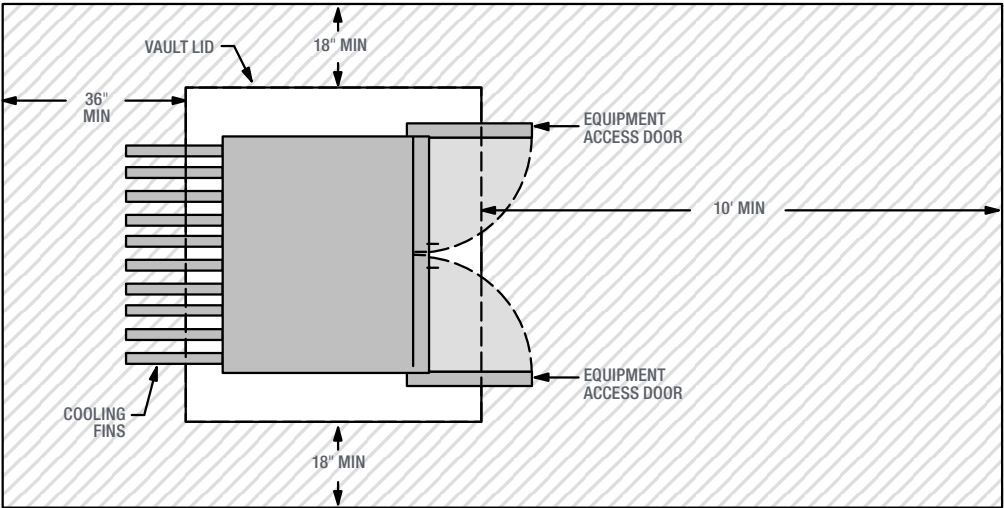
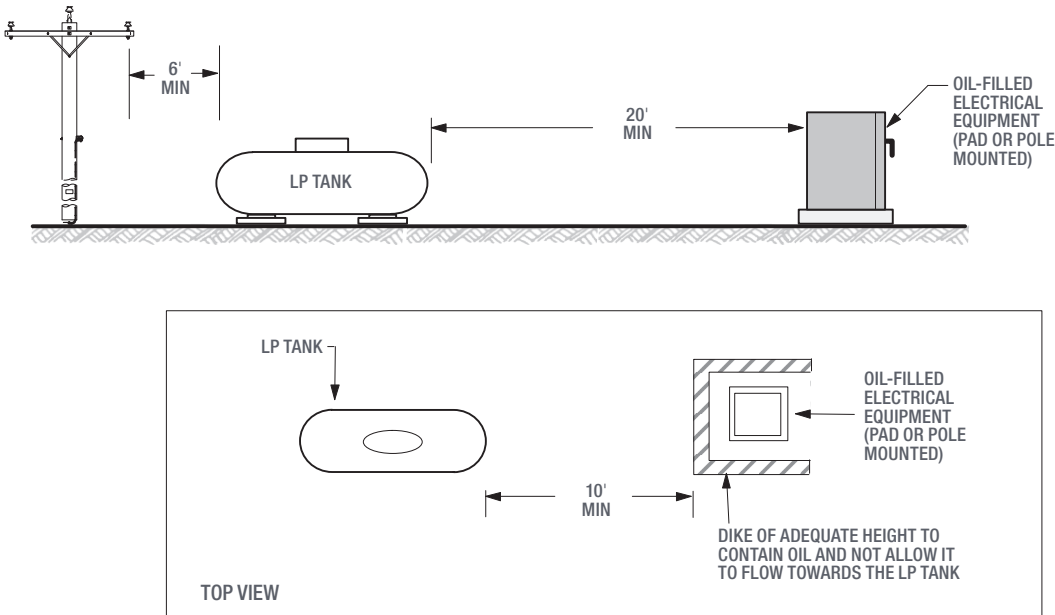


Figure 6 Minimum clearances from oil-filled equipment to LP, hazardous liquid, or fuel tanks



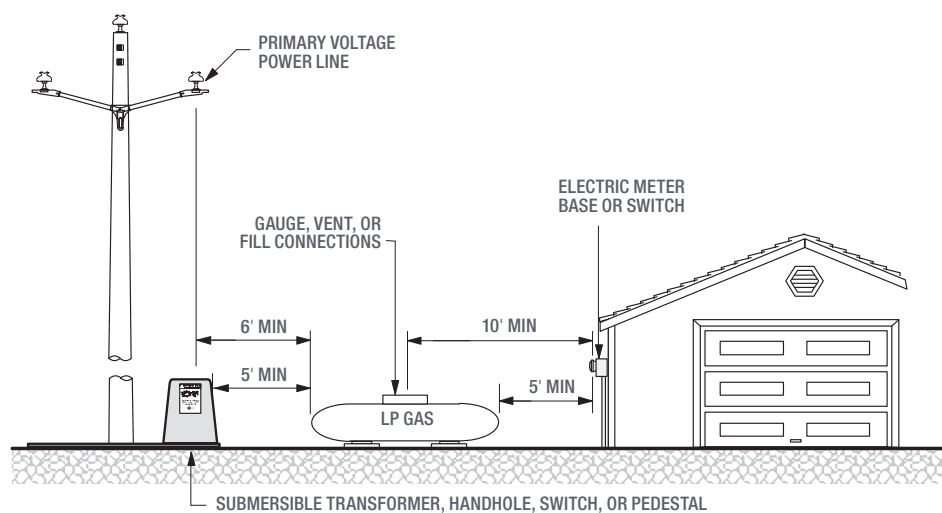
Liquefied propane tanks: clearances from ignition source

If there are liquefied propane (LP), hazardous liquid, or fuel tanks on your property, the following minimum clearances apply from PSE's padmounted transformer or the ignition source (see Figures 6 and 7).

- All LP tanks must be at least 6 feet from a vertical plane extending down from an overhead primary voltage line.
- Consumer storage LP tanks must be at least 5 feet from any source of ignition, such as electric meter bases, submersible transformers, secondary handholes or pedestals, or padmount switches.
- The fill connection, gauge connection, or vent on the LP tank must be at least 10 feet from any source of ignition.

Figure 7

Minimum clearances from LP storage tanks to sources of ignition



Outbuildings

An outbuilding is a stand-alone structure that is located on residential property and is not a living space. Typical outbuildings are barns, pump houses, garages, shops, and storage sheds.

Service line installation responsibilities for outbuildings

An underground service line to an outbuilding is installed by the customer or PSE, depending upon the intended use of the outbuilding (see Table 6).
If you want PSE to install a separate service to your outbuilding, refer to the Service Installation Responsibilities section at the beginning of this chapter.

Table 6

Service line installation responsibilities

| If the primary use of Outbuilding is for . . . | Service line will be installed and maintained by . . . |
|--|--|
| Commercial purposes or a pump house for a multifamily/community well serving more than 2 households. | Customer |
| General residential (garages, shops, small barns and well pump houses serving up to 2 households). | Puget Sound Energy |

NOTE: Installation costs and billing rates are different for each type of primary use of outbuildings. Contact your CCS Representative at **1-888-321-7779** for more information.

Cost for service

Charges vary depending on the location of existing electrical facilities, the type of service you are requesting, and the distance to run service from our facilities to your home.

Contact CCS at **1-888-321-7779** to determine the cost for service.

Power quality, voltage flicker

In your Application for Service, PSE requires the locked rotor starting currents (in Amps) for the largest single-phase and three-phase motors that draw in-rush current. After we determine the size of transformer required to serve the new load of the facility, we will calculate the percent voltage flicker (from the motor's starting current) at the point of service and provide that number to you.

If this voltage dip exceeds PSE's limits based on facility type, the transformer size must be increased to compensate for this. **You will be responsible for the difference in cost of the larger transformer**, or you will need to install sufficient controls to bring flicker back within PSE's limits.

NOTE: We will size PSE's facilities to provide a level of voltage flicker that is normally acceptable to customers. If you need to be served with a higher quality of service, contact your CCS Representative.

Chapter 2

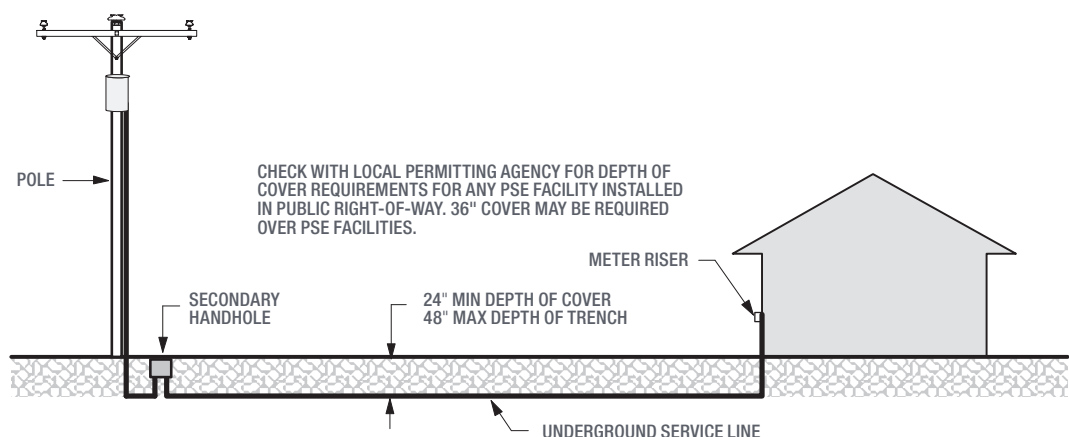
Permanent underground service

Steps to a successful underground service installation

The following list details the key steps in the installation of your underground service resulting in PSE's installation of your underground service line and meter (see Figure 8).

- Confirm where your service line will originate by contacting Customer Construction Services (CCS) at **1-888-321-7779**.
- Call PSE to set up an account and submit an order. Allow a minimum 4-12 weeks for possible engineering, right-of-way permits, and easement review.
- Obtain an electrical work permit.
- Determine an acceptable location for your meter base/socket (see Chapter 5).
- Coordinate with PSE project manager for any work in right-of-way.
- Order underground utility locate service by contacting the 811 "Call Before You Dig" hotline a minimum of two business days before digging.
- Dig a trench and provide proper conduit between your meter location and the service line origination (transformer, handhole, pole, or stubout).
 - » Provide 4-foot-square work pits at poles, stubouts, handholes, and meter service entrance.
 - » Provide conduit for electrical service lines and a minimum of 3/8-inch pull rope.
- Install your meter base/socket service entrance equipment.
- Obtain a city or state electrical inspection and approval of your installation.
- Call CCS at **1-888-321-7779** to have your service installed and energized.

Figure 8 Typical underground service from overhead power facilities



Selecting a meter base/socket location

When choosing your meter base/socket location, be sure to consider the types of terrain where your service line will be buried. Since PSE is responsible for repairing your service line if it fails, the path you select is subject to being dug up. Therefore, we recommend that the service line route be accessible for repairs and excavation.

NOTE: Refer to the general requirements section in Chapter 5, Metering Installation, when selecting a location for your electric meter base and socket.

Multiple metered services

If a residential class customer installs a bus gutter or meter-pack enclosure to set two meters (one meter for the house, the other for the shop, barn, garage, etc.) on a single piece of property being billed to the same individual, PSE will run a single service line at the customer's request. However, the single line must accommodate the kW load and limit the voltage drop and voltage flicker to within PSE's standards.

NOTE: PSE will not run a single service line to a bus gutter or meter-pack that serves multiple residential class customers residing on differing properties with separate legal ownership.

NOTE: Alternate Dwelling Units (ADU)'s with different mailing address must be metered separately (One meter on each home).

Service line trenches

This section refers to the illustrations found in the Electric Underground Service Installation Requirements handout available at pse.com/construction-services.

Trench routing/clearances

The routing of a customer-provided trench must maintain a minimum of 5 feet from septic tanks and a minimum of 10 feet from drain fields.

Trench and backfill requirements

PSE will allow **customer-owned facilities** within the service line trench if the following minimum horizontal clearances from PSE facilities are maintained:

- 18 inches minimum for customer-owned tight-line sewer (not tile), storm drain lines, roof drain lines, natural gas line, propane gas line, fuel oil line, and water mains up to 6 inches.
- 12 inches minimum for water services, irrigation pipes, lighting, security and electric supply circuits, closed-system roof drains/storm drains (not French drains), and culverts.

NOTE: The Electric Underground Service Installation Requirements handout illustrates the service trench requirements in detail.

Customer-installed service line conduit

If your service line will be crossing under any permanent structure (driveways, sidewalks, decks, patios, rockeries, retaining walls, or through your backyard), you are required to provide and install conduit under those obstructions.*

You are required to provide an electrical service line conduit for services 100 feet long or less. However, PSE recommends the use of conduit for all services.

* Any portion of the service conductor not in conduit may not be under a drive path or hard surface.

Customer-installed service line conduit installation requirements

- The service line conduit shall be gray, schedule 40 PVC conduit with a minimum 3 inches in diameter for all runs.
- White water pipe or green sewer pipe is not acceptable.
- The service line conduit shall contain no more than a total of 180 degrees of bends of which no individual bend is less than a 24-inch radius.
- Install a minimum of 3/8-inch pull rope, or 3/8-inch polyester pulling tape, in the conduit. Strength of the pulling rope or tape shall meet or exceed 1800-pound rated tensile strength.
- Stop the conduit 4 feet from the pole in the work pit with the pole butt exposed.
- Do not provide a conduit elbow at the base of PSE's pole, and do not install conduit on a PSE pole.
- When installing conduit at a transformer, stop 3 feet from the entrance at the bottom of the transformer minipad (Figures 9, 10 and 24).

NOTE: Details of a service line trench with customer-installed conduit is shown in the Electric Underground Service Installation Requirements handout (Form 6080).

Continuous and discontinuous conduit systems

A continuous conduit system is defined as a section of conduits permanently glued together and installed between the location of available power (e.g., PSE power pole, padmount transformer, pedestal, handhole, or stubout) and the meter base without any points of separation where it exists underground (e.g., conduit work pits). See Figure 9.

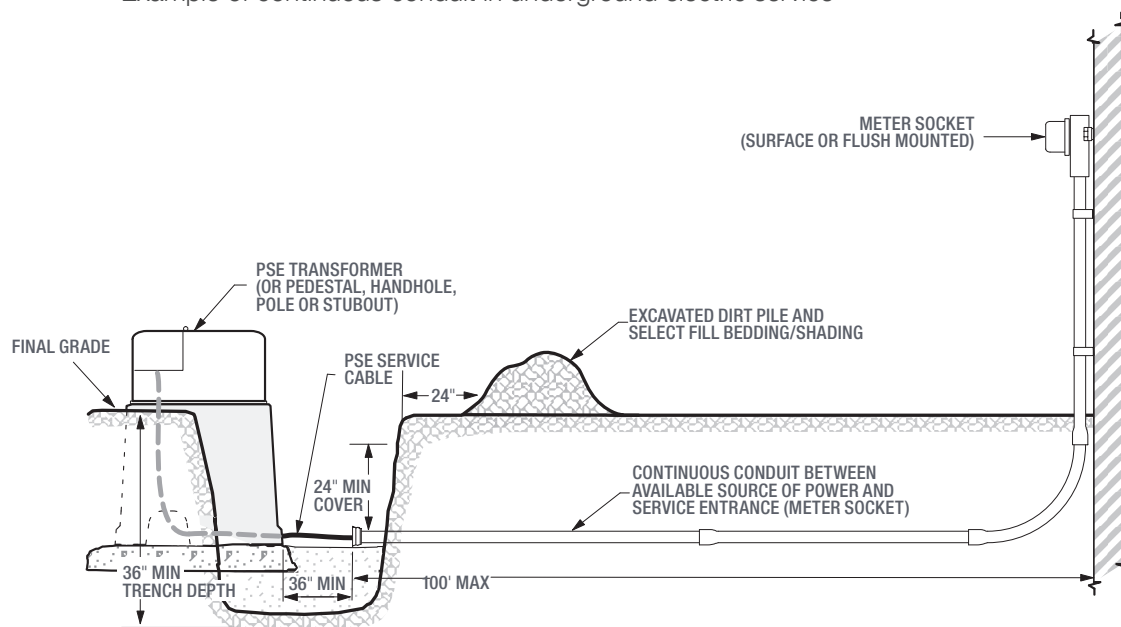
A discontinuous conduit system is defined as multiple sections of conduits installed between the location of available power and the meter socket with points of separation between sections where they exist underground (see Figure 10).

Choosing to install a continuous conduit system has its advantages and disadvantages:

- An advantage of a continuous conduit system is that the PSE electrical crew does not require an excavated work pit to be open at the location of your meter socket on the day your new service is energized. Preferred method of PSE installation is a work pit at the meter base i.e. a discontinuous conduit system.
- Disadvantages of a continuous conduit system:
 - » The length should be enough to ensure PSE's electrical cable can be pulled between the location of available power and the meter socket, and,
 - » Water can migrate and flow into the home if the available power source exists at a higher elevation than the location of the meter base.

NOTE: Contact CCS or your PSE project manager to initiate a cable pulling review.

Figure 9 Example of continuous conduit in underground electric service



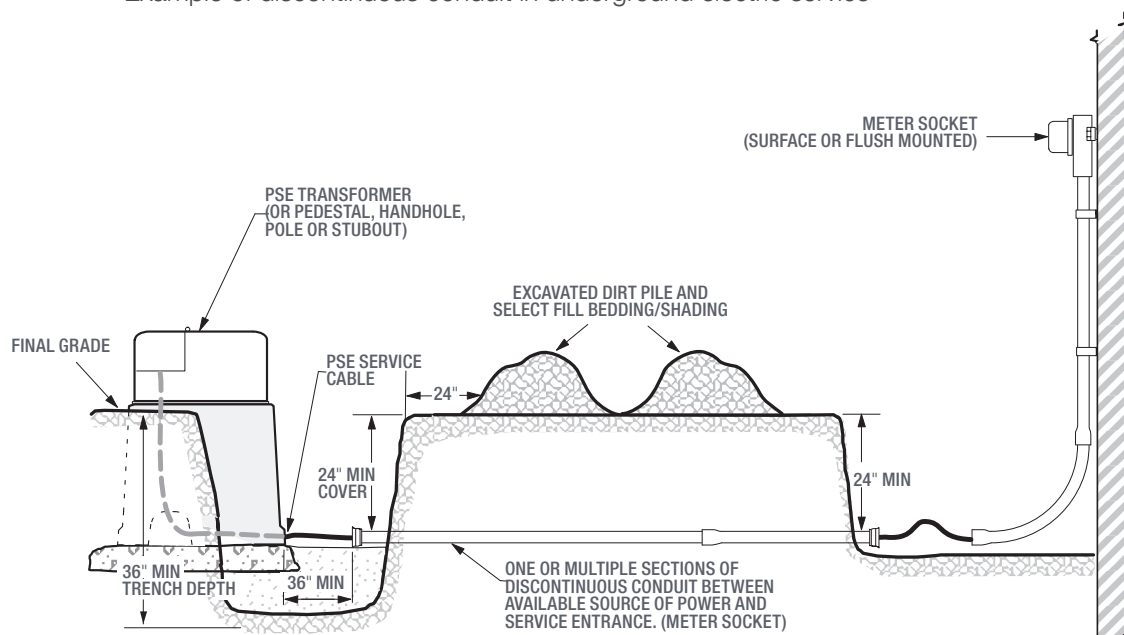
When to choose continuous conduit

Choose to install a continuous conduit system for your electrical service if:

- At a distance where the cable pulling is easy without a pull rope. Contact CCS or your PSE project manager to initiate a cable pulling review.
- The sum total of the degrees of bends in the conduit run (including the bend required at the bottom of the meter base riser) does not exceed 180° with minimum radius of bend is 24 inches.
- The elevation at the location of available power is less than the elevation of your meter socket (i.e., your meter socket is uphill from the location of available power).

