

OKANOGAN COUNTY ELECTRIC COOPERATIVE

# ELECTRICAL SERVICE HANDBOOK

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93 WEST CHEWUCH ROAD  
P.O. BOX 69  
WINTHROP WA 98862-0069

PH: (509) 996-2228

FAX: (509) 996-2241

[www.ocec.coop](http://www.ocec.coop)



# ELECTRICAL SERVICE HANDBOOK



## OKANOGAN COUNTY ELECTRIC CO-OP

93 W Chewuch Rd	P.O. Box 69	Winthrop, WA 98862-0069
Phone: (509) 996-2228	Toll Free: (888) 710-2228	Fax: (509) 996-2241
Summer Hours:	Monday – Thursday	7:00 AM – 5:30 PM
Winter Hours:	Monday – Friday	8:00 AM – 4:30 PM

### CONTACTS

General Manager - David Gottula	Office Manager - Lynn Northcott
Operations Manager - Glenn Huber	Billing Clerk - Teri Parker
Sr. Staking Technician - Deanna Melton	Administrative Assistant - Katie Sigler
Propane Manager - Tracy McCabe	Member Services - Jessica Dewbrey

### LOCATES

Utility Notification Center	811	<a href="http://www.callbeforeyoudig.org">www.callbeforeyoudig.org</a>
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### ELECTRICAL INSPECTIONS

WA State Labor & Industries	(509) 886-6500
519 Grant Rd – East Wenatchee, WA	<a href="http://www.lni.wa.gov">www.lni.wa.gov</a>



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# ELECTRICAL SERVICE HANDBOOK

## II. Introduction

The information in this booklet is intended to provide electrical contractors, architects, building contractors, engineers and cooperative members with Okanogan County Electric Co-op requirements for residential, commercial and irrigation service installations. The booklet provides most of the information and requirements. It cannot, and is not intended to, cover every specific situation or eventuality. The Cooperative employees are therefore authorized to make policy adjustments to accommodate those unique situations as they arise. All conflicts between this handbook and Okanogan County Electric Cooperative's policies shall comply with the most current policies approved by the OCEC Board of Directors. Revisions are subject to change without notice. Please review OCEC New Service [Policy 30-211](#) and Line Extension [Policy 30-410](#) as necessary.

The time required to design, schedule and construct the work will vary depending upon the complexity of the job. The OCEC Engineering department will communicate with you regarding current scheduling information.

When submitting your [Request for Service](#) it is important to provide OCEC's Engineering department with all the information requested on the form and follow the associated [checklist](#). When easements, permits, licenses, franchises or other right are required for the Cooperative to place its equipment on or over property, they must be obtained before construction can begin or the service is energized.

### A. Inspection and Code

It is the member's responsibility to ensure compliance with OCEC Policy and Specifications, the National Electric Code (NEC), Washington Administrative Code (WAC), and any Federal, State or local codes and ordinances that apply to the project.

**The member, if not knowledgeable in electrical work, should consider using a licensed electrical contractor to install the electrical equipment.**

**Inspections:** Before we will energize your temporary or permanent service the service will need to be inspected and approved by Washington State Labor & Industries Electrical Division. L&I can be reached by calling the regional office at (509) 886-6500, visiting them at 519 Grant Road in East Wenatchee, WA, or online at [www.lni.wa.gov](http://www.lni.wa.gov). Check with them for permitting, inspection requirements and fees.

### B. General

All equipment that the Cooperative installs will remain property of the Cooperative. The member or property owner shall grant OCEC permission to enter and exit their property in order to install and maintain OCEC facilities.

The Cooperative's agents and employees shall have access during normal business hours for the purpose of, but not limited to, installation of facilities, right-of-way clearing, meter reading, inspecting, repairing and removing the Cooperatives facilities. In addition, the Cooperative's agents and employees shall have access at all times for emergencies.



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### C. Legal Access: Permits and Easements

The member, **at the member's expense and to the satisfaction of the Cooperative**, will secure all necessary rights of way, easements and permits before the Cooperative will begin construction. In the event there is any challenge to the Cooperative's right to install facilities on land owned by others, it shall be the obligation of the applicant to resolve such challenge to the Cooperative's satisfaction before the Cooperative shall have any obligation to make or complete the line extension.

The member shall provide for line clearing of the [right-of-way](#) to OCEC standards.

#### Licenses for Right-Of-Way / Public Agency Permits

OCEC will obtain the required licenses/permits from public agencies or entities. It shall be the responsibility of the member to coordinate any professional land survey(s), if required, for these permits.

**The member shall pay for any and all licenses/permits, including but not limited to, Washington State Department of Transportation, Okanogan County Public Works, United States Forest Service, and other license/permits as may be required along with any required professional surveys.**

### D. Engineering Design

OCEC's Engineering Department will develop a design to meet the member's needs and that of the Cooperative. We will schedule a site visit with the applicant or their representative to review the request and begin the design process. OCEC will then develop a design and quote a cost following the guidelines below.

- 1) The Cooperative will determine the length, depth, point of delivery, location, phases, primary voltage, capacity and cost of the line extension. The line extension shall be compatible with the present electrical distribution facilities.
- 2) The line extension design shall be designed and constructed in accordance with OCEC's minimum standards.
- 3) Members must provide the Cooperative with final property specifications as required and approved by the appropriate government authorities. These specifications may include, but are not limited to, recorded plat maps, utility easements, final construction grades and installed property corner pins.
- 4) The member is responsible for any unusual conditions including but not limited to, frost, weather events, rock, landscape replacement, boring charges and equipment.



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## E. Line Extension Policy

Okanogan County Electric Co-op's Board sets the costs and rules for extending service to new members and modifying the existing system to meet member's needs through [Policy 30-410](#). The objective of this policy includes:

- To treat all applicants for electric service in a fair and uniform manner.
- To assure the costs of providing new service are fair and equitable for the Cooperative and all members.

## F. Temporary Service

For temporary services, OCEC will connect and install an electric meter only after inspection and approval by the state electrical inspector.

## III. New Service

### A. Service Voltages for New Services

For single-phase installations, 120/240 volt service is available. This is the typical three-wire service used for residences. 120 volt, 2-wire service is not available.

For three-phase installations, 120/240, 120/208, 240/480, and 277/480 volt services are available. These are the typical four-wire services used in commercial building and irrigation.

### B. Requests for New Service

A member can submit an application for either a temporary or permanent service. A temporary service consists of an installation that is intended to be removed within 1 year. A permanent service is installed without a planned removal date.

All requests for a new service start by filling out a [Request for Service](#) and paying the appropriate design and mapping fee. Once these are received by our office, a representative of the Cooperative Engineering department will be scheduled to meet with the member and/or member contractor at the proposed job site in order to design and create a cost estimate.

The cost estimate for a new service will include all costs associated with the installation of the electrical equipment. An estimate for a temporary service will also include the cost to remove the electrical equipment. These costs must be paid prior to construction. An adjustment will be made when the work is complete and actual costs have been determined. If after 1 year the job does not have a scheduled start date the design fee is forfeited.

All costs quoted are good for 30 days from the date of the cost estimate.



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## New Service Checklist

- 1) Member/Contractor: Initiate a Cost Estimate by submitting our [Request For Service](#) form along with the appropriate fee and your site plan
- 2) OCEC: will contact you within 5 business days to schedule a site visit
- 3) OCEC: generate a Cost Estimate within 3 weeks of the site visit, provided no additional changes are discussed.
- 4) Member/Contractor: Pay all applicable fees per the Cost Estimate and set up a billing account with the Cooperative
- 5) Member/Contractor: If applicable, obtain required Easement(s) as determined at the sole discretion of the Cooperative
- 6) OCEC: if applicable, obtain appropriate permits and/or Franchise Agreements (i.e. WaDOT, Forest Service)
- 7) Member/Contractor: Obtain an Electrical Permit from Washington State Labor & Industries
- 8) Member/Contractor: Prepare site and install all applicable materials per OCEC design standards (see applicable equipment requirements in [Section X – Specifications and Drawings](#))
  - a) **Ensure that any existing utilities in the proposed dig area have been located by calling 811 at least 2 business days prior to digging**
  - b) Any wiring performed without first checking with the Cooperative is done so at the risk of having to change either the service entrance equipment or location of same or both.
- 9) Member/Contractor: Clear all Right-Of-Way as per Cooperative standards and provide appropriate access to jobsite
- 10) Member/Contractor: Contact L&I and schedule an inspection (see item #7). When Service Approval is received, notify OCEC.
- 11) OCEC: complete final inspection of job site and schedule work once approved. Notify member/Contractor of schedule date.

Please note that our schedule can be affected by unplanned outages, weather and other unforeseen circumstances.

## IV. Service Modifications

### A. Requests for Service Modification

Service modifications of existing OCEC facilities include, but are not limited to, changes because of new electrical load, relocating, wrong information on the original service application, changing or adding to Cooperative property. The cooperative must be notified in advance if a member intends to perform a service modification. If an upgrade to OCEC facilities is necessary to support the proposed modification, line extension fees and system access charges will apply and are the responsibility of the member. In the event that a member fails to notify OCEC, and as a result OCEC equipment is damaged, the member will be liable for the cost of such damage.



# ELECTRICAL SERVICE HANDBOOK

## Service Modification Checklist

- 1) Member/Contractor: Initiate a Cost Estimate by submitting our [Request For Service](#) form along with the appropriate fee and your site plan.
- 2) OCEC: will contact you within 5 business days to schedule a site visit
- 3) OCEC: generate a Cost Estimate within 3 weeks of the site visit, provided no additional changes are discussed.
- 4) Member/Contractor: Pay all applicable fees per the Cost Estimate
- 5) Member/Contractor: Obtain an Electrical Permit from Washington State Labor and Industries
- 6) Member/Contractor: Prepare site and install/upgrade all applicable materials per OCEC design standards (see applicable equipment requirements in [Section X – Specifications and Drawings](#))
  - a) All upgrading, rewiring or conversion shall be in compliance with the state electrical regulations and requirements, in addition to the Cooperative's policies and procedures in effect at the time of the upgrade, rewire or conversion
  - b) Any wiring performed without first checking with the Cooperative is done so at the risk of having to change either the service entrance equipment or location of same or both.
- 7) Member/Contractor: Contact L&I and schedule an inspection (see item #5). When Service Approval is received, notify OCEC.
  - a) If work was not performed by a licensed electrician and an L&I permit obtained, service will not be reconnected and/or energized until approved by the state inspector and work performed is acceptable to the Cooperative.
- 8) OCEC: complete final inspection of the job site and schedule work. Notify member/contractor of schedule date.

Please note that our schedule can be affected by unplanned outages, weather and other unforeseen circumstances.

## V. General Metering Requirements

Only authorized and qualified OCEC personnel may remove and install meters. With some types of meter sockets, removal of the meter does not de-energize the member's system.

Meter tampering is dangerous and against the law. You could face criminal charges and penalties.

Meter altering, removing, meter seal removal or other unauthorized diversion of electricity shall be considered meter tampering as per Cooperative [Policy 30-310](#).



