2023

Electric Service Manual

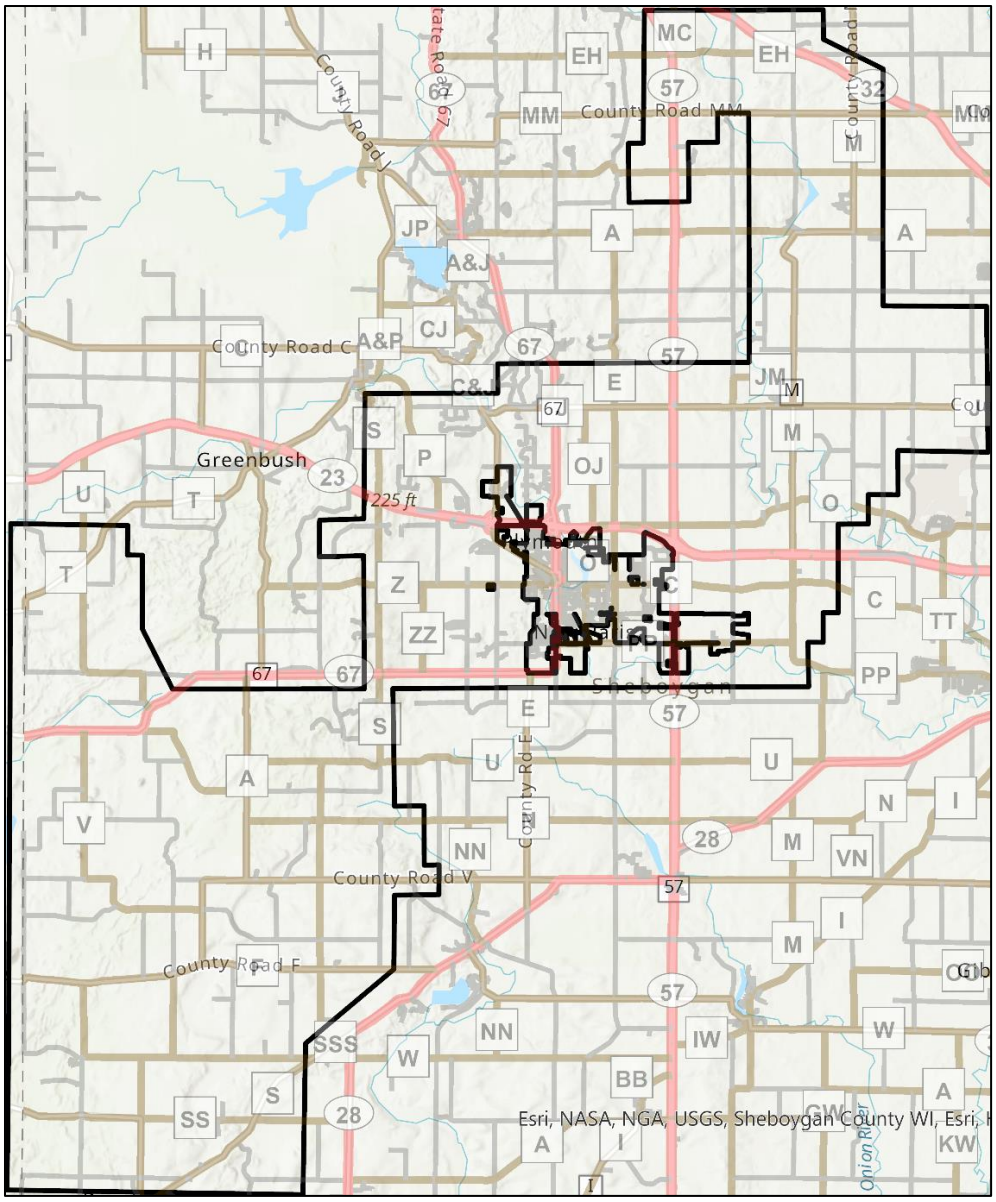
PLYMOUTH UTILITIES

Wisconsin State Statute 182.0175 requires one to notify Diggers Hotline of intent to excavate and to allow a minimum of 3 working days prior notice before digging. Persons causing damage to underground facilities without calling Diggers Hotline will be responsible for the damage and may be subject to a fine up to $2000. Call before you dig.

Diggers Hotline contact information:
Toll Free **800-242-8511** (Dial **811**)
Hearing Impaired (TDD) **800-542-2289**
diggershotline.com

Plymouth Utilities Electric Service Area and Contact Information

Plymouth Utilities (PU) provides electric service to the City of Plymouth, WI and surrounding rural area. PU's electric service territory is depicted here.



Electric Service Territory

Plymouth Utilities Contact Information:
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Plymouth, WI 53073
920-893-1471
www.plymouthgov.com/utilities

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Plymouth Utilities

Chapter 1

General Information

Reserved For Notes:

100. INTRODUCTION

This Electric Service Manual (ESM) is published to provide a convenient resource to Plymouth Utilities customers and their contractors, engineers, architects, and employees concerned with electric service installations within Plymouth Utilities' electric service area. Information is provided to address the responsibilities for ownership, installation, and maintenance of equipment to accommodate installation of utility owned overhead and underground service laterals and the installation of customer termination and metering facilities. PU's objective is to cooperate with and assist customers to obtain safe and reliable electric service. This Electric Service Manual exists to convey Plymouth Utilities requirements that are in addition to the *National Electric Code (NEC)*. The reasons for being more restrictive are safety, power quality, and standardization.

101. PURPOSE

A. Information in this ESM is intended to cover typical installations. To avoid misunderstanding and unnecessary expenses, the customers or their representatives should consult with PU.

B. All information provided in this ESM is used in conjunction with Plymouth Utilities' tariffs on file with the Wisconsin Public Service Commission (PSC).

This edition of the Electric Service Manual supersedes all previous editions.

102. CODES AND RULES

Plymouth Utilities requires that all customer wiring installations meet the minimum requirements of the National Electric Code (NEC), National Electrical Safety Code (NESC), National Fuel and Gas Code (NFPA 54), Liquified Petroleum Gas Code (NFPA 58), International Building Code (IBC), DOT Regulations and/or state and local codes when their requirements are more restrictive.

A. Compliance: Plymouth Utilities reserves the right to refuse to extend service or discontinue service where a customer's installation does not comply with these provisions and requirements as stated.

B. Prior to initial electrical service, an electrical inspection from the local electrical inspector and/or approval from PU is required.

C. Plymouth Utilities may de-energize any service if a dangerous, or unsafe, condition exists on the customer's premises.

D. Plymouth Utilities may give a disconnect notice for services in need of repair.

103. WORD APPLICATION

A. "Shall" denotes a rule or mandatory requirement which must be followed. The words "must" and "will" are also treated like "shall."

B. "Should" recommends a desirable practice for a specific condition.

C. "May" indicates a possible option.

D. Definitions The local Authority Having Jurisdiction (AHJ) will make the final determination as to the building classification.

1. **"Building"** is defined as a structure which stands alone, or which is separated from adjoining structures by fire walls. Check with the local AHJ as to whether the building in question is a single building or classified as more than one building.
2. **"Structure"** other than a building is defined as a substation, pole, pedestal, vault, pad mounted switchgear, communication tower or other structure identified by Plymouth Utilities.
3. **"Electrically Isolated Building"** is defined as a building where there are no continuous metallic paths to any other building or structure. These metallic paths include but are not limited to: electric conduit and wiring (phase, neutral, or grounds), communication systems (telephone, coaxial cable, data lines, etc.) and metallic piping (water, steam, hydraulic, augers, fencing, etc.) Separation to other buildings, structures, and equipment must be sufficient to prevent lightning flashover.
4. **"Row-house"** is defined as three or more contiguous living units, not more than three stories high. It is separated by firewalls having a minimum one-hour fire resistive rated construction which extends from the foundation to the underside of the roof deck with no doors or windows in the firewall.
5. **"Zero Lot Line Building"** is defined as buildings separated by a common firewall as allowed by the local AHJ.

104. CONTINUITY OF SERVICE

A. Plymouth Utilities' goal is to provide continuous electric service, restore service promptly, and maintain its facilities with minimal inconvenience to customers. However, PU does not guarantee continuous service, standard voltage or frequency at all times. PU shall not be liable for any loss, injury, or damage resulting from interruptions of service not due to negligence on its part.

B. Customers who are operating equipment that is sensitive or require a higher quality of service may find it necessary to install, at their own expense, power-conditioning equipment to protect, mitigate, or otherwise provide the standard of service needed by their load.

C. Plymouth Utilities shall have the right to cause service to any customer to be interrupted or limited at any time without liability, by automatic devices or otherwise, when in the judgment of PU such interruption or limitation of service is necessary or desirable due to emergency conditions.

105. POINT OF SERVICE

The energy supplied by Plymouth Utilities changes ownership at the point of service. This is the location where the customer's wiring starts and Plymouth Utilities' ends. The point of service differs for different service types and is as follows:

A. Overhead Services: The point of service is where Plymouth Utilities' service drop wire attaches to the customers service mast wires.

B. Single Phase and Three Phase Self Contained Underground: The point of service is where Plymouth Utilities' wires terminate in the meter pedestal/cabinet

C. Single Phase and Three Phase Instrument Metered Underground: The point of service is at the secondary terminals of Plymouth Utilities pad mounted transformer.

D. Primary Metered Services: The point of service is at the primary metering point.

106. APPLICATION FOR SERVICE

Application for a new service or changes made to an existing service shall be made in writing and made in advance of the required service date. This will permit Plymouth Utilities to plan and schedule work to provide service by the date requested. Please be ready to provide the following information: service address, service type (single or three phase), service voltage, service size, service class (residential, commercial, or industrial), expected project timeline, load calculations, and site plan.

A. Application forms: The proper application form for service shall be submitted when applying for service. The forms may be obtained in person at Plymouth Utilities' office or on Plymouth Utilities' website.

B. Service Location:

1. The customer shall contact Plymouth Utilities for assistance and approval when determining the location of the electric service on the building or structure supporting the electric service.
2. The customer shall provide Plymouth Utilities with all load information and the proposed service entrance size and voltage requirements with the application for service. In some instances, Plymouth Utilities may request a load calculation.

C. Line Extension: After review of the site and facilities in the area, PU will notify the customer if a line extension contract is required and if any additional charges will be required to cover the cost to extend electric service facilities. When this occurs, a contribution is necessary before the line extension can be scheduled for installation. PU shall utilize the most direct, engineering feasible route to determine additional charges.

D. Easements:

1. The customer requesting the service shall obtain any easements needed. PU will provide the easement document. Any costs involved in obtaining the easement will be the responsibility of the customer.
2. Construction will not begin until easements are obtained.

E. Site Preparation:

The customer shall be responsible for the initial clearing of the right-of-way required for line construction.

1. For overhead construction, trees and brush should be trimmed back 10 feet plus the distance equal to the four-year growth cycle on both sides of the line. 10 feet shall be the minimum distance trimmed.
2. For underground construction, the grade shall be within 3 inches of final grade. Also, any trees, brush, stumps, etc. shall be cleared back to make a path of at least 10 feet in width.

3. Any equipment re-installations required because of grade changes will be at the expense of the customer.
4. The customer can request the utility to do clearing work. In such an instance, the customer shall make a contribution to the utility in an amount equal to the utility's estimate of the cost thereof. Such a contribution shall be nonrefundable, except that after completion of the extension the utility will determine the actual cost of clearing work, recompute the contribution required, and will refund the excess, if any, of the contribution over that required as based on such actual cost.
5. Underground installation routes shall be frost free. Any frost charges incurred during installation will be passed on to the customer.

F. Wiring Inspections:

1. Customer wiring installations shall comply with any local, state, national electrical codes, the Wisconsin State Electrical Code, and the service rules of the utility.
2. For all commercial and new residential, a Certificate of Electrical Inspection is required before PU will energize the service.
3. Plymouth Utilities reserves the right to inspect for compliance with this ESM but assumes no responsibility for inspection of the customer's installation.
4. If PU personnel are on site and notices the installation may be unsafe, Plymouth Utilities reserves the right to request an inspection prior to energizing the customer.

107. SERVICE VOLTAGES AND MAXIMUM AMPERAGE (600 VOLT OR LESS)

Standard (600 Volt or less) service voltages, and their maximum service size provided by Plymouth Utilities are listed below.

Available Service Voltage and Amperage

TRANSFORMER SERVICE	POLE-MOUNT OH	POLE-MOUNT UG	PAD-MOUNT UG
120/240V-1 Phase	600[1]	600[1]	600
120/208V-1 Phase	200[2]	200[2]	200[1]
120/240V-3 Phase	200[3]	200[3]	1600[3]
240V-3 Phase	200[3]	200[3]	800[3]
480V-3 Phase	--[4]	200[3]	800[3]
120/208V-3 Phase	600[5]	600[5]	2000[6]
277/480V-3 Phase	--[4]	200[5]	1600[7]

1. The maximum overhead transformer size in use by Plymouth Utilities is 50 kVA.
2. Available only from an existing 120/208V 4-wire system, maximum 200-amp network meter.
3. Delta service not available to new installations. Limited to existing overhead transformer installations where ferro resonance would not be likely to occur.
4. Plymouth Utilities does not purchase or stock 277/480V overhead transformers.

5. Limited by loading on (3) 50 kVA transformers.
6. Services larger than 2000-amp will require primary metering and service voltage, unless otherwise approved by Plymouth Utilities.
7. Services larger than 1600-amp will require primary metering and service voltage, unless otherwise approved by Plymouth Utilities.

Notes:

1. All services shall be wye grounded. Existing delta services will be required to change to wye when upgraded or wiring changes are made.
2. All 277/480V services shall have a Potential Transformer for metering. Self-contained 480V services are not permitted.

108. NUMBER OF SERVICES

Plymouth Utilities provides each parcel of land or property with only one service (refer to Section 107 for service sizes). It is supplied by one overhead service drop or underground service lateral to a building or structure located on a non-contiguous parcel of land or property. Multiple adjacent parcels, used in a single operation, are considered one parcel. Reference: *NEC 230.2*. If an existing customer with a single-phase service drop or lateral requests three-phase service, the customer shall rewire their equipment to operate from the three-phase service drop or lateral before three phase service will be extended. The single-phase service drop or lateral will be removed from service after the three-phase service has been extended.

Additional services may be permitted with approval from Plymouth Utilities, if the following requirements have been met:

A. Primary Service

1. A separate secondary voltage service may be provided for supplying emergency systems where such systems are legally required by municipal, state, federal or other codes, or by any government agency having jurisdiction.
2. A backup service is allowed as a separate service to the customer's property but may only be utilized when the primary service is not available. Primary and backup services may share common metering or be separate. The backup service shall have an open switch at the perimeter of the customer's property, separating this service feed from the main service feed to the customer's load. When the customer's main feed is interrupted, the open switch for the backup service will be closed by Plymouth Utilities to pick up the customer's load.

B. Secondary Service

Plymouth Utilities will review exceptions on a case by case basis.

Reference: *NEC 230.2E & NEC 250.58*

Informational Note: The number of services is limited to increase safety for occupants and first responders, improve power quality, and standardize.

1. Distance Exceptions:

a) Buildings

For buildings that cannot be served by only one service, Plymouth Utilities may provide a second service at any available secondary voltage. The new service shall be located 150 ft. from the existing 120/240 volt service or 120/208 volt 3-phase service. If either the existing or the new service is 277/480 volt, 3-phase, a minimum of 250 ft. separation shall be maintained Each of the above distances is measured in a straight line. All load side conductors supplied for each service shall have no common raceway or connection with any other service.

Informational Note: The 150 ft. minimum spacing is from Wisconsin's State Electrical Code SPS 316.

b) Structures (other than a building)

Services may be installed on multiple structures, if they are no closer than 250 ft. apart, (measured in a straight line) and if all load side conductors supplied by each service have no common raceway or connection with any other service.

Informational Note: For structures, other than a building, the minimum was increased to 250 ft. because conductors typically extend directly to the loads and don't follow the outline of a building, Consequently, most conductor lengths will be shorter, decreasing voltage drop issues.

2. Multiple Occupancy Buildings Exception (*NEC 230.2B*):

A separate service may be provided for each multiple metered building. Multi-metered buildings may have a second service provided the distance separation requirements are met.

3. Electrically Isolated Service Exception:

Additional service(s) may be provided to a building or structure, where there are no electrically conductive (i.e. wiring) paths to another service. Services provided by this exception are treated according to Plymouth Utilities extension rules.

4. Special Occupancies Exceptions:

For row-house construction a separate drop or lateral may be provided for each two attached units. Buildings must comply with the unique building codes specifically intended for row-houses only. This does not apply for condominiums.

5. Farm House Exceptions:

On an active farm that is either 120/208V 3-phase or 277/480V 3-phase the farm house may have a separate service at 120/240V 1-phase.

109. SHORT CIRCUIT DUTY REQUIREMENTS

The customer's service equipment and other devices shall be adequate to withstand and interrupt the maximum available short circuit current (Fault Current). Consult Plymouth Utilities for the available short circuit duty when requesting the location for service entrance facilities.

Definitions:

1. **Short Circuit Current Requirements (SCCR)** – The prospective symmetrical fault current at a nominal voltage to which an apparatus or system is able to be connected without sustaining damage exceeding defined acceptance criteria (*NEC* 100).

2. **Fault Current** – is an abnormal current in an electrical circuit due to a fault, usually a short circuit or abnormally low impedance path. Fault Current comes in three varieties; phase-to-neutral fault, phase-to-phase fault and phase-to-earth ground fault.
3. **Ampere Interrupting Capacity (AIC)** – This applies to circuit breakers and their ability to open and protect a circuit with a specific amount of current flowing in the circuit. Short Circuit Current Ratings are from 10,000 to 65,000 amps.
4. **Arc Flash Current** – The Available Fault Current for the Present System. The "Present System" values are for existing system as of the date of the request. The values may change at any time without notice due to system changes.

Informational Note: The Short Circuit Current Ratings listed in the tables below are the maximum theoretical fault current values calculated at the secondary terminals of the transformer. These numbers do not take into account service wire sizes or lengths. These numbers are for informational purposes. Plymouth Utilities should be consulted for actual available fault current, as it may differ from these values.

A. Single Phase Metering:

Minimum Short Circuit Current Ratings

120/240 Volt, Single-Phase & 120/208 Volt, Single-Phase	
Service Ampacity	**Minimum SCCR**
100 amp	10,000
150 amp	22,000
200 amp	22,000
320 amp	22,000
400 amp	35,000
600 amp	35,000

Notes:

1. Total service ampacity ratings of all present and future service entrance equipment connected to the same overhead service drop or underground service lateral.

B. Three Phase Metering:

Minimum Short Circuit Current Ratings

120/208 Volt Three-Phase	
Service Ampacity	**Minimum SCCR**
200	22,000
400	35,000
600	65,000
800	100,000
1200	100,000
1600	100,000

277/480 Volt Three-Phase	
Service Ampacity	**Minimum SCCR**
400	35,000
600	65,000
800	65,000
1200	65,000
1600	65,000

Notes:

1. Total service ampacity ratings of all present and future service entrance equipment connected to the same distribution transformer.

C. Available Fault Current for Arc Flash Studies – Consult with Plymouth Utilities.

110. INSPECTIONS AND MAINTENANCE

In areas where electrical inspectors are provided, the inspector is the AHJ on all issues dealing with customer owned electrical wiring facilities.

111. SERVICE CONNECTIONS

Plymouth Utilities will make all service connections to its electric distribution system. Connection to or alteration of Plymouth Utilities' electric service facilities or other equipment is prohibited and subject to immediate disconnection.

112. IDENTIFICATION OF CONDUCTORS

The customer's neutral conductor shall be identified by white tape, white insulation, white paint, or other techniques permitted by *NEC* Article 200.

113. CHANGES TO EXISTING SERVICE-ENTRANCE EQUIPMENT

Informational Note: All references to the current version of the NEC in this section refer to the current version of the NEC adopted by the State of WI.

A. When the customer is changing the ampacity of their service entrance equipment, they must meet the current version of the *NEC* and the ESM

B. When the customer modifies their service in any way that requires them to adhere to the current *NEC*, they shall also adhere to the current ESM.

C. Moving or relocating service equipment to a new or different location shall constitute an upgrade.

Exception with Plymouth Utilities approval only:

Customer is replacing or relocating damaged equipment, possibly to a better location, due to an accident, fire, storm, or other natural disaster. Customer is not upsizing equipment, only replacing with equipment of the same size.

D. 120/240V delta customers shall convert to a standard voltage with any upgrade.

114. PLYMOUTH UTILITIES EQUIPMENT ON CUSTOMER PREMISES

A. Customers shall grant Plymouth Utilities the right to install its equipment on the customer's premises to supply service. All such equipment shall remain Plymouth Utilities property and may be removed when service is no longer required.

B. Plymouth Utilities shall have the right of access to equipment located on customer premises for inspection, maintenance, restoration and removal of service. The customer shall provide, without cost to PU, the necessary easements and/or right-of-way for PU personnel to install, maintain and access electric facilities that provide service to the customer. This will include permission to trim and/or remove trees and brush that may interfere with the installation and operation of Plymouth Utilities' facilities.

C. Customers shall take care of Plymouth Utilities equipment located on their property. Customers will be responsible for all damages to or loss of PU property located on their premise, unless damage is by causes beyond their control. The customer shall not grant authority to anyone who is not an employee of PU to open or operate PU equipment.

115. CAPACITY

A. Service entrances shall have ample capacity per *NEC* Article 220 for any electrical load that may be expected to develop. All current carrying components of the metering installation shall have an ampacity rating equal to or greater than the required ampacity rating of the service entrance conductors.

B. The customer shall give Plymouth Utilities notice of any load increases (permanent or temporary) which may require PU to increase the capacity of its facilities. Customers who fail to notify Plymouth Utilities will be charged for the cost to replace damaged PU equipment.

C. For customer installations of two to six breakers or sets of fuses, on the load side of a termination box or metering transformer cabinet, the sum of the ampere ratings of the circuit

breakers or fuses multiplied by 80% will not exceed the ampere rating of the termination or metering cabinet.

D. The rating of the service disconnect is to be not less than the calculated load to be carried and not the actual load carried. (*NEC* 230.79)

E. Adjustable breakers whose maximum rating, either individually or in combination, exceed the rating of the self-contained meter are prohibited.

F. Meter disconnect switches, nominally rated not in excess of 600 volts, shall have a short circuit rating equal to or greater than the available short circuit current. These devices shall also be grounded and bonded according to parts V and VII of Article 250. (*NEC* 230.82)

116. SEQUENCE OF DISCONNECTING SERVICE AND METER

The location of the service disconnect, unless specifically approved by Plymouth Utilities, shall be on the load side of the metering **(meter-switch-fuse)** sequence. "Hot Sequence"

Exception #1:

In multiple meter locations where the *NEC* requires a main disconnect, the sequence shall be:

Main Service Disconnect – Meter – Switch – Fuse "Cold Sequence"

For all 480Y/277 Volt services with self-contained meters, the sequence shall be:

Switch – Meter – Switch – Fuse "Cold Sequence"

117. CUSTOMER INSTALLATION

A. The customer installs, owns and maintains the service entrance equipment and provides a secure location for holding service wires and service entrance equipment to the building or structure. All service entrances shall include a service disconnecting means, over-current protection and Plymouth Utilities approved metering equipment located in the vicinity of where electric service is supplied to the building or structure.

B. The *NEC* states where the service disconnects may be located. The Wisconsin State Electrical Code, Chapter SPS 316, states where the customer owned service entrance conductors and service disconnects may be located. The Electric Service Manual states where utility owned service conductors shall be located, terminated and metered.

1. The *National Electrical Code* in Section 230.70(A) limits the location of the service disconnect to a readily accessible location either outside of the building or inside nearest the point of entrance of the service conductor's location.
2. The Wisconsin State Electric Code in SPS 416.230(3)(b) states that conduits for service conductor located according to *NEC* 230-70(A) can extend no more than 8 feet into the building from the point they enter the inside of building through the outside wall or concrete floor.

Informational Note: The Wisconsin 8 ft. rule is in addition to NEC 230.70(A). In Wisconsin, service entrance disconnects, when located inside, must be near the point of entrance of the service conductor and must be within 8 ft. of where the conductors enter the building through the outside wall or concrete floor.

3. This ESM limits the location and termination of utility owned service conductors to an installation on the outside of the customer's building or structure.

118. COMMUNICATION TOWER INSTALLATION

A. All communication towers are considered structures. Plymouth Utilities will provide either one underground service lateral or one overhead service drop to a tower site, regardless of the number of tower users.

B. The tower owner will be responsible for providing metering and service entrance facilities to serve all tenants utilizing the tower facilities.

C. Metering shall be made accessible to Plymouth Utilities personnel. Metering shall be installed in one of the following ways:

1. Outside of the customer's secured area.
2. Inside a common fenced area or separately fenced area and provide provisions for a Plymouth Utilities lock. The metering shall be located 4' to 5' from the edge of the fence to facilitate reading the meters through the fence.

D. When additional customers request service, *NEC* Article 220 load calculates are required before the new service(s) will be energized.

E. The tower owner is required to install sufficient meter positions when the first tenant goes on the tower to accommodate all possible tenants. Label each position as Unit #1, Unit #2, etc. Do not use tenant names as tenants may change.

F. Communication towers are considered a commercial account.

Plymouth Utilities

Chapter 2

Temporary Service

Reserved For Notes:

200. GENERAL

A. A service application shall be required for all temporary services. Plymouth Utilities will work with the customer to determine the location of the temporary service.

B. Temporary services shall be located as near as possible to the location of permanent service to the building or structure. Abnormal conditions involving compliance with the foregoing provision will be cleared with PU and permission granted by PU prior to locating the customer connection

C. The customer shall reimburse Plymouth Utilities for its costs to install and remove the temporary service. The customer is also responsible for the energy usage costs.

D. All temporary service shall be maintained in a safe manner in order to keep Plymouth Utilities harmless from injury to persons or property. The service shall remain temporary only for a reasonable time and must be made permanent when PU directs such action.

E. Should the customer elect to receive permanent service the installation charges for extension of new electric service as provided in Plymouth Utilities tariffs on installation and embedded cost credits will apply. Credit shall be given for payment already made for that portion of the temporary service facilities that can be used for permanent service without modification

F. Customer-owned temporary service entrances are not permitted on Plymouth Utility-owned poles.

G. Working space clearances as defined by *NEC* 110.26, shall be required for temporary services.

H. The service entrance of a temporary service must meet all requirements of *NEC* Article 230 Parts I through VIII that are required for permanent service entrances.

I. Temporary services shall not be in service for more than 180 days without approval from Plymouth Utilities.

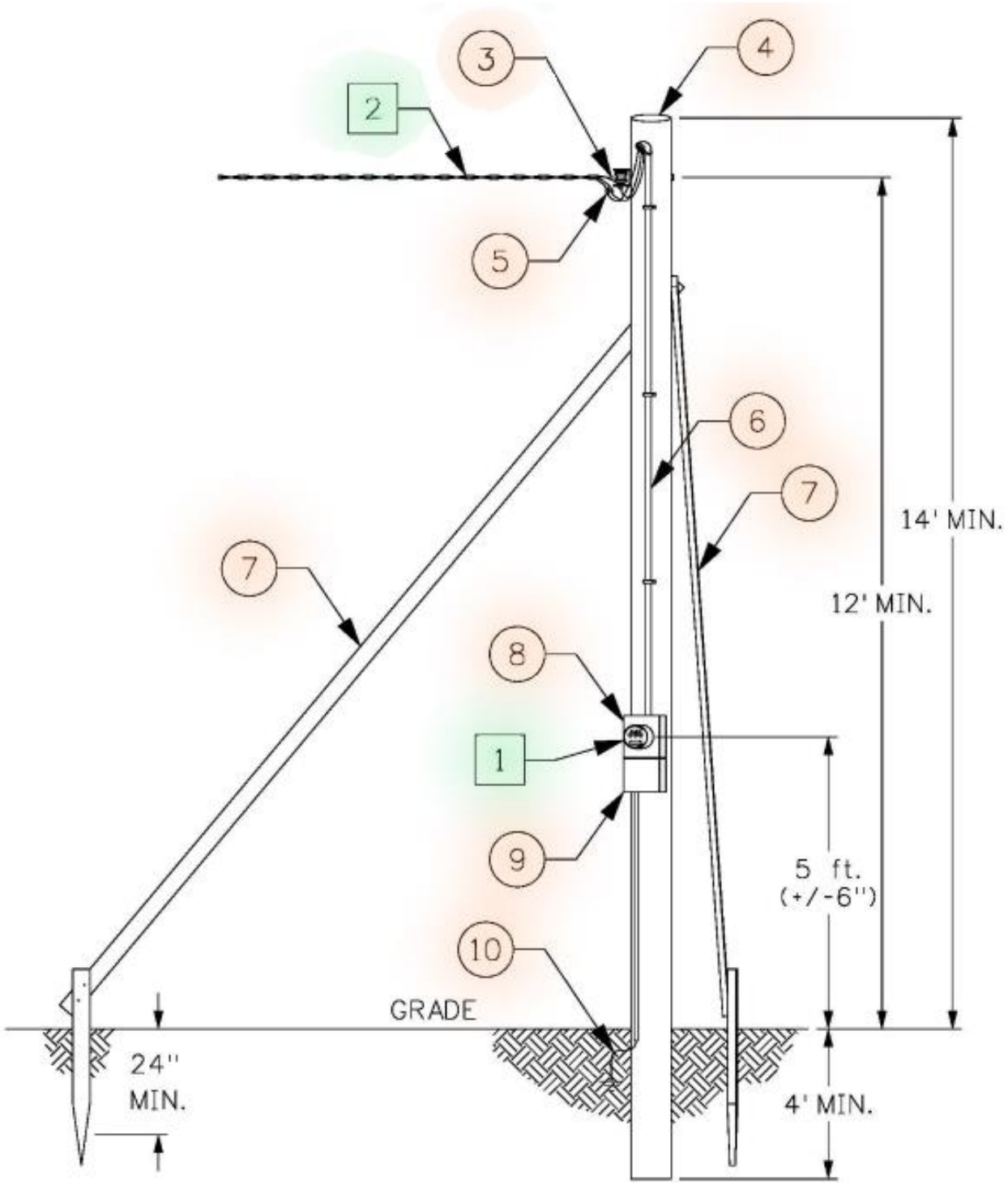
201. OVERHEAD TEMPORARY SERVICE, SINGLE-PHASE, 3-WIRE, 120/240 OR 120/208 VOLT, 200 AMP MAX (FOR CONSTRUCTION SITES)

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Overhead service drop, see Note 1	X	
3	Service dead-end		X
4	Pole min. class 7 or 4”x 4” treated post, min. 4’ in ground		X
5	Service entrance wires with 36” leads		X
6	Rigid conduit or service entrance cable		X
7	Two braces of 2”x 4”x 16’ or supporting guy		X
8	Approved Meter socket (Section 307)		X
9	Fused main disconnect switch or main		X
10	Ground in accordance with *NEC*		X

Notes:

1. Customer point of attachment shall be a minimum of 10’ to a maximum of 100’ horizontal separation from Plymouth Utilities facilities.
2. Attachment point shall be 6” – 12” below weatherhead.
3. Temporary services shall not be installed across public streets, roads, railroad tracks, or driveways.
4. Panel boards shall be service entrance rated. Panel boards with more than two single pole breaker positions require a main disconnect or breaker.
5. Panel boards and installed breakers shall follow the SCCR requirements of Section 109, Short Circuit Duty Requirements.

201. OVERHEAD TEMPORARY SERVICE, SINGLE-PHASE, 3-WIRE, 120/240 OR 120/208 VOLT, 200 AMP MAX (FOR CONSTRUCTION SITES) – CONTINUED

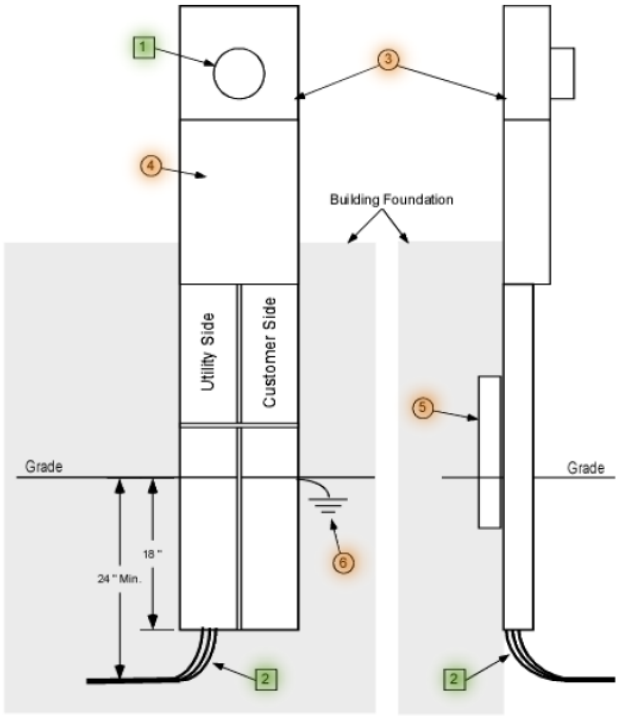


202. UNDERGROUND TEMPORARY/PERMANENT SERVICE – SINGLE-PHASE, 3-WIRE, 120/240 VOLT, 200 AMP MAX (FOR CONSTRUCTION SITES) PREFERRED CONSTRUCTION

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Utility UG service conductors	X	
3	Approved free standing meter pedestal (Section 708)		X
4	Customer's main (Inside Panel)		X
5	Customer's feeder panel		X
6	Ground in accordance with the *NEC*		X

Notes:

1. Approved Pedestal can be ordered with GFCI duplex receptacles for use by the contractor for construction.
2. Pedestal has separate exit channel for a breaker protected feeder to another building or structure.
3. Device will satisfy service requirements for permanent service when temporary use is no longer required.



203. UNDERGROUND TEMPORARY SERVICE – SINGLE-PHASE, 3-WIRE, 120/240 OR 120/208 VOLT, 200 AMP MAX (FOR CONSTRUCTION SITES)

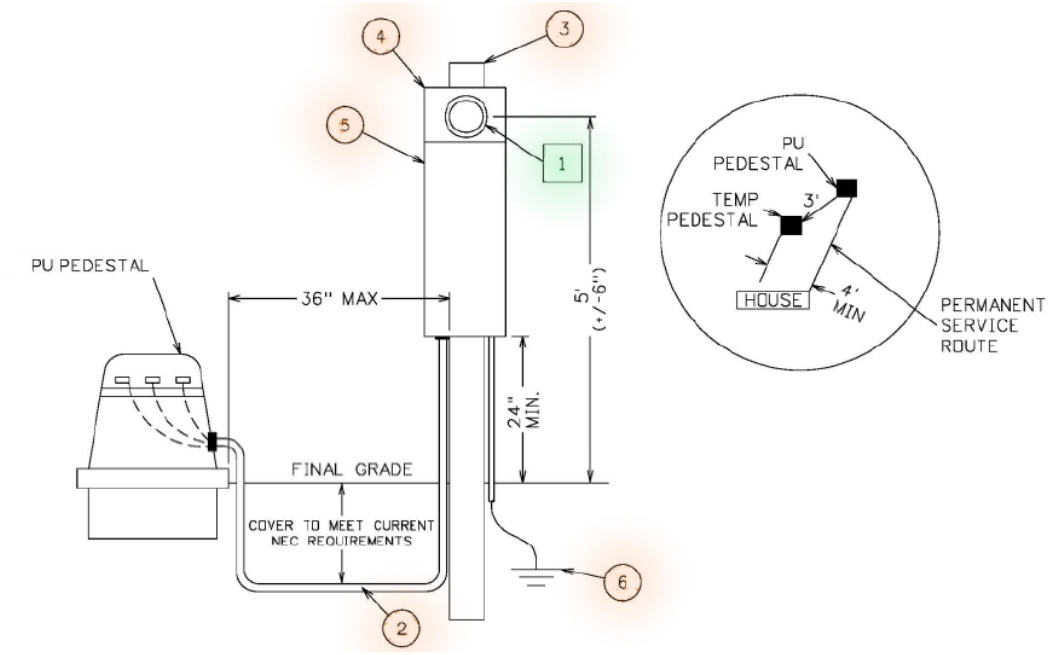
Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Service lateral LFMC* or LFNC**		X
3	4”x 4” treated wood post or approved manufactured pedestal		X
4	May use any approved meter socket		X
5	Fused main disconnect switch or main circuit breaker with GFCI outlets		X
6	Ground in accordance with the *NEC*		X

*LFMC – Liquid tight Flexible Metal Conduit – See *NEC* 350

**LFNC – Liquid tight Flexible NON-Metal Conduit – See *NEC* 356

Notes:

1. Temporary pedestal shall be placed within 3 feet of Plymouth Utilities’ supply source.
2. Panel boards and pedestals shall be service entrance rated. Panel boards with more than two single pole breaker positions require a main disconnect or breaker.
3. Panel boards, pedestals, and installed breakers shall follow the SCCR requirements of Section 109.



Plymouth Utilities

Chapter 3

Overhead Secondary Service

Reserved For Notes:

300. SCOPE

This chapter covers the requirements and rules for overhead residential and commercial secondary service for Plymouth Utilities customers.

301. ATTACHMENT OF SERVICE DROPS

A. The customer's structure shall support the service drop and meet required clearances for the service drop and drip loops above the ground, buildings, driveways, roads and other facilities.

B. The customer is responsible to provide and install an insulated attachment point either located on the service mast or a screw knob that will support the utility's service conductors.

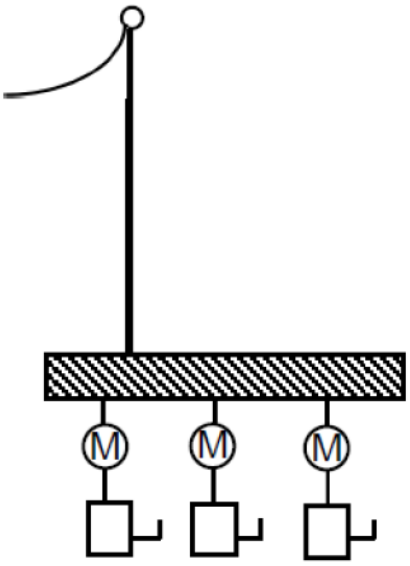
C. For connection to Plymouth Utilities' service drop wires, the customer's service entrance conductors shall extend at least 36 inches beyond the weatherhead for a single service riser.

D. Neutral conductors are to be identified according to the *National Electric Code* (*NEC*).

E. The maximum height Plymouth Utilities will attach a service drop to a building is 20 feet above ground. If a greater attachment height is required, customer shall obtain prior approval.

302. SERVICE RISER REQUIREMENTS

2 to 6 Self-Contained Meters



(2 to 6 Meters)
(2 to 6 Service Disconnects)

Notes:

1. Cable tray or raceway shall be NEMA 3R, lockable and sealable by Plymouth Utilities.

2. Refer to ESM Section 107 for maximum allowable entrance size for each service voltage.

303. SERVICE MAST CONSTRUCTION

A. Service masts for support through the roof shall be constructed of Rigid Galvanized Steel (RGS) conduit with an inside diameter of no less than two inches. Intermediate Metal Conduit (IMC) is not allowed as a service mast through the roof.

B. The portion of the mast above the uppermost conduit support (roof line) shall be continuous in length without couplings.

C. No portion of the service mast pipe, except the portion extending through the roof eve/overhang shall be covered.

D. If the service drop attachment is more than 36 inches above the roof line, the overhead mast must be guyed.

E. Service masts shall not extend more than 5’ above the roof line without approval from Plymouth Utilities. The height is measured form the point where the conduit exists the enclosed portion of the roof to the top of the weatherhead.

F. Only power service-drop conductors shall be permitted to be attached to a service mast – *NEC* 230.28.

G. The drip loop and service conductor shall have a separation of at least 12” to any communication circuit.

H. All overhead service conductors shall be 500 kcmil or smaller.

MAXIMUM HEIGHT OF WEATHERHEAD ABOVE SUPPORT ON AN UNGUYED SERVICE MAST

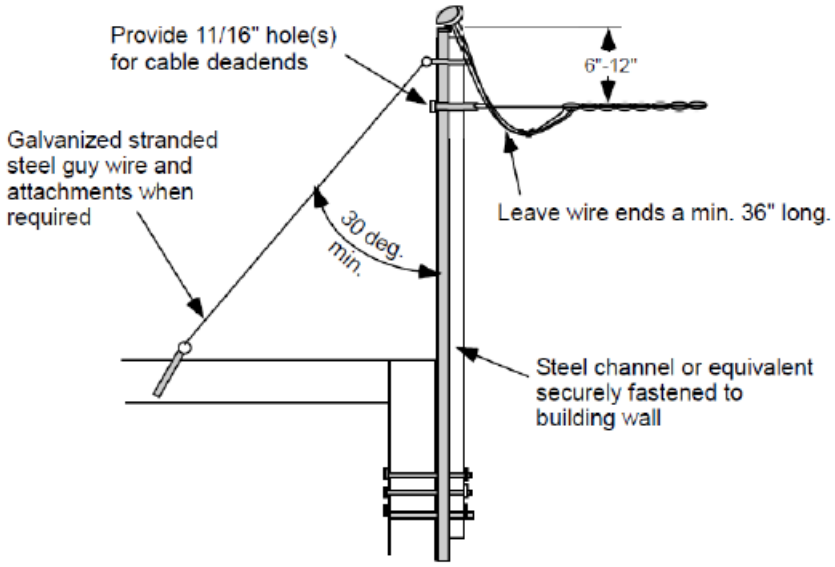
Heavy loaded service drop tension may not exceed 500 lbs.

Type of Conduit Material	Conductor Size	Service Drop Length (ft.)	2” Conduit	2 ½” Conduit*	3” Conduit*
Rigid Galvanized Steel (RGS) Conduit	#2 Aluminum Triplex	30	6’-0”	8’-0”	8’-0”
		40	6’-0”	8’-0”	8’-0”
		50	5’-10”	8’-0”	8’-0”
		60	5’-1”	8’-0”	8’-0”
		70	4’-7”	7’-6”	8’-0”
		80	4’-1”	6’-8”	8’-0”
	#1/0 Aluminum Triplex	30	6’-0”	8’-0”	8’-0”
		40	6’-0”	8’-0”	8’-0”
		50	5’-0”	8’-0”	8’-0”
		60	4’-4”	7’-2”	8’-0”
		70	3’-11”	6’-4”	8’-0”
		80	3’-7”	5’-8”	8’-0”

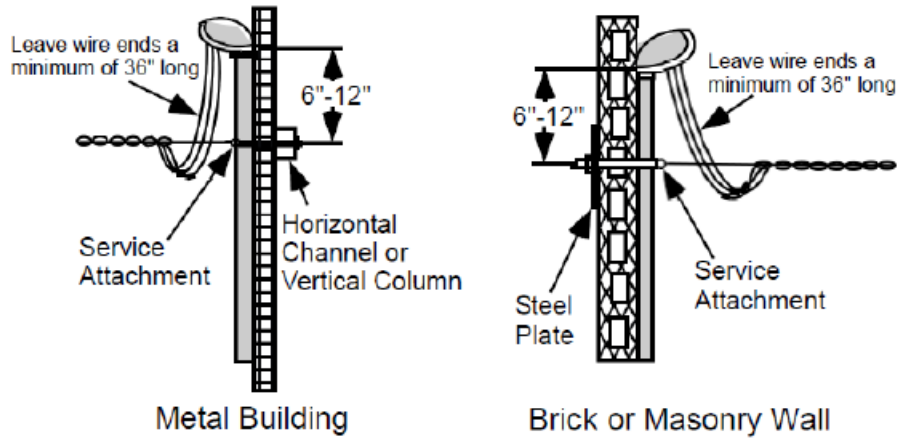
*Service masts cannot extend more than 6 ft. above any sloped roof regardless of the slope. They can however extend to more than 6 ft. above a flat roof where a ladder can be safely used.

