

# VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS MANUAL

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# VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS MANUAL

The **Vermont Utilities Electric Service Requirements** manual is produced by a voluntary association of electric utilities for use as a guide in constructing electric service facilities. The utilities that produced the manual, and the utilities that use the manual, are not responsible, as an association, for the accuracy or application of the information contained within. The responsibility for the accuracy or application of the information contained within remains with the individual utility. The manual is intended to meet the minimum requirements of the National Electric Code and the National Electric Safety Code. To some degree the minimum requirements are exceeded for the purpose of simplifying construction and maintenance. For any questions not answered in the manual contact the serving utility.

Certain utilities listed below have not adopted this manual. Those utilities are listed below only to complete this manual as a reference; the instructions contained in the manual are not applicable to those utilities. Please contact those utilities for alternative instructions. The utilities that have not adopted this manual are indicated by the phrase (Not Adopted) next to the utility's name.

The producers of this manual meet regularly to update and correct this manual. Revisions are issued annually. To submit any updates, corrections or additions please submit a marked up change, with supporting information, to our Secretary, Randy Schramm, GMP  
357 South Road, E. Arlington, VT 05252.

E-mail [Randy.Schramm@GreenMountainPower.com](mailto:Randy.Schramm@GreenMountainPower.com)

## **Barton Village, Inc. (Adopted)**

P.O. Box 519  
Barton, VT 05822  
(802) 525-4747

Communities served in part:

Barton      Brownington      Charleston      Irasburg      Sutton      Westmore

## **Burlington Electric Department (BED) (Not Adopted)**

585 Pine Street  
Burlington, VT 05401-4891  
(802) 658-0300

Community served: Burlington

Revised 11/01/12

## **Enosburg Falls Electric Department (Adopted)**

42 Village Drive  
Enosburg Falls, VT 05450  
(802) 933-4443

Communities served in part:

Bakersfield      Berkshire      Enosburg      Fairfield      Sheldon

## **Green Mountain Power Corporation (GMP) (Adopted)**

Corporate Headquarters  
163 Acorn Lane  
Colchester, VT 05446  
(802) 864-5731

For outages, service connections, customer service, billing, and other related business questions, please call: **(888) 835-4672**

### **GMP BRADFORD SERVICE CENTER** (located on VT 25)

339 Waits River Road  
Bradford, VT 05033

Communities served in whole or in part:

Bradford      Newbury      Strafford      Vershire  
Fairlee      Norwich      Thetford      West Fairlee

### **GMP BRATTLEBORO SERVICE CENTER** (located on VT 30)

P.O. Box 598  
455 West River Road  
Brattleboro, VT 05302

Communities served in whole or in part:

Brattleboro      Dover      Guilford      Marlboro      Stratton      Vernon  
Brookline      Dummerston      Jamaica      Newfane      Townshend      Wardsboro

## **GMP COLCHESTER SERVICE CENTER**

163 Acorn Lane  
Colchester, VT 05446

Communities served in whole or in part:

Addison	Essex	Jericho	Richmond	Vergennes
Bolton	Ferrisburg	Monkton	Sherburne	Waltham
Charlotte	Hinesburg	New Haven	South Burlington	Williston
Colchester	Huntington	Panton	Starksboro	Winooski

## **GMP MIDDLEBURY SERVICE CENTER**

121 Cady Road  
Middlebury, VT 05753

Communities served in whole or in part:

Addison	Buels Gore	Hubbardton	Monkton	Ripton	Weybridge
Benson	Cornwall	Huntington	New Haven	Salisbury	Whiting
Brandon	Ferrisburg	Leicester	Orwell	Shoreham	
Bridport	Goshen	Lincoln	Panton	Starksboro	
Bristol	Hancock	Middlebury	Pittsford	Sudbury	

## **GMP MONTPELIER SERVICE CENTER**

25 Green Mountain Drive  
P.O. Box 486  
Montpelier, VT 05601

Communities served in whole or in part:

Barre	Calais	Groton	Orange	Waterbury
Barre Town	Duxbury	Marshfield	Plainfield	Webster ville
Berlin	East Montpelier	Middlesex	Waitsfield	Williamsville
Buels Gorge	Fayston	Montpelier	Warren	Worcester
Cabot	Graniteville	Moretown	Washington	

## **GMP POULTNEY SERVICE CENTER**

P.O. Box 193  
193 York Street  
Poultney, VT 05764

Communities served in whole or in part:

Benson	Fair Haven	Pawlet	Rupert	Tinmouth	West Haven
Castleton	Middletown Springs	Poultney	Sandgate	Wells	

Revised 11/01/12

**GMP ROYALTON SERVICE CENTER** (located on VT 107)  
2388 VT107  
Bethel, VT 05032

Communities served in whole or in part:

Barnard	Chelsea	Northfield	Randolph	Stockbridge
Bethel	Granville	Norwich	Rochester	Strafford
Braintree	Hancock	Pittsfield	Roxbury	Tunbridge
Bridgewater	Hartford	Plymouth	Royalton	Woodstock Town
Brookfield	Hartland	Pomfret	Sharon	Woodstock Village

**GMP RUTLAND SERVICE CENTER** (located on US 7 near Post Road)  
2154 Post Road  
Rutland, VT 05701

Communities served in whole or in part:

Brandon	Danby	Mount Holly	Rutland City	Wallingford
Bridgewater	Dorset	Mount Tabor	Rutland Town	West Rutland
Castleton	Ira	Pittsford	Sherburne	
Chittenden	Mendon	Plymouth	Shrewsbury	
Clarendon	Middletown Springs	Proctor	Tinmouth	

**GMP ST. ALBANS SERVICE CENTER**  
60 Industrial Park Road  
St. Albans, VT 05478

Communities served in whole or in part:

Bakersfield	Essex	Hyde Park	St. Albans City	Underhill
Belvidere	Fairfax	Jeffersonville	St. Albans Town	Westford
Cambridge	Fletcher	Jericho	Sheldon	
Colchester	Georgia	Milton	Swanton	

**GMP ST. JOHNSBURY SERVICE CENTER** (located on US 5)  
P.O. Box 309  
603 Main St.  
St. Johnsbury, VT 05819

Communities served in whole or in part:

Barnet	Granby	Lunenburg	Victory	Wheelock
Concord	Guildhall	Lyndon	Walden	
Danville	Kirby	St. Johnsbury	Waterford	

**GMP SPRINGFIELD SERVICE CENTER**

38 Precision Drive  
Springfield, VT 05156

Communities served in whole or in part:

Andover	Grafton	Ludlow	Springfield	Weston
Athens	Hartland	Peru	Townshend	Windham
Baltimore	Jamaica	Plymouth	Weathersfield	Windsor
Cavendish	Landgrove	Reading	West Windsor	Winhall
Chester	Londonderry	Rockingham	Westminster	

**GMP SUNDERLAND SERVICE CENTER** (located on South Road near US 7 Exit 3)

357 South Road  
E. Arlington, VT 05252

Communities served in whole or in part:

Arlington	Glastenbury	Peru	Sandgate	Sunderland
Bennington	Jamaica	Pownal	Shaftsbury	Winhall
Dorset	Manchester	Rupert	Stratton	Woodford

**GMP WELLS RIVER SERVICE CENTER**

22 Main Street  
P.O. Box 677  
Wells River, VT 05081

Communities served in whole or in part:

Barnet	Corinth	McIndoes Falls	Peacham	Topsham	Wells River
Danville	Groton	Newbury	Ryegate	Waterford	

**GMP WESTMINSTER SERVICE CENTER**

1308 Westminster Heights Rd.  
Westminster, VT 05158

Communities served in whole or in part:

Bellows Falls	Dummerston	Rockingham	Springfield	Westminster
Brookline	Putney	Saxtons River	Vernon	

## **GMP WHITE RIVER JUNCTION SERVICE CENTER**

64 Olcott Drive

Wilder, VT

White River Jct., VT 05001

Communities served in whole or in part:

Hartford

Hartland

Norwich

Wilder

Quechee

Thetford

## **GMP WILMINGTON SERVICE CENTER**

Haystack Road

P.O. Box 398

Wilmington, VT 05363

Communities served in whole or in part:

Dover

Marlboro

Searsburg

Stratton

Wilmington

Halifax

Readsboro

Stamford

Whitingham

## **Town of Hardwick Electric Department (Adopted)**

North Main Street, Box 516

Hardwick, VT 05843

(802) 472-5201

Communities served in part:

Calais

Eden

Hardwick

Glover

Wolcott

Craftsbury

Elmore

Hyde Park

Greensboro

Woodbury

## **Vermont Electric Cooperative, Inc. (Adopted)**

42 Wescom Rd.  
Johnson, VT 05656  
(802) 635-2331  
(800) VEC-COOP

Communities served in whole or in part:

Albany	Charleston	Greensboro	Maidstone	Sheldon
Alburg	Coventry	Highgate	Milton	Shelburne
Averill	Craftsbury	Hinesburg	Montgomery	South Hero
Avery's Gore	Derby	Holland	Morgan	Starksboro
Barton	Eden	Huntington	Morristown	Stowe
Bakersfield	Enosburg	Hyde Park	Newark	Swanton
Belvidere	Essex	Irasburg	Newport	Troy
Berkshire	Fairfax	Isle La Motte	Newport City	Underhill
Bolton	Fairfield	Jay	North Hero	Vernon
Bloomfield	Ferdinand	Jericho	Norton	Waterville
Brighton	Fletcher	Johnson	Richford	Westfield
Brownington	Franklin	Lemington	Richmond	Westford
Brunswick	Georgia	Lewis	St. Albans	Williston
Cambridge	Glover	Lowell	St. George	
Canaan	Grand Isle	Lyndon	Sheffield	

## **Village of Hyde Park, Inc. (Not Adopted)**

P.O. Box 400  
Hyde Park, VT 05655  
(802) 888-2310

Communities served in part:

Hyde Park      Johnson      Morristown

## **Village of Jacksonville Light Dept. (Adopted)**

PO Box 169  
Jacksonville, VT 05342  
(802) 368-2811

Communities served in part:      Whitingham

## **Village of Johnson Water & Light Department (Adopted)**

P.O. Box 603  
293 Lower Main Street West  
Johnson, VT 05656  
(802) 635-2301 (P.W. Dept.)  
(802)635-2611 (Municipal Offices)

Community served in part:      Johnson

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## **Village of Ludlow Electric Department (Adopted)**

9 Pond St.  
Ludlow, VT 05149  
(802) 228-3721  
(802) 228-7766

Communities served in part:

Cavendish                      Ludlow                      Plymouth

## **Village of Lyndonville Electric Department (Adopted)**

119 Park Ave., P.O. Box 167  
Lyndonville, VT 05851  
(802) 626-3366

Communities served in whole or in part:

Burke              Glover              Lyndon              St. Johnsbury      Sutton              Westmore  
East Haven      Kirby              Newark              Sheffield              Victory              Wheelock

## **Village of Morrisville Water & Light Department (Not Adopted)**

857 Elmore St.  
Morrisville, VT 05661  
(802) 888-3348

Communities served in part:

Eden              Elmore              Hyde Park              Johnson              Morristown              Stowe  
Wolcott

## **Village of Northfield Electric Department (Adopted)**

51 South Main Street  
Northfield, VT 05663  
(802)-485-5411  
(802)-485-8426 (fax)

Communities served in part:

Berlin              Moretown              Northfield

## **Village of Orleans Electric Department (Adopted)**

One Memorial Square  
Orleans, VT 05860  
(802)-754-8584

Communities served in part:

Barton      Browington      Coventry      Irasburg

## **Village of Stowe Water & Light Department (Not Adopted)**

Main Street, Box 190  
Stowe, VT 05672  
(802)-253-7392  
(802)-253-7215

Communities served in part:

Stowe      Waterbury

## **Village of Swanton Electric Light Department (Adopted)**

100 Grand Avenue, P.O. Box 279  
Swanton, VT 05488-0279  
(802) 868-3397

Communities served in part:

Highgate      Swanton

## **Washington Electric Cooperative, Inc.      (Adopted)**

Box 8, Route 14  
East Montpelier, VT 05651  
(802) 223-5245

Communities served in whole or in part:

Barnet	Chelsea	Groton	Orange	Topsham	Wheelock
Barre	Corinth	Hardwick	Peacham	Tunbridge	Williamstown
Berlin	Danville	Marshfield	Plainfield	Vershire	Woodbury
Bradford	Duxbury	Middlesex	Randolph	Waitsfield	Worcester
Brookfield	East Montpelier	Moretown	Roxbury	Walden	
Cabot	Fayston	Newbury	Ryegate	Washington	
Calais	Greensboro	Northfield	Stannard	West Fairlee	

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## I. GENERAL INFORMATION

### 101. Requirements and Compliance with Electrical Code

A. The requirements stated herein are not intended to supersede or conflict with the pertinent standards and regulations of the National Board of Fire Underwriters or with any state or municipal rule now in effect or which may later be enacted. The latest revision of the National Electric Code of the National Board of Fire Underwriters is a minimum requirement. Some requirements in addition to those in the latest edition of the National Electric Code are contained herein because the Utility deems them advisable for the safety of customers and employees. **SERVICE CONNECTION WILL NOT BE MADE UNTIL APPROVAL IS RECEIVED FROM THE APPROPRIATE STATE OR LOCAL INSPECTION AUTHORITY WHEN REQUIRED.** The Utility has no obligation to determine whether or not the customer's wiring and installations are proper and safe or comply with the National Electrical Code, National Electric Safety Code, or other codes or regulations in effect at the customer's location. However, if it comes to the attention of the Utility that the customer's wiring and electrical installations are not proper and safe, or do not comply with such codes, the Utility has the right to refuse or discontinue service.

B. The definitions established by the latest edition of the NEC shall be applicable to these electric service information requirements.

### 102. Revision of Requirements

The contents of this book are effective as dated and supersede all similar requirements previously issued. Revisions of this information shall be made as necessary and the Utility reserves the right to make such revisions. The Utility cannot guarantee to give notice of revisions to persons who may have received this book. **IT SHALL BE THE RESPONSIBILITY OF THE CUSTOMER TO VERIFY WITH THE LOCAL UTILITY THAT THEY HAVE THE LATEST VERSION OF THIS BOOK PRIOR TO CONSTRUCTION.** All services shall be required to comply with the most recent set of requirements.

### 103. Departments of The Utility

The Utility has specialized departments and individuals to assist with customer electrical requirements. Check with your local Utility for more information.

#### **104. Rate Assistance**

Utilities are prepared to assist in the selection of the available rate, or rates, best suited to the customer's use of electricity at the time of installation. It is strongly urged that customers, contractors, architects, electricians, consultants, and design engineers take advantage of this assistance prior to installation of the end users' electric service. Utilizing the Utility's advice may avoid delays and result in greater satisfaction and more efficient use of electric service.

#### **105. Diversion of Electricity**

A. Diversion of electrical energy is any method, or device, used by any agent to unlawfully and/or intentionally prevent, or interfere with, an electric meter from duly registering the proper quantity of electricity supplied by the Utility. It is also the unlawful, or intentional, taking of any electrical current from any wire of the Utility without the consent of the Utility. The diversion of electrical energy by any method or device is a serious act against the Utility and its customers, as it results in higher operating expenses for the Utility and increased electric rates to its customers. Diversion could create potential hazardous conditions. Vermont law (13 VSA §§ 3782, 3784 & 2528) provides penalties for diversion and tampering with electric lines and energy metering.

B. Where there is proof of meter tampering or theft of electrical energy, such person, or persons, responsible shall be liable for the energy so diverted and shall be subject to civil prosecution.

#### **106. Adequate Wiring**

The latest edition of the NEC outlines in detail the recognized minimum safe practices which should be followed when installing electric wiring and equipment. Compliance with the Code only assures that the installation will conform with recognized safe practices. The customer's consultant should aid the customer in obtaining a wiring installation that is not only safe, but is adequate to his present and future needs.

#### **107. Special Cases**

Careful consideration will be given to special or unusual conditions. The Utility reserves the right to permit departure from these requirements when, in its judgment, conditions warrant. Such departure will not be considered as establishing a precedent.

#### **108. Written Confirmation**

Information furnished by the Utility will be put in writing upon request. The Utility assumes no responsibility for misunderstandings resulting from verbal communications.



## **109. Customer Premises**

The Utility shall not be liable for damages to the person, property of the customer, or any other persons arising from the use of electricity or the presence of the Utility's equipment on the customer's premises. All property owned by the Utility and located on the customer's premises shall be deemed to be personal property and title thereto shall remain in the Utility, and the Utility shall have the right at the termination of service to remove all of its property whether affixed to the realty or not.

## **110. Customer Responsibility**

The customer shall be responsible for safekeeping of property of the Utility on their premises and, in the event of damage, shall pay to the Utility any cost of inspection and repairs. The customer shall protect the equipment of the Utility on their premises and shall not permit any person, except an authorized representative of the Utility, to break any seals upon or do any work on any meter or other apparatus of the Utility located on the customer's premises.

## **111. Access to the Premises**

The Utility shall have the right of access to a customer's premise, and to all property furnished by the Utility installed therein, at all reasonable times during which services are furnished to the customer and on or after its termination for the purpose of reading meters, inspection and repair of devices used in connection with its services, removing its property, or for any other proper purpose. Identification will be shown upon request.

## **112. Unauthorized Attachment to Poles**

The Utility forbids the unauthorized attachment of any flags, banners, signs, clothes lines, antennas, basketball hoops, etc. to any of its poles. It forbids the use of its poles for any placards, political posters, or any advertising matter. The Utility will remove any such unauthorized attachment without notice and may prosecute such trespassing.

## **113. Construction in the Proximity to Conductors**

A. Construction in proximity to any electrical conductor shall not be started until the Utility has been contacted and it has been determined that such construction will not violate the requirements of the applicable electrical codes, national electrical safety codes, laws of the state, and/or local municipal authorities.

B. Swimming pools shall not be constructed in proximity to any electrical conductor per the applicable electrical codes.

C. The cost of relocation of electrical facilities to comply with A and B above shall be borne by the customer.

#### **114. Continuity of Service**

The Utility makes every effort to maintain its system at the highest possible standards, but assumes no liability as a result of any failure of its service or equipment. The Utility reserves the right to interrupt service to a customer without notice when repairs or changes make such a procedure necessary or appropriate, and also to restore service without notice when such work is completed. Any equipment which might endanger life or damage property under such condition or under conditions of low voltage, two phase, or single phase operation, should be provided with suitable automatic protection by the customer.

Should the supply of service be curtailed, changed, interrupted, or become impaired because of accident, strike, legal process, federal, state, or municipal interference, or any cause whatsoever beyond the Utility's control and except as caused by willful default or neglect on its part, the Utility shall not be liable for damages, direct or consequential, resulting from such interruption, impairment, curtailment, or change.

#### **115. Voltage Sensitive Equipment**

Customers owning, or planning to purchase computers, reproduction, X-ray, data processing equipment, or similar devices should be aware that this type of equipment can be extremely sensitive to power system transients or loss of voltage. Customers should consult the manufacturer of their equipment for suitable devices to protect against these conditions. The Utility cannot assume responsibility for voltage variations which may be caused by protective equipment operation, switching, lightning surges, or by other conditions normal or emergency in nature.

#### **116. Losses, Damages or Injury**

The Utility shall not be responsible for any losses, damages, or injury resulting from:

- \* Any cause resulting from the actions of the customer's electrician or contractor.
- \* The customer's wiring or appliances if faulty, improperly grounded/connected, used or inappropriately sized for the customer's service.
- \* The customer's intentional or unintentional overloading of the service provided.
- \* The customer's non-compliance with the Guidelines.
- \* Tampering with or alteration of Utility's meters, lines, transformers or other equipment whether or not located on the customer's premises.
- \* Any other cause not resulting from the sole negligence of the Utility.

#### **117. Life Support Systems**

The Utility recognizes some customers may rely on life support equipment connected to electric service supplied by the Utility. The Utility strongly encourages these customers to report this condition to the Utility. The Utility shall not be responsible for any life- or health-threatening incidents these customers may incur due to variation of electric service. Therefore, the Utility urges these customers to have adequate back-up.

## 118. Digsafe

A. The Digsafe office should be contacted at least 48 hours before digging or excavating on public or private property, the Underground Utility Damage Prevention System, 30 VSA §§7001-7008 requires everyone to contact the **DIG SAFE** program at **1-888-Dig-Safe** (1-888-344-7233).

Dig Safe  
331 Montvale Ave.  
Woburn, MA 01801

Dig Safe is a Public Utility Underground Utility Damage Prevention System which operates in Vermont, New Hampshire, Maine, Rhode Island and Massachusetts. A call to Dig Safe notifies the appropriate Utility to mark their underground lines.

The Dig Safe law and system does not apply to Municipal Water and Sewer Utilities. You must contact them directly to request marking.

B. Hours: Dig Safe operates during regular business hours, excluding holidays and weekends, and is available for emergency calls 24 hours a day, 7 days a week.

C. Excavation Activities Defined: The Underground Utility Damage Prevention System defines excavation activities as “activities involving the removal of earth, rock or other materials in the ground, disturbing the subsurface of the earth, or the demolition of any structure, by the discharge of explosives or the use of powered or mechanized equipment, including but not limited to digging, trenching, blasting, boring, drilling, hammering, post driving, wrecking, razing or tunneling, within 100 feet of an underground Utility easement (which includes private property), or the area of a public right-of-way in which an underground Utility facility is located. Excavation activities shall not include the tilling of the soil for agricultural purposes or activities relating to routine public highway maintenance.”

D. Responsibility: The excavator is responsible for knowing and understanding the Underground Utility Damage Prevention System. Any person or Utility who violates this law is liable for damages and subject to fines and penalties.

E. Premarking: The proposed excavation areas shall be premarked, prior to calling Dig-Safe. Premark with white paint, stakes, or other suitable white markings to identify the general scope of the excavation. Premarking is not required if the actual excavation will be continuous and will exceed 500 feet in length; or, if the boundaries of the excavation can be described in a way that precisely identifies the boundaries of the excavation, to the owner of the underground Utility facility.

F. Horizontal or Directional Boring: When excavation activities involve horizontal or directional boring, the excavator shall expose underground facilities to verify their location and depth, in a safe manner, at each location where the work crosses a facility and at reasonable intervals when paralleling an underground facility. The exposure shall occur after the Dig-Safe procedure, and prior to boring.

## **119. Unauthorized Work on Electric Utility Facilities.**

Customers and their Contractors are prohibited from working on, or in, Electric Utility Facilities. Specifically, they shall not install, remove, maintain, or adjust equipment on, or in, Utility owned poles, terminating cabinets, padmounted transformers, secondary pedestals, secondary handholes, manholes or switchgear. If the Utility becomes aware that individuals are violating this prohibition, the Utility will write the offender a letter asking them to Cease and Desist. Copies will go to the Electricians Licensing Board, State Utility Regulators, and OSHA. Failure to comply with this requirement will result in the initiation of procedures with state regulators and safety officials. The following are exceptions:

- Installation of service riser equipment, that is installed on a pole, within 8 feet of the grade, by persons standing on the ground.
- Installation and removal of seasonal decorations and banners, on a pole, at a height selected by Electric Utility Personnel. Such attachments require specific advance approval.
- Installation of conduits, and cables, into device foundations prior to initial energization.
- Installation of conduits, and cables, into device foundation subsequent to initial energization, but, under the direct supervision of Electric Utility Personnel.
- Other work deemed appropriate by the responsible Electric Utility Personnel.

This prohibition applies to Customers and their Contractors making or removing connections between the Utility Owned Overhead Service Drop and the Customer Owned Service Entrance Cable, unless specific approval is made in advance.

This prohibition is not directed toward personnel or contractors employed by Utility Joint Users. And, it is not directed toward customers, or their contractors, working on customer owned facilities, unless those facilities are mounted upon, or within, Utility owned facilities.

## **120. Modification to Service Equipment after Energization.**

Customers and their Contractors are prohibited from modifying service equipment, without the notification and consent of the Utility, and, when required, the appropriate State or Local Inspection Authority. Examples of modifications that require prior notification and consent are:

- Replacing a Service Entrance cable fed from a Utility owned overhead service.
- Connecting a new, or relocated, building, trailer or structure, to a pre-existing service. This does not apply to connections made from the main panel in the pre-existing building.
- Changes in the buildings or structures, that reduce clearances to, or increase access to, a Utility owned overhead or underground service.
- Changes in the buildings or structures, that reduce clearances to, or reduce access to, a meter socket.
- Replacing a customer owned underground service fed from a pole meter or pedestal meter.
- Replacing, or adding, a main panel for the purpose of increasing capacity.
- Other actions that may create safety concerns, NEC violations, equipment overloads, or be contradictory to these Service Requirements or Utility Tariffs.

## II. GENERAL REQUIREMENTS FOR SERVICE

### 201. Planning for Service

A. Application for new service, or changes to existing service, should be made with the Utility nearest the job location. Consult list of Utilities for localized assistance. **APPLICATION SHOULD BE MADE AS FAR IN ADVANCE AS POSSIBLE OF THE DATE ELECTRIC SERVICE IS REQUIRED.** The customer, or their representative, should consult the Utility regarding the character of service available before plans are completed, equipment purchased, or construction commenced on facilities to be connected to the Utility's distribution system. Information the customer or their representative furnishes the Utility with regard to the proposed electrical installation should be technically detailed, in writing, and sent to the local Utility.

All equipment using electrical energy should comply with Energy-Efficiency Guidelines. Check with your local Utility for compliance.

B. **A CUSTOMER LOAD DATA SHEET (DRAWING #501), INDICATING THE SERVICE REQUIREMENTS FOR THE PROJECT, AND A SITE PLAN SHALL BE SUBMITTED TO THE LOCAL UTILITY FOR ALL COMMERCIAL AND INDUSTRIAL SERVICES AT THE EARLIEST POSSIBLE TIME.** Data should include the size of the main disconnect, phase(s), voltages, connected KW load, phase conductor and neutral/ground, peak and coincidental demand. This information is vital for the design of the Utility's distribution facilities to service a customer's requirements. **No equipment shall be placed on order without this information. Many construction materials and transformers require a lead time of six months or more to be obtained.**

The Utility may require the site plan to be on a diskette. Check with the local Utility.

<p><b><u>NOTE:</u></b> The site plan shall be on a disk with a cad file having an extension of ".DWG", or ".DGN". If a cad file is not available files having extensions of ".IGES" or ".DXF" are necessary. Mylars will still be acceptable when the previously mentioned medium is not available.</p>
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C. Individual residential customers shall not be required to furnish a diskette or mylar site plan but should consult with the local Utility during the planning stages to ensure electrical service will be available when required. A site plan, or sketch, would be helpful in determining the location of the distribution lines.

## 202. Availability of Service

### A. Underground Service

**The Utility shall be consulted before work begins** to determine the feasibility of underground service. Municipal requirements, soil, and terrain conditions shall, in the opinion of the Utility, be compatible with those on which the policy is based. Unsuitable terrain includes, but is not limited to, ledge, excessively wet areas, leach fields, and waste disposal areas. UD in some areas may result in excessive costs for the customer due to special engineering and installation costs.

### B. Three-phase service

**THREE-PHASE SERVICE IS NOT READILY AVAILABLE IN ALL LOCATIONS.** The Utility shall be consulted before three-phase installations are designed and constructed. Failure to do so may result in a substantial expense, or delay, which could otherwise have been avoided.

## 203. New Service

A. **CUSTOMERS INSTALLING NEW ENTRANCES SHALL CONSULT WITH THE UTILITY FOR THE LOCATION OF SERVICE ENTRANCES AND METERS BEFORE WIRING IS STARTED.** The point of attachment to the service drop and the location of the meter shall be determined solely by the Utility. If a state or local wiring permit is required, the customer should obtain approval of these Utility-chosen locations by the inspector having jurisdiction before wiring begins. Approval by the Utility is required, but does not imply approval by state or local inspectors.

B. All single-phase service shall be **three-wire**, and all single-phase service equipment shall be provided with two-pole overload protection and a solidly grounded neutral as required by the latest edition of the NEC and/or the authority having jurisdiction. In cases where an existing two-wire service entrance is being changed to a three-wire service the existing load shall be balanced. It is the customer's responsibility to accomplish the balancing. Exceptions shall be made for individual equipment which only requires 120 volt service (i.e. cable television amplifier). The grounded conductor shall be identified in accordance with the requirements of the latest edition of the NEC and/or the authority having jurisdiction.

C. Normally, only one service will be installed for a customer at a given location. Two or more services may be installed at the option of the Utility, if approved by appropriate governing or inspecting authority, to supply suitable capacity, special loads, or to meet unusual conditions. When electricity is metered by more than one meter, the cost of service delivered through each meter will be computed separately. A location requiring both three-phase and single-phase service shall balance the single-phase load across all three phases and receive only four-wire wye service where practical. The Utility reserves the right to determine the type of service which will be supplied.

#### **204. Relocation or Alteration of Existing Service**

A. Whenever changes are made in existing service installations involving relocation, replacement, or additions, the entire service installation shall, to the extent practical, be subject to, and rebuilt to, present standards. **Customers are urged to contact the Utility before putting out to bid any changes that may be made and for any special requirements the Utility may have.** Discussions as to the actual changes required shall be determined by consultation with the customer, the Utility, and the local electrical inspector on an individual basis. In the event that the Utility shall be required to place any portion of its existing overhead distribution system underground, or is required to change the location of any poles in its distribution system, a new point of delivery will, if necessary, be designated by the Utility. The customer may be required to make any necessary changes in their wiring system at their own expense.

B. If, for any reason, a customer makes any change in their wiring involving a change of meter or service location, the addition of one or more meters, or major changes in repair to existing service entrance wiring, the customer shall follow the provisions of these requirements. **Customers are encouraged to check with the Utility for any charges to be paid by the customer relating to the foregoing work.**

C. If a customer desires a change of service, and the meters are to be left in an indoor location, the change must first be approved by the Utility.

#### **205. Load Changes**

The customer shall give proper notice to the Utility of any substantial increase or decrease proposed in their connected load, or of any proposed change in characteristics, purpose of use, or location of load. Failure on the part of the customer to give notice as provided above shall render them liable for any damages to meters, transformers, wires, and associated apparatus of the Utility resulting from the use of increased or changed load.

#### **206. Temporary Service**

A. **A "temporary service" is generally** supplied by the Utility **for a period not to exceed six months.** The Utility reserves the right to remove the temporary service after the six month period. Check with the local Utility on availability.

B. The customer shall pay in advance for a temporary service an amount equivalent to the cost of installing, connecting, and removing the Utility's service facilities connected to the customer's temporary service at the filed rate.

C. The standard temporary service is generally limited to 200 ampere, single-phase, three-wire 120/240 volts. Other voltages, phasing, and capacity characteristics may be available for installation at an additional cost to the customer.

D. The maximum distance for a temporary overhead service drop is 100 feet. The customer shall supply a suitable point of attachment as shown in attached Drawings 301 and 303. **A tree may not be used for this purpose.**

GMP Only- A tree, that has been topped and limbed-out, may serve as a support for a temporary service, provided that it is of sufficient height and strength.

E. In areas where the primary voltage distribution system is underground, temporary service for construction purposes will be installed under the provisions of Section 203 and Drawing 302, providing further that:

1. The primary conductors and transformers to serve the customer's permanent installation have already been installed, connected, and energized.
2. The customer has provided a suitable support adjacent to the transformer and installed thereon the appropriate meter socket, protection device, grounds, etc. The customer and/or contractor must contact the Utility for details on the temporary connections between the transformer and the meter.

F. All wiring shall comply with the latest edition of the NEC.

## **207. Customer Service Costs**

A. Information relating to the portion of the service construction costs to be paid by the customer shall be supplied by the Utility when requested by the customer. The customer requesting service shall be charged in accordance with established tariffs. A copy of the price list is available upon request from your local Utility. Commercial and industrial customers and developers shall submit to the Utility a site plan and Customer Load Data Sheet (refer to Drawing 501). The Utility shall design its electrical distribution facilities to serve a customer's requirements and provide information for cost quotation. Prices quoted for all primary line extensions shall be in writing by a Utility representative. Prices are subject to change; check with your local Utility for information about the length of time that pricing remains valid.

B. **Income Tax Assessment** - The Tax Reform Act of 1986 requires that the Utility pay both Federal and State income tax on contributions in-aid-of construction. This tax assessment shall be levied on all Investor-Owned Utility (IOU)-built extensions and on customer-installed extensions when the Utility takes over ownership and maintenance.

## **208. Energizing Permits**

The Utility is not allowed to energize a service (commercial, including rental or multiple-unit) until an approved energizing permit has been issued by the authority (State of Vermont and/or municipality) requiring such inspection. It is the responsibility of the customer to follow whatever procedure is required by the State of Vermont or municipal authority to assure that the Utility receives an energizing permit prior to the time that electrical service is required. No portion of the service equipment, including the service drop or underground service, may be energized prior to receipt of the permit.

Under current law, State Electrical Inspectors only have jurisdiction in public buildings. They do not have jurisdiction in single-unit buildings occupied by the owner as their personal residence. All rental properties are considered public buildings regardless of the number of units.

For customer owned equipment, any of this manual's requirements, that are in excess of code specified minimums, are recommended not required.



## 209. Limiting Service Fault Current

Typical minimum rating low voltage disconnect/breakers are rated for a maximum interrupting capacity of 10,000 amps. The chart below shows combinations of transformer impedance and cable lengths, that would result in fault currents less than, or equal to, 10,000 amps. Because the initial design, and future changes, are possible, both on the Utility side, and on the customer side, the Utility, Customer, and the Customer's Contractor must work together to ensure an appropriate breaker rating. The most frequent instances where this is an issue are: a small customer is fed from a large transformer; a pole meter/disconnect, or pedestal meter/disconnect, is close to the transformer; or, a small temporary service meter/disconnect is fed by a large transformer. Alternatively, a breaker with a higher interrupting rating can be used.

Transformer	Imp.	Phases	Fault Amps	Cable Length (Ft.)		
Size (kva)			W/O Cable	1/0 Al	4/0 Al	350 Mcm Al
15-120/240	1.5%	Single	7 ka	0 ft	0 ft	0 ft
25-120/240	1.5%	Single	12 ka	10	15	20
37.5-120/240	1.5%	Single	18 ka	20	35*	45*
50-120/240	1.5%	Single	24 ka	25	45*	65*
75-120/240	1.5%	Single	36 ka	45*	80*	110*
100-120/240	1.5%	Single	48 ka	50*	90*	130*
167-120/240	1.5%	Single	80 ka	55*	100*	150*
75-208Y/120	1.5%	Three	14 ka	30*	45*	65*
112-208Y/120	1.5%	Three	21 ka	45*	75*	110*
150-208Y/120	1.5%	Three	28 ka	50*	90*	130*
225-208Y/120	1.5%	Three	42 ka	55*	100*	150*
300-208Y/120	2.5%	Three	34 ka	50*	90*	135*
500-208Y/120	2.5%	Three	56 ka	55*	100*	155*

\*For Utilities that require a meter/disconnect, Pole Metering is not available, unless a disconnect with a higher interrupting rating is used.

## 210. Re-energization of Service

In circumstances where a service is to be re-energized after a customer's property is damaged, such as a fire or flood, or, that the property has been without service for an extended period of time, as determined by the Utility, the Utility may have requirements to be met before the service is re-energized. Contact your Utility for any such requirements.

An energizing permit from a State Electrical Inspector is required only when a new electrical service is installed in a public building and is not required for re-energizing existing electrical services, in a public building or a private residence, after a fire, flood, or extended period without service. In the event of a region wide disaster such as a flood, State Electrical Inspectors may be directed by the Vermont Department of Public Safety to act in an advisory capacity evaluating any affected structure, but there is no statutory requirement that they do so.

If there is any question whether or not a repair, in a public building, is extensive enough to be considered a new service, the State Electrical Inspector for the area where the structure is located should be contacted for clarification.

## 209. Limiting Service Fault Current

Typical minimum rating low voltage disconnect/breakers are rated for a maximum interrupting capacity of 10,000 amps. The chart below shows combinations of transformer impedance and cable lengths, that would result in fault currents less than, or equal to, 10,000 amps. Because the initial design, and future changes, are possible, both on the Utility side, and on the customer side, the Utility, Customer, and the Customer's Contractor must work together to ensure an appropriate breaker rating. The most frequent instances where this is an issue are: a small customer is fed from a large transformer; a pole meter/disconnect, or pedestal meter/disconnect, is close to the transformer; or, a small temporary service meter/disconnect is fed by a large transformer. Alternatively, a breaker with a higher interrupting rating can be used.

Transformer	Imp.	Phases	Fault Amps	Cable Length (Ft.)		
Size (kva)			W/O Cable	1/0 Al	4/0 Al	350 Mcm Al
15-120/240	1.5%	Single	7 ka	0 ft	0 ft	0 ft
25-120/240	1.5%	Single	12 ka	10	15	20
37.5-120/240	1.5%	Single	18 ka	20	35*	45*
50-120/240	1.5%	Single	24 ka	25	45*	65*
75-120/240	1.5%	Single	36 ka	45*	80*	110*
100-120/240	1.5%	Single	48 ka	50*	90*	130*
167-120/240	1.5%	Single	80 ka	55*	100*	150*
75-208Y/120	1.5%	Three	14 ka	30*	45*	65*
112-208Y/120	1.5%	Three	21 ka	45*	75*	110*
150-208Y/120	1.5%	Three	28 ka	50*	90*	130*
225-208Y/120	1.5%	Three	42 ka	55*	100*	150*
300-208Y/120	2.5%	Three	34 ka	50*	90*	135*
500-208Y/120	2.5%	Three	56 ka	55*	100*	155*

\*For Utilities that require a meter/disconnect, Pole Metering is not available, unless a disconnect with a higher interrupting rating is used.