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## A. Meter and Service Entrance Specifications

Single Family Dwelling – services sized 400 amp and below

### **MEMBER RESPONSIBILITIES**

#### **Items owned and installed by Member:**

- **Service 0-400-amp wall mount meter base (underground/overhead):**
- Conduit to extend a minimum of 36" below finished grade (underground)
  - a. 200 amp requires a 3" gray schedule 40 PVC
  - b. 400 amp requires a 3" gray schedule 40 PVC
- Service entrance conductors to extend 24" out of the weather head with neutral marked (overhead)

#### **Meter Location:**

- Must be installed 5' to 7' from the finished grade to the center of the meter socket.
- Meter base and conduit must be placed on the outside wall, not enclosed in the wall. Flush mount meter bases are not allowed.
- The preferred meter base location is on the transformer side of the house/building.
- Meters must not be installed under any type of overhang, porch, roof, deck or similar enclosure that will limit access to the meter.
  - If installed under any overhang or similar enclosure, meters must be protected from ice or snow sliding off roofs by extending eaves, a gutter or other means.
  - Removal of the meter base face (cover) shall not be hindered and must be accessible without tools.
- Shrubbery and landscaping must be kept clear from the meter location.
- Meter must be protected from physical damage.

#### **Meter Mounting:**

- Meter base must be readily accessible, free from vibration, corrosive atmosphere and abnormal temperatures. If, in the opinion of OCEC, a meter is made inaccessible for any reason, the member must, at their expense, move the meter socket to an accessible location.
- Meter base must be plumb and level and securely mounted to a rigid surface. All conductors must be securely fastened and must not interfere with the meter.
- Meter base must be installed, approved by Washington L&I Electrical Division, and have service wires connected before OCEC will energize the service.



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## Other Meter Requirements:

- Not more than one service of like voltage will be provided to any one building or structure unless otherwise granted special permission from OCEC and Washington State Department of Labor and Industries.
- All temporary power supplied by OCEC to member/contractor must be metered. The name(s) of the person(s) responsible for the billing must be included in the application for service.
- All new temporary and permanent meter base installations require a passing inspection by a State Electrical Inspector prior to being energized.
- All meter bases will be UL listed and have set screw lugs provided to accommodate the conductor size as specified by OCEC.
- Self-contained meter bases can be used for residential services up to and including 400 amps single phase. All single-phase residential services larger than 400 amps must have current transformer metering. Contact the OCEC Engineering department for more information.
- Any service in excess of 800 amps shall be by three-phase service which shall be balanced on both three-phase and single-phase loading. Contact the OCEC Engineering department for information about three-phase services.
- Single phase motor services will be allowed up to 10HP maximum.
- Contact the OCEC Engineering department for:
  - When a permanent service entrance cannot be provided on the house/building (requiring meter pole installation)
  - Temporary underground/overhead service requirements.
- All backup generator installations must have a transfer switch installed in accordance with the requirements of the NEC.
- Any wiring installed without first contacting OCEC to determine the service entrance location is done at the risk of having to change the service location to conform to OCEC's requirements.

To view a diagram of our specifications, see [Section X - Specifications and Drawings](#), or visit our website at [www.ocec.coop](http://www.ocec.coop)

## OCEC RESPONSIBILITIES

### Items Owned and installed by OCEC:

- Meter
- Transformer
- Primary Wire (before transformer)
- Secondary Wire (after transformer, before meter)



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### B. Meter Location Requirements

- The Cooperative must approve all meter locations prior to installation (WAC 296-46-23001). The member shall furnish a location acceptable to the Cooperative - readily accessible without the risk of bodily harm to Cooperative employees, free from vibration, corrosive atmosphere, and abnormal temperatures - in which to install the metering equipment
- Meters shall not be in carports, breezeways, porches, fenced in areas, or such locations where subsequent addition, rewiring or remodeling could enclose the meter
- Meters shall not be enclosed by any paneling, or siding, etc. Meter and meter base must be exposed and readily accessible without tools. Contact the Engineering Department for specifics.
- A meter installed in an alley or driveway must be protected adequately to prevent damage from vehicular traffic
  - In heavy snow areas, the meter must be protected from damage by snowplow, and snow and ice loading
- Metering shall not be mounted on or in the Cooperative's pad-mount transformer, junction box, or primary pole
- Meter must be at least 10' away from the Cooperatives pad-mount transformer or junction box, and at least 10' away from any overhead power lines

### C. Meter Socket Arrangement & Requirements

- On multiple meter installations, each meter shall be labeled with a permanent placard
- Socket forms or arrangements to provide correct metering for the various systems used in the Cooperative are illustrated in the [Meter Socket Requirements](#) table
- Sockets must be mounted plumb and be security fastened to the structure
- The Cooperative prohibits the use of meter sockets with automatic circuit closing devices
- Terminals shall be marked with a conductor range for aluminum or copper conductors. When aluminum conductors are used, the socket must be approved and clearly marked by the manufacturer that it is acceptable for aluminum conductor.
- Taps are not allowed in meter sockets.
- The line supply conductors to a socket shall be connected to the top terminals and the load supply conductors shall be connected to the bottom terminals.
- The neutral service conductor shall be bonded to the meter base using the grounding screw or bonding terminal.

### D. Sequence of Service Entrance Equipment

The sequence of service equipment shall be meter-switch-fuse or meter-circuit breaker-load unless not allowed by Code. Prior Cooperative authorization is required.



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## E. Meter Sockets – Classifications & Limitations

Classification of meter sockets by NEMA Standards:

- **Style 2** – A 100 ampere socket rectangular shaped and generally constructed of sheet steel (listed or approved)
- **Style 3** – A 200 ampere socket (160 ampere continuous duty and/or special socket UL approved for 200 amperes continuous duty)
- **Style 4** – Limited to “grouped”, “stacked” or on-the-job- assembled meter sockets and switch assemblies at multi-meter installations (listed or approved)

Limitations of meter sockets by Style:

- Use of **Style 2** socket is limited to installations where the size of service entrance conductors does not exceed #2 AWG copper or #1/0 aluminum
- Use of the **Style 3** socket is limited to installations where the size of the service entrance conductors does not exceed 2/0 copper or 4/0 aluminum
- **Style 4** sockets may be used in multi-meter installations of 2 or more meters

## F. Clearances and Meter Height

- A level standing and working surface shall be provided and maintained in front of each metering installation. A clear and unobstructed working space shall be provided above this surface
- Should the metering installation be on a working platform then the platform must be accessible by a permanent stairway that conforms to OSHA/WISHA regulations

See the [Metering Clearance Requirements](#) table for detailed clearance information

## G. Meter Rooms

Where a multiple installation is four (4) meters or more, the location may be on the inside lines of the structure, provided the location is a metering room accessible to the Cooperative.

- The number of metering rooms in apartment buildings shall not exceed one (1) without the Cooperative’s approval
- When a metering room is to be used, a floor plan shall be submitted to the Cooperative for approval prior to any wiring thereof
- Meter rooms shall be properly illuminated with a switch located immediately next to the access door. The Cooperative has the right to refuse to enter inadequately illuminated or unsafe spaces
- Meters shall not be installed in commercial buildings above the first level or below the first basement level with the Cooperative’s approval



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## H. Outdoor Metering Requirements

All meter equipment exposed to weather shall be rain-tight according to the National Electrical Manufacture's Association (NEMA) 3R minimum.

- Meter sockets containing energized equipment shall be covered and sealed with a transparent cover plate if a meter is not installed
- Meters shall only be installed in sockets that are level, plumb and securely fastened to the structure
- Installation of three (3) meters or less shall be on the outside lines of the building and shall be grouped in such a manner that a single service drop may serve all meters
- All unused openings of the meter socket enclosure shall be closed with rain-tight plugs that are secured tightly in place from inside the enclosures before a meter is installed

## I. Meter Socket Labeling

- Before a meter will be installed, the member must obtain a valid service address from the proper agency. When the meter is installed and sealed, it is designated in the Cooperative's official record as the meter serving that premise. Apartment unit or space numbers are considered part of the valid address
- It is the responsibility of the owner or manager of multi-unit complexes to notify the Cooperative of any changes in numbering so that the Cooperatives' Meter Department may verify metering circuits. Such notice must be given in writing immediately to the Member Services and Engineering Departments to permit re-designation of meters serving the premise. The member shall be responsible for renumbering both the premises and meter sockets prior to dispatch of the Meter Department
- Meters will not be installed nor service energized until marking is complete. Each meter position and service switch or breaker shall be clearly and permanently identified by the member to indicate the particular location supplied by it. The relation of the meter socket, breaker, and location served must be easy to identify. Clear identification means a legible apartment or street number. The store name or number may be included but does not constitute a clear designation in itself.

Examples of permanent marking are:

- An identification plate attached by screws, rivets, or a secure adhesive
- Commercially available decals

Meter retaining rings will be provided and installed by the Cooperative.



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## VI. CT Metering Installations

Any service meeting the following criteria shall be a CT'd service:

Single Phase 120/240 volts over 400 amps

Three-Phase service over 200 amps

- All current transformer installations shall be in acceptable enclosures (CT cans).
- All current transformer enclosures in residential services will be mounted on the outside of the building so that access to the enclosure is from outside the building only.
- The member must provide a 50,000 amp fault current rated "Landing Pad" for mounting of CT's.
- Meter base must be installed according to the configuration specified and installed within 20' of CT can. Contact the Cooperative for distances exceeding 20'.
- CT enclosures must be grouped with the meter socket or meter enclosure. A minimum of one (1) inch conduit is required to connect meter base to CT enclosure
- The Cooperative will complete the terminal connections from the members' side of the CTs to the metering equipment

### A. Indoor CT Metering (Commercial Only)

- If a Current Transformer (CT) is installed on a balcony or platform, it must be accessible by a permanent stairway that conforms to OSHA/WISHA. A minimum of 3 feet of clearance in front of enclosure is required
- Adequate lighting shall be permanently provided with a switch located immediately next to the access door. The Cooperative has the right to refuse to enter inadequately illuminated spaces

### B. Switchboard Metering – Services over 801 amps

The member shall consult the Cooperative and submit equipment drawings prior to the manufacture of the switchgear to determine the type of meter or meters that will be used, and arrangements for mounting.

When the member's factory-built switchgear is manufactured and installed, current transformers may be obtained by the member directly from the Cooperatives Meter Department in Winthrop. Current transformers shall remain the property of the cooperative.

On switchboards, the current transformers shall be installed in such a manner as to be readily accessible after all bussing is in place. Installation plans regarding size of cubicle and placement of equipment shall be approved by the Cooperative before switchboard manufacturing. Neutral connections for metering shall be readily accessible and sealable.

Working spaces in back of a freestanding switchboard shall not be less than thirty-six (36) inches from the panel to the rear wall with provisions for safe exit.

The cover of the current transformer enclosure on switchgear shall be free of meters or equipment; however, the meter connected to the current transformer may be mounted on the cover provided said cover is hinged, sealable and removable.



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## 1. Switchboard Metering – Services over 801 amps, cont.

- Current Transformers (CT’s) are furnished by the Cooperative and shall remain the property of the Cooperative
- Transformer enclosures must contain only the line/load wires and transformers. The enclosure must not be used as a junction box for other wires or conduits
- Enclosures shall not be mounted in or under floors or crawl spaces. See [Meter Clearance Requirements](#) table for further clearance requirements
- Space requirements for meter socket and associated equipment shall be adequate for mounting, access and safe working of all equipment. All doors must be able to be completely removed or opened to 180 if hinged
- Meters shall not be mounted on panels covering compartments which contain fuses, switches, or any other devices that will require servicing, changing, or adjusting, necessitating the breaking of seals on meter panels

### CT METERING CABINET SIZE REQUIREMENTS

REQUIRED CT’S		CABINET DIMENSIONS		
Service Size	Number of CT’s	Width	Height	Depth
Single Phase, 401 – 800 Amps*	2	24”	36”	11”
Three Phase, 200 – 800 amps	3	36”	48”	11”
801 amps +	Requires switchgear			

\*Minimum size. Consult Engineering and/or Meter Department for more information

- Three phase cabinet cover must be hinged.
- **The Meter Department personnel will make up all termination of metering points on all current transformer installations.**

## VII. Protection of Electrical Equipment

- 1) The member shall provide protective equipment as required by the National Electric Code (NEC) or other applicable code(s).
- 2) For all three-phase motor installations the member is responsible for installing protection equipment against loss of phase conditions.

