



ELECTRICAL SERVICE MANUAL

Revised November 2016

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ELECTRICAL SERVICE MANUAL

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INTRODUCTION

The purpose of this manual is to supply essential information to customers, contractors, builders, architects, engineers, and others concerned with the planning of electrical installations.

All information given in this manual is to be used in conjunction with the Lake Mills Light and Water’s Rate Tariffs and Electric Rules on file with the Public Service Commissions of Wisconsin. In issuing this manual, the Lake Mills Light and Water is in no way relieving the customer or contractor of his or her responsibility to install the wiring in accordance with the applicable local and Wisconsin State Electrical Codes, or to maintain the wiring and equipment in a safe operating condition. Electrical wiring should only be done by those who have been trained on safety concerns, wiring techniques and code requirements. Lake Mills Light and Water cannot accept any responsibility for the condition of the customer's wiring and equipment. The information contained herein is general and may not cover all conditions. In all cases, safety will be paramount in the decision to make any exceptions to our procedures. For new or special cases not specifically covered in this manual, Lake Mills Light and Water should be consulted.

This edition of the **Electrical Service Manual** supersedes any and all previous editions.

LML&W reserves the right to refuse service if a customer does not comply with these rules or if a dangerous electrical condition exists on a customer’s premises.

LML&W requests that contractors, developers and homeowners contact LML&W early in the design process to ensure all issues are resolved prior to construction.

Before any new electric service is energized the electrical contractor, building owner, or general contractor must be on site to take responsibility for the newly energized service or LML&W crews must have safe access to the service’s main disconnect.

Key Contacts:

- Paul Hermanson**, Director of Public Works..... 920-648-4026
phermanson@ci.lake-mills.wi.us
- Chris Evenson**, Lead Foreman..... 920-648-4026
- Al Milbrath**, Lead Foreman..... 920-648-4026

TO OBTAIN ELECTRIC SERVICE

LML&W requires an application for electric service be completed and returned to the appropriate city or town Building Inspector prior to connecting a service. Each application shall include an itemized copy of the connected load, including lights, motors and appliances. To upgrade an existing service or for additional service facilities, customers must contact the Building Inspector to determine if permits or inspections are needed. A copy of the application is available at the Lake Mills municipal building 200 Lake Street, Lake Mills, WI.

The applicant agrees to pay any required contribution in aid of construction. The utility may require that the contribution in aid of construction be paid in advance of construction or may, at the utility's option, offer customers an installment payment plan. For more detail or information, refer to the latest LML&W Rate Tariffs and Electric Rules, filed with the Public Service Commission of Wisconsin (PSC).

The utility shall provide one standard overhead service drop or one standard underground service lateral per premise at no charge to a customer. For more details, refer to the appropriate service entrance diagram in this service manual and the latest LML&W Rate Tariffs and Electric Rules as filed with the Public Service Commission of Wisconsin (PSC). A "frost adder" will be in effect when frost reaches a depth of 6" as well as a "rock trenching adder" for all underground service laterals.

TEMPORARY SERVICE FOR CONSTRUCTION

LML&W will install temporary services to provide electricity during construction. It is preferred that temporary services remain in place for no more 6 months unless prior approval is gained. **Please contact LML&W at 920-648-4026 prior to installing a temporary electric service.**

Temporary Service requirements for construction are:

1. The customer will agree to reimburse the utility for its expenditures in extending electric service.
2. Temporary service shall be given to a customer connection only when constructed in accordance with this service manual. The post supporting the unit shall be located as near as possible to the location of permanent service to the building. Abnormal conditions involving compliance with the foregoing provision will be cleared with the utility and permission granted by the utility prior to locating the customer connection.
3. All temporary service shall be maintained in a safe manner in order to keep the utility harmless from injury to persons or property. The service shall remain temporary only for a reasonable time and must be made permanent when the utility directs such action.
4. Should the customer elect to receive permanent service, the installation charges for extension of new electric service will apply. Credit shall be given for the payment already made for that portion of the temporary service facilities that can be used for permanent service without modification.
5. Design and layout of temporary service must be approved by LML&W.

The utility will also extend temporary electric service to fairs, carnivals and like short-time gatherings and uses (not including short-time uses in the nature of auxiliary, stand-by or seasonal use) under the following rules:

1. The customer will agree to reimburse the utility for its expenditures in extending service.
2. The cost of extending service shall include all items of labor and materials, with the customary overhead charges, necessary to furnish the customer with the service requested. It shall also include any costs involved in the dismantling of materials and their return to stock. Where materials dismantled have a salvage value, the cost of extending service will be credited with such salvage value.
3. All energy will be measured at one standard voltage at some convenient point designated by the utility.
4. The customer will make the necessary arrangements and provide for the necessary equipment in the event more than one voltage is required.
5. The cost of all construction (labor and materials) necessary to distribute energy on the premises occupied by the customer will be borne by the customer.
6. The utility may require the customer to make an advance deposit sufficient to cover the costs of extending service and the estimated bill for energy.
7. The rates applicable in the area where temporary service is rendered shall be applied in determining the customer's bill.

LOCATING A NEW ELECTRIC OVERHEAD & UNDERGROUND SERVICE

LML&W shall, in all cases, designate the location where the LML&W service will terminate. LML&W uses the following guidelines when sighting a new service entrance location:

- The preferred residential and small commercial service spot is within six feet of the corner of the living space nearest the LML&W source.
- The location shall minimize LML&W investment in the service and meter making.
- LML&W facilities shall not be located in areas that are likely to cause conflicts with the following:
 - Enclosed areas, patios, porches, doorways, etc.
 - Concrete areas (patios and driveways)
 - Carports, fenced-in areas, pools and hot tubs, wells
 - Clearance problems/codes, etc.
 - Common walls with gas and electric meters, LP tanks and lines and above/below ground fuel tanks
 - Potentially hazardous, high traffic areas (sidewalks, driveways, alleys)
 - Installation and future maintenance costs
 - Remote locations that would make meter reading or maintenance difficult (fenced yards)
 - Septic systems and their alternate fields
 - Future buildings or additions and Grade changes
 - Buried customer facilities
- An overhead service is limited to a maximum of 150' because of voltage drop, clearance and conductor tension constraints.
- If the customer prefers to locate the service entrance somewhere other than the LML&W designated location, the customer has that option, but may be subject to a special facilities payment for the added materials and labor.
- Variations – unusual house designs and variations in LML&W system construction will be encountered in the field. Each situation should be addressed individually, based on the guidelines included in this section.

ELECTRIC SERVICE CHECKLIST

Prior to LML&W scheduling a service connection, the customer is responsible to confirm that:

- ✓ A written application for electric service has been submitted to the utility.
- ✓ All fees or charges to install a service are paid in full,
- ✓ All necessary easements are signed,
- ✓ Service lateral route is clear of dirt piles, trees, buildings, other obstructions,
- ✓ Service entrance wiring is completed,
- ✓ Electrical inspection is complete, and
- ✓ Grade is within four inches of final grade.

VOLTAGES

Lake Mills Light and Water has dual primary distribution voltages of 4,160 VAC and 24, 940 VAC.

LML&W standard secondary voltages are:

- 120/240 VAC 3-wire single phase
- 120/208 VAC 4-wire wye three phase
- 277/480 VAC 4-wire wye three phase

Secondary voltages no longer provided as new services:

- 240 Volt, 3Ø, 3-Wire Service, Grounded B Phase
- 480 Volt, 3Ø, 3-Wire Service

For some classes of service, especially three phase, availability is also dependent upon the customer's connected load. LML&W must be contacted for cost and availability of service.

METERING

Lake Mills Light and Water will supply all electric meters. LML&W's general standard requirement for a residential single phase service rated at 320 amps continuous is a plug-in meter socket. For approved meter socket please see the service entrance diagrams included in this service manual.

For residential services rated 320 amps or less, LML&W does not require current or potential transformers. For commercial services rated 400 amps or greater, current and potential transformers may be required. Contact LML&W for more details. LML&W will furnish the current and potential transformers and complete all the necessary meter wiring. The customer must furnish an approved metering cabinet, meter socket, current and potential mounting provisions, and test switches.

Metering equipment may not be located on LML&W's facilities. All meters must be placed on the exterior of any dwelling or facility, must be protected from potential damage, and must be easily accessible for reading and maintenance.

TRANSFORMERS

Lake Mills Light and water will supply all transformers. Transformers may be overhead or padmount for use with underground service. LML&W will work with customers to ensure that location of transformers meets or exceeds all necessary clearances as outline in state and national safety codes. Transformers must be accessible by truck, when possible, for maintenance and replacement reasons.

The utility shall provide standard design transformers necessary to serve the customer's load at no charge.

A standard design transformer is a transformer with capacity less than or equal to 300 kVA. If a customer requests or requires additional capacity, the utility shall add to the total cost of installation a charge equal to the cost of the necessary transformer(s) less a credit for the cost of the maximum capacity standard transformer.

Customers will be charged for the pad or basement for underground transformers.

SERVICE ENTRANCE DIAGRAMS

This series of Service Entrance Diagrams is meant to show typical or common service entrances and metering set-ups. Variations to these outlines may be necessary in some applications, but all service entrances must conform to applicable codes, pass electrical inspection and must be approved by LML&W.

- Unless otherwise indicated, all items shown on the diagrams are to be furnished and installed by the customer.
- Meters and metering transformers will be furnished, installed and maintained by LML&W.
- Only meter mounting devices and service termination equipment approved by LML&W are to be used.
- The listing of equipment in this manual is not an endorsement or indication of suitability, but only that it is acceptable for installation of our metering equipment and termination of our service lateral conductors as required. It is the responsibility of the customer or their electrical contractor to verify that the equipment is suitable for the installation and that it is installed in accordance with all applicable codes.
- Electrical wiring should only be done by those who have been trained on safety concerns, wiring techniques, and code requirements. LML&W cannot inspect your wiring or provide electrical code interpretations. This is to be done by State-Certified Electrical Inspectors.
- Electrical contractors are expected to acquaint themselves with the plans of other trades on the premises being wired so that the meter can be located in accordance with LML&W Electric Service Rules and Regulations.
- Transfer equipment used with stand-by power plants or generators shall be suitable for intended use and be designed and installed as to prevent the inadvertent interconnection of normal and stand-by energy sources. Transfer equipment shall be installed such that it is located electrically on the load side of the meter. All transfer schemes shall be submitted to the LML&W office for acceptance before installation.
- The use of approved material, tested and listed by a nationally recognized testing laboratory, and approved methods of installation are requirements of the Wisconsin State Electrical Code by the Wisconsin State Electrical Code Section of the Department of Commerce, and by OSHA for employers, for customer owned electrical service equipment.
- This manual only covers secondary services. For primary services, contact LML&W.

GENERAL REQUIREMENTS FOR UNDERGROUND SERVICE

Space Requirements

1. The unobstructed space required in front of termination compartments, transockets and metering equipment shall be as defined by the "Working Space About Electrical Equipment", Section 110.26, of the National Electrical Code. This unobstructed space shall extend from the floor or ground to a minimum height of 6'-6". For equipment higher than 6'-6" this space shall extend to the top of the equipment.

Service Laterals and Entrances

1. Service laterals are furnished and installed by LML&W.
2. Service laterals will generally be terminated in a meter pedestal, meter socket, transocket or termination compartment. Customers shall obtain information from LML&W relative to the proper location of the service lateral and termination equipment. Such information will be furnished in writing upon request.
3. The preferred termination of service laterals is on the outside of a building (or structure). Service laterals that terminate inside of a building shall terminate immediately upon entering as shown in this manual. The raceway for service laterals under or thru a building shall not extend longer than 8' after penetrating the outside wall.
4. For services, generally 2000 Amperes and larger, and with LML&W approval, the service lateral may be terminated in the customer's switchgear or on the customer's bus duct. This type of installation is further restricted by the following:
 - a. Customer shall provide all necessary plastic conduit encased in 3" of concrete for the extension of the cable within his building (see Note 3 above).
 - b. Customer shall obtain LML&W acceptance of the switchgear terminal and C.T. compartment (if any) design. Three copies of the switchgear plans shall be submitted to LML&W for acceptance. The plans must show the general layout of the switchgear, the switchgear location within the building, and the specific details of the termination compartment and any C.T. compartment(s). Specific details such as compartment size, bus spacing and drilling dimensions, other clearances, bus & bus support configuration, barrier location, sealing provisions, and materials used are to be included.
5. Only meter mounting devices and termination equipment rated to accept underground conductor, approved and listed in this manual are to be used. All equipment must be listed by a nationally recognized testing laboratory, e.g. UL, installed and used as per the listing and the manufacturer's instructions.
6. Where metallic rigid conduit or IMC is used for the service lateral raceway the ends are to be threaded and threaded couplings, connectors or locknuts are to be used. Slip type fittings shall not be used.
7. For outdoor service terminations with direct buried lateral, the horizontal portion of the conduit shall extend through a minimum of 12" of undisturbed earth where practicable, defined as follows:
 - a. Undisturbed earth: The area not excavated for the construction of the building. (May be compacted fill.)
 - b. Fill area: The area between the building wall and the undisturbed earth. (May vary from a few inches to several feet or more).
8. Services to individual dwelling units shall consist of one service lateral and one meter.

Grounding

1. Grounding shall be in accordance with all applicable codes.
2. Stainless steel (A.I.S.I. 302, 304 or 416) ground rods are recommended where ground rods must be installed in the vicinity of buried galvanized rigid conduit to minimize the possibility of corrosion.
3. The grounding electrode conductor shall not be run through the meter pedestal, meter socket, transocket, or termination compartment, unless a separate raceway is provided. The grounding electrode conductor may terminate on the neutral bus of: the termination compartment for multi-metered installations provided it does not interfere with the installation of the service lateral conductors, or a meter pedestal equipped with a main disconnect and listed as Service Equipment.
4. Ground rods and grounding electrode conductors shall not be located in front of meter pedestals or wiring troughs.
5. Bonding to other systems shall not be done on or within a metering enclosure unless a means of bonding, intended for inter-system bonding, is furnished as part of the metering enclosure (PSC 114.099(C)).

GENERAL REQUIREMENTS FOR OVERHEAD SERVICE

Service Drops, Attachments, Supports, and Entrances

1. All service drops are furnished and installed by LML&W.
2. In all installations except those stated in the General Service and Extension Rules, on file with the PSC, the customer shall verify the proper location of the service head and service drop from LML&W, which will furnish this information in writing upon request.
3. In all cases, an adequate support for the service drop attachment and service drop shall be provided by the customer. LML&W furnishes attachments and will provide information as to the pounds of pull that the service drop support must be designed for or withstand.
4. Typical installations for various service voltages and ampere capacities are shown in succeeding pages. Unusual installations require special consideration and LML&W shall be consulted in all cases.
5. Only meter mounting devices and termination equipment rated to accept overhead conductors, approved and listed in this manual are to be used. Equipment must be listed by a nationally recognized testing laboratory, e.g. UL, installed and used per the listing and the manufacturer's instructions.
6. The service head is to be located at a height such that the service drop conductors can be dead-ended below the service head and still maintain proper clearance above ground, but they are not to be installed higher than 30' above ground.
7. When a service mast is used to support the service drop, only the service drop is to be attached to it. Other utilities such as telephone or cable TV shall not be attached to the service mast.

Grounding

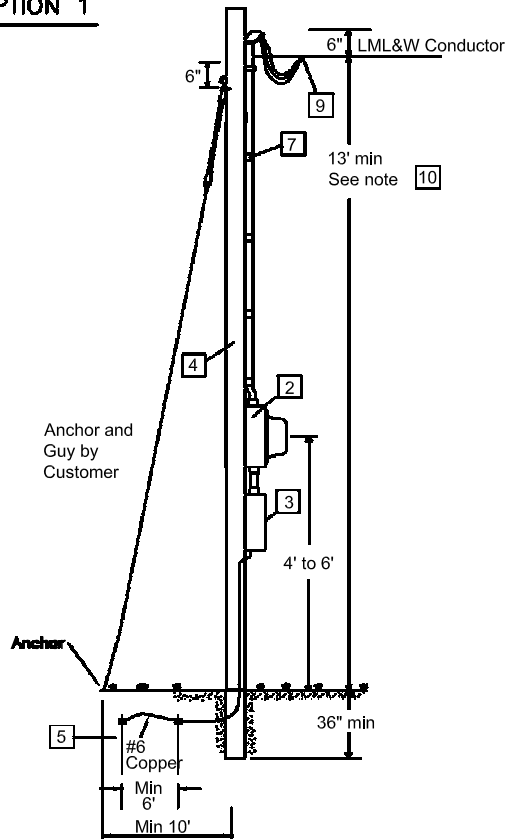
1. Grounding shall be in accordance with all applicable codes.
2. Stainless steel (A.I.S.I. 302, 304, or 416) ground rods are recommended where ground rods must be installed in the vicinity of buried galvanized rigid conduit, to minimize the possibility of corrosion.
3. The grounding electrode conductor shall not be run through the meter socket or transocket.
4. Bonding to other systems shall not be done on or within a metering enclosure unless a means of bonding, intended for inter-system bonding, is furnished as part of the metering enclosure (PSC 114.099(C)).