## 210. Re-energization of Service

In circumstances where a service is to be re-energized after a customer's property is damaged, such as a fire or flood, or, that the property has been out of service for an extended period of time, as determined by the Utility, the Utility may have requirements to be met before the service is re-energized. Contact your Utility for any such requirements.

### III. STANDARD SERVICE CHARACTERISTICS

#### 301. Low-Voltage Service

Alternating current, 60 Hertz service is supplied throughout the territory served by your Utility. Characteristics of the service available in any locality should be obtained from your Utility before ordering any new, additional, or replacement equipment.

Low voltage service for secondary rate customers will be supplied from the nearest suitable distribution line of the Utility at one of the following standard service voltages:

##### Single-Phase

3-Wire 120/240 Volts

Three-phase Wye, Delta or voltage variations may not be available in all locations. Check with your local Utility.

##### Three-Phase (Overhead)

4-Wire Wye 120/208 Volts

4-Wire Wye 277/480 Volts

3-Wire Delta 240 Volts

3-Wire Delta 480 Volts

4-Wire Delta 120/240 Volts

##### Three-Phase (Underground)

4-Wire Wye 120/208 Volts

4-Wire Wye 277/480 Volts

Voltage	Availability by Utility							
	GM	VE	WE	LE	HE	VJ	NE	
4-Wire Wye 120/208 Volts	A	A	A	A	A	A	A	
4-Wire Wye 277/480 Volts	A	A	B	A	A	A	A	
3-Wire Delta 240 Volts	F	E	E	E	E	E	E	
3-Wire Delta 480 Volts	F	E	E	E	E	E	E	
4-Wire Delta 120/240 Volts	C	E	E	E	E	E	E	
4-Wire Open-Delta 120/240 Volts	D	D	E	E	E	D	E	

A- Available in all three phase locations, either pole-mounted or pad-mounted.

B- Available in all three phase locations as pole-mounted; not available as pad-mounted.

C- Available in areas not planned for future 34.5 kv distribution, as pole-mounted; not available as pad-mounted.

D- Available in all two phase locations, for limited loads, as pole-mounted; not available as pad-mounted.

E- Not available for new installations.

F- Available only in areas that have delta primary configuration.

The voltages are nominal and subject to reasonable variations in accordance with regulatory commission standards.

Check with your local Utility. Utilities have stocking limitations on transformer sizes. This may result in a particular voltage not being available for a range of transformer size or range of customer load.

### **302. 120/240 Volt, Three Wire, Single Phase**

Generally available for residential and small commercial and industrial customers for general lighting, heating, cooking, and small power loads with individual motors not over 5 h.p.

Where the total load exceeds 50 KVA, your local Utility may, at its option, require the customer to arrange his wiring for three phase service.

### **303. 120/208 Volt, Three Wire, Single Phase**

Available only where the low voltage distribution system is three phase, four wire, 120/208 volts, Wye connected, for services of similar uses and size as covered in Section 302.

### **304. 120/208 and 277/480 Volt, Three Phase, Four Wire, Wye**

These services are preferred voltages for commercial and industrial service and can be supplied where three phase distribution is available.

### **305. 120/240 Volt, Three Phase, Four Wire, DELTA Connected**

For combined single phase, 120/240 volt and three phase, 240 volt service, or where only two phase distribution is existing. This service will not be available from 34.5 KV distribution, and may not be available from your local Utility.

### **306. High-Voltage Service**

Primary voltages are available. Check with the local Utility for more information.

Service Type	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Three-Phase Primary Distribution	Y	Y	N	Y	Y	Y	Y		
Three-Phase Subtransmission	Y	Y	N	N	N	N	N		
Single-Phase Primary Overhead Distribution	Y*	Y	N	Y	N	Y	Y		
Single-Phase Primary URD Distribution	Y*	Y	N	Y	N	Y	Y		

Y\* -Residential customers may only own overhead or underground primary installations with both utility and PSB approval.

## **IV. SERVICES (UNDER 600 VOLTS)**

### **401. Service Connections**

A. All final connections, permanent or temporary, between the customer's wiring and the Utility's distribution lines or equipment shall be made by the Utility. The Utility shall not permit, tolerate, or authorize connections by anyone other than the Utility's personnel without prior approval of the Utility.

B. The Utility shall be the final authority in determining the size and characteristics of the wire used for interconnection between the Utility and the customer.

### **402. Overhead Service Drop**

A. The Utility shall not allow a connection between its service drop and the customer's service entrance conductors unless a sufficient length of service entrance conductor (2 feet or more) is left for this purpose.

B. Large-capacity commercial and industrial overhead services require that the transformer pole, terminal pole, or structure in most cases be situated no further than 100 feet from the weatherhead(s) on the facility being served because of the weight of the service conductors. A mid-span support pole may be required even at these distances. The customer shall provide a point of attachment on the building or facility, such as an eye bolt, capable of supporting the service conductors. The hardware shall be provided by the local Utility and the customer shall install it. The maximum capacity of transformers that the local Utility will install on a pole is limited due to the weight of transformers, check with your local Utility for the maximum size. A facility requiring capacities in excess of these, or having limitations due to the number or size of the secondary cables shall be served from a pad-mounted transformer or special substation. Associated costs shall be borne by the customer.

C. The service drop shall have the clearances above ground, above structures, and horizontal clearances as specified in the National Electrical Safety Code. For customer-owned services NEC will apply.

### **403. Pole Service**

Many Utilities do not allow metering on poles. Contact your local Utility regarding availability of this type of service and installation practices. See Drawing 202.

### **404. From Overhead Lines**

When requested by the customer and accepted by the local Utility, or where conditions require it, an underground service may be installed from overhead supply lines. See Drawings 201 and 202.

#### **405. From Underground Lines**

In those areas served by underground distribution, all new services shall also be installed underground.

#### **406. Route**

The local Utility will determine the route of the Utility-owned underground service from the distribution system to the building.

#### **407. (Utility-Owned) Residential Underground Services**

A. All trenching and backfilling shall be provided by the customer, see Drawing 203 for Trenching Specifications.

B. Conduit is required for the Utility-owned underground service and shall be provided and installed by the customer, (refer to Section 513 for Conduit Requirements).

C. If the customer elects to install the service, including service cable and conduit, it shall be done in accordance with the requirements of this section and Drawings 201 and 202. A minimum of forty continuous feet (or unless otherwise agreed to) of service cable shall be provided at the base of the pole for connection to the Utility's system. The local Utility may provide and install the stand-offs, conduit, condulator-weatherhead and other associated equipment on the pole, above the sweep after the customer has installed the conduit in the ground. The Utility's field representative may provide and install, if practical, the first stand-off as a guide for the proper installation, by the customer, of the conduit adjacent to the pole.

D. If an underground service cable, (owned by the Utility), fails and is considered by the local Utility not to be repairable, the local Utility shall install the new underground. In some circumstances a temporary repair may be necessary prior to a permanent repair.

E. The following chart delineates the division of functions between the Customer and the Utility. This chart also applies to Paragraph 408 (Customer-Owned) Residential Underground Service.

Single Phase Low Voltage URD Service	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Res. URD Ownership before Meter	D	A	B	B	B	B	B		
Res. URD Ownership after Meter	C	C	C	C	C	C	C		
Stand-off Brackets Provided by	U	U	C	C	U	C	U		
Riser Conduit Provided by	C	U	C	C	C	C	C		
Weatherhead Normally Required	Y1	Y	N	Y	Y	N	Y		
Condulator Normally Required	Y1	N	Y	N	N	Y	N		
Weatherhead/Condulator Provided by	C	U	C	C	C	C	U		
Expansion Joint Provided by	C	C	C	C	C	C	C		
Riser Installation by	U	U	U	U	U	U	U		
Trenching and Backfill by	C	C	C	C	C	C	C		
Trench Conduit by	C	C	C	C	C	C	C		
Trench/Conduit Inspection by	U2	U	C	C	C	U	U		
Warning Tape Installation by	C	C	C	C	C	C	C		
Conduit Highly Recommended	Y	Y	Y	Y	Y	Y	Y		
Conduit Required	D	Y	Y	N	Y	Y	Y		
Cable Provided by	C	C	C	C	C	C	C		
Cable Installed by	C	C	C	C	C	C	C		
Padmount Secondary Connectors by	U1	U1	U	U1	U	U1	U1		
Pole Meter Required	N	N	N	N	N	N	N		
Pole Meter Allowed	U2	Y	NA	N	U2	N	U2		
Disconnect Required at Pole Meter*	Y	Y	NA	NA	N	NA	Y		
Pole Meter Socket Installation by	C	U	NA	NA	C	NA	U		
Bldg. Meter Socket Installation by	C	C	C	C	C	C	C		

Y-Yes N-No

Y1- Weatherhead required 350mcm Aluminum and smaller, and 4/0 Copper and smaller. Condulator required for larger conductors and for multiple cables in one conduit.

A-Residential URD Services are normally Utility-Owned.

B-Residential URD Services are normally Customer-Owned.

C-Customer provided material/function.

D- Residential URD services are either to be Utility-Owned or Customer-Owned at the Customer's option. Utility-Owned services are limited to single runs of 1/0, 4/0 or 350mcm aluminum no longer than 400 ft. Length limitations by voltage-drop also apply. Utility Owned Services require conduit. Conduit is highly recommended for Customer Owned Services.

NA- Not Applicable

U-Utility provided material/function.

U1-Padmount secondary connectors normally provided by Utility; however, the customer shall provide connectors for conductors larger than 350MCM.

U2- Function may be available at Utility's option.

\* See Paragraph 209. A meter/disconnect on a pole (or pedestal), other than on a mobile home service, shall not normally be considered to be the Main Service Disconnect. Four wire services are only required after the Main Service Disconnect.

#### **408. (Customer-Owned) Residential Underground Service**

A. Many Utilities do not allow customer-owned underground residential service. Check with your local Utility for details. The installation must conform to and meet the Utility's specifications. The customer may, with the advance approval of the local Utility, install, own, and maintain his own secondary underground service from either the Utility's overhead distribution system or from the secondary terminals of the Utility's nearest underground system distribution transformer. All connections to the Utility's distribution system will be made by Utility employees. The attachment of the customer's underground service facilities to the Utility's pole will be performed by the Utility and the cost of such work will be borne by the customer, less a credit, if applicable, equivalent to the cost of an overhead service if normally furnished by the Utility in accordance with tariff provisions.

B. All trenching and backfilling shall be provided by the customer, (refer to Drawing 203 for Trenching Specifications).

C. Conduit may be required for the customer-owned underground service and shall be provided and installed by the customer. Check with local Utility to see if conduit is required, (refer to Section 513 for Conduit Requirements). For customer-owned underground service, a conduit installation is always highly recommended. Experience shows that the lack of the conduit results in a significantly higher failure rate, and more expensive repairs. However, the NEC does not require conduit, so, this document will not require conduit for customer-owned underground service.

D. With the customer-owned underground, the customer shall buy, install and maintain the underground service. The meter location will be determined by your local Utility.

E. The Chart in paragraph 407E applies to Customer-Owned Residential Underground Services.

#### **409. Commercial and Industrial Underground Services (Single-Phase)**

A. All commercial or industrial underground services shall be installed, owned, and maintained by the customer.

B. The customer shall retain ownership and perform all future maintenance work. It is recommended that services be installed in electrical-grade conduit for the entire service run whether the source is from a pad-mounted transformer or a riser-pole.

C. All trenching and backfilling shall be provided by the customer, (refer to Drawing 203 for Trenching Specifications).

D. When the source is a pad-mounted transformer a minimum of ten (10) continuous feet of conductors measured from the top surface of the transformer base shall be left by the customer for the local Utility to make connections at the transformer.



E. In single-phase underground services with cable larger than 350-MCM originating from a pad-mounted transformer, the customer shall provide the local Utility-approved secondary connectors for the transformer.

F. If a service originates from a pole, the customer may be required to provide everything but the stand-offs, (check with local Utility). Because of the high-voltage hazard the customer shall install the conduit in the ground and may install the wire. The rest of the conduit and a minimum of forty continuous feet of service cable shall be provided at the base of the pole for connection to the Utility's system.

G. The following chart delineates the division of functions between the Customer and the Utility. This chart also applies to Paragraph 410 Commercial and Industrial Underground Services (Three-Phase).

Low Voltage Service Type	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Commercial URD Ownership	C	B	B	B	B	C	C		
Stand-off Brackets Provided by	U	U	C	C	U	C	C		
Riser Conduit Provided by	C	C	C	C	C	C	C		
Weatherhead Normally Required	Y1	Y	N	Y	Y	N	Y1		
Condulator Normally Required	Y1	N	Y	N	N	Y	Y1		
Weatherhead Provided by	C	C	NA	C	C	C	C		
Expansion Joint Provided by	C	C	C	C	C	C	C		
Riser Installation by	U	U	U	U	U	U	U		
Trenching and Backfill by	C	C	C	C	C	C	C		
Trench Conduit by	C	C	C	C	C	C	C		
Trench/Conduit Inspection by	U4	C	C	U	U	U	U		
Warning Tape Installation by	C	C	C	C	C	C	C		
Conduit Highly Recommended	Y	Y	Y	Y	Y	Y	Y		
Conduit Required	N	Y	Y	N	Y	Y	Y		
Cable Provided by	C	C	C	C	C	C	C		
Cable Installed by	C	C	C	C	C	C	C		
1 Phase Padmount Secondary Connectors Provided by	U3	U1	U	U1	U1	U1	U1		
1 Phase Padmount Secondary Connectors Installed by	U	U	U	U	U	U	U		
3 Phase Padmount Secondary Connectors Provided by	C	C	U	U2	U	C	C		
3 Phase Padmount Secondary Connectors Installed by	U	U	U	U	U	U	U		
Bldg. Meter Socket Installation by	C	C	C	C	C	C	C		

Y-Yes

N-No

Y1- Weatherhead required 350mcm Aluminum and smaller, and 4/0 Copper and smaller. Condulator required for larger conductors and for multiple cables in one conduit.

A-Commercial/Industrial URD Services are normally Utility-Owned .

B-Commercial/Industrial URD Services are normally Customer-Owned.

C-Customer provided material/function.

NA- Not Applicable

U-Utility provided material/function.

U1-Padmount secondary connectors normally provided by Utility; however, the customer shall provide connectors for single phase services larger than 350MCM.

U2-Padmount secondary connectors normally provided by Utility; however, the contractor shall provide and install connectors for multiple runs and for services larger than 350MCM. Contractor shall only work on de-energized transformers.

U3-Padmount secondary connectors normally provided by Utility; however, the customer shall provide connectors for single phase services larger than 500MCM.

U4- Function may be available at Utility's option.

#### **410. Commercial and Industrial Underground Service (Three-Phase)**

A. Same as single-phase with exceptions below.

B. The concrete pad for three-phase transformers shall be provided by the customer, (check with local Utility's specifications).

C. Underground services, from a Utility owned three-phase pole-mounted transformer bank, shall be limited to 800 Amp Service Rating. Larger services shall be served from three-phase padmounted transformers. This restriction does not apply to Utility-Owned overhead services.

D. The Chart in paragraph 409G applies to Commercial and Industrial Underground Services (Three-Phase).

#### **411. Mobile Homes**

A. Service to individual mobile homes shall be metered on a pole or a pedestal. The customer may install, own, and maintain his own secondary underground service from the Utility's distribution system. The installation must conform to the National Electrical Code and the Utility's specifications. All connections to the Utility's distribution system will be made by Utility employees. The attachment of the customer's underground service facilities to the Utility's pole will be performed by the Utility. The cost of such work will be borne by the customer, less a credit, if applicable, equivalent to the cost of an overhead service if normally furnished by the Utility in accordance with tariff provisions, (See Drawing 204).

B. Individual mobile homes used as rentals or installed on leased land require an energizing permit from the appropriate State or Local Inspection Authority.

**NOTE: This article applies only to mobile homes as defined in article 550-2 of the National Electrical Code. See glossary for definition of mobile home.**

#### **412. Mobile Homes & Travel Trailer Parks**

A. Services in mobile home and travel trailer parks shall be metered on structures served from the nearest local Utility distribution system. Typical installations are shown in Drawings 204 and 206.

B. The park owner shall install, own, and maintain the entire secondary underground service from the metering point. Depending upon the local utility, the supply to the meter point may be owned by either the utility or the customer. The installation must conform to the National Electrical Code and the Utility's specifications. All connections to the Utility's distribution system will be made by local Utility employees. The attachment of the customer's underground service facilities to the company's pole will be performed by the local Utility. The cost of such work will be borne by the customer, less a credit, if applicable, equivalent to the cost of an overhead service if normally furnished by the local Utility in accordance with tariff provisions.

C. Plans and details of the installation should be submitted in advance for acceptance and approval by the local Utility.

**NOTE:** This article applies only to mobile home parks as defined in Article 550-2 of the National Electrical Code, (see glossary for definition).

## **V. PRIMARY AND SECONDARY LINE EXTENSIONS**

### **501. Utility-Installed Line Extensions**

Refer to the local Utility's Line Extension Tariff and Vermont Public Service Board (VPSB) Rule 5.600.

### **502. Territorial Boundaries**

Territorial boundaries have been established between adjoining Utilities in the State of Vermont by the VPSB. Maps delineating territorial boundary lines have been drawn showing clearly-defined points-of-reference from the nearest existing facilities of each adjoining Utility and the measured distance each Utility may extend along a road or other reference point. The local Utility (or Utilities) shall determine in which Utility's territory the application for electric service is located.

### **503. Act 250 Letters**

Customers seeking an Act 250 letter from a Utility indicating the Utility's capability to serve the **CUSTOMER SHALL SUPPLY AVAILABLE LOAD DATA IN WRITING, ALONG WITH A SITE PLAN**, to the Utility in whose area the facility, or development, will be located. Any costs associated with additional Act 250 work are the customer's responsibility. For an example of a Customer Load Data Sheet see Drawing 501.

### **504. Act 250 Environmental Approval for Utility-Owned Line Extensions**

A. Construction of line extensions which encompass an area in excess of one acre (for example, 20 foot wide right-of-way (s) which run 2,200 feet in total length) trigger Act 250 jurisdiction, and are therefore under the review authority of the Environmental Board through its District Environmental Commissions. Line Extensions in so-called ten-acre towns (those which have both permanent zoning and subdivision regulations) will only trigger Act 250 jurisdiction if they exceed 10 acres in size (for example, 20 feet wide, and 22,000 feet long). The Utility will research the requirement for Act 250 permits for the particular line extension in the particular town.

B. The Utility has the responsibility for the preparation of applications for Act 250 Permits for submission to the District Environmental Commission. An application for an Act 250 Permit shall be accompanied by the easements from all adjoining property owners before the application can be submitted to the District Environmental Commission. All permits from state and local agencies shall be approved before the Utility will commence construction of a line extension. There may be customer expenses associated with the application process, (check with local Utility for specific application information).

## **505. General Method of Underground Installation**

A. In a development or public roadway the underground cable shall normally be installed within a ten (10) foot strip ***outside and adjacent to the road right-of-way.***

B. On private roads or driveways cable shall normally be installed parallel to, and not more than, ten (10) feet off the ***edge of the traveled roadway.***

C. Connection boxes and pad-mounted transformers shall be installed on the back side of the sidewalk and within the boundaries of the lots that are served from them.

D. To achieve the most satisfactory installation ***the construction should normally take place during the months of April through November.*** Developments requiring Engineering design layouts should submit data prior to September 1 so that the necessary paperwork and easements can be sent to the customer in time to meet the cut-off. All right-of-way easements, agreements, and any other necessary documents should be completed and payment rendered prior to October 15. All trenching should be completed by November 20 to assure completion of the job by the cut-off date of December 1. ***Failure to meet above deadlines may result in delays.*** Verify cut-off dates with your local Utility.

E. The Utility, the telephone company, and cable television shall utilize a common trench for installation of their cables, where possible.

F. A primary UD system shall be installed on the opposite side of the street or road from water, sewer, and gas lines. If the above conditions cannot be met there shall be a minimum separation of ten (10) feet between any primary or secondary electric lines running parallel to water, sewer, or gas lines.

G. If a customer-installed service originates from a pole, beginning at a point twelve (12) inches below the transformer(s) the conduits and conductors shall extend down the pole into the ground to a depth of thirty-six (36) inches to the top of the conduit, forty-two (42) inches trench depth. Conductors, conduit, condulator, weatherhead, sweeps, trenching, and backfilling shall be provided by the customer. Stand-offs may be provided by the Utility, (check with the local Utility). Because of the high-voltage hazard the customer shall install all the conduit in the ground and the first section on the pole. The rest of the conduit and a minimum of forty feet of service cable shall be provided at the base of the pole for connection to the Utility's system, (check with the local Utility). The end of the cable shall be sealed with cable sealant and taped to prevent water from entering into the cable.

H. A minimum of ten (10) feet of conductors, measured from the top surface of a pad-mounted transformer base, shall be left by the customer for the Utility to make connections at the transformer.

## **506. Trenching Specifications**

A. All trenching and back-filling shall be provided by the customer. If ledge is encountered the customer shall do the blasting or whatever means is necessary to remove the ledge to the required trench depth. In some cases an exception to the minimum thirty-six (36) inch depth may be allowed where a supplemental two (2) inch minimum concrete cap is installed, (check with the local Utility). The bottom of all trenching shall be of uniform, not undulating, pitch.

B. Unfrozen sand or fine gravel that will pass a 1 inch mesh screen shall be used to form a four (4) inch cushion on all sides of the conduit. The balance of the trench may be random-fill with no stones greater than three (3) inches in maximum dimension. No foreign materials such as wood, glass, trash, ashes, blasted ledge, or frozen material are to be in the back-fill material. See Drawing 203; and, refer to local utility Standards.

C. All trenches shall be a minimum width of eighteen (18) inches and depth of forty-two (42) inches (refer to Drawing 203; see local Utility standards). Secondary and service trenches can be, where possible, part of the primary trench.

D. In a development the trench line shall be in accordance with the plan provided by the Utility. The trench line is not to deviate horizontally more than one (1) foot, plus or minus, from the plan without consulting the Utility. Deviations can be caused by wet areas, ledge, etc. The customer shall establish final grades, and have the surface roughly leveled; easement boundaries, street, lot, and trenching line shall be staked prior to trenching.

E. During trench back-filling the trench should be properly, and periodically, re-tamped (compacted) to avoid undesirable stresses to the conduit which could result in premature failure.

F. Electrical equipment (e.g. padmounted transformers) should not be located such that the surrounding area drainage patterns and run-off accumulate in the equipment area. If it cannot be avoided, the foundation grade should be high enough to be above flood levels. In areas of high ground water or poor drainage it may be necessary for the customer to supply and install a drainage system for the fiberglass/concrete vaults. A Utility inspector shall consult with on-site construction personnel.

G. **THE UTILITY IS TO BE NOTIFIED AT LEAST TWENTY-FOUR (24) HOURS PRIOR TO BACK-FILLING TO HAVE AN INSPECTOR ON SITE TO INSPECT THE TRENCH DEPTH, CONDUIT INSTALLATION, BACK-FILL MATERIAL, AND EQUIPMENT SUPPORTS.** Marking tape shall be provided by the Utility for both primary and secondary cable installations for Utility-owned underground. The tape shall be left at the site when the trench is inspected and is to be buried by the customer at a depth of 8 to 12 inches below final grade. The customer is advised to install marking tape on their own installations.

H. Where the customer is installing conduit to a pole, the trench shall be immediately re-filled at the pole, and properly tamped, after the conduit is installed. This shall be done for a distance of three (3) feet.

## **507. Conduit Requirements**

### **A. Specifications:**

Conduits to be accepted by the Utility shall meet NEMA Standard TC-2 (latest publication for conduit), NEMA Standard TC-3 (latest publication for fittings) and shall be UL marked. Electric-plastic-conduit (EPC) shall be rigid-polyvinyl-chloride (PVC) of the types listed below:

1. EPC-40-PVC - Electric-plastic-conduit.
2. EPC-80-PVC - Electric-plastic-conduit.
3. The following sizes are typically used:
  - a. 2 inch - For street light conductors
  - b. 2-1/2 inch - For residential services (conductors smaller than 350-MCM)
  - c. 3 inch - Secondary conductors  
- Residential services (conductors 350-MCM or larger)
  - d. 3 or 4 inch - For 15 kV and 35 kV single-phase primary  
conductors. Check with your local utility.
  - e. 4 or 5 inch - For three-phase conductors 15 kV and 35kV  
Check with your local utility.

Different types and/or size changes shall be approved by the Utility.

### **B. General Applications:**

1. All Applications
  - a. The Utility shall specify the type, size, and composition of the electrical conduit to be used.
  - b. The customer shall leave a pull rope in the conduit to assist in pulling in the cable(s). This rope shall have a minimum pull-strength of 500 pounds for all cable sizes.



- c. Where required by the local municipality or Utility, conduits crossing all public roads, traveled public right-of-ways (private roads in developments), or over other utilities shall be as listed below. This procedure is necessary to provide mechanical protection of the conduit against damage. Minimum depth for road crossings shall be 48 inches rather than the normal minimum 36 inch depth.
  - 1). Schedule-40 electrical-grade conduit, encased in a four (4) inch concrete envelope under the traveled portion of the highway. The concrete shall have a minimum compressive strength of 3,000-PSI after twenty-eight (28) days.
  - 2). Schedule-40 electrical-grade conduit, encased in a Utility-approved sleeve.
  - 3). Rigid-galvanized steel may be substituted when crossing existing roadways.
  - 4). Schedule-40 electrical-grade conduit in thoroughly compacted gravel backfill, that would pass a 1 inch mesh screen, to a depth of 1 foot above the conduit.

**NOTE:** Check with local Utility for appropriate method.

- d. Where practical, all road crossings shall be perpendicular to the side lines of the road.
- e. There shall be no more than 3 ninety-degree bends in the conduit, including one at the pole/pad/pedestal and another at the meter socket.
- f. Ninety-degree horizontal bends shall have a four (4) foot radius. Ninety-degree vertical bends shall have a three (3) foot radius.
- g. Electrical-grade schedule-40 and -80 PVC are not to be joined or mixed in a conduit run within the trench. The conduits have the same outside diameters; however, the inside diameters differ. It shall be necessary to have a terminating cabinet as a transition point if the two sizes are joined or mixed. If schedule-80 is going to be used it might be more economical to run it the entire distance instead of using the terminating cabinet.
- h. Conduit installations shall be graded to cause all ducts to drain toward one, or both, ends of the section to minimize water retention and freezing. Examples follow:
  - 1). From pole grade down to the first vault.
  - 2). Graded from vault to vault.
  - 3). Graded from the mid-point of the conduit run to the vault on either side of the mid-point. (double-slope method).
  - 4). Minimum pitch of conduits shall be two (2) inches per 100 feet.
  - 5). In areas of high ground water or poor drainage it may be necessary for the customer to supply and install a drainage system for the fiberglass or concrete vaults. A Utility inspector shall consult with on-site construction personnel. If no simple solution is apparent the customer may need to have a drainage system designed which shall meet Utility approval.

- i. The Utility may require concrete encasement of the conduit where foreign objects interfere with the installation of the conduit run. Conduit runs within twenty (20) feet of propane or gasoline installations shall be PVC encased in concrete ( see Section 513 B.1.c above) or rigid metal conduit.
- j. Pull-boxes or vaults may be necessary for lengthy cable runs. The size and location of such pull-boxes and vaults shall be determined by the Utility on an individual basis.
- k. Utility conductors energized at 600 volts or less, and communications, may utilize the same trench as the primary conductors. The separation shall be a minimum of twelve (12) inches.
- l. An expansion coupling is required at the point where the conduit emerges from the ground. The coupling should be placed a minimum of twelve (12) inches above final ground grade.

C. Customer-Owned Underground:

For customer-owned underground services, the customer shall provide the conduit (and weatherhead or condulator) to the point of Utility connection for the riser(s) at the pole. The conduit shall be installed to allow positioning of the stand-off brackets. The conduit location at the pole shall be determined by the Utility prior to installation. **THE CUSTOMER SHALL NOT PERFORM ANY WORK ON THE POLE OR AT THE PADMOUNTED TRANSFORMER DUE TO THE HIGH-VOLTAGE HAZARD.** Materials needed for utility crews to complete the work on the pole or in the transformer shall be available at the job site.

**508. Foundations**

A. All foundations shall be level. This reference is for concrete pads, fiberglass vaults, or other foundations that are used to support electrical equipment.

B. No foundation top shall be less than two (2), or more than four (4), inches above final grade; final grade being loam, asphalt, concrete, etc.

C. Where it is possible for a foundation to be covered or washed out (undermined), an approved retaining wall shall be provided to protect the pad.

D. There shall be twelve (12) inches of **crushed stone** under concrete vaults and fiberglass vaults extending a minimum of twelve (12) inches from all sides of the foundations.

E. The area around the foundation at finished grade shall be level for at least two (2) feet from the edge of the foundation on all sides.

F. The pre-cast concrete base for three-phase pad-mounted electrical equipment shall be supplied and installed by the customer in accordance with specifications provided by the Utility. Check with your local utility to confirm the appropriate foundations for the installation.

## 509. Function Responsibility

A. The following chart delineates the division of functions between the Customer and the Utility.

Utility-Owned Primary Voltage Underground Line Extension	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Providing Specifications	U	U	U	U	U	U	U		
Stand-off Brackets Provided by	U	U	C	C	U	U	C		
Riser Conduit Provided by	C	U	C	C	C	C	C		
Condulator Provided by	U	U	C	C	C	U	C		
Expansion Joint Provided by	C	C	C	C	C	C	C		
Riser Installation by	U	U	U	U	U	U	U		
Riser Cutouts, Arresters and Brackets Provided by	U	U	U	U	U	U	U		
Riser Cutouts, Arresters and Brackets Installed by	U	U	U	U	U	U	U		
Trenching and Backfill by	C	C	C	C	C	C	C		
Trench Conduit by*	C	C	C	C	C	C	C		
Pull-string by	C	C	C	C	C	C	C		
Warning Tape Installation by	C	C	C	C	C	C	C		
Conduit Required	Y	Y	Y	Y	Y	Y	Y		
Single-Phase Conduit Size	3"	2.5"	3"	3"	3"	3"	3"		
Three-Phase Conduit Size	5"	3x2.5"	5"	5"	5"	5"	5"		
Cable Provided by	U1	U	U	C	C	U	U1		
Cable Installed by	U1	U	U	C	U	U	U1		
Terminators/Elbows Provided by	U1	U	U	U	U	U	U1		
Terminators/Elbows Installed by	U	U	U	U	U	U	U		
Single-Phase Transformer Foundation Provided by	U1	C	U	C	C	C	U1		
Single-Phase Transformer Foundation Installed by	C	C	C	C	C	C	C		
Three-Phase Transformer Foundation Provided by	C	C	U	C	C	C	C		
Three-Phase Transformer Foundation Installed by	C	C	C	C	C	C	C		
Single-Phase Terminating Cabinet Provided by	U1	U	U	C	C	U	U1		
Single-Phase Cabinet's Foundation Provided by	U1	C	U	C	C	C	U1		
Three-Phase Terminating Cabinet Provided by	U1	U	U	C	C	U	U1		
Three-Phase Cabinet's Foundation Provided by	U4	C	U	C	C	C	C		
Terminating Cabinet's Foundation Installed by	C	C	C	C	C	C	C		
Terminating Cabinet Installed by	U	U	U	C	C	U	U		
Ground Grids Installed by	C	C	C	C	C	C	C		
Transformers Provided by	U3	U	U	C	U	U	U3		
Inspection by	U	U	U	U	U	U	U		

Y-Yes N-No C-Customer provided material/function.

C1-Customer provided material/function is normal. Utility provided material/function is customer's option.

U-Utility provided material/function.

U1-Utility provided material/function is normal, customer provided is an option.

U2-Utility provided material/function is normal. Contractor shall leave foundation unburied to allow ground grid installation.

U3-Utility provided material/function is normal. Certain tariff options require customer owned transformers.

U4 -Concrete foundations are to be provided by the Customer. Fiberglass foundations are to be provided by the Utility. The Utility shall determine which foundation type is appropriate.

\* Utility Tariff may result in a reduction of the Line Extension Estimate as a partial credit for the conduit installation.

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## VI. SERVICE-ENTRANCE

### 601. General Information

The customer shall furnish and install the service-entrance conductors, meter socket(s), and equipment. For exceptions, refer to Section VII - Metering. They shall meet all the requirements of the latest edition of the NEC and/or requirements of the authority having jurisdiction with regard to size, type, finish, fittings, installation, etc.

### 602. Clearance

- A. (Refer to Drawing 101 for overhead service clearances)
- B. (Refer to Drawing 102 for mast service clearances).

### 603. Service Drop Clearance

The point of attachment of a service to a customer's building or other structure shall not be less than 15 feet, nor more than 25 feet above permanent ground level. Service attachment shall be so installed as to permit the maintenance of the following minimum clearance:

Location	Minimum Clearance (60 F - no wind)
Over waterways and lakes	32 Feet (Lowest Utility)
Over railroad tracks	27 Feet (Lowest Utility)
Over public streets, alleys, commercial areas, parking lots, agricultural areas, and roads on other than residential property	18 Feet
Residential driveways and spaces accessible to pedestrians	15 Feet
Over roofs	8 Feet
From windows, doors, porches, fire escapes, and similar locations (conductors run above the top level of a window shall be considered out of reach from that window)	3 Feet

The chart above contains clearance requirements from the NEC. Utilities are required to follow differing clearance requirements of the National Electric Safety Code (NESC). Refer to the NESC or Local Utility Standards Book.

#### **604. Attachment**

The service drop shall be attached to the building or other structure at a suitable point determined by the local Utility. The point of attachment is to be provided by the customer. The attachment to the building or other structure must be in a rigid and permanent manner. On buildings constructed of tile, stucco, concrete, asbestos shingle, sheet iron, or similar materials, the customer should consult the local Utility regarding the means of attachment. The service wires will be attached to the building below the head of the service conduit or cable.

#### **605. Service Mast**

Where a service mast is used for the support of service drop conductors, it shall be of adequate strength or be supported by braces or guys to withstand safely the strain imposed by the service drop. When such a service mast is installed, the customer shall assume full responsibility for it, including roof leaks and the ability of the installation to support the required service. See Drawing 102 for typical illustration.

#### **606. Color Code for Conductors**

On three phase, four wire, delta service, the service entrance conductor to be connected to the higher voltage-to-ground service drop conductor shall have an orange outer covering or be marked orange at the meter socket and service equipment and also at the weather head or terminal box. This conductor shall be in the center position in service panels; if necessary for meter function, it may be in the right position in meter sockets.

#### **607. Concealment**

Service entrance cable or conduit containing service entrance conductors shall not be placed within the building wall or concealed in any way, except where they pass horizontally through the building wall. All conduit fittings shall be placed so as to be fully exposed to view. See Paragraph 721 regarding meter socket concealment.

#### **608. General**

An approved type of service disconnecting means must be provided for each customer's source of supply.

#### **609. Location**

The disconnecting means must be located in a readily accessible location nearest the point of entrance of the service conductors into the building. This distance should not be greater than 10 feet, (local jurisdiction may require a shorter distance).

## **610. Sealing**

All service equipment located on the line side of the meter must be enclosed type, with facilities for sealing by the local Utility.

## **611. Rating of Service Equipment**

A minimum 100 ampere rated service is required for all single family dwellings, and for each individual residence in multi-family dwellings. A minimum 100 ampere rated service is recommended for non-residential service.

In the case of a small commercial load, such as a CATV power supply or a traffic signal, a service rated at less than 100 amperes is acceptable because the load has a defined small magnitude. However, for connection and strength reasons, a minimum #4 Aluminum cable is required.

Disconnects before or after the meter shall be rated the available fault current. For additional information see Paragraph 209.

## **612. Marking of Multiple Disconnects**

Where multiple service equipment is provided for either commercial or dwelling occupancy, each disconnecting means shall be marked in a conspicuous, legible, and permanent manner to indicate which portion of the installation it controls.

## **613. Main Service Disconnect**

If a disconnect or a meter/disconnect on the exterior of a building, at the point-of-entrance, is a NEC required Main Service Disconnect, then a four wire (on single-phase) or five wire (on three-phase) feeder cable is required. The subsequent panel must be wired as a subpanel with the neutral and ground conductors separated. The Main Service Disconnect shall be listed as service equipment. As an example, the exterior Main Service Disconnect would be required if the distribution panel were a distance, greater than allowable (10 ft cable length), from the point-of-entrance. If the disconnect or meter/disconnect, on the exterior of the building, is not a NEC required Main Service Disconnect, then a four wire (on single-phase) or five wire (on three-phase) feeder cable, with the subsequent panel wired as a subpanel, is acceptable but not required.