### A. Member Generation

To ensure the safety of Cooperative personnel, and maintain the integrity of OCEC’s distribution system, all electrical generating facilities, including but not limited to: propane, fuel oil, biomass, wind or solar, connected to OCEC distribution system must be approved in advance and inspected by OCEC at the time of startup.

## 1. Net Metering

The member shall abide by RCW 80-60 and OCEC [Policy 30-420](#).



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## B. Quality of Power – Member Responsibilities

The characteristics of the member's electrical equipment and devices must allow the Cooperative's distribution system to operate efficiently without undue interference to the Cooperative's service or to other members. Per OCEC [Policy 30-105](#), the member agrees to maintain an average total harmonic distortion (THD) level of the load current that is consistent with the IEEE 519 (1992) standard for distribution system customers. If the Cooperative determines that the member load is contributing to excess THD on the distribution system the member will install the necessary filtering or compensation to maintain the THD at or below the level required by the Cooperative within thirty (30) days of the Cooperative's written request to the member. Failure to install the necessary preventative equipment will result in disconnection of the service.

The Cooperative reserves the right to inspect and test any equipment connected to its lines and to obtain any information necessary to determine the operational characteristics of the equipment.

## VIII. Overhead Service

Depending on the on-site facilities, the member may have the option of constructing the new service either overhead or underground. This section covers requirements for residential, irrigation and commercial overhead service installations at secondary voltages less than 600 volts.

- 1) If overhead service length is 75' or more from the OCEC secondary connection point, or crosses a road, an OCEC installed service pole may be required to maintain clearances. The Cooperative Engineering department will determine if a service pole is necessary. Costs associated with OCEC installed service poles are the responsibility of the member. (See [Intermediate Service Pole](#) drawing.)
- 2) OCEC will furnish, install and maintain the service pole, service conductors, connectors, service dead-end clamp, and meter.
- 3) The member must furnish, install and maintain all required service entrance equipment, including wire, service mast, weatherhead, and attachment point.
- 4) The mast provided for attachment of the service conductors must be a minimum of 2" rigid steel galvanized conduit or immediate metallic conduit (IMC) and provide a structurally sound attachment for the service conductors. Service masts must be guyed. (See [Overhead Residential](#) drawing)
- 5) For a duplex or larger building where only one strike to the building is permitted by state law but more than one weatherhead is desired, the weatherheads must terminate within 18" of one another.
- 6) If the installation calls for an overhead electric temporary service, the service pole must be a continuous, single structure, 6" x 6" x 14', with 3' buried in the ground for overhead clearances where NO TRUCK TRAFFIC IS PRESENT and should be located within 50' of the transformer pole.
  - i) Overhead temporary meter poles must have two 2" x 4" braces securely fastened to the post with the service aligned between them.
  - ii) If the installation calls for an overhead electric temporary service across a trafficked area, then the pole SHALL BE a minimum of 8" x 8" x 24' with 5' buried in the ground.



# ELECTRICAL SERVICE HANDBOOK

## A. Attachment of Overhead Service Conductors

- 1) Service entrance conductors must extend at least 24" out of the weatherhead to permit connection to the service conductors.
- 2) The service mast should be located to facilitate only one attachment of the service conductors to the building.
- 3) Do not terminate service conductors on chimneys, vent pipes, gutters or other nonstructural portions of the building. Suitable service attachment devices should be provided and installed during construction.

## B. Overhead Service Conductor Clearance

- 1) Service Conductor clearance must meet NEC 230-24.
- 2) Before the service is installed, provide a path clear of the buildings, trees or other obstructions between OCEC's pole and your point of attachment. (See [Right-Of-Way Clearing Guide](#)). Clearances from any obstruction – vertical or horizontal – must be in accordance with this section.
- 3) On permanent overhead services OCEC will need to attach service conductors a minimum of 12' and a maximum of 25' above **final grade**. The bottom of the drip loop must be a minimum of 12' above **final grade**. Only power service drop conductors are allowed to be attached to the electrical mast.

## C. Meter Pole Requirements

If an acceptable meter attachment point is not available on a permanent structure owned by the member, a meter pole may be installed by OCEC. Costs associated with the meter pole and any necessary guying installation shall be the responsibility of the member.

- 1) If overhead service length is 75' or more from the OCEC secondary connection point, the meter pole shall be guyed.
- 2) The meter base must be attached to the meter pole with 18" standoffs, readily accessible with no tools and the face of the meter must be at least 5' but not more than 6' off the ground.

## IX. Underground Service

Depending on the on-site facilities, the member may have the option of constructing the new service either overhead or underground. This section covers requirements for residential, irrigation and commercial underground service installations at secondary voltages less than 600 volts.



# ELECTRICAL SERVICE HANDBOOK

## A. Underground Service Equipment

- 1) The underground temporary meter post must be on minimum of a 4" x 4" x 8' pressure-treated wood post, with 3' securely buried in the ground. The temporary service shall be no closer than 10' from OCEC's transformer with the meter socket not facing the transformer. Trenching shall be furnished by the member.
- 2) Underground service entrances to mobile homes must be mounted on a minimum of 6" x 6" by 10' pressure-treated wood post and be located within 30' of the manufactured home, as per NEC.
- 3) The underground permanent meter pedestal shall be at least 10' away but not more than 150' from the pad mount transformer.
- 4) Service-side conduit size depends on the size and number of conductors in the conduit. Contact your electrician for proper conduit size. This is governed by the National Electric Code (NEC).
- 5) If the installation calls for an overhead electric temporary service, the service pole must be a continuous, single structure, 6" x 6" x 14', with 3' buried in the ground for overhead clearances where NO TRUCK TRAFFIC IS PRESENT and should be located in close proximity to the transformer pole. Temporary service will be 50' or less.
  - i) If the installation calls for an overhead electric temporary service across a trafficked area, then the pole SHALL BE a minimum of 8" x 8" x 24' with 5' buried in the ground.

## B. Underground Meter Post (Member Owned) Requirements

- 1) All meter posts shall be furnished by the member, will remain property of the member and shall be maintained by the member.
- 2) Meter must be at least 10' away from the Cooperatives pad mount transformer or junction box, and at least 10' away from any overhead power lines.
- 3) If a meter post is determined inadequate by the Cooperative, and must be replaced, the member shall, at their expense, transfer all member owned service entrance equipment to the new post and upgrade to current standards.
  - i) Once transfer to updated member owned equipment is complete an L&I inspection must be obtained before service will be reconnected by the Cooperative.

### **UNDERGROUND SERVICE METER POST REQUIREMENTS**

4" x 6" x 8' full treated timber set at 48" minimum burial

**OR**

4" x 13# steel I-beam, 7' long set in minimum 18" x 18" x 18" concrete foundation

## C. Residential Services

- 1) The member must furnish, install and maintain all required service entrance equipment.
- 2) OCEC will furnish, own and maintain the meter, secondary conductor and all necessary connections.



# ELECTRICAL SERVICE HANDBOOK

## D. Service Conductors

- 1) Contact the OCEC Engineering department for acceptable conductor sizes.
- 2) Contact your electrician for the maximum number of conductors allowed per phase on three-phase services where you wire out for connection to OCEC facilities.
- 3) On an outside wall, service conductors may be installed in a minimum of Schedule 40 nonmetallic conduit, or equivalent.

### Minimum Residential Secondary Conduit Size

Conduit and secondary wire will be supplied by the member.

0 – 200 Amperes: 3" gray schedule 40

201 – 400 Amperes: 3" gray schedule 40

Over 400 Amperes: Consult your electrician for service wire sizing. Confirm size of wire with OCEC Engineering department.

## E. Underground Secondary Conductor Clearance

All underground secondary conductors rated 600 volts must meet the following minimum requirements:

- 1) Ditch must have a minimum width of 18" to allow equal separation and safe working space between utilities.
- 2) Cover of 3' and maximum final grade depth of 5'.
- 3) If the electrical secondary conductor runs parallel to a primary conductor, water line, phone, television or other communication cable, there must be a minimum of 12" of separation.
- 4) When electrical secondary conductors cross over or under a primary conductor, water line, phone, television or other communication cable there must be a minimum of 12" of vertical separation.

## F. Excavation

State law requires that all existing underground utilities be notified 48 hours in advance before excavation begins so buried facilities can be located and marked. Locate marks are only accurate to within 24" of the outside dimensions of both sides of an underground facility. Excavation within that 48" area needs to be done in a non-destructive manner, such as hand-digging or vacuuming. One call to **811** will notify existing underground utilities that are members of the "One Call" system.

## G. OCEC Ditching and Conduit Specifications

### MEMBER RESPONSIBILITIES

Member is expected to provide all ditching, conduit and bedding sand. Ditch and conduit must be inspected and approved before backfilling to final grade. The first inspection is included in the design fee. If additional inspections are required the cost will be added to the installation estimate. Once ditch and conduit are approved and the service is approved by L&I OCEC will schedule our portion of the installation work.

You are responsible for obtaining locates before digging. Use caution while ditching; digging into active utilities can cause injury or death. Call 811 two full business days prior to digging. **You are accountable for any damage done to existing utilities if a locate request was not made.**



## ELECTRICAL SERVICE HANDBOOK

### **DITCH:**

**Final grade must be completed before ditching to required depth specifications, mounding over cable will not be allowed.**

Ditch must be in straight lines or as designed by OCEC with the bottom smooth, level and free of obstructions, sharp objects or rocks larger than 1". Excavated loose material shall be placed at least 2' from the edge of ditch along non-access side (do not pile on road side or alongside of ditch OCEC needs to access for installation). Each end and proposed facility site shall be made accessible to OCEC's Equipment.

Field stakes installed by OCEC can be removed while ditching. **These stakes must be replaced at the side of the ditch as close to the original location as possible. Failure to replace stakes can lead to improper equipment placement possibly causing delays and/or additional cost.**

Standard ditch width is 12" when installing electric only; contact OCEC for guidelines if using a trencher. When other utilities, such as gas, phone, fiber, and CATV, are installed a 30" width is required. This allows for separation between electric and other lines. Ditch must provide a 12" radial separation between electric and communications and 24" between electric and gas or water. A 12" vertical and 12" horizontal separation, or a 24" horizontal separation, can obtain this. (See [Recommended Ditch Configuration](#) drawing.)