304. SERVICE MAST INSTALLATION

Flat or Low-roofed buildings



Metal Buildings, Brick or Masonry Wall

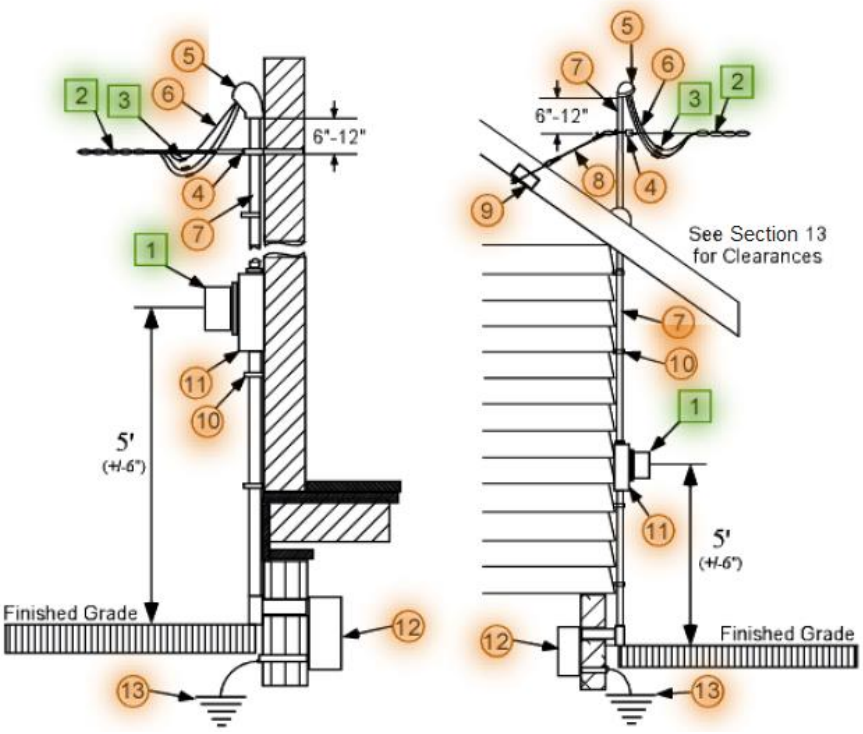


Notes:

1. The customer shall consult Plymouth Utilities before any above installation is planned or started.
2. The customer furnishes, installs, and maintains the installation except for Plymouth Utilities' service drop and connectors.
3. The customer should consult with Plymouth Utilities for service drop tensions and shall provide attachment with adequate strength. The installation shall meet required clearances for Plymouth Utilities' overhead service drop.

305. WALL OR THROUGH-THE-ROOF INSTALLATION – PREFERRED CONSTRUCTION

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Overhead service cable	X	
3	Service dead-end clamp or grip and connectors	X	
4	Service attachment point		X
5	Rain-tight weatherhead		X
6	Service entrance wires with 36” leads		X
7	Rigid conduit		X
8	Rigid galvanized steel (RGS) conduit		X
9	Conduit guy – ¼” Min. Galv. Steel (if required)		X
10	Conduit or cable supports (as required)		X
11	Approved meter socket		X
12	Customer’s service entrance panel		X
13	Ground in accordance with the *NEC*		X



306. NOT USED

307. APPROVED OVERHEAD METER SOCKETS

Plymouth Utilities requires all overhead meter sockets to be ringless and have either manual or lever bypasses (320 Amp and 7 Terminal Sockets only). The tables below list commonly used sockets. Other sockets should be checked with Plymouth Utilities for approval. When checking with Plymouth Utilities, please provide the socket spec sheet.

307A. Residential 200 Amp Overhead Meter Sockets without Main Breaker

Manufacturer	Catalog Number
Durham, Eaton-Cutler Hammer, Midwest Electric Products	UHTRS233*-( )[1,2]
Milbank	U1773-XL-TG-KK

1. –( ) = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D
2. UHT, UGHT, UTH, UGTH, UT, USTS, & UGT Series: *= Select desired bolt-on-hub or top configuration.

307B. 200 Amp 5-Terminal Overhead Meter Sockets without Main Breaker

Manufacturer	Catalog Number
Durham, Eaton-Cutler Hammer, Midwest Electric Products	UHTRS233*-( )[1,2]
Milbank	U1773-XL-TG-KK-5T

1. –( ) = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D
2. UHT, UGHT, UTH, UGTH, UT, USTS, & UGT Series: *= Select desired bolt-on-hub or top configuration.

307C. Residential 320 Amp Overhead Meter Sockets

Manufacturer	Catalog Number
Durham, Eaton-Cutler Hammer, Midwest Electric Products	1008540-( )[1]
Milbank	U1799-RRL-K3-K1350
Siemens/Talon	48104-82WI (60162 Lugs)
	48704-82GP

1. –( ) = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D

307D. Residential 200 Amp Overhead Meter Sockets with Main Breaker

Manufacturer	Catalog Number
Eaton-CH	MB200BTSD
Leviton	LP820-HMC
Midwest Electric Products	R281CB1
Milbank	U5844-PXL-200
	U5168-XTL-200-KK
Siemens/Talon	LG0846B1200RBT

307E. Residential 200 Amp 5-Terminal Overhead Meter Sockets with Main Breaker

Manufacturer	Catalog Number
Eaton-CH	MB816B200BTSD
Milbank	U5168-XTL-200-KK-5T
Siemens/Talon	LGMM0202B1200RJBX
	MC0816B1200RJBT
	MM0202B1200RJBX

307F. Residential 320 Amp Overhead Meter Sockets with Main Breaker

Manufacturer	Catalog Number
Milbank	U6585-X-2-200-K3L
	U6227-X-400-K3L
	U6228-X-400-K3L
	U5059-X-2/200-K3L

307G. Commercial/Residential 200 Amp Overhead Meter Sockets

Manufacturer	Catalog Number
Brooks Utility Products	601U43V3B41-B20A00-MK
Milbank	U6513-XL-BL
Siemens/Talon	9804-8947

307H. Commercial/Residential 300 Amp Overhead Meter Sockets

Manufacturer	Catalog Number
Brooks Utility Products	601U49V3B42-B32A00-MK
Durham, Eaton-Cutler Hammer, Midwest Electric Products	1008541-( )[1]
Siemens/Talon	48104-82WI (60162 Lugs)
	48704-82GP

1. –( ) = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D

307I. Commercial/Residential 200 Amp 5-Terminal Overhead Meter Sockets

Manufacturer	Catalog Number
Brooks Utility Products	601U43V3B51-B20A00-MK
Milbank	U6513-XL-BL
Siemens/Talon	48805-0BNU

307J. Commercial/Residential 300 Amp Overhead 5-Terminal Meter Sockets

Manufacturer	Catalog Number
Brooks Utility Products	601U49V3B52-B32A00-MK

307K. Commercial/Residential 200 Amp Overhead Meter Socket with Main Breaker

Manufacturer	Catalog Number
Midwest Electric Power	R281CB1034
Milbank	U6012-XL-200-K1
	U3995-XL-200
Leviton	LP815-LMC
	LP820-LMC

307L. Commercial/Residential 300 Amp Overhead Meter Socket with Main Breaker

Manufacturer	Catalog Number
Milbank	U4835-X-2/150-K3-BL
	U4835-X-200/100-K3-BL
	U6585-X-200-100-K3L
	U6585-X-2-150-K3L
	U6227-X-300-K3L
	U6228-X-300-K3L
	U5059-X-2-150-K3L
	U5059-X-200-100-K3L
Siemens/Talon	MK0402L1400RLM

307M. Commercial/Residential 200 Amp 5-Terminal Overhead Meter Socket.

Manufacturer	Catalog Number
Milbank	U6012-XL-200-K1-5T9
Siemens/Talon	MC0408B1200JLT
	MM0202B1200RLC
Leviton	LP815-MC
	LP820-MC

307N. Commercial/Residential 200 Amp 7-Terminal Overhead Meter Sockets (3-Phase)

Manufacturer	Catalog Number
Brooks Utility Products	601U43V3B71-B20A00-MK
Milbank	U1493-X

307O. Commercial/Residential 300 Amp 7-Terminal Overhead Meter Sockets (3-Phase)

Manufacturer	Catalog Number
Brooks Utility Products	601U49V3B72-B32A00-MK
Durham, Eaton-Cutler Hammer, Midwest Electric Products, Square-D	1008543-( )[1]
Milbank	U2594-X-K7
Siemens/Talon	48707-[029 or 82][2]

1. –( ) = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D
2. 48707-029 does not include lugs; 48707-82 does include lugs

307P. Commercial/Residential Instrument Transformer Rated Overhead Meter Sockets

Terminals	Manufacturer	Catalog Number
6	Milbank	UC7532-XL
13	Brooks Utility Products	602U3060B13-1542-MK
	Durham, Eaton-Cutler Hammer, Midwest Electric Products	USTS132*-( )[1,2]
	Erickson Electric	W-340
	Milbank	UC7449-XL
	Siemens/Talon	9837-8503
	Tesco/Advent	9070122

1. –( ) = (blank) Durham, (CH) Eaton-Cutler Hammer, (E) Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D
2. UHT, UGHT, UTH, UGTH, UT, USTS, & UGT Series: *= Select desired bolt-on-hub or top configuration.

Plymouth Utilities

Chapter 4

Underground Secondary Service

Reserved For Notes:

400. SCOPE

This chapter covers the requirements and rules for underground residential and commercial secondary services for Plymouth Utilities customers.

401. GENERAL INFORMATION

A. The underground service lateral is defined as Plymouth Utilities' underground service conductors from the last pole, pedestal, transformer, or other Plymouth Utilities structure, connecting to the customer's metering point, or termination equipment. Plymouth Utilities will install, own, and maintain the underground service laterals in accordance with applicable tariffs and extension rules. Plymouth Utilities will not install underground service laterals across rock quarries, tillable agricultural land, or other locations not suitable for underground cables and equipment.

B. Plymouth Utilities will not terminate service lateral conductors inside the customer's building or in customer-owned switchgear. The termination point shall be outside the customer's building in free-standing or wall-mounted equipment, (self-contained meter, metering transformer cabinet, or a termination box). PU will not terminate on a customer's circuit breaker or disconnect switch.

C. Before installing service entrance equipment, the customer shall apply to Plymouth Utilities for underground service and obtain approval for the service location. The customer shall install, own, and maintain all service entrance facilities other than the service lateral, meters, instrument transformers and instrument transformer wiring.

D. All underground service cables shall be protected from physical damage. See Rigid Conduit in Section 406. Reference: *NEC*230.32, *NEC*230.50, & *NEC* 300.5.

E. See Section 106 part E for required site preparation.

F. Plymouth Utilities should be consulted before changing grade over PU's underground cables.

G. All underground self-contained metering apparatuses shall be pedestal style.

402. SIZING UNDERGROUND FACILITIES

A. Conduit – Number of conduits sized to customer's main disconnect. See Section 406.

B. Transformer Pad – Consult Plymouth Utilities. Sized to customer's main disconnect. See Sections 407-409: Three-Phase Transformer Pad Options

C. Underground Conductors – Sized to customer's load, voltage drop, and flicker requirements.

D. Transformer – Sized to customer's load.

E. Metering Transformer or Termination Cabinets – Sized to customer's main disconnect.

403. LOCATION OF PLYMOUTH UTILITIES SECONDARY VOLTAGE CABLES

A. Buildings and Pools

Plymouth Utilities cables (primary or secondary) shall not be located under buildings or pools. Inform PU of plans for future buildings, pools, etc.

B. Sidewalks, Hard Surfaced Parking Lots, Driveways, Patios, and Decks

1. With approval from Plymouth Utilities, buried cables may be installed in conduit through these areas, if no other acceptable route exists.

Informational Note: Cable runs crossing under sidewalks at 90° may not be required to be installed in conduit, unless there are other circumstances that would require conduit.

2. When installing a hard surface, if it will be over top existing underground cable, the customer shall pay Plymouth Utilities for the relocation of said underground cable.

C. Compliance

Whenever a direct buried cable installation is found to be out of compliance with any of the stated requirements, or in violation of local, state or national codes, the customer's equipment and/or Plymouth Utilities facilities will be modified at the customer's expense to bring the installation into compliance.

404. UNDERGROUND SERVICE INSTALLATIONS

A. Self-Contained Metering Installations

Plymouth Utilities will install trench and cable for all self-contained metering installations. These are single-phase 120/240 volt 200-320 amp and three-phase 120/208 volt 200 amp rated installations.

1. The metering enclosure shall be pedestal style, not socket style. The customer is responsible for providing the pedestal. See Section 410 for approved meter pedestals.
2. Overhead meter sockets installed with underground are limited to existing installations only. Any service upgrades will require the installation of a meter pedestal. All new installations shall be a meter pedestal for underground residential services.

B. Instrument Rated Metering Installations

The customer is responsible for installing trench, conduit, and cable for all services terminated inside of a metering transformer cabinet, termination cabinet, etc. Plymouth Utilities will terminate the wire inside of PU's transformer. See Section 613 for instrument transformer metering requirements.

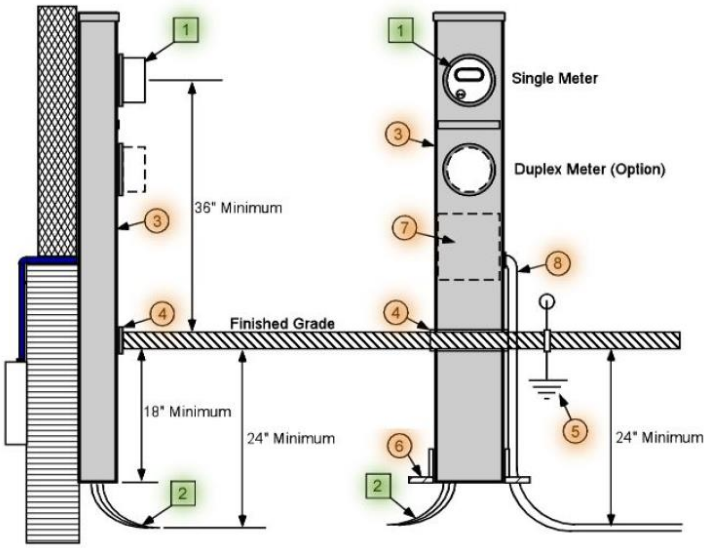
C. The customer's service installation shall be in compliance with all requirements of the *National Electrical Code (NEC)* and those of Plymouth Utilities.

405. OUTDOOR METER PEDESTAL SERVICE

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Underground service cable	X	
3	Approved meter pedestal		X
4	Concrete sleeve		X
5	Ground in accordance with the *NEC*		X
6	Factory stabilization footing (See Note 3)		X
7	Service Entrance Equipment – Main (See Note 2)		X
8	Rigid conduit – Customer load conductor (See Notes 4 & 5)		X

Notes:

1. All of the ground rods shall be installed on the same side of the meter pedestal. Ground rods shall not be placed within the pedestal.
2. The grounding electrode conductor may only terminate in pedestal with a main disconnect(s).
3. The pedestal shall be securely fastened to the building wall or foundation. A free-standing meter pedestal with a stabilization footing shall not be used. Instead, a meter structure shall be used in accordance section 610.
4. A 3’ square area shall be provided around pedestal to facilitate access to cable for repair or replacement. Conduit is required under concrete and shall extend 3’ beyond edge.
5. Customer’s load conductors are not allowed to exit the bottom of the pedestal unless divided for metered and un-metered conductors. Customer load conductor may exit through factory knockouts in the back of the pedestal.
6. Meter pedestal shall be at least 12’ from the nearest pole or other Plymouth Utilities facility.



406. RIGID CONDUIT

A. Rigid conduit includes Rigid Galvanized Steel (RGS), rigid aluminum, galvanized Intermediate Metal Conduit (IMC), or rigid nonmetallic conduit schedule 80 PVC electrically rated and schedule 80 equivalent polyethylene. The rigid nonmetallic conduit shall conform to specifications in Article 342, 344, and 352 of the *NEC*. Refer to individual sections for specific installations. Galvanized steel conduit may be either rigid steel or galvanized IMC. It shall not be Electric Metallic Tubing (EMT).

B. Schedule 40 electrically rated PVC is allowed for horizontal runs 18 inches below final grade and into pad mounted transformers and pad mounted cabinets.

C. The tables below are to be used as a general guide to determine conduit and wire sizes for the listed services. The sizes and numbers of these facilities may have to be modified to take into account the length of the service lateral, the customer loads, and any voltage drop considerations that may apply. Service laterals extending directly from a transformer should be limited to 250'. Service laterals extending from a pedestal should not exceed 150'. Longer lengths are acceptable if service loading is to be significantly lower than normal. For deviations from these tables please consult with Plymouth Utilities.

Underground Single-Phase

Service Amps	Min. Number of Conduits	Conduit Size (in.)	Number and Size Al Conductor	Number and Size Cu Conductor	Number and Size Compact Al Conductor
200	1	2[1]	(1) – 4/0 AWG	(1) – 3/0 AWG	(1) – 4/0 AWG
400	1	4	-----	(1) – 500 kcmil	-----
	2	2[1]	(2) – 4/0 AWG	(2) – 3/0 AWG	(2) – 4/0 AWG
600	2	4	(2) – 400[2] kcmil	(2) – 300 kcmil	(2) – 400[2] kcmil

1. A 2½" conduit may be required if larger conductors are required.
2. Acceptable if load calculation is 540 amps or less.

Notes:

1. All PVC service conduit elbows shall be preformed.

2. Allowable conductor sizes for Al and Cu service conductor: 4/0, 250, 300, 350, 400, 500, and 600.

3. Allowable conductor sizes for compact Al service conductor: 4/0, 350, 400, 450, 500, 600, 750.

Underground Three-Phase

Service Amps	Min. Number of Conduits	Conduit Size (in.)	Number and Size Al Conductor	Number and Size Cu Conductor	Number and Size Compact Al Conductor
200	1	2[1]	(1) – 4/0 AWG	(1) – 3/0 AWG	(1) – 4/0 AWG
400	1	4	-----	(1) – 500 kcmil	-----
	2	2[1]	(2) – 4/0 AWG	(2) – 3/0 AWG	(2) – 4/0 AWG
600	2	4	(2) – 400 kcmil[2]	(2) – 300 kcmil	(2) – 400 kcmil[2]
800	2	4	-----	(2) – 500 kcmil	-----
	3	4	(3) – 400 kcmil	-----	(3) 400 kcmil
1200	3	4	-----	(3) – 600 kcmil	-----
	4	4	(4) – 500 kcmil	-----	(4) – 500 kcmil
1600	4	4	-----	(4) – 600 kcmil	-----
	5	4	(5) – 600 kcmil	-----	(5) – 600 kcmil
2000[3]	5	4	-----	(5) – 600 kcmil	-----
	6	4	(6) – 600 kcmil	-----	(6) – 600 kcmil

1. A 2½" conduit may be required if larger conductors are required.
2. Acceptable if load calculation is 540 amps or less.
3. Limited to 120/208 volt services only.

Notes:

1. Service sizes listed may not be available without prior Plymouth Utilities approval. Check Section 107 and consult with PU prior to installing service.

2. All PVC service conduit elbows shall be preformed.

3. Allowable conductor sizes for Al and Cu service conductor: 4/0, 250, 300, 350, 400, 500, and 600.

4. Allowable conductor sizes for compact Al service conductor: 4/0, 350, 400, 450, 500, 600, 750.

407 – 409: TRANSFORMER PAD OPTIONS

The customer/contractor shall install, own, and maintain a concrete pad whenever underground service requires a three-phase pad, or single-phase underground service is instrument metered.

407: Transformer Concrete Pad

Metering transformer cabinet is wall-mounted or pad-mounted on a separate isolated pad. Wall-mounted cabinets require prior approval from Plymouth Utilities.

408: Concrete Foundation Walls for Transformer Pad

Where unstable soil conditions exist to avoid tilting of pad, or where a large number of secondary cables are required to provide a cable training area.

409: Back-to-Back Joint Transformer and Instrument Metering Cabinet Concrete Pad

When metering transformer cabinet is pad-mounted and it is desired to pour a single pad for the metering transformer cabinet and transformer, this design requires the use of conduit between the transformer and metering transformer cabinet. This is the preferred construction.

407A. CONCRETE PAD SPECIFICATIONS AND LAYOUT FOR THREE-PHASE, PAD-MOUNT TRANSFORMERS

A. The customer/contractor shall contact Plymouth Utilities for sizes and number of primary and secondary conduits.

B. Pad shall rest on firm, well-compacted soil, free of organic or other undesirable materials.

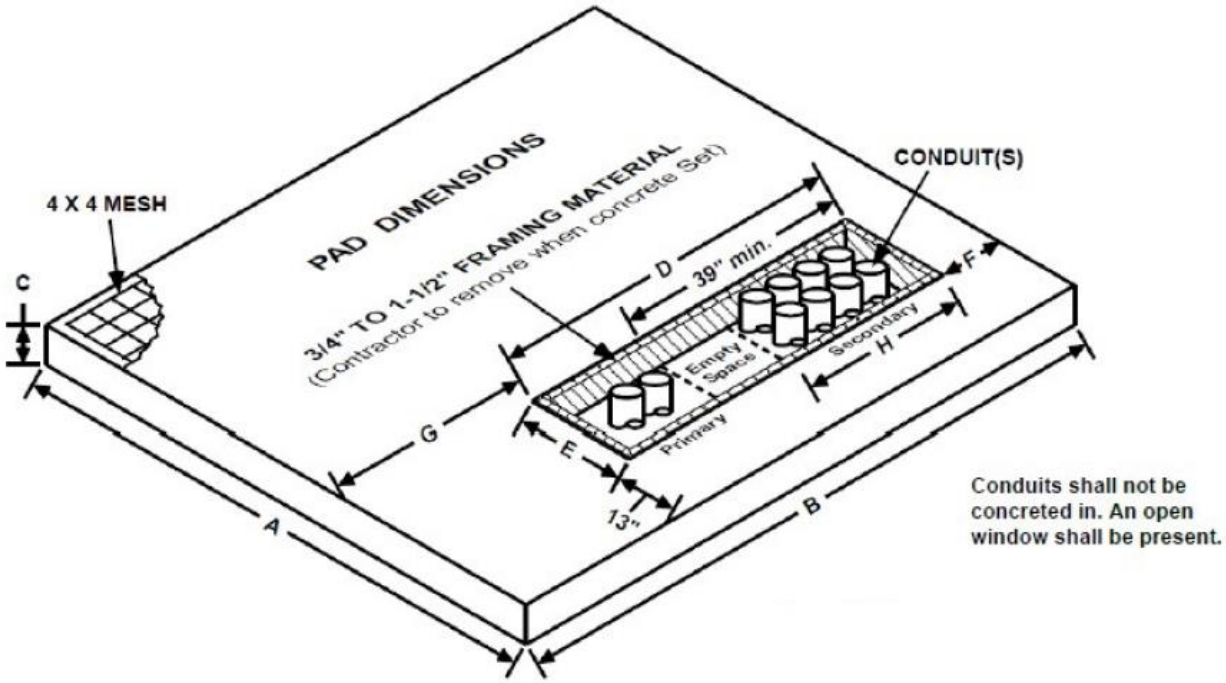
C. Concrete mix shall have a minimum strength of 4000 lb./sq. in. after 28 days.

D. The top of the pad shall be level and all edges and corners rounded off.

E. The pad shall be reinforced with #4 wire, 4"x 4" welded mesh or equivalent materials with additional 3/8-inch reinforcing rods around the cable opening. The mesh shall not be less than 1 inch from the edges and opening and 3" below the surface.

F. If the #4 wire, 4"x 4" mesh is not available, two layers of #10 wire, 6"x 6" mesh, staggered by 2 inches horizontally, may be substituted for the #4 wire.

G. Macro-Synthetic Fiber may be used in lieu of wire mesh. The fiber shall be installed per manufacturer specifications for minimum shrinkage and temperature reinforcement of slab on grade applications.



		Service Size		Dimensions							
		208Y/120	480Y/120	A	B	C	D	E	F	G	H
Pad	kVA	Amps		Inches							
I	75-500	100-1200	100-600	84	96	6	55	17	10	31	22
II	750-2500	1600-3000	800-3000	105	108	8	60	17	14	34	27

407B. CONCRETE PAD SPECIFICATIONS AND LAYOUT FOR SINGLE-PHASE, PAD-MOUNT TRANSFORMERS

A. The customer/contractor shall contact Plymouth Utilities for sizes and number of primary and secondary conduits.

B. Pad shall rest on firm, well-compacted soil, free of organic or other undesirable materials.

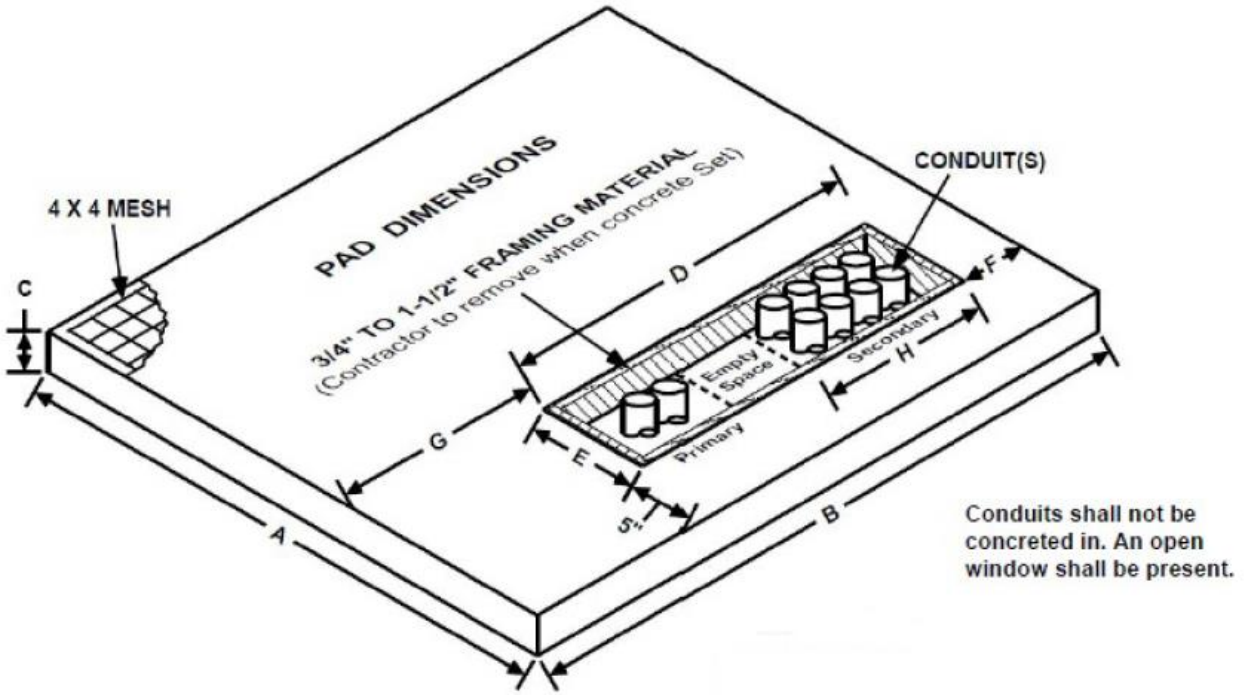
C. Concrete mix shall have a minimum strength of 4000 lb./sq. in. after 28 days.

D. The top of the pad shall be level and all edges and corners rounded off.

E. The pad shall be reinforced with #4 wire, 4"x 4" welded mesh or equivalent materials with additional 3/8-inch reinforcing rods around the cable opening. The mesh shall not be less than 1 inch from the edges and opening and 3" below the surface.

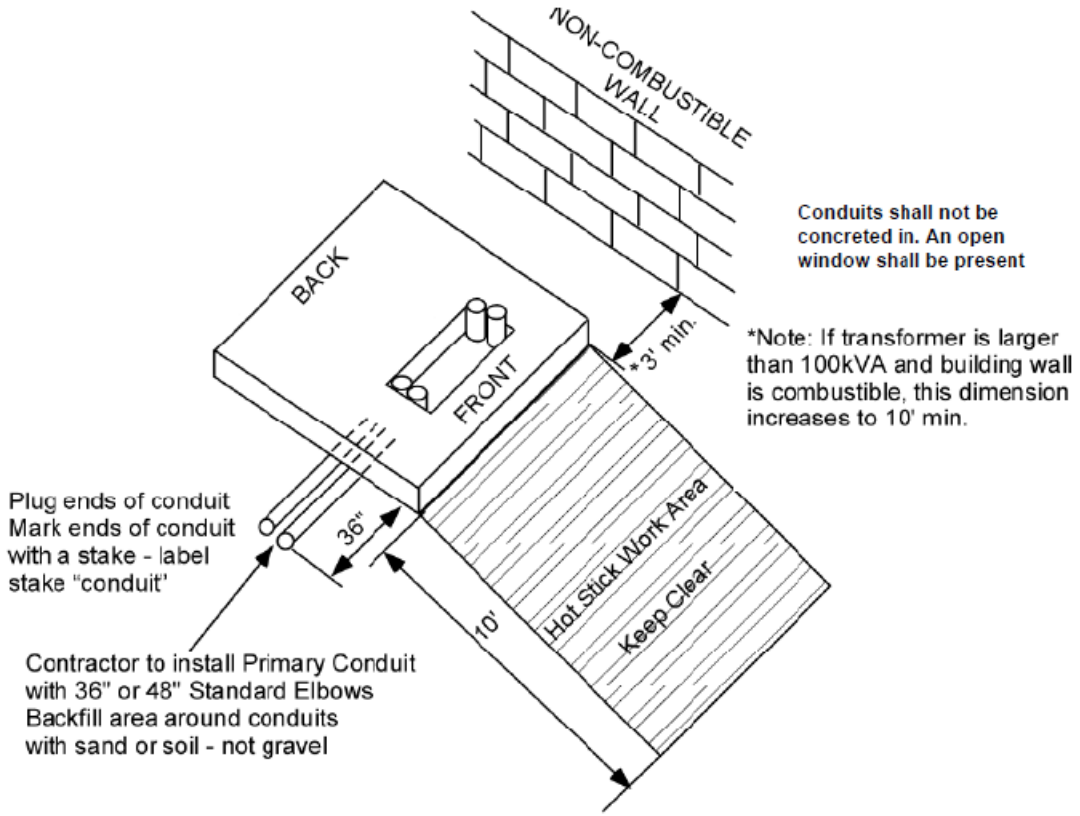
F. If the #4 wire, 4"x 4" mesh is not available, two layers of #10 wire, 6"x 6" mesh, staggered by 2 inches horizontally, may be substituted for the #4 wire.

G. Macro-Synthetic Fiber may be used in lieu of wire mesh. The fiber shall be installed per manufacturer specifications for minimum shrinkage and temperature reinforcement of slab on grade applications.



			Dimensions							
			A	B	C	D	E	F	G	H
Pad	kVA	Voltage	Inches							
I	25-75	120/240	50	44	6	28	12	8	8	12
II	100-167	120/240	58	44	6	28	14	8	8	12

407C. CONCRETE PAD SPECIFICATIONS AND LAYOUT FOR PAD-MOUNT TRANSFORMERS



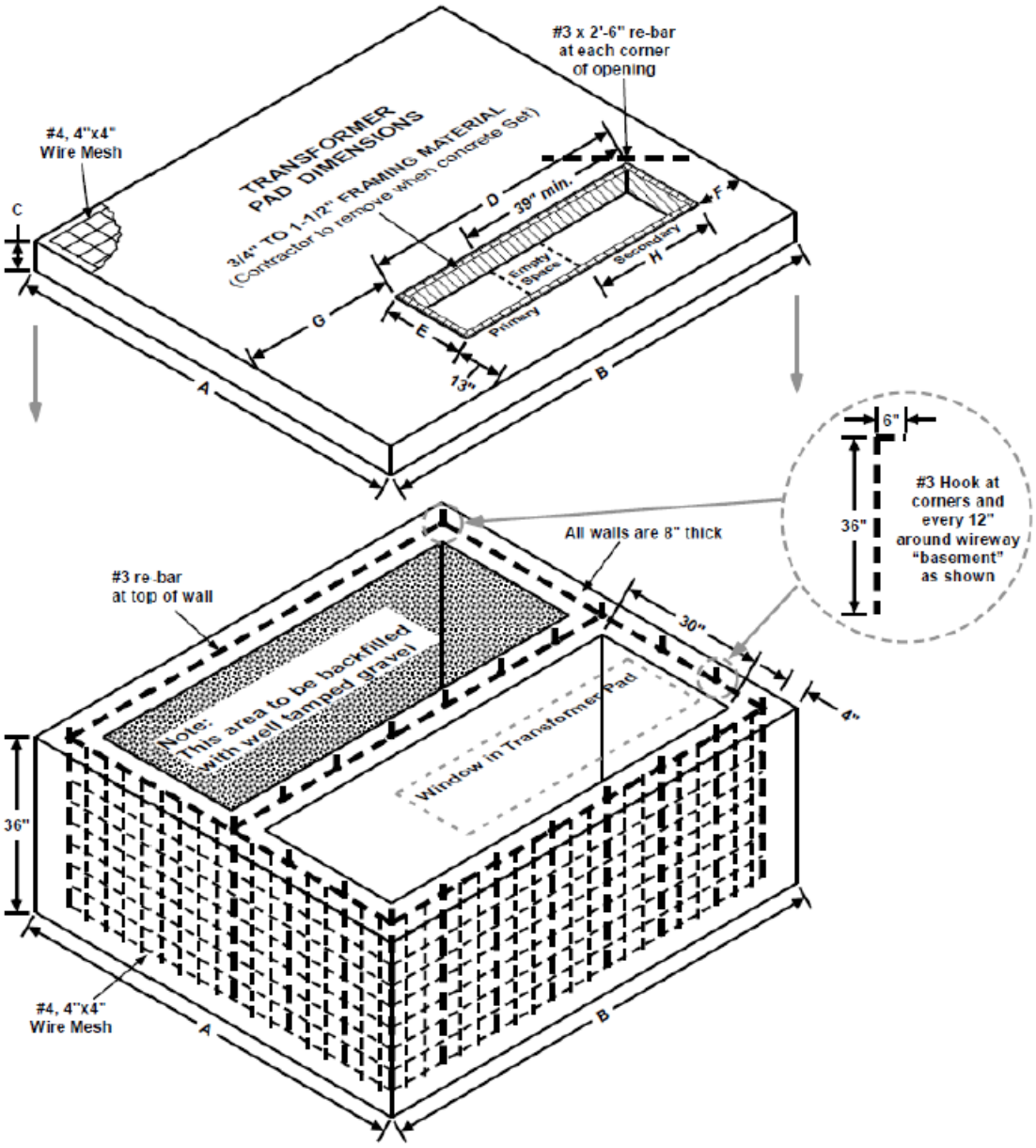
Three Phase Pad Specifications

Notes:

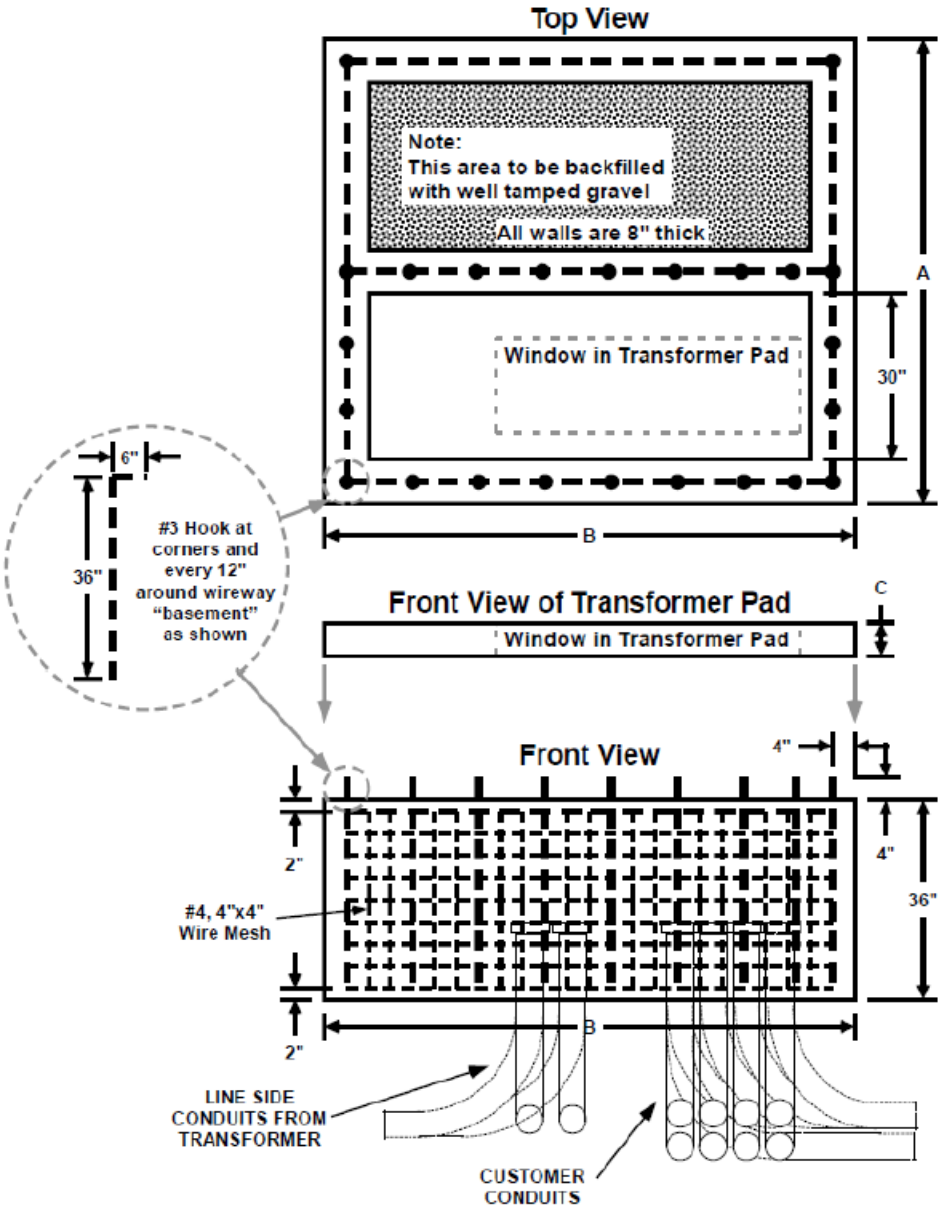
1. A clear space of 10 feet shall be maintained in front of the transformer to provide working space for hot-stick operation of the transformer and 3 feet on all other sides. Transformers or other pad mounted equipment shall not be covered with decorative objects for the purpose of hiding from public view.
2. Pad mounted metering transformer cabinets may be mounted on an isolated pad, adjacent to the transformer pad, or on a joint transformer and metering transformer cabinet pad designed to accommodate conduit elbow sweeps.
3. All conduits shall enter through the window opening provided in the pad foundation. These conduits shall be cut off so the top of the conduit is flush with the surface of the pad.
4. All metallic conduits shall be fitted with an insulating bushing.

408. CONCRETE SPECIFICATIONS AND LAYOUT FOR FOUNDATION WALL FOR TRANSFORMER PAD

Stand-alone transformer pad, **ESM 407**, will sit on top of foundation walls detailed below. Foundations may be used where unstable soil conditions exist to avoid tilting of pad, or where a large number of secondary cables are required to provide a cable training area. Consult with Plymouth Utilities.



408. CONCRETE SPECIFICATIONS AND LAYOUT FOR FOUNDATION WALL FOR TRANSFORMER PAD (CONTINUED)



Notes:

1. Top of foundation walls shall be level.

2. Drainage around pad is sloped to allow liquids to flow away from any building.

409. CONCRETE PAD SPECIFICATIONS AND LAYOUT FOR JOINT PAD THREE-PHASE, PAD-MOUNT TRANSFORMER AND INSTRUMENT METERING TRANSFORMER CABINET "BACK-TO-BACK DESIGN"

A. The customer/contractor shall contact Plymouth Utilities for sizes and number of primary and secondary conduits.

B. Pad shall rest on firm, well-compacted soil, free of organic or other undesirable materials.

C. Concrete mix shall have a minimum strength of 4000 lb./sq. in. after 28 days.

D. The top of the pad shall be level and all edges and corners rounded off.

E. The pad shall be reinforced with #4 wire, 4"x 4" welded mesh or equivalent materials with additional 3/8-inch reinforcing rods around the cable opening. The mesh shall not be less than 1 inch from the edges and opening and 3" below the surface.

F. If the #4 wire, 4"x 4" mesh is not available, two layers of #10 wire, 6"x 6" mesh, staggered by 2 inches horizontally, may be substituted for the #4 wire.

G. Macro-Synthetic Fiber may be used in lieu of wire mesh. The fiber shall be installed per manufacturer specifications for minimum shrinkage and temperature reinforcement of slab on grade applications.