## **614. Wiring Methods prior to a Meter Socket mounted on the exterior of a building**

Individual service entrance conductors shall be enclosed in an approved raceway or conduit. SEU cable shall not be installed inside a conduit (Exception - the SEU may be installed inside conduit if the installer provides documentation confirming that the cable is Listed to be installed inside conduit). SEU, raceway, conduit and meter socket shall be installed on the surface of the building siding and shall not be installed within the wall of the structure.

Per the Vermont Electrical Safety Rules – An overcurrent device that is not within sight of, and not within 30 feet of the building or structure served, shall not be considered to be the service disconnecting means. And, therefore a safety ground conductor is not required between such a device and the structure.

## **615. Wiring Methods from an Exterior Meter Socket to an Interior Main Panel**

Individual service entrance conductors shall be enclosed in an approved raceway or conduit. SEU cable shall not be installed inside a conduit (Exception - the SEU may be installed inside conduit if the installer provides documentation confirming that the cable is Listed to be installed inside conduit). SEU, raceway, or conduit may be installed within open or enclosed wall or floor joist cavities, provided that the cable length from the point-of-entry is 10 feet or less.

## **VII. METERING**

### **701. General Information**

A. The meter location shall be designated by a Utility Representative. It is in the best interest of both the customer and the Utility that a suitable meter location be provided to facilitate reading and testing without undue inconvenience to the customer or the Utility. The Utility shall furnish, install, and connect all meters.

B. The customer shall exercise reasonable diligence to protect the meter and its associated equipment from damage, theft, or tampering while in service on the customer's property. Only Utility personnel are authorized to handle and access Utility equipment located in or on customer property.

### **702. Meter Locations - Outdoor**

A. Outdoor meter locations are required on all new installations. Exceptions to the requirement will be permitted only by approval of the Utility. Suitable inside meter locations may be designated by the Utility if it appears necessary to avoid undue damage to, or breakage of, the meter or, in other cases, where it is mutually acceptable that the meter be located indoors.

B. Outdoor meter locations shall be readily accessible to Utility representatives for meter reading, testing, and maintenance. The location shall be such that meters or Utility personnel will not be subject to falling ice and snow, or other hazards. Nor shall the location require the Utility representatives to use adjacent property, climb fences, or other obstructions, expose themselves to undue hazards, or cause damage to the customer's property (such as shrubbery and flower beds), in gaining access to and servicing the meters.

C. Socket type meters installed in areas where accidental or malicious damage may be anticipated, should be protected within a suitable enclosure furnished and installed by the customer. Hasps shall be provided on such enclosures for the installation of Utility padlocks and the meter shall be made accessible for reading and servicing.

D. When the customer's distribution and metering point is allowed to be located on a separate metering pole, at the customer's request, the customer shall be billed for the pole and anchor at the current tariff rate if provided by the Utility. The Utility shall supply and set the metering pole and anchor, if necessary, and shall retain ownership of, and maintain, the facilities. The connection of the customer's wiring to the Utility shall be done by the Utility.

**NOTE:** Check with your local Utility to see if a separate metering pole is an available option.



### 703. Meter Locations - Indoor

A. When outdoor locations are not feasible, meters should be located indoors near the service entrance, in a safe, clean, dry place, reasonably secure from damage; not subject to vibration, excessive moisture, dust, heat, or fumes. Neither shall they be installed in explosive atmospheres, nor where there are chemical or combustible fumes, or gases, present.

B. Indoor meters shall be easily accessible during normal business hours or a key shall be provided for reading and maintenance.

C. In multiple occupancy buildings, meters shall be in a public or common area of the building.

### 704. Meter Height and Clearance

A. Meter sockets shall be mounted so that the face of the meter is 5 feet above the final grade level if outdoors, or 5 feet above the floor if indoors. In no instance will any meter be installed with the face of the meter more than 6 feet, nor less than 4 feet above the final grade level or floor.

B. Where meter cabinets are used, the top of the meter cabinet shall be six (6) feet from final grade level.

C. A clear area of three (3) feet is required in front of the meter and six (6) inches of space shall be provided around meters to allow for testing, reading, and repairing.

D. On either indoor or outdoor installations all meters shall be grouped at one location when more than one meter is to be installed.

E. In buildings over three floors in height, meters may, with Utility approval, be grouped in a suitable indoor location on each floor.

### 705. Standard Meter Installations

A. For each meter installation, the Utility will specify the type of metering. Self-contained socket metering is standard where the load-side capacity is not more than 200 amperes and the line-to-ground voltage is not more than 300 volts. Check with your local Utility for availability of Class 320 metering. The following chart shows availability, by Utility, of Class 320 metering.

Metering Requirements	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Class 320 1-Phase Available	Y	Y	Y	Y	Y	Y	Y		
Class 320 3-Phase Available	Y	Y	N	Y	Y	Y	Y		

B. The customer or their contractor shall always consult with the Utility to ascertain whether self-contained or transformer-rated meters will be used.

C. All self-contained meter sockets (single phase or three phase) shall be furnished and installed by the customer. Meter sockets shall be listed and meet the provisions of the attached Meter Socket Specifications, (refer to Drawing 601).

D. A lockable disconnect may be required on the line side of the meter on a 277/480 volt, self-contained, three phase service. Check with the local Utility for specific requirement. The following chart shows whether this disconnect is required.

Metering Requirements	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Line-side 480 Volt Disconnect Required	Y	N	N	N	N	Y	Y		

E. Check with your local Utility (or read chart below) for information on the requirement to provide an approved manual bypass on self-contained meter sockets. See Drawing 601 for details. Exception: Manual bypasses in a meter pack assembly, may not be commercially available; and, therefore are not required. However, separate main disconnects are required for each meter, at the meter location. The following chart shows options regarding the requirement for a manual bypass.

Metering Requirements	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Residential- Bypass Required on 200 Amp Sockets	N	N	N	N	N	Y	N		
Commercial- Bypass Required on 200 Amp Sockets	Y	Y	Y	Y	Y	Y	Y		
Residential- Meter/Disconnect alternative to Bypass	Y	N	N	N	N	Y	N		
Commercial- Meter/Disconnect alternative to Bypass	N1	N	N	N	N	N	N		

N1- A meter/disconnect is not an acceptable alternative, except for installations with a 30 Amp or smaller breaker that is accessible to the meter reader/installer.

F. The Locking (Clamping) Jaw feature on meter sockets is available on some 200 amp sockets and standard on 320 amp sockets. The following chart indicates the Utility's requirement for this feature on 200 amp sockets and socket/disconnects.

Metering Requirements	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Locking Jaw Required- Single Phase	N	Y	N	N	N	N	N		
Locking Jaw Required- Three Phase	Y	Y	N	N	N	N	Y		

N- Not Required- does not equate to Not Allowed.

## 706. Moving or Removing Metering Equipment

A. Meters, instrument transformers, and other metering devices are the property of the Utility and shall not be moved, removed, or altered by other than authorized employees of the Utility, except when specific permission is obtained from the Utility.

B. Responsibility for the cost of relocation shall be based on whoever made the request and the reasons for the relocation.

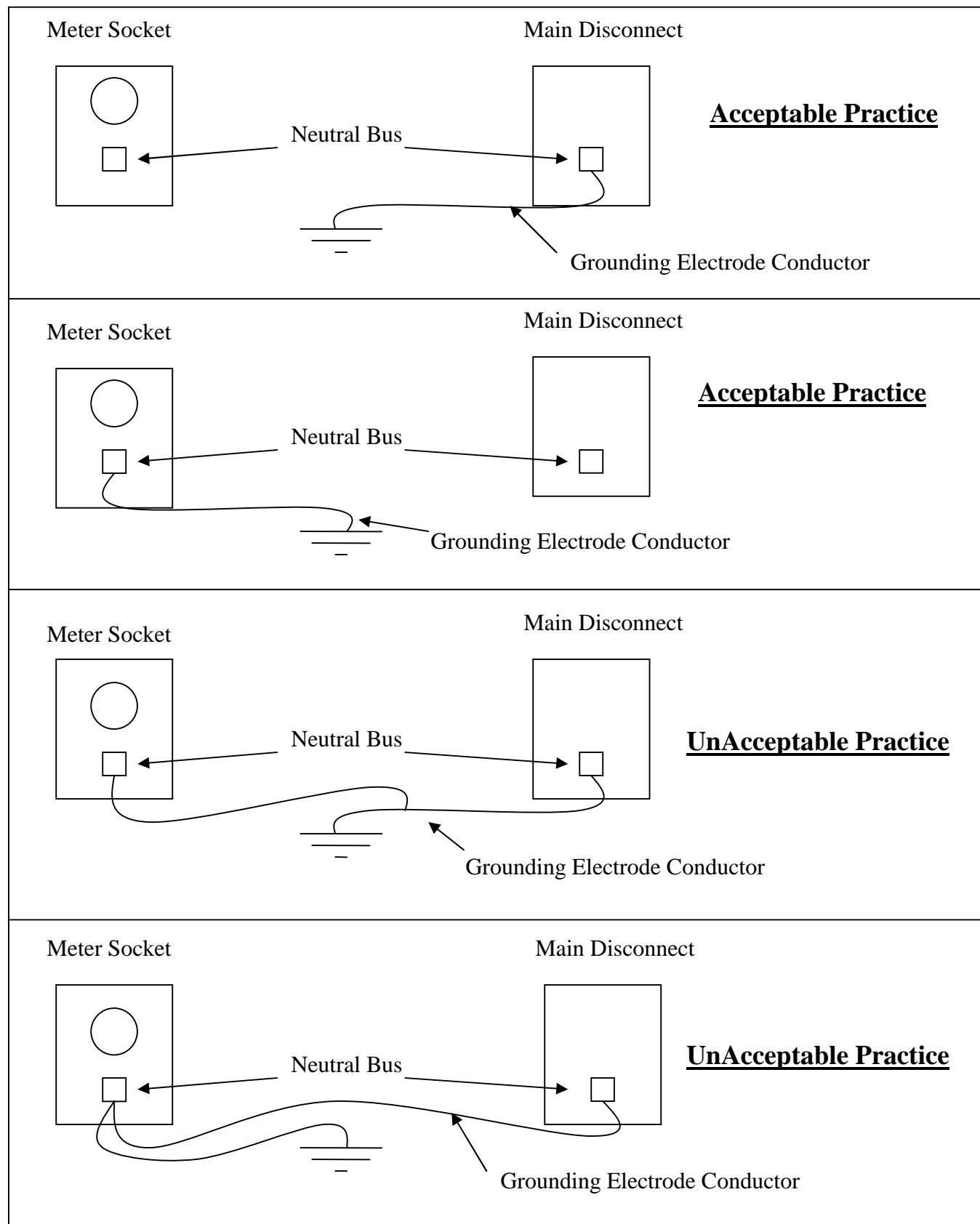
C. The Utility reserves the right to change the location of its meter(s) at any time at its expense.

## 707. Grounding of Meter Sockets and Current Transformer Cabinets

A. The service grounding electrode connection, for residential services, may be made in the meter socket to a separate grounding lug (which shall be part of the neutral bus). Alternatively, if the service grounding electrode connection is to be made in the main panel, then the meter socket shall not be bonded, nor in any way connected to, the grounding electrode conductor. See diagram below. *(Exception- Check with your local Utility to confirm whether a bonding jumper to the pole downground, on a pole meter, is required or disallowed).* The following chart shows whether making the ground electrode connection, at the meter socket, for a residential meter socket, is required, disallowed, or optional, for a particular Utility. Typically, grounding electrode connections, other than for residential services, shall be made at the main panel. Check with your local Utility.

Metering Requirements	Availability by Utility							
	GM	VE	WE	LE	HE	VJ	NE	
Connection Required to be at the Meter Socket	N	N	N	Y	Y	Y	Y	
Connection Required to be at the Main Panel	N	N	Y	N	N	N	N	
Connection Location Customer Option	Y1	Y	N	N	N	N	N	

Y1- Customer option except in the circumstance that a temporary service will eventually become a permanent service. In that case the service grounding connection shall be in the meter socket.



B. Typically the meter socket's neutral buss is bonded to the meter socket's steel case. That bond shall satisfy the requirement to connect the meter socket's steel case to ground. If the neutral buss is not connected to the meter socket's steel case, then install a bonding jumper to connect the case. (*Exception- Check with your local Utility to confirm whether a bonding jumper to the pole downground, on a pole meter, is required or disallowed.*)

C. The neutral conductor will be bonded to the current transformer cabinet with No. 6 copper wire or larger.

D. For locations where two (or more) electrical enclosures are within arm's reach (7 feet), the enclosures shall be bonded together. In order to avoid return current on the grounding or bonding conductors (or metallic conduit) the neutral bus must be isolated and insulated in all (or no more than one) enclosures.

## **708. Joint Metering**

A. The Utility supports the idea that electricity users who are billed directly for their consumption will use energy more efficiently and are more satisfied customers. As individual customers, they are responsible for their potential impact on the electrical system and associated energy and capacity costs. An electric meter for each customer resolves a number of issues that can be involved when a multi-unit building is served by only one meter.

B. In all new buildings or structures, the Utility will provide each customer and/or individual unit with a separate meter and bill.

C. Historically, multiple-occupancy buildings were permitted to be constructed under a Master Meter arrangement whereby, regardless of the number of units, one meter was installed to register the combined consumption of all units. Should any of these established structures be renovated, each unit should receive an individual meter. Check with your local Utility to determine what metering options are available in your area.

D. Any common area or facility used by two or more tenants, which is not wired to an individual meter to allow each tenant control of their electrical usage, will be billed to the landlord under a separate meter called a house meter.

E. The Utility may request installation of a separate service and meter for a garage, barn or adjacent building, and will bill the appropriate rate. The Utility will not allow a second or multiple meters for a single customer in a one-dwelling unit, rental space, or business on the same billing rate.

F. Construction that deviates from the above requirements shall be sufficient cause to refuse connection to the Utility's system.

## **709. Sub Metering**

A customer may, at their expense, install, maintain and operate check metering equipment, provided such equipment does not interfere with the Utility's equipment. No electric energy shall be metered by a customer for resale to others.

## **710. Metering Equipment Owned and Installed by the Customer**

The customer shall furnish and install the meter socket, meter trough, meter-connection cabinet, or outdoor meter cabinet, as required. Transformer-rated metering may require the customer to supply some of the associated equipment. Check with your local Utility for specific details. Where more than one meter is served from one set of service conductors, the meter sockets shall be connected as a meter pack by means of a metal buss-bar system which shall be furnished by the customer. No raceways between meter sockets shall be allowed.

## **711. Installation of Sockets**

A. Meter sockets must be mounted plumb and level, using wood screws of sufficient length and size to hold the socket securely, independent of conduit or cable connections. The screws shall extend through any siding material, and into the permanent sheathing. See Drawing 602. Rust-resisting screws shall be used outdoors and in damp locations.

It is recommended that bolts, expansion shields, or anchors be used on brick, stone, and concrete walls, and that toggle bolts be used on hollow tile, terra cotta, and plaster walls. The Utility shall not accept nails, wood plugs, dowels, cleats, or backboards as a means of fastening equipment.

B. The threads on conduits, fittings, or sealing plugs screwed into the hubs of meter sockets located outdoors shall have joint sealant applied to prevent the entrance of water.

C. Meter sockets and connecting conduits shall contain no wires or connections other than those necessary to connect meters to line and distribution panels or to carry control signals from the meter.

**NOTE:** For Pole Metering Applications refer to local Utility, (see Drawing 202).

## **712. Meter Socket Cover Plates**

After the wiring has been completed, the customer shall install clear cover plates (socket covers) furnished by the Utility to protect the interior of the sockets from the weather, and protect the public from injury from possible energized socket terminals. All unused meter socket positions shall be covered with clear socket cover plates.

## **713. Meter Socket Connections**

A. The service or line side conductors are always connected to the top terminals of meter sockets and the load side conductors to the bottom terminals, (see Drawings 602 and 603 for details).

B. Two conductors are not allowed to be installed to a connector position unless the connector is listed to connect multiple conductors.

#### **714. Identification of Meter Sockets and Customer Disconnecting Means**

A. Where more than one socket is installed at one address, all meter sockets and customer disconnecting means must be plainly and permanently marked for proper suite, floor, apartment, office, etc.

B. Where offices, apartments, or other areas are not assigned numbers by the building owner, the electrical contractor shall designate the location of each tenant's premises, such as: "basement front", "first floor right", or "second floor rear". Such locations shall be determined from a position facing the front of the building from outside.

#### **715. Multiple Meter Installations**

A. In shopping centers, apartment houses, and other multiple occupancy buildings where it is mutually agreeable between the Utility and the customer to install metering within each individual store site or other similarly partitioned area served from a common wire buss and junction-box network, the customer shall assure that contract specifications require the electrical contractor to install all meter sockets and main breakers simultaneously with the installation of the buss junction-box network. An electric service of this configuration shall not be energized unless this requirement is met. All junction-boxes on the line side of metering shall have padlock hasps for the Utility to install its padlocks or seals.

B. Enclosures with open able doors that are located outdoors, and which if opened would expose energized live parts, shall be secured with a padlock or other device to limit inappropriate access. Check with the Utility to determine if the lock is customer or Utility owned.

C. In shopping centers, apartment houses, and other multiple occupancy buildings where there are more than six (6) meter installations a main disconnect shall be provided for the service drop or service lateral prior to all metering to comply with the latest edition of the NEC. The following requirements shall be met:

1. The conduit-bearing service conductors from an overhead service or from a pad-mounted transformer into the main disconnect ahead of the metering shall, in all cases, comply with the latest edition of the NEC and other applicable local and state requirements.
2. The main disconnect for the building shall be a circuit breaker located within an enclosure capable of being padlocked on the line side of the metering.
3. The enclosure housing the current limiting fuses, if required, shall be capable of being padlocked if on the line side of the metering.
4. The feeders that extend from the enclosure containing the current limiting fuses to the group meter locations shall be installed in electrical grade, rigid, thick-wall steel conduit. Other cable enclosure systems including wire-ways and buss-duct are not acceptable.

## 716. Transformer Rated Metering

A. Meter installations where the voltage is over 300 volts to ground, or the load is greater than 200 amperes, require special consideration. The Utility shall be consulted well in advance in regard to location and type of metering to be installed. For single phase services over 200 amperes, see Section 705 paragraph A, Class 320 amp single phase self contained.

B. The Utility shall provide, and the customer shall install, the meter socket and current transformers. The current transformers shall be installed as directed by the Utility. Under no condition shall the customer make or change any connection to the current transformers or meter socket. The customer shall furnish and install all necessary conduit between the instrument-transformer cabinet and meter socket. The conduit shall be rigid, thick-wall steel or schedule 80 PVC with a minimum diameter of 1 1/4 inch.

### NOTES:

1. Check with local Utility for maximum allowable distance between instrument transformers and meter socket.
2. Check with local Utility for who supplies the instrument transformer enclosure when required.

Metering Requirements	Availability by Utility								
	GM	VE	WE	LE	HE	VJ	NE		
Maximum wiring distance	50'	50'	30'	50'	50'	50'	50'		
Instrument Enclosure Provided by	U	U	U	C	U	U	U		
Enclosure Located Building	P	P	P	P	P	P	P		
Enclosure Located on Pedestal	O	O	O	O	O	O	O		
Enclosure Located on Three-Phase Padmount	O	O	N	O	O	N	N		

Y-Yes

N-No

C-Customer provided material/function.

U-Utility provided material/function.

P-Preferred Location.

O-Available at Utility's option.

C. The Utility shall furnish, install, and connect all meters and secondary wiring from the instrument-transformers to the meter. The Utility shall determine where the instrument-transformers will be located.

D. Except for Utility-owned metering equipment, no instruments, meters, or other equipment shall be placed in the instrument transformer cabinets or compartments, or connected to the secondaries of metering transformers.

E. The Utility will furnish and install all meters, instrument transformers and associated equipment when located on the Utilities pole.



## **717. Use of Instrument Transformer Enclosures**

Instrument transformer enclosures shall not be used as junction boxes or for branch circuit wireways. Service conductors shall enter and leave the enclosure as one circuit with no branches, regardless of the number of conductors per phase. Line side connections to other meters shall not be made in the instrument transformer enclosure. Instrument transformer enclosures will be sealed or locked by the Utility.

## **718. Metal-Clad Switchgear Installations**

The customer may, with Utility approval, install Utility-owned instrument transformers in metal-clad switchgear where this type of installation is contemplated. The Utility must be consulted for technical data on the instrument transformers that will be installed, and other engineering advice. Certain specifications in regard to metering transformer compartments are particularly important.

A. CT Compartment: A separate, sealable, and accessible compartment shall be provided within the switchgear for standard current transformers that will be furnished by the Utility and installed by the customer. This compartment shall be large enough to contain three current transformers and shall be so designed that after proper electrical isolation, the current transformers can be readily removed or changed after installation. Instrument transformer compartments shall contain only Utility-owned metering equipment and must be closed by hinged doors that are capable of being padlocked.

B. VT Compartment: Where metering voltage transformers are used, a separate, sealable, and accessible compartment shall be provided within a switchgear for standard voltage transformers of a type approved for metering by the Utility. This compartment shall be large enough to contain three voltage transformers. When the voltage transformers are stationary-mounted in the compartment, they shall be readily removable. When voltage transformers are mounted on a draw out carriage, the front of the carriage shall extend up to close the compartment when the transformers are in the operating position. Primary contacts for the draw out feature shall be of such design as will ensure continued maintenance of the contact pressure. Visible grounding devices shall be provided to make certain that the draw out carriage-mounted voltage transformer primary terminals are grounded when the carriage is withdrawn.

## **719. Sealing of Meters and Related Equipment**

All meters and all points of access to unmetered wiring in a building shall be sealed by the Utility. All cabinets, switch boxes, and fittings used inside a building and containing unmetered wires shall be made sealable before service will be supplied. The breaking of seals by unauthorized persons or tampering with meters or any switches or wires in connection with the meter wiring is prohibited by Vermont law (13 VSA §§ 3782, 3784 & 2528). If it is necessary to break the seal to change or repair equipment, the customer shall contact the Utility to have authorized personnel remove, repair or replace the meter. When the job is completed, the Utility shall inspect the socket and replace the seal.

## **720. Meter Socket Specifications**

(See Drawing 601)

## **721. Meter Socket Concealment**

The practice of enclosing meter sockets within small enclosures, in order to improve the appearance, is not encouraged. However, at the customer's insistence, an enclosure may be allowed. Such an enclosure shall not conceal the service entrance cables for more than the thickness of the roof or floor of the enclosure (ie. no more than one inch). The enclosure shall have a door that easily opens to allow meter reading. The door shall hinge on the left or the right. The enclosure's door shall be high enough (32 inches min.) above grade so that snow build-up will not prevent the door from being opened. The enclosure shall be large enough to allow 8 inches on each side, top, and bottom, between the meter socket and the enclosure. The enclosure shall be not less than 16 inches deep and not more than 24 inches deep. Equipment, such as lawn tools, shall not be stored within the enclosure. Other devices, such as dryer vents or gas installations, shall not be installed inside the enclosure. Meter sockets shall not be inset into the building wall. The customer, not the Utility, is responsible for any damage that might occur, as the result of the Utility accessing the meter installation.

## **VIII. CUSTOMER EQUIPMENT**

### **801. General**

A. A customer may not utilize electric service in a manner that causes unusual fluctuations or disturbances in the Utility's supply system. Should the use of any equipment by a customer adversely affect the Utility's ability to render adequate service to other customers, the Utility reserves the right to discontinue service until necessary corrections are made by the customer.

B. The equipment used by the customer shall:

1. Be suitable for operation on the service provided.
2. Have appropriate control devices.
3. Have power factor correction equipment as required.
4. Meet any applicable energy efficiency requirements.
5. Be installed to provide safe operation as defined by the NEC or local codes.

C. A customer must consult with the Utility in advance of making any commitments for large motors, welders, X-ray machines, or other equipment that may have high instantaneous electrical demand.

D. All loads shall be electrically balanced on three phase supply. Single phase loads shall be as evenly divided as possible between the two energized conductors.

### **802. Motors**

A. The Utility reserves the right to refuse service to the following:

1. Single phase motors larger than 5 horsepower. The Utility may authorize the use of single phase motors larger than 5 horsepower if it concludes that the quality of service to others will not be impaired.
2. The use of Polyphase motors larger than 5 horsepower operated from a single phase service by use of a phase converter.
3. Polyphase motor installations totaling less than 5 horsepower. In those cases where the customer proposes a limited amount of three phase equipment the Utility will require specific permission to provide three phase, as opposed to single phase, service. A special equipment charge to cover the cost of three phase transformers may be required.

4. The Utility further reserves the right to limit the size of the largest motor which may be started across-the-line on any part of its system. Based on the Utility system capabilities, the Utility may limit the maximum horsepower, the starting method, and the number of starts per day. The starting of the motor should not result in a voltage fluctuation of more than 3%, as measured at the point where other customers are affected. The limitation of 3% voltage fluctuation is applicable to motors that start once per hour or less frequently. A lower percentage voltage fluctuation shall be determined, by the Utility, in those cases where the motor starts more frequently than once per hour. Technical questions regarding the starting of large motors should be referred to the Utility's Engineering Department.

B. Single phase motors shall meet the following requirements:

1. Motors with a rating of  $\frac{1}{2}$  horsepower or less may be connected to a 120 volt supply. Motors with a rating larger than  $\frac{1}{2}$  horsepower should be connected to a 208 volt, or higher, supply. Motors with a rating of 1 horsepower or larger, shall not be connected to a 120 volt supply.
2. Motors rated for 220, or more, volts may, or may not, operate properly at 208 volts.
3. Single phase service at 208 volts may not be available. Check with your local Utility. Single phase service at 240 volts may not be available from a given transformer bank. Check with your local Utility.
4. Single phase motors supplied from a three phase service shall be properly balanced across the three phases. Exception: Single phase 120 volt motors are to be balanced across the two hot legs on 240/120 volt services.
5. In residential installations, and for small commercial installations, the Utility shall be notified prior to installing any motor larger than 2 horsepower.

C. Three phase motors shall meet the following requirements:

1. Motors rated at 10 horsepower or less, with locked rotor codes of A through G, may be started across-the-line. For larger motors, the Utility reserves the right to require reduced voltage starters or other acceptable starting means. The Utility may allow exceptions where the system capabilities are sufficient. Such exceptions shall be documented in writing.
2. Motors rated for operation at 230 or 208-230 volts may, or may not, operate properly on a 208 volt system. When the supply is 208 volts, a motor with ratings of 200 or 208 volts should operate properly.

D. Motor controls and protection shall be provided as follows:

1. Safety and Equipment Protection. It is the customer's responsibility to provide over-current and lockable disconnect devices as required by the NEC.
2. Single phasing protection. It is the customer's responsibility to provide protection against the possibility of loss of one or two phases on a three phase motor.

3. Phase reversal protection. It is the customer's responsibility to provide protection against phase reversal in those cases where such a reversal could result in injury or equipment damage. In particular, but not limited to, passenger and freight elevators, cranes and hoists, or other equipment that may require such protection.
4. Low voltage protection. It is the customer's responsibility to provide protection against the possibility of low voltage.
5. Electronic control protection. It is the customer's responsibility to provide protection for the electronic control equipment used with certain motors. This equipment may be sensitive to commonly occurring system disturbances.
6. Harmonic Filtering. Rectifiers used with DC motors and other devices may cause harmonic interference in the customer's facility and on the Utility's system. It is the customer's responsibility to provide filtering required to limit the effect of the interference.

E. Transformer Oversizing for Motor Starting may be necessary to reduce Voltage Flicker. If an individual customer, with a large motor, is the only customer that receives objectionable flicker, then that customer may be required to pay a Special Equipment Charge to offset the additional cost of a larger transformer.

### **803. Auxiliary or Emergency Systems**

A. Auxiliary or emergency systems are installed where customers have determined that a backup source of electric power is required for the efficient or safe operation of their facility. The normal source of electric power is provided by the Utility. The customer shall notify the Utility of the existence and type of any auxiliary or emergency system.

B. Wiring. The auxiliary or emergency system shall be connected to the customer's wiring such that the Utility source cannot be tied to the auxiliary or emergency source. The customer shall be required to connect the auxiliary source via a Utility-approved switching device. The double-throw switch or transfer device shall be constructed and connected to prevent any possibility of power, from the customer's emergency source, feeding back into the Utility's distribution system. The switch may be either manual or automatic, (see Drawing 402).

### **804. Standby Service**

A. Standby service is provided by the Utility for those customers that normally supply their electric power with their own generator. The customer may be required to pay costs of installation and maintenance of Utility standby equipment.

B. Wiring. The standby system shall be connected to the customer's wiring such that the Utility source cannot be tied to the customer's source. The customer shall be required to connect the standby source via an Utility approved switching device. The double-throw switch or transfer device shall be constructed and connected to prevent any possibility of power, from the customer's emergency source, feeding back into the Utility's distribution system. The switch may be either manual or automatic, (see Drawing 402).

## **805. Customer Generation Operating in Parallel with the Utility System**

A. This document is not intended to cover larger commercial generation facilities. See PSB Rule 5.500. What follows is intended to describe requirements for smaller customer generation facilities; however, it is not intended to supersede PSB Rule 5.100.

B. A customer may request to operate a generation or co-generation system in parallel with the Utility's system. The Utility will determine if the installation can operate without hindrance to other customers. Electricity produced by the customer for sale to the Utility shall be separately metered. However, in certain circumstances, a 'Net Metering Generation Connection' may be available. See paragraph 805G.

C. It is the customer's responsibility to ensure that their installation meets all safety requirements. It is the customer's responsibility to provide equipment needed to protect the customer's system. In particular, the customer's system shall be equipped to avoid damage that would occur if the Utility experienced a brief outage followed by an immediate reclose to normal supply.

D. It is the customer's responsibility to provide equipment to automatically isolate the customer's generation from the Utility system if system disturbances occur. This equipment shall include over-and-under voltage relays, and over-and-under frequency relays, operating a customer's breaker. Other equipment may be required.

E. The cost of any equipment on or study of the Utility's system necessary to allow the customer's system to operate in parallel, shall be borne by the customer.

F. The customer shall provide a lockable disconnect switch, accessible by the Utility's employees, that will be used to prevent parallel operation under certain circumstances. The disconnect switch shall be clearly marked 'Generator Disconnect Switch' with permanent letters, a minimum of 3/8 inch high. The preferred location of the generator disconnect switch is that it be located outdoors within 10 feet of the Utility's electric service meter. The generator disconnect switch may be located in some other accessible location. The disconnect switch must be lockable in the open position with a standard Utility padlock, with a 3/8 inch shank. Check with your utility; in certain circumstances some utilities may not require this disconnect.

1. The required non-Net Metering electrical connection is to connect the generation through a separate generation meter, to the generator disconnect/breaker and on to the generator. The generator disconnect/breaker must be listed as 'Service Equipment'. The generation meter will be either dual back-to-back meters with detented registers, or, a single meter with dual registers. See Dwg 403.
2. The required non-Net Metering electrical connection is to connect the generation through the service meter, to the main panel, to the generator disconnect and on to the generator. The service meter will have a detented register, that will only measure delivered electricity. This installation would be used for a customer that wants to 'peak shave'. See Dwg. 404.
3. The recommended Net Metering electrical connection is to connect the disconnect switch to a feeder breaker in the main panel, and then on to the generation source. See Dwg. 405.
4. An alternative Net Metering electrical connection is to connect the generation from the service meter, to a generator disconnect/breaker, and on to the generator and the main panel (sub-panel). The generator disconnect/breaker must be listed as 'Service Equipment'. See Dwg. 406.

5. Larger, three-phase, generators shall be connected through a three-phase gang-operated loadbreak device. If the switching device does not have a visible break disconnect; then the device shall be in series with a switch(s) that do have visible break. This disconnect switch is not expected to be within 10 feet of the service meter.

G. Vermont Public Service Board Rule 5.100 specifies electrical connections, protection requirements, operating rules and other aspects for 'Net Metering Generation Connections'. Utilities may adopt work practices and policies surrounding 'Net Metering' systems as long as they are consistent with Rule 5.100. Check with your utility for their policies and practices.

## **806. Communications**

A. Service for the operation of radio and television transmitting apparatus shall be furnished under conditions specified by the Utility. Conditions of use of such service shall not cause disturbance to the power supply of other customers or handicap the Utility in maintaining proper system conditions.

B. Where necessary, suitable eliminators or traps shall be installed by the customer in such manner as to prevent radio, telephone, and television interference feeding back into the supply circuit.

C. Where service is required for a transmitting station or other high frequency equipment at a specific location, it is essential that the Utility be consulted during early planning. Detailed technical investigation shall be necessary before giving assurance of service to meet requirements.

D. Unauthorized attachment of antenna systems to Utility poles carrying Utility's conductors is strictly prohibited due to the possibility of serious results from accidental contacts. Such attachments shall be removed immediately upon discovery by the Utility at the customer's expense.

E. Outdoor antenna and lead-in conductors shall not cross over, but may cross under, electric light or power circuits provided the conditions of the latest edition of the NEC are met.

F. If a customer's wiring is used for carrying current of a carrier system for remote control of power, communication, or signaling purposes, there shall be installed suitable isolation/filter equipment approved by the Utility to keep the Utility's distribution system free of any high frequency AC or DC components produced by the customer's equipment.

G. Requests to install communication cables on poles for the distribution of high-frequency signals employed in CATV systems shall be referred to the Utility in writing. All construction shall conform to Utility Standards, the latest edition of the NEC Article 820, and any other regulations for CATV and/or Communication Cable pole/line attachments.

## **807. Energy Management Systems**

Customers installing an Energy Management System (EMS) should consult with the Utility if they would like pulse signals from a pulse initiator to receive output from the Utility's meter. The customer shall not receive an end-of-interval (EOI) signal. There shall be a charge for the installation and maintenance of the pulse initiator. As 'Smart Meters' become available they may supersede EMS systems.

### **808. Power Factor Correction**

The use of equipment by the customer for power factor correction must conform to requirements of the Utility as to electrical characteristics of equipment and its operation and control. The customer may be required to limit the size of their static capacitor installation, or to maintain effective control of the capacitors or other corrective equipment, in order to prevent the use of such equipment from causing excessive voltage at the service. Corrective equipment installed by the customer must be located on the load side of their service disconnecting device.

### **809. Alternating Current Arc Welders**

A. The Utility reserves the right to refuse the supply of service to any AC arc welders which cause interference or disturb the quality of service to other customers. They shall always be rated at not less than 208 volts. The use of AC arc welders in conjunction with residence service and under residence service rates will generally be restricted to limited input type with maximum welding current rating of 230 amperes and 20% duty cycle.

B. Spot welders shall not be installed on the company's lines without first obtaining the company's permission.

### **810. Intermittently Operated Equipment**

Flashing signs, photographer's illumination equipment, radio transmitters, and other similar devices rated at more than 1,000 watts and which operate intermittently shall not be operated at 120 volts and shall be balanced between phase conductors. The Utility reserves the right to remove any service which may cause interference or disturb the quality of service to other customers.

### **811. Heating Equipment**

A. Heating devices rated at 1,650 watts or more shall be arranged for operation at 208 volts or higher. The Utility reserves the right to require that industrial or commercial equipment rated at more than 15 KW be arranged for operation on three phase, 208 volts, or higher.

B. Large single phase heating units, such as those associated with hydronic boilers and heat storage units must be switched in increments of 12 KW or less, with a time delay of from 10 to 15 seconds.

### **812. Luminous Tube Signs and Lamps**

Installations of more than 500 volt-amperes consisting of, or including, luminous tube signs and/or lamps will be accepted for connection only when installed with sufficient power factor correction equipment to maintain an overall power factor on the entire installation of not less than 90%.



### **813. Harmonic Distortion**

The Utility recognizes the growing incidence of customers adding loads that result in harmonic distortion. These harmonic distortions causing loads are devices such as computer power supplies, compact fluorescent lights and variable speed drives. These devices draw a distorted current because they include solid-state electronics that turn off current flow for part of every voltage cycle. This is often referred to as a non-linear load. This distorted current flows back through the electric system causing a voltage drop which results in all customers along the electric system receiving a distorted voltage. Some degree of voltage distortion is considered acceptable, because it has limited consequences. The accepted measure of acceptable harmonic voltage distortion is 3% of the fundamental 60Hz voltage for any individual harmonic frequency and 5% Total Harmonic Distortion.

## **IX. GROUNDING**

### **901. General Information**

A permanent and effective grounding system furnished, installed, and maintained by the customer is an essential part of any two or three wire, single phase and any four wire, three phase installation . On three phase, three wire installations a common earth bonding connection must be used for equipment grounding.

A. The customer shall provide and maintain in good condition a suitable ground on all service equipment. All grounding of meter sockets, entrance switches, conduits, cables, equipment, etc., shall comply with the latest version of the NEC.

B. Grounding Electrodes and Ground Electrode Conductors shall be installed in accordance with the latest edition of the NEC.

C. The secondary circuits of current and potential instrument-transformers shall be grounded by the Utility only.

D. The cases, or frames, of instrument-transformers shall be grounded by the Utility.

E. The service entrance neutral conductor must be run to each individual service entrance switch, including the water heating service entrance switch, if any. It also must be connected to the grounded electrode in the service entrance cabinet.

F. All metallic pole risers and meter enclosures shall be effectively grounded.

G. The grounding electrode conductor shall be installed in one continuous length without splice or joint, unless spliced only by irreversible compression-type connectors listed for the purpose or by the exothermic welding process.