**Depth for primary** (before the transformer) is 36"

**Depth for secondary** (after the transformer, before the meter) is 36"

- Member is expected to excavate to within two (2') feet of primary connection points such as pad-mount transformers, junction boxes or a feed-thru, and ground sleeves; Check with OCEC for details.
  - For cut-in line situation stay two (2') feet away from located line. Check with OCEC for details.
- Excavate to within one (1') foot of an existing Primary pole. Consult with the OCEC Engineering department for:
  - site-specific authorization
  - proper conduit location at the base of the pole
- Member is expected to excavate up to secondary splice boxes.
- Backfill material shall be a maximum of 1" minus for a minimum of 6" above and below the conduit. The backfill material shall contain no sharp or foreign objects. Bedding sand would be the preferred material.
  - In rocky soil conditions, where bedding is required, the trench shall be an additional 6" deeper to allow placement of proper bedding under the conduit.
- Water needs to be removed by pumping or draining at all proposed facility locations.
- **OCEC crew will dig under all primary connection points.**



## ELECTRICAL SERVICE HANDBOOK

### **CONDUIT:**

- Primary power conduit shall be 3" inch Schedule 40, gray electrical conduit
- Each primary conductor shall have 1 run of conduit
- Each service shall have 1 run of conduit
- A conduit run shall contain no more than 270 degrees of total bend. This includes sweeps at the transformer and meter base.
- Conduit sweeps at OCEC facilities shall be provided and installed by OCEC.
- Conduit must be bonded together with cement that is compatible with the conduit.

Road crossing may require member to provide Gray 4" schedule 80 PVC electrical use conduit. Contact OCEC Engineering department for number of conduits, size and specifications of conduit requirements.

Ditch and conduit installation shall be inspected by the OCEC Engineering department prior to backfilling. **Call the Cooperative at (509) 996-2228 to schedule an inspection. Minimum of 24 hours' notice is required.**

You will be billed for crew time and equipment use for the following:

- Incomplete ditch
- Additional material used to complete your project
- Lost time or other delays to OCEC crews caused by the member or member contractor

The member is responsible for providing bedding material, screened by a ¼" screen, at all proposed facility locations, i.e. primary dip pole, junction box, and transformer. Consult with the OCEC Engineering department to determine required quantity.

To view a diagram of our specifications see [Section X - Specifications and Drawings](#), or visit our website at [www.ocec.coop](http://www.ocec.coop)

## X. Specifications and Drawings

### A. OCEC Primary Connection Point

PRIMARY POLE WITH OVERHEAD TRANSFORMER



PAD-MOUNTED TRANSFORMER



SINGLE-PHASE PEDESTAL

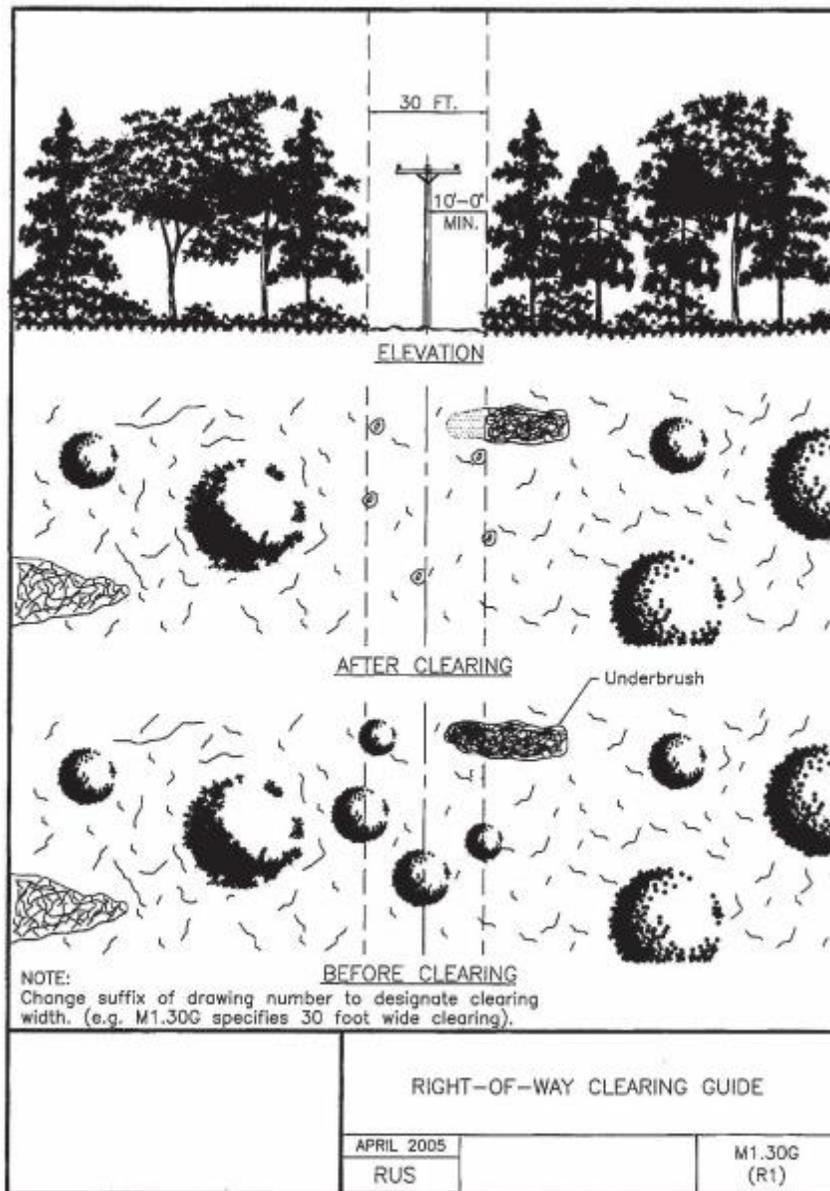




# ELECTRICAL SERVICE HANDBOOK

## B. Primary Overhead Right-Of-Way Specifications

15' either side of power line



On all new services, the member will be responsible to clear the initial right of way based on Okanogan County Electric Co-op's specifications. The OCEC Engineering department will be in contact with the member to discuss the required specifications and to show member what trees/brush need to be trimmed or removed. OCEC crews will do all clearing within the State and County right of way and the member will be invoiced for this service. Members will not be put on the construction schedule until the right of way has been cleared and approved by the Engineering department. After construction is complete OCEC will handle all future right of way clearing/trimming.

**\*Please do not plant trees under - or near - the power lines.\***

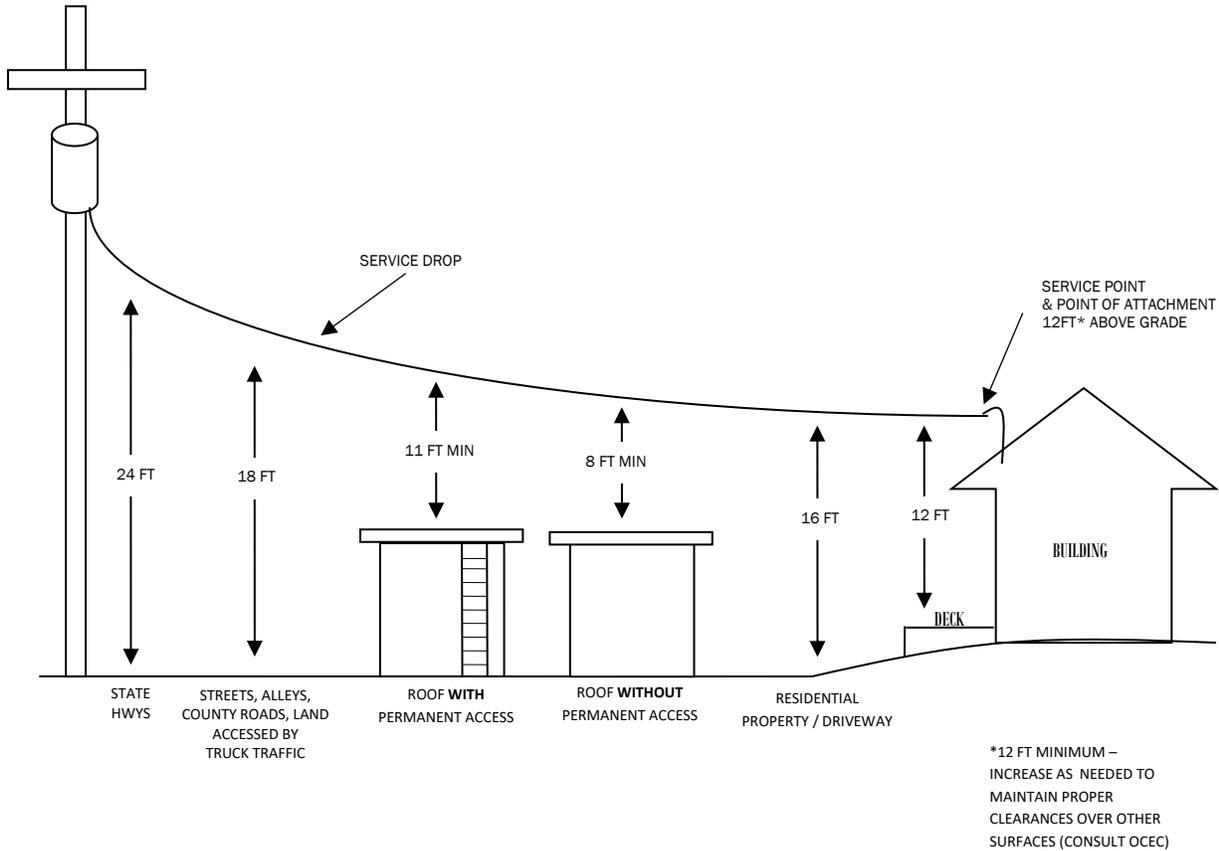
Please contact the OCEC Engineering department at (509) 996-2228 if you have questions.



# ELECTRICAL SERVICE HANDBOOK

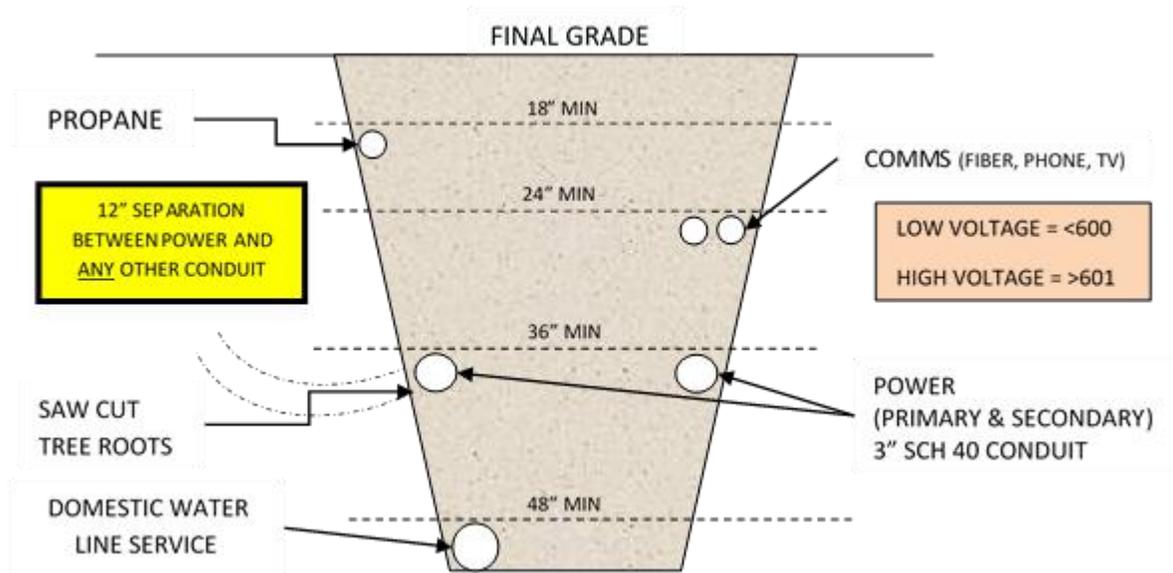
## C. Minimum Clearances per NEC/NESC

The member is not responsible to supply or install the overhead conductor (wire), but you are required to provide a point of attachment at your service point that will allow the Cooperative to meet the clearance requirements.