NOTE: By choosing to install a continuous conduit system, the customer assumes responsibility for recognizing potential surface and sub-grade water flows that may create an entry of water into the customer's electrical equipment. PSE is not responsible for damage caused by water entering a customer's meter base or equipment.

Figure 10 Example of discontinuous conduit in underground electric service



When to choose discontinuous conduit

Choose to install a discontinuous conduit system for your electrical service if:

- The sum total of the degrees of bends in the conduit run (including the bend required at the bottom of the meter base riser) exceeds 180° requiring additional work pits for cable pulling.
- The elevation at the location of available power is greater than the elevation of your meter socket (i.e., your meter socket is downhill from the location of available power).

A table for selecting the required conduit size is provided in the Electric Underground Service Installation Requirements handout.

Puget Sound Energy (PSE) does not prefer continuous conduit system.

Contact CCS at **1-888-321-7779** if you have questions on whether to install continuous or discontinuous conduit for your underground electric service.

Service entrance equipment

Determine the meter base/socket location, the service line route, and the size of the service you want (for example, 200 A), before you begin installing your service entrance equipment.

Installation requirements

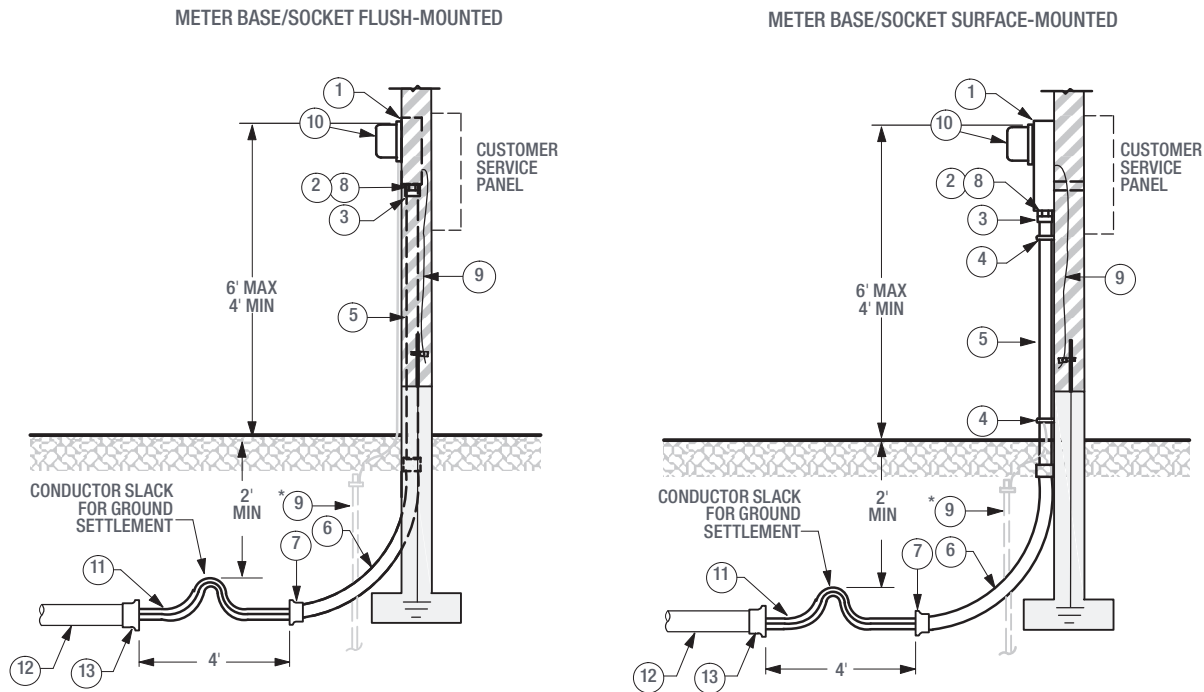
- Service entrance equipment can be installed either flush-mounted or surface-mounted (see Figure 11).
- Install the meter base/socket so that the top of the meter will be between 4 and 6 feet above finished grade with a 5 foot height being ideal.
- The service entrance conduit has a maximum of one 45° or 90° degree bend with a minimum 24-inch radius.
- Do not install “LB” joints, conduits, or devices that allow access to the service conductor in the riser ahead of the meter.
- A current transformer (CT) enclosure, if required, must be mounted on the outside of the structure it serves.

NOTE: Service entrance equipment for a 401–800 A installation is shown in Figure 12.

Service entrance conduit size

The Electric Underground Service Installation Requirements handout illustrates the service entrance conduit size requirements in detail.

Figure 11 Two types of meter bases/sockets for permanent underground service, home built on permanent foundation



NOTE: Conductor slack shall be left at the base of the service entrance for ground settlement to relieve tension on meter connections.

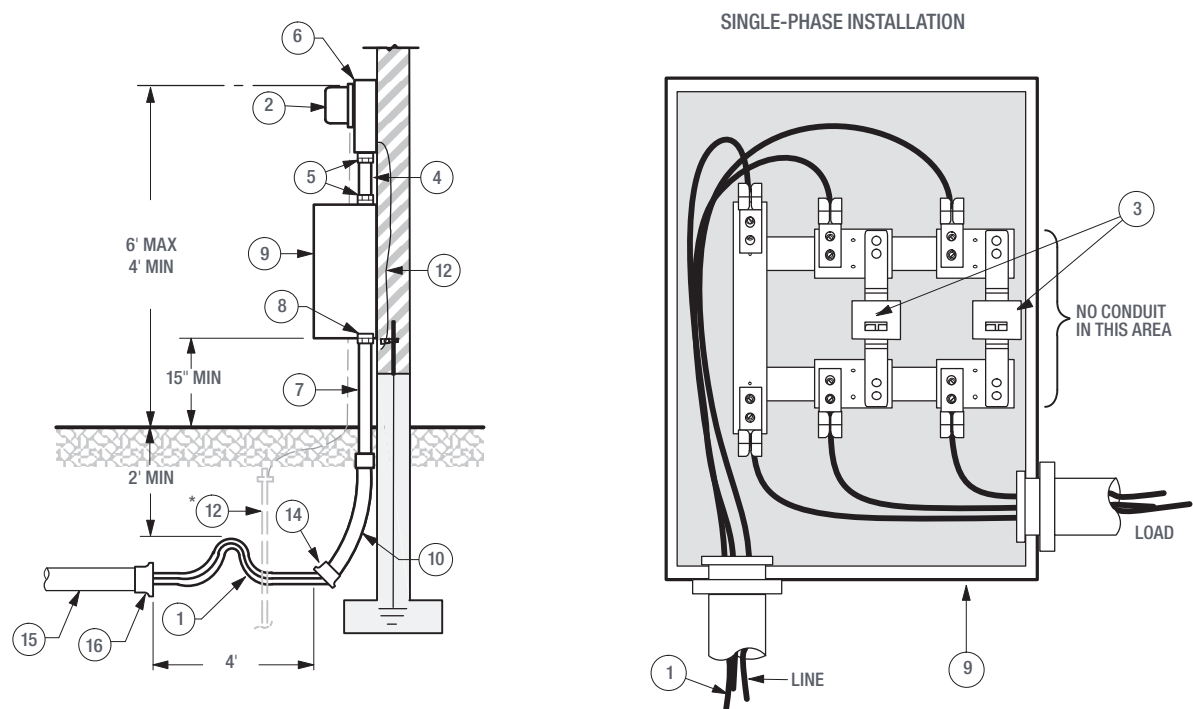
NOTE: Total distance of raceway within the building to the customer's overcurrent protection shall not exceed 15 ft (WAC 296-46B-230.070).

- * Optional grounding electrode(s) for structures without permanent foundation.
- ** Schedule 40 PVC or rigid-steel conduit may not be allowed on **flush-mount** installations. Check with local jurisdictional codes before installation.

| Items owned and installed by customer | |
|---------------------------------------|--|
| 1 | Meter base/socket |
| 2 | Insulating busing |
| 3 | Terminal adapter or lock washer |
| 4 | Conduit strap (2) |
| 5 | Rigid steel conduit, Sch 40 or Sch 80 PVC ** |
| 6 | Elbow, 45° or 90°, 24" min radius |
| 7 | Bell end |
| 8 | Lock washer |
| 9 | Ground electrode and wire in accordance with NEC/WAC |

| Items owned and installed by PSE | |
|--|---|
| 10 | Meter |
| 11 | Service line |
| PSE owned but customer purchased and installed | |
| 12 | Conduit (required in residential plats) |
| 13 | Bell end |

Figure 12 401–800 A service entrance equipment, home built on permanent foundation



NOTE: Total distance of raceway within the building to the customer's overcurrent protection shall not exceed 15 ft (WAC 296-46B-230.070).

- * Optional grounding electrode(s) for structures without permanent foundation.
- ** Schedule 40 PVC or rigid-steel conduit may not be allowed on flush-mount installations. Check with local jurisdictional codes before installation.

| Items owned and installed by customer | | Items owned and installed by PSE | |
|---------------------------------------|---|---|---|
| 4 | Conduit (Sch 40 or Sch 80 PVC or steel or EMT), 1" single-phase, 1-1/4" three-phase | 1 | Service conductors (residential only) |
| 5 | Insulating busing | 2 | Meter |
| 6 | Six terminal meter base/socket with test switch space | 3 | Current transformer with meter circuit wiring |
| 7 | Rigid steel conduit, Sch 40 or Sch 80 PVC ** | PSE owned but customer purchased and installed | |
| 8 | Insulating bushing | 15 | Conduit (required in residential plats) |
| 9 | Current transformer enclosure (outside or in electric room) | 16 | Bell end |
| 10 | 45° or 90° bend - rigid steel, Sch 40 or Sch 80 PVC | | |
| 11 | Line and load side connectors for service conductors (2-bolt lugs) | | |
| 12 | Ground electrode and wire in accordance with NEC/WAC * | | |
| 13 | Current transformer mounting bracket | | |
| 14 | Bell end | | |

Permanent underground service for manufactured homes, 0–200 A

Service equipment installation

If you are installing an underground service to your manufactured home, your service equipment can be installed one of two ways:

- On a customer-owned pedestal or meter post (see Figure 13).
- On the manufactured home, if both of the following conditions are met:
 - » The manufacturer installed the service equipment at the time your home was built.
 - » The service equipment meets the meter base/socket requirements listed below.

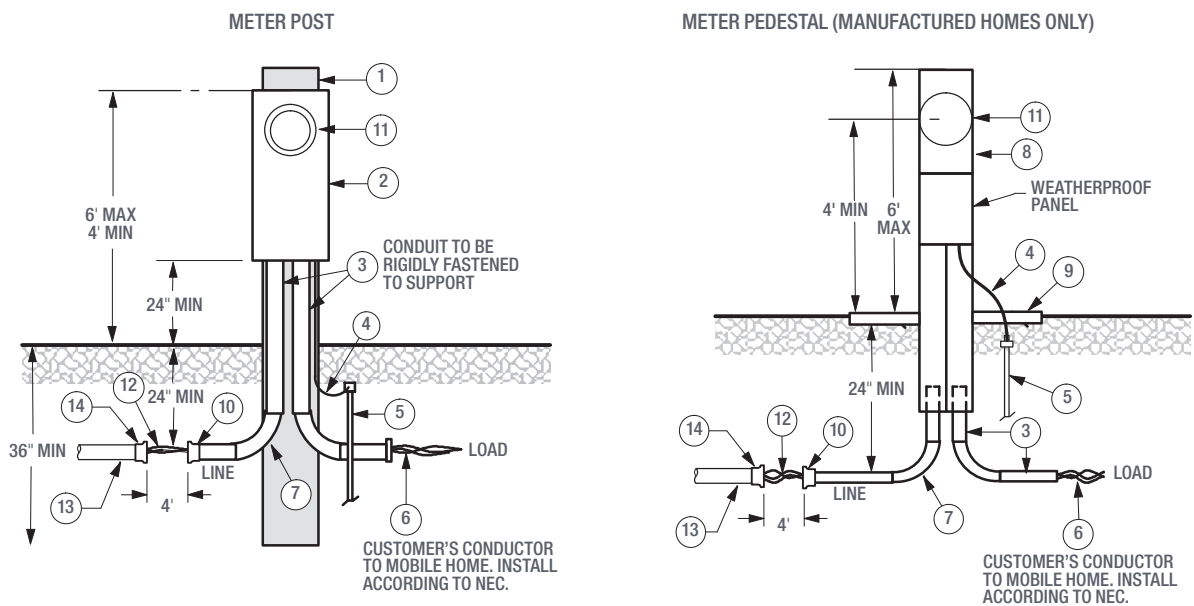
Meter base/socket requirements

Meter base/sockets installed on manufactured homes must:

- Be located on an outside wall of your home.
- Be located on the front one-third of your home closest to normal drivable public access. Refer to Meter Locations and Clearances on Page 2 of the Electric Underground Service Installation Requirements handout for more information.
- Be between 4 and 6 feet above finished grade.
- Meet PSE's service entrance conduit size requirements.
- Not be in a walkway or breezeway.
- Not be in an area that is subject to being fenced.

NOTE: Meter bases/sockets not installed on the manufactured home must meet the requirements of NEC 550.32(B).

Figure 13 Permanent underground service for manufactured homes, 0–200 A



| Items owned and installed by customer | |
|---------------------------------------|--|
| 1 | 6" x 6" x 8' min fully pressure-treated post |
| 2 | Service entrance equipment |
| 3 | Service conduit as specified in Table 7 |
| 4 | Ground wire, in accordance with NEC/WAC |
| 5 | Ground rod(s), in accordance with NEC/WAC |
| 6 | Service conductor to building/residence |
| 7 | Elbow, 45° or 90° bend, 24" min radius |
| 8 | Factory-built metal meter pedestal (manufactured homes only) |
| 9 | 36" x 36" x 3" min concrete stabilizer pad |
| 10 | Bell end |

| Items owned and installed by PSE | |
|--|---|
| 11 | Meter |
| 12 | PSE service line |
| PSE owned but customer purchased and installed | |
| 13 | Conduit (required in residential plats) |
| 14 | Bell end |

Remote metering (meter loop) for underground residential services

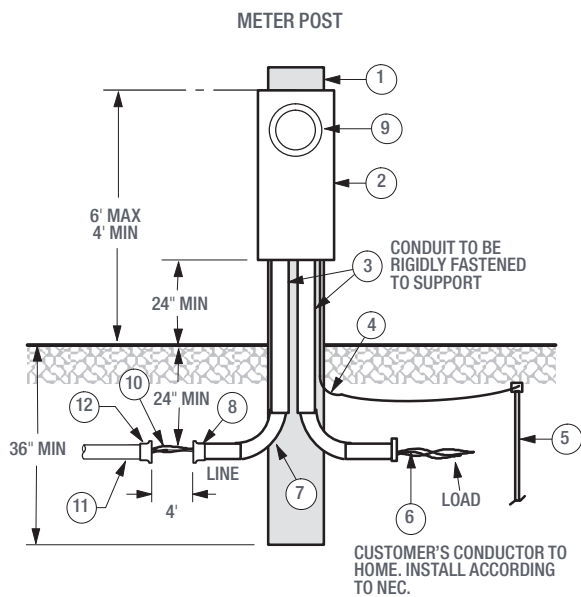
What is remote metering?

Normally, a meter base/socket and associated devices (current transformers, etc.) are attached to a permanent fixed structure that contains the load being served (such as a house). If the metering equipment is not attached to the permanent structure, it is called “remote metering.” In this case, the conductors that run from the meter to your house are installed, owned, and maintained by you.

Requirements for residential remote metering, 200 A or less

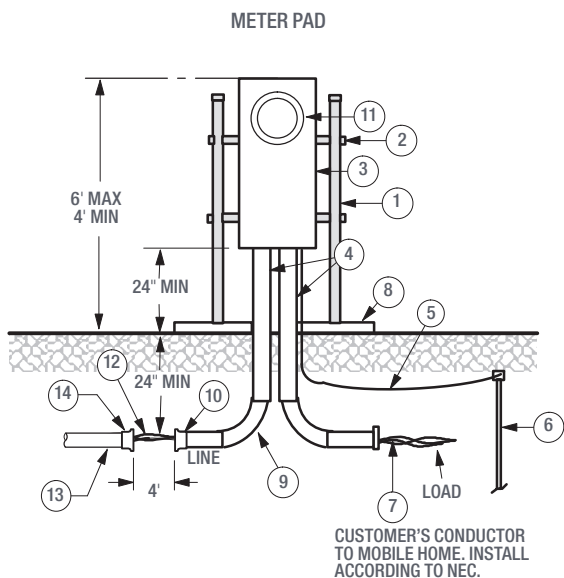
Remote metering shall be mounted on a structure or meter post. It is your responsibility to purchase, install, and maintain this equipment. The required metering cabinet and supporting structure are shown in Figure 14.

Figure 14 Remote metering for underground residential services on meter post



| Items owned and installed by customer | |
|---|--|
| 1 | 6" x 6" x 8' min fully pressure-treated post, mason block, or concrete |
| 2 | Service entrance equipment |
| 3 | Service conduit as specified in Table 7 |
| 4 | Ground wire, in accordance with NEC/WAC |
| 5 | Ground rod(s), in accordance with NEC/WAC |
| 6 | Service conductor to building/residence |
| 7 | Elbow, 45° or 90° bend, 24" min radius |
| 8 | Bell end |
| Items owned and installed by PSE | |
| 9 | Meter |
| 10 | PSE service line |
| PSE owned but customer provided and installed | |
| 11 | Conduit (required in residential plats) |
| 12 | Bell end |

Figure 15 Remote metering for underground residential services on meter pad



| Items owned and installed by customer | |
|---|--|
| 1 | Galvanized steel pipe |
| 2 | C-channel (unistrut) cross bracing |
| 3 | Service entrance equipment |
| 4 | Service conduit as specified in Table 7 |
| 5 | Ground wire, in accordance with NEC/WAC |
| 6 | Ground rod(s), in accordance with NEC/WAC |
| 7 | Service conductor to building/residence |
| 8 | 36" x 36" x 3" min concrete stabilizer pad |
| 9 | Elbow, 45° or 90° bend, 24" min radius |
| 10 | Bell end |
| Items owned and installed by PSE | |
| 11 | Meter |
| 12 | PSE service line |
| PSE owned but customer provided and installed | |
| 13 | Conduit (required in residential plats) |
| 14 | Bell end |

400 A and larger panels

Remote meter installations that require current transformers shall be mounted on permanent support structures that are made of galvanized steel pipe with unistrut cross-braces, concrete, or masonry blocks. Support structures made of wood (treated or not) are unacceptable.

The customer shall provide a 3-foot x 3-foot x 3-inch-thick concrete pad surrounding the meter or holes 2 feet deep that are filled with concrete to anchor the structure.

Meter bases/sockets shall be **permanently labeled** to indicate the address they serve. PSE requires engraved **phenolic nameplates** or adhesive die-cut labels at least 1-inch high. Service will not be established until marking is complete.

NOTE: Felt-tip pens and label maker tape are not considered permanent marking.

Other requirements specified in this handbook for meter bases/sockets and current transformer (CT) enclosures apply.

Remote services greater than 800 A

Remote services 800 A or greater require EUSERC outdoor switchgear. Ask your CCS Representative for more information.

Meter post and pedestal locations

Remote metering must be:

- Accessible for reading and maintenance during normal business hours.
- Not be in a walkway or breezeway.
- Not be in an area that is subject to being fenced or enclosed.
- Safe parking must be located within 50 feet of the meter.

NOTE: When installed close to PSE's transformer, all metering equipment must be a minimum of 3 feet from the transformer and not installed in front of the transformer.

