

Commercial Service Workbook

Electric and Fiber Optics for
Multi - Family
Irrigation
Commercial Services
and
Construction
Temporary
Services

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 "District".

Note: *italicized* words are defined in the Glossary.

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.

Initial Contact

Information for new services or modification to existing services is available at the District's local office(s). The District's contact person will be the *Service Expediter*.

District Responsibility

The District has developed this workbook to assist the Customer with District Policy and procedures. Included in the workbook is a Service Connection Agreement.

The Customer shall complete a "Service Connection Agreement" and return it to the *Service Expediter*. The *Service Expediter* will route the request to the appropriate District personnel.

The *Service Expediter* will coordinate design of your project with either a serviceman or an *Engineering Technician*.

The *Service Expediter* will contact the Customer and if necessary, arrange for an on-site field visit with an *Engineering Technician*. At this point, the *Engineering Technician* will discuss the line extension requirements for the permanent service.

The District will construct facilities up to a predetermined *demarcation point*.

The District will connect the service at the *demarcation point* after all inspections have been made and approved by the appropriate inspectors. The Washington Labor and Industries *State Electrical Inspector* will notify the District when the service installation has passed inspection.

Customer Responsibility

The Customer reads the workbook and completes the "Service Connection Agreement" then mails, faxes, or delivers it to the *Service Expediter*. NOTE: 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 *demarcation 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 District approved metering equipment.

The Customer is responsible for providing equipment that will not adversely affect the District's voltage parameters or cause fluctuation on the District's 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 "Contribution-in-Aid-of-Construction" (CIAC). Depending on the type of service connection. The CIAC will either be billed on the first monthly billing or be paid prior to the District connecting to the service at the predetermined *demarcation point*.

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 Transformer meter
1Ø	167	120/240	400 amp	401+ amps
3Ø	1000	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 the District.

Emergency Generators

Customer-owned emergency generation equipment interconnected with the District's electrical system must be inspected by the Department of Labor & Industries. The customer shall notify the District of their intent to utilize an emergency generator or net metering and provide District 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). The District 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 the District of any changes or modifications to an electrical service. A "Service Connection Agreement" shall be completed detailing the anticipated changes or modifications. Failure to notify the District of changes and modifications may result in additional charges to damaged equipment.

Demarcation Point

A *demarcation point* is established solely for the purpose of construction. The *demarcation point* defines where the District's construction stops and Customer construction starts for either electric service or fiber optic telecommunications service.

A *demarcation point* and *service point* may or may not be at the same location, but are distinguished by the status of construction or active service.

The *demarcation point* for an installed electrical service is the termination point of your provided and installed service equipment to the District's system.

The *demarcation point* for fiber is the customer-accessible cable jacks located on the Gateway enclosure. This is the fiber *Point of Contact*.

Service Point - Electric

A *service point* is defined as "the point of connection between the District's facilities (normally sealed or locked and restricted to public access) and the Customer's wiring". The District will maintain the facilities up to this point when construction is completed. This point is described as follows:

- a. Overhead Service, 400 amp for 1Ø and 200 amp for 3Ø – The *service point* is at the source side of the meter lugs. The Customer provides and maintains the weather head, conductor in the meter loop, and the meter sockets. The District provides the meter and will connect to the conductor at the weather head.
- b. Overhead Service, 401 amp for 1Ø and 201 amp for 3Ø – The *service point* will be at the weather head with the Customer providing a Current Transformer (CT) enclosure with internal bus and *meter socket* ahead of any disconnects. Service sizes are limited to connected load up to 167 kVA 1Ø and 500 kVA 3Ø. However, the District may elect to serve these loads with an underground *padmount transformer*.
- c. Underground Service, 400 amp for 1Ø and 200 amp for 3Ø – The *service point* is at the source side of the meter lugs. The Customer provides the meter sockets and conductor depending on the *demarcation point*. The District provides the meter and will connect to the Customer supplied conductor at the *demarcation point*.
- d. Underground Service, over 401amps for 1Ø and 201 amps for 3Ø – If an individual transformer is provided for service, the District may elect to CT meter at the secondary bushings of the transformer. However, the District may elect to have the Customer supply a CT enclosure with bus, *meter socket*, and the conductor to the CT enclosure and the District will connect at the *demarcation point*.

Service Point - Fiber Optic

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

**SERVICE CONNECTION AGREEMENT
PUBLIC UTILITY DISTRICT OF GRANT COUNTY**

page 1 of 2

PO Box 878 Ephrata WA 98823

(All conditions of service are subject to the District Customer Service Policies)

SERVICE EXPEDITER: Telephone 509-766-2501 Fax 509-754-6658 email serviceexpediter@gcpud.org

1) CUSTOMER INFORMATION:

NAME			DATE
MAILING ADDRESS			
PHONE	Primary:	Secondary:	
EMPLOYER			
SPOUSE NAME			SPOUSE EMPLOYER:
NEED LIFE SUPPORT?	<input type="checkbox"/> YES <input type="checkbox"/> NO if yes, what type?		
PRIOR GRANT PUD SERVICE	<input type="checkbox"/> YES <input type="checkbox"/> NO List name(s) service was listed under:		
Description of animals at residence			
Contact Person if other than owner	Name:	Phone:	

2) SERVICE LOCATION:

Residential or Commercial

Irrigation Only

Address:		Farm Unit:	Block:	
City:		Twp:	Rng:	Sec:
Plat Addition:		Legal Owner:		
Lot:	Block:	Mailing Address:		
Parcel Number:		Parcel Number:		

3) LOAD INFORMATION:

<input type="checkbox"/> Single Phase 120/240 (recommended residential)		
<input type="checkbox"/> Three Phase 120/240 (OH only)	<input type="checkbox"/> Three Phase 120/208	<input type="checkbox"/> Three Phase 277/480
<input type="checkbox"/> Underground	<input type="checkbox"/> Overhead	

Construction Temporary

<input type="checkbox"/> Non Metered	<input type="checkbox"/> Metered
--------------------------------------	----------------------------------

Residential:

House size (Sq Ft)		Anticipated KW Usage (including HVAC)	
Shop size (Sq Ft)		Anticipated KW Usage (including HVAC)	
Meter Base Size in Amps	<input type="checkbox"/> 200 <input type="checkbox"/> 400 (320 continuous)		<input type="checkbox"/> Over 400 (CT Meter)
Building Type	<input type="checkbox"/> Stick Built <input type="checkbox"/> Manufactured Home Other:		
Future or Additional Load			

Commercial/Non-Residential:

Type of Business or Facility			
Service Size in Amps		General Load HP/KW:	
Motors in HP		Other:	

Irrigation:

Service Size in Amps		Individual Pump(s) – HP:
Number of Drive motors(HP)		
End Gun Pump(HP)		Other Pumps or Motors:
TOTAL HP LOAD		Future Load:

***Please be sure to sign the agreement on page 2 of 2**

SERVICE CONNECTION AGREEMENT

page 2 of 2

RIGHTS AND OBLIGATIONS

Public Utility District No. 2 of Grant County (Grant County PUD) will construct electrical facilities on customer's property, if necessary. In exchange for part of this value received, Customer grants Grant County PUD the right to construct, operate, patrol, maintain and remove overhead and/or underground electrical distribution lines and associated appurtenances. Customer grants Grant County PUD the right to clear the area where the distribution equipment and facilities are located on the customer's property and keep the same clear of brush, trees, timber, structures, improvements and all fire hazards. Customer also grants to Grant County PUD the right of ingress and egress to and from Grant County PUD distribution electrical facilities. Customer agrees not to place, construct or maintain any building, structures or other improvements within a 10 foot area of Grant County PUD electrical facilities. Customer agrees not to reduce or enlarge the clearances between the ground and any distribution lines within a 10 foot area of Grant County PUD electrical facilities. Grant County PUD may seek and enforce specific performance of any activities required of the customer by this section.

SITE SKETCH

Draw a plan of your site including building, septic, drain field, sewer, cable TV, telephone, gas, driveway, other future structures, property lines, proposed power line route and nearest transformer number if available. Also, identify at least two bordering roads and any other foreign easements areas (i.e., irrigation district, public lands, properties belonging to other individuals, etc.)

Please note the date you will have your proposed transformer/service/meter locations staked. Date:

Site Sketch



Be sure to include location of customer's meter socket

FIELD NOTES:

Legal Land Owner of Record Signature

Your signature indicates you have read and agree to Conditions stated in the "Rights and Obligations" section. Customer understands the work requested & authorizes PUD to begin work as listed on the Service Connection Agreement form. Customer agrees to pay all charges associated with Construction.

Official Use:

Completing the Service Connection Agreement

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

- Customer Information
- Service Location
- Load Information
- Rights and Obligations
- Site Sketch
- Signature of Legal Land Owner

When completing the Service Connection Agreement, please type or print legibly with a pen. The information on the Service Connection Agreement 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 requested information is provided or the request may be delayed or returned.

Customer Information

Include the customer's full name, current mailing address, and appropriate phone numbers. Also include employer name and spouse's name and employer, if applicable.

Check the appropriate box if anyone connected to this new service will be on a life support system(s). If the answer is "yes" list the type of support system; i.e. oxygen, kidney dialysis, etc. **If the life support system is critical to an individual's well-being, then the customer may need to provide back-up power in case of scheduled and non-scheduled power outages. (NOTE: Customer-owned emergency generation equipment interconnected with the District's electrical system must be inspected by Department of Labor and Industries. The customer shall notify the District to assure generators are connected by methods acceptable to the District.)** The life support information will be included in the customer's account file and will be beneficial when scheduling power outages. However, the District may not notify the customer for either a scheduled or non-scheduled power outage.

Check the "Yes" box if the customer has had prior service with the District and provide the name(s) the service was listed under.

Are there pets (especially dogs) that would interfere with construction, maintenance, or on-

going meter reading? If so, list whether the pet(s) are confined, number of pet(s), type, and name of pet(s), such as "1 German Shepherd named Ralph chained up". This information is helpful to District personnel when reading meters and maintaining the service.

List any contact person, other than the customer, who is authorized to represent the customer and coordinate construction activities. Include his or her name 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; i.e. a street address, a plat lot, a block, and division, 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.

Load Information

The Load Information section of the "Service Connection Agreement" should be completed with accurate information. Include any future or additional loads. This information will allow the District 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 at a later date.

For residential service, check the box indicating "Single-Phase 120/240". This is a normal residential service. Normally, three-phase services are for irrigation or commercial applications.

Load Information (con't.)

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, the District 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 2, "Typical Overhead Construction,") and: (Chapter 8, Figure 3, "Typical Underground Construction") to identify overhead and/or underground construction.

Mark the appropriate box for phase and voltage then designate whether temporary or permanent. See "Available Service (Voltage & Size)" to determine service voltage and size, Table 1, (page 1).

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 indicate the largest connected load, i.e. hp, HVAC, etc. and any future anticipated load(s). List the type of structure: i.e. concrete, steel building stick built, modular home, etc.

For Irrigation Load, complete the Load Information section. Indicate service panel size in amps, list each motor size in horse power (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, check which type the customer will provide, "metered" or "non-metered" temporary service. Cost for service will be calculated accordingly. For more information on *temporary services* please refer to Chapter Four: *Construction Temporary Services*.

Rights and Obligations

Please read this section carefully. When the legal land owner signs the "Service Connection Agreement", permission is being granted to the District 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 on Design for preparation of the site sketch.

