



Grant County Public Utility District No. 2

COMMERCIAL SERVICE WORKBOOK

**ELECTRIC and FIBER OPTICS SERVICE WORKBOOK for
MULTI-FAMILY, IRRIGATION, COMMERCIAL SERVICES
& CONSTRUCTION TEMPORARY SERVICES**

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Commercial Service Workbook

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CHAPTER ONE -GENERAL INFORMATION

Introduction

Welcome to Public Utility District No.2 of Grant County, hereafter referred to as “Grant PUD”.

This workbook provides the requirements for multi-family residential, irrigation, commercial, large commercial and temporary construction services. Plat development, residential service, and Net Metering are covered in a different workbook.

Note: italicized words are defined in the Glossary.

Initial Contact

For Information on new services or modification to existing services contact New Construction Service at 509-766-2501.

Grant PUD Responsibility

Grant PUD has developed this workbook to assist the Customer with Grant PUD Policy and procedures.

The Customer shall complete a “Service Connection Application” online. New Construction Services will route the request to the appropriate Grant PUD personnel.

The Engineering Tech will coordinate the design of your project and will contact the Customer to arrange for an on-site field visit, if necessary. At this point, the Engineering Technician will discuss the line extension requirements for the permanent service.

Grant PUD will construct facilities up to a predetermined connection point.

Grant PUD will connect the service to the connection point after all inspections have been made and approved by the appropriate inspectors. The Washington Labor and Industries State Electrical Inspector will notify Grant PUD when the service installation has passed inspection.

Customer Responsibility

The Customer reads the workbook and completes the “Service Connection Application”. This workbook does not cover all possible federal, state, or local code requirements. It is the Customer’s responsibility to be knowledgeable of the most recent issue of the NEC and WAC and any other federal, state, or local codes that may apply.

The Customer is responsible for obtaining rights-of-way. (see chapter on Rights-of-Way). If a temporary service is needed see the chapter on “Temporary Service”.

The Customer is responsible for wiring and construction up to the predetermined connection point.

The Customer shall mark the area where digging will occur in white paint to identify the locations for utility locators. To get a locate, call the

Utilities Underground Location Center (UULC) One Call 811

(also known as “Call Before You Dig”) 48 hours prior to excavation. The color markings are designated to identify the following Utilities:

Red..... Electric

Yellow..... Gas/Oil

Orange.....Telephone/Cable TV

Blue.....Water

Green.....Sewer

White.....Area to be located

The State requires that any digging within 24 inches on either side of the location markings be done by hand.

- The Customer is responsible for providing Grant PUD approved metering equipment.
- The Customer is responsible for providing equipment that will not adversely affect Grant PUDs voltage parameters or cause fluctuation on Grant PUDs electrical system.
- The Customer is responsible for sizing the equipment to safely interrupt available fault currents.
- The Customer shall ensure that the installation meets the most recent NEC, WAC, Ordinances, and all federal, state, and local codes in locating and constructing the electrical service.
- The Customer is responsible for obtaining all permits and inspections for the service as required by Federal, State, and Local Codes.
- The Customer shall pay all Construction costs and must have met all right-of-way requirements prior to the job being released to Construction.
- It is the Customer’s responsibility to notify each provider, utility or agency for intended or needed services, including a service provider for fiber optic service.

Table 1. Available Service:

(Voltage and Size)

The following service(s) are available:

Phase	Largest kVA	Voltage	Self Contained Meter	Current Transform er
1Ø	100	120/240	400 amp	401+ amps
3Ø	750	120/208	200 amp	201 + amps
3Ø	2500	277/480	200 amp	201 + amps

Under special conditions, service sizes outside these parameters may be considered by Grant PUD.

Emergency Generators

Customer-owned emergency generation equipment interconnected with Grant PUD's electrical system must be inspected by the Department of Labor & Industries. The customer shall notify Grant PUD of their intent to utilize an emergency generator or net metering and provide Grant PUD approved disconnect devices. This workbook does not cover net-metering equipment.

Motor and Equipment Protection

On motor installations (including commercial and irrigation applications), the Customer is responsible to provide adequate relays or other approved protective equipment to guard any and all motors against damage due to excessive under/over voltage, surges, voltage spikes, and to protect three-phase motors against damage from single-phasing operation. Three-phase motors equipped for restarting after a service interruption should be protected against any line condition resulting in single-phase service to the motors (single phasing). Grant PUD must approve automatic restarting on 50 HP and larger motors prior to installation.

It is recommended that three thermal over-current devices (for three-phase motors) and, in addition, dual element time delay fuses or circuit breakers of suitable rating, be installed as minimum protection.

It is the Customers responsibility to provide power conditioning devices in order to provide "quality of power" necessary for optimum performance of voltage sensitive equipment such as computers or microprocessors.

Modifications of Existing Facilities

The Customer shall notify Grant PUD of any changes or modifications to an electrical service. A "Service Connection Application" shall be completed detailing the anticipated changes or modifications. Failure to notify Grant PUD of changes and modifications may result in additional charges for damaged equipment.

Demarcation Point

A demarcation point is established solely for the purpose of ownership. The demarcation point defines a designated point on the Customer's property where Grant PUD's facilities end, and the Customer's facilities begin. It can be for either an overhead or underground primary metered electric service.

Connection Point - Electric

A connection point is defined as "the designated point on the Customer's property where their secondary service is connected to Grant PUD's facilities. Grant PUD will maintain the facilities up to this point when construction is completed. This point is described as follows:

Overhead Service, up to 400 amps for 1 \emptyset and up to 200 amps for 3 \emptyset – The connection point is at the weatherhead at the top of the service mast. The Customer provides and maintains the weather head, conductor in the meter loop, and the meter sockets. Grant PUD provides the meter and will connect to the conductor at the weather head.

Overhead Service, 401 amps and larger for 1Ø and 201 amps and larger for 3Ø – The connection point will be at the weather head at the top of the service mast. The Customer provides a Current Transformer (CT) enclosure with internal bus and meter socket ahead of any disconnects.

Underground Service, up to 400 amps for 1Ø and up to 200 amps for 3Ø – The connection point is at the moped (secondary handhole) or transformer. The Customer provides the meter sockets, conduit, and conductor between the meter base and the connection point. Grant PUD provides the meter and will connect to the Customer supplied conductor at the connection point.

Underground Service, 401 amps and larger for 1Ø and 201 amps and larger for 3Ø – If an individual transformer is provided for service, Grant PUD may elect to CT meter at the secondary bushings of the transformer. However, Grant PUD may elect to have the Customer supply a CT enclosure with bus, meter socket, conduit, and the conductor between the CT can and the connection point.

Service Point - Fiber Optic

The service point (generally located next to a meter socket) will be at the CAT5 RJ45 customer connection point in Grant PUD supplied Gateway.

Completing the Service Connection Application

The *Service Connection Application* is comprised of six areas:

- Customer Information
- Service Location
- Voltage and Load Information
- Rights and Obligations
- Site Sketch
- Signature of Legal Landowner

The information on the Service Connection Application will be used to generate a work request and establish account information which includes rate class, deposit requirements, line extension costs, etc. It is very important that all the requested information is provided, or the request may be delayed or returned.

Customer Billing Information

Include the Business/Company customer's full name, current mailing address, email address, and all phone numbers.

Check the "Yes" box if the customer has had prior service with Grant PUD and enter billing account number. If you do not have a current billing account number, contact New Construction Services to set up an account.

If your account is set up on autopay, and the total charges are over \$25,000, you will need to contact us for payment. If the charges are under \$25,000, the amount will be drawn from your account on the next billing cycle.

List any contact person and/or contractor, other than the customer, who is authorized to represent the customer and coordinate construction activities. Include his or her name, email address, and telephone number on the appropriate line.

Service Location

The Service Address is where the new or altered service(s) will be constructed. Complete the service address information, including a street address, plat lot, block, and parcel number for Residential and Commercial Services. Include the farm unit and block, or Section, Township, Range information for all Irrigation services.

List the legal owner of record along with his or her mailing address. Include the "Tax Parcel Number(s)" for the property where the service will be constructed. The tax parcel number(s) can be found on the Grant County tax statement or property closing documents (if newly purchased). The tax parcel number is a nine-digit number that is formatted like 00-0000-000. The tax parcel

number(s) will be used to determine necessary rights-of-way required for construction of the service connection.

Service Request Type

The Service Request Type section should be completed with accurate information. It must be noted if this is a new service or if you are making modifications to existing services and meter. Indicate the business square footage and operational square footage, and general Load HP/KW and Motors in HP. Fill in the service entrance size in amps.

Voltage and Load information

For Commercial and/or Irrigation services, the “Three-Phase 120/208 or 277/480” box may be more appropriate. Depending on the on-site facilities, Grant PUD has the option of constructing the new service either overhead or underground. Check with the local governing body (normally the planning department) to see if an ordinance allows either type of construction. Then check the appropriate box giving the preference of construction. Please refer to the Overhead and/or underground chapters for more information. (Chapter 8: Figure 1, “Typical Overhead Construction,”) and: (Chapter 8, Figure 2, “Typical Underground Construction”) to identify overhead and/or underground construction.

Include any future or additional loads. This information will allow Grant PUD to adequately size the electrical equipment and provide a cost estimate for the service. Inaccurate information may lead to over-sizing the service, thus increasing installation costs, or under-sizing the service and causing power disturbances later.

For Multi-family Residential load, indicate the number of units in the complex, square feet per unit, HVAC load in kW, service size, and number of meters required.

For Commercial/Non-Residential load, complete the Commercial Load section. Fill in the service panel size in amps and the connected single phase and three phase loads. Indicate the total heating, ventilation, air conditioning (HVAC) load in kilowatts (kW), the general load in hp/kW, and the lighting load in kW. In addition to the total load indicates the largest connected load, i.e. hp, HVAC, etc. and any future anticipated load(s).

For Irrigation Load, complete the Load Information section. Indicate service panel size in amps, list each motor size in horsepower (largest to the smallest including number of drive motors and size), and end gun pump size.

Construction Temporary Service

If a temporary service is required, the customer will provide a “metered” temporary service. The cost of service will be calculated accordingly based on usage. For more information on *temporary services* please refer to Chapter Four: *Construction Temporary Services*.

Electric Vehicle (EV) Charger

If an EV charger will be included in your new service, select Level 1 or Level 2. EV charging is categorized into three levels based on the power output, charging speed, and the type of current used.

Level 1 – Standard household charging; suitable for overnight charging at home or in a place where vehicles are parked for extended periods. It uses a standard household electrical outlet. 120 volts, 12-16 amps, Power output; 1.2 to 1.9 kW.

Level 2 – Commonly found in homes, workplaces, and public charging stations. Requires a dedicated charging unit and a higher voltage outlet. 240 volts, up to 80 amps (most commonly 30-40 amps) and Power output 3.3 to 19.2 kW.

Level 3 – Primarily used for fast charging in public stations along highways or in urban areas for quick top-ups. It requires specialized equipment and infrastructure.

Rights and Obligations

When the legal landowner signs the “Service Connection Application”, permission is being granted to Grant PUD to construct and maintain the requested facilities. For additional information regarding permits and easements, refer to Chapter Three, “Right-of-Way”.

Site Sketch

Refer to the Chapter Two on Design Site Sketch for preparation of the site sketch.

Simple Service Fee

The fee for an underground simple service is \$850 (Eight Hundred and Fifty Dollars). The fee for an overhead *simple service* is \$450 (Four Hundred and Fifty Dollars) and will be billed to the customer’s account.

Summary

The customer completes the Service Connection Application online at gcpud.org and submits the application.

Upon receipt of the “Service Connection Application”, the *Engineering Tech* will determine if the work is a *simple* or a Line Extension *request*.

If the job is a line extension *request*, the *Engineering Technician* to work with the customer and complete a design for the new service. The customer may request a need-date that should be realistic and allow time for design, obtaining necessary easements and permits, inspections, construction, and connecting the service. Grant PUD’s lead time will vary due to construction activity within the local areas and the type of permits required for rights-of-way.

Quoted Costs

Quoted cost estimates to extend Grant PUD facilities for a new service are valid for ninety (90) days.

CHAPTER TWO – DESIGN SITE SKETCH

In this section, draw a site plan of the construction project. Here are items to follow in preparing the site plan:

- Draw the site plan indicating which direction is north with an arrow in the upper right-hand corner.
- Identify at least two bordering roads.
- Identify any *foreign easement* areas, i.e. irrigation ditch crossing, telephone line, etc. If the service will cross another person's property, identify this easement area and to whom the property belongs.
- Identify any buildings, septic tanks, drain field, sewer lines, water lines, cable TV, etc. that exist on the property.
- Identify existing District facilities on the property such as a pole, transformer, *secondary handhole*, or *secondary pedestal*. Show transformer stencil Number "T-XXXXX" if applicable, (See Chapter 8, Figures 1 and 2).
- Mark the proposed *meter base* location and proposed transformer location.
- Show route of the underground service and footage.

Grant PUD Responsibility

Upon completion of the Service Connection Application Grant PUD will contact the Customer and, if necessary, arrange for an on-site field visit. An *Engineering Technician* will utilize the site sketch to create a design drawing and calculate the construction charges. The Customer will be notified by phone, mail or email of the construction charges. The quote to construct the line extension is valid for ninety (90) days. If the Customer has not confirmed their intent to proceed in this time frame a new Service Connection Application needs to be submitted and the process started over.

Grant PUD will provide the following:

- Three-phase primary voltage line extension including vault and pad under a *padmount transformer* 500 kVA and smaller.
- Secondary voltage line extension to the *connection point*.
- *Secondary above ground pedestal (mo-ped)*, as required, see Chapter 8 Figure 2.
- Distribution transformer either an overhead or padmount depending on the design.
- Current transformers (CT), wiring harness for CT metering, and the meter.
- Trenching, conduit, and backfill for those primary and secondary conductors and fiber cable up to the *connection point*.
- Primary and secondary conductor and fiber cable up to the connection point.
- Grant PUD will designate handhole, manhole, and transformer size requirements.

Customer Responsibility

Determine whether the service will be overhead or underground and the location of the electrical installation.

- Trench and installation Customer provided conduit and warning tape for both electric and fiber service from the *connection point* to the *metering equipment and fiber optic service point*. Normally, the fiber optic conduit will parallel the electrical service conduit.

- For any primary metered service, provide all secondary electrical wiring, switching vaults, transformer vaults, (Chapter 8 - Figure 2, Secondary above ground pedestal (Mo-Ped) and transformer), PVC Schedule 40 conduit, labor, trenching, and backfill for those facilities installed by the Customer from the pre-determined *demarcation point*.
- Provide vault and pad for three-phase *padmount transformer* sizes 750 kVA and larger per Grant PUD specifications.
- The installation of the *meter socket* or CT enclosure including landing pad and lugs.
- Obtain construction and inspection permits (building, well, electrical, etc.)
- Install and upgrade existing equipment to current National, State, and Local codes.
- Maintain adequate clearances per District specifications to all Grant PUD owned equipment, including transformers, mopeds, and metering equipment. (see Chapter 8 - Figure 8 – Clearances for Oil-Filled Equipment)
- Maintain access to the meter during and after construction.
- Provide and maintain a clear path/trench for your *secondary conductors*.
- Protect Customer owned service equipment with surge suppressers, single phasing relays, overcurrent relays, etc.
- Make provision for any future construction or changes to the property so they won't interfere with your electrical service. Stake the proposed meter location and mark the underground route with white paint for locates. Call UULC 811 – 48 hours prior to excavation.
- The Customer is responsible for the installation and maintenance of the facilities on the Customer's side of the connection *point*.

CHAPTER THREE – RIGHT OF WAY

General Information

This chapter covers Grant PUD's requirements and the Customer's responsibilities for land use requirements, rights-of-way and permits.

An *Engineering Technician* will be assigned to any "Line Extension project" that requires additional rights-of-way and/or permits.

Land Use Requirements

The customer shall comply with the following land use requirements for both the electric system and the fiber optic system.

Compliance with other Agencies

The Customer will be required to comply with all applicable jurisdictional agencies, state, county, and local statutes. These shall include, but not necessarily be limited to, the County Unified Development Code, Uniform Building Code, Urban Growth Management Area development standards, and regulations requiring certain minimum improvements.