Chapter 3

Permanent overhead service

Steps to a successful overhead service installation

The following checklist will assist you in preparing for the installation of an overhead service (see Figure 16). After you have completed these items, PSE can install the overhead service line and meter.

- Check for any local ordinances/covenants that prevent you from obtaining an overhead service.
- Call PSE to set up an account and submit an order. Allow adequate time for possible engineering, right-of-way permits, and easement review.
- Obtain an electrical work permit.
- Complete Electric Service Application Single-Family Residential 100E. All forms can be downloaded at **pse.com/construction-services**.
- Supply recently approved site drawings including septic, drain field location, wet and dry utility locations and load information to your PSE Customer Construction Services (CCS) Representative.
- Call CCS to find out where your service line will originate.
- Determine an acceptable location for your meter base/socket.
- Provide a path clear of obstructions between PSE's service pole and your service mast. Remove any trees/tree branches, bushes and any vegetation within 3 feet around the service conductor path.
- Provide the location of any domestic or community water well on your property included in the site plan as well.
- Install the required service entrance equipment.
- Install the service entrance conductors (leave a minimum of 18 inches exposed at the weatherhead).
- Verify that the service mast height requirements have been met (see Figure 16).
- Provide payment for any preconstruction costs determined by CCS.
- Have the city or state inspect and approve your installation.
- Call CCS at **1-888-321-7779** to have your service installed and energized.

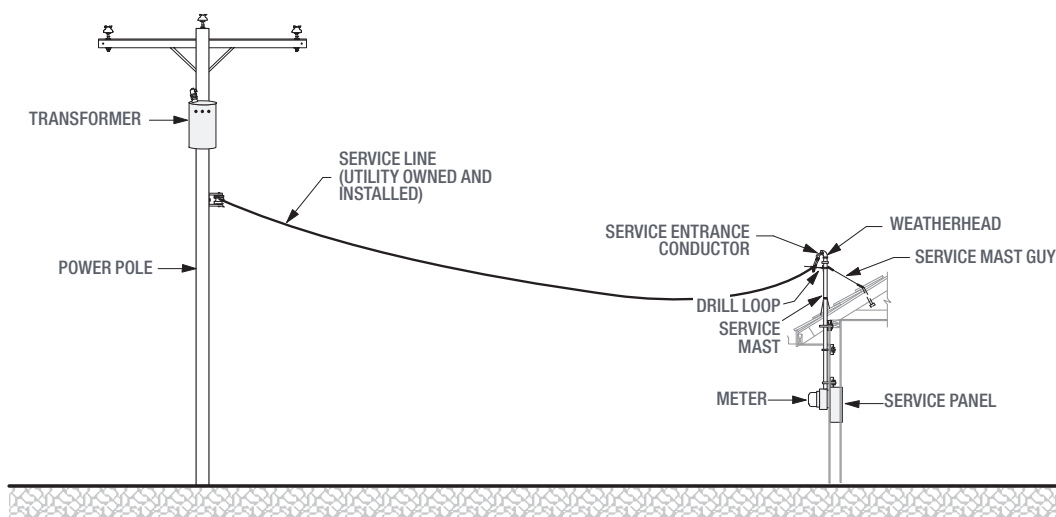
Selecting a meter base/socket location

After CCS determines which pole the service line will come from, you can determine the location of your meter base/socket.

Your meter base/socket must be located outside and on the front one-third of your structure closest to normal drivable public access. Refer to Chapter 5 in this handbook for detailed meter location criteria.

Consider the type of terrain the line will cross when choosing a meter base/socket location. PSE strongly suggests avoiding service line routes that cross a driveway. Service lines that cross driveways can be hit by vehicles, which can cause damage to the service equipment and even to your home.

Figure 16 Typical overhead service installation



Clearance requirements

Service line ground clearance

The National Electric Safety Code (NESC) establishes minimum clearance requirements to maintain safe height requirements for electrical conductors over various terrain (see Figure 17).

The NESC requires the lowest point of a service conductor to be at least **12 feet** above the ground. The bottom of the drip loop must be a minimum of **10 feet** above the ground.

Maintenance of your service around trees

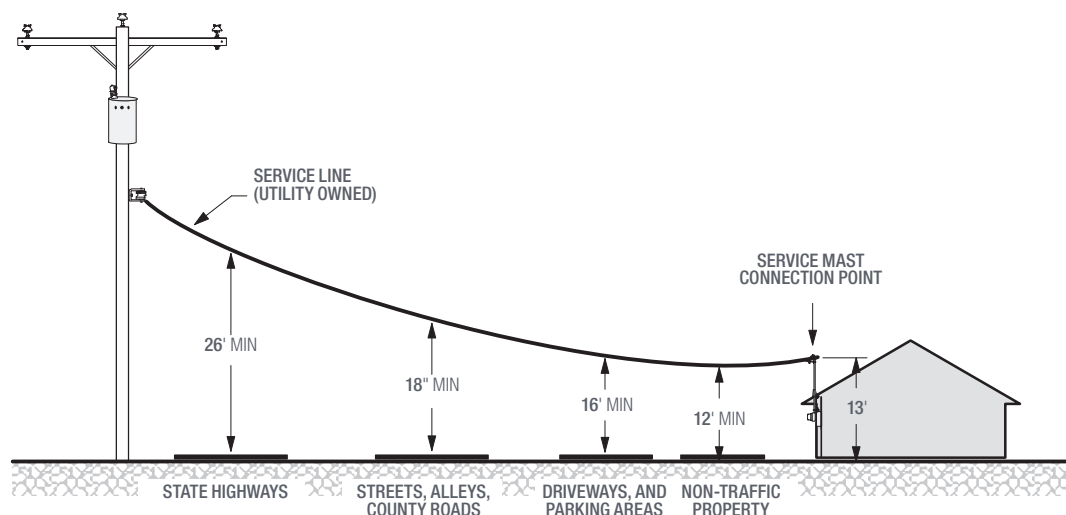
If the service line will pass through any trees, you are required to prune those trees to provide a clear path for the service line. You are also responsible for regular tree pruning, and if necessary, tree removal to keep the path clear.

Attachment of service conductor

It is not your responsibility to string the conductor, but you are required to provide a point of attachment at your service mast that will allow PSE to install the conductor and maintain the required clearances.

If you need further details, please contact the state or local electrical inspector for your area.

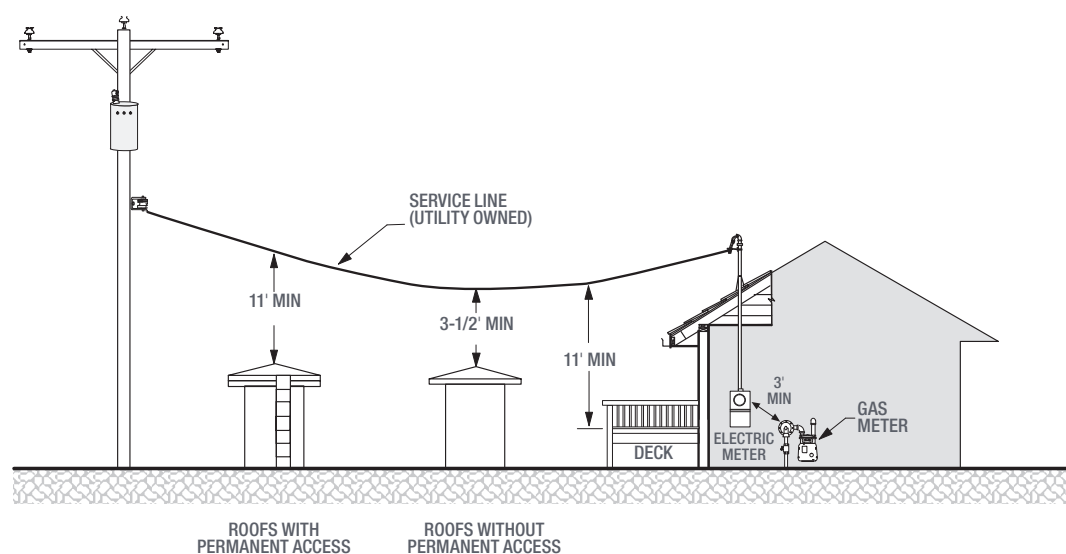
Figure 17 Minimum overhead service line vertical clearances from ground level



Minimum clearances from structures, building openings, and gas meters

- A minimum clearance of 3 feet is required between electric service lines and windows, doors, porches, fire escapes, or similar openings.
- A minimum radial clearance of 3 feet is required between electric service equipment and the natural gas meter pressure relief vent (see Figure 18).
- Service lines passing over the roof of another structure (but not attached to that structure) must maintain the minimum clearances (see Figure 18).
- Service lines passing over a deck must maintain a minimum clearance of 11 feet (see Figure 18).

Figure 18 Minimum clearances over other structures

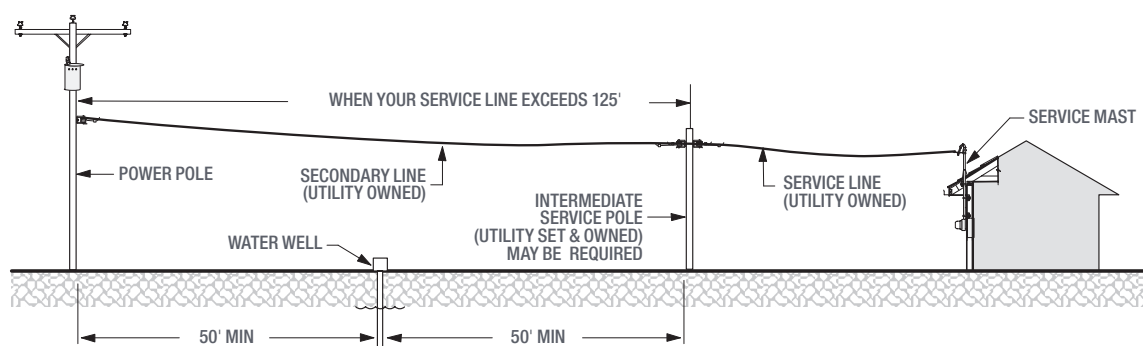


Intermediate service pole

When the length of an overhead service line exceeds 125 feet or the clearances shown in Figure 18 cannot be achieved, an intermediate service pole **may** be required to maintain safe ground clearance (see Figure 19) for the wire and to relieve excessive tension at the service mast. Contact your PSE project manager to initiate a review.

This intermediate service pole is set and owned by PSE and the cost is in addition to the service line costs. Please contact CCS for installations that may require an intermediate service pole to determine additional costs.

Figure 19 Intermediate service pole location



Service mast

A service mast is a rigid steel conduit that runs vertically from the top of your meter base/socket up through your roof. It contains your service entrance conductors and typically supports one end of your service line. Service masts are necessary when installing an overhead service and are installed by you or your electrical contractor.

Service mast requirements

The service requirements for the installation of the service mast are located in the National Electric Code (NEC). Some of the more common methods are included in this section (see Figures 20 and 21).

Height requirements

The service bracket (the point of connection with PSE's service wire at the top of your service mast) must be at least 13 feet above final grade or terrain so that the minimum clearances over your property can be maintained. Additional height may be required depending on the location and type of structure or terrain that your service line passes over.

The NEC also requires that your service mast maintain minimum clearances above your roof (see Figure 20). The clearance required depends on the slope of your roof, and whether or not your service line is attached to the structure.

For other options and details refer to the NEC. Your CCS Representative can assist you with determining the proper mast height.

Figure 20 Unguyed service masts

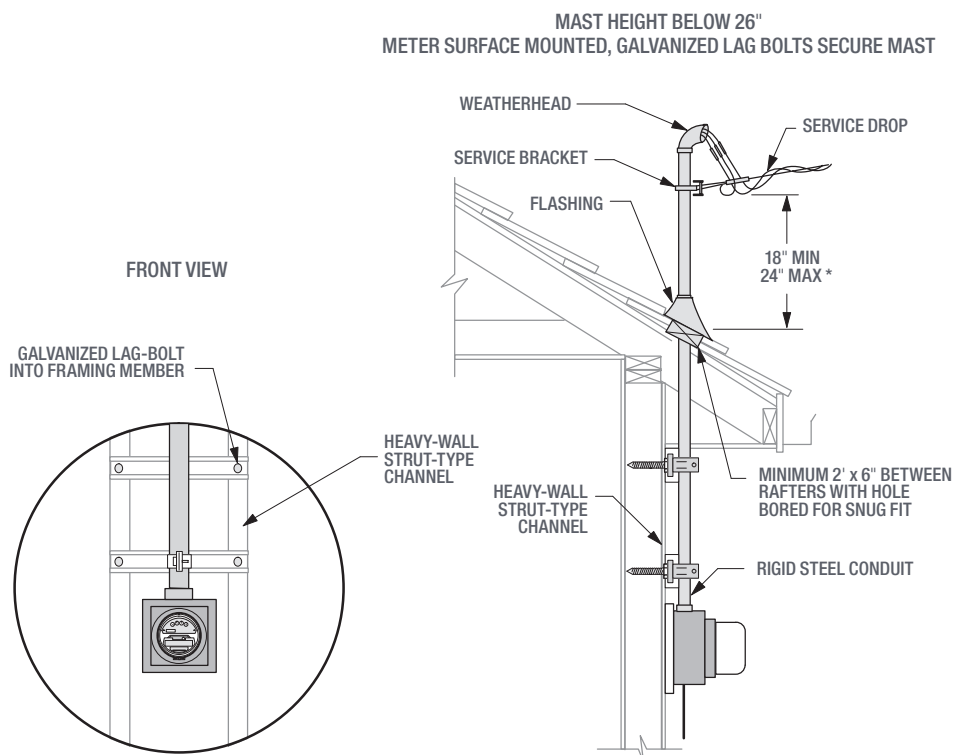
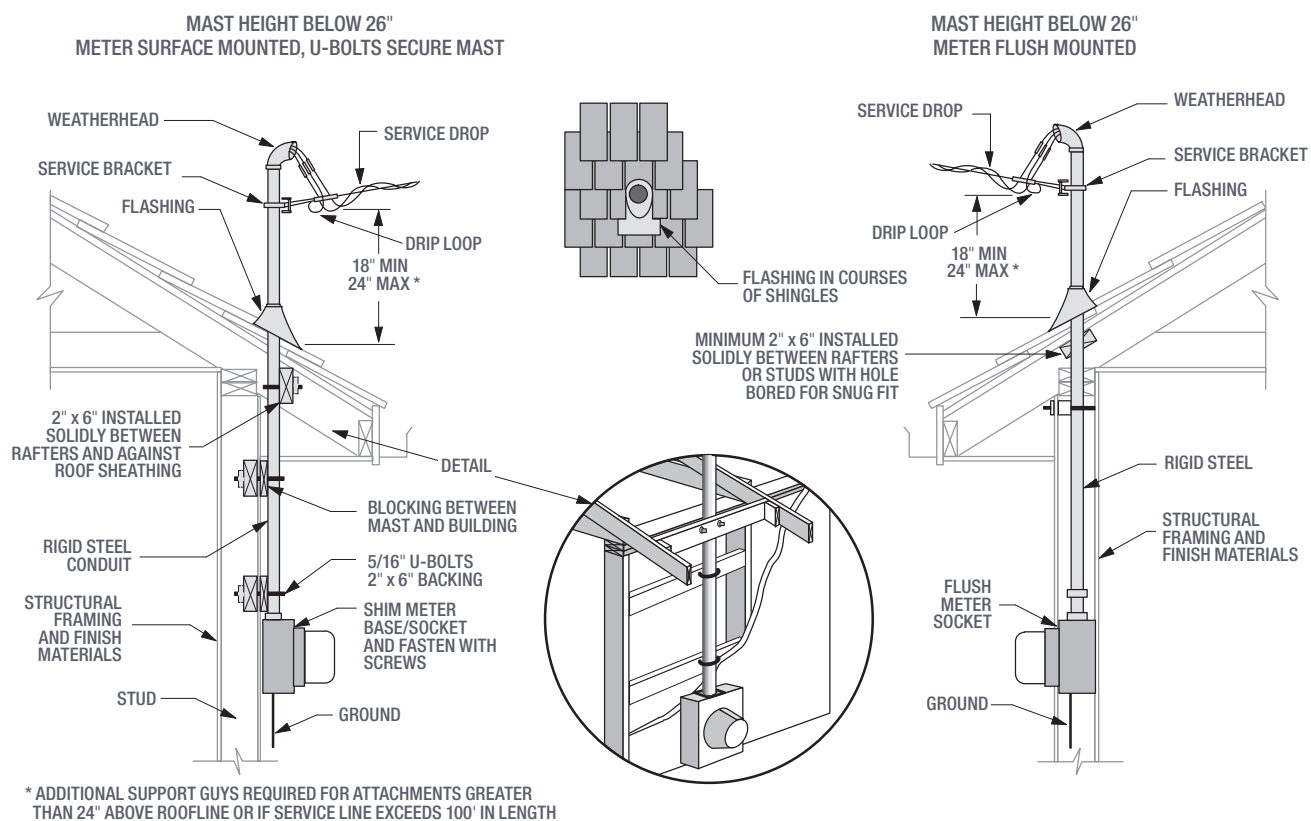
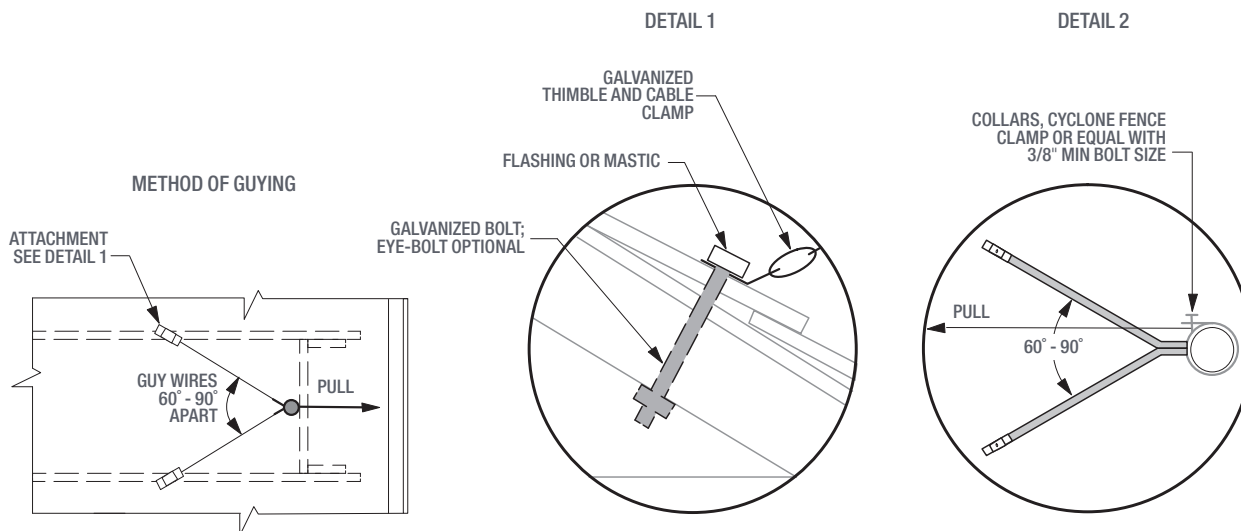
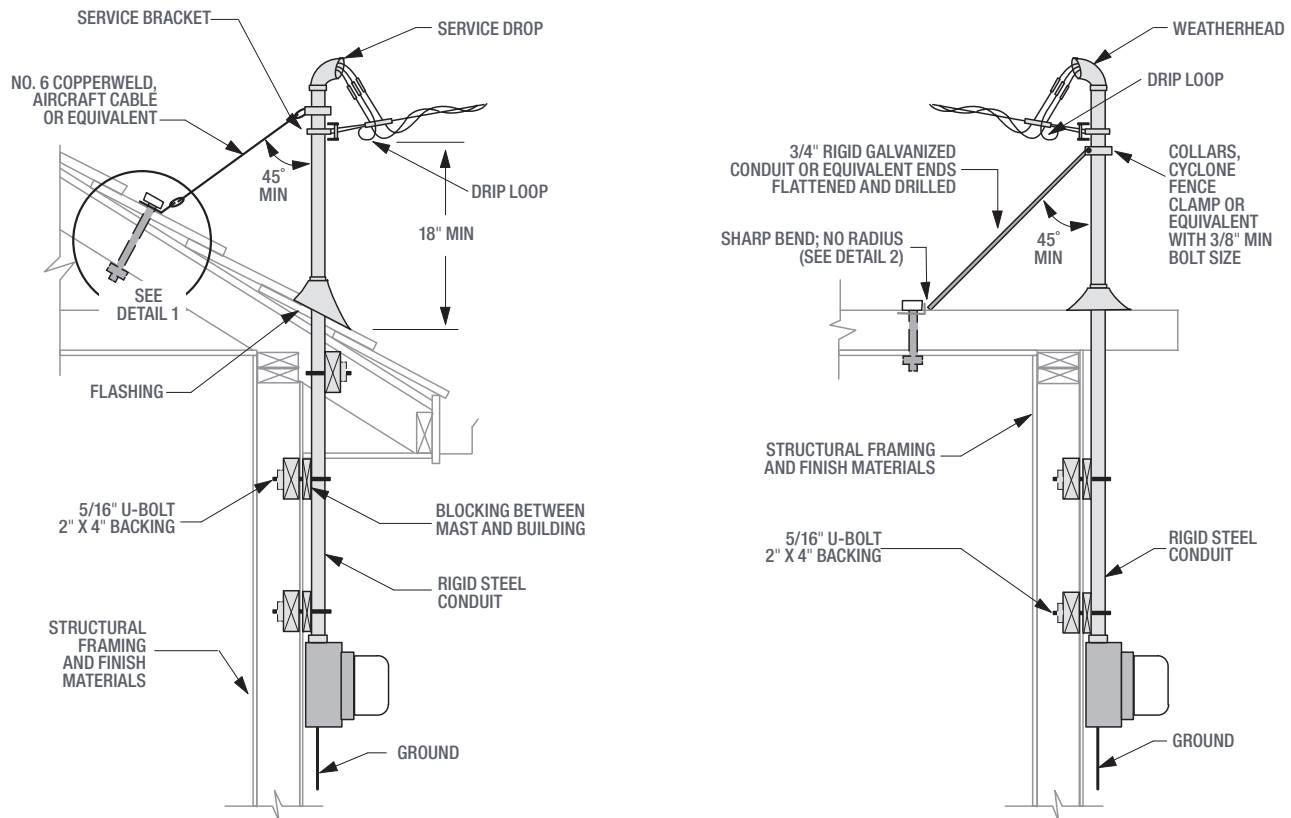