Simple Service Fee

The fee for an underground or overhead *simple service* is \$300 (Three Hundred Dollars) and will be billed to the customer's account.

Summary

The customer completes the Service Connection Agreement and mails, faxes, or delivers it to the *Service Expediter*.

Upon receipt of the "Service Connection Agreement", the *Service Expediter* will determine if the work is a *simple* or *complex service request*.

If the job is a *complex service request*, the *Service Expediter* will notify an *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. The District'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 District 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 2 and 3).
- Mark the proposed *meter base* location and proposed transformer location.
- Show route of the underground service and footage.

District Responsibility

Upon completion of the Service Connection Agreement the District 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 or mail 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 Agreement needs to be submitted and the process started over.

The District 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 *demarcation point*.
- *Secondary above ground pedestal (mo-ped)*, as required, see Chapter 8 Figure 3.
- 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 up to the *demarcation point*.

- PVC conduit (gray schedule 40) for UG service conductor from the *demarcation point* to the *service point*.
- PVC conduit (Orange schedule 40) for fiber optic cable from the fiber vault to the *demarcation point*.
- The District 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.

Install District provided conduit and warning tape for both electric and fiber service from the *demarcation point* to the *service point*.

Provide all electrical wiring, switching vaults, transformer vaults, (Chapter 8 - Figure 3, 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*. See (Chapter 8 - Figure 3, Secondary above ground pedestal (Mo-Ped) and transformer).

Provide vault and pad for three-phase *padmount transformer* sizes 750 kVA and larger per District 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 District owned equipment, including transformers, mopeds, and metering equipment. (see Chapter 8 -Figure 9 – Clearances for Oil-Filled Equipment)

Maintain access to the meter during and after construction.

Provide and maintain a clear path/trench for your *service wire*.

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 the 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 *service point*.

CHAPTER THREE – RIGHT OF WAY

General Information

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

An *Engineering Technician* will be assigned to any "complex 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 District:

The customer shall provide the District with executed copies of any and 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 in order to protect buried facilities.

Easements for Rights-of-Way

The customer shall complete the "Service Connection Agreement" with the names of legal land owners, 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 Agreement" in order for the District to install facilities on the property.

The District will determine if additional easements for rights-of-way are required. The District will prepare all easements on District easement templates and the Customer shall obtain all property owners' signatures. The District'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 the District: Attention; Lands Department – Distribution Right-of-Way. The District 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

The District 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 the District's *primary* or *secondary wires* cross an irrigation district waterway. These permits will be obtained by the District from the appropriate irrigation district (i.e. South Columbia Basin Irrigation District, Quincy Columbia Basin Irrigation District, or East Columbia Basin Irrigation District.) A minimum of three weeks is required to obtain permit(s).

Grant County Road Permits are required whenever the District's *electrical* or *fiber wires* are within a County road right of way. A minimum of two weeks is required to obtain permit(s).

Lincoln County Road Permits are required if the District's *primary* or *secondary wires* cross a county road. The cost varies from \$75 to \$150, and is subject to change. A minimum of three weeks is required to obtain the permit(s).

**Public Agency Permits/Licenses for
Right-of-Way can't**

Washington State Department of Transportation (WSDOT) Permits are required if the District's *primary* or *secondary* wires 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 the District's underground *primary* or *secondary* wires are constructed within city limits. A minimum of two weeks is required to obtain permit(s).

Bonneville Power Administration (BPA) Permits are required if the District's *primary* or *secondary* wires cross under a BPA power line or are located in the BPA easement area. A minimum of three months is required to obtain permit(s).

United States Bureau of Reclamation (USBR) Licenses are required if the District's *primary* or *secondary* wires cross USBR property. The USBR charges \$200 (subject to change) and a percentage of Fair Market Value for this license. A minimum of six months is required to obtain license(s).

Department of Natural Resources (DNR) Easements are required if the District's *primary* or *secondary* wires cross DNR property. To obtain this permit a professional survey is required. The District will obtain the survey and the permit. The DNR charges \$2,500 (subject to change) for the costs 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 three to four 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 Agreement.

Bureau of Land Management (BLM) Easements are required if the District's *primary* or *secondary* wires cross BLM property. To obtain this permit, an application and permit fee must be submitted to BLM. The permit fee ranges from \$175

to \$1,125. A minimum of three months is required to obtain easement(s).

Railroad Permits are required if the District's *primary* or *secondary* wires cross over or under a railroad track. The cost for a permit from Burlington Northern Santa Fe Railroad is \$3,000 and the cost for a permit from Washington Central Railroad is \$3,000 (either fee is subject to change). A minimum of six weeks is required to obtain permit(s).

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

The customer has the option to provide the District 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 construction temporary service is unavailable, contact the District *Service Expediter* for more information. The customer may need to apply for a permanent service.

There are metered and non-metered temporary services.

Temporary Metered Connection Fee – The customer completes a “Service Connection Agreement” and submits it to the District *Service Expediter*. The customer installs a meter panel adjacent to District facilities and obtains an electrical permit from Washington State Department of Labor and Industries (L&I). When installation is approved by L&I, contact the District’s *Service Expediter* to schedule the connection. The metered temporary connection fee is \$10 (Ten Dollars) and will be billed at the appropriate rate schedule up to one-year. At the end of one year the District will either remove the service or charge the customer the simple service connection fee and consider the service permanent.

Temporary Non-metered Connection Fee — Customer completes a “Service Connection Agreement” and submits it to the District *Service Expediter*. The customer installs a temporary service panel limited to 60 amp; see Figure 1, adjacent to District facilities and obtains an electrical permit from L&I. When installation is approved by L&I, contact the District’s *Service Expediter* to schedule a connection. The non-metered connection fee is \$60 (Sixty Dollars) for a six month period. The District will allow one six-month extension provided the customer re-applies and pays the \$60 (Sixty Dollars) connection fee.

There are underground and/or overhead connected temporary services. Please refer to the section in this chapter for the type of service being requested. Please contact the District’s *Service Expediter* for additional information or to answer any questions.

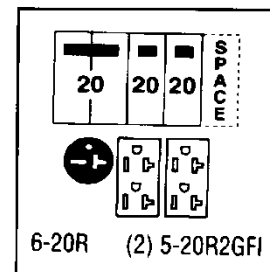
Temporary Overhead Service

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

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

Temporary Underground Service

Temporary underground service is available in the District’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 District’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*.



Wiring Diagram

Figure 1: Non-metered Temporary Service Panel

CHAPTER FIVE – CONSTRUCTION

Overhead Construction - Electric

The District will provide all materials and labor from existing overhead facilities to the *demarcation point*.

It is essential when choosing a route that clearances are taken into account. The District 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 *service wires* or the Districts electrical facilities.

For secondary overhead service, the District will install a *meter pole* (see Chapter 8 -Figure 4 – PUD Owned Meter Pole), if necessary, or attach the *secondary wire* 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 District required safe clearance standards.

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

Underground Construction - Electric

The District will provide equipment, materials, labor, trenching, bedding, and backfilling from existing overhead or underground facilities to the *demarcation point* (see Chapter 8 -Figure 6 -Underground Service from Overhead Transformer and Chapter 8 -Figure 7- Underground Service from *Padmount Transformer*).

The Customer shall provide and install any vault and pad for three-phase *padmount transformers* 750 kVA and larger, Check with the *Service Expediter* for specifications and installation details of either the pad or vault as required. In addition, the Customer shall provide the labor and install any District supplied conduit, materials, trenching, bedding, from the *demarcation point* to their load or to the *service point*.

When the *demarcation point* is different than the *point of service* the Customer shall install the facilities to District standards. The District will take ownership and maintenance responsibility up to the *service point* after the service is energized.

The Customer will need to coordinate an outage with the District in order to install the electrical facilities up to the *demarcation point*.

The District will connect the service at the *demarcation point* provided 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 Construction - Overhead

If fiber optic cable is available in the area, the District will provide and install overhead fiber optic cable to the District supplied residential Gateway which is generally located next to meter socket. (see Chapter 8 -Figure 4 - PUD Owned Meter Pole.)

Fiber Optic Construction - Underground

If fiber optic cable is available in the area, the Customer shall install District supplied conduit (normally one (1) inch orange schedule 40 conduit) from the fiber optic *demarcation point* to a point adjacent to the meter or the facility to be served. (see Chapter 8 -Figure 6 and 7.)

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.

The District 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 the District.

All easements for rights-of-way must be signed and notarized and permits received by the District prior to the service being energized.

CHAPTER SIX – SERVICE TYPES

Multi-Family Services

Multi-family dwellings are duplexes, apartment complexes 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, the District encourages the Customer to utilize 3Ø, 120/208Y voltage when the service requires a load of 45 kW and larger. This allows the District and the Customer to balance loads for better efficiencies. Most appliances are dual rated 208/240 volt and will operate efficiently at either voltage.

The District requires one *service 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

To obtain commercial service, follow the information provided in this workbook for service.

The District will provide all electrical facilities, trenching, conduit and backfill to the *demarcation 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), the District 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 the District prior to the electrical service being energized. A motor start test performed by District 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 for general service lighting, heating and power requirements. This rate does not include b2

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

To obtain irrigation service, follow the information provided in this workbook for service

Irrigation Additional Requirements cont

The District will provide all electrical facilities, trenching, conduit, and backfill to the *demarcation point* and will install the meter in the Customer's supplied *meter socket*.

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 the District prior to the service being energized.

Upon completion of the design, the District will prepare an Irrigation Power Agreement and notify the Customer of the required deposit amount in order 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. The District, 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, the District 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 the District. A motor start test performed by District 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, the District 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 the District's distribution system, the District may require the Customer to install reduced voltage starting equipment. The District will furnish the Customer with written motor starting requirements based on the motor

horsepower information provided on the Service Connection Agreement.

Motor and Equipment Protection

On motor installations, 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). The District 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.

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 the District's distribution system. The District 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 the District 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 District 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 the District at the nearest local office 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. The District will lock and seal all of the above.

All District 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 the District of such emergency. The District 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 the District requirements, the District 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 the District connecting the service.

Meter Location

The metering location shall be located outside in a non-corrosive environment that is accessible to the District 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 District supplied meter pole

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 10, 11.)

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

Meter Socket Requirements

For safety reasons, the District requires "safety socket" meter sockets on certain *self-contained* meters.

Lever by-passes 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 the District 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 the Districts 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 8, 10, and 11.)

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 8).

Customer Load Monitoring

The District 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, the District 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, District 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

The District 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 (District 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

14). 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 service 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 14 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.

60 kW or 50 hp at 120/240 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 the Districts manual bypass and dimensional requirements. (see Chapter 8 -Figure 12.)

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.

Service Conductors for Self-Contained Metering

The source (line-side) conductors shall always be connected to the top terminals in the *meter socket*. Service 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 15 and 16), 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 in excess of 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 service conductors.

Provide and install conduit and conductors between the District's transformer and the CT enclosure when the District's transformer is the *demarcation point*.

Provide and install the *meter socket* and the metering circuit conduit. (See Chapter 8 - Figure 18) 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 the District. A pull string is required in any meter conduit over 25 feet in length.

District Requirements

The District will provide and install the following:

- ☐ Current transformers (CT)
- ☐ Revenue meter
- ☐ Test switches
- ☐ Metering circuits (wiring harness)
- ☐ The District 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 19).