H. Joint pad is an extension of Plymouth Utilities standard transformer pad (ESM 407**).**

I. Pad dimensions vary based on Instrument Metering Transformer Cabinet used.

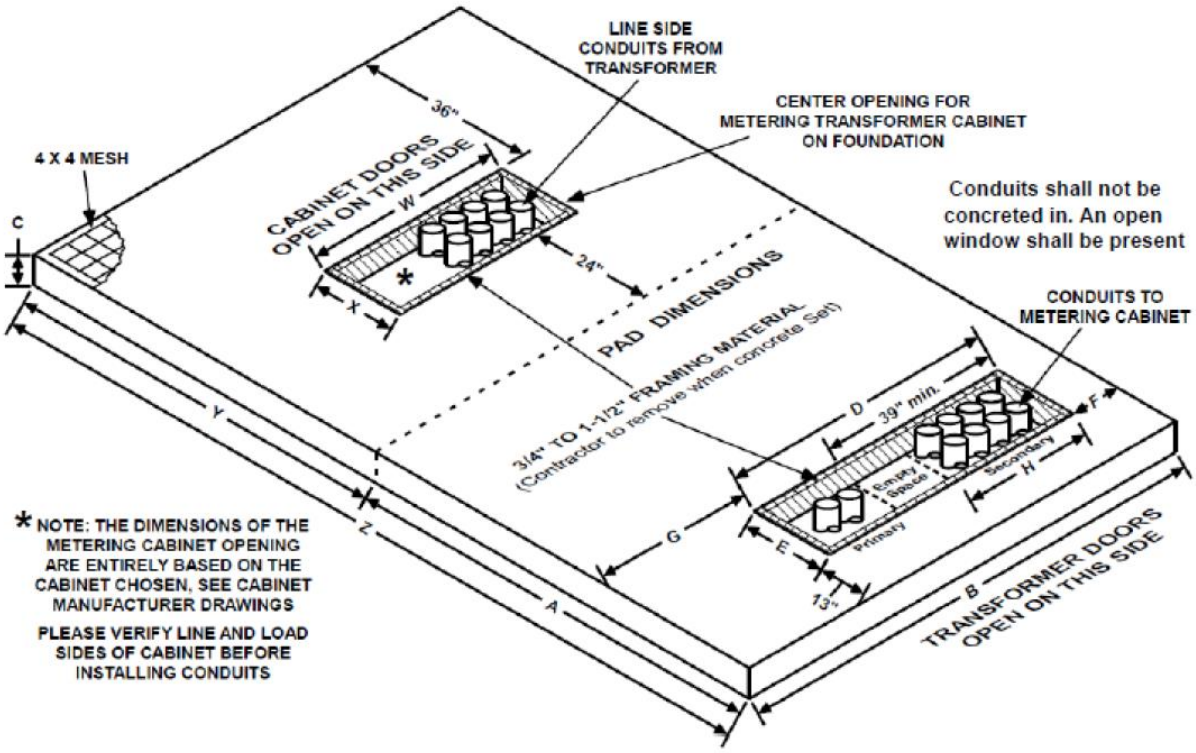
J. Joint pads are not allowed at farm installations where livestock may be present (see ESM 805).

Informational Note: On a farm with livestock the Metering Transformer Cabinet and transformer are required to be on separate pads. This has to do with the potential of needing to install a neutral isolator. If using a shared pad, neutral isolation may be impacted by the metal reinforcing rods.

		Service Size		Known Dimensions							
		208Y/120	480Y/120	A	B	C	D	E	F	G	H
Pad	kVA	Amps		Inches							
III	75-500	100-1200	100-600	84	96	6	55	17	10	31	22
IV	750-2500	1600-3000	800-3000	105	108	8	60	17	14	34	27

		Service Size		Dimensions Based on Metering Transformer Cabinet Used			
		208Y/120	480Y/120	W	X	Y	Z
Pad	kVA	Amps		Inches			
III	75-500	100-1200	100-600	Based on cabinet	Based on cabinet	X + 60"	A + Y
IV	750-2500	1600-3000	800-3000	Based on cabinet	Based on cabinet	X + 60"	A + Y

409. CONCRETE PAD SPECIFICATIONS AND LAYOUT FOR JOINT PAD THREE-PHASE, PAD-MOUNT TRANSFORMER AND INSTRUMENT METERING TRANSFORMER CABINET (CONTINUED)



Notes:

1. A clear space of 10 feet shall be maintained in front of the transformer to provide working space for hot-stick operation of the transformer and 3 feet on all other sides. Transformer or other pad-mounted equipment shall not be covered with decorative objects for the purpose of hiding the Plymouth Utilities equipment from public view.
2. Pad mounted instrument metering transformer cabinets may be mounted on an isolated pad, adjacent to the transformer pad (ESM 407), or on a joint transformer and instrument metering transformer cabinet pad (ESM 409) designed to accommodate conduit elbow sweeps.
3. All conduits shall enter through the window opening provided in the pad foundation. These conduits shall be cut off so the top of the conduit is flush with the surface of the pad.
4. All metallic conduits shall be fitted with an insulated bushing.
5. When an oil sump is required, excavate 18 inches under and around the pad and fill with coarse crushed rock – check with local building code to determine if an oil sump is required.

410. APPROVED METER PEDESTALS

Plymouth Utilities requires all meter pedestals to be ringless and have either manual or lever bypasses. The tables below list commonly used pedestals. Other pedestals should be checked with Plymouth Utilities for approval. When checking with Plymouth Utilities, please provide the pedestal spec sheet.

410A. Residential 200 Amp Meter Pedestals

Manufacturer	Catalog Number	Number of Meters
Durham, Eaton-Cutler Hammer, Midwest Electric, Square-D	1009264-( )[1]	2
	UHTRP242363-( )[1]	1
Milbank	U1783-O-KK[2]	2
	U3358-O-KK[2]	1
Siemens/Talon	UAP317-PP-WI	1
	UAP2317-PP-WI	2

1. –( ) = (blank Durham, (CH) Eaton-Cutler Hammer, Є Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D.
2. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad, or post-mount. Contact manufacturer for details and part number.

410B. Residential 320A Meter Pedestals

See Section 410F. Commercial/Residential 320 Amp Meter Pedestals.

410C. Residential 200 Amp Meter Pedestals with Main Breaker

Manufacturer	Catalog Number
Durham, Eaton-Cutler Hammer, Midwest Electric	1009842-( )[1] (Note: utility on right side)
	1008846-CH
Milbank	U5925-O-200-KK[2]
Siemens/Talon	MP0406B1100RB

1. –( ) = (blank Durham, (CH) Eaton-Cutler Hammer, Є Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D.
2. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad, or post-mount. Contact manufacturer for details and part number.

410D. Residential 320 Amp Meter Pedestals with Main Breaker

Manufacturer	Catalog Number
Eaton-Cutler Hammer	1009017-CH[1]
Milbank	U6318-O-2-200-K3L[1]
	U6317-O-2/200-K3L[1]

1. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad, or post-mount. Contact manufacturer for details and part number.

410E. Commercial/Residential 200 Amp Meter Pedestals

Manufacturer	Catalog Number
Milbank	U4724-O

410F. Commercial/Residential 320 Amp Meter Pedestals

Manufacturer	Catalog Number
Durham, Eaton-Cutler Hammer, Midwest Electric, Square-D	1009018-( )[1,2]
Milbank	U1748-O-WI[2]
Siemens/Talon	47604P-9WI

1. –( ) = (blank Durham, (CH) Eaton-Cutler Hammer, € Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D.
2. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad, or post-mount. Contact manufacturer for details and part number.

410G. Commercial/Residential 200 Amp 7-Terminal Meter Pedestal (3 Phase)

Manufacturer	Catalog Number
Durham, Eaton-Cutler Hammer, Midwest Electric	1009846-( )[1]
Milbank	U9107-O-WI[2]

1. –( ) = (blank Durham, (CH) Eaton-Cutler Hammer, € Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D.
2. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad, or post-mount. Contact manufacturer for details and part number.

A. Commercial/Residential 200 Amp Meter Pedestal with Main Breaker

Manufacturer	Catalog Number
Midwest Electric	R281E1P6H034
	R281C1P6H034
	R281C1B6H034
Milbank	U5701-O-200S[1]
	U6221-O-200-10GR[1]

1. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad, or post-mount. Contact manufacturer for details and part number.

B. Commercial/Residential 300 Amp Meter Pedestal with Main Breaker

Manufacturer	Catalog Number
Eaton-Cutler Hammer	1009020
Durham, Eaton-Cutler Hammer, Midwest Electric	1009841-( )[1]
	1009565-( )[1]
Milbank	U6318-O-2-150-K3L[2]
	U6318-O-200-100-K3L[2]
	U6317-O-200-100-K3L[2]
	U6317-O-2/150-K3L[2]

1. –( ) = (blank Durham, (CH) Eaton-Cutler Hammer, € Eaton, (MEP) Midwest Electric Products, or (SQD) Square-D.
2. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad, or post-mount. Contact manufacturer for details and part number.

Plymouth Utilities

Chapter 5

Distributed Generation

Reserved For Notes:

500. SCOPE

This chapter includes distributed or customer-owned generation interconnected in parallel and operating with Plymouth Utilities' electric distribution system. This is not a standalone chapter meaning all chapters of the ESM apply.

For all Distributed Generation (DG) installations, please contact Plymouth Utilities.

501. PERMISSION TO INTERCONNECT

DG interconnection may be an option for single and three phase customers. Characteristics of Plymouth Utilities' electrical system vary by circuit. Not every size, voltage, or type of generator can be interconnected at every location.

The customer shall supply Plymouth Utilities with the required electrical drawings and application for the proposed DG prior to installation. Plymouth Utilities may specify and require certain protective schemes based on the size, location, and other factors for the generating unit proposed.

See ESM Section 107.F. Wiring Inspections

502. RELEVENT CODES

All DG installations shall comply with the *National Electrical Code* (*NEC*) and Wisconsin Administrative Code Chapter PSC 119 – Rules for Interconnecting Distributed Generation Facilities. Plymouth Utilities requires the use of the proper WI PSC 119 forms #6027, #6028, #6029, and #6030 based on the DG facility size. These forms may be obtained at: https://psc.wi.gov/Pages/ForConsumers/MoreResources/CustomerOwnedGeneration.aspx. The customer may use the new forms created by the Wisconsin Distributed Resources Collaborative as supplemental information along with the old numbered forms.

503. METERING EQUIPMENT

A. Plymouth Utilities shall meter DG facility based on ESM Chapter 6 and/or Chapter 10.

B. A bi-directional meter is required at all DG facilities to properly meter forward and reverse energy flow. This meter will be placed at the time of commissioning the DG system, assuming the DG system is working properly.

C. Metering equipment may require replacement to accommodate DG metering. Such as, but not limited to:

1. Round-ring sockets
2. Rusted or damaged sockets or cabinets
3. Sockets or cabinets with inadequate internal or external clearances.

D. Modifying or installing lugs in a meter socket, pedestal, or instrument metering transformer cabinet other than what is listed on the manufacturer's drawing associated with the UL Listing is not allowed.

E. Metering equipment shall be accessible to Plymouth Utilities personnel. Accessible means the metering equipment shall be capable of being reached/accessed for programming,

reading, probing, inspections, and service without climbing, removing obstacles, utilizing ladders, entering locked areas, etc. Metering equipment that is not readily accessible will be required to be made accessible by the customer before interconnection of DG will be allowed.

F. The DG facility shall only be interconnected with a single metered service.

Informational Note: This means the customer is not allowed to feed DG from one building's electrical system into another building's electrical system when the two buildings are fed from separate metered electrical services.

504. PLYMOUTH UTILITIES DISTRIBUTION SYSTEM

All modifications and additions to Plymouth Utilities' electrical distribution system in order to accommodate distributed generation facilities will be at the customer's expense.

505. PRIMARY METERING CUSTOMERS WITH DG

All primary metered customers shall meet the requirements of ESM Chapter 10. Contact Plymouth Utilities for requirements related to specific installation of DG facilities on a primary service.

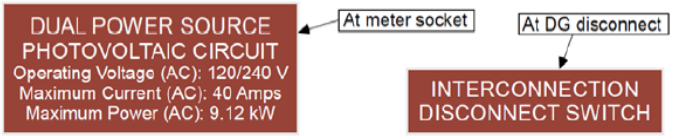
506. OPTIONAL STANDBY GENERATOR USED WITH DG

Where a customer operates both distributed generation and an optional standby generator, the standby generator shall be installed in accordance with the connection and transfer switch requirements of ESM Chapter 12.

507. LABELING REQUIREMENTS

A. It is the responsibility of the customer to comply with any and all labels required by the *NEC* or other jurisdictional codes and requirements.

B. Customer shall provide and install a "Dual Power Source" label at the meter socket indicating the operating voltage, maximum current, and maximum power of the solar PV system that is installed. Customer shall provide an "Interconnection Disconnect Switch" label at the DG disconnect. Example labels shown below:



C. Permanent labeling is required; labeling shall be rigid engraved plastic, engraved self-sticking brass, or engraved self-sticking aluminum.

D. Labeling shall use a minimum of ¼ inch block lettering.

508. POINT OF INTERCONNECTION

A. Preferred Methods

1. DG Connected via properly sized sub-breaker downstream from the main in service panel
2. Meter socket/pedestal with Main for Alternative Energy

3. Meter socket /pedestal with factory installed dual lugs, 320A
4. Attached to instrument metering transformer cabinet with available lugs

B. Optional Method

1. Insulation piercing connectors on the line side of customer's service entrance overcurrent protective device (Breaker/Fuse)

C. Not Permitted when connecting DG on the line side of customer's service entrance overcurrent protective device (Breaker/Fuse).

1. Splices
2. Split bolts
3. Tap connectors
5. Installing more cables than lugs are designed to handle
6. Modifying or installing lugs on any equipment on the line side of the overcurrent protective device, other than what is listed on the manufacturer's drawing associated with the UL Listing. All single throw disconnect switches shall be connected such that their blades are de-energized when the switch is in the open position.
7. Any other modifications to meter sockets/pedestal or instrument metering transformer cabinet

509. INTERCONNECTION DISCONNECT SWITCH (DISCONNECTION DEVICE) REQUIREMENTS

A. A device capable of disconnecting DG facilities from the electrical distribution system shall be installed at every DG site. The disconnection device shall be located within 10 feet of the utility electric meter on residential and single building structures. The disconnection device shall be located in an accessible location and within line of sight of the electric meter.

B. Disconnection device shall be mounted at a height between 30 and 72 inches.

C. Disconnection device shall open with a visual break, be able to be locked open, be capable of disconnecting and de-energizing distributed generation, and shall conform to state requirements.

D. The disconnection device should disconnect DG only and should not disconnect any load.

E. Any DG connection on the line side of the main service disconnect(s) shall have a service entrance rated disconnect switch with overcurrent protection.

F. Farm services utilizing a site-isolating device

1. DG interconnections shall not be allowed on the line side of the site-isolating device as defined by *NEC* 547.9.

510. BATTERY ENERGY STORAGE SYSTEMS

A. Battery energy storage systems shall use UL-1741 listed utility-interactive inverters.

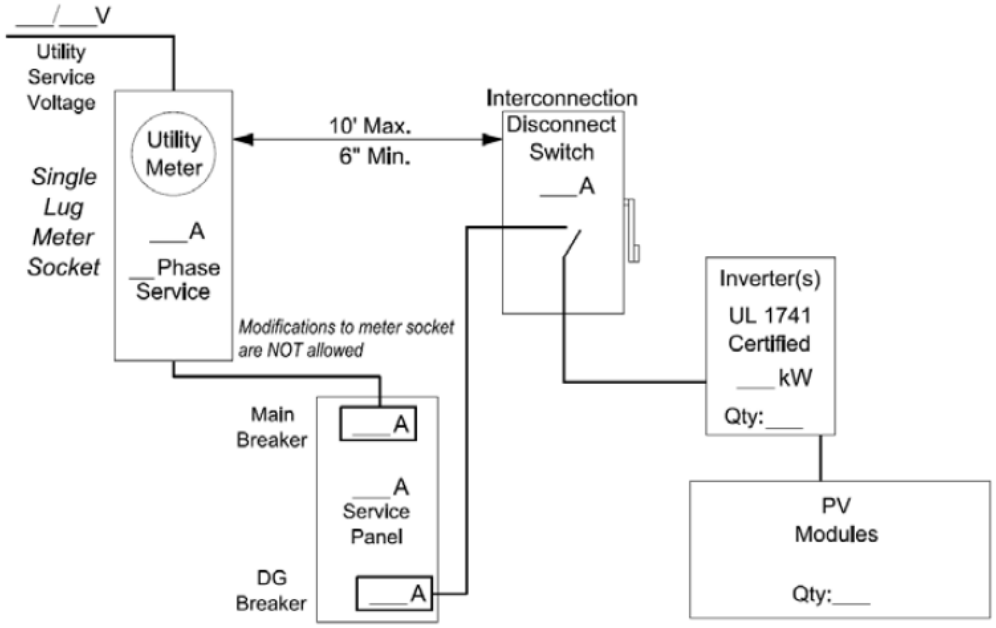
B. Energy storage system transfer devices are subject to the same requirements as standby generation system, see ESM Chapter 12.

C. 511 – 512 Drawings

Sample one-line diagrams are shown in 511-512; Plymouth Utilities should be consulted for all DG installations.

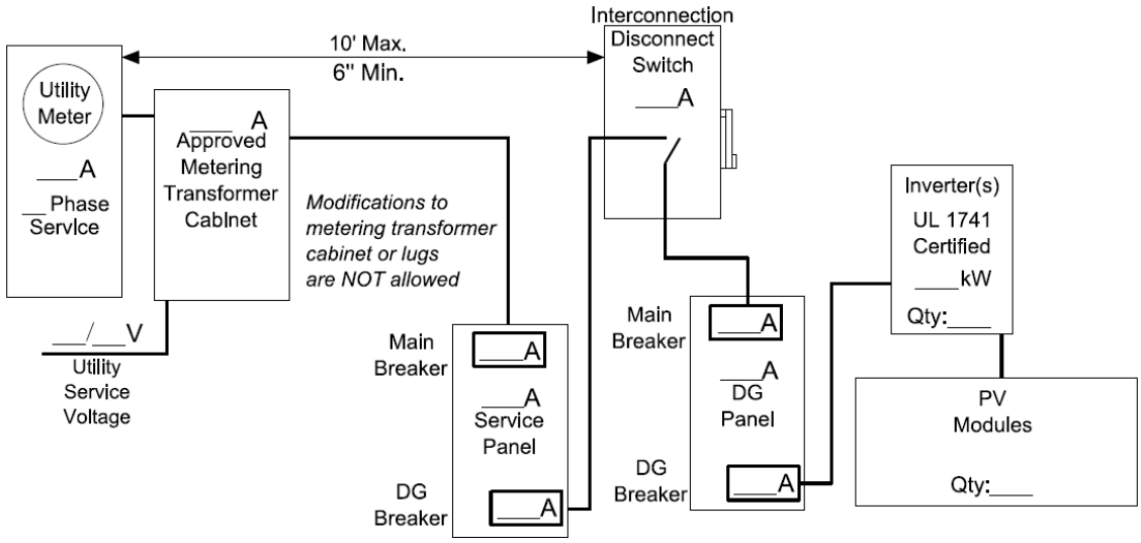
Informational Note: Utility meter and service lateral or drop are furnished and installed by Plymouth Utilities, all other equipment shown is furnished and installed by customer.

511. 1-PHASE/3-PHASE, SELF-CONTAINED, SINGLE LUG



512. NOT USED

513. 1-PHASE/3-PHASE, INSTRUMENT METERING TRANSFORMER CABINET



Notes:

- ***If DG Panel serves any load, the rated ampacity of the service panel main breaker plus the rated ampacity of the interconnection Disconnect Switch fuse shall not exceed the rated ampacity of the utility meter.***
- ***If DG Panels serves DG only, neither the rated ampacity of the service panel main breaker nor the rated ampacity of the interconnection Disconnect Switch fuse shall exceed the rated ampacity of the utility meter.***

514.-518. NOT USED

519. APPROVED METER SOCKETS/PEDESTALS FOR DISTRIBUTED GENERATION

Plymouth Utilities requires all meter sockets/pedestals to be ringless and have either manual or lever bypasses. The tables below list commonly used sockets/pedestals. Other sockets/pedestals should be checked with Plymouth Utilities for approval. When checking with Plymouth Utilities, please provide the socket/pedestal spec sheet.

519A. Commercial/Residential Alternative Energy 200 Amp Overhead Meter Sockets with Main Breaker

Manufacturer	Catalog Number
Eaton-Cutler Hammer	MBX2040PV200BTS

519B. Commercial/Residential Alternative Energy 200 Amp 5-Terminal Overhead Meter Sockets with Main Breaker

Manufacturer	Catalog Number
Siemens/Talon	MC2040S1200JLC

Plymouth Utilities

Chapter 6

Secondary Metering

Reserved For Notes:

600. SCOPE

This chapter covers the requirements and rules for secondary metering. For primary metering see Chapter 10. In this chapter socket and pedestal will be used interchangeably. Overhead services should utilize a socket while underground services shall utilize a pedestal.

601. METERING FACILITIES

A. Meter sockets are required on all services except special cases outlined in Plymouth Utilities rates.

B. Residential customers may use a residential or commercial meter socket. Commercial, farm, and non-residential customers shall use a commercial meter socket.

C. All meters located on a commercial property shall meet commercial requirements.

D. For installations requiring instrument transformers (potential or voltage transformer, PTs, and current transformers, CTs) an instrument metering transformer cabinet will be required. These instrument metering transformer cabinets are also commonly referred to as metering transformer cabinets, instrument transformer cabinets, or current transformer (CT) cabinets.

E. All outdoor service raceway or cable connections to meter socket bases, meter enclosures, CT cabinets, and/or switches shall be minimum NEMA Type 3R.

F. Meter assemblies containing breakers must meet Short Circuit Current Ratting (SCCR), Fault Current Ratings, and Amperage Interrupting Current (AIC); if the meter assembly does not contain breakers, these ratings do not apply.

G. If pouring concrete around an underground meter pedestal, Plymouth Utilities prefers a 30-inch wide by 36-inch deep clear space. If this space is not maintained, an expansion joint, at a minimum, shall be left around the meter pedestal cover. In the event Plymouth Utilities needs to perform work under the concrete, PU will cut said concrete, remove, it and not reinstall it.

H. Splices are not allowed in meter sockets, pedestals, or cabinets.

I. Metering equipment shall not be used as a raceway unless designed by the manufacturer with such provisions

J. It is not permitted to modify or install lugs in a meter socket, pedestal, or CT cabinet other than what is listed on the manufacturer's drawing associated with the UL Listing.

K. All 277/480 volt applications will require an instrument metering transformer cabinet and PTs.

602. LOCATION OF METERS

A. Plymouth Utilities shall pre-approve the location of all meters and metering equipment. The metering equipment shall be accessible at all times to PU representatives.

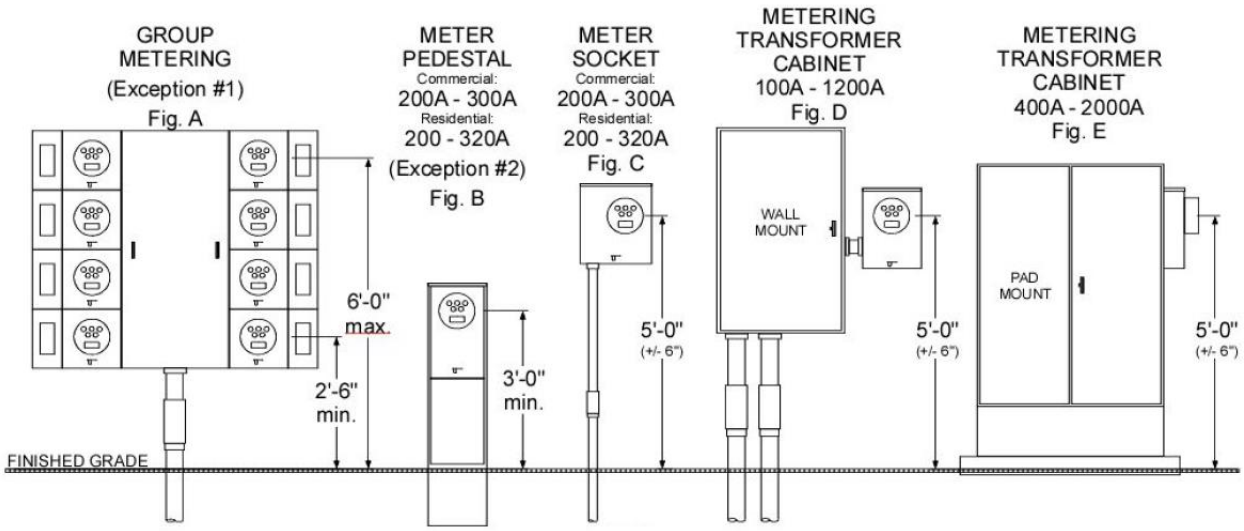
B. Meter sockets and pedestals shall be installed outdoors securely fastened to a building, structure or foundation. A field built metering structure may be used where no substantial buildings are available. CT cabinets and terminations cabinets shall be pad-mounted. Wall mounted CT and termination cabinets may, under certain conditions, be approved by the utility.

C. When used for metering purposes, Plymouth Utilities prefers all yard pole meters, field built metering structures, or free-standing metering pedestals to be installed so the meter faces an area (usually a driveway) that will accommodate motor vehicle access to the meter.

D. If a self-contained meter is installed at a location other than a building or farm distribution center then over current protection and grounding are required at the metering point.

E. See ESM Section 607.A. for indoor metering requirements. Indoor metering requires prior approval from Plymouth Utilities.

603. METERING INSTALLATIONS



Informational Note: Overhead meter sockets installed with underground are limited to existing installations only. Any service upgrades will require the installation of a meter pedestal. All new installations shall be a meter pedestal. (See ESM 404.A.2). See 602.B for wall mount CT cabinets.

A. Equipment

1. Customer furnishes and installs:

- Meter sockets/pedestals
- Ganged meter sets
- CT and termination cabinets
- Cable tray or raceway
- 1” conduit for instrument transformer wiring
- Any other related metering equipment

2. Plymouth Utilities furnishes and installs:

- Meters
- Instrument transformers (CTs and PTs)
- Instrument transformer wiring.

B. Meter mounting devices shall be securely fastened to the supporting building or structure with non-corrosive fasteners. Conduits and cables shall not be used to support wall-mounted devices. Meter sockets or cabinets shall not be installed where they will be exposed to mechanical damage, excessive dust, excessive moisture, corrosive vapors, or vibrations.

C. When mounting a meter socket to the side of a CT cabinet self-tapping screws will not be permitted, the socket shall be through bolted.

D. Customer-owned equipment shall not be installed in any cabinets that are sealed by Plymouth Utilities, see ESM Section 605.

E. All sockets shall be inspected and approved by Plymouth Utilities to ensure they meet PU requirements. Plymouth Utilities will not approve the use of altered, rusted, damaged, or modified equipment.

F. Meters and metering devices shall be mounted plumb such that the center of the meter is approximately 5' (+/-6") above the final grade except as follows.

Exception No. 1 – Group metering shall be mounted such that meter centers are between 2'-6" and 6'-0" above final grade.

Exception No. 2 – Outdoor wall-mounted, or free-standing meter pedestals shall be mounted such that meter centers are a minimum of 3'-0" above final grade.

604. IDENTIFICATION OF METERS

For multiple metering installations, each meter position shall be marked with the address or unit number of the location served on the outside of the socket or by the breaker. This marking shall also be placed on the corresponding distribution panel(s). The external marking shall be permanent self-sticking brass or engraved rigid plastic label with ½" block letters of number. A permanent marking shall also be inside the meter socket base in a visible location when the cover is removed. Plymouth Utilities will not install meters until this requirement is met.

605. METER SEALS

Plymouth Utilities will seal all meters, meter facilities and points of access to un-metered wiring on the customer's premises. All cabinets, conduit fittings, and equipment enclosures containing un-metered conductors shall be made sealable before the service is energized. It is illegal for customers or contractors to remove meters or seals. Contact Plymouth Utilities if access to any PU sealed cabinet is required. Violation of this rule could result in immediate disconnection and prosecution.

606. SEPARATION OF METERED AND UN-METERED CONDUCTORS

A. Metered conductor shall not be enclosed with un-metered conductor in the same raceway or cable tray, except as required in sealed meter equipment assemblies: meter sockets, meter pedestals, and metering transformer cabinets.

B. If an instrument transformer cabinet is equipped with an internal or external raceway meant for metered conductors, the customer shall use this raceway to maintain separation from un-metered conductors. The customer shall also install their conduits beneath this raceway.

C. Where metered circuit conductors are run parallel to un-metered service entrance conductors, they shall be at least 6 inches apart at their termination where not in conduit and exposed, such as weather heads.

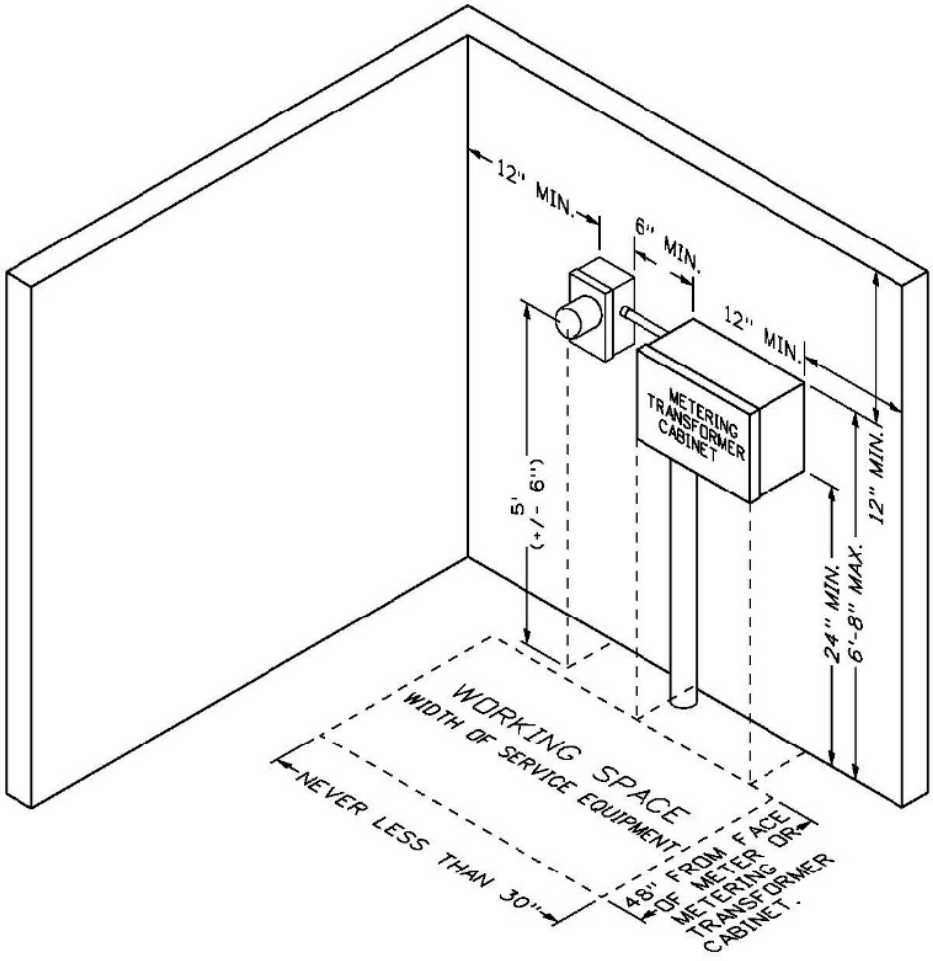
D. Line and load conductors shall not cross each other.

E. The customer shall not install accessible fittings (e.g., LB, box, etc.) in conduit risers that enclose un-metered service conductors.

607. CLEARANCE REQUIREMENTS FOR METERING EQUIPMENT

Plymouth Utilities requires a minimum of 48” working space in front of each meter or metering transformer cabinet.

Unobstructed Work Area



Notes:

1. Workspace is measured out 48” from the face of the meter or door(s) of the cabinet and a minimum 30” wide.
2. A minimum 6” vertical and horizontal separation shall be maintained between metering equipment and other obstructions or non-metering equipment.
3. The space shall be large enough to allow the cabinet doors to open 90 degrees.
4. The space shall be clear from final grade to at least 6’-6” (8’-0” preferred) above the ground.
5. An area of at least 30” in width shall be provided to access the work area.
6. This work area shall not be used for storage.

608. METER SOCKET REQUIREMENTS

Service Type	Phase	Wire	Voltage	Max. Amps	Terminals	Meter Form
Self-contained						
Single Phase – Commercial	1	3	120/240	300	4	2S
Single Phase – Residential	1	3	120/240	320	4	2S
Network Single Phase[1]	1	3	120/208	200	5	12S
Four Wire WYE	3	4	120/208	320	7	16S
Current Transformer Rated						
Single Phase CT Cab.	1	3	120/240	20	6	4S
Four Wire WYE	3	4	120/208	20	13	9S
Maintenance Only						
Single Phase CT Cab.[2]	1	3	120/208	20	8	5S/45S
Four Wire Delta[3]	3	4	120/240	20	13	9S
Three Wire Delta[4]	3	3	120/240	20	8	5S/45S

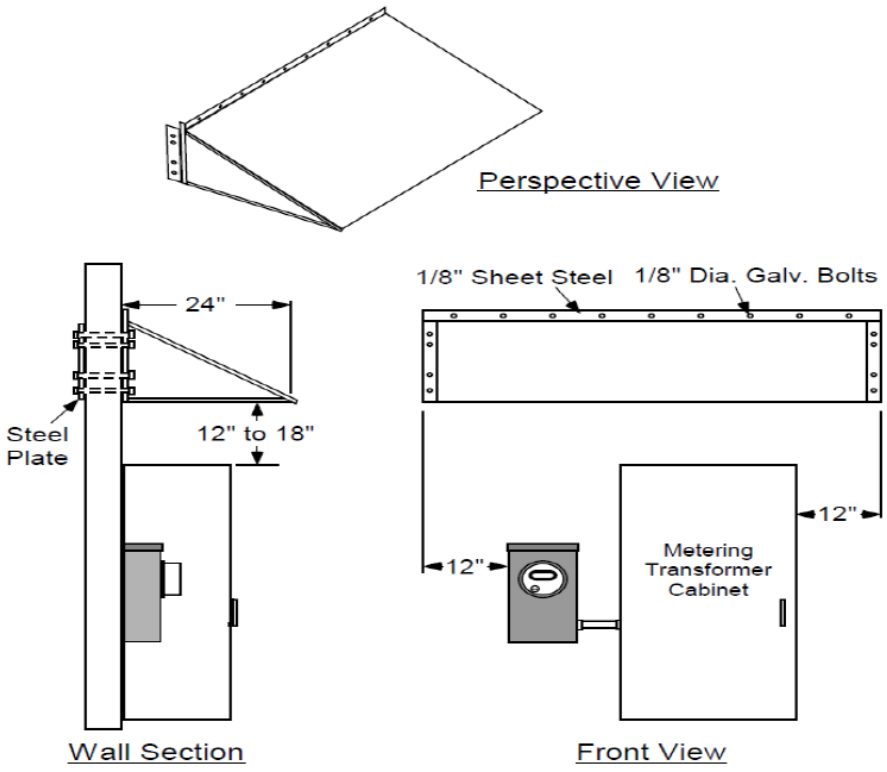
1. Network Meters – The fifth terminal shall be installed horizontally in the nine o'clock position. Permanent or added fifth position terminals shall be of the screw-in-type, unless otherwise approved by Plymouth Utilities.
2. 8-terminal sockets is for 120/208 1-phase network metering transformer cabinets for maintenance purposes only (Not for new installations).
3. This meter socket is for 4-wire delta & 4-wire wye maintenance only.
4. This meter socket is for 3 wire delta maintenance only.

A. Line and load side conductors entering a meter socket for underground service shall enter and leave the socket on opposite sides. Line conductors shall enter the socket on the bottom left side and the load conductors shall leave on the bottom right side of the socket. The center knockout in the bottom of the 320-amp socket shall only be used when it is necessary to accommodate the customer with a second conduit. The second conduit may only be installed if the lugs are rated for a second conductor or there are two sets of lugs. Preapproval from Plymouth Utilities is required to change this orientation.

B. Self-contained meters for commercial single and three-phase services shall not exceed loads of 300 amps. The maximum allowable amperage rating of 300 amps along with adjustable breaker and fuse or a combination guarantees the accuracy of the self-contained meters. Commercial service with loads greater than 300 amps shall use an instrument-transformer rated meter.

609. METERING EQUIPMENT SHIELD

The customer is responsible for protecting Plymouth Utilities meter(s) and customer's own metering equipment from damage caused by falling ice, snow, or other objects. If protection is not provided for meter equipment by adequate roof overhang the customer shall construct a protective shield or the metering equipment location shall be moved to a safe area. The customer will be charged for meter replacement if damage occurs and typically an outage will be required to replace any damaged equipment. An adequate roof overhang shall extend a minimum of 18" – 24" out from the face of the wall to which the meter is mounted.



Notes:

1. Steel to be primed and painted with rust-resistant paint.
2. Shield shall be capable supporting 50 pounds.
3. Shield may be constructed of steel, treated wood or masonry. Thin sheet metal (tin) is not acceptable.
4. Shield to be so located as to not be a "head bumping" hazard.
5. Width of shield may vary depending on the number of meters being protected.

610. OUTDOOR FREE STANDING (FIELD-BUILT) METER STRUCTURES

A. Plymouth Utilities approval is required for use.

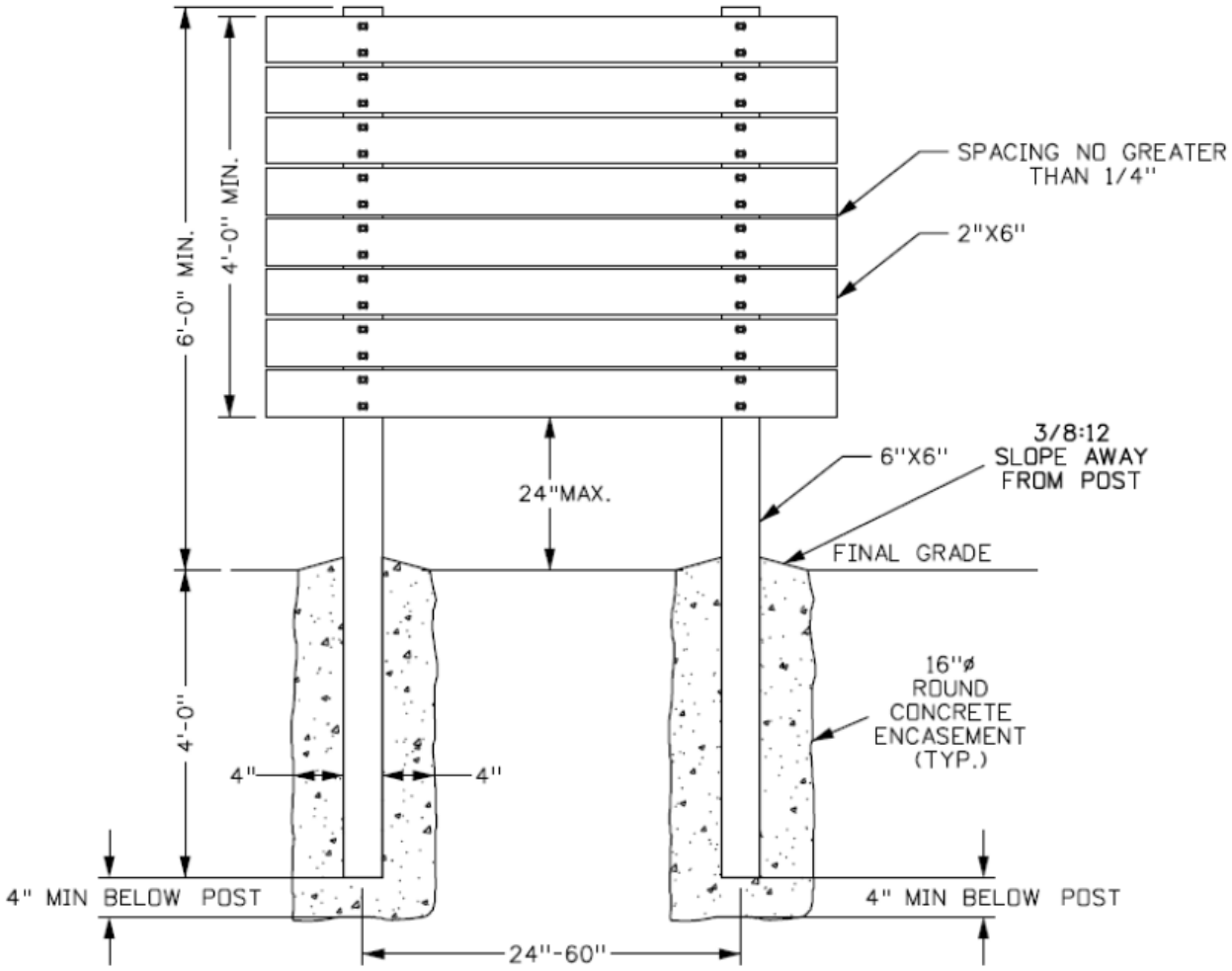
B. Field built structures are limited to 1200 Amp Maximum.

C. Wood field-built structures shall have a minimum of two 6" x 6" wood posts and 2" x 6" planks that are pressure treated against decay per the American Wood Protection Association (AWPA). The posts shall be buried a minimum of 4 feet deep, plumb and set in concrete the

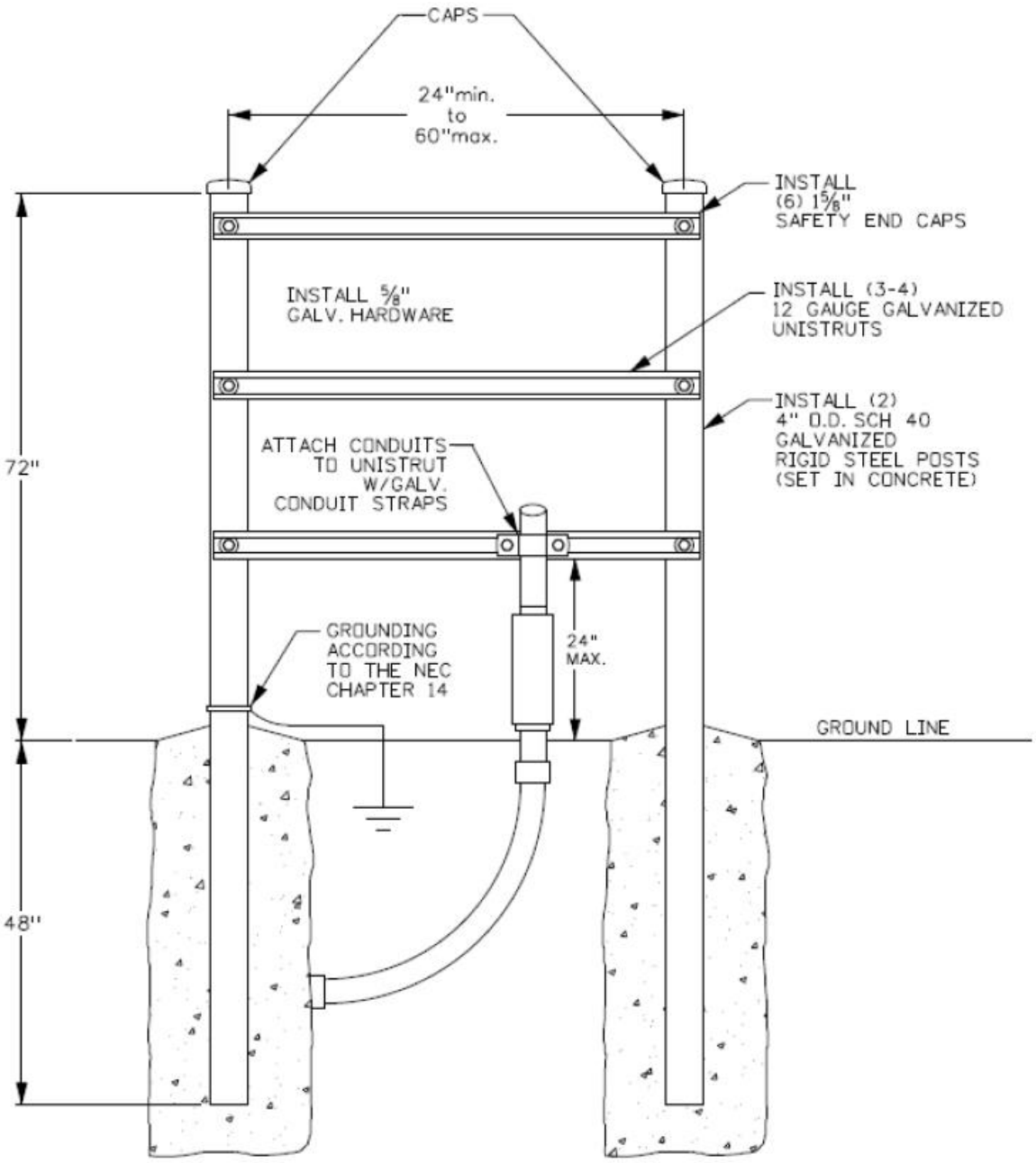
full depth. The planks shall be level and fastened with stainless steel or hot-dipped galvanized (G-185) hardware (bolts, washers, nuts, etc.), **nails and screws are not acceptable**. The customer is responsible for the maintenance of the structure.