Figure 21 Guyed service masts



Additional mast supports (guy or brace)

Additional mast supports, typically a guy or a brace, are required for any service line if:

- The service line is over 100 feet long; or,
- The point of attachment is more than 24 inches above your roof (see Figure 21).

Guys and braces are installed to prevent the weight of the service line from pulling your service mast away from your home or damaging your roof.

Further information regarding guying and bracing service masts is available in the NEC.

Screw-in service knobs

For new or altered overhead service lines, you must provide a substantial point of attachment that meets NEC requirements. Older type screw-in service knobs attached to the home's wall are often inadequate to support modern triplexed service lines. PSE may prohibit use of service knobs if deemed inadequate.

Service entrance equipment installation requirements

After you have determined the meter base/socket location, the service route, the height of your service mast, and the size of your service (200 A, 400 A, etc.); you are ready to begin installing your service entrance equipment.

Once you have installed your meter base/socket and mast you are ready to provide and install your service entrance conductor. The service entrance conductor is the wire that is connected to the top lugs in your meter base/socket and runs up through the service mast.

The service entrance conductors must be sized according to the NEC and to the rating of your meter base/socket. When installing the wire, leave at least 18 inches of it exposed at the end of the weatherhead to allow PSE to connect your service line to it. When you install your meter base/socket, make sure the top of the meter will be between 4 and 6 feet above finished ground level.

If you have any questions regarding the installation of your service equipment, we suggest that you refer to the NEC, call the inspecting agency for your area, or contact an electrical contractor.

Manufactured homes

If you are installing an overhead service to a manufactured home, our service equipment can be installed one of two ways:

1. On a customer-owned meter pole, or
2. On the manufactured home, if both of these conditions are met:
 - a. The manufacturer installed the service equipment at the time the home was built, and
 - b. The service equipment meets the meter base/socket requirements listed below.

Meter base/ socket installation requirements for manufactured homes

Meter base/sockets installed on manufactured homes must be:

- Located on an outside wall of your home and accessible for reading and testing.
- Located on the front one-third of your home closest to normal public access.
- Between 4 and 6 feet above finished grade.

NOTE: Do not locate the meter base/socket in an area that is subject to being fenced.

Customer-owned meter pole

Meter pole requirements

If a meter pole is required for the project, it is your responsibility to purchase and install it. The meter pole must meet the following requirements:

- Be sound, round, reasonably straight, and made of wood.
- Fully pressure treated.
- Class 6 or better with a minimum diameter of 5-1/2 inches at the top.
- 35 feet long minimum.
- Butt gain cut 12 feet from the bottom of the pole (2-inch by 1/2-inch cut into the face of the pole), or a manufacturer's tag attached at 12 feet from the bottom of the pole.

Installation requirements

The installation requirements for a meter pole are:

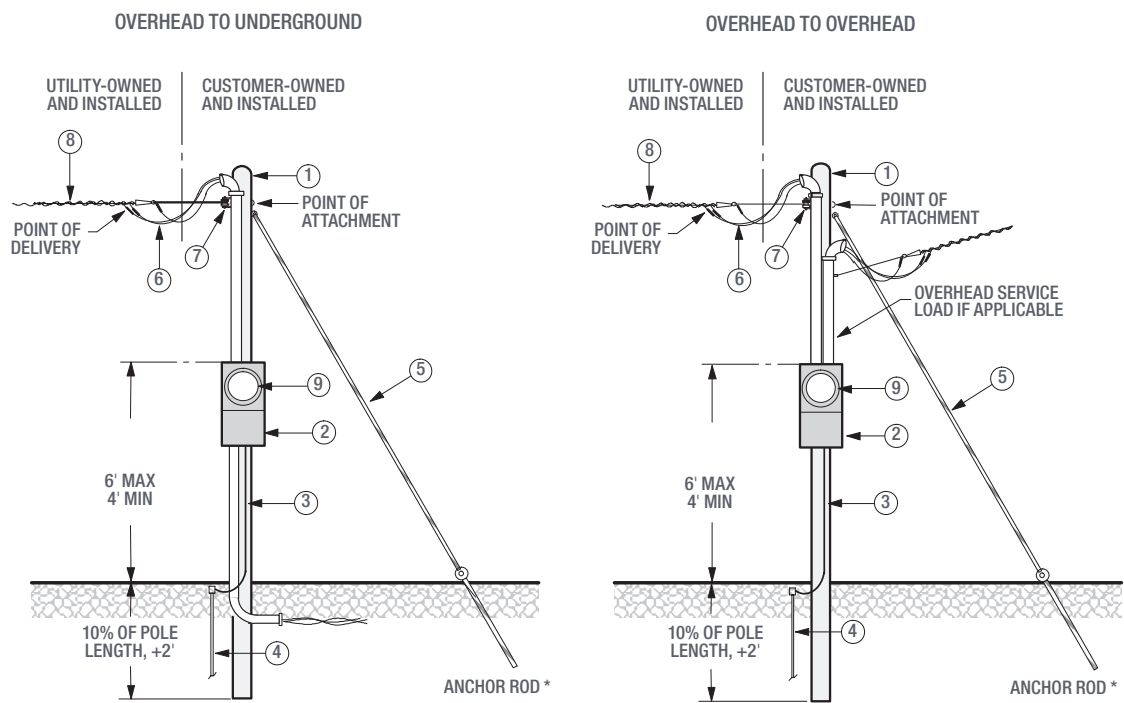
- Must be located on the parcel the meter will serve.
- Must be buried a minimum of 10% of the pole's length plus 2 feet. If soil conditions are poor, crushed rock should be used as a substitute for backfill to stabilize the pole.
- Must be guyed if the service line crosses a public road or if the distance between the meter pole and PSE's pole **is greater than 70 feet**. A push brace or pole key brace may be used if guy space is not available.

A meter pole installation is shown in Figure 22.

NOTE: Multiple meters serving separate properties are not allowed on a single-meter pole.

If you have any questions, contact your CCS Representative for further assistance.

Figure 22 Permanent overhead meter pole installation



* ANCHORS SHOULD BE EITHER SCREW TYPE OR CROSS-PLATE TYPE.

| Items owned and installed by customer | |
|---------------------------------------|---|
| 1 | Customer-owned meter pole |
| 2 | Meter socket |
| 3 | Ground wire, in accordance with NEC/WAC |
| 4 | Ground rod(s), in accordance with NEC/WAC |
| 5 | Down guy, 5/16" minimum diameter noncorrosive stranded steel wire required for services over 70 ft from PSE pole. Push brace or pole key brace may be substituted for down guy. |
| 6 | Service entrance conductors - 18" out of weatherhead |
| 7 | Insulated clevis |

| Items owned and installed by PSE | |
|----------------------------------|--------------|
| 8 | Service line |
| 9 | Meter |



Chapter 4

Primary line extensions

If your new residence is not located close to existing primary electrical facilities, a primary line extension is required to place a transformer close to your structure. Primary line extensions are typically underground facilities.

Customer responsibility

PSE's Electric Tariff G, Schedule 85 requires customers to provide the trenching, excavation for vaults and backfill in accordance with PSE standards and work sketch, or contract with PSE to provide this work at its estimated cost.

If you require a primary line extension, submit Electric Service Application Single-Family Residential 100E. All forms can be downloaded at pse.com/construction-services.

Inspection/Coordination

PSE shall assign a Project Manager to oversee the trench location, equipment placement/installation, and backfilling.

- Work shall be subject to the inspection and satisfaction of PSE.
- No work shall be backfilled, covered, or concealed until it has been inspected and approved by the inspector.

Site preparation

The following site requirements must be met before the installation can begin.

- The trench route shall be clear of spoils, construction materials, and any other obstacles.
- The site shall be at final grade or acceptable subgrade in the area of construction.
- The front property line shall be surveyed and staked.

Customer-provided trench

Trench width

The minimum trench width is 18 inches. The excavator may need to increase the trench width depending on the other conduits/lines being installed in the trench.

When increasing the trench width, remember to allow adequate horizontal separation between PSE's electrical conduits/cables, gas lines, and other utility-owned conduits and lines in the trench (see Figure 23).

Customer-owned facilities may not be in the same trench with PSE-owned gas lines.

PSE will allow customer-owned facilities within an electric power trench if the following minimum horizontal clearances from PSE electric facilities are maintained:

- 18 inches minimum for customer-owned tight-line sewer (not tile), storm drain lines, roof drain lines, natural gas line, propane gas line, fuel oil line, and water mains up to 6 inches.
- 12 inches minimum for water services, irrigation pipes, lighting, security and electric supply circuits, communication lines, closed-system roof drains/storm drains (not French drains), and culverts.

NOTE: When constrained by obstructions or clearances from other buried utility lines/facilities, the horizontal clearance between PSE power and communications may be reduced to 4 inches with mutual agreement from the participating communications providers. It is your responsibility to obtain agreement from participating communications providers for a reduced clearance when needed.

Figure 23 illustrates PSE's width and depth requirements for primary voltage cable residential line extension trenches on private property with and without a gas line present.

Figure 23

Conduit riser placement detail - top view (not to scale)

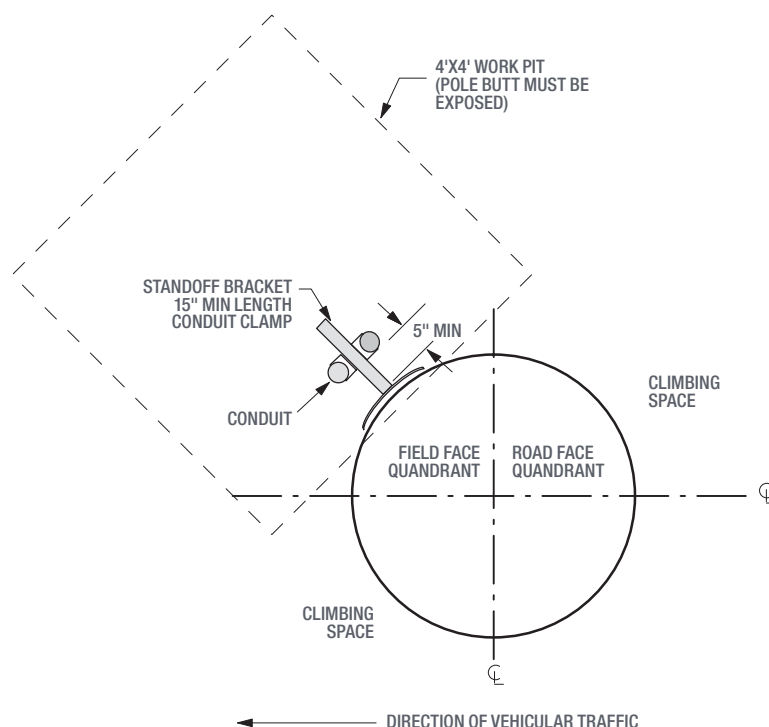
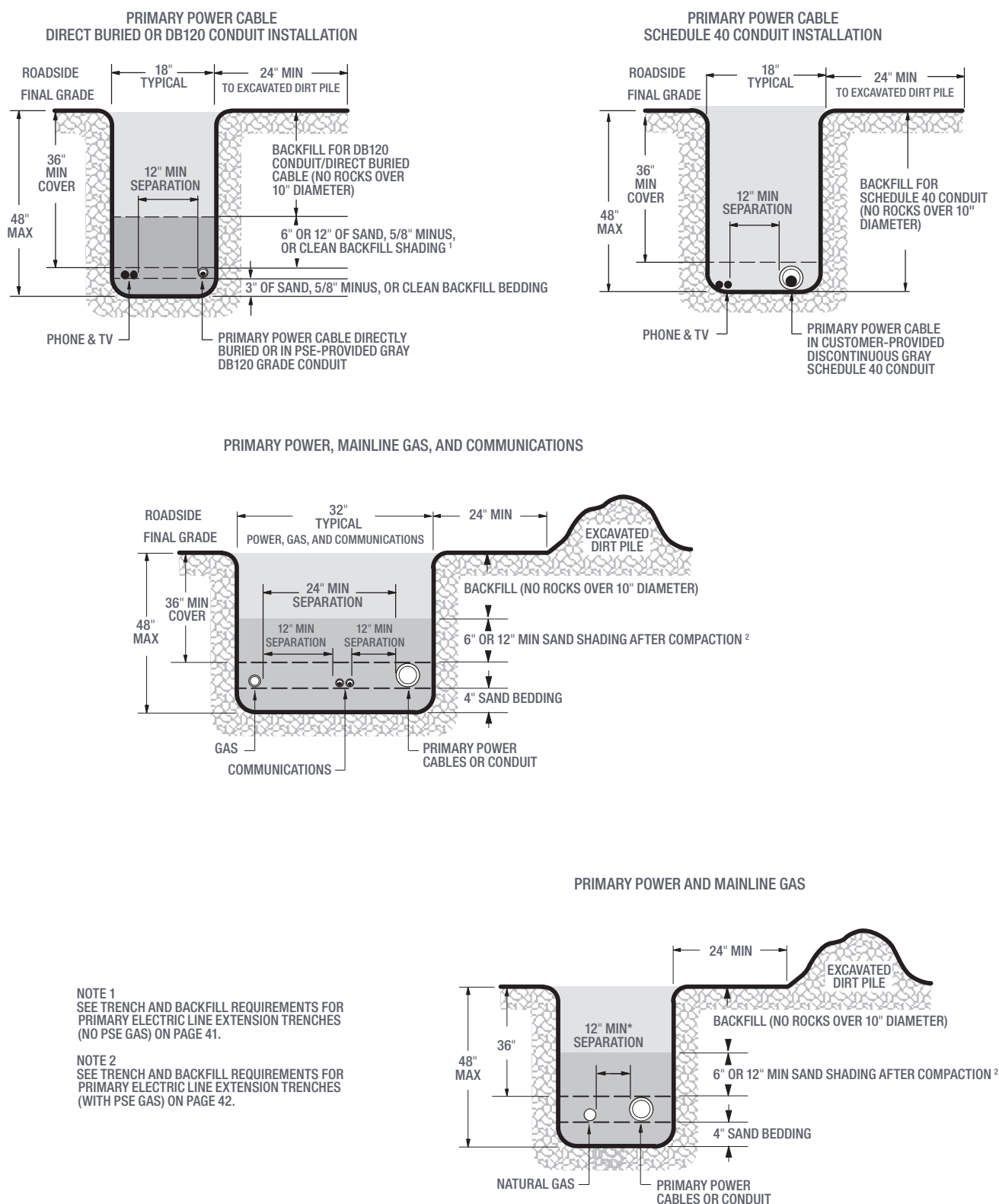


Figure 24 Typical joint utility trench with primary voltage cable on your private property (cross-section view)



Trench excavating requirements

The following requirements for the trench must be met before power conduits/cables will be installed.

- When trenching in right-of-way (ROW), the governing jurisdictions may require the entity performing the trenching to obtain a ROW permit. Additionally the entity performing the work will need to be licensed and bonded.
- Contact the governing jurisdiction to determine specific permitting requirements and the approximate turn around time from the permit application submittal date.
- For trench work provided by you within a public ROW or a PSE easement, PSE requires that you use a Washington State licensed and bonded contractor and complete and sign a PSE trenching agreement form.
- Trench work within a public right-of-way must meet the erosion and sediment control requirements of the local jurisdiction.

NOTE: Acquiring permits for excavation-related activity can take more than a month or longer depending on the amount of material being excavated, location of the excavation, and the jurisdiction issuing the permit. To avoid schedule delays, contact your PSE Project Manager for an estimated time frame to acquiring your permits.

- Provide a signed Excavation Requirements & Final Grade Certification document supplied by your Project Manager or PSE Representative.
- The trench shall be excavated according to the trench detail and PSE's work sketch.
- The trench shall be straight and the trench bottom shall be smooth, level, and free from obstructions, sharp objects, or rocks larger than 1/2 inch in diameter.
- Excavated or loose material shall be placed at least 2 feet from the field edge of the trench.
- Water shall be removed by pumping or draining following the erosion and sediment control requirements of the local jurisdiction.

NOTE: Trenches or vault excavations that are 4-feet-deep or greater require special sloping. Contact your PSE Project Manager for these requirements.

Restrictions: When PSE's project scope requires the manipulation of an existing primary cable or circuit, customers or third party contractors shall not uncover and expose existing buried primary voltage power lines or ducts in an energized state. PSE shall coordinate with the customer and service provider for the lines to be de-energized and grounded, or PSE shall provide qualified workers to perform exposure of energized buried lines. These restrictions apply to both direct-buried cables and cables in conduit.

Trench and backfill requirements for primary electric line extension trenches (no PSE gas)

PSE will not energize its facilities until backfill is completed.