Provide Copies to Grant PUD

The customer shall provide Grant PUD with executed copies of all required agency developmental approvals, i.e. approved building site plan.

Property Corners

Property corners that are disturbed shall be replaced by the owner. Property corners shall not be driven deeper than 18 inches below final grade to protect buried facilities.

Easements for Rights-of-Way

The customer shall complete the "Service Connection Application" with the names of legal landowners, property description(s), and sketch showing all property boundaries that the service connection will affect.

The customer is required to obtain the property owner's signature on the "Service Connection Application" in order for Grant PUD to install facilities on the property.

Grant PUD will determine if additional easements for rights-of-way are required. Grant PUD will prepare all easements on Grant PUD easement templates and the Customer shall obtain all property owners' signatures. Grant PUD's cost for preparing the easement(s) for rights-of-way will be a flat "fee" per easement. The assigned *Engineering Technician* will advise the customer of the required fees.

Once the easement(s) for rights-of-way are signed by the property owner(s) and notarized in the presence of a Notary Public, return them to Grant PUD: Attention; Lands Department – Distribution Right-of-Way. Grant PUD will record the easement (s) at the respective Auditor's Office of the appropriate county, i.e. Grant, Lincoln, Adams, Douglas, etc.

Public Agency Permits/Licenses for Right-of-Way

Grant PUD will obtain the required permits/licenses from public agencies or entities (DOT, USBR, BLM, DNR, Railroads, Cities, etc.) and coordinate any professional land survey(s), if required, for these permits.

The customer shall pay for any or all permits/licenses, including but not limited to, Washington State Department of Transportation, United States Bureau of Reclamation, Bureau of Land Management, Department of Natural Resources, Railroad, and other permits/licenses as may be required along with any required professional surveys.

Columbia Basin Irrigation District Permits are required if Grant PUD's electrical conductors or fiber optic cables are within an irrigation district waterway. These permits will be obtained by Grant PUD from the appropriate irrigation district (i.e. South, Quincy, or East Columbia Basin Irrigation District, or East Columbia Basin Irrigation Districts.) A minimum of four weeks is required to obtain permit(s). East Columbia Basin Irrigation District charges a \$200 easement filing fee.

Grant County Road Permits are required whenever Grant PUD's electrical conductors or fiber optic cables are within a county road right of way. Grant County charges a minimum of \$100 (subject to change) for the costs of the permit. A minimum of two weeks is required to obtain permit(s).

Lincoln County Road Permits are required if Grant PUD's electrical conductors or fiber optic cables are within a county road. The cost varies from \$75 to \$150 and is subject to change. A minimum of four weeks is required to obtain the permit(s).

Washington State Department of Transportation (WSDOT) Permits are required if Grant PUD's electrical conductors or fiber optic cables cross a state highway or parallel a state highway within their right-of-way and easement. There is a fee for this permit, usually ranging in cost from \$150 to \$500. A minimum of four to six months is required to obtain the permit(s).

City Permits may be required if Grant PUD's *electrical* conductors or fiber optic cables *wires* are constructed within city limits. A minimum of two weeks is required to obtain permit(s). The City of Quincy is the only municipality that charges a fee. Their fees are based on distance and type of disturbance.

Bonneville Power Administration (BPA) Permits are required if Grant PUD's *electrical* conductors or fiber optic cables cross under a BPA power line or are located in the BPA easement area. A minimum of twelve months is required to obtain permit(s).

United States Bureau of Reclamation (USBR) Licenses are required if Grant PUD's *electrical* conductors or fiber optic cables cross USBR property. The USBR charges \$3,000 (subject to change) and a percentage of Fair Market Value for this license. The customer will be required to pay the USBR work charge deposit prior to work beginning on the *License* or Consent to Use agreement and any additional costs incurred by the USBR. A minimum of eighteen months is required to obtain license(s).

Washington Department of Natural Resources (WDNR) Easements are required if Grant PUD's *electrical* conductors or fiber optic cables cross DNR property. To obtain this permit a professional survey is required. The Customer is responsible for acquiring a WDNR approved survey. The WDNR charges a minimum of \$1,000 (subject to change) for the cost of the permit. Upon completion of the survey, the survey and application fee will be submitted to DNR for processing and approval. A minimum of six months is required to obtain permit(s).

DNR tenants will not be required to obtain a permit; however, DNR must approve and sign the tenant's Service Connection Application.

Bureau of Land Management (BLM) Easements are required if Grant PUD's *electrical* conductors or fiber optic cables cross BLM property. To obtain this permit, an application and permit fee must be submitted to BLM. The application fee ranges from \$175 to \$1,156. The BLM charges a minimum of \$1,000 (subject to change) for the costs of the permit. A minimum of three months is required to obtain easement(s).

Railroad Permits are required if Grant PUD's *electrical* conductors or fiber optic cables cross over, under, or run parallel to the railroad track. The minimum cost for a permit from Burlington Northern Santa Fe Railroad is \$3,800 and the minimum cost for a permit from Washington Central Railroad is \$3,700 (either fee is subject to change). A minimum of four months is required to obtain permit(s). Any license renewal fees will be charged to the Customer.

Professional Surveys are provided by a licensed land surveyor and are obtained by Grant PUD. All survey fees and costs are the customer's responsibility.

The customer has the option to provide Grant PUD with a "Record of Survey" that will be acceptable to the permitting agencies. The customer shall be familiar with the permitting agencies requirements if supplying the "Record of Survey".

CHAPTER FOUR – TEMPORARY SERVICE

General Information

A Construction Temporary Service is an electrical service used for construction purposes. It is only available where single phase, 120/240-volt power, is adjacent and accessible to the customer installed temporary service panel. If a temporary service other than the single phase 120/240V is needed, please note on the Service Connection Application.

If construction temporary service is unavailable, contact Grant PUD *Engineering Tech* for more information. The customer may need to apply for permanent service.

Temporary Metered Connection Fee

The customer completes a “Service Connection Application” and submits to grantpud.org. The customer installs a temporary meter base adjacent to Grant PUD facilities and obtains an electrical permit from Washington State Department of Labor and Industries (L&I). When installation is approved by L&I, contact Grant PUD’s New Construction Services to schedule the connection. The metered temporary connection fee is \$380 (Three hundred and eighty dollars) for an overhead temporary service and \$340 (Three hundred and forty dollars) for an underground temporary service and will be billed at the appropriate rate schedule up to 18 months. At the end of the 18 months, Grant PUD will disconnect and remove the temporary service.

There is underground and/or overhead connected temporary services. Please refer to the section in this chapter for the type of service being requested.

Temporary Overhead Service

Temporary overhead service is available in Grant PUD’s service area where the existing electrical system is overhead construction.

A temporary overhead service may be placed within 50 feet of Grant PUD facilities, provided adequate clearances can be maintained. If Grant PUD’s facilities are underground, refer to the temporary underground service section of this chapter.

Temporary Underground Service

Temporary underground service is available in Grant PUD’s service area where existing power facilities are installed underground. Underground temporary services need to be installed within 10 feet of a *padmount transformer, secondary handhole or secondary pedestal*. The customer provides the trench, conduit, and wire from Grant PUD’s facilities to the temporary service. Allow three (3) feet of wire for makeup to a *secondary handhole or secondary pedestal* and ten (10) feet if run to a *padmount transformer*.

CHAPTER FIVE – CONSTRUCTION

Overhead Construction - Electric

Grant PUD will provide all materials and labor from existing overhead facilities to the *connection point*. It is essential when choosing a route that clearances are considered. Grant PUD strongly suggests that the Customer avoid overhead routes that will cross roadways, driveways, parking lots, etc. due to clearance requirements. Also, tree areas will require the Customer to maintain clearances for *secondary service wires* by removing or trimming trees.

In choosing a route, consideration shall be given to future construction projects that might interfere with Grant PUDs electrical facilities.

For secondary overhead service, Grant PUD will install a *meter pole* at the Customer's expense (see Chapter 8 -Figure 4 –Customer Owned Meter Pole), if necessary, or attach the *secondary* conductor to a *service mast* within 100 feet of the source distribution pole. The Customer shall provide and install the *service mast*, weather head, and *meter socket* at the point of service. (See Chapter 8 -Figure 5 – Typical Overhead Service Installation.)

To maintain minimum clearances, the top of the *service mast* must be at least 13 feet above final grade. Additional height may be required depending upon the routing, location, terrain, and/or type of structure. All electrical facilities shall meet Federal, State, Local, and Grant PUD required safe clearance standards.

When the Customer completes the installation and the *State Electrical Inspector* has approved the installation, Grant PUD will make the final connections at the *connection point*.

Underground Construction - Electric

Grant PUD will provide equipment, materials, labor, trenching, bedding, and backfilling from existing overhead or underground facilities to the *connection point* (see Chapter 8 -Figure 5 -Underground Service from Overhead Transformer and Chapter 8 -Figure 6-Underground Service from *Padmount Transformer*). For developments containing more than one multi-unit building, please refer to the Commercial Subdivision handbook.

The Customer shall provide and install any vault and pad for three-phase *padmount transformers* 750 kVA and larger. Check with the *Engineering Technician* for specifications and installation details of either the pad or vault as required. In addition, the Customer shall provide the labor and install all conduit, materials, trenching, bedding, from the *connection point* to their load or to the metering equipment.

The Customer will need to coordinate an outage with Grant PUD in order to install the electrical facilities up to the *connection point*.

Grant PUD will connect the service at the *connection point* provided an adequate conductor is available for connection. Following is a recommended length to be available for connection:

Above Ground Pedestal – 3 feet

Padmount Transformer – 10 feet

Padmount transformer secondary bushing connections shall be limited to eight (8) conductors (wires) per phase (per bushing).

Fiber Optic Service

Once a customer's electric service is energized and the meter is set, the Customer must request fiber service through an internet service provider to obtain Fiber Optic Service. Once a request is received by the service provider, a workflow process for fiber optic construction will commence. A comprehensive list of service providers and fiber-available areas can be found on the Grant PUD website.

Fiber Optic Construction - Overhead

If fiber optic cable is available in the area, Grant PUD will provide and install overhead fiber optic cable to the Grant PUD supplied residential Gateway which is generally located next to meter socket. (See Chapter 8 -Figure 3 - Customer Owned Meter Pole.)

Fiber Optic Construction - Underground

Regardless of whether fiber optic cable is available in the area, the Customer shall provide and install conduit (normally one (1) inch orange schedule 40 conduit) from the fiber optic handhole to a point adjacent to the meter or the facility to be served. (See Chapter 8 -Figure 5 and 6.) NOTE: Customer supplied fiber optic conduit is for Grant PUD fiber optic cable only. Other companies, such as telephone and cable TV, will not be authorized to utilize this conduit.

Energization

- Prior to being energized the *State Electrical Inspector* must approve the installation.
- Prior to being energized all construction charges and deposits must be paid or accounted for.
- Grant PUD requires a copy of the approved well or pumping permits.
- The Irrigation Power Agreement must be signed, notarized and received by Grant County PUD
- Motor start test, if required, must be completed.
- Motor start letter, if required, must be signed and returned to Grant PUD.
- All easements for rights-of-way must be signed and notarized and permits received by Grant PUD prior to the service being energized.

CHAPTER SIX – SERVICE TYPES

Multi-Family Services

Multi-family dwellings are duplexes, apartment complexes, mobile home parks, and condominiums. These multi-family dwellings are normally served from one source but have multiple meters.

Additional Requirements

To obtain service for multi-family dwelling(s) follow the information provided in this workbook for service.

When available, Grant PUD encourages the Customer to utilize 3Ø, 120/208Y voltage when the service requires a load of 45 kW and larger. This allows Grant PUD and the Customer to balance loads for better efficiencies. Most appliances are dual rated 208/240 volt and will operate efficiently at either voltage.

Grant PUD requires one metering *point* using gang meter sockets for multi-family dwellings.

Commercial Services

Commercial service is considered in Rate Schedule 2. Rate Schedule 2 is a General Service rate and accounts for loads not to exceed 500 kW Billing Demand. The loads include lighting, heating and general power requirements (excepting irrigation service).

Additional Requirements

Grant PUD will provide all electrical facilities, trenching, conduit and backfill to the *connection point* and will install the meter in the Customer supplied *meter socket*.

Available voltages are three phase 120/208Y and 277/480Y.

For connected loads that include large motors (non-irrigation), Grant PUD will notify the Customer of motor starting requirements (normally 100 hp and larger). The Customer will need to acknowledge receipt of the motor start letter by signing the document and returning to Grant PUD prior to the electrical service being energized. A motor start test performed by Grant PUD personnel may also be required prior to energizing the service.

Large Commercial Service

Large Commercial Service is considered in Rate Schedule 7. Rate Schedule 7 is a Large General Service and accounts for loads not less than 200 kW nor more than 5,000 kW Billing Demand. This service provides general service lighting, heating and power requirements.

Irrigation Service

Irrigation service is considered in Rate Schedule 3 and includes accounts for irrigation, orchard temperature control or soil drainage loads not exceeding 2,500 horsepower.

Additional Requirements

Grant PUD will provide all electrical facilities, trenching, conduit, and backfill to the *connection point* and will install the meter in the Customer's supplied *meter socket*.

Grant PUD will only extend underground secondary conductors to an irrigation service if the irrigation service's metering equipment is within twenty feet of Grant PUD's existing facilities (either a padmount transformer or a pole with transformers on it).

New irrigation services require a deposit to be paid equal to the estimated annual billing and/or provide an Irrigation Power Agreement properly executed by the property owner. The deposit or Irrigation Power Agreement must be received by Grant PUD prior to the service being energized.

Upon completion of the design, Grant PUD will prepare an Irrigation Power Agreement and notify the Customer of the required deposit amount to connect the irrigation service.

The Irrigation Power Agreement will need to be signed in the presence of a Notary Public by the legal owners of the property where the irrigation facilities are being installed. Grant PUD, upon receipt of a signed document, will record the Document at the Grant County Courthouse.

Motor Starting Requirements

For connected loads that include large motors, Grant PUD will notify the Customer of motor starting requirements (normally 100 hp and larger). The Customer will need to acknowledge receipt of the motor start letter by signing the document and returning it to Grant PUD. A motor start test performed by Grant PUD personnel may also be required.

Customer accounts which serve motor loads will not be energized until the Customer acknowledges receipt of the requirements by signing and returning the motor starting requirements letter and passing the motor start testing procedures.

At the time of testing, Grant PUD will verify the size and name plate rating of the motor. If the Customer supplied information varies from test data, the Customer may be required to sign another motor start requirements letter and an Irrigation Power Agreement.

NOTE: This could cause delay in energizing the irrigation service.

To reduce flicker and voltage disturbances on Grant PUD's distribution system, Grant PUD may require the Customer to install reduced voltage starting equipment. Grant PUD will furnish the Customer with written motor starting requirements based on the motor horsepower information provided on the Service Connection Application.

Motor and Equipment Protection

On motor installations, the Customer is responsible to provide adequate relays or other approved protective equipment to guard all motors against damage due to excessive under/over voltage, surges, voltage spikes, and to protect three-phase motors against

damage from single-phasing operation. Three-phase motors equipped for restarting after a service interruption should be protected against any line condition resulting in single-phase service to the motors (single phasing). Grant PUD must approve automatic restarting on 50 HP and larger motors prior to installation.

It is recommended that three thermal overcurrent devices (for three-phase motors) and, in addition, dual element time delay fuses or circuit breakers of suitable rating, be installed as minimum protection.

It is the Customers responsibility to provide power conditioning devices in order to provide "quality of power" necessary for optimum performance of voltage sensitive equipment such as computers or microprocessors.

Variable Frequency Drive (VFD) Motors

Variable Frequency Drive Motors are a major source of harmonic distortion. This harmonic distortion causes heating of equipment and system disturbances on Grant PUD's distribution system. Grant PUD has adopted IEEE 519 - 1992 Standard as a guide to mitigate harmonic distortion. The Customer shall design the service so that harmonic distortion falls within the IEEE Standard. This may require harmonic filters or various types of motors designed to reduce harmonics. If Grant PUD determines that the harmonic distortion is outside the standard, the service will not be energized until satisfactory mitigation has been completed by the Customer.