D. All service equipment shall be waterproof, lockable, and listed by an approved testing agency for service entrance use.

Wood Construction



Steel Post Construction



Notes:

1. Steel posts are not allowed to serve as equipment grounding conductor.
2. Unistrut shall not extend beyond post and must have safety end caps.
3. All metallic parts shall be bonded according to the *NEC*.
4. Grounding shall conform to *NEC* and ESM Chapter 14.
5. Aluminum posts or beams are not allowed due to their corrosive properties when installed in concrete.

610A. DEPARTMENT OF TRANSPORTATION (DOT) – RIGHT OF WAY (ROW) FIELD-BUILT METER STRUCTURE – ADDITIONAL REQUIREMENTS

The following applies to outdoor free-standing field-built meter structures in DOT ROW. These rules are in addition to the rules stated in 610.

A. Concrete base shall not extend more than 3" above finished grade, preferably flush.

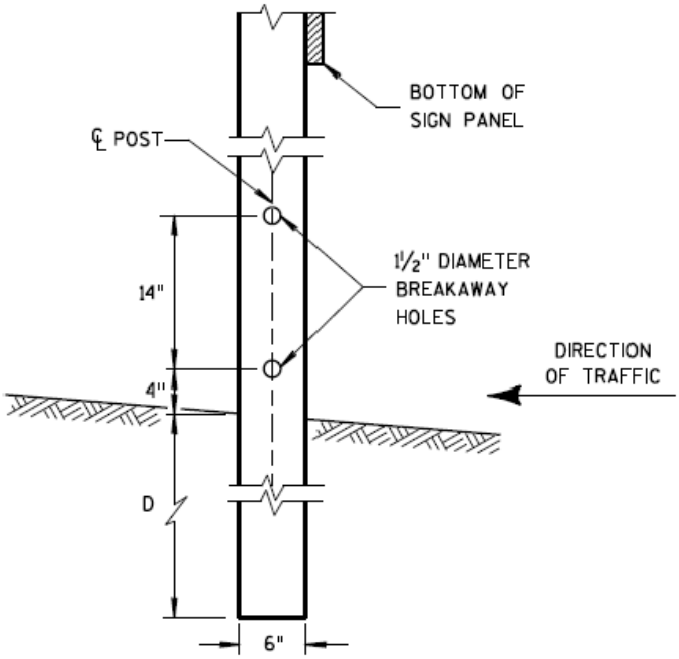
B. Base shall be constructed such that it is easily removed if necessary and small enough not to block other utility installations for using the adjacent ROW.

C. Structures shall not be installed within intersection vision corners or other places that the DOT needs a clear area for highway operations and maintenance purposes.

D. These structures shall not pose a roadside hazard. Any aboveground utility facility has to be located as far to the edge or ROW as possible, be out of the clear zone and if not, either be shielded or of breakaway design. If DOT has a concern with a particular placement, they may require installer to complete a roadside hazard analysis as a condition of the permit. As part of the analysis, DOT would require proof that if struck, no part of the structure would penetrate a vehicle's windshield.

E. No matter where the structure is placed in the ROW, the posts should be "breakaway." An errant vehicle just doesn't magically stop at the edge of the clear zone. DOT has details for 4" x 6" breakaway wood posts, so only those would be allowed – not 6" x 6" posts. Steel posts may not be permitted unless crash test documentation is provided and accepted by DOT.

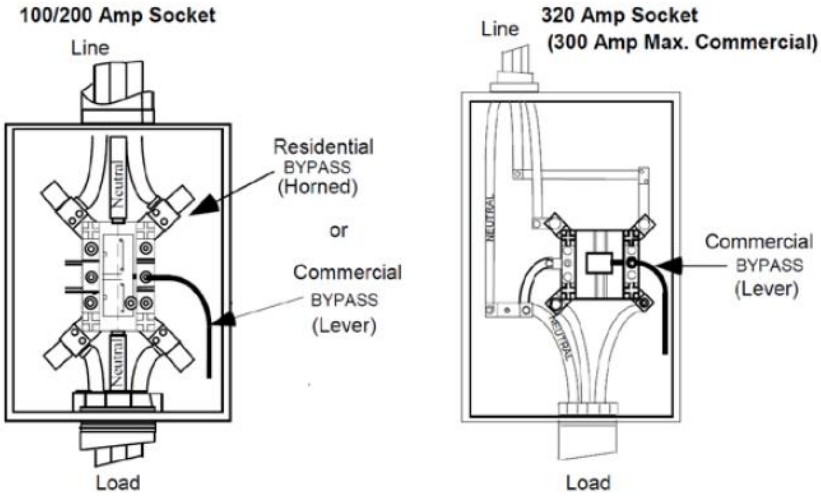
F. These structures look similar to small billboards, no advertising will be allowed on them. This requirement does not preclude the placement of small warning signs or placards necessary to meet NESC or other state/federal safety requirements.



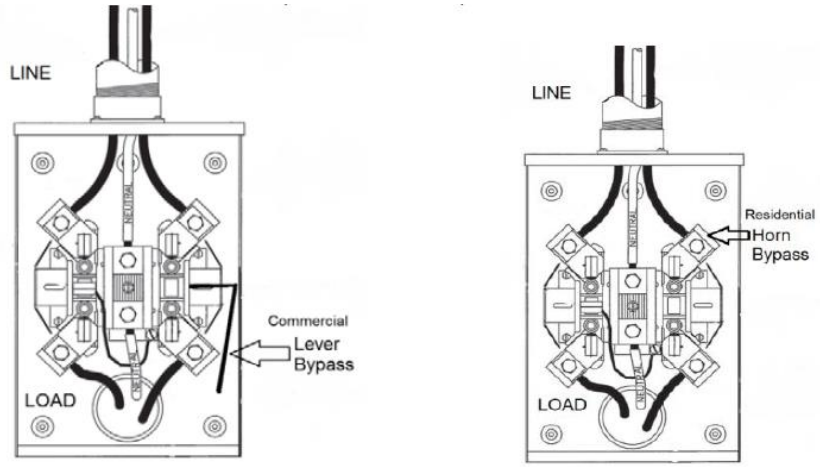
4" x 6" Wood Post Modification

611. METER SOCKET TYPES

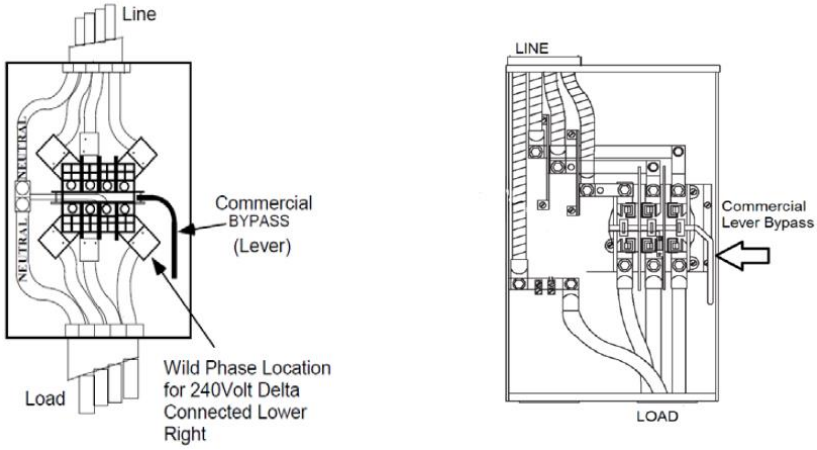
A. 120/240 Volt Single Phase – Overhead – Self-contained



B. 120/208 Volt Single Phase (Network) – Overhead – Self-contained



C. Three Phase – 4-Wire – Overhead – Self-contained



612. SELF CONTAINED GROUP AND MODULAR METERING

Multiple meter positions (2 or more), up to 200 amps per socket, 250V max.

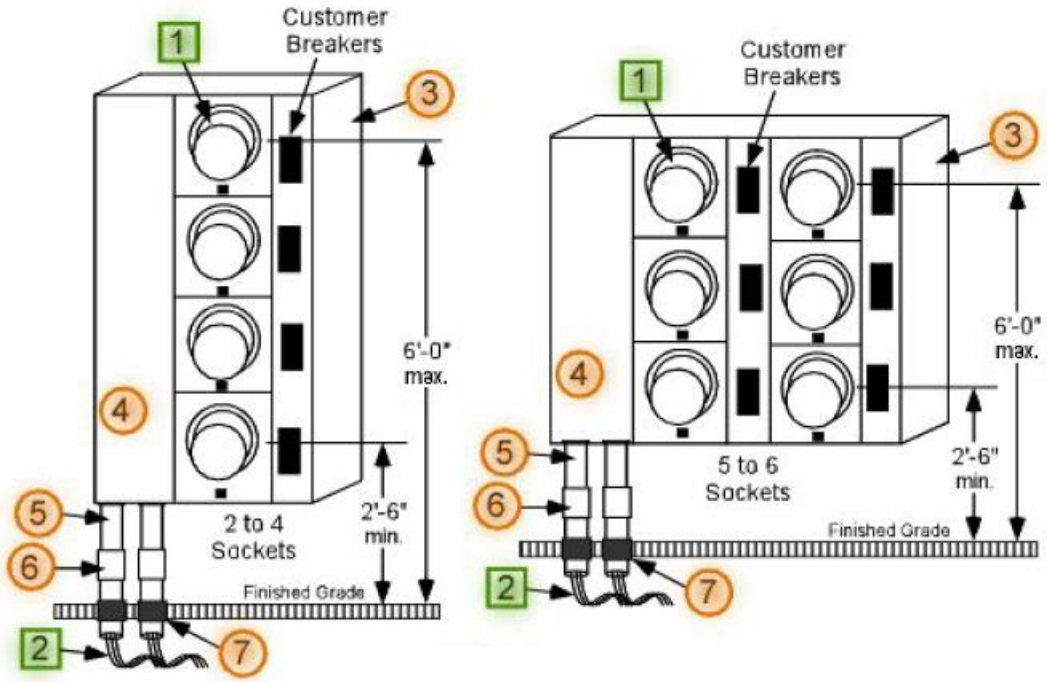
Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Underground service lateral	X	
3	Multiple metering equipment		X
4	Termination area (See Note 6)		X
5	Rigid conduit		X
6	Conduit expansion joint		X
7	Concrete sleeve		X
8	Ground in accordance with the *NEC* (See ESM Chapter 14)		X

Notes:

1. Service disconnect switches shall be located adjacent to the meter or grouped in an integrated factory manufactured section of the multiple metering equipment.
2. Meters shall be arranged in a logical left to right and top to bottom numbering sequence.
3. The customer shall provide Plymouth Utilities with a diagram of the meter socket assembly with each unit clearly identified and a floor plan of the facility with each unit clearly identified.
4. The normal sequence shall be **meter-switch-fuse** for six or less meters. For 7 or more meters the sequence shall be **switch-fuse-meter-switch-fuse**.
5. For units larger than 200 amps per meter position consult Plymouth Utilities.
6. Plymouth Utilities will not terminate on a customer's circuit breaker or disconnect switch.

612A. SELF CONTAINED GROUP AND MODULAR METERING - CONTINUED

Multiple meter positions (2 or more), up to 200 amps per socket, 250V max.



Multiple Metering

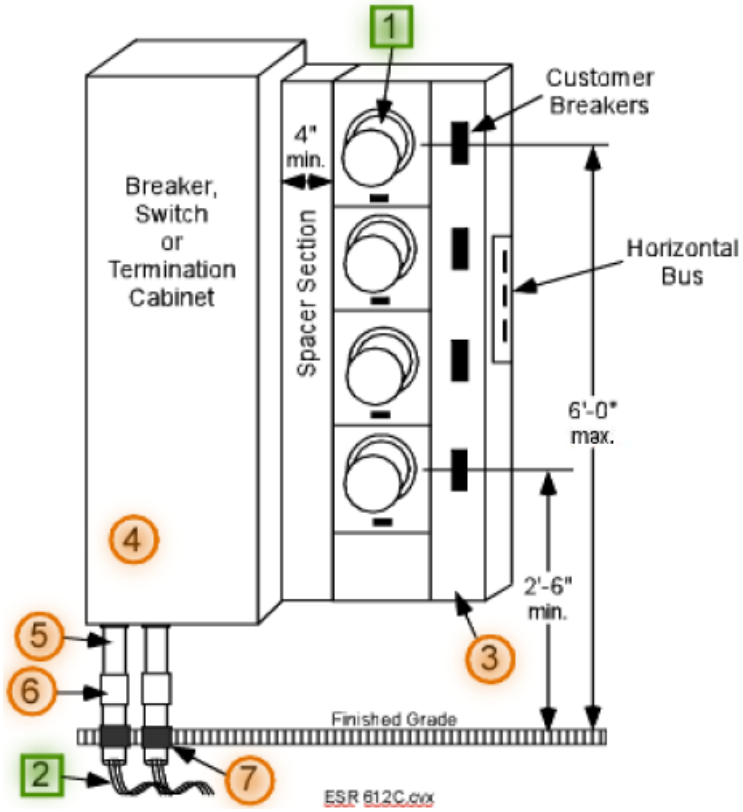
Meter Pak – 2 to 6 Meters

Notes:

1. Multi-meter minimum height is 2’-6” and maximum height is 6’-0”.

612B. SELF CONTAINED GROUP AND MODULAR METERING - CONTINUED

Multiple meter positions (2 or more), up to 200 amps per socket, 250V max.



Modular Multiple Metering

Horizontal Bussed

Notes:

1. Multi-meter minimum height is 2’-6” and maximum height is 6’-0”.
2. The spacer section as shown in the above drawing is required whenever the 4 inch minimum clearance from the meter glass to a cabinet cannot be obtained.

613. INSTRUMENT METERING TRANSFORMER CABINET INSTALLATIONS

This metering requirement is applicable for the following service ratings:

- Single-phase services rated more than 320 amps up to and including 600 amps
- Three-phase 120/208Y services rated more than 200 amps up to and including 2000 amps
- Three-phase 277/480Y services of any rating up 1600 amps

Exceptions to these service voltages and sizes will be at the discretion of Plymouth Utilities. For primary rated voltage applications see Chapter 10.

A. Customer should consult with Plymouth Utilities before any installation is planned or started.

B. Working space as specified in ESM Section 607 shall be maintained for all installations.

C. Cabinet doors shall not block or impede meter socket access at any time (open or closed).

Informational Note: This means that if an instrument metering transformer cabinet has any internal or external cable raceway it should be designed such that the cabinet door hinge and raceway are on the side of the cabinet and the instrument transformer rated meter socket are mounted on the other side of the cabinet.

D. Instrument metering cabinets shall be pad-mounted on the same pad as the transformer or on a separate isolated pad immediately adjacent the transformer pad. Wall mount CT cabinets are generally not allowed, but may, under certain conditions, be approved by the utility.

E. Meter sockets shall not be mounted to the CT cabinet door.

F. The customer shall install the meter socket, instrument transformer metering cabinet, service conductor, and conduit between the utility transformer, CT cabinet, and meter socket. The utility shall supply the meter, instrument transformers (current, CTs and/or voltage, PTs, VTs), and meter wiring.

G. A rain tight hub or gasket shall be used on all conduit connections to the instrument metering cabinet and meter socket.

H. Service voltages at 277/480 volt shall utilize PTs.

613A. OUTDOOR INSTRUMENT METERING TRANSFORMER – UNDERGROUND SERVICE

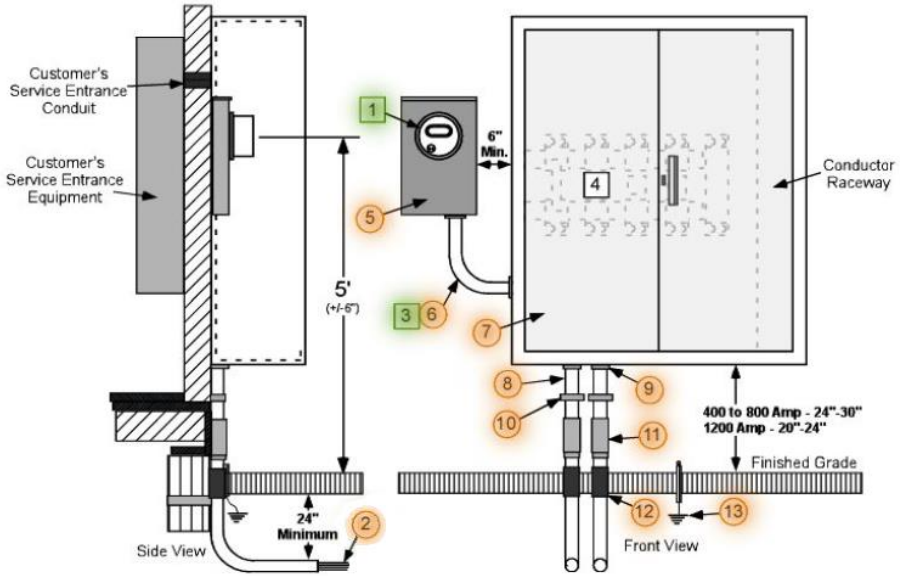
Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Secondary Cable from utility transformer		X
3	Metering cable (if conduit needed, customer provides)	X	
4	Instrument transformers (inside cabinet)	X	
5	Approved meter socket		X
6	1” rigid galvanized steel conduit (wall-mount only)		X
7	Metering transformer cabinet		X
8	Rigid conduit		X
9	Insulating bushing		X
10	Conduit straps (wall-mount only)		X
11	Conduit expansion joint (wall-mount only)		X
12	Sleeve if conduit passes through concrete or asphalt		X
13	Ground in accordance with the *NEC* (See ESM Chapter 14)		X

Notes:

1. The customer owns and is responsible for locating the secondary cables from the transformer to the CT cabinet and beyond.
2. The customer shall install a 1” rigid galvanized steel (RGS) conduit for metering conductors between the CT cabinet and the instrument transformer rated meter socket. Maximum allowable conduit run is 15’ with two 90-degree bends. Minimum separation of 6 inches is required between the socket and the cabinet. This metering conduit shall not pass through any cabinet raceway provided for load conductors to exit the cabinet. Note this requirement is for wall mounted sockets and cabinets only.
3. The customer shall mount the CT cabinet outdoors at the specified height above finished grade and at locations specified by Plymouth Utilities.
4. All free-standing (pad-mount) cabinets shall be mounted on a UL approved manufacturer’s base that is a minimum of 9 inches high If base is incorporated into the design, the bottom of the access door shall be a minimum of 9 inches above grade.
5. Plymouth Utilities will not terminate conductors or meter secondary services inside a customer’s building.
6. Line side (un-metered) utility conductors shall land on the bottom lugs. Load side (metered) conductors shall land on the top lugs

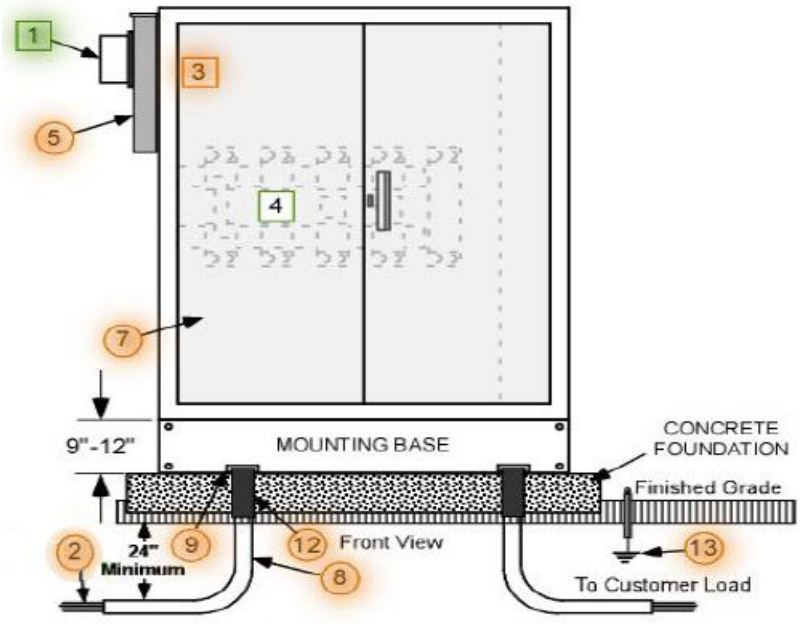
613A. OUTDOOR INSTRUMENT METERING TRANSFORMER – UNDERGROUND SERVICE – CONTINUED

Wall Mount CT Cabinet (Not Typical)



Note: Wall mount installations require approval from Plymouth Utilities

Pad-Mounted CT Cabinet (Typical)



615. CAMPGROUNDS

In campgrounds Plymouth Utilities requires all metering installations to be group metered at a single location. A free standing metering structure shall be utilized. Multiple structures shall be placed at distances (based on voltage) as specified in Section 108.B. Each structure shall feed all sites within the specified distance.

616. APPROVED MULTI-METER SETS

Plymouth Utilities requires all metering installations to be ringless and have either manual or lever bypasses. The tables below list commonly used metering installations. Other metering installations should be checked with Plymouth Utilities for approval. When checking with Plymouth Utilities, please provide the metering installation spec sheet.

616A. 200 Amp Rated Multi-Meter Socket Arrangements

Manufacturer	Positions	Catalog Number
Milbank	2	U1252-X-KK-K1-PED[1,2]
	2	U1783-O-KK[2]
	3	U1253-X-KK-K3-PED[1,2]
	4	U1254-X-KK-K3-PED[1,2]
	5	U1255-X-KK-K4-PED[1,2]
	6	U1256-X-KK-PED[1,2]

1. Must order catalog number S2291-TO for pedestal raceway.
2. 5th terminal kit extension for 5-terminal meters is K5T (Install in 9-o'clock position).

616B. 200 Amp Rated Multi-Meter Socket Arrangements with Main Breaker

Manufacturer	Positions	Catalog Number
Milbank	2	U2862-X-KK-K1-PED[1,2]
	3	U2863-X-KK-K1-PED[1,2]
	4	U2864-X-KK-PED[1,2]
	5	U2865-X-KK-PED[1,2]
	6	U2866-X-KK-PED[1,2]

1. Must order catalog number S2291-TO for pedestal raceway.
2. 5th terminal kit extension for 5-terminal meters is K2381 (Install in 9-o'clock position).

616C. Multi-Position Modular Metering

Manufacturer	Catalog Number	Mount	SCCR
120/240 Volt | 1PH-in, 1PH-out | 4-Terminal | 200 Amp			
Eaton-Cutler Hammer	35MM#20R12 (1-4 position)[1]	Panel	10,000
Siemens/Talon	WML#1225RJ (1-4 position)[1]	Panel	10,000
Square D	EZML11#225 (1-4 position)[1,2]	Panel	10,000
120/208 Volt | 3PH-in, 1PH-out | 5-Terminal | 200 Amp			
Eaton-Cutler Hammer	35MM#20R12 (1-4 Position)[1]	Panel	10,000
Erickson	CM**4-# (2-4 position)[1,3]	Panel	10,000
GE	TMPR12#22R (1-4 position)[1]	Panel	10,000
Siemens/Talon	WMLZ#2125RJ (3-5 position)[1]	Panel	100,000
	WMLZF#2125RJ (3-5 position)[1]	Panel	100,000
	WLM#2225RJ (2-4 position)[1]	Wall	100,000
Square D	EZML31#225 (1-4 position)[1,2]	Panel	10,000
120/208 Volt | 3PH-in, 3PH-out | 7-Terminal | 200 Amp			
Eaton-Cutler Hammer	37MM#20R12 (1-4 position)[1]	Panel	10,000
Erickson	CM**7-# (2-4 position)[1,3]	Panel	10,000
GE	TMPR312#22R (1-4 position)[1]	Panel	10,000
Siemens/Talon	WML#3225RJ (1-4 position)[1]	Panel	100,000
Square D	EZML33#225 (1-4 position)[1,2]	Panel	10,000

1. # = Multiple catalog number, approved for positions as shown next to catalog number.
2. EZML requires deep well end covers. Shallow end covers shall not be used.
3. ** = Select bus rating, see manufacturer drawing for details.

617. APPROVED INSTRUMENT METERING TRANSFORMER CABINETS

Metering transformer cabinets not listed in the tables below should be checked with Plymouth Utilities. Please provide a spec sheet when submitting additional CT cabinets to PU.

617A. 120/240 Volt Single Phase Wall Mount CT Cabinets

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALICT4-3	85,000	X	X	
		ALIECT5-3L	85,000	X	X	X
		ALICT4-3BR[1]	85,000	X	X	X
	EMI	ALICT140	65,000	X	X	
		ALICT140P	65,000			X
	Erickson	CT41-ALI	42,000	X	X	X
	Milbank	ALIM-413	65,000	X	X	
		ALIM-413UGBX[2]	65,000			X
600 Amp	A.M.P.	ALICT6-3	85,000	X	X	
		ALIECT6-3L	85,000	X	X	X
		ALICT6-3BR[1]	85,000	X	X	X
	EMI	ALICT160	65,000	X	X	
		ALICT160P	65,000			X
	Erickson	CT61-ALI	65,000	X	X	X
		CT61-ALI-SEA	65,000	X	X	
	Milbank	ALIM613	65,000	X	X	
		ALIM-613UGBX[2]	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.
2. Standard wireway, hinge and PT mount are on the left side. Add “REVWW” to PO to change it to the right side.

617B. 120/240 Volt Single Phase Pad-Mount CT Cabinets

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALIECT4-3L CR15ECTS	85,000			X
		ALIPCT4-3R[1]	85,000			X
	Erickson	CT41-ALI PMB1624x10	42,000			X
	Milbank	ALIM-413PM[2]	65,000			X
600 Amp	A.M.P.	ALIECT6-3L CR15ECTS	85,000			X
		ALIPCT6-3R[1]	85,000			X
	Erickson	CT61-ALI PMB1624x10	65,000			X
	Milbank	ALIM-613PM[2]	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.
2. Standard wireway, hinge and PT mount are on the left side. Add “REVWW” to PO to change it to the right side.

617C. 120/208 Volt Three Phase Wall Mount CT Cabinets.

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALICT4-4	85,000	X	X	
		ALIECT4-4L	85,000	X	X	X
		ALICT4-4BR[1]	85,000	X	X	X
	EMI	ALICT340	65,000	X	X	
	Erickson	CT44-ALI	42,000	X	X	X
	Milbank	ALIM-434	65,000	X	X	
		ALIM-434UGBX[2]	65,000			X
600 Amp	A.M.P.	ALICT6-4	85,000	X	X	
		ALIECT6-4L	85,000	X	X	X
		ALICT6-4BR[1]	85,000	X	X	X
	EMI	ALICT360	65,000	X	X	
	Erickson	CT64-ALI	65,000	X	X	X
		CT64-ALI-SEA	65,000	X	X	
	Milbank	ALIM-634	65,000	X	X	
		ALIM-634UGBX[2]	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.
2. Standard wireway, hinge and PT mount are on the left side. Add “REVWW” to PO to change it to the right side.

617D. 120/208 Volt Three Phase Pad-Mount CT Cabinets

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALIECT4-4L CR15ECTS	85,000			X
		ALIPCT4-3R[1]	85,000			X
	Erickson	CT44-ALI PMB1624x10	42,000			X
	Milbank	ALIM-434PM[2]	65,000			X
600 Amp	A.M.P.	ALIECT6-3L CR15ECTS	85,000			X
		ALIPCT6-3R[1]	85,000			X
	Erickson	CT61-ALI PMB1624x10	65,000			X
	Milbank	ALIM-613PM[2]	65,000			X
800 Amp	A.M.P.	ALIECT8-4L CR15ECTS	85,000			X
		ALIPCT8-4R[1]	85,000			X
	Erickson	CT84-ALI PMB1625x10	65,000			X
	Milbank	ALIM-834PM[2]	65,000			X
1200 Amp	A.M.P.	ALIPCT12-4R[1]	85,000			X
	Erickson	PMCT124-MF-ALI	100,000			X
	Milbank	ALIM-1234PM[2]	85,000			X
1600 Amp	A.M.P.	ALIPCT16-4R[1]	85,000			X
	Erickson	PMCT164-MF-ALI	100,000			X
	Milbank	ALIM-1634PM[2]	85,000			X
2000 Amp	A.M.P.	ALIPCT20-4R[1]	85,000			X
	Erickson	PMCT204-MF-ALI	100,000			X
		PMCTCC4210N-MF-ALI	85,000			X
	Milbank	ALIM-2034PM[2]	85,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.
2. Standard wireway, hinge and PT mount are on the left side. Add “REVWW” to PO to change it to the right side.

617E. 277/480 Volt Three Phase Pad-Mount CT Cabinets

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALIECT4-4L CR15ECTS PTB36	85,000			X
		ALIPCT4-4PTR[1]	85,000			X
	Erickson	CT44-PT-ALI PMB1624x10	42,000			X
	Milbank	ALIM-464PM[2]	65,000			X
600 Amp	A.M.P.	ALIECT6-4L CR15ECTS PTB36	85,000			X
		ALIPCT6-4PTR[1]	85,000			X
	Erickson	CT64-PT-ALI PMB1625x10	65,000			X
	Milbank	ALIM-664PM[2]	65,000			X
800 Amp	A.M.P.	ALIECT8-4L CR15ECTS PTB36	85,000			X
		ALIPCT8-4PTR[1]	85,000			X
	Erickson	CT84-PT-ALI PMB1624x10	65,000			X
	Milbank	ALIM-864PM[2]	65,000			X
1200 Amp	A.M.P.	ALIPCT12-4PTR[1]	85,000			X
	Erickson	PMCT124-MF-PT-ALI	100,000			X
	Milbank	ALIM-1264PM[2]	85,000			X
1600 Amp	A.M.P.	ALIPCT16-4PTR[1]	85,000			X
	Erickson	PMCT164-MF-PT-ALI	100,000			X
	Milbank	ALIM-1664PM[2]	85,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.
2. Standard wireway, hinge and PT mount are on the left side. Add “REVWW” to PO to change it to the right side.

617F. 120/240 Volt Bussed Instrument Transformer Cabinets

Manufacturer	Catalog Number	Main Size	Top In	Bottom In	Pad-mount
120/240 Volt | 1PH-in, 1PH-out | 400 Amp | Wall Mount					
Eaton-Cutler Hammer	CTAP3244NCM8-CH11	2-200	X	X	
	CTAP325NCM8-CH11	400	X	X	
	CTAT325NCM8-CH11	400	X	X	
Erickson	ALI-CT*-P-3244N-CM**[1,2]	2-200	X	X	
	ALI-CT*-DK-325N-CM**[1,2]	400	X	X	
	ALI-CT*-P-325N-CM**[1,2]	400	X	X	
	ALI-CT*-T-325N-CM**[1,2]	400	X	X	
120/240 Volt | 1PH-in, 1PH-out | 600 Amp | Wall Mount					
Eaton-Cutler Hammer	CTAT326NCM8-CH11	400	X	X	
Erickson	ALI-CT*-LD-326N-CM**[1,2]	600	X	X	
	ALI-CT*-T-326N-CM**[1,2]	600	X	X	

1. ** = Select bus rating, see manufacturer drawing for details.
2. Fill in * with A for Top In / Bottom Out or B for Bottom In / Top Out.

617G. 120/208 Volt Bussed Instrument Transformer Cabinets

Manufacturer	Catalog Number	Main Size	Top In	Bottom In	Pad-mount
120/208 | 3PH-in, 3PH-out | 400 Amp | Wall Mount					
Eaton-Cutler Hammer	CTAP4244NCM8-CH	2-200	X	X	
	CTAP425NCM8-CH	400	X	X	
	CTAT425NCM8-CH	400	X	X	
Erickson	ALI-CT*-P-4244N-CM**[1,2]	2-200	X	X	
	ALI-CT*-DK425N-CM**[1,2]	400	X	X	
	ALI-CT*-T-425N-CM**[1,2]	400	X	X	
	ALI-CT*-P-425N-CM**[1,2]	400	X	X	
120/208 Volt | 3PH-in, 3PH-out | 600 Amp | Wall Mount					
Eaton-Cutler Hammer	CTAT426NCM8-CH	600	X	X	
Erickson	ALI-CT*-LD-426N-CM**[1,2]	600	X	X	
	ALI-CT*-T-426N-CM**[1,2]	600	X	X	
120/208 Volt | 3PH-in, 3PH-out | 800 Amp | Wall Mount					
Eaton-Cutler Hammer	CTAT427NCM8-CH	800	X	X	
Erickson	ALI-CT*-MD-427N-CM**[1,2]	800	X	X	
	ALI-CT*-T-427N-CM**[1,2]	800	X	X	

1. ** = Select bus rating, see manufacturer drawing for details.
2. Fill in * with A for Top In / Bottom Out or B for Bottom In / Top Out.

617H. 277/480 Volt Bussed Instrument Transformer Cabinets

Manufacturer	Catalog Number	Main Size	Top In	Bottom In	Pad-mount
277/480 Volt | 3PH-in, 3PH-out | 400 Amp | Wall Mount					
Erickson	ALI-CT*-KD-465N-PT-6CM**[1,2]	400	X	X	
	ALI-CT*-P-465-PT-6CM**[1,2]	400	X	X	
	ALI-CT*-T-465N-PT-6CM**	400	X	X	
120/208 Volt | 3PH-in, 3PH-out | 600 Amp | Wall Mount					
Erickson	ALI-CT*-LD-466N-PT-6CM**[1,2]	600	X	X	
	ALI-CT*-T-466N-PT-6CM**[1,2]	600	X	X	
120/208 Volt | 3PH-in, 3PH-out | 800 Amp | Wall Mount					
Erickson	ALI-CT*-MD-467N-PT-6CM**[1,2]	800	X	X	
	ALI-CT*-T-467N-PT-6CM**[1,2]	800	X	X	

1. ** = Select bus rating, see manufacturer drawing for details.
2. Fill in * with A for Top In / Bottom Out or B for Bottom In / Top Out.

618. APPROVED TERMINATION BOXES

The tables in this section list commonly used termination boxes. For others, not listed the customer should consult with Plymouth Utilities and provide a spec sheet for approval.

618A. 120/240V Single Phase Wall Mount Termination Boxes

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALITC4-3	85,000	X	X	
		ALITC4-3BR[1]	85,000	X	X	X
	EMI	ALITB140	65,000	X	X	
	Erickson	ALI-TB-365N	42,000	X	X	X
	Milbank	TBALIM-413-1	65,000	X	X	
		TBBXALIM-413-1	65,000			X
600 Amp	A.M.P.	ALITC6-3	85,000	X	X	
		ALITC6-3BR[1]	85,000	X	X	X
	EMI	ALITB160	65,000	X	X	
	Erickson	ALI-TB-366N	65,000	X	X	X

	Milbank	TBALIM-613-2	65,000	X	X	
		TBBXALIM-613-2	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side "R", change to "L" to move to the Left side.

618B. 120/240 Volt Single Phase Pad-Mount Termination Boxes

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALIPTC4-3R[1]	85,000			X
	Milbank	TBPMALIM-413-1	65,000			X
600 Amp	A.M.P.	ALIPTC6-3R	85,000			X
	Milbank	TBPMALIM-613-2	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side "R", change to "L" to move to the Left side.

618C. 120/208 Volt Three Phase Wall Mount Termination Boxes

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALITC4-4	85,000	X	X	
		ALITC4-4BR[1]	85,000	X	X	X
	EMI	ALITB340	65,000	X	X	
	Erickson	ALI-TB-465N	42,000	X	X	X
	Milbank	TBALIM-434-1	65,000	X	X	
		TBBXALIM-434-1	65,000			X
600 Amp	A.M.P.	ALITC6-4	85,000	X	X	
		ALITC6-4BR[1]	85,000	X	X	X
	EMI	ALITB360	65,000	X	X	
	Erickson	ALI-TB-466N	65,000	X	X	X
	Milbank	TBALIM-634-2	65,000	X	X	
		TBBXALIM-634-2	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.

618D. 120/208 Volt Three Phase Pad-Mount Termination Boxes

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALIPTC4-4R[1]	85,000			X
	Milbank	TBPMALIM-434-1	65,000			X
600 Amp	A.M.P.	ALIPTC6-4R[1]	85,000			X
	Milbank	TBPMALIM-634-2	65,000			X
800 Amp	A.M.P.	ALIPTC8-4R[1]	85,000			X
	Milbank	TBPMALIM-834-1	65,000			X
1200 Amp	A.M.P.	ALIPTC12-4R	85,000			X
	Erickson	ALI-PMTB-468N	100,000			X
	Milbank	TBPMALIM-1234-5	65,000			X
1600 Amp	A.M.P.	ALIPTC16-4R[1]	85,000			X
	EMI	ALITB316	65,000			X
	Erickson	ALI-PMTB-469N	100,000			X
	Milbank	TBPMALIM-1634-4	65,000			X
2000 Amp	A.M.P.	ALIPTC20-4R[1]	85,000			X
	EMI	ALITB320	65,000			X
	Erickson	ALI-PMTB-4610N	100,000			X
		PMCTCC4610N-TB-ALI	85,000			X
	Milbank	TBPMALIM-2034-5	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.

618E. 277/480 Volt Three Phase Pad-Mount Termination Boxes

Size	Manufacturer	Catalog Number	SCCR	Top In / Bottom Out	Bottom In / Top Out	Bottom In / Bottom Out
400 Amp	A.M.P.	ALIPTC4-4R[1]	85,000			X
	Milbank	TBPMALIM-434-1	65,000			X
600 Amp	A.M.P.	ALIPTC6-4R[1]	85,000			X
	Milbank	TBPMALIM-634-2	65,000			X
800 Amp	A.M.P.	ALIPTC8-4R[1]	85,000			X
	Milbank	TBPMALIM-834-1	65,000			X
1200 Amp	A.M.P.	ALIPTC12-4R	85,000			X
	Erickson	ALI-PMTB-468N	100,000			X
	Milbank	TBPMALIM-1234-5	65,000			X
1600 Amp	A.M.P.	ALIPTC16-4R[1]	85,000			X
	EMI	ALITB316	65,000			X
	Erickson	ALI-PMTB-469N	100,000			X
	Milbank	TBPMALIM-1634-4	65,000			X

1. Standard wireway, hinge and PT mount are on the Right side “R”, change to “L” to move to the Left side.

618F. 120/240 Volt Bussed Termination Boxes

Manufacturer	Catalog Number (Lug kit)	Main Size	SCCR	Top In	Bottom In
120/240 Volt | 1PH-in, 1PH-out | 400 Amp | Wall Mount					
Eaton-Cutler Hammer	ALI-TRB325N-CH			X	X
Erickson	ALI-TRB325N			X	X
Siemens	WEB1400B (LK12500N2)	400	65,000		X
	WEB1400BU (LK12500N2)	400	100,000		X
	WES1400BU (LK12500N2)	400	100,000		X
120/240 Volt | 1PH-in, 1PH-out | 600 Amp | Wall Mount					
Eaton-Cutler Hammer	ALI-TRB326N-CH			X	X
Erickson	ALI-TRB326N			X	X
Siemens	WEB1600B (LK12500N2E)	600	65,000		X
	WEB1600BU (LK12500N2E)	600	100,000		X
	WES1600BU (LK12500N2E)	600	100,000		X

618G. 120/208 Volt Bussed Termination Boxes

Manufacturer	Catalog Number (Lug kit)	Main Size	SCCR	Top In	Bottom In
120/208 Volt | 3PH-in, 3PH-out | 400 Amp | Wall Mount					
Eaton-Cutler Hammer	ALI-TRB425N-CH			X	X
Erickson	ALI-TRB425N			X	X
Siemens	WEB3400B (LK32500N2)	400	65,000		X
	WEB3400BU (LK32500N2)	400	100,000		X
	WES3400BU (LK32500N2)	400	100,000		X
120/208 Volt | 3PH-in, 3PH-out | 600 Amp | Wall Mount					
Eaton-Cutler Hammer	ALI-TRB426N-CH			X	X
Erickson	ALI-TRB426N			X	X
Siemens	WEB3600B (LK32500N2E)	600	65,000		X
	WEB3600BU (LK32500N2E)	600	100,000		X
	WES3600BU (LK32500N2E)	600	100,000		X
120/208 Volt | 3PH-in, 3PH-out | 800 Amp | Wall Mount					
Eaton-Cutler Hammer	ALI-TRB427N-CH			X	X
Erickson	ALI-TRB427N			X	X
Siemens	WET3800BU (LK35600N2)		100,000		X
	WEB3800B (LK33500N2)	800	65,000		X
	WEB3800BU (LK33500N2)	800	100,000		X
	WES3800BU (LK33500N2)	800	100,000		X
120/208 Volt | 3PH-in, 3PH-out | 1200 Amp | Wall Mount					
Eaton-Cutler Hammer	ALI-TRB428N-CH			X	X
Erickson	ALI-TRB428N			X	X
Siemens	WET31200BU (LK33750N2E)		100,000		X
	WEB31200B (LK34500N2E)	1200	65,000		X
	WEB31200BU (LK34500N2E)	1200	100,000		X
	WES31200BU (LK34500N2E)	1200	100,000		X
	WEBM31200B (LK34500N2E)	1200	65,000		X
	WEBM31200BU (LK34500N2E)	1200	100,000		X

618H. 277/480 Volt Bussed Termination Boxes

Manufacturer	Catalog Number (Lug kit)	Main Size	SCCR	Top In	Bottom In
277/480 Volt | 3PH-in, 3PH-out | 400 Amp | Wall Mount					
Erickson	ALI-TRB465N			X	X
277/480 Volt | 3PH-in, 3PH-out | 600 Amp | Wall Mount					
Erickson	ALI-TRB466N			X	X
277/480 Volt | 3PH-in, 3PH-out | 800 Amp | Wall Mount					
Erickson	ALI-TRB467N			X	X
277/480 Volt | 3PH-in, 3PH-out | 1200 Amp | Wall Mount					
Erickson	ALI-TRB468N			X	X

Plymouth Utilities

Chapter 7

HUD Manufactured Homes

Reserved For Notes:

700. SCOPE

This chapter covers service requirements for all manufactured homes constructed to the requirements of the United States Housing and Urban Development (HUD) standards and all mobile homes. The term MANUFACTURED HOME as used in this chapter shall also apply to all mobile homes (see definition of mobile home). This chapter does not cover camp grounds.