When PSE primary cables are directly buried, or installed in PSE-provided gray DB120 grade conduit, you are responsible for the following:

- Providing a minimum 3-inch bedding layer of sand, 5/8-inch minus, or clean backfill (with rocks or solid material no larger than 5/8 inch in diameter and no sharp objects) placed below cables/conduits.
- A 12-inch layer of the same shading material above the directly buried cables/conduits.
- If native backfill is completely free of foreign objects and rocks in excess of 8 inches in diameter, shading with sand, 5/8-inch minus, or clean backfill can be reduced to 6 inches.
- The remaining trench shall be backfilled with soil that is free of rocks larger than 10 inches in diameter and foreign objects.

When PSE primary cables are installed in gray Schedule 40 grade or better conduit, you are responsible for the following:

- Backfilling the trench with soil that is free of foreign objects and rocks larger than 10 inches in diameter. Bedding and shading of the conduit with sand, clean backfill or select fill as 5/8-inch minus crushed aggregate is not required.

Trench and backfill requirements for primary electric line extension trenches (with PSE gas)

You must provide a 12-inch layer of sand above and a 4-inch layer of sand bedding below the utilities before backfilling (see Figure 24). If native backfill is completely free of foreign objects and rocks in excess of 8 inches in diameter, sand shading over utilities can be reduced to 6 inches after compaction.

You are responsible for the following:

- Completing backfill as soon as practical after facilities are placed and inspected.
- Carefully placing backfill to prevent damage or movement of the cables or conduit.
- Cost of damages to PSE facilities caused by improper backfill or compaction.
- Relocation costs due to change in grade or alignment.

CAUTION: Do not use a compactor directly over the power conduit(s) until at least 30 inches of backfill is in place so that the compactor will not damage the cables or conduit. Do not penetrate the soil deeper than 3 inches during compaction with a backhoe compactor.

Vaults

PSE is responsible for furnishing and installing all primary vaults and secondary handholes required for your electric service.

Vault excavation procedure

1. Locate the vault according to PSE's work sketch drawing.
2. Determine a suitable place to put the spoils (at least 2 feet from the edge of the excavation).
3. Excavate so the vault is in correct alignment with the trench and so that conduits for primary voltage cables (if required) can be brought straight into the front half of the vault.
4. Dig a hole large enough to accommodate the transformer or junction box vault and allow for easy installation and compaction (see Figures 25 through 27).
5. Remove debris and level the bottom of the excavation.
6. Prepare the bottom of the excavation so that the vault will rest on solid undisturbed earth with a 6-inch base of crushed rock. This prevents vault settling.

Figure 25 Minimum dimensions and excavation requirements for a single-phase padmount transformer vault

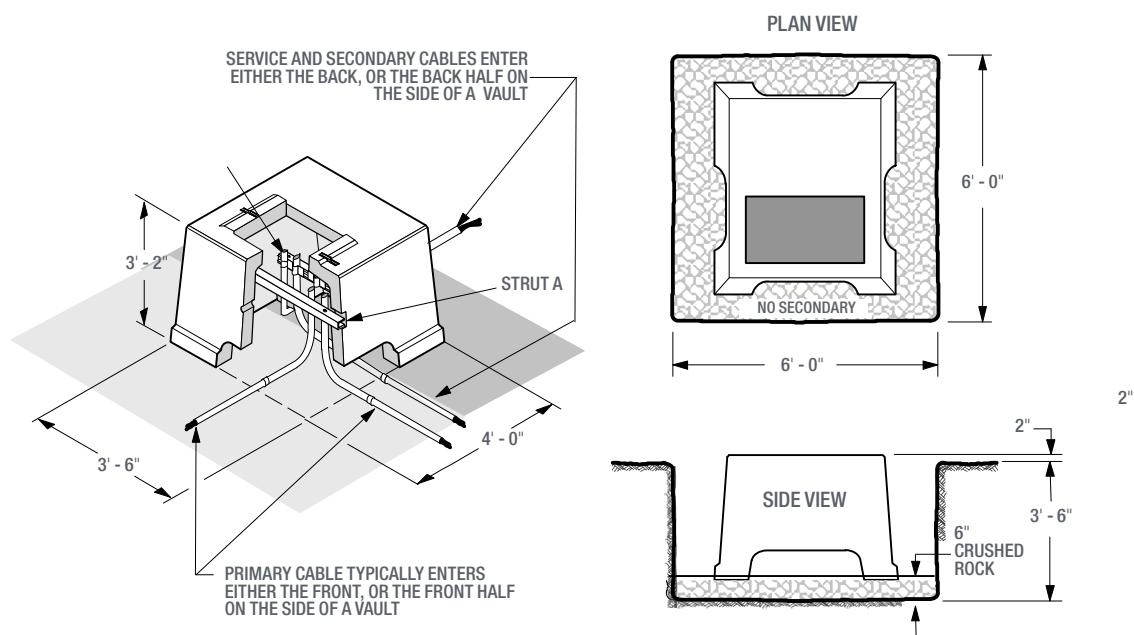


Figure 26 Aboveground junction box vault excavation

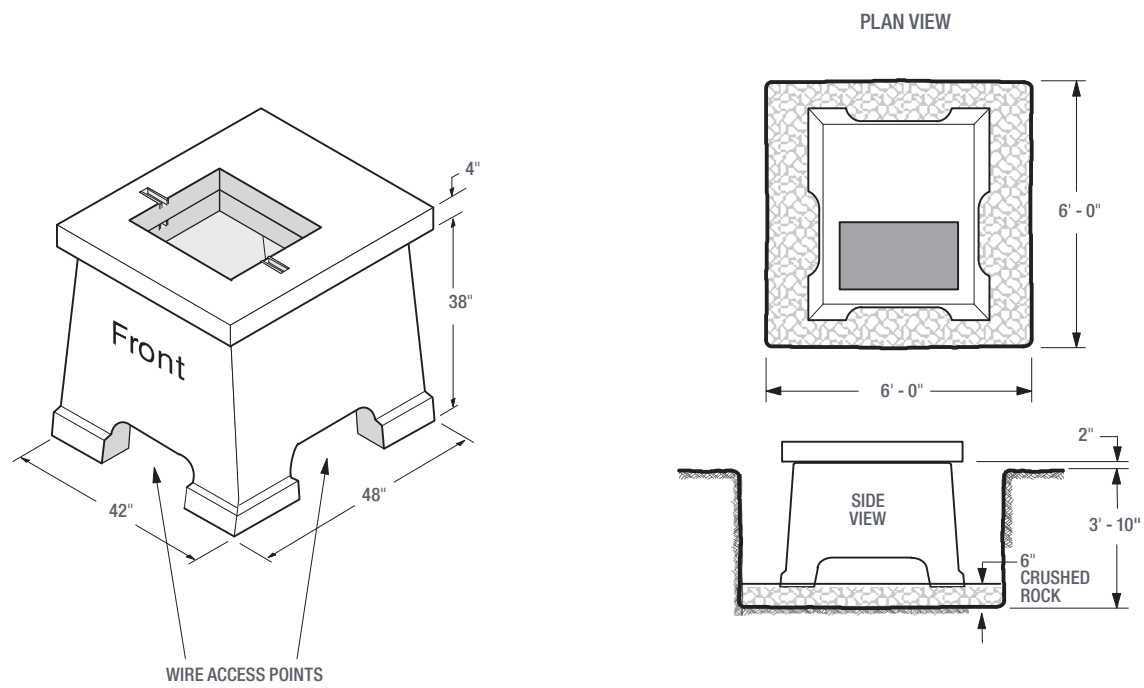


Figure 27 Minimum dimensions of excavation requirements for small secondary handholes

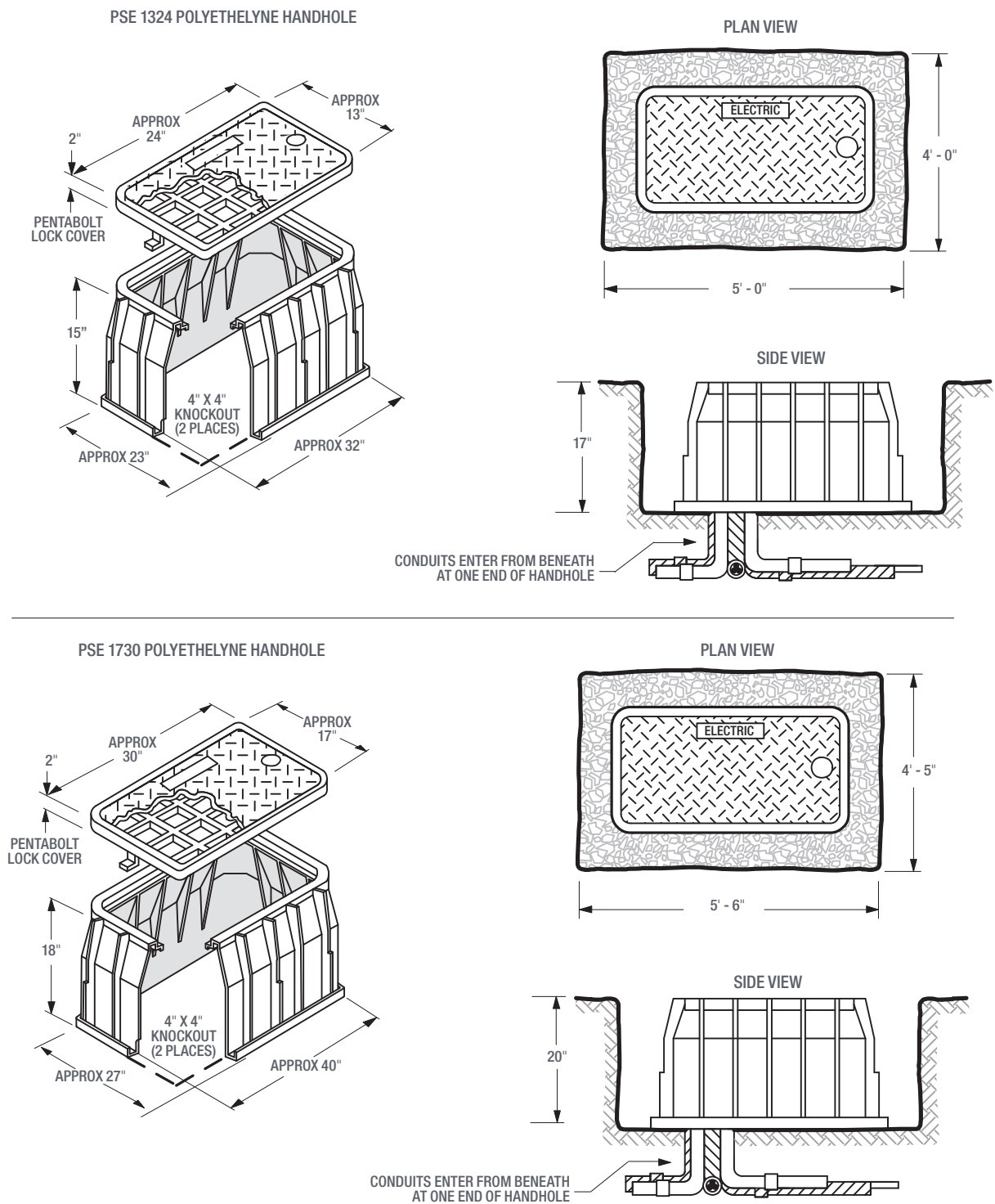


Figure 28 Joint trench detail for vaults and pedestals

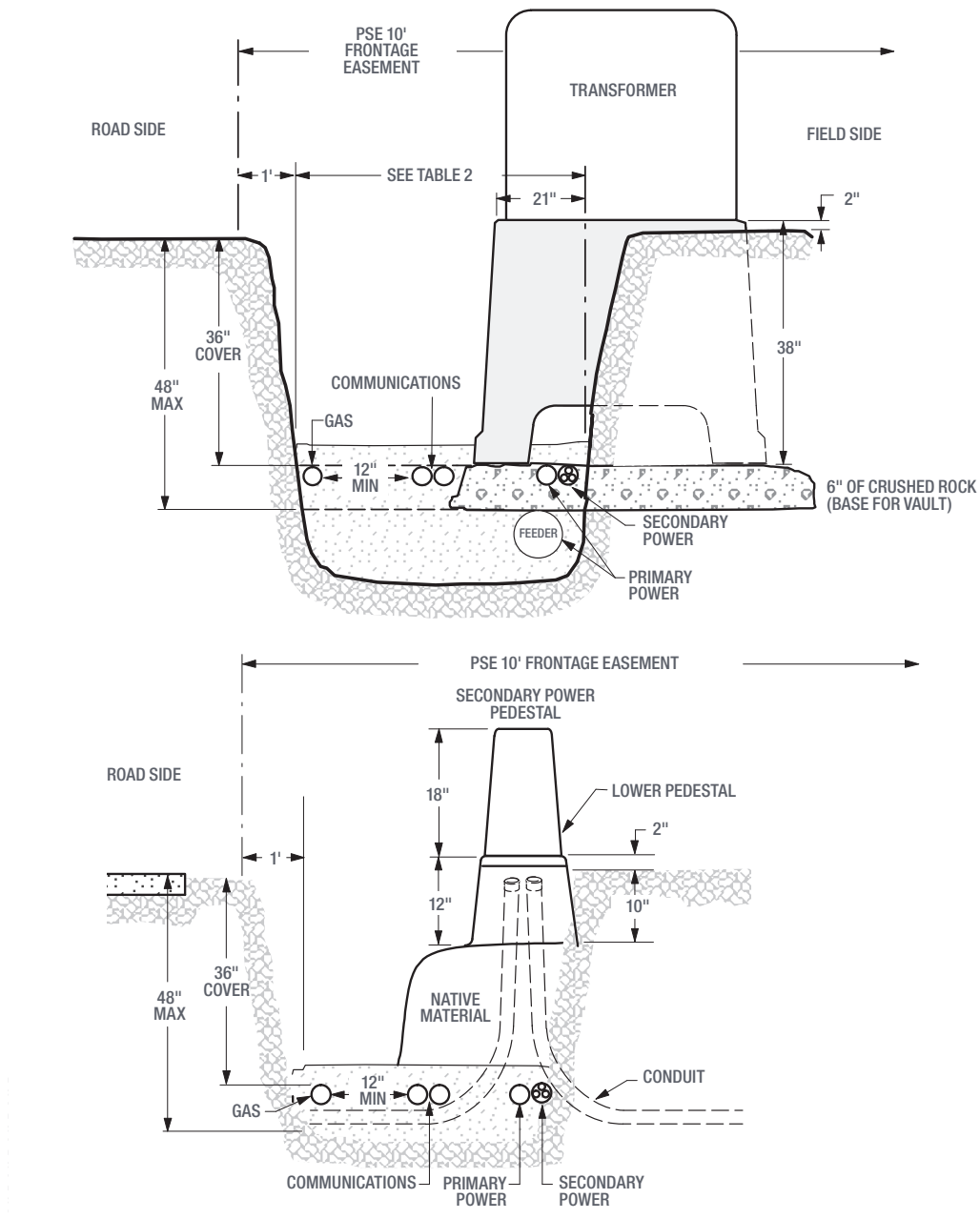
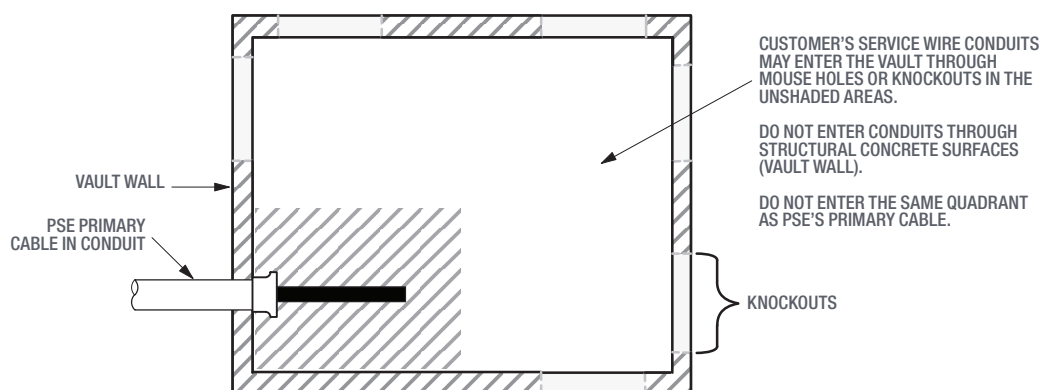


Figure 29 Location of customer conduit entrance requirements in PSE vaults



Vault location and access

Underground equipment must be readily accessible by workers and equipment during construction and for future operation and maintenance. Workers should not have to climb over or remove obstacles to gain access. Heavy construction equipment must be able to get close enough to the excavation to place the vault in the hole. Consider the underground equipment's weight and the lifting angle and swinging radius of the boom truck when choosing the underground equipment's location. Remember that dump trucks may need access if select fill is used for fill or if excavated material will be hauled away.

A clear and level working space is necessary for the operation and maintenance of underground equipment. The location must allow room to operate a switch handle, completely open a hinged steel door, or use a hotstick to install and operate equipment. In no case shall clearances be less than those required by code from combustible and noncombustible walls, bodies of water, fire escapes, etc.

The working space should be free from obstructions such as trees, shrubbery, poles, buildings, retaining walls, structures, fences, fire hydrants, decorative screens, ditches, streams, roadways, etc. Consider possible future structures and equipment that could interfere with clearances and accessibility.

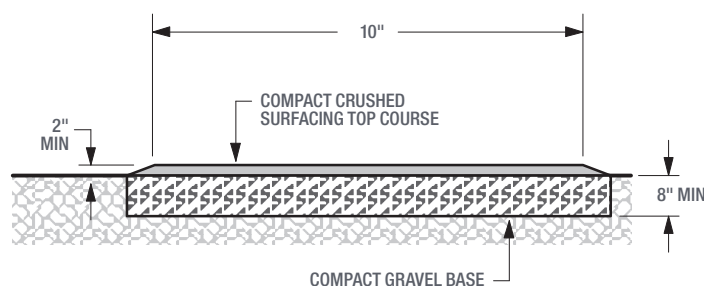
Vault backfill material

Backfill around vaults should consist of good compactable material such as clean earth fill, crushed rock, or sand. No voids should remain between the vault walls and the sides of the excavation.

Backfill beneath the vault shall be crushed rock, six inches deep, to stabilize the vault.

If the vault is located in a concrete drive or sidewalk, a felt joint is to be installed around its perimeter.

Figure 30 Electrical vault access road cross-section



Customer-supplied conduits

You may supply and install primary conduit for construction convenience.

If you supply the conduit for primary voltage cable, it will be owned and maintained by PSE and shall meet the following specifications:

- PVC electrical grade, Schedule 40 (or Schedule 80 if required in poor soil conditions).
- Gray in color.
- 2-, 3-, 4-, or 6-inch diameters as specified on the work sketch.
- Conduit bends shall be long radius bends, 36-inch minimum radius.
- Meet requirements in ASTM F 512 and NEMA TC 2.

Terminating conduit at transformer

If the service line conduit is to extend into a minipad transformer, the customer shall install the service line conduit two inches into the mousehole on the face of the minipad that is closest to the residence and perpendicular to the face of the minipad. Refer to customer conduit entrance requirements (Figure 30).

If the service is connected to a submersible transformer in a vault, a qualified PSE representative shall be present when the knockouts are broken out and while the service line conduit is placed two inches into the vault.

Excavating to expose existing buried primary voltage power lines

Routinely, PSE must uncover existing buried primary power cables in order to maintain, intercept and reroute, or cut new equipment into the circuit such as transformers or J-boxes. In these situations, the excavation taking place must be coordinated with the customer with respect to the hazards a buried energized line presents. Customers preparing trench up to a cable intercept point shall not uncover the cable ahead of the scheduled date for line work. Customers preparing a trench route to a cable intercept point must stop 3 feet from locate marks prior to the start of PSE line construction work. Only once the cable is isolated, tested, and grounded by qualified electrical workers, rendering the cable de-energized, may a customer proceed to expose PSE's cable through normal safe work and digging practices.