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 17 - Drawing 328A. For three-phase services, refer to Chapter 8 - Figure 17 - Drawing 329A.

CT Enclosure Specifications con't.

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 alternate, 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 the District for use. The Customer shall be responsible for providing proof that their equipment is equivalent to the District specifications.

<i>CURRENT TRANSFORMER (CT) SIZE ENCLOSURES and Mounting Base</i>					
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	<u>6019-HA</u> 321 amp	<u>K4797</u> 321/600/800 amp
				<u>6019-HE</u> 600/800 amp	
Three Phase 4 Wire; 201– 800 Amps	36" x 48" x 11"	364811HRTCT	CT364811-HC	<u>6067-HA</u> 201/400 amp	<u>K4798</u> 201/400/600/800 amp
				<u>6067-HEE</u> 600/800 amp	

**Table 3 – Approved Current Transformer (CT)
Size Enclosures and Mounting Base**

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													
3Ø	120/208		117TB - 7	127TB - 7	121413 - 13 ²	121413 - 13 ²								
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														

Table 4 – Approved Commercial & Industrial Meter Sockets

CHAPTER EIGHT – Drawings and Figures

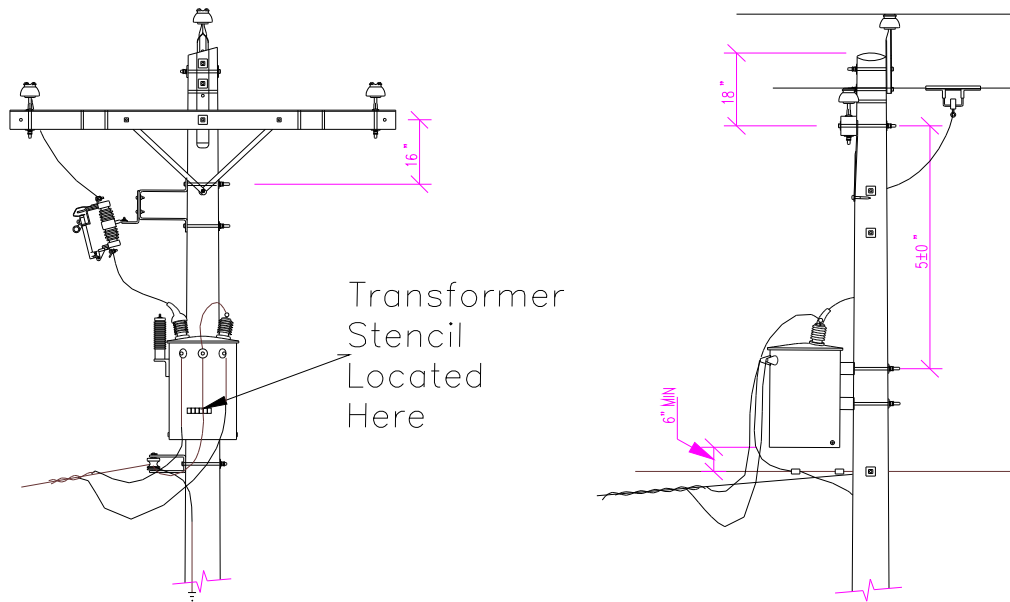


Figure 2. Typical Overhead Construction

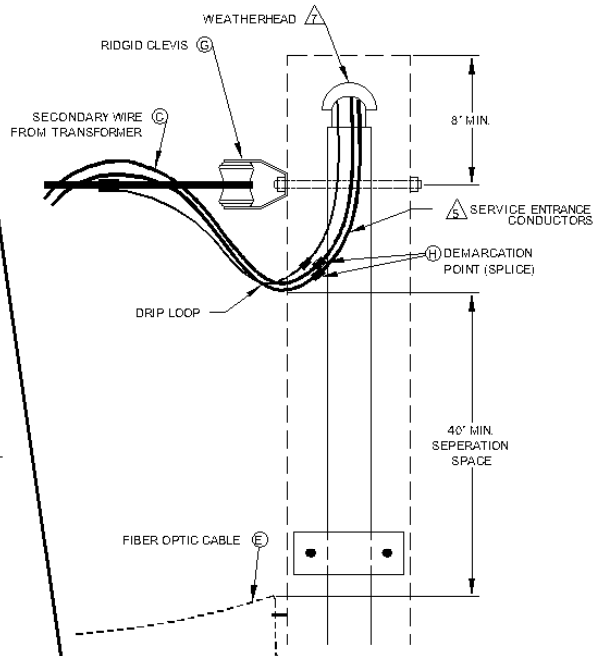
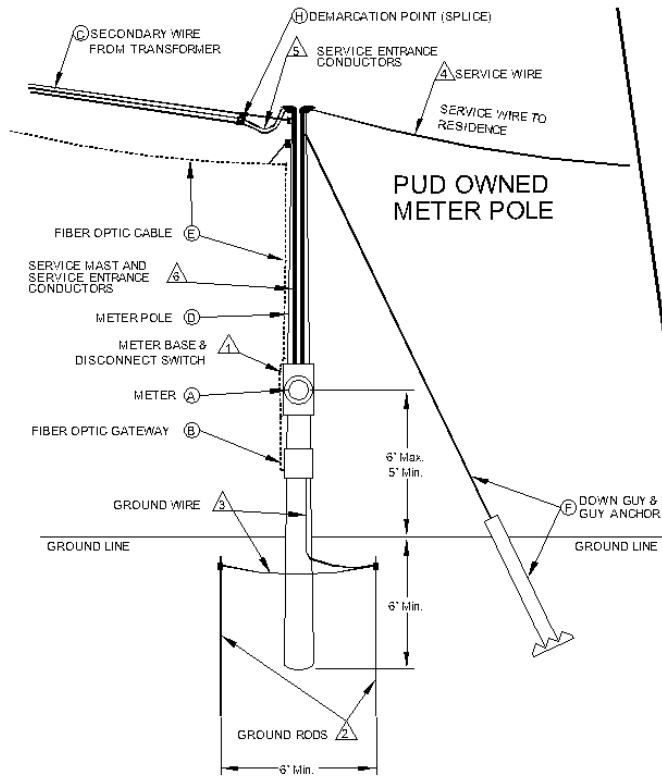


Secondary Pedestal (Moped)



Padmount Transformer

Figure 3. Secondary Above Ground Pedestal (MO-PED) and Transformer



DETAIL

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. METER POLE
5. SERVICE ENTRANCE CONDUCTORS 18 INCHES OUT OF WEATHERHEAD.	E. FIBER OPTIC CABLE
6. SERVICE MAST, SERVICE ENTRANCE CONDUCTORS	F. DOWN GUY AND ANCHOR (REQUIRED IF SECONDARY WIRE IS MORE THEN 100')
7. WEATHERHEAD	G. RIDGID CLEVIS
	H. DEMARCATION POINT (SPLICE)

Figure 4. PUD Owned Meter Pole

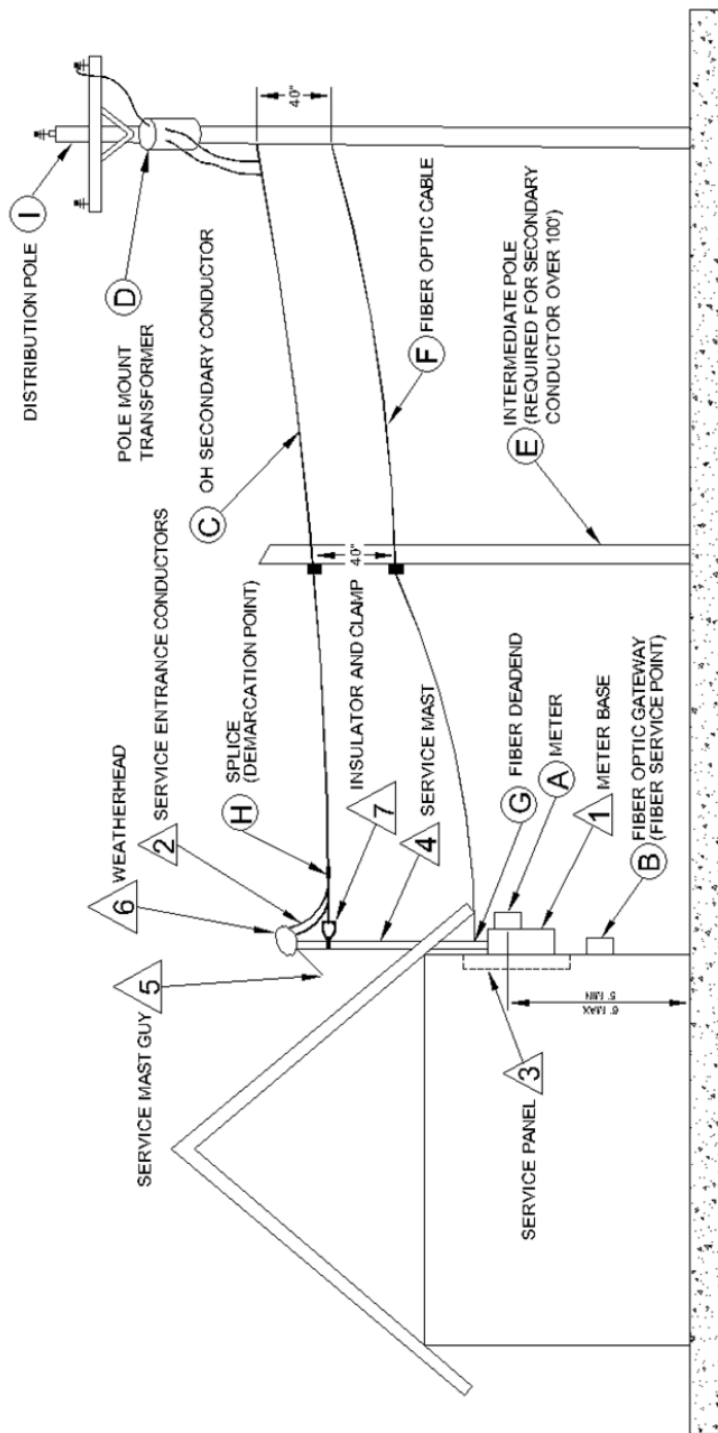
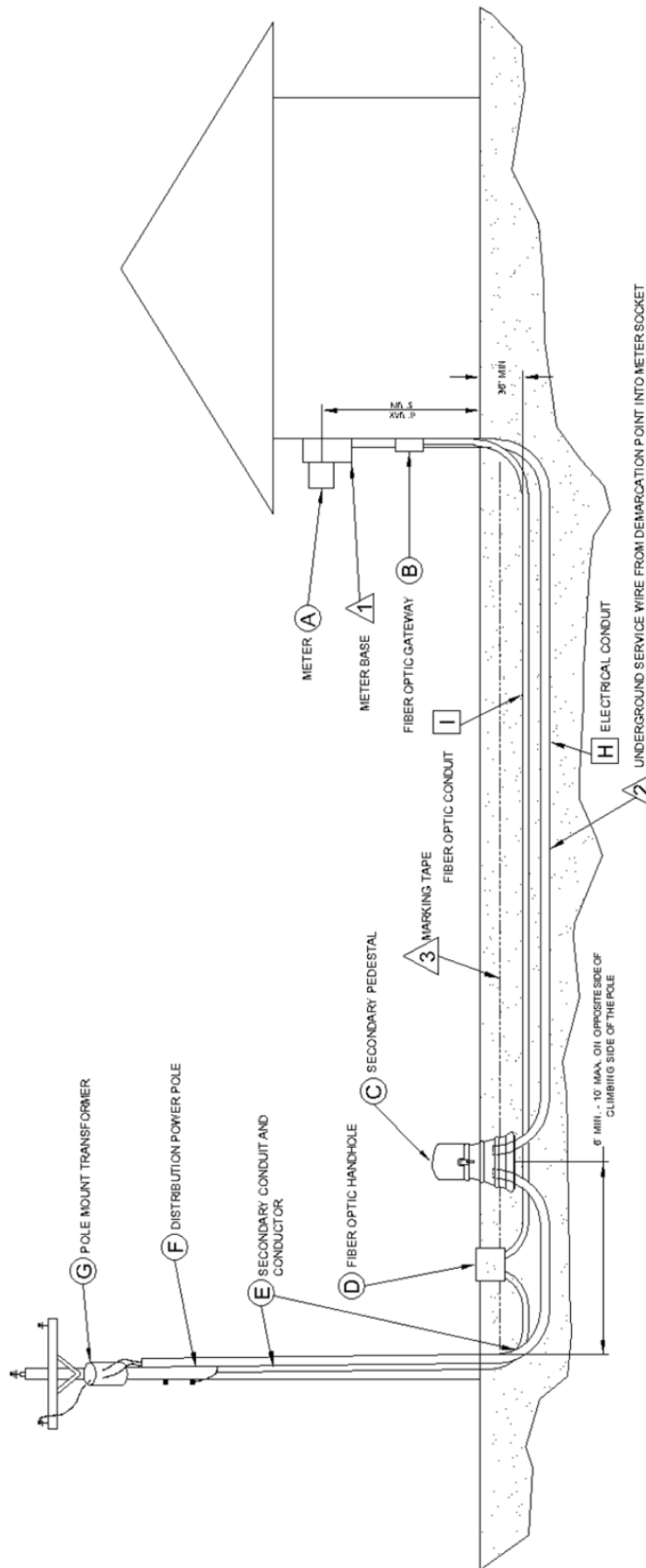