701. GENERAL REQUIREMENTS

A. Plymouth Utilities will provide and install the service cable to individual or group metering points for manufactured homes. The customer will provide and install the meter socket(s) and service equipment. Manufactured homes receiving service at a central location shall obtain prior approval from Plymouth Utilities for each installation. Group metering installations shall follow the same rules as individually metered units.

B. Each meter socket shall be permanently marked or tagged to coincide with the address or unit of the location served. Appropriate marking shall consist of a permanent plaque and/or directory. A permanent marking shall also be inside each meter socket base. Meters shall not be installed until these requirements are met. See ESM Section 604 for additional information.

C. Minimum rating of a manufactured home service entrance shall be 100 amps. Receptacles shall have overcurrent protection no greater than their rated capacity.

D. The manufactured home service entrance equipment shall contain a means for serving an accessory building, structure, or additional electrical equipment located outside a manufactured home by a fixed wiring method.

E. Manufactured home service entrance equipment is permitted to have additional receptacles for connection of electrical equipment located outside the home and all such 120-volt, single phase, 15 and 20-amp receptacles shall be protected by listed ground-fault circuit interrupter protection.

F. All branch circuit breakers and feeder breakers shall be connected on the load side of a single service entrance breaker.

G. A field installed manufactured home service entrance shall be located adjacent to the manufactured home and not mounted on or in the manufactured home and not more than 30 feet from the home. If the manufactured home is placed on a permanent foundation a conventional service may be installed on the foundation, if the following provisions are met:

1. Service entrance rated equipment is located immediately adjacent to the meter pedestal or is an integrated part of the meter pedestal.

2. The service entrance shall contain a means for serving an accessory building structure of additional electrical equipment outside the manufactured home by a fixed wiring method.

3. A four-wire feeder is run from the load side of the service entrance to the electrical panel in the manufactured home.

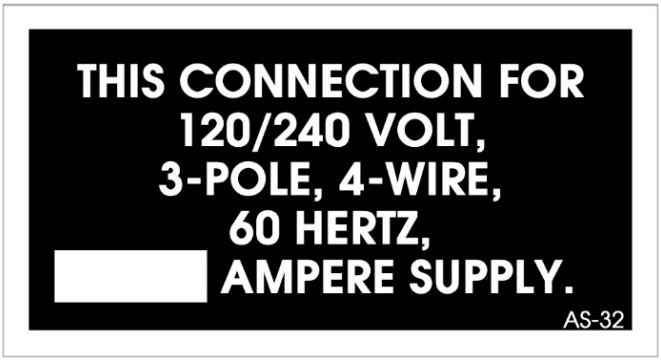
702. DEFINITIONS

Mobile Homes: *NEC* 550.2: A factory-assembled structure or structures transportable in one or more sections that are built on a permanent chassis and designed to be used as a dwelling without a permanent foundation where connected to the required utilities; these include the plumbing, heating, air-conditioning, and electric systems. (The term “mobile home” refers to factory-built homes that were produced prior to June 15, 1976; when the HUD requirement went into effect.)

Manufactured Homes: These are homes built entirely in the factory under a federal building code administered by the U.S. Department of Housing and Urban Development (HUD). The Federal Manufactured Home Construction and Safety Standards (commonly known as the HUD code) went into effect June 15, 1976. Manufactured homes may be single- or multi-section and are transported to the site and installed. The federal standards regulate manufactured housing design and construction, strength and durability, transportability, fire resistance energy efficiency, and quality. The HUD code also sets performance standards for the heating, plumbing, air-conditioning, thermal, and electrical systems. It is the only federally-regulated national building code. On-site additions, such as garages, decks, and perches, often add to the attractiveness of manufactured homes and must be built to local, state, or regional building codes.

Manufactured homes will have a plate (sticker) located on the end of transportable section:

If the manufactured home is built to ***NEC* 550.32A** there will be a sticker located near the panel indicating a four-wire feeder is required, these homes will be provided service according to this chapter:



If the manufactured home is built to meet the conditions of ***NEC* 550.32B**, the manufacturer will place a sticker on the outside of the home near the service panel indicating that grounding is required prior to connection of service, these homes will be provided service according to ESM Chapters 1 through 6:

Modular Homes: These factory-built homes are built to the state, local, or regional code where the home will be located. Modules are transported to the site and installed. These homes will have a state sticker (right) indicating that it has been constructed to the applicable state code requirements.

Panelized Homes: These are factory-built homes in which panels – a whole wall with windows, doors, wiring, and outside siding – are transported to the site and assembled. The homes must meet state or local building codes where they are sited.

Pre-Cut Homes: This is the name for factory-built housing in which building materials are factory-cut to design specifications, transported to the site and assembled. Pre-cut homes include kit, log, and dome homes. These homes must meet local, state or regional building codes.

Modular homes, panelized homes, and pre-cut homes will be supplied electric service according to ESM Chapters 1 through 6.

703. MOBILE / MANUFACTURED HOME COURTS

A. A mobile/manufactured home court is defined as a contiguous parcel of land that is used for the accommodation of occupied manufactured homes. Underground distribution systems in a new court will be installed and owned by Plymouth Utilities according to existing extension rules and the Electric Service Manual.

B. For distribution system rebuilds, any relocation of service drops, service laterals, or meter locations, requested by the customer, shall be billed according to existing extension rules.

C. When replacing a meter socket or other equipment located at a central distribution point, the meter socket shall contain a service disconnect or a service disconnect shall be located adjacent to the meter socket. The installation shall comply with *NEC* 550.32.

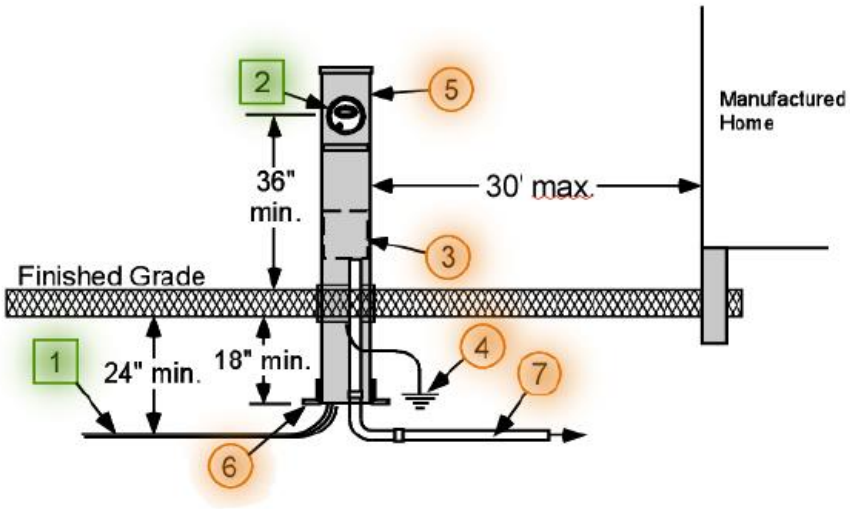
704. SERVICE ENTRANCE PEDESTAL FOR MANUFACTURED HOMES

100-200 AMP, SINLGE-PHASE, 3-WIRE -120/240 VOLT – UNDERGROUND

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Underground service lateral	X	
2	Meter	X	
3	Mobile/manufactured home service entrance		X
4	Ground in accordance with the *NEC* (See ESM Chapter 14)		X
5	Approved Pedestal		X
6	Factory provided “stabilizing foot”		X
7	Mobile/manufactured home 4-wire power supply cord or permanent installed 4-wire feeder.		X

Notes:

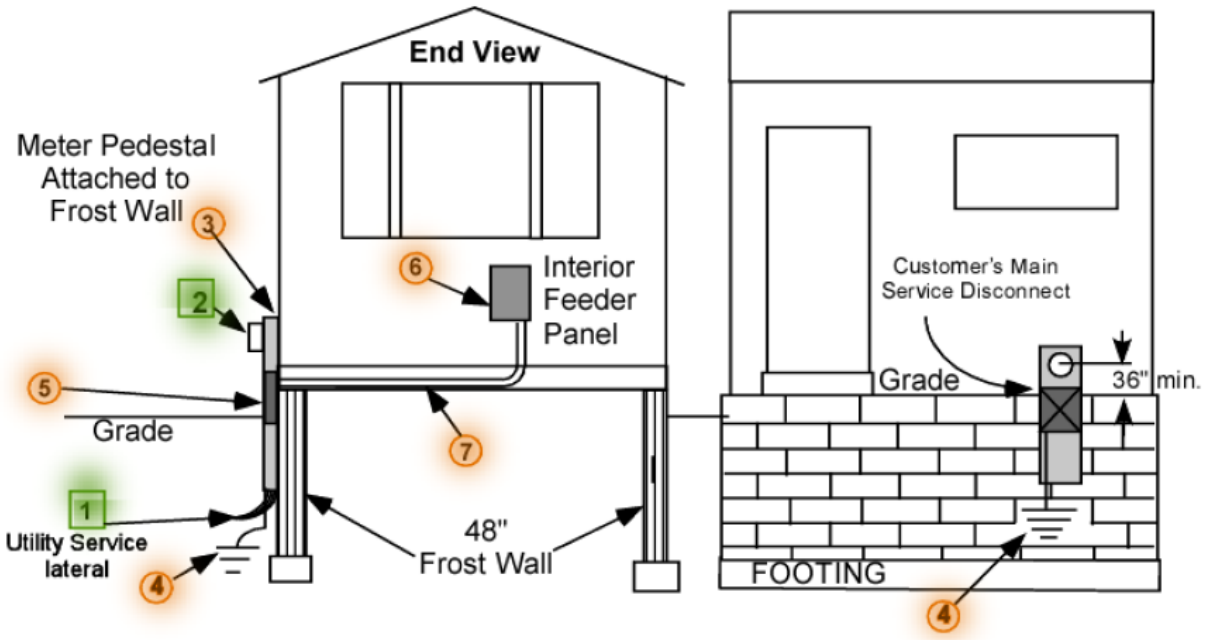
1. A mobile/manufactured home service entrance pedestal or an additional disconnecting means listed as suitable for service entrance use shall be located in sight of and not more than 30’ from the exterior wall of the mobile/manufactured home it serves.
2. A clear space of 4’ shall be maintained in front of and in back of the meter pedestal.
3. Commercially made mobile/manufactured home metered service entrance pedestals shall be listed as suitable for service equipment for manufactured homes and mounted to a field-built metering structure (Consult Plymouth Utilities).



705. NOT USED

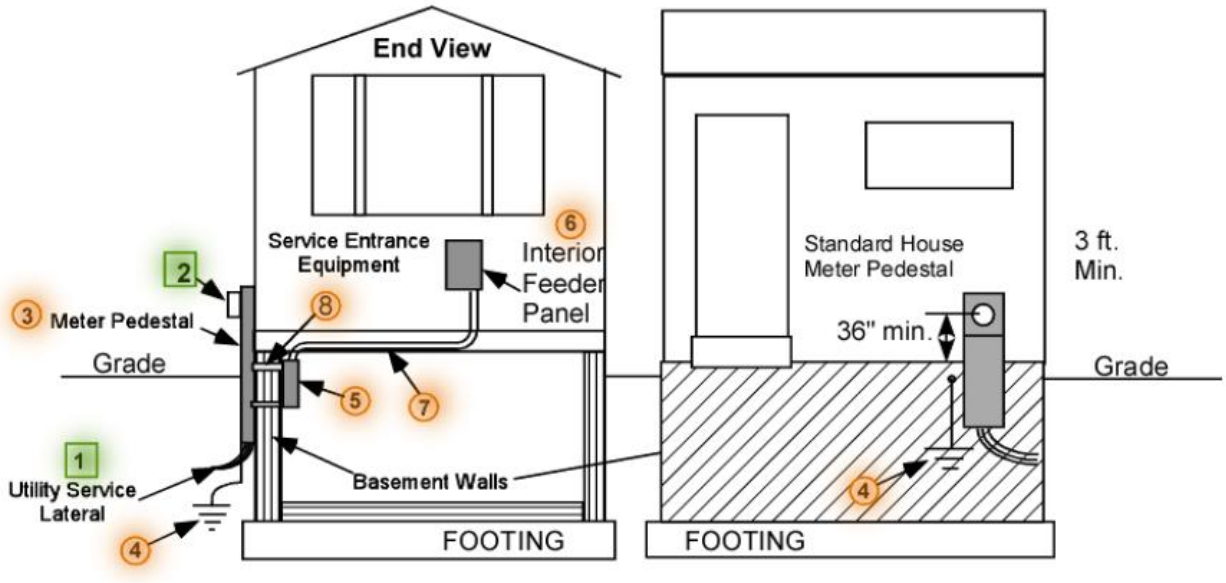
706. MANUFACTURED HOME SERVICE PEDESTAL, MOUNTED ON FROST WALL PERMANENT FOUNDATION, SINGLE-PHASE, 100-200 AMP, 120/240 VOLTS.

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Underground service lateral	X	
2	Meter	X	
3	Approved Meter Pedestal with main		X
4	Ground in accordance with the *NEC* (See ESM Chapter 14)		X
5	Mobile/manufactured home service entrance equipment, rated for outdoor use, single main with provisions for feeder or branch circuits. Can be foundation mounted or free standing		X
6	Factory installed feeder panel		X
7	Permanently install 4-wire feeder to manufactured home		X



707. MANUFACTURED HOME SERVICE PEDESTAL, MOUNTED ON FULL BASEMENT, PERMANENT FOUNDATION, SINGLE-PHASE, 100-200 AMP, 120/240 VOLTS.

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Underground service lateral	X	
2	Meter	X	
3	Approved Meter Pedestal with main		X
4	Ground in accordance with the *NEC* (See ESM Chapter 14)		X
5	Service entrance equipment, single main disconnect with provisions for feeder of branch circuits		X
6	Factory installed feeder panel		X
7	Permanently install 4-wire feeder to manufactured home		X
8	Service entrance conductors		X



708. APPROVED METER PEDESTALS FOR MANUFACTURED HOMES

Plymouth Utilities requires all meter pedestals to be ringless and have either manual or lever bypasses. The tables below list commonly used pedestals. Other pedestals should be checked with Plymouth Utilities for approval. When checking with Plymouth Utilities, please provide the pedestal spec sheet.

708A. Manufactured Home 100 Amp Meter Pedestals with Main

Manufacturer	Catalog Number	Positions
Midwest Electric	R101CB6HP	2
	R101CP6HP	1
Milbank	U5136-O-100S[1,2]	1
	U5137-O-100S[1,2]	2
	U5702-O-100S[1]	2

1. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad or post-mount. Contact manufacturer for details and part number.
2. Specify Milbank Series K5400-Bridge-(XXX) receptable/circuit breaker kits as needed for manufactured home power supply cord or other convenience receptacle.

708B. Manufactured Home 200 Amp Meter Pedestals with Main

Manufacturer	Catalog Number	Positions
Midwest Electric	R281C1B6H	2
	R281C1P6H	1
Milbank	U5136-O-200S[1,2]	1
	U5137-O-200S[1,2]	2
	U5702-O-200S[1]	2

1. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad or post-mount. Contact manufacturer for details and part number.
2. Specify Milbank Series K5400-Bridge-(XXX) receptable/circuit breaker kits as needed for manufactured home power supply cord or other convenience receptacle.

708C. Recreational Vehicle 100 Amp Meter Pedestals with Main

Manufacturer	Catalog Number	Positions
Milbank	U5136-O-100S[1]	1
	U5137-O-100S[1]	2

1. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad or post-mount. Contact manufacturer for details and part number.

708D. Recreational Vehicle 200 Amp Meter Pedestals with Main

Manufacturer	Catalog Number	Positions
Milbank	U5136-O-200S[1]	1
	U5137-O-200S[1]	2

1. Extension Kit or Stabilizer Foot required for freestanding, direct buried, pad or post-mount. Contact manufacturer for details and part number.

Plymouth Utilities

Chapter 8

Farm Services

Reserved For Notes:

800. SCOPE

This chapter includes single and three phase services to farms, acreages where animals may be present, and/or irrigation installations. The service shall connect to an approved field-built structure. Plymouth Utilities will not install underground service laterals across rock quarries, tillable agricultural land, or other locations not suitable for underground cables and equipment.

801. NON-FARM SERVICE

Services for installations not covered in this chapter shall be installed in accordance with services as shown in ESM Chapter 3 and Chapter 4.

802. FARM SERVICE YARD POLE OR STRUCTURE

Informational Note: Yard poles are limited to existing installations only.

A. The farm service yard pole or field-built structure is owned by the customer. This pole or field-built structure shall be located on the customer's property. Under no circumstances may the customer's pole or field-built structure be located in road right-of-way.

B. Plymouth Utilities distribution poles shall not be used as farm service yard poles, for fencing, signage, or any other non-Plymouth Utilities purpose.

C. The transformer should be located 20 feet from the customer's service entrance and any other customer owned structure/facilities for potential neutral isolation request in the future. If this cannot be achieved due to physical limitations, the transformer may be located 12 feet but no more than 30 feet from the customer's service entrance according to Plymouth Utilities Electric Service Manual Chapter 8, Farm Services.

D. For safety concerns, the customer shall consult Plymouth Utilities before installing any equipment on a yard pole or field-built structure.

E. All underground circuits extending from the yard pole or field-built structure shall be feeders or branch circuits (*NEC* 547).

F. The customer shall protect the yard pole or field-built structure and equipment on it from damage by vehicles and/or farm equipment. The yard pole or field-built structure and equipment on it shall be maintained in good operating condition and repaired or replaced, at the customer's expense, when warranted.

G. Plymouth Utilities requires all meters to be installed so the meter faces an area that is accessible and clear.

H. The customer's pole top transfer switch (*NEC* 547.2 Site Isolation Device) shall be approved by Plymouth Utilities as a single switch unit mounted in one enclosure. The site isolation device shall disconnect all underground conductors on the premise from utility service.

I. Pole top switch installations shall have a minimum switch size of 400 Amps. A customer-owned yard pole will be used to support the customer's electrical distribution center (This installation limited to existing only.)

J. The bonding conductor from the pole top transfer switch and all grounding and grounded conductors for the customer's wiring system shall be connected together at the yard pole as shown in the grounding chapter (ESM Chapter 14).

K. Plymouth Utilities encourages customers to convert to 3-phase, 480/277 volt whenever practical and when appropriate for present loads or future expansion. To convert to 3-phase a customer:

1. Shall have 3-phase loads or immediate plans to install such.
2. Farm load has exceeded single-phase service sizes offered by Plymouth Utilities.

When converting to 3-phase, the customer shall make appropriate wiring changes on their side of the meter to utilize and balance all 3 phases as best as practical.

L For animal confinement facilities and associated/connected premises, one service per property applies. All exceptions shall be approved at Plymouth Utilities discretion. See ESM Chapter 1 for more information.

M. Plymouth Utilities will not install additional service drops or laterals to any farm building or farm structure when any portion of the building or structure is located within 150 feet of the yard pole distribution center. If another service may be warranted, the separation between the services shall be 300 feet minimum, measured in a straight line.

N. A separate service may be installed to a building on the farm site if that building is not part of the farm operation. The separate service shall not originate from the yard pole.

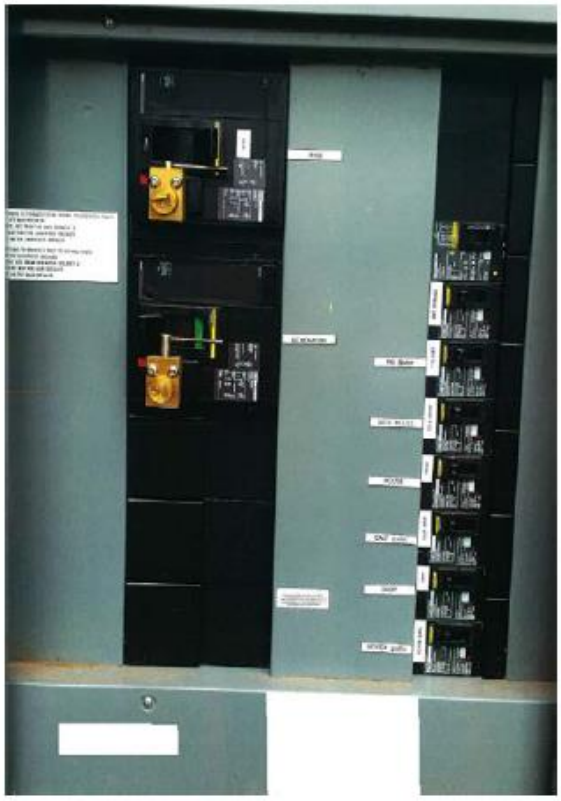
O. All farm use meters shall be installed on the yard pole or field-built structure. A house (or houses) on a farm site may be considered as part of the farm operation and may be metered as part of the farm service or metered separately from the yard pole or field-built structure. Meters for house services not involved with farming operations are not permitted on the yard pole and may require a separate transformer.

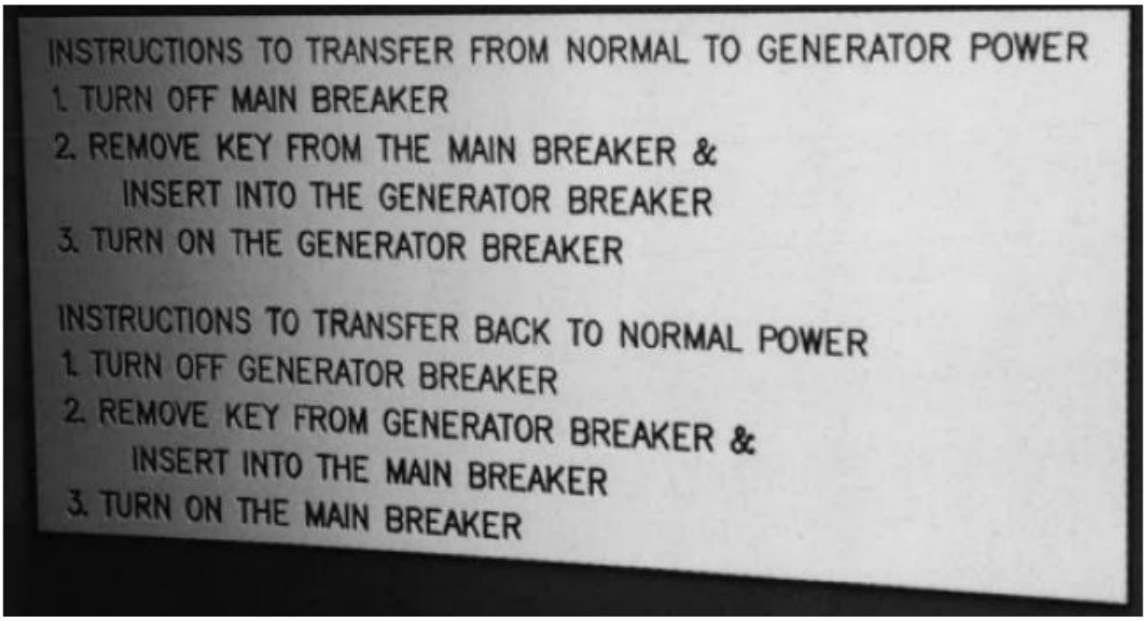
Informational Note: To prevent flicker issues caused by the farm loads, customers not involved with farm operation should be served from a separate transformer provided there are no electrically conductive pathways between the two services.

P. Farms with two or more services on the same tract or parcel of land shall maintain a permanent plaque at each service location indicating its usage (*NEC* 547).

803. KEY-INTERLOCK SYSTEMS – FARM STANDBY GENERATION

Keyed interlock systems for standby generation may be allowed at farm installations with prior approval from Plymouth Utilities. Labeling and instructional placards shall be installed by the customer as shown below.





804A. SERVICE TO A FARM YARD POLE, SELF-CONTAINED WITH GRADE LEVEL DISCONNECT AND OVERCURRENT PROTECTION

(Maintenance Only, not for new construction)

300 AMP MAX AND 240 VOLT MAX

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Overhead service drop	X	
3	Service dead-end		X
4	Pole – treated 35’ Class 5 minimum		X
5	Down guy, anchor, and guy guard		X
6	Rain-tight weatherhead		X
7	Overhead service rigid conduit		X
8	Approved meter socket		X
9	Service entrance/disconnect		X
10	Feeder conduit		X
11	Customer’s feeder conductors		X
12	Ground in accordance with the *NEC* (See ESM Chapter 14)		X

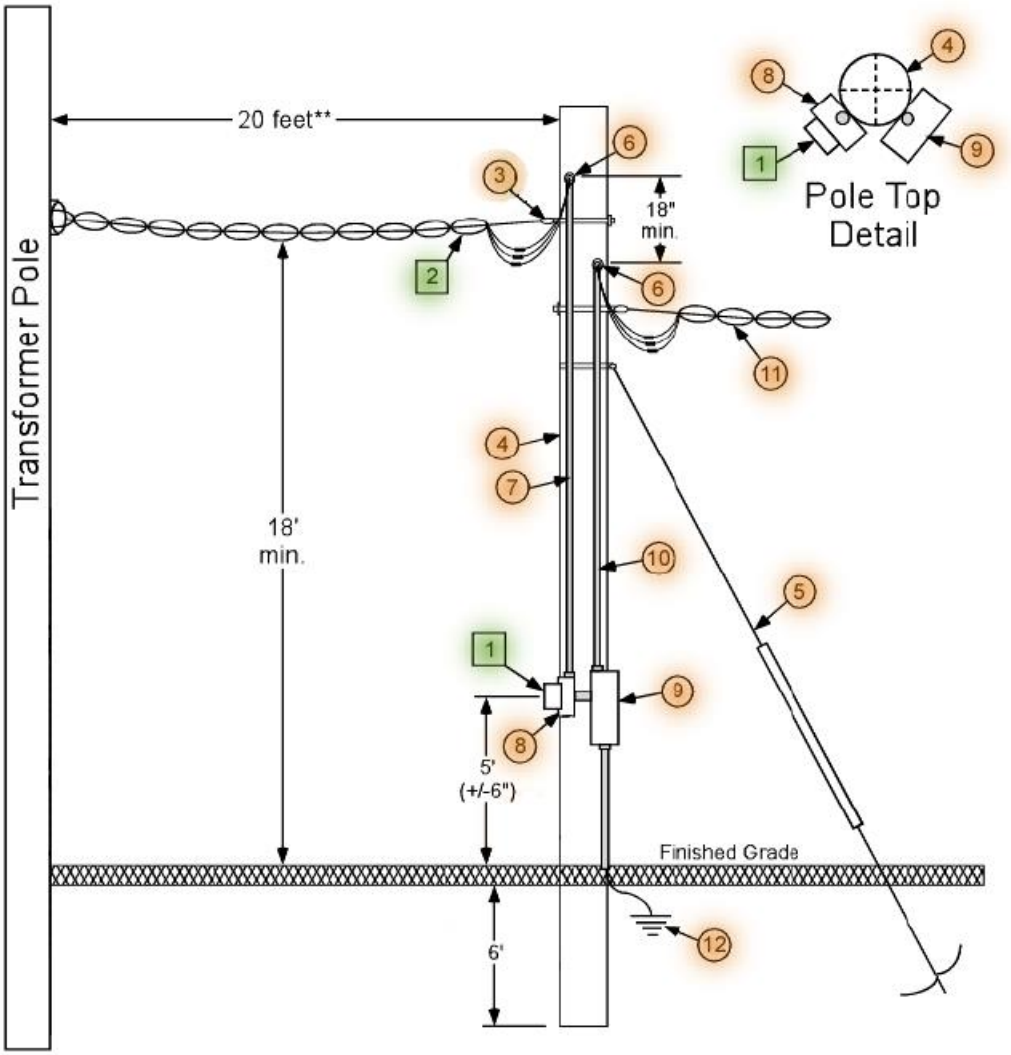
Notes:

1. Customer shall provide 36 inch leads at the weatherhead.
2. All customer equipment shall be installed on two adjacent quadrants of the pole as shown in the pole top detail.
3. Drop shall be a minimum of 18 feet above ground at the lowest point.
4. Item 11 above is limited to six service disconnects without a main service disconnect (Item 9).
5. Item 9 may be replaced by a service rated transfer switch.
6. Sites with multiple service points require each service point to be identified per *NEC* 547.

804A. SERVICE TO A FARM YARD POLE, SELF-CONTAINED WITH GRADE LEVEL DISCONNECT AND OVERCURRENT PROTECTION – CONTINUED

(Maintenance Only, not for new construction)

300 AMP MAX AND 240 VOLT MAX



**Note: 20 feet is expected. 12-30 feet is allowed when necessary due to physical limitations.

804B. SERVICE TO FIELD-BUILT STRUCTURE, SELF-CONTAINED WITH GRADE LEVEL DESCONNECT AND OVERCURRENT PROTECTION – EXISTING ONLY

(Maintenance Only, not for new construction)

300 AMP MAX AND 240 VOLT MAX

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Overhead service drop	X	
3	Service dead-end		X
4	Pole – treated 35’ Class 5 minimum		X
5	Down guy, anchor, and guy guard		X
6	Rain-tight weatherhead		X
7	Overhead service rigid conduit		X
8	Field-built structure (ESM 610)		X
9	Approved Meter Socket		X
10	Service entrance/disconnect		X
11	Feeder panels or branch circuits, as needed		X
12	Transfer switch, if installed		X
13	Stand-by generator circuit and outlet, if installed		X
14	Ground in accordance with the *NEC* (See ESM Chapter 14)		X

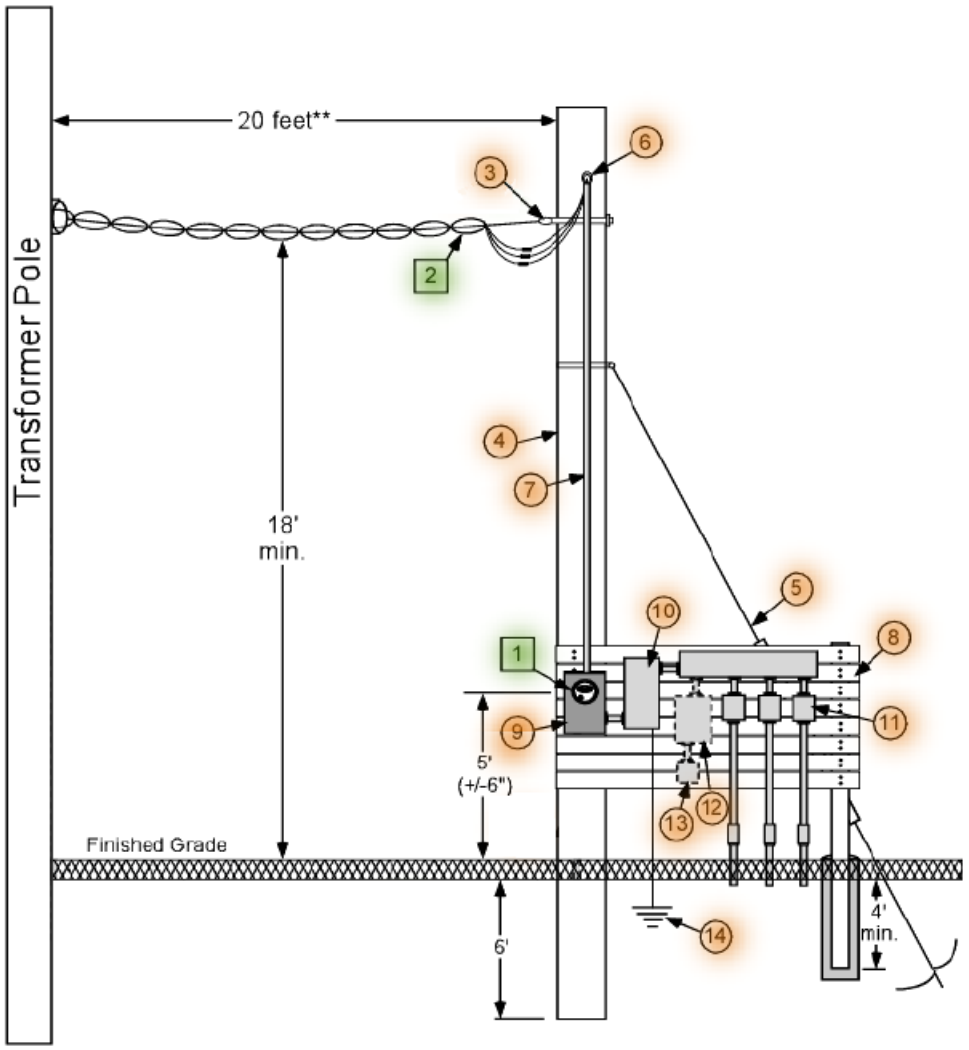
Notes:

1. Customer shall provide 36 inch leads at the weatherhead.
2. Drop shall be a minimum of 18 feet above ground at the lowest point.
3. Item 11 above is limited to six service disconnects without a main service disconnect (Item 10).
4. Items 10, 11, and 12 may be replaced by a service rated disconnect/transfer switch.
5. Sites with multiple service points require each service point to be identified per *NEC* 547.

804B. SERVICE TO FIELD-BUILT STRUCTURE, SELF-CONTAINED WITH GRADE LEVEL DESCONNECT AND OVERCURRENT PROTECTION – CONTINUED

(Maintenance Only, not for new construction)

300 AMP MAX AND 240 VOLT MAX



**Note: 20 feet is expected. 12-30 feet is allowed when necessary due to physical limitations.

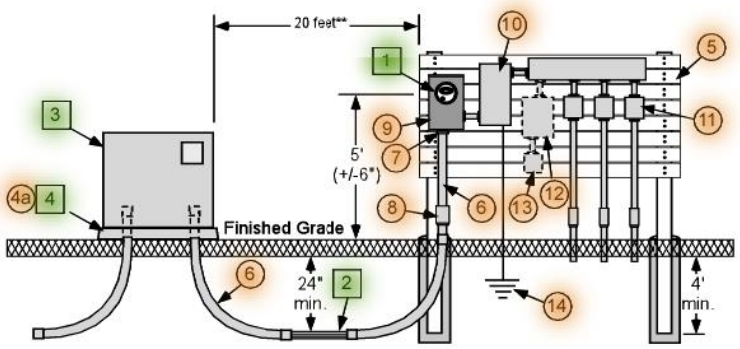
804C. UNDERGROUND SERVICE TO FIELD-BUILT STRUCTURE, SELF-CONTAINED, WITH GRADE LEVEL DISCONNECT AND OVERCURRENT PROTECTION

300 AMP MAX AND 240 VOLT MAX

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Underground service lateral	X	
3	Pad-mounted transformer	X	
4 (4a)	Box pad for 1 phase transformer Concrete pad for 3 phase transformer	X	 X
5	Field-built structure (ESM 610)		X
6	Rigid conduit		X
7	Insulating bushing		X
8	Conduit expansion joint		X
9	Approved Meter Socket		X
10	Service entrance/disconnect		X
11	Feeder panels or branch circuits, as needed		X
12	Transfer switch, if installed		X
13	Stand-by generator circuit and outlet, if installed		X
14	Ground in accordance with the *NEC* (See ESM Chapter 14)		X

Notes:

1. A clear space of 10 feet shall be provided in front of the transformer.
2. Customer shall install secondary rigid conduit into the transformer
3. Item 11 above is limited to six service disconnects without a main service disconnect (Item 10).
4. Items 10, 11, and 12 may be replaced by a service rated disconnect/transfer switch.
5. Sites with multiple service points require each service point to be identified per *NEC* 547.



**Note: 20 feet is expected. 12-30 feet is allowed when necessary due to physical limitations.

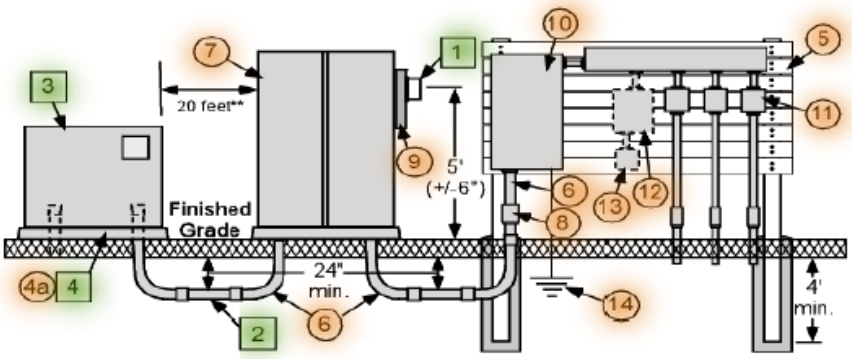
805. UNDERGROUND SERVICE TO FIELD-BUILT STRUCTURE, FROM PAD-MOUNT TRANSFORMER AND METERING TRANSFORMER CABINET

301 – 2000 AMPS (208/120 VOLT) OR 301 – 1600 AMPS (480/277 VOLT)

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Meter	X	
2	Underground service lateral	X	
3	Pad-mounted transformer	X	
4 (4a)	Box pad for 1 phase transformer Concrete pad for 3 phase transformer	X	 X
5	Field-built structure (ESM 610)		X
6	Rigid conduit		X
7	Pad-mounted metering transformer cabinet		X
8	Conduit expansion joint		X
9	Approved Meter Socket		X
10	Termination cabinet or service entrance/disconnect		X
11	Feeder panels or branch circuits, as needed		X
12	Transfer switch, if installed		X
13	Stand-by generator circuit and outlet, if installed		X
14	Ground in accordance with the *NEC* (See ESM Chapter 14)		X

Notes:

1. A clear space of 10 feet shall be provided in front of the transformer.
2. Customer shall install secondary rigid conduit into the transformer
3. Item 11 above is limited to six service disconnects without a main service disconnect (Item 10).
4. Items 10, 11, and 12 may be replaced by a service rated disconnect/transfer switch.
5. Sites with multiple service points require each service point to be identified per *NEC* 547.
6. Livestock farms must have at least 8’ of separation between transformer concrete pad and metering transformer cabinet concrete pad.



**Note: 20 feet is expected. 12-30 feet is allowed when necessary due to physical limitations.

Plymouth Utilities

Chapter 9

Utility/CATV Services

Reserved For Notes:

900. GENERAL

This chapter has been established for electric service requests from other utilities; telephone, telecommunications, cable television, Department of Transportation, and local municipalities. Many of these services include a request to place a meter socket and/or disconnect devices on Plymouth Utilities poles which shall meet Grade B construction.

If the request for attachment is wire, fiber, wi-fi devices, distributed antenna systems, or small cells, the Attaching Entity must apply to attach and be approved to attach before any of these attachments are placed on Plymouth Utilities poles. Failure to get approval will result in immediate removal of the non-approved facilities. The application is part of the agreement between Plymouth Utilities and the attaching entity. All requirements of the agreement shall be met and the application approved before attaching to Plymouth Utilities poles.

Requests involving attachments of customer equipment, disconnects, power supplies, risers, and meter sockets can create conditions where the pole becomes cluttered, making it very difficult and dangerous to climb.

A. Plymouth Utilities will not allow new meter sockets on poles. Metering facilities will not be allowed on Plymouth Utilities poles, except where entities have previously been allowed to attach metering facilities (due to prior rules that allowed this practice). Current rules do not allow metering facilities to be on a pole, and no new requests will be allowed. Exceptions will be at Plymouth Utilities discretion.

B. Poles with transformers, capacitor bank, risers, three-phase switches, three-phase buck arm corner, or taps should be avoided if possible.

C. When the customer's equipment, risers, and meter-sockets are allowed on Plymouth Utilities poles, they may not occupy more than two adjacent quadrants. Clearances shall be maintained as indicated in the NESC, *NEC*, and any local or state codes.

D. Request for underground service to customer owned underground termination and/or metering facilities may or may not meet requirements set forth by Plymouth Utilities for service. PU will evaluate each request on an individual basis.

901. UTILITY/CATV POLE-MOUNT SERVICE, 120/240 VOLTS, SINGLE-PHASE, 3-WIRE, 200 AMP MAX (CATV, TELEPHONE, MUNICIPAL)

(Maintenance Only, not for new construction)

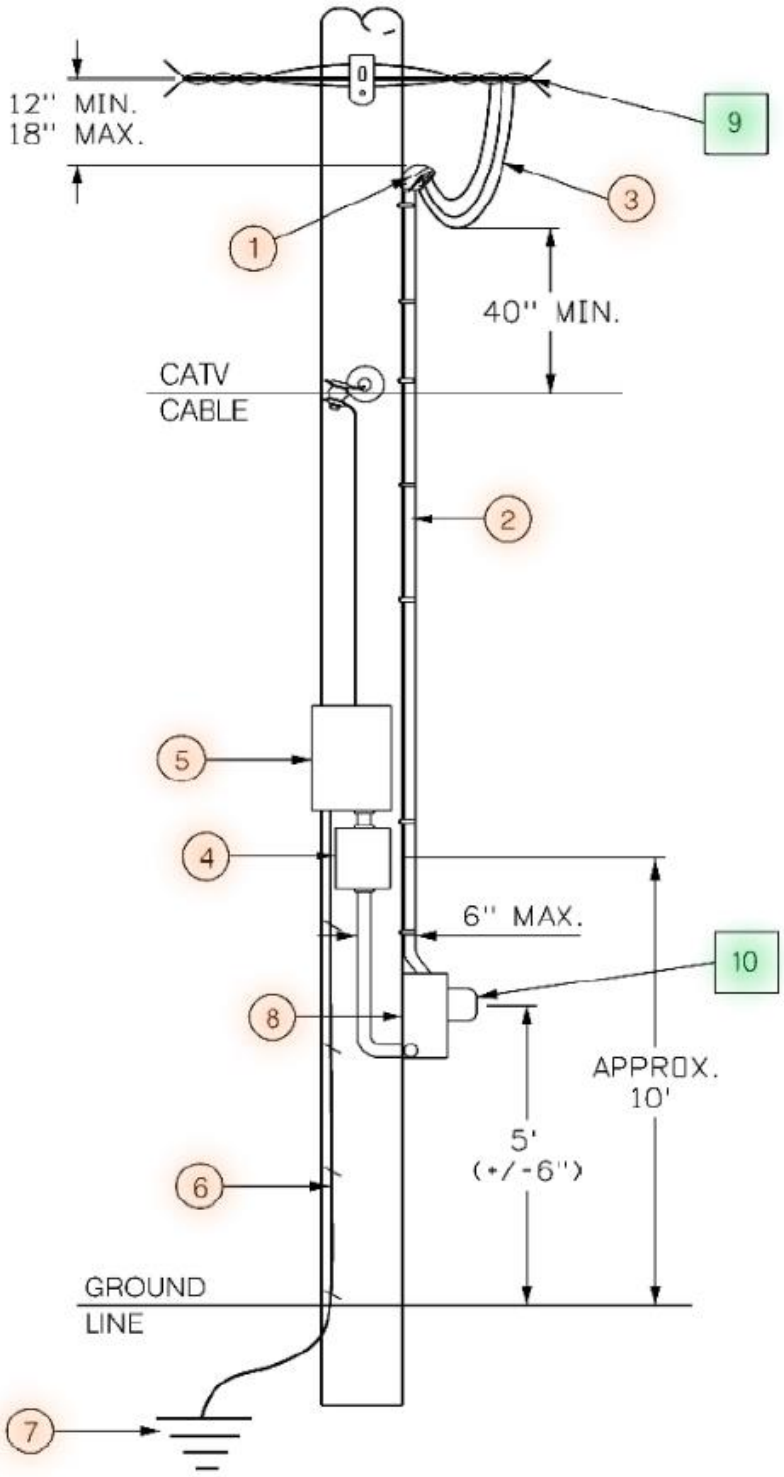
Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Service weatherhead		X
2	Service entrance rigid conduit		X
3	Service entrance conductors		X
4	Weather-proof service fused disconnect		X
5	Cable TV Power supply or equivalent device		X
6	Ground in accordance with the *NEC* (See ESM Chapter 14)		X
7	8’ ground rods (quantity as required)		X
8	Approved meter socket		X
9	Service conductors and connections	X	
10	Meter	X	

Notes:

1. Non-metallic conduit (Schedule 80). If metallic conduit is used, it shall be covered with a non-metallic covering 40 inches above and 40 inches below any communication attachment.
2. The service entrance conductors shall extend at least 36” beyond the service head to permit proper connections.
3. The disconnect power supply unit, meter socket and TV cable shall be mounted on the same quadrant of the pole.
4. When a unit contains both the service switch and the power supply, installation height shall be in accordance with applicable codes.
5. Power supply units may not be mounted on poles where transformers, risers, vertical supply conductors to aerial services, switch handles, traffic signal, capacitor banks, or similar equipment exists. Power supplies may not be mounted on three-phase distribution corner poles or tap poles.
6. When foreign facilities are attached to a pole supporting a lighting fixture, a clearance of 20” is required.
7. Bonding should be provided between all metallic power and communications apparatus.
8. Minimum wire size shall be number 6 AWG and maximum wire size shall be 4/0.
9. For commercial installations, residential meter sockets are acceptable for service entrances 60 amps or less. For service entrances 100 amps or larger, commercial meter sockets are required.
10. All installations shall conform to the *NEC*, the NESC, and Wisconsin state electrical codes for clearances and working space.