CHAPTER SEVEN – METERING

General Information

Removing and Installing Meters

To avoid a hazardous situation and a possible monetary fine, only authorized and qualified Grant PUD personnel are allowed to remove and install meters, access *meter sockets*, CT enclosures, transformers, *secondary pedestals*, and *secondary handholes*. With some types of *meter sockets*, removal of the meter does not de-energize the customer's system. Contact Grant PUD at 509-766-2501 to request a disconnect.

Metering Equipment

Metering equipment consists of meters, *meter sockets*, current transformers (CT's), and CT enclosures. All meters, metering equipment and un-metered conductors in gutters and switchgear shall have provisions for locking and sealing. Grant PUD will lock and seal all the above.

All Grant PUD seals and locks shall not be removed except by District qualified personnel. If an emergency exists that requires the seal or lock to be broken the Customer shall immediately notify Grant PUD of such an emergency. Grant PUD will then inspect the installation and replace the seal or notify the *Washington State Electrical Inspector* for an inspection.

Metering equipment shall meet EUSERC (Electric Utility Service Equipment Requirements Committee) requirements for *meter sockets*, metering enclosures, and connecting equipment. Where conflict exists between EUSERC and Grant PUD requirements, Grant PUD requirements shall prevail.

Customer supplied meter equipment shall be UL (Underwriters Laboratory) approved and be inspected by Washington State Department of Labor and Industries prior to Grant PUD connecting the service.

Meter Location

The metering location shall be located outside in a non-corrosive environment that is accessible to Grant PUD for meter reading, disconnects, maintenance, and emergency response.

The meter(s) shall be plumb and securely fastened on a permanent structure (vibration free) that is owned and maintained by the Customer or on a Customer owned meter pole (paid for by Customer and installed by Grant PUD) or *padmount transformer*. If the meter is mounted on a pedestal or post it shall be located facing the road or access. (See Chapter 8 - Figures 9, 10.)

Gang meters shall be mounted in a location and manner that meets Grant PUD's specifications. Due to the variety of circumstances and materials, the meter locations and installation shall be pre-approved at the time the service is being designed.

Meter Socket Requirements

For safety reasons, Grant PUD requires “safety socket” meter sockets on certain *self-contained* meters.

Lever bypasses and/or lever releases are NOT permitted and shall not be re-used or altered for safety reasons.

Meter Sockets shall not be jumpered to provide power. This will be considered power theft and Grant PUD will pursue retribution.

Meter sockets shall be rated for exterior use and be rain-tight according to NEMA-3R (National Electric Manufacturer’s Association). All openings shall be tightly sealed from within the *meter socket*.

All *meter sockets* shall be ring type with sealable ring and shall have anodized screw-type or stainless-steel slip-lock type rings.

Modifications to the manufactured *meter socket(s)* shall not be permitted for usage on Grant PUDs metering installations.

Grounding Requirements

All meter equipment shall be bonded and grounded in accordance with the National Electrical Code (*NEC*) and the Washington Administrative Code (*WAC*).

Clearance Requirements

It is the Customers responsibility to provide and maintain the following clearances:

The meter(s) shall be mounted between five (5) and six (6) feet above finished grade. An exception for meter pedestals and gang *meter sockets* will be given during the design stage of the service. (See Chapter 8 - Figure 7, 9, and 10.)

A minimum of three (3) feet of unobstructed workspace shall be maintained around the meter including landscaping, fencing, etc.

Siding or the finished surface of a structure shall not overlap or interfere with the ability to install or remove a flush mounted meter(s). A space of ten (10) inches is required above the motor enclosure. (See Chapter 8, figure 7).

Customer Load Monitoring

Grant PUD may provide metering *kyz* pulses for Customer load monitoring equipment at a predetermined cost. Cost will be determined at time of design. If metering *kyz* pulses are provided, Grant PUD will not guarantee reliability or accuracy of the pulses.

Current Limiting - Breakers/Fuses

The Customer shall provide electrical equipment that will interrupt available fault currents. This equipment may be fuses and/or circuit breakers. These devices shall not be installed in *meter sockets*, CT enclosures, Grant PUD supplied transformers and/or switch cabinets, and non-metered equipment.

They may be installed in the customer’s service panel, or in a separate enclosure between the *meter socket* and the panel.

Self-Contained Meter Sockets

Grant PUD will self-contain meter all services that meet the following criteria:

PHASE	VOLTAGE	AMP	SAFETY SOCKET
1Ø	120/240 V	200 amp	Residential NA
1Ø	120/240 V	200 amp	Nonresidential required
1Ø	120/240 V	320 amp	Required
3Ø	120/208 480/277	200 amp	Required

Table 2. Self-Contained Meter Sockets

The different types of *meter sockets* are: flush mount, surface mount, pedestal (Grant PUD pole mounted, factory built, or frame mounted).

If the service entrance requirements exceed the *self-contained* metering ampacities, then a Current Transformer (CT) is required. For more information on CT services, refer to the CT metering section of this chapter.

Nonresidential Meter Sockets (Manual Bypass Requirements)

All *self-contained* nonresidential *meter sockets*, except temporary services require a manual bypass block (see Chapter 8 -Figure 13). **Automatic circuit closures or lever bypasses are not acceptable and shall not be reused or upgraded.** Three-phase services require a seven terminal *meter socket* with a manual bypass block where the secondary conductor capacity does not exceed 200 Amps, as specified in *NEC*. The *neutral* (grounded conductor) shall be connected or tapped to the third terminal from the left on the lower terminals (See Chapter 8 -Figure 13 drawing).

Meter Socket Motor Load Limit

Limit the continuous duty on *self-contained meter sockets* for motor loads to:

- 60 kW or 50 hp at 120/208 volt, three-phase.
- 120 kW or 100 hp pump + 15 hp drive motors at 277/480 volt, three-phase.

Meter Socket/Main Disconnect Combinations

Meter socket and circuit breaker combinations are acceptable for 0-400 Amps single-phase, and 0-200 Amps three-phase, provided the *meter socket* meets Grant PUDs manual bypass and dimensional requirements. (See Chapter 8 -Figure 11.)

Load Balancing

When 120/208 three-phase transformers provide single-phase service, it is the customer's responsibility to identify the conductors and balance the load on the transformer.

Secondary Conductors for Self-Contained Metering

The source (line-side) conductors shall always be connected to the top terminals in the *meter socket*. Secondary conductors shall be arranged in the *meter socket* to avoid interfering with the meter installation or operation of the bypass blocks. The Customer is responsible for ensuring that the connection of *service entrance conductors* in the *meter socket(s)* are inspected and tightened before the service is energized. When safety sockets are used, circuit-connection nuts shall be properly torqued. Meters shall not be installed unless these connections are tight and are wired correctly for the class of service involved. Meters shall not be installed if conductors place undue strain on the terminal(s).

Current Transformer (CT) Meter Sockets

Provisions for current transformers (CT) metering shall be made when the current-carrying capacity of the *service entrance conductors* exceeds 400 Amps single-phase or 200 Amps three-phase, as determined by *NEC*.

Customer Responsibility

The Customer shall furnish, install, and maintain the *meter socket(s)*, CT enclosures if applicable (See Chapter 8 - Figure 14 and 15), all necessary wiring, connectors, and lugs (except for the CT meter wiring harness), conduit, and protective equipment associated with a CT installation.

Single-phase farmstead CT installations more than 320 Amps and less than 800 Amps may be permitted in the *padmount transformer* cabinet.

The Customer shall provide and install two-bolt lugs on the CT mounting base for the line and load sides of each phase and the *neutral* bus.

Note: An instrument transformer enclosure shall contain only the main secondary conductors.

Provide and install conduit and conductors between Grant PUD's transformer and the CT enclosure when Grant PUD's transformer is the *connection point*.

Provide and install the *meter socket* and the metering circuit conduit. (See Chapter 8 - Figure 17) for additional information. A minimum of one inch rigid, plastic (Schedules 40 or 80), or EMT conduit is required between the *meter socket* and CT enclosure and shall be installed by the Customer.

Flex conduit and junction boxes are not acceptable between the *meter socket* and CT enclosure.

The one-inch conduit shall be as short as possible, and shall not exceed 50 ft in length, and not over 270° in bends, unless specifically approved by Grant PUD. A pull string is required in any meter conduit over 25 feet in length.

Grant PUD Requirements

Grant PUD will provide and install the following:

- ☐ Current transformers (CT)
- ☐ Revenue meter
- ☐ Test switches
- ☐ Metering circuits (wiring harness)
- ☐ Grant PUD will furnish, install, and maintain Revenue Meters, CT's, CT wiring harness, Test Switches, and CT metering at their discretion when one transformer is utilized for a service or for services over 800 amps.

CT Enclosure Specifications

- The CT enclosure shall meet the following specifications:
- Approved Current Transformer (CT) cabinet (enclosure) size is listed in Table 4.
- Access covers shall be hinged if over nine (9) square feet in size and equipped with a device to hold the cover in the open position at 90° or more. (See Chapter 8 - Figure 18).
- All CT enclosures require a minimum front working clearance of 36 inches.
- The cover shall be sealable, equipped with two handles, and have a caution label reading

“DO NOT BREAK SEALS - NO FUSES INSIDE.”

- Hinged covers shall be sealed on the unsupported side and all securing screws shall be captive.
- Hinged CT enclosure doors shall not block a safe exit while open.
- The top of the CT enclosure shall not exceed a maximum of 8 feet above the floor or finished grade; the bottom shall not be lower than 12 inches above the floor or finished grade.
- CT enclosures shall not be mounted in crawl spaces, attics; any confined areas, or mounted on ceilings.
- A CT mounting base on services of 800 Amps or less shall be mounted in the enclosure. For single-phase services, refer to Chapter 8 - Figure 16 - Drawing 328A. For three-phase services, refer to Chapter 8 - Figure 16 – Drawing 329A.

- The CT mounting base and bus support bars shall be rigid to prevent turning and misalignment of the bus when the conductors are in place.
- The *neutral* bus may be located at either side and shall be provided with a 10-32 screw and washer. As an alternative, a bondable double lug may be provided in place of the *neutral* bus.
- Each cable terminating position shall consist of two 1/2-inch steel bolts extending from 2 inches minimum to 2-1/2 inches maximum from the mounting surface and spaced on 1-3/4-inch vertical centers. 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. All parts shall be plated to prevent corrosion.
- Service wire connections shall not be made on the CT terminal pads. A maximum of four (4) conductors per phase will be allowed in a CT enclosure provided a Homac 4-hole terminal #ZBT-2027-175 connector or equivalent is provided by the customer.
- Tables 3, 4 and 5, list *meter sockets* and meter enclosures by manufacturer. This listing is solely for the purpose of facilitating description of the equipment desired and shall be deemed to be followed by the words “or equivalent”. Items deemed “or equivalent” must be approved by Grant PUD for use. The Customer shall be responsible for providing proof that their equipment is equivalent to Grant PUD specifications.

Table 3 – Approved Current Transformer (CT)

Size Enclosures and Mounting Base

CURRENT TRANSFORMER (CT) SIZE ENCLOSURES and Mounting Base					
Service Size	Enclosure Size Wall Mounted	Enclosure Recommended Manufacturers		CT Mounting Base Recommended Manufacturers	
	W x H x D	Cooper B-Line	Milbank	Cooper B-Line	Milbank
Single Phase 3-wire; 321-800 Amps	24" x 48" x 11"	244811HRTCT	CT244811-HC	6019-HA 321 amp	K4797 321/600/800 amp
				6019-HE 600/800 amp	
Three Phase 4 Wire; 201– 800 Amps	36" x 48" x 11"	364811HRTCT	CT364811-HC	6067-HA 201/400 amp	K4798 201/400/600/800 amp
				6067-HEE 600/800 amp	

Table 4. Approved Commercial & Industrial Meter Sockets

Approved Commercial & Industrial Meter Sockets Revision Date September 13, 2010														
Grant County PUD Service Area														
Amperages			100	200	400	800	100	200	400	800	100	200	400	800
Phase	Voltages	Service Type	Cooper Beeline (Circle AW)				Milbank				Model # & - Jaws			
			Model # & - Jaws				Model # & - Jaws				Model # & - Jaws			
1Ø	120/240	Underground or Overhead	114TB - 4	124TB - 4	324N - 4 ¹	12145 - 5 ^{1&3}			U3548-X - 4 ¹	UC3435-XL - 5 ¹				
3Ø	120/240		117TB - 7	127TB - 7	121413 - 13 ²	121413 - 13 ²								
3Ø	120/208													
3Ø	277/480													

Note ¹ CT metering: Current Transformer metering is required when the ampacity of a 1Ø service entrance exceed 320 amps.

Note ² CT metering: Current Transformer metering is required when the ampacity of a 3Ø service entrance exceed 200 amps.

Note ³ 800 amp CT metering for 1 Ø can be done with 12146- the 6 jaw will not be connected and wiring shall conform to a 5 jaw configuration. Added Note 09/13/10

CHAPTER EIGHT – DRAWINGS AND FIGURES



Figure 1. Typical Overhead Construction

Transformer Stencil located here

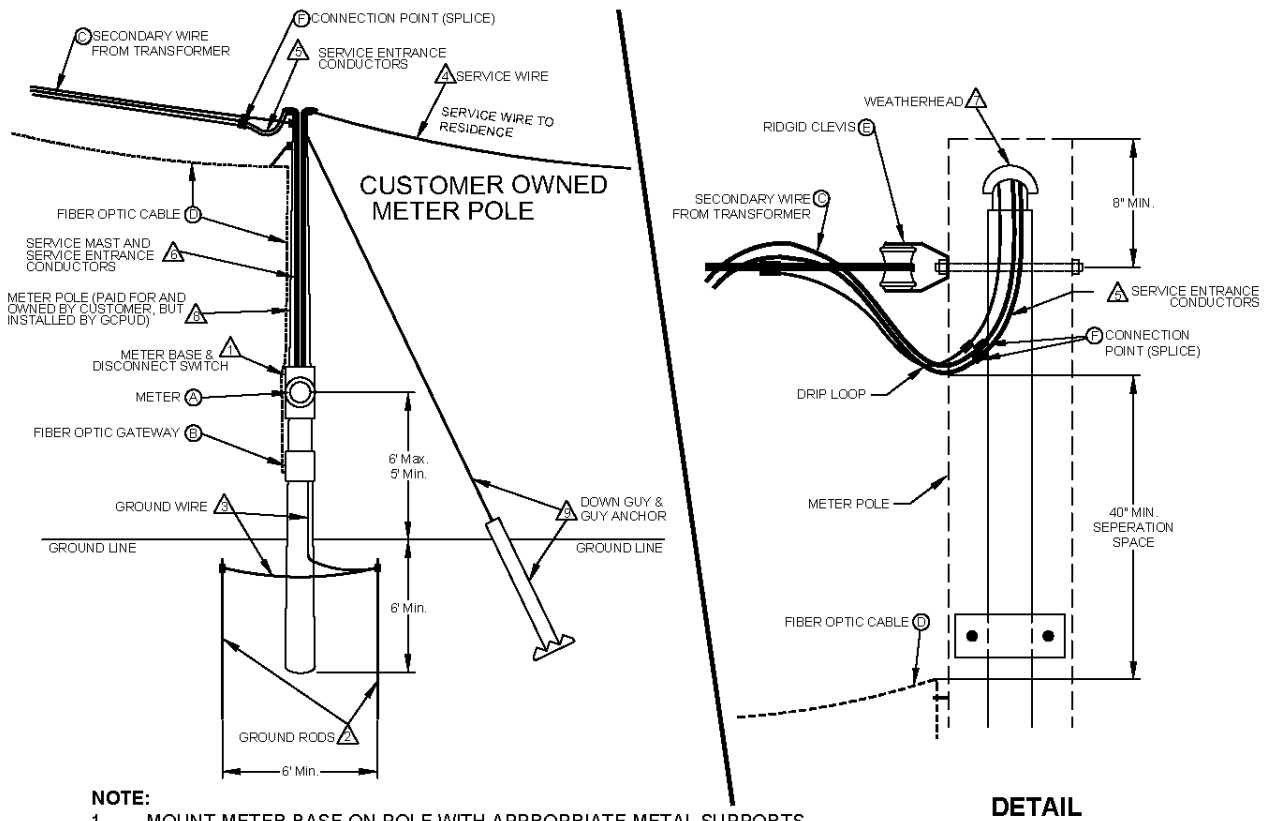


Secondary Pedestal (Moped)