TEMPORARY SERVICES - UNDERGROUND AND OVERHEAD

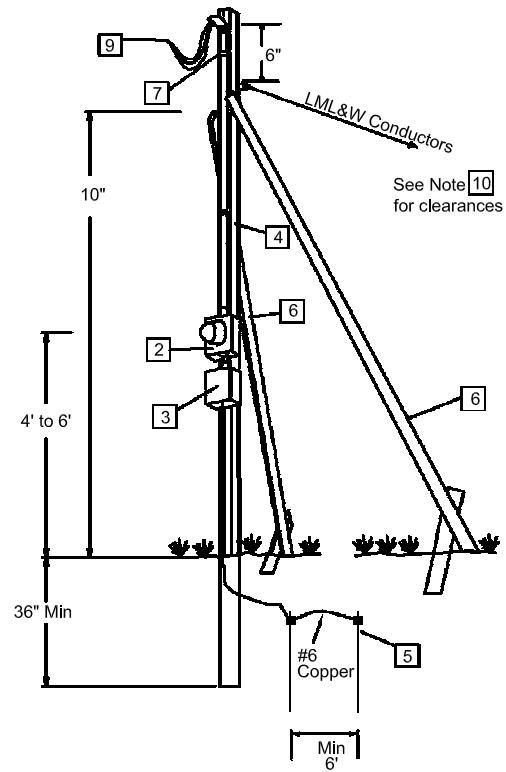
NOTES:

1. All materials shall be furnished and installed by the owner unless noted otherwise. The utility shall specify the location of temporary service poles. Care must be taken to avoid the permanent service route. Potential clearance problems must also be avoided.
2. The meter sockets shall be 100 or 200 Amp rated. They shall be a ringless design with bypass horns and UL approved. LML&W will provide and install the meter.
3. The switchgear shall be installed per code. This requires the switchgear to be weatherproof or protected from the elements. It also requires GFI protection on all outlets unless OSHA-required electrical inspections are done regularly (Difficult to comply with).
4. The temporary service pole shall be at least 4-inches in diameter, provided and installed by customer.
5. Ground as required by code. Two ground rods are required. Also, a bond to a metallic water pipe may be required, if available. The ground conductor shall be terminated in the switchgear and not in the meter sockets,
6. Brace and stakes made out of 2 x 4's.
7. For residential 100 Amp temporaries, the conductor must be at least #4 copper or #2 aluminum. For residential 200 Amp temporaries, the conductor must be at least 2/0 copper or 4/0 aluminum. Service entrance conductors shall extend at least 30" beyond the service head to permit proper connection to LML&W conductors.
8. Temporary services are intended only for a short use. If the temporary service is expected to be used longer than one year, see Sections 2 or 3 for permanent installation instructions.
9. LML&W will provide service conductors and make all connections to the LML&W system.
10. Temporaries must be high enough to maintain basic code ground clearances. Refer to basic clearances-services in this manual for more details.
11. Used equipment, such as 60 Amp meter sockets and old indoor 60 Amp fuse panels, are not acceptable for temporaries. If LML&W must make return trips because of clearance problems or unsafe equipment, there may be additional charges.
12. Option #5 shows how to install a permanent meter pedestal and breaker panel and how to avoid using a temporary service. The breaker panel must either be weatherproof or protected from a wet or damp environment. The basement walls must be backfilled and adequately tamped for LML&W to run the permanent underground service. Another option is to use approved flexible conduit between the meter pedestal and the breaker box. See the appropriate service sketch for details on permanent underground services.