Figure 5. Overhead Service Installation



<p>△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> METER BASE UNDERGROUND SERVICE WIRE FROM DEMARCATION POINT INTO METER SOCKET (DISTRICT OWNS CONDUCTOR AFTER SERVICE IS ESTABLISHED) MARKING TAPE 	<p>○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD</p> <ol style="list-style-type: none"> METER FIBER OPTIC GATEWAY (FIBER SERVICE POINT) SECONDARY PEDESTAL FIBER OPTIC HANDHOLE UNDERGROUND SECONDARY CONDUIT AND CONDUCTOR DISTRIBUTION POWER POLE POLE MOUNT TRANSFORMER <p>□ ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> ELECTRICAL CONDUIT (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)
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Figure 6. Underground Service from Overhead Line and Pole Mounted Transformer

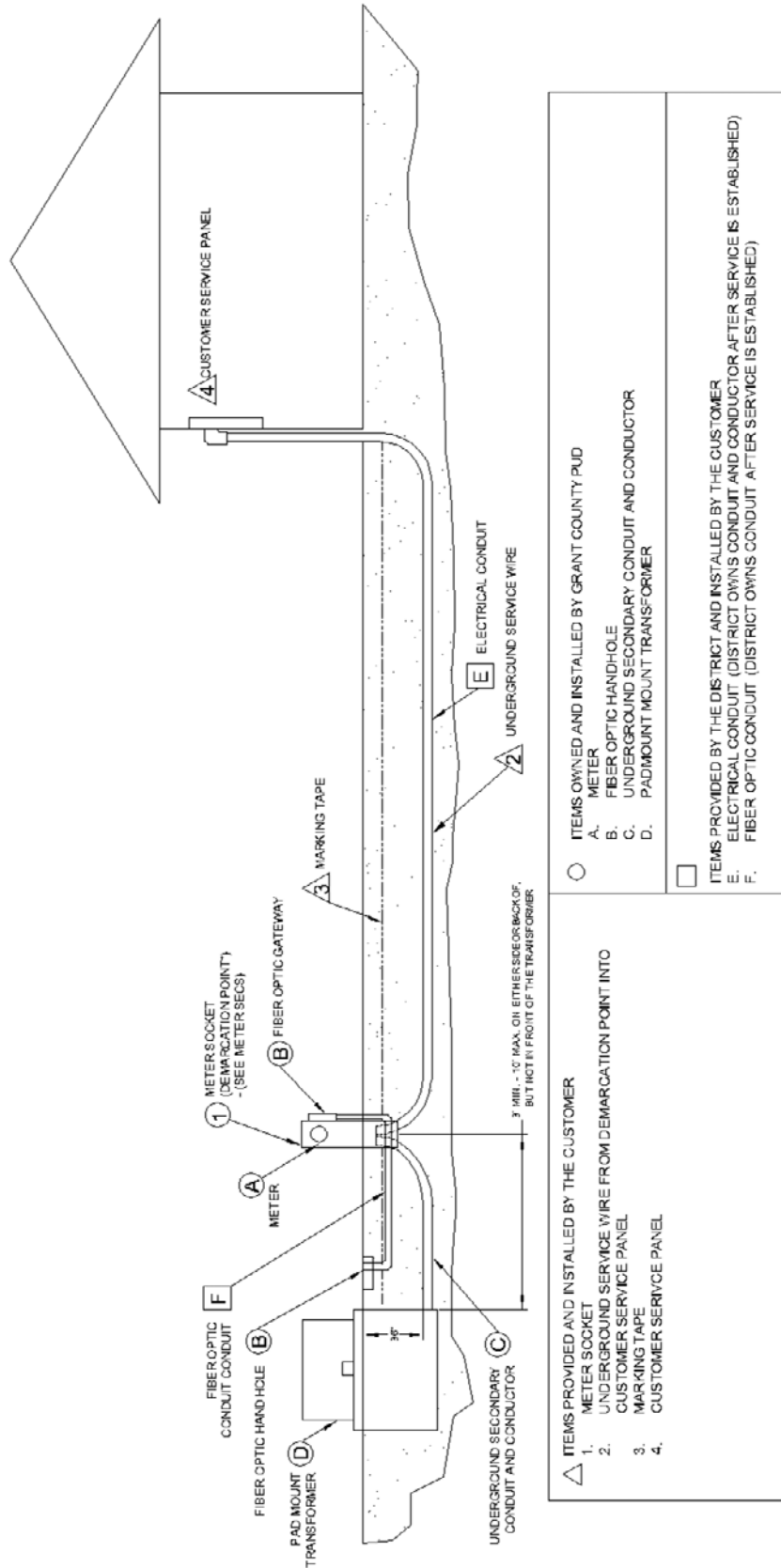
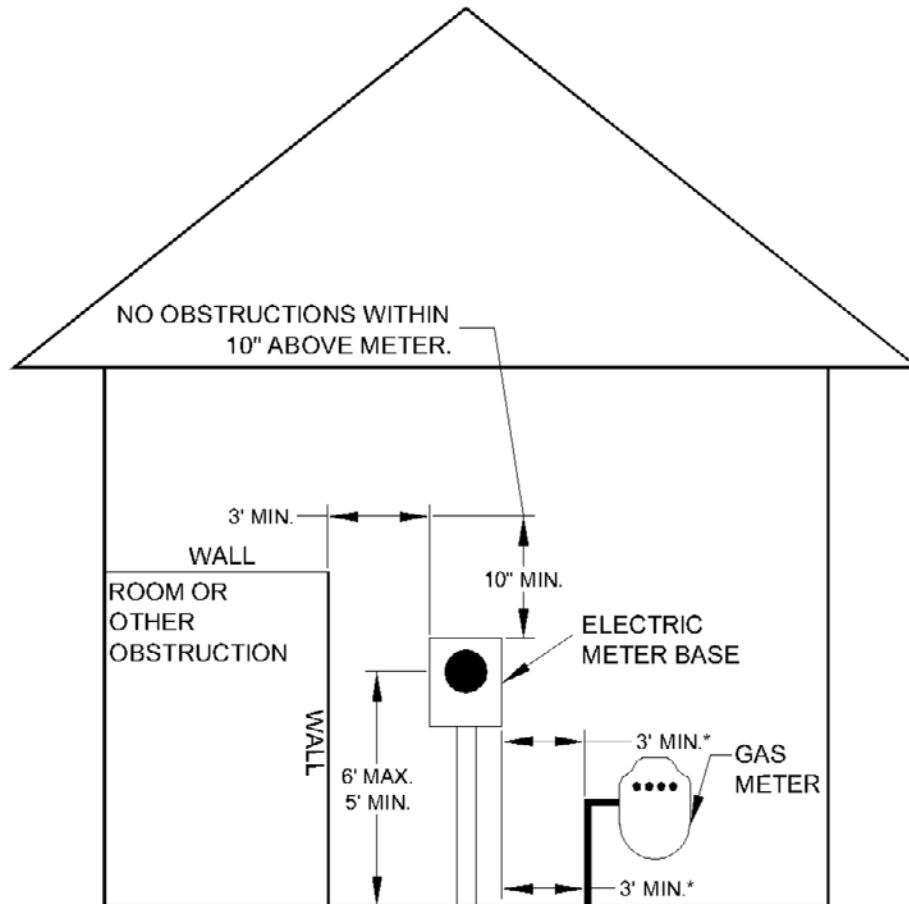


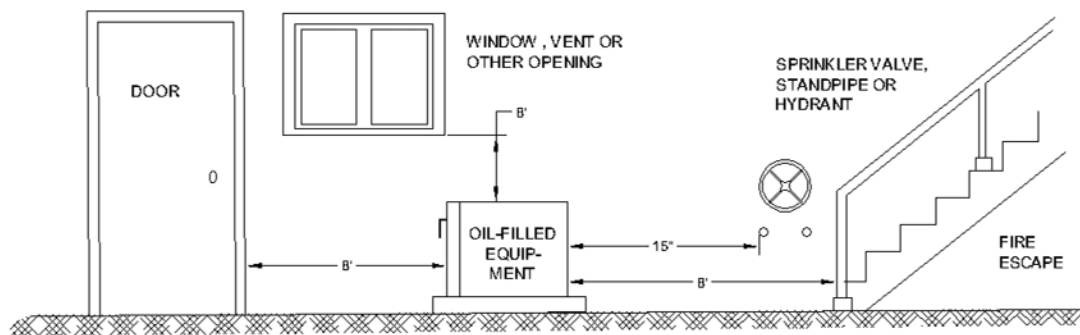
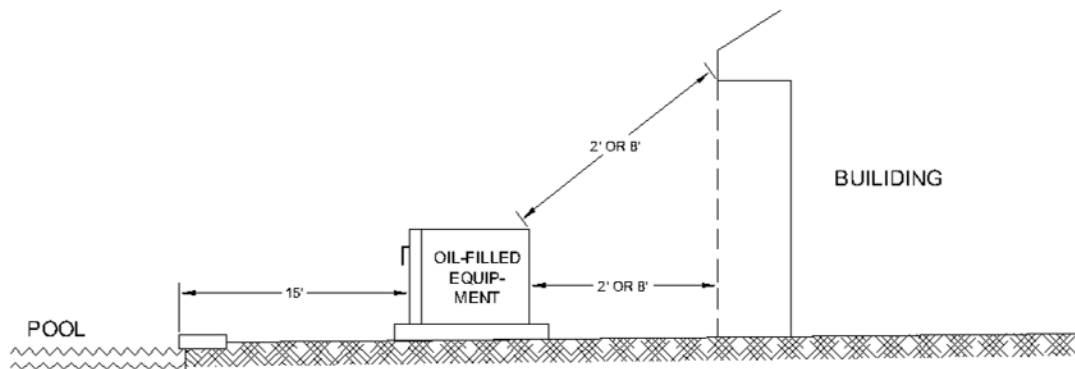
Figure 7. Underground Service from a Padmount Transformer (for Multi-Family Services Only)