Chapter 5

Meter installation

This chapter provides you with PSE's requirements for the metering equipment that you must provide to hook up your new service. Please follow these requirements to avoid a delay in your service hookup. If you have any questions about this information, call your Customer Construction Services (CCS) Representative.

Service rating options

PSE's metering equipment requirements for single-family residential structures (not apartments or condominiums) are based upon the following single-phase service ratings:

| Voltage | Ampere rating |
|---------|---------------|
| 120/240 | 200 A |
| 120/240 | 400 A |
| 120/240 | over 400 A * |

* If you need a three-phase service, please contact your CCS Representative. Such services require the approval of PSE's Meter Department and are not covered in this handbook.

Responsibilities

Puget Sound Energy

PSE is responsible for installing the meter, service line, and current transformers (CTs).

Customer

You are responsible for providing and installing all service entrance equipment (including the meter base/socket and CT enclosure).

Customer equipment

The customer load monitoring equipment shall be installed only on the load side of PSE metering. No customer equipment shall be allowed inside a meter or current transformer enclosure. This includes customer load monitoring and control devices.

Note: Meter base/socket and current transformer enclosures shall not be used as a junction boxes

Meter bases/sockets

General requirements

The meter base/socket you purchase and install shall meet the following general requirements:

- Be a ring-type socket that includes a screw-type, stainless steel, or aluminum meter ring (snap-type rings must be stainless steel).
- Be Underwriters Laboratories (UL) approved.
- Be rated for exterior use and be rain-tight according to NEMA-3R.
- Have all unused openings tightly sealed from the inside of the socket.
- Be plumb and securely fastened to the supporting structure.
- Have a cover that is securely attached to the meter base/socket case.

NOTE: Meter base/socket and current transformer enclosures shall not be used as a junction box.

Meter base/socket location

For single-family residences and manufactured and mobile homes, you are required to install your meter base/socket in a place that is accessible to PSE. All locations are subject to approval by a PSE Representative. If you have questions regarding meter locations, call your CCS Representative.

Meter bases/sockets and current transformer (CT) enclosures must be located:

- Outside.
- On the front one-third of your home closest to normal public access.
- In an area that is not subject to being fenced or walled in (such as patios, decks, porches, breezeways, backyards, and carports).
- On a structure that is owned by you.

These locations allow PSE to:

- Read your meter in a cost-effective manner.
- Maintain your meter efficiently.
- Disconnect your service in case of fire.

Meter location information is provided in the Electric Underground Service Installation Requirements handout.

Grounding requirements

All meter bases/sockets, enclosures, and conduit shall be bonded and grounded in accordance with the NEC.

Clearance requirements for meter installations

The following clearances are required around all meter installations. It is your responsibility to provide and maintain these clearances.

- The top of the meter shall be between 4 and 6 feet above finished grade (except meter pedestals).
- A working space of 36 inches wide by 36 inches deep (see Figure 31) is required around the meter. This working space is to be kept clear of any obstructions including landscaping. Six feet of worker headroom is required.
- There shall be a minimum horizontal and vertical clearance of 18 inches between the center of the electric meter and any obstruction (see Figure 31).
- If a recessed meter base/socket is installed, a 10-inch clearance is required from the meter to the closest portion of the wall (see Figure 32).
- If a flush or recessed meter base/socket is installed, the siding or finished surface of the structure shall not overlap the cover of the meter base/socket.
- If a flush or recessed meter base/socket is installed, space must be left around the locking tab for PSE to install a meter seal.
- Meter base/socket may be recessed a maximum of 4 inches behind a finished exterior surface.

Figure 31 Meter base/socket minimum clearances

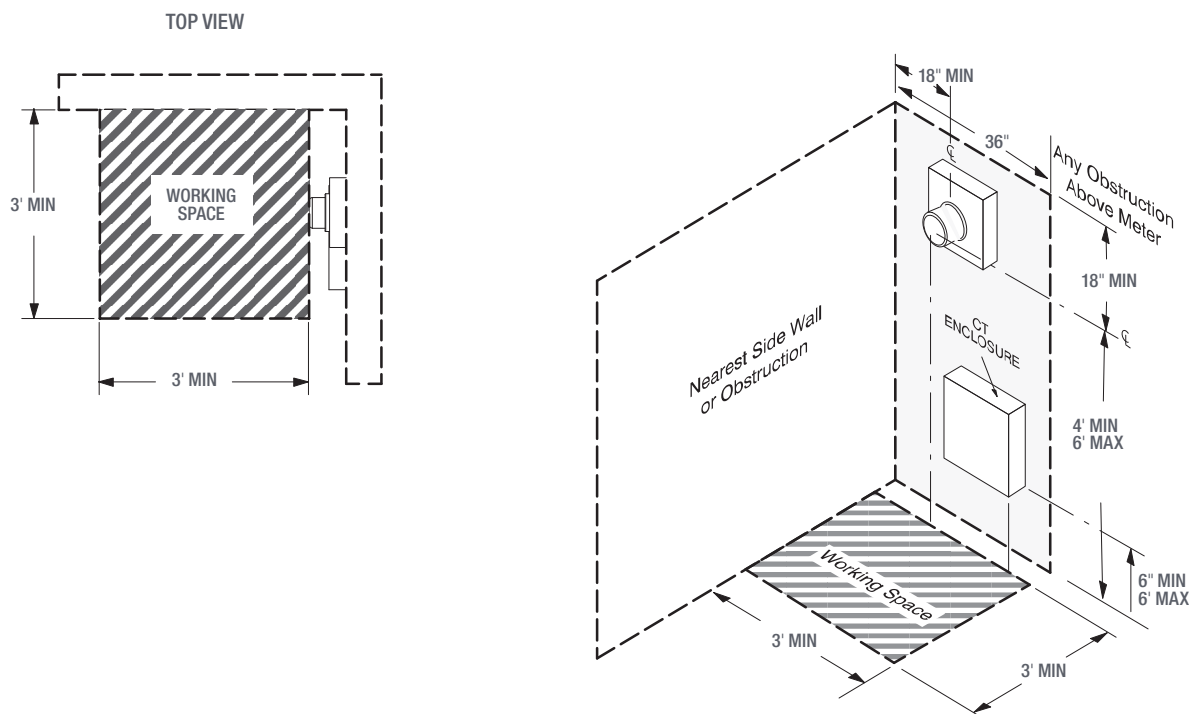
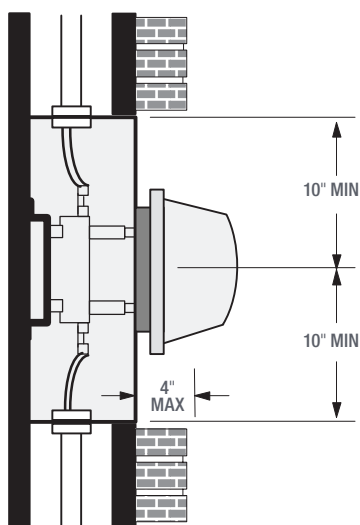


Figure 32 Recessed meter installation clearances



200 A services

Single-family residential

The 120/240 V, 200 A service is the most common service installed by PSE. Typically, it is installed on homes with a living area of less than 2,500 square feet. However, depending upon what type of equipment you are installing, you may want a larger service. It is your responsibility to determine your electrical requirements and to notify PSE of the size of service you would like. Refer to Chapter 1, Table 3, for service size information.

Underground

In addition to the meter base/socket requirements earlier in this chapter, meter bases/sockets for 200 A underground services shall:

- Be rated for 120/240 V and 200 A.
- Contain four meter jaws and one connection point for the neutral conductor.
- Be at least 4-1/4 inches deep, 11 inches wide, and 14 inches high.
- Accept 3 inch PVC conduit.
- Have lugs (electrical connectors) that are marked to accept 4/0 aluminum conductors.

NOTE: Use only the conduit knockouts on either side of the bottom of the meter base/socket enclosure for PSE's service cable.

Overhead

In addition to the meter base/socket requirements earlier in this chapter, meter bases/sockets for 200 A overhead services shall:

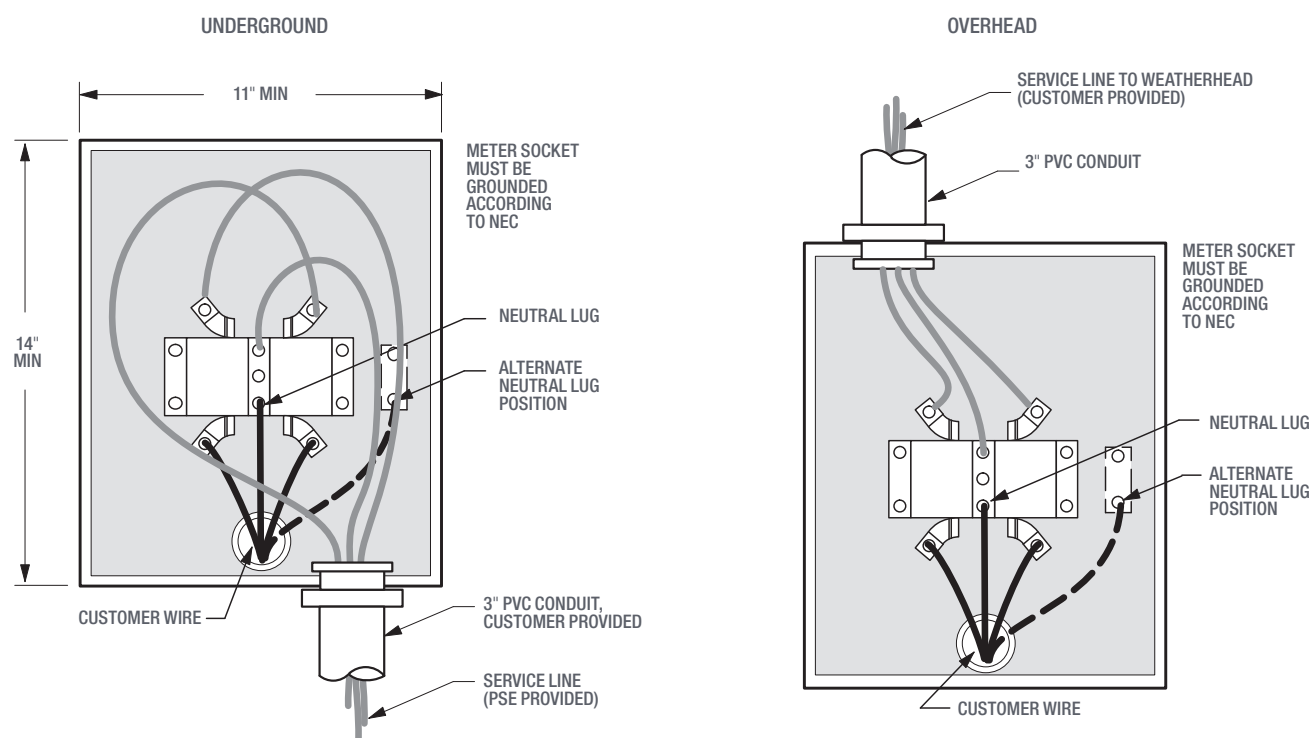
- Be rated for 120/240 V and 200 A.
- Contain four meter jaws and one connection point for the neutral conductor.

**Outbuildings
(overhead or
underground
service)**

Meter bases/sockets for 200 A (or less) services to single-family residential use outbuildings (such as garages, shops, single-family wells, or noncommercial barns) must meet all the requirements listed in this chapter for either underground or overhead services.

NOTE: If an outbuilding is used for a commercial operations, please refer to PSE's Electric Service Handbook, Commercial/Industrial and Multifamily Projects as you will have additional requirements including customer-provided service conductor and a manual bypass meter base/socket.

Figure 33 Residential meter socket wiring diagrams



400 A self-contained services

The meter base/socket required for a 120/240 V, 400 A service is called a Class 320 meter base/socket (see Figures 34 and 35). It is larger than the 200 A meter base/socket, but it is still a self-contained meter base/socket. It can be installed on residences where the continuous current rating is 320 A or less.

NOTE: If your structure requires more than 320 A of continuous current, you are required to install a CT service (refer to the 400 A current transformer (CT) services section in this chapter).

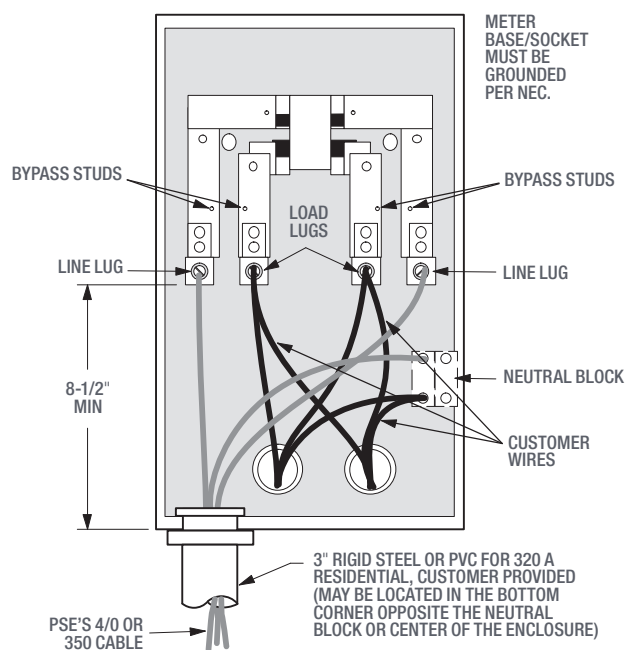
Underground

In addition to the meter base/socket requirements listed earlier in this chapter, Class 320 meter bases/sockets for 400 A underground services shall:

- Be rated for 120/240 V and 320 A continuous current.
- Contain four meter jaws and one connection point for the neutral conductor.
- Contain a Class 320 manual block bypass (see Figure 34).
- Have lugs that will accept 350 MCM aluminum wire.
- Accept 3-inch steel or Schedule 40 or 80 conduit through a knockout in the bottom left corner or center of the enclosure.
- Have at least an 8-1/2-inch clearance between the bottom of the lugs and the bottom of the enclosure (see Figure 34).

Figure 34

Typical arrangement of service conductors for underground class 320 meter base/socket



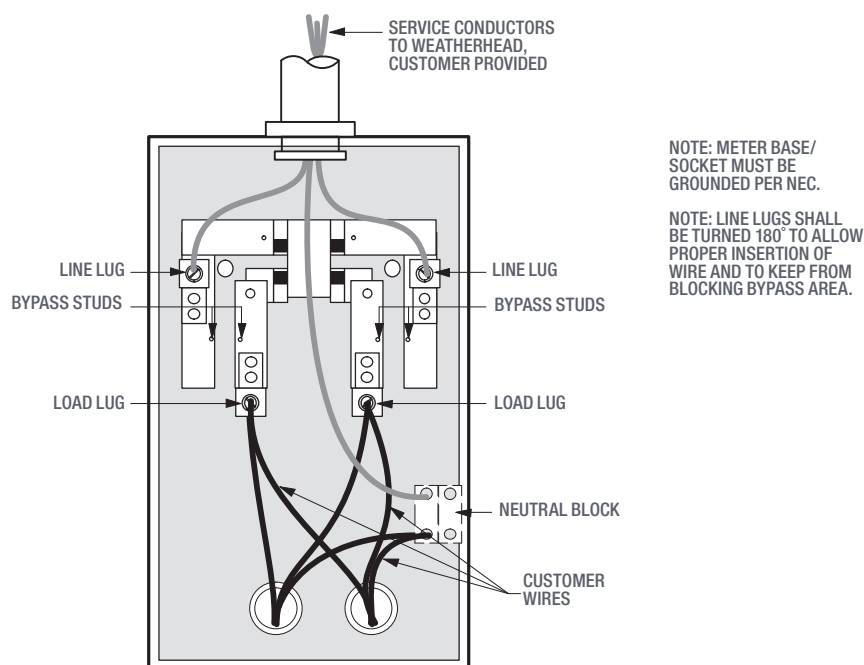
Overhead

In addition to the meter base/socket requirements listed earlier in this chapter, Class 320 meter bases/sockets for 400 A overhead services shall:

- Be rated for 120/240 V and 320 A continuous current.
- Contain four meter jaws and one connection point for the neutral conductor (see Figure 35).
- Contain a Class 320 manual block bypass.

Figure 35

Typical arrangement of service conductors for overhead class 320 meter base/socket

**Outbuildings
(overhead or
underground
service)**

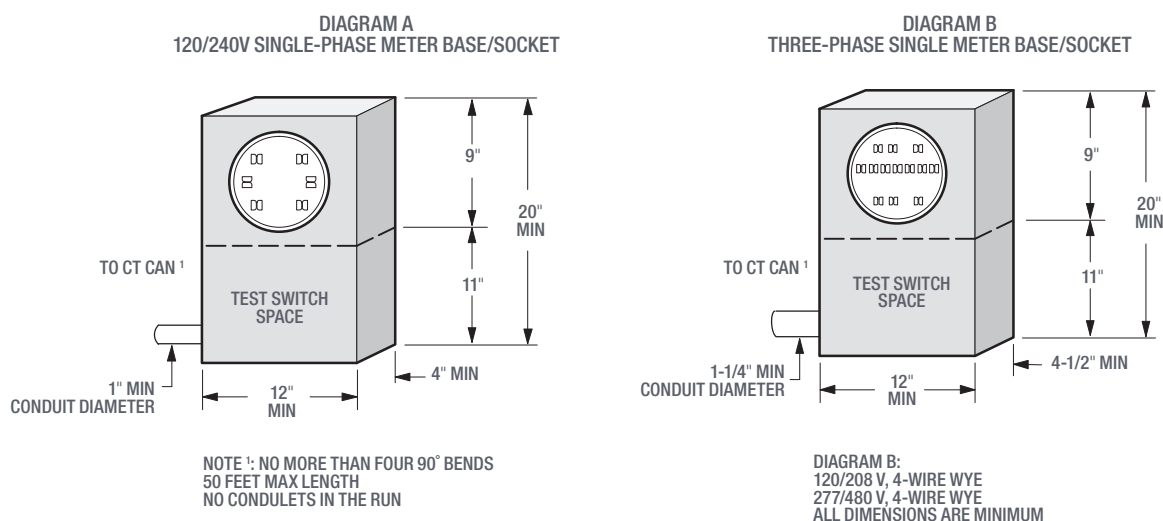
The metering requirements for 400 A services to outbuildings are the same as the metering requirements for 400 A services to single-family residential structures.

400 A current transformer (CT) services

120/240 V, 400 A CT services are available at an additional charge. This service requires a different meter base (see Figure 36). It also requires additional equipment CT enclosure, conduit, CT mounting bracket, etc.). The CT enclosure must be located on the outside of the structure that it serves. Contact your CCS Representative for more information.

NOTE: The CT enclosure cannot be used as a junction box or bus gutter.

Figure 36 Instrument-rated (CT) meter bases/sockets



Services over 400 A

All 120/240 V services over 400 A (320 A continuous current) require CT metering. Figure 37 shows a CT mounting base. Please contact your CCS Representative for more information. Table 7 describes minimum CT enclosure dimensions.