## **902. Grounding Electrode System**

If available on the premises at each building or structure served, each item 1 through 4 below shall be bonded together to form the grounding electrode system:

1. Metal underground water pipe
2. Metal frame of the building (where effectively grounded)
3. Concrete-encased electrode
4. Ground ring- 30" deep

A metal underground water pipe shall be supplemented by an additional electrode (2, 3, or 4 above) or a rod electrode of a type specified in Section 903. The ground wire shall be attached to the water-service pipe on the supply side of any shutoff or water meter. Reference should be made to National Electrical Code Section 250.

On new structures, with new concrete footing or foundation, a concrete encased electrode is required to be installed. The electrode shall be encased by a minimum of 2 inches of concrete; and shall be located within and near the bottom of the footing or foundation. The electrode shall consist of at least 20 feet of one or more bare or zinc galvanized steel reinforcing rod (minimum ½" in diameter); or at least 20 feet of bare copper not smaller than #4 AWG. Reinforcing rods shall be permitted to be bonded together by the usual steel tie wires or other effective means. Connections shall be suitable for the location. Protect the electrode and Grounding Electrode Conductor, from corrosion at the exit from the footing or foundation. Reference should be made to National Electrical Code Section 250.

## **903. Ground Rods**

Where none of the electrodes specified in Section 902 are available, two or more ground rods shall be used. Where practical, ground rods shall be embedded below permanent moisture level. Such electrodes shall be free from non-conductive coatings, such as paint or enamel. The use of ground rods shall not be an alternative to the required concrete encased electrodes in new structures. When driven ferrous ground rods are used, they shall be at least eight (8) feet long, and not smaller than 5/8 inch in diameter.

## **904. Ground Rod Installation**

The ground rods shall be installed such that at least 8 feet of length is in contact with the soil. It shall be driven to a depth of not less than 8 feet except where rock bottom is encountered. The ground rods shall be driven at an oblique angle not to exceed 45 degrees from the vertical or shall be buried in a trench that is at least 2½ feet deep. The upper end of the ground rods shall be flush with or below ground level unless the above ground end and the ground rod conductor attachment are protected against physical damage.

## 905. Grounding Conductor Size

The size of the grounding conductor shall not be less than specified in the following table:

Size of Largest Individual Copper Conductor, or the Equivalent in Multiple Service Entrance Conductor	Size of Largest Individual Aluminum Conductor, or the Equivalent in Multiple Service Entrance Conductor	Size of Copper Grounding Conductor Required AWG No.
2 or smaller	1/0 or smaller	8*
1 or 1/0	2/0 or 3/0	6
2/0 or 3/0	4/0 or 250 MCM	4
over 3/0 to 350 MCM	over 250 MCM to 500 MCM	2
over 350 MCM to 600 MCM	over 500 MCM to 900 MCM	1/0
over 600 MCM to 1,100 MCM	over 900 MCM to 1750 MCM	2/0
over 1,100 MCM	over 1750 MCM	3/0
* If the size is smaller than No. 6, the ground conductor shall be run in conduit, metallic tubing, or cable armor.		

Exception: The sizing requirement of this chart applies to those electrodes shown in Paragraph 902. It does not apply to made electrodes such as a rod, pipe or plate. In the case of a rod, pipe, or plate electrode, the Grounding Electrode Conductor shall not be required to be larger than No. 6 copper.

**Refer to Article 250 of the NEC.**

## **X. APPENDIX A - GLOSSARY**

Ability to Serve	- A letter indicating that the Utility can provide the electrical service requested by an applicant in an Act 250 proceeding.
Act 250	- A Vermont law governing land development.
Alternating Current	- Electric current that reverses the direction of its flow, as opposed to direct current, which always flows in the same direction.
Ampere	- The unit of measurement of electric current representing the flow of electrons in a conductor past a given point in one second, similar to the measurement of cubic feet of water flowing per second.
Approved Drawing	- A final detailed drawing approved by the utility and provided to a line extension applicant showing a proposed line extension.
Authorities	- State and local government representatives that are legally empowered to regulate or inspect the customer's installation or equipment.
AWG	- American Wire Gauge.
Balanced Load	- The same load on all phases.
CATV	- Community Antenna Television, often referred to as cable TV.
Characteristics	- Voltage rating, amperage rating, and number of phases.
Circuit Breaker	- A device for protection and interruption of electrical current in a circuit.
Co-generation	- An energy system providing both heat and power.
Conduit	- Pipe used to protect electric wires or cables, generally underground.
Condulator	- A cover providing protection against the elements where the conductors enter an electrical-grade conduit.
Connectors	- Devices for attaching wires.
Contribution-in-aid-of-Construction	- The amount a customer is required to pay the utility in advance before construction of a line extension.
Current Transformer (CT)	- An instrument transformer, intended for measuring or control purposes, and designed to have its primary winding connected in series with a conductor carrying large alternating currents.
Customer	- A present, or prospective, user of the Utility's electric service. Can be an individual, contractor, or developer.

Demand	- The rate of usage of electricity by a customer usually measured in kilowatts (KW).
Demand Limiter	- A system that automatically controls equipment to lower the peak demand.
Demand Period	- A specific period of time over which the load (or KW) is measured. The Utility typically measures demand in 15 minute intervals.
Direct Current	- Electric current that consistently flows in the same direction as opposed to alternating currents that reverses its direction of flow.
Disconnect	- A device for opening an electrical circuit.
District Environmental Commission	- A board administering Act 250 at the local level.
Diversion of Electricity	- The use of unmetered electricity without authorization from the utility.
Drip Loop	- The extra wire on the conductors of a service entrance allowing formation of a short, semi-circular loop to prevent moisture from entering service equipment.
Electric Meter	- A device that measures and records periodic electrical energy consumption.
Electrical-Grade Conduit	- Conduit that is expressly designed and manufactured for electrical service.
Emergency Service	- Customer-owned emergency, on-site generation is considered a system to maintain critical circuitry, such as elevators, exit lighting, ventilation, panic controls, fire detection systems, etc.
Energizing Permits	- A governmental permit to activate an electrical service.
Energy Charge	- The portion of a customer's electric bill that is based on the kilowatt hours used during the billing period.
Energy Management System (EMS)	- Programmable computer that controls equipment to reduce energy costs.
Fault Current	- Current flowing through conductors as a result of an unintended short circuit.
Generation	- The process of producing electricity.
Grounding Conductor	- The conductor making an electrical connection with the earth.
High Voltage Lines	- All electrical lines carrying above 600 volts are considered high voltage lines.

Inspector	- An individual representing a government agency, or the Utility, who is qualified to determine if electrical installation requirements have been met.
Junction Box	- An enclosure for the connection of one or more electrical circuits.
Kilowatt (KW)	- A unit of electrical work equal to 1,000 watts comparable to ten 100-watt light bulbs.
Kilowatt Hour (KWH)	- A basic unit of measuring electricity consumption, equal to the use of ten 100-watt bulbs for one hour.
KVA	- Kilovolt-amperes, often referred to as apparent power.
Line	- A system used for the general distribution of electricity.
Line Extension	- Addition to the Utility's distribution system necessary to provide service to a customer.
Load Data	- Information that refers to the size, phase, voltage, and expected consumption of both energy and demand for a particular electrical service.
Load Management	- Efforts of a Utility and its customers to shift electrical usage away from period of high demand to lower costs.
MCM	- Thousand-Circular-Mills (size of cable).
Megawatt (MW)	- One thousand kilowatts.
Megawatt Hour (MWH)	- One thousand kilowatts used for one hour.
Meter Socket	- The enclosure that houses the electric service conductors and provides the mechanism for connection of the service to the electric meter.
Meter Pedestal	- A supporting, upright structure for the attachment of metering.
Mobile Home	- "A factory-assembled structure or structures, transportable in one or more sections, that is built on a permanent chassis and designed to be used as a dwelling without a permanent foundation where connected to the required utilities and includes the plumbing, heating, air conditioning, and electric systems contained therein", NEC 550.2.
Mobile Home Park	- "A contiguous parcel of land that is used for the accommodation of occupied mobile homes", NEC 550.2.

National Electrical Code (NEC)	- A nationally-accepted guide for the safe installation of electrical wiring and equipment published by the NFPA.
National Electrical Safety Code (NESC)	- Safety procedures governing all electrical work done on the Utility system.
NEMA	- National Electrical Manufacturers Association.
Net Metering	- As defined by PSB Rule 5.100.
Net Metering Generation Connection-	The use of a single meter at a customer with both outgoing (load), and incoming (generated), energy. The meter runs backwards when the customer is generating more energy than it is using.
Neutral	- A grounded conductor that carries current resulting from an unbalanced load.
NFPA	- National Fire Protection Association.
Overload Protection	- Interruption of current under conditions of excessive demand, or fault.
Peak Demand	- The highest measured KW load for any typical 15 minute interval during a billing period.
Point-of-Service (Attachment)	- The point at which the Utility ownership terminates its service lateral and the customer begins their wiring.
Power Factor	- The ratio of real power measured in kilowatts (KW) to apparent power measured in kilovoltampere (KVA) for any given load and time. Generally expressed as a percentage.
Primary Service	- Power at primary voltage.
Primary Voltage	- High voltages used in transmission and distribution systems.
Pull Box	- A box with a blank cover for installing conductors into a conduit run, raceway, or metallic tubing which facilitates the installation of conductors.
Right-of-Way Easement (R-O-W)	- A right acquired by the Utility to use land belonging to another for the construction, operation, and maintenance of electric facilities.



Seals	- Devices with various identifying marks and colors which secure electric meters and associated equipment.
Secondary Service	- Power at secondary voltage between transformer and the Utility-owned equipment such as a pole or pedestal.
Secondary Voltage	- 600 volts or less.
Service Drop	- The overhead service conductors furnished by the Utility between the last pole, or other aerial support, and the first point of attachment to the building or intermediate support.
Service Entrance	- The part of the service which runs from the point of attachment of the overhead service drop on the building to the service entrance equipment. The service entrance conductors shall be sized and installed in accordance with the National Electrical Code.
Service Equipment	- The necessary equipment (usually consisting of circuit breaker, or switch and fuses, and their accessories) located near the point of entrance of supply conductors to a building intended to constitute the main control and means of cutoff for the supply to the premises.
Single Phase	- Wiring used on a circuit is supplied by only one of the three phase conductors available from the primary distribution system.
Site Plan	- A detailed drawing of a parcel of land indicating relevant elevations, buildings, and Utilities.
Smart Meter	- A metering system with two-way communication which may have abilities to provide additional services to the customer.
Stand-by Service	- Electrical service provided by the utility for customers generally using a co-generation or self-generation system.
Starting Compensators	- Devices that limit the maximum current drawn when a motor is started.
Stray Voltage	- The voltage between the wiring system's neutral conductor and surfaces intimately contacting earth. Because return current flows on the system neutral conductor, the neutral will have a voltage different than earth potential due to voltage drop.
Structure	- For the purposes of code enforcement – That which is built or constructed. A pole, pedestal or similar support used exclusively by a utility, to support utility meter enclosures or combination of meter enclosure and overcurrent devices, shall not be considered to be a structure.

Switch Gear	- Metal enclosed equipment normally consisting of interrupter switches and fuses plus control and sensing devices, which allows for connections between circuits.
Temporary Service	- A minimum service provided solely for construction purposes.
Three Phase	- The wiring used on a circuit is supplied by all three of the phase conductors available from the primary distribution system.
Time of Use (TOU)	- A method of metering with different charges for specified times.
Transfer Switches	- Switches that operate so that power is provided from one of two possible sources.
Transformer	- Equipment designed to increase or decrease voltage.
Transmission	- The delivery of electricity over lines from a generation source to a distribution point.
UD	- Underground distribution.
URD	- Underground Residential Distribution.
Vermont Department of Public Service	- The agency of state government which functions as the public advocate in proceedings before the Public Service Board.
Vermont Public Service Board	- The three-person, quasi-judicial body, appointed by the governor of Vermont, which approves rates and generally oversees the public electric Utilities in Vermont.
Volt	- The unit of electromotive force or electric pressure through a conductor or circuit, similar to water pressure measured in pounds per square inch.
Voltage Transformer (VT)	- A small capacity instrument transformer used to reduce voltage to supply electrical equipment. The primary winding is connected in parallel with the circuit whose voltage is to be measured or controlled.
Weatherhead	- A cover mounted on the highest point of the service entrance cable to prevent water from flowing down the cable into the meter socket.
Wiring Permit (Work Notice)	- Authorization to install new wiring or equipment by extending an existing circuit or adding a new one.

# DRAWINGS

Drawing Applicability	Availability by Utility							
	GM	VE	WE	LE	HE	VJ	NE	
Overhead Service Dwg. 101	A	A	A	A	A	A	A	
Mast Service Dwg. 102	A	A	A	A	A	A	A	
Underground Service Dwg. 201	A1	O	A	A1	A1	A	A	
Pole Metering Dwg. 202	O	O	N	N	O	O	O	
Trench Dwg. 203	A	A	A	A	A	A	A	
Typical Meter Pedestal Dwg. 204	A3	O	A	A1	A1	A	A	
Meter Pedestal Current Transf. Dwg. 205	O	O	O	O	O	O	O	
Multiple Meter Pedestal Dwg. 206	O	O	O	O	O	O	O	
Typical Temporary Service Dwg. 301	A	A	N	A	A	A	A	
Temporary Underground Service Dwg. 302	A	O	A	O	O	A	A	
Typical Temporary Service Dwg. 303	O	A	A	A	A	O	N	
Gas/Meter Clearance Dwg. 401	A	A	A	A	A	A	A	
Emergency Supply Dwg. 402	A	A	A	A	A	A	A	
Non-Net Metering Generation Connection Dwg. 403	A	A	A	A	A	A	A	
Non-Net Metering Peak Shaving Generation Dwg. 404	A	A	A	A	A	A	A	
Net Metering Generation Connection Dwg. 405	A	A	A	A	A	A	A	
Net Metering Generation Connection Alternate Dwg. 406	A	A	A	A	A	A	A	
Customer Load Data Dwg. 501	A	A	A	A	A	A	A	
Fault Current Request Dwg. 502	A	A	A	A	A	A	A	
Meter Socket Spec. Dwg. 601	A	A	A	A	A	A	A	
Single Phase Meter Installation Dwg. 602	A	A	A	A	A	A	A	
Polyphase Meter Installation Dwg. 603	A	A	A	A	A	A	A	
Transformer Rated Meter Inst. Dwg. 604	A	A	A	A	A	A	A	

A-Fully Applies      N-Does Not Apply      O-Available at Utility's option.

A1- Applies with the exception that the chart below substitutes for the chart on the drawing.

A2- Applies with the exception that the chart below substitutes for the chart on the drawing. Available in limited circumstances at the Utility's option.

A3- Applies with the exception that the chart below substitutes for the chart on the drawing. Available in limited circumstances at the Utility's option. See GMP Distribution Standard 1647 for details.

RESIDENTIAL 120/240 VOLT SERVICES ONLY			
RATING	CABLE LENGTH*	TRIPLEX SIZE	CONDUIT
100A	0-140 FT	#2**	2-1/2"***
	0-210 FT	1/0	2-1/2"***
	211-270 FT	2/0	2-1/2"
	271-410 FT	4/0	2-1/2"
	411-650 FT	350 MCM	3"
	651-890 FT	500 MCM	3"
150A	0-175 FT	2/0	2-1/2"
	176-275 FT	4/0	2-1/2"
	276-435 FT	350 MCM	3"
	436-590 FT	500 MCM	3"
200A	0-205 FT	4/0	2-1/2"
	206-325 FT	350 MCM	3"
	326-440 FT	500 MCM	3"
300A	0-220 FT	350 MCM	3"
	221-295 FT	500 MCM	3"

\* Cable Length is the total of trench and riser lengths. This chart does not indicate that the cable can be pulled into conduits of these lengths. Pulling calculations are necessary to make that determination.

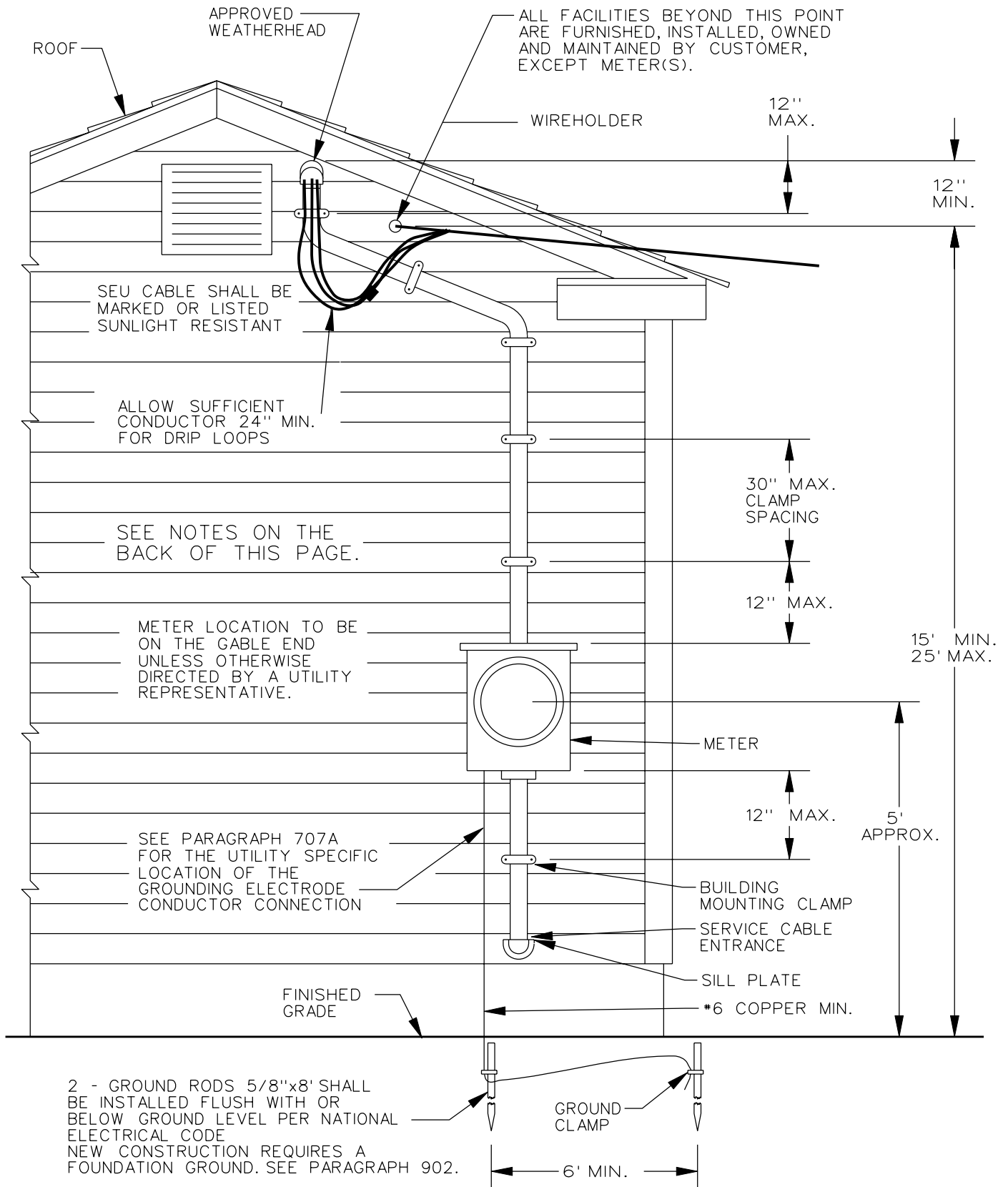
\*\* Customer Owned Services Only

\*\*\* 2" NEMA Schedule 80 conduit may be used on the riser pole. Customer owned only.

Double cable runs (eg. two runs of 4/0 cable) will allow a double length cable run. A minimum of double #2 is required for 150A. A minimum of double 2/0 is required for 200A.

	<b>VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS</b>	App'd: <i>YES</i>	DRAWING NUMBER
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# OVERHEAD SERVICE



## VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 01-07-08
APPRVD: <i>DES</i>	DATE: 01-07-08
DRAWING No.: 101	PAGE: 1 of 2
DATA BASE No.: DTW01889d	

# OVERHEAD SERVICE

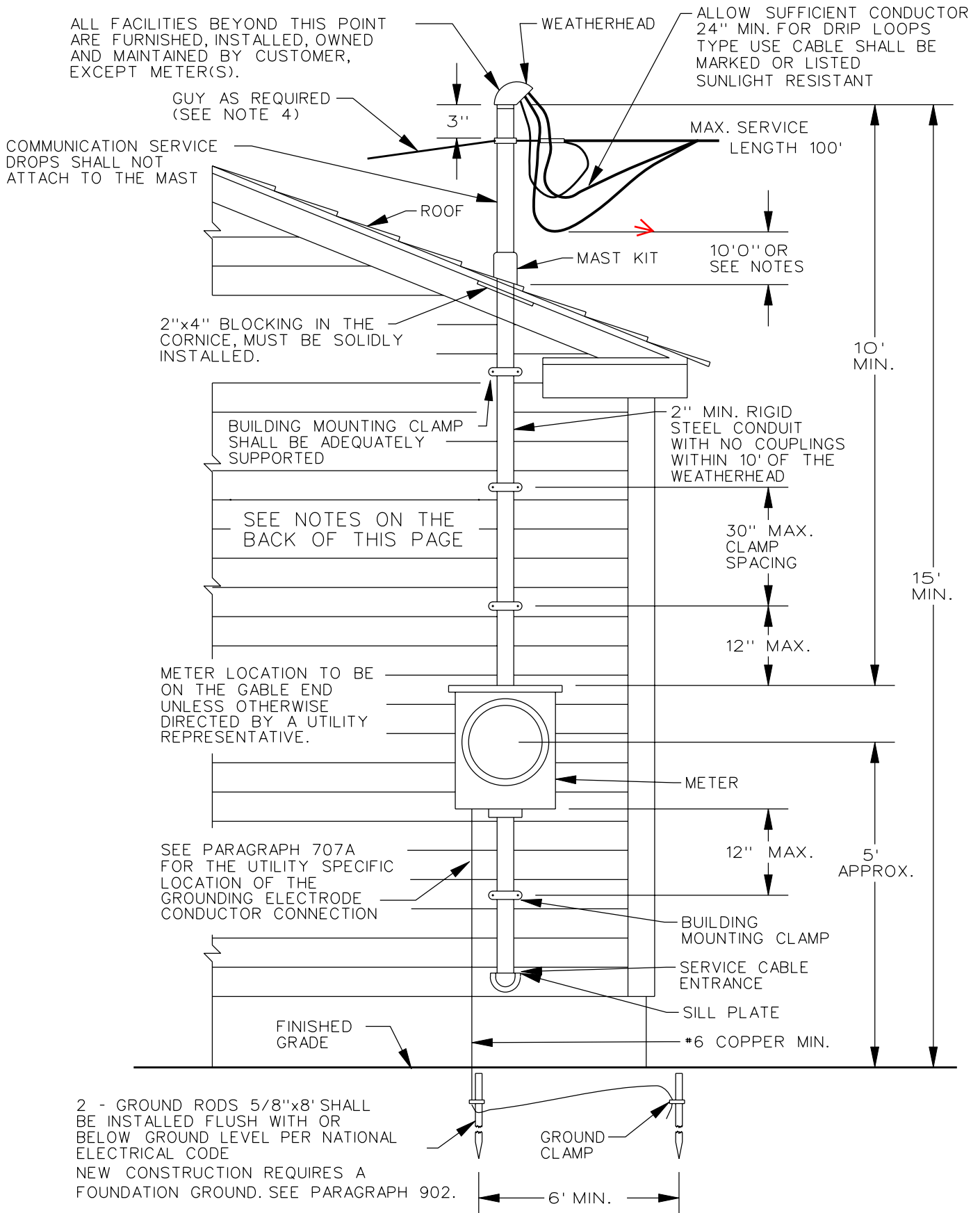
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## Notes:

1. All wiring and materials shall conform to the requirements of the National Electric Code (NEC) and to any applicable local codes. Where conflict exists the more stringent code will apply. For customer owned equipment, any requirements in excess of code specified minimums, are recommended not required.
2. The point of attachment of the service drop and the location of the meter socket will be designated by the utility representative. Any relocation shall be approved by a utility representative.
3. On low buildings, without the minimum 15 ft clearance, a mast installation shall be required (refer to mast installation drawing).
4. The service drop will not be allowed to be attached on or under the eaves.
5. In areas subject to truck traffic, the clearance required to the service drop, is a minimum of 16 ft, under the ice loading conditions described in the National Electric Safety Code (NESC). If the overhead service is owned by the customer, rather than the utility, the clearance required is a minimum of 18 ft under the conditions described in the NEC (no loading at 60° F). In areas only subject to pedestrian traffic, the clearance required to the service drop, is a minimum of 12 ft, under the ice loading conditions described in the NESC.
6. Residential 320 amp meter sockets, and all commercial meter sockets, shall have a manual bypass. For Utility-specific details see Paragraph 705E. See Paragraph 707 for requirements and Utility-specific details of how a Service Grounding Connection is to be made. See the Meter Socket Specification (Dwg 601) included in this manual.
7. The grounding electrode conductor, to a driven ground, shall be a minimum of #6 copper. The conductor shall be adequately protected. The driven rods shown shall be a minimum of 5/8" in diameter and 8' long. See Paragraph 901 through 905 for details of the Service Ground.
8. All gas valves shall be a minimum of 10 ft from electric meter equipment. For clearances less than 10 ft see Dwg. 401 and NFPA 58.
9. The Service Disconnecting Means shall be installed at a readily accessible location, either outside of a building or structure, or, inside a building or structure nearest the point of entrance of the service conductors, not to exceed 10 feet of conductor length, from the point of entrance.
10. The service drop cable and its drip loop shall have a clearance of 3 ft from any accessible opening such as to the side of an openable window, to the top of a doorway to a balcony, or to the side of a fire escape. No clearance is required directly above a window. If the opening is used for access for people or materials, then service cables shall not be placed below the opening. See NEC Article 230.9.
11. All services, unless the exceptions of Notes 12 or 13 apply, shall have a clearance of 10 ft, from the roof. That clearance is required above the roof and 3 ft beyond the edge of the roof. The service drop may attach to the side of the building.
12. For roofs easily accessible to pedestrian or vehicular traffic, clearances are those required above ground surfaces. See Note 5.
13. For inaccessible roofs with a slope of 4 on 12, or steeper, and voltages less than 300 volts between conductors, the clearance to the roof may be reduced to 3 ft. A roof is considered accessible if it can be accessed by a window or permanently mounted ladder.

	<b>VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS</b>	App'd: <i>UES</i> DATE: 02/10 101PG2D.DOC	<u>DRAWING NUMBER</u> <b>101</b> Page 2
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# MAST OVERHEAD SERVICE



VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 01-07-08
APPRVD: <i>MS</i>	DATE: 01-07-08
DRAWING No.: 102	PAGE: 1 of 2
DATA BASE No.: DTW01890d	

# MAST OVERHEAD SERVICE

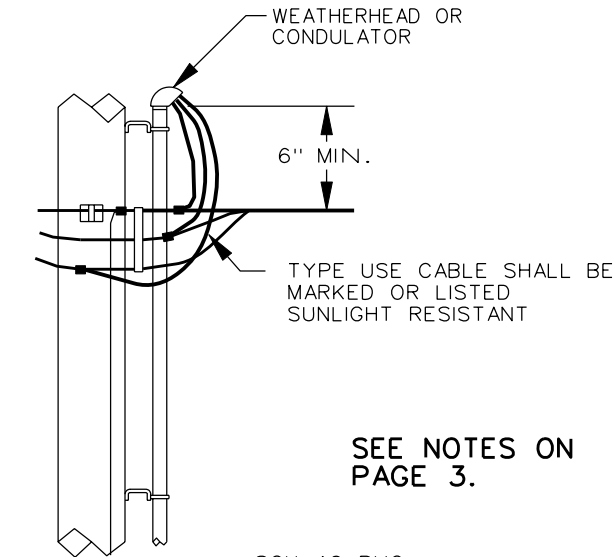
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## Notes:

1. All wiring and materials shall conform to the requirements of the National Electric Code (NEC) and to any applicable local codes. Where conflict exists the more stringent code will apply. For customer owned equipment, any requirements in excess of code specified minimums, are recommended not required.
2. The location and height of the service mast and the location of the meter socket will be designated by the utility representative. Any relocation shall be approved by a utility representative.
3. All entrance wiring shall be completed prior to the utility placing the service drop. The customer assumes the responsibility that the mast is of adequate strength, and adequately braced, to support the strain of the service drop.
4. For mast heights above 3 ft, or service drops longer than 100 ft, the mast shall be guyed. Guying may be required on masts shorter than 3 ft. As an alternative, a larger than nominal conduit, may be required, to support the service drop, on masts shorter than 3 ft.
5. If circumstances result in the mast being located on the eaves side of the building, rather than the gable side, the meter socket shall be protected, by an overhang, or else wise, from water or ice falling from the eaves.
6. All services, unless the exceptions of Notes 7, 8 or 9 apply, shall have a clearance of 10 ft, from the roof. That clearance is required above the roof and 3 ft beyond the edge of the roof.
7. For roofs easily accessible to pedestrian or vehicular traffic, clearances are those required above ground surfaces. See Note 10.
8. For inaccessible roofs with a slope of 4 on 12, or steeper, and voltages less than 300 volts between conductors, the clearance to the roof may be reduced to 3 ft. A roof is considered accessible if it can be accessed by a window or permanently mounted ladder.
9. For mast service installations with a voltage less than 300 volts between conductors, the clearance to the roof may be reduced to 18 inches, provided no more than 6 ft of service drop crosses over the roof and provided the mast is no more than 4 ft from the edge of the roof.
10. In areas subject to truck traffic, the clearance required to the service drop, is a minimum of 16 ft, under the ice loading conditions described in the National Electric Safety Code (NESC). If the overhead service is owned by the customer, rather than the utility, the clearance required is a minimum of 18 ft under the conditions described in the NEC (no loading at 60° F). In areas only subject to pedestrian traffic, the clearance required to the service drop, is a minimum of 12 ft, under the ice loading conditions described in the NESC.
11. Residential 320 amp meter sockets, and all commercial meter sockets, shall have a manual bypass. For Utility-specific details see Paragraph 705E. See Paragraph 707 for requirements and Utility-specific details of how a Service Grounding Connection is to be made. See the Meter Socket Specification (Dwg 601) included in this manual.
12. The grounding electrode conductor, to a driven rod shall be a minimum of #6 copper. The conductor shall be adequately protected. The driven rods shown shall be a minimum of 5/8" in diameter and 8' long. See Paragraph 901 through 905 for details of the Service Ground.
13. All gas valves shall be a minimum of 10 ft from electric meter equipment. For clearances less than 10 ft see Dwg. 401 and NFPA 58.
14. The Service Disconnecting Means shall be installed at a readily accessible location, either outside of a building or structure, or, inside a building or structure nearest the point of entrance of the service conductors, not to exceed 10 feet of conductor length, from the point of entrance.

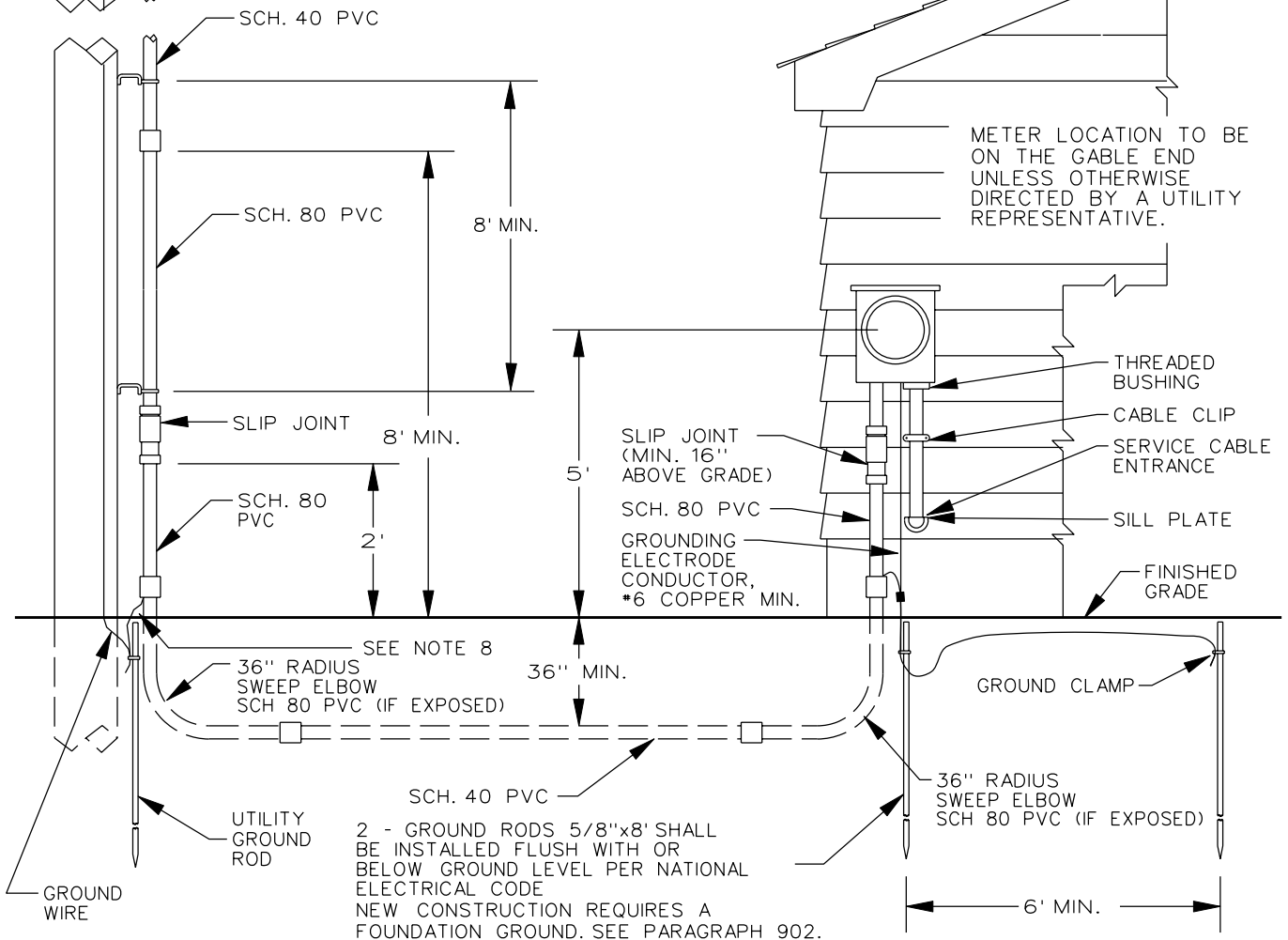
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# UNDERGROUND SERVICE



RESIDENTIAL SERVICES ONLY			
RATING	CABLE LENGTH*	TRIPLEX SIZE	CONDUIT
100 A	0-210 FT.	1/0	2 1/2"
	211-410 FT.	4/0	2 1/2"
	411-650 FT.	350 MCM	3"
150 A	0-275 FT.	4/0	2 1/2"
	276-435 FT.	350 MCM	3"
200 A	0-205 FT.	4/0	2 1/2"
	206-325 FT.	350 MCM	3"
300 A	0-220 FT.	350 MCM	3"

\* Cable Length is the total of trench and riser lengths. This chart does not indicate that the cable can be pulled into conduits of these lengths. Pulling tension calculations are necessary to make that determination.



VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 01-08-09
APPRVD: <del>123</del>	DATE: 01-08-09
DRAWING No.: 201	PAGE: 1 of 3
DATA BASE No.: DTW01891g	



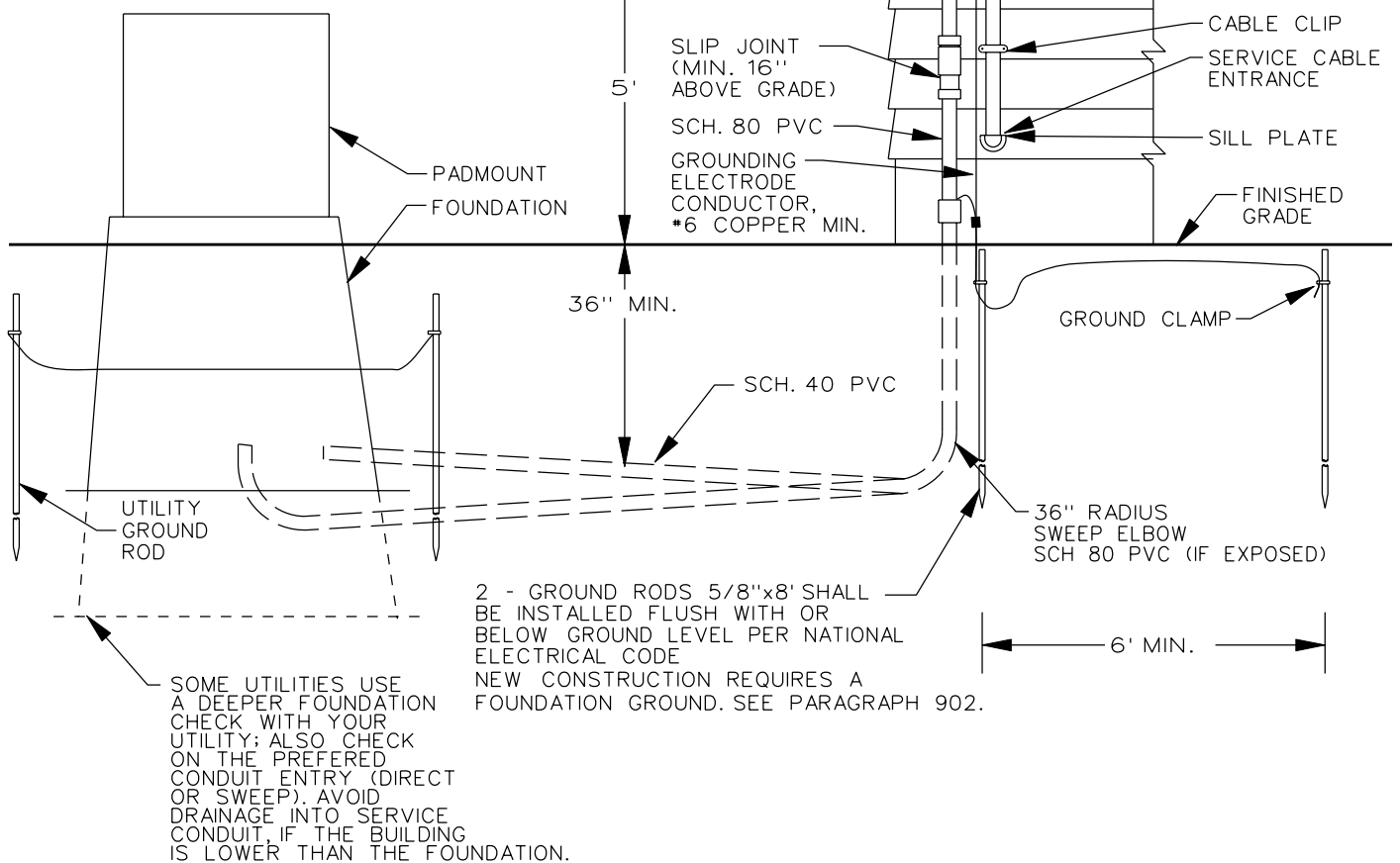
# UNDERGROUND SERVICE

## RESIDENTIAL SERVICES ONLY

RATING	CABLE LENGTH*	TRIPLEX SIZE	CONDUIT
100 A	0-210 FT.	1/0	2 1/2"
	211-410 FT.	4/0	2 1/2"
	411-650 FT.	350 MCM	3"
150 A	0-275 FT.	4/0	2 1/2"
	276-435 FT.	350 MCM	3"
200 A	0-205 FT.	4/0	2 1/2"
	206-325 FT.	350 MCM	3"
300 A	0-220 FT.	350 MCM	3"

\* Cable Length is the total of trench and riser lengths. This chart does not indicate that the cable can be pulled into conduits of these lengths. Pulling tension calculations are necessary to make that determination.

SEE NOTES ON THE NEXT PAGE.



VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 11-26-08
APPRVD: <i>MS</i>	DATE: 11-26-08
DRAWING No.: 201	PAGE: 2 of 3
DATA BASE No.: DTW01891.2a	

DRAWINGS/STANDARD/VERMONT

# UNDERGROUND SERVICE

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## Notes:

1. All wiring and materials shall conform to the requirements of the National Electric Code (NEC) and to any applicable local codes. Where conflict exists the more stringent code will apply. For customer owned equipment, any requirements in excess of code specified minimums, are recommended not required.
2. This specification covers residential services. Commercial service equipment is under the jurisdiction of the electrical inspector. The cable sizes shown in the chart may not apply to commercial services.
3. The location of the conduit risers and the meter socket will be designated by the utility representative. Any relocation shall be approved by a utility representative.
4. Conduit Condulators may be required for multi-conductor services and for conductors of 350 MCM or larger. Exercise care in limiting water entry.
5. Locate the riser conduit on the quarter of the pole away from normal traffic.
6. Residential 320 amp meter sockets, and all commercial meter sockets, shall have a manual bypass. For Utility-specific details see Paragraph 705E. See Paragraph 707 for requirements and Utility-specific details of how a Service Grounding Connection is to be made. See the Meter Socket Specification (Dwg 601) included in this manual.
7. The grounding electrode conductor, to a driven ground, shall be a minimum of #6 copper. The conductor shall be adequately protected. The driven grounds shown shall be a minimum of 5/8" in diameter and 8' long. See Paragraph 901 through 905 for details of the Service Ground.
8. Any steel conduit within 18" of the surface shall be bonded. Steel conduit is not required.
9. Any construction, at the pole, above ground level, shall be done by the utility company. Exception: The customer may install that portion of their equipment that can be reached while standing on the ground. Any trench near the base of the pole shall be immediately backfilled and properly tamped.
10. Depths shallower than 36" may be allowed where obstructions such as ledge are encountered. Any portion of conduit shallower than 24" shall be covered by a minimum 2" concrete cap. See the utility for additional requirements for conduit buried near underground facilities, under driveways or roadways, or, for depths shallower than 12".
11. All gas valves shall be a minimum of 10 ft from electric meter equipment. For clearances less than 10 ft see Dwg. 401 and NFPA 58.
12. The Service Disconnecting Means shall be installed at a readily accessible location, either outside of a building or structure, or, inside a building or structure nearest the point of entrance of the service conductors, not to exceed 10 feet conductor length, from the point of entrance.
13. The chart shows the acceptable total cable length for given service amp ratings and conductors. The chart is based on a maximum 3% voltage drop in an aluminum underground service cable for a 120/240 volt service. For other voltages, cables or multiple cables consult your local utility.
14. A marker tape shall be installed, above the conduit, 12 inches below grade. Type USE cable shall be marked or listed sunlight resistant.
15. A side bus bar meter socket is required if 350MCM cable is used.
16. URD Service Risers, from a pole-mounted three-phase transformer bank, shall be limited to an 800 amp rating. Larger services shall be supplied by a padmounted transformer.
17. Customer must provide sufficient cable to reach the transformer or secondary cable and to make connections.



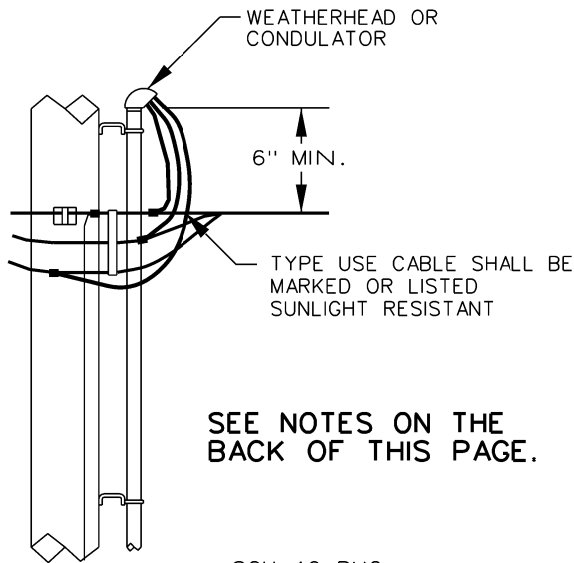
## **VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS**

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**201** Page 3

# POLE METERING

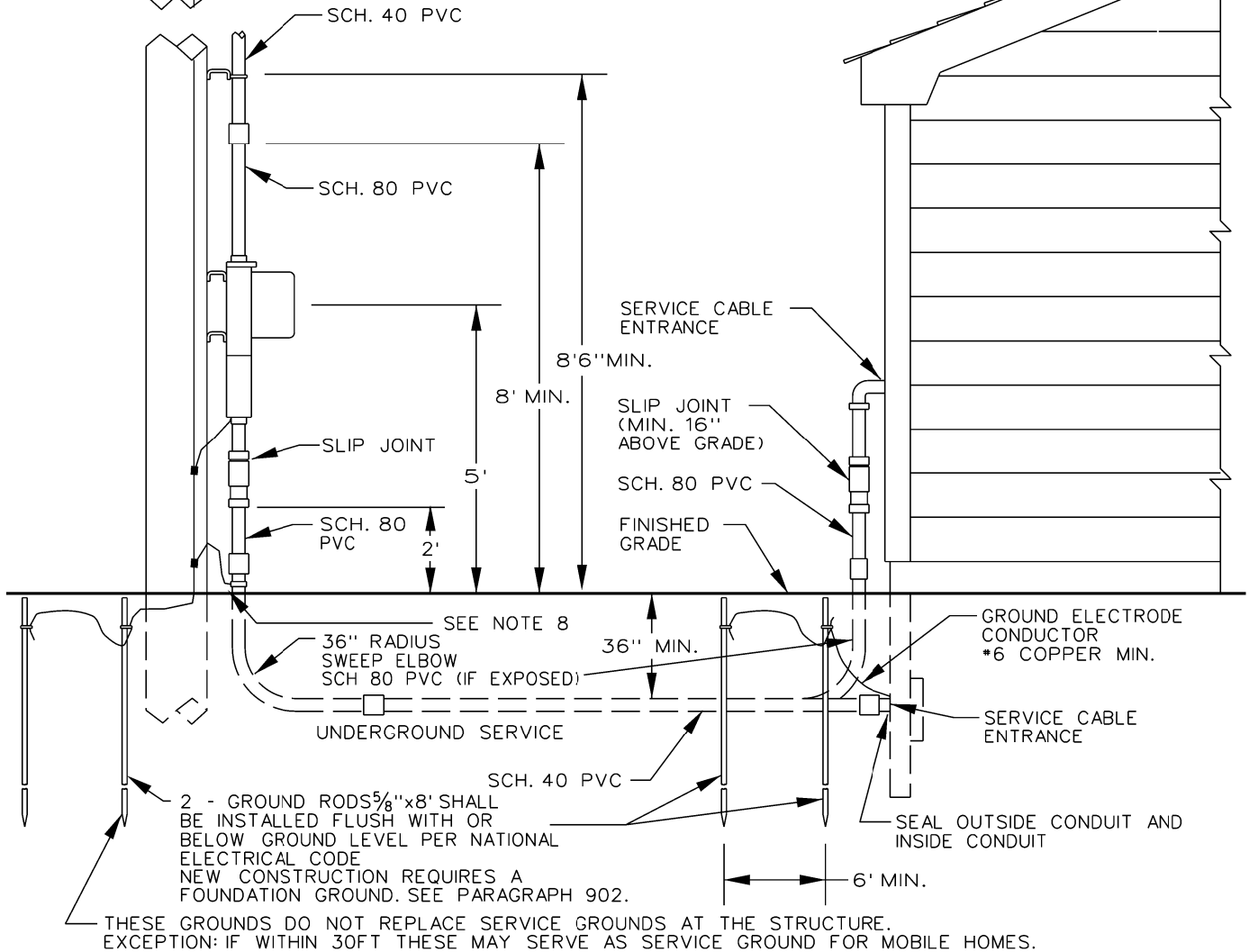
CHECK WITH LOCAL UTILITY TO SEE WHERE APPLICABLE.



SEE NOTES ON THE BACK OF THIS PAGE.

RESIDENTIAL SERVICES ONLY			
RATING	CABLE LENGTH*	TRIPLEX SIZE	CONDUIT
100 A	0-210 FT.	1/0	2 1/2"
	211-410 FT.	4/0	2 1/2"
	411-650 FT.	350 MCM	3"
150 A	0-275 FT.	4/0	2 1/2"
	276-435 FT.	350 MCM	3"
200 A	0-205 FT.	4/0	2 1/2"
	206-325 FT.	350 MCM	3"
300 A	0-220 FT.	350 MCM	3"

\* Cable Length is the total of trench and riser lengths. This chart does not indicate that the cable can be pulled into conduits of these lengths. Pulling tension calculations are necessary to make that determination.



VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 11-11-12
APPRVD: JES	DATE: 11-11-12
DRAWING No.: 202	PAGE: 1
DATA BASE No.: DTW018921	

DRAWINGS/STANDARD/VERMONT

# POLE METERING

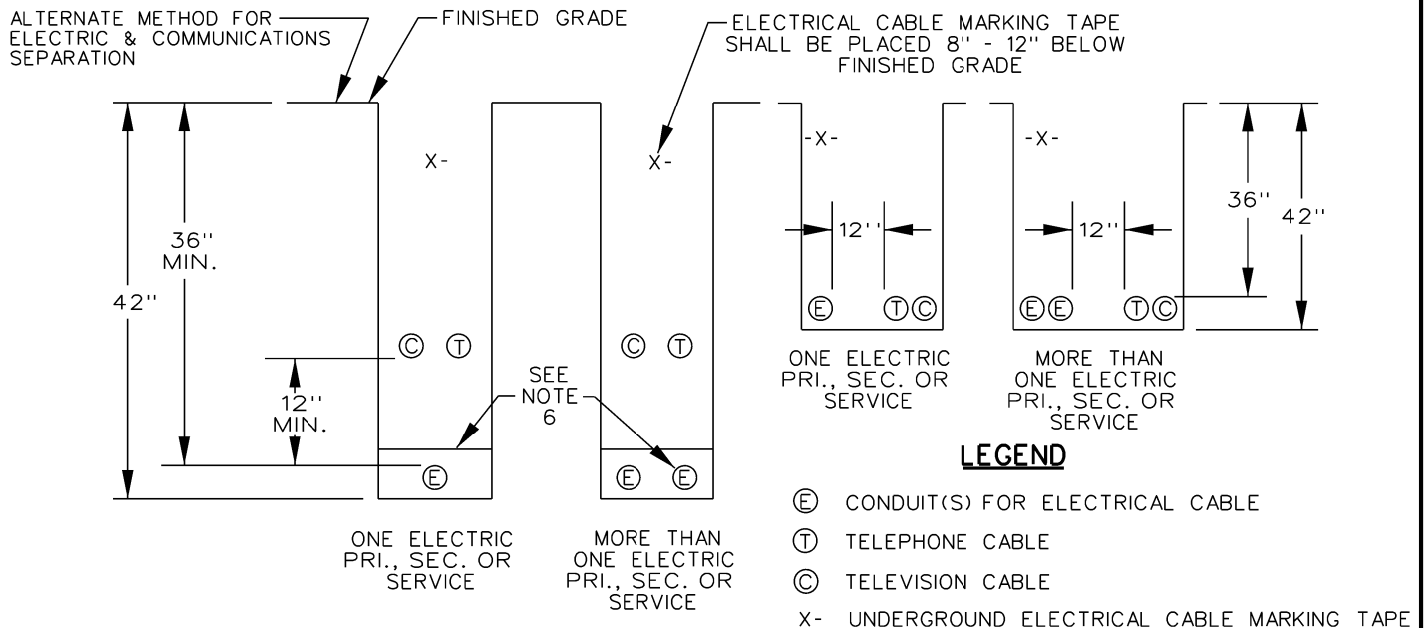
## Notes:

1. All wiring and materials shall conform to the requirements of the National Electric Code (NEC) and to any applicable local codes. Where conflict exists the more stringent code will apply. For customer owned equipment, any requirements in excess of code specified minimums, are recommended not required.
2. This specification covers residential services. Commercial service equipment is under the jurisdiction of the electrical inspector. The cable sizes shown in the chart may not apply to commercial services.
3. The location of the conduit risers and the meter socket will be designated by the utility representative. Any relocation shall be approved by a utility representative.
4. Conduit Condulators may be required for multi-conductor services and for conductors of 350 MCM or larger. Exercise care in limiting water entry.
5. Locate the riser conduit on the quarter of the pole away from normal traffic.
6. Residential 320 amp meter sockets, and all commercial meter sockets, shall have a manual bypass. For Utility-specific details see Paragraph 705E. The meter socket shall have a separate grounding electrode conductor connector. The connector shall be appropriately connected to the service neutral bus. The service neutral, and not the grounding electrode conductor, shall extend from the meter socket to the main disconnect in the building. An exception would occur if a breaker, under the meter socket, is the main disconnect for a mobile home. See the Meter Socket Specification (Dwg. 601) included in this manual.
7. The grounding electrode conductor, from the main disconnect, to a driven ground, shall be a minimum of #6 copper. The conductor shall be adequately protected. The driven grounds shown shall be a minimum of 5/8" in diameter and 8' long. See Paragraph 901 through 905 for details of the Service Ground.
8. Any steel conduit within 18" of the surface shall be bonded. Steel conduit is not required.
9. Any construction, at the pole, above ground level, shall be done by the utility company. Exception: The customer may install that portion of their equipment that can be reached while standing on the ground. Any trench near the base of the pole shall be immediately backfilled and properly tamped.
10. Depths shallower than 36" may be allowed where obstructions such as ledge are encountered. Any portion of conduit shallower than 24" shall be covered by a minimum 2" concrete cap. See the utility for additional requirements for conduit buried near underground facilities, under driveways or roadways, or, for depths shallower than 12".
11. All gas valves shall be a minimum of 10 ft from electric meter equipment. For clearances less than 10 ft see Dwg. 401 and NFPA 58.
12. The Service Disconnecting Means shall be installed at a readily accessible location, either outside of a building or structure, or, inside a building or structure nearest the point of entrance of the service conductors, not to exceed 10 feet of conductor length, from the point of entrance.
13. The chart shows the acceptable total cable length for given service amp ratings and conductors. The chart is based on a maximum 3% voltage drop in an aluminum underground service cable for a 120/240 volt service. For other voltages, cables or multiple cables consult your local utility. The chart is a recommendation, rather than a requirement, in the case of Pole Metering. However, failure to follow these recommendations can cause damage or malfunction of the customer's equipment. The Utility does not accept any liability for loss or damage incurred as a result of said failure, and, the customer proceeds at his own risk. The conduit attached to the pole shall meet the chart's size, for the cable chosen by the customer. The cable size shall, at a minimum, meet the ampacity of the customer's disconnect.
14. A marker tape shall be installed, above the conduit, 12 inches below grade. Type USE cable shall be listed or marked sunlight resistant.
15. The decision to allow pole metering is solely at the Utility's discretion. The pole shall be in a location that is protected from pedestrian and vehicular traffic. The pole shall be in a location that is convenient for meter reading. The pole shall not be encumbered with equipment, primary taps or other risers, that make future pole replacements difficult. Pole metering is not available for customers with multiple service rates, or, for customers with time-of-day rates controlled by a relay in the meter.
16. The Utility recommends that the customer install an integral breaker/meter socket. The purpose of the breaker is to allow the customer to maintain their underground service without an expensive linecrew visit. Check with your Utility to determine whether the breaker is required.



# TYPICAL TRENCH CROSS-SECTION

## U.G. CABLE IN CONDUIT



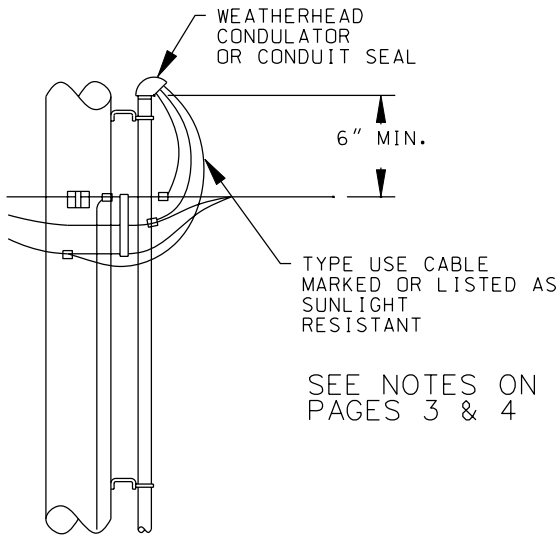
### NOTES:

1. ALL TRENCHES AND ELECTRICAL CONDUIT(S) REQUIRE APPROVAL BY UTILITY INSPECTOR BEFORE BACKFILLING.
2. ALL TRENCHES SHALL BE 18 INCH MINIMUM WIDTH. THE CONDUIT SHALL BE EMBEDDED IN UNFROZEN SAND OR FINE GRAVEL, THAT WILL PASS A 1 INCH MESH. THIS MATERIAL SHALL BE A MINIMUM OF 4 INCHES THICK ON ALL SIDES OF THE CONDUIT. THE REMAINDER OF THE BACKFILL SHALL BE CLEAN, AND, SHALL NOT CONTAIN ROCKS LARGER THAN 8 INCHES IN ANY DIMENSION. CAREFULLY COMPACT THE FULL DEPTH OF BACKFILL, UNDER TRAVELLED WAYS AND PARKING LOTS. THE MINIMUM DEPTH, UNDER A HIGHWAY, SHALL BE 48 INCHES RATHER THAN 36 INCHES. MOUNDING THE TRENCH, TO PROVIDE THE REQUIRED DEPTH, IS NOT ALLOWED.
3. CONDUIT SHALL BE ENCASED IN A 4 INCH ENVELOPE OF CONCRETE UNDER THE FOLLOWING CONDITIONS:
  - A) BROOK CROSSINGS.
  - B) CROSSINGS OF WATER, SEWER, AND GAS PIPELINES. CROSSINGS SHALL BE DONE AT NINETY DEGREES IF POSSIBLE. NORMALLY, THE ELECTRICAL CONDUIT SHALL BE A MINIMUM OF 18 INCHES ABOVE THE PIPE. CAREFULLY COMPACT THE FILL BELOW THE ELECTRICAL CONDUIT. CONCRETE ENCASEMENT IS REQUIRED FOR 10 FEET ON EACH SIDE OF THE PIPE.
  - C) UNDER THE TRAVELLED WAY OF CITY STREETS, AND, UNDER TOWN HIGHWAYS, IF REQUIRED BY THE TOWN. A PIPE SLEEVE, SURROUNDING THE CONDUIT, MAY BE SUBSTITUTED.
  - D) CONDUITS WITHIN 20 FEET OF TANKS CONTAINING FUELS, OR SOLVENTS. THESE TANKS MAY BE ABOVE OR BELOW GRADE. THIS REQUIREMENT DOES NOT APPLY TO URD SERVICES.
4. TRENCHES SHOULD BE LOCATED 10 FEET FROM ANY STRUCTURE, UNLESS THE CONDUIT IS GOING TO THE STRUCTURE. CONTACT THE UTILITY IF CLOSER APPROACHES ARE NECESSARY.
5. TRENCHES SHOULD BE LOCATED 10 FEET FROM ANY WATER, SEWER, OR GAS PIPELINE THAT PARALLELS THE CONDUIT. CONTACT THE UTILITY IF CLOSER APPROACHES ARE NECESSARY.
6. COMMUNICATIONS CABLES AND CONDUITS MAY BE LOCATED IN THE SAME TRENCH WITH ELECTRIC CABLES OR CONDUITS. A MINIMUM HORIZONTAL OR VERTICAL SEPARATION OF 12 INCHES IS REQUIRED. ELECTRICAL CONDUITS SHALL BE SEPARATED BY 4 INCHES. THESE DISTANCES ARE MEASURED SURFACE-TO-SURFACE, NOT CENTER-TO-CENTER.
7. DEPTHS SHALLOWER THAN 36 INCHES MAY BE ALLOWED WHERE OBSTRUCTIONS SUCH AS LEDGE ARE ENCOUNTERED. ANY PORTION OF THE CONDUIT SHALLOWER THAN 24 INCHES SHALL BE COVERED WITH A MINIMUM 2 INCH CONCRETE CAP. SEE THE UTILITY FOR DEPTHS SHALLOWER THAN 12 INCHES.
8. CHECK WITH THE LOCAL UTILITY FOR SPECIFIC REQUIREMENTS.

**VERMONT UTILITIES**  
**ELECTRIC SERVICE REQUIREMENTS**

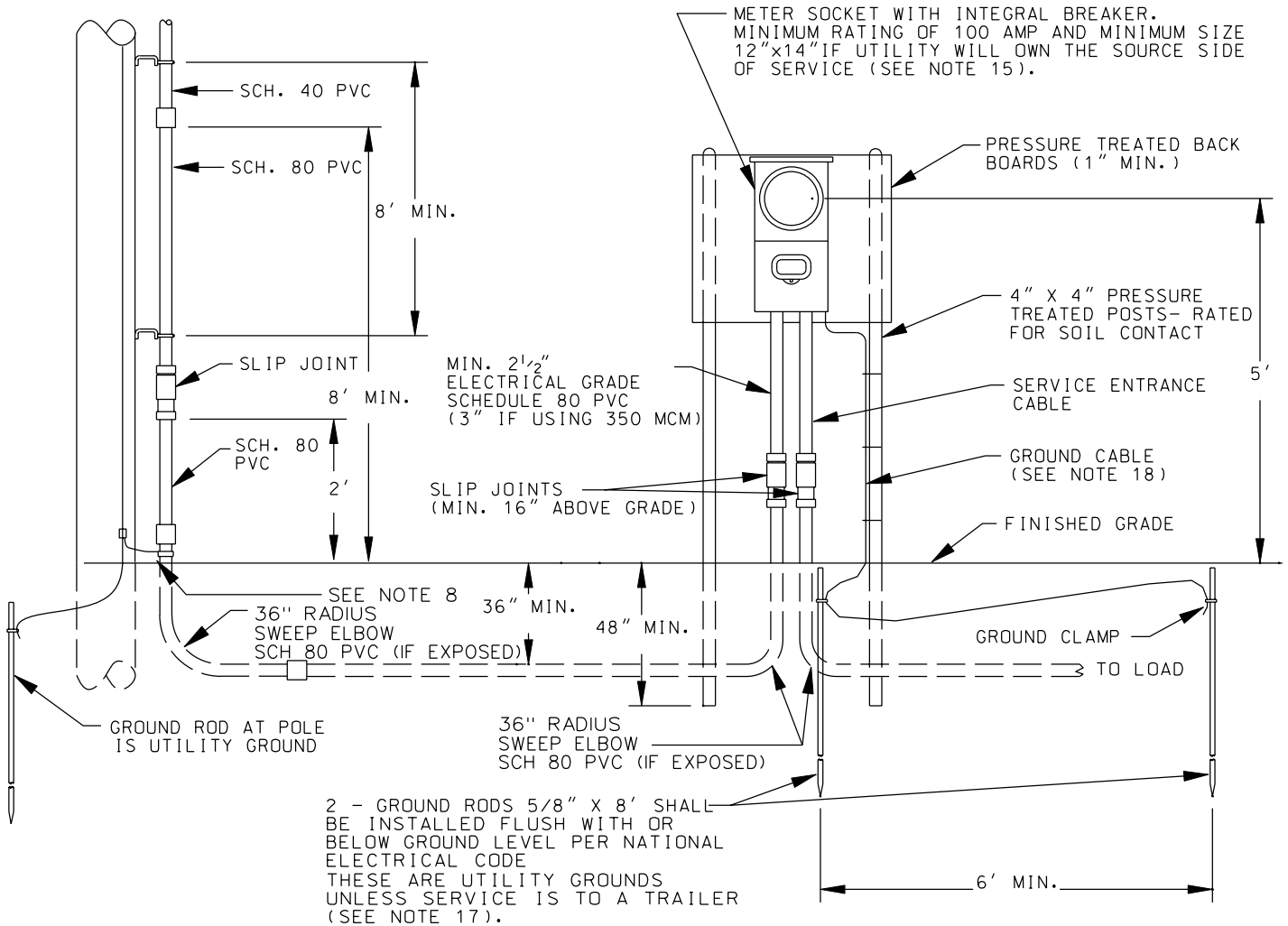
DRAWN: LAW	DATE: 11-11-12
APPRVD: <i>ALS</i>	DATE: 11-11-12
DRAWING No.: 203	PAGE: 1
DATA BASE No.: DTW01893d	

# TYPICAL METER PEDESTAL



RESIDENTIAL 120/240 VOLT SERVICES ONLY			
RATING	CABLE LENGTH*	TRIPLEX SIZE	CONDUIT
100A	0-210 FT.	1/0	2 1/2"
	211-410 FT.	4/0	2 1/2"
	411-650 FT.	350 MCM	3"
150 A	176-275 FT.	4/0	2 1/2"
	276-435 FT.	350 MCM	3"
200A	0-205 FT.	4/0	2 1/2"
	206-325 FT.	350 MCM	3"
300A	0-220 FT.	350 MCM	3"

\* Cable Length is the total of trench and riser lengths. This chart does not indicate that the cable can be pulled into conduits of these lengths. Pulling tension calculations are necessary to make that determination.



VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 01-08-09
APPRVD: JES	DATE: 01-08-09
DRAWING No.: 204	PAGE: 1 of 4
DATA BASE No.: DTW01894g	

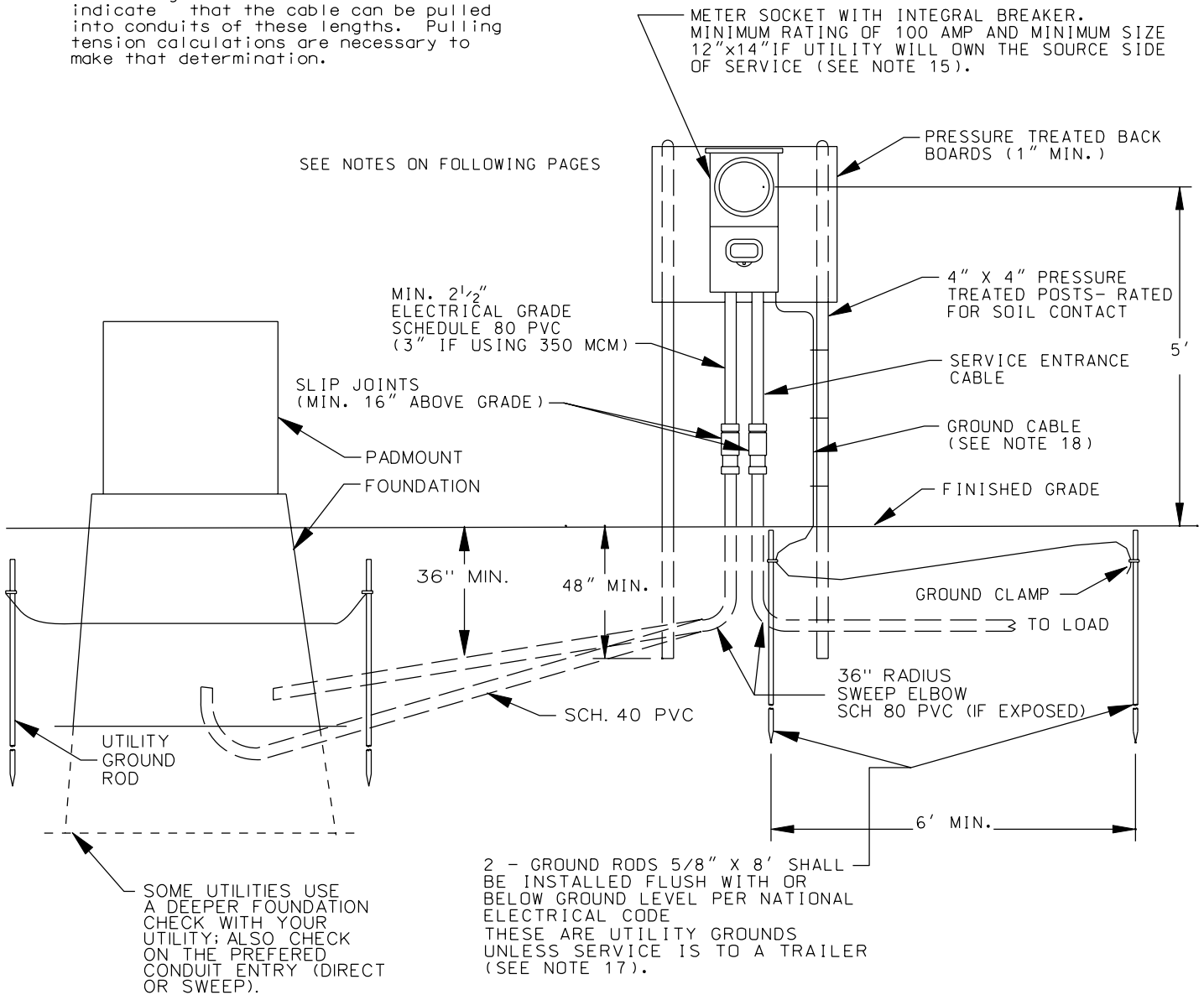
## TYPICAL METER PEDESTAL

RESIDENTIAL 120/240 VOLT SERVICES ONLY			
RATING	CABLE LENGTH*	TRIPLEX SIZE	CONDUIT
100A	0-210 FT.	1/0	2 1/2"
	211-410 FT.	4/0	2 1/2"
	411-650 FT.	350 MCM	3"
150 A	176-275 FT.	4/0	2 1/2"
	276-435 FT.	350 MCM	3"
200A	0-205 FT.	4/0	2 1/2"
	206-325 FT.	350 MCM	3"
300A	0-220 FT.	350 MCM	3"

IF THE TRANSFORMER IS IN CLOSE PROXIMITY TO THE METER/DISCONNECT, CONFIRM THAT THE BREAKER IS RATED FOR THE AVAILABLE FAULT CURRENT.

\* Cable Length is the total of trench and riser lengths. This chart does not indicate that the cable can be pulled into conduits of these lengths. Pulling tension calculations are necessary to make that determination.

SEE NOTES ON FOLLOWING PAGES



# VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 12-02-08
APPRVD: <del>MS</del>	DATE: 12-02-08
DRAWING No.: 204	PAGE: 2 of 4
DATA BASE No.: DTW01894.2a	

DRAWINGS/STANDARD/VERMONT

# TYPICAL METER PEDESTAL

## Notes:

1. All wiring and materials shall conform to the requirements of the National Electric Code (NEC) and to any applicable local codes. Where conflict exists the more stringent code will apply. For customer owned equipment, any requirements in excess of code specified minimums, are recommended not required.
2. This specification covers residential services. Commercial service equipment is under the jurisdiction of the electrical inspector. The cable sizes shown in the chart may not apply to commercial services.
3. The location of the meter pedestal and conduit risers and the meter socket will be designated by the utility representative. There shall be no more than three ninety-degree bends in the conduit, including one at the pole/pad and another at the meter pedestal. Any relocation shall be approved by a utility representative.
4. Locate the riser conduit on the quarter of the pole away from normal traffic.
5. The pedestal shall be a minimum of 10 feet from the pole or padmount transformer, and, 5 feet from the mobile home.
6. All gas valves shall be a minimum of 10 ft from electric meter equipment. For clearances less than 10 ft, see Drawing No. 401 in this manual or refer to NFPA 58.
7. The customer shall supply and install the pedestal, conduit, meter socket/disconnect and grounding. A pull rope having a minimum pull strength of 500 lbs. is required to be installed in the conduit by the customer if the Utility supplies the cable. If the customer supplies the cable, it shall be installed in the conduit, and connected to the meter socket.
8. The trench should be dug a minimum of 18 inches wide and 36 inches deep to the top of the conduit.
9. Depths shallower than 36" may be allowed where obstructions such as ledge are encountered. Any portion of conduit shallower than 24" shall be covered by a minimum 2" concrete cap. See the Utility for additional requirements for conduit buried near underground facilities, under driveways or roadways, or, for depths shallower than 12".
10. A marker tape shall be installed, above the conduit, 12 inches below grade. Type USE cable shall be listed or marked sunlight resistant.
11. Any steel conduit within 18" of the surface shall be bonded. Steel conduit is not required.
12. Any construction, at the pole, above ground level, shall be done by the utility company. Exception: The customer may install that portion of their equipment that can be reached while standing on the ground. Any trench near the base of the pole shall be immediately backfilled and properly tamped.
13. The chart shows the acceptable total cable length for given service amp ratings and conductors. The chart is based on a maximum 3% voltage drop in an aluminum underground service cable for a 120/240 volt service. For other voltages, cables or multiple cables consult your local Utility.
14. Residential 320 amp meter sockets, and all commercial meter sockets, shall have a manual bypass. For Utility-specific details see Paragraph 705E. The meter socket shall have a separate grounding electrode conductor connector. The connector shall be appropriately connected to the service neutral bus. The service neutral, and not the grounding electrode conductor, shall extend from the meter socket to the main disconnect in the building. An exception would occur if a breaker, under the meter socket, is the main disconnect for a mobile home. See the Meter Socket Specification (Dwg. 401) included in this manual.
15. A side bus bar meter socket and 3 inch conduit are required if 350 MCM cable or a double run of cable is used.
16. The Service Disconnecting Means shall be installed at a readily accessible location, either outside of a building or structure, or, inside a building or structure nearest the point of entrance of the service conductors, not to exceed 10 feet of conductor length, from the point of entrance.
17. A disconnect is required to be within 30 feet of a mobile home. Four wire services are required from the disconnect to the subpanel (in the mobile home). The breaker in the disconnect shall be sized to protect the feeder to the subpanel. Modular homes, rated by the manufacturer 'For Permanent Foundation', may have the meter socket mounted directly on the structure.
18. The grounding electrode conductor, from the main disconnect, to a driven ground, shall be a minimum of #6 copper. The conductor shall be adequately protected. The driven grounds shown shall be a minimum of 5/8" in diameter and 8' long. See Paragraph 901 through 905 for details of the Service Ground.
19. The Utility recommends that the customer install an integral breaker/meter socket. The purpose of the breaker is to allow the customer to maintain their underground service without an expensive linecrew visit. Check with your Utility to determine whether the breaker is required.
20. Where subject to state or local electrical inspection, such inspection must be made prior to energizing.