901. UTILITY/CATV POLE-MOUNT SERVICE, 120/240 VOLTS, SINGLE-PHASE, 3-WIRE, 200 AMP MAX (CATV, TELEPHONE, MUNICIPAL) - CONTINUED

(Maintenance Only, not for new construction)



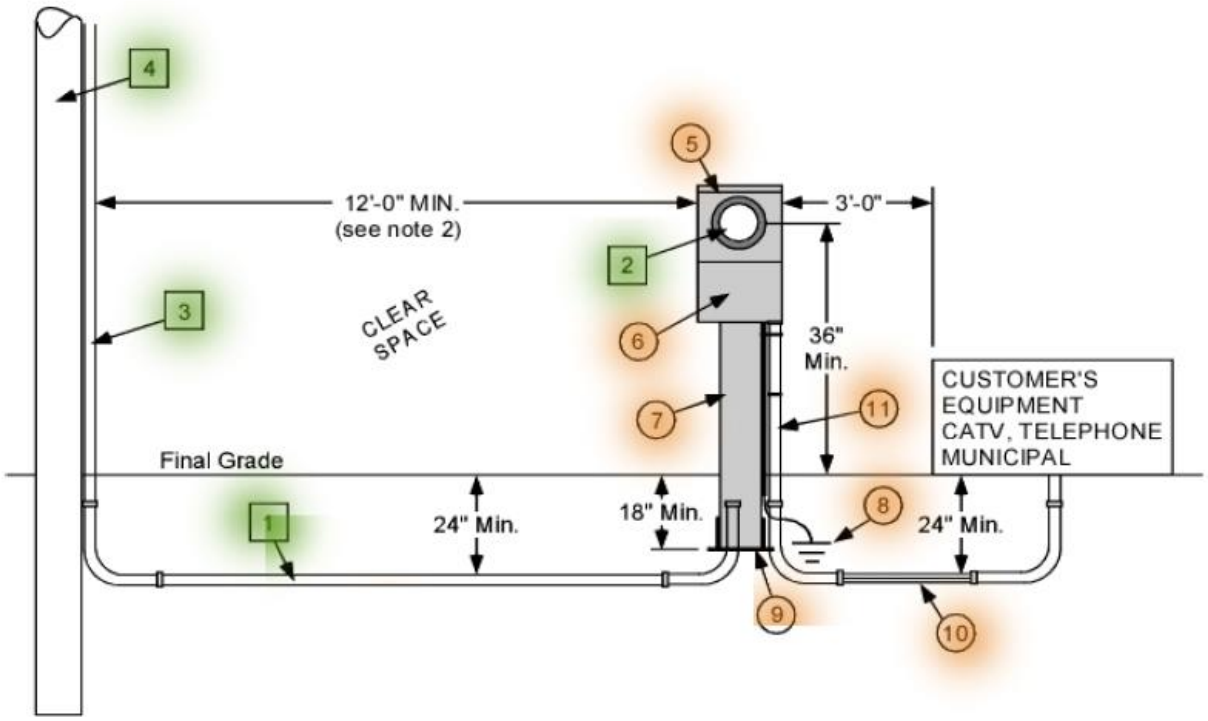
902. UNDERGROUND SERVICE, 120/240 VOTLS, SINGLE-PHASE, 3-WIRE, 200 AMP MAX (CATV, TELEPHONE, MUNICIPAL)

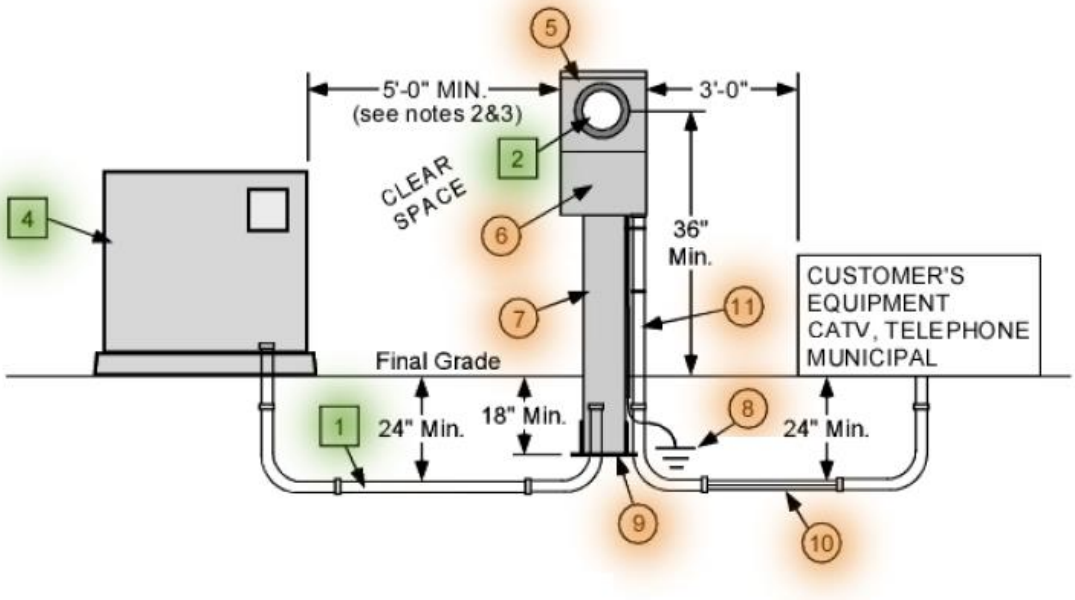
Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Underground service lateral	X	
2	Meter	X	
3	U-Guard	X	
4	Plymouth Utilities facilities (riser pole or pad-mount transformer)	X	
5	Approved Meter Socket		X
6	Service entrance equipment		X
7	Pedestal stake (minimum 6 feet)		X
8	Ground in accordance with the *NEC* (See ESM Chapter 14)		X
9	Factory manufactured stabilization foot (See note 8)		X
10	Underground feeder circuit		X
11	Rigid conduit (for customer conductors when required)		X

Notes:

1. Grounding electrodes shall be installed per the *NEC*.
2. A minimum of 12 feet of clear space is required from customer owned equipment to Plymouth Utilities energy facilities (riser pole, pad-mount transformer, or pedestal) in rural areas where livestock may be present or in areas where a truck may need to gain access between PU facilities and customer equipment.
3. With Plymouth Utilities approval the minimum clear space from note 2 may be reduced to 5 feet in residential subdivision and urban areas when the customer owned equipment is served from a Plymouth Utilities owned pad-mount transformer or pedestal.
4. Item 11, when the entrance trough on a meter pedestal is not divided for metered and un-metered conductors, the contractor shall provide a conduit exit from disconnect device.
5. The bottom of the disconnecting means shall be mounted a minimum of 2 feet above finished grade or a platform.
6. Bonding should be provided between all above ground metallic supply and communications enclosures (pedestals, terminals, apparatus cases, transformer cases, etc.) that are separated by a distance of 6 feet or less. (*NEC* 384(C))
7. Minimum wire size shall be number 6 AWG and maximum wire size shall be 4/0.
8. A free-standing meter pedestal with a stabilization footing shall not be used. Instead, a meter structure shall be used in accordance section 610.

902. UNDERGROUND SERVICE, 120/240 VOTLS, SINGLE-PHASE, 3-WIRE, 200 AMP MAX (CATV, TELEPHONE, MUNICIPAL) - CONTINUED





Plymouth Utilities

Chapter 10

Primary Service

Reserved For Notes:

1000. SCOPE

This chapter contains information concerning primary metered service, defined as a service where the customer is served at a standard primary voltage.

1001. GENERAL

A. The primary service standard at Plymouth Utilities is 12.47 kV. However, Plymouth Utilities requires the installation of 25 kV rated metering equipment, overhead conductor, underground cable, switchgear, and other equipment (where voltage rating is for insulation) for all new installations, equipment upgrades, or equipment replacements in Plymouth Utilities service territory. All customer transformers, arresters, capacitors, and other devices where voltage rating is not for insulation purposes, shall be 15 kV rated. Customer owned transformers are recommended to be dual tapped for 12.47 kV and 24.9 kV. Contact Plymouth Utilities to discuss non-standard primary service and equipment needs prior to designing or ordering.

1. Customer installs primary rated (>600V) equipment. This includes, but not limited to conductor, cable, transformers, and switchgear.

2. Customer is only required to upgrade equipment that is being replaced during equipment replacements.

3. Equipment will be energized at Plymouth Utilities' currently available voltage.

B. The customer shall submit an application to Plymouth Utilities for the proposed primary service and obtain approval of the location, equipment, and design before starting installation of the service entrance. Detailed shop drawings are required for underground service terminations and metering sections in switchgear.

C. Plymouth Utilities furnishes, installs, and maintains all primary service conductors and/or cable terminators up to the point of service. Plymouth Utilities also furnishes, installs, and maintains the metering equipment (CTs and PTs) in accordance with applicable rates, extension rules, and the requirements of the Electric Service Manual Chapter 1.

D. The customer furnishes, and maintains the metering transformer cabinet. Plymouth Utilities will work with the customer to take possession of the metering cabinet for installation of CTs and PTs then install the cabinet at the customers location when applicable. The customer furnishes, installs, and maintains all other service entrance facilities.

E. The customer will incur all costs for clearing either the overhead or underground routes, including tree removal, building, and/or foundation or rubble removal, and any other obstacles encountered.

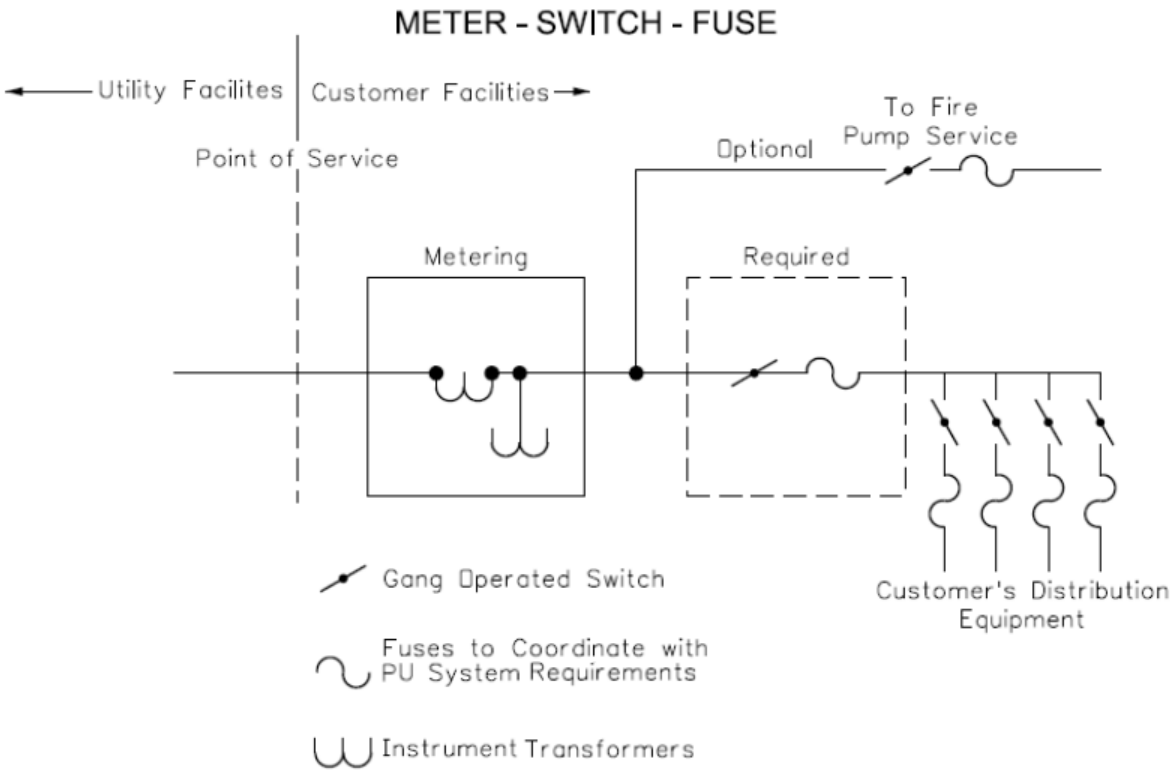
1. For all underground services: Prior to the installation of Plymouth Utilities' underground service lateral, a 10-foot-wide cable route shall be free of all obstructions and within 3 inches of final grade.

2. For all three-phase overhead services: Prior the installation of Plymouth Utilities' overhead service the customer shall provide a 30-foot-wide route free of all obstructions.

3. For all single-phase overhead services: Prior to the installation of Plymouth Utilities' overhead service the customer shall provide a 20-foot-wide route free of all obstructions.

F. The customer shall provide the necessary easements, at no expense to Plymouth Utilities, for the installation and maintenance of the primary service. No permanent buildings or trees shall be placed in the easement area.

G. Prior to finalizing orders for service equipment, the customer shall submit a design package including but not limited to plan view and elevation view drawings, one-lines, and equipment lists included in the installation to Plymouth Utilities for approval, to avoid delays and unnecessary expense for the customer and Plymouth Utilities.
Service entrance equipment located at the point of service shall include a three-phase, gang-operated load break disconnecting means and over current protection for a three phase service. The disconnecting device shall be located to provide a visible open and operating capability to both the customer and Plymouth Utilities. The sequence of the equipment toward the load shall be **meter-switch-fuse** with variations approved by Plymouth Utilities.



Typical Primary Metering Service

1002. UNDERGROUND PRIMARY SERVICE TO METERING ENCLOSURE

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Underground primary service	X	
2	PTs and CTs	X	
3	Meter	X	
4	Disconnect and arresters (on previous structure, not pictured)	X	
5	Primary metering enclosure (See Note 5 below)		X
6	Box pad		X
7	PT fuse holder		X
8	Arresters	X	
9	Approved meter socket		X
10	Underground primary cable with terminations and arresters		X
11	Switchgear		X
12	Switchgear pad		X
13	Grounding per *NEC* 250		X

Notes:

1. Height for training primary cable.

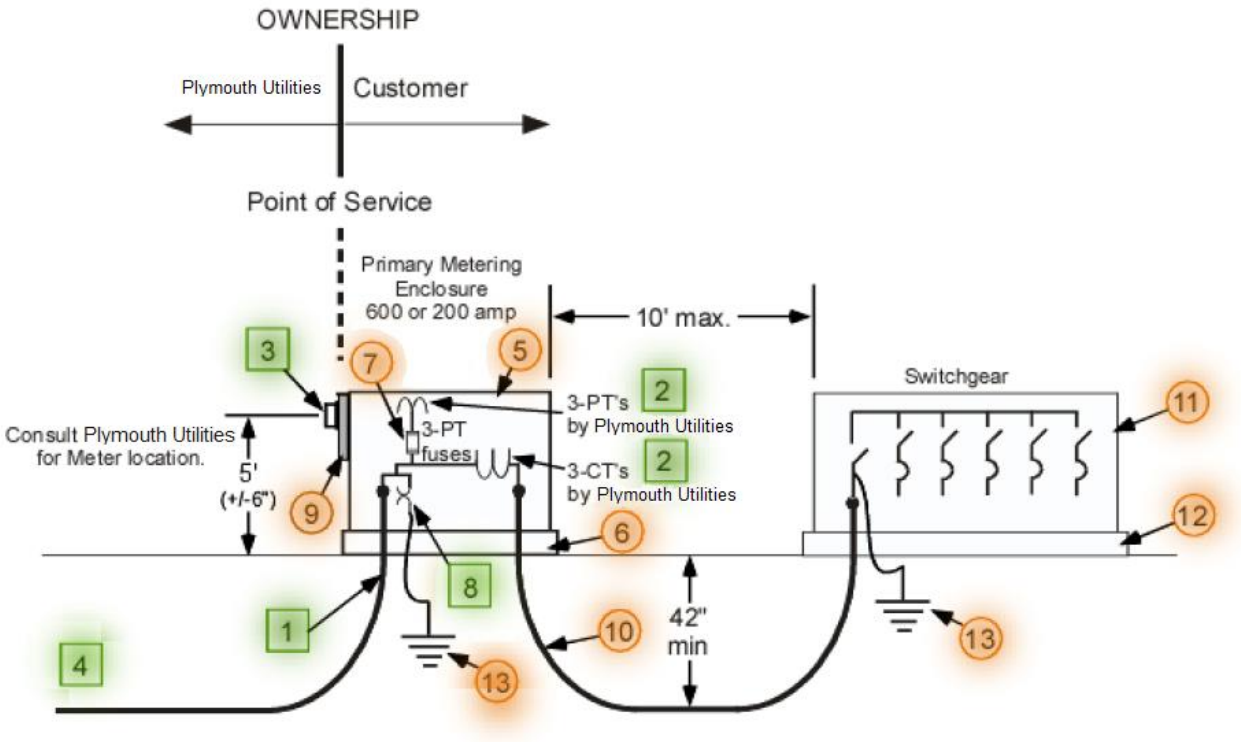
2. Switchgear shall be located within 10 feet of metering enclosure to minimize the length of unprotected customer primary cable.

3. Switchgear shall have a main disconnect that is gang operated, operable by Plymouth Utilities and customer, lockable visual open, be capable of carrying full load requirements, and withstanding faults of 10,000 amps (RMS symmetrical).

4. Consult Plymouth Utilities for appropriate PTs and CTs, ordering procedure, and shipment details to manufacturer for installation (If applicable).

5. Plymouth Utilities may take possession of metering enclosure for installation of CTs and PTs then install the enclosure for the customer.

1002. UNDERGROUND PRIMARY SERVICE TO METERING ENCLOSURE - CONTINUED



Contact Plymouth Utilities to provide means to disconnect service to this enclosure by closest upstream disconnection device for maintenance of PTs and CTs. Customer required to provide grounding means on load side of primary metering enclosure.

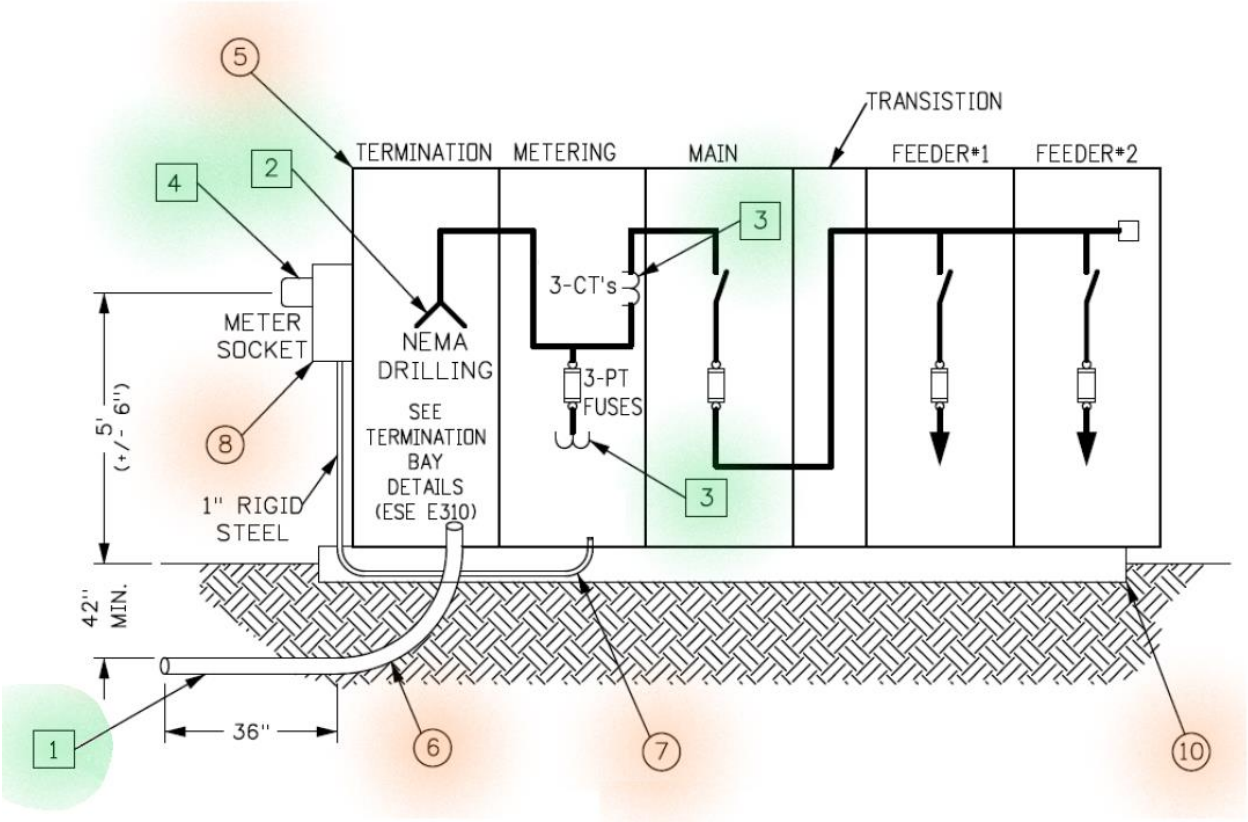
1003. UNDERGROUND PRIMARY SERVICE TO SWITCHGEAR

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Underground primary service cables	X	
2	Terminators	X	
3	PTs and CTs	X	
4	Socket type of meter	X	
5	Primary switchgear		X
6	6” conduit		X
7	1” metering conduit		X
8	Approved meter socket		X
9	Grounding – Per *NEC* 250		X
10	Switchgear pad		X

Notes:

1. Switchgear drawings shall be submitted to Plymouth Utilities for approval before ordering.
2. Utility cables entering the termination bay of the switchgear shall be bottom connected. Clear space shall be provided for primary conductors below the termination points including room in the bottom of the cabinet(s) for 6” conduit to enter directly below the center point of the three termination points.
3. A single service disconnect is required. It shall be gang operated, be operable by the customer and by Plymouth Utilities, have means to show visual open contacts, be capable of carrying full load requirements and withstanding faults of 10,000 amps (RMS symmetrical).
4. Arrangements for double locking or other special procedures shall be discussed with Plymouth Utilities.
5. Minimum 10 feet of clearance shall be provided in front of termination and metering bays. If Plymouth Utilities is under contract to operate and maintain this switchgear, then the 10’ clearance applies to all bays of the switchgear.

1003. UNDERGROUND PRIMARY SERVICE TO SWITCHGEAR – CONTINUED



Sequence is Meter-Switch-Fuse

1004. OVERHEAD PRIMARY SERVICE

(Maintenance Only, not for new construction)

Item No.	Description	Furnished & Installed by Utility	Furnished & Installed by Customer
1	Overhead primary service conductors	X	
2	PTs and CTs with mounting hardware	X	
3	Meter	X	
4	Dead-end shoes and insulators	X	
5	Disconnect and arresters (on previous structure, not pictured)	X	X
6	Arresters – Recommended		X
7	Meter socket		X
8	Grounding		X
9	Poles		X
10	Overhead primary conductor		X
11	Primary fusing		X
12	Rigid conduit for metering		X
13	Gang operated switch		X
14	Insulator in switch operating rod handle		X

Notes:

1. Customer shall provide two poles of adequate height that allows ground in clearance in accordance with all codes for primary conductors including the neutral. The poles shall be of adequate class to provide strength to support conductors with ice and wind loading per the NESC.

2. The customer's isolation switch shall be gang-operated from grade level, be lockable in the open position, be operable by the customer and Plymouth Utilities, have means to show visible open contacts, be capable of interrupting all load being served, be capable of carrying all load requirements and withstanding faults of 10,000 amps RMS symmetrical.

3. Main fuses or breakers shall have adequate load carrying capacity and a minimum interrupting rating of 10,000 amps, RMS symmetrical. The customer shall verify with Plymouth Utilities that all fuses and breakers coordinate with Plymouth Utilities' system.

4. The customer shall supply a minimum 48" of vertical spacing for the installation of Plymouth Utilities' metering bracket with current and potential transformers. Plymouth Utilities will supply the bracket for these transformers.

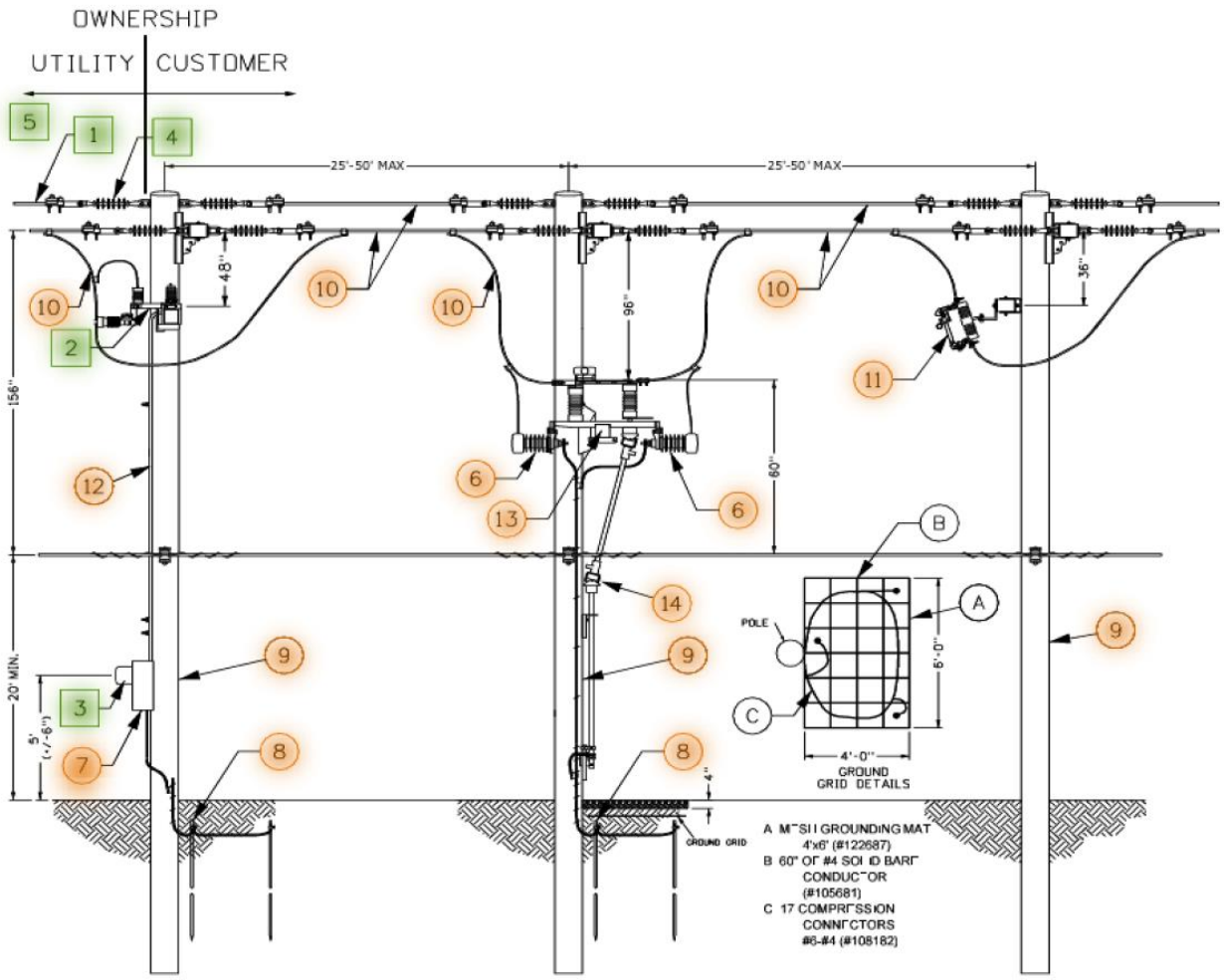
5. Branch circuit switches, operated at primary voltage, should meet operating criteria similar to the main fuse or breakers to provide adequate protection to the transformers served. Fuse size for Plymouth Utilities owned transformers will be specified by Plymouth Utilities.

6. The customer shall provide adequate climbing space on the main service entrance structure as specified in the NESC.

7. Metering conduit is 1" rigid steel conduit with weatherproof NEMA 3R junction box. Maximum allowable conduit run is 50' with a total of 180 degrees in bends. Runs longer than 50' or runs with more than 180 degrees in bends shall be approved by Plymouth Utilities.

1004. OVERHEAD PRIMARY SERVICE - CONTINUED

(Maintenance Only, not for new construction)



A main fuse needs to be installed on a pole within 50 feet of the main disconnect as shown above, therefore, another pole may be required within the 50-foot distance. (*NEC* 230.91) Plymouth Utilities will install a set of arresters on the closest upstream pole from the metering pole to protect the CTs/PTs on the closest upstream pole.

Plymouth Utilities

Chapter 11

Special Equipment and Motors

Reserved For Notes:

1100. SCOPE

This chapter covers the requirements for customer-owned equipment that may affect the quality of the service provided by Plymouth Utilities.

1101. SERVICE IMPAIRING EQUIPMENT

A. Service impairing equipment, because of its use, can lower the quality of power to other customers. Equipment that cannot be modified to prevent this shall be eliminated or controlled within performance limits required by Plymouth Utilities. If the customer meets these limits but still causes issues, such as but not limited to: flicker, harmonic distortion, voltage fluctuation, the customer causing the issues shall have the equipment installed, at their expense, that addresses the service impairment.

1. Common types of service impairing equipment includes welders, arc furnaces, electric motors, augers, conveyors, plasma cutters, motor driven compressors, instantaneous water heaters, distribution generation (Inverter based resources), power factor correction equipment, or other equipment having highly fluctuating or large instantaneous demands.

2. Other types of service impairing equipment include those with loads that cause harmonic distortion, such as data centers, inverter based equipment, rectifiers and variable frequency drives.

3. Equipment causing high-frequency current or harmonic distortion shall comply with IEEE standard 519-2022.

B. The customer shall obtain pre-approval from Plymouth Utilities before installing equipment such as those listed in Section 1101.A above.

C. In most circumstances, Plymouth Utilities' electrical supply facilities are adequate to serve normal load additions. Customers installing service impairing equipment shall be billed the costs for additional facilities, metering, and alterations specifically required to prevent impairment of service to other customers caused by this service impairing equipment.

1102. PHASE BALANCE

Where a customer connects single phase equipment to a three phase service, the single phase equipment shall be connected to prevent unbalance of the loads on the three phase service in excess of 10 percent. Such a customer shall maintain a power factor of 90 percent (or as otherwise specified in Plymouth Utilities' tariffs). When these requirements cannot be met, the customer shall apply for a separate single phase service.

A. Customers shall make appropriate wiring changes on their side of the meter to utilize and balance all 3 phases as best as practical.

B. Each phase conductor should carry a minimum of 25% of the total kVA at normal operating and maximum load conditions.

C. Exceptions to this rule may exist in certain locations as approved by Plymouth Utilities.

D. Exceptions may also include lightly loaded systems.

E. Imbalance shall not create negative system impact, negative customer impacts, or safety concerns.

1103. PROTECTION AND CONTROL

A. The customer shall be responsible for the protection against voltage fluctuations, transients, sags, and swells, or phase loss wherever these or unexpected restarting could cause damage to the customer's equipment or result in personal injury.

B. A control apparatus equipped with approved reverse-phase relays shall be installed by the customer on all poly-phase motor installations for:

1. Elevators, hoists, and cranes.

2. Manufactured processes where accidental reversal of rotation is liable to cause injury to persons or damage to machinery, equipment, or work in progress.

1104. MOTOR SPECIFICATIONS

In order to prevent impairment of service to other customers, it is necessary to establish limits for the allowable starting currents of motors. Before selecting motor equipment, the customer should consult Plymouth Utilities to determine the specific voltages available at any location.

When a motor is used to drive equipment that requires varying torque during each cycle of operation, such as a compressor or reciprocating pump, the combined installation should have enough momentum in its moving parts so that its operation will not interfere unduly with service to other customers.

A **frequently started motor** is defined as a motor starting more than four timer per hour.

A. Types of motor service available on general service lighting rates, single-phase only are as follows:

1. Single-phase fractional horsepower motors: Automatically controlled and frequently started, whose locked rotor currents do not exceed 23 amperes may be connected to 120-volt circuits.

2. Single-phase motors, one horsepower or less: Manually controlled or infrequently started, whose locked rotor currents do not exceed 50 amperes may be connected to 120-volt circuits. No single-phase motor larger than 1 horsepower shall be operated on a 120-volt circuit.

3. Infrequently started single-phase motors of 10 horsepower or less may be connected to 240-volt circuits if their locked rotor currents do not exceed the values shown in the next section describing motor service available on power rates.

4. In urban areas infrequently started three-phase motors of 10 horsepower or less; connected through single-phase to three-phase converters may be used on other circuits.

5. Single-phase motors above 10 horsepower are not permitted in rural areas.

B. Types of motor service available on power rates and combined light and power rates, single-phase and three-phase are as follows:

1. Motors with long periods of continuous operation under maximum load conditions and having not more than four starts per hour may be connected if their locked rotor currents do not exceed those listed in the following table. Consult Plymouth Utilities where these conditions cannot be met, or where equipment ratings and/or starting characteristics exceed the values in the table below:

Motor Starting Table

Motors Rated	Total Locked Rotor Current Not to Exceed
120 Volts – Single-Phase	50 Amperes
240 Volts, Single-Phase	
2 Horsepower or Less	60 Amperes
2 to 6.5 Horsepower	60 Amperes Plus 20 Amperes per Horsepower in Excess of 2 Horsepower
6.5 to 15 Horsepower	150 Amperes Plus 10 Amperes Per Horsepower in Excess of 6.5 Horsepower
240 Volts, Three Phase	
2 Horsepower or Less	50 Amperes
2 to 19.9 Horsepower	50 Amperes Plus 14 Amperes Per Horsepower in Excess of 2 Horsepower
20 to 40 Horsepower	300 Amperes Plus 4 Amperes Over Horsepower in Excess of 20 Horsepower
50 Horsepower and over	8 Amperes Per Horsepower

2. Motors above 10 horsepower rating are to be three-phase

3. New installation of motors of 50 horsepower or larger should be approved by the utility as to motor type, starting and protective equipment, and as to availability of an adequate power supply at the proposed location.

4. Motors subject to frequent starts, such as elevator and hoist motors, when connected to the secondary distribution system, should have their starting current limited to 100 amperes.

5. For motors of higher voltage rating than shown in the motor starting table, the allowable currents are inversely proportional to the voltages.

C. If service to any customer is negatively affected, the cost of additional facilities necessary to provide adequate service shall be at the expense of the customer who causes the problem.

Plymouth Utilities

Chapter 12

Standby Generation

Reserved For Notes:

1200. SCOPE

This chapter addresses any customer owned generation system not operated in parallel with Plymouth Utilities' electric distribution system including closed transition type transfer switches that parallel the generator system and the normal supply for a maximum of 100 milliseconds (1/10 second). See Chapter 5 for customer owned generator systems operated in parallel for greater than 100ms.

Notes:

Closed transition = make before break, no disruption to load

Open transition = break before make, requires disruption to load

1201. SAFETY

A. No generator may be electrically connected to Plymouth Utilities' distribution system without the written consent of the utility and with adequate physical arrangements to prevent hazard to life and damage to utility property.

B. The customer shall fill out a standby generation application, available on Plymouth Utilities' website or at the main office, prior to installing standby generation. This application will suffice as the written consent of the utility when returned to the customer. Accompanying this application shall be a One-Line diagram utilizing ANSI electrical symbols and spec sheets for the generator and any transfer or disconnect switches installed with the generator.

C. Transfer switches may only be located before the main service disconnects where they meet Chapter 1 Section 109 the short circuit duty (AIC Rating).

D. The customer's transfer device shall be installed to mechanically prevent any possibility of power from the customer's standby source feeding back into Plymouth Utilities' distribution system.

E. It is the responsibility of the customer to comply with all rules and labeling requirements of the *NEC* or any other jurisdictional codes.

1202. TRANSFER SYSTEM REQUIREMENTS

A. Plymouth Utilities shall approve automatic transfer systems.

B. The customer may supply any portion of their electrical load from a standby generator.

C. The customer shall install a transfer switch or contactor in order to transfer load from ungrounded conductors between the normal supply and standby generator.

D. All transfer switch devices that meet UL 1008 Rated and designed with Break-Before-Make connections will not require a Standby Generation Disconnect.

E. Transfer Switches that do not meet UL 1008 shall have a lockable, visually-open break in the circuit that isolates the utility normal supply from the customers transfer switch. This break, referred to as the Standby Generation Disconnect, shall be accessible to Plymouth Utilities and should be located within 10' of the meter, unless otherwise labeled. A circuit beaker may be considered if installed with a locking mechanism and approved by Plymouth Utilities.

F. Permanent labeling is required; Labeling shall be rigid engraved plastic, engraved self-sticking brass, or engraved self-sticking aluminum with a minimum of ¼ inch block lettering. Customer shall install a label at the disconnect reading: "Standby Generation Disconnect".

1203. TRANSFER SWITCH OPTIONS

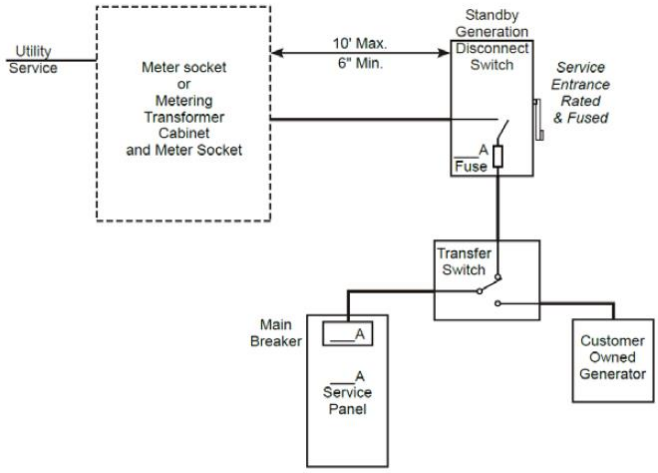
A. Permitted:

1. Manual or automatic double throw switches
2. Double throw relays
3. Mechanically interlocked switches
4. Breakers with factory designed mechanical interlocks

B. Not permitted:

1. Key interlocked switches or breakers
2. Switches that plug into the meter-socket
3. The addition of splices or taps in meter sockets and metering transformer cabinets
    - **Exception:** Key interlocked switches or breakers are permitted for existing Farm Services with prior Plymouth Utilities approval.

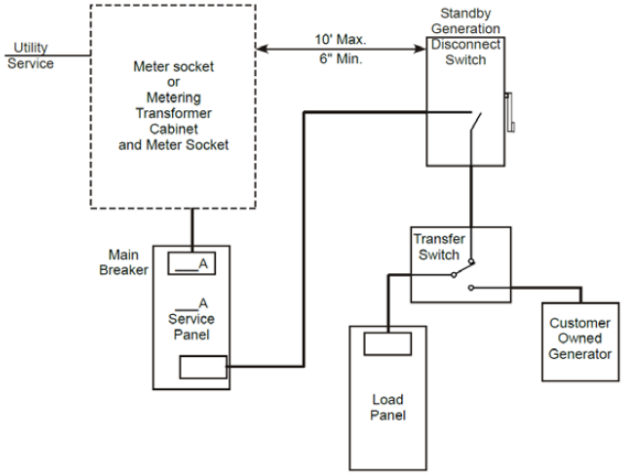
1204. 1-PHASE/3-PHASE, FULL SERVICE BACKUP



Notes:

1. Modification to metering equipment is not allowed.
2. If meter socket or metering transformer cabinet includes overcurrent protection (customer main) Standby Generation Disconnect does not need to be fused.
3. All transfer switch devices that meet UL 1008 Rated and designed with Break-Before-Make connections will not require a Standby Generation Disconnect.

1205. 1-PHASE/3-PHASE, PARTIAL LOAD BACKUP



Notes:

1. Modification to metering equipment is not allowed.
2. If meter socket or metering transformer cabinet includes overcurrent protection (customer main) Standby Generation Disconnect does not need to be fused.
3. All transfer switch devices that meet UL 1008 Rated and designed with Break-Before-Make connections will not require a Standby Generation Disconnect.