## D. Underground Ditch Specifications

DO NOT BACKFILL DITCH UNTIL IT HAS BEEN INSPECTED  
AND APPROVED BY APPROPRIATE AUTHORITY



**NOTES:**

- 1) Ditches containing primary electrical conduit shall have a minimum depth of 36" from final grade to the top of the conduit
- 2) Ditches containing secondary electrical conduit shall have a minimum depth of 36" from final grade to the top of the conduit
- 3) Ditch shall be as straight as possible between equipment locations. (1) 90 deg conduit sweep is required at the beginning of the run and (1) 90 deg sweep is required into the new equipment. This allows (1) possible 90deg sweep between these two points. A gentle curve of the ditch and bending the duct in the ditch is the preferred method.
- 4) Ditch shall be as wide as necessary to contain all conduits (power, fiber, TV, telephone) at the required depth and maintain all required conduit spacing
 

Water Lines	2' horizontal AND 6" vertical
Irrigation	12" horizontal OR vertical
Telephone & Cable TV	12" horizontal
Gas	24" horizontal
Sewer	12" vertical at crossings/as per jurisdiction
Storm Drain	12" vertical at crossings/as per jurisdiction

  - a) Ditch must provide a 12" radial separation between electric and communications
  - b) Ditch must provide a 24" separation between electric and gas or water. This can be obtained by either a:
    - i) 12" vertical plus 12" horizontal separation
    - ii) 24" horizontal separation



## ELECTRICAL SERVICE HANDBOOK

**CALL 811** AT LEAST 2 BUSINESS DAYS BEFORE DIGGING TO ENSURE THAT EXISTING FACILITIES (POWER, PHONE, FIBER, ETC.) ARE LOCATED. THERE IS NO CHARGE TO YOU FOR THIS SERVICE. **HAND DIG** WITHIN 2' (TWO FEET) OF LOCATE MARKS. TREAT EXISTING FACILITIES AS LOCATE MARKS.

### DITCH

- When electrical conduits/conductors cross over or under water, there shall be a minimum of 12" (twelve inches) of vertical separation.
- Bedding sand (sand, native rock-free material) shall be made available by the member for Okanogan County Electric Co-Op (OCEC) to use as backfill at all transformer, pedestal and pole locations. Contact OCEC to determine necessary amount.
- Provide all ditching to the edge of the existing facility – transformer, pedestal, or pole. Hand dig when you are within 2' (two feet) and expose the base of the facility.
- Trenching for HIGH VOLTAGE and LOW VOLTAGE before the meter shall be inspected by an OCEC Engineer prior to backfilling. Minimum of 24 hours' notice is requested.
- Trenching for LOW VOLTAGE after the meter shall be inspected by the WA L&I Electrical Division prior to backfilling.

### CONDUIT

- Primary power conduit shall be 3" Schedule 40, gray electrical conduit. For services over 400 Amps, the customer will supply a minimum of (2) 3" Sch 40 PVC.
- A maximum of (3) 90-degree bends are allowed in the conduit run.
- All conduit sweeps shall be SCH 40 PVC – 36" maximum radius.
- Conduit must be bonded together with cement that is compatible with the conduit.

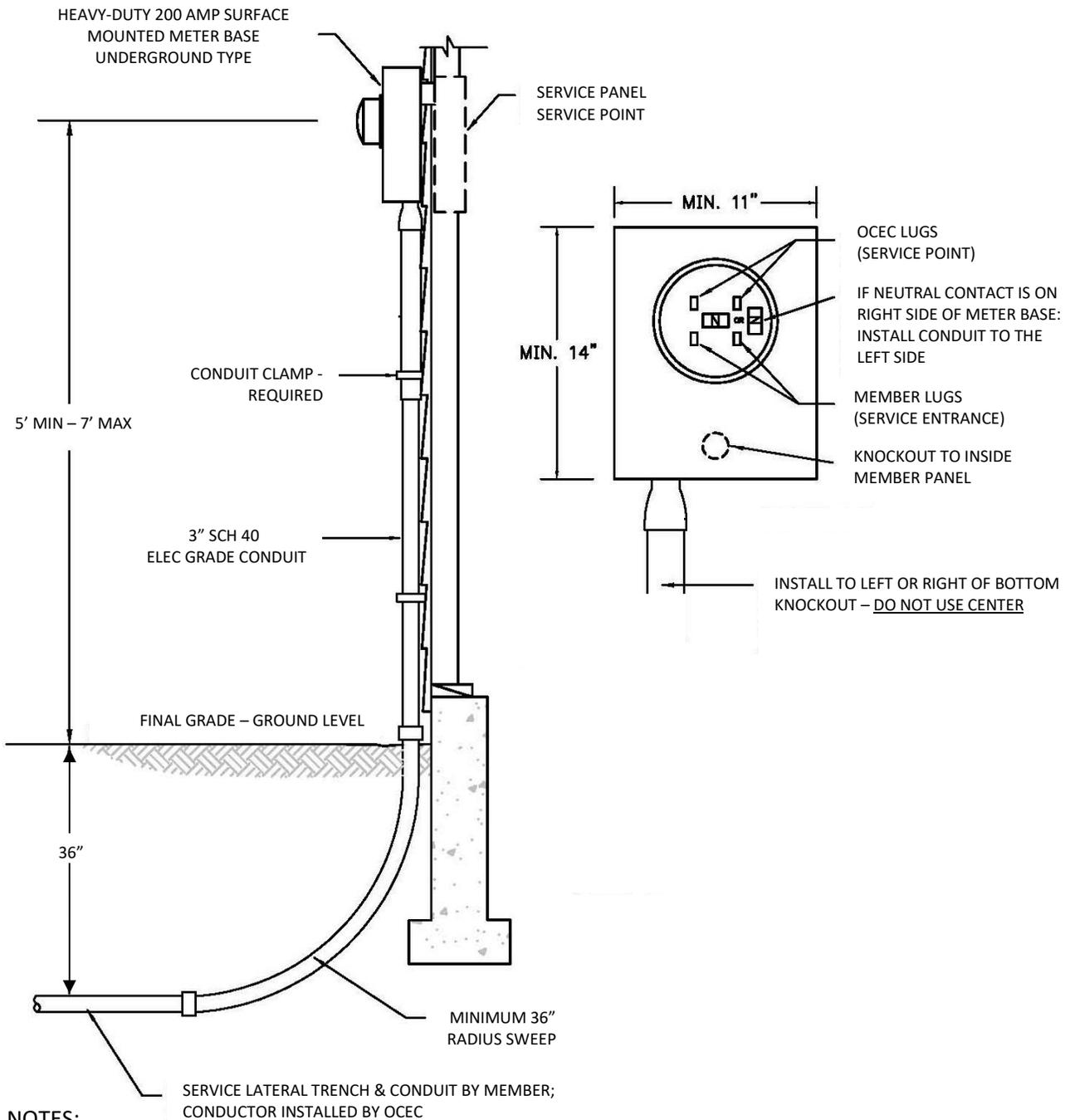
**DO NOT ATTEMPT TO INSTALL CONDUIT AND/OR CONDUCTORS INTO ENERGIZED FACILITIES**



**E. Minimum Clearance from pad-mount facilities**

A notice sign with a diamond-patterned background. At the top, the word "NOTICE" is written in large, white, bold letters on a blue background. Below it, the words "DO NOT OBSTRUCT" are written in large, black, bold letters. The central illustration shows a pad-mount transformer with a person working on it. Dimension lines indicate a 10-foot clearance in front of the transformer and 3-foot clearances on both sides. The text below the illustration reads: "We need room to properly work on this device. Please keep shrubs, structures and fences 10 feet away from the front and 3 feet away from other sides. Obstructions will cause delays when restoring electric service and will result in the removal of the obstruction." At the bottom left, it says: "For planting instructions call Okanogan County Electric Co op at 1-509-996-2228." At the bottom right is the Okanogan County Electric Co-Operative logo.

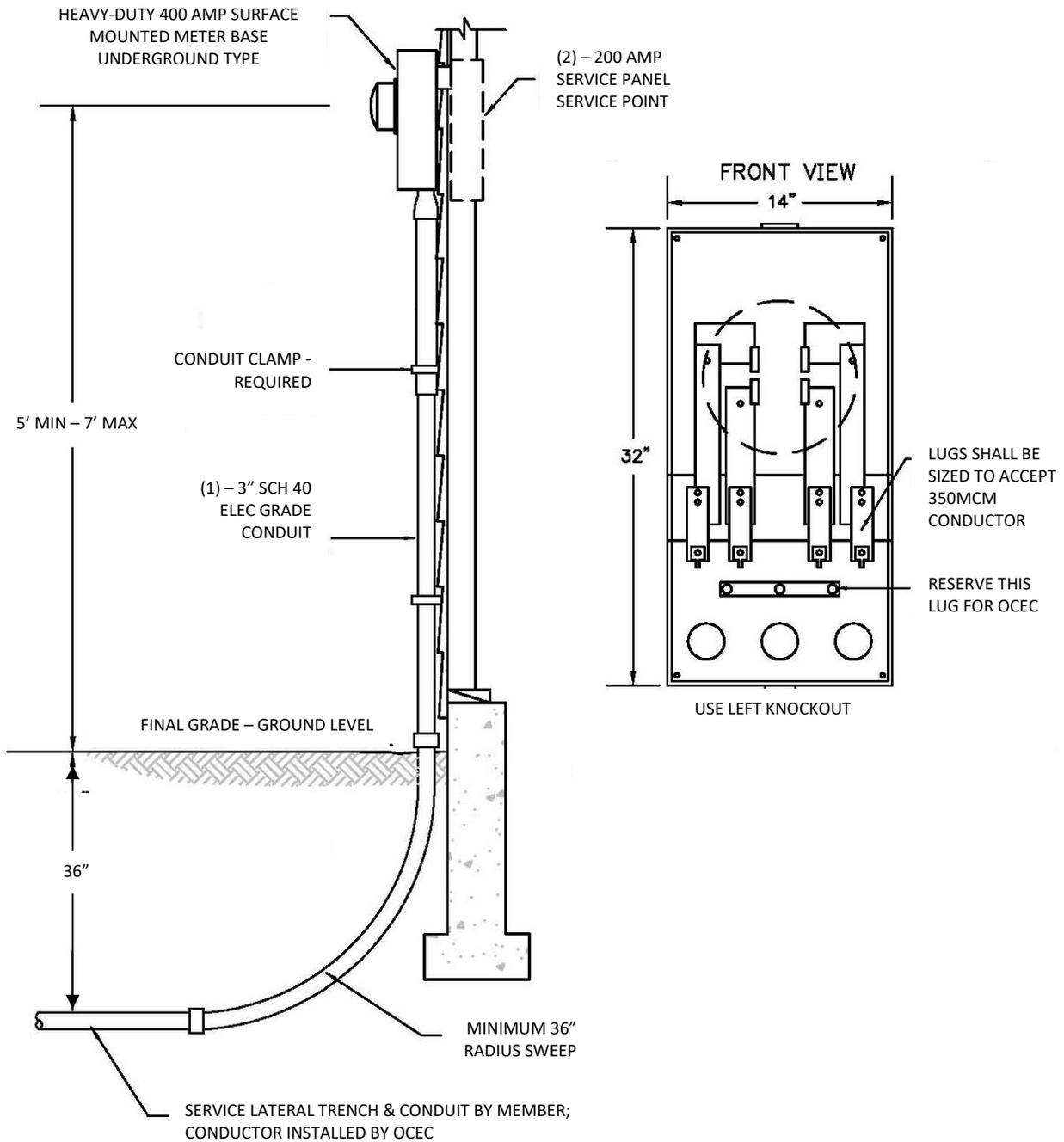
## F. 200 Amp Meter Base



- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around the meter base. This space is to be kept clear of all obstructions including landscaping
- 3) All material to be supplied by the member or member's contractor unless otherwise noted

