RESIDENTIAL
Electric Service Handbook



2026

Building or remodeling residential property in Clark County, Washington

This handbook provides information regarding Clark Public Utilities standards and requirements for installing residential electric service.

Clark Public Utilities

CONTACTS

Construction Services
Office Hours: Monday-Friday
7:00 AM to 4:00 PM
Location: 8600 NE 117th Ave
Vancouver, WA 98662

PO Box 8900 • Vancouver, WA • 98668
Updated November 26

Clark Public Utilities

- Website — clarkpublicutilities.com

- Construction Services Department — construction@clarkpud.com
  - To initiate a new service or service upgrade, request a service line inspection or disconnection, or to provide backfill or electrical service approval notification. — (360) 992-8558

- Construction Design — designdesk@clarkpud.com
  - For questions regarding existing work requests, designs, job status, or prepayment. — (360) 992-8511

- Meter Department — meterdepartment@clarkpud.com
  - For meter equipment questions, scheduling CT delivery and installation or meter equipment review. — (360) 992-8001

- Operations Office — ops@clarkpud.com
  - To request primary inspections, primary standbys or for questions on a scheduled job. — (360) 992-8839

- Customer Service Department — clarkpublicutilities.com/contact
  - For general billing questions regarding existing electric or water accounts or to pay a construction invoice with check by phone. — (360) 992-3000

Other Contact Information

"Call Before You Dig" Utility Notification Center

- To request locates of underground utilities — WA811.com
  811 or (800) 424-5555

Washington State Department of Labor and Industries — lni.wa.gov

- To obtain an electrical permit — (360) 896-2300
- Questions regarding a permit or code — (360) 896-2360
- To request an electrical inspection — (360) 896-2350

City of Vancouver — cityofvancouver.us

- To obtain an electrical permit — (360) 487-7833
- Questions regarding a permit or code — (360) 487-7801
- To request an electrical inspection — (360) 487-7890

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CHAPTER 1

Introduction

This handbook establishes requirements for new or altered electric service to single-family residential structures. The information in the following chapters applies to all residential customers.

Codes, Permits and Inspections

This handbook provides general guidance and does not supersede requirements of the State of Washington or other authorities having jurisdiction.

It is the customer's responsibility to request inspections from the appropriate agency and ensure the project complies with all applicable federal, state, and local codes. All required permits, approvals, and code requirements must be addressed before construction begins.

Service and Electrical Inspection for New Service

Clark Public Utilities inspects the service trench, conduit, and utility-owned facilities from the power source to the residential structure or service demarcation point prior to connecting electric service.

The Authority Having Jurisdiction (AHJ), either the Washington State Department of Labor & Industries or the City of Vancouver, depending on the service location, inspects all customer-owned electrical equipment attached to and within the structure, including the meter base, service entrance equipment, and service panel.

It is the customer's responsibility to request all required inspections from the appropriate agency, ensure all approvals are completed, and notify Clark Public Utilities before electric service can be connected

Projects are scheduled for connection once all requirements have been met, including but not limited to permits, easements, utility inspections, AHJ approvals, prepayment, and customer trench backfill.

How to Contact Clark Public Utilities

Clark Public Utilities contact information is located inside the front cover of this handbook. This list also includes phone numbers and websites for other construction-related agencies and services.

Online service applications, this handbook, and additional resources are available at: **clarkpublicutilties.com**

For billing questions related to existing electric or water service accounts, call the 24-hour Customer Service line at (360) 992-3000 or visit **clarkpublicutilties.com**

CHAPTER 2

Residential Electric Service General Information

This chapter provides general information on the responsibilities of both the utility and the customer, as well as the process for starting a project.

Definitions

A **single-family residence** is a structure that is:

- Located on a lot zoned for residential use.
- Approved for occupancy as a permanent, single-family residence by the local Authority Having Jurisdiction (AHJ).

A **mobile** or **manufactured home** is considered a single-family residence if it meets the above criteria, and:

- Is permanently located on a foundation.
- Has all wheels and axles removed.
- Meets all other requirements of a manufactured home placement permit as required by the AHJ.

An **accessory dwelling unit (ADU)** is considered a residential dwelling unit that:

- Is attached to or detached from the principal dwelling.
- Provides complete, independent living facilities.
- Meets all applicable city and/or county code requirements for residential use.

For utility service classification purposes, a property containing a principal dwelling and one ADU served by a ganged meter base is generally considered a single-family residential development. Properties with three or more residential dwelling units served by a ganged meter base are considered multi-family residential developments and are subject to applicable multi-family service requirements.

An **outbuilding** is a standalone structure that is not intended for residential occupancy. Common types of outbuildings include barns, pump houses, garages, workshops, and storage sheds. Services to outbuildings on single-family residential properties must meet all requirements in this handbook and the National Electrical Code (NEC).

A **subdivision** or **short plat** refers to the division of land into multiple residential lots for the purpose of residential development. Subdivisions and short plats creating more than three (3) lots, as well as developments proposing more than one multi-family structure (e.g., apartment buildings), require a subdivision or multifamily utility design prepared by a Utility-approved design firm. Contact the Construction Services department at **construction@clarkpud.com** or (360) 992-8558 for additional information regarding subdivisions and multi-family buildings.

Service Installation Responsibilities

Installing a new electrical service to a residential structure is a cooperative effort between the customer and Clark Public Utilities in which both share responsibility.

Clark Public Utilities is Responsible For:

- Developing electrical designs in accordance with utility construction standards to effectively meet the needs of both the customer and the utility.
- Applying for Right-of-Way (ROW) trenching and crossing permits within unincorporated Clark County and for work within state road and highway ROWs. Fees for these permits will be included on the customer's Clark Public Utilities construction bill.
- Inspecting installations of primary and secondary facilities, and electrical service up to the customer-owned meter base. The meter base, service entrance equipment, electrical panel and branch circuits are inspected by the AHJ.
- Installing current transformers (CTs), when required.
- Connecting the service after the customer provides notification of service approval from the AHJ.
- Setting the electric meter in a customer-installed and maintained meter base.

The Customer is Responsible For:

- Initiating an electric service work request, establishing a construction billing account, and establishing the subsequent electric service account.
- Providing a Clark County or city-approved site plan, one-line diagram, and load summaries (if required). A full list of required project information can be found in **Chapter 3, Residential Underground Services.**
- Hiring a utility-approved **Primary Electrical Installation Contractor (APC)** to supply and install all required primary (distribution-voltage) electrical equipment in accordance with the utility-provided electrical design.
- Contacting the utility design engineer at least two weeks prior to construction. This allows time for final plan review, site staking, installation of necessary equipment, and any required design revisions.
- Ensuring the utility-provided electrical design is shared with all contractors performing work associated with the project and is available on-site during construction. Any installation that deviates from the utility-provided design may be subject to correction or re-work at the customer's expense.
- Obtaining required ROW permits within city limits.
- Notifying the Utility Notification Center (Call Before You Dig) before excavation.
- Performing all trenching associated with the installation.
- Obtaining electrical wiring permits and inspections from the AHJ.
- Ensuring the customer-hired APC installs all required primary electrical facilities in accordance with the utility-provided design and requests all primary inspections.
- Ensuring all required secondary and service facilities are installed in accordance with utility requirements. This includes trenches, conduits, conductors, service equipment and metering equipment, whether installed by the customer or customer-hired contractor.
- Contacting the utility to request inspection of the service trench and conduit prior to backfilling.

- Requesting the installation of CTs, when required, once the metering equipment and service conductors are installed but not yet energized.
- Maintaining the customer-owned and customer-installed service entrance, electrical panel and metering equipment, excluding the meter.
- Maintaining electrical equipment safety clearances for both existing and new installations of primary and secondary equipment and the meter base.
- Ensuring that all utility-owned infrastructure and equipment, including the meter, remains accessible to utility personnel 24 hours a day, seven days a week.

Ownership and Maintenance Responsibilities

Once the new service passes all required inspections, has been backfilled by the customer and is energized by the utility, the facilities will be transferred to Clark Public Utilities. The utility will operate and maintain the primary voltage facilities and electrical service up to the meter. This includes all transformers and primary facilities installed as part of a customer project. These facilities become part of the overall electric grid serving the community. Clark Public Utilities shall have the right to utilize utility-owned equipment and facilities for future service and system needs, including serving additional customers where appropriate.

All electric service wiring on the customer (load) side of the meter base, including the service entrance/down pipe and the service mast of overhead services, is owned and maintained by the customer. The customer is responsible for any required repairs or modifications to the meter base, service entrance, electrical panel(s), and branch circuits within the structure.

NOTE: *For residential services where the meter is not installed on the structure being served, the customer owns and maintains all load-side service conductors and equipment beyond the meter.*

Starting the Residential Electric Service Design Process

A billing account will be established at the time the financially responsible party contacts the Construction Services department to request new or altered electric service or completes and submits a webform **Residential – Non-subdivision/rural** or **Residential – Subdivision/short plat**, found on our website, **clarkpublicutilties.com**.

Construction Services can be reached at **construction@clarkpud.com** or (360) 992-8558, Monday through Friday, between 7:00 a.m. and 4:00 p.m. A construction coordinator will ask for billing information and the address of the new service site. For detailed information required to initiate a residential electric service request, see **Chapter 3, Residential Underground Services**.

Service Voltage

The utility offers 120/240 volt, 3- wire systems for single-phase residential service. Customers interested in a residential three-phase service can contact the Construction Services department **construction@clarkpud.com** or (360) 992-8558, for additional information.

Service Sizes

Clark Public Utilities offers several service sizes for single-family residential structures and outbuildings. The service size required depends upon the size of the structure and the power requirements of the equipment being installed. **Table 2-1** outlines common residential service sizes.

Table 2-1 Residential Service Sizes

Ampere Rating	Typical Use	Common Load Examples
Less than 200 amps	Shop and other outbuildings	Lighting, receptacles, small air compressor, basic tools, well pump, small electric heater
200 amps	Small to medium-size homes	HVAC system, EV charger, electric range/oven, clothes dryer, dishwasher, water heater, general lighting/outlets
320-400 amps	Medium to large homes will additional structures (shop, ADU, barn, etc.)	Multiple HVAC systems, EV charger(s), hot tub/spa, large shop equipment, ADU subpanel loads
Over 400 amps	Very large homes with multiple additional residential structures	Multiple EV chargers, heated floors, pool + spa equipment, large workshops, multiple subpanels, high-end appliances

Service Less Than 200 Amps

A single-family residential structure (shop, outbuilding, well house, etc.) may have a service panel rated for less than 200 amps. In these cases, the utility will provide a design requiring a service line and meter base that is sized to accommodate up to 200 amps of service.

Solar Generation

Connection of a customer-owned solar generating system (including solar additions, whole house batteries and other forms of generation) requires pre-approval of the planned system and metering. All generating systems must pass electrical inspection by the local AHJ before the utility will connect service and set meters. Clark Public Utilities requires installation of both a production meter and net meter for residential solar generation installations.

The following items are required for connection of customer-owned solar generation:

- Completed and signed application and agreement.
- One-line electrical diagram.
- Site plan showing proposed meter locations (net and production).
- Manufacturer equipment cut sheets.
- Prepayment of all applicable application fees and charges.

For additional information and application materials related to solar systems, contact the Energy Resources department at **netmetering@clarkpud.com** or call (360) 992-3244. You may also visit **clarkpublicutilties.com** for additional resources and documentation.

Electric Vehicle Chargers

Electric vehicle (EV) chargers can add substantial load to a residential electric service, particularly Level 2 (240V) equipment and multiple EV charger installations. To maintain safe and reliable service, customers should contact the Construction Services department prior to installing EV charging equipment to initiate a job for review of the existing electrical system and determine whether a service upgrade is needed. EV chargers are typically treated as continuous loads under the National Electrical Code (NEC), and installations may require service upgrades or load management solutions depending on existing capacity.

Meter Equipment Location Requirements

The meter base and associated devices (CT enclosure, solar production meter, etc.) must be attached to a permanent fixed structure that contains the load being served (such as a house, shop or ADU). This location is to remain accessible to Clark Public Utilities personnel 24 hours a day.

Location requirements:

- On the outside of the structure being served.
- On the ground floor, with the center of the meter 5 to 6 feet above finished grade (5 feet preferred).
- On the front one-third of the home, closest to normal public access.
- In an area that is not subject to being fenced-in. Patios, decks, porches, breezeways and backyards are not approved new service locations.
- The meter base and associated service equipment must remain uncovered, visible and readily accessible at all times. Decorative covers, enclosures, landscaping or other obstruction that hinder utility access are not permitted.

These approved locations allow Clark Public Utilities to:

- Read the meter.
- Maintain the metering equipment.
- Disconnect the electric service quickly in case of emergency.

NOTE: *See* **Chapter 5, Residential Metering** *for more information.*

Trenching

The customer, or a contractor hired by the customer, is responsible for excavating the electric service trench on their property and installing a continuous conduit run as outlined by the utility-provided design. Any excavated trenches or conduit installations that deviate from the utility-provided design will be subject to re-work at the customer's expense. After all required inspections are completed, the customer is responsible for backfilling and compacting the trench.

All utility work within the public road ROW, including trenching and road crossing installations, as well as any work on property not owned by the customer, must be performed by a contractor hired by the customer who is licensed and bonded to perform excavation work.

If the project requires a primary line extension to bring electric distribution facilities to the property, the customer must hire a utility-approved primary electrical installation contractor. This contractor serves as the single point of contact for the project and is responsible for excavating all primary electric trenches, requesting utility inspection of all primary trenches (regardless of subcontracting), and backfilling and compacting all trenches after required inspections are completed. Any trenching or conduit installation that differs from the approved utility design may require correction or re-work prior to utility approval.

For additional trenching information, see **Chapter 3, Residential Underground Services** or **Chapter 4, Primary Line Extensions**.

Locating Existing Underground Utilities

State law requires customers to contact the Utility Notification Center (the underground utilities locating service) at least two full business days in advance of trenching, horizontal directional drilling/boring, or excavation. **Utility locates must be in place prior to the start of digging.**

Customers can call the national "Call Before You Dig" number, 811 or 1-800-424-5555 or visit **WA811.com** One request to the Utility Notification Center notifies all utilities that locates have been requested. Underground electric distribution lines owned and maintained by Clark Public Utilities and the residential service line from the source equipment to the main structure will be located. This service is free of charge. The customer is responsible for facilitating locates for privately-owned, underground utilities beyond the main residential structure.

Visit **WA811.com** to view a list of private locate companies. **Table 2-2** shows the color code for marking the location of each utility.

NOTE: *The day the locate request is made is not included in the two business days.*

Table 2-2 Color Code for Locating Underground Utilities

Color	Underground Service
Red	Electric
Yellow	Gas, Oil, Steam
Orange	Telephone, Cable TV
Blue	Water
Purple	Reclaimed water
Green	Sewer
Pink	Temporary survey marks
White	Proposed excavation

NOTE: *Any digging within 24 inches of location marks must be done with hydrovac/hydro excavation or with wood or fiberglass handled tools. Do not use digging bars in the vicinity of buried electric cables.*

Joint-Use Facilities

Joint-use describes a group of utilities that share pole space or underground trenches to reduce installation and maintenance costs for customers. In Clark County, joint-use agreements exist with telecommunications providers, cable television companies, fiber optic networks, and wireless service providers.

Joint-Use Trench

The customer may place telephone, cable television, or other communication facilities in the same trench as electric service conductors, provided the installation meets the requirements of Clark Public Utilities and all other parties sharing the trench.

In certain cases, natural gas and water services may also be installed in a common trench. See **Chapter 3, Residential Underground Services** and **Chapter 4, Primary Line Extensions** for additional trenching requirements and information.