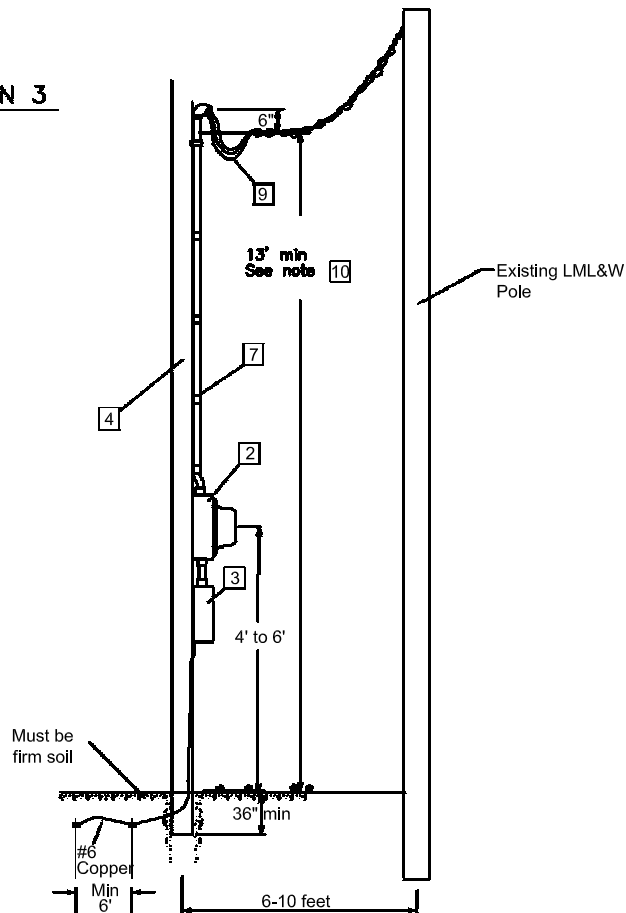
OPTION 1



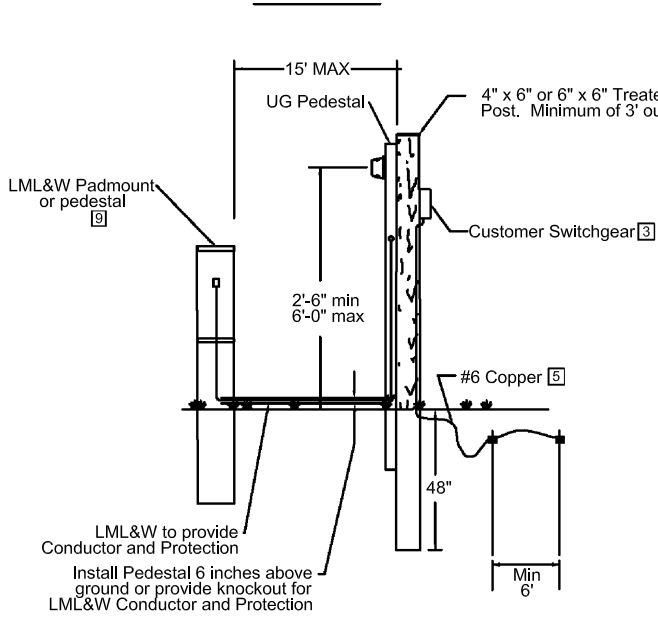
OPTION 2



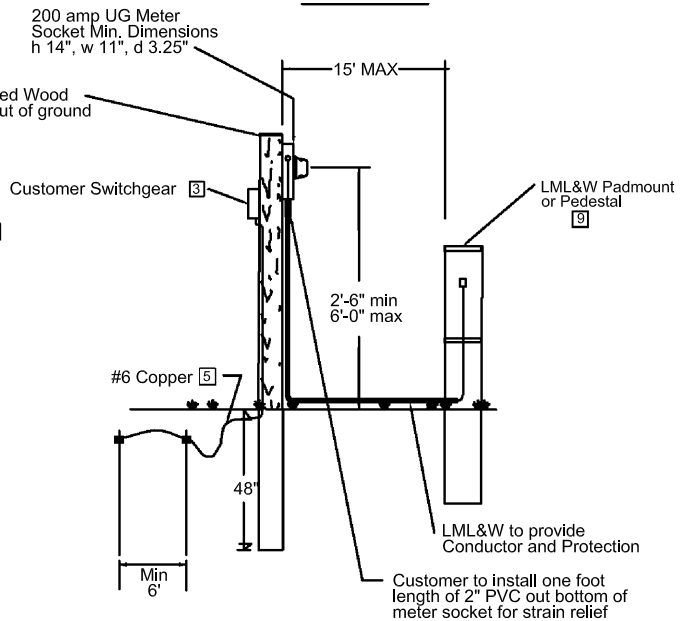
OPTION 3



OPTION 4a

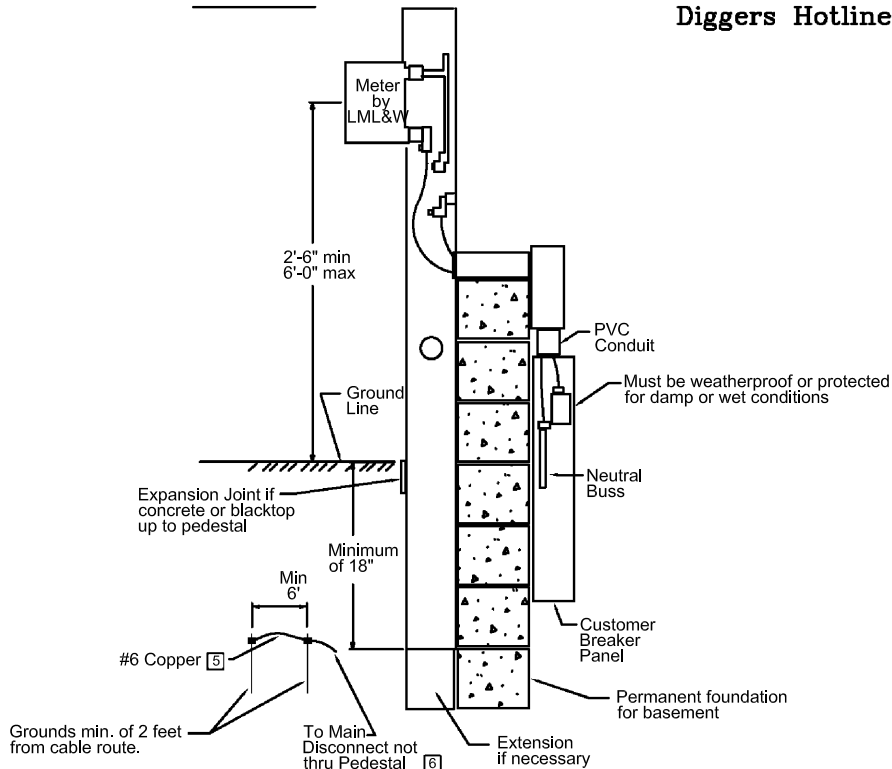


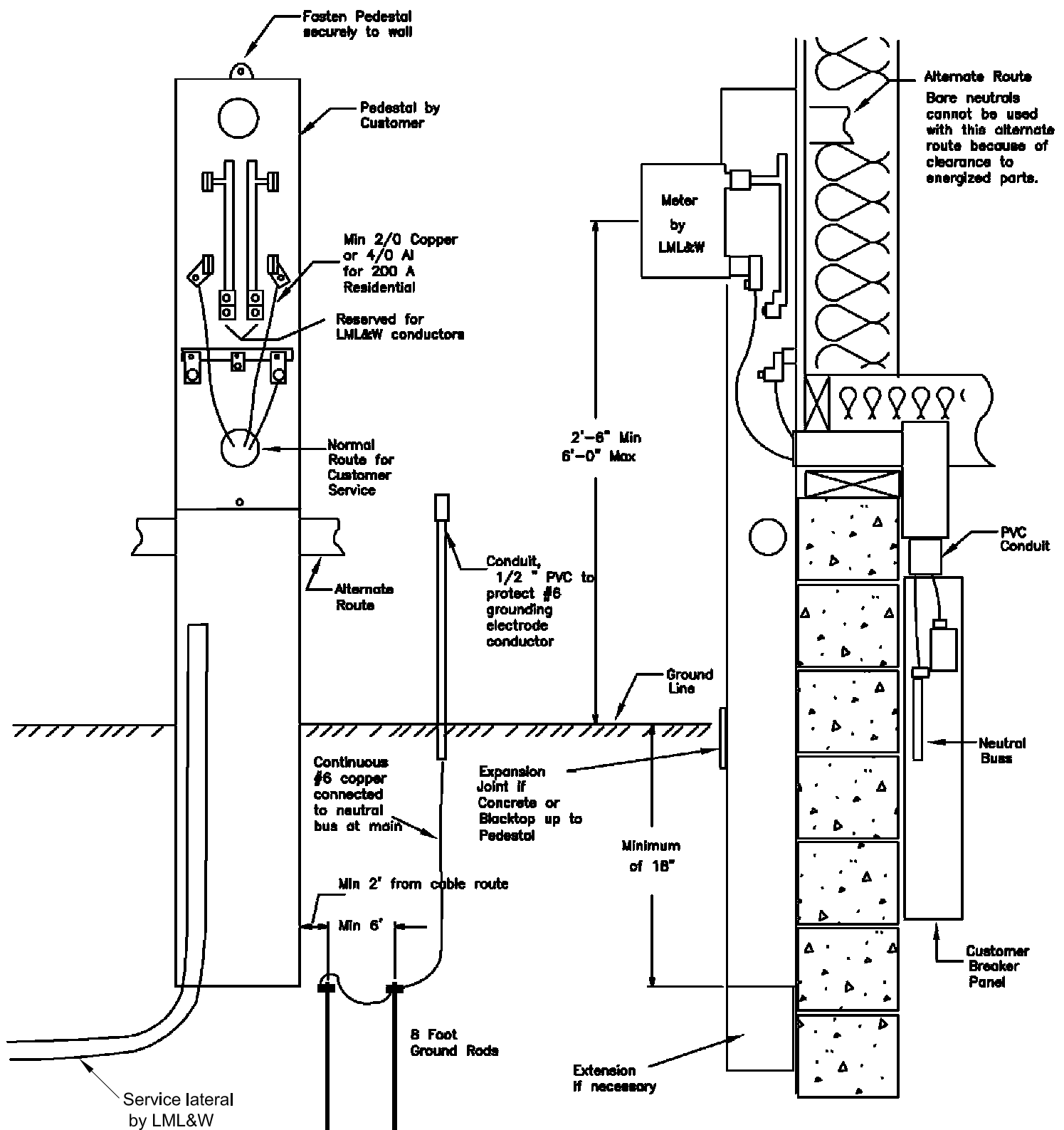
OPTION 4b



OPTION 5

Diggers Hotline Dial 811

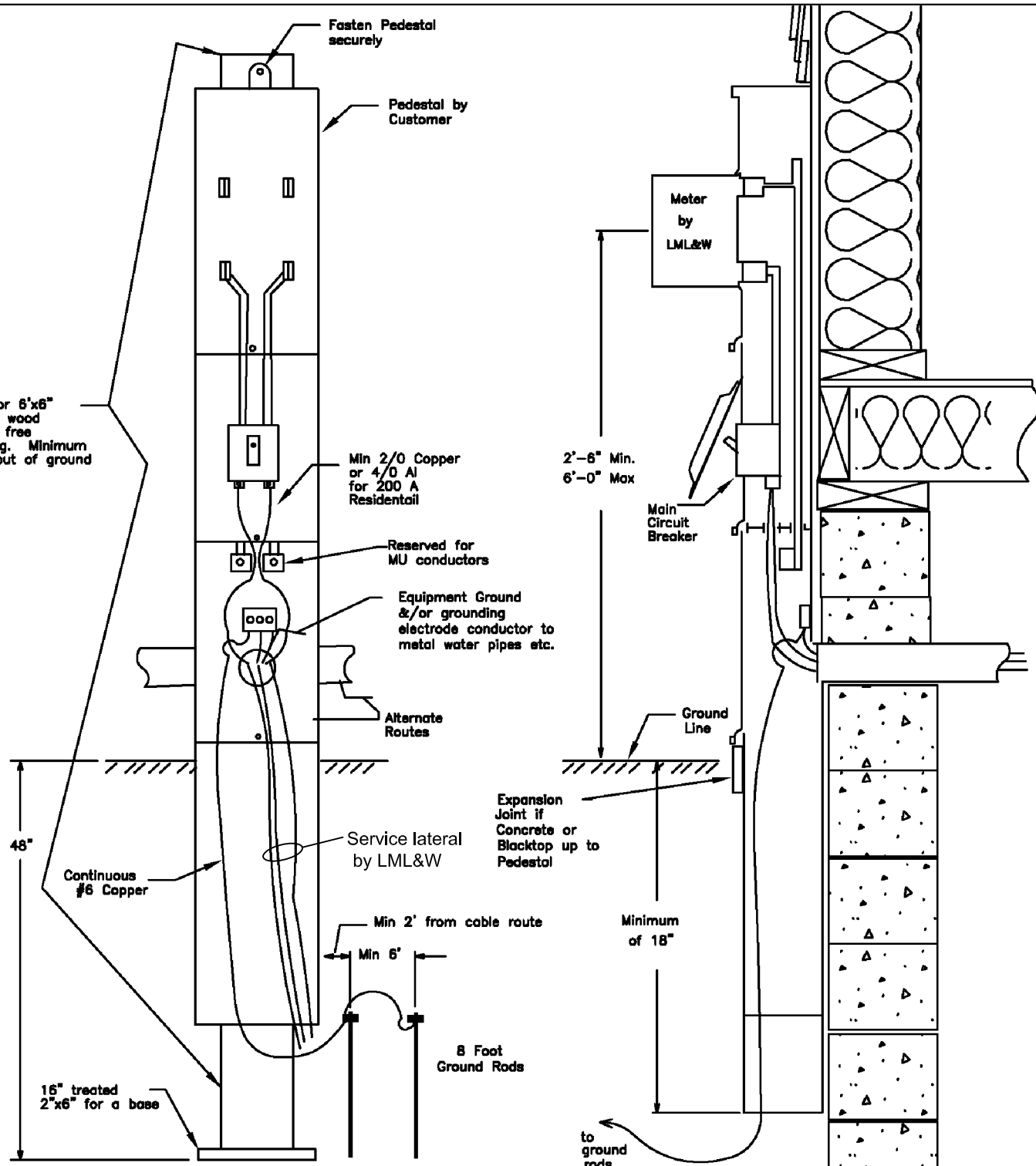




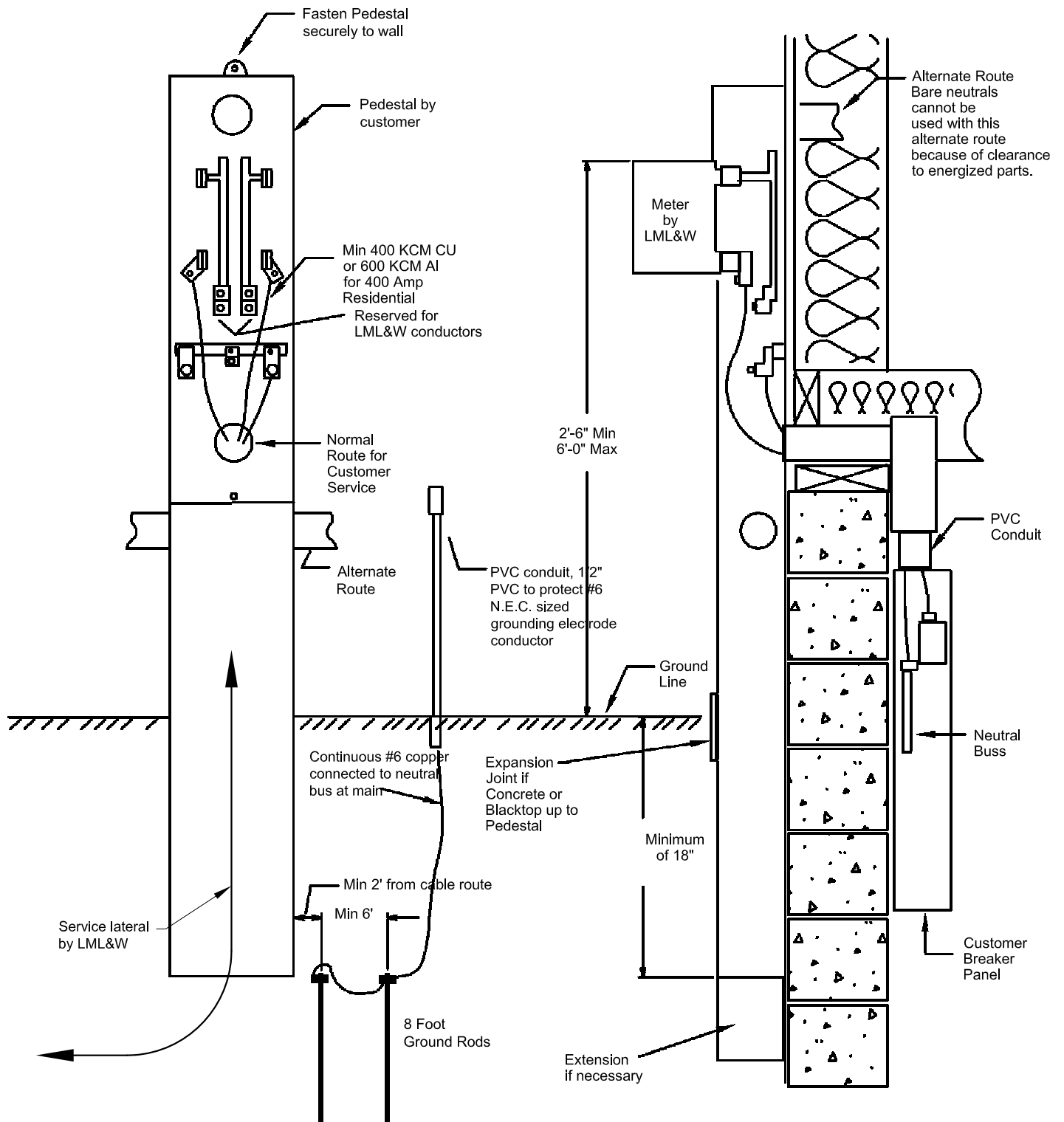
Notes: Refer to General Requirements for Underground Service for more information.

DIGGERS HOTLINE Dial 811

4"x6" or 6"x6"
treated wood
post if free
standing. Minimum
of 4' out of ground



1. This type of meter pedestal required if free standing (remote from building).
2. Not acceptable for mobil home use.
3. Must be attached to support post if free standing.
Use a minimum of 8 foot, pressure treated 6X6 or 4X6.
This must be buried at least 48 inches with a 16 inch treated 2X6 for a base.
4. This is commonly used if the service entrance conductor extends greater than 8 feet into the building.



NOTES:

1. This is a 320 class meter (320 Amp Residential). Designed for 320 Amps continuous and 400 amps intermittent. Refer to General Requirements for Underground Service for more information.

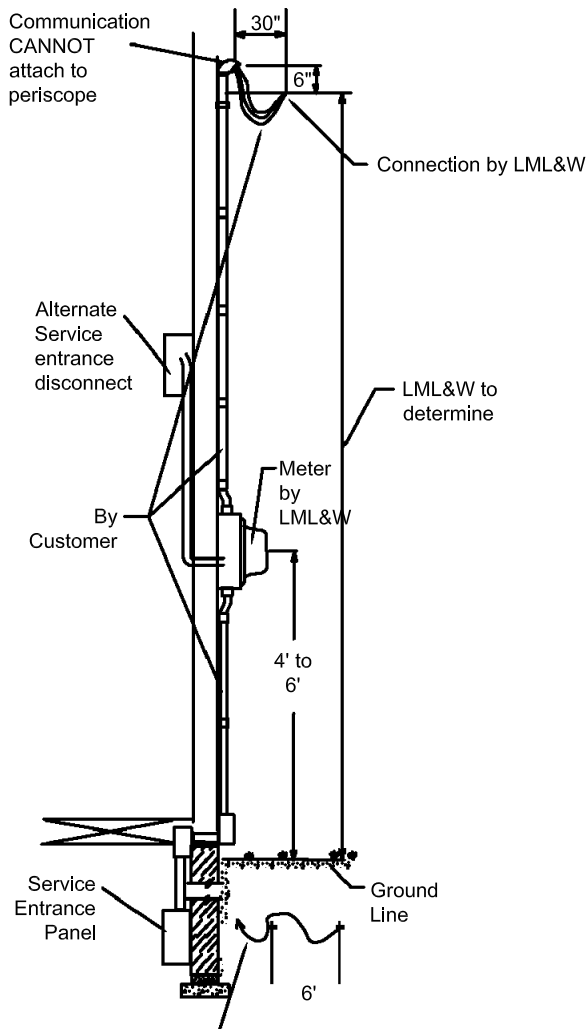
100-200 AMP SINGLE PHASE OVERHEAD

Notes:

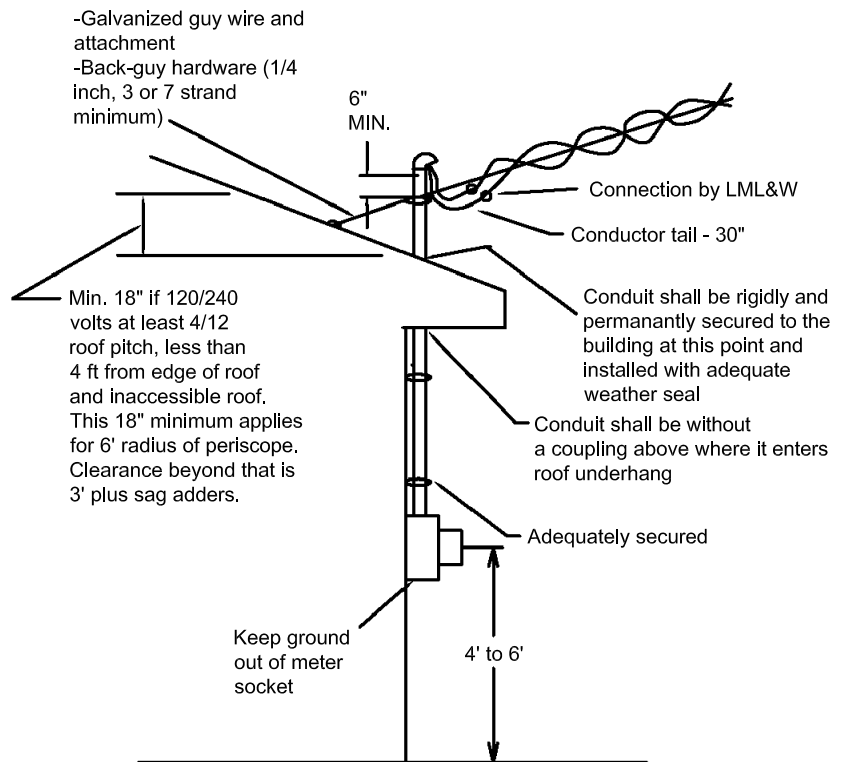
1. Lake Mills Light & Water employees must designate the service location and specify the mounting height of the periscope. This is required because of a numerous code clearance issues with the overhead service drop conductors.
2. The weatherhead must extend at least 6 inches above the attachment point for the service drop. This attachment device is provided by LML&W and installed by the customer. It must be adequately attached so it can handle 400 lbs or line tension.
3. The conductor coming out of the weatherhead shall be at least 30 inches long. LML&W will make the connections to the overhead service conductors.
4. The conduit shall be adequately supported with pipe straps. The meter socket shall also be adequately attached to the structure.
5. All periscopes (unsupported conduit extending above the roof) shall be made of rigid metal electrical conduit and if shall be back guyed. Aluminum, IMC or thin all is NOT acceptable. Minimum size shall be 2 inch for 0-200 amp, because of strength requirements. This includes upgrades to 100 amps. No couplings can be above where the conduit enters the roof overhang or anywhere above the roof on the periscope
6. Communication and customer owned circuits cannot be attached to electrical entrance periscopes (NEC 230-28)
7. The neutral conductor shall be identified by white tape, white insulation, white paint, or other techniques approved by NEC article 200-7 and 230-22
8. The raceways containing service entrance conductors or service entrance cables shall not extend more than 8 feet into the building before the main disconnect. Note that if the conduit is installed under the siding, or it is bricked in, it is considered already being inside the building per the state of Wisconsin (SPS 316.230)
9. Service entrance cable (rather than conduit) is acceptable, if installed properly, accepted by a local inspection authority and not placed behind any siding
10. Supports used to support service-drop conductors (attain clearance over buildings) will not be used for new installations. For existing installations, they must be substantial and meet the requirements of NEC 230-29

Acceptable Meter Sockets

The utility has no list of approved sockets for this application. The only requirements are that they be UL approved, a minimum of 100-Amp rated, for 100 Amp entrance, 200-Amp rated for (200 Amp entrance), ringless style and have at least manual bypass horns.



Continuous #6 Copper run to Main Disconnect. This cannot go to the meter socket. Protect with 1/2" PVC where exposed to abuse. Install ground thru wall above sill plate to avoid water seepage.



BASIC CLEARANCES - 120/240 VOLT

1. Drip loop must be at least 17 feet above the ground line. Refer to section titled Basic Electric Clearances - Services for additional requirements.
2. The drip loop and overhead service conductors must be at least 3 feet in any direction from windows, doors, porches or similar structures. An exception is above the top level of the window or a window designed not to open.
3. The drip loop and overhead service conductor must be at least 12 inches from communication circuits.
4. The drip loop and overhead service conductor must have 18 inches of clearance from the roof if a periscope is run thru the roof. This 18" clearance applies for a 6 foot radius of the periscope. The rood must be at least a 4" vertical to 12" horizontal pitch, with the periscope within 4 feet of the edge of the roof, and the inaccessible.
5. Avoid wood decks when locating the meter socket.
6. Customer to install house knob if used. This is because of need to fasten into substantial support.

MOBILE HOMES - UNDERGROUND AND OVERHEAD

NOTES:

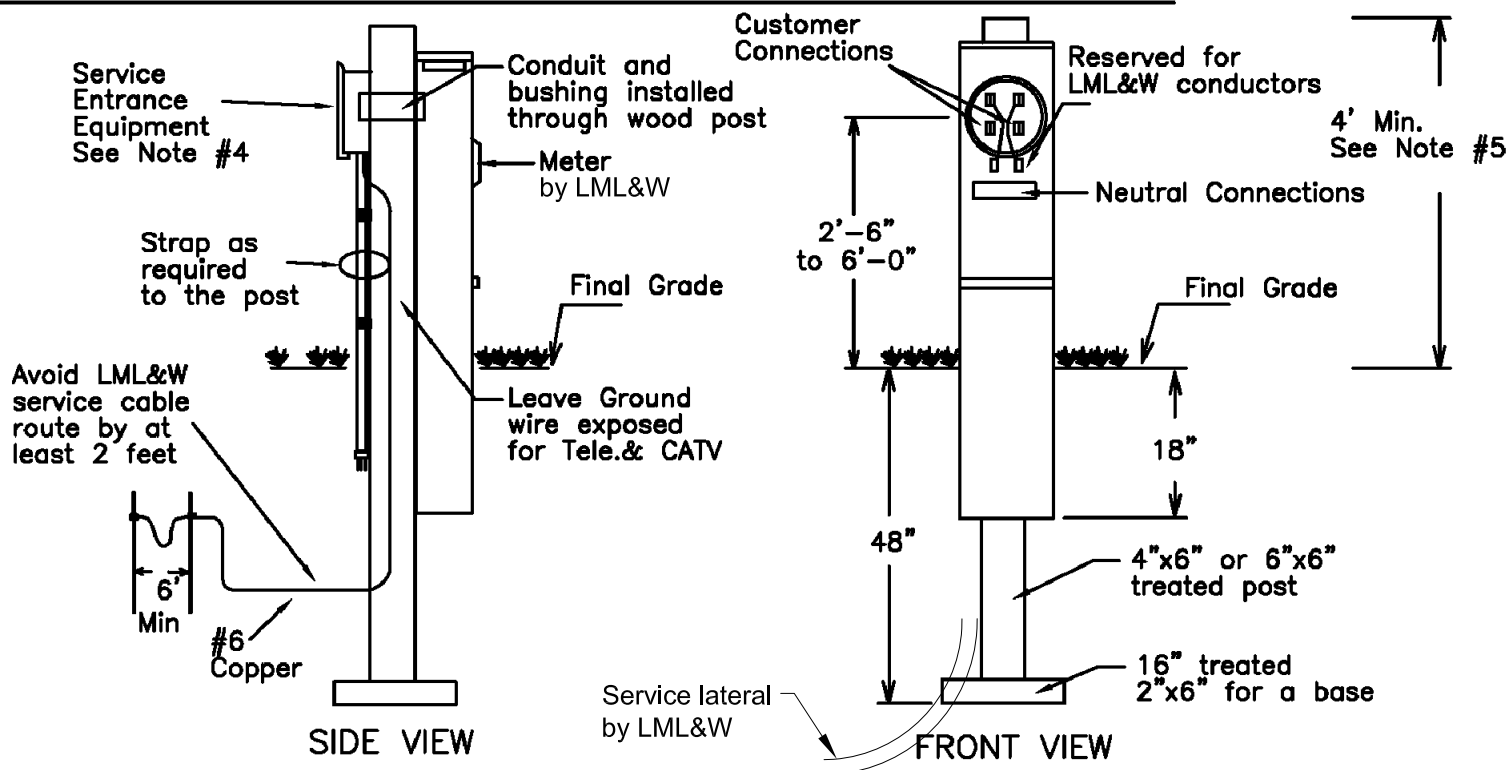
1. Mobile Home (definition from NEC 550-2): "A factory-assembled structure or structures transportable in one or more sections, that is built on a permanent chassis and designed to the required utilities, and includes the plumbing, heating, air-conditioning, and electric systems contained therein. Mobile homes can be identified by a red, rectangular HUD inspection label on the outside corner of the home. Manufactured homes (ex. Wausau home) on the other hand can be identified by a state inspection sticker on the electrical panel or inside of closet door or similar location.
2. Mobile homes must be wired per this standard. The only exception is if the mobile home is installed on a basement. In that case a meter pedestal can be attached to the basement wall and installed per the 100-200 Amp Single Phase UG sketch. The service entrance panel with main disconnect must be installed on the inside of the basement wall. It is not acceptable to go into the basement and then up into the mobile home panel directly. This is because of the requirements of NEC 230-70, 550-23 and COMM state code. Also note that the mobile home panel is not rated as "Service Entrance Equipment". It is also unacceptable if there is only a crawl space or slab because of NEC 110-26 (e).
3. Install mobile home metering pedestals with the meter pointed toward the driveway or street, or away from the mobile home. It is not acceptable to point the meter toward the home or away from the driveway. LML&W will spot the location of metering facilities to comply with code clearances. The metering pedestals must be labeled in the mobile home parks or RV parks as to the residence it serves. No more than 2 services per pole.
4. The following are basic Electrical Code Requirements for Mobile Homes (Refer to NEC 550 for complete set of code requirements):
 - a. Service Shall be 120/240 single-phase.
 - b. The service entrance equipment shall be rated at least 100 Amp, be weatherproof, and be mounted at least two and a half feet above ground for underground service.
 - c. The service entrance equipment cannot be mounted on the mobile home, must be within site of the mobile home, but not more than 30 feet from the mobile home.
 - d. The service entrance equipment must have at least a 50 Amp 120/240 volt breaker or fuse for feeding the mobile home. The norm is 100 Amp or more.
 - e. There shall be branch circuit capabilities in the service entrance equipment for serving an accessory building, structure, or additional electrical equipment. This is often used to feed a well or out-building. Wisconsin code does not require a single main disconnect for mobile homes.
 - f. The service entrance equipment should have provisions for serving an outside 15 or 20 Amp, 120-Volt GFI outlet.
 - g. Two 8-foot ground rods with a minimum of 6-foot separation shall be installed. The grounding electrode conductor shall be at least #6 copper and run into the service entrance equipment (not meter socket).