# ELECTRICAL SERVICE HANDBOOK

## G. 400 Amp Meter Base



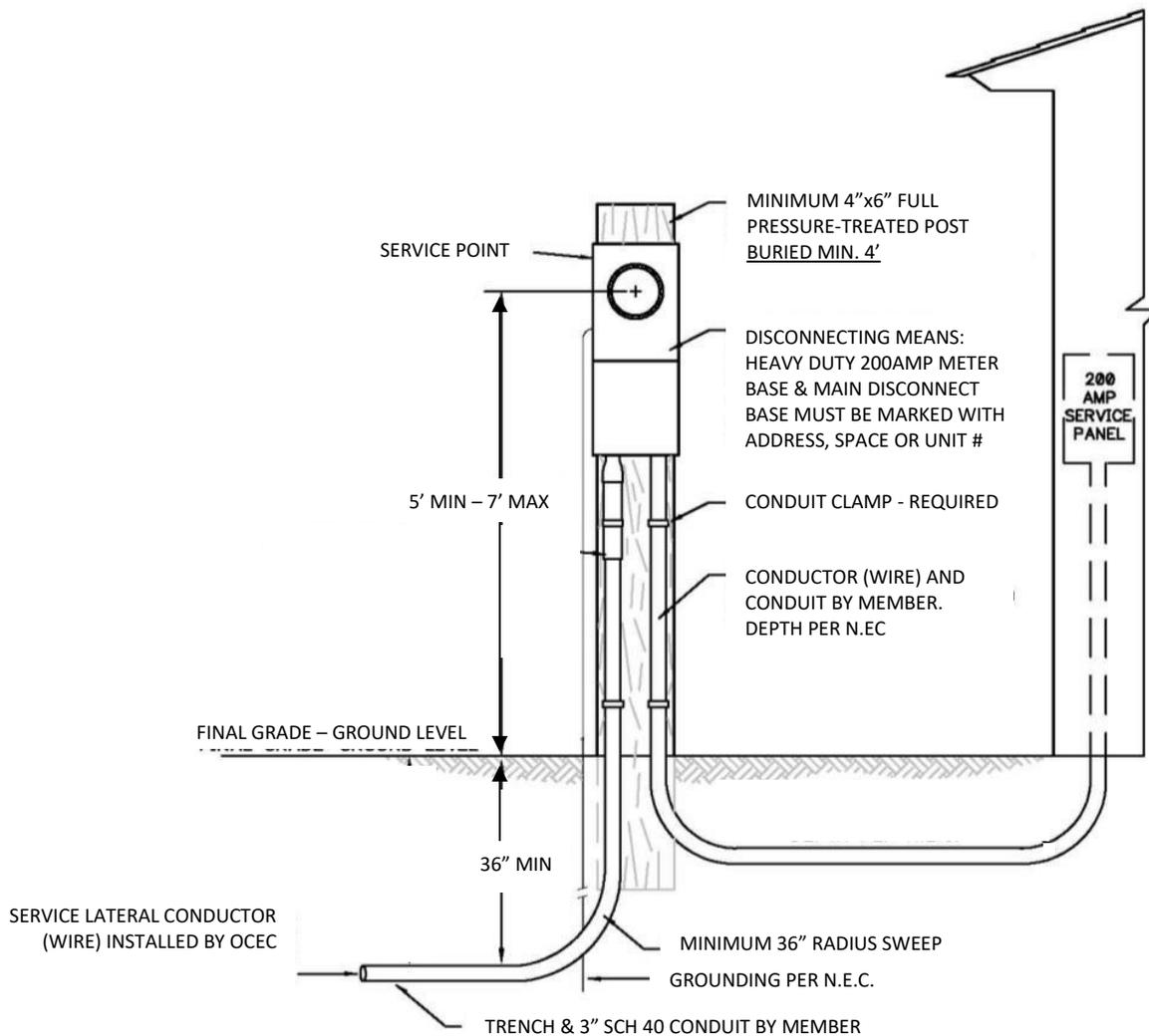
**NOTES:**

- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around the meter base. This space is to be kept clear of all obstructions including landscaping
- 3) All material to be supplied by the member or member's contractor unless otherwise noted



# ELECTRICAL SERVICE HANDBOOK

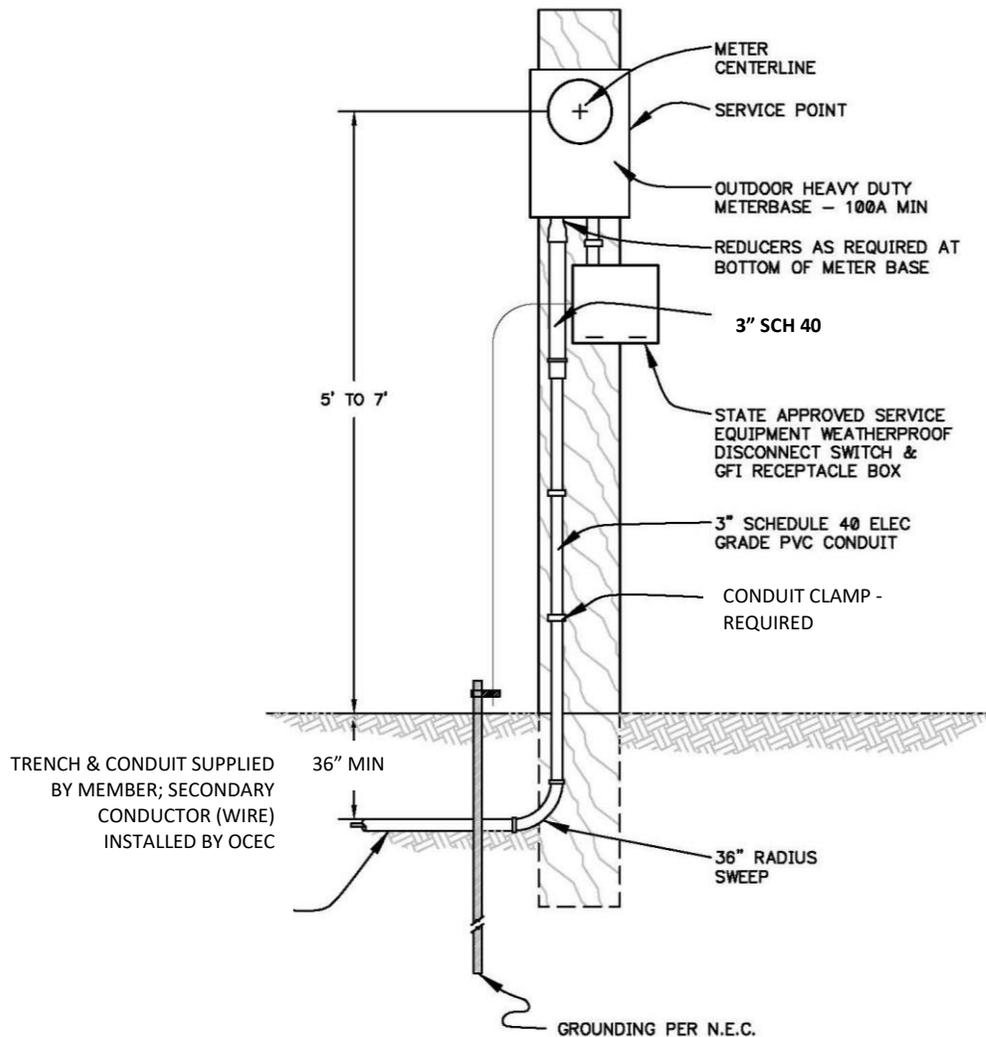
## H. 200 Amp Manufactured Home Service



### NOTES:

- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around the meter base. This space is to be kept clear of all obstructions including landscaping
- 3) All material to be supplied by the member or member's contractor unless otherwise noted

## I. Underground Recreational Vehicle Service



### NOTES:

- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around the meter base. This space is to be kept clear of all obstructions including landscaping
- 3) All material to be supplied by the member or member's contractor unless otherwise noted



# ELECTRICAL SERVICE HANDBOOK

## J. Meter Socket Requirements

Voltage	Wires	Service Capacity Amps	# of Terminals	Meter Socket Config	Manual Block Bypass Acceptable?	Accessible Disconnect Required?	Socket
<b>SINGLE-PHASE RESIDENTIAL</b>							
120/240	3	<201	4	A	Yes	No	Self-Contained socket
120/240	3	201 – 320	4	A	Yes	No	Self-contained 320 Amp socket
120/240	3	>320	6	B	N/A	N/A	Instrument transformer rated with provisions for test switch
<b>SINGLE-PHASE NON-RESIDENTIAL</b>							
120/240	3	>320	6	B	N/A	N/A	Instrument transformer rated with provisions for test switch
120/208	3	<201	5	C	Yes	No	Self-contained socket
<b>ALL THREE-PHASE</b>							
120/208	4	<201	7	D	Yes	No	Self-contained socket
120/208	4	>201	13	E	N/A	N/A	Instrument transformer rated with provisions for test switch
120/240	4	<201	7	D	Yes	No	Self-contained socket (RESTRICTED APPLICATION) –High leg on right terminals
120/240	4	>200	13	E	N/A	N/A	Instrument transformer rated with provisions for test switch (RESTRICTED APPLICATION)
277-480	4	<201	7	D	Yes	Yes	Self-contained socket
277/480	4	>200	13	E	N/A	N/A	Instrument transformer rated with provisions for test switch

### NOTES:

- 1) Three wire services taken from any 208/120 volt system require a #10 wire from the neutral grounded conductor that shall be connected to the fifth terminal.
- 2) Three phase four-wire services require the neutral tap to be connected to the terminal second from the right on the bottom or load side. In the case of four-wire delta services, the high voltage-to-ground phase conductor shall always be connected to the right hand terminal, top and bottom, and be properly color coded.
- 3) The accessible disconnect shall be located after the meter.