NOTE: *Sewer lines, water mains and storm drainage systems are not permitted in a joint-use trench with electric facilities.*

Overhead Joint-Use

Whenever an existing Clark Public Utilities pole is replaced or removed, or an overhead service is converted to underground at an existing pole, any joint use pole with remaining attachments from other utilities will be topped and abandoned (left in place) for the remaining joint users. The last utility with facilities attached to the pole is responsible for removing the pole.

Clark Public Utilities does not have the authority to remove or relocate facilities owned by other utilities attached to the pole. It is the customer's responsibility to contact all joint-use utilities regarding conversion of their services and to coordinate removal of the pole(s) prior to the start of the project.

Utility Coordination Requirement

New construction typically involves the installation of telephone lines, cable television cables, water and natural gas services, and electric power facilities. It is the customer's responsibility to notify each utility of the intended service installation.

Conduit

All new underground primary, secondary and electric services that will be owned and maintained by the utility require continuous runs of conduit. Conduit specifications will be provided by a utility design engineer. The conduit installation will be inspected by utility personnel, ensuring it meets all relevant standards and requirements.

NOTE: *Detailed trenching, conduit, and excavation requirements are provided in* **Chapter 3, Residential Underground Services and Chapter 4, Primary Line Extensions.**

Work Clearances Around Transformers

If the project requires the installation of a transformer, a minimum of 10 feet of clear, level working space is required in front of a pad-mounted transformer, three feet from the back and sides. This allows utility personnel enough room to perform transformer switching (rerouting of high voltage power) and maintenance. Landscaping, fences and other obstructions must not encroach on these clearances.

Additional safety clearances may also apply. More information about clearances around pad-mounted equipment and transformer placement can be found in **Chapter 4, Primary Line Extensions**.

Cost for Service

Charges vary depending on the location of existing electrical facilities, the size of service requested and the type of metering required. Below is a brief description of the charges that may apply to residential electric service requests.

These charges are subject to change. Contact Clark Public Utilities' Construction Services department at **construction@clarkpud.com** or (360) 992-8558 for verification of current rates. Additional resources and current service charges are available at **clarkpublicutilities.com/building-remodeling**.

NOTE: *Electric service requests on file are subject to review when ready for service connection. Current rates, fees, taxes, and charges in effect at the time of service connection shall apply.*

System Development Charge

This charge covers costs incurred by the utility to increase the capacity of the existing electric distribution system. Charges are based on the panel size of the new or altered service. Service panel changes and upgrades may also require payment of the system development charge.

Miscellaneous Construction Charges

New and upgraded services that require an extension of primary facilities or upgrades to existing primary or secondary facilities may be subject to additional charges. These charges cover the labor and materials required to modify the utility's existing system to connect new or additional services.

Relocation of existing utility facilities to accommodate new structures, driveways, grade changes, or other customer-requested improvements may also be subject to construction charges.

A utility design engineer will evaluate the job site and advise of any applicable miscellaneous construction or relocation charges.

NOTE: *Adding additional load to an existing residential service may require upgrades to the existing facilities and distribution system. Costs for required upgrades are the responsibility of the financially responsible party.*

Right-of-Way (ROW) Work Permit Charges

Clark Public Utilities will apply for all ROW work permits required for electric facilities installed within unincorporated Clark County ROW. This includes permits required for trenching and crossing on federal, state, county and railway ROW.

Fees for these permits vary depending on the requirements of the job and will be added to the customer's construction billing.

If the job site is within any incorporated city limit, it is the customer's responsibility to apply for and secure the required ROW permits.

Temporary Service

Residential customers may request a metered temporary service to provide electric service during the building process. A utility design engineer will provide a design indicating the source and location for the requested temporary service. When an underground-fed temporary service is required, the customer is responsible for providing and installing the service post and bracing (if needed), the meter base, underground conductors, and panel(s) in accordance with the NEC. After the installation passes inspection by the AHJ and the utility is notified of approval, the utility will connect the service and set the meter.

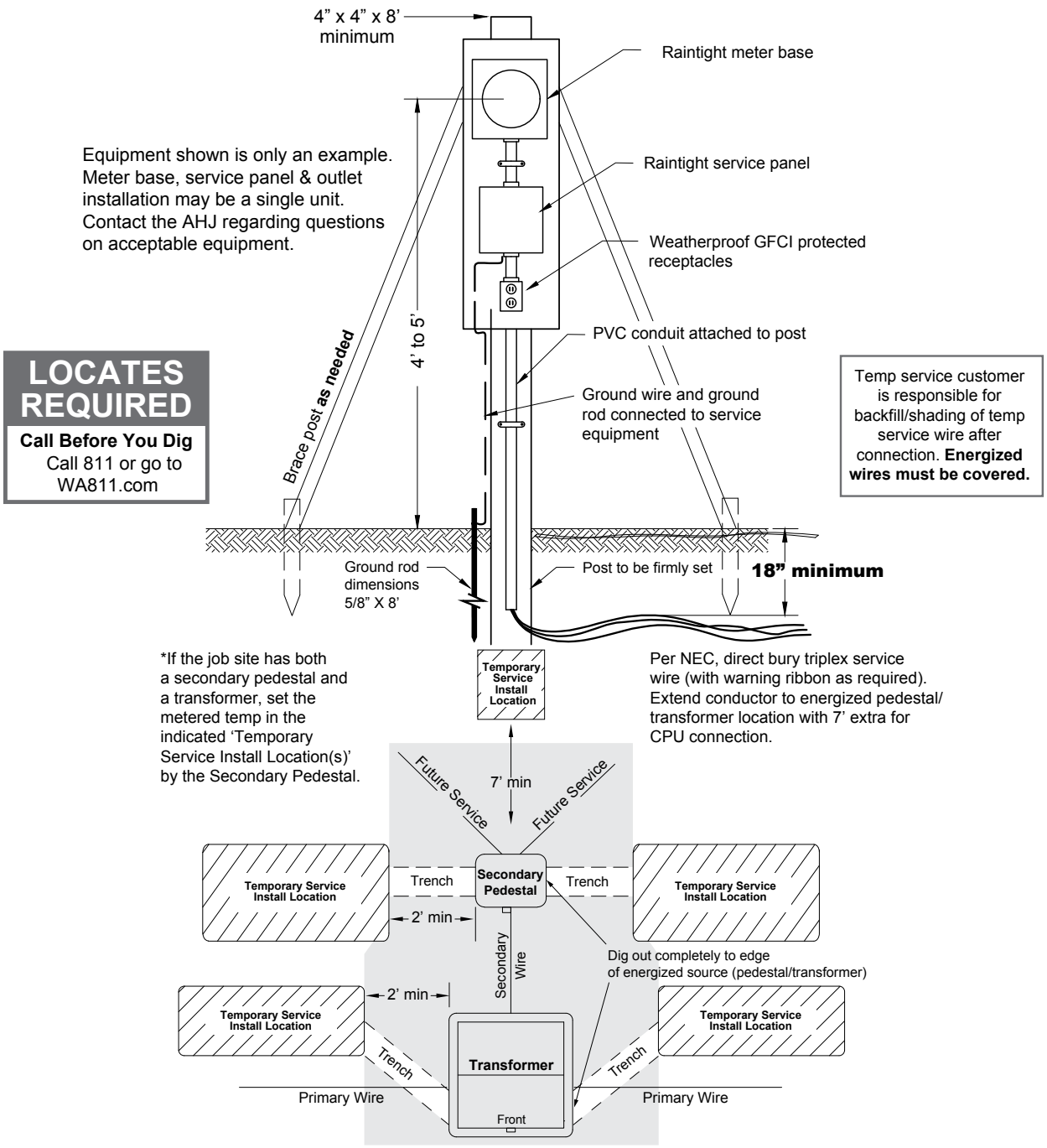
The customer is responsible for backfilling or shading conductors with a minimum of 3 to 4 inches of soil to protect temporary service conductors after connection. All energized conductors must be properly covered. ***(Figure 2-1)***

Overhead temporary services require the customer to provide and install the service post, meter base, panel(s), service mast, weatherhead and overhead wire support tripod.

Additional overhead temporary service installation information:

- Minimum clearance of 12′ 6″ at the point of attachment and 10′ from the wire drip loop to the ground is required per the NEC.
- Ensure the support tripod is tall enough to maintain required overhead clearances.
- An overhead line to a temporary service installed on a job site shall **not** cross a driveway.
- The utility will provide the overhead conductor, meter and connect the service once the electrical inspection has passed and the utility is notified.

Figure 2-1 Metered Temporary Service – Underground Feed



DO NOT INSTALL TEMPORARY SERVICE EQUIPMENT IN GRAY AREA

Temporary electric service equipment and installation must meet NEC requirements and pass inspection by the AHJ before Clark Public Utilities can set a meter and energize the service.

NOTE: If source equipment is not energized, temporary service wire must be landed and tagged in the source facility by the contractor setting the temporary service equipment.

CHAPTER 3

Residential Underground Services

This chapter establishes requirements for new residential underground electric service installations, including application procedures, trenching guidelines, conduit installation, service conductor requirements, inspection requirements, and utility connection procedures.

General Service Requirements

A standard 120/240-volt residential service is typically sufficient when the meter base is located less than 200 feet from the transformer.

Large electrical loads, such as heat pumps, air conditioning systems, hot tubs, EV chargers, or other motor loads, may reduce the allowable service distance.

Single-family residences located more than 200 feet from an existing transformer will require a primary underground line extension and installation of a new transformer closer to the structure. See **Chapter 4, Primary Line Extensions**, for additional requirements.

Residential Electric Service Process

Initial Application

Submit a New Electric Service Request - Residential at **clarkpublicutilties.com** or contact Construction Services:

- Email: **construction@clarkpud.com**
- Phone: (360) 992-8558

Provide the following information:

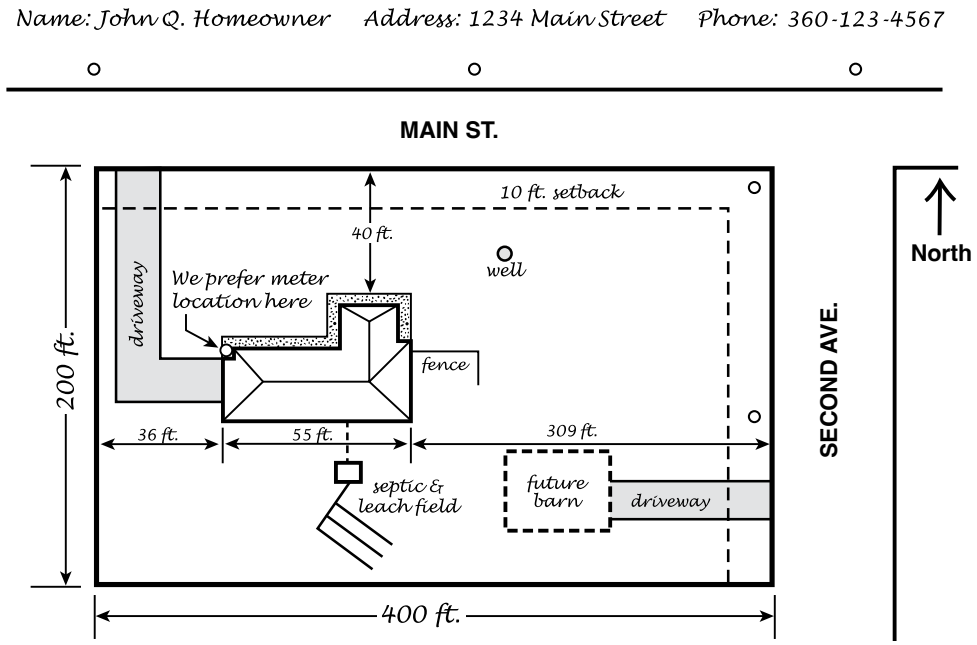
- Job site address and/or Assessor's Parcel Number (APN).
- Description of the residential structure(s).
- Billing information for the financially responsible party.
- Contact information for design-related questions.

Pre-Design and Site Preparation

Before utility design can begin:

- Apply for or obtain the required building permit.
- Locate and clearly mark property corners.
- Stake the proposed structure location(s).
- Install the driveway approach at the final county-approved location and surface with gravel.
- Provide a copy of the site plan submitted for the building permit application, showing:
  - Structure locations
  - Property corners and lines
  - Culverts and bodies of water, wetlands, etc.
  - Existing and proposed utilities
  - Easements and access areas
- Provide electrical load calculations for services greater than 400 amps.

Figure 3-1 Typical Customer-Provided Site Plan



NOTE: Customer to stake property corners, location of house or manufactured home, well, septic system and future structures.

Utility Design Phase

During the design phase:

- Coordinate a site visit with the utility design engineer, when required.
- Complete all required action items identified during the site meeting.
- Obtain the official utility-provided design.
- Review the design carefully and request revisions, if necessary.

NOTE: *Design revisions must be approved by the utility design engineer prior to construction. Installations that do not match the approved utility design will fail inspection and may result in project delays.*

Permits and Pre-Construction Requirements

Before construction begins:

- Obtain an electrical work permit from the Authority Having Jurisdiction (AHJ).
- Contact the Utility Notification Center ("Call Before You Dig") at least two business days prior to excavation.
- Obtain all required Right-of-Way (ROW) work and crossing permits.
- Secure all required easements.
- Pay all required construction charges.

NOTE: *Electric service will not be connected until all required easements, permits, inspections, and fees have been obtained, approved, and paid.*

Construction and Installation

All work shall conform to the approved utility-provided design. A printed copy of the final utility design shall be provided to all contractors and installers and kept on site during all phases of construction.

Installations without a utility conduit stub-out

If the energized transformer or secondary pedestal does **not** include a utility conduit stub-out:

- Excavate the trench to the utility designated source location
- Schedule a utility standby for the installation of continuous conduit into the source facility.
- Install continuous conduit between the source location and the customer-owned meter base.
- The utility will provide and install the service conductors and complete the connections at the source and meter base.

Installations with a utility conduit stub-out

If the energized transformer of secondary pedestal includes a utility conduit stub-out:

- Excavate the trench to the utility-designated source location as specified in the utility-provided design.
- Locate the marked utility conduit stub-out.
- Install continuous conduit between the utility stub-out and the customer-owned meter base.
- The utility will provide and install the service conductors and complete the connections at the source and meter base.

NOTE: *Installations that do not match the approved utility-provided design will not pass inspection.*

Inspection and Backfill

Before backfilling:

- Contact Construction Services at **construction@clarkpud.com** or (360) 992-8558 to request a trench and conduit inspection and provide the utility work request number.
- Obtain AHJ electrical inspection approval for:
  - Meter base
  - Service entrance equipment
  - Panel(s)
  - Branch circuits

After inspection approval:

- Backfill the trench completely where a continuous conduit run is installed.
- For installation of customer owned conductors:
  - Schedule a utility standby at the energized source and install conductors.
  - Connect conductors in the service entrance equipment.
- For installation of utility owned conductors:
  - Notify the utility when backfill is complete.