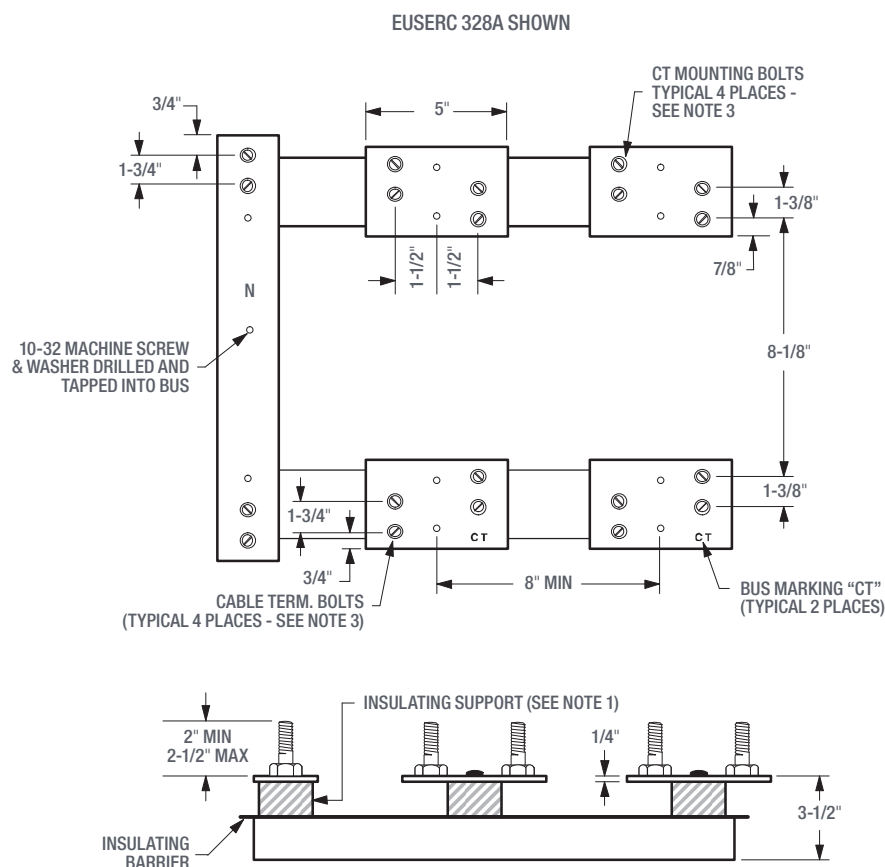
Table 7 Current transformer (CT) enclosure dimensions (minimum)

| Phase | Switch Ampacity | No. of Transformers | Width | Height | Depth |
|-------|-----------------|---------------------|-------|--------|-------|
| 1 * | 400-800 | 2 | 24" | 48" | 11" |
| 3 * | 201-800 | 3 | 36" | 48" | 11" |
| 3 ** | over 800 | 3 | ** | | |

* When enclosure dimension is greater than 24" x 48", a single side-hinged door is required.

** Services over 800 A require a switchboard designed to EUSERC specifications. Services from 201-800 A may be switchboard designed to EUSERC specifications.

Figure 37 Single-phase CT mounting base



Notes:

1. Insulated supports shall be rated for the serving voltage and have sufficient mechanical strength for the application.
2. Mounting base accepts bar-type current transformers only.
3. Two 1/2-inch steel bolts shall be provided for each cable terminating position and each bolt shall be furnished with a spring washer and a nut. The spring washer may be either a cone-type (belleville) or a split-ring washer and a flat washer. Bolts shall be secured in place and spaced as shown. All parts shall be plated to prevent corrosion.

Chapter 6

Customer generation

This chapter provides you with PSE's rules and requirements to interconnect and operate customer-owned and installed generation sources in parallel with PSE's electric distribution system. Customer generation sources include fuel cell, hydroelectric, biomass, solar, or wind power generators. Customer generation does not include emergency power generators.

Responsibilities

Puget Sound Energy

Approval of customer generation installations by PSE is required ahead of construction. Failure to obtain approval ahead of construction may result in delays and unanticipated costs for any corrections necessary.

PSE's Customer Solutions and meter engineering groups will review and approve all customer installation designs. PSE will provide and install net and production meters.

Customer

All customer electrical equipment must comply with the NEC and any state or local code requirements. Any system capable of exceeding 25 kW may require a dedicated transformer.

General requirements

Customer-owned generators up to 100 kW may be connected to and operate in parallel to PSE's facilities in accordance with Electric Tariff G, Schedule 150, Net Metering Service for Renewable Energy Systems.

The design of these systems shall meet PSE's standards for voltage flicker and harmonics and will be served by PSE at a standard service voltage (see Chapter 1, Table 2).

What to submit with applying for interconnection

Customers should apply for interconnection, net metering, and production metering using Electric Schedule 150 Attachment B or EZ Agreements. Customers should read through Electric Schedule 150 and 151 for more information on how the state incentive works. A three-line wiring schematic should accompany all applications and agreements.

Interconnection system diagrams

For PSE to review the installation proposal, an electric system one-line diagram must be provided with application for service. The one-line diagram shall schematically represent the following equipment and electrical connectivity:

- Generator
- Inverter
- Battery bank (as applicable)
- Disconnect switch (as applicable)
- Production meter (as applicable)
- Main electrical panel
- Sub panel (as applicable for battery backup)
- Service meter/Net meter
- Utility service point of connection

A system diagram guide can be found at:

pse.com/pages/customer-connected-solar#contractors

Meter location

Net meters and production meters are subject to the meter location requirements defined in Chapter 5 of this handbook.

Additionally, the production meter must be located “adjacent” to the net meter except as described in three exceptions detailed in the following paragraphs. “Adjacent” is defined as between 10 inches to 6 feet center-to-center along the same wall. Installers may not round corners.

The following exceptions provide the conditions under which net and production meters are not required to be located adjacent to each other:

Exception No. 1: When the production system is installed on a separate structure from the service meter (net meter), the production meter may be installed on the same structure as the production system if it also has an electric subpanel. If the structure does not have an existing electric subpanel, the production meter must be colocated with the service meter (net meter).

A typical example would be a system of solar panels on a barn where the barn is served off a branch circuit from the main panel of the house. In this case, the production meter could be located on the barn rather than adjacent to the service meter at the house.

Ground mount installations do not qualify as separate structures.

Exception No. 2: When the service meter (net meter) is remotely located on a pedestal or post (see the remote metering for underground residential services section in Chapter 2, Permanent Underground Service), the production meter may be installed on the same structure as the production system if it also has an electric panel.

Exception No. 3: When there is no space available or it is extremely difficult to place the production meter adjacent to the service (net meter), the production meter may be installed where there is a line-of-sight from the service (net meter).

For these exceptions, the production meter placement must still meet all standards for access and placement. Also engraved phenolic directory indicating location of other meters shall be placed on both the production and net meters.

Meter socket requirements

Customer-provided metering equipment shall meet the requirements stated in Chapter 5 of this handbook. Installers may not tap at or in the meter socket (supply side tap) except for 320 Amp service. For 320 Amp services installer may not create new lugs or modify the existing lugs or tap on to bypass lugs.

Labeling requirements

All meter sockets shall be labeled with permanently affixed signage at the production meter and net meter enclosures to identify their function (i.e., net meter or production meter). Where metering is accomplished at different voltages, the signage must also identify the voltages at which the meters are energized. Labels shall conform to the requirements of NEC article 690. All labeling should be capitalized. PSE requires engraved phenolic nameplates or adhesive precut labels at least one inch high, with raised or cut-out lettering that is a minimum of 3/8 inches high.

NOTE: Felt-tip pens and label marker tape are not considered permanent marking.

Disconnect switch requirements

PSE must have the ability to disconnect a generator from PSE's system for employee protection. A disconnect switch is recommended to be installed for all customer generation systems, and required in some cases.

A disconnect switch is required if your system meets any of the following characteristics:

- Output is greater than 25 kW
- Electric service is three-phase
- Electric service is CT-metered

A disconnect switch is optional if your system meets all of the following characteristics:

- Output is 25 kW or less
- Electric service is single-phase
- Electric service is self-contained

**Disconnect
switch location**

When a production system requires a disconnect switch, the following criteria shall be applied to determine the location of the disconnect switch:

- For 240 V and 120/208 V self-contained and CT-rated production meters, the disconnect switch shall be on the line side of the production meter (between the production meter and the inverter).
- For customers that have no load between the PSE transformer and inverter (typically community solar or power purchase customers), only one bidirectional meter is necessary to monitor production credits and inverter load. The disconnect switch shall be on the load side of the generation/service meter (between the meter and the inverters).
- When more than one production meter is required for the customer production system, the disconnect location shall be determined by PSE Meter Engineering.

For any of the above cases, the disconnect switch must be co-located within 5 feet of the meter.

Resources

Additional information about PSE's program for interconnecting and net metering customer generation, the benefits of net metering, Electric Schedule 150 Tariff documents, and ways to contact PSE's energy advisors can be found online at:

pse.com/green-options/Renewable-Energy-Programs/renewablesbytype-home

Chapter 7

Temporary services

What this chapter contains

In this chapter you will find answers to questions such as:

- What are the installation requirements for underground and overhead service?
- What are the trenching requirements?
- How do I locate existing underground utilities before I dig?
- How do I get my temporary service energized?

Definition

A temporary (temp) service is a means of supplying electricity to your site for less than one year. Typically, a temporary service provides power for the construction phase of your project, while provisions are being made for your permanent power system.

Temp service is provided underground or overhead depending on available PSE facilities.

Obtaining your temporary service from existing power facilities

The following information applies to your temporary service installation:

- Determine if you need overhead or underground service (see Preface, Figure 1 and Figure 2).
- Obtain an electrical work permit.
- Order underground utility locate service by contacting the 811 “Call Before You Dig” hotline a minimum of two business days before digging.
- Prepare the job site and install your temp service equipment (service post, pedestal, and meter base per illustrations found in this chapter).
- Obtain an electrical inspection approval of your temp service equipment (this is done by you or your contractor).
- Call PSE to request that your temp service be connected and energized after your electrical inspection is complete.
- Apply for permanent service.
- At your request, we will check your site to determine if engineering is required.

If you have any questions, please call Customer Construction Services (CCS) at **1-888-321-7779**. For information on permanent services, please contact CCS.

Scheduling

Most temp services are connected to existing power facilities and engineering is not required. In these cases temp services are typically energized 3 to 5 days after your installation has passed inspection. Depending on complexity and work volume, time frames will vary.

Customer charge for service

Charges vary due to the type of system we have in your area. Your CCS Representative will explain current temp service fees.

Temporary meter base/socket requirements

You are required to provide a meter socket with the following specifications:

- A ring-type socket that includes a screw-type, stainless steel, or aluminum meter ring (snap-type rings must be stainless steel).
- Rated 120/240 V
- Single-phase
- Minimum rating of 100 A
- Maximum rating of 200 A
- Four jaws
- Underwriters Laboratory (UL) approved

Temporary underground services

Temporary underground service is available in PSE's service area where the existing power facilities are installed underground.

The process and cost of obtaining your temporary underground service can vary, depending on the location of our existing facilities. If there is a power stubout, handhole, pedestal, or transformer located on your property adjacent to our existing facilities (see Preface, Figure 1), engineering may not be required. Simply install your temporary service facilities (see Figure 38 and Figure 39), obtain an electrical inspection, and call PSE to connect your temporary service.

Meter location

To properly locate your temporary meter pedestal, set the meter pedestal on your property no more than 5 feet from the transformer, stubout, handhole, or pedestal.

Sometimes a distance greater than 5 feet is required such as when your home site is some distance from our existing facilities and you want your pedestal close to where your permanent service will be located. In this case, please contact a CCS Representative at **1-888-321-7779** for information on setting up a remote temporary underground service.

Trenching and excavation requirements

It is the customer's responsibility to provide the trenching needed to connect to a power stubout (shown in Figure 38). The cable you provide is to be sized according to the NEC and have a minimum 24 inches of backfill coverage.

NOTE: A 4-foot-square excavation is required at the stubout to provide working room for our personnel to splice your cable to ours.

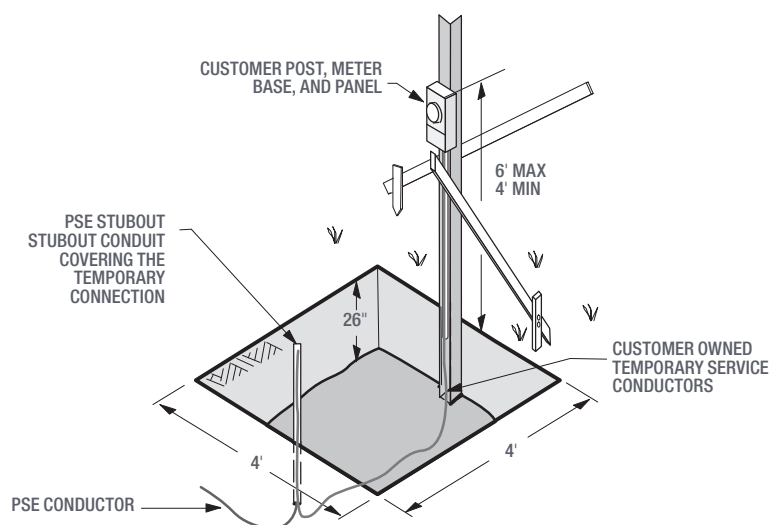
If the connection point to PSE facilities is a handhole, pedestal, or transformer; trench up to the nearest side and leave your wires exposed. If you discover any other conductors while digging your trench, please leave them covered.

Remember to order underground utility locate service by contacting the 811 "Call Before You Dig" hotline a minimum of two business days before digging.

NOTE: Any trenching within 24 inches of existing underground facilities must be done by hand.

Figure 38

Trenching requirements for power stubout



NOTE: 4' x 4' work pit is required to allow working room for the tools necessary to connect temporary service.

**Underground
temporary
service
installation
process**

The following items must be completed before PSE energizes your underground temporary service:

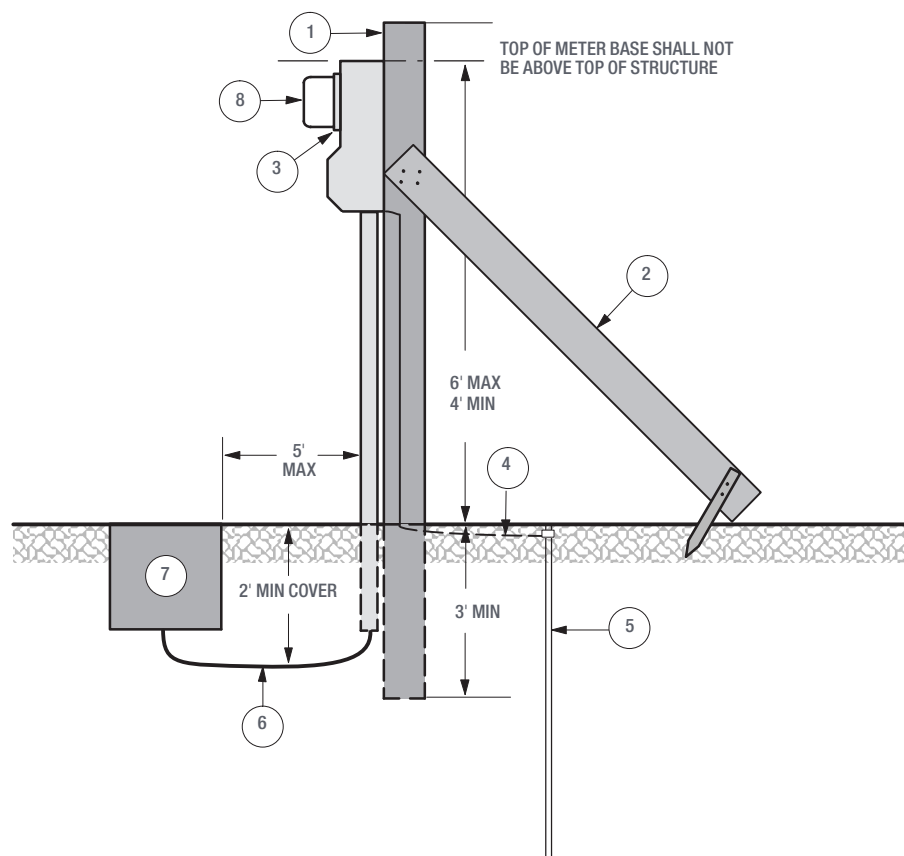
1. Contact a CCS Representative at **1-888-321-7779** and request your temporary underground service.
2. Obtain an electrical work permit from the inspecting agency.
3. Order underground utility locate service by contacting the 811 “Call Before You Dig” hotline two business days before digging.
4. Install your meter pedestal and meter base/socket in the appropriate location (see Figures 38 and 39).
5. Provide the appropriately sized conductor from your meter socket to PSE’s connection point. Please leave 5 feet of extra cable at the stubout or handhole, and 10 extra feet at a transformer. Consult the NEC for the appropriate cable sizes.
6. Obtain and pass an electrical inspection.
7. Trench up to and expose the PSE connection point at the stubout, handhole, or transformer.
8. If trenching is provided, cover your cable except in the work pit where our personnel will be splicing your cable to ours.
9. After the above items are complete, call CCS at **1-888-321-7779** and inform a CCS Representative that your installation has been inspected and that you are ready for your temporary service.

Figure 39 shows the standard temporary underground service installation that we recommend. The dimensions shown are the minimum acceptable.

Please do not deviate from our installation standards without approval from your CCS Representative. Doing so may extend the time frame for your service hookup.

If service needs to be connected in right-of-way, a permit will be required. This can take several weeks.

Figure 39 Temporary underground service installation



| Items owned and installed by customer | |
|---------------------------------------|--|
| 1 | 4" x 4" x 10' continuous single structure |
| 2 | 2" x 4" bracing (post should be braced from two directions) |
| 3 | Meter socket and distribution panel (up to 200 A, 120/240 V) |
| 4 | Ground wire, in accordance with NEC/WAC |
| 5 | Ground rod(s), in accordance with NEC/WAC |
| 6 | Service entrance conductors in accordance with NEC |

| Items owned and installed by PSE | |
|----------------------------------|---|
| 7 | Transformer, handhole, pedestal, or stubout |
| 8 | Meter |

Temporary overhead services

Temporary overhead service is available anywhere in PSE's service area where the existing electrical system is installed overhead.

The process and cost of obtaining your temp overhead service can vary depending on the location of our existing facilities. The least complicated and cheapest way a temp service can be installed is if a transformer is located on a pole alongside your property (see Preface, Figure 2). If this is the case, engineering may not be required. All you have to do is install your temp service equipment, have it inspected, and call Customer Construction Services (CCS) at **1-888-321-7779** to order your service. Once the above items are completed, your service will be connected within a few business days.

Meter location

Your temporary meter post should be located on your property and within 70 feet of the PSE pole that will serve you. This limitation ensures that your temporary service pole can withstand the weight of the conductor. If a distance greater than 70 feet is required, or if PSE's pole is on the opposite side of the street, please call CCS for our review and approval prior to construction. A taller, stouter temporary service post with additional bracing could be required.

Service line path requirements

In addition to the meter post distance limitation mentioned above, the service line path requirements are:

- The path that the service line will take should not cross property belonging to other individuals.
- If the service line will pass through trees or brush, clear a path to allow our service personnel to run the line and to allow the lines to hang without contacting trees or limbs. Maintaining this clear path is the customer's responsibility.
- The service line path should avoid areas where vehicular traffic will occur, unless your temporary service post height is increased to provide adequate clearance (see Figure 40).

Clearance requirements

The National Electric Code (NEC) and the National Electric Safety Code (NESC) have established minimum clearance requirements to maintain safe heights for electrical conductors over various terrains.