# ELECTRICAL SERVICE HANDBOOK

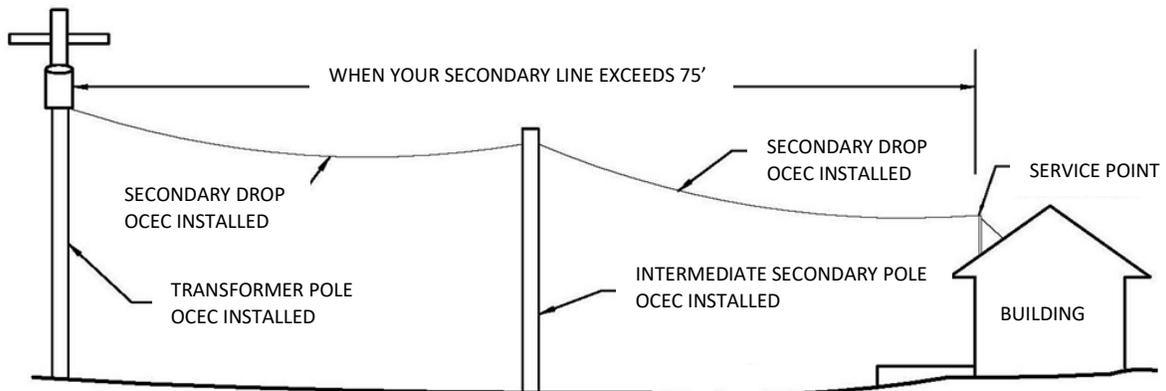
## K. Metering Clearance Requirements

<u>FOR</u>	<u>CLEARANCE</u>
Socket Height	5 feet minimum to 7 feet maximum above finished grade or floor (WAC 296-46-180) In metering rooms 3 feet minimum and 7 feet maximum
Current Transformer Enclosures	Bottom of device shall be no less than 12" above finished grade, floor or working platform. Top of enclosure no more than 8' from finished grade, floor or working platform
Working Space	<ul style="list-style-type: none"><li>• Minimum of 3 feet wide and 3 feet deep measured from the front of the current transformer enclosure or meter face</li><li>• Plants, shrubs and trees shall not be planted in this area</li><li>• All meter socket enclosures shall be accessible and unobstructed to allow the removal of cover, retaining ring, and meter</li><li>• Minimum distance between socket centers is 16" VERTICAL and 10" HORIZONTAL</li></ul>
Meter Pedestals (RV Manufactured Home)	Minimum 44" and maximum 7 feet



# ELECTRICAL SERVICE HANDBOOK

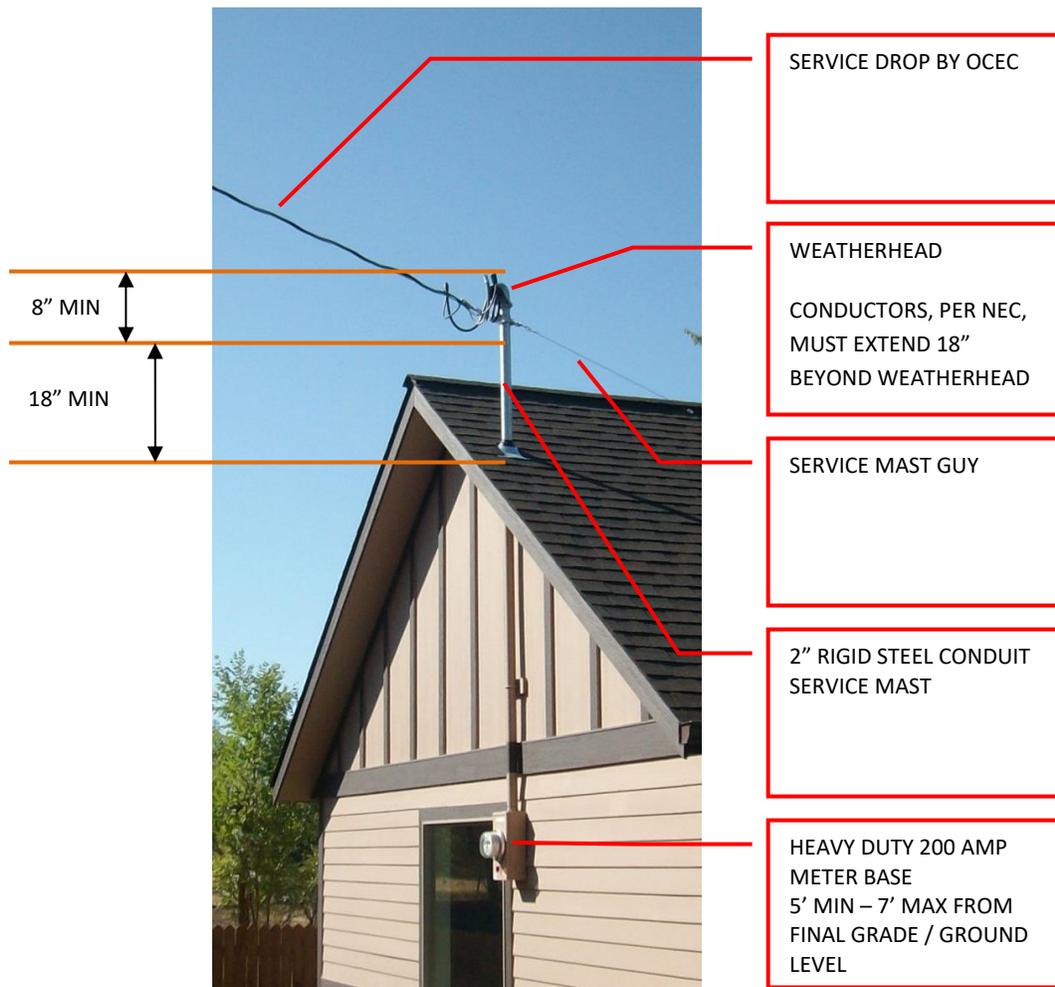
## L. Intermediate Service Pole



### NOTES:

- 1) Service Conductor clearance must meet NEC 230-24
- 2) Do not terminate service conductors on chimneys, vent pipes, gutters or other nonstructural portions of the building

## M. Overhead Residential Installation



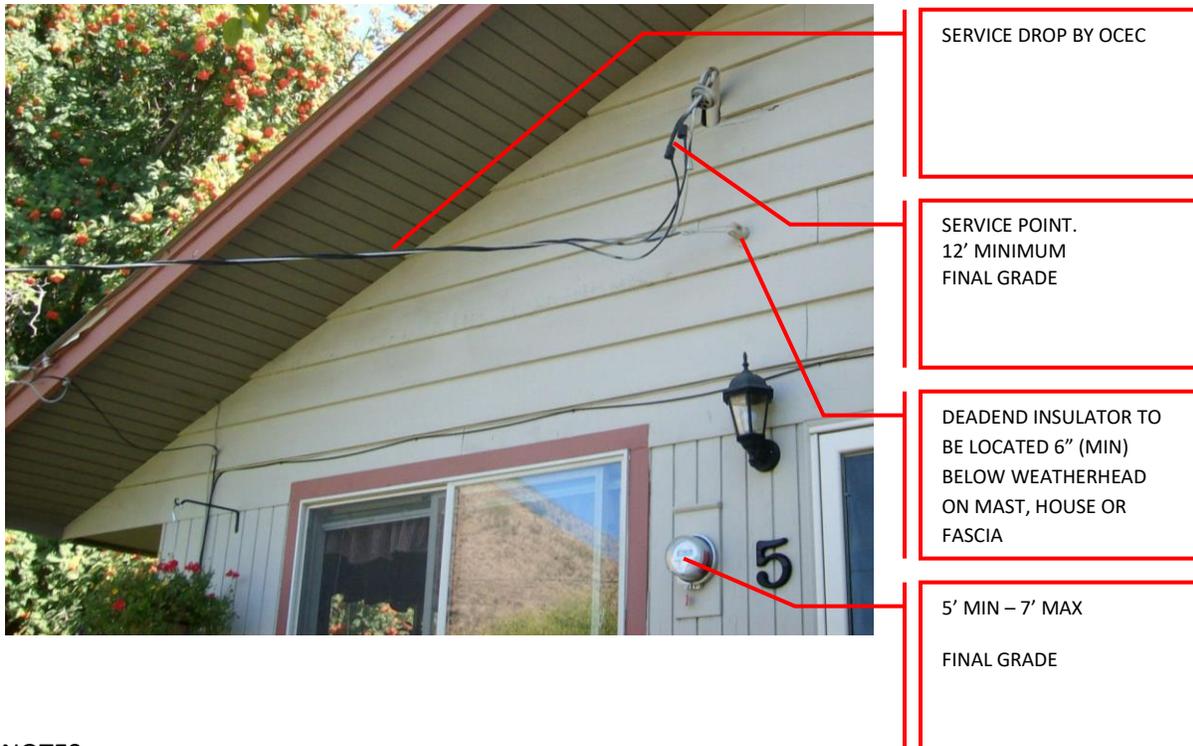
### NOTES:

- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around meter base. This space is to be kept clear of all obstructions including landscaping and enclosures
- 3) Per NESC minimum requirements, If service mast is located:
  - a. within 4' of roof edge, service wire must maintain a minimum clearance of 18" from the roof top within a 6' radius
    - i. Beyond a 6' radius, service wire must maintain a minimum clearance of 3' from the roof top
  - b. more than 4' from the roof edge, service wire must maintain minimum clearance of 3' from the roof top
- 4) Service mast must be tall enough to provide required clearances from ground to service conductors everywhere in the span
- 5) All material shown is supplied and installed by the member or member's contractor unless otherwise noted



## ELECTRICAL SERVICE HANDBOOK

### N. Gable End Mount – Under Eave

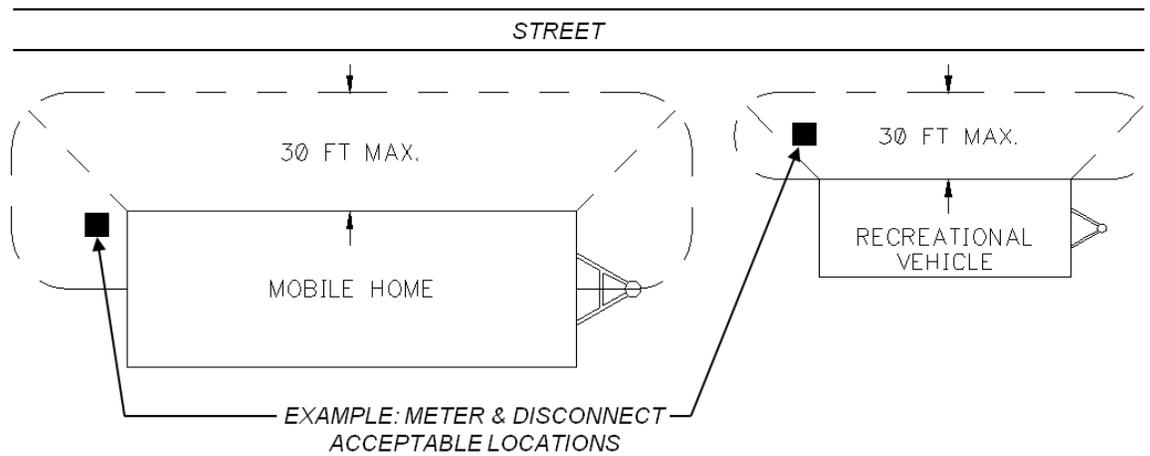


#### NOTES:

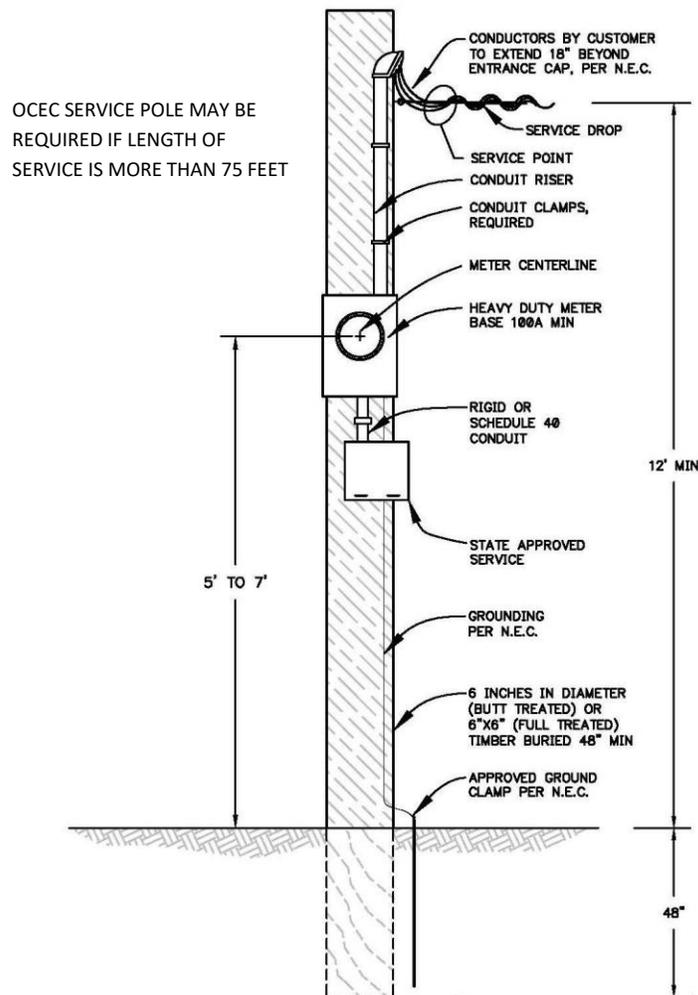
- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around meter base. This space is to be kept clear of all obstructions including landscaping
- 3) All material shown is supplied and installed by member or member's contractor unless otherwise noted