Padmount Transformer

Figure 2. Secondary Above Ground Pedestal (MO-PED) and Transformer

Figure 3. Customer Owned Meter Pole



NOTE:

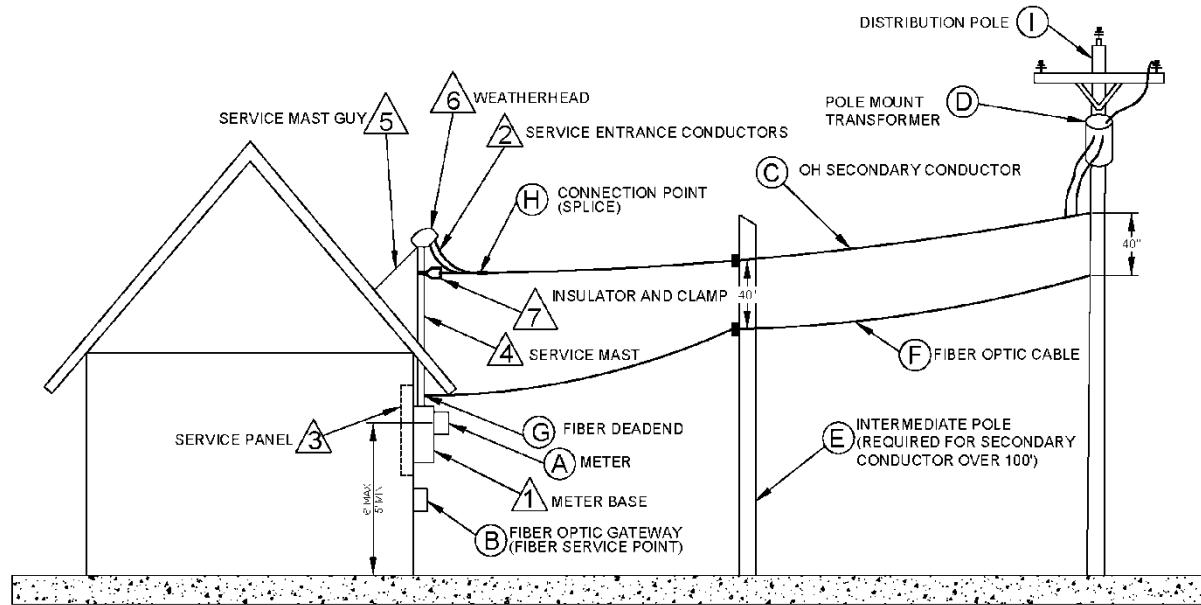
1. MOUNT METER BASE ON POLE WITH APPROPRIATE METAL SUPPORTS .
NO WOOD BACKING AND NO POLE NOTCHING
2. WEATHERHEAD MUST BE NO MORE THAN 2" FROM THE TOP OF THE POLE AND AT LEAST 8" ABOVE THE RIDGID CLEVIS.

△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER	○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD
1. METER BASE AND DISCONNECT EQUIPMENT, IF APPLICABLE	A. METER
2. GROUND RODS (PER NEC AND WAC)	B. RESIDENTIAL GATEWAY
3. GROUND WIRE (PER NEC AND WAC)	C. SECONDARY WIRE FROM TRANSFORMER
4. SERVICE WIRE (CUST. OWN AND MAINTAIN)	D. FIBER OPTIC CABLE
5. SERVICE ENTRANCE CONDUCTORS 18 INCHES OUT OF WEATHERHEAD.	E. RIDGID CLEVIS
6. SERVICE MAST, SERVICE ENTRANCE CONDUCTORS	F. CONNECTION POINT (SPLICE)
7. WEATHERHEAD	
8. METER POLE (PAID FOR AND OWNED BY CUSTOMER, BUT INSTALLED BY GCPUD)	
9. DOWN GUY AND ANCHOR (REQUIRED IF SECONDARY WIRE IS MORE THAN 100')(PAID FOR BY CUSTOMER, BUT INSTALLED BY GCPUD)	

FIGURE 3. CUSTOMER OWNED METER POLE

REVISED: 03-02-23

Figure 4. Typical Overhead Service Installation





 ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER	 ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD
1. METER BASE 2. SERVICE ENTRANCE CONDUCTORS 18" WEATHERHEAD - CUSTOMER OWNS 3. SERVICE PANEL 4. SERVICE MAST 5. SERVICE MAST GUY 6. WEATHERHEAD 7. INSULATOR AND CLAMP	A. METER B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT) C. OVERHEAD SECONDARY CONDUCTOR D. POLE MOUNT TRANSFORMER E. INTERMEDIATE POLE (PAID FOR BY CUSTOMER) F. FIBER OPTIC CABLE G. FIBER OPTIC DEADEND H. CONNECTION POINT (SPLICE) I. DISTRIBUTION POLE

FIGURE 4. TYPICAL OVERHEAD SERVICE INSTALLATION

REVISED: 03-02-23

Figure 5. Underground Commercial Service From Overhead Line and Pole Mount Transformer

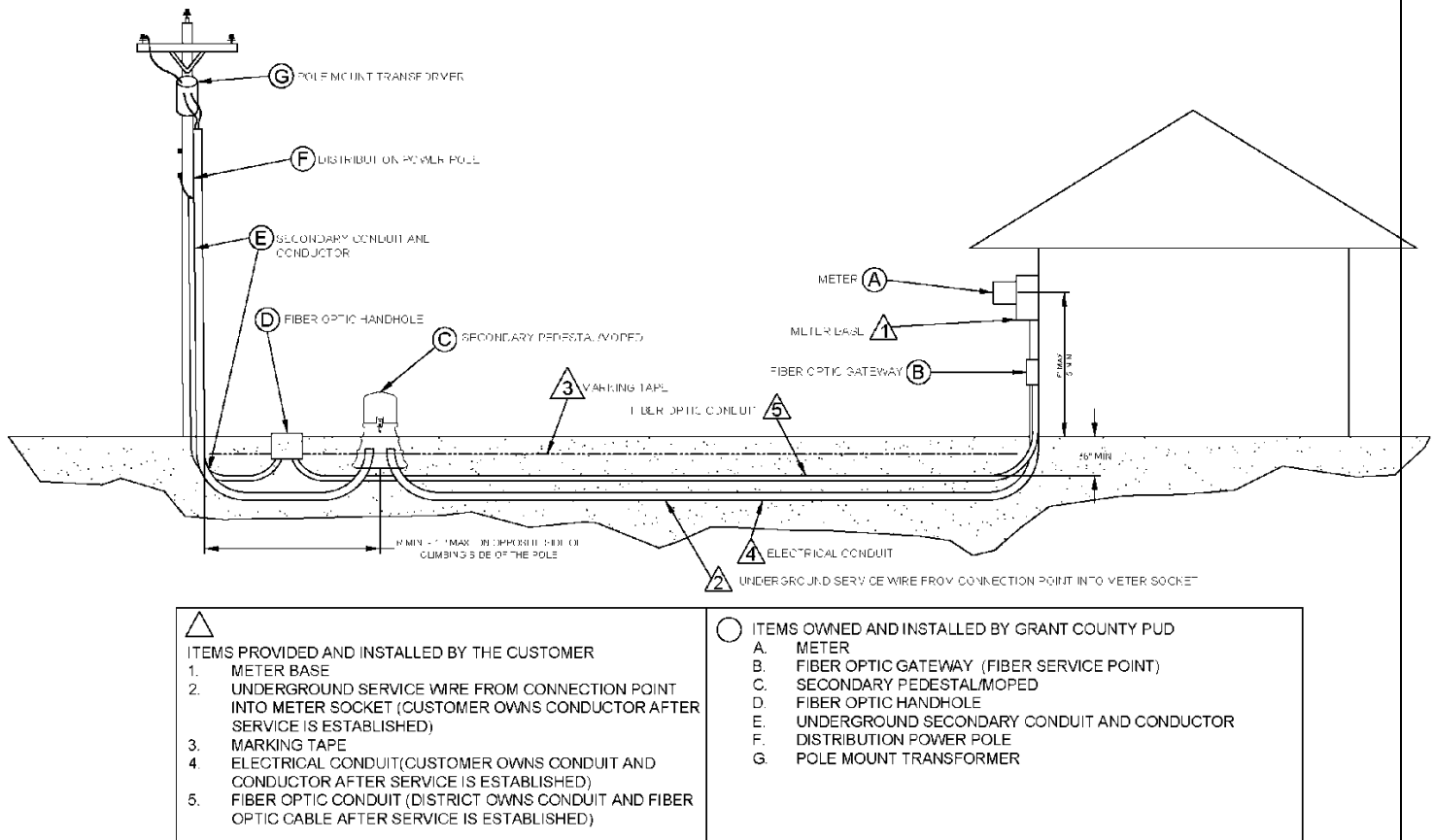
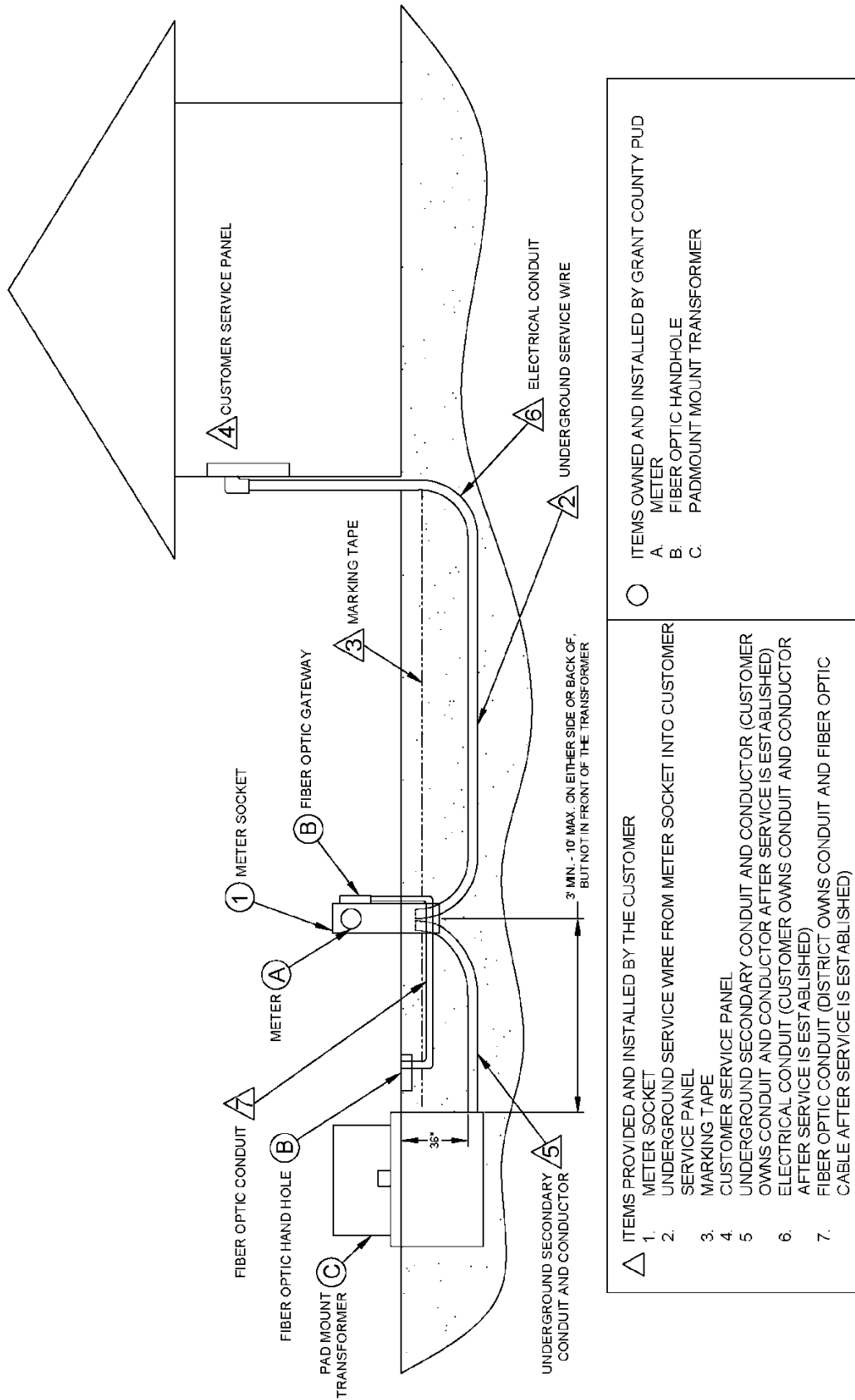


FIGURE 5. UNDERGROUND COMMERCIAL SERVICE FROM OVERHEAD LINE AND POLE MOUNT TRANSFORMER

REVISED: 05-23-23

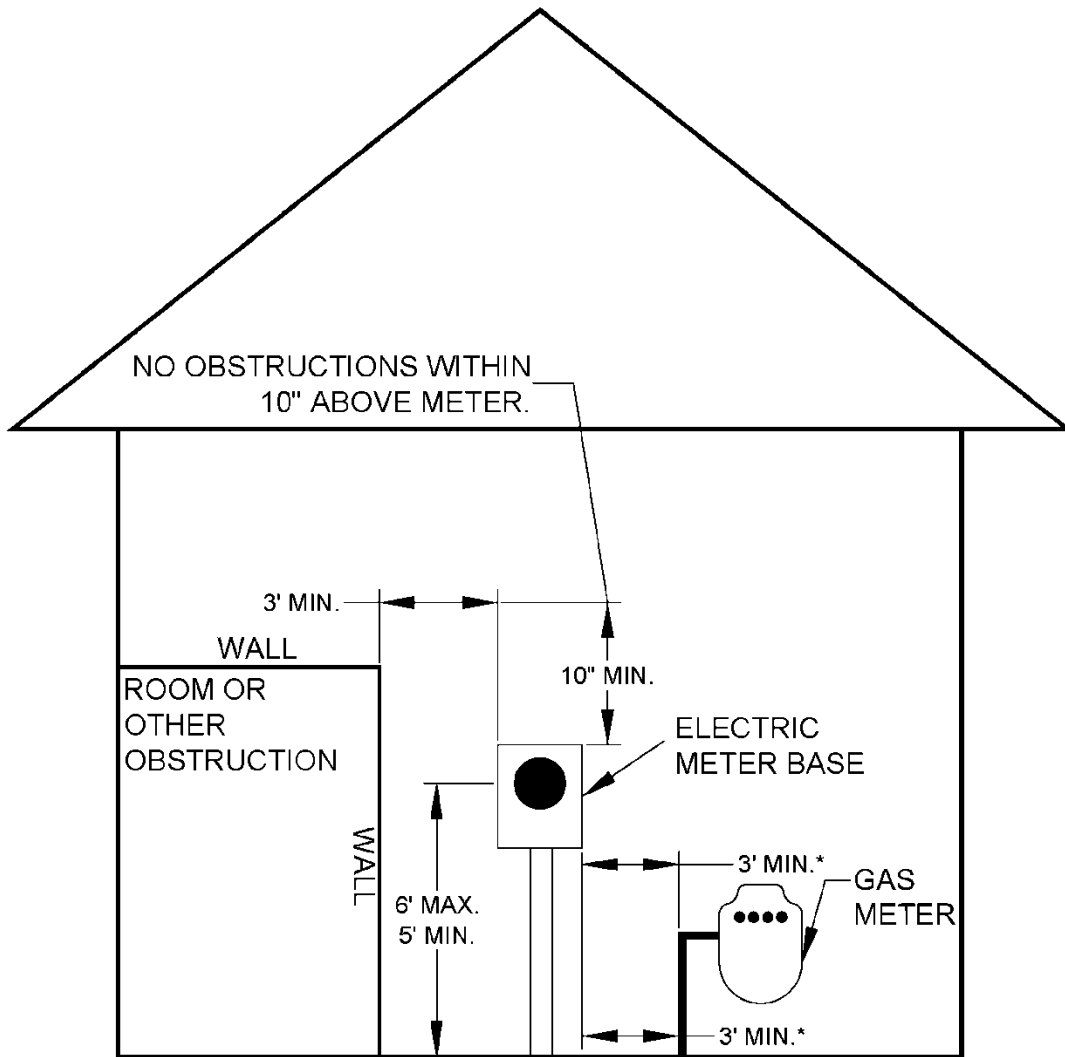
Figure 6. Underground Commercial Service From Padmount Transformer