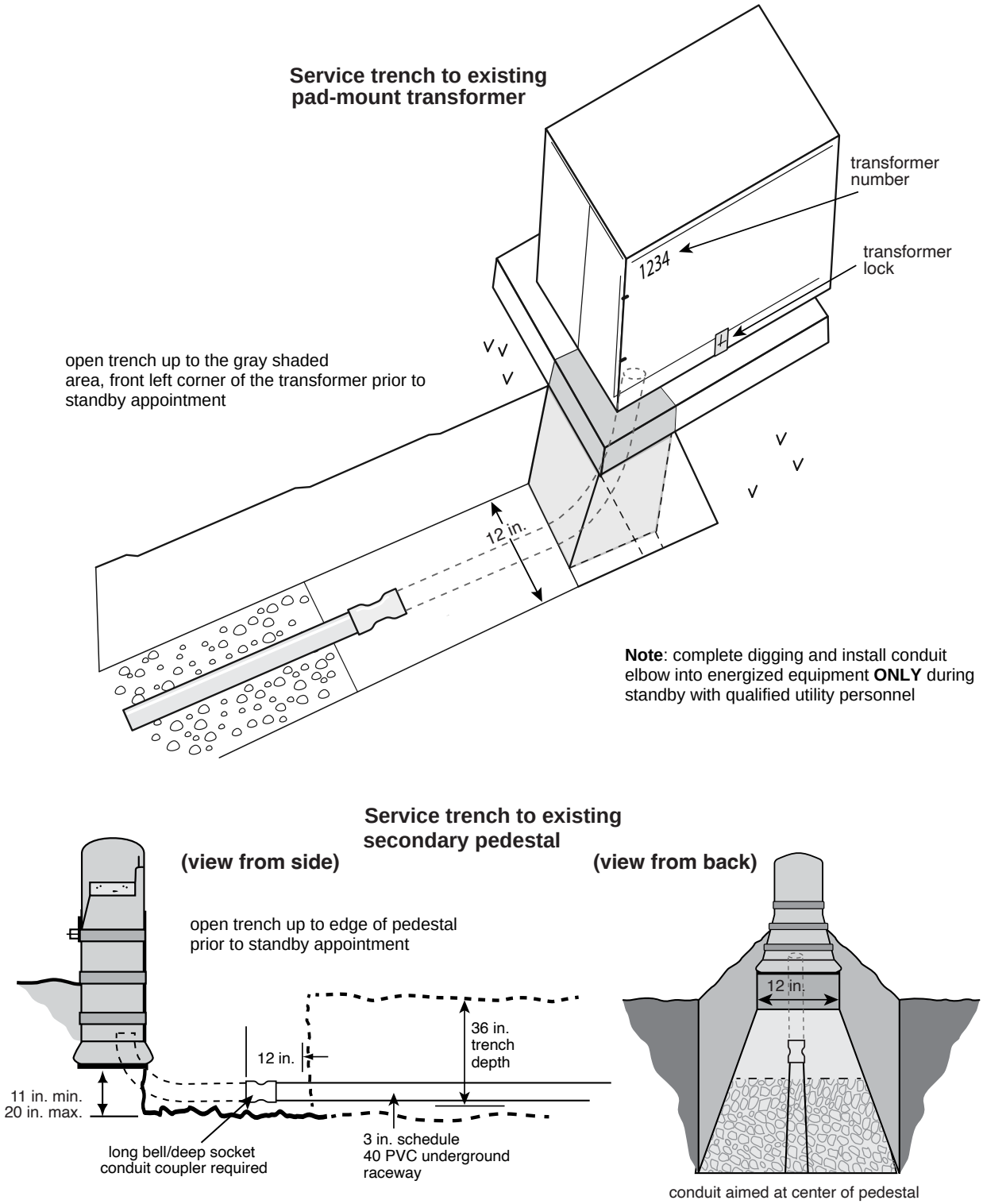
NOTE: *Service conductors shall* ***not*** *be installed until trench and conduit inspections are approved and all required backfilling is complete.*

Utility Final Connection

After all customer requirements are complete, Clark Public Utilities will:

- Provide and install utility owned service conductors.
- Connect underground service conductors at the utility source.
- Install and energize the electric meter.

Figure 3-2 Service Trenches to Underground Utility Sources without Stub-outs



NOTE: Clark Public Utilities personnel will provide standby at energized facilites

Figure 3-3 Typical Underground Electric Service

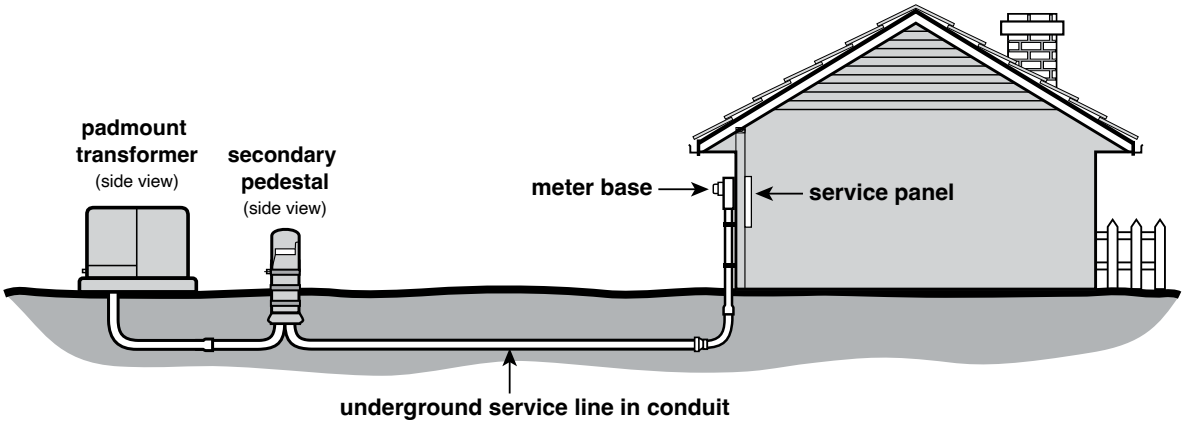
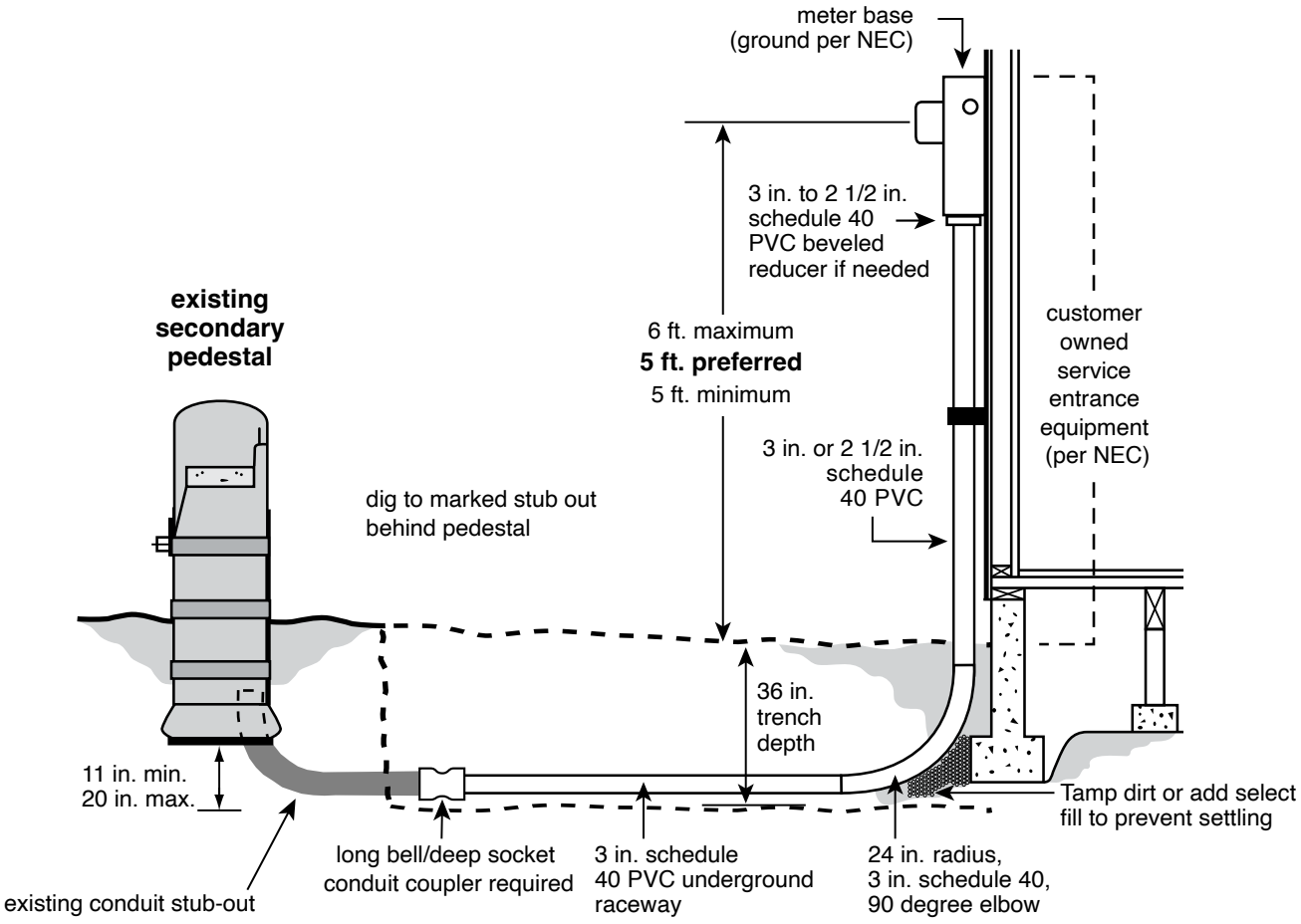


Figure 3-4 Electric Service to Secondary Pedestal



NOTE: 3 in. to 2 1/2 in. reducer (if needed) may be installed at the meter base knockout or in the down pipe at the top of the elbow.

Electric Service Trenching Requirements

Trench Width and Depth

Unless otherwise approved by Clark Public Utilities:

- Minimum trench width shall be 12 inches.
- Minimum trench depth shall be 36 inches.
- Road crossings for primary, secondary and service conductors shall have a minimum trench depth of 48 inches, unless otherwise required by the permitting agency.

Joint-use trenches may require additional width to maintain required utility separation clearances. See ***Figure 3-5*** Electric Service Trench Detail.

Joint-Use Trenches and Crossings

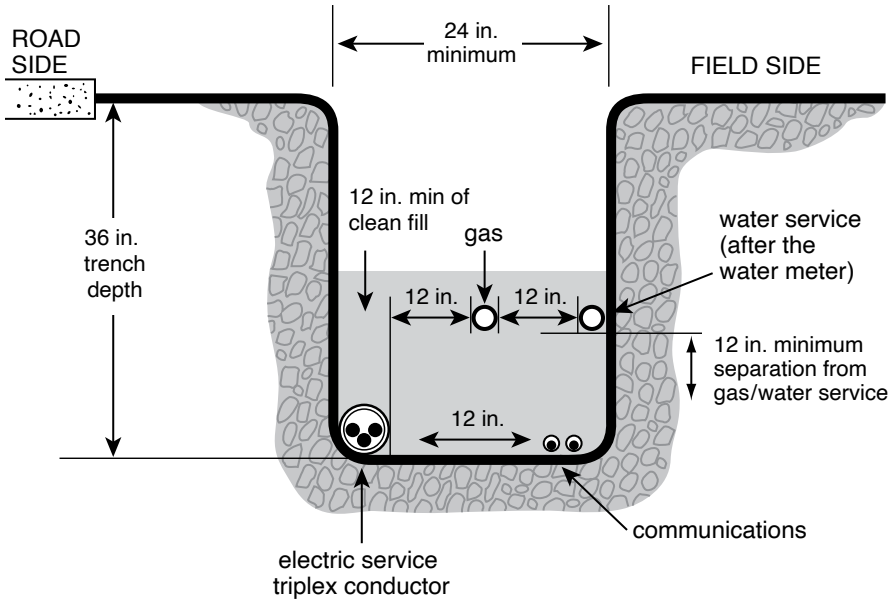
Joint-use trenches are permitted when approved by Clark Public Utilities. The customer is responsible for coordinating installation with all other utilities.

Requirements include:

- All road and driveway crossings shall be installed perpendicular to the road or driveway.
- Maintain a minimum 12-inch horizontal and vertical separation between Clark Public Utilities electric conduit and other utilities ***(Figure 3-5)***.
- Use select backfill or controlled density fill (CDF) where required by the utility design engineer or inspector.
- Electric service conduit shall be installed in accordance with utility conduit requirements.

NOTE: *Sewer lines, water mains and storm drainage systems are not permitted in a joint-use trench with electric facilities.*

Figure 3-5 Electric Service Trench Detail



NOTE: Road crossings and trenching within the public ROW require a trench depth of 48 inches.

Public Right-of-Way (ROW) Work Requirements

A licensed and bonded excavation contractor must perform all utility work within the public road ROW, including trenching and installation of primary, secondary, and service crossings along or beneath roads and highways.

Requirements

- Fees associated with permits obtained by Clark Public Utilities will be charged to the financially responsible party and included on the Clark Public Utilities construction bill.
- Regardless of which entity obtains the ROW work permit (the utility or the excavation contractor), the excavation contractor is responsible for complying with all permit requirements, including advance notification prior to beginning work within the ROW.
- Standard trench depth within the public ROW is 48 inches unless a greater depth is required by permit conditions or the approved utility design. Work within WSDOT ROW requires a minimum of 5 feet of cover above the top of the conduit.
- All utility work performed within the public ROW must comply with the erosion and sediment control requirements of the applicable local jurisdiction.
- The excavation contractor is responsible for roadway restoration and site cleanup as required by the permit issuing agency.

NOTE: *The excavation contractor is responsible for complying with all applicable federal, state, county, trench safety, and permit requirements.*

Permit responsibilities for utility work within the public ROW are summarized in ***Table 3-1***.

Table 3-1 Public Right-of-Way (ROW) Permit Responsibilities

Permit or Requirement	Responsible Party
City Right-of-Way (ROW) Work Permit	Excavation Contractor
Clark County Public Works Utility (PWU) Permit	Clark Public Utilities
WSDOT Utility Accommodation Permit	Clark Public Utilities
Permit Compliance and Required Notifications	Excavation Contractor
Roadway Restoration and Site Cleanup	Excavation Contractor

Horizontal Directional Drilling (HDD)

Horizontal directional drilling (HDD) may be used for roadway crossings or underground service installations when approved by Clark Public Utilities.

The HDD contractor shall:

- Contact the utility design engineer at least two weeks before construction to verify the current approved design.
- Obtain route approval prior to drilling.
- Comply with Utility Standard HDD1.
- Comply with all utility and AHJ permit requirements.
- Provide a copy of the bore log when requesting the trench/conduit inspection.

See ***Chapter 4, Primary Line Extensions*** for additional HDD requirements.

Trench Excavation Requirements

The customer or contractor is responsible for:

- Following the most current utility-provided design.
- Verifying design revisions with the utility design engineer prior to construction.
- Complying with all permit conditions and requirements.
- Ensuring all road crossings are perpendicular to the roadway. Deviations require prior approval from the utility and the authority having jurisdiction.
- Excavating trenches in accordance with utility standards.
- Providing trench protection and shoring where required by OSHA and WAC regulations.
- Maintaining a minimum 5-foot separation from building foundations.
- Maintaining a minimum 5-foot separation from water mains, sewer, and storm drainage facilities when installed in parallel.
- Keeping trenches straight, level, and free of debris.
- Removing standing water prior to inspection.

NOTE: *Any trench deeper than 4 feet shall comply with OSHA and WAC 296-155 Part N trench safety requirements.*

Additional Trenching Guidelines

Recommended installation practices include:

- Install trenches as straight as practical.
- Minimize the time trenches remain open.
- Leave unidentified buried utilities undisturbed.
- Contact the utility design engineer if difficult excavation conditions exist.
- Compact backfill and allow for settlement.

NOTE: *Do not pull service conductors until the trench and conduit inspections have passed and the trench has been backfilled.*

Service Conduit Requirements

Clark Public Utilities requires the installation of a continuous conduit from the meter base on the residential structure to the utility source (transformer, secondary pedestal, or pole base).