- h. The cable or cord run from the service entrance panel shall be a four-conductor cable (two hots, neutral, and an equipment ground).
5. The wood post shall extend out of the ground by at least four feet. This is to accommodate telephone and/or CATV on the sides of the wood post.
6. All load conductors shall be installed by the customer.
7. The proper depth and tamped back-fill is critical to minimize frost heave and further potential customer maintenance costs.
8. On overhead service drop installations, it is critical to have a tall enough pole to maintain code clearances. (Refer to Basic Electric Clearances-Services in this manual for more details.
9. Milibank Catalog #U8980-O-KK pedestals are not acceptable for mobile homes because they lack an accessory breaker position. This pedestal can, however, be used if Note #2 applies.
10. LML&W requires UG services in all new mobile home parks. This is because of OH clearance issues and moving mobile homes.

Diggers Hotline Dial 811

Mobile Homes - Underground

Requires assembly of individual components



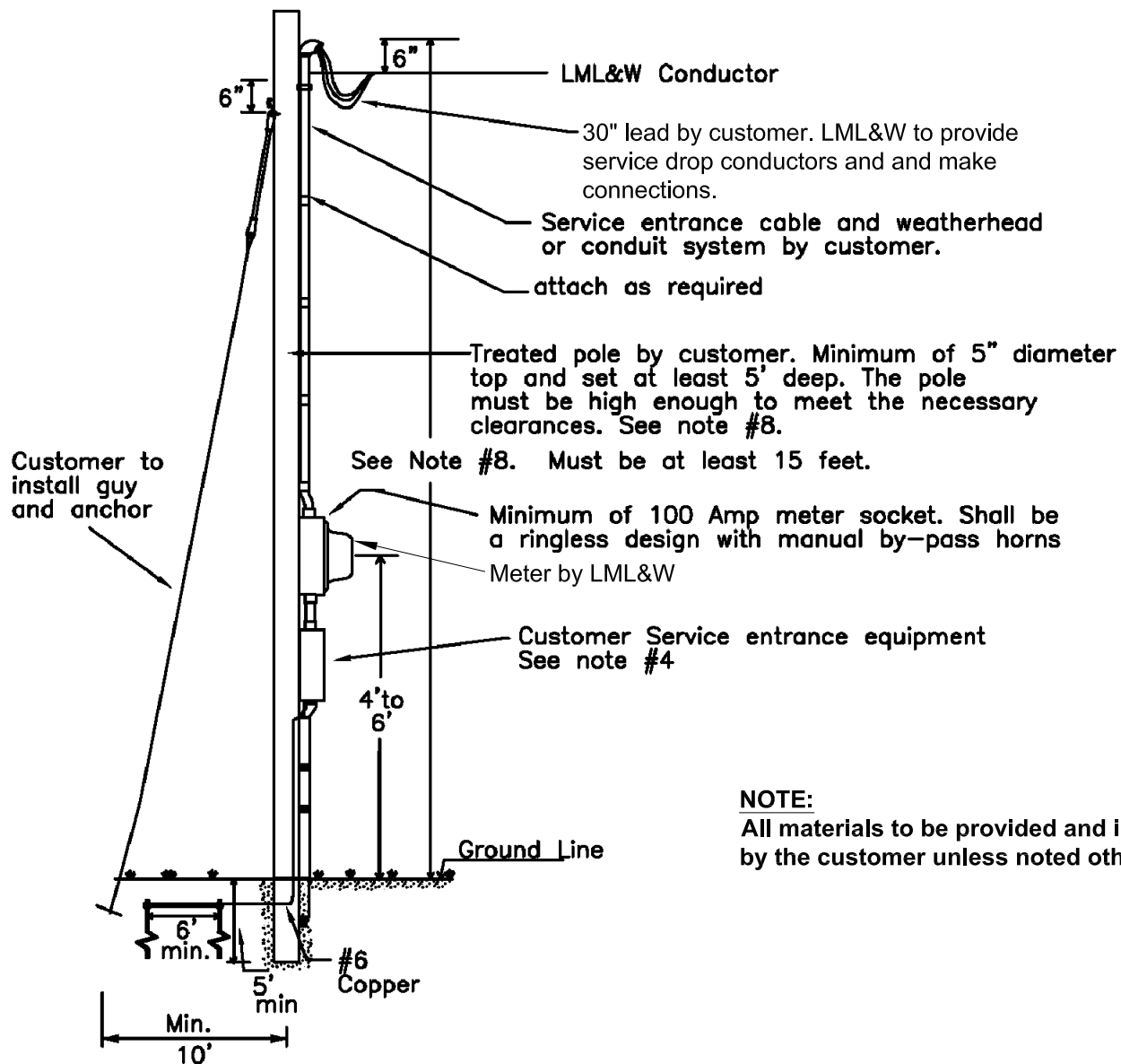
NOTE:

All materials to be provided and installed by the customer unless noted otherwise

NOTE:

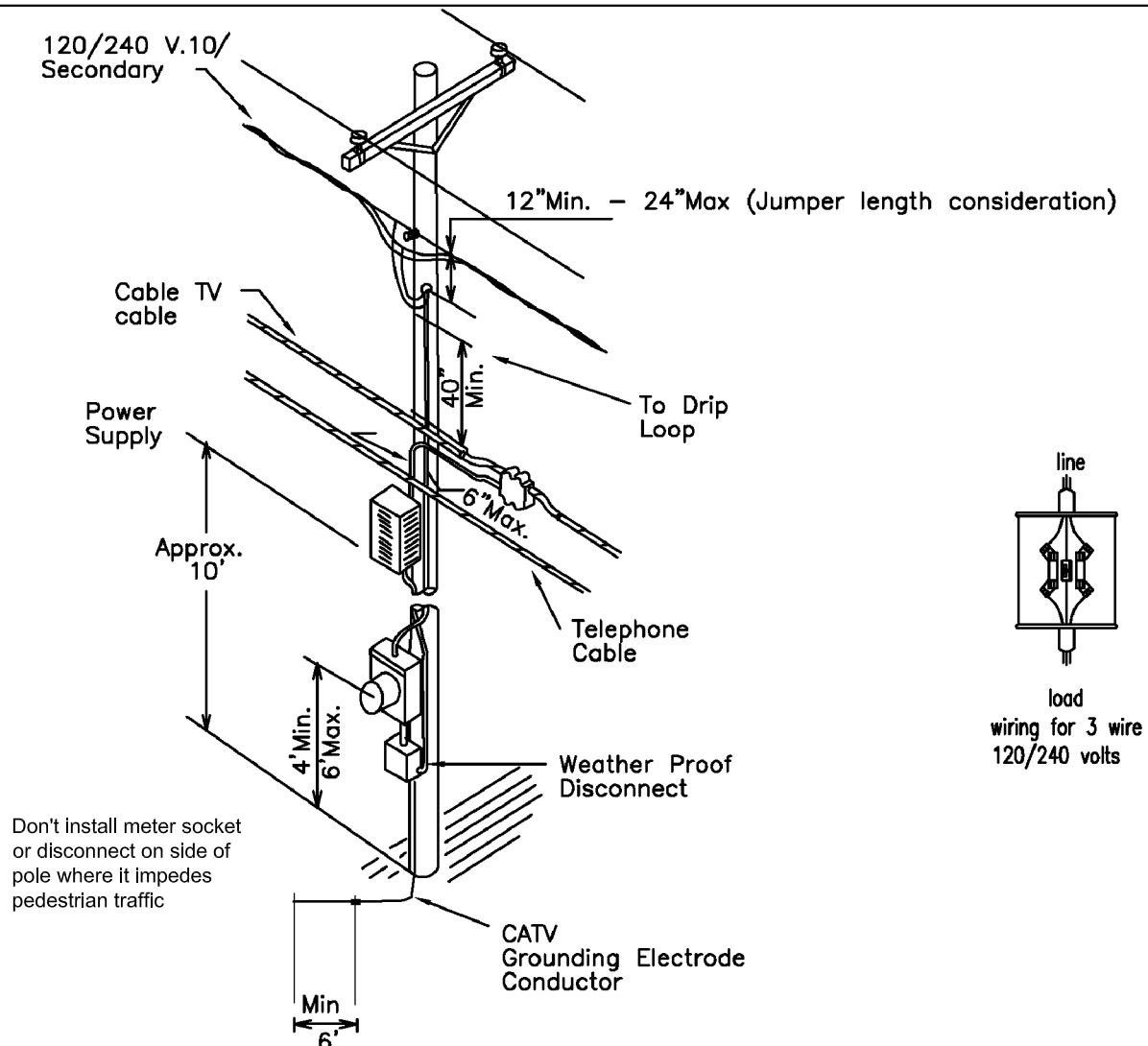
Will allow back to back pedestals, no more than 2 meters per set-up. Must meet all code requirements.

Mobile Homes - Overhead



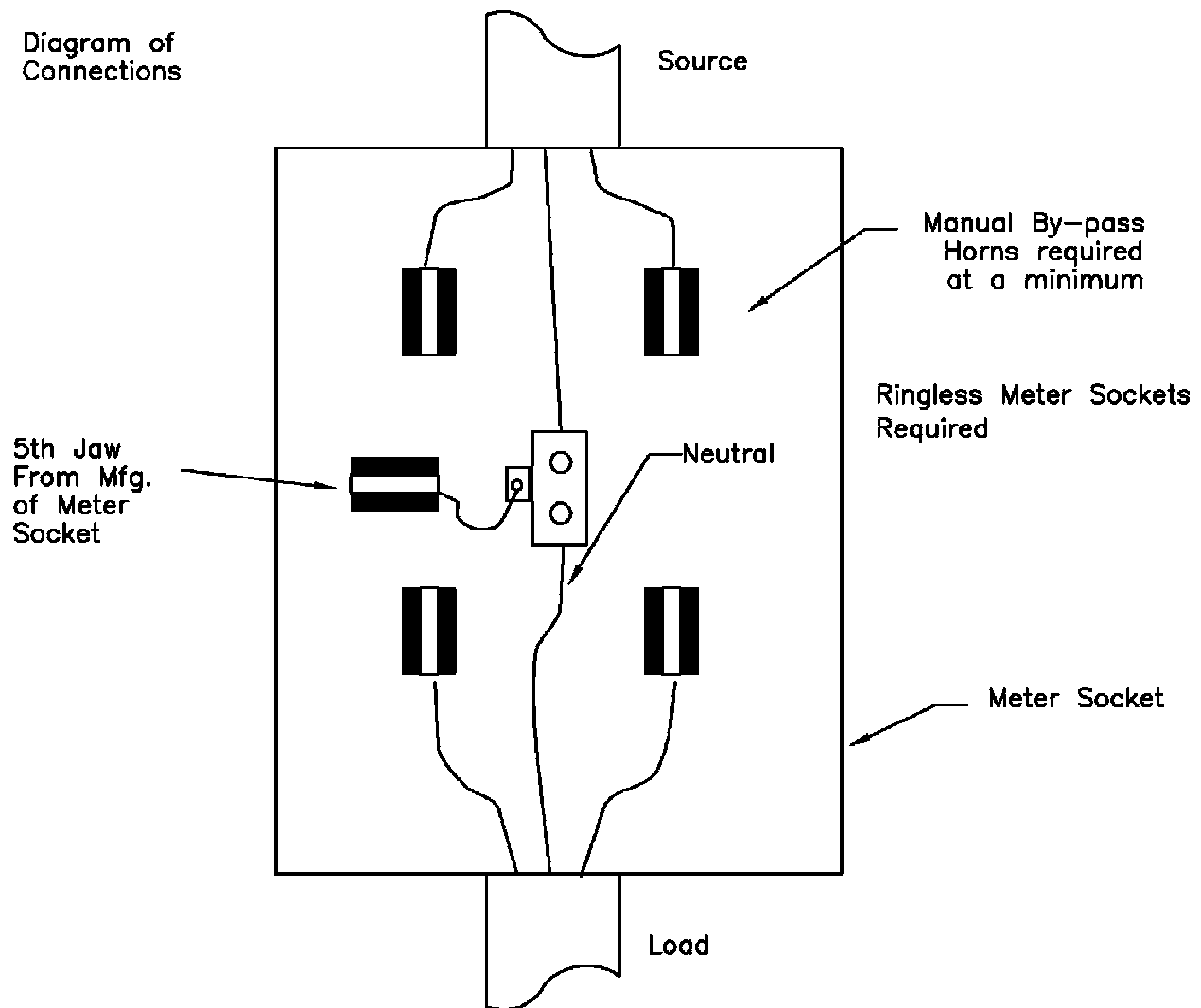
NOTE:

All materials to be provided and installed by the customer unless noted otherwise



1. Consult LML&W before installing in order to make sure that 120/240 volt service is available on the pole in question.
2. All installations must conform with all applicable electrical codes and LML&W requirements including requirements for clearances, climbing space and working space.
3. Only qualified and authorized personnel shall make this type of installation. They shall be trained and knowledgeable of the clearance requirements and working rules of the NESC (Vol.1 Wisconsin State Electric Code). The qualified personnel shall be trained and competent in:
 - a. Distinguishing exposed live parts from other parts of electric equipment.
 - b. The techniques necessary to determine the nominal voltage of exposed live parts.
 - c. Minimum approach distances corresponding to the voltages to which the qualified personnel will be exposed.
4. All materials, except meter, shall be furnished and installed by the CATV company.
5. The meter socket shall be a minimum of 100 amp, ringless style, with manual by-pass horns. The service will be 3-wire 120/240 volt. Two wire 120 volt service is not acceptable.
6. The service entrance conductors shall be run in non-metallic conduit, Schedule 80. If metallic conduit is used, it shall be covered with a non-metallic covering 40" above and 72" below any communications attachments (NESC 239G.1.). The service entrance conductors shall extend 30" beyond the weatherhead and shall be rated with 600 volt insulation. LML&W will make connections to its' lines.
7. It is a code violation to have fused and unfused service entrance conductors in the same raceway.
8. The disconnect, power supply unit, meter socket and CATV cable shall be mounted on the same quadrant of the pole. There shall be a maximum of 6" between the service entrance conduit and CATV cable.
9. Grounding shall be in accordance with the National Electrical Code article 250. Note that code requires a separate ground down the pole and a separate double ground rod. Do not run this ground into the meter socket (PSC 114.099 (2) C)
10. When a unit contains both the service disconnect switch and the power supply, installation height shall be in accordance with applicable codes.
11. This unit may not be mounted on any pole on which there are transformers, primary risers, section cutouts, capacitors, circuit reclosers, regulators, traffic signals or similar fixtures without the consent of the LML&W Electrical Engineer.

Diagram of
Connections

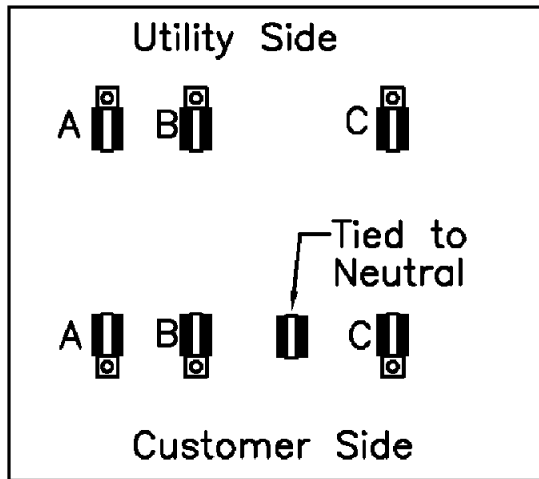


Single Phase 120/208 0-400 Amp, Network

NOTES:

1. A fifth jaw can be added to most new-style, single-phase 120/240 meter sockets for 120/208 single-phase service. The fifth jaw shall be added in the 9 o'clock position as pictured and securely attached (Milbank Snap in Jaws are not acceptable).
2. This voltage is common in or near commercial areas. It is also common for large apartment complexes.
3. There are some existing installations with the fifth jaw in the 6'clock position (as compared to the normal 9 o'clock position) or with a wire jumper between the meter and the meter socket. These should be corrected if possible when upgrading the wiring.
4. Single phase service drop application shall be limited to 400 Amp. Larger installations shall have a three phase service drop with the single phase meters and connected loads balanced on all phases. The single phase meters must also be limited to 400 Amp.

VIEW OF METER SOCKET



7 Jaw Meter Socket

Used for:

120/208 4-wire 3 Ø/wye
277/480 4-wire 3 Ø/wye
/

Basic Meter Socket Requirements

100-200 Amp Three Phase Overhead or Underground

1. Ringless style, 200 Amp minimum rated, clamp type jaws, 600 volt rated, wrench operated connectors (not screwdriver), sealable, and provided with protective shield covering the jaws.
2. The meter sockets shall have a manual by-pass, designed to visually check the by-pass connections with meter installed. Also it must be designed so the cover cannot be installed with the by-pass closed.
3. The phase designations are commonly used designations by electricians. They do not indicate clockwise or counter-clockwise rotation.