<p>△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> METER SOCKET UNDERGROUND SERVICE WIRE FROM METER SOCKET INTO CUSTOMER SERVICE PANEL MARKING TAPE CUSTOMER SERVICE PANEL UNDERGROUND SECONDARY CONDUIT AND CONDUCTOR (CUSTOMER OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) ELECTRICAL CONDUIT (CUSTOMER OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AND FIBER OPTIC CABLE AFTER SERVICE IS ESTABLISHED) 	<p>○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD</p> <ol style="list-style-type: none"> METER FIBER OPTIC HANDHOLE PADMOUNT MOUNT TRANSFORMER
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REVISED: 03-21-23

FIGURE 6. UNDERGROUND COMMERCIAL SERVICE FROM PADMOUNT TRANSFORMER



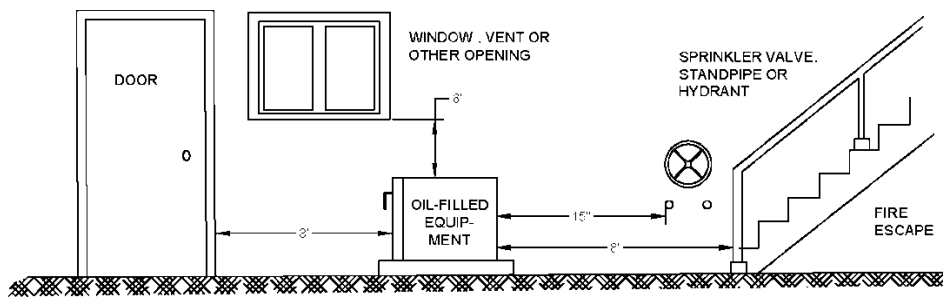
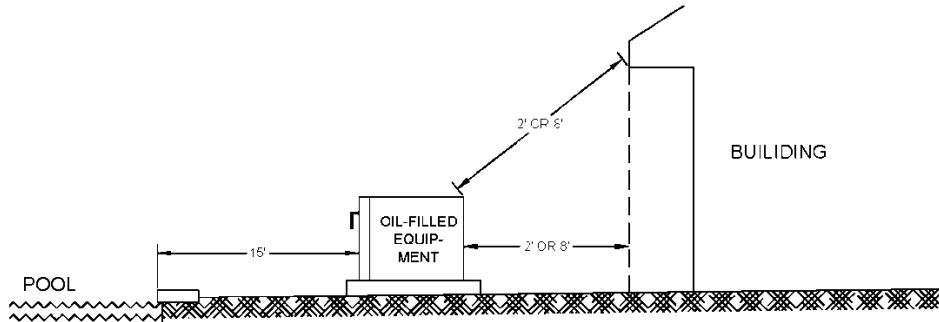
THERE SHALL BE A MIN. OF 3' OF UNOBSTRUCTED SPACE BETWEEN THE NEAREST METERING EQUIPMENT AND ANY OBSTRUCTION ON SIDES AND IN FRONT OF THE METER

* NATIONAL FUEL GAS CODE 54-5.7.2.3

FIGURE 7. METER CLEARANCE

REVISED: 02-23-23

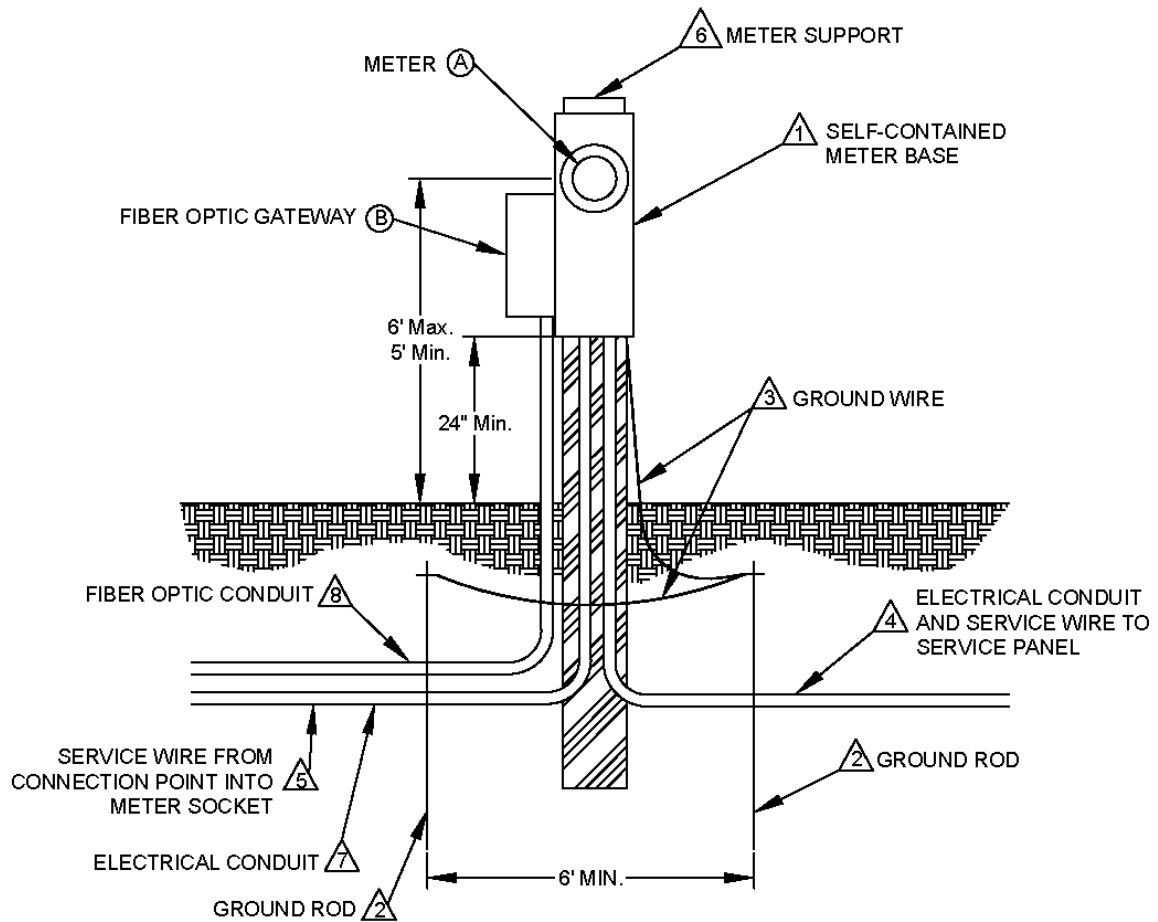
Figure 7. Meter Clearance



IF THE OIL FILLED EQUIPMENT IS ADJACENT TO...	THE CLEARANCE REQUIREMENT IS...
NON-COMBUSTIBLE WALLS (INCLUDING BRICK, CONCRETE, STEEL AND STONE) PROVIDING THE SIDE OF THE TRANSFORMER FACING THE WALL DOES NOT HAVE DOORS.	2 FOOT
FIRE SPRINKLER VALVES, STANDPIPES, AND FIRE HYDRANTS	15 FEET
COMBUSTIBLE WALLS (INCLUDING STUCCO), DOORS, WINDOWS, VENTS, FIRE ESCAPES, AND OTHER BUILDING OPENINGS	8 FOOT
THE WATER'S EDGE OF A SWIMMING POOL OR ANY BODY OF WATER	15 FEET
FACILITIES USED TO DISPENSE OR STORE HAZARDOUS LIQUIDS OR GASES. (FOR EXAMPLE, SERVICE STATION GAS PUMPS AND TANKS, PROPANE BULK DISPENSING TANKS, AND EMERGENCY GENERATOR FUELING POINTS, ETC.)	20 FEET

FIGURE 8. CLEARANCES FOR OIL-FILLED EQUIPMENT REVISED: 02-23-23

Figure 8. Clearances for Oil-Filled Equipment

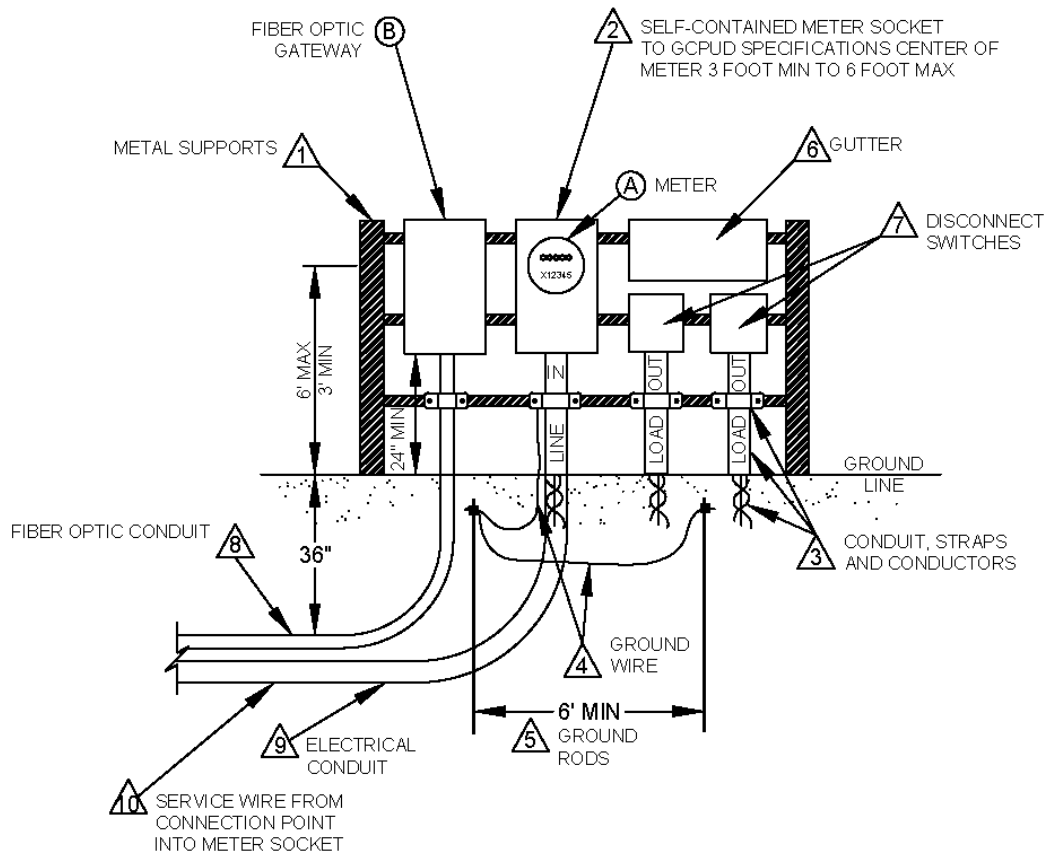


<p>△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> 1. SELF-CONTAINED METER BASE 2. GROUND RODS (IN ACCORDANCE WITH NEC AND WAC RULES, TWO REQUIRED.) 3. GROUND WIRE (IN ACCORDANCE WITH NES AND WAC RULES) 4. ELECTRICAL CONDUIT AND SERVICE WIRE TO SERVICE PANEL 5. SERVICE WIRE FROM CONNECTION POINT INTO METER SOCKET (CUSTOMER OWNS AFTER SERVICE IS ESTABLISHED.) 6. METER SUPPORT, 6" x 6" x 10' MIN. LENGTH FULLY PRESSURE-TREATED POST OR METAL SUPPORT BURIED A MIN. OF 3' DEEP. WHEN ANGLE IRON, CHANNEL IRON OR RIGID PIPE IS USED, IT MUST BE SET IN 6" x 24" x 24" CONCRETE FOOTING. 7. ELECTRICAL CONDUIT - (CUSTOMER OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) 8. FIBER OPTIC CONDUIT - (DISTRICT OWNS CONDUIT AND FIBER OPTIC CABLE AFTER SERVICE IS ESTABLISHED) 	<p>○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD</p> <ol style="list-style-type: none"> A. METER B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT)
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REVISED: 03-21-23

**FIGURE 9. POST MOUNTED METER INSTALLATION
(FOR COMMERCIAL SERVICE)**

Figure 9. Post Mounted Meter Installation

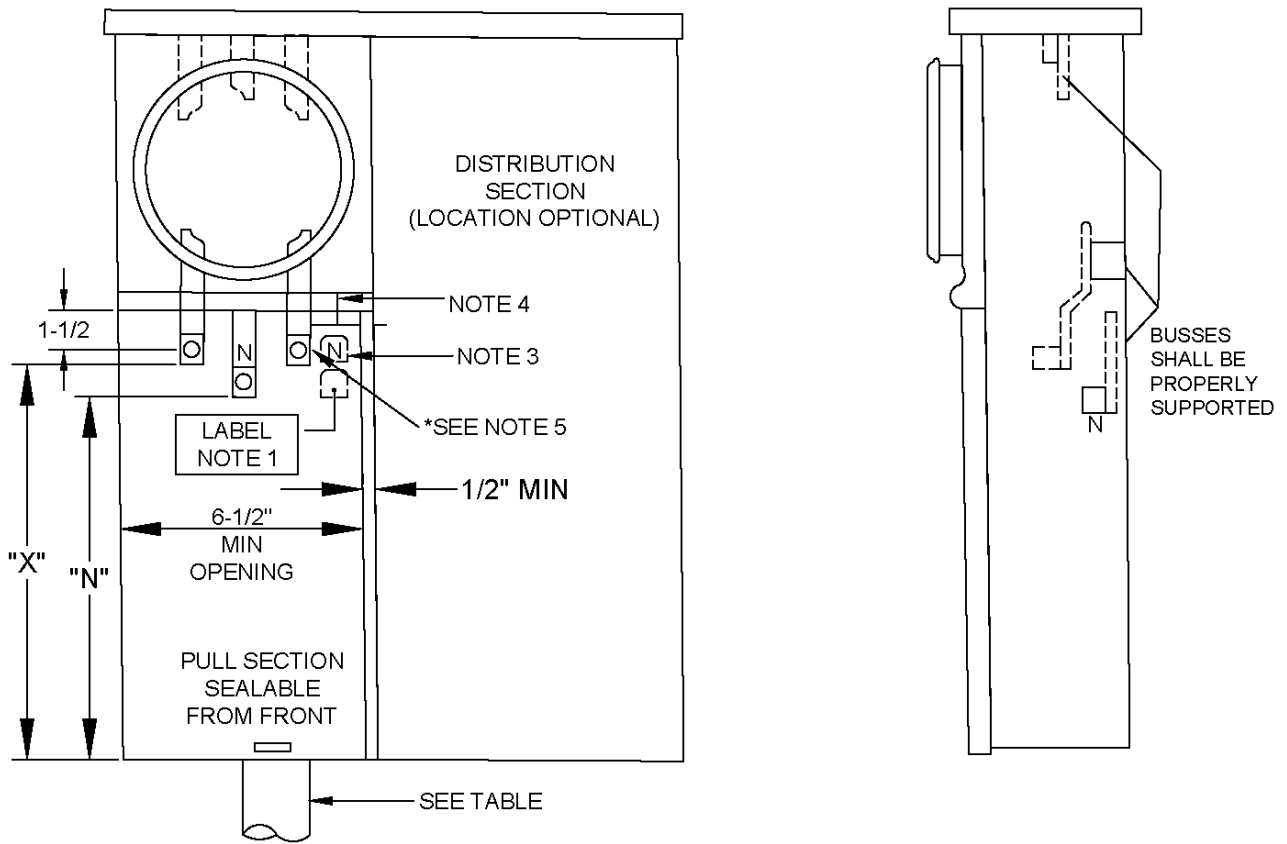


<p>△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> 1. METAL SUPPORT SHALL BE SQUARE TUBE DESIGN (2"x2"x1/8") OR EQUIVALENT (METAL), WITH ANGLE IRON SUPPORTS (2"x2"x3/16") AND MUST BE SET IN 6"x24"x24" CONCRETE FOOTING. 2. SELF CONTAINED METER SOCKET 3. CONDUIT 4. GROUND WIRE (IN ACCORDANCE WITH NEC AND WAC) 5. GROUND RODS (IN ACCORDANCE WITH NEC AND WAC) 6. GUTTER 7. DISCONNECT SWITCHES 8. FIBER OPTIC CONDUIT PROVIDED AND SUPPLIED BY THE CUSTOMER (DISTRICT OWNS CONDUIT AND FIBER OPTIC CABLE AFTER SERVICE IS ESTABLISHED) 9. ELECTRICAL CONDUIT (CUSTOMER OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) 10. SERVICE WIRE FROM CONNECTION POINT INTO METER SOCKET (CUSTOMER OWNS AFTER SERVICE IS ESTABLISHED) 	<p>○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD</p> <ol style="list-style-type: none"> A. METER B. FIBER OPTIC GATEWAY
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FIGURE 10. FRAME MOUNTED METER INSTALLATION
(FOR COMMERCIAL SERVICE)