Electric service conduit shall be:

- Electrical-grade, UL-listed, Schedule 40 gray PVC conduit.
- 3-inch diameter.

Additional requirements:

- Parallel conductors require separate conduits.
- All conduit couplings shall be long bell (deep socket) type.
- All conduit joints shall be glued using PVC cement and allowed to cure per the manufacturer's recommendations.
- Maximum total bend:
  - 270 degrees
  - Up to three 90-degree elbows, including the elbow into the source facility.
- Only manufactured elbows are permitted.
- Heat-bent conduit is prohibited.

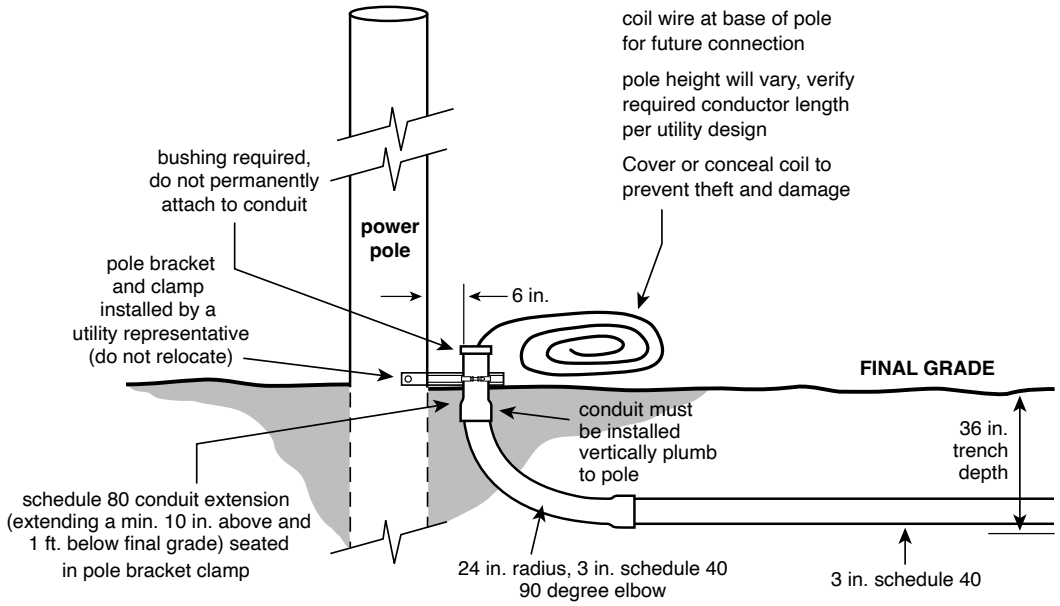
NOTE: *White water pipe, SDR 3034 pipe and ABS sewer pipe are not acceptable.*

Pole Base Installations:

Service to pole base requires: :

- 3-inch Schedule 40 gray PVC elbow
- 24-inch radius sweep
- Schedule 80 extension installed in utility pole bracket assembly *(Figure 3-6)*

Figure 3-6 Electric Service Overhead to Underground Pole Bracket Installation.



NOTE: Where required, ground rods installed at pole bases for new electric service shall comply with NESC requirements.

Service Conductors

Electric Service Conductor Specifications

Acceptable residential service conductors include:

- 4/0 aluminum URD triplex
- 350 MCM aluminum URD triplex

Conductors may be standard or compressed stranding.

NOTE: *COMPACT conductors are NOT acceptable and will not be energized by Clark Public Utilities.*

Table 3-2 Residential Underground Service Conductors

Panel Amps	Conductor Type
0 to 200 amps	4/0 aluminum, URD, triplex
201 to 400 amps	350 MCM or (2) 4/0 aluminum, URD, triplex
401 amps and larger	See utility personnel for details

Conductor Tagging

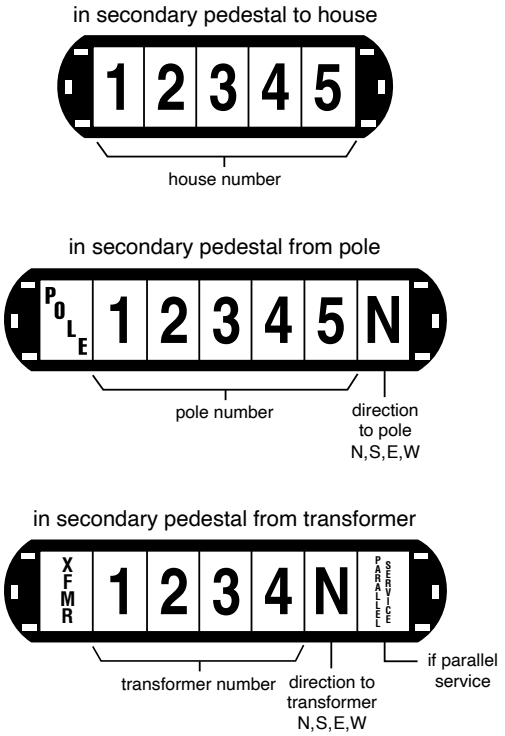
Clark Public Utilities requires Tech Products conductor tags.
Tags shall identify:

- Source equipment
- Pole or transformer number
- Directional designation
- Structure address

NOTE: *Conductor tags shall be secured (zip-tied) below termination blocks on all conductors, including the neutral.*

Visit **clarkpublicutilties.com** to view the **Approved Materials List** and **Secondary Pedestal and Tagging.**

Figure 3-7 Conductor Tagging Detail



Service Entrance Equipment

The exposed conduit between final grade and the meter base is considered customer-owned service entrance equipment.

Installation Requirements

- Meter center height:
  - 5 to 6 feet above finished grade
  - 5 feet preferred
- Maximum one 90-degree bend
- 24-inch minimum bend radius
- Two 45-degree bends are permitted where necessary
- LB fittings or access fittings ahead of the meter are prohibited
- Equipment may be flush-mounted or surface-mounted
- Flush-mounted conduit shall not be installed within shear walls or within 4 feet of building corners

NOTE: *Customer-owned wiring and conduit installations on the load side of the meter shall comply with NEC requirements and are subject to inspection by the AHJ. Conduit sleeves may be required beneath permanent structures such as driveways, sidewalks, decks, patios or retaining walls, as required by the NEC or AHJ.*

Table 3-3 Service Entrance Conduit Sizes

Service Size	Minimum Service Entrance
0-200 amps	2-1/2 inch Schedule 40 gray PVC. A 3-inch conduit preferred
201-400 amps (parallel 4/0 service line)	Parallel 2-1/2 inch Schedule 40 gray PVC conduits. A 3-inch conduit preferred
201-400 amps (350 MCM service line)	3-inch Schedule 40 gray PVC.
Over 400 amps	Parallel 3 inch Schedule 40 gray PVC conduits.

Secondary Pedestal Installation

Where required by the utility-provided design, the customer shall provide and install the secondary pedestal and conductor tagging.

Requirements Include:

- 36-inch trench depth from the pole to the pedestal.
- 36-inch radius sweep elbow at the pole, seated in the pole bracket clamp with the bell end facing downward.
- 24-inch radius sweep elbow inside the pedestal.
- Conductor coiled at the pole base, with length and size as specified in the utility-provided design.
- Conductor tags securely zip-tied to line and load conductors, including the neutral.
- All conductors landed and terminated.
- Insulating covers installed over termination blocks.
- Backfill placed around the equipment to the indicated grade line.

For additional information, see **Figure 3-7, Conductor Tagging Detail**, **Figure 3-8, Secondary Pedestal Installation Detail**, and review the **Secondary Pedestal and Tagging** guide.

Figure 3-8 Secondary Pedestal Installation Detail

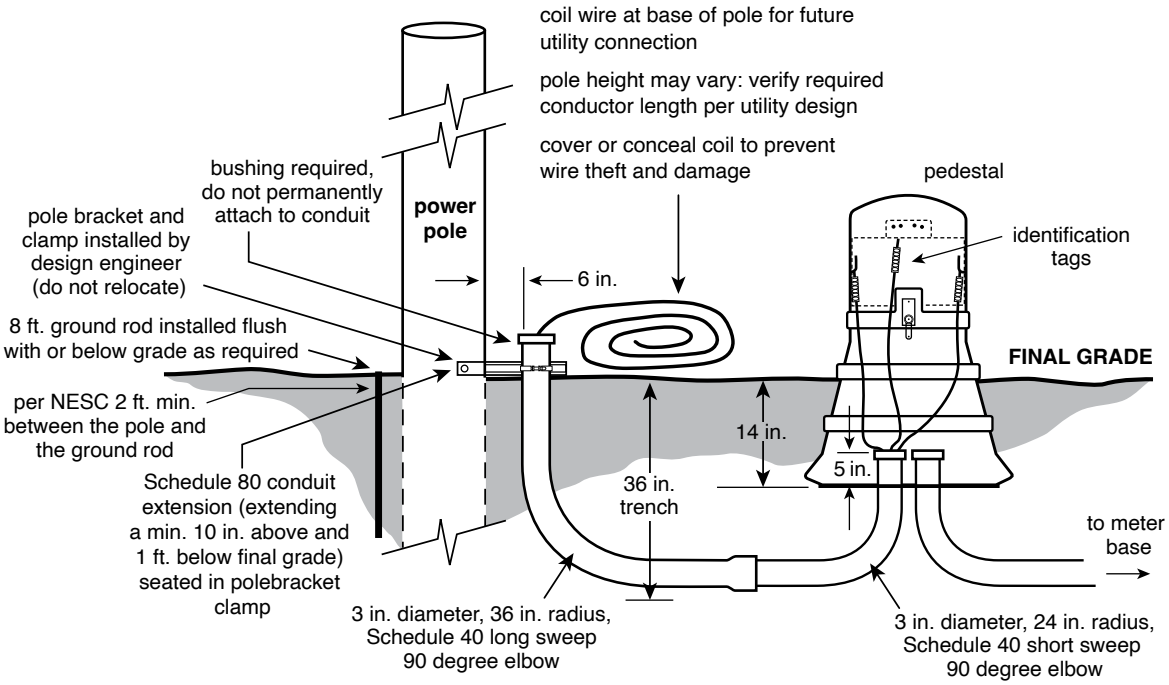


Table 3-4 Source-Specific Installation Requirements

Source Type	Trench Depth	Conduit Termination	Conductor Requirement
Transformer	36”	Continuous conduit	Utility provided
Secondary Pedestal	36”	Continuous conduit	Utility provided
Secondary Pedestal with Conduit Stub-Out	36”	Stub out-continuous conduit	Utility provided
Pole Base	36”	Pole bracket clamp-continuous conduit	Coil length per design

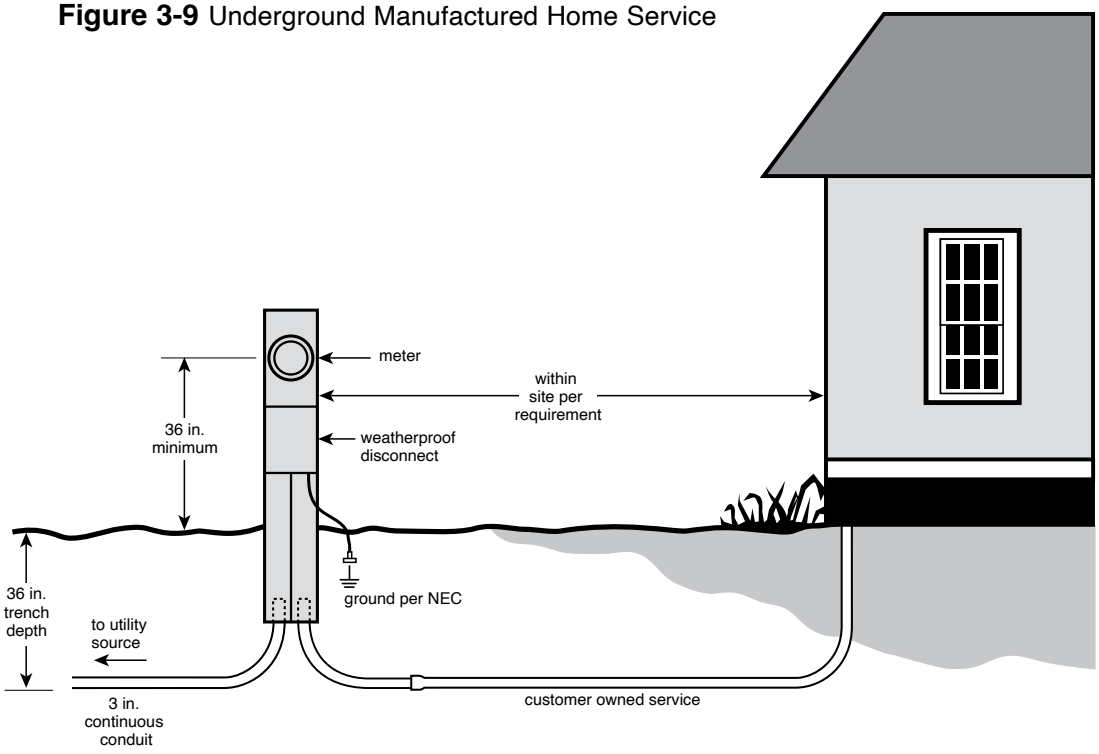
Manufactured Home Service

Underground service to manufactured homes is customer-owned beyond the meter pedestal. Meter pedestal requirements:

- Metal pedestal construction.
- Main disconnect with space for an auxiliary breaker.
- Typical 200-amp service rating.
- Located within sight of the manufactured home it serves, in accordance with applicable NEC, WAC and AHJ requirements.
- Four-wire feeder on load side of the service disconnect.
- Only factory-installed meter bases may be attached directly to manufactured homes.

NOTE: *Manufactured home services must comply with all applicable requirements of the AHJ, including manufactured home placement and permitting requirements.*

Figure 3-9 Underground Manufactured Home Service



Residential Leased Area Lighting

Utility-leased area lights are installed on utility-owned poles and maintained by Clark Public Utilities. Monthly energy and maintenance charges are billed to the customer's electric service account.

The Customer is Responsible For:

- Requesting a leased lighting service through Construction Services.
- Performing trenching where required.
- Requesting utility locates before excavation.
- Installing utility-provided conduit and conductors.
- Requesting inspection.
- Reporting lights that are out or not working properly.

Clark Public Utilities is Responsible For:

- Providing lighting service design.
- Providing conduit and conductors.
- Installing poles and risers where required.
- Completing utility connections.
- Installing light identification tags.
- Maintaining lighting equipment.

NOTE: *Leased area lights shall not be directed over public roadways.*

CHAPTER 4

Primary Line Extension

Single-family residences located more than 200 feet from an existing transformer will require a primary line extension and installation of a new transformer closer to the structure. Primary line extensions are installed as underground facilities.

This chapter outlines the requirements for residential primary line extensions, including trenching, conduit installation, inspections, transformer placement, and work within public rights-of-way (ROW).

Installation Responsibilities

Clark Public Utilities' construction policy requires the customer to hire a utility-approved primary electrical installation contractor (APC) to provide materials and install underground primary line extensions.

A utility design engineer will provide a design including:

- New primary (distribution) voltage facilities required (transformer, secondary pedestal, j-box, riser, etc.).
- Locations of the new distribution-voltage facilities.
- Upgrades to the existing distribution system, if applicable
- A link to a current list of Clark Public Utilities approved primary electrical installation contractors (APC)

The list of APCs is also available on the Clark Public Utilities website at **clarkpublicutilities.com**.

Maintenance Responsibilities

Once the primary line extension is energized by the utility, Clark Public Utilities takes over ownership of the line extension, transformer, secondary facilities, and the electric service to the meter base. The utility is then responsible for repairing and maintaining utility-owned facilities up to the customer-owned service entrance equipment.