MULTIPLE METERING

1-Phase, 120/240 Volts, 0-400 Ampere Bus

0-200 Amperes Per Meter, 2-6 Meters

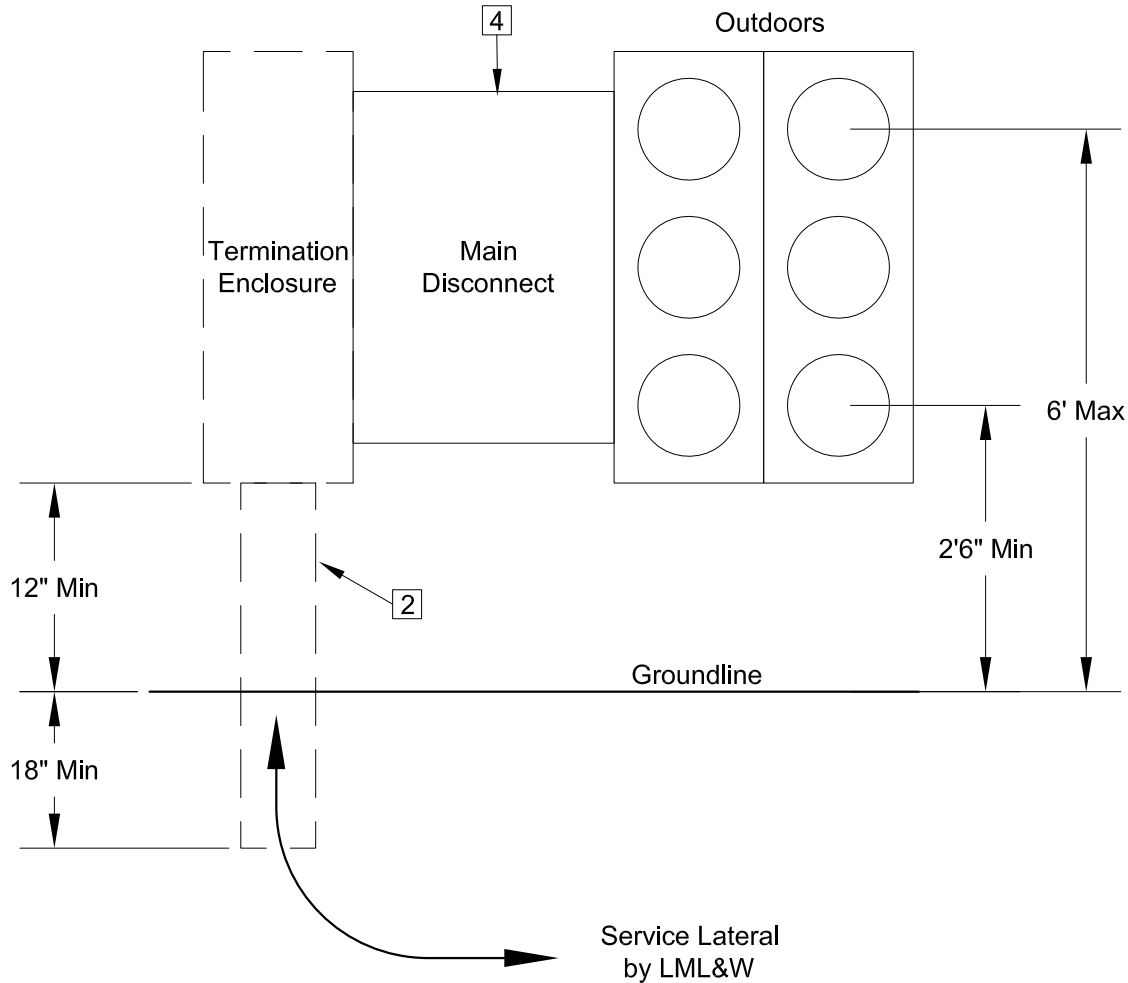
Direct Buried Lateral

1. All materials to be provided and installed by the Customer unless noted otherwise. LML&W shall provide and install meters, service lateral conduits and cables. Refer to service sketches and supplemental data for more information.
2. Customer shall provide a wire trough large enough for all incoming service lateral conduits and cables. Riser conduits between the bottom of the termination cabinet and 18 inches below grade are no longer acceptable. See appropriate table for common service lateral conduit quantities, conduit sizes and cable sizes for each service entrance size.
3. For all LML&W services 400 amp or larger, the customer shall provide an active telephone number to read the electric meter remotely. Refer to appropriate section for more telephone details.
4. **General Meter Requirement:** There is a lot of multiple metering equipment available. Because of this, LML&W only requires the following minimum standards:
 - a. Four jaw for single phase 120/240.
 - b. Rated at Least 100 amp each socket.
 - c. Ringless.
 - d. Sealable.
 - e. Has at least Horn Bypasses. Manual bypass lever not required except if three phase.
 - f. UL approved.
 - g. No covers over the meters.
 - h. Termination enclosures for utility conductors shall meet requirements describe in this manual.
 - i. **All metering shall be outside.**
5. **Duplexes:** LML&W can only run one service to a duplex. This is required by NEC 230.2(A). This is required even though the garages may be between the dwelling parts of the duplex. If consideration is given to declaring a duplex as two separate buildings, there has to be a substantial fire wall through the roof between the duplexes. In Wisconsin, SPS 316.100(2)(a) states this has to be a three-hour fire wall, which is a substantial masonry wall.

NEC 210.25 (and WI PSC 113.0802 or 113.0803) requires a third meter for common areas (well pumps etc.) on duplexes. Effective with 1996 NEC (not enforced in Wisconsin until 2000/2001). SPS 316.210(5) makes an exception to this rule for upgrades on existing duplexes.
6. LML&W requires meter pedestals for all underground installations on duplexes.
7. **Large Installations:** Multi-meter installations shall meet all noted clearances in this manual. Minimum clear space in front of the termination cabinet and/or meter shall meet NEC 110.26.
8. **Labeling:** Each meter socket shall be labeled with a permanent marking system, both inside and outside the meter socket, and at the service panel that the meter serves. NEC 110.22.

9. LML&W uses 90 degree C conductor; therefore, LML&W cannot terminate on customer main disconnects (NEC 110.14). LML&W can terminate in an integral termination enclosure.
10. Refer to the following pages for clearances for large multi-meter installations
- Multiple Metering - Indoor/Outdoor Vertical clearances
 - Multiple Metering - Indoor/Outdoor Horizontal Clearances
 - Swinging door, Frontal and Side Clearances for Indoor Multiple Metering

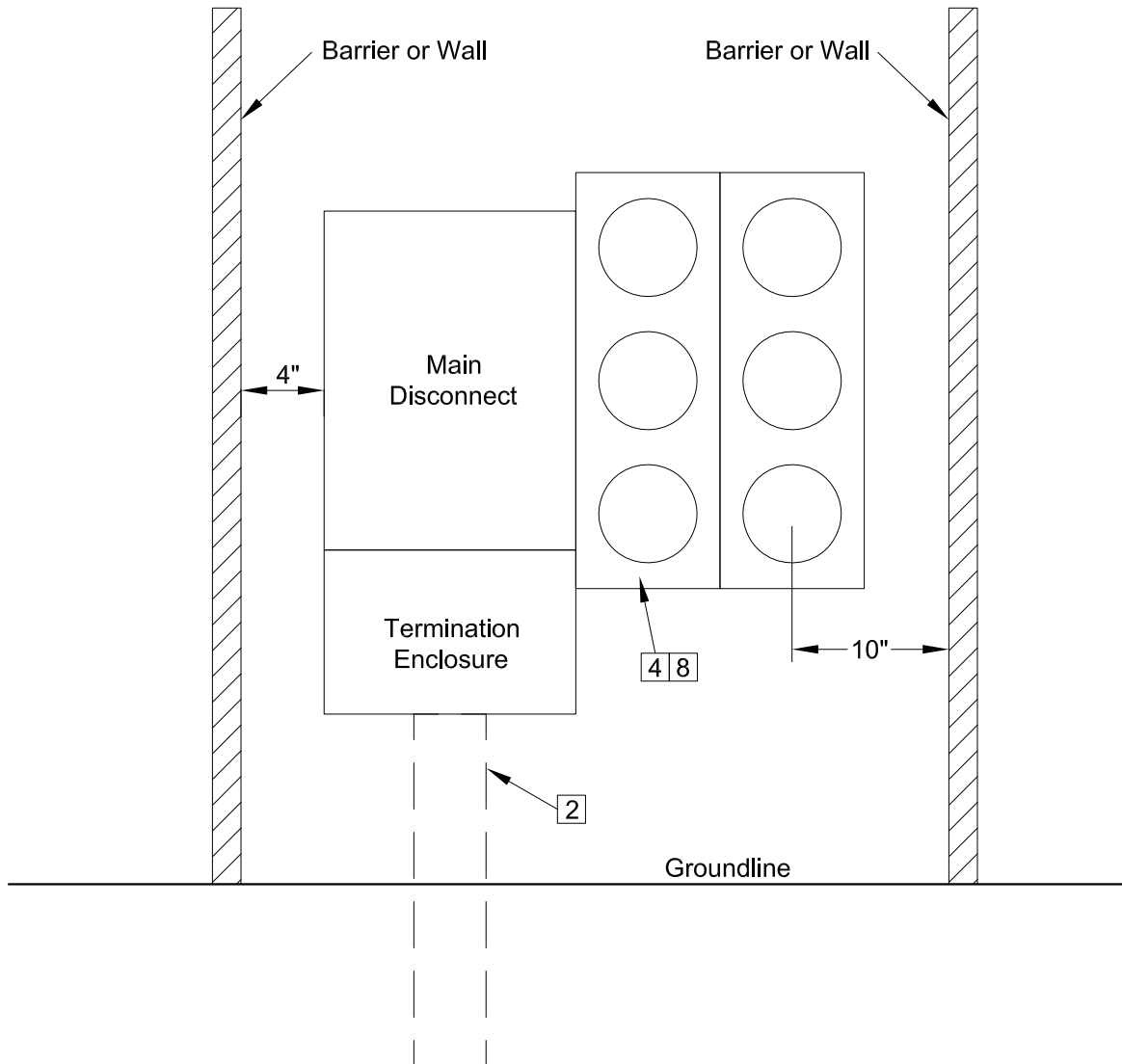
Vertical Clearances



NOTES:

- All materials shall be provided and installed by the customer unless noted otherwise. Underground service lateral conduits and cables shall be provided and installed by LML&W.
- Customer shall furnish, install and maintain multiple metering equipment including meter sockets, switches, fuses, circuit breakers, termination enclosures and associated equipment. Metering shall be outside.
- A minimum of 3 feet must be provided in front of all metering installations. See NEC 100-26 for more information.
- All 100 Amp or 200 Amp meter sockets shall contain the horn type by-pass for single-phase or network installation, be ringless and UL approved.
- 6'-6" of headroom working space required per NEC 100-16(E).
- LML&W uses 90°C conductor, therefore LML&W can not terminate on customer main disconnects (NEC 110-14). LML&W can terminate in integral termination enclosures or separate termination enclosures.

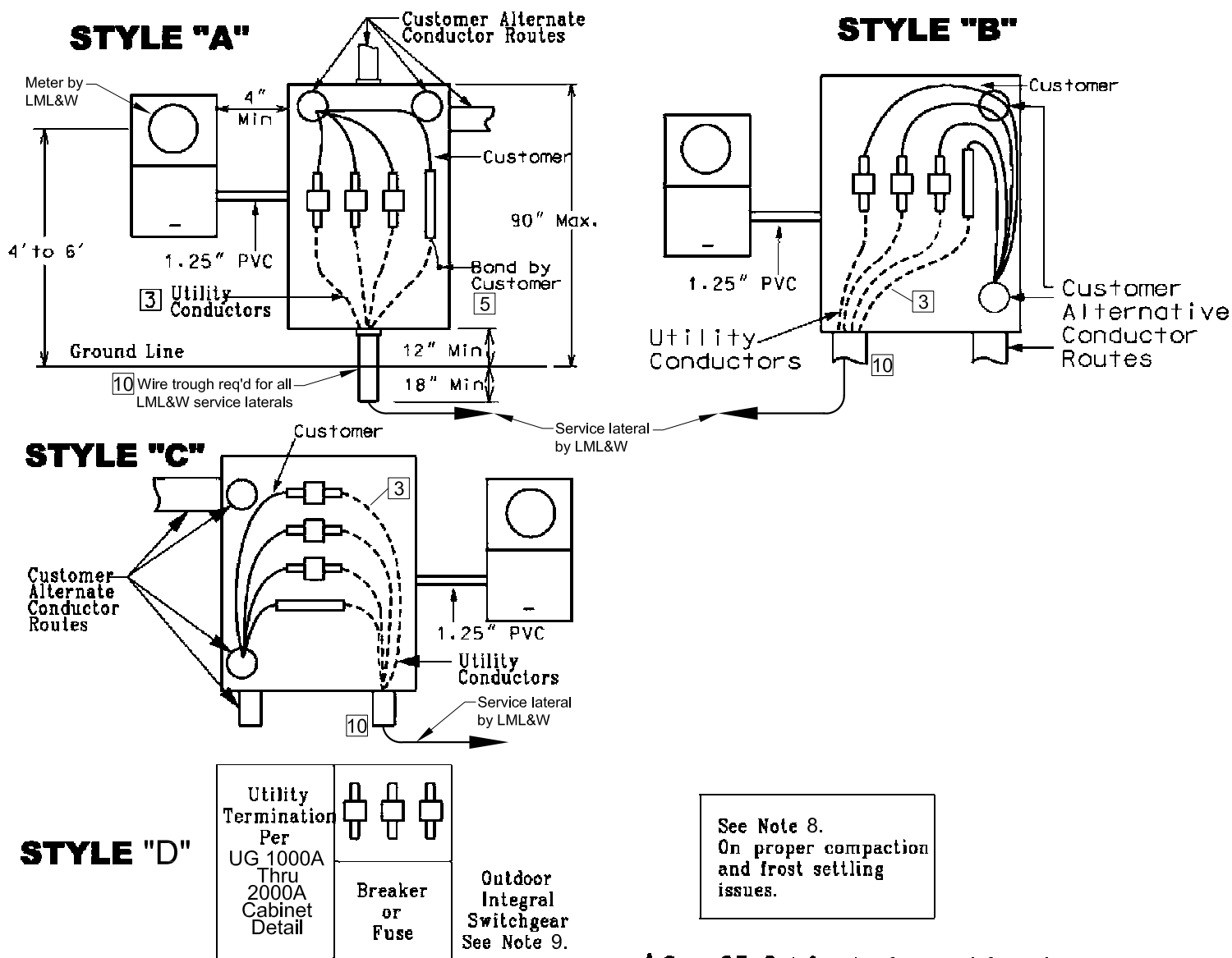
Horizontal Clearances



NOTES:

1. On group installations each meter socket and service switch shall be permanently marked identifying the location to be served. The location being served shall be identified in the same manner. This identification shall be made on the outside of the metering panels (for the benefit of tenants and meter readers), inside the meter enclosure (non-moveable part a cover panels usually are interchangeable), and at the service panel that the meter serves. A label on the service panel is critical because labeling systems for apartments change, making it difficult to trace. This identification is often done with permanent black markers or white paint. See NEC 110-22 and PSC 113.0809.
2. All materials shall be provided and installed by the customer unless noted otherwise. Underground service lateral conduits and cables shall be provided and installed by LML&W.
3. Customer shall furnish, install and maintain multiple metering equipment including meter sockets, switches, fuses, circuit breakers, termination enclosures and associated equipment.
4. A minimum of 3 feet must be provided in front of all metering installations. See NEC 110-26(a).
5. All 100 Amp or 200 Amp meter sockets shall contain the horn type bypass, for single-phase or network installations. Installations shall have ringless meter sockets and be UL approved.
6. LML&W uses 90°C conductor, therefore LML&W can not terminate on customer main disconnects (NEC 110-14). LML&W can terminate in integral termination enclosures or separate termination enclosures.

Underground CT Cabinets



★See CT Cabinets for more information.

Notes:

1. All materials to be provided and installed by the Customer unless noted otherwise.
2. The CT cabinet and meter socket shall be mounted outside. Meter socket must be mounted independent of the transocket. Meter sockets mounted on the transocket door are not acceptable.
3. Note the location of the customer and utility conductor terminations as shown above. The Utility cannot terminate its conductors in any other location. Consult the Utility with any questions. Service lateral conduits and cables to be provided and installed by LML&W.
4. CT metering is required for all three phase services. Metering potential transformers are required for all 480V services rated over 200 amps.
5. The CT cabinet must be bonded per NEC 250.102. See NEC and State Code Requirements for service entrance grounding and bonding requirements.
6. Minimum working and clear space in front of the cabinet and/or meter shall meet NEC 110.26.

7. LML&W may require conduit by the Customer for services under driveways and parking lots.
8. Because of settling problems, it is necessary for the customer to provide adequate compaction for disturbed soils below 30 inches. This is soil below the normal underground service burial depth. This needs to be done with sand or gravel. Frozen material and non-compacted clay are not acceptable. See also NEC 300.5(J).
9. Integral switchgear installations, similar to Style "D", need to be approved by LML&W. These installations need to be capable of accommodating a window current transformer. Contact LML&W for CT dimensions currently in use by LML&W. The switchgear manufacturer shall provide the bus bar and CT support with the switchgear.
10. Customer shall provide a wire trough large enough for all incoming service lateral conduits and cables. Riser conduits between the bottom of the transocket and 18 inches below grade are no longer acceptable. See appropriate table for common service lateral conduit quantities, conduit sizes and cable sizes for each service entrance size. Size wire trough accordingly.
11. For all LML&W services 600 amp or larger, the customer shall provide an active telephone number to read the electric meter remotely. Contact LML&W to confirm if a phone line is required.

Pedestal Raceways for CT Cabinets

(Conduit Riser for Utility Conductors are not acceptable)

	Erickson	Galva-Closure
Length	600/800 Amp	600/800 Amp
36"	USR-36	CC-36
48"	USR-48	CC-48
60"	USR-60	CC-60

AMP also makes pedestal raceways in varying sizes and lengths. This is under the WWPB catalog series.