# TYPICAL METER PEDESTAL

## Notes:

21. The drawing pictures two 4x4 pressure treated posts comprising the support for the meter pedestal. The posts are labeled 'rated for soil contact'. That description, or more completely, 'Ground Contact and Fresh Water Use' is from the wood preservative treatment standard AWPA C2. 'Ground Contact' rated posts are acceptable. A lesser level of treatment, 'Above Ground', which is not intended to be in contact with soil, are not acceptable. A higher level of treatment 'Permanent Wood Foundation,' is preferred, because the timbers will have the longest life. There are several types of preservative chemicals referenced in this standard. Generally, this Manual does not specify which types of treatment may be used; however, posts treated with creosote, are strongly discouraged.

22. Currently available copper-based preservatives are very corrosive to steel items embedded in, and in contact with, the treated timber. Use stainless steel fasteners, and place a permanent barrier between the meter socket and the post.

23. Other factors, affecting the durability of a pedestal installation, are the depth of burial, the surface area of the post exposed to the soil, the type of backfill material, and the compression of the backfill material. Increasing the quality of these factors will result in a pedestal that is less likely to be overturned, by forces experienced in the environment.

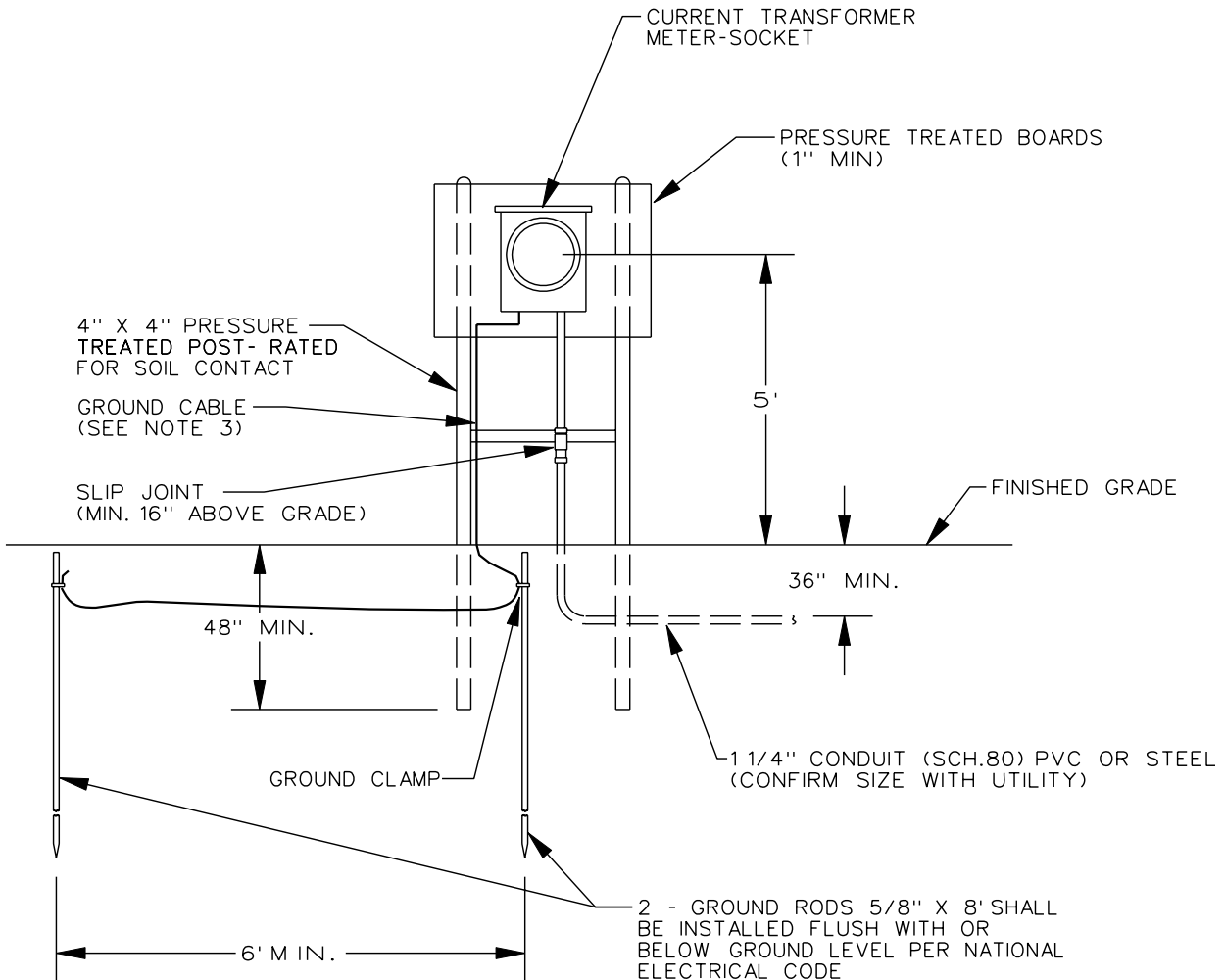
24. Supports of descriptions, other than two 4x4 pressure treated posts (rated for soil contact) and buried 48" (min.) depth, may be preferred, or allowed, by particular Utilities. The alternative supports, listed below, are examples. The Customer/Contractor may suggest other alternative methods; however, the Utility retains the right to make a determination of acceptability.

- a) Larger dimension pressure treated wood (PTW) posts
- b) Posts with a greater burial depth
- c) Single posts supporting, at most, two sockets, on opposite sides of post
- d) Concrete posts
- e) Structural fiberglass, plastic, or plastic/wood posts
- f) Rigid hot-dipped galvanized steel conduit (RGSC) (minimum 2" dia.) posts. Individual conduit supports shall not be used as both a support and as a wire conduit. The two posts shall be embedded in 8" diameter-48" depth (minimum) concrete footings. The socket's neutral bus (and the socket) shall be connected to grounding electrodes and the posts shall be bonded to the socket, by metal Unistrut socket supports. The two posts shall be capped.
- g) Manufactured metal meter pedestals, direct embedded or mounted on concrete slab
- h) Socket support of pressure treated boards, or metal Unistrut, between the two posts

Meter Pedestal Variations	Applicability by Utility							
	GM	VE	WE	LE	HE	VJ	NE	
Meter Pedestals for other than Mobile Homes	O	U	O	N	U	U	O	
Two 4"x4" PTW Posts set 48" deep	O	U	P	P	P	O	O	
Two 6"x6" PTW Posts set 48" deep	O	P	O	O	O	P	O	
One 4"x12" PTW Posts set 60" deep (2 sockets max.)	O	U	N	O	N	N	O	
One 8"x8" PTW Posts set 60" deep (2 sockets max.)	O	U	N	O	N	N	O	
Two 2" RGSC Posts set in concrete 48" deep	O	O	N	O	N	O	N	
Alternate Materials (concrete, fiberglass, etc.)	U	U	N	U	U	U	U	
Manufactured Metal Pedestal direct embedded	N	N	N	N	N	N	N	
Manufactured Metal Pedestal on concrete slab	O	O	N	O	O	O	N	
Other Supports Suggested by Customer/Contractor	U	U	N	U	U	U	U	
PTW Board Socket Support (no plywood)	O	P	O	O	O	O	O	
Unistrut Socket Support	O	O	N	O	O	O	O	

U- Utility Option, O- Customer Option, P- Preferred Option, N- Not Available as an Option

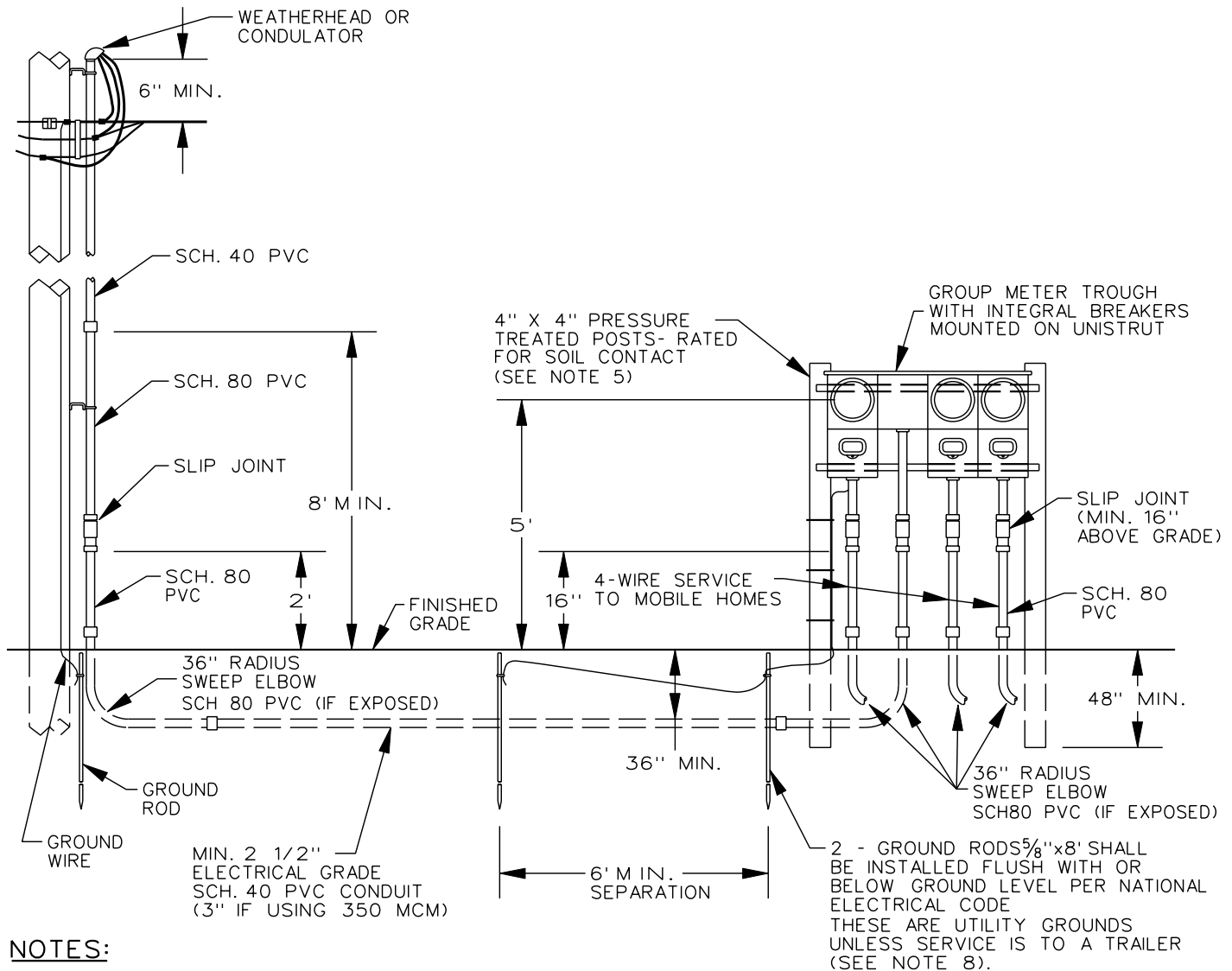
# TYPICAL METER PEDESTAL FOR CURRENT TRANSFORMER METER



## NOTES:

1. Location of the pedestal will be designated by a Utility representative.
2. 4" X 4" pressure treated wood posts shall be rated for soil contact.
3. A minimum #6 copper ground cable must be connected in the meter socket, to its own ground terminal.
4. Pedestal shall be located a minimum of 10' from pole or pad mounted transformer.

# TYPICAL MULTIPLE METER PEDESTAL



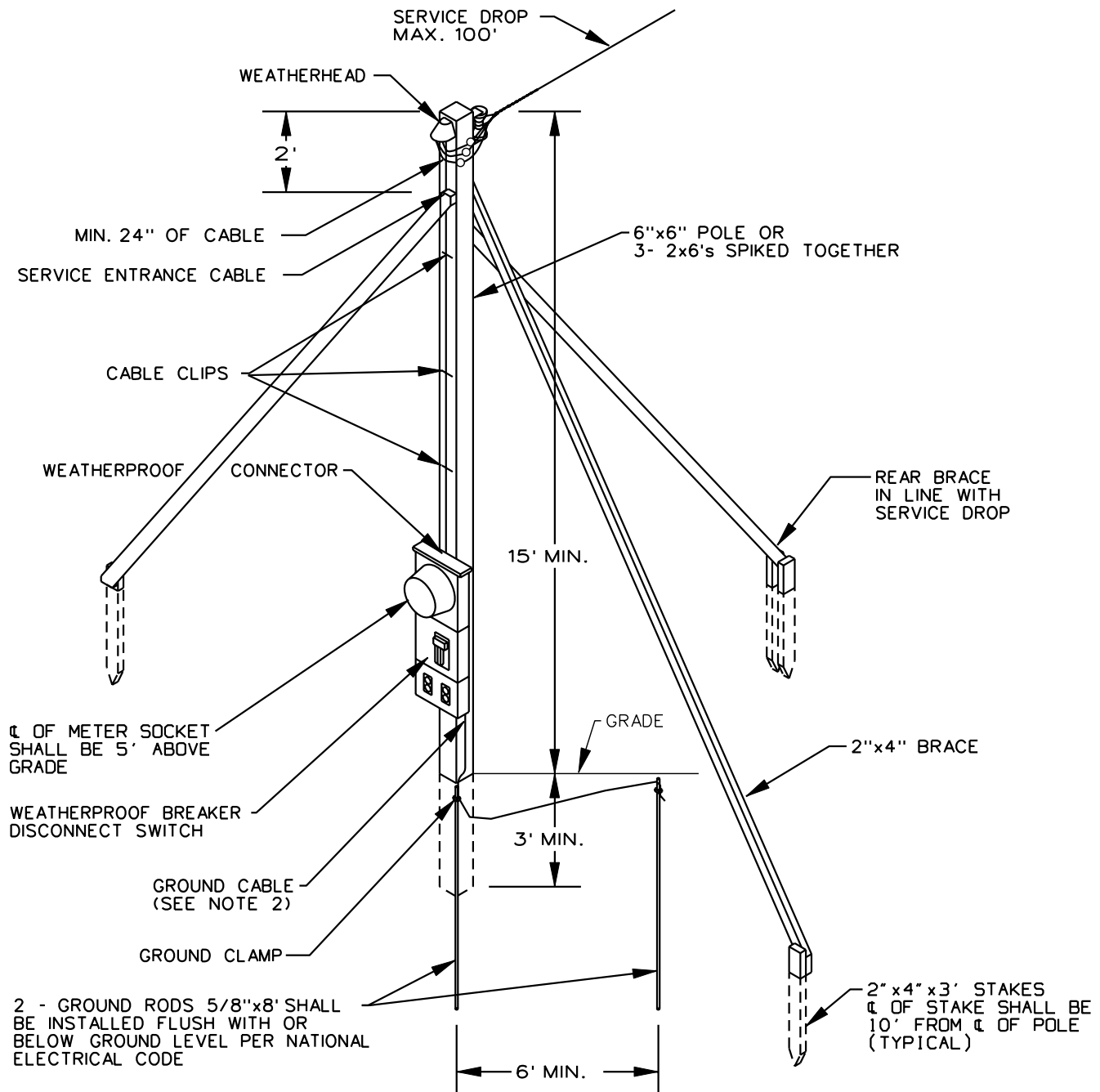
## NOTES:

1. THE LOCATION OF THE PEDESTAL WILL BE DESIGNATED BY A UTILITY REPRESENTATIVE. THERE SHALL BE NO MORE THAN 3 NINETY-DEGREE BENDS IN THE CONDUIT, INCLUDING ONE AT THE POLE/PAD AND ANOTHER AT THE PEDESTAL.
2. TRENCH SHOULD BE DUG A MINIMUM OF 18 INCHES WIDE AND 36 INCHES DEEP, TO THE TOP OF CONDUIT.
3. THE CUSTOMER SHALL SUPPLY AND INSTALL THE PEDESTAL, CONDUIT, METER SOCKET/DISCONNECT, AND GROUNDING. A PULL ROPE, HAVING A MINIMUM PULL STRENGTH OF 500 LBS. IS REQUIRED TO BE INSTALLED IN THE CONDUIT BY THE CUSTOMER IF THE UTILITY SUPPLIES THE CABLE. IF THE CUSTOMER SUPPLIES THE CABLE, IT SHALL BE INSTALLED IN THE CONDUIT, AND CONNECTED IN THE METER SOCKET.
4. A SIDE BUS BAR METER SOCKET AND 3 INCH CONDUIT ARE REQUIRED IF 350MCM CABLE IS USED.
5. 4"X4" PRESSURE TREATED WOOD POSTS SHALL BE RATED FOR SOIL CONTACT.
6. THE GROUND CABLE MUST BE CONNECTED IN THE METER SOCKET, TO ITS OWN GROUND TERMINAL. THE GROUNDING CONDUCTOR SHALL BE A MINIMUM OF #6 COPPER. TWO GROUND RODS ARE REQUIRED.
7. THE PEDESTAL SHALL BE LOCATED A MINIMUM OF 10 FEET FROM THE POLE OR PADMOUNTED TRANSFORMER; AND, IT SHALL BE A MINIMUM OF 5 FEET FROM A MOBILE HOME.
8. MOBILE HOMES AND MANUFACTURED HOMES:  
A DISCONNECT IS REQUIRED TO BE WITHIN 30 FEET OF A MOBILE HOME. FOUR WIRE SERVICES ARE REQUIRED FROM THE DISCONNECT TO THE SUBPANEL (IN THE MOBILE HOME). THE BREAKER IN THE DISCONNECT SHALL BE SIZED TO PROTECT THE FEEDER TO THE SUBPANEL. MANUFACTURED HOMES, RATED BY THE MANUFACTURER 'FOR PERMANENT FOUNDATION' MAY HAVE THE METER SOCKET MOUNTED DIRECTLY ON THE STRUCTURE.
9. WHERE SUBJECT TO STATE OR LOCAL ELECTRICAL INSPECTION, SUCH INSPECTION MUST BE MADE PRIOR TO ENERGIZATION.
10. CONDUIT CONDULATORS MAY BE REQUIRED FOR MULTI-CONDUCTOR SERVICES AND FOR CONDUCTORS OF 350MCM OR LARGER. EXERCISE CARE IN LIMITING WATER ENTRY.
11. A MARKER TAPE SHALL BE INSTALLED, ABOVE THE CONDUITS, 12 INCHES BELOW GRADE. TYPE USE CABLE SHALL BE MARKED OR LISTED SUNLIGHT RESISTANT.

VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 01-01-07
APPRVD: <i>MS</i>	DATE: 01-19-07
DRAWING No.: 206	PAGE: 1
DATA BASE No.: DTW01896e	

# TYPICAL TEMPORARY SERVICE



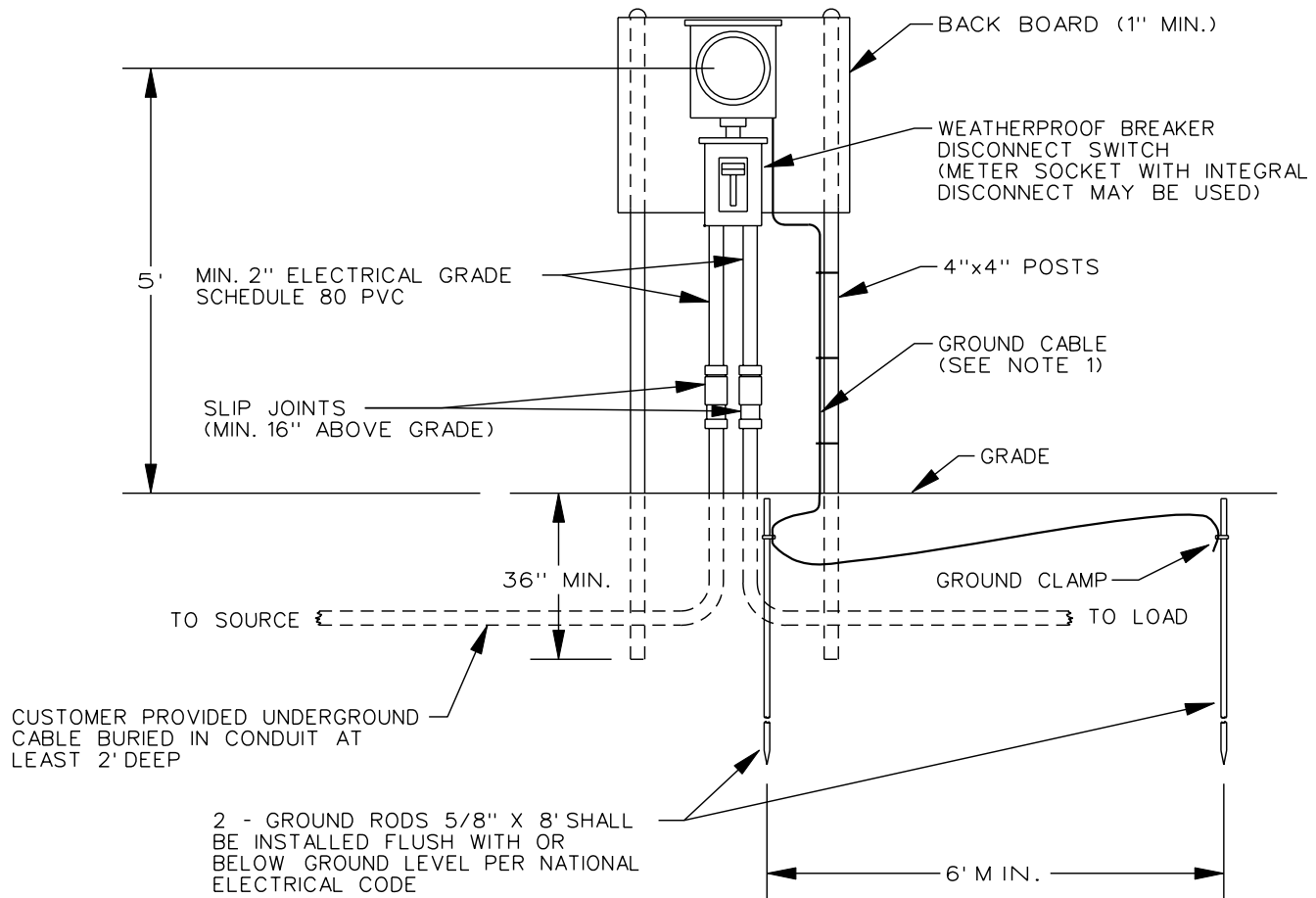
## NOTES:

1. A minimum of 18' clearance is required above all roads, streets, nonresidential driveways, parking lots and other land traversed by vehicles.
2. A minimum #6 copper ground cable must be connected in the meter socket, to its own ground terminal. The grounding electrode conductor shall be adequately protected.
3. Temporary service is limited to a six month time period unless extension is approved by Utility.
4. Rain tight service equipment, with ground fault protection and provision for locking, and all other materials and equipment to be owned and installed by customer. Utility to install meter and service drop and connect service drop at weatherhead.
5. Service location and type of construction must be approved in advance by Utility.
6. Where subject to state or local electrical inspection, such inspection must be made prior to energizing.

VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 01-01-07
APPRVD: <del>DES</del>	DATE: 01-19-07
DRAWING No.: 301	PAGE: 1
DATA BASE No.: DTW01897a	

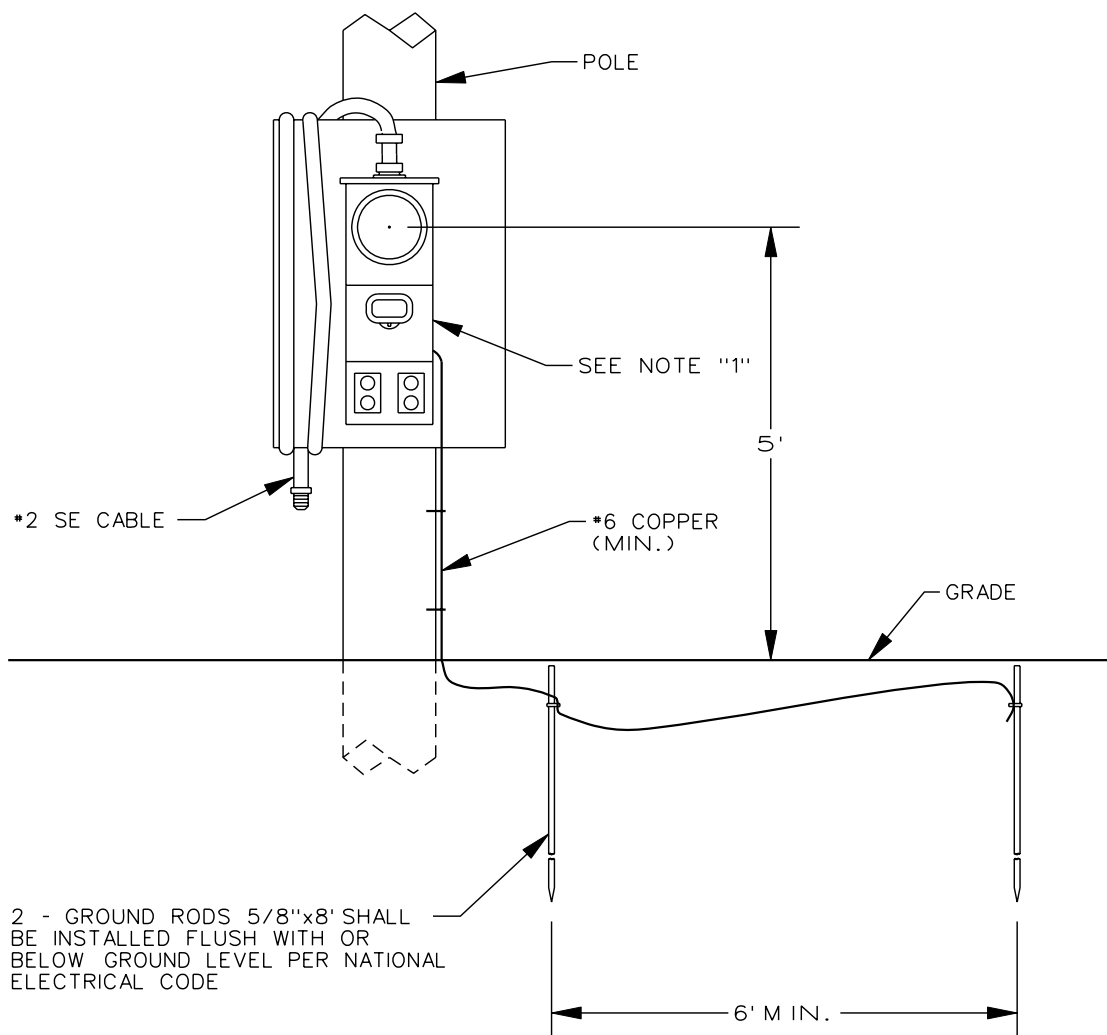
## TYPICAL TEMPORARY UNDERGROUND SERVICE



NOTES:

1. A minimum #6 copper ground cable must be connected in the meter socket to its own ground terminal. The grounding electrode conductor shall be adequately protected.
2. Temporary service is limited to six month time period unless extension is approved by Utility.
3. Rain tight service equipment, with ground fault protection (per NEC) with provision for locking. Check with local Utility as to who will supply hardware. Utility will install meter and make service connection.
4. Service location and type of construction must be approved in advance by Utility.
5. Where subject to state or local electrical inspection, such inspection must be made prior to energizing.
6. In order to limit the FAULT AMP CURRENT to less than 10,000 amps at the breaker, this pedestal shall be located a sufficient distance from the transformer. Example being 20 feet of #2 Alc. service cable.

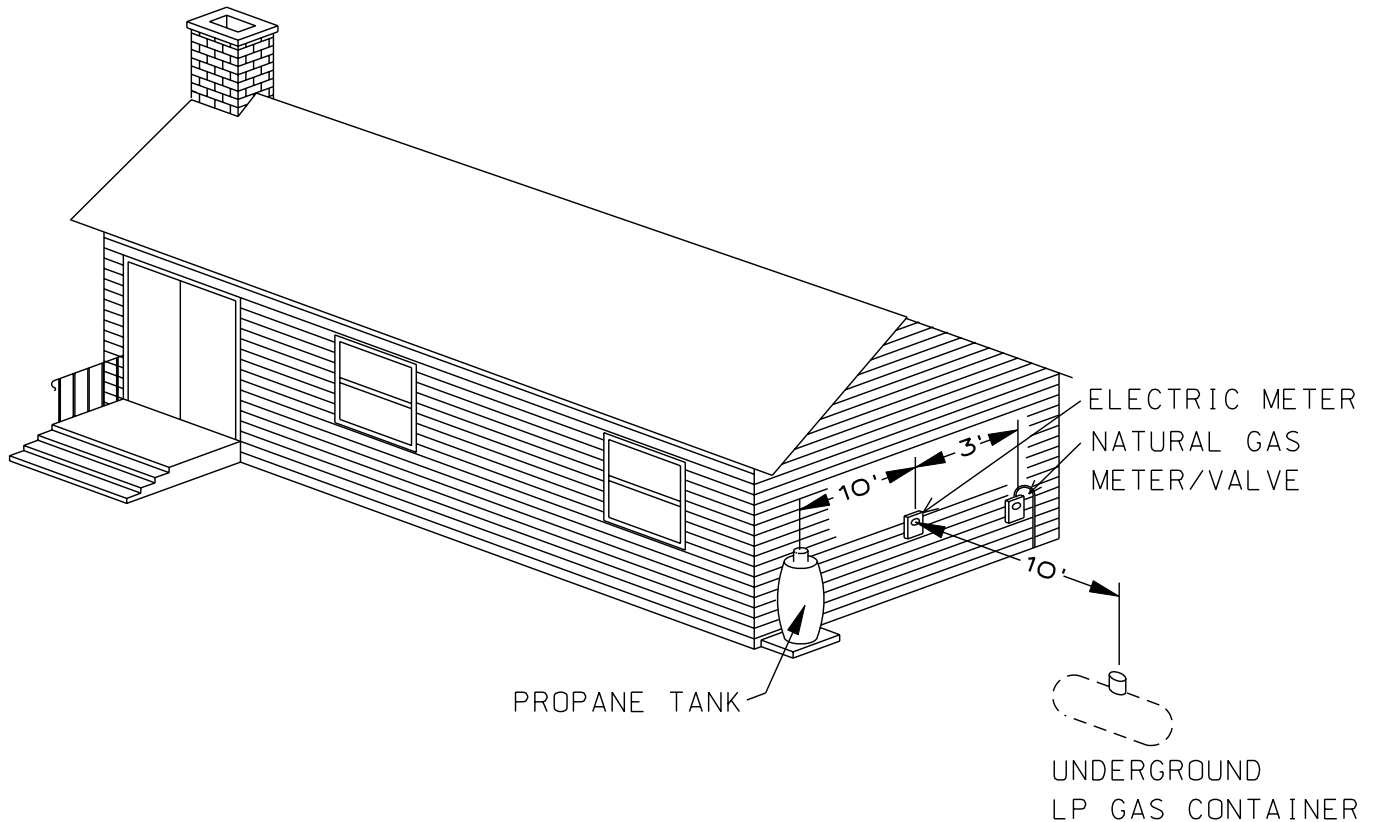
# TYPICAL TEMPORARY SERVICE



## NOTES:

1. RAIN TIGHT SERVICE EQUIPMENT WITH GROUND FAULT PROTECTION AND PROVISION FOR LOCKING SHALL BE USED AS PER NATIONAL ELECTRICAL CODE (NEC).
2. INSTALLATION AND REMOVAL OF THE SE CABLE TO THE POLE ABOVE THE LEVEL OF THE METER SOCKET MUST BE DONE BY THE UTILITY. INSTALLATION ON THE STRUCTURES OR OTHER TYPE OF CONSTRUCTION OTHER THAN ABOVE, MAY BE PERMITTED ONLY WITH ADVANCE APPROVAL OF UTILITY.
3. WHERE SUBJECT TO STATE OR LOCAL ELECTRICAL INSPECTION, SUCH INSPECTION MUST BE MADE PRIOR TO ENERGIZING.
4. CHECK WITH LOCAL UTILITY ON COST AND WHO IS TO SUPPLY TEMPORARY CONNECTION.
5. TEMPORARY SERVICE IS LIMITED TO A SIX (6) MONTH TIME PERIOD UNLESS EXTENSION IS APPROVED BY UTILITY.
6. CHECK WITH THE LOCAL UTILITY FOR THE AVAILABILITY OF THIS MOUNTING METHOD.
7. THE SEU CABLE'S LENGTH SHALL BE SUFFICIENT TO REACH JUST ABOVE THE NEUTRAL/SECONDARY.

# CLEARANCE BETWEEN ELECTRIC METERS AND L.P. OR NATURAL GAS EQUIPMENT



## NOTES:

1) NATIONAL GAS CODES<sup>1</sup> REFER TO CLEARANCE FROM SOURCES OF IGNITION FOR GAS METERS, SERVICE REGULATORS, RELIEF VALVES, FILL CONNECTIONS, VENTS DRAINS AND OTHER COMPONENTS. ELECTRIC METERS, DEPENDING ON FEATURES OF THEIR DESIGNS, MAY BE SOURCES OF IGNITION.

2) THIS STANDARD IS INTENDED TO SERVE AS A GUIDELINE IN SPECIFYING THE POINT OF ELECTRIC SERVICE WHERE LIQUID PETROLEUM OR NATURAL GAS INSTALLATIONS ARE PRESENT. THE REQUIREMENTS IN THE NFPA GAS CODES ARE INTENDED AS FIRE-PREVENTATIVE MEASURES, NOT AS ELECTRICAL REQUIREMENTS OR PERSONAL PROTECTION MEASURES. IN THIS APPLICATION WE ARE AVOIDING A GAS CODE VIOLATION WHEN LOCATING, OR RELOCATING, THE ELECTRIC SERVICE EQUIPMENT, AFTER THE GAS EQUIPMENT HAS BEEN INSTALLED.

3) MAINTAIN THE FOLLOWING CLEARANCES:

- A) INSIDE INSTALLATIONS SHOULD MAINTAIN CLEARANCE OF NOT LESS THAN: 3.0 FT.
- B) OUTSIDE INSTALLATIONS SHOULD MAINTAIN CLEARANCE SHOWN ON FIGURE SHOWN ABOVE.
- C) AN LP GAS REGULATOR, MOUNTED ON THE BUILDING SHOULD MAINTAIN A CLEARANCE OF 5.0 FT.

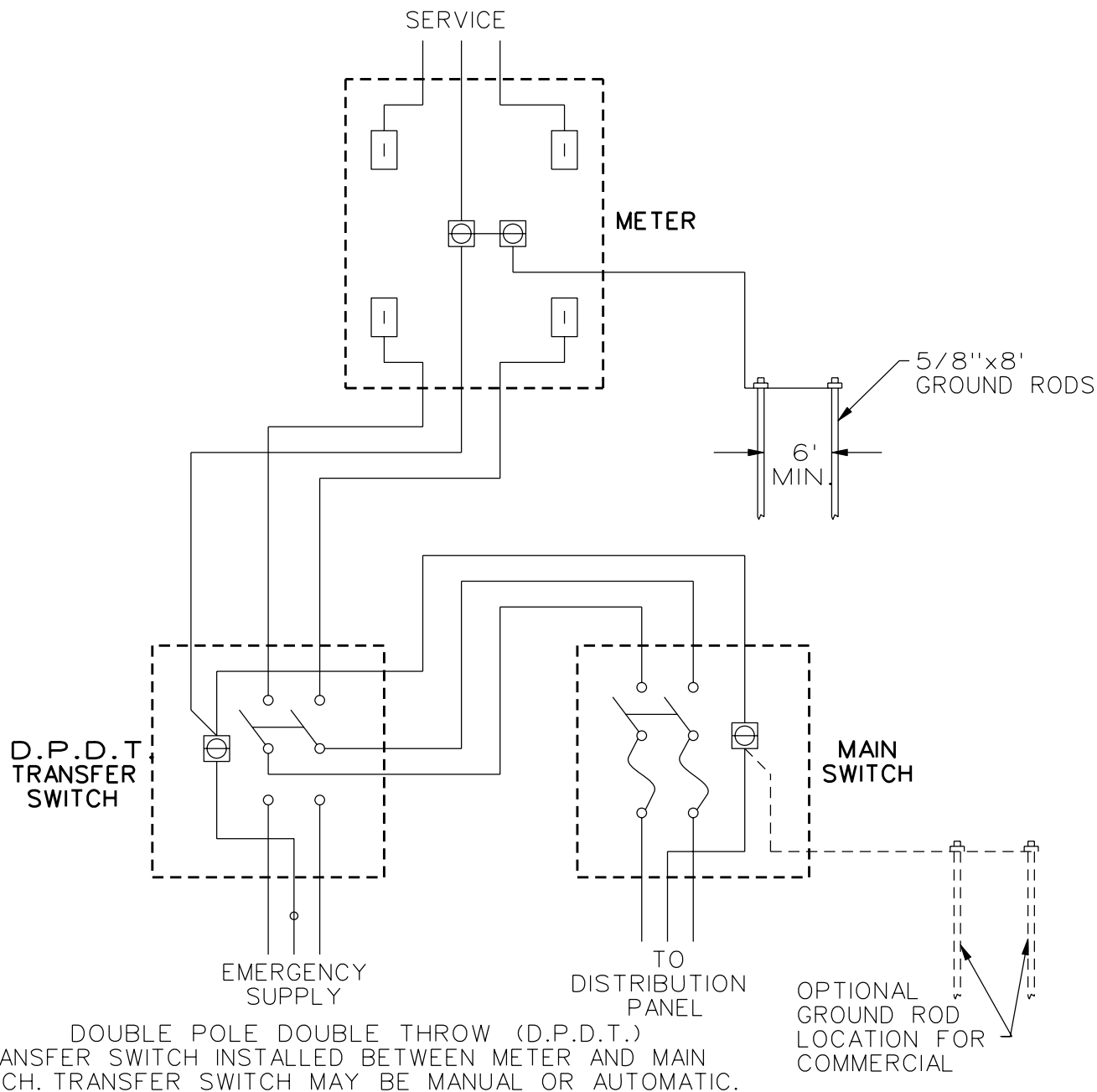
1. NFPA-54 (NATIONAL FUEL GAS CODE), NFPA-58 (L.P. GASES), AND 49CFR SUBPART H (FOR NATURAL GAS).

VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: LAW	DATE: 01-01-07
APPRVD: <i>YES</i>	DATE: 01-19-07
DRAWING No.: 401	PAGE: 1
DATA BASE No.: DTW01900c	

# TYPICAL SWITCHING OF CUSTOMER'S EMERGENCY SUPPLY

## THREE WIRE, SINGLE PHASE SERVICE



DOUBLE POLE DOUBLE THROW (D.P.D.T.)  
TRANSFER SWITCH INSTALLED BETWEEN METER AND  
MAIN SWITCH. TRANSFER SWITCH MAY BE MANUAL OR AUTOMATIC.

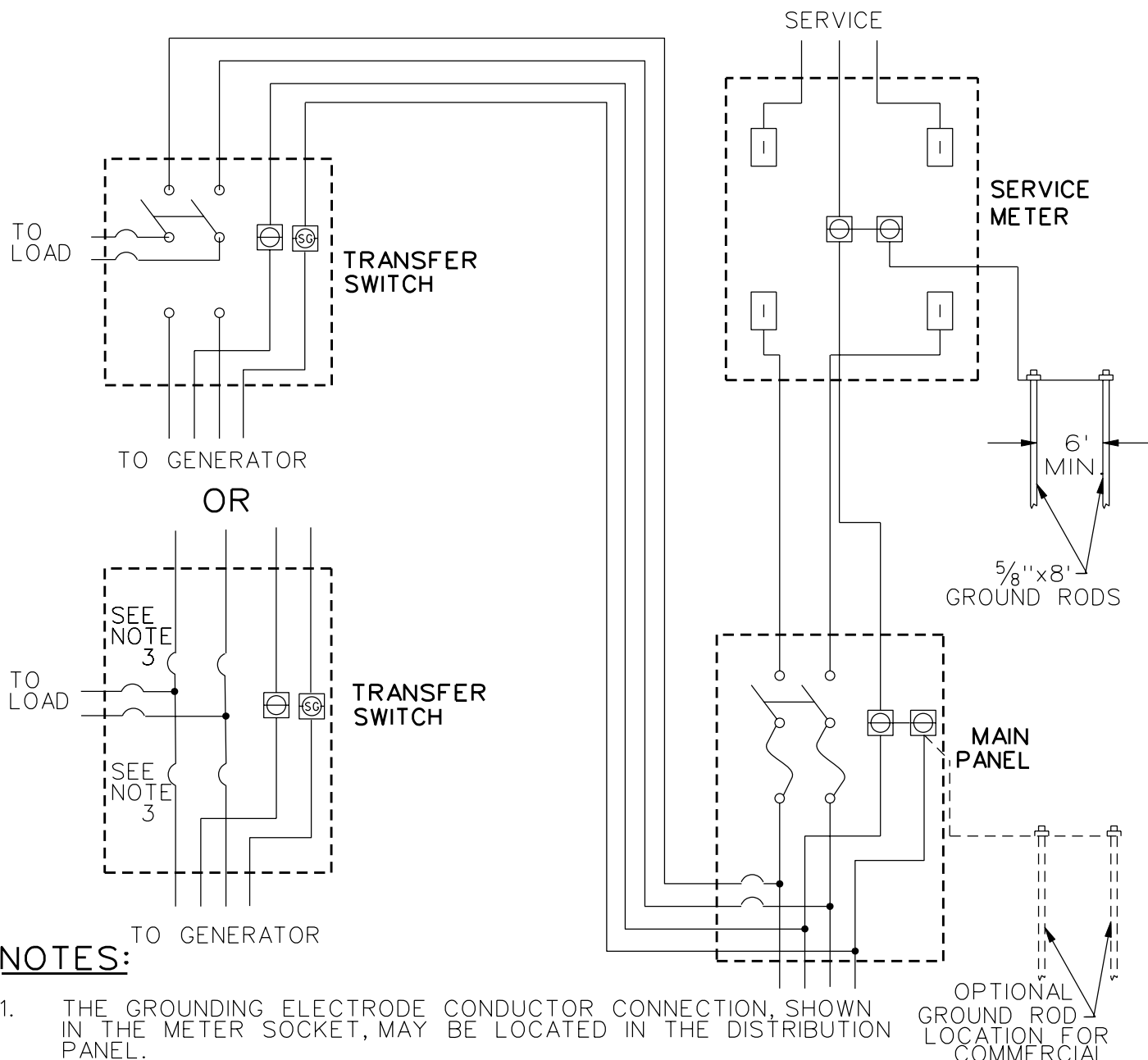
### NOTES:

1. THE TRANSFER SWITCH SHALL BE LISTED AS SERVICE EQUIPMENT. OR, IT MAY JUST BE LISTED, WITH A MAIN DISCONNECT BEFORE THE SWITCH.
2. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE DISTRIBUTION PANEL.
3. COMMERCIALLY AVAILABLE STANDBY GENERATORS MAY BE WIRED WITH THE SAFETY GROUND BONDED TO THE NEUTRAL. IF SO, REMOVE THE BOND, OR WIRE THE TRANSFER SWITCH AS A SEPARATELY DERIVED SOURCE.
4. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.



# TYPICAL SWITCHING OF CUSTOMER'S EMERGENCY SUPPLY - ALTERNATE CONNECTION

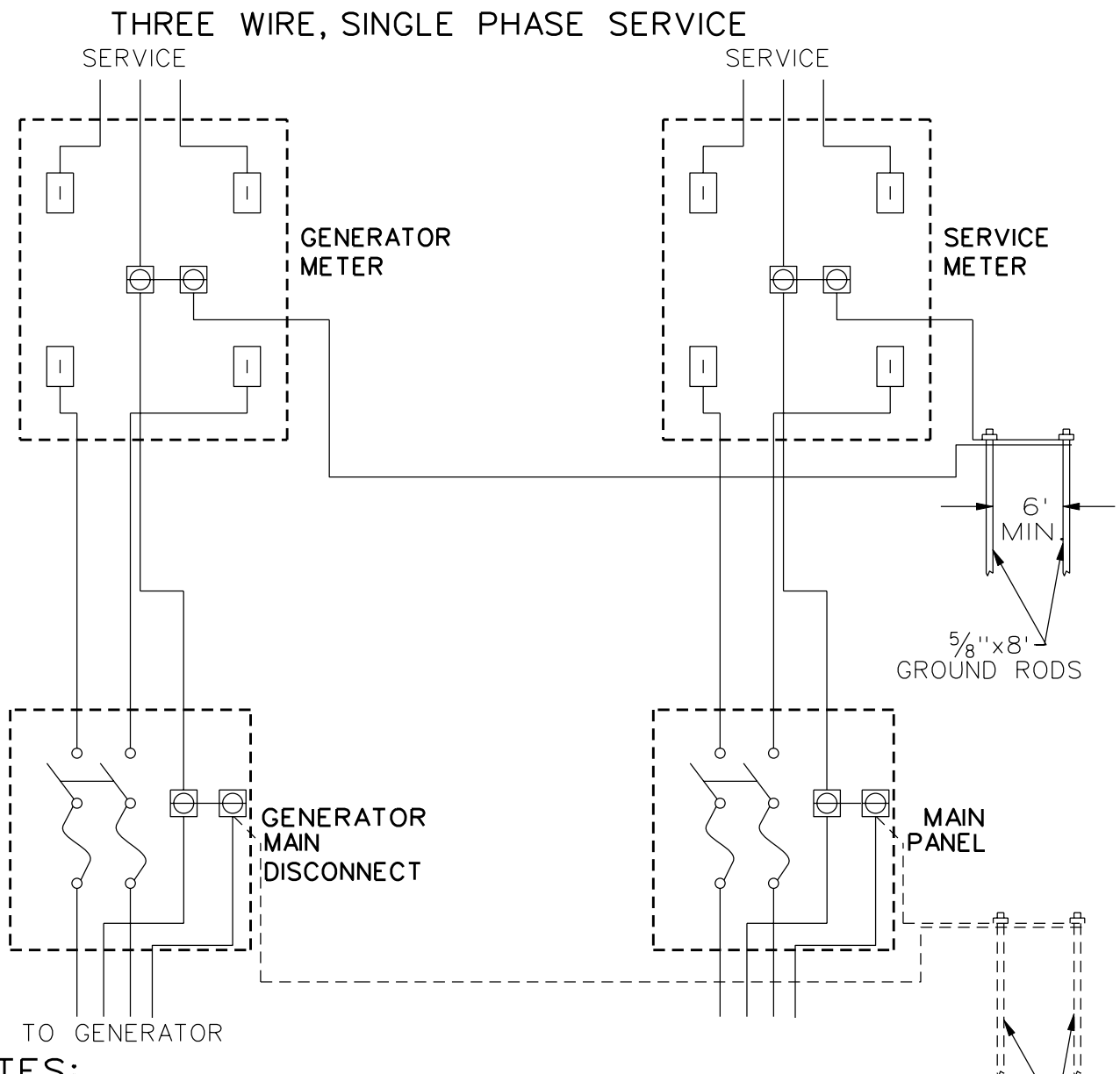
## THREE WIRE, SINGLE PHASE SERVICE



### NOTES:

1. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE DISTRIBUTION PANEL.
2. COMMERCIALLY AVAILABLE STANDBY GENERATORS MAY BE WIRED WITH THE SAFETY GROUND BONDED TO THE NEUTRAL. IF SO, REMOVE THE BOND.
3. THE SCHEMATIC REPRESENTS A DEVICE WITH TWO BREAKERS THAT ARE MECHANICALLY LINKED SUCH THAT ONE OF THE PAIR IS ALWAYS OPEN. CHECK WITH YOUR UTILITY WHETHER SUCH A DEVICE IS ACCEPTABLE. IF SUCH DEVICES ARE ACCEPTABLE THEY SHALL NOT BE EASILY DISABLED OR BROKEN (ALLOWING THE TWO SOURCES TO BE INTERCONNECTED).
4. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.

# GENERATION IN PARALLEL WITH UTILITY SYSTEM NON-NET METERING WITH ENERGY SALES CONTRACT



## NOTES:

1. THE GENERATOR METER AND GENERATOR MAIN DISCONNECT SHALL BE LOCATED WITHIN TEN FEET OF, AND IN VIEW OF, THE SERVICE METER.
2. THE GENERATOR DISCONNECT SHALL BE MARKED 'GENERATOR DISCONNECT SWITCH' WITH PERMANENT LETTERS A MINIMUM OF 3/8" HIGH. THE DISCONNECT SWITCH MUST BE LOCKABLE IN THE OPEN POSITION, WITH A STANDARD UTILITY PADLOCK WITH A 3/8" SHANK. THE DISCONNECT SHALL BE LISTED AS SERVICE EQUIPMENT.
3. THE GENERATOR METER WILL BE EITHER DUAL BACK-TO-BACK METERS, WITH DETENTED REGISTERS, OR, A SINGLE METER WITH DUAL REGISTERS.
4. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE MAIN PANEL ON COMMERCIAL INSTALLATIONS. SEE PARAGRAPH 707A.
5. LOW VOLTAGE THREE-PHASE INSTALLATIONS ARE TO BE CONSTRUCTED SIMILARLY.
6. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.

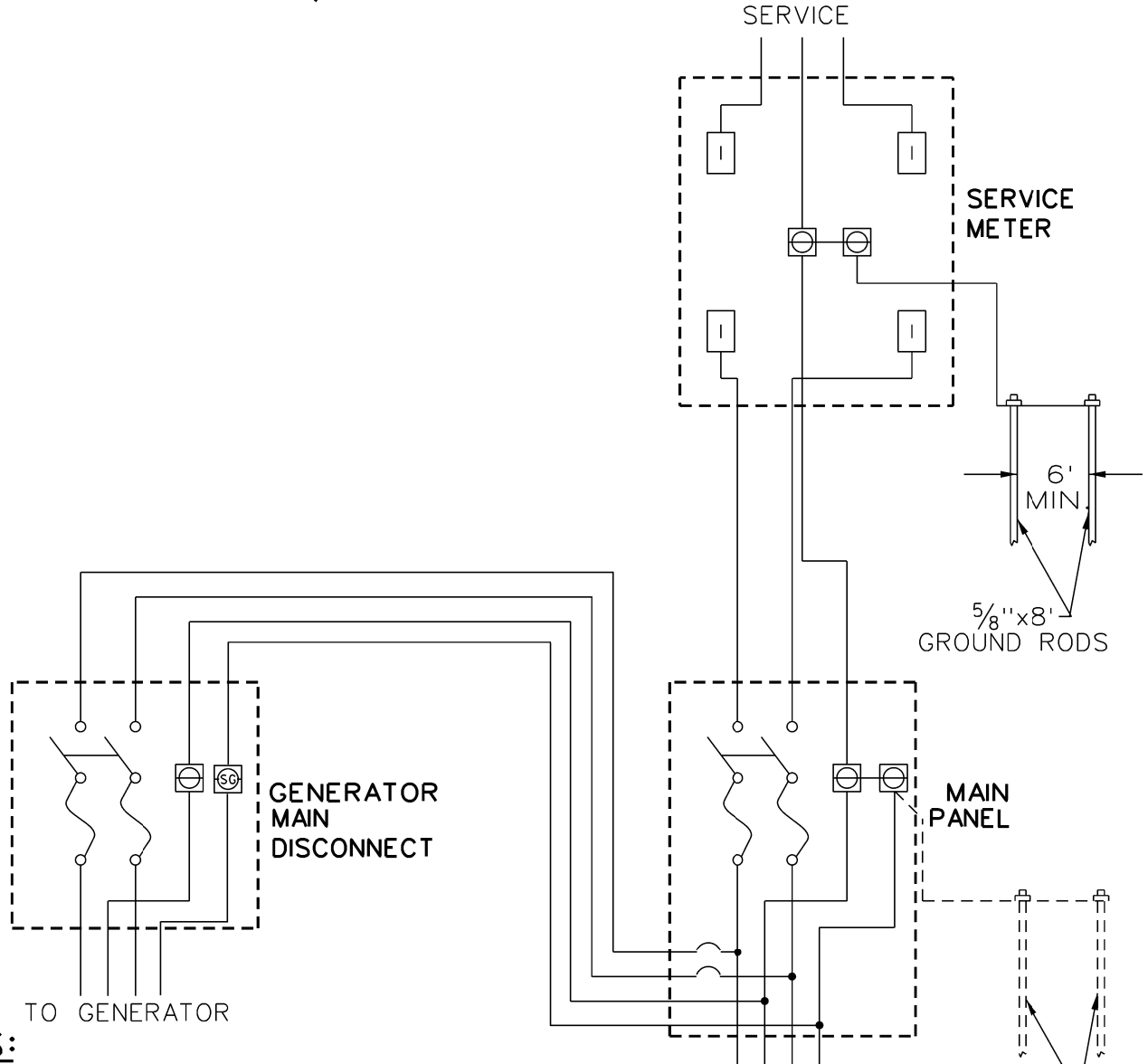
VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: PSM	DATE: 01-08-09
APPRVD: <del>MS</del>	DATE: 01-08-09
DRAWING No.: 403	PAGE: 1
DATA BASE No.: DTW01905b	

DRAWINGS/STANDARD/VERMONT

# GENERATION IN PARALLEL WITH UTILITY SYSTEM NON-NET METERING - PEAK SHAVING

## THREE WIRE, SINGLE PHASE SERVICE



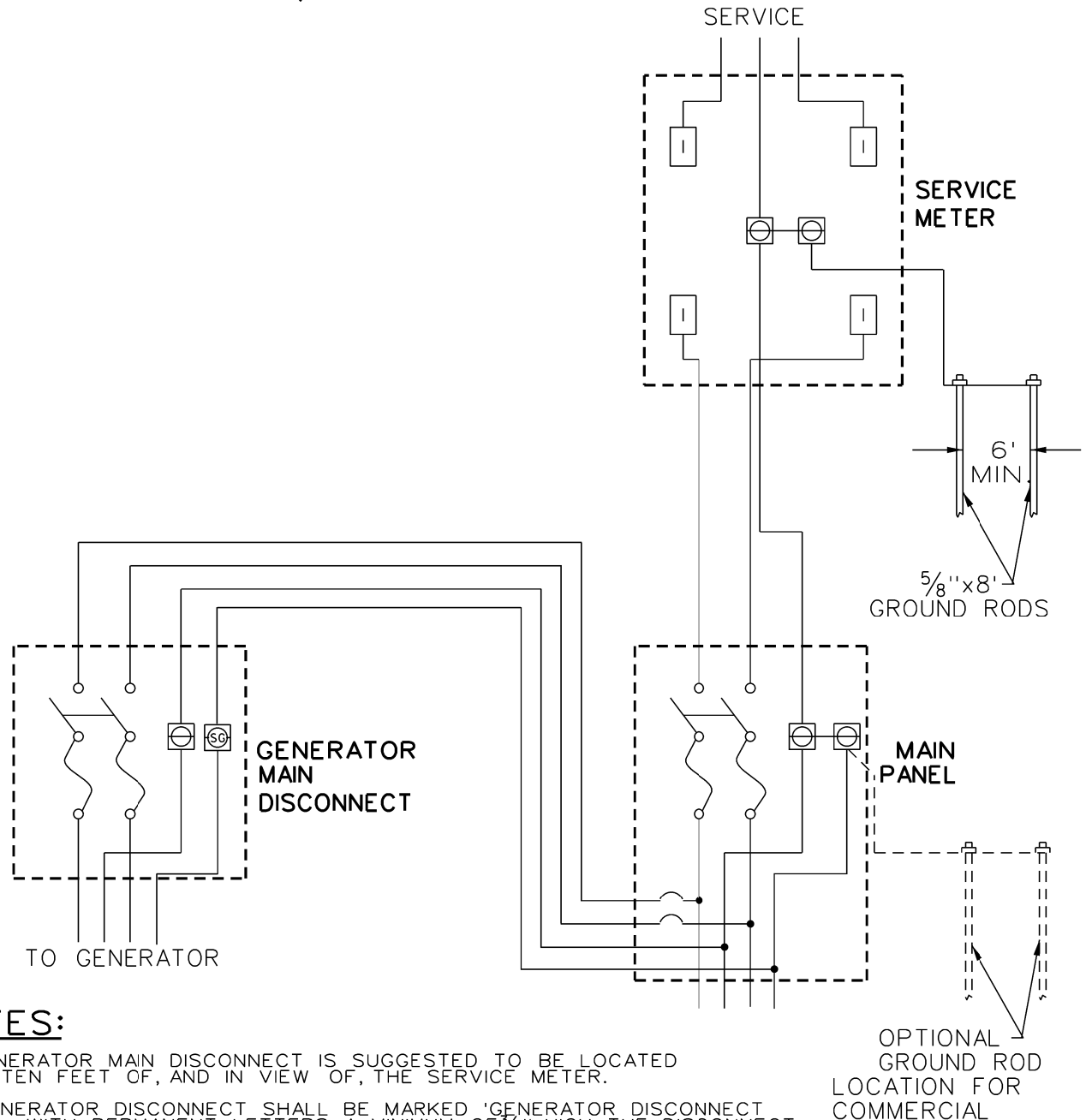
### NOTES:

1. THE GENERATOR METER AND GENERATOR MAIN DISCONNECT SHALL BE LOCATED WITHIN TEN FEET OF, AND IN VIEW OF, THE SERVICE METER.
2. THE GENERATOR DISCONNECT SHALL BE MARKED 'GENERATOR DISCONNECT SWITCH' WITH PERMANENT LETTERS A MINIMUM OF  $\frac{3}{8}$ " HIGH. THE DISCONNECT SWITCH MUST BE LOCKABLE IN THE OPEN POSITION, WITH A STANDARD UTILITY PADLOCK WITH A  $\frac{3}{8}$ " SHANK. THE DISCONNECT SHALL BE LISTED AS SERVICE EQUIPMENT.
3. THE SERVICE METER WILL HAVE A DETENTED REGISTER THAT WILL ONLY MEASURE DELIVERED ELECTRICITY; OR, IT SHALL HAVE TWO SEPARATE INTERNAL REGISTERS. THE INSTALLATION WILL USED BY A CUSTOMER THAT WILL NOT SUPPLY ELECTRICITY, BUT WILL PEAK SHAVE.
4. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE MAIN PANEL ON COMMERCIAL INSTALLATIONS. SEE PARAGRAPH 707A.
5. LOW VOLTAGE THREE-PHASE INSTALLATIONS ARE TO BE CONSTRUCTED SIMILARLY.
6. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.

OPTIONAL  
GROUND ROD  
LOCATION FOR  
COMMERCIAL

# GENERATION IN PARALLEL WITH UTILITY SYSTEM NET METERING - RECOMMENDED CONNECTION

## THREE WIRE, SINGLE PHASE SERVICE



### NOTES:

1. THE GENERATOR MAIN DISCONNECT IS SUGGESTED TO BE LOCATED WITHIN TEN FEET OF, AND IN VIEW OF, THE SERVICE METER.
2. THE GENERATOR DISCONNECT SHALL BE MARKED 'GENERATOR DISCONNECT SWITCH' WITH PERMANENT LETTERS A MINIMUM OF  $\frac{3}{8}$ " HIGH. THE DISCONNECT SWITCH MUST BE LOCKABLE IN THE OPEN POSITION, WITH A STANDARD UTILITY PADLOCK WITH A  $\frac{3}{8}$ " SHANK.
3. THE SERVICE METER WILL HAVE A DETENTED REGISTER THAT WILL MEASURE DELIVERED ELECTRICITY MINUS ANY GENERATED ENERGY; OR, IT SHALL HAVE TWO SEPARATE INTERNAL REGISTERS.
4. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE MAIN PANEL ON COMMERCIAL INSTALLATIONS. SEE PARAGRAPH 707A.
5. LOW VOLTAGE THREE-PHASE INSTALLATIONS ARE TO BE CONSTRUCTED SIMILARLY.
6. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.
7. CHECK WITH YOUR LOCAL UTILITY, IN CERTAIN CIRCUMSTANCES THE DISCONNECT MAY NOT BE REQUIRED.

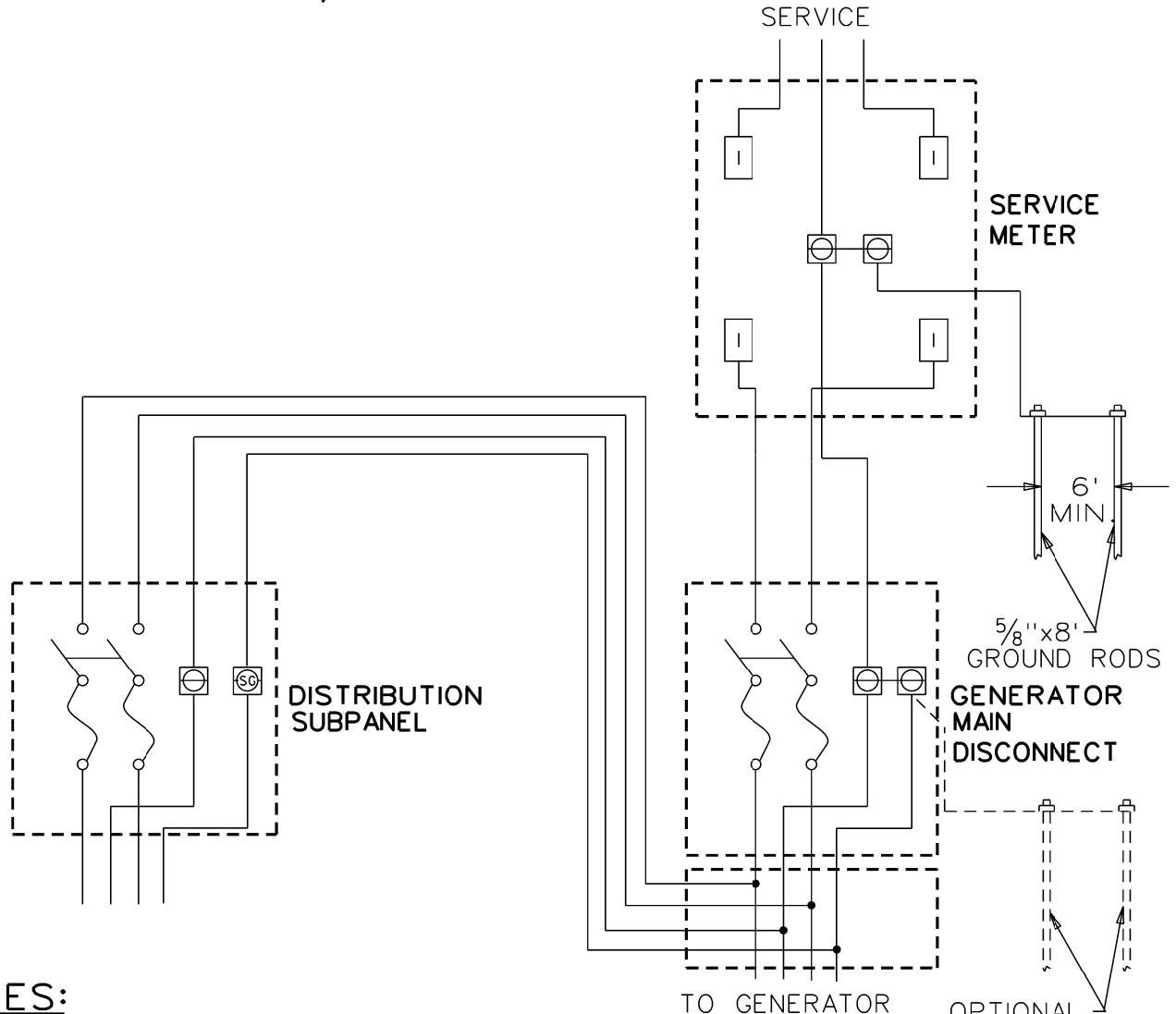
VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: PSM	DATE: 11-11-12
APPRVD: JES	DATE: 11-11-12
DRAWING No.: 405	PAGE: 1
DATA BASE No.: DTW01907d	

DRAWINGS/STANDARD/VERMONT

# GENERATION IN PARALLEL WITH UTILITY SYSTEM NET METERING - ALTERNATE CONNECTION

## THREE WIRE, SINGLE PHASE SERVICE



### NOTES:

1. THE GENERATOR MAIN DISCONNECT IS SUGGESTED TO BE LOCATED WITHIN TEN FEET OF, AND IN VIEW OF, THE SERVICE METER.
2. THE GENERATOR DISCONNECT SHALL BE MARKED 'GENERATOR DISCONNECT SWITCH' WITH PERMANENT LETTERS A MINIMUM OF  $\frac{3}{8}$ " HIGH. THE DISCONNECT SWITCH MUST BE LOCKABLE IN THE OPEN POSITION, WITH A STANDARD UTILITY PADLOCK WITH A  $\frac{3}{8}$ " SHANK. THE DISCONNECT SHALL BE LISTED AS SERVICE EQUIPMENT.
3. THE SERVICE METER WILL HAVE A DETENTED REGISTER THAT WILL MEASURE DELIVERED ELECTRICITY MINUS ANY GENERATED ENERGY; OR, IT SHALL HAVE TWO SEPARATE INTERNAL REGISTERS.
4. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE MAIN PANEL ON COMMERCIAL INSTALLATIONS. SEE PARAGRAPH 707A.
5. LOW VOLTAGE THREE-PHASE INSTALLATIONS ARE TO BE CONSTRUCTED SIMILARLY.
6. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.
7. CHECK WITH YOUR LOCAL UTILITY, IN CERTAIN CIRCUMSTANCES THE DISCONNECT MAY NOT BE REQUIRED.
8. THE ALTERNATE CONNECTION IS NOT RECOMMENDED. SERVICE WILL BE DISCONTINUED WHEN THE LINECREW TAKES CLEARANCE FOR HOT-LINE WORK.

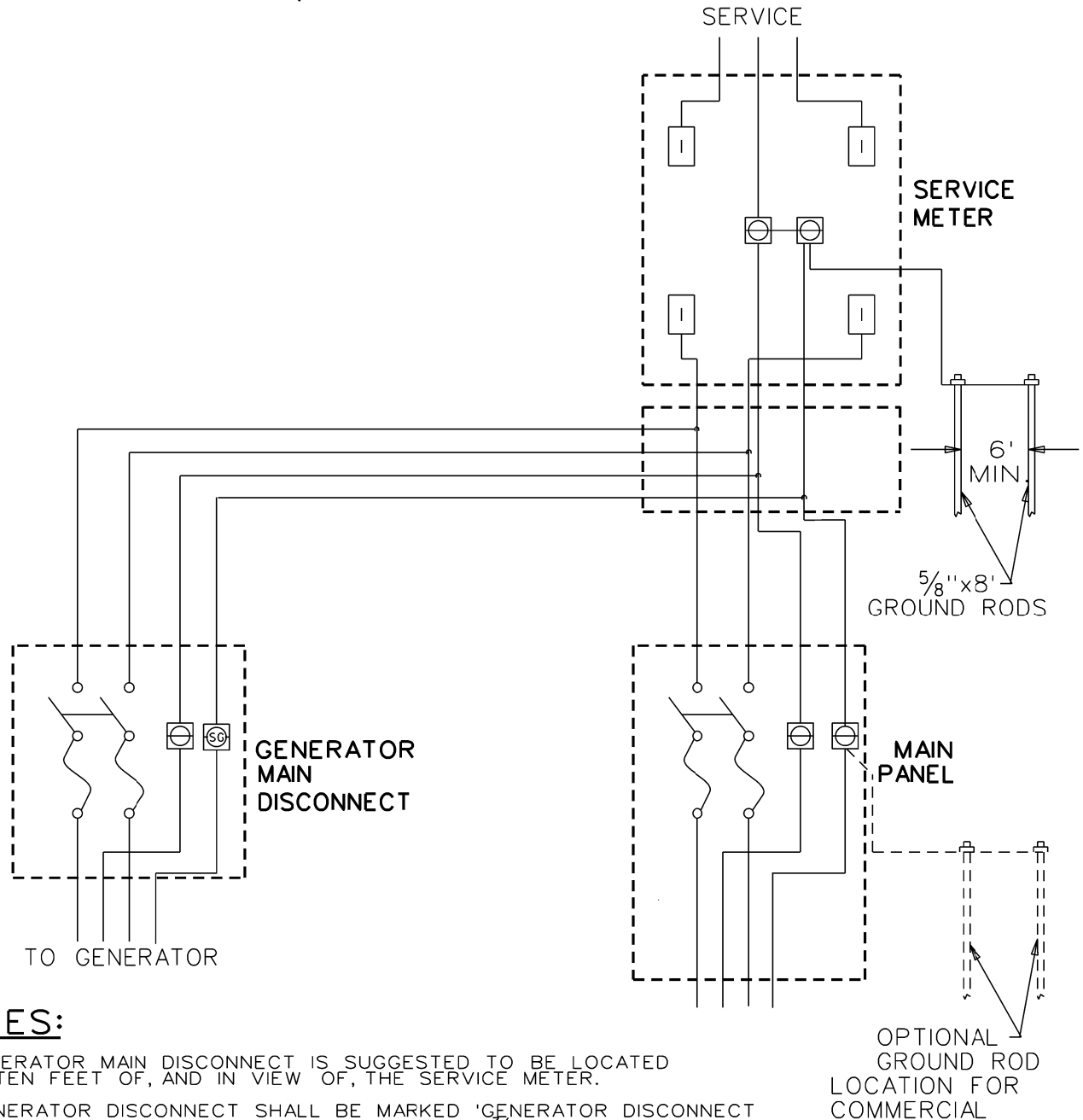
VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

DRAWN: PSM	DATE: 11-11-12
APPRVD: JES	DATE: 11-11-12
DRAWING No.: 406	PAGE: 1
DATA BASE No.: DTW01908d	

DRAWINGS/STANDARD/VERMONT

# GENERATION IN PARALLEL WITH UTILITY SYSTEM NET METERING - ALTERNATE CONNECTION

## THREE WIRE, SINGLE PHASE SERVICE



### NOTES:

1. THE GENERATOR MAIN DISCONNECT IS SUGGESTED TO BE LOCATED WITHIN TEN FEET OF, AND IN VIEW OF, THE SERVICE METER.
2. THE GENERATOR DISCONNECT SHALL BE MARKED 'GENERATOR DISCONNECT SWITCH' WITH PERMANENT LETTERS A MINIMUM OF  $\frac{3}{8}$ " HIGH. THE DISCONNECT SWITCH MUST BE LOCKABLE IN THE OPEN POSITION, WITH A STANDARD UTILITY PADLOCK WITH A  $\frac{3}{8}$ " SHANK.
3. THE SERVICE METER WILL HAVE A DETENTED REGISTER THAT WILL MEASURE DELIVERED ELECTRICITY MINUS ANY GENERATED ENERGY; OR, IT SHALL HAVE TWO SEPARATE INTERNAL REGISTERS.
4. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE MAIN PANEL ON COMMERCIAL INSTALLATIONS. SEE PARAGRAPH 707A.
5. LOW VOLTAGE THREE-PHASE INSTALLATIONS ARE TO BE CONSTRUCTED SIMILARLY.
6. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.
7. CHECK WITH YOUR LOCAL UTILITY, IN CERTAIN CIRCUMSTANCES THE DISCONNECT MAY NOT BE REQUIRED.