Inspection and Coordination

Clark Public Utilities will dispatch a utility inspector to perform inspections of all primary trenches, conduits, conductors, and equipment installations upon request from the APC.

Electric secondary and service trenches, conduits, and conductors, whether installed by the APC, customer, or electrician, are also inspected by the utility prior to backfilling or energization. The customer or electrical contractor is responsible for notifying the utility when the installation is ready for inspection.

Any deviations from the utility-provided electric design must receive prior approval from a utility design engineer before primary inspections can be scheduled.

NOTE: *The APC is responsible for calling and* ***requesting all primary inspections****.*

Site Preparation

The following site requirements must be met before the installation of a new residential service can begin:

- Property lines and surveyed corner pins have been marked in the field.
- County or city-approved site plan is submitted to the utility design engineer and driveway/approach is rocked.
- A utility-provided electric design has been completed for the installation of all primary, secondary, and service-voltage lines and equipment.
- The customer has hired an APC from Clark Public Utilities' current list of approved primary electrical installation contractors to install any primary voltage lines or equipment.
- The APC shall distribute a printed copy of the final approved utility design to all contractors and installers and maintain a copy on site throughout all phases of construction.
- Required easements have been obtained.
- All required permits have been secured (trenching, street crossing, etc.).
- The site is at final grade or acceptable sub-grade around the area of construction.
- The trench route is clear of construction material and any obstructions.

Primary Trench

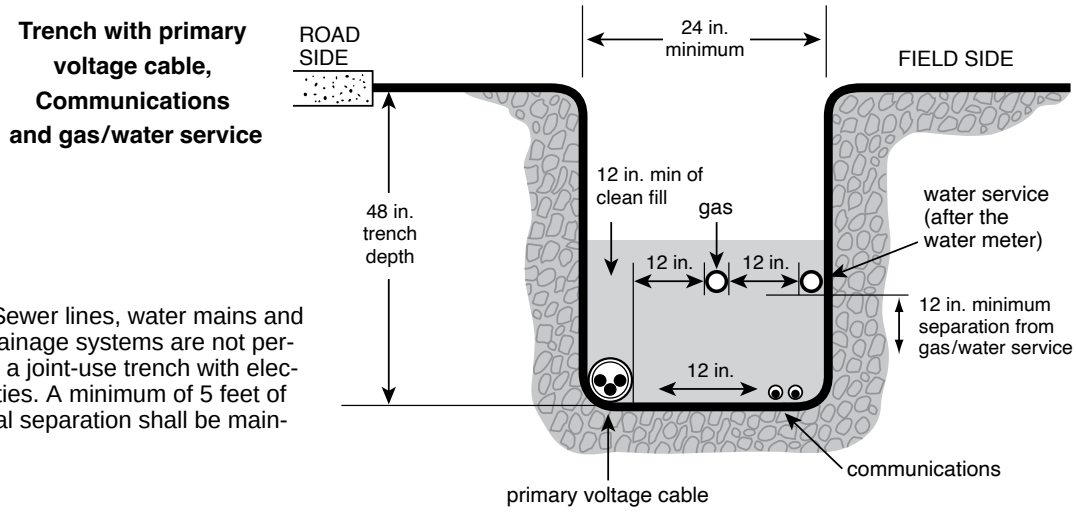
Trench Width and Depth

The primary trench width is 24 inches unless otherwise approved by utility personnel. The excavator may need to increase the trench width to accommodate other conduits and/or lines installed in a joint-use trench. When increasing trench width, maintain a minimum of 12-inch horizontal separation between Clark Public Utilities electric conduits and other utility service lines.

Standard trench depth for primary electric lines is 48 inches unless greater depth is required by permit conditions or the utility-provided design. ***Figure 4-1*** illustrates the utility's width and depth requirements for primary line extension trenches with and without a natural gas/water service line.

It is the excavation contractor's responsibility to ensure compliance with all applicable federal, state, county, and trench safety regulations, as well as permit requirements, including required crossing depths.

Figure 4-1 Typical Utility Trench with Primary Voltage Cable



Trench Excavation Requirements

The following utility trench and excavating requirements must be met before primary electric conduits can be installed:

General Utility Trenching Requirements

- The APC is responsible for ensuring work is performed in accordance with the most recent utility-provided design prior to the start of work. The APC must contact the utility design engineer to verify they have the current design.
- The APC shall comply with all requirements of a ROW work or crossing permit.
- Utility locates must be requested at least two business days in advance and confirmed in place prior to the start of any excavation work.
- All crossings shall be perpendicular to the road.
- All road crossings for electric primary, secondary, and service lines shall be installed at a depth of 48 inches.
- Trenches shall be excavated according to the trench detail ***(Figure 4-1)***, and the utility-provided electric design.
- Primary electric trenches must be at least 5 feet from a structure's footings/foundation.
- Excavation may extend to the energized source transformer: however, the transformer pad or foundation shall not be undermined or disturbed.
- Any trench 4 feet or deeper requires protection and/or shoring per OSHA and WAC 296-155-N.
- Trenches shall be straight and the bottom smooth, level, and free from rocks and construction debris.
- The APC shall remove water from the primary and secondary voltage trenches prior to inspection, either by pumping or draining.
- The APC is responsible for calling the utility to request inspection of the primary trench

Contractor Responsibility for Open Excavations

Open trenches or pits excavated in preparation for future equipment installation shall remain the sole responsibility and liability of the APC from the time of excavation until the trench or pit is properly backfilled or otherwise closed. The APC is required to implement and maintain appropriate safety measures to prevent accidents and unauthorized access.

Acceptable safety measures include, but are not limited to:

- Caution tape
- Safety barrier fence – "snow fence"
- Barricades – "waffle board barriers"
- Plywood covers
- Steel plates or trench covers

These measures must be inspected and maintained regularly by the APC to ensure continued safety and compliance with all applicable regulations.

Plan projects and schedule work to minimize the duration of open excavations, and promptly contact the Operations Office, **ops@clarkpud.com** or (360) 992-8839, to request inspections. Once the utility completes inspections and/or work, they will notify the APC to proceed with backfilling.

Public Right-of-Way (ROW) Work Requirements

Utility work within the public ROW shall comply with Chapter 3 requirements, including permit responsibilities, contractor requirements, roadway restoration, erosion control, and permit compliance requirements.

Additional requirements for primary line extension work include:

- Standard trench depth is 48 inches unless greater depth is required by permit conditions or the utility provided design.
- Work within WSDOT ROW requires a minimum of 5 feet of cover above the top of the conduit.
- The APC may subcontract excavation work to a licensed excavation contractor. The APC remains responsible for coordinating all primary line extension work performed within the ROW.
- Primary inspections (trench/conduit and cable) shall be requested by the APC.

Horizontal Directional Drilling (HDD)

Horizontal directional drilling (HDD) used for primary electric line installations, electric service installations, and road or driveway crossings, shall meet the following requirements:

Primary electric line installations or crossings

- The APC shall contact the utility design engineer a minimum of two weeks prior to starting work to obtain site approval and verify the current design.
- If HDD work is performed by a subcontractor, it shall be under the direction of the APC.
- The APC shall remain the sole point of contact with the utility design engineer and retain full responsibility for the HDD installation, including coordination, compliance, and initiation of required inspections.
- A pre-construction meeting may be required to review the HDD route and construction details.
- The APC shall provide a copy of the bore log to the Operations Office at **ops@clarkpud.com** when requesting the trench/conduit inspection.

Electric service installations or crossings

- The HDD contractor retained by the customer shall contact the utility design engineer a minimum of two weeks prior to starting work to obtain site approval and verify the current design.
- The HDD contractor shall be responsible for coordination and compliance related to the service installation.
- The HDD contractor shall provide a copy of the bore log to the Construction Services department **construction@clarkpud.com** when requesting the service trench/conduit inspection.

General HDD requirements

- The HDD route must be reviewed and approved by the utility design engineer prior to the start of construction.
- Review and compliance with Utility Standard HDD1 prior to construction.
- Compliance with all utility requirements and permit regulations set by the AHJ.
- All road and driveway crossings shall be installed perpendicular to the road or driveway.
- Utility locates must be requested and confirmed in place prior to the design engineer's review and approval of the trench route, and before the start of HDD.
- Road crossing and ROW work permits have been secured prior to the start of work.
- Conduit shall be gray in color.

- Conduit must meet wall thickness requirement of SDR13.5 or Schedule 80.
- Installation shall use approved mechanical couplings for all HDPE-to-PVC transitions. See the utility's **approved materials list**.

Primary Voltage Conduit

Clark Public Utilities requires the installation of a continuous conduit for all primary voltage conductors. Conduit is installed by an APC hired by the customer. The APC is responsible for contacting the utility and requesting the conduit inspection.

See **Chapter 3, Residential Underground Services** for general conduit requirements applicable to residential electric services.

Primary Conduit Requirements

- Electrical-grade, UL-listed, Schedule 40 gray PVC conduit.
- 2-inch diameter for single-phase primary conductors.
- All conduit couplings shall be long bell (deep socket) type.
- All conduit joints shall be glued using PVC cement and allowed to cure per the manufacturer's recommendations.
- A maximum of 270 degrees of total bend is allowed in the primary conduit run. This allows up to three 90-degree elbows, including the elbow into the source facility. The total allowable degrees of bend for the project will be indicated on the utility-provided design.
- Only manufactured elbows are permitted.
- Heat-bent conduit is prohibited.
- Overhead-to-underground residential primary installations require a 2-inch, 36-inch radius, Schedule 40, 90-degree elbow seated in the trench and a Schedule 80 conduit extension installed in the pole bracket clamp attached to the base of the pole ***(Figure 4-2)***.

NOTE: *Primary cable shall not be installed until the trench and conduit inspections have passed and the trench has been backfilled.*

Primary Cable

The APC shall request any required standbys, provide and pull the cable, and request a primary cable and makeup inspection. A Clark Public Utilities representative will inspect the primary and secondary cables leading to and connecting with utility-owned source equipment, and the service line up to the customer-installed meter base and service entrance. The AHJ will inspect the residential metering equipment, service entrance, electrical panel and branch circuits beyond the meter.

General Primary Cable Handling Details

- Pulls over 450 feet require a pulling calculation.
- Do not pull cable until the primary trench and conduit have passed utility inspection and the trench is backfilled.
- When pulling cable into energized equipment, a primary standby is required. Only qualified utility personnel may open, enter, or manipulate energized primary equipment.

- Cable pulling equipment shall be set up at the un-energized equipment (e.g., transformer, junction box, etc.).
- Always pull primary cable from the energized source facility to the newly installed, un-energized (or de-energized existing) equipment.

  NOTE: *Pulling cable towards the energized source is only permitted if explicitly specified on the utility-provided electric design.*

- The APC is required to contact the Operations Office at **ops@clarkpud.com** or (360) 992-8839 at least two business days prior to the start of work to schedule a primary standby.
- Cable pulled into any un-energized utility equipment requires termination and tagging completed by the APC.
- All primary cable pulls require the use of utility-approved lubrication.

The table below indicates the minimum amount of lubricant required based on the total pull footage.

Table 4-1 Cable Pulling Lubricant

Maximum Length (ft)	1 – 1/0 Cable in 2" Conduit		3 – 1/0 Cables in 4" Conduit	
	Minimum Gallons	Minimum Quart Front-End Packs	Minimum Gallons	Minimum 1/2 Gallon Front-End Packs
70	0.25	1	0.5	1
150	0.50	2	1.0	2
225	0.75	3	1.5	3
300	1.00	4	2.0	4
375	1.25	5	2.5	5
450*	1.50	6	3.0	6

**For every additional 75 feet beyond 450 feet, add:*
-1 quart for 1-1/0 conductor in 2" conduit
-1/2 gallon for 3-1/0 conductors in 4" conduit

Primary Voltage Installations to Utility Pole Bases

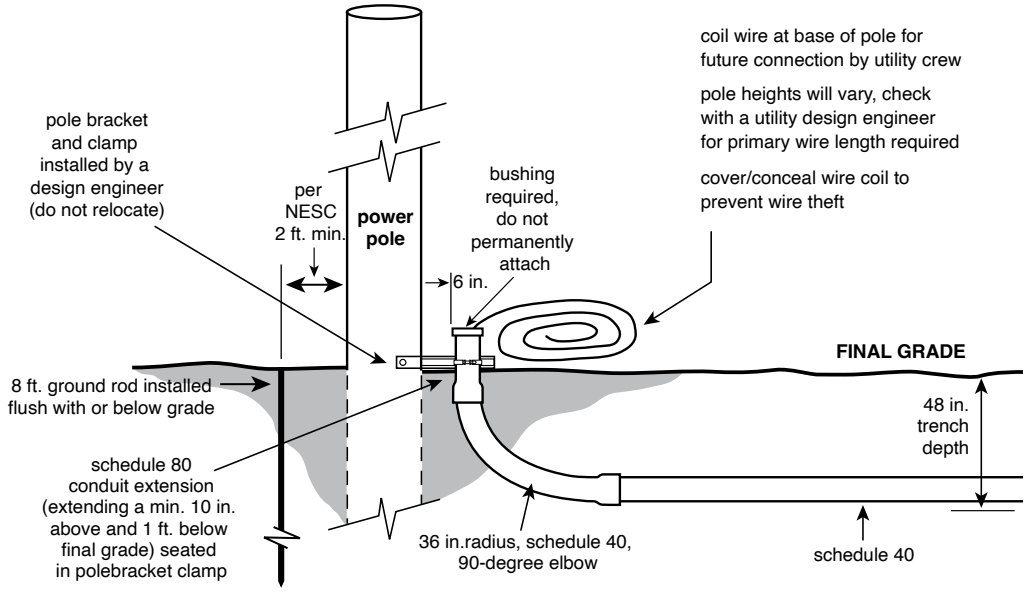
A utility representative will install a pole bracket and clamp assembly at the base of the source pole. The APC is responsible for providing and installing the following equipment up to Clark Public Utilities' pole bases ***(Figure 4-2)***:

- A 48-inch depth trench extending to and exposing the pole base.
- Conduit and wire as outlined in the utility-provided electric design.
- A schedule 40 conduit elbow properly seated in the trench adjacent to the pole base.
- A schedule 80 conduit extension installed in the utility pole bracket clamp assembly attached to the pole base. All exposed conduit, both above grade and extending at least 1 foot below grade at the pole base, must be electrical-grade, UL-listed, gray, schedule 80 PVC.
- A primary junction box, when specified in the utility-provided design.
- An approved ground rod, in accordance with the National Electrical Safety Code (NESC), for utility connection of the pole ground wire when one is not already present ***(Figure 4-2)***. Refer to the **approved materials list** for acceptable materials.

Additional Pole Base Installation Information

- Do not trench to or install primary cable to a utility pole that does not have a pole bracket assembly installed. Contact the utility design engineer to install or reattach the assembly.
- Do not remove or relocate a utility-installed pole bracket assembly.
- Pole heights vary. Contact the utility design engineer for the required wire coil length.
- Cover wire coils left at pole bases to prevent wire theft.
- Schedule work to minimize the time that wire is coiled at the pole base. Promptly contact the Operations Office at **ops@clarkpud.com** or (360) 992-8839 to request inspections.

Figure 4-2 Primary Voltage Overhead to Underground Pole Bracket Installation



NOTE: Install ground rod according to the NESC.

Trench Backfill Requirements

Clark Public Utilities will not energize electric facilities until all primary trenches are backfilled to final grade by the APC.