# ELECTRICAL SERVICE HANDBOOK

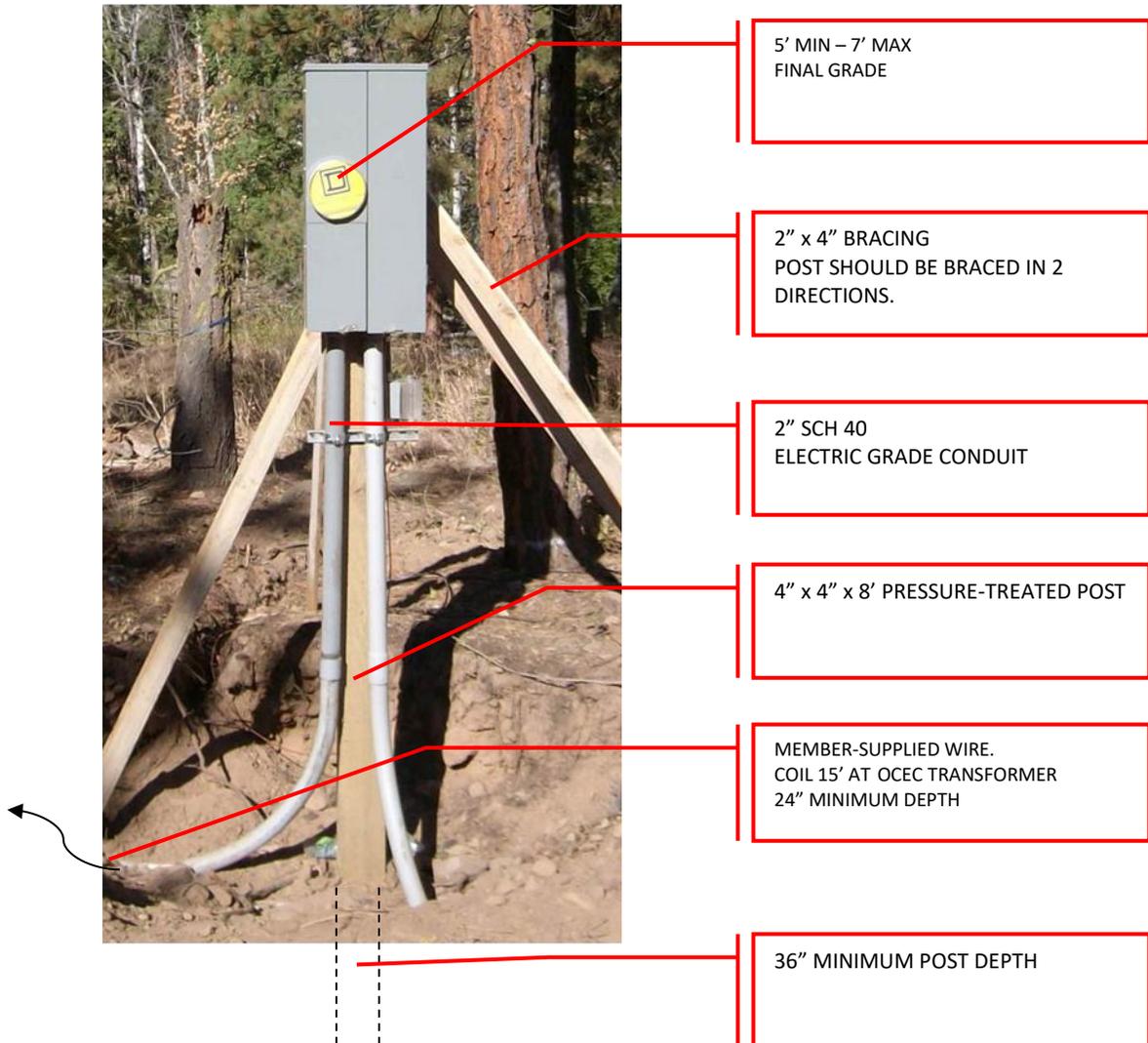
## O. Acceptable disconnect locations



## P. Overhead Recreational Vehicle Service



## Q. Typical Underground Temp Meter Post



5' MIN – 7' MAX  
FINAL GRADE

2" x 4" BRACING  
POST SHOULD BE BRACED IN 2  
DIRECTIONS.

2" SCH 40  
ELECTRIC GRADE CONDUIT

4" x 4" x 8' PRESSURE-TREATED POST

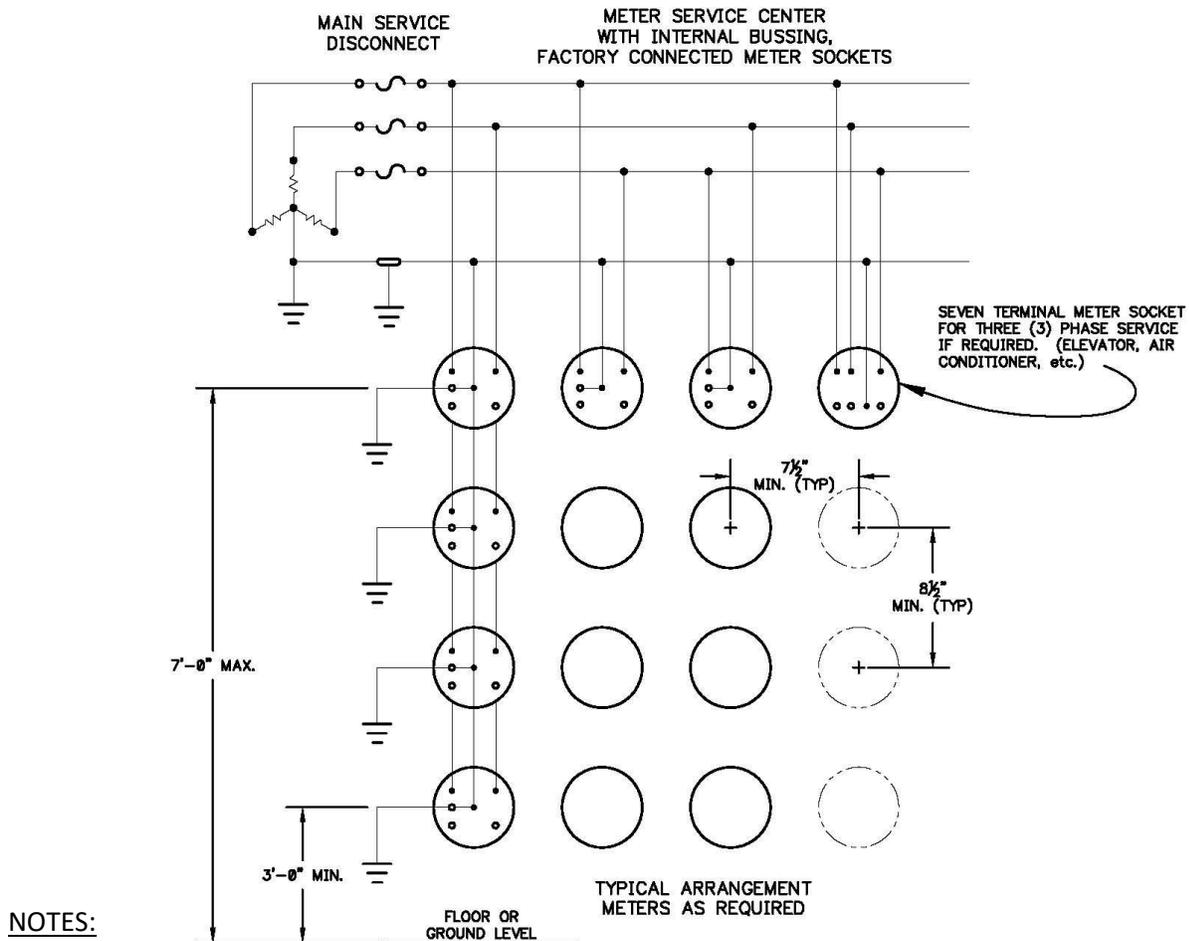
MEMBER-SUPPLIED WIRE.  
COIL 15' AT OCEC TRANSFORMER  
24" MINIMUM DEPTH

36" MINIMUM POST DEPTH

### NOTES:

- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around meter base. This space is to be kept clear of all obstructions including landscaping
- 3) All material shown is supplied and installed by member or member's contractor unless otherwise noted

## R. Multiple Meter Installations



- 1) All metering installations shall be bonded and grounded per current NEC requirements
- 2) Working space of 36" in all directions shall be maintained around meter base. This space is to be kept clear of all obstructions including landscaping
- 3) On residential multi-meter panels, the minimum spacing between socket centers shall be
  - a) 7 1/2" horizontally
  - b) 8 1/2" vertically
  - c) Not less than 1" clearance on the top and sides of the meters
  - d) Not less than 2" clearance on the bottom
- 4) The center shall be a minimum of 3' and a maximum of 7' above the finished grade
- 5) All meters shall be identified as per the requirements in the [Meter Socket Arrangement and Requirements](#) section
- 6) Meter socket jumpers shall not be used to serve house meters
- 7) 208/120 volt three-wire single phase meter socket to be 5 terminal with neutral located on left side facing meter
- 8) All load to be balanced between phases (+/- 10% of nominal voltage)
- 9) Load center may be top or bottom connected; must be approved by OCEC before being installed
- 10) Non-shunting type meter sockets shall be used
- 11) All material shown is supplied and installed by member or member's contractor



# CALL **811** BEFORE YOU DIG!

or visit

[www.CallBeforeYouDig.org](http://www.CallBeforeYouDig.org)

to request a locate at your project site.

The request must be made TWO (2) full working days before you dig. **There is NO CHARGE to you!** It is required by law, and you could be held liable for any damages you cause to utility services if you do not request a locate.

The Facility Operators (Power Company, Phone Company, City Water & Sewer, etc.) will mark where power, water, gas lines, and other utilities are located on your property, using the following color codes:

COLOR	DESCRIPTION
WHITE	Proposed Excavation (your responsibility)
RED	Electric Power Lines
YELLOW	Gas, Oil, Steam, Petroleum
ORANGE	Communications, Alarm or Signal Lines
BLUE	Potable Water
GREEN	Sewers and drain lines
PURPLE	Reclaimed Water, Irrigation and slurry lines
PINK	Temporary Survey Markings