Plymouth Utilities

Chapter 13

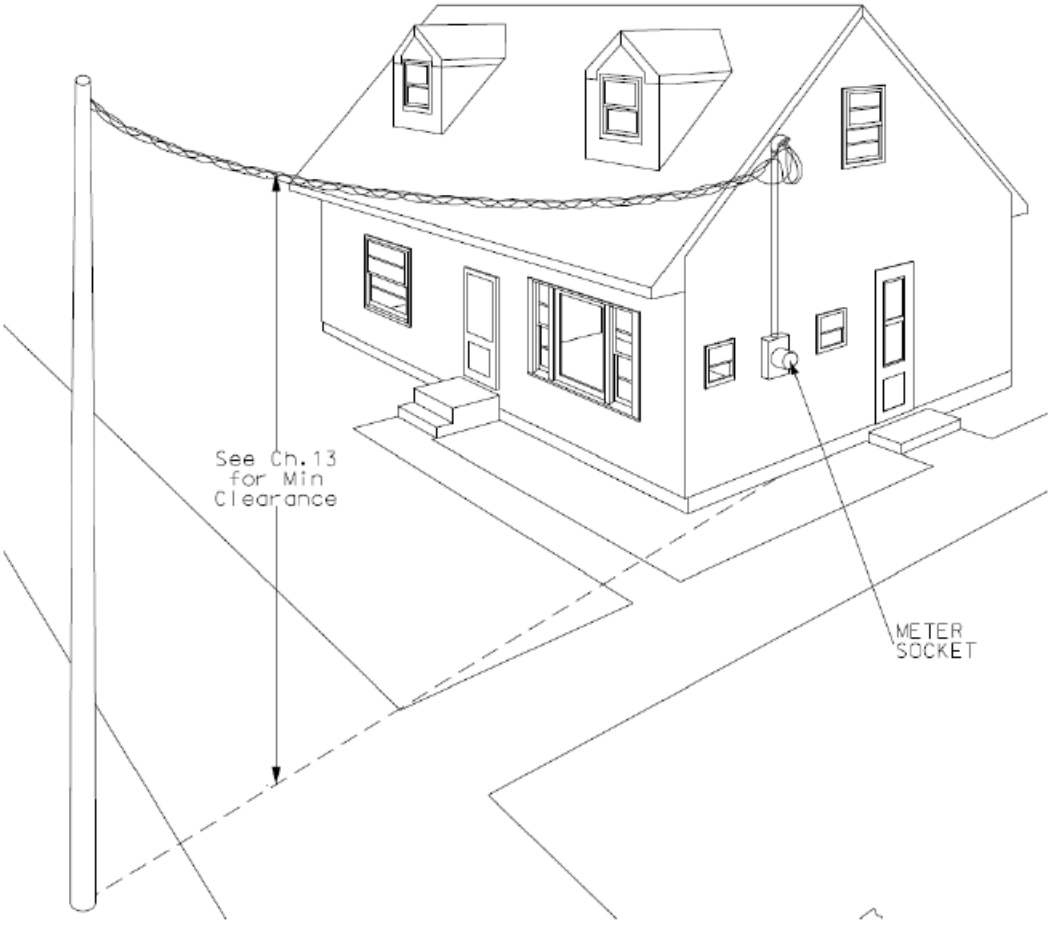
Clearances

Reserved For Notes:

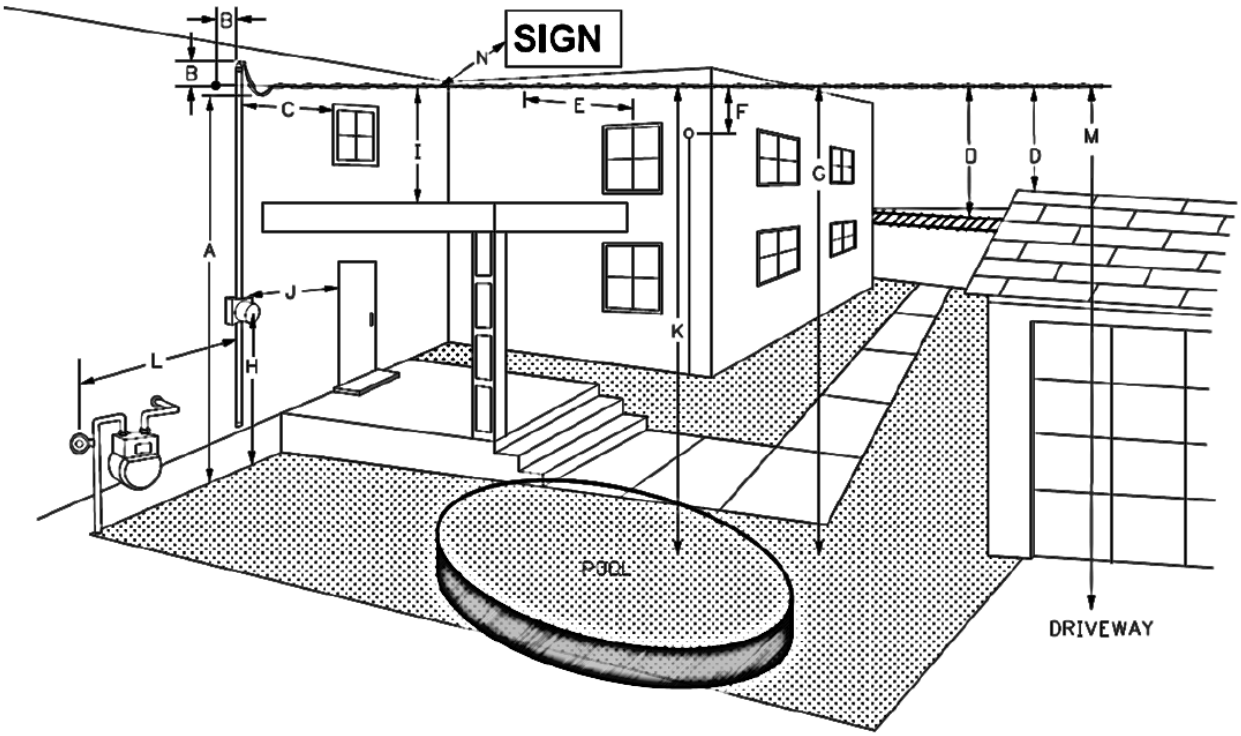
1300. SCOPE

This chapter covers the minimum clearances required by Plymouth Utilities for secondary and service voltages 480 volts or less. These requirements are designed to meet or exceed *NEC*, NESC, NFPA and state or building code minimum requirements.

Unobstructed work area clearance requirements are covered in ESM Section 607.



1301. MINIMUM CLEARANCES FOR SERVICE 300 VOLTS AND BELOW



The *NEC* and NESC prescribe minimum clearances for service wires.

A. 10-feet minimum to drip loops of triplex, if voltage to ground is less than 150 volts.

B. 1-foot minimum and 2-feet maximum horizontal (left or right) and 6 to 12 inch vertical (above or below) between service head and attachment point.

C. Exposed conductors shall be no less than 3-feet from window, doors, porches, fire escapes, awnings, signs, and similar construction, when service is attached to building. The exposed service conductors shall be 3-feet from all sides except top of window. When the service conductors are attached above a window the drip loop shall not sag below the top of the window.

D. Where services pass over a building but do not attach, the vertical roof clearance shall be no less than 8.0 feet for accessible roofs and 3.0 feet if the roof is not accessible and has a slope not less than 1 (vertical) to 3 (horizontal).

E. 5-feet when wires pass opposite a window, where the service is attached. (NESC table 234-1).

F. 2-feet from communication wires to supply cables 0 to 750V. (NESC table 233-1) For open supply conductor, this is increased to 4.0 feet.

G. 12-feet supply cable to ground (0 to 750V). (NESC table 232-1.5) Note 8: If the height of building does not permit 12-feet, it can be reduced to 10.5 feet (0 to 300V). If the voltage to ground is less than 150 volts, it can be reduced to 10-feet.

H. Center of meter 5’ +/- 6” above finished grade. (See ESM Section 603)

I. On buildings where service attaches, the vertical clearance over a porch or balcony shall be a minimum of 10-feet if the area is accessible. For inaccessible areas it may be reduced. (NESC 234.C.3.d)

J. When a door opens outward, mount the meter socket a door's width plus 6-inches on the hinged side away from the door opening. Do not mount the meter along high traffic passageways.

K. See Section 1303.

L. A minimum horizontal separation of 3-feet shall be maintained between natural gas service equipment (vented regulators) and electric metering or termination equipment. Transformers shall have a minimum separation of 5-feet from natural gas service equipment. A minimum separation of 5-feet shall be maintained between electric metering or termination equipment and liquid petroleum facilities on site but not filled on site. If the liquid petroleum facilities are filled on site the minimum separation is 10-feet.

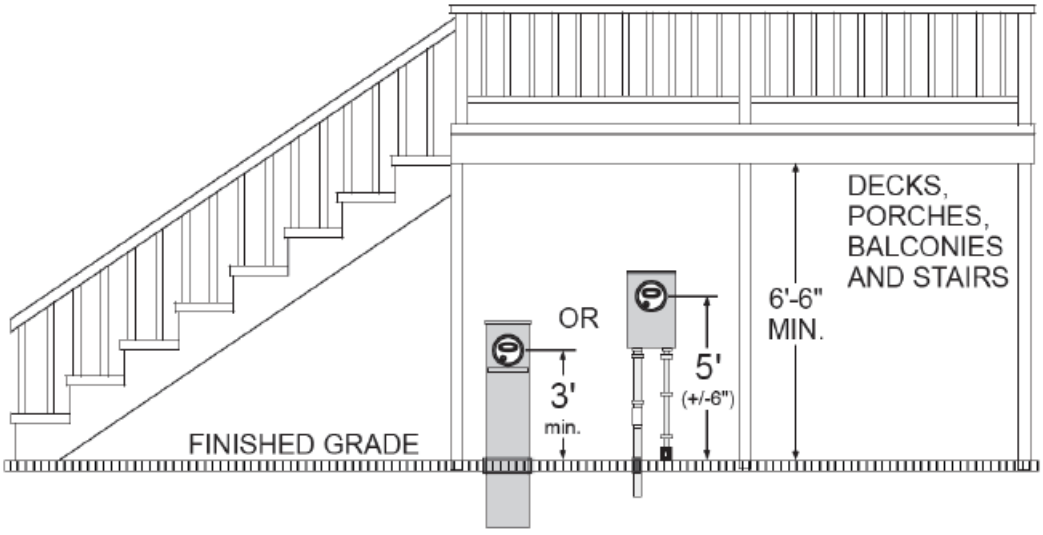
M. 16-feet over a driveway may be reduced on residential only drives to 12.5-feet for insulated drops limited to 300 Volts to ground or 12-feet for triplex service drops limited to 150 Volts to ground. (NESC table 232-1)

Informational Note: Plymouth Utilities has adopted a Minimum of 20-feet clearance on all DOT crossings.

N. The horizontal clearance to buildings, signs, etc. where services (at rest) pass but are not attached to the building at this location is 4.5 feet. If the drop meets NESC 230C1 the clearance may be reduced to 2-feet if the building is maintenance free. If the drop is subject to wind movement, then the horizontal clearance is 3.5 feet at blow out position.

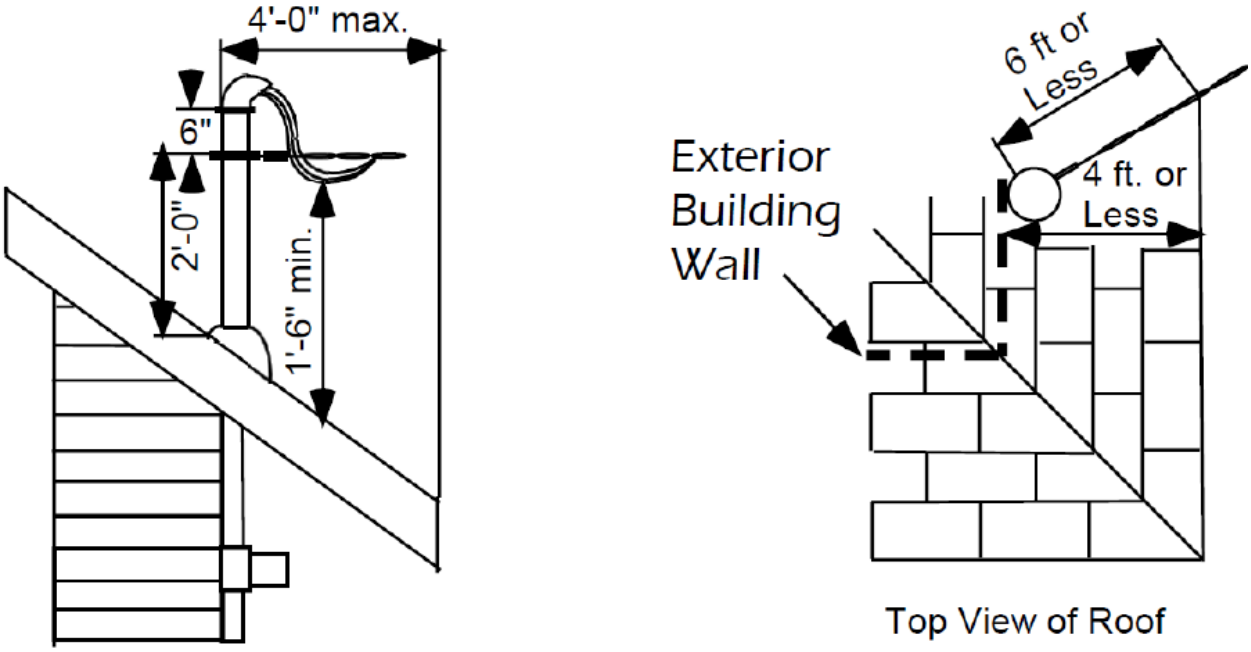
O. Minimum vertical clearance of railroad is 24.5 feet.

P. In order for a meter socket, pedestal or any other metering equipment to be located under decks, porches, balconies, or stairs, a minimum vertical clearance of 6.5 feet is required.



Informational Note: Overhead meter sockets installed with underground are limited to existing installations only. Any service upgrades will require the installation of a meter pedestal. All new installations shall be a meter pedestal. (See ESM 404.A.2)

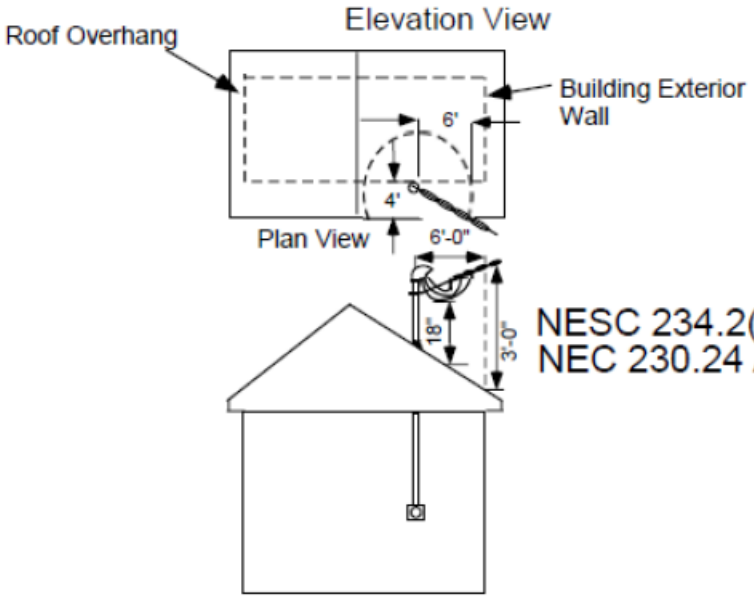
1302. SERVICE MAST INSTALLATION – ROOF CLEARANCES, CLEARANCE OF SERVICE DROP TERMINATING ON SUPPORT MAST, 300 VOLTS OR LESS

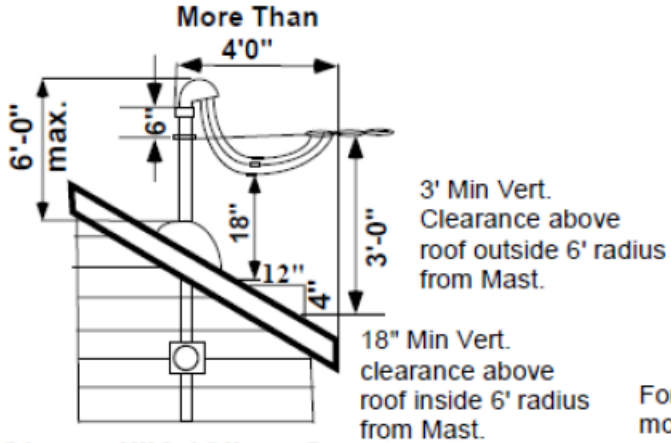


Notes:

1. If 6-feet (4 feet horizontally) or less of service conductor passes over the roof overhang to attach to a service mast through the roof and the service support is located 4-feet or less from the roof edge, the vertical clearance of the service can be reduced to 18”.
2. No coupling is allowed in conduit between the weatherhead and bottom of the soffit.
3. If the roof has a slope of 4/12 or greater and 6 feet or more of the service conductors pass over the roof horizontally, then the minimum clearance allowed is 3 feet.
4. If roof is flat or has a slope less than 4/12 and 6 feet or more of the service conductors pass over the roof or roof overhang, the minimum clearance is 8 feet.
5. 8-feet minimum clearance is required over any roof that is accessible through a doorway, ramp, stairway, or permanently mounted ladder.

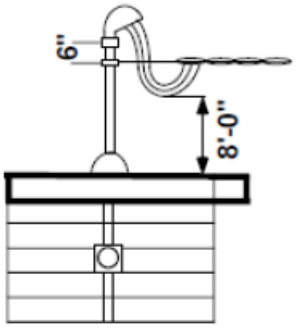
1302. SERVICE MAST INSTALLATION – ROOF CLEARANCES, CLEARANCE OF SERVICE DROP TERMINATING ON SUPPORT MAST, 300 VOLTS OR LESS – CONTINUED





Roof Slope 4"X 12" or Greater

NEC 230.24 A(2)

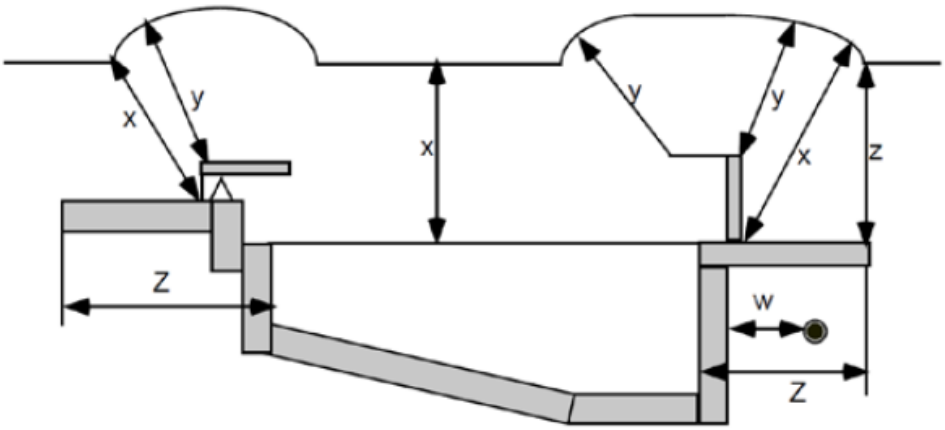


Flat Roof

NEC 230.24 A(3)

For service drop crossing more than 6' of flat roof or roof overhang with less than 4 X 12 slope a vertical clearance of 8 ft. is required.
Where a service drop crosses less than 6' of overhang the vertical clearance requirement is 18" regardless of roof slope.

1303. MINIMUM CLEARANCES FOR SERVICES 300 VOLTS AND BELOW, OVER POOLS



	Insulated supply/service cables up to 750V to ground. Supported and cabled with an effectively grounded neutral conductor	All other supply/service drop conductors
X – Clearances in any direction to the Water level, edge or water surface, base of diving platform or permanently-anchored raft	**22.5'**	**25'**
Y – Clearance in any direction to the diving platform or tower	**14.5'**	**17'**

W – Clearance from all underground conductors from the outside edge of the pool shall be a minimum of 5 feet.

Z – Horizontal limit of clearance measured from the inside wall of the pool shall extend to the outer structure and not less than 10 feet.

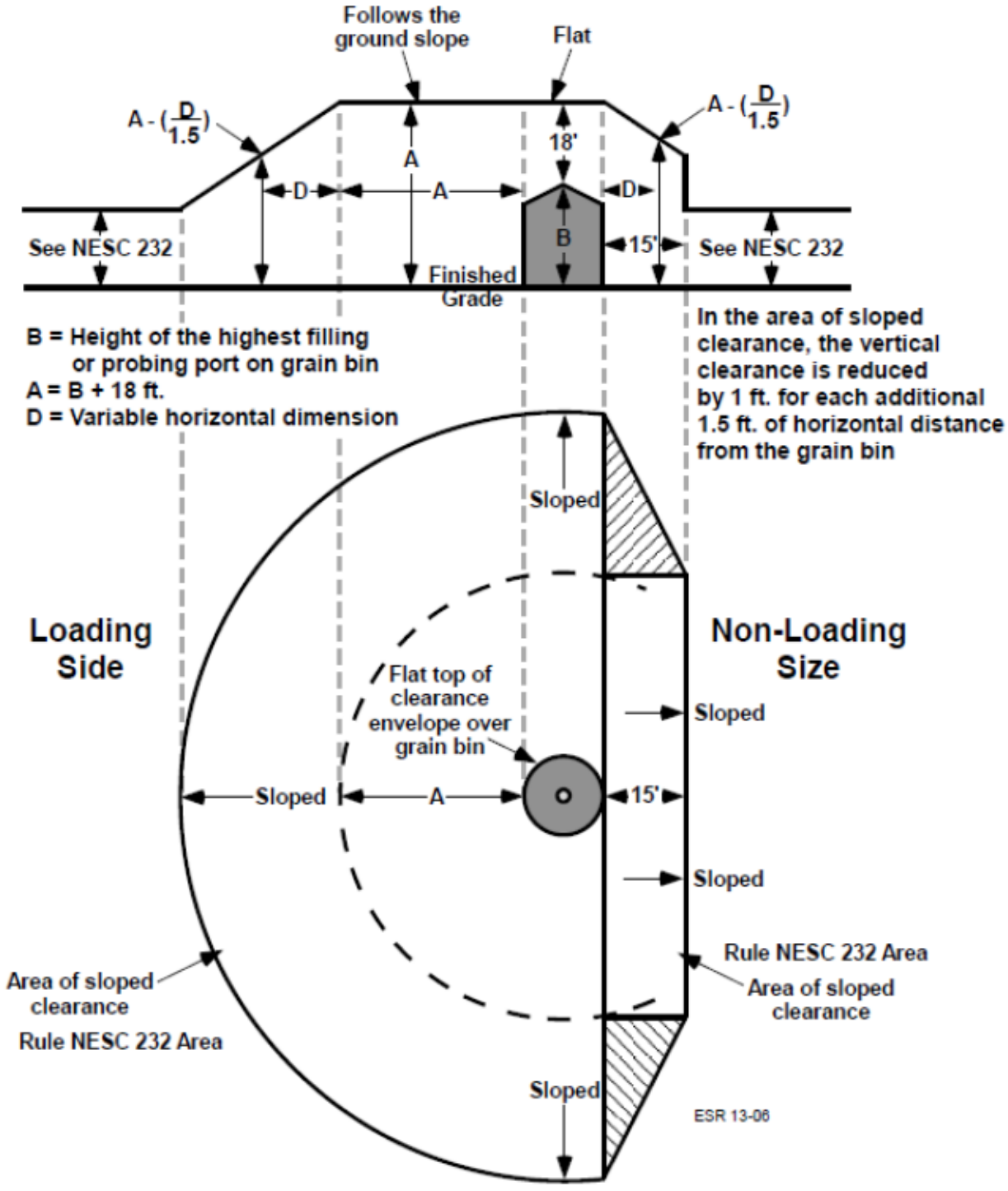
1304. MINIMUM CLEARANCE FOR SERVICES OVER STATE AND FEDERAL HIGHWAYS (DOT Minimum Requirements)

Plymouth Utilities has adopted a minimum of 20-feet clearance on all DOT crossings.

1305. SERVICE CONDUCTOR CLEARANCE FROM SIGNS

Conductor or Cable	Clearance
Horizontal (displaced by wind)	3.5 ft.
Vertical	3.5 ft.

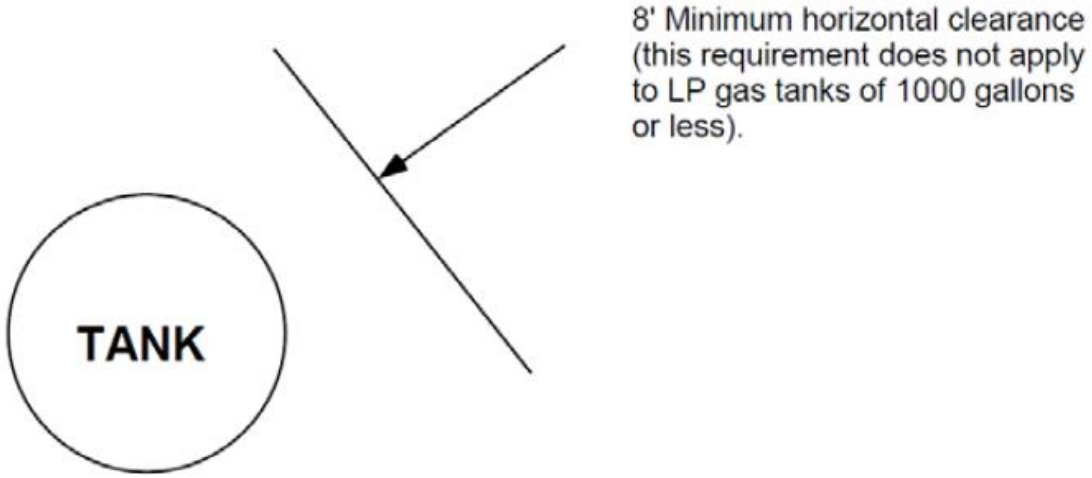
1306. CLEARANCE ENVELOPE FOR GRAIN BINS FILLED BY PORTABLE AUGERS, CONVEYORS AND ELEVATORS



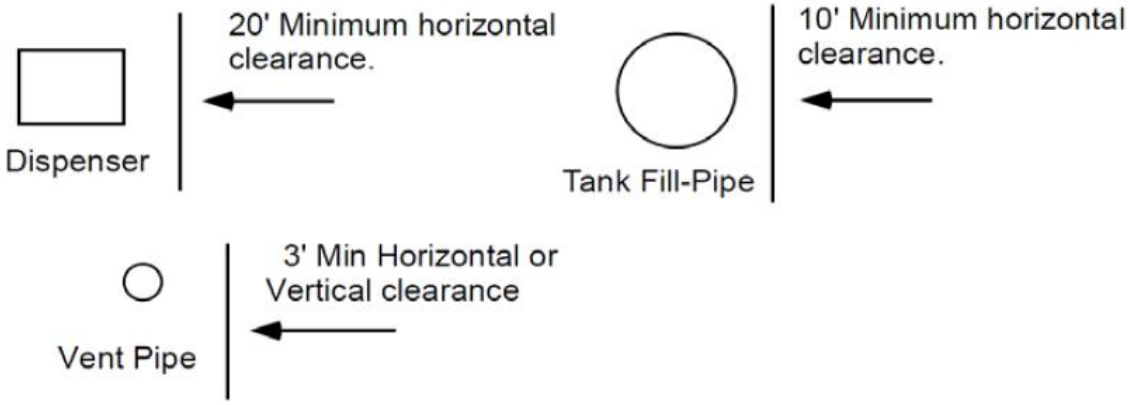
Note: 18 feet of clearance must be maintained in all directions probe port. (NESC Rule 234)

1307. SPECIAL HORIZONTAL CLEARANCES FOR OVERHEAD CABLE SERVICES

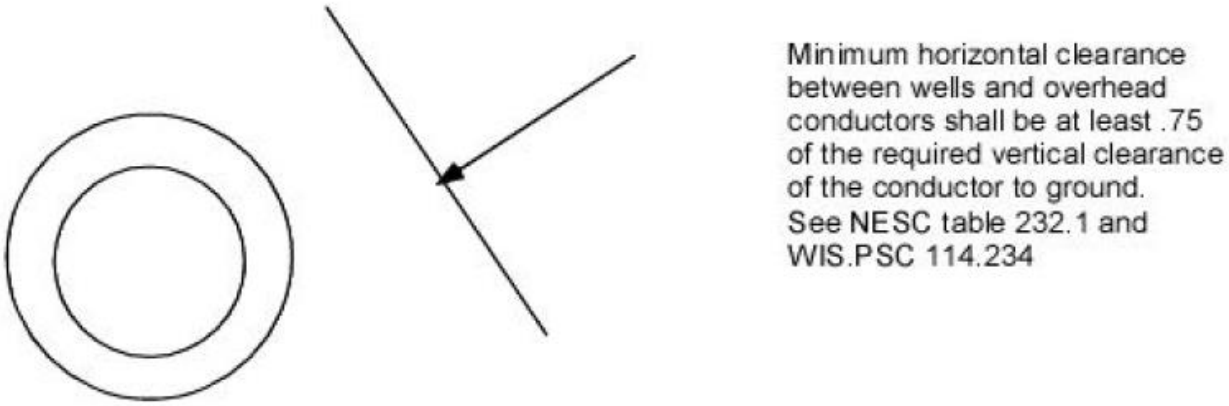
A. Above-ground Flammable Liquid Storage Tanks and LP Gas Storage Tanks



B. Gasoline Dispensing and Service Stations



C. Wells



Note: Clearances apply to service lines, metering equipment, and other potential sources of ignition.

D. Antennas

Antenna System Support – Poles used for electric power or for communication lines may not be used for supporting or for guying antenna systems.

Setback – No wires, cables, or guy wires shall extend over any street or other public thoroughfare or over any electric power or communication lines.

E. Legally required standby systems

The enclosure of the alternate source of power located outdoors for legally required standby systems shall be located at least 10 feet horizontally from any combustible portion of a Type III, Type IV, or Type V building and at least 20 feet from an outdoor electrical transformer, electrical metering, service equipment, or normal power distribution equipment.

Note:

These dimensions may be reduced where a noncombustible barrier is installed that extends at least 3 feet beyond each side of the alternate power source and transformer. The height of the barrier shall be at least one foot above the top of the transformer, electrical metering, service equipment, or alternate power source, whichever is higher.

F. Emergency Systems

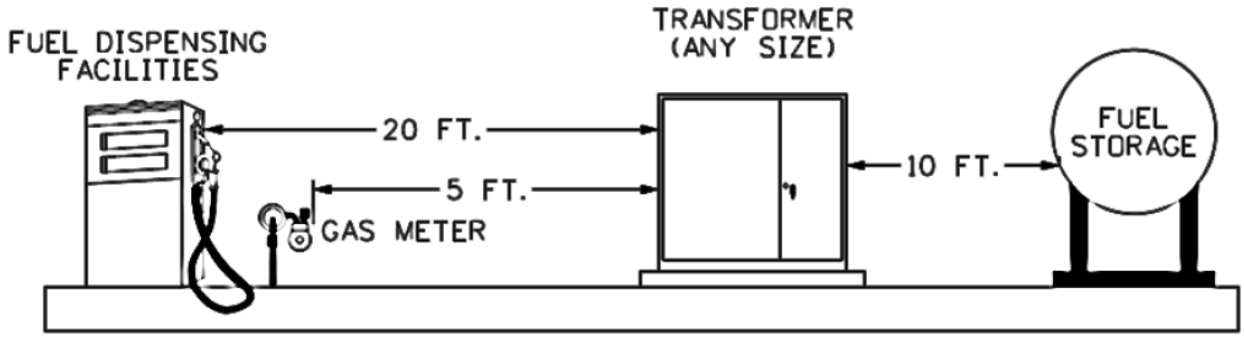
The enclosure for emergency systems shall be located at least 20 feet from an outdoor electrical transformer, electrical metering, service equipment, or normal power distribution equipment. These dimensions may be reduced where a noncombustible barrier is installed that extends at least 3 feet beyond each side of the alternate power source and transformer. The height of the barrier shall be at least one foot above the top of the transformer, electrical metering, service equipment, or alternate power source, whichever is higher.

1308. PAD-MOUNT TRANSFORMER LOCATIONS

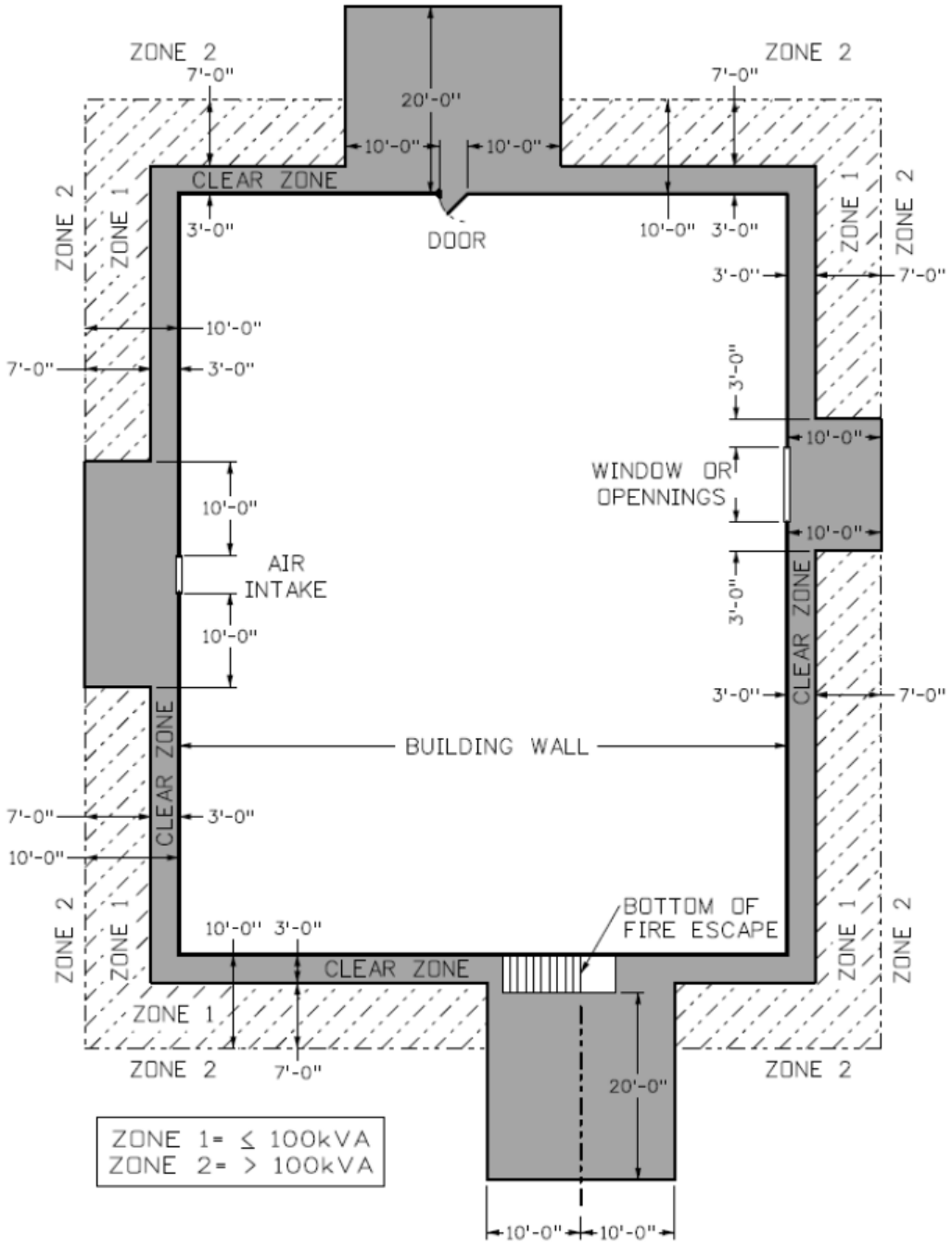
- Plymouth Utilities shall approve the location of all transformer pads.
- Transformer pad locations shall be in accordance with the requirements of *NEC*, NESC, National Fire Protection Association (NFPA), Environmental Protection Agency (EPA), and any state or local requirements.
- Pad-mounted transformers are to be located far enough from the building overhang so they will not be subject to damage by falling snow and ice.
- Pad-mounted transformer locations shall be graded for proper drainage and be readily accessible by truck or other means for change-out.
- Where danger of snow plowing or traffic damage exists, barriers consisting of concrete filled pipe shall be provided for protection.
- Strict adherence to clearance requirements is required in all cases.
- Ten (10') feet of horizontal clearance is required in front of all pad-mounted transformers.

A. Clearance to Fuel Equipment

1. Transformers shall have a minimum separation of 5-feet from gas service equipment.
2. A minimum separation of 5-feet shall be maintained between transformers and liquid petroleum facilities on site, but not filled on site.
3. If the liquid petroleum facilities are filled on site, the minimum separation is 10-feet.



B. Pad-Mount Transformer Location Map



Notes:

Clear Zone: (Gray area) = No transformers shall be located in this zone.

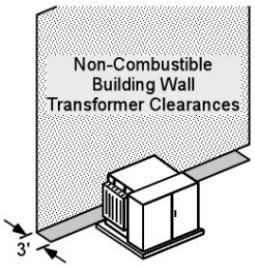
Zone 1: (Shaded area) = Minimum distance for pad-mounted transformer up to 100 kVA

Zone 2: Minimum distance for pad-mounted transformers greater than 100 kVA from a combustible building. An oil-collecting sump shall be installed for transformers over 500 kVA if the immediate terrain is pitched toward the building.

C. Non-Combustible Building Walls

A non-combustible wall is one that will not ignite, burn, or support combustion when subject to fire or heat. Non-combustible walls are made of non-combustible materials, such as Portland cement concrete, full size brick or stone, hollow concrete block, or steel.

Metal skinned wood framed buildings are considered to be combustible.

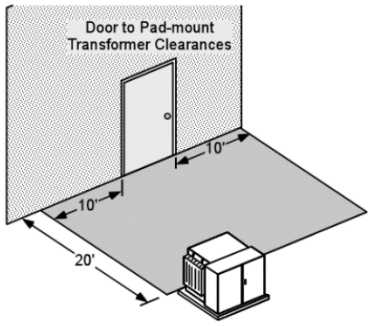


A non-combustible wall shall have not less than a 3 hour fire-resistance rating with all openings in the wall protected with 3 hour rated fire door assemblies. Reference Wisconsin's State Electric Code SPS 316.

Pad-Mount oil insulated transformers shall be located a minimum of 3-feet away from non-combustible walls. The following clearances shall also be maintained from doors, windows, and other openings:

1. **Doors:**

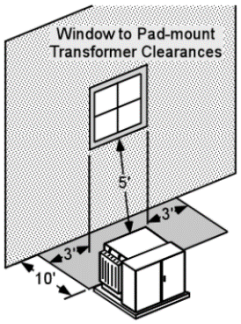
   Pad-Mount oil insulated transformers shall not be located within a zone extending 20-feet outward and 10-feet to either side of the building door.



2. **Windows or Openings Other than Air Intake:**

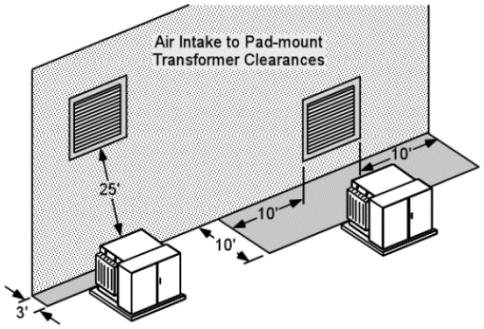
   a) Pad-Mount oil insulated transformer shall not be located within a zone extending 10-feet outward and 3-feet to either side of a window or opening other than an air intake.

   b) Pad-Mount oil insulated transformers shall not be located less than 5-feet from any part of a second story window or opening other than an air intake.



3. **Air-Intake Openings:**

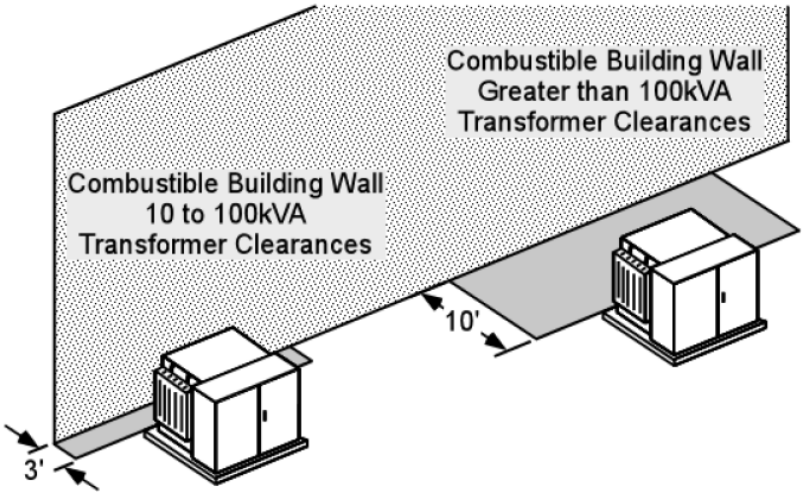
Pad-Mount oil insulated transformers shall not be located within a zone extending 10 feet outward and 10 feet to either side of an air intake opening. Transformers may be located within the zone beneath an air intake opening provided there is a minimum 25 feet diagonal separation between the transformer and the opening.



D. Combustible Building Walls

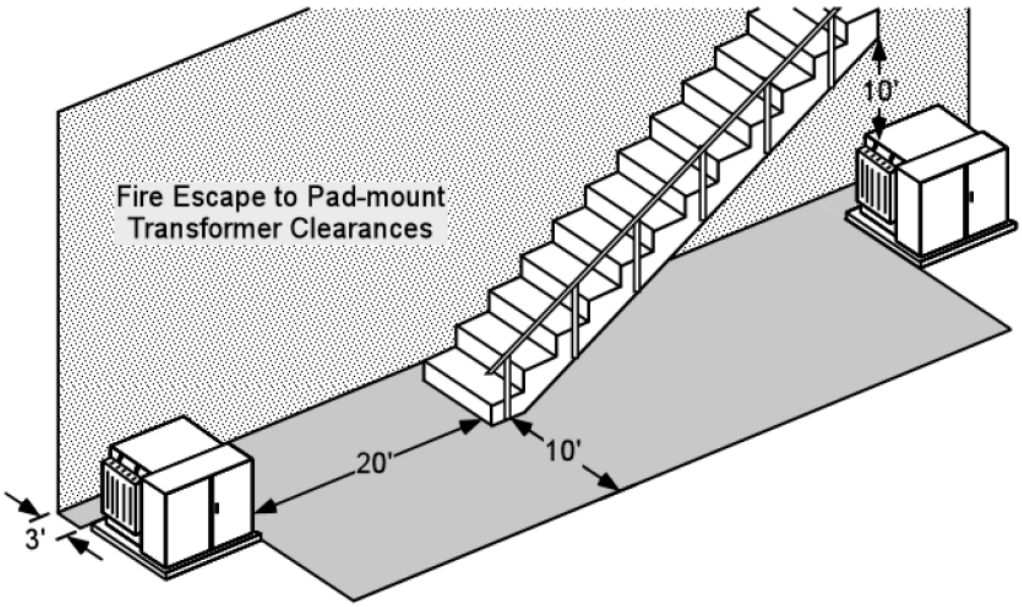
1. Pad-mount oil insulated transformers in size up to and including 100 kVA shall be located according to the provisions set forth in the Non-Combustible Buildings Walls – Section C.