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

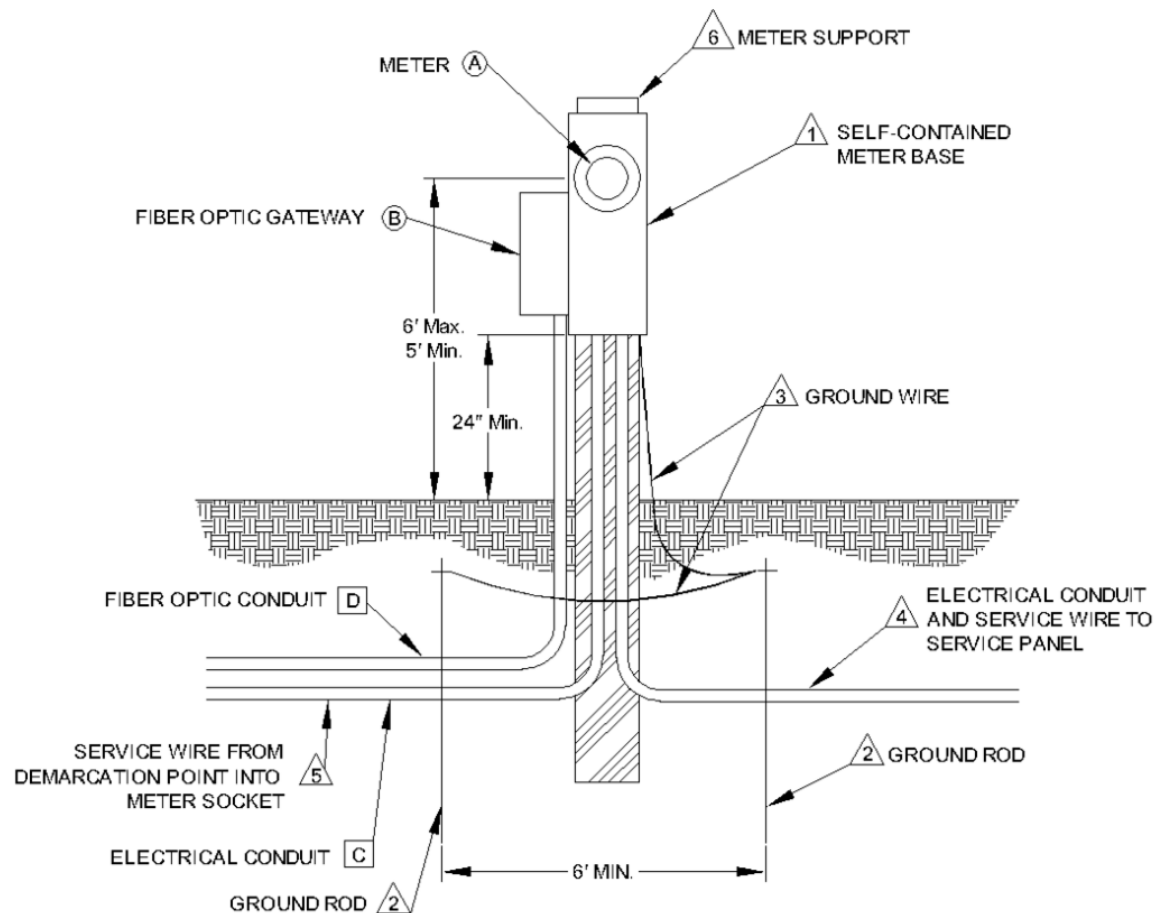
* NATIONAL FUEL GAS CODE 54-5.7.2.3

Figure 8. Working Space Requirement



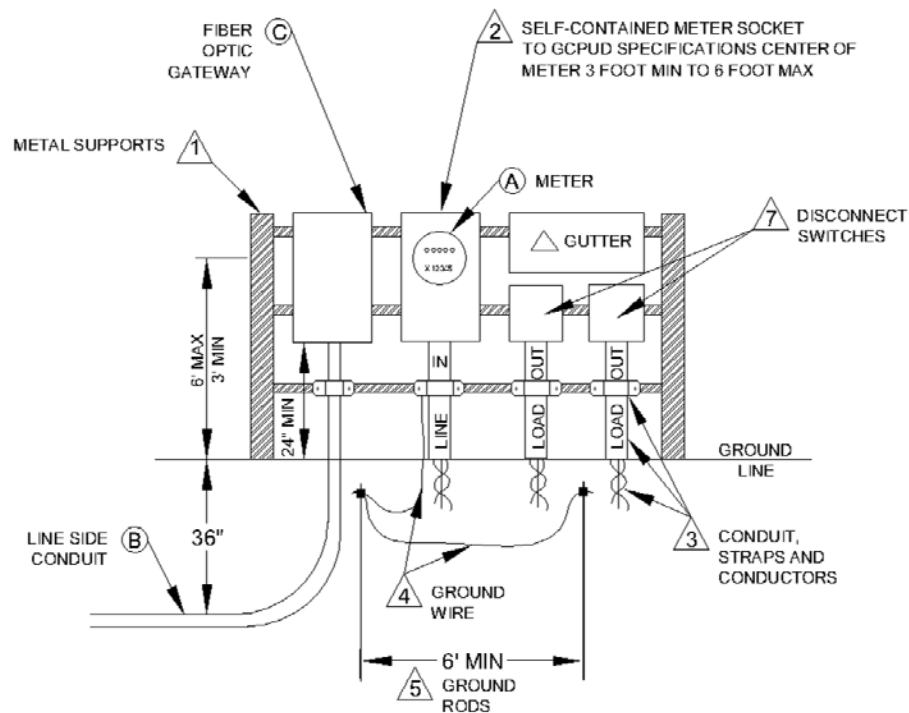
IF THE OIL FILLED EQUIPMENT IS ADJACENT TO...	THE CLEARANCE REQUIREMENT IS...
NON-COMBUSTIBLE WALLS (INCLUDING BRICK, CONCRETE, STEEL AND STONE) PROVIDING THE SIDE OF THE TRANSFORMER FACING THE WALL DOES NOT HAVE DOORS.	2 FOOT
FIRE SPRINKLER VALVES, STANDPIPES, AND FIRE HYDRANTS	15 FEET
COMBUSTIBLE WALLS (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 9. Clearances for Oil-Filled Equipment



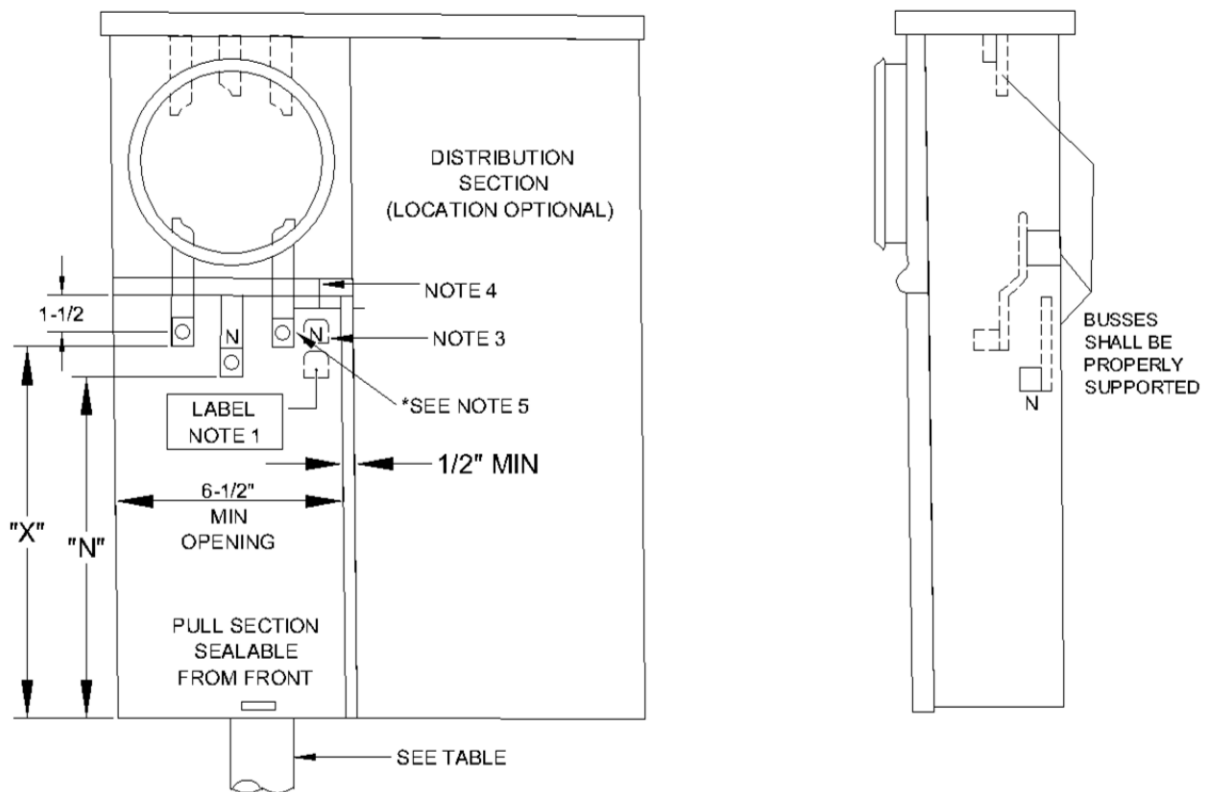
<p>△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> 1. SELF-CONTAINED METER BASE 2. GROUND RODS (IN ACCORDANCE WITH NEC AND WAC RULES, TWO REQUIRED.) 3. GROUND WIRE (IN ACCORDANCE WITH NES AND WAC RULES) 4. ELECTRICAL CONDUIT AND SERVICE WIRE TO SERVICE PANEL 5. SERVICE WIRE FROM DEMARCATION POINT INTO METER SOCKET (DISTRICT 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. 	<p>○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD</p> <p>A. METER B. FIBER OPTIC GATEWAY (FIBER SERVICE POINT)</p> <hr/> <p>□ ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER</p> <p>C. ELECTRICAL CONDUIT - (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) D. FIBER OPTIC CONDUIT - (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)</p>
--	---

Figure 10. Post Mounted Meter Installation



△ ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER	○ ITEMS OWNED AND INSTALLED BY GRANT COUNTY PUD
<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 	<ol style="list-style-type: none"> A. METER B. LINE SIDE CONDUIT PROVIDED AND SUPPLIED BY THE DISTRICT C. FIBER OPTIC GATEWAY