Figure 10. Frame Mounted Meter Installation



MAXIMUM AMPACITY	'X' MIN DIM	'N' MIN DIM	'Y' MIN DIM	CONDUIT RANGE
125	8"	6"	4"	1-1/4" - 2-1/2"
225	11"	8-1/2"	5-1/2"	1-1/2" - 3"

ALL DIMENSIONS ARE SHOWN IN INCHES

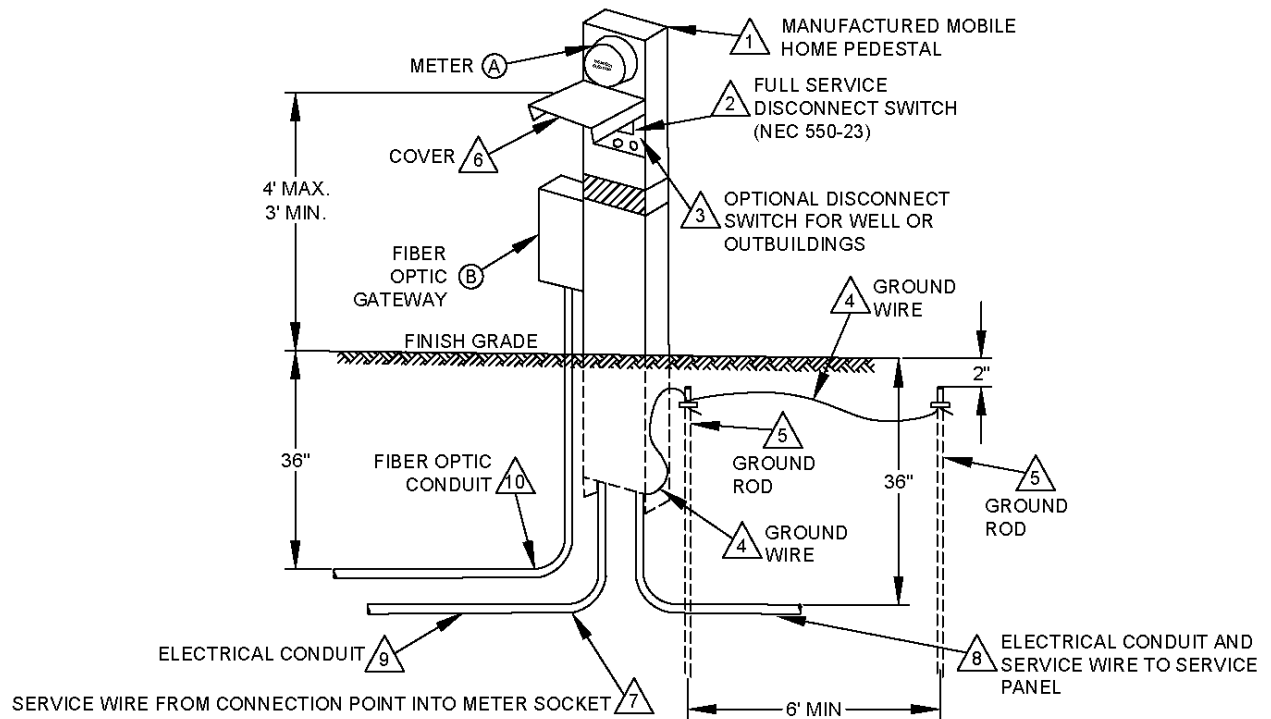
NOTE:

1. THIS EQUIPMENT MAY BE CONSTRUCTED FOR OVERHEAD, UNDERGROUND, OR FOR COMBINATION OVERHEAD/UNDERGROUND (OH/UG) SERVICE APPLICATIONS. WHEN CONSTRUCTED AS AN OH/UG DEVICE, A YELLOW CAUTION LABEL (2" x 3" MIN) SHALL BE INSTALLED BELOW THE TERMINATIONS IN THE PULL SECTION READING "**CAUTION: BUS ENERGIZED AT ALL TIMES.**"
2. TERMINATIONS FOR SERVICE WIRES SHALL BE ALUMINUM BODIED PRESSURE TYPE LUGS WITH A RANGE OF NO. 6 THROUGH 1/0 AWG FOR THE 125 AMP DEVICE AND 1/0 AWG THROUGH 250 MCM FOR THE 225 AMP DEVICE.
3. PROVIDE A BONDING SCREW OR JUMPER IF THE NEUTRAL TERMINAL IS INSULATED FROM THE ENCLOSURE.
4. A MINIMUM RADIAL CLEARANCE OF 1-1/2 INCHES SHALL BE PROVIDED BETWEEN HOT BUS TERMINALS AND GROUND OR NEUTRAL SURFACES.
5. TERMINATION LUGS MUST BE LOCATED BELOW METER SOCKET LOCATION.

FIGURE 11. COMBINATION METER SOCKET INCLUDING TABLE

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Figure 11. Combination Meter Socket Including Table

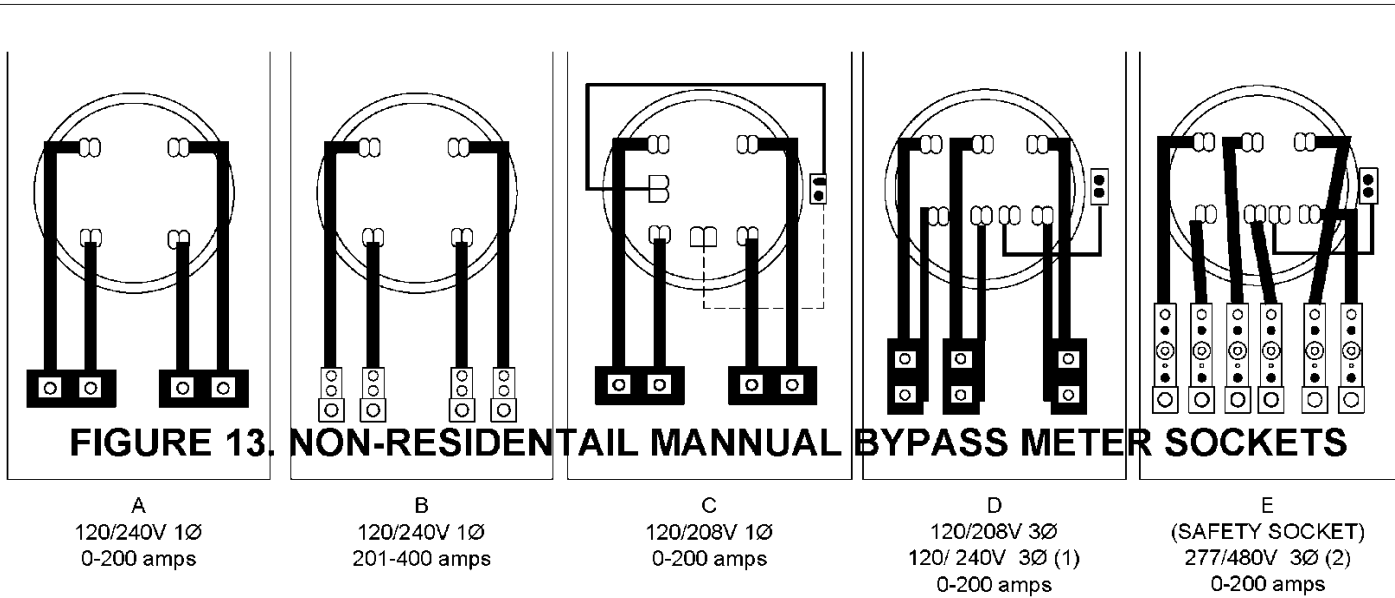


△	ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER	○	ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD
1.	MANUFACTURED MOBILE HOME PEDESTAL.	A.	METER
2.	FULL SERVICE DISCONNECT SWITCH (NEC 550-23)	B.	FIBER OPTIC GATEWAY (FIBER SERVICE POINT)
3.	OPTIONAL DISCONNECT SWITCH FOR WELL OR OUTBUILDING		
4.	GROUND WIRE (IN ACCORDANCE WITH NEC AND WAC RULES)		
5.	GROUND RODS (IN ACCORDANCE WITH NEC AND WAC RULES)		
6.	COVER		
7.	SERVICE WIRE FROM CONNECTION POINT INTO METER SOCKET (CUSTOMER OWNS AFTER SERVICE IS ESTABLISHED)		
8.	ELECTRICAL CONDUIT AND SERVICE WIRES TO SERVICE PANEL		
9.	ELECTRICAL CONDUIT (CUSTOMER OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED)		
10.	FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AND FIBER OPTIC CABLE AFTER SERVICE IS ESTABLISHED)		

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FIGURE 12. MANUFACTURED MOBILE HOME PEDESTAL WITH METER BASE INSTALLATION (FOR MULTI-UNIT MOBILE HOME PARKS)

Figure 12. Manufactured Mobile Home Pedestal with Meter Base Installation

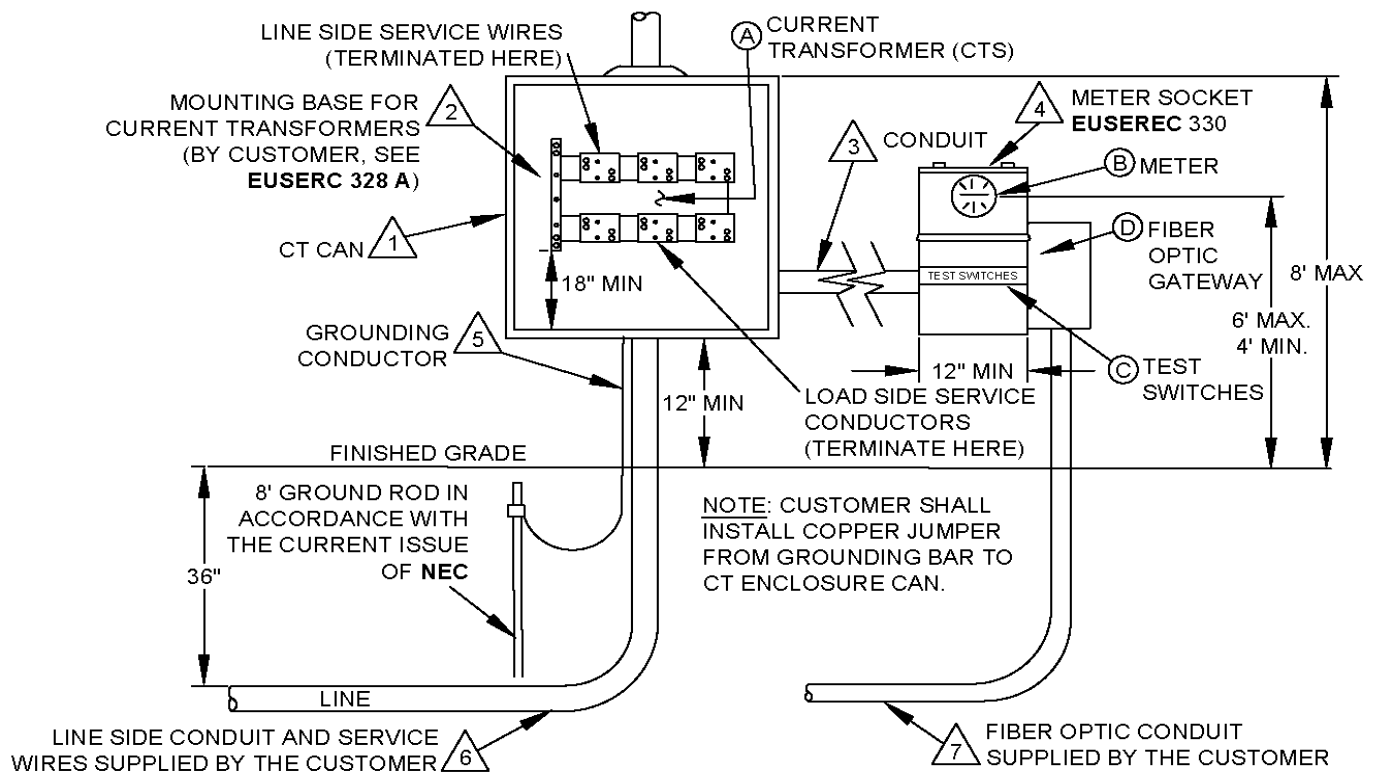


THE HIGH LEG (POWER LEG) OF A FOUR-WIRE DELTA CIRCUIT SHALL BE CONNECTED THROUGH THE RIGHT HAND TERMINALS OF THE SOCKET. ALSO, THE HIGH LEG (208 VOLT, PHASE TO GROUND) SHALL BE IDENTIFIED IN ORANGE IN THE METER SOCKET, AT THE WEATHERHEAD FOR OVERHEAD SERVICES, AND AT THE TRANSFORMER, SECONDARY HANDHOLE, OR SECONDARY PEDESTAL FOR UNDERGROUND SERVICES. THIS IS DONE IN ADDITION TO THE GROUNDED CONDUCTOR REQUIRED BY *NEC (SECTION 200-06)*

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FIGURE 13. NON-RESIDENTIAL MANUAL BYPASS METER SOCKETS (EXAMPLES A - E)