2. Transformers greater than 100 kVA shall be located a minimum of 10-feet from a combustible wall. Also, the clearances from building doors, windows, and other openings set forth for non-combustible walls shall be maintained.
3. An oil-collecting sump shall be installed for transformers in sizes exceeding 500 kVA if the immediate terrain is pitched toward the building.

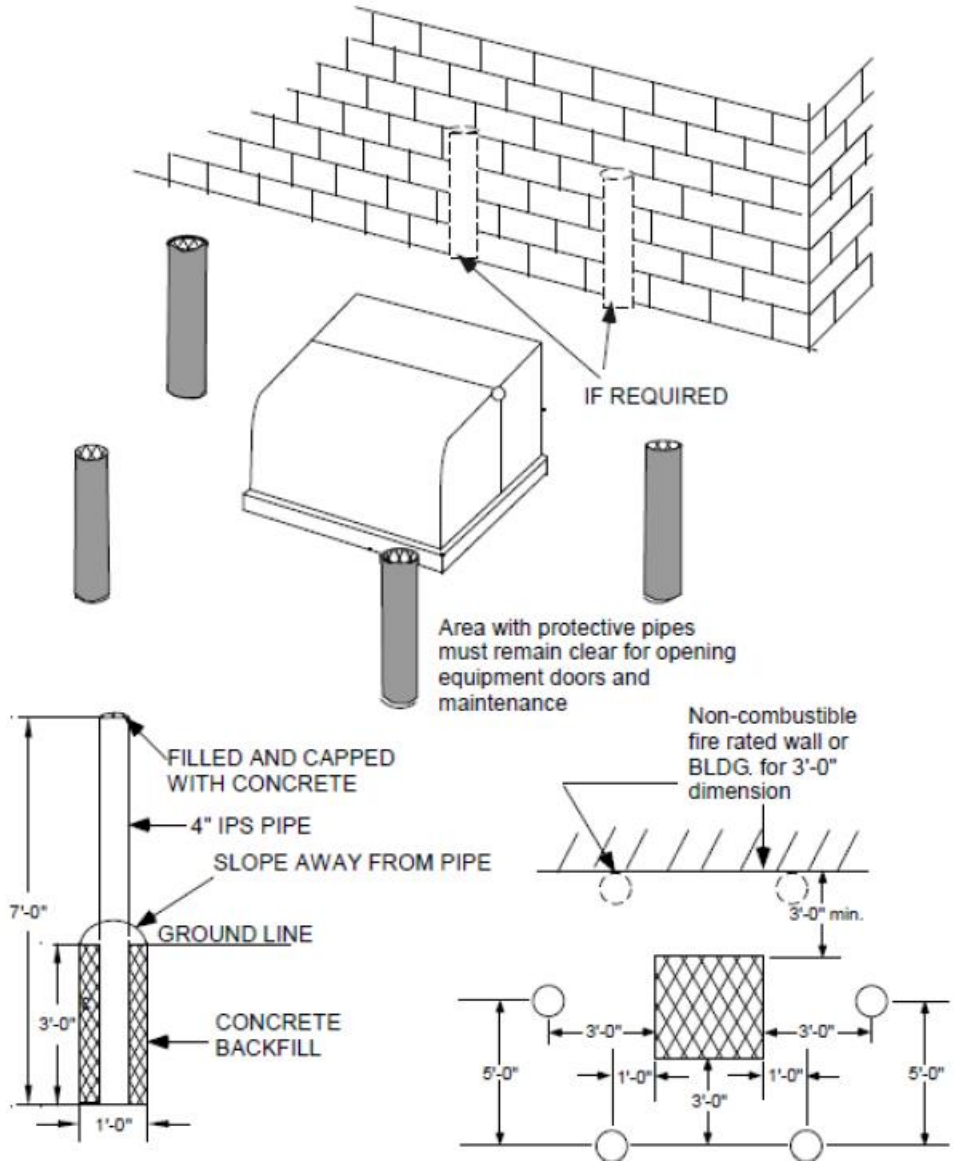


E. Fire Escapes

Pad-mount oil insulated transformers shall be located such that a minimum outward clearance of 20-feet and a minimum clearance of 10-feet to either side of the point where the fire escape touches the ground shall be maintained at all times. If the pad-mount transformer is located under the fire escape a vertical clearance of 10-feet shall be maintained.



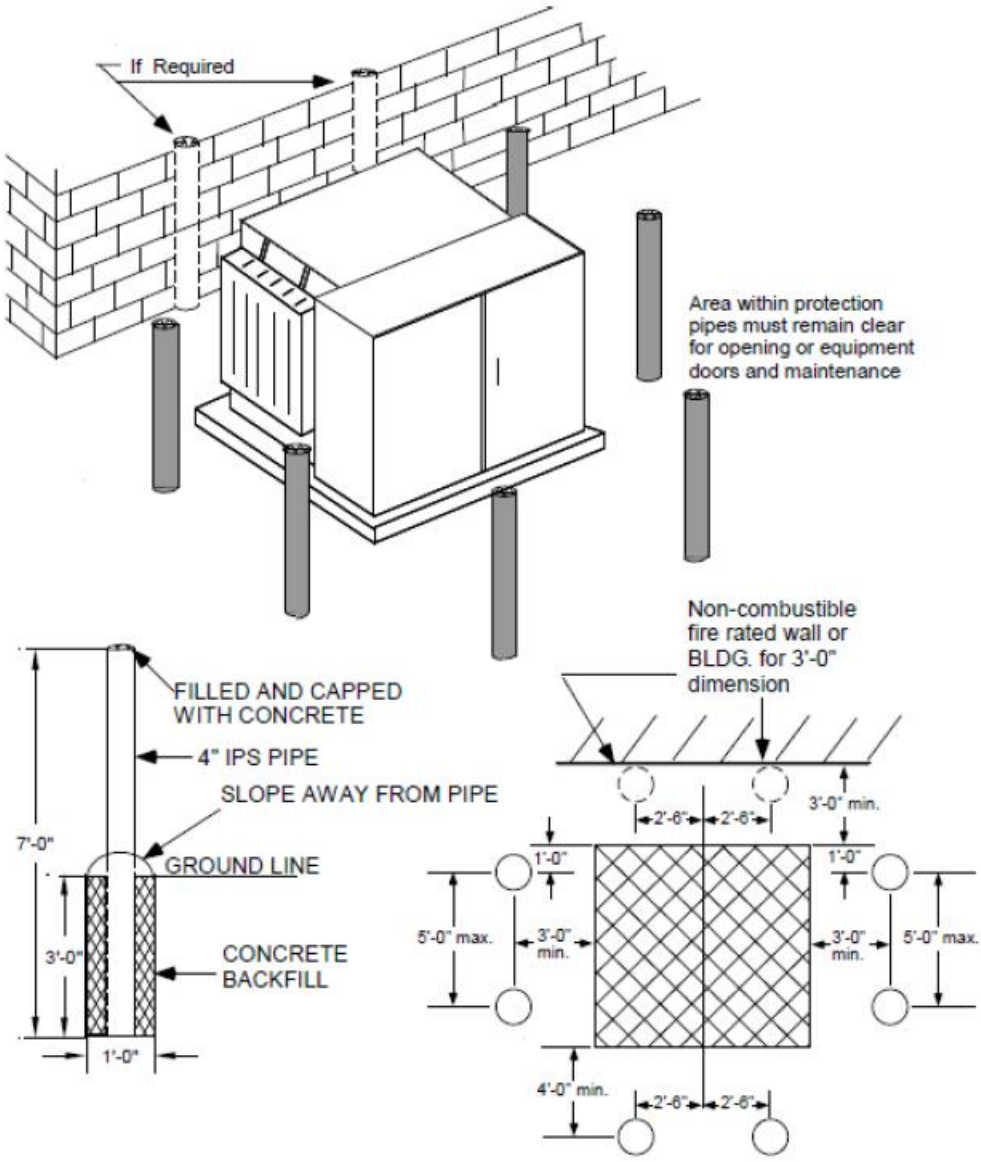
1309. SINGLE-PHASE, PAD-MOUNT TRANSFORMER PROTECTION



Notes:

1. Transformer protection required as requested by Plymouth Utilities.
2. Horizontal Barriers between posts are not allowed without Plymouth Utilities approval.
3. Screw in bollards do not meet protection requirements and are not allowed.
4. The cost associated with the installation of protective posts is the responsibility of the customer.

1310. THREE-PHASE, PAD-MOUNT TRANSFORMER PROTECTION



Notes:

5. Transformer protection required as requested by Plymouth Utilities.

6. Horizontal Barriers between posts are not allowed without Plymouth Utilities approval.

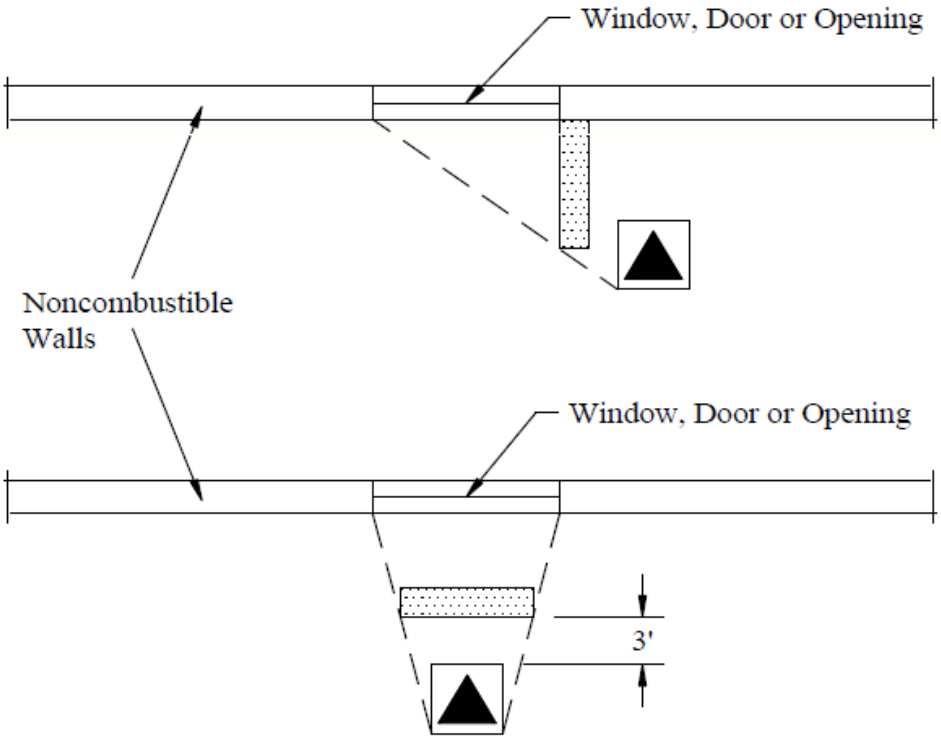
7. Screw in bollards do not meet protection requirements and are not allowed.

8. The cost associated with the installation of protective posts is the responsibility of the customer.

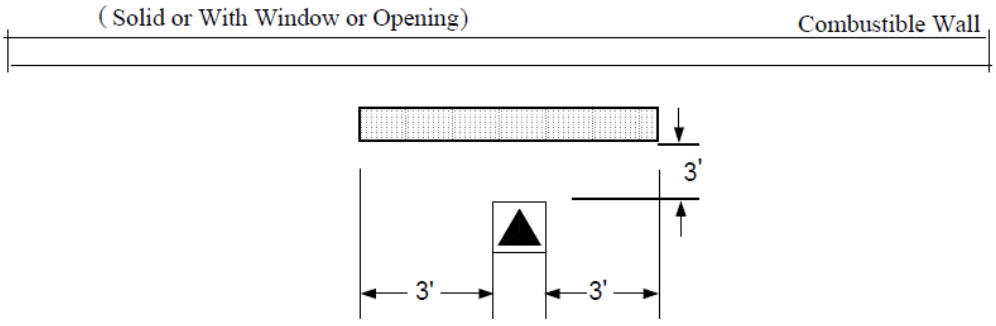
1311. BARRIERS

If the clearances specified previously cannot be obtained, a fire resistance barrier may be constructed in lieu of the separation. The following methods of construction are acceptable.

A. Non-combustible walls – The barrier shall extend to a projection line from the corner of the pad-mount to the farthest corner of the window, door, or opening in question. The height of the barrier shall be 1 foot above the top of the pad-mount transformer.



B. Combustible walls – The barrier shall extend 3-feet beyond each side of the pad-mount transformer. The height of the barrier shall be 1-foot above the top of the pad-mount transformer.



C. A barrier is not an acceptable solution to Air-Intake opening clearance requirements.

1312. RECREATIONAL VEHICLES (RV's), MOBILE HOMES, MANUFACTURED HOMES AND PARK TRAILER CLEARANCES

RV and mobile home parks shall conform to *NEC* 550, 551, and 552 as required by code in addition to state and local laws.

A. Recreational Vehicles:

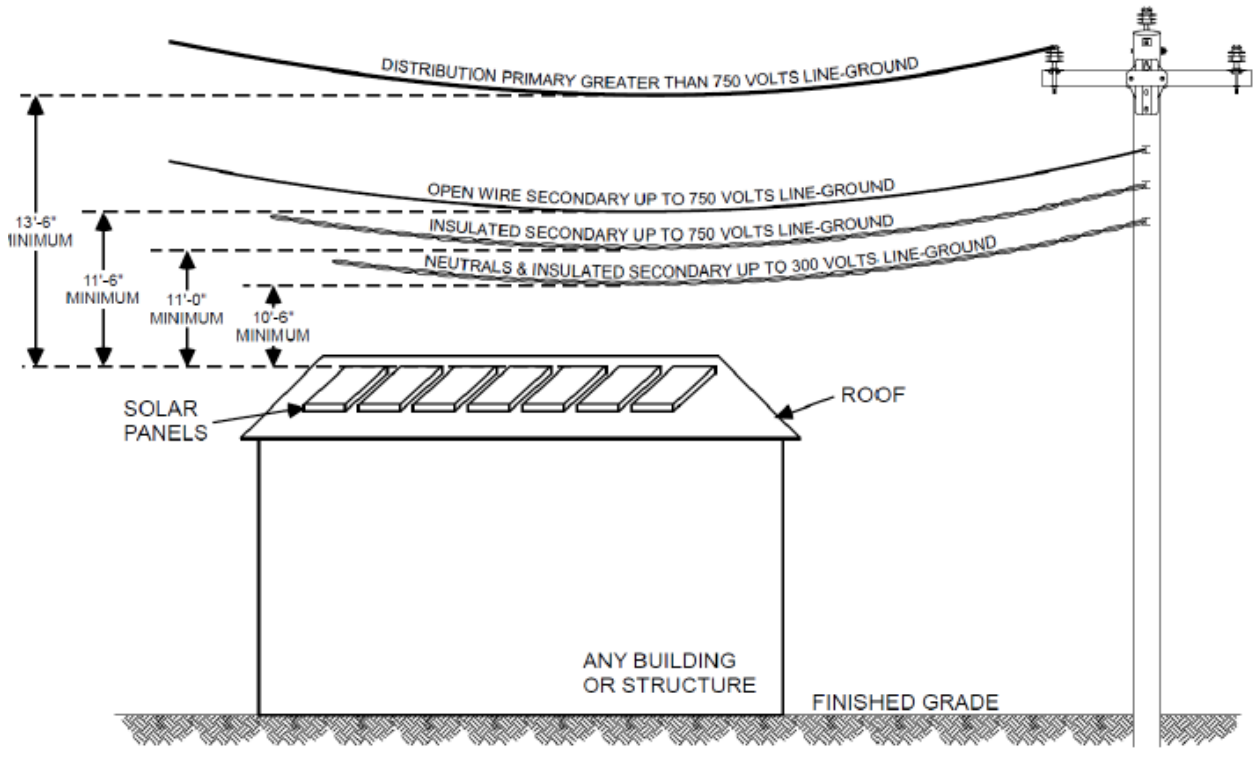
Open conductors 1000 volts and less, nominal, shall have a minimum vertical clearance of 18 feet and a minimum horizontal clearance of 3 feet in all areas subject to recreational vehicle movement. See *NEC* 551.79 Clearance for Overhead Conductors.

B. All other Areas:

Clearances shall conform to the *NEC* and/or the rest of this chapter.

1313. SOLAR PANEL CLEARANCE REQUIREMENT

A minimum vertical clearance of 10.5-feet is required from any Plymouth Utilities secondary or service conductors that cross over any building or structure containing solar panels. Additional clearances are required based on the type of conductor spanning over the location of the proposed solar panel installation.



Plymouth Utilities

Chapter 14

Grounding

Reserved For Notes:

1400. SCOPE

This chapter contains the typical grounding and bonding requirements for service types listed within this manual. Not all grounding and bonding situations are covered in this chapter. It is the responsibility of the customer and the Authority Having Jurisdiction (AHJ) to verify all *NEC* and other applicable code grounding requirements are met.

1401. GENERAL

A. The grounding of electric installations is essential for the safety of those using the electric service, personnel maintaining the service, and is a safeguard for the customer's equipment.

B. The grounding electrode conductor (GEC).

1. The grounding electrode conductor shall not be routed through meter sockets, metering transformer cabinets, or a metering pedestal without a service disconnect.

2. The grounding electrode conductor may be terminated in one of the following:

a) In the service disconnect(s)

b) In the metering equipment containing a service disconnect

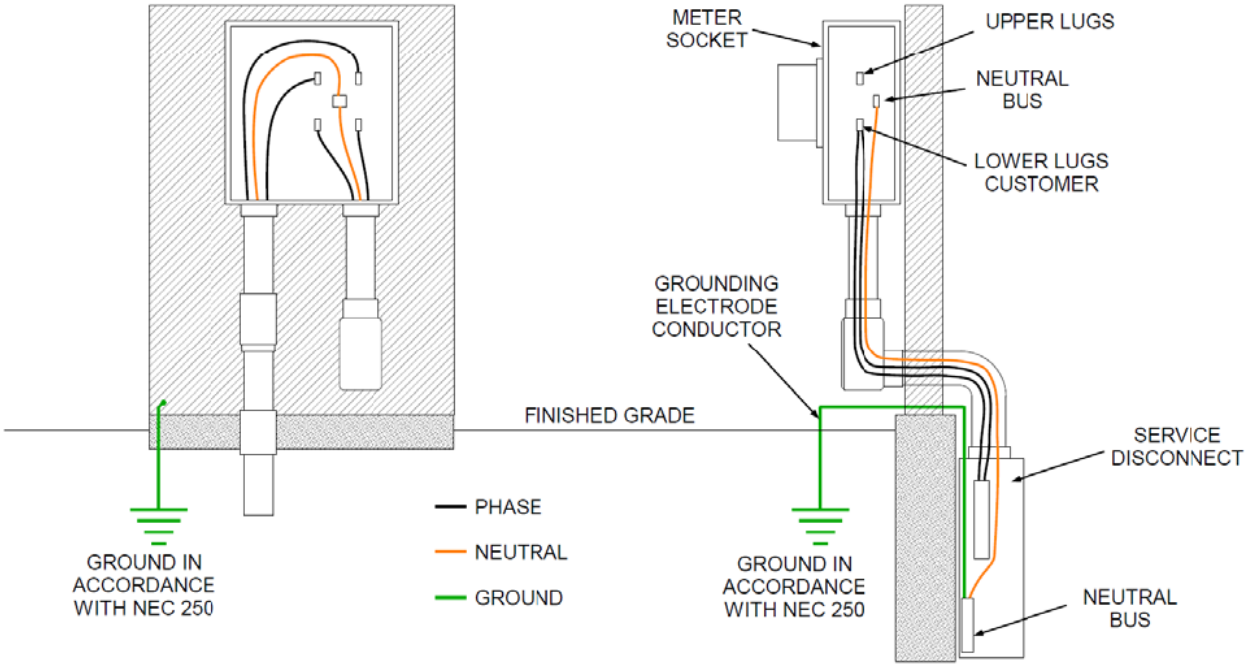
c) In the termination compartment of multiple metering installations

C. Metal underground gas piping systems on the line side of the gas meter shall not be used as a grounding electrode or be bonded to the grounding electrode system.

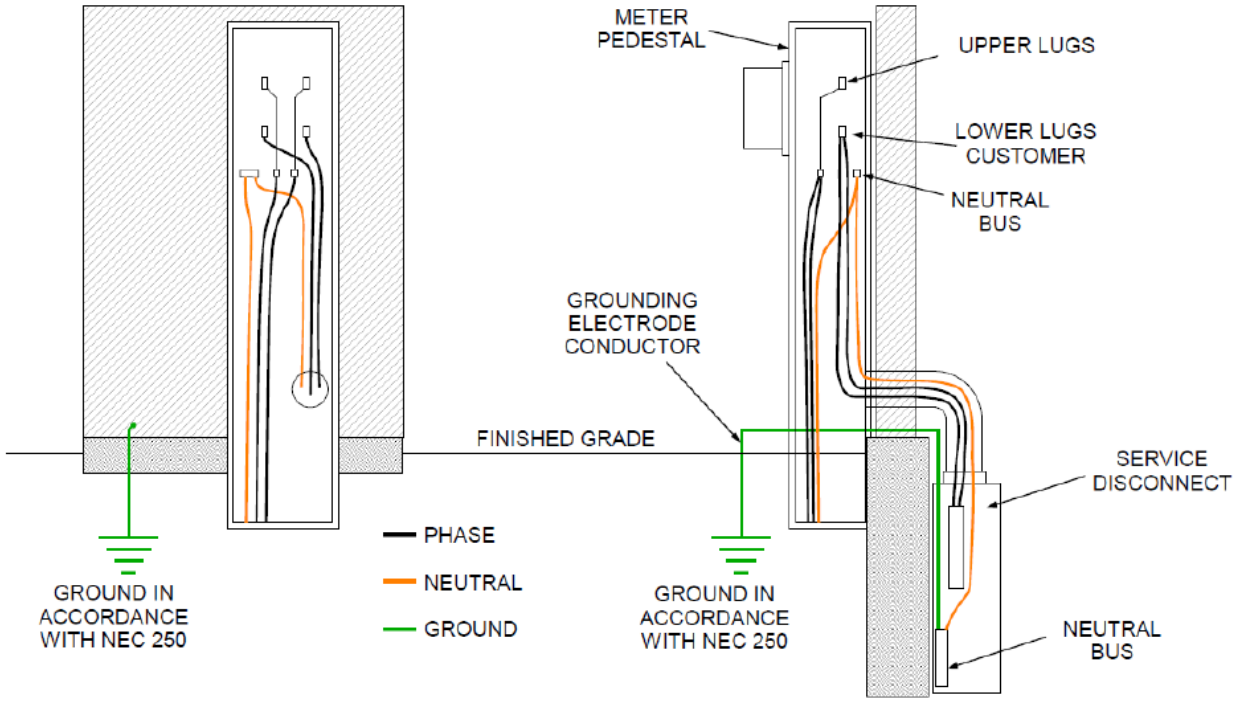
D. If two ground rods are installed, both ground rods shall be installed to the left or to the right of meter socket but not in front. The grounding electrode shall not pass in front of meter-socket or pedestal.

E. For all 3-Phase, 4-Wire services, the customer's grounded (neutral) conductor shall be terminated on the first service disconnect or series of service disconnects (6 switch rule) reference (*NEC* 250.24(C)).

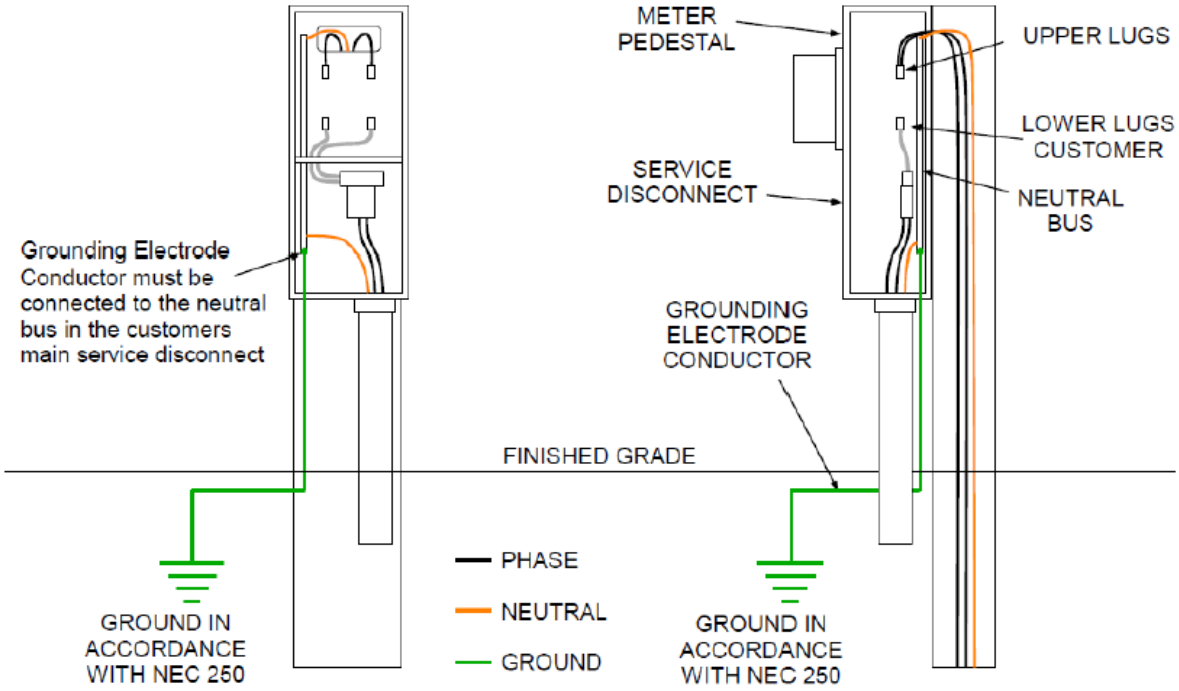
1401A. GROUNDING – WALL MOUNTED METER SOCKET



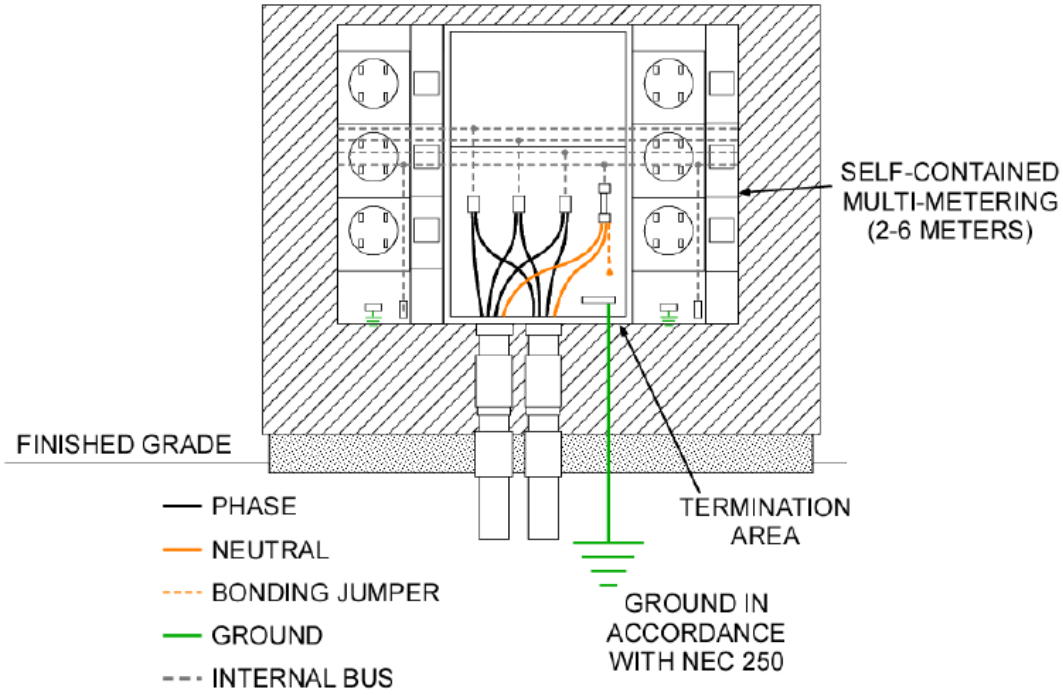
1401B. GROUNDING – WALL MOUNTED SOCKET PEDESTAL



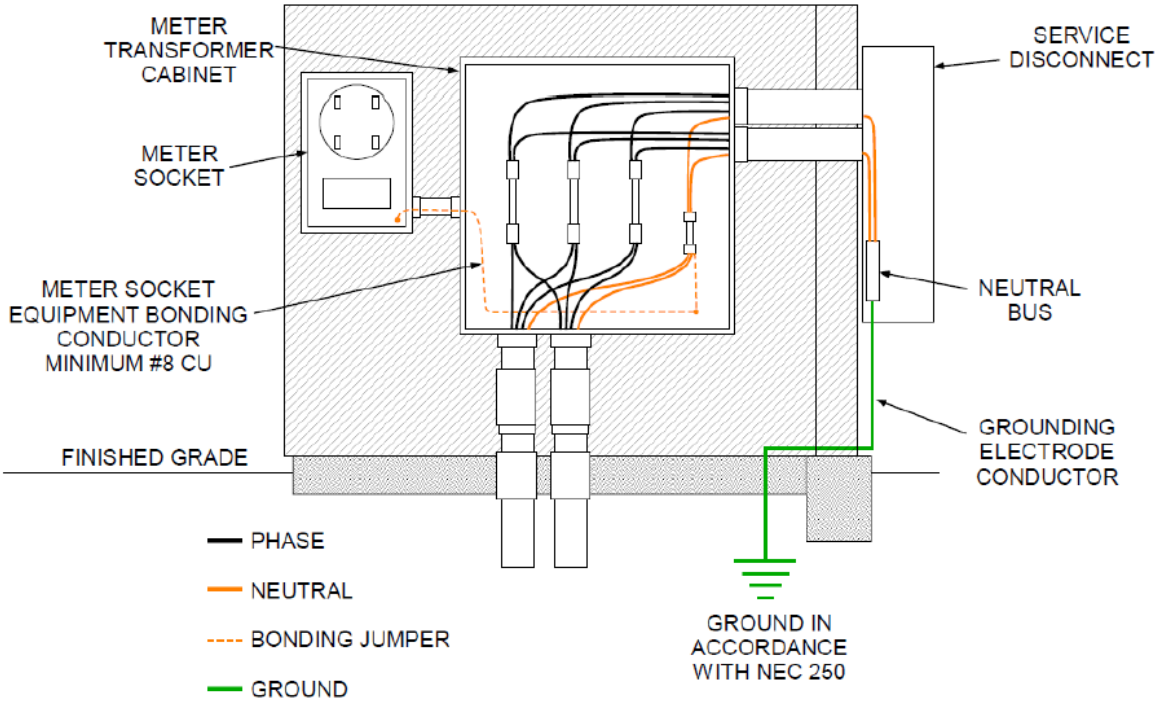
1401C.GROUNDING – FREE STANDING PEDESTALS WITH BREAKER (MAIN)



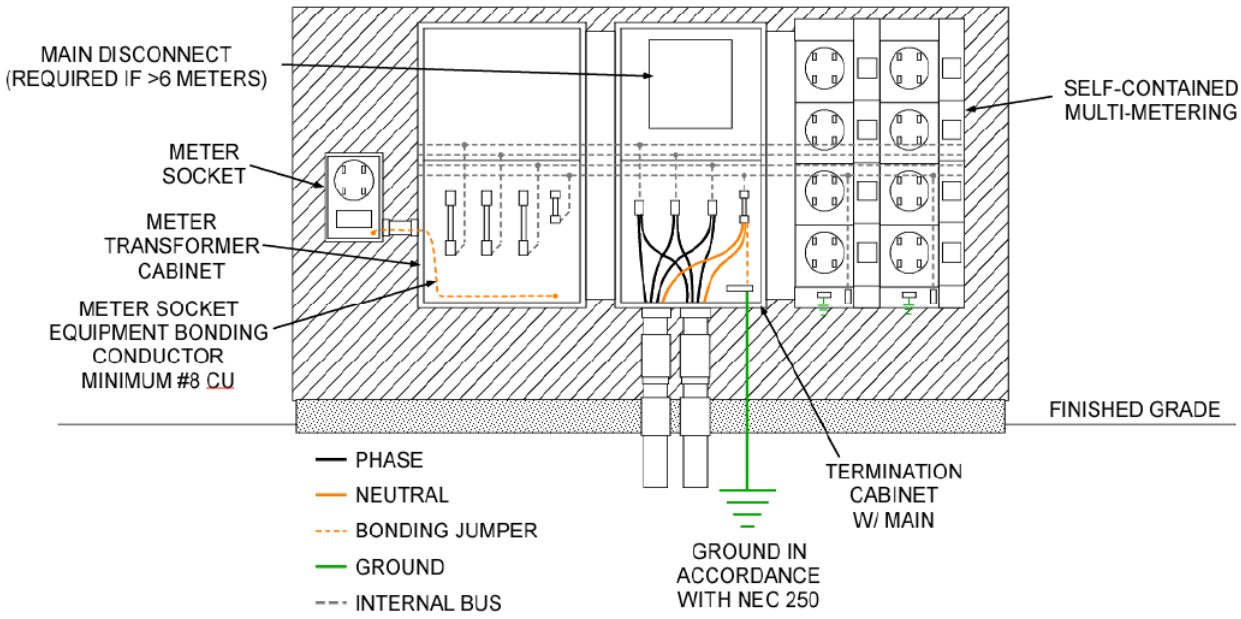
1401D.GROUNDING – MULTUMETERING (2 to 6 METERS)



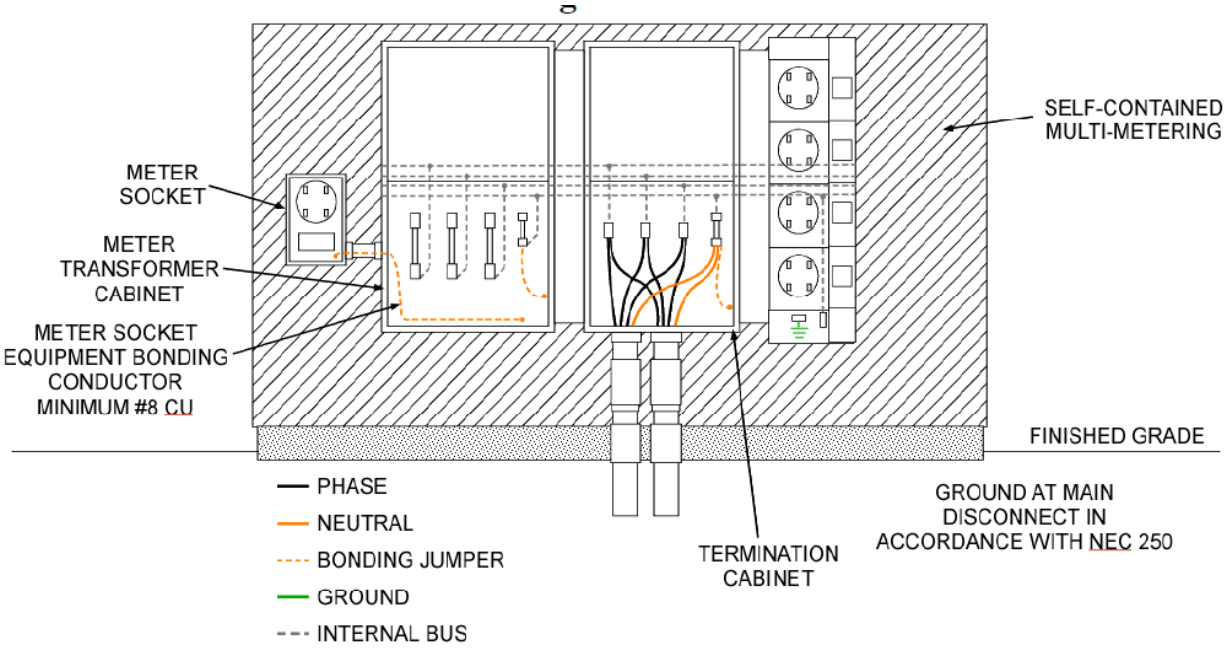
1401E. GROUNDING – METERING TRANSFORMER CABINET



1401F. GROUNDING – TERMINATION CABINET W/MAIN, METERING TRANSFORMER CABINET, MULTIMETERING



1401G. GROUNDING – TERMINATION CABINET WITHOUT MAIN, METERING TRANSFORMER CABINET, MULTIMETERING



1402. BONDING SERVICE ENTRANCE AND METERING EQUIPMENT

A. The electrical contractor is responsible for all bonding connections.

B. The termination cabinet, the metering transformer cabinet, and the metering socket enclosure shall be bonded to:

1. The system neutral when they are located on the line side of or at the main disconnect.

2. The equipment grounding conductor, when all of the following apply:

a) They are installed on the load side of the main disconnect

b) No service ground-fault protection is installed

c) They are located immediately adjacent to the main disconnect

C. Bonding shall be provided where necessary to ensure electrical continuity and have the capacity to safely conduct any fault current likely to be imposed on it.

D. Intersystem bonding – CATV, satellite dish systems, and telephone companies shall bond to the grounding electrode system, if available. If the grounding electrode system is not readily available, bonding shall be done at the ground terminal bar in the main service entrance equipment (*NEC* 250.94 (2) or (3) only). The intersystem bonding shall not be done in or on the metering equipment, refer to Wisconsin PSC 114.099.

E. Meter disconnect switches nominally rated not in excess of 600 volts shall have a short circuit rating equal to or greater than the available short circuit current. These devices shall also be grounded and bonded according to parts V and VII of *NEC* 250.

1403. BONDING CONDUCTOR SIZE

A. Equipment bonding conductors on the supply side of service shall be sized according to *NEC* 250.102C. ESM Table 1403 shall be used as a guide in determining the minimum size for equipment bonding conductors for metering cabinet installations.

B. ESM table 1403 assumes 75°C temperature ratings for service entrance conductors, with no adjustment factor for more than three current-carrying conductors. On a 3-phase 4-wire wye service where the major portion of the load consists of nonlinear (harmonic) loads, the neutral shall be considered as a "current-carrying" conductor (*NEC* 310.15(B)(5)(c)); in such cases, a larger equipment-bonding conductor shall be used.

Aluminum Bonding Conductor Table

Metering Cabinet Rating	Service Entrance Conductor Size 75°C	kcmil	*NEC* Table 310.15(B)(16) 75°C Ampacity (per run)	Number of Runs	Total Ampacity	Service Entrance Conductor Total Area	Bonding Conductor Area	Minimum Equipment Bonding Conductor Size or Equivalent Area for Parallel Conductors	
Amps	**AL**	**kcmil**	**Amps, per run**	**Runs**	**Amps**	**kcmil**	**kcmil**	**AL, AWG/kcmil**	**CU, AWG/kcmil**
Notes:		**(5)**	**(4) (6)**					**(1)* (2)****	**(3)**
400	250	250	205	2	410	500	63	** 1/0	#2
	350	350	250	2	500	700	88	** 3/0	1/0
600	250	250	205	3	615	750	94	** 3/0	1/0
	350	350	250	3	750	1050	131	** 4/0	2/0
800	250	250	205	4	820	1000	125	** 4/0	2/0
	350	350	250	4	1000	1400	175	** 4/0	2/0
1200	350	350	250	5	1250	1750	219	** 4/0	2/0
	500	500	310	4	1240	2000	250	* 250	3/0
	600	600	340	4	1360	2400	300	* 350	4/0
1600	350	350	250	7	1750	2450	306	* 350	4/0
	500	500	310	6	1860	3000	375	* 400	250
	600	600	340	5	1700	3000	375	* 400	250
2000	350	350	250	8	2000	2800	350	* 350	4/0
	500	500	310	7	2170	3500	438	* 600	350
	600	600	340	6	2040	3600	450	* 600	350
2500	750	750	385	7	2695	5250	656	* 750	500
	1000	1000	445	6	2670	6000	750	* 750	500
3000	750	750	385	8	3080	6000	750	* 750	500
	1000	1000	445	7	3115	7000	875	* 1200	700

Notes:

(1) *NEC* 250.102(C)(1) Size – Supply-Side Bonding Jumper – 12.5%

(2) *NEC* Table 20.66, up to 1750 kcmil

(3) *NEC* Table 250.122, Equivalent Copper to Aluminum

(4) *NEC* Table 310.15(B)(16) 75°C Ampacity

(5) *NEC* Chapter 9, Table 8, Conductor Properties

(6) *NEC* 310.15(B)(5)(a) Neutral Conductor Not Considered a "Current-Carrying" Conductor

Copper Bonding Conductor Table

Metering Cabinet Rating	Service Entrance Conductor Size 75°C	kcmil	*NEC* Table 310.15(B)(16) 75°C Ampacity (per run)	Number of Runs	Total Ampacity	Service Entrance Conductor Total Area	Bonding Conductor Area	Minimum Equipment Bonding Conductor Size or Equivalent Area for Parallel Conductors	
Amps	**CU**	**kcmil**	**Amps, per run**	**Runs**	**Amps**	**kcmil**	**kcmil**	**CU, AWG/kcmil**	**AL, AWG/kcmil**
Notes:		**(5)**	**(4) (6)**					**(1)* (2)****	**(3)**
400	3/0	168	200	2	400	336		**#2	1/0
	4/0	212	230	2	460	454		** 1/0	3/0
	600	600	420	1	420	600		** 1/0	3/0
600	3/0	168	200	3	600	504		** 1/0	3/0
	4/0	212	230	3	690	636		** 2/0	4/0
	350	350	310	2	620	700		** 2/0	4/0
800	350	350	310	3	930	1050		** 2/0	7/0
	500	500	380	3	1140	1500	188	* 4/0	350
1200	350	350	310	4	1240	1400	175	* 4/0	350
	500	500	380	4	1520	2000	250	* 250	400
	750	750	475	3	1425	2250	281	* 350	600
1600	350	350	310	6	1860	2100	263	* 350	600
	500	500	380	5	1900	2500	313	* 350	600
	600	600	420	4	1680	2400	300	* 350	600
	750	750	475	4	1900	3000	375	* 400	600
2000	350	350	310	7	2170	2450	306	* 350	500
	500	500	380	6	2280	3000	375	* 400	600
	600	600	420	5	2100	3000	375	* 400	600
	750	750	475	5	2375	3750	469	* 500	750
2500	500	500	380	7	2660	3500	438	* 500	750
	600	600	420	6	2520	3600	450	* 500	750
	750	750	475	6	2850	4500	563	* 700	1200
3000	500	500	380	8	3040	4000	500	* 500	750
	600	600	420	8	3360	4800	600	* 700	1200
	750	750	475	7	3325	5250	656	* 700	1200

Notes:

(1) *NEC* 250.102(C)(1) Size – Supply-Side Bonding Jumper – 12.5%

(2) *NEC* Table 20.66, up to 1750 kcmil

(3) *NEC* Table 250.122, Equivalent Copper to Aluminum

(4) *NEC* Table 310.15(B)(16) 75°C Ampacity

(5) *NEC* Chapter 9, Table 8, Conductor Properties

(6) *NEC* 310.15(B)(5)(a) Neutral Conductor Not Considered a "Current-Carrying" Conductor

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