Figure 11. Frame Mounted Meter Installation



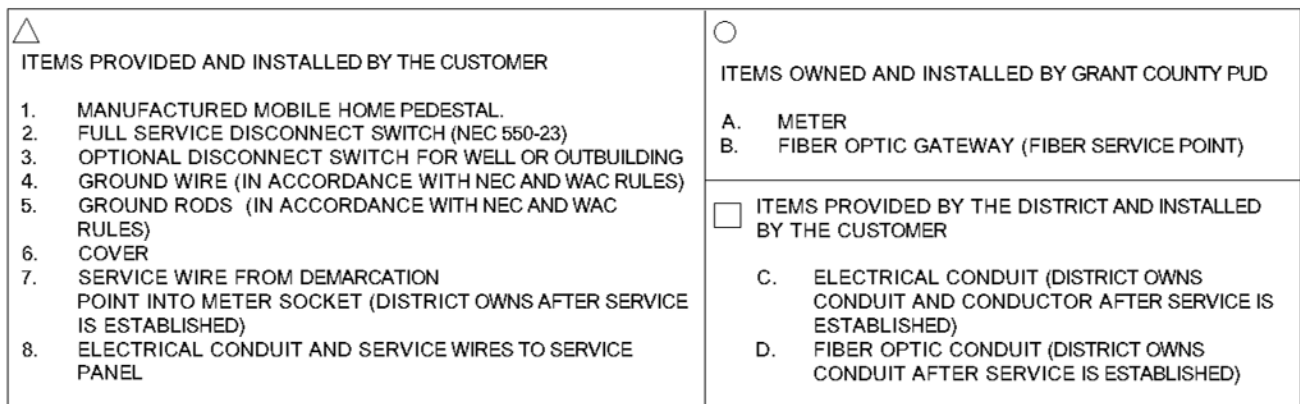
MAXIMUM AMPACITY	'X' MIN DIM	'N' MIN DIM	'Y' MIN DIM	CONDUIT RANGE
125	8"	6"	4"	1-1/4" - 2-1/2"
225	11"	8-1/2"	5-1/2"	1-1/2" - 3"

ALL DIMENSIONS ARE SHOWN IN INCHES

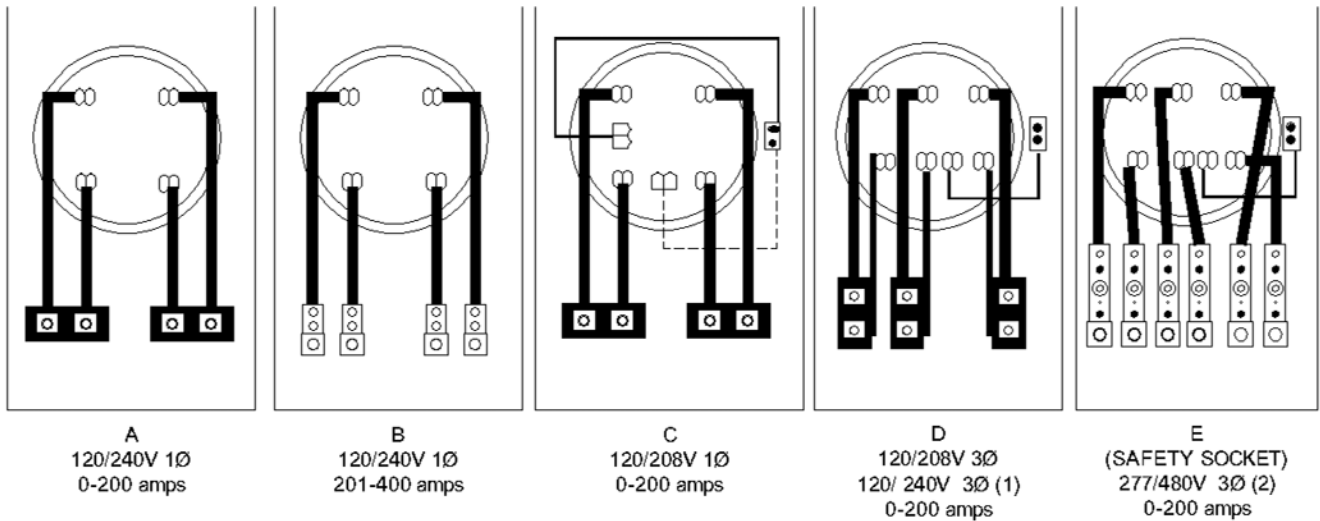
NOTE:

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 12. Combination Meter Socket Including Table

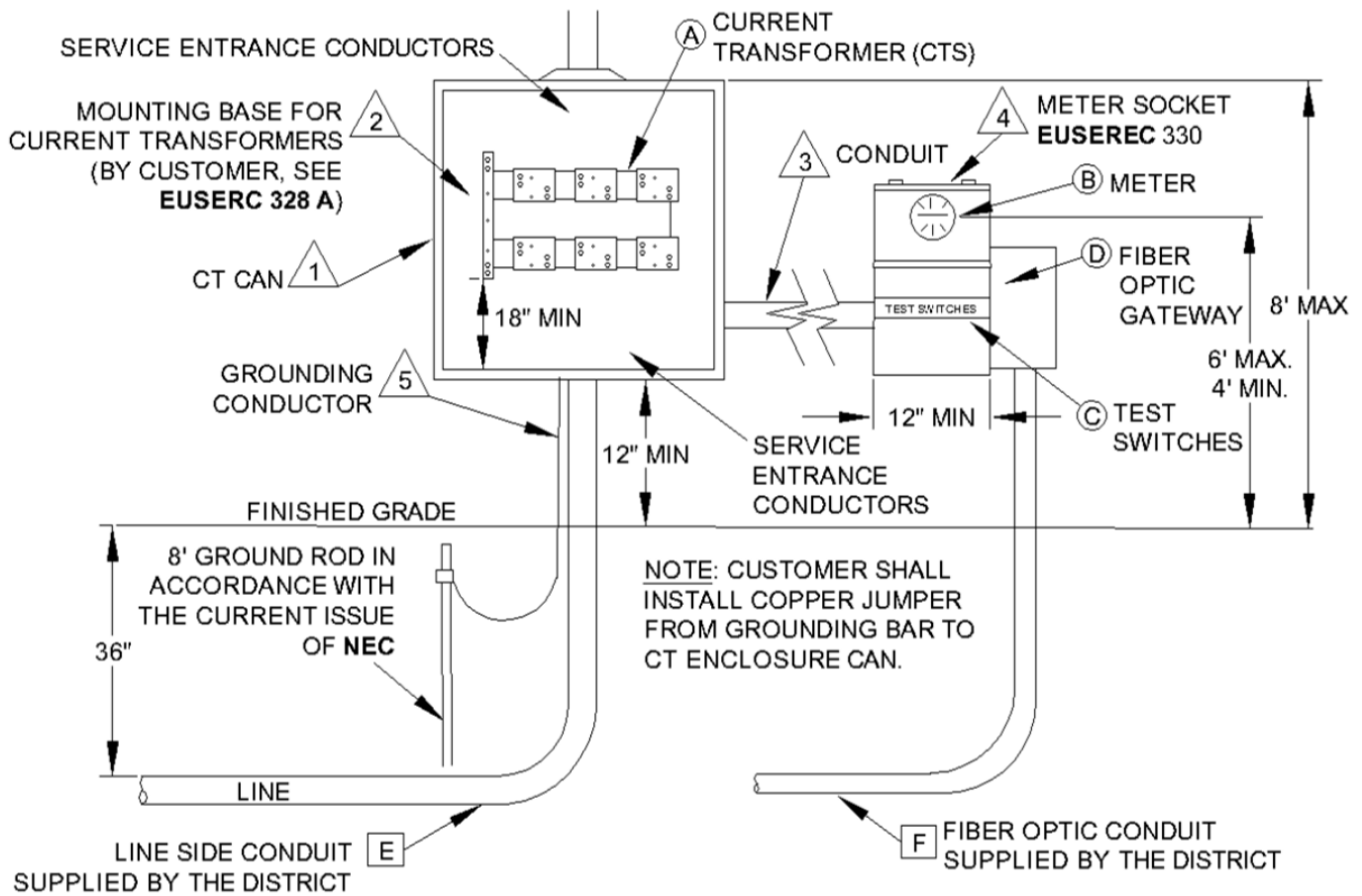


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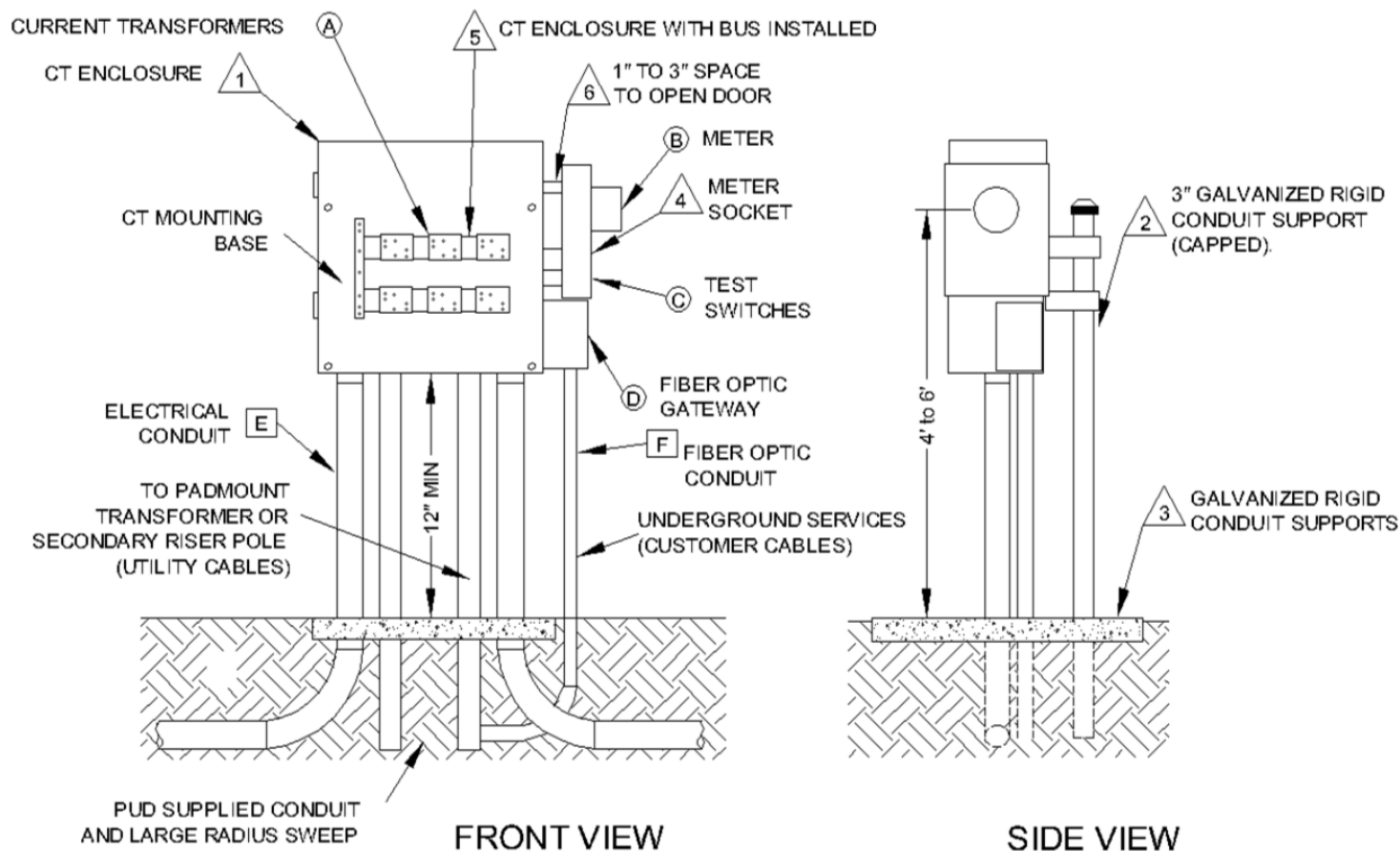
THE HIGH LEG (POWER LEG) OF A FOUR-WIRE DELTA CIRCUIT SHALL BE CONNECTED THROUGH THE RIGHT HAND TERMINALS OF THE SOCKET. ALSO, THE HIGH LEG (208 VOLT, PHASE TO GROUND) SHALL BE IDENTIFIED IN ORANGE IN THE METER SOCKET, AT THE WEATHERHEAD FOR OVERHEAD SERVICES, AND AT THE TRANSFORMER, SECONDARY HANDHOLE,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