Once primary inspections are complete, the APC is responsible for the following:

- Allowing PVC cement to cure according to manufacturer's recommendations prior to backfill.
- Completing backfill as soon as practical after facilities are placed and inspected.
- Carefully placing backfill to prevent damage or movement of the conduit(s).
- Providing a minimum 12-inch bedding of clean cover (rocks no larger than 5/8-inch) over power conduits.
- Ensuring all backfill is free of rocks larger than 5 inches and foreign materials/objects.
- Installation of caution tape may be required on certain projects.
- Backfilling with controlled density fill (CDF)/select backfill when required by utility personnel.
- Completing backfill up to and around customer-installed elbows attached to the pole bracket assembly ***(Figure 4-2)***.
- Relocation costs due to change in grade or alignment.

NOTE: *Do not pull primary cable until the trench and conduit inspections have passed and the trench has been backfilled*

Transformers

Transformer Sizing

Transformer sizing is determined by a utility design engineer using load information supplied by the customer.

Transformer Location and Access

Underground electric facilities must remain readily accessible to utility personnel during construction and for future operation and maintenance. The area around pad-mounted electrical equipment must provide clear, level working space and remain free of obstructions such as landscaping, fences, retaining walls, structures, posts, and similar items.

Prior to the installation of any pad-mounted equipment, the job site requires:

- Survey and staking of property lines.
- Excavation to final grade.

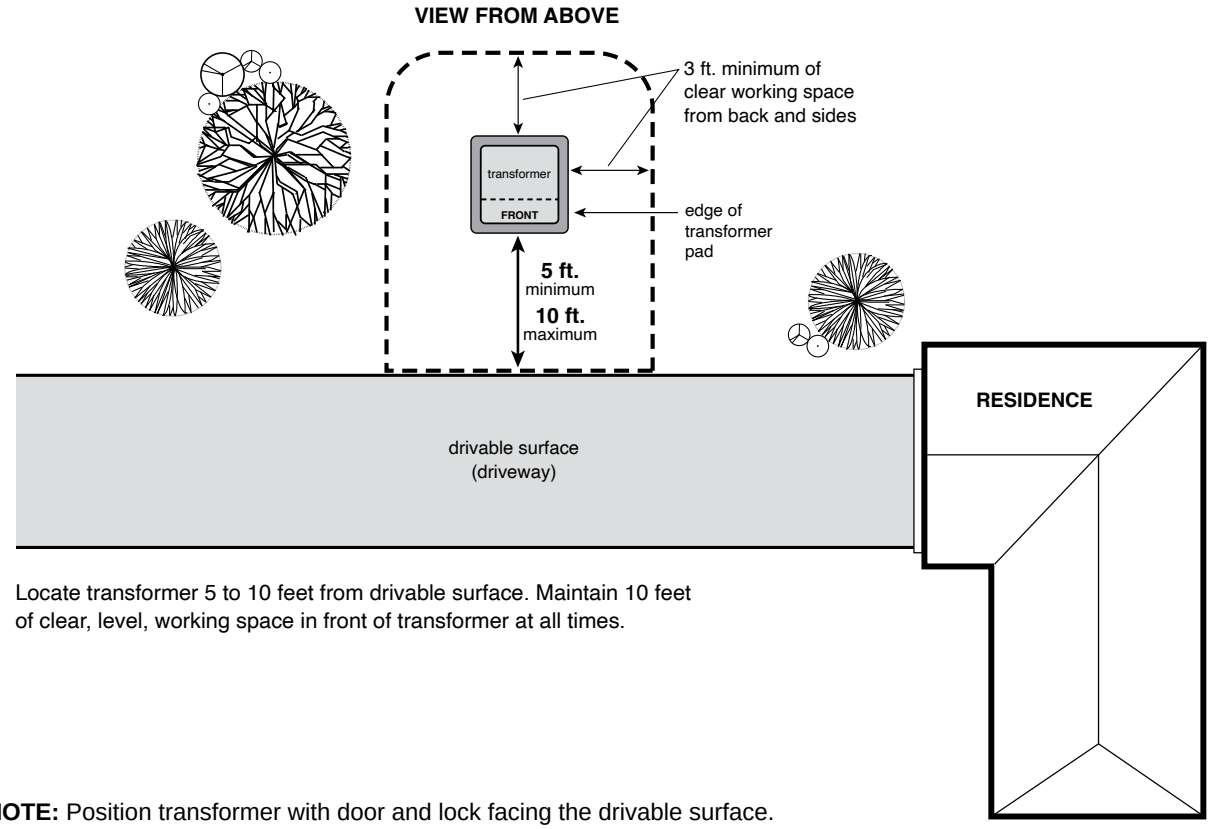
All transformers and pad-mounted equipment are to be located:

- Within 10 feet of a drivable surface but not closer than 5 feet ***(Figure 4-3)***.
- With the front of the equipment (door and lock side) facing toward the drivable surface.
- With the transformer pad parallel to the edge of the drivable surface.

Minimum working clearances shall be maintained with 10 feet of clearance in front of the equipment and 3 feet of clearance from the back and sides ***(Figure 4-3)***.

Transformers installed on slopes or hillside locations may require retaining walls, protective barriers, or other site stabilization measures as determined by the utility design engineer. Additional clearances and access requirements may apply.

Figure 4-3 Residential Pad-Mounted Transformer Location and Access



Locate transformer 5 to 10 feet from drivable surface. Maintain 10 feet of clear, level, working space in front of transformer at all times.

NOTE: Position transformer with door and lock facing the drivable surface.

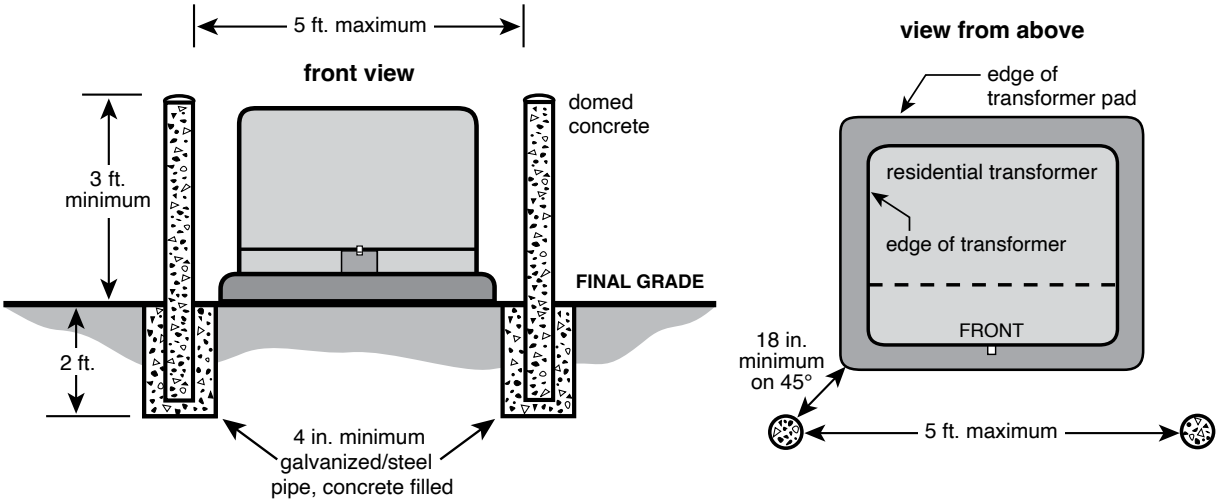
Guard Post Installation

The installation of guard posts (bollards) may be required when electrical equipment is exposed to vehicular traffic. It is the customer's responsibility to supply, install, and maintain guard posts when required by Clark Public Utilities personnel ***(Figure 4-4)***.

Materials and installation requirements:

- 5-foot by 4-inch (minimum and preferred) galvanized or steel pipe.
- Set each post a minimum of 24 inches deep.
- Fill posts with concrete.
- Posts set in stable soil are to be surrounded by 6 inches of concrete.
- Use 12 inches of concrete around each post in areas with unstable soil or sand.
- If several guard posts are used, locate them no more than 5 feet apart, or as otherwise specified by a Clark Public Utilities representative.
- Single-phase pad-mounted transformers and other electrical equipment require two bollards, with one bollard installed at each front corner on the opening side of the equipment.
- Install yellow, smooth finish, bollard sleeve(s) or paint exposed section of post "traffic yellow."
- See utility standard UTP9, for additional information.

Figure 4-4 Guard Post (bollard) Installation for Residential Transformers

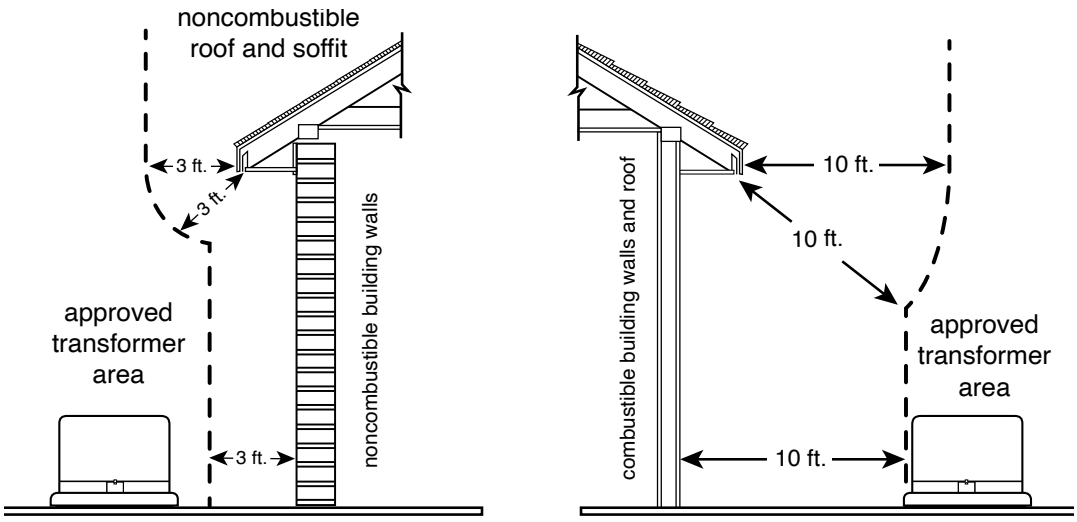


Safety Clearances Around Transformers

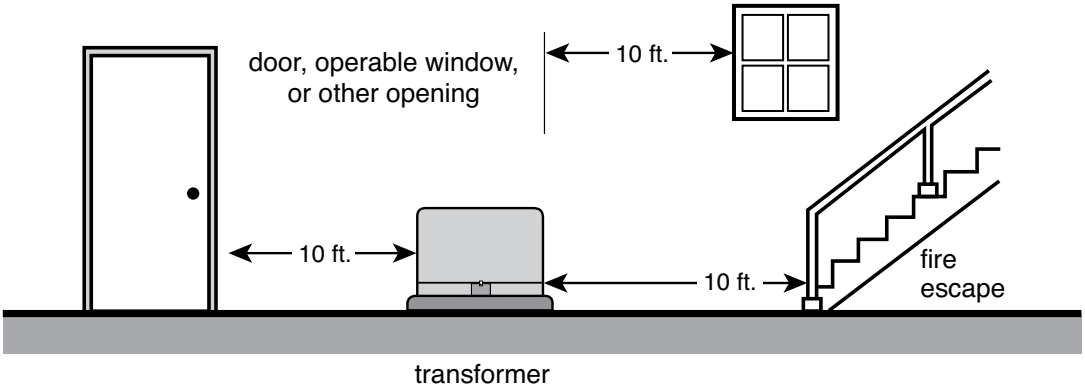
Clearances from pad-mounted transformers to structures are measured from the nearest metal portion of the transformer to the structure or any overhang. The required clearance from a building is 10 feet for combustible walls and 3 feet for non-combustible walls, as shown in ***Figure 4-5***. The required clearance area must remain unobstructed. ***Table 4-2*** provides additional safety clearances that apply to all oil-filled electrical equipment.

NOTE: *Transformer clearances are measured to the nearest portion of any roof, balcony, deck, or similar overhang, regardless of the construction material. Overhangs shall not extend directly above or into the transformer clearance zone.*

Figure 4-5 Residential Pad-Mounted Transformer Minimum Safety Clearances



NOTE: Roof overhangs, balconies, decks, and other structural projections shall not encroach into the approved transformer clearance zone, including the space above the transformer.



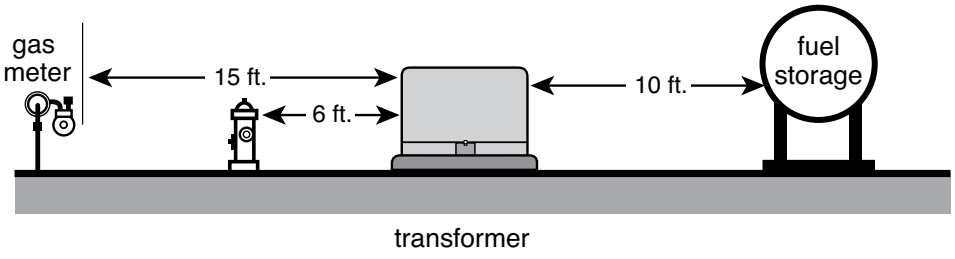


Table 4-2 Pad-Mount Transformer Safety Clearances

Feature	Clearance distance
Combustible walls or roof (including stucco, hardiplank or equivalent)	10 ft.
Non-combustible walls provided the side of the transformer facing the wall does not have doors. Materials that pass UBC standard 2-1 or ASTM E136-79 are considered to be non-combustible.	3 ft.
Doors, windows, vents, fire escapes, and other building openings	10 ft.
The water's edge of a swimming pool	15 ft.
The water's edge of a natural or manmade open body of water	25 ft.
Facilities used to store hazardous liquids or gases (e.g. service station fuel storage tank or permanent oil/gas/propane tanks)	10 ft.
Storage tank and service facility filling points and relief vents, including natural gas meters or threaded gas service piping	15 ft.
Well water system wellhead	15 ft.
Fire sprinkler valves, FDC standpipes and fire hydrants	6 ft.

NOTE: *Electrical clearances do not supersede any environmental permit requirements, clearances or reviews.*

CHAPTER 5

Residential Metering

This chapter outlines metering equipment requirements for new or upgraded residential electric services. Contact your utility design engineer or the Meter Department Coordinator at (360) 992-8001 with questions regarding residential electric service metering.

General Residential Metering Responsibilities

The following information applies to all metering systems installed for Clark Public Utilities residential customers.

Clark Public Utilities Responsibilities:

The utility is responsible for furnishing, installing, and maintaining the following residential metering equipment:

- Self-contained and CT-rated meters.
- Current transformers (CTs), if applicable, and associated CT meter wiring.

NOTE: *Only qualified and authorized Clark Public Utilities personnel shall unlock, remove, install and seal meters and related metering equipment.*

Customer Responsibilities

The customer is responsible for providing, installing, and maintaining the following residential meter equipment attached to a customer-owned structure:

- Meter base.
- CT enclosure, if applicable.
  - CT mounting base.
  - Metering conduit between the CT enclosure and meter base.
- Equipment grounds per the NEC.

Residential Meter Bases

The following general requirements apply to all residential meter bases required by the utility and installed by the customer:

- Ring-type meter socket enclosures.
- Rated for exterior use and rain-tight.
- UL-listed.
- Meets NEC requirements.
- All unused openings in the enclosure shall be tightly sealed from the inside of the meter base.
- Installed level, plumb, and securely fastened to a rigid structure being served.

NOTE: *The requirements for each job site vary. A utility design engineer will provide a service design that includes guidance on metering requirements.*

Grounding Requirements

All customer-owned and installed meter equipment, including meter bases, CT enclosures, and conduit, shall be bonded and grounded by the customer in accordance with the NEC and the requirements of the Authority Having Jurisdiction (AHJ).