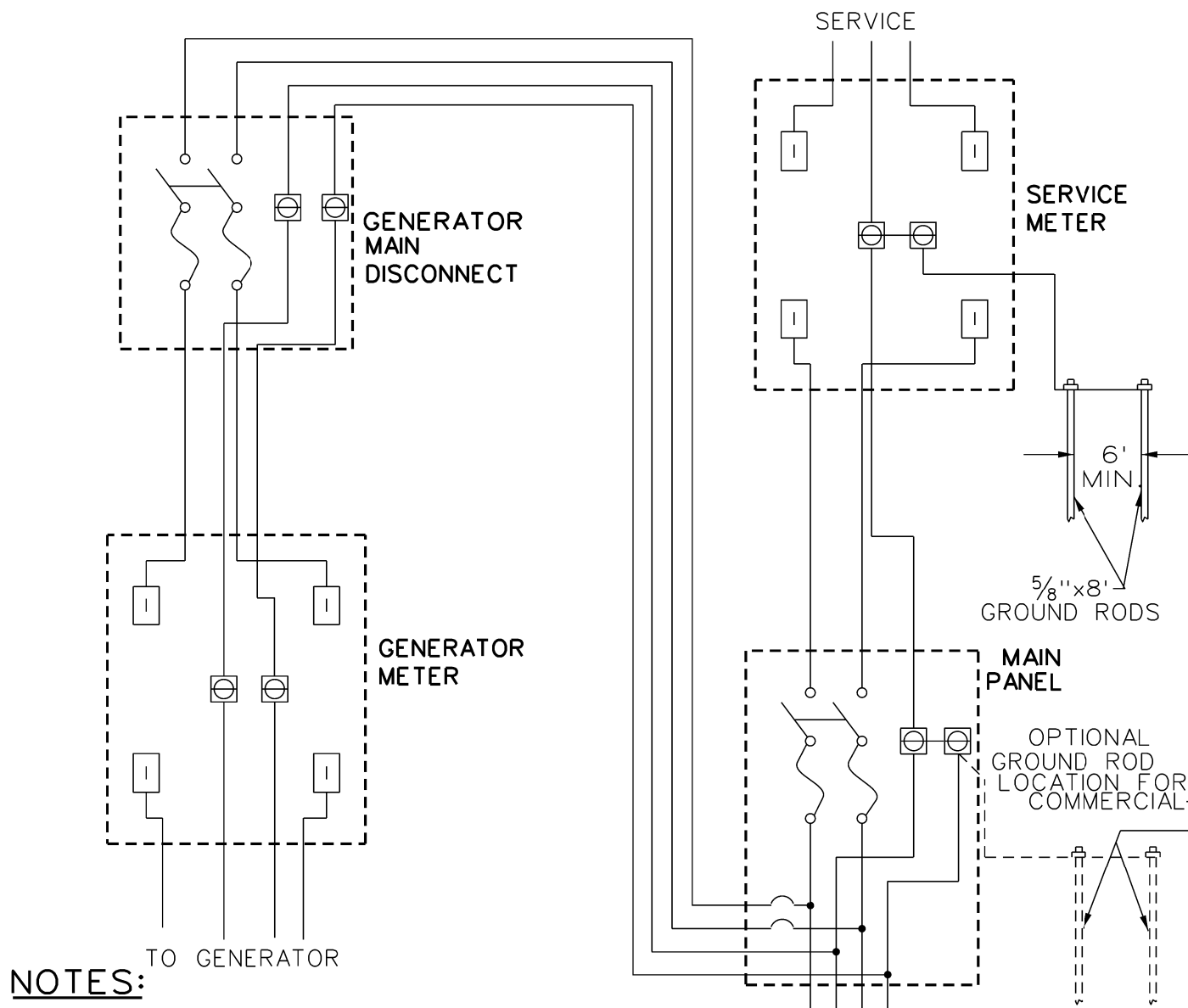
VERMONT UTILITIES  
ELECTRIC SERVICE REQUIREMENTS

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APPRVD: <i>MS</i>	DATE: 11-11-12
DRAWING No.: 407	PAGE: 1
DATA BASE No.: DTW01910b	

DRAWINGS/STANDARD/VERMONT

# GENERATION IN PARALLEL WITH UTILITY SYSTEM NET METERING - WITH GENERATION METER

## THREE WIRE, SINGLE PHASE SERVICE



### NOTES:

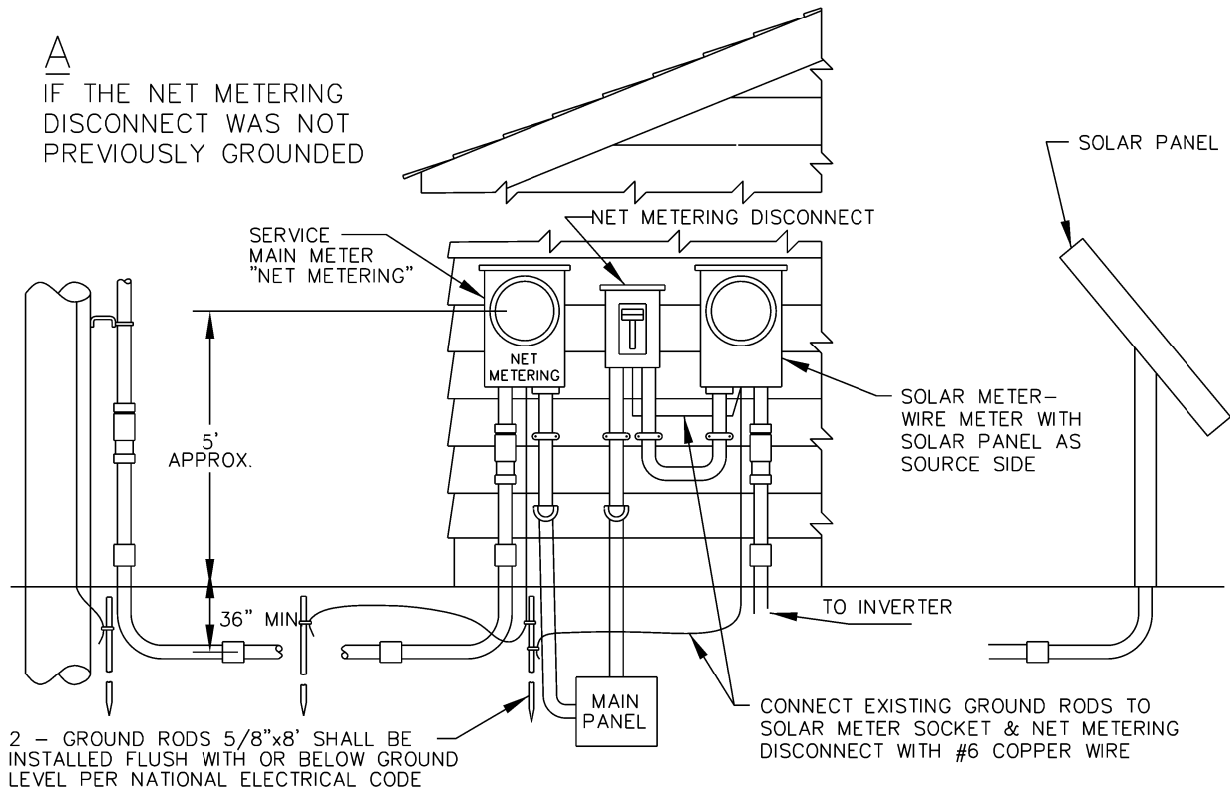
1. THE GENERATOR MAIN DISCONNECT IS SUGGESTED TO BE LOCATED WITHIN TEN FEET OF, AND IN VIEW OF, THE SERVICE METER.
2. THE GENERATOR DISCONNECT SHALL BE MARKED 'GENERATOR DISCONNECT SWITCH' WITH PERMANENT LETTERS A MINIMUM OF  $\frac{3}{8}$ " HIGH. THE DISCONNECT SWITCH MUST BE LOCKABLE IN THE OPEN POSITION, WITH A STANDARD UTILITY PADLOCK WITH A  $\frac{3}{8}$ " SHANK.
3. THE SERVICE METER WILL HAVE A DETENTED REGISTER THAT WILL MEASURE DELIVERED ELECTRICITY MINUS ANY GENERATED ENERGY; OR, IT SHALL HAVE TWO SEPARATE INTERNAL REGISTERS.
4. THE GROUNDING ELECTRODE CONDUCTOR CONNECTION, SHOWN IN THE METER SOCKET, MAY BE LOCATED IN THE MAIN PANEL ON COMMERCIAL INSTALLATIONS. SEE PARAGRAPH 707A.
5. LOW VOLTAGE THREE-PHASE INSTALLATIONS ARE TO BE CONSTRUCTED SIMILARLY.
6. METALLIC ENCLOSURES WITHIN ARM'S REACH SHALL BE BONDED TOGETHER IN SUCH A WAY TO PREVENT THE BONDING CONDUCTOR FROM CARRYING RETURN CURRENT.
7. CHECK WITH YOUR LOCAL UTILITY, IN CERTAIN CIRCUMSTANCES THE DISCONNECT MAY NOT BE REQUIRED.

# GENERATION IN PARALLEL WITH UTILITY SYSTEM NET METERING - WITH GENERATION METER

THIS SPECIFICATION SHOWS AN UNDERGROUND SERVICE WITH THE SOLAR METER LOCATED NEXT TO THE MAIN SERVICE METER. OTHER CONFIGURATIONS ARE POSSIBLE, BUT THE SOLAR METER MUST BE ELECTRICALLY CONNECTED ON THE UTILITY GRID SIDE OF THE INVERTER WITH THE SOLAR PANEL AS ITS SOURCE. CHECK WITH YOUR LOCAL UTILITY FOR MORE INFORMATION.

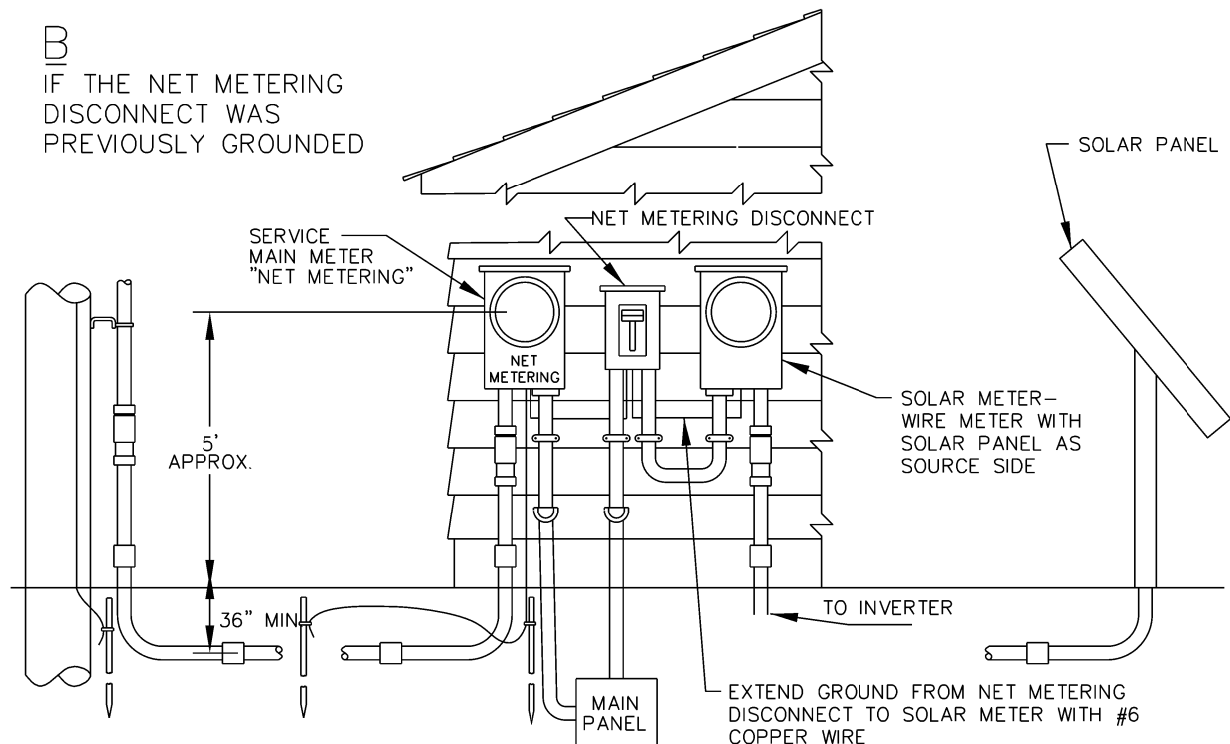
A

IF THE NET METERING  
DISCONNECT WAS NOT  
PREVIOUSLY GROUNDING



B

IF THE NET METERING  
DISCONNECT WAS  
PREVIOUSLY GROUNDING





## CUSTOMER LOAD DATA

CUSTOMER'S NAME

ADDRESS

TELEPHONE NO.

CONTRACTOR'S NAME

ADDRESS

TELEPHONE NO.

ELECTRICIAN'S NAME

ADDRESS

TELEPHONE NO.

LOCATION

SERVICE ADDRESS

PROSPECTIVE NEW CUSTOMER

PROSPECTIVE INCREASE LOAD

### BUILDING INFORMATION

Building Use: \_\_\_\_\_ Expected Hours of Operation \_\_\_\_\_ Square Footage \_\_\_\_\_ Shifts \_\_\_\_\_

### SERVICE INFORMATION

Existing Service Amps \_\_\_\_\_ Volts \_\_\_\_\_ Phase \_\_\_\_\_ WireSize \_\_\_\_\_ Wire#Runs \_\_\_\_\_ 3-Wire ☐ 4-Wire ☐ CU ☐ AL ☐

Service Desired Amps \_\_\_\_\_ Volts \_\_\_\_\_ Phase \_\_\_\_\_ WireSize \_\_\_\_\_ Wire#Runs \_\_\_\_\_ 3-Wire ☐ 4-Wire ☐ CU ☐ AL ☐

Date Service Desired \_\_\_\_\_ Number of Existing Meters \_\_\_\_\_ Number of New Meters \_\_\_\_\_

Size of Main Panel \_\_\_\_\_ Amps \_\_\_\_\_ Rate Classification \_\_\_\_\_

Metering Requirements \_\_\_\_\_ Load Management? Yes No

Request Fault Current ? No Yes (Submit request form)

### CONNECTED LOADS

		Existing	New/Increase			Existing	New/Increase
Air Conditioning	HP/TONS	_____	_____	Motor Load	HP	_____	_____
Cooking Equipment	KW	_____	_____	Refrigeration	KW	_____	_____
Heating Load	KW	_____	_____	Storage Heat	KW	_____	_____
Lighting Load	KW	_____	_____	Water Heating	KW	_____	_____
Receptacles	KW	_____	_____	Special Equip. (Welder, X-Ray, Etc.)	KW	_____	_____
Miscellaneous	KW	_____	_____				
Total Connected				Estimated Demand			KW

Emergency Generator No Yes Size \_\_\_\_\_ Switch Type \_\_\_\_\_

List all individual motors over 5 HP (Circle those included above) \_\_\_\_\_

(Single phase motors over 5 HP and three phase motors over 10 HP required reduced voltage starting) (Use back of sheet if necessary)

Miscellaneous Motors \_\_\_\_\_

This data will be used for transformer sizing and connected load billing information for this account. If load changes significantly, contact the District Office.

Completed by \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

Accepted by \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

(Utility Representative)

### For Utility Use Only

District \_\_\_\_\_ Town \_\_\_\_\_

Circuit \_\_\_\_\_ Line Name \_\_\_\_\_ Pole/Pad Number \_\_\_\_\_

Present Demand \_\_\_\_\_ Expected Increase \_\_\_\_\_ Expected Total Demand \_\_\_\_\_

Transformer KVA Size \_\_\_\_\_ Metering Requirement \_\_\_\_\_

Estimated Annual Revenues \_\_\_\_\_

From: \_\_\_\_\_ Dept. \_\_\_\_\_ Date \_\_\_\_\_

TO: ENGINEERING METERING DISTRICT SUPERINTENDENT ENERGY SERVICES

ENERGY PLANNING CUSTOMER SERVICES DISTRICT MANAGER

OTHER \_\_\_\_\_

## VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS

## FAULT CURRENT REQUEST

Requesting Party Name Address Phone #

Business/Owner Address Phone #

Service Location Address

Rating of Service Entrance Equipment: Amperes Volts

Number of Runs Single Phase Three Phase Service Equipment is New Existing

Secondary conductor size & type CU AL

Secondary distance from transformer terminals

### For Utility Use Only

Location for which short circuit currents were calculated by

- \_\_\_\_\_ A. Transformer secondary terminals  
\_\_\_\_\_ B. Weatherhead  
\_\_\_\_\_ C. Pedestal, Meter, Utility Pole  
\_\_\_\_\_ D. Other

Value of SYMMETRICAL short circuit currents resulting from calculation:

Amperes at Volts line-line

Amperes at Volts line neutral

### Values used in calculation:

Transformer size Va, single phase, three phase,

Transformer impedance %, nominal secondary voltage,

### Copies of this sheet sent to:

Requester  
Owner of property  
Architect associated with project  
Consulting Engineer associated with project  
State Wire Inspector

### Form completed by:

Name: Title: Date:

## VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS

# METER SOCKET SPECIFICATION

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## **Transformer-Rated Metering:**

The Utility shall supply all the necessary meter mounting devices for transformer-rated metering. Transformer-rated metering shall be used only when the Utility determines that self-contained metering is impractical, (see below). In all cases, the Utility shall specify the type of metering to be installed.

## **Self-Contained Metering:**

Self-contained metering is standard where the service rating is not more than 200 amperes, and where on grounded systems, the line to ground voltage does not exceed 300 volts. In all cases, the Utility shall specify the type of metering that is to be installed. Class 320 ampere sockets may be allowed, (check with local Utility).

The customer shall furnish and install a meter socket which meets the appropriate section(s) of this standard. For multiple socket installations, the Utility must be consulted to determine its requirements for these types of installations.

### **A. Type of Services:**

#### **1. Overhead single phase, three wire 120/240 volt services**

- a. Residential: The customer shall supply a socket meeting part B of this standard, "General Socket Specifications". Manual bypasses are required for 320 amp sockets and must meet Section C of this standard, "Manual Bypasses".
- b. Commercial and Industrial: The customer shall supply a socket with a manual bypass, and terminal shields. The socket shall meet Sections B and C of this standard, "General Socket Specifications" and "Manual Bypasses".

#### **2. Overhead Single Phase Three Wire 120/208 Volt (Network) Services**

- a. Residential: The customer shall supply a meter socket with a fifth terminal. It shall meet Section B of this standard, "General Socket Specifications". Manual bypasses are required for 320 amp sockets and must meet part C of this standard, "Manual Bypasses".
- b. Commercial and Industrial: The customer shall supply a meter socket with a fifth terminal, a manual bypass, and terminal shields. The socket shall meet sections B and C of this standard, "General Socket Specifications" and "Manual Bypasses".

	<b>VERMONT UTILITIES ELECTRIC SERVICE REQUIREMENTS</b>	<u>App'd:</u> <i>YES</i> <u>DATE:</u> 02/10 601pg1f.doc	<u>DRAWING NUMBER</u> <b>601</b> Page 1
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# METER SOCKET SPECIFICATION

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## 3. Underground Single Phase, Three Wire Services

- a. Residential: The customer shall supply a minimum of a 100 ampere rated socket. The minimum dimensions shall be 14" high by 12" wide by 4 3/8" deep with knockouts for a minimum of 2 1/2 inch conduit. If 350 MCM cable or larger is used, a meter socket with a side wired buss bar with appropriately sized lug connectors will be required. The socket shall meet Section B of this standard, "General Socket Specifications". Manual bypasses are required for 320 amp sockets and must meet Section C of this standard, "Manual Bypasses".
- b. Commercial and Industrial: The customer shall supply a minimum of a 200 ampere rated socket. The minimum dimensions shall be 14 inches high by 12 inches wide by 4 3/8 inches deep with knockouts for a minimum of 2 1/2 inch conduit. The requirements for 350 MCM are the same as residential in Section 3a. The socket shall have a manual bypass, shields, and shall meet Sections B and C of this standard, "General Socket Specifications" and "Manual Bypasses".

## 4. Underground Single Phase, Three Wire, 120/208 (Network) Services

- a. Residential: The customer shall supply a minimum of a 100 amp rated socket. The minimum dimensions shall be 14 inches high by 12 inches wide by 4 3/8 inches deep with knockouts for a minimum of 2 1/2 inch conduit. If 350 MCM cable or larger is used, a meter socket with a side wired buss bar with appropriately sized lug connectors will be required. The socket shall have a fifth terminal at the 9 o'clock position. The socket shall also meet part B of this standard, "General Socket Specifications". Manual bypasses are required for 320 amp sockets and must meet Section C of this standard, "Manual Bypasses".
- b. Commercial and Industrial: The customer shall supply a minimum of a 200 ampere rated socket. The minimum dimensions shall be 14 inches high by 12 inches wide by 4 3/8 inches deep with knockouts for a minimum of 2 1/2 inch conduit. The requirements for 350 MCM are the same as residential in Section 4a. The socket shall have a fifth terminal at the 9 o'clock position, with a manual bypass and terminal shields. It shall comply with both Sections B and C of this standard, "General Socket Specifications" and "Manual Bypasses".



# METER SOCKET SPECIFICATION

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## 5. Overhead Three Phase Services

- a. All Customers: The customer shall supply a 7-terminal meter socket for 3 phase 4 wire services, and a 5-terminal meter socket for 3 phase 3 wire services. The socket shall have a manual bypass and comply with Sections B and C of this standard, "General Socket Specifications" and "Manual Bypasses". For multiple socket installations, the Utility must be consulted to determine the special requirements for this type of installation.

## 6. Underground Three Phase 3 and 4 Wire Services Only

- a. All Customers: The customer shall supply a minimum of a 200 ampere rated socket. The line and load lugs shall be capable of accepting 350 MCM cu/al. The socket shall have a manual bypass and meet both Sections B and C of this standard, "General Socket Specifications" and "Manual Bypasses".

## B. General Socket Specifications:

1. Sockets shall be Listed and Approved for their location and use.
2. Sockets shall be of the rectangular sheet-metal type. Round-type sockets or cast-metal sockets are not permitted.
3. The socket rating shall equal or exceed the capacity of the service entrance equipment and conductors.
4. The socket lugs shall be sized appropriately to fit the required service conductor size. The socket lugs shall be of the Lay-in type. A grounding electrode conductor connector, connected to the neutral bus, shall be included in sockets intended for use in residential applications.
5. Sockets may be the ring type or ringless. Sealing rings, if required, shall be supplied by the customer.
6. Automatic bypasses are not permitted under any circumstances.
7. There shall normally, not be more than 3 vertical positions at any multiple-socket installations.
8. All sockets, at the time of installation, must be equipped with the number of terminals required by the type of service to be metered.
9. All four terminal sockets shall have the capability of adding a fifth terminal in the (6 or 9 o'clock positions), without removing the terminal blocks. When an existing installation is changed to accommodate a different type of service or rate requiring additional terminals, the additional terminals must be furnished and installed by the customer at the time of the change or the socket replaced with a socket containing the proper number of terminals.
10. Cover plates shall be the approved clear plastic type. The Utility will supply them. They will be used after the wiring is completed to protect the interior until a meter is set.



## METER SOCKET SPECIFICATION

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11. Note carefully that on 120/240 volt, three phase, four wire, Delta services, the conductor that measures 208 volts-to-ground must be connected to the right hand terminals of the sockets.
12. On commercial and industrial services all meter sockets shall be equipped with manual by-passes and shields for meter jaws. See Drawings 602 and 603.

### C. Manual Bypasses:

Manual by-passes are required on certain services in order to permit meter exchange without interruption of service to the customer, and as an additional safety feature for the meter person. By-passes are not designed for and must not be used as load making or breaking devices.

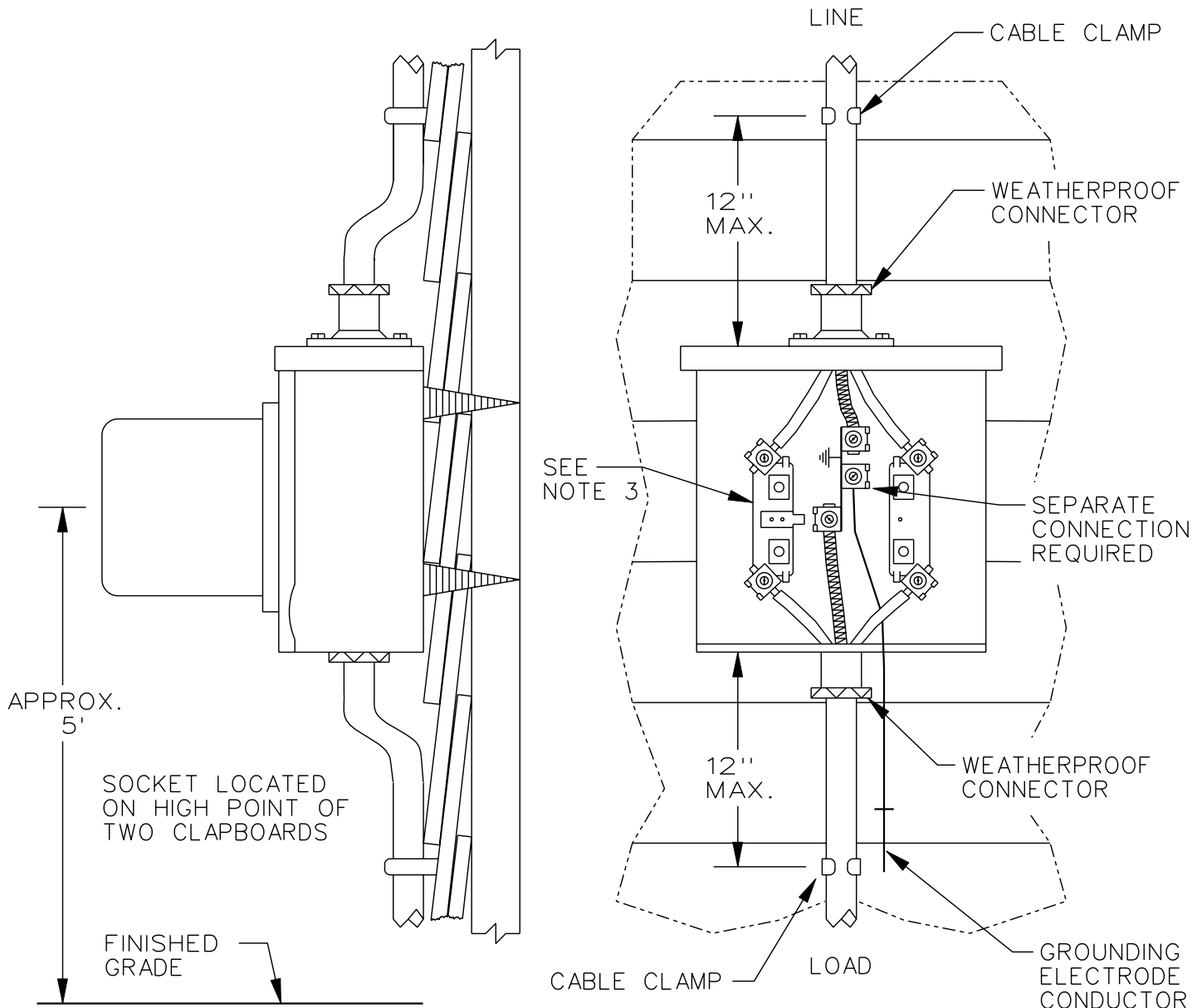
To be approved for system use, sockets with a manual by-pass must meet the following requirements:

1. Automatic bypasses are prohibited.
2. Bypass shall have a single, independent, Bypass handle-operated mechanism.
3. The non-bypassed, in service position of the operating mechanism must be visible when the meter is installed without the socket cover for test purposes.
4. It must not be possible to replace the socket cover when the operating mechanism handle is in the bypassed position.
5. By-passes which require auxiliary equipment, such as straps, jumpers, etc., shall not be allowed.
6. All three phase sockets with bypasses must have a mechanism which locks the meter blades in the socket jaws when in the non-bypassed (in service) position, and which will release the blades in the bypassed position.



# SINGLE PHASE INSTALLATION

## 3 WIRE 1 PHASE & NETWORK



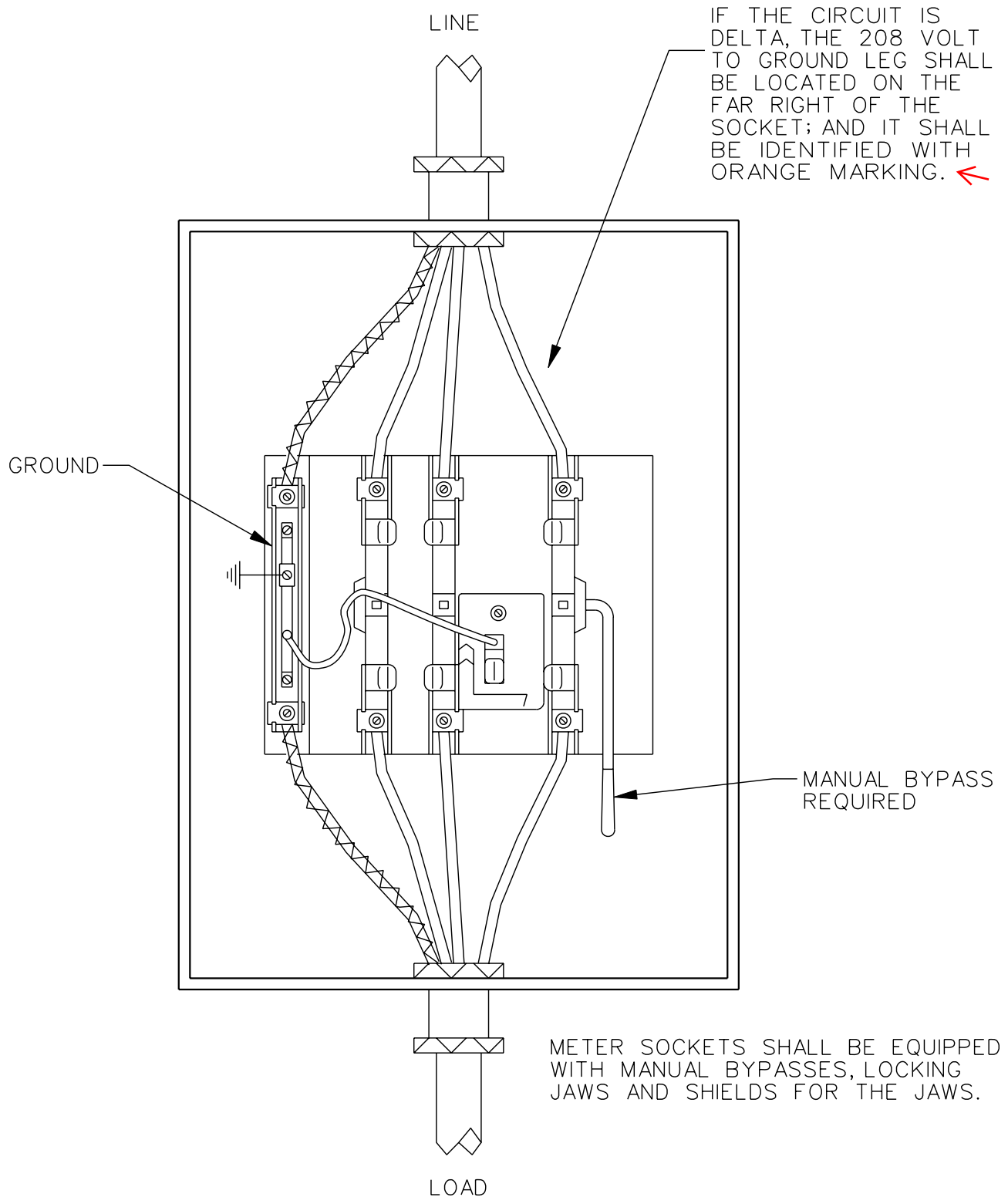
SOCKET MUST BE SET SO THAT  
METER DISK IS LEVEL

### NOTES:

1. ON RESIDENTIAL SERVICES, METER SOCKETS WITH AN AMPERE CAPACITY OF 200 AMPS OR ABOVE, SHALL BE EQUIPPED WITH MANUAL BYPASS AND SHIELDS FOR THE JAWS. FOR UTILITY-SPECIFIC DETAILS SEE PARAGRAPH 705E.
2. ON COMMERCIAL AND INDUSTRIAL SERVICES, ALL METER SOCKETS SHALL BE EQUIPPED WITH MANUAL BYPASSES AND SHIELDS FOR THE JAWS.
3. FIFTH TERMINAL MUST BE INSTALLED AT 9 O'CLOCK POSITION FOR NETWORK AND CONNECTED TO NEUTRAL. WITH UTILITY PERMISSION 6 O'CLOCK POSITION MAY OCCASIONALLY BE ALLOWED.

# SELF CONTAINED POLYPHASE INSTALLATION

3 PHASE 4 WIRE WYE OR DELTA  
200 AMPERE





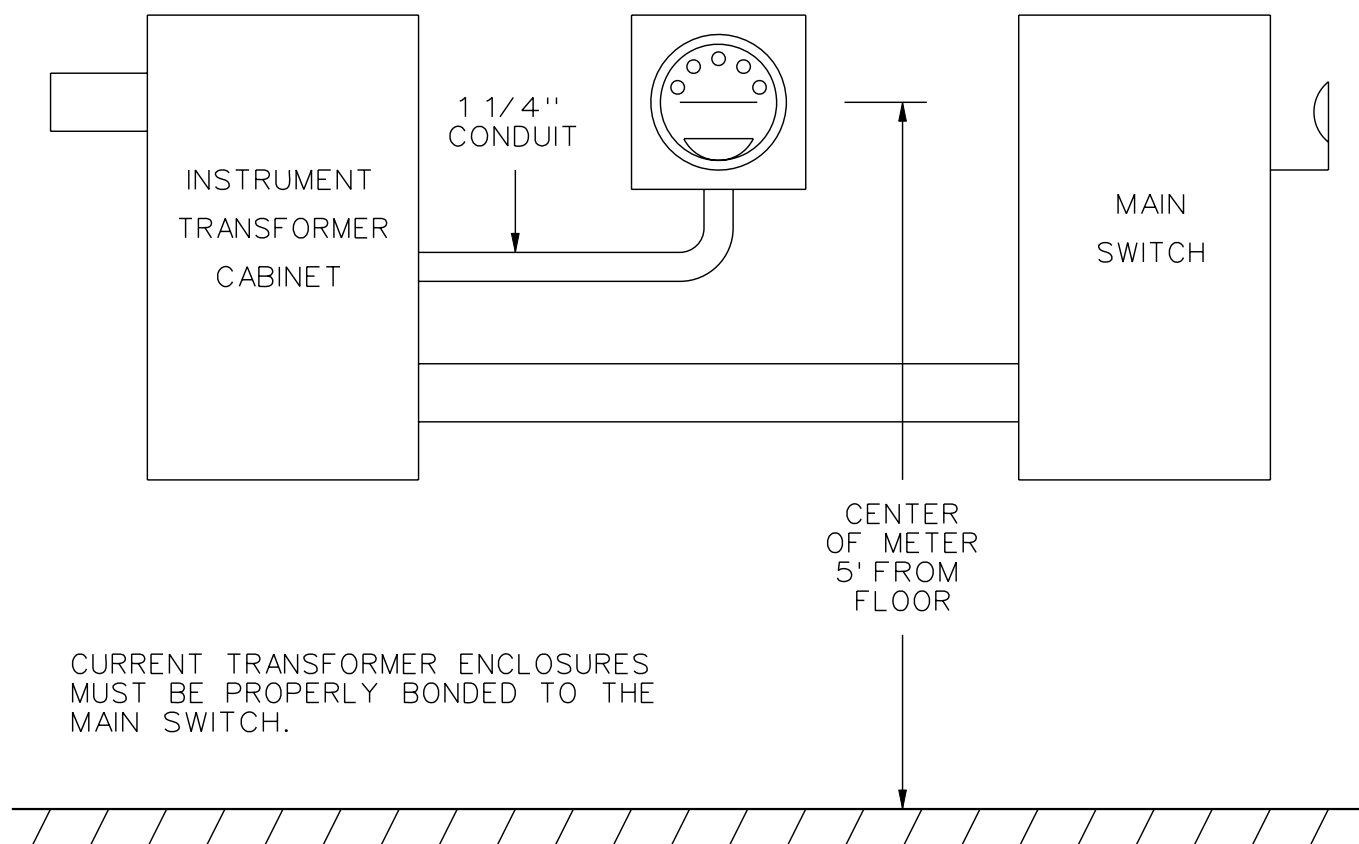
# TYPICAL

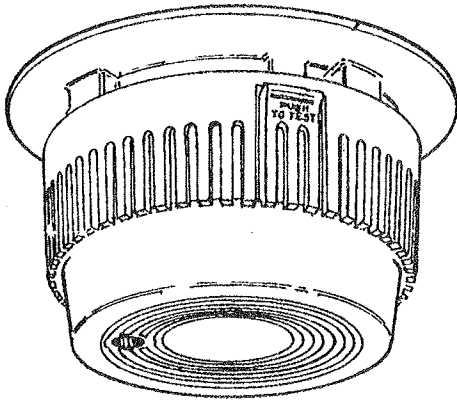
## TRANSFORMER RATED METERING INSTALLATION

### WITH INSTRUMENT TRANSFORMER ENCLOSURES

THE METER, METER SOCKET AND ANY INSTRUMENT TRANSFORMERS WILL BE SUPPLIED BY THE UTILITY. CHECK WITH YOUR LOCAL UTILITY ON WHO SUPPLIES THE INSTRUMENT TRANSFORMER ENCLOSURE. A UTILITY REPRESENTATIVE WILL BE CONSULTED FOR LOCATION OF METER SOCKETS AND INSTRUMENT TRANSFORMER ENCLOSURES.

THE CUSTOMER'S CONTRACTORS WILL INSTALL THE METER SOCKET AND THE INSTRUMENT TRANSFORMER ENCLOSURE AND INSTALL 1 1/4" CONDUIT BETWEEN THEM. THE CUSTOMER'S CONTRACTOR WILL ALSO INSTALL AND MAKE THE PRIMARY CONNECTIONS TO THE CURRENT TRANSFORMERS. IF A METER SOCKET IS USED THE HEIGHT SHALL BE 5 FEET TO THE FLOOR FROM THE CENTER OF THE METER. IF A METER CABINET IS USED THE HEIGHT SHALL BE 6 FEET FROM THE TOP OF THE CABINET TO THE FLOOR. THE HEIGHT OF THE INSTRUMENT TRANSFORMER ENCLOSURE IS NOT CRITICAL.





# STATE OF VERMONT

## SMOKE DETECTOR LAW

- Did you know that most fatal fires occur in single family dwellings?
- Did you know the majority of fire deaths occur at night while everyone is asleep?

Smoke detectors are necessary to provide early warning in event of a fire. Having working smoke detectors in your home cuts the risk of dying in a fire in half.

*The new Vermont Smoke Detector Law\* will reduce the loss of life, injuries and property damage caused by house fires.*

**A**ny new single family dwelling constructed in Vermont after January 1, 1994 must be equipped with smoke detectors installed in accordance with the manufacturers instructions. They must be powered by the house electrical service with battery back-up.

Any existing single family dwelling when transferred or sold must have working smoke detectors installed in accordance with the manufacturers'

instructions. They may be EITHER powered by the house electrical service with battery back-up OR powered by the house electrical service OR powered by battery. At the time of the sale a form must be completed as part of the closing and be presented to the buyer indicating the dwelling is in compliance with this law.

The manufacturers' instructions, which come with each smoke detector, will provide

information on the required placement and proper installation of the smoke detectors.

Forms have been made available to Real Estate Agents, Attorneys and Bankers. Anyone who needs a form or more information, can contact your local Department of Labor & Industry Regional Office.

Montpelier	828-2106
Rutland	773-5867
Springfield	886-2712
Williston	658-2199