Bonding Table			
Size of Largest Service Entrance Conductor or Equivalent Area For Parallel Conductors		Bonding Jumper	
Copper	Aluminum	Copper	Aluminum
#2 or smaller	1/0 or smaller	#8 or 16.51 kcmil	#6
#1 or 1/0	2/0 or 3/0	#6 or 26.24 kcmil	#4
2/0 or 3/0	4/0 or 250 kcmil	#4 or 41.74 kcmil	#2
Over 3/0 – 350 kcmil	Over 250 kcmil – 500 kcmil	#2 or 66.36 kcmil	1/0
Over 350 kcmil – 600 kcmil	Over 500 kcmil – 900 kcmil	1/0 or 105.6 kcmil	3/0
Over 600 kcmil – 1100 kcmil	Over 900 kcmil – 1750 kcmil	2/0 or 133.1 kcmil	4/0
Over 1100 kcmil – 1300 kcmil	Over 1750 kcmil – 2000 kcmil	3/0 or 167.8 kcmil	250
Over 1300 kcmil – 1700 kcmil	Over 2000 kcmil – 2400 kcmil	4/0 or 211.6 kcmil	300
Over 1700 kcmil – 2000 kcmil	Over 2400 kcmil – 2800 kcmil	250 kcmil	350
Over 2000 kcmil – 2800 kcmil	Over 2800 kcmil – 4000 kcmil	350 kcmil	500
Over 2800 kcmil – 4000 kcmil	Over 4000 kcmil – 6000 kcmil	500 kcmil	750
Over 4000 kcmil – 6000 kcmil	Over 6000 kcmil – 10000 kcmil	750 kcmil	1250

Equipment Bond – supply side of Service and Main Bonding Jumper (CT Cabinets)

Table 250.66

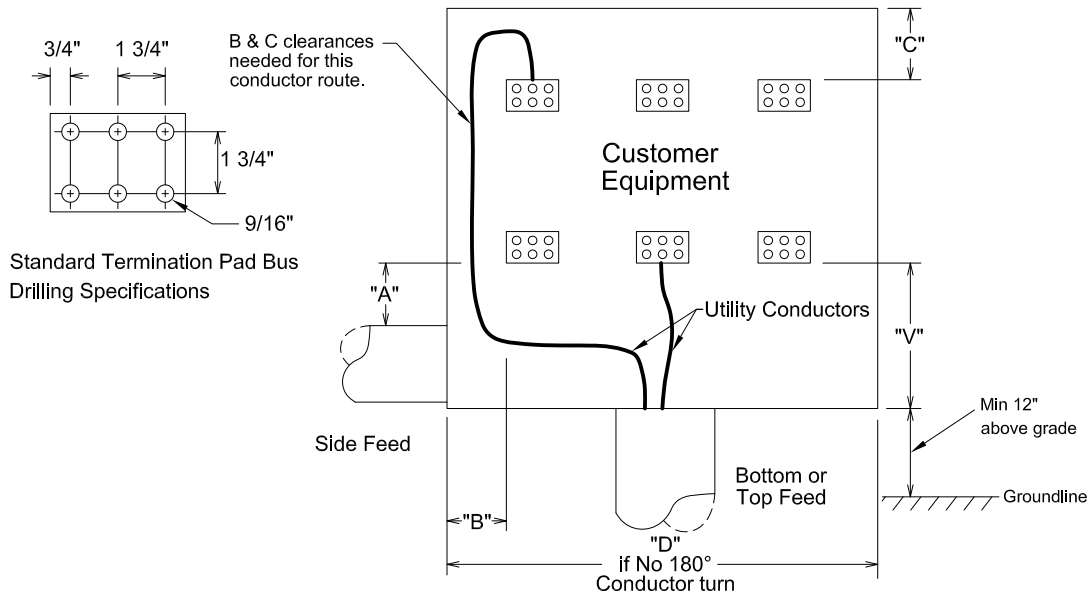
NEC 250.96, NEC 250.102 and NEC 250.142

It is not necessary to run the bond from the CT cabinet back to the service disconnect if the CT cabinet is located on the supply side of the disconnect.

LAKE MILLS LIGHT & WATER ELECTRICAL SERVICE MANUAL

UNDERGROUND CT CABINETS THROUGH 2000 AMPS

Space Required to Terminate in Service Entrance Panels & Switchgear



Utility Standard Conductor and Conduit Sizes

Switchgear (Amps)	Phases	No. & Size Conductors Per Phase Aluminum	No. of Conduits and Size (in.)	"V"	"A"	"B"	"C"	"D"
Conduit Run								
200	1	1-3/0	1-2"	6.5"	6.5"	4"	6.5"	8"
200	3	1-3/0	1-3"	6.5"	6.5"	4"	6.5"	10"
400	3	1-500	1-4"	12"	12"	5"	12"	11"
600	3	2-350	2-4"	18"	18"	8"	16"	12"
800	3	2-500	2-4"	24"	24"	10"	18"	19"
1000	3	3-500	3-4"	30"	30"	12"	20"	26"
1200	3	4-500	4-4"	30"	30"	14"	22"	35"
1600	3	5-500	5-4"	36"	36"	-	-	40"
2000	3	6-500 Cu	6-4"	42"	42"	-	-	40"

+ Std. is 350 neutral

Notes:

1. This page deals exclusively with LML&W conductors.
2. LML&W uses 90°C conductor; therefore, LML&W cannot terminate on customer main disconnects. (NEC 110.14)
3. "V" dimension for 3/0 and 350 comes from NEC Table 312.6(B).
4. "B" dimension based on NEC 312.6(A). "C" dimension based on NEC 312.6(B). 180 degree cable bends are only allowed by LML&W through 600 Amp. Consult LML&W if you have such a situation with a larger entrance.
5. If these minimum termination dimensions cannot be met, it may be necessary to use a separate termination enclosure.
6. This table gives standard LML&W conductor sizes. Customers must size their service entrance conductor based on the NEC. Note things such as Table 310.15(B)(16) on general conductor ampacities, Table 310.15(B)(3)(a) on derating for more than three current-carrying cables in a raceway, duct configurations for over 2KV cables in Figure 310.60, Article 376 and 378 on raceway fill, etc.
7. Consult LML&W when planning 2000 Amp and larger switchgear.
8. "D" Dimension based on terminator widths and 1" phase spacing. This applies only to single direction termination. If some conductors must turn a 180 degree to terminate, add dimension "B" as necessary.
9. One additional conduit shall be required where potential problems may occur under blacktop, concrete, or building structure. Additional considerations shall be given for rocky conditions.

PSC 114.317 Outdoor location of oil-insulated pad-mounted transformers near buildings. [Follows NESC 316, p. 236] (Addition) Add the following section:

Outdoor location of oil-insulated padmounted transformers near buildings.

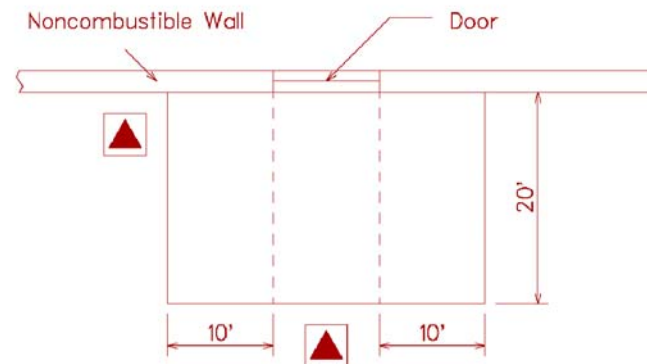
A. Noncombustible and Combustible Walls

For the purposes of this section, combustible walls are walls of Type No. V buildings as determined by Wisconsin Building Code (Construction Classification IBC Chapter 6). All other walls are considered to be non-combustible.

B. Noncombustible Walls

Padmounted oil-insulated transformers may be located directly next to noncombustible walls if the following clearances are maintained from doors, windows and other building openings.

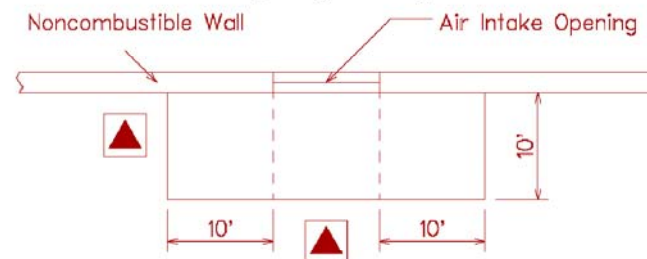
1. Padmounted oil-insulated transformers shall not be located within a zone extending 6.1 m (20 ft) outward and 3.0 m (10 ft) to either side of a building door. See Figure PSC 114-317B1.



1

Figure PSC 114-317B1.

2. Padmounted oil-insulated transformers shall not be located within a zone extending 3.0 m (10 ft) outward and 3.0 m (10 ft) to either side of an air intake opening. Such transformers may be located within said zone beneath an air intake opening provided there is not less than 7.6 m (25 ft) diagonal separation between the transformer and said opening. See Figure PSC 114-317B2.



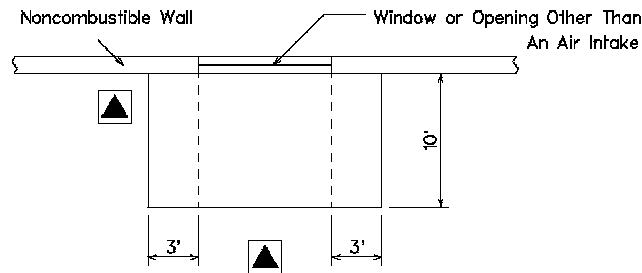
2

Figure PSC 114-317B2.

This is reprinted from Vol. 1 of the Wisconsin State Electrical Code (PSC 114.317)
Refer to current PSC 114.317 publication for updates.

3.a. Padmounted oil-insulated transformers shall not be located within a zone extending 3.0 m (10 ft) outward and 0.9 m (3 ft) to either side of a building window or opening other than an air intake. See Figure PSC 114-317B3a.

Exception: This does not apply to a glass block or fire window meeting the requirements of the Wisconsin Commercial Building Code (Fire Window IBC Chapter 7, Section 714.3).

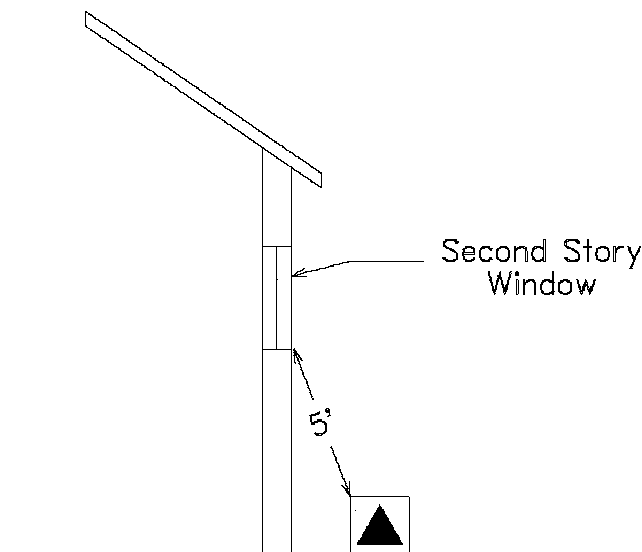


3

Figure PSC 114-317B3a.

3.b. For second story windows, the transformer shall not be located less than 1.5 m (5 ft) from any part of the window. See Figure PSC 317B3b.

Exception: This does not apply to a glass block or fire window meeting the requirements of the Wisconsin Commercial Building Code (Fire Window, IBC Chapter 7, Section 714.3).



4

Figure PSC 114-317B3b.

C. Combustible Walls

1. Padmounted oil-insulated transformers in sizes up to and including 100 kVA shall be located according to the provisions set forth in Subsection B for noncombustible walls.

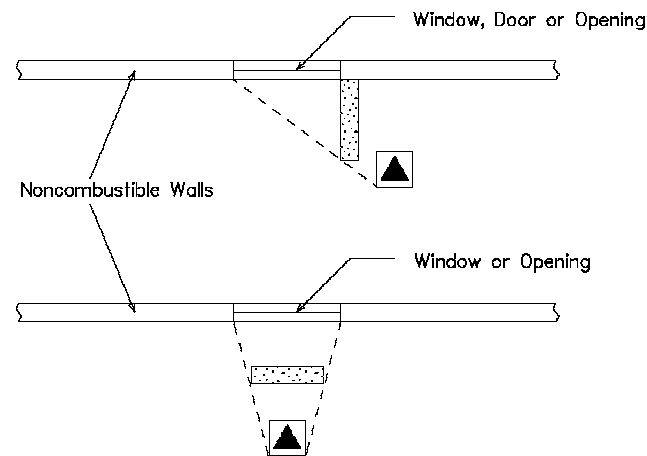
2. Padmounted oil-insulated transformers in sizes above 100 kVA shall be located a minimum of 3.0 m (10 ft) from the building wall in addition to the clearances from building doors, windows and other openings set forth for noncombustible walls. Also, a sump shall be installed for transformers in size exceeding 500 kVA if the immediate terrain is pitched toward the building.

D. Barriers

If the clearances specified in PSC 114.317 cannot be obtained, a fire-resistant barrier may be constructed in lieu of the required separation. The following methods of construction are acceptable:

1. Noncombustible Walls

The barrier shall extend to a projection line from the corner of the padmounted transformer to the furthest corner of the window, door or opening in question. The height of the barrier shall be 0.3 m (1 ft) above the top of the padmounted transformer. See Figure PSC 114-317D1.

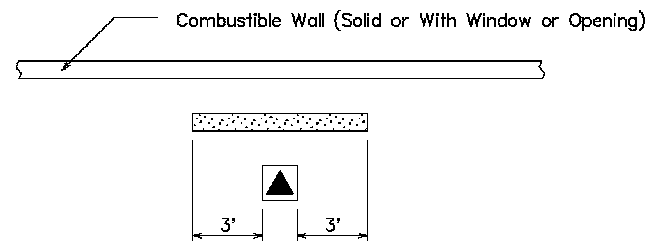


5

Figure PSC 114-317D1.

2. Combustible Walls

The barrier shall extend 0.9 m (3 ft) beyond each side of the padmounted transformer. The height of the barrier shall be 0.3 m (1 ft) above the top of the transformer. See Figure PSC 114-317D2.



6

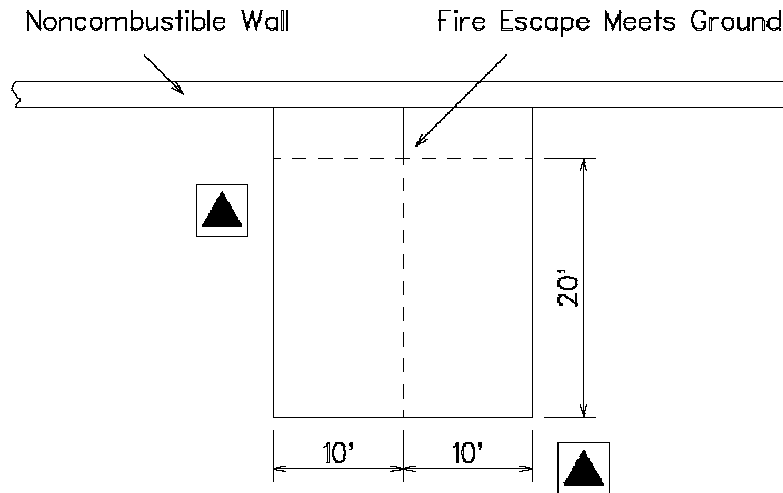
Figure PSC 114-317D2.

E. Fire Escapes

1. Padmounted oil-insulated transformers shall not be located within a zone extending 6.1 m (20 ft) outward and 3 m (10 ft) to either side of the point where a fire escape meets the ground. See Figure PSC 114-317E1.

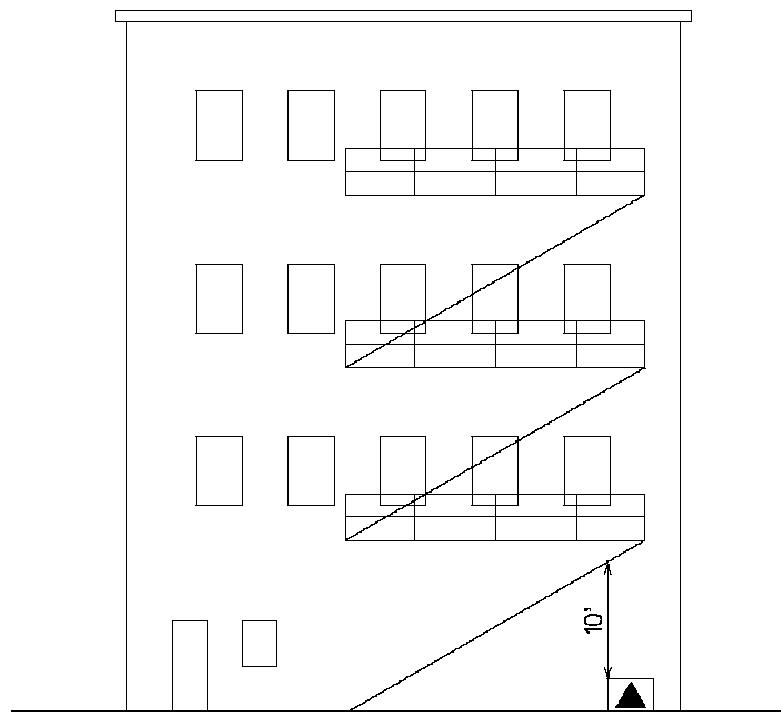
2. Padmounted oil-insulated transformers located beneath fire escapes shall have a vertical clearance of not less than 3 m (10 ft)

from the top of the transformer to the bottom of the fire escape.
See Figure PSC 114-317E2.