Figure 13. Non-Residential Manual Bypass Meter Sockets
Examples A-E



<p>△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> 1. CT CAN 2. MOUNTING BASE FOR CURRENT TRANSFORMER LANDING PAD 3. CONDUIT (NORMALLY 2-4 INCHES IN LENGTH, NOT TO EXCEED 50 FEET IN LENGTH, MINIMUM ONE INCH CONDUIT) 4. METER SOCKET 5. GROUNDING WIRE AND GROUND RODS 6. ELECTRICAL CONDUIT AND SERVICE WIRES (CUSTOMER OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) 7. FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AND FIBER OPTIC CABLE AFTER SERVICE IS ESTABLISHED) 	<p>○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD</p> <ol style="list-style-type: none"> A. CURRENT TRANSFORMER (CT'S) B. METER C. TEST SWITCHES D. FIBER GATEWAY (FIBER SERVICE POINT)
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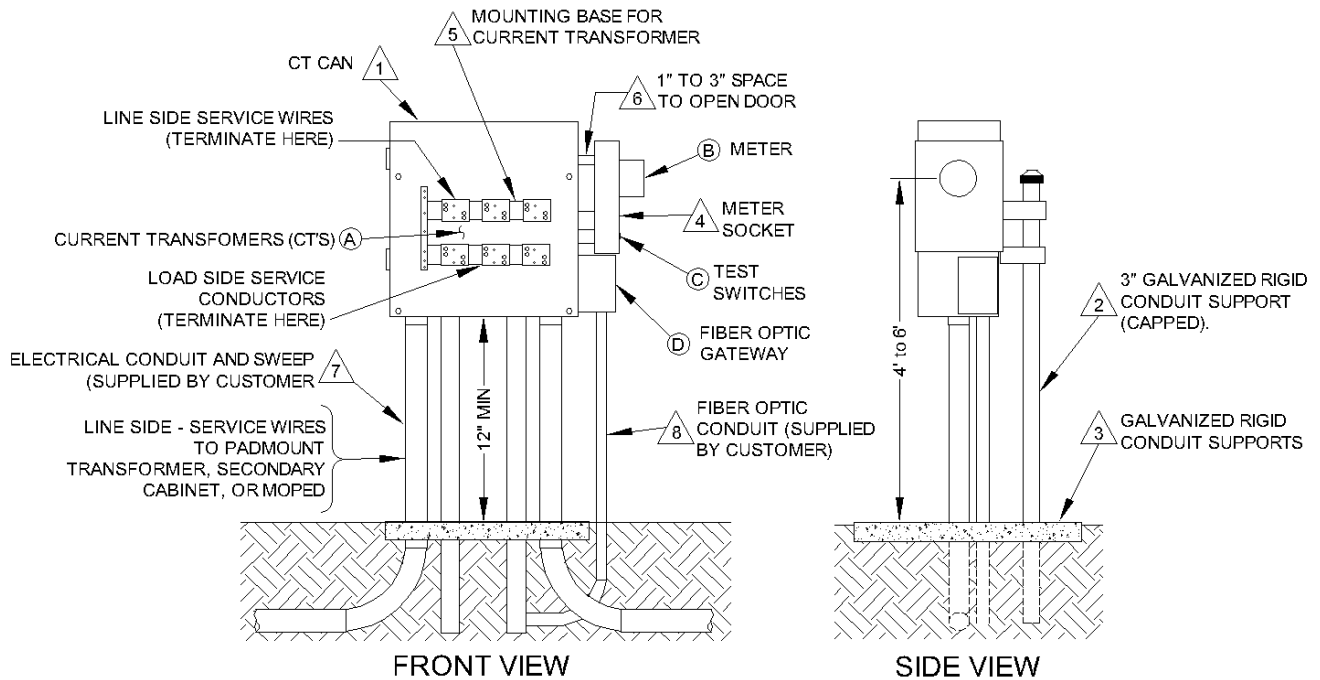
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FIGURE 14. CURRENT TRANSFORMER METERING - WALL MOUNT- BELOW 600 VOLTS, 800 AMPS MAX (FOR COMMERCIAL SERVICE)

Figure 14. Current Transformer Metering – Wall Mount

Below 600 Volts, 800 Amps Max

Figure 15. Current Transformer Metering – Post Mounted

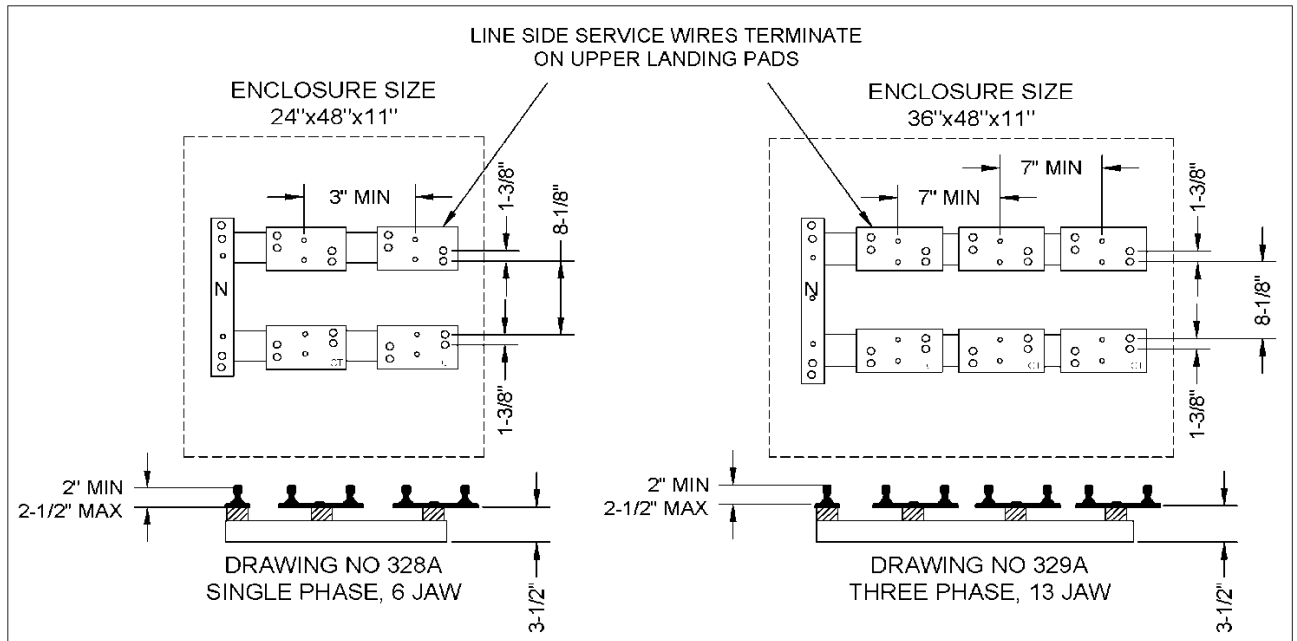


<p>△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> 1. CT CAN 2. 3" GALVANIZED RIGID CONDUIT SUPPORT (CAPPED). 3. GALVANIZED RIGID CONDUIT SUPPORTS MUST BE SET IN A CONCRETE FOOTING ADEQUATE TO SUPPORT THE CT STRUCTURE MINIMUM 6"x24"x24" FOOTING FOR A SINGLE RIGID CONDUIT SUPPORT. METAL SUPPORT CAN BE SQUARE TUBE DESIGN (2"x24"x24") OR EQUIVALENT (METAL), WITH ANGLE IRON (2"x2"x$\frac{3}{8}$") SUPPORTS AND MUST BE SET IN (6"x24"x24" CONCRETE FOOTING. 4. METER SOCKET 5. MOUNTING BASE FOR CURRENT TRANSFORMERS (CT'S) 6. CONDUIT FOR METER WIRING HARNESS 7. ELECTRICAL CONDUIT AND SERVICE WIRES (CUSTOMER OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) 8. FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AND FIBER OPTIC CABLE AFTER SERVICE IS ESTABLISHED) 	<p>○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD</p> <ol style="list-style-type: none"> A. CURRENT TRANSFORMER (CT'S) B. METER C. TEST SWITCHES D. FIBER GATEWAY (FIBER SERVICE POINT)
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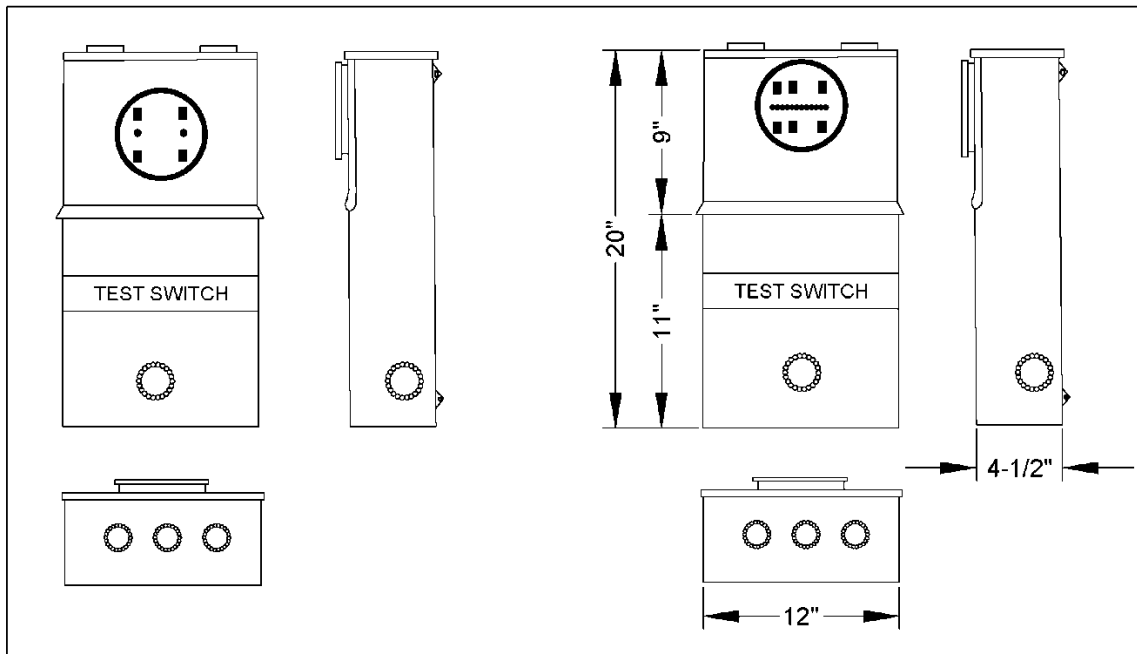
**FIGURE 15. CURRENT TRANSFORMER METERING - POST MOUNTED
(FOR COMMERCIAL SERVICE)**

Figure 16. Current Transformer Cabinet Sizes



REVISED: 02-24-23

FIGURE 16. CURRENT TRANSFORMER CABINET SIZES

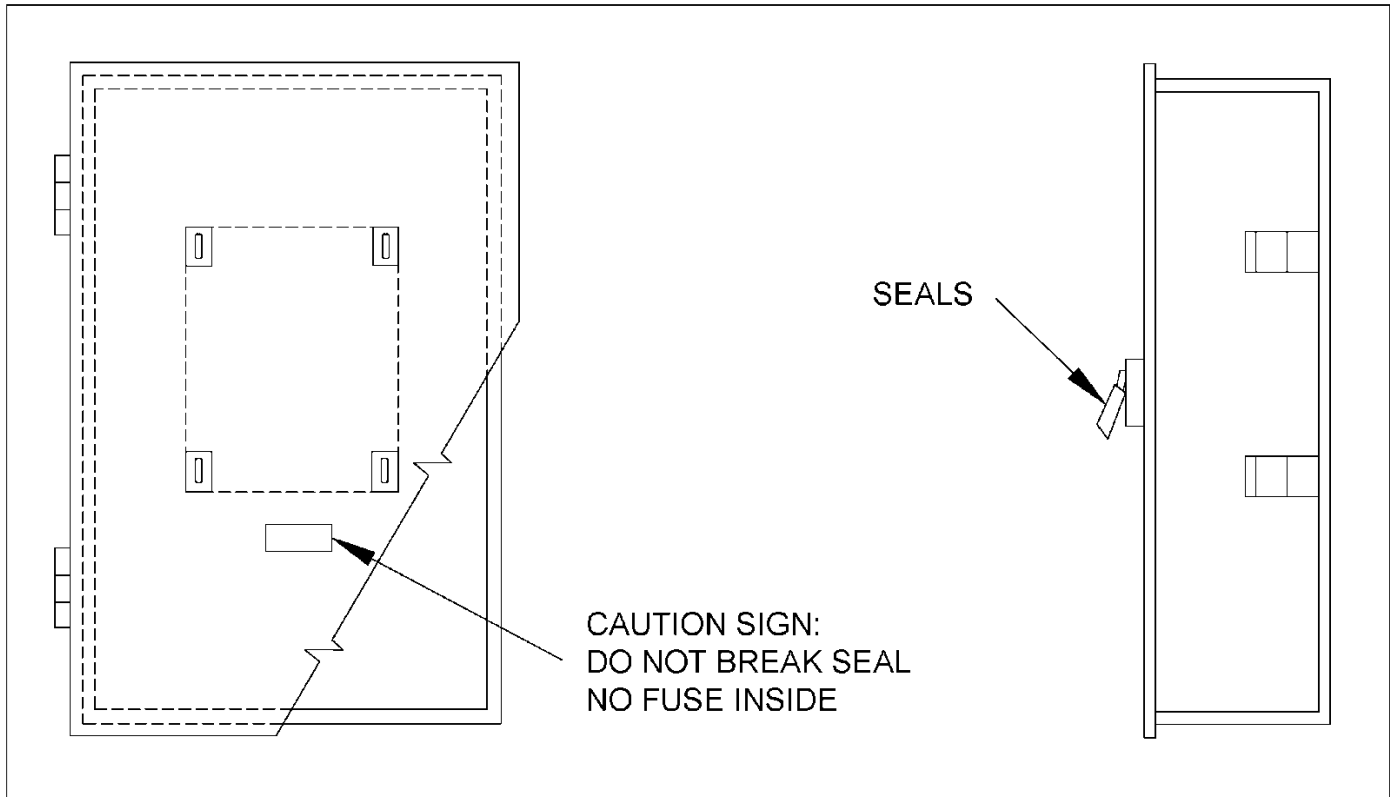


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ALL SECTION COVERS SHALL BE INDEPENDENTLY REMOVABLE. UPPER COVER SHALL BE NON-REMOVABLE WHEN METER IS IN PLACE. LOWER COVER SHALL BE SEALABLE AND PERMANENTLY LABELED; "DO NOT BREAK SEALS, NO FUSES INSIDE."

FIGURE 17. REMOTE SOCKET FOR CURRENT TRANSFORMER METERS, REFERENCE EUSERC 339 FOR SWITCH PERCH DIMENSIONS AND LABELS.

Figure 17. Remote Socket for Current Transformer Meters



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**FIGURE 18. CURRENT TRANSFORMER CABINET
800 AMPS MAXIMUM, 0-600 VOLTS**

Figure 18. Current Transformer Cabinet – 800 Amps Max, 0-600 Volts

GLOSSARY

Approved Service Consultant - A person who has previous satisfactory experience with Grant PUD, attended Grant PUD training, and is knowledgeable of the Service Connection Agreement process.

Connection Point - The designated point on the Customer's property where their secondary service is connected to Grant PUD's facilities. This would be at the weatherhead for an overhead secondary service and at a secondary termination point(moped(pedestal)/vault/transformer) for an underground secondary service.

Demarcation Point - A designated point on the Customer's property, at which Grant PUD's Facilities end and the Customer's Facilities begin. It can be for either an overhead or underground primary metered service.

Engineering Technician - A Grant PUD employee that designs construction projects and coordinates construction activities.

Foreign Easement - A recordable document granting Grant PUD permission to cross another person(s) property.

Guy or Guying - Cables or braces used to relieve the strain of overhead conductors on masts and poles.

HVAC - Heating, Ventilation and Air Conditioning.

Line Extension Service Request – A Service Connection Application that requires engineering and/or right of way.

Meter Pole – Secondary pole with the customer's meter base attached.

Meter Socket (meter base) - The mounting device consisting of meter jaws, connectors, and enclosure for accommodating socket-type meters.

Metered Temporary Service – A metered service panel provided and installed by the customer or his contractor for the purpose of providing power during construction of a premise.

NEC - National Electric Code

NESC - National Electric Safety Code

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

Padmount Transformer - An electrical device which is mounted on a base used to change the voltage to a level appropriate to serve customers.

Dedicated *Padmount Transformer*: A *padmounted transformer* which serves one account only.

Multi-Service *Padmount Transformer*: A *padmounted transformer* which serves more than one account.

Primary Wire - Electrical high voltage conductor.

Rigid Clevis - A porcelain insulator with mounting bracket used to terminate overhead services.

Secondary conductor – On an overhead service, the electrical conductors that extend from Grant PUD's system to the connection point at the weatherhead. On an underground service, the electrical conductors go from the connection point to

the Customer's metering equipment. Underground secondary conductors are provided and installed by the Customer, and overhead secondary conductors are installed by Grant PUD.

Secondary Handhole - A box that is flush mounted in the ground which contains electrical equipment or *splices*.

Secondary Pedestal - A box that is mounted above ground level which contains electrical equipment or *splices*.

Self-Contained - In reference to *meter sockets*: a device designed and rated to continuously carry the entire capacity of the service entrance equipment. The maximum *self-contained meter socket* current rating approved by Grant PUD is 400 Amps (also called a single-phase Class 320 A meter). **Service Entrance Conductors** - The electrical conductors in an overhead service that extend from the *meter socket* up through the service mast and extend 18 inches past the weatherhead to the *connection point*. *Service entrance conductors* are provided and installed by the customer.

Service Mast - The conduit above the meter used to provide mechanical protection for the service entrance conductors and to support the service drop from Grant PUD's system.