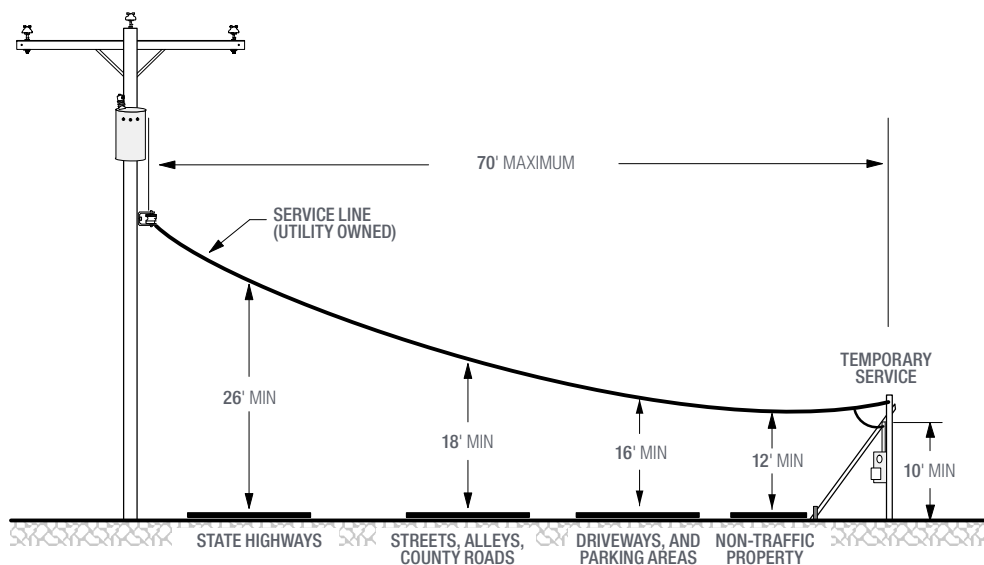
Figure 40 shows the clearance requirements for the types of terrain most commonly encountered.

The NEC and NESC require the lowest point of a service conductor to be at least 12 feet aboveground. The bottom of the drip loop must be a minimum of 10 feet above the ground.

You are required to provide a point of attachment on your service pole that will allow PSE to install the conductor and maintain the required clearances.

If you need further details, please consult the current issue of the NEC, or contact the state or local electrical inspector for your area.

Figure 40 Minimum clearance requirements upon installation



Overhead temporary service installation process

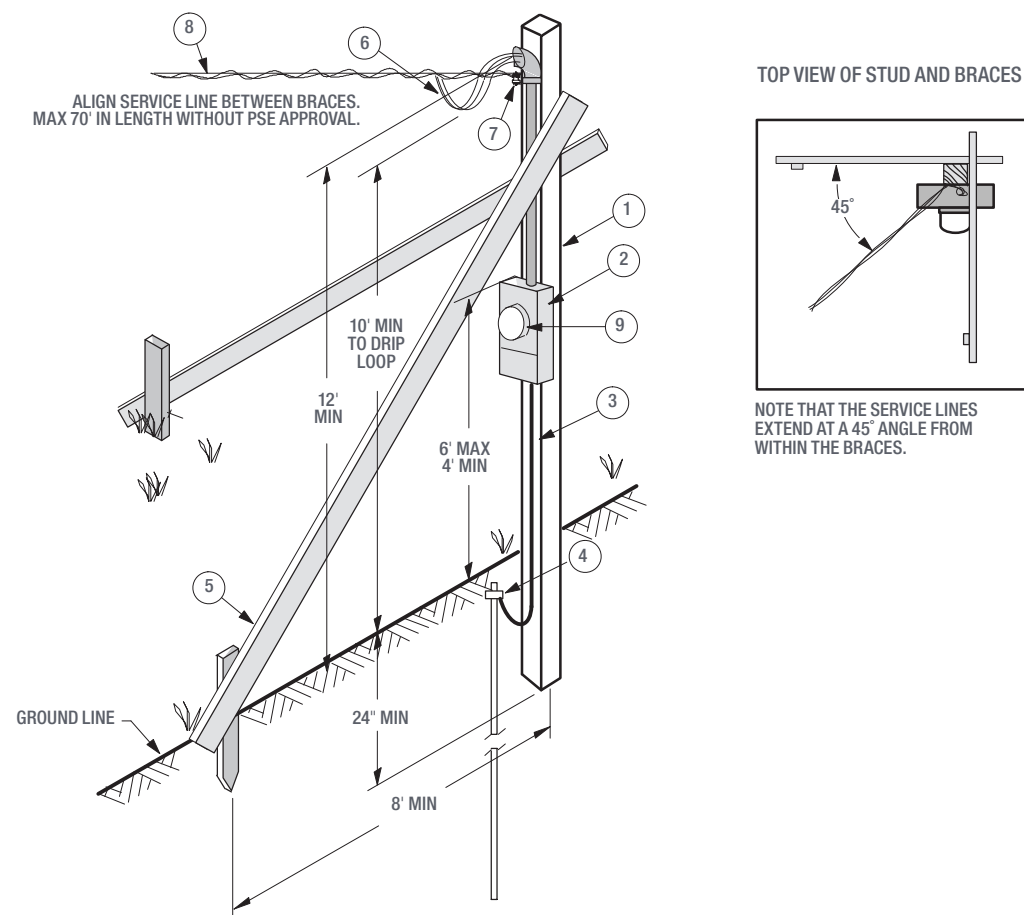
The following items must be completed before we can energize your service:

1. Contact a CCS Representative and request your temporary overhead service.
2. Obtain an electrical work permit from the inspecting agency.
3. Install a meter pole and meter socket. Temporary service equipment on trees is not acceptable.
4. Obtain and pass an electrical inspection.
5. After these items are completed, call CCS and inform a CCS Representative at **1-888-321-7779** that your installation has been inspected and that you are ready for temporary service.

Figure 41 shows a typical temporary overhead service installation.

Consult with your CCS representative for non-typical installations.

Figure 41 Temporary overhead service installation



| Items owned and installed by customer | |
|---------------------------------------|---|
| 1 | 4" x 4" x 16' or 2" x 10" x 16' minimum, continuous single structure. No timber |
| 2 | Meter socket and distribution panel (up to 200 A, 120/240 V) |
| 3 | Ground wire, in accordance with NEC/WAC |
| 4 | Ground rod(s), in accordance with NEC/WAC |
| 5 | 2" x 4" brace (two required) |
| 6 | Service entrance conductors - 18" out of weatherhead minimum |
| 7 | Insulated clevis (point of attachment) |

| Items owned and installed by PSE | |
|----------------------------------|--------------|
| 8 | Service line |
| 9 | Meter |

Chapter 8

Disconnection and modification of service

There may be a time when your electric service needs to be modified. You may wish to have your service disconnected, reconnected, moved from its current location, relocated, or simply de-energized. This may involve lengthening, shortening, transferring, or rerouting the existing service.

Disconnection of your meter

If you need the power disconnected to work on your side of the meter, without actually removing the wire from the insulator, PSE will perform a simple disconnect/reconnect service for you.

PSE defines a “disconnection” as the disconnection or reconnection of single-phase, self-contained meters or service lines at the meter base or weatherhead for the convenience of the customer.

If the wire has to be removed, relocated, or otherwise manipulated as this becomes a modified service, refer to the Modified services section below. Check with your CCS Representative to verify any charges that you may incur.

Modified services

PSE classifies work done on a service as a “modified service” when a customer requests a change in their secondary service that alters its current point of delivery or location to a new point of delivery without requiring the replacement of the entire service entrance conductor.

A modified service still must meet all the new service installation requirements. You are responsible for equipment from the meter socket into your building.

An electrical work permit must be present on your property for all work done on the customer side of the meter. You must apply for the permit before the work is started. After the work is completed, your local government agency must inspect the work before PSE can energize the service.

We know at times the electrical inspection is not completed or feasible by the time we arrive to reconnect your service. For modified services, if the permit is present and the work is completed, but the inspection has not been done, the service may still be energized by PSE if the work looks safe, clean, and completed. The inspection can take place the following day.

The customer requesting a modified service shall be required to pay PSE the costs of altering, transferring, or extending the existing electric service to the new point of delivery or location.

Modified service requirements can vary depending on the scope of the change (see Table 8)

Table 8

Example of overhead and underground modified service

| Customer request | PSE and Customer responsibilities |
|--|---|
| <p>Overhead Modified Service</p> <p>Your electric meter base is being replaced with a new meter base, and will be located a few feet away from where old meter base was. You will also replace the existing mast and weatherhead.</p> | <ul style="list-style-type: none"> • Notify your CCS Representative if you are changing panel amperage rating or increasing the connected load within your building. • You or your electrician must arrange for PSE to remove the wire from the point of attachment and make permanent connection to the new weatherhead. You must give PSE adequate notice of your intentions, typically 5 to 10 working days prior to needing your service energized. • An electrical permit must be present and visible prior to PSE energizing your service. |
| <p>Underground Modified Service</p> <p>Your mobile home is being relocated and you need to move your meter pedestal closer to the new location. Or, you are remodeling and have to change the electrical panel and/or meter location.</p> | <ul style="list-style-type: none"> • Notify your CCS Representative if you are increasing the load or capacity of your meter panel. • You are responsible for digging to the new pedestal location. • You must expose PSE's wire or conduit at the old pedestal location. This is where your new trench will start. • A new pedestal installation permit must be present and visible on-site prior to calling PSE to perform the work. You must give PSE 5 to 10 working days' notice prior to calling PSE to perform the work. |

Glossary

Approved – Acceptable to the authority having jurisdiction.

Backfill – Native soil or soil brought in from another area, free from sharp objects, rocks, scrap building material, and corrosive material.

Clearance – A set distance between two objects.

Conduit – A listed or approved wireway with a smooth interior surface to permit easy drawing-in of the electrical conductors. A conduit may be metallic or nonmetallic, depending on its usage, in accordance with codes and Puget Sound Energy Standards.

Current Transformer (CT) Enclosure – A sealable cabinet designed for surface or flush mounting, and provided with a frame or trim in which doors or removable covers are hung.

Customer Construction Services (CCS) Representative – The designated representative of Puget Sound Energy, responsible for design and/or coordination of new or revised services to PSE customers. The CCS Representative responds to inquiries on policies, standards, practices, rates, and energy utilization.

Customer Generation – A generation facility installed by PSE customers that are interconnected and operated in parallel with PSE's electric distribution system through the electric service meter (net meter).

Demand – The maximum average kilowatt load used by the customer for a specific period of time during the billing period.

Direct Burial – The installation of electrical conductors in a trench, without the use of conduit.

Disconnect Switch – A single blade-type, visible and lockable disconnect.

Drip Loop – A loop formed in overhead secondary conductors at the weatherhead to prevent water from entering into the service entrance conduit and equipment.

EUSERC – Electrical Utility Service Equipment Requirements Committee

Ground Rod – A ground electrode made up of a rod not less than 8' in length and 5/8" in diameter, typically made of zinc or copper coated steel. More information on ground rods is available in the National Electric Code.

Guy – Cable or brace used to relieve the strain of overhead conductors on masts and poles.

Inverter – An electronic device used to change dc current into ac current.

Locked Rotor Current – Locked rotor current is associated with the amount of current drawn from your electric service necessary to start an electric motor. Typically, a motor draws its maximum current to transition the rotor from being stationary, or stopped, to spinning. Once the rotor of a motor is spinning, the current needed to power the motor is typically reduced. Locked rotor current is sometimes referred to as Locked Rotor Amperes, In-Rush Current, or Starting Current. Not all motorized devices have a unique starting current.

Manual Block Bypass (Circuit-Closing Block) – A provision for paralleling the meter circuit, allowing the meter to be removed without interrupting service to the customer.

Meter Jaw – A spring-loaded receptacle installed inside a meter socket, interfacing the terminals of the meter to the source and load conductors of the service.

Meter Loop – Any provision in which an electrical meter may be installed. Does not include the service disconnect device.

Meter Pole – A pole which supports the metering equipment owned and maintained by the customer.

Meter Base/Socket – The mounting device consisting of meter jaws, connectors, and enclosure for accommodating socket-type meters. The mounting device may be either a single socket or a trough to accommodate more than one mounting unit.

Metering Equipment – Any equipment associated with measuring electric energy.

Municipal or State Inspector – The qualified representative of a city or the Washington State Department of Labor and Industries, who has been authorized by governmental agencies to inspect electrical service installations on their behalf.

NEC – National Electrical Code

NESC – National Electrical Safety Code

Net Meter – A PSE meter through which the customer generation is interconnected to the PSE electric distribution system. Net meters measure both energy delivered from PSE to the customer and energy returned to PSE from the customer.

Neutral – The grounded conductor in a single-phase, three-wire or three-phase, four-wire system. The service conductor that is at zero potential to ground.

Point of Attachment (Point of Service) – The point at which Puget Sound Energy's service conductors are attached to the customer's premises by an approved insulated clevis.

Point of Delivery – The connection point of the meter base, on the customer's premises, where Puget Sound Energy's circuit and the customer's system are interconnected.

Primary Voltage – The higher voltage, before transformation, used to distribute electrical energy through neighborhoods and local areas. Normally in excess of 600 V.

Production Meter – A PSE meter measuring energy production from customer generation sources.

RCW – Revised Code of Washington

Seal – The locking device used to secure meter and/or service entrance equipment to assure safety and security for the unit.

Secondary Voltage – The lower voltage, after transformation, used to supply the customer with electrical energy. Normally less than 600 V.

Self-Contained – In reference to meter sockets: a device designed and rated to continuously carry the entire capacity of the service entrance equipment through the meter.

Service Entrance Conductors – Those conductors which extend between the customer's load center and point of delivery.

Service Entrance Equipment – Service conduit, conductors, weatherhead, meter base, enclosures, service disconnect, and load center.

Service Mast – The conduit above the meter used to provide mechanical protection for the service conductors and to support the service drop from Puget Sound Energy's system.

Supply Side Tap – A connection that is made on the line or utility side of the main service disconnect breaker.

Temporary Service – An electrical service installed by Puget Sound Energy to provide power to a customer on a temporary basis (12 months or less).

UL – (Underwriters Laboratories) A nationally recognized test laboratory which lists materials it has tested and accepted.

UULC – Utilities Underground Location Center

WAC – Washington Administrative Code

Notes

Electric Site Preparation Checklist for Residential Overhead Projects

To assist our customers, the most common causes of delays are listed below. For a comprehensive list of our construction requirements please go to PSE.com/CustomerConstruction. All of the following must be completed before the construction crew can begin work.

Your Project Manager or PSE representative will visit the site for an initial readiness inspection a minimum of five work days prior to the scheduled date of construction. Should the site not be 100% construction-ready upon initial inspection you'll have the rest of the day to correct any issues prior to re-inspection the following day. Upon re-inspection, should the site not be 100% ready, the job maybe pulled from the schedule. Once the corrections have been made, please notify your Project Manager. Once the site is deemed ready for construction, the job will be rescheduled to the next available date. For additional information on how to ensure your site is ready, please refer to the attached Residential Service Handbook and appropriate service requirement forms (form 3061 for joint trench and form 6080 for electric-only trench).

Overhead Service Requirements*:

**See chapter 3 in Electric Service Handbook for more details*

- ☐ Front property line and lot corners must be surveyed and staked.
- ☐ Service line to ground clearance must meet the 12 feet NESC minimum over residential property, 17 feet 6 inches over roadways/driveways/parking areas/alleys and 26 feet over state highways.
- ☐ Drip loop must be a minimum of 10 feet above the ground.
- ☐ Minimum clearances from structures, building openings and gas meters must be met.
- ☐ A clear path through any trees must be cleared and maintained by the customer for the life of the service.
- ☐ A point of attachment at your service mast must be supplied by the customer (if you need further details, please contact the state or local electrical inspector for your area).
- ☐ Riser not properly guyed.
- ☐ Location of service strike causes overhang of the adjacent property.

Common causes that could delay your installation:

- ☐ Meter panel isn't installed on the front third of the building in reference to the drivable access.
- ☐ Meter panel is located in a fenced or walled-in area (e.g. patios, decks, porches, breezeways, backyards and carports).
- ☐ Center of meter panel isn't between 4 and 6 feet above finished grade (5 feet is preferred).
- ☐ Meter panel location doesn't meet PSE clearance requirements.
- ☐ Labor & Industries permit documentation and approved/signed sticker isn't visible and/or posted on meter base.
- ☐ Job site doesn't have drivable access (paved or rocked drive path per PSE specifications) and/or has objects on-site that obstruct access.
- ☐ Site isn't at final grade or acceptable subgrade in the area of construction.

For detailed construction requirements go to PSE.com/CustomerConstruction

Tips on how to prepare your job site for underground electric service

Residential customer-provided trench projects

Below is a checklist of important construction requirements, as well as the most common causes of project delays. For a comprehensive list of all construction requirements, please visit PSE.com/CustomerConstruction. All of the following must be completed before the construction crew can begin work.

Your Project Manager or PSE representative will visit the site for an initial readiness inspection a minimum of five work days prior to the scheduled date of construction. Should the site not be 100% construction-ready upon initial inspection, you'll have the rest of the day to correct any issues prior to re-inspection the following day. Upon re-inspection, should the site not be 100% ready, the job maybe pulled from the schedule. Once the corrections have been made, please notify your Project Manager. Once the site is deemed ready for construction, the job will be rescheduled to the next available date. For additional information on how to ensure your site is ready, please refer to the attached Residential Service Handbook and appropriate service requirement forms (form 3061 for joint trench and form 6080 for electric-only trench).

Trenching, conduit - and backfilling requirements:

**See chapter 2 in Electric Service Handbook for more details on underground service installation requirements*

**See chapter 4 in Electric Service Handbook for more details on underground primary installation requirements*

- ☐ All trench excavation, conduit installation and backfill related to installing your underground electric cable is your responsibility and must meet PSE design and jurisdictional requirements.
- ☐ Prior to backfilling a joint trench, it must to be inspected for proper horizontal and vertical clearances from other utilities.
- ☐ Trenching and conduit placement can take place any time before the five-work-day readiness inspection.
- ☐ All conduit must be electrical grade, Schedule 40 (or Sch.80 due to poor soil conditions), gray in color, and sized per PSE design.
- ☐ Conduit end-bells must be installed on both ends of all conduit runs, this provides a smooth, rounded pulling-surface, preventing damage to cable sheathe or insulation.
- ☐ Service conduit shall contain no more than a total of 180 ° in bends and none less than 24 inches in radius.
- ☐ Primary conduit shall contain no more than a total of 180 ° in bends and none less than 36 inches in radius.
- ☐ For direct-buried cable – cable not installed in conduit – proper bedding and shading material must be within hand-shoveling distance to the work pit
 - Required backfill material: ¾ yard sand: washed, clean, and free of debris or rocks larger than ¼"
- ☐ 3/8 - inch poly pull rope is required for services that are 60 feet or more and for all primary line extensions.
- ☐ Conduit must be stopped 4 feet from utility poles and 2 feet from transformer vaults.
- ☐ If trenching to a utility pole, the face of the utility pole must be exposed from grade level to bottom of the work pit.
- ☐ Work pit dimensions:
 - 48"x48"x28" at service panel or stubout
 - 48"x48"x40" at utility pole, vault, or handhole (per PSE design)

Common causes that could delay your installation:

- ☐ Meter panel isn't installed on the front third of the building in reference to the drivable access.
- ☐ Meter panel is located in a fenced or walled in area, or an area that is subject to being fenced or walled in (e.g. patios, decks, porches, breezeways, backyards, and carports).
- ☐ Center of meter panel isn't between 4 and 6 feet above finished grade (5 feet is preferred).
- ☐ Meter panel location doesn't meet PSE's clearance requirements.
- ☐ Labor & Industries permit documentation and approved/signed sticker isn't visible, legible and/or posted on meter base.
- ☐ Job site doesn't have drivable access (paved or rocked drive path per PSE specifications) and/or has objects on-site that obstruct access.
- ☐ Trench and/or work pit(s) aren't ready (e.g. - water, construction debris, and/or sloughed spoils haven't been removed).
- ☐ Site isn't at final grade or acceptable subgrade in the area of construction.
- ☐ Front property line and lot corners aren't surveyed and staked.

For detailed construction requirements go to PSE.com/CustomerConstruction