7

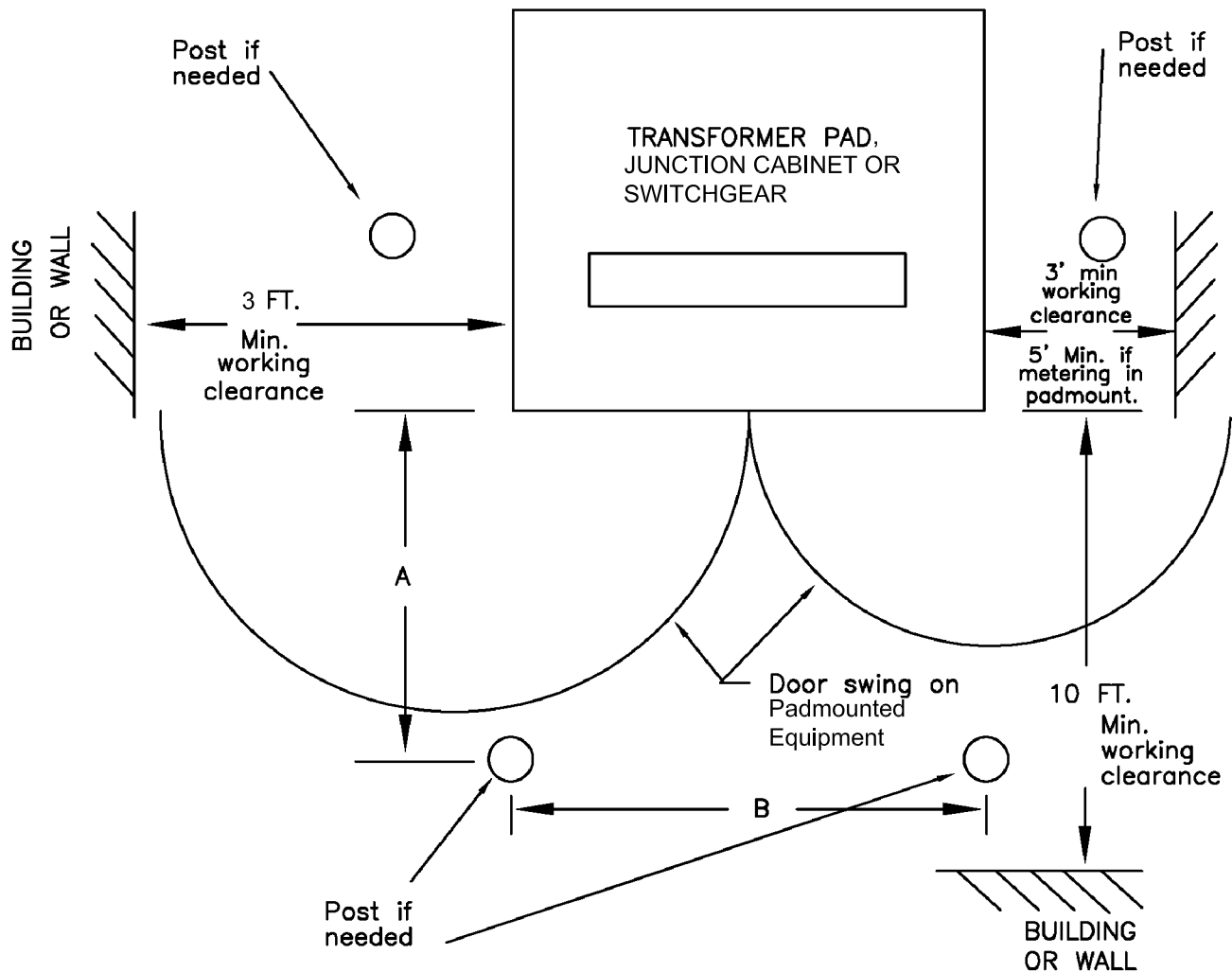
Figure PSC 114-317E1



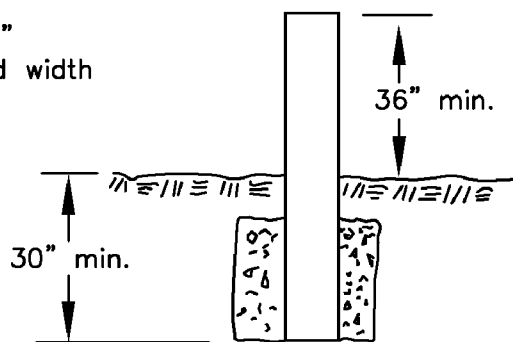
8

Figure PSC 114-317E2

History: CR 07-021: cr. Register January 2008 No. 625, eff. 2-1-08; CR 13-039: r. and recr. Register June 2014 No. 702, eff. 7-1-14.



All single phase A=24", B=48"
 All three phase A=60", B=pad width



Diggers (Wisc.) 1-800-242-8511

Notes:

1. See PSC 114 for code clearances to combustible walls, doors, windows, intakes, etc.
2. Protective posts are required where the transformer is subject to vehicular traffic. Installation and cost of this protection is the responsibility of the customer. Exact location to be identified by LML&W.
3. 3 Feet minimum working clearance from equipment surface. Equipment may extend beyond pad.

Clearances for Electric Overhead Cable Services

This does not deal with secondary or primary clearances.

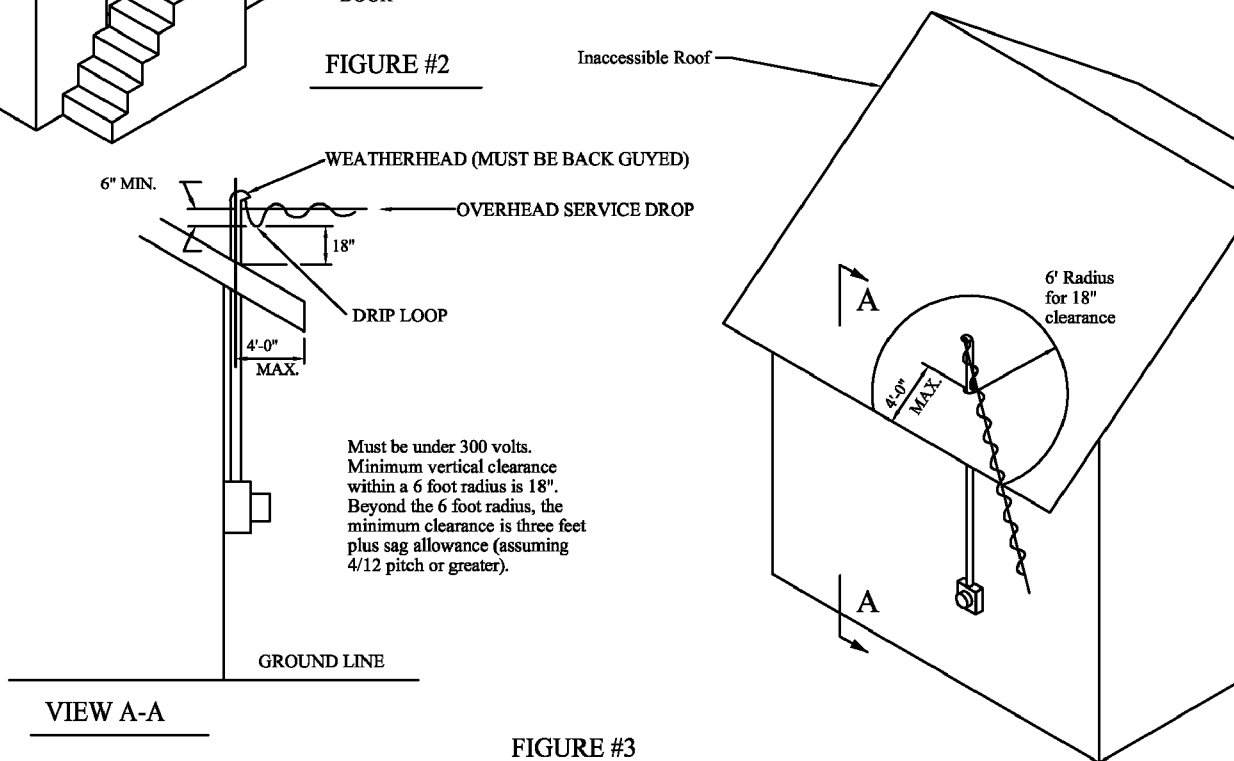
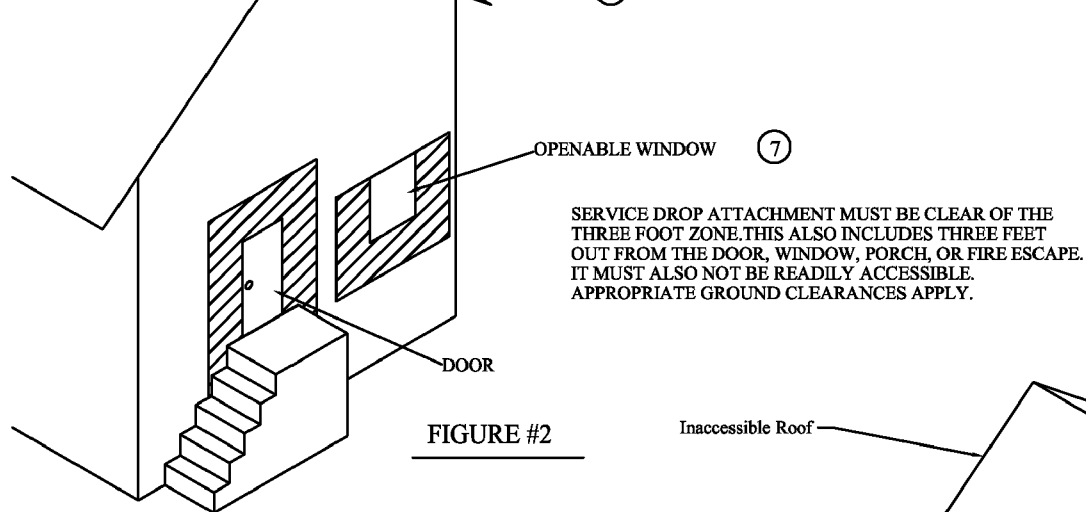
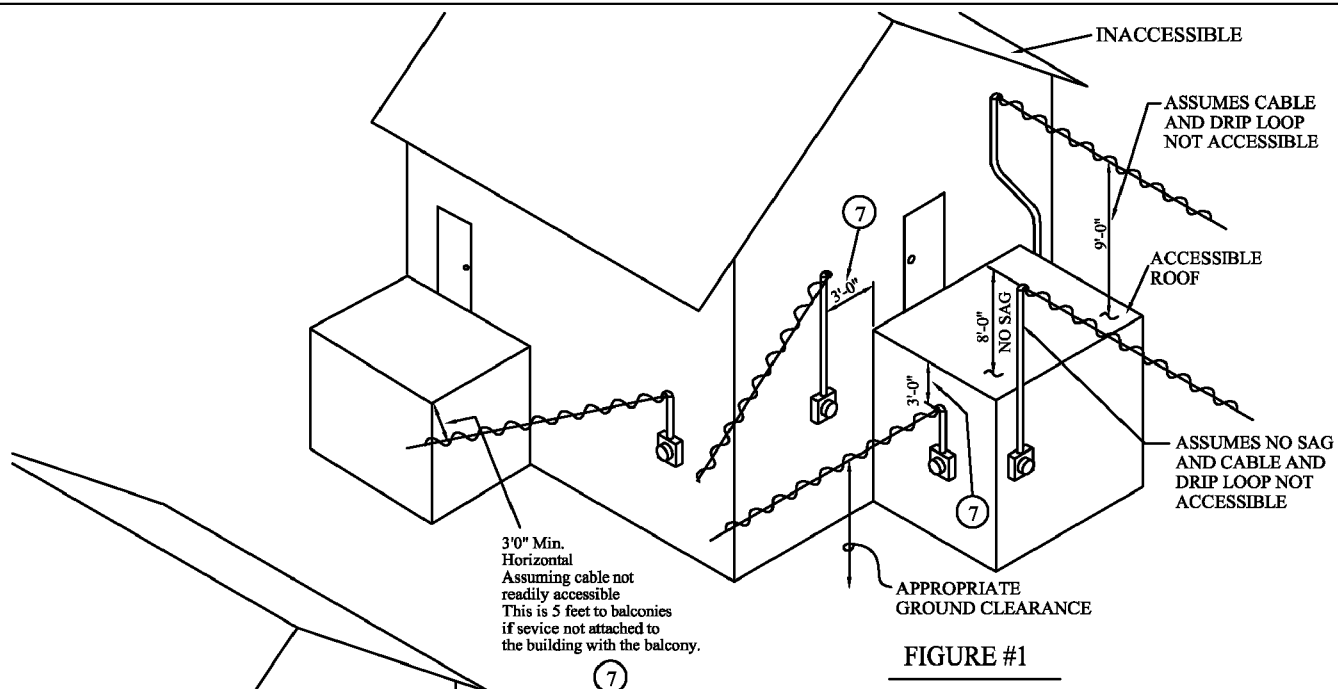
(Per NESC Table 232-1 and Table 234-1)

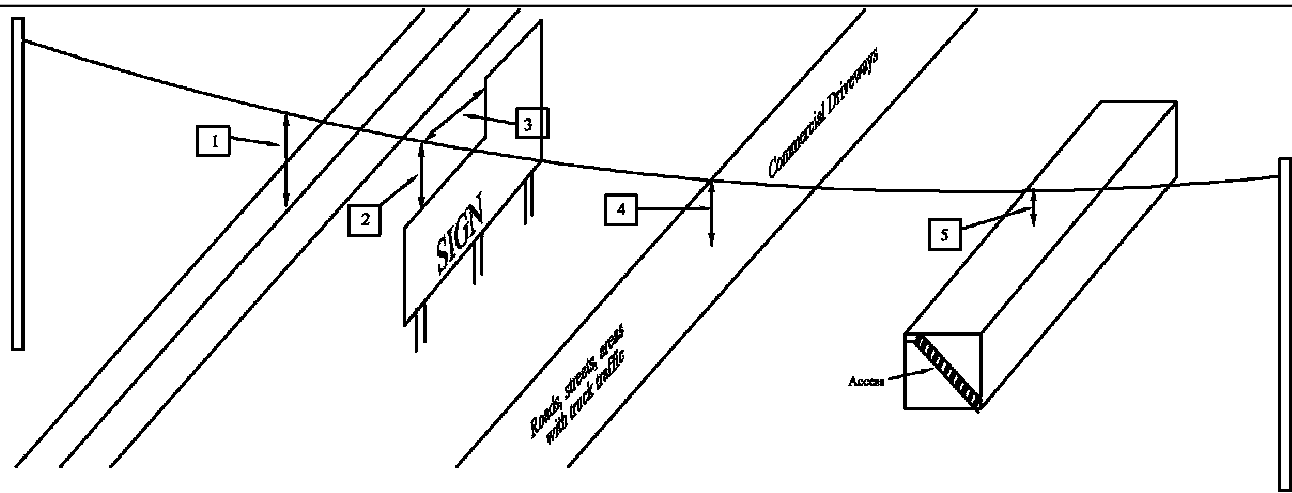
(Refer to current NESC and Wis. Administration Code PSC. 114 for updates and additional details)

Vertical Clearances	Nominal Voltages to Ground		
	150v	300v	750v
Roads, Streets and Areas Subject to Truck Traffic	17'	17'	17'
Single and 2-Family Residential Driveways ⑨	16'	16'	17'
By Special LML&W Approval ②	13'	13'6"	17'
Drip Loops to Ground - Line Clearance for the Span Applies			
Unless by Special LML&W Approval ②	10'	10'6"	16'
Pedestrians-Only Areas to Ground	13'	13'	13'
Wisconsin DOT Highways ③	18'	18'	18'
Over or Under Roofs or Projections (also railings, walls, or parapets around balconies or roofs) (Inaccessible) ④⑤⑥⑧	11'	11'	11'
Over or Under Roofs, Balconies, Decks, etc. (Accessible) ④⑤	12'	12'	12'
Over Roofs, Balconies, Decks and Service Attached to Building (Accessible) (If conductors or drip loop not readily accessible) ④⑤⑧	12'	12'	12'
Signs, Chimneys and Other Structures Not Classified as a Building	4'6"	4'6"	4'6"
Horizontal Clearances	Nominal Voltages to Ground		
	150v	300v	750v
Building Walls, Projections, Windows, Balconies, etc. ⑦	5'	5'	5'
Signs, Chimneys and Other Structures Not Classified as a Building	3'6"	3'6"	3'6"

Notes:

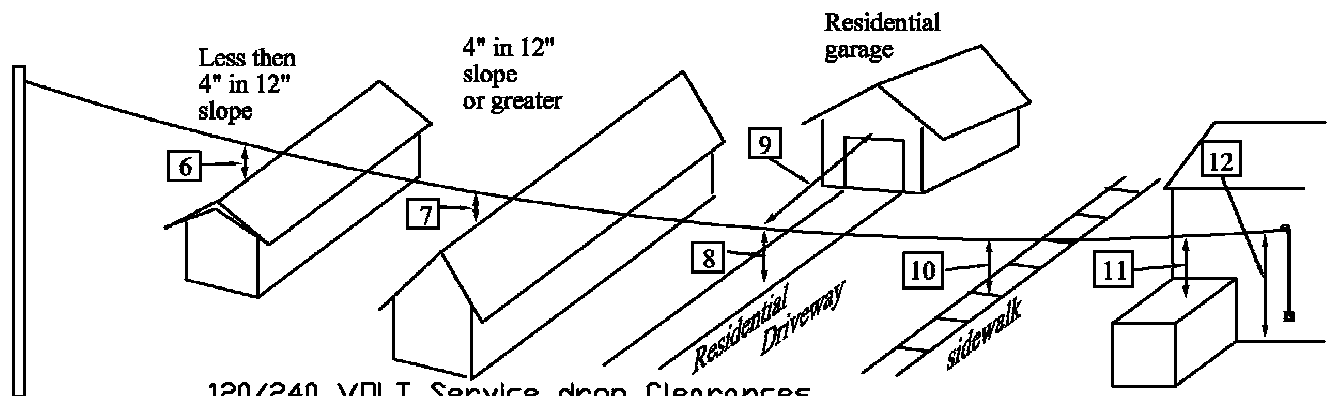
1. One foot is added to all vertical clearance to account for thermal or ice loading of the service cable. One foot was not added for vertical clearances for service drip loops and for horizontal clearances. For horizontal clearances, conductor blow-out must be considered.
2. Where the height of attachment to a building or other installation does not permit service drops to meet the normal values, contact LML&W.
3. This applies to all Wisconsin roads for all overhead conductors. This does not apply to normal triplex or quadriplex cables.
4. A roof, balcony or other area is considered accessible to pedestrians if the means of access is through a doorway, ramp, window, stairway or permanently-mounted ladder. A permanently-mounted ladder is not considered a means of access if its bottom rung is 8 feet or more from the ground or other permanently-installed accessible surface.
5. Where these clearances cannot be obtained, the conductors and rigid live parts shall be guarded. (NESC 234C2)
6. See figure #3 for an exception to roof clearance when using a periscope (through the roof raceway) and non-accessible roof or balcony and with voltages less than 300 volts to ground. NESC 234C3d (1).
7. This may be reduced to three feet in any direction from windows (above windows is accepted), doors, porches, and fire escapes if the service drop is attached to the building and not readily accessible. See Figure #2. NESC 234C3d (2).
8. From NESC 234C3d.
9. A driveway to a residence that can reasonably have trucks on it must not use this clearance. Examples are garbage and septic trucks that take most rural driveways out of this category for clearances.