Figure 14. Non-Residential Manual Bypass Meter Sockets



<p>△</p> <p>ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> 1. CT ENCLOSURE 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 	<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) <p>□ ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> E. ELECTRICAL CONDUIT (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) F. FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)
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Figure 15. Current Transformer Metering Wall Mount – Below 600 Volts, 800 AMPS Maximum



<p><input type="checkbox"/> ITEMS PROVIDED AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> 1. CT ENCLOSURE 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$\frac{1}{8}$") SUPPORTS AND MUST BE SET IN (6"x24"x24" CONCRETE FOOTING. 4. METER SOCKET 5. CT ENCLOSURE WITH BUS INSTALLED 6. CONDUIT FOR METER WIRING HARNESS 	<p><input type="radio"/> 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) <p><input type="checkbox"/> ITEMS PROVIDED BY THE DISTRICT AND INSTALLED BY THE CUSTOMER</p> <ol style="list-style-type: none"> E. ELECTRICAL CONDUIT (DISTRICT OWNS CONDUIT AND CONDUCTOR AFTER SERVICE IS ESTABLISHED) F. FIBER OPTIC CONDUIT (DISTRICT OWNS CONDUIT AFTER SERVICE IS ESTABLISHED)
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FIGURE 16. CURRENT TRANSFORMER METERING - POST MOUNTED

Figure 16. Current Transformer Metering Post Mounted

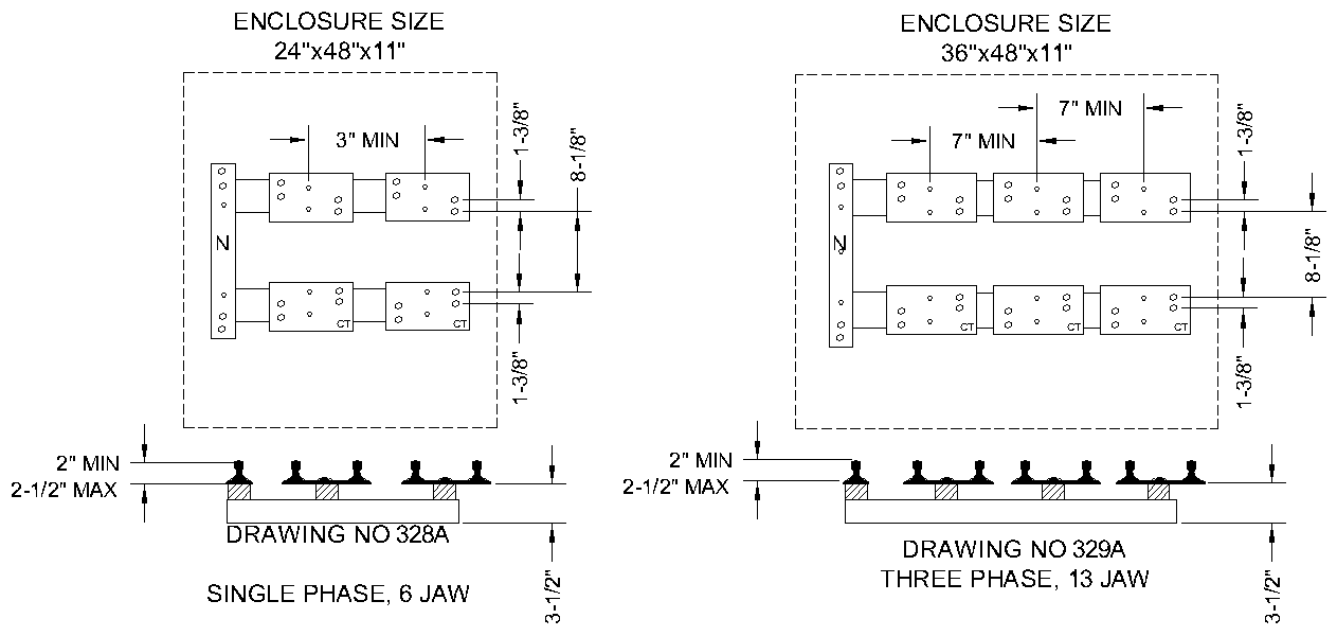
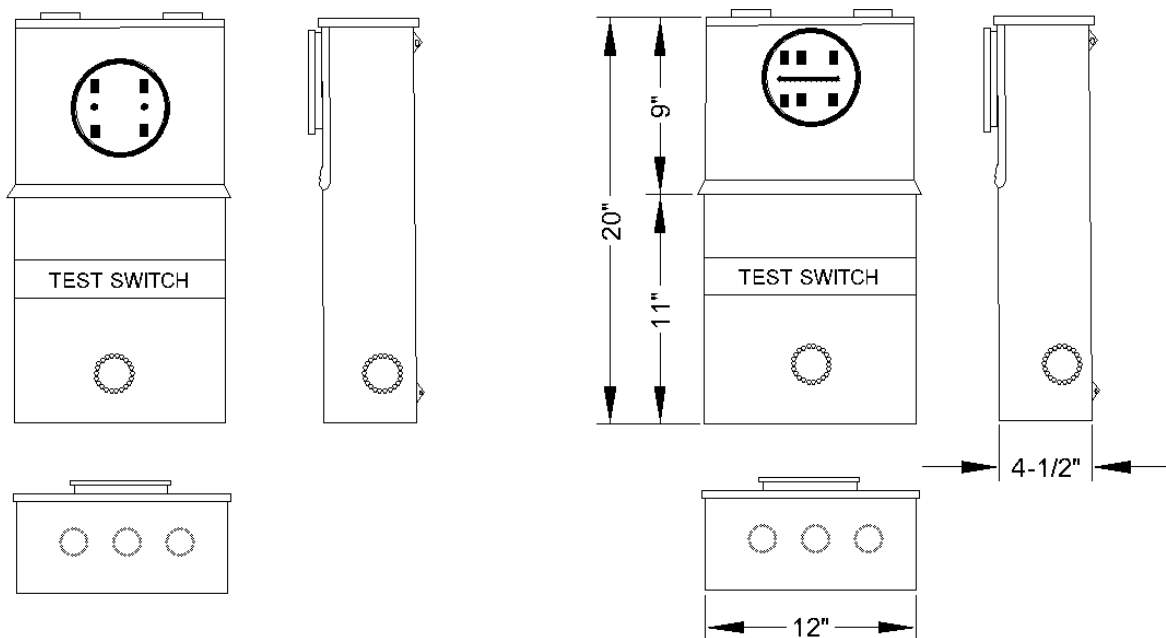


Figure 17. Current Transformer Cabinet Sizes



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 18. Remote Socket for Current Transformer Meters Reference
EUSERC 339 for Switch Perch Dimensions and Labels

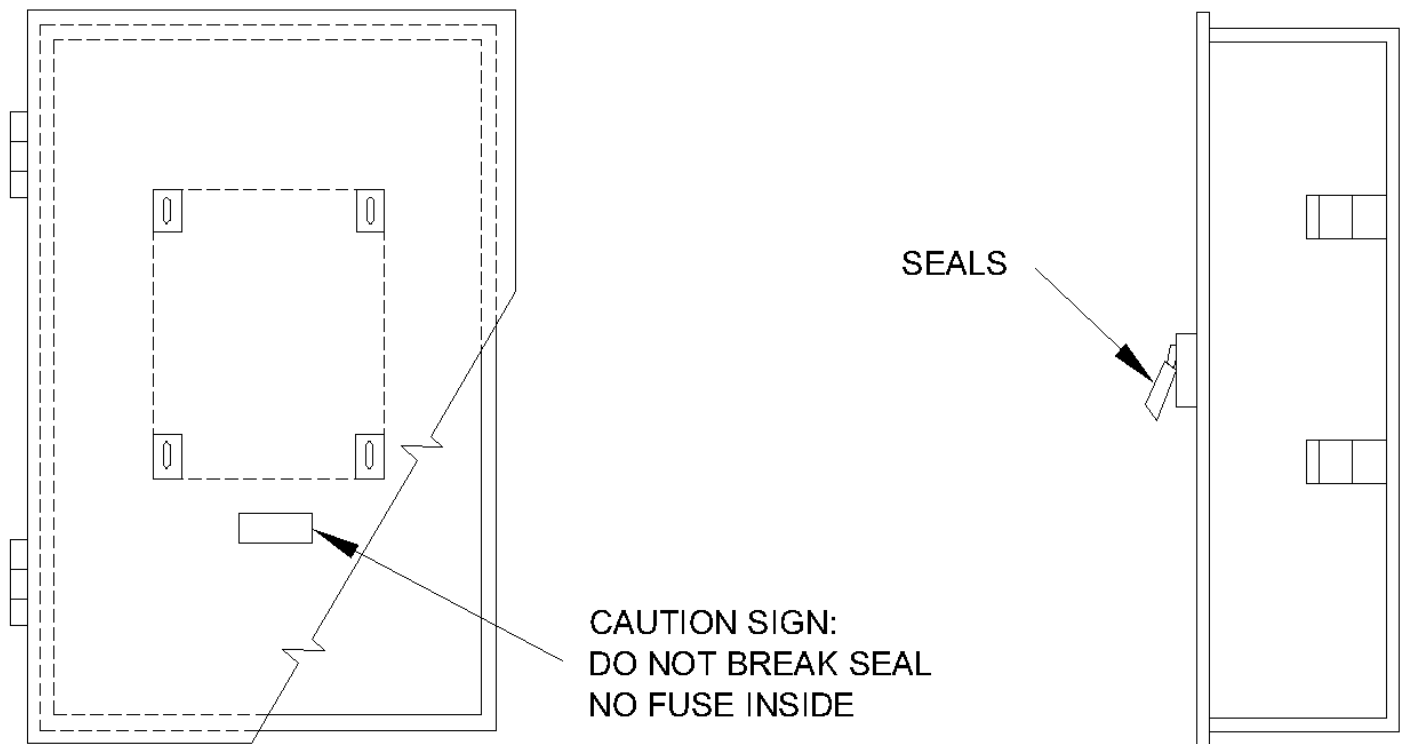


Figure 19. Current Transformer Cabinet 800 AMPS Maximum, 0-600 Volts

GLOSSARY

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

Complex Service Request - A Service Connection Agreement that requires engineering and/or right of way.