Service Pole – Intermediate pole to support overhead secondary service.

Service Point – point where the customer's telecommunications system connects to Grant PUD's systems. This point will be the CAT5 RJ45 cable connectors in the Gateway enclosure.

Simple Service Request - A Service Connection Application for electrical service where Grant PUD's facilities exist on customer's property and does not require right of way.

Splice - A junction point between two conductors.

State Electrical Inspector - The qualified representative of the State of Washington Department of Labor and Industries, who has been authorized to inspect electrical service installations.

Utility System – Grant PUD electrical distribution system which includes the customer owned service entrance and meter socket (base).

Weatherhead - A device installed at the top of the service entrance conduit that prevents water from entering the conduit, while allowing access for the service entrance conductors.

TELEPHONE NUMBERS

Grant County PUD

New Construction Services	766-2501
Customer Service Call Center	766-2505
Grant County PUD Toll Free Number	1-800-422-3199

State & County Government

Department of Labor and Industries- 3001 W. Broadway, Moses Lake	764-6900
Department of Labor and Industries Electrical Inspection (24 hour) Line.....	764-6966
Building Department - 332 Division West, Ephrata.....	754-2011
Health District – 1 st & C Street N.W., Ephrata	754-6060
Health District – 1038 W Ivy Avenue #1, Moses Lake.....	766-7960

City and Town Government

Town of Coulee City - 501 Main Street West.....	632-5331
Town of Electric City - 10 Stevens Avenue.....	633-1510
City of Ephrata - 121 Alder S.W.....	754-4601
City of George - 102 Richmond Avenue	785-5081
City of Grand Coulee - 306 Midway Avenue.....	633-1105
Town of Hartline - Main Street North	639-2606
Town of Krupp (Marlin) - 293 Urquhart Avenue North	345-2531
City of Mattawa - East 521 Government Road	932-4037
City of Moses Lake - 321 Balsam Street- Existing Service	766-9214
City of Moses Lake - 321 Balsam Street - New Service.....	766-9235
City of Quincy - 104 B Southwest	787-3523
City of Royal City - 445 Camelia Street	346-2263
City of Warden – 121 S Main Avenue.....	349-2326
City of Wilson Creek- 254 Railroad Street.....	345-2531

Utilities Underground Location Center (UULC).....	811
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APPENDIX (STANDARD 10.0008 TRENCH CONSTRUCTION – PVC CONDUIT)

Page 1 of 6 Trench Construction, PVC Conduit

Section Number 10.0008

TRENCH CONSTRUCTION, PVC CONDUIT

1. SCOPE:

This specification covers trenching, trenching location in reference to other utilities, conduit location within the trench, backfill and compaction of backfill.

2. STANDARDS:

This specification includes reference to the following “*The American Society for Testing and Materials International*” (ASTM International) standards.

2.1. Soil Compaction:

ASTM D 698-00a Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort 12,400 ft.-lb/ft cubed.

2.2. Soil Classifications for Backfill:

ASTM D 2487-00 Standard Practice for Classifications of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2488-00 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

3. TERMINOLOGY:

- 3.1. **Trench:** Excavation for placement of individual conduits or duct systems for electrical and/or communication services.
- 3.2. **Backfill Area:** Area of trench backfilled in three zones- 1) Foundation 2) Embedment 3) Final Backfill Zone.
- 3.2.1. **Foundation:** Used only where the trench bottom is unstable or a material that does not compact. Additional compacted material may be added to make a secure base.
- 3.2.2. **Embedment:** Compacted material placed below, around and above the conduit/duct system to provide support and protection for the conduit/duct system.
- 3.2.2.a. **Bedding:** Material placed on the trench bottom or on foundation to provide uniform support and protection for the conduit(s)
- 3.2.2.b. **Conduit Zone:** Material placed on either side of the conduit and/or between ducts. This material prevents lateral displacement of the conduit/duct due to live loads or water infiltration.
- 3.2.2.c. **Spring Line Cover:** Six inches of material placed above the top of the

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CONSTRUCTION STANDARDS

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DESIGNER:	AJW		
STANDARDS ENGR:	E WENKE	LAST REV 07/16/2005	

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Section Number 10.0008

TRENCH CONSTRUCTION, PVC CONDUIT

conduit/duct system. This material provides protection for the conduit duct system from final backfill and/or live loads imposed on the trench.

- 3.2.3. Final Backfill: Trench area that extends from the top of the 6 inch cover to the top of the trench. Material here is native soil, unless the material contains cobbles or boulders over 4 inches in diameter.
- 3.3. Spring Line: The top of a single conduit or highest duct in the trench with more than one conduit.
- 3.4. PVC Conduit: Polyvinylchloride (PVC) conduit used for single conduit runs or duct systems. PVC conduit for electric systems will be grey. PVC conduit for fiber optic system shall be orange.
- 3.5. Definitions: This standard includes the definitions in ASTM 2487 and 2488, Section 3 "Terminology."

4. BACKFILL MATERIALS:

General: All backfill materials are defined in ASTM 2487 & 2488, Section 3 "Terminology." All backfill used in any trench shall be organic-free material. This includes organic particles and larger organic debris.

- 4.1. Foundation Materials:
This material shall be compactible material such as gravel, sand, silt or clay or a mixture of those materials. Nothing larger than 1 inch minus gravel/aggregate shall be used. See ASTM 2487 & 2488, Section 3 "Terminology," 3.1.2 "Gravel" (subsection "fine")
- 4.2. Embedment Zone Materials:
Material in all three areas, bedding, conduit zone and cover, shall be sand, silt or clay material. Material shall pass a number 40 sieve but does not have to pass a number 200 sieve. Clay or Silt materials are defined as *fine grained top soil or soil free of any gravel, rock or rock chips*. See ASTM 2487 & 2488, Section 3 "Terminology," 3.1.1 "Clay" & 3.1.7 "Silt."
Sand is defined as *fine particles of rock, common reference "blow sand"*. See ASTM 2487 & 2488, Section 3 "Terminology," 3.1.6 "Sand" (subsection "fine")
- 4.3. Final Backfill Zone Materials
This material can in most cases be native soil/rock excavated from the trench. However if this material contains cobble/boulders larger than 4 inches in diameter it shall not be used.

5. CONSTRUCTION LOCATION/DIMENSIONS:

- 5.1. Location: The trench shall be within the easement granted to the District. The trench shall not be closer to other utilities than described below.

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Section Number 10.0008

TRENCH CONSTRUCTION, PVC CONDUIT

- 5.1.1. **Water Lines:** The electric trench shall be a minimum of 18 inches horizontally from any water line at any elevation.
- 5.1.2. **Gas Lines:** The electric trench shall be a minimum of 10 feet horizontally from any gas transmission line and 18 inches horizontally from any gas service line.
- 5.1.3. **Sewer Lines:** Where the sewer line is at or above the electric line elevation the horizontal separation shall be a minimum of 24 inches. If the sewer line is at a lower elevation than the electric line the trench shall be a minimum of 36 inches horizontally from the sewer line trench.
- 5.1.4. **Communications:** Communication lines, other than the District's fiber optic cable, shall be located no closer to the primary or secondary electric lines than 12 inches. This is a radial measurement of 360 degrees.
- 5.2. **Width:**
The minimum width of an electrical trench shall be 24 inches for a single conduit up to 4 inches in diameter. (See Figure # 1 in Section 7 under 7.1 Cross Section Dimension on page 5 of 6.) Trenches for conduit larger than 4 inches in diameter or with more than one conduit shall be determined by the conduit(s) placement in the trench. Minimum trench width shall be 5 times the diameter of a single conduit or 24 inches. (Which ever is larger).
- 5.3. **Depth:**
The minimum depth of an electrical service trench shall be 36 inches for primary power, 30 inches for secondary power, and 36 inches for fiber optic cable. This depth shall be measured from the top of the conduit (Conduit Spring Line). The trench must be deep enough to place the foundation (if required) and bedding so the entire diameter of the conduit is below minimum grade. (Exceptions to this must have prior District approval and be installed as shown in this Standard. See Figure # 2 in Section 7 under 7.2 Concrete Encased Conduit on page 6 of 6.)
- 5.4. **Backfill:**
 - 5.4.1 **Foundation:** Foundation where required shall be a minimum of 2 inches of compacted material. Foundation backfill does not need to be continuous provided compaction & cable protection is achieved.
 - 5.4.2 **Bedding:** Bedding shall be a minimum of 2 inches continuous compacted material and shall be constructed so the conduit is in contact with the bedding at all times.
 - 5.4.3 **Conduit Zone:** Conduit Zone depth shall be determined by the diameter of the conduit. The conduit zone shall be from the bedding to the spring line of the conduit and shall consist of material compacted along each side of the conduit. The material shall be

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TRENCH CONSTRUCTION, PVC CONDUIT

installed so there are no voids along the bottom sides of the conduit. Filling these voids shall be accomplished by shovel slicing, water compaction or other standard method.

- 5.4.4. Six Inch Cover: Cover zone shall be a minimum of 6 inches of compacted material.
- 5.4.5. Final Back Fill Zone: The final back fill zone shall restore the trenched area to the original contours with compacted native or borrow fill.

6. COMPACTION:**6.1. General Compaction:**

All trench materials shall be compacted to 95% compaction. Compaction can be achieved by water, vibration or mechanical means. All material shall be compacted in 6 inch layers or as per ASTM D 698.

See ASTM D 698 for full requirements.

6.2. Zone Required Compaction:

6.2.1. Trench Bottom/Foundation: The trench base shall be compacted if excavated with a back hoe. All rake ridges shall be compacted or removed to undisturbed soil. If full or partial foundation is required it shall be added in minimal lifts and compacted to 95% compaction.

6.2.2. Bedding: The compacted (95%) two inches of bedding shall form a smooth pipe bed for uniform support of the conduit.

6.2.3. Conduit Zone: The compaction of the conduit zone shall be done in a manner that shall not damage or compress the conduit. Compaction shall be a minimum of 95%, as required.

6.2.4. Six Inch Cover: The conduit cover zone shall be in one lift and compacted to 6 inches @ 95% compaction.

6.2.5. Final Backfill: Final backfill requirements shall be determined by the material used and the land use over the trenched area. Compaction shall be a minimum of 95% with lifts that shall not exceed 8 inches regardless of the material employed as backfill.

6.2.5.1. Landscaped Areas: Any landscaped area shall be restored with acceptable top soil or native fill.

6.2.5.2. Parking Lot/Street: Any material and compaction under lots and/or streets shall be determined by the governing agency/owner.

6.2.5.3. Sidewalks/Curbs/Retaining Walls: Native fill shall be replaced with either 5/8 or 3/4 inch minus material that is compacted to full density.

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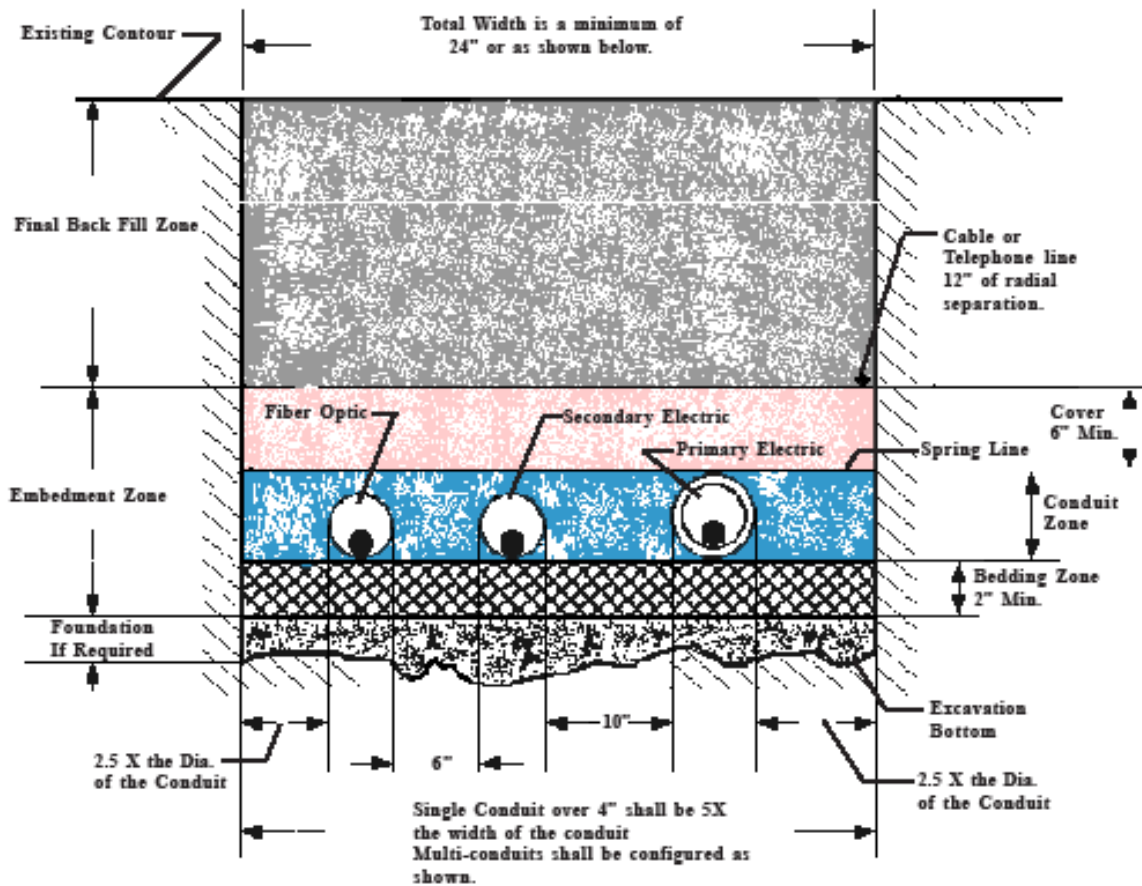
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7. DRAWINGS/DIAGRAMS/ILLUSTRATIONS

Figure #1 below is a typical trench layout cross sectional view showing the various zones and minimum required dimensions.

Figure #2 on page 6 of 6 is a cross section view of a concrete encased conduit. This method of reduced clearances is acceptable only with approval of District Staff.

7.1 Figure #1 Cross Section Dimension:



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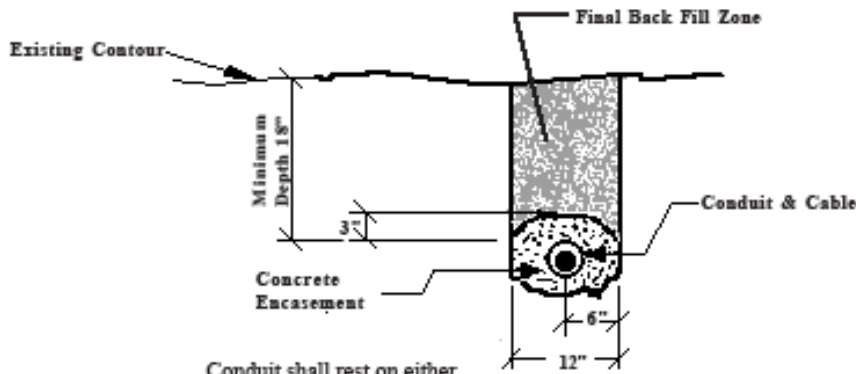
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7.2 Figure #2 Concrete Encased Conduit



Conduit shall rest on either concrete or suitable foundation.
 Concrete encasement shall be a 4 sack cement mix.

Notes:

1. Gas Transmission Lines require 10 feet of separation.
2. Horizontal Separation: Water/Gas Service lines must be a minimum of 18 inches from electric primary and secondary conductors.
 Secondary conductors must be a minimum of 6 inches from primary conductors
 Sewer shall be separated as per instruction in Section 5.1.3 of this document.
3. Radial Separation TV/Tele-Cable must be a minimum of 12 inches from primary and secondary conductors.
4. The District fiber optic conduit must be a minimum of 6 inches from the electric primary and secondary conductors and have a minimum radial separation of 12 inches from foreign cable/telephone utilities.

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STANDARDS ENGR:	E WENKE	LAST REV	07/16/2005

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