☐ NOTES:

1. 18' for Wisc. State and Federal roads.
2. 4'6" vertical clearance to signs, chimneys and other structures.
3. 3'6" horizontal clearance to signs, chimneys and other structures. Wind movement of the service drop must be considered and added to this.
4. 17' Vertical to roads and areas subject to truck traffic.
5. 12' over accessible roofs or balconies not attached to the building being served by the service drop.



120/240 VOLT Service drop Clearances

Note: Add 1 foot to all vertical clearances except to drip loops in order to account for thermal and ice loading.

6. 11' if low sloped roof and inaccessible.
7. 4' if steep roof and inaccessible.
8. 16' to residential driveways. This can be reduced in special cases where higher attachment points can't be obtained. If there is a reasonable chance of truck traffic this 16' clearance does not apply.
9. 5' horizontal clearance to building. Wind movement of the service drop must be considered and added to this.
10. 13' over sidewalks and pedestrian only areas. This does not apply if vehicles can reasonably be driven here.
11. 12' over accessible attached roofs and balconies (assumes cable and drip loop not readily accessible).
12. Adjacent line clearance for the lines applies. In this example it would be 13' (note 10). It can be reduced to 10' if no other options and is approved by LML&W.

MISCELLANEOUS CLEARANCES

Wells

Underground 5 feet for electric or gas.

Overhead Horizontal clearance must be no less than 3/4 of the required vertical clearance of the conductors to ground. A conservative guide is 14 feet on service drops and 20 feet on primary lines. Note OSHA working clearances. (PSC 114.234C8)

Private Septic Systems

Sewer Pipe Gravity fed pipes - One foot.
Pressurized Pipes - Try to avoid. One foot by code.

Stored Materials

Overhead Overhead lines shall not be run over areas designated for material storage where cranes or other types of high machinery are used unless adequate clearance can be provided for full use of the equipment (PSC 114.234C6).

Working Clearances

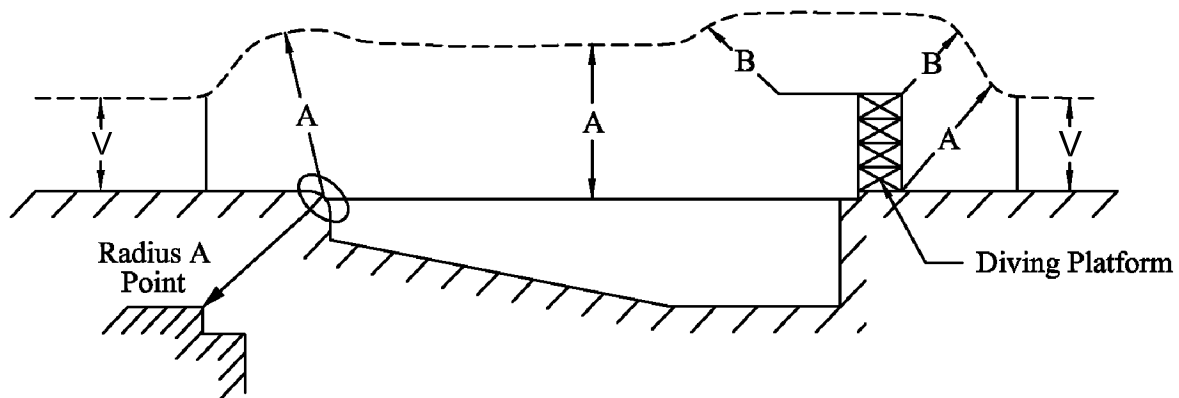
Following are the Department of Labor, Occupational Safety and Health Administration, Safety and Health Regulations for Construction. OSHA subsection N 1926.416(g)(2).

Voltage	Minimum personnel clearance, to any part of crane, or to the load in feet
69 kv and below	10
115 kv and 138 kv	11
345 kv	15

Swimming Pools (also includes Outdoor Hot Tubs)

Underground 5 feet of pool hot tub or auxiliary equipment (NESC 351C1)

Overhead Shall be avoided by 10 feet horizontally. The following are clearances for utility service drops (under 750 volts). One foot is added for thermal loading. (PSC 114.234E1). A=23.9 feet, B=15.5 feet, V=Normal Clearance (NESC 232)



Padmount Transformers

See page 3-18.

Natural Gas Lines and Meters

Basic underground clearance from gas lines to all other utilities or below-ground structures is one foot (PSC 114.352E). It is recommended that clearance to wells and septic fields be 5 feet. Note the mound system clearances on page 7-5.

Fuel Tanks

Overhead

Electric lines cannot be run over above-ground flammable liquid or LPG storage tanks. The horizontal clearance is 8 feet for secondary and services, 15 feet for all other electric lines. LPG tanks with a capacity of 1000 gallons or less are exempt. (PSC 114.234C7)

Underground

Underground cables shall not go under fuel tanks. They shall not come within 10 feet of above or below-ground tanks. Electric cables can come closer if installed in "Fiberglass Reinforced Epoxy" (FRE) conduit or other approved conduit. (See EDE for details).

Class I Hazardous Locations

Buried electric lines, meter sockets, CT cabinets, or termination enclosures must observe the following minimum horizontal clearances from the flammable fuel system components listed below:

Under fuel storage tanks	10 feet
Fill Pipe	10 feet
Dispensing device on tank	20 feet
Remote pump	10 feet

Consult LML&W for other Class I Hazardous locations. (NESC 127 and NEC 514-2).

Buildings

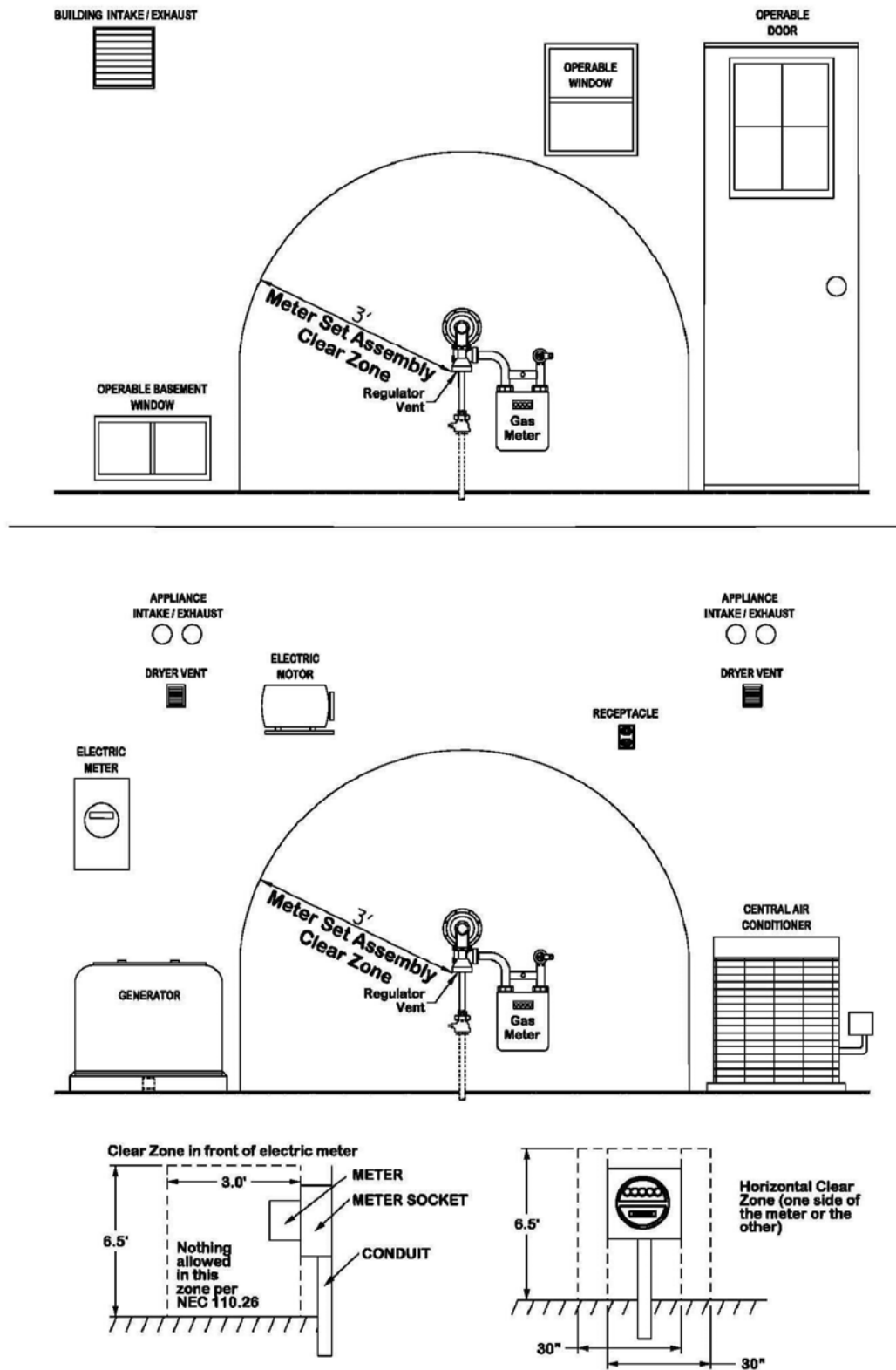
Underground electric lines are **not allowed under buildings** unless installed in conduit. (NESC 351C2 and NEC 300-5c)

Special Cases

See LML&W for additional clearance requirements not listed above. Some of the items which require special clearances include the following:

Railroads
Flag Poles
Light Poles (standards)
Grain Bins

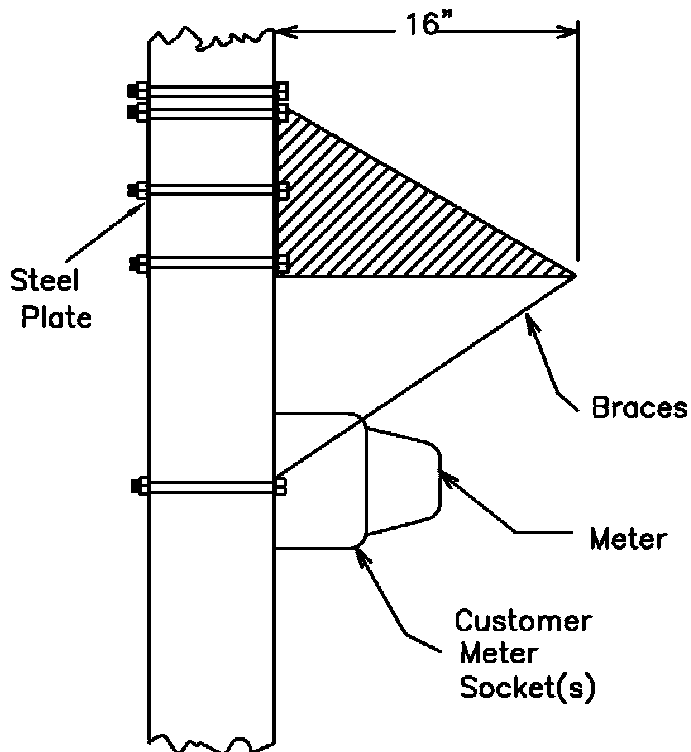
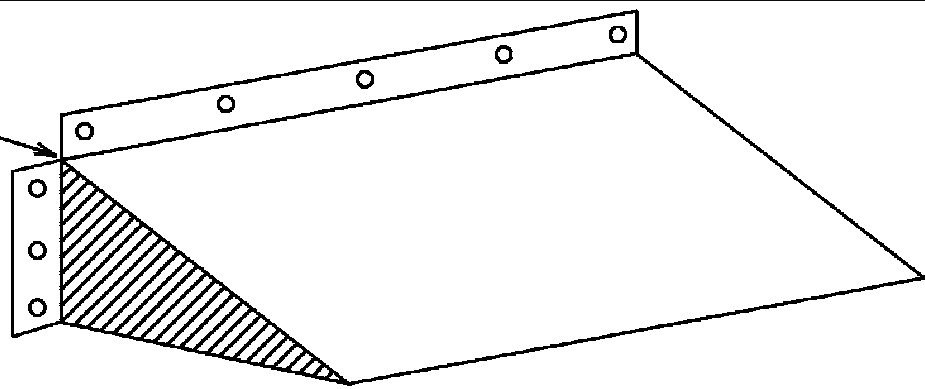
Sailboat Areas
Boat Landings
Airport Approaches
Electric Transmission / Distribution Lines



Notes:

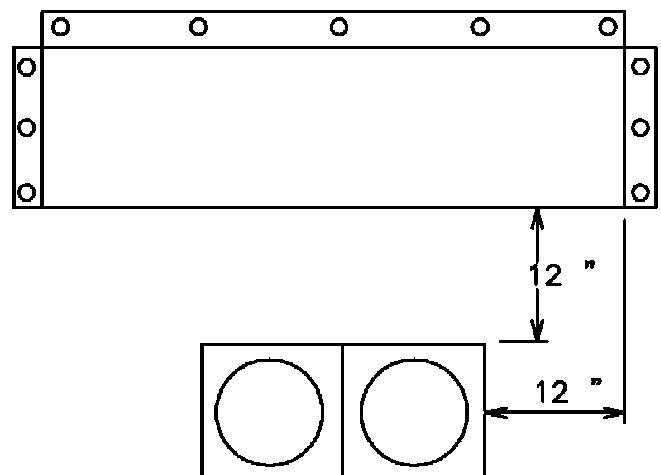
1. Exhaust vents which may leak water, condensate, grease, oil, or other substances are not allowed above gas meters or other gas controls.
2. Avoid short overhangs which could cause ice problems in winter.
3. The National Electric Code 110.26 requires 3'-0" in front of electrical equipment including the electric meter socket. This clearance zone applies from the ground up to 6.5 feet.
4. The 3-foot radius clearance applies to clearances between the electric meter and the vents on LP regulators.

Perspective
View



Wall section

1/4 In. Dia. Galv. Bolts



Front View

☐ NOTES:

1. A snow and ice shield provided by the customer is mandatory on the pitched side of metal buildings. A shield is highly recommended for other areas. The customer is responsible for damage to the metering and meter sockets, etc.
2. Shield must be capable of protecting meter.
3. Metal shields (min. of 10 gauge) shall be primed and painted with rust resistant paint.
4. Wood or plywood shields shall be supported by braces.

Single Meter and Service Rule

LML&W will normally supply to each customer's building, structure or premises:

1. One Service Lateral (drop)
2. One Class of Service
3. One Meter

EXCEPTIONS to this rule are:

1. Multiple occupancy buildings (e.g., row houses, condominiums) which comply with the Wisconsin State Electrical Code by having areas under different occupancies separated by approved fire walls may be supplied by more than one service.

Note: A fire wall is a 3-hour fire-resistive wall which shall be a substantially constructed masonry wall running from the foundation and extending to the roof. A wall constructed of materials other than masonry must be approved in writing by a verified testing company and/or building inspector or fire department. (SPS 316.100)

2. Fire pumps or other emergency electrical systems requiring separate service. (LML&W suggests tapping ahead of the main disconnect. This will avoid ongoing service charges and possible special facilities charges.)
3. Large or unusual loads requiring additional services or in cases where, in the judgement of the utility, voltage regulation would be unreasonable due to load size and distance between loads.
4. Where more than one point of delivery or more than one point of metering is necessary because of interruptible service rate, governmental requirements or regulatory rules.
 - a. As of March 1, 1980, the Wisconsin Administrative code, PSC 113.0803 requires individual electric meters for nontransient multidwelling unit residential buildings, mobile home parks and for commercial establishments. Individual unit metering will not be required:
 - 1.) Where commercial unit space requirements are subject to alteration with change in tenants as evidenced by temporary versus permanent type wall construction separating the unit spaces.
 - 2.) For electricity used in central heating, ventilating and air conditioning systems.
 - 3.) For electric backup service to storage heating and cooling systems or when alternative renewable energy resources are utilized in connection with central heating, ventilating and air conditioning systems.
5. Customers with an existing three-phase service do not qualify for an additional single-phase service.
6. Customers with an existing three-phase service would not qualify for a second three-phase service of a different voltage unless approved by LML&W.
7. Customers with 120/240 single-phase requesting 120/208 three-phase are required to eliminate the single-phase service.
8. Two or more service drops or laterals for the same class of service if located more than 150 feet apart, measured in a straight line, and provided that all electrical wiring supplied by each service has no common raceway or connection with any other service. (SPS 316.230)