Demarcation Point - A location established for the purpose of construction to define where the District's circuit and the customer's *circuit* are interconnected. For an overhead system, the *demarcation point* is the *splice* point just outside the customer's *service mast* or a temporary *meter socket*. For underground service, the *demarcation point* is the first secondary connection on the customer's property either at a *padmount transformer*, *secondary handhole*, *secondary pedestal* or a *meter socket*. Demarcation only applies to construction. Once a service is activated, a *service point* is established which defines control.

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

Foreign Easement - A recordable document granting the District 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.

Meter Pole – Secondary pole with the customers 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 service 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.

Point of Contact – point where the customer's electrical system connects to the District's system. This point will be the load lugs on the customer owned but District controlled meter socket (base).

Primary Wire - Electrical high voltage conductor.

GLOSSARY (CON'T.)

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

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*.

Secondary Wire - The conductors from the District's system to the customer's *demarcation point* which can be overhead or underground.

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 the District 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 riser to the *demarcation point*. *Service entrance conductors* are provided by the customer.

Service Expediter - A District employee that is the initial contact person on construction projects.

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

Service Pole – Intermediate pole to support overhead secondary service.

Service Point – point where the customers electrical or telecommunications system connects to the District's systems. This point will be the load lugs on the customer owned but District controlled meter socket (base). The fiber *service point* is the CAT5 RJ45 cable connectors in the Gateway enclosure.

Service Wires - The electrical wires that connect the customer's *meter socket* to the District's *demarcation point*. Service conductors are provided by the customer.

Simple Service Request - A Service Connection Agreement for electrical service where the District's facilities are existing 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.

Unmetered Temporary Service - An unmetered 120/240 volt single phase electrical service installed by the customer or his contractor to provide construction power to a job site for less than six months. The limited capacity temporary service panel has will be connected after L & I approval for \$60.

Utility System – District 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 conductor.

TELEPHONE NUMBERS

Grant County PUD

Service Expediter	766-2501
Service Expediter Fax	754-6658
Ephrata Local Office - 30 C Street S.W., Ephrata	754-0500
Grand Coulee Local Office - 555 Grand Coulee West, Grand Coulee	633-2522
Moses Lake Local Office - 312-3rd Avenue West, Moses Lake	766-2505
Quincy Local Office - 27 B Street S.W., Quincy	787-3565
Royal City Local Office - 505 Royal Road, Royal City	346-2228
Royal City Local Office - Mattawa Exchange	932-4299
Customer Service Call Center	766-2505
Grant County PUD Toll Free Number	1-800-422-3199
Zipp Customer Care Team	754-6632 Toll Free 1-888-254-1899

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 - 35 C Street N.W., Ephrata	754-6060
Health District - 903 W 3rd Avenue, Moses Lake	766-7960

City and Town Government

Town of Coulee City - 501 Main Street West	632-5331
Town of Electric City - 10 Western 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 - 697 Camelia Street	346-2263
City of Warden - 201 Ash Street	349-2326
City of Wilson Creek- 204 4th North	345-2531

Utilities Underground Location Center (UULC)	811
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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

PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON				
CONSTRUCTION STANDARDS				
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DESIGNER:	AJW			
STANDARDS ENGR:	E WENKE	LAST REV.	07/16/2005	Page 1 of 6

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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.

PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON

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

- 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

PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON**CONSTRUCTION STANDARDS**

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DESIGNER:	AJW			
STANDARDS ENGR:	E WENKE	LAST REV:	07/16/2005	Page 3 of 6

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Section Number 10.0008

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.

PUBLIC UTILITY DISTRICT NO. 2 OF GRANT COUNTY, WASHINGTON**CONSTRUCTION STANDARDS**

STANDARDS COMMITTEE APPROVAL DATE:	11/07/2002	Title: 10.0008 TRENCH CONSTRUCT PVC, CONDUIT		10.0008
DESIGNER:	AJW			
STANDARDS ENGR:	E WENKE	LAST REV	07/16/2005	Page 4 of 6

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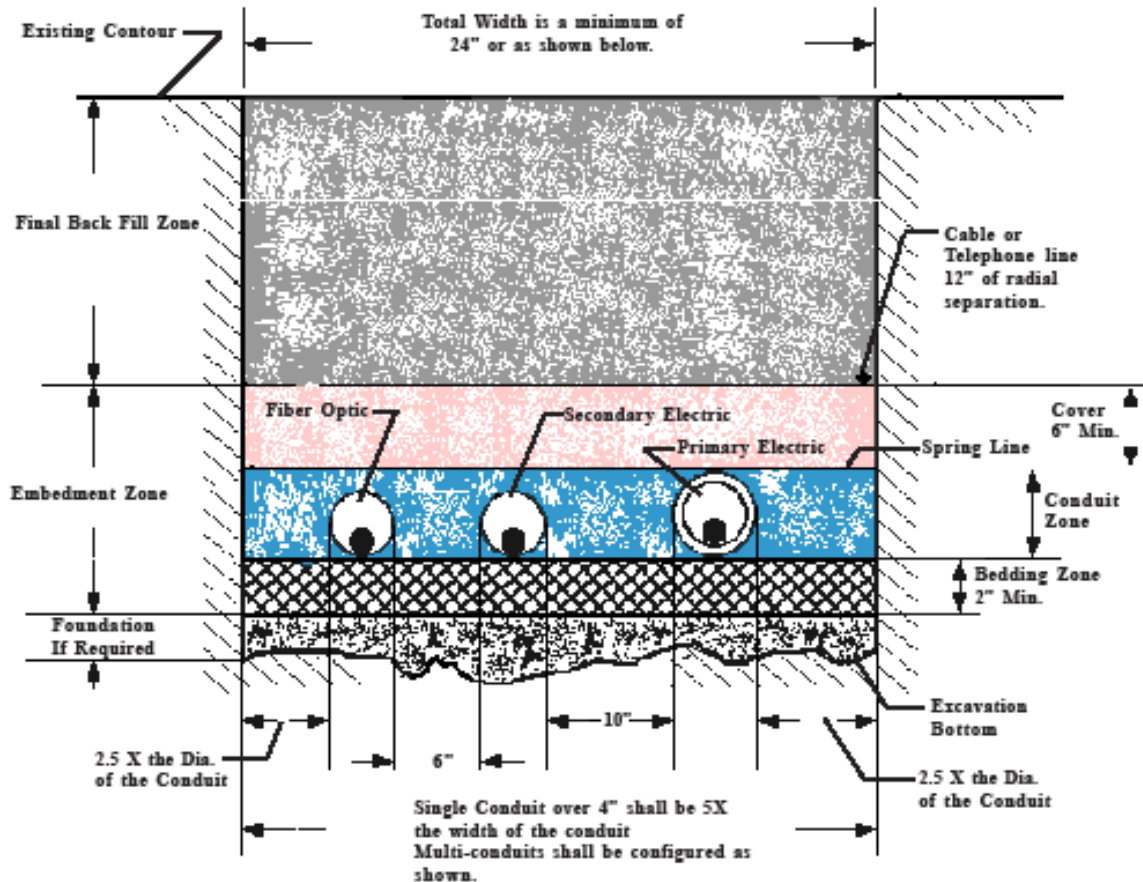
Section Number 10.0008
TRENCH CONSTRUCTION, PVC CONDUIT

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:

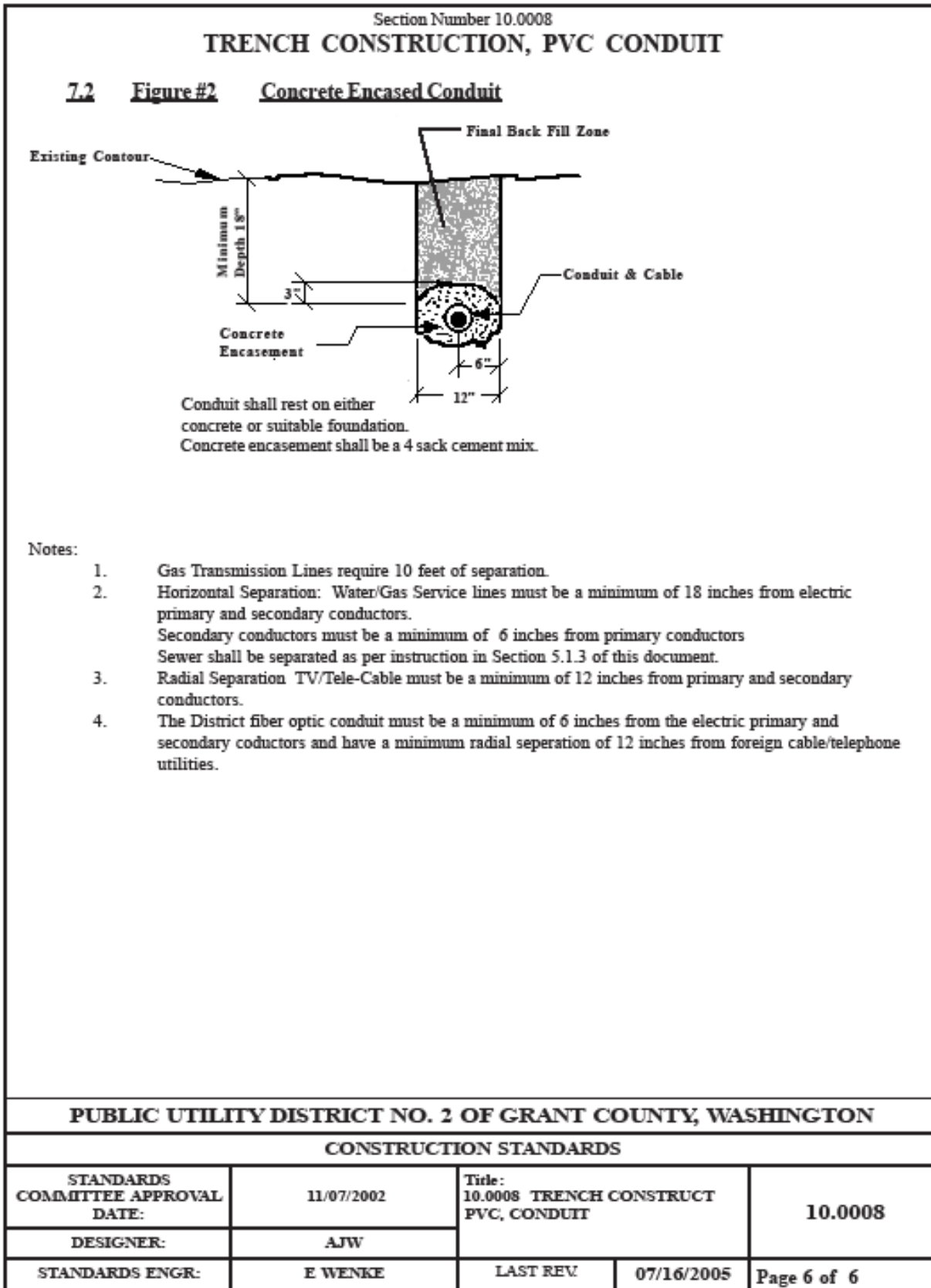


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