Service Inspection and Approval

The customer is responsible for securing the electrical wiring permit and requesting an electrical inspection. Once the metering equipment, service entrance, and panel are installed, the AHJ must approve the installation before the utility energizes the service. Once the installation is approved, the customer shall notify the utility that electrical inspection approval has been obtained.

Contact Construction Services at **construction@clarkpud.com** or (360) 992-8558 to report inspection approval. Clark Public Utilities will not connect a new residential electric service without notification of electrical inspection approval.

Additional Customer Equipment

Customer-owned equipment, such as a load monitoring devices or transfer switches, shall not be installed within a meter base or CT enclosure.

All customer-owned equipment shall be installed:

- On the load side of the meter, either within the customer's service panel or in a separate enclosure located between the meter base and the service panel.
- With all utility meter equipment installed ahead of the emergency disconnect.
- So that the continuous rating of the service disconnect does not exceed the rating of the meter base.

NOTE: *See Section **320-Amp Continuous Service** for additional requirements.*

Meter Equipment Locations

Clark Public Utilities requires residential meter bases and CT enclosures to be mounted on the exterior of the permanent structure containing the load being served. These requirements also apply to meter bases installed on outbuildings, garages, well houses and other structures that do not provide living space.

This location must remain free of obstruction and allow 24-hour access to utility personnel for meter reading, testing and maintenance. All meter equipment locations are subject to approval by a utility design engineer prior to installation.

Approved Residential Meter Equipment Locations

- On the exterior of the structure being served.
- On the ground floor, with the center of the meter 5 to 6 feet above finished grade (5 feet preferred).
- On the front one-third of the home closest to normal public access.
- In an area that is not subject to being fenced in or enclosed.

- If the meter is not located on the building it serves, it may be installed on another customer-owned structure. This type of installation requires prior approval from a utility design engineer.

Contact your utility design engineer to review any unique conditions or requirements prior to installation of meter equipment.

These locations allow Clark Public Utilities to:

- Read the meter.
- Maintain the meter.
- Disconnect the service in case of emergency.

Do Not Locate Meter Equipment

- On poles owned by Clark Public Utilities.
- On customer-owned wood poles or posts (only temporary electric service meter bases may be installed on customer-owned wood poles or posts).
- Where shrubs or landscaping could obstruct access.
- Above stairways or window wells.
- Outside of bedroom or bathroom windows and doors, to respect customer privacy.
- Inside breezeways or fenced areas.
- On mobile structures such as a trailer.

Clearance Requirements for Metering Equipment

Meter clearances are measured from the center of the meter socket or the center of the meter face. The customer is required to provide and maintain these clearances at all times.

The following clearances are required for all residential meters installed on a structure:

- The center of the meter shall be between 5 to 6 feet above finished grade (5 feet preferred).
- A clear working space, 3 feet deep ***(Figure 5-1)*** in front of the meter and/or CT enclosure. This space is to be kept clear of any obstructions including landscaping.
- 10-inch minimum horizontal and vertical clearance shall be maintained between the center of the electric meter and any obstruction ***(Figure 5-2)***.
- If a flush or recessed meter base is installed, siding or finished surface materials shall not overlap the meter base cover.
- Do not apply caulking or sealant along the meter base cover seam. The cover shall remain accessible for utility personnel and must remain removable for inspection, maintenance, or service without removing sealant. If sealant is removed for access, the customer is responsible for reapplying caulking.
- The opening around a flush or recessed meter base shall extend a minimum of 3 inches.
- Electric meters installed near natural gas meters or threaded service piping shall maintain a minimum horizontal clearance of 3 feet.

NOTE: *Enclosing residential electric meters is prohibited.*

Figure 5-1 Meter Equipment Minimum Work Clearances

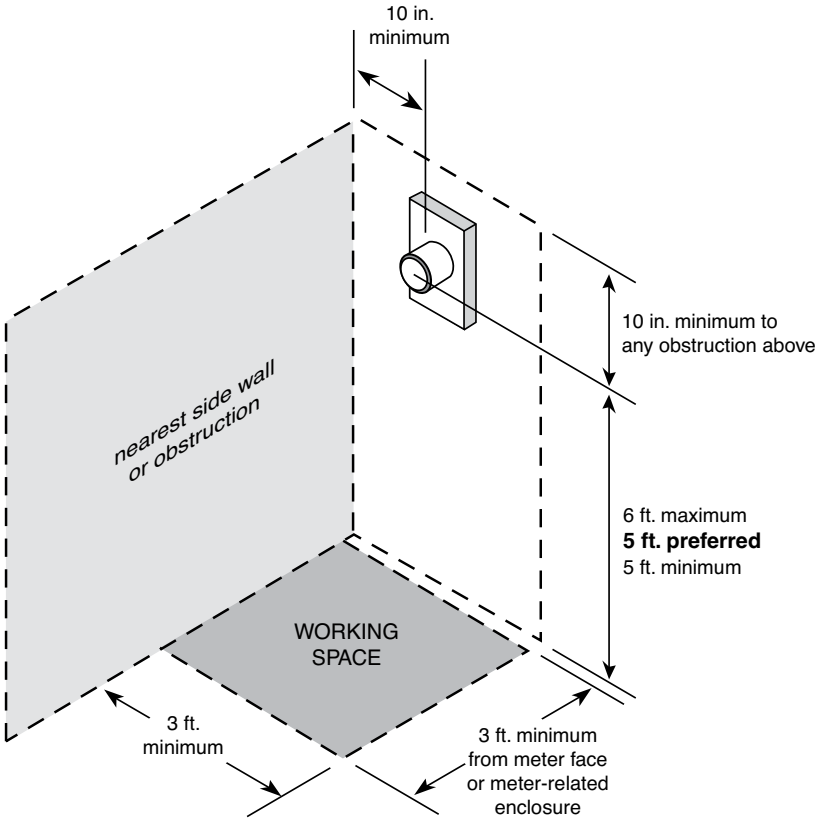
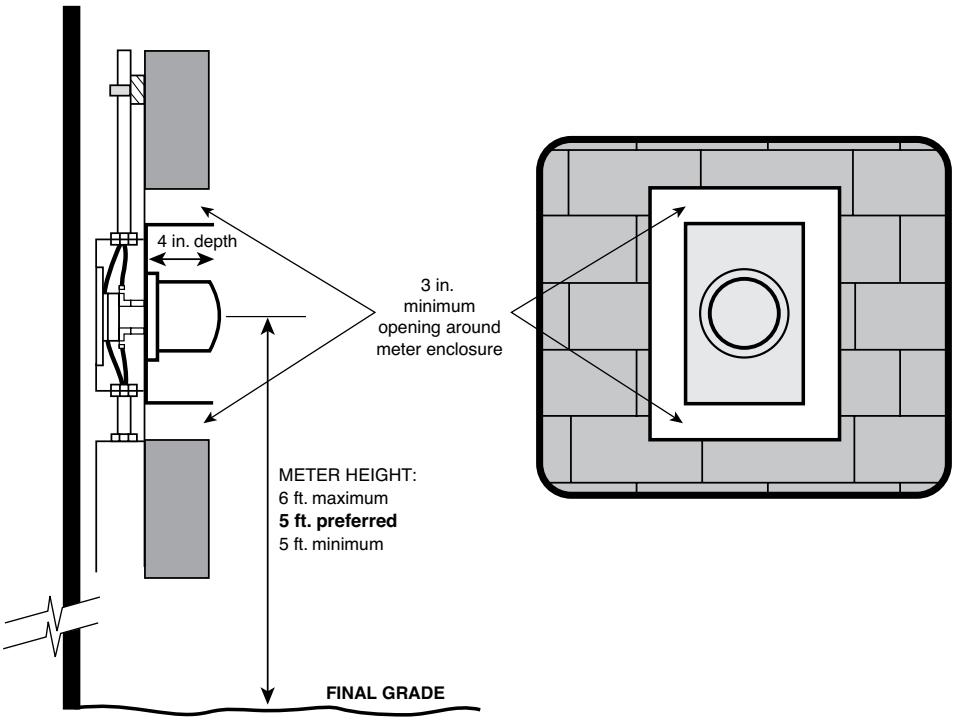


Figure 5-2 Recessed Meter Base Detail



Meter Base Installation Tips

When installing a residential meter base, the following mechanical checks will help ensure proper installation.

After installing the meter base, verify:

- Conductors are not under undue strain at the terminals.
- Terminals are rated for the size and type of conductor required.
- No conductor strands have been removed to make conductors fit undersized terminals.

200 Amp Services

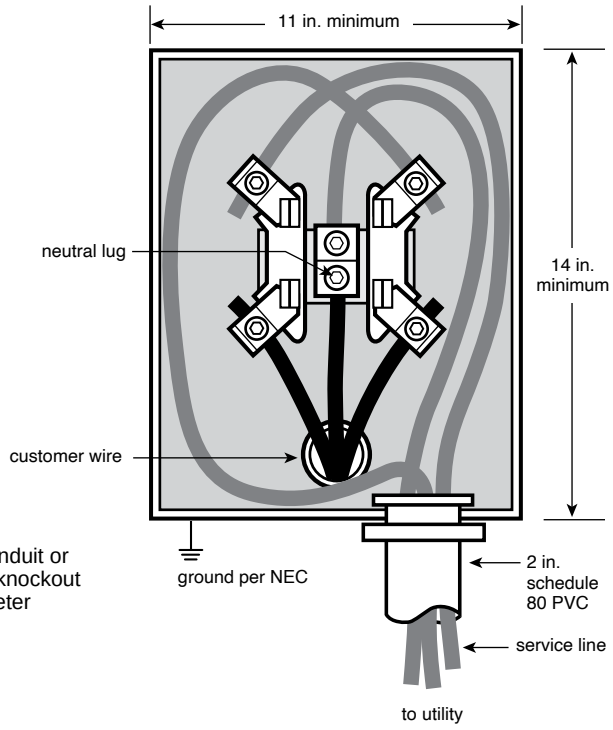
A 200-amp meter base is a meter socket designed for standard residential electric service. It is rated for 120/240-volt, single-phase service and is the most commonly installed service size for single-family homes. This type of service is typically adequate for homes with a living area of less than 3,000 square feet.

Service size requirements may vary depending on total connected load, including appliances, heating and cooling systems, EV chargers, or other high-demand equipment. The customer is responsible for determining load requirements and notifying the utility design engineer of the appropriate service size.

In addition to the meter base requirements mentioned earlier in this chapter, meter bases for 200-amp underground services shall:

- Be rated for 120/240 volts and 200 amps.
- Contain four meter jaws and a connection point for the neutral conductor.
- Accept a minimum 2 1/2-inch gray PVC conduit.
- Have lugs (electrical connectors) that are marked to accept 4/0 aluminum conductors.

Figure 5-3 Typical 200-Amp Meter Base



NOTE: Do not route service conduit or conductors through the center knockout located on the bottom of the meter base.

Outbuildings

Meter bases for 200-amp or smaller services supplying residential-use outbuildings, including garages, shops, single-family wells, or non-commercial barns, shall meet all applicable requirements for 200-amp services outlined in this handbook, the NEC, and the local AHJ.

Outbuildings intended for commercial or multifamily use, including professional shops, ADUs, community wells, security gates, or lighted entrance signs, are subject to additional requirements. Refer to the Commercial Electric Service Handbook available at **clarkpublicutilities.com** or contact Construction Services at **construction@clarkpud.com** or (360) 992-8558 for additional information.

320-Amp Continuous Service

A Class 320 meter base is designed for residential services with a maximum continuous load of 320 amps at 120/240 volts. These meter bases are commonly used when a standard 200-amp service is insufficient, such as for larger homes, properties with detached shops, accessory buildings, multiple distribution panels, EV chargers, or large HVAC loads.

Although commonly referred to as a "400-amp" meter base, the service is limited to a maximum continuous load of 320 amps due to the 80 percent continuous load rating limitation. A typical installation consists of two 200-amp panels, each with a maximum continuous load rating of 160 amps. Customers shall not size connected loads assuming 400 amps of continuous capacity.

A Class 320 meter base is commonly used for applications such as:

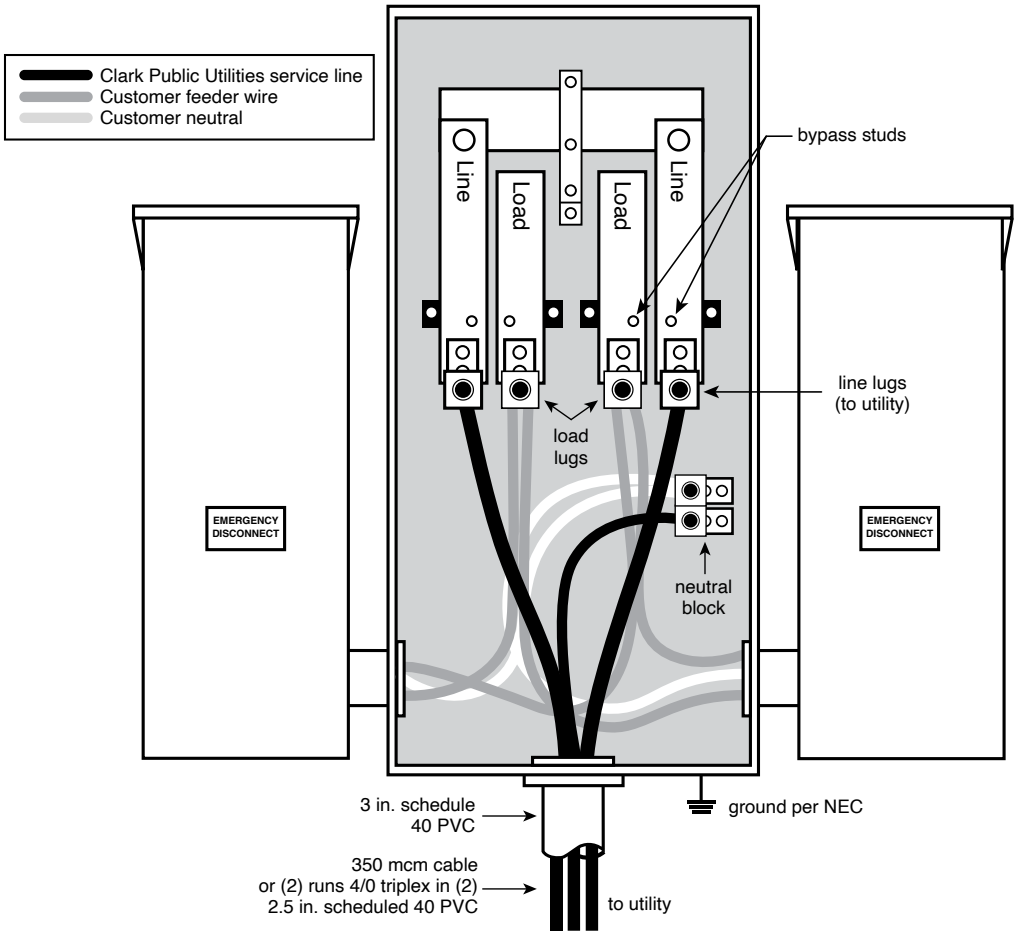
- Supplying a 200-amp main panel and an additional panel serving a detached shop or accessory building.
- Feeding multiple distribution panels from a single utility meter.
- Supporting larger residential electrical loads while maintaining a single service connection and utility bill.

In addition to the meter base requirements listed earlier in this chapter, a Class 320 meter base shall have:

- A rating of 120/240 volts, 320 amps continuous.
- Four meter jaws and one neutral connection point.
- A utility-approved Class 320 manual bypass meter socket.
- A service disconnecting means, either separate or integrated within a utility-approved meter-main combination.

NOTE: *CT metering is required when the combined continuous load rating of all service disconnects exceeds 320 amps.*

Figure 5-4 Class 320-Amp Residential Meter Base



Services Greater Than 400 Amps

For residential electric services exceeding 400 amps (320 amps continuous), current transformer (CT) metering is required. CT metering is used to safely and accurately measure higher electrical loads that cannot be directly metered with standard, self-contained meter bases.

All 120/240-volt services above this threshold must be equipped with a CT meter base and associated equipment, including a CT enclosure, conduit, and a bus bar CT mounting bracket. All CT metering components must be installed on the exterior of the structure in accordance with utility requirements. CT metering is available following design approval and is provided at an additional cost. The utility provides and installs the CTs, CT wiring, and meter.

Customers are responsible for coordinating CT installation by contacting the Meter Department Coordinator, **meterdepartment@clarkpud.com** or (360) 992-8001 to schedule CT delivery and installation, and to ensure proper setup of all required equipment.

The CT metering equipment installed by the customer shall meet the following general requirements:

- Securely mounted, plumb and level on the exterior of the structure.
- Rated for exterior use, rain-tight and NEMA 3R-rated.
- 6-jaw meter socket (Eaton part number 926 or equivalent) installed with the center of the meter between 5 and 6 feet above finished grade (5 feet preferred).
- CT enclosure minimum dimensions of 30 inches X 36 inches x 11 inches.
- 6-foot maximum height to the top of the CT enclosure.
- No knockouts are permitted on the top of the CT enclosure.
- A meter base is not permitted above or below a CT enclosure.
- Bottom of CT enclosure shall be a minimum of 18 inches above finished grade.
- Enclosure shall have a single, side-opening hinged door with sealing provisions.
- Factory-installed hinges shall be located on the side of the enclosure opposite the meter socket. The door shall open away from the meter base to ensure clear working clearance.
- Permanent LINE and LOAD labeling shall correspond with the appropriate connections inside the CT enclosure.
- Grounding and bonding of the CT meter base and CT enclosure shall comply with the NEC and requirements of the local AHJ.

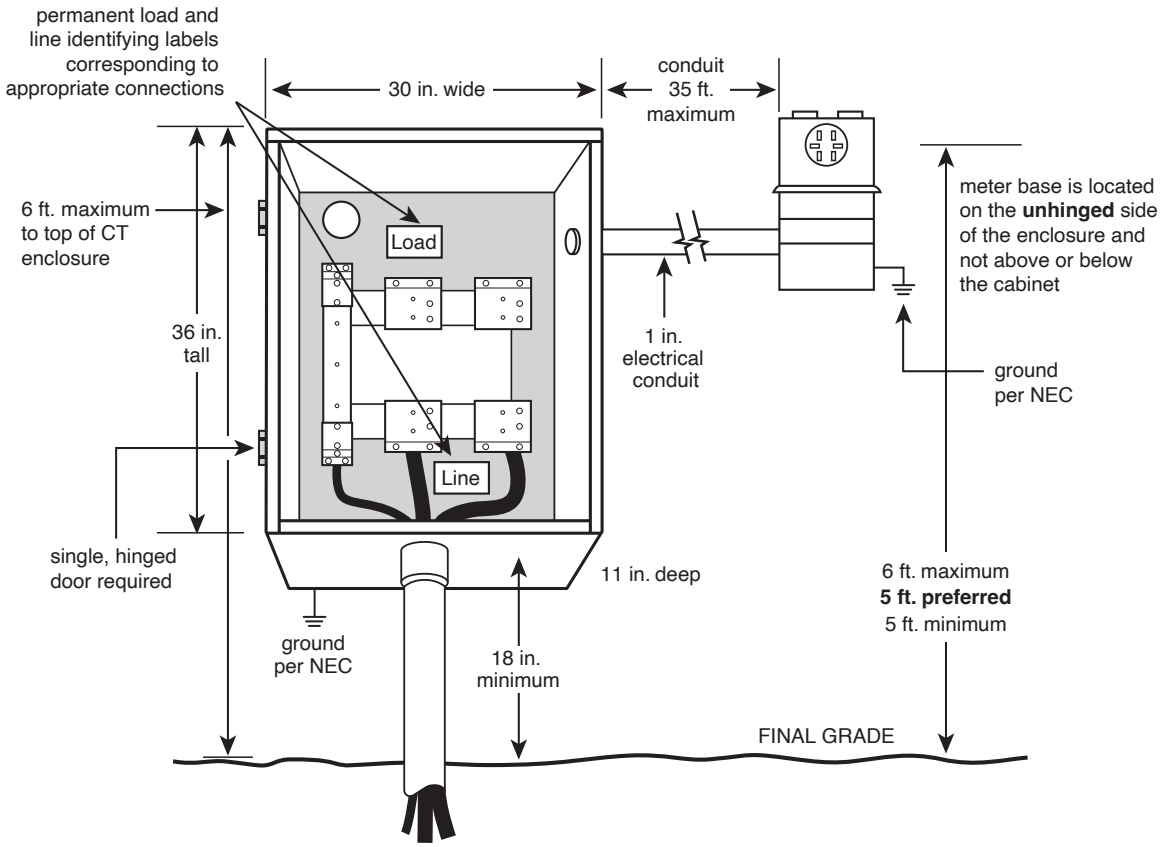
NOTE: *A CT enclosure shall not be used as a junction box or bus gutter for feeding other services.*

CT Metering Conduit

Customer-installed conduit between the meter base and CT enclosure shall meet the following requirements:

- 1-inch electrical conduit.
- Schedule 80 PVC or rigid galvanized conduit (flexible conduit is not acceptable).
- Grounding bushings at both ends of the run if galvanized conduit is used.
- A maximum length of 35 feet between the enclosure and meter base (pull cord or string required for runs over 10 feet).
- Conduit installed with no more than three 90-degree elbows in the total run (270 degrees total).
- A continuous run with no conduit bodies (LB fittings, condulets, etc.).

Figure 5-5 Typical 401-800-Amp Single-Phase Current Transformer (CT) Metering



NOTE: For additional information, see EUSERC drawing 328B.

CT Mounting Base

Installation requirements for CT mounting bases are as follows:

- The mounting base fault current rating shall be sufficient for the available fault current at the installation location and for the intended application.
- The mounting base shall be EUSERC-listed.
- The customer shall furnish all lugs and terminate all line-side and load-side conductors to the bus.

Residential Multi-Unit Meter Labeling (ADU, Duplex)

Multiple meter equipment (grouped, ganged, or meter pack) installed for ADUs or duplexes shall be permanently labeled to clearly identify the unit/suite and address of the structure being served. Proper labeling ensures accurate billing, worker safety, and the ability to disconnect the correct unit during an emergency or for maintenance.

Residential meter packs with two or more meters must have permanent labels on the meter disconnect and inside the corresponding breaker panel. Before electric meters will be set, the customer/electrician is responsible for ensuring that all meter equipment is labeled appropriately as outlined below:

- The meter disconnect and electrical panel shall be permanently labeled.
- Marker tape or permanent markers are not acceptable for permanent labeling of meter bases or disconnects.
- When the project is complete, unit doors must be permanently labeled and correspond to meter equipment labeling.

NOTE: *Meter equipment labels described in this handbook are in addition to the labeling requirements of the inspecting AHJ.*

Contact the Construction Services department at **construction@clarkpud.com** or (360) 992-8558 to request meter set(s) when the following is complete:

- The customer has confirmed the final site address as verified in the Clark County GIS database.
- Labeling is completed as outlined below.
- Service(s) are approved/stickered by the inspecting AHJ.
- Interior panel or load center covers shall be removed and left on site.
- Meter base and exterior breaker covers shall not be removed.

General Residential Multi-Unit (ADU, Duplex) Meter Labeling Requirements:

- A minimum of ½-inch letter height is required for all meter equipment labels described.
- Hard plastic, metal or phenolic block labels with raised or engraved letters are required. (These types of labels are available at trophy and sign shops.)
- Numerals/letters and the background must be in contrasting colors.
- Rivets or permanent adhesive must be used to affix identification plates to the metering equipment (WAC 296-46B-100).
- An address label is required at the meter base.
- An address label shall include: house number, direction, street name, street type and unit number.

EXAMPLE: 1000 NE 75 CIR UNIT A

- Meter equipment labels shall correspond to permanent unit/suite numbers attached to or adjacent to corresponding unit doors or suite entrances once the project is complete.
- The interior panel/load center is labeled on the inside with the unit/suite number. A permanent marker may be used for interior unit labeling inside a residential electrical panel ***(Figure 5-7)***.

Figure 5-6 Residential Multi-Meter Packs: Duplex or ADU

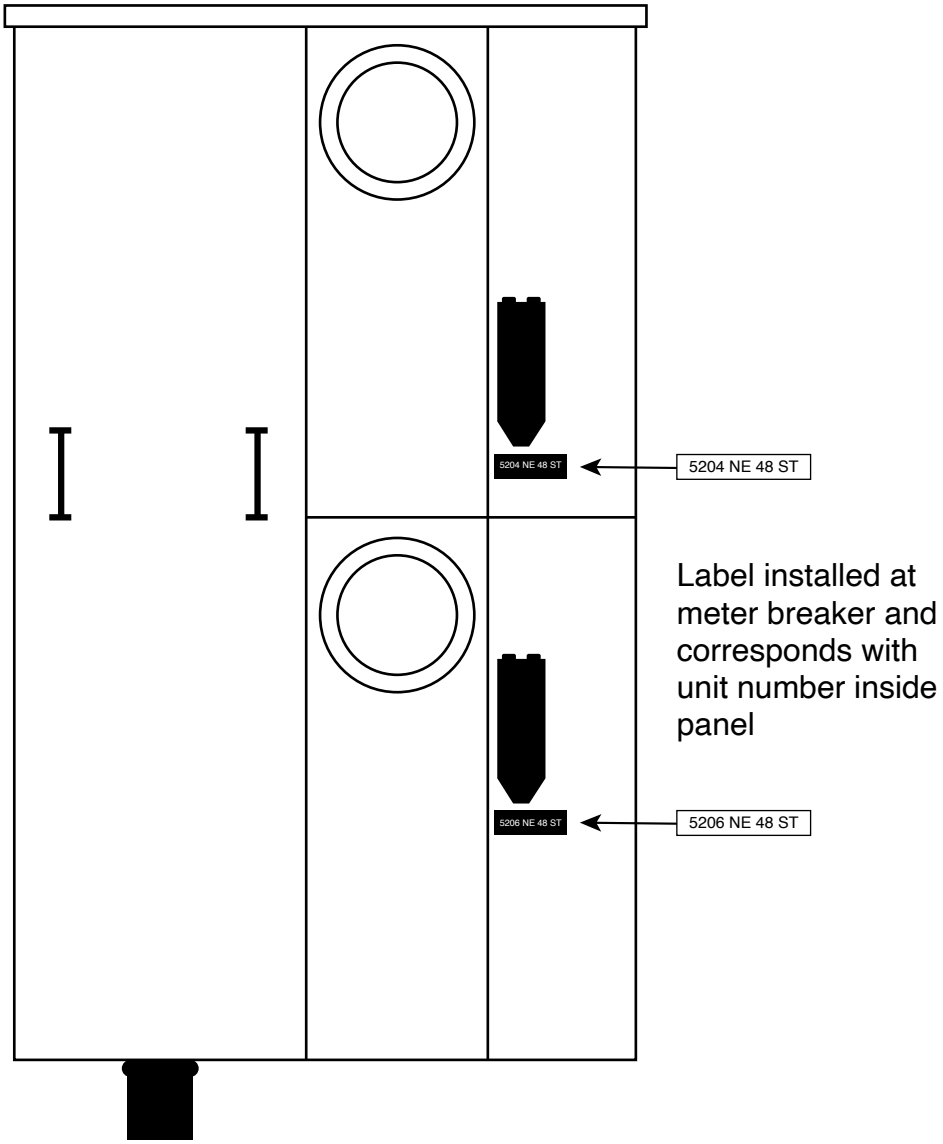
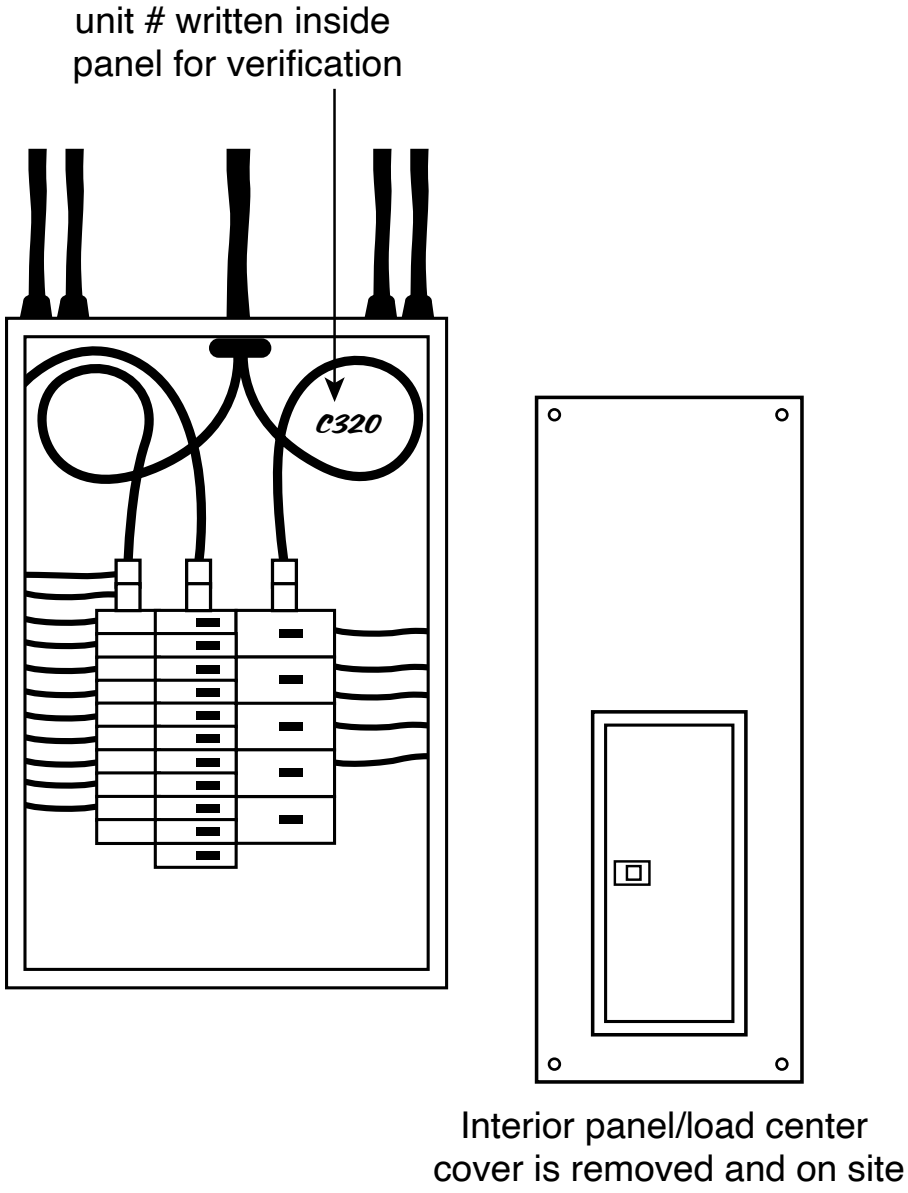


Figure 5-7 Residential Multi-Unit Panel Label



NOTE: Meters will not be set until labeling is complete